



Owner's Manual

5 H.P. VERSATILLER™

- Safety
- Assembly
- Controls
- Operation
- Maintenance

Model

12168





Dear Owner:

Thank you for purchasing the TROY-BILT® VersaTiller™. This unique piece of outdoor power equipment gives you the deep tilling power that rear-mounted counter-rotating tines provide, and provides the outstanding convenience of a front tine cultivator and tiller as well. The optional edger attachment and optional aerator attachment install easily and work very effectively to add even more versatility to your machine.

Please read this manual. It tells you how to safely and easily assemble, operate and maintain your machine. *Be sure that you and any other operator carefully follow the recommended safety practices at all times. Failure to do so could result in personal injury or property damage.* This manual is considered a permanent part of the unit and it must stay with the unit if it is resold. A replacement manual can be obtained from the factory or your local authorized dealer.

All information in this manual is based on the latest product information available at the time of printing. Review this manual frequently to familiarize yourself with its features and operation.

If you have any problems or questions concerning the unit, contact your local authorized dealer or the factory. Our telephone numbers and mailing addresses are listed on Page 3.

We want to ensure your complete satisfaction at all times.



WARNING:

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

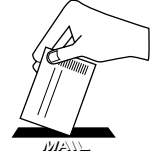
Safety Alert Symbol



This is a safety alert symbol. It is used in this manual and on the unit to alert you to potential hazards. When you see this symbol, read and obey the message that follows it. Failure to obey safety messages could result in personal injury or property damage.

Owner Registration Card

Please fill out and mail the enclosed owner registration card. The purpose of this card is to register each unit at the factory in order to keep the owner informed with informational bulletins and safety literature.



Warranty Service

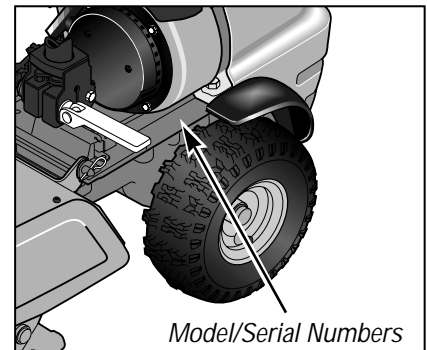
The warranty statement is included in the unit's literature package.

Model/Serial Numbers

The Model/Serial Numbers are located on the engine mounting bracket (see figure below). For ready reference, record these numbers in the spaces below.

Date of purchase:

Model/Serial Numbers:

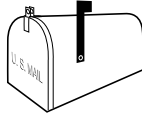


Left and Right Sides

Left and right sides of the unit are determined from the operator's position behind the handlebar.

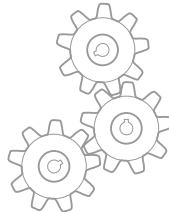
Customer Service and Technical Service

If you have questions or problems with the unit, contact your local dealer or call or write to the factory. (When calling or writing the factory, provide the model/serial number of the unit.)



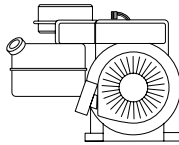
Replacement Parts

Factory specified replacement parts are available from your authorized dealer or directly from the factory. For parts ordering information, refer to the parts catalog.



Engine Service and Repair

For engine service or repair, contact your nearest authorized engine dealer (look in the Yellow Pages under "Engines—Gasoline"). The engine is warranted by the engine manufacturer. Any unauthorized work performed on the engine during the warranty period may void this warranty. For complete details on the engine warranty, refer to the engine owner manual.



To Contact the Factory:

GARDEN WAY INCORPORATED
1 Garden Way
Troy, New York 12180

FAX: (518) 391-7332

Telephone Numbers:

Customer Service: 1-800-437-8686
Technical Service: 1-800-520-5520
Parts Service: 1-800-648-6776

Outside the United States and Canada:

Customer Service: (518) 391-7007
Technical Service: (518) 391-7008
Parts Service: (518) 391-7006

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CAUTION

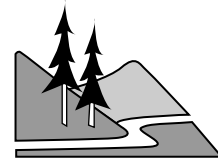
TO AVOID SERIOUS INJURY:

- READ THE OWNER'S MANUAL.
- KNOW LOCATIONS AND FUNCTIONS OF ALL CONTROLS.
- KEEP ALL SAFETY DEVICES AND SHIELDS IN PLACE AND WORKING.
- NEVER ALLOW CHILDREN OR UNINSTRUCTED ADULTS TO OPERATE TILLER.
- SHUT OFF ENGINE AND DISCONNECT SPARK PLUG WIRE BEFORE MANUALLY UNCLOGGING TINES OR MAKING REPAIRS.
- KEEP BYSTANDERS AWAY FROM MACHINE.
- KEEP AWAY FROM ROTATING PARTS.
- USE EXTREME CAUTION WHEN REVERSING OR PULLING THE MACHINE TOWARDS YOU.

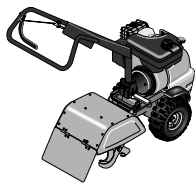
Section 1 Safety

SPARK ARRESTER WARNING TO RESIDENTS OF CALIFORNIA AND SEVERAL OTHER STATES

Under California law, and under the laws of several other states, you are not permitted to operate an internal combustion engine using hydrocarbon fuels on any forest, brush, hay, grain, or grass covered land; or land covered by any flammable agricultural crop without an engine spark arrester in continuous effective working order.



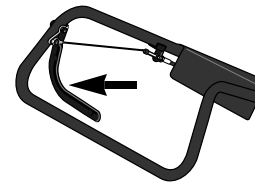
The engine on the unit is an internal combustion engine which burns gasoline, a hydrocarbon fuel, and must be equipped with a spark arrester muffler in continuous effective working order. The spark arrester must be attached to the engine exhaust system in such a manner that flames or heat from the system will not ignite flammable material. Failure of the owner/operator of the unit to comply with this regulation is a misdemeanor under California law (and other states) and may also be a violation of other state and/or federal regulations, laws, ordinances or codes. Contact your local fire marshal or forest service for specific information about which regulations apply in your area.



*Rear
Tine
Tiller
Mode*



*Front Tine
Cultivator
Mode*



*Drive
Bail*



Training

Read this Owner's Manual and the separate engine owner manual carefully before operating this equipment. Be completely familiar with the controls and the proper use of the unit. Know how to stop the unit and disengage the controls quickly. A replacement manual is available by contacting us.

- Never allow children to operate the equipment. Never allow adults to operate the equipment without proper instruction.
- Keep the area of operation clear of all persons, particularly small children and pets. Keep bystanders at least 25 feet away from the area of operation.
- Keep in mind that the operator or user is responsible for accidents or hazards occurring to other people, their property, and themselves.
- Familiarize yourself with all safety and operating decals on the unit and on any attachments or accessories.
- Do not run the engine in an enclosed area. Engine exhaust contains

carbon monoxide gas, a deadly poison that is odorless, colorless, and tasteless. Do not operate the unit near buildings, windows, or air conditioners.

- Do not allow hands or any other part of the body or clothing near the rotating tines or near any other moving part. Once the engine is started and the unit is **in rear tine tiller mode**, the tines and wheels begin to rotate when the Drive Bail is closed against the handlebar. If **in front tine cultivator mode**, only the tines rotate when the Drive Bail is closed.
- Before inspecting, servicing or adjusting any part of the unit, shut the engine off, wait for all moving parts to stop, disconnect the spark plug wire from the spark plug. Move the wire away from the spark plug.
- Do not operate the unit if you are under the influence of alcohol, medication, or when tired or ill.

Preparation

- Thoroughly inspect the area where the equipment will be used. Remove foreign objects before tilling or cultivating.

- Let go of the Drive Bail before starting the engine.
- Do not operate this equipment without wearing suitable clothing. Avoid loose garments or jewelry that could get caught in moving parts of the tiller or its engine.
- Do not operate the tiller when you are barefoot, in sandals, sneakers or other light footwear. Wear protective footwear that grips well on slippery surfaces.
- Do not till or cultivate near underground electric cables, telephone lines, pipes or hoses. Contact your telephone company or utility to verify locations of cables or lines.
- Handle gasoline with care; it is flammable, the vapors explosive. Take the following precautions:
 - Use an approved gas container.
 - Gas cap shall never be removed or fuel added with engine running. Engine shall be allowed to cool before refueling. Operators shall not smoke.
 - Keep matches, cigarettes, cigars, pipes, open flames, or sparks away from the fuel tank and fuel container.

d.) Fill fuel tank outdoors using extreme caution. Never add fuel indoors. Use a funnel or spout to prevent spillage.

e.) Replace all fuel tank and container caps securely.

f.) If fuel is spilled, do not attempt to start the engine, but move the machine away from the area of spillage and avoid creating any source of ignition until fuel vapors dissipate.

7. Never attempt to make any adjustments while the engine is running or the spark plug wire is connected, except when so instructed.

Operation

1. Do not put hands or feet near or under rotating parts.
2. Use extreme caution when on or crossing gravel driveways, walks or roadways. Be alert for hidden hazards or traffic. Do not carry passengers.
3. If you hit a foreign object, stop the engine, let all moving parts come to a complete stop, disconnect spark plug wire and move wire away from the spark plug, and inspect for damage. Repair damage before restarting.
4. Exercise caution to avoid slipping or falling.
5. If abnormal tiller vibration occurs, stop engine immediately, disconnect the spark plug wire, and move wire away from spark plug. Check for the cause. Carefully inspect for any damage. Fix the problem before using the tiller again. Vibration is generally a warning sign of trouble.
6. Stop the engine, let all moving parts stop completely, disconnect the spark plug wire and move the wire away from the plug before leaving the operating position, unclogging tines, or making repairs, adjustments or inspections.
7. Take all possible precautions when leaving the machine unattended. Let go of all controls. Stop engine, allow all moving parts to stop completely, disconnect spark plug wire and move wire away from plug to prevent the possibility of accidental starting.
8. Before cleaning, repairing or inspecting, stop the engine, let all moving parts stop completely, disconnect the spark plug wire and move wire away from spark plug to prevent the possibility of accidental starting.
9. The Operational Interlock System should be tested for correct function

every time prior to using this equipment. See Section 4 in this Manual.

10. Never use equipment unless safety guards and safety devices are in place and working properly.
11. Do not remove the hood flap or in any way alter its performance. Doing so may allow stones to be thrown in the operator's direction, increase the risk of accidentally coming into contact with the tines, or increasing the possibility that the unit may unexpectedly be propelled backward.
12. Do not run the engine in an enclosed area. Engine exhaust contains carbon monoxide gas, a deadly poison that is odorless, colorless and tasteless.
13. Keep children and pets away.
14. Never operate the equipment in the rear tine tiller mode (operator standing behind the tines) unless the tine hood is properly installed over the tines. Refer to illustrations on Page 4. The tine hood may only be removed after the handlebar is swung around 180° to the front tine tiller/cultivator mode (handlebar is positioned over the engine). Never till or cultivate in front tine tiller/cultivator mode with the tine hood installed—in this mode the tine hood should always be off. Failure to comply with these requirements could result in serious personal injury or damage to the tine hood. A special safety interlock switch prevents the engine from running if the tine hood is removed when the handlebar is in the rear tine tiller mode (handlebars over hood and tines). See illustration on Page 4.
15. When in rear tine tiller mode, the tiller could unexpectedly jump backward if the tines dig in too deeply and the wheels lose traction. To minimize the possibility of the machine jumping backwards, do not push down on the handlebar when in rear tine tilling mode.

