Operator's Manual

CRAFTSMAN®

3 HORSEPOWER REAR TINE TILLER

Model No: 987.293190

CAUTION:

Before using this tiller, read this manual and follow all its Safety Rules and Operating Instructions.

- **Safety Rules**
- **Assembly**
- **Operation**
- **Maintenance**
- **Parts**

Sears, Roebuck and Co., Hoffman Estates, IL 60179 U.S.A.

Visit the Craftsman web page: www.sears.com/craftsman

SAFETY RULES

CAUTION: ALWAYS DISCONNECT SPARK PLUG WIRE AND PLACE WIRE WHERE IT CANNOT CONTACT SPARK PLUG TO PREVENT ACCIDENTAL STARTING WHEN SETTING UP, TRANSPORTING, ADJUSTING OR MAKING REPAIRS.

TRAINING

1. Read this Owner's Manual and any other literature you may receive carefully before operating this equipment. Be completely familiar with the controls and the proper use of this equipment. Know how to stop the unit and disengage the controls quickly.

2. Never allow children or untrained adults to operate this equipment.

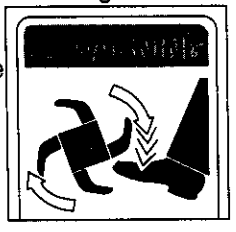
3. Keep the area of operation clear of all persons, particularly small children and pets. Keep bystanders at least 25 feet from area of operation.

4. Keep in mind that the operator or user is responsible for accidents or hazards occurring to other people, their property, and themselves.

5. Familiarize yourself with all of the safety and operating decals on this equipment and on any of its attachments or accessories.

6. Do not run engine in an enclosed area. Engine exhaust contains carbon monoxide gas, a deadly poison that is odorless, colorless, and tasteless. Do not operate this equipment near buildings, windows, or air conditioners.

7. Do not allow hands or any other part of the body or clothing near the rotating tines or near any other moving part. The tines begin to rotate backward once the engine starts and the Forward Clutch Bail is engaged.



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

9. Do not operate this equipment if you are under the influence of alcohol, medication, or when tired or ill.

PREPARATION

1. Thoroughly inspect the area where the tiller will be used. Remove foreign objects before tilling.

2. Make sure that all control levers are released and both wheels are in Wheel Drive position before starting the engine.

3. Do not operate the tiller without wearing suitable clothing. Avoid loose garments or jewelry that could get caught in moving parts of the tiller or its engine.

4. 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.

5. Do not till near underground electric cables, telephone lines, pipes, or hoses. Contact your telephone or utility to verify locations of underground cables or lines.

6. Handle gasoline with care; it is highly flammable and has explosive vapors. Take the following precautions:

   a. Use an approved gas container.
   b. Gas caps shall never be removed or fuel added with engine running. Engine shall be allowed to cool before refueling. Operators shall not smoke.
   c. 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 have dissipated.

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. Never operate the tiller unless safety guards or other protective devices are in place.

2. Never operate the tiller without good visibility or light.

3. Never operate the tiller if you are fatigued, or under the influence of alcohol, drugs or medication.

4. Use tiller attachments and accessories when recommended. Use only attachments and accessories approved by the manufacturer.

5. Operators shall not tamper with the engine-governor settings on the machine; 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.

6. To load or unload the tiller from a vehicle, see instructions in the "Operation" section.

7. Keep children and pets away.

8. Clear the area of bystanders before tilling.

9. Do not run the engine in an enclosed area. Engine exhaust contains carbon monoxide gas, a deadly poison that is odorless, colorless, and tasteless.

10. Start the engine carefully according to instructions and with feet well away from the tines.

11. Never pick up or carry a machine while the engine is running.

12. Never use the tiller at high ground speeds on hard or slippery surfaces.

13. Never operate the tiller under engine power if the wheels are in the FREEWHEEL position. In FREEWHEEL, the wheels will not hold the tiller back and the revolving tines could propel the tiller rapidly

LOOK FOR THIS SYMBOL TO POINT OUT IMPORTANT SAFETY PRECAUTIONS. IT MEANS– ATTENTION!!! BECOME ALERT!!! YOUR SAFETY IS INVOLVED.

backward, possibly causing loss of control. Always engage the wheels with the Wheel Drive Pins in WHEEL DRIVE position before starting engine or engaging tines with Forward Clutch Bail.

14. Look behind and exercise caution when backing up.

15. The tiller could unexpectedly bounce upward or jump backward and be propelled toward you if the tines strike or catch very hard-packed soil, sod, frozen ground, or any buried obstacle such as large stones or roots. If in doubt about tilling conditions, use the following precautions to assist you in maintaining tiller control:

a. Walk behind and on either side of the tiller, using one hand on the handlebar. Relax your arm, but use a secure hand grip.
b. Use a deep depth regulator setting.
c. Use slower engine speeds.
d. Clear the tilling area of big stones, roots and other debris.
e. Avoid putting downward pressure on the handlebar. If necessary, apply slight upward pressure to prevent the tines from digging too deeply.
f. In an emergency, stop tines and wheels by releasing the Forward Clutch Bail. Do not attempt to restrain the tiller.

16. Do not overload the machine capacity by trying to till too deeply at too fast a rate.

17. Do not operate tiller on a slope too steep for safety. On slopes, slow down and be sure you have good footing. Don't let the tiller "freewheel" down slopes.

18. Do not touch engine parts that may be hot from operation (muffler, fins, etc.). Make certain all parts have cooled down before inspecting, cleaning or repairing.

19. Remember—To stop the tines and wheels, release the Forward Clutch Bail.

20. Do not put hands or feet near or under rotating parts.

21. Use extreme caution when on or crossing gravel driveways, walks or roads. Be alert for hidden hazards or traffic. Do not carry passengers.

22. If you hit a foreign object, stop the engine, let all moving parts come to a complete stop, disconnect spark plug wire, move wire away from the spark plug, and inspect for damage. Repair damage before restarting.

23. Exercise caution to avoid slipping or falling.

24. 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.

25. Stop the engine, disconnect the spark plug wire and move wire away from spark plug after leaving the operating position, before unclogging tines, or before making repairs, adjustments or inspections.

26. Take all possible precautions before leaving the machine unattended. Make sure that all control levers are released, stop engine, and disconnect spark plug wire and move wire away from plug to prevent accidental starting. Be sure both wheels are in the Wheel Drive position.

27. Before cleaning, repairing or inspecting, stop the engine, let all moving parts stop, and disconnect spark plug wire and move wire away from spark plug to prevent accidental starting.

28. The flap on the tine hood must be down when operating tiller.

MAINTENANCE & 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 your 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 chance of a fire hazard, keep grass, leaves, grease off engine.

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 tiller is to be stored for an extended period.

9. If the fuel tank has to be drained, do so outdoors.

10. Follow manufacturer's recommendations for safe loading, unloading, transport, and storage of machine.

⚠ WARNING

TO AVOID INJURY:

- **READ OWNER'S MANUAL.**
- **KNOW LOCATION AND FUNCTION 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 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.**

⚠ WARNING:

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

CONGRATULATIONS on your purchase of a Sears Craftsman tiller. It has been designed, engineered and manufactured to give you the best possible dependability and performance.

Should you experience any problems you cannot easily remedy, please contact your nearest Sears Service Center/Department. We have competent, well-trained technicians and the proper tools to service or repair this machine.

Please read and retain this manual. The instructions will help you assemble and maintain your machine properly. Always observe the "SAFETY RULES."

MODEL NUMBER: 987.293190

SERIAL NUMBER:_____

DATE OF PURCHASE:_____

THE MODEL AND SERIAL NUMBERS WILL BE FOUND ON A DECAL LOCATED ON THE TRANSMISSION OF YOUR MACHINE.

YOU SHOULD RECORD BOTH THE SERIAL NUMBER AND DATE OF PURCHASE AND KEEP IN A SAFE PLACE FOR FUTURE REFERENCE.

MAINTENANCE AGREEMENT

A Sears maintenance agreement is available on this product. Contact your nearest Sears store for details.

CUSTOMER RESPONSIBILITIES

- ❑ Read and observe the safety rules.
- ❑ Follow a regular schedule in maintaining, caring for and using this product.
- ❑ Follow the instructions under "CUSTOMER RESPONSIBILITIES" and "STORAGE" sections of this manual.

PRODUCT SPECIFICATIONS

HORSEPOWER:	3 HP
DISPLACEMENT:	9.06 CU. IN.
FUEL CAPACITY:	2 Quarts
ENGINE OIL CAPACITY:	21 Ounces
SPARK PLUG (GAP 0.030-in.):	Champion RJ-17LM* or equivalent
IGNITION:	Electronic
NET ENGINE WEIGHT:	25 Pounds
NET TILLER WEIGHT:	117 Pounds

* In Canada, replace spark plug with a resistor plug.

WARNING

This machine is equipped with an internal combustion engine and should not be used on or near any unimproved forest-covered, brush-covered or grass-covered land unless the engine's exhaust system is equipped with a spark arrester meeting applicable local or state laws (if any). If a spark arrester is used, it should be maintained in effective working order by the operator.

In the state of California the above is required by law (Section 4442 of the California Public Resources Code). Other states may have similar laws. Federal laws apply on federal lands. This engine is not equipped with a spark arrestor for the muffler. A spark arrester for the muffler is available through your nearest Sears authorized service center. See the REPAIR PARTS section of this manual.

LIMITED TWO-YEAR WARRANTY ON CRAFTSMAN® TILLER

For two years from the date of purchase, when this Craftsman® Tiller is maintained, lubricated, and tuned up according to the operating and maintenance instructions in the owner's manual, Sears will repair, free of charge, any defect in material or workmanship.

If this Craftsman® Tiller is used for commercial or rental purposes, this warranty applies for only 90 days from the date of purchase.

THIS WARRANTY DOES NOT COVER:

- Expendable items which become worn during normal use, such as tine(s), belts, spark plug, and air cleaner.
- Repairs necessary because of operator abuse or negligence including bent crankshafts and the failure to maintain the equipment according to the instructions contained in the owner's manual.

WARRANTY SERVICE IS AVAILABLE BY RETURNING THE CRAFTSMAN® TILLER TO THE NEAREST SEARS SERVICE CENTER IN THE UNITED STATES. THIS WARRANTY APPLIES ONLY WHILE THIS PRODUCT IS IN USE IN THE UNITED STATES.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Sears, Roebuck and Co., D/817WA, Hoffman Estates, IL 60179

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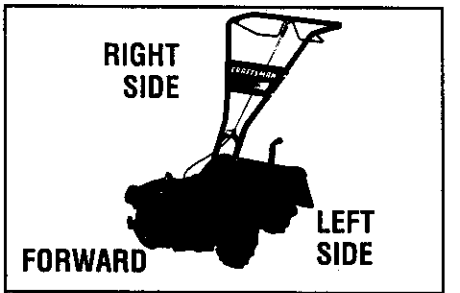


OPERATOR'S POSITION
All references to LEFT and RIGHT sides of the tiller are given from the operator's position behind the handlebars (unless specified otherwise).

ACCESSORIES

These accessories were available when the tiller was purchased. They are available at most Sears retail outlets, catalog and service centers. Most Sears stores can order repair parts for you when you provide the model number of your tiller.

ACCESSORIES

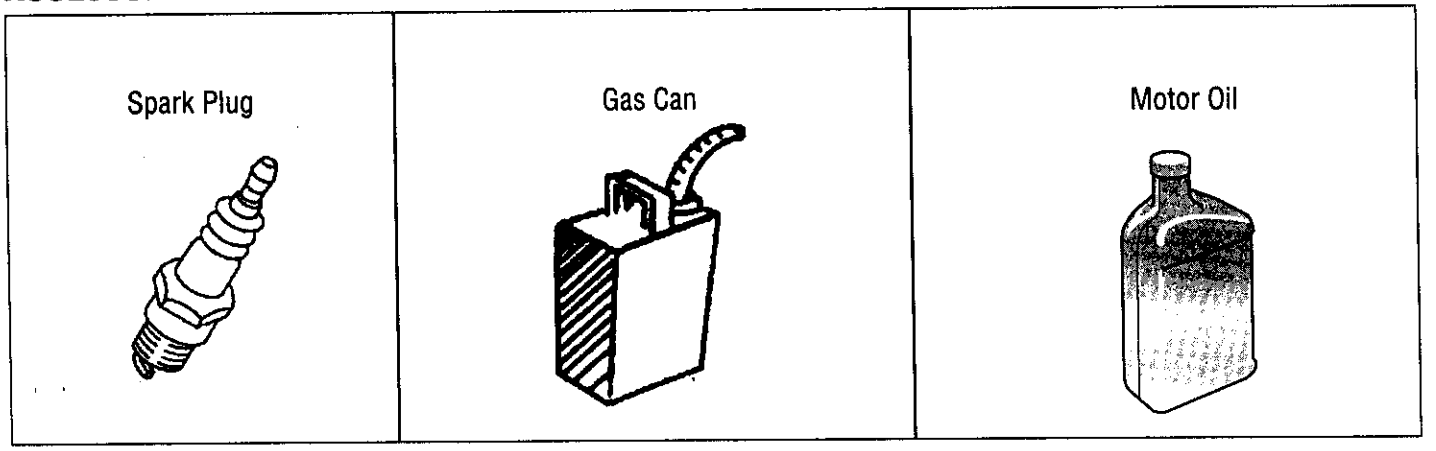
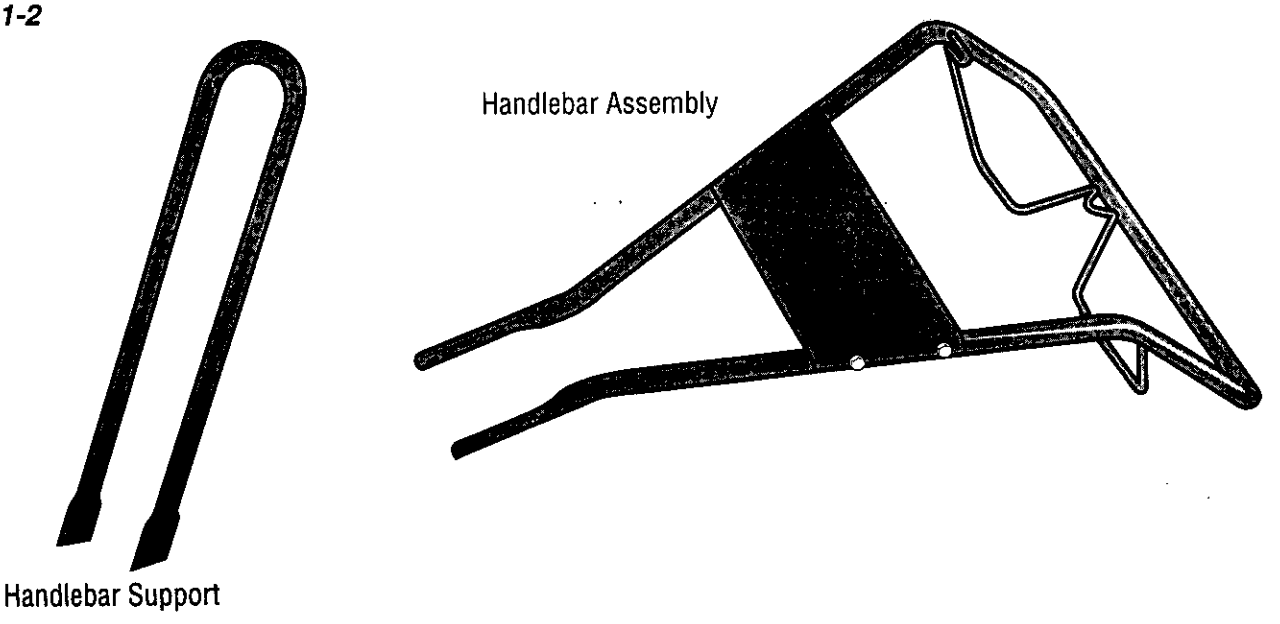


Figure 1-1

COMPONENTS REQUIRING ASSEMBLY

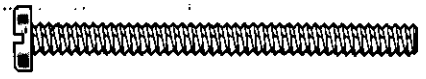
Figure 1-2



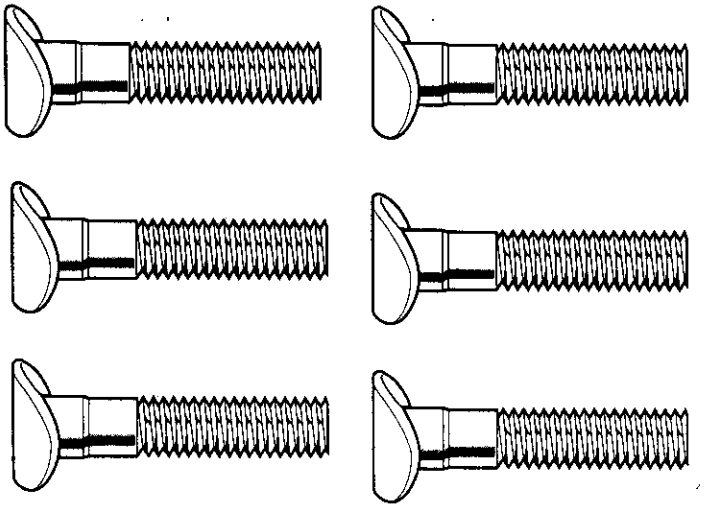
CONTENTS OF HARDWARE PACK

Parts Bag Contents (parts shown full size unless otherwise noted)

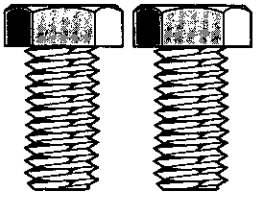
Slotted Head Screw
#10-24 x 2" long
Qty.: (1)



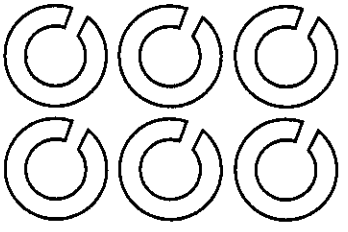
Curved Head Screw
5/16"-18 x 1-1/2" long
Qty.: (6)



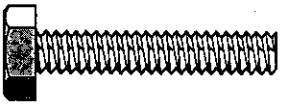
Hex Head Screw
3/8"-16 x 3/4"
Qty.: (2)



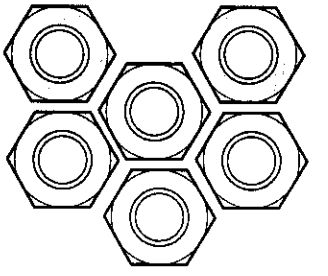
Split Lockwasher, 5/16"
Qty.: (6)



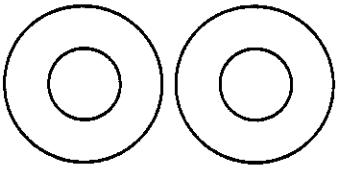
Hex Head Screw
1/4"-20 x 1-1/4" long
Qty.: (1)



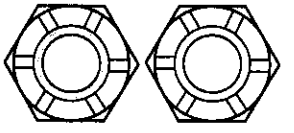
Hex Nut
5/16"-18
Qty.: (6)



Flat Washer, 3/8"
Qty.: (2)



Hex Locknuts
3/8"-16
Qty.: (2)



Hex Locknut
1/4"-20
Qty.: (1)

Cable Spring
Qty.: (1)
(shown at reduced size)

Cable Bracket
Qty.: (1)
(shown at reduced size)

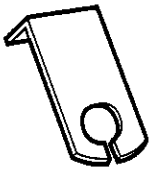


Figure 1-3

ASSEMBLY

Read these instructions completely before you attempt to assemble or operate your new equipment. Your tiller has been assembled at the factory with the exception of those parts left unassembled for shipping purposes. Steps in this section show you how to do so. To ensure safe and proper operation of your machine, all parts and hardware you install or adjust must be tightened securely. Use the correct tools as necessary to ensure proper tightness.

UNPACKING INSTRUCTIONS

- Inspect your machine immediately. Be sure neither the carton nor contents have been damaged. If you find or have reason to suspect damage, contact the nearest Sears Service Center/Department for assistance.
- Once the cardboard shipping carton is open, remove any packing material from around the machine. Remove any staples securing bottom of carton to wood pallet. Lift off carton. Before disposing of the carton or any of the packing materials, be sure to check them thoroughly for any small parts.
- Leave unit on base of pallet during assembly steps (to safely remove unit from pallet, wait until you have installed the handlebar assembly).
- Also remove any packaging around the handlebar.
- Perform the assembly on a clean, level surface. If you need to move the machine, be careful not to severely bend any of the control cables on the equipment.

