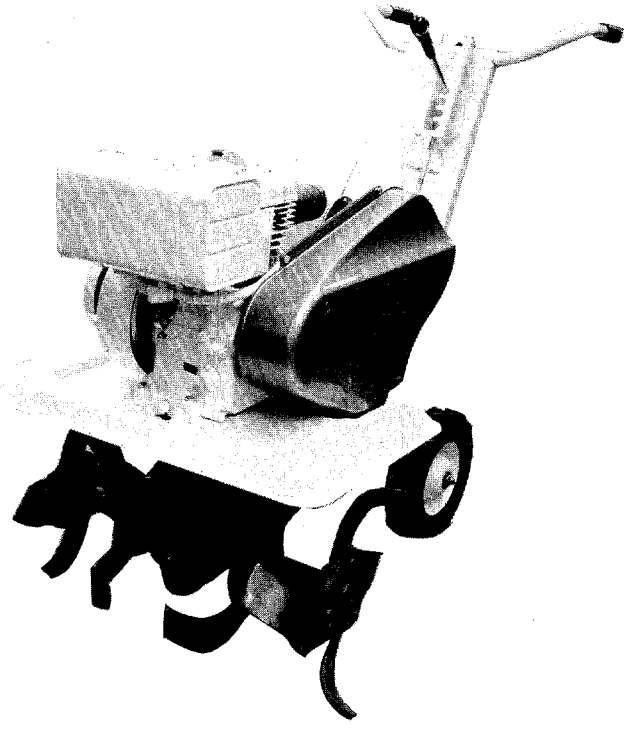
FORM NO. TLP-009

OPERATING INSTRUCTIONS AND SERVICE MANUAL

8 H. P. ROTARY TILLER
MODEL 1850



211-380

PENNCRAFT OUTDOOR POWER EQUIPMENT GUARANTEE

Within one year of purchase (30 days for commercial use), we will repair any Outdoor Power Equipment Product which is defective. Just contact us for service.

Naturally, the cost of routine maintenance and service (engine adjustment, cleaning and blade sharpening) is your responsibility.

Original: February 1971

J. C. PENNEY COMPANY, INC.-1301 AVENUE OF THE AMERICAS, NEW YORK, N. Y., 10019

CONTENTS

ILLUSTRATIONS

SAFETY RULES

BEFORE TILLING	AFTER TILLING
1. DO NOT operate the equipment when barefooted or when wearing open sandals. 2. DO NOT start machine until each control and its function is understood. See Sections 2 and 3. 3. DO NOT let anyone use the tiller who is unfamiliar with the controls. Keep children and pets away from the machine. 4. Check tank for fuel of crankcase for oil level. See Section 2. 5. Always disconnect the sparkplug wire during repairs, refueling, or adjustments except when tuning the engine. 6. NEVER refuel with motor running. 7. DO NOT spill gasoline on hot engine. 8. NEVER try to start the engine with the clutch control in any position but NEUTRAL. 9. Stand clear of tines when starting the engine. 10. Never stand in front of or work on tines when the engine is running. Keep hands and feet clear of tines.	1. Read and understand all instructions in Sections 2 and 3. 2. NEVER use the tiller in the dark. 3. STOP the engine and remove the spark plug wire whenever the machine is left unattended. 4. Never leave an operating tiller unattended. 5. If the machine begins to vibrate or produces any other than normal operating sounds, STOP the machine immediately and check the cause. 6. Keep children away from the operating tiller at all times. 7. Know how to stop the tiller instantly. 8. Stop the machine when crossing driveways, roads, or walkways. 9. If the blades strike any obstructions, STOP the engine, remove the spark plug wire, and check for damage.

SECTION I
GENERAL INFORMATION AND ASSEMBLY

1-1. TECHNICAL DESCRIPTION

The Model 1850 Rotary Tiller is equipped wih a Briggs and Stratton 8 hp, 4-cycle engine and a recoil starter. The tines are heavy duty slasher type and the wheels are 10 x 2.50 inches with a rib tread. This tiller weighs 340 pounds.

The maximum tilling width is 26 inches.

1-2. Preliminary Preparation

Maximum tilling results, equipment performance, and personal safety depend on correct operation of the equipment and on proper maintenance of its components. The operator of this Penncraft rotary tiller should, therefore, famiarize himself with the machine and its controls before attempting to operate the equipment. The two important considerations are:

a. Knowing the location of each control and its function, as outlined in this manual, to ensure for most efficient operation of the equipment and for best performance.

b. Observing the operating instructions and safety rules at all times to prevent possible injury to persons and to equipment.

1-3. Assembly

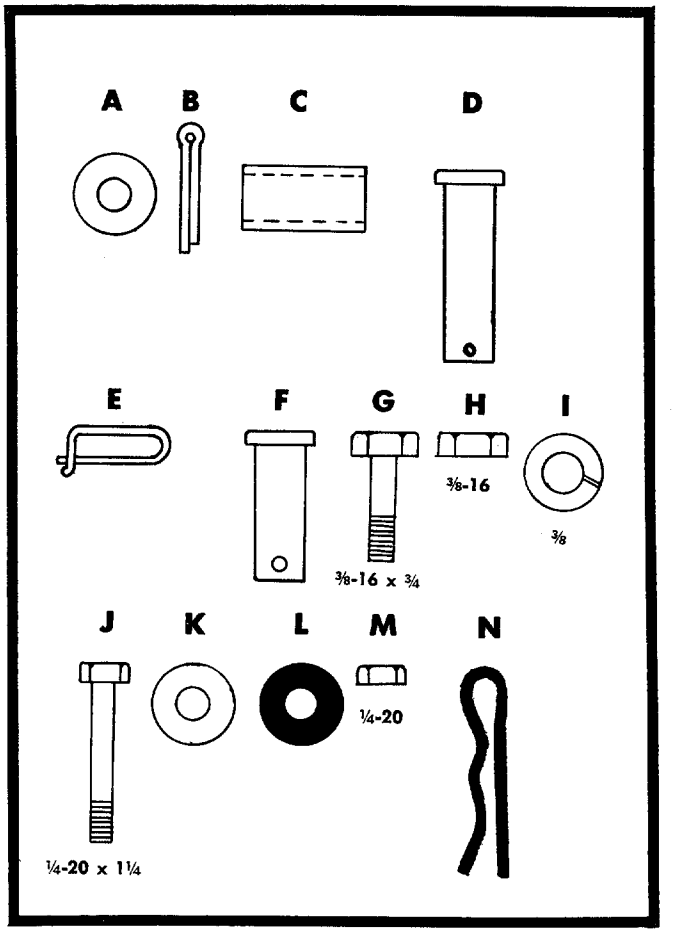
The Model 1850 is shipped completely assemblea except for the handle, depth bar, and wheels. These parts, with the necessary hardware, are easily assembled to the machine, as outlined in this section.

NOTE

Reference to right-hand or left-hand side of machine is from the operating position.

TOOLS NEEDED	
Two	7/16" Wrenches
Two	9/16" Wrenches

HARDWARE SUPPLIED



a. Wheel and Wheel Hanger Assembly

Refer to figure 1-1.

Step 1. Slide the axle through the wheel hanger.

Step 2. Place the washer A, spacer C, wheel, and washer A on each side of the axle and secure each with a cotterpin B.

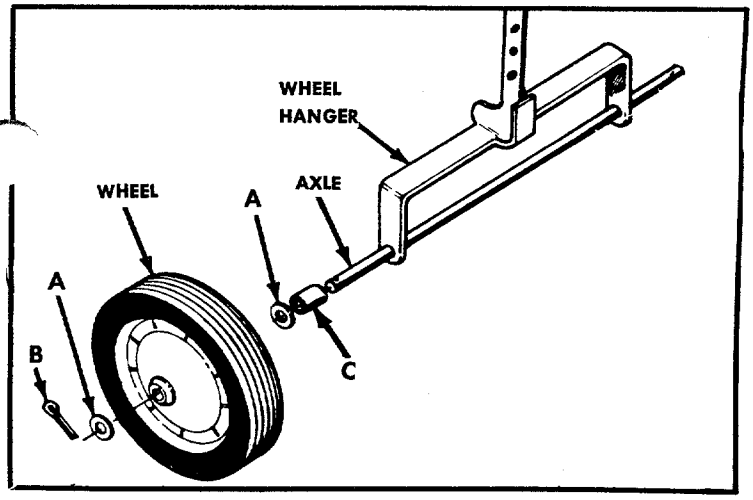


FIGURE 1-1. WHEEL ASSEMBLY

Refer to Figure 1-2.

Step 3. Place the wheel hanger into the tailpiece and secure with clevis pin D and locking pin E.

b. Depth Bar

Refer to Figure 1-2.

Step 1. Attach the depth bar to the tailpiece with the clevis pin.

Step 2. Secure the clevis pin F with the locking pin E.

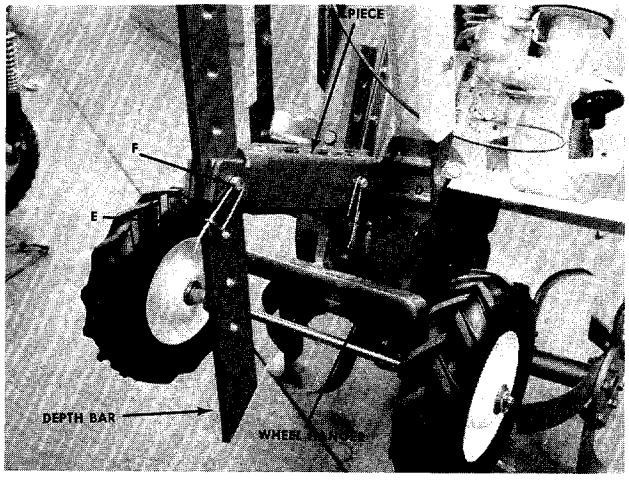


FIGURE 1-2. WHEEL HANGER AND DEPTH BAR

c. Handle Assembly

Refer to Figure 1-3.

Assemble the handle to the handle bracket with 4 hex bolts G, lockwashers I and hex nuts H.