16. If in doubt about tilling conditions, use the following precautions to help you in maintaining tiller control:
 - a.) Walk on the left side of the handlebar when in the rear tine tilling mode. When front tine tilling or cultivating, walk behind the handlebar.
 - b.) Use slower engine throttle speeds.
 - c.) When tilling, work gradually deeper with each tilling pass.
 - d.) Clear the tilling area of big stones, roots and other debris.
 - e.) When in rear tine tilling mode, avoid putting downward pressure on the handlebar which would cause the wheels to lose traction. If necessary, apply upward pressure to increase wheel traction and to prevent the tines from digging too deeply. When in the cultivating mode, do the opposite—apply downward handlebar pressure to prevent the tines from digging too deeply.
 - f.) In an emergency, release the control lever to stop tines and wheels.
17. Do not overload the capacity of the machine by trying to till or cultivate too deeply at too fast a rate.
18. Never use the tiller at high speed on hard or slippery surfaces. Look behind and use care when backing up (there is no powered "reverse").
19. Do not use this unit on steep slopes. On modest slopes, slow down. Obtain good footing. Don't let unit "freewheel" down slopes. When possible, operate unit under power with wheels engaged.
20. Clear the area of bystanders before tilling or cultivating.
21. Use only attachments and accessories approved by Garden Way Inc.
22. Use tiller attachments and accessories when recommended.
23. Never operate this equipment without good visibility or light.

Section 1: Safety

24. Never operate this equipment if you are fatigued, or under the influence of alcohol, drugs or medicine.
25. Operators shall not tamper with the engine-governor settings; the governor controls the maximum safe operating speed and protects the engine and all moving parts from damage caused by overspeed. Authorized service shall be sought if a problem exists.
26. Do not touch engine parts that may be hot from operation (muffler, fins, etc.). Be certain all parts have cooled down before inspecting, cleaning or repairing.
27. Remember—to stop tines and wheels, let go of the Drive Bail. Do not try to restrain the tiller. Let go of the handlebar if necessary.
28. Use extreme caution when moving backward or pulling unit toward you.
29. Start the engine carefully according to instructions and with feet well away from the tines.
30. Never pick up or carry equipment while the engine is operating.

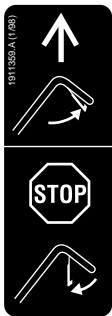
Maintenance and Storage

1. Never perform maintenance when engine is running or spark plug wire is connected except when specifically directed to do so.
2. Keep tiller, attachments and accessories in safe working condition.
3. Check all nuts, bolts and screws frequently for proper tightness. Always verify the equipment is in safe working condition.
4. Never store the machine with fuel in the fuel tank inside a building where fumes may reach an open flame or spark, or where ignition sources are present (such as hot water and space heaters, furnaces, clothes dryers, etc.).
5. Let the engine cool down before storing it in an enclosure.
6. To reduce fire hazard possibilities, keep the engine free of grass, leaves or grease.
7. Store gasoline in a cool, well-ventilated area, safely away from any spark- or flame-producing equipment. Store gasoline in an approved container, safely out of the reach of children.
8. Refer to the Maintenance Section in this Manual for storage information if your equipment is to be stored for an extended period.
9. If the fuel tank has to be drained, do this outdoors.
10. Follow manufacturer's recommendations for safe loading, unloading, transport and machine storage.

Decals

For your personal safety and the safety of others, safety message decals have been affixed to your unit. Keep them clean and legible. Contact your local service dealer or the factory for replacements if any decals are

damaged or missing. Refer to the separate parts catalog for decal locations, part numbers, and ordering instructions. The safety and operational decals on your equipment are shown below (not actual size).



Decal located on top of handlebar—left side.



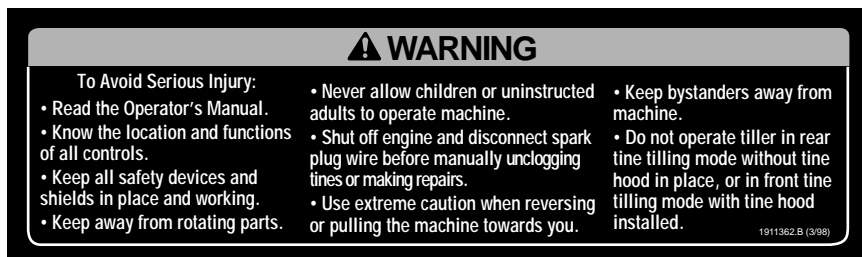
Decal located on fuel tank.



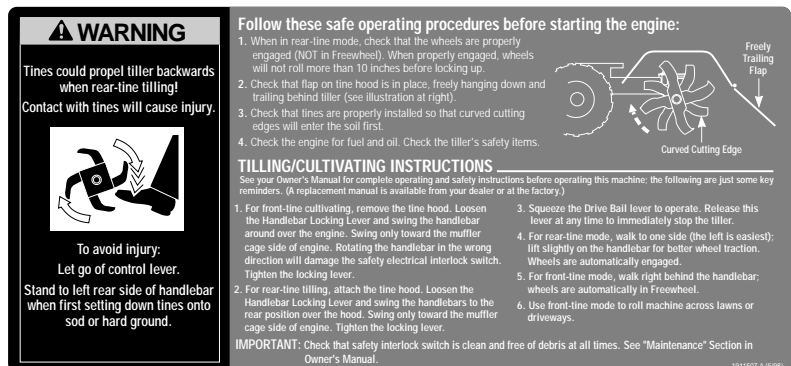
Decal located on bottom of handlebar and on hood flap.



Decal located on handlebar locking lever.

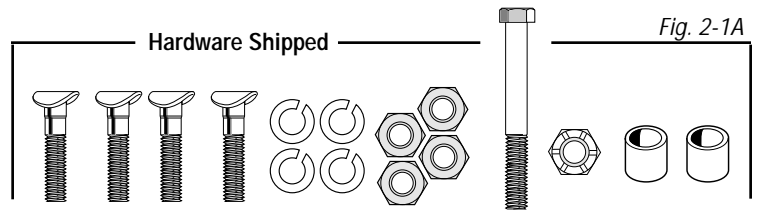


Decal located on front plate of handlebar.



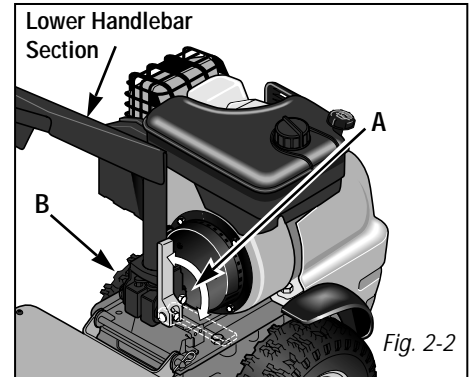
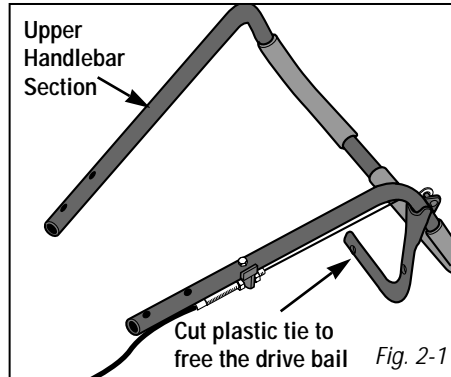
Decal located on top of tine hood.

Section 2 Assembly



WARNING

TO PREVENT PERSONAL INJURY OR PROPERTY DAMAGE, DO NOT START THE ENGINE UNTIL ALL ASSEMBLY STEPS ARE COMPLETE AND YOU HAVE READ AND UNDERSTAND THE SAFETY AND OPERATING INSTRUCTIONS IN THIS MANUAL.



Inspect unit

Inspect the unit and carton for damage immediately after delivery. Contact the carrier (trucking company) if you find or suspect damage. Inform them of the damage and request instructions for filing a claim. To protect your rights, put your claim in writing and mail a copy to the carrier within 15 days after the unit has been delivered. Contact the factory if you need assistance in this matter.

Tools/Materials Needed for Assembly

- (One) 1/2" wrench*
- (Two) 9/16" wrenches*
- (One) Automotive-type air pressure gauge
- (One) Clean oil funnel
- (One) Quart clean, high-quality engine oil. Refer to the Engine Owner Manual for engine oil specifications and quantity required. Do not overfill.

* Adjustable wrenches may be substituted.

IMPORTANT: Motor oil must be added to the engine before starting. Follow the instructions in this "Assembly" section and in the Engine Owner's Manual.

Unpacking Instructions

1. After opening the carton, remove cardboard support materials and packaging material around handlebar and engine.

2. Lift up the carton to remove it.

3. Carefully put aside the upper section of the handlebar (it is connected to the machine by a control cable) and the hardware bag. See Fig. 2-1. Do not kink the control cable connected to the upper handlebar section. Also cut the plastic tie on the handlebar to free the drive bail (Fig. 2-1).

4. The assembly is easiest by leaving the tiller on the wood shipping pallet until the handlebar has been completely assembled. If the unit must be moved off the pallet and rolled to another location for assembly, see "Freewheel" message on Pg. 8.

5. Open the hardware bag and group the hardware. Check the contents against the following list and Fig. 2-1A above (hardware shown at a reduced size):
 - four 5/16"-18 x 1-1/2" curved head screws
 - four 5/16" lockwashers
 - four 5/16"-18 hex nuts
 - one 3/8"-16 x 3-1/4" screw
 - one 3/8"-16 locknut
 - two steel bushings (for handlebar)

STEP 1: Adjust Handlebar Height

1. Move the handlebar locking lever up (A, Fig. 2-2), then tilt the lower handlebar section upward to align the holes in the base and the lower handlebar section (B).
2. Hold the lower handlebar section in this position with the holes in the base aligned. Move the handlebar locking lever down to "freeze" the hole alignment.

STEP 2: Install Hardware in Base and Lower Handlebar Section

1. Insert one bushing (C, Fig. 2-3) on the end of the 3-1/4" long screw (D), and slide the screw through the base of the lower handlebar section. Put the other bushing (C) on the screw on the other side, sliding it on all the way.
2. Use 9/16" wrenches to install the 3/8" locknut (E) on the screw (D). Tighten hardware securely. NOTE: Do not tighten the other long screw next to this hardware – it is factory tightened. See Fig. 2-3.

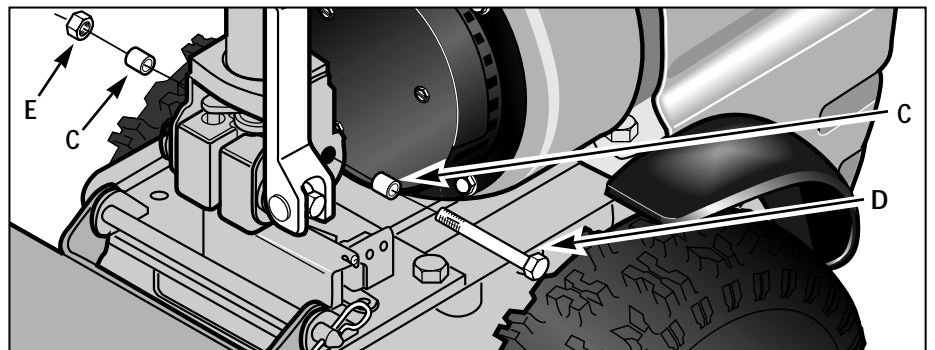


Fig. 2-3: Install hardware to secure lower handlebar section to the base.