Tools Needed For Assembly:

- Open-end or adjustable wrenches: One 3/8"; Two 7/16"; One 1/2"; Two 9/16"
- Funnel (to add motor oil)
- Rag (for any oil cleanup needed)
- Block of Wood (to support the tiller when removing wheel)
- Ruler (for belt tension check)

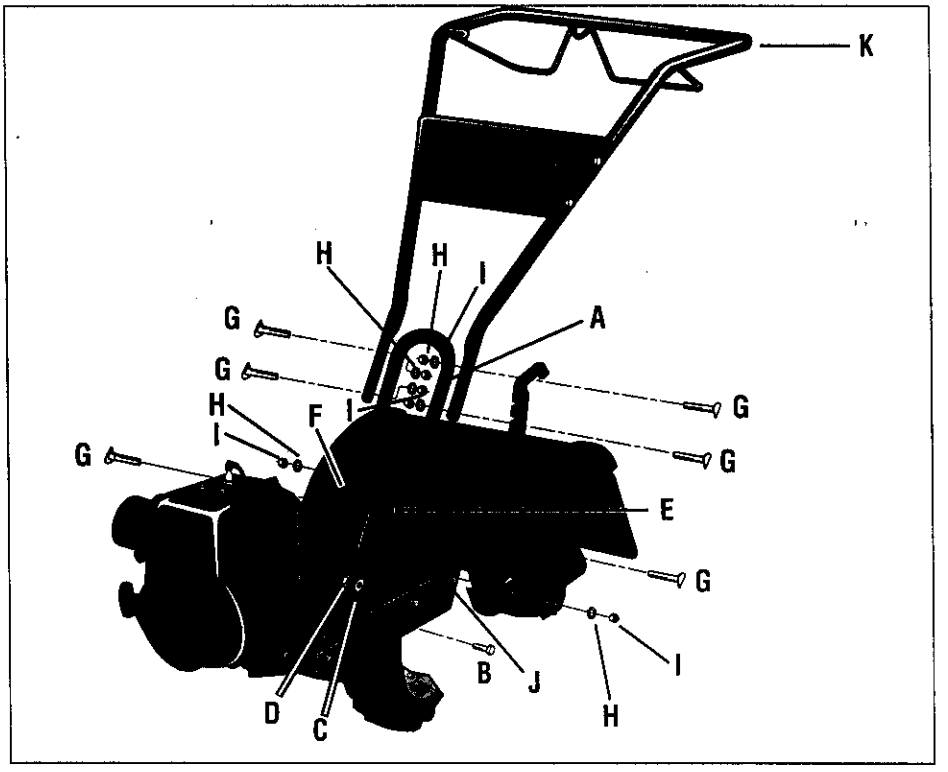


Figure 2-1: Assemble handlebar.

ASSEMBLY STEPS

STEP 1: Attach the Handlebar

1. Attach the legs of the handlebar support (A, Figure 2-1) loosely to the inner sides of the tiller frame using two 3/8"-16 x 3/4" hex hd. screws (B), 3/8" flat washers (C) and 3/8"-16 hex locknuts (D).

2. Using the middle holes in the handlebar support brackets (E and F, Figure 2-1), loosely attach the support brackets to the handlebar support (A) using two 5/16"-18 x 1-1/2" curved hd. screws (G), 5/16" split lockwashers (H) and 5/16"-18 hex nuts (I). NOTE: If a support bracket will not move, loosen attaching screw (J) and nut.

3. Attach the handlebar assembly (K) to the handlebar support (A) using four 5/16"-18 x 1-1/2" curved hd. screws (G), 5/16" split lockwashers (H) and 5/16"-18 hex nuts (I). Tighten the four screws securely.

4. Tighten all handlebar mounting hardware securely.

STEP 2: Move Tiller off Shipping Platform

To roll the tiller without the engine running, the wheels must be placed in their FREEWHEEL position, as described below.

1. Use a sturdy block of wood to raise one wheel off the ground.

2. Remove the hair pin cotter (N, Figure 2-2) and clevis pin (O). Slide the wheel inward on the axle (P) and reinstall the clevis pin and cotter through the axle only (not through the wheel hub). Repeat on other wheel.

3. Using the handlebar as a lever, roll the tiller to a flat area.

IMPORTANT: Before starting engine, wheels must be moved to WHEEL DRIVE position (pins through wheel hubs and axle). This procedure is described in the "OPERATION" section.

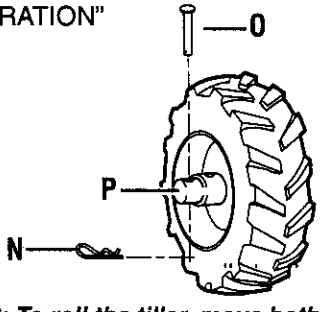


Figure 2-2: To roll the tiller, move both wheels to the FREEWHEEL position.

STEP 3: Install Forward Clutch Cable

1. Place the cable bracket (R, Figure 2-3) on the handlebar support (A) as shown.

2. Attach the cable bracket using a 1/4"-20 x 1-1/4" hex hd. screw (S, Figure 2-3) and 1/4"-20 hex locknut (T). Tighten securely.

3. Unwrap the forward clutch cable (U, Figure 2-3) from around the engine and slide the thin cable wire into the slot in the cable bracket. Push the cable connector (V, Figure 2-3) up through the hole in the bracket until the groove in the connector snaps into place on the bracket.

4. Insert the #10-24 x 2" slotted hd. screw (W, Figure 2-4) into the cable spring (X).

5. Thread the screw (W) into the cable adjuster (Y).

6. Hook the cable spring (X) into the "V"-shaped bend in the forward clutch bail (Z, Figure 2-5).

7. Lift and hold the forward clutch bail against the handlebar. See Figure 2-6.

8. Measure the distance between the coils of the cable spring (Figure 2-6). The length should be approximately 1-7/8". If the length is incorrect, you will have to make an adjustment to the cable tension as described in "Checking and Adjusting Belt Tension" in the "SERVICE and ADJUSTMENTS" section.

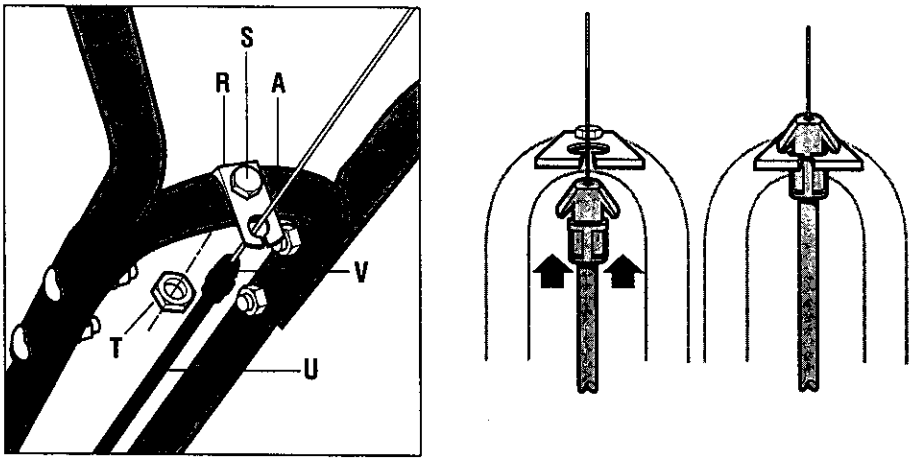


Figure 2-3: Installing forward clutch cable bracket and cable.

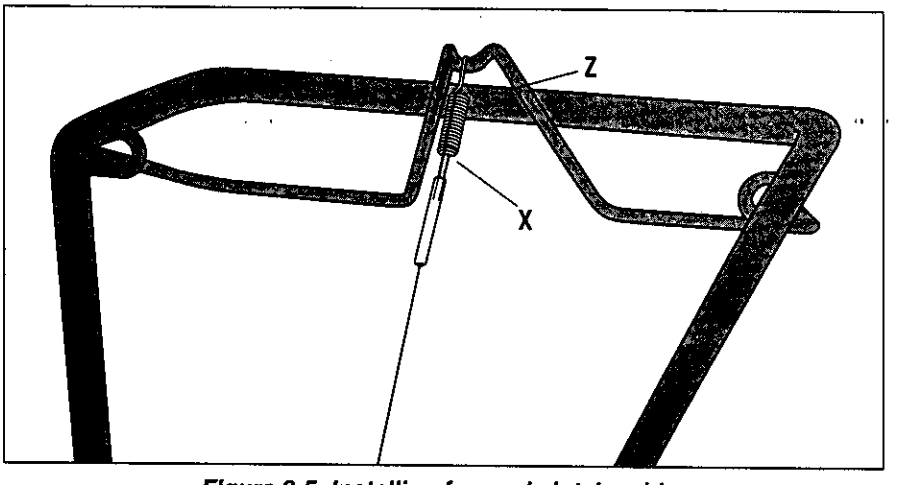


Figure 2-5: Installing forward clutch cable.

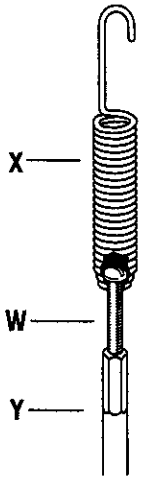


Figure 2-4: Assemble spring and adjuster.

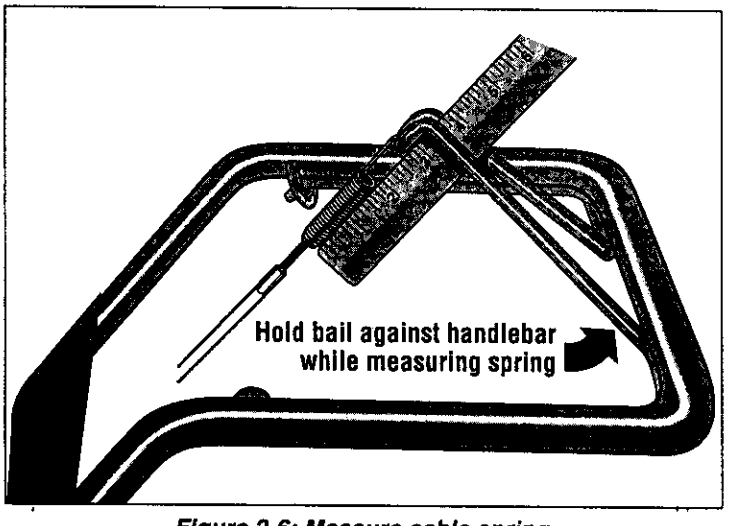


Figure 2-6: Measure cable spring.

STEP 4: Check Level of Transmission Gear Oil

The transmission was filled with gear oil prior to being shipped. However, you should check the gear oil level to make certain it is correct.

1. With the tiller on level ground, pull the Depth Regulator Lever (AA, Figure 2-7) back and then all the way up until the lowest notch in the lever is engaged.

2. Remove the gear oil fill plug (BB, Figure 2-8) from the transmission housing and look into the filler hole.

3. Looking down inside the hole, you will notice there is a drive shaft on one side of the hole. If the gear oil level is correct, the gear oil should be approximately half way up the sides of the drive shaft.

4. If the gear oil level is low, add gear oil by referring to "Checking Transmission Gear Oil" in the "CUSTOMER RESPONSIBILITIES" section. **Do not operate tiller if gear oil level is low. Severe damage to transmission will result.**

NOTE: Do not use automatic transmission fluid or engine oil in the transmission.

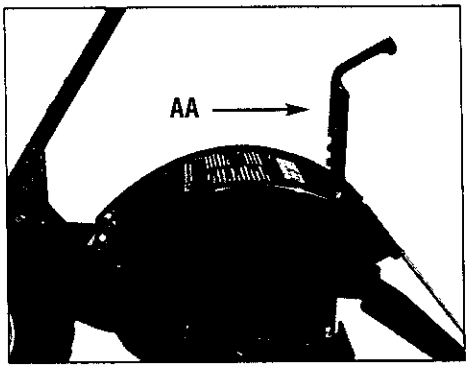


Figure 2-7: Adjust Depth Regulator Lever.

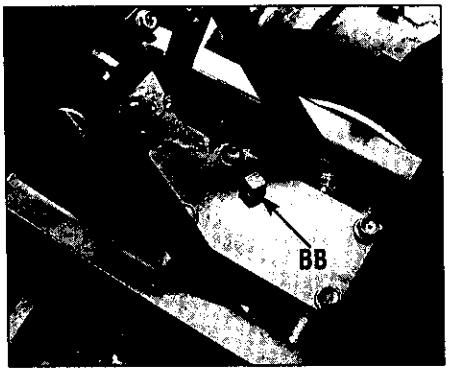


Figure 2-8: Remove gear oil fill plug.

STEP 5: Check Hardware for Tightness

Check all nuts and screws for tightness.

STEP 6: After Assembling and Before Using Unit

- Read this entire Owner's Manual for proper safety, operation and maintenance information.
- Make sure spark plug wire is connected to spark plug before starting the unit.

IMPORTANT: Motor oil must be added to the engine crankcase before starting the engine. Oil filling instructions are covered in the "OPERATION" section.

CAUTION

Unit is shipped without oil in engine crankcase. DO NOT start engine until oil has been added. Severe engine damage will result if this instruction is not followed. See "Operation" Section of this manual for oil filling procedure.

OPERATION

KNOW YOUR TILLER

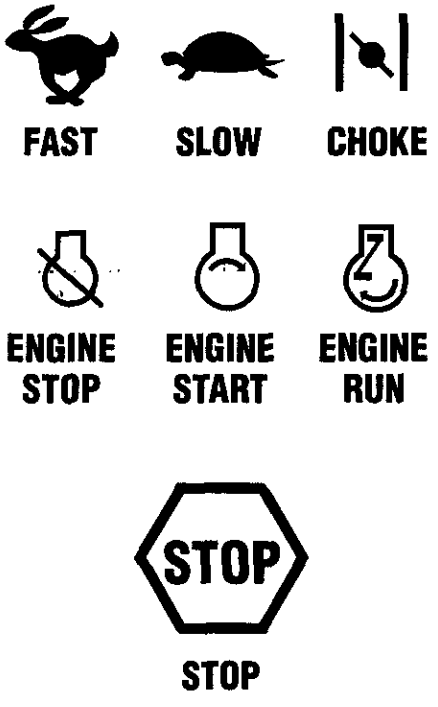
READ THIS OWNER'S MANUAL AND ALL SAFETY RULES BEFORE OPERATING THIS EQUIPMENT. Know the location and function of all features and controls on the equipment. Save this manual for future reference.

MEETS ANSI B71.8 – 1996 SAFETY STANDARD

This machine meets voluntary safety standard B71.8 – 1996, which is sponsored by the Outdoor Power Equipment Institute, Inc., and is published by the American National Standards Institute, Inc.

Operating Symbols

Various symbols are used on the tiller to indicate control settings (your model may not have all of the symbols). These symbols are shown below with a description of their meaning.



LOCATION AND USE OF CONTROLS

Wheel Drive Pins

These two pins (one on each side of the wheel shaft), secure the wheels to the wheel shaft and can be positioned by you to put the wheels in either a WHEEL DRIVE or a FREEWHEEL mode.

Before starting the engine, put both wheels in the WHEEL DRIVE position by inserting the Wheel Drive Pins through the holes in both the wheel shaft and wheel hub on both sides of the tiller (see instructions on next page). This "locks" the wheels to the wheel shaft, causing the wheels to turn when you engage the Forward Clutch Bail.

Use the FREEWHEEL position only when the engine is off. This position lets you easily push or pull the tiller. To use the FREEWHEEL mode, place the Wheel Drive Pins through the holes in the wheel shaft only (see instructions on next page). This keeps the wheels on the shaft, thus allowing the wheels to rotate freely when you push or pull the tiller handlebar.

WARNING

Never let either of the wheels be in FREEWHEEL position when the engine is running. Always put both wheels in the WHEEL DRIVE position before starting the engine.

Failure to comply could cause loss of tiller control, property damage, or personal injury.

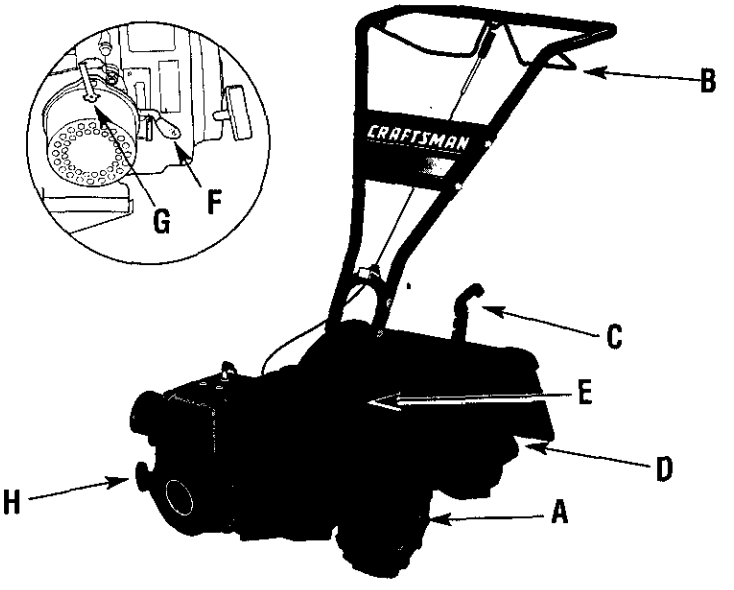


Figure 3-1: A– Wheel Drive Pins; B– Forward Clutch Bail; C– Depth Regulator Lever; D– Anti-Reverse Stake; E– Handlebar Height Adjustment; F– Engine Throttle Lever; G– Engine Choke Lever; H– Engine Recoil Starter.

To Place Wheels in WHEEL DRIVE Position

1. ***The engine must be shut off and cool. Disconnect spark plug wire and move it away from the spark plug.***

2. Raise one wheel off the ground and place a sturdy support under the transmission.

3. Remove the hair pin cotter from the wheel drive pin and pull out the wheel drive pin.

WARNING

Do not place tiller on its side when changing wheel drive positions or gasoline could leak from the fuel tank.

Failure to follow this instruction could result in personal injury or property damage.

4. Slide the wheel outward and align the holes in the wheel hub and wheel shaft. Insert the wheel drive pin through these holes (see Figure 3-2). Insert the straight leg of the hair pin cotter into the hole in the wheel drive pin as far as it will go.

5. Repeat the above steps for the other wheel, then remove the support under the transmission.

To Place Wheels in FREEWHEEL Position

1. Follow steps 1-through-3 of "To Place Wheels in WHEEL DRIVE Position."

2. Slide wheel inward on wheel shaft as far as possible.

3. Insert wheel drive pin only through the hole in the wheel shaft. Insert the straight leg of the hair pin cotter into the wheel drive pin as far as it will go. See Figure 3-3.

4. Repeat Steps 1-through-3 for the other wheel. Remove the support beneath the transmission.

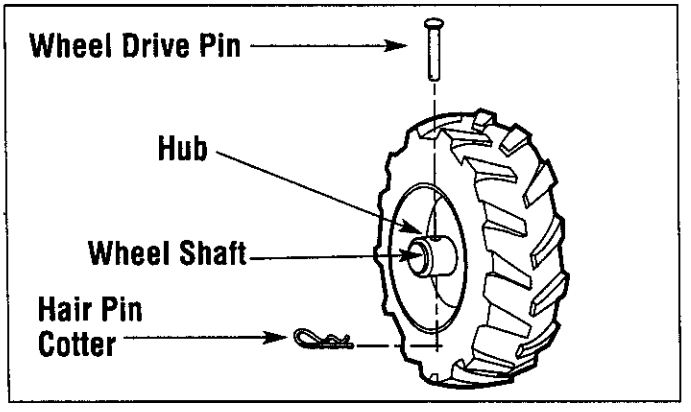


Figure 3-2: WHEEL DRIVE position.

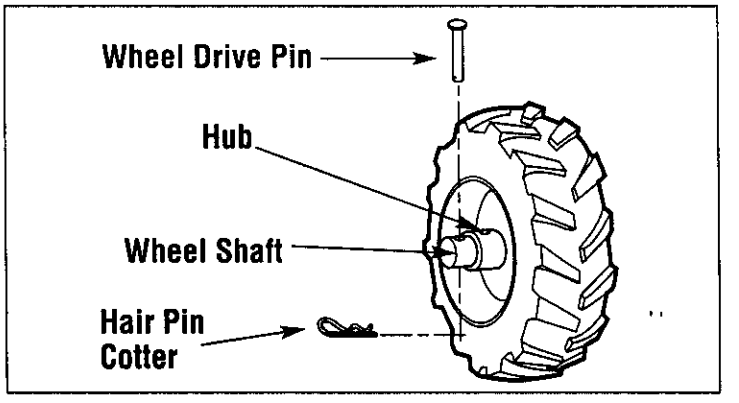


Figure 3-3: FREEWHEEL position.

Forward Clutch Bail

The Forward Clutch Bail (Figure 3-4) is used to engage or disengage (stop) the tiller wheels and tines.

WARNING

Before starting the engine, be sure that both wheels are in the WHEEL DRIVE position. See "Wheel Drive Pins" for instructions.

Failure to comply could result in loss of tiller control, personal injury or property damage.

Operate the Forward Clutch Bail as described below:

1. Put the wheels in the WHEEL DRIVE position.

2. Rest one hand, palm down, on top of the handlebar.

3. Use the other hand to lift up and hold the Forward Clutch Bail. See Figure 3-4. When the bail is in this position, the wheels and tines will turn. NOTE: The wheels will rotate in a forward direction; the tines will rotate counter-clockwise (backward toward the operator).

