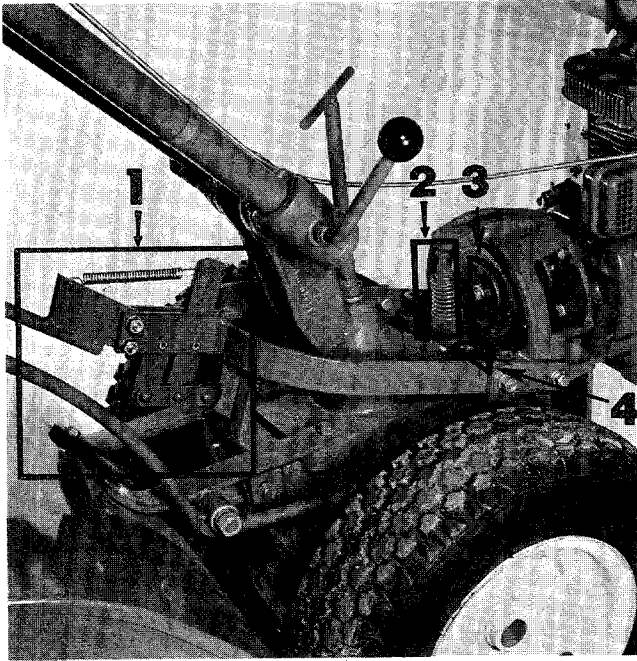


HOW TO ADJUST & MAINTAIN REVERSE



(Photo 7/22) To operate a Troy-Bilt, you know that you must **LIFT** and **HOLD** the Forward/Reverse Lever in upward position in order to reverse the tiller at all. When you do, this brings into play primarily four components that control the tiller's reverse action: (1) the Forward/Reverse Assembly, (2) the Reverse Spring and Plunger Assembly, (3) the reverse disc, and (4) the transmission drive pulley.

CHECK FOR PROPER REVERSE DISC ADJUSTMENT

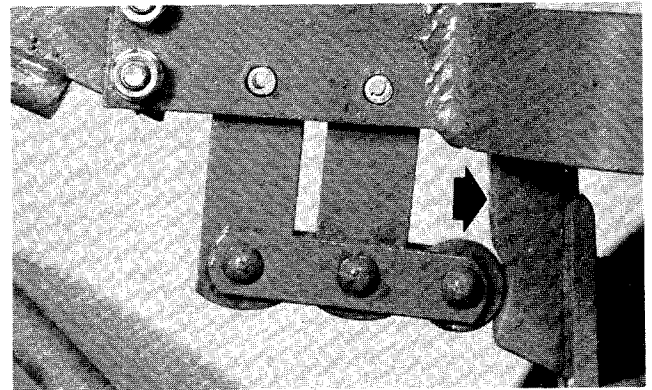
7

Put the Forward/Reverse Lever in Neutral Position so that the clutch roller is resting within the indentation on the belt adjustment block (as shown by arrow in Photo 7/23). The lever should not be in Forward or Reverse.

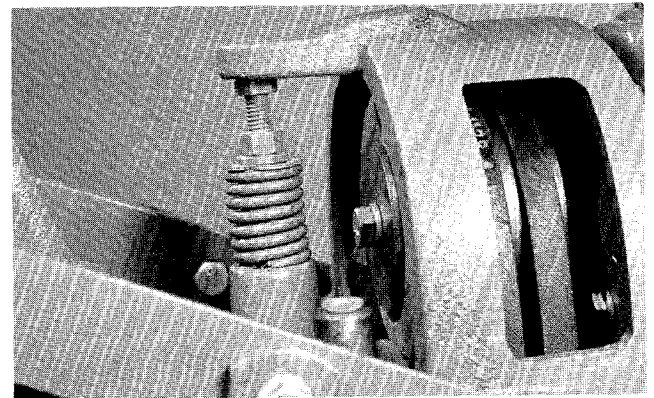
If all is properly adjusted in Neutral, the cast-iron motor mount (part #1002) should be resting (as shown in Photo 7/24) squarely on top of the plunger bolt, or close enough to it so that you can hardly see daylight between them.

Neutral position does not have to be at any specific position within the indentation or on the face of the adjustment block (Part #1133) (as shown in Photo 7/23). The *Neutral* position that the roller takes on the adjustment block results primarily from the tension on the reverse spring and the overall length of the belts. As belts get older and stretch (sometimes not for a year or two), and as successive adjustments are made for belt tension, the *Neutral* position of the roller will gradually move higher and higher on the block—until the block hits bottom and there is no more adjustment room left because belts have stretched too much.

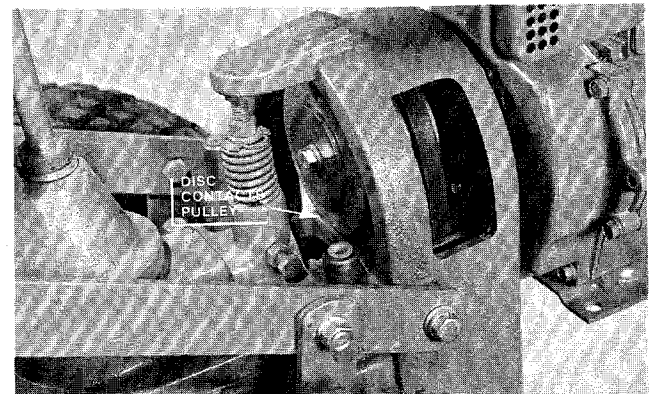
With the lever in Reverse and the motor mount pressing down on the reverse adjustment bolt



(Photo 7/23) New block has neutral position.



(Photo 7/24) Motor mount rests on plunger bolt.



(Photo 7/25) With Forward/Reverse lever in reverse.

