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IDENTIFICATION

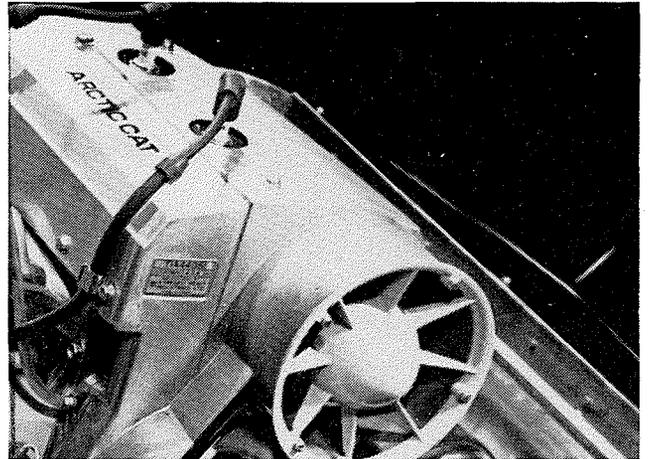
Each Arctic Cat snowmobile has three (3) identifying numbers; chassis model and serial number, a body serial number, and an engine model and serial number.

Chassis Model and Serial Number — Plate located on the right front side of the body tunnel. All internal records are maintained by the chassis serial number.



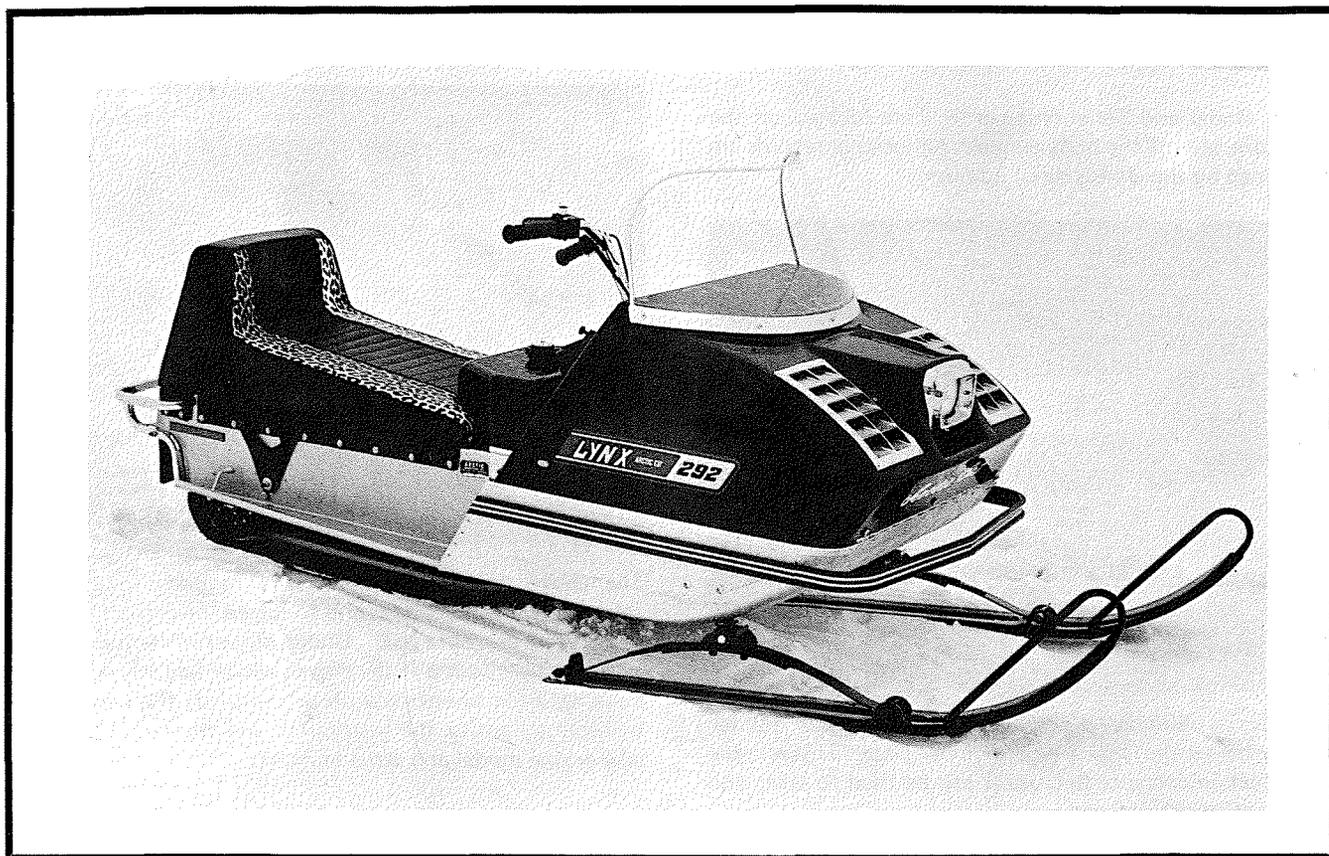
Body Serial Number — Stamped into the body tunnel, directly below the chassis serial number plate. This number is of great importance because it can be used to trace and identify stolen machines.

Engine Model and Serial Number — Located on the engine nameplate or stamped into the block of the engine.



The above described numbers are required to properly complete warranty claims and to insure the correct replacement parts are obtained. Under no circumstances should warranty be allowed if the chassis model and serial number plate has been tampered with or removed. If a new engine is installed, notify the distributor and the factory of the new engine model and serial number.

LYNX SPECIFICATIONS



SERVICE DATA

Chassis:

Length W/Skis	95"
Height W/Windshield	39"
Height W/O Windshield	31"
Overall Width	31½"
Track Width	17"
Track Length On Ground	26"
Approximate Curb Weight	336 Lbs.
Fuel Capacity	4½ Gal.

Engine:

Make	Arctic
Model . . . . .	.KT150B
Bore	74mm
Stroke	68mm
Cylinders	1
Displacement	292cc
Cooling	Centrifugal Fan

Ignition:

Type	Flywheel Magneto
Point Gap . . . . .	.012" - .016"
Timing . . . . .	.026" BTDC*

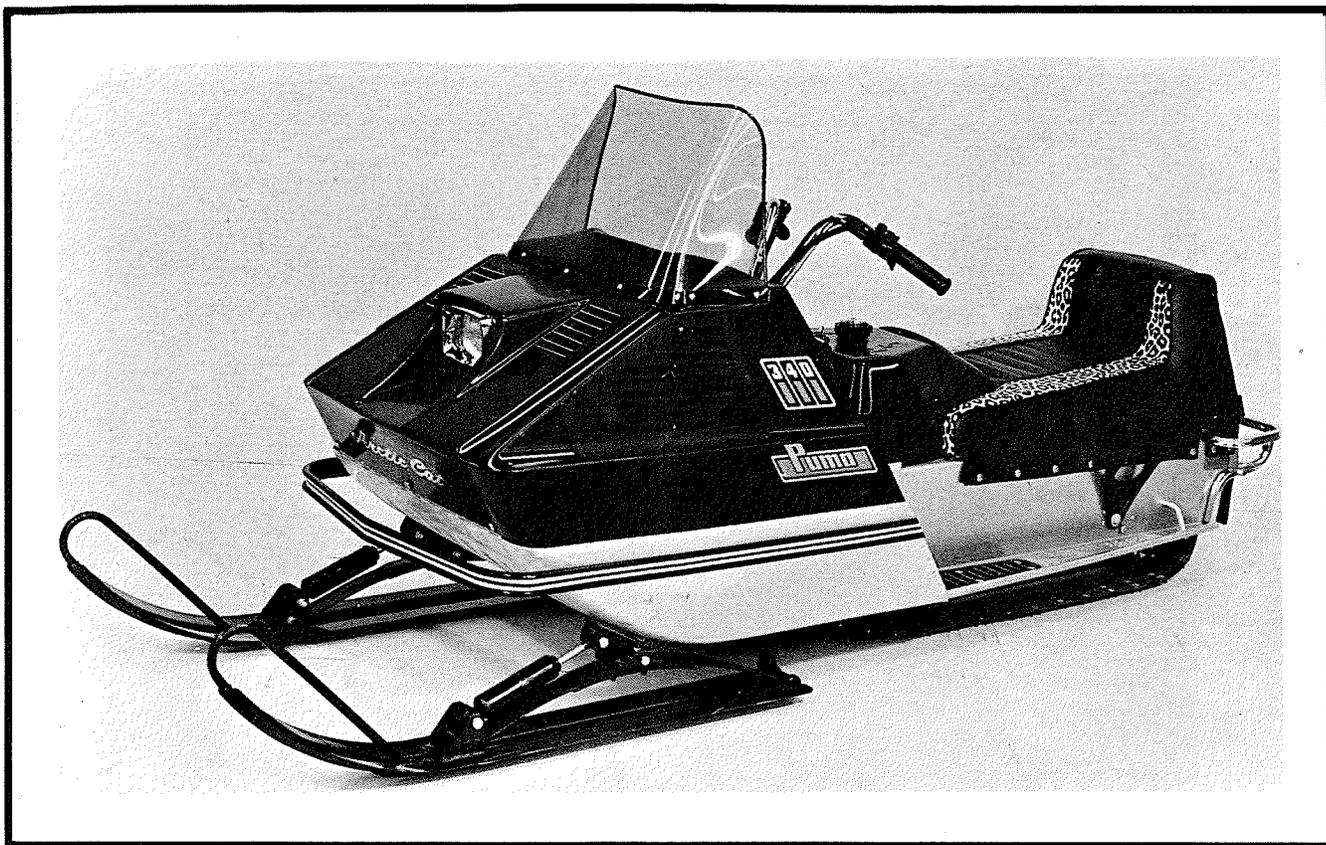
Spark Plug:

Champion	K9
Bosch	M280T31
Electrode Gap020"

Fuel/Oil Ratio	20:1
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*Retarded Cam

PUMA SPECIFICATIONS



SERVICE DATA

Chassis:

Length W/Skis	95"
Height W/Windshield	41"
Height W/O Windshield	30½"
Overall Width	31½"
Track Width	17"
Track Length On Ground	26"
Approximate Curb Weight	381 Lbs.
Fuel Capacity	6½ Gal.

Engine:

Model	T1A340S1	T1A400S1	T1A440S1
Make	Arctic	Arctic	Arctic
Bore	60mm	65mm	68mm
Stroke	60mm	60mm	60mm
Cylinders	2	2	2
Displacement	339cc	398cc	436cc
Cooling	Axial Fan	Axial Fan	Axial Fan

Ignition:

Type	Flywheel Magneto		
Point			
Gap	.012" - .016"	.012" - .016"	.012" - .016"
Timing	.015" BTDC*	.015" BTDC*	.015" BTDC*

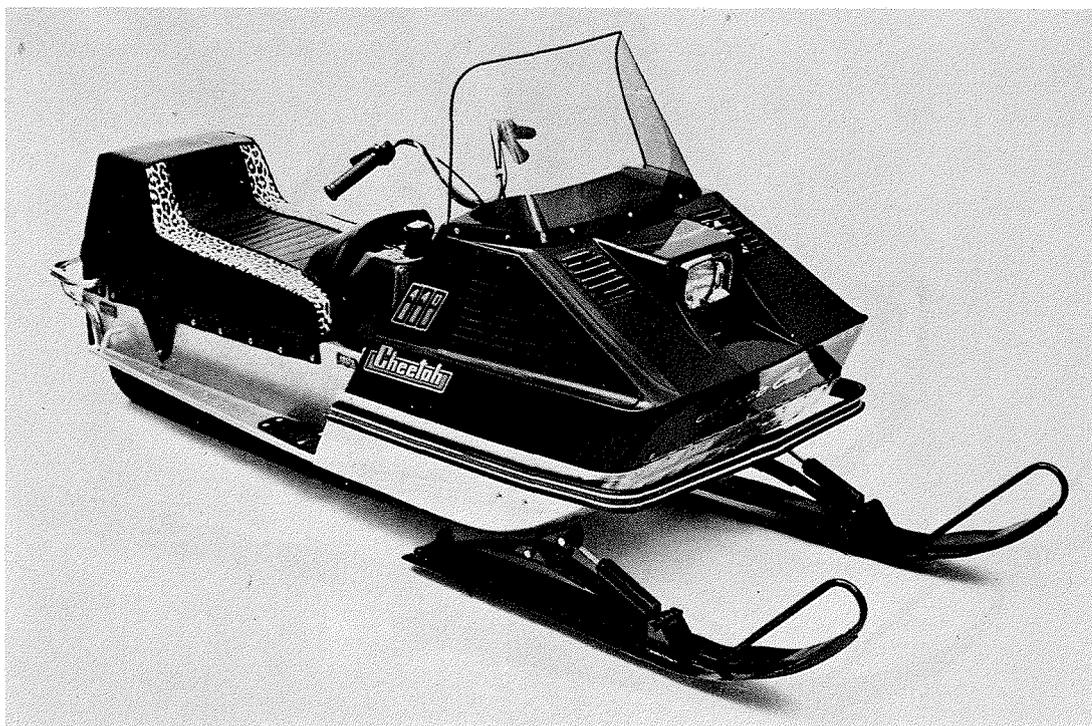
Spark Plug:

NGK	B9ES	B9ES	B9ES
Electrode			
Gap	.020"	.020"	.020"

Fuel/Oil	20:1	20:1	20:1
Ratio			

*Retarded Cam

CHEETAH SPECIFICATIONS



SERVICE DATA

Chassis:

Length W/Skis . . . . .	. 103"
Height W/Windshield . . . . .	. 41"
Height W/O Windshield . . . . .	. 30½"
Overall Width . . . . .	. 31½"
Track Width . . . . .	. 17"
Track Length On Ground . . . . .	. 33"
Approximate Curb Weight	405 Lbs.
Fuel Capacity . . . . .	. 6½ Gal.

Engine:

Model	T1A340S1	T1A400S1	T1A440S1
Make	Arctic	Arctic	Arctic
Bore	60mm	65mm	68mm
Stroke	60mm	60mm	60mm
Cylinders	2	2	2
Displacement	339cc	398cc	436cc
Cooling	Axial Fan	Axial Fan	Axial Fan

Ignition:

Type	Flywheel Magneto		
Point			
Gap	.012" - .016"	.012" - .016"	.012" - .016"
Timing	.015" BTDC*	.015" BTDC*	.015" BTDC*

Spark Plug:

NGK	B9ES	B9ES	B9ES
Electrode			
Gap	.020"	.020"	.020"

Fuel/Oil

Ratio	20:1	20:1	20:1
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*Retarded Cam

PANTHER SPECIFICATIONS



SERVICE DATA

Chassis:

Length W/Skis	105"
Height W/Windshield	42"
Height W/O Windshield	31"
Overall Width	31½"
Track Width	17"
Track Length On Ground	36"
Approximate Curb Weight	425 Lbs.
Fuel Capacity	5 Gal.

Engine:

Model	KM914	T1A340S1	T1A400S1	T1A440S1
Make	Sa/Wa	Arctic	Arctic	Arctic
Bore		60mm	65mm	68mm
Stroke		60mm	65mm	68mm
Cylinders		2	2	2
Displacement		339cc	398cc	436cc
Cooling	Axial Fan	Axial Fan	Axial Fan	Axial Fan

Ignition:

Type	Flywheel Magneto			
Point				
Gap	.014" - .018"	.012" - .016"	.012" - .016"	.012" - .016"
Timing	10° - 12° BTDC	.015" BTDC*	.015" BTDC*	.015" B

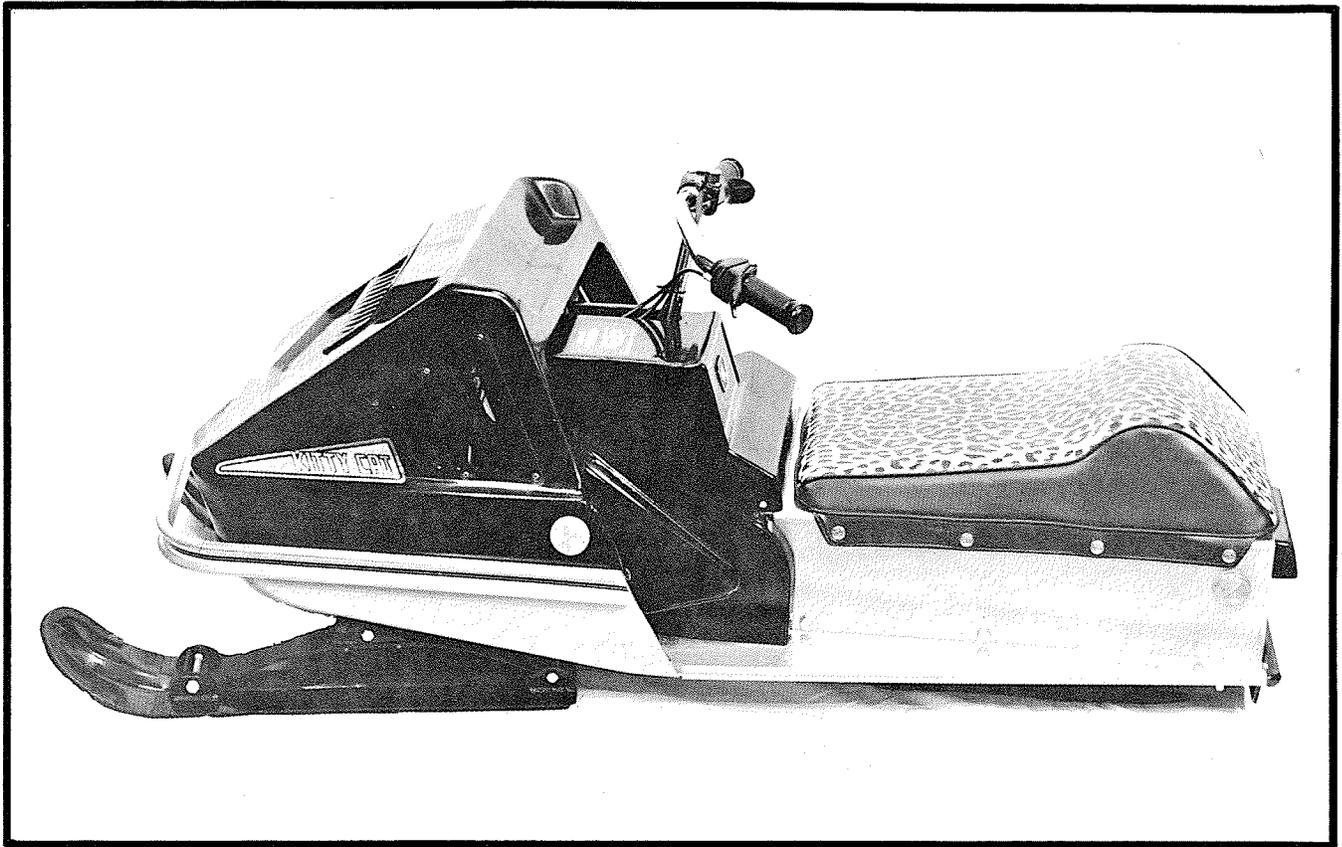
Spark Plug:

Bosch	W150M11S			
NGK	B9ES	B9ES	B9ES	B9ES
Electrode				
Gap	.020"	.020"	.020"	.020"

Fuel/Oil				
Ratio	50:1	20:1	20:1	20:1

*Retarded Cam

KITTY CAT SPECIFICATIONS



SERVICE DATA

Chassis:

Overall Length 56"
 Overall Height 22"
 Overall Width 23"
 Track Width 10"
 Track Length On Ground 14"
 Approximate Curb Weight 100 Lbs.
 Fuel Capacity 2 Qts.
 Carrying Capacity 1 Rider, 100 Lbs. Max.

Engine:

Make Arctic
 Model T5A060S1A
 Bore 42mm
 Stroke 44mm
 Cylinders 1
 Displacement 60cc

Ignition:

Type Flywheel Magneto
 Point Gap012" - .016"
 Timing 25° BTDC

Spark Plug:

NGK B6H
 Electrode Gap020"

Fuel/Oil Ratio 25:1

Millimeter/Decimal/Inch Conversion Table

MM	Decimal Equiv.	Inches	+ or -	MM	Decimal Equiv.	Inches	+ or -
1	0.0394	1/32	+	53	2.0866	2 3/32	-
2	0.0787	3/32	-	54	2.1260	2 1/8	+
3	0.1181	1/8	-	55	2.1654	2 5/32	+
4	0.1575	5/32	+	56	2.2047	2 7/32	-
5	0.1969	3/16	+	57	2.2441	2 1/4	-
6	0.2362	1/4	-	58	2.2835	2 9/32	+
7	0.2756	9/32	-	59	2.3228	2 5/16	+
8	0.3150	5/16	+	60	2.3622	2 3/8	-
9	0.3543	11/32	+	61	2.4016	2 13/32	-
10	0.3937	13/32	-	62	2.4409	2 7/16	+
11	0.4331	7/16	-	63	2.4803	2 15/32	+
12	0.4724	15/32	+	64	2.5197	2 17/32	-
13	0.5118	1/2	+	65	2.5591	2 9/16	-
14	0.5512	9/16	-	66	2.5984	2 19/32	+
15	0.5906	19/32	-	67	2.6378	2 5/8	+
16	0.6299	5/8	+	68	2.6772	2 11/16	-
17	0.6693	21/32	+	69	2.7165	2 23/32	-
18	0.7087	23/32	-	70	2.7559	2 3/4	+
19	0.7480	3/4	-	71	2.7953	2 25/32	+
20	0.7874	25/32	+	72	2.8346	2 27/32	-
21	0.8268	13/16	+	73	2.8740	2 7/8	-
22	0.8661	7/8	-	74	2.9134	2 29/32	+
23	0.9055	29/32	-	75	2.9528	2 15/16	+
24	0.9449	15/16	+	76	2.9921	3.0	-
25	0.9843	31/32	+	77	3.0315	3 1/32	+
26	1.0236	1 1/32	-	78	3.0709	3 1/16	+
27	1.0630	1 1/16	+	79	3.1102	3 1/8	-
28	1.1024	1 3/32	+	80	3.1496	3 5/32	-
29	1.1417	1 5/32	-	81	3.1890	3 3/16	+
30	1.1811	1 3/16	-	82	3.2283	3 7/32	+
31	1.2205	1 7/32	+	83	3.2677	3 9/32	-
32	1.2598	1 1/4	+	84	3.3071	3 5/16	-
33	1.2992	1 5/16	-	85	3.3465	3 11/32	+
34	1.3386	1 11/32	-	86	3.3858	3 3/8	+
35	1.3780	1 3/8	+	87	3.4252	3 7/16	-
36	1.4173	1 13/32	+	88	3.4646	3 15/32	-
37	1.4567	1 15/32	-	89	3.5039	3 1/2	+
38	1.4961	1 1/2	-	90	3.5433	3 17/32	+
39	1.5354	1 17/32	+	91	3.5827	3 19/32	-
40	1.5748	1 9/16	+	92	3.6220	3 5/8	-
41	1.6142	1 5/8	-	93	3.6614	3 21/32	+
42	1.6535	1 21/32	-	94	3.7008	3 11/16	+
43	1.6929	1 11/16	+	95	3.7402	3 3/4	-
44	1.7323	1 23/32	+	96	3.7795	3 25/32	-
45	1.7717	1 25/32	-	97	3.8189	3 13/16	+
46	1.8110	1 13/16	-	98	3.8583	3 27/32	+
47	1.8504	1 27/32	+	99	3.8976	3 29/32	-
48	1.8898	1 7/8	+	100	3.9370	3 15/16	-
49	1.9291	1 15/16	-	101	3.9764	3 31/32	+
50	1.9685	1 31/32	-	102	4.0157	4 1/32	-
51	2.0079	2.0	+	103	4.0551	4 1/16	-
52	2.0472	2 1/16	-	104	4.0945	4 3/32	+

+ = Decimal equivalent is greater than the fraction.
 - = Decimal equivalent is less than the fraction.



Millimeter/Decimal/Inch Conversion Table

<u>MM</u>	<u>Decimal Equiv.</u>	<u>Inches</u>	<u>+ or -</u>	<u>MM</u>	<u>Decimal Equiv.</u>	<u>Inches</u>	<u>+ or -</u>
105	4.1339	4 1/8	+	157	6.1811	6 3/16	-
106	4.1732	4 3/16	-	158	6.2205	6 7/32	+
107	4.2126	4 7/32	-	159	6.2598	6 1/4	+
108	4.2520	4 1/4	+	160	6.2992	6 5/16	-
109	4.2913	4 9/32	+	161	6.3386	6 11/32	-
110	4.3307	4 11/32	-	162	6.3779	6 3/8	+
111	4.3701	4 3/8	-	163	6.4173	6 13/32	+
112	4.4094	4 13/32	+	164	6.4567	6 15/32	-
113	4.4488	4 7/16	+	165	6.4961	6 1/2	-
114	4.4882	4 1/2	-	166	6.5354	6 17/32	+
115	4.5276	4 17/32	-	167	6.5748	6 9/16	+
116	4.5669	4 9/16	+	168	6.6142	6 5/8	-
117	4.6063	4 19/32	+	169	6.6535	6 21/32	-
118	4.6457	4 21/32	-	170	6.6929	6 11/16	+
119	4.6850	4 11/16	-	171	6.7323	6 23/32	+
120	4.7244	4 23/32	+	172	6.7716	6 25/32	-
121	4.7638	4 3/4	+	173	6.8110	6 13/16	-
122	4.8031	4 13/16	-	174	6.8504	6 27/32	+
123	4.8425	4 27/32	-	175	6.8898	6 7/8	+
124	4.8819	4 7/8	+	176	6.9291	6 15/16	-
125	4.9213	4 29/32	+	177	6.9685	6 31/32	-
126	4.9606	4 31/32	-	178	7.0079	7.0	+
127	5.0000	5.0		179	7.0472	7 1/16	-
128	5.0394	5 1/32	+	180	7.0866	7 3/32	-
129	5.0787	5 3/32	-	181	7.1260	7 1/8	+
130	5.1181	5 1/8	-	182	7.1653	7 5/32	+
131	5.1575	5 5/32	+	183	7.2047	7 7/32	-
132	5.1968	5 3/16	+	184	7.2441	7 1/4	-
133	5.2362	5 1/4	-	185	7.2835	7 9/32	+
134	5.2756	5 9/32	-	186	7.3228	7 5/16	+
135	5.3150	5 5/16	+	187	7.3622	7 3/8	-
136	5.3543	5 11/32	+	188	7.4016	7 13/32	-
137	5.3937	5 13/32	-	189	7.4409	7 7/16	+
138	5.4331	5 7/16	-	190	7.4803	7 15/32	+
139	5.4724	5 15/32	+	191	7.5197	7 17/32	-
140	5.5118	5 1/2	+	192	7.5590	7 9/16	-
141	5.5512	5 9/16	-	193	7.5984	7 19/32	+
142	5.5905	5 19/32	-	194	7.6378	7 5/8	+
143	5.6299	5 5/8	+	195	7.6772	7 11/16	-
144	5.6693	5 21/32	+	196	7.7165	7 23/32	-
145	5.7087	5 23/32	-	197	7.7559	7 3/4	+
146	5.7480	5 3/4	-	198	7.7953	7 25/32	+
147	5.7874	5 25/32	+	199	7.8346	7 27/32	-
148	5.8268	5 13/16	+	200	7.8740	7 7/8	-
149	5.8661	5 7/8	-	201	7.9134	7 29/32	+
150	5.9055	5 29/32	-	202	7.9527	7 15/16	+
151	5.9449	5 15/16	+	203	7.9921	8.0	-
152	5.9842	5 31/32	+	204	8.0315	8 1/32	+
153	6.0236	6 1/32	-	205	8.0709	8 1/16	+
154	6.0630	6 1/16	+	206	8.1102	8 1/8	-
155	6.1024	6 3/32	+	207	8.1496	8 5/32	-
156	6.1417	6 5/32	-	208	8.1890	8 3/16	+

+ = Decimal equivalent is greater than the fraction.

- = Decimal equivalent is less than the fraction.

Millimeter/Decimal/Inch Conversion Table

MM	Decimal Equiv.	Inches	+ or -	MM	Decimal Equiv.	Inches	+ or -
209	8.2283	8 7/32	+	255	10.0393	10 1/32	+
210	8.2677	8 9/32	-	256	10.0787	10 3/32	-
211	8.3071	8 5/16	-	257	10.1181	10 1/8	-
212	8.3464	8 11/32	+	258	10.1575	10 5/32	+
213	8.3858	8 3/8	+	259	10.1968	10 3/16	+
214	8.4252	8 7/16	-	260	10.2362	10 1/4	-
215	8.4646	8 15/32	-	261	10.2756	10 9/32	-
216	8.5039	8 1/2	+	262	10.3149	10 5/16	+
217	8.5433	8 17/32	+	263	10.3543	10 11/32	+
218	8.5827	8 19/32	-	264	10.3937	10 13/32	-
219	8.6220	8 5/8	-	265	10.4330	10 7/16	-
220	8.6614	8 21/32	+	266	10.4724	10 15/32	+
221	8.7008	8 11/16	+	267	10.5118	10 1/2	+
222	8.7401	8 3/4	-	268	10.5512	10 9/16	-
223	8.7795	8 25/32	-	269	10.5905	10 19/32	-
224	8.8189	8 13/16	+	270	10.6299	10 5/8	+
225	8.8583	8 27/32	+	271	10.6693	10 21/32	+
226	8.8976	8 29/32	-	272	10.7086	10 23/32	-
227	8.9370	8 15/16	-	273	10.7480	10 3/4	-
228	8.9764	8 31/32	+	274	10.7874	10 25/32	+
229	9.0157	9 1/32	-	275	10.8268	10 13/16	+
230	9.0551	9 1/16	-	276	10.8661	10 7/8	-
231	9.0945	9 3/32	+	277	10.9055	10 29/32	-
232	9.1338	9 1/8	+	278	10.9449	10 15/16	+
233	9.1732	9 3/16	-	279	10.9842	10 31/32	+
234	9.2126	9 7/32	-	280	11.0236	11 1/32	-
235	9.2520	9 1/4	+	281	11.0630	11 1/16	+
236	9.2913	9 9/32	+	282	11.1023	11 3/32	+
237	9.3307	9 11/32	-	283	11.1417	11 5/32	-
238	9.3701	9 3/8	-	284	11.1811	11 3/16	-
239	9.4094	9 13/32	+	285	11.2204	11 7/32	+
240	9.4488	9 7/16	+	286	11.2598	11 1/4	+
241	9.4882	9 1/2	-	287	11.2992	11 5/16	-
242	9.5275	9 17/32	-	288	11.3386	11 11/32	-
243	9.5669	9 9/16	+	289	11.3779	11 3/8	+
244	9.6063	9 19/32	+	290	11.4173	11 13/32	+
245	9.6457	9 21/32	-	291	11.4567	11 15/32	-
246	9.6850	9 11/16	-	292	11.4960	11 1/2	-
247	9.7244	9 23/32	+	293	11.5354	11 17/32	+
248	9.7638	9 3/4	+	294	11.5748	11 9/16	+
249	9.8031	9 13/16	-	295	11.6142	11 5/8	-
250	9.8425	9 27/32	-	296	11.6535	11 21/32	-
251	9.8819	9 7/8	+	297	11.6929	11 11/16	+
252	9.9212	9 29/32	+	298	11.7323	11 23/32	+
253	9.9606	9 31/32	-	299	11.7716	11 25/32	-
254	10.0000	10.0		300	11.8110	11 13/16	-

+ = Decimal equivalent is greater than the fraction.
 - = Decimal equivalent is less than the fraction.

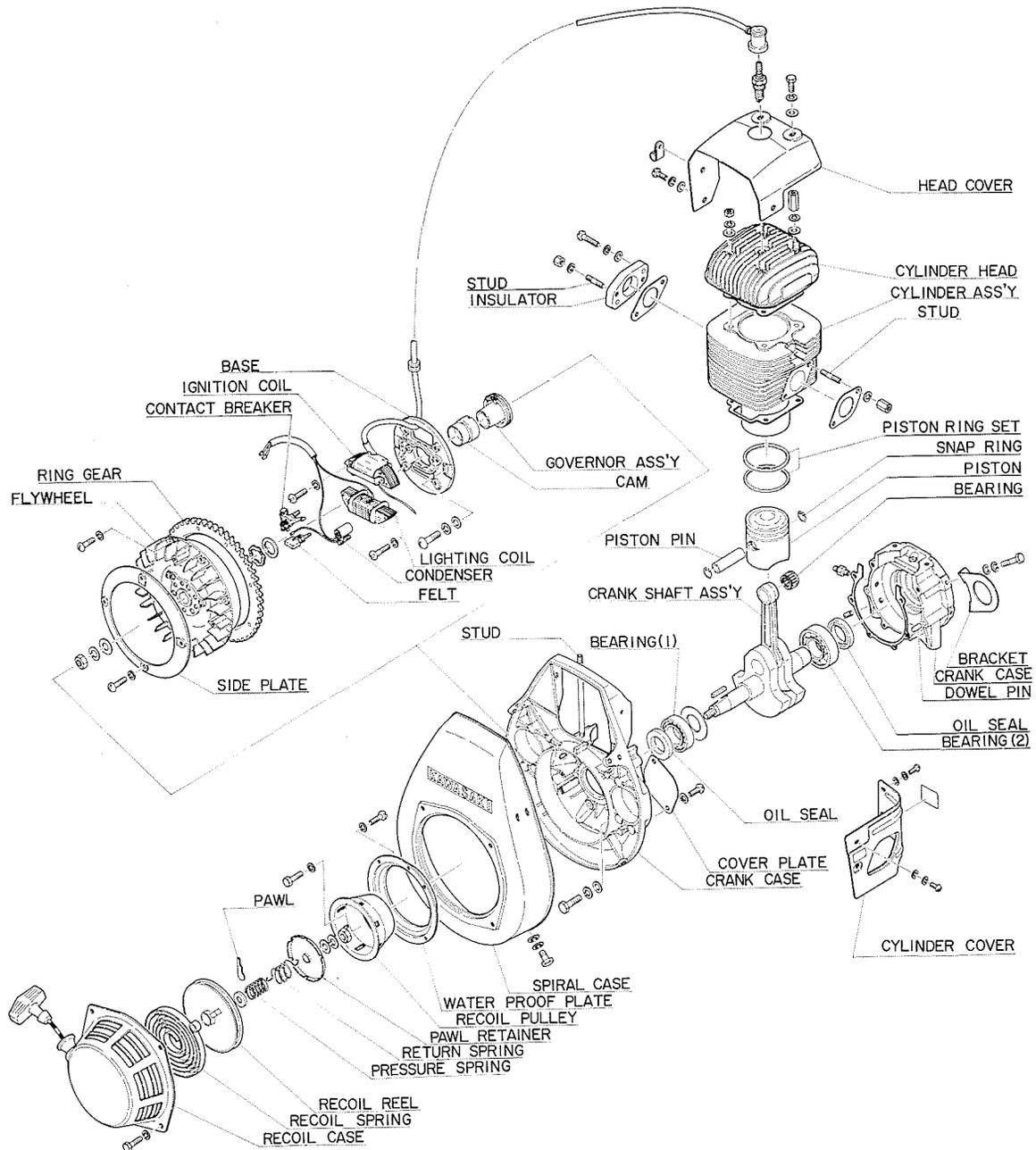
Conversions

Number of Cubic Centimeters x 0.061 = Cubic Inches
 Number of Cubic Inches x 16.387 = Cubic Centimeters
 Number of Foot Pounds x 0.1383 = Kilograms in Meters
 Number of Kilogram Meters x 7.235 = Foot Pounds

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KT150 ENGINE/TORQUE SPECIFICATIONS



Tightening Torques

Cylinder Head	16 Ft. Lbs.
Crankcase Bolts	13 Ft. Lbs.
Flywheel Nut	56 Ft. Lbs.
Recoil Starter Mounting Bolts	13 Ft. Lbs.
Spark Plug	25 Ft. Lbs.

ENGINE THEORY OF OPERATION

General

The engines used in all Arctic Cat snowmobiles utilize air as the primary cooling agent. The air-cooled engine is simple to maintain and does not require protection from freezing.

Conversely, water-cooled engines, because they utilize a radiator, hoses, water lines, and a water pump, require low temperature protection from freezing and the expansion of water. The cost of said maintenance and component parts is much greater than the air-cooled engine.

Any engine generates heat during operation (combustion process) and eventually must be dissipated to prevent overheating and possible engine damage. Air-cooled engines are equipped with a blower or axial fan which blows a cool air stream around the engine crankcase and cylinder(s). An engine shroud directs this cool air stream over the areas of heat buildup. These heat buildup areas are usually finned so as to accommodate maximum cool air flow.

Combustion Cycle

During each revolution of the crankshaft, the piston makes one stroke up and one stroke down the cylinder. As a result, for each crankshaft revolution there are two piston strokes with combustion occurring each time the piston reaches the top of the cylinder. Considering this information, the name "two stroke engine" is clearly evident.

The Kawasaki engine has four (4) "ports" cut into the cylinder wall: the exhaust port; inlet port; and two transfer ports.

Exhaust Port – The burned gases pass out of the cylinder to the atmosphere.

Inlet Port – Connects the carburetor to the crankcase.

Transfer Ports – Located at the upper end of the passages connecting the cylinder to the crankcase.

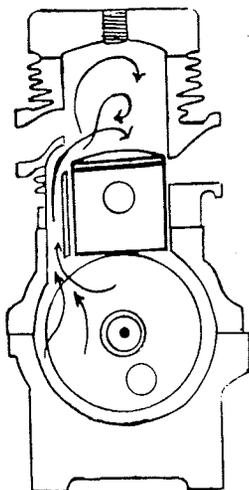
NOTE: The inlet port opening and closing is controlled by the piston skirt. The transfer and exhaust ports are controlled by the top edge of the piston.

With the piston positioned at bottom dead center (BDC) the engine operating cycle commences. On the upward stroke of the piston, the top side of the piston seals off the transfer ports and the exhaust port, compressing the fuel/air mixture into the cylinder head cavity. Simultaneously, the piston skirt uncovers the inlet port and a fresh charge of the fuel/air mixture is drawn into the crankcase.

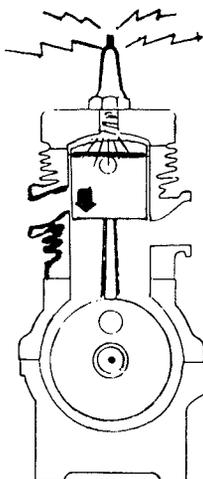
As the piston reaches the top of the stroke, the compressed fuel/air mixture is ignited by the spark plug. The ignited gases, expanding from the combustion process, push the piston down the cylinder; this is known as the power stroke. Continuing the piston descent, the exhaust port is uncovered and at this time, the burned gases escape through the exhaust system and into the atmosphere.

Near the bottom of the stroke, the piston uncovers the transfer ports, allowing the fuel/air mixture that was drawn into the crankcase to be pumped into the cylinder. The pumping action is a result of the piston skirt sealing off the inlet port, causing a pressure rise in the crankcase.

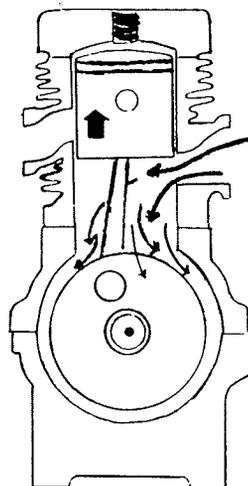
NOTE: To prevent some of the fuel/air mixture from escaping through the exhaust port, the cylinder head is shaped to act as a barrier and the muffler serves as a restrictor. This assists in cleaning the combustion chamber of all the burned gases and limits the escape of the fuel/air mixture when it is being pumped into the cylinder. The piston then begins to rise again to start another cycle of operation.



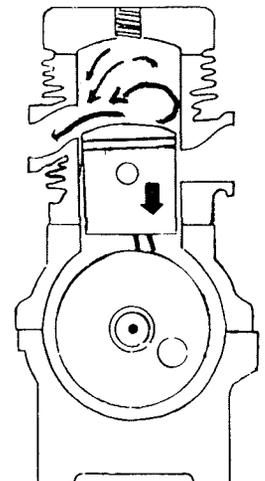
FUEL TRANSFER



POWER



INTAKE

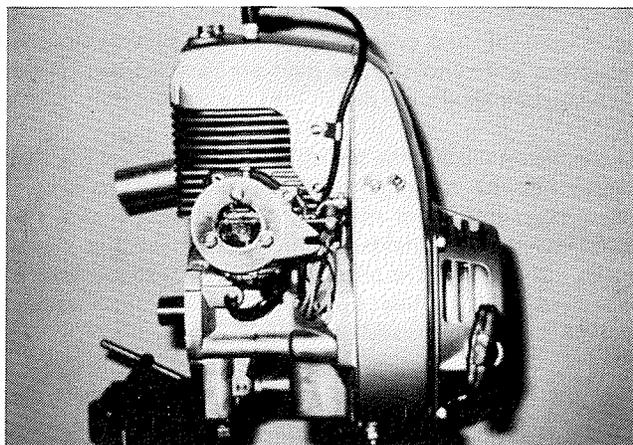


EXHAUST

ENGINE SERVICING (SINGLE CYLINDER)

General Engine Information

In the manufacture of Arctic Cat snowmobiles, both the single cylinder (KT150A and KT150B) and the twin-cylinder (T1A) engines are used. This engine section will provide you with the information necessary to service the single-cylinder (KT150) engine. Read and understand this section before performing any engine service procedures.



Engine Removal

To remove the engine from the front end assembly, use the following procedure:

NOTE: When the engine is being removed and during engine disassembly, all fasteners should be retained with the appropriate component parts.

1. Open or remove the hood, whichever will better facilitate engine removal and servicing. If the hood is removed, the headlight harness must be removed first.
2. Disconnect the spark plug lead wire.
3. Remove the drive belt (see Drive Belt Removal, page 109).
4. Disconnect the headlight/ignition harness at the recoil side of the engine.
5. Disconnect the choke and the throttle cable wires at the carburetor.
6. Remove the inlet fuel line and the vapor return line at the carburetor.

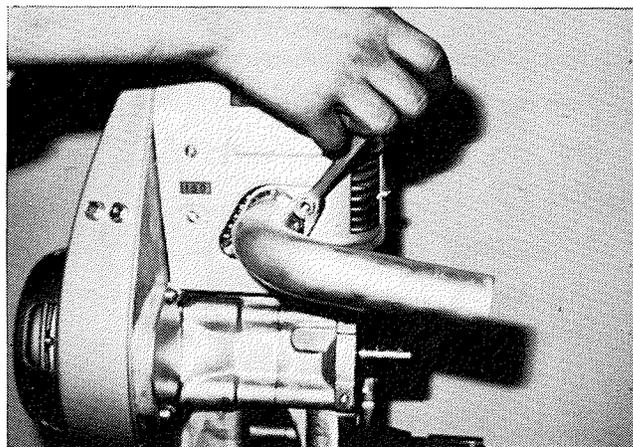
WARNING

To prevent gas leakage, insure that the fuel line ends are positioned above the fuel tank.

7. Disassemble the muffler from the exhaust outlet pipe by removing the wire clip that secures the muffler to the exhaust outlet pipe.
8. Remove the bracket securing the recoil starter handle to the right side of the console.
9. On electric start models, perform the following:
 - A) Disconnect the negative (-) battery cable (black) from the negative (-) battery terminal.
 - B) Disconnect the regulator rectifier.
 - C) Disconnect the positive (+) battery cable (red) and the solenoid wires from the starter.
10. Loosen the locking collar at the base of the steering post with an Allen wrench. Slide collar up the steering post to keep it away from the engine base plate.
11. Remove the two (2) lock nuts and flat washers that secure the rear of the engine base plate.
12. Lastly, remove the two (2) lock nuts and flat washers that secure the front of the engine base plate. The lock nuts and flat washers are located directly below the exhaust outlet pipe (center of engine).

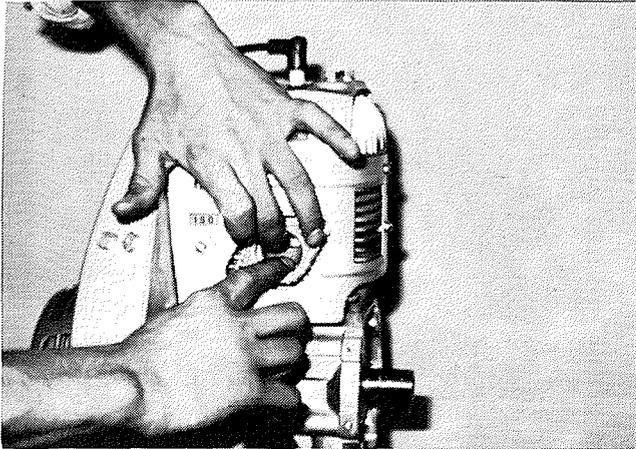
Engine Disassembly

1. Remove the two (2) coupling nuts and lock washers securing the exhaust outlet pipe to the engine. Slide exhaust outlet pipe off the mounting studs.

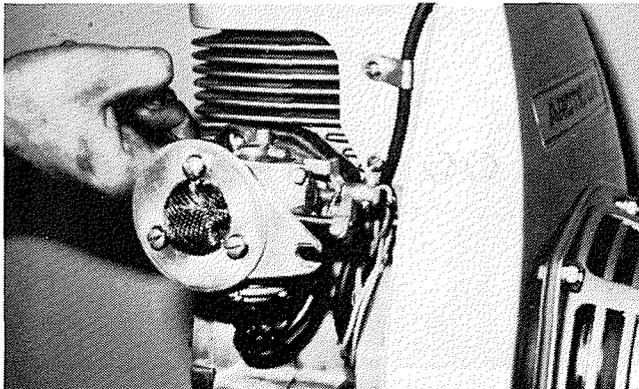


ENGINE SERVICING (SINGLE CYLINDER)

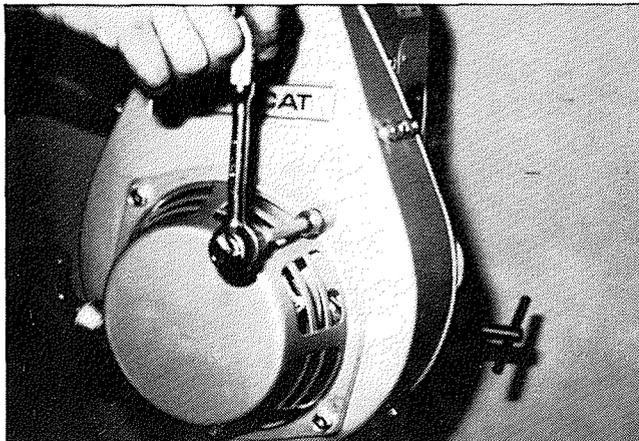
2. Remove the asbestos exhaust outlet gasket.



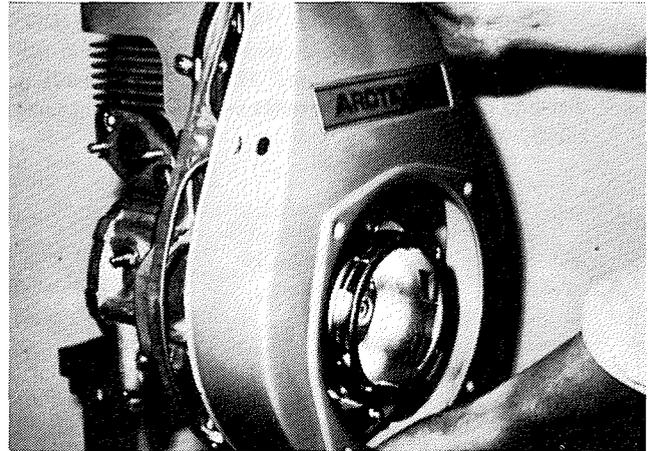
3. Disconnect the impulse line at the engine. Unscrew the two (2) carburetor flange nuts and slide washers off mounting studs. Carefully pull carburetor from the mounting studs. **CAUTION:** Be sure the mounting studs do not back out; breakage of the carburetor ear could result when reassembling.



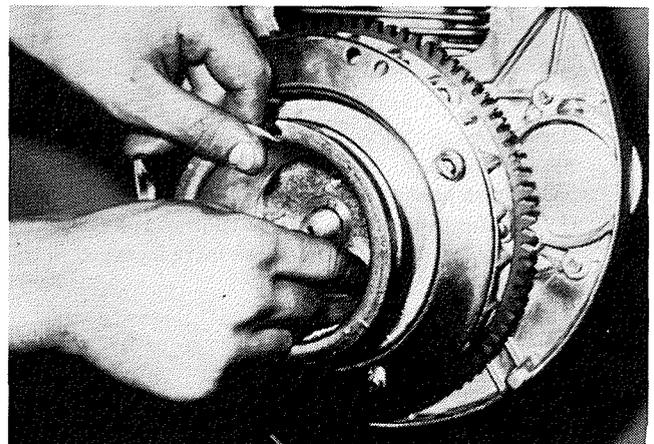
4. Remove the four (4) capscrews and washers securing the recoil starter and set aside.



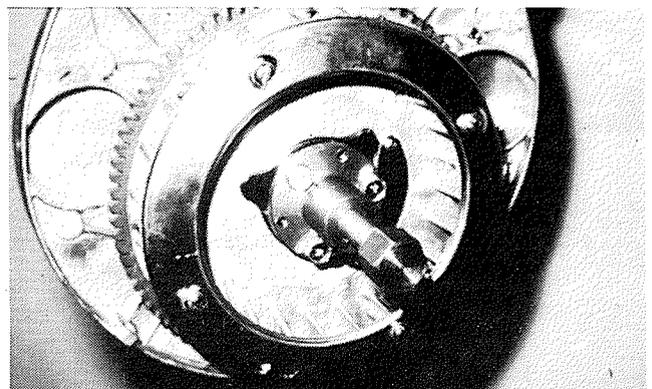
5. Remove the six (6) bolts securing the spiral case to fan cowl. Pull spiral case straight out from the engine.



6. Using a flywheel holding tool and a 13mm socket wrench, remove the three (3) bolts and rope pulley.

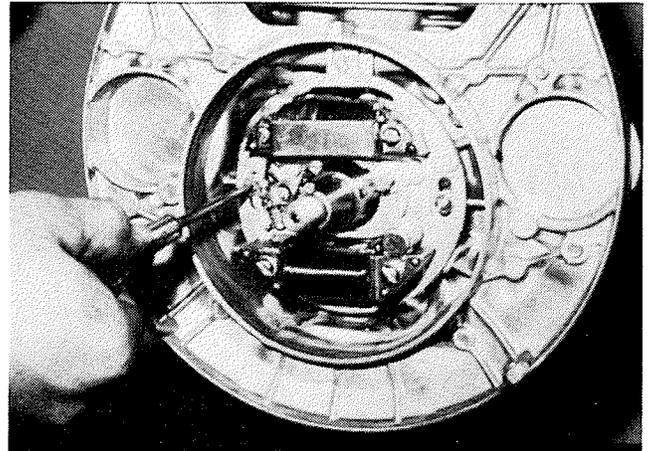
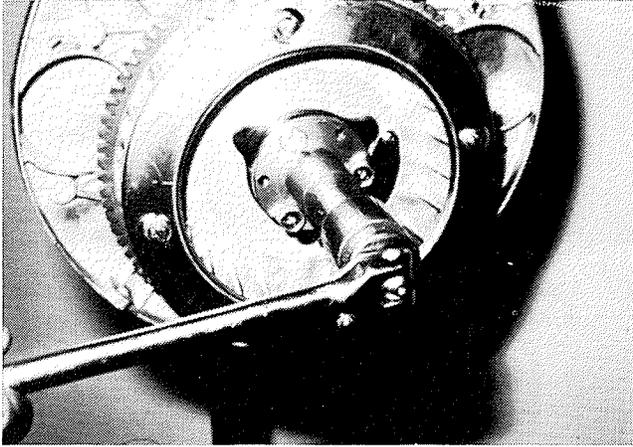


7. Install flywheel puller (Arctic Part No. 0144-064) by using the three (3) rope pulley bolts. **CAUTION:** Insure the flywheel puller is evenly seated and all three bolts are tightened uniformly. If bolts protrude through the flywheel, damage to the magneto coils may occur.

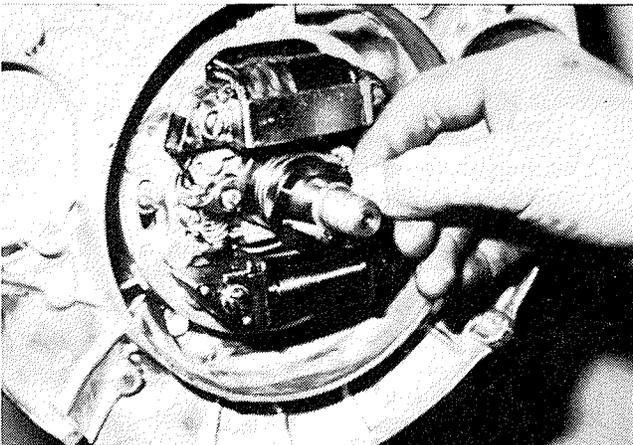


ENGINE SERVICING (SINGLE CYLINDER)

8. Tighten the flywheel puller bolt until the flywheel freely disengages.
9. Pull flywheel off the crankshaft and remove the flywheel puller from the flywheel. **CAUTION:** Always place the flywheel with magnets facing upward on a clean, dry area. Damage may result if dirt and other foreign particles come in contact with the flywheel magnets.

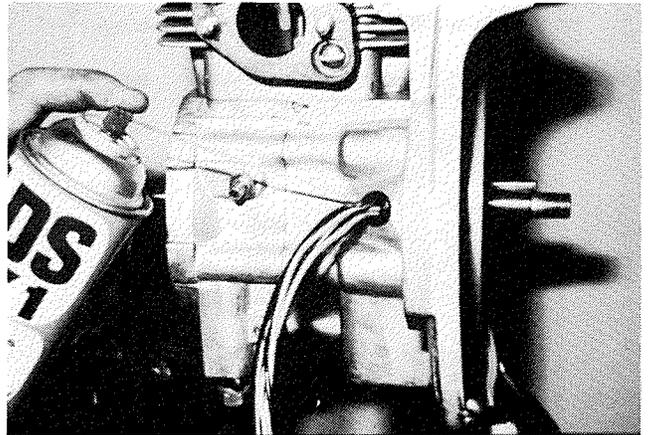


10. Remove the spring washer and the flat washer next to the ignition cam. **NOTE:** Steel flat washer is always positioned next to the ignition cam. Mark the position of the magneto base in relation to the crankcase with a scribe, insuring that it can be re-installed in the same position.

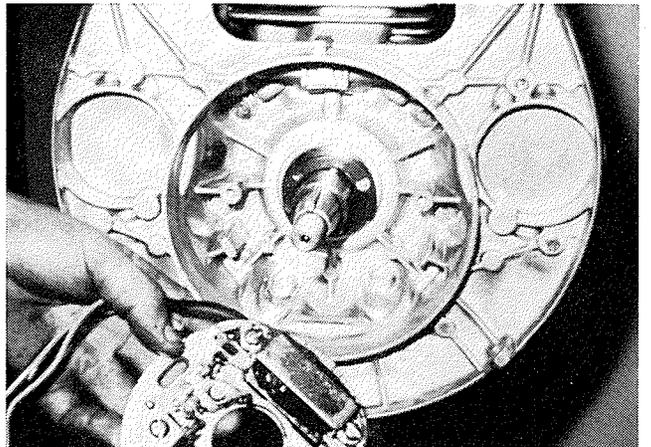


11. Remove the two (2) screws that secure the magneto assembly (see top right column photo).

12. Spray the wiring with lubricant or silicone spray to facilitate removal. To enable the wire to be pulled through the grommet, remove spark plug wire cap, and the holding clamp. Pull ignition wiring through grommet.

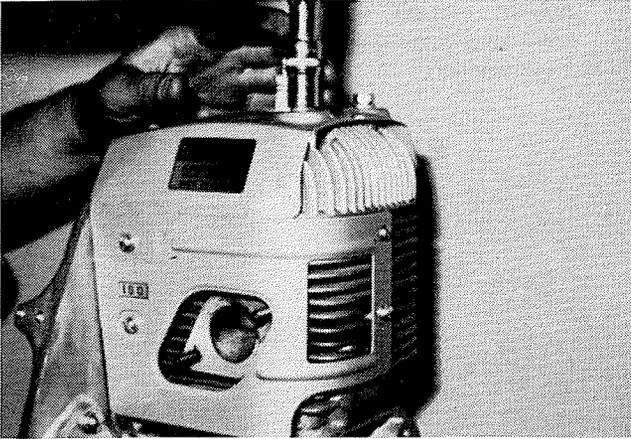


13. Remove the magneto assembly, cam governor assembly, and the flywheel key. **NOTE:** Cam governor assembly must be removed before the key in the crankshaft is pulled.

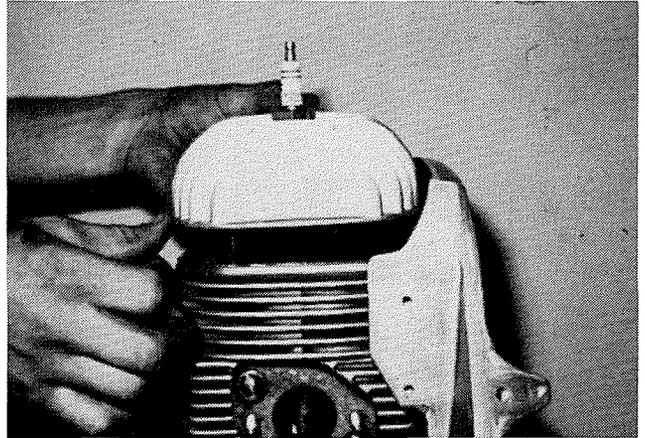


ENGINE SERVICING (SINGLE CYLINDER)

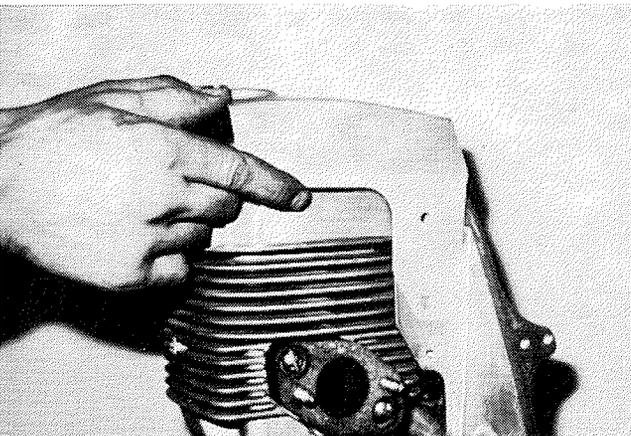
14. Remove the bolts retaining the cylinder head cover and the screws retaining the engine shrouding.



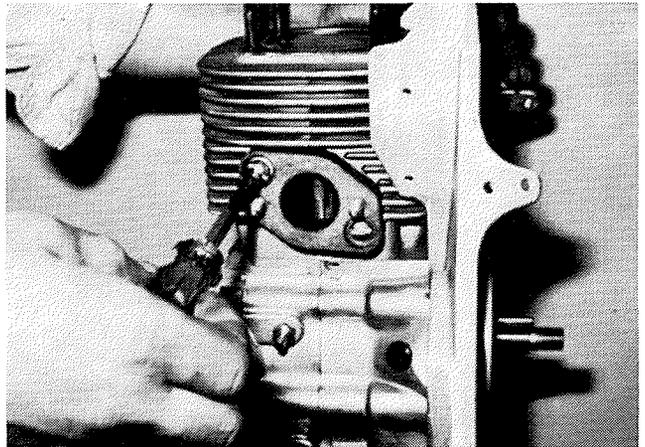
17. Remove cylinder head and gasket. **NOTE:** It is advisable to replace the gasket when reassembling a used engine.



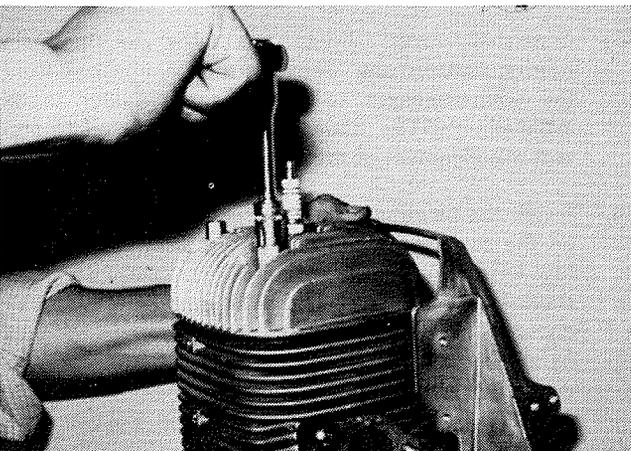
15. Both the cylinder cover and head covers can now be removed.



18. To disassemble the carburetor insulator block from the cylinder, remove the two (2) screws and lock washers.



16. Disassemble the cylinder head from the cylinder by removing the four (4) cylinder head nuts and washers.



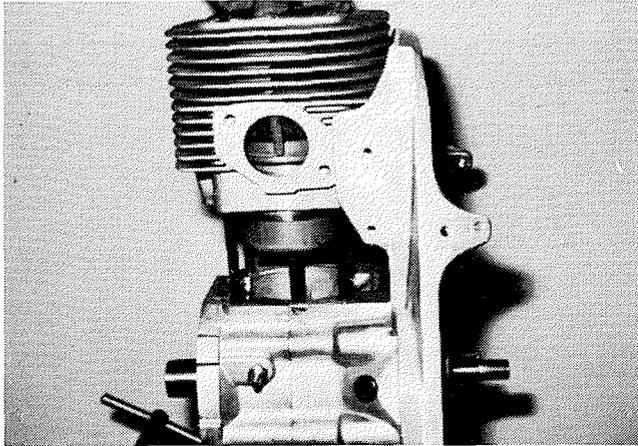
19. **NOTE:** Insure the carburetor insulator block is not damaged or cracked.

20. Rotate the crankshaft until the piston reaches bottom dead center (BDC). Remove the cylinder and cylinder gasket. **NOTE:** Replace the cylinder gasket when reassembling the engine. While removing the cylinder, grasp the piston for stabilization to prevent possible piston damage if the piston should come in contact with cylinder studs (see top left column photo, page 16).

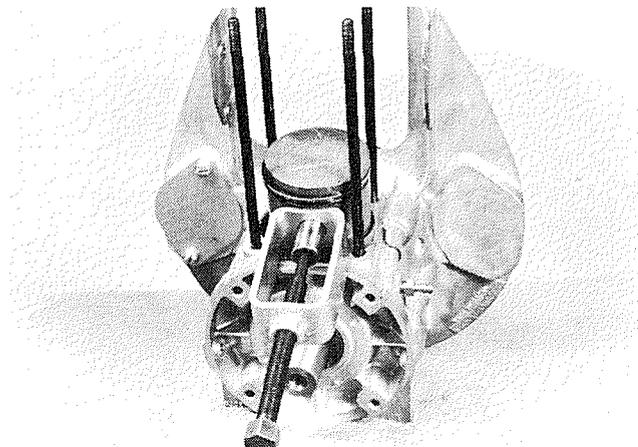
CAUTION: When performing top end repair, stuff a clean shop cloth into the crankcase opening around the con-

ENGINE SERVICING (SINGLE CYLINDER)

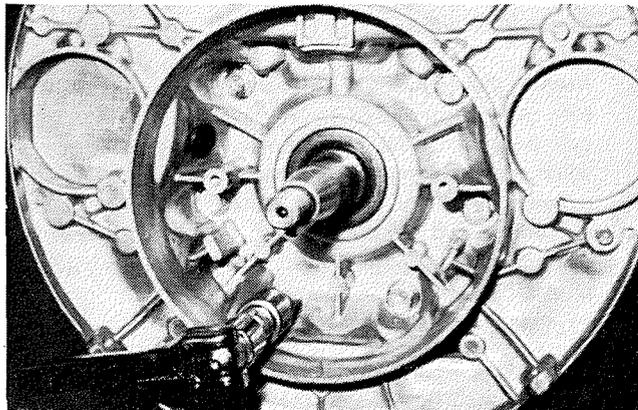
necting rod to prevent objects and foreign particles from falling into the crankcase.



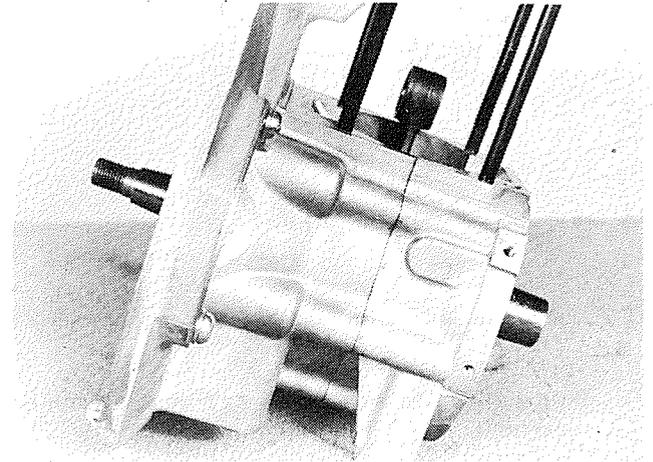
21. To disengage the piston from the connecting rod, remove the circlips. Using a piston pin puller (Arctic Part No. 0144-003), remove the piston pin.



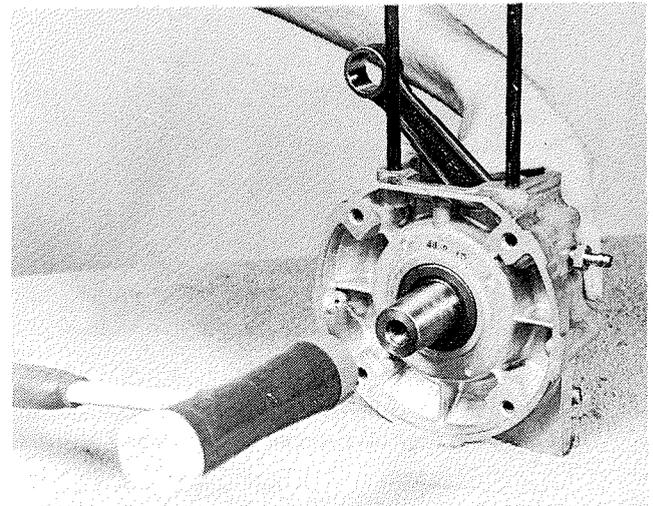
22. Separate the crankcase in halves by removing the six (6) crankcase bolts. **NOTE:** The two (2) center crankcase bolts are longer than the other four (4) bolts and therefore, must be replaced in the same positions to prevent possible crankcase damage.



23. When separating the two (2) crankcase halves, hold magneto side of the case and tap the end of the crankshaft with a plastic mallet. **CAUTION:** To prevent possible damage to the crankshaft and crankcase, never tap the end of the crankshaft with a steel hammer.

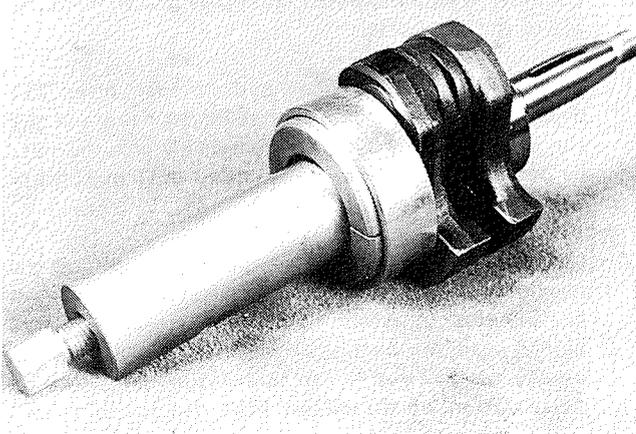


24. Using a plastic hammer, tap the crankshaft out of the opposite crankcase half.

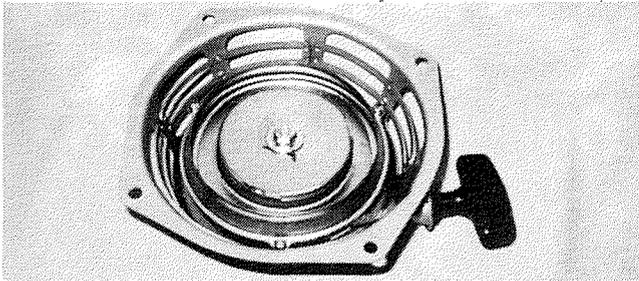


25. Crankshaft repair should be limited to the main bearing replacement. Separate the main bearing from the counterweights to allow bearing puller to be installed. **NOTE:** Care should be exercised to prevent misalignment of the crankshaft.
26. Install the bearing puller (Arctic Part No. 0144-006) on the crankshaft and remove the main bearing (see top left column photo, page 17). **NOTE:** The crankshaft is a factory assembled unit, and therefore, disassembly is not recommended. No warranty will be allowed on any component of the engine if the crankshaft has been disassembled. If the crankshaft should fail during the warranty period, replace with a new factory assembled unit.

ENGINE SERVICING (SINGLE CYLINDER)



27. Disassemble the recoil assembly (see Recoil Starter Disassembly, page 22).

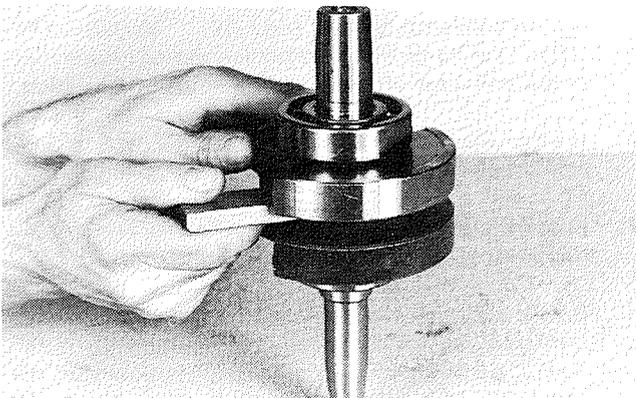


28. At this point the engine and recoil assembly have been completely disassembled. Clean all component parts and replace any defective or questionable items.

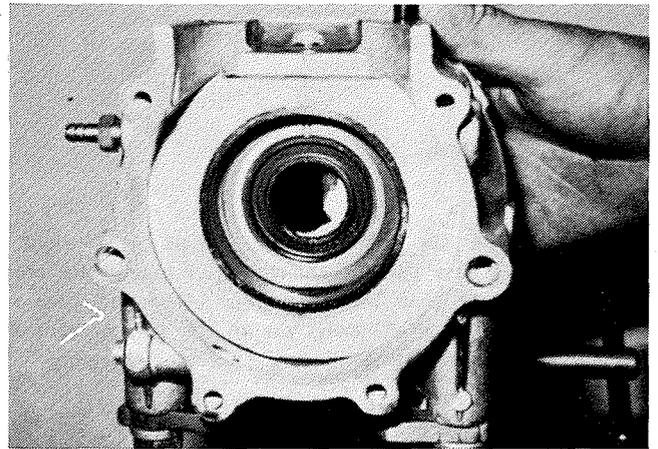
Engine Assembly

Prior to assembling the engine, insure all parts are clean and damaged components replaced. To assemble the engine, proceed as follows:

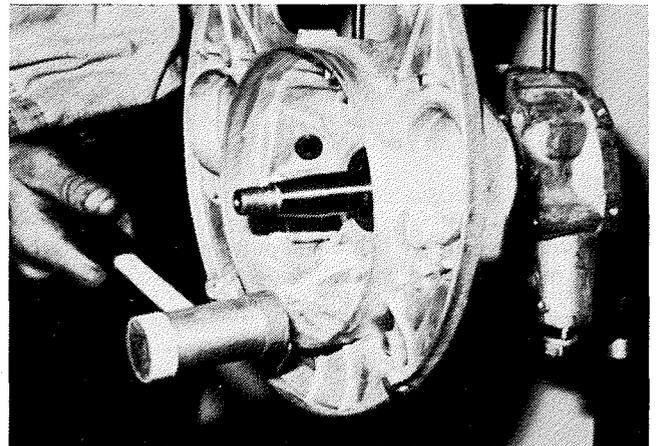
1. Support the crankshaft between the flyweights and install new main bearings. Crankshaft is supported to prevent accidental misalignment while the bearing is being pressed on the crankshaft.



2. Inspect the crankshaft seals and replace if necessary. To insure a good seal, pack the oil seal lips with bearing grease. Clean the gasket surface and install a new crankcase gasket, using crankcase sealer (Arctic Part No. 3000-211).
3. With a propane torch, heat the bearing seat of the PTO side crankcase. **CAUTION: To prevent seal or gasket damage resulting in improper sealing, insure that the torch flame does not contact the seal and gasket.**



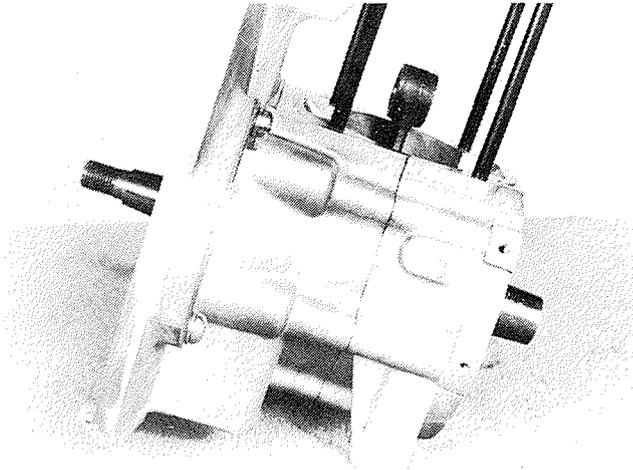
4. Install crankshaft to PTO side of crankcase, insuring that the bearing has seated properly.
5. Perform step three (3) on magneto side of crankcase.



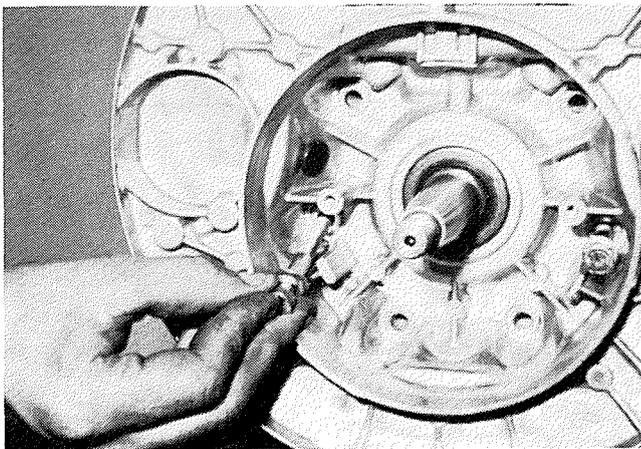
6. Assemble the two crankcase halves and the crankshaft assembly. Insure bearings are seated properly.
7. After the crankcase halves have firmly seated together, rotate the crankshaft to insure that it rotates freely. If resistance is felt, the bearings may not have fully seated in the crankcase halves. To correct this situation, tap on both ends of the crankshaft with a

ENGINE SERVICING (SINGLE CYLINDER)

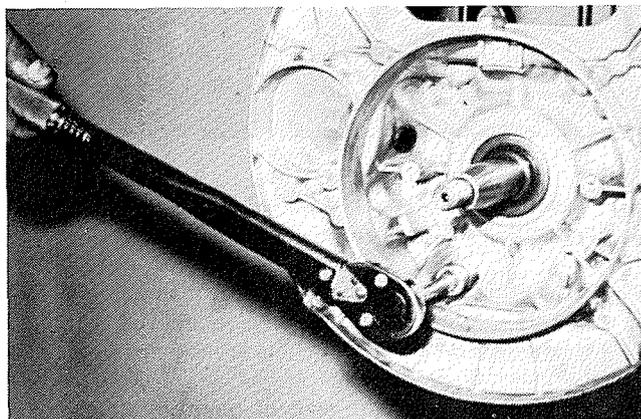
plastic mallet, doing so while the crankcase bearing seats are still warm from heating.



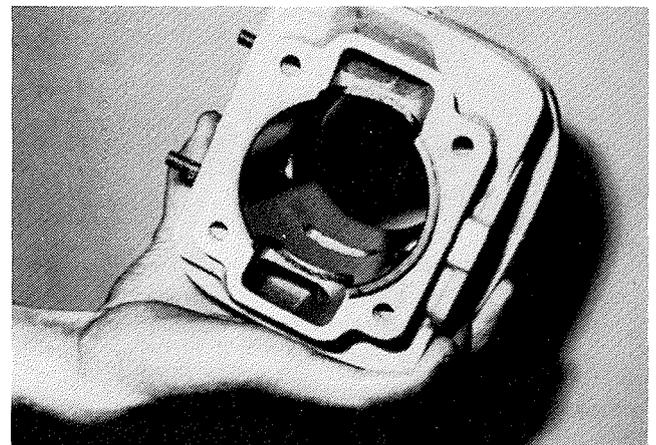
8. Install the six (6) crankcase bolts finger tight. **NOTE:** The two (2) center crankcase bolts are 9mm longer than the other four (4) bolts. Insure that these two (2) bolts are in the proper center locations before tightening.



9. Using a crisscross tightening pattern, torque all bolts to thirteen (13) ft. lbs.



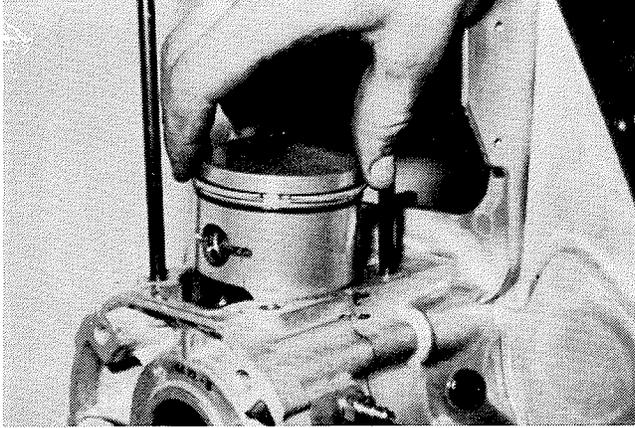
10. Carefully trim all exposed crankcase gasket from the top of the crankcase.
11. Before installing the piston and cylinder, clean and decarbonize the exhaust port, cylinder head and the top of the piston. **NOTE: Piston ring grooves must be perfectly clean before any upper end components are replaced.**
12. Check the condition of the piston, rings, and the needle bearing and piston pin. Rings are the most likely items to wear. Therefore, check each ring before installing on piston. **NOTE: Worn rings can usually be detected by an increase in end gap or by discoloration of the piston skirt due to "blowby".**
13. Check the cylinder walls; replace cylinder if damage is evident. If small deposits of aluminum have adhered to the cylinder bore (no grooves), the cylinder may be salvaged by a very light honing process.



14. Check the ring end gap by placing the ring in the lower portion of the cylinder and lightly press on the ring with the top of the piston. With a feeler gauge, insure that the ring end gap is .006" - .014".
15. If a new piston is being installed, always use a new set of rings. The light green teflon colored ring must be installed in the top ring groove of the piston (see top left column photo, page 19). **NOTE: The teflon coating provides protection during engine run-in but will wear off after several hours of operation.**
16. If either the piston pin or needle bearing need replacement, replace as a complete set.
17. Install the open ends of the rings between the piston ring groove pins (see top left column photo, page 19).
18. Install the needle bearing in the upper end of the crankshaft and slide piston into position on crankshaft. Secure piston to crankshaft with piston pin and retain in place with two (2) circlips. Insure the

ENGINE SERVICING (SINGLE CYLINDER)

circlips are seated in the piston pin grooves. **NOTE:** Open end of circlips must face either up or down. Install circlip on magneto side before installing the piston.

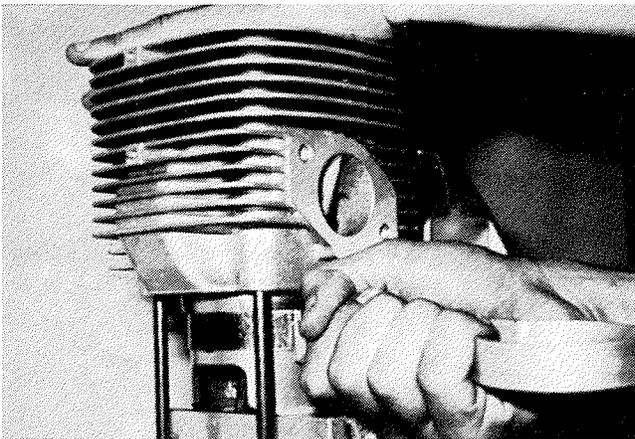


19. Clean the gasket areas of the crankcase and check the bottom of the cylinder for damaged surfaces. Install a new cylinder base gasket.

20. Lubricate the upper and lower rod bearings, sides of piston, and the cylinder walls with Arctic Cat Purple Powerlube.

21. Position a block of soft metal or wood under the piston and turn the crankshaft until both skirts (bottom edge) of the piston rest on the block (see photo below).

22. Hold the rings with a piston ring compressor (Arctic Part No. 0144-001) and carefully slide the cylinder over the bolts (see photo below). When the cylinder is positioned over the piston rings, carefully remove the ring compressor and the block. **NOTE:** Insure cylinder base gasket was not damaged when block was removed.

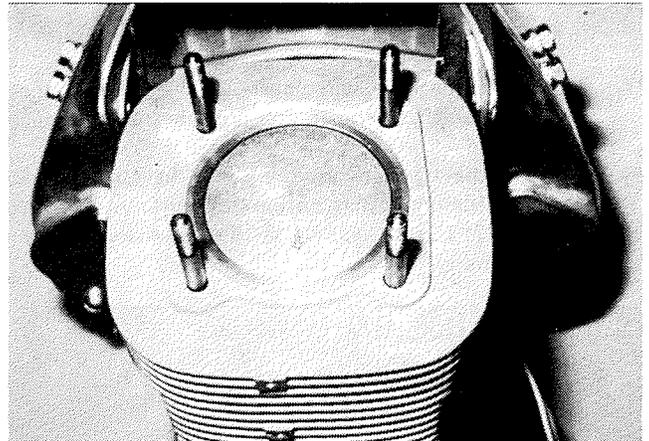


NOTE: Standard piston to cylinder clearance is .0035" at the skirt and should not exceed .005". The Arctic Cat piston is made of special alloy with an anti-friction surface

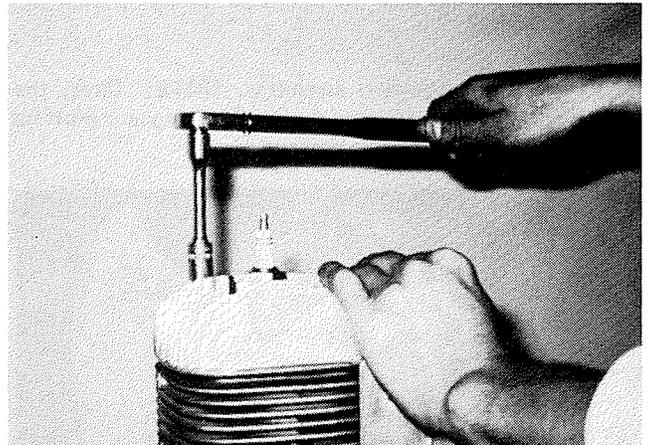
material. Always use genuine Arctic Cat pistons for replacement.

23. Maintaining even pressure, press cylinder down until cylinder has firmly seated on the crankcase.

24. Observe the top of the piston; arrow must point toward the exhaust side of the engine. **NOTE:** On 1971 model KT150 engines and prior to 1971, the arrow must point toward the PTO side of the engine.

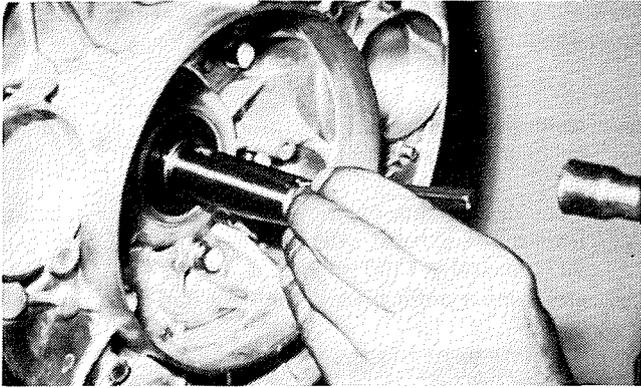


25. Install a new cylinder head gasket. Carefully position the cylinder head over the cylinder bolts. Start the four (4) cylinder head nuts and torque nuts to 8 ft. lbs. in a crisscross pattern. When all four (4) nuts have been torqued to 8 ft. lbs., re-torque the nuts to 16 ft. lbs., using the same crisscross sequence. **NOTE:** Install coupling nuts on the PTO side of engine.

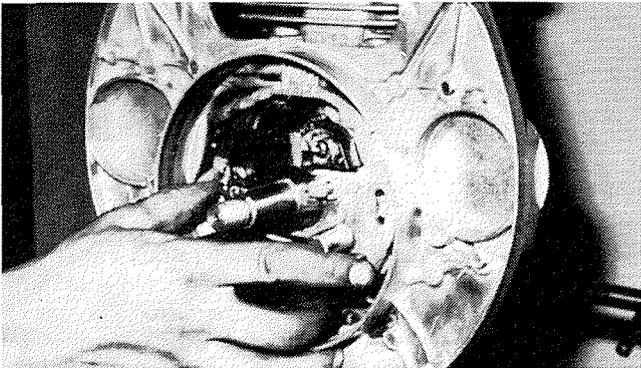


26. Install key on crankshaft, using a plastic mallet to firmly seat it in groove. Then install cam-governor assembly. Key should be even with shoulder of shaft (see top left column photo, page 20). **NOTE:** Care should be exercised to prevent damage to the key.

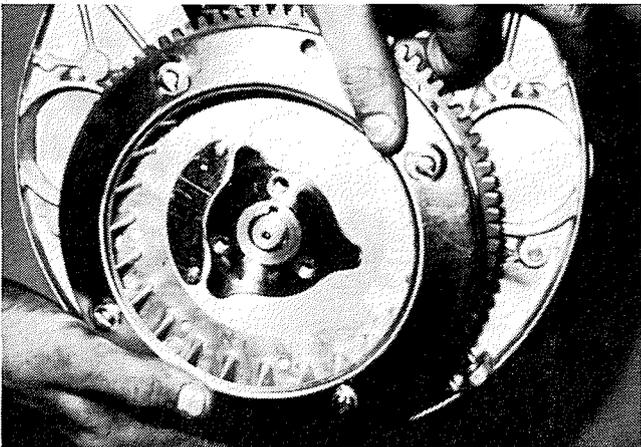
ENGINE SERVICING (SINGLE CYLINDER)



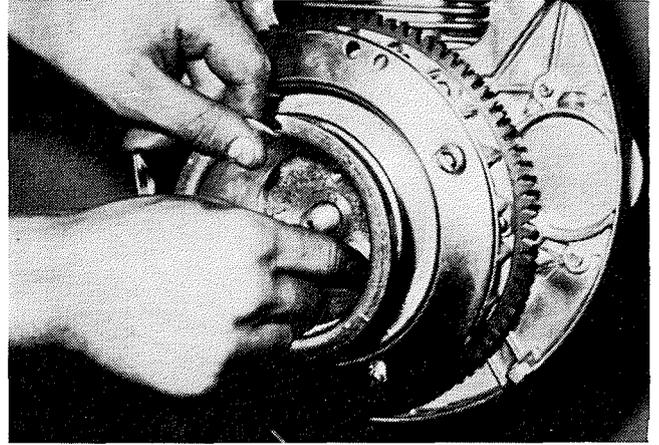
27. Insert the magneto wires through the hole in the crankcase and seat the rubber grommet in the hole.
28. Position the magneto assembly per the scribe mark made on the crankshaft during disassembly. Tighten the two (2) screws securely as this will insure nearly-correct timing.



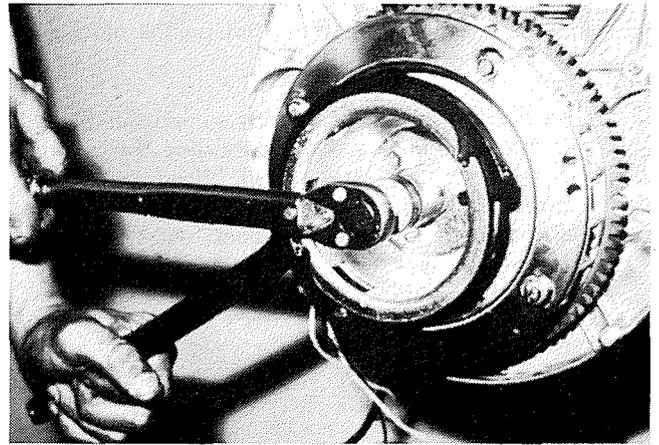
29. Position the flat washer and spring washer on crankshaft, insuring that the notch on the flat washer fits over the key.
30. Replace the flywheel assembly. **NOTE: Check the magneto for particles of metal. The magneto must be clean to avoid possible damage.**



31. Assemble the emergency rope pulley to the flywheel. Using a flywheel holding tool to hold the flywheel, slightly torque the three (3) emergency rope pulley bolts.



32. Install the special washer and flywheel nut. Hold the flywheel with a flywheel holding tool and torque the nut to 56 ft. lbs. Remove auxiliary rope pulley. Bend locking tabs of the special washer to properly retain flywheel nut.



33. Properly time the engine (see Timing, page 25).
34. When the engine has been timed, replace the auxiliary rope pulley and secure in place with three (3) lock-washers and bolts. Torque bolts to 13 ft. lbs.

ENGINE SERVICING (SINGLE CYLINDER)

35. Install the recoil assembly to the engine with the four (4) mounting bolts. Tighten bolts to a point just before binding of the recoil assembly occurs. Pull the recoil rope out approximately six (6) to ten (10) inches or until the pawls engage securely, centering the recoil assembly. Torque the mounting bolts to 5 ft. lbs.



36. Using the two screws and lockwashers, replace the insulator gasket, insulator block, and carburetor to the intake side of the cylinder. **NOTE: A new gasket should be installed between the insulator and the cylinder.**
37. Install a gasket and the carburetor on the mounting studs and secure the carburetor in place with two (2) washers and flange nuts. Connect the impulse line to the engine.
38. Replace the exhaust outlet pipe by installing a new asbestos gasket and exhaust outlet pipe on the mounting studs. Secure the exhaust outlet pipe in place with two (2) lockwashers and nuts.

Engine Installation

1. Position the engine on the front end assembly and secure in place with the four (4) engine mounting nuts and washers.
2. Secure the recoil starter handle and bracket assembly to the right side of the console.
3. Connect the muffler to the exhaust outlet pipe.
4. Connect the positive (+) battery cable (red) and the solenoid wires to the starter if so equipped.
5. Connect the regulator rectifier.
6. Secure the negative (-) battery cable (black) to the negative (-) battery terminal if so equipped.
7. Replace the inlet and vapor return lines on the carburetor.
8. Connect the ignition/headlight harness at the recoil side of the engine.
9. Connect the headlight harness connector to the headlight.
10. Install the choke and throttle cable wires at the carburetor and secure in place.
11. Install the drive belt.
12. Install the spark plug lead wire on the spark plug.
13. Finally, close or replace the hood, whichever was performed to facilitate engine removal and servicing.

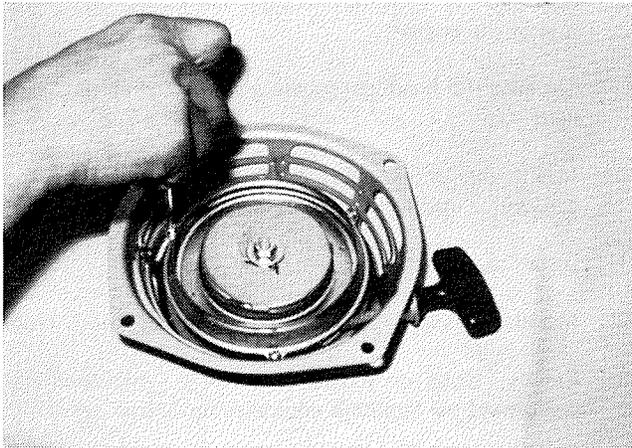
ENGINE SERVICING (SINGLE CYLINDER)

Recoil Starter Disassembly

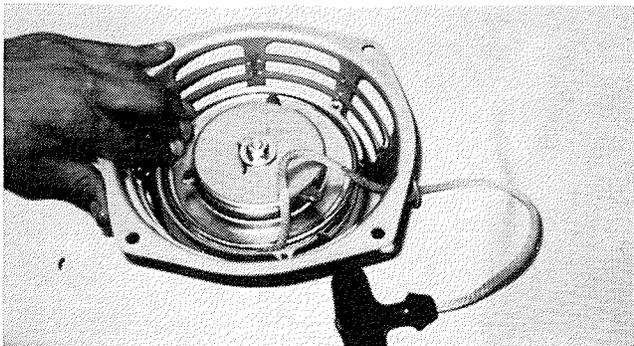
1. Remove the recoil starter handle from the right side of the console.
2. Disassemble the recoil starter from the engine by removing the four (4) bolts and lockwashers.



