Carburetor Adjustments

If your engine skips, backfires, or starts hard, carburetor adjustments may be required (first make sure the air filter is clean and the spark plug is in good condition).

Minor adjustments may also be required to compensate for differences in fuel, temperature, altitude, or engine load. DO NOT MAKE UNNECESSARY ADJUSTMENTS.

CAUTION:

- **Do not run engine in an enclosed or poorly ventilated area. Exhaust gases contain carbon monoxide, an odorless, tasteless, and deadly poison.**
- **Keep cigarettes, sparks, and open flames away from carburetor and fuel system area to prevent fire or explosion.**
- **Keep hands and face away from hot muffler and surrounding parts.**

IMPORTANT

- **Do not close the adjusting screws or needles too tight. Doing so can damage the screws or seats.**
- **Remember to pause 10 to 15 seconds after each adjustment to allow the engine to react to the new settings.**

6 HP and 7 HP Carburetor Adjustments

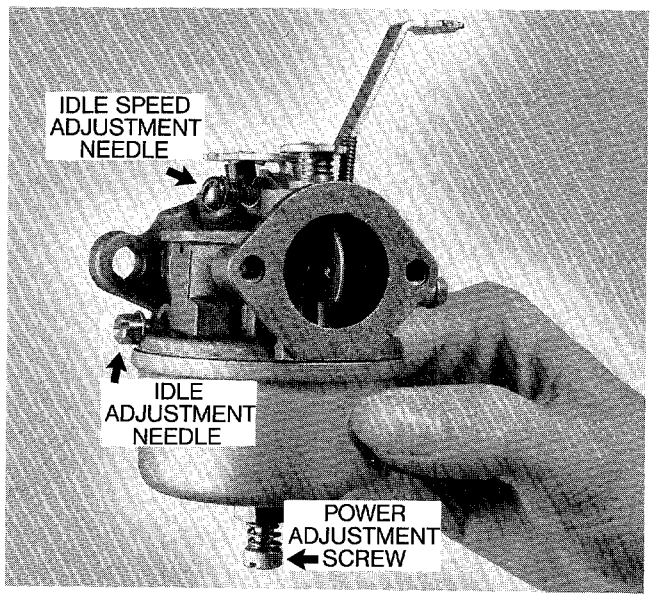
POWER ADJUSTMENT SCREW: This screw (See Photo 7/55 or 7/56) regulates the fuel-to-air mixture for high speed or power. If the engine seems to have enough power before you start tilling, but then loses power the minute you engage the tines in the soil, it probably means you have to open the screw about 1/4 to 1/2 of a turn. This provides a richer fuel mixture, allowing more fuel to flow. (Be sure not to run the engine so richly that it smokes—normally you shouldn't see any exhaust.)

If you're not sure where the screw should be set and your engine is running reasonably well, then you should set the engine throttle at a fast position and turn the screw outward until the engine coughs and sputters (overly rich mixture). Now, count the turns as you turn the screw back inward (see Photo 7/57 or 7/58) until it again coughs and sputters (too lean a mixture). Then, go back to the halfway point between the two extremes you have just located. That position, or opening the screw about 1/2 turn more, should be the proper setting for tilling.

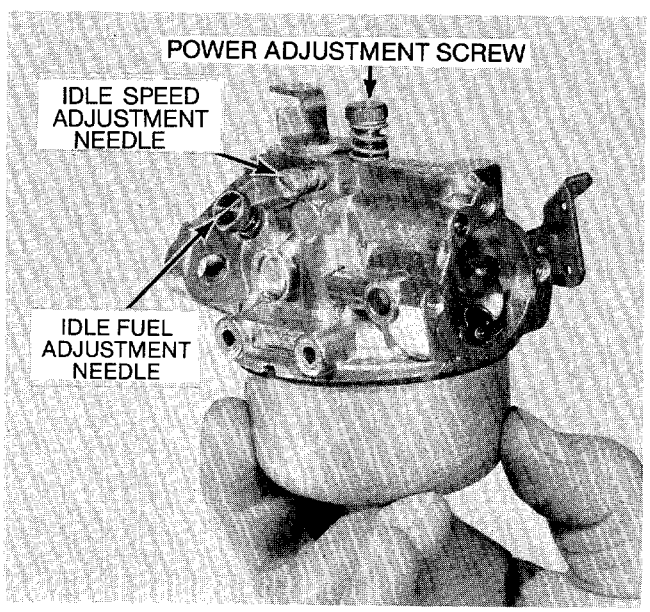
IDLE FUEL ADJUSTMENT NEEDLE: This needle (see Photo 7/55 or 7/56) affects the idle fuel mixture. If you open the throttle lever on the handlebar and the engine will not accelerate properly (it hesitates or misses), you will likely have to open up the idle fuel needle to a little richer mixture.

Make sure the engine is warm and that the throttle lever on the handlebar is in a slow (idle) setting before adjusting this needle. Turn the needle out about 1/8 turn at a time and allow the engine to adjust to each setting. Finally, recheck the setting on the Power Adjustment Screw—it may need to be slightly readjusted.

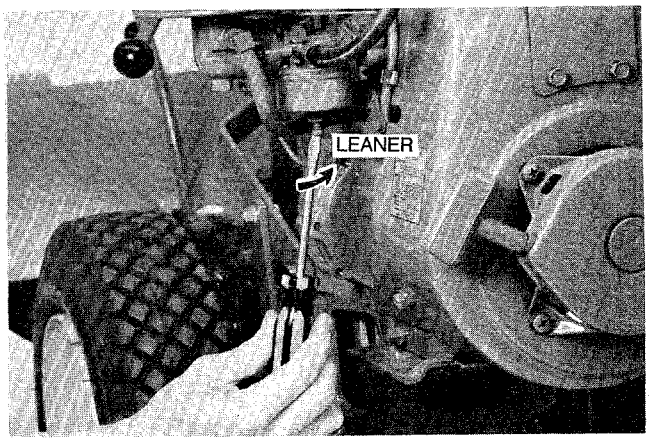
IDLE SPEED ADJUSTMENT NEEDLE: This needle (see Photo 7/55 or 7/56) is a mechanical stop that prevents the throttle from going beyond a certain setting. If the engine is idling too fast, you turn the needle out and it will slow down the idle. Turn the screw in to increase idle speed.



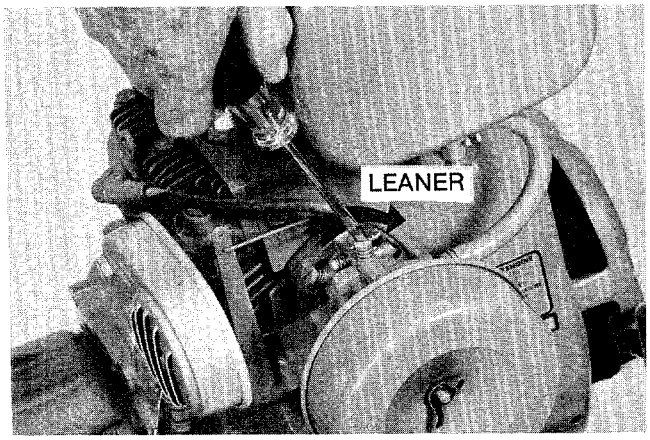
7/55—Carburetor for 6 HP engine.



7/56—Carburetor for 7 HP engine.



7/57—6 HP power adjustment screw.



7/58—7 HP power adjustment screw.

8 HP Carburetor Adjustments

POWER ADJUSTMENT SCREW: This screw (see Photo 7/59) regulates the fuel-to-air mixture for high speed or power. If the engine seems to be running fine, but then loses power when you engage the tines in the soil, it might mean that you need to open up the screw by 1/8 or 1/4 of a turn. As shown in Photo 7/59, when the screwdriver turns the screw to the left, it richens the mixture, allowing more fuel to flow. Turning it to the right leans out the mixture, allowing less fuel and more air (proportionately) in the fuel/air mixture.

If you're not sure where the screw should be set and your engine is running reasonably well, then you should set the engine throttle at a fast position and turn the screw outward until the engine coughs and sputters (overly rich mixture). Now, count the turns as you turn the screw back inward until it again runs roughly (too lean a mixture). Then, go back to the halfway point between the two extremes you have just located. That position, or opening the screw about 1/4 to 1/2 turn more, should be the proper setting for tilling.

IMPORTANT

- **Do not close the adjusting screws or needles too tight. Doing so can damage the screws or seats.**
- **Remember to pause 10 to 15 seconds after each adjustment to allow the engine to react to the new settings.**

Adjusting the Carburetor When the Engine Won't Start

If the carburetor is so far out of adjustment that you can't get the engine started, try using the settings below for your particular engine. These initial adjustments should permit the engine to be started so that you can then make any final adjustments that might be needed.

