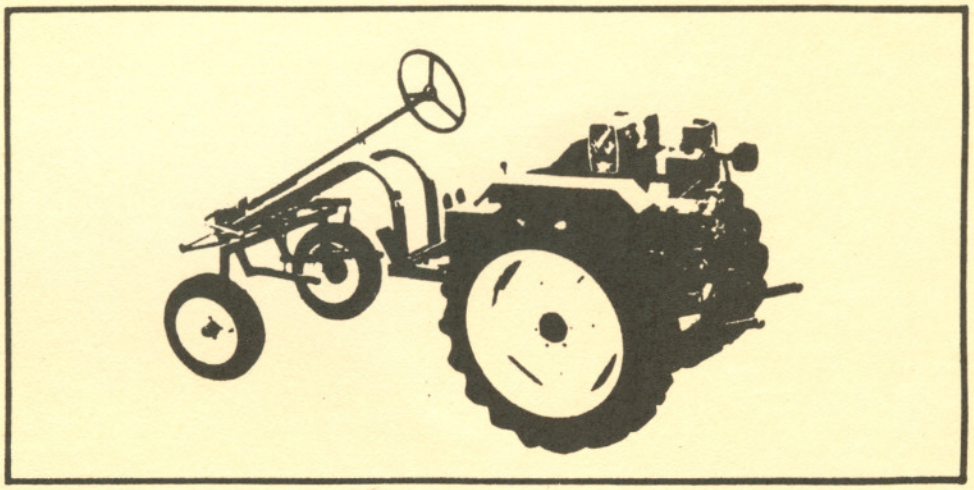
OWNERS & OPERATORS SERVICE MANUAL



Juff-bilt

TRI
TRACTOR MANUFACTURING CO., INC.
Cummings, Georgia 30130

THINGS YOU SHOULD KNOW ABOUT YOUR TUFF-BILT TRACTOR

With any new equipment, a familiarization period is required. Your **Tuff-BILT** tractor has several levers and controls. It is best to take your tractor to an open area and practice operation of the controls.

THE CONTROLS ARE:

A. **Hydro-Pedal**
B. **Right and Left Rear Brake Pedals**
C. **Front and Rear Lift Control Levers**
D. **Throttle**
E. **Choke**
F. **Ignition Starter Switch**
G. **Transmission Gear Selector**
H. **Light Switch**

The above controls are illustrated on the following page.

STARTING PROCEDURE

To start your new **Tuff-BILT** tractor be sure your foot is **NOT** on the hydro-pedal. Set the throttle about ¼ open. **NEVER** start engine at full throttle. Severe damage to internal parts will result from the lack of oil. Pull the choke out all the way. Turn the ignition key to the start position. When it starts up, push the choke in about halfway. After engine runs for a few seconds, push choke in all the way.

OPERATING PROCEDURE

To start your tractor in motion, place the transmission in gear. From this point on, speed and power application is controlled with the hydro-pedal. Place foot gently on the hydro-pedal with your heel resting on the lip at the bottom. **To go forward**, ease the hydro-pedal forward gently to obtain the speed desired. **To stop forward motion**, move hydro-pedal gently to the neutral position. Reverse is obtained by pushing down gently with your heel on the bottom of the hydro-pedal. To stop, simply return the hydro-pedal to neutral position. ***CAUTION: Never press hydro-pedal all the way forward or reverse quickly.*** Serious damage could result to tractor, the equipment, the operator or bystanders.

The hydro-pedal also controls power application. Maximum horsepower is delivered to the hydraulic system with the engine at full RPM. If engine RPM begins to fall during operation, ease pressure from the hydro-pedal.

GEAR SELECTION

Your **Tuff-BILT** is equipped with a three speed (reverse is blocked out) transmission to reduce the load on the hydraulic system. Always select the gear which will allow desired speed while maintaining full engine RPM when the hydro-pedal is in the full open position. For example, it is better to operate the tractor in second gear at full open hydro-pedal than third gear ¾ open hydro-pedal. (See page on hydrostatic transmission drive for a further explanation of your hydraulic drive system).

HYDRO-PEDAL (A)

The hydro-pedal on your **Tuff-BILT** tractor controls the forward and reverse of the tractor. **To start motion**, lay foot gently on the pedal with heel resting on the lip at the bottom. **To go forward**, ease the hydro-pedal forward gently to obtain the speed desired. **To stop forward motion**, move hydro-pedal forward gently to the neutral position. **Reverse** is obtained by pushing down gently with heel on the bottom of the hydro-pedal. **To stop**, simply return hydro-pedal to the neutral position. ***CAUTION: Never press hydro-pedal all the way forward or reverse quickly.*** Serious damage could result to tractor, the equipment, the operator or bystanders.

BRAKES (B)

The brakes on the **Tuff-BILT** tractor are a band type brake. The brakes are seldom or never used for stopping since the tractor will stop by moving the hydro-pedal to the neutral position. However, they can be used to stop. Brakes are used primarily for turning. The left pedal controls the left wheel, and the right pedal the right wheel. **To turn left**, turn the steering all the way to the left and press the left brake pedal. Move hydro-pedal gently forward, and tractor will turn in a short radius. **To turn right**, press the right brake pedal. Move hydro-pedal gently forward and tractor will turn in a short radius. When turns are complete release brake, straighten wheels and continue operation.

HYDRAULIC LIFT CONTROLS (C)

The lifts on your tractor are totaly hydraulic. They are operated by the pump that drives the tractor. The controls are located at the right side of the seat at seat level. The handle on the inside controls the front lift. The outside or right handle controls the rear lift. **To lower either lift**, move handle in a downward motion. **To raise either lift**, pull upward on the handle. The lift can be set in any position by moving handle quickly and release it. The lift will stay in that position. Oil linkage daily for smooth operation.

THROTTLE (D)

The throttle control is located on the left fender at the front. **To increase engine speed** move control forward. **To slow engine**, move throttle control backward.

CHOKE (E)

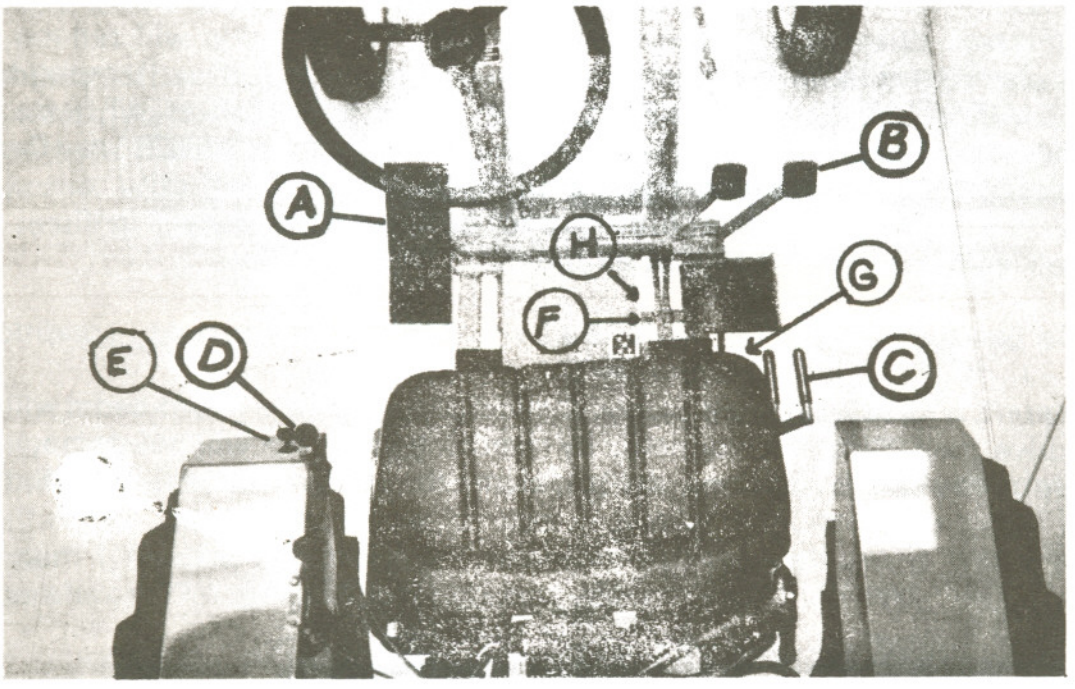
The engine choke is located on the left fender next to the throttle cable. **To engage choke**, pull choke cable. **To disengage choke** push choke cable.

IGNITION SWITCH (F)

The ignition switch is located on the right side of the transmission cowel cover. **To start**, turn ignition key clockwise and release when engine starts. **To stop engine**, turn key counter clockwise.

TRANSMISSION GEAR SELECTOR (G)

The gear selector is located underneath the right front corner of the seat. The tractor is equipped with a three speed transmission. In order to shift the transmission the tractor must be completely stopped. A diagram of the gear pattern is located on the top of the transmission cowel cover. You will notice one position marked X. This is reverse. The transmission gear selector is deliberately bent to a position to keep the transmission from being shifted into reverse. If the transmission should be shifted into reverse, causing the hydro-pedal to operate backwards, don't be alarmed no damage has occured to the tractor. Simply shift the transmission into one of the forward gears. If you should have some difficulty shifting the transmission in gear, apply pressure to the gear selector while at the same time, gently apply pressure to the hydro-pedal. This will allow internal splines to become aligned and transmission can be shifted into gear.



LIGHT SWITCH (H)

The light switch is located next to the ignition switch. **To turn light on**, pull switch out and up. **To turn light off**, push switch down.