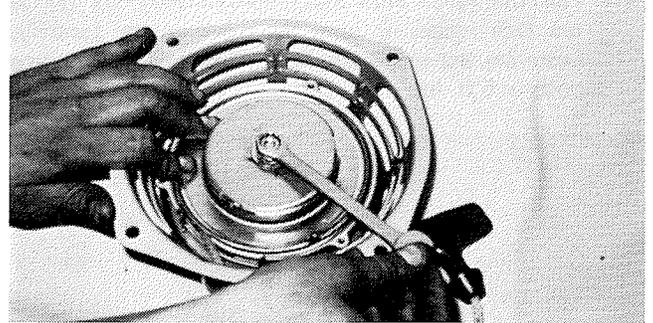
3. If the recoil starter is so equipped, remove the waterproofing plate, using a Phillips screwdriver.



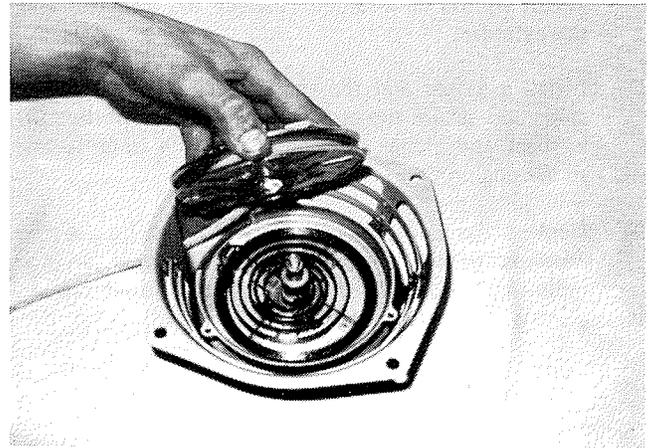
4. Release the preload on the recoil starter spring by using the following procedure:
 - A. Pull rope outward until rope can be positioned in the notch of the recoil reel.
 - B. Rotate the reel assembly clockwise.
 - C. Rotate the recoil reel a sufficient number of turns so that when the reel is released, slack will remain in the rope.



5. Remove the outside retaining nut, lockwasher and flat washer that secures the entire assembly in position.



6. Lift out the internal components and pay special attention to the location and relative position of each component part. **NOTE: Observe the positioning of the small return spring.**
7. Carefully lift out the reel, making sure that the main recoil spring is not accidentally pulled out. **NOTE: The main spring should not be removed from the case unless it is necessary to clean or replace it.**



8. Observe the general condition of the nylon recoil rope. If there are any signs of wear or deterioration, replace with a new Arctic recoil rope.
9. If the main recoil spring must be removed, carefully lift the spring out, protecting against a sudden uncoiling of the spring.

WARNING

Personal injury may be incurred if the spring should suddenly uncoil and strike the mechanic or a bystander.

ENGINE SERVICING (SINGLE CYLINDER)

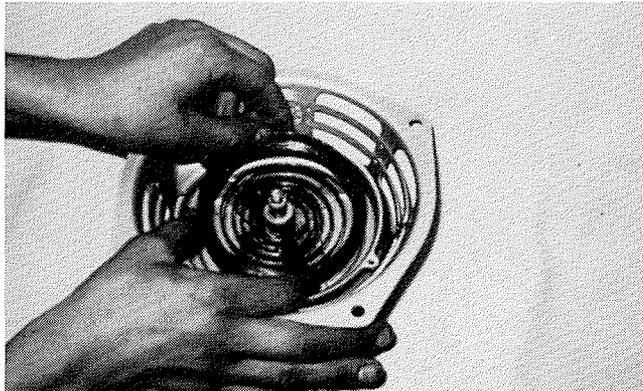
Inspection/Cleaning

1. Inspect all parts for wear or damage; replace all necessary parts.
2. Remove lubricant buildup from parts by washing in a cleaning solvent.

Recoil Starter Assembly

1. Lubricate the component parts of the recoil assembly with petroleum jelly or light grease. **NOTE: Free movement of the recoil mechanism depends upon lubrication between the coils of the main recoil spring.**
2. Wind the main recoil spring, using the recoil spring tool (Arctic Part No. 0144-005).
3. Wind the spring into the tool, starting with the outer coil (end with hook) and press the inner coils into position one by one.

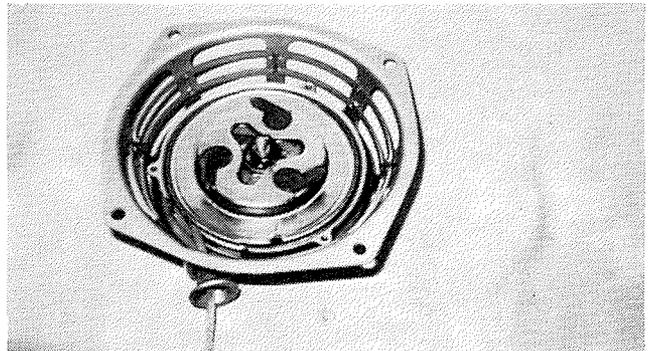
CAUTION: Spring must be wound in a counterclockwise direction with the hook on the spring in contact with the lug of the outer case.



4. Position the recoil spring tool in the case and transfer the spring from the tool to the case.
5. Install the rope and recoil reel over the recoil spring so that the center lug of the recoil reel engages with the inner hook of the main spring.



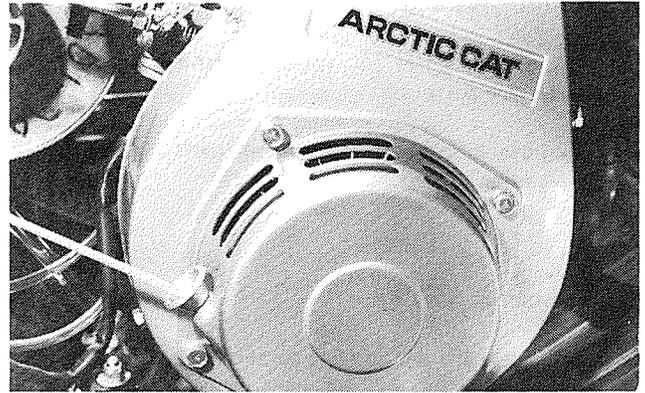
6. Replace the dished washer, three (3) engagement pawls, pressure spring, and the return spring.



7. Install the retainer cover so that the end of the return spring protrudes through the retainer cover.
8. Rotate the retainer cover one-third turn clockwise to slightly preload the spring.
9. Replace the center flat washer, lockwasher and nut.
10. If the recoil rope handle was not removed during disassembly, position the rope in the notch of the recoil reel and rotate the recoil reel two (2) turns counterclockwise to preload the recoil spring.

ENGINE SERVICING (SINGLE CYLINDER)

11. If the recoil rope handle was removed, turn recoil reel three (3) turns counterclockwise and insert the end of the rope through the hole in the recoil case.
NOTE: There should be evidence of rope tension.
12. Tie a knot temporarily to retain the rope and install the recoil rope handle.
13. Pull the recoil rope to insure the recoil starter assembly is operating properly (pawls must extend and retract).
14. Replace the waterproofing plate and install the recoil starter assembly to the engine, using four (4) lock-washers and bolts.



15. Install the recoil starter handle to the right side of the console.

ENGINE SERVICING (SINGLE CYLINDER)

Timing (Single Cylinder)

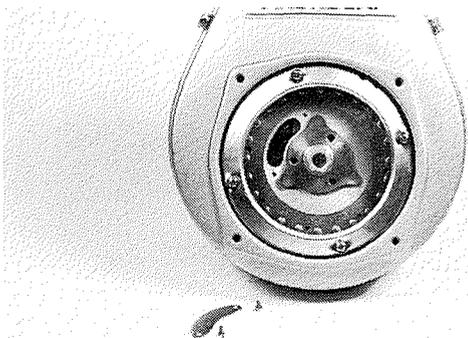
1. Disconnect the spark plug lead wire and remove the spark plug from the cylinder head.
2. Disassemble the recoil starter from the engine by removing the four (4) bolts and lockwashers.



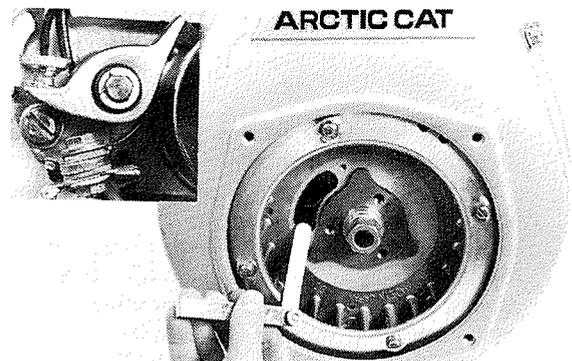
3. Remove the auxiliary starting pulley from the flywheel, using the holding tool (Arctic part number 0144-007).



4. Remove the two screws and cover plate from the flywheel.



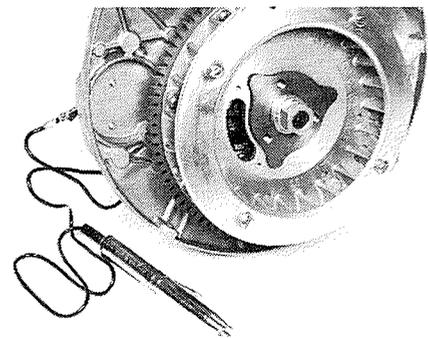
5. Inspect the condition of the breaker points; if pitted or burnt, replacement is necessary. **NOTE: Points may be resurfaced (cleaned) by inserting a piece of paper between the points and rubbing it against the contact surfaces. "SNAP ON Flex Stone" used in conjunction with spray cleaner may also be used to resurface the points.**
6. Rotate the crankshaft until the points are in a fully-open position.
7. Adjust the points to .014", using a screwdriver and feeler gauge. **NOTE: After the points are secured in position, recheck the point gap; tightening the screw may have altered the point gap.**



8. Check the timing, using a continuity light in conjunction with the Timing Mark Method (see step 9) or the Dial Indicator Method (see step 10).

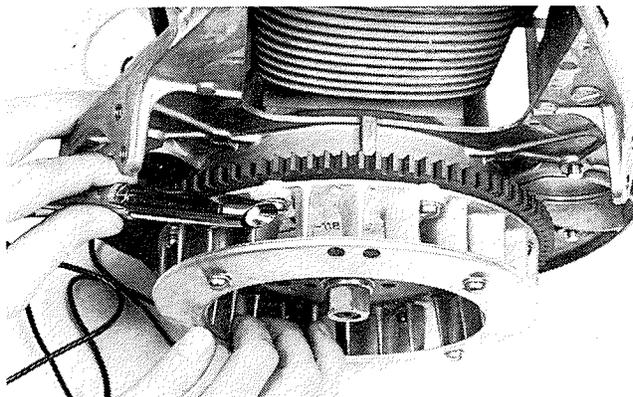
TIMING MARK METHOD

9. Check the timing, using the timing marks on the flywheel and crankcase. Use the following procedure:
 - A. Remove the cover housing.
 - B. Connect one wire of the continuity light to the black wire running from the engine. Ground the other continuity light wire to the engine.

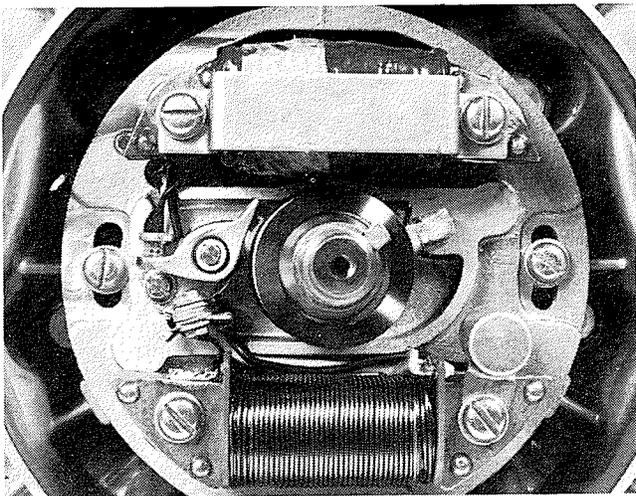


ENGINE SERVICING (SINGLE CYLINDER)

- C. Rotate the flywheel 1/4 turn counterclockwise.
- D. Slowly rotate the flywheel clockwise until the continuity light brightens. When the continuity light brightens, it indicates the firing moment of the engine. **NOTE: The "F" mark and the timing mark in the crankcase should now be aligned.**



- E. If the timing marks are not aligned, loosen the two (2) stator plate retaining screws. When the "F" mark is positioned to the right of the crankcase timing mark, rotate the stator plate counterclockwise to advance the timing. When the "F" mark is positioned to the left of the timing mark in the crankcase, rotate the stator plate clockwise to retard the timing. **NOTE: The "F" mark and the timing mark in the crankcase should now be aligned.**



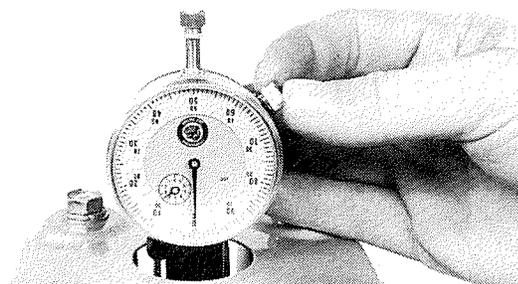
DIAL INDICATOR METHOD

- 10. To check the timing, using the dial indicator method, use the following procedure:
 - A. Perform steps 1 - 7.
 - B. Rotate the crankshaft to position the piston at top dead center (TDC).

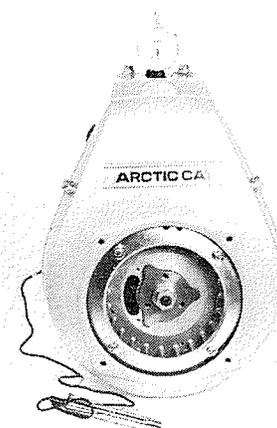
- C. Install the dial indicator adapter into the spark plug hole. Place the dial indicator into the adapter. **NOTE: DO NOT LOCK INDICATOR INTO POSITION.**



- D. Slowly rotate the crankshaft clockwise and counterclockwise to determine the exact point of needle reversal. At this point, lock the dial gauge in position by tightening the thumb screw.
- E. Slowly rotate the crankshaft clockwise and counterclockwise to determine the point of needle reversal. At this point, set the movable dial face at 0.

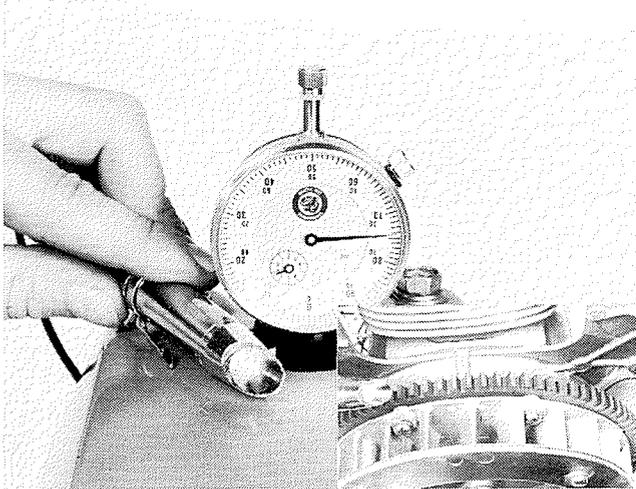


- F. Connect one (1) wire of the continuity light to the black wire running from the engine. Ground the other continuity light wire to the engine.

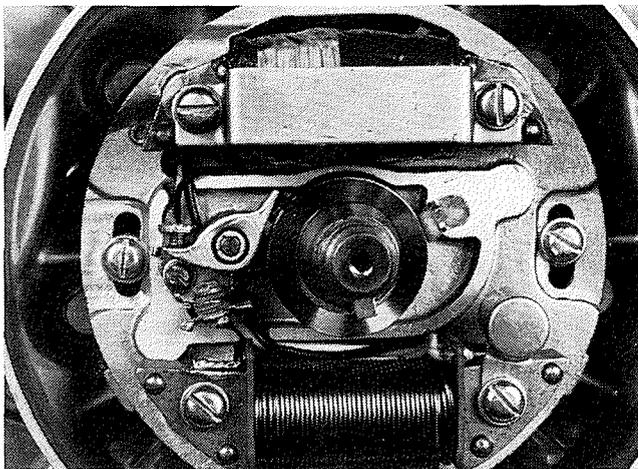


ENGINE SERVICING (SINGLE CYLINDER)

- G. Rotate the crankshaft counterclockwise until the indicator needle passes the specific setting (.026"). Slowly rotate the flywheel clockwise until the continuity light brightens. At this point, indicator needle should read specific setting (.026"). **NOTE: The "F" mark and the timing mark in the crankcase should now be aligned. Cover housing must be removed to see timing marks.**



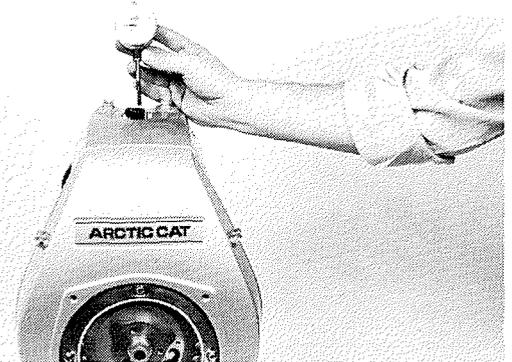
- H. If the timing marks are not aligned, loosen the two (2) stator plate retaining screws. When the "F" mark is positioned to the right of the crankcase timing mark, rotate the stator plate counterclockwise to advance the timing. When the "F" mark is positioned to the left of the crankcase timing mark, rotate the stator plate clockwise to retard the timing. The "F" mark and the timing mark in the crankcase should now be aligned.



11. Disconnect the continuity light.
12. Install the cover plate to the flywheel and secure with two (2) screws.

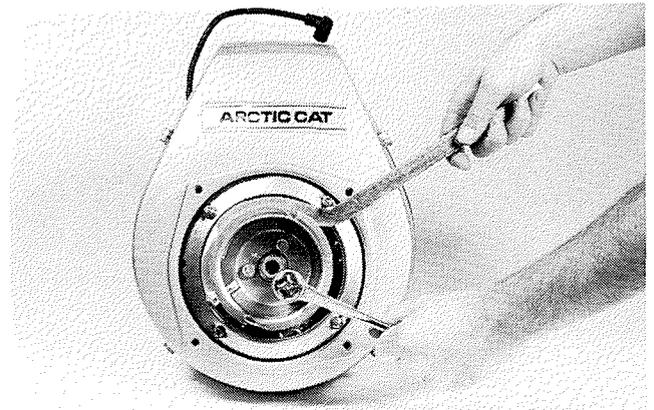
13. If dial indicator method was used, remove, using the following procedure:

- A. Loosen the thumb screw holding the dial indicator in the adaptor and remove the adaptor.
B. Remove the adaptor from the spark plug hole.



14. Install the spark plug or replace with a new plug and set the gap at .020". Connect the spark plug lead wire.

15. Install the auxiliary starting pulley on the flywheel.



16. Assemble the recoil starter to the engine, using the four (4) lockwashers and bolts.

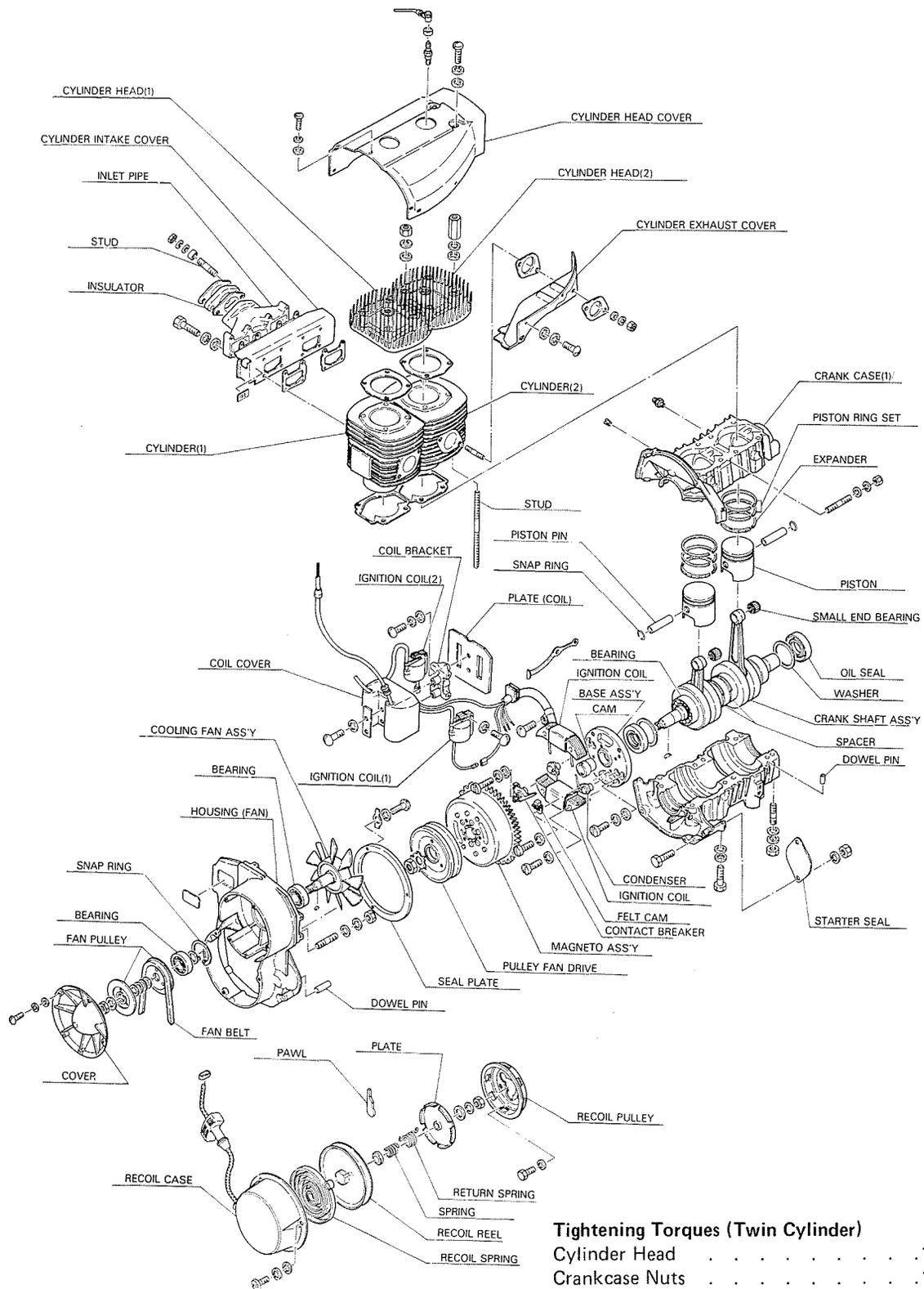


NOTES

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T1A ENGINE/TORQUE SPECIFICATIONS



Tightening Torques (Twin Cylinder)

Cylinder Head16 Ft./Lbs.
Crankcase Nuts	. . . . .	.16 Ft./Lbs.
Crankcase Bolt	. . . . .	.5 Ft./Lbs.
Flywheel Nut	. . . . .	.60 Ft./Lbs.
Recoil Starter Mounting Bolts	. . . . .	.5 Ft./Lbs.
Spark Plug	. . . . .	.25 Ft./Lbs.

ENGINE THEORY OF OPERATION

General

The engines used in all Arctic Cat snowmobiles utilize air as the primary cooling agent. The air-cooled engine is simple to maintain and does not require protection from freezing.

Conversely, water-cooled engines, because they utilize a radiator, hoses, water lines, and a water pump, require low temperature protection from freezing and the expansion of water. The cost of said maintenance and component parts is much greater than the air-cooled engine.

Any engine generates heat during operation (combustion process) and eventually must be dissipated to prevent overheating and possible engine damage. Air-cooled engines are equipped with a blower or axial fan which blows a cool air stream around the engine crankcase and cylinder(s). An engine shroud directs this cool air stream over the areas of heat buildup. These heat buildup areas are usually finned so as to accommodate maximum cool air flow.

Combustion Cycle

During each revolution of the crankshaft, the piston makes one stroke up and one stroke down the cylinder. As a result, for each crankshaft revolution there are two piston strokes with combustion occurring each time the piston reaches the top of the cylinder. Considering this information, the name "two stroke engine" is clearly evident.

The Kawasaki engine has four (4) "ports" cut into the cylinder wall: the exhaust port; inlet port; and two transfer ports.

Exhaust Port – The burned gases pass out of the cylinder to the atmosphere.

Inlet Port – Connects the carburetor to the crankcase.

Transfer Ports – Located at the upper end of the passages connecting the cylinder to the crankcase.

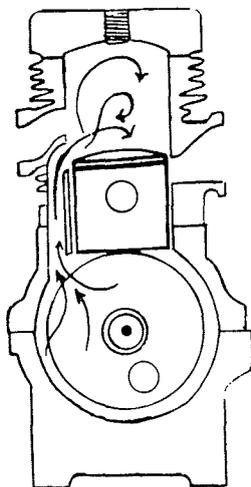
NOTE: The inlet port opening and closing is controlled by the piston skirt. The transfer and exhaust ports are controlled by the top edge of the piston.

With the piston positioned at bottom dead center (BDC) the engine operating cycle commences. On the upward stroke of the piston, the top side of the piston seals off the transfer ports and the exhaust port, compressing the fuel/air mixture into the cylinder head cavity. Simultaneously, the piston skirt uncovers the inlet port and a fresh charge of the fuel/air mixture is drawn into the crankcase.

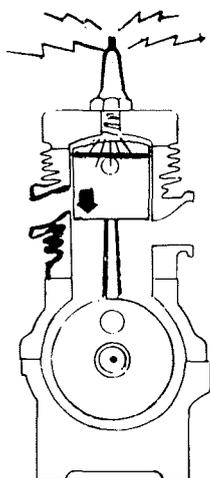
As the piston reaches the top of the stroke, the compressed fuel/air mixture is ignited by the spark plug. The ignited gases, expanding from the combustion process, push the piston down the cylinder; this is known as the power stroke. Continuing the piston descent, the exhaust port is uncovered and at this time, the burned gases escape through the exhaust system and into the atmosphere.

Near the bottom of the stroke, the piston uncovers the transfer ports, allowing the fuel/air mixture that was drawn into the crankcase to be pumped into the cylinder. The pumping action is a result of the piston skirt sealing off the inlet port, causing a pressure rise in the crankcase.

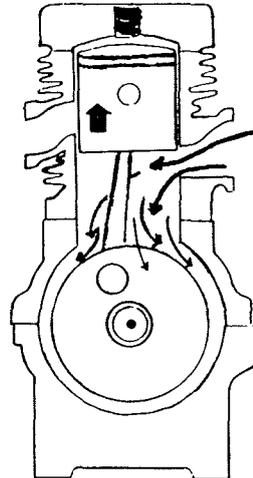
NOTE: To prevent some of the fuel/air mixture from escaping through the exhaust port, the cylinder head is shaped to act as a barrier and the muffler serves as a restrictor. This assists in cleaning the combustion chamber of all the burned gases and limits the escape of the fuel/air mixture when it is being pumped into the cylinder. The piston then begins to rise again to start another cycle of operation.



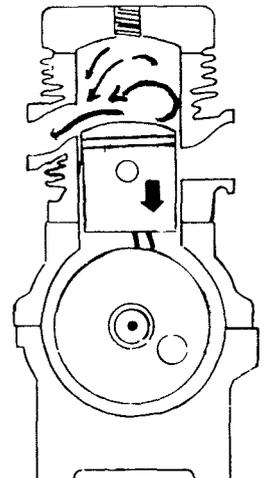
FUEL TRANSFER



POWER



INTAKE



EXHAUST

ENGINE SERVICING (TWIN CYLINDER)

General Engine Information

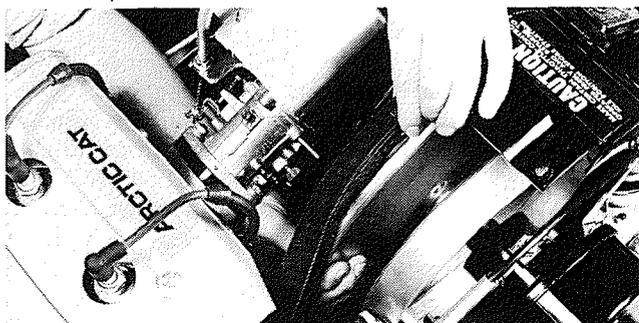
In the manufacture of Arctic Cat snowmobiles, both the Kawasaki single cylinder (KT150A and KT150B) and the twin cylinder (T1A) engines are used. This engine section will provide you with the information necessary to service the Kawasaki twin cylinder (T1A) engine. Read and understand this section before performing any engine service procedures.

Engine Removal

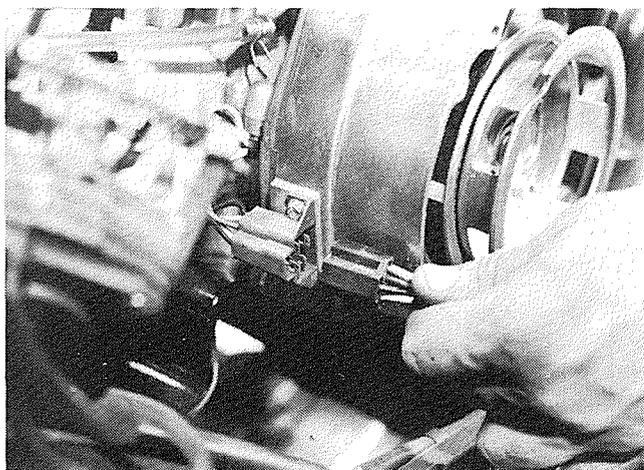
To remove the engine from the belly pan, use the following procedure:

NOTE: When the engine is being removed and during engine disassembly, all fasteners should be retained with the appropriate component parts.

1. Open or remove the hood, whichever will better facilitate engine removal and servicing. If the hood is removed, the headlight harness must be removed first.
2. Disconnect the spark plug lead wires.
3. Remove the drive belt (see Drive Belt Removal, page 109).



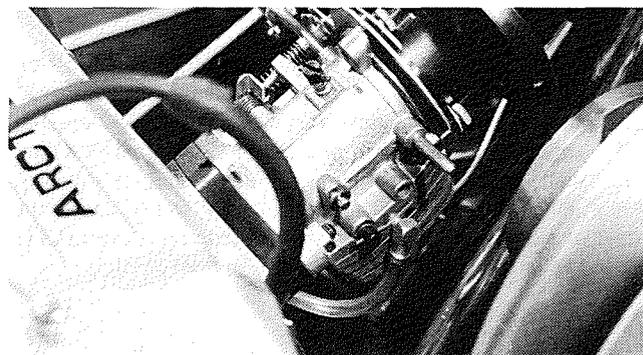
4. Disconnect the headlight/ignition harness at the recoil side of the engine.



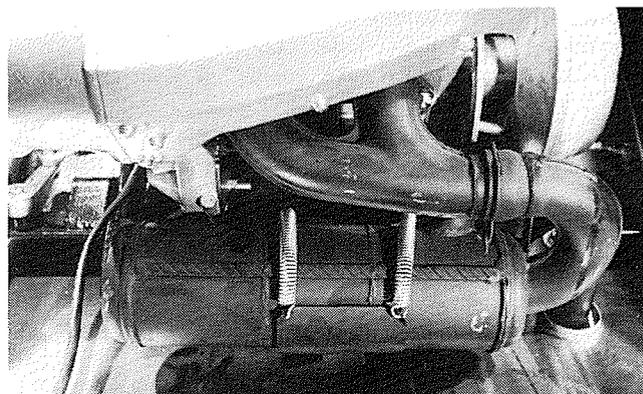
5. Disconnect the choke and the throttle cable wires at the carburetor.
6. Remove the inlet fuel line and the vapor return line at the carburetor.

WARNING

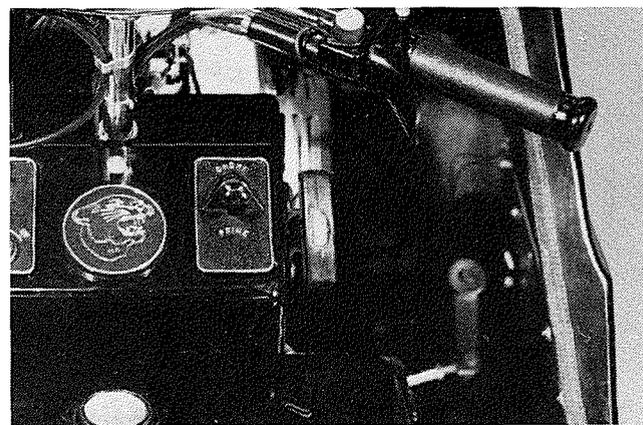
To prevent gas leakage, insure that the fuel line ends are positioned above the fuel tank.



7. Disassemble the muffler from the exhaust outlet pipe by removing the two (2) springs and wire clip that secure the muffler to the exhaust outlet pipe.

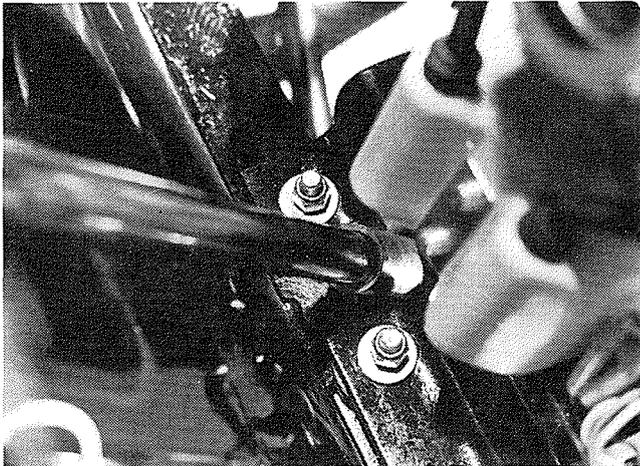


8. Remove the bracket securing the recoil starter handle to the right side of the console.

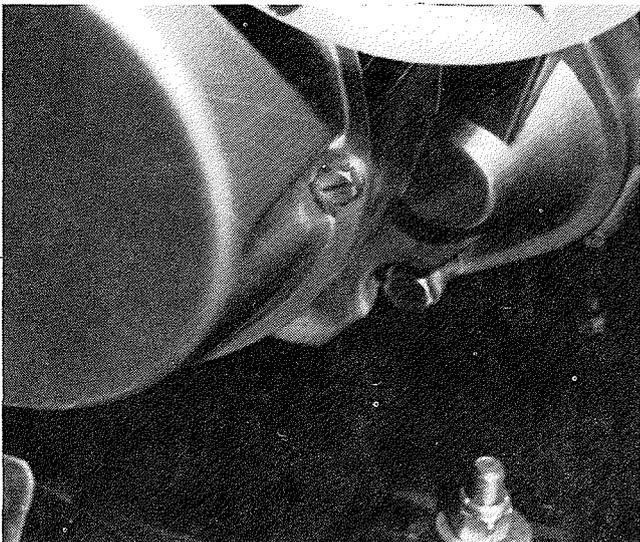


ENGINE SERVICING (TWIN CYLINDER)

9. On electric start models, perform the following:
 - A) Disconnect the negative (-) battery cable (black) from the negative (-) battery terminal.
 - B) Disconnect the regulator rectifier.
 - C) Disconnect the positive (+) battery cable (red) and the solenoid wires from the starter.
10. Loosen the locking collar at the base of the steering post with an Allen wrench. Slide collar up the steering post to keep it away from the engine base plate.
11. Remove the two (2) locknuts and flat washers that secure the rear of the engine base plate.

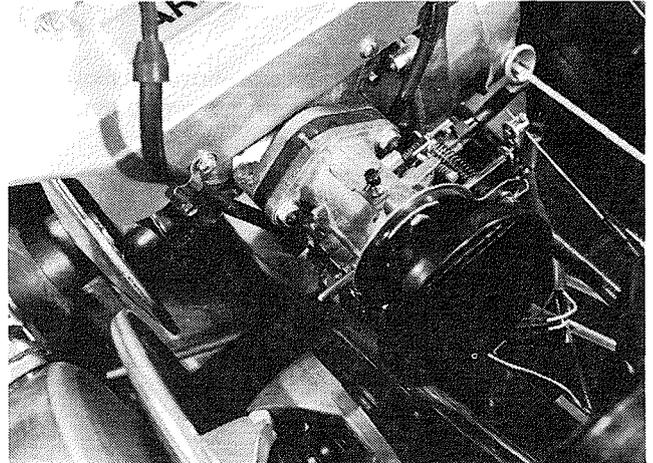


12. Remove the right front locknut and the outside two (2) locknuts at the left front side of the engine. Lift the engine out of the front end assembly.

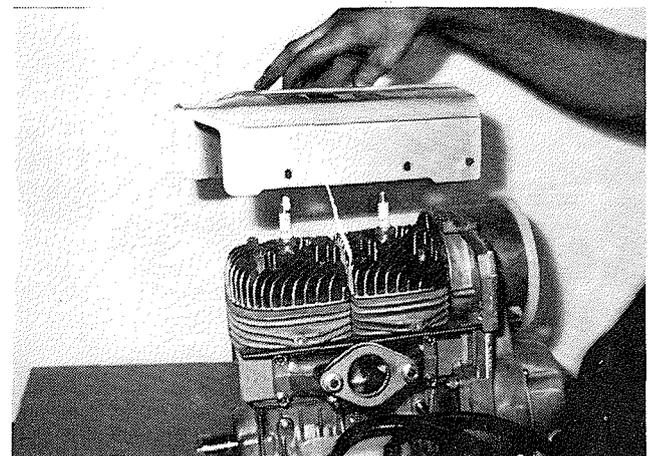


Engine Disassembly

1. Remove the four (4) nuts and lock washers securing the exhaust outlet pipe to the engine. Slide pipe off the mounting studs.
2. Remove the asbestos exhaust outlet gaskets.
3. Disconnect the impulse line from the engine. Remove the two (2) carburetor flange nuts and slide washers off the mounting studs. Carefully pull carburetor and the insulator block from the mounting studs. **CAUTION: Be sure the mounting studs do not back out; breakage of the carburetor ear could result when reassembling.**

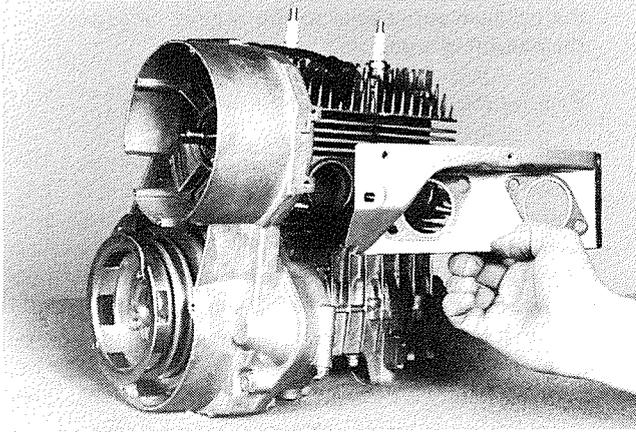


4. Remove the spark plug lead wires from the retainer clips.
5. Remove the ten (10) screws, flat washers and lock washers securing the cylinder head cover to the cylinder. Lift off cylinder head cover.

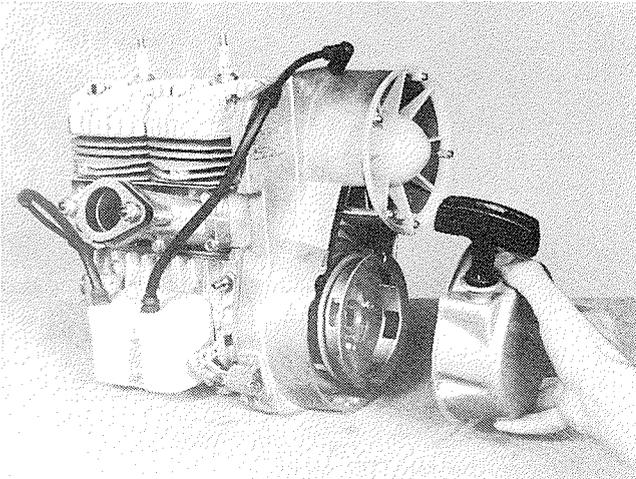


ENGINE SERVICING (TWIN CYLINDER)

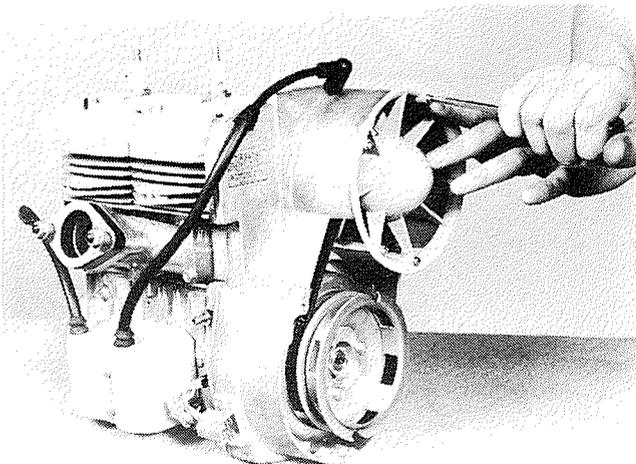
6. Remove the screw, flat washer and lock washer securing the front cylinder cover to the cylinder.



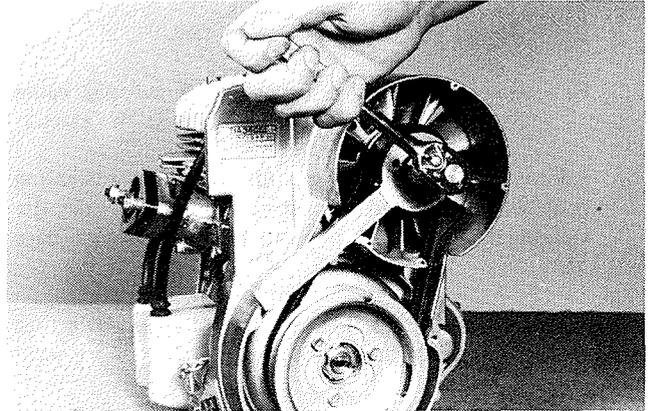
7. Using either a wrench or screwdriver, remove the three (3) bolts and lock washer securing the recoil starter assembly.



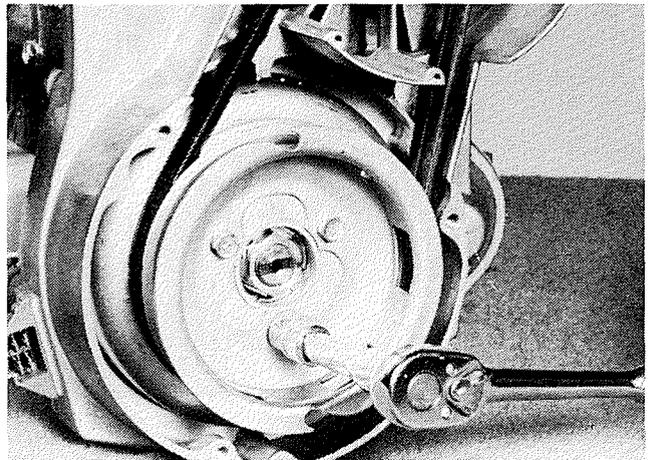
8. Disassemble the axial fan cover by removing the five (5) screws, lock washers and flat washers.



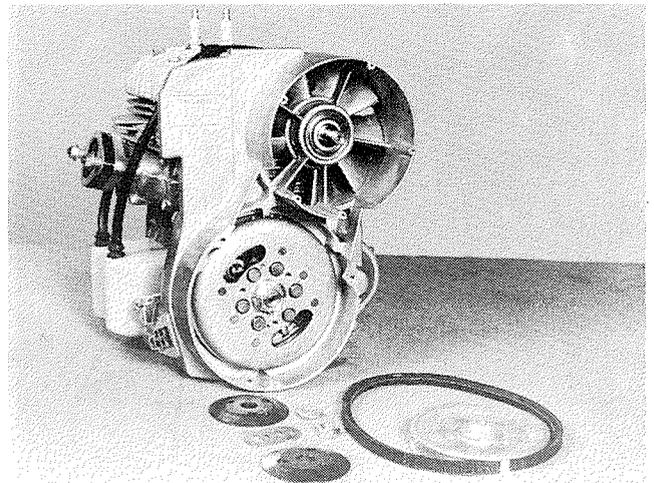
9. Using an axial fan holder (Arctic Part No. 0144-004) disassemble the axial fan by removing the locknut, lock washer, outer fan adjustment sheave, belt tension spacers, belt and inner sheave.



10. Remove the three (3) bolts and lock washers retaining the auxiliary rope pulley.

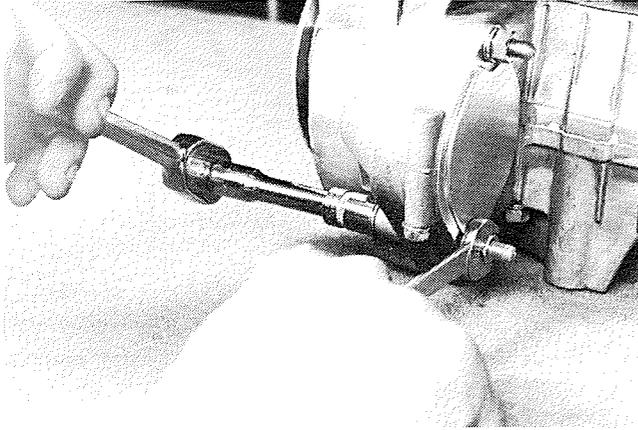


11. Disassemble the recoil pulley and the axial fan belt pulley into the component parts as shown below.

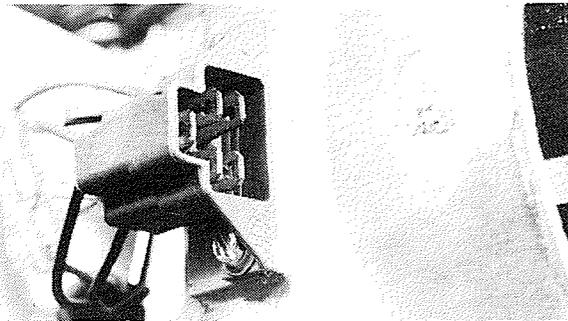


ENGINE SERVICING (TWIN CYLINDER)

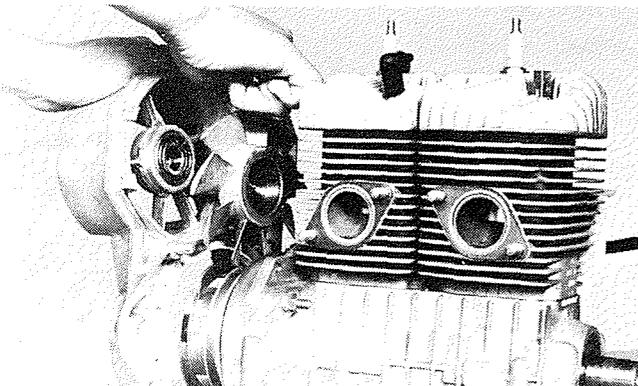
12. Disassemble the fan housing from the crankcase by removing the bolt, nut, lock washer, and flat washer as shown below. Also, remove the two (2) nuts, lock washers, and flat washers above and below the electric start opening. **NOTE: If engine is equipped with an electric starter, starter must be removed before fan housing can be disassembled.**



Next, remove the main wiring harness connector from the intake side of the fan housing and the two (2) nuts, lock washers, and flat washers securing the intake side of the fan housing to the crankcase.

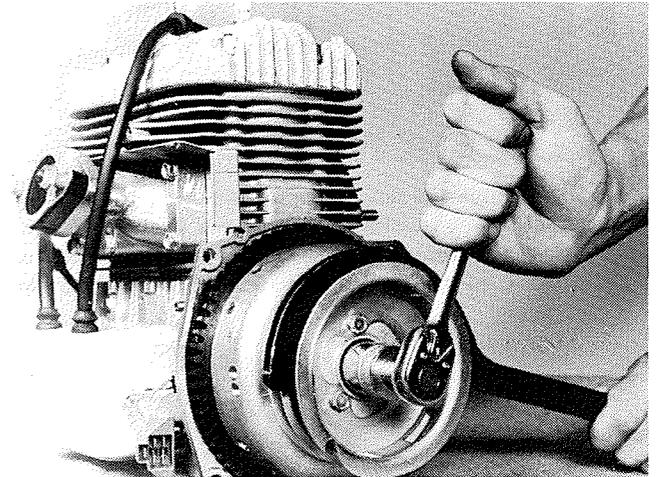


13. Disassemble the fan housing from the crankcase and remove the axial fan to expose the axial fan bearings. **NOTE: When removing the axial fan from the fan housing, observe the close tolerance of the fan blades with the fan housing. The two (2) bearings are separated by spacers and held in position by two (2) snap rings, located between the bearings.**

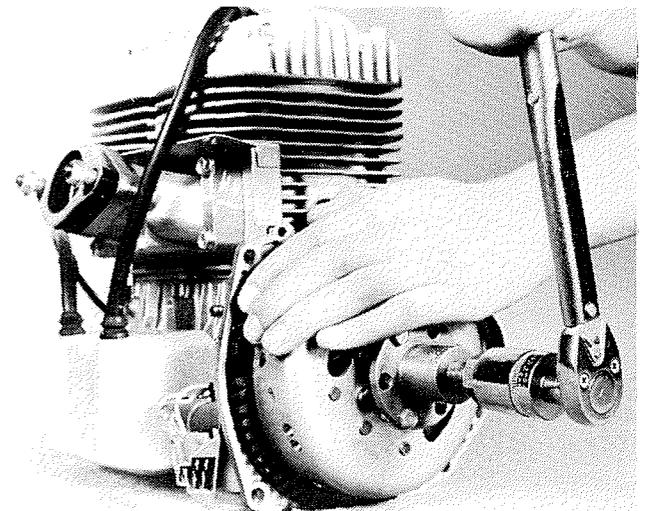


14. Remove the flywheel, using the following procedure:

- A) Using a small hammer with a punch or awl, bend the locking tabs away from the flywheel nut.
- B) Re-install the recoil pulley, using the three (3) bolts and lock washers.
- C) Using the flywheel holding tool and a 22mm socket, loosen the flywheel nut.

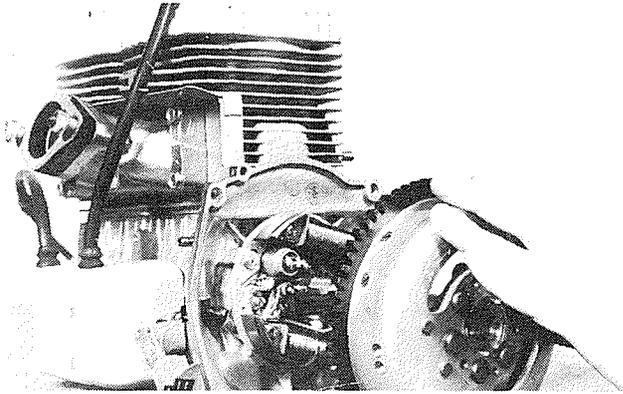


- D) Remove the recoil start pulley.
- E) Install the flywheel puller (Arctic Part No. 0144-002) to the flywheel, using the three (3) special case hardened bolts (Arctic Part No. 0144-008). Torque the three (3) bolts evenly.
- F) Tighten the main flywheel puller bolt until the flywheel freely disengages.

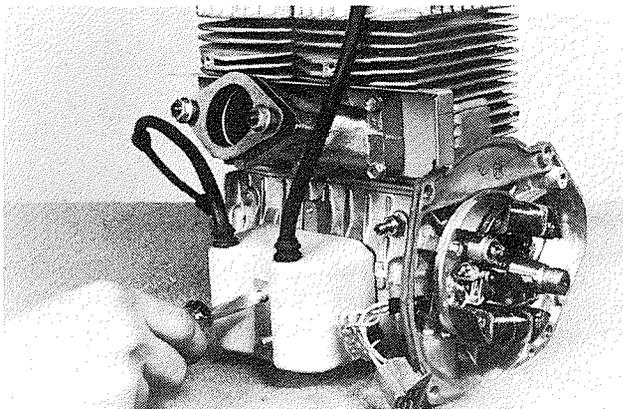


ENGINE SERVICING (TWIN CYLINDER)

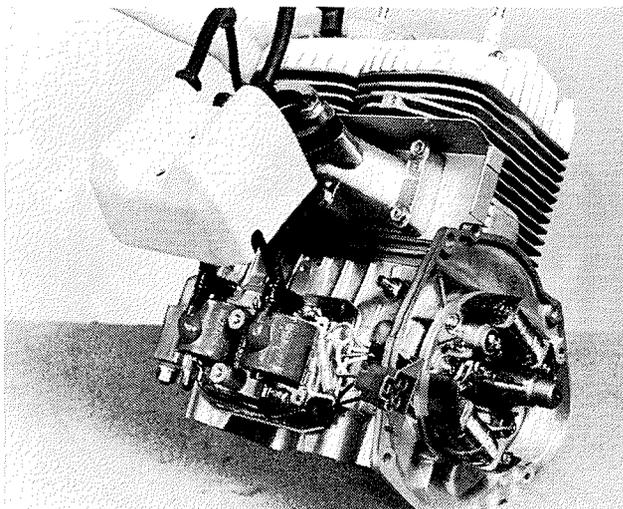
15. Pull the flywheel straight off the crankshaft and remove the flywheel puller from the flywheel. **CAUTION:** Always place the flywheel on a clean, dry area. Damage may result if dirt and other foreign particles come in contact with the flywheel. Position magnet ring upward.



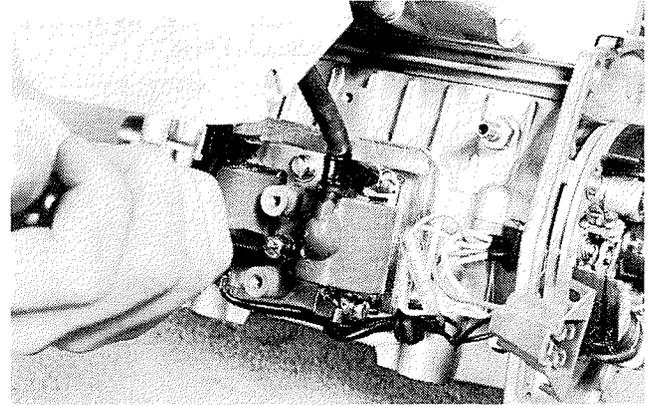
16. Disassemble the coil cover by removing the two (2) screws, lock washers, and washer plate. **NOTE:** Spray the spark plug lead wires with lubricant or silicone to facilitate sliding the coil cover up the wires.



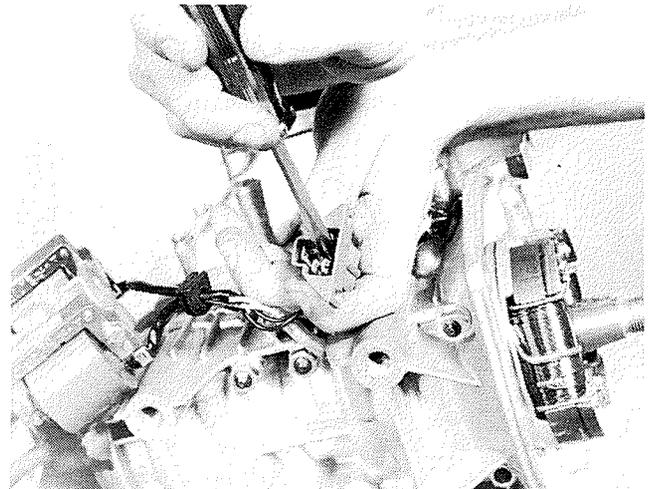
17. Slide coil cover upward on the spark plug lead wires.



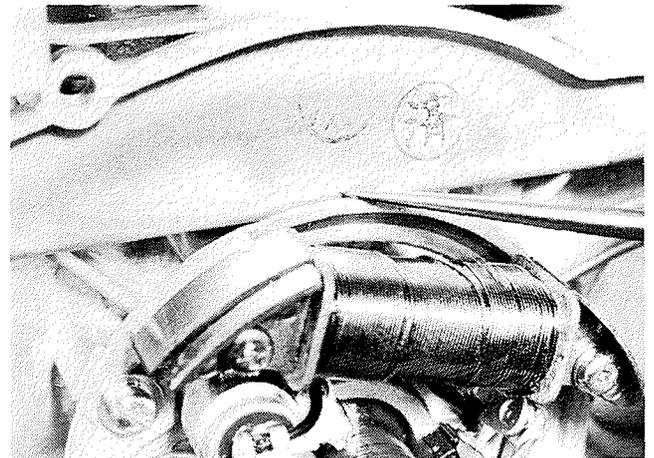
18. Disassembly of the coil bracket is accomplished by removing the two (2) screws and lock washers that retain coils to crankcase. When screws have been removed, both coils can be disassembled from the coil bracket.



19. Place end of small screwdriver into wire harness connector and press the split terminals together. Harness will now release from connector.

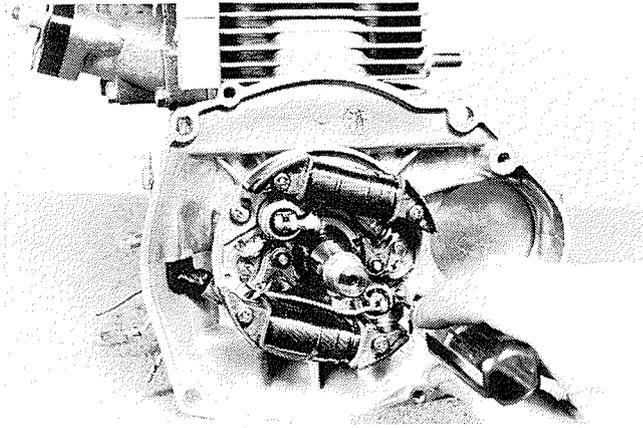


20. Prior to removing the magneto assembly, scribe a mark on the crankcase and the magneto base plate to insure proper installation placement.

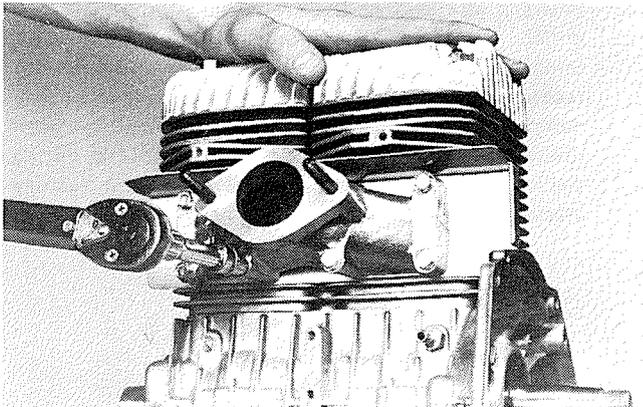


ENGINE SERVICING (TWIN CYLINDER)

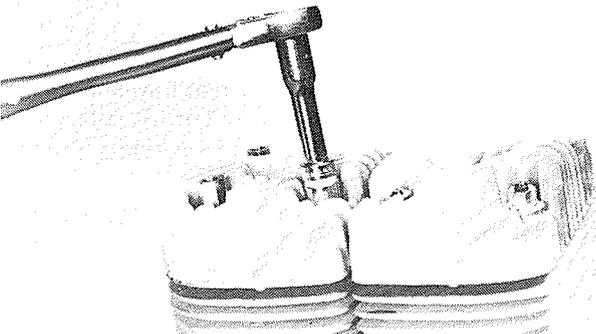
21. To disassemble the magneto assembly from the crankcase, remove the two (2) screws, lock washers, and flat washers. Holding the magneto assembly in one hand, carefully pull the wires through the grommet.



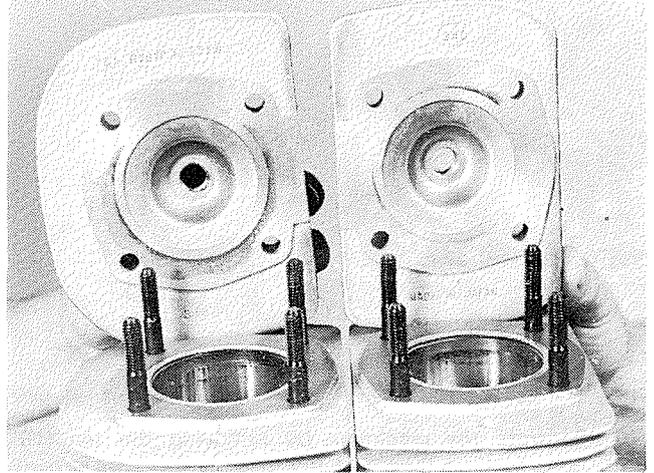
22. Disassembly of the intake manifold and the intake cylinder cover from the cylinders is accomplished by removing the six (6) bolts, lock washers, and flat washers. **NOTE:** A gasket is positioned between the intake manifold and cylinder cover, and also, between the cylinder cover and the cylinder.



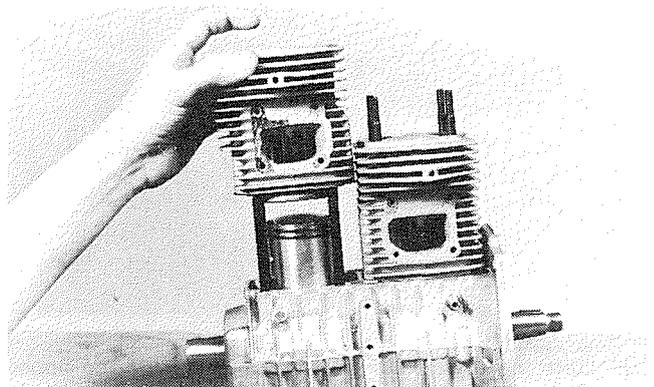
23. Disassemble the cylinder heads by removing the eight (8) nuts, lock washers, and flat washers. **NOTE:** The long nuts must be installed on the outside edge (PTO side) of the cylinder head during engine assembly.



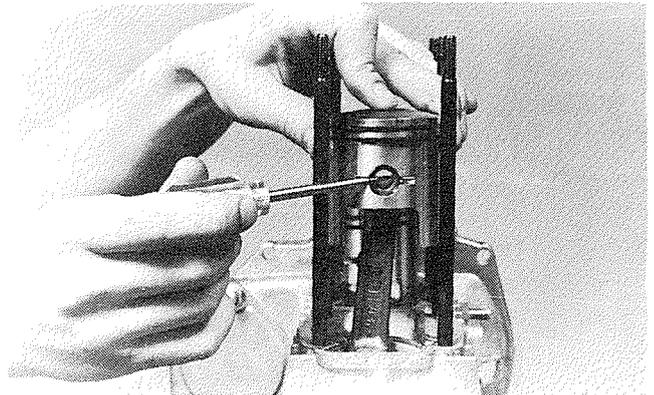
24. Remove the cylinder head and gasket. **NOTE:** It is advisable to replace the head gasket when reassembling a used engine.



25. Rotate the crankshaft until the piston reaches bottom dead center (BDC). Remove the cylinder and cylinder gasket.
26. Remove the opposite cylinder by following the same procedure as in step 25.

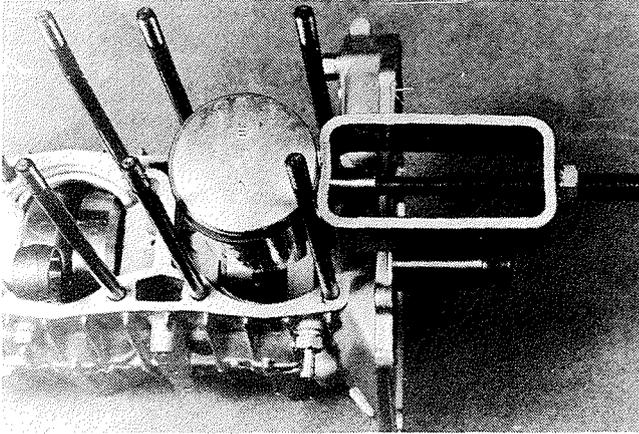


27. Remove the circlips from both ends of the piston pins of each cylinder.

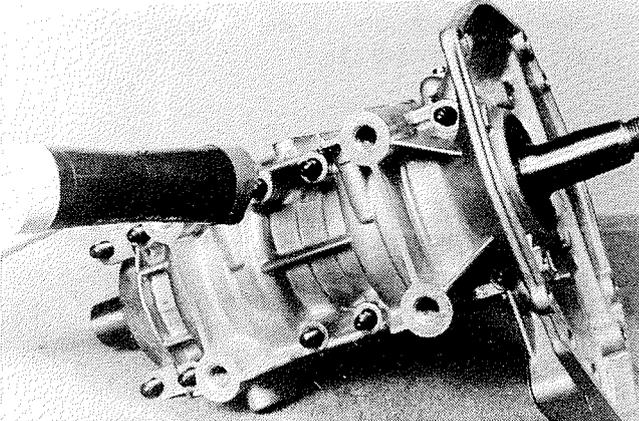


ENGINE SERVICING (TWIN CYLINDER)

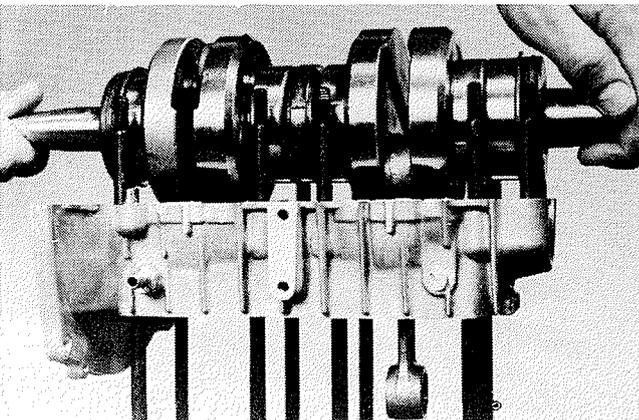
28. To disengage the piston from the connecting rod, use a piston pin extractor (Arctic Part No. 0144-003) and remove the piston pin from the piston.



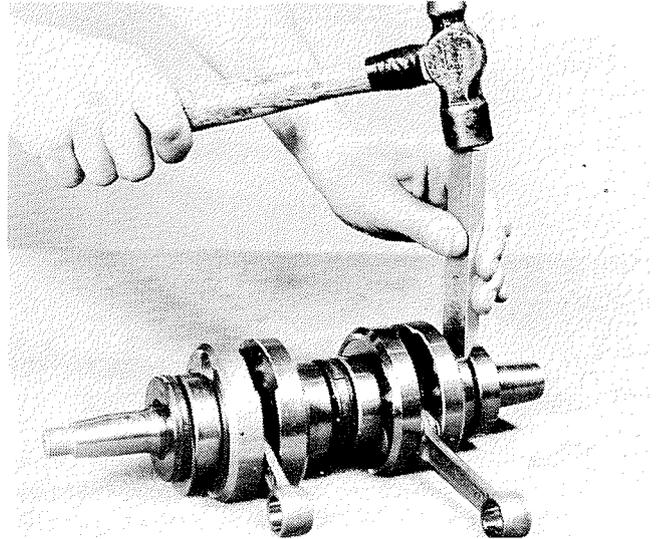
29. Separate the crankcase by removing the ten (10) nuts, lock washers, and flat washers from the bottom of the crankcase and the vertical bolt at the electric start mount. When all fasteners have been removed, use a plastic mallet and tap the end of the crankcase studs.



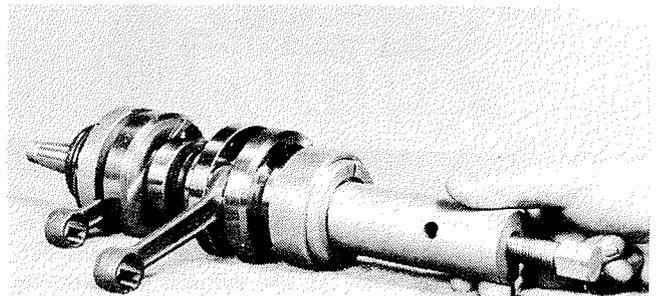
30. Lift the lower half of the crankcase off the upper half. Remove crankshaft assembly from upper half of the crankcase.



31. Crankshaft repair should be limited to end seal and main bearing replacement. Separate the main bearings from the counterweights to allow bearing puller to be installed. **NOTE: Care should be exercised to prevent misalignment of the crankshaft.**



32. Install the bearing puller (Arctic Part No. 0144-006) on the crankshaft and remove the main bearing. When pulling the PTO side bearings, insert a spacer between the end of the crankshaft and the bearing puller. **NOTE: The crankshaft is a factory assembled unit, and therefore, disassembly is not recommended. No warranty will be allowed on any component of the engine if the crankshaft has been disassembled. If the crankshaft should fail during the warranty period, replace with a new factory assembled unit.**



33. Disassemble the recoil assembly (see Recoil Disassembly, page 44).
34. At this point, the engine and recoil assembly have been completely disassembled. Clean all component parts and replace any defective or questionable items.

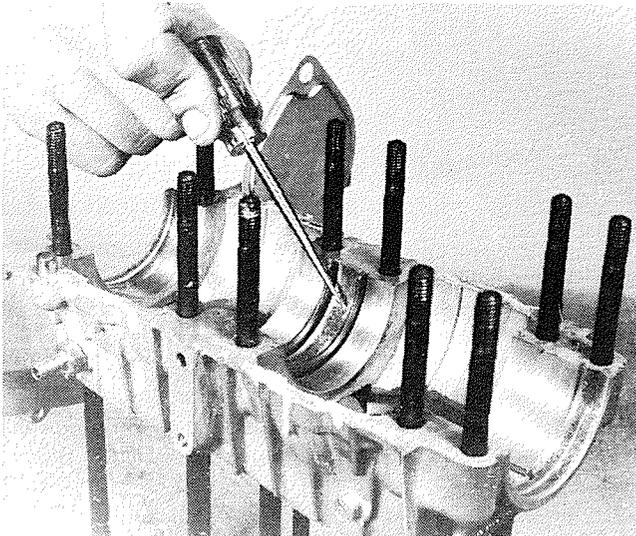
Engine Assembly

1. Clean crankcase halves and the seal areas with a solvent. Remove old sealer from any matched metal

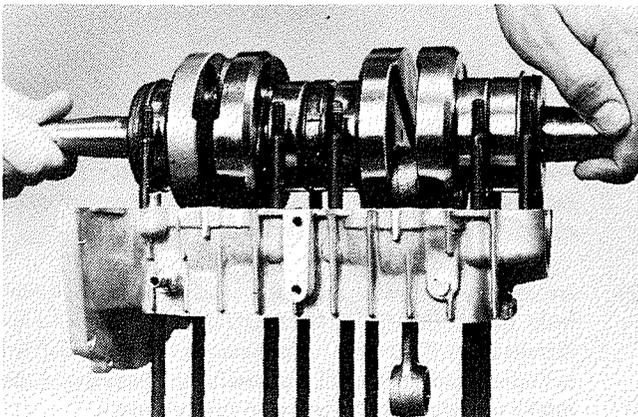
ENGINE SERVICING (TWIN CYLINDER)

surface. **CAUTION:** Do not scratch or damage any surface area that must be sealed. An improper seal may cause engine damage.

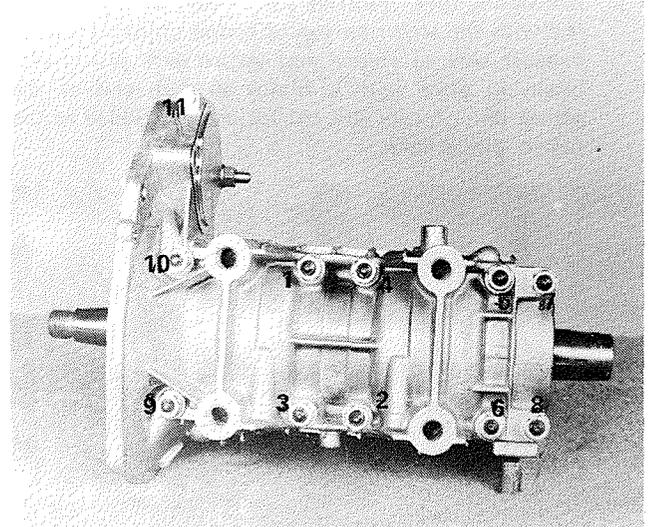
2. Position the upper half of the crankcase upside down on the cylinder studs and apply locktite to the center seal area of the crankcase. **NOTE:** Remove and discard the two (2) half-washers shown below.



3. Support the crankshaft between the flyweights and install the main bearings. Crankshaft is supported to prevent accidental misalignment while the bearing is being pressed on the crankshaft.
4. Inspect the crankshaft seals and replace if necessary to insure a good seal. Pack the oil seal lips with bearing grease.
5. Place the crankshaft in the top half of the crankcase. Insure the center seal of the crankshaft will seat between the two (2) grooves in the crankcase.



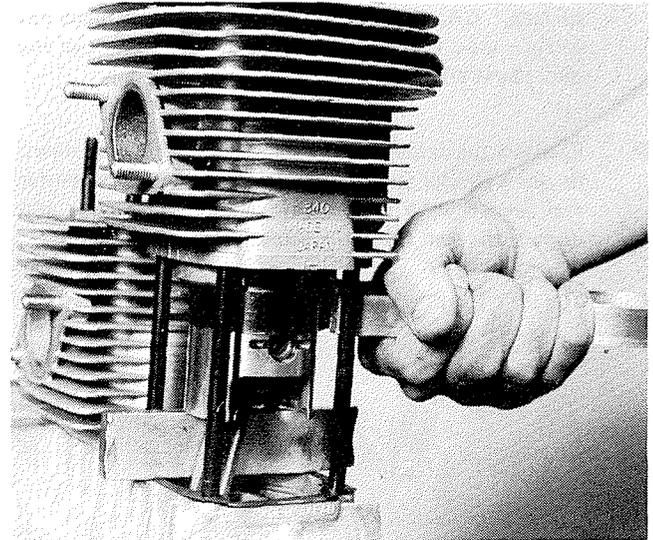
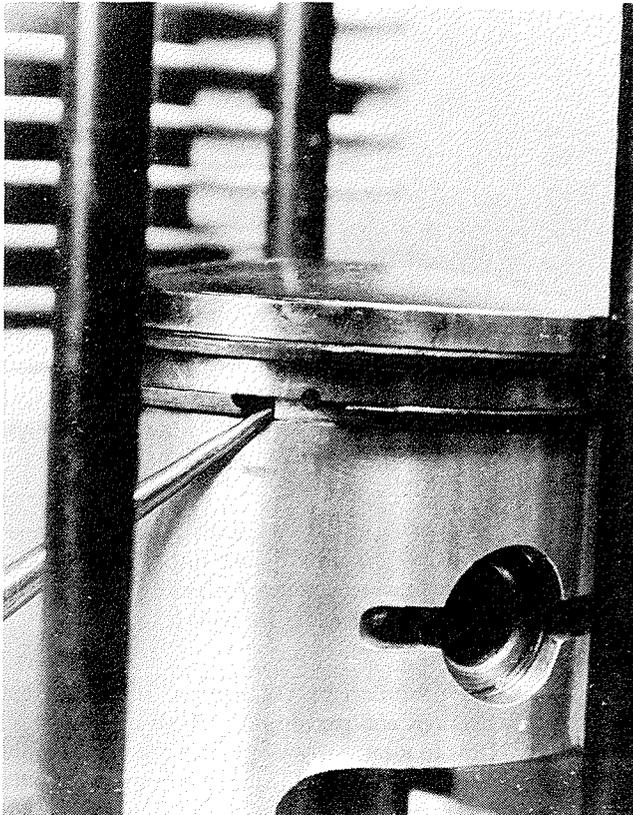
6. Using crankcase sealer (Arctic Part No. 3000-211), assemble the lower half of the crankcase to the upper half. Using the sequence shown in the photo, replace the flat washers and lock washers and torque all nuts (1-10) to 16 ft./lbs.



7. Bolt (11) at the side of the electric start mount should be torqued to 5 ft./lbs.
8. If the original piston is being installed, clean and decarbonize piston and cylinder head. **NOTE:** Piston ring grooves must be perfectly clean before any upper end components are replaced.
9. Check the condition of the pistons, rings, and the needle bearings and piston pins. Rings are the most likely items to wear, therefore, check each ring before installing on pistons. **NOTE:** Worn rings can usually be detected by an increase in end gap or by discoloration of the piston skirt due to "blowby".
10. Check the cylinder walls; replace cylinder if damage is evident. If only small deposits of aluminum have adhered to the cylinder wall (no grooves), the cylinder may be salvaged by a very light honing process.
11. Check the ring end gap by placing the ring in the lower portion of the cylinder and lightly press the ring with the top of the piston. With a feeler gauge, insure that the ring end gap is .008" - .016".
12. If a new piston is being installed, always use a new set of rings.

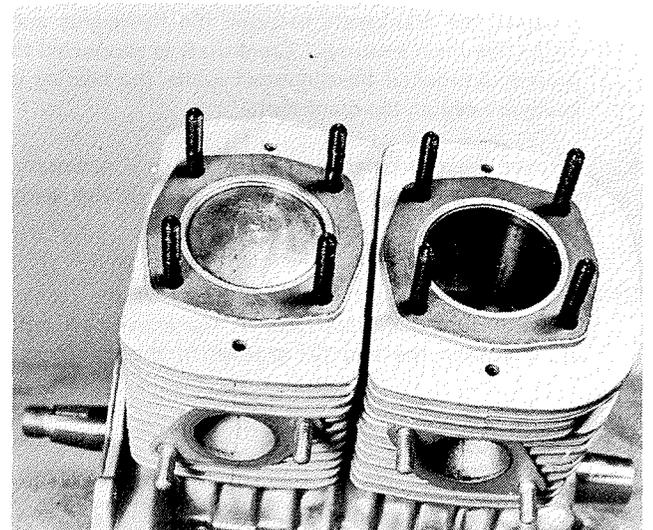
ENGINE SERVICING (TWIN CYLINDER)

13. If either the piston pin or needle bearing need replacement, replace as a complete set.
14. Install the open ends of the rings between the piston ring groove pins.
15. Install the needle bearings in the upper end of the connecting rods. Position piston over the connecting rod with the arrow on top of piston pointing toward exhaust side of engine and secure with piston pin; retain in place with a circlip on each end of the piston pin. Insure the circlips are positioned in the piston pin grooves.



16. Insure the gasket areas of the crankcase and the bottom of the cylinders are clean. Install new cylinder base gaskets.
17. Lubricate the upper and lower rod bearings, sides of pistons, rings, and the cylinder walls with Arctic Cat Purple Powerlube.
18. Using a wooden or soft metal block for support, rotate the crankshaft until the piston skirts rest on the support block. **NOTE: Do not damage the cylinder base gasket.**
19. Install a piston ring compressor (Arctic Part No. 0144-001) over the piston rings. Compress the piston rings and slide the cylinder onto the crankcase studs. Also perform this step on the opposite cylinder.

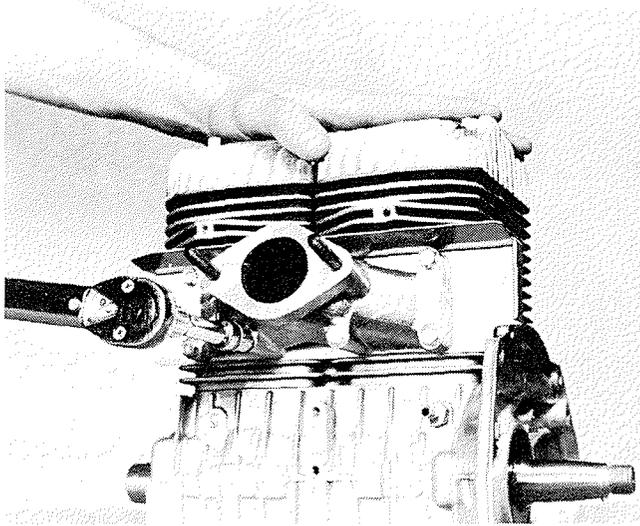
20. When cylinder is adequately installed, carefully remove the block from under the piston, insuring that the cylinder base gasket is not damaged.
21. Insure each piston is installed correctly. Proper installation is obtained when the arrow on top of the piston points toward the exhaust side of the engine.
22. Install new head gaskets. **NOTE: DO NOT use gasket sealer.**



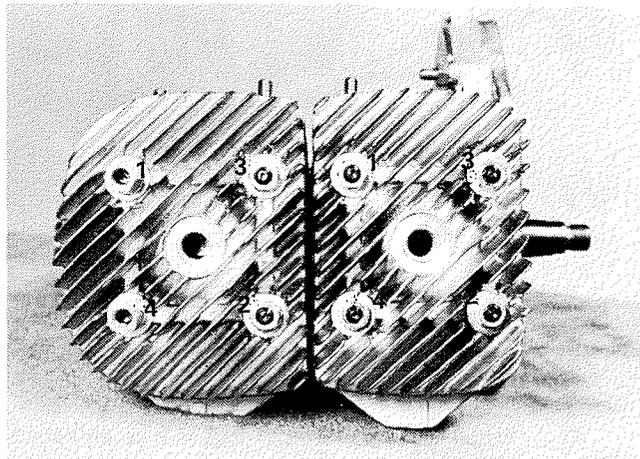
23. Position the appropriate cylinder head on the corresponding cylinder. Note the difference between each of the cylinders and heads.
24. Install the flat washers, lock washers, and cylinder head nuts **FINGER TIGHT ONLY**; long nuts to be installed on PTO side. **Important: Do not tighten cylinder head nuts until the intake air shroud and the intake manifold are installed to the cylinders.**

ENGINE SERVICING (TWIN CYLINDER)

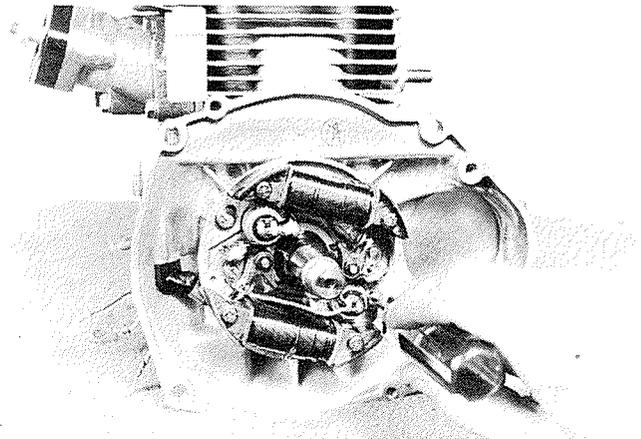
25. Using a lock washer and bolt, install the intake air shroud and the intake manifold, making sure that a gasket is positioned on both sides of the air shroud. Torque the six (6) bolts from 2 - 4 ft./lbs. **NOTE: If lock washers are not installed, bolts may bottom out and twist off. The two (2) longest bolts must be installed at the bottom of the intake manifold.**



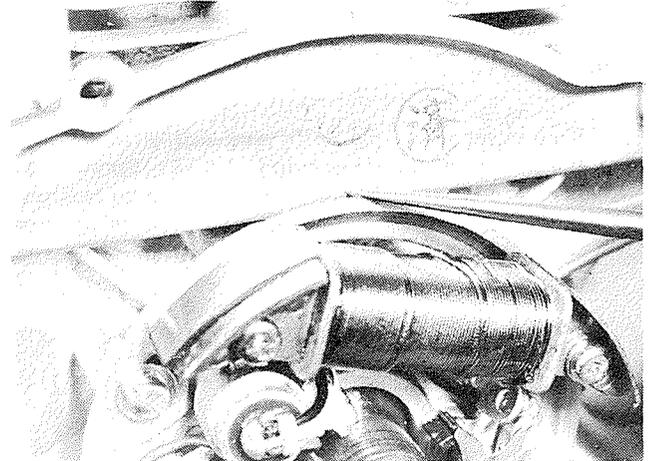
26. Now torque the cylinder head nuts to 16 ft./lbs., using the indicated crisscross sequence. **NOTE: Insure the long nuts have been installed on PTO side of engine.** Loosen the intake manifold bolts and re-torque from 2 - 4 ft./lbs.



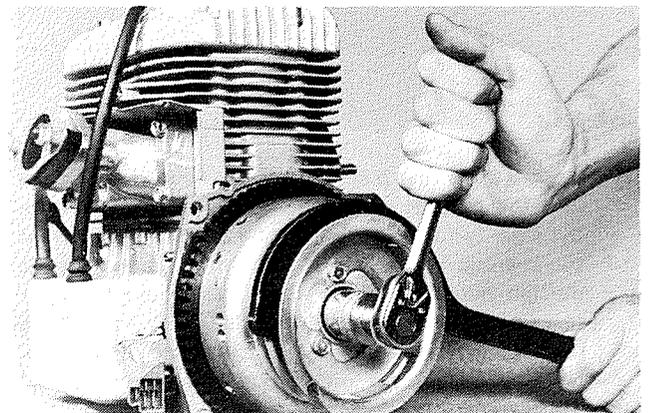
27. Re-install the magneto assembly by sliding the wires and rubber grommet through the grommet cutout in the crankcase. Insure grommet is fully seated (see top right column photo). **NOTE: A light coating of silicone or spray lubricant will aid in seating the grommet.**



28. Align the scribe mark made on the magneto assembly plate and on the crankcase and tighten screws securely.

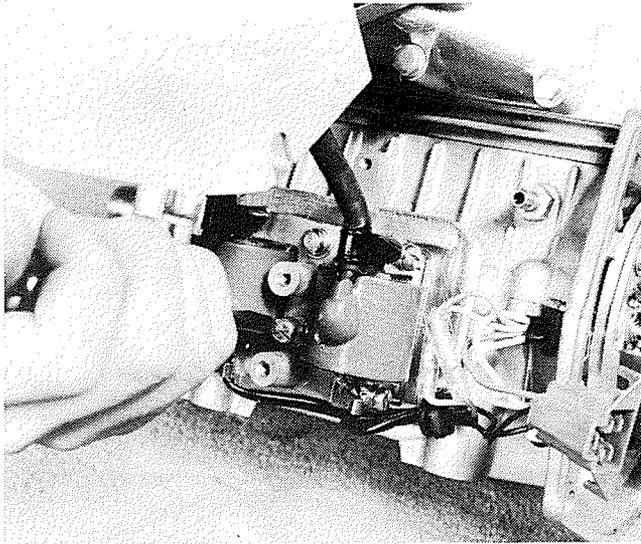


29. Assemble the flywheel to the crankshaft with the special lock washer and locknut. Temporarily install the auxiliary rope pulley to aid in tightening the flywheel nut. Using a flywheel holding tool (Arctic Part No. 0144-007) and a 22mm socket, torque the flywheel nut to 60 ft./lbs. Remove the auxiliary rope pulley. **BEND THE LOCK WASHER LOCKING TAB TOWARD THE FLYWHEEL NUT TO PROPERLY LOCK IN PLACE.**

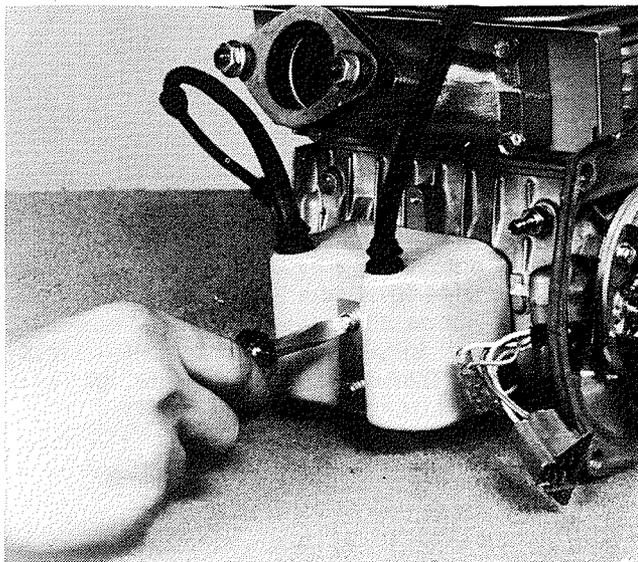


ENGINE SERVICING (TWIN CYLINDER)

30. Assemble the coils in the coil bracket. Secure the coils and coil bracket to the crankcase with two (2) lock washers and screws.



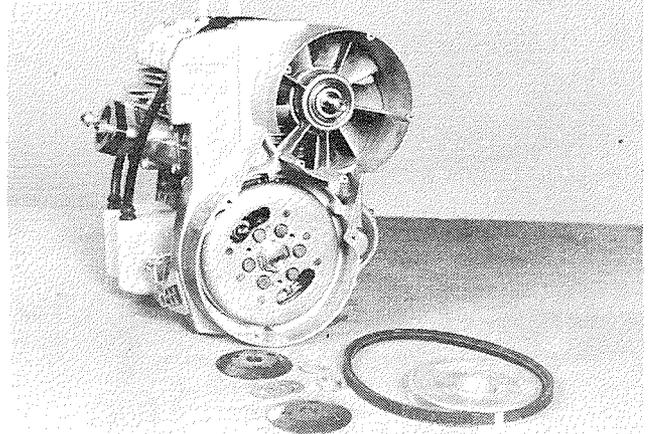
31. Slide cover down the spark plug lead wires and into the proper mounting position. **NOTE: Spray spark plug lead wires with lubricant or silicone to facilitate sliding the coil cover.** Secure coil cover in position with the washer plate, two (2) lock washers and screws.



32. Using a snap ring pliers, insert the two (2) snap rings into the grooves of the fan housing hub. Lubricate the axial fan bearings with light oil and press one of the bearings into the inside face of the hub. Rotate the fan housing and install the spacers on the inner race of the previously installed bearing. Press remaining bearing into the outside face of the hub. **NOTE: For proper installation, protective seals of the bearings must face outward.**

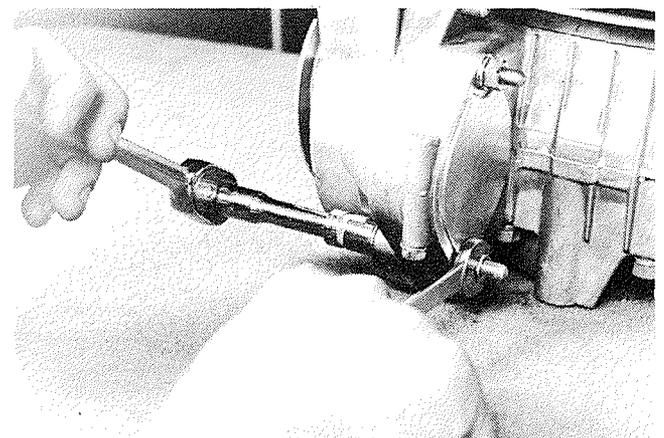
33. Slide the axial fan shaft through the fan housing bearings.

34. Assemble the inner pulley sheave, belt tension spacers, outer pulley sheave, and the lock washer on the axial fan shaft. Secure the entire axial fan assembly in place with the lock washer and locknut.



35. Install the axial fan housing assembly to the crankcase, using the following procedure:

- A) Using two (2) flat washers, lock washers, and nuts, secure the intake side of the fan housing to the crankcase.



- B) Replace the main wiring harness connector on the intake side of the fan housing.

- C) Install electric starter if engine is so equipped.