(on top of the plunger), the reverse disc should seat itself in the groove of the lower transmission pulley—see Photo 7/25. In Neutral, the reverse disc does not make contact with the pulleys (as shown in Photo 7/26, by arrow **A**). The distance the disc maintains above the pulley in *Neutral* varies with adjustment of the Reverse Spring and Plunger and the overall length of the belts. (Lubrication, or lack of lubrication of the yoke assembly and the engine mounting bars also influences the position of the roller on the block in *Neutral*).

WATCH ACTION OF REVERSE DISC & PULLEY

First, disconnect the spark plug wire from your engine. Then, squat along side the right side of your tiller to get a close-up view of the roller, reverse disc and lower pulley. Reach under the handlebar and pull the lever up into Reverse position (while you do, observe that the reverse disc is lowered into the pulley)—see Photo 7/25.

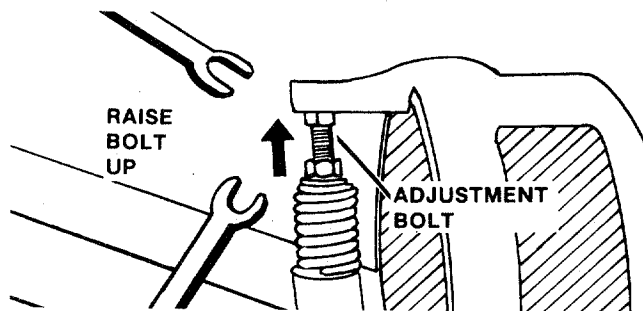
Now, while holding the lever in Reverse with your left hand, reach around in front of the engine with your right hand and pull the starter rope, briefly. You should see the reverse disc and lower pulley *both turn*—see Photo 7/27. The, let go of the lever (the reverse disc will move a fraction of an inch away from the pulley) and pull the starter rope again. This time, the reverse disc will turn but the lower pulley *should not*—see Photo 7/28. If the lower pulley does turn, raise the reverse adjustment bolt upward a few turns until the pulley does not turn when the Forward/Reverse lever is released.

The Spring and Plunger Assembly is designed to prevent the reverse disc from making contact with the pulleys until the operator decides to shift into Reverse by lifting up on the Forward/Reverse Lever and holding it there. The lowering motor mount compresses the spring enough to “pop” the lever back into Neutral when it is released.

IF THE TILLER GOES INTO REVERSE BY ITSELF

If your tiller goes into Reverse by itself, here's all you do to correct it:

With two 9/16” wrenches (as shown in Photo 7/29), loosen the lock nut on the bottom of the reverse adjustment bolt. Then, adjust the bolt *upward* (counter-clockwise). This adjust-



(Sketch 7/25A) If lever doesn't “pop” out of reverse, *RAISE* Adjustment bolt up until lever does “pop” out of reverse when you let go!

ment widens the gap between the reverse disc and the transmission pulley to the desired distance.

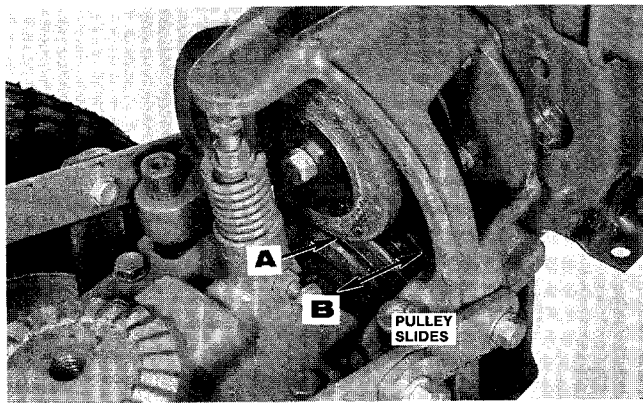
If it takes too much upward pressure to hold the lever in Reverse, or if your tiller will not Reverse at all, then turn the reverse adjustment bolt *downward* (clockwise) until your tiller “pops” out of Reverse when the lever is released, but does not require exceptional strength to hold it in Reverse. While you are adjusting the reverse adjustment bolt downward, make sure that the plunger inside the heavy spring is not turning with the bolt. If the plunger turns, hold it with a pair of pliers so that you can thread the bolt further in the threaded hole—see Photo 7/30. When you have found the proper reverse adjustment on the adjustment bolt, hold the bolt in position with one wrench and turn the lock nut below it to lock it in that position.

REVERSE DISC AND LOWER PULLEY ALIGNMENT

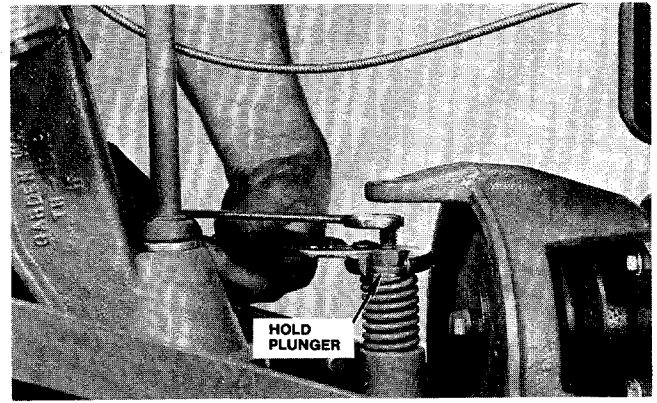
The reverse disc should rest directly over the center of the groove in the lower pulley. The lower pulley has a tiny amount of “float” built into it so that it can move back and forth between two snap rings to automatically center itself when it is driven by the reverse disc—see **B** in Photo 7/26.