Section 2: Assembly

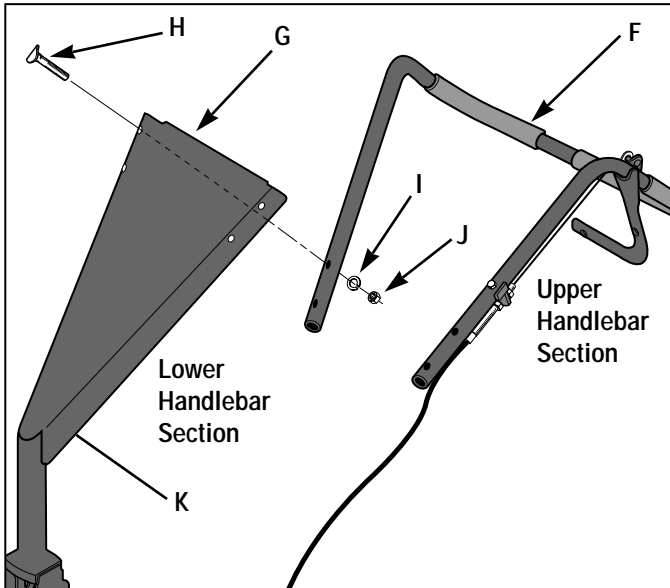


Fig. 2-4

STEP 3: Attach Upper Handlebar Section to Lower Handlebar Section

1. Align the mounting holes in the upper handlebar section (F, Fig. 2-4) with the corresponding mounting holes in the lower handlebar section (G).
2. Insert four 5/16"-18 x 1-1/2" curved head screws (H, Fig. 2-4) **DOWN** through the holes in the two handlebar sections. Install the top screws first for easiest installation. Secure the screws with four 5/16" lockwashers (I), and four 5/16"-18 hex nuts (J). Tighten with a 1/2" wrench.
3. Press the handlebar control cable into the plastic clip (K, Fig. 2-4) underneath the left side of the control panel.
4. Lift up the handlebar locking lever and swivel the handlebar toward the engine starter rope to test hardware tightness at the base of the handlebar. If the handlebar seems secure and swivels smoothly, the hardware is tightened properly. Tighten the front bolt (D, Fig. 2-3) more if the handlebar doesn't seem secure enough. Loosen the front bolt (D) a little if the handlebar is hard to swivel. **IMPORTANT: This bolt must be tightened properly for the handlebar to swivel properly. The other long bolt next to it should not be tightened now, but may at some time in the future require tightening which is explained in the Maintenance Section.**

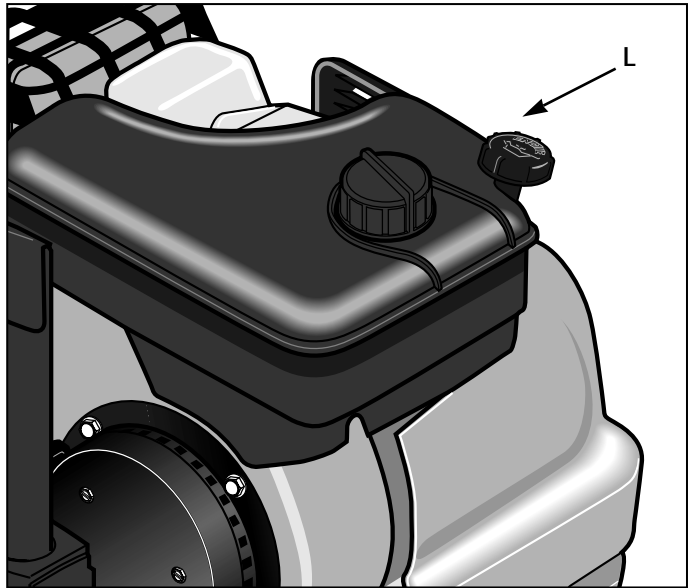


Fig. 2-5



WARNING

DO NOT START THE ENGINE UNTIL ENGINE CRANKCASE HAS BEEN FILLED WITH OIL. FAILURE TO FOLLOW THIS INSTRUCTION WILL RESULT IN SERIOUS ENGINE DAMAGE.

STEP 4: Add Motor Oil to Engine

1. Refer to the separate Engine Owner's Manual for the recommended type and viscosity motor oil to use.
2. With the tiller on level ground, unscrew and remove the oil fill dipstick (L, Fig. 2-5). Using a funnel, pour fresh motor oil into the dipstick opening. Add oil gradually and check the level with the dipstick several times to be sure not to overfill the engine. Add oil until the level is up to the "FULL" mark on the dipstick.
3. The oil level on the dipstick should always be between the "ADD" and "FULL" marks. Wait a few minutes after filling the crankcase for the oil to settle. Re-check the oil level and adjust as needed.
4. Wipe up any oil spillage and replace the oil fill dipstick securely.

STEP 5: Check and Adjust Tire Air Pressure

Use an automotive-type tire pressure gauge to check the air pressure in both pneumatic tires. Inflate both tires evenly between 15-to-20 PSI.

STEP 6: Check External Hardware for Tightness

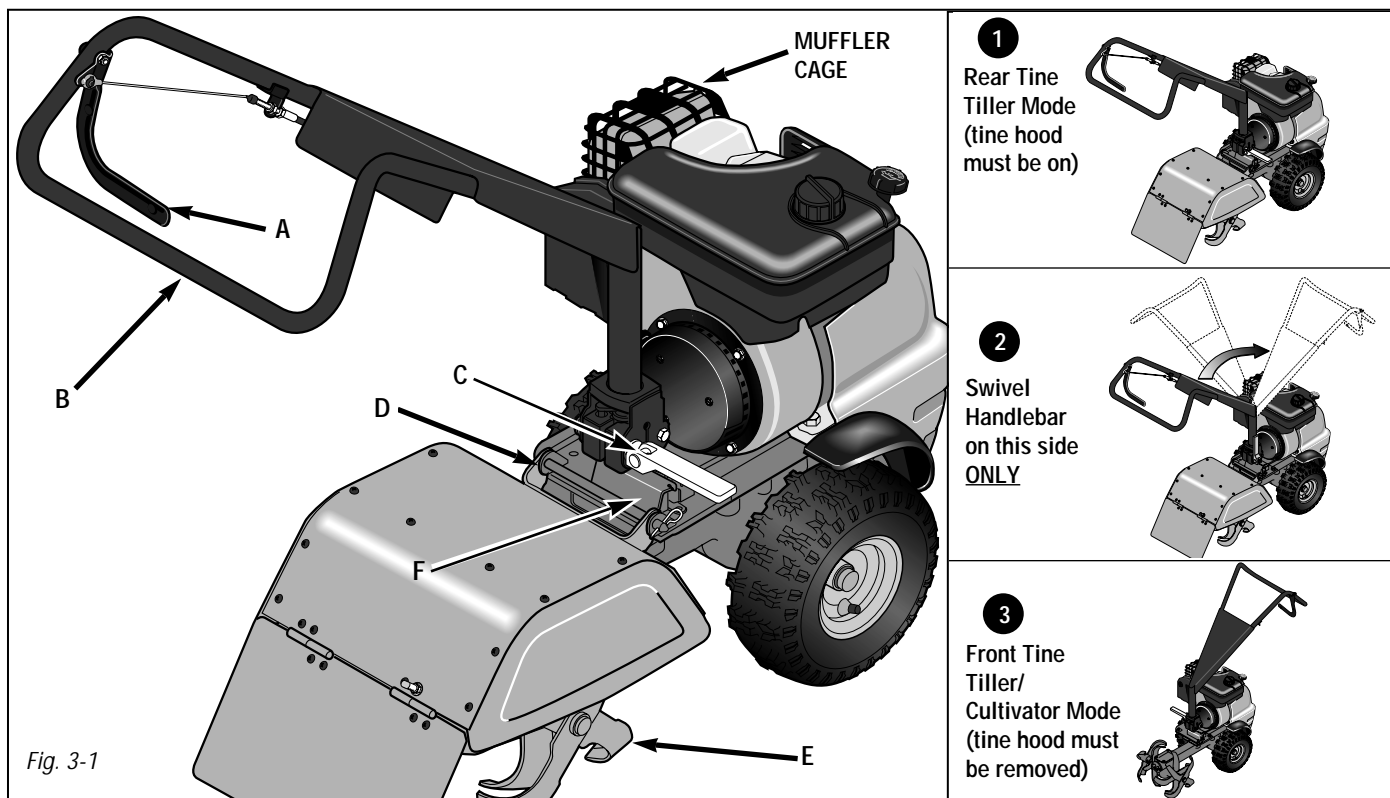
Inspect the screws, bolts and nuts on the tiller and make sure they are securely tightened.

How To Move the Machine in "Freewheel"

IMPORTANT: To "freewheel" (wheels turn freely due to disengagement from transmission gears) the machine off the pallet to another location, unlock the handlebar locking lever (see Pg. 9), then swivel the lower section of the handlebar (stand on the engine muffler cage side only) 180° to position it over the engine. Relock the lever. Using the lower handlebar section for leverage, roll the equipment to the desired location. Swivel the handlebar back to its original position over the tine hood to return to the rear tine tiller mode. *Do not pick up the machine by the fenders to avoid damage to the fenders.*

Section

3 Features and Controls



This section describes the various features and controls on the unit. Refer to the next section, "Operation," for an explanation of the use of these controls.

TILLER FEATURES/CONTROLS

Drive Bail

Holding the Drive Bail (A, Fig. 3-1) closed against the handlebar engages the tines and wheels (when handlebar is in the rear tine tiller mode) or engages power to just the tines (when handlebar is turned to front tine tiller/cultivator mode).

Swivel Handlebar

The handlebar (B, Fig. 3-1) swivels 180° to convert the equipment into either a rear tine tiller or a front tine tiller/cultivator. The handlebar also offers infinite height adjustments for operator comfort.

IMPORTANT: Only swivel the handlebar 180° on the muffler cage side of the equipment, or damage to the unit can occur!

Handlebar Locking Lever

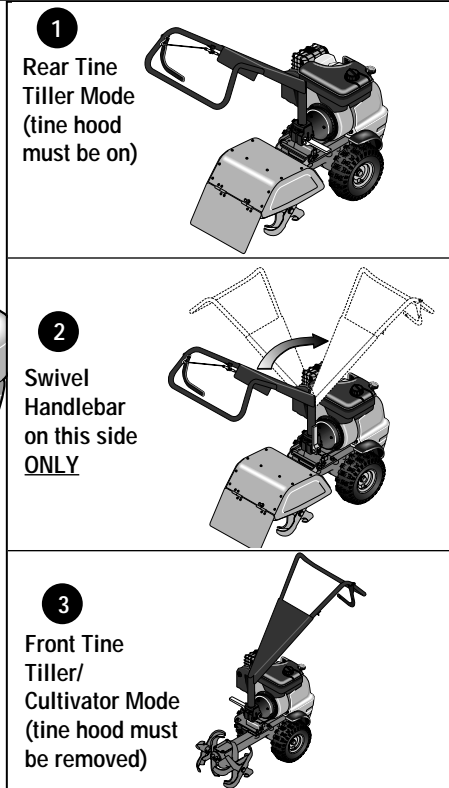
Lift up the lever (C, Fig. 3-1) to unlock the handlebar. This allows the handlebar height to be raised or lowered, and the handlebar to be swiveled 180°. See Inset Figures above for rear tine tiller and front tine tiller/cultivator modes.

Hood Release Pin

This pin (D, Fig. 3-1) locks the hood to the tiller chassis. When the pin is taken out the hood can be removed and then the handlebar swiveled around and positioned over the engine for cultivating. NOTE: The hood must always be in place and locked with the hood release pin when the machine is used for rear tine tilling or else the engine will not run.

Tines

Four tine sets (E, Fig. 3-1) (each set has four tines) rotate at high speed and do the tilling and cultivating in the soil. When you are rear tine tilling and standing in the operator's position behind the



hood, the tines rotate counterclockwise (CRT) in a direction opposite from forward travel. When you are front tine tilling or cultivating (hood is removed; handlebar is swung 180° over the engine), the tines rotate clockwise in the direction of forward travel.

IMPORTANT: In rear tine tiller mode, both the tines and wheels are powered. In front tine tiller/cultivator mode, only the tines are powered.

