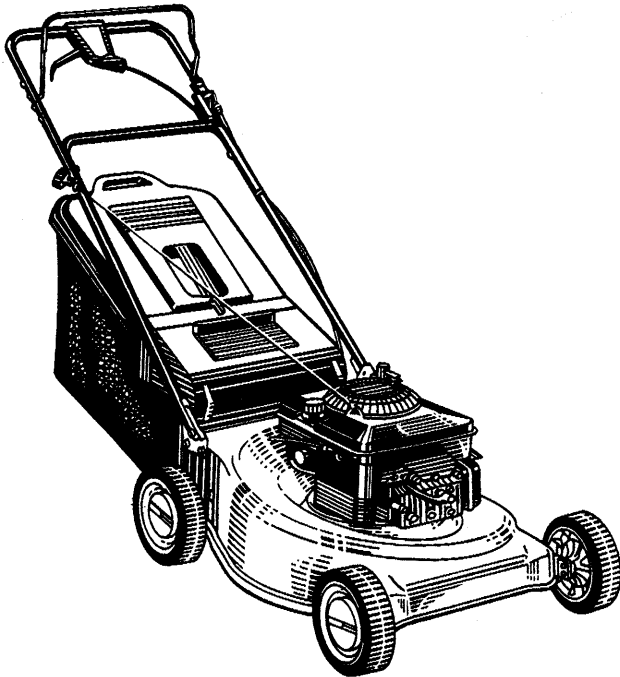


OWNER'S GUIDE

• ASSEMBLY • OPERATION • MAINTENANCE • PARTS •



(Model 478R Shown)

190-076-000-HARD
190-078-000-SOFT
21"

ROTARY MOWERS *122-488*

Model Numbers

- 122-460R00 122-470R00
- 122-462R00 122-472R00
- 122-463R00 122-473R00
- 122-464R00 122-474R00
- 122-465R00 122-475R00
- 122-466R00 122-476R00
- 122-468R00 122-478R00

122-479R013

IMPORTANT!

Record the **Model No.** and **Mfg. Code** which appear on your unit in the space below. You **must** have these numbers, along with the date of purchase, in order to receive warranty or service.

MEETS ANSI SAFETY STANDARDS

MODEL NO.	MFG. CODE

**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 360900, Cleveland, Ohio 44136.


IMPORTANT

SAFE OPERATION PRACTICES


 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 LAWN MOWER. FAILURE TO COMPLY WITH THESE INSTRUCTIONS MAY RESULT IN PERSONAL INJURY. WHEN YOU SEE THIS SYMBOL—  HEED ITS WARNING. 

 **DANGER:** Your lawn mower 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. If you violate any of these rules, you may cause serious injury to yourself or others.

TRAINING


- 
1. Read this owner's guide carefully in its entirety before attempting to assemble or operate this machine. Be completely familiar with the controls and the proper use of this machine before operating it. Keep this manual in a safe place for future and regular reference and for ordering replacement parts.
 2. Your rotary mower is a precision piece of power equipment, not a plaything. Therefore, exercise extreme caution at all times. Your unit has been designed to perform one job: to mow grass. Do not use it for any other purpose.
 3. Never allow children under 14 years old to operate a power mower. Children 14 years old and over should only operate mower under close parental supervision. Only persons well acquainted with these rules of safe operation should be allowed to use your mower.
 4. Keep the area of operation clear of all persons particularly small children and pets. Stop engine when they are in the vicinity of your mower to help prevent blade contact or thrown object injury. Although the area of operation should be completely cleared of foreign objects, an object may have been overlooked and could be accidentally thrown by the mower in any direction and cause serious personal injury to the operator or any others allowed in the area.

PREPARATION


- 
1. Thoroughly inspect the area where the equipment is to be used. Remove all stones, sticks, wire, bones and other foreign objects which could be picked up and thrown by the mower in any direction and cause serious personal injury to the operator or any others allowed in the area. Plan your mowing pattern to avoid discharge of material toward roads, sidewalks, bystanders and the like.
 2. Always wear safety glasses or eye shields during operation or while performing an adjustment or repair, to protect eyes from foreign objects that may be thrown from the machine in any direction.
 3. Wear sturdy, rough-soled work shoes and close-fitting slacks and shirts. Shirts and pants that cover the arms and legs and steel-toed shoes are recommended. Do not wear loose fitting clothes or jewelry. They can be caught in moving parts. Never operate a unit in bare feet, sandals, or sneakers.
 4. Before working with gasoline, extinguish all cigarettes, cigars, pipes and other sources of ignition. Check the fuel level before starting the engine. Gasoline is an extremely flammable fuel. Do not fill the gasoline tank indoors, while the engine is running, or until engine has been allowed to cool for at least two minutes after running. Replace gasoline cap securely and wipe off any spilled gasoline before starting the engine as it may cause a fire or explosion.
 5. Disengage the self-propelled mechanism or drive clutch on units so equipped before starting the engine.
 6. The blade control handle is a safety device. Never attempt to bypass its operation. Doing so makes the safety device inoperative and may result in personal injury through contact with the rotating blade. The blade control handle must operate easily in both directions and automatically return to the disengaged position when released.
 7. Never attempt to make a wheel or cutting height adjustment while the engine is running.
 8. Never operate the mower in wet grass. Always be sure of your footing. A slip and fall can cause serious personal injury. Keep a firm hold on the handle and walk, never run. Mow only in daylight or in good artificial light.

9. For your safety, use the slope gauge included as part of this manual to measure slopes before operating this unit on a sloped or hilly area. If the slope is greater than 15° as shown on the slope gauge, do not operate this unit on that area or serious injury could result.

OPERATION

- 
1. Do not change the engine governor settings or overspeed the engine. Excessive engine speeds are dangerous.
 2. Do not put hands or feet near or under rotating parts. Keep clear of the discharge opening at all times as the rotating blade can cause injury.
 3. Stop the blade when crossing gravel drives, walks or roads.
 4. After striking a foreign object, stop the engine, remove the wire from the spark plug, and thoroughly inspect the mower for any damage. Repair the damage before restarting and operating the mower.
 5. If the equipment should start to vibrate abnormally, stop the engine and check immediately for the cause. Vibration is generally a warning of trouble.
 6. Shut the engine off and wait until the blade comes to a complete stop before removing the grass catcher or unclogging the chute. The cutting blade continues to rotate for a few seconds after the engine is shut off. Never place any part of the body in the blade area until you are sure the blade has stopped rotating.
 7. Before cleaning, repairing or inspecting, make certain the blade and all moving parts have stopped. Disconnect the spark plug wire, and keep the wire away from the spark plug to prevent accidental starting.
 8. Do not run the engine indoors.
 9. Never cut grass by pulling mower toward you. Mow across the face of slopes, never up-and-down. Exercise extreme caution when changing direction on slopes. Do not mow excessively steep slopes. Always be sure of your footing. A slip and fall can cause serious personal injury.
 10. Never operate mower without proper guards, plates or other safety protective devices in place.
 11. Muffler and engine become hot and can cause a burn. Do not touch.
 12. Do not operate this mower with the chute door open, unless the complete grass catcher or chute deflector is properly mounted on the mower.

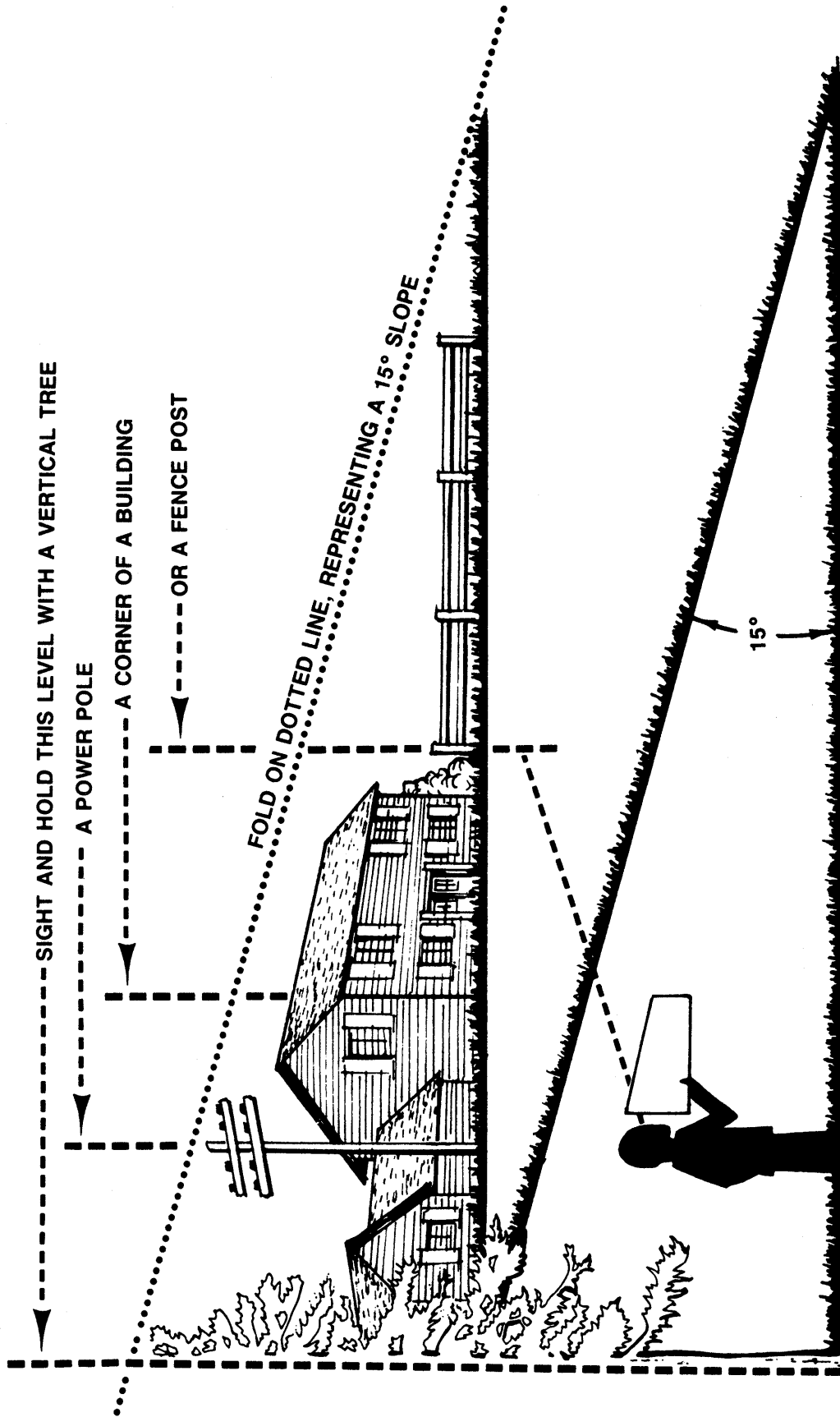
MAINTENANCE AND STORAGE

- 
1. Check the blade and engine mounting bolts at frequent intervals for proper tightness. Also visually inspect blade for damage (e.g. bent, cracked). Replace with blade which meets original equipment specifications.
 2. Keep all nuts, bolts, and screws tight to be sure the equipment is in safe working condition.
 3. Never store the mower with gasoline in the tank or gas containers inside of a building where fumes may reach an open flame or spark (e.g. gas hot water heater). Allow the engine to cool before storing in any enclosure.
 4. To reduce fire hazard, keep the engine free of grass, leaves and excessive oil.
 5. Check the grass catcher bag frequently for wear or deterioration. Replace a worn or damaged bag immediately. For safety protection, replace only with new bag meeting original equipment specifications.