If the pulley will not easily move a tiny fraction of an inch back and forth, squirt some penetrating oil on the shaft behind the lower pulley (shown at arrow **B**). The oil should free the pulley. Follow that up with a little lubricating oil.

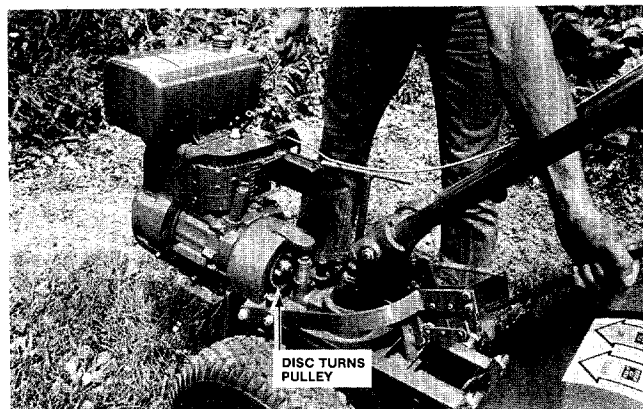
If proper alignment between the reverse disc and the pulley is *still* a problem after you get the pulley free, check the reverse disc for unusual wear on the front and back edge, or even for nicked and broken edges—see Photo 7/31. You may have to replace the disc with a new one or shim the upper pulley or reverse disc from the front or the rear. See the instructions below for procedures to shim up the reverse disc or to change or replace a new disc.



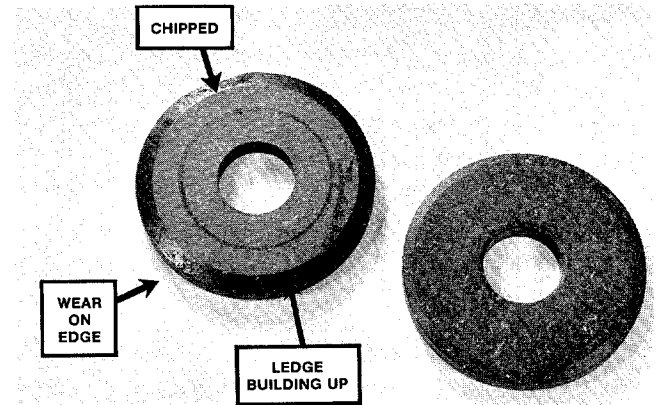
(Photo 7/26) With clutch lever in neutral.



(Photo 7/30) If plunger turns, hold with pliers.



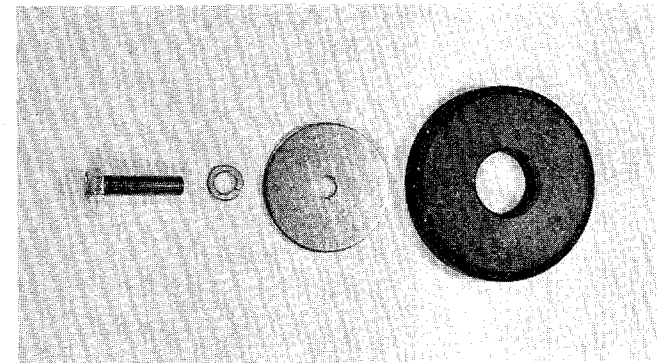
(Photo 7/27) Hold clutch lever in reverse.



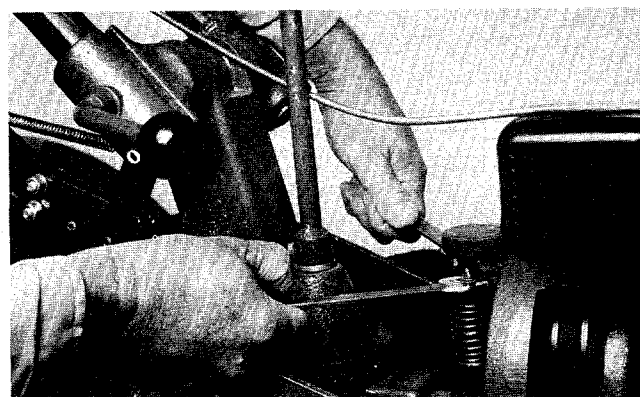
(Photo 7/31) Check condition of reverse disc.



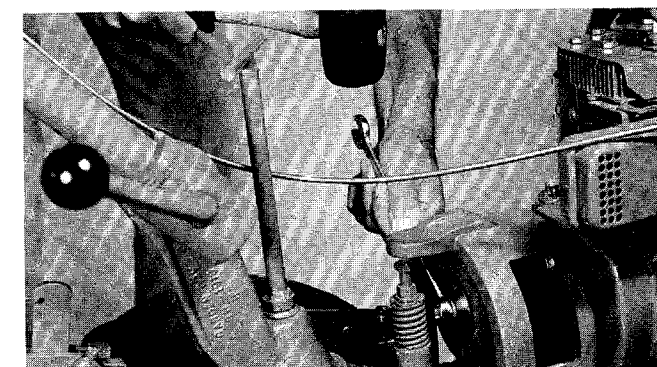
(Photo 7/28) With clutch lever in neutral.



(Photo 7/32) Mounting bolt, lockwasher, mounting plate, and fiber reverse disc.



(Photo 7/29) Loosen locknut on adjustment bolt.



(Photo 7/33) Loosening upper pulley bolt.

REVERSE DISC REMOVAL AND REPLACEMENT

Improper alignment of your disc and pulley causes uneven wear and noise. It will require early disc replacement. Often, when the disc is misaligned, the operator must exert undue upper pressure to hold the lever in Reverse. The reverse disc is made of an asbestos fiber similar to that used in brake linings; it will normally wear out with use.