CAUTION: Close screws and needles finger tight only. Overtightening can damage the screws, needles and seats.

6 HP TECUMSEH ENGINE:

1. Turn the Power Adjustment Screw in (towards lean) very gently until it stops. Do not force the screw, or you will damage the needle and seat. Now, turn the screw out 1 1/2 turns.
2. Close the Idle Fuel Adjustment Needle by turning it in very gently until it stops. Now, turn the needle out 1 1/4 turns.
3. Start engine and let it warm up before making any final carburetor adjustments.

7 HP KOHLER ENGINE:

1. Turn the Power Adjustment Screw in (towards lean) very gently until it stops. Do not force the screw, or you will damage the needle and seat. Now, turn the screw out 3 full turns.
2. Close the Idle Fuel Adjustment Needle by turning it in very gently until it stops. Now, turn the needle out 1 1/2 turns.
3. Start engine and let it warm up before making any final carburetor adjustments.

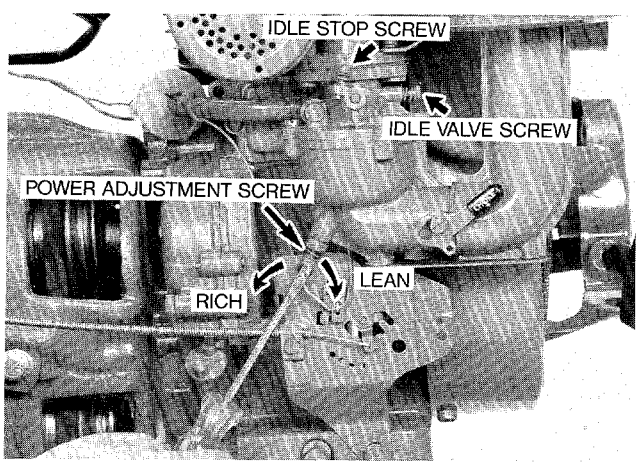
8 HP BRIGGS & STRATTON ENGINE:

1. Turn the Power Adjustment Screw in (towards lean) very gently until it stops. Do not force the screw, or you will damage the needle and seat. Now, turn the screw out 1 1/2 turns.
2. Close the Idle Valve Screw by turning it in very gently until it stops. Now, turn the screw out 1 full turn.
3. Start engine and let it warm up before making any final carburetor adjustments.

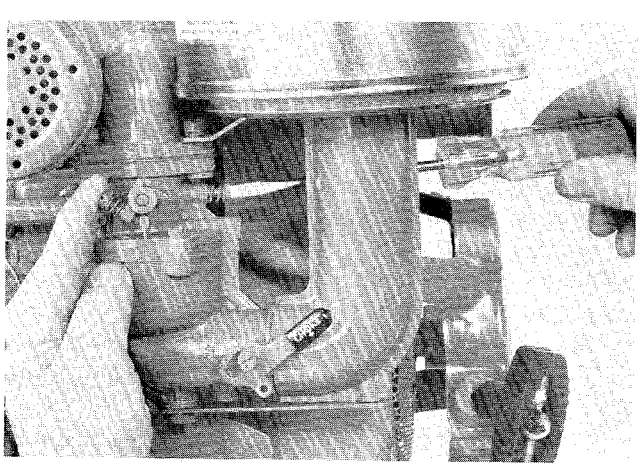
IDLE STOP SCREW: This screw (shown in Photo 7/59), is a mechanical stop that prevents the throttle from going beyond a certain setting. If you turn the screw in further, the engine will idle a little faster because the screw will not allow the throttle to go all the way down (instead, it will stop and hit the plate below a little sooner). If your engine is idling too fast, you turn that screw a little bit out and it will slow down the idle.

IDLE VALVE SCREW: This screw (see Photo 7/60) affects the idle fuel mixture. If you open the throttle lever on the handlebar and the engine will not accelerate properly (it doesn't have a fast recovery), you will likely have to open up the idle valve screw to a little richer mixture.

As shown in Photo 7/60, reach around with your hand and hold the throttle against the idle stop while you make this adjustment. The engine should be running at a relatively slow pace (from 1600 to 1750 RPM idle) while you make this adjustment. While holding the throttle against the idle stop, turn the screw inward to lean and outward to rich. Set it at the midpoint between rich and lean. Then, release the throttle by letting go of the idle stop screw and recheck the idle RPM.



7/59—Carburetor for 8 HP engine.



7/60—Adjusting the 8 HP idle valve screw.

Throttle Cable Adjustments

Even though your engine's throttle cable was attached and adjusted at the factory, it may need an adjustment at a later date.

For instance, the engine could be difficult to start or stop, or it may not respond immediately when you move the throttle lever. Such symptoms could be due to a need for throttle cable maintenance or replacement.

Occasionally, throttle cables become bent or kinked from being twisted or snagged in some way. Rarely, if ever, can kinks be straightened properly to give satisfactory throttle control. If you have a badly kinked cable, please order a new cable from us. When ordering, be sure to include the make and horsepower rating of your engine.

Frequent lubrication of the throttle cable works wonders for smooth performance. Remember to lubricate the cable regularly with either engine oil, grease, silicone spray, or graphite (all work well). Brush or spray the lubricant along the entire length of the casing and into both ends.

CAUTION: Stop the engine and let the muffler cool down before adjusting or replacing the throttle cable.

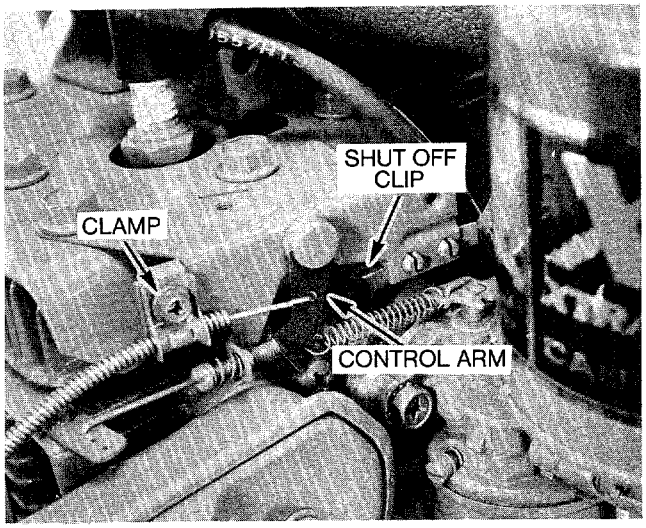
6 HP Cable Adjustments

On the 6 HP engine, engine shut-off and a full range of engine speeds can be selected remotely by moving the throttle control lever on the handlebar.

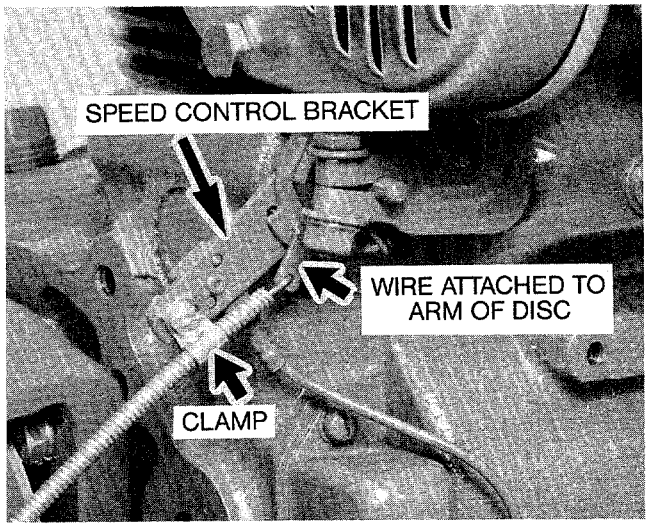
When the throttle lever on the handlebar is moved all the way forward (to the right), the cable moves the Throttle Control Arm on the engine forward until it touches the engine Shut Off Clip—see Photo 7/61. This grounds out the ignition and stops the engine.

If the Control Arm doesn't touch the clip when you move the throttle lever to shut off, then you will have to loosen—but don't remove—the Cable Clamp (shown in Photo 7/61). Then, move the cable forward until it does (the throttle lever on the handlebar should be in the shut off position while you're doing this). Finally, tighten the Cable Clamp and test for proper adjustment.

