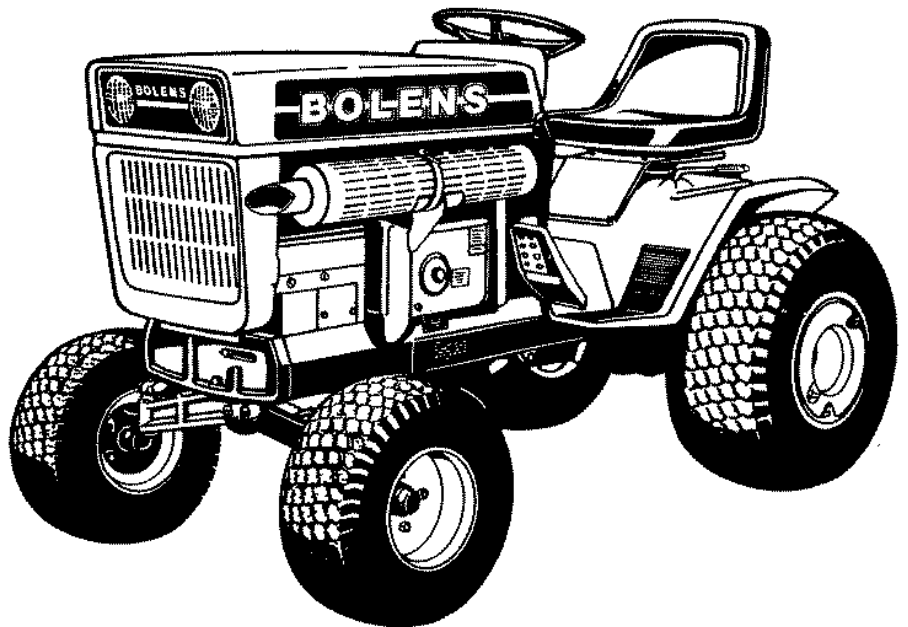

Bolens[®]

Tractor

HT23 (2389)



**Safety and
Operation
Instructions**

FORM 553353-2 (10/80)
SUPERSEDES 553353-1

MyTractorForum.com

Thank you for purchasing this piece of Bolens equipment. We feel you now own one of the finest pieces of equipment available.

This is a safety, operation and general maintenance manual which does not attempt to cover major repairs. Bolens equipment is carefully designed, engineered, and manufactured to give good performance if properly operated and maintained. Review this manual to familiarize yourself with the unit, its features and its operation.

This equipment is a product of Bolens Corporation, 215 South Park Street, Port Washington, Wisconsin, 53074, telephone 414-284-5521. If you should have any questions or encounter any problems, which you feel only the factory can solve, write to the above address or phone, attention the Service Department.

Your Warranty Statement is on the back cover of this manual. Please read it carefully. Also, please return the completed postpaid owner registration card which is included with this manual. The purpose of this card is to register each unit and owner at the factory for safety purposes.

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GENERAL SAFETY PRECAUTIONS



Preventing accidents is the responsibility of every equipment operator. The following general safety precautions must be fully understood and followed by every operator of this equipment. Review them frequently and **NEVER TAKE CHANCES. BE CAREFUL BEFORE, DURING AND RIGHT AFTER USE OF ANY POWER EQUIPMENT. ACCIDENTS CAN BE PREVENTED.**

1. Know the controls and how to stop quickly. **READ THE SAFETY AND OPERATION INSTRUCTION MANUAL.**

2. Do not allow children to operate the vehicle. Do not allow adults to operate it without proper instruction.

3. Do not carry passengers. Keep children and pets a safe distance away.

4. Clear the work area of objects which might be picked up and thrown.

5. Disengage all the attachment clutches and shift into neutral before attempting to start the engine (motor).

6. Disengage power to attachment(s), place transmission in neutral, stop the

engine (motor) and remove ignition key before leaving the operator's position.

7. Disengage power to attachment(s) and stop the engine (motor) before making any repairs or adjustments.

8. Disengage power to attachment(s) when transporting or not in use.

9. Take all possible precautions when leaving the vehicle unattended, such as disengaging the power-take-off, lowering the attachment(s), shifting into neutral, setting the parking brake, stopping the engine, and removing the key.

10. Do not stop or start suddenly when going uphill or downhill. Mow up and down the face of steep slopes; never across the face.

GENERAL SAFETY PRECAUTIONS (continued)

11. Reduce speed on slopes and in sharp turns to prevent tipping or loss of control. Exercise extreme caution when changing direction on slopes.
12. Stay alert for holes in the terrain and other hidden hazards.
13. Use care when pulling loads or using heavy equipment.
 - a. Use only approved drawbar hitch points.
 - b. Limit loads to those you can safely control.
 - c. Do not turn sharply. Use care when backing.
 - d. Use counterweight(s) or wheel weights when suggested in the owner's manual.
14. Watch out for traffic when crossing or near roadways.
15. When using any attachments, never direct discharge of material toward bystanders nor allow anyone near the vehicle while in operation.
16. Handle gasoline with care — it is highly flammable.
 - a. Use approved gasoline container.
 - b. Never remove the cap of the fuel tank or add gasoline to a running or hot engine, or fill the fuel tank indoors. Wipe up spilled gasoline.
 - c. Open doors if the engine is run in the garage — exhaust fumes are dangerous. Do not run the engine (motor) indoors.
17. Keep the vehicle and attachments in good operating condition, and keep safety devices and shields in place.
18. Keep all nuts, bolts, and screws tight to be sure the equipment is in safe working condition.
19. Never store the equipment with gasoline in the tank inside a building where fumes may reach an open flame or spark. Allow the engine to cool before storing in any enclosure.
20. To reduce fire hazard, keep the engine free of grass, leaves, or excessive grease.
21. The vehicle and attachments should be stopped and inspected for damage after striking a foreign object, and the damage should be repaired before re-starting and operating the equipment.
22. Do not change the engine governor settings or overspeed the engine.
23. When using the vehicle with mower, proceed as follows:
 - (1) Mow only in daylight or in good artificial light.
 - (2) Never make a cutting height adjustment while the engine (motor) is running if the operator must dismount to do so.
 - (3) Shut the engine (motor) off when unclogging chute.
- (4) Check the blade mounting bolts for proper tightness at frequent intervals.
24. Study all attachment manuals thoroughly before using attachments with tractor. By doing so you will be aware of both the tractor and attachment capabilities when used as a unit and also the safest manner in which to operate them.
25. Always follow manufacturer's operational suggestions.
26. Never wear loose clothing when operating unit. Loose clothing can get caught in moving parts and cause severe injuries.
27. Do not tow vehicle. Personal injury or damage to the vehicle could occur.
28. Always disconnect negative (—) battery cable from battery before doing any work on the electrical system. Reconnect it LAST when work is done. This is to prevent shorting of electrical system and accidental burns.
29. Do not drive this unit on a public thoroughfare at any time. The operator is risking injury from passing vehicles. Most local ordinances prohibit operating a unit such as this on a public thoroughfare.
30. Do not operate attachments when transporting vehicle.
31. Always wear substantial foot-wear to provide as much protection as possible.

The equipment which you have just purchased does not have a spark arrester. If this equipment is used on any forest covered land, brush covered land, or grass covered unimproved land in the State of California, before using on such land, the California law requires that a spark arrester be provided. In addition, spark arrester is required by law to be in effective working order. The spark arrester must be attached to the exhaust system and comply with Section 4442 of the California Public Resources Code.

IDENTIFICATION NUMBERS

To ensure prompt service when repairs or adjustments are required, your **BOLENS DEALER** must have the following information. For your own personal reference, fill in the serial number spaces provided below.

The tractor Model Number and Serial Number are on a name plate attached to the heat shield. The engine Model Number and Serial Number are on the engine shroud.

Tractor Model/Serial Numbers (A)

Engine Model/Serial/Spec Numbers (B)

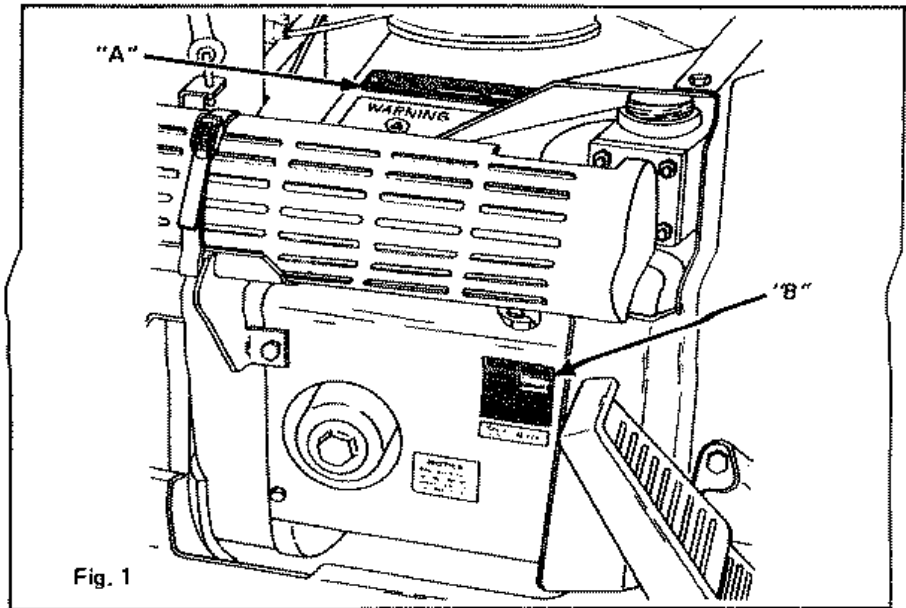


Fig. 1



CAUTION

WE URGE USING ONLY GENUINE BOLENS REPLACEMENT PARTS, WHICH MEET ALL OF THE LATEST REQUIREMENTS. REPLACEMENT PARTS

MANUFACTURED BY OTHERS COULD PRESENT SAFETY HAZARDS EVEN THOUGH THEY MAY FIT ON BOLENS PRODUCTS.

SPECIFICATIONS

Boiens reserves the right to make changes in specifications shown herein, add improvements or discontinue the manufactured product at any time without notice or obligation.

Illustrations in this manual may not relate exactly to the finished product due to product improvement and running changes.

Engine Kohler 23HP (17.1kW) at 3600 RPM	Attachment speed 2000 RPM	Shipping Weight 1100 lbs. (499kg)
Engine Type Twin Cylinder 4 Cycle Air Cooled	Power to attachments . . . triple belt drive with universal joints and splined shaft	Standard Equipment
Fuel Capacity 5.0 gal. (19 liter)	Tires High Flotation Lawn & Garden Tires 26 x 12.00-12	Splined shaft to drive front, center, or rear attachments; hydraulic lift system; electric starting; head lights and taillight; full fenders; adjustable moulded contour seat with spring suspension; 45 amp battery; interlock switches to prevent tractor from being started in drive and with attachment drive level in ON position; ammeter; hour meter.
Engine Oil Capacity 8 pts. (3.8 liter)	Rear - 18 x 8.50-8 Front	
Air Cleaner Dry Type	Height 45 in. (114cm)	
Battery 45 Amp.	Overall width 46 in. (107cm)	
Drive Hydro Transmission	Length 75 in. (190cm)	
Trans. Oil Capacity 10 qts. (9.4 liter)	Wheelbase 52 in. (132cm)	
Speed Infinitely Variable	Turning radius 54 in. (137cm)	
Forward 0-10 mph (0-16 km/h)	Ground clearance rear axle	
Reverse 0-5 mph (0-8 km/h)	8-1/2 in. (22.6cm)	

CONTROLS

Before operating the tractor the operator should become familiar with the function and location of each control to ensure proper and efficient operation.

The symbols used on these pages and on the controls of the tractor are INTERNATIONAL SYMBOLS. These symbols are used all over the World on equipment such as this. These symbols are readily identified in all languages.

The following listed numbers and accompanying information correspond to those numbers assigned to the controls indicated in Fig. 2.

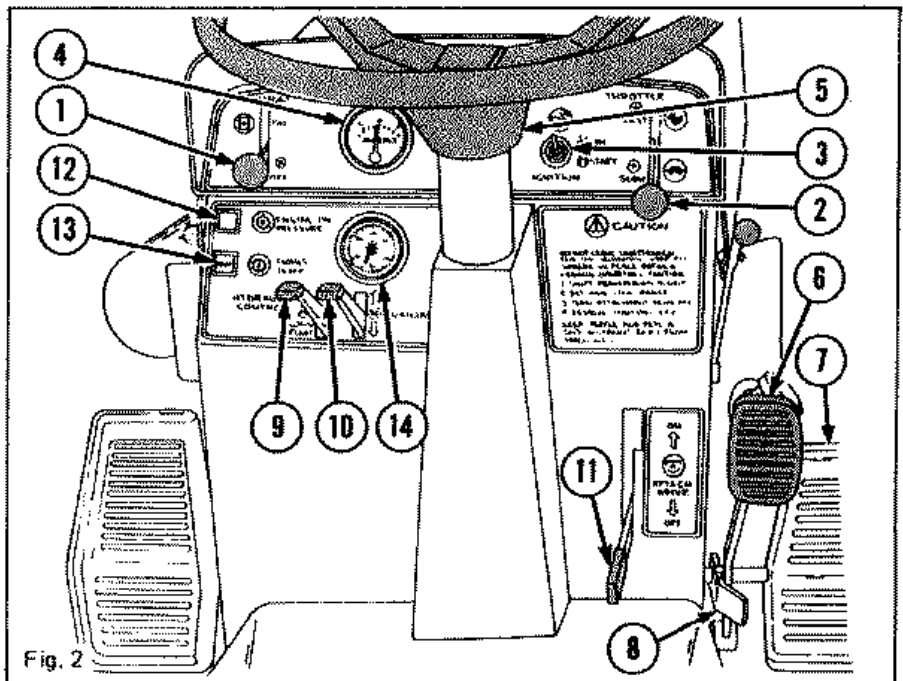
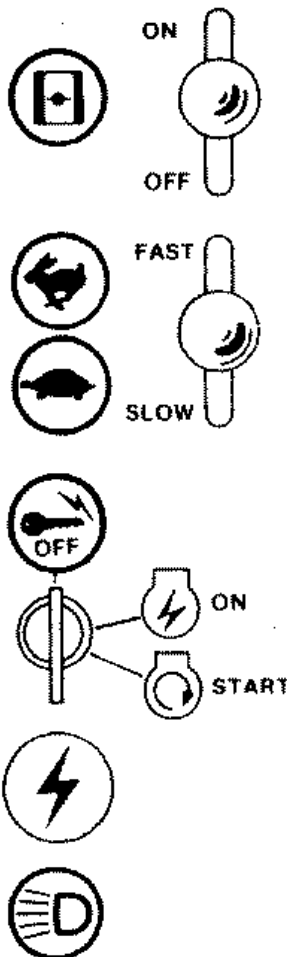


Fig. 2



1. **CHOKE** - Choke lever "UP" towards the "ON" position closes choke for starting. Choke lever "DOWN" to "OFF" position opens choke for operation.