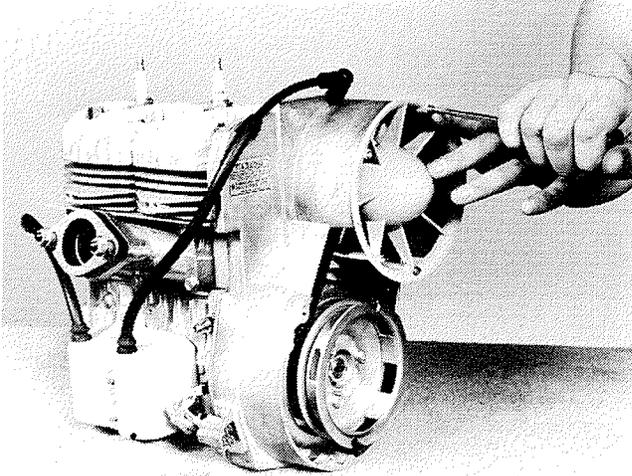
- D) Secure the exhaust side of the fan housing with the two (2) flat washers, lock washers, and nuts above and below the electric start opening.

- E) Install the bolt through the fan housing and the lower hole of the electric start opening. Secure in place with flat washer, lock washer and nut (see top left column photo, page 41).

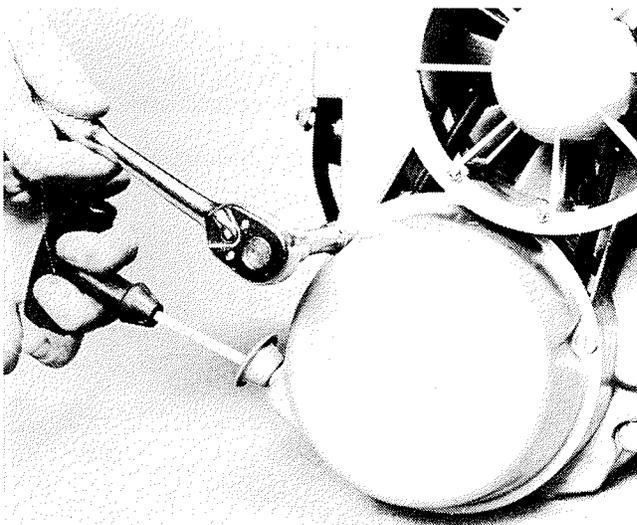
ENGINE SERVICING (TWIN CYLINDER)

F) Connect all wiring to the wiring harness.

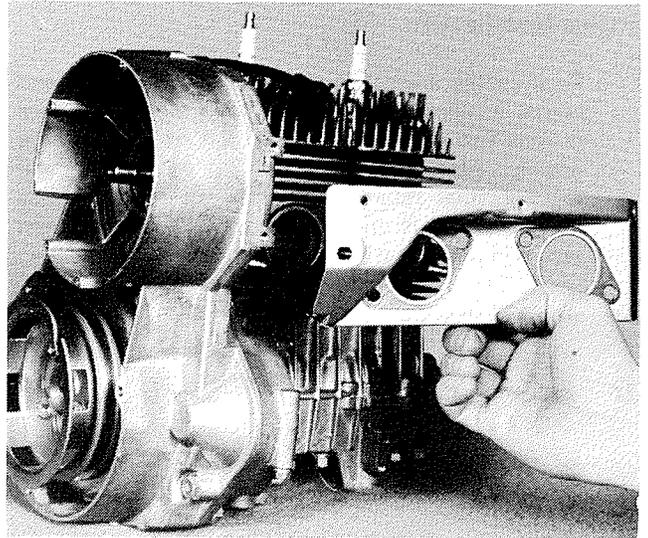
36. Properly time the engine (see Timing, page 47).
37. When the engine has been timed, replace the axial fan drive belt, fan drive pulley, and the auxiliary rope pulley with three (3) lock washers and bolts. Torque the bolts to 5 ft./lbs. Replace the fan cover.



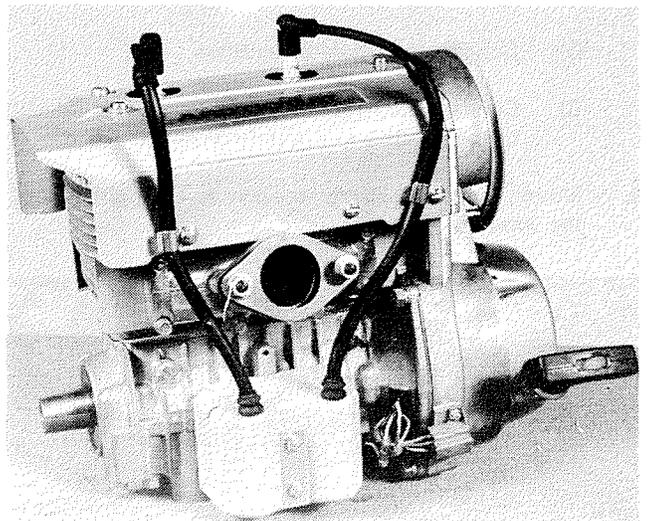
38. Install the recoil starter assembly to the engine with three (3) lock washers and slotted bolts. Tighten the bolts to a point just before binding of the recoil assembly occurs. Pull the recoil rope out approximately six (6) to ten (10) inches or until the pawls engage securely, centering the recoil assembly. Torque the mounting bolts to 5 ft./lbs.



39. Place two (2) asbestos gaskets on the exhaust outlet mounting studs. Secure cover in place with a flat washer, lock washer and screw. A gasket should also be positioned on the outside of the cover.



40. Replace the cylinder head cover, using ten (10) flat washers, lock washers and screws. **NOTE: Two (2) of the fasteners are used to secure the spark plug lead wire retainer clips in conjunction with the cylinder head cover (see step 41).**
41. Position the spark plug lead wires under the retainer clips and secure clips in place with two (2) flat washers, lock washers and screws.

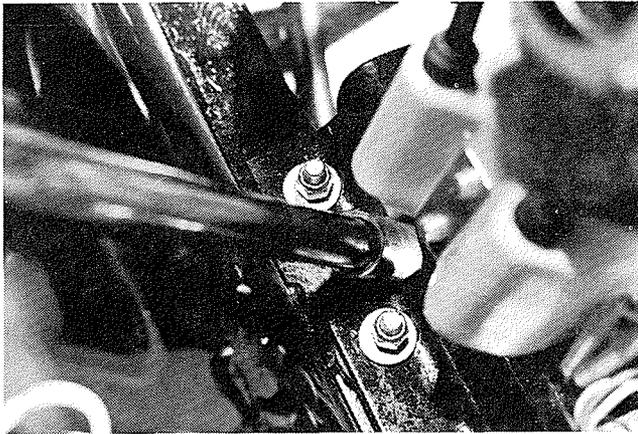


42. Install a carburetor insulator gasket, insulator block, insulator gasket, and the carburetor on the mounting studs. Secure the carburetor in place with two (2) collars, flat washers, lock washers and nuts. Connect the impulse line to the engine.
43. Mount the exhaust outlet pipe by placing new asbestos gaskets and the outlet pipe on the mounting studs. Secure in place with four (4) lock washers and nuts.

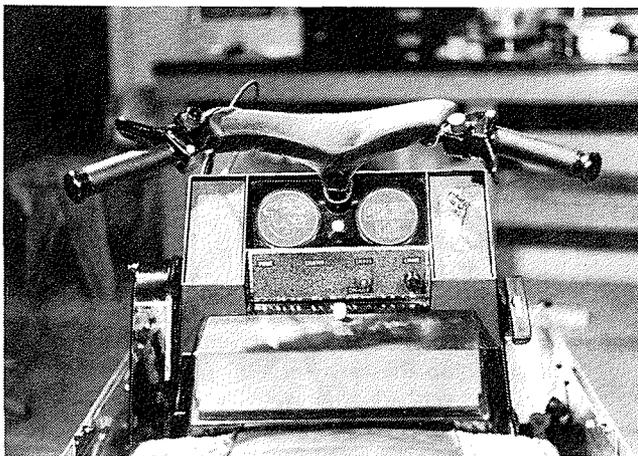
ENGINE SERVICING (TWIN CYLINDER)

Engine Installation

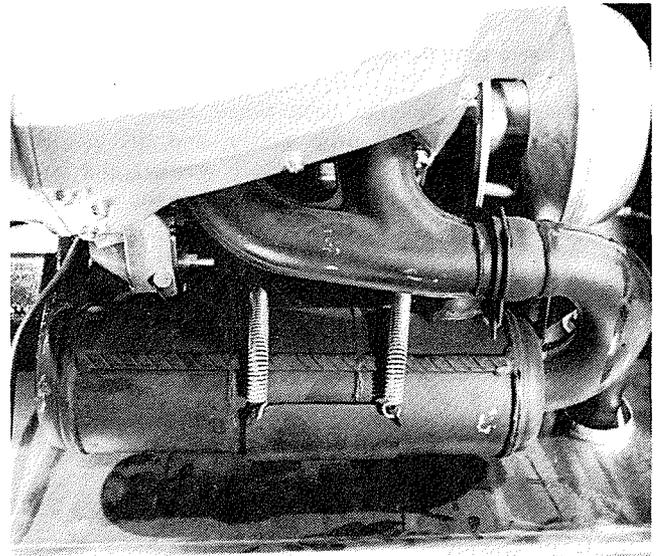
1. Position the engine on the front end assembly and secure in place with the right front locknut and the outside two (2) locknuts at the left front side of the engine. Also, replace the two (2) flat washers and locknuts that retain the rear of the engine. Slide locking collar to the base of the steering post and secure in position with an Allen wrench.



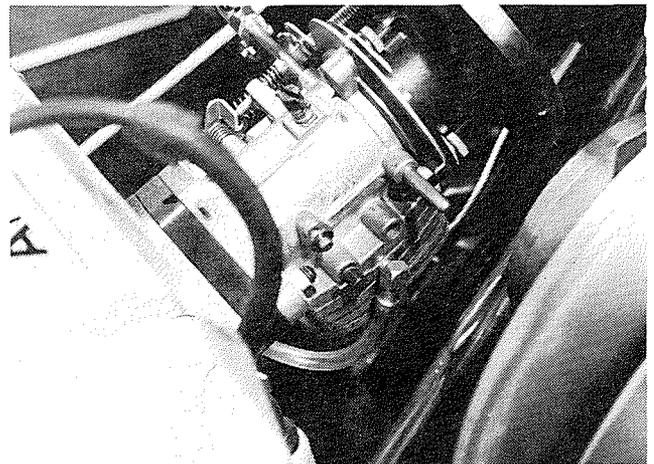
2. On electric start models, perform the following:
 - A) Connect the positive (+) battery cable (red) and the solenoid wires to the starter.
 - B) Connect the regulator rectifier.
 - C) Connect the negative (-) battery cable (black) to the negative (-) battery terminal.
3. Mount the recoil starter bracket to the right side of the console.



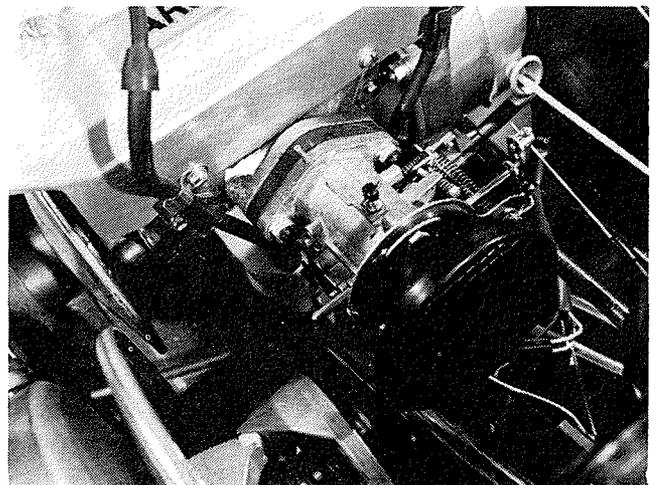
4. Assemble the muffler to the exhaust outlet pipe and secure in place with the wire clip and retaining springs.



5. Connect the inlet fuel line and the vapor return line at the carburetor.

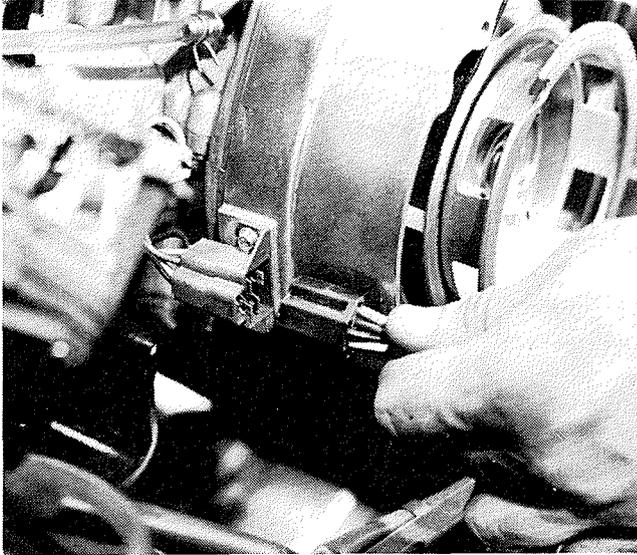


6. Connect the choke and the throttle cables at the carburetor.

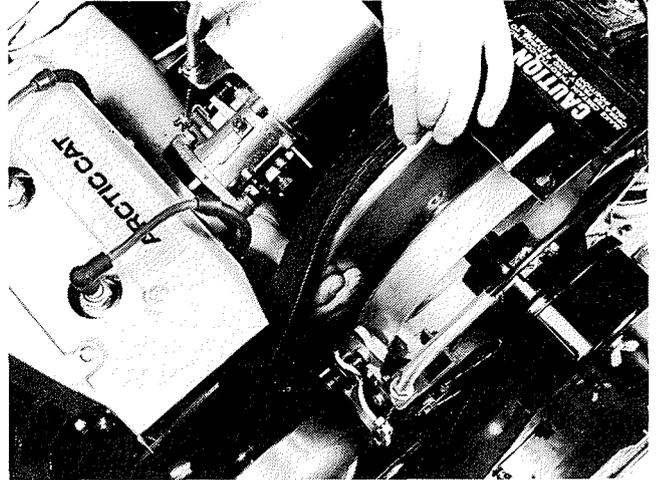


ENGINE SERVICING (TWIN CYLINDER)

7. Connect the ignition/headlight harness to the connector at the recoil side of the engine.



8. Replace the drive belt.



9. Connect the spark plug lead wires to the spark plugs.
10. Finally, close or replace the hood, whichever was performed to facilitate engine removal and servicing.

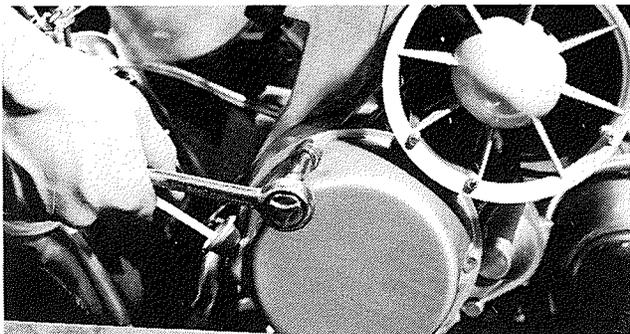
ENGINE SERVICING (TWIN CYLINDER)

Recoil Starter Disassembly

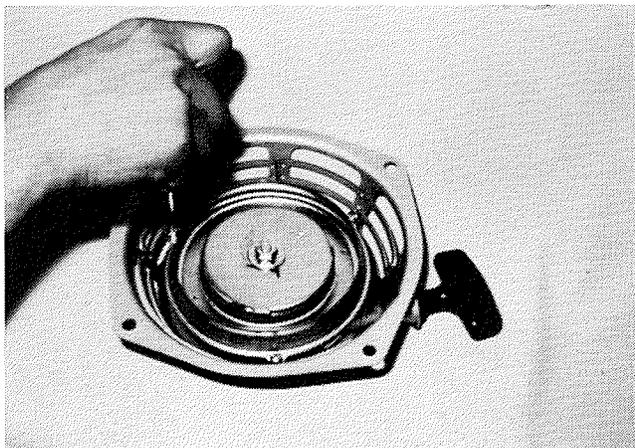
1. Remove the recoil starter handle from the right side of the console.



2. Disassemble the recoil starter from the engine by removing the three (3) bolts and lock washers.



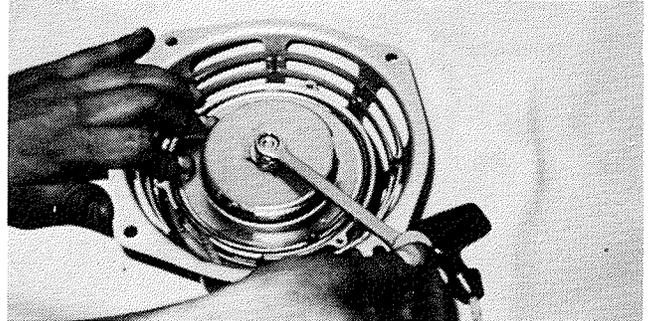
3. If the recoil starter is so equipped, remove the water-proofing plate.



4. Release the preload on the recoil starter spring by using the following procedure:

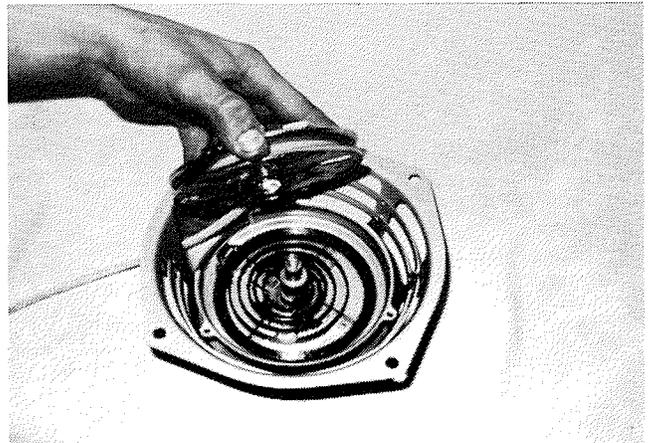
- A) Pull rope outward until rope can be positioned in the notch of the recoil reel.
- B) Rotate the reel assembly clockwise.
- C) Rotate the recoil reel a sufficient number of turns so that when the reel is released, slack will remain in the rope.

5. Remove the outside retaining nut, lock washer and flat washer which secure the entire assembly in position.



6. Lift out the internal components and pay special attention to the location and relative position of each component part. **NOTE: Observe the positioning of the small return spring.**

7. Carefully lift out the reel, making sure that the main recoil spring is not accidentally pulled out. **NOTE: The main spring should not be removed from the case unless it is necessary to clean or replace it.**



8. Observe the general condition of the nylon recoil rope. If there are any signs of wear or deterioration, replace with a new Arctic recoil rope.

9. If the main recoil spring must be removed, carefully lift the spring out, protecting against a sudden uncoiling of the spring.

WARNING

Personal injury may be incurred if the spring should suddenly uncoil and strike the mechanic or a bystander.

ENGINE SERVICING (TWIN CYLINDER)

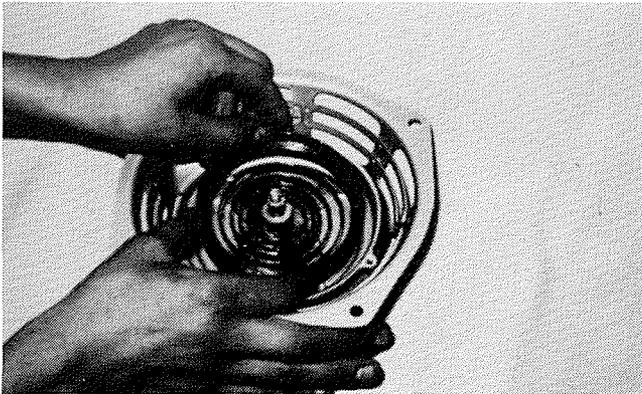
Inspection/Cleaning

1. Inspect all parts for wear or damage; replace all necessary parts.
2. Remove lubricant buildup from parts by washing in a cleaning solvent.

Recoil Starter Assembly

1. Lubricate the component parts of the recoil assembly with petroleum jelly or light grease. **NOTE: Free movement of the recoil mechanism depends upon lubrication between the coils of the main recoil spring.**
2. Wind the main recoil spring, using the recoil spring tool (Arctic Part No. 0144-005).
3. Wind the spring into the tool, starting with the outer coil (end with hook), and press the inner coils into position one by one.

CAUTION: Spring must be wound in a counterclockwise direction with the hook on the spring in contact with the lug of the outer case.

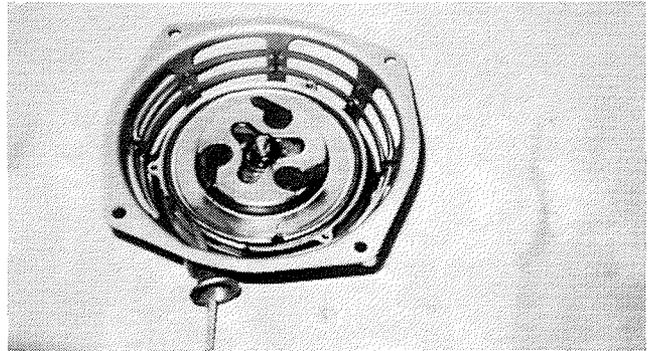


4. Position the recoil spring tool in the outer case and transfer the spring from the tool to the outer case.

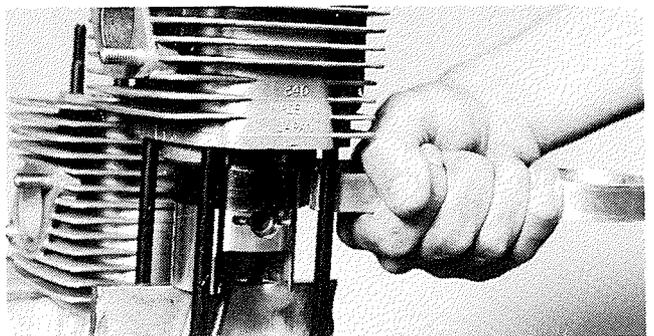
5. Install the rope and recoil reel over the recoil spring so that the center lug of the recoil reel engages with the inner hook of the main spring.



6. Install the dished washer, three (3) engagement pawls, pressure spring, and the return spring.

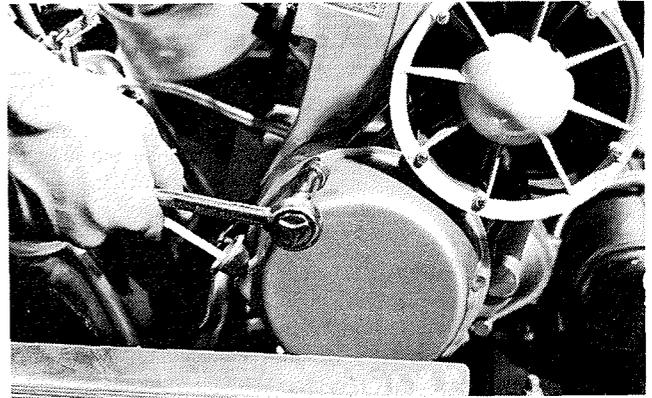


7. Install the retainer cover so that the end of the return spring protrudes through the retainer cover.
8. Rotate the retainer cover one-third turn clockwise to slightly preload the spring.
9. Replace the center flat washer, lock washer and nut.
10. If the recoil rope handle was not removed during disassembly, position the rope in the notch of the recoil reel and rotate the recoil reel two (2) turns counterclockwise to preload the recoil spring.



ENGINE SERVICING (TWIN CYLINDER)

11. If the recoil rope handle was removed, turn recoil reel three (3) turns counterclockwise and insert the end of the rope through the hole in the recoil case.
NOTE: There should be evidence of rope tension.
12. Tie a knot temporarily to retain the rope and install the recoil rope handle.
13. Pull the recoil rope to insure the recoil starter assembly is operating properly (pawls must extend and retract).
14. Install the recoil starter assembly to the engine, using three (3) lock washers and bolts.

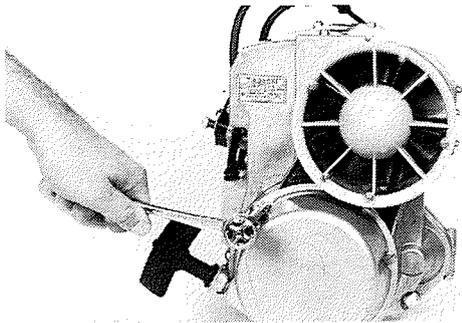


15. Install the recoil starter handle to the right side of the console.

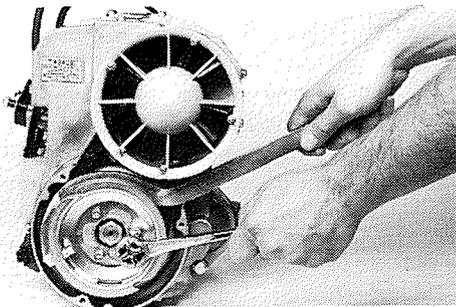
ENGINE SERVICING (TWIN CYLINDER)

Timing (Twin Cylinder)

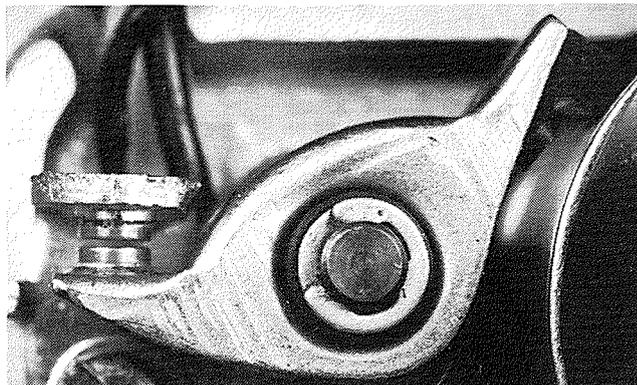
1. Disconnect the spark plug lead wires and remove the spark plugs from the cylinder heads.
2. Disassemble the recoil starter from the engine by removing the three (3) bolts and lock washers.



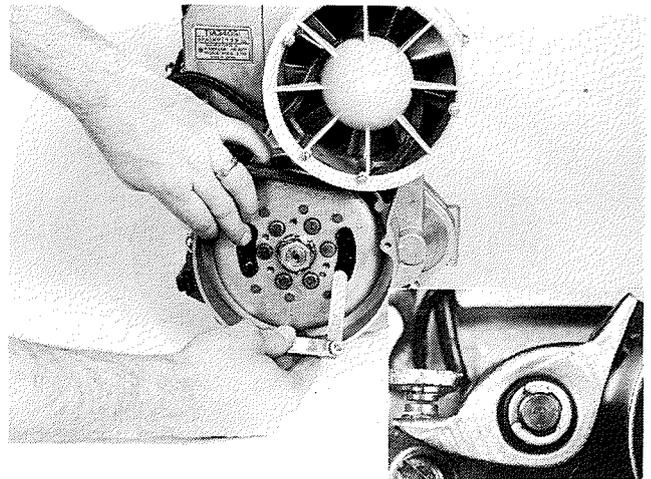
3. Remove the auxiliary starting pulley from the magneto ring plate, using the holding tool (Arctic Part No. 0144-007). The axial fan drive pulley must now be removed.



4. Inspect the condition of both breaker point sets; if pitted or burnt, replacement is necessary. **NOTE:** Points may be resurfaced (cleaned) by inserting a piece of paper between the points and rubbing it against the contact surfaces. "Snap On Flex Stone" used in conjunction with spray cleaner may also be used to resurface both point sets.
5. Rotate the crankshaft until the left set of points are in a fully-open position.



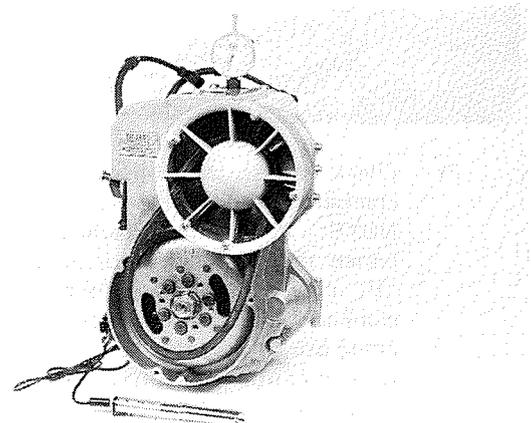
6. Rotate the crankshaft 180° or until the set of points on the right are in a fully-open position.
7. Adjust the points from .012" to .016", using a screwdriver and feeler gauge. **NOTE:** Adjusting point gap changes the ignition timing on only one cylinder. Conversely, adjusting the stator plate changes the ignition timing of both cylinders.



8. After the points are secured in position, recheck the point gap; tightening of the screw may have altered the point gap.
9. Check the timing, using a continuity light in conjunction with the Timing Mark Method (see step 10) or the Dial Indicator Method (see step 11).

TIMING MARK METHOD

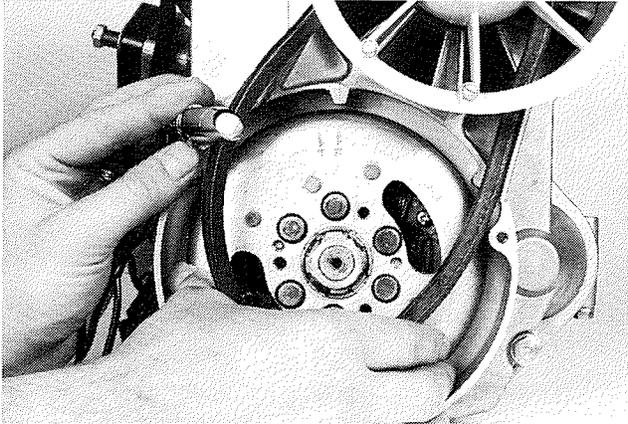
10. To check the timing using the timing marks on the flywheel and crankcase, use the following procedure:
 - A) Connect the continuity light wires to the two (2) black wires running from the engine.



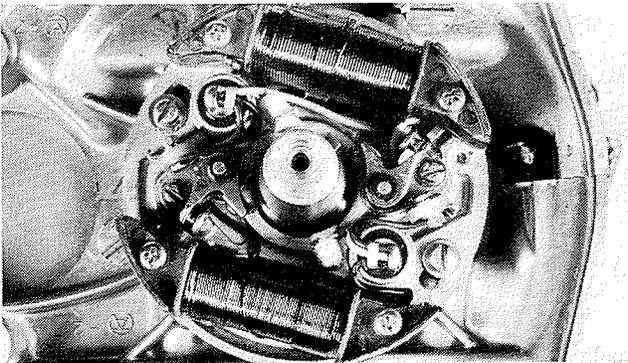
- B) Rotate the flywheel 1/4 turn counterclockwise.

ENGINE SERVICING (TWIN CYLINDER)

- C) Slowly rotate the flywheel clockwise until the continuity light brightens. When the continuity light brightens, it indicates the firing moment of the engine. **NOTE: The "F" mark and the timing mark in the crankcase should now be in alignment.**



- D) If the timing marks are not aligned, loosen the two (2) stator plate retaining screws. If the "F" mark is positioned to the right of the crankcase timing mark, rotate the stator plate counterclockwise to advance the timing. If the "F" mark is positioned to the left of the timing mark in the crankcase, rotate the stator plate clockwise to retard the timing. **NOTE: The "F" mark and the timing mark in the crankcase should now be in alignment.**



- E) Check the second cylinder by rotating the crankshaft 180°. Perform steps B and C. **NOTE: If the timing marks are not aligned, loosen the second cylinder point set.** If the "F" mark is positioned to the right of the crankcase timing mark, gradually close the point gap to advance the timing. If the "F" mark is positioned to the left of the crankcase timing mark, gradually open the point gap to retard the timing. The "F" mark and the timing mark in the crankcase should now be aligned.

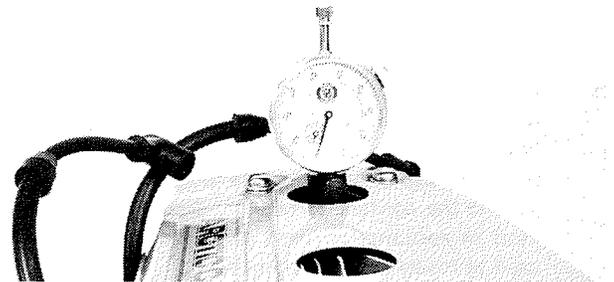
DIAL INDICATOR METHOD

11. To check the timing using the dial indicator method, use the following procedure:

- A) Perform steps 1 - 8.
- B) Rotate the crankshaft to position the piston at Top Dead Center (TDC).
- C) Install the dial indicator adaptor into the spark plug hole. Place the dial indicator into the adaptor. **NOTE: DO NOT LOCK INDICATOR INTO POSITION.**



- D) Slowly rotate the crankshaft clockwise and counterclockwise and determine the exact point of needle reversal. At this point, lock the dial gauge in position by tightening the thumb screw.

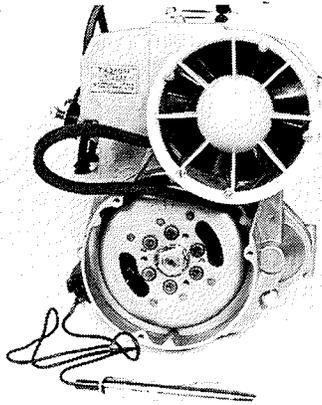


- E) Slowly rotate the crankshaft clockwise and counterclockwise to determine the point of needle reversal. At this point, set the movable dial face at 0.

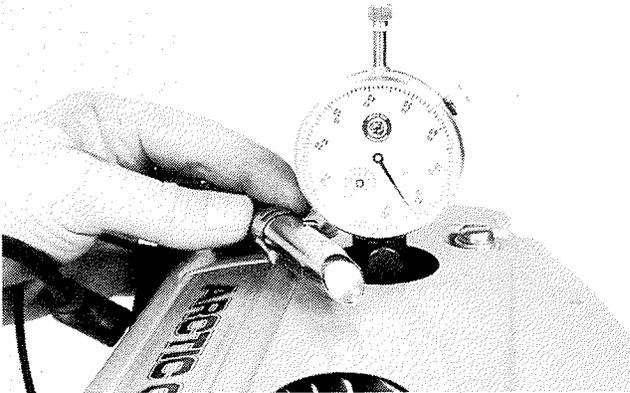


ENGINE SERVICING (TWIN CYLINDER)

- F) Connect the continuity light wires to the two (2) black wires running from the engine.

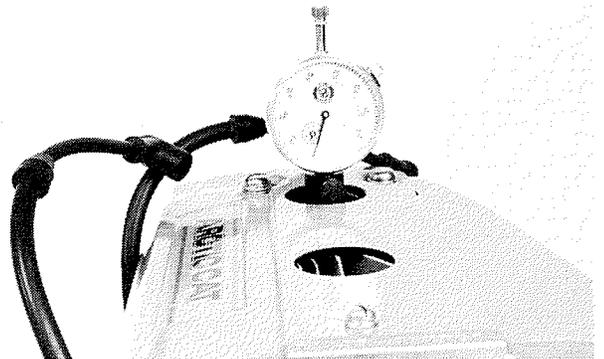


- G) Rotate the crankshaft counterclockwise until the indicator needle passes the specific setting (.015"). Slowly rotate the flywheel clockwise until the continuity light brightens. At this point, indicator needle should read specific setting (.015"). **NOTE: The "F" mark and the timing mark in the crankcase should now be aligned.**

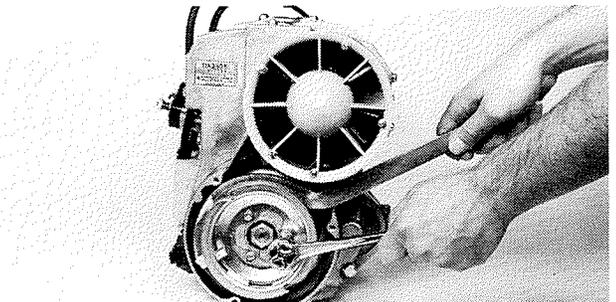


- H) If the "F" mark is positioned to the right of the crankcase timing mark, rotate the stator plate counterclockwise to advance the timing. If the "F" mark is positioned to the left of the crankcase timing mark, rotate the stator plate clockwise to retard the timing.
12. Check the second cylinder by rotating the crankshaft 180°. Perform steps B - G. **NOTE: If the timing marks are not aligned, loosen the second cylinder point set.** If the "F" mark is positioned to the right of the crankcase timing mark, gradually close the point gap to advance the timing. If the "F" mark is positioned to the left of the crankcase timing mark, gradually open the point gap to retard the timing. The "F" mark and the timing mark in the crankcase should be in alignment. Repeat this procedure as often as necessary to obtain timing mark alignment.

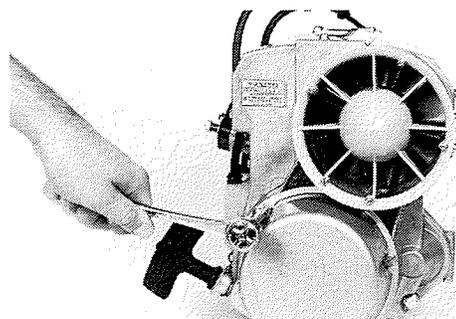
13. Disconnect the continuity light.
14. If a Dial Indicator was used, remove from the engine, using the following procedure:
- A. Loosen the thumb screw holding a Dial Indicator in the adaptor and remove the Dial Indicator.
 - B. Remove the adaptor from the spark plug hole.



15. Install the spark plugs or replace with new plugs and set the gap at .020". Connect the spark plug lead wires.
16. Install the axial fan drive pulley and belt.
17. Install the auxiliary starting pulley on the flywheel.



18. Assemble the recoil starter to the engine, using the three (3) bolts and lock washers.



NOTES

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ENGINE SERVICING (WANKEL KM914B)

Technical Data

Engine type:	SACHS/Wankel Engine KM 914 B
Cooling:	Air cooled with fan
Direction of rotation:	Counterclockwise (as seen from the power driveside)
Chamber Displacement:	18.3 cu. in. (300 c.c.) per chamber
Compression ratio:	8:1
Power output:	18 HP (DIN) at 5000 rpm 20 HP (SAE) at 5000 rpm
Mainshaft bearings:	2 anti-friction bearings
Engine lubrication:	Fuel/oil mixture at a ratio of 50:1 (for appropriate oils see page 18)
Ignition system:	BOSCH magneto ignition/lighting system (12 Volt 40 Watt or 12 Volt 75 Watt)
	BOSCH magneto ignition (without lighting generator) also in conjunction with starter/generator
Ignition advance:	10° . . . 12° before top dead center
Contact breaker gap:	(0.016 [±] 0.002 in. (0.4 [±] 0.05 mm)
Pole shoe gap:	0.315 . . . 0.472 in. (8 . . . 12 mm) without lighting generator and with 12 Volt 75 Watt systems
	0.590 . . . 0.748 in. (15 . . . 19 mm) with 12 Volt 40 Watt systems
Spark plug:	BOSCH W 150 M 11 S
Carburetor:	TILLOTSON diaphragm carburetor HL 268 A (0.866 in. I.D. = Ø 22 mm)
Carburetor setting:	Main jet = 1½ turn open Idle jet = ½ . . . ¾ turn open
Air filter:	Wet air filter
Starting device:	Recoil starter with emergency starting device

Construction

Basic elements of the engine are the rotor casing and the triangular rotor. All sealing elements are contained in the rotor which is supported by the mainshaft. The three chambers formed between the perimeter of the rotor and the contour of the rotor casing are closed by two side plates. The cast-in channels for porting are located in the side plates as well as in the casing. The sealing elements that form a sealing boundary, comparable to piston rings, produce workable air tight chambers. In spite of the eccentric rotary movement of the rotor, the apex seals at the points of the rotor guarantee absolute sealing efficiency.

Counterweights are situated eccentrically in the magneto and in the flywheel on the power drive side, compensating the centrifugal forces caused by the off-set rotor. This results in an indisputable advantage of being able to construct a completely mechanically balanced engine.

Function

With the rotation of the rotor, which is supported eccentrically, the three (3) chamber volumes are constantly increased and decreased.

Because of the power transmission ratio of 1:3 from rotor to shaft, three (3) power impulses originate from each rotation of the rotor (each rotor side completes a full working cycle per rotor revolution).

Per shaft revolution, one (1) power impulse; this corresponds to a rotor angle of rotation of 120°.

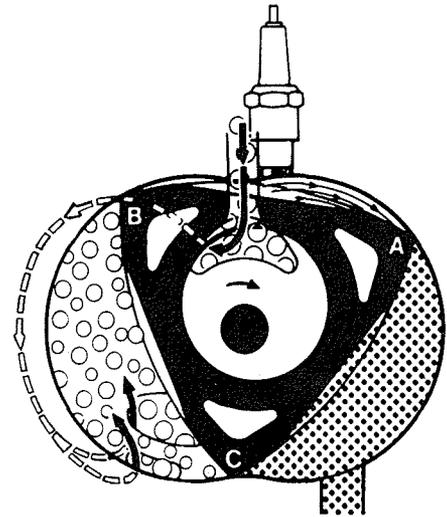
The power flow results from the combustion chamber onto the flat rotor side and is transmitted over the eccentric as lever arm to the shaft.

ENGINE SERVICING (WANKEL KM914B)

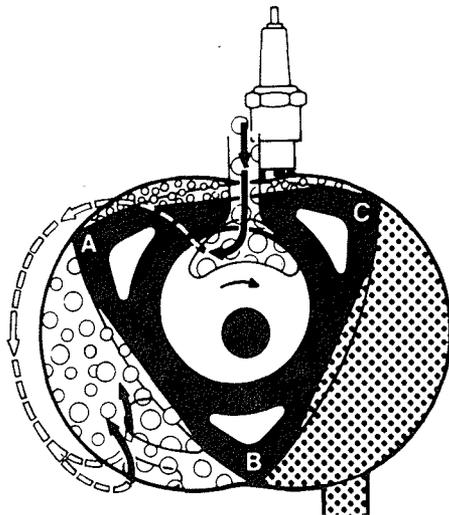
The intake and discharge of the fuel/air mixture and exhaust gases are described and illustrated in the following:

At the ignition moment (a few degrees before top dead center, where the chamber volume is at its smallest) intake simultaneously occurs in the preceding chamber between points A and B.

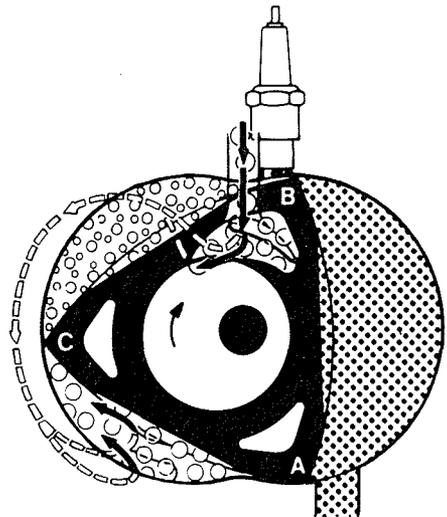
1. In comparison to conventional combustion engines:
 Top Dead Center = Minimum Chamber Volume
 Bottom Dead Center = Maximum Chamber Volume



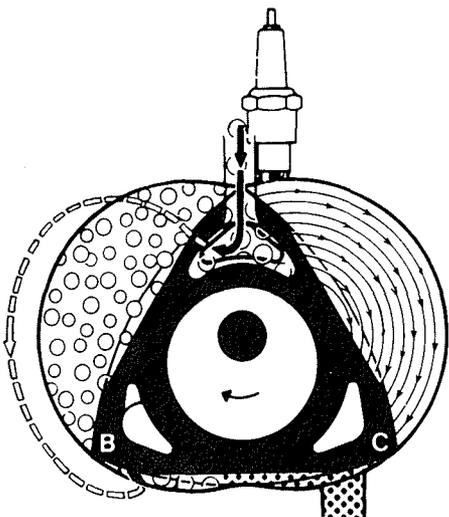
This illustration shows the same chambers, between points B and A, in the bottom dead center position between the power and exhaust stroke.



From the illustration note that after the power stroke has been completed, the burnt gases between B and C are forced out of the exhaust port and that this chamber has reached a top dead center position, whereby the exhaust port as well as the intake port are simultaneously opened.

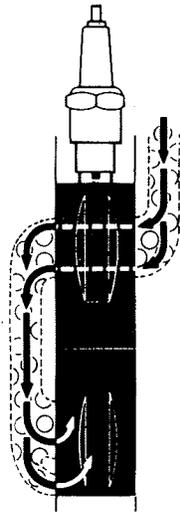


Supply of the chamber with fuel/air mixture takes place over a carburetor of conventional design. Because of the vacuum caused through the increasing of the chamber volume, the fuel/air mixture is sucked either through the openings in the rotor or in the eccentric shaft (depending on rotor or shaft position), thereby lubricating and cooling the moving parts. The passage from the carburetor to the intake port is constantly open (see top left column photo, page 52).



Finally we see the chamber, located between points A and B at the beginning of a new cycle with the unfinished intake phase shortly before top dead center (see top right column photo).

ENGINE SERVICING (WANKEL KM914B)



Disassembly

Remove all connections from the engine to the console (control cables, electrical connections, etc.)

Remove engine from belly pan and cleanse thoroughly before disassembling.

It is advisable to disassemble in the following manner when overhauling the engine:

Air Filter and Carburetor

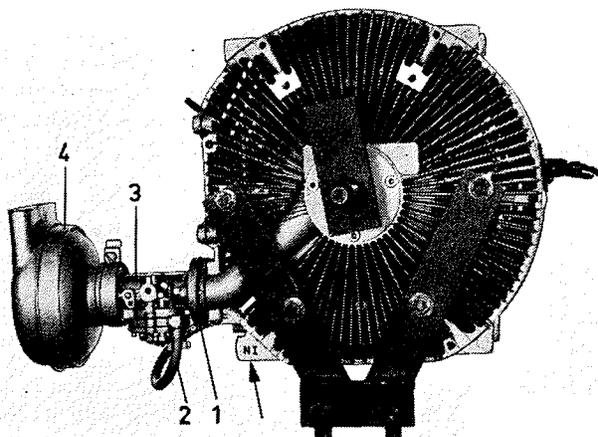
Mount the engine, as illustrated, onto the repair jig, using 4 bolts M 10 x 30.

Loosen and remove wet air filter (4).

Remove the flange mounted on the carburetor only when necessary.

Remove the impulse line (2) from the rotor casing and unscrew the carburetor (3).

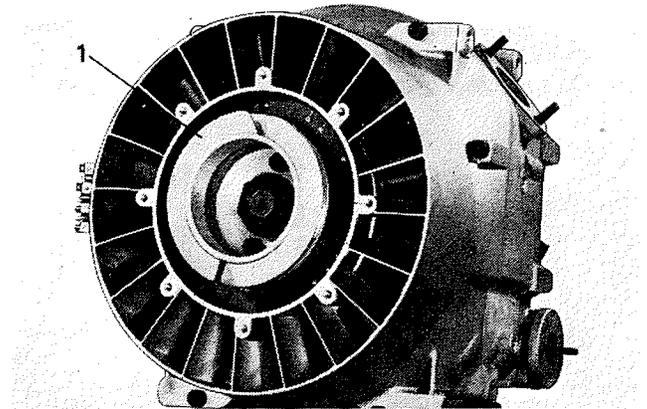
Remove the intermediate flange (1) only when necessary.



Recoil Starter and Starter Bell with Emergency Starting Device

Unscrew and remove the recoil starter with intermediate flange.

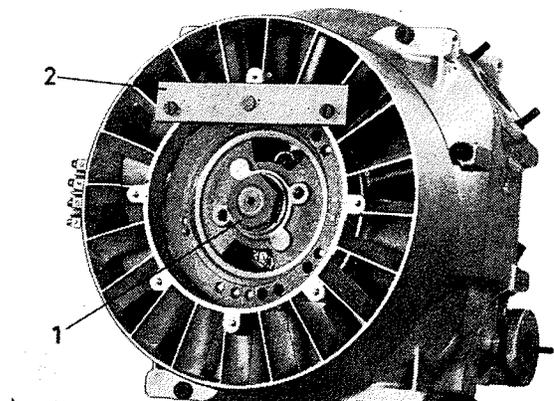
Unscrew and remove the starter bell (1).



Flywheel with Fan, Magneto Flywheel, Flywheel Power Drive-Side and Fan Housing

Fasten the retaining plate (2) with two (2) screws M 6 x 20.

Remove nut (1) and washer.



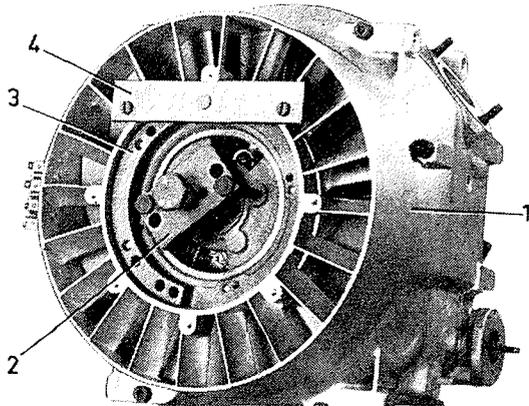
Install puller block (2) by screwing two screws M 8 x 60 into the flywheel with fan (3) and pull by screwing the thrust bolt inwards (see top left column photo, page 53).

Remove puller block (2) and retaining plate (4) from flywheel (see top left column photo, page 53).

Unscrew and remove fan housing (1), observing the alignment dowels (see top left column photo, page 53).

Remove the flywheel (3) with fan and magneto flywheel (see top left column photo, page 53).

ENGINE SERVICING (WANKEL KM914B)



Armature Base Plate and Receiving Plate

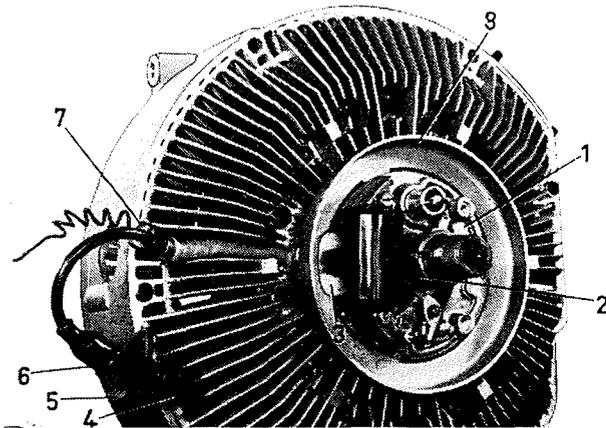
Remove key and cam (2).

Unscrew spark plug connector (4) with well boot (5) and rubber grommet (6).

Unscrew and remove armature base plate (1) with cables, rubber grommet (7) and fibre block.

Set the armature base plate into the flywheel.

Unscrew and remove the receiving plate (8), observing the O-ring seal.



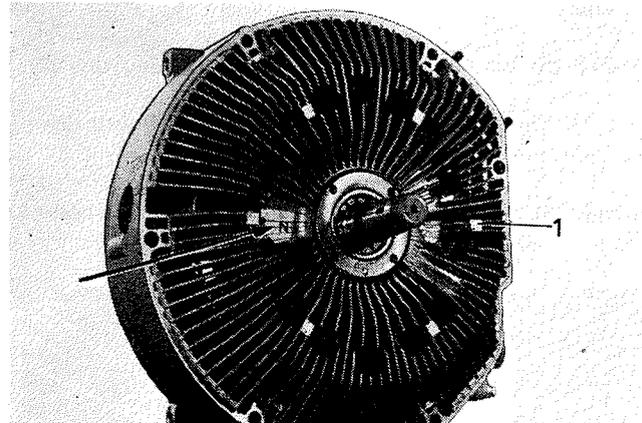
Side Plate Magneto-Side (See top right column photo.)

Remove 14 socket cap screws.

Lift off the side plate (1), observing sealing strips, sealing pins, sealing pin springs and alignment dowels that could stick to the side plate.

NOTE: If the side plates are to be used again, carefully remove all traces of sealing compound.

Protect the machined surfaces of the side plate against damage.

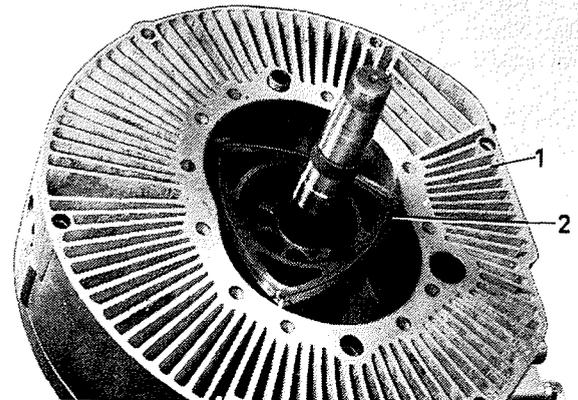


Rotor and Rotor Casing

Lift out the rotor, observing sealing strips, sealing pins and sealing pin springs.

Protect the rotor against damage.

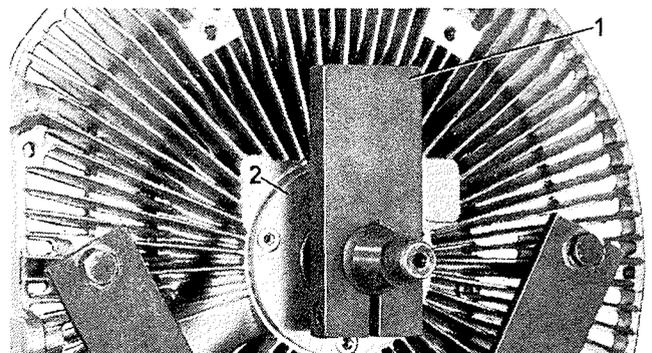
Lift off the rotor casing (1), observing the alignment dowels.



Counterweight and Retaining Flange

Remove the counterweight (1) and key.

Unscrew and remove the retaining flange (2), observing the rubber O-ring seal.



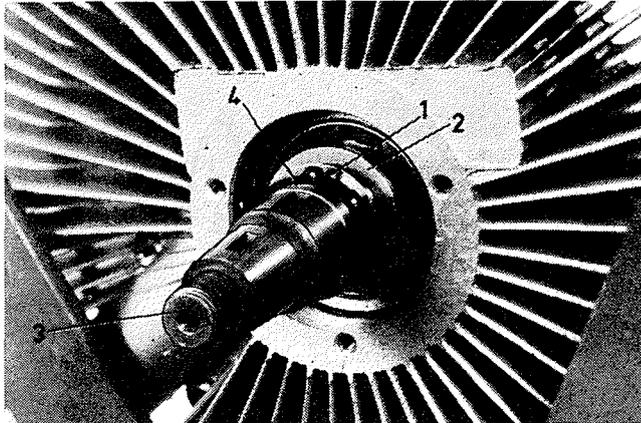
ENGINE SERVICING (WANKEL KM914B)

Mainshaft

Remove the circlip (4), shims (1) and retaining ring (2).

Take the mainshaft (3) out of the side plate power drive-side and remove the latter from the repair jig.

Protect the machined surfaces of the side plate against damage.



Clean all parts thoroughly, check for wear (see "Inspecting the Side Plates, Rotor and Rotor Casing for Wear", page 51) and replace as necessary.

It is advisable to install new gaskets when giving the engine a general overhaul.

Use only genuine Arctic Cat spare parts!

Inspecting the Side Plates, Rotor and Rotor Casing for Wear

1. Side Plates

The side plates can be refinished 3 times and replaced separately.

The side plates are deliverable on a trade-in basis and are marked according to the number of refinishing with N I (=1st refinishing), N II or N III and are to be obtained through an Arctic Cat distributor.

In countries where trade-in side plates can't be obtained because of duty or shipping difficulties, it is possible to refinish the side plates when the following is observed:

- Refinishing is to be done on a rotating bed grinding machine
- Maximum peak to valley roughness 40 . . . 252 u in. (1 . . . 6.3 u mm).
- Waviness height limit, up to 320 u in. (8 u mm)
- Plane, concave maximum 0.00078 in. (0.02 mm)

The side plates can be refinished 3 times (0.0157 in. = 0.4 mm each). The side plates are to be marked according to each refinishing process, e.g.: N I = 1st Refinishing
N II = 2d Refinishing
N III = 3d Refinishing

The refinishing identification markings are to be brought onto the side plates, magneto-side and side plates, power drive-side.

When mounting refinished side plates, check the length of the alignment dowels and when necessary shorten them from 0.59 to 0.55 in. (15 to 14 mm).

2. Rotor

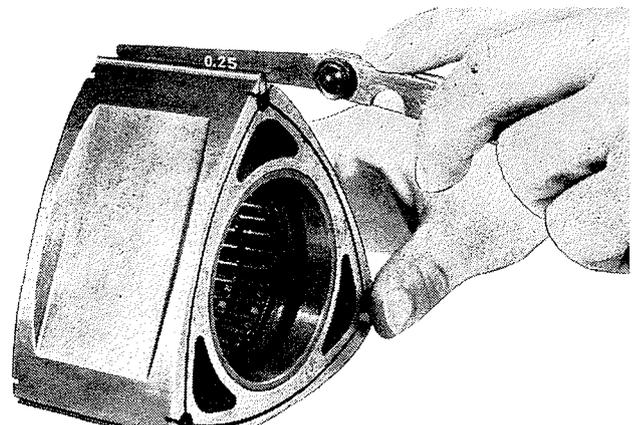
The rotor must be replaced when the teeth or support surface are worn or damaged.

Replace the pinion in the magneto-side and support ring in the power drive-side together with the rotor.

After decarbonizing the rotor (see Decarbonizing, page 55) check the side play of the apex seals in their grooves with a feeler gauge and new apex seals.

Maximum permissible apex seal side play is 0.0098 in. (0.25 mm).

ATTENTION! The apex seal grooves are conical; the feeler gauge is not to be inserted more than 0.078 in. (2 mm) into the grooves when measuring.



a. Apex Seals

The apex seals are to be measured at positions a, b and c with a micrometer (see top left column illustration, page 55).

Original Measurement:
0.2363 in. -0.0058
(6 mm) -0.15

ENGINE SERVICING (WANKEL KM914B)

Permissible Wear:

0.0157 in. = 0.4 mm

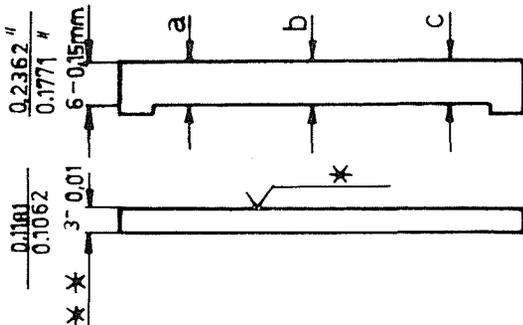
(at measuring positions a, b and c)

Maximum difference of measurement of positions a and c:

0.0078 in. (0.2 mm)

* Permissible unevenness 0.00078 in. (0.02 mm)

** Permissible wear up to -0.00078 in. (-0.02 mm)



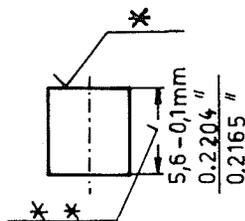
b. Sealing Pins

The sealing pins must be evenly worn.

Check with a micrometer.

* Permissible unevenness 0.0019 in. (0.05 mm)

** Permissible wear up to -0.0118 in. (-0.3 mm)



c. Sealing Strips

Original Measurement:

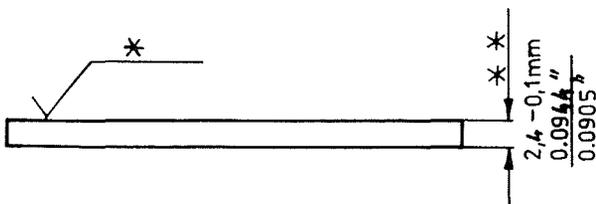
0.0944 ^{-0.0039} in. -0.0039

(2.4 _{-0.1} mm) -0.1

Permissible Wear:

0.0078 in. (0.2 mm)

The sealing strip should not be worn more than 0.0039 in. (0.1 mm) at its ends, as compared to the rest of the sealing strip.



d. **Apex Seal Springs, Sealing Pin Springs and Sealing Strip Springs** must be replaced after every disassembly of the engine.

* Permissible unevenness 0.0039 in. (0.1 mm)

** Permissible wear up to -0.0078 in. (-0.2 mm)

3. Rotor Casing

The rotor casing must be replaced, when the elnisil coating of the rotor casing has been damaged from dirt or foreign bodies or when cracks (not very fine cracks) are perceptible.

The wear of the rotor casing is very minor, when the above mentioned deficiencies are not present.

NOTE: The sealing elements and their springs must also be replaced when replacing the rotor casing.

Replacing the Cylindrical Roller Bearing, Pinion Gear and Support Ring

The side plates are to be serviced with utmost care, observing that the machined surfaces aren't damaged. The smallest damage could lead to seizure of the engine and/or a loss of imperviousness and therefore a loss of efficiency.

Do not remove minor carbon deposit from the side plates' machined surfaces.

Remove major carbon deposit **carefully**.

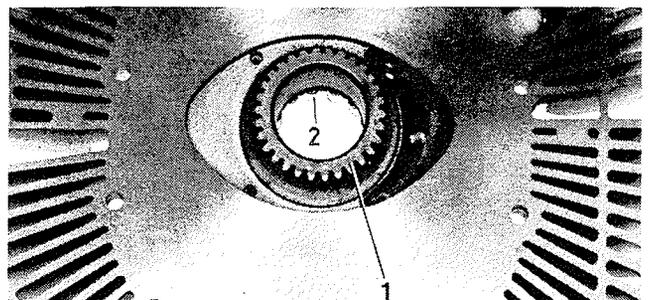
Side Plate Magneto-Side

Pull cylindrical roller bearing (2) with a conventional internal puller.

Heat the side plate pinion gear (1) and press the bearing completely onto its stop.

Heat the side plate to 335°F (150°C) to press the pinion gear (1) in and out.

Observe the alignment pin in the side plate magneto-side and alignment bore in the flange of the pinion gear (1) when pressing in the latter.

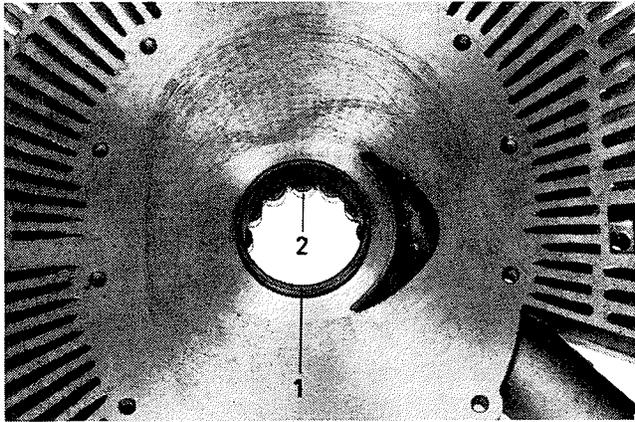


ENGINE SERVICING (WANKEL KM914B)

Side Plate Power Drive-Side

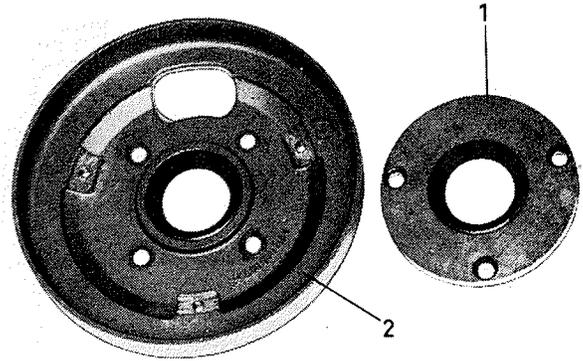
Heat the side plate power drive-side to approximately 335°F (150°C). Press out the support ring (1) and cylindrical roller bearing (2).

Press the support ring (1) and cylindrical roller bearing (2) completely onto their stop.



To press the seals in and out, heat the receiving plate (2) and retaining flange (1) to approximately 212°F (100°C).

Press the seals in flush, as illustrated, with the sealing lip first.



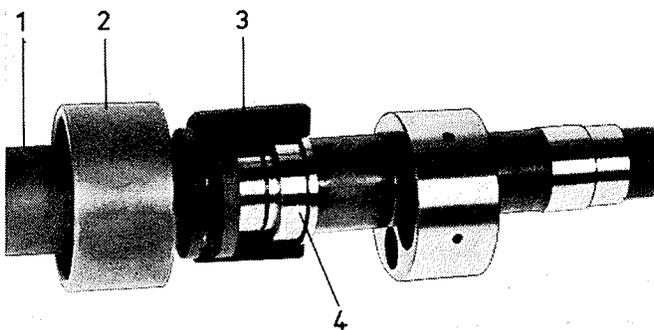
Mainshaft

Cylindrical Bearing Inner Race

Pull cylindrical roller bearing inner race (4) with threaded sleeve (1), clamping ring (2) and pulling shells (3).

NOTE: One of the puller shells has been removed and the clamping ring pulled away to clearly illustrate the application of the puller assembly.

Warm the cylindrical bearing inner race (4) and press it onto the crankshaft to its stop.

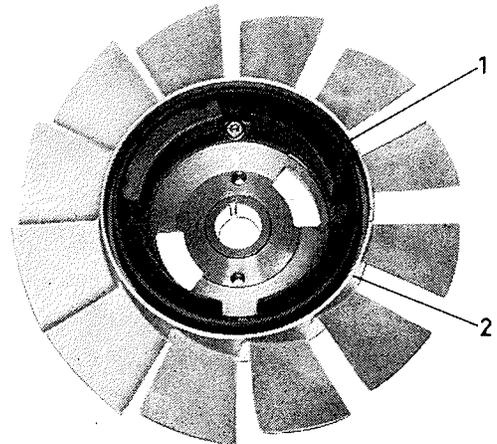


Replacing the Fan, Magneto Flywheel and Counter-Weight Flywheel

Disassembling

Remove 4 screws and take out magneto flywheel (1).

Remove fan (2).



Replacing the Seals

Receiving Plate and Cylindrical Roller Bearing Retaining Flange

Assembling (See top left column photo, page 57.)

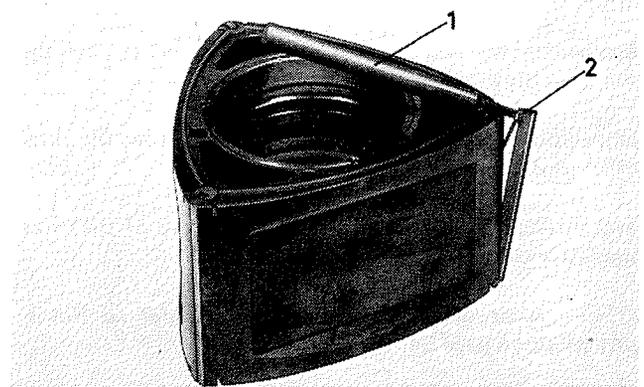
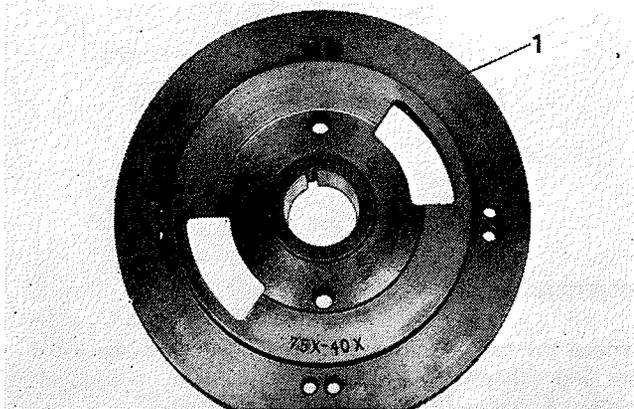
NOTE: Two of the bores in the flywheel (1) are marked with "40X" (for 40 Watt systems) and with "75X" (for 75 Watt systems with exterior coil).

With unmarked flywheels note the position of the bore ("40X" or "75X") in relationship to the keyway.

ENGINE SERVICING (WANKEL KM914B)

Assemble the fan (2), magneto flywheel (1) and counterweight flywheel (1), so that the bores coincide with each other, either for 40 Watt or 75 Watt systems, and secure with 4 socket cap screws M 6 x 15.

Tightening torque 5.8 . . . 8.0 ft. lbs. (0.8 . . . 1.1 kpm)



Loosen the sealing pins (1) from their seat by inserting the tip of the decarbonizing tool into the pin and twist. Pry the pins outward.

Remove the springs under the pins (see page 55, observe paragraph b and d).

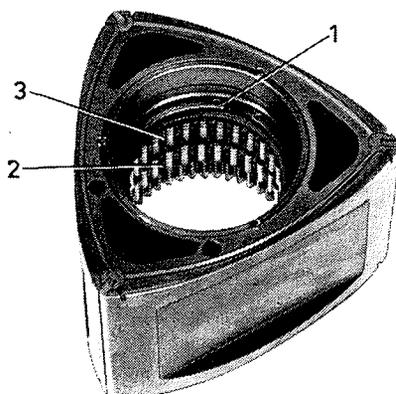
Disassembling, Decarbonizing and Assembling the Rotor

When the sealing elements stick in their grooves after a long period of running time because of carbon buildup, it is advisable to dismantle the rotor as follows:

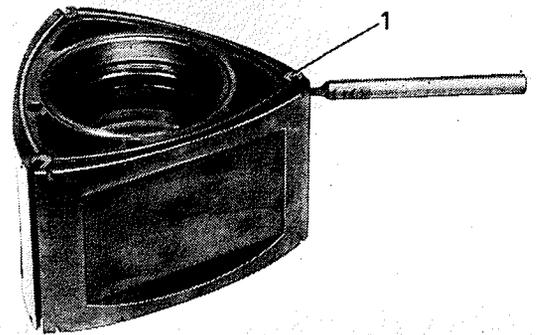
Disassembly

After removing the rotor, mark both bearing cages according to position and rotation direction.

Remove circlip (1), needle bearing cages (3 and 2) and second circlip.

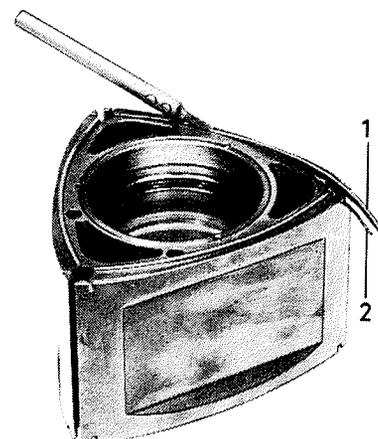


Set the decarbonizing tool (1) under the end of the apex seal (2) and remove the latter and its spring by tapping lightly (see top right column photo).



Remove the sealing strips (1) by lightly tapping them with the decarbonizing tool.

Remove the sealing strip springs (2), (see page 55 and observe paragraph c and d).



ENGINE SERVICING (WANKEL KM914B)

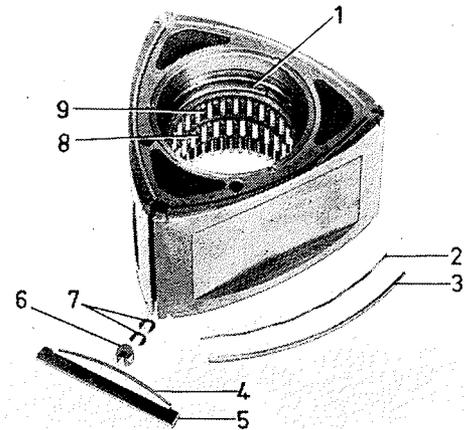
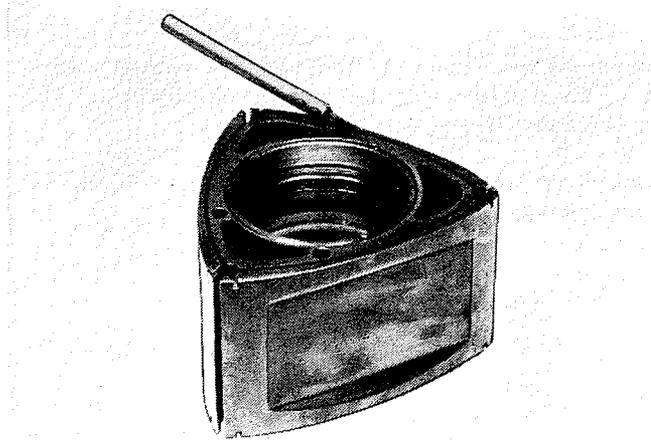
Decarbonizing

Decarbonize the sealing elements, their grooves and the rotor after dismantling.

Remove only major carbon buildup (flakes) from the sides of the rotor.

Never attempt to polish or scrape the surfaces of the rotor completely clean.

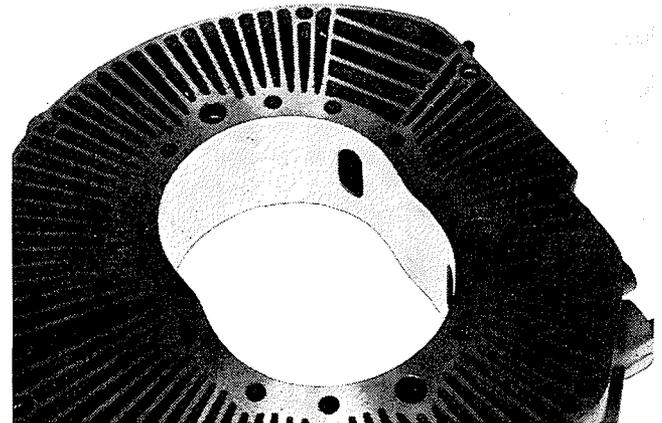
NOTE: After decarbonizing the rotor, refer to Rotor instructions on page 54.



Decarbonizing the Rotor Casing

Remove the carbon buildup carefully from the spark plug bore and exhaust port with a screwdriver or a triangular scraper, observing that no metal is scraped off.

Cleanse the rotor casing, wash it when necessary.



Assembling (See top right column photo.)

Install circlip (1), needle bearing cages (9 and 8) and second circlip.

Coat the grooves for the sealing elements lightly with vaseline grease.

Set two springs (7) into each opening for the sealing pins, so that the ends are pointing away from each other (align slits with grooves in the rotor apex). Insert the sealing pins (6).

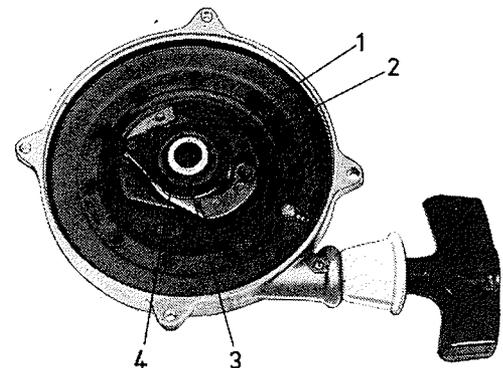
Insert sealing strip springs (2) with spring ends pointing to seal and sealing strips (3).

NOTE: The rotor is shown with only 1 of its 3 sets of sealing elements, the other two sets are already installed. Install apex seals (5) and springs (4) after mounting the rotor.

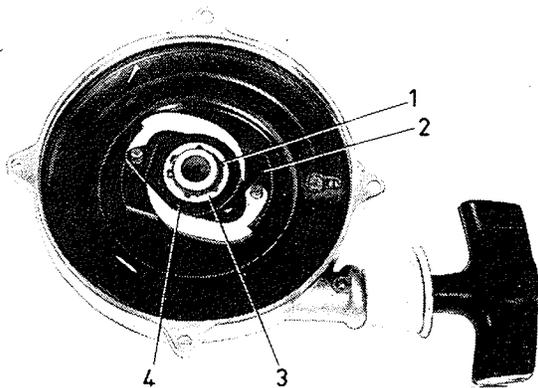
Recoil Starter with Friction Shoes or Pawls

Disassembly

Remove, circlip (1), washer (3), spring washer, friction disc (4), brake lever carrier (2) with brake arms and shims.



ENGINE SERVICING (WANKEL KM914B)



Pull the grip approximately 8 in. (20 cm) outwards and safety the cable disc with a self-made spring winding tool (5).

Remove the clamping ring (3) with the clamping cone (4) out of the grip (2).

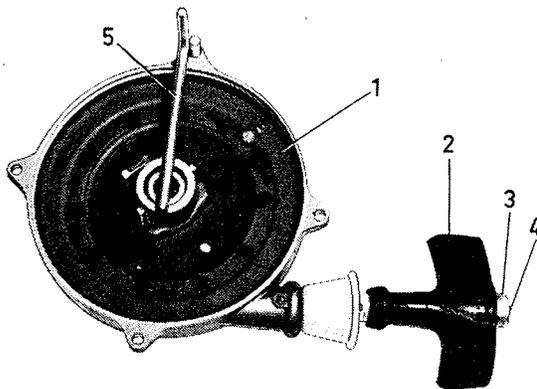
Pull the clamping cone out of the ring and remove from the cable.

Remove clamping ring and grip from cable.

Remove the spring winding tool (5) and let the cable recoil into the housing completely.

Remove the cable disc (1), observing that the spiral spring does not spring out.

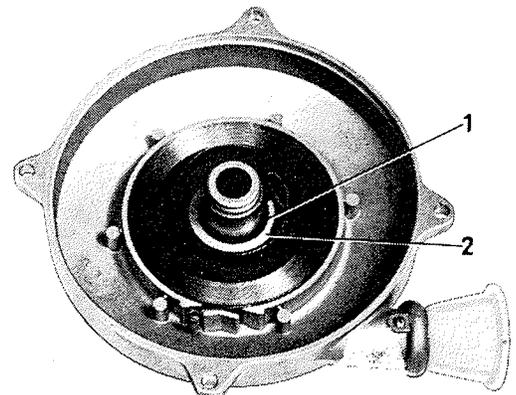
Remove the cable from the disc.



Remove spacer ring (1) and centering ring (2) (see top right column photo).

To remove the spiral spring, strike the housing against the top of the workbench (spring side downwards) and control its uncoiling with the housing.

NOTE: When the anti-friction disc (1) must be replaced, heat the bearing bushing (4), let cool and remove (see bottom right column photo).

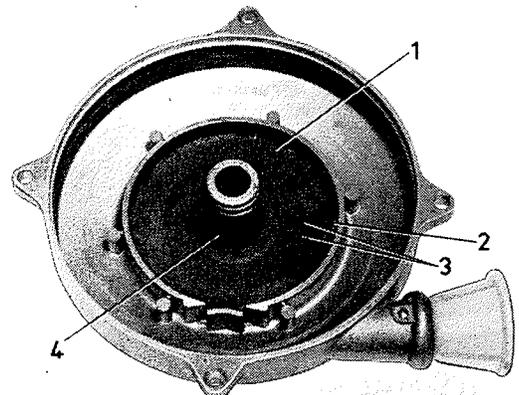


Assembly

Install the anti-friction disc (1), so that the bent down tabs (3) lock over the cast-in rib in the housing.

Press the bearing bushing (4) completely onto the housing center hub.

Coat the anti-friction disc lightly with Molykote oil.



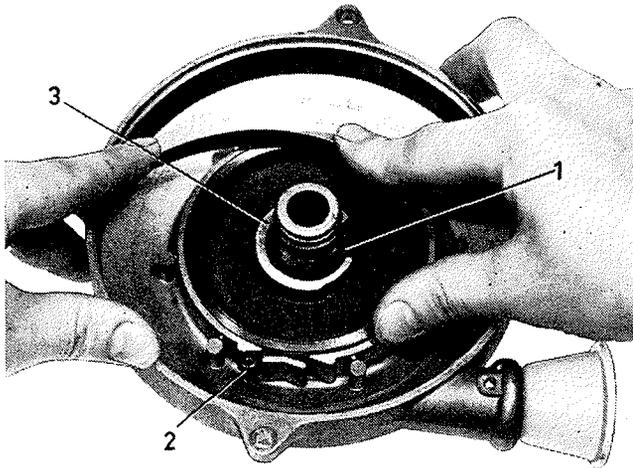
Set the spring end (2) with hollow rivet (shoulder downwards) into the housing, as illustrated, and coil the spring, one winding after the other into the housing, rotating the latter (see top left column photo, page 60).

NOTE: The first winding of the spiral spring must lie between the bent up tab (2) of the anti-friction disc and the housing, and inside of the tab, observing that the windings lie flatly on the disc (see photo above).

Install spacer ring (1) and centering ring (3, proper side upwards), so that the riveted spring end and eye loop lie snugly in the ring (see top left column photo, page 60).

Coat the spiral spring lightly with Molykote oil.

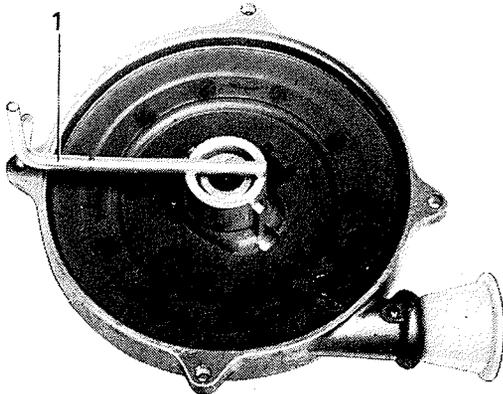
ENGINE SERVICING (WANKEL KM914B)



Mount the cable disc onto the bearing bushing, observing that the tab of the disc is inserted into the spring eye loop.

Coil the spring completely in starting direction with the self-made winding tool (1). Uncoil the spring 1/2 to 1 turn until the cut-out for the cable nipple coincides with the opening in the housing for the cable. Secure the winding tool (1) in this position with a properly sized steel peg.

Wet the cloth with oil SAE 10 and thread the cable through the "keyhole".



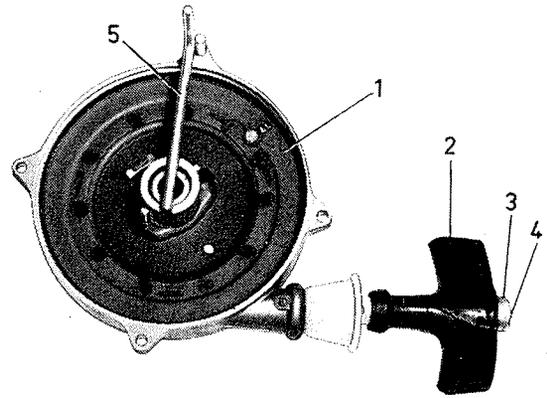
(See photo top right column.)

Mount the grip (2) and clamping ring (3) onto the cable.

Lay the cable over the clamping cone (4) and pull it into the ring.

Pull the ring into the grip.

Remove winding tool (5) and let the grip be pulled up against the starter.



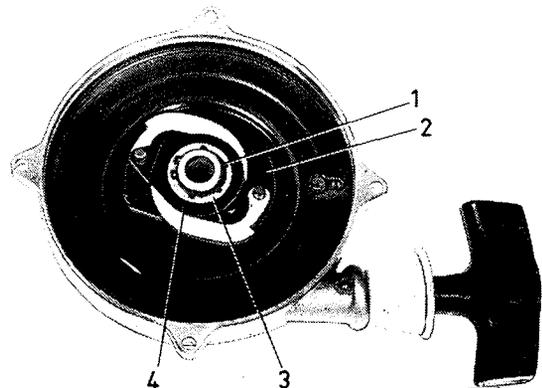
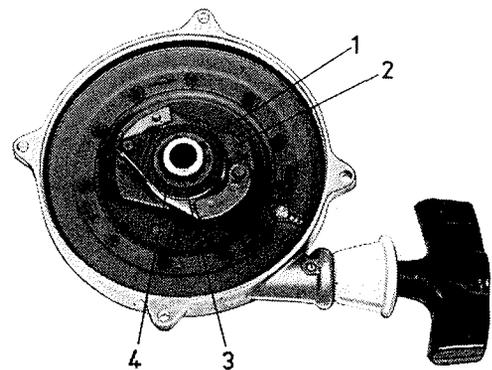
Install shims, as needed, onto the hub.

NOTE: After completing the starter, a play of 0.003 . . . 0.007 in. (0.1 . . . 0.2 mm) must be present between the friction disc and the brake lever carrier. This play can be corrected by changing the number of shims between the cable disc and brake lever carrier (2).

Install the carrier (2) with brake levers, so that the bent over ends of the brake arms are inserted into the notches in the cable disc.

Mount the friction disc (4), spring washer, cover disc (3) and circlip (1).

If the brake levers don't move outwards when activating the starter, remove shims from under the carrier.



ENGINE SERVICING (WANKEL KM914B)

Magneto Ignition/Lighting System

Replacing the Ignition Coil and Lighting Armature

The ignition coil and lighting armature are offered as spare parts. The shoes of the cores are so machined that they can be installed onto the base plate without any special apparatus.

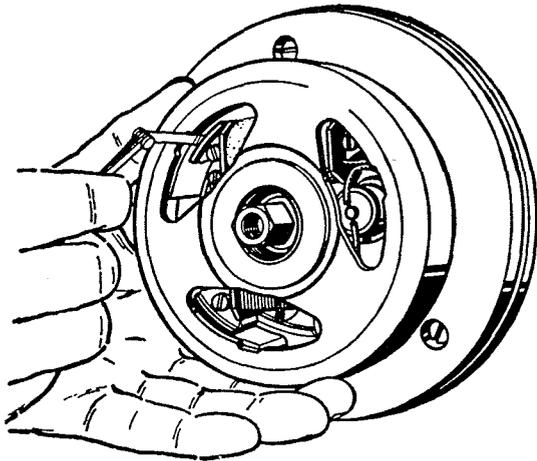
After the installation, an air gap must be adjusted between the core shoes and magnets, because the highest ignition and lighting efficiency is only obtained when the prescribed air gap of 0.009 . . . 0.013 in. (0.25 . . . 0.35 mm) is present.

NOTE: The mainshaft bearings must be in good condition to obtain an accurate adjustment and reading.

Air gap 0.009 . . . 0.013 in.
(0.23 . . . 0.35 mm)

The air gap is to be measured at various positions through the windows in the magneto flywheel.

The air gap can be corrected by loosening the retaining screws and adjusting the cores. The adjustment can eventually be carried out through the windows in the magneto flywheel.



Replacing the Contact Breaker

The contact breaker must be replaced when: the breaker points, breaker point pivot shaft, cam follower or breaker point bushing are worn or the short circuit wire or lever spring are damaged.

1. Unscrew short circuit wire (when present), observing the sequence of the insulating washers.
2. Remove safety from breaker point pivot shaft and pull of breaker point lever (note shims).

3. Remove screw and stationary breaker point.
4. Remove breaker point lever pivot shaft.

Install new parts in opposite row of order and note the following hints:

Swage the pivot shaft after screwing it in.

Use only the prescribed breaker point contact set for the engine.

The two breaker contacts should be of equal height and parallel to each other after the installation.

Lubricate the bearing surface (bore) of the movable breaker point with BOSCH grease Ft 1 v 8 before installing.

Lubricate the lubricating pad and the cam follower with BOSCH grease Ft 1 v 4 (obtainable in tubes at BOSCH repair shops).

Ensure that no grease or oil gets on the breaker contacts.

Replacing the Condenser

1. Unsolder both connecting wires.
2. Turn armature base plate over and press the condenser out with a wooden dowel.
3. Scrape the high spots on the bore caused from previous swaging.
4. Push the condenser into the bore and swage carefully.
5. Re-solder both wires.

Engine Assembly (See top left column photo, page 62.)

Mainshaft and Side Plate Power Drive-Side

Mount the retaining disc (1) and circlip (2) onto the mainshaft.

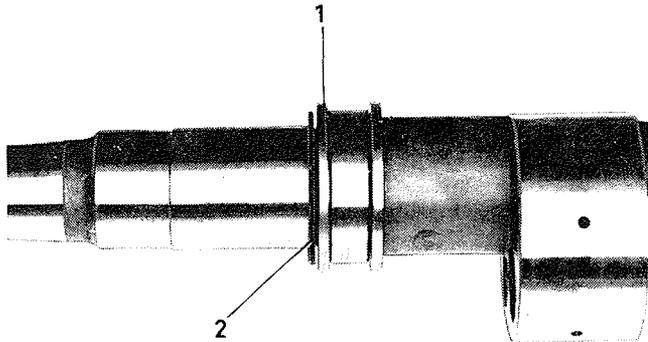
Check the axial play of the retaining disc.

Permissible axial play of the mainshaft (or retaining disc) 0.004 . . . 0.011 in. (0.1 . . . 0.3 mm).

NOTE: Compensate for the given axial play (minus the permissible play) with shims.

Remove the circlip and retaining disc.

ENGINE SERVICING (WANKEL KM914B)

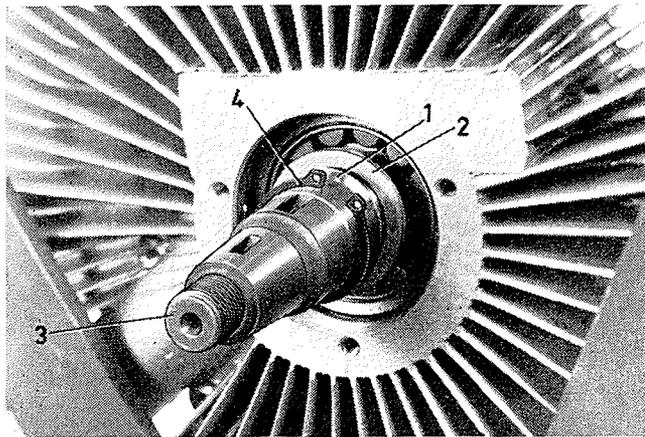


Mount the side plate power drive-side to the repair jig and secure with 4 bolts M 8 x 30.

Insert the mainshaft (3) with the pressed-on inner race.

Mount the retaining disc (1), shims (2) and circlip (4).

Assure that the circlip is well seated in its groove.



Retaining Flange and Counterweight

Fill the space between the sealing lip and metal rim of the seal in the retaining flange (1) with ALVANIA 3.

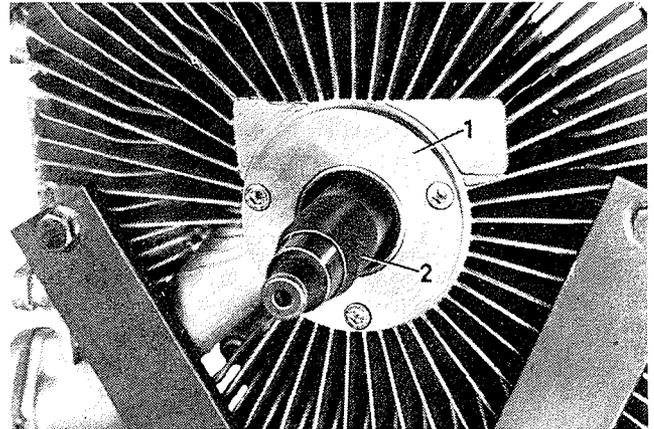
Set the adapter sleeve (2, Arctic Part No. 0144-), mount the retaining flange (1) with rubber O-ring seal and secure with 3 socket cap screws M 6 x 15.

Tightening torque 4.3 . . . 5.6 ft. lb. (0.6 . . . 0.8 kpm)

Remove adapter sleeve.

Insert key into keyway, mount the counterweight (1) and secure with socket cap screw M 8 x 35.

Tightening torque 13.0 . . . 16.0 ft. lb. (1.8 . . . 2.2 kpm)



Rotor Casing and Rotor

Insert the two alignment dowels into the side plate power drive-side.

CAUTION: Coat the rotor casing mating surfaces lightly with sealer, so that the latter isn't squeezed into the engine chambers when assembling, thereby hindering the sealing elements in their movement.

We recommend the colorless sealer No. 40, F&S order No. 0999 107 000.

Mount the rotor casing (5).

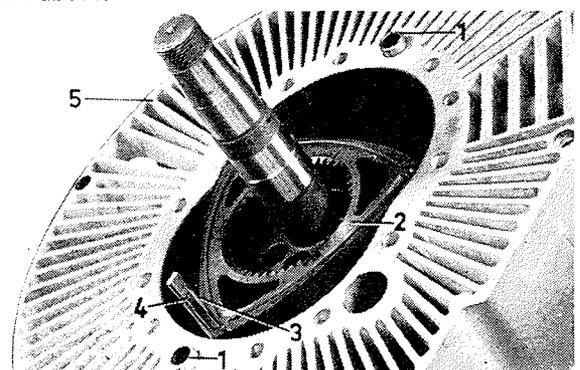
Insert the two alignment dowels (1).

Install the pre-assembled rotor (2) with the teeth pointing upwards.

Observe the sealing elements.

