

LIST PRICE \$5.00

# POWER UNITS & Gardening Attachments

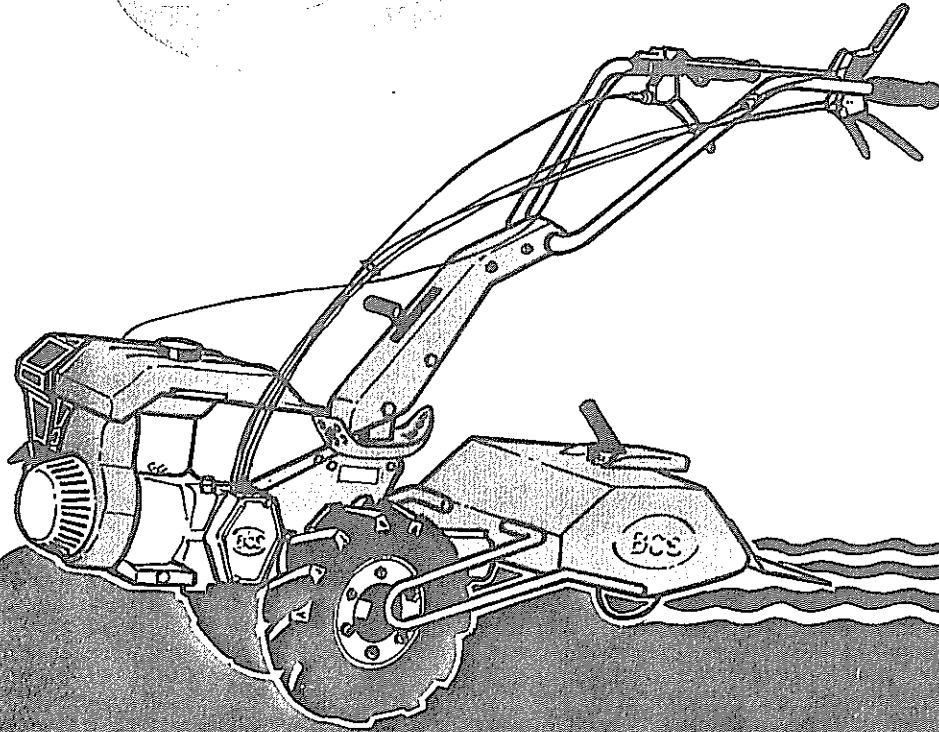
MODELS

201

203

204

205



# OWNERS Use & Care MANUAL



READ THIS OWNER'S MANUAL BEFORE ATTEMPTING TO  
OPERATE ANY OF THE POWER UNITS OR ATTACHMENTS

# PREFACE

Dear Customer;

Thank you for your purchase. Get set to enjoy the benefits your wise selection of a BCS machine has earned for you. We believe there to be no other make machine that can handle so many lawn and garden tasks with such fine results as you can enjoy with your BCS — and with such little effort on your part.

The BCS Limited Warranty for your machine extends for a full three years, or one year for commercial or rental use, during which time all necessary service qualifying under the conditions of warranty will cost you only for the transportation of the machine.

The beauty of the BCS concept is that you need only to add interchangeable attachments to your BCS instead of buying a whole machine for each application. With precision gearing throughout, your BCS machine is built for lasting service, with no troublesome drive belts or chains.

Our network of BCS distributors and servicing dealers stands ready to supply your needs for attachments, accessories, parts and service. With a yearly check-up, your local dealer can help you keep your BCS equipment in top shape. In the meantime, be sure to follow the operating and maintenance tips in this owner's manual for satisfied performance of your machine.

BCS Mosa, Inc.

## GRAPHIC SYMBOLS

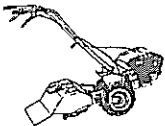


*This symbol is like a warning flag. It flags your attention to danger warnings in the manual.*

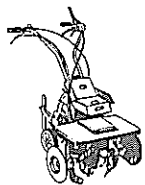


*When placed over a picture or an item in the picture, this symbol says "NO! Do not do, or use, or permit whatever is shown."*

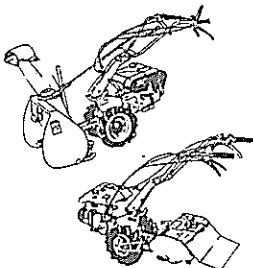
## PUSHER, TRACTOR AND CONVERTIBLE POWER UNITS



A **tractor** has the power take-off (PTO) connector in the rear and the engine up front. Model 201 is a tractor. Its sole attachment is the 18-inch rear tine tiller.



A **pusher** has the power take-off (PTO) connector up front and the engine in the rear. Models 203 and 204 are pushers. They can be used only with front-mounted attachments including a rotary mower, cutter bar mower, and snow thrower. A front-mount tiller attachment is available for model 204.



**Convertible** pusher/tractor model 205. This model can use most of the front-mount attachments the model 204 uses or can be converted to tractor for the rear-tine tiller attachment. Conversion from one mode to the other consists of swinging the control handle around from one end to the other and setting the wheels to rotate for forward travel with machine in forward gear.

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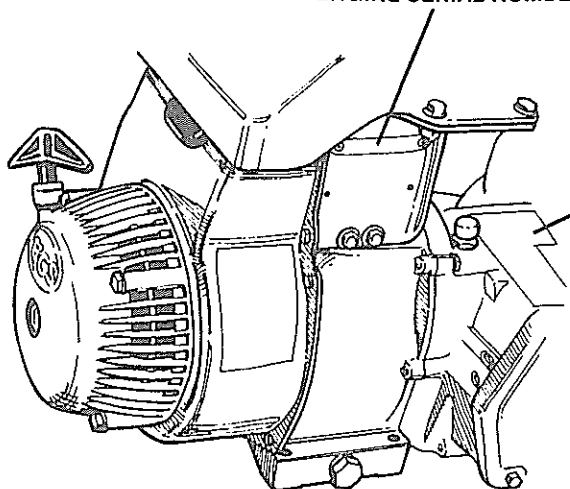
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## ⚠ WARNING

**READ ALL SAFETY RULES AND OPERATING AND MAINTENANCE INSTRUCTIONS IN THIS MANUAL BEFORE USING ANY POWER UNIT, ATTACHMENT, AND/OR ACCESSORY.**

ENGINE SERIAL NUMBER



BCS UNIT  
SERIAL  
NUMBER

RECORD SERIAL NUMBERS HERE

BCS UNIT ☆ \_\_\_\_\_ ☆

ENGINE MODEL \_\_\_\_\_

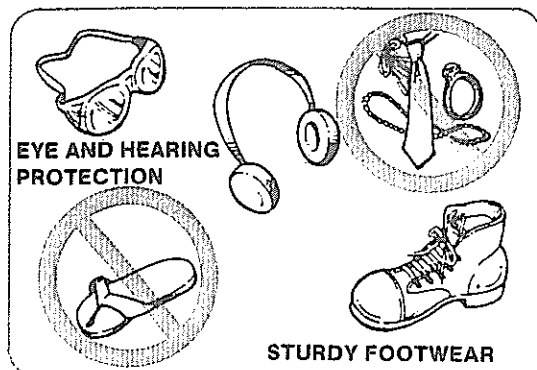
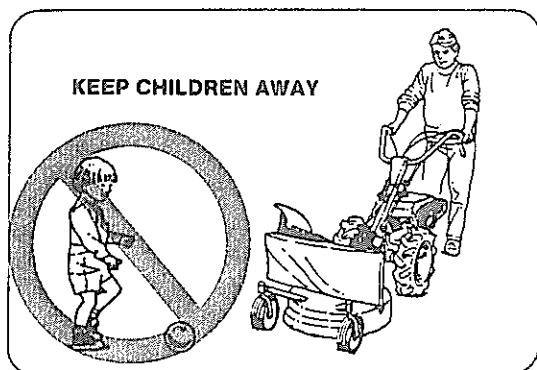
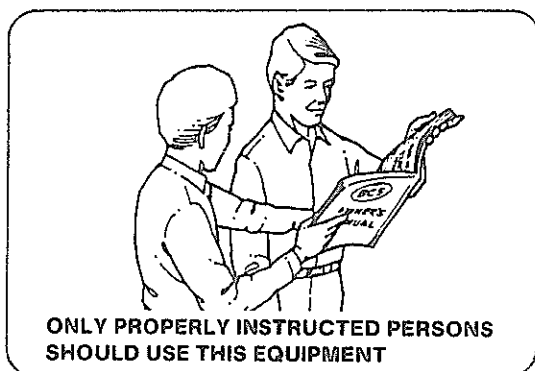
ENGINE SERIAL \_\_\_\_\_

# SECTION ONE

## INSTRUCTIONS FOR SAFE OPERATION OF BCS POWER UNITS AND ATTACHMENTS

General precautions and instructions are followed by specific precautions for each combination of attachment and power unit in the owner's manual.

### GENERAL PRECAUTIONS AND INSTRUCTIONS



#### TRAINING

READ THIS OWNER'S MANUAL PRIOR TO OPERATING THE POWER UNITS AND ATTACHMENTS. BCS power units and attachments are designed for operation by properly instructed adults only. Make certain that any person operating this equipment has read this manual.

DO NOT LET CHILDREN OPERATE THE POWER UNIT.

KEEP THE OPERATING AREA CLEAR OF PEOPLE AND ANIMALS. BE CAREFUL THAT CHILDREN DO NOT COME NEAR.

During its storage and whenever the power unit is unattended, render the engine unstartable by disconnecting the spark plug wire from the spark plug.

#### PREPARATION

Wear appropriately protective clothing and safety protection articles for the climate and type of attachment you are to operate.

1. For all walk-behind applications, wear sturdy non-slip boots or shoes. See recommendations listed for use of a particular attachment. Do not wear open-toed sandals or go barefoot when operating these machines.
2. Wear snug-fitting protective clothing which allows freedom of movement without being loose-fitting. Ties, scarfs, and jewelry which could be caught in the machinery should not be worn.
3. Wear hearing protection.
4. Wear eye protection when operating a snow-thrower, rotary mower, or cutter bar mower attachment.
5. Overexposure to sunlight can be damaging to your eyes and skin. When working in strong sunlight, protect your eyes with sun glasses, and either keep your body covered or apply a sun screen lotion.

Do not operate on terrain where you cannot maintain good footing or where the machine could overturn or slide into you. Walk slowly behind the unit. DO NOT RUN!

Thoroughly inspect the area where you are going to mow grass or throw snow. Remove toys, stones, wires, glass, and other objects which could be caught up and thrown by the machine.

Take the following precautions for the safe handling and storage of fuel:

1. Keep fuel supplies in approved type, properly labeled fuel containers.
2. Do not store fuels or fueled units in closed (unventilated) areas or in garages or shops connected to human living quarters. Do not store units or fuel where there are flames or sources of sparks such as electrical appliances and switches.
3. Obey all local regulations for the storage and handling of fuel.
4. Do not smoke when fueling, and do not fuel where the fumes could be ignited by fire or sparks.
5. Do all fueling outdoors over non-flammable surfaces. If fuel is spilled on the unit, wipe the unit dry and properly dispose of the wiping rag. ALWAYS MOVE THE UNIT AT LEAST 10 FEET (3m) AWAY from the fueling spot and fuel supplies before starting the engine.
6. Always remove the engine fuel cap very slowly to equalize tank pressure and avoid spurting of fuel. Keep your face and eyes away from the tank while loosening the fuel cap.
7. Do not fuel a running or hot engine. Do not loosen the fuel cap until the engine has stopped. Then wait several minutes for the engine to cool before pouring fuel.

Before starting the engine, disengage all control levers including the power take-off (PTO) for the attachment.

Never make blade height or any other adjustment to the power unit or any attachment while the engine is running.

## OPERATION

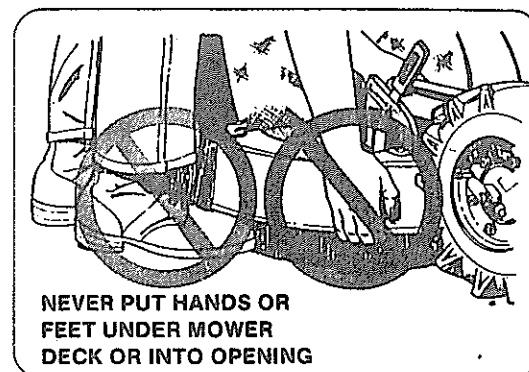
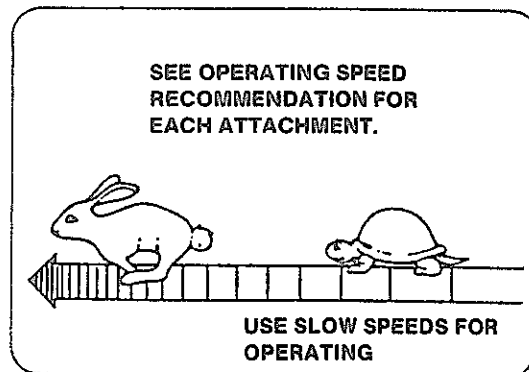
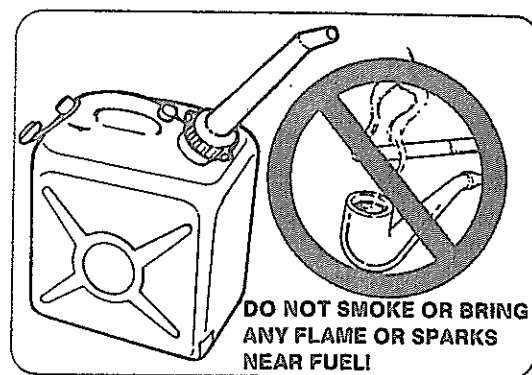
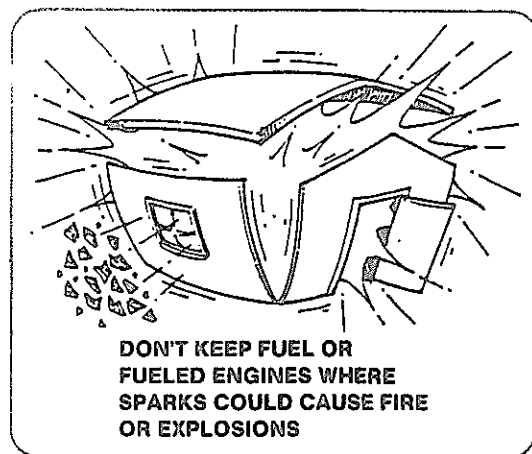
Operate only when there is good visibility. Do not operate at dusk or at night. Do not operate when it is foggy or hazy.

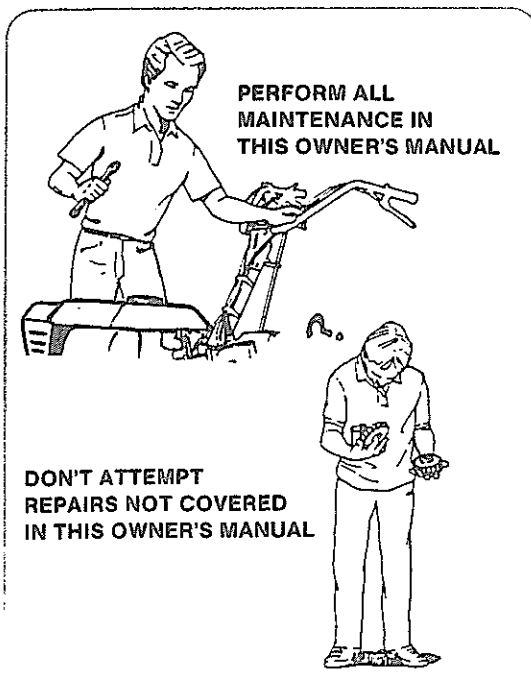
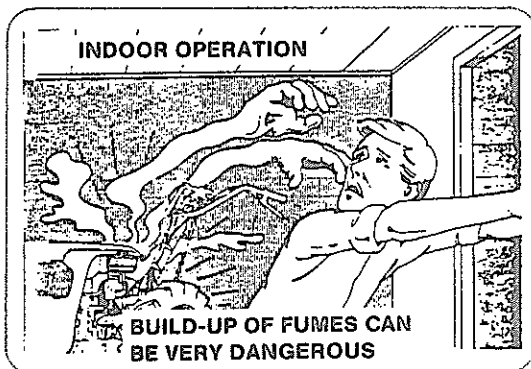
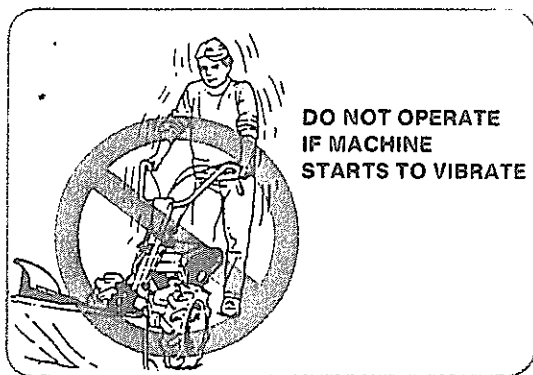
Never change the engine governor setting or overspeed the engine. Use the throttle and gear settings recommended for particular attachments and applications in this owner's manual.