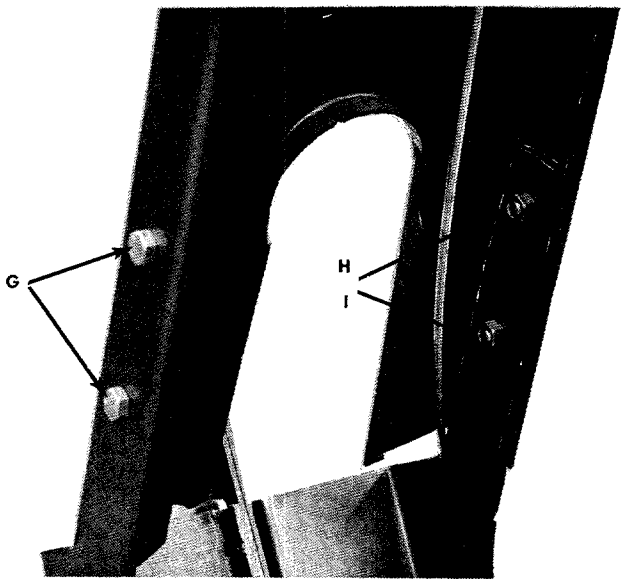


FIGURE 1-3 HANDLE ASSEMBLY

d. Control Assembly

Refer to Figure 1-4.

Step 1. Place the control lever through the handle assembly.

Step 2. Attach at the bottom with hex bolt J, steel washer K, rubber washer L and secure with hex nut M.

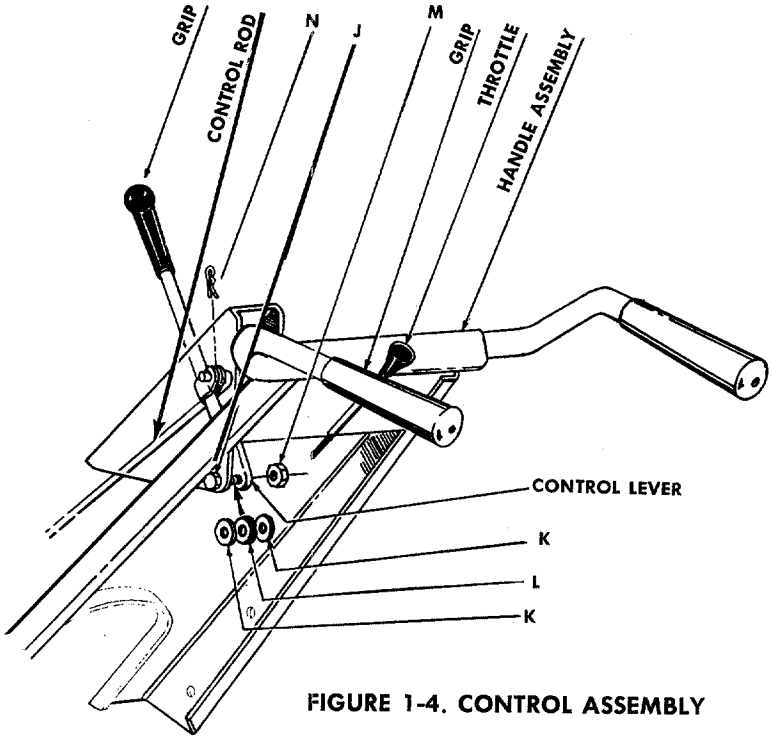


FIGURE 1-4. CONTROL ASSEMBLY

Refer to Figure 1-5.

Step 3. Screw the control rod into the ferrule until it extends through the ferrule 7/8 of an inch.

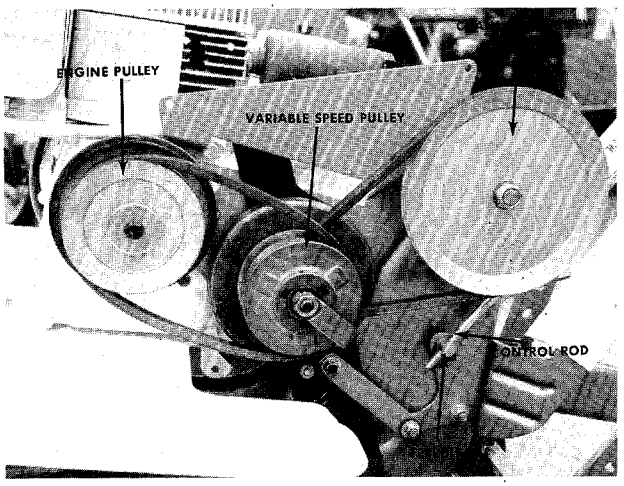


FIGURE 1-5. FERRULE ADJUSTMENT

Refer to Figure 1-6.

Step 4. Place the bent end of control rod into the control lever and fasten with cotter hairpin N.

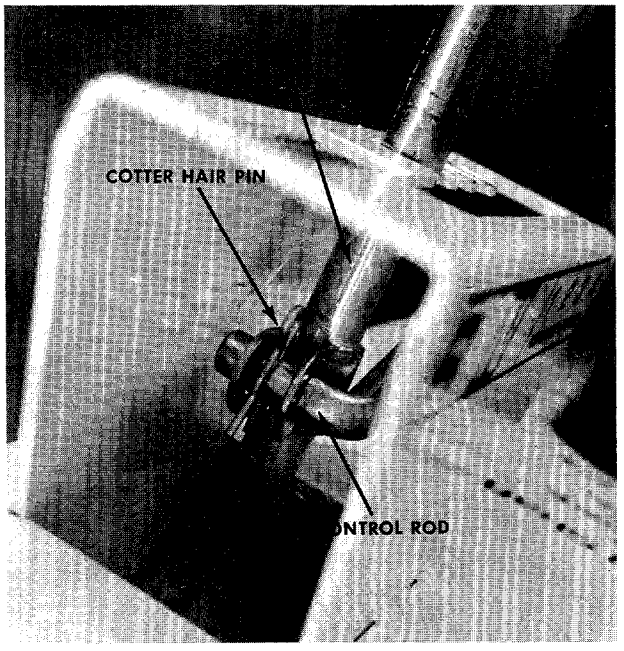


FIGURE 1-6. CONTROL ASSEMBLY

e. Throttle Control Assembly

Step 1. Push the black plastic knob on the throttle control all the way.

Step 2. Pull out the black knob until the detent clicks twice to allow the spring lockwasher and the hex nut to pass over the detent ball to the threads.

Step 3. Slide the spring lockwasher and the hex nut over the detent ball and thread the hex nut one or two turns.

Step 4. Place the conduit through the slot in the handle panel.

Step 5. Push the throttle control in until it seats.

Step 6. Tighten the hex nut.

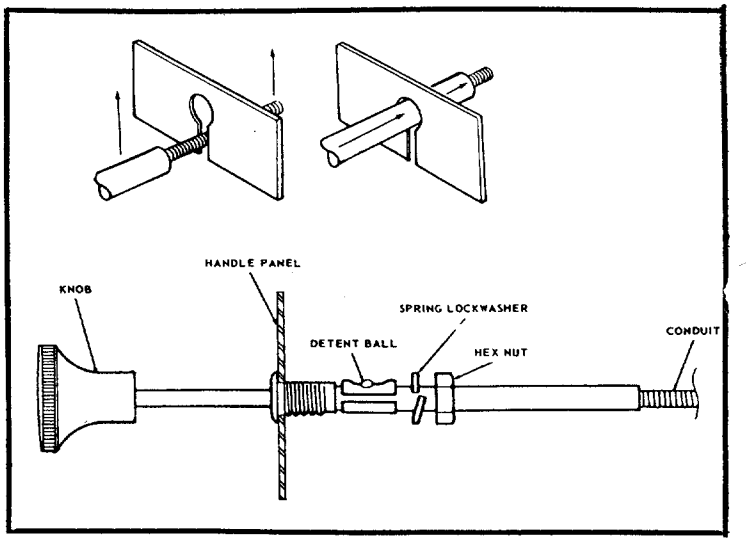


FIGURE 1-7. THROTTLE ASSEMBLY

SECTION 2
CONTROLS AND PRELIMINARY CHECKS

2-1. CONTROLS

The controls on Model 1850 Rotary Tiller are the control lever and throttle control.

a. The Control Lever

The Control Lever is released from Neutral by moving it to the right and allowing the spring tension to pull the control lever into one of the four forward speeds. See Figure 2-1.

NOTE

Number 1 position is the slowest tine rotation speed and number 4 is the fastest.

Pulling the control lever backwards into the Reverse position reverses the direction of tine rotation.

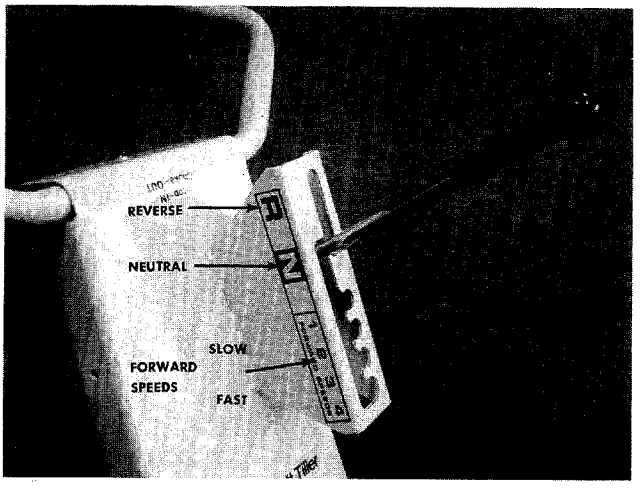


FIGURE 2-1. CONTROLS

b. The Throttle Control

The throttle control actuates the butterfly in the carburetor and may be set at stop, slow, fast or choke to control the speed of the engine.

NOTE

Always check the throttle cable at the engine end for a tight connection.

To stop the engine, push the throttle control all the way in. To operate the choke, pull the throttle control all the way out. See Figure 2-1.

c. The Depth Bar

The depth bar is used to prevent the tiller from running on top of the ground instead of tilling. The deeper you set the depth bar, the deeper you will till. Tilling depth is from 0 to 8-inches. See Figure 2-2.

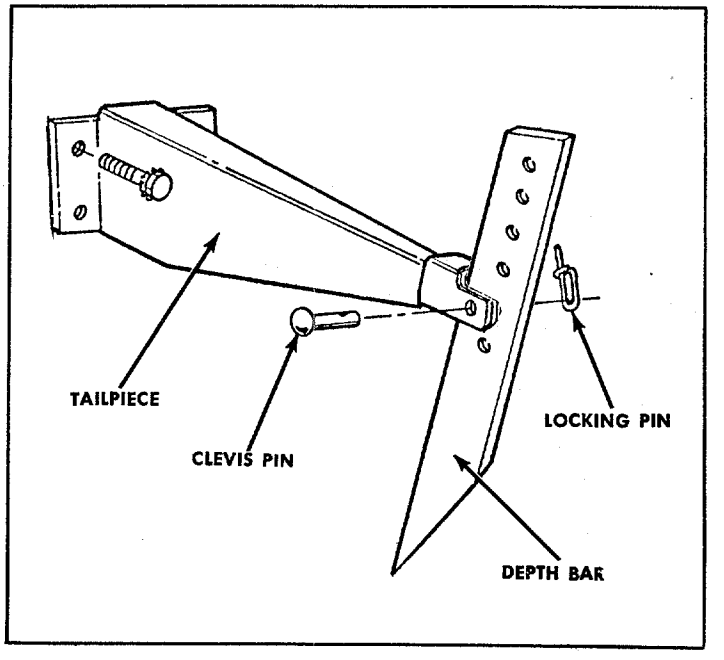


FIGURE 2-2. DEPTH BAR

2-2. WHEEL ADJUSTMENT

The wheel height can be adjusted by removing the long clevis pin on the wheel hanger and raising or lowering the setting. The higher the setting the deeper the tilling depth. See Figure 2-3.