HYDROSTATIC TRANSMISSION DRIVE

A Sundstrand hydrostatic transmission is a precision piece of equipment and should be treated as such. ***NEVER use dirty oil, ALWAYS keep a clean filter and use only a free flow 10 micron filter and use caution when changing filter.*** Wipe all dirt from surface before screwing filter on.

A Sundstrand hydrostatic transmission consists of a hydraulic variable displacement piston pump and a fixed displacement motor, which enables you to lower the volume and increase the pressure, which will give you a lower speed and more pulling power. ***EXAMPLE - a 16 H.P. engine would pump approximately 12 gallons per minute (G.P.M.) at approximately 8 or 9 hundred pounds per sq. inch (P.S.I.), 6 G.P.M at 2,000 P.S.I. or 1 G.P.M. at 5,000 P.S.I.*** This allows you to increase your power at a slower speed without stopping and changing gears, however at no lead there is little or no pressure. It is recommended that the lowest gear be used that can satisfy the desired speed; ie, ***ALWAYS use first gear with the hydro-pedal in full forward position, rather than use second gear and the hydro in less than one half full forward position.*** The forgoing will allow the hydrostatic transmission to operate at a lower hydraulic pressure, thus giving longer trouble-free life. Regardless of speed however, the higher the speed the more pressure it isll take to do the job. If you have to back off the hydro-pedal to increase power for a period of more than five (5) minutes it is recommended that you shift the three (3) speed manual transmission down into a lower gear. As you can see this will reduce the pressure on the hydraulic system and the transmission will operate at a lower temperature. THIS IS VERY IMPORTANT SINCE OIL WILL BREAKDOWN UNDER EXTREME HEAT. Type "F" transmission fluid should be used year round in the hydraulic system. ***"NEVER" use Dextron Transmission Fluid or any other not marked Type "F".***

The hydraulic reservoir must be kept 3/4 Full at all times.

Fluid and filter should be changed once a year and more often in extreme dusty conditions.

"NOTICE" When you start, it should be done gently. A sudden push on the hydro-pedal will put severe strain on the drive train. Stopping suddenly by removing your foot will not damage the drive train. Always use gentle strokes on the hydro-pedal and the system will last much longer.

SERVICE-ADJUSTMENT

SERVICE SCHEDULE

PERFORM SERVICE AT INTERVALS INDICATED (X)	EACH DAY	EVERY 25 HOURS	EVERY 50 HOURS	EVERY 100 HOURS	EVERY 500 HOURS
CHECK OIL LEVEL (maintain in safe operating range)	X				
CLEAN AIR INTAKE SCREEN (plus other external surfaces)	X				
REPLENISH FUEL SUPPLY (use clean, fresh fuel)	X				
CHANGE OIL (Use API Service SC of proper weight)		X			
CHECK AIR CLEANER ELEMENT (dry type only)			X		
SERVICE SPARK PLUG (gap .025" for gasoline)				X	
SERVICE BREAKER POINTS (gap .020")					X

NOTE: Intervals stated are for good, clean operating conditions—perform services more frequently if dusty or dirty conditions prevail.

LUBRICATION

OIL LEVEL: With the splash system, the oil level must be maintained on the "Safe" operating range at all times—this is between the F (full) and L (low) mark on the dipstick. Check the level daily and add oil as needed. **DO NOT OVERFILL—oil level must not exceed F mark.**

On engines with the threaded type plug-dipstick, turn the plug all the way out of crankcase, wipe oil off dipstick then re-insert - **DO NOT** turn plug in to check oil—**SHOULDER PLUG** on top of hole then remove to observe level. After checking oil, turn plug all the way into crankcase. With the extended oil fill tube and dipstick, push all the way down on tube then take reading. Engine must be level for accurate reading.

MODEL	OIL CAPACITY (U.S. STANDARD MEASURE)
OH160	52 ozs. (1.6 quarts)
K341A	48 ozs. (1.5 quarts)

OIL TYPE: Oils meeting the requirements of the American Petroleum Institute's (API) Service classification SC* are suitable for use in Kohler Air Cooled Engines. Service SC oils are detergent type oils. Oil viscosity (weight) is selected according to the anticipated ambient temperatures. The temperature viscosity recommendations are:

AIR TEMPERATURE	OIL VISCOSITY
Above 30° F	SAE 30
30° F to 0° F	SAE 10W - 30
Below 0° F	SAE 5W - 20

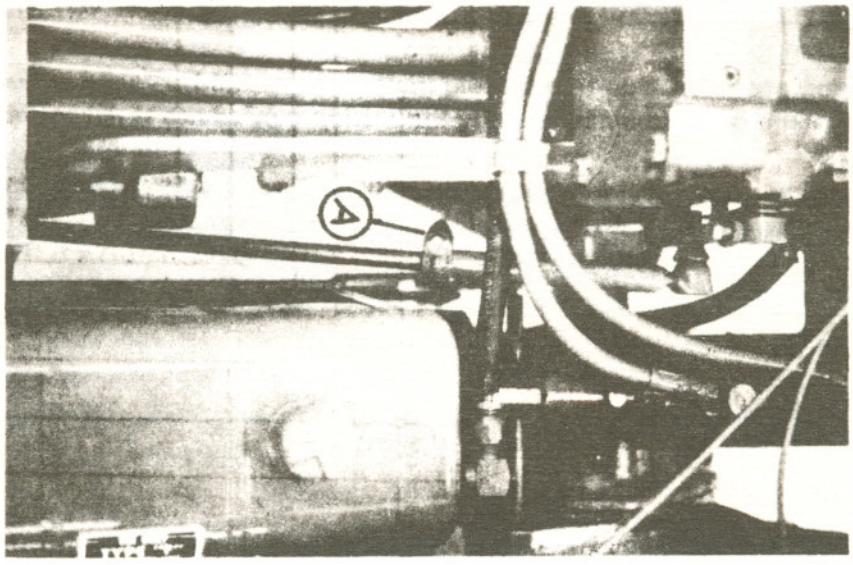
**API Service CC (MIL-2104B) and SD class oils may also be used.*

OIL CHANGE: On new or rebuilt engines, the oil should be changed after the **first five** hours of operation—**thereafter each 25 hours** of operation under normal conditions. If extremely dusty or dirty conditions prevail, change oil more frequently. If possible, run engine just prior to changing oil—the oil will flow more freely and carry away a greater amount of contaimnation when it is hot.

ADJUSTMENTS AND MAINTENANCE SECTION

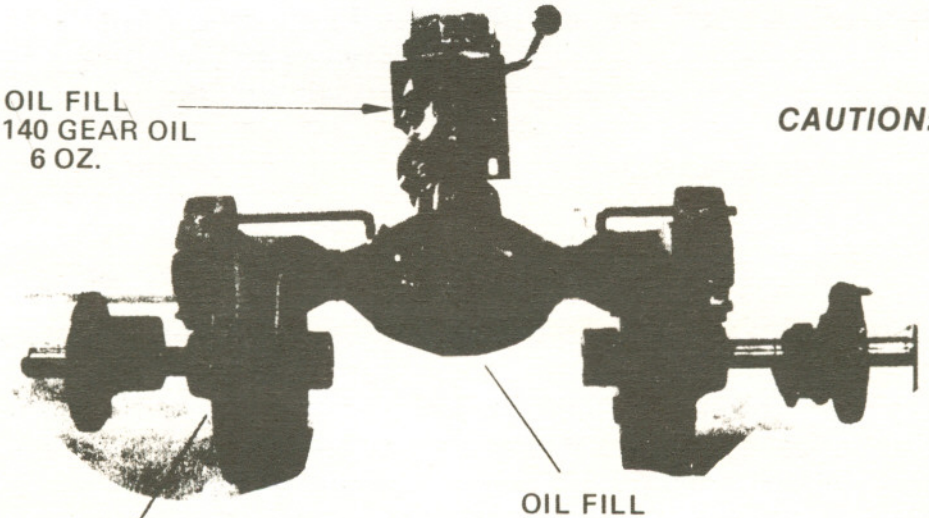
HYDRO-PEDAL

Hydro-pedal neutral position can be adjusted so the hydro-pedal will fit the individual operator. To adjust the position, loosen the locking collar on the rod back at the pump. (FIGURE A) Move hydro-pedal to the position desired and tighten collar securely.