USE THIS SHEET AS A GUIDE TO DETERMINE SLOPES WHERE YOU MAY NOT OPERATE SAFELY.

SLOPE GAUGE

(Keep this sheet in a safe place for future reference.)



Do not mow on inclines with a slope in excess of 15 degrees (a rise of approximately 2½ feet every 10 feet). A riding mower could overturn and cause serious injury. If operating a walk-behind mower on such a slope, it is extremely difficult to maintain your footing and you could slip, resulting in serious injury.

Operate RIDING mowers up and down slopes, never across the face of slopes.

Operate WALK-BEHIND mowers across the face of slopes, never up and down slopes.

CONTENTS OF HARDWARE PACK

Remove this sheet from your owner's manual and lay the hardware on the illustration for identification purposes. After assembly, keep the Slope Gauge which is on the reverse side of this sheet for future use. (Hardware pack may contain extra items which are not used on your unit.—Part numbers are shown in parentheses.)

A ATTACHING THE LOWER HANDLE

Hairpin Clips (714-0104)

B ATTACHING THE UPPER HANDLE

Split Washers 5/16" I.D. (736-0119)

Curved Head Bolts (710-0671)

Hex Nuts 5/16-18 Thread (712-0267)

C ATTACHING THE STARTER ROPE

Rope Guide (710-1205)

Hex Lock Nut 1/4-20 Thread (712-0324)

D SECURING THE CABLES

Cable Ties (726-0240)

E ATTACHING THE DRIVE CLUTCH CONTROL CABLE

Phillips Head Screws (710-0841)

Plastic Cap (731-1059)

F ASSEMBLY OF GRASS CATCHER Models 460R through 469R (Soft Grass Bags):

Self-Tapping Screws (710-1025)

Models 470R through 479R (Hardtop Grass Bags):

Flat Washer 1/4" I.D. x 5/8" O.D. (736-0463)

Self-Tapping Screws (710-0892)

Shoulder Bolt (738-0137)

Wave Washer 3/8" I.D. (736-0286)

Internal "Star" Washer 1/4" I.D. (736-0498)

Locking Lever (720-0224)



ASSEMBLY INSTRUCTIONS

IMPORTANT: This unit is shipped **WITHOUT GASOLINE** or **OIL**. After assembly, service engine with gasoline and oil as instructed in the separate engine manual packed with your unit.

NOTE: Reference to right or left hand side of the mower is observed from the operating position.

Tools Required for Assembly

- (1) Pair of Pliers
- (1) 1/2" Wrench*
- (1) Phillips Screwdriver
- (1) 7/16" Wrench*

*Or one 6" Adjustable Wrench

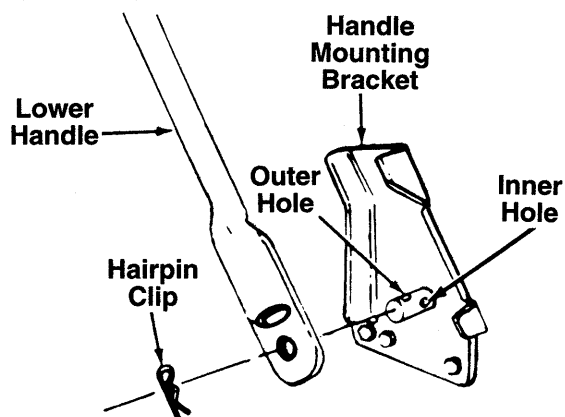


FIGURE 1.

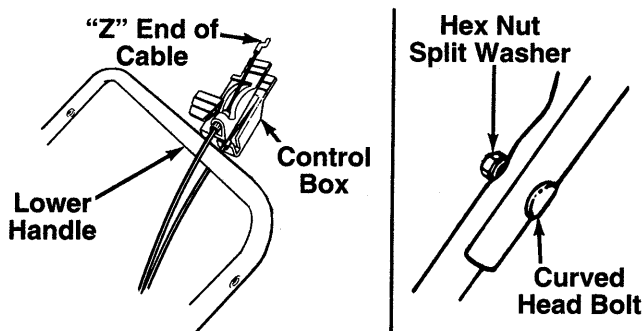


FIGURE 2.

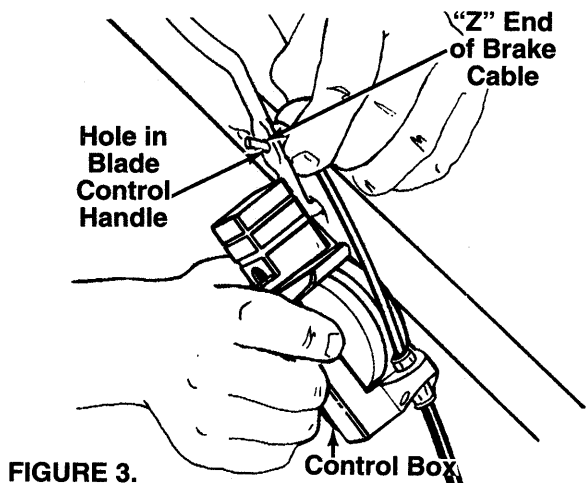


FIGURE 3.

UNPACKING

1. Remove the lawn mower from the carton by opening the top flaps and lifting the unit out. Be careful of the staples. Make certain all parts and literature have been removed from the carton before the carton is discarded.
2. Disconnect the spark plug wire and move away from the spark plug.
3. Stretch out the control cables (with control box attached) to the left side of the mower and place on the floor. Be careful not to bend or kink cables at any time during assembly.
4. Remove page four from this manual and lay the contents of the hardware pack on the illustration for identification.

← ATTACHING THE LOWER HANDLE (Hardware A)

1. Attach the lower handle by placing the bottom holes in the lower handle over the weld pins on the handle mounting brackets on the rear of the deck. The extra hole in the upper part of lower handle must be on the **right** side of the unit.
2. Using a pair of pliers, squeeze one leg of the lower handle against the handle mounting bracket. Insert the hairpin clip into the **inner** hole on the weld pin. See figure 1. Repeat on other side.

NOTE: There are two (2) holes in the handle mounting brackets. Place the hairpin clip in the inner hole for operation. Outer hole is for storage.

ATTACHING THE UPPER HANDLE (Hardware B)

1. Slide the control box over the lower handle so that the cable with the "Z" end is routed above the lower handle, and the other cable is routed below. See figure 2.
2. Place the upper handle in position over the lower handle. The hole in the side of the blade control handle (attached to the upper handle) must be on the **left** side. Make certain the blade control handle is on the **top** of the upper handle.
3. Secure the upper handle using the curved head bolts, split washers and hex nuts as shown in figure 2. Tighten securely.

ATTACHING THE CONTROL BOX

Attach the control box to the upper handle as follows.

1. Remove the truss machine screw and hex lock nut from the middle of the control box using a phillips screwdriver. Hold your finger over the hex lock nut so it stays inside the control box so you can unscrew the truss machine screw.

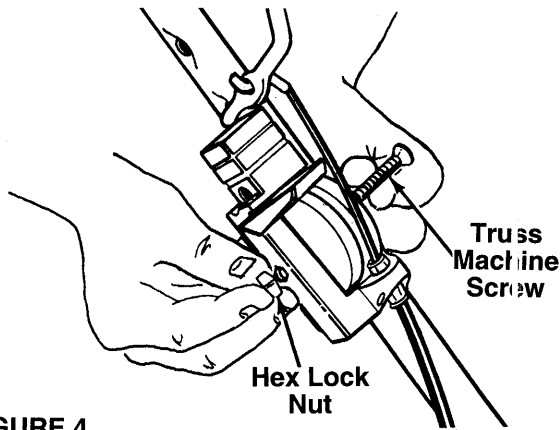


FIGURE 4.

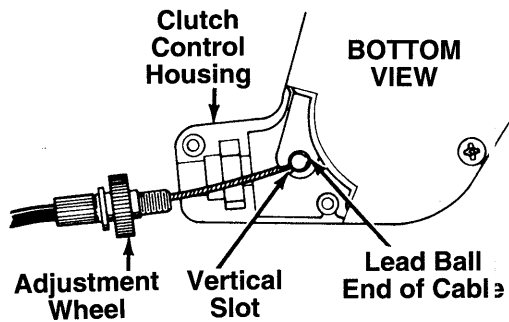


FIGURE 5.

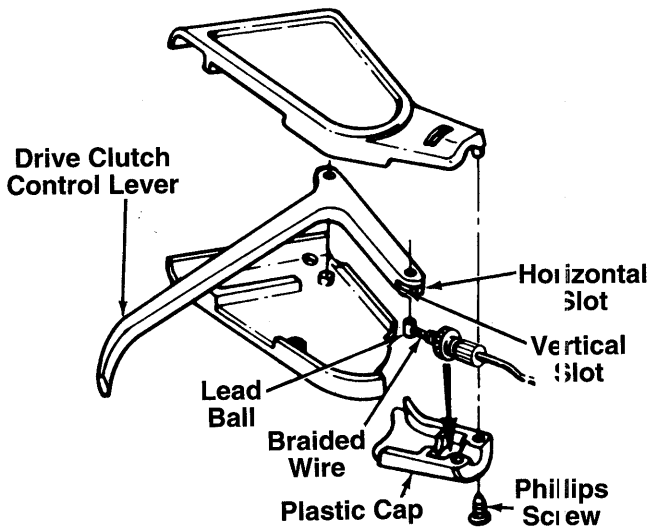


FIGURE 6.