NOTE

Pick a height that places the handles in a comfortable position for the operator.

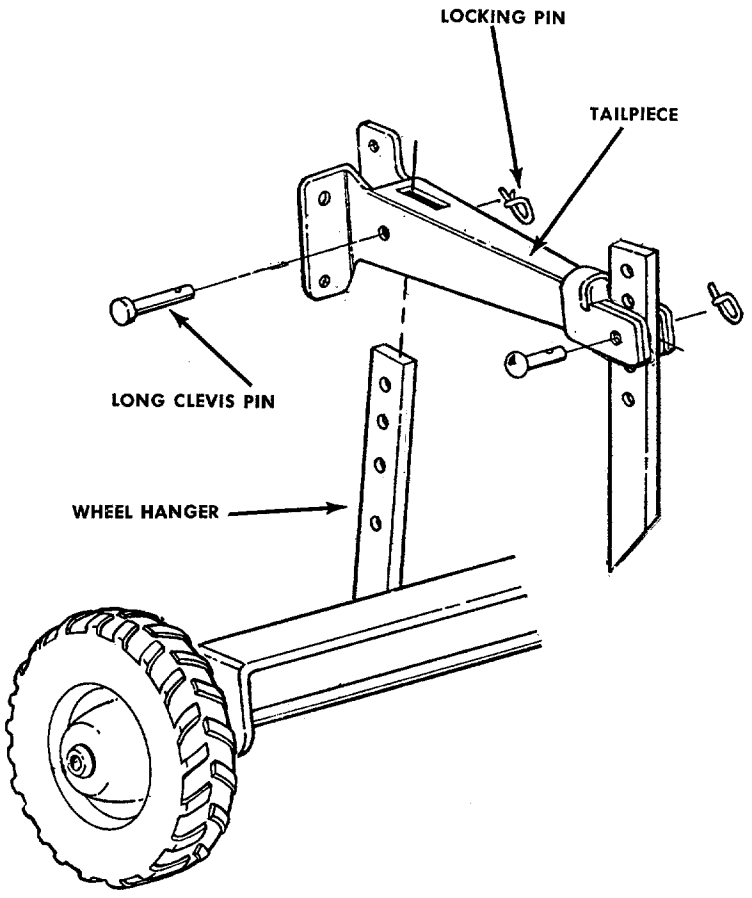


FIGURE 2-3. WHEEL HEIGHT ADJUSTMENT

2-3. CHECKING OIL, GASOLINE, AND GEAR CASE

NOTE

When packaged for shipment the machine contains no oil or gasoline. Before starting the engine, oil must be added to the engine crankcase and gasoline to the tank. DO NOT mix oil with gasoline.

a. Oil

With the tiller on level ground, remove the oil filler plug and pour 2¾ pints of good quality, SAE 30 type MS engine oil into the crankcase. Replace the oil filler plug.

b. Gasoline

Remove the gas cap and fill the tank with FRESH REGULAR GASOLINE. If the gasoline has been in a metal can for a long period, throw it away and use fresh gasoline.

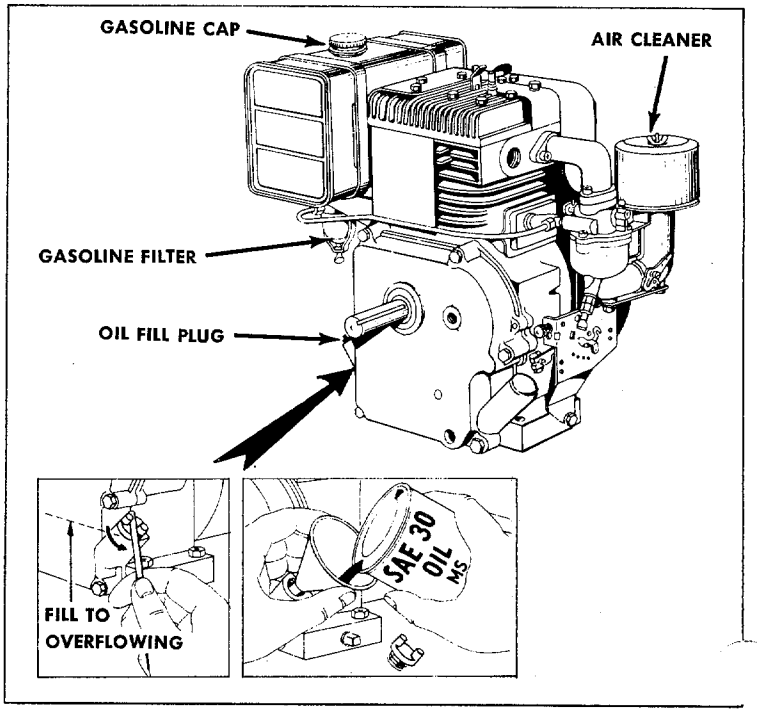


FIGURE 2-4. OIL AND GASOLINE FILL

c. Chain Case Lubricant

The chain case is sealed and requires no further lubrication unless the chain case is disassembled for repair.

SECTION 3
OPERATING INSTRUCTIONS

3-1. STARTING THE ENGINE

Step 1. With the tiller set on level ground, set the control lever in NEUTRAL.

Step 2. Set the throttle control to CHOKE.

Step 3. As illustrated in figure 3-1, grasp the recoil starter handle, pull out sharply, and hold it in the out position. (Do not let cord snap back.)

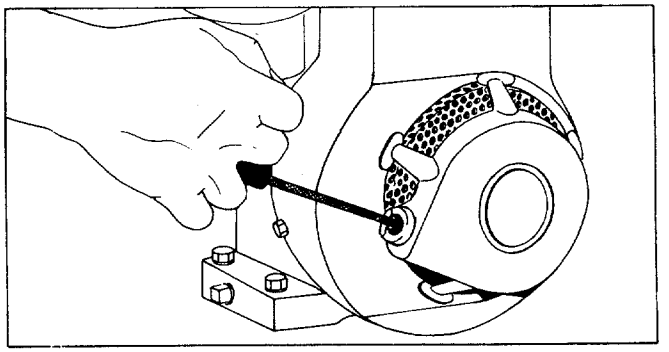


FIGURE 3-1. RECOIL STARTER

NOTE

The cord should NOT be pulled out more than about two feet. If engine fails to start, allow the cord to wind back into the housing, then pull out sharply again. Refer to Step 5.

Step 4. When the engine starts, gradually move the throttle to the FAST position. After engine warms up (about 2 or 3 minutes) set throttle at IDLE position.

Step 5. DO NOT OVERCHOKE ENGINE. Repeated cranking with throttle at CHOKE position will cause gasoline to flood the intake tube and the engine. If, after 3 or 4 attempts, the engine fails to start, place throttle in FAST position, crank the engine several times to clear out the excess fuel; and then proceed with steps 2, 3 and 4.

3-2. STOPPING THE ENGINE

To stop the engine, push the throttle control all the way in to the STOP position. See Figure 2-1. When the throttle control is in the STOP position, a switch blade is activated to short-circuit the spark plug.

WARNING

WHENEVER THE TILLER IS LEFT UNATTENDED, DISCONNECT THE SPARK PLUG LEAD AND PLACE THE THROTTLE CONTROL IN THE STOP POSITION.

3-3. STOPPING THE TINES

Pull the control lever into the NEUTRAL position. The tines will not rotate. See Figure 2-1.

3-4. OPERATING THE TILLER

Typical operation of the tiller is as follows:

Step 1. Set the clutch control to NEUTRAL.

Step 2. Start the engine as outlined in paragraph 3-1.

NOTE

To move the tiller to the work area, keep the depth bar in the highest position. With the throttle in the SLOW position, slowly engage the control lever into the number 1 position and the tiller will walk to the work area without digging into the ground.

Step 3. With the clutch control in NEUTRAL, set the depth bar in one of the lower settings.

NOTE

When several passes must be made over a certain area, lower the depth bar each time a pass is made.

Step 4. Set the throttle control to FAST.

Step 5. Slowly engage the clutch control to the number 1 position and the tines will begin rotating. Number 4 position will give the maximum tine speed. Tilling the ground for the first time should be done in the number 1 or 2 position. To pulverize the soil after it has been tilled, move the control lever to the number 3 or 4 position.

NOTE

The engine must be running to move the control lever into the faster speeds.

NOTE

A downward pressure on the handles will increase the working depth and reduce the forward speed. An upward pressure on the handles will reduce the working depth and increase the forward speed. The type of soil and working conditions will determine the actual setting of the depth bar and the handle pressure required.

CAUTION

If the tines stop rotating or the belt slips, stop the engine and examine the tine area for a rock or some object that may be jamming the tines and prevent them from turning. Reversing the tiller will usually free the object.

Step 6. To reverse the direction of rotation of the tines, pull the control lever into the reverse position. The control lever must be held in reverse. See Figure 2-1.

SECTION 4
MAINTENANCE

4-1. CRANKCASE OIL

To ensure maximum engine performance, perform the following periodic maintenance:

a. Oil Check

Check the oil level in the crankcase before each use of the machine and after every two hours of opration. The oil level shall be over-flowing at the oil fill plug. See figure 4-1.