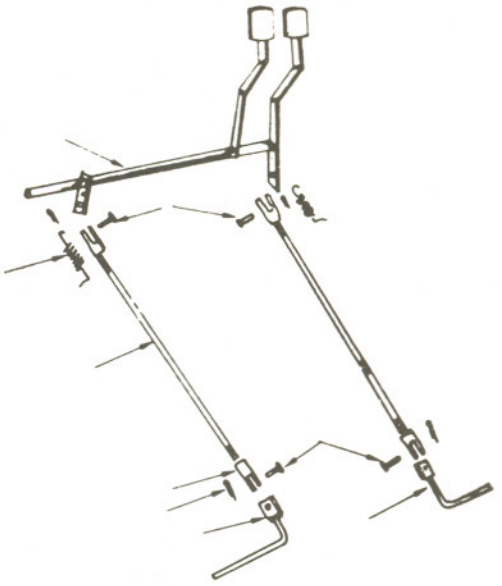


LUBRICATION

REAR-END AND TRANSMISSION ASSEMBLY LUBRICATION



CAUTION: Never Over Fill



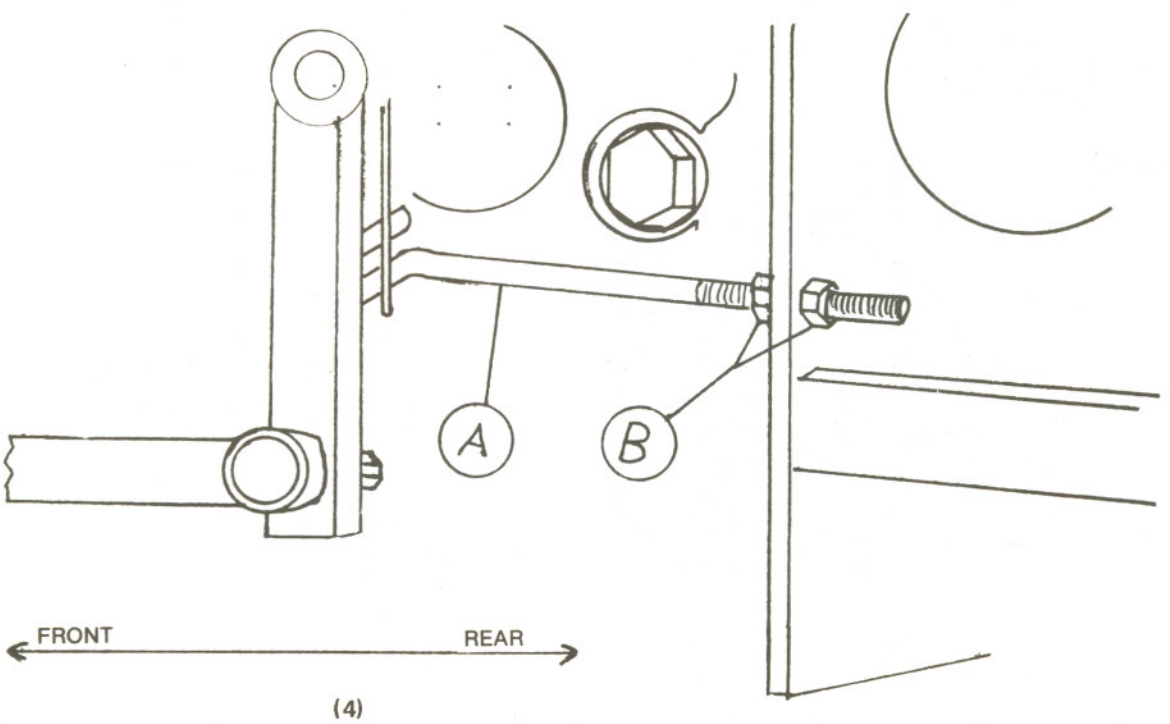
BRAKE ADJUSTMENT

Remove two clevis pins from brake levers, loosen jam nut and extend the length of brake rod by turning clevis counter-clockwise.

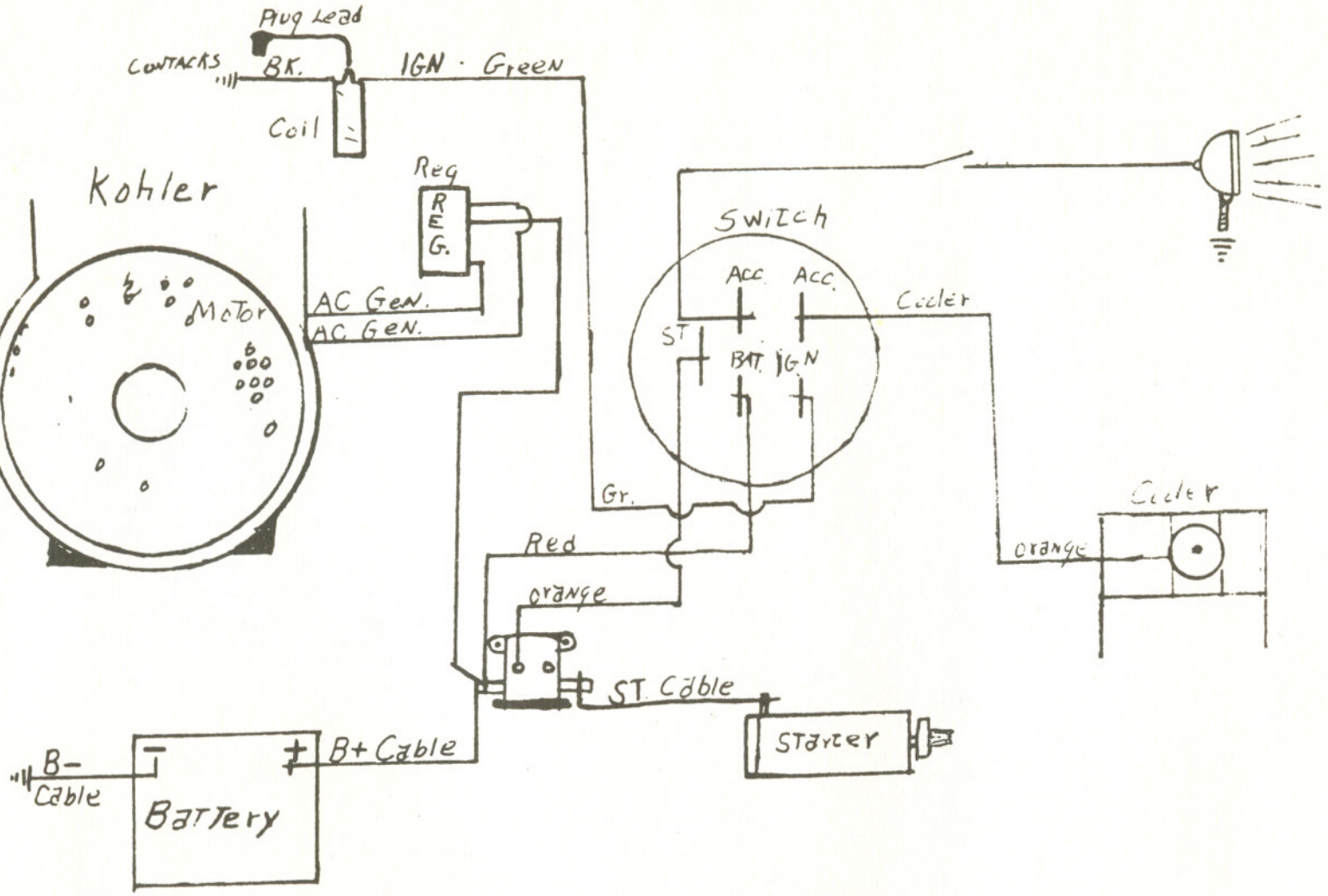
TRACTOR CREEP IN NEUTRAL

Tractor creep is the slight movement of forward or reverse while the hydro-pedal is in the neutral position and engine running. To adjust this condition, hold neutral rod (A) with a pair of locking pliers. Loosen locking nuts (B) 1½ turn at a time. (loosen one nut ⅙ turn and tighten the other ⅙ turn as you proceed, this will keep the rod in place at all times.) If the tractor is moving forward, move the rod to the front of the tractor. If the tractor is moving backwards, adjust the rod so as to move it to the back of the tractor. ***NOTE: the adjustment is sensitive. Move only ⅙ turn at a time.*** Sometimes a buzzing noise can be heard at the pump, tip hydro-pedal on top with your finger till the buzzing stops. This will tell you which way the pedal needs to move.

"NEVER" hook-up implements with engine running."



(4)



WIRING DIAGRAM WITH KOHLER ENGINE

CAUTION

PLEASE BE CAREFUL

One should always be very careful when installing implements, making very sure ENGINE IS SHUT-OFF.