HOW TO REMOVE THE REVERSE DISC

1. Turn the engine off and shift the Forward/Reverse Lever into FORWARD position.
2. Loosen the bolt for the reverse disc mounting plate by placing a 9/16" closed-end wrench on the bolt and giving the wrench a sharp tap downward with a mallet—see Photo 7/33, Page 104. Remove the bolt, mounting plate and the reverse disc. If necessary, wedge a hammer handle, a screwdriver, or a small board between the upper or lower pulley and the motor mount to loosen the disc mounting bolt. This will prevent pulleys from turning. Remove the disc as shown in Photo 7/18.

PLEASE NOTE: After you install a new reverse disc, take the following steps to "break it in" properly. Place the depth regulator in travel position to keep the tines off of the floor. Put the Wheel Speed Shift Lever in Free Wheel position and start the engine. Then, using the Forward/Reverse Lever, lower the reverse disc into the pulley groove and up into Neutral several times. This will form a glaze on the reverse disc which will minimize further problems.

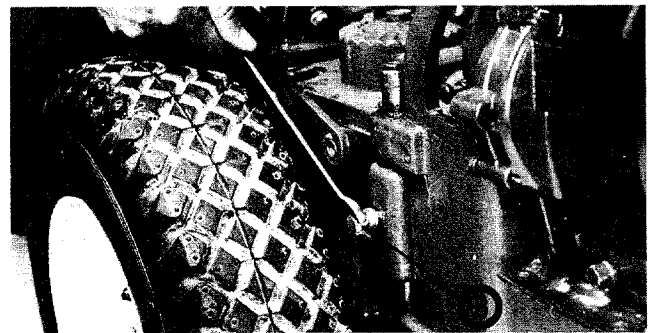
If you are removing or replacing the disc because you have an alignment problem, look carefully at both edges of the disc—see Photo 7/31. Severe wear on the edge nearest the engine, but no sign of wear on the edge closest to the operator, means that the reverse disc is not quite far enough away from the engine. A small shim or a second part #1073 (early) reverse disc face plate behind the disc will move it forward enough to get the proper alignment.

If your reverse disc shows exceptional wear on the edge facing the operator, you must remove the engine pulley and take out a shim that is behind the engine's pulley. The shims behind the engine pulley are usually about 1/16". In this instance, a shim behind the pulley of half thickness would suffice. The inner diameter of shims (part #1138) is 49/64 inches.

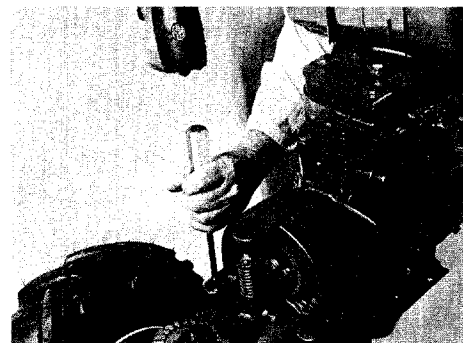
NOTE: On a tiller that has had twenty-five or more hours of use, if the upper pulley can't be aligned with the lower pulley (part #1008-1) properly, it could be that the main drive shaft has become loose. (See page 134 for "How to Shim the Tiller Transmission Drive Shaft.")

To remove one shim or more from behind the engine pulley (part #1007-1), here are the steps you will have to take. First, you probably have already removed the mounting bolt securing the reverse disc and the engine pulley as described in Step 2 above and shown in Photo 7/33. If not, remove the bolt and the reverse disc.

After you have loosened the pulley mounting bolt, remove the belts (refer to belt changing instructions on page 99 of this section). With the reverse disc removed, take out both motor mount bars (part #1034) by backing off the bolt **B** (shown in Photo 7/34) and tapping the bar down with a hammer and a 1/2" rod or dowel (as shown in Photo 7/35). With the motor mount bars and belts removed, it will be possible to lift the motor mount and the engine off the tiller. Please refer to "Removing the Engine from the Troy-Bilt Horse Model" on page 148 for detailed information.



(Photo 7/34) Back off motor mount bar bolt B.



(Page 7/35) Tap bar down and out.

When the engine and the engine mount are removed as an assembly, you can turn your thoughts back to the reverse disc alignment problem. Next, remove the engine pulley by putting a pry bar or a large screwdriver through the opening in the motor mount, as shown in Photo 7/36, and tap the bar toward the front of the engine to loosen the pulley. When it is loose, carefully take the pulley off the engine power takeoff shaft.

REMOVING ENGINE PULLEY SHIMS

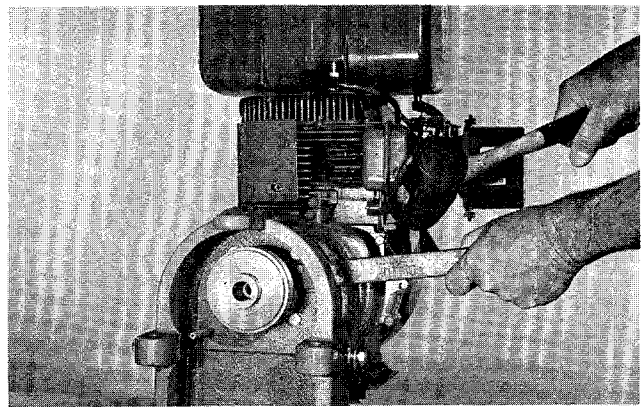
As you remove the engine pulley (part #1007-1), take careful note as to how many shims (thin washers) are between the pulley and the engine. Write down the number of shims between the end of the engine crankshaft and the pulley—see Photo 7/37. The written note will help you return to the original shim distance, if desired. There may be one, two or three shims used. If you add a shim behind the pulley, it will move the pulley toward the operator by the thickness of the shim. If you take out a shim, it will move the pulley toward the engine.