4. To stop motion of the wheels and tines, release the Forward Clutch Bail.

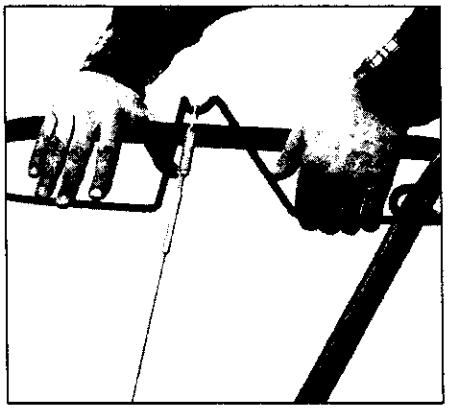


Figure 3-4: Operating the Forward Clutch Bail.

Depth Regulator Lever

This lever controls the depth that the tines penetrate the soil (see Figure 3-5). Adjust the lever to change tilling depth by pulling back on it and moving the lever up (for deeper tilling) or down (for shallower tilling).

To place the tines in the "travel" position, move the lever down to the highest notch. This raises the tines above the ground and allows the tiller to be moved without tilling.

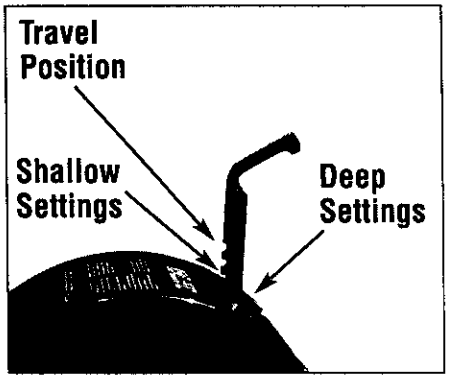


Figure 3-5: Depth Regulator Lever.

Anti-Reverse Stake

This stake is located at the rear of the transmission, under the tine hood (see Figure 3-6). Its purpose is to automatically help prevent the counter-rotating tines from letting the tiller back up in the direction of the operator if the tiller wheels had been inadvertently left in the FREEWHEEL position. In this situation, the Anti-Reverse Stake will be forced down into the ground, lifting the tines upward out of the soil and helping prevent backward motion of the tiller.

The Anti-Reverse Stake requires no adjustment, but should be inspected before each tiller use to verify that it swivels freely. Remove any clogged materials (dirt, roots, rocks, etc.) that prevent the anti-reverse stake from swinging freely.

WARNING

Engaging the tines when the wheels are in FREEWHEEL position can cause the tiller to move backward suddenly in the direction of the operator. Before engaging the tines, the wheels must always be in WHEEL DRIVE position.

Failure to do so can cause personal injury or property damage.

Figure 3-6: Arrow points to Anti-Reverse Stake.

WARNING

Before adjusting handlebar height, shut off the engine, let it cool down, let all moving parts stop completely, then disconnect the spark plug wire and move it away from the spark plug.

Failure to do so can cause personal injury or property damage.

Handlebar Height Adjustment

You can adjust the tiller handlebar height to any of three different positions. (See Figure 3-7.) As a general guide, adjust the handlebars so they are at waist level when the tines are about 3"-to-4" down into the soil.

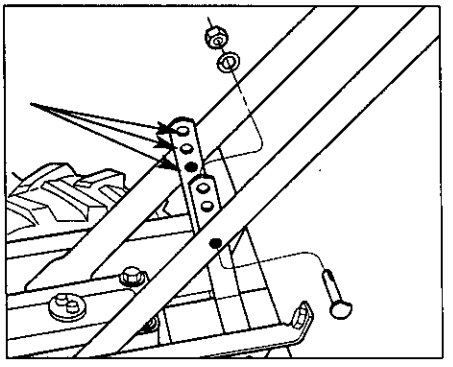


Figure 3-7: Handlebar adjustment holes offer three height settings.

ENGINE CONTROLS

WARNING

Release the Forward Clutch Bail before moving the Engine Throttle Lever.

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

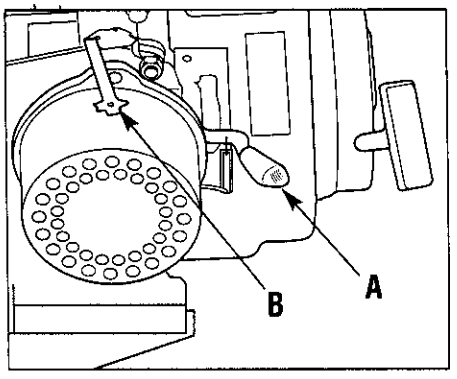


Figure 3-8: Engine Throttle Lever ("A") adjusts engine speed. Engine Choke Lever ("B") is used to assist starting when engine is cold.

F) Engine Throttle Lever

Adjust this lever (see A, Figure 3-8) to start and stop the engine and to regulate engine speed.

- To increase engine speed, move the lever upward to FAST (Rabbit symbol) position.
- To decrease engine speed, move the lever down toward SLOW (Turtle symbol) position.
- To stop the engine, move the lever all the way down to STOP position.
- To start the engine, move the lever to the FAST (Rabbit symbol) position.

G) Engine Choke Lever

The Choke Lever (B, Figure 3-8) allows a richer air/gasoline mixture (more gasoline) to enter the engine cylinder to make starting a cold engine easier. The lever has three settings: FULL CHOKE, PARTIAL CHOKE and NO CHOKE.

Detailed instructions for using the Choke Lever are provided in this section.

H) Engine Recoil Starter

The Engine Recoil Starter (refer to Figure 3-9) is used to start the engine.

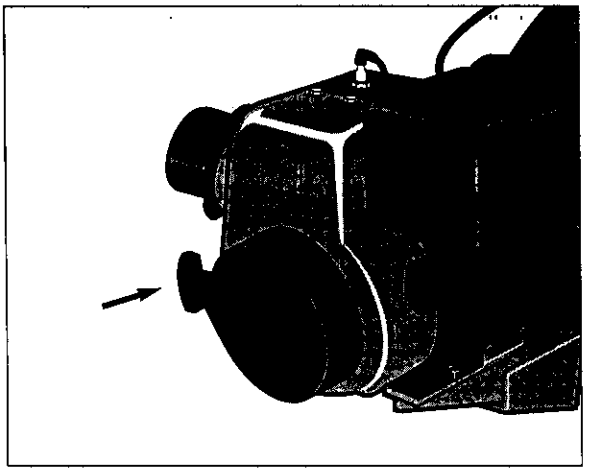


Figure 3-9: The Engine Recoil Starter rope is used to start the engine.

Pre-Start Checklist

Move the tiller to a level area, then make the following checks and perform the following services before starting the engine.

1. Disconnect spark plug wire.

2. Add motor oil to engine. (Refer to instructions on next page.)

3. Check the air cleaner. It must be securely assembled and clean.

4. Check safety guards. All guards and covers must be fastened securely in place.

5. Check engine cooling system. The cooling fins and air intake screen must be clear of debris.

6. Adjust handlebar height.

7. Check that the wheels are in the WHEEL DRIVE position.

8. Put gasoline in the fuel tank. (Refer to instructions on the next page.)

Use fresh, clean, unleaded fuel. Fuel goes stale if stored for more than six months. Do Not Mix Oil With Gasoline!

9. Put Depth Regulator Lever in the "travel" position.

10. Reconnect spark plug wire.

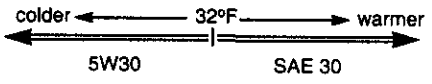
BEFORE STARTING ENGINE

Engine Lubrication

The tiller is shipped without oil in the engine. Permanent engine damage will result if the engine is run without oil.

1. Only use high quality detergent oil with API service classification SF, SG, SH, or SH/CD. Above 32°F, use SAE 30; below 32°F, use 5W30. DO NOT USE SAE 10W40 OIL.

NOTE: Although multi-viscosity oils (5W30, 10W30, etc.) improve starting in cold weather, these oils will result in increased oil consumption when used above 32°F. Check engine oil more frequently to avoid possible engine damage from running low on oil.



2. With the tiller on level ground, pull the Depth Regulator Lever (Figure 3-5) back and then all the way up until the lowest notch in the lever is engaged. The tines must be in contact with the ground— move the anti-reverse stake back out of the way to allow the tines to rest on the ground.

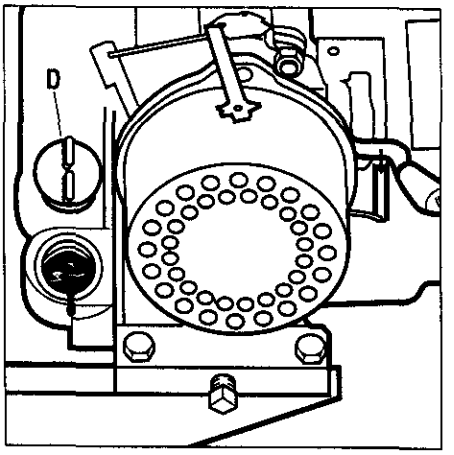


Figure 3-10: Add motor oil to the engine using the oil fill hole.

3. Unscrew the engine oil fill plug (D, Figure 3-10). Using a clean funnel, slowly add oil until the oil level reaches the overflow point in the oil fill tube. ALWAYS MAINTAIN THE OIL LEVEL AT THE OVERFLOW POINT.

4. Securely replace the oil fill plug.

- Check the oil level before each use and after every five operating hours. See Page 21.
- Change the oil after the first two operating hours and every 10 operating hours thereafter. Change the oil more often if the machine is operated in extremely dusty or dirty conditions. See Page 21.

Fill Fuel Tank

The engine must be off and cool before removing the fuel fill cap (Figure 3-11).

Clean area around fuel fill cap and then remove fill cap. Fill gas tank with clean, fresh unleaded gasoline. Do not mix oil with gasoline.

Using a funnel or spout, fill tank to within 1/2" below the bottom of the fuel tank filler neck to prevent spills and to allow for fuel expansion.

Install the fill cap securely and wipe up any spilled gasoline.

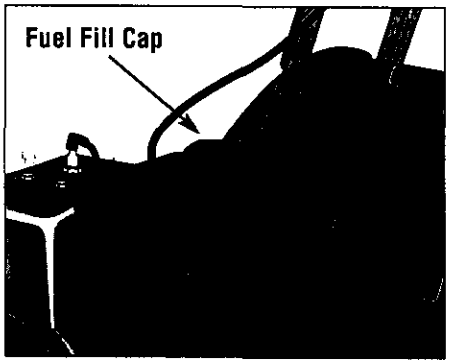


Figure 3-11: Fill the fuel tank.

IMPORTANT: Experience indicates that alcohol-blended fuels (gasohol or using ethanol or methanol) can attract moisture which leads to separation and formation of acids during storage. Acidic gas can damage the fuel system of an engine while in storage. To avoid problems, the fuel system should be emptied before storage for 30 days or longer. Drain the gas tank, start the engine and let it run until the fuel lines and carburetor are empty. Use fresh fuel next season. See STORAGE instructions for additional information. Never use engine or carburetor cleaner products in the fuel tank or permanent damage may occur.

DANGER

Gasoline is highly flammable and its vapors are explosive. Follow these safety practices to 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 smoking in fueling area.**
- **Fill fuel tank outdoors in a well-ventilated area. Wipe up 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 tiller in a well-ventilated area. Do not store fuel or 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 before storing.**

Stopping the Engine

1. Release the Forward Clutch Bail to stop the wheels and tines from turning.

2. Move Engine Throttle Lever to STOP position to stop the engine.

Starting the Engine

1. Do not engage (hold) the Forward Clutch Bail against the handlebar when starting engine.

2. Both wheels must be in the WHEEL DRIVE position (see Figure 3-2).

3. Move the Choke Lever to the FULL CHOKE position (move lever in direction of arrowhead located on lever). **NOTE:** If restarting a warm engine after a short shutdown, move Choke Lever to NO CHOKE position.

4. Move the Engine Throttle Lever fully up to fast (Rabbit) position which is used for starting.

5. Place your left hand on the gasoline tank (to avoid hot surfaces) to stabilize the tiller when starting.

6. Use your right hand to slowly pull the recoil starter rope (Figure 3-12) until you feel resistance. Let it rewind. Then rapidly pull the starter rope outward. (First check for any obstacles behind you.) Repeat until the engine starts.

WARNING

Always place both wheels in the WHEEL DRIVE position before starting the engine.

Never have the wheels in the FREEWHEEL position when the engine is running. When the wheels are in FREEWHEEL, they do not hold back the tiller, and the tines could propel the tiller backward rapidly.

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

7. Once the engine is running, gradually move the Choke Lever to the NO CHOKE position. If engine falters, move Choke Lever to 1/2 Choke until engine runs smoothly, then to NO CHOKE position.

NOTE: If engine fails to start after three pulls, move Choke Lever to NO CHOKE position and pull starter rope again.

NOTE: If engine fires, but does not continue to run, move Choke Lever to FULL CHOKE and repeat steps 4, 5 and 6 until engine starts.

8. Move the Engine Throttle Lever to the position that provides the desired engine speed.

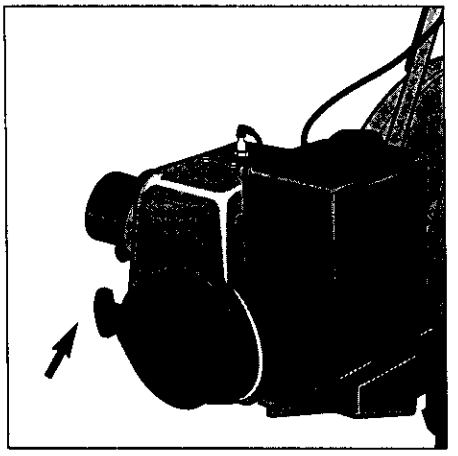


Figure 3-12: Pull Recoil Start Rope out rapidly to start engine.

DANGER

Do not run engine indoors. Engine exhaust contains carbon monoxide, a deadly gas that is colorless, odorless and tasteless.

Failure to follow this instruction could result in serious personal injury or properly damage.

Guiding the Tiller

When tilling, relax and let the tiller move along at its own speed. Do not push the tiller to make it move faster. Do not push down on the handlebars to make the tines dig more deeply.

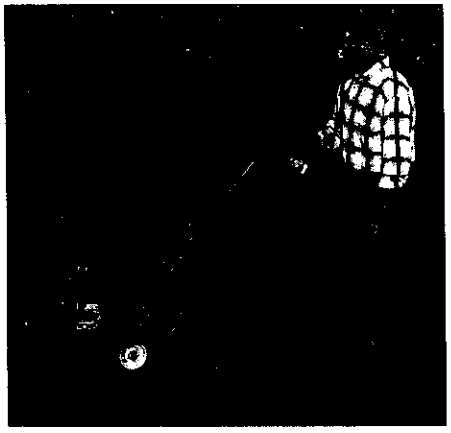


Figure 3-13: Tilling With Just One Hand Is recommended.

Walk beside the tiller on the untilled side. Use one hand, yet keep a firm hand grip on the handlebar (while keeping your arm loose) to guide the tiller. Walking alongside keeps you from disturbing the newly tilled soil and replanting any weed seeds which the tines might have brought up to the surface. It is also easier to control the tiller in hard or rocky soil if you walk beside it guiding it with one hand (instead of walking behind the tiller, controlling it with two hands).

Tilling Depths

This is a CRT (counter-rotating tine) tiller. As the wheels pull forward, the tines rotate backward. This creates an "uppercut" tine action which digs deeply, uprooting soil and weeds. Don't overload the engine, but dig as deeply as possible on each pass. On later passes, the wheels may tend to spin in the soft dirt. Help them along by lifting slightly on the handlebar. (Using just one hand, palm upward, works most easily.)

When cultivating between rows, use a shallow Depth Regulator Lever setting. This will get rid of in-row weeds, but prevent the tines from digging deeply enough to damage plant roots.

Moving the Tiller Forward

IMPORTANT: Before you begin tilling, move the tiller to a safe, level area and practice maneuvering without actually tilling. Keep the Depth Regulator Lever in the "travel" position.

After you become familiar with the handling of your tiller, you can move it into the garden and begin tilling.

! WARNING

Do not push down on the handlebars to try to make the tiller till more deeply. This prevents the wheels from controlling tiller speed and can allow the tines to rapidly propel the tiller backward, which could result in loss of control, property damage, or personal injury.

1. Put the wheels in the WHEEL DRIVE position (wheel pins must be through the wheel hubs and the axle holes).

2. Move the Depth Regulator Lever to the desired position. Check that the Anti-Reverse Stake swivels freely back and forth– remove any clogged material on or around the stake.

3. Start the engine.

4. For forward motion of the wheels and tines, lift and hold the Forward Clutch Bail against the handlebars. The wheels and tines will rotate as long as the bail is held in this position.

5. As the tiller moves forward, let the wheels pull the tiller along. Do not push the tiller to make it go faster. Allow the tiller to move along at its own speed.

6. To stop the wheels and tines, release the Forward Clutch Bail. The engine will continue to run until stopped by moving the Engine Throttle Lever to the STOP position.

Moving the Tiller Rearward

The tiller weighs only 117 pounds, so it is quite easily maneuvered rearward for short distances by using the following procedure:

1. Release the Forward Clutch Bail.

2. Tilt the handlebar slightly upward until the tines are out of the soil.

3. Swing the handlebar to the left so the right wheel takes a "step" toward the rear.

4. Now move the handlebar to the right so the left wheel takes a step backward.

5. Repeat to "walk" your tiller rearward. If longer distances need to be covered in reverse, shut off the engine, then move the wheel pins so the wheels are in FREEWHEEL.

Turning the Tiller Around

Practice turning your tiller in an open, level area until you feel comfortable with the procedure.

1. As you near the end of a row, lift the handlebar so the tines clear the ground. Refer to Figure 3-14.

2. As you come out of a row, swing the handlebars to the side, pivoting the tiller 180^0, so you can line up with the next row. See Figure 3-15.

3. As the tiller enters the next row, lower the handlebar slowly until the tines start to till.

Tilling in the Garden

The following pages provide suggestions for using the tiller in the garden. You can design your garden layout to obtain the most beneficial use from your tiller.

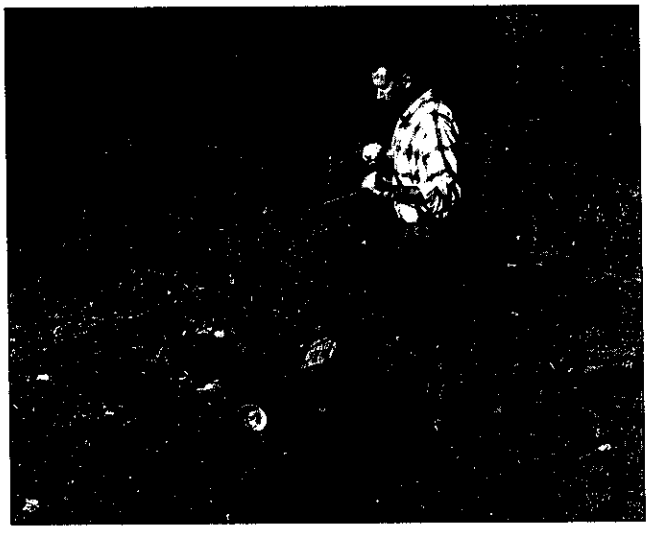


Figure 3-14: Exiting a row in the garden.

Figure 3-15: Lining up the tiller to enter the next row.

Seedbed Preparation

Prior to planting, be sure the soil is as loose and finely textured as possible. About two or three weeks before planting, till the garden two or three times. Then, till once more before planting.

When preparing the soil, till a fresh path on each pass rather than overlapping. This gives the wheels maximum traction on undisturbed soil. See Figure 3-15. Dig as deeply as possible on each pass without overloading the engine. Later passes can be overlapped. After going up and down the rows in one direction, make a second pass at a right angle across your earlier rows. See Figure 3-16. In very hard ground, additional passes may be needed.

Don't till when the soil is too wet. This produces large clumps which later dry out and become hard. If the soil compresses easily into a ball, it is still too wet to be tilled.

Cultivating

When planning your garden, keep in mind that the tiller has a tilling width of approximately 14". Allow at least this width between rows in your garden— plus additional width for plant growth. Take into account that bushy plants like beans and tomatoes need more width.

When cultivating, use a shallow Depth Regulator Lever setting. Do not cultivate deeper than 1"-or-2". Shallow cultivating keeps weed growth to a minimum and doesn't damage plant roots.

For best results, begin cultivating as soon as seedlings appear, and then cultivate as often as once a week. The day after a light rain is an excellent time to cultivate, as long as the plants are dry. Avoid working in the garden when plants are wet. Diseases, blight, and rust can be easily spread among wet plants with your hands, clothing or even the tiller.

Avoid Making Footprints

When tilling, always try to walk alongside the tiller on the side that is yet to be tilled. This prevents replanting weed seeds and leaves a nicer appearance.

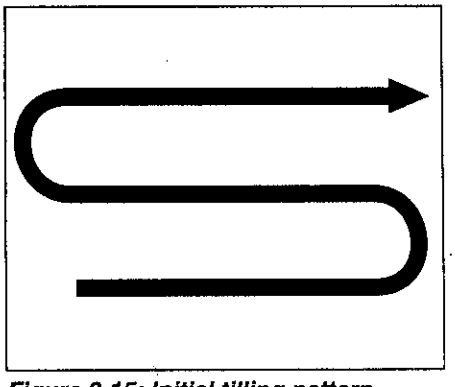


Figure 3-15: Initial tilling pattern.

