

## REAR TINE TILLER MODEL 450 Series



### IMPORTANT: READ SAFETY RULES AND INSTRUCTIONS CAREFULLY

**Warning:** This unit 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. A spark arrester for the muffler is available through your nearest engine authorized service dealer or contact the service department, P.O. Box 368022 Cleveland, Ohio 44136-9722.

**MTD PRODUCTS INC. P.O. BOX 368022 CLEVELAND, OHIO 44136-9722**

---

## SECTION 1: FINDING YOUR MODEL NUMBER

This Operator's Manual is an important part of your new tiller. It will help you assemble, prepare and maintain your tiller. Please read and understand what it says.

Before you start to prepare your tiller for its first use, please locate the model plate and copy the information from it in this Operator's Manual. The information on the model plate is very important if you need help from your dealer or the MTD customer support department.

- Every tiller has a model plate. You can locate it by standing in the operating position behind the unit and looking down at the center of the rear tire cover.
- The model plate will look like Figure 1.

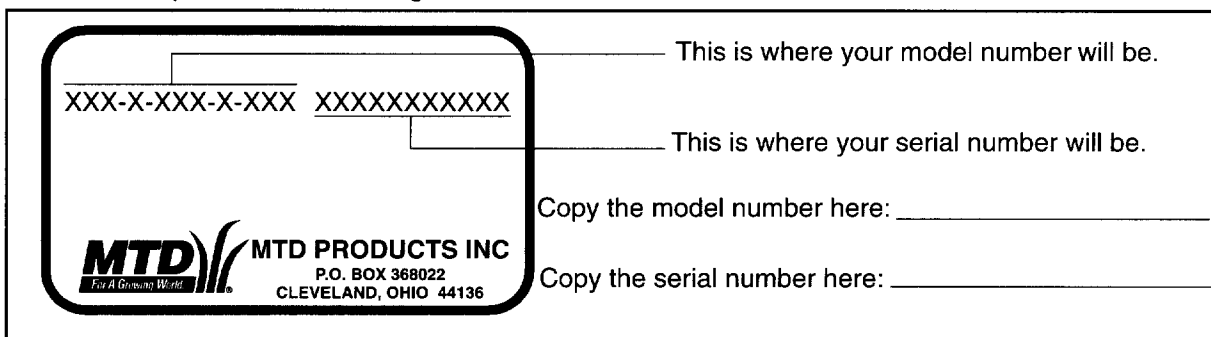


Figure 1

---

## SECTION 2: CALLING CUSTOMER SUPPORT

- **LOCATE YOUR MODEL NUMBER AND SERIAL NUMBER** — Record this information in the space provided. To find your unit's specific model number and serial number, see SECTION 1: FINDING YOUR MODEL NUMBER.
- If you are having difficulty assembling this product or if you have any questions regarding the controls, operation or maintenance of this unit, please call the Customer Support Department.
- Customer Support can be reached by dialing: **1- (330) 220-4MTD (4683)**  
or  
**1- (800)-800-7310**
- Please have your model number and serial number ready when you call.
- Although both numbers are important, you will be asked to enter only your **serial** number before your call can be processed.

---

## SECTION 3: IMPORTANT SAFE OPERATION PRACTICES



**WARNING:** THIS SYMBOL POINTS OUT IMPORTANT SAFETY INSTRUCTIONS WHICH, IF NOT FOLLOWED, COULD ENDANGER THE PERSONAL SAFETY AND/OR PROPERTY OF YOURSELF AND OTHERS. READ AND FOLLOW ALL INSTRUCTIONS IN THIS MANUAL BEFORE ATTEMPTING TO OPERATE YOUR TILLER. FAILURE TO COMPLY WITH THESE INSTRUCTIONS MAY RESULT IN PERSONAL INJURY. WHEN YOU SEE THIS SYMBOL— **HEED ITS WARNING.**



**WARNING:** The Engine Exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.



**DANGER:** Your tiller was built to be operated according to the rules for safe operation in this manual. As with any type of power equipment, carelessness or error on the part of the operator can result in serious injury. This tiller is capable of amputating hands and feet. Failure to observe the following safety instructions could result in serious injury or death.

### 1. GENERAL OPERATION

- Read this operator's manual carefully in its entirety before attempting to assemble this machine. Read, understand, and follow all instructions on the machine and in the manual(s) before operation. Be completely familiar with the controls and the proper use of the machine before operating it. Keep this manual in a safe place for future and regular reference and for ordering replacement parts.
- Your tiller is a powerful tool, not a plaything. Therefore, exercise extreme caution at all times. Your unit has been designed to perform one job: to till soil. Do not use it for any other purpose.
- Never allow children under age 14 to operate the unit. Children 14 years and older should only operate the unit under close parental supervision. Only responsible individuals who are familiar with these rules of safe operation should be allowed to use your unit.
- Do not operate tiller while under the influence of alcohol or drugs.
- Keep the area of operation clear of all persons, particularly small children and pets. Stop the engine when they are in the vicinity of your tiller.
- Wear sturdy, rough-soled work shoes and close fitting slacks and shirt. Shirt and slacks that cover the arms and legs and steel-toed shoes are recommended. Do not wear loose fitting clothes or jewelry and secure hair so it is above shoulder length. They can be caught in moving parts. Never operate a unit in bare feet, sandals or sneakers.
- Operate tiller only in daylight or good artificial light.
- Do not start tiller unless the shift lever (if provided) is in the neutral (N) position.
- Do not allow anyone to stand or walk in front of tiller when starting or running engine.
- Do not place feet or hands on or near the tines when starting the engine or while the engine is running.
- Never attempt to make depth bar, tine width, cable, handle, or wheel adjustments while the engine is running.
- Do not leave the tiller unattended with the engine running.
- Before attempting to remove rocks, bricks and other objects from tines, stop the engine and be sure the tines have stopped completely. Disconnect the spark plug wire and move it away from the spark plug.
- If your machine should start making an unusual noise or vibration, immediately stop the engine and allow the machine to come to a complete stop. Disconnect the spark plug wire and move it away from the spark plug. Take the following steps:
  - Inspect for damage.
  - Repair or replace any damaged parts.
  - Check for any loose parts and tighten to assure continued safe operation.
- Muffler and engine become hot and can cause a burn. Do not touch.
- Keep all shields, guards and safety devices in place and operating properly.
- Use caution when tilling near fences, buildings and underground utilities. Rotating tines can cause damage or injury.
- Do not operate engine if air cleaner or cover over carburetor air intake is removed, except for adjustment. Removal of such parts could create a fire hazard.

- Only use accessories approved for this machine by the manufacturer. Read, understand, and follow all instructions provided with the approved accessory.
- If situations occur which are not covered by this manual, use care and good judgment. Contact your dealer for assistance.

## 2. CHILDREN

- Tragic accidents can occur if the operator is not alert to the presence of small children. Children are often attracted to the tilling activity. Never assume that children will remain where you last saw them.
- Keep children out of the work area and under the watchful eye of a responsible adult other than the operator.
- Be alert and turn the unit off if a child enters the area.
- Never allow children under the age of 14 to operate the tiller.

## 3. SERVICE

- Use extreme care in handling gasoline and other fuels. They are extremely flammable and the vapors are explosive.
- Store fuel and oil in approved containers, away from heat and open flame, and out of the reach of children. Check and add fuel before starting the engine. Never remove gas cap or add fuel while the engine is running. Allow engine to cool at least two minutes before refueling.
- Replace gasoline cap securely and wipe off any spilled gasoline before starting the engine as it may cause a fire or explosion.