Do not put hands and feet under the mower deck or into the discharge openings of a rotary mower.

Do not put fingers or any other part of the body into the intake or discharge openings of any mower or snow-thrower attachment unless the engine has been rendered unstartable (by disconnection of spark plug wire). Keep machine clean-out holes closed. Stay out of the discharge stream of a mower or snow-thrower.

Always stop operation of a rotary mower, a cutter bar mower, snow thrower, or a tiller before crossing paved or gravel roadways.





Do not make adjustments or repairs to the machine when the engine is running. Shut off the engine, wait until reciprocating or rotating parts of the attachment have stopped, and disconnect the spark plug wire:

1. Before leaving the unit where unauthorized persons may start it accidentally.
2. When a foreign object has been struck or taken into the attachment. Proper operation should be restored before further use.
3. Before cleaning out a clogged attachment such as a rotary mower, cutter bar, or snow-thrower.
4. If the machine suddenly starts to vibrate or run erratically. The entire machine should be inspected by an authorized BCS servicing dealer before further use.

Never back the unit when power to the attachment is engaged. Before using *reverse*, always be sure the PTO (power take-off) to the attachment is disengaged.

Some units have either a *PTO Lockout* or a *PTO/Reverse Lockout*. Both devices ensure against inadvertent engagement of the PTO. Also, the *PTO/Reverse Lockout* prevents operating the attachment during backing of the unit. **DO NOT DISCONNECT** either device or otherwise defeat its purpose.

All safety guards, plates, deflectors, and shields must be in proper position. Do not operate if any safety devices or fastening parts are missing from the unit.

Do not run the engine indoors where deadly poisonous carbon monoxide fumes can collect. If the engine is to be started inside a garage or barn, open the doors and windows wide so the fumes can escape.

## MAINTENANCE AND STORAGE

Keep the power unit, engine, and all attachments in safe working condition.

Clean the unit and attachments at regular intervals; also check for damaged or missing parts. Check the tightness of all fasteners.

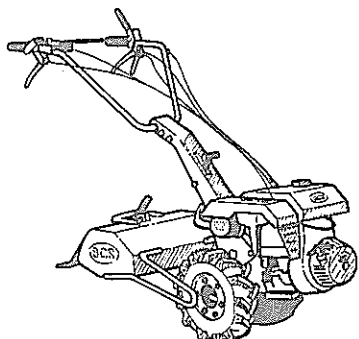
Perform the items of maintenance recommended in this owner's manual. Do not attempt any disassembly and repairs for which instructions have not been furnished. Certain engine adjustments and internal servicing of the engine, power unit, and attachments should be done only by a BCS-trained serviceman at an authorized BCS servicing dealer or distributor.

Do not store the machine with fuel in the system. Disconnect the fuel line at the carburetor inlet and drain the fuel into a fuel container. Then reconnect the fuel line. Start and run the engine until it stops from lack of fuel. Open the drain and drain the float bowl at the bottom of the carburetor.

Store the machine in a well-ventilated place, protected from dampness and the weather.

# TILLER PRECAUTIONS

## FOR BOTH REAR-TINE AND FRONT MOUNT TILLERS



### SPECIAL: TO SET MODEL 205 AS TRACTOR

Do the following to convert the model 205 from a pusher to a tractor for rear-tine tiller operation:

1. Swing the control handle over the PTO end of the unit. (See page 12 for procedure.)
2. Change the reverser on the wheels from the direct drive to the reverse position. This will cause the tractor to move forward in forward gear. (See page 13 for reverser instructions.)

Disengage the PTO before backing the unit. Use slow throttle setting during backing. Never till while backing the unit.

Do not use makeshift accessories in conjunction with the unit or the attachment.

Do not put hands or feet near or under the tiller housing. Keep away from the rotating tines. The tines of the BCS tiller rotate at high speeds independent of the tractor gear speed settings.

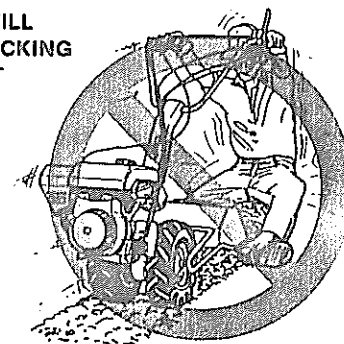
Inspect the area to be tilled. Pick up rocks and other objects of a size which may jam or otherwise interfere with tiller operation.

Till only when there is good light.

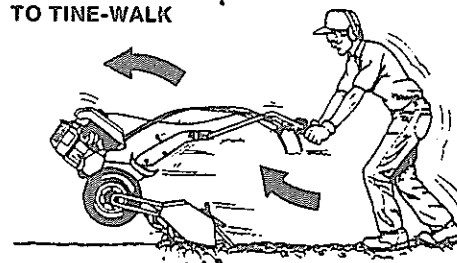
Use caution to avoid slipping and falling. Wear footwear which will improve footing on slippery surfaces.

On hard, rocky or previously untilled soil, set the tiller for minimum soil penetration and use slow throttle and gear settings for the first few passes. **DO NOT LATCH THE CONTROLS.** Keep on the alert in case a hidden obstruction causes the tiller to tine-walk (leap forward). If the unit tine-walks, let go of the controls and it will stop. If you fight to maintain control, you may lose it.

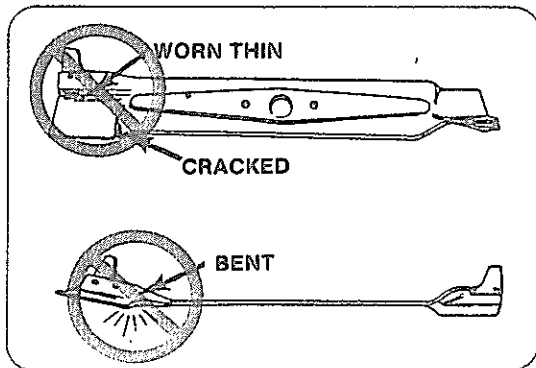
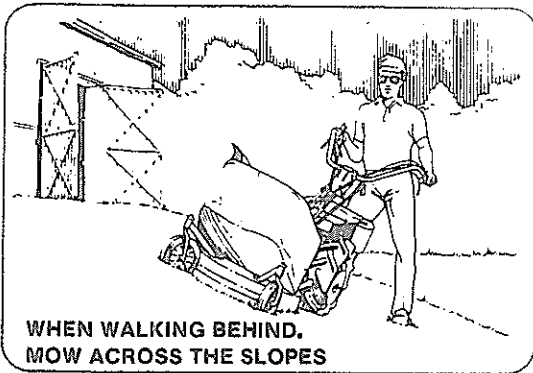
**DO NOT TILL  
WHILE BACKING  
THIS UNIT**



**OBSTRUCTIONS  
CAN CAUSE TILLER  
TO TINE-WALK**



## ROTARY MOWER PRECAUTIONS



Clear the area to be mowed of all objects (wires, rocks, toys, etc.) which might be picked up and thrown by the mower.

Stay alert for holes, rocks, roots in the terrain, and other hidden hazards. Keep away from drop-offs.

Be especially cautious when changing direction on slopes. When walking behind, mow across the slope, never up and down. Do not mow excessively steep slopes.

Use *slow* throttle setting during backing. If the unit is not equipped with a **PTO/reverse lockout** to prevent simultaneous engagement of *PTO* and *reverse*, **DISENGAGE THE PTO BEFORE BACKING THE UNIT.**

Be careful not to discharge grass in the direction of roadways, houses, vehicles and people.

Inspect grass bags frequently for wear and deterioration. Replace grass bags which are not in good condition.

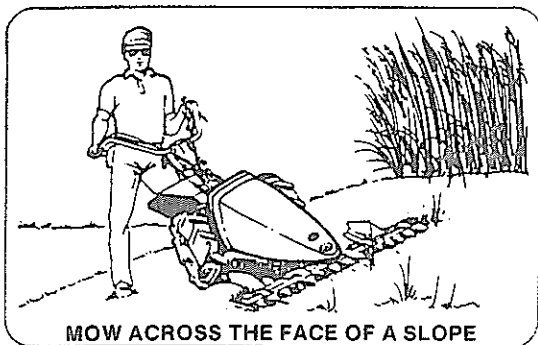
Mower decks designed for grass bags either must have a grass bag in position or must have the discharge opening to the grass bag closed or covered with a baffle.

Before removing the grass bag for emptying, disengage the PTO, shut off the engine, and wait until the mower blades have stopped.

Never put hands in any openings of the mower or grass bag when the engine is running. If necessary to clear out the discharge chute with your hands, always first disconnect the spark plug wire.

Keep the mower blades in good condition. Inspect, sharpen, and maintain blades as recommended for mower attachments in Section 4. Replace bent, badly worn blades because pieces breaking off can become projectiles. After they are sharpened, blades should be balanced.

## CUTTER BAR MOWER PRECAUTIONS



Cutter bar mowers are designed for mowing over terrain which is too rugged or steep for use of rotary mowers. Use care when mowing hilly terrain. Always mow across the face of a slope, never up and down. Use wheel extenders for added stability. Do not mow excessively steep slopes. Go slowly and carefully on all turns.

Cutter bar mower attachments are intended for walk-behind operation only. Do not operate the mower from a trailer or sully.

Disengage\* the PTO when backing the machine.

If the reciprocating blades become jammed, always shut off the engine, disengage all controls, disconnect the spark plug wire, and wait until all movement stops before attempting to clear the obstruction.

\* If a model 204 or 205 has a PTO/reverse lockout, it is impossible to engage **PTO** and **reverse** simultaneously.



# SNOW THROWER PRECAUTIONS

Wear protective, trim fitting winter clothing with no scarfs or draw strings which could be caught in the machinery. Wear boots or shoes designed to improve your footing on slippery surfaces. Wear proper eye protection.

When necessary to start the engine indoors and to drive the machine out of the building, keep the doors and windows wide open. Exhaust fumes can be dangerous.

The wooden stick clamped to the outside can be removed and used to deice the inside of the snow thrower. Never put this stick, or your hands, or anything else into the discharge opening or the impeller/collector opening when the engine is running. Severe injury can result from hand contact with a rotating impeller. Hard objects, such as the deicing stick, contacted by the moving blades will be thrown out with great force. Always disengage the PTO, shut off the engine, and wait until all moving parts have stopped before doing the following:

1. Cleaning or deicing the impeller/collector and discharge chute. (If possible, detach snow-thrower and thaw in a warm, dry place.)
2. After striking a foreign object, thoroughly inspect for damage. Make repairs before further operation.

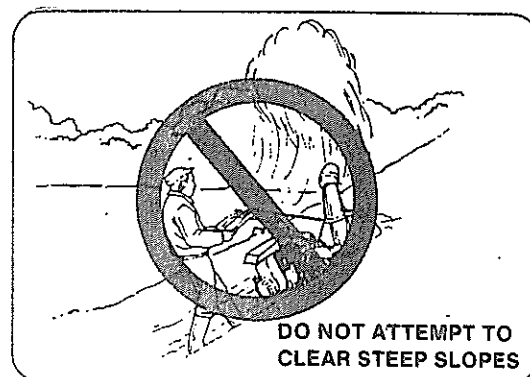
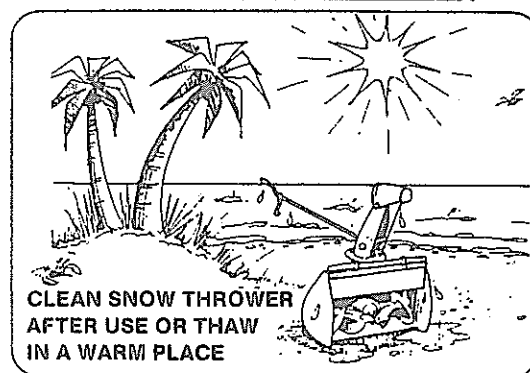
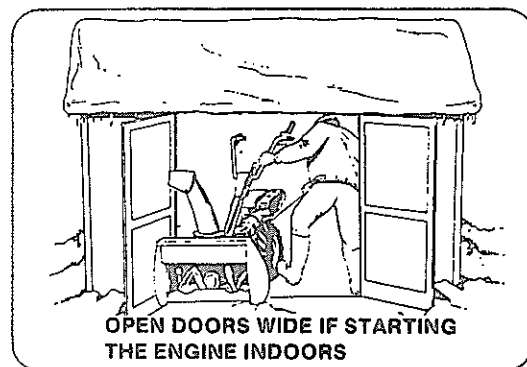
Never use the snow thrower near glass enclosures, automobiles, window wells, drop-offs, etc., without adjusting the discharge angle away from them.

Keep children, pets and observers away.

Do not overload machine capacity by attempting to clear snow at too fast a pace.

Work at slow speeds only. Never use high speed on slippery surfaces, and do not attempt to clear steep slopes.

Use only attachments and accessories (wheels and tires, chains, counterweights, etc.) approved by the manufacturer.



# SECTION TWO

## PREPARING FOR USE

### SPECIFICATIONS:

#### ENGINE

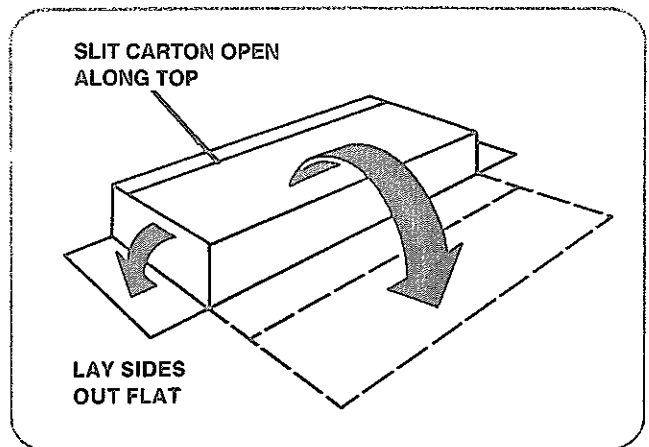
#### POWER UNIT

MODEL	BCS A-180	BCS A-220
TYPE	4-stroke, air-cooled	4-stroke, air-cooled
DISPLACEMENT	179 cm <sup>3</sup> -10.92 in. <sup>3</sup>	220 cm <sup>3</sup> -13.43 in. <sup>3</sup>
RATED POWER	3.3 kw-4.5hp	4 kw-5.5hp
MAXIMUM SPEED	377 rad/s-3600 rpm	377 rad/s-3600 rpm
AIR CLEANER	foam filter element	dry cartridge

ITEM	MODEL 201	MODEL 203	MODEL 204	MODEL 205
<b>ALL-GEAR TRANSMISSION</b> Constant mesh Gears: Forward Reverse  Speed (mph) No. 1 No. 2 Reverse	1 Free-wheeling, no reverse  0.75 — —	1 Free-wheeling, no reverse  1.7 — —	2 1  1.7 3.7 2.0	2 1  Rear Mount: 0.6 0.9 0.7 Front Mount: 1.7 2.7 2.0
<b>POWER TAKE-OFF (PTO)</b> Rotation at highest peak with engine at 3600 rpm Type Attaching method	920 rpm Independent Spring-loaded couplers	920 rpm Independent Spring-loaded couplers	920 rpm Independent Spring-loaded couplers	920 rpm Independent Spring-loaded couplers
<b>WHEELS &amp; TIRES</b> Size Reverser/reducer Tread Track Width	3.50-6 No Tractor 340mm—13.4 inches	3.50-6 No Turf or tractor 340mm—13.4 inches	3.50-6 No Turf or tractor 340mm—13.4 inches	3.50-6 Yes Tractor 360mm—14 inches
<b>WEIGHT (lbs.)</b>	88	86	88	115
<b>DIMENSIONS (inches)</b> Height Width Length	With rear tine tiller 35"—45" 20" 63"	With cutter bar 35"—46" 20" 59"	With cutter bar 35"—46" 21" 59"	With rear tine tiller 28"—42" 21" 63"
<b>CAPACITIES (qts.)</b> Fuel tank Transmission Crankcase	2.72 1.40 0.60	2.72 1.40 0.60	2.72 1.40 0.60	2.72 1.40 0.60
<b>RUNNING TIME (@ 3600 rpm)</b>	Up to 2.5 hrs.	Up to 2.5 hrs.	Up to 2.5 hrs.	Up to 2.5 hrs.