Operational Interlock System

Located at the base of the handlebar (F, Fig. 3-1). This safety switch shuts the engine off or prevents it from starting if the operator attempts rear tine tilling with the tine hood off, or attempts front tine tilling/cultivating with the handlebar in any position other than pointing back over the engine.

IMPORTANT: Do not attempt to operate machine in front tine tiller/cultivator mode with the tine hood installed as damage to the tine hood could occur.

Section 3: Features and Controls

ENGINE FEATURES/CONTROLS



WARNING

Before operating your machine, be sure you read and understand all safety, controls, and operating instructions in this Owner's Manual and on the decals on your machine.

Failure to follow these instructions can result in serious injury or property damage.

The following are descriptions of the features and controls on your engine.

Additional engine information is provided in Section 4 "Operation" in this manual and in the engine manufacturer's Operator's Manual which is included in your literature package. Be sure to read the Engine Operator's Manual carefully and save it for future reference.

Engine Throttle Lever

The throttle lever (G, Fig. 3-2) is used to adjust engine speed as well as start and stop the engine.

Move the throttle lever all the way up from the STOP position to the START/RUN position before pulling out the recoil starter. There is an IDLE position between the STOP and START/RUN positions. Move the throttle lever down to the STOP position to turn the engine off.

Fuel Primer Bulb

This bulb (H, Fig. 3-2) pumps a small amount of gasoline into the carburetor to aid in starting the engine. Refer to the following section, "Operation," for specific primer bulb operating information under various starting conditions.

Recoil Starter

The recoil starter (I, Fig. 3-2) is used to manually start the engine.

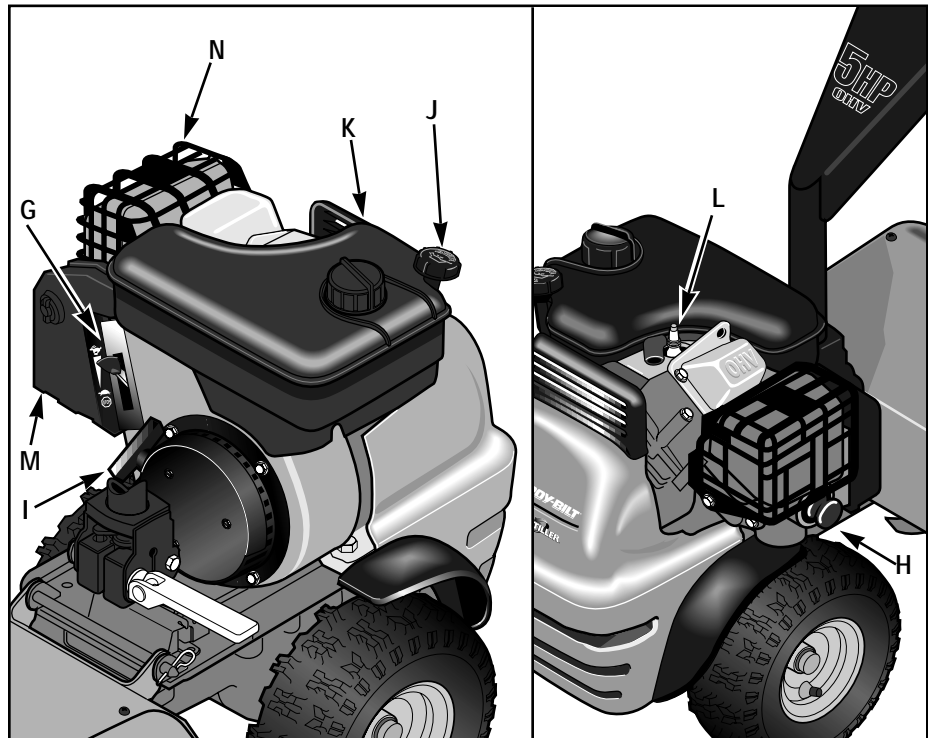


Fig. 3-2: Engine features and controls.

Oil Fill Tube and Dipstick

Turn and lift up to remove the oil dipstick (J, Fig. 3-2) from the top of the engine. Always keep the oil level between the "ADD" and "FULL" marks at the end of the dipstick. Refer to your Engine Operator's Manual for specific motor oil recommendations.

Fuel Tank

The fuel tank and cap are on top of the engine (K, Fig. 3-2).

Spark Plug

The spark plug wire (L, Fig. 3-2) must be securely attached to the spark plug in order for the engine to start and run properly. Always disconnect the spark plug wire and move it away from the plug before performing any repairs or maintenance.

Air Cleaner

Your engine has a dual element air cleaner system for maximum filtration efficiency (see M, Fig. 3-2). Never run the engine without the complete air cleaner installed. Service the air filter system regularly as specified in your Engine Operator's Manual.

Muffler

The engine muffler (N, Fig. 3-2) has a steel cage surrounding it to keep objects away from its hot surface. Do not touch the engine muffler while the engine is running or cooling down.

Section 4 Operation

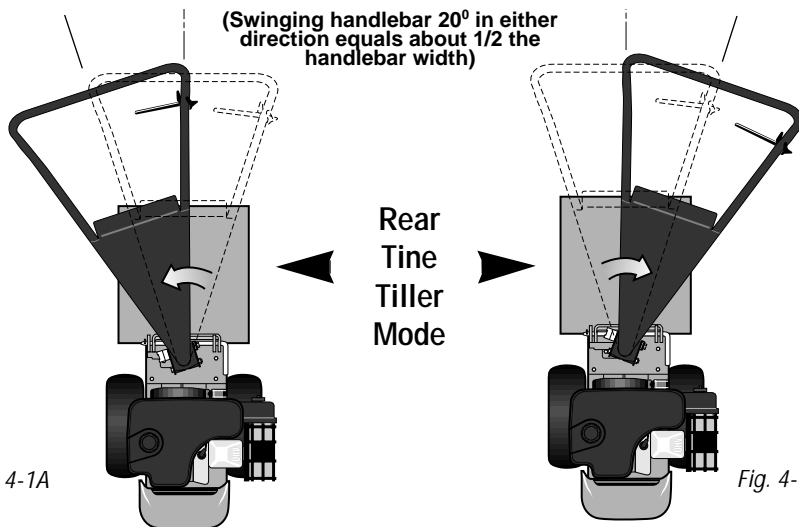


Fig. 4-1A

Fig. 4-1B

MAXIMUM RECOMMENDED HANDLEBAR OFFSET IS 20° LEFT OR 20° RIGHT IN EITHER REAR TINE TILLER MODE OR FRONT TINE TILLER/CULTIVATOR MODE.

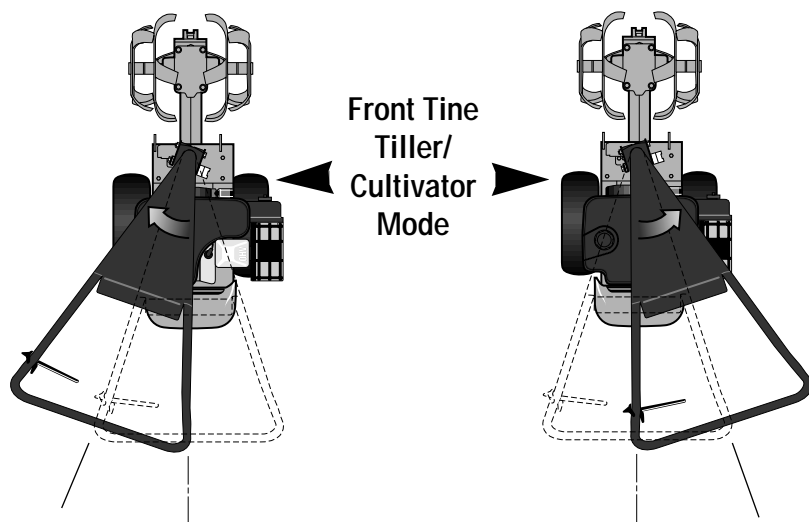


Fig. 4-2A

Fig. 4-2B

(Swinging handlebar 20° in either direction equals about 1/2 the handlebar width)

This section explains how to:

- Transport the Machine
- Prepare for Starting and Break-In Operation
- Check Operational Interlock System
- Convert the Equipment From a Rear Tine Tiller to a Front Tine Tiller/Cultivator...Then Back to a Rear Tine Tiller
- Start and Stop the Engine
- Operate the Rear Tine Tiller
- Clear Debris from the Tines
- Operate the Front Tine Tiller/Cultivator
- Cultivate in Flower Beds and in Confined Shrub Areas
- Optional Attachments
- Load and Unload the Tiller

Before operating your unit, be sure you have read and understand all Safety Instructions in Section 1 and Controls information in Section 3. First practice using the unit (as a tiller and a cultivator) in an open, level area. After a thorough practice session, you can then "freewheel" the unit to the work area.

How To Transport the Machine in "Freewheel"

To "freewheel" the machine to another location, unlock the handlebar locking lever (see Pg. 9), then swivel the handlebar (do this on the engine muffler side only) 180° to position it over the engine. Relock the lever. Roll the equipment to the desired location. Swivel the handlebar back to its original position over the tine hood to return to the rear tine tiller mode.



WARNING

Before operating your machine, be sure you read and understand all safety, controls, and operating instructions in this Owner's Manual and on the decals on your machine.

Failure to comply can result in injury or property damage.

IMPORTANT: Always swivel handlebar around on muffler cage side of engine. To avoid damage to engine recoil cover and control cable, never swivel handlebar on fuel tank side of engine!



WARNING

- To avoid injury, keep hands, feet, legs and clothing away from revolving tines.
- Do not operate tiller in rear tine tilling mode without tine hood in place, or in front tine tilling/cultivating mode with tine hood on.

Section 4: Operation

Preparation For Starting

Make the following checks and adjustments before starting the engine.

1. **Check Engine Oil Level.**
2. **Check the Air Cleaner.** It must be securely assembled and clean.
3. **Check Safety Guards.** All guards and covers must be securely in place.
4. **Attach Spark Plug Wire.**
5. **Check Engine Cooling System.** Cooling fins and air intake must be clean.
6. **Adjust Handlebar Height.**
7. **Test Operational Interlock System.** Perform this test in both front tine cultivator mode and in rear tine tiller mode. Refer to Pg. 13 for full instructions.

8. Select Rear Tine Tiller Mode or Front Tine Tiller/Cultivator Mode. If you select rear tine tiller mode, check to see that the wheels do not "Freewheel." Roll the tiller forward several inches to verify that the wheels are fully engaged. If you select front tine tiller/cultivator mode, check to see that the wheels do "Freewheel." See Pg. 14 for instructions.

8. Add Gasoline to Fuel Tank. Use fresh, clean unleaded automotive gasoline. Either regular or premium grades are acceptable. **DO NOT MIX OIL WITH GASOLINE.** See the separate Engine Operator's Manual for all fuel recommendations.

NOTE: Do not use fuel containing methanol (wood alcohol). Fuel containing up to 10% ethanol or "Gasohol" may be used but requires special care when the engine is not used for extended periods. Use clean fuel and store in an approved, covered container. Use a clean fill funnel. Never use "stale" gasoline left over from last season or if stored for long periods.

To Add Gasoline:

1. Clean the fuel cap area before removing the fuel cap.



Fig. 4-3



WARNING

Gasoline is highly flammable and its vapors are explosive. Follow these safety practices to help prevent injury from fire or explosion:

- Never fill tank if engine is running or hot from use. Let engine and muffler cool down before refueling.
- Do not permit open flames, sparks, matches or any smoking materials in the refueling area.
- Fill fuel tank outdoors in a well-ventilated area. Wipe away any fuel spills and move tiller away from fumes before starting the engine.
- Use only an approved fuel container and lock it safely away from children.
- Store fuel and the equipment in a well-ventilated area. Do not store fuel or the tiller where fuel vapors may reach an open flame or spark, or an ignition source (a hot water heater, furnace, clothes dryer, electric motor, or the like).
- Let engine cool down before storing equipment.