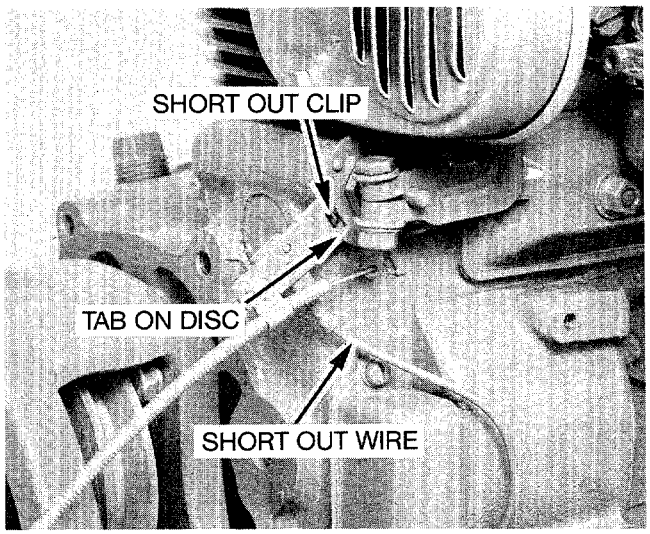
If you are installing a brand-new cable, then simply connect the crimped end of the wire to the Throttle Control Arm, as shown in Photo 7/61. Then place the cable loosely in the Cable Clamp and route the cable up the right handlebar. Attach the control lever to the handlebar (see Section 1, Step 5, for cable hook-up and routing instructions), and then adjust the cable until it makes contact with the shut-off clip, as explained above. Finally, tighten the cable in the clamp and test for proper adjustment.



7/61–6 HP control arm should touch shut-off clip.



7/62–7 HP throttle cable hook-up.



7/63–Tab on disc should contact short-out clip–7 HP.

7 HP Cable Adjustments

The throttle cable on your 7 HP engine contains a wire that connects the throttle lever on the handlebar to the engine.

As shown in Photo 7/62, the outer casing of the cable is fastened to the Speed Control Bracket by a Cable Clamp. The wire inside the casing is then hooked through a hole in the arm of the Speed Regulating Disc.

When you move the throttle lever to the left for engine shutoff, the throttle wire rotates the Speed Regulating Disc in a clockwise direction until a tab on the disc contacts the Short-Out Clip that protrudes through the hole in the Speed Control Bracket–see Photo 7/63. This grounds out the ignition (through the Short Out Wire) and stops the engine.

If the tab on the disc doesn't touch the Short-Out Clip when you move the throttle lever to shut off, then you will have to adjust the cable until it does. First, loosen–but don't remove–the screw in the Clamp that secures the cable to the Speed Control Bracket. Then hold the cable just behind the clamp and pull the cable back as far as you can in the direction of the handlebars. Hold the cable at that position and securely retighten the clamp. Finally, return to the throttle lever on the handlebar and move it to the right and then all the way back to the left. If the cable is adjusted correctly, the tab on the Speed Control Disc will be touching the Short-Out Clip.

If you are installing a brand-new cable, then first connect the crimped end of the wire to the arm of the Speed Regulating Disc (Photo 7/62). Then place the cable loosely in the cable clamp and route the cable up the right handlebar. Attach the control lever to the handlebar (see Section 1, Step 5, for cable hook-up and routing instructions), and then adjust the cable until the disc contacts the short-out clip, as explained above. Finally, tighten the cable in the clamp and test for proper adjustment.

8 HP Cable Adjustments

On the 8 HP engine, the throttle cable containing the throttle wire comes down the handlebar, crosses over to the engine, and then fastens to the Governor Control Bracket by a clamp that holds the cable in position. See Photo 7/64. The wire inside the cable is then hooked through a hole in the Speed Control Lever.

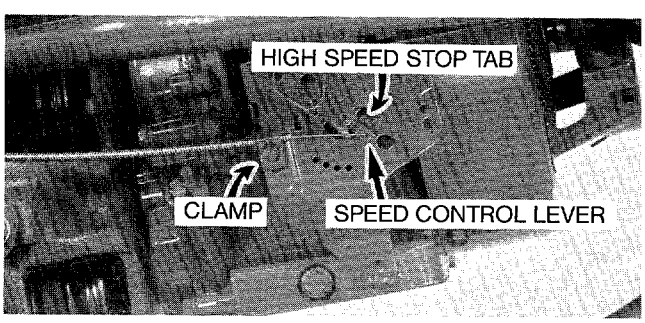
When you push the throttle lever on the handlebar all the way forward to the high speed position, the wire moves the Speed Control Lever forward in the slot until it touches the High Speed Stop Tab–see Photo 7/64. If the lever doesn't quite reach the high speed stop tab, or if you don't

achieve high speed, you should loosen—but don't remove—the cable clamp and push the cable forward until it contacts the tab. After making your adjustment, retighten the cable in the clamp. Then, test to make sure that the cable still engages the Shut Off Switch, as explained next.

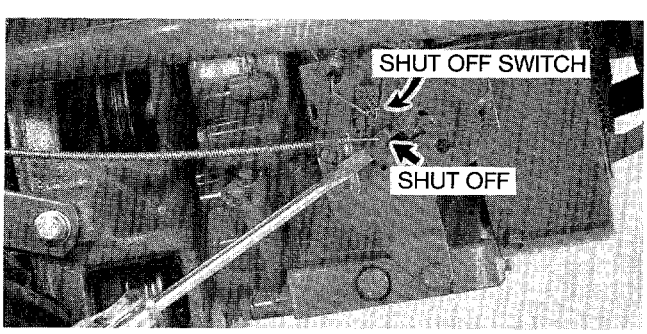
When the throttle lever on the handlebar is moved all the way left to the shutoff position, the Speed Control Lever will move all the way back in the slot—see Photo 7/65. As it does, a tab behind the bracket comes over and touches a grounding point which is attached to the short-out wires. This grounds out the ignition and stops the engine.

The tab behind the bracket should always make good contact with the grounding point. If it doesn't, then loosen—but don't remove—the cable clamp and move the cable backwards until it does. Hold the cable at that position and securely retighten the clamp. If the cable is adjusted correctly, the tab behind the bracket will contact the grounding point when you move the handlebar throttle lever to the stop position.

If you are installing a brand-new cable, then first connect the crimped end of the wire to the Speed Control Lever—see Photo 7/64. Then place the cable loosely in the cable clamp and route the cable up the right handlebar. Attach the control lever to the handlebar (see Section 1, Step 5, for cable hook-up and routing instructions), and then adjust the cable for high-speed and shut-off, as explained above. Finally, tighten the cable in the clamp and test for proper adjustment.



7/64—8 HP speed control lever should reach high speed stop tab.



7/65—8 HP speed control lever at shut-off position.

Removing the 8 HP Engine Fuel Filter

You normally will not have to remove the 8 HP engine fuel line filter for perhaps several years. However, if for some reason you do have to remove it, simply follow the procedure below. NOTE: The filter may be located on either the right or left side of your engine.

A clean, NEW fuel line filter may be installed in either direction. However, if for any reason a USED filter is going to be reinstalled, then the dirty side (the side receiving fresh fuel from the gas tank) of the filter must be replaced so that it is again facing the gas tank side of the engine. (This would be facing the same direction as it was originally mounted.) If you put a dirty filter on backwards—with the dirty side closest to the carburetor—all of the dirt trapped in the filter would flow into your carburetor and cause problems the filter is intended to avoid.

CAUTION:

- **Before removing fuel filter, the engine must be COLD to avoid a fire or explosion.**
- **Keep lighted cigarettes, sparks or open flames away from work area.**

Fuel Filter Removal Steps:

1. Turn the fuel valve under the fuel tank clockwise (inward) to shut off the fuel flow—see Photo 7/66.

2. Using pliers, squeeze the prongs on the clamp next to the filter and move the clamp off the filter and over towards the muffler—see Photo 7/67.

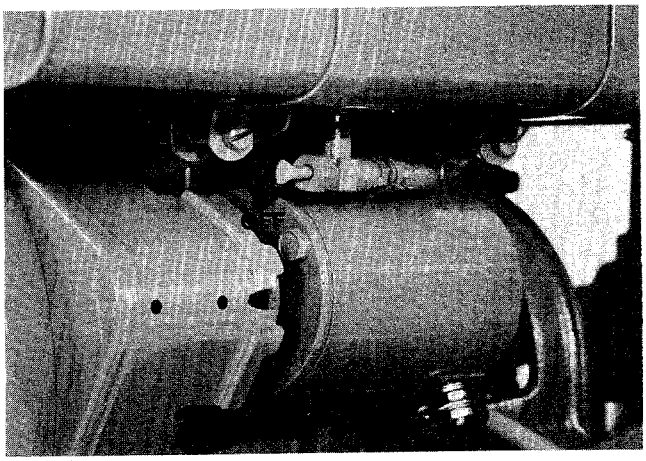
3. Now remove the clamp behind the fuel filter, as shown in Photo 7/68.