# UNPACKING

1. The wheels and control handle were removed for shipping and must be reassembled to the unit. Cut the tape and remove staples at top of the carton. Slit it open and lay the side out flat.
2. Remove the unit, the wheels, and the control handle. (Be careful not to bend the cables.)
3. The fastening parts for assembly of wheels and control handle have been placed on the unit in the holes where they are to be installed.



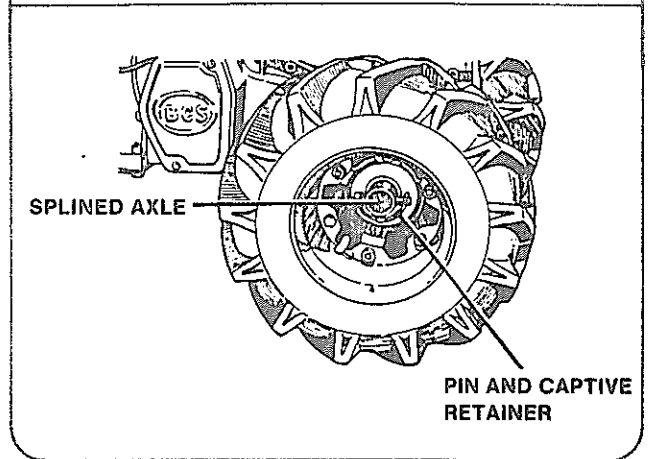
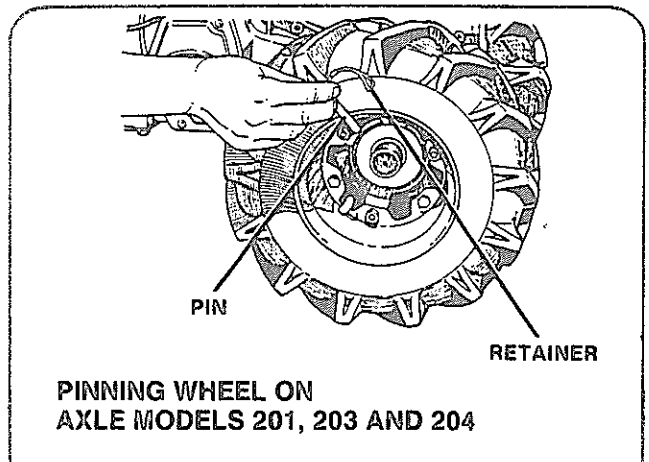
# ASSEMBLING THE UNIT

## INSTALL THE WHEELS

### NOTE

The standard wheel has 3.50-6 tractor Vee tread tires. Other wheel and tire combinations are optional. The Vee tread should point in the direction most often used.

**MODELS 201, 203 and 204:** Pins with captive retainers hold the wheels in place on the axle. Unhook the retainers and remove the pins. Slide the wheels onto the axle and install the pins. Secure each wheel by hooking the retainer over the pin. (See drawing.)

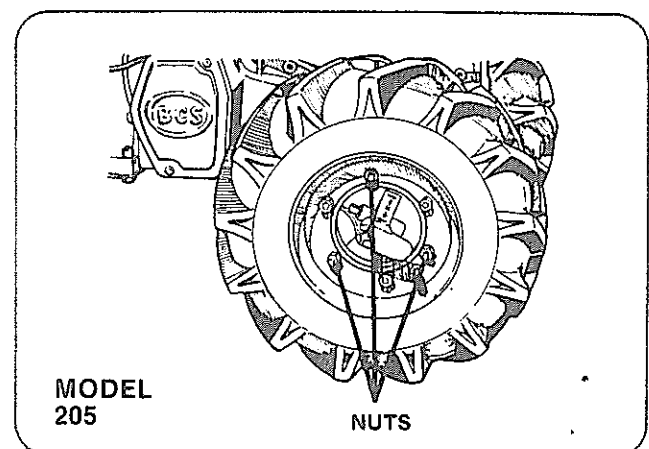


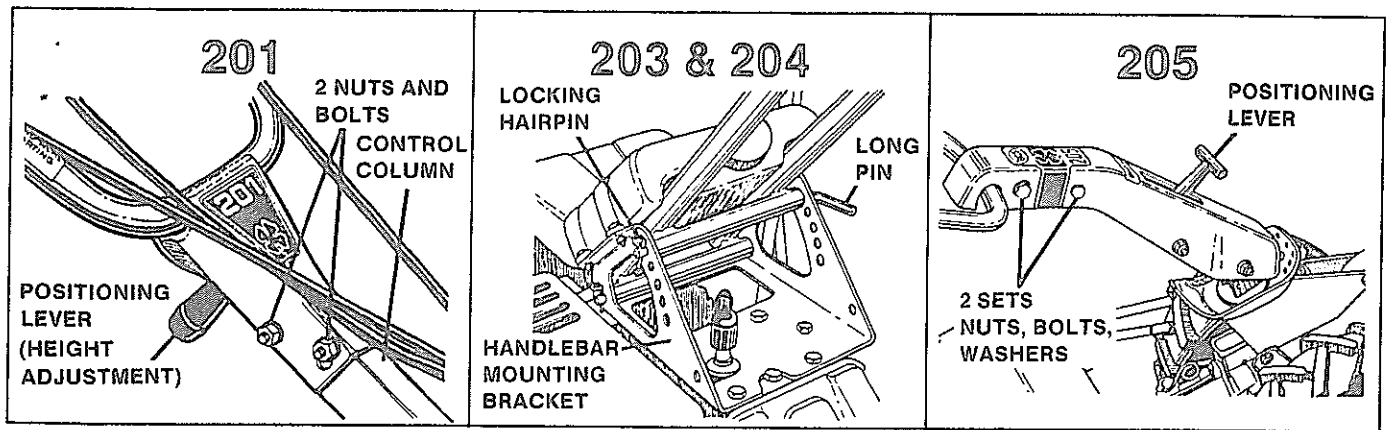
**MODEL 205:** Remove the three nuts and lock washers from each wheel-mounting flange. Mount the wheels in place and secure each with three lockwashers and nuts.

Model 205 wheel assemblies have a planetary gear reverser device. The device has three settings:

- DIRECT DRIVE for pusher operation
- DISENGAGED for free-wheeling
- REVERSED DRIVE (through planetary gears) for tractor operation

See instructions (page 13) for setting the reverser.





## ASSEMBLE CONTROL HANDLE AND ADJUST HANDLE HEIGHT

### NOTE

During this assembly procedure be very careful that the control cables do not become bent, twisted, or damaged in any manner.

**MODELS 203 & 204:** Use the provided long pins and "hairpins" to attach the control handle assembly to the mounting bracket over the engine. Note that the hole selection at the rear of the bracket determines handlebar height.

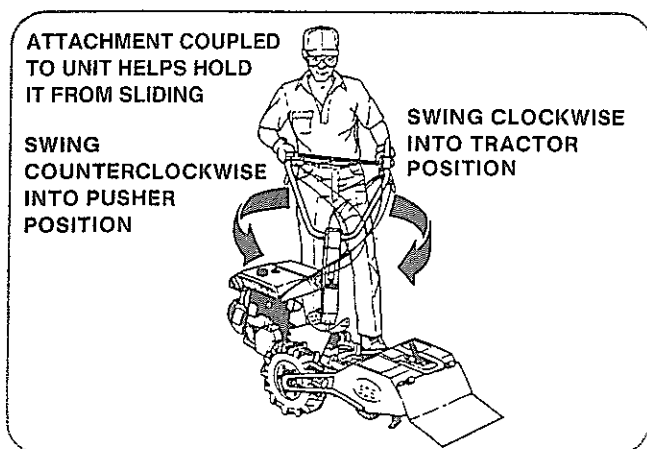
**MODELS 201 & 205:** Control handle attachment and handlebar height adjustment procedures on these models are similar.

- a) Use the two nuts and bolts to secure the model 201 handlebar assembly to the control column.

(For handlebar height adjustment, follow instructions in paragraph c.)

- b) Remove the nuts, bolts, and wave washers from the two holes at top of the vibration-dampened control column of the model 205. Use these fasteners to attach the control handle assembly to the control column.
- c) On both 201 and 205 units, pulling up the positioning lever releases the locking pin from a hole in the control column mounting bracket on the unit. Pull the lever, raise or lower the handles, and release the lever to repin the column in one of the holes in the bracket. On certain 205 units, the positioning lever may be as shown on the model 201 rather than the 205 drawing.

## SET CONVERTIBLE 205 FOR EITHER PUSHER OR TRACTOR OPERATION



Coupling an attachment to the unit helps to keep it from sliding when the handles are being swung around. (See page 14 for coupling instructions.) Pull up the **handlebar** positioning lever to free the control column from the locking bracket on the unit.

**TO CONVERT FROM TRACTOR TO PUSHER (HANDLES OVER ENGINE):** Always swing the control handle slowly **counterclockwise** so as not to harm the cables. Select desired handle height and **relock** the positioning lever tip in a hole in the bracket.

**TO CONVERT FROM PUSHER TO TRACTOR (HANDLES OVER PTO):** Swing the control handles slowly **clockwise** so as not to harm the cables. Select the desired handle height and relock the positioning lever tip in a hole in the bracket.

## ⚠ WARNING

Serious injury can occur if the machine backs up when placed in **FORWARD GEAR**.

Do not forget to set the Model 205 wheel reverser device so the unit will advance when placed in forward gear.

## SET 205 REVERSER IN PUSHER OR TRACTOR MODE:

a) Each wheel has a **reverser**. The reverser cap decal has arrows showing which way to slide the cap for the desired position. While setting the cap, block the wheel off the ground so you can turn it slightly to engage the gears while setting the cap with your other hand. Push the button on the cap, and slide the cap in or out to the desired position. These positions are:

**TRACTOR MODE:** Cap in the inside position for rear-tine tiller.

**FREE-WHEELING:** Cap in central position.

**PUSHER MODE:** Cap in the outside position for all front-mount attachments such as a cutter bar.

b) When you get the proper engagement, the button should pop back out. If it stays in, the reverser is not properly locked. Adjust the setting until the button pops out.

## CHECKING LUBRICATION

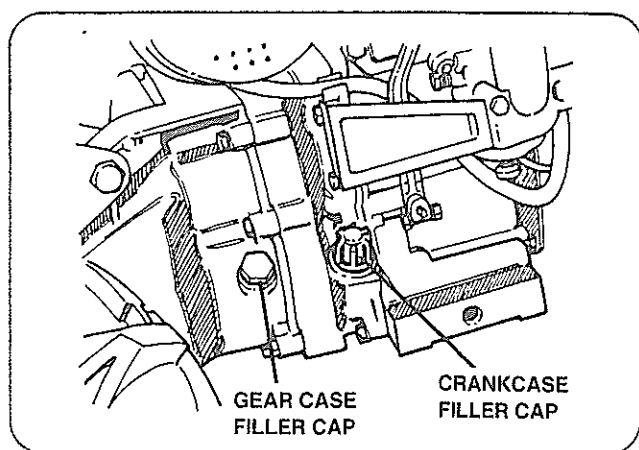
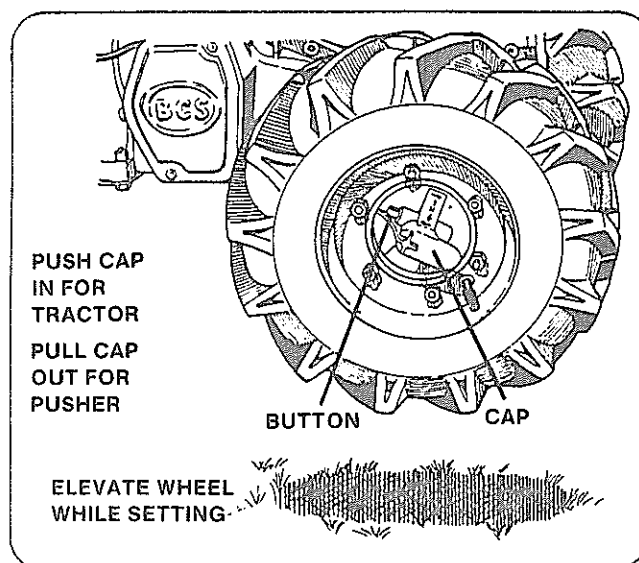
Proper lubrication is vital to your power unit! Check crankcase and gear case (gear box) oil levels **now**, and regularly hereafter.

**ENGINE:** Always use a 4-cycle engine type detergent oil of high quality in the crankcase. The thickness of an oil depends upon its temperature. An SAE-30 weight oil\* should be used when the weather is warm and the engine turns over easily when the recoil starter is pulled. For other oil/temperature recommendations, see page 28.

**GEAR CASE:** Use SAE 80W-90EP, an extreme pressure gear oil under all temperature conditions where SAE-30 weight oil is suitable in the engine crankcase. Where colder temperatures demand use of an oil lighter than SAE-90EP, see page 28. \*

1. Place the unit on a level surface. Be sure the axle is horizontal. Remove the gear case filler cap. According to the engine model, remove the crankcase filler cap or the dipstick.

MODE	CAP POSITION	SPEED (MPH)			SUITABLE ATTACHMENTS
		1st	2nd	R	
TRACTOR (Engine in front)	INSIDE	0.6	0.9	0.7	REAR TILLER ONLY
PUSHER (Engine in rear)	OUTSIDE	1.7	2.7	2	ALL FRONT MOUNTS.



2. If the oil level is below the threads in the filler hole or the mark on the dipstick, add oil until the level is above the bottom threads or right at the mark. Reinstall caps and/or dipstick.

**BCS A-180 AIR CLEANER:** Check the sponge air filter in this air cleaner before first use. (See instructions on page 27.) The filter must be properly moist with engine oil. DO NOT MOISTEN the dry cartridge of an A-220 engine air cleaner.

\* SAE 10W-30 multi-viscosity oil is a suggested alternative to SAE-30.

# FUELING THE ENGINE

## ⚠ WARNING

Gasoline is highly flammable. Refuel only when the engine is cool and not running. Read all safety precautions on page 5 for the handling, pouring, and storage of gasoline.