Insert the apex seal (4), as illustrated, into its groove. Insert apex seal spring (3) and push the seal with its spring completely into the groove.

Rotate the rotor and insert the seals with springs as described above.



ENGINE SERVICING (WANKEL KM914B)

Side Plate Magneto-Side and Receiving Plate

Lubricate all rubbing parts with an appropriate oil. Mount side plate magneto-side and secure with 14 socket cap head screws M 6 x 100 with lock washers.

Tightening torque 4.3 . . . 5.8 ft. lb. (0.6 . . . 0.8 kpm)

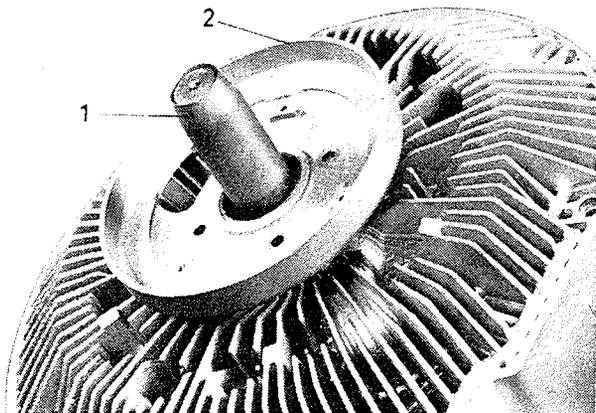
Lay the rubber O-ring onto the side plate and the adapter sleeve (1, Arctic Part No. 0144-) onto the mainshaft.

Fill the hollow space between sealing lip and metal rim of the seal, in the receiving plate (2), with grease, ALVANIA 3.

Mount the receiving plate, so that the window is pointing towards the spark plug and secure with 4 screws M 6 x 20 with gasket rings.

Tightening torque 4.3 . . . 5.8 ft. lb. (0.6 . . . 0.8 kpm)

Remove adapter sleeve (1).



Armature Base Plate, Flywheel with Fan and Magneto Flywheel

Mount the fibre block (3), as illustrated, pushing it onto the cables (always renew when servicing). Guide the wires and rubber grommet through the window in the receiving plate. Mount the base plate with fibre block, noting the timing reference marks and secure with 3 screws M 5 x 12 (dip in sealer).

Tightening torque 2.9 . . . 3.6 ft. lb. (0.4 . . . 0.5 kpm)

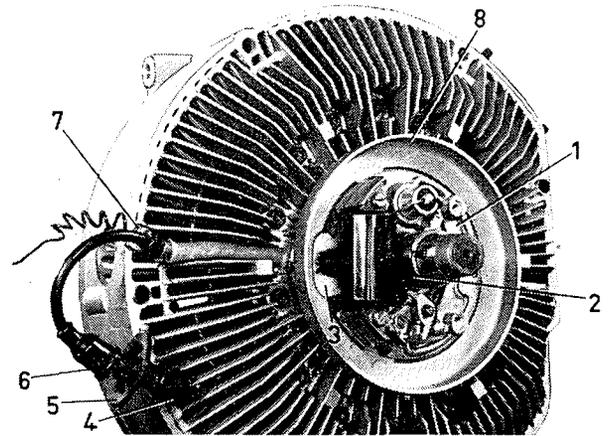
NOTE: New armature base plates have no markings and must therefore be centered in their slots.

Screw on spark plug connector (4) with well cover (5) and rubber grommet (6).

Mount the cam (2), with the keyway pointing upwards, and key.

De-grease the magneto flywheel and mainshaft tapers.

Mount the magneto flywheel with fan and flywheel onto the mainshaft, guiding the key into the keyway in the flywheel.



Fan Housing

Insert two alignment dowels into the rotor casing and mount the fan housing (4), guiding the rubber grommet (2) into the recess.

Secure the fan housing with 6 screws M 8 x 125.

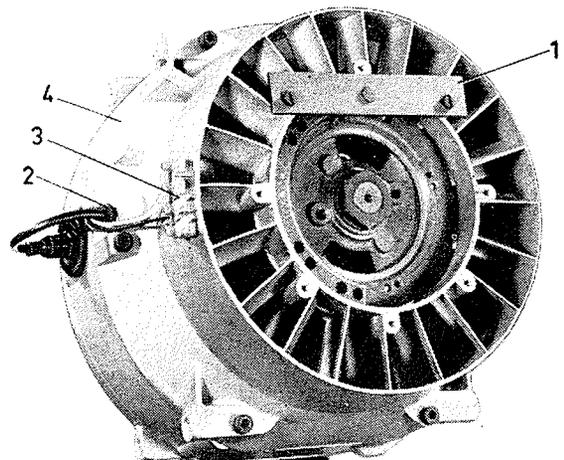
Tightening torque 13 . . . 16 ft. lb. (1.8 . . . 2.2 kpm)

Connect the wires, if present, to the terminal block as follows:

Lighting wires (yellow) to terminals 1 and 2, short circuit wire (black) to terminal 3, earth lead (brown) to terminal 4.

Mount the retaining plate (1, Arctic Part No. 0144-) to the fan housing, using 2 screws M 6 x 20 and secure the flywheel with washer 0.965 x 1.574 x 0.118 in. (24.5 x 40 x 3 mm) and nut M 24 x 1.5.

Tightening torque 54.4 . . . 58.0 ft. lb. (7.5 . . . 8.0 kpm)



ENGINE SERVICING (WANKEL KM914B)

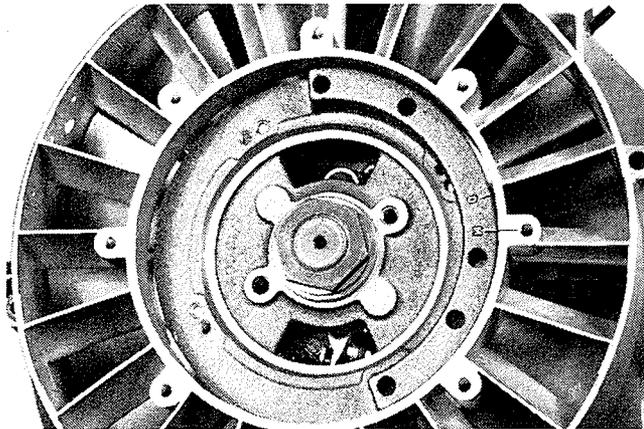
Timing Ignition

Spark Advance: $10^{\circ} \dots 12^{\circ}$ before top dead center
Contact Breaker Gap: 0.016 ± 0.002 in. (0.4 ± 0.05 mm)
Pole Shoe Gap: $0.590 \dots 0.748$ in. ($15 \dots 19$ mm)
(with 12 Volt 40 Watt systems)
 $0.315 \dots 0.472$ in. ($8 \dots 12$ mm)
(with 12 Volt 75 Watt systems)
Measuring Instruments: feeler gauge 0.016 in. (0.4 mm)

There are two markings stamped in the magneto flywheel.

"O" coincides with the reference mark on the housing (on housings without markings use center of right bore as reference) when the rotor is at top dead center.

"M" refers to the firing moment.



It is recommended that the ignition system be checked each time that the engine is serviced, as the engine performance depends on it and various troubles in the lighting system are caused by an incorrect ignition setting.

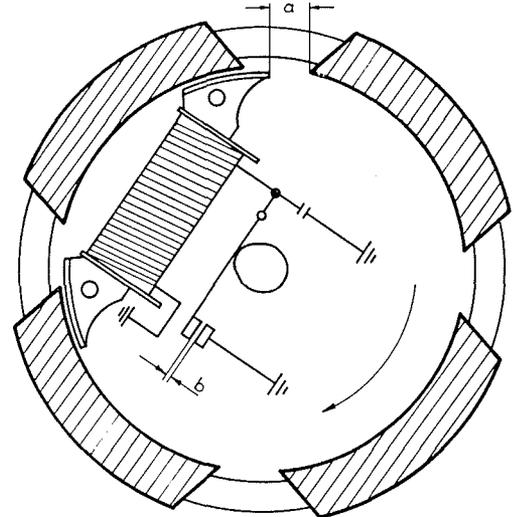
The spark plug is also to be inspected and when necessary adjusted to 0.020 in. (0.5 mm).

The Timing of the Ignition System Is to be Done as Follows:

1. Adjust breaker contact to 0.016 ± 0.002 in. (0.4 ± 0.05 mm) at maximum lift of cam.
2. Turn the magneto flywheel against the direction of turn until the "M" mark on the flywheel coincides with the reference mark on the housing (on housings without markings use the center of the right bore as a reference).
3. In this position the breaker contacts must just begin to open. If this is not the case, the firing moment can be corrected by rotating the armature base plate within its slots. Spark advance: by turning the base plate against the direction of turn. Spark retard: by

turning the base plate in the same direction that the mainshaft turns.

4. Always secure the armature base plate well after such an adjustment.
5. When the ignition system is correctly timed, the pole shoe gap should be between $0.315 \dots 0.472$ in. ($8 \dots 12$ mm) depending on type of system.



The pole shoe gap is to be measured between the tail-end of the magnet that is going away from the shoe and the shoe itself (observe proper rotating direction).

If the pole shoe gap is not correct, it can be corrected by slightly changing the breaker contact gap within the specified range of 0.016 ± 0.002 in. (0.4 ± 0.05 mm).

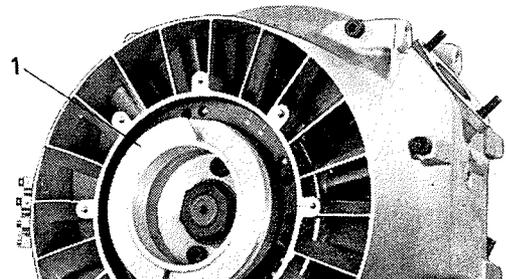
Starter Bell and Recoil Starter

Mount the starter bell (1) and secure with 2 screws M 8 x 15.

Tightening torque $13 \dots 16$ ft. lb. ($1.8 \dots 2.2$ kpm)

Mount the recoil starter with intermediate flange and secure with 4 screws M 6 x 30 with lock washers.

Tightening torque $4.3 \dots 5.8$ ft. lb. ($0.6 \dots 0.8$ kpm)



ENGINE SERVICING (WANKEL KM914B)

Carburetor and Air Filter

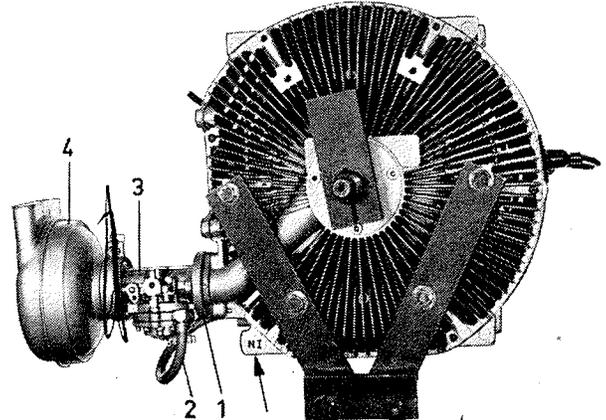
Mount the carburetor (3) with gasket and secure with 2 washers (0.019 in. = 0.5 mm thick) and nuts M 6.

Connect the pulsation line (2) to the connection on the rotor casing.

Mount the air filter and (4) tighten.

Secure exhaust system.

Tightening torque 13.0 . . . 16.0 ft. lb. (1.8 . . . 2.2 kpm)



HINTS AND WIRING DIAGRAM FOR MAGNETO/GENERATOR 12 VOLT 40 WATT

(with center point wiring)

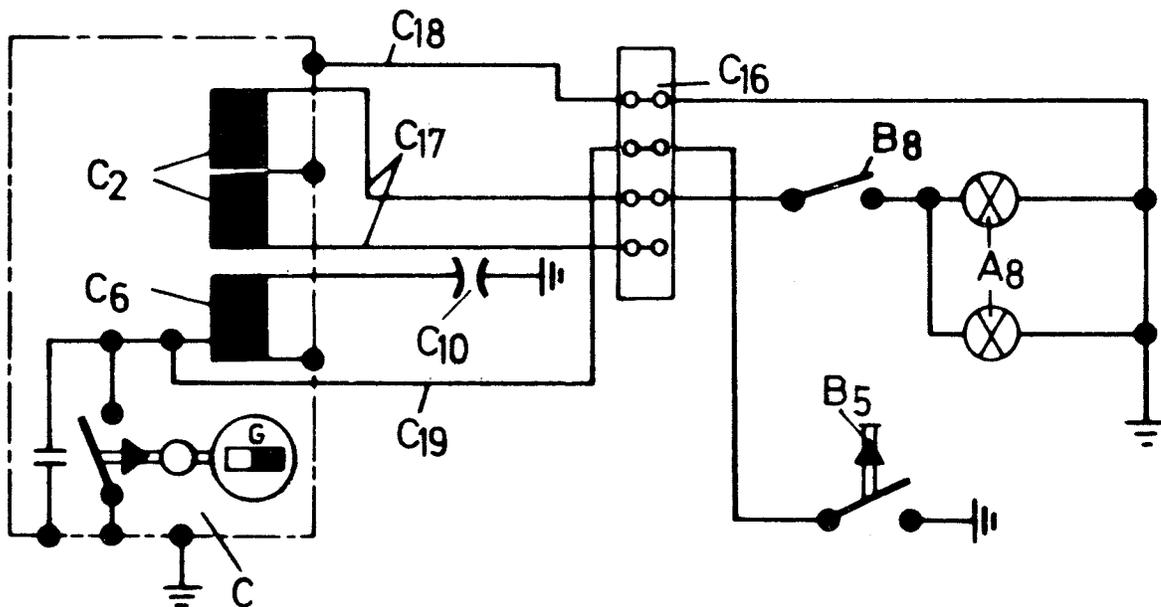
The magneto/generator produces alternating current with a lighting capacity of 40 Watt at 12 Volt.

Only one of the yellow lighting leads is to be used (see wiring diagram).

The second yellow lighting lead remains blind, it may be used for battery charging.

The bulbs should be so selected, that the total lighting load of the magneto/generator is 40 Watt, otherwise the bulbs could burn through.

Care should be taken to ensure a good earth connection from the engine, via the frame, to the lamps.



- A₈ = Load (12 Volt 40 Watt)
- B₅ = Short Circuit Switch
- B₈ = Light Switch
- C = Magneto/Generator
- C₂ = Generator Armature
- C₆ = Coil

- C₁₀ = Spark Plug
- C₁₆ = Connection Terminal
- C₁₇ = Lighting Lead (Yellow)
- C₁₈ = Additional Earth Lead (Brown)
- C₁₉ = Short Circuit Lead (Black)

ENGINE SERVICING (WANKEL KM914B)

HINTS AND WIRING DIAGRAM FOR MAGNETO/GENERATOR 12 VOLT 75 WATT

The magneto/generator produces alternating current with a lighting power of 75 Watt at 12 Volt.

Only one of the yellow lighting leads should be connected up (see wiring diagram).

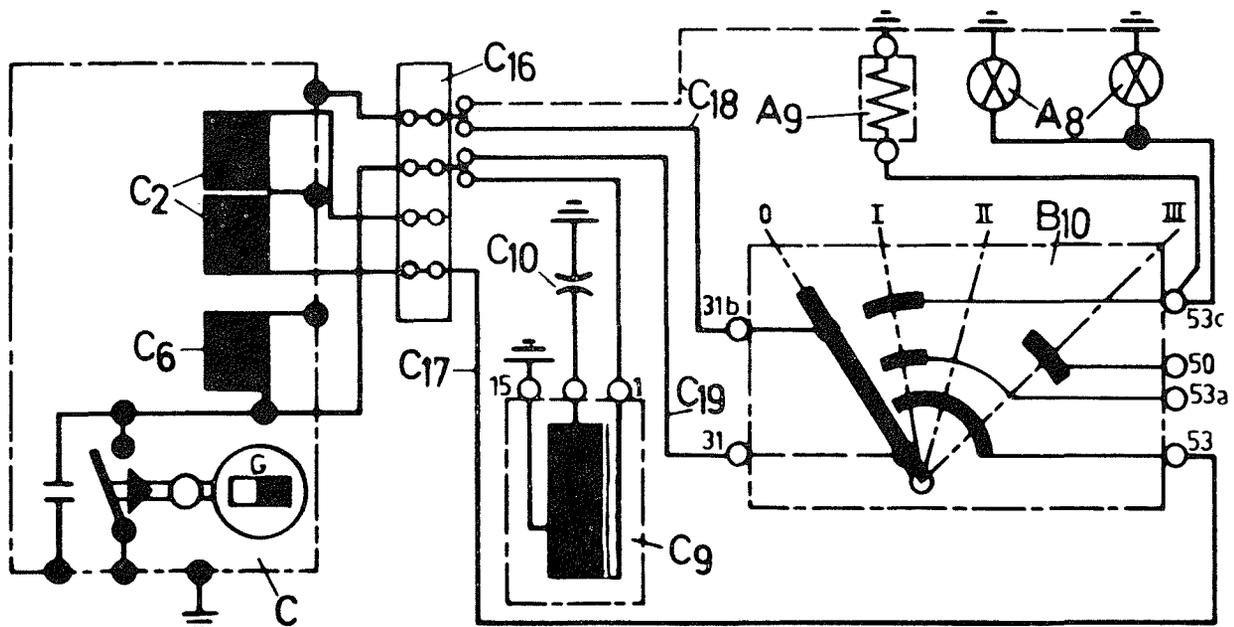
The second yellow lighting lead remains blind, and may be used later for connecting up a rectifier to charge a battery.

The black wire is the short-circuiting lead and the brown wire is an additional earth lead.

The bulbs should be so selected that the total load of the magneto/generator is 50 Watt.

Additionally, for reaching 75 Watt, a resistance of 25 Watt must be connected.

Care should be taken to ensure a good earth connection from the engine via the chassis to the lamps.



- A₈ = Load (12 Volt 50 Watt)
- A₉ = Resistance (12 Volt 25 Watt)
- B₁₀ = Ignition/Light/Start Switch
- C = Magneto/Generator
- C₂ = Generator Armature
- C₆ = Ignition Armature (Primary)

- C₉ = Coil (Exterior)
- C₁₀ = Spark Plug
- C₁₆ = Connection Terminal
- C₁₇ = Lighting Lead (Yellow)
- C₁₈ = Additional Earth Lead (Brown)
- C₁₉ = Short Circuit Lead (Black)

Switch Positions:

- 0 = Off (Ignition Short-Circuited)
- I = Night Drive
- II = Daylight Drive
- III = Starting (Provided)

TEST-RUNNING AND RUNNING-IN THE ENGINE

Test-Running

Start the engine and let it warm up (open the choke as soon as the engine starts).

Final Adjustment:

Adjust the desired idling speed of the engine by means of the idling adjustment screw.

ENGINE SERVICING (WANKEL KM914B)

Then slowly vary the setting of the adjusting screw of the idling jet so that the engine speed increases smoothly when the throttle is opened. The main jet is correctly adjusted when the engine gives satisfactory two-stroke operation under load and only slight fumes are discharged from the exhaust. If there is excessive exhaust smoke under load, turn main jet adjusting screw clockwise (closing) until smoking stops and engine runs satisfactorily.

If the idling speed fluctuates too much or is too high, turn the idling jet adjusting screw anti-clockwise (to open the jet) until the engine runs smoothly at lower speed without beginning to discharge more smoke from the exhaust.

Running-In Time

Even the most finely machined surfaces of the rotor's sealing elements, side plates and rotor casing are rougher than parts that have been rubbing against each other for a long period of time, therefore the moving parts must undergo a running-in period.

There is no need, however, to be overcautious. The engine should not be driven to its maximum speed for the first 5 hours, but should be driven at half-throttle in the middle rpm range. It is important that no unnecessary rpm are obtained, as this can result in bearing damage and a loss of efficiency accompanied with starting difficulties.

It is not necessary to use an extra mixing proportion of fuel and oil nor to use special additives during the running-in period.

PRESERVING THE ENGINE

If the engine is not used over a long period of time (e.g. through the winter) it is necessary that preventive measures be taken to prevent rust or corrosion. The following instructions for preserving the engine should be observed.

1. Remove the wet air filter and squirt at least 10 c.c. SAE 30 oil (for example ENSIS oil 30 from SHELL) into the carburetor intake opening, with opened choke and butterfly, while activating the starter 5 . . . 6 times.

Thus the rotor casing surface, bearings and rotor are sufficiently protected against corrosion.

2. To protect the exterior of the engine we recommend the following preservatives of reputable oil firms:

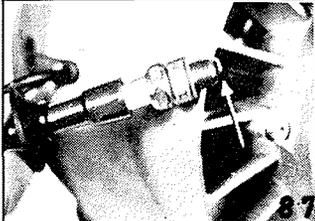
For example: Anticorit MR 5 from the firm FUCHS,
D-6800 Mannheim
Lubrication-Oil MIL-L644B from the firm MOBIL-Oil
Shell ENSIS Fluid 260 from the firm SHELL
RUST BAN 395 from the firm ESSO

There is a danger of the oil separating itself from the fuel when the engine is stored for 6 months or longer. In such cases it is necessary that the fuel-oil mixture either be stirred by hand or by shaking the tank or refilled with a fresh fuel-oil mixture.

APPROPRIATE LUBRICATING OILS FOR SACHS-WANKEL ENGINES

	Australia	Blegium	Denmark	Germany	England	Finland	France	Italy	Netherlands	Austria	Sweden	USA
BP Super Outboard Motor-Oil	x	x	x	x	x	x	x	x	x	x	x	x
ESSOLUB HD 30		x	x	x	x	x	x	x	x	x	x	x
MOBILMIX TT		x	x	x	x	x	x	x	x	x	x	x
MOBILOIL Outboard Motor-Oil	x	x	x	x	x	x	x	x	x	x	x	x
MOBILOIL TT		x	x	x	x	x	x	x	x	x	x	x
SHELL-Rotella SAE 30		x	x	x	x	x	x	x	x	x	x	x
SHELL-Premium Outboard Motor-Oil	x											
VALVOLINE-Super Outboard Motor-Oil	x											x

ENGINE SERVICING (WANKEL KM914B)

LUBRICATION AND MAINTENANCE CHART		Maintenance	Every 100 runn. hrs.	Every 200 runn. hrs.	As needed	When mounting
Maintenance and/or lubrication position	Lubricant, lubricant quantity and/or maintenance work					
	<p>Spark Plug The spark plug can be cleaned of carbon deposit at the insulator and electrodes.</p>					
	<p>Function Check Remove spark plug, push it into the connector, ground it to the cylinder, activate the starting device. With a properly functioning engine a strong spark must jump over the electrodes. Spark plug gap 0.019 in. (0.5 mm), see arrow.</p>	X				
Ignition system	Check contact breaker points and adjust.	X				
	Lubricate the lubricating pad with BOSCH special grease Ft 1 v 4.			X		
Decarbonizing (see page 20)	Check the exhaust port and spark plug bore for carbon build-up and decarbonize when needed.			X		
Fuel strainer	Cleanse fuel strainer or replace filter insert when present.				X	
Fan	Cleanse the cooling air entrance ports and fins with compressed air.				X	
Carburetor	Cleanse and adjust.				X	
Recoil starter	Lubricate the spiral spring with Molykote oil. Coat the housing center boss lightly with high temperature grease. Pull the cable through a cloth wetted with SAE 10 oil.					X
Seals	Pack with grease (Alvania 3).					X
Rotor friction surface, main shaft bearings	<p>These components are lubricated with a two-stroke mixture consisting of SACHS special oil for Wankel engines (0.5 liq. pt. = 250 c.c., pre-mixed, F & S order No. 2763 005 001) with gasoline to a ratio of 1:50.</p> <p>NOTE: The oils in the table on page 18 can be used in place of SACHS special oil for Wankel engines.</p>					

ENGINE SERVICING (WANKEL KM914B)

TIGHTENING TORQUES FOR BOLTS AND NUTS

Bolts

Arctic Part No.	Qty.	Used for component	Size	Tightening torque	
				ft. lb.	kpm
2740 035 101	14	Side plate power drive-side	M 6 x 100	4.3 ... 5.8	0.6 ... 0.8
1940 108 000	4	Receiving plate	M 6 x 20	4.3 ... 5.8	0.6 ... 0.8
2740 024 002	3	Retaining flange	M 6 x 15	4.3 ... 5.8	0.6 ... 0.8
0240 056 002	3	Armature base plate	M 5 x 12	2.9 ... 3.6	0.4 ... 0.5
2740 024 002	4	Flywheel	M 6 x 15	5.8 ... 8.0	0.8 ... 1.1
2740 040 001	6	Fan housing	M 8 x 125	13.0 ... 16.0	1.8 ... 2.2
1940 108 002	4	Recoil starter	M 6 x 20	4.3 ... 5.8	0.6 ... 0.8
2740 051 001	2	Starter bell	M 8 x 15	13.0 ... 16.0	1.8 ... 2.2
1940 039 000	1	Counter-weight	M 8 x 35	13.0 ... 16.0	1.8 ... 2.2
2740 003 002	4	Recoil starter	M 6 x 30	4.3 ... 5.8	0.6 ... 0.8
2740 039 001	2	Fan housing	M 8 x 105	13.0 ... 16.0	1.8 ... 2.2
0940 047 000	4	Ignition cam	M 5 x 8	2.9 ... 3.6	0.4 ... 0.5
1940 108 000	4	Starter housing	M 6 x 20	4.3 ... 5.8	0.6 ... 0.8

Nuts

F & S Order No.	Qty.	Used for component	Size	Tightening torque	
				ft. lb.	kpm
2742 004 001	1	Flywheel magneto-side	M 24 x 1.5	54.2 ... 57.8	7.5 ... 8.0
0242 020 000	2	Muffler	M 8	13.0 ... 16.0	1.8 ... 2.2

TROUBLE SHOOTING

Problem	Cause
<p>A. Engine will not start</p>	<p>There is not ignition spark because:</p> <ol style="list-style-type: none"> 1. Spark plug is oiled-up, wet (externally), bridged or damaged, 2. Ignition cable loose or grounded, 3. Contact-breaker contacts oiled-up, wet or charred, 4. Short circuit button jammed, 5. Ignition coil damaged, 6. Condenser damaged. <p>No fuel reaching the engine because:</p> <ol style="list-style-type: none"> 1. Fuel tank is empty, 2. Fuel tap closed, 3. Strainer in fuel tap clogged with dirt, 4. Jets blocked. <p>Engine not receiving ignitable mixture because:</p> <ol style="list-style-type: none"> 1. Water in carburetor, 2. Infiltrated air due to loose carburetor.
<p>B. Engine power diminishes</p>	<p>Because of dirt:</p> <ol style="list-style-type: none"> 1. Air cleaner clogged with dirt, 2. Fuel tank not ventilated. <p>Engine has been subjected to overspeeding. Care must be taken at all times to avoid overspeeding of the engine, even for short intervals.</p>

ENGINE SERVICING (WANKEL KM914B)

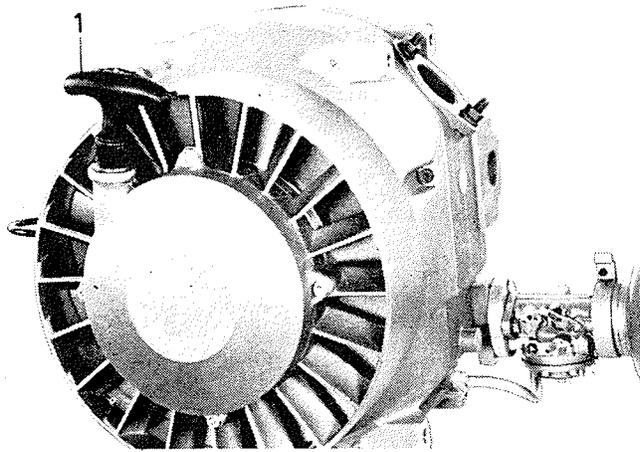
Wankel Component Changes

The following text describes the earlier component versions that differ from those found in this service manual.

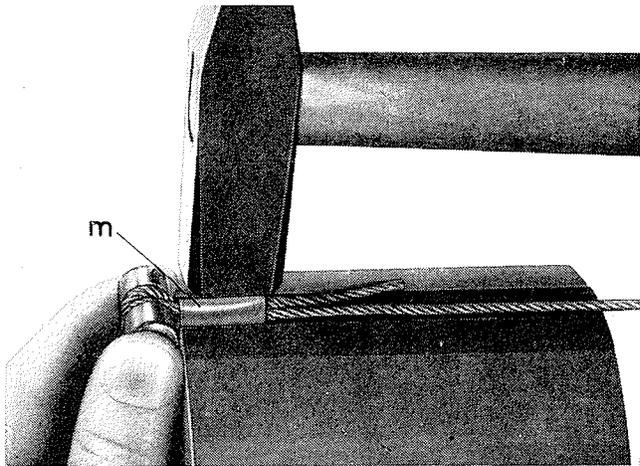
Recoil Starter without Intermediate Flange

The recoil starter without intermediate flange is secured with 4 socket cap screws M 6 x 20.

Tightening torque 4.3 . . . 5.8 ft. lb. (0.6 . . . 0.8 kpm)



When dismantling the recoil starter, pull the retaining pin out of the grip and loosen the clamping sleeve (m) by tapping it with a hammer. Pull the retaining pin and the grip from the cable. When assembling, place grip and new sleeve (m) onto the cable, wrap a double bow around the retaining pin and safety the sleeve.

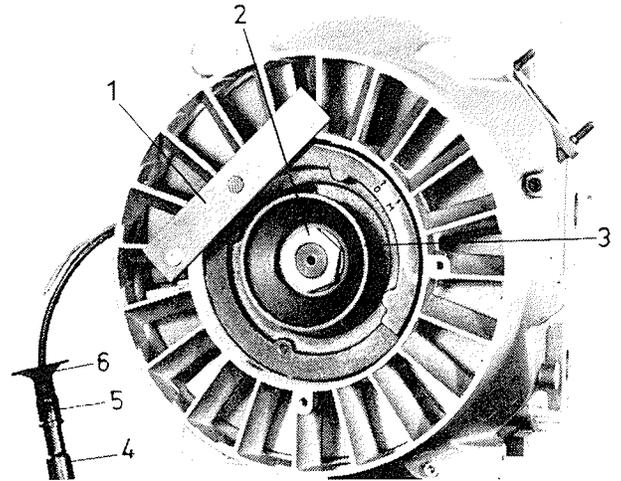


Starter Bell without Emergency Starting Device

Retain the flywheel in place with the retaining plate (1, Arctic Part No. 0144-) to remove and mount the starter bell (3) and nut (2) M 24 x 1.5.

Tightening torque 54.2 . . . 57.8 ft. lb. (7.5 . . . 8.0 kpm)

Observe washer and both bearing rollers 0.15 dia. x 0.31 in. (Ø 4 x 8 mm).



Fan Housing

The fan housing is secured with 4 socket cap screws M 8 x 125 and 2 socket cap screws M 8 x 105.

Observe rubber grommet and alignment dowels.

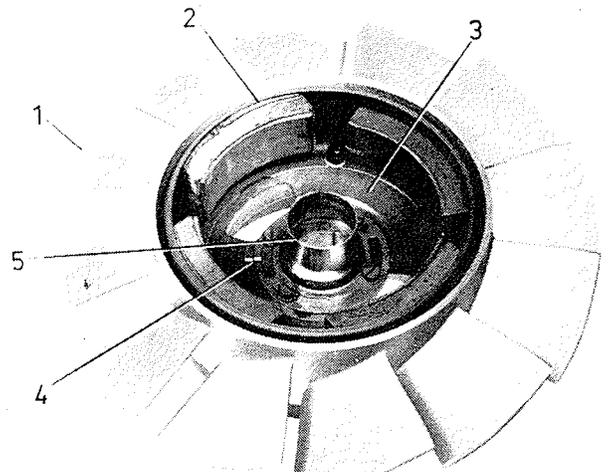
Tightening torque 13.0 . . . 16.0 ft. lb. (1.8 . . . 2.2 kpm)

Flywheel with Ignition Cam

When replacing the ignition cam (5), the marking "L" on the rim of the cam is to coincide with the reference marking (4) of the flywheel.

The ignition cam is secured to the flywheel with 4 screws M 5 x 8 with washers.

Tightening torque 2.9 . . . 3.6 ft. lb. (0.4 . . . 0.5 kpm)



ENGINE SERVICING (WANKEL KM914B)

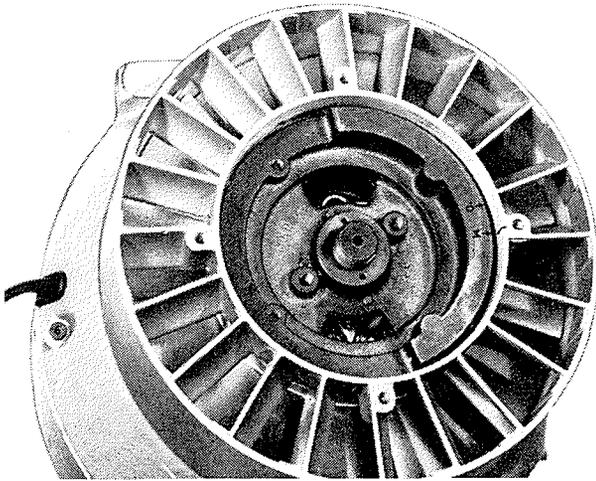
Timing the Ignition

Spark Advance: $10^{\circ} \dots 12^{\circ}$ before top dead center
Contact Breaker Gap: 0.016 ± 0.002 in. (0.4 ± 0.05 mm)
Pole Shoe Gap: $0.590 \dots 0.748$ in. ($15 \dots 19$ mm)
Measuring Instruments: feeler gauge 0.016 in. (0.4 mm)

There are two markings stamped in the magneto flywheel.

"O" coincides with the reference mark on the housing when the rotor is at top dead center.

"M" refers to the firing moment.



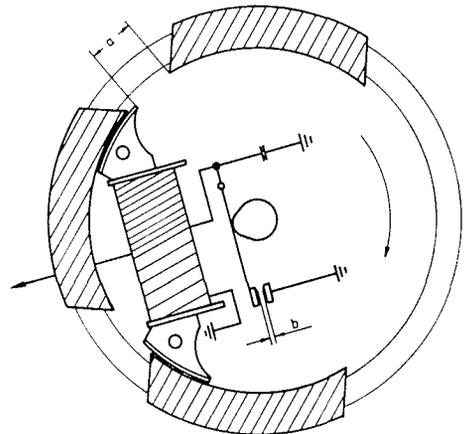
It is recommended that the ignition system be checked each time that the engine is serviced, as the engine performance depends on it and various troubles in the lighting system are caused by an incorrect ignition setting.

The spark plug is also to be inspected and when necessary adjusted to 0.020 in. (0.5 mm).

The timing of the ignition system is to be done as follows:

1. Adjust the breaker contact (b) to 0.016 ± 0.002 in. (0.4 ± 0.05 mm) at maximum lift of cam.
2. Rotate the magneto flywheel against the direction of turn until the "M" mark on the flywheel coincides with the reference mark on the housing (on housings without markings, use the center of the right bore as a reference).
3. Adjust the pole shoe gap (a) to $0.590 \dots 0.748$ in. ($15 \dots 19$ mm) by rotating the armature base plate within its slots.
4. Always secure the armature base plate well after such an adjustment.
5. In this position the breaker contacts must just begin to open. If this is not the case the firing moment can be corrected by rotating the ignition cam (5) within its slots.

Rotating against the direction of rotation of the flywheel: spark retard. Rotating in rotation direction: spark advance.



NOTES

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CARBURETION (WALBRO)

General

Walbro carburetor models WD and WR incorporate a straight-through primary venturi eliminating the restriction of a secondary. A large diaphragm assures precise fuel metering as the built-in fuel pump delivers the necessary fuel, thus eliminating "flat spots". The fuel is filtered internally and vapor released by a unique pumping action preventing vapor lock due to high temperature or high altitude.

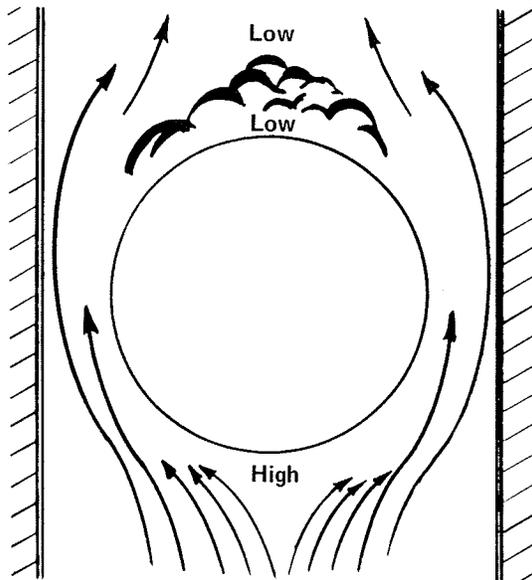
Theory of Operation

The primary function of a carburetor is to mix fuel and air demanded by the engine for operation. Necessary for proper carburetion are the following:

- A. Atmospheric Pressure
- B. Venturi
- C. Airfoil

ATMOSPHERIC PRESSURE

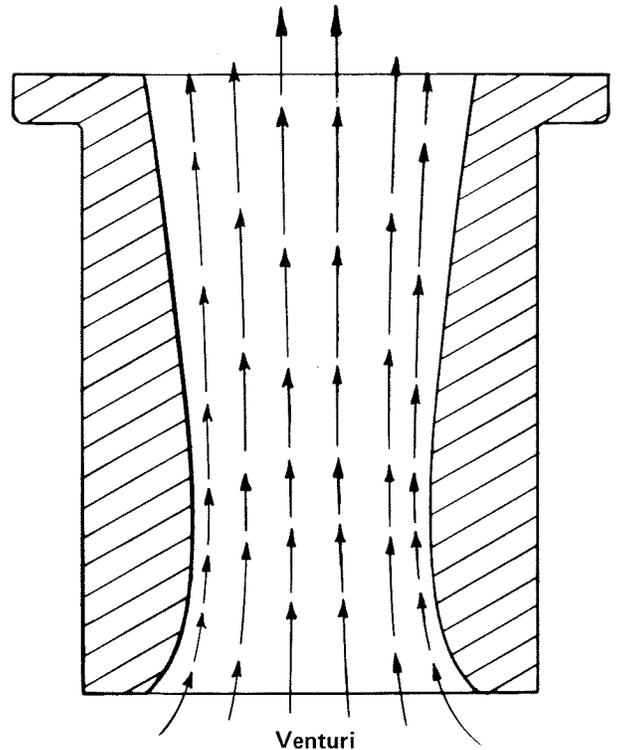
Atmospheric pressure may vary in some areas as a result of altitude and temperature variations but the pressure will equalize itself and apply a force on a given area. This air pressure, usually between 13 and 15 pounds per square inch, always moves from a high to low pressure area.



How is atmospheric pressure used in a carburetor? A low pressure area is created, resulting in air current movement and fuel introduction. As pressure increases between the high and low, the fuel velocity increases. Velocity is then defined as the distance fuel can be raised.

VENTURI

A venturi is a constricted area where air is allowed to pass through. Because of the venturi design, pressure varies between the inside of the carburetor throat and the outside air. This is to allow better atomization of the fuel in the carburetor resulting in better engine performance at all operating speeds. When air moves through the venturi, the velocity of air flow is increased due to the restriction of the venturi area. **NOTE: The venturi also produces a vacuum at the point of maximum restriction. The Walbro Carburetor utilizes a power needle at the maximum point of restriction, resulting in a mixture of fuel that has been drawn with incoming air. This process of mixing fuel and air is known as vaporization.**



AIRFOIL

When air is calm, pressure is equal on all sides of an object. When any air movement is initiated, a distinct airfoil pattern is formed, resulting in a high pressure area and an extremely low pressure area.

The principles of atmospheric pressure, the venturi, and airfoil patterns will now be applied to the Walbro carburetor operation.

The entire carburetor is complex but it operates simply by means of pressure differences. While in operation, the carburetor will use approximately 90,000 gallons of air and expend 10 gallons of gasoline. In summary, faster air flow

CARBURETION (WALBRO)

through the venturi equals lower air pressure. Regulating air flow velocity by utilizing a throttle valve will govern the amount of fuel delivered to the engine.

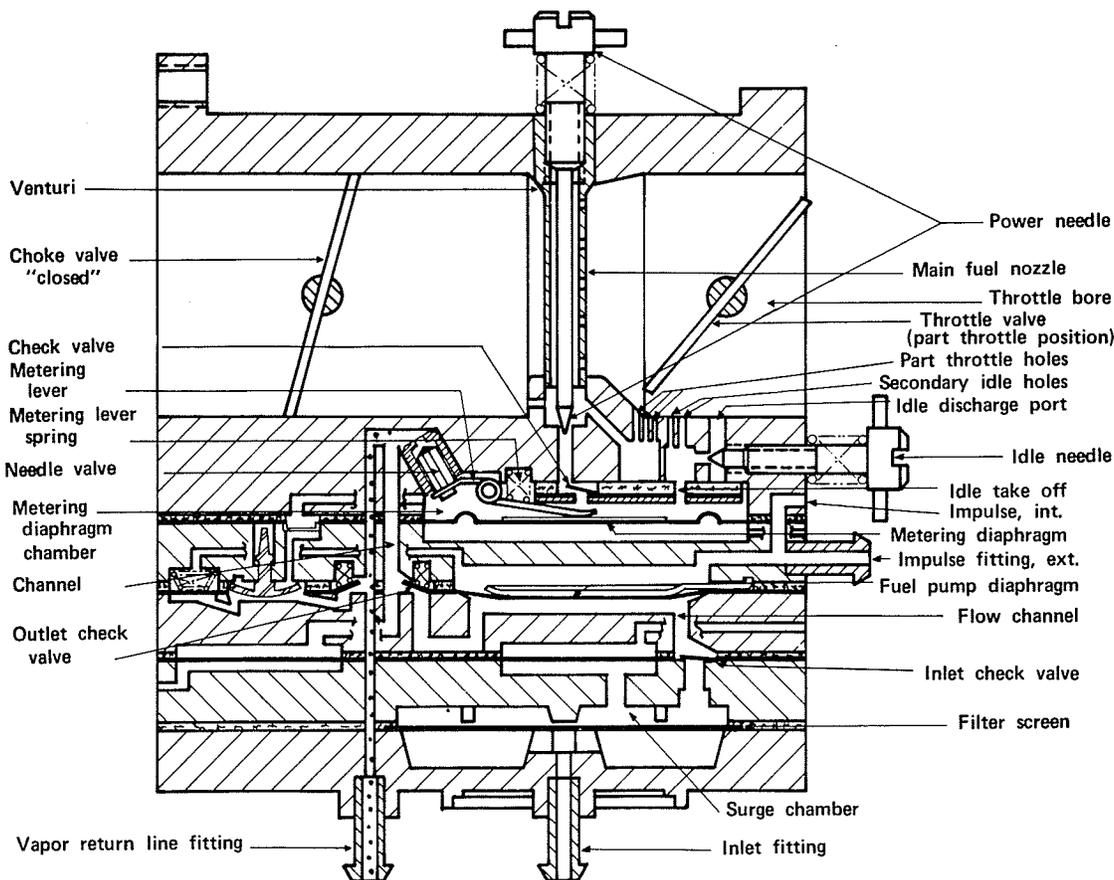
Starting Operation (Choke)

When the engine is cranked with the choke in a closed position, the fuel pump diaphragm pulsates, drawing fuel from the snowmobile fuel tank through the fuel inlet, into the surge chamber, and filtered through the carburetor, and filtered through the carburetor screen. The engine crankcase pulsations transmitted through the external impulse fitting or the internal impulse hole, results in the actuation of the fuel pump diaphragm, which implements the pumping action for the fuel pump. A low pressure area is created on the fuel side of the diaphragm. The fuel is drawn from the surge chamber through the

check valve and channel. Fuel continues to flow through the channel and to the needle valve. The metering lever spring transmits a force on the inlet needle valve. Engine suction pulls the metering diaphragm upward, transmitting this same suction through the idle discharge port hole, secondary idle holes, and the part throttle feed holes. The diaphragm action depresses the metering lever and unseats the needle valve, allowing fuel to enter the metering diaphragm chamber and pass through the idle take off. The check valve is now forced open, allowing fuel to pass through the main nozzle feeding the part throttle feed holes.

NOTE: Fuel is introduced through all discharge holes when the choke is closed to provide a rich fuel mixture for starting. Only a small amount of air is introduced to the rich fuel mixture through the cutout in the choke valve.

STARTING OPERATION (CHOKE)



CARBURETION (WALBRO)

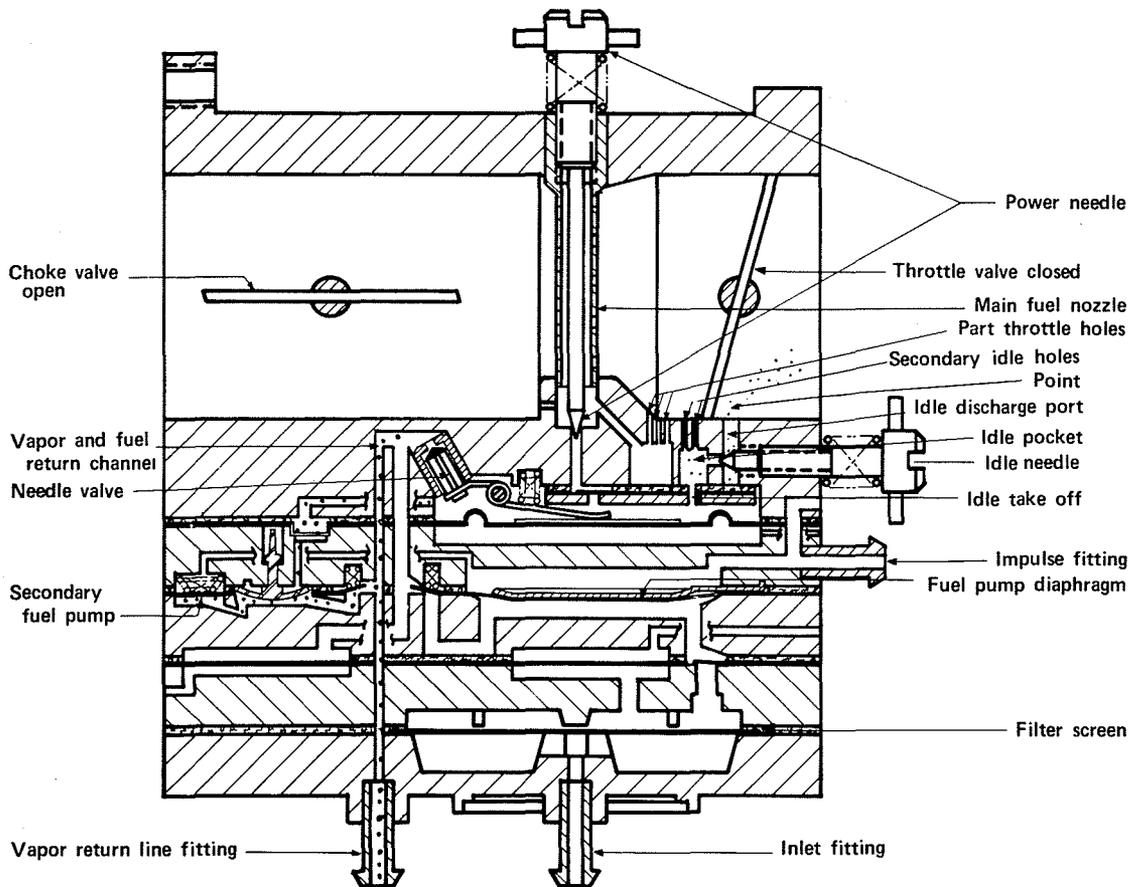
Idle Operation

When the engine is idling the throttle valve is partially open. During the idle process, fuel flows from the idle take off to the idle pocket where it is mixed with air from the

secondary idle holes. This rich mixture passes by the idle needle through the idle discharge port.

NOTE: The entire carburetor is at atmospheric pressure during idle operation.

IDLE OPERATION



CARBURETION (WALBRO)

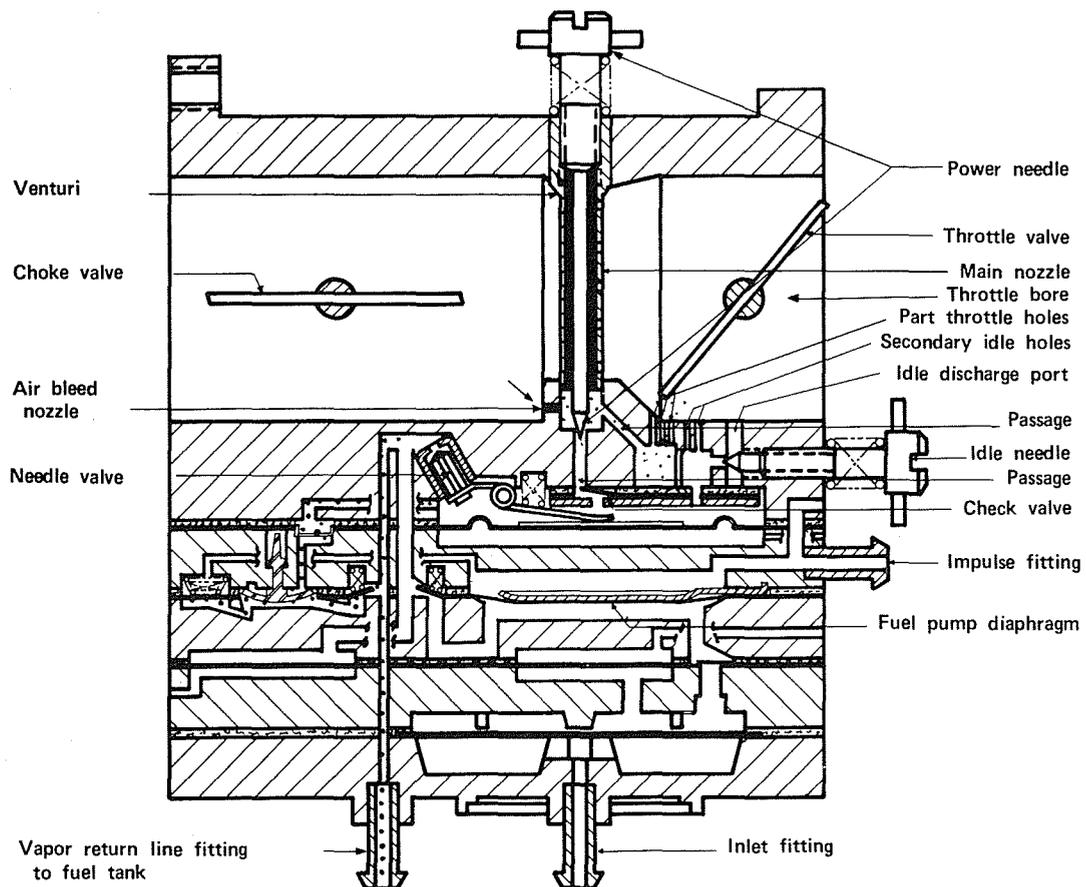
Part Throttle Operation

Fuel is introduced into and passes through the carburetor in the same manner as during engine idle operation. As the throttle is opened and the engine speed increases, more fuel is demanded from the carburetor. The additional fuel necessary for part throttle operation enters past the check

valve, through the passage hole, around the power needle, and through the passage holes. The fuel is then discharged into the throttle bore through the three (3) part throttle holes. Air is introduced to the increased fuel demand through the air bleed nozzle.

NOTE: During part throttle operation the venturi is not obstructed.

PART THROTTLE OPERATION



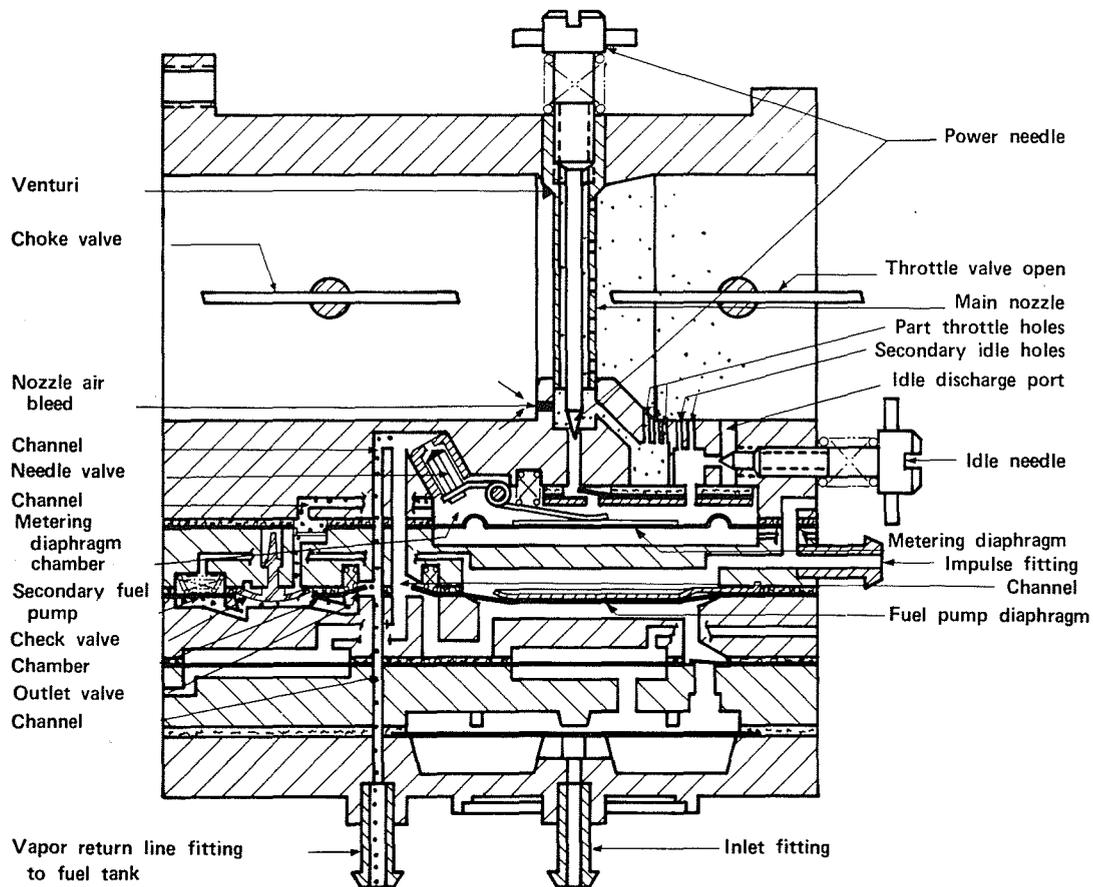
CARBURETION (WALBRO)

Full Throttle Operation (Wide Open)

As the throttle valve opens progressively further from part throttle operation, the air velocity through the venturi increases. At full throttle operation, fuel passes around the power needle and is discharged through the main nozzle

into the venturi. When full throttle is obtained, air is mixed with fuel in the main nozzle through the nozzle air bleed. Suction (vacuum) created by the reciprocating action of the engine piston draws fuel and air as the ports are exposed by the throttle valve position.

FULL THROTTLE OPERATION



Fuel and Vapor Return System

During engine operation at high elevation or high climatic temperature, fuel vaporizes and collects in the channel and metering diaphragm chamber. As fuel is pumped past the fuel pump diaphragm through the channel to the needle valve, a portion of the fuel and vapor is pumped into the

channel and out the fuel and vapor return line fitting. The vapor in the metering diaphragm chamber is pumped by a secondary fuel pump; vapor flows through the channel, past the check valve, into the chamber, through the outlet valve, into the vapor and fuel return channel, and back into the snowmobile fuel tank via the vapor return line fitting.

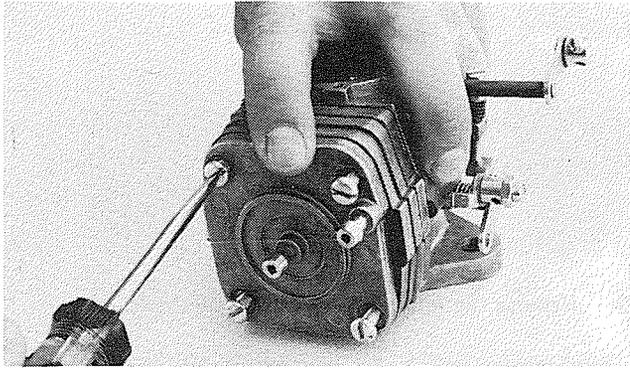
CARBURETION (WALBRO)

Disassembly

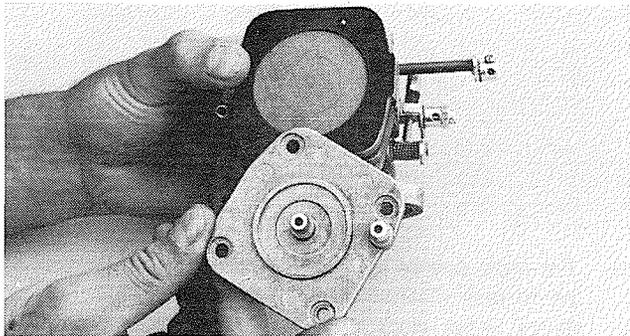
Carefully clean all dirt and foreign matter from the outside of the carburetor. Select a clean working area for carburetor servicing.

To disassemble the Walbro Carburetor, use the following procedure:

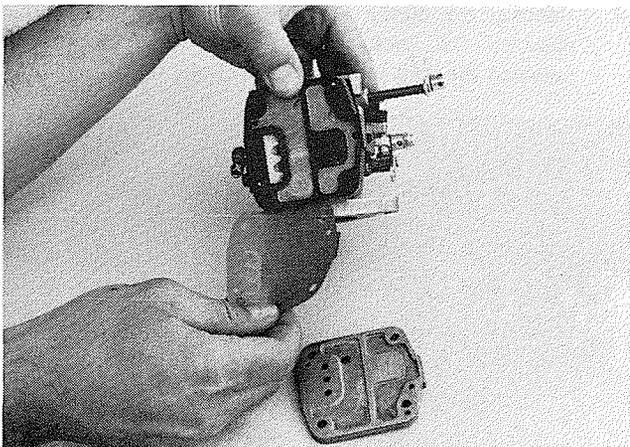
1. Remove the four (4) bottom cover screws.



2. Remove the fuel pump cover, which will expose the fuel inlet gasket, screened filter and filter plate. Remove gasket and screened filter.

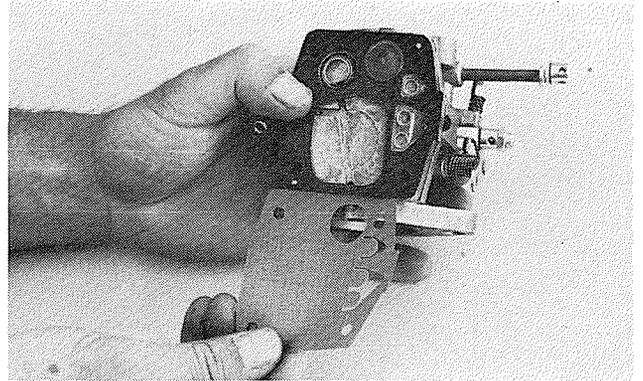


3. Disassemble the diaphragm check valve and gasket from the fuel pump plate. Remove fuel pump plate.



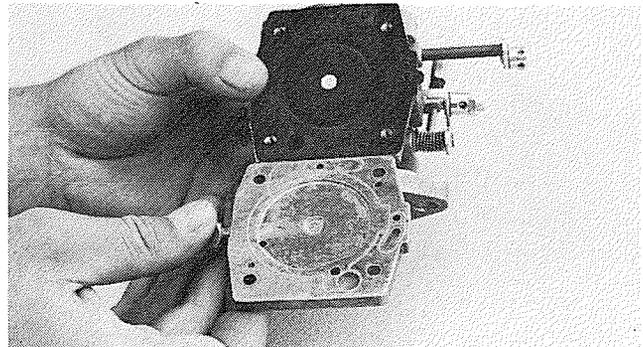
4. At this time the fuel pump diaphragm should be exposed. Carefully peel the diaphragm back and remove the gasket which lies under the fuel pump diaphragm. Examine the cone-shaped pressure spring adjacent to the red vapor pump valve.

NOTE: Vapor pump pressure spring must always be fully seated in the base of the casting.

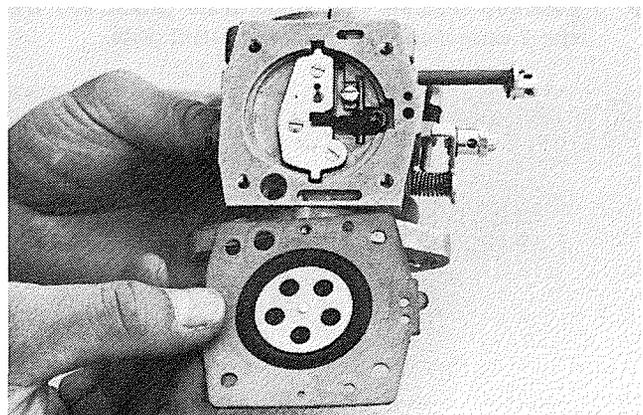


5. Remove the metering diaphragm plate.

NOTE: Located under and on the bottom side of the metering diaphragm plate is a small filtering screen. If obstructed, it may be necessary to blow the screen free from foreign matter.

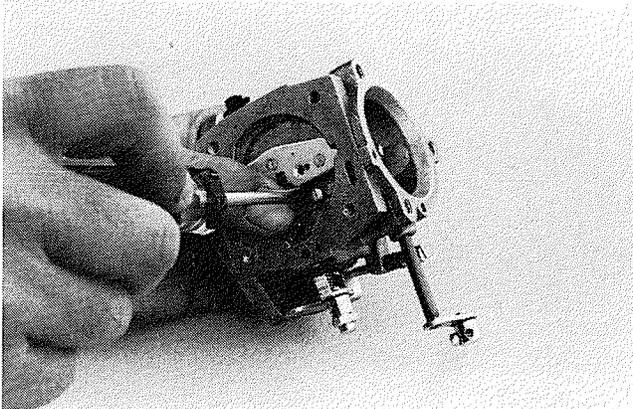


6. Remove the metering diaphragm.

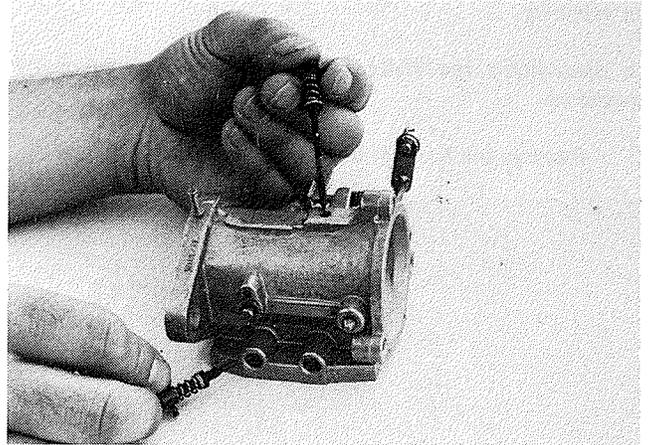


CARBURETION (WALBRO)

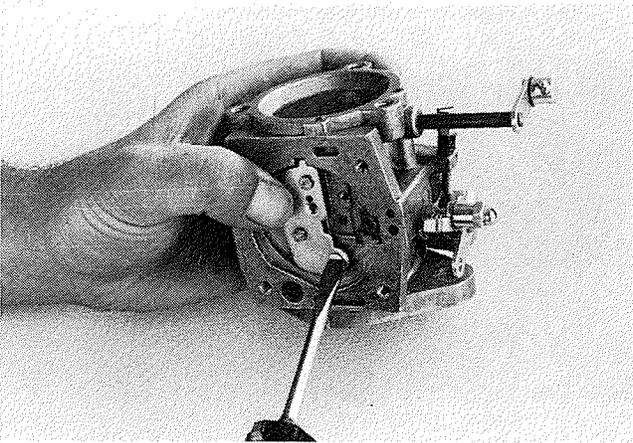
7. Grasp the carburetor and place thumb over the metering lever and metering lever spring. Remove the metering lever pin screw. Slowly release thumb and allow the metering lever, metering lever pin, metering lever spring, and the inlet needle valve to disengage the casting. **NOTE: Metering lever spring may "fly out" if care is not exercised when components are removed.**



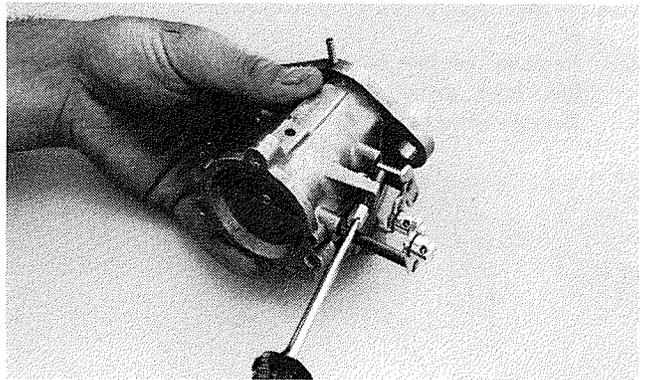
10. Remove the high speed mixture needle.
11. Remove the low speed mixture needle.



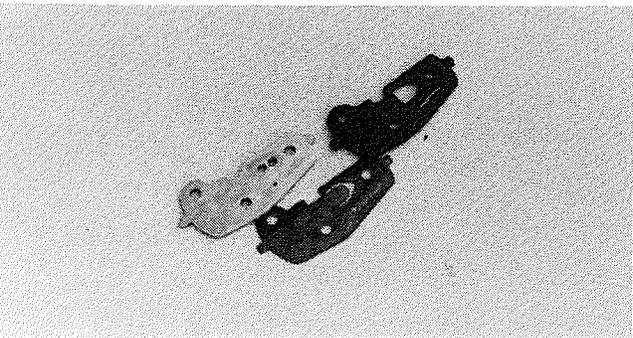
8. Disassemble the circuit plate from the carburetor body by removing the three (3) circuit plate screws.



12. Remove the idle adjusting screw and spring.

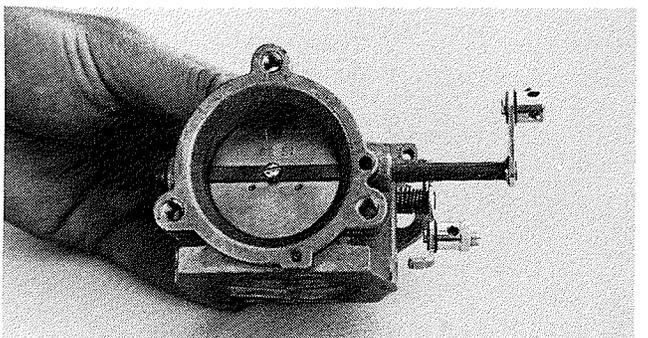


9. Carefully separate the circuit plate gasket and the check valve diaphragm from the circuit plate.



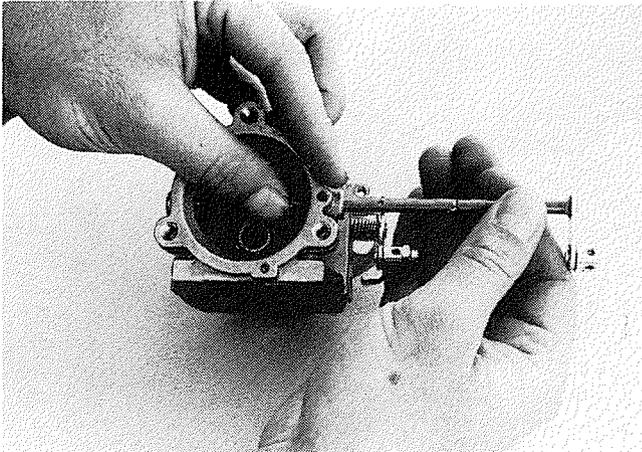
13. For most service applications the carburetor need not be further disassembled. If the choke or throttle levers show signs of wear or are malfunctioning, replacement of these components must be made. If replacement is necessary, continue using the following steps.

14. Remove the choke valve screw securing the choke valve to the choke shaft. Pull choke valve from between the split section of the choke shaft.

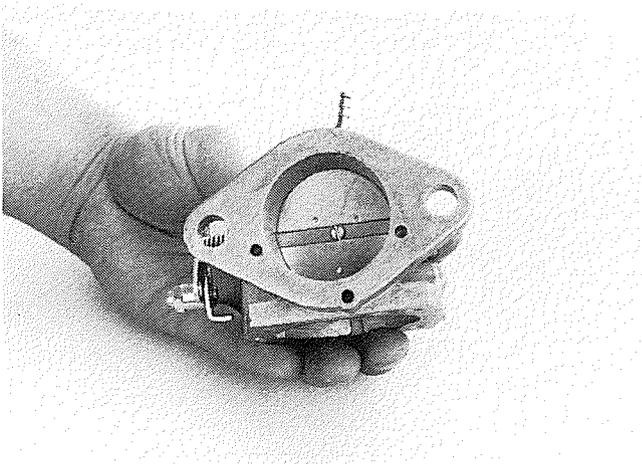


CARBURETION (WALBRO)

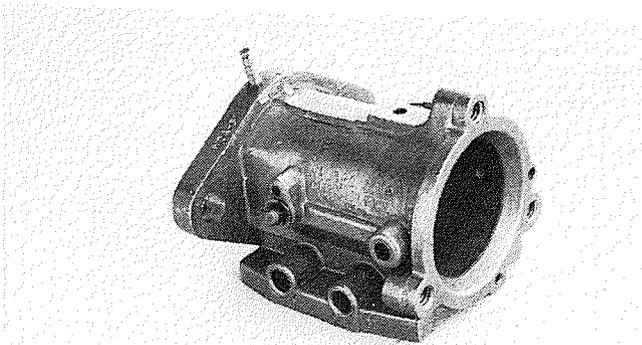
15. Hold intake side of carburetor upward and pull the choke shaft from the main body of the carburetor. Tip carburetor over and allow the choke friction ball and spring to fall from the carburetor body.



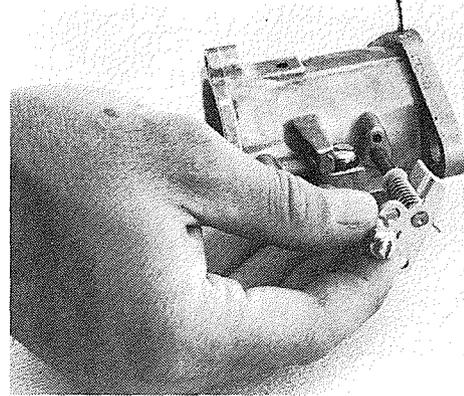
16. Remove the throttle valve screw securing the throttle valve to the throttle shaft. Pull throttle valve from between split section of throttle shaft.



17. Remove the retaining ring at end of throttle shaft.



18. Slowly allow the throttle return spring to disengage all tension and pull the throttle shaft and spring assembly from the carburetor body. **NOTE: Do not lose the nylon bushing located on the throttle shaft.**



Cleaning

1. Carefully wash all carburetor components with a good quality carburetor cleaner. Blow out all carburetor body channels and clean the remainder of the components with compressed air.
2. Replace all components that have been malfunctioning or if the components are worn.

Inspection

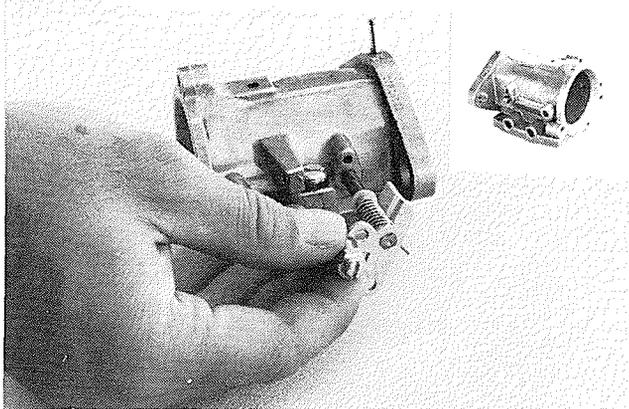
1. The carburetor body casting should be inspected for cracks and stripped threads. If screens are damaged, replacement is necessary.
2. Check the condition of all springs. If spring compression is doubtful, replace before assembling the carburetor.
3. Examine the choke and throttle shafts and the carburetor mounting holes for wear. If shafts or carburetor casting show signs of wear, replace before assembly.
4. Inspect the fuel pump cover, filter plate, fuel pump plate, and the metering diaphragm plate for cracks, holes, and imperfections in the castings. Replace as conditions dictate.
5. Examine all gaskets and diaphragms. Replace damaged gaskets and diaphragms before assembly.

Assembly

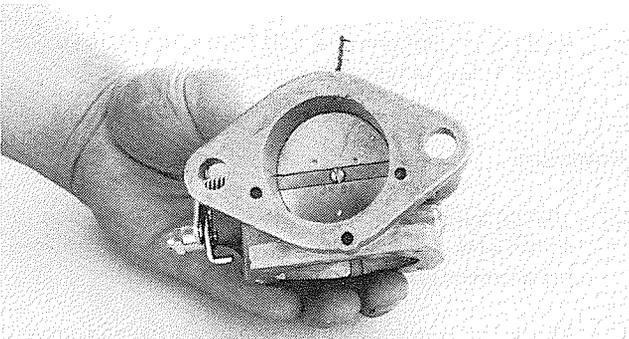
1. Slide throttle shaft into the carburetor and pre-load the throttle shaft spring one revolution. Hold com-

CARBURETION (WALBRO)

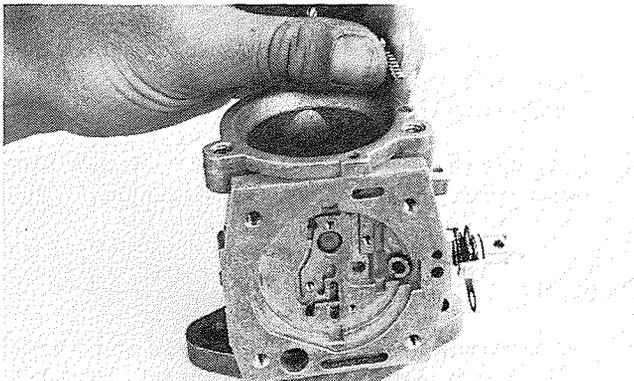
ponents in position and secure in place with retaining ring.



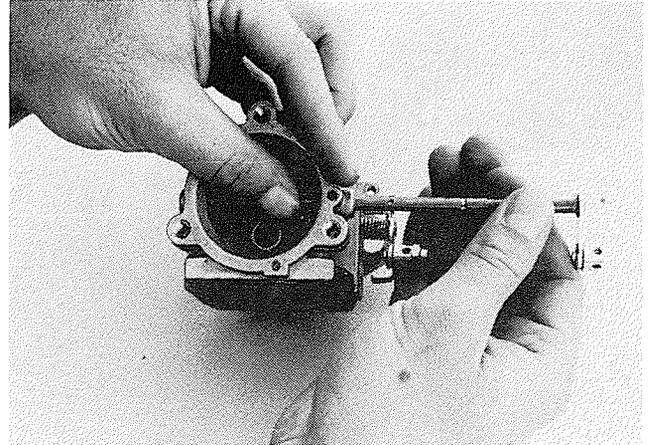
2. Rotate the throttle shaft and install the circular throttle valve between the split section of the throttle shaft. **NOTE: Small hole in throttle valve must be positioned at the bottom of the carburetor throat and face toward the engine mounting side of the carburetor. Secure the throttle valve in place with screw and star washer.**



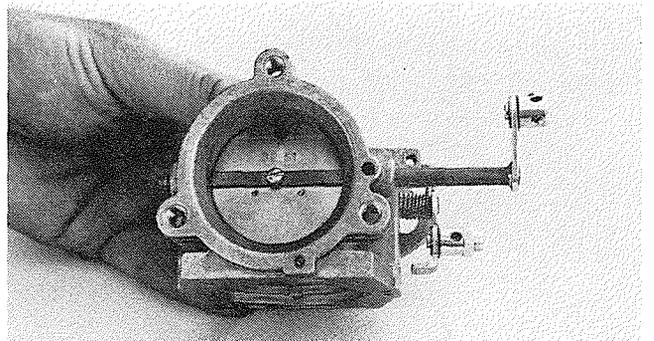
3. Position the carburetor with choke side facing upward.
4. Insert the choke friction spring and ball through the small hole located over the choke shaft mounting hole.



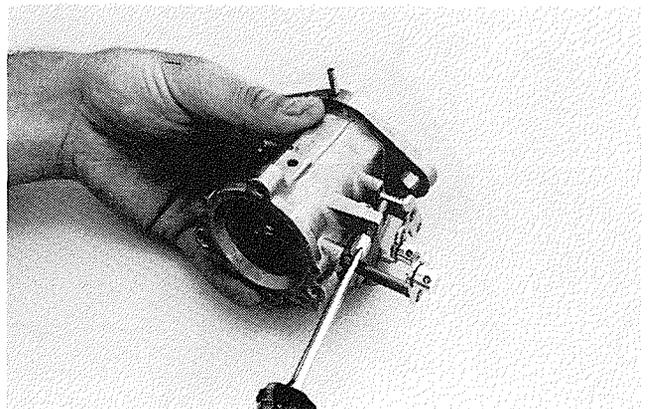
5. Slide the choke shaft into the mounting hole and over the friction spring and ball. Continue to push the choke shaft through the carburetor body and into position.



6. Rotate the choke shaft and install the choke valve between the split section of the choke shaft. **NOTE: Cut-out in choke valve must face toward the top of the casting and the number in the throttle valve must face toward the outside of the carburetor body. Secure the choke valve in place with screw and star washer.**

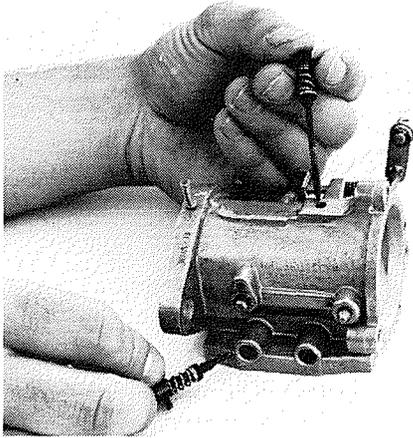


7. Install the idle adjusting screw and spring.

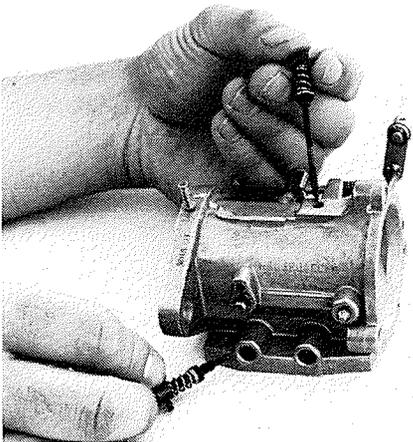


CARBURETION (WALBRO)

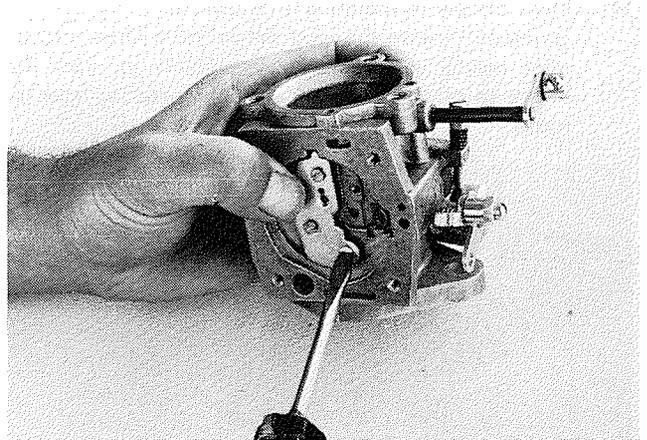
8. Replace the low speed mixture needle, packing ring, packing washer, and spring into the hole at the side of the carburetor body. **NOTE:** Low speed needle should be installed finger tight only to minimize possible damage to the needle and/or seat.



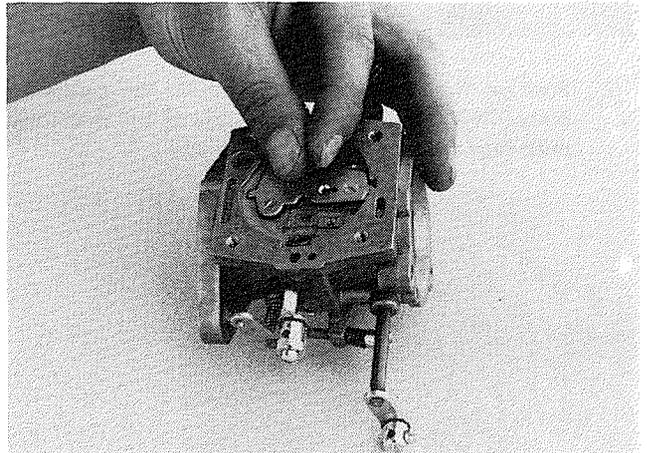
9. Replace the high speed mixture needle packing ring, "O" ring retainer (dished side facing carburetor body), and spring into the hole at the top front third section of the carburetor body. **NOTE:** High speed mixture needle should be installed finger tight only to minimize possible damage to the needle and/or seat.



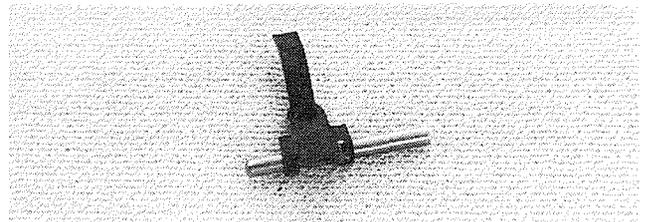
10. Position in sequence, the circuit plate, check valve diaphragm, and the circuit plate gasket. Secure components to the carburetor body with three (3) circuit plate screws.



11. Place the metering lever spring into the casting seat.



12. Place the metering lever pin through the holes in the metering lever.

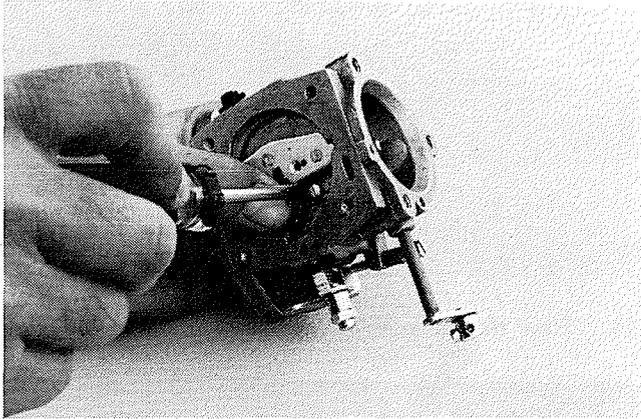


13. Position the inlet needle valve on the end of the metering lever.

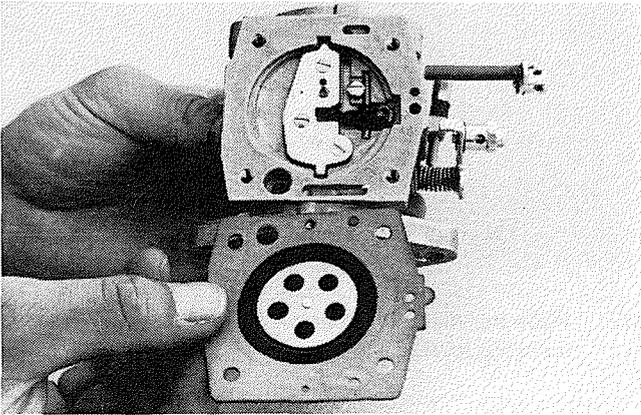


CARBURETION (WALBRO)

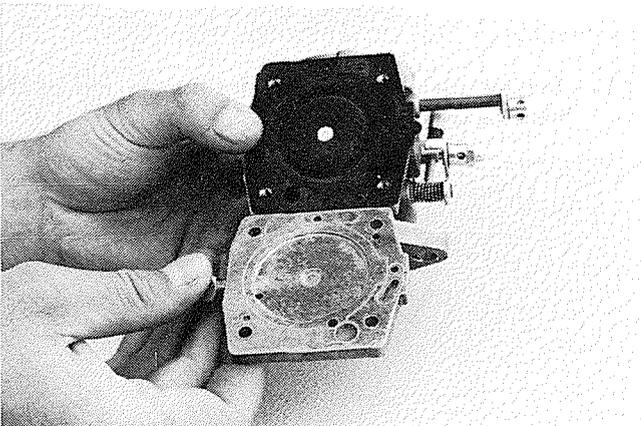
14. Place dimple in metering lever over the metering lever spring and insure the inlet needle valve slides into the inlet needle seat. Hold components in place and secure to carburetor body with the metering lever pin screw.



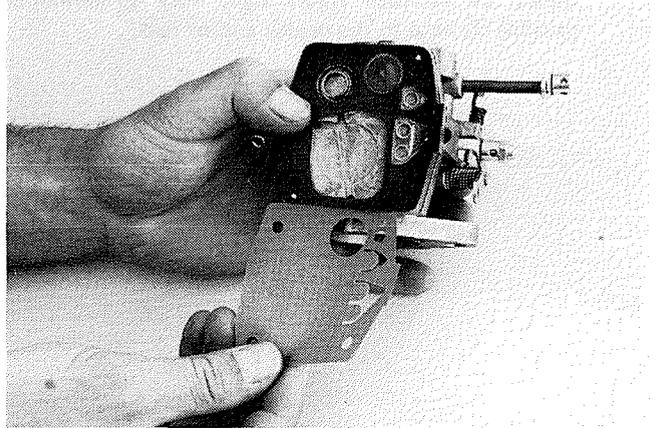
15. Position the metering diaphragm on the carburetor body. **NOTE:** The light gray side of the diaphragm must face toward the carburetor body.



16. Insure the pressure spring is fully seated in the metering diaphragm plate. Position the metering diaphragm plate on the metering diaphragm.



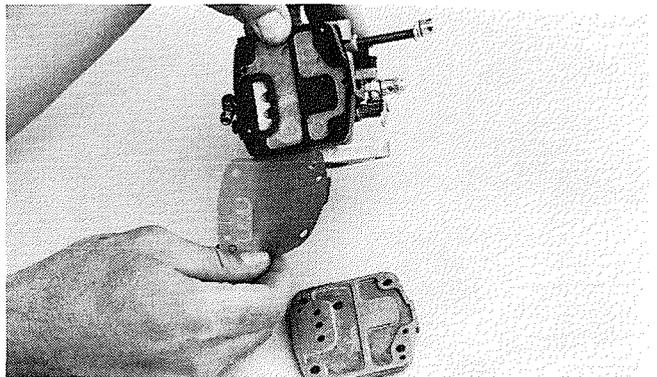
17. Place the fuel pump gasket and the fuel pump diaphragm over the metering diaphragm plate.



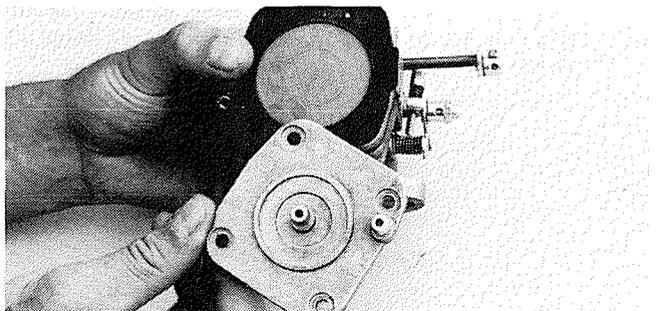
18. Position the fuel pump plate on the fuel pump diaphragm. **NOTE:** Two dime sized recesses in the fuel pump plate must fit directly over the red vapor pump valve and the cone shaped pressure spring located under the fuel pump diaphragm and gasket.

19. Place the fuel pump check valve gasket and the diaphragm check valve on the fuel pump plate.

20. Position the filter plate over the diaphragm check valve. **NOTE:** Circular recess of filter plate must face outward.

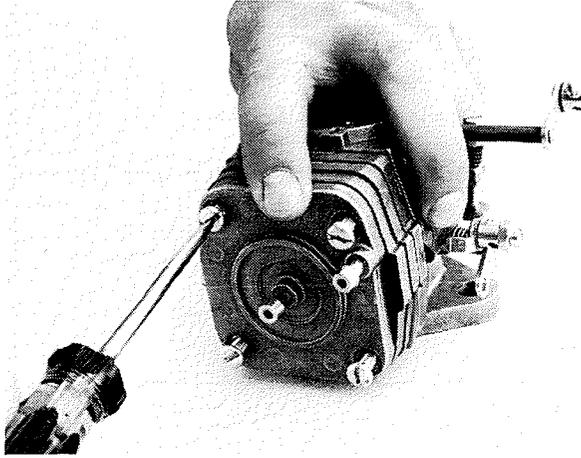


21. Place screened filter over the studs in the filter plate. Position the fuel inlet gasket over the filter plate studs and screened filter.



CARBURETION (WALBRO)

22. Position the fuel pump cover over the fuel inlet gasket and secure all components to the carburetor body with four (4) cover screws.



Adjusting Carburetor

The engines on all Arctic Cat snowmobiles are equipped with a diaphragm-type carburetor. Altitude or temperature may necessitate a carburetor adjustment.

Basic Adjustment

NOTE: Damage to needles and seats can be prevented by carefully making carburetor adjustments. Forcing any of the needles may cause damage. The high speed mixture and low speed mixture screws should be turned clockwise to

close (lean mixture) and counterclockwise to open (rich mixture). A lean mixture results in too little fuel and an excessive amount of air. A rich mixture results in excessive fuel and too little air.

Approximate Walbro carburetor settings for engines used in 1972 Arctic Cat snowmobiles are as follows:

	High Speed	Low Speed
340, 399, 440		
Kawasaki (Walbro WD)	1-1/4	1

Initial high speed carburetor setting is for starting purposes only. To obtain optimum performance, the carburetor must be fine tuned.

- A. Low Speed Mixture Needle – An improper adjustment may result in poor acceleration.
- B. High Speed Mixture Needle – A lean adjustment may result in engine and spark plug overheating, as well as internal engine damage. A rich setting will cause excessive exhaust emissions (smoke), “four cycling”, and plug fouling. The desired adjustment is at the point of eliminating the “four cycling” effect at full throttle. The only accurate test of this adjustment can be made by actual full load operation.
- C. Idle Speed Screw – Perform this adjustment after the low speed needle has been set. Because there is a definite relationship between the idle speed screw and the low speed mixture needle adjustments, neither should be changed without checking the other. Rotate the idle speed screw clockwise to increase idle RPM and counterclockwise to decrease idle RPM. Set engine idle at a speed slightly below clutch engagement.

TROUBLE SHOOTING

Faulty carburetor operation is the result of three (3) main problems: A) Dirt in the carburetor; B) Richness; C) Leanness

RICH CONDITION	
Problem: 1. Diaphragm lever too high. 2. Foreign matter lodged under inlet needle valve. 3. Metering lever spring not seated correctly on the dimple in the metering lever. 4. Fuel pump diaphragm leaks. 5. Foreign matter under the umbrella check valve.	Solution: 1. Set metering lever to specification. 2. Remove needle valve and clean. 3. Remove metering lever and install to specification. 4. Replace with a new fuel pump diaphragm. 5. Blow through screen on reverse side of plate.
LEAN CONDITION	
Problem: 1. Dirt in idle fuel channels. 2. Metering lever set too low. 3. Nozzle check valve diaphragm leakage. 4. Hose in metering diaphragm. 5. Obstruction in crankcase to carburetor pulse line. 6. Manifold gasket(s) leakage. 7. Diaphragm check valve leakage. 8. Worn fuel pump diaphragm check valve. 9. Dirty fuel inlet screen. 10. Faulty fuel delivery system to carburetor.	Solution: 1. Disassemble and clean carburetor. 2. Set flush with base of chamber floor. 3. Replace diaphragm. 4. Replace diaphragm. 5. Clean pulse line. 6. Replace gasket(s). 7. Replace diaphragm check valve assembly. 8. Replace fuel pump diaphragm check valve. Remove bottom plate and clean. 9. Check complete fuel delivery system. 10. Replace fuel line or pick up filter when necessary.

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CARBURETION (TILLOTSON)

General

The Tillotson carburetor incorporates a diaphragm controlled metering system which allows precise fuel metering to the engine at extreme angles and vibration factors prevalent during snowmobile operation. The proportionate amount of fuel passing through the carburetor metering chamber is always equal to the fuel demanded by the engine during operation.