- Extinguish all cigarettes, cigars, pipes and other sources of ignition.
- Never refuel unit indoors because flammable vapors will accumulate in the area.
- Never store the machine or fuel container inside where there is an open flame or spark such as a gas hot water heater, space heater, clothes dryer or furnace.
- Never run your machine in an enclosed area as the exhaust from the engine contains carbon monoxide, which is a odorless, tasteless and deadly poisonous gas.
- To reduce fire hazard, keep engine and muffler free of leaves, grass, and other debris build-up. Clean up fuel and oil spillage. Allow unit to cool at least 5 minutes before storing.
- Before cleaning, repairing, or inspecting, make certain the tines and all moving parts have stopped. Disconnect the spark plug wire and keep wire away from spark plug to prevent accidental starting. Do not use flammable solutions to clean air filter.
- Keep all nuts, bolts, and screws tight to be sure the equipment is in safe working condition.
- Never tamper with safety devices. Check their proper operation regularly.
- Do not alter or tamper with the engine's governor setting. The governor controls the maximum safe operating speed of the engine. Overspeeding the engine is dangerous and will cause damage to the engine and to other moving parts of the machine.



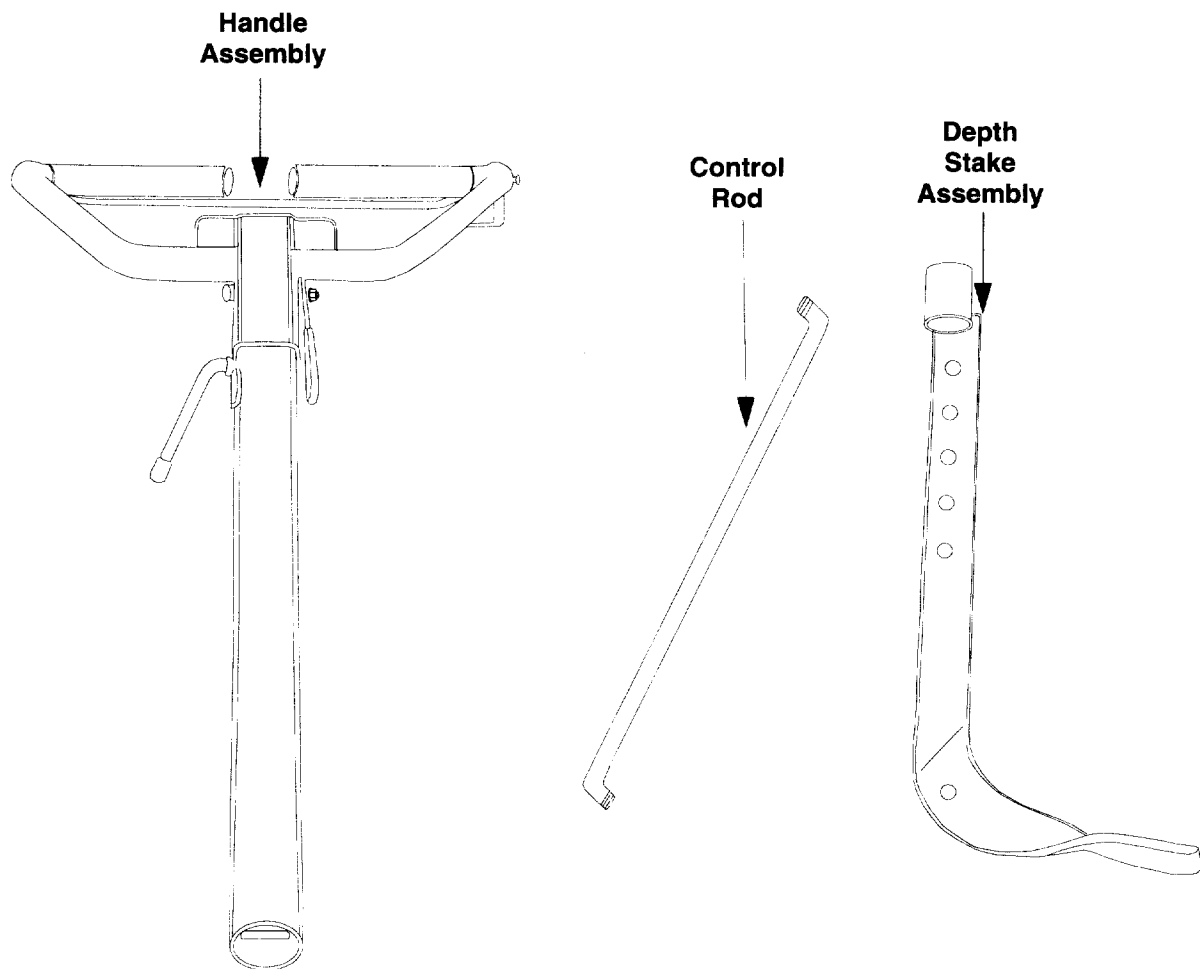
**WARNING — YOUR RESPONSIBILITY:** Restrict the use of this power machine to persons who read, understand and follow the warnings and instructions in this manual and on the machine.



Figure 2 Safety labels found on your unit

---

## SECTION 4: LOOSE PARTS



**NOTE:** Cable tie not shown.

## SECTION 5: ASSEMBLY INSTRUCTIONS

**IMPORTANT:** This unit is shipped WITHOUT GASOLINE or OIL. After assembly, see separate engine manual for proper fuel and engine oil recommendations.

**NOTE:** Left and right is determined from the operator's position, standing behind the tiller.

### TOOLS REQUIRED FOR ASSEMBLY

Adjustable Wrenches

Pair of Pliers

### TO REMOVE UNIT FROM CARTON

1. Remove staples, break glue on top flaps, or cut tape at carton end and peel along top flap to open carton.
2. Remove loose parts included with unit (i.e., operator's manual, etc.).
3. Cut along dotted lines and lay carton down flat.
4. Remove packing material.
5. Roll or slide unit out of carton. Check carton thoroughly for loose parts.
6. Extend control cable and lay on the floor. Be careful not to bend or kink control cable.

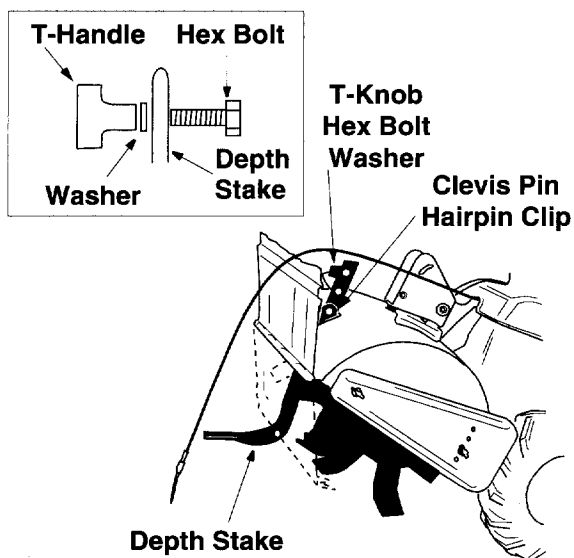


Figure 3

### ATTACHING DEPTH STAKE ASSEMBLY

1. Tip the tiller forward so it rests on front counterweight.
2. Raise the tine shield hinge flap assembly. Remove "T" knob, flat washer and hex bolt from depth stake. Insert the depth stake assembly in front of spacer (under the tine shield) and up through the tine shield assembly as shown in Figure 3.
3. Insert clevis pin through the tine shield and the second hole from top of the depth stake. Secure with hairpin clip.
4. Insert hex bolt into the top hole of the depth stake assembly. Place flat washer on hex bolt and thread "T" knob onto the hex bolt. See Figure 3. Tighten securely.
5. Tip the tiller back down so it rests on the depth stake (transport position).

### ATTACHING THE HANDLE ASSEMBLY

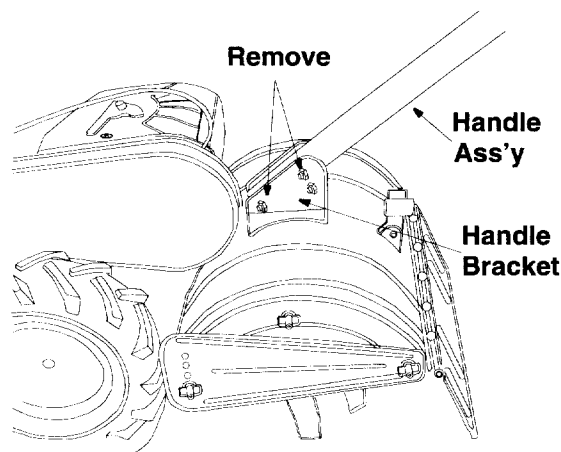


Figure 4

1. Remove top two bolts and flange lock nuts from handle mounting brackets as shown in Figure 4. Do not remove the bottom bolt and nut.
2. Place handle assembly in position between the handle mounting brackets. See Figure 4.
3. Line up holes in handle with holes in handle mounting brackets. Secure with hardware removed in step 1.