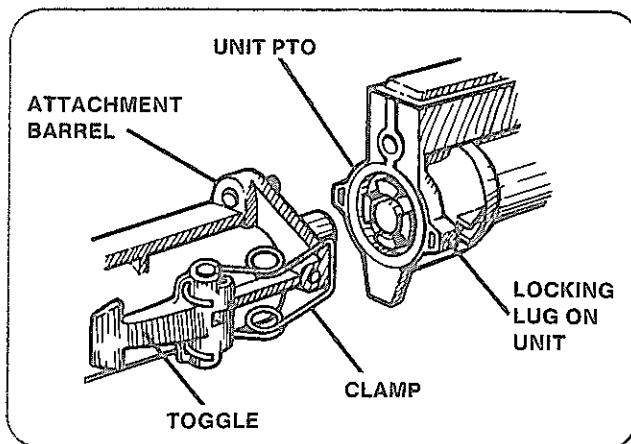
1. Avoid getting dirt, dust, or water in the fuel tank while the fuel cap is removed.
2. Fill the tank with a good quality, clean and fresh, lead-free gasoline product. Reinstall the cap.
3. If fuel is spilled, wipe off the spillage and push the unit away from the fueling spot before starting the engine.

# COUPLING ATTACHMENT TO PTO

1. Pull out the toggle clamps on the attachment coupling barrel.
2. Push the coupling barrel of the attachment into the PTO flange of the unit.
3. Slip the clamps over the lugs on the unit and snap the toggles shut against the attachment.

## NOTE

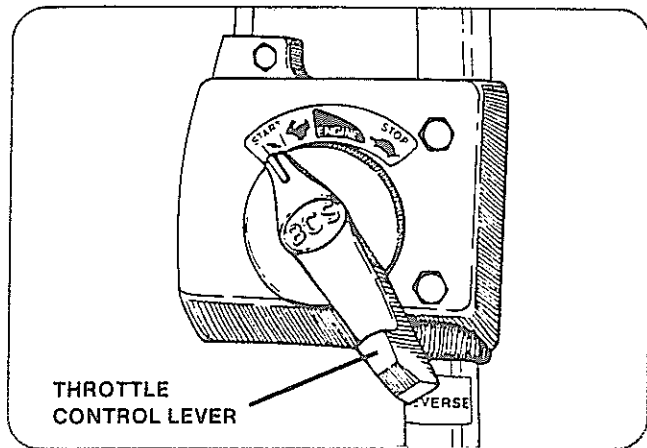
Your cutter bar mower attachment may have different couplings than those described here. See page 21 for illustrated cutter bar mounting instructions.



# LEARNING THE CONTROLS

## THROTTLE CONTROL

The throttle lever position is indicated on the throttle box. The extreme positions are labeled **START** and **STOP**. In the **START** position, the device chokes down the air

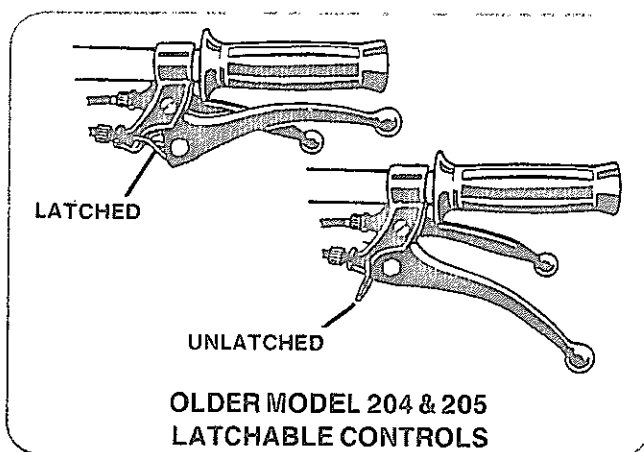


supply for the enriched fuel/air mixture needed to start a cold engine. In **STOP** position, the control grounds the electrical system so the engine cannot run. In the range of operating speeds between **START** and **STOP**, speed increases as the indicator is moved towards **START**.

## MOTION CONTROLS

The levers at the handlebar grips control motion of the unit and attachment. The control levers can be latched on some units. On others, the levers have to be held in engagement by the operator. One of the drawings (page 15) will show the type and location of each control lever on your unit. All motion controls engage power when fully depressed and disengage when allowed to spring back.

**LEVER ENGAGEMENT:** Grasp the handle. When set to engage, pull the lever quickly for clean engagement. A slow pull or soft squeeze causes the gears to clash before meshing. This can damage the transmission.



**Latchable levers:** Pull and hold the lever depressed. You do not have to latch the lever for engagement. If you elect to latch **forward** gear or the **PTO** lever, do it only on straight runs at slow throttle speeds where there are no obstructions. **To latch:** tuck the spring latch up against the front of the lever. Squeeze and release the lever to unlatch.

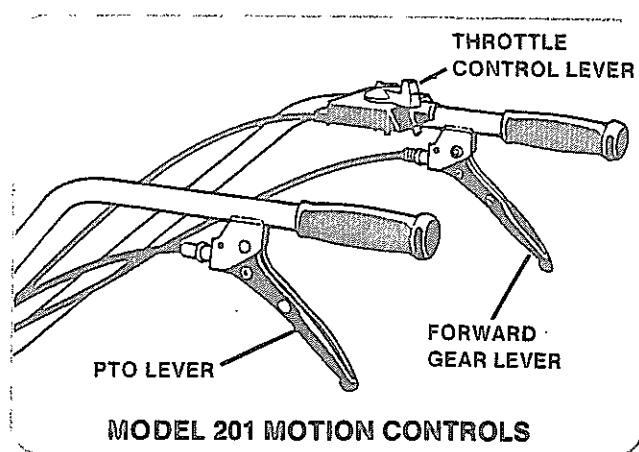
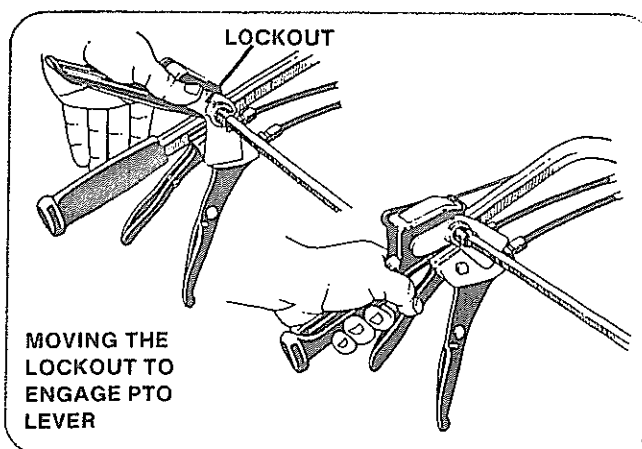
#### NOTE

A latched lever must be squeezed to collapse the latch spring before the lever can be released to disengage power.

### ⚠ WARNING

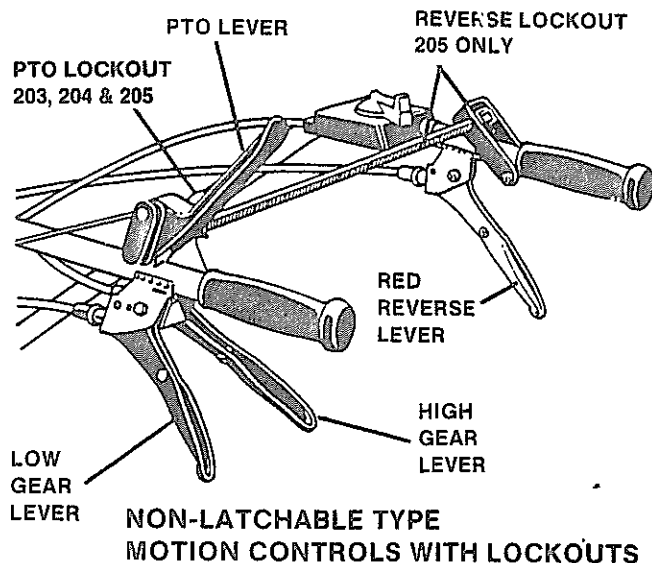
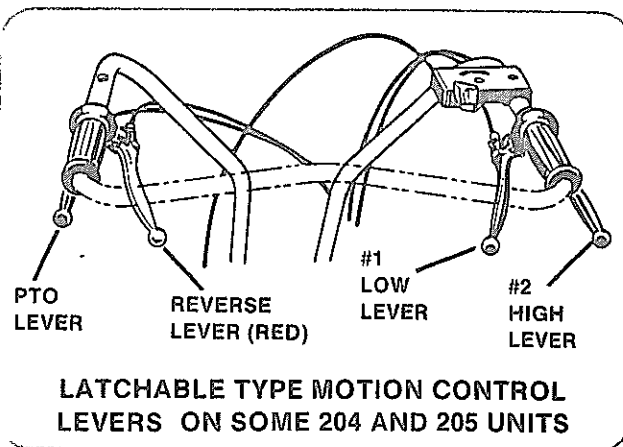
Do not engage the PTO while backing the unit.

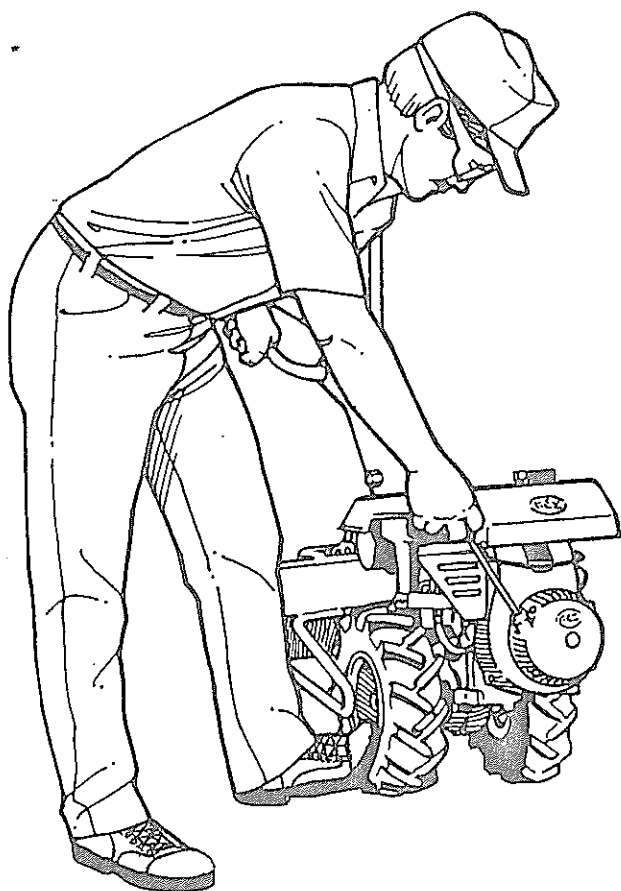
**Unlatchable levers:** The two levers on model 201 are the press-and-hold type without latches or lockouts. The unlatchable levers of late model 203, 204 and 205 units have **PTO lockout** devices. On these models, the lockout must be moved out of the way for engagement of the PTO. On the 205 only, a connection from the reverse lever to the PTO lockout makes the device a **PTO/REVERSE LOCKOUT**. It blocks shifting into reverse gear while the PTO is engaged, and blocks PTO engagement while the unit is in reverse gear.



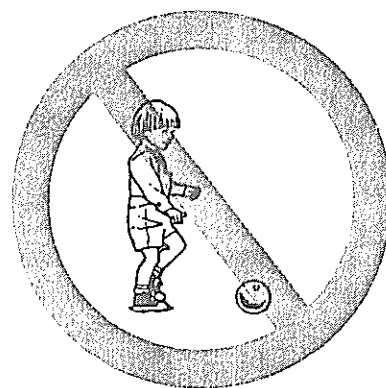
### ⚠ WARNING

Latched controls must be squeezed before they can be disengaged. Do not latch controls when operating in close quarters, on hilly, uneven or slippery terrain, or in new (unfamiliar) areas where there may be obstructions. Stay on the alert! Be ready to disengage power in an emergency.





# STARTING, STOPPING, & OPERATING



## ⚠ DANGER

Do not operate when children are nearby!

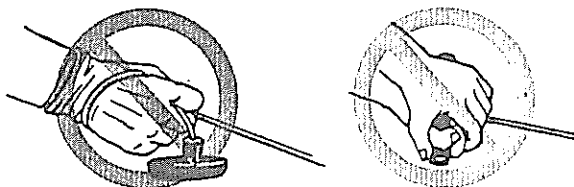
1. **THROTTLE CONTROL LEVER:** Set to "START" position.
2. **MOTION CONTROL LEVERS:** If unit has latchable type levers, see that all levers are disengaged.
3. **TAKE CRANKING STANCE:** Grasp the starter grip firmly IN ONE HAND. Place the other hand on the control column near the point marked by a decal. Steady the unit with your foot against the tire. (See decal on control handle.)

4. **CRANK TO START ENGINE:** Slowly pull the grip a short way until you feel the starter engage. Then give a smooth, hearty pull. Do not pull to the end of the rope or you may damage the starter. REPEAT CRANKING until the engine fires and starts.
5. **SET THROTTLE FOR OPERATION:** Move the lever from "START" to a medium speed position before the engine chokes itself out on the enriched mixture.
6. **ENGINE MOTION CONTROLS:** Take your position behind the handlebars. Depress the PTO lever (see page 15) to start the attachment, and **forward** (# 1) gear lever when ready to move.

## ⚠ WARNING

Improper grip on starter can result in injury if engine should kick.

Use one hand only. Never wrap the rope around your hand or wrist for a better grip or use two hands for starting.



## ⚠ WARNING

**DO NOT LATCH LEVERS** in any area where the unit could jump or overturn or where your footing is poor. Be especially wary of jumping or tine-walking tendency of power tillers.



Moving the throttle control lever to the "STOP" position grounds the ignition system. The engine will stop. It cannot be restarted with the lever in "STOP" position.

7. **BEFORE BACKING A 204 OR 205 UNIT:** Look behind to be sure there is enough room. Do not engage the PTO. Throttle down to low speed and engage the (red) **REVERSE LEVER** on the handlebar. **DO NOT LATCH THE REVERSE LEVER!** Prepare to let go of the handlebars to stop the unit if your control is threatened.

### ⚠ WARNING

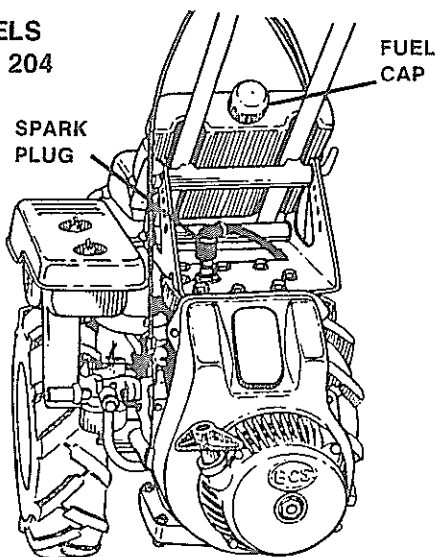
Do not latch controls when backing. You can be injured if you lose your footing or the unit backs you into an obstruction. Be ready to let go of reverse gear lever in case you lose control during backing.

8. **TO STOP:** Disengage the PTO to stop the attachment. Disengage the control lever to the drive wheels to stop the unit. Put the throttle control lever to "STOP" position to shut down completely.

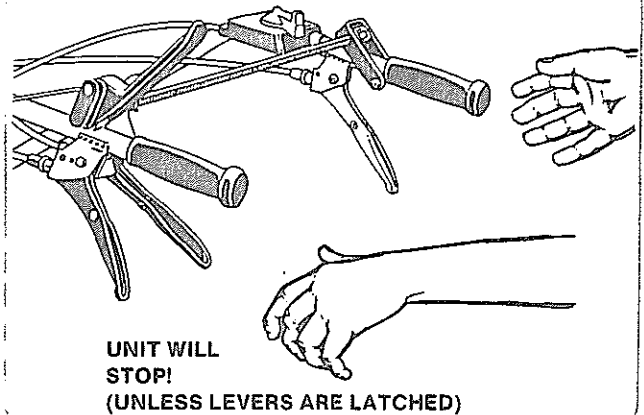
### ⚠ WARNING

Persons, including children, attracted to an unattended unit may be injured if they start it accidentally. Before leaving a unit unattended, always disable it by pulling the spark plug wire off the spark plug.