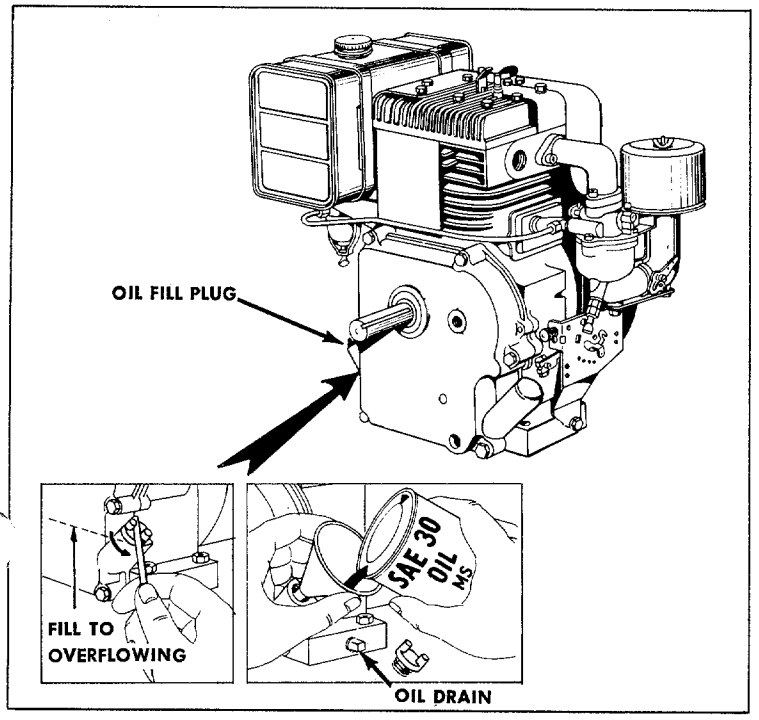


FIGURE 4-1. OIL FILL PLUG

b. Oil Change

After the first two hours of operating a new engine, drain the oil (see figure 4-2) from the crankcase while engine is still hot and refill crankcase with new oil; thereafter change the oil after every 25 hours of operation. This procedure ensures for minimum wear of engin parts and provides for virtually trouble-free operation. To change the oil, proceed as follows:

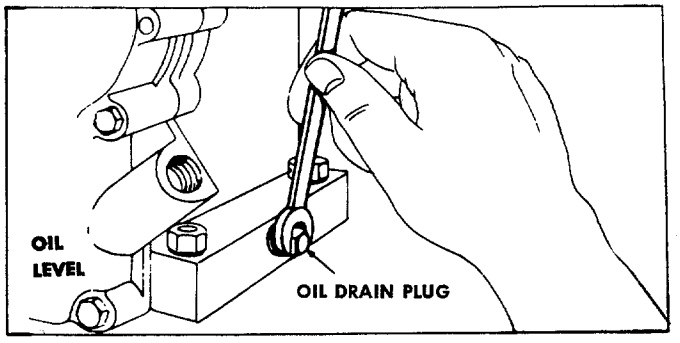


FIGURE 4-2. OIL DRAIN

Step 1. With the machine on level ground, place a suitable metal container under the oil drain plug, then remove the drain plug.

Step 2. After the oil has been drained completely from the crankcase, replace the drain plug and tighten.

Step 3. Refill crankcase with 2¾ pints of SAE 30 engine oil (A.P.I. class MS). Pour the oil slowly to eliminate airlock.

4-2. CHAIN CASE LUBRICATION

The chain is permanently lubricated and requires no further lubrication unless the case is disassembled for repair.

If the case is disassembled, clean the chain with kerosene, allow it to dry and work a high temperature grease, such as Lubriplate No. 310 into the chain.

NOTE

A 4 oz container of Lubriplate No. 310 is available under part number 727-136.

4-3. CHAIN ADJUSTMENT

No chain adjustment is necessary.

4-4. AIR FILTER

Under normal operating conditions, the air cleaner, located on top of the carburetor, must be serviced after every ten hours of use. Under extremely dusty operating conditions, the air cleaner must be serviced after every hour of operation. See Figure 4-3.

Step 1. Remove the wing nut and cover.

Step 2. Lift off foam element from support base.

Step 3. Remove metal support tube assembly (screen and two metal caps) from foam element by compressing the foam element.

Step 4. a. Wash foam element in a solvent such as kerosene or liquid detergent and water to remove dirt.

b. Wrap foam in cloth and squeeze dry.

c. Saturate foam in engine oil, then squeeze out excess oil.

NOTE

Use the same oil for the air cleaner that you use in the engine.

d. Assemble parts and fasten to the carburetor.

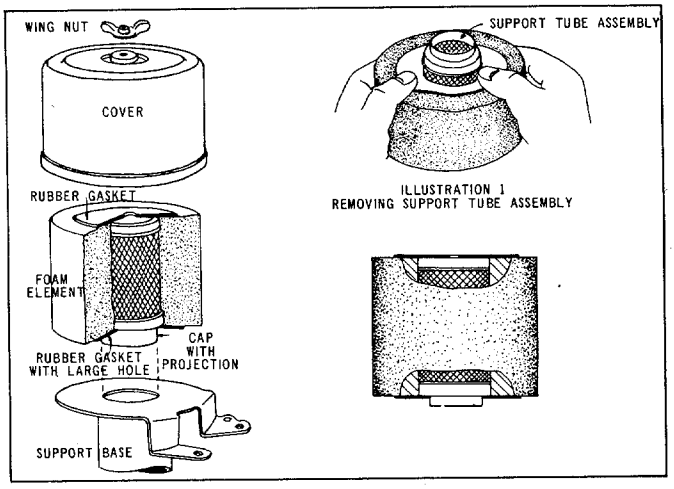


FIGURE 4-3. AIR CLEANER

4-5. CLEANING ENGINE AND TINE AREA

Any fuel or oil spilled on the tiller should be wiped off promptly. Dirt, leaves and other debris must not be left to accumulate around the cooling fins or the engine or on any part of the tiller. Clean the under side of the tine shield after each use. The dirt washs off the tine easier if washed off immediately instead of after it dries.

4-6. BELTS

Check that belts are free of oil or dirt. Wipe the belts periodically with a clean rag.

NOTE

Belt tension is automatically maintained on the forward and reverse drive belts by idlers. No adjustment is necessary.

4-7. SPARK PLUG

The spark plug gap should be cleaned, and reset to a 0.030-inch clearance every 25 hours of engine operation (see figure 4-4). Spark plug replacement is recommended at the start of each tiller season; check engine parts list for correct plug type.

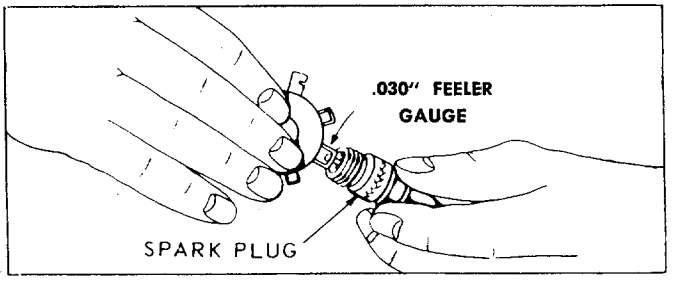


FIGURE 4-4. SPARK PLUG

4-8. GASOLINE FILTER AND SHUT-OFF VALVE.

Refer to Figure 4-5.

Step 1. Close the shut-off valve.

Step 2. Loosen the thumb screw below the bowl.

Step 3. Remove and clean the screen.

Step 4. Open the shut-off valve to see if gasoline flows freely from the gasoline tank.

Step 5. Clean the bowl and screen. Use alcohol or acetone to clean the parts if you find a gummy, varnish-like substance in the bowl.

Step 6. Reassemble.

Step 7. Open the shut-off valve.

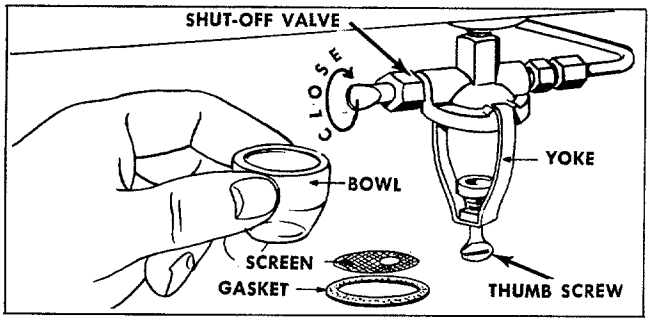


FIGURE 4-5. GASOLINE FILTER AND SHUT-OFF

4-9. BELT ADJUSTMENT

To check the belt adjustment, it is necessary to remove the belt cover so the belts are exposed as shown in Figure 4-6.

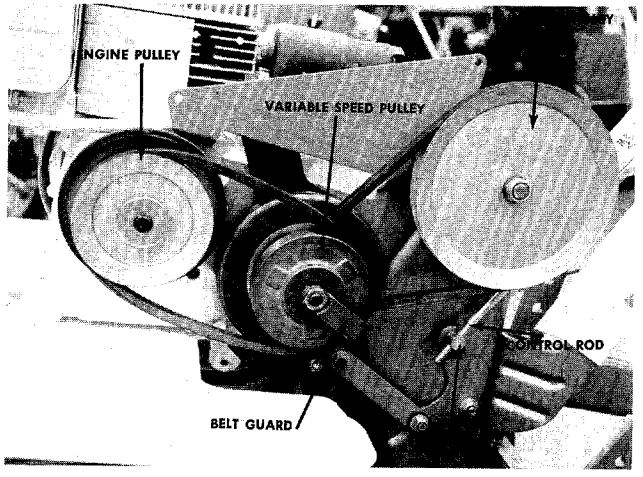


FIGURE 4-6. DRIVE SYSTEM

Start the engine and move the control lever into the number 4 position. The belt closest to the engine should move to the outside edge of the variable speed pulley so the top of the belt is almost flush with the pulley. See Figure 4-7.

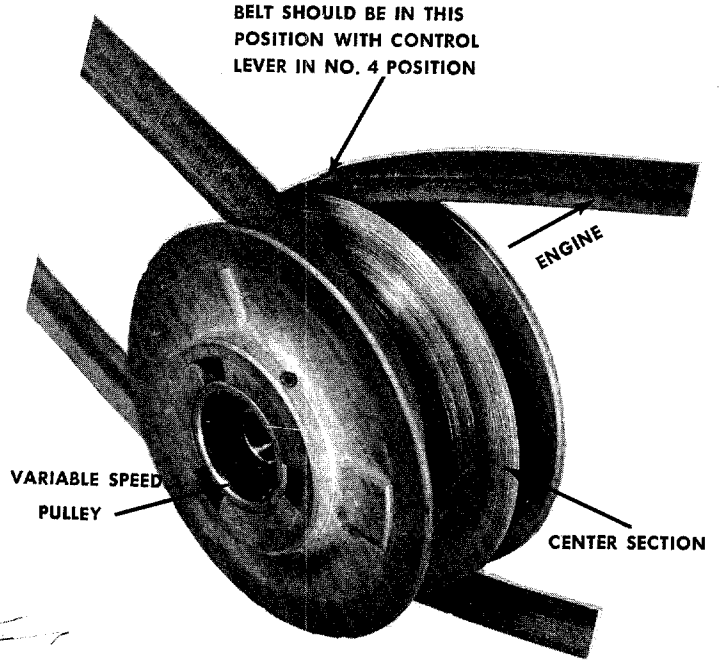


FIGURE 4-7. VARIABLE SPEED PULLEY

4-10. BELT REPLACEMENT

Step 1. Remove the belt cover so the belts are exposed as shown in Figure 4-6.