4. With both clamps removed, simply pull the filter off the fuel line, as shown in Photo 7/69.

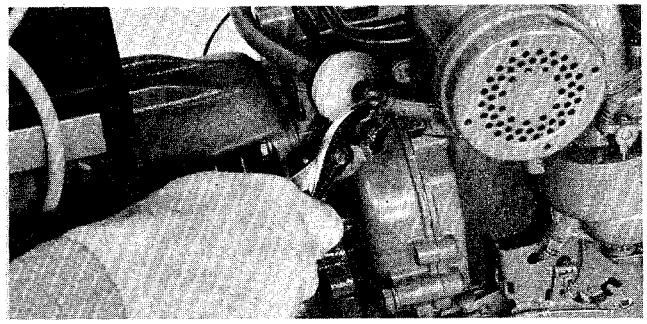
Replacement Steps:

1. If you install a clean, NEW filter, it can go on facing either direction. If you reinstall the OLD filter, replace it facing the same direction it was facing before removal.

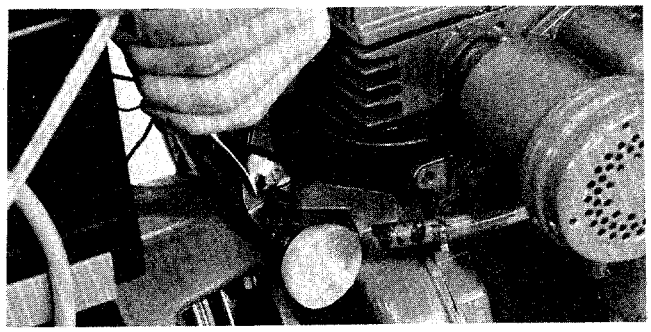
2. Slip the fuel hoses over both ends of the filter and secure the hoses with the clamps. The hoses and clamps should be snug against the sides of the filter.



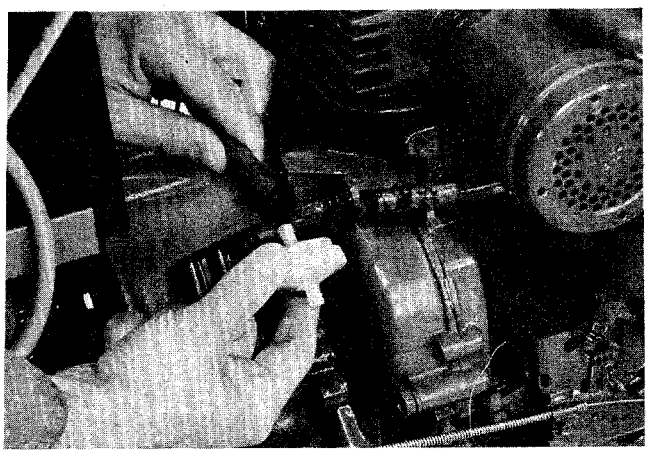
7/66—Turn fuel valve to off position.



7/67—Slide clamp over towards muffler.



7/68—Squeeze clamp prongs and slide clamp backwards.



7/69—Remove filter from fuel hose.

Troubleshooting the Electric Start System

Here are a series of simple checks you can make if your starter motor doesn't turn over when you turn the Key Switch to START, or if the engine doesn't stop when you turn the key to OFF.

If the Starter Motor Won't Turn Over

When you turn the key to the START position and hold it there (for no longer than 10 seconds), the starter motor on the engine should spin over, indicating that the battery and the electric starting system is working properly. If the starter motor doesn't turn over, then you should make the following checks in order to isolate the problem. (Before beginning, be sure you are following the correct starting procedure for your engine, as explained in Section 4.)

CAUTION:

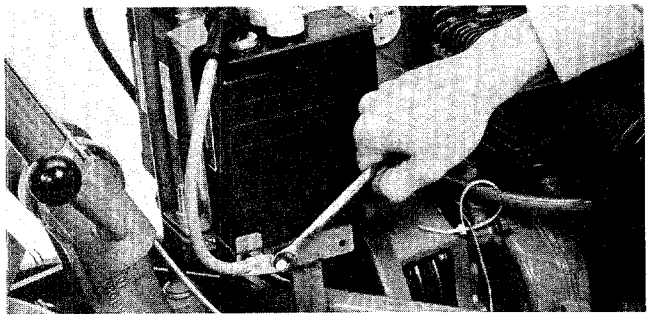
- **Before checking the electric start system, place the Forward/Neutral/Reverse Lever in Neutral and disconnect the spark plug wire.**
- **Carefully read the electrical and battery safety precautions found in Sections 1 and 2 before proceeding.**

1. Check Wires and Connections

Check all wires and cables to make sure they are snugly connected at their proper points.

a). The exposed ends of each wire should touch only the connection studs and their washers or nuts, and not other parts.

b). The negative cable terminal on the right side of the battery bracket must make good contact with the metal bracket to assure a good ground—see photo 7/70. If the connection is secure, then check to make sure that the area around the hole in the bracket is free from paint, dirt or rust. The terminal should be touching bare metal at this connection.



7/70—Check for good ground between cable and bracket.

c). Check the insulation on all wires and cables. If there are any bare spots or cracks showing, you should cover them with electrical tape or replace the wire or cable (please call us if you have a bad wire or cable).
d). Check the green wire that leads from the key switch to the engine. Its function is to stop the engine by grounding out the ignition when you turn the key to OFF. Make sure the wire is firmly connected to the receptacle and engine and nowhere else.

2. Wires are O.K., Starter Motor Still Won't Turn Over

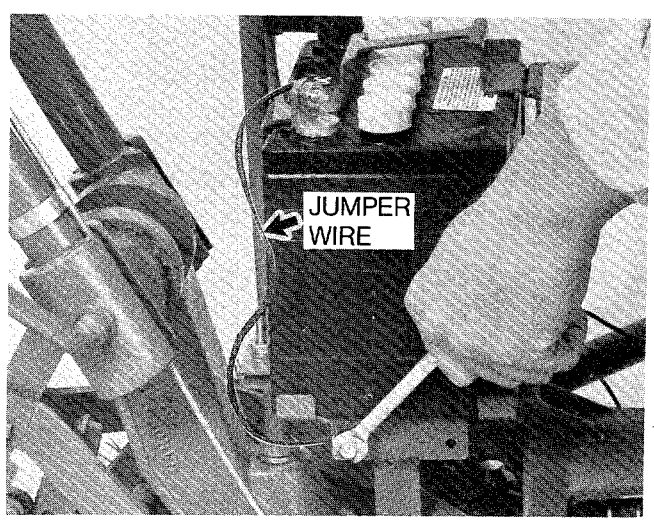
Check to make sure that the battery is properly filled and that its terminals are clean (see "Battery Care and Maintenance" in Section 5). If it appears to be in good condition, then you may have to charge it briefly to activate it. You can do this by operating the engine, as explained next.
a). Place the Forward/Neutral/Reverse Lever in Neutral.
b). Turn the key to the RUN position, move the throttle lever on the handlebars to the start position, and then start the engine with the recoil starter rope (see complete engine starting instructions in Section 4).
c). Run the engine for 45 minutes or more. (Remember, the battery cells must be properly filled with acid before running the engine).
d). Stop the engine and see if the starter motor will start the engine when the key switch is turned to START. If it does, all systems should be in working order now.
NOTE: If the battery is over a year old and it has run down, you should check for a possible problem with your automatic recharging system. See "Recharging System" in these instructions.

CAUTION: For safety, don't attempt to jump the battery with your car's battery or charging system. It could cause your battery to explode, and would ruin the electric start system and possibly the ignition system.

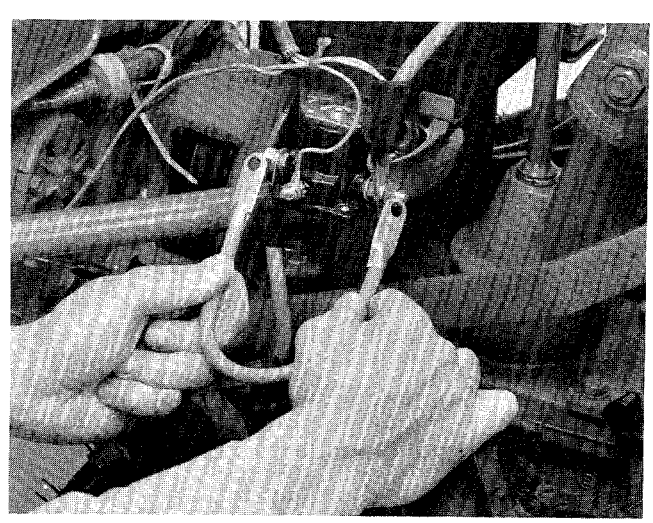
3. Engine Runs, Starter Motor Still Won't Energize

If you were able to start the engine with the recoil rope, then at least you know that the starting problem is definitely somewhere in the electric start system, and not with the ignition or fuel system. This next step will tell you whether the battery and the starter motor are o.k.
a). As a safety precaution, so that the tiller won't start up and move unexpectedly, you should place the Forward/Neutral/Reverse Lever in Neutral and move the engine's throttle lever to the shut-off position. Also disconnect the spark plug wire and move it away from the plug and fuel tank area.
b). Obtain about 12-inches of heavy, INSULATED wire (#10 wire or larger). Strip away 3/4-inches of insulation at both ends.
c). Disconnect the negative (–) battery cable (on the right side of the battery) from the battery post and the bracket and replace it with this heavy wire—see Photo 7/71.