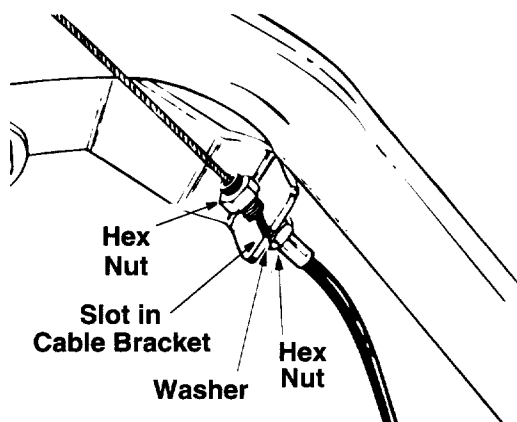


Figure 5

## ATTACHING THE CLUTCH CABLE

Attach the clutch cable to the handle as follows (be careful not to kink the cable).

1. Route the clutch cable to the left side of the tiller, and underneath the handle. Remove one hex nut and lock washer from the end of the casing on the clutch cable. Thread the other nut all the way onto the threaded casing, as far as it will go.
2. Slip the wire through the slot on the cable bracket on the handle. Push the end of the casing up through the cable bracket. Slide the lock washer on the casing and rethread the hex nut on the end of the cable casing, four turns. Do not tighten at this time. See Figure 5.

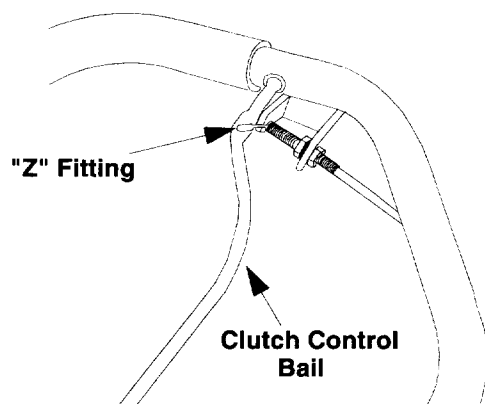


Figure 6

3. Pull the cable upwards to obtain slack, push the "Z" end into the bail. You will need to attach "Z" fitting from the inside to the outside. See Figure 6.
4. With the clutch control bail released, adjust the bottom nut at the cable bracket three turns up from end of threads. Tighten the upper nut against the bracket. Carefully squeeze the clutch control bail against the handle. The control wire should now be straight.

**NOTE:** Do not overtighten control wire. Too much tension may cause it to break.



**WARNING:** Be certain to check the clutch cable adjustment as instructed on page 7 of your owner's guide before operating the tiller.

Secure drive cable to handle using cable tie. Refer to Figure 8. Cut off excess end of cable tie.

## ATTACHING THE CONTROL ROD

1. Remove hairpin clips from control rod, (rubber washers to remain on control rod).
2. Insert one end of the control rod through the indicator bracket on the shift cover and secure with hairpin clip that was removed in step 1. See Figure 7.
3. Insert the remaining end of the control rod through the hole in the gear selector handle and secure with hairpin clip. See Figure 8.

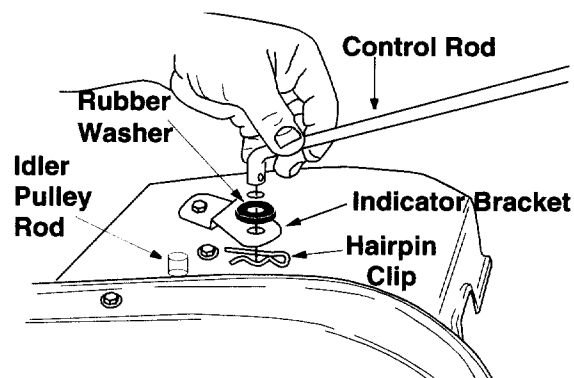


Figure 7

## CHECKING THE CLUTCH ADJUSTMENT

**IMPORTANT:** Service the engine with oil and gasoline before checking this adjustment. Refer to the separate engine manual packed with your tiller for proper fuel and engine oil recommendations.

Position the tiller so the front counterweight is against a solid object, such as a wall. With the gear selection lever in NEUTRAL, start the engine. Refer to the separate engine manual.

Standing on the right side of the tiller, examine the belt (inside the belt cover). It should not be turning.

**NOTE:** Do not put fingers under the belt cover.

If the belt turns with the unit in neutral, adjust by moving the hex nut below the cable bracket **down** two full turns. See Figure 5. Tighten the upper hex nut against the bracket.

Now move the shift lever to FORWARD (Wheels Forward) position. Carefully engage the clutch by lifting the clutch control bail against the handle. The wheels should spin.

If the wheels do not spin with the unit in forward, adjust by moving the hex nut which is above the cable bracket **up** two full turns. Tighten the bottom hex nut against the bracket.

Recheck both adjustments, and readjust as necessary.

**NOTE:** A secondary cable adjustment is available if you reach the point that additional adjustment is needed. Remove the belt cover and move the hex nuts at the other end of the cable towards the end of the casing. Then readjust the hex nuts at the handle.

## TIRE PRESSURE

The tires on your unit may be over-inflated for shipping purposes. Reduce the tire pressure before operating the unit. Recommended operating tire pressure is approximately 20 p.s.i. (check sidewall of tire for tire manufacturer's recommended pressure).



**WARNING:** Maximum tire pressure under any circumstances is 30 p.s.i. Equal tire pressure should be maintained on both tires.

## SECTION 6: CONTROLS

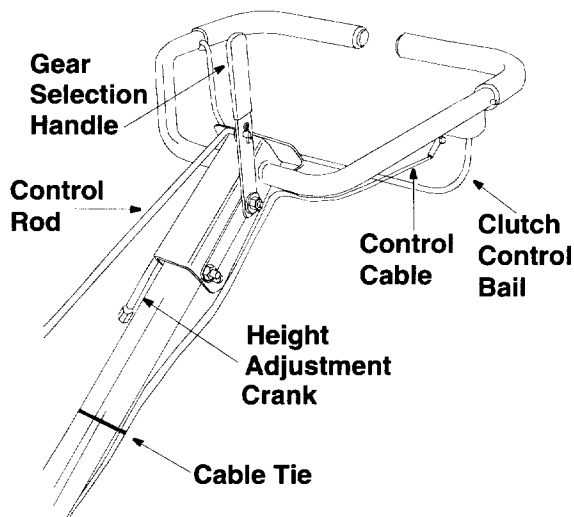


Figure 8

### THROTTLE CONTROL

The throttle control lever is located on the engine. It controls the engine speed and stops the engine. See Engine manual for further information.

### CHOKE LEVER

The choke lever is located to the left of the throttle. It is used to enrich the fuel mixture in the carburetor when starting a cold engine. See Engine manual for further information.

### GEAR SELECTION HANDLE

The gear selection handle is located in the center of the handle on the tiller. It is used to select NEUTRAL, REVERSE, or one of the FORWARD modes (see below). Pull or push the handle so that the indicator on top of shift cover points to the operating mode desired. See Figure 8.

NEUTRAL—Transmission is in neutral.

REVERSE—Reverse wheel drive.

FORWARD Modes:

Wheels Forward—Forward wheel drive only.

Tines Reverse—Forward wheel drive and reverse tine drive.

Tines Forward—Forward wheel and tine drive.



**WARNING:** Make certain unit is in NEUTRAL when starting the engine.

**NOTE:** If difficulty is encountered in moving the gear selection handle, move the tiller forward or backward slightly to allow the gears to synchronize.

### CLUTCH CONTROL BAIL

The clutch control bail is located below the handle. See Figure 8. Lifting the clutch control bail against the handle engages the wheel and tine drive mechanisms.