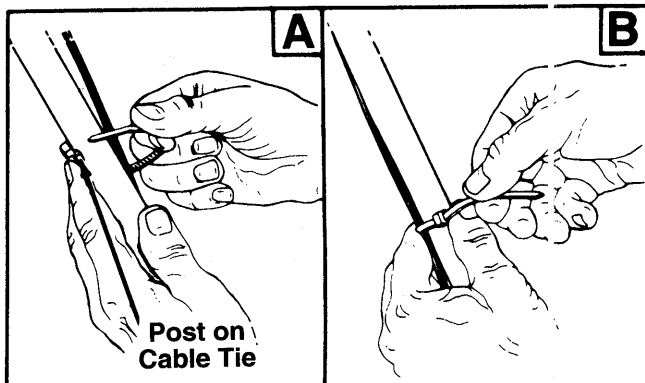


FIGURE 7.

2. Holding the control box near the left side of the upper handle (control box must be inside the handle), hook the "Z" end of the brake cable into the control handle from the outside to the inside. See figures 3 and 4.

3. Place the control box on the upper handle just below the end of the control handle as shown in figure 4. Secure with hardware removed in step one by placing hex lock nut into the indent on the inside of the control box. Screw the truss machine screw into the hex lock nut.

ATTACHING THE DRIVE CLUTCH CONTROL CABLE (Hardware E)

The drive clutch control cable is attached to the deck. Route the cable under the lower handle. Attach the cable to the lever in the clutch control housing, located in the middle of the upper handle, as follows.

1. Place the lead ball end of the cable into the fitting provided in the end of the clutch control lever. Slip the braided wire into the vertical slot as shown in figure 5.

2. Slide the braided wire around in the horizontal slot. See figure 6.

3. Make certain the adjustment wheel is threaded onto the cable as far as possible as shown in figure 5. Place the adjustment wheel into the clutch control housing.

4. Secure the plastic cap to the clutch control housing using the two Phillips head screws. See figure 6.



WARNING: Drive clutch adjustment must be checked before the unit is operated, as described in the Operation Section.

SECURING THE CABLES (Hardware D)

Secure all cables to the left side of the handle as follows.



WARNING: When attaching the control cables, the cables must be routed to avoid contact with all sharp edges and hot surfaces to prevent damage to the cables, which will render the controls inoperative.

1. Insert posts on cable ties into holes provided on the lower handle. The holes may be either on the inside or outside of the handles. See figure 7A.

2. Secure the cables with the cable ties, making certain the cables do not contact the wheel. See figure 7B. Trim excess ends of cable ties.

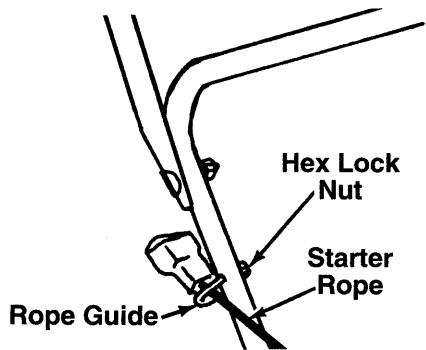


FIGURE 8.

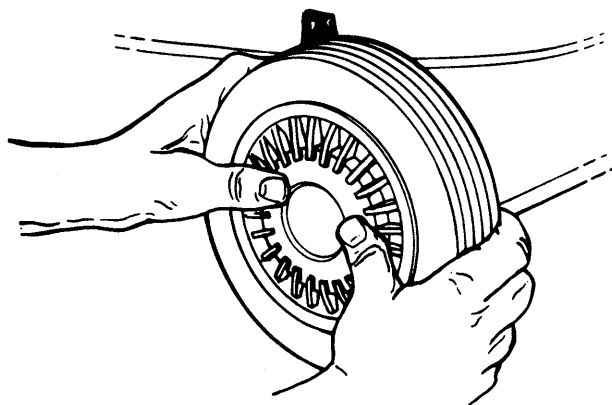


FIGURE 9.—Optional Hub Caps

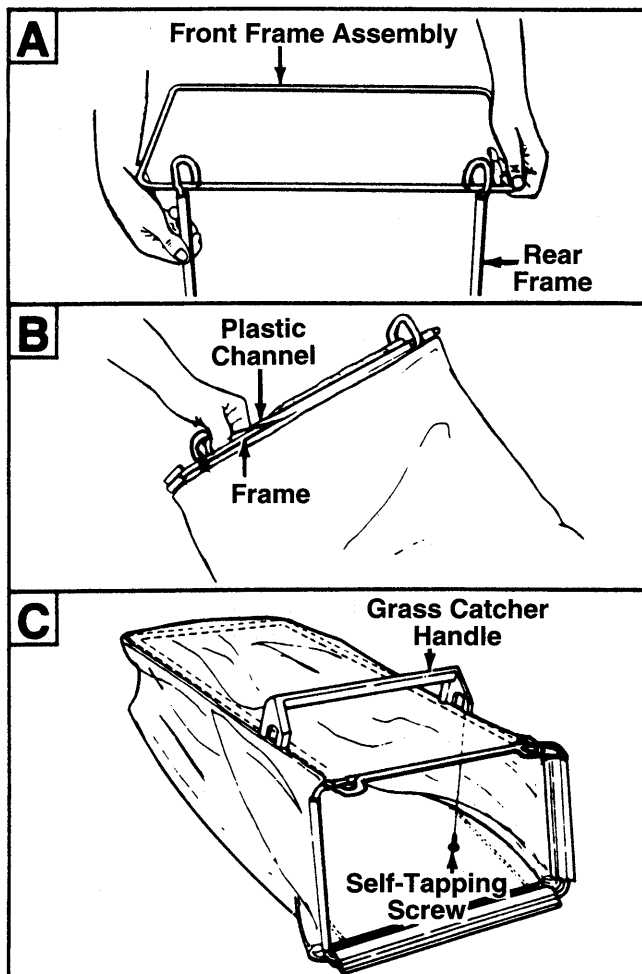


FIGURE 10.

ATTACHING THE STARTER ROPE (Hardware C)

1. The starter rope is inside the top of the engine. Additional rope may be wound around the starter handle. If so, unwind the rope from the handle.
2. With the spark plug wire disconnected and grounded, depress the blade control handle and pull the rope out of the engine.
- ← 3. Place the rope guide around the starter rope, so the rope guide is positioned as shown (bends downward slightly). Insert the rope guide through the right side of the lower handle, and secure with hex lock nut. See figure 8.

INSTALLATION OF HUB CAPS (Optional)

1. If your mower is equipped with hub caps which have four tabs, line up the tabs on the hub caps with the holes in the wheels. Push to lock in position.
2. If your mower is equipped with 2" wide tires, place hub caps in position against the inner hub of the wheel. Press firmly around the center portion of hub cap in a circular motion, similar to installing a lid on a round, plastic container. See figure 9. The hub caps are flexible and will snap over the 3-1/2" diameter wheel hubs.

NOTE: It may be helpful to place the hub caps in hot tap water for several minutes to make them pliable before installing, especially if the temperature is less than 60° F.

FINAL ASSEMBLY OF MOWER

Make certain all nuts and bolts are tightened securely.

ASSEMBLY OF GRASS CATCHER (Hardware F)

There are two different types of grass catchers, those with soft grass bags and those with hardtop grass bags. Follow the instructions which pertain to your unit.

NOTE: Make certain the grass bag is turned right side out before assembling (warning label will be on the outside).

Models 460R through 469R (Soft Grass Bags):

- ← 1. Join the rear frame and front frame assembly as shown in figure 10A.
2. Place bag over frame (black plastic side is the bottom of bag). Hooks on the front frame go toward the top of the bag.
3. Secure front of bag to frame by working the plastic channels on bag over frame. See figure 10B.
4. Place the grass catcher handle in position on top of the grass bag and frame as shown in figure 10C. Secure with four self-tapping screws.

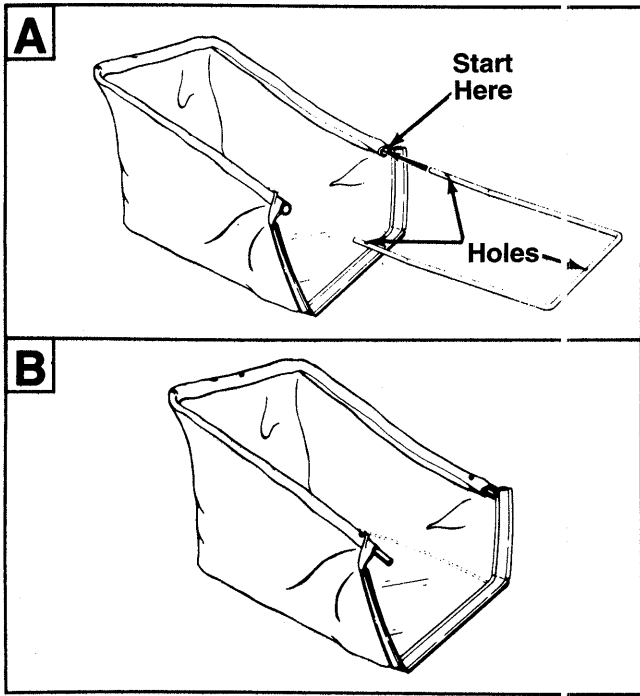


FIGURE 11.

Models 470R through 479R (Hardtop Grass Bags):

1. There are three holes in the rear frame. With the holes on the upper side as shown in figure 11A, insert one end of the rear frame into the cloth channel on the edge of the grass catcher bag. Feed all the material on one side of the frame, then work it around the frame. See figure 11B.

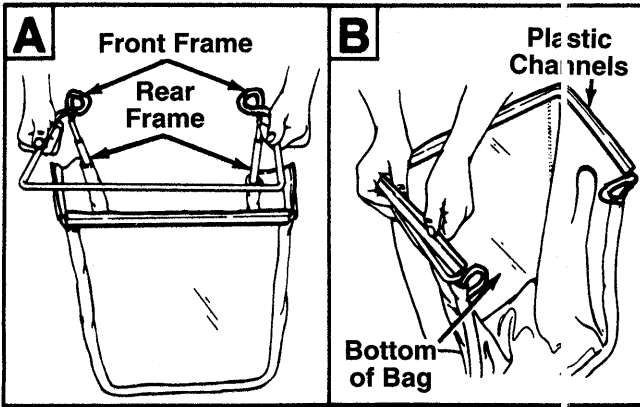


FIGURE 12.