7

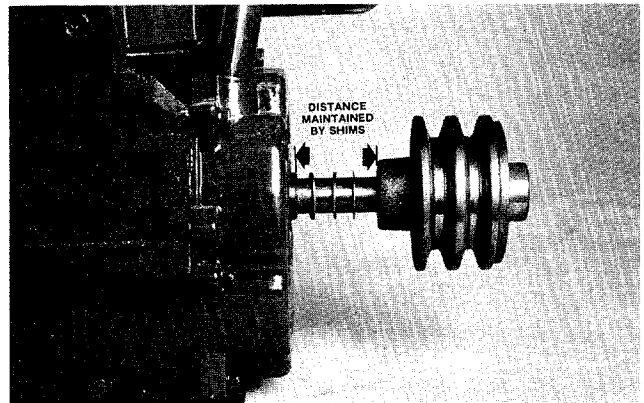
Replace the shim behind the pulley (with a thinner one, or none at all, if need be) and then put the pulley in place and tap the key back in the pulley (Photo 7/38). Clean off the motor mount bars and grease them lightly. Lift the engine and place it back into position.

Then, insert the bars in the top hole of the motor mount. As soon as a motor mount bar gets through the lower hole, stop tapping it down. Then, back off the jam nut and install the locking bolt for the bar. Turn it until it is finger tight and you feel it strike the bar. Take a wrench and apply a very slight pressure on the bolt while you continue to tap the bar down—see Photo 7/39. When the groove in the bar reaches the bolt, the pressure on the bolt will be relieved. Thread the bolt all the way in. Then, back the bolt off one-half turn and lock the jam nut with a second wrench while you hold the bolt in position. Install both engine mount bars.

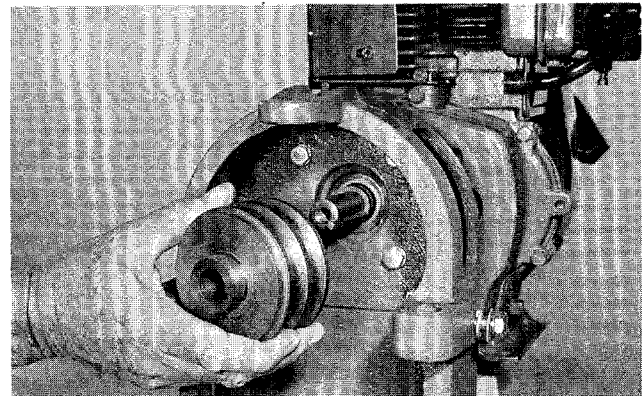
Next, replace the belts and the reverse disc.



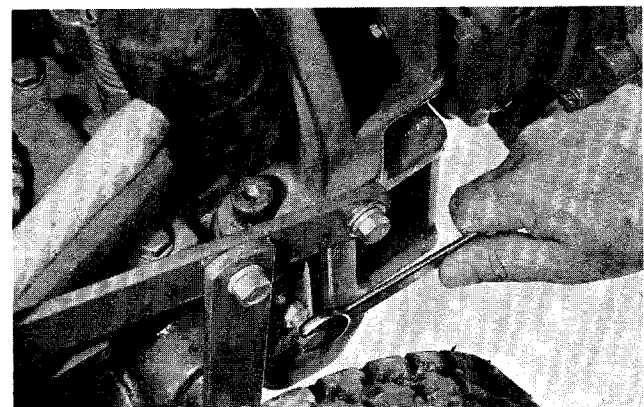
(Page 7/36) Loosening engine pulley.



(Photo 7/37) Shims between pulley and engine.



(Photo 7/38) Replacing the engine pulley.



(Photo 7/39) Keep pressure on bolt and tap bar.

Put on the disc mounting plate and the pulley mounting bolt. Secure the bolt tightly. Check out the disc and lower pulley alignment, **reverse** operation and belt tension.

If you have any problems whatsoever in aligning your reverse disc or getting proper shims, or understanding which way to shim the reverse disc to get the proper clearance, please get in touch with us right away here at the factory. We will send you the proper shims and give you further instructions to help you get the proper alignment.

While you're replacing the reverse disc, take the time to use the oil can on the lower pulley to keep it lubricated. Also, make sure that all of the linkage for the Forward/Reverse Lever is well oiled and lubricated.

If the reverse spring adjustment (described on page 103 of this manual) does not result in a properly functioning Reverse, please check these points: Make sure that new belts have had an hour or two of tiller operation to "break in" before going any further. Check the alignment of the reverse disc and the lower pulley. Inspect the reverse disc for wear or damage.

If these checks have not determined a cause for your improper reverse action, please write to us at the Service Department in Troy, New York and let us know the difficulty and what you have tried to correct it. If it's urgent, call us on the telephone. [The number is (518) 235-6010. Ask for the Service Department.]

THROTTLE CABLE HOOKUP, ADJUSTMENTS, AND MAINTENANCE

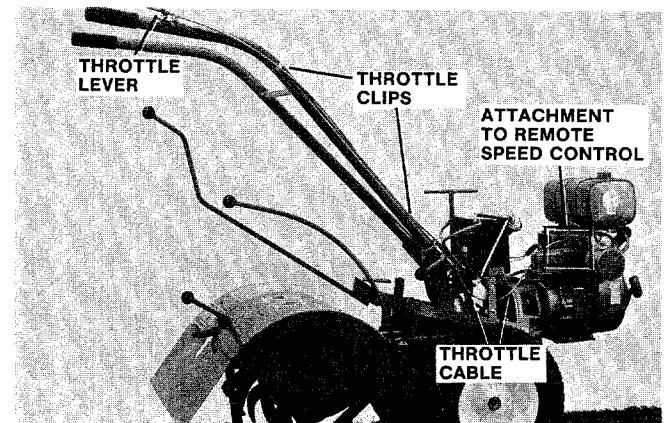
Even though your Tiller's throttle cable was hooked up at the factory before it was shipped to you, it may need adjustment at a later time.