Step 2. Put the depth bar on the wheel hanger and place the tip of the depth bar under the variable speed pulley bracket as shown in Figure 4-8.

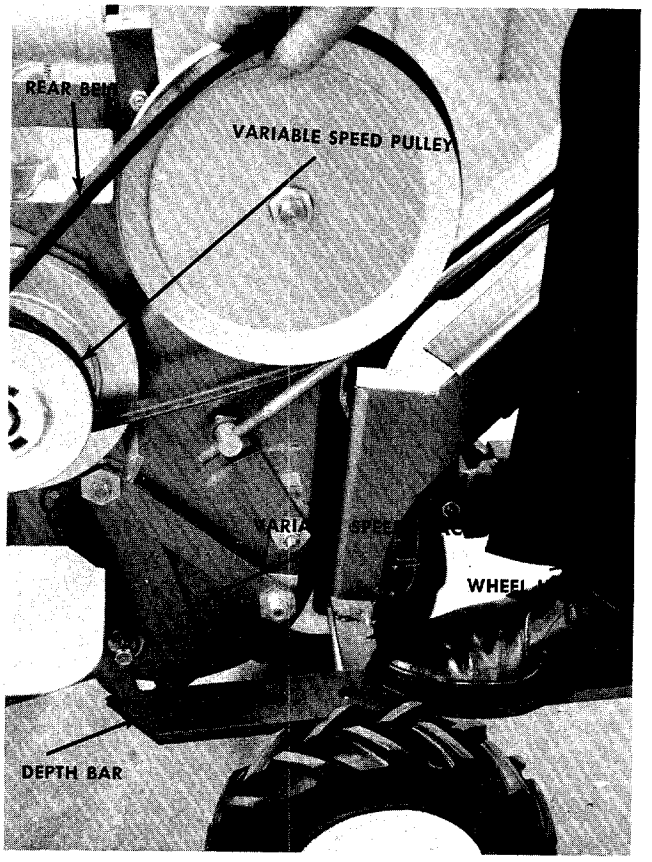


FIGURE 4-8. BELT REMOVAL

Step 3. Place your foot on the rear of the depth bar and apply pressure. The belts will go slack.

Step 4. Remove the REAR belt first and ALLOW IT TO FORM A LOOP AROUND THE VARIABLE SPEED PULLEY.

Step 5. Slide the center section of the variable-speed pulley towards the engine. See Figure 4-7.

Step 6. Remove the FORWARD belt from the engine pulley and the variable-speed pulley.

NOTE

By following this order of belt removal, it is not necessary to remove the belt guard on the varible-speed pulley.

Step 7. Remove the rear belt from the variable-speed pulley.

Step 8. Reassemble with the new belts.

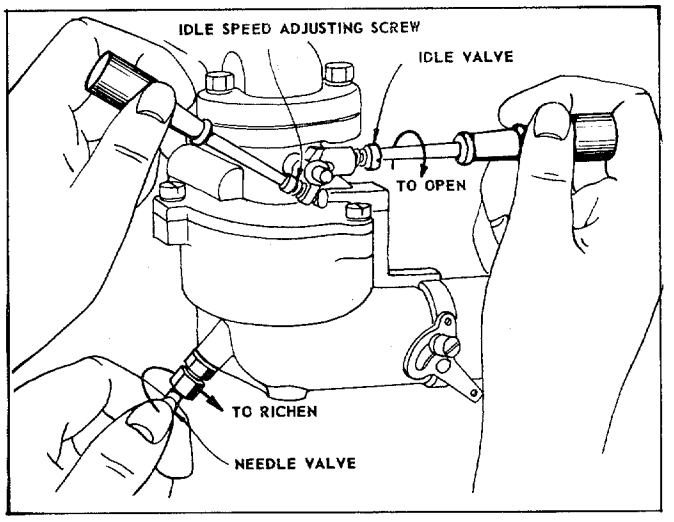


FIGURE 4-9. CARBURETOR ADJUSTMENT

4-11. ADJUSTING THE CARBURETOR

Minor carburetor adjustment may be required to compensate for differences in fuel, temperature, altitude and load.

To Adjust Carburetor:

Turn needle valve clockwise until it just closes. See Figure 4-9.

CAUTION

Valve may be damaged by turning it in too far.

Now open needle valve 1½ turns counter-clockwise.

Close idle valve in same manner and open ¼ to ¾ turns. This initial adjustment will permit the engine to be started and warmed up prior to final adjustment.

Final Adjustment:

Turn needle valve in until engine misses (lean mixture) then turn it out past smooth operating point until engine runs unevenly (rich mixture). Now turn needle valve to the mid-point between rich and lean so the engine runs smoothly.

Hold throttle at idle position and set idle speed adjusting screw until fast idle is obtained (1750 RPM).

Hold throttle in idle position and turn idle valve in (lean) and out (rich) until engine idles smoothly. Then reset idle speed adjusting screw so that engine idles at 1750 RPM. Release throttle—engine should accelerate without hesitation or sputtering. If engine does not accelerate properly, the carburetor should be re-adjusted to a slightly richer mixture.

4-12. ADJUSTING CARBURETOR CHOKE

Proper choke and stop switch operation is dependent upon proper adjustment of remote controls on the powered equipment.

To Check The Operation Of The Choke:

Step 1. Remove the air cleaner.

Step 2. Pull the throttle control all the way out to the CHOKE position. See Figure 2-1. The choke should be closed.

Step 3. The engine should shut off when the throttle control is all the way in. (STOP position.)

To Adjust:

Place remote control lever on equipment in FAST (high speed) position. Loosen control casing clamp screw "B." Move control casing "A" and wire until lever "D" touches choke operating link at "C." Tighten casing clamp screw "B." Replace air cleaner. See Figure 4-10.

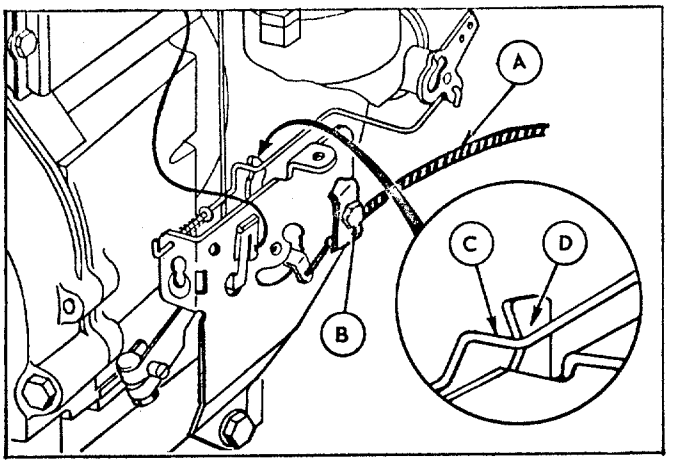


FIGURE 4-10. CHOKE ADJUSTMENT

4-13. MAGNETO AND SPARK PLUG CHECK

WARNING

WHENEVER CHECKING THE MAGNETO OR THE SPARK PLUG FOR AN ELECTRICAL SPARK, USE INSULATED PLIERS TO HOLD THE SPARK PLUG WIRE OR THE SPARK PLUG.

a. Magneto Check

Step 1. Disconnect the spark plug wire from the spark plug, and place throttle control lever in CHOKE or FAST position.

Step 2. Using insulated pliers, hold the wire close (¼-inch distance) to engine block or cylinder, then crank the engine several times. A spark should jump from the wire to the block or cylinder; if a spark does not occur, check the wire and the magneto.

b. Spark Plug Check

Step 1. Remove spark plug from cylinder but leave the wire connected, and set throttle at CHOKE or FAST position.

Step 2. Using insulated pliers, hold the metal side of the spark plug in contact with the engine block, and crank the engine several times. The spark should jump the gap between the center and side electrode in the plug.

Step 3. If a spark does not occur, check the electrode gap and repeat step 2. If no spark occurs, replace the plug.

4-14. OFF-SEASON STORAGE

If the machine is to be inoperative for a period longer than 30 days, the following precautions are recommended:

Step 1. Working outdoors, drain all fuel from the fuel tank. Use a clean dry cloth to absorb the small amount of fuel remaining in the tank, then run the engine until all fuel in carburetor is exhausted.

WARNING

DO NOT DRAIN FUEL WHILE SMOKING OR IF NEAR AN OPEN FIRE.

Step 2. Drain all the oil from the crankcase (this should be done after the engine has been operated and is still warm) and refill the crankcase with clean new oil.

Step 3. Disconnect the spark plug wire and remove the spark plug from the cylinder. Pour about six drops of engine oil into the cylinder, and then pull the recoil starter several times to spread the oil on the cylinder wall. Replace the spark plug, but DO NOT connect the wire.

Step 4. Clean the engine and the entire tiller thoroughly.

Step 5. Lubricate the gear cane an indicated in paragraph 4-2.

Step 6. Wipe tines with oiled rag to prevent rust.

MAINTENANCE LOG

After using and servicing the machine, enter the data on this log for future reference. Change oil after first 5 hours of operation; thereafter, change oil every 25 hours of operation. Clean the air cleaner every 10 hours; every hour under very dusty conditions. Lubricate all points indicated in figures 4-2, 4-3 and 4-4 every 10 hours.