2. Slide the ends of the front frame assembly into the ends of the rear frame as shown in figure 12A.
3. Secure front of bag to front frame by slipping plastic channels on sides and bottom of bag over frame. See figure 12B.

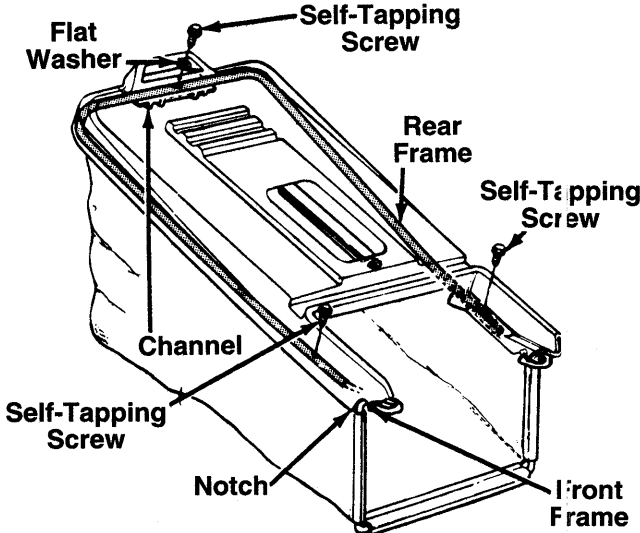


FIGURE 13.

4. Attach the hardtop cover to the grass catcher as follows. See figure 13.
 - a. Place the cover in position on top of the grass catcher. Press the rear frame into the channel on the rear of the cover (beneath the rear handle).
 - b. Slide the notches on the sides of the cover over the front catcher frame.
 - c. Attach rear of cover to frame using the flat washer and one self-tapping screw as shown in figure 13. Attach the sides of the cover to frame with the other two self-tapping screws.

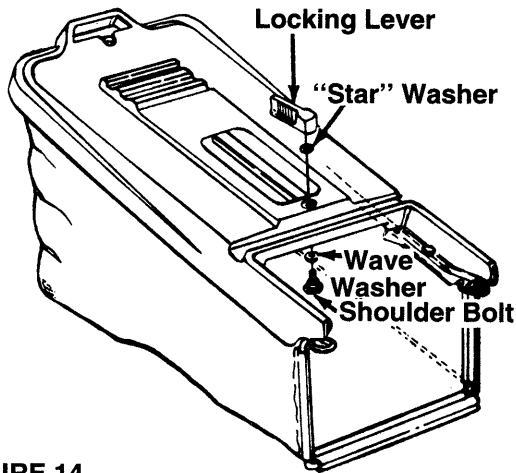


FIGURE 14.

5. Assemble the locking lever as follows:
 - a. Place wave washer on shoulder bolt (crowned side of washer goes against the head of bolt).
 - b. Insert shoulder bolt up through hole in hardtop cover as shown in figure 14. Place "star" washer over shoulder bolt.
 - c. Thread shoulder bolt into the grass catcher locking lever, using a 9/16" socket wrench. Do not overtighten. Locking lever must be able to pivot.

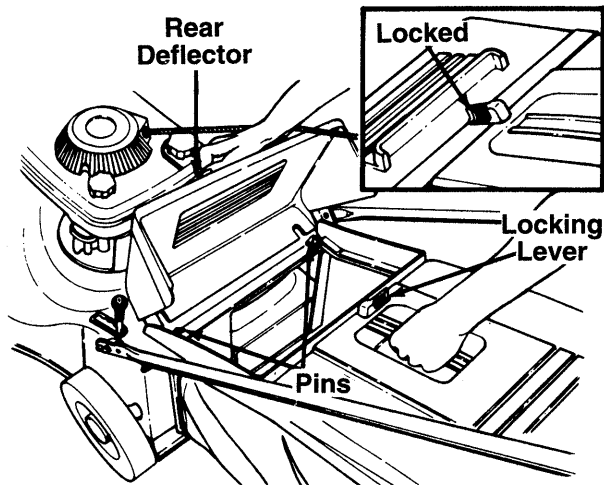


FIGURE 15.

ATTACHING BAG TO MOWER

Lift the rear deflector on the mower. Place the loops on the grass catcher frame over the pins on the back of the mower. See figure 15. Release the rear deflector. Turn the locking lever to the locked position to secure the rear deflector (hardtop grass bags only). See figure 15, inset.

To remove the grass catcher, turn the locking lever to the unlocked position and lift the rear deflector on the mower. Lift the grass catcher up, over the pins on the back of the mower. Release the deflector.

CONTROLS

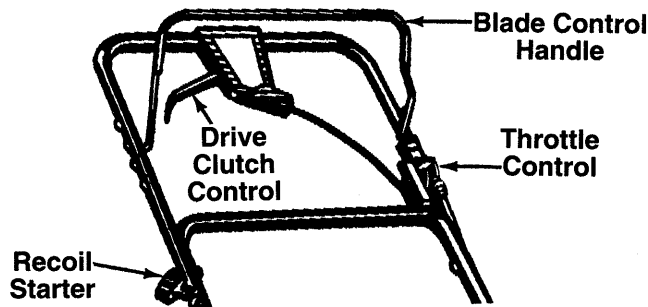


FIGURE 16.

BLADE CONTROL HANDLE

WARNING: This control mechanism is a safety device. Never attempt to bypass its operations.

The blade control handle is located on the upper handle of the mower. See figure 16. The blade control handle must be depressed in order to operate the unit. Release the blade control handle to stop the engine and blade.



WARNING: The blade will be rotating whenever the engine is running.

THROTTLE CONTROL

The throttle control is located on the side of the upper handle. It is used to regulate the engine speed.



WARNING: The throttle control cannot be used to stop the engine.

RECOIL STARTER

The recoil starter handle is attached to the handle. See figure 16. Stand behind the unit in the operating position to start the unit.

DRIVE CLUTCH CONTROL

Squeezing the drive clutch control engages the drive mechanism to the rear wheels. Releasing the clutch control stops the rear wheels from driving. Release the drive clutch control to slow down when negotiating an obstacle, making a turn or stopping. See figure 16.

OPERATION



FIGURE 17.

Keep hands and feet away from the chute area on cutting deck. See figure 17.

The operation of any lawn mower can result in foreign objects being thrown into the eyes, which can result in severe eye damage. Always wear safety glasses or eye shields. We recommend wide vision safety mask for over spectacles or standard safety glasses.



NOTE: For shipping purposes your mower is set with the wheels in a low cutting height position. For best results raise the cutting position until it is determined which height is best for your lawn. See cutting height adjustment section.

GAS AND OIL FILL-UP

Service the engine with gasoline and oil as instructed in the separate engine manual packed with your mower. Read instructions carefully.



WARNING: Never fill fuel tank indoors, with engine running or until the engine has been allowed to cool for at least two minutes after running.

BEFORE STARTING

1. Attach spark plug wire to spark plug. If unit is equipped with a rubber boot over the end of the spark plug wire, make certain the metal loop on the end of the spark plug wire (inside the rubber boot) is fastened securely over the metal tip on the spark plug. See figure 18.

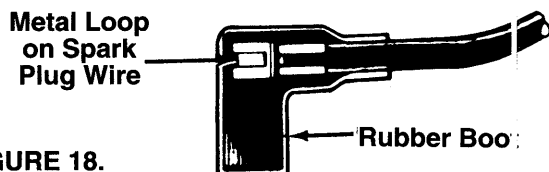


FIGURE 18.

2. Before each use, check for proper drive clutch operation by performing the following before starting the engine:

With the drive clutch control released, push mower forward. It should move freely. Pull mower backward. It should move with only a small amount of resistance (no more than 15 lbs. pressure).

If it does not and the rear wheels tend to lock up, the clutch may not be releasing completely. Do not start the engine until corrections have been made. Check the control cable for severe bend, kinks and binding, or grass build-up around the belt. Correct and adjust as required. Refer to instructions under "Drive Clutch Control Adjustment" in Adjustment Section for loosening the drive belt.

TO START ENGINE AND ENGAGE BLADE



WARNING: When starting the unit for the first time, face the mower against a solid object such as a wall, fence, etc. Start the unit, and if it shows any signs of motion with the drive clutch control disengaged, shut the engine off immediately.

1. Move throttle control lever all the way forward.
2. If engine is equipped with a primer, prime engine as instructed in the separate engine manual packed with your unit.
3. Standing behind the unit, depress the blade control handle and hold it against the upper handle as shown. See figure 19.
4. Grasp the recoil starter handle and pull back rapidly, extending rope fully. Return it slowly to the rope guide.
5. After engine starts, move throttle control to desired engine speed.

NOTE: If any problems are encountered, refer to the Trouble Shooting Guide on page 20.

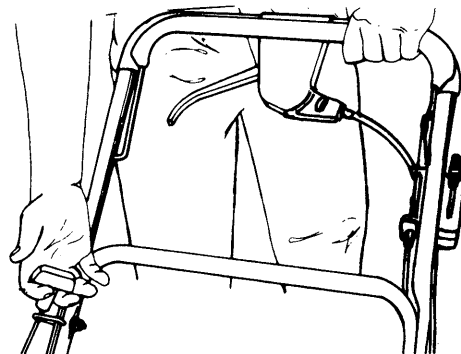


FIGURE 19.

TO STOP ENGINE AND BLADE

1. Move throttle control lever to SLOW position.
2. Release the blade control handle to stop the engine and blade.



WARNING: The blade continues to rotate for a few seconds after the engine is shut off.

3. Disconnect the spark plug wire and ground it against the engine to prevent accidental starting while equipment is unattended.

USING YOUR ROTARY MOWER



WARNING: Never operate your unit without either the rear deflector or entire grass catcher assembly in place.

Be sure that lawn is clear of stones, sticks, wire, or other objects which could damage lawn mower or engine. Such objects could be accidentally thrown by the mower in any direction and cause serious personal injury to the operator and others.

For the best results, do not cut wet grass because it tends to stick to the underside of the mower, preventing proper discharge of grass clippings, and could cause you to slip and fall. New grass, thick grass or wet grass may require a narrower cut. Blade speed should be adjusted to the condition of the lawn.

For best results, cut off one-third or less of the total length of the grass. Lawn should be cut in the fall as long as there is growth.

This mower is designed to be operated at full throttle to give you the best cut and do the most effective job of bagging the cut grass.