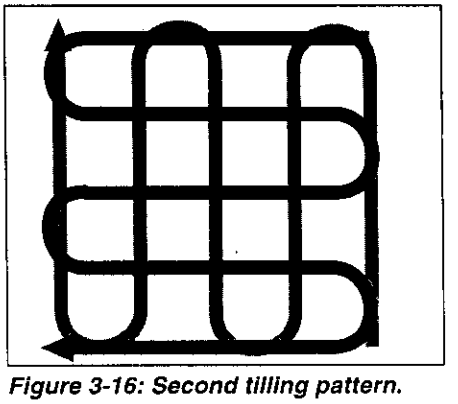


Figure 3-16: Second tilling pattern.

Preventing Tines From Becoming Tangled

...When tilling, you may find that the tines become tangled with material (tall vegetation, long grass, tough vines, etc.).

WARNING

Before removing any debris from the tines, stop the engine, allow it to cool, disconnect the spark plug wire and move it away from the spark plug.

Failure to do so could result in personal injury or property damage.

To help prevent tangling:

1. While tilling, swing the handlebars from side-to-side about 6"-to-12". This "fishtailing" action will often dislodge any debris.

2. Always use the deepest Depth Regulator Lever setting possible (without making the tiller jump or buck upward).

3. Till under cover crops and crop residues while they are still green.

4. Shred or chop up any tall, tough, or stringy organic matter before tilling it into the soil.

5. You may have to mow or cut vegetation before power composting.

6. If the tines are heavily tangled, stop the engine and disconnect the spark plug wire. Then, cut away any debris.

Tilling on Slopes

Plant your garden preferably on flat ground, but certainly on no more than a moderate slope. Do not operate the tiller on a slope that is too steep for safe operation.

Plant garden rows vertically on a slope (up and down the slope). This lets you use the entire area for a seedbed and leaves enough room between the rows for cultivation. You lose these benefits if you garden on areas styled like terraces.

WARNING

Do not operate the tiller on a slope too steep for safe operation. Till slowly and be sure that you have good footing.

Failure to do so could result in personal injury or property damage.

If you put enough organic material into the soil to improve its water-holding capabilities, you should not have a problem with soil erosion.

NOTE: On a slope, the oil level in the tiller engine slants toward the downhill side of the engine. Some internal parts may not get enough oil. To prevent this, make sure that the engine oil level is full to the point of overflowing from the oil check tube *before starting to till.* Also check the oil level every thirty minutes while you're tilling on a slope.

Tiller Loading and Unloading

- Shut the tiller engine off before loading or unloading. Let engine cool, disconnect spark plug wire and prevent wire from touching the plug.

- The tiller is too heavy (over 115 lbs.) to be safely lifted by one person. If you do lift the tiller, two or more people should share the load.

- We recommend that you use sturdy ramps and that you manually roll the tiller into or out of the vehicle (tiller engine must be off). This requires the assistance of another.

- Ramps should be strong enough to support the tiller and those moving it. The ramps should provide good traction and have side rails to guide the tiller up and down; they should have a locking device to secure them to the vehicle bed.

- The operator and handlers should wear sturdy footwear that grips well.

- Position the vehicle so the ramp angle is as flat as possible. Turn the vehicle engine off and apply the vehicle parking brake.

CAUTION

Loading and unloading a tiller into or from a vehicle is potentially hazardous. We do not recommend that you do so unless absolutely necessary because this could result in personal injury or property damage.

If loading or unloading must be undertaken, use the following guidelines to assist you.

- When going UP ramps, stand in the normal operating position and push the tiller ahead of you. Position a person at each wheel to help.

- When going DOWN ramps, carefully walk backward down the ramps with the tiller following you. Position a person at each wheel to control the speed of the tiller.

- Have wood blocks handy to place on the downhill sides of the wheels if you need to stop the tiller from rolling down the ramps. Use the blocks to temporarily keep the tiller in place on the ramps while you get a firmer grip on the handlebars, etc. Also use blocks to keep the wheels in place after tying down the tiller.

- After positioning the tiller in the vehicle, be sure both wheels are engaged in the WHEEL DRIVE position to prevent the tiller from moving. Then securely tie down the tiller.

CUSTOMER RESPONSIBILITIES

REQUIRED MAINTENANCE SCHEDULE					
REQUIRED MAINTENANCE	Before Each Use	Every 10 Hours	Every 30 Hours	Every 50 Hours	As Noted
Tiller Lubrication		•			
Check Engine Oil Level "Engine Lubrication"	•				1
Changing Engine Oil		•			2
Checking Transmission Gear Oil Level			•		4
Air Cleaner Maintenance			•		5
Engine Cooling System Maintenance	•				
Spark Plug Maintenance			•		
Tighten Tiller Hardware		•			3
Check Tines for Wear			•		
Checking/Adjusting Belt Tension		•			3
Check Anti-Reverse Stake	•				

NOTE 1 – Check frequently during first 2 hours of new operation; thereafter every 5 hours.
NOTE 2 – Change after 2 initial operating hours; thereafter every 10 hours.
NOTE 3 – Check after 2 initial operating hours; thereafter every 10 hours.
NOTE 4 – Check after 2 initial operating hours; thereafter every 30 hours.
NOTE 5 – Replace more often if used in extremely dusty or dirty conditions

GENERAL RECOMMENDATIONS

The warranty on this machine does not cover items that have been subjected to operator abuse or negligence. To receive full value from the warranty, the operator must maintain the machine as instructed in this manual.

Some adjustments will need to be made periodically to properly maintain your machine.

Keep the air filters clean and change the spark plug annually. A clean air filter system and new spark plug help the engine run better and last longer.

Regular Maintenance

Because the tiller is operated in the garden, frequently under hot and dirty conditions, regular maintenance is very important to ensure that you are getting proper performance from your tiller. There are several maintenance procedures that will help keep your tiller in good operating condition:

- Change engine oil regularly.
- Lubricate the controls when needed.
- Keep the correct tension on the forward drive belt.
- Replace the engine air cleaner element when dirty.
- Keep engine cooling fins clean.

Tiller Lubrication

Refer to Figure 4-1 and Figure 4-2 for lubrication points on your tiller.

Use common lubricating oil (#30 weight motor oil is acceptable) at the oil points. Use a good quality grease (preferably with a metal lubricant additive) at the grease points.

1. Wheel Shaft
Remove the wheels and use a clean rag to wipe off old grease from the wheel shaft ("1", Figure 4-1). Inspect the shaft and use fine sandpaper to remove any rust or burrs. Apply new grease to the wheel shaft. This makes future wheel removal easy.

2. Depth Regulator Lever
Clean and grease the back, front and sides (refer to "2", Figure 4-1).

3. Handlebar Support Bolts
Oil the threads on both handlebar support bolts ("3", Figure 4-1).

4. Tine Shaft
Remove the tine holder assemblies and clean any rust or burrs from the shaft ("4", Figure 4-1) with a fine sandpaper. Liberally apply grease to the tine shaft.

5. Shifting Mechanism
Carefully oil all pivot points on the shifting mechanism ("5", Figure 4-2).

NOTE: When you oil the pivot points on the shifting mechanism, be sure that you do not get any oil on either the belt or the pulleys. Otherwise, the belt could slip and would be unable to transfer engine power to the transmission.

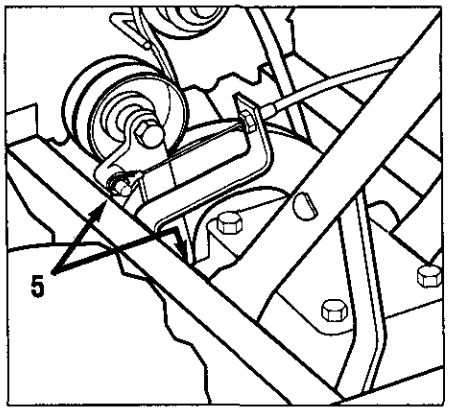


Figure 4-2: Lubrication points on shifting mechanism.

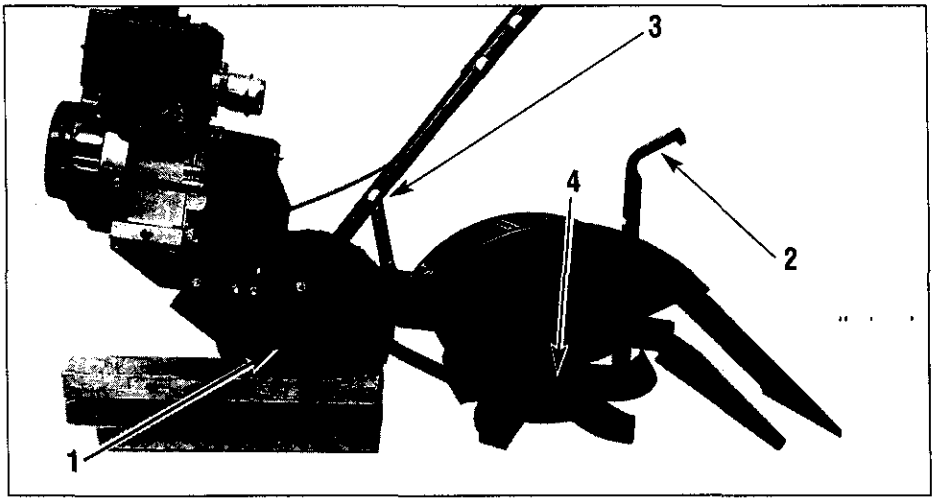
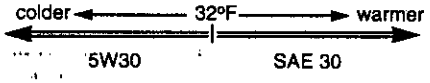


Figure 4-1: Tiller lubrication points.

Engine Lubrication

Only use high quality detergent oil with API service classification SF, SG, SH, or SH/CD. Above 32°F, use SAE 30; below 32°F, use 5W30. DO NOT USE SAE 10W40 OIL.

NOTE: Although multi-viscosity oils (5W30, 10W30, etc.) improve starting in cold weather, these oils will result in increased oil consumption when used above 32°F. Check engine oil more frequently to avoid possible engine damage from running low on oil.



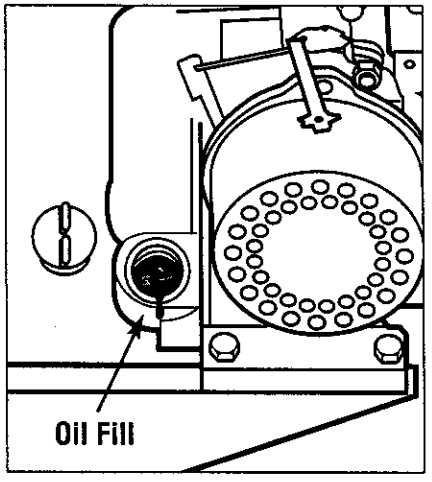


Figure 4-3: Oil Fill Plug location.

- Check the engine oil level frequently during the first two hours of engine break-in operation.
- Check the engine oil level before starting the engine. When operating the tiller, stop the engine and check oil level every 5 operating hours. Keep oil level at the overflow point in the oil fill hole.
- Change the oil after the first two operating hours and every 10 operating hours thereafter. Change the oil more often if the machine is operated in extremely dusty or dirty conditions. See Page 21.

WARNING

Stop the engine, allow it to cool, disconnect the spark plug wire and prevent it from touching the spark plug before changing the engine oil. Do not touch any engine parts which may be hot.

Failure to do so could result in personal injury or property damage.

Checking Engine Oil Level:

1. Move the tiller to a level area.
2. Pull the Depth Regulator Lever all the way up until it is in the bottom notch. The tines must be in contact with the ground— move the anti-reverse stake back if necessary.
3. Unscrew the oil fill plug from right side of engine (see Figure 4-3).
4. If the oil level is correct, the level will crest at the top of, or begin to flow from, the oil fill tube. Reinstall the oil fill plug.
5. If the level of the oil was below the very top of the fill tube, oil must be added as follows.

Adding Engine Oil:

1. Insert a clean funnel into the oil fill hole.
2. Above 32°F, use SAE30 oil; below 32°F, use SAE 5W30 oil. Do not use SAE 10W40 oil.
3. Slowly pour oil into the funnel. Check the oil level frequently while pouring. (Remove the funnel when checking.) When the oil just begins to overflow, the level is correct.
4. Replace the oil fill plug securely.

Changing Engine Oil

1. Start engine and let it warm up. Then turn the engine off.
2. There are two engine oil drain plugs on either side of the engine base. Use whichever one is most conveniently located for you.
3. Place a 2"x 4" wood board under the wheel opposite the drain plug you'll be removing.
4. Place a drain pan with a minimum capacity of 1-quart beneath the drain plug.
5. Use a 3/8" open end wrench to remove the drain plug (see arrow in Figure 4-4). Put it aside. Let all of the old engine oil drain completely into the drain pan.
6. Reinstall the drain plug securely.
7. Remove the wood board from beneath the wheel.
8. Refill the engine with the correct type and weight engine oil. Above 32°F, use SAE30 oil; below 32°F, use SAE 5W30 oil. Do not use SAE 10W40 oil.
9. Check the oil level to be sure it is correct before starting the engine.

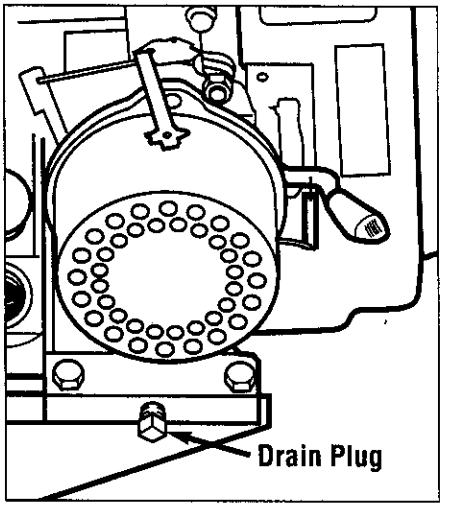


Figure 4-4: Draining engine oil.

Checking and Topping-Off Transmission Gear Oil

Checking Transmission Gear Oil:

1. Move the tiller to a level area.

2. Pull the Depth Regulator Lever up.

3. Unscrew the filler/check plug from the top of the transmission (it is located just behind the belt cover).

4. Use a flashlight to look down into the filler/check plug hole. See Figure 4-5. Note the drive shaft on one side of the hole. If the gear oil level is correct, it should be halfway up the sides of the drive shaft. If topping off is needed, follow the instructions below.

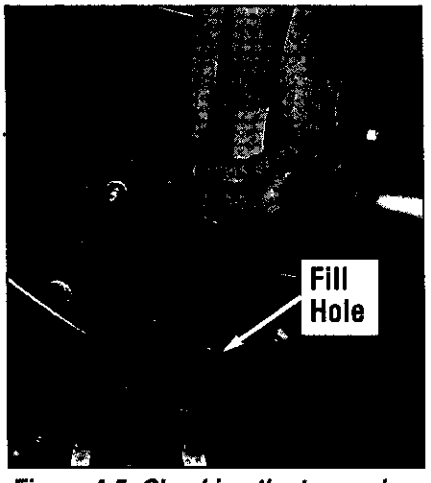


Figure 4-5: Checking the transmission gear oil level.

Topping off Transmission Gear Oil

1. Complete steps 1-through-3 described in "Checking Transmission Gear Oil."

2. Insert a funnel into the filler/check plug hole.

NOTE: When adding only a few ounces of gear oil, use API rated GL-4 or GL-5 transmission gear oil with a viscosity of SAE 140, SAE 85W-140, or SAE 80W-90. **When adding a complete refill of new gear oil after having drained the transmission, refill only with SAE 140 or SAE 85W-140 with an API of GL-4.**

NOTE: Do not use automatic transmission fluid or engine oil in the transmission.

Figure 4-6: Gear oil fill hole.

3. Slowly pour clean gear oil into the transmission. Frequently check the level so as not to overfill the transmission. See Figure 4-6.

4. When gear oil level is correct, reinstall filler/check plug securely.

Changing Transmission Oil

The transmission gear oil does not have to be changed unless you know that it has been contaminated by foreign materials such as sand, dirt, or metal particles. Of course, any internal repairs on the transmission would also require that the gear oil be drained and changed.

1. Drain gasoline from the fuel tank or run the engine until the fuel tank is empty.

2. Drain the oil from the engine.

3. Remove the four screws securing the transmission cover to the front part of the transmission. Lift the cover and gasket off the transmission. See Figure 4-7.

4. Remove the left wheel.

5. Lower the left axle down into a drain pan and slowly tilt the tiller to the left so the gear oil drains from the top of the transmission into the drain pan. See Figure 4-8.

6. Once gear oil has drained, tilt tiller upright and reinstall wheel.

7. Reinstall the transmission cover using a new cover gasket.

8. Add new gear oil—see specifications in NOTE at left.

9. Add engine oil to the engine.

DANGER

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

- **Allow the engine and muffler to cool for at least two minutes before draining the tiller's gasoline tank.**
- **Do not allow open flames, sparks, matches or smoking in the area.**
- **Wipe away spills and push tiller away from spilled fuel.**
- **Use only an approved fuel container and store it safely out of the reach of children.**
- **Do not store gasoline in an area where its vapors could reach an open flame or spark, or where ignition sources are present (such as hot water and space heaters, furnaces, clothes dryers, stoves, electric motors, etc.)**

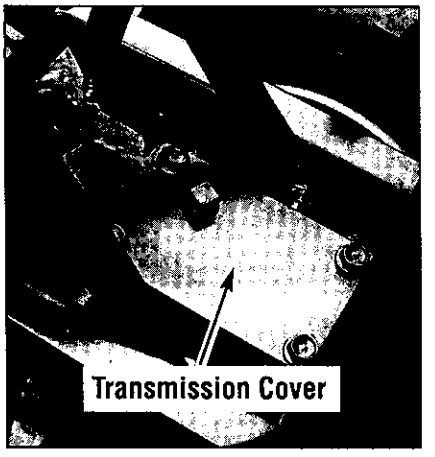


Figure 4-7: Remove four screws to remove transmission cover.

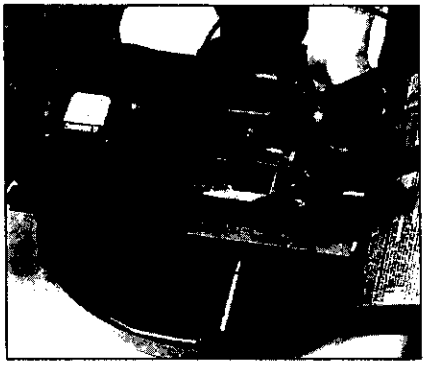


Figure 4-8: Draining the gear oil.

Checking for Oil Leaks

Regularly check your tiller for oil leaks from the engine and the transmission. Slight seepage is no cause for major concern. However, if your tiller is losing a lot of oil, do not use it until it's repaired.

Inspect the area where you park your tiller for stains on the floor which would indicate a leak. If you find a leak, first tighten any bolts or screws which may have loosened up.

If you are unsure how much oil has been lost from the tiller, check the oil levels before operation. Also, when operating your tiller, frequently check the oil levels to be sure that engine oil and transmission gear oil levels don't become too low for safe operation.

If you have further problems with oil leaks, contact your Sears Service Center for assistance.

Air Cleaner Maintenance

Your tiller's engine is equipped with a replaceable dry paper filter. Replace this filter every 30 operating hours or at least once a year, and even more frequently under dusty or dirty operating conditions.

Do not attempt to clean this filter. Simply replace it when dirty.

To Remove Paper Air Filter:

1. Loosen the two screws that secure the air cleaner cover to the base of the air cleaner.

2. Slightly turn the cover counterclockwise. Remove the cover and the paper air filter.

To Change the Paper Air Filter:

1. Thoroughly clean the base of the air cleaner and the inside of the air cleaner cover.

2. Place the new paper filter in the cover.

3. Place the cover (with filter inside it) on the base of the air cleaner. Align the two screw holes in the cover with the two screws in the base of the air cleaner. Refer to Figure 4-9.

4. Turn the cover slightly clockwise and tighten the two screws.

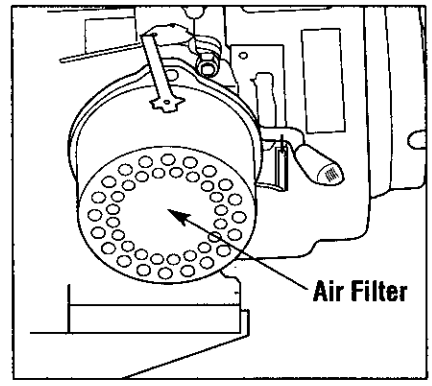


Figure 4-9: Engine Air Filter.

Engine Cooling System Maintenance

Frequently inspect the engine cooling fins, shrouds, and throttle linkage for a build-up of dirt, dried weeds, grease, etc.

Always keep these areas free from debris to keep air currents flowing freely. See arrows in Figure 4-10.

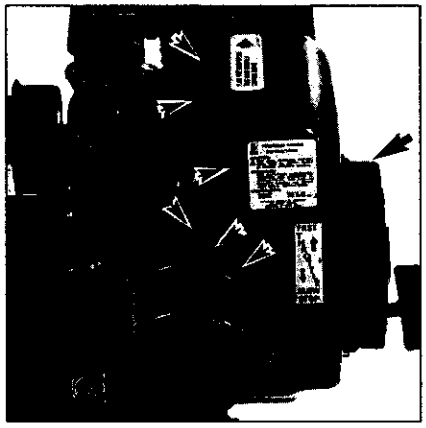


Figure 4-10: Keep these areas free of debris.