STARTING TIME	FINISHING TIME	OPERATING TIME	ACCUMULATED TIME	OIL CHANGE	AIR CLEANER	LUBRI-CATION	COMMENTS

SECTION 5

EXPLODED VIEWS

AND

PARTS LIST

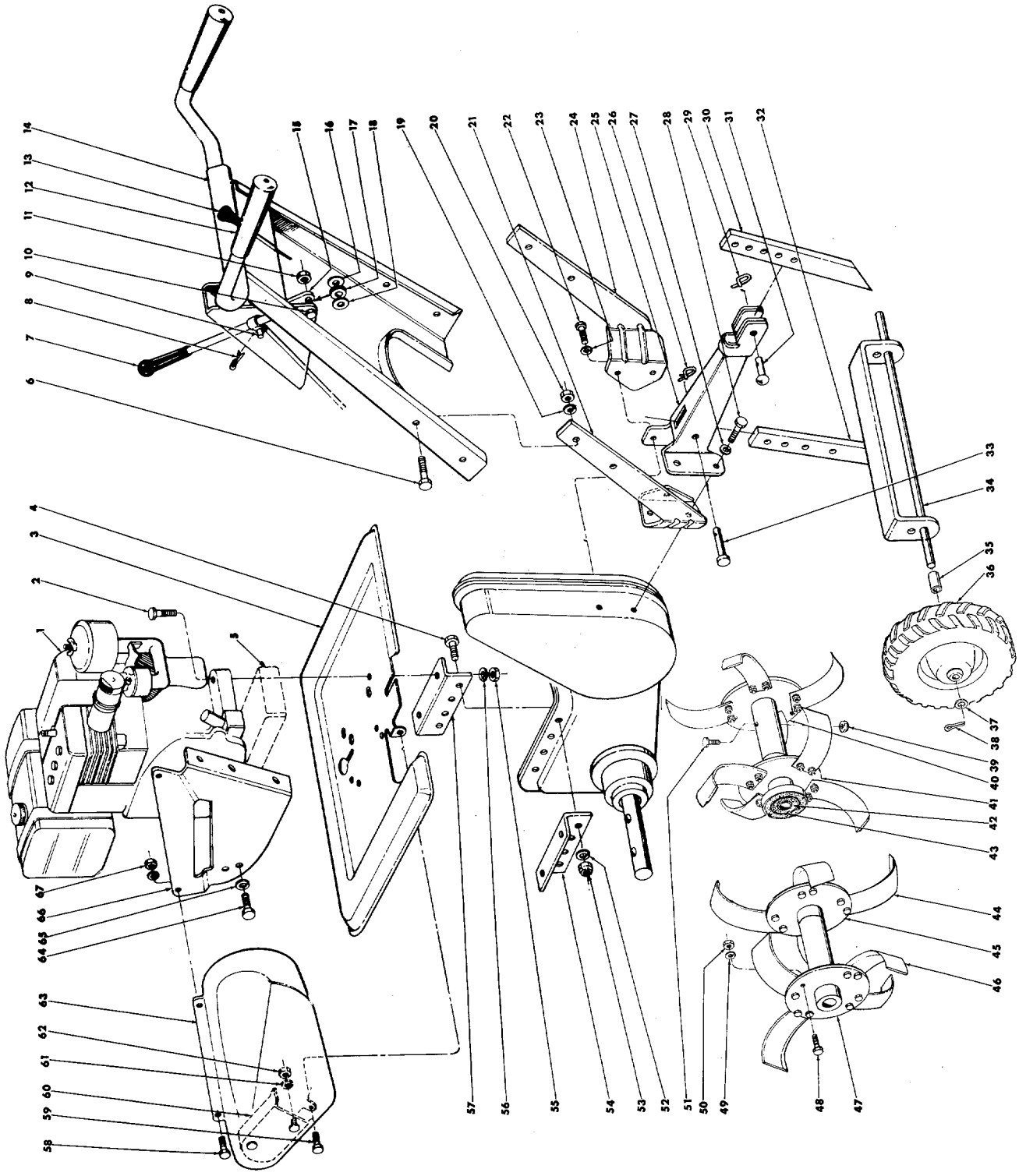


FIGURE 5-1. PENNCRAFT TILLER MODEL 1850

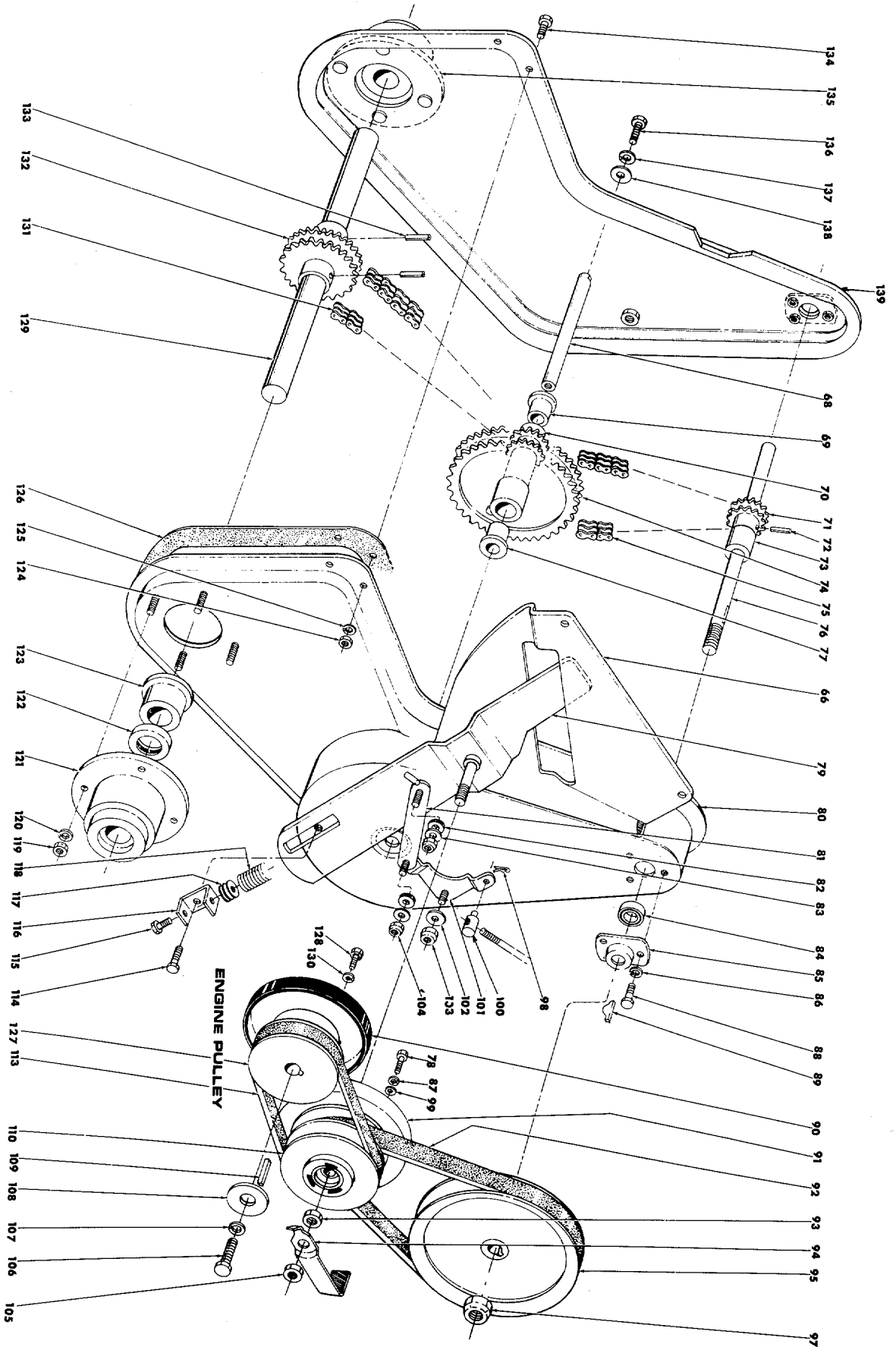


FIGURE 5-2. PENNCRAFT TILLER MODEL 1850

PARTS LIST—ROTARY TILLER MODEL 1850

WHEN ORDERING REPAIR PARTS, ALWAYS GIVE THE FOLLOWING INFORMATION AS SHOWN IN THIS LIST:

1. The PART NUMBER 2. The PART NAME 3. MODEL NUMBER

DO NOT use Reference Numbers when ordering Repair Parts, always use Part Numbers

Your lawn mower is right hand (R.H.) or left hand (L.H.) as you ride.