**NOTE:** Never engage clutch lever while shifting.



## DEPTH STAKE

The depth bar controls the tilling depth. Refer to SECTION 8: HOW TO USE YOUR TILLER on page 9.

## HANDLE ADJUSTMENT (See Figure 8)

The handle may be adjusted to be raised or lowered in line with the tiller. To adjust the handle position loosen the handle height adjustment crank a few turns. Pivot handle up or down to desired position. Tighten crank.

---

## SECTION 7: OPERATION

**NOTE:** Engine is shipped without oil.



**WARNING:** Before operating the tiller, be certain to read SECTION 8: HOW TO USE YOUR TILLER on page 9. Use the reverse tine drive when tilling virgin ground, sod or hard soil. Use the forward tine drive when cultivating or tilling soft ground.

### BEFORE STARTING

1. Service engine with oil as instructed in the separate engine manual packed with your unit.
2. Fill fuel tank with clean, fresh, lead-free, low-lead or regular grade leaded gasoline.

### TO START ENGINE



**WARNING:** Be Sure No One Is Standing In Front Of The Tiller While The Engine Is Running Or Being Started.

1. Place the throttle control lever in the FAST (rabbit) position.
2. Move choke lever to CHOKE position.

**NOTE:** A warm engine may not require choking.

3. Stand at side of tiller. Grasp the starter handle with your right hand and pull out slowly, until it pulls slightly harder. Place your left hand on the lower portion of the upper handle.
4. Pull starter handle rapidly. Do not allow handle to snap back. Allow it to rewind slowly while keeping a firm hold on the starter handle.
5. Repeat steps 3 and 4 until engine starts.
6. As engine warms up and begins to operate evenly, move choke lever gradually to RUN position. If engine falters, return to choke position, then slowly move to RUN position.
7. Refer to engine manual for additional engine information.

**NOTE:** After starting engine and prior to using the tiller, be certain to check the clutch adjustment as described in "Checking the Clutch Adjustment" section of Assembly Instructions.

### TO STOP ENGINE

1. Move throttle control to the STOP position.
2. Disconnect spark plug wire and ground to prevent accidentally starting while equipment is unattended.

**NOTE:** After the first ten hours of operation, recheck the clutch adjustment. Refer to "Checking the Clutch Adjustment" section of the Assembly Instructions.

---

## SECTION 8: HOW TO USE YOUR TILLER



**WARNING:** When operating the tiller for the first time, use the depth stake setting that gives 1 inch of tilling depth (second hole from the top).

See Figure 9.

Tilling depth is controlled by the depth stake which can be adjusted to five different settings. See Figure 9. Adjust the side shields as shown in Figure 10, as you adjust the depth stake. Be certain spark plug wire is disconnected and grounded against the engine.

1. When using the tiller for the first time, use the second adjustment hole from the top (1" of tilling depth). See Figure 9.

2. When breaking up sod and for shallow cultivation, use the setting which gives 1" of tilling depth (second hole from the top). Place the side shields in their lowest position. For further depth, raise the depth stake and side shields and make one or two more passes over the area.
3. When tilling loose soil, depth stake may be raised to its highest position (use bottom adjustment hole) to give the deepest tilling depth. Raise the side shields to their highest position.

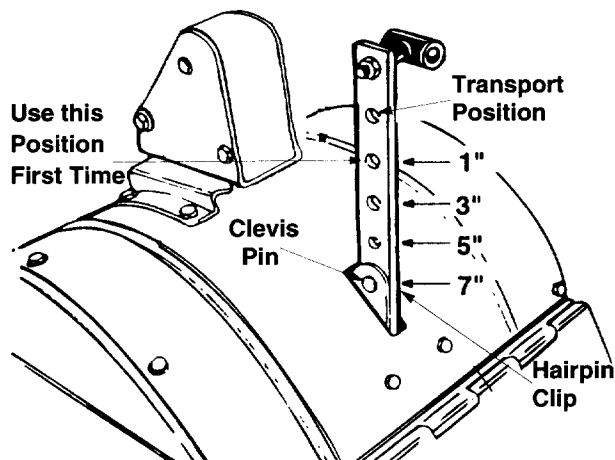


Figure 9

4. To transport tiller, lower the depth stake (use top adjustment hole).
5. To adjust the depth stake, remove the clevis pin and hairpin clip. See Figure 9. Move the depth stake to the desired setting.
6. To adjust the side shields, remove the front wing nut and loosen the rear wing nut. See Figure 10. Place side shield in position desired. Replace wing nuts and tighten securely.

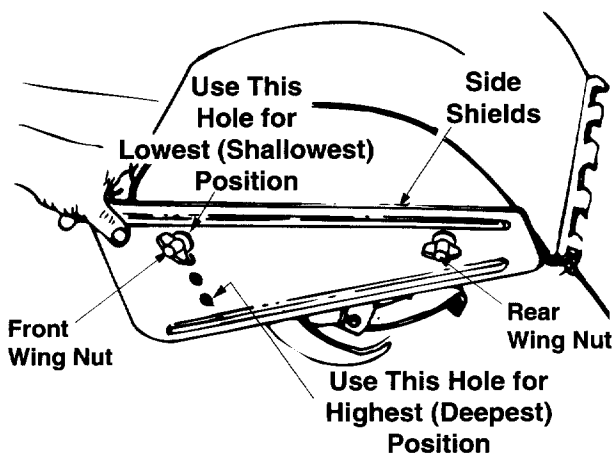


Figure 10

## TO OPERATE THE TILLER:

1. Select the depth stake setting.
2. Start engine as instructed on page 9.
3. Move gear selection handle to one of the forward modes or reverse.

**Use the reverse tine drive when tilling virgin ground, sod or hard soil. Use the forward tine drive when cultivating or tilling soft ground.**

**IMPORTANT:** When using the forward tine drive, lower the depth stake (use a shallower tilling depth) to make certain the tines do not run across the ground.



**WARNING:** Do not move the gear selection handle with the wheels or tines engaged. Make certain the unit is stopped completely before changing the gear selection.

4. Squeeze the clutch control bail against the handle to engage the wheels and tines.

**NOTE:** Make certain the gear selection indicator is correctly positioned before engaging the clutch handle. If it is between gears, the engine will stall.

To transport tiller, **do not** engage the tines. Select the wheel drive only.



**WARNING:** Do not push down on the handles so that the wheels are lifted off the ground while using the reverse tine drive, or the tiller could move backward and cause personal injury.

For best results, it is recommended the garden be tilled twice (lengthwise, then widthwise) to pulverize the soil.

## SECTION 9: ADJUSTMENTS

### HANDLE ADJUSTMENT

The handle height may be adjusted. Refer to the Control section for details of handle adjustment.

### BELT TENSION ADJUSTMENT

Periodic adjustment of the belt tension may be required due to normal stretch and wear on the belt. Adjustment is needed if the tines or wheels seem to hesitate while turning, but the engine maintains the same speed.

To adjust the tension on the belt, refer to clutch adjustment information in "Checking the Clutch Adjustment" section of the Assembly Instructions. After belt tension has been adjusted, if the belt is excessively stretched, you may need to adjust the idler pulley rod. This can easily be checked. With the engine off and the clutch control bail disengaged, shift the gear selection handle to each forward mode. If the indicator bracket touches the idler pulley rod, (with the clutch control bail disengaged), then an adjustment is necessary.

1. Disconnect and ground out spark plug wire against the engine.
2. Remove the belt cover as described in the belt replacement section on page 12.
3. Remove the hairpin clip and flat washer from the idler pulley rod. See Figure 12.
4. Move the idler pulley rod to the lower hole in the idler bracket. See Figure 12.

5. Replace the wave washer and hairpin clip.
6. Check clearance of the idler pulley rod to the indicator bracket by shifting to each forward mode, as before.

## CARBURETOR ADJUSTMENT



**WARNING:** If any adjustments are made to the engine while the engine is running, (e.g. carburetor), disengage all clutches and tines. Keep clear of all moving parts. Be careful of heated surfaces and muffler.