Engine Ignition System Maintenance

Your tiller's engine has a dependable, maintenance-free electronic ignition system. The system has no condenser or points. This means you do not have to tune up the engine. The only ignition system maintenance required is periodic changing of the spark plug. (See the following spark plug instructions.)

Spark Plug Maintenance

Check the spark plug at the beginning or the end of each season, or every 30 operating hours.

Clean the area around the spark plug hole before removing the spark plug.

1. Stop the engine, and wait for all moving parts to stop completely.

2. Disconnect the spark plug wire from the spark plug.

3. Use a 13/16" spark plug socket to remove the spark plug. The plug may be cleaned (do not sandblast or wire-brush it), and the gap set at .030" or a new spark plug may be used instead.

4. Install a new plug if the old plug's electrodes are pitted or burned or if the porcelain is cracked. For replacement use Champion RJ-17LM only.

NOTE: A resistor spark plug must be used for replacement.

Carburetor Adjustments

Your carburetor has been preset for best tiller performance. If your carburetor may need adjustment, contact your nearest Sears Service Center.

WARNING

Stop the engine, allow it to cool, disconnect the spark plug wire and prevent it from touching the spark plug before tightening any bolts, screws, or nuts.

Failure to do so could result in personal injury or property damage.

Tightening Tiller Hardware

After the first two hours of tiller operation, check all fasteners (nuts, bolts, screws, pins, etc.) and tighten any that may have loosened. After this initial check, check those same fasteners after every ten hours of tiller operation.

Most of the fasteners on your tiller are in plain view. However, the following ones are not readily visible. Be sure to check them for tightness as well.

1. Rear End Cap Bolts– These three bolts are located at the rear end of the tiller transmission. They secure the rear cap and the anti-reverse stake. Lift up the hood flap to view this hardware.

2. Transmission Housing Cover Bolts– These four bolts are located on the top of the rear end of the tiller transmission. You see them when you lift the hood flap.

Tines

As you use your tiller, the tines will gradually wear. They will become shorter, narrower and pointed, decreasing their ability to till effectively. Check the tines for wear several times a season, and replace badly worn tines to restore the tiller's effectiveness.

NOTE: You must first remove the tiller hood before removing either a single tine holder or individual tines. Remove the two screws at the front of the hood and the two screws at the rear of the hood and lift off the hood. Be sure to replace the hood securely after changing tines or tine holders.

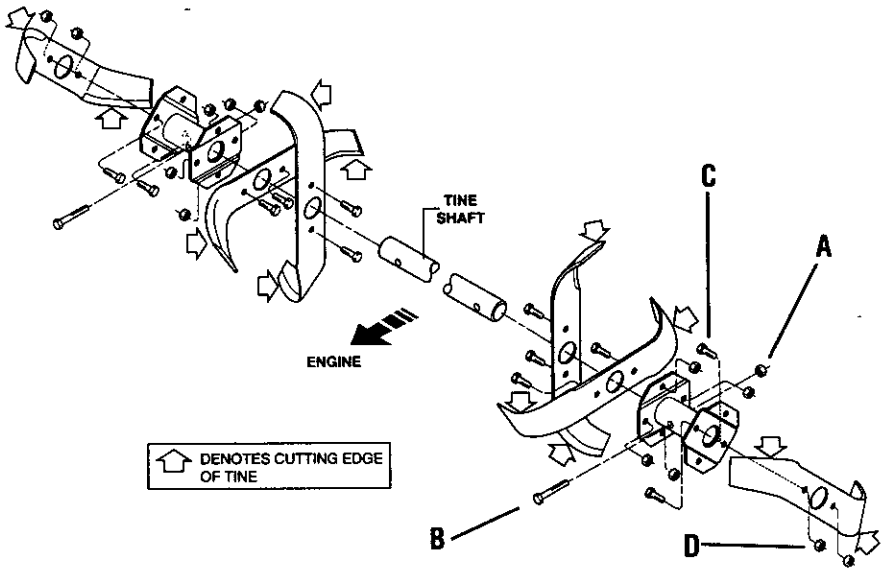


Figure 4-11

WARNING

This is a CRT (counter-rotating tine) tiller and its tines must be mounted in the direction shown in Figure 4-11. If mounted with curves in the opposite direction, tiller will dig poorly and be more likely to run backwards.

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

Removing and Installing Tine Assemblies

WARNING

Stop the engine, allow it to cool, disconnect the spark plug wire and prevent it from touching the spark plug before removing or installing a tine or a tine assembly.

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

1. Use a 9/16" socket, 6" extension, a ratchet, and a 9/16" box end wrench to loosen the nut (A, Figure 4-11) and screw (B) that secure the tine holder to the tine shaft.

2. Use a rubber mallet to tap the tine holder loose. Slide the tine assembly off the tine shaft.

3. Repeat Steps 1 and 2 above to remove the other tine assembly.

4. Installing the tine assembly is simply the reverse of its removal. First be sure to remove any rust, uneven spots or burrs from the tine shaft using fine sandpaper. Then grease the tine shaft before reinstalling the tine assemblies. Be sure all the cutting edges face so they will enter the soil first when the tiller is moving forward– this means the cutting edge on the top of each tine faces *toward* the operator position.Tighten the hardware very securely.

Removing and Installing Individual Tines

1. Use two 9/16" box end wrenches to remove the two screws (C, Figure 4-11) and nuts (D) that secure the tine to its tine holder.

NOTE: If the nuts are rusted, apply penetrating oil to the screw and nut. Always loosen the nut rather than the screw.

2. When installing individual tines, install them in the reverse order from which they were removed. The two sets of *inboard* tines are installed so one set faces toward the transmission housing and the other faces away from it. The single *outboard* tine set faces toward the transmission housing. *Also be sure the cutting edge at the top of each tine faces toward the operator position.* (See Figure 4-11.)

Checking and Adjusting Belt Tension

WARNING

Stop the engine, allow it to cool down, disconnect the spark plug wire and prevent it from touching the spark plug before checking the belt tension.

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

After the initial two hours of tiller operation, check the belt tension. After this initial check, check the belt tension every 10 operating hours. The same schedule should be followed after installing a new belt. If the belt is slipping (the tines and wheels don't rotate as fast as when new, or they may even stop turning when the engine is running at full speed), perform the belt tension check to see if the belt needs to be tightened. If you find you can not bring the Forward Clutch Bail all the way up to the bottom of the upper handlebar, you will need to loosen the belt tension.

1. Lift the Forward Clutch Bail up and hold it to the bottom of the handlebar.

2. Measure the length of the clutch bail spring with a ruler. Refer to Figure 4-12.

3. If the belt tension is correct, the length of the spring should be approximately 1-7/8".

4. If the spring is too short, the belt tension will be too loose. If the spring is too long, the belt tension will be too tight.

5. To adjust the length of the spring, release the Forward Clutch Bail. Screw the threaded adjuster counterclockwise (as viewed from the operator's position) to increase the length of the spring or clockwise (as viewed from the operator's position) to decrease the length of the spring.

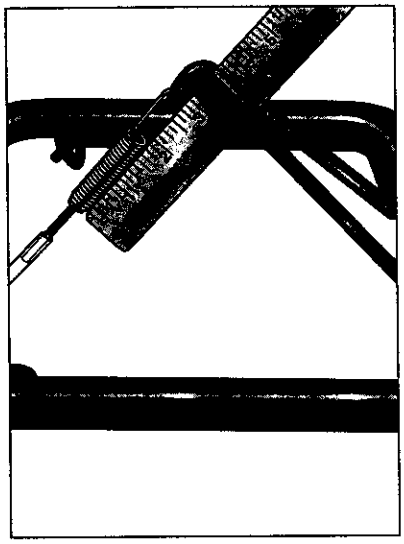


Figure 4-12: Measure the length of the Clutch Bail Spring to check for correct belt tension (1-7/8").

NOTE: If you have difficulty turning the adjuster by hand, have an assistant hold the Forward Clutch Bail to the handlebar while you insert a flat-tipped screwdriver into the clutch bail spring. Engage the tip of the screwdriver with the slot in the screw head that is inside the clutch bail spring. While you turn the screw, keep the Forward Clutch Cable from turning by gripping the adjuster on its upper end with a pliers. See Figure 4-13.

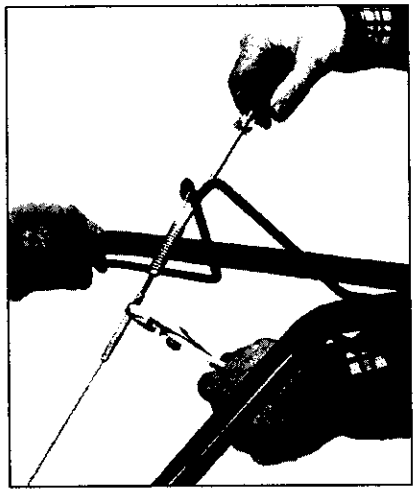


Figure 4-13: Adjusting the length of the Clutch Bail Spring.

WARNING

Stop the engine, let it cool down, disconnect the spark plug wire and prevent it from touching the spark plug before changing the belt.

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

Belt Removal and Replacement

To Remove the Belt:

1. Use a 3/8" wrench to remove the bolt that attaches the belt cover to the tiller. Slide the belt cover up the cable slightly so it is out of the way. See Figure 4-14.

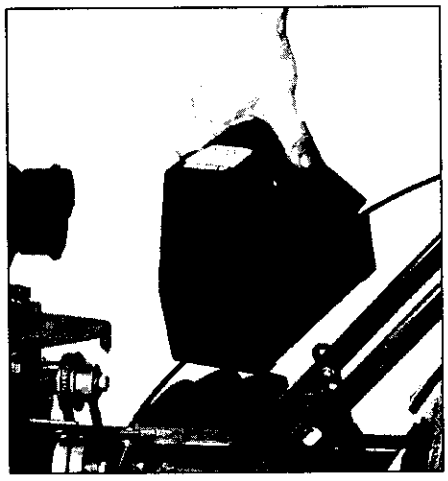


Figure 4-14: Remove belt cover.

2. Push down on the upper section of the belt to create some belt slack when you move the belt off the transmission pulley. Reach underneath the tiller and move the belt forward, off the transmission pulley. Refer to Figure 4-15.

3. From above, lift the belt up and off the engine pulley. You need to guide the lower portion of the belt as you're removing it so that it doesn't hang up on anything.

To Install the Belt:

1. Insert the new belt downward, in back of the engine pulley and in front of the transmission.

2. Work the belt over the transmission pulley. Make sure the belt goes in the groove in the transmission pulley.

3. Loop the upper section of the belt around the engine pulley. Make sure the belt goes in the groove in the engine pulley. Also be sure the belt goes between the engine pulley and the wire belt guide on each side of the pulley. Refer to Figure 4-17.

4. Slide the belt cover down the Forward Clutch Cable and reinstall it on the tiller.

5. Check the belt tension. See "Checking and Adjusting Belt Tension" for specific instructions.

NOTE: If you've installed a new belt, remember to check and readjust its tension after the first two hours of operation.

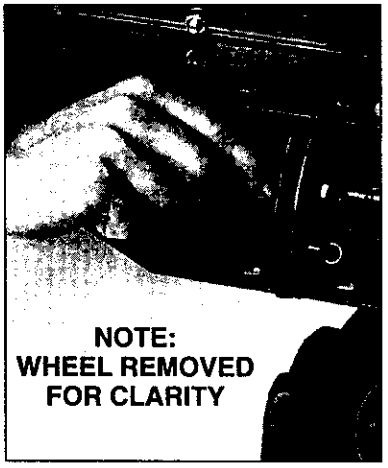


Figure 4-15: Moving the belt off the transmission pulley.

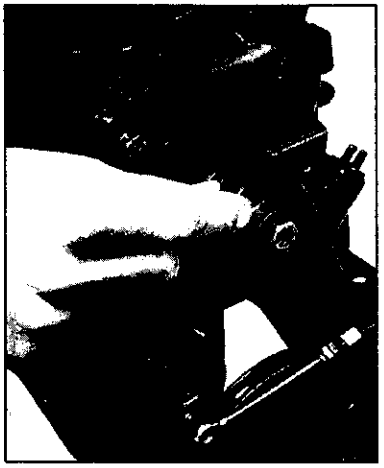


Figure 4-16: Moving the belt off the engine pulley.

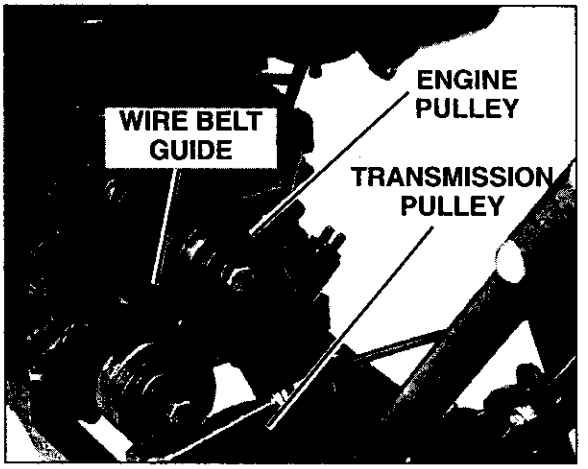


Figure 4-17: The new drive belt installed.

Forward Clutch Bail Adjustment

WARNING

Stop the engine, allow it to cool, disconnect the spark plug wire and prevent it from touching the spark plug before removing or installing the Forward Clutch Cable.

Failure to comply could result in injury or property damage.

See "Checking and Adjusting Belt Tension" in this section. When the belt has the correct amount of tension, the Forward Clutch mechanism should be properly adjusted.

If, after adjusting the belt tension, the Forward Clutch mechanism does not operate correctly, please contact your Sears Service Center for further assistance.

Removing and Installing the Forward Clutch Cable

To Remove Forward Clutch Cable:

1. Unhook the spring that is on the upper end of the Forward Clutch Cable from the Forward Clutch Bail.

2. Use a 3/8" wrench to remove the bolt that attaches the belt cover to the tiller. Slide the belt cover up the cable until it is out of the way.

3. Use a pair of needle nose pliers to carefully remove the clip ring from the clevis pin on the idler lever (Figure 4-18).

4. Use one 7/16" and one 3/8" open end wrench to loosen the locknut on the lower end of the Forward Clutch Cable sheath where it attaches to the cable mounting bracket (refer to Figure 4-19).

5. Push the Forward Clutch Cable forward to free it from the cable mounting bracket.

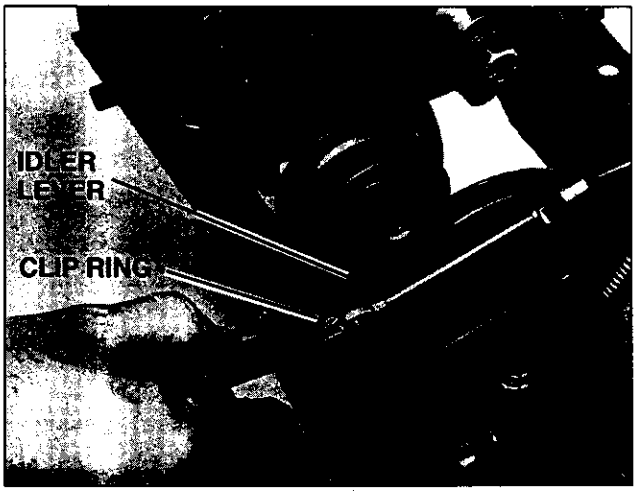


Figure 4-18: Removing the clip ring.

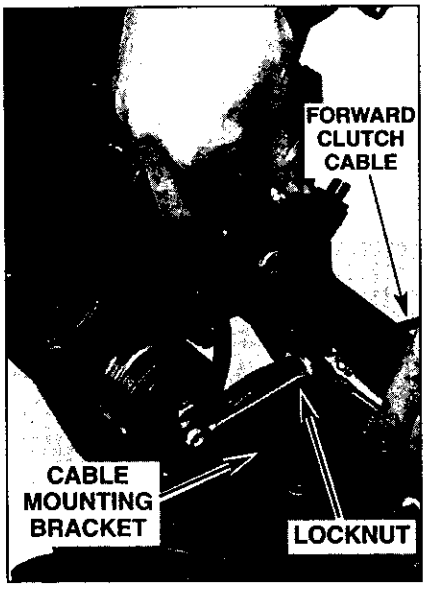


Figure 4-19: Loosening the Forward Clutch Cable.

6. Pull downward on the upper end of the Forward Clutch Cable sheath where the connector fits into the cable bracket on the upper end of the lower handlebar. Guide the cable out of the slot in the cable bracket. See Figure 4-20.

To Install Forward Clutch Cable

1. Place the lower end of the Forward Clutch Cable into the cable mounting bracket and use one 7/16" and one 3/8" open end wrench to securely fasten it to the cable mounting bracket. Refer to Figure 4-21.

2. Place the lower end of the Forward Clutch Cable over the clevis pin on the left-hand side of the idler lever. See Figure 4-21.

3. Use a pair of needle nose pliers to place the clip ring on the clevis pin (Figure 4-18).

4. Hook the spring on the upper end of the Forward Clutch Cable to the Forward Clutch Bail.

5. Pull downward on the upper end of the black cable sheath. Slide the Forward Clutch Cable into the slot in the cable bracket that is on the upper end of the lower handlebar. Center the connector on the upper end of the cable sheath in the hole in the cable bracket and push the connector into the hole until it snaps into place. See Figure 4-20.

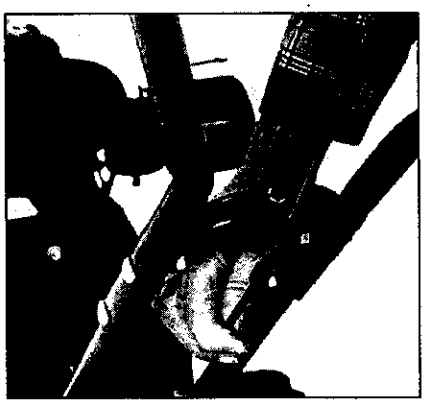


Figure 4-20: Remove the Forward Clutch Cable from the cable bracket.

Figure 4-21: Installing the lower end of the Forward Clutch Cable.

STORAGE

Tiller Storage

Whenever you don't intend to use your tiller for 30 days or longer, you should perform the following steps to ensure that it will start easily and perform properly when removed from storage.

- Thoroughly clean the machine.
- Be sure that all nuts, bolts and screws are securely fastened. Inspect parts for damage, breakage or wear. Replace as necessary.
- Touch up all rusted or chipped paint surfaces. Sand lightly before repainting.
- If possible, store your unit indoors and cover it with a suitable protective cover (not plastic) that does not retain moisture.

IMPORTANT: Never cover the unit while the engine and exhaust areas are still warm.

- Do not store gasoline from one season to another.
- Replace your gasoline can if it starts to rust. Rust and/or dirt in your gasoline will cause problems.

Engine Storage

Fuel System

IMPORTANT: It is important to prevent gum deposits from forming in essential fuel system parts such as carburetor, fuel filter, fuel hose, or tank during storage. Also, experience indicates that alcohol blended fuels (called gasohol or using ethanol or methanol) can attract moisture which leads to separation and formation of acids during storage. Acidic gas can damage the fuel system of an engine while in storage.

- Drain the fuel tank.
- Start the engine and let it run until the fuel lines and carburetor are empty.
- Never use engine or carburetor cleaner products in the fuel tank or permanent damage may occur.
- Use fresh fuel next season.

! DANGER

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

- **Let engine and muffler cool at least 2 minutes before draining fuel tank.**
- **Do not allow open flames, sparks, or matches, or permit smoking in fueling area.**
- **Wipe up spills and push the tiller away from spilled fuel.**
- **Use only an approved fuel container and store it safely from children.**
- **Do not store gasoline in an area where its vapors could reach an open flame or spark, or where ignition sources are near (such as hot water and space heaters, furnaces, clothes dryers, stoves, motors, etc.)**

NOTE: If "Gasohol" has been used, run engine until the tank is empty. Then put 1/2 pint of "Unleaded" regular gasoline into the fuel tank and again run the engine until tank is empty.

NOTE: Fuel stabilizer (such as Craftsman Fuel Stabilizer No. 335500) is an acceptable alternative in minimizing the formation of fuel gum deposits during storage. Add stabilizer to gasoline in fuel tank or storage container. Always follow the mix ratio and instructions on the stabilizer container. Run engine at least 10 minutes after adding stabilizer to allow the stabilizer to reach the carburetor. Do not drain the gas tank and carburetor if using fuel stabilizer.

Engine Oil

Drain oil and replace with clean engine oil. See "Engine Lubrication" in the CUSTOMER RESPONSIBILITIES section.

Engine Cylinder

- Remove spark plug. Squirt one (1) oz. (30ml) of clean engine oil into spark plug hole.
- Cover spark plug hole with a clean rag.
- Pull starter rope to crank engine over, slowly, several times.
- Install spark plug. Do not connect spark plug wire.