2. Using a clean funnel, fill tank to within 1/2" of the top to prevent spills and to allow for fuel expansion. Replace the fuel cap securely before starting the engine.

IMPORTANT: TO AVOID DAMAGE TO THE ENGINE RECOIL COVER, CONTROL CABLE AND THE INTERLOCK SYSTEM, NEVER SWIVEL HANDLEBAR ON FUEL TANK SIDE OF ENGINE.

Break-In Operation

During the first few hours of new operation, the following maintenance steps are required. For detailed informa-

tion on these procedures, refer to Section 5— "Maintenance."

1. **Change Engine Oil.** Change oil after the first two (2) hours of new operation. Thereafter, every fifty (50) operating hours.

2. **Check Drive Belt Tension.** Due to the new belt "seating in," a tension adjustment may be needed after the first 2-to-3 hours of new operation.



DANGER

The Operational Interlock System is designed for the operator's safety. Do not disconnect or attempt to defeat the purpose of the system. If the system malfunctions, immediately contact your local authorized dealer or the TROY-BILT Technical Service Department for assistance. Do not use the equipment unless the Operational Interlock System is functioning properly.

The Operational Interlock System

The Operational Interlock System is a micro-switch designed to shut the engine off immediately (or prevent it from starting) if an attempt is made to use the equipment in either of two unsafe conditions.

The system is active all the time and will shut the engine off or prevent it from starting if: A) you attempt to operate the equipment in the rear tine tiller mode with the hood removed, or B) if the equipment is in the front tine tiller/cultivator mode (hood is removed) and an attempt is made to swivel the handlebar more than halfway around from the cultivating position at the front of the engine. If either of these situations occurs, the engine will shut off if running, or the engine will not start.

Rear Tine Tiller Mode – In this mode, the handlebar is positioned directly over the tine hood (or within 20° of this position) and the operator stands alongside or behind the hood. The hood must be properly installed and securely locked. If the tine hood were to be removed, the engine would stop immediately or, if it had not been running, it would not start.

Front Tine Tiller/Cultivator Mode – In this mode, the handlebar is swiveled around so it is over the engine (or is within 20° of this position) and the tine hood is removed. If the handlebar were swiveled more than halfway around in the direction of the tines, the engine would stop or, if it had not been running, it would not start.

Check the Operational Interlock System by performing the test below in *Front Tine Tiller/Cultivator Mode* :

- 1) When the equipment is in "Front Tine Tiller / Cultivator Mode," the handlebar is positioned over the engine and the tine hood is removed. See Pg. 14 for detailed instructions.
- 2) Start the engine.
- 3) Swivel handlebar halfway around toward the tines (one muffler cage side of engine). See Fig. 4-4A.
- 4) The engine should shut off and should not be able to be restarted with the handlebar in this position. This means the Interlock System is operating properly.
- 5) Swivel handlebar around over the engine again. Now the engine should be able to be started.

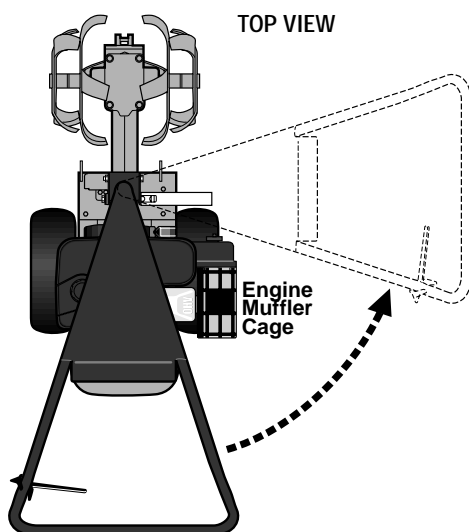


Fig. 4-4A: Handlebar positioned over the engine. Hood is off. Start the engine. Swing the handlebar from over the engine halfway around toward the tines. The engine should stop.

Check the Operational Interlock System by performing the test below in *Rear Tine Tiller Mode* :

- 1) When in "Rear Tine Tiller Mode," the handlebar is positioned over the tine hood. The hood must be properly and securely installed. Engine must be off.
- 2) Start the engine.
- 3) Be very careful not to engage the Drive Bail when performing this step. Remove the tine hood (see Fig 4-4B). The engine should stop. If it does, the Interlock System is operating properly. Do not use the tiller if the engine continues to run– a repair is needed.
- 4) Replace the tine hood securely. The engine will now be able to be started again.

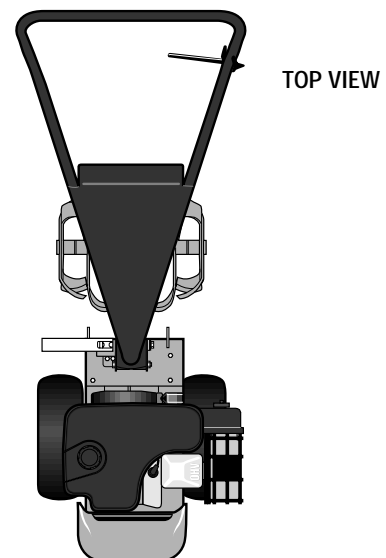


Fig. 4-4B: The handlebar is positioned over the tines; the tine hood is installed. Start the engine. Remove the tine hood– the engine should stop and fail to restart. Replace tine hood– the engine should start.

Section 4: Operation

Use this procedure to convert your equipment from rear tine tiller mode... to front tine tiller/cultivator mode..then back to a rear tine tiller again.

To Change from rear tine tiller mode to front tine tiller/cultivator mode:



WARNING

To avoid serious personal injury or property damage, stop the engine, let all moving parts stop completely, disconnect the spark plug wire, move the wire away from the spark plug, and let the engine and muffler cool down before changing from one tiller mode to another or performing any adjustments or service on your equipment.

1. Move the equipment to a level, firm surface.
2. Stop the engine and disconnect the spark plug wire.
3. Lift up the handlebar locking lever (A, Fig. 4-5) to unlock the handlebar.

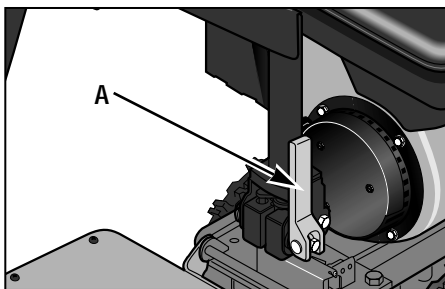


Fig. 4-5

4. Grasp the handlebar and walk it around the muffler cage side of the engine a full 180° until the handlebar is positioned over the top of the engine. Refer to Fig. 4-6.
5. Push the handlebar locking lever down.
6. Remove the hair pin clip (B, Fig. 4-7) from the hood release pin (C, Fig. 4-7). Slide the hood release pin out of the hood bracket (D, Fig. 4-7).

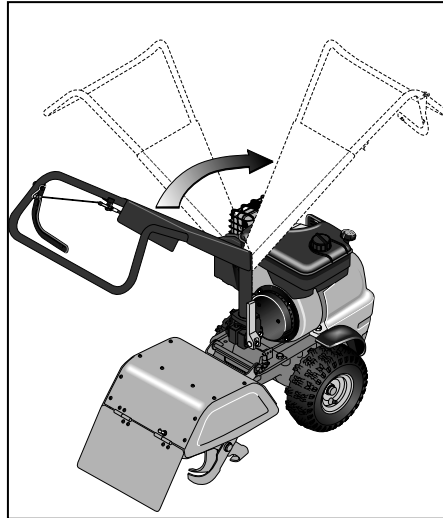


Fig. 4-6

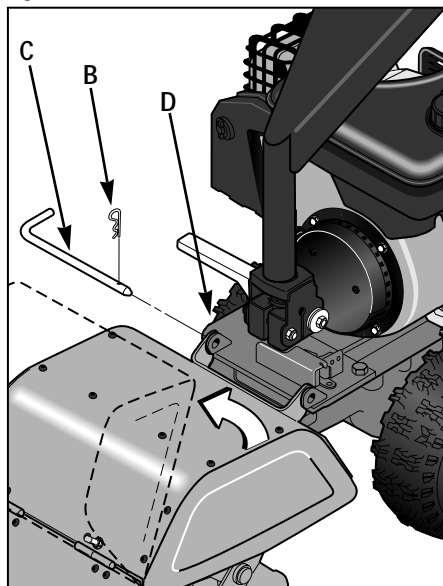


Fig. 4-7

7. Lift up the hood flap and tilt the tine hood backward so the bracket at the rear of the hood disengages from the transmission. Lift the hood assembly off and put it aside. Refer to Fig. 4-7. Keep the hair pin clip and hood release pin installed on the hood at all times to prevent their loss. Reconnect the spark plug wire securely.
8. The equipment is now ready for front tine tilling and cultivating! See Fig. 4-8.

To Change from front tine tiller/cultivator mode to rear tine tiller mode:

1. Stop the engine and disconnect the spark plug wire. The equipment must be on a level, firm surface.
2. Replace the hood by first engaging the rear hood bracket on the pin at the end of the transmission (see Fig. 4-7). Connect the front of the hood to the handlebar base by aligning the two brackets (offset the hood brackets to the left of the base brackets), then insert the hood release pin and hair pin clip (see Fig. 4-7).
3. Lift up the handlebar locking lever (A, Fig. 4-5) to unlock the handlebar.
4. Swivel the handlebar around on the engine muffler cage side of the equipment 180° to position it over the tine hood. Push the locking lever down. This is the rear tine tiller mode. See Fig. 4-9.
5. Reconnect the spark plug wire.

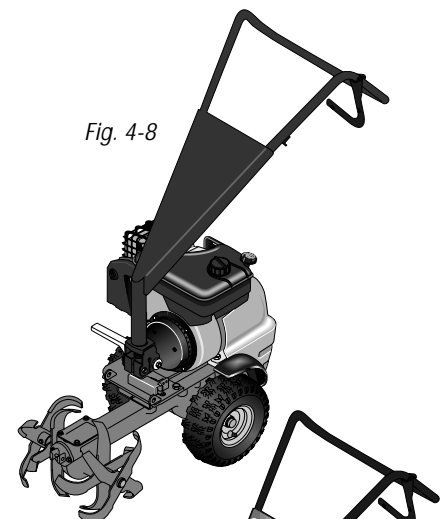


Fig. 4-8

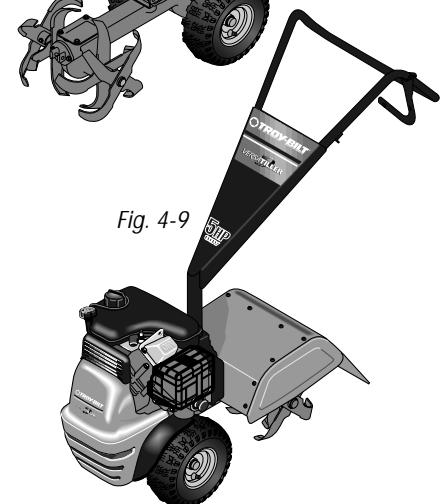


Fig. 4-9

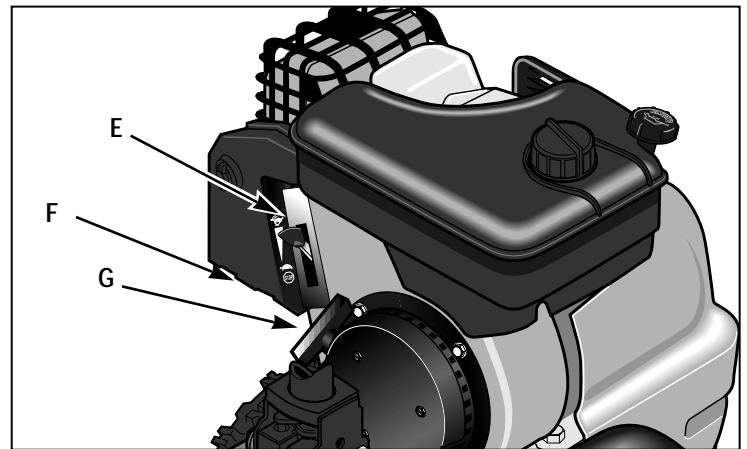
To Start and Stop the Engine

IMPORTANT: Use the following steps to practice starting and stopping the engine **ONLY**. Do not attempt to use the equipment as a tiller or cultivator until you have read all operating instructions in this Owner's Manual.