Never make unnecessary adjustments. The factory settings are correct for most applications. If adjustments are needed, refer to the separate engine manual packed with your tiller.

---

## SECTION 10: LUBRICATION

**Transmission**—The transmission is pre-lubricated and sealed at the factory. It requires no checking unless the transmission is disassembled. To fill with grease, lay the right half of the transmission on its side. Add 30 ounces of Benalene 920 grease. Apply a bead of RTV or silicone sealant to the right half of the transmission, all the way around the gear compartment. Assemble the left half to it. This grease can be obtained at your nearest authorized dealer. Order part number 737-0300.

**Clutch Bail**—Lubricate the pivot point on the clutch bail and the cable at least once a season with light oil. The control must operate freely in both directions.

**Pivot Points**—Lubricate all pivot points and linkages at least once a season with light oil.

**Tine Shaft**—Remove tines at least once a season and lubricate with oil.

**Wheel Axle**—Remove the wheel assemblies at least once a season and lubricate with oil.

---

## SECTION 11: MAINTENANCE



**WARNING:** Disconnect the spark plug wire and ground it against the engine before performing any repairs or maintenance.

### ENGINE

**Refer to the separate engine manual for engine maintenance instructions.**

Maintain **engine oil** as instructed in the separate engine manual packed with your unit. Read and follow instructions carefully.

Service **air cleaner** every ten hours under normal conditions. Clean every hour under extremely dusty conditions. Poor engine performance and flooding usually indicates that the air cleaner should be serviced. To service the air cleaner, refer to the separate engine manual packed with your unit.

**IMPORTANT:** Never run your engine without air cleaner completely assembled.

The **spark plug** should be cleaned and the gap reset every 25 hours of engine operation. Spark plug

replacement is recommended at the start of each tiller season; check engine manual for correct plug type and gap specification.

**Clean the engine** regularly with a cloth or brush. Keep the cooling system (blower housing area) clean to permit proper air circulation which is essential to engine performance and life. Be certain to remove all dirt and combustible debris from muffler area.

### CLEANING THE TINE AREA

Clean the underside of the tine shield after each use. The dirt washes off the tines easier if washed off immediately instead of after it dries.

## BELT REPLACEMENT



**CAUTION:** Do not use an off-the-shelf belt.

Your tiller has been engineered with a belt made of special material (Kevlar Tensile) for longer life and better performance. It should not be replaced with an off-the-shelf belt.

If belt replacement is required, order belt or belts by part number from your nearest authorized dealer.

Part No. 754-0434—"V" Belt

1. Disconnect and ground the spark plug wire against the engine.
2. Remove the belt cover from the left side of the tiller as follows: See Figure 11. Remove two torx screws from the top of belt cover.
3. Remove the hex cap nut and flat washer from the side of the belt cover. Remove the hex screw at the bottom of the front of the cover.
4. Remove the belt keeper bracket located behind the engine pulley by removing two hex bolts and lock washers. See Figure 12.
5. Remove belt. Reassemble new belt, following instructions in reverse order.

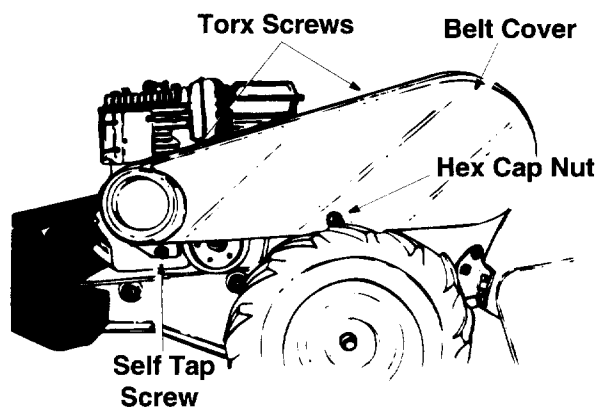


Figure 11

**NOTE:** Upon reassembly, make certain the belt is routed over the idler pulley and inside of belt keepers by engine pulley. See Figure 12.

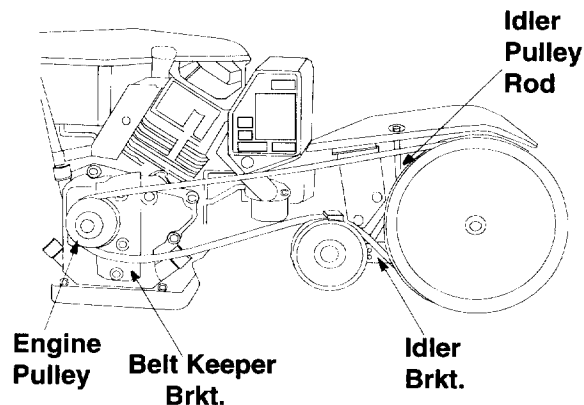


Figure 12

## TIRES

Recommended operating tire pressure is approximately 20 p.s.i. (check sidewall of tire for tire manufacturer's recommended pressure). Maximum tire pressure under any circumstances is 30 p.s.i. Equal tire pressure should be maintained on both tires.

When installing a tire to the rim, be certain rim is clean and free of rust. Lubricate both the tire and rim generously. Never inflate to over 30 p.s.i. to seat beads.



**WARNING:** Excessive pressure (over 30 p.s.i.) when seating beads may cause tire/rim assembly to burst with force sufficient to cause serious injury.

## SECTION 12: OFF-SEASON STORAGE

If the tiller will not be used for a period longer than 30 days, the following steps should be taken to prepare the tiller for storage.

1. Clean the exterior of engine and the entire tiller thoroughly. Lubricate the tiller as described in the lubrication instructions.
2. Refer to the engine manual for correct engine storage instructions.

3. Wipe tines with oiled rag to prevent rust.
4. Store tiller in a clean, dry area. Do not store next to corrosive materials, such as fertilizer.

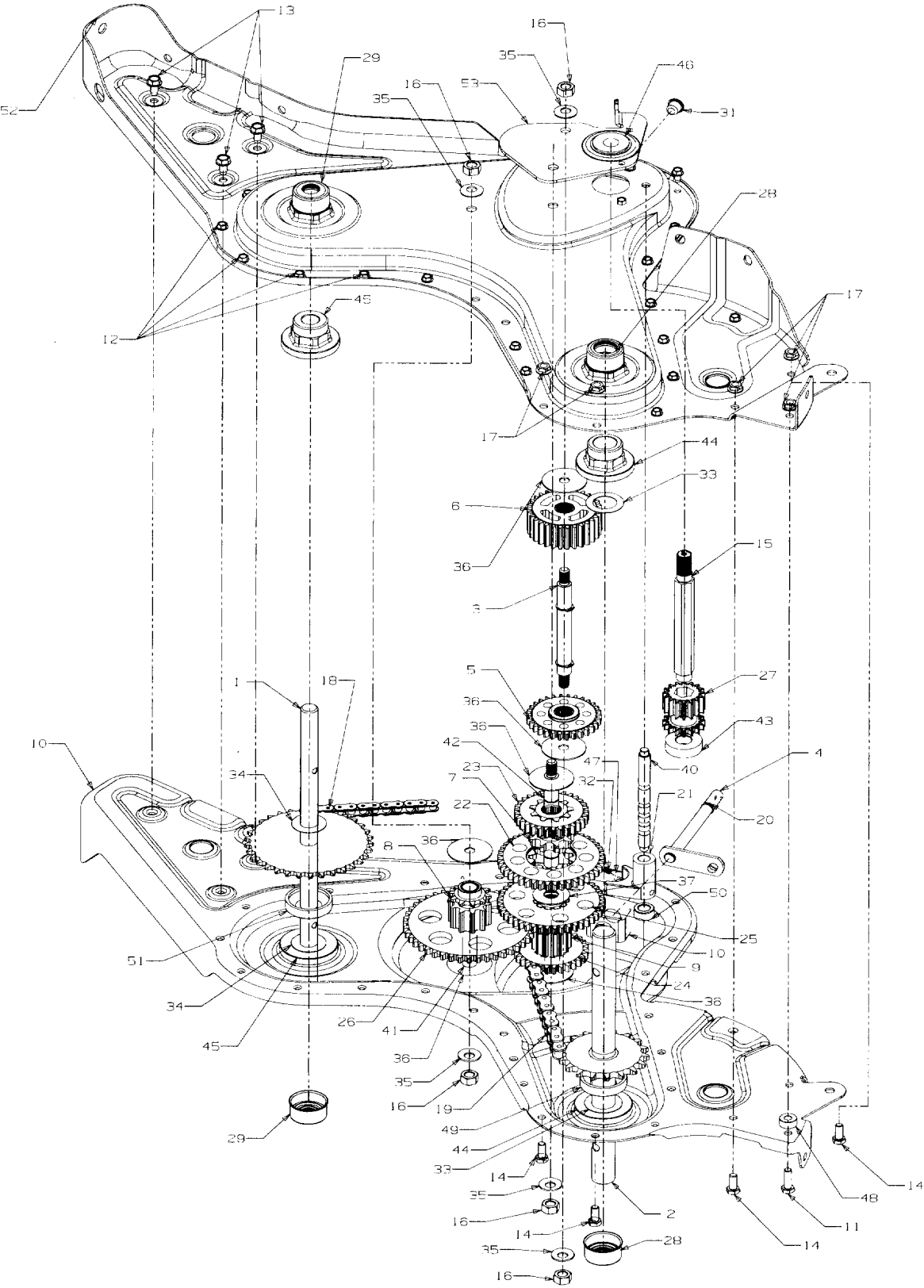
**NOTE:** When storing any type of power equipment in an unventilated or metal storage shed, care should be taken to rustproof the equipment. Using a light oil or silicone, coat the equipment, especially any springs, bearings and cables.