WARNING: If you strike a foreign object, stop the engine. Remove wire from spark plug, thoroughly inspect the mower for any damage, and repair the damage before restarting and operating the mower. Extensive vibration of the mower during operation is an indication of damage. The unit should be promptly inspected and repaired.

ADJUSTMENTS



WARNING: Do not at any time make any adjustment to lawn mower without first stopping engine and disconnecting spark plug wire.

CUTTING HEIGHT ADJUSTMENT

The height adjustment handle is located on the left side of the deck. The handle may be placed in one of nine cutting height positions. Push the handle to the left and then either forward to lower the cutting height or backward to raise the cutting height. See figure 20.

For rough or uneven lawns, move the height adjustment handle to a position which will give a higher cutting height.

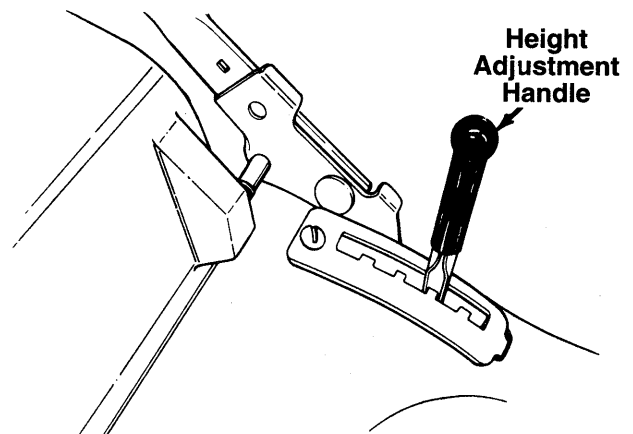


FIGURE 20.

DRIVE CLUTCH CONTROL ADJUSTMENT

Use the adjustment wheel located in the clutch control housing to tighten the drive belt if mower does not self-propel with the drive clutch control engaged, or if drive belt is slipping (unit hesitates while engine maintains the same speed). See figure 21.

In addition, the adjustment wheel may also be used to determine the position in which the drive clutch control is engaged. If it is more comfortable to have the drive engaged with the lever further away from the handle, tighten the drive belt.

Make certain to retest the unit for neutral as instructed in the Operation Section. Move the adjustment wheel in the opposite direction to loosen the drive belt if necessary.

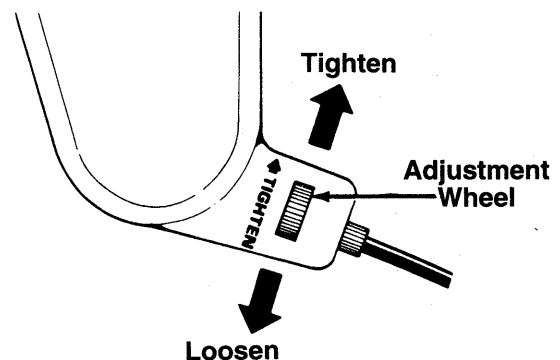


FIGURE 21.

THROTTLE CONTROL ADJUSTMENT

If the throttle control requires adjustment or if it has been replaced, adjust the throttle control as follows.

1. Remove the screw shown in figure 22. Remove the cable clamp from the cable.

NOTE: If you have a Tecumseh engine, simply loosen the screw shown in figure 22 so the cable will move freely beneath the clamp. It is not necessary to remove the screw and clamp completely.

2. Push the throttle control lever on the handle all the way forward as far as it will go, then back it off one "click". Make certain the throttle control lever remains in this position.
3. Push the control lever on the engine as far toward the rear of the engine as it will go. Secure the cable in this position with the cable clamp and screw.

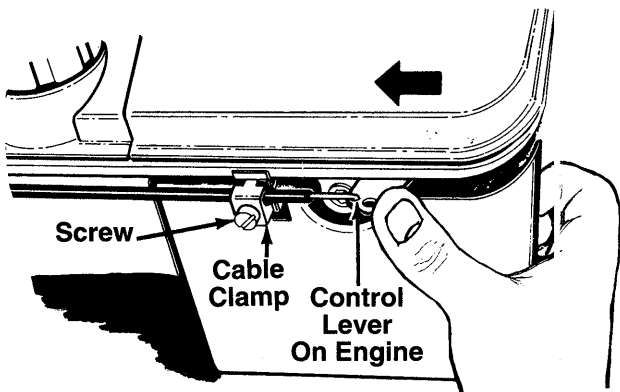


FIGURE 22A.—Briggs & Stratton Quantum Engines

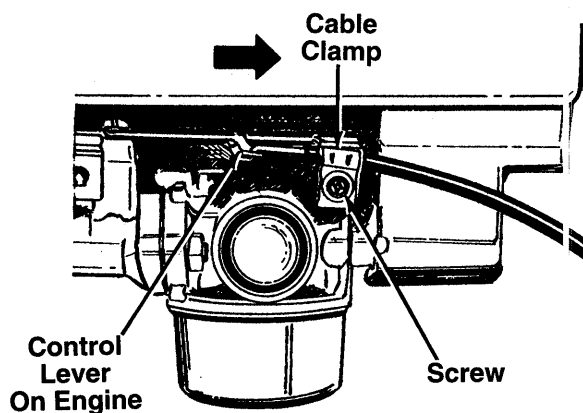


FIGURE 22B.—Tecumseh Engines

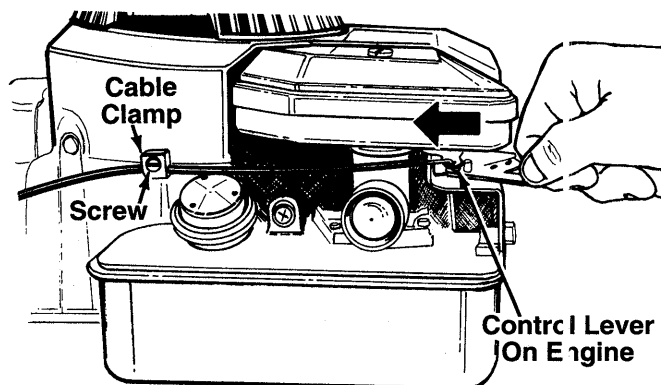


FIGURE 22C.—Briggs & Stratton Sprint and Classic Engines

CARBURETOR ADJUSTMENTS



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

Minor carburetor adjustments may be required to compensate for differences in fuel, temperature, altitude and load. To adjust carburetor, refer to the separate engine manual packed with your mower.

NOTE: A dirty air cleaner will cause an engine to run rough. Be certain air cleaner is clean and attached to the carburetor before adjusting carburetor. Refer to the separate engine manual.

LUBRICATION



WARNING: Always stop engine and disconnect spark plug wire before cleaning, lubricating or doing any kind of work on lawn mower.

Blade Control—Lubricate the pivot points on the blade control handle and the brake cable at least once a season with light oil. See figure 23. The blade control must operate freely in both directions.

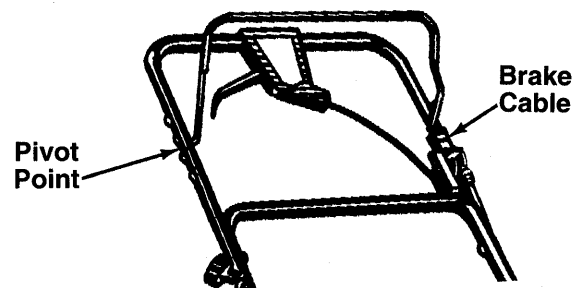


FIGURE 23.

Discharge Chute Deflector—The torsion spring and pivot point should be lubricated periodically with light oil to prevent any rust or binding. Deflector must work freely.

Wheels—Mower may be provided with ball bearing wheels. Lubricate at least once a season with light oil. Also, if the wheels are removed for any reason, lubricate the surface of the axle bolt and the inner surface of the wheel with light oil. A 4 oz. plastic bottle of light oil lubricant is available. Order part number 737-0170. Engine oil may also be used.

Engine—Follow engine manual for lubrication instructions.

Transmission—The transmission is pre-lubricated and sealed at the factory. It does not require checking. If disassembled for any reason, fill with 2 ounces of Alvania grease, part number 737-0168.

MAINTENANCE



WARNING: Be sure to disconnect and ground the spark plug wire before performing any repairs or maintenance.

NOTE: When tipping the unit, empty the fuel tank and keep engine spark plug or muffler side up.

TROUBLE SHOOTING

Refer to page 20 of this manual for trouble shooting information.

CUTTING BLADE

When removing the cutting blade for sharpening or replacement, protect hands by using heavy gloves or a rag to grasp the cutting blade. Remove the bolt and bell washer which hold the blade and adapter to the engine crankshaft. Remove the blade and adapter from the crankshaft.

If the blade or blade adapter needs replacing, remove the two small bolts, lock washers and nuts which hold the blade to the adapter.



WARNING: Periodically inspect the blade adapter for cracks, especially if you strike a foreign object. Replace when necessary.

When sharpening the blade, follow the original angle of grind as a guide. It is **extremely important** that each cutting edge receives an equal amount of grinding to prevent an unbalanced blade. An unbalanced blade will cause excessive vibration when rotating at high speeds, may cause damage to the mower and could break, causing personal injury.

It is recommended that the blade always be removed from the adapter for the best test of balance.

The blade can be tested by balancing it on a round shaft screwdriver. Remove metal from the heavy side until it balances evenly.

Before reassembling the blade and the blade adapter to the unit, lubricate the engine crankshaft and the inner surface of the blade adapter with light oil. Lubricating the bolt holes, bolts and inner surface of the nuts with light oil is also recommended. A 4 oz. plastic bottle of light oil lubricant is available. Order part number 737-0170. Engine oil may also be used.

When replacing the blade, be sure to install the blade with the side of the blade marked "Bottom" (or with part number) facing the ground when the mower is in the operating position.

Blade Mounting Torque

Center Bolt: 450 in. lbs. min., 600 in. lbs. max.

Blade Adapter Bolts: 200 in. lbs. min., 350 in. lbs. max.

To insure safe operation of your unit, all nuts and bolts must be checked periodically for correct tightness.

DECK

The underside of the mower deck should be cleaned after each use to prevent a buildup of grass clippings, leaves, dirt or other matter. If this debris is allowed to accumulate, it will invite rust and corrosion, and may cause an uneven discharge of grass clippings at the next cutting.

The deck may be cleaned by tilting the mower and scraping clean with a suitable tool (make certain the spark plug wire is disconnected).

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 25 hours under normal conditions. Clean every few hours 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.