2. **THROTTLE** - Move throttle lever "UP" one-half way for starting.

3. **IGNITION-STARTER SWITCH** - Turn ignition key clockwise to start engine. Release when engine starts.

4. **AMMETER** - Indicates rate of charge to or discharge from battery.

5. **LIGHT SWITCH** - Push light switch lever up to turn on lights -- push down to turn lights off.

CONTROLS (continued)



6. **FOOT BRAKE** - Use when vehicle is being moved manually or free-wheeling.



7. **TRAVEL PEDAL** - Depress pedal with toe of foot for forward motion. Depress with heel of foot for reverse motion.



8. **PARKING BRAKE** - To engage "Parking Brake" depress foot brake pedal and lift parking brake latch to hold the brake pedal in the park position. To release the "Parking Brake" depress the brake pedal until the latch is released and drops downward.



9. **HYDRAULIC LIFT LEVER** - Pull lever up to raise and push lever down to lower attachments. Push lift lever all the way down to lock for FLOAT position.



10. **AUXILIARY HYDRAULIC LEVER** - This lever regulates the auxiliary control-cylinders on any attachments which are plugged into either the front or rear auxiliary hydraulic connections.



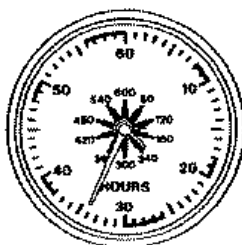
11. **ATTACHMENT DRIVE LEVER** - Engages and disengages power to attachments.



12. **OIL PRESSURE LIGHT** - Indicates when engine oil pressure is low.



13. **HYDROSTATIC OIL TEMPERATURE LIGHT** - Indicates when hydrostatic transmission and hydraulic system becomes overheated.



14. **HOUR METER** (Serial Number 0100101 thru 0199999) - Indicates hours of tractor use. White hand indicates meter is running. Red hand with outside numbers indicates hours of use up to 60 hours. Yellow hand with inside numbers indicates hours of use up to 600 hours. **EXAMPLE:** When figuring total hours, see where yellow inside hand is. If hand is between the 120 and 180, the total hours of use would be 120 plus whatever the outside red hand reads. If the red hand is on 34, then your total hours would be 154 hours. (See meter at left.) When outside red hand is in a red zone check with maintenance chart.



15. HOUR METER (Serial Numbers 0200101 and later) - Indicates hours of tractor use. Red hand indicates meter is running. White hand indicates hours of use. Yellow hand indicates Maintenance intervals. When yellow hand reaches outside indicated hours, check with lubrication chart for maintenance.

BEFORE OPERATION

The operator should become familiar with the following list, and perform each check prior to starting or operating the FMC Bolens tractor.

1. Check for proper level of engine oil. Fill crankcase through dipstick opening. The oil level is indicated by marks on the dipstick (capacity 3 qts/2.84L). See Maintenance Chart pg. 25 for type and grade of oil.

2. Check gasoline tank for sufficient gas supply. Use a good grade of clean regular gasoline.

(For cold weather operation use winter blend gasoline.) Do not mix oil with gasoline.

Check to see that vent hole in fuel tank cap is not plugged.

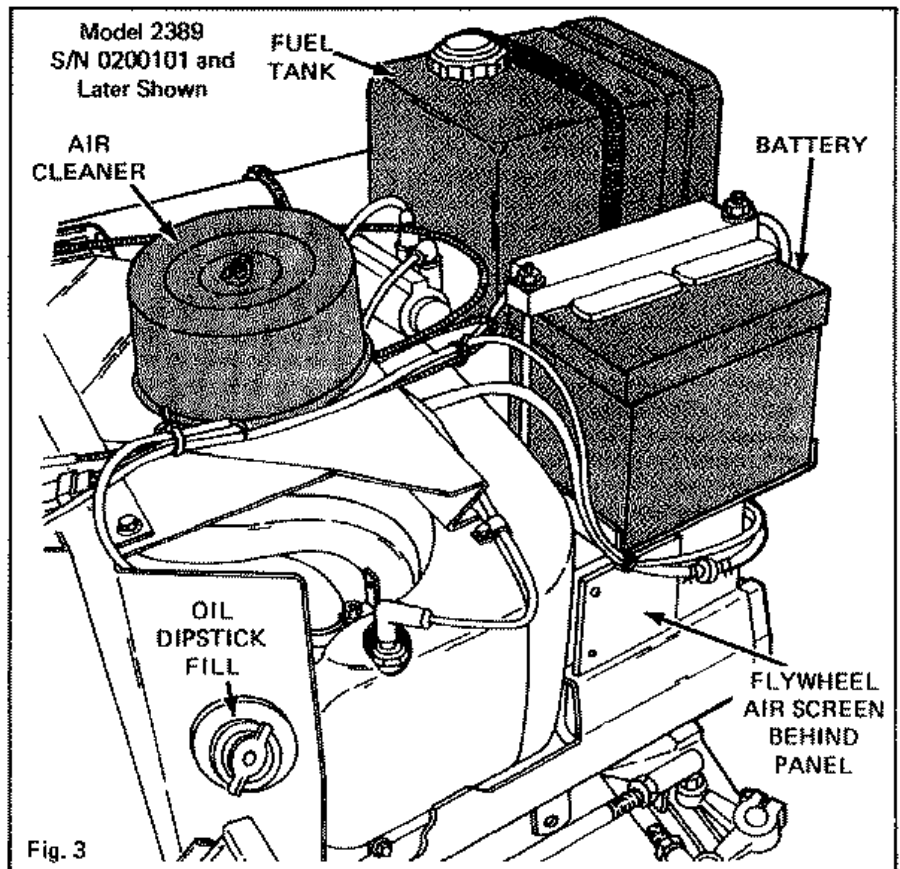


WARNING

DO NOT REFUEL TRACTOR WHILE ENGINE IS RUNNING OR HOT. KEEP SMOKERS AND FLAMES AWAY WHEN REFUELING. BE CAREFUL NOT TO SHORT FUEL CAN ON ELECTRICAL CONNECTIONS.

3. Inspect battery for:

- A. Proper electrolyte level.
- B. Clean cables of dirt and corrosion.
- C. Clean terminals of dirt and corrosion.



Refer to Figure 3 for battery location.



WARNING

4. Check to see that air cleaner element is free of debris. Clean regularly. Refer to Figure 3 and Maintenance, page 15.

ENGINE MUST BE STOPPED BEFORE CLEANING.

5. Check flywheel screen for debris, and clean regularly.

6. Visually check for loose or missing nuts, screws, and damaged parts. Replace and tighten before starting engine.

BEFORE OPERATION (continued)

7. Check hydrostatic oil before operating. Locate dipstick under seat, Fig. 4 and check. Oil level should be maintained in the safe operating range at all times.

8. Check for even tire inflation. Front and rear tire inflation should not be less than 8 lbs. (55kPa) nor more than 12 lbs. (82kPa).

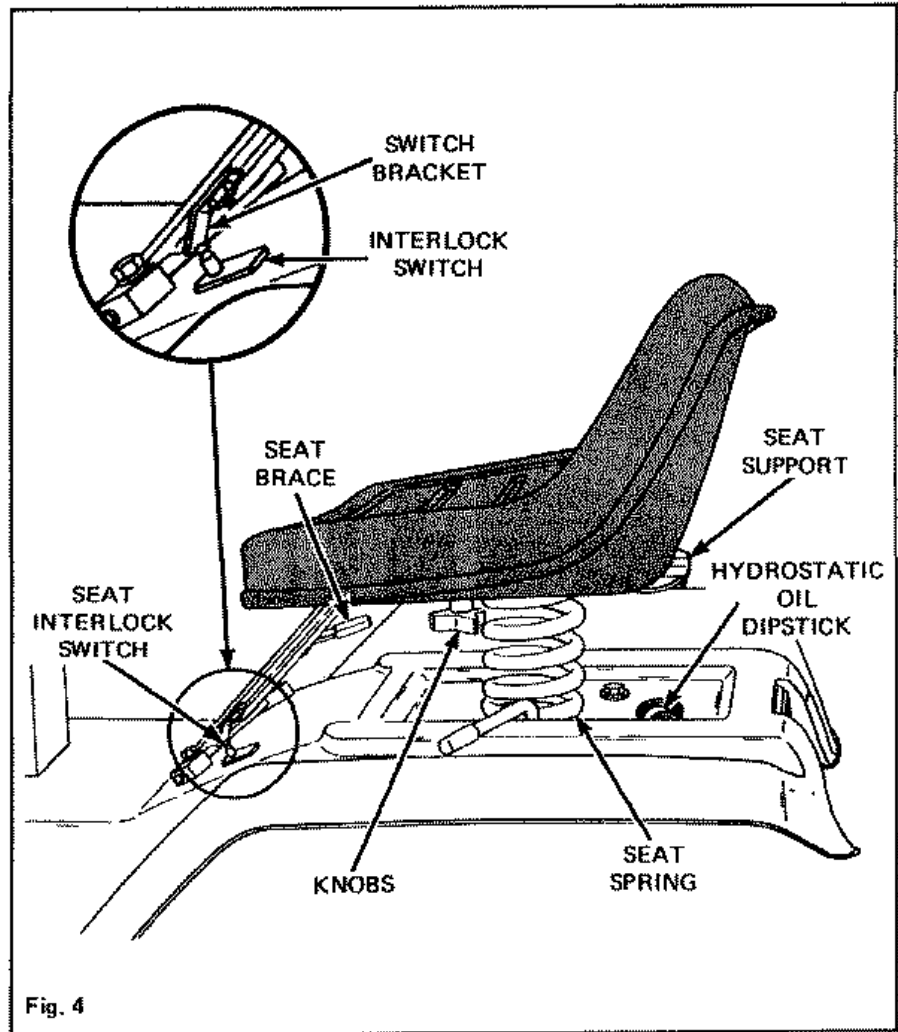


Fig. 4

BREAK-IN PERIOD

A special "break-in" oil is used by the engine manufacturer during the engine test and run-in period. After "run-in," the special oil is drained.

Further use of "break-in" oil is not required nor recommended for new engines.

NOTE

These tractors are shipped without oil in the engine crankcase. Be sure to fill the crankcase with oil before starting the engine.

Use oil recommended in lubrication chart page 25.

The engine should be placed under load, but not over loaded, from the very beginning as this will improve the final seating of the rings. Do not operate under light loads for prolonged period of time during "break-in."

OPERATION

Before driving the FMC Bolens tractor the operator should be familiar with the location and function of all controls.



WARNING

CHILDREN SHOULD NOT OPERATE THIS TRACTOR BECAUSE AN AVERAGE CHILD IS NOT ABLE TO COPE WITH THIS POWER TOOL.

SEAT ADJUSTMENT (Refer to Fig. 4)

NOTE

For safe operation adjust the seat for comfort and control.

1. To adjust seat, loosen knobs beneath seat and slide seat forward or back. For different spring suspension, twist spring to loosen. Slide spring to the front for light operators or back for heavy operators. Twist spring to tighten.

Model 2389 Serial Number 0100101 thru 0199999 only

2. To keep seat in a upright position, turn seat brace down to act as a brace for the seat.

NOTE

When transporting tractor on an open trailer or truck either remove or tie down the seat.

NORMAL STARTING (Refer to Fig. 5)

1. The starter will only operate when attachment drive lever is in "off" position and foot brake depressed or locked in park.

2. Move choke lever all the way up (choke on). Experience will indicate need for more or less choking due to variations in temperature, grade of fuel, etc.

3. Move throttle lever up about half-way.

4. Insert ignition key and twist clockwise to start engine. Release when engine starts.

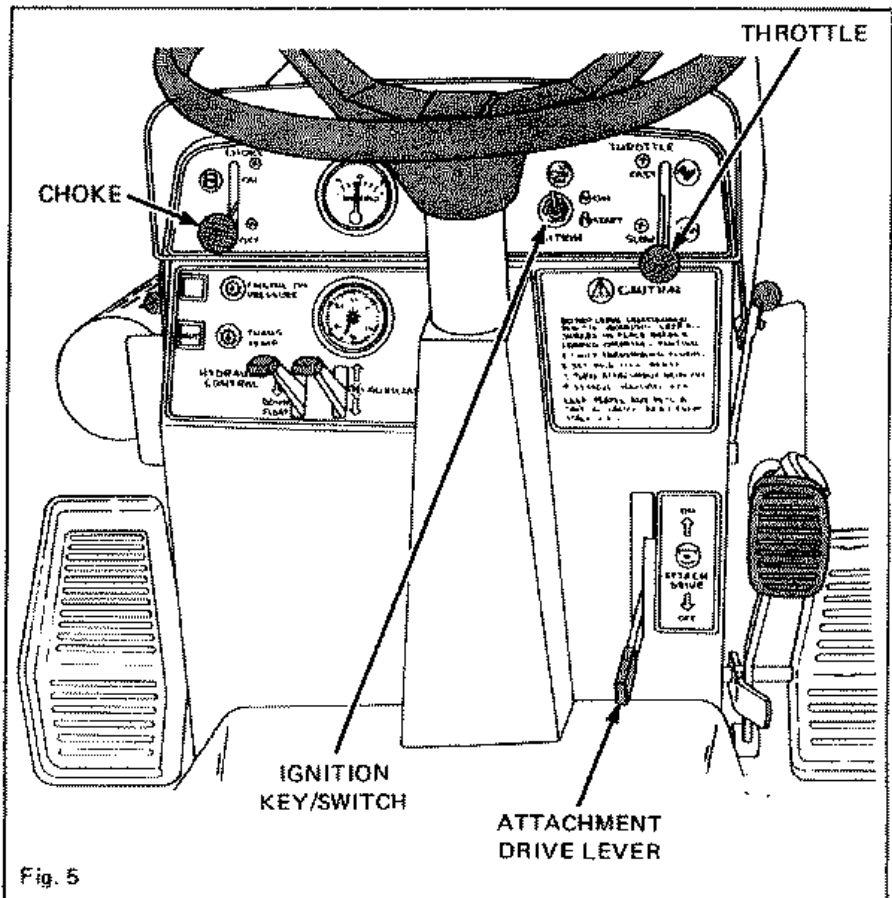


Fig. 5

In order for the P.T.O. to work, the seat switch must be activated by sitting on the seat, or if there is a need to start the P.T.O. from off the seat, just tip the seat up and lift interlock button up, see Figure 4.