## SECTION 13: TROUBLE SHOOTING GUIDE

Trouble	Possible Cause(s)	Corrective Action
Engine fails to start	Fuel tank empty, or stale fuel.  Throttle control lever not in correct starting position (if so equipped). Blocked fuel line. Dirty aircleaner. Choke not in ON position. Spark plug wire disconnected. Faulty spark plug. Engine flooded.	Fill tank with clean, fresh gasoline. Fuel will not last over thirty days unless a fuel stabilizer is used. Move throttle lever to start position.  Clean fuel line. Refer to the engine manual packed with your unit. Move switch to ON position. Connect wire to spark plug. Clean, adjust gap or replace. Refer to the engine manual packed with your unit.
Engine runs erratic	Unit running on CHOKE. Spark plug wire loose. Blocked fuel line or stale fuel.  Vent in gas cap plugged. Water or dirt in fuel system. Dirty air cleaner. Carburetor out of adjustment.	Move choke lever to OFF position. Connect and tighten spark plug wire. Clean fuel line; fill tank with clean, fresh gasoline. Fuel will not last over thirty days unless a fuel stabilizer is used. Clear vent. Drain fuel tank. Refill with fresh fuel. Refer to the engine manual packed with your unit. Refer to the engine manual packed with your unit.
Engine overheats	Engine oil level low. Dirty air cleaner. Air flow restricted. Carburetor not adjusted properly.	Fill crankcase with proper oil. Refer to the engine manual packed with your unit. Refer to the engine manual packed with your unit. Adjust carburetor as instructed in separate engine manual.
Tines do not engage	Foreign object lodged in tines. Tine clevis pin(s) missing. Pulley and idler not in correct adjustment. Not shifting properly.  Control cable not adjusted properly. Belt worn and/or stretched.	Dislodge foreign object. Replace tine clevis pin(s). Take unit to authorized service dealer.  Refer to Controls section of operator's manual for proper shifting procedures. Adjust control cable (see assembly instructions). Replace belt.
Tines skip over ground	Improper rotation.	Forward rotation should only be used on soil that has already been tilled, not on virgin soil.
Wheels do not engage	Clevis pin missing. Tiller is not being shifted properly.  Control cable not adjusted properly. Belt worn and/or stretched.	Replace clevis pin. Refer to Controls section of operator's manual for proper shifting procedures. Adjust control cable (see assembly instructions). Replace belt.

Note: For repairs beyond the minor adjustments above, contact your local authorized service dealer.

