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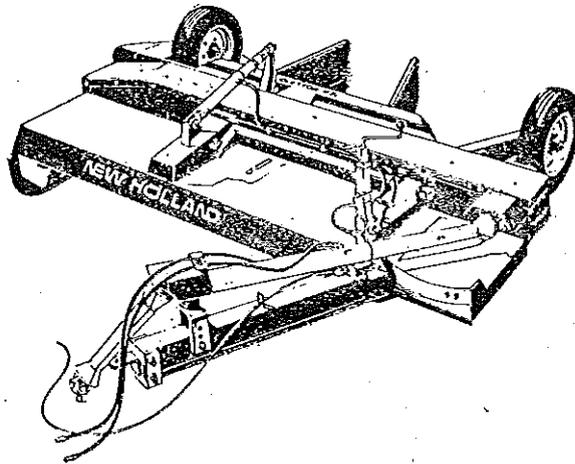
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# SERVICE MANUAL

**MODEL 96  
ROTARY HAY MOWER**



**SPERRY  NEW HOLLAND**

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# SPECIFICATIONS

Length .....	3239 mm	No. of Blades .....	3 per Rotor
Width Operating .....	3531 mm	No. of Rotors .....	2
Transport .....	3226 mm	No. of Cutting Edges .....	4 per Blade
Height Raised		P.T.O. Speed .....	540 r.p.m.
(To top of tongue screw jack) .....	1181 mm	Blade Tip Speed .....	4175, 76m/min
Lowered .....	800 mm	P.T.O. Clutch Capacity .....	44,7 kw
Weight .....	862 kg	Hydraulic Pressure .....	126,5 bar
Height Adjustment Range		Wheel Size .....	356 mm
(Measured at blade tip, static rotors)		Tyre Size .....	7.35 x 14 x 4 ply
Cutting Height .....	13-158 mm	Tyre Pressures .....	180 kPa
Transport .....	375 mm	Wheel Bearings .....	Tapered Roller
Width of Cut .....	2438 mm	Lubrication Points .....	17
Offset of Cut .....	965 or 1073 mm		

## OPTIONAL EQUIPMENT

### CHAIN GUARD (Figure 1 )

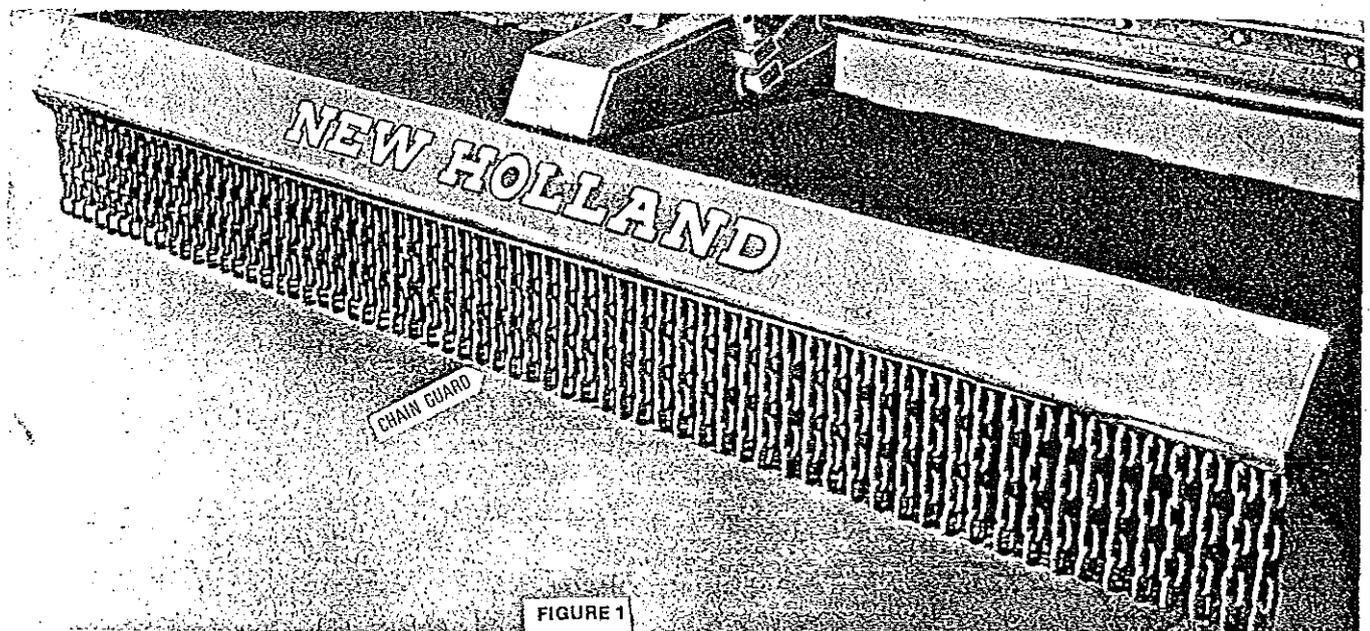
(Safety Shield Kit, Part No. 60689)

The chain guard is attached to the front of the mower; it will allow material to enter the cutting area, yet serve as a protection from stones, etc., which may be thrown forward.

The chain guard must be fully assembled before being bolted in position across the front of the mower frame.

To assemble, place an end link of each chain section through one of the slots in the chain support. The chain rod is now passed through the end links and secured at each end with the cotter pins supplied.