The dual venturi multiplies the venturi pressure drop, causing extremely fine atomization of the fuel that is delivered by the main fuel nozzle. As a result, fuel reaches the engine as a combustible fog rather than a fluid stream.

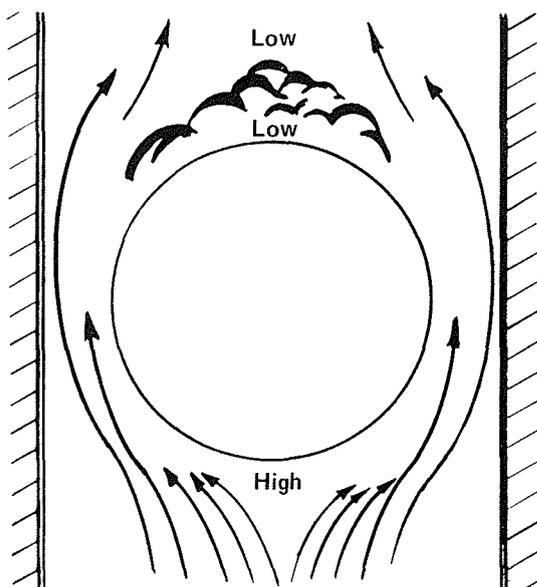
Theory of Operation

The primary function of a carburetor is to mix fuel and air demanded by the engine for operation. Necessary for proper carburetion are the following:

- A. Atmospheric Pressure
- B. Venturi
- C. Airfoil

ATMOSPHERIC PRESSURE

Atmospheric pressure may vary in some areas as a result of altitude and temperature variations but the pressure will equalize itself and apply a force on a given area. This air pressure, usually between thirteen (13) and fifteen (15) pounds per square inch, always moves from a high to a low pressure area.

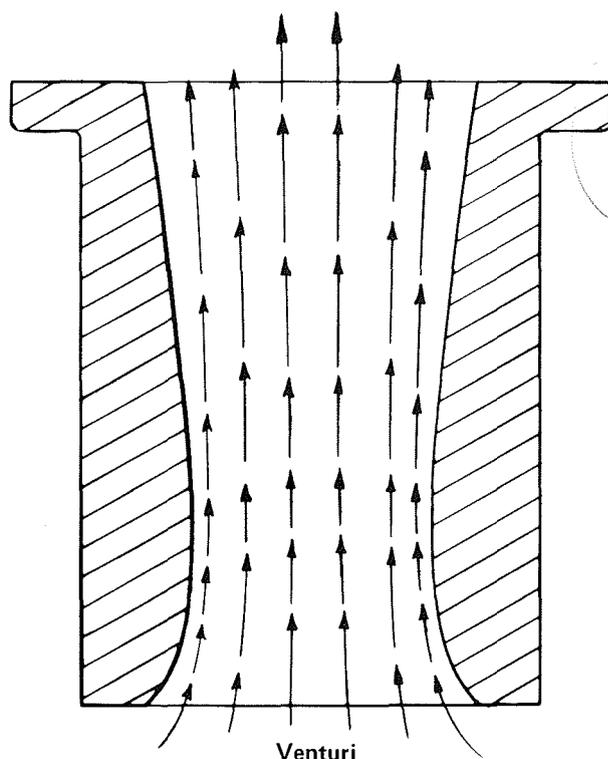


How is atmospheric pressure used in a carburetor? A low pressure area is created, resulting in air current movement and fuel introduction. As pressure increases, between the

high and low, the fuel velocity increases. Velocity is then defined as the distance fuel can be raised.

VENTURI

A venturi is a restricted area where air is allowed to pass through. Because of the venturi design, pressure varies between the inside of the carburetor throat and the outside air. This is to allow better atomization of the fuel in the carburetor, resulting in better engine performance at all operating speeds. When air moves through the venturi, the velocity of air flow is increased due to the restriction of the venturi area. **NOTE: The venturi produces a vacuum at the point of maximum restriction.**



AIRFOIL

When air is calm, pressure is equal on all sides of an object. When any air movement is initiated, a distinct airfoil pattern is formed, resulting in a high pressure area and an extremely low pressure area.

The principles of atmospheric pressure, the venturi, and airfoil patterns will now be applied to the Tillotson carburetor.

The entire carburetor is complex but it operates simply by means of pressure differences. While in operation, the carburetor will use approximately 90,000 gallons of air and expend 10 gallons of gasoline. In summary, faster air flow through the venturi equals lower air pressure. Regulating

CARBURETION (TILLOTSON)

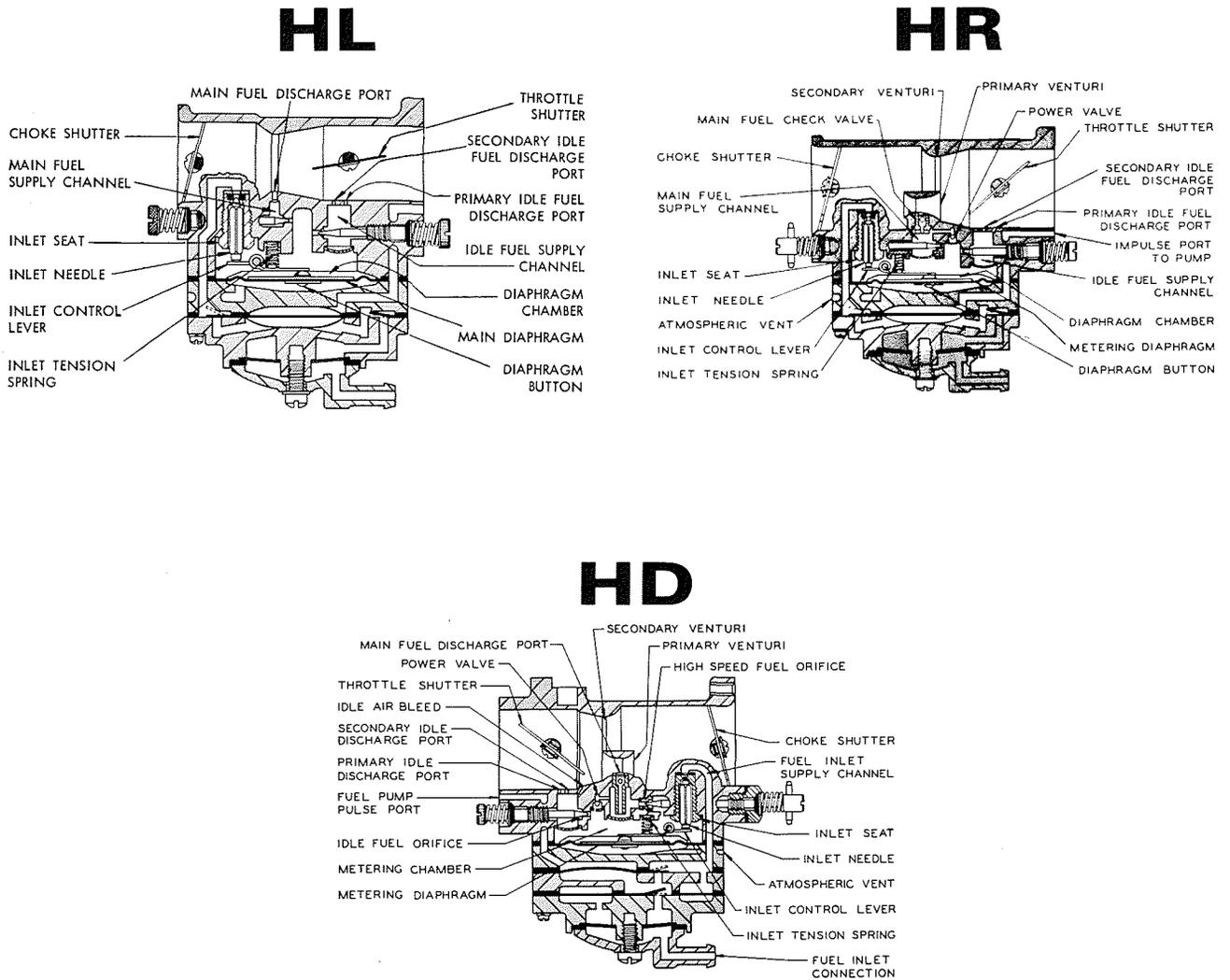
air flow velocity by utilizing a throttle valve will govern the amount of fuel delivered to the engine.

Starting Operation (Choke)

When the engine is cranked with the choke in a closed position and the throttle shutter in a partial or open position, engine suction will be transmitted to the diaphragm fuel chamber through both the primary and

secondary idle discharge ports, as well as the main fuel discharge port. At this time, a low pressure area is formed on the fuel side of the main diaphragm. Atmospheric air pressure on the reverse side of the main diaphragm will force the main diaphragm upward, causing the diaphragm button to depress the inlet control lever, overcoming the inlet tension spring pressure. Fuel will now enter through the inlet seat by forcing the inlet needle off its seat contact, into the fuel chamber side of the main diaphragm, through the idle and main fuel supply orifices and channels, and out the discharge ports to the engine.

STARTING OPERATION (CHOKE)



CARBURETION (TILLOTSON)

Idle Operation

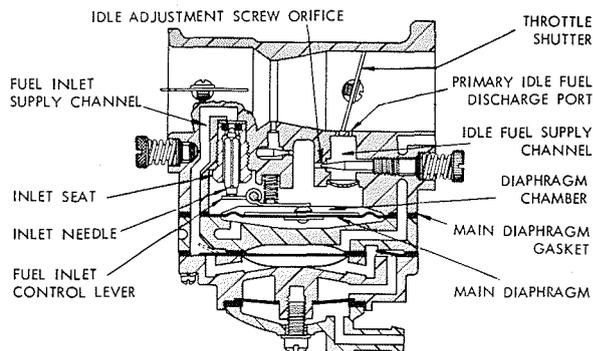
When the engine is idling, the throttle valve is partially open. During the idle process, engine suction is transmitted through the primary idle discharge port to the fuel chamber side of the main diaphragm via the idle fuel supply channel. Again, the main diaphragm is forced upward by atmospheric pressure, depressing the inlet control lever and

permitting pressurized fuel to force the inlet needle off its seat, filling the fuel chamber side of the main diaphragm. The fuel is then drawn up through the idle fuel discharge port.

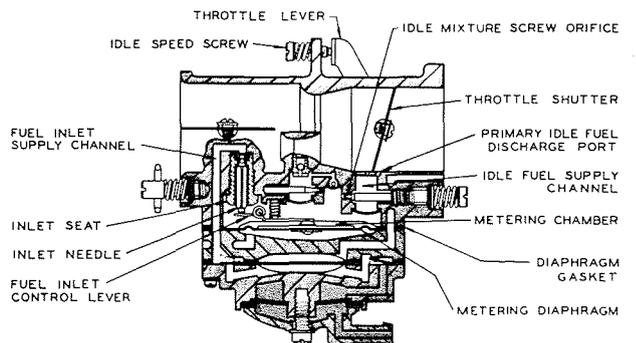
NOTE: The entire carburetor is at atmospheric pressure during idle operation.

IDLE OPERATION

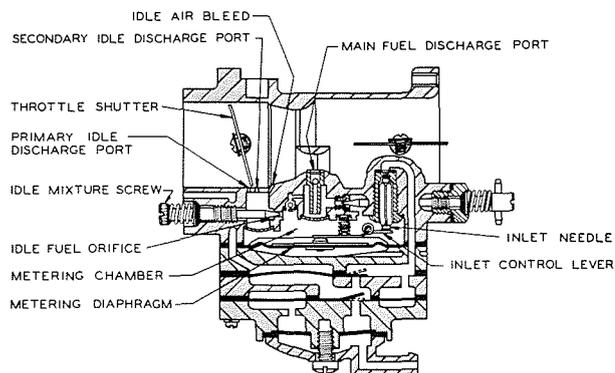
HL



HR



HD



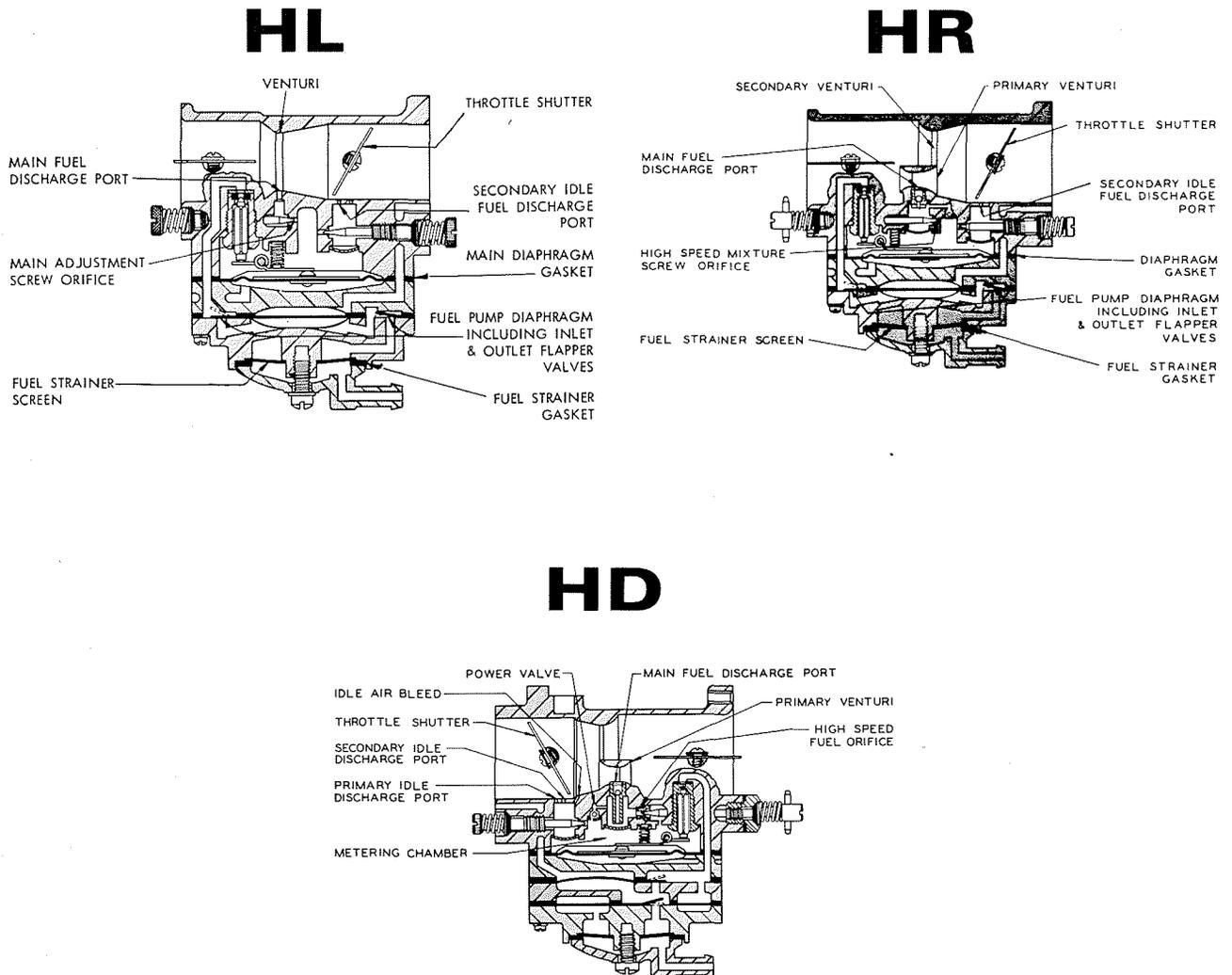
CARBURETION (TILLOTSON)

Part Throttle Operation

Fuel is introduced into and passes through the carburetor in the same manner as during engine idle operation. As the throttle is opened and the engine speed increases, more fuel is demanded from the carburetor. The additional fuel necessary for part throttle operation is supplied to the engine by valving in the secondary idle discharge port located immediately behind the throttle shutter. As the

throttle shutter continues to open and the engine speed increases, the velocity of air passing through the venturi creates a low pressure area at the venturi throat and diminishes the suction on the engine side of the throttle shutter. When the pressure at the venturi throat is lower than the pressure within the main diaphragm fuel chamber, the fuel is drawn up through the main adjustment screw orifice, out through the main fuel discharge port, and into the air stream entering the engine intake.

PART THROTTLE OPERATION



CARBURETION (TILLOTSON)

Full Throttle Operation

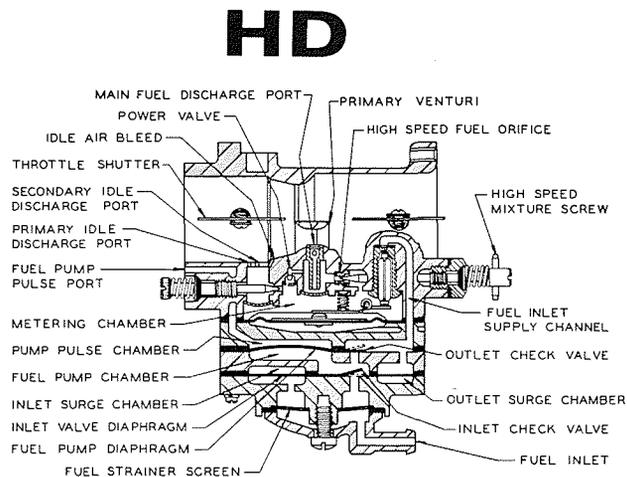
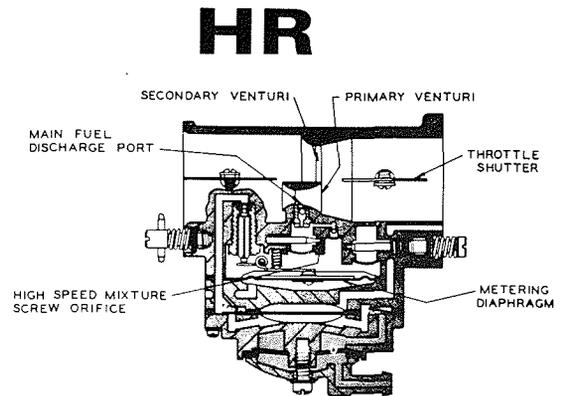
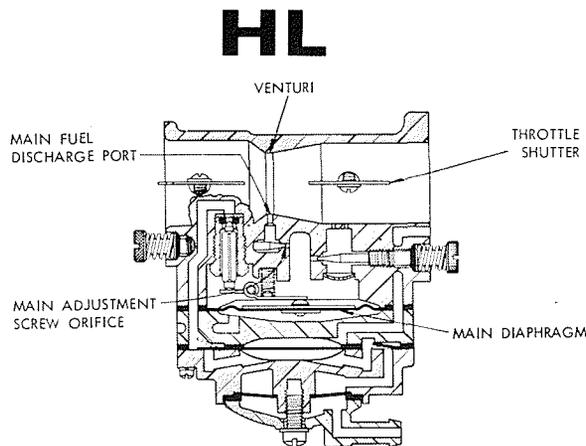
As the throttle valve opens progressively further from part throttle operation, the air velocity through the venturi increases. At full throttle operation, fuel is metered up through the main adjustment screw orifice and main fuel discharge port.

NOTE: Fuel demand is governed by the power load of the engine.

The action of the main diaphragm is the same as previously described, with suction required to operate the diaphragm being transmitted through the main fuel discharge port.

NOTE: The primary and secondary idle discharge ports deliver relatively little fuel at full throttle operation. Most of the fuel deliverance is supplied from the main fuel discharge port.

FULL THROTTLE OPERATION



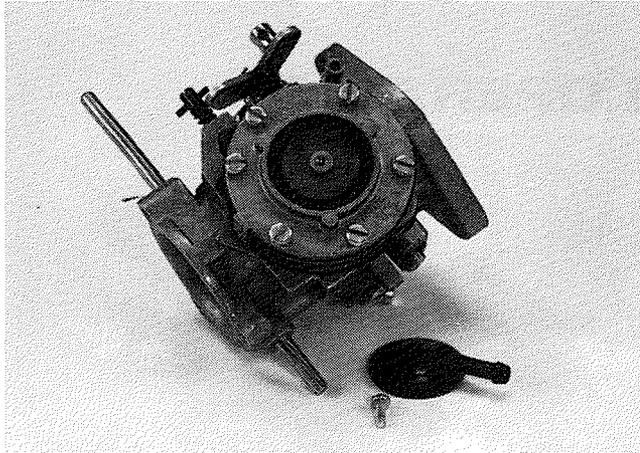
CARBURETION (TILLOTSON)

Disassembly

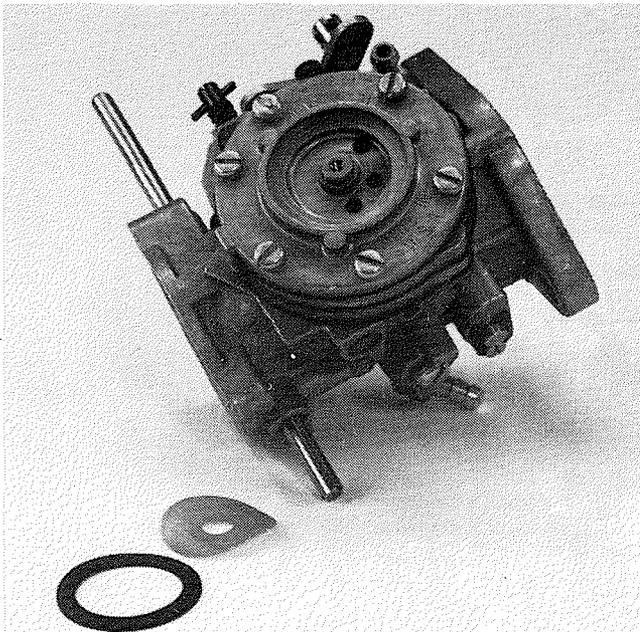
Carefully clean all dirt and foreign matter from the outside of the carburetor. Select a clean working area for carburetor servicing.

To disassemble the Tillotson carburetor, use the following procedure:

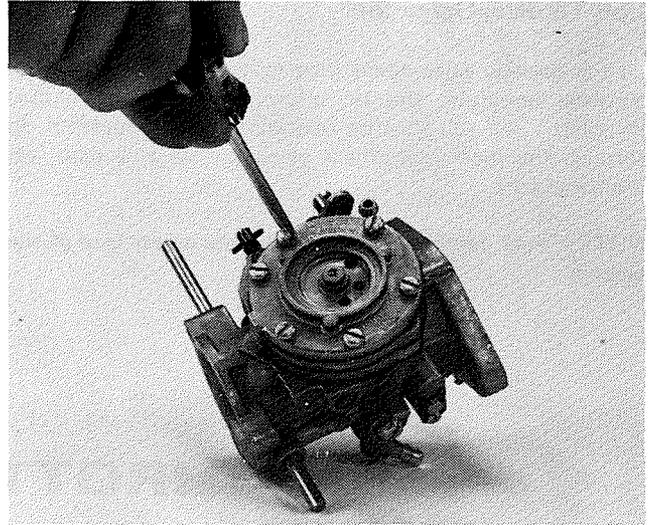
1. Remove the fuel strainer cover retaining screw and the plastic fuel strainer cover. Clean fuel strainer cover thoroughly.



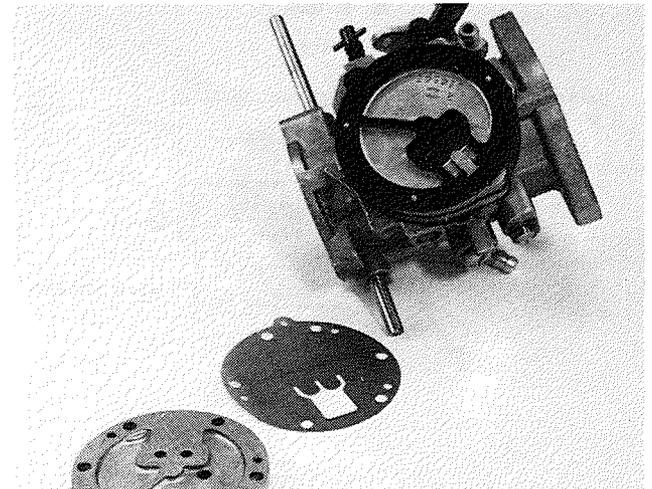
2. Remove the strainer screen gasket and the fuel strainer screen. **NOTE: The fuel strainer screen should be cleaned with solvent and dried with compressed air. The strainer screen gasket should be replaced whenever the fuel strainer screen is serviced.**



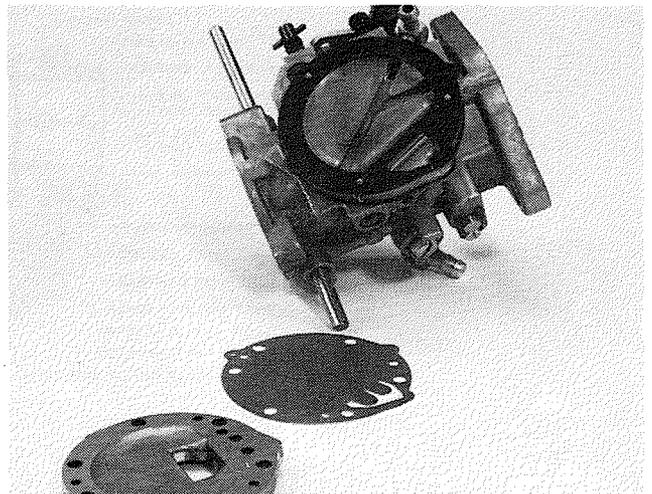
3. Remove the six (6) body screws and washers.



4. Remove the inlet valve body, diaphragm, and gasket.

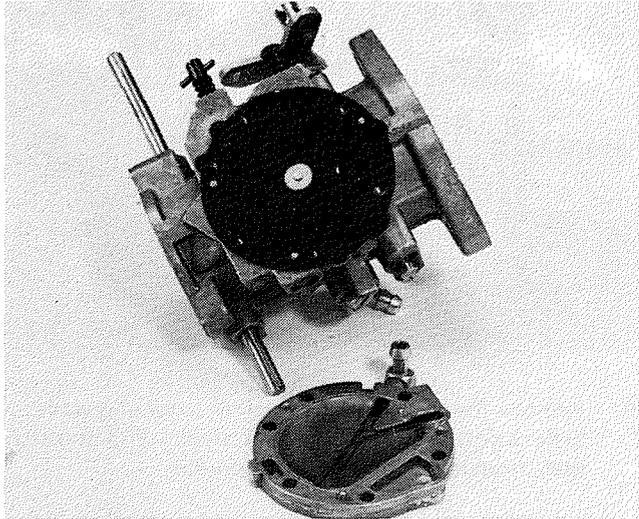


5. Remove the fuel pump body, which will expose the fuel pump diaphragm and gasket. Remove gasket and diaphragm. **NOTE: Replace the gasket if it is creased or damaged in any way.**

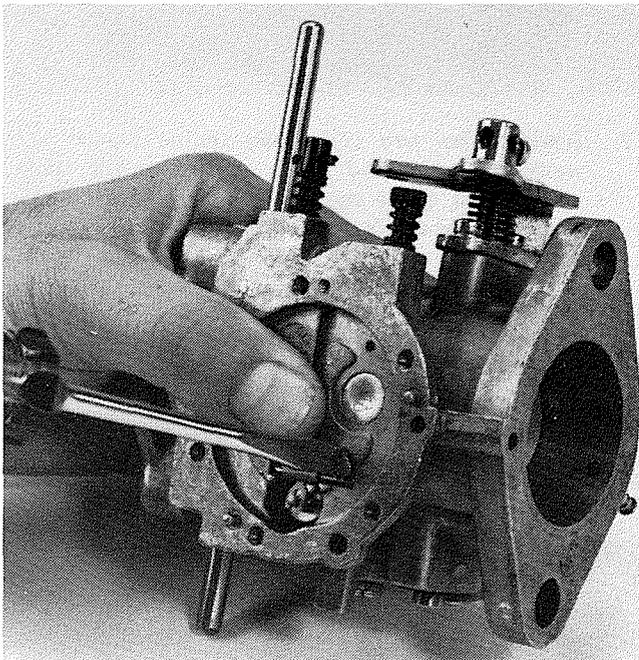


CARBURETION (TILLOTSON)

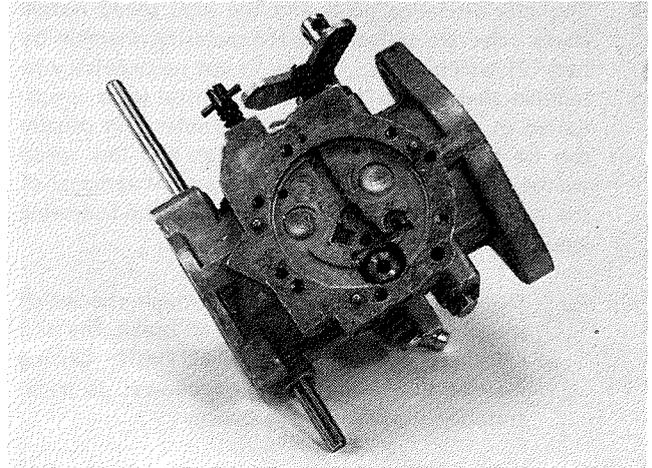
6. Remove the diaphragm cover plate, main diaphragm, and the main diaphragm gasket. **NOTE:** Replace the main diaphragm and diaphragm gasket if damage is evident.



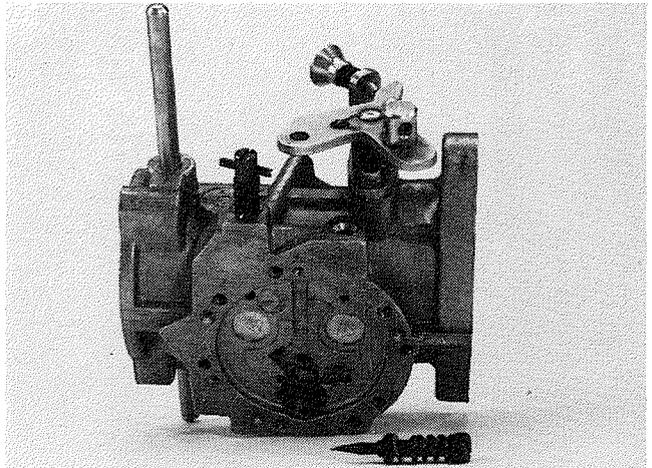
7. Grasp the carburetor and place thumb over the inlet control fulcrum pin, inlet control lever, and tension spring. Remove screw securing components in place. Slowly release thumb and allow the inlet control lever fulcrum pin, inlet control lever, the tension spring, and the needle to disengage the casting. **NOTE:** Tension spring may "fly out" if care is not exercised when components are removed. If tension spring is distorted or condition is doubtful, replace with a new spring.



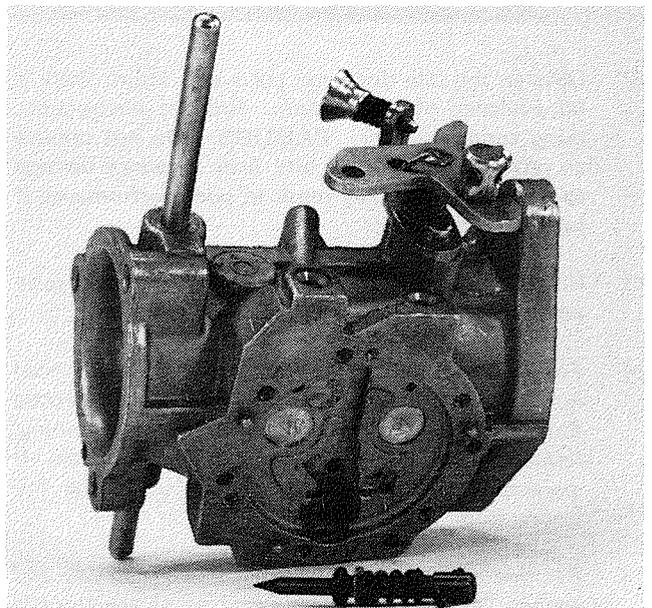
8. Using a 5/16 inch thin wall socket, remove the inlet seat and gasket.



9. Remove the low speed mixture needle.



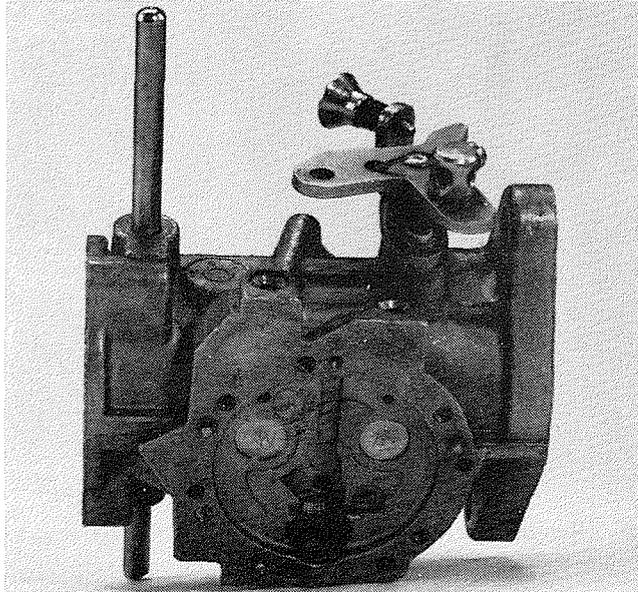
10. Remove the high speed mixture needle.



CARBURETION (TILLOTSON)

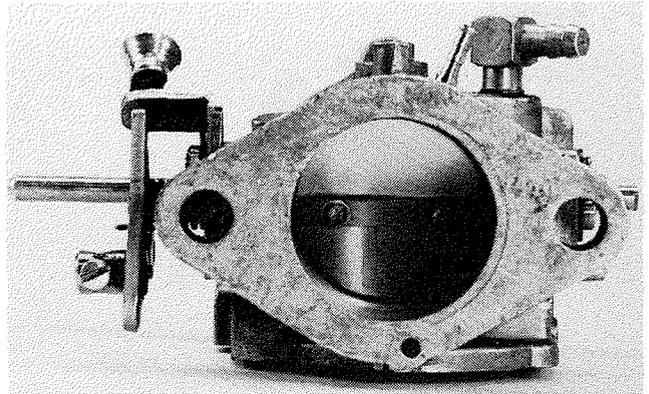
11. The idle discharge ports and the high speed nozzle check valve are sealed from the metering chamber by two (2) welch plugs. It should not be necessary to remove these plugs because very little wear is sustained in these areas. If dirt accumulates, it usually can be blown out through the high and low speed needle holes by using compressed air. If removal of the welch plug(s) is necessary, perform the following steps:

- A. Using a 1/8 inch bit, drill through the welch plug. Allow the bit to just break the top surface of the welch plug. **CAUTION: Casting may be damaged if the bit is allowed to penetrate too deeply into the cavity.**
- B. Using a small punch, pry the welch plug out of its seat.

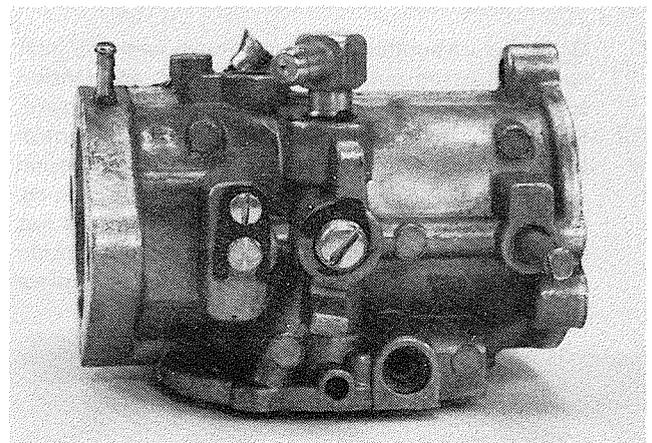


12. Observe the idle discharge ports and insure there is no evidence of obstruction. Remove obstruction, using compressed air. **CAUTION: Do not remove an obstruction by using bits, nails, or wires; damage to the carburetor may result in poor performance if such items are used.**
13. Remove the high speed nozzle ball check valve assembly with a screwdriver of correct width.
14. For most service applications, the carburetor need not be further disassembled. If the choke or throttle shutters show signs of wear or are malfunctioning, replacement of these components must be made. If replacement is necessary, continue using the following steps:
15. Remove the two (2) throttle shutter screws and washers securing the throttle shutters to the throttle

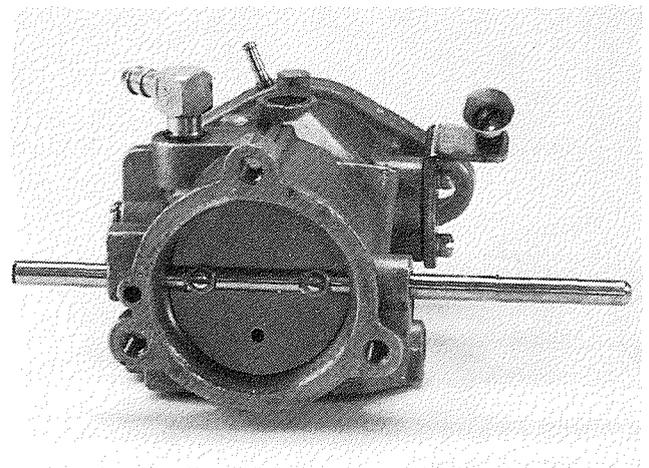
shaft. Pull throttle shutter from between the split section of the throttle shaft.



16. Remove the throttle shaft retainer screw and washer. Slide throttle clip off throttle shaft. Pull throttle shaft from main body of the carburetor.

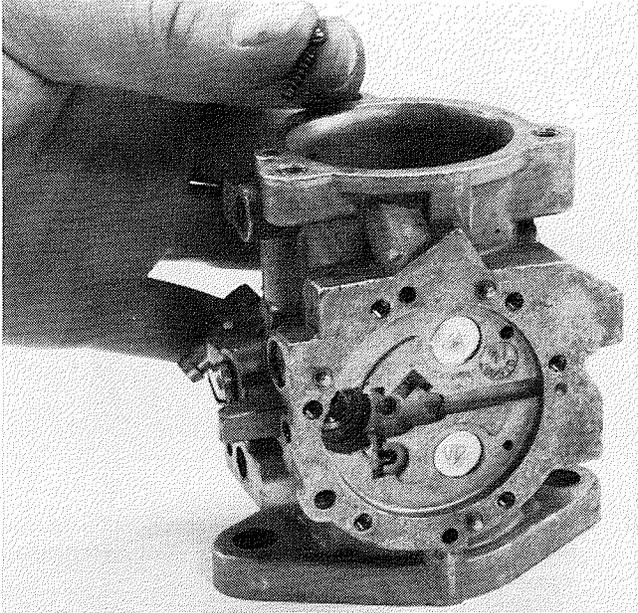


17. Remove the two (2) choke shutter screws and washers securing the choke shutter to the choke shaft. Pull choke shutter from between the split section of the choke shaft.



CARBURETION (TILLOTSON)

18. Hold intake side of carburetor upward and carefully pull the choke shaft from the main body. Tip carburetor over and allow the choke friction ball and spring to fall from the carburetor body.



Cleaning

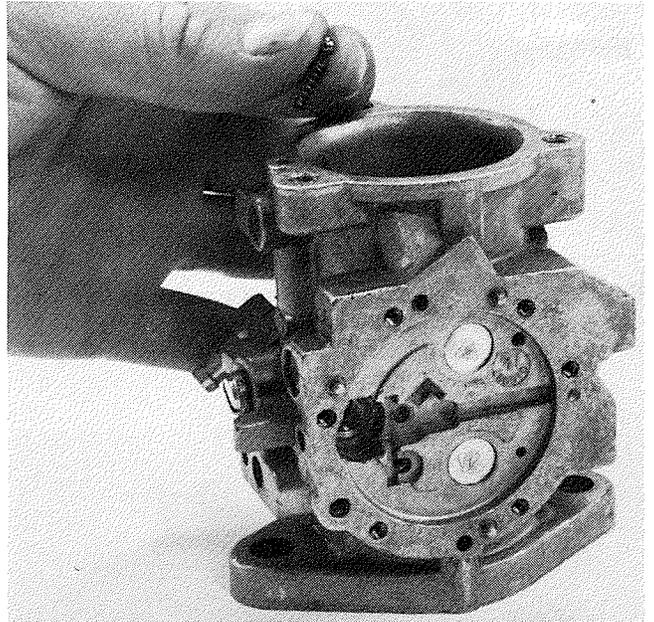
1. Carefully wash all carburetor components with a good quality carburetor cleaner. Blow out all carburetor body channels and clean the remainder of the components with compressed air.
2. Replace all components that have been malfunctioning or if the components are worn.

Inspection

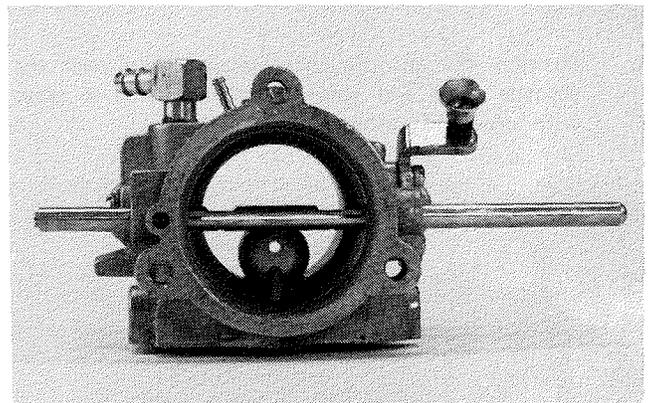
1. The carburetor body casting should be inspected for cracks and stripped threads.
2. Check the condition of all springs. If spring compression is doubtful, replace before assembling the carburetor.
3. Examine the choke and throttle shafts and the carburetor mounting holes for wear. If shafts or carburetor casting show signs of wear, replace before assembly.
4. Inspect the inlet valve body, fuel pump body, and the main diaphragm cover for cracks, holes, and imperfections in the castings. Replace as conditions dictate.
5. Examine all gaskets and diaphragms. Replace damaged gaskets and diaphragms before assembly.

Assembly

1. Position the carburetor with choke side facing upward.
2. Insert choke friction spring and ball into the small hole located over the choke shaft mounting hole.

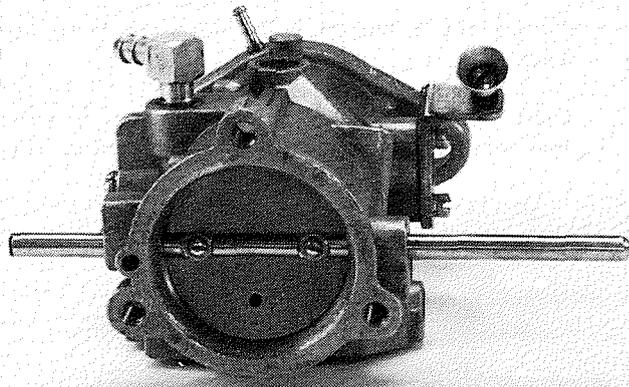


3. Slide the choke shaft into the mounting hole and over the friction ball and spring. Continue to push the choke shaft through the carburetor body and into position.

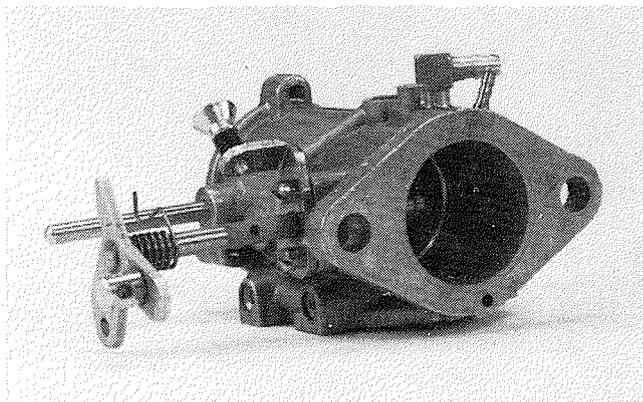


4. Rotate the choke shaft and install the choke shutter between the split section of the choke shaft. **NOTE: Hole at center of choke shutter must be positioned toward the bottom of the carburetor.** Secure the choke shutter in position with two (2) screws and washers. **NOTE: Two (2) cutouts in the choke shaft must face outward to accommodate the two (2) screws and washers (see top left column photo, page 94).**

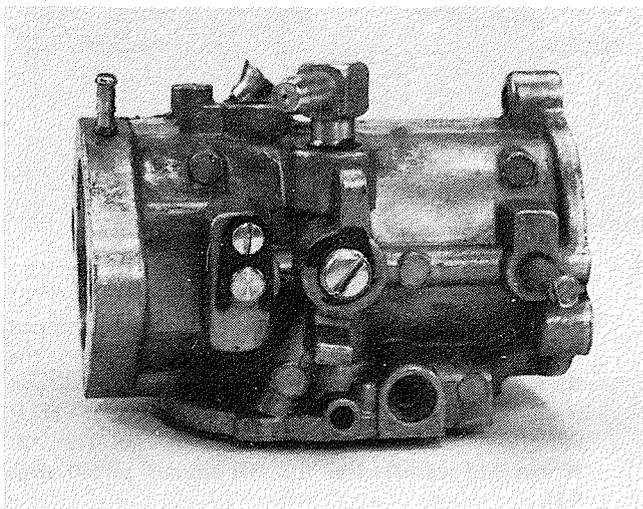
CARBURETION (TILLOTSON)



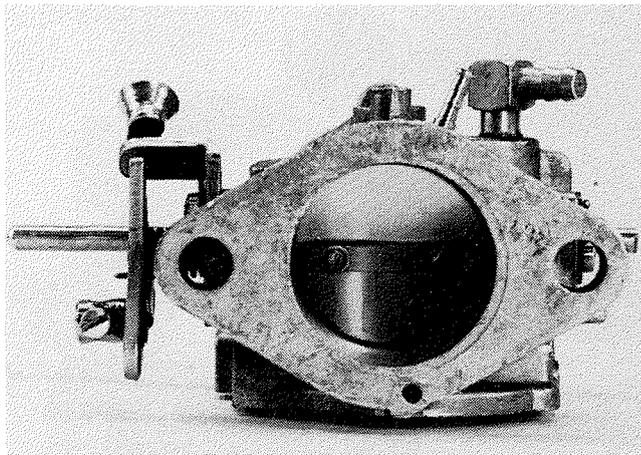
5. Slide throttle shaft and spring partially into the carburetor. Insure spring is engaged and rotate the shaft one (1) turn clockwise while completing the shaft insertion.



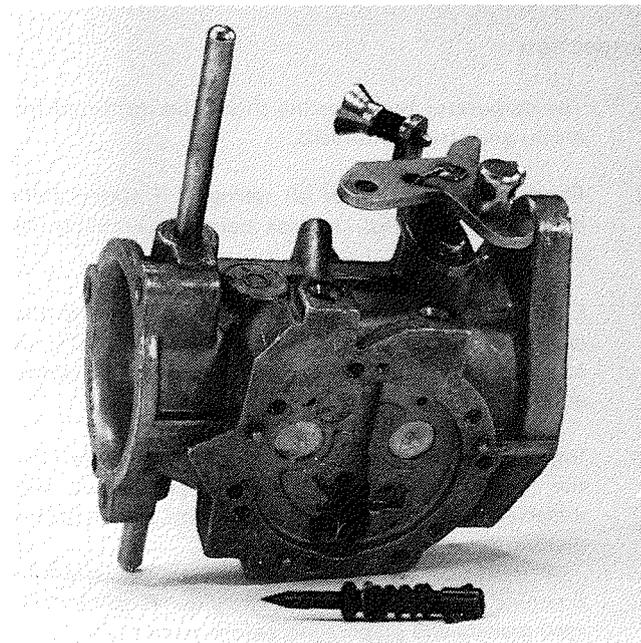
6. Position the throttle shaft retainer clip over the throttle shaft and secure all components in place with screw and washer.



7. Rotate the throttle shaft and install the throttle shutter between the split section of the throttle shaft. Secure the throttle shutter in place with two (2) screws and washers.

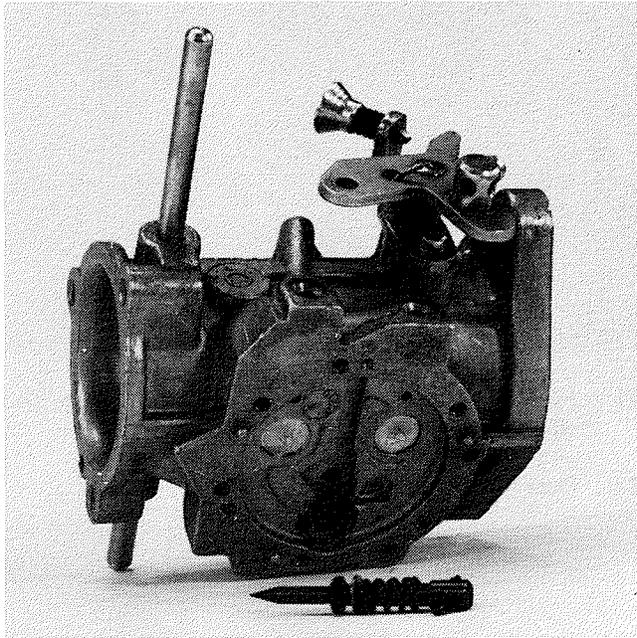


8. Install the high speed nozzle ball check valve assembly if it was serviced. **NOTE: Do not tighten excessively as distortion may result.**
9. Position a new welch plug into the casting. **NOTE: Convex side of welch plug must face upward.** Using a 5/16 inch flat end punch, gently tap the welch plug until it becomes flat.
10. Install the high speed mixture needle, packing ring, rubber washer, and spring. **NOTE: High speed mixture needle should be installed finger tight only to minimize possible damage to the needle and/or seat.**

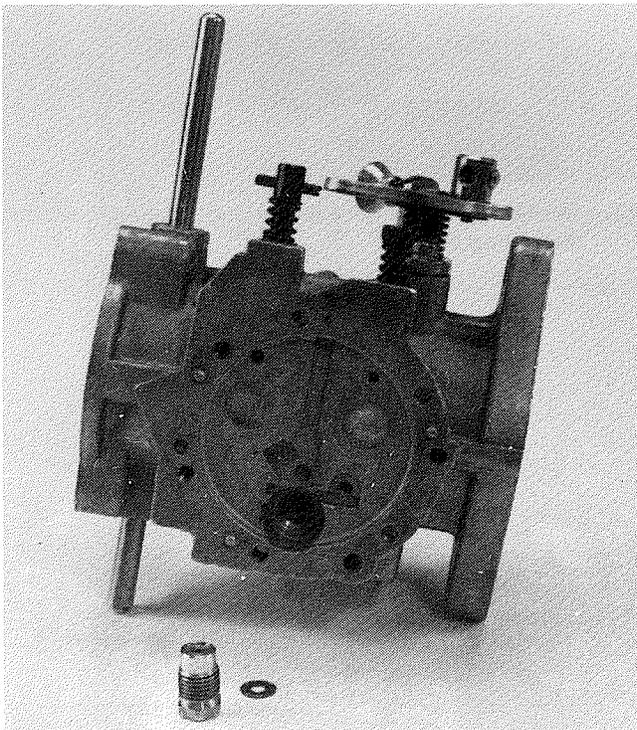


CARBURETION (TILLOTSON)

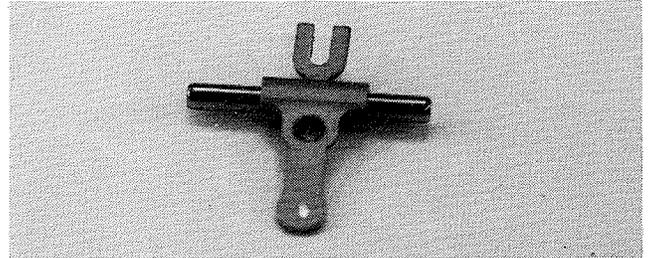
11. Replace the low speed mixture needle, packing ring, packing washer, and spring. **NOTE:** Low speed mixture needle should be installed finger tight only to minimize possible damage to the needle and/or seat.



12. Install the inlet seat gasket.
13. Install the inlet seat. Using a 5/16 inch thin wall socket, torque the seat from 25 to 30 inch pounds.



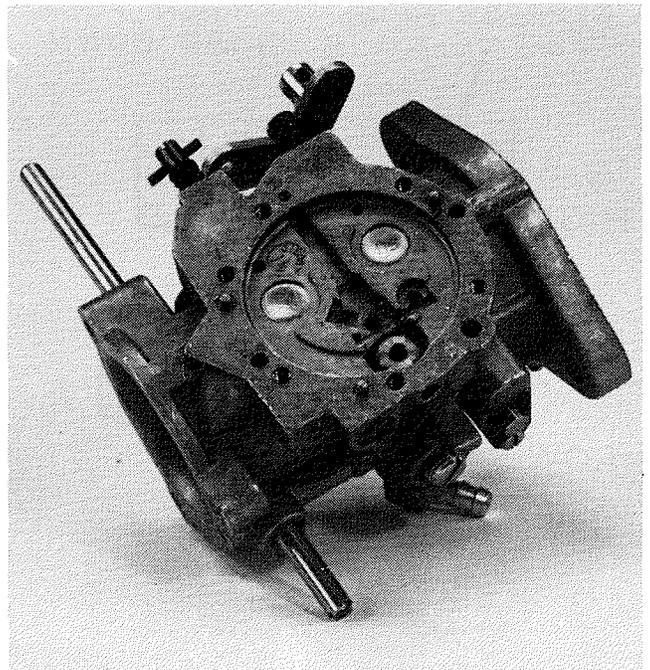
14. Place the fulcrum pin through the hole in the inlet control lever.



15. Position the inlet needle on the end of the inlet control lever.

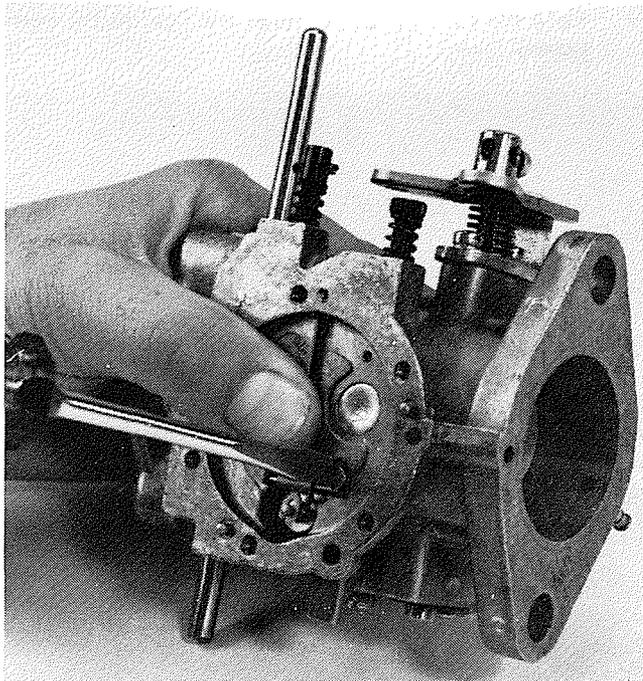


16. Position the tension spring into the casting seat.

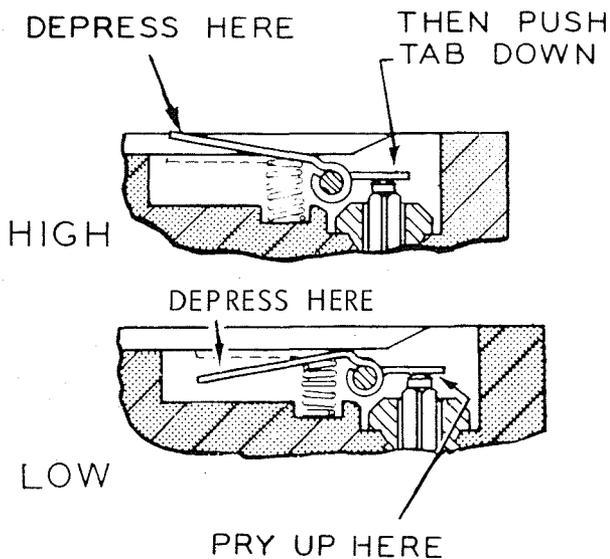


17. Place dimple in the inlet control lever over the tension spring and insure the inlet needle slides into the inlet seat. Hold components in place and secure to carburetor body with the fulcrum pin retaining screw (see photo top left column, page 96).

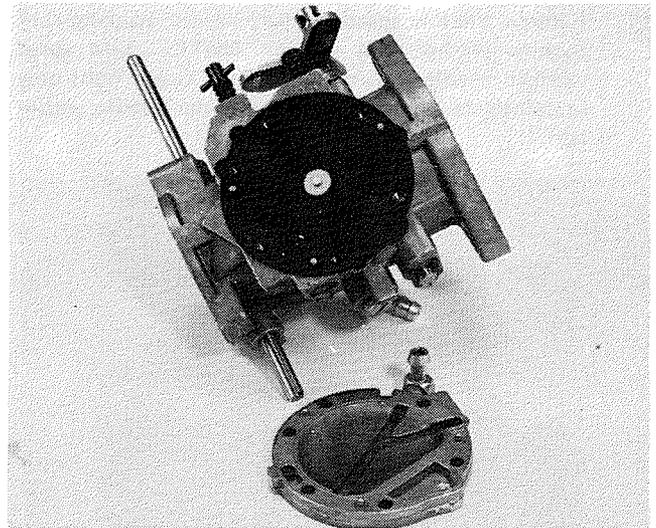
CARBURETION (TILLOTSON)



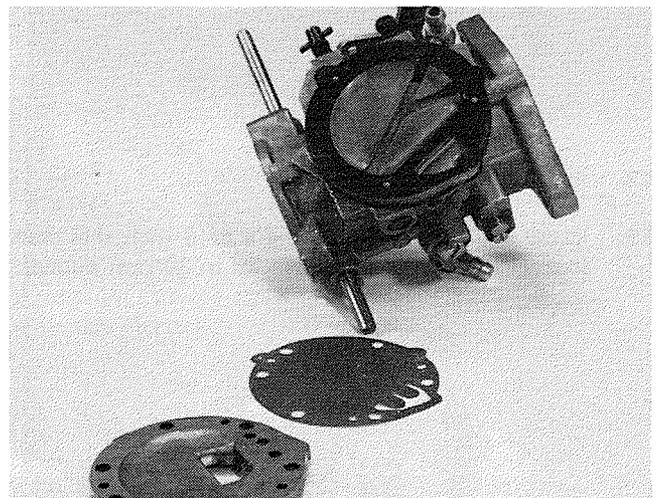
18. Adjust the inlet control lever so that the center of the lever that contacts the main diaphragm is flush with the side of the metering chamber walls.



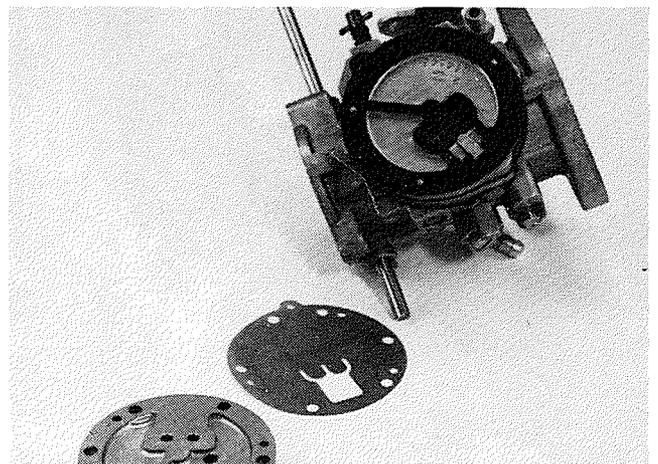
19. Position the main diaphragm on the carburetor body.
NOTE: The side of the main diaphragm with the large metal washer must face toward the carburetor body. Install main diaphragm gasket.
20. Install the main diaphragm cover.



21. Install the fuel pump gasket and fuel pump diaphragm.
22. Place fuel pump body into position.

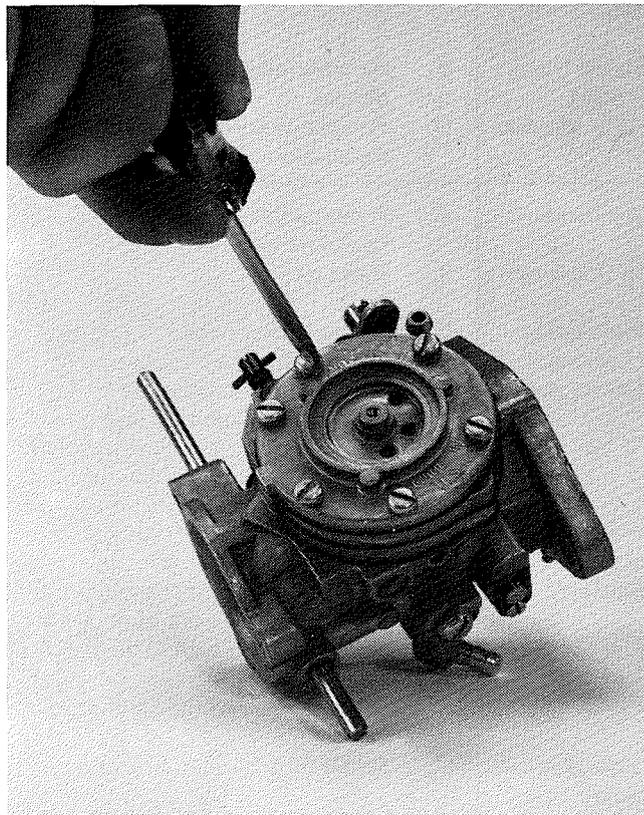


23. Position the inlet valve gasket and diaphragm on the fuel pump body.

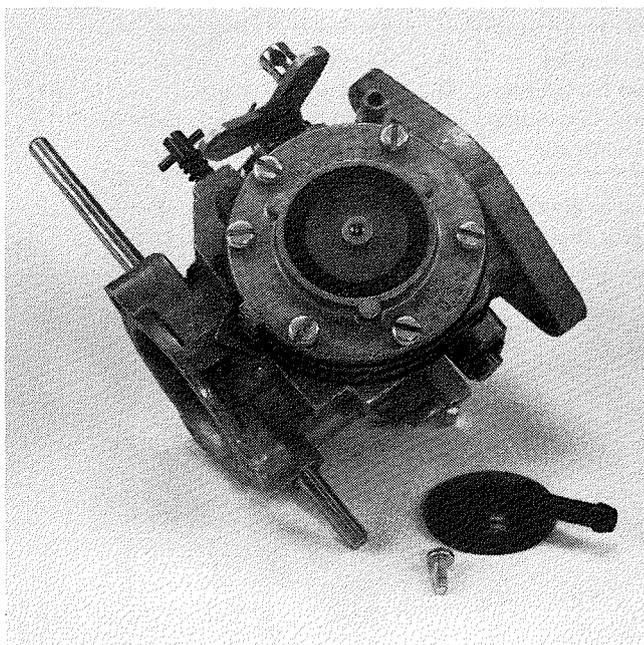


CARBURETION (TILLOTSON)

24. Properly position the inlet valve body and secure components in place with six (6) body screws and washers.



25. Place fuel strainer screen, gasket, and cover over the center mount of the inlet valve body. Secure in place with screw.



Adjusting Carburetor

The engine on all Arctic Cat snowmobiles are equipped with a diaphragm type carburetor. Altitude and temperature may necessitate a carburetor adjustment.

Basic Adjustment

NOTE: Damage to needles and seats can be prevented by carefully making carburetor adjustments. Forcing any of the needles may cause damage. The high speed and low speed mixture needles should be turned clockwise to close (lean mixture) and counterclockwise to open (rich mixture).

A lean mixture results in too little fuel and an excessive amount of air. A rich mixture results in excessive fuel and too little air.

Approximate carburetor settings for engines used in 1972 Arctic Cat snowmobiles are as follows:

	Low Speed	High Speed
292 Kawasaki (Tillotson HR)	1	1-1/8
303 Wankel (Tillotson HL)	3/4	1-1/2

Initial high speed carburetor setting is for starting purposes only. To obtain optimum performance, the carburetor must be fine tuned.

- A. Low Speed Mixture Needle — An improper adjustment may result in poor acceleration.
- B. High Speed Mixture Needle — A lean adjustment may result in engine and spark plug overheating, as well as internal engine damage. A rich setting will cause excessive exhaust emissions (smoke), 4-cycling, and plug fouling. The desired adjustment is at the point of eliminating the 4-cycling effect at full throttle. The only accurate test of this adjustment can be made by actual full load operation.
- C. Idle Speed Screw — Perform this adjustment after the low speed needle has been set. Because there is a definite relationship between the idle speed screw and the low speed needle adjustments, neither should be changed without checking the other. Rotate the idle speed screw clockwise to increase idle RPM and counterclockwise to decrease the idle RPM. Set the engine idle at a speed slightly below clutch engagement.

TROUBLE SHOOTING

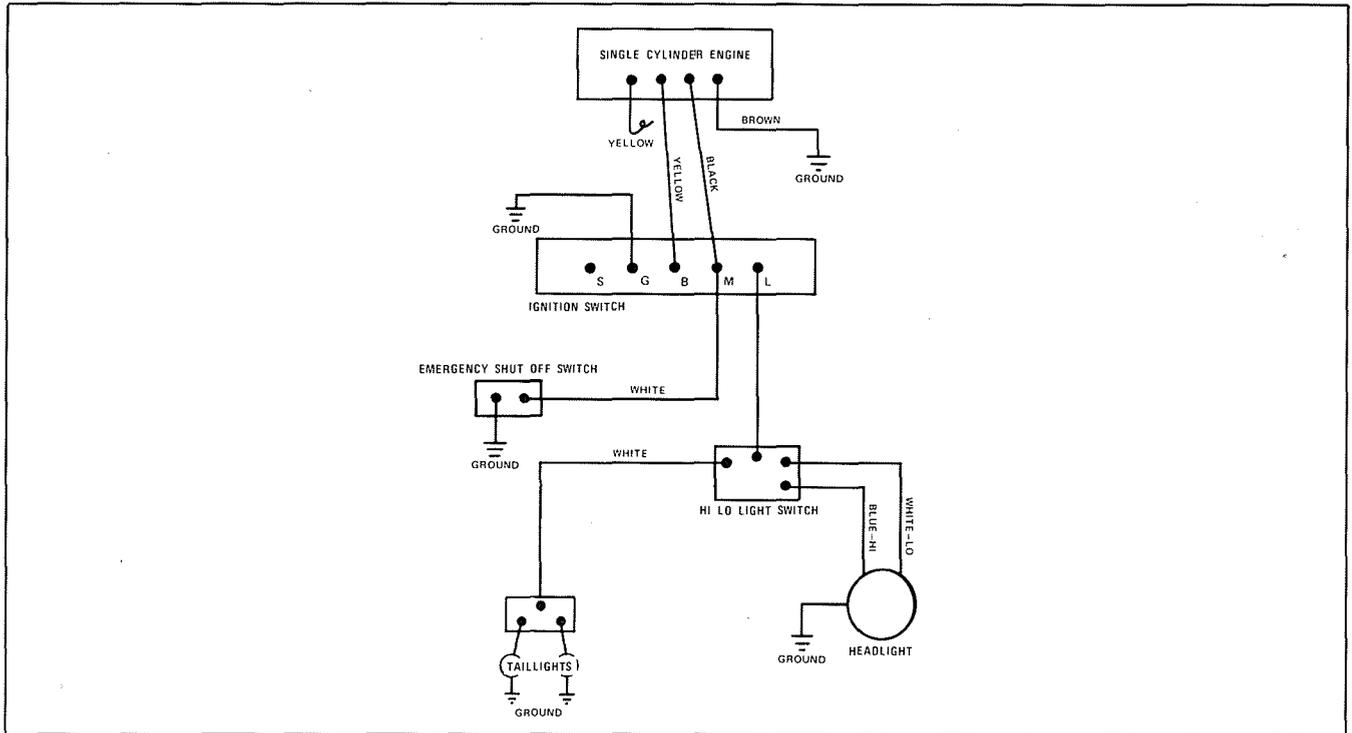
PROBLEM	CONDITION	SOLUTION
1. Carburetor Floods	<ul style="list-style-type: none"> A. Dirt or Foreign Particles Preventing Inlet Needle from Seating B. Diaphragm Lever Spring Not Seated on Lever Dimple C. Diaphragm Improperly Installed 	<ul style="list-style-type: none"> A. Remove, clean, and replace. B. Remove lever and re-install on dimple. C. Replace or correct diaphragm installation.
2. Poor Acceleration	<ul style="list-style-type: none"> A. Low Speed Adjusting Screw Set Too Lean B. Incorrect Setting on Diaphragm Lever C. Diaphragm Cover Plate Loose D. Diaphragm Gasket Leaking E. Main Fuel Orifice Obstructed 	<ul style="list-style-type: none"> A. Rotate adjustment screw counterclockwise. B. Reset lever. C. Tighten cover plate. D. Replace diaphragm gasket. E. Remove diaphragm cover, diaphragm, diaphragm lever, and main (high speed) adjusting screw. Clean out orifice by blowing through main adjusting screw hole.
3. Engine Will Not Idle	<ul style="list-style-type: none"> A. Incorrect Idle Adjustment B. Obstructed Idle Discharge Ports or Channels C. Diaphragm Lever Set Incorrectly D. Throttle Shutter Jammed in Throttle Bore, Causing a Fast Idle E. Dirty Nozzle Check Valve F. Welch plug covering the idle discharge ports does not seal. This causes engine to idle with idle adjustment closed (off). 	<ul style="list-style-type: none"> A. Set to best idle adjustment. B. Blow out with compressed air. If compressed air is not available, clean and flush with solvent. C. Reset diaphragm lever so it is flush with the floor of the diaphragm chamber. D. Install throttle shutter properly. E. Clean or replace. F. Replace Welch plug.
4. Lean Operation	<ul style="list-style-type: none"> A. Fuel Tank Vent Obstructed B. Leak in Fuel System from Tank C. Ruptured Fuel Pump Diaphragm D. Main Fuel Orifice Obstructed 	<ul style="list-style-type: none"> A. Clean and replace when necessary. B. Tighten or replace fittings or lines. C. Replace fuel pump diaphragm. D. Clean main fuel orifice.
5. Rich Operation with Main Adjustment Screw Closed (Off)	<ul style="list-style-type: none"> A. Nozzle Channel Plug or Nozzle Check Valve Cage Not Sealing 	<ul style="list-style-type: none"> A. Install a new nozzle channel plug or nozzle check valve cage.

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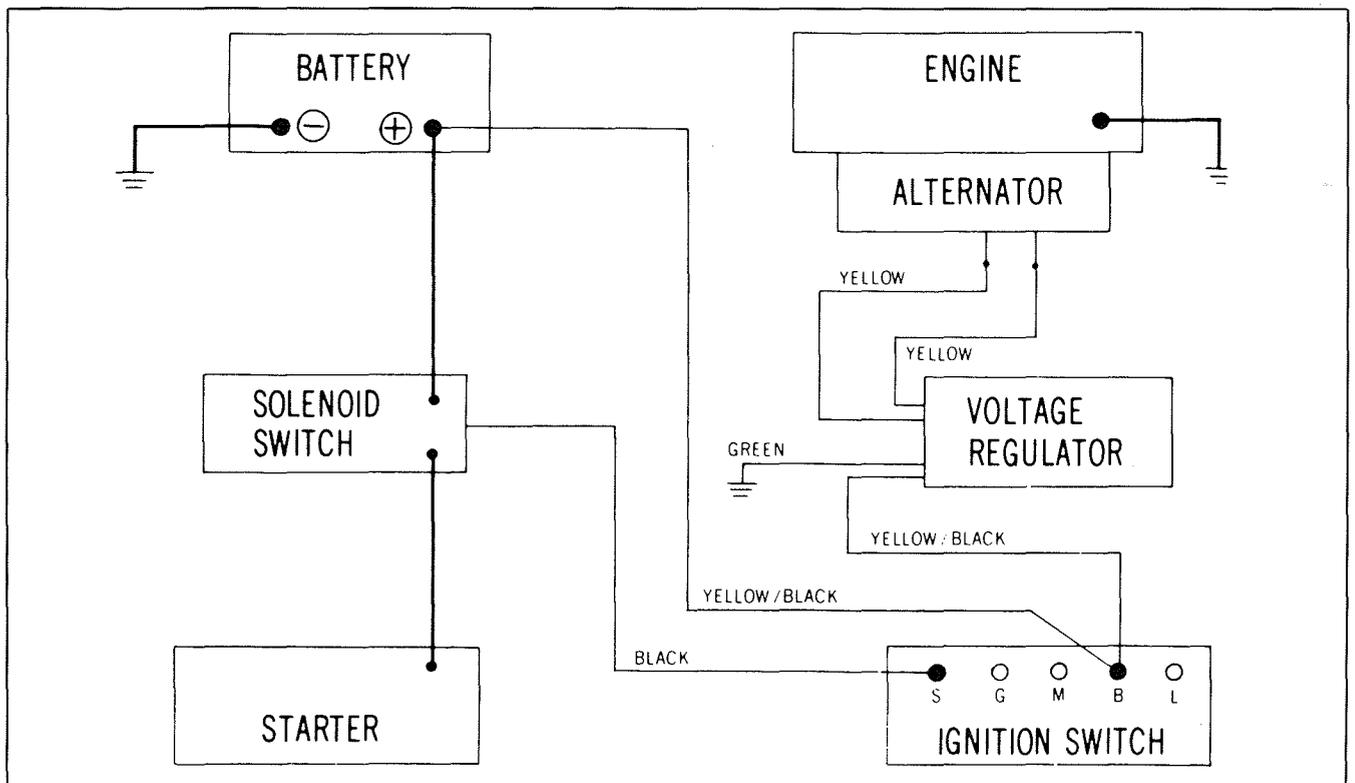
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ELECTRICAL

1972 KT150-292 RECOIL START

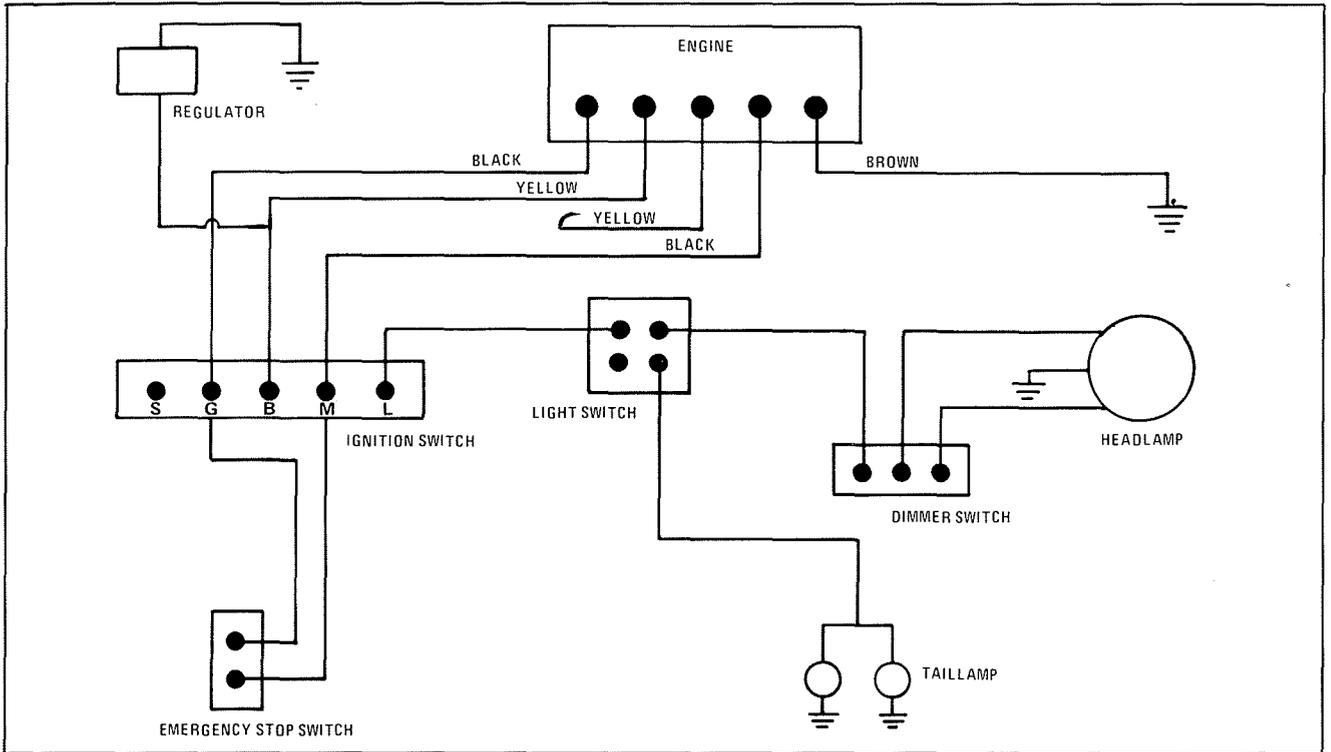


1972 KT150-292 ELECTRIC START

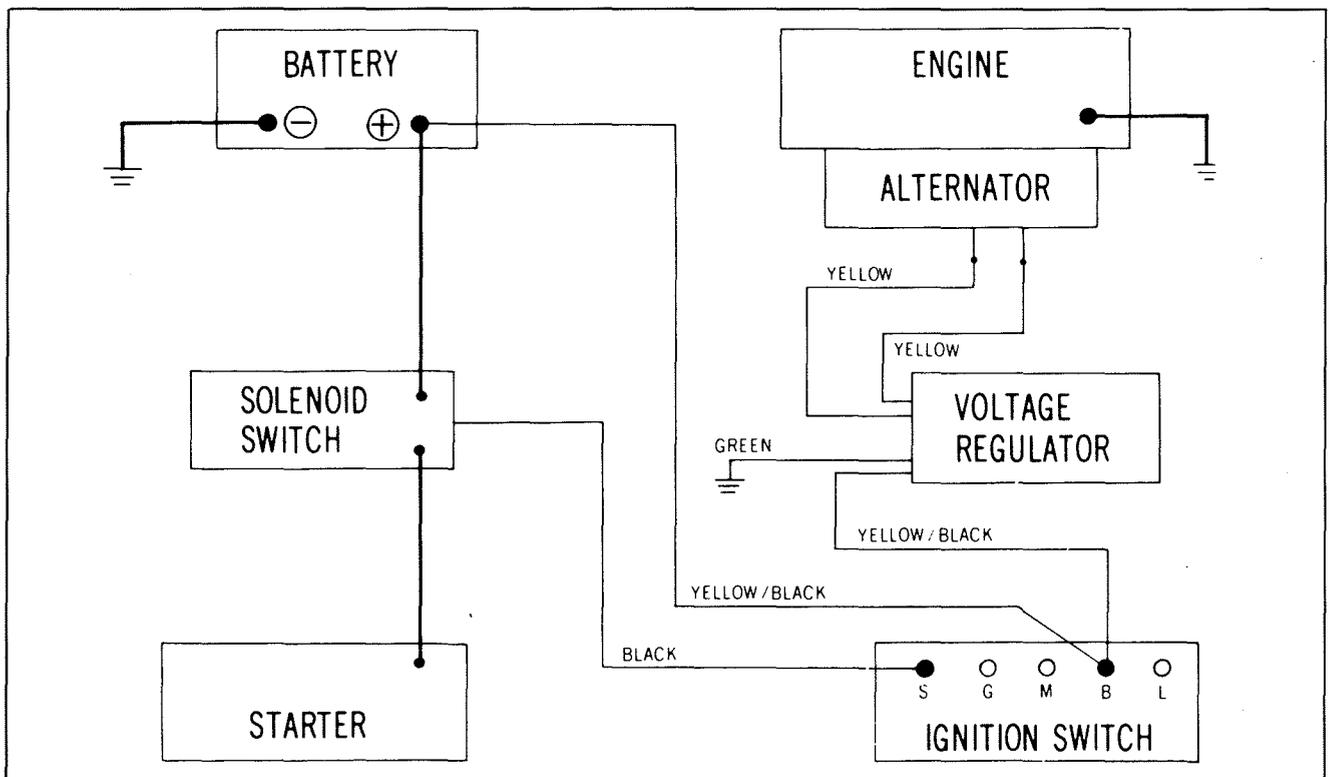


ELECTRICAL

1972 T1A340S1 RECOIL START

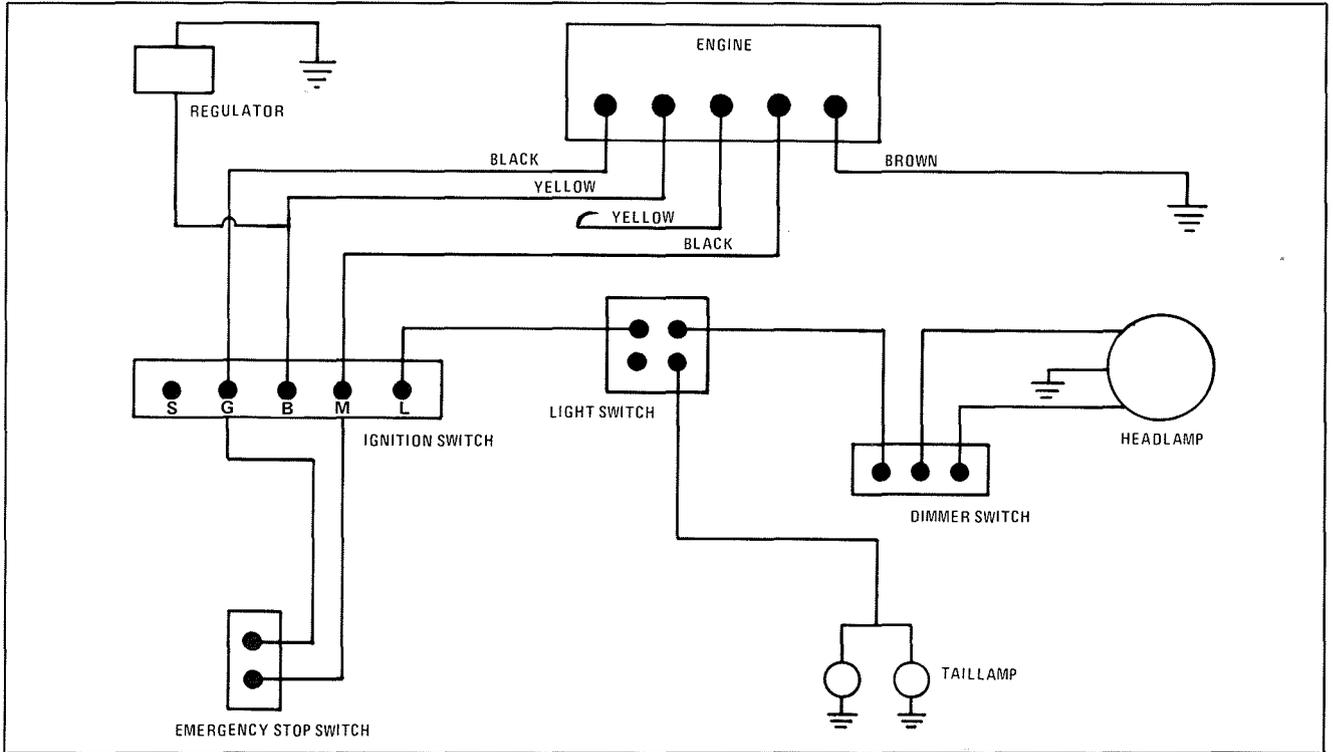


1972 T1A340S1 ELECTRIC START

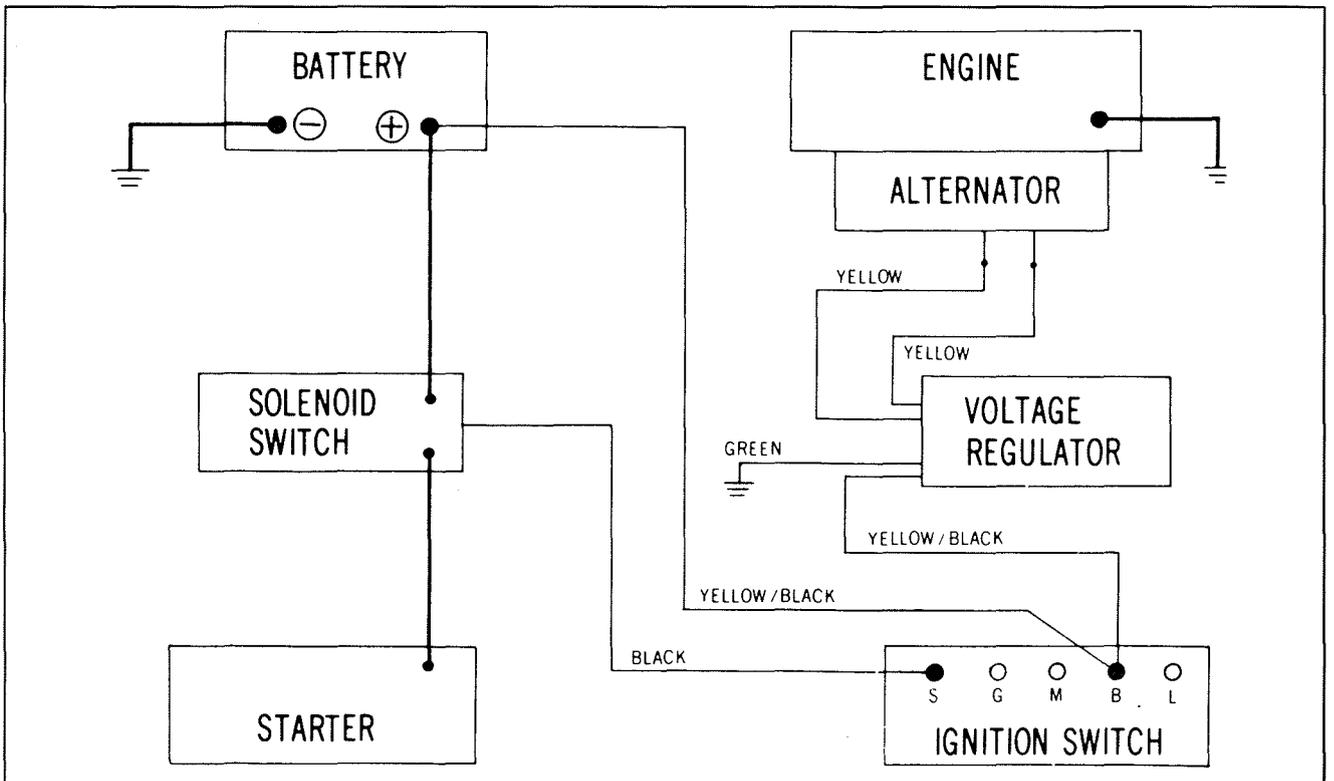


ELECTRICAL

1972 T1A400S1 RECOIL START

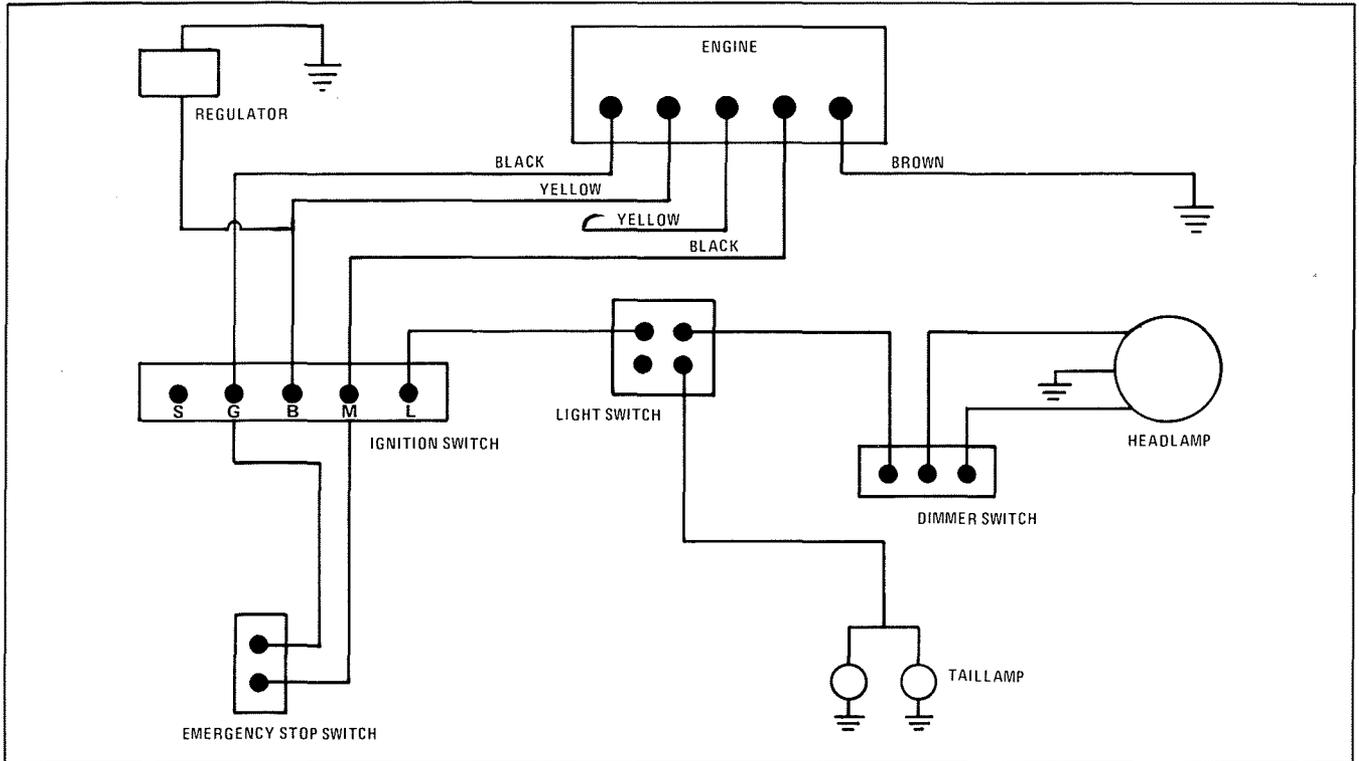


1972 T1A400S1 ELECTRIC START

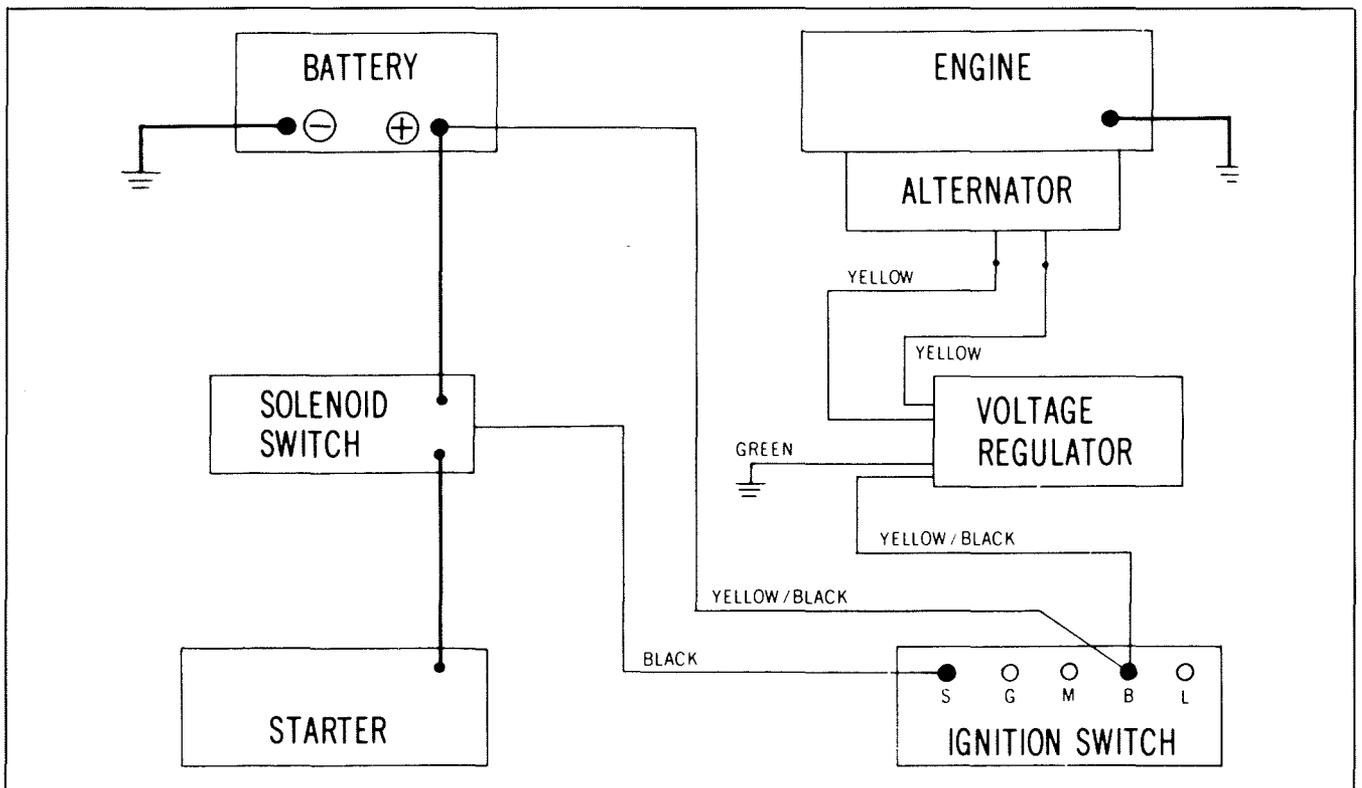


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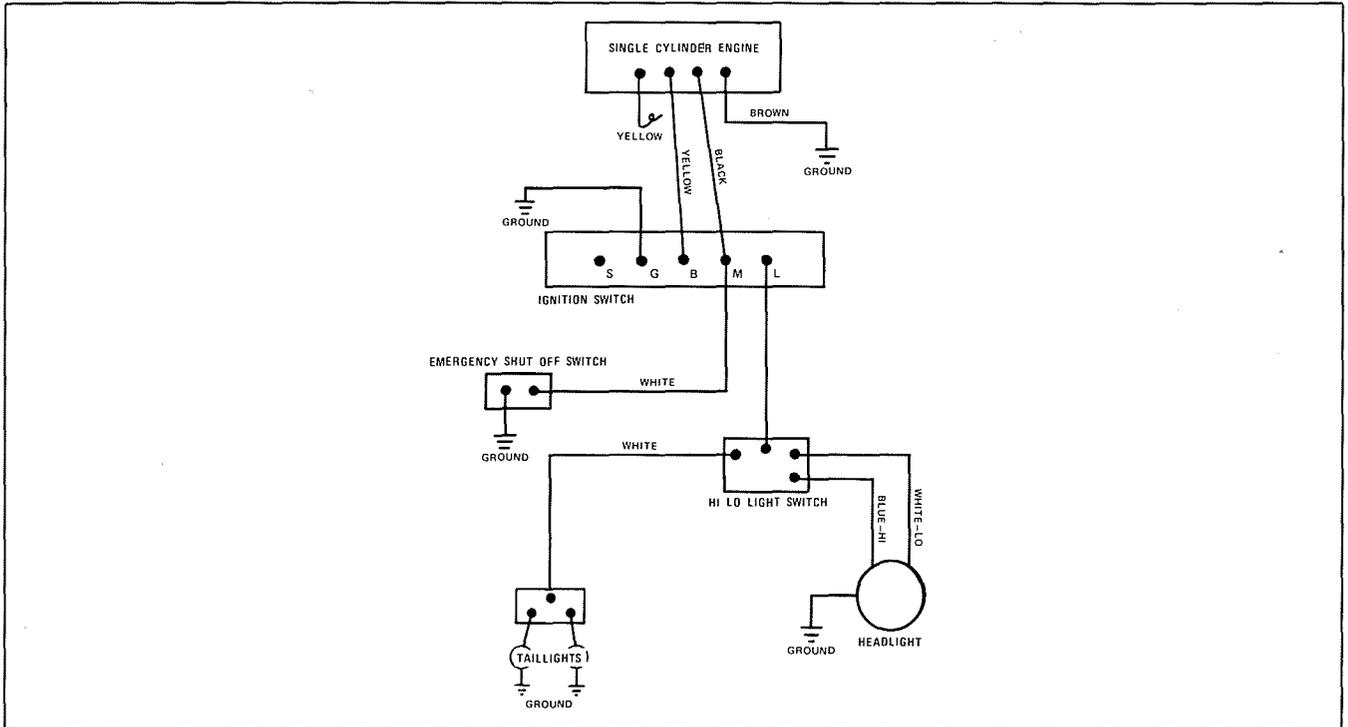


1972 T1A440S1 ELECTRIC START



ELECTRICAL

1972 WANKEL KM914B RECOIL START



REPLACEMENT BULB CHART

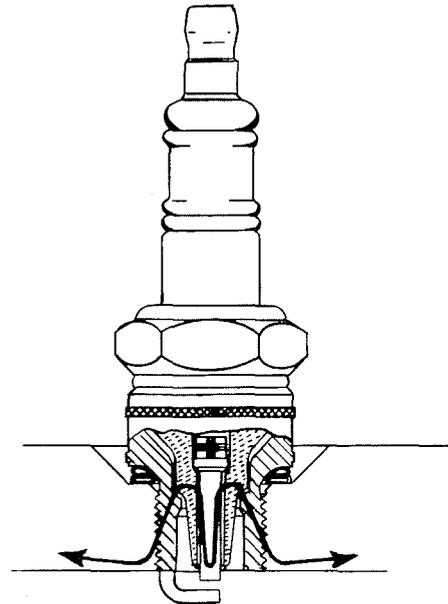
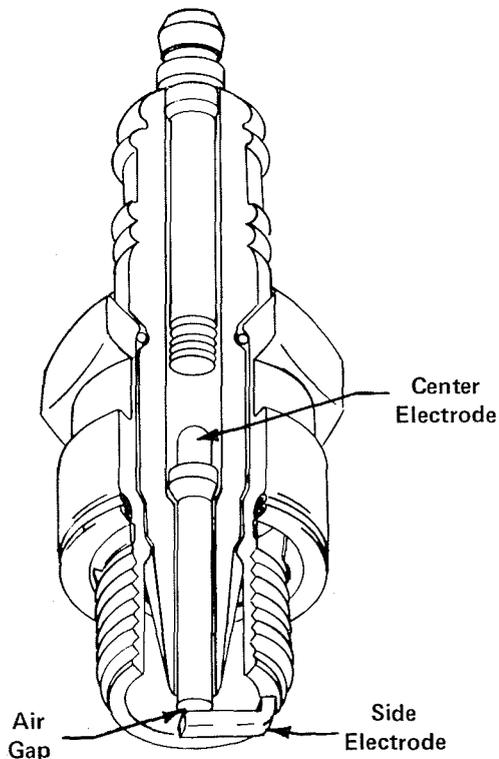
Indicated in the chart below is the voltage and wattage for the headlight and taillight bulbs. Magneto wattage output is 75 watts for all engines indicated.