**MODELS  
203 & 204**

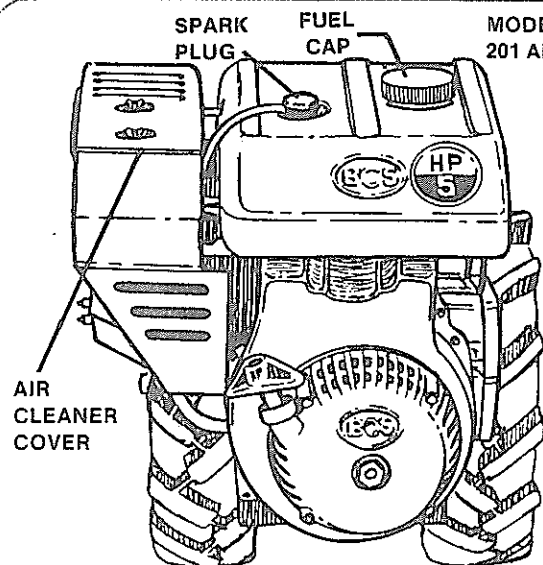


## IF YOU LOSE CONTROL, LET GO!



9. **TO RESTART A WARM ENGINE:** A recently shut down and still warm engine usually can be started at a medium throttle speed setting. Always try this setting first. Put the throttle lever to "START" position only when the engine refuses to fire after several cranking spins at medium throttle.
10. **TO CLEAR A FLOODED ENGINE:** Flooding can be caused by using the wrong throttle control lever setting, such as the "STOP" setting, which prevents ignition, or the "START" setting (see paragraph 8), which feeds too rich a mixture for a warm engine. The remedy is to remove the plug and wipe it dry. "Spark Plug Inspection" on page 29 tells how to troubleshoot when the engine will not start.

**MODELS  
201 AND 205**



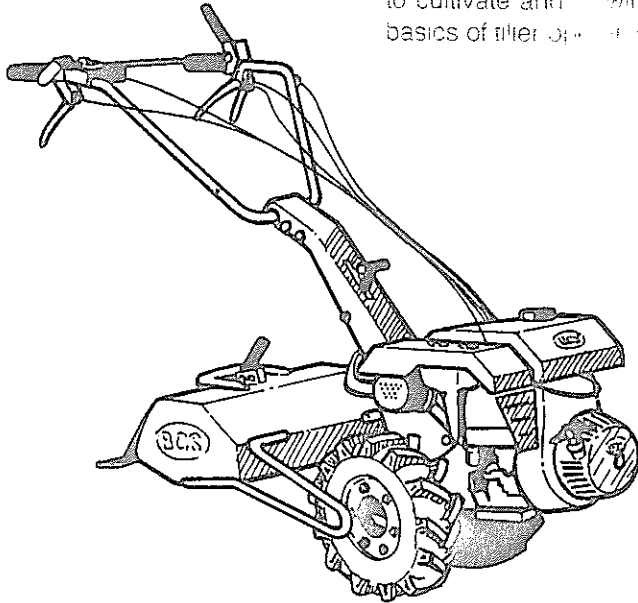
# SECTION THREE

## USE & CARE OF ATTACHMENTS

112

113

Nothing is as valuable as your own experience in learning to cultivate and till with a rear-tine tiller. Here are some basics of tiller operation.



### NOTE:

CONNECT TO BELT DRIVE TO TRACTOR:

Control handle for PTO (page 14)

Control handle for tractor in forward gear (page 5)

LOWERED

RAISED

KNIFE

KNIFE

SHALLOW CUT

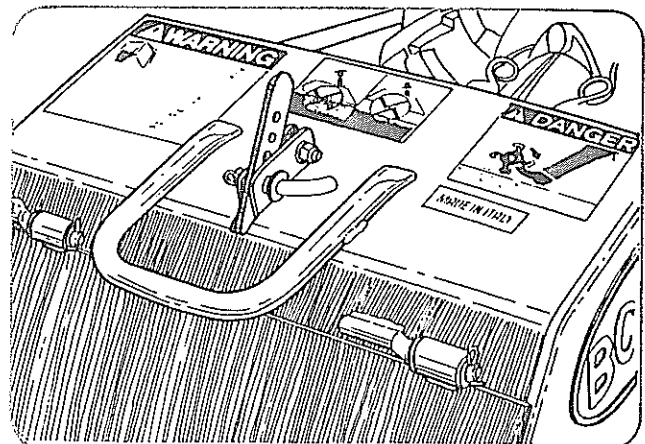
DEEP CUT

## DEPTH GAUGE ADJUSTMENT

Persons previously experienced with front-mount tillers, where depth is increased by lowering the knife, may be confused when reading that the opposite is true of a rear-tine tiller.

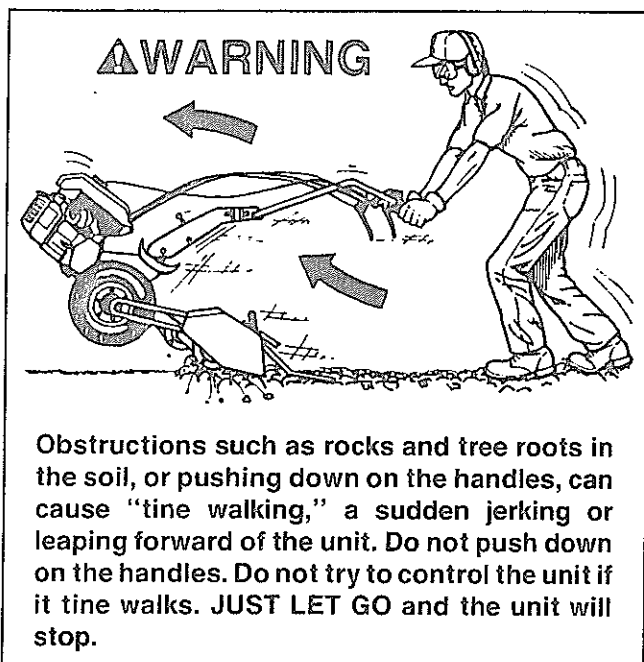
*To increase tilling depth, you raise the knife of a rear-tine tiller!*

To raise or lower the knife, remove the "hairpin" and pin from the bracket and knife bar on the tiller hood. Push knife down for a shallow cut, or pull all the way up for the deepest penetration. Lock up at desired setting with the pin and hairpin.



## TILLING NEW OR HARD GROUND AREAS

The more passes you make, the easier it becomes to break up hard soil. For clay, hard pan, rocky, or previously untilled soil, always make the first few passes at minimum depth setting and slow tractor speed. Use slow throttle. Use low gear on model 205. As the soil loosens, you may increase both speed and tilling depth.



## SOFT SOIL PREPARATION

If you are fortunate to have rich loam or light, sandy soil which tills easily, you may be able to start tilling at maximum depth and speed. However, always remember that slow speed produces the finest finish.

## CROP CULTIVATION

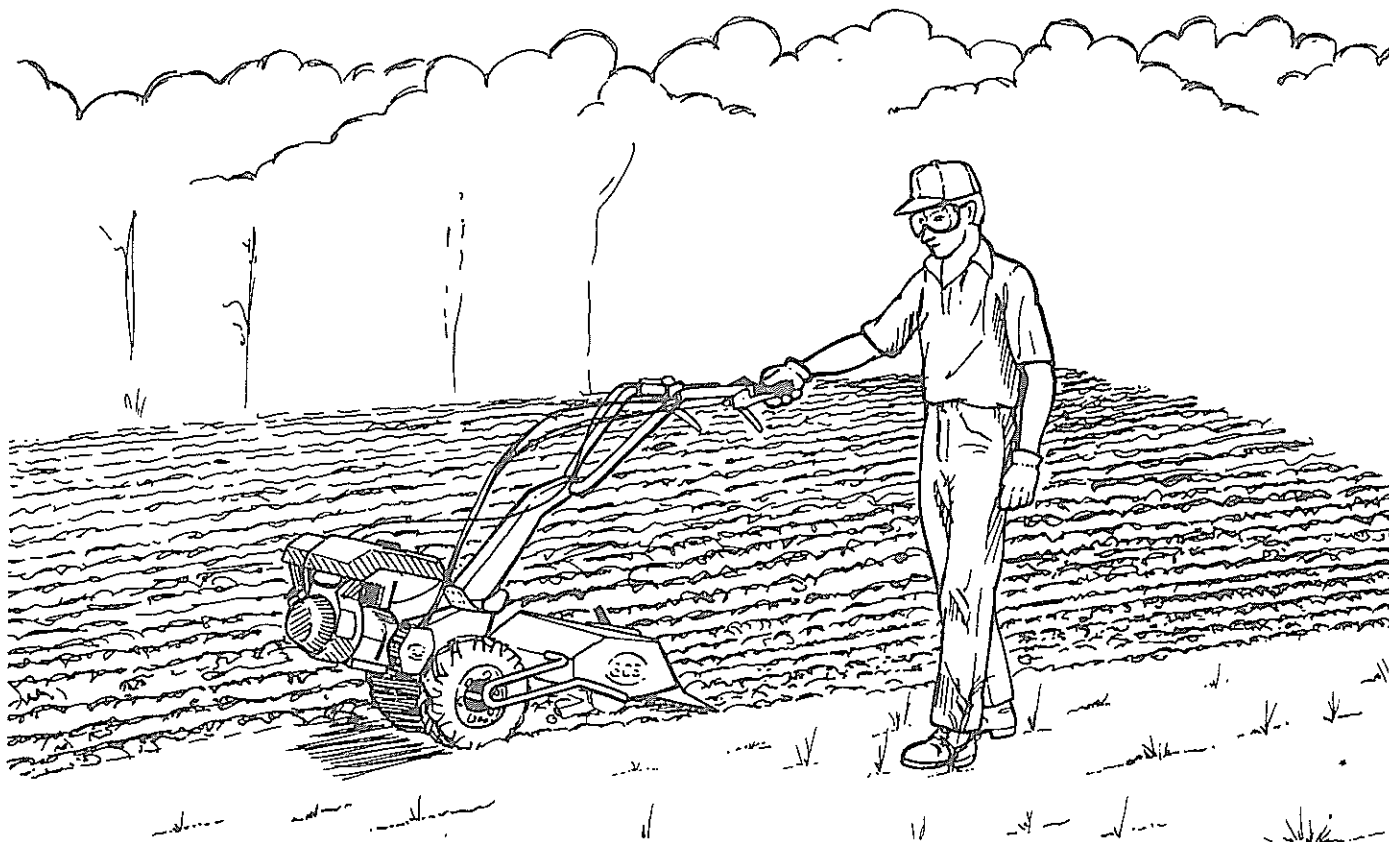
For row crops cultivate only the top layer between the rows so as not to disturb the crop roots. Top layer cultivation provides two benefits — weed control and soil moisture retention. Cultivate often.

## COMBINED RIDGER

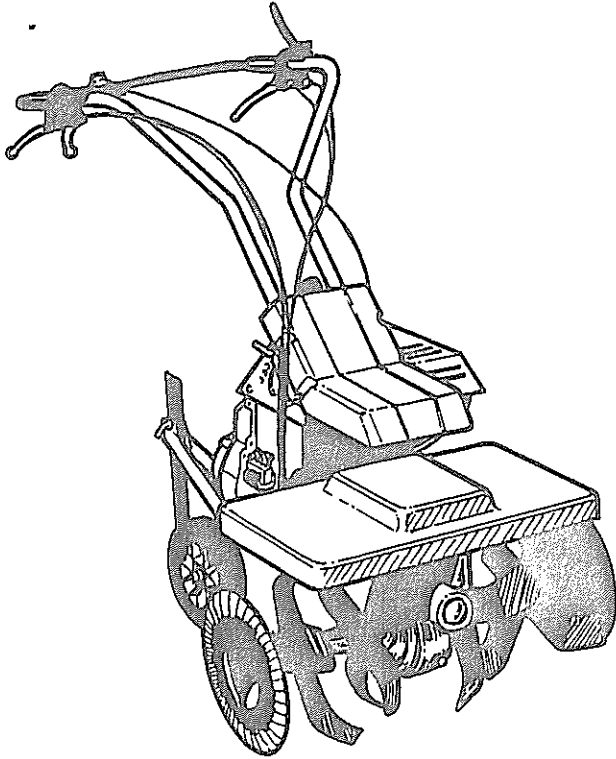
This accessory can be installed in place of the regular tiller hood assembly. It plows a vee behind the tiller tines. Use the cultivator to form drainage ditches or to create raised rows for crop planting. Installation instructions are provided with the cultivator.

## FOOTPRINT ERASURE

An advantage in using the rear tine tiller models is being able to set the control handles to either left or right of center position. Then you can walk to one side, avoiding footprints and compaction of the tilth.



# FRONT-MOUNT TILLER FOR MODEL 204



## ASSEMBLING TINES ON THE UNIT

This front-mount tiller attachment can be used only on the model 204. It cannot be mounted on the axles of model 205.

a) Unhook the captive retainers, remove the pins, and pull the wheels off the unit. The pins will be used to lock the tiller tine hubs onto the axle.

b) There are two sets of tines and hubs plus a protective disc joined on each side by the same **type** pin and captive retainer as described in step a, above. For narrow row cultivation, one set, or one set per side, may be removed.

c) The sharpened edges of the tines must fall in the direction of rotation which is towards operator at bottom of the rotation. Slide the tines and discs on the unit axle, push the pins through the holes, and lock them with the captive retainers.

## MOUNT WHEEL AND KNIFE BRACKET ASSEMBLY

a) Use four sets of (M8) bolts, lock washers, and nuts to secure the lower mounting bracket to the engine crankcase.

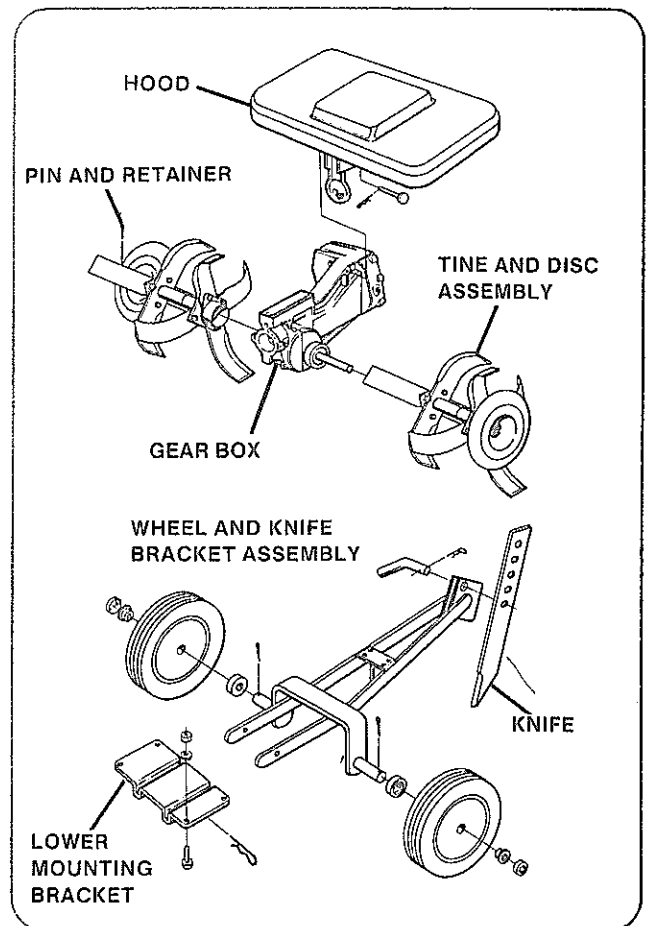
b) Slide the wheel/knife bracket into the lower mounting bracket. Secure with the "hairpins" furnished.