The **spark plug** should be cleaned and the gap reset once a season. Spark plug replacement is recommended at the start of each mowing season; check engine manual for correct plug type and gap specifications.

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 grass, dirt and combustible debris from muffler area.

BELT REMOVAL AND REPLACEMENT

1. Disconnect the spark plug wire and ground it against the engine.
2. Drain the fuel tank or place a piece of plastic beneath the cap to prevent gasoline leakage.
3. Tip the mower back on its handle. Block securely.
4. Remove the rear belt baffle by removing the lock washer and hex nut shown in figure 24. Then remove one Torx bolt, using a #27 Torx driver. A 9/64" Allen wrench may also be used. Then remove one carriage bolt, lock washer and nut as shown.

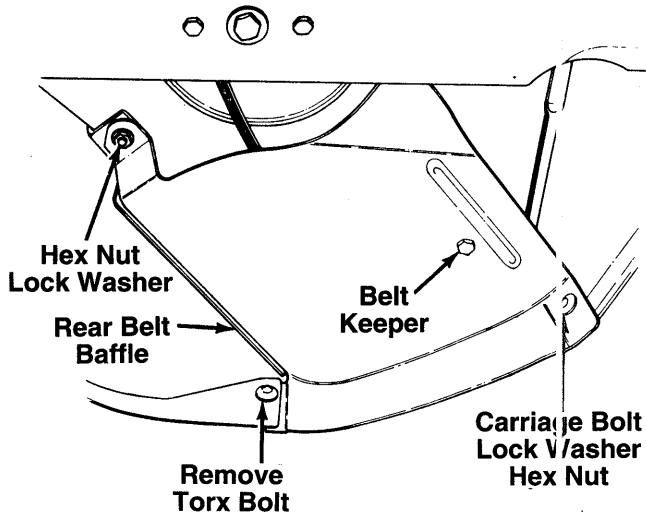


FIGURE 24.

5. Roll the belt off the transmission pulley. Remove the belt from between the idler pulley and belt guard. See figure 25.
6. Remove the belt from the pulley on the engine crankshaft, and pull it over the blade.

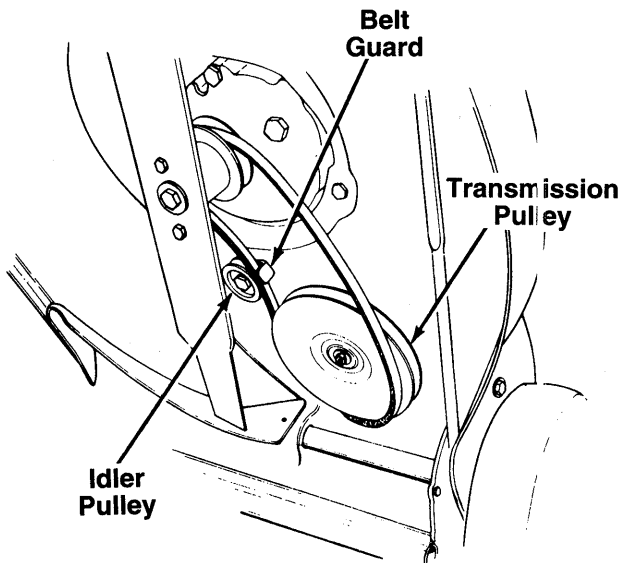


FIGURE 25.

7. Reassemble in reverse order with the new belt.

NOTE: When reassembling the rear belt baffle, make certain the belt keeper is outside of the belt, and the edge of the rear belt baffle is between the rear chute baffle and the rear panel as shown in figure 24. Make certain to tighten all nuts and bolts securely. If plastic was placed under the gas cap, be certain to remove it.

OFF-SEASON STORAGE

The following steps should be taken to prepare lawn mower for storage.

1. Clean and lubricate mower thoroughly as described in the lubrication instructions.
2. Refer to engine manual for correct engine storage instructions.
3. Coat mower's cutting blade with chassis grease to prevent rusting.
4. Store mower in a dry, clean area. Do not store next to corrosive materials, such as fertilizer.

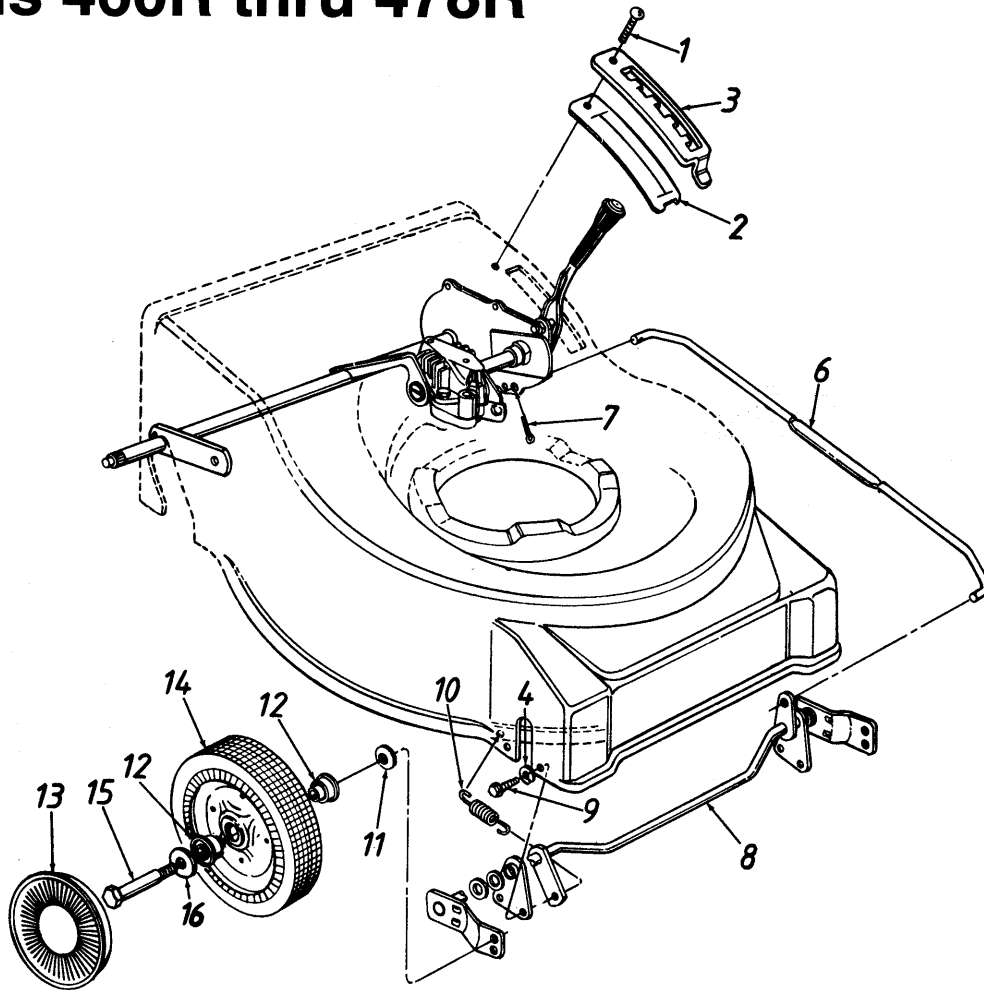
NOTE: When storing any type of power equipment in an unventilated or metal storage shed, care should be taken to rust-proof the equipment. Using a light oil or silicone, coat the equipment, especially cables and all moving parts.

HANDLE STORAGE

The handle may be placed in an upright position for storage. Move hairpin clips to outer hole on weld pins. See figure 1. Press outward on the bottom of the lower handle and push forward. The handle will lock in this position.

To place the handle in the operating position, remove the starter rope from the rope guide. Grasp the lower handle at the bottom, press outward slightly and tip the handle backward. Place the hairpin clips in the inner holes. With the spark plug wire disconnected and grounded, depress the blade control handle and pull the starter rope out from the engine. Slip the starter rope into the rope guide.

Models 460R thru 478R



PARTS LIST FOR MODELS 460R THRU 478R ROTARY MOWERS

REF. NO.	PART NO.	CODE	DESCRIPTION	REF. NO.	PART NO.	CODE	DESCRIPTION
1	710-1017		Torx Mach. AB-Tap Scr. 1/4 x .62" Lg.	10	732-0589		Extension Spring 2.39" Lg.
2	721-0216		Height Adjustment Support	11	736-0105		Bell-Wash. .380" I.D. x .88"
3	17323		Height Adjustment Plate	12	**		Flange Ball Bearing 1/2" I.D.
4	736-0329		L-Wash. 1/4" I.D.*	13	—		Hub Cap (See Below)
6	747-0699		Height Adj. Connecting Rod	14	**		Wheel Ass'y. Comp.—Front
7	714-0507		Cotter Pin 3/32" Dia.	15	738-0102		Shld. Bolt .498" Dia. x 1.45"
8	17022		Front Axle Ass'y.	16	736-0232		Wave Wash. .53" I.D. x .78"
9	710-0352		Hex L-Wash. Hd. AB-Tap Scr. 1/4 x .38" Lg.				

*For faster service obtain standard nuts, bolts and washers locally.
If these items cannot be obtained locally, order by part number
and size as shown on parts list.

Optional Hub Caps

Size	Tread Type	Part No.	Bearings
8" x 1.75"	"T" Tread	734-0180	741-0180 1/2" I.D. Ball Brg.
8" x 1.75"	Bar Tread	634-0020	—
8" x 2"	"S" Wave	734-1512A	—
8" x 2"	"S" Wave	734-1513B	741-0180 1/2" I.D. Ball Brg.