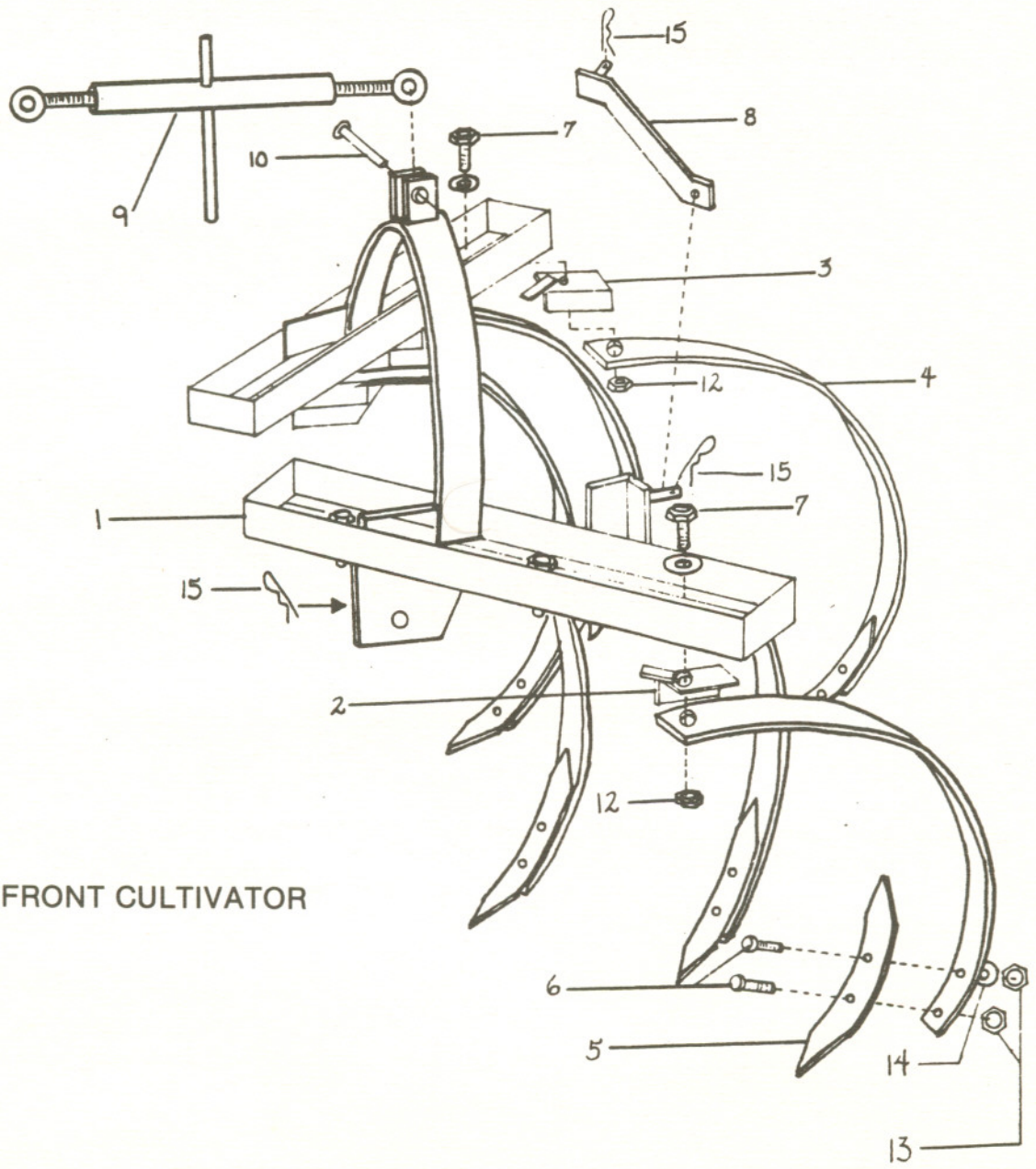
Should the Hydro-Pedal get Hit or Accidently Bumped, this would start the Tractor moving and could result in a very Serious Accident.

PLEASE BE CAREFUL

CULTIVATORS-FRONT AND REAR

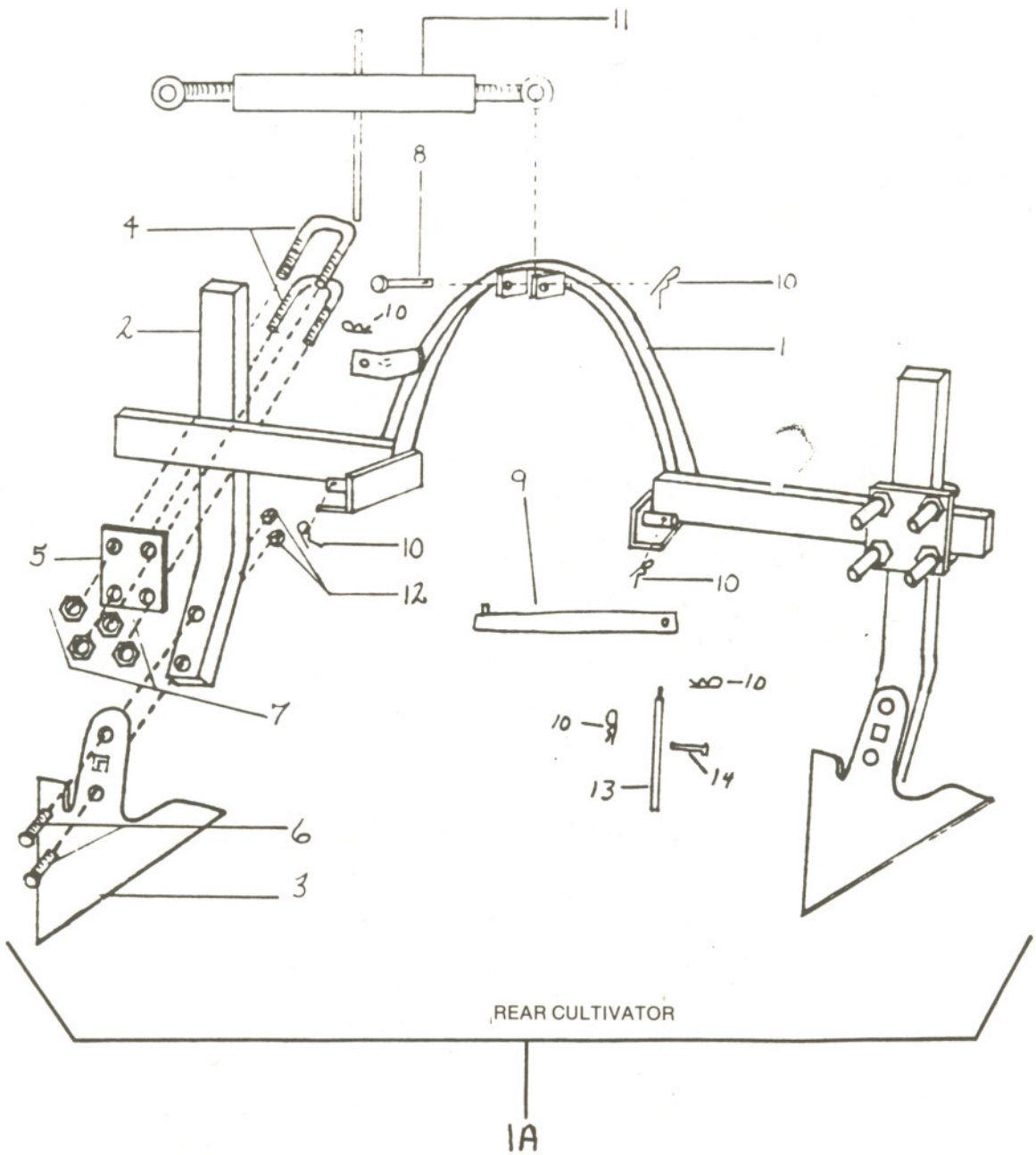
After the cultivators have been attached to the tractor, there is only two adjustments to make. Let implements down on level ground till they almost touch. Use small turnbuckles on right hitch arm to level. Do this on front and rear. Next, implements must be level from front to back. After you start to plow, lower plows to the correct depth. Check front and rear plows to see if: The rear plow is straight up and down and the front is level from front to back.

To attach front stabilizer bar (item #8) place end of bar with hole over the pin of left top side of front cultivator frame. Then insert pin end of stabilizer bar into hole in center of tractor frame.



FRONT CULTIVATOR

To attach rear stabilizer insert flat end of bar (item #13) into left rear of tractor frame. Insert pin (item#14) through tractor frame and through hole in item #13. Place end of bar (item #9) with hole over pin on item #13. Place other end of item #9 into hole in right side of rear cultivator frame.



REAR CULTIVATOR

1A

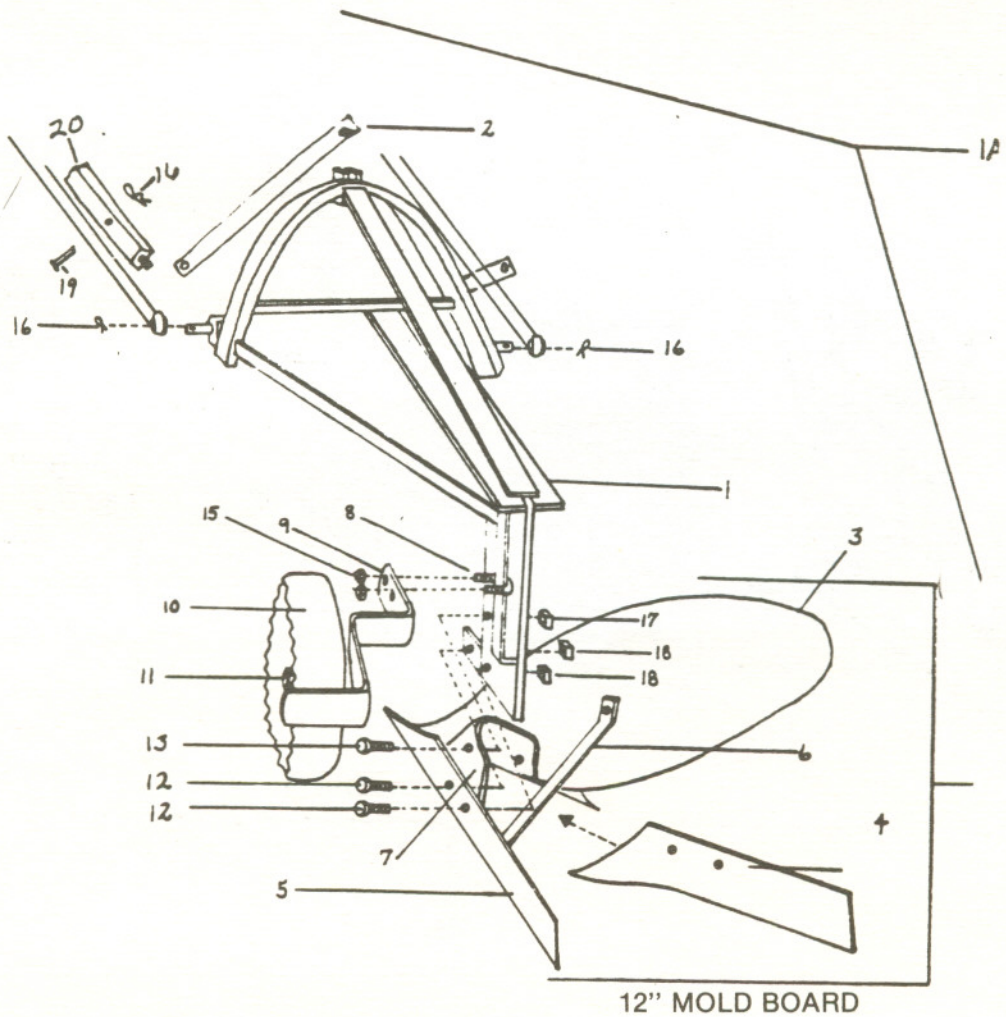
BOTTOM PLOW (REAR MOUNTED)

Connect turning plow to the tractor using the three point look up. Be sure stabilizer bar is on. Stabilizer bar is mounted in the same manner as the rear cultivator stabilizer.