REF. NO.	PART NO.	DESCRIPTION	APPROX. SELLING PRICE
1	—	Engine	
2	710-380	Hex Hd. Cap Scr. 5/16-18 x 1¾ Lg.*	.20
3	384-4524	Tine Shield	
4	710-376	Hex Hd. Cap Scr. 5/16-18 x 1 Lg.*	.20
6	710-216	Hex Hd. Cap Scr. ⅜-16 x ¾ Lg.*	.20
7	720-143	Grip	.60
8	714-507	Cotter Pin 3/32 x ¾ Lg.*	.20
9	711-422	Control Rod	
10	710-106	Hex Hd. Cap Scr. ¼-20 x 1¼ Lg.*	.20
11	712-107	Hex Center Lock Nut ¼-20 Thd.*	.20
12	305-1166	Grip	.30
13	746-122	Throttle Control—Complete	2.25
14	384-4533	Handle Assembly	
15	310-4525	Control Lever Assembly	
16	736-325	Flat Washer*	.20
17	736-155	Rubber Washer	.20
18	736-325	Flat Washer*	.20
19	736-217	Spring Lockwasher ⅜ Screw*	.20
20	712-798	Hex Nut ⅜-16 Thd.*	.20
21	428-4506	Handle Mounting Bracket L.H.	
22	710-253	Hex Hd. Cap Scr. ⅜-16 x 1 Lg.*	.20
23	736-217	Spring Lockwasher ⅜ Scr.*	.20
24	428-4505	Handle Mounting Bracket R.H.	
25	428-4507	Tail Piece	
26	732-194	Spring Pin	.50
27	736-148	Ext. Lockwasher for ⅜ Scr.*	.20
28	710-253	Hex Hd. Cap Scr. ⅜-16 x 1 Lg.*	.20
29	732-194	Spring Pin	.20
30	428-4328	Depth Bar	4.80
31	711-231	Clevis Pin	.30
32	428-4527	Wheel Hanger Bracket	
33	711-510	Clevis Pin	
34	310-4451	Rear Axle	
35	711-313	Spacer	.80
36	501-8929	Wheel Assembly	6.00
37	736-160	Flat Washer*	.20
38	714-115	Cotter Pin ⅛ Dia. x 1 Lg.*	.20
39	712-236	Hex Elastic Stop Nut 7/16-20 Thd.*	.20
40	428-4474	Outer Tine Adapter	
41	428-4511	Inner Tine Adapter	
42	736-220	Dust Pad	
43	736-224	Dust Pad	
44	742-113	Tine L. H.	1.80
45	428-4511	Inner Tine Adapter	
46	742-110	Tine R.H.	1.80
47	428-4474	Outer Tine Adapter	
48	710-152	Hex Hd. Cap Scr. ⅜-24 x 1 Lg.*	.20
49	736-169	Spring Lockwasher ⅜ Scr.*	.20
50	712-711	Hex Jam Nut ⅜-24 Thd.*	.20
51	710-483	Hex Hd. Cap Scr. 7/16-20 x 2¼ Lg.*	.20
52	736-119	Spring Lockwasher 5/16 Scr.*	.20
53	712-158	Hex Center Lock Nut 5/16-18 Thd.*	.20
54	428-4519	Engine Mounting Bracket	
55	712-158	Hex Center Lock Nut 5/16-18 Thd.*	.20
56	736-119	Spring Lockwasher 5/16 Scr.*	.20
57	428-4519	Engine Mounting Bracket	
58	710-258	Hex Hd. Cap Scr. ¼-20 x ⅝ Lg.*	.20
59	710-252	Hex Hd. Cap Scr. ¼-20 x ¾ Lg.*	.20
60	312-4516	Belt Guard	
61	736-329	Spring Lockwasher ¼ Scr.*	.20
62	712-287	Hex Nut ¼-20 Thd.*	.20
63	312-4537	Belt Trap Assembly	
64	710-121	Hex Hd. Cap Scr. ½-20 x ¾ Lg.*	.20
65	736-921	Spring Lockwasher ½ Scr.*	.20
66	312-4523	Variable Speed Guide Bracket	
67	712-287	Hex Nut ¼-20 Thd.*	.20
68	711-504	Sprocket Shaft	
69	748-855	Flange Bearing	1.00
70	310-4529	Double Sprocket Assembly	
71	717-188	11-2 Tooth Sprocket ⅜ Pitch	
72	715-120	Spirol Pin 3/16 Dia. x 1 Lg.—Heavy Duty	.20
73	750-118	Spacer	.50
74		Part of Ref. No. 70	
75	713-149	Roller Chain w/Master Link #35-2 x 36¾ Lg.	
76	711-505	Pulley Shaft	
77	748-855	Flange Bearing	1.00
78	710-230	Hex Hd. Cap Scr. ¼-28 x ½ Lg.*	.20
79	428-4517	Variable Speed Bracket Assembly	
80	428-4501	Housing Assembly L.H.	
81	428-11021	Eccentric Link	
82	736-161	Rubber Washer	.20
83	736-703	Flat Washer	.20
84	741-155	Ball Bearing ⅝ x 1⅜	
85	310-5034	Bearing Housing	.60
86	736-329	Spring Lockwasher ¼ Scr.*	.20
87	736-329	Spring Lockwasher ¼ Scr.*	.20
88	710-258	Hex Hd. Cap Scr. ¼-20 x ⅝ Lg.*	.20
89	714-136	Hi Pro Key #505	
90	310-5080	Friction Wheel Assembly	11.50
91	310-4515	Friction Disc	
92	754-158	V-Belt 21/32 x 35 Lg. Special	
93	712-461	Hex Jam Nut ½-13 Thd.	.20
94	428-4520	Variable Speed Belt Guard	
95	756-167	8" x ⅝" Pulley	
96	726-106	Push On Pal Nut (Not Shown)	.20
97	712-221	Hex Elastic Stop Nut ⅝-18 Thd.	.40
98	714-115	Cotter Pin ⅛ Dia. x 1 Lg.	.20
99	736-204	Flat Washer	.20
100	711-392	Ferrule	.40
101	428-4521	Link Bracket Assembly	
102	736-703	Flat Washer	.20
103	712-116	Hex Elastic Stop Nut ⅜-24 Thd.*	.20
104	712-116	Hex Elastic Stop Nut ⅜-24 Thd.*	.20
105	712-461	Hex Jam Nut ½-13 Thd.	.20
106	710-152	Hex Hd. Cap Scr. ⅜-24 x 1 Lg. (Heat Treated)*	.20
107	736-217	Spring Lockwasher ⅜ Scr.* (Heavy Duty)	.20
108	310-7386	Flat Washer	.20
109	714-118	Square Key ¼ Sq. x 1½ Lg.*	
110	310-10843	Variable Speed Pulley Assembly	
111	750-166	Spacer (For Item 116) Not Shown	
112	748-180	Pivot Slide (For Item 79) Not Shown	
113	754-157	V-Belt 21/32 x 28 Lg. Special	
114	738-138	Shoulder Bolt Special	
115	710-380	Hex Hd. Cap Scr. 5/16-18 x 1¾ Lg.*	.20
116	310-11002	Spring Bracket	
117	711-509	Spring Insert	
118	732-232	Variable Drive Spring	
119	712-158	Hex Center Lock Nut 5/16-18 Thd.*	.20
120	736-119	Spring Lockwasher 5/16 Scr.*	.20
121	428-4530	Cast Bearing Housing Assembly	
122	721-117	Oil Seal 1¼ x 1¾	
123	748-194	Flange Bearing 1¼ x 1¾	
124	712-287	Hex Center Lock Nut ¼-20 Thd.*	.20
125	736-329	Spring Lockwasher ¼ Scr.*	.20
126	721-119	Gasket	
127	310-4531	Engine Pulley	
128	710-118	Hex Hd. Cap Scr. 5/16-18 x ¾ Lg.	.20
129	711-506	Tine Shaft	
130	736-119	Spring Lockwasher 5/16 Scr.*	.20
131	713-150	Roller Chain w/Master Link #40-2 x 34 Lg.	
132	717-189	24-2 Tooth Sprocket ½" Pitch	
133	715-125	Spirol Pin ⅜ Dia. x 2 Lg. (Heavy Duty)	.20
134	710-258	Hex Hd. Cap Scr. ¼-20 x ⅝ Lg.*	.20
135	428-4530	Cast Bearing Housing Assembly	
136	710-118	Hex Hd. Cap Scr. 5/16-18 x ¾ Lg.*	.20
137	736-119	Spring Lockwasher 5/16 Scr.*	.20
138	736-703	Flat Washer	.20
139	428-4503	Housing Assembly R.H. Side	