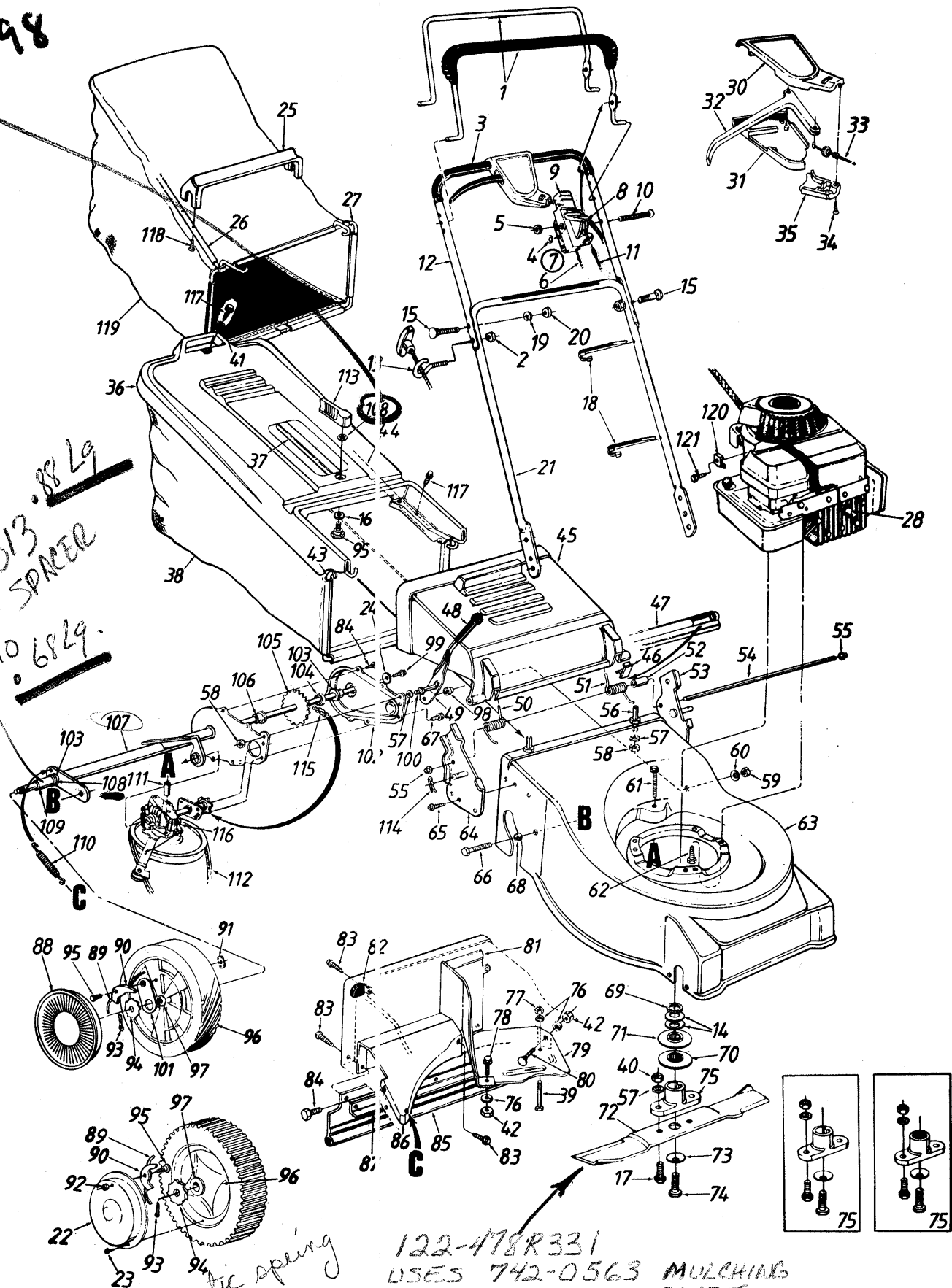
Description	Part No.
Gray (5-1/2" Dia.)	731-0981A
Beige (5-1/2" Dia.)	731-0982A
Gray (3-1/2" Dia.)	720-0249
Black (1-1/2" Dia.)	720-0251
Red (1-3/8" Dia.)	731-0342

Models 460R thru 478R

731-0498

RH
711-0313 .8829
SPACER

LH
748-0190 .6829



(RH) plastic spring
faces out
LH faces IN

122-478R331
USES 742-0563 MULCHING
BLADE

Models 460R thru 478R

PARTS LIST FOR MODELS 460R THRU 478R ROTARY MOWERS

REF. NO.	PART NO.	CODE	DESCRIPTION	REF. NO.	PART NO.	CODE	DESCRIPTION
1	747-0824	N	Std. Control Handle	49	732-0580		Spring Lever
	647-0004	N	Deluxe Control Handle	50	732-0578A		Torsion Spring—R.H.
2	712-0324		Hex Lock Nut 1/4-20 Thd.	51	732-0577A		Torsion Spring—L.H.
3	720-0225		Foam Grip (Optional)	52	750-0566		Spacer .255" I.D.
4	736-0501	N	Spr. Wash. .66" I.D.	53	12297A		Handle Brkt. Ass'y.—L.H.
5	712-0291		Hex L-Nut 1/4-20 Thd.	54	747-0698B		Hinge Pin 17.75" Lg.
6	746-0843	N	Throttle Cable—55" (B & S)	55	726-0106		Cap Speed Nut
	746-0845	N	Throttle Cable—45" (Tecumseh)	56	711-0805		Shld. Pin 3/8-24 x 1.43" Lg.
7	811-00185	N	Throttle Box Comp. (Incl. Ref. 4, 5, 8, 9, 10)	57	736-0169		L-Wash. 3/8" I.D.*
8	746-0876	N	Throttle Lever	58	712-0711		Hex Jam Nut 3/8-24 Thd.
9	746-0875	N	Throttle Body	59	712-0296		Hex L-Nut 3/8-24 Thd.
10	710-0605		Oval C-Sunk Scr.	60	736-0105		Bell-Wash. .38" I.D. x .88"
11	746-0554		Control Cable—40.5" (B & S)	61	710-0778		Hex Wash. Hd. Tap Scr. 1/4-20 x 1.5" Lg.
	746-0555		Control Cable—55" (Tecumseh)	62	710-0654A		Hex L-Wash. Hd. Scr. 3/8-16 x 1" Lg.
12	749-0439B		Upper Handle				21" Deck Ass'y.
13	710-1205		Rope Guide	63	16997	638	Handle Brkt. Ass'y.—R.H.
14	736-0473	N	Bell-Wash. 7/8" I.D. (Used w/Keyed Adapter)	64	12296A		Hex L-Wash. Hd. AB-Tap Scr. 1/4 x .62" Lg.
	736-0450		Bell-Wash. 1.01" I.D. (Used w/Splined Adapter)	65	710-0892		Hex Wash. Hd. Tap Scr. 3/8-16 x .75" Lg.
15	710-0671		Curved Carriage Bolt 5/16-18 x 1.38" Lg.	66	710-1006		Hex Wash. Hd. Tap Scr. 1/4-20 x .5" Lg.
16	736-0286		Bowed Washer	67	710-0599		Spacer .383" I.D.
17	710-1055		Hex Bolt 3/8-24 x 1" Lg.	68	750-0736		Crankshaft Spacer (Keyed)
18	726-0240		Cable Tie	69	748-0358	N	Crankshaft Spacer (Splined)
19	736-0119		L-Wash. 5/16" I.D.*		748-0332		Pulley Half—Lower (Keyed)
20	712-0267		Hex Nut 5/16-18 Thd.*	70	756-0961	N	Pulley Half—Upper (Keyed)
21	749-0504C		Lower Handle	71	756-0962	N	Pulley Half—2 Req'd. (Used w/Splined Adapter)
22	10647		Hub Cap (Optional)		756-0502		21" Blade
23	710-0748		Pan Hd. Tap Scr. #12 x .50" Lg. (Used w/Ref. #22)	72	742-0306A		Bell-Wash. .39" I.D. (Used w/Keyed Adapter)
24	736-0270		Bell-Wash. .265" I.D. x .75"	73	736-0452		Bell-Wash. .46" I.D. (Used w/Splined Adapter)
25	731-0801		Bag Handle†				Hex Bolt 3/8-24 x 1.5" Lg. (Used w/Keyed Adapter)
26	749-0764A		Rear Catcher Frame†		736-0453		Hex Bolt 7/16-20 x 1.5" Lg. (Used w/Splined Adapter)
27	764-0412	N	Front Catcher Frame†				Blade Adapter Kit (Keyed)
28	735-0639		Spark Plug Boot (Optional)	74	710-1044		Blade Adapter Kit (Splined)
29	—		Engine				L-Wash. 1/4" I.D.*
30	731-1057		Control Cover Half—Upper		710-0757		Hex Jam Nut 1/4-20 Thd.
31	731-0618A		Control Cover Half—Lower				Hex Bolt 1/4-20 x .85" Lg.
32	731-0620		Control Lever	75	753-0484		Rear Belt Baffle
33	746-0711A	N	Drive Cable—51" Lg.		753-0485		Carr. Bolt 1/4-20 x .50" Lg.*
34	710-0841		Flat C-Sunk Hd. Tap Scr. #10 x .75" Lg.	76	736-0329		Rear Panel Baffle
35	731-1059		Cable Mtg. Cap	77	712-0298		Corner Plug
36	731-0857A		Hardtop Bag Cover††	78	710-0252		Torx Mach. AB-Tap Scr. 1/4 x .62" Lg.
37	731-0856		Hardtop Handle††	79	17013		Hex B-Tap Scr. 1/4 x .38" Lg.
38	764-0252		Grass Bag††	80	710-0167		Rear Flap
39	710-0166		Truss Mach. Scr. 1/4-20 x 1.0" Lg.	81	17006		Rear Chute Baffle
40	712-0241		Hex Nut 3/8-24 Thd.*	82	731-0931		Retaining Strip
41	736-0463		Fl-Wash. .281" I.D. x .62"††	83	710-1017		Hub Cap (Optional)
42	712-0287		Hex Nut 1/4-20 Thd.*	84	710-0352		Plastic Spring
43	764-0411	N	Front Catcher Frame††	85	731-0669		Pawl .345" I.D.
44	749-0736A		Rear Catcher Frame††	86	17008		
45	731-0859		Chute Deflector	87	14847		
46	731-0970B		Deflector Plug	88	**		
47	731-0858		Seal—Extrusion	89	10622B		
48	720-0223		Grip	90	748-0188B		

Models 460R thru 478R

PARTS LIST FOR MODELS 460R THRU 478R ROTARY MOWERS (CONTINUED)

REF. NO.	PART NO.	CODE	DESCRIPTION	REF. NO.	PART NO.	CODE	DESCRIPTION
91	712-0414	N	Weld Top L-Nut 1/4-20 Thd. (Used w/Ref. #88)	108	736-0400 0160		Internal F-Wash. 1/4" I.D.
92	712-0324		Hex Ins. L-Nut 1/4-20 Thd. (Used w/Ref. #22)	109	748-0190 11-0313		Spacer .513" I.D. RH
93	714-0115		Cotter Pin 1/8" Dia.	110	732-0481		Extension Spring 3.8" Lg.
94	748-0318		Ratchet Wheel 1.62" O.D.	111	750-0589		Spacer .325" I.D.
95	738-0137		Shld. Bolt .342" Dia. x .268"	112	754-0346		V-Belt
96	**		Wheel Ass'y. Comp.—Rear	113	720-0224		Grass Catcher Locking Knob
97	**		Bearing 1/2" I.D.	114	714-0104		Internal Cotter Pin 5/16" Dia.
98	750-0624		Shld. Spacer .50" Dia.	115	713-0353		#48 Chain .50" Pitch x 30 Links
99	710-0751		Hex Bolt 1/4-20 x .62" Lg. (Gr. 5)	116	717-0417B		Transmission Comp. (See Breakdown)
100	711-0805		Shld. Pin 3/8-24 x 1.43" Lg.	117	710-0892		Hex L-Wash. H.D. AB-Tap Scr. 1/4 x .62" Lg.††
101	16855		Pawl Plate	118	710-1025		Hex AB-Tap Scr. #12 x 1.25" Lg.†
102	17053A		Chain Cover Ass'y.	119	764-0246	N	Grass Bag†
103	741-0324		Hex Flange Brg. .506" I.D.	120	751-0568	N	Cable Clamp (B & S)
104	736-0160		Fl-Wash. .531" I.D. x .93"	121	710-1237	N	Hex Self-Tap Scr. #10-32 x .62" Lg. (B & S)
105	738-0719A		Rear Axle Ass'y.				
106	741-0522		Hex Flange Bearing				
107	17009		Chain Axle Ass'y.				