Let plow down on the ground. Adjust top link so the heel of the plow is about 1½ or 2 inches off the ground. Set the gauge wheel about 3 inches off the ground. Next, plow a furrow. Go back to the start and drive right wheels in that furrow and plow about 15 feet. Dismount tractor and check plow action.

1. **If plow does not take ground quick enough**, turn top link, so as to shorten it one or two turns.
2. *Check plow depth.* **If plow is going too deep** lower gauge wheel. **If plow is not deep enough**, raise gauge wheel.

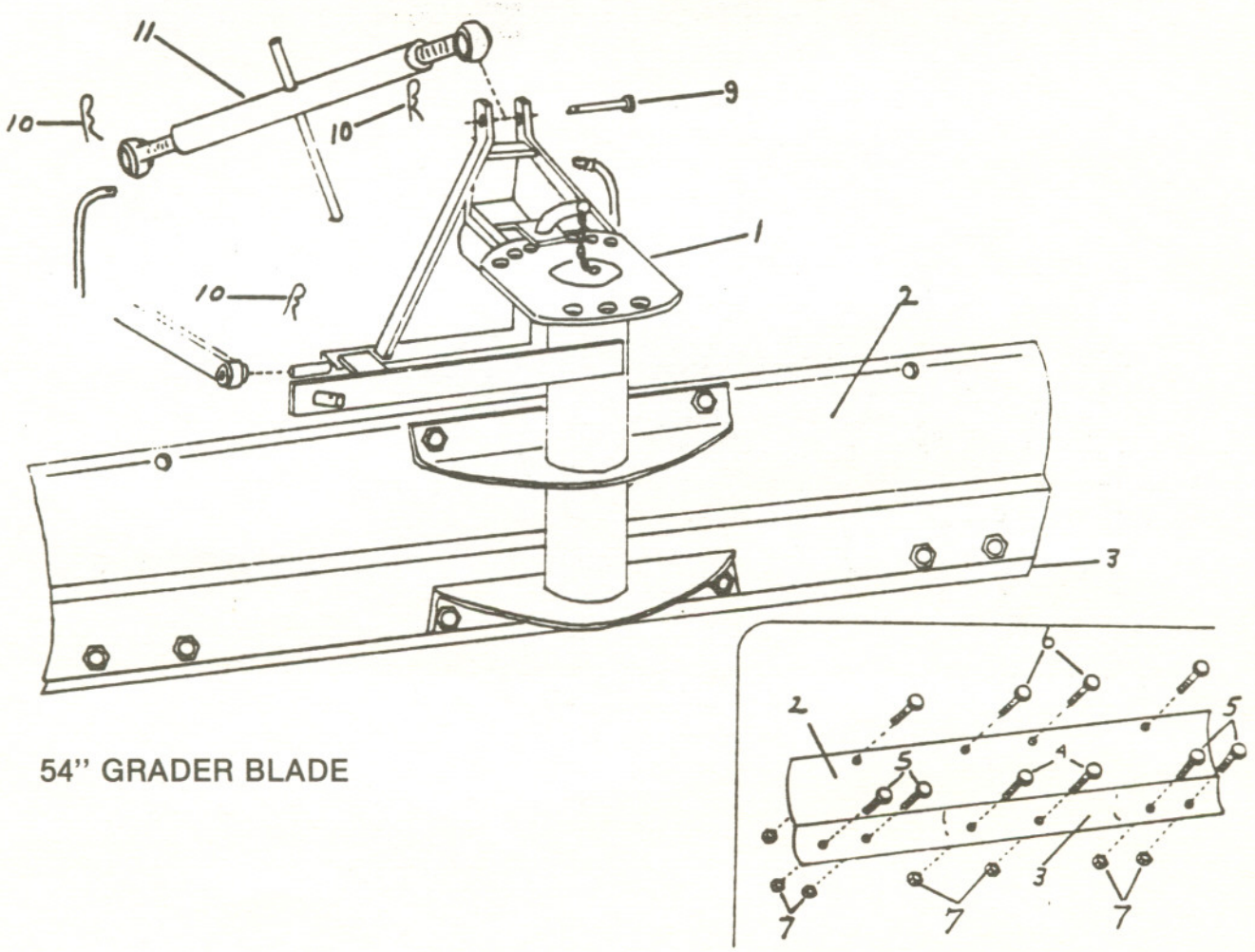
With right tractor wheels setting in furrow, look at the turning plow from the rear. The frame should be level or almost level. This can be adjusted by the small turnbuckle on the lift arm on the right side. ***NEVER adjust plow on the first furrow. ALWAYS adjust on second furrow*** for accurate adjustments.



12" MOLD BOARD

GRADER BLADE (FRONT OR REAR MOUNTED)

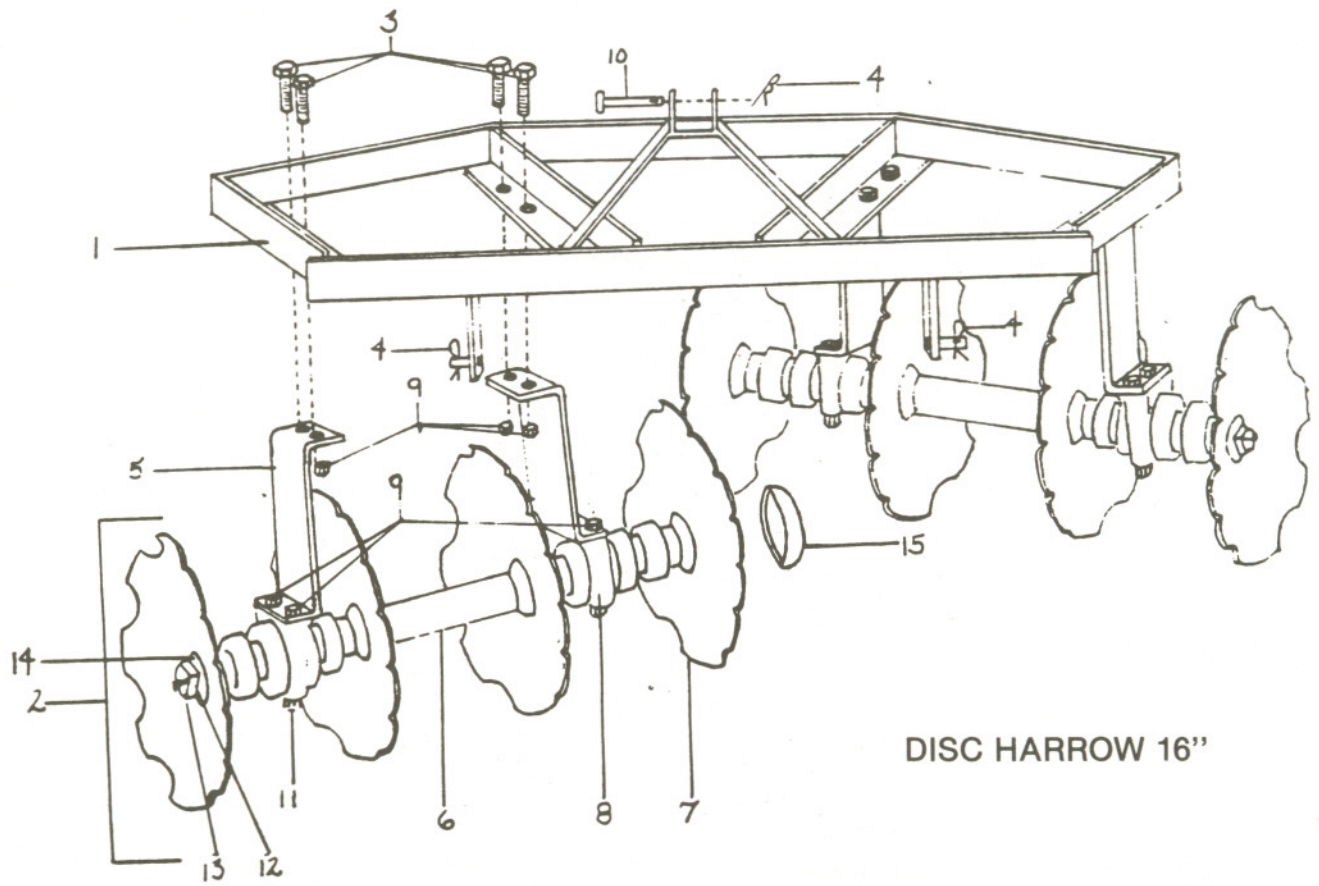
The 54 inch grader blade can be used on the front or rear of your tractor. You can level the blade with the small turnbuckle on the right lift arm. The top link controls the amount of cut. **For more cut**, make top link longer. **For less cut and smoothing action**, make top link shorter. On the front use the stabilizer that is same as front cultivator.