## FRONT TILLER SPECIFICATIONS

Tilling width — 8-22 in (20-56cm)

Tine speed — 50-90 rpm. Controlled by gear selection and throttle speed setting (not by PTO).

Weight — Tiller attachment only, 46lb (21kg)  
Attachment on 204, 121lb (55kg)



c) Mount wheel on the bracket axles. Use the furnished cotter pins.

d) Use the bent lock pin and "hairpin" to attach the knife to the bracket.

## MOUNT THE HOOD OVER THE TINES

Use the pins and "hairpins" provided.

## SET THE SPEED CONTROLS

Since the tiller tines are mounted on the axle in place of the unit drive wheels, tine rotation speed and forward progress are controlled by the throttle setting and the selected gear, AND NOT by the PTO. After start-up, select desired (#1 or #2) forward gear, and throttle down to a smooth, slow engine speed. Slow speed settings give fine results.

## TILLING NEW (UNTILLED) OR HARD GROUND

As with any type of tiller, go slow and till at a shallow depth for the first few passes, until the hard top is broken up. Then you can lower the knife for tilling to the desired depth.

## TILLING SOFT OR SANDY SOIL

It may be possible to till right off at desired depth and good speed.

## CULTIVATION OF ROW CROPS

The front-mount tiller is easy to maneuver on turns. In addition the width may be varied from the maximum 22-inches (56cm) to a minimum of 8-inches (20cm) by removing tine sets. No special parts are required for narrow row cultivation.

# CUTTER BAR MOWERS FOR 203, 204 & 205

### ⚠ WARNING

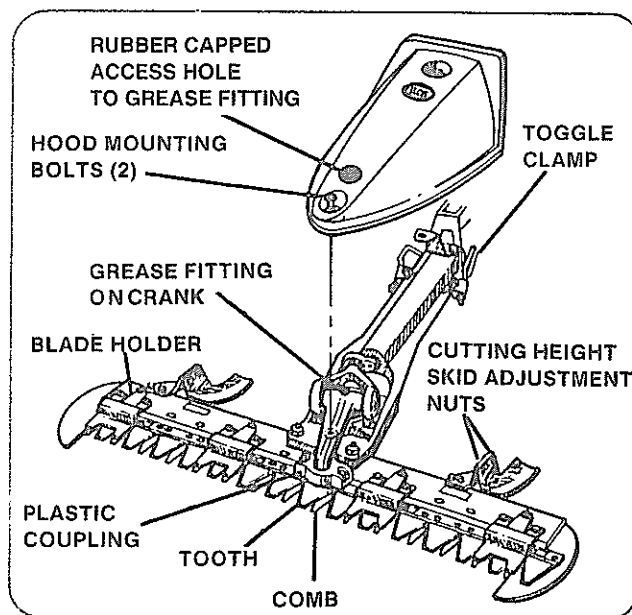
(CONVERTIBLE MODEL 205)

You can be injured if the unit backs up when put into forward gear.

When attaching the cutter bar mower, be sure that the model 205 handlebars are over the engine and the wheel reversers are in the direct drive position. (See pages 12 and 13.)

### NOTICE

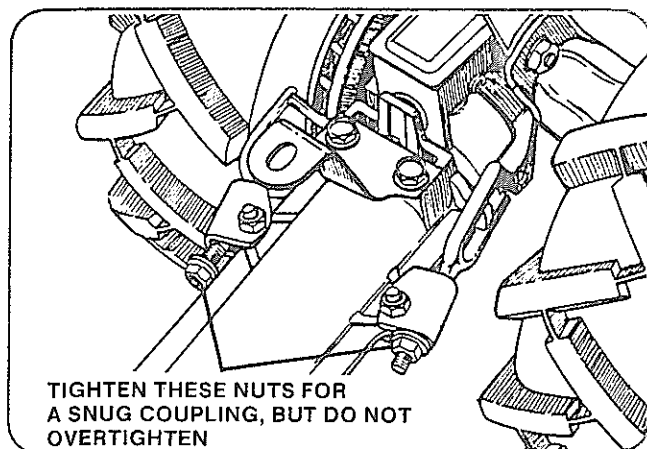
Some cutter bar mowers have the style of toggle clamps shown on this page, in place of the clamps shown on page 14. The tension of these clamps should be tightened for a snug coupling after the coupling has been made. IMPORTANT: DO NOT OVERTIGHTEN THE CLAMP NUTS or the tension may break off the PTO lugs.



## ASSEMBLY ON 203, 204 & 205

Couple the attachment to the PTO of the unit. (See page 14 or the NOTICE on this page.)

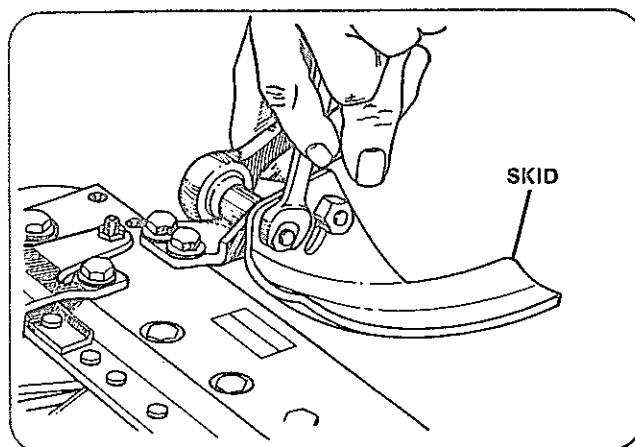
Convert model 205 into the **pusher** mode: Handlebars over engine, wheel reverser caps in the outside position for direct drive. (See pages 12 & 13.)



## CUTTING HEIGHT ADJUSTMENT

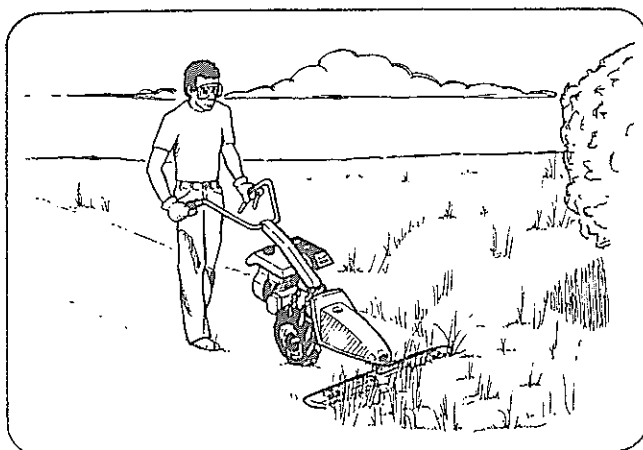
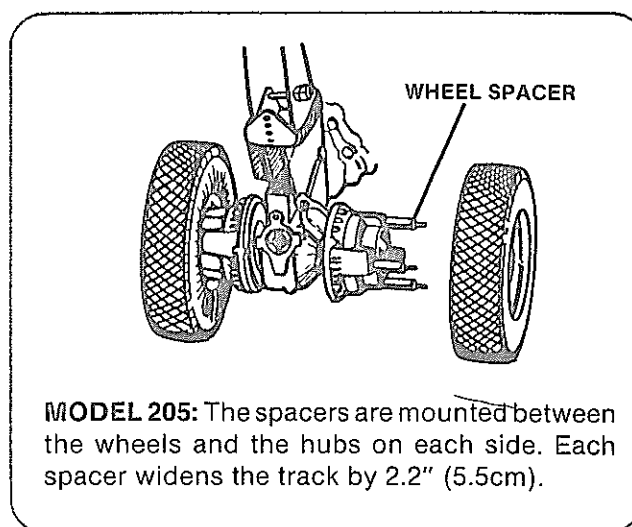
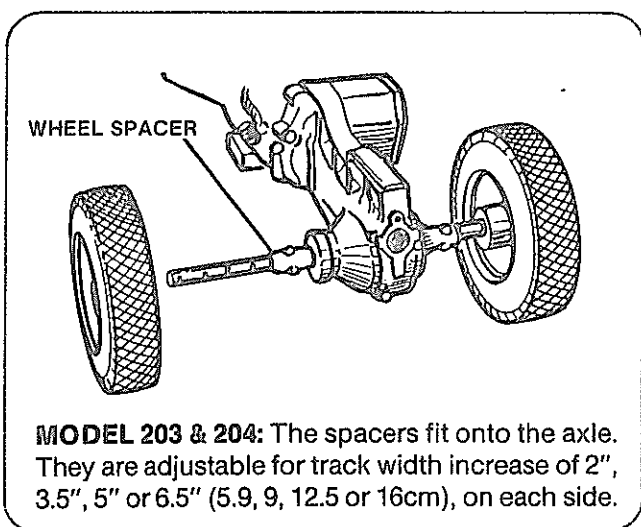
There seldom is a need for close-cropping with a cutter bar mower. So, keep the cutter bar adjustment **high** to avoid as much contact as possible with rocks and soil.

The cutting height is controlled by the skids on the cutter bar. Loosen the nuts, adjust the skids by raising or lowering them to the desired setting. Tighten the nuts.



## OPTIONAL WHEEL SPACERS

Wheel spacers, to widen the track for increased stability of the unit on sloping ground, are available for models 203, 204 and 205.

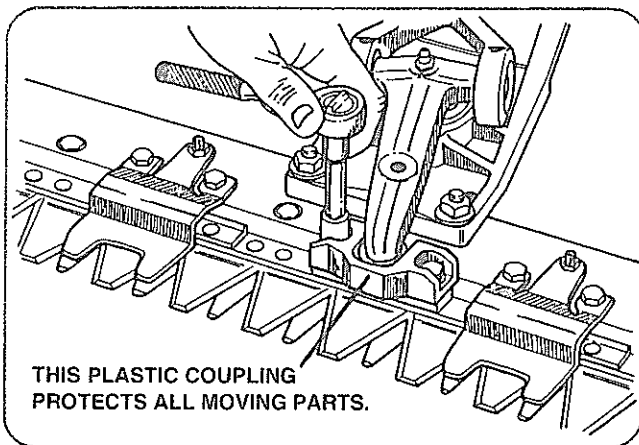


## MOWING OPERATION

The 200-series combination cutter bar mower attachment has abilities of both sickle bars and mulching bars. Like a sickle bar, it cuts dry meadow and crop grasses. It also mulches (recuts) mown grass. It resists clogging in wet grass, and can handle brush of any size that will fit into the tooth comb.

The cutter bar attachment is rugged, but not unbreakable. To protect the teeth and other parts from breaking, BCS has put a plastic coupling between the driving and sliding parts. This coupling may break if the blade is

stopped by an object such as a metal rod. If the driving parts rotate but the blade does not move, **SHUT OFF THE ENGINE** and inspect for a broken coupling. (See the maintenance paragraph for removal of couplings.)



The rule for successful mowing and least wear and tear on the reciprocating parts is:

**GO SLOWLY AND DELIBERATELY!**

Running the engine at wide open throttle is not necessary for cutter bar mowing. A medium throttle speed setting is suggested for all models. If an increased ground speed is desirable, select high gear rather than advanced throttle setting.

Failure to make a clean cut indicates a need for blade sharpening and/or tensioning. (See "Cutter Bar Mower Maintenance", below.)

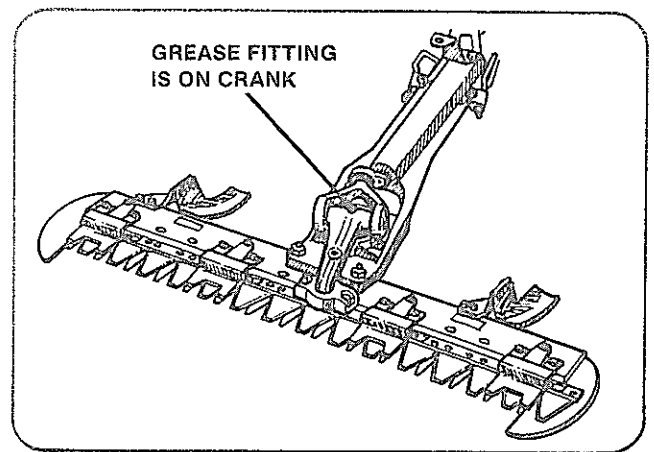
## CUTTER BAR MOWER MAINTENANCE

### ⚠ WARNING

**Before approaching the cutter bar for any reason, always shut off the engine and wait until all movement stops.**

Wash down and recoil the cutter bar blades after every use of the attachment.

The small rubber cap on the hood can be removed for access to the grease fitting on the crank. Pump a lithium base grease into the grease fitting on the crank every four operating hours. (See drawing.) No gear oil is required for the driving mechanism.



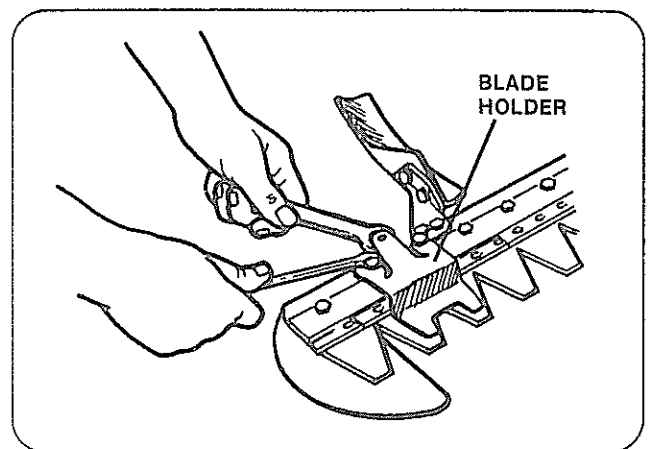
Dull cutting blades should be removed and sharpened with an abrasive stone. Grind only the beveled top sides of the teeth. Do not dress the undersides which slide against the comb. If you prefer, take the blade to your BCS servicing dealer.

**FOR BLADE REMOVAL:** Remove the two bolts and the plastic blade coupling. (See drawing.) Loosen the blade holder bolts. Then slide out the blade.

**TO SET BLADE TENSION:** Loosen the blade holder bolts. Then loosen and hold the lock nut from turning. Set the tension by turning the jackpost type adjusting screw against the blade holder with a wrench. Check the tension after tightening the lock nut and bolts. Rear play can be eliminated by pulling back the blade holder while tightening the nuts.

### NOTE

The tension must be snug for clean cutting, but should not bind or freeze the blade against the comb.



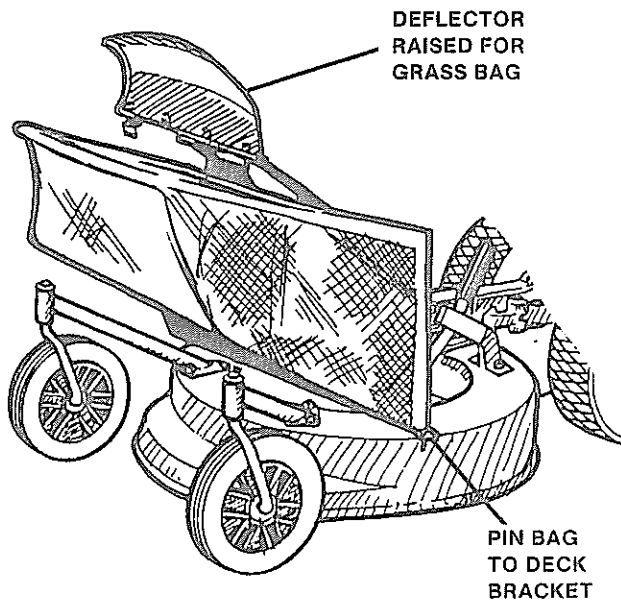
The tension between the blade and the wear strip behind it is self-adjusting.