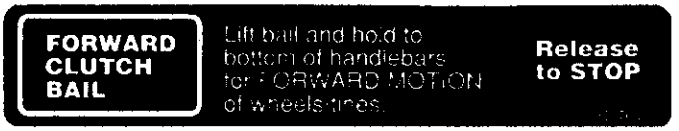
TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	CORRECTION
Engine Does Not Start.	1. Spark plug wire disconnected. 2. Fuel tank empty. 3. Stale gasoline. 4. Incorrect choke setting. 5. Dirty air filter. 6. Defective or incorrectly gapped spark plug. 7. Carburetor out of adjustment.	1. Reconnect wire. 2. Add gasoline. 3. Drain gasoline and add fresh gasoline. 4. Put choke in correct setting. 5. Replace air filter. 6. Inspect spark plug. Re-gap to .030". Replace if cracked or otherwise damaged. 7. Contact Sears Service Center.
Engine Runs Poorly.	1. Bad spark plug. 2. Incorrect choke 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.	1. Inspect spark plug. 2. Put choke in correct setting. 3. Replace air filter. 4. Contact Sears Service Center. 5. Drain gasoline and add fresh gasoline. 6. Contact Sears Service Center. 7. Clean debris guard and engine cooling fins.
Engine Overheats.	1. Engine cooling system clogged. 2. Carburetor out of adjustment. 3. Oil level is low.	1. Clean debris guard and engine cooling fins. 2. Contact Sears Service Center. 3. Check and add oil.
Engine does not shut off.	1. Defective engine throttle lever.	1. Contact Sears Service Center.
Wheels and Tines will not turn.	1. Improper use of controls. 2. Worn, broken, or misadjusted drive belt(s). 3. Internal transmission wear or damage. 4. Bolt loose in transmission pulley.	1. Review OPERATION section. 2. See SERVICE AND ADJUSTMENTS section. 3 Contact Sears Service Center. 4. Tighten bolt.
Tines turn, but wheels don't.	1. Wheel Drive Pins not in WHEEL DRIVE. 2. Internal transmission wear or damage.	1. See OPERATION section. 2. Contact Sears Service Center.
Wheels Turn, but Tines Don't.	1. Tine holder mounting hardware missing. 2. Internal transmission wear or damage.	1. Replace hardware. 2. Contact Sears Service Center.
Poor tilling performance.	1. Worn tines. 2. Improper Depth Regulator setting. 3. Incorrect throttle setting. 4. Drive Belt slipping.	1. See SERVICE AND ADJUSTMENTS section. 2. See OPERATION section. 3. See OPERATION section. 4. See SERVICE AND ADJUSTMENTS section.

OPERATING AND SAFETY DECALS

A.

E.

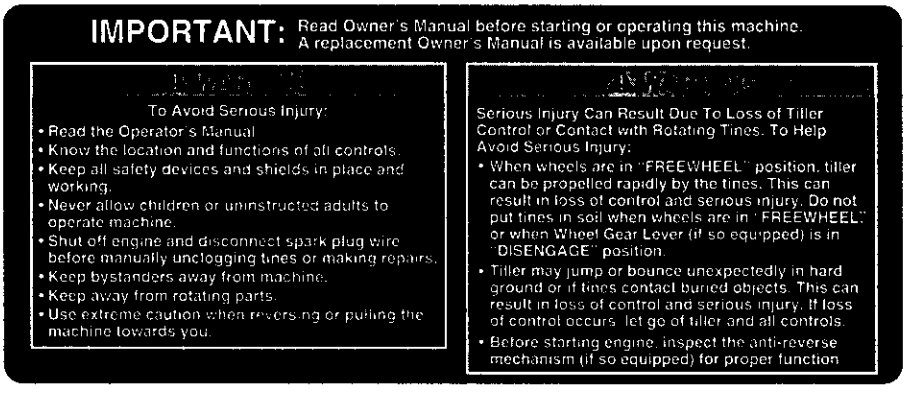


B.

C.

F.

D.

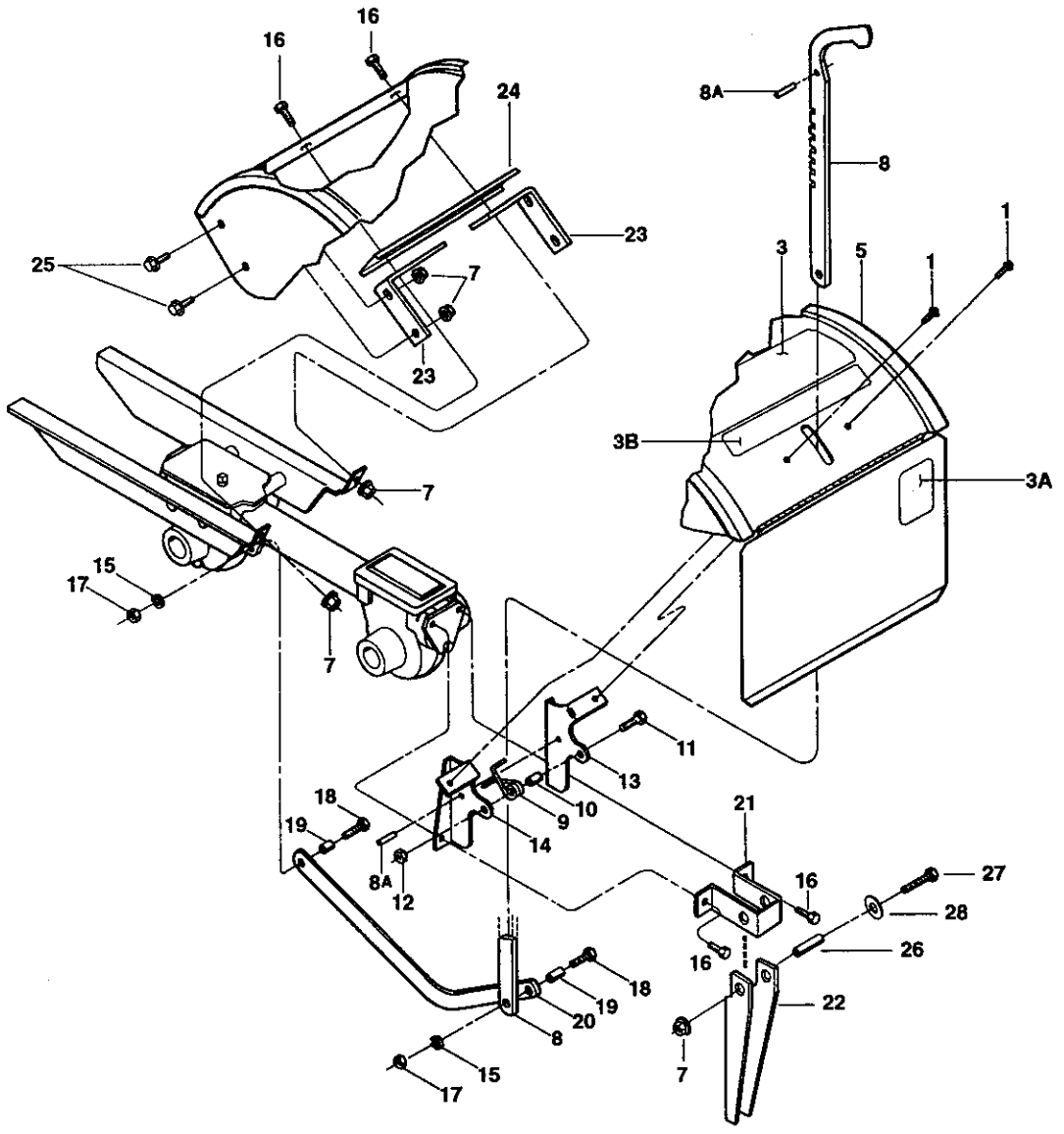


Ref. Letter	Part #	Description and Location	Qty.
A	1909942	Owner's Manual Replacement	1
B	1911361	WARNING– Keep Away From Tines	1
C	1900766	Starting Stabilization Instructions	1
D	1916805	Hood Decal	1
E	1900765	Forward Clutch Bail	1
F	1904549	WARNING– Hot Surfaces	1

(Decals Not Shown Actual Size)

CRAFTSMAN 3HP MODEL 987.293190 REPAIR PARTS

TINE HOOD, DEPTH REGULATOR, AND DRAG BAR

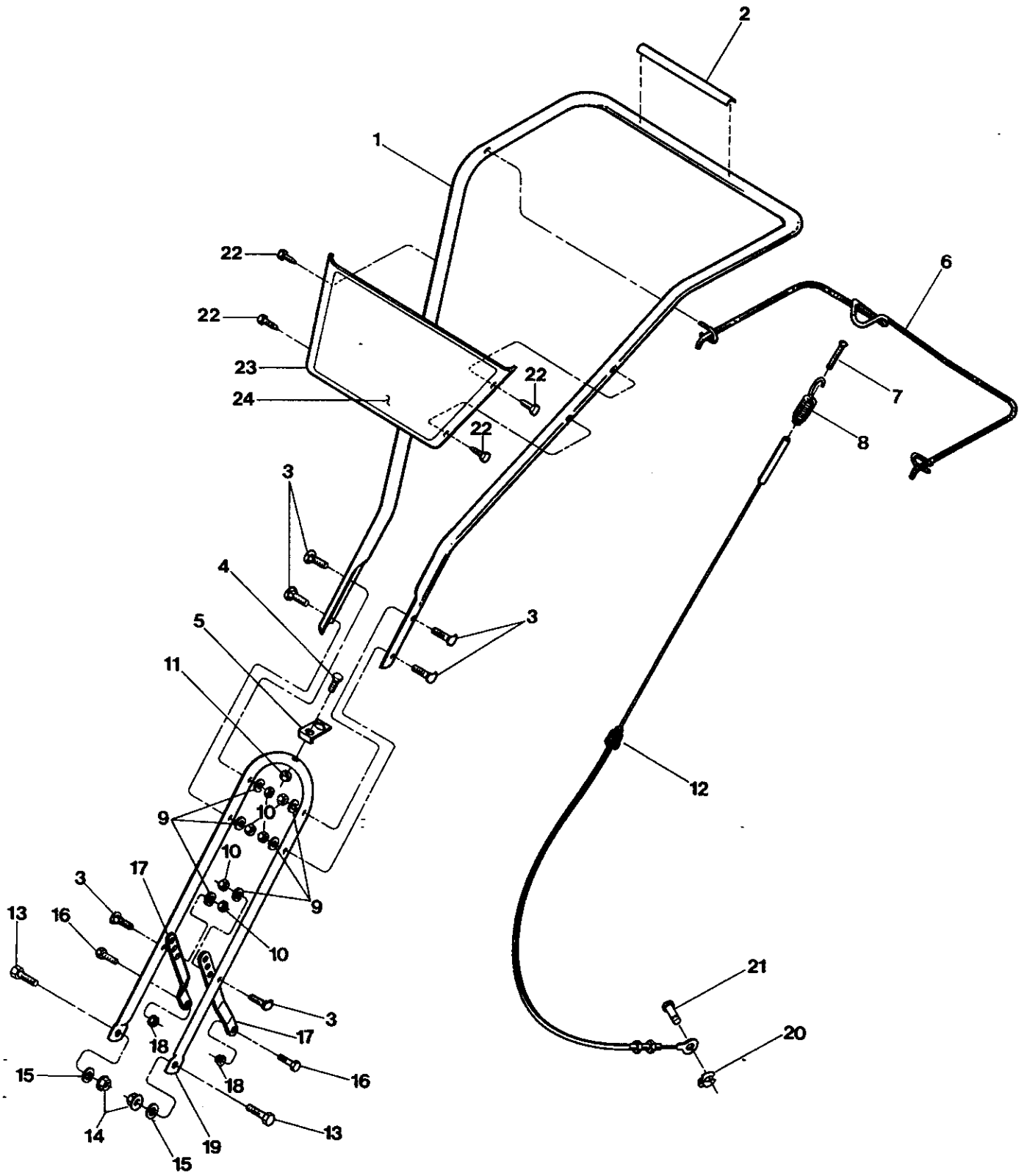


REF No.	PART No.	DESCRIPTION	QTY.
1	9552	Bolt–Fl. Hd., Self-Tap, 1/4-20 x 1/2"	2
3	1916805	Decal–Hood	1
3A	1911361	Decal–Warning	1
3B	1916807	Decal–Logo	1
5	1916763	Tine Hood–Includes tine flap and Ref. No. 3, 3A, and 3B	1
6		(Ref. No. Not Used)	
7	1186391	Nut–Flange Lock, 5/16-18	9
8	1916118001	Depth Regulator Lever	1
8A	9308	Spirol Pin	2
9	9384	Spring–Depth Regulator	1
10	9534	Spacer	1
11	1100069	Bolt–Hex Hd., 1/4-20 x 1"	1
12	9811	Locknut–Hex Hd., 1/4-20	1
13	1916119001	Bracket–Hood, Right Hand	1
14	1916120001	Bracket–Hood, Left Hand	1

REF No.	PART No.	DESCRIPTION	QTY.
15	11000242	Lockwasher, 5/16"	2
16	1186331	Bolt–Flanged Hd., 5/16-18 x 1"	4
17	1186230	Nut–Hex Hd., 5/16-18	2
18	1100808	Bolt–Hex Hd., 5/16-18 x 1-1/4"	2
19	55088	Bushing–Drag Bar	2
20	1916121001	Drag Bar	1
21	1916569001	Bracket– Stop	1
22	1916570001	Arm– Reverse (Drag Stake)	1
23	1916708001	Bracket– Hood Support	2
24	1916707001	Bracket– Support Channel	1
25	1186328	Bolt– Hex Hd. 5/16"-18 x 5/8"	6
26	1916771	Spacer	1
27	1111607	Bolt– Hex Hd. 5/16"-18 x 2-1/4"	1
28	1107382	Washer– 5/16" I.D.	1

CRAFTSMAN 3HP MODEL 987.293190 REPAIR PARTS

HANDLEBARS, FORWARD CLUTCH CABLE, AND HANDLEBAR MOUNTING HARDWARE

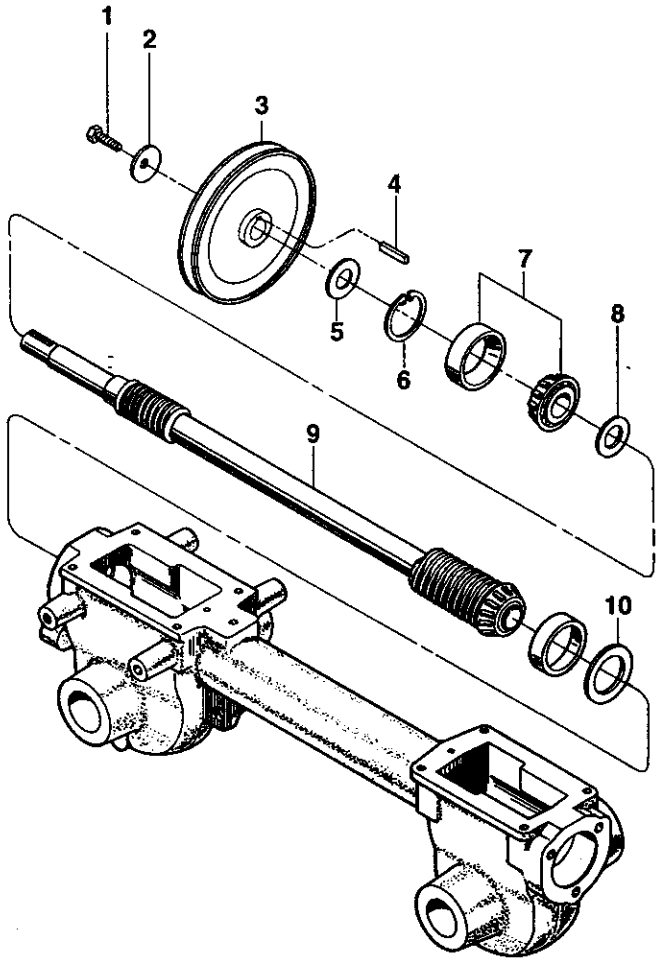


CRAFTSMAN 3HP MODEL 987.293190 REPAIR PARTS

HANDLEBARS, FORWARD CLUTCH CABLE, AND HANDLEBAR MOUNTING HARDWARE

REF No.	PART No.	DESCRIPTION	QTY.
1	1916909	Handlebar, Upper – Incl. Ref. 2	1
2	1900765	Decal–Forward Clutch Bail	1
3	9854	Bolt–Curved Hd., 5/16-18 x 1-1/2".	6
4	1100806	Bolt–Hex Hd., 1/4-20 x 1-1/4"	1
5	55044	Bracket, Cable	1
6	1916106001	Bail–Forward Clutch	1
7	9855	Screw, 10-24 x 2"	1
8	1916712	Spring–Forward Clutch	1
9	1100242	Lockwasher–5/16"	6
10	1186230	Nut–Hex Hd., 5/16-18	6
11	9811	Nut–Hex Hd., Lock, 1/4-20	1
12	55048	Cable Assy–Forward Clutch	1
13	1100068	Bolt–Hex Hd., 3/8-16 x 3/4"	2
14	9837	Locknut–Hex Hd., 3/8-16	2
15	1107383	Washer–Flat, 3/8	2
16	1100044	Bolt–Hex Hd., 5/16-18 x 3/4"	2
17	1916107001	Support, Handlebar	2
18	1110107	Locknut–Hex Hd., 5/16-18	2
19	1916108001	Handlebar, Lower	1
20	9386	Klip Ring	1
21	9856	Clevis Pin	1
22	9552	Screw–Hex Hd., 1/4-20 x 1/2", Self-Tapping	4
23	1901273001	Panel	1
24	1916804	Decal–Logo	1

DRIVE SHAFT ASSEMBLY

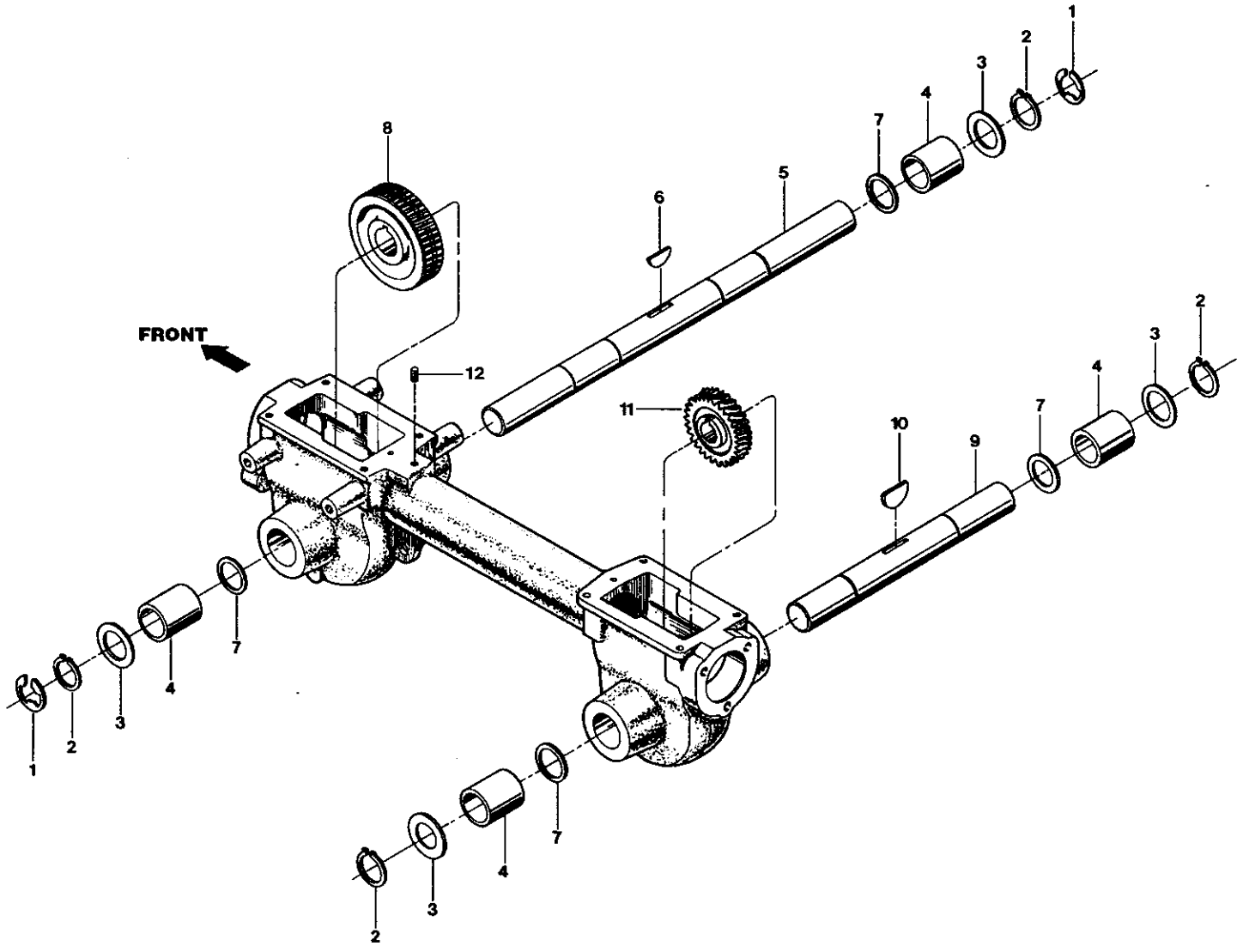


REF No.	PART No.	DESCRIPTION	QTY.
1	1100004	Bolt–Hex Head, 5/16-24 x 3/4, Grade 5	1
2	9944	Washer–Belleville	1
3	1911321	Pulley–Transmission	1
4	9301	Key–Transmission Pulley, 3/16 x 1	1
5	50027	Support Washer–Front	1
6	9517	Snap Ring	1
7	1714	Bearing–Tapered Roller with race	2
8	50043	Support Washer–Rear	1
9	1916541	Drive shaft Assembly	1
10	1224-1	Shim–Rear Bearing Cap, .010 thick	A/R
	1224-2	Shim–Same as above except .030 thick	A/R
	1224-3	Shim–Same as above except .005 thick	A/R
	1224-4	Shim–Same as above except .062 thick	A/R
	1325C	Shim Set–Includes the following shims: two #1224-1, two 1224-2, one 1224-3, and one #1224-4	A/R