CAUTION

In the event of a "false start" (engine gets up sufficient speed to disengage starter but fails to continue running), the engine must be completely stopped before another starting attempt is made. Failure to allow engine to come to a complete stop can cause damage to the starting mechanism and engine. Limit cranking (continuous) to a period of 30

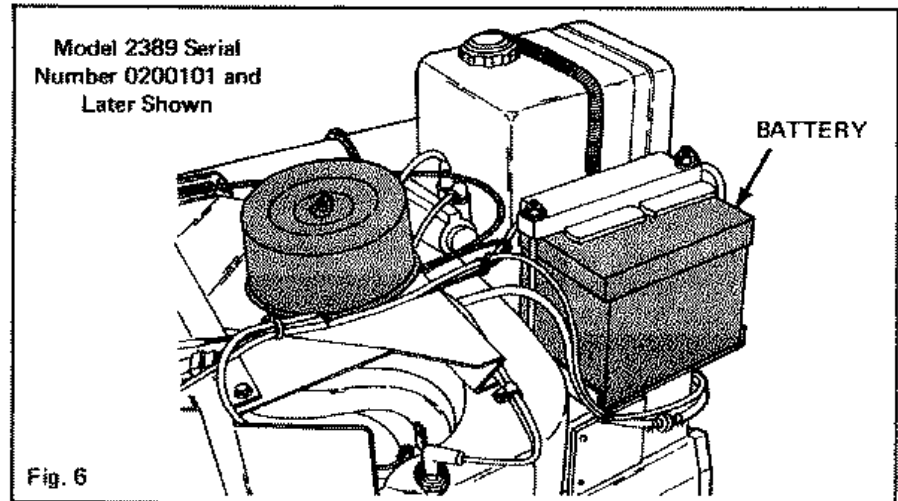
seconds to prevent overheating of the starter. If cranked over 30 seconds, starter should not be operated again for 60 seconds to allow time for cooling.

OPERATION (continued)

5. Move choke lever down about halfway as soon as engine starts. Gradually push all the way down as the engine warms up. In normal operation, choke lever should be in off (down) position for best engine efficiency and fuel economy.

6. Move throttle lever up to full speed when operating tractor.

7. To stop the engine, bring engine back to idle, engage parking brake and place attachment drive lever in "Off" position. Let engine idle 30 seconds before turning ignition switch off and removing the ignition key.



EMERGENCY STARTING

In the event of electrical failure, get in touch with your dealer for assistance in locating the trouble.

Should the battery be too low on power to start the unit, it is always best to remove it and have it recharged. However, should jumper cables be used the following must be observed:

1. Remove cell caps when using jumper cables.

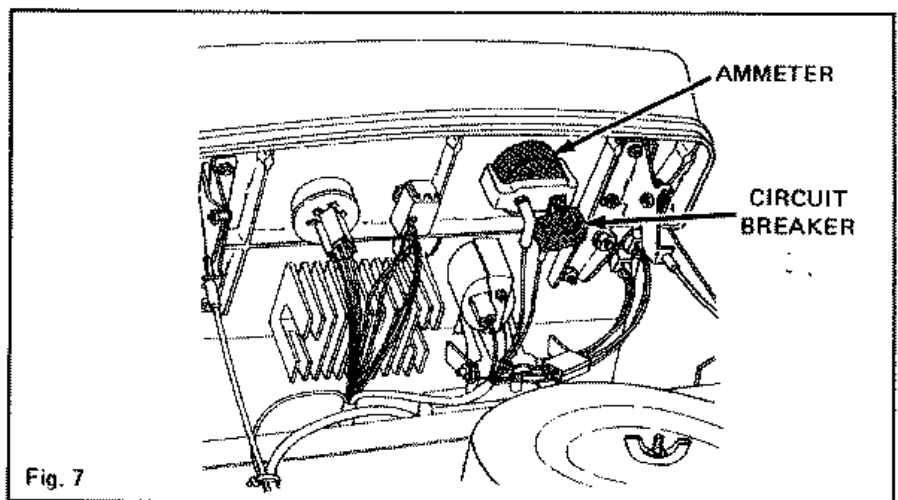


WARNING

ELECTRIC STORAGE BATTERIES GIVE OFF HIGHLY FLAMMABLE HYDROGEN GAS WHILE BEING JUMPED, AND CONTINUE TO DO SO FOR SOME TIME. DO NOT UNDER ANY CIRCUMSTANCES, ALLOW AN ELECTRIC SPARK OR AN OPEN FLAME NEAR THE BATTERY. DO NOT LAY TOOLS ACROSS THE BATTERY TERMINALS AS THIS MAY RESULT IN A SPARK OR SHORT CIRCUIT WHICH MAY CAUSE AN EXPLOSION.

2. Be certain jumper cables are connected positive to positive and neg-

10



ative from the booster battery to the engine block of the tractor, not to negative (-) terminal of battery.

3. Check attachment drive lever (must be in "Off" position) and parking brake must be engaged.

4. Follow procedure outlined under Electric Starting.

5. After unit is started remove jumper cables from booster battery first. Then remove cables from the tractor, replace battery cell caps and boot over positive (+) terminal.

CIRCUIT BREAKER

If electrical system fails while operating engine, shut engine off and let tractor stand a few minutes to allow circuit breaker to cool and reset. See Figure 7 for location.

SEAT SWITCH

There is an interlock switch positioned in the fender, underneath the seat. See Figure 10. In order for the P.T.O. to start, the switch must be activated. The two ways to activate the switch are by sitting on the seat or lifting the seat up and manually lifting the button up.

OPERATION (continued)

ENGINE OIL PRESSURE LIGHT

This light (Figure 8) indicates when the engine oil pressure drops below the safe operating level. If this light comes on check the crankcase oil level. Add oil if level is low. If the oil level is not low change the engine oil filter (Figure 15). If the light does not go off after performing the above, see your Bolens Dealer.

FOOT AND PARKING BRAKE

To release the "Parking Brake" Fig. 9 depress the brake pedal until the latch is released and drops downward. The foot brake should also be used for emergency stops.

HYDROSTATIC TRANSMISSION

The Two Speed hydrostatic transmission gives the operator a choice of infinitely variable speeds from 0 to 10 mph (0-16km/h) forward, and 0 to 5 mph (0-8km/h) in reverse. Avoid excessive HIGH travel speed whenever possible. Lower travel speeds are best for most jobs such as snow throwing or mowing tall or lush grass.

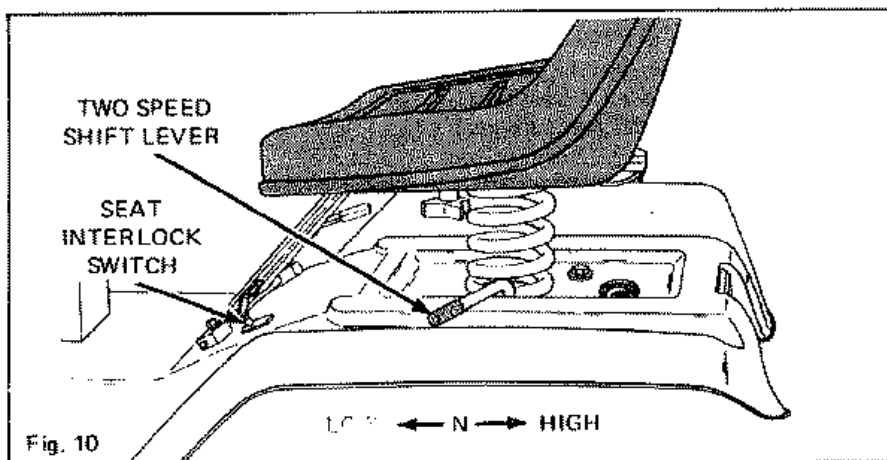
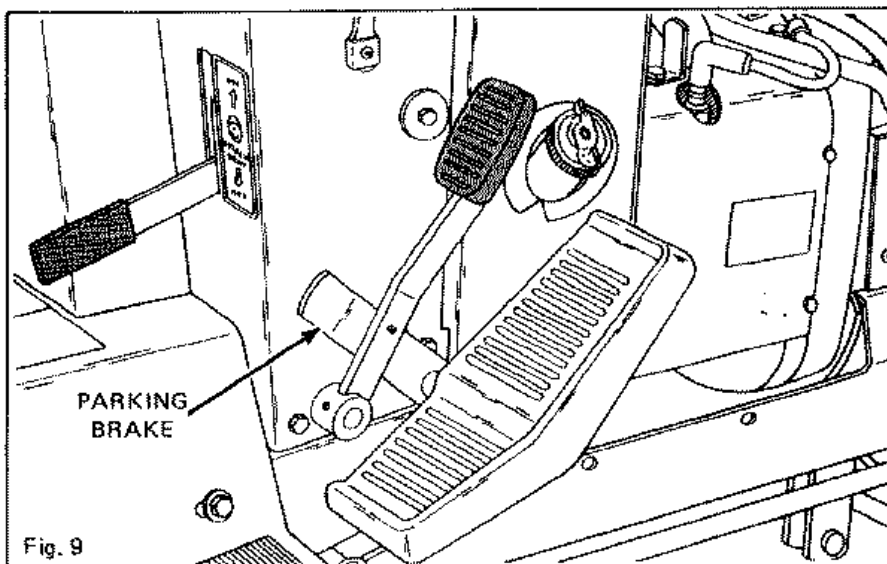
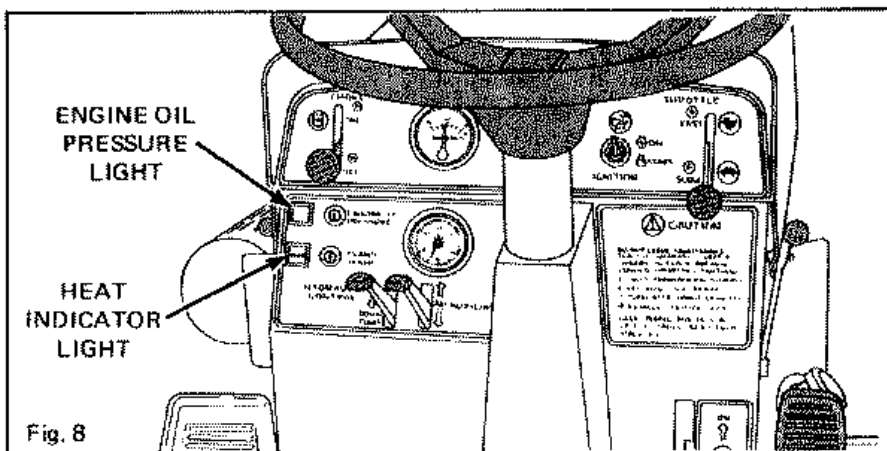
The travel (control) pedal is generally used for dynamic braking. To slow down or stop the tractor while it is in forward motion, gradually apply pressure to the travel control pedal with heel of right foot until tractor comes to a full stop. To slow down or stop the tractor while it is in reverse motion, apply pressure to travel control pedal with toe of right foot until tractor comes to a full stop.

TWO SPEED TRANSMISSION

The two speed shift arm, Fig. 10 MUST be operated with the tractor completely stopped.

Use HIGH range (0-10 mph) for transport.

Use LOW range (0-3.6mph) for high load operations, such as tilling, plowing, snow throwing, etc.



OPERATION (continued)

NOTE

Do not drive the tractor immediately after start up. Let the engine run a few minutes to allow hydrostatic fluid to warm up first. In extreme cold weather the tractor should not be driven until after the hydraulic lift system is operating. Length of warm up will be determined by temperature. It is required that the tractor operate at **FULL THROTTLE**. While operating under heavy load conditions, listen to the engine RPM. If the engine begins to labor do not advance the travel pedal. By letting up on the travel pedal, the ground speed will decrease and the engine speed will increase, thereby allowing engine to maintain constant attachment speed.

If transmission "HOT LIGHT" (Fig. 11) comes on, this indicates that the fluid in the hydrostatic and hydraulic system is overheated. When this light comes on, shut the tractor off and let the system cool down. When restarting tractor operate at **LOW** range.

NOTE

If the heat indicator light comes on frequently due to operating and load conditions, we recommend the installation of a oil cooler kit.

HYDRAULIC LIFT

The hydraulic lift can be operated while vehicle is at rest or in motion. Lift lever to raise and push down on lever to lower attachments. When released, lever will automatically return to **NEUTRAL** position and hold, except when in the **FLOAT** position. Push lift lever all the way down to lock in **FLOAT** position. The **FLOAT** position must be used when the operator wants the attached implement to follow ground contours independently. (See Figure 11). Consult your attachment manual for correct lift lever position.



CAUTION

BE SURE ATTACHMENT IS COMPLETELY HOOKED UP BEFORE

12

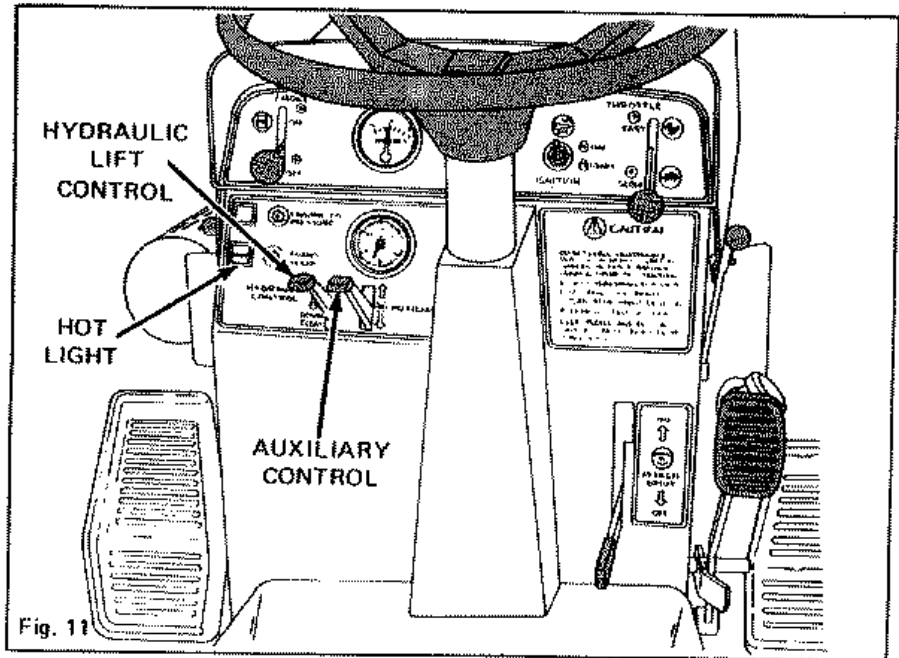
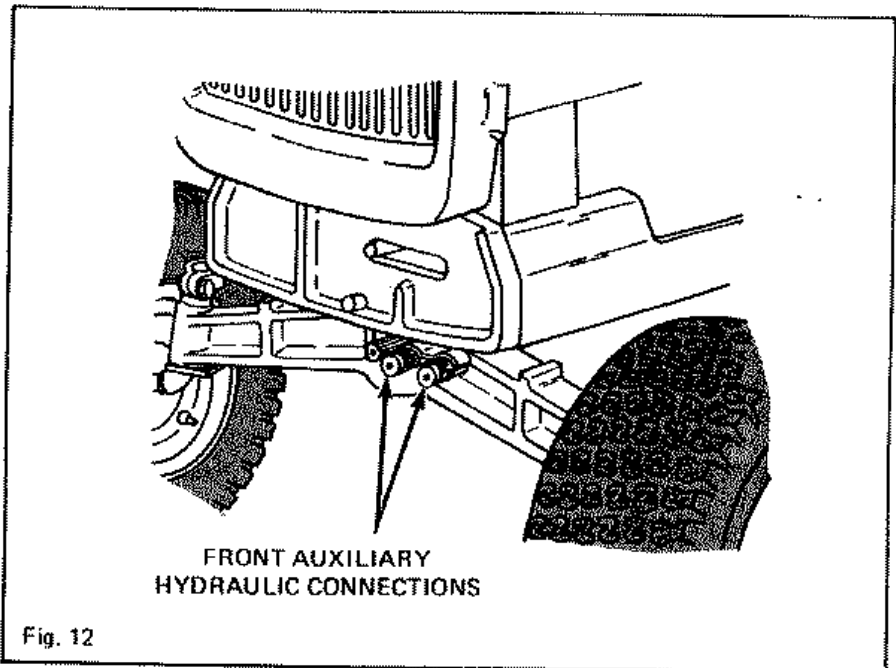


Fig. 11



FRONT AUXILIARY HYDRAULIC CONNECTIONS

Fig. 12

USING HYDRAULIC LIFT. DAMAGE COULD RESULT. MOVE THE ATTACHMENT THROUGH ITS COMPLETE RANGE SLOWLY TO MAKE SURE IT DOES NOT BIND OR HAVE INTERFERENCE. MAKE NECESSARY ADJUSTMENT IF REQUIRED.