54" GRADER BLADE

HARROWS (REAR MOUNTED)

Connect harrows to tractor. Raise harrows up. Level left and right with small turnbuckle on right lift arm. Level front to back with top link.



DISC HARROW 16"

DISC PLOW (FRONT MOUNTED)

Right front tractor wheel must be adjusted to widest position before disc plow can perform properly. To do this, loosen right tie rod clamp and remove the two bolts on the spindle arm and slide out to the maximum position. Replace bolts and tighten tie rod clamp.

STEP

1. Position disc plow frame underneath the tractor with the gauge wheel on disc plow (item #9) located behind the right front tractor wheel.

2. Remove the top end of the turnbuckle (located on right front lift arm) by removing the cotter pin. This will allow lift arm to be moved freely.

3. Place ball joint of right front lift arm over pin on item #12.

4. Turn top half of turnbuckle 180 degrees so the top half is pointing to the outside of tractor.

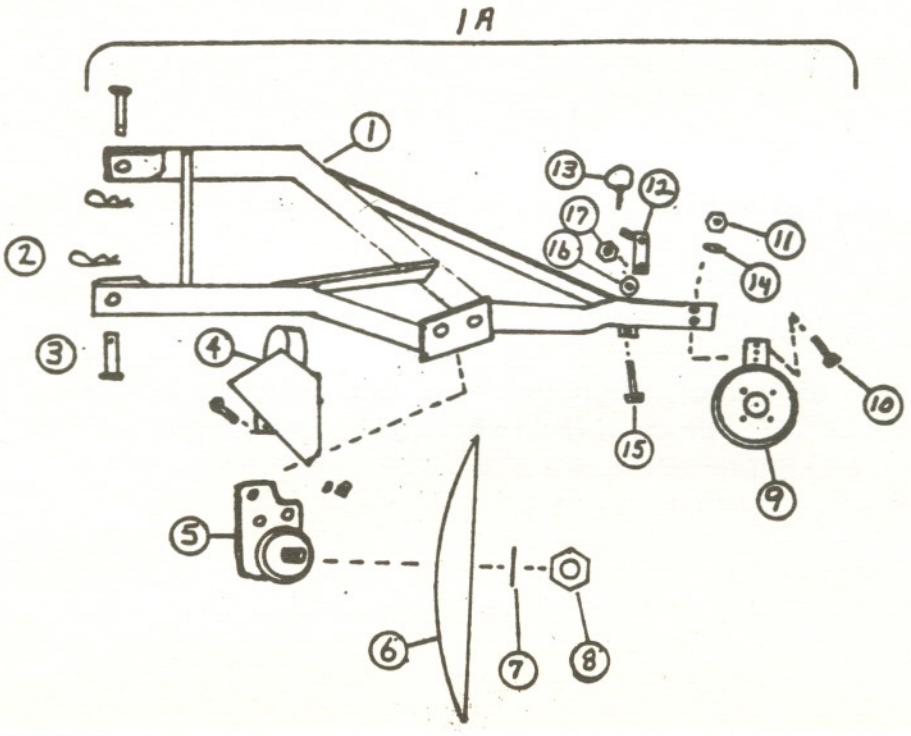
5. Replace turnbuckle back into hole on lift bracket.

6. Start engine and raise front lift to the maximum height.

7. Stop engine, align holes in rear of plow frame with holes in struts on tractor frame and insert pins (items #3) through holes.

You are now ready to plow. Start engine, lower the front lift all the way down and plow a furrow. Riase the front lift and return to the start of the furrow. Drive right tractor wheel into the furrow. Lower the front lift and plow another furrow. If the furrow is not deep enough, raise the gauge wheel on the disc plow. If the furrow is too deep, lower the gauge wheel. The first furrow will never be as deep as the second. It is always best to make a couple of furrows before adjusting the gauge wheel.

DISC PLOW



INSTALLATION AND OPERATION OF MOWER

INSTALLATION

STEP

1. Remove cover guard over crankshaft *located on rear of engine.*

2. Place ¼ inch keystock in keyway on crankshaft and place PTO pulley and sheave on crankshaft as shown in Fig. 1. Do not tighten at this time.

3. Remove belt guard from tail section assembly (Fig. 2).

4. Remove clip pins on top turnbuckle (located on right rear lift arm) allowing lift arm to be lowered to the ground.

5. Remove clip pin on top of lift link *(located on the left rear lift arm)* allowing lift arm to be lowered to the ground.

6. Slide tail section assembly into the rear of tractor frame.

7. Align holes in tail section assembly with holes in tractor frame and insert pins through holes.

8. Replace lift arms and replace pins removed in Step 4 and Step 5.

9. Align PTO pulley with flat idler pulley and PTO groove on double groove pulley on tail section assembly. (Fig. 3).

10. Tighten PTO pulley as shown in Fig 1; install PTO belt and replace belt guard on tail section.

11. Place pin (welded to chain on left front side of tail section assembly) through hole on lift clevis as shown in Fig. 4.

12. Position mower deck in front of tractor and drive tractor over top of mower deck using small boards as ramps. The front tires of the tractor will not damage the mower deck (Fig. 5).

13. Lower front lift and attach lift chains on front of mower deck to ball joints on front lift arms.

14. Raise front lift to maximum height.

15. Standing at rear of tractor, align holes in mower struts with holes in tail section assembly struts. ***NOTE: For most lawn application the second hole from the bottom on the tail section assembly should be used.*** The third hole from the rear on the mower struts should be used with a new belt.

16. Tighten lift V-groove idler pulley (located on left side of tail section, Fig. 6 item 16), about 1½ inches from top of slot. ***NOTE: Never tighten drive belt with this pulley.*** It should reamin in that position at all times.

17. Loosen right V-groove idler pulley on tail section assembly. ***NOTE: Always tighten mower drive belt with this pulley.***

18. Position mower drive belt in the bottom side of the left V-groove idler pulley, next in the top of the deck belt groove in the double groove pulley (Fig. 3) and finally in the bottom side of right V-groove idler pulley.

19. Push down on right V-groove pully using a short pry bar and tighten ***NOTE: To check belt tension, place one hand on drive belt approximately 12 inches behind belt guide on rear of mower deck.*** If belt can be pressed together add more tension. Belt should come within one inch of touching.

20. Start engine and lower rear lift to maximum position.

21. Remove pin in clutch arm (Fit. 6, item 13.)

22. With engine at about half throttle raise rear lift slowly. This will engage mower. ***NOTE: Always lower rear lift before stopping the engine.*** The tractor will not start with the mower engauged. Should this occur, you must disengauge the mower manually by inserting pin in clutch arm.

To remove the mower from tractor perform the following steps:

STEP

1. Lower front and rear lift

2. Stop engine

3. Loosen right V-groove idler pulley on tail section assembly and remove drive belt.

4. Remove pins for mower struts from holes in tail section assembly.

5. Place pin in clutch arm (Fig. 6, item 3)

6. Perform Steps 4 and 5 of installation

7. Remove PTO belt from PTO pulley on engine crankshaft.

8. Remove pin from step 11 of installation.

9. Remove pins from step 7 of installation.

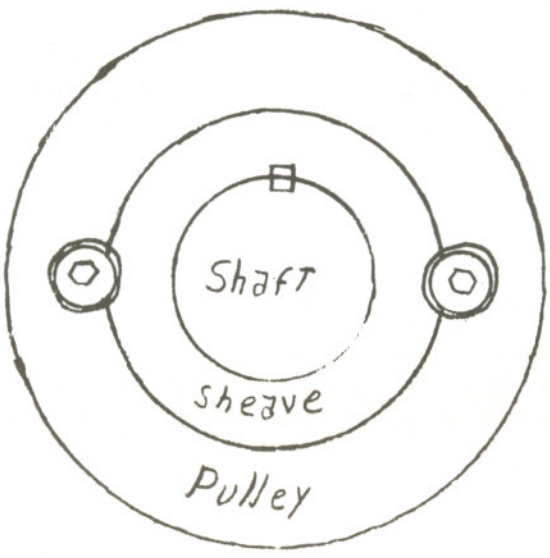
10. Remove tail section assembly from tractor.

11. Perform step 8 of installation

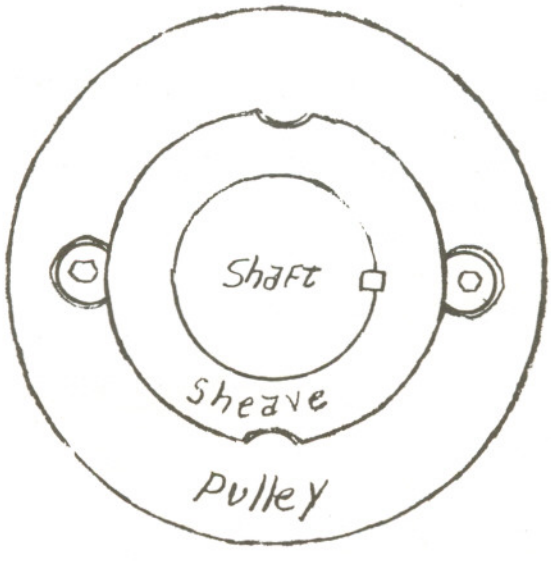
12. Remove pins from step 13 of installation.