To Start the Engine:

1. The spark plug wire must be connected to the spark plug and the fuel tank must have fresh, unleaded gasoline.
2. Let go of all controls.
3. Move engine throttle lever (E, Fig. 4-10) all the way up to RUN/START position.
4. Push fuel primer bulb (F, Fig. 4-10) two or three times. Allow two seconds or so between pushes. In cold weather (below 50°F) push primer five times. **NOTE:** Primer use may be needed to restart a warm engine after a short shutdown.
5. Grasp starter handle (G, Fig. 4-10) and pull rope out slowly until it pulls slightly harder. Let rope rewind slowly. Then pull

Fig. 4-10



rope with a rapid full arm stroke. Let rope return slowly. **NOTE:** If engine fails to start after three (3) pulls, push fuel primer two times and pull starter rope again.

To Stop the Engine:

1. Move the engine throttle lever (E, Fig. 4-10) down to the STOP position.
2. Let all moving parts come to a complete stop, then disconnect the spark plug wire and move the wire away from the

spark plug to prevent the possibility of accidental starting.



WARNING

Engine throttle lever speed should not be adjusted while the tines are engaged either for tilling or cultivating.

Failure to comply could result in severe personal injury or property damage.

How to Operate Your Machine as a Rear Tine Tiller

You will find that general tilling, and sodbusting in particular, are real delights with the VersaTiller. This is largely due to the machine's counter-rotating tines which handle tough ground-breaking jobs easily. Be sure the equipment is in rear tine tiller mode (see Fig. 4-11).

When breaking new sod (especially when it is wet or very hard), the wheels could lose traction and cause the tines to unexpectedly propel the tiller backward. This condition is most likely to occur during initial tine engagement with the sod, such as when starting a new tilling pass.

If this condition occurs, simply release the drive bail to quickly stop the tines and wheels. Do not exert any downward pressure on the handlebar or attempt to restrain the tiller.

To minimize the possibility of the tiller moving unexpectedly backwards, always avoid pushing down on the handlebar when in the rear tine tilling mode. **If necessary, apply upward pressure to increase wheel traction and to prevent**

the tines from digging too deeply. This is a very important technique! See Fig. 4-11. Also, check that the tine hood flap is back in the trailing position and not pointing straight down or toward the tines.

1. Start the engine and let it warm up.
2. Stand behind and on the left-side of the handlebar and close the Drive Bail by moving the bail up against the handlebar. The tines and wheels will rotate. You may walk on the left side of the machine and slightly behind the handlebar, guiding the tiller as it moves along, keeping its path straight. Using one hand on the handlebar prevents footprints in the freshly tilled soil.
3. As you approach the end of the first row, raise the handlebar to lift the tines out of the soil. As you swing the handlebar to make your turn for the next row, let the powered wheels assist you in making the turn.

4. Lower the handlebar to let the tines contact the soil again and complete the next row. Continue tilling back and forth.

5. Till the complete garden area once again, but at a right-angle to the original direction.

6. To stop the tiller, let go of the Drive Bail. To stop the engine, move the engine throttle lever all the way down to STOP.

IMPORTANT: The wheels will not "freewheel" when the equipment is in rear tine tiller mode (they only "freewheel" when in front tine cultivator mode).



Fig. 4-11

Section 4: Operation

Clearing Debris from the Tines



WARNING

To help avoid personal injury, shut off the engine, let all moving parts stop completely, disconnect the spark plug wire and move the wire away from the plug before attempting to clean the tiller tines.

Long grass, string, or tough vines may become tangled in the tines. It's not necessary to remove all of the tangled material for best tilling results, but the bulk of the material should be removed for effective tilling. The tine hood may be removed for the most complete tine cleaning.

To avoid tangled materials:

- Till under crop residues or cover crops while they are still green.

- Using the handlebar, swing the tiller from side-to-side (6" to 12" each way) occasionally— this can clear up tangles.
- If tangled material begins to build up, stop the engine, let all moving parts stop completely, disconnect the spark plug wire, move the wire away from the plug, then use a pocket knife or linoleum knife to cut the material away.

How to Operate Your Machine as a Front Tine Tiller/Cultivator

The VersaTiller is not only a very capable, high-performance rear tine tiller, but a wonderful front tine tiller/cultivator as well. Its cultivating capabilities will help your garden, flower beds, and shrubbery areas flourish the entire growing season.

If you plan carefully before planting, you can leave enough room between plant rows for later cultivating. That will eliminate most hand-weeding or hoeing chores during the growing season. Allow for the overall wheel width (16") between rows plus some additional room for plant growth (particularly for bushy crops like beans, tomatoes, peas, etc.) See Fig. 4-12.

Tine Width (all four tine gangs): 12"

Tine Width (inner tine gangs only): 7¼"

Wheel-to-Wheel Width: 16"

1. Be sure the equipment is in front tine tiller/cultivator mode (See Fig. 4-8 and 4-12). **The handlebar must be positioned over the engine and the tine hood removed.** (See Page 14 for instructions.)
2. Start the engine and let it warm up. Adjust the throttle lever to a medium engine speed.
3. Stand behind the handlebar and at the front of the engine (Fig. 4-12). Close the DRIVE BAIL against the handlebar and the tines will revolve.

IMPORTANT: When in front tine tiller/cultivator mode, only the tines are powered when the Drive Bail is closed— NOT THE WHEELS. In this mode, the wheels are always in "freewheel" and the equipment can be easily moved.

4. The rotating tines will pull the machine along as it tills or cultivates. You can push down on the handlebar to raise the tines if they stay in one location too long.

5. To stop the tines, let go of the drive bail. To stop the engine, move the engine throttle lever all the way down to STOP.

Cultivating Tips:

- *Shallow cultivating is most effective. Don't let the tines dig in too deeply as you proceed through a row. To prevent this from happening, push down on the handlebar to raise the tines up. Also use the handlebar as a depth control so the tines do not till up vegetable plant roots which are deeper than weed roots.*
- *Sweep the tines from side to side by moving the handlebar. This action imitates hand-weeding and prevents the tines from staying in one location too long.*

- *You may remove both outer tine gangs if a narrower overall tine width will help cultivate between individual plants. Simply take off the hardware that secures both outer tine gangs and slide the outer gangs off the tine shaft.*

Cultivating in Flower Beds and in Confined Shrubby Areas

The VersaTiller is designed to help you cultivate easily in and around congested flower beds and shrub areas. If necessary, simply remove the two outer tine gangs. The remaining inner tine gangs measure just 7¼" overall. You can "poke" these tines into very compact areas without damaging flowers, leaves and stems.



Fig. 4-12: Cultivating in the garden.

OPTIONAL ATTACHMENTS

The Edger Attachment

The Edger Attachment allows you to make clean, sharp edges wherever grass meets a walkway, driveway, terrace, patio, or other such surface. It's an extremely handy landscaping and yard care tool that attaches quickly to your equipment. Simply set up in front tine tiller/cultivator mode (the tine hood must be off, and handlebar positioned over the engine), remove the tines, and install the edger blade and wheel on the tine shaft. Refer to Fig. 4-13.



Fig. 4-13: The edger attachment leaves sharp, clean edges between grassy areas and walkways, driveways, patio areas, etc.

The Aerator Attachment

The aerator is an extremely effective way to open up the "pores" in your lawn's sod, thereby allowing sprinkler water, commercial nutrients, rain, and air to enter the earth and nourish the lawn roots. It is especially beneficial when reseeding areas of grass, as lawn growth occurs much more quickly after you use the aerator tines.

This attachment is used when your equipment is in the rear tine tiller mode—the tine hood is securely mounted and the handlebar extends back over the tine hood. Simply remove the four tine gangs from the tine shaft, and in their place install the four aerator blades supplied with their own mounting hardware. See Fig. 4-14.

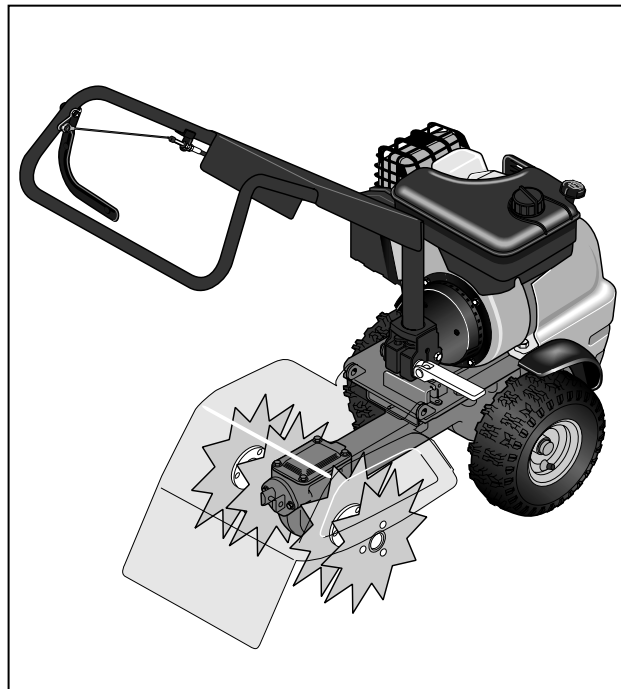


Fig. 4-14: The aerator attachment uses four aerator tines (installed in place of the regular tiller tines) to open up airways in the soil for better absorption of moisture, air, and lawn fertilizer applications.

Section 4: Operation

Loading and Unloading the Tiller



WARNING

Loading and unloading a tiller in or from a vehicle is potentially hazardous and we don't recommend that you do so unless absolutely necessary, as this could result in personal injury or property damage. However, if you must load or unload the tiller, follow the directions below.

- Shut off the tiller engine before loading or unloading. Let the engine cool. Disconnect the spark plug wire and prevent the wire from touching the spark plug.
- The tiller is too heavy (over 120 lbs.) and bulky to be safely lifted by one person. If you do lift the tiller, two or more people should share the load. With one person on one side of the equipment and another person on the other side, each should grip the machine at the front shield (use the slot in the shield) and at the tine hood.
- However, the preferred method that we recommend is that you use sturdy ramps and manually roll the tiller (in front-tine cultivator mode so the wheels freewheel) in or out of the vehicle with another person's assistance.
- Ramps should be strong enough to easily support the tiller and those moving it. The ramps should also have good traction, side rails to direct the tiller, and a locking device to secure them to the vehicle bed.
- The operator and assistants should wear sturdy footwear with good traction.
- Position the vehicle so the ramp angle is as flat as possible. Turn off the vehicle engine and apply its parking brake.
- When going up the ramps, stand behind the handlebar and push the equipment ahead of you.
- When going down ramps, walk backward down the ramps with the equipment following you.
- Have wood blocks handy to chock the wheels if necessary. Use the chocks, for example, if repositioning the equipment on the ramps is required. Also chock the wheels when transporting the equipment in the vehicle.
- Once in the vehicle, securely tie the equipment for stability during travel.

Section 5 Maintenance



WARNING

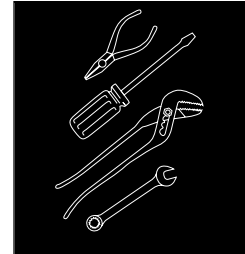
Before inspecting, cleaning or servicing the machine, shut off engine, wait for all moving parts to come to a complete stop, disconnect spark plug wire and move wire away from spark plug.