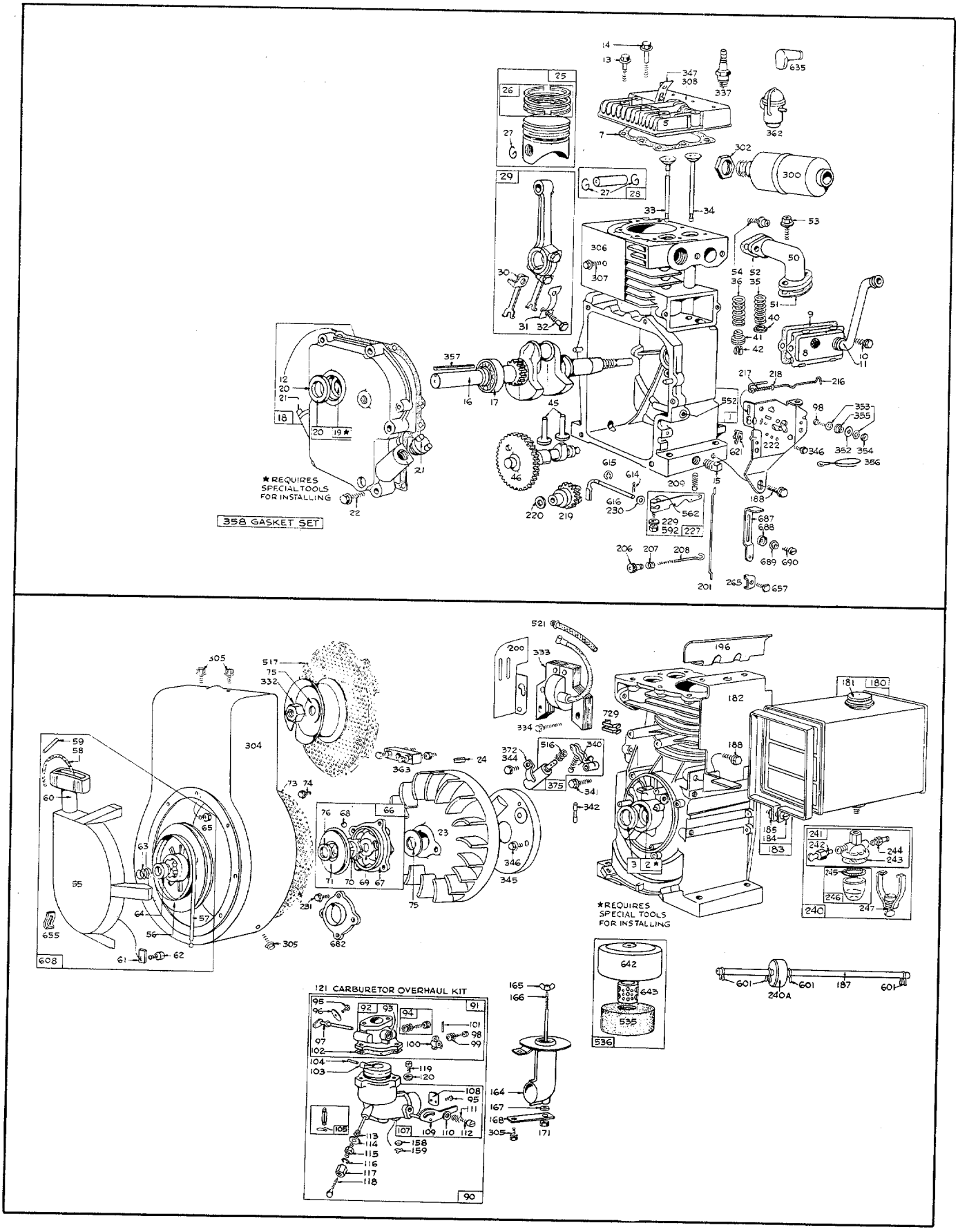


FIGURE 5-3. ENGINE MODEL 190402-0689-01

PARTS LIST ENGINE MODEL 190402-0689-01

REF. NO.	PART NO.	DESCRIPTION	APPROX. SELLING PRICE
1	390399	Cylinder Assembly	36.95
2	295962	Bushing—Cylinder	1.20
		Note: Requires special tools for installation.	
3	294606	Seal—Oil	.55
5	211778	Head—Cylinder	4.95
7	*270430	Gasket—Cylinder Head	.45
8	390321	Breather Assembly	1.20
9	*27803	Gasket—Valve Cover	.20
10	93536	Screw—Sem	.20
11	67068	Tube Breather	.60
12	*27750	Gasket—Crankcase Cover—1/64" Thick	.20
	*27876	Gasket—Crankcase Cover—.005" Thick	.20
	*27877	Gasket—Crankcase Cover—.009" Thick	.20
13	93210	Screw—Cylinder Head (2-9/32" Long)	.20
	93583	Stud—Cylinder Head (2). Used on type Nos. 0646, 0647	.45
14	93211	Screw—Cylinder Head (2-9/16" Long)	.20
15	91084	Plug—Oil Drain	.20
	93418	Plug—Oil Drain (Hex Socket) Used on type Nos. 0144, 0652.	.20
16	261149	Crankshaft	38.00
17	29530	Bearing—Ball	6.35
18	299167	Cover Assy.—Crankcase	12.95
19	295964	Bushing—Crankcase Cover	1.65
		Note: Requires special tools for installation.	
20	298423	Seal—Oil	.85
21	66768	Plug—Oil Filler	.20
22	93585	Screw—Crankcase Cover Mounting Sem	.75
23	298260	Flywheel	19.50
24	61760	Key—Flywheel	.20
25	390347	Piston Assembly—Std.	9.60
	390348	Piston Assembly—.010" O.S.	9.60
	390349	Piston Assembly—.020" O.S.	9.60
	390350	Piston Assembly—.030" O.S.	9.60
RING SETS:			
26	299569	Ring Set—Piston—Std.	4.25
		CONSISTS OF—	
	211637	Ring—Piston, Comp., Top, Std.	1.25
	211636	Ring—Piston, Comp., Center, Standard	1.25
	211635	Ring—Piston, Oil, Std.	1.25
	299570	Ring Set—Piston—.010" O.S.	4.25
		CONSISTS OF—	
	211649	Ring—Piston, Comp., Top, .010" O.S.	1.25
	211650	Ring—Piston, Comp., Center, .010" O.S.	1.25
	211651	Ring—Piston, Oil, .010" O.S.	1.25
	299571	Ring Set—Piston—.020" O.S.	4.25
		CONSISTS OF—	
	211653	Ring—Piston, Comp., Top, .020" O.S.	1.25
	211654	Ring—Piston, Comp., Center, .020" O.S.	1.25
	211655	Ring—Piston, Oil, .020" O.S.	1.25
	299572	Ring Set—Piston—.030" O.S.	4.25
		CONSISTS OF—	
	211657	Ring—Piston, Comp., Top, .030" O.S.	1.25
	211658	Ring—Piston, Comp., Center, .030" O.S.	1.25
	211659	Ring—Piston, Oil, .030" O.S.	1.25
27	68546	Lock—Piston Pin	.20
28	295840	Pin Assy.—Piston—Std.	1.15
	295841	Pin Assembly—Piston—.005" O.S.	1.15
29	390401	Rod Assy.—Connecting	3.90
		Note: For Connecting Rod with .020" undersize Crankpin Bore—Order No. 390773.	
30	222113	Dipper—Connecting Rod	45
31	222114	Lock—Conn. Rod Screw	.20
32	92659	Screw—Connecting Rod	.20
33	390419	Valve—Exhaust	3.25
34	261055	Valve—Intake	1.70
35	65906	Spring—Intake Valve	.30
36	26828	Spring—Exhaust Valve	.80
40	221596	Retainer—Intake Valve	.25
41	292260	Rotocoil—Exhaust Valve	3.15
42	93630	Retainer—Exhaust Valve Rotocoil (2)	.20
45	260933	Tappet—Valve	.55
46	210728	Gear—Cam	5.70
50	211812	Elbow—Intake	1.60
51	*270684	Gasket—Intake Elbow	.20
52	*27828	Gasket—Intake Elbow Mtg.	.20
53	93128	Screw—Carburetor Mounting Sem	.20
54	93208	Screw—Intake Elbow Mounting Sem	.20
55	295272	Housing—Rewind Starter	4.10
56	295871	Pulley—Rewind Starter	2.95
57	294303	Spring—Rewind Starter	.75
58	66564	Rope—Rewind Starter (63" Long)	.80
59	230228	Pin—Starter Grip	.20
60	66728	Grip—Starter Rope	.55
61	68848	Bumper—Starter Pulley	.20
62	93254	Screw—Pulley Bumper Mounting Sem	.20
63	260414	Spring—Ratchet	.20
64	230543	Adapter—Ratchet Spring	.35
65	93106	Screw—Rewind Starter Housing Mounting Sem	.20
66	298798	Clutch Assy.—Rewind Starter	3.00
67	211383	Housing—Rewind Starter Clutch	1.35
68	63770	Ball—Clutch	.20
69	66718	Washer—Starter Clutch Thrust	.20
70	298799	Ratchet—Rewind Starter Clutch	.95
71	221653	Washer—Retainer	.20
73	221796	Screen—Rewind Starter	.80
75	220865	Washer—Spring	.20
76	68238	Washer—Ratchet Sealing	.20
90	390727	Carburetor Assembly (Manual Choke)	19.50
91	390404	Body Assembly—Upper Carburetor	8.80
92	390503	Body—Upper Carburetor	5.20
93	23108	Bushing—Throttle Shaft	.25
94	†292681	Valve Assembly Carburetor Idle	.25
95	93038	Screw—Throttle and Choke Valve Mtg. Sem	.20
96	62940	Valve—Throttle	.20
97	298826	Shaft and Lever—Throttle	1.55
98	91920	Screw—Machine, Fil. Hd.—8-32 x 5/8"	.20
99	26157	Spring—Throttle Adjustment	.20
100	61967	Stop—Throttle	.65
101	93043	Pin—Throttle Stop	.20
102	†27918	Gasket—Carburetor Body	.20
103	99333	Float—Carburetor	.95
104	†230896	Pin—Float Hinge	.20
105	299096	Valve—Fuel Inlet	.60
107	390403	Body Assembly—Lower Carburetor	6.15
108	62872	Valve—Choke	.20
110	62899	Washer—Choke Lever	.20
111	26155	Spring—Choke Lever	.20
112	23123	Screw—Choke Lever	.20
113	†390395	Nozzle—Carburetor	2.00
114	†68667	Gasket—Nozzle	.20
115	†23117	Retainer—Needle Valve	.35
116	†68677	Packing—Needle Valve	.20
117	†23118	Nut—Needle Valve Pkng.	.20
118	†230009	Valve—Needle	.40
119	90746	Screw—Machine, Fil. Hd.—10-32 x 5/8"	.20
120	92290	Washer—Lock—No. 10 x 1/16" x 3/64"	.20
121	295938	Carburetor Overhaul Kit	4.25
158	27590	Filter—Carburetor Drain	.20
159	220521	Retainer—Carburetor Drain Filter	.20
164	390311	Pipe Assy.—Air Cleaner	2.80
165	93453	Nut—Wing	.30
166	230768	Stud—Air Cleaner	.45
167	66648	Gasket—Air Cleaner Stud	.20
168	222150	Strap—Air Cleaner Pipe	.30
171	92129	Nut—Hex—1/4-28	.20
180	290816	Tank Assy.—Fuel (4 quart)	9.50
181	69221	Cap—Fuel Tank	.30
182	221935	Bracket—Fuel Tank	2.15

PARTS LIST ENGINE MODEL 190402-0689-01

Ref. No.	Part No.	Description	Approx. Selling Price
183	291367	Strap Assy.—Fuel Tank	1.00
184	91257	Screw—Machine, Fil. Hd.—¼-20 x 1½"	.20
185	90970	Nut—Square—¼-20	.20
187	299942	Pipe—Fuel (Flexible) 13½" Long	.95
196	22907	Support—Upper Fuel Tank	.60
200	221760	Guide—Air	.20
201	260872	Link—Governor	.20
206	230149	Nut—Gov. Control Rod	.40
207	26855	Spring—Gov. Control Rod	.20
208	230841	Rod—Governor Control	.30
209	260695	Spring—Governor	.30
216	261122	Link—Choke	.20
217	261119	Spring—Choke Link	.20
218	221198	Washer—Choke Link	.20
219	297656	Gear—Governor	1.45
220	221551	Washer—Thrust	.20
222	390670	Plate—Governor Control	
227	299165	Lever Assy.—Governor	.65
230	221559	Washer—Spacer	.20
231	93064	Screw—Sem	.20
240	295984	Filter Assembly—Fuel	3.95
240A	298090	Filter—Fuel (In Fuel Pipe)	2.75
241	296005	Cover Assembly—Fuel	2.90
242	295913	Valve—Fuel Shut-Off	.80
243	22547	Screen—Fuel Filter	.20
245	*68477	Gasket—Fuel Filter Bowl	.20
246	298683	Bowl—Fuel Filter	.35
247	99665	Yoke—Fuel Filter	.70
265	221535	Clamp—Casing	.20
300	390578	Muffler—Exhaust	1.95
302	91242	Locknut—Muffler and Elbow	.25
305	93158	Screw—Sem	.20
306	221898	Shield—Cylinder	.45
307	93163	Screw—Cylinder Shield Mtg. Sem	.20
308	221901	Cover—Cylinder Head	.30
333	298968	Armature Assembly	7.20
334	93381	Screw—Armature Mtg. Sem	.20
337	298809	Plug—Spark (1½" high—38 M.M.)	1.10
340	26018	Spring—Breaker Arm	.20
341	93381	Screw—Breaker Arm Mounting Sem	.20
342	65704	Plunger—Breaker Point	.30
345	222117	Cover—Breaker Point	.45
346	93014	Screw—Sem	.20
347	221808	Switch—Stop	.20
352	66068	Washer—Insulating	.20
353	92791	Washer—Lock—Shakeproof (3)	.20
354	90576	Nut—Hex—8-32 (2)	.20
355	66554	Collar—Insulating	.20
356	299500	Wire—Ground	.20
357	91540	Key—Pulley	.20
358	299577	Gasket Set	1.45
362	291630	Shield—Spark Plug (With Stop Switch)	2.70
372	220477	Clamp—Condenser	.20
375	294628	Breaker Points and Condenser Set	1.85
	299061	Ignition Kit	2.20
		INCLUDES—	
	294628	Point Set	1.85
	65704	Plunger	.30
	61760	Key—Flywheel	.20
521	298529	Shielding—Ignition Cable	.65
535	270093	Element—Air Cleaner	3.05
536	390400	Cleaner Assy.—Air	4.05
552	230843	Bushing—Governor Shaft	.65
562	92613	Bolt—Governor Lever	.20
592	90356	Nut—Hex—10-24	.20
601	93053	Clamp—Fuel Pipe	.20
605	297187	Bracket—Guard (Upper)	1.60
608	295001	Starter Assy.—Rewind	10.95
614	93306	Cotter—Hair Pin	.20
615	93307	Retainer—E-Ring	.20
616	230842	Crank—Governor	.95
621	297472	Switch—Stop	.20
635	66538	Elbow—Spark Plug	.50
642	221468	Cover—Air Cleaner	.85
643	280001	Cup—Air Cleaner	.50
655	221014	Anchor—Spring	.20
657	93496	Screw—Sem	.20
682	211516	Shield—Starter Clutch	.70
687	298957	Slide—Friction Control	.85
688	221766	Cap—Friction Spring	.20
689	260847	Spring—Friction	.20
690	92484	Screw—Machine, Fil. Hd.—10-32 x ½"	.20

*Included in Gasket Set—Part No. 299577.

†Included in Carburetor Overhaul Kit—Part No. 295938.