13. Back the front tires of tractor over mower deck.

Figure 1

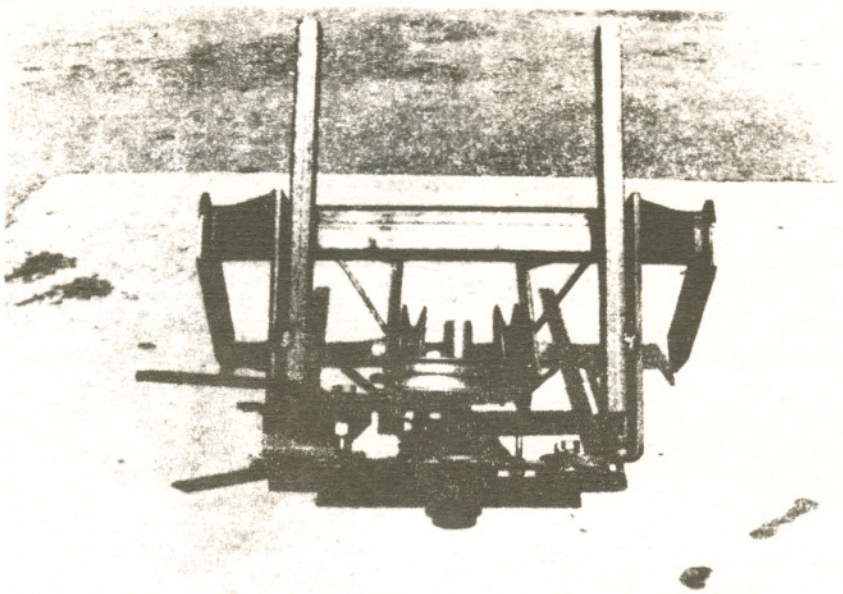


(1) INSTALL SHEAVE IN PULLEY AS SHOWN.