A/R – As Required

CRAFTSMAN 3HP MODEL 987.293190 REPAIR PARTS

WHEEL SHAFT & TILLER SHAFT ASSEMBLIES

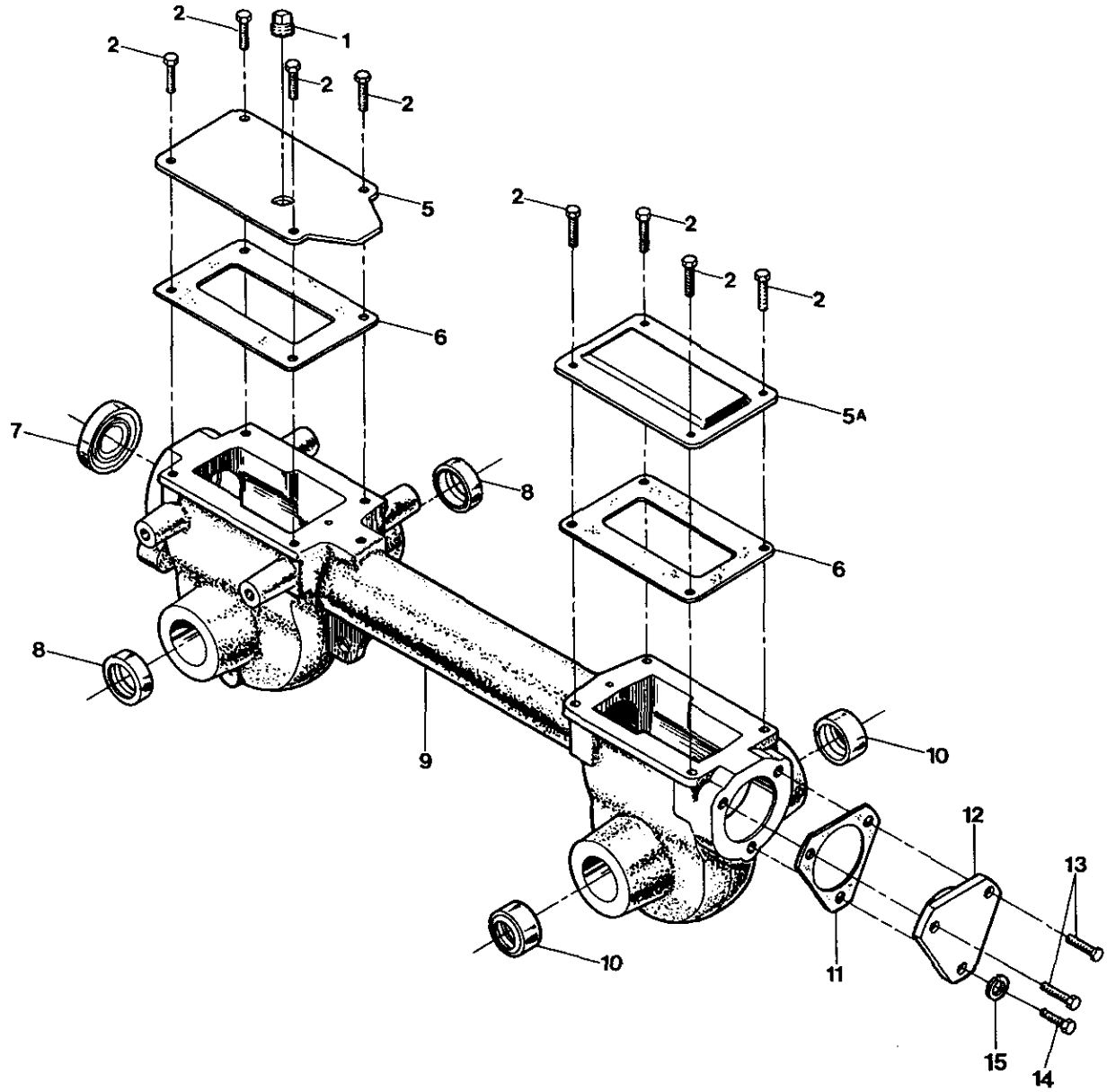


REF No.	PART No.	DESCRIPTION	QTY.
1	9512	Retainer–Snap Ring, "E" Type	2
2	9511	Retainer–Snap Ring	4
3	1166-1	Shim–0.062" Thick	A/R
	1166-2	Shim–0.030" Thick	A/R
	1166-3	Shim–0.015" Thick	A/R
	1166-4	Shim–0.010" Thick	A/R
	1166-5	Shim–0.005" Thick	A/R
4	1086	Bushing–Bronze	4
5	1916722	Wheel Shaft	1
6	9305	Key–Wheel Shaft, Hi Pro, 1/4 x 1	1
7	1132-2	Spacer	4
8	1904278	Worm Gear–Wheel Shaft	1
9	1915074	Tiller Shaft	1
10	1104	Woodruff Key–Tiller Shaft	1
11	1916542	Worm Gear–Tiller Shaft	1
12	1916484	Plug–Vent	1

A/R – As Required

CRAFTSMAN 3HP MODEL 987.293190 REPAIR PARTS

TRANSMISSION HOUSING, COVERS, SEALS, GASKETS, AND PLUG

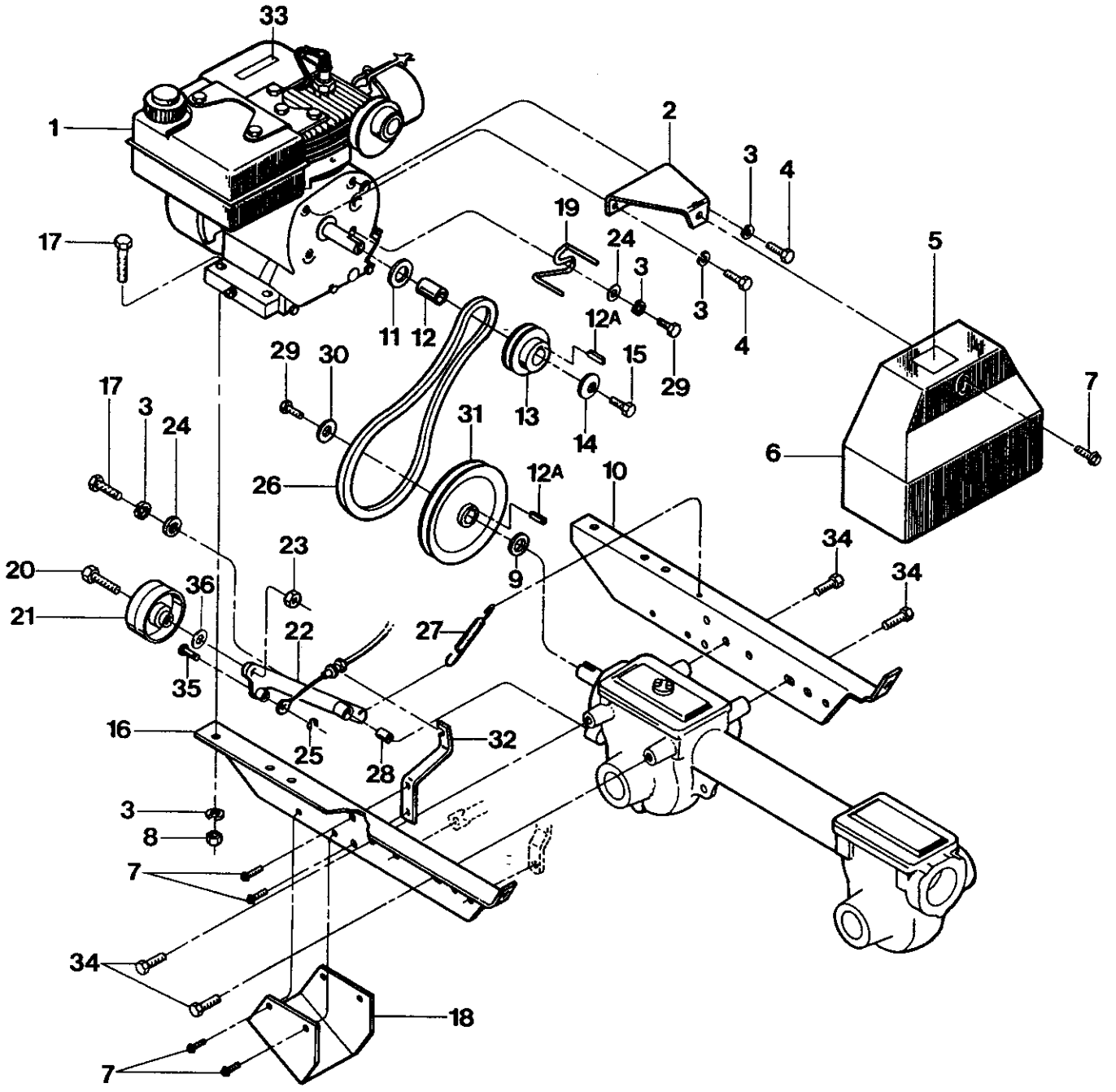


REF No.	PART No.	DESCRIPTION	QTY.
1	9727	Plug–Transmission Oil Fill/Check	1
2	1186328	Bolt–Hex Hd., Flange Lock, 5/16-18 x 5/8", GR5	8
3		This Ref. No. not used.	
4		This Ref. No. not used.	
5	1916641001	Cover–Trans. Housing Front	1
5A	1916109001	Cover–Trans. Housing, Rear	1
6	50032	Gasket–Transmission Housing Cover (Front and Rear)	2
7	9617	Oil Seal–Drive Shaft	1
8	9621	Oil Seal–Wheel Shaft	2

REF No.	PART No.	DESCRIPTION	QTY.
9	1916752001	Transmission Case, Rear Housing and Tube Assembly	1
10	1909374	Oil Seal–Tine Shaft	2
11	55011-1	Gasket–Bearing Cap (.010" thick)	1
	55011-2	Gasket–Bearing Cap (.030" thick)	1
12	1916111001	Cap–Rear Bearing	1
13	1186331	Bolt–Flanged Hd., 5/16-18 x 1"	2
14	1100044	Bolt–Flanged Hd., 5/16-18 x 3/4"	1
15	1100242	Lockwasher, 5/16"	1

CRAFTSMAN 3HP MODEL 987.293190 REPAIR PARTS

ENGINE, ENGINE BRACKETS, AND FORWARD DRIVE MECHANISM



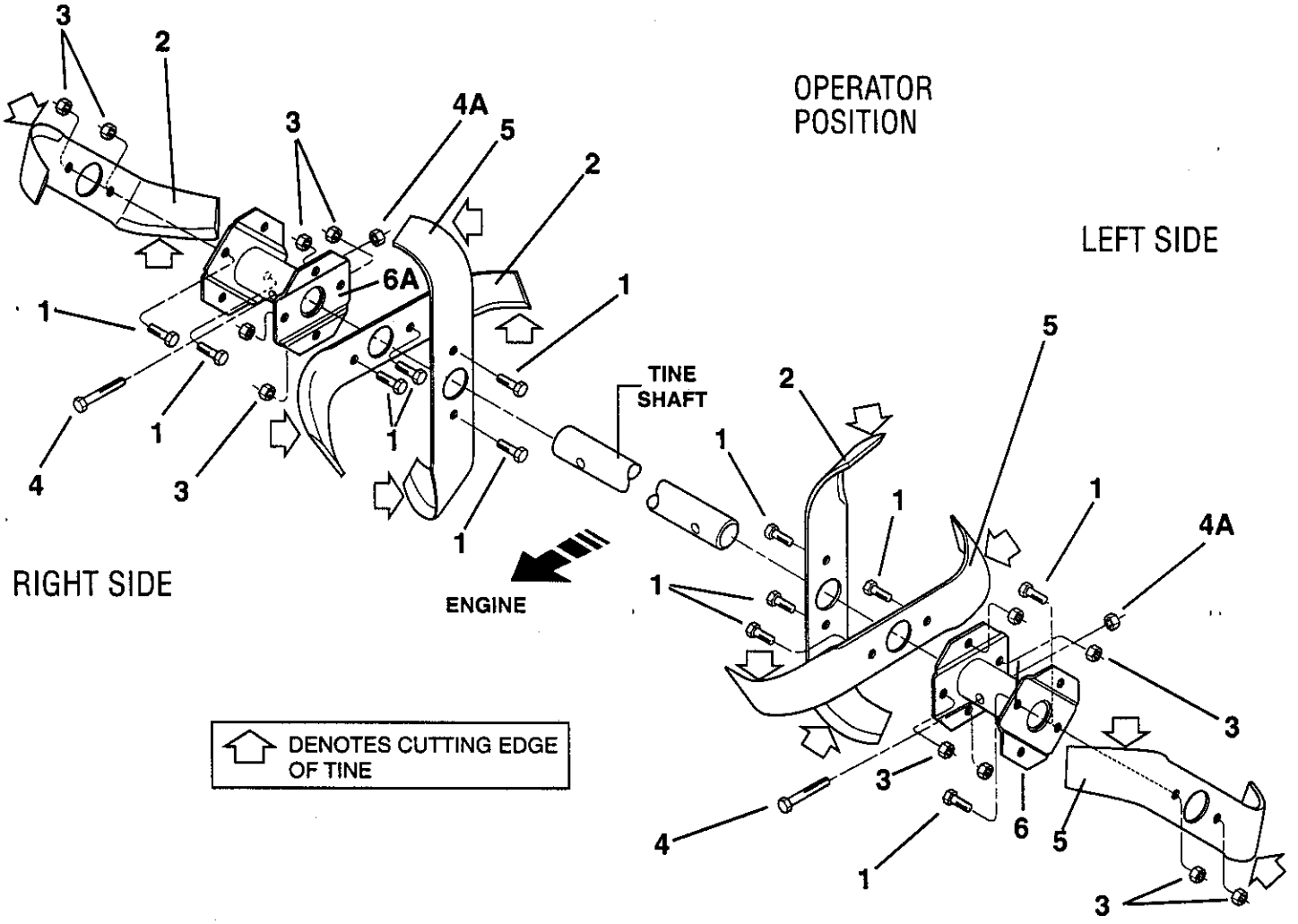
CRAFTSMAN 3HP MODEL 987.293190 REPAIR PARTS

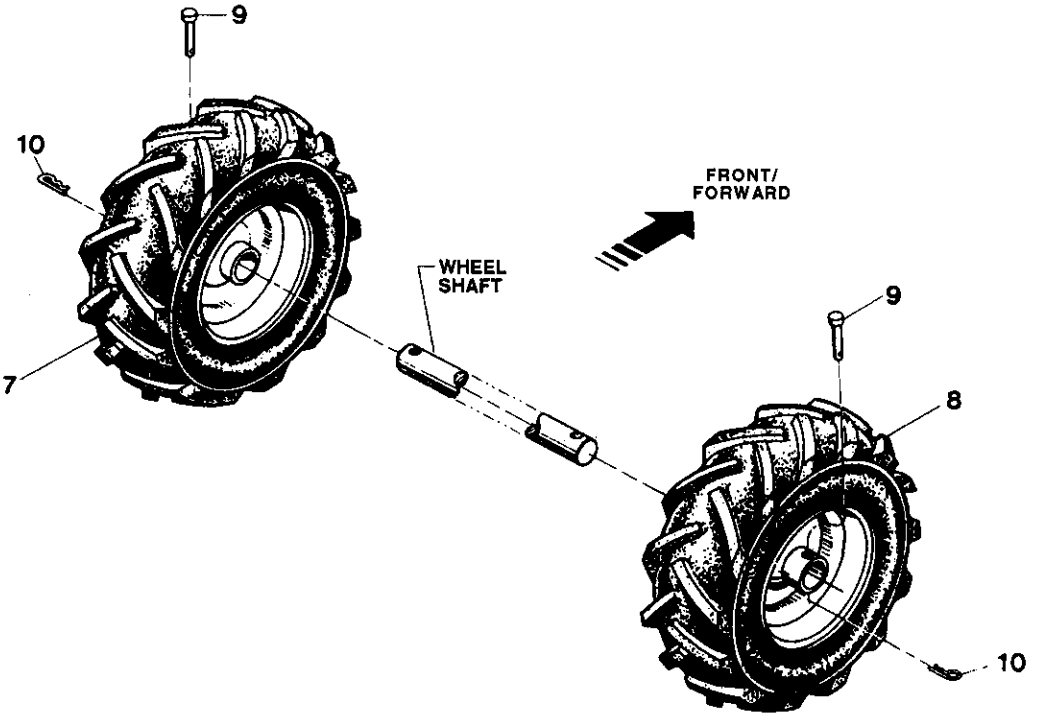
ENGINE, ENGINE BRACKETS, AND FORWARD DRIVE MECHANISM

REF No.	PART No.	DESCRIPTION	QTY.
1	*	Engine– Craftsman, recoil start	1
2	1916112001	Bracket, Belt Cover	1
3	1100242	Lockwasher–5/16"	8
4	1111696	Bolt–Hex Hd., 5/16-24 x 1/2"	2
5	1904549	Decal–Warning, Hot Surfaces	1
6	1904573	Belt Cover–(includes decal 1904549)	1
7	9552	Bolt–Flanged Hd., Self-Tapping, 1/4-20 x 1/2"	7
8	1186230	Nut–Hex Hd., 5/16-18"	4
9	50027	Support Washer	1
10	1916113001	Bracket, Engine, Right	1
11	1138-2	Shim	As Req'd
12	55036	Spacer	1
12A	9301	Key–3/16" x 1"	2
13	1916661	Pulley, Engine Driven	1
14	9925	Washer, Belleville	1
15	1100009	Bolt–Hex Hd., 3/8-24 x 1"	1
16	1916114001	Bracket, Engine, Left	1
17	1100799	Bolt–Hex Hd., 5/16-18 x 1-1/2"	5
18	1916552001	Belt Pulley Guard	1
19	1916706	Belt Guide	1
20	9558	Bolt–Hex Hd., 3/8-16 x 1-1/2"	1
21	9090	Idler Pulley	1
22	1916116001	Idler Lever	1
23	1110108	Locknut – 3/8-16"	1
24	1107382	Washer, Flat	2
25	9386	Klip Ring	1
26	1916657	V-Belt	1
27	55034	Spring, Return	1
28	55033	Bushing–Idler Lever	1
29	1100004	Bolt–Hex Hd., 5/16-24 x 3/4", Grade 5	2
30	9944	Washer, Belleville, Transmission Pulley	1
31	1911361	Pulley–Transmission	1
32	1916117001	Bracket–Cable Mount	1
33	1900766	Decal–Stabilization	1
34	1186328	Bolt–5/16-18 x 5/8", Engine Bracket to Transmission	4
35	9856	Clevis Pin–Control Cable	1
36	1107383	Washer-flat, 3/8"	1
--	1771879	Craftsman Motor Oil, SAE 30 (Sears Ref. No. 33027)	27 oz.
--	1905191	Owner's Manual/Parts List	1

* See Engine Assembly, Pages 40-43

TINES, WHEELS





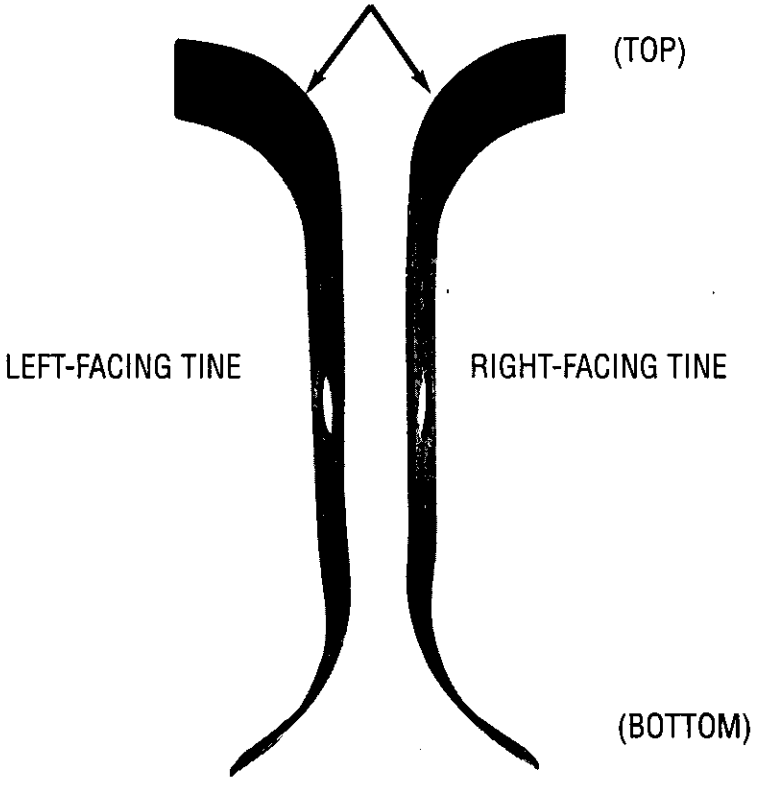
CRAFTSMAN 3HP MODEL 987.293190 REPAIR PARTS