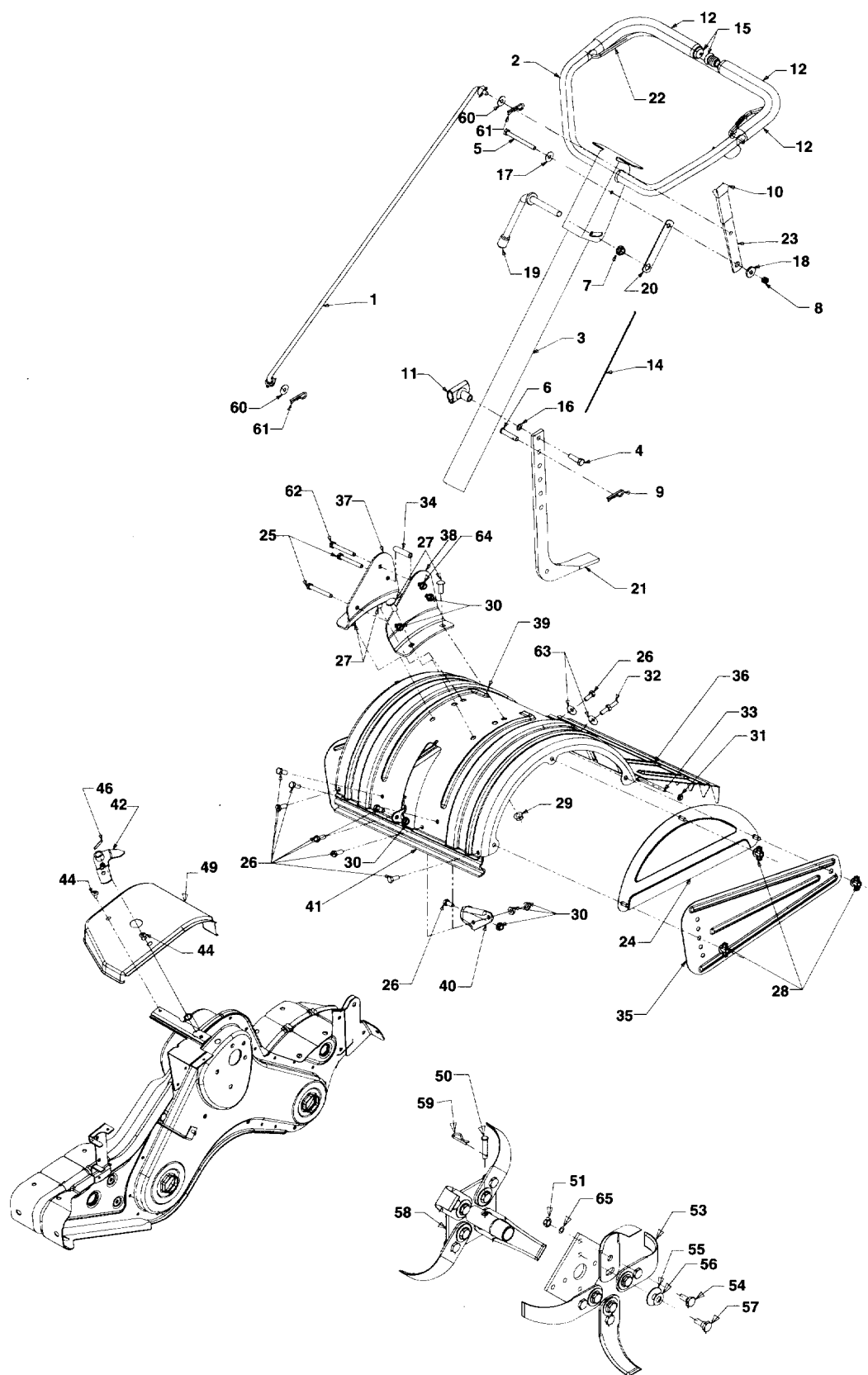
MODEL 450



## Model 450

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
1	611-0020	Wheel Shaft Ass'y: 33T	28	721-0378	Seal 1.0 Shaft
2	611-0021	Tine Shaft Ass'y: 18T	29	721-0379	Seal .75 Shaft
3	611-0128	Jack Shaft Ass'y	31	726-0277	Taper Cap Ring
4	611-0129	Input Shaft Ass'y	32	732-0496	Compression Spring .50" Lg.
5	617-0058	Rev. Idler Gear Ass'y: 30T	33	736-0163	Thrust Wash. 1.03" I.D. x 1.62" O.D.
6	617-0059	Ftine Idler Gear Ass'y: 30T	34	736-0351	Fl-Wash .76" I.D. x 1.5" O.D.
7	617-0060	Tine Input Sprocket Ass'y: 9T	35	736-0407	Bell-Wash .45" I.D. x 1.0"
8	617-0061	Wheel Input Sprocket Ass'y: 10T	36	736-0518	Thrust Wash. .445 x 1.92 x .060
9	617-0062	Gear Ass'y: 11T	37	736-3088	Fl-Wash. .635" I.D. x 1.59 O.D.
10	686-0108	R.H. Housing Ass'y	40	738-0645	Detent Shaft 1/2" Dia.
11	710-0376	Hex Bolt 5/16-18 x 1" Lg.	41	738-0648	Jack Shaft .625 x 2.385
12	710-0599	Hex S-Tap Scr. 1/4- 20 x .5"	42	738-1013	Jack Shaft .625 x 5.0
13	710-0604	Hex S-Tap Scr. 5/16-18 x .625"	43	741-0124	Ball Bearing
14	710-3008	Hex Bolt 5/16-18 x .75"	44	741-0420	Flange Bearing 1.0 x 2.5 x 1.38
15	711-1349	Input Shaft	45	741-0421	Flange Bearing .75 x 2.5 x 1.38
16	712-0378	Hex Nut 7/16-20	46	741-0563	Ball Bearing . 6692 x 5745 x .466
17	712-3004A	Flange Nut 5/16-18	47	741-0862	Detent Ball .250
18	713-0367	#420 Chain 1/2 Pitch x 50 Links	48	750-0258	Spacer .315
19	713-0484	#50 Chain 5/8 Pitch x 54 Links	49	750-0570	Spacer 1.0 I.D x 2.0 O.D. x .440
20	716-0865	Snap Ring	50	750-0664	Spacer .505 I.D. x .88 O.D. x .440
21	717-0853	Shifting Fork	51	750-0671	Spacer .75 x 2.0 x .50
22	717-1582	Spur Gear 44T	52	786-0171	L.H. Chain Case Ass'y
23	717-1583	Spur Gear 30T	53	786-0238	Gear Positioner Bracket
24	717-1584	Spur Gear 30T	-	737-0300	Benelene 920 Grease
25	717-1585	Spur Gear 44T	-	737-0288	Never Seez Grease
26	717-1587	Spur Gear 44T	-	686-0107	Gear Case Assembly Complete
27	717-1594	Spur Gear 16T			