AUXILIARY HYDRAULICS

This is a 3 position valve, with the center position being "OFF" or "NEUTRAL." This valve is used only for operating small double acting cylinders on the remote or auxiliary hydraulically controlled attachments. (See Fig. 11)

OPERATION (continued)

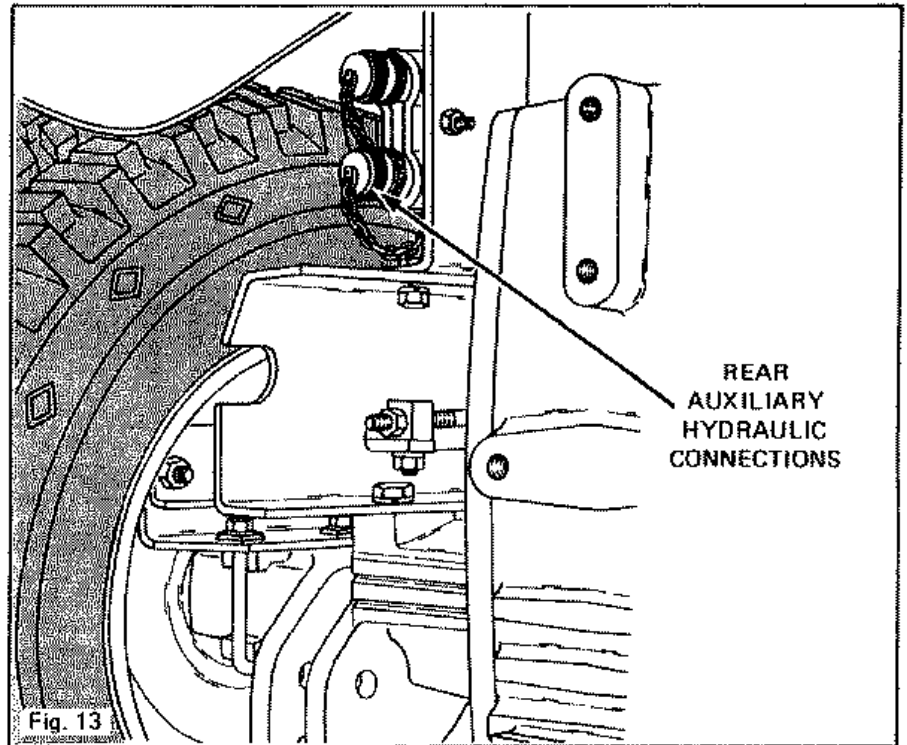
AUXILIARY HYDRAULIC CONNECTIONS

Refer to Figure 12 and 13. These are connections for the auxiliary hydraulic controls. To use, clean all dirt and debris from around connections. Push lock collar back towards tractor, remove rubber plugs and insert hydraulic hose end. When not in use, rubber cap plugs must be in place at all times to prevent entry of dirt into hydraulic system.

NOTE

These connections must be kept clean. This is necessary to prevent contamination of the hydraulic fluid and subsequent damage to the hydraulic components.

Only Boiers approved attachments are to be attached to these auxiliary hydraulic connections. Consequential damage to the hydraulic system could result from the use of unapproved attachments, thus voiding warranty.



ATTACHMENT DRIVE (Refer to Fig. 14)

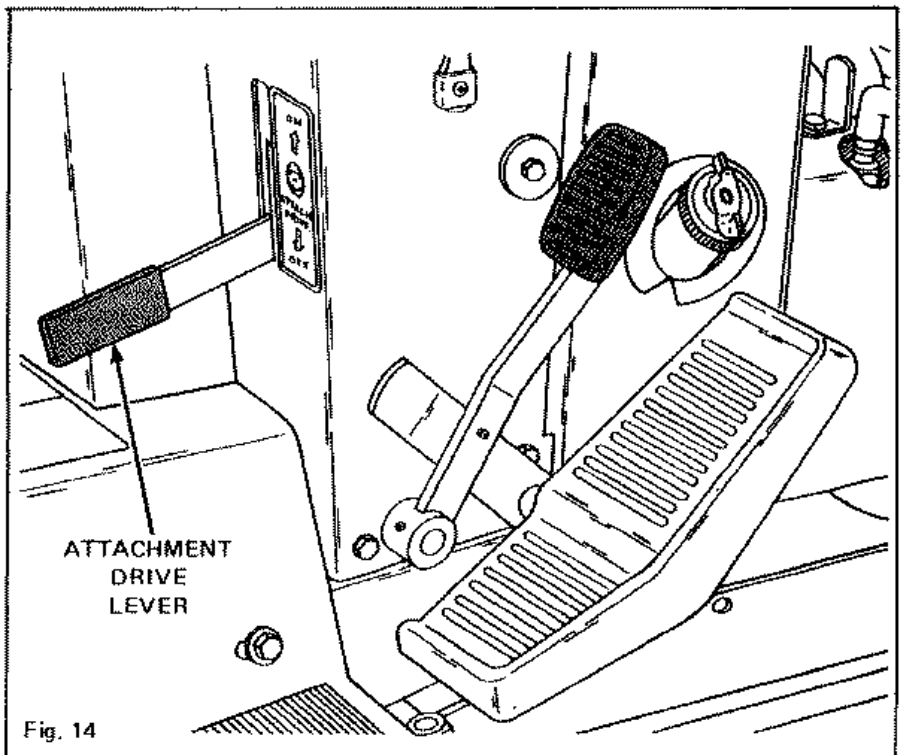
The attachment drive and hydrostatic transmission are separate systems; therefore the attachment drive can be engaged or disengaged at any time.

Move attachment drive lever up and lock in detent to engage attachment drive. Move attachment drive lever down to disengage attachment drive.



CAUTION

DO NOT ENGAGE ATTACHMENT DRIVE WITHOUT AN IMPLEMENT ATTACHED. ALWAYS REMOVE UNIVERSAL JOINTS FROM TRACTOR PTO SHAFT AFTER ATTACHMENT IS REMOVED. SERIOUS DAMAGE WILL RESULT IF UNIVERSAL JOINTS ARE LEFT ON AND ATTACHMENT DRIVE IS ENGAGED.



MAINTENANCE

A little time spent by the operator on preventive maintenance each day the unit is used will lead to longer operating life of the Bolens tractor.

The removal of debris, dirt and grease accumulations are considered normal maintenance practices and can help discover minor difficulties before they become troublesome.

LUBRICATION

See Lubrication Chart on page 25.

Use the hour meter equipped with the tractor to aid in maintenance. When the hour meter reaches the red zone in hours refer to the Lubrication Chart on page 25.

ENGINE (Refer to Fig. 15)

The engine oil level must be maintained in the "safe" operating range at all times. Oil level must be between the "L" (low) and "F" (full) marks on the dipstick. Clean area around dipstick so dirt does not fall into crankcase when dipstick is removed. Check daily and add oil as necessary to maintain proper level — DO NOT OVERFILL. Oil level must not exceed the "F" mark. After completely draining oil, reinstall drain plug then remove oil filler cap and refill with 3 quarts (2.8 liter) of oil — check the oil level on the dipstick before adding more — then bring the level up in the safe range. If the oil filter has been changed, add one additional pint (half quart) (0.47 liters) of oil. Select oil weight and type according to the outside temperature. Refer to the Lubrication Chart on page 25.

OIL FILTER (Refer to Fig. 16)

The filter is mounted on the crankcase of the engine. These are "throw away" cartridge type filter elements. If the cartridge has been overtightened during installation, a strap wrench may have to

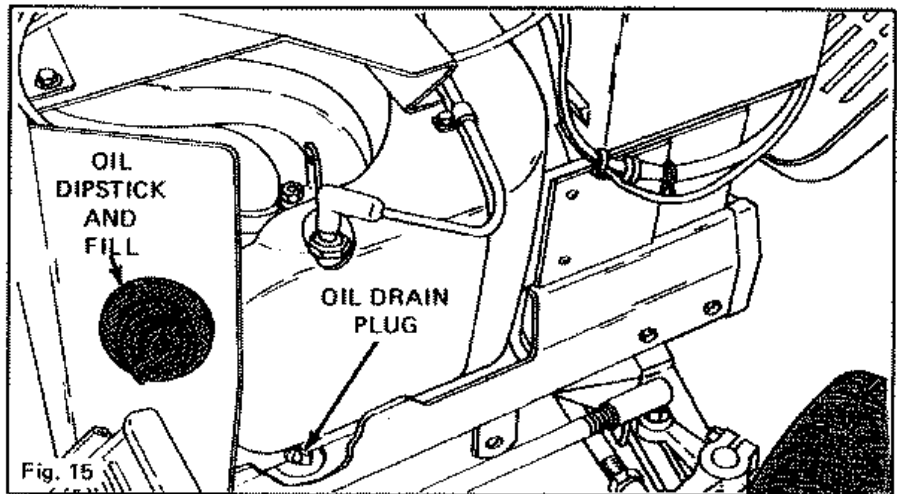


Fig. 15

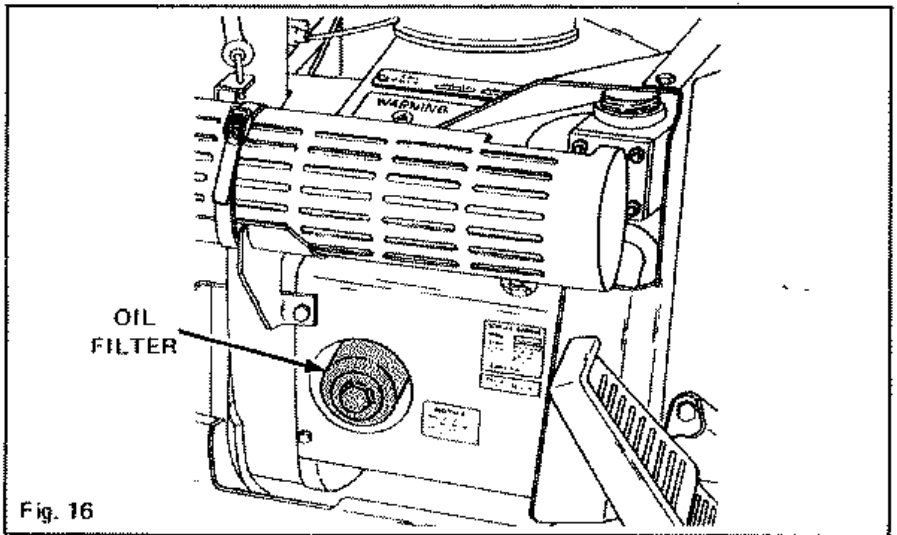


Fig. 16

be used to remove it but usually it can be removed by hand. Use the following procedure to replace:

1. Drain crankcase oil.
2. Place rags or a pan below the cartridge to catch spilled oil. Unscrew the cartridge counterclockwise and discard.
3. Wipe up any spilled oil, then wipe the adapter clean.
4. Apply grease on oil filter gasket then

turn new cartridge (with gasket in place) onto the adapter in clockwise direction — hand tighten only.

5. After replenishing oil and restarting engine, check area around cartridge for signs of oil leakage. Correct leakage if need be by turning cartridge tighter.

Failure to change oil filter elements at the recommended intervals can lead to serious damage to the engine. An oil filter does a very effective job; however, it must be replaced each 100 hours of

MAINTENANCE (continued)

operation (every other oil change) under normal conditions or more often if the engine is subject to extremely dirty conditions.

NOTE

Use only the genuine Kohler oil filter cartridge for replacement.

AIR SCREEN

Clean flywheel air screen, Figure 17, frequently. A dirty air screen and/or engine will cause the engine to overheat and damage the engine.

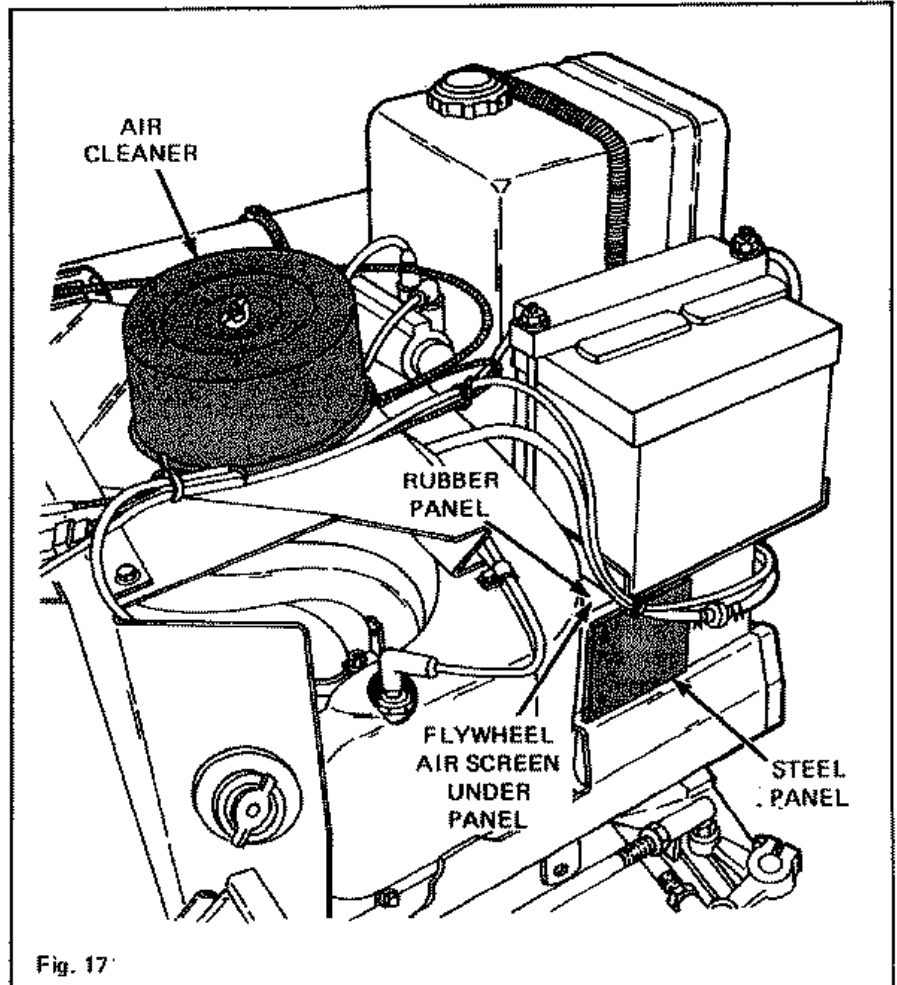
To clean the flywheel air screen, remove the rubber and steel panels around screen. Replace the panels after the screen has been cleaned. These panels must remain in place for proper cooling of engine.