CAUTION: When removing negative cable, first disconnect lower terminal from side of battery bracket and bend cable safely away from battery and tiller. Then, disconnect upper end of cable from negative battery post. When replacing cable, first connect to negative post on top of battery, and then to grounding point on side of bracket.



7/71—Replace negative cable with jumper wire.



7/72—Touch right side, then left side (briefly) of solenoid posts.

d). Using the negative battery cable as a "jumper wire," firmly touch one end of the cable to the right side post of the solenoid, as shown in Photo 7/72. Be sure that you hold only the INSULATED parts of the cable during this test.

e). Take the other end of the cable and BRIEFLY touch the terminal to the left side post of the solenoid—see Photo 7/72. This brief touch will most likely cause a spark and should also energize the starter motor. If the starter motor turns over, then you know that the battery and the starter motor are working. You also have further isolated the problem as being with either the key switch or its wires, or with the solenoid (rare). You should now proceed to Step 4.

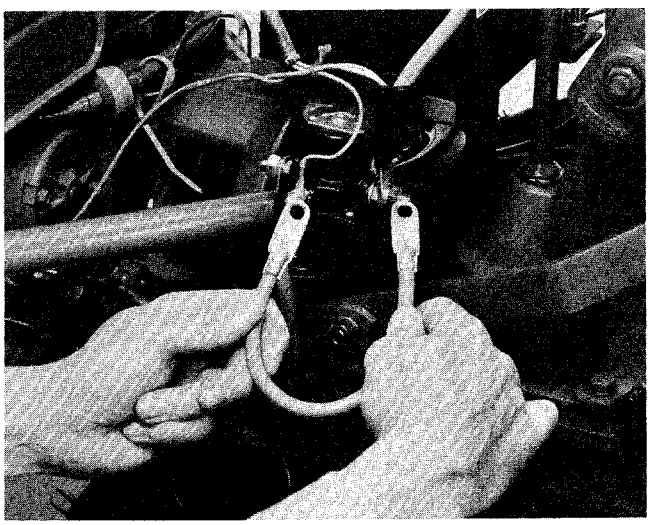
If the above test did not cause a spark or briefly energize the starter motor, it's a good indication that the battery is dead and you should remove it and have it tested at your service station.

If there was a spark, but the starter motor didn't energize, then the starter motor may be at fault. If you suspect the starter motor, please get in touch with our Technical Service Department for further advice.

4. Jumper Cable Energizes Starter Motor, But Key Switch Doesn't

If the battery and starter motor are in good condition but the starter motor still doesn't turn over when you turn the Key Switch to START, then the solenoid should be checked out, as described next. You will again use the negative cable (which you removed in Step 3) as a jumper wire. NOTE: The positive (+) cable must be properly connected at all times.

a). Holding only the insulated part of the cable, firmly touch one end to the right post of the solenoid, as shown in Photo 7/73.



7/73—Briefly touch right side and center posts of solenoid.

b). Now, briefly touch the other end of the terminal to the center post of the solenoid—see Photo 7/73. Again, there may be a spark when you do this. If the starter motor turns over, the test confirms that the solenoid is working properly, and that the problem is either with the wire to the key switch or the connections to the switch, or with the switch itself. Continue to Step 5 to check these parts.

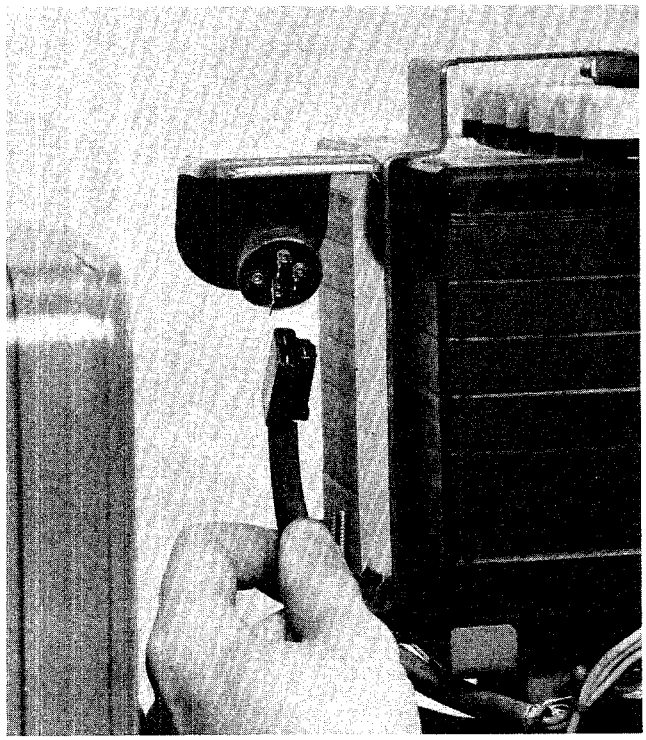
If the battery and starter motor are good and you had no energizing of the starter motor in this test, then it indicates that the solenoid may be bad. First, check to make sure that the screws that hold the solenoid to the tiller bracket (behind the solenoid and bracket) are tight and make a good ground to the bracket (remove any rust or corrosion). If they are o.k., then get in touch with our Technical Service Department for further instructions regarding the solenoid.

5. Solenoid Works, But Key Switch Doesn't Energize Starter Motor

At this point, you have either found the problem, or have isolated it to the key switch and its wiring. Here's how to test the switch and its wiring.

a). First, take your negative battery cable (used as a jumper cable in Steps 3 and 4) and put it back on the battery and grounding point (connect grounding point last). Make sure the connections at the battery and bracket are snug.

b). Unplug the receptacle from the bottom of the key switch—see Photo 7/74.



7/74—Unplug receptacle from key switch.

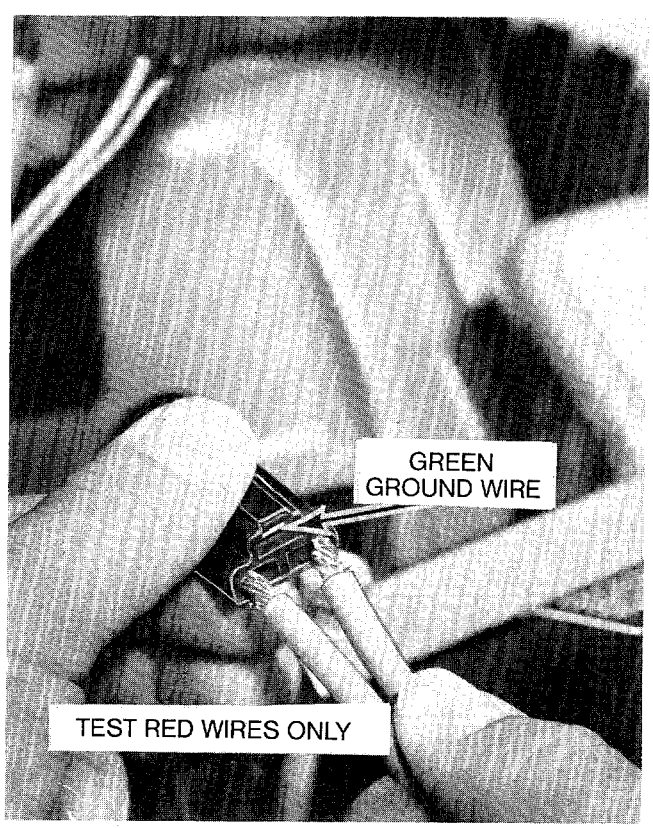
c). Take the #10 wire you used in Steps 3 and 4 and stick the ends of the wire in the left and right sockets of the receptacle, as shown in Photo 7/75.

If the starter motor energizes when you do this, then you know that the problem is with the key switch, or with the contact between the receptacle and the switch. Make sure the receptacle is firmly connected to the key switch and try to start the engine again with the key. If this doesn't energize the starter motor, then you know that the problem lies within the wiring to the switch.