See your BCS servicing dealer for all parts, accessories and service. Mower blades are available as a complete assembly. You also can obtain single teeth.

# ROTARY MOWER

## for Models 203, 204 & 205

- FOR USE WITH DEFLECTOR FOR SIDE DISCHARGE, OR WITH GRASS BAG.
- CUTTING HEIGHT ADJUSTMENT LEVER WITH FOUR SETTINGS RAISES OR LOWERS BLADE UNDER THE DECK. WHEELS SUPPORT DECK CLOSE TO GROUND LEVEL FOR OPERATING SAFETY.



### ⚠ WARNING

(CONVERTIBLE MODEL 205)

You can be injured if unit backs up when put into forward gear. Be sure handlebars are over the engine and wheel reversers are in the direct drive position. (See pages 12 & 13.)

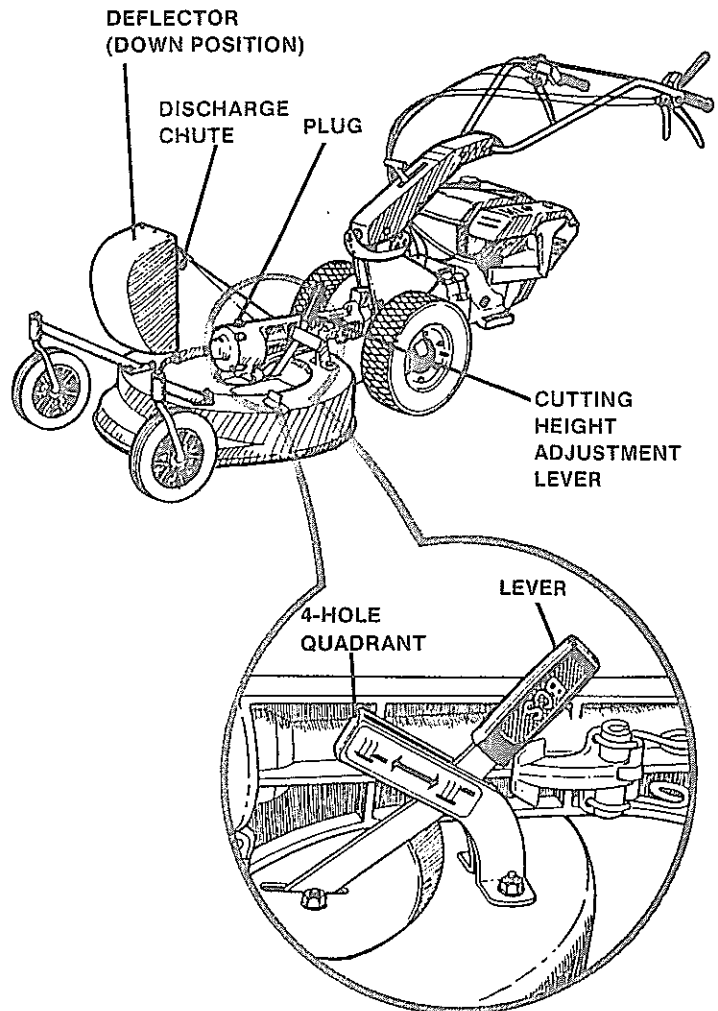
## ASSEMBLY TO UNIT

COUPLE ATTACHMENT TO PTO  
OF UNIT: See page 14.

## ADJUSTING CUTTING HEIGHT

On this BCS Mower, the deck stays in position, safely close to the ground, and the cutting height is set by raising or lowering the mower blade with a lever. (See drawing.)

Because the blade cannot be seen under the deck, it is good to set the height control lever for the



highest cut by pinning it in the bottom hole of the 4-hole quadrant. After measuring the grass height of a test swath, you can decide whether to continue with that setting or move the lever forward for a lower cut.

## ATTACHING THE GRASS BAG

### ⚠ WARNING

DO NOT OPERATE WITH WIDE OPEN DISCHARGE! Use of the grass bag is optional. But, if the bag is not installed, the deflector must be in position to cover the discharge opening and deflect the grass to the right.

Lift up the deflector. Fit the grass bag to the mower discharge opening, and fit the locating pin at bottom rear of the bag into the bracket on deck.



## ⚠ WARNING

Read all instructions in Section One for the safe use of the unit and rotary mower. Do not operate if the unit or mower vibrates excessively, if the deflector does not stay in place, or if the grass bag is torn or deteriorated.

## SETTING SPEED FOR MOWING

Use a full throttle speed setting, particularly when the grass is heavy. The choice of low or high gear is optional.

## WHEN TO PICK UP CLIPPINGS & WHEN TO MULCH

In the Spring, when the grass is heavy and rich, it is wise to bag and remove the clippings. But the bag will require many emptyings. Your option is to use the deflector to throw the clippings to the right. Starting at one edge of the lawn, mow in a pattern to pile the clippings in the center. The big pile can be recut into a fine mulch, then transferred to your mulch pile. In Summer, when the grass is drier and less bulky, it can add food to your lawn if you leave it as it falls.

## BLADE INSPECTION AND SHARPENING

### ⚠ WARNING

Always shut off the engine, and remove the mower from the unit before taking off the blade. Wear heavy gloves for protection when working on the blade.

Sharpen the blade often, and check its condition each time. Turn the mower deflector-side-down. Remove two bolts and the blade. Examine the blade for wear and cracks at places marked on the drawings. Replace, DO NOT REINSTALL, a bent, thin-worn or cracked blade. (See warning.)

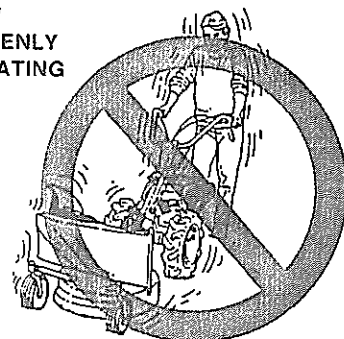
### ⚠ WARNING

**IF A HARD OBJECT IS STRUCK:** Shut off engine immediately and detach the mower. Remove and inspect the blade for a bent condition. Do not try to straighten a blade for re-use, because an impact which bends the steel may cause tiny cracks which will enlarge until the blade later breaks.

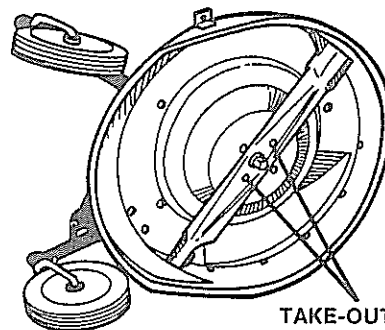
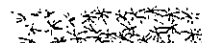
## MAINTAINING GEAR BOX OIL LEVEL

The mower gear box has an oil filler plug. The oil level should not be lower than two inches (5cm) below the bottom of the filler hole. When low, fill with SAE 90 EP gear oil.

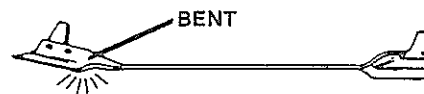
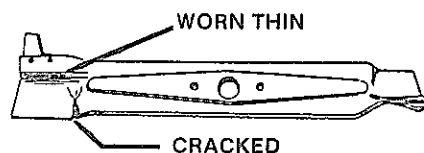
DO NOT MOW  
IF UNIT SUDDENLY  
STARTS VIBRATING

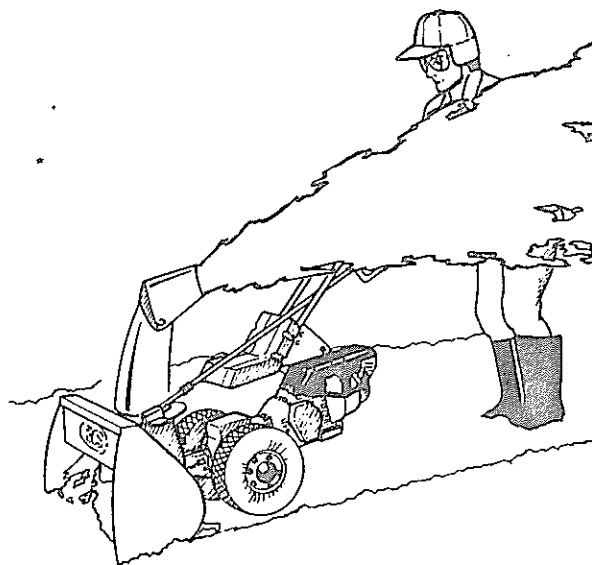


START



TAKE-OUT BOLTS  
TO REMOVE BLADE





# SNOW THROWER

Always disengage the PTO when backing the snow thrower. Throttle down when backing.

Do not use too high a throttle setting for snow thrower operation. Always throttle down and be extra careful on turns and slopes.

## ATTACHMENT TO THE UNIT

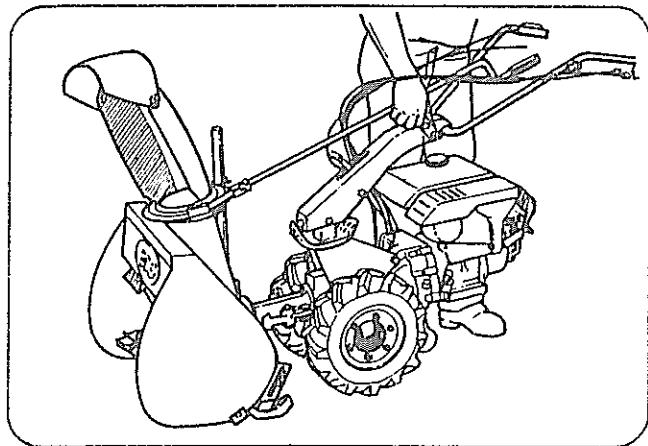
This is a front-mounted attachment. On the Model 205, put the handlebars over the engine and set the wheel reverser in the **outside** or direct drive position for **pusher** operation. (See pages 12 & 13.)

### ⚠ WARNING

Be sure the Model 205 is in the *pusher* mode so it will move forward in forward gear. (See pages 12 & 13.)

Couple the attachment to the unit PTO. (See page 14.)

Connect the chute crank to the snow thrower coupling and to the central handle of the unit. (See drawing.)



## SNOW THROWER OPERATION

Read all precautions in Section One pertaining to the safe operation of the unit and Snow Thrower Attachment.

If necessary to start the engine in a barn or shed, keep the doors wide open.

### ⚠ WARNING

Do not try to clear slopes so steep that you could lose control, or the machine could slide into you or an obstruction.

### ⚠ DANGER

When fire or electricity is to be used for deicing, remove the snow thrower from the unit. Never bring the unit near sources of flame or sparks.

Always be sure to direct the discharge away from living quarters, vehicles and people.

Work in a pattern which will pile the snow where desired, and which requires the fewest passes with the unit. With the wrong procedure, you could be throwing the same snow over and over without clearing the area. Do not forget the wind. Use the wind to help blow away the snow if you can.

### ⚠ DANGER

Do not attempt to clear the chute or the impeller with your hands and fingers, or with a deicing stick or other tool, unless both engine and impeller have stopped and you have disconnected the spark plug wire.

**IMPELLER RETARD SYSTEM:** Paddle-like rubber retard pads, located in line with the discharge chute and attached to the impeller vanes, are designed to stop the impeller from coasting longer than three seconds after PTO disengagement. If the impeller coasts for a long time, have your servicing dealer check these pads.

A wooden stick for clearing and deicing comes with the attachment. You can also deice the snow thrower by thawing it in a warm place.

# SECTION FOUR

## UNIT MAINTENANCE

### & ADJUSTMENT

#### ⚠ WARNING

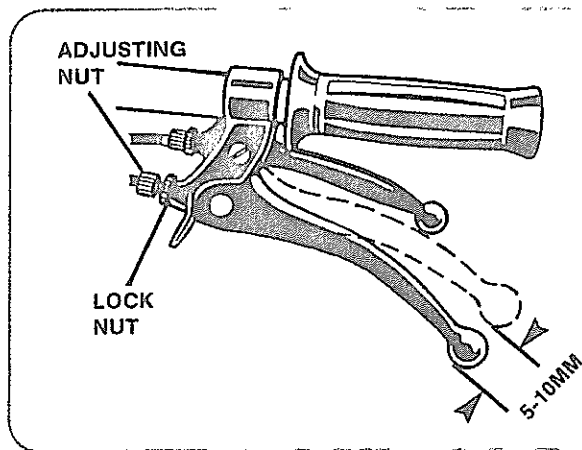
Stop the engine and disconnect the spark plug wire before performing any maintenance.

#### TIRE PRESSURE

The correct pressure is 14.2 pounds (psi) or 98 kilopascals. Check tire pressure at least yearly.

#### ADJUSTMENT OF CABLES AND PITCH BOLT

Cable stretch eventually may cause hard shifting. Free play should be adjusted whenever the gears clash and cannot be engaged cleanly.



For each control lever, measure the free play at the top of the lever. (See drawing.) This play should be between five and ten millimeters (3/16" - 3/8").

To adjust the free play, loosen the locknut. Turn the adjusting nut up or down to set the proper play. Tighten the lock nut.

#### ⚠ DANGER

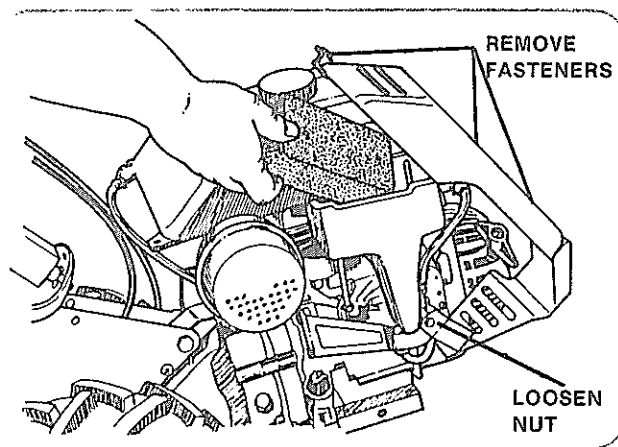
**GASOLINE IS HIGHLY EXPLOSIVE!**

Always use kerosene, mineral spirits, detergent and water, or other cleaning solvents whenever cleaning of parts is recommended.

#### AIR CLEANER MAINTENANCE

Check the air filter often.

**SPONGE TYPE FILTER IN BCS A-180 ENGINE:** Serious engine damage can result from operating when the sponge type filter element lacks enough oil or is clogged with dirt.