(2) ROTATE ¼ TURN BEFORE TIGHTENING

Figure 2



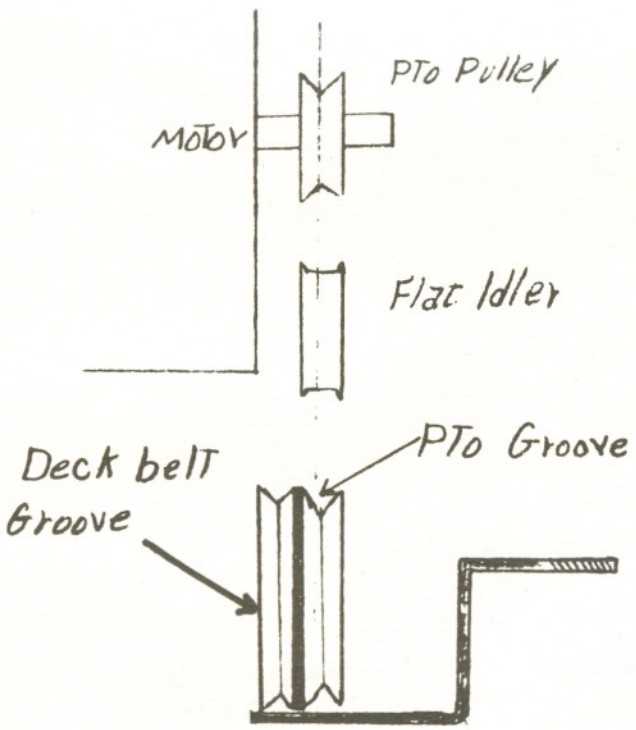


Figure 3

WHEN BOTH BELTS ARE ON, INSTALL BELT HOLDER THROUGH PLATE AND TIGHTEN. LEAVE ½" CLEARANCE BETWEEN BELT AND HOLDER

Figure 4

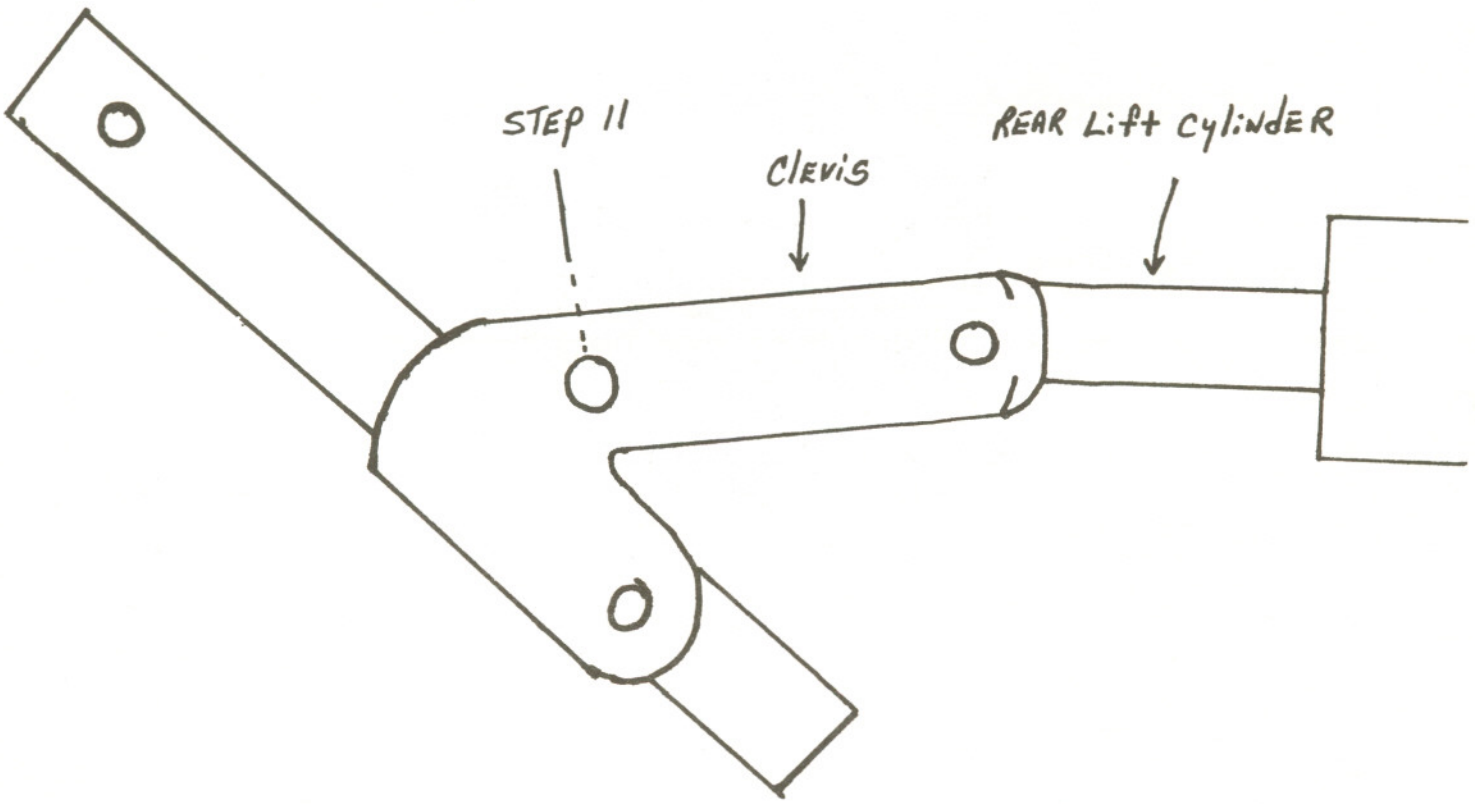


Figure 5

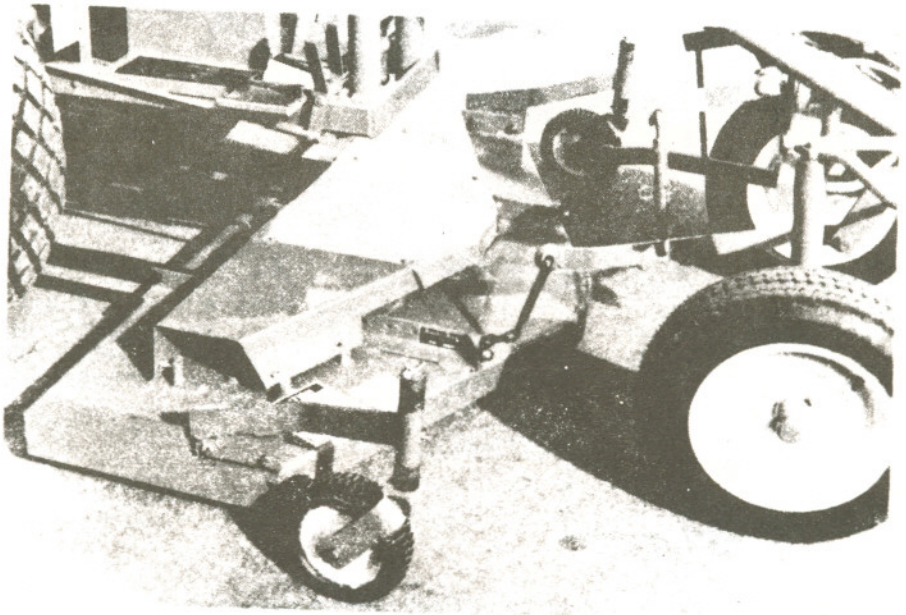


Figure 6

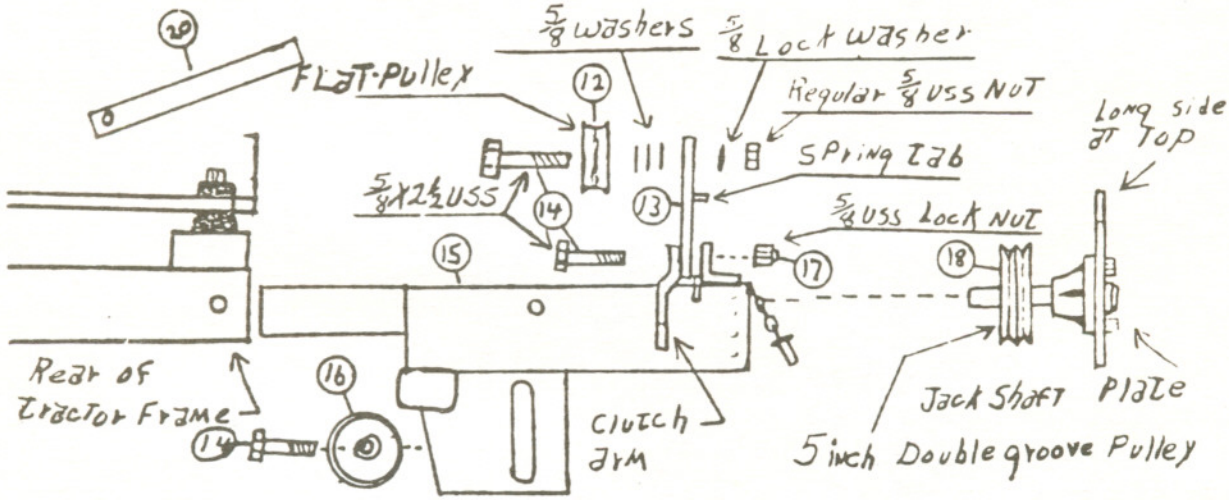
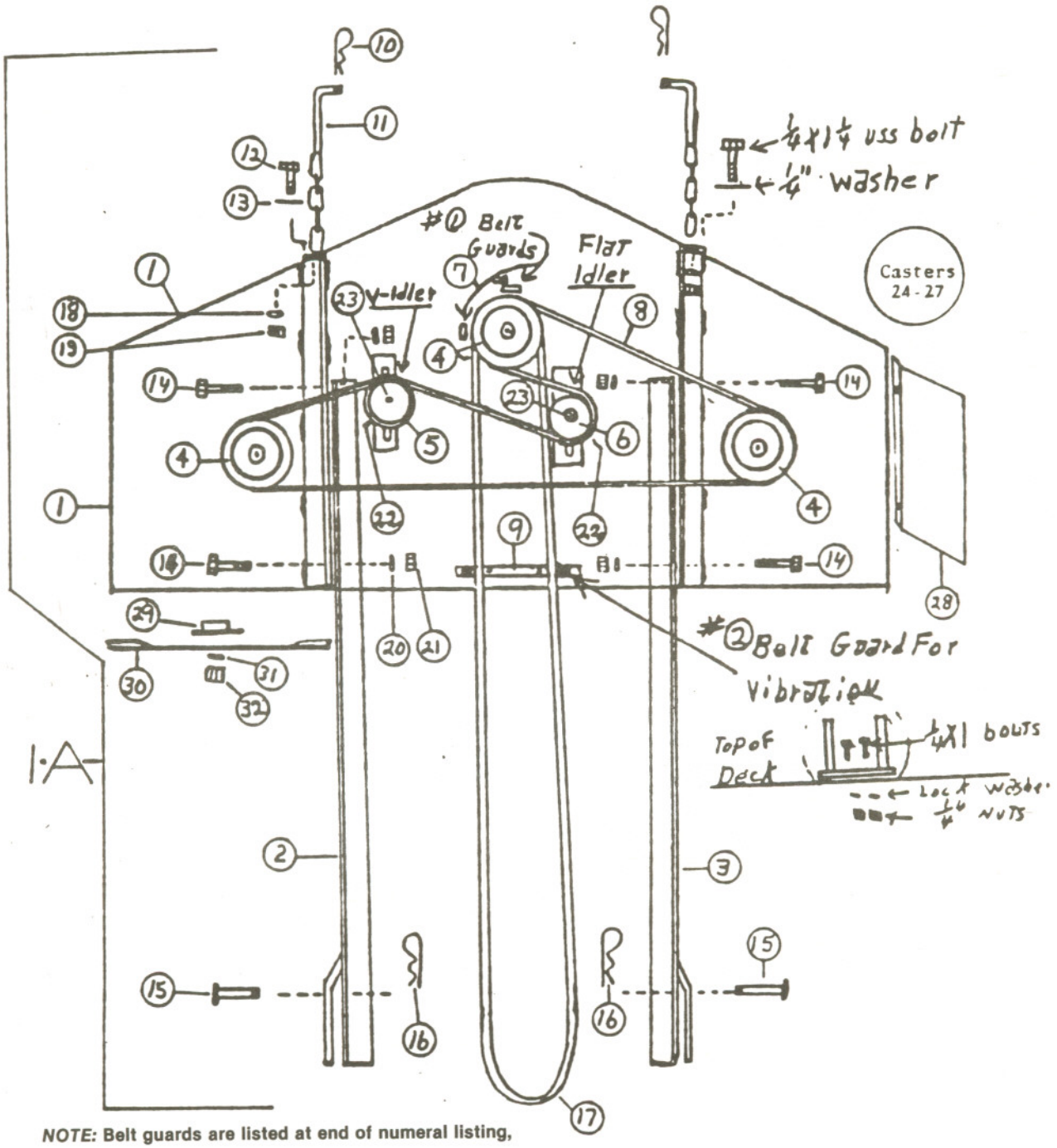

20
FLAT Pulley
5/8 washers
5/8 Lock washer
Regular 5/8 USS NUT
12
Spring Tab
Long side at Top
5/8 X 2 1/2 USS
14
13
5/8 USS Lock NUT
15
17
18
Rear of Tractor Frame
16
14
Clutch Arm
Jack Shaft
Plate
5 inch Double groove Pulley

Figure 7



NOTE: **Belt guards are listed at end of numeral listing,**

TIPS FOR BEST PERFORMANCE OF YOUR MOWER

Drive tractor with mower installed on level ground and lower front lift until casters touch the ground. If they don't touch the ground at the same time, adjust the turnbuckle on the right front lift arm until they touch the ground at the same time.

To avoid scalping your lawn, lower front lift until caster just slightly touches the ground. The front lift of the tractor will carry the weight of the mower deck. The casters are to keep the mower from scalping the lawn should the tractor wheels run in a low place.

To adjust the height of cut for your lawn, move the spacers on the caster arms. To lower the cut, move the larger spacers to the top. To raise the cut move the larger spacers to the bottom. After acquiring the desired height, drive tractor on level ground and make sure the rear of the mower deck is slightly higher off the ground than the front of the deck. If rear of deck is lower than the front, remove pins from the holes in the mower struts and move up intil the rear of the mower deck is slightly higher than the front.

BELT ADJUSTMENTS

Your mower has three belts. After some use it may be necessary to tighten these belts.

The PTO belt should be loose enough to install and remove freely. **To tighten this belt**, loosen the four bolts on the jackshaft plate (Fig. 6) and lower plate. **To tighten the deck belt**, remove belt guards from the top of mower deck and **adjust tension** with the flat idler pulley (Fig. 7, item 6).

The **drive belt tension** is adjusted with the right idler V-groove pulley on the tail section assembly. Should there not be enough travel in the pulley to get proper tension, remove pins from mower struts and move mower deck forward one hole.

DEALERS REGISTRATION FORM

CARD MUST BE COMPLETED AT DATE OF SALE.

TRACTOR MODEL NO: _____ SERIAL NO: _____

DATE OF PURCHASE: _____

DEALER

_____

_____

PURCHASER
(name, address, phone number)

_____

_____

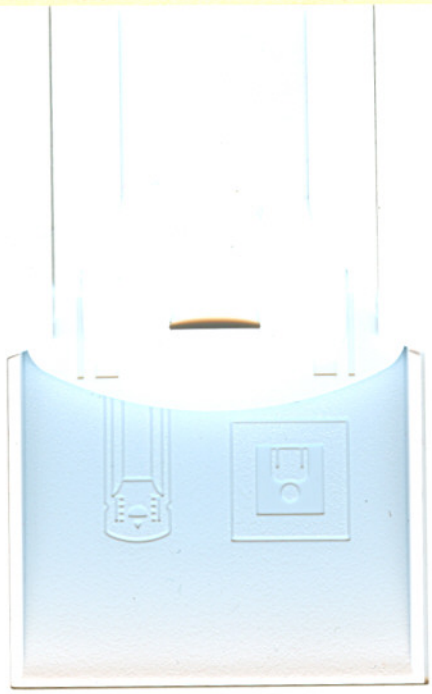
_____

Equipment and accessories purchased with tractor: (please check)

( ) MOWER	( ) CULTAVATORS	( ) DISC. PLOW
( ) MOLDBOARD PLOW	( ) WHEEL WEIGHTS	( ) BLADE
( ) PLANTER ATTACHMENT	( ) DRAWBAR	( ) OTHER

Owner hereby has been informed of Maintenance, Operation and Warranty Policy of the New Tractor.

_____
Owner Signature



Place
Stamp
Here

Tuff-bilt

TRI
RACTOR MANUFACTURING CO., INC.
ROUTE 1 HWY. 19 NORTH
CUMMING, GEORGIA 30130

Attention: Service Department