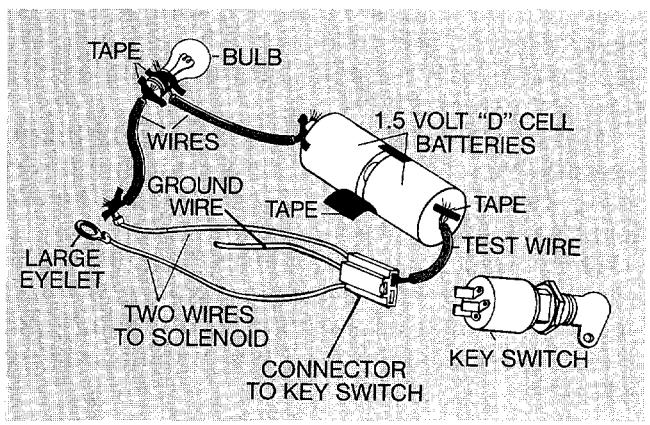
There is a way to check to see if the wiring is connected properly, even though you can't see anything wrong. To do this, you should use a tester (called a continuity tester). You can make one from two D-sized flashlight batteries, some wire, and a flashlight bulb, as shown in Sketch 7/76. Or, you can buy a continuity tester at a hardware store.

To test the two wires that lead to the solenoid for continuity, place the leads from your tester at the points shown in Sketch 7/76. If the bulb lights, it indicates that the wire or connection being tested is working properly. Check each wire individually. Let us know if a wire doesn't light the bulb.

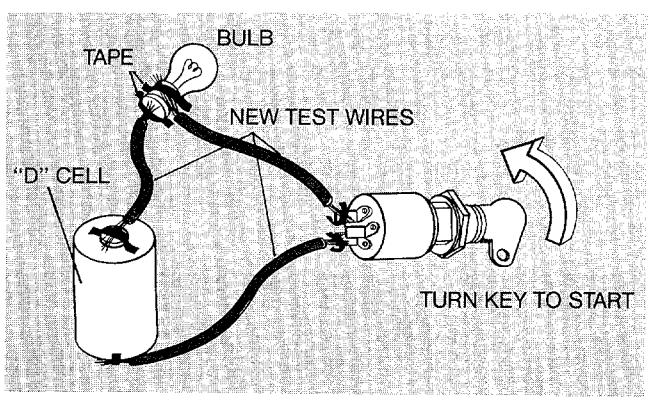
You can also check the key switch with the continuity tester, as shown in Sketch 7/77. If the bulb fails to light when you turn the key to Start, then you probably have a faulty key switch. Get in touch with us if this is the problem.



7/75—Use test wire to "jump" wire to key switch.



7/76—With your homemade tester, first test the wire with the small eyelet (shown tested here), then stick the test wire in the other socket below and the other end of the test wire on the large eyelet. Proper continuity should light the bulb.



7/77—To test the switch, tape end of test wire to side-by-side prongs on key switch, then turn switch to Start. Start should light the bulb. Only one battery is shown here, you can use two if you wish.

If the Key Switch Won't Stop the Engine

There are two ways to stop your electric start engine:

1. Turn the key switch to the OFF position.

2. Move the control lever on the handlebar all the way over to the STOP position.

Both methods stop the engine by "grounding out" the ignition system. If your key switch does NOT shut the engine off, here's what to do.

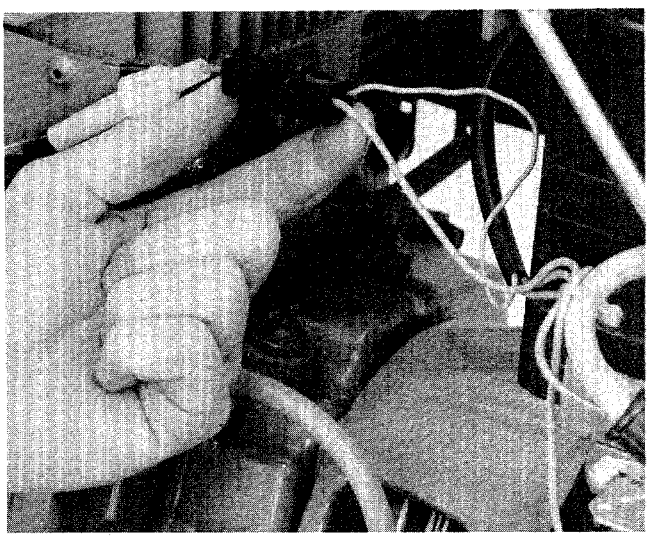
FOR 6 HP ENGINES: Check the green wire that leads from the key switch receptacle to the plastic terminals shown in Photo 7/78. Push these terminals firmly together to insure a good connection. Now test for OFF with the key switch.

FOR 8 HP ENGINES: Check the green wire that leads from the receptacle to the engine shut-off switch on the right side of the engine (Photo 7/79). Make sure the connections at both ends of the wire are secure.

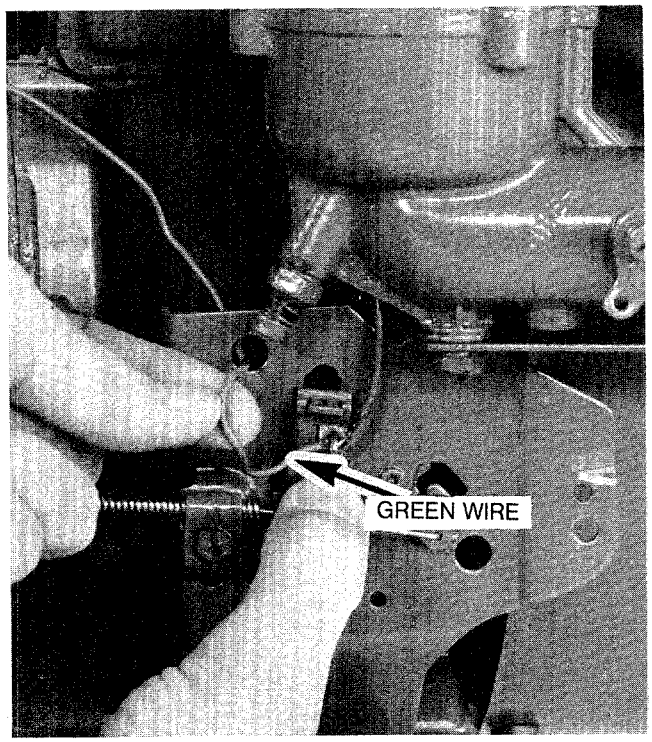
FOR 6 HP and 8 HP ENGINES: If the above checks don't solve the problem, then unplug the receptacle from underneath the key switch—see Photo 7/74. Using an insulated jumper wire (#10 wire or larger, as described in Step 3 of previous starting problem checks), stick one end in the single hole (green ground wire hole) of the receptacle and touch the other end to the mounting screw at the front of the battery clamp—see Photo 7/80. If the engine stops, then the key switch should be checked further, as described next.

CAUTION: Do not touch the battery posts with the jumper wire!

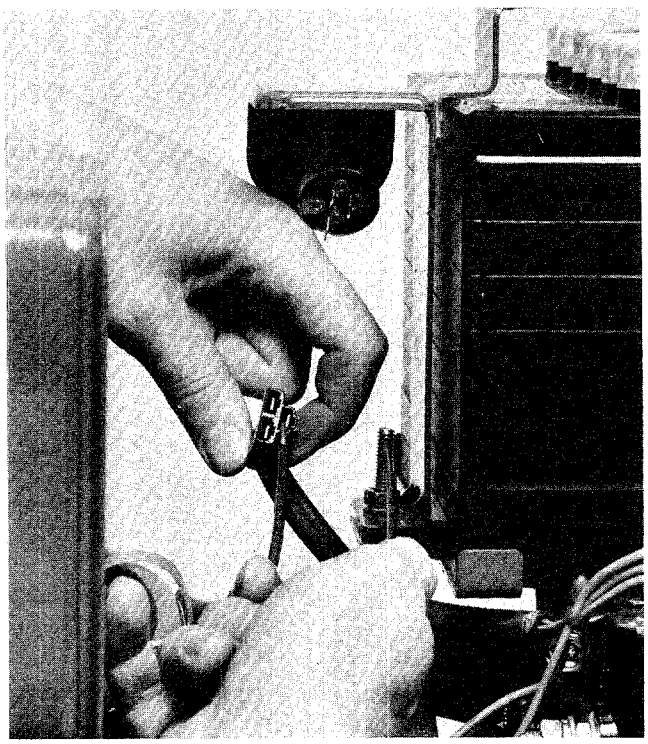
To check the switch, remove it from its metal plate using large pliers or a 7/8-in. wrench. To shut the engine off, the washer underneath the nut must be contacting bare metal. If the decal on the plate is blocking that metal-to-metal connection, then scrape some of the decal away so good contact is made. Replace the switch and test . . . there should be no problem if a proper grounding connection is made. If the switch still doesn't work, please contact us for further advice.