For instance, your 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. There's no need to put up with this sort of nuisance. Now, you can learn how to make proper adjustment easily for the best Tiller performance.

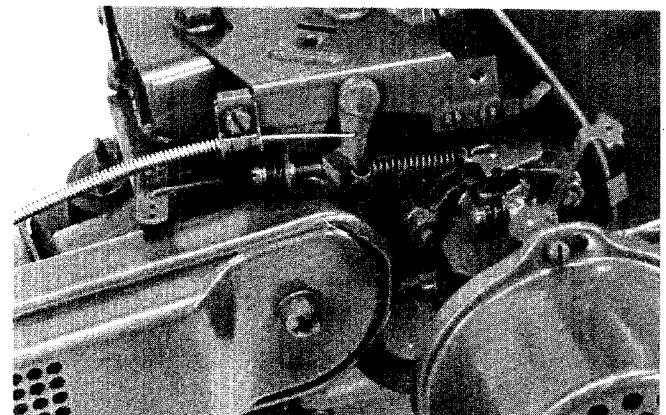
6 HP TECUMSEH-LAUSON ENGINES

Photo 7/40 shows the throttle cable and its casing running right down the handlebar and crossing over to the engine. At the engine, the casing is fastened with a mounting clip and the throttle wire continues over to attach to the remote speed control lever. A close-up of these connections is shown in Photo 7/40A.

On all Troy-Bilt Horse Model Tillers, the throttle cable has been clamped to the handlebar with two spring clips—see Photo 7/40. On all engines, *engine shut-off* and a full range of engine speeds can be selected remotely by moving the speed control lever on the handlebar—see Photo 7/41.



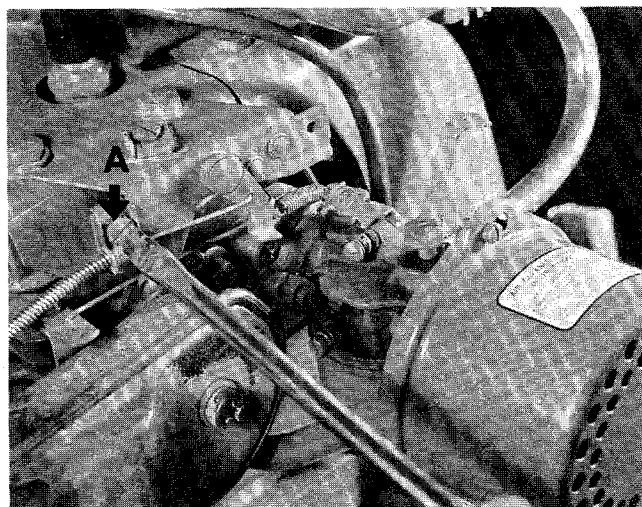
(Photo 7/40) 6 HP engine with throttle cable.



(Photo 7/40A) 6 HP throttle cable hook-up.

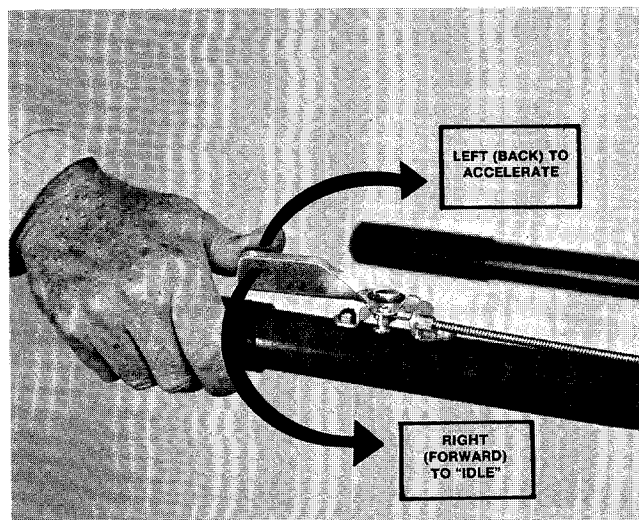
When the speed control lever on the handlebar is all the way forward, the engine shuts off by touching a short-out clip. See Photo 7/42.

In between *engine shut off* and *high speed* is the full range of the throttle speed. If you move the lever to the left (back) the engine runs faster. Moving it to the right (forward), makes the engine run slower, or stop.



(Photo 7/40B) 6 HP remote speed control.

7 *NOTE: Occasionally, through normal use, throttle cables become "kinked," from being twisted or snagged in some way, caught on something, or bent when the tiller handlebars bump against some obstruction. Rarely, if ever, can cable "kinks" be straightened properly to give satisfactory positive throttle control. If you have a badly kinked cable, you'd better order a new throttle cable wire from us at the factory. Please use your Troy-Bilt Parts Order Form to do so, and include the make and horsepower of your engine.*

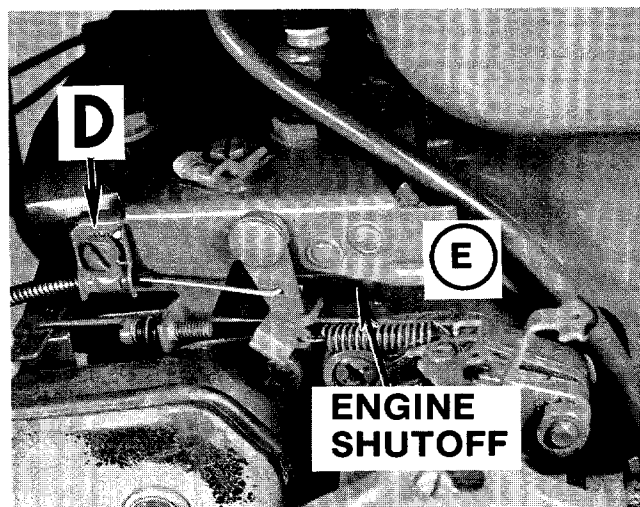


(Photo 7/41) Throttle Lever.