ENGINE		HEADLIGHT		TAILLIGHT		MAGNETO OUTPUT
Type	C.C.	Voltage	Wattage	Voltage	Wattage	Wattage
KT150-292	292	12.8	60	12	4	75
T1A340S1	339	12.8	60	14	4	75
T1A400S1	398	12.8	60	14	4	75
T1A440S1	436	12.8	60	14	4	75
KM914B	303	12.8	60	14	14	75

ELECTRICAL

General Spark Plug Information

All spark plugs basically consist of two (2) distinct electrodes separated by an air gap. Completely insulated in the core of the spark plug is the "center electrode". The "side electrode" is connected to the outer shell of the spark plug base. When a high voltage is produced in the ignition coil, it is transferred to the center electrode, causing a spark to jump the "air gap" to the side electrode. At this time the spark which occurs inside the cylinder starts the actual combustion process.



Proper spark plug heat range selection is very important to the operation of the snowmobile engine. A spark plug of a low heat range (cold) has a relatively short electrode extension, which permits rapid heat transfer. A hot spark plug has a longer electrode extension, which permits heat transfer less rapidly. The metal washer (gasket) of the spark plug is a very important condition in relation to heat ranges. If the spark plug is over-tightened, causing the metal washer to be flattened, heat will be conducted too rapidly, causing the plug to burn cooler than expected. Conversely, if the spark plug is not tightened adequately, the metal washer will not be crushed enough, causing a leaking effect, and resulting in overheating and burned pistons.

Heat Range

Spark plugs must operate within a specific heat range to allow the engine to operate efficiently. **HEAT RANGE** — The ability of the spark plug to dissipate heat away from the center electrode and its insulating material. This ability to dissipate heat is controlled by the actual design of the insulator and shell structures. The actual heat escape route is as follows:

1. Spark Plug Shell
2. Metal Washer (Gasket)
3. Cylinder Head Threads
4. Cool Air from the Fan

During normal engine operation the plug must burn hot enough to rid itself of combustion (carbon) deposits but also, burn cold enough so that heat is efficiently transferred, insuring the fuel mixture is not pre-ignited. A plug which is too hot may contribute to an excessively high temperature in the cylinders, resulting in burned pistons or other internal engine damage. A plug which is too cold will result in continuous spark plug fouling and frequent changing of the fouled spark plug.

Snowmobile engines are equipped with standard plugs (medium heat range) are suitable for normal operation.

If the engine will be operated at a constant speed for an extended time, consideration must be given to the installation of a special spark plug. When the machine will be used for trail riding, a plug of a hotter heat range is advisable to curtail the possibility of spark plug fouling. Should high speed operation be anticipated, a cold plug should be used. If the machine will be used in competition (racing), a very cold plug should be used.

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Spark plug manufacturers vary the construction of the insulator to obtain spark plugs of different heat ranges. The various spark plug manufacturers have plugs in many sizes from which a plug of the correct heat can be selected (see Spark Plug Chart, page 105).

CAUTION: DO NOT sandblast, scrape, or in any way attempt to clean fouled or dirty spark plugs. Foreign particles may drop into the cylinder and cause severe engine damage. Optimum engine performance is obtained with a new plug of the proper heat range.

Gap

High voltage induced in the center electrode causes a spark to jump the air gap between the two electrodes. This air gap is very critical for optimum engine performance. For best performance, set the "gap" as indicated in the chart

below. This air gap setting has a direct influence on every aspect of engine performance; starting, idling, power, acceleration, and top end speed. Each spark plug must be gapped uniformly to insure optimum performance of the engine.

Installation

Spark plugs must be installed properly to operate correctly. A new metal washer (gasket) should be used when a plug is installed — clean the gasket surface.

CAUTION: Do not allow any foreign matter to enter the spark plug hole when cleaning the gasket surface or when installing a new plug. Failure to observe this caution may cause internal engine damage. The spark plug should be tightened with a torque wrench according to the spark plug manufacturer's torque specification.

SPARK PLUG CHART

(Recommended for 1972 Lynx, Puma, Cheetah and Panther)

Engine	CC	Spark Plug	Gap
KT150 B	292	Bosch - M280T31 or M260T1	.018" - .022"
T1A340S1	339	NGK - B9ES	.018" - .022"
T1A400S1	398	NGK - B9ES	.018" - .022"
T1A440S1	436	NGK - B9ES	.018" - .022"
K181	305	Champion - XJ8	.025"
KM914	303	Bosch - W150M11S	.018" - .022"

NOTE: The spark plugs described above are for use under normal operating conditions. If trail riding is anticipated, a hotter plug might be necessary. When the engine will be used for racing, a colder plug may be necessary.

Spark Plug Nomenclature (NGK)

Thread Size — The first letter (A) indicates thread size. If second and third letters are used, it indicates variations. The letter "P" indicates a projected nose; "R" indicates a resistor plug and "M" as a second or third letter indicates a low profile plug.

"A" — 18mm
 "AB" — 18mm
 "B" — 14mm
 "C" — 10mm
 "D" — 12mm

Heat Range — The number specifies the heat range of the plug. Heat ranges vary from 2 - 14. Two (2) is a very hot plug and fourteen (14) is a very cold plug.

Thread Reach — The letters "E", "H", and "L" are used to specify thread reach. If none of the aforementioned letters appear, reach is as follows:

18mm Plug — 12mm Reach
 14mm Plug — 3/8 Inch

The letter "F" is a suffix and it indicates the taper seat.

"E" — 3/4 Inch Reach
 "H" — 1/2 Inch Reach
 "L" — 7/16 Inch Reach

Electrode Type — Special electrode types are denoted by suffix letters and may be used in conjunction with the thread suffix, or by itself if a thread suffix does not exist. Conventional electrodes do not use a suffix.

ELECTRICAL

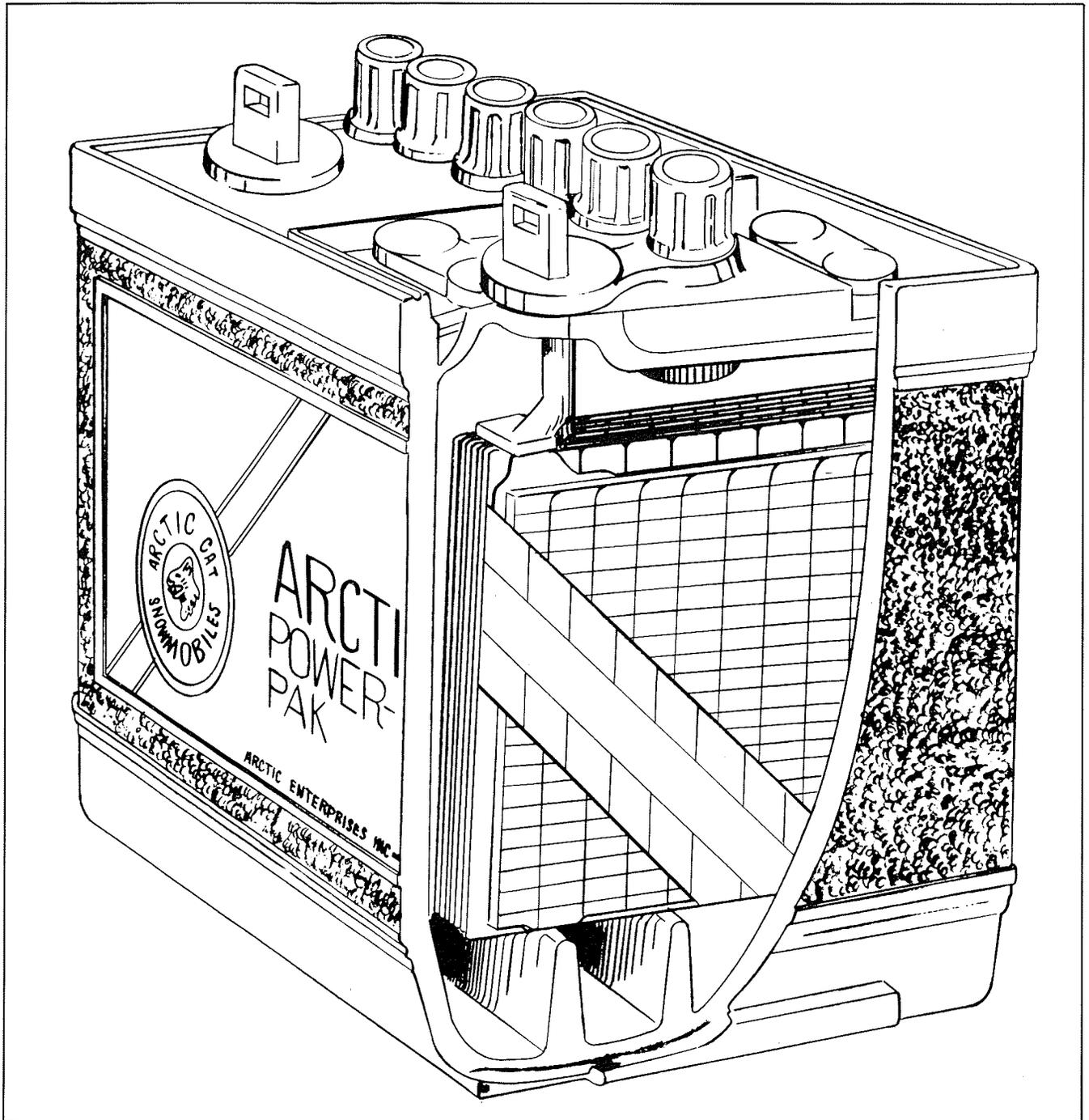
- "C" – Competition Electrode
- "N" – Racing Nickel Electrode
- "P" – Racing (Platinum) Electrode
- "S" – Heat Range Overlap
- "X" – Surface Gap Electrode

General Battery Information

A battery serves as a storage center for current used in starting the snowmobile engine and in operating accessories

when the engine is not running. When electrical trouble is experienced in any circuit, the battery should be checked first as a source of possible trouble.

Since the battery is common to the ignition cranking and charging systems, it only makes sense to check the battery. If the battery is defective, it should be replaced. If the battery is undercharged, the circuits must be checked more intensely.



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Battery Care

Systematic battery servicing and care can prevent electrical malfunctions and battery failures. Efficient battery care determines the longevity of the battery and its performance in relation to the entire electrical system. To obtain the longest battery life span, the following measures should be taken:

1. The electrolyte level should be checked on a weekly basis.
2. Only add approved or pure distilled water to the level specified by the battery manufacturer. **DO NOT OVERFILL.**

NOTE: If the battery is overfilled, electrolyte will be forced out through the cell cap vent holes, resulting in a diluted solution strength. If this solution comes in contact with the battery cables, corrosion will result and snowmobile parts damage may occur near the battery.

3. Keep the battery and terminals clean by washing with a solution of baking soda and water. Always flush the battery with water to remove the baking soda/water solution. **NOTE: Do not get any of the solution in the cell cap vent holes.**
4. Coat the battery terminals with grease or petroleum jelly after the battery cables have been connected to prevent corrosion.
5. The battery hold down should be kept tight to prevent the battery from shaking but not so tight as to place undue strain on the battery. If either situation occurs, the battery case may be damaged.
6. Before connecting the battery cables, clean both the terminals and cable connectors to insure a good connection. When connecting the battery, connect the positive (+) cable first. The negative (-) cable should be connected last to prevent the possibility of arcing.
7. Before installing the battery in the snowmobile insure the carrier is clean and free from corrosion and any deposits.

Battery Servicing

A battery is a perishable piece of equipment and, therefore, the battery must be properly maintained to insure peak performance and output. When a battery requires charging, the only way to completely restore the battery is to use a slow charge.

Never allow the battery to remain in a discharged state — charge the battery immediately, using the charge rate indicated below.

To check the condition of the battery, inspect the condition of the solution with a battery hydrometer. The electrolyte solution consists of sulphuric acid and water that varies in weight in relation to the state of battery charge. When the battery charge decreases, acid is released from the solution and transposed to the battery plates, resulting in a decrease in electrolyte weight.

The hydrometer is used to measure the specific gravity of the solution contained within the battery. Most battery hydrometers read true at +80°F.

1. Add .004 to the hydrometer reading for every 10° above +80°F.
2. **SUBTRACT .004** for every 10° below +80°F.

If the hydrometer reading is 1.110 or less, the battery is considered to be in a discharged state. Remove the battery from the snowmobile and recharge. Charge the battery until it is fully charged (see Battery Charge Table below).

WARNING

The hydrogen gas formed while the battery is being charged is extremely explosive. Keep open flame electrical spark and lit cigarettes away from the battery to prevent an explosion.

Battery Charge Table

Specific Gravity Corrected Temp.	State of Charge	Freezing Point
1.260	Completely Charged	-74°F
1.230	3/4 Charged	-42°F
1.200	1/2 Charged	-16°F
1.170	1/4 Charged	0°F
1.110	Completely Discharged	+19°F

Changing Battery Electrolyte

Under normal conditions with proper care and maintenance, it should never be necessary to change the elec-

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trolyte solution. If the solution should accidentally be neutralized by adding an alkaline substance, if distilled water was carelessly added, or if the solution was spilled, the battery solution may be changed and possibly restored to a full state of charge.

It is not recommended that the electrolyte be changed in an old battery. When the electrolyte is drained from the battery, waste materials, the result of repetitive charging discharging may release from the sediment chambers and become lodged in separators. If the situation occurs, a short circuit may result, causing damage to the electrical system. To detect a weak solution, proceed as follows:

1. Charge the battery until "gassing" is clearly evident in each cell.

NOTE: Gassing is the bubbling action of the electrolyte. If one or more cells fail to gas, do not change the electrolyte, as this clearly indicates a structural defect in the battery.

2. Check the specific gravity — no rise should take place for three (3) consecutive readings. Readings should be taken at hourly intervals.

3. Drain the electrolyte solution from the charged battery and refill with water.
4. Charge the battery until maximum specific gravity is obtained (see Battery Charge Table, page 107).
5. Drain the solution and add prepared electrolyte to the proper level.
6. Charge the battery until maximum specific gravity is obtained (see Battery Charge Table, page 107).
7. If specific gravity accidentally gets too high, add water to dilute the solution to the specification (see Battery Charge Table, page 107).

Sulphated Battery Restoration

If a battery remains in a discharged state for a period of time, crystalization of lead sulphate will take place, decreasing the battery's normal rate of charge acceptance. If this condition exists, the battery should be charged twice as long and at half the specified rate. A transformation of the crystalline material into active ingredients may take place if a longer charging time and a slower rate of charge is used.

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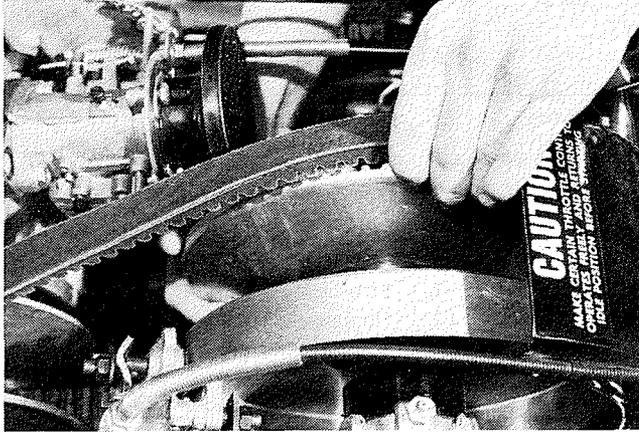
TRANSMISSION (DRIVE BELT)

General Drive Belt Information

The purpose of the drive belt is to transmit power from the drive pulley to the driven pulley. If the machine is being serviced for any particular reason, observe the condition of the drive belt. If the belt is worn, cracked, or damaged in any way, it should be replaced. Poor performance of the machine can also be caused by a worn or damaged drive belt.

Drive Belt Removal

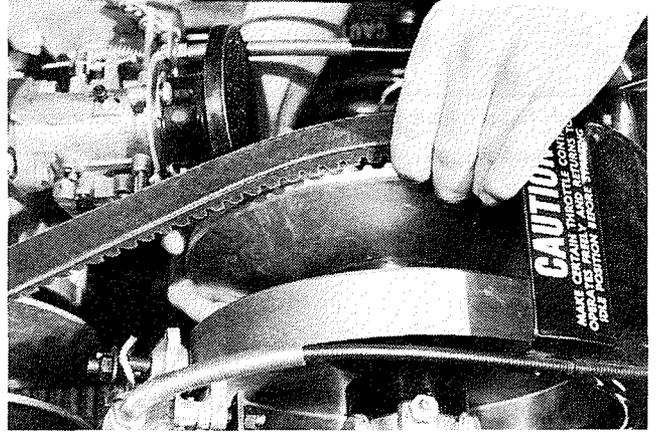
1. With the hood open, grasp the belt and pull up while rotating the moveable face of the driven pulley backward and toward the engine. This action will open the face of driven pulley and obtain slack in the belt.



2. Roll the belt over the top of the driven pulley and toward the steering post.
3. When the belt is free from the driven pulley, remove the belt from the drive pulley.

Drive Belt Installation

1. Position the belt on the drive pulley.
2. Position the drive belt to the inside of the driven pulley.
3. Rotate and pull the moveable face of the driven pulley toward the engine. Rotate the belt onto the driven pulley.



DRIVE BELT TROUBLE SHOOTING

To assist in locating possible causes of accelerated drive belt wear, the following belt wear chart has been compiled. Any belt that is less than 1-1/16 inch wide should definitely be replaced with a new Arctic Cat drive belt (refer to parts manual).

BELT CONDITION	CAUSE	SOLUTION
1. Cracks Between Belt Lugs When Flexed	Normal Belt Wear	Replace with a new belt.
2. Belt Worn on One (1) Side	A) Misaligned Pulleys B) Engine Mount(s) Loose	A) Align drive and driven pulleys. B) Tighten engine mount nuts securely.
3. Frayed or Broken Cord at Edge of Belt	Misaligned Pulleys	Align drive and driven pulleys.

TRANSMISSION (DRIVE BELT)

DRIVE BELT TROUBLE SHOOTING

BELT CONDITION	CAUSE	SOLUTION
4. Belt Disintegrates	Lubricant on Pulley Surface	Clean pulley surfaces.
5. Lugs Torn from Belt	Abrupt Engagement of Drive Pulley	A) Lubricate drive pulley. B) Replace damaged drive pulley components (spring). C) Replace drive pulley if necessary.
6. Narrow Belt Wear Pattern in One Area	A) Improper Operation of Drive Pulley B) Engine Idling Too Fast C) Incorrect Pulley Distance D) Wrong Belt (Length) E) Track Frozen to Skid Frame or Other Components F) Track Binds	A) Repair or replace drive pulley. B) Reduce the engine RPM. C) Move engine to adjust distance. D) Use correct belt. E) Free the track from any ice, snow, or foreign matter. F) Adjust track tension.
7. Belt has a baked finish.	A) Lubricant on Clutch Surfaces B) Rust on Drive and/or Driven Clutch Shafts	A) Clean pulley surfaces. B) Clean pulley shaft(s).
8. Decreased Width in Top of Belt	A) Damaged or Worn Clutch Surfaces B) Improper Outward Operation of the Drive Clutch	A) Repair or replace pulley. B) Lubricate drive pulley. C) Replace damaged drive pulley components. D) Replace drive pulley.
9. Belt turns over at high speeds.	A) Belt Pushing Out on Drive Clutch B) Misaligned Clutch	A) Move engine to adjust distance. B) Align pulley.

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TRANSMISSION (ST. LAWRENCE)

General (St. Lawrence Drive Pulley)

A drive pulley (torque convertor) is a power transmission mechanism which transmits power from the engine to a driven pulley. This transmission of power is accomplished by means of a V-shaped belt.

The variable pitch drive pulley has one (1) fixed face and one (1) moveable face. The drive pulley moveable face is controlled by arms which change position in relation to the engine speed (RPM).

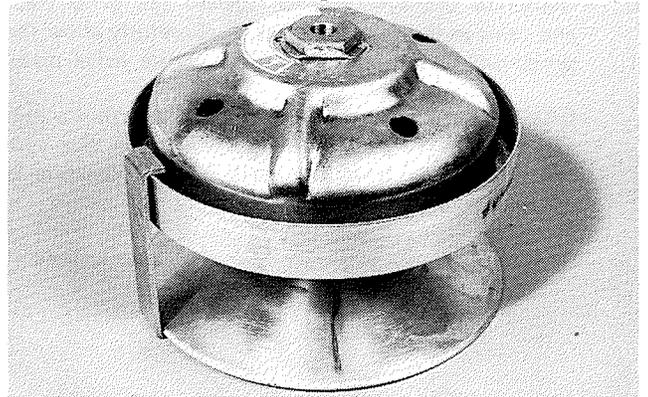
When the engine is not in operation and when it is at a slow idle, the distance between the fixed and moveable faces of the drive pulley is slightly greater than the width of the drive belt, resulting in a "disengaging" relationship between the belt and drive pulley. As the engine speed (RPM) increases, the arms are thrown outward by centrifugal force, causing the moveable face to move closer to the fixed face. At this time, belt engagement occurs and power is transmitted to the driven pulley.

Drive Pulley Removal (St. Lawrence)

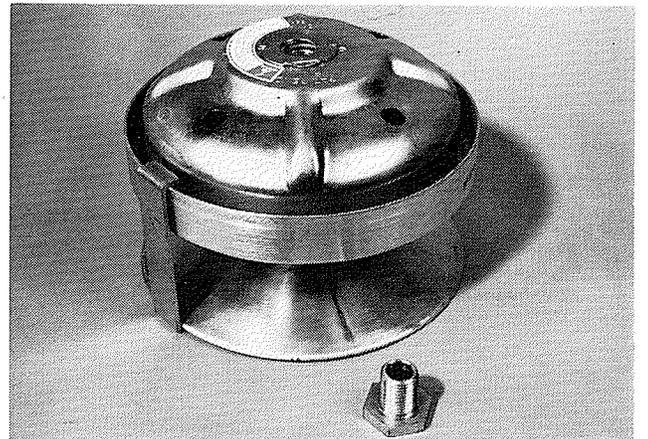
1. Open or remove the hood, whichever will facilitate drive pulley removal.
2. Remove the drive belt (see Drive Belt Removal, page 109).
3. Using an air impact tool, remove the drive pulley bolt.
4. Thread the St. Lawrence Puller (Arctic part number 0144-052) into the pulley and bottom the puller against the crankshaft. Back the puller off 1/2 turn.
5. Using an air impact tool, screw the puller against the crankshaft until the drive pulley becomes disengaged.
6. Remove the puller and the drive pulley from the crankshaft.

Drive Pulley Disassembly (St. Lawrence)

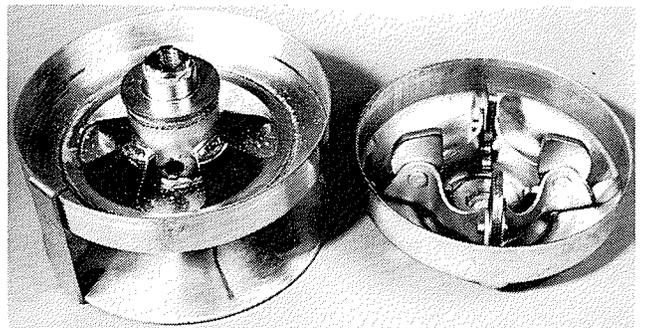
1. Install the retainer bracket supplied with the puller (Arctic part number 0144-052) on the drive plate and the synchronizer to prevent the components from the springing apart.
2. After the retainer bracket has been installed, bend the locking tab away from the captive bolt.



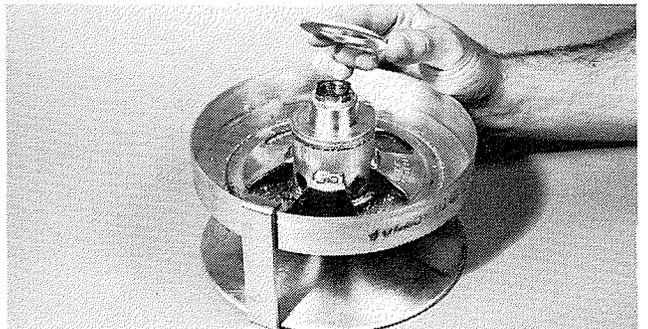
3. Remove the captive bolt and locking washer.



4. Pull the safety plate and spider assembly (welded assembly) off the drive plate shaft.



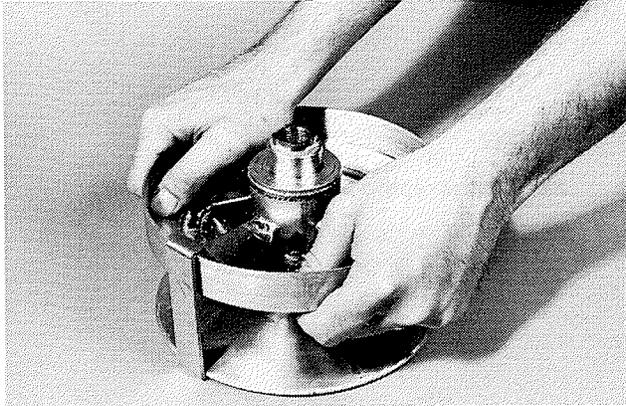
5. Remove the thrust washer.



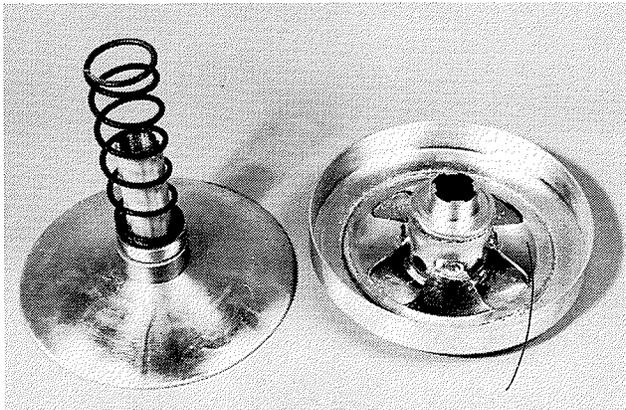
TRANSMISSION (ST. LAWRENCE)

6. Compress the synchronizer toward the drive plate and remove the retainer bracket. Carefully allow the synchronizer to retract away from the drive plate.

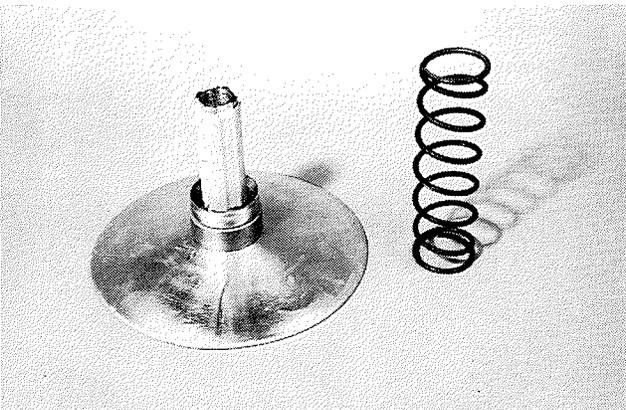
CAUTION: The coil spring contained within a synchronizer is very strong and will force the synchronizer away from the drive plate if pressure is not exerted against the spring tension.



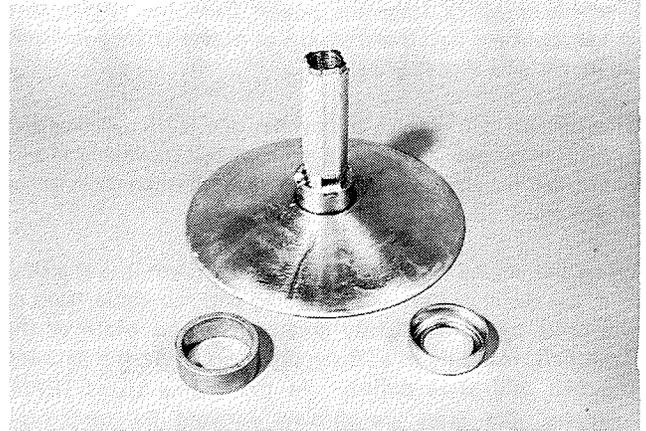
7. Remove the synchronizer from the drive plate shaft.



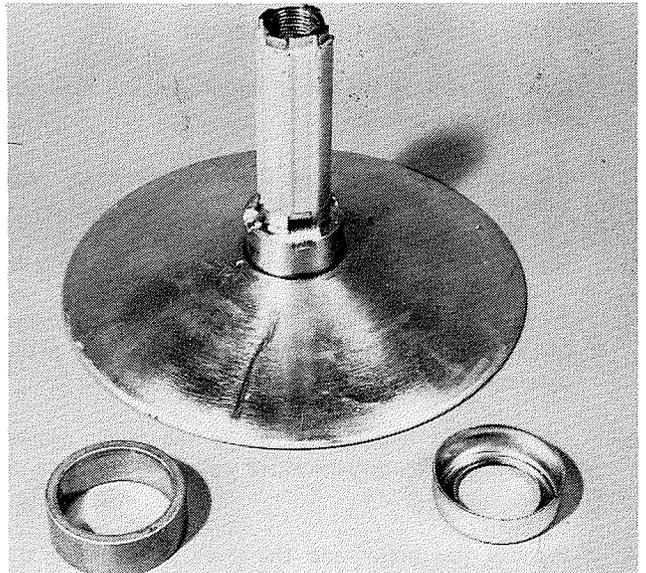
8. Remove the coil spring from the drive plate shaft.



9. Slide the spring collar and idler bearing off the drive plate shaft.



10. Remove the nylon bushing from the drive plate shaft if service is necessary.



Cleaning

1. Remove all grease and dirt by placing components (except nylon bushing) in cleaning solvent and wash thoroughly. Dry parts with compressed air; use a dry clean cloth if compressed air is not available.
2. Remove rust and drive belt accumulations from the drive plate face and shaft, the synchronizer, safety plate and spider assembly, and the thrust washer, using a fine grade steel wool. Wipe components with a clean cloth.
3. Remove any other deposits from the remaining components by using a stiff brush or steel wool. Wipe components with a clean cloth.

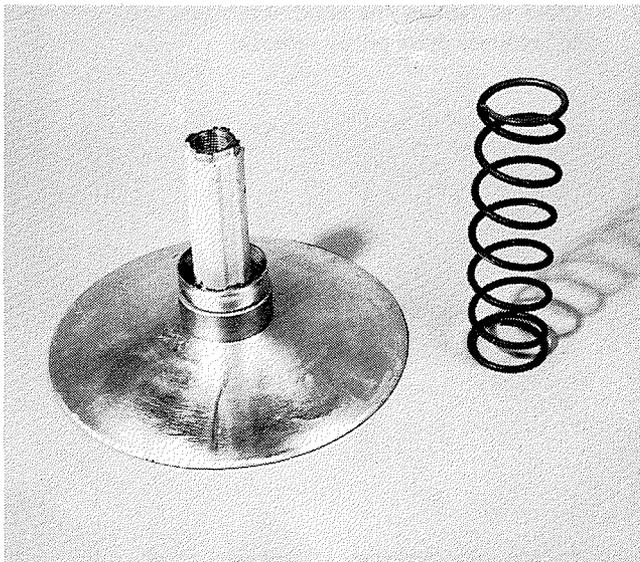
TRANSMISSION (ST. LAWRENCE)

Inspection

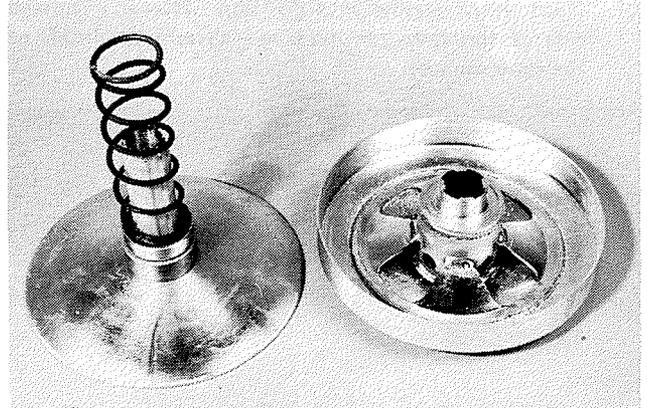
1. Inspect the drive plate, the synchronizer, and the safety plate and spider assembly for imperfections in the casting.
2. Inspect the safety plate and spider assembly for fatigue cracks, distortion, and elongations.
3. Inspect the nylon bushing for any visible wear. Replace as necessary.
4. Inspect the spring for fatigue or damage. Replace as necessary.
5. Inspect all threaded parts for stripped threads or otherwise damaged threads. Replace damaged components.
6. Check the idler bearing and spring collar. Replace if damaged or if condition is doubtful.

Drive Pulley Assembly (St. Lawrence)

1. If the nylon bushing was serviced, replace using the following procedure:
 - A. Heat nylon bushing in hot water.
 - B. Slide nylon bushing over the drive plate shaft.
2. Slide the idler bearing and spring collar over the drive plate shaft. **NOTE: Chamfered side of spring collar must be positioned against the idler bearing.**



3. Place the coil spring into the spring collar.



4. Position the recessed spring cut-out of the synchronizer over the top end of the coil spring.

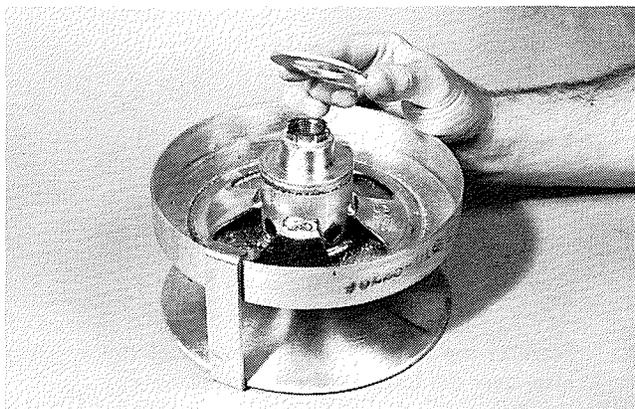


5. When the spring is seated in the cutout recess, press the synchronizer toward the drive plate and secure components together with the retainer bracket.

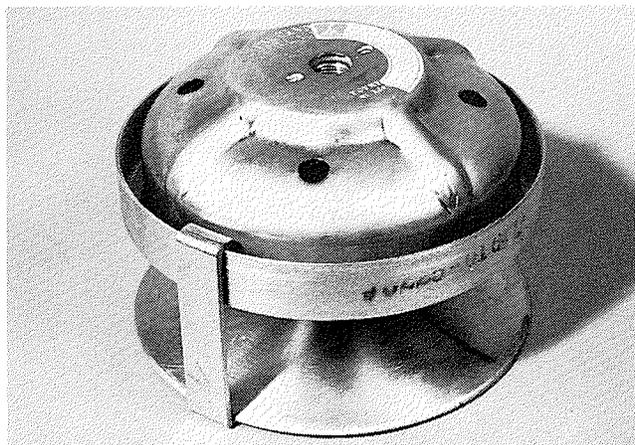


TRANSMISSION (ST. LAWRENCE)

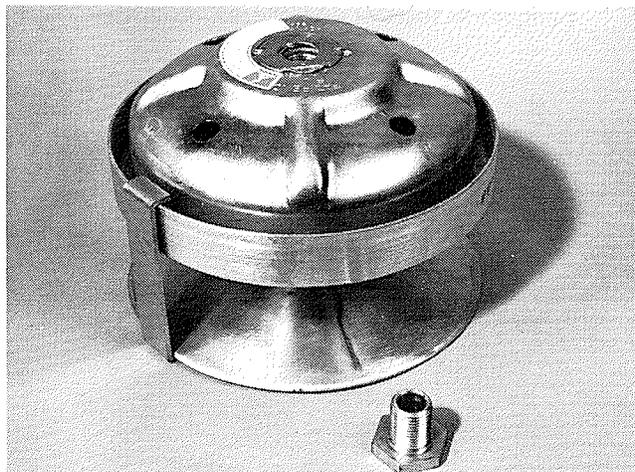
6. Place thrust washer into position. **NOTE:** Tapered side of thrust washer must face toward the inside of the synchronizer.



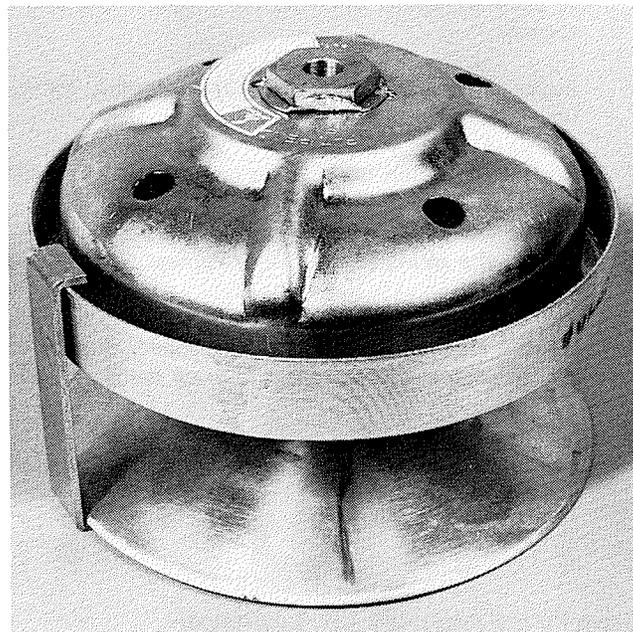
7. Position the safety plate and spider assembly on the drive plate shaft. **NOTE:** Insure component is fully seated on the shaft.



8. Place locking washer into position and secure all components with the captive bolt. Torque bolt from 150 - 165 ft. lbs.



9. Bend the locking tab against the side of the captive bolt head.



Drive Pulley Installation (St. Lawrence)

1. Install the drive pulley on the crankshaft and secure in place with the drive pulley bolt. **NOTE:** Torque the drive pulley bolt to 70 ft. lbs.
2. Replace the drive belt (see Drive Belt Installation, page 109).
3. Close or replace the hood, whichever was performed to facilitate drive pulley removal.

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TRANSMISSION (SALSURY 910)

General

A drive pulley (torque converter) is a power transmission mechanism which transmits power from the engine to a driven pulley. This transmission of power is accomplished by means of a V-shaped drive belt.

The variable pitched drive pulley has one (1) fixed face and one (1) moveable face. The drive pulley moveable face is controlled by roller weight arms and springs which change position in relation to the engine speed (RPM).

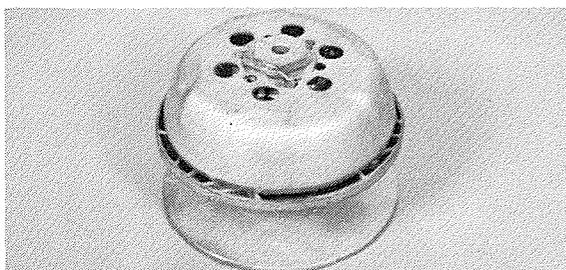
When the engine is not in operation and when it is at a slow idle, the distance between the fixed and moveable faces of the drive pulley is slightly greater than the width of the drive belt, resulting in a disengaging relationship between the belt and drive pulley. As the engine speed (RPM) increases, the governor weights are thrown outward by centrifugal force, causing the moveable face to move closer to the fixed face. At this time, belt engagement occurs and power is transmitted to the driven pulley.

Drive Pulley Removal (Salsbury 910)

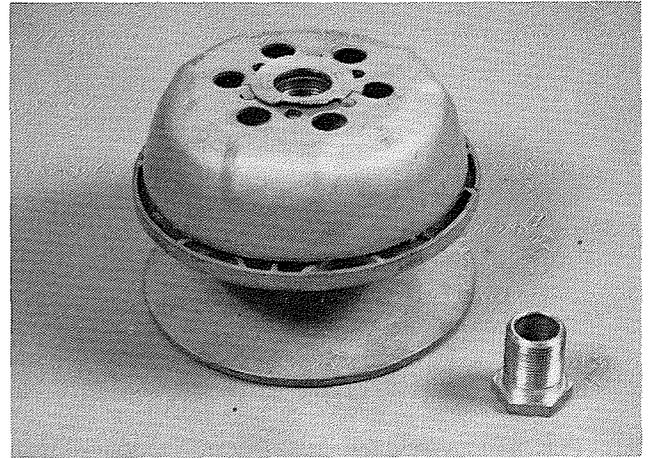
1. Open or remove the hood, whichever will facilitate drive pulley removal.
2. Remove the drive belt (see Drive Belt Removal, page 109).
3. Using an air impact tool, remove the drive pulley bolt.
4. Thread the Salsbury Puller (Arctic part number 0144-029) into the pulley and bottom the puller against the crankshaft. Back puller off one-half turn.
5. Using an air impact tool, screw the puller against the crankshaft until pulley becomes disengaged.
6. Remove the puller and the pulley from the crankshaft.

Drive Pulley Disassembly (Salsbury 910)

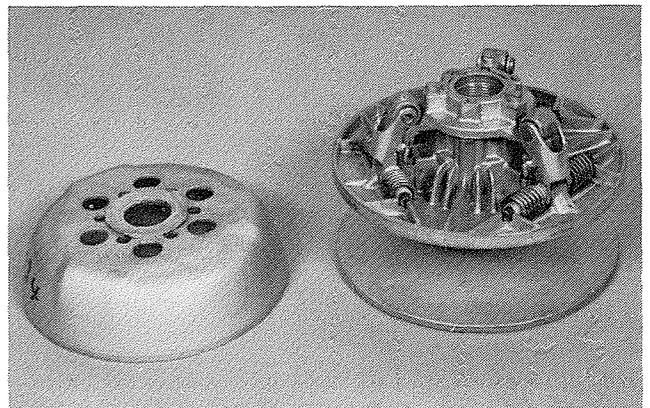
1. Using a punch and hammer, bend the locking tab down so that the large retaining nut can be removed from the drive pulley.



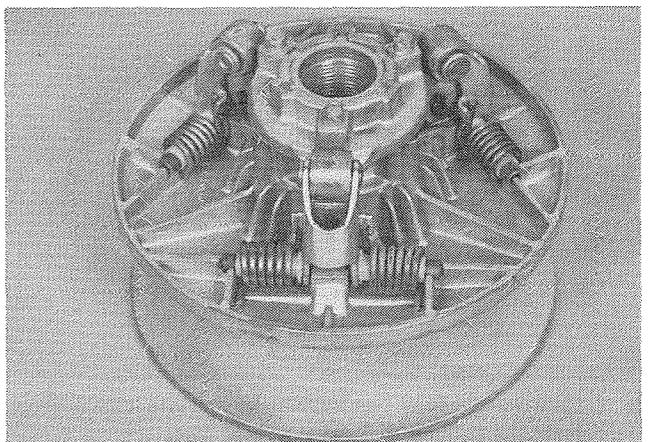
2. Remove the large retaining nut, using an air impact tool.



3. Remove the ramp plate assembly which also includes a locking tab.

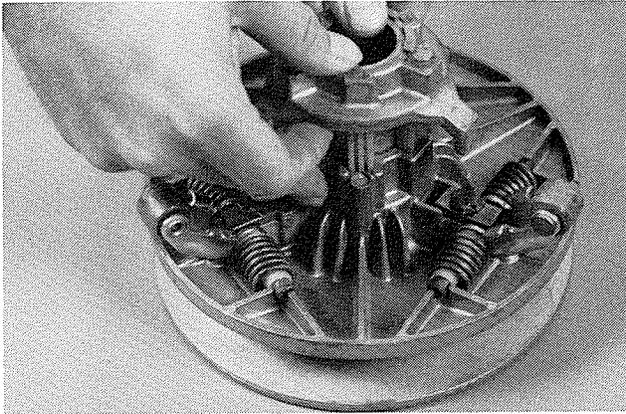


4. Release the roller arm spring tension by disengaging the springs from the roller arm. Perform this step on all roller arms.

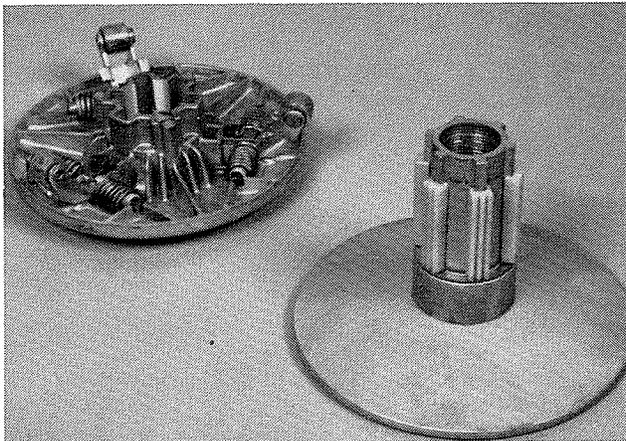


TRANSMISSION (SALSBUURY 910)

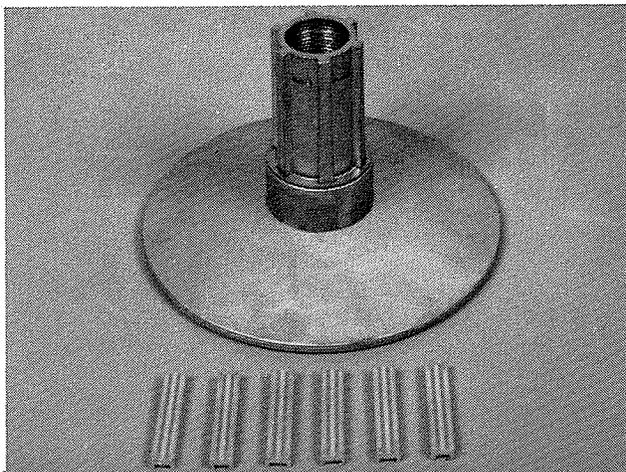
5. When the three (3) arms are free, pull spider off the splined shaft.



6. Pull the moveable face assembly off the splined shaft of the fixed face.

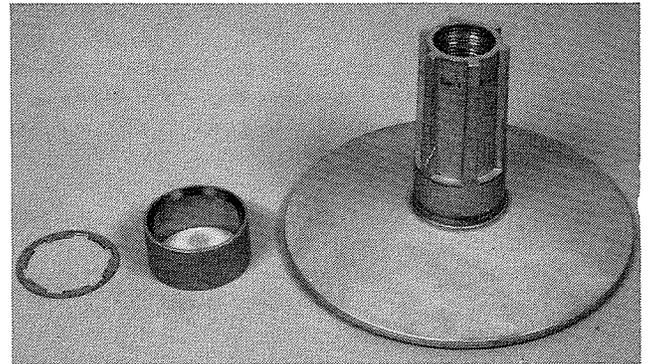


7. Remove the six (6) splined liners from the splines.

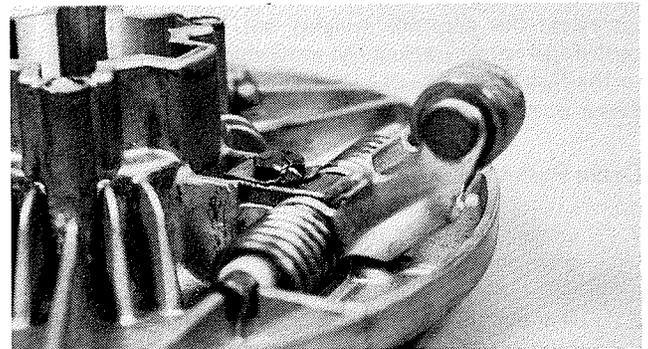


8. Remove the idler bearing washer and the idler bearing from the splined shaft of the fixed face.

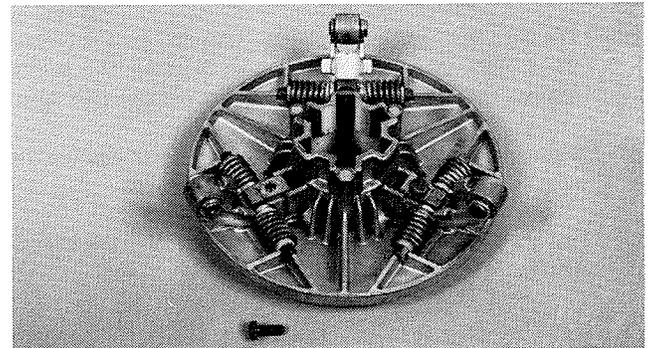
NOTE: The fixed face of the drive pulley should now be completely disassembled.



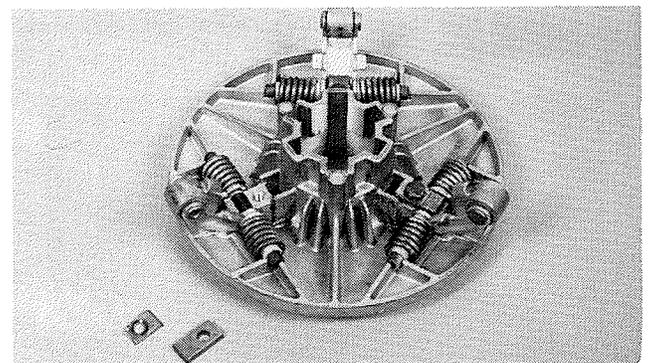
9. Bend the locking tab downward so that the roller arm retaining bolt can be removed.



10. Remove the retaining bolt which secures the roller arm assembly to the moveable face.

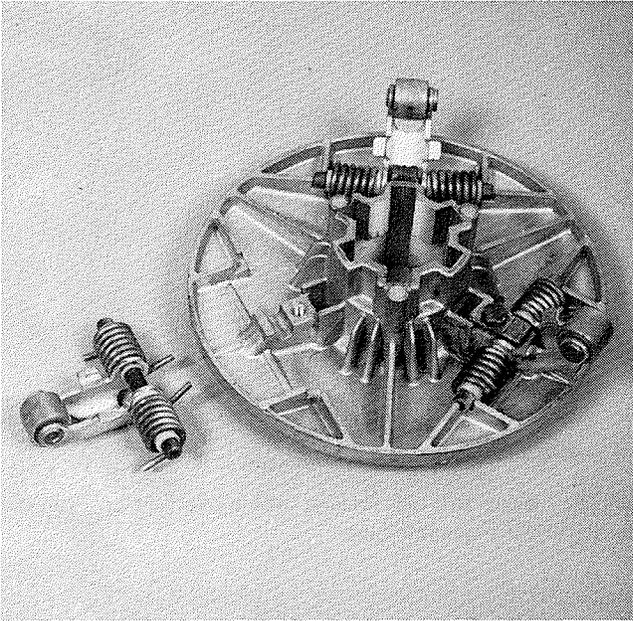


11. Remove the locking tab and retaining plate.

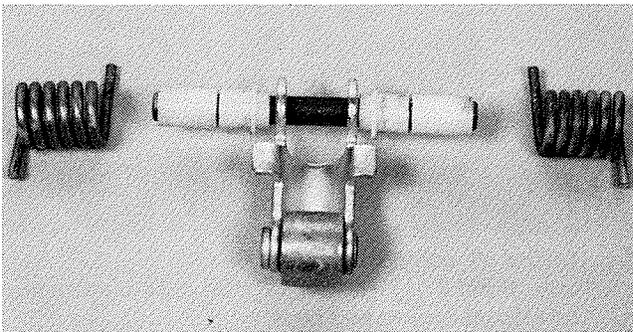


TRANSMISSION (SALSBURY 910)

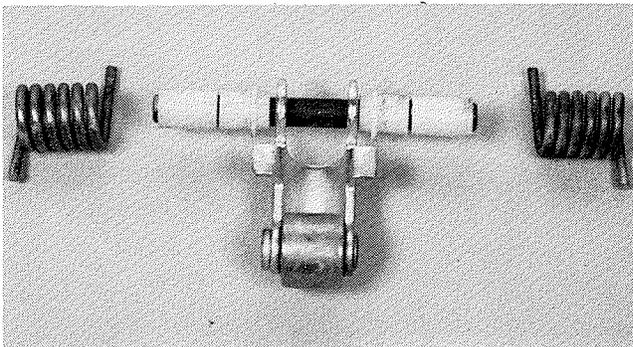
12. Pull the complete roller arm assembly from the moveable face.



13. Slide the two (2) springs off the roller arm shaft.

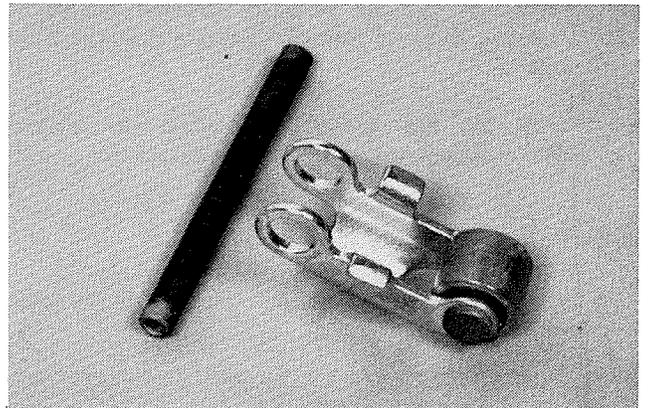


14. Slide the four (4) nylon bushings off the roller shaft and inspect for damage. Replace if necessary.



15. Remove the roller arm shaft from the roller arm.

NOTE: The roller arm must be serviced as one component part.



16. Perform steps 9 - 15 on the remaining two (2) roller arms.

Cleaning

1. Remove all grease and dirt by placing all components (except nylon bushings and spline liners) in cleaning solvent and wash thoroughly. Dry parts with compressed air; use a dry cloth if compressed air is not available.
2. Remove rust and drive belt accumulations from the fixed face and shaft, moveable face, and the ramp plate using a fine grade steel wool. Wipe components with a clean cloth.
3. Remove any other deposits from the remaining components by using a stiff brush or steel wool. Wipe components with a clean cloth.

Inspection

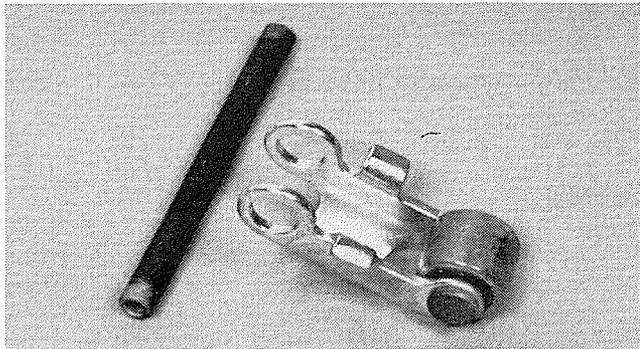
1. Inspect the fixed face, moveable face, ramp plate, and spider for cracks and imperfections in the casting.
2. Inspect the roller and rivet securing the roller to the roller arm; roller must not be loose or the rivet rotate in the roller arm.
3. Inspect the roller arm for fatigue cracks, distortion, and elongation.
4. Inspect the plastic bushings for wear from both the roller arm, shaft, and the springs.
5. Inspect the holes in the roller arm for elongation which will cause a loose roller arm condition.
6. Inspect the springs for fatigue or damage. Replace as necessary.
7. Examine the nylon spline liners for wear and deterioration. Replace if worn.

TRANSMISSION (SALSBURY 910)

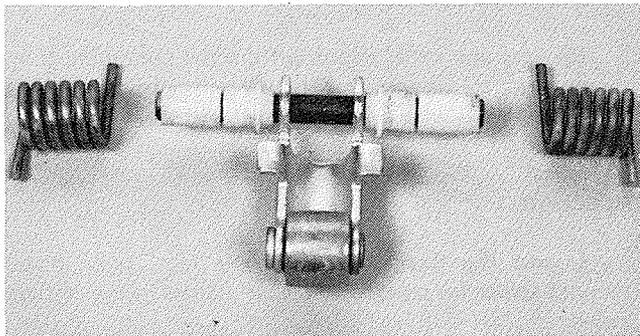
8. Inspect all threaded parts for stripped threads or otherwise damaged threads. Replace damaged components.
9. Check the bearing and bearing retainer washer. Replace if damaged or if condition is doubtful.

Drive Pulley Assembly (Salsbury 910)

1. Insert roller arm shaft through the holes in the roller arm.

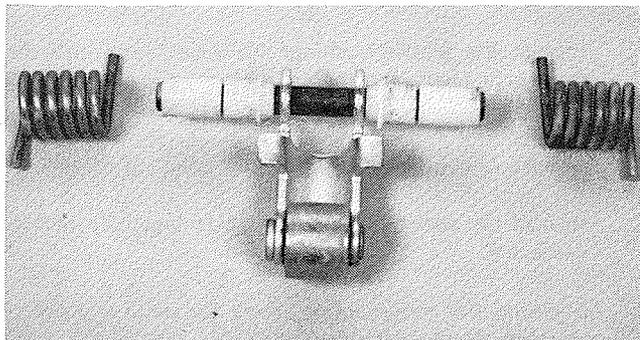


2. Slide the two (2) flanged nylon bushings on the roller shaft, insuring that flanged end of bushing is installed in the roller arm holes. Place cylindrical nylon bushings on the roller arm shaft.

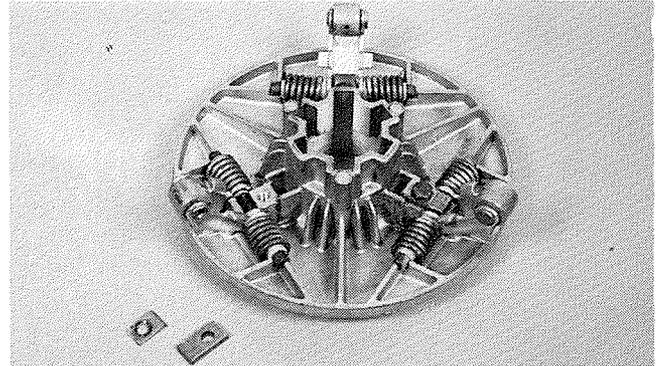


3. Install the two (2) springs on the roller arm shaft.

NOTE: The longer end of each spring must be positioned adjacent to the holes in the roller arm.

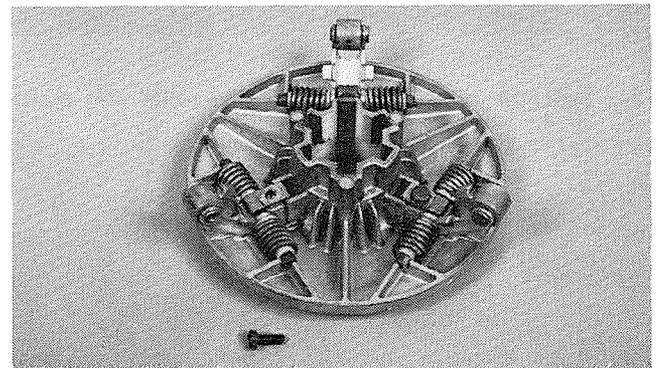


4. Place the complete roller arm and shaft assembly into proper position in the moveable face casting.



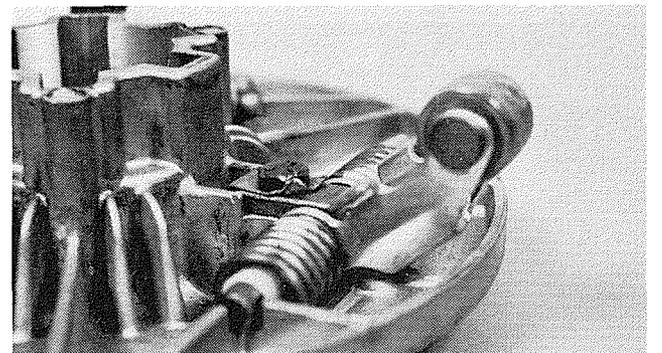
5. Position the retainer plate and locking tab over the roller shaft.

NOTE: Bent side of locking tab must face toward the center of the moveable face.



6. Secure all components in place with bolt. Torque bolt from 5 - 7 ft. lbs. Retain bolt by bending locking tab against bolt head.

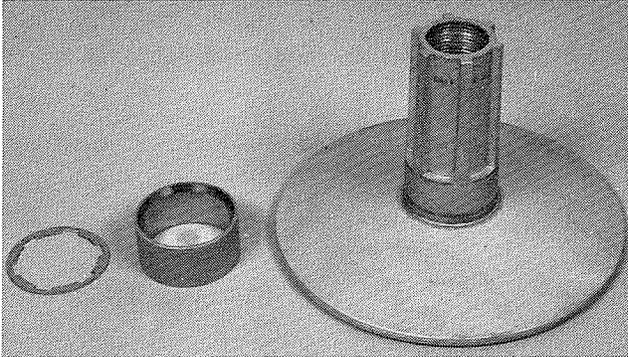
7. Perform steps 1 - 6 on the remaining roller arms.



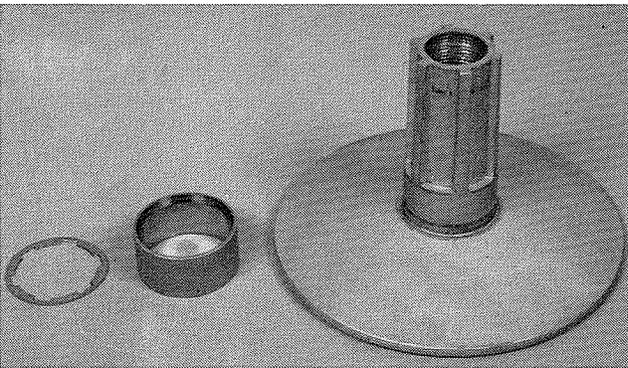
TRANSMISSION (SALSBURY 910)

8. Install the idler bearing on the shaft of the fixed face.

NOTE: Chamfered end of the idler bearing must be installed toward the fixed face.

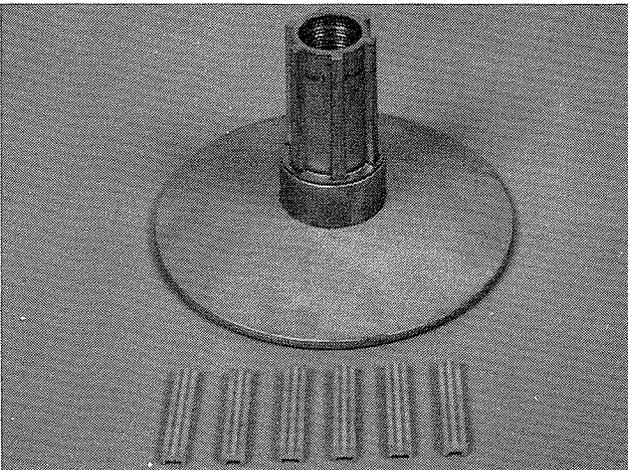


9. Place the idler bearing retaining washer on the fixed face shaft.

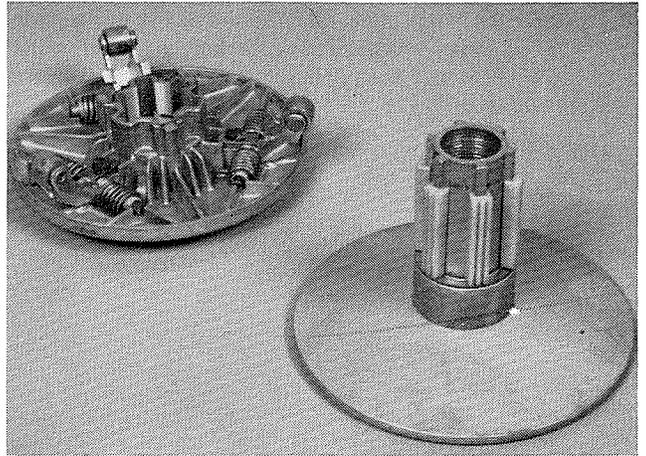


10. Install the six (6) splined liners.

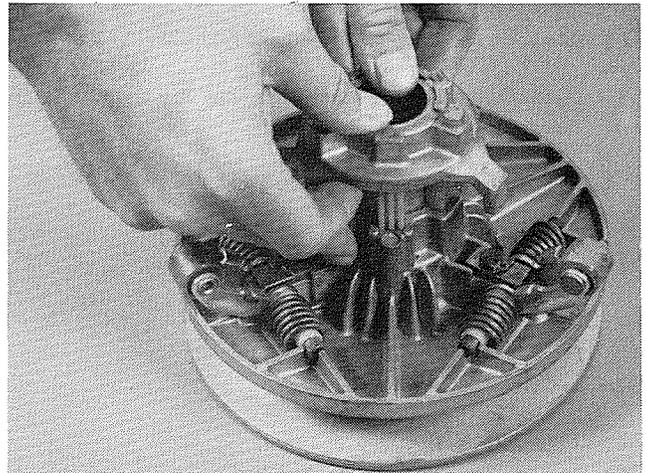
NOTE: The internal taper of the spline liners must match the splines on the fixed face shaft to be installed properly.



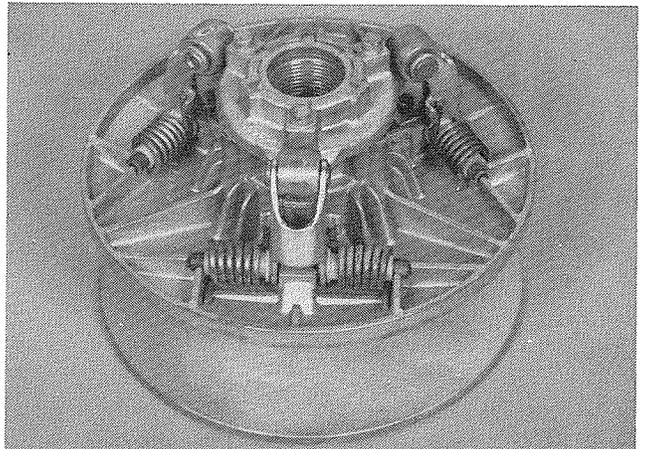
11. Slide the moveable face over the fixed face shaft and splined liners.



12. Install the spider on the fixed face spline shaft.

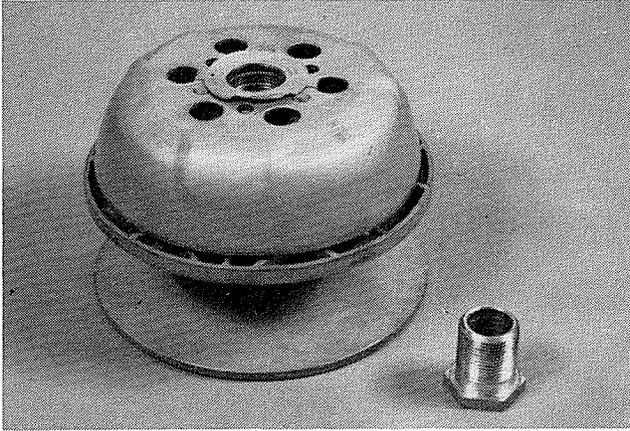


13. Pull the moveable face upward and install spring ends behind the roller arm seats using the spring tool (Arctic part number 0144-014). Perform this step on all roller arms springs.

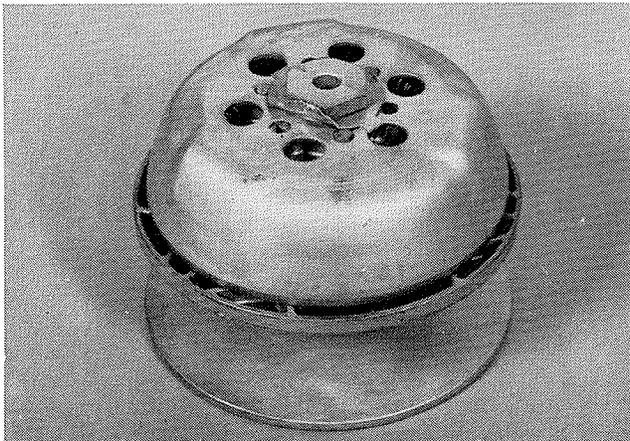


TRANSMISSION (SALSBURY 910)

14. Install the ramp plate which includes the ramp plate locking tab and secure complete drive pulley with the large ramp plate retaining nut. Torque nut from 150 - 165 ft. lbs.



15. Retain ramp plate retaining nut by bending tab against side of nut.



Drive Pulley Installation (Salsbury 910)

1. Install the drive pulley on the crankshaft and secure in place with the drive pulley bolt. **NOTE: Torque drive pulley bolt to 70 ft. lbs.**
2. Replace the drive belt (see Drive Belt Installation, page 109).
3. Close or replace the hood, whichever was performed to facilitate drive pulley removal.

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TRANSMISSION (SALSBURY 780)

General (780 Salisbury)

A drive pulley (torque converter) is a power transmission mechanism which transmits power from the engine to a driven pulley. This transmission of power is accomplished by means of a V-shaped drive belt.

The variable pitched drive pulley has one (1) fixed face and one (1) movable face. The drive pulley movable face is controlled by roller weight arms and springs which change position in relation to engine speed (RPM).

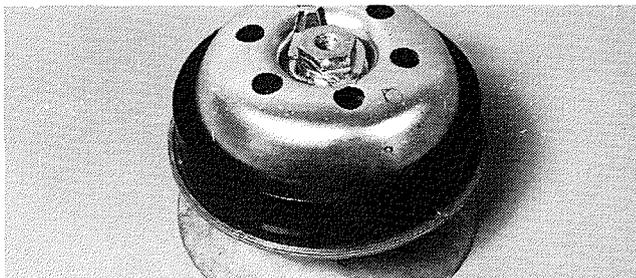
When the engine is not in operation and when it is at a slow idle, the distance between the fixed and movable faces of the drive pulley is slightly greater than the width of the drive belt, resulting in a disengaging relationship between the belt and drive pulley. As the engine speed (RPM) increases, the governor weights are thrown outward by centrifugal force, causing the movable face to move closer to the fixed face. At this time, belt engagement occurs and power is transmitted to the driven pulley.

Drive Pulley Removal (780 Salisbury)

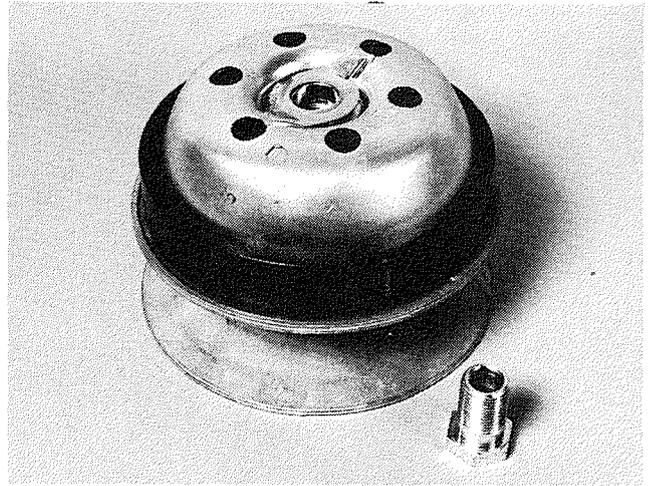
1. Open or remove the hood, whichever will facilitate drive pulley removal.
2. Remove a drive belt (see Drive Belt Removal, page 109).
3. Using an air impact tool, remove the bolt securing the drive pulley to the crankshaft.
4. Thread the Salisbury puller (Arctic part number 0144-031) into the internal hub threads and bottom the puller against the crankshaft. Back puller off 1-half turn.
5. Using an air impact tool, screw the puller into the crankshaft until the pulley becomes disengaged.
6. Remove the puller and drive pulley from the crankshaft.

Drive Pulley Disassembly (780 Salisbury)

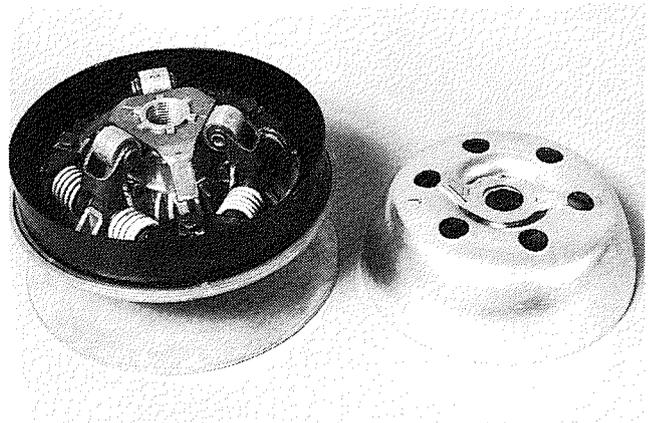
1. Bend the lock plate tab away from the head of the ramp plate nut.



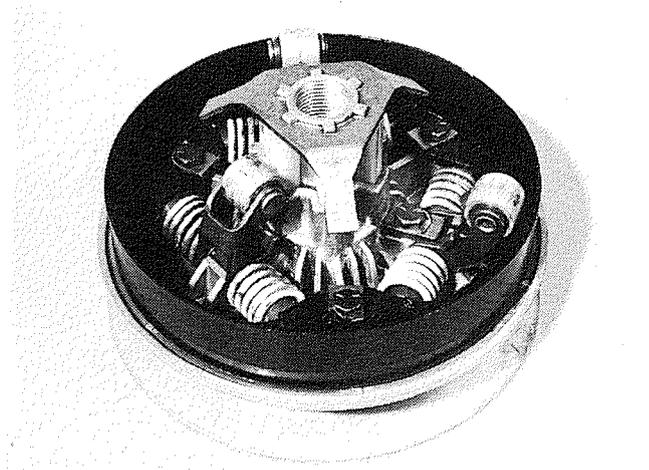
2. Using an air impact tool, remove the ramp plate nut.



3. Remove the ramp plate which includes a lock plate and washer.

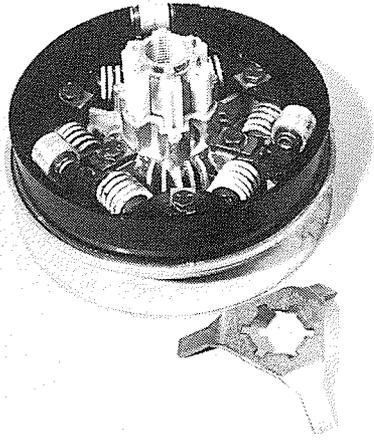


4. Release the spring tension on all roller arms. **NOTE: When spring tension is released, the movable face will drop toward the fixed face.**

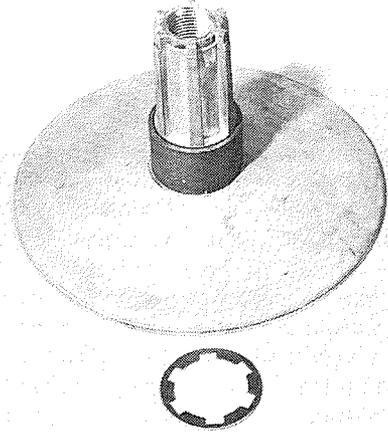


TRANSMISSION (SALSBURY 780)

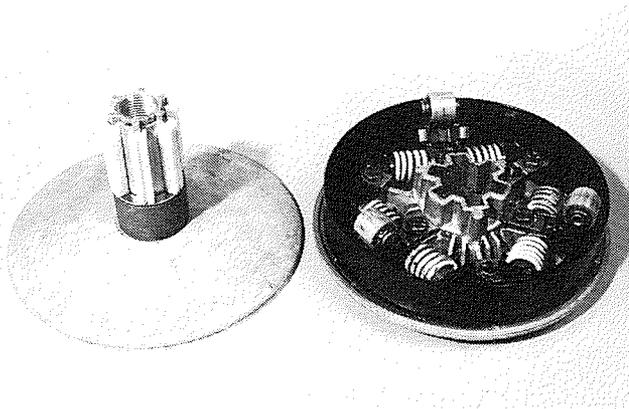
5. Remove the retractor from the fixed face splined shaft.



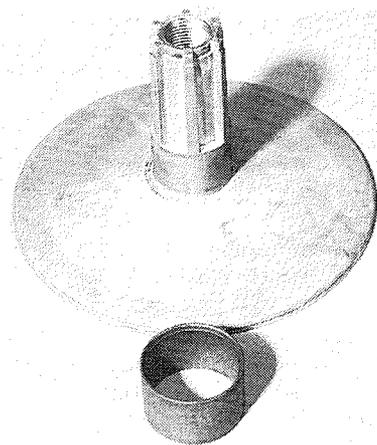
8. Slide the keyed washer off the shaft of the fixed face.



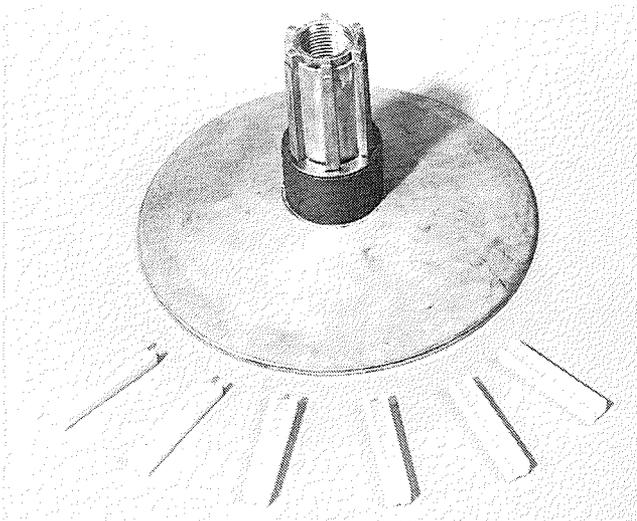
6. Slide the movable face assembly off the fixed face splined shaft.



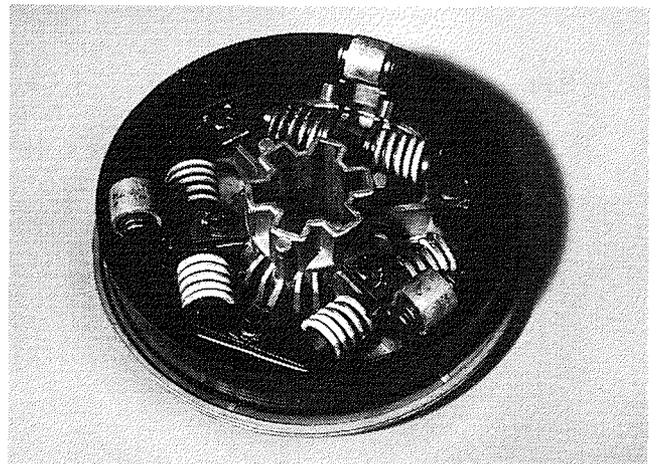
9. Remove the idler bearing from the shaft of the fixed face. **NOTE: Chamfered end of the idler bearing must face toward the fixed face.**



7. Remove the six (6) splined liners if damaged.

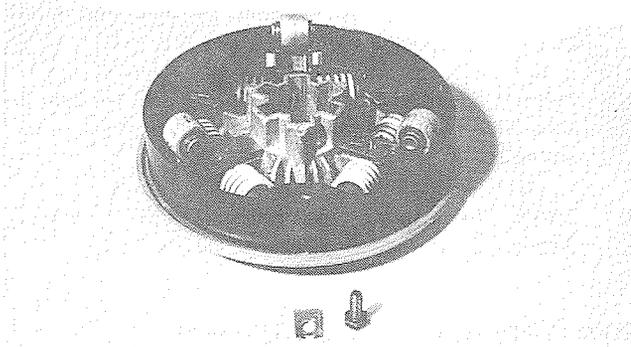


10. Bend the corner of the three (3) lock plates away from the head of the return flange retaining bolts.

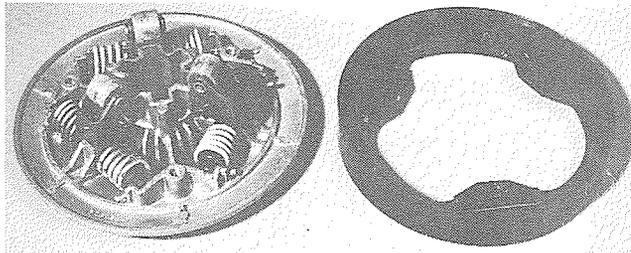


TRANSMISSION (SALSBURY 780)

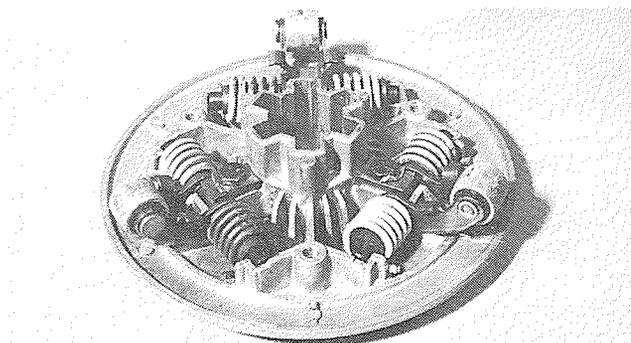
11. Remove the three (3) retaining bolts and lock plates, securing the return flange to the movable face.



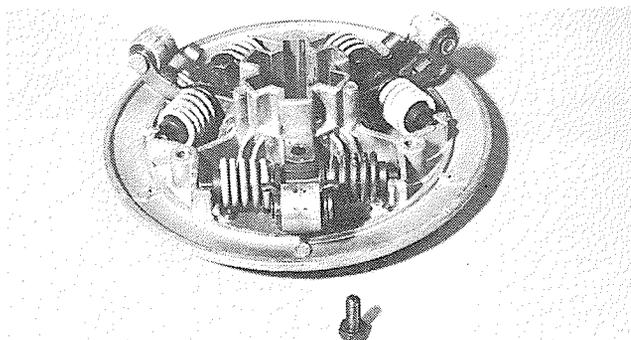
12. Lift the return flange off the movable face.



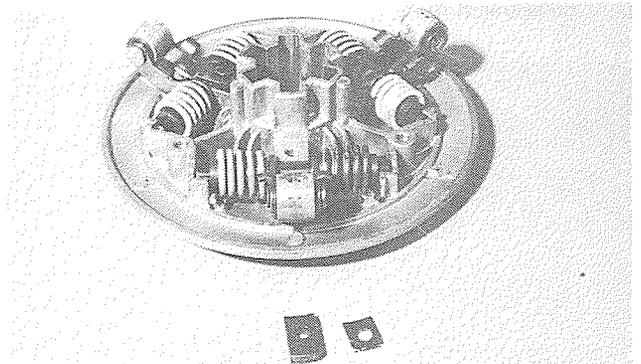
13. Bend the locking tab downward so that the roller arm retaining bolt can be removed.



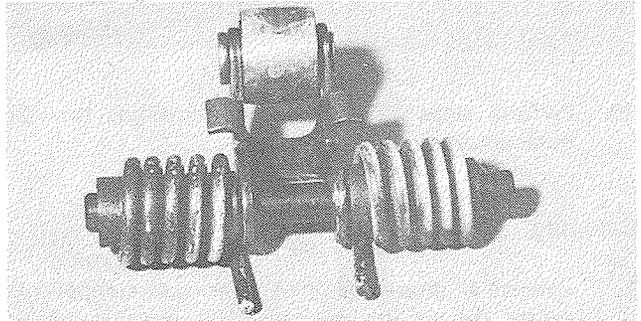
14. Remove the retaining bolt which secures the roller arm assembly to the movable face.



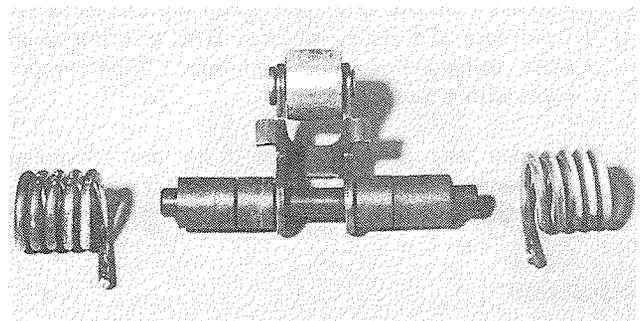
15. Remove the locking tab and retaining plate.



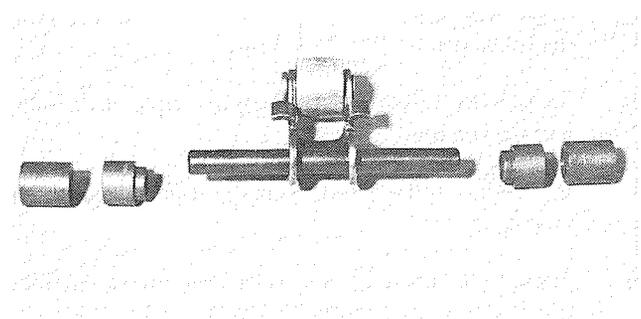
16. Pull the complete roller arm assembly from the movable face.



17. Slide the two (2) springs off the roller arm shaft.

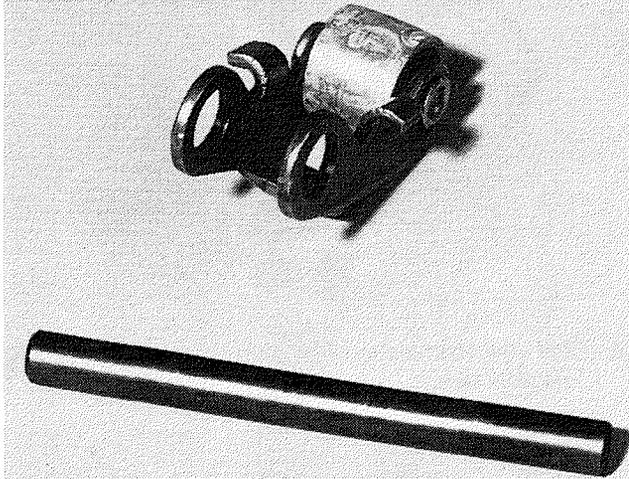


18. Slide the four (4) bushings off the roller shaft and inspect for damage. Replace if worn or damaged.



TRANSMISSION (SALSBUURY 780)

19. Remove the roller arm shaft from the roller arm.
NOTE: The roller arm must be serviced as one component part.



20. Perform steps 13 - 19 on the remaining two (2) roller arms.

Cleaning

1. Remove all grease and dirt by placing all components except the six (6) spline liners in cleaning solvent and wash thoroughly. Dry parts with compressed air; use a dry cloth if compressed air is not available.
2. Remove rust and drive belt accumulations from the fixed face and shaft, movable face, and the ramp plate, using a fine grade steel wool. Wipe components with a clean cloth.
3. Remove any other deposits from the remaining components by using a stiff brush or steel wool. Wipe components with a clean cloth.