7/78—Make sure plastic terminals are tight (6 HP).



7/79—Be sure green wire is secure (8 HP).



7/80—Run jumper wire from single hole in receptacle to clamp mounting screw in front of battery.

In Case Of a Dead Battery

If your battery is dead, or if one or both battery cables is disconnected, your recoil rope starter can be used to run the engine, but only after you have taken the following steps to protect your electrical system from harm:

1. FOR 6 HP AND 8 HP ENGINES: Make sure that all battery cells are full of battery acid, with no lead plates exposed. If the engine is run with a dry battery (or one low in acid), the battery and other electrical parts can be damaged.

2. FOR 6 HP ENGINES ONLY: Disconnect the fuse holder, remove the fuse, and tape over the half of the fuse holder nearest to the engine—Photo 7/81. This will protect the diode from harm.

3. FOR 8 HP ENGINES ONLY: If the battery is in place, keep both battery posts and the solenoid connection covered with the insulated rubber boots provided with the battery.

If the battery is removed, do not operate the engine without first insulating the positive battery cable terminal with electrical tape, or with the rubber boot provided with the battery. Failure to do so can result in sparking from the battery cables.

4. FOR 6 HP and 8 HP ENGINES: When starting the engine with the rope starter, the key switch must be placed at the RUN position and the throttle control lever moved away from the shutoff position.

Battery Recharging System

Your tiller's electric start system is designed to automatically recharge the battery whenever the engine is in operation.

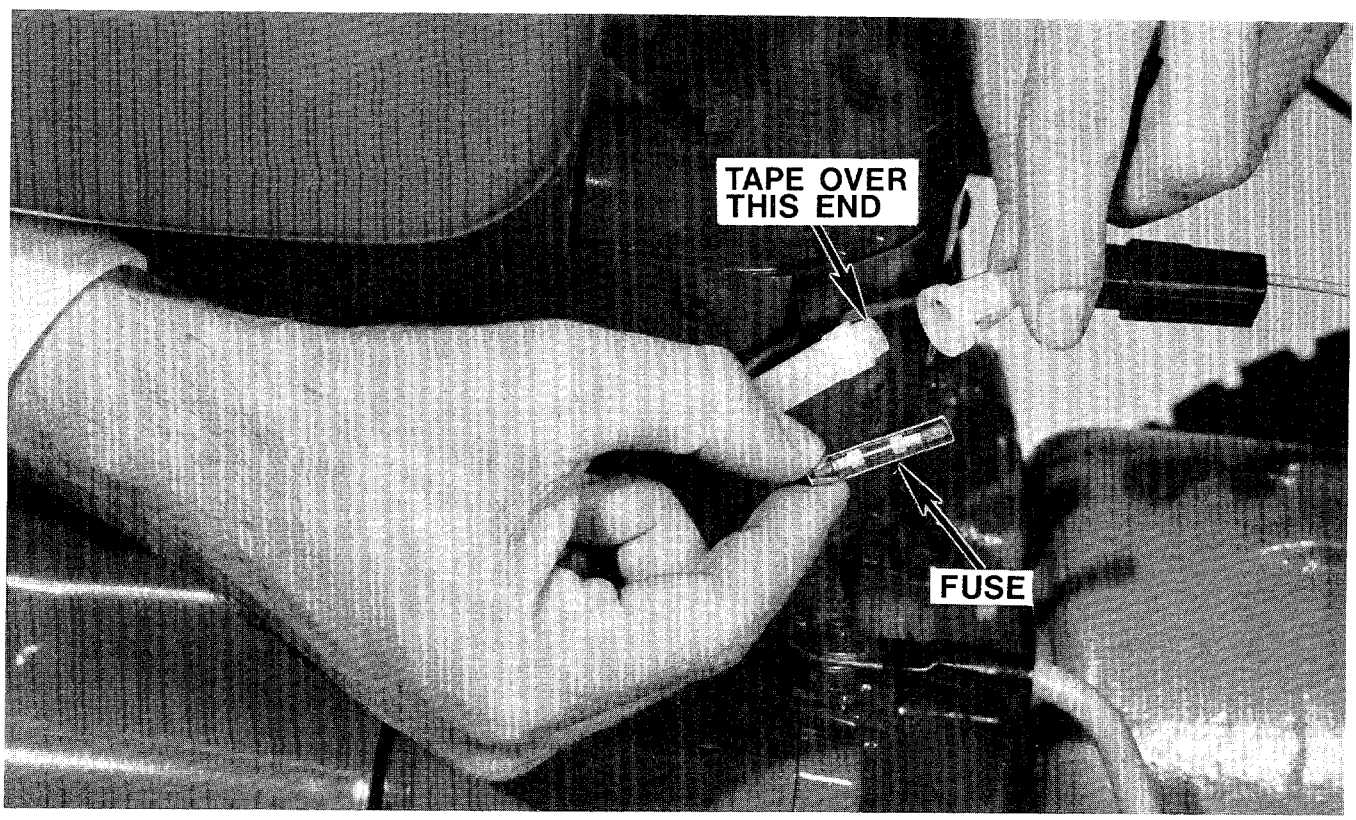
If an older battery is run down, even though you have operated the engine recently, you should check for the following possible reasons:

a). Check the entire length of the recharging line and the positive battery cable for loose or corroded connections, and for bare spots or cracks in the insulation.

b). On 6 HP engines only, check the condition of the fuse (shown in Photo 7/81). If the thin metal strip inside the glass tube is broken, the recharging current will not reach the battery when the engine is running. Replace the fuse with a new one.

c). The battery may have a bad cell. Have it tested by a qualified mechanic.

d). The diode or the engine's recharging system may be faulty. Have them checked by an engine service shop who is authorized by the engine manufacturer to service your make engine.



7/81—To disconnect 6 HP fuse holder, push the two halves of the holder together and then turn one part counter-clockwise. Place tape over the half that is closest to the engine.

Ignition System Service

If your engine won't start, the most common causes are ignition, electrical (for battery start engines), fuel, or carburetion problems. Many of these causes can be corrected easily, once the problem is identified.

If your carburetor is adjusted correctly, and your fuel is fresh and clean (without any water in it), then not being able to start might well be the fault of your ignition system.

The first step in investigating ignition problems is to check the spark plug and its wire. Make sure that the connection to the wire is secure and there are no breaks or bare spots on the wire. (On the 6 HP engine, be sure to keep the wire away from the fuel tank bracket—see Photo 7/82. A short circuit could develop between the wire and the bracket which could make engine starting a frustrating job.)

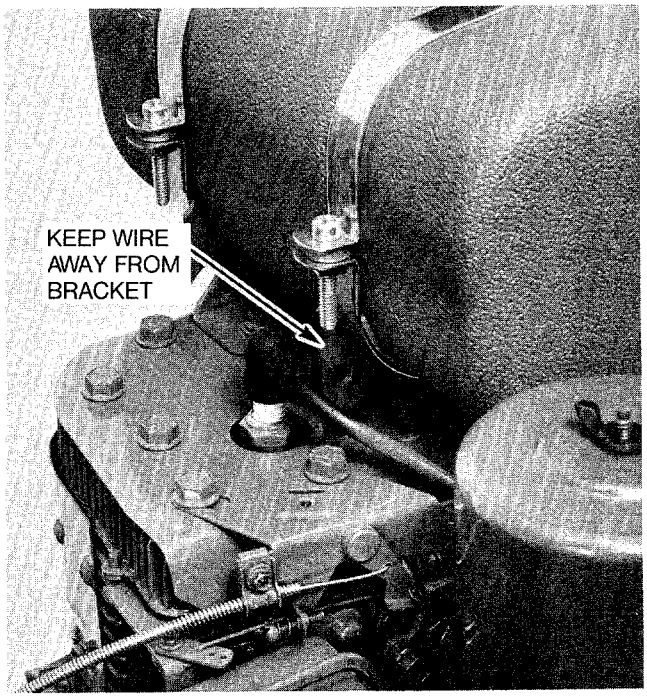
Next, remove the spark plug and inspect it carefully (see "Servicing the Spark Plug" in Section 6). If the plug is dirty, encrusted with deposits, or corroded, you'd best replace it with a new one. If it is wet with oil, look for the source of the oil (crankcase overfilled, worn piston rings, clogged crankcase breather, etc.). The oil problem must be corrected or the problem will just repeat itself with a new plug. Finally, be sure that the plug is gapped correctly and that it is the proper type for your engine.