TINES, WHEELS

REF No.	PART No.	DESCRIPTION	QTY.
1	1100044	Bolt–Hex Head, 5/16-18 x 3/4", Grade 5, Tine Mounting	12
2	1817059	Tine–Twin-Edged, Left-Facing	3
3	1732499	Locknut–Hex Hd., 5/16-18	12
4	1982612	Bolt–Hex Hd., 3/8-16 x 2" (tine holder to tiller shaft)	2
----	1916783	Replacement Set of 6 Tines– including three right-facing tines, three left-facing tines; and all required assembly hardware	1
4A	1733398	Locknut– Hex Hd., 3/8"-16	2
5	1817060	Tine–Twin-Edged, Right-Facing	3
6	1916691001	Tine Holder– left side	1
6A	1916692001	Tine Holder– right side	1
7	50273-01	Wheel & Tire Assy–Left Side	1
8	50273-02	Wheel & Tire Assy–Right Side	1
9	9380	Clevis Pin–.312" x 1-3/4", secures wheel hub to wheel shaft	2
10	9338	Hair Pin Cotter	2

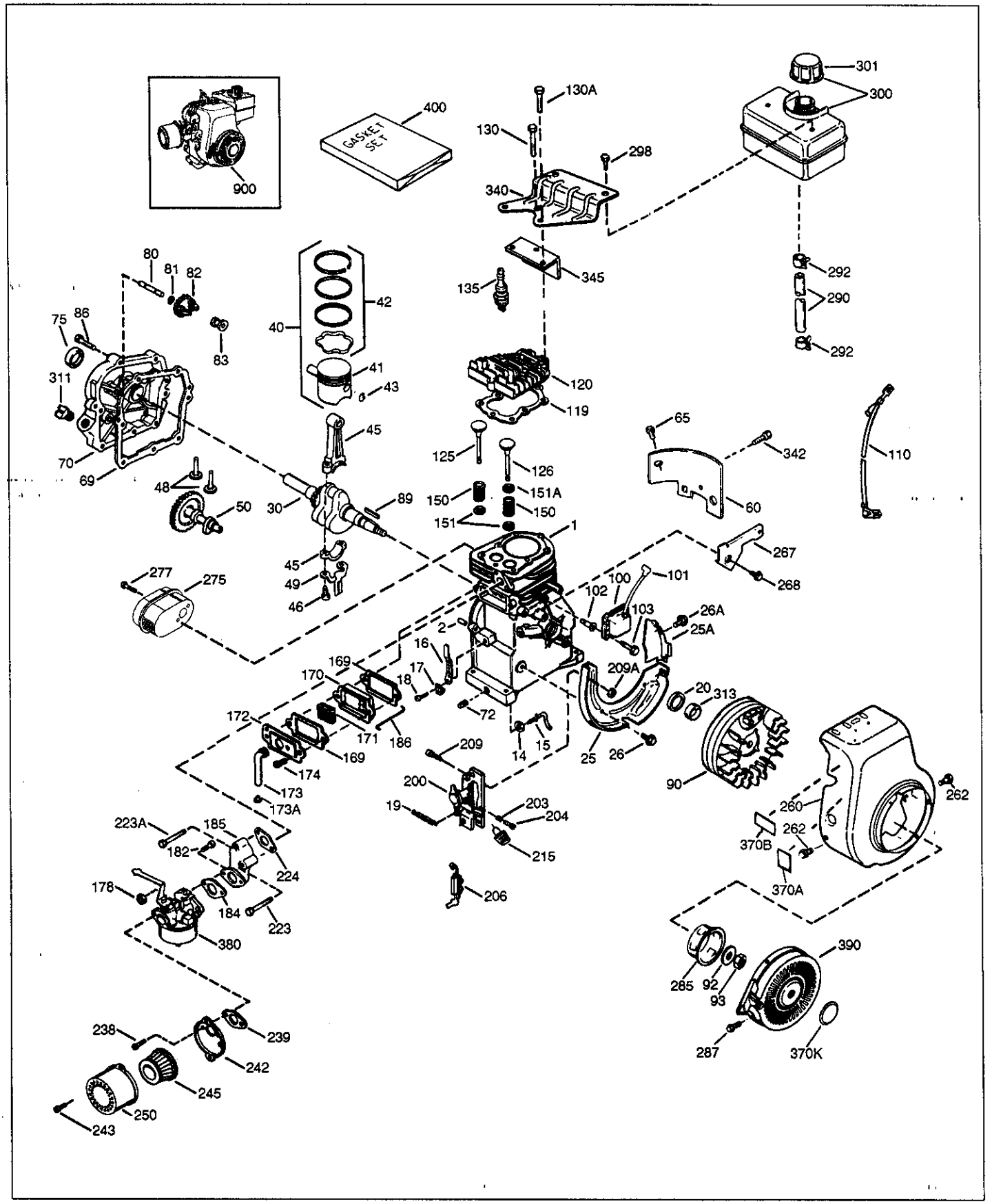
IMPORTANT: LEFT AND RIGHT SIDES OF TILLER ARE DETERMINED BY STANDING IN THE OPERATOR POSITION (BEHIND THE HOOD) AND FACING THE DIRECTION OF FORWARD TRAVEL.

MOUNT TINES SO THE CUTTING EDGE AT THE TOP OF EACH TINE FACES THE OPERATOR



CRAFTSMAN 3HP MODEL 987.293190 REPAIR PARTS

Craftsman 4-Cycle, 3HP Engine (143-993001)



CRAFTSMAN 3HP MODEL 987.293190 REPAIR PARTS

Craftsman 4-Cycle, 3HP Engine (143.993001)

Engine Assembly

Ref #	Part #	Description	Qty
1	36560	Cylinder (incl. 2, 20, 72, 125)	1
2	26727	Dowel Pin	2
14	28277	Washer	1
15	31334	Governor Rod	1
16	31510	Governor Lever	1
17	31335	Governor Lever Clamp	1
18	651018	Screw, Torx T-15, 8 - 32 x 19/64"	1
19	31426	Extension Spring	1
20	32600	Oil Seal	1
25	36552	Blower Housing Baffle (incl. 262)	1
25A	35883	Baffle Extension	1
26	650802	Screw, 1/4-20 x 5/8"	2
26A	650926	Screw, 8 - 32 x 21/64"	1
30	37303	Crankshaft	1
40	40020	Piston, Pin & Ring Set (Std.)	1
40	40021	Piston, Pin & Ring Set (.010" OS)	1
41	40018	Piston & Pin Assy. (Std.), (incl. 43)	1
41	40019	Piston & Pin Assy. (.010 OS), (incl. 43)	1
42	40022	Ring Set (Std.)	1
42	40023	Ring Set (.010" OS)	1
43	20381	Piston Pin Retaining Ring	2
45	30963B	Connecting Rod Assy. (incl. 46 & 49)	1
46	32610A	Connecting Rod Bolt	2
48	27241	Valve Lifter	2
49	28594	Oil Dipper	1
50	32197A	Camshaft (MCR)	1
60	29745	Blower Housing Extension	1
65	650128	Screw, 10 - 24 x 1/2"	1
69	27677A	Cylinder Cover Gasket	1
70	35863A	Cylinder Cover (incl. 75 through 83, 311)	1
72	27642	Oil Drain Plug	2
75	26208	Oil Seal	1
80	30574A	Governor Shaft	1
81	30590A	Washer	1
82	30591	Governor Gear Assy. (incl. 81)	1
83	30588A	Governor Spool	1
86	650488	Screw, 1/4"-20 x 1-1/4"	7
89	610961	Flywheel Key	1
90	611195	Flywheel	1
92	650815	Belleville Washer	1
93	650816	Flywheel Nut	1
100	34443B	Solid State Ignition	1
101	610118	Spark Plug Cover	1
102	651024	Solid State Mounting Stud	2
103	651007	Screw, Torx, T-15, 10 - 24 x 15/16"	2
110	35182	Ground Wire	1
119	36437	Cylinder Head Gasket	1
120	36438	Cylinder Head (incl. 130)	1
125	36471	Exhaust Valve (Std.) (incl. 151)	1
125	36472	Exhaust Valve (1/32" OS) (incl. 151)	1
126	29314C	Intake Valve (Std.) (incl. 151)	1
126	29315C	Intake Valve (1/32" OS) (incl. 151)	1
130	650694A	Screw, 5/16"-18 x 2"	5
130A	6021A	Screw, 5/16"-18 x 1-1/2"	3
135	33636	Resistor Spark Plug (RJ17LM)	1
150	31672	Valve Spring	2
151	31673	Valve Spring Cap	2
151A	40016A	Intake Valve Seal	1
169	27234A	Valve Cover Gasket	2
170	27666	Breather Body	1
171	31410	Breather Element	1
172	34146	Valve Cover	1
173	32447	Breather Tube	1
173A	32446	Breather Tube Grommet	1
174	650783	Screw, 10-24 x 3/4"	2
178	29752	Nut & Lock Washer, 1/4 - 28	2
182	6201	Screw, 1/4"-28 x 7/8"	2
184	26756	Carburetor to Intake Pipe Gasket	1
185	28416A	Intake Pipe	1
186	31858	Governor Link	1
200	36677	Control Bracket (incl. 203 through 209A)	1
203	31342	Compression Spring	1
204	651029	Screw, Torx T-10, 5 - 40 x 7/16"	1
206	610973	Terminal	1
209	650139	Screw, 8 - 32 x 3/4"	2
209A	30322	Lock Nut	2
215	32410	Control Knob	1
223	650664	Screw, 1/4"-20 x 1-19/32"	1
223A	650840	Screw, 1/4"-20 x 1-7/32"	1
224	26754A	Intake Pipe Gasket	1
238	650152	Screw, 8 - 32 x 3/8"	2
239	27272A	Air Cleaner Gasket	1
242	31691	Air Cleaner Base	1
243	28820	Screw, 10 - 32 x 1/2"	2
245	30727	Air Cleaner Filter	1
250	31715	Air Cleaner Cover	1
260	35585	Blower Housing	1
262	650737	Screw, 1/4-20 x 1/2"	2
267	34212	Hold Down Bracket	1
268	30200	Screw, 10 - 24 x 9/16"	1
275	40024	Muffler (w/catalyst)	1
277	650988	Screw, 1/4-20 x 2- 5/16"	2
285	36467A	Starter Cup	1
287	650926	Screw, 8 - 32 x 21/64"	2
290	30705	Fuel Line	1
292	26460	Fuel Line Clamp	2
298	650665	Screw, 1/4-15 x 7/8"	2
300	35584	Fuel Tank (incl. 292, 301)	1
301	36246	Fuel Cap	1
311	27625	Oil Fill Plug	1
313	34080	Spacer	1
340	36247	Fuel Tank Bracket	1
342	650751	Screw, 1/4-20 x 7/16"	1
345	33344	Heat Baffle	1
370A	36261	Lubrication Decal	1
370B	35703	Control Decal	1
370K	36695	Starter Decalq	1
380	640167	Carburetor (incl. 184)	1
390	590732	Rewind Starter	1

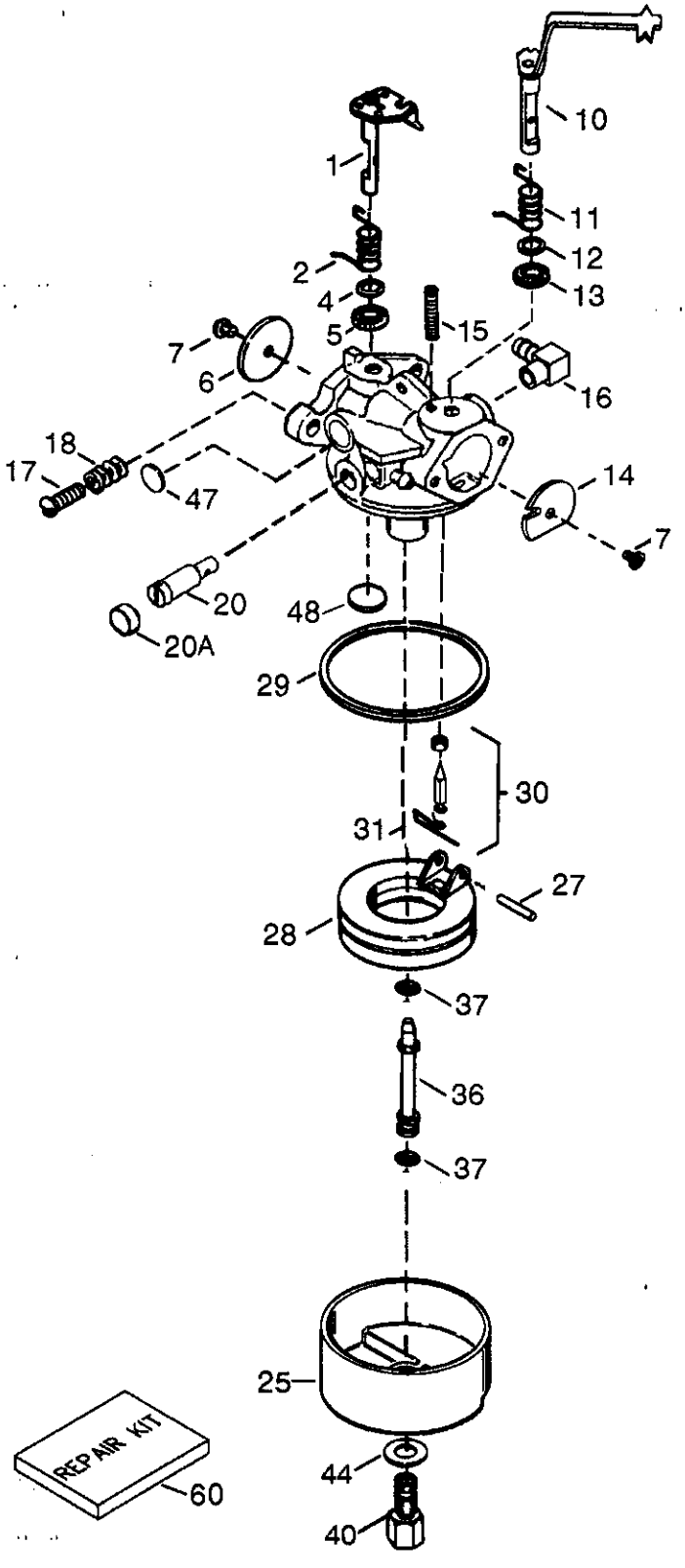
(Note: this engine could have been built with the 590738 Rewind Starter.)

400	36439	Gasket Set (incl. part numbers 26754A(1), 26756(1), 27234A(2), 27272A(1), 27677A(1), 29673(1), 30081A(1), 31688A(1), 32649A(1), 36437(1).
900	----	Replacement Engine 903666
900	----	Replacement Short Block 7543133

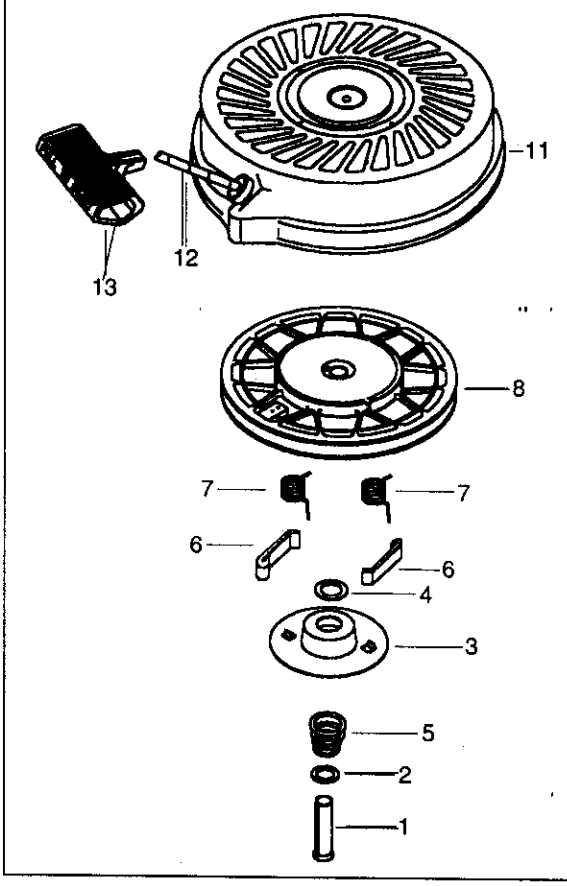
CRAFTSMAN 3HP MODEL 987.293190 REPAIR PARTS

Craftsman 4-Cycle, 3HP Engine (143-993001)

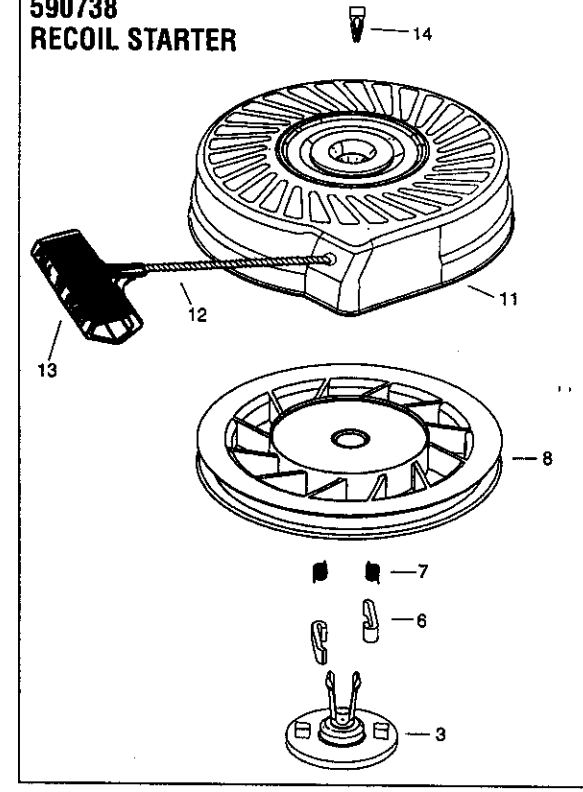
CARBURETOR



590732 RECOIL STARTER



590738 RECOIL STARTER



CRAFTSMAN 3HP MODEL 987.293190 REPAIR PARTS

CARBURETOR— Craftsman 4-Cycle, 3HP Engine (143-993001)

Ref #	Part #	Description	Qty
0	640167	Carburetor (incl. 184 of Engine Parts List)	1
1	631615	Throttle Shaft/Lever Assy.	1
2	631767	Throttle Return Spring	1
4	631184	Dust Seal Washer	1
5	631183	Dust Seal	1
6	640070	Throttle Shutter	1
7	650506	Shutter Screw	2
10	631919	Choke Shaft & Lever Assy.	1
11	632042	Choke Return Spring	1
12	631184	Dust Seal Washer	1
13	631183	Dust Seal	1
14	631890	Choke Shutter	1
15	630735	Choke Positioning Spring	1
16	631807	Fuel Fitting	1
17	651025	Throttle Crack Screw / Idle Speed Screw	1
18	630766	Tension Spring	1
20	640018	Idle Restrictor Screw	1
20A	640053	Idle Restrictor Screw Cap	1
25	631867	Float Bowl	1
27	631024	Float Shaft1	1
28	632019	Float	1
29	631028	Float Bowl "O" Ring	1
30	631021	Inlet Needle, Seat & Clip (incl. 31)	1
31	631022	Spring Clip	1
36	640019	Main Nozzle Tube	1
37	632547	"O" Ring, Main Nozzle Tube	2
40	640050	High Speed Bowl Nut	1
44	27110A	Bowl Nut Washer	1
47	630748	Welch Plug, Idle Mixture Well	1
48	631027	Welch Plug, Atmospheric Vent	1
60	632760	Repair Kit	1

590732 RECOIL STARTER — Craftsman 4-Cycle, 3HP Engine (143-993001)

Ref #	Part #	Description	Qty
0	590732	Rewind Starter	1
1	590599A	Spring Pin (incl. 4)	1
2	590600	Washer	1
3	590696	Retainer	1
4	590601	Washer	1
5	590697	Brake Spring	1
6	590698	Starter Dog	2
7	590699	Dog Spring	2
8	590700	Pulley & Rewind Spring Assembly	1
11	590695	Starter Housing Assy. (40 degree grommet)	1
12	590535	Starter Rope (Length 98" x 9/64" diam.)	1
13	590701	Starter Handle	1

590738 RECOIL STARTER — Craftsman 4-Cycle, 3HP Engine (143-993001)

Ref #	Part #	Description	Qty
0	590738	Rewind Starter	1
3	590740	Retainer	1
6	590616	Starter Dog	2
7	590617	Dog Spring	2
8	590618A	Pulley & Rewind Spring Assembly	1
11	590687A	Starter Housing Assy. (40 degree grommet)	1
12	590535	Starter Rope (Length 98" x 9/64" diam.)	1
13	590701	Starter Handle	1
14	590760	Spring Clip	1

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