AIR CLEANER (Refer to Fig. 17)

Under normal operating conditions, disassemble and service air cleaner components every 50 hours of operation. Do this more frequently (even daily) if extremely dusty or dirty conditions prevail. The dry type element is cleaned by gently tapping on a flat surface — when doing this, be careful not to damage gasket surfaces on element. Do not attempt to clean dry type elements in any liquid or with compressed air as this will damage paper filter material. Wipe dirt or dust accumulation from cover including base plate where used.

Dry type elements should be replaced after each 100 to 200 hours — replace at 100 hours if engine is operated under dirty conditions — replace every 200 hours under good clean air conditions.

The importance of maintaining an air cleaner in proper condition cannot be overemphasized! Dirt induced through improperly installed, improperly serviced or inadequate elements, wears out more engines than does long hours of operation.



MAINTENANCE (continued)

CARBURETOR ADJUSTMENTS

(Refer to Figure 18)

Carburetor is adjusted at the factory and should not have to be reset. If black exhaust smoke is noted, check the air cleaner first. An "overrich" mixture is usually caused by a poorly serviced, clogged air cleaner element, not an improperly adjusted carburetor.

If readjustment becomes necessary, stop the engine. Turn the MAIN and IDLE fuel adjusting screws all the way in until they bottom tightly – do not force them closed as this will damage the needle valves. For preliminary setting, turn MAIN fuel screw out (counterclockwise) 2 full turns and the IDLE 1-1/4 turns. For final adjustments, start engine and allow it to warm up then operate at full throttle and under load, if possible. Turn MAIN fuel screw in until engine slows down (lean side) then out until it slows down again from overrich setting – note positions of screw at both settings, then set it about half-way between the two. The IDLE fuel setting can then be adjusted in the same manner for smoothest idle. Rough idle is often due to the idle speed being set too low – check this also.

To adjust idle speed, remove plug in heat shield (Figure 18) to gain access to adjusting screw. The idle speed should be no less than 1,200 RPM. The proper idle speed will help prevent carburetor "load up" and engine "kill".

FUEL FILTER

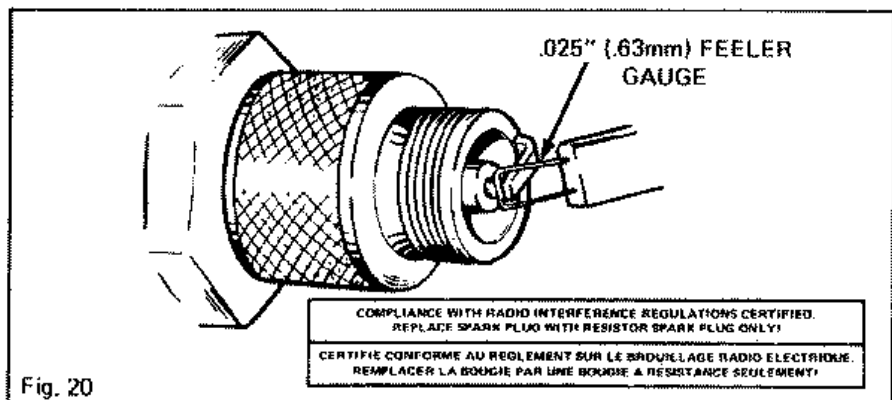
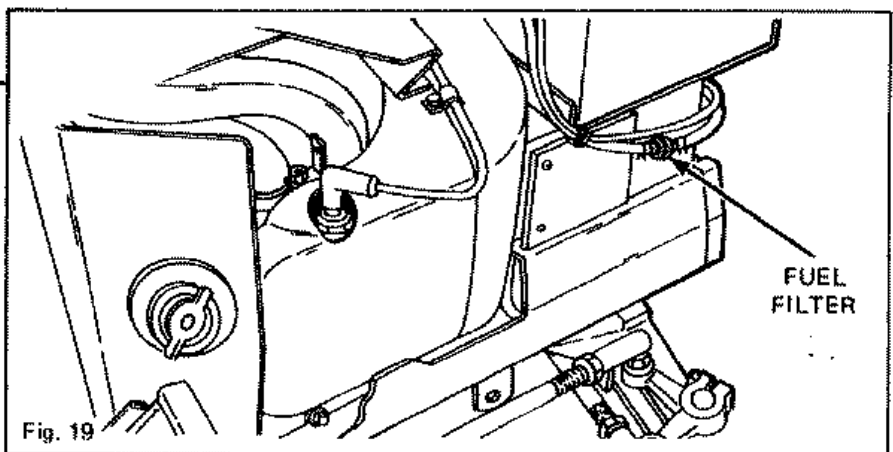
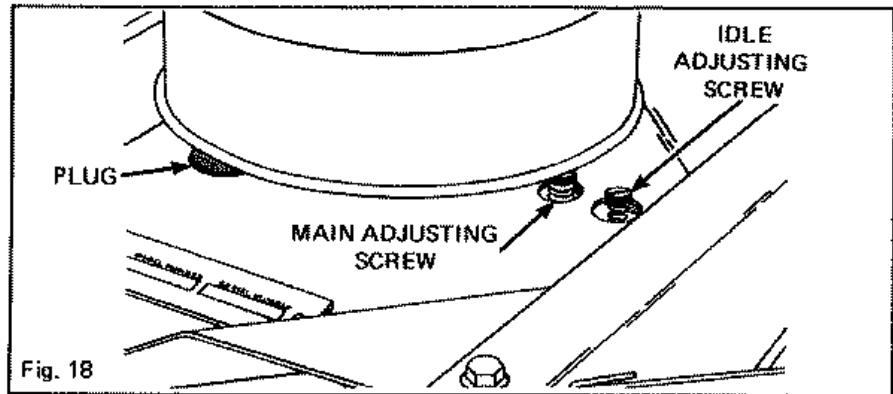
There is a fuel filter in the line from the fuel tank. See Figure 19 for location. This filter is a throw away type.

When it shows excessive dirt in the inside it should be replaced.

When replacing the filter turn off the fuel valve. This valve is located on the underside of the tank.

Open valve again after filter has been replaced.

16



SPARK PLUGS

Every 100 hours remove plugs, check condition and reset at .025 inch (63mm) or replace plugs if needed. Good operating conditions are indicated if plugs have light coating of gray or tan deposit. A dead

MAINTENANCE (continued)

coating of gray or tan deposit. A dead white, blistered coating could indicate overheating. A black (carbon) coating may indicate an "over-rich" fuel mixture caused by clogged air cleaner or improper carburetor adjustment. Do not service plugs in poor condition – best results are obtained with new plugs.

NOTE

Cleaning of spark plugs in cleaning machines that use abrasive grit is not recommended. Spark plugs should be cleaned by scraping or wire brushing and washing with a commercial solvent.

BREAKER POINTS

Operation is greatly affected by breaker point condition and adjustment of point gap. If points are burned or badly oxidized, little or no current will pass and as a result the engine may not operate at all, or if it does run, it is likely to miss particularly at full throttle. This service should be performed by an Authorized Kohler Dealer.

TIMING

Timing should be performed only by an Authorized Kohler Dealer.

CYLINDER HEAD SERVICE

After each 500 hours of operation have your authorized Kohler Dealer remove the carbon deposits from in the two cylinders.

NOTE

Under certain operating conditions carbon may build up more rapidly. These build-ups are indicated by heavy deposits of carbon on the spark plug electrodes. When this condition exists 250 hour intervals are recommended.

VALVE SERVICE

After each 500 operating hours (or sooner if a noisy valve is detected) have your authorized Kohler Dealer service and adjust the valves.

BATTERY

Keep cables and terminals clean and apply a light coat of petroleum jelly or oil for protection. Check battery bracket for corrosion and keep clean. Reinstall in same position.

NOTE

Be sure to keep the terminal boot in place over the positive battery terminal.



WARNING

ELECTRIC STORAGE BATTERIES GIVE OFF HIGHLY FLAMMABLE HYDROGEN GAS WHILE CHARGING, AND CONTINUE TO DO SO FOR SOME TIME AFTER RECEIVING A STEADY CHARGE. DO NOT UNDER ANY CIRCUMSTANCES ALLOW AN ELECTRIC SPARK OR AN OPEN FLAME NEAR THE BATTERY. DO NOT LAY TOOLS ACROSS THE BATTERY TERMINALS AS THIS MAY RESULT IN A SPARK OR SHORT CIRCUIT WHICH MAY CAUSE AN EXPLOSION. BE CAREFUL TO AVOID SPILLING ANY ELECTROLYTE ON HANDS OR CLOTHING.

NOTE

When servicing the battery, be sure battery cables are disconnected before attempting removal of the battery from the tractor. Always disconnect negative (-) cable first. When installing the battery, always check the polarity of the battery terminals to be sure the battery is not reversed. The negative terminal (-) is ground. Apply a light coat of petroleum jelly or oil to the inside of the clamp terminals and over the bolt stud before connecting terminals. Always connect the negative terminal (-) last. When reinstalling the battery: (1) Place hold down rods in place. (2) Tighten wingnuts finger tight only, do not overtighten to avoid possible damage to battery case.

The electrolyte (acid and water) in each cell should be at triangle level at all times to prevent battery failure. When the electrolyte is below this level, add pure, distilled water.

Under no circumstances add any special battery additives: this voids warranty.

MAINTENANCE (continued)

INTERLOCK SWITCHES

Switch "A" is wired to be normally open or off when the switch lever is not depressed. When the attachment drive lever is in "Off" position and the "Parking Brake" is set, the switch lever is depressed closing or turning on the switches.

To check adjustment of the interlock switch on the foot brake proceed as follows:

1. Remove seat and fender assembly.
2. Depress the foot brake. When rod "A" Figure 22 is 1 to 1-1/4 inches (2.5-3.2cm) from the top of frame rail at "B", pin "C" Figure 23 should just be in slot "D" of lever "E" as shown.

With the above adjustments the interlock switch should activate, closing the circuit.

3. If necessary to adjust, loosen hex nut "F" Figure 22. Remove pin "G" and turn clevis "H" either clockwise or counter-clockwise on rod "I" to obtain proper adjustment.

4. When adjustment is achieved replace pin "G" and lock with cotter pin. Lock clevis "H" with hex nut "F".

A second switch is on the attachment drive lever. Switch "B" Figure 21 is wired to be normally open or off. This switch works in conjunction with the seat switch, see Figure 4 page 8.

The seat switch is activated when the back edge of seat support is depressed 5/8 in. (1.6cm). If not, adjust switch bracket to correct location.

In order for this unit to start the attachment drive lever must be down or off and the seat switch must be depressed by sitting on the seat.

If there is a need to start the unit from off the seat, just tip the seat up and lift interlock button up, see Figure 4 page 8.

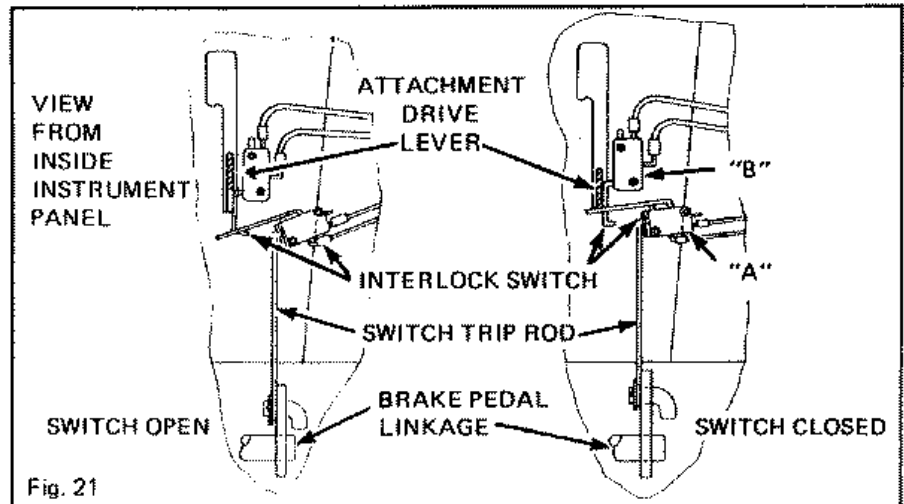


Fig. 21

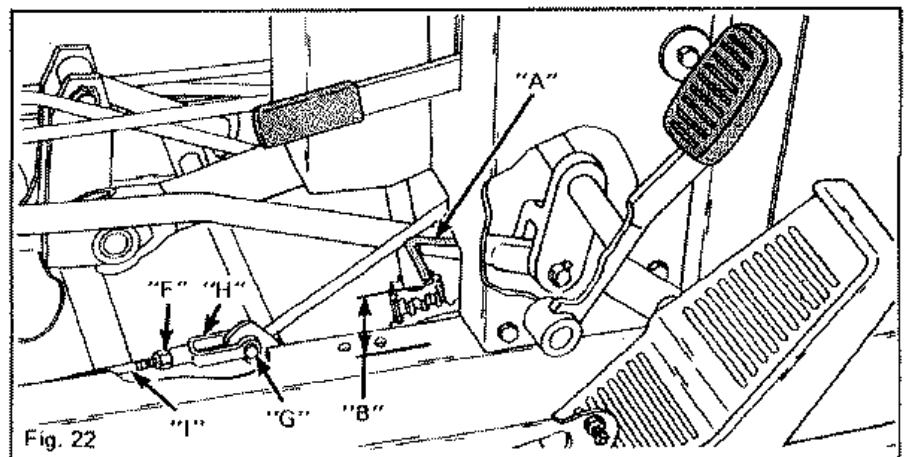


Fig. 22

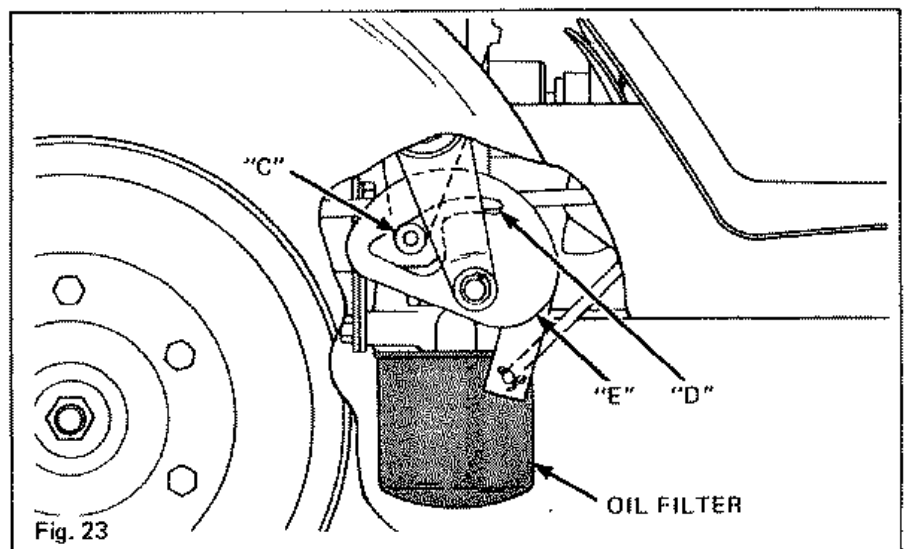


Fig. 23

MAINTENANCE (continued)

ATTACHMENT DRIVE LEVER — ADJUSTMENT (Refer to Figure 24)

1. Place lever in the "OFF" position.
2. Remove spring pin and turn the control rod in until the desired tension is obtained. Reinstall spring cotter pin.
3. With the drive lever in the "ON" position, loosen the hex capscrew which secures the upper belt guide shown in Figure 25. Adjust upper belt guide for 1/8 to 1/4 inch (0.31 to 0.62cm) clearance between belt and belt guide. Tighten hex capscrew securely.