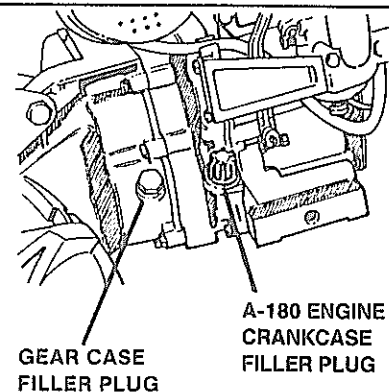
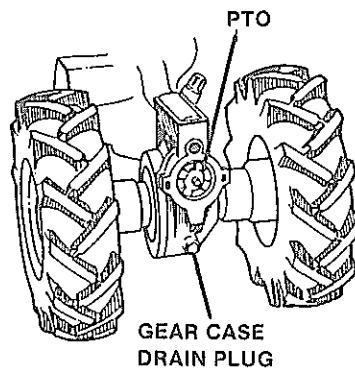
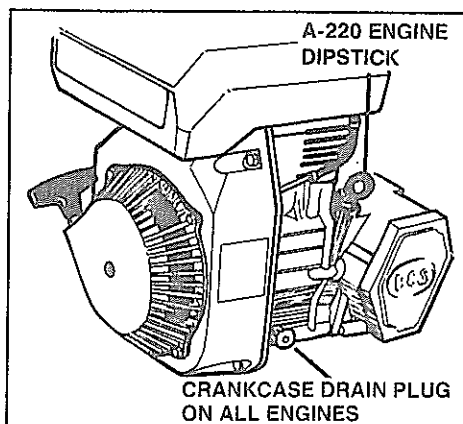
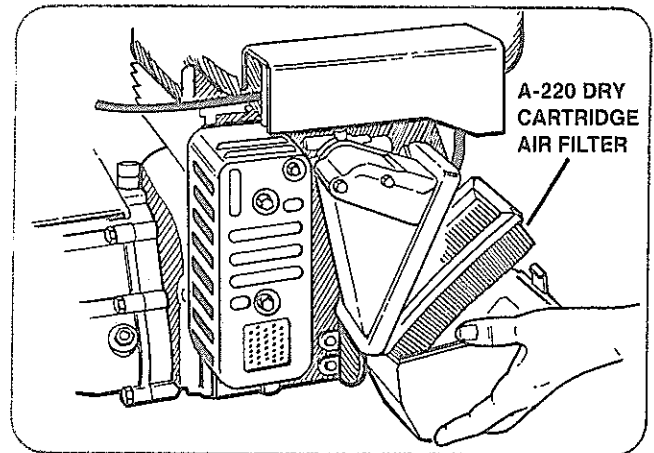


1. If the air cleaner cover is held to the fuel tank by a bolt, washer and wing nut, remove these fasteners. Then loosen the bolt which holds the guard to the bottom of the air cleaner body. (See drawing.)
2. Remove the two sets of wing nuts, washers and long bolts which hold the air cleaner cover and body together. According to the model, remove the cover or swing it forward out of the way.
3. Using several changes of cleaning solvent. (Do not use gasoline.) Squeeze with your fingers to force out dirt from the filter sponge. LET DRY THOROUGHLY.
4. Soak the clean filter in **clean engine oil**. Squeeze with the fingers to force out the excess of oil — leaving it moist with oil. Reinstall the filter and fasten the air cleaner cover in place with the fasteners previously removed. Do not forget to tighten the bolt at the guard.

### DRY CARTRIDGE FILTER IN BCS A-220 ENGINE:

Serious engine damage can occur from operating when the pleated filter element is clogged with dirt, cracked or torn, or improperly fitted into the air cleaner.

1. Unsnap the clip on the air cleaner cover and lift out the filter. (See drawing.)
2. **DO NOT WASH WITH WATER OR SOLVENT!** Dirt can be dislodged by tapping the flat gasketed edge of the filter against a clean surface. As cleaning never removes all of the dirt from the filter pores, replace the filter after a few cleanings.
3. Always check that the filter has no cracks or tears through which dirt could enter the engine.
4. Fit the clean filter carefully into place, and snap the cover back onto the air cleaner.



## MAINTENANCE OF LUBRICATION

### NOTE

Dirty or poor quality oil, or not enough oil can result in serious engine damage. Always keep the oil up to proper levels in the crankcase and gear case, and change oils as recommended on this page.

If the unit gets a lot of use, a yearly oil change is advisable. If you change to different weights of oil during the year, these changes will be enough.

Place the unit on a level surface for an accurate oil level check. (See drawings for locations of filler cap and drain plugs.)

**ENGINE CRANKCASE:** Keep the oil level above the bottom threads of the filler hole, or right at the full mark on an A-220 engine dipstick. The recommended detergent oils and temperature ranges are:

40°F and above

SAE-30 or SAE 10W-30

40°F and below

Conoco DN 600 Polar Start or Amoco Ultimate

**GEAR CASE:** Keep the oil level above the bottom threads of the gear case filler hole. Use SAE 80W-90EP gear oil in all temperatures above 40°F. In weather colder than 40°F, switching to \*Conoco DN 600 Polar Start or Amoco will enable you to turn over the engine with the recoil starter. Do not forget to change back to SAE 80W-90EP gear oil in the gear case as soon as the climate moves above 40°F.

When changing crankcase or gearcase oil, always run the engine to heat the oil. Then shut off the engine before removing the drain plug. Put a drip pan under the drain hole and tip the unit so all of the dirty oil can drain. Re-install the drain plug.

### NOTE

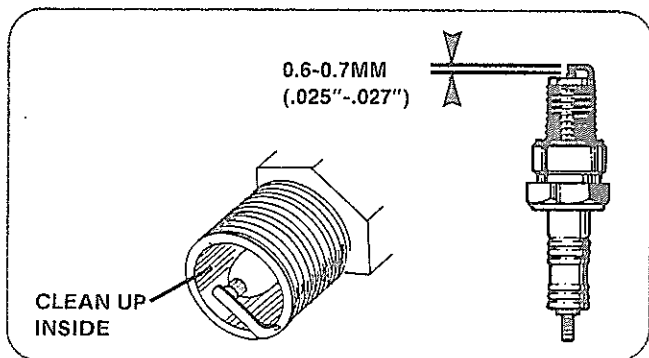
Do not pollute the environment. Dispose of waste oil properly!

\* For cold weather starting, Conoco Polar Start contains 10% refined petroleum oil. It mixes with standard motor oils, and can be used in both engine and transmission. Amoco Ultimate is a 100% synthetic oil.

## SPARK PLUG MAINTENANCE

The spark plug usually performs well for a long time with no need of attention. It should be removed and checked whenever there is trouble starting the engine. During the following checks, the starting problem either will disappear or you will know more about where the trouble lies:

a) Check that there is fresh fuel in the tank. The engine will not run without fuel, and may not start on fuel left over from a previous season.



b) Remove the plug and install a new one. Gap the electrodes of the new plug to between 0.6 and 0.7 millimeters (.023\" - .027\"). The replacement plug should be a Bosch W175 T1, a Marelli CW 5N or Champion L86. If the old plug was at fault, the engine now should be ready to start.

c) If the problem persists, and the new plug is wet with fuel, there could be a lack of spark, or something may be causing the engine to flood. Wipe the plug clean and dry and try starting again.

d) After repeated cranking, suspect a clogged carburetor fuel filter or a throttle linkage problem if the plug comes out bone dry.

If you have followed the maintenance and adjustment instructions on pages 29 through 31 to no avail, the problem should be discussed with your BCS servicing dealer. He is equipped to service your unit properly.

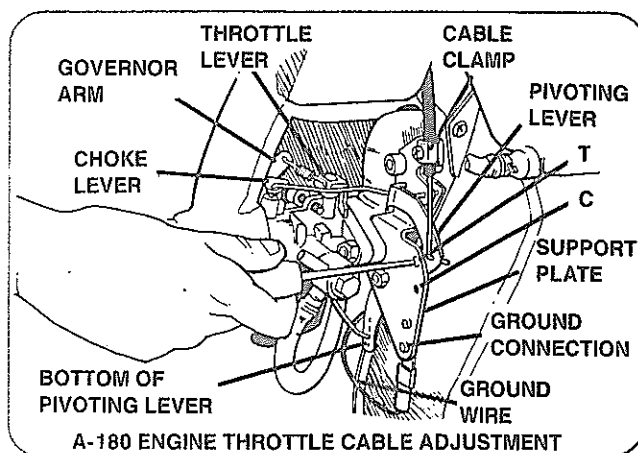
## ⚠ WARNING

Do not make internal engine repairs yourself. Without training and special service tools, a person could do such damage that the engine could fly apart when started.

## THROTTLE CONTROL CABLE ADJUSTMENT

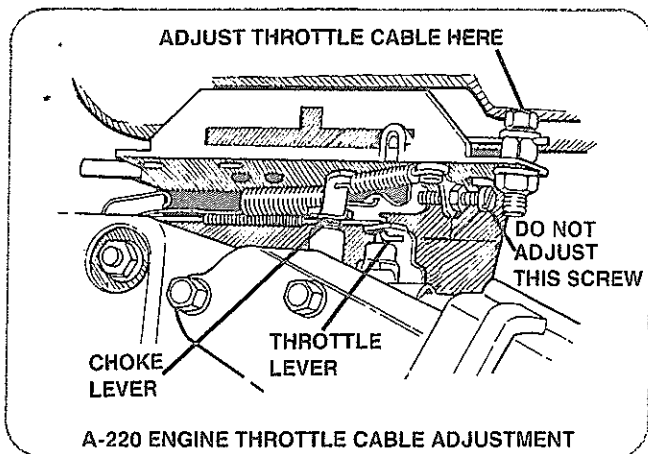
Parts wear and "cable stretch" may affect operation of the throttle control on the handlebar, but it is wise to check all causes of hard starting and lost power (page 31), and also check whether the **choke** and **throttle** shutters on the carburetor are being opened and closed fully, before making an adjustment.

In "**START**" position, the choke lever should be held flush against its stop (in the choked position). In all other control positions, including "**STOP**," the choke lever should be all the way open (90° from closed position.) In "**START**" position, the throttle lever should nearly touch the front mounting flange of the carburetor. As the control is moved back towards "**STOP**," the throttle lever should move towards the idle stop screw, and should be in contact with this screw by the time "**STOP**" position is reached.



**ADJUSTMENT ON BCS A-180 ENGINE:** Alignment holes (see drawing) on the support plate and pivoting lever to which the cable is hooked, simplify adjustment. Place the throttle control at "**START**." Loosen the cable clamp screw, (see drawing.) Push a suitable tool (awl or ice pick) into hole "**T**" of the support plate. Move the pivot lever with your finger until the tool drops into the hole in the pivot plate. Tighten the clamp screw.

**ADJUSTMENT ON BCS A-220 ENGINE:** With this control system there is a point, just before the throttle is advanced all the way to "**START**," where the choke will be pulled open halfway. Half-choke can be used during engine warm-up. Just back off the throttle if the engine falters. With the exception of removing cable slack, all



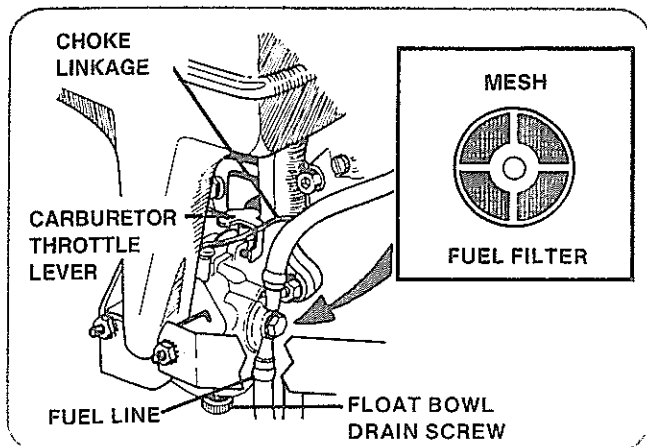
carburetor, governor and throttle control cable adjustments on this engine should be made only by authorized BCS service personnel. To remove cable slack: Put control at "STOP." Loosen clamp screw (see A-220 engine drawing.) Pull out cable to remove slack and tighten the clamp screw.

#### NOTICE

THE ENGINE GOVERNED SPEED WAS SET AT THE BCS FACTORY FOR ENGINE PROTECTION. DO NOT MAKE ANY ADJUSTMENTS TO THE GOVERNOR OR CHANGE THE WAY IT IS LINKED TO THE THROTTLE.

## FUEL FILTER MAINTENANCE

A screen type filter is in the fuel inlet to the carburetor. (See drawing.) Remove the screw and filter from the fitting, and drain the fuel into a suitable container for later re-use. Clean the filter in solvent or with air. (Read compressed air DANGER warning on this page.) If the mesh is uncleanable, replace the filter. Reconnect the fuel line to the carburetor.



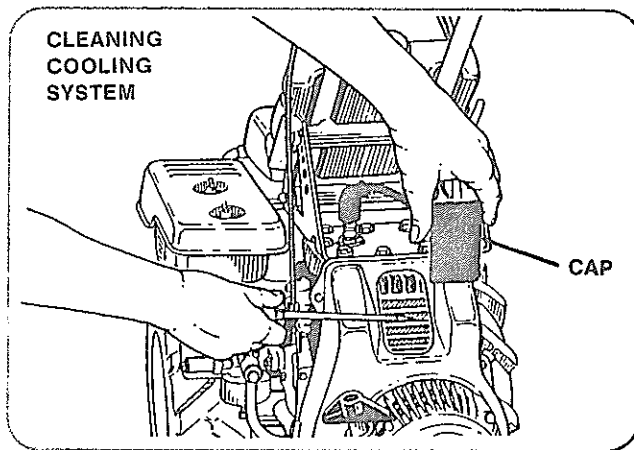
## CLEANING THE COOLING SYSTEM

### ⚠ DANGER

If used for cleaning, compressed air must be handled with extreme caution. Wear eye protection. Air directed at body parts can penetrate through the skin into the blood stream, causing illness or death. Never aim the air hose at any person or blow air at your skin to test the pressure. Do not use compressed air to clean garments being worn.

The engine will run too hot if the cylinder cooling fins become caked with dirt and the air passages are clogged with debris. Clean the cooling system regularly for a cool-running engine. How often to clean depends on the operating conditions.

On the A-180 engine it is necessary to pull off the rubber cap (see drawing) to expose the cylinder for cleaning. The cylinder fins of the A-220 engine are accessible for cleaning. Use a long-handled wire brush. Try to dislodge packed material, and brush the fins down to bare metal. Install the rubber cap on the A-180 engine.



## LONG TERM STORAGE

The unit should be prepared for storage if it is to be idle longer than three months.

Run the engine to get the oil in the crankcase warm. Follow instructions on page 28 to drain the used oil and refill the crankcase with fresh, clean oil.

Put a drip pan under the carburetor fuel inlet fitting and drain all fuel from the fuel system. (See "Fuel Filter Maintenance" and drawing of carburetor and fuel filter on this page.)

#### NOTE

Do not let fuel drain to the ground! Use it in another engine, if you can.

Remove the spark plug and pour a tablespoonful (½-ounce) of engine oil into the cylinder. Slowly pull the starter rope two or three times so this oil coats the cylinder walls and piston. Install the spark plug, but leave the spark plug wire disconnected.

Pull the starter rope slowly until the piston starts into its compression stroke and it is harder to pull the rope. In the compression stroke, the valves and the ignition breaker points are closed and protected from dirt and corrosion.

Wash and wipe dry the exterior of the machine. Use a light oil spray to protect surfaces which might rust.

Store the unit in a dry, dust-free area.

TROUBLESHOOTING CHART			
PROBLEM	CAUSES	REMEDIES	PAGE
ENGINE DOES NOT START	a) No fuel	a) Fill the tank	14
	b) Throttle lever at "STOP"	b) Put lever at "START"	14
	c) Spark plug wire is disconnected	c) Connect wire	29
	d) Flooded engine	d) Remove, clean spark plug and wipe dry	17
	e) Dirty or faulty spark plug	e) Clean and re-gap, or replace	29
	f) Throttle control misadjusted	f) Adjust at carburetor throttle connection for full travel	29
	g) Maladjusted or dirty breaker points	g) BCS dealer service required	
HARD STARTING OR LOST POWER	a) Dirt or water in fuel tank	a) Flush tank. Refill with clean fuel	14
	b) Clogged fuel cap vent	b) Clean cap	
	c) Dirty air filter	c) Clean. (Re-oil filter if foam type)	27
	d) Dirty fuel filter	d) Clean or replace	30
	e) Incorrect valving	e) BCS dealer service required	
	f) Low compression	f) BCS dealer service required	
OVERHEATING	a) Wrong spark plug	a) Replace with correct plug	29
	b) Dirty air filter	b) Clean. (Re-oil filter if foam type)	27
	c) Low oil level	c) Fill to filler hole level	28
	d) Dirty cooling fins	d) Clean	30
ENGINE BURNS TOO MUCH OIL	a) Engine overfilled	a) Restore oil level to bottom of crankcase oil filler hole	28
	b) Engine wear	b) BCS dealer service required	
DIFFICULTY IN ENGAGING GEARS	Improperly adjusted control cables	Adjust cables at the control levers	29
STARTER DOES NOT REWIND FAR ENOUGH	Dry or broken parts	BCS dealer service required	