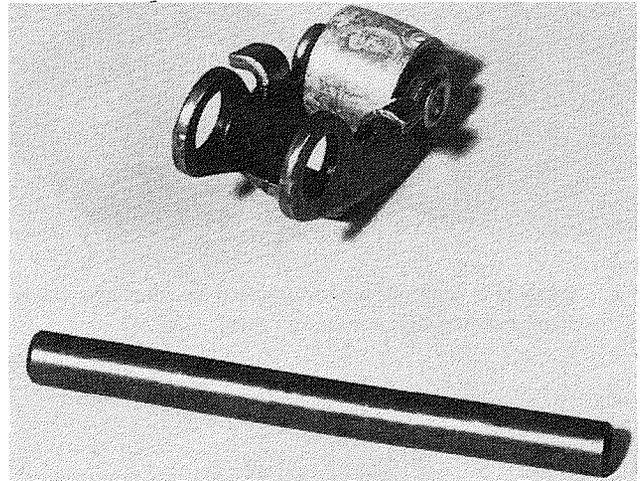
Inspection

1. Inspect the fixed face, movable face, ramp plate, and spider for cracks and imperfections in the casting.
2. Inspect the roller and rivet securing the roller to the roller arm; roller must not wauble or rivet rotate in the roller arm.
3. Inspect the roller arm for fatigue cracks, distortion, and elongations.
4. Inspect the roller arm bushings and idler bearing for wear or cracks.
5. Inspect the holes in the roller arm for elongations which may cause a loose roller arm.

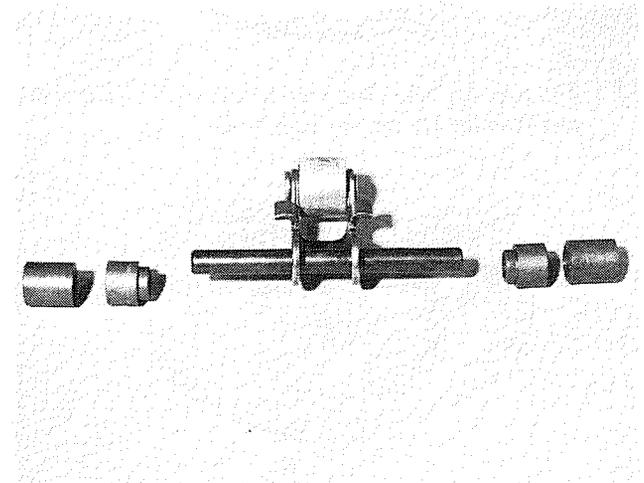
6. Inspect the springs for fatigue or damage. Replace as necessary.
7. Examine the nylon spline liners for wear and deterioration. Replace if worn.
8. Inspect all threaded parts for stripped threads or otherwise damaged threads. Replace damaged components.
9. Check the bearing and bearing retainer washer. Replace if damaged or if condition is doubtful.

Drive Pulley Assembly (780 Salsbury)

1. Insert the roller arm shaft through the holes in the roller arm.

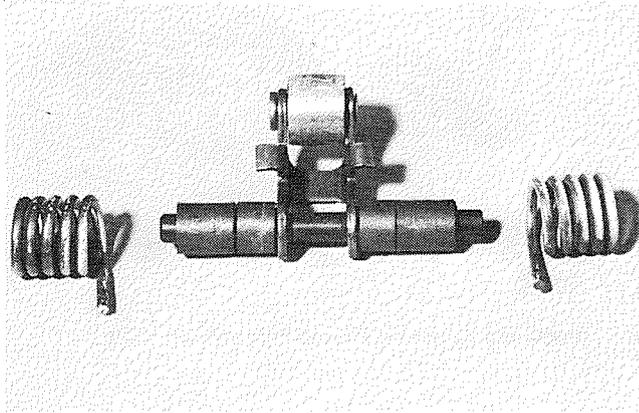


2. Slide the two flanged bushings on the roller shaft, insuring that flanged end of bushing is installed in the roller arm holes. Place cylindrical bushings on the roller arm shaft.

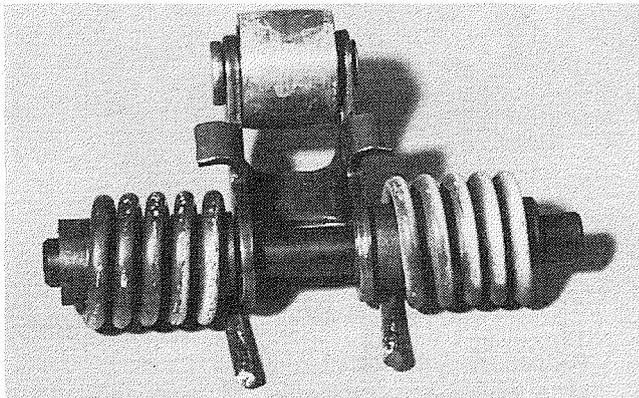


TRANSMISSION (SALSBUURY 780)

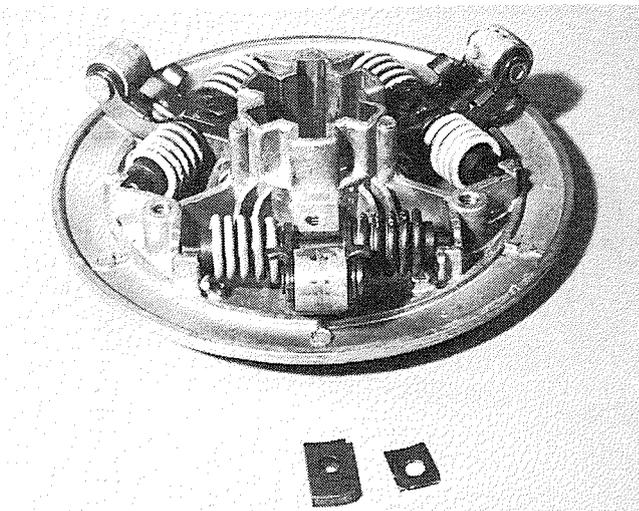
3. Install the two (2) springs on the roller arm shaft. **NOTE:** The longer end of each spring must be positioned adjacent to the holes in the roller arm.



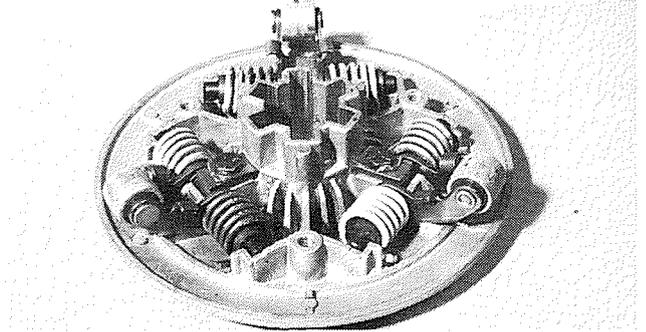
4. Place the complete roller arm and shaft assembly into proper position in the movable face casting.



5. Position the retainer plate and locking tab over the roller shaft. **NOTE:** Bent side of locking tab must face toward the center of the movable face.

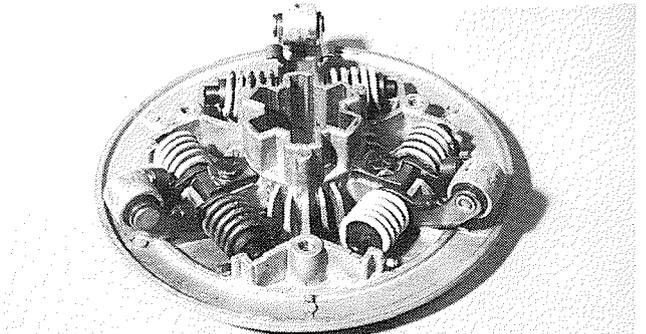


6. Secure all components in place with bolt. Retain bolt by bending corner of locking tab against the bolt head.

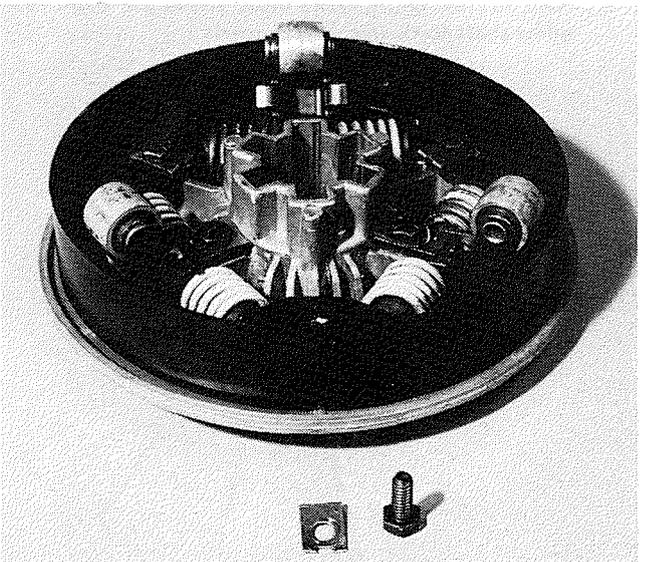


7. Perform steps 1 - 6 on the remaining roller arm.

8. Position the roller arm spring ends behind the roller arm seats, using the spring tool (Arctic part number 0144-014). Perform this step on all roller arm springs.

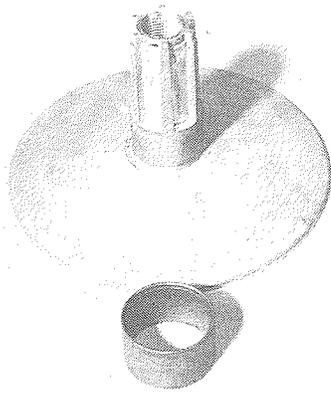


9. Place the return flange in proper position and secure with three (3) lock plates and retaining bolts.

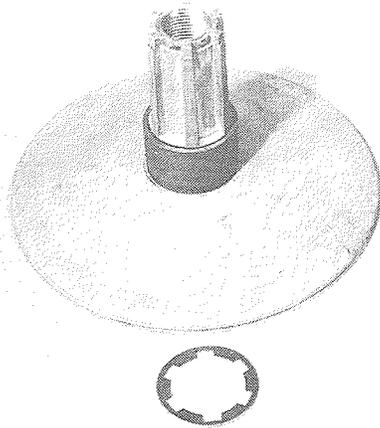


TRANSMISSION (SALSBUARY 780)

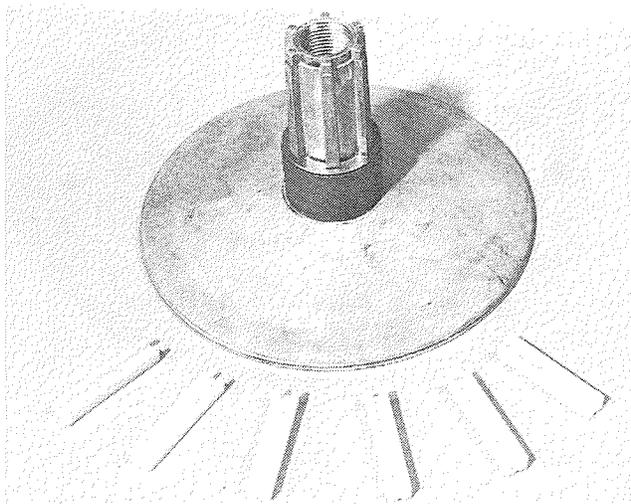
10. Install the idler bearing on the shaft of the fixed face. **NOTE:** Chamfered end of idler bearing must be installed toward the fixed face.



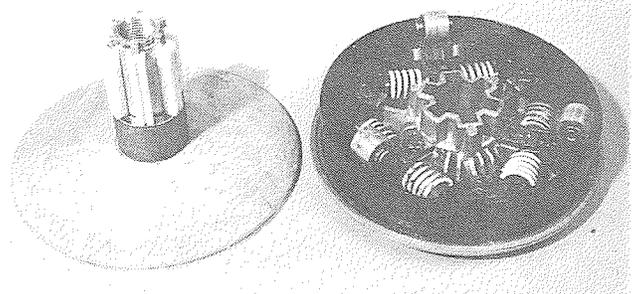
11. Place idler bearing retaining washer on the fixed face shaft.



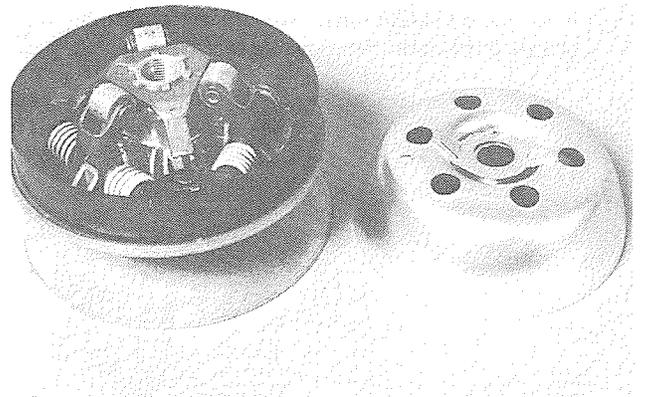
12. Install the six (6) spline liners. **NOTE:** The internal taper of the spline liners must match the fixed face spline shaft to be installed properly.



13. Slide the movable face assembly over the fixed face shaft and spline liners.

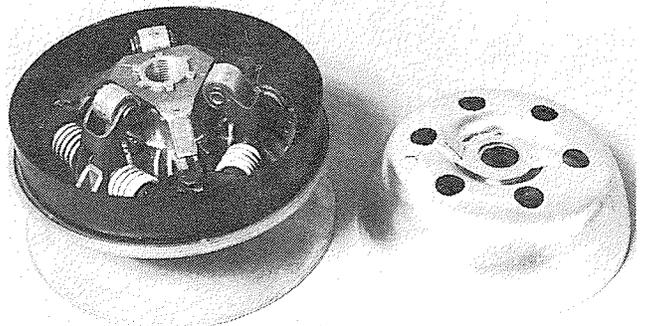


14. Install the spider on a fixed face splined shaft.



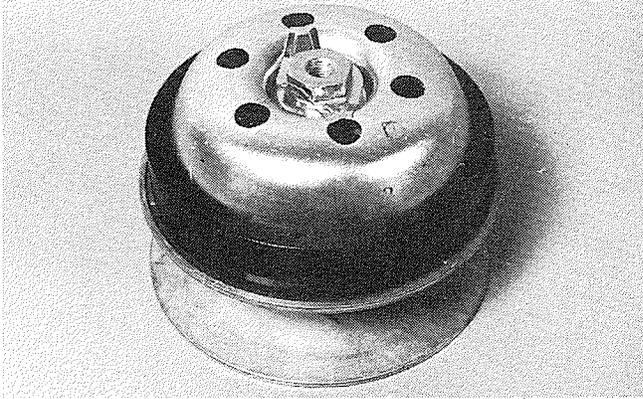
15. Position the ramp plate, which includes the ramp plate washer and locking tab on the splined shaft. **NOTE:** Inside of the ramp plate has splined cut-outs; these cut-outs must match the splined shaft for proper assembly.

Secure the complete drive pulley with the large ramp plate retaining nut.



TRANSMISSION (SALSBURY 780)

16. Secure the ramp plate retaining nut by bending the locking tab against the side of the nut.



Drive Pulley Installation (780 Salsbury)

1. Install the drive pulley on the crankshaft and secure in place with the drive pulley bolt and retaining washer. **NOTE: Torque the drive pulley bolt to 70 ft. lbs.**
2. Replace the drive belt (see Drive Belt Installation, page 109).
3. Close or replace the hood, whichever was performed to facilitate drive pulley removal.

NOTES

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TRANSMISSION (SALSBUARY 770)

General (770 Salsbury)

A drive pulley (torque converter) is a power transmission mechanism which transmits power from the engine to a driven pulley. This transmission of power is accomplished by means of a V-shaped drive belt.

The variable pitched drive pulley has one (1) fixed face and one (1) movable face. The drive pulley movable face is controlled by roller weight arms and springs which change position to engine speed (RPM).

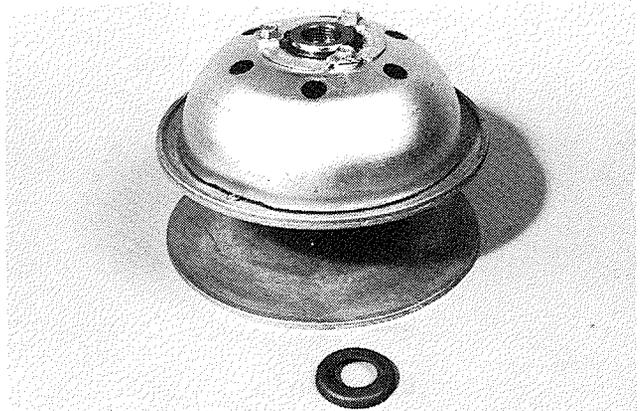
When the engine is not in operation and when it is at a slow idle, the distance between the fixed and movable faces of the drive pulley is slightly greater than the width of the drive belt, resulting in a disengaging relationship between the belt and drive pulley. As the engine speed (RPM) increases, the governor weights are thrown outward by centrifugal force, causing the movable face to move closer to the fixed face. At this time, belt engagement occurs and power is transmitted to the driven pulley.

Drive Pulley Removal (770 Salsbury)

1. Open or remove the hood, whichever will facilitate drive pulley removal.
2. Remove the drive belt (see Drive Belt Removal, page 109).
3. Using an air impact tool, remove the belt and washer securing the drive pulley to the crankshaft.
4. Thread the Salsbury puller (Arctic part number 0144-031) into the internal threads of the ramp plate retaining nut and bottom the puller against the crankshaft. Back the puller off 1/2 turn.
5. Using an air impact tool, screw the puller against the crankshaft until a drive pulley becomes disengaged.
6. Remove the puller and drive pulley from the crankshaft.

Drive Pulley Disassembly (770 Salsbury)

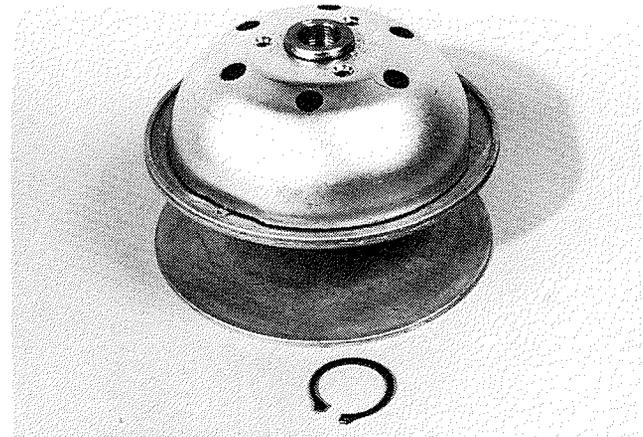
1. Bend the lock plate tab away from the three (3) ramp plate retainer bolts.



2. Remove three (3) ramp plate bolts, lock plate and the three (3) bushings.

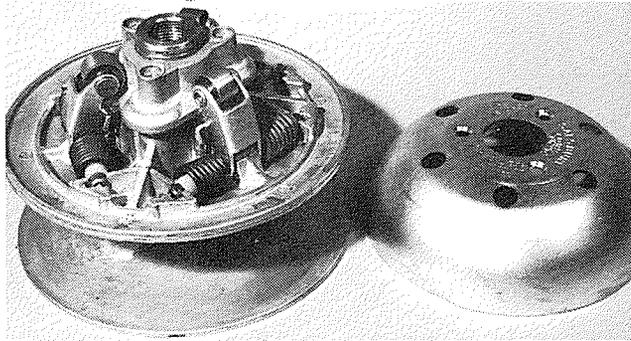


3. Remove the snap ring, using a snap ring pliers. **NOTE: Fixed face shaft has two (2) grooves for snap ring installation; observe which groove snap ring occupied and install in the same groove when re-assembling.**

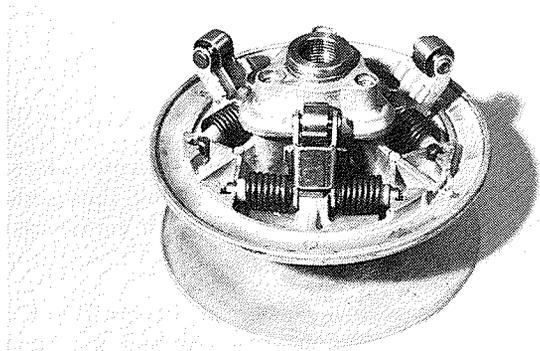


TRANSMISSION (SALSBURY 770)

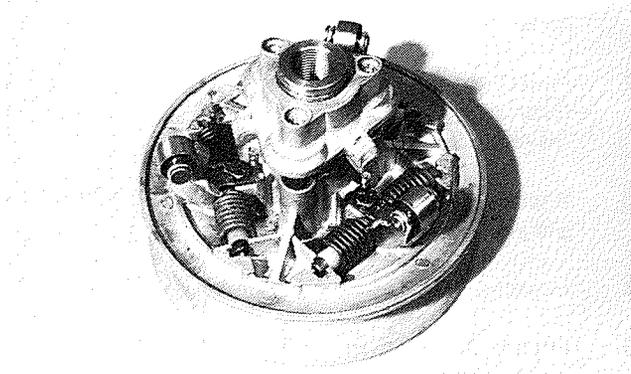
4. Pull the ramp plate off the shaft of the fixed face. **NOTE:** If difficulty is encountered in removing the ramp plate, heat the ramp plate area around the center hub. Using two (2) screwdrivers positioned on either side of the ramp plate, pry the ramp plate off the shaft.



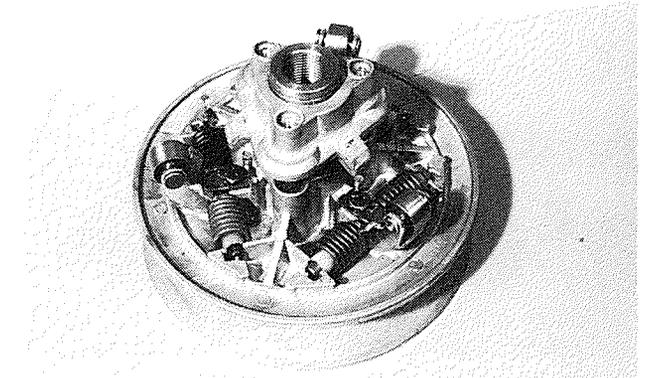
5. Release the spring tension on all roller arms. **NOTE:** When spring tension is released, the movable face will drop toward the fixed face.



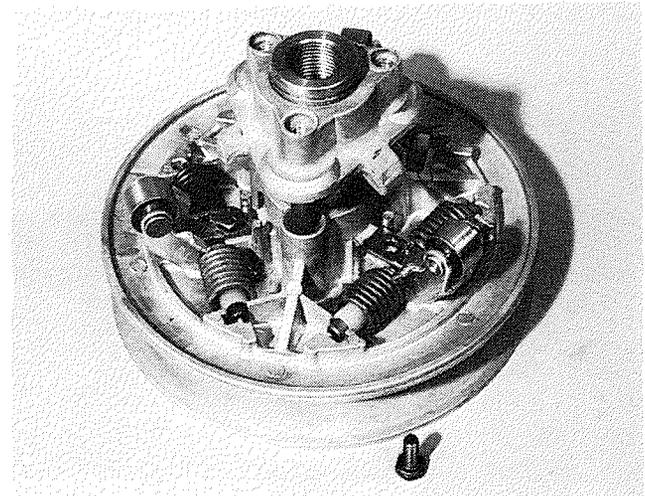
6. The spider and pin assembly should be removed and replaced **ONLY IF DAMAGE TO THE COMPONENT OR MOVEMENT IS EVIDENT.** If the spider and pin assembly must be replaced, heat the component and remove; **REPLACE WITH A NEW PART.** If it is necessary to replace the fixed or movable face, the spider and pin assembly must also be replaced.



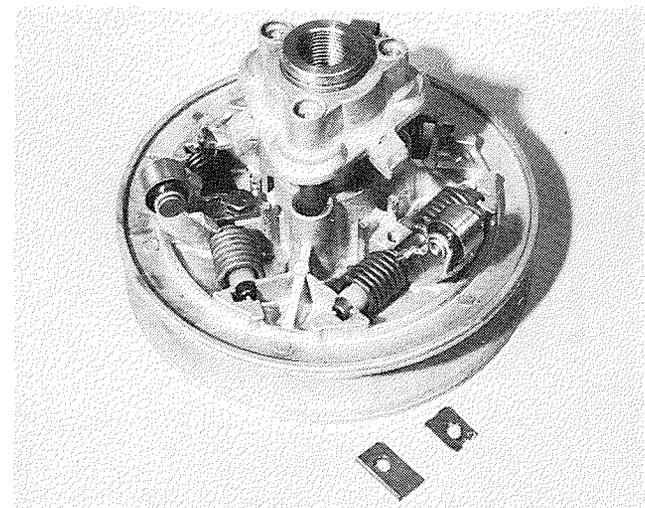
7. Bend the corner of the lock plates away from the three (3) roller arm retaining bolts.



8. Remove the roller arm retaining bolt which secures the roller arm to the movable face.

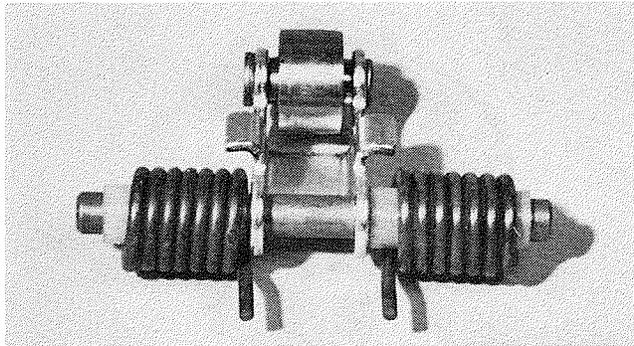


9. Remove the locking tab and the retaining plate.

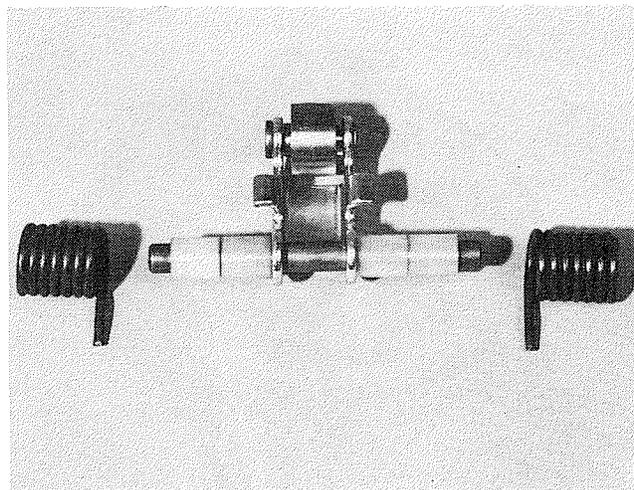


TRANSMISSION (SALSBURY 770)

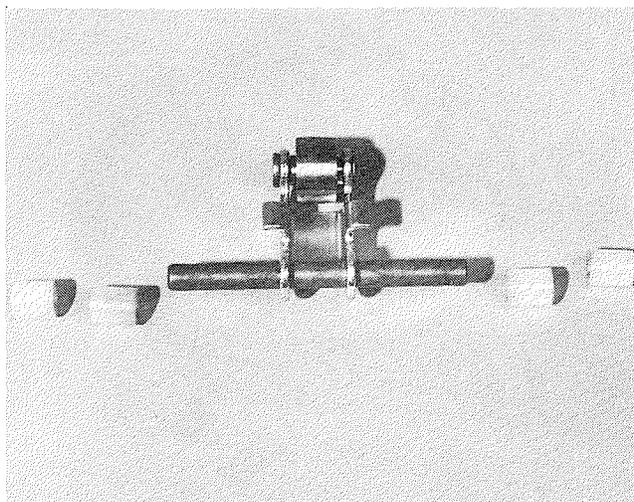
10. Lift the complete roller arm assembly from the movable face.



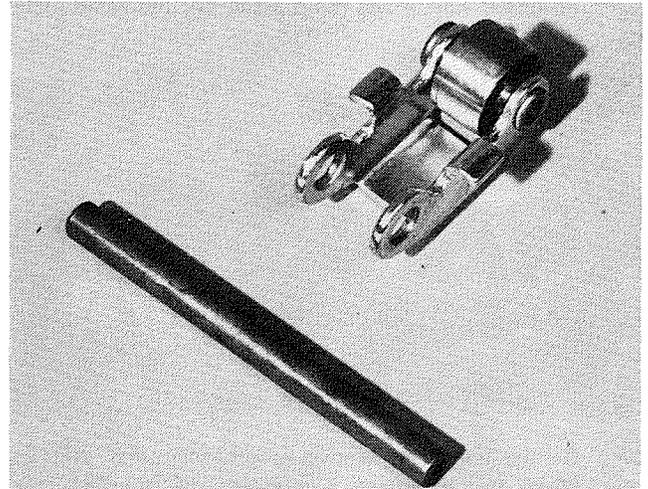
11. Slide the two (2) roller arm springs off the roller arm pin.



12. Slide the four (4) bushings off the roller arm pin and inspect for damage. Replace if worn or damaged.



13. Remove the roller arm pin from the roller arm. **NOTE: The roller arm must be serviced as one component part (see parts manual).**



14. Perform steps 8 - 13 on the remaining two (2) roller arms.

Cleaning

1. Remove grease and dirt by placing all components in cleaning solvent and wash thoroughly. Dry parts with compressed air; use a dry cloth if compressed air is not available.
2. Remove rust and drive belt accumulations from the fixed face and shaft, movable face and the ramp plate, using a fine grade steel wool. Wipe components with a clean cloth.
3. Remove any other deposits from the remaining components by using a stiff brush or steel wool. Wipe components with a clean cloth.

Inspection

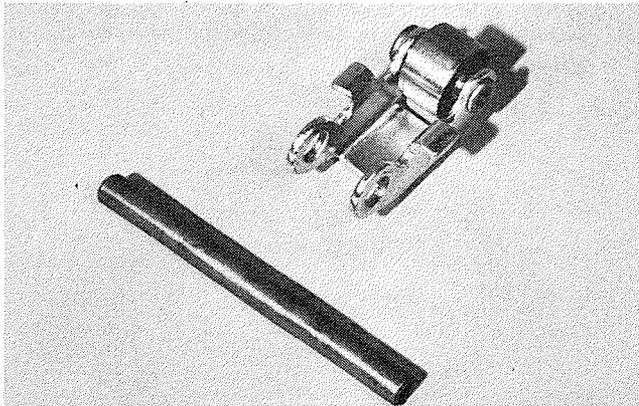
1. Inspect the fixed face, movable face, ramp plate and spider for cracks and imperfections in the castings.
2. Inspect the roller and rivet securing the roller to the roller arm; roller must not wauble or rivet rotate in the roller arm.
3. Inspect the roller arm for fatigue cracks, distortion and elongation.
4. Inspect a roller arm bushing for wear or cracks.
5. Inspect the holes in the roller arm for elongations which may cause a loose roller arm.

TRANSMISSION (SALSBURY 770)

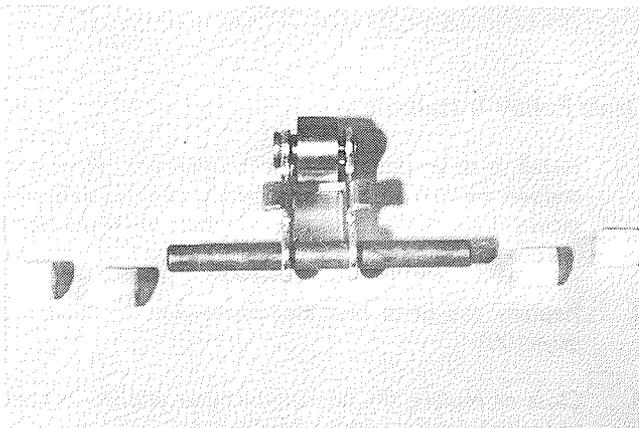
6. Inspect the spring for fatigue or damage. Replace as necessary.
7. Examine the nylon bushings for wear and deterioration. Replace if condition is doubtful.
8. Inspect all threaded parts for stripped threads or otherwise damaged threads. Replace damaged components.
9. Inspect the snap ring. Replace if damaged or if condition is doubtful.
10. Inspect the cup washer. Replace if damaged or if condition is doubtful.

Drive Pulley Assembly (770 Salsbury)

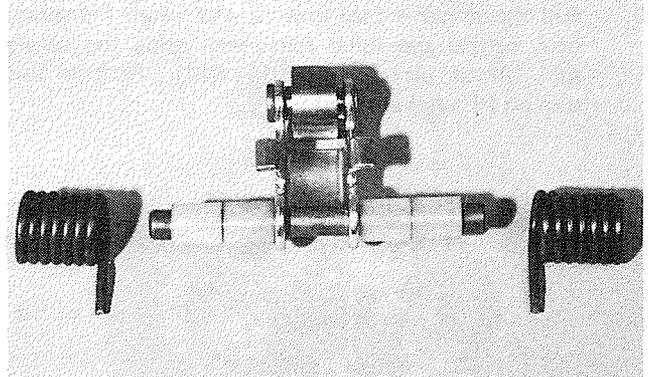
1. Insert the roller arm pin through the holes in the roller arm.



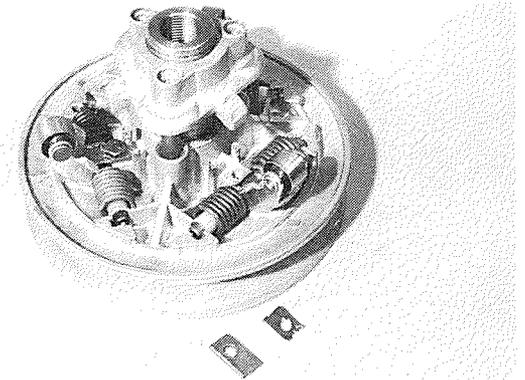
2. Slide the nylon bushings on the roller arm pin. **NOTE: If nylon bushings have a flanged end, the flange must be installed in the roller arm holes. If nylon bushings do not have a flange on the end, bushings may be installed in any sequence on the roller arm pin.**



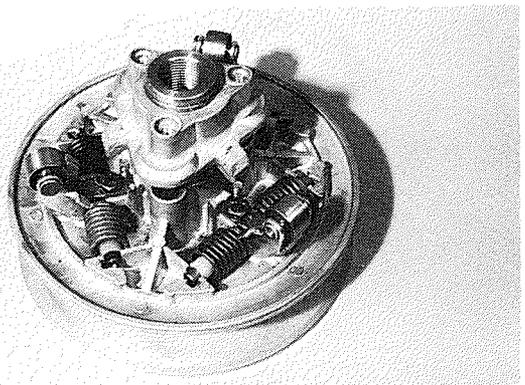
3. Install the two (2) springs on the roller arm pin. **NOTE: The longer end of each spring must be positioned adjacent to the holes in the roller arm.**



4. Place the complete roller arm and pin assembly into proper position in the movable face casting.
5. Position the retainer plate and locking tab over the roller arm pin. **NOTE: Bent end of locking tab must face toward the center of the movable face.**



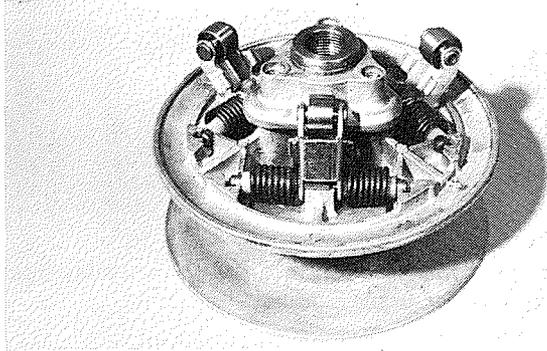
6. Secure all components in place with the roller arm retaining bolt. Torque bolts from 5 - 7 ft. lbs. Retain bolt by bending the locking tab against the bolt head.



7. Perform steps 1 - 6 on the remaining roller arms.

TRANSMISSION (SALSBUARY 770)

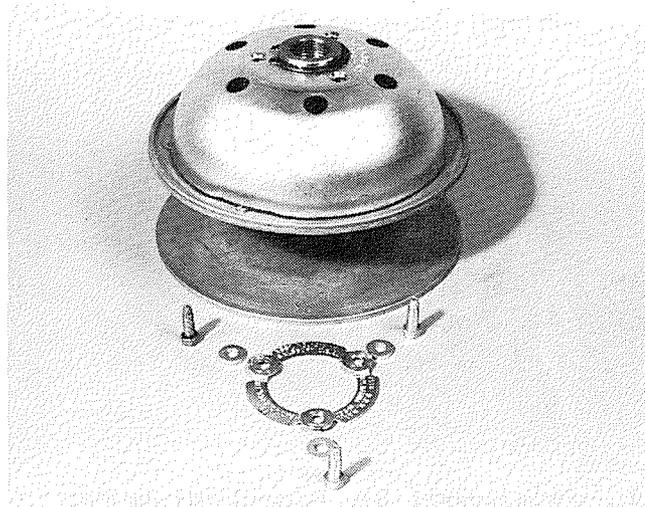
8. Install the spider and pin assembly if it was serviced or if it was removed to service the fixed or movable face.
9. Pull the movable face upward and install the spring ends behind the roller arm seats, using the spring tool (Arctic part number 0144-014). Perform this step on all roller arm springs.



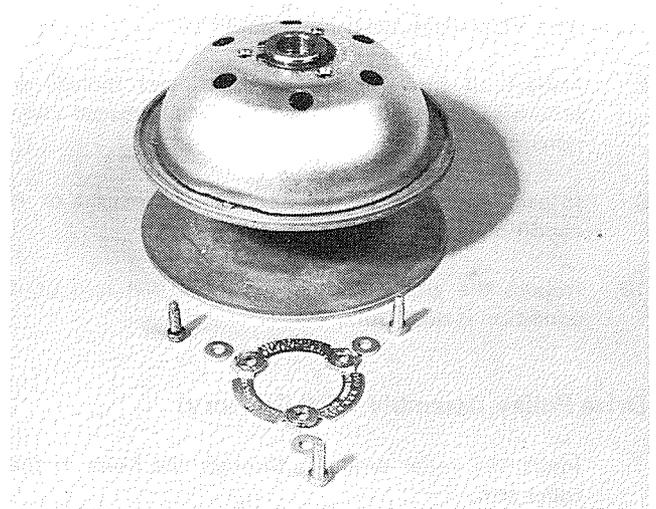
10. Install the ramp plate and secure in place with the snap ring.



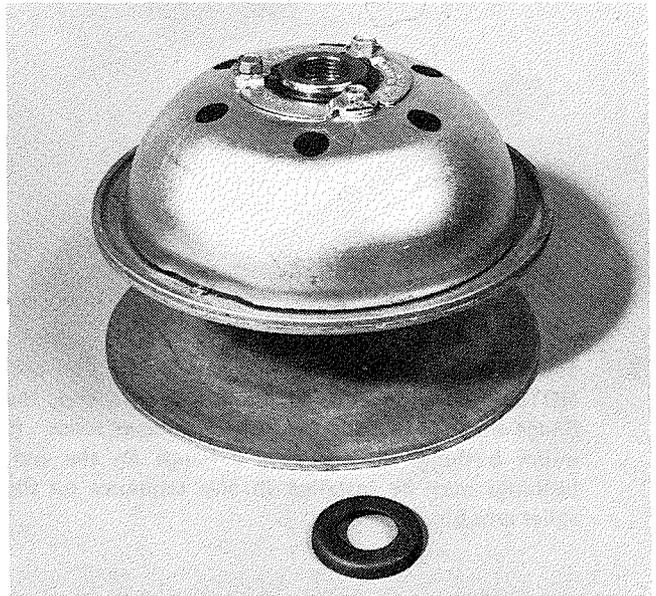
11. Position the three (3) bushings and the lock plate over the holes in the ramp plate.



12. Secure ramp plate in place with the three (3) ramp plate bolts. Torque bolts from 8 - 10 ft. lbs.



13. Retain ramp plate bolts by bending the locking tabs against the bolt head.



Drive Pulley Installation

1. Install a drive pulley on the crankshaft. Place the cupped washer on the drive pulley retainer bolt and secure drive pulley to the crankshaft with the bolt. Torque retainer bolt to 25 ft. lbs.
2. Replace the drive belt (see Drive Belt Installation, page 109).
3. Close or replace the hood, whichever was performed to facilitate drive pulley removal.

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TRANSMISSION (ARCTIC DRIVE)

General

A drive pulley (torque converter) is a power transmission mechanism which transmits power from the engine to a driven pulley. This transmission of power is accomplished by means of a V-shaped belt.

The variable pitch drive pulley has one (1) stationary sheave and one (1) movable sheave. The drive pulley movable sheave is controlled by arms which change position in relation to the engine speed (RPM).

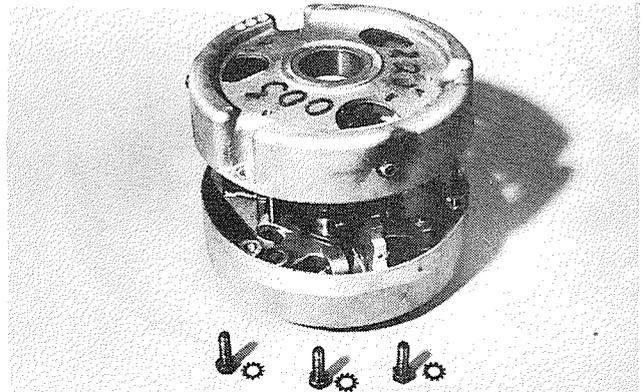
When the engine is not in operation and when it is at a slow idle, the distance between the stationary and movable sheaves of the drive pulley is slightly greater than the width of the drive belt, resulting in a "disengaging" relationship between the belt and drive pulley. As the engine speed (RPM) increases, the arms are thrown outward by centrifugal force, causing the movable sheave to move closer to the fixed face. At this time, belt engagement occurs and power is transmitted to the driven pulley.

Drive Pulley Removal (Arctic)

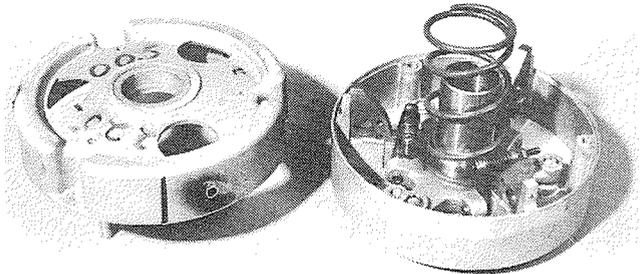
1. Open or remove the hood, whichever will facilitate drive pulley removal.
2. Remove the drive belt (see Drive Belt Removal, page 109).
3. Using an air impact tool, remove the drive pulley bolt.
4. Thread the Arctic puller (Arctic part number 0144-054) into the pulley and bottom the puller against the crankshaft. Back the puller off 1/2 turn.
5. Using an air impact tool, screw the puller against the crankshaft until the drive pulley becomes disengaged.
6. Remove the puller and the drive pulley from the crankshaft.

Drive Pulley Disassembly (Arctic)

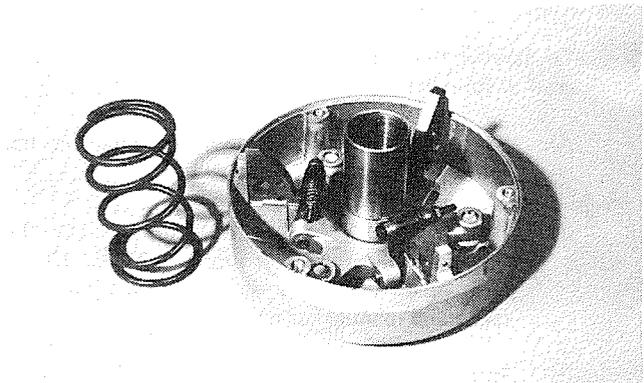
1. Pull the complete movable sheave assembly off the stationary sheave hub.
2. Place the complete movable sheave assembly on the working surface. Loosen the three (3) capscrews and lock washers securing the cover housing, exert downward pressure on the cover housing and remove the three (3) capscrews and lock washers. Slowly release hand pressure on the cover housing.



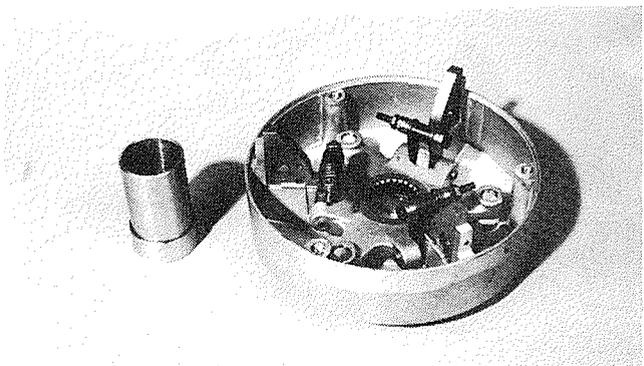
3. Remove the cover housing from the movable sheave. **NOTE: If the dowel pins require servicing, heat the casting mount with a propane torch and pull dowel pin from the casting mount.**



4. Slide the spring off the sleeve.

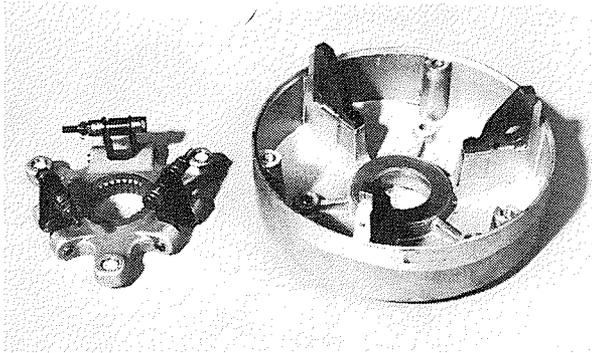


5. Remove the sleeve from the movable sheave.

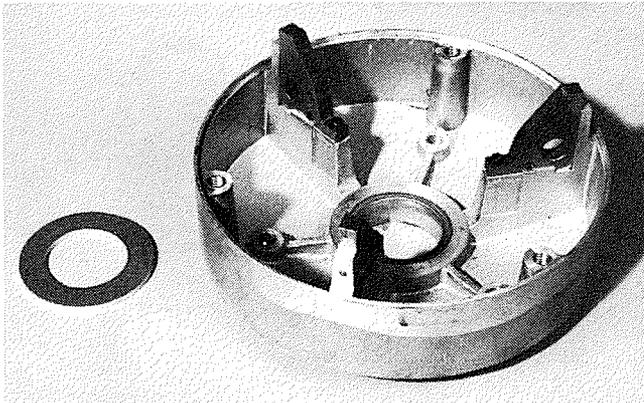


TRANSMISSION (ARCTIC DRIVE)

6. Remove the spider assembly.

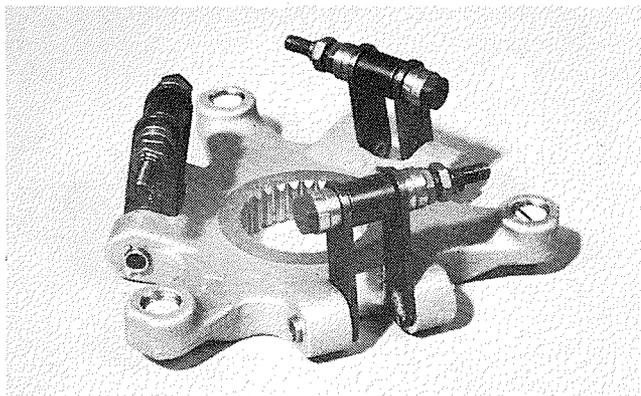


7. Remove the spacer from the center of the movable sheave.

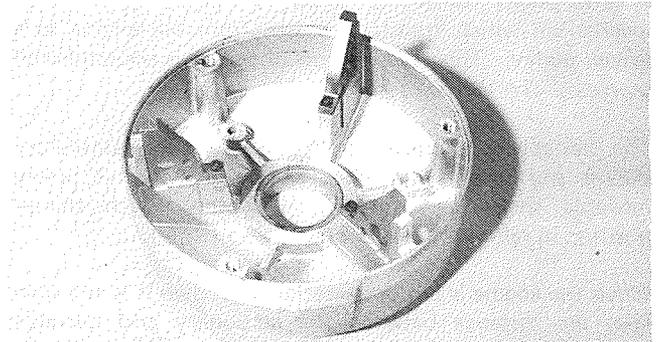


8. To service the spider roller arms and weights, proceed as follows:

- A) Remove the capscrew and nut securing the roller arm weights and the roller.
- B) Slide the roller arm inward to remove the roller arm pin from the spider. **NOTE: Roller arm must be serviced as one component part (see parts manual for exploded view).**
- C) Perform steps A and B on remaining roller arms.



9. Remove the set screw and ramp from the movable sheave.



Cleaning

1. Remove all grease and dirt by placing components in cleaning solvent and wash thoroughly. Dry parts with compressed air or a dry, clean cloth if compressed air is not available.
2. Remove rust and drive belt accumulations from the stationary sheave and hub, movable sheave, dowel pins, cover housing and spider, using a fine grade steel wool. Wipe components with a clean cloth.
3. Remove any other deposits from the remaining components by using a stiff brush or steel wool. Wipe components with a clean cloth.

Inspection

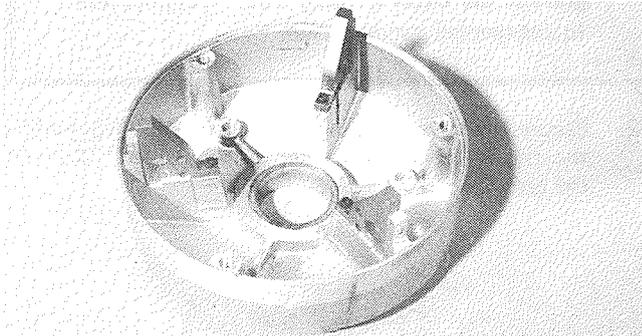
1. Inspect the stationary sheave, movable sheave, ramp plates, spider and cover housing for imperfections in the castings.
2. Inspect all components for fatigue, distortion and elongations. Replace when necessary.
3. Inspect the spring for fatigue or damage. Replace when necessary.
4. Inspect all threaded parts for stripped threads or otherwise damaged threads. Replace any damaged components.

Drive Pulley Assembly (Arctic)

1. Be sure all component parts have been cleaned, repaired or replaced when necessary.
2. Position the ramp in the movable sheave. Secure ramp to movable sheave with the set screw.

TRANSMISSION (ARCTIC DRIVE)

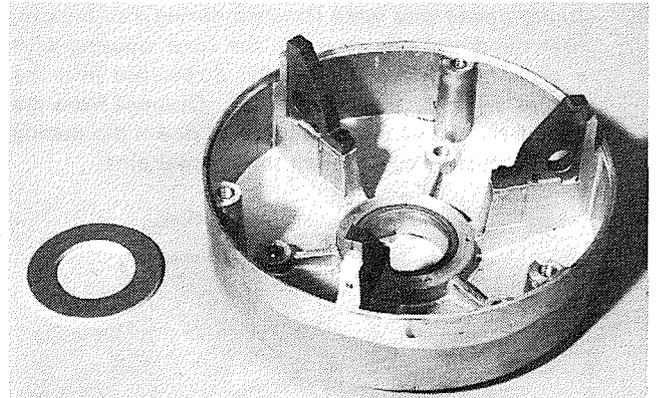
3. Place the movable sheave on the hub of the stationary sheave. **NOTE: The alignment detents in both the stationary and movable sheaves must line up.**



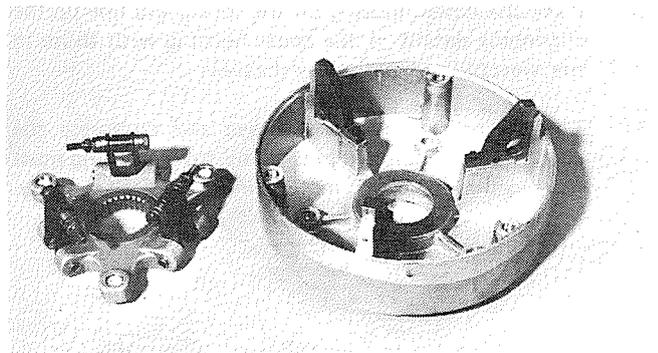
4. If the roller arms were serviced, use the following procedure:
 - A) Slide the pinned end of the roller arms into the roller arm mounting hole.
 - B) Slide a roller arm weight on the capscrew and start the capscrew into the roller arm from the left side.
 - C) Place roller between the roller arms and push the capscrew completely through the roller and opposite roller arm.
 - D) Slide the remaining roller arm weight on the capscrew and secure all components with the nut.
 - E) Perform steps A, B, C and D on the remaining arm.



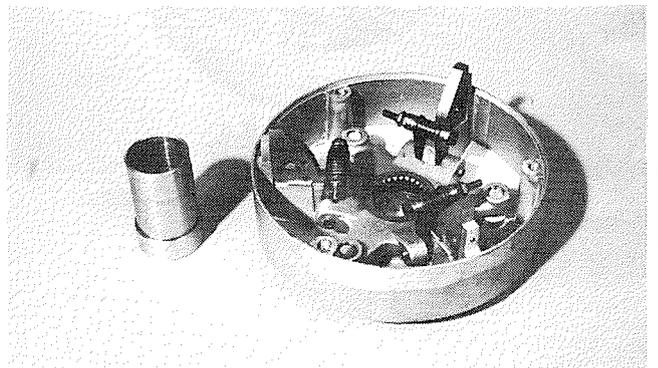
5. Place the spacer over the center hub of the stationary sheave. **NOTE: Spacer must seat on center hub recess.**



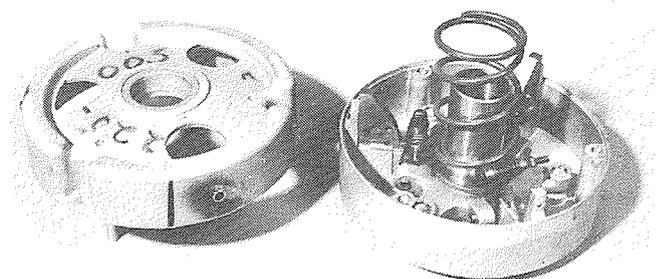
6. Slide the spider assembly onto the splines of the center hub. **NOTE: Dished side of spider must face upward for proper installation.**



7. Position the sleeve (largest end first) over the center hub. **NOTE: Sleeve must contact spider.**

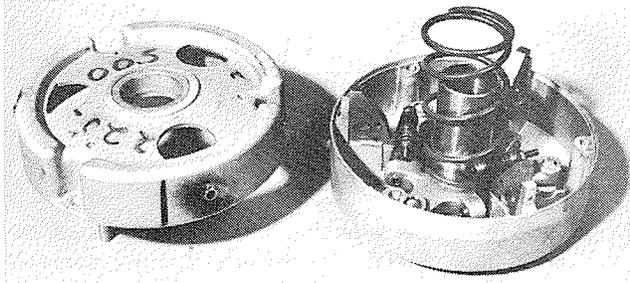


8. Slide the spring over the sleeve.

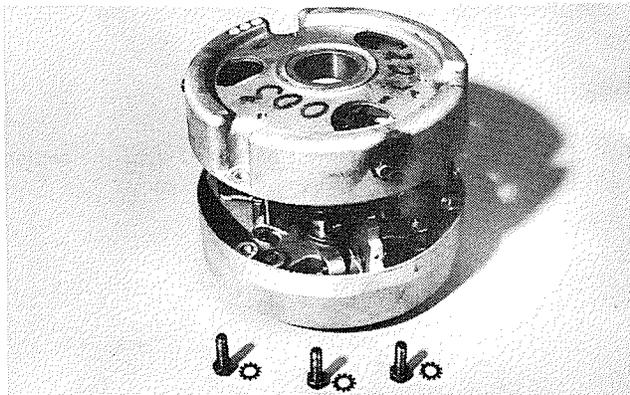


TRANSMISSION (ARCTIC DRIVE)

9. If the dowel pins were removed during disassembly, heat the dowel pin mount in the cover housing with a propane torch and push the dowel pin into the mount as far as possible. **NOTE: Distance from the top of the dowel pin to the top of dowel pin casting mount must be equal for all three dowel pins.**



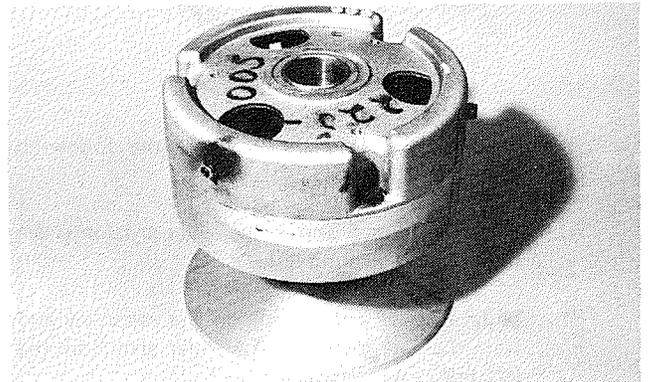
10. Place the cover housing on the spring and line up the alignment detent in the cover housing with those in the movable and stationary sheaves.
11. Lift up on the movable sheave and compress the cover housing. Dowel pins in the cover housing must fit into the dowel pin mounts in the spider assembly.



WARNING

Keep steady pressure on the cover housing to prevent the cover housing from flying off due to unexpected spring release.

12. Secure the cover housing to the movable sheave with the three (3) capscrews and lock washers. Torque the capscrews from 18 - 20 ft. lbs.



Drive Pulley Installation (Arctic)

1. Install the drive pulley on the crankshaft and secure in place with the drive pulley bolt and washer. Torque the drive pulley bolt to 75 ft. lbs.
2. Replace the drive belt (see Drive Belt Installation, page 109).
3. Close or replace the hood, whichever was performed to facilitate drive pulley removal.

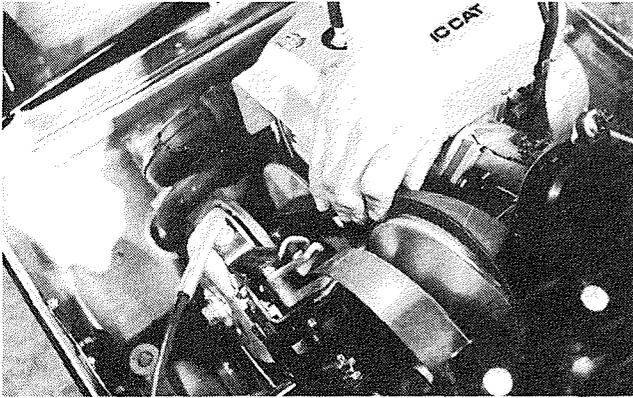
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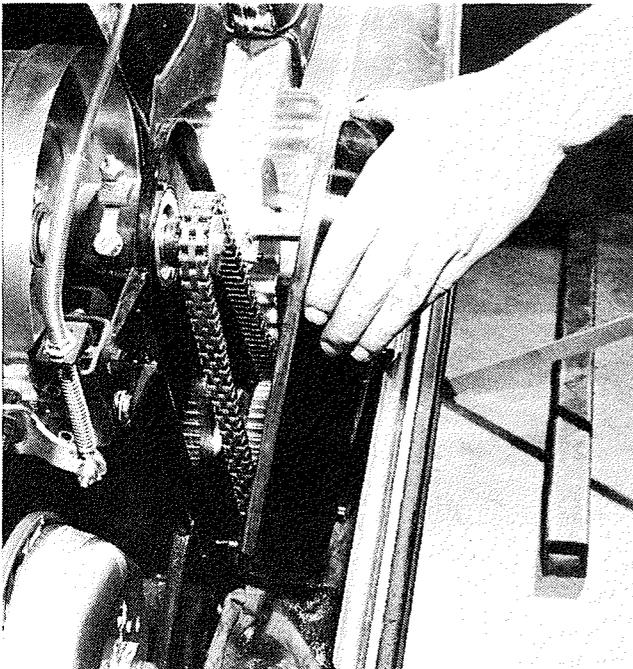
TRANSMISSION (ARCTIC DRIVEN)

Driven Pulley Removal

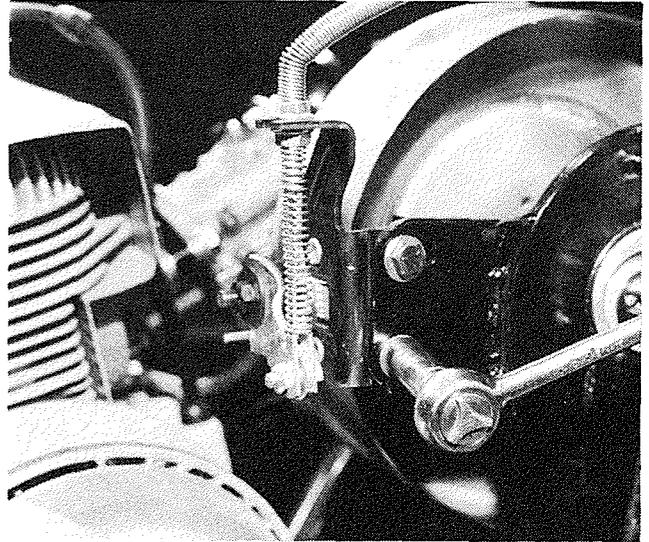
1. Open the hood.
2. Remove the drive belt (see Drive Belt Removal, page 109).



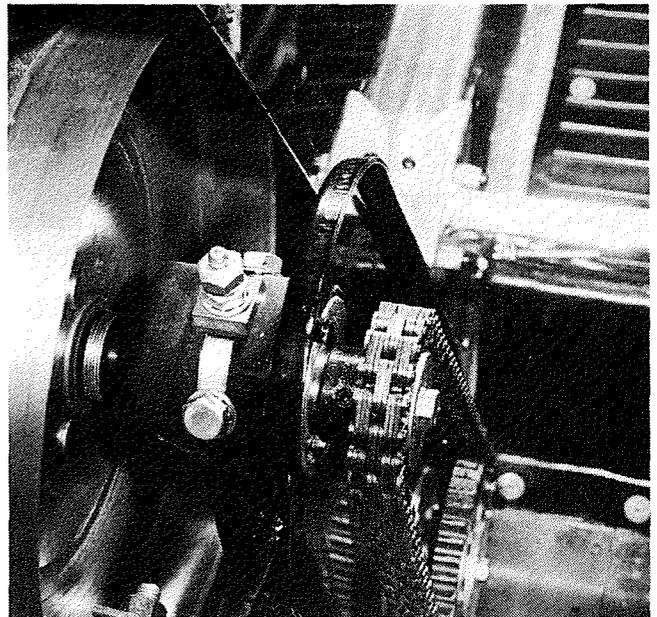
3. Place rags in the belly pan below the dropcase to absorb the chain lube which will flow during dropcase removal.
4. Remove the three (3) thumb screws retaining the dropcase cover to the dropcase mount.
5. Pull the dropcase and gasket away from the dropcase mount. Allow the chain lube to drain onto the rags that were placed in the belly pan.



6. Remove the two (2) capscrews and flat washers retaining the brake assembly to the brake mount plate. Remove the brake assembly.



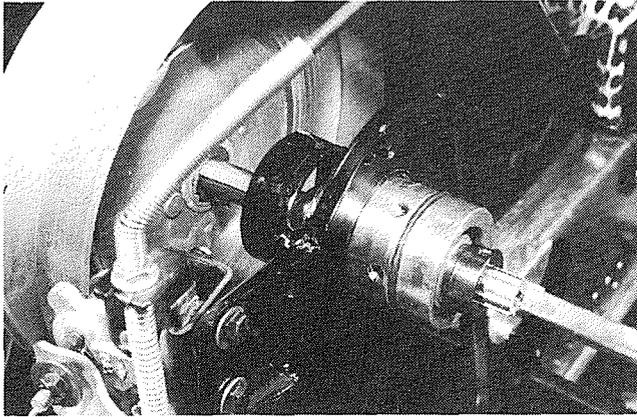
7. Remove the capscrews, lock washers, zerk fitted cap-screw and washer plate from the eccentric bearing. Rotate the eccentric to its lowest point to obtain optimum slack in the drive chain.
8. Remove the 1/2-inch capscrew and flat washer that retain the upper drive sprocket.
9. Pull the sprocket and chain off the eccentric shaft. **NOTE: It may be necessary to use a puller to remove the sprocket.**



10. To remove the driven pulley from the eccentric shaft, remove the cap screw and flat washers securing the driven pulley to the shaft.

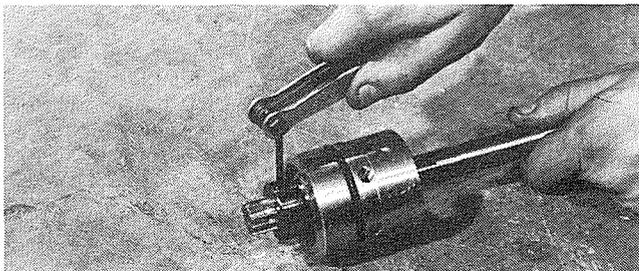
TRANSMISSION (ARCTIC DRIVEN)

11. Grasp the eccentric assembly and pull the eccentric shaft from the driven pulley. **NOTE: Flat washers are positioned on the eccentric shaft and must be retained.**

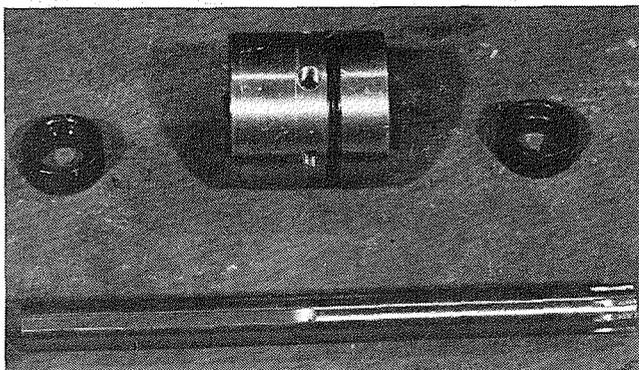


12. Eccentric Servicing — If the eccentric must be serviced, proceed as follows:

- A) Loosen the setscrew from the two lock collars located at both ends of the eccentric.



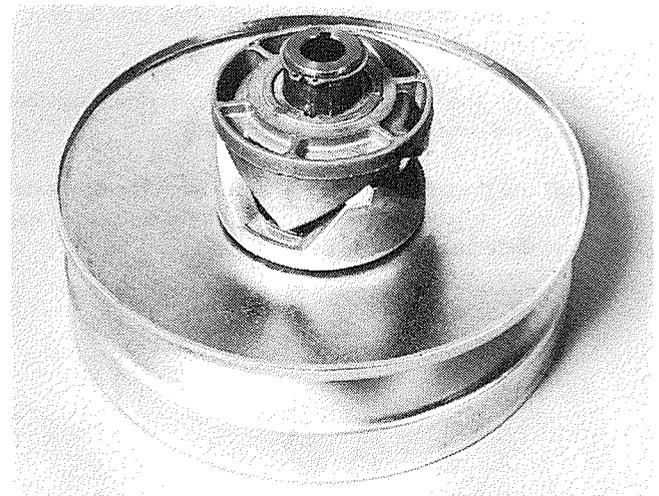
- B) Using a punch and hammer, drive the lock collar in the same direction as normal shaft rotation. **NOTE: Punch must be placed in the lock collar detent for driving purposes.**
- C) Perform step B on the remaining lock collar.
- D) Slide the eccentric shaft from within the eccentric.



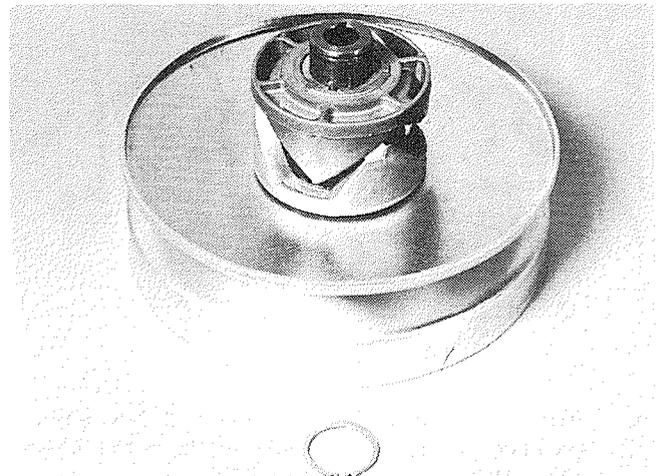
- E) Using hot oil (200°F), heat the entire eccentric. Bearings contained within both ends of the eccentric housing will slide out for servicing procedure.
- F) To assemble the eccentric, use reverse procedure.

Driven Pulley Disassembly (Arctic)

1. Completely release the spring tension from the inside of the torque bracket. **NOTE: A screwdriver may be used to pry the spring.**
2. Position the driven pulley with the fixed face on the working surface. Place heels of hands on the torque bracket and press downward until the keyway in the torque bracket becomes free from the key in the fixed face hub. Rotate the torque bracket to lock under the key.



3. Using a snap ring pliers, remove the snap ring from the fixed face hub.

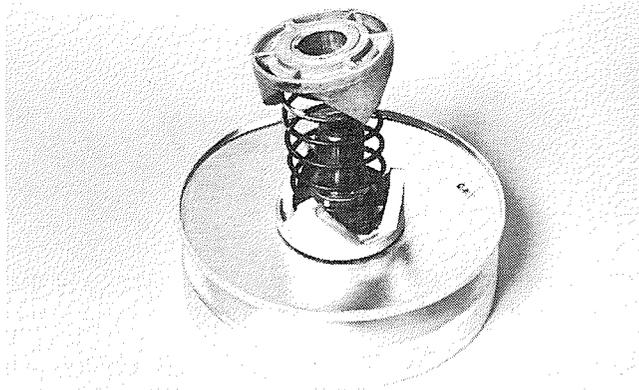


TRANSMISSION (ARCTIC DRIVEN)

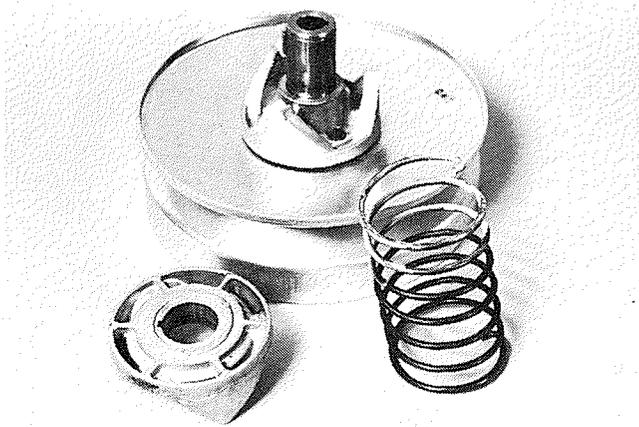
4. Rotate the torque bracket to align the keyway and key; allow the torque bracket and movable face to slide upward.

WARNING

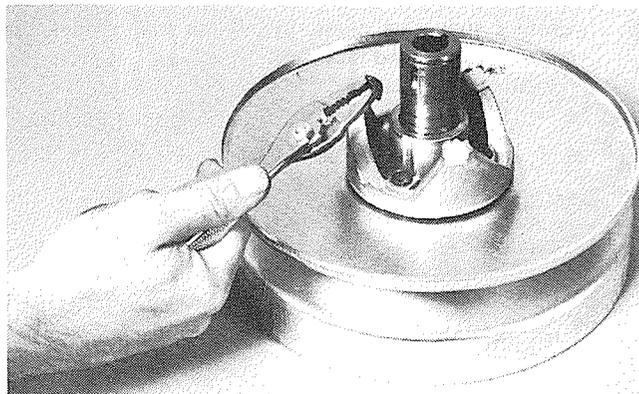
Keep slight downward pressure on the torque bracket to prevent a sudden upward release of the spring.



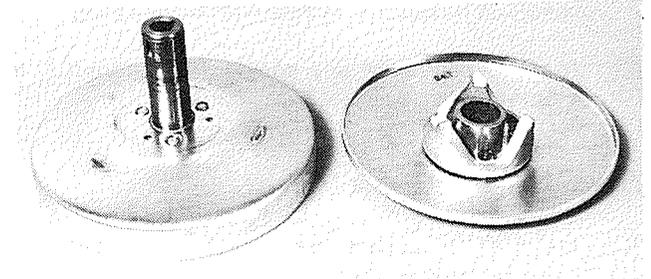
5. Remove the torque bracket and spring.



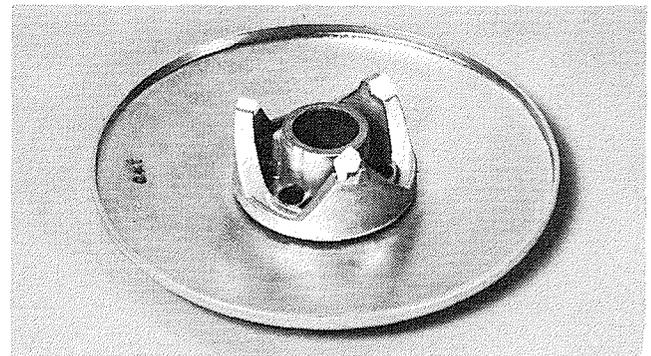
6. Remove the woodruff key from the fixed face hub.



7. Slide the movable face off the fixed face hub.



8. Remove the shoe ramps from the movable face.



Cleaning

1. Clean all foreign matter from shoe ramps with a clean cloth. **CAUTION: DO NOT clean the shoe ramps with solvent; damage to the components may result.**
2. Place remaining components in cleaning solvent and remove all grease and dirt. After cleaning, dry components with compressed air or a dry, clean cloth.
3. Remove rust and drive belt accumulations from the fixed face center hub with a fine grade steel wool. Wipe the fixed face and hub with a dry, clean cloth.
4. Remove rust and drive belt accumulations from the movable face and the fixed face with fine emery cloth. Wipe components with a dry, clean cloth.
5. Remove foreign deposits from remaining components, using a stiff wire brush.

Inspection

1. Inspect the shoe ramps for wear, damage or deterioration. Replace if necessary.
2. Inspect the fixed and movable faces for rough surfaces, grooves or scratches. Use fine emery cloth to repair. Wipe with a dry, clean cloth.

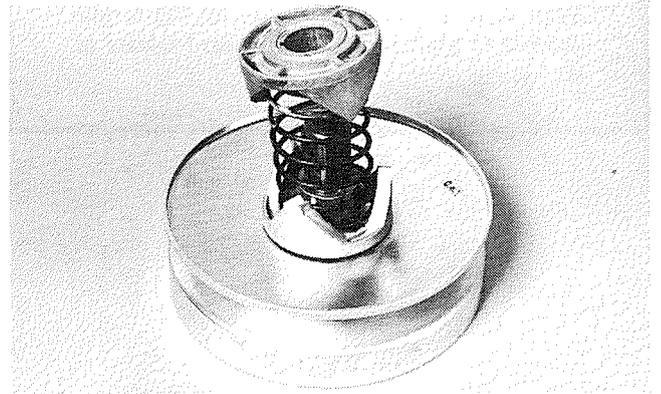
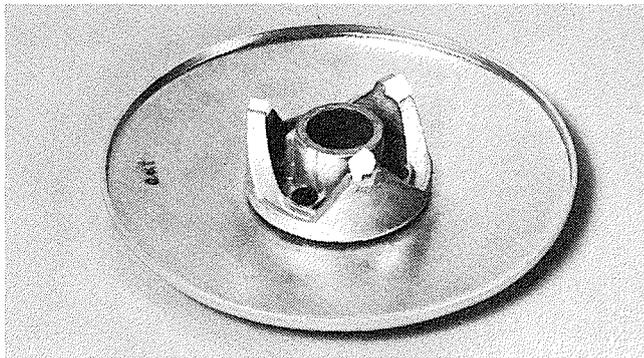
TRANSMISSION (ARCTIC DRIVEN)

3. Check for a broken or distorted spring. If spring condition is doubtful, replace with a new spring.
4. If the condition of any component is doubtful, it should always be replaced.

5. Place the spring over the fixed face hub and hook the end of the spring in against the casting knurl.
6. Position the torque bracket over the top of the spring.

Driven Pulley Assembly (Arctic)

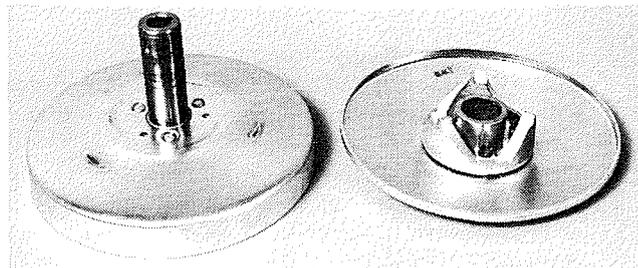
1. Insure all components are clean and defective parts either repaired or replaced.
2. Place the shoe ramps into position on the torque bracket. Tap into place, using a rubber mallet.



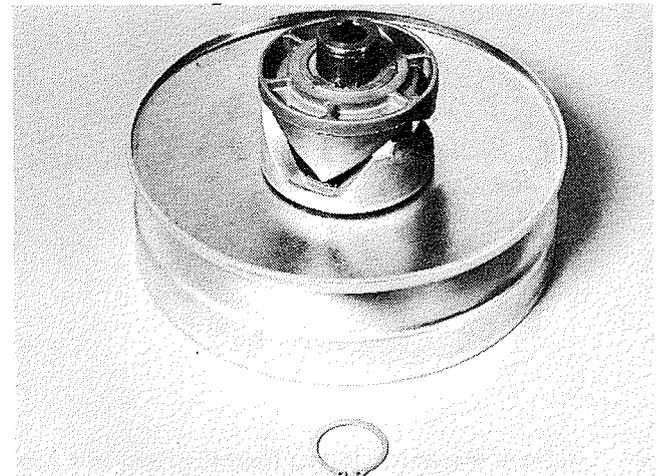
3. Slide the movable face on the fixed face hub.

7. Press down slightly on the torque bracket and pre-load the spring 3/4 turn clockwise.

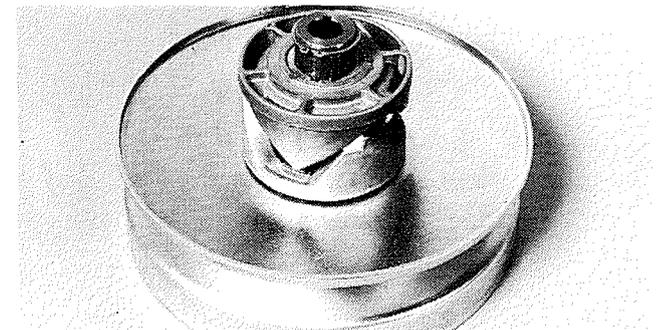
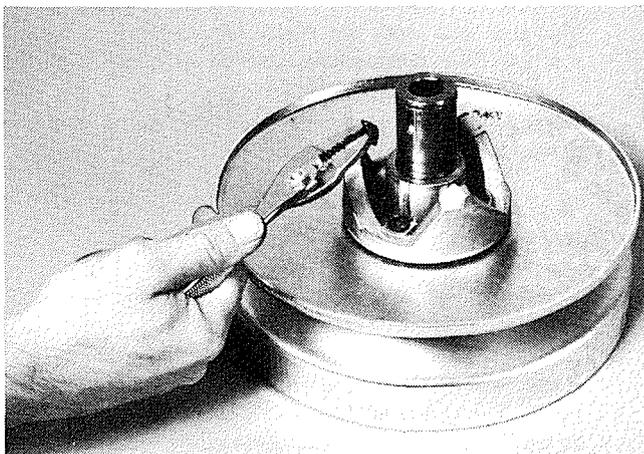
8. Maintaining the spring pre-load, align the key and torque bracket keyway and push the components completely downward. Rotate the torque bracket to lock under key.



4. Install the woodruff key in the fixed face hub. **NOTE:** Insure key is completely seated in the keyway.



9. Using a snap ring pliers, install the snap ring in the groove of the fixed face hub.

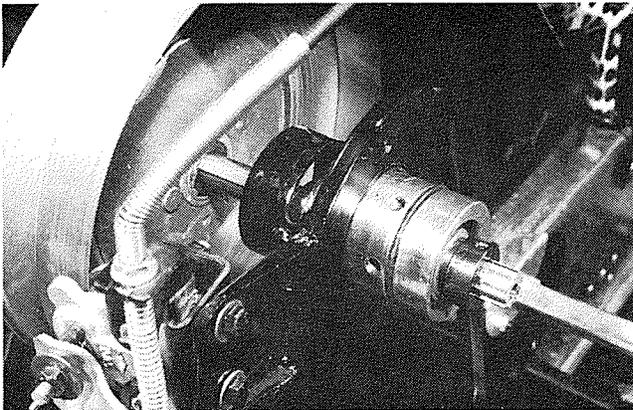


TRANSMISSION (ARCTIC DRIVEN)

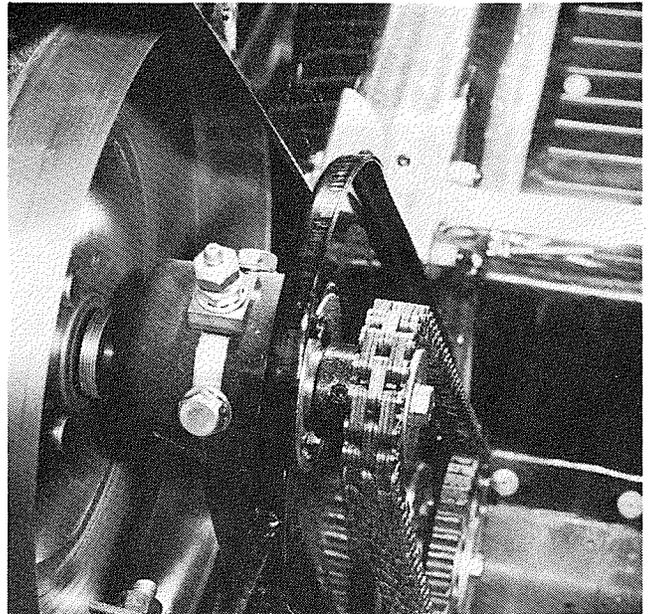
10. Press down on the torque bracket, align the keyway and key and allow the torque bracket to release against the snap ring.

Driven Pulley Installation (Arctic)

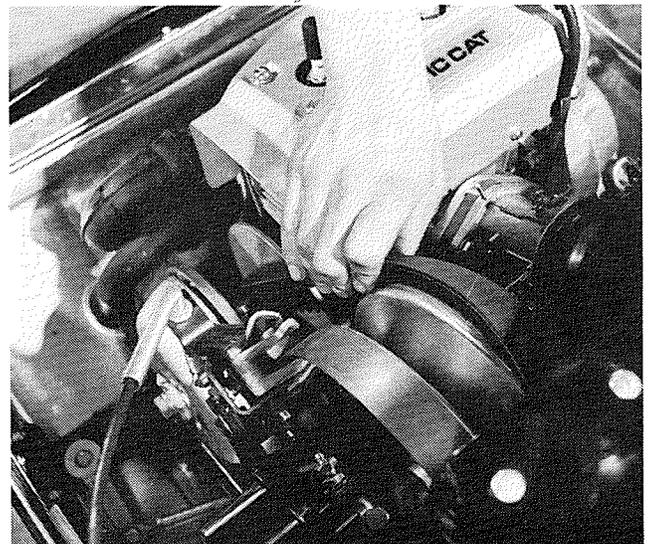
1. Slide the flat washers on the eccentric shaft and place the long key in the eccentric shaft keyway.
2. Position the driven pulley on the inside of the eccentric bearing mount. Slide the keyed end of the eccentric shaft through the eccentric mount and into the driven pulley. **NOTE: The eccentric shaft key must line up with the keyway in the driven pulley.**
3. Secure the driven pulley to the eccentric shaft with the capscrew and flat washer. Torque the capscrew to 12 ft. lbs.



4. Position the chain on the lower drive sprocket and the upper drive sprocket. Slide the upper drive sprocket and chain on the eccentric shaft. Secure the sprocket and chain to the eccentric shaft with the 1/2-inch capscrew and flat washer. Torque the capscrew to 12 ft. lbs. **NOTE: Threaded holes in the eccentric must face upward to be accessible through the eccentric mount slot.**
5. Install the capscrews, lock washers, zerk fitted capscrew and the washer plate to the eccentric. **DO NOT ADJUST OR TIGHTEN THE ECCENTRIC AT THIS TIME.**

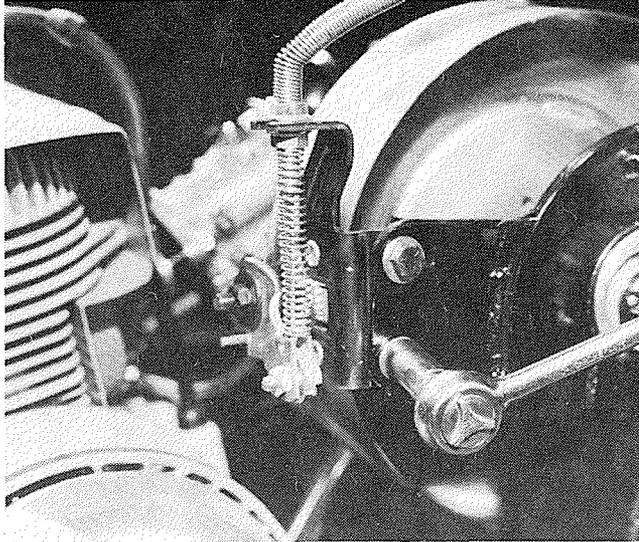


6. Check the position of the eccentric shaft in relation to the eccentric housing. If the shaft position is ahead of center, rotate the eccentric toward the rear of the machine; if the shaft position is to the rear of center, rotate the eccentric toward the front of the machine. When proper chain deflection is obtained (1/4" - 1/2" at mid span), tighten the three (3) capscrews, which will lock the adjustment in place.
7. Install the drive belt (see Drive Belt Installation, page 109).

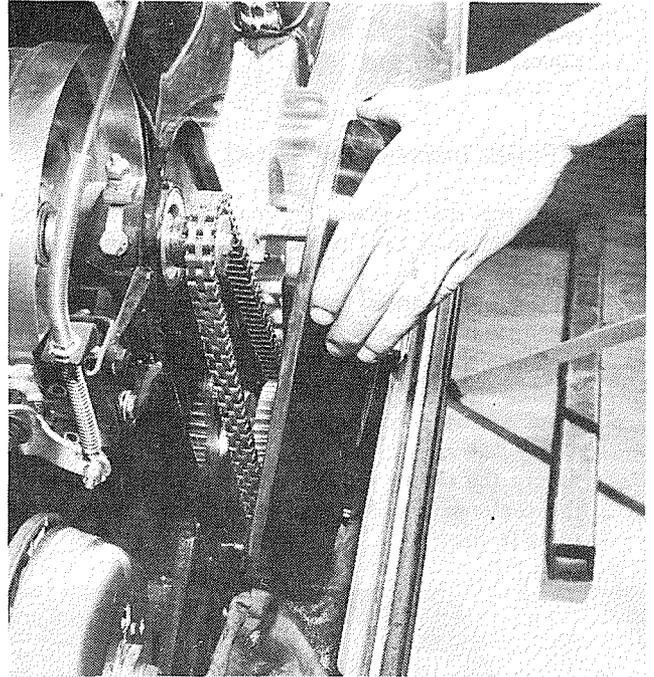


TRANSMISSION (ARCTIC DRIVEN)

8. Install the brake assembly to the brake mount. Secure in place with two (2) capscrews and flat washers.



9. Install the dropcase cover and gasket to the dropcase mount. Secure in place with the three (3) thumb screws.



10. Fill the dropcase with 8 oz. of Arctic Chain Lube.
11. Close the hood.

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SUSPENSION

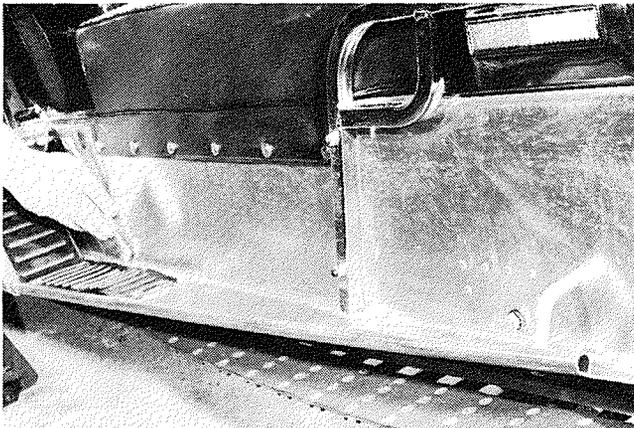
General (Skid Frame)

All Arctic Cat snowmobiles are built with a skid frame and torsion spring suspension system. Skid frame principle: Because of the downward pressure of the skid frame on a maximum track surface, the track rides the top of uneven terrain.

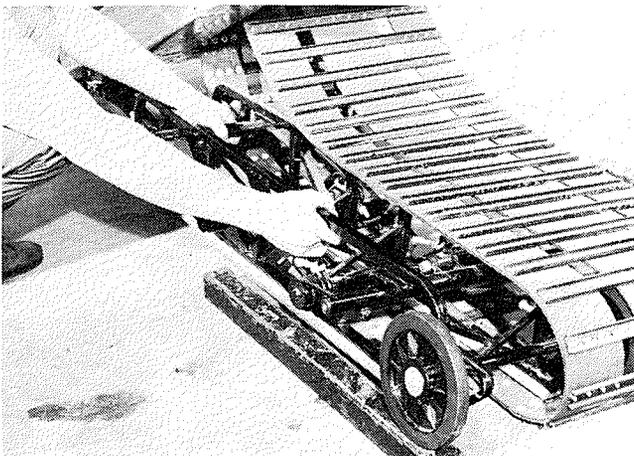
Skid Frame Removal

To completely service or disassemble the skid frame, the skid frame must be removed from the snowmobile body and from between the drive track. To remove the skid frame, proceed as follows:

1. Position the machine on the floor.
2. Disconnect the spark plug lead wires from the spark plugs.
3. Remove the four (4) bolts and lock washers that secure the skid frame to the sides of the body.

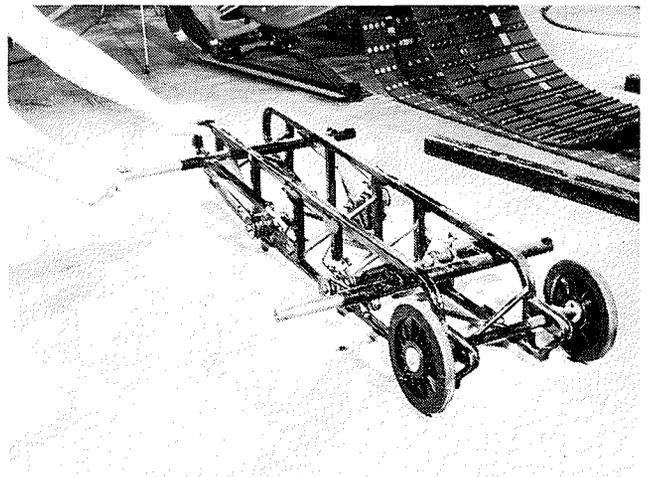


4. Using a winch hoist, raise the rear of the machine off the floor approximately two (2) feet.
5. Grasp the skid frame and pull it from between the track.