ATTACHMENT DRIVE BELT — REMOVAL

Should it become necessary to replace drive belts, install new belts as follows:

1. Place drive lever in the "OFF" position.
2. DO NOT disturb upper belt guide, if 1/8 to 1/4 inch (0.31 to 0.62cm) gap is evident with drive lever in the "ON" position.
3. Remove lower belt guide and old belts.
4. With hood open place the three NEW BELTS over both ENGINE and IDLER pulley with your right hand while feeding belts up from below with left hand, then feed into grooves to pulley.
5. Reinstall lower belt guide and adjust for a 3/32 to 1/8 inch (0.23 to 0.31cm) clearance between belt guide and belts with lever in the "ON" position. Tighten the two hex capscrews securely. Check upper belt guide and adjust if necessary. Place lever in "OFF" position.

P.T.O. Brake (Figure 25) (Serial Nos. 0100101 thru 0199999)

To adjust brake follow these instructions. With P.T.O. handle in the engaged position or ON, adjust rod end to obtain a gap, not more than 1/6 inch (0.15cm) between the P.T.O. pulley and the brake

lining. P.T.O. pulley must stop within 5 seconds. If not, adjust rod end till stopping time is reached.

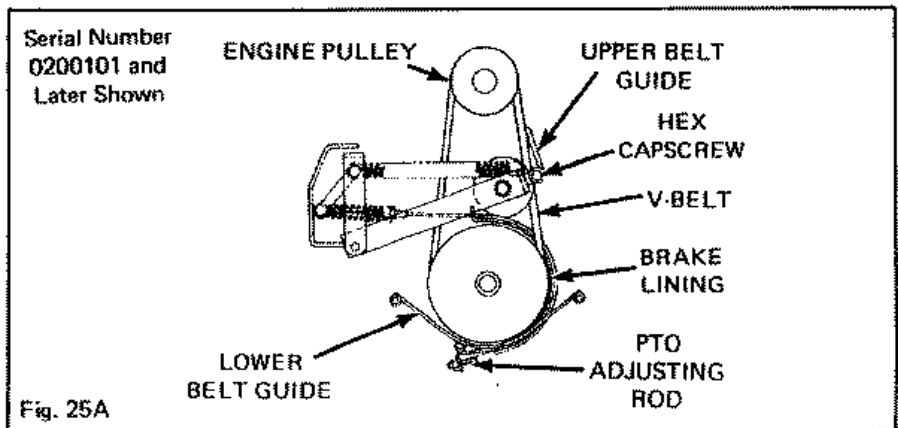
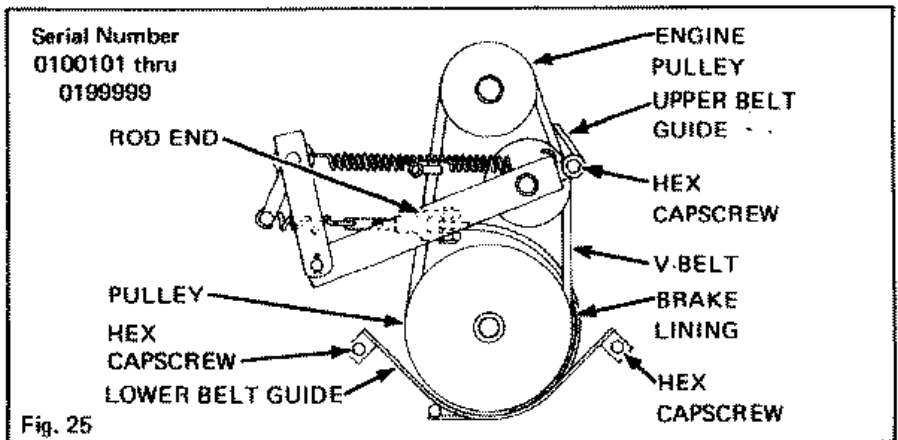
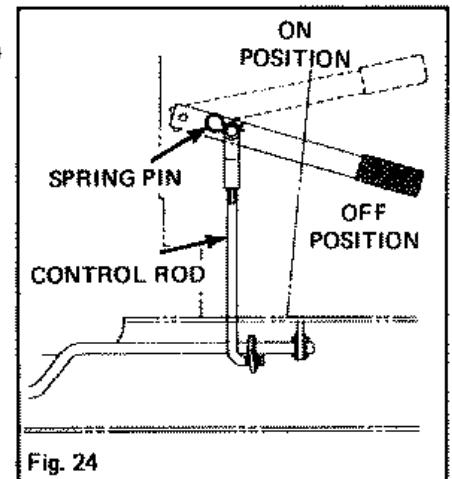
P.T.O. BRAKE (Figure 25A) Serial Nos. 0200101 and later

To adjust brake follow these instructions. With P.T.O. handle in the engaged position or ON adjust rod to obtain a gap, not more than 1/16" (0.15 cm) between the P.T.O. pulley and the brake lining. PTO pulley must stop within 5 seconds. If not adjust rod end till stopping time is reached.

HYDROSTATIC TRANSMISSION

Remove ignition key. Remove all dirt from around transmission filler dipstick area and filter. Clean transmission housing periodically. If tractor is operated in a dusty environment, check and clean more frequently. Consult your Bolens dealer for transmission maintenance.

Hydrostatic Oil Filter Figure 23, must be changed as called out in the Maintenance Chart on page 23.



MAINTENANCE (continued)

The "Hydrostatic" neutral is adjusted at the factory.

If, with the engine running and the brakes released, the tractor creeps either "Forward" or "Backward" the "Neutral" position needs adjustment.

NOTE

Failure to do so will result in damage to the hydrostatic unit.

Adjust the "Neutral" as follows:

1. Remove seat and fender assembly.
2. Securely block up rear of tractor off of the ground.
3. Place travel pedal into the "Neutral" position. Start the engine and release the brakes.
4. Loosen nuts "A" Figure 26, if the rear wheels creep "Forward" shorten link "B" Figure 26 until wheels stop creeping. If the rear wheels creep "Backward" lengthen link "B" until wheels stop creeping. Retighten nuts "A".

5. Shut off engine and set brakes. Remove the blocking from under the tractor.

TRAVEL PEDAL ADJUSTMENT

The travel pedal angle can be adjusted for the operator's comfort.

1. Loosen nut "C" Figure 26.
2. Remove spring cotter "D" from pin "E". Remove pin "E" from control arm "F", Figure 27.
3. To bring toe of pedal closer to operator, shorten rod "G".
4. To move toe of pedal farther away from operator, lengthen rod "G".

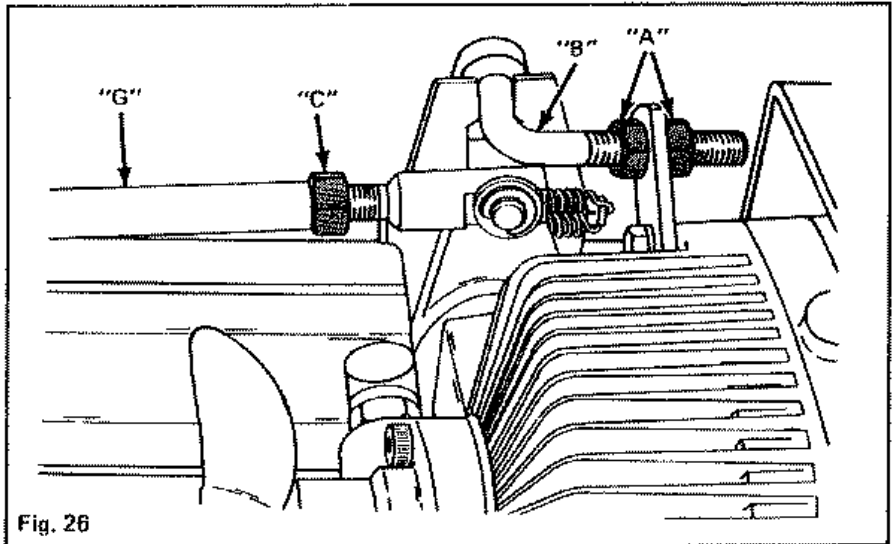


Fig. 26

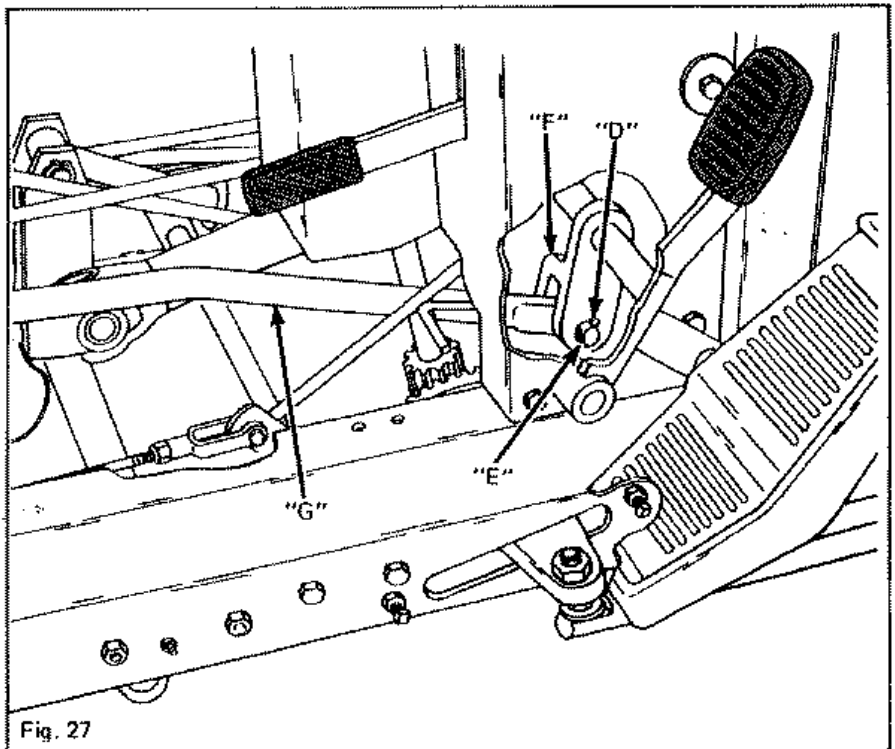


Fig. 27

5. After desired adjustment is reached, align hole in pedal end of rod "G" with hole in control arm "F", Figure 27 and secure with pin "E" and spring cotter "D". Lock hex nut "C".

NOTE

With the foot pedal in reverse turn the steering wheel in both directions. Make sure the steering arm does not contact the pedal.

MAINTENANCE (continued)

BRAKE ADJUSTMENT

After every 50 operating hours check clearance of brake pads. If there is more than .010 inch (0.25mm) clearance between the brake pads and brake disc, see "A" Figure 28, the brakes need adjustment. To adjust place brake pedal in the "OFF" position, then turn nut "B", Figure 28, clockwise to bring the brake pads closer to the brake disc. The correct clearance is 0 to .010 inch (0 to 0.25mm).

NOTE

Be sure to adjust the brakes on both wheels equally to avoid uneven braking. Check for proper operation.

FRONT AXLE STOP ADJUSTMENT

If the clearance between the Front axle assembly "A" and the Stop assemblies "B", Figure 29 is 1/16 inch (0.15cm) or more, the stops must be adjusted.