Failure to follow these instructions can result in serious personal injury or property damage.

NOTE: All references to left, right, front and rear of the machine are determined by standing behind the handlebar and facing the direction of forward travel.

Subjects covered in this section include:

- Tiller/Cultivator Maintenance
- Engine Maintenance
- Storing your Equipment



REQUIRED MAINTENANCE SCHEDULE				
PROCEDURE	Before Each Use	Every 10 Hours	Every 25 Hours	As Noted
Check engine oil level	•			And every 5 operating hours
Test Operational Interlock Safety System	•			See Section 4
Check drive belt tension			•	After initial 2 hours
Check nuts and bolts		•		After initial 2 hours
Clean tiller tine shaft		•		
Lubricate tiller		•		
Change engine oil*				Every 50 operating hours***
Clean foam element air filter Check paper element air filter			• •	More often in dusty, dirty areas
Check for oil leaks			•	After initial 2 hours
Check gear oil level in the transmission			•**	
Check tines for wear			•	
Check air pressure in tires			•	Annually, at start of season
Lubricate eccentric pivot bushings			•	And at end of tilling season
<p>* During engine break-in period, change engine oil after first 2 hours of operation. ** Check transmission gear oil level every 25 hours and at beginning of tilling season if any leakage is observed. *** More often under dirty or dusty conditions.</p>				

Section 5: Maintenance

TILLER/CULTIVATOR MAINTENANCE

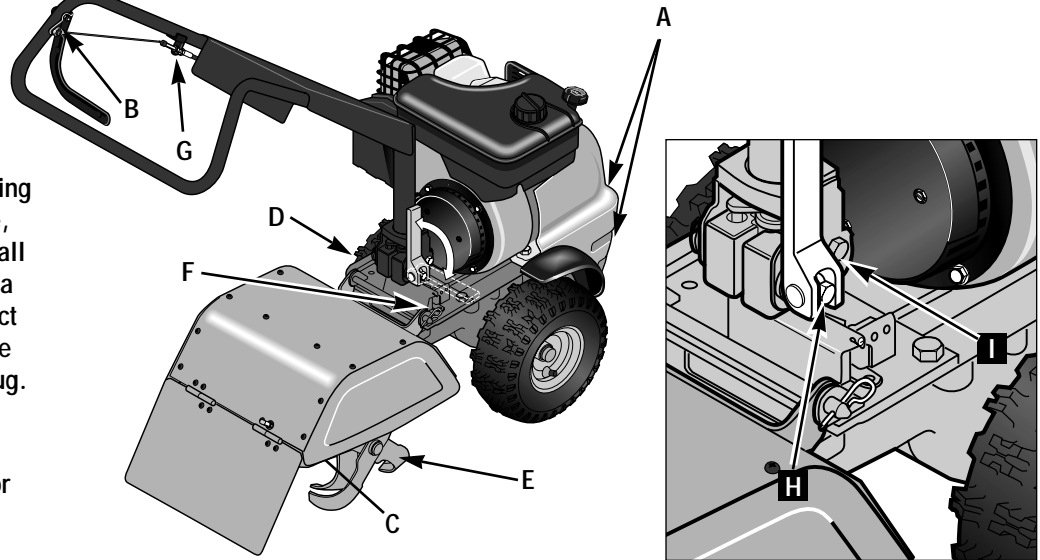
Fig. 5-1: Hardware locations to check for tightness.



WARNING

Before inspecting, cleaning or servicing the machine, shut off engine, wait for all moving parts to come to a complete stop, disconnect spark plug wire and move wire away from spark plug.

Failure to follow these instructions can result in serious personal injury or property damage.



Tighten Bolts and Nuts

Check for loose or missing hardware every ten (10) operating hours. Failure to tighten or replace missing fasteners can cause poor performance, equipment damage or oil leakage. See your Parts Catalog for fastener descriptions.

Most hardware on your equipment is visible. Pay particular attention to the hardware shown in Fig. 5-1 at right.

1. Check the mounting screws (A) securing the protective high-impact cover on the engine.
2. Check hardware (B) securing Drive Bail to the handlebar.

3. Check the two screws (C) securing the bearing cap to the end of the transmission housing. Do not overtighten them or the aluminum threads could be stripped.

4. Check the four screws (D) securing the handlebar mounting plate to the two chassis side rails.

5. Check the mounting hardware securing the tine sets (E) to the tine shaft. The locknuts do not need to be overtightened. Just tighten them securely.

6. Check that the interlock switch (F) is securely connected to the interlock housing.

7. The cable jam nuts (G) on the left side of the handlebar securing the Drive Bail cable to the cable bracket must be tight.

8. Also, if the handlebar feels loose (the handlebar locking lever must be DOWN) when force is exerted on the handlebar either up and down or from side to side, check the tightness of the two screws (H and I in the Inset Figure above) that secure the handlebar and the handlebar locking lever to the base. Over time, the "seating" of parts can cause some looseness to occur. Tighten both nuts that secure the screws approximately one-sixth (1/6th) of a turn. Check to see if the loose handlebar feeling has been eliminated. Alternate between modest tightening and checking for handlebar looseness until the handlebars feel as secure as when new.

Tiller/Cultivator Lubrication

Proper lubrication of the tiller's mechanical parts is an essential part of good maintenance. Lubrication should be done after every ten (10) hours of operation.

Use #30 weight motor oil wherever oil is specified. Use a quality grease with a metal lubricant where grease is recommended (grease without a metal lubricant is acceptable). The

transmission requires special gear oil which is described on the next page.

IMPORTANT– Do not allow oil or grease, or other lubricant to come into contact with pulleys or drive belt. This can cause the belt to slip on the pulleys.

1. After removing the wheels (one at a time), lightly lubricate the wheel shaft on the areas which the wheels ride. Use a quality metal lubricant.

2. After removing the tine gangs from the tine shaft, very lightly grease all exposed areas of the tine shaft (both ends).

3. The base of the handlebar locking lever has several rotating parts. Use a spray lubricant such as WD-40 to keep these parts lubricated.

Transmission Gear Oil Maintenance

A. Check for Transmission Oil Leaks

After the first two (2) hours of brand-new operation, check the transmission for oil leaks. Thereafter, check for leaks every 25 operating hours. Specifically, inspect the following areas for signs of leaks or seepage:

1. There are oil seals on each side of the transmission housing where the tine shaft passes through the housing. Examine those areas for seepage or for leaks on the ground. An oil seal leak can lead to internal damage, so the seal should be replaced immediately.
2. There are oil seals on each side of the transmission housing where the wheel shaft passes through the housing. Leaks from either of these seals also means seal replacement should be done right away.
3. The end of the transmission housing has a bolted on end cap. It should be examined for leaks. Tighten the bolts if they seem loose. If a gear oil leak continues, remove the end cap, clean its surfaces, and apply a new coating of rubberized silicone sealant behind the end cap. Reinstall the end cap by tightening the bolts securely, but do not overtighten them.

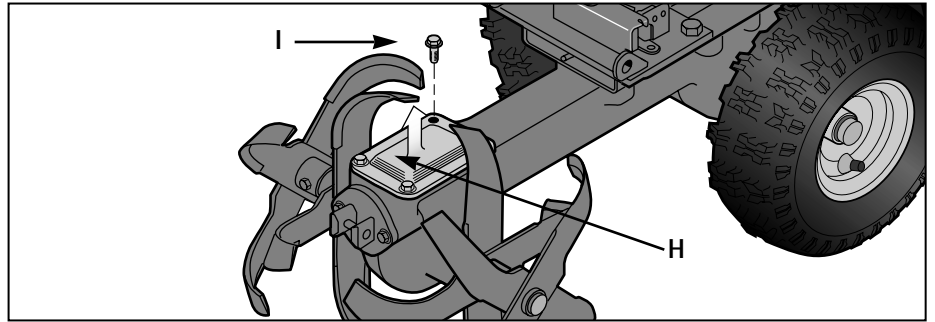


Fig. 5-2: Remove transmission top cover to check the level of gear oil.

B. Check Transmission Gear Oil Level

Every 25 hours of operation (and at the beginning of the tilling season), check the gear oil level in the transmission housing (see Fig. 5-2).

1. Shut off the engine, let all moving parts stop completely, disconnect the spark plug wire and move the wire away from the plug to prevent the possibility of accidental starting.
2. Disconnect the tine hood from the hood bracket and put the hood aside (refer to Figs. 4-6 and 4-7). Tilt tine end of tiller up to allow gear oil to move to front cavity in the transmission. Then lower tine end of tiller down.
3. Clean around the top cover (H, Fig. 5-2) before removing the four cover screws (I, Fig. 5-2). Loosen the cover by gently

tapping it sideways with a hammer (do not pry it up with a screwdriver which could damage the gasket underneath the cover). The gear oil level should be 1-3/4" below the topmost surface of the chassis (this surface is machined) when level. Add or remove gear oil as needed (use a dipper or suction).

Small Top-Offs: use SAE 140 or SAE 85W-140. Use API rating of GL-4.

Full Replacement: SAE 140 or SAE 85W-140 with an API rating of GL-4 only.

4. Replace the top cover securely with the four screws (I) removed previously. Tighten them firmly, but do not overtighten to avoid thread damage.
5. Replace the tine hood.
6. Reconnect the spark plug wire.

Drive Belt Maintenance

A. Checking Cable Tension Applied to the Drive Belt

After the first two hours of operation, the amount of tension that the bail lever cable applies to the drive belt should be checked and, if necessary, adjusted. Thereafter, perform this check every twenty-five (25) operating hours.

1. Move the machine to firm, level ground. The equipment must be in the front tine cultivator mode (the handlebar is swung around over the engine and the tine hood is removed).
2. Start the engine. Move the throttle lever to between idle and full-speed. Position yourself behind the handlebar.

3. Slowly pull the Drive Bail back toward the handlebar and note when the tines begin to rotate. The bail lever should have traveled anywhere between one-third (1/3) to one-half (1/2) the distance toward the handlebar. Cable tension on the belt must be increased if the bail traveled more than one-half the distance. Reduce cable tension if the tines "creep" with the bail fully open or if they rotate when the bail is less than one-third closed.

B. Adjusting Cable Tension Applied to the Drive Belt

4. To increase cable tension, loosen the upper nut (J, Fig. 5-3) securing the threaded cable adjuster (K) to the handlebar mounting bracket. Turn the lower nut to move the cable end down, then

retighten the upper nut.

5. To decrease cable tension, loosen the lower nut (L, Fig. 5-3), turn the upper nut to move the adjuster upward, then retighten the lower nut.

6. Recheck the cable tension (see Steps 1 through 3 at left).

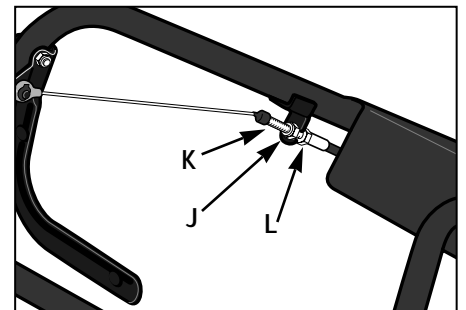


Fig. 5-3

Section 5: Maintenance

Tine Maintenance

Tine Sets Should Be Inspected Regularly and Replaced When Worn

Inspect the tines every 25 hours of operation (or at least a couple of times a year) for wear and general condition. If any tines are broken, or if you notice that tilling and cultivating do not mix the soil as thoroughly as when the tines were new, it's time to inspect and perhaps replace the tine sets. Refer to your parts catalog for correct part number information. NOTE: The tine sets with the thicker tines must be positioned closest to the transmission. The hardware securing the tine sets must be tightened securely (8 ft-lbs.).