If the plug appears to be in good condition, then you should make the following simple test of the ignition system.

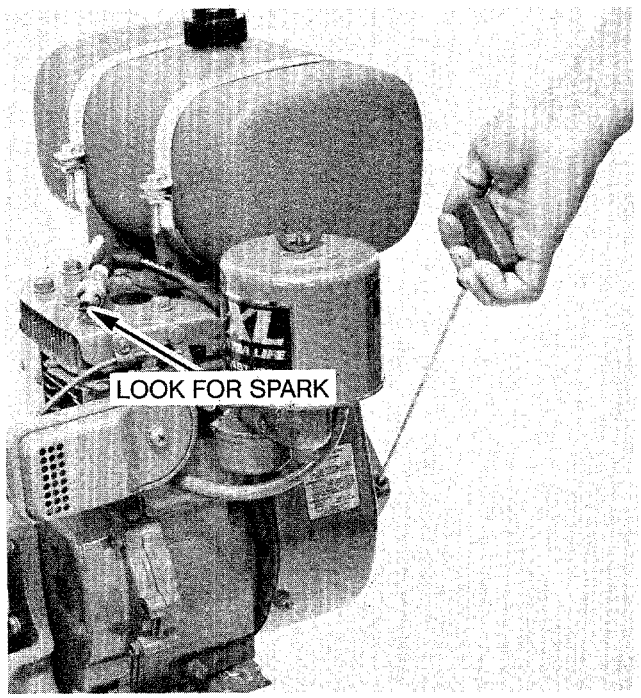
1. Attach the spark plug wire to a good or new spark plug.
2. Set the throttle lever away from the shutoff position (and on electric start engines also place the key at RUN).
3. Rest the plug on the engine so that its threads are touching a bare metal part (scrape away a little paint if necessary).

CAUTION: Position the plug well away from the fuel tank area so that any spark from the plug will not be near the gasoline or its fumes.

4. Without touching the plug or its wire (which could give you a shock), pull the starter rope with a firm pull and look closely for any spark between the gap in the plug—see Photo 7/83.
5. If you see a strong, bright blue spark, it indicates that the spark plug and the rest of the ignition system is okay. Check for other possible causes of hard engine starting by referring to the "Troubleshooting Guide" in Section 8.
6. If there is no spark, or only a very weak yellow one, then the problem is probably somewhere in the ignition system. First, try another spark plug to be sure the test plug (even a new one) wasn't defective in some way. If that doesn't work, then please call or write us for further advice. NOTE: If you have a 6 HP engine, see the special instructions that follow regarding the engine shut-off clip.



7/82—Check condition of spark plug and wire.



7/83—Look for bright blue spark.

Checking the 6 HP Engine Shut-off Switch

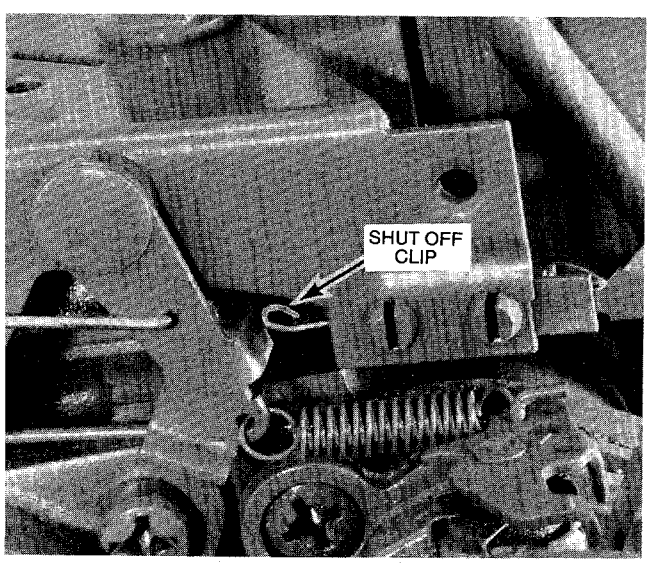
If you cannot start your 6 HP engine for any apparent reason, one thing to do is to check the action of the engine shut-off clip (see Photo 7/84). If the spring clip is bent so that it touches the carburetor mounting bracket at all times, it will be doing the same thing as stopping the engine; and therefore, preventing you from starting the engine.

The engine shut-off switch can be easily checked by pulling the terminal wire off the shut-off switch and taping the metal terminal with electrical tape—see Photos 7/85 and 7/86. The tape will prevent the switch wire from touching any metal on the engine.

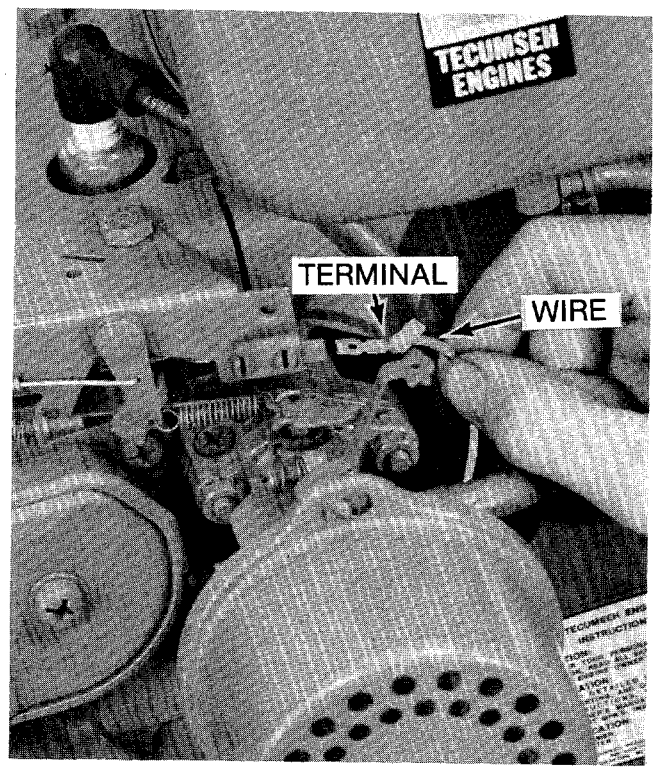
Then, if you pull the starter rope and the engine starts, you know that the shut-off clip was touching the carburetor mounting bracket and preventing engine startup. Simply bend the clip away from the bracket slightly. Now make sure that the prong on the throttle lever still engages the shut-off clip when you move the handlebar throttle lever forward to the shut-off position.

To shut off an engine that is running while you have the short out wire taped up, move the throttle lever to a slow idle position and either remove the tape and touch the wire to any part of the engine's metal—away from the rotating flywheel for safety—or simply move the lever on the carburetor to the full choke position. Only stop the engine with the choke in emergencies, since repeated use of this method can be harmful to your engine.

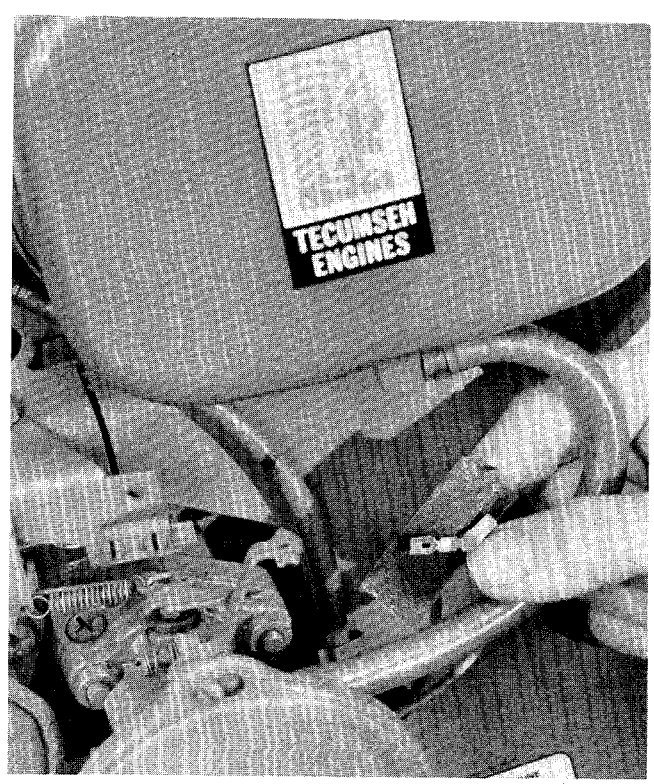
NOTE: A short somewhere else in the wire that leads from the shut-off switch to the engine's magneto would be more serious and would have to be taken care of by a service dealer. This, however, is a very rare occurrence.



7/84—Shut-off clip on 6 HP Tecumseh engine.



7/85—Pull wire terminal off shut-off switch.



7/86—Tape up metal terminal during test.