A. Loosen Capscrews "C", Figure 29,

B. Move Stop assemblies "B", Figure 29, up against Front axle assembly "A".

C. Secure capscrews "C".

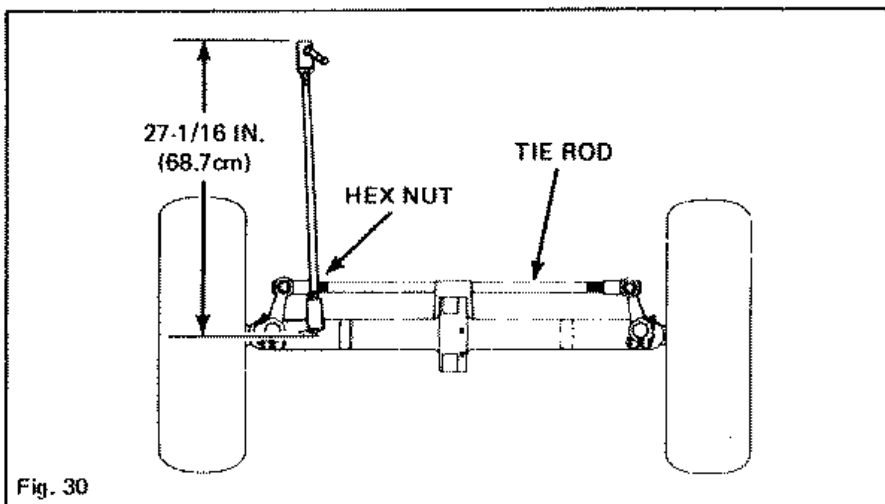
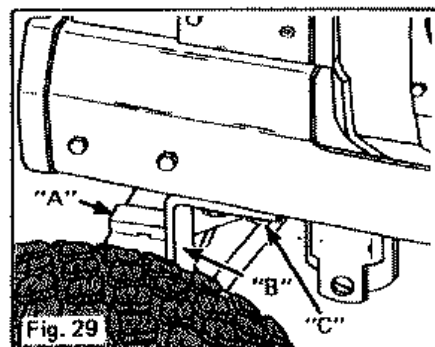
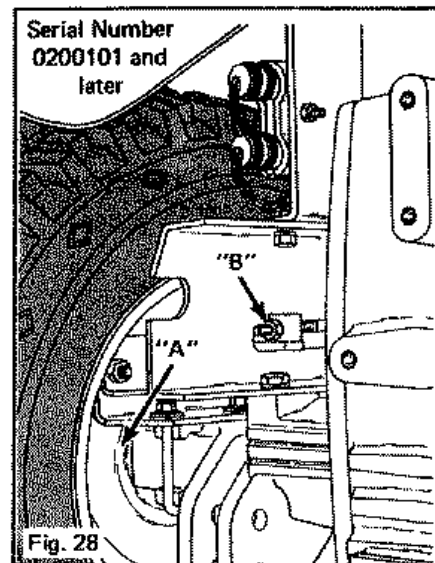
FRONT WHEEL ALIGNMENT (Figure 30)

1. Turn steering wheel so that front wheels are straight ahead.

2. Disconnect R.H. side of tie rod from steering arm. Measure distance across front of tire, center line to center line. Measure distance across rear of front tire, center line to center line and adjust toe-in from 0 to 3/8" (0 to 0.96cm) maximum, by turning tie rod in or out as required. (Front reading should be less than rear reading when measured across tire center lines.)

3. Tighten hex nut securely, and reinstall tie rod into steering arm making sure lockwasher is between ball joint and arm.

4. Check length of steering drag link. Overall length should be approximately 27-1/16" (68.7cm). Adjust if necessary.



MAINTENANCE (continued)

TURNING RADIUS ADJUSTMENT

1. Adjust turning radius if, in making short turns, a front tire interferes with front mounted attachment brackets or center mounted attachments. Adjusting screws are provided as follows:

A. You will find a slot in the right hand frame at the rear of the steering drag link where it connects to the steering gear. (See Figure 31). Near each end of the slot is a square head setscrew, with lock nut, inserted in the frame.

B. The screw at the front of the slot area controls the LEFT turning radius. The screw at the rear controls the RIGHT turning radius.

C. Turning these screws IN will increase the tractor turning radius. Turning screws OUT will decrease the radius.

NOTE

Adjust screws so that tractor turning radius is approximately the same, left and right.

2. Check to make sure the stops are making contact.

FRONT WHEEL BEARINGS (Figure 32)

Front wheel bearings should be repacked at least once a year. After blocking up front end of tractor, proceed as follows:

1. Remove the dust cap (A).
2. Remove cotter pin and unscrew slotted nut (B).
3. Remove outer bearing (C).
4. Remove wheel (D) and hub assembly (E) from spindle.
5. Remove seal (F) from hub. If this seal is damaged in any way replace it.
6. Remove inner bearing (G) from hub.
7. Clean both inner race and outer race

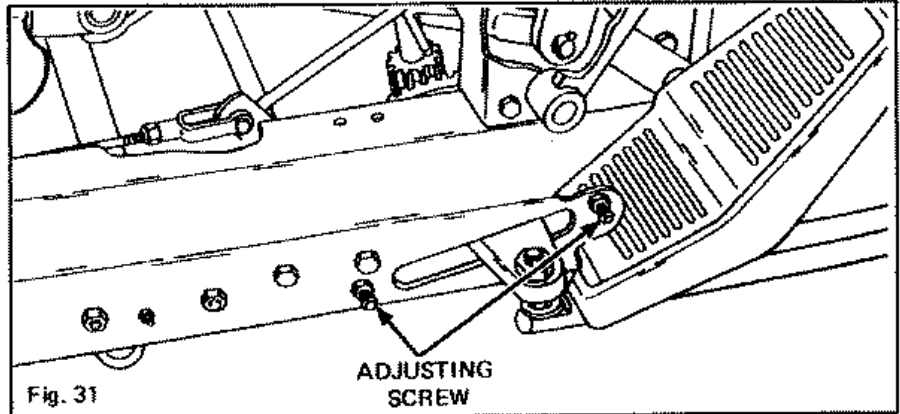


Fig. 31

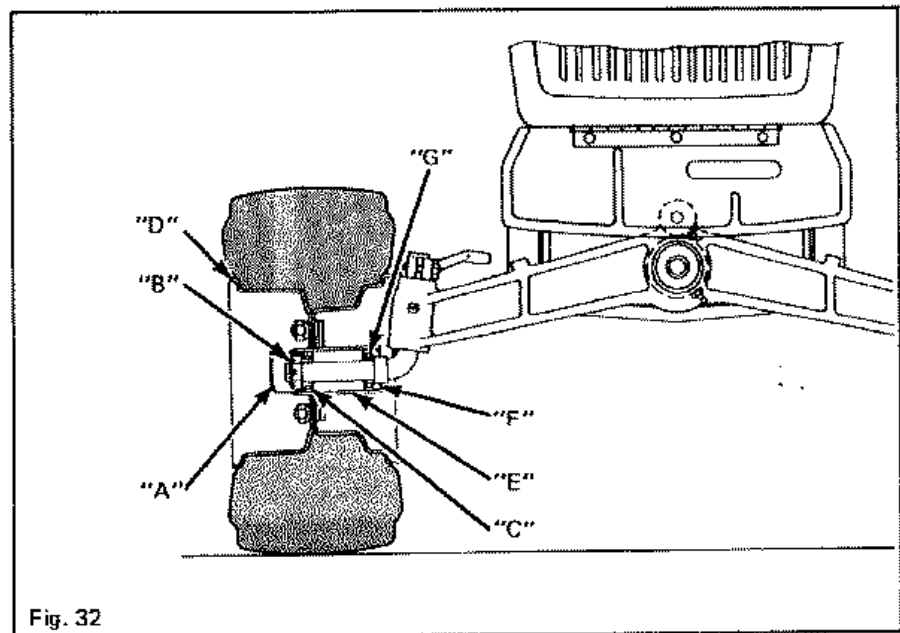


Fig. 32

of bearings. Check both for wear or pitting. Replace if necessary.

8. Clean bearings in a commercial solvent. Dry with compressed air or a clean cloth.

9. Pack bearings with a good grade of wheel bearing grease.

10. Install inner bearing and seal into hub.

11. Install wheel and hub assembly to spindle.

12. Install outer bearing.

13. Tighten nut until it snugs up against the outer bearing. Spin wheel to align bearings, then back nut off to nearest slot in line with hole in spindle and install new cotter pin.

14. Install dust cap.

PNEUMATIC TIRES

Keep both front and rear tires inflated evenly. Under no circumstances should tire inflation be less than 8 pounds (55kPa), nor more than 12 pounds (82kPa). Check air pressure regularly with a low pressure gauge. Operating with incorrect pressures may damage tires.

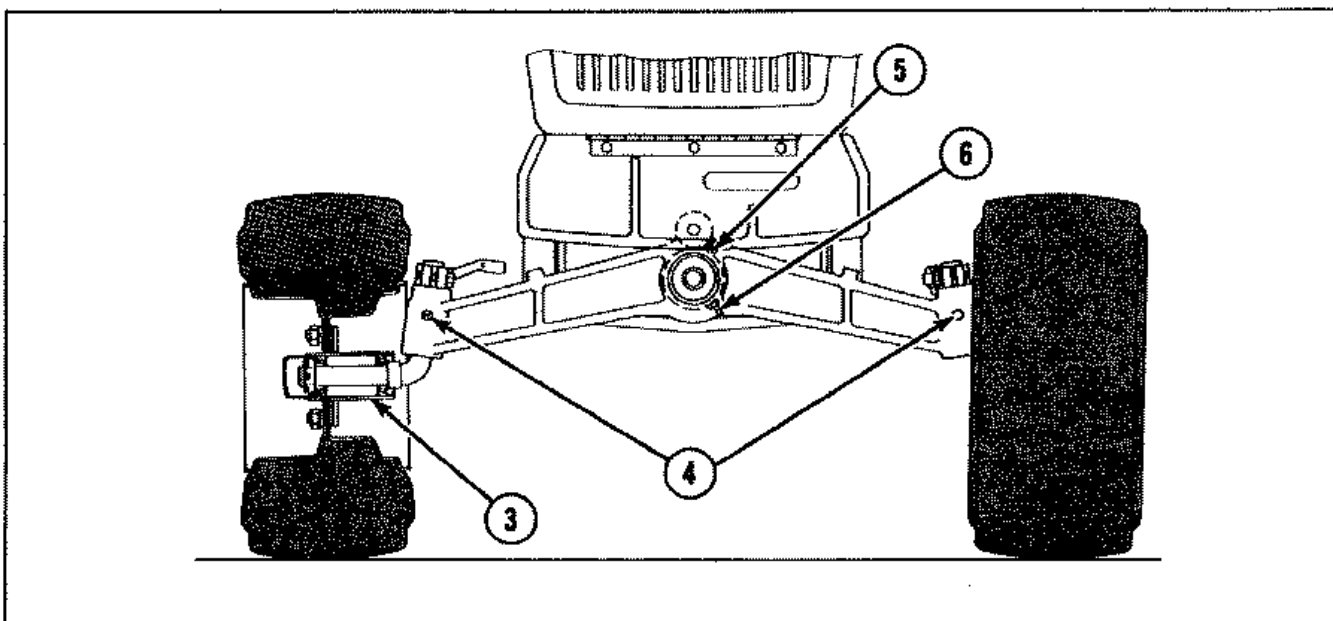
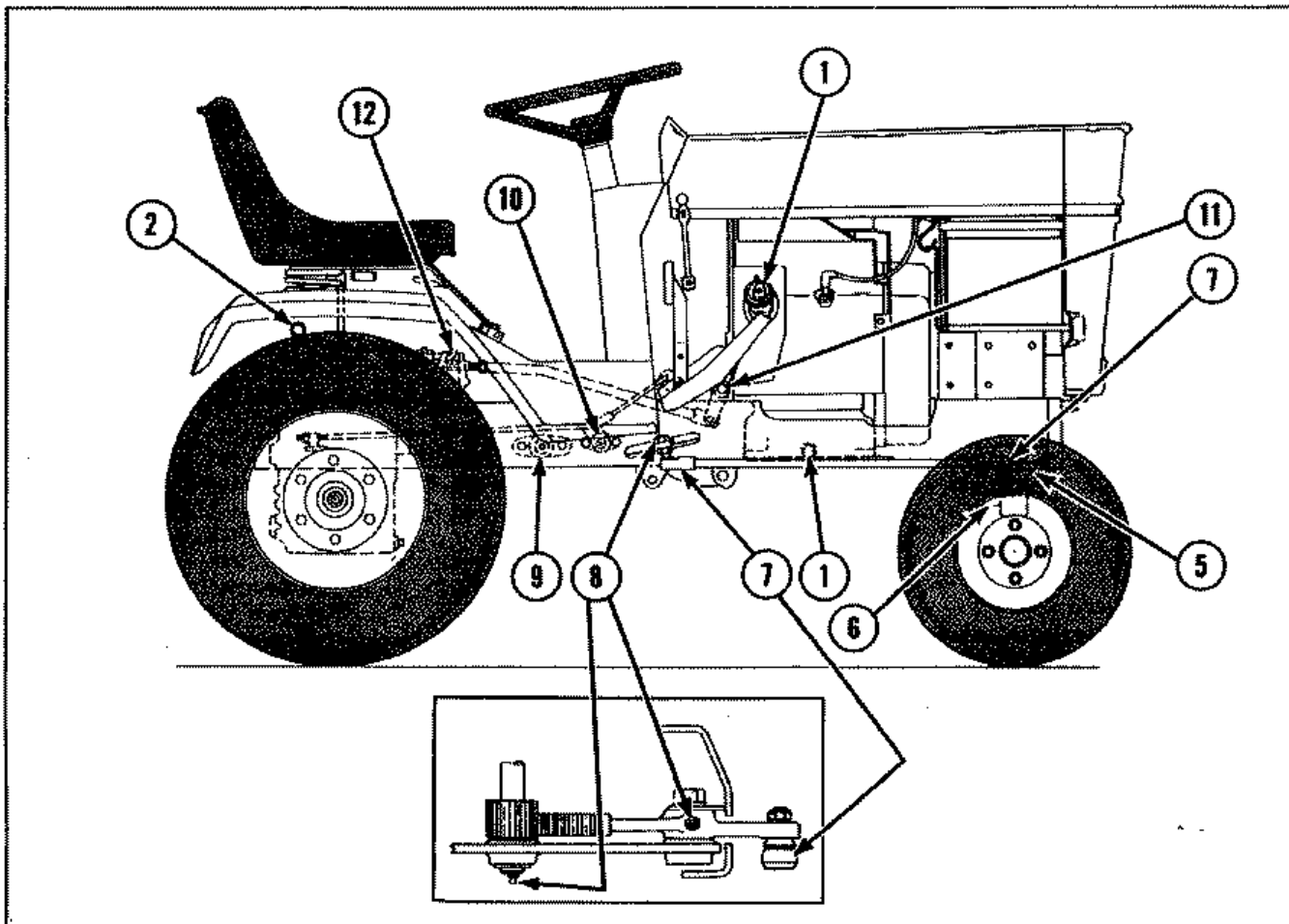
MAINTENANCE (continued)

MAINTENANCE REQUIRED	Length of Operation	Type of Maintenance
Engine Oil Filter –	100 Hrs.*	Replace
Engine Cooling Air Screen –	10 Hrs.	Brush Clean
Engine Air Cleaner –	50 Hrs.*	Shake Out Dirt
	100 Hrs.*	Replace
Cooling Fins – (Engine) –	10 Hrs.	Clean – Use Air Hose if Available
Spark Plugs –	100 Hrs.	Service or Replace
Breaker Points –	500 Hrs.	Service or Replace
Ignition Timing –	500 Hrs.**	Adjust
Engine Valves –	500 Hrs.**	Adjust
Engine Cylinder Heads –	500 Hrs.**	Remove Carbon
Fuel Filter –	100 Hrs.	Replace if One Piece, Clean if Two Piece Filter
Battery –	Daily	Check Electrolyte Level – Add Water As Necessary
Hydrostatic and Rear Axle Fins –	50 Hrs.*	Clean – Use Air Hose if Available
Belts –	50 Hrs.*	Check for Wear and Adjust
Tires –	30 Hrs.	Check for Damage and Air Pressure
Transmission Filter –	After First 5 Hours then After Every 100 Hours*	Change and Add Oil to Bring to Operating Level Use Only <u>Bolens Filter</u> No. 172-6450

*More often under extreme conditions.