The tine sets must be reinstalled as shipped originally from the factory. The tines are designed to rotate backward, with their curved cutting edges entering the soil first. If mounted incorrectly, the tines may tend to run along on top of the ground rather than digging in the soil.

This could unexpectedly cause the machine to jump backward. Also—the tines must all point inward and the two tine sets with the thicker tines must be mounted inboard, as seen in Fig. 5-4.

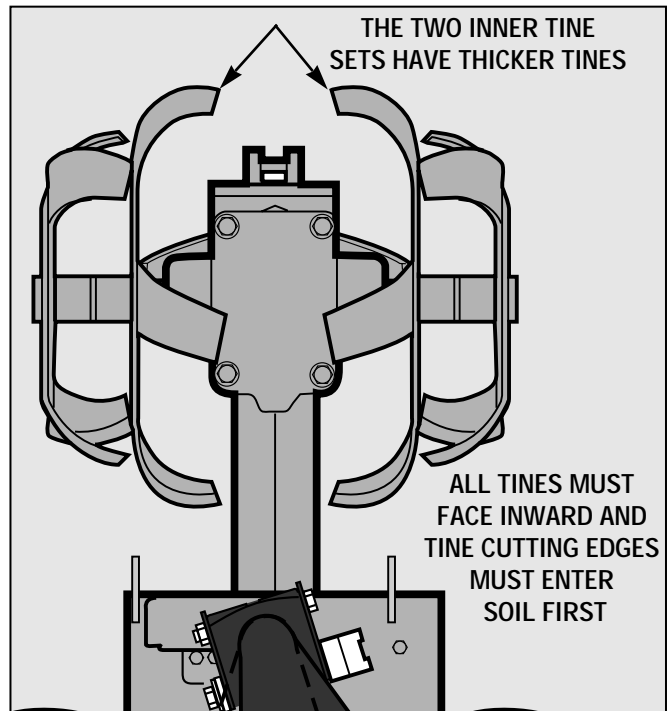


Fig. 5-4: All of the tines point inward. The tines are thicker on the two inner sets. Tines must be mounted so each tine's cutting edge enters the soil first.

Maintenance of the Operational Interlock System

The Operational Interlock System is an electrical safety system that prevents the engine from starting (or shuts the engine off) if either of two unsafe operating conditions were to occur: 1) while in use as a rear tine tiller with the handlebar extending over the tine hood, the interlock will shut the engine off if the tine hood were not securely locked in place; 2) while in use as a front tine tiller/cultivator with the hood removed and the handlebars positioned over the engine, the interlock will shut the engine off if the handlebar is swiveled more than 90° toward the exposed tines.

Keep the interlock switch area (M, Fig.5-5) clean and free of all debris. Inspect this location every time the equipment is used and clean if dirty.

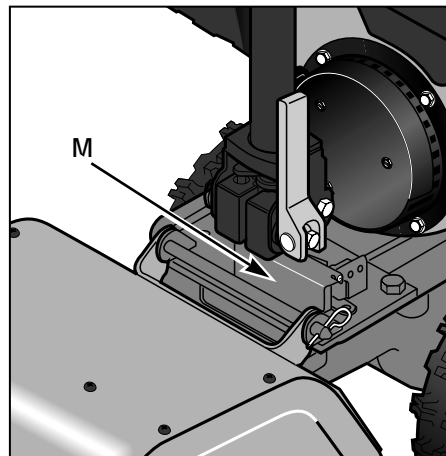


Fig. 5-5: Location of interlock switch.

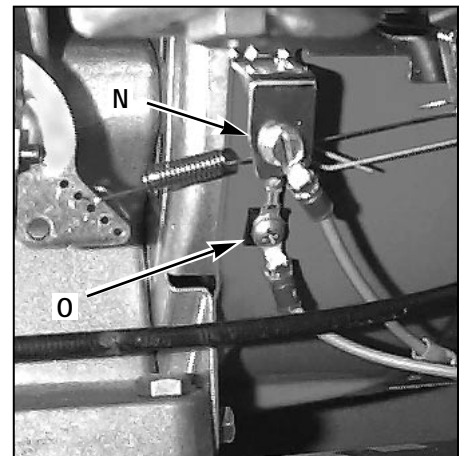


Fig. 5-6: Engine shutoff locations.

Also check the two electrical connections (N and O, Fig. 5-6) on the engine. The connectors must be securely attached.

ENGINE MAINTENANCE

Engine Oil Maintenance

Change engine oil after the first two (2) hours of new operation. Thereafter, change the oil every fifty (50) operating hours (or sooner if the work environment is very dirty or dusty).

The front cover shield (secured with four screws) must be removed to gain access to the oil drain plug which is located at the base of the engine on the muffler side. Locations to check/add oil and drain oil are shown in Figs. 5-7 and 5-8. Follow the engine manufacturer's literature for specific oil changing procedures, quantities, and the specific grade and viscosity of oil to use in the engine.

Air Cleaner Maintenance

The engine is equipped with a dual element air cleaner (refer to Fig. 5-9) that filters the air twice before it enters the carburetor to mix with the fuel. The filters must be kept clean and properly installed at all times.

Refer to the engine manufacturer's literature supplied with your equipment for complete air cleaner service and maintenance information.

Spark Plug Maintenance

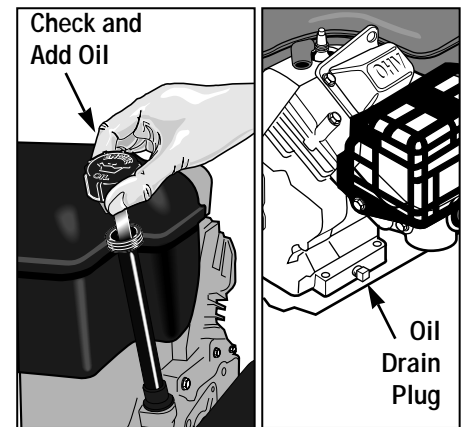
The spark plug (see Fig. 5-10) must be in good condition for proper engine operation. Remove and inspect the plug every one-hundred (100) operating hours or annually, whichever comes first.

The correct electrode gap for your engine spark plug is .030". Check the gap with a feeler gauge. Do not use a spark plug if the porcelain is cracked, the electrodes are pitted or burned, or if other visible damage is present.

To install a plug, first tighten it securely by hand, then use a spark plug wrench to tighten the plug another 1/4 turn.

Ignition System Maintenance

Your engine is equipped with electronic ignition. It does not have a condenser or points, so there is no need to perform any regular "tune-up" maintenance on this system other than adjusting or replacing the spark plug.



Figs. 5-7 and 5-8

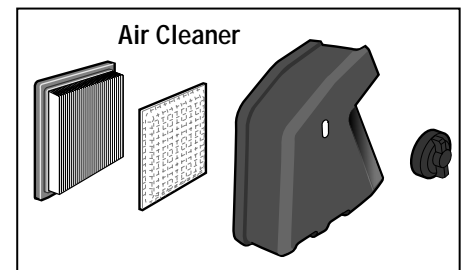


Fig. 5-9

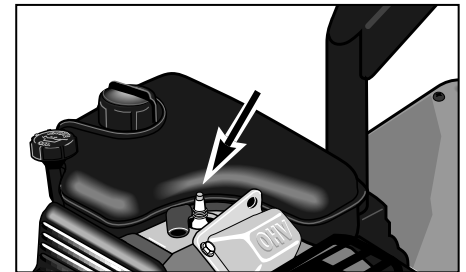


Fig. 5-10

OFF-SEASON STORAGE

When your tiller won't be used during the off-season, prepare it for storage with the following steps:

1. Clean the tiller and engine.
2. Do routine tiller lubrication and check for loose hardware.
3. Protect the engine from deterioration or damage by referring to the Engine Storage instructions in your engine manual literature. Drain the gasoline or use a gasoline stabilizer as recommended in the Engine Manual.
4. When the engine is still warm, drain the oil from the engine crankcase. Refill with fresh, clean motor oil.
5. Protect the internal cylinder against rust by removing the spark plug and pouring one ounce of clean engine oil into the spark plug hole. Then slowly pull out the recoil starter rope 2 or 3 times to distribute the oil internally. Replace the spark plug, but do not reconnect the plug wire. Pull the rope out until resistance is felt— let the rope rewind. The valves are seated.
6. Lubricate the eccentric pivot bushings (at the base of the handlebar) with WD-40.
7. Store the equipment in a clean, dry area.
8. Never store the equipment with fuel in the fuel tank in an *enclosed area* where gas fumes could reach an open flame or spark, or where ignition sources are present (like space heaters, hot water heaters, furnaces, etc.).

TROUBLESHOOTING

Before performing any of the procedures in this Troubleshooting Chart, refer to the appropriate information contained in this Manual for the correct safety precautions and operating or maintenance procedures. Contact your local authorized Engine Service Dealer for engine service. Contact your local authorized TROY-BILT tiller dealer or the Factory for service problems with the machine.

PROBLEM	POSSIBLE CAUSE	CORRECTION
Engine Does Not Start.	<ol style="list-style-type: none"> 1. Spark plug wire disconnected. 2. Fuel tank empty. 3. Stale gasoline. 4. Incorrect throttle setting. 5. Dirty air filter. 6. Defective or incorrectly gapped spark plug. 7. Carburetor out of adjustment. 8. Tine hood not properly attached. 9. Handlebar swung more than half-way. 	<ol style="list-style-type: none"> 1. Reconnect wire. 2. Add gasoline. 3. Drain gasoline and add fresh gasoline. 4. Put throttle in correct setting. 5. Replace air filter. 6. Inspect spark plug. 7. See Engine Service Dealer. 8. Check for proper hood installation. 9. Swing handlebar back into proper range.
Engine Runs Poorly.	<ol style="list-style-type: none"> 1. Bad spark plug. 2. Incorrect throttle setting. 3. Dirty air filter(s). 4. Carburetor out of adjustment. 5. Stale gasoline. 6. Dirt or water in fuel tank. 7. Engine cooling system clogged. 	<ol style="list-style-type: none"> 1. Inspect spark plug. 2. Move throttle to correct setting. 3. Replace filter. 4. See Engine Service Dealer. 5. Drain gasoline and add fresh gasoline. 6. See Engine Service Dealer. 7. Clean engine cooling fins.
Engine Overheats.	<ol style="list-style-type: none"> 1. Engine cooling system clogged. 2. Carburetor out of adjustment. 3. Oil level is low. 	<ol style="list-style-type: none"> 1. Clean fins. 2. See Engine Service Dealer. 3. Check and add oil.
Engine does not shut off.	<ol style="list-style-type: none"> 1. Defective engine throttle lever. 	<ol style="list-style-type: none"> 1. See Engine Service Dealer.
If tines turn, but wheels do not turn in rear tine tiller mode.	<ol style="list-style-type: none"> 1. Wheel Clutch not engaging properly. 	<ol style="list-style-type: none"> 1. See local servicing Dealer.
Wheels do not disengage in front tine tiller/cultivator mode.	<ol style="list-style-type: none"> 1. Wheel Clutch not disengaging properly. 	<ol style="list-style-type: none"> 1. See local servicing Dealer.
Tines do not turn.	<ol style="list-style-type: none"> 1. Drive belt is off pulleys or belt is broken, or drive bail cable tension is incorrect. 	<ol style="list-style-type: none"> 1. Replace drive belt on pulleys or adjust drive bail cable tension (see Page 21).

For customer assistance, contact your nearest authorized dealer or:

GARDEN WAY INCORPORATED • 1 Garden Way • Troy, New York 12180

Customer Service: 1-800-437-8686 • Technical Service: 1-800-520-5520 • Parts Service: 1-800-648-6776 • FAX: (518) 391-7332

Outside the United States and Canada:

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