†Models 460R thru 468R Only.
††Models 470R thru 478R Only.

*For faster service obtain standard nuts, bolts and washers locally.
If these items cannot be obtained locally, order by part number and size as shown on parts list.

NOTE: The engine is not under warranty by the mower manufacturer. . . If repairs or service is needed on the engine, please contact your nearest authorized engine service outlet. Check the "Yellow Pages" of your telephone book under "Engines—Gasoline."



This instruction manual covers various models, and all specifications shown do not necessarily apply to your model. Specifications subject to change without notice or obligation.

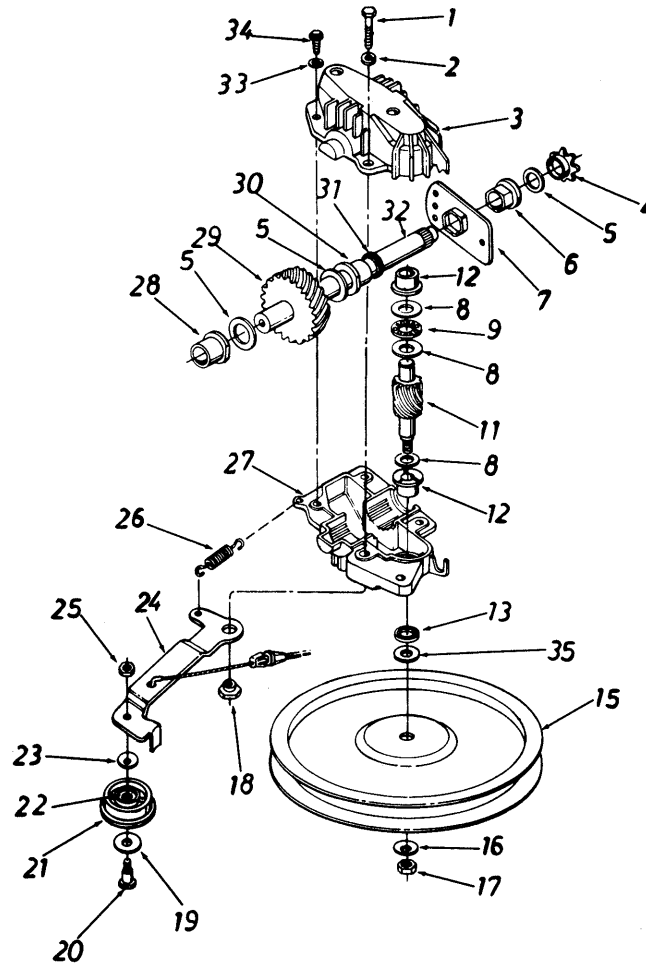
**REAR WHEEL CHART

Size	Tread Type	Part No.	Bearings
8" x 1.75"	Bar Tread	634-0020	—
8" x 1.75"	"T" Tread	734-1412	741-0180 1/2" I.D. Ball Brg. (2 Req'd.)
8" x 2"	"S" Wave	734-1510AB (Silver)	741-0186B 1/2" I.D. Sleeve Brg.
8" x 2"	"S" Wave	734-1514B (Beige)	741-0186B 1/2" I.D. Sleeve Brg.
8" x 2"	"S" Wave	734-1512A (Silver)	—

**Optional Hub Caps

Description	Part No.
Gray (5-1/2" Dia)	731-0981A
Beige (5-1/2" Dia.)	731-0982A
Gray (3-1/2" Dia.)	720-0249
Black (1-1/2" Dia.)	720-0251
Red (1-3/8" Dia.)	731-0342

Models 460R thru 478R



PARTS LIST FOR MODELS 460R THRU 478R ROTARY MOWERS

REF. NO.	PART NO.	CODE	DESCRIPTION	REF. NO.	PART NO.	CODE	DESCRIPTION
1	710-1062		Hex Bolt 1/4-20 x 1.25" Lg. w/Patch	19	736-0344		FI-Wash. .390" I.D. x 1.0"†
2	736-0329		L-Wash. 1/4" I.D.*	20	738-0826		Shld. Bolt .375" Dia. x .40"†
3	717-0418A		Upper Hsg. Half	21	756-0558		FI-Idler Plastic 1.50" Dia.†
4	713-0400		#48 Sprocket 7 Tooth x 1/2 Pitch	22	741-0556		Needle Brg. .375" x .31"†
5	736-0336		FI-Wash. 5/8" I.D. x .030	23	736-0270		Bell-Wash. .265" I.D. x .75"†
6	741-0413		Hex Flange Brg. .631" I.D.	24	17052A		Idler Brk't. Ass'y.†
7	16500A		Hex Bearing Cup	25	712-0138		Hex Patch L-Nut 1/4-28 Thd.†
8	736-0314		Thrust Wash. .382" I.D. x .70" O.D.	26	732-0357A	N	Extension Spring 1.12" Lg.†
9	741-0479		Thrust Bearing .375" I.D. x .812" O.D.	27	717-0419A		Lower Hsg. Half
11	717-1216		11 Tooth Pinion Shaft	28	741-0415		Flange Bearing .566 Dia.
12	748-0208A		Flange Bearing	29	717-0422		33 Tooth Helical Gear
13	721-0212		Oil Seal	30	741-0414		Flange Bearing .629 Dia.
15	756-0330A		FI-Pulley 5.06" O.D.†	31	721-0213		Oil Seal .625 Dia.
16	736-0270		Bell-Wash. .265" I.D. x .75"†	32	738-0607		Gear Sprocket Shaft
17	712-0351		Hex L-Nut 1/4-28 L.H. Thd.†	33	736-0722		L-Wash. #10 I.D.
18	738-0440		Shld. Spacer .375" Dia. x .170"†	34	710-0436		Hex B-Tap Scr. #10 x .62"
				35	736-0410		Hex Washer .26" x .88"†
				—	717-0417B		Transmission Comp.

†Not Part of Transmission Complete

TROUBLE SHOOTING GUIDE

Trouble	Possible Cause(s)	Corrective Action
Engine fails to start	<ol style="list-style-type: none"> 1. Blade control handle disengaged. 2. Spark plug wire disconnected. 3. Throttle control lever not in CHOKE or START position. 4. Fuel tank empty, or stale fuel. 5. Blocked fuel line (if so equipped). 6. Faulty spark plug. 7. Engine flooded. 	<ol style="list-style-type: none"> 1. Engage blade control handle. 2. Connect wire to spark plug. 3. Move throttle lever to CHOKE or START position. 4. Fill tank with clean, fresh gasoline. 5. Clean fuel line. 6. Clean, adjust gap or replace. 7. Remove spark plug, dry the plug, and crank engine with plug removed and throttle in off position. Replace spark plug, connect wire and resume starting procedures.
Engine runs erratic	<ol style="list-style-type: none"> 1. Unit running in CHOKE or START position. 2. Spark plug wire loose. 3. Blocked fuel line (if so equipped) or stale fuel. 4. Vent in gas cap plugged. 5. Water or dirt in fuel system. 6. Dirty air cleaner. 7. Carburetor out of adjustment. 	<ol style="list-style-type: none"> 1. Move throttle lever to FAST position. 2. Connect and tighten spark plug wire. 3. Clean fuel line; fill tank with clean, fresh gasoline. 4. Clear vent. 5. Drain fuel tank. Refill with fresh fuel. 6. Clean air cleaner.† 7. Adjust carburetor.†
Engine overheats	<ol style="list-style-type: none"> 1. Engine oil level low. 2. Air flow restricted. 3. Carburetor not adjusted properly. 	<ol style="list-style-type: none"> 1. Fill crankcase with proper oil. 2. Remove blower housing and clean.† 3. Adjust carburetor.†
Occasional skip (hesitates) at high speed	<ol style="list-style-type: none"> 1. Spark plug gap too close. 2. Carburetor idle mixture adjustment improperly set. 	<ol style="list-style-type: none"> 1. Adjust gap to .030" 2. Adjust carburetor.†
Idles poorly	<ol style="list-style-type: none"> 1. Spark plug fouled, faulty or gap too wide. 2. Carburetor improperly adjusted. 3. Dirty air cleaner. 	<ol style="list-style-type: none"> 1. Reset gap to .030" or replace spark plug. 2. Adjust carburetor.† 3. Clean air cleaner.†
Excessive vibration	<ol style="list-style-type: none"> 1. Cutting blade loose or unbalanced. 2. Bent cutting blade. 	<ol style="list-style-type: none"> 1. Tighten blade and adapter. Balance blade. 2. Replace blade.
Mower will not discharge grass	<ol style="list-style-type: none"> 1. Engine speed too low. 2. Wet grass. 3. Excessively high grass. 	<ol style="list-style-type: none"> 1. Set throttle between 3/4 and full throttle. 2. Do not mow when grass is wet; wait until later to cut. 3. Mow once at a high cutting height, then mow again at desired height or make a narrower cutting swath (1/2 width).
Uneven cut	Dull blade.	Sharpen or replace blade.

†Refer to separate engine manual packed with your unit.

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

**FOR REPLACEMENT PARTS, CONTACT:
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