**Services should be performed by an Authorized Kohler Engine Dealer.

MAINTENANCE (continued)



MAINTENANCE (continued)

LUBRICATION

LUBRICATION REQUIRED		Length of Operation	Type of Lubrication	Amount Required
1. Engine Crankcase --		Daily & 10 Hrs.	Engine Oil	Add Oil To Full Mark
Average Temperature	(Spring, Summer, Autumn) (+120° F. to 40° F.) (+44° C to 4° C)	50 Hrs.*	SAE 30 Oil Type SD-DE	Replace 3 QT (2.84L)
	(Winter) (+40° to 0° F.) (+4° C to -18° C)	50 Hrs.*	SAE 10W-30 Oil Type SD-SE	Replace 3 QT (2.84L)
	(Winter) (Below Zero)	50 Hrs.*	SAE 5W-20 Oil Type SD-SE	Replace 3 QT (2.84L)
2. Hydrostatic Transmission -- (Capacity 10 qts.)		Check Weekly Or 30 Hrs.	Fill with Bofens Oil 1738157 (Benzoil THL 19), or Mobil 423 or Texaco TDH	Level must be maintained in the operating zone
		When Oil is Discolored	Drain and refill with Bofens Oil 1738157 (Benzoil THL 19), or Mobil 423 or Texaco TDH	
3. Front Wheel Bearings --		Once a year	Wheel Bearing Grease	Pack
4. Front Wheel Spindles --		10 Hrs.	Grease with Multi-Purpose Grease	1-2 Strokes
5. Front Axle Pivot --		10 Hrs.	Grease with Multi-Purpose Grease	1-2 Strokes
6. Attachment Drive		10 Hrs.	Grease with Multi-Purpose Grease	1-2 Strokes
7. Tie Rod Ends and Drag Links --		10 Hrs.	Oil	Small Amount
8. Steering Shaft & Steering Arm --		10 Hrs.	S/N 01 - oil S/N 02 and above grease with Multi-Purpose Grease	Small Amount
9. Pivot Shaft --		10 Hrs.	Grease with Multi-Purpose Grease	1-2 Strokes
10. Brake Linkage --		10 Hrs.	Oil	Small Amount
11. Travel Pedal Shaft --		10 Hrs.	Oil	Small Amount
12. Hydrostatic Control Arms --		10 Hrs.	Light Machine Oil	Small Amount

*More often under extreme conditions.

**Plus 1 pint when changing oil filter.

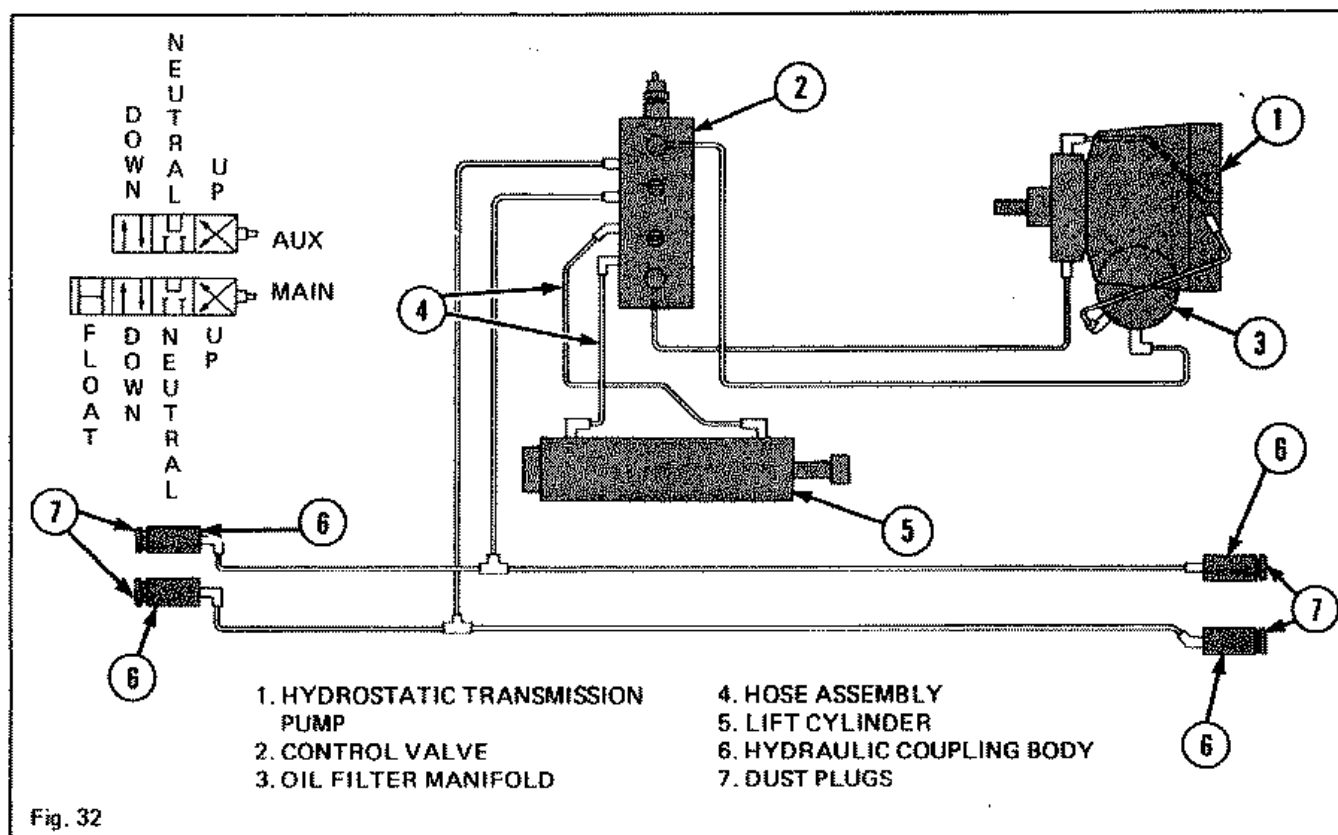
NOTE: A hand type grease gun is recommended when greasing your unit. Hi-pressure type grease guns could cause damage to the fittings and bearing seals.

MAINTENANCE (continued)

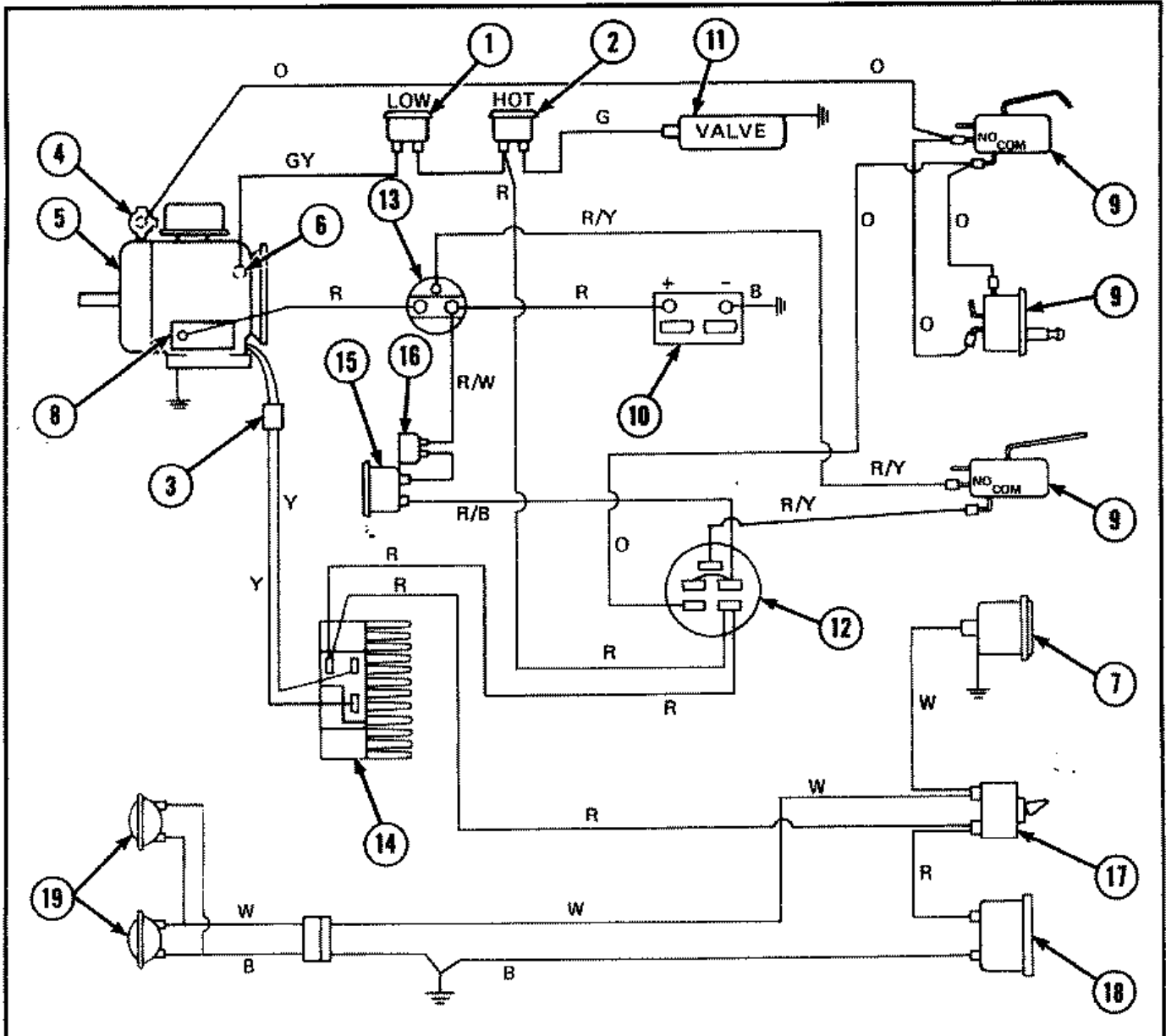
IF TRACTOR ACTS IN FOLLOWING MANNER	CHECK FOR POSSIBLE CAUSE												
	CLEAN OFF ENGINE FINS	FLYWHEEL SCREEN (CLEAN)	FAULTY IGNITION*	FAULTY SPARK PLUG	EMPTY FUEL TANK	BATTERY	CARBURETOR OIL	AIR CLEANER (CLEAN)	CHOKER	SEE YOUR BOLENS DEALER	CONTROLS NOT IN CORRECT POSITION	CHECK 3 INTERLOCK SWITCHES	VACUUM LINE LEAK
Engine will turn over but won't start			X	X	X		X		X	X			X
Engine will not turn over						X				X	X	X	
Starts only after repeated tries			X	X			X		X	X			
Stalls in a few seconds					X		X			X			X
Stalls when hot	X	X	X	X	X		X	X		X			X
Idles rough			X	X			X		X	X			
Engine overheats	X	X	X				X	X	X	X			

*See Your Authorized Dealer.

HYDRAULIC CIRCUIT DIAGRAM



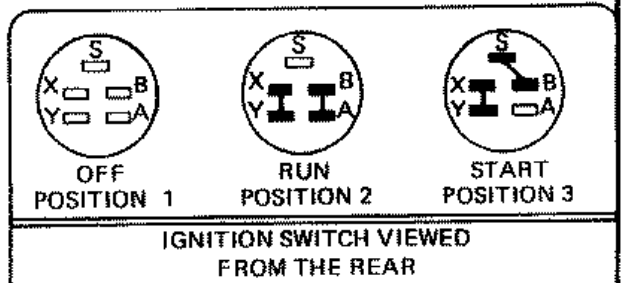
WIRING DIAGRAM



1. OIL PRESSURE LIGHT
2. HEAT INDICATOR LIGHT
3. CONNECTOR
4. IGNITION COIL
5. ENGINE
6. OIL PRESSURE SWITCH
7. TAIL LIGHT
8. STARTER
9. INTERLOCK SWITCH
10. BATTERY
11. HEAT INDICATOR SWITCH
12. IGNITION SWITCH
13. SOLENOID
14. RECTIFIER - REGULATOR
15. AMMETER
16. CIRCUIT BREAKER
17. LIGHT SWITCH
18. HOUR METER
19. HEAD LIGHTS

COLOR CODE

- GY - GRAY
- G - GREEN
- W - WHITE
- R - RED
- B - BLACK
- O - ORANGE
- Y - YELLOW
- R/W - RED/WHITE
- R/B - RED/BLACK
- R/Y - RED/YELLOW



STORING YOUR BOLENS TRACTOR

Always keep your Bolens tractor in a dry protected place when not in use to prolong its usefulness and appearance. With year around use, it is not necessary to "store" the tractor; but when it is not to be used for some time, it should be prepared for storage in the following manner:

1. Completely clean all accumulated dirt or trash from all parts, especially engine fins and fly wheel screen.
2. Wipe oil or a rust preventive on any parts that may rust. Touch up any area where paint has been chipped or worn off on tractor.
3. Drain gas tank and carburetor.
4. Drain oil from crankcase while engine is still hot and flush with clean, light oil.

Refill with the appropriate oil per lubrication chart.

5. Check fuel filter and replace if dirty.
6. Remove, clean and regap spark plug and put a small amount of oil (SAE 30) into cylinder. Turn the engine over a few times to fully lubricate the cylinder walls, valve seats and valve stems. This can be done by engaging the key starter briefly. Replace spark plug.
7. Keep tractor covered when stored inside or outside. A custom fit vinyl cover is available for your tractor through your FMC Bolens Dealer.
8. BATTERY — Keep terminal posts cleaned of corrosion salts and coat with petroleum jelly or grease. Keep cables

clean. Stored battery must be kept fully charged and with all cells filled to tri-angle. Store at cool temperature, 20^o to 50^o. Check each two months and charge as necessary.

9. The air cleaner should be cleaned and sealed off with a plastic bag or facsimile, for the duration of the storage period.
10. If tractor is stored with an attachment mounted on it, the attachment must be lowered to the ground, and the attachment switch in OFF position.
11. It is highly recommended that machines be stored inside a building through the winter. If this is not possible, the engine should be protected from snow and ice with a covering of waterproof material.

Bolens reserves the right to change specifications, add improvements, or discontinue the manufacture of any of its equipment without notice of obligation to purchasers of its equipment.

Bolens' approval of the use of attachments manufactured by allied manufacturers is limited to assurance that such use will not void Bolens warranty of the Bolens equipment to which the allied manufactured attachments are adapted. The responsibility for the design, performance, durability, safety and operation, service repair availability, and warranty obligation remain with the allied manufacturer. Bolens specifically excludes from its warranty obligation all such allied manufactured attachments.

Bolens warranty will be voided if unapproved attachments are adapted to use with Bolens equipment and are so used.