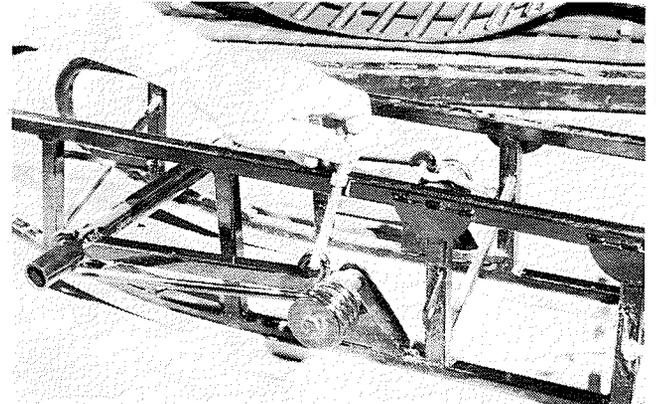


Skid Frame Disassembly

1. Position the skid frame so that the hi-fax slides are facing upward.
2. Examine the hi-fax slides and replace if worn or damaged. **NOTE: If the rivet heads securing the hi-fax slide to the skid frame is flush with the surface of the hi-fax, replacement is necessary.**
3. To remove the hi-fax from the skid frame, cut the rivets by placing a sharp chisel between the hi-fax and the skid frame. With the cutting edge of the chisel against the rivet, give the end of the chisel a solid blow with a hammer. Continue this procedure until all rivets and the hi-fax slides have been removed. **NOTE: Insure that rivet holes in skid frame are free from rivet pieces.**
4. Continuing the disassembly of the skid frame, remove both the inner axles from the front and rear arms.

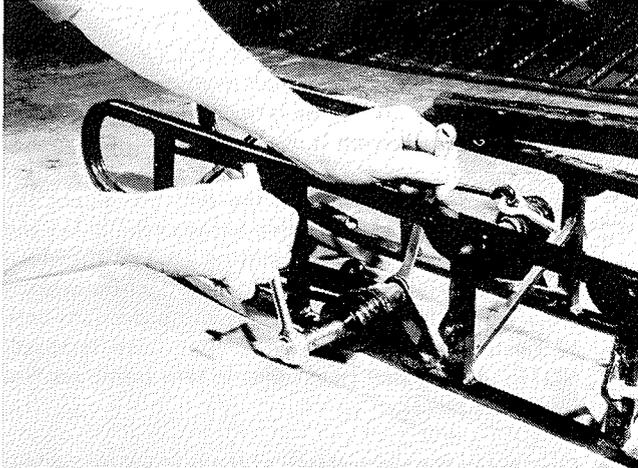


5. Release the spring tension on the front arm by removing the nuts on the ends of the eyebolts. **NOTE: To break the nut loose it may be necessary to hold the inside eyebolt nut with a wrench.**
6. Remove the eyebolts from the front spring hooks.

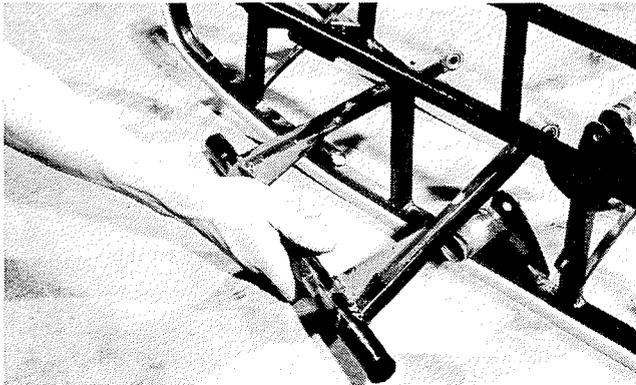


SUSPENSION

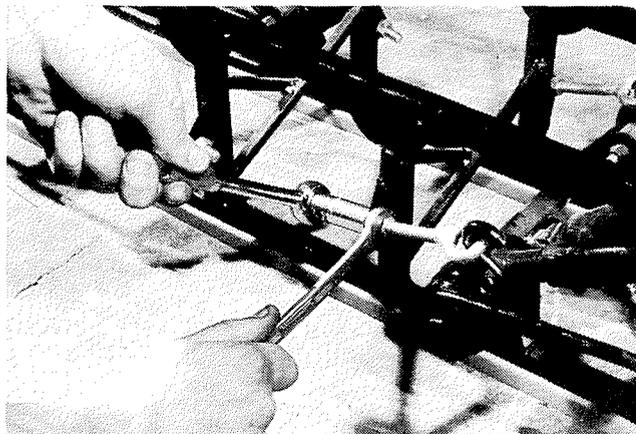
7. Disassemble the two (2) front springs and front arm by removing the bolts, flat washers, and locknuts from the skid frame assembly.



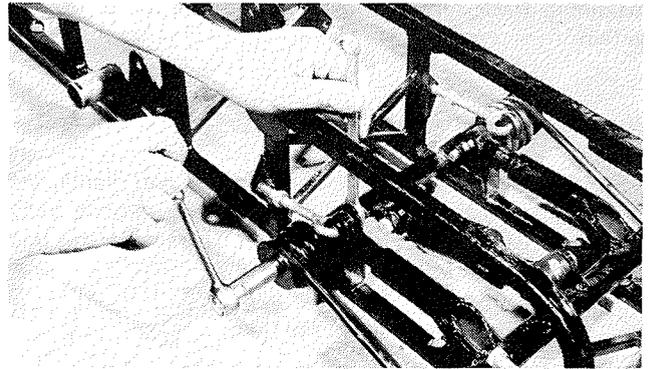
8. Rotate the front arm to the side and remove it from the inside of the skid frame. Note the two (2) bushings in the front arm extension; replace if bushings are damaged or worn.



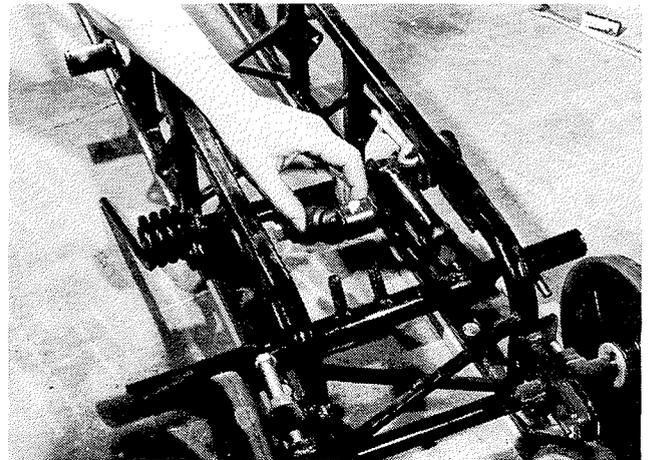
9. Release the spring tension on the rear arm by removing the nuts on the ends of the eyebolts. **NOTE:** To break the nuts loose it may be necessary to hold the inside eyebolt nut with a wrench.



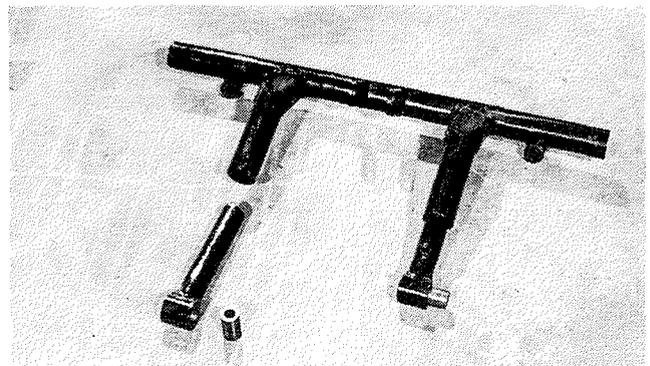
10. Remove the eyebolts from the rear spring hooks.
11. Disassemble the two (2) rear springs and rear arm by removing the bolts, flat washers, and locknuts from the skid frame assembly.



12. Remove the bolt and locknut securing the top of the shock absorber to the cross member of the rear arm.

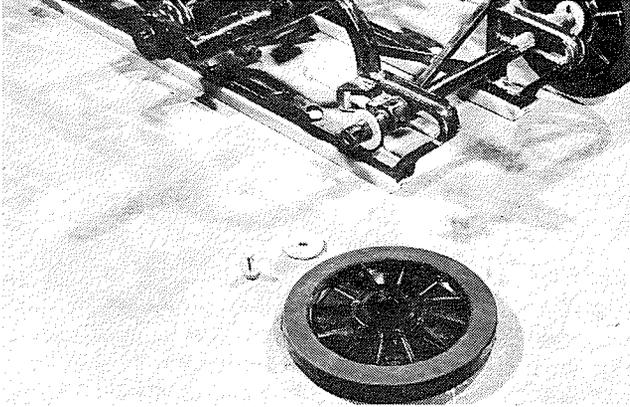


13. When the top of the shock absorber is disconnected from the rear arm, remove the rear arm assembly from the skid frame. Separate the inside arms from the rear arm assembly. Note the two (2) bushings in the inside arms; replace if bushings are damaged or worn.

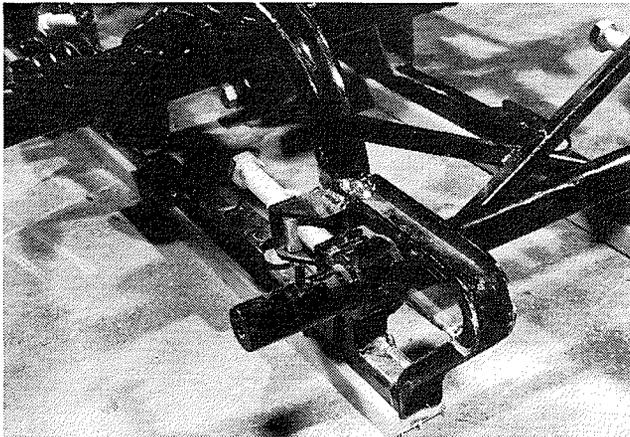


SUSPENSION

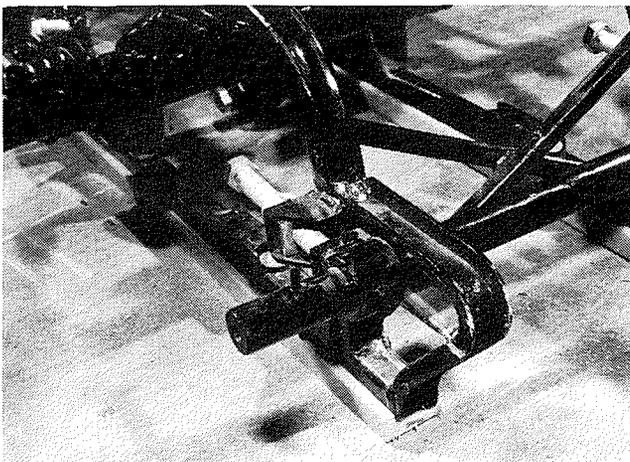
14. Disassemble the two (2) rear idler wheels from the rear wheel axle by removing the bolts and flat washers securing the rear idler wheels to the axle. **NOTE: If the rear idler wheels are worn or damaged, replace the wheel(s) as one component part.**



15. Loosen the two (2) track tension adjusting bolts until both rear axle spacers are free from the adjusting bolts.



16. Pull the two (2) roll pins from the rear axle. Loosen the rear axle spacer set screws and slide spacers off the axle.



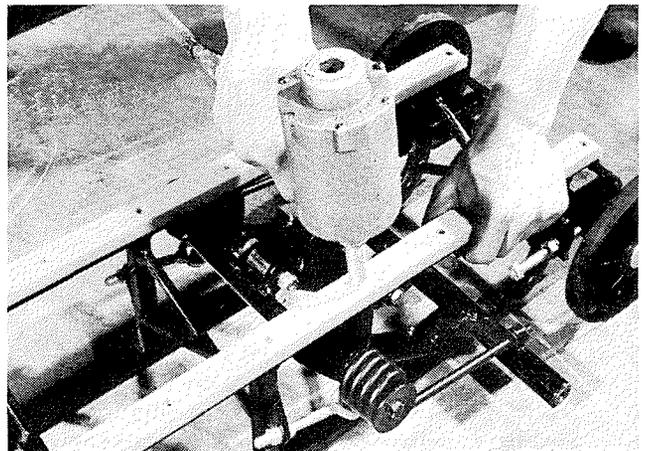
17. Pull the rear wheel axle from between the axle slide of the skid frame.

Inspection

1. After the skid frame has been disassembled, inspect all fasteners and threaded parts for thread damage; replace if damaged.
2. Check all bushings for wear and defects; replace if damaged.
3. Inspect all component parts for cracks, wear, poor weldments, and any other defect which may be evident.

Skid Frame Assembly

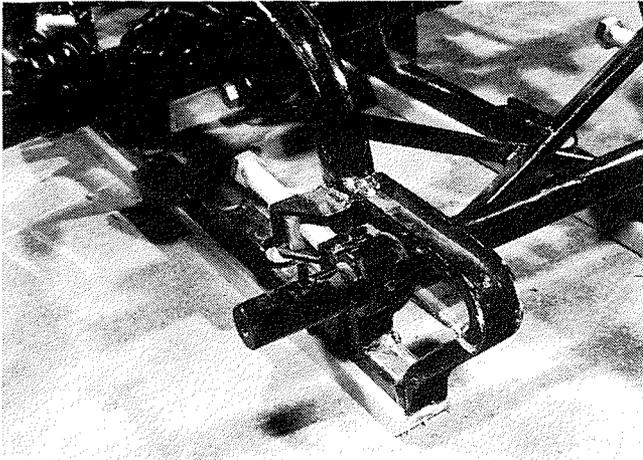
1. Insure that the skid frame and the component parts have been cleaned and inspected for possible damage and defects.
2. Replace the hi-fax slide to the skid frame rails, using the following procedure: **NOTE: Hi-fax slides must be at room temperature (70°) to insure correct replacement and for ease of installation to the skid frame rails.**
 - A) Insure the rails of the skid frame are clean.
 - B) Secure the new hi-fax slide to the front (curved end) of the skid frame rail with a rivet.
 - C) With the hi-fax slide secured to the front of the skid frame by a rivet, carefully heat the hi-fax with a propane torch and bend hi-fax into position on the curved end of the skid frame. Continue to secure hi-fax in place with rivets; heat hi-fax as necessary.
 - D) Continue to secure the hi-fax to the remainder of the skid frame rail.



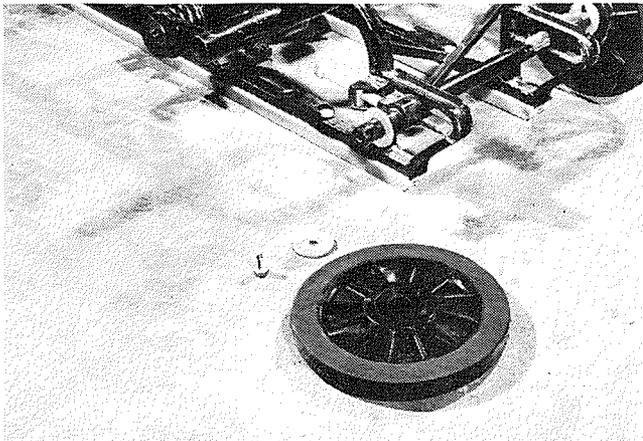
SUSPENSION

E) Perform steps B, C, and D on the opposite skid frame rail.

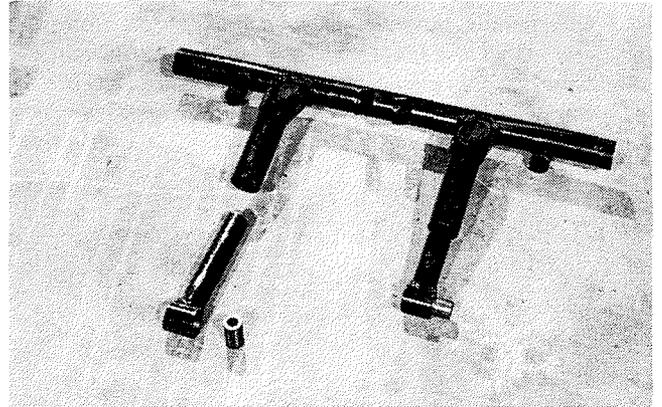
3. Replace the rear wheel axle between the skid frame slides.
4. Slide the two (2) rear axle spacers on the rear axle. To obtain the correct positions for the rear axle spacers, the distance from the side of the spacers to the end of the rear axle must be equidistant. Spacers must be positioned against the axle slide to obtain an accurate measurement.
5. When rear axle spacers are properly positioned, secure in place on the axle with the spacer set screws.
6. Replace the two roll pins on the rear axle.



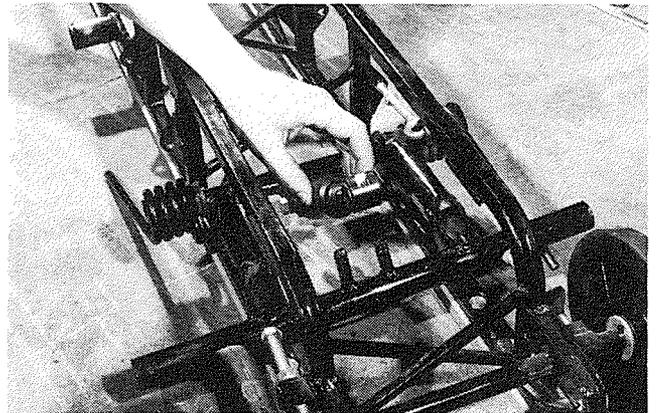
7. Place a flat washer on both ends of the rear axle and slide the rear idler wheels into position. Secure rear idler wheels to the rear axle with flat washers and bolts.



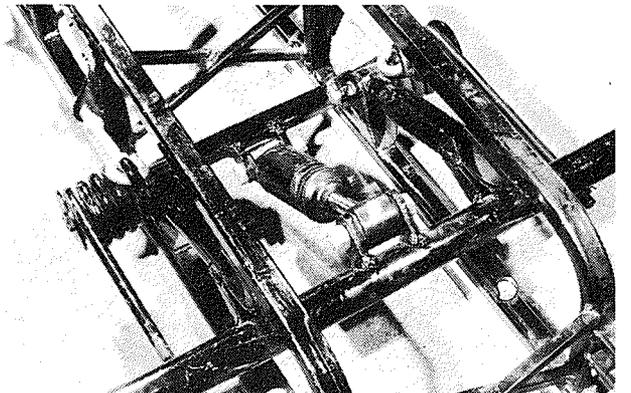
8. Assemble the inside rear arms to the rear arm and install the assembly in position on the skid frame. DO NOT secure in place. NOTE: Insure that shock absorber mounting ear on the rear arm faces upward.



9. Slide the end of the rear springs into the spring retainer of the rear arm. Note the bushings in the spring retainer. With both springs in position, secure assembly in place with flat washers, bolts, and locknuts. NOTE: The hooked end of the rear spring must be facing to the inside of the skid frame.



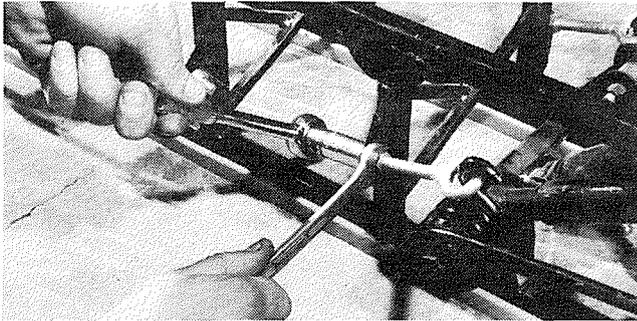
10. Secure the shock absorber to the rear arm with a bolt and locknut.



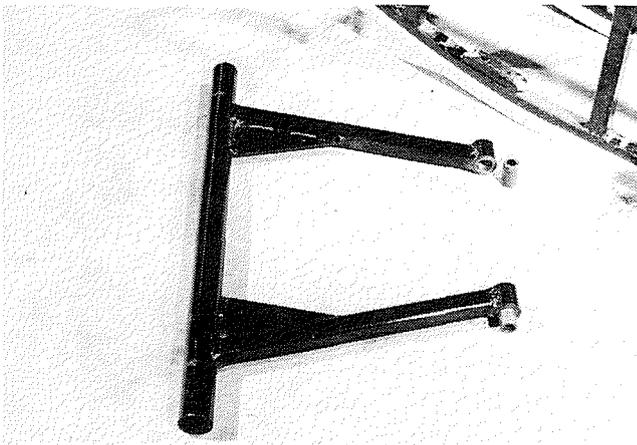
11. Replace the eyebolts on the rear spring hooks.
12. With an eyebolt nut threaded half the distance on both eyebolts, insert the end of the eyebolt through the skid frame bracket.

SUSPENSION

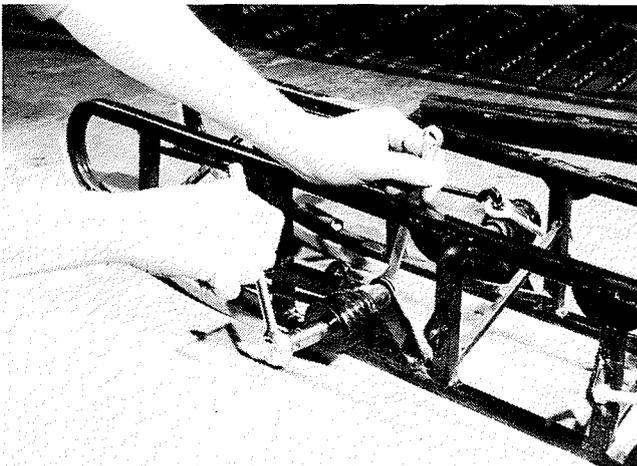
13. Install a nut on the end of the eyebolt and adjust each side evenly. Spring tension should be evident. Lock adjustment into position by bottoming out the eyebolt nuts on the skid frame bracket.



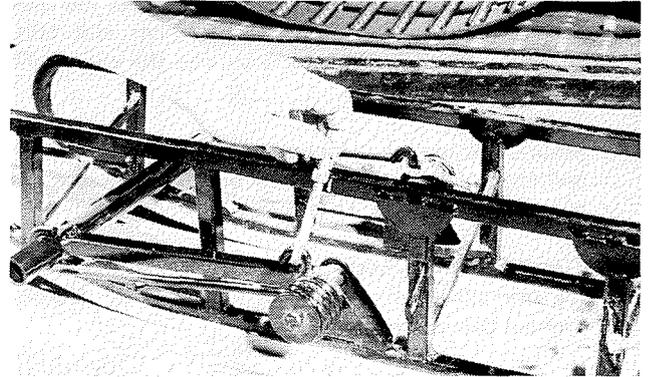
14. Check the insert pivots and the bushings of the front arm; replace if damaged. Position the front arm on the inside of the skid frame.



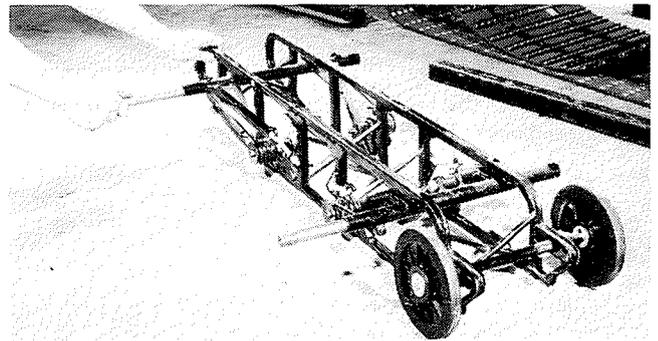
15. Position the long spring hook end around the front arm and secure assembly in place with flat washer, bolt, and locknut. **NOTE: Spring hook for eyebolt must face the inside of the skid frame.**



16. Replace the eyebolts on the front spring hooks.

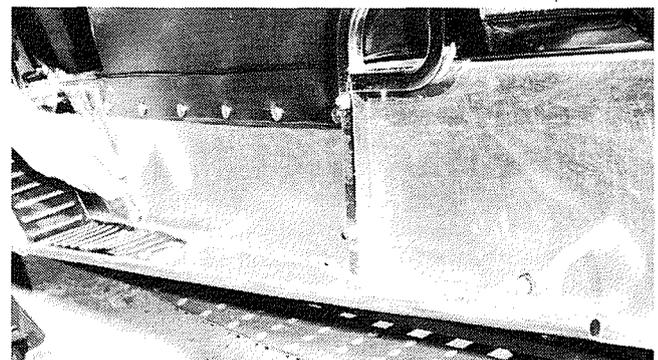


17. With an eyebolt nut threaded half the distance on both eyebolts, insert the end of the eyebolt through the skid frame bracket.
18. Install a nut on the end of the eyebolt and adjust each side evenly. Spring tension should be evident. Lock the adjustment into position by bottoming out the eyebolt nuts on the skid frame bracket.
19. Replace the front and rear inner axles in the front and rear arms.



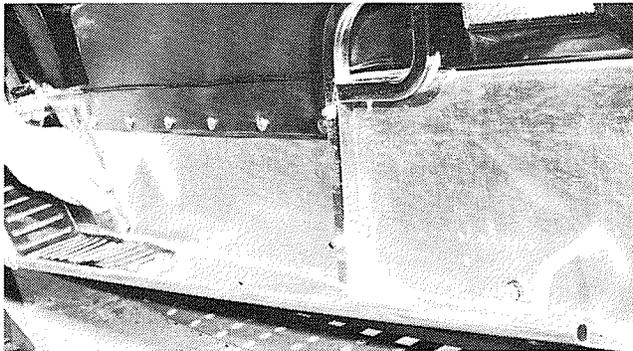
Skid Frame Installation

1. Position the machine on its recoil side. With the rear idler wheels in a fully released position, slide the skid frame within the track.
2. Secure one side of the front axle with a lock washer and bolt. **NOTE: Thread the bolt halfway into the axle shaft. DO NOT TIGHTEN!**

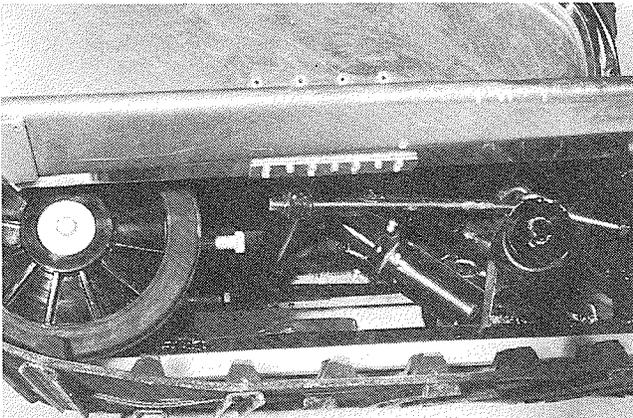


SUSPENSION

3. Tip the machine on its PTO side and secure that side of the front axle with a lock washer and bolt. **NOTE: Thread the bolt halfway into the axle shaft. DO NOT TIGHTEN!**
4. Secure the rear skid frame axle with a lock washer and bolt. **NOTE: Thread the bolt halfway into the axle shaft. DO NOT TIGHTEN!**
5. Tip the machine back on the recoil side and secure the rear axle with a lock washer and bolt. **NOTE: Tighten bolt securely.**
6. Position the machine right side up and tighten the remaining front and rear axle bolts.



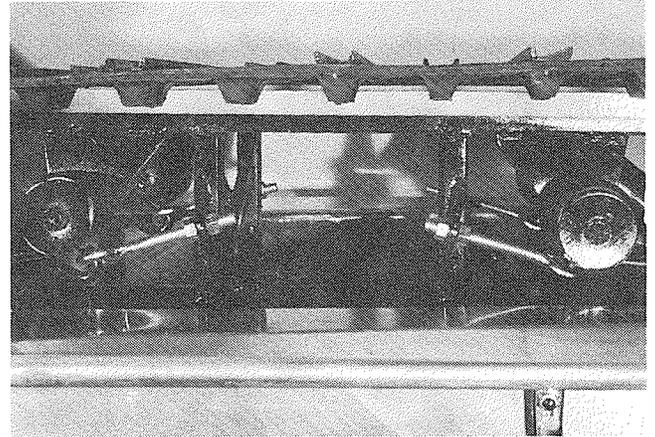
7. Lubricate the rear suspension arms with low temperature grease (Texaco 2346 EP or equivalent).



8. Correctly set the track tension (see Suspension [Track Tension], page 156).
9. Properly align the track (see Suspension [Track Alignment], page 158).
10. Connect the spark plug lead wires to the spark plug.
11. Set the suspension for related snow conditions and operator weight (see Suspension [Suspension Adjustment], page 148).

Suspension Adjustment

A soft or firm ride can be obtained by adjusting the two (2) bolts located on each side of the suspension frame. The rear adjustment should be made for the weight of the operator to prevent "bottoming" on all but the most severe bumps. The front adjustment should be made for snow conditions in your area.



SUSPENSION

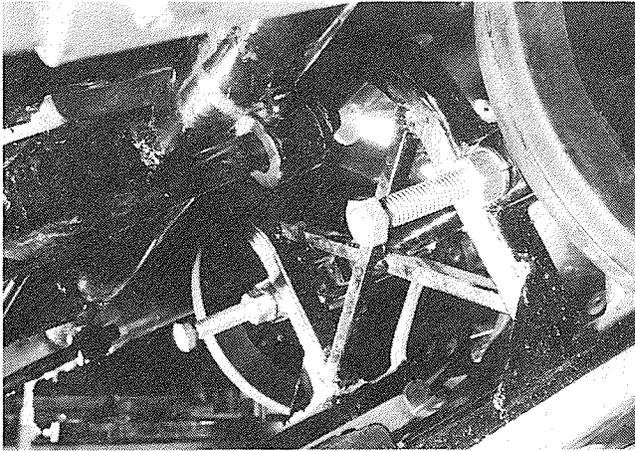
General (Rear Idler Wheel)

The rear idler wheels in conjunction with the track tension adjusting bolts provide proper track tension and alignment. The tension and alignment may be incorrect if the rear wheels are damaged or worn. Should this be the case, it may be necessary to replace the rear idler wheels.

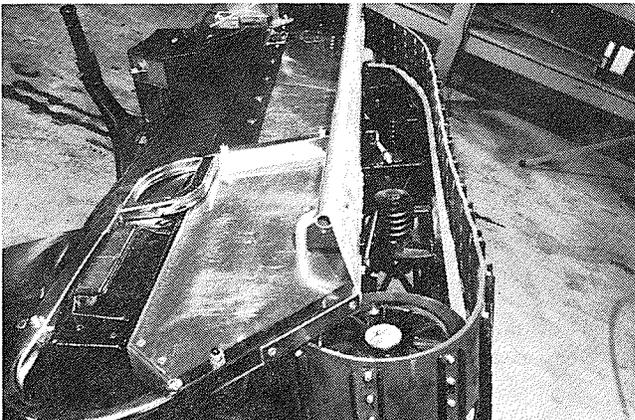
Rear Idler Wheel Removal

To replace the rear idler wheels, proceed as follows:

1. Position the machine on the floor.
2. Disconnect the spark plug lead wires from the spark plugs.
3. Using a winch hoist, raise the rear of the machine off the floor approximately two (2) feet.
4. Release the track tension to its absolute minimum by completely loosening the two (2) tension adjusting bolts.

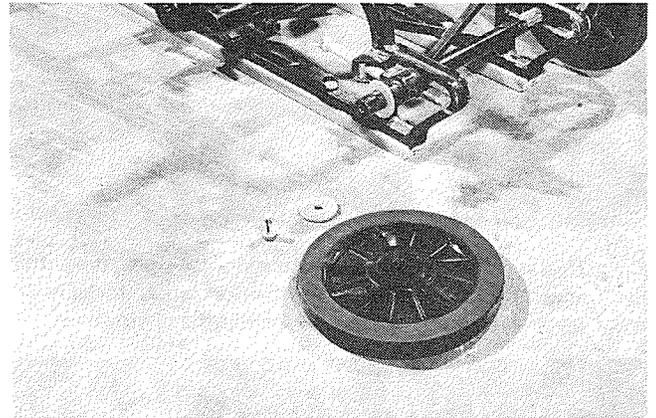


5. After track tension has been released, remove the bolt and flat washer retaining the rear idler wheels to the rear axle. Remove rear idler wheels.



Rear Idler Wheel Installation

1. Install a new rear idler wheel to the rear axle and secure in place with a flat washer and bolt. **NOTE: When installing a new wheel to the rear axle, it may be necessary to pull the track rearward to allow sufficient clearance for rear wheel installation.**



2. Correctly set the track tension (see Suspension [Track Tension] , page 156).
3. Properly align the track (see Suspension [Track Alignment] , page 156).
4. Lower the machine to the floor.
5. Connect the spark plug lead wire(s) to the spark plug(s).

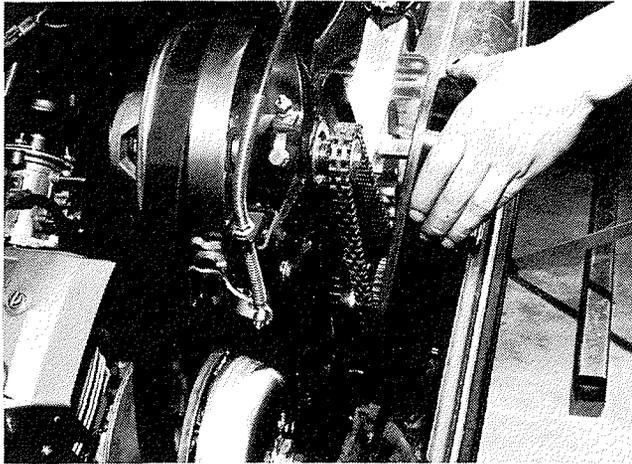
General (Track Drive)

The drive shaft assembly, using power from the engine and transmitted through the drive chain, propels the track at various speeds. If the drive shaft assembly is damaged or defective, the total performance of the machine will be greatly hindered.

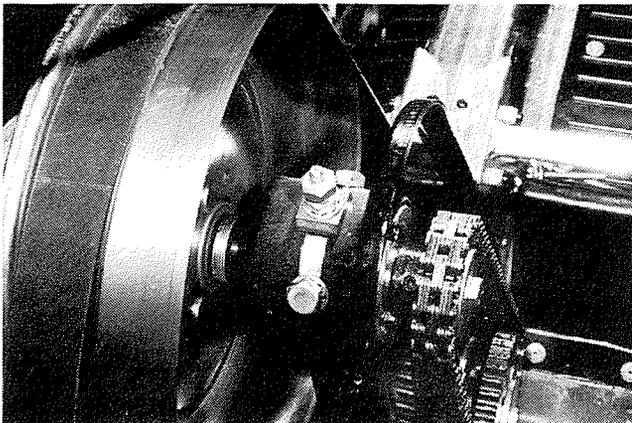
Track Drive Removal

1. Open or remove the hood, whichever will better facilitate drive shaft removal and servicing. If the hood is removed, the headlight harness must be removed first.
2. Place rags below the dropcase to absorb the oil when dropcase is removed.
3. Remove the three (3) thumbscrews and rubber washers securing the dropcase cover. Pull dropcase cover and gasket away from the dropcase mount. Oil will now flow from the dropcase onto the rags placed in the bottom of the belly pan.

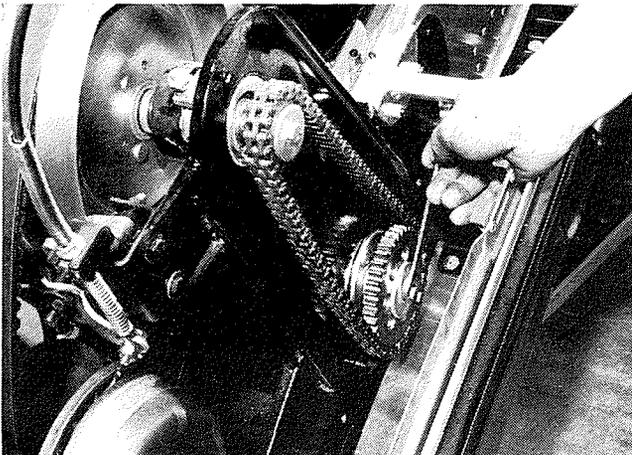
SUSPENSION



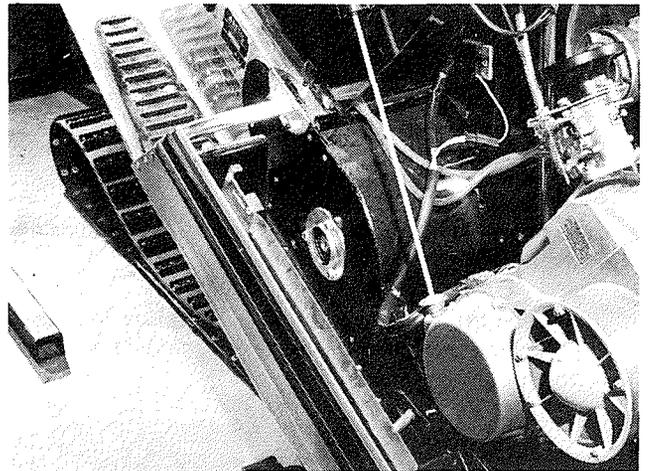
4. Release the drive chain tension by loosening the eccentric bolts. Slide the eccentric either forward or backward until slack is obtained in the chain.



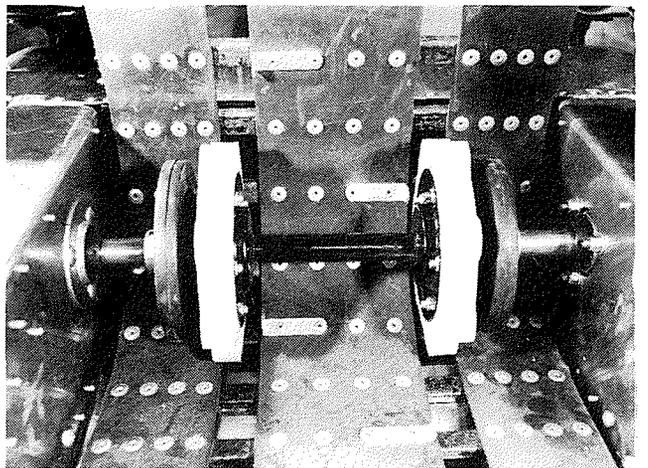
5. Remove the skid frame (see Suspension [Skid Frame Removal], steps 1 - 5, page 143).
6. Remove the bolt and large flat washer from the end of the drive shaft. Using a regular three-pronged puller, pull the lower drive sprocket off the splined end of the drive shaft.



7. If the machine is equipped with a speedometer, remove the drive head and disconnect the coupling cable from the drive shaft.
8. Move to the recoil side of the engine. Disassemble the bearing retainer plate from the inside of the front end assembly by removing the three (3) carriage bolts and locknuts. **NOTE:** Carriage bolt heads are located inside of the front end assembly; locknuts are located on the outside.

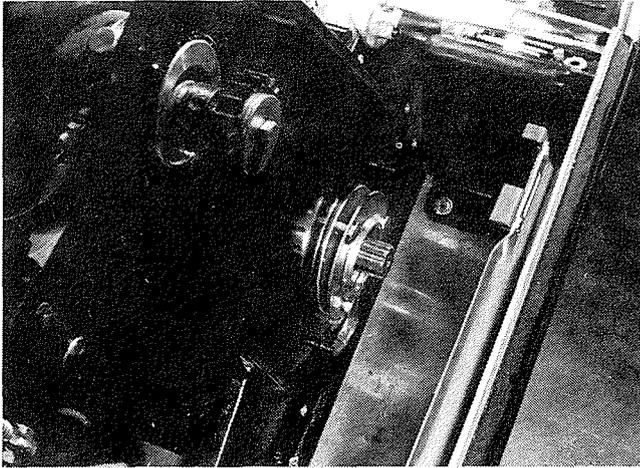


9. Carefully tip the machine on its recoil side.
10. Locate the drive shaft bearing and lock collar on the dropcase end of the drive shaft and loosen the lock collar set screw. Using a punch and hammer, rotate the lock collar in the opposite direction of normal shaft rotation to unlock the bearing.

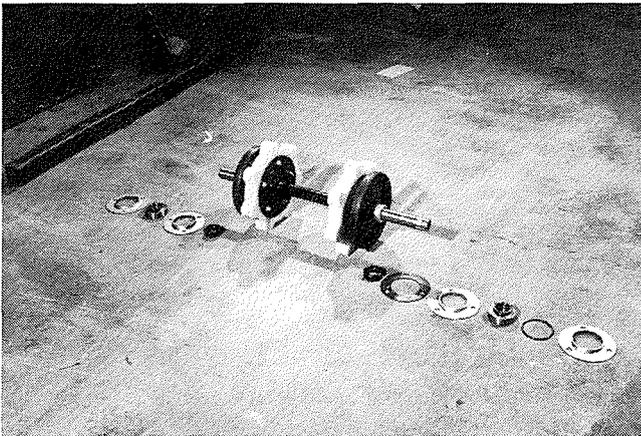


11. Disassemble the bearing retainer plate from the drive shaft and front end assembly by removing the three (3) carriage bolts, flat washers, and locknuts. **NOTE:** Locknuts and washers are located inside of the front end assembly.

SUSPENSION

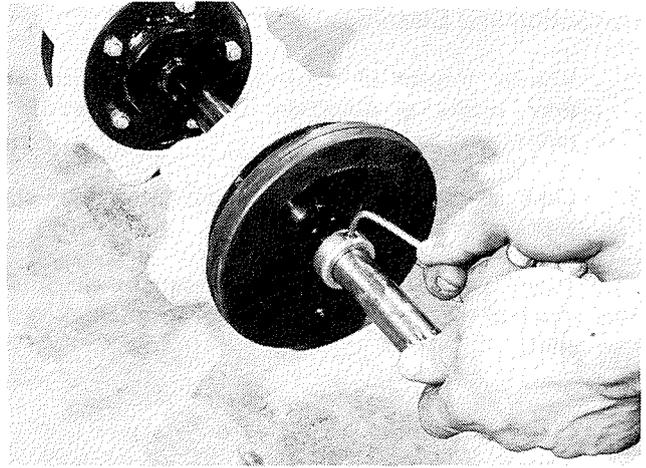


12. Remove the bearing retainer plate, "O" ring, bearing, lock collar, retainer plate, and the bearing retainer plate gasket. **NOTE: Insure "O" ring and gasket are not damaged.**
13. Lift the entire drive shaft assembly upward and pull bottom end outward. Slide the complete drive shaft assembly and the track out of the front end assembly. Bearing retainer plate on recoil side of drive shaft will be loose and possibly fall off the shaft. Remove the drive shaft assembly from the confines of the track.

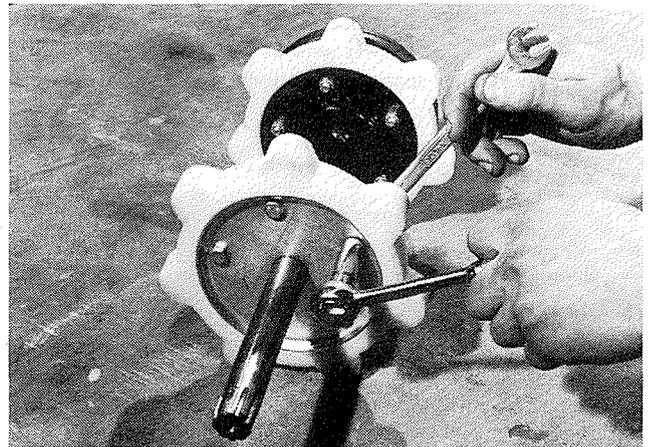


Track Drive Disassembly

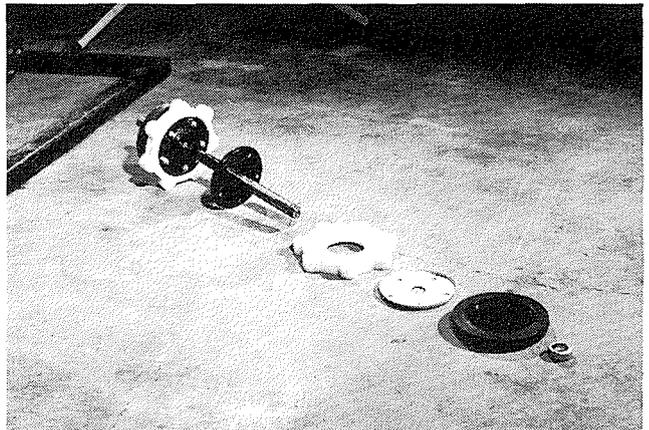
1. Locate the bearing and lock collar on the recoil side of the drive shaft and loosen the lock collar set screw. Using a punch and hammer, rotate the lock collar in the opposite direction of normal shaft rotation to unlock the bearing.
2. Remove the bearing lock collar and the inner bearing retainer plate from the drive shaft.
3. Remove the front idler wheel by loosening the set collar set screw; slide set collar and idler wheel off the drive shaft.



4. Perform step 3 on opposite front idler wheel.
5. Disassemble the track drive sprocket from the drive shaft assembly by removing the five (5) bolts and locknuts.



6. Slide the sprocket flange plate and the track drive sprocket off the drive shaft.



7. Perform step 6 on opposite track drive sprocket.

SUSPENSION

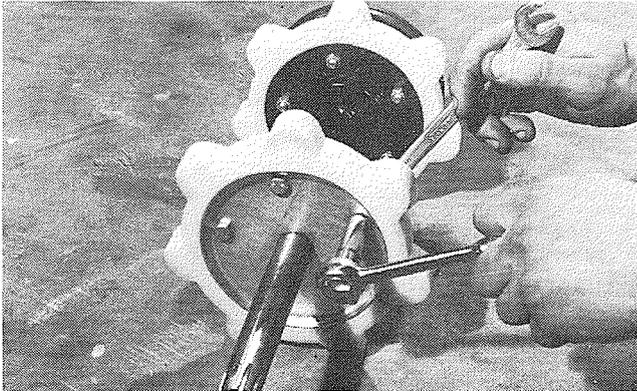
Inspection and Cleaning

1. Visually inspect all component parts for damage, wear, cracks, or distortion. If damage is evident, replace with a new part.
2. Clean all grease, dirt, and foreign matter from the entire track drive assembly.

CAUTION: DO NOT use cleaning solvents on the front idler wheels or the track drive sprockets; permanent damage may result.

Track Drive Assembly

1. Insure all component parts have been inspected for damage and properly cleaned. Replace damaged or worn parts.
2. Slide the track drive sprocket and the sprocket flange plate into position on the drive shaft assembly. Flange plate must be installed with lip facing outward. Secure in place with five (5) bolts and lock-nuts. **NOTE: Bolts should be tightened evenly to insure proper seating and alignment of the track drive sprocket.**
3. Perform step 2 on the opposite track drive sprocket.



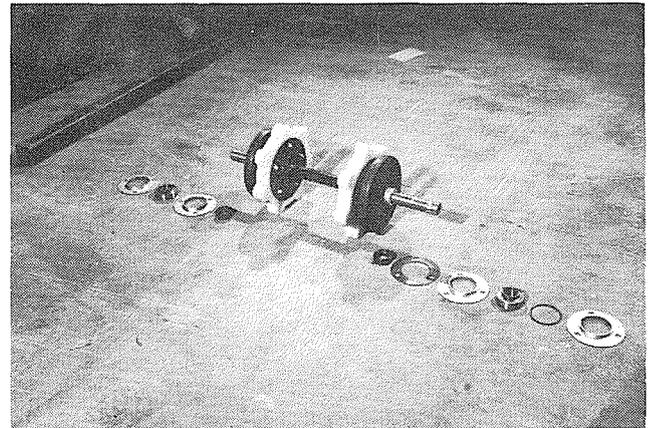
4. Install the front idler wheel on the drive shaft assembly with the longest end of the idler collar facing inward. Slide the set collar against the idler wheel and lock into place by tightening the set screw.



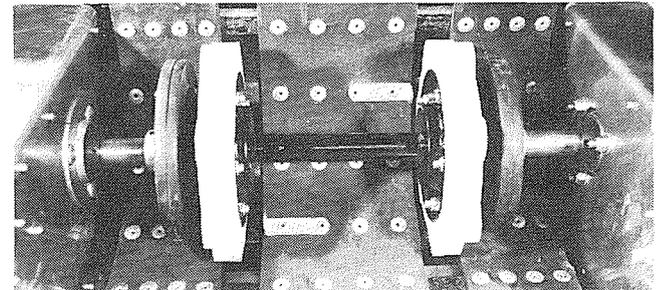
5. Perform step 4 on the opposite front idler wheel.

Track Drive Installation

1. On the splined end of the drive shaft assembly, install a bearing retainer plate (lip facing inward), a lock collar, bearing (race facing inward), "O" ring, bearing retainer plate (lip facing outward), and gasket. DO NOT secure any of these components in place at this time.
2. Position the track in the front end assembly.
3. While holding the components on the drive shaft, slide the splined end through the hole in the front end assembly. Splined end of drive shaft must be installed on PTO side of front end assembly.
4. Install the opposite end of the drive shaft through the hole on the recoil side of the front end assembly.
5. Position the bearing retainer plate (lip facing inward), lock collar, bearing (race facing inward), and the remaining bearing retainer plate (lip facing outward) on the drive shaft.



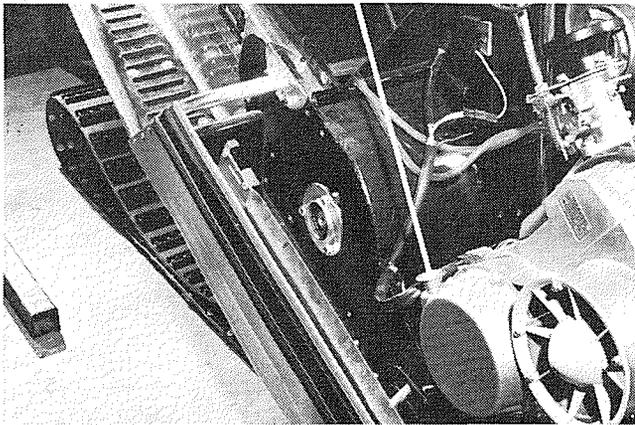
6. Secure the bearing retainer plates to the front end assembly with the three (3) carriage bolts, washers, and locknuts. **NOTE: Washers and locknuts must be installed on the inside of the front end assembly.**



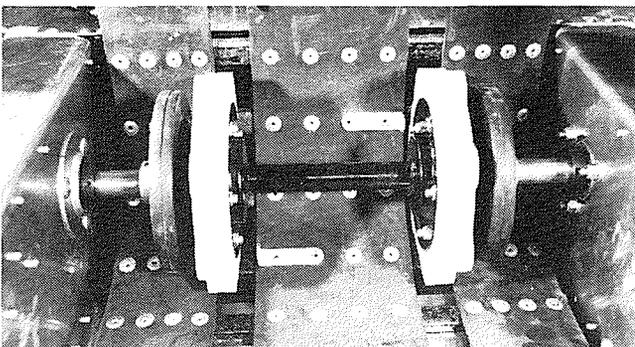
Retain in place with three (3) carriage bolts and nuts. Install nuts on outside of front end assembly. DO NOT TIGHTEN.

SUSPENSION

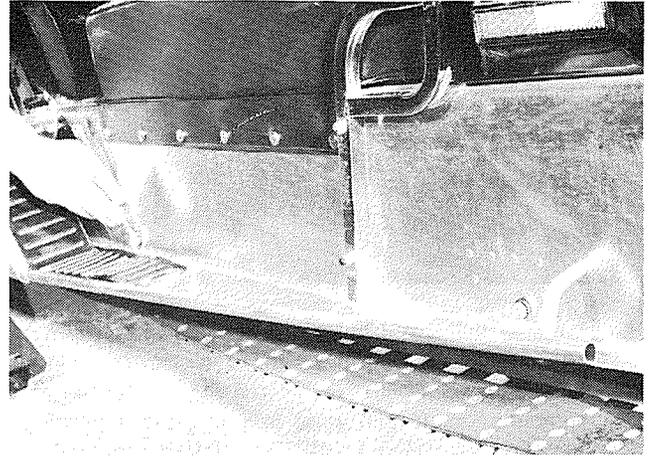
7. Align the drive shaft in the front end assembly. Proper alignment is obtained when the outside edge of both track drive sprockets is equidistant from the sides of the body tunnel.
8. Hold the drive shaft in place to insure proper alignment. Slide the lock collar against the bearing and rotate the collar in the normal operational drive shaft rotation. Assembly will now remain in place.
9. Using a punch and hammer, secure the assembly in place by tightening the collar in the same direction as performed in step 8. Tighten the lock collar set screw.
10. Position the bearing retainer plates on the recoil side of the front end assembly and install the three (3) carriage bolts.
11. Tip the machine right side up and tighten the bearing retainer plates to the front end assembly with the three locknuts. **NOTE: Locknuts to be installed on outside of front end assembly.**



12. If the machine is equipped with a speedometer, install the coupling cable and the drive head.
13. Once again, tip the machine on its recoil side.
14. Using a punch and hammer, tighten the lock collar on the recoil side of the drive shaft in the same direction the shaft will turn during normal operation. Tighten the lock collar set screw.

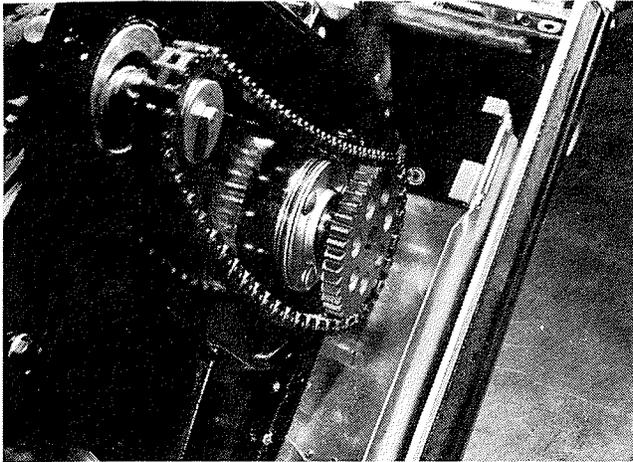


15. With the rear idler wheels in a fully-released position, slide the skid frame within the track.
16. Secure one side of the front axle with a lock washer and bolt. **NOTE: Thread the bolt halfway into the axle shaft. DO NOT TIGHTEN!**



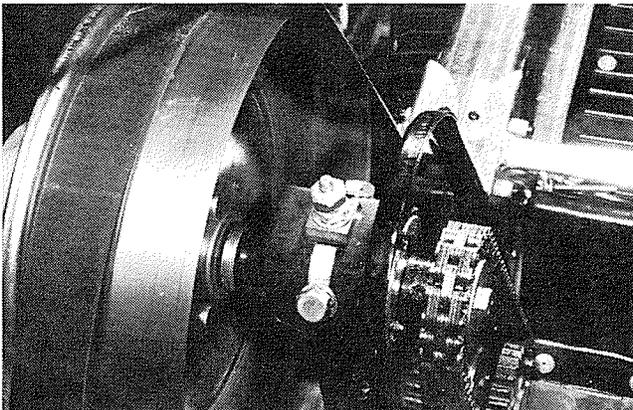
17. Tip the machine on its PTO side and secure that side of the front axle with a lock washer and bolt. **NOTE: Thread the bolt halfway into the axle shaft. DO NOT TIGHTEN!**
18. Secure the rear skid frame axle with a lock washer and bolt. **NOTE: Thread the bolt halfway into the axle shaft. DO NOT TIGHTEN!**
19. Carefully tip the machine back on the recoil side and secure the rear axle with a lock washer and bolt. **NOTE: TIGHTEN BOLT SECURELY!**
20. Position the machine right side up and tighten the remaining front and rear axle bolts.
21. Correctly set the track tension (see Suspension [Track Tension], page 156).
22. Align the track (see Suspension [Track Alignment], page 156).
23. Set the suspension for related snow conditions and operator weight (see Suspension [Suspension Adjustment], page 148).
24. Position the drive chain around the small driven sprocket and the lower drive sprocket. Replace the chain and lower drive sprocket on the splined shaft and secure in place with the large flat washer and bolt.

SUSPENSION

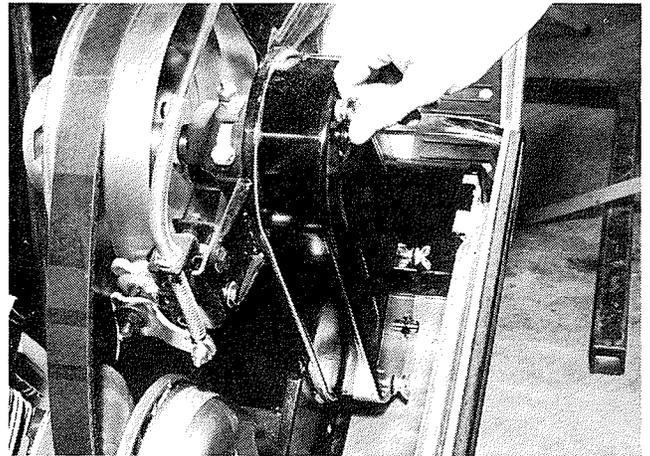


25. Observe the eccentric bearing housing and determine if the shaft is behind or ahead of center. Apply thumb pressure to the eccentric in the proper direction; shaft will raise and increase tension as pressure is increased. **NOTE: If bolts contact the eccentric slide, remove and install in an available hole.**

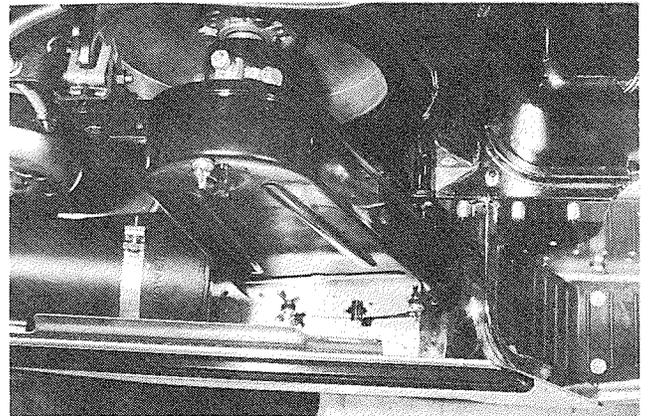
For snowmobile usage, the drive chain should be run with a minimum amount of slack to insure optimum performance. Proper chain deflection is a quarter of an inch at midspan of the chain. Insure chain is in alignment with both sprockets.



26. Position the dropcase and dropcase gasket to the dropcase mount; secure in place with three rubber washers and thumbscrews.



27. Remove the dropcase filler plug and fill the dropcase with eight (8) ounces of Arctic Chain Lube. Replace the dropcase filler plug.



28. Close or replace the hood. If hood was removed, the headlight harness must be connected to the headlight.

SUSPENSION

General (Track)

The track used on Arctic Cat is composed of three (3) separate belts, held together by means of a metal cleat, which is riveted to the outside of the track surface. The track provides traction to drive the snowmobile, acts as a cushion to absorb minor impacts and bumps, and working in conjunction with the brake, exerts a drag on the snow surface to aid in slowing down or stopping the machine.

Track Removal

1. If minor track maintenance is being performed, it may be adequate to remove only the skid frame (see Suspension [Skid Frame Removal], page 143).
2. If major track maintenance is being performed, remove the skid frame (see Suspension [Skid Frame Removal], page 143), then remove the track drive assembly (see Suspension [Track Drive Removal], page 149).

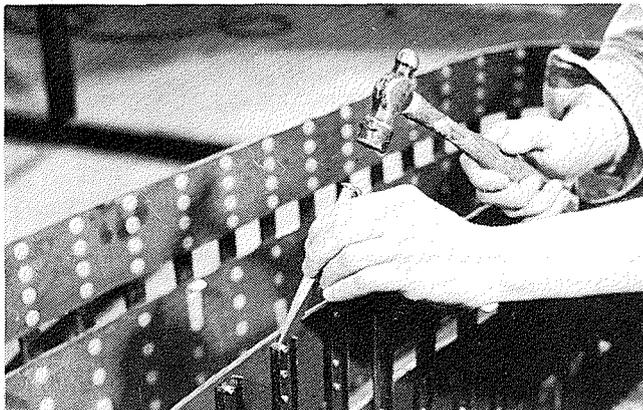
Inspection and Cleaning

1. Inspect the track for wear, shredding and cuts.
2. Check for missing cleats and guides; replace and install as necessary.
3. Clean the inside and outside belts of the track with soap and water. Rinse track thoroughly of soap and allow to dry.

Cleat/Guide Installation

NOTE: If rivets are missing from a cleat or track guide, rivet replacement is necessary.

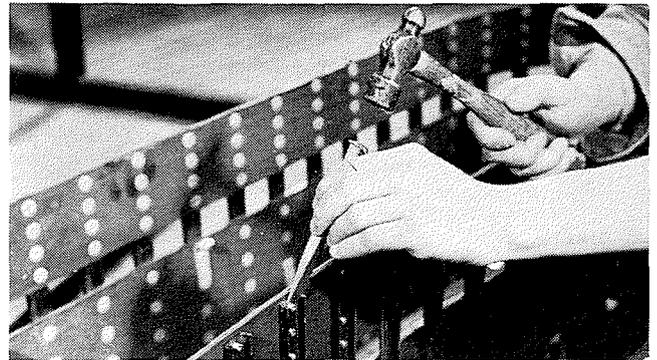
1. Track cleats or guides may be replaced by cutting the rivets on the bottom side of the track with a sharp chisel and hammer. **NOTE:** Remove all rivet pieces from the track.



2. Using track rivets to secure the cleats and guide rivets to secure the track guides, pop the rivets in place with a rivet gun.

Track Belt Replacement

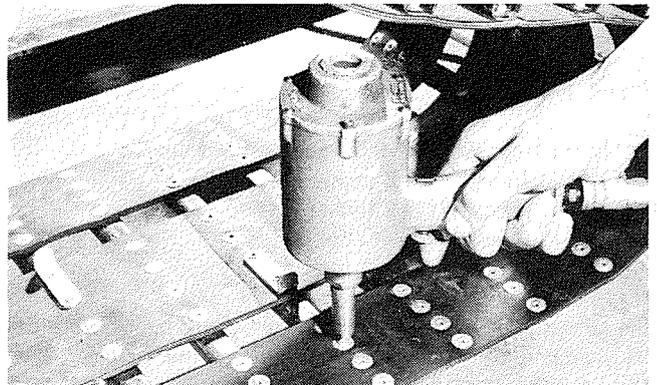
1. To install a new track belt (outer or center belt), cut the rivets on the bottom side of the track with a sharp chisel and hammer.



2. When the necessary rivets have been removed, replace the damaged track belt.

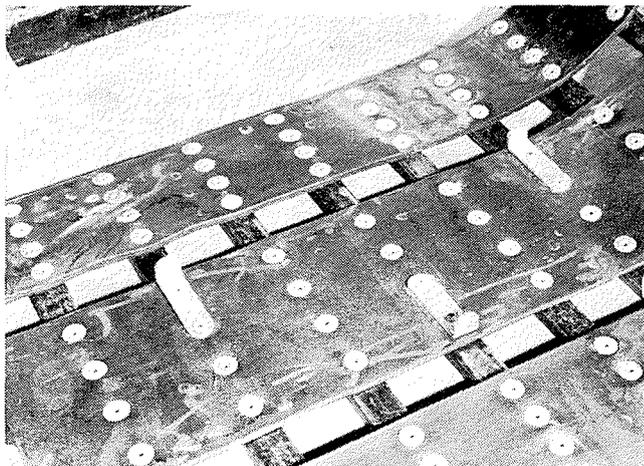
NOTE: The center track belt is wider than the outer belts. When installing the outer belts, the outside punched hole closest to the side of the track belt must always be installed toward the inside.

3. Position the new track belt and align the holes in the track belt with the holes in the cleats.
4. Rivet the track in position, using a rivet gun.



SUSPENSION

NOTE: Track guides must be installed from side to side on every second cleat. The guide flange must always face toward the outside of the track.



5. When a track guide must be riveted to the track and cleat, a track guide rivet must be used.

Track Installation

1. If minor track maintenance was performed, replace the skid frame (see Suspension [Skid Frame Installation], page 147).
2. If the track was removed from the machine, constituting major track maintenance, reassemble and install the various components (see Suspension [Track Drive Installation], page 152).
3. Set the track tension (see Suspension [Track Tension], page 156).
4. Properly align the track (see Suspension [Track Alignment], page 156).

Track Tension

Proper track tension on 1972 models is as follows:

- A) Lynx ----- 2 Inches
- B) Puma ----- 2 Inches
- C) Cheetah ----- 1 Inch
- D) Panther ----- 1 Inch

The prescribed distance is obtained by raising the rear of the machine off the ground and measuring between the track and the bottom surface of the skid frame. If an adjustment of the track tension is necessary, proceed as follows:

- A) Loosen the hex nuts on both track tension bolts.

- B) If the track tension is either too loose or too tight, adjust the track tension bolts accordingly. Bolts must be adjusted equally on both sides.



- C) Lock the adjustment in position by "bottoming" the hex nut on the skid frame.
- D) After the track tension has been equally adjusted, set the track alignment.

Track Alignment

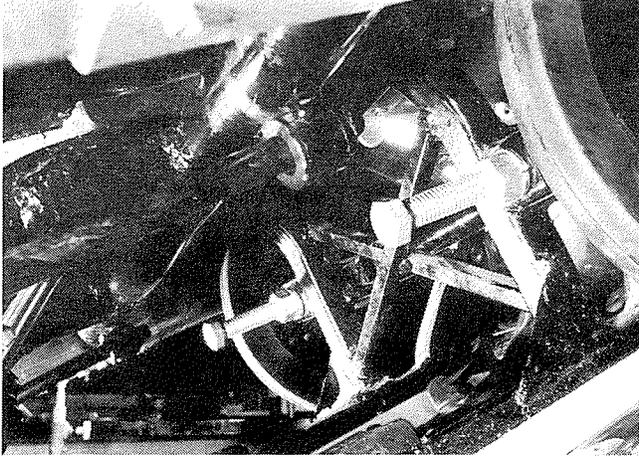
CAUTION: Track tension and alignment are both inter-related; always perform both adjustments, even if only one particular adjustment was necessary. Always set the track tension before adjusting track alignment.

1. Support the rear of the machine and insure the entire track is off the ground and free to turn.
2. Start the engine and accelerate slightly to turn the track several revolutions. **SHUT ENGINE OFF!**
3. Note which direction the track has run.

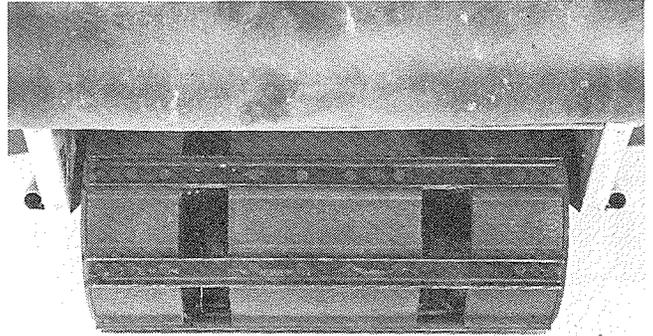
WARNING
Shut engine off before making any adjustments to the track. Never allow anyone to stand in front of or to the rear of the machine when checking or adjusting track alignment.

4. If the track ran to the right, tighten the right track tension bolt. If the track ran to the left, tighten the left track tension bolt.

SUSPENSION



NOTE: The correct adjustment is obtained when the both sides of the track are equidistant from the sides of the body.



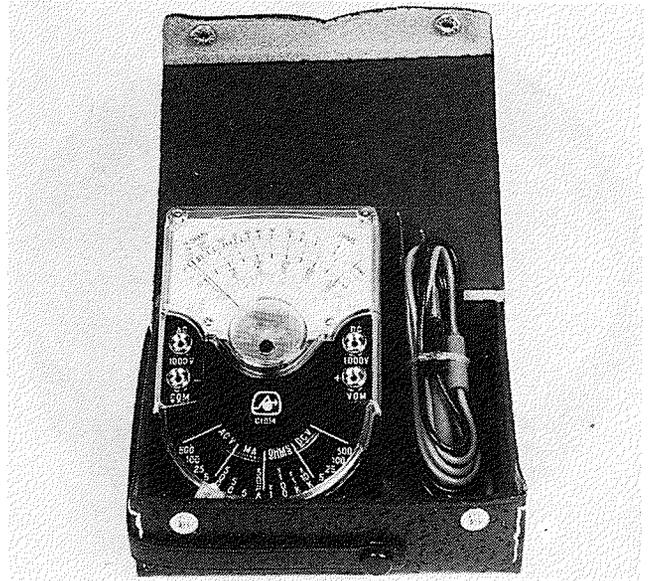
5. When the adjustment has been completed, lower the machine to the ground, start the engine and run the track under normal conditions.
6. Recheck the track and adjust if necessary.

NOTES

**SPECIAL
ARCTIC CAT
TOOLS**

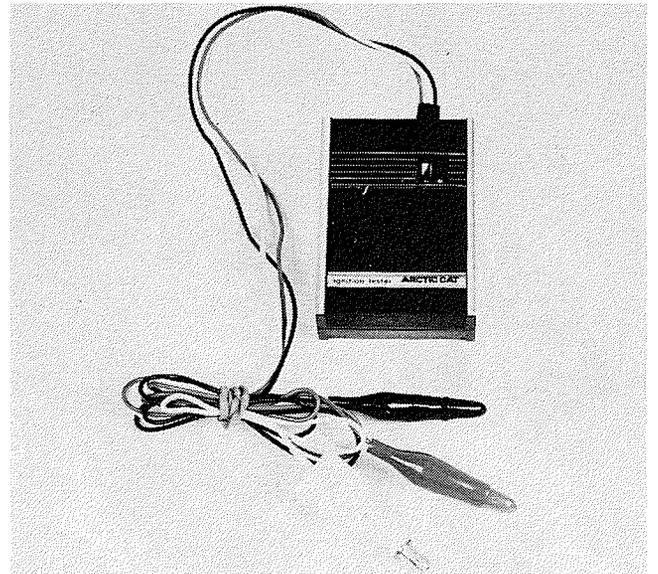
Multitester

Part No. 0144-053



Indicator, Timing Buzzer

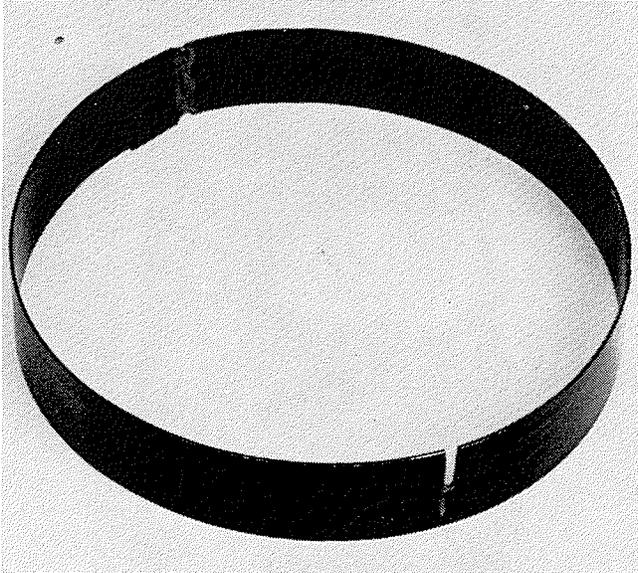
Part No. 0144-010



Gauge, Engine Timing

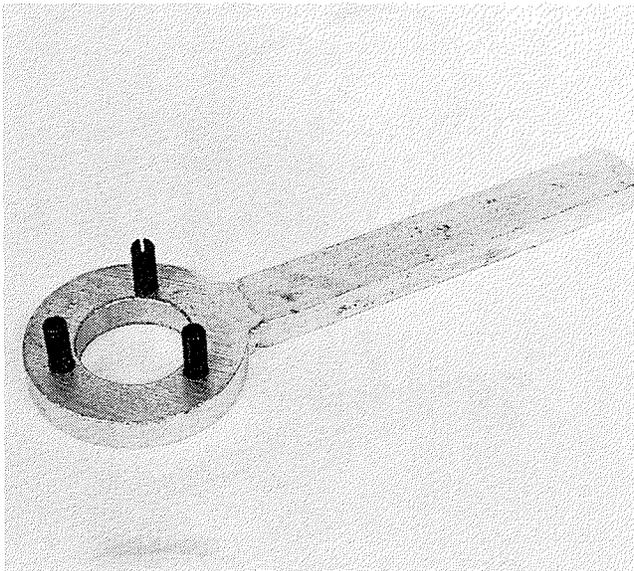
Part No. 0144-009





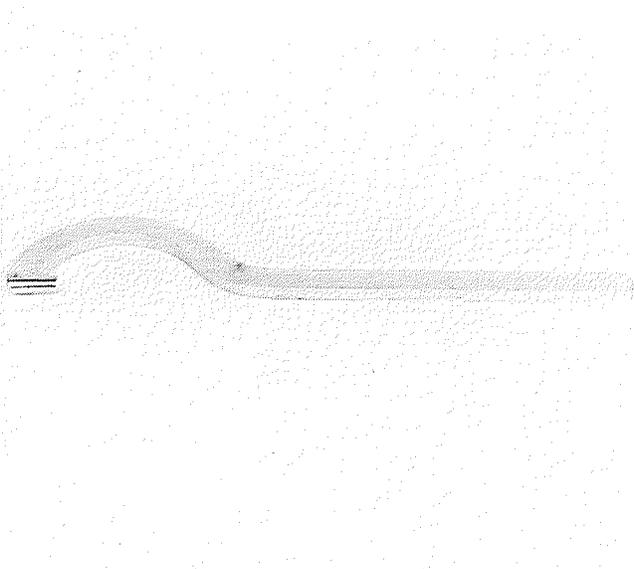
Retainer, Recoil Spring

Part No. 0144-005



Holder, Pan

Part No. 0144-004



Wrench, Flywheel Spanner

Part No. 0144-007

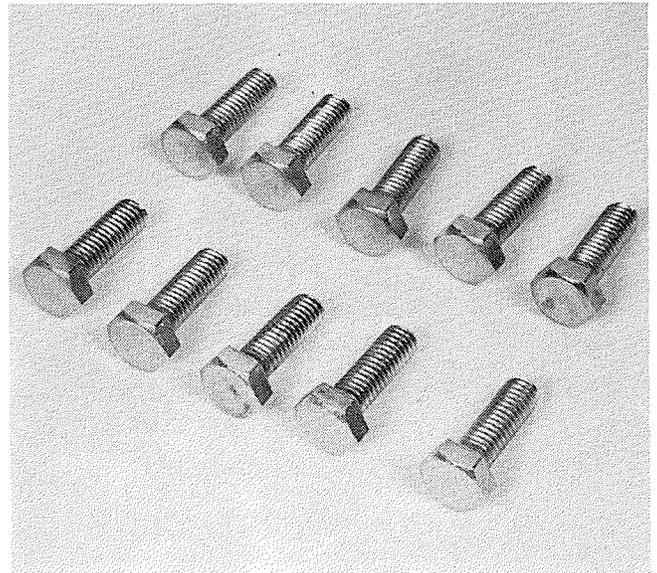
Bolt Kit, Puller

Part No. 0144-063



Bolt, Puller

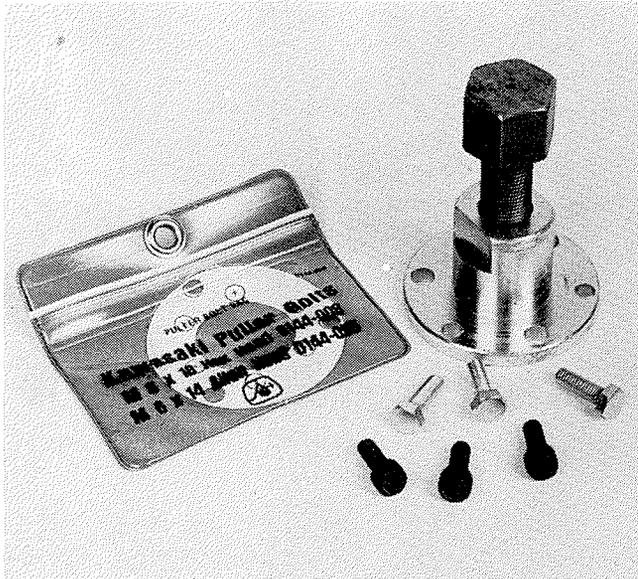
Part No. 0144-008



Bag, Puller Bolts

Part No. 0144-059

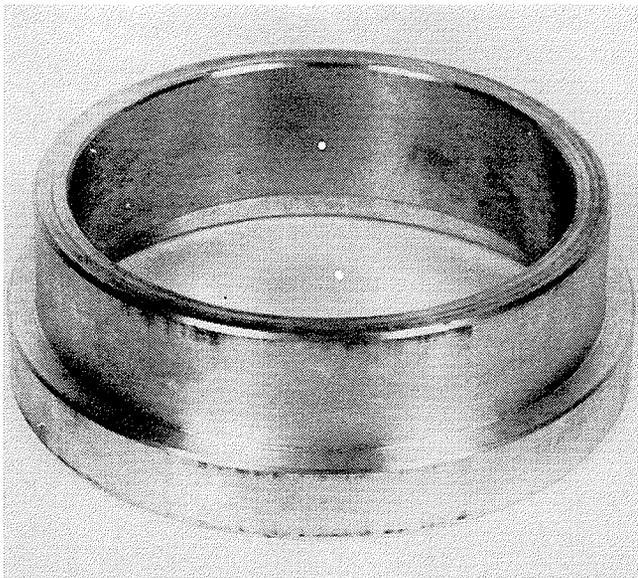




Puller Kit, Flywheel

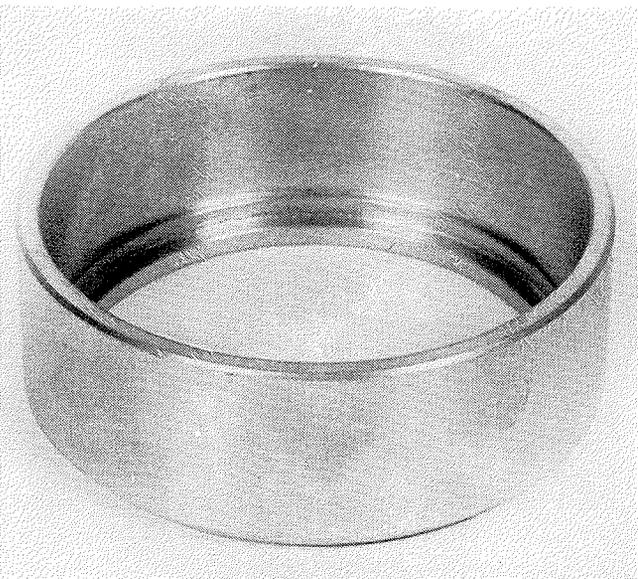
Part No. 0144-064

(Includes Puller Bolts)



Gauge, CDI

Part No. 0144-056

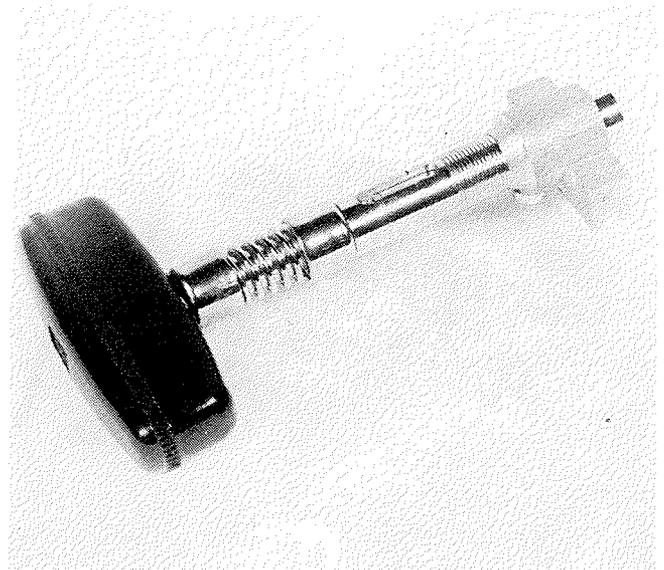


Gauge, Magneto

Part No. 0144-011

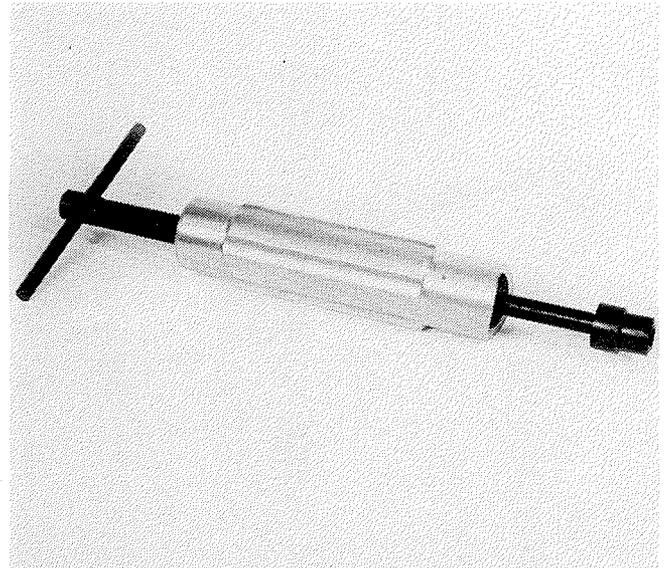
Gauge, Belt Tension

Part No. 0144-012



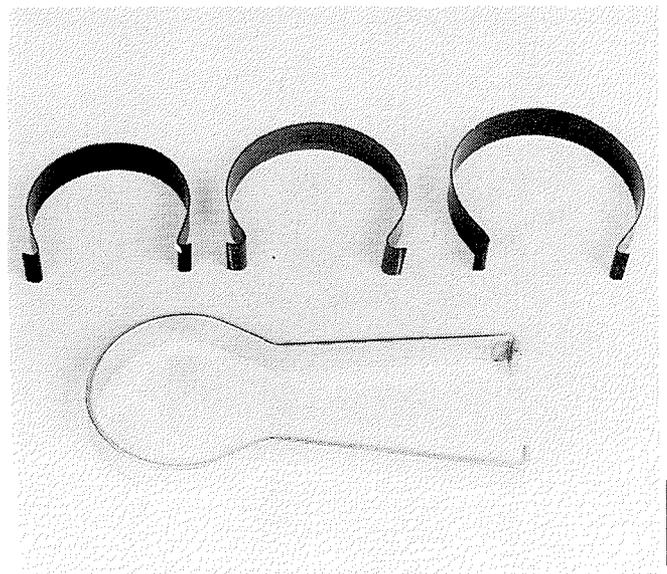
Extractor, Piston Pin

Part No. 0144-003



Clamp, Piston Ring Installer

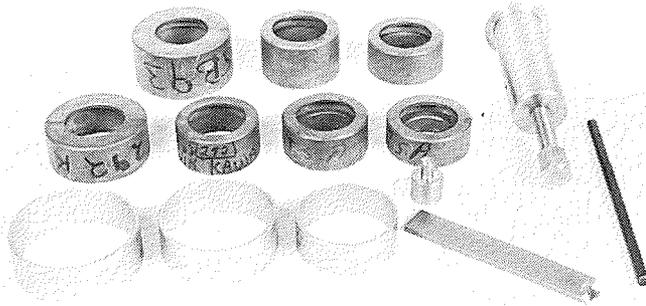
Part No. 0144-001



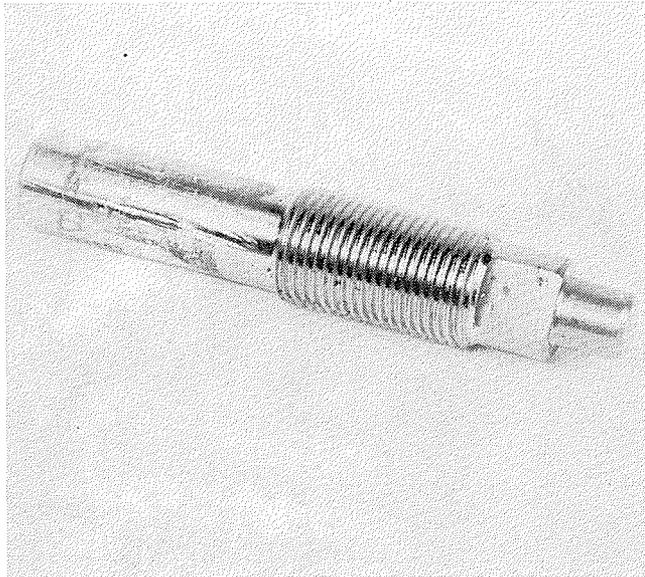
Puller Kit, Bearing

Part No. 0144-080

(Items 1 - 11 may be purchased separately.)

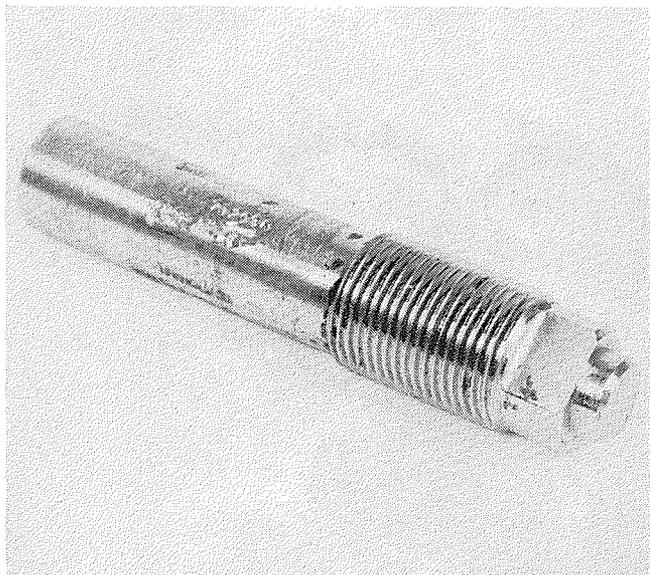


- | | |
|-----------------------|--|
| 1. Part No. 0144-070 | Puller Shells – SB93 Sachs |
| 2. Part No. 0144-071 | Puller Shells – 50AMAX |
| 3. Part No. 0144-072 | Puller Shells – Bearing Reduction Case T5A |
| 4. Part No. 0144-073 | Puller Shells – Bearing Crankshaft T5A |
| 5. Part No. 0144-074 | Puller Shells – Bearing Crankshaft T6A |
| 6. Part No. 0144-075 | Puller Shells – Bearing Crankshaft T1A T1B |
| 7. Part No. 0144-076 | Puller Shells – Bearing Crankshaft T4B |
| 8. Part No. 0144-077 | Plug, Crankshaft |
| 9. Part No. 0144-078 | Spreader, Bearing |
| 10. Part No. 0144-079 | Body Assy., Bearing Puller |
| 11. Part No. 0144-081 | Ring, Bearing Puller |



Puller, 770 Salsbury Clutch

Part No. 0144-031

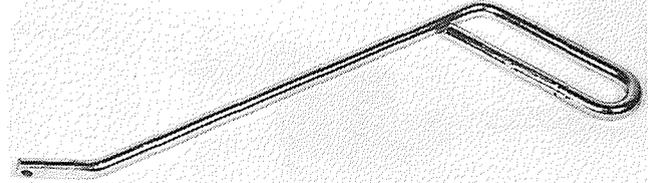


Puller, 910 Salsbury Clutch

Part No. 0144-029

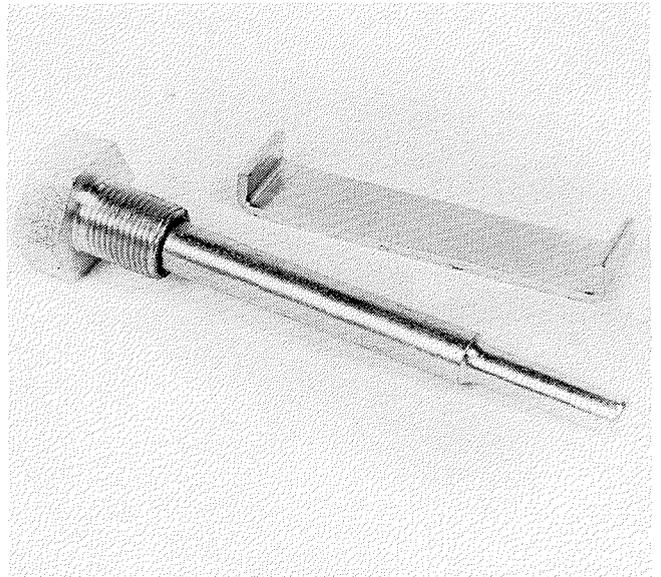
Tool, Spring Seating

Part No. 0144-014



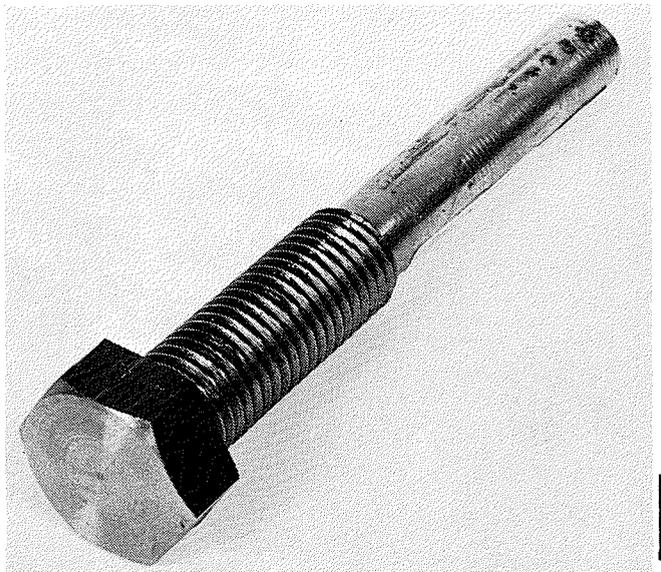
Tool Set, St. Lawrence

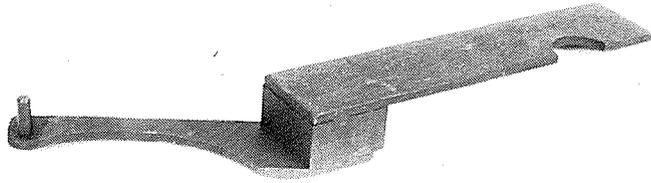
Part No. 0144-052



Puller, Arctic Clutch

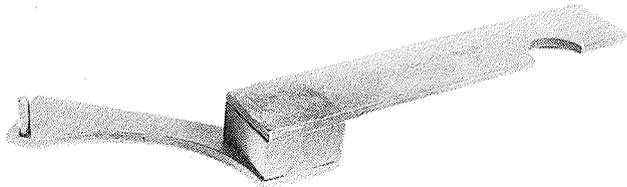
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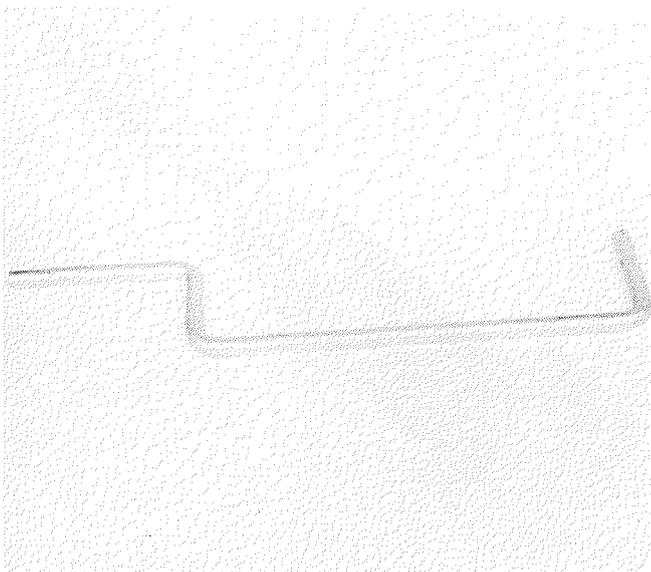
Tool, Alignment

Part No. 0144-057



Tool, Alignment

Part No. 0144-058

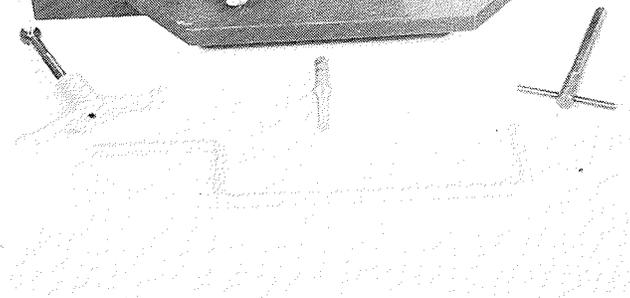
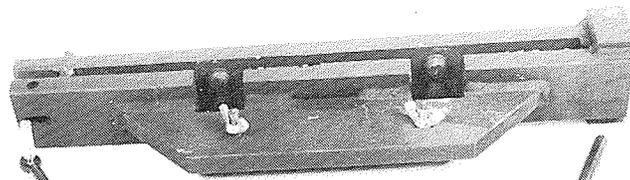


Stand, Snowmobile

Part No. 0144-082

Tool, Solid Riveting

Part No. 0144-062



NOTES