# MODEL 450

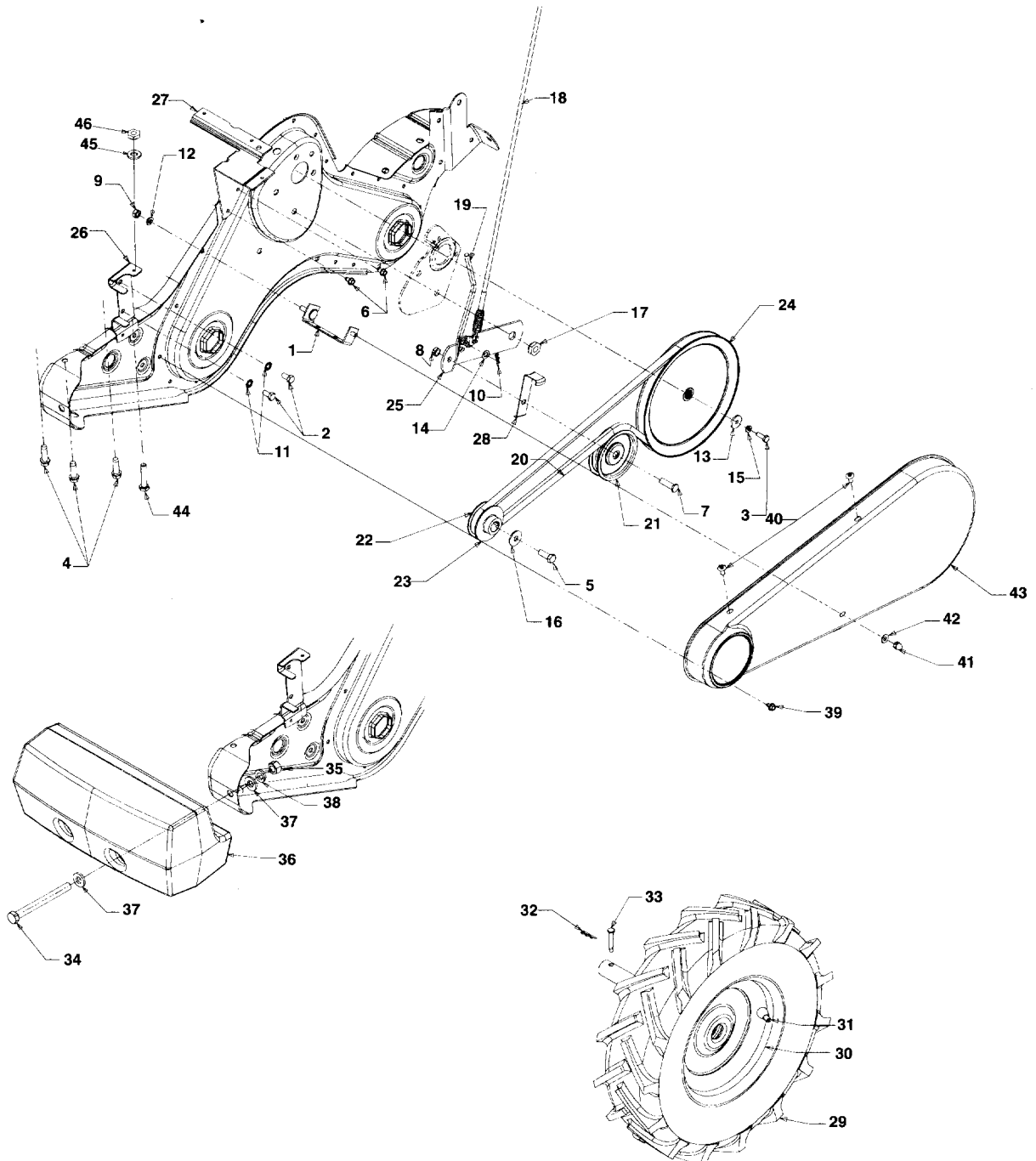




# MODEL 450

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
1	747-1152	Shift Rod	32	738-0849	Hex Screw 5/16-18 x .75" Lg.
2	649-0033	Upper Handle Ass'y	33	747-0432	Rod
3	649-0034	Lower Handle Ass'y	34	750-0885	Spacer .435 O.D. x .322 I.D.
4	710-3005	Hex Screw 3/8-16 x 1.25	35	786-0090	Shoulder
5	710-3056	Hex Screw 5/16-18 x 3.25	36	786-0113	Tine Shield Hinge Flap
6	711-0415	Clevis Pin 3/8-1.62	37	786-0176	R.H. Handle Brkt.
7	712-0379	Flange Lock Nut 3/8-24	38	786-0177	L.H. Handle Brkt.
8	712-0429	Hex Lock Nut 5/16-18	39	786-0178	Tine Shield
9	714-0147	Cotter Pin	40	786-0179	Tine Shield Brkt.
10	720-0313	Grip	41	786-0180	Shoulder Spacer Brkt.
11	720-0210A	T-Knob	42	686-0109	Shift Crank Ass'y
12	720-0278	Foam Grip	44	710-1017	Screw 1/4-14 x .625
14	726-0317	Cable Tie	46	715-0120	Spirol Pin 3/16 x 1.00
15	735-0246	Plug	49	784-0208C	Shift Cover
16	736-0117	Flat Washer 3/8 x .620 x .033	50	711-0415	Clevis Pin
17	736-0242	Bell Wash. .340 I.D. x .872 O.D.	51	712-3054	Hex Nut 3/8-24 Thd.
18	738-0958	Shoulder Spacer	53	742-0305	13" Dia. Articulating Tine
19	784-0190	Handle Adjustment Crank	54	738-0689	Shld. Bolt 1/2" Dia. x .175
20	784-0191	Hex Nut Ret. Bracket	55	736-0208	Fl-Wash. .51" I.D. x 1.50"
21	786-0120	Depth Stake	56	736-0253	Bell-Wash. .515" I.D. x 1.14"
22	747-1157	Bail Clutch	57	738-0688	Shld. Bolt 1/2" Dia x .320
23	786-0181	Shift Lever Rod	58	784-0160	Tine Adapter Ass'y 18"
24	686-0044A	Tine Shield Cover Ass'y	59	714-0149B	Internal Cotter Pin
25	710-0176	Hex Cap Screw 5/16-18 x 2.75	60	735-0127	Rubber Washer
26	710-3008	Hex Cap Screw 5/16-18 x .750	61	714-0104	Cotter Pin
27	710-3097	Carriage Bolt 3/8-16 x 1.0	62	710-3022	Hex Screw 3/8-16 x 2.75" Lg.
28	712-0421	Wing Nut	63	736-0204	Flat Washer
29	712-0431	Flange Nut 3/8-16	64	712-0431	Flange Nut .344 I.D. x .62 O.D.
30	712-3004A	Flange Nut 5/16-18	65	736-0169	Lock Washer
31	726-0106	Cap Nut			

# MODEL 450



## MODEL 450

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
1	686-0111	Belt Cover Brkt. Ass'y	27	786-0187	Shift Cover Brkt.
2	710-0237	Hex Bolt 5/16-24 x .62" Lg.		786-0123A	Shift Cover Brkt. (Models 452,454, 456)
3	710-0412	Hex Bolt 1/4-28 x .75" Lg.	28	786-0193	Idler Belt Keeper
4	710-0502A	Hex Wash.TT-Sems Screw 3/8-16 x 1.250" Lg.	29	634-0110	RH Wheel Ass'y Comp. 14.0 x 4.5
5	710-0591	Hex Bolt 3/8-24 x 1.00		634-0111	LH Wheel Ass'y Comp. 14.0 x 4.5
6	710-0599	Hex Wash. Hd. S-Tap Scr.		634-0106	RH Wheel Ass'y Comp. 16.0 x 4.0
7	710-0723	Hex Cap Screw 3/8-16 x 1.25		634-0107	LH Wheel Ass'y Comp. 16.0 x 4.0
8	712-0266	Ctr. Lock Jam Nut 3/8-16		634-1796	Tire Only 14.0 x 4.5
9	712-0267	Hex Nut 5/16-18		734-0808	Tire Only 16.0 x 4.0
10	714-0104	Internal Cotter Pin	30	634-0108	Wheel Rim Ass'y Comp.
11	736-0104	Hairpin Clip		634-0112	Wheel Rim Ass'y Comp.
12	736-0119	L-Wash. 5/16" I.D.	31	734-0255	Air Valve
13	736-0176	FI-Wash. 1/4 I.D. x .93 O.D.	32	711-1017	Clevis Pin
14	736-0271	Spring-Wash. .317 x .625 O.D. x .099	33	714-0104	Internal Cotter Pin
15	736-0329	L-Wash. 1/4" I.D.	34	710-0382	Hex Bolt 1/2-13 x 5.00" Lg.
16	736-0452	Bell-Wash. .396 x 1.140 x .095	35	712-0206	Hex Nut 1/2-13 Thd.
17	738-0876	Shld. Nut 7/16-20	36	723-0381	Counterweight
18	746-1083	Clutch Cable	37	736-0326	FI-Wash. .510" I.D. x 1.0" O.D.
19	747-1159	Idler Pulley Rod	38	736-0921	L-Wash. 1/2" Lg.
20	754-0434	Belt: 4L x 58.16 Lg.	39	710-0653	Hex Screw 1/4-20 x .375" Lg.
21	756-0405	FI-Idler w/Flange 3.75" O.D.	40	710-1017	Screw 1/4-14 x .625" Lg.
22	756-0971	Outer Engine Pulley Half	41	712-0392	Acorn Lock Nut
23	756-0972	Inner Engine Pulley Half	42	736-0463	FI-Washer 1/4 x .620" Lg.
24	756-1162	Input Pulley	43	784-0158A	Belt Cover
25	786-0064A	Idler Bracket	44	710-0805	Hex Bolt 5/16-18 x 1.50" Lg.
26	786-0185	Belt Keeper Brkt.	45	736-0242	(Models 454,456,458)
	786-0186	Belt Keeper Brkt.			Bell-Wash. .340 I.D. x .872 O.D.
		(Models 454, 456, 458)	46	712-3010	(Models 454,456,458)
					Nut:Hex 5/16-18 (Models 454,456,458)

**IMPORTANT:** For a proper working machine, use Factory Approved Parts

**V-BELTS** are specially designed to engage and disengage safely. A substitute (non OEM) V-belt can be dangerous by not disengaging completely.

# MANUFACTURER'S LIMITED WARRANTY FOR:



For TWO YEARS from the date of retail purchase within the United States of America, its possessions and territories, MTD PRODUCTS INC will, at its option, repair or replace, for the original purchaser, free of charge, any part or parts found to be defective in material or workmanship. This warranty covers units which have been operated and maintained in accordance with the operating instructions furnished with the unit, and which have not been subject to misuse, abuse, commercial use, neglect, accident, improper maintenance or alteration.

Normal wear parts or components thereof are subject to separate terms as noted below in the "No Fault Ninety Day Consumer Warranty" clause.

All normal wear part failures will be covered on this product for a period of 90 days regardless of cause. After 90 days, but within the two year period, normal wear parts failures will be covered ONLY IF caused by defects in material or workmanship of OTHER component parts. Normal wear parts are defined as batteries\*, belts, blades, blade adapters, grass bags, rider deck wheels, seats, snow thrower skid shoes, shave plates and tires.

**How to obtain service:** Warranty service is available, with proof of purchase, through your local authorized service dealer. To locate the dealer in your area, please check the yellow pages or contact the Customer Service Department of MTD PRODUCTS INC, P. O. Box 368022, Cleveland, Ohio 44136-9722. Phone 1 (330) 220-4683. The return of a complete unit will not be accepted by the factory unless prior written permission has been extended by the Customer Support Department of MTD PRODUCTS INC.

**Transportation charges:** Transportation charges for the movement of any power equipment unit or attachment are the responsibility of the purchaser.

**Units exported out of the United States:** MTD PRODUCTS INC does not extend any warranty for products sold or exported outside of the United States of America, its possessions and territories, except those sold through MTD PRODUCTS INC's authorized channels of export distribution.

## **Other Warranties:**

1. The engine or component parts thereof carry separate warranties from their manufacturers. Please refer to the applicable manufacturer's warranty on these items.
2. \*Batteries are covered by a 90-day replacement warranty.
3. Log splitter pumps, valves and cylinders or component parts thereof are covered by a one year warranty.
4. All other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular purpose, are hereby expressly disclaimed in their entirety.
5. The provisions as set forth in this warranty provide the sole and exclusive remedy of MTD PRODUCTS INC's obligations arising from the sales of its products. MTD PRODUCTS INC will not be liable for incidental or consequential loss or damage.

**How state law relates to this warranty:** This limited warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Certain disclaimers are not allowed in some states and therefore they may not apply to you under all circumstances.

**NOTE:** This warranty does not cover routine maintenance items such as lubricants, filters, blade sharpening and tune-ups, or adjustments such as brake adjustments, clutch adjustments or deck adjustments. Nor does this warranty cover normal deterioration of the exterior finish due to use or exposure.