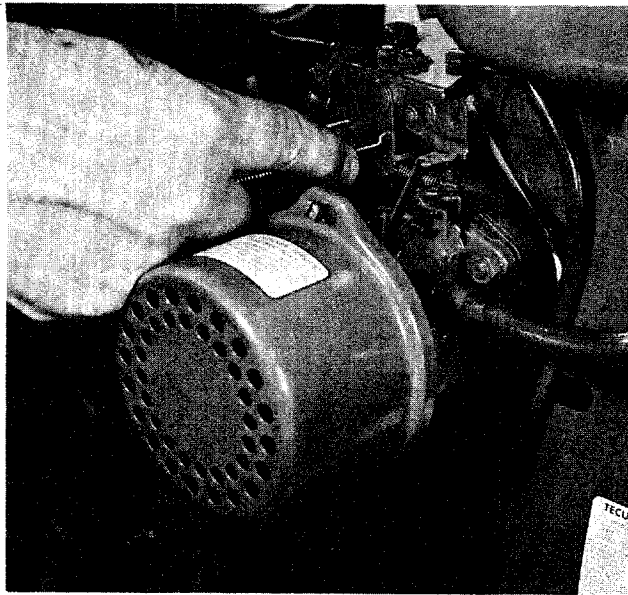
ADJUSTING THROTTLE CABLE ON THE 6HP ENGINE

To adjust your throttle cable (if you don't get engine *shutoff* by moving the lever on the handlebar), loosen but do not remove the clamp (as shown in Photo 7/40B, arrow **A**). Just move the speed control lever on the handlebar all the way forward toward the engine. Then, move the casing and all so that the remote speed control lever makes contact with the *shutoff* clip (Photo 7/42, arrow **E**), tighten the clamp, holding the casing at arrow **D**.

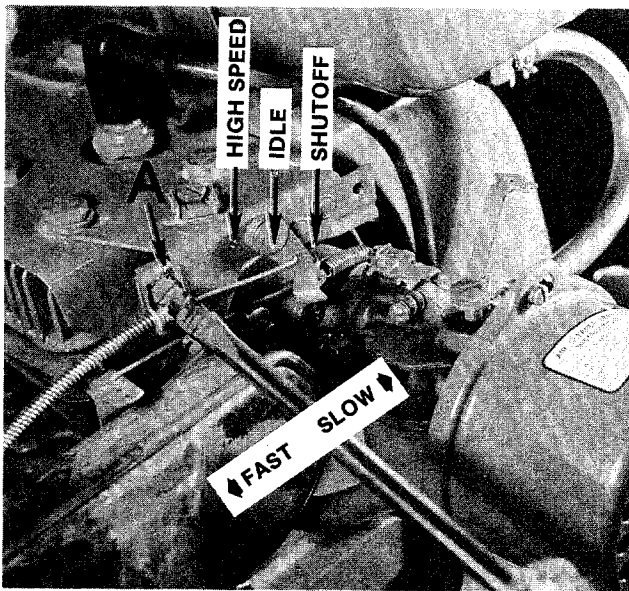
Now, try the lever on the handlebar once more. All the way back is *full speed*. All the way forward should be *shutoff*. Idle and slow speed are in between.



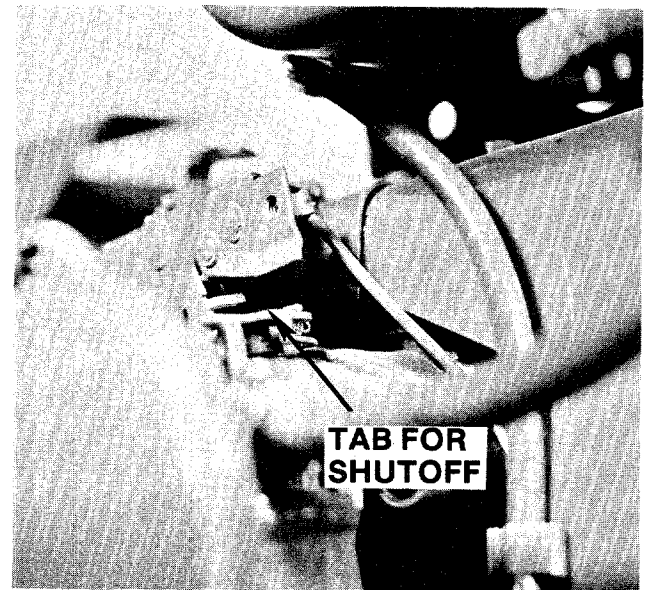
(Photo 7/42) Adjusting throttle cable—6 HP.



(Photo 7/43) Connect wire to speed control lever.



(Photo 7/44) Allow overhang (6 HP).



(Photo 7/45) Throttle control touches tab.

TO INSTALL A NEW CABLE

Lay the throttle cable casing down the length of the handlebars to the remote speed control lever (shown in Photo 7/40).

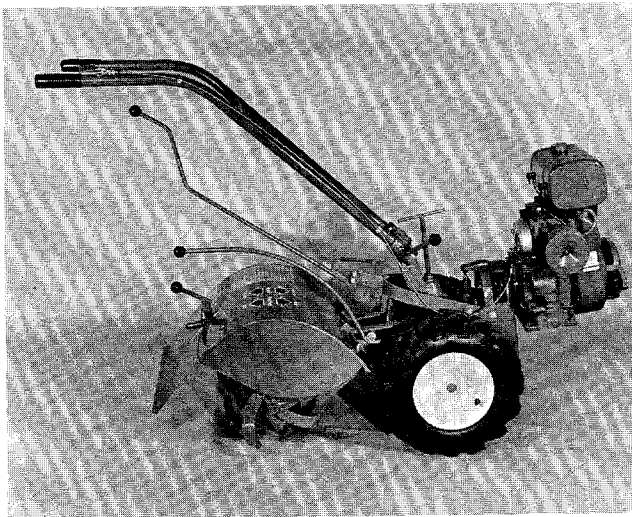
On the standard recoil start or electric start engine, route the throttle cable straight down the handlebar. Put one cable clip above the top

bend of the handlebar and one clip about 10 to 12 inches above the height adjustment stud.

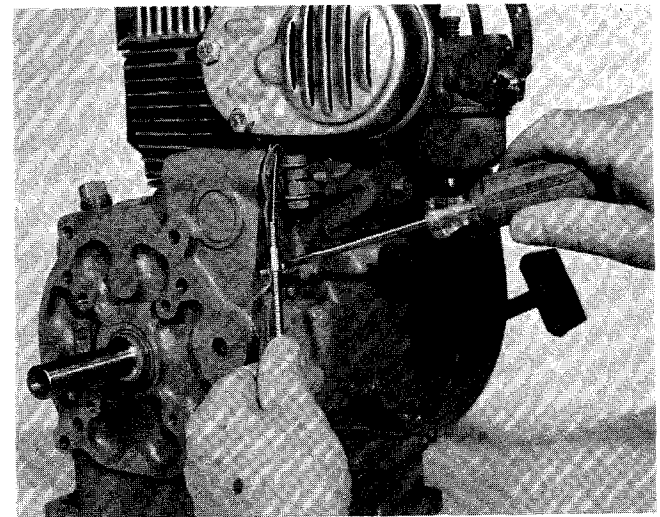
Connect the crimped end of the throttle wire at the remote speed control as shown in Photo 7/43. Then, place the cable in the clamp shown in Photo 7/44 and tighten the clamp. Now, test the cable for proper throttle and shutoff settings—see Photo 7/42 and 7/45.

CABLE HOOK-UP AND ADJUSTMENT FOR 7 HP KOHLER ENGINE

There really isn't very much adjustment required on the throttle cable for your 7 HP Kohler engine. Once it is properly hooked up, all you're likely to require is some regular maintenance, such as making sure that the full length of the throttle cable is oiled and well lubricated. Be sure to squirt some oil inside the casing at both ends. Then, make sure that the clamp screw is tight and in the proper position so it doesn't permit a bend in the wire to occur. See Photos 7/46 and 7/47 for the correct throttle wire connection to the governor control disc.



(Photo 7/46) Throttle cable on 7 HP tiller.



(Photo 7/47) Put wire in nearest hole.

NOTE: For both the 6 H.P. Tecumseh-Lauson and the Kohler engines, clips are not designed to fit all the way around the handlebars.

Since your throttle wire connects directly onto the governor control disc, you should be alert to the fact that the nut and bolt clamping the governor arm (in Photo 7/47) should not be loosened or fiddled with. It takes a trained serviceman to readjust a governor if you loosen that bolt or the wide nut in front of the governor control disc. So please don't fool with them unless you get some knowledgeable help first.

Just make sure the throttle cable is lubricated on that end. A rusty throttle cable is the most common reason for having to put too much pressure on the throttle lever to move it—which ultimately leads to a bent wire and the start of tinkering with the governor linkage.

PERIODIC LUBRICATION

Frequent lubrication of the throttle cable works wonders. Remember to oil the throttle cable regularly with engine oil, grease, silicone oil spray, or graphite. All work well. Brush or spray the lubricant on the entire length of the cable casing. Lubricate the external moving linkages of the throttle lever, speed control and governor assembly.

Lubricate them at least every few times you go out with your tiller—at least once every few weeks. Lubrication of the throttle cable components prior to winter storage can also be quite helpful in the performance of your tiller in the spring.

QUICK ENGINE MAINTENANCE REMINDERS

1. Engine Oil

- Use SE rated oil right from the start.
- Check the oil level and make sure it is clean.
- Check the oil level with the dipstick prior to each use of the tiller.
- Check the oil level every 2 hours, if you are tilling all day long.
- Check the oil in the engine every 10 hours or less.
- In dusty conditions, change the oil whenever it becomes dirty.

2. Check and service the air cleaner frequently. Every time you till for more than 1 hour, check the air cleaner at intervals during tilling.

3. Clean the debris from the cooling fins on the engine.

4. Check the governor and carburetor linkages for operation and ease of movement. Oil them occasionally.

5. Inspect the spark plugs.

6. Check the carburetor and air cleaner fit for tightness and good gaskets. Make sure that there are no movements, indicating looseness.

7. Check gasoline for presence of water.

8. Inspect the engine shroud for dents or interference with the flywheel.

9. Engine power loss (not due to faulty carburetor adjustment or bad fuel):

- Check the engine compression immediately after the engine stops running. Pull gently on the starter rope to feel the compression.
- Where there is a loss of compression, check for a sticky valve or valve lifter, or for loose head bolts or a blown gasket. See an authorized service dealer.
- Have the compression tested for suspected worn rings.
- Worn rings can be caused by dirty oil or a dirty air cleaner.
- Don't use non-detergent oil for long periods, then switch to detergent oil. Use SE rated oil right from the beginning. Prolonged use of non-detergent oil prior to use of detergent oil can cause excessive ring wear.