The assembled chain guard bolts on to the three brackets at the front on the underside of the mower frame. One bracket is centrally located and the others are located at each side of the mower. The guard is bolted in position using the capscrews and washers provided.



## FEATURES

- Fully offset, 8ft. cut.
- Torsion bar suspension.
- Moderate power requirement. (MIN 22 PTO kw/30 hp).
- Patented quick release blade with 4 cutting edges.
- 6 blades (3 per rotor).
- Height adjustable skids. 1/2" to 6" cutting height.  
Topping to 12".
- Swinging drawbar adjustable from tractor seat.
- Parallel lift.
- Fully enclosed gearbox and shaft drive protected by slip clutch and shearpin.
- Adjustable windrow allows greater flexibility of entire hay operation.

## SAFETY PRECAUTIONS

During the design of the Rotary Hay Mower special attention has been given to safety, but accidents can still happen if these few simple precautions are not observed:-

- DON'T clean, lubricate or make any adjustments to the mower while it is in operation or while the tractor engine is running.
- DON'T engage the tractor clutch until you have checked that everyone is clear of the mower and have made sure that no tools are lying on the machine.
- DON'T work around the unit in loose clothing that might catch in any of the moving parts.
- DON'T attempt to pull material from any part of the mower while it is in operation.
- DON'T get off the tractor while the mower is in operation.
- DON'T work underneath mower when it is raised unless the safety clamp is fitted to the axle cylinder.

## ASSEMBLY

1. Check shipping damage while removing parts from shipping position. If damaged submit claim immediately.
2. Check for short shipments and owners kit complete. Report short shipments immediately.
3. Locate and attach drawbar tongue, lightly greasing pivot bolt and wear pad.
4. Attach PTO assembly, remove burrs from splines and lightly grease gearbox shaft.
5. Secure hydraulic hoses in position.
6. Jack machine and place skids in UP position.
7. Securely store books and owners kit.

Approximate assembly time = 1-1/2 hrs.

## PRE-DELIVERY SERVICE CHECKLIST

### LUBRICATE AS PER OWNER'S MANUAL

1. Grease all points with good quality chassis grease.
2. Smear with grease, tongue pivot wear pad, and tongue latch pin.
3. Oil axle pivot bearings.

Check the 3 gearbox oil levels (S.A.E.90)

NOTE: Do not overfill. Level reading is correct when dipsticks are screwed down.

### CHECK AND ADJUST AS REQUIRED

1. All nuts and bolts for tightness.
2. P.T.O. retaining set screws (2).
3. P.T.O. telescopes freely.
4. Slip clutch operation (refer Owner's Manual).
5. Tongue latch operation (all positions).
6. Torsion bar transport latch operation.
7. Tongue screw jack operation.
8. Rotor gearbox mounting bolt tension (180-200 ft lbs).
9. Rotor mounting nut tension (400 ft lbs).
10. Rotor timing (refer Owner's Manual).
11. Blade attaching pins correctly located.
12. Free movement of rotor blades.

13. Wheel stud tension and bearing preload.

14. Tyre pressure (26 p.s.i.).

### ATTACH MOWER TO TRACTOR

1. Fit suitable snap couplings to hydraulic lines.
2. Check all hydraulic fittings for tightness.
3. Position hoses to clear P.T.O., tractor, etc.

### CHECK BEFORE PROCEEDING

- Tongue cylinder transport stop removed.  
Axle cylinder stop fully backed off.  
Adjustable skids fully raised.
4. Prime mower hydraulic system as per Owner's Manual.
  5. Check torsion bar adjustment (refer Owner's Manual.)
  6. Engage tractor P.T.O. and run mower for 10-15 minutes.
  7. Stop tractor and check for mower gearbox overheating.
  8. Re-check gearbox oil levels.

### CHECK

1. All shields in place.
2. Windrow shield adjustment.
3. Owner's kit intact and with machine.

Approximate predelivery time 2 hours.

## DELIVERY AND START-UP CHECKLIST

To obtain customer satisfaction with a new machine, it is essential the unit be started in a competent, professional manner, with an atmosphere of confidence and efficiency.

Machine preparation is vital for a successful start-up, with a comprehensive pre-delivery and a clean, bright new looking machine.

REMEMBER: Early problems leave bad impressions with owners.

### 1. Physically hitch machine to tractor and explain in detail:-

- (1) Hitching.
- (2) Hydraulics operation.
- (3) Safety precautions.
- (4) Correct PTO speed under load. (540 RPM).
- (5) Lubrication points and intervals and gearbox oil levels.
- (6) Importance of correct slip clutch adjustment.
- (7) Correct replacement of shear/drive pins.
- (8) Correct Rotor timing.
- (9) General machine limitations. (e.g. speed, rocks, tractor power).

### 2. After initial machine operation:-

- (1) Hand over owner's kit and explain warranty certificate with special provisions as applicable to the machine.
- (2) Using the operator's manual explain to the owner/operator, general and specific field adjustments, maintenance, and general operating hints.

## SETTING UP MOWER FOR OPERATION

### PRIMING HYDRAULICS

- Ensure shipping stop has been removed from the tongue jack cylinder.
- Connect both hydraulic hoses to tractor hydraulics; do not hitch tongue to tractor.
- Operate tractor hydraulics and extend the centre axle cylinder sufficiently to remove transport clamp and fully back off adjustable stop.
- Fully raise skids - release all tension from tongue jack and disconnect transport latch.
- Operate tractor hydraulics until both cylinders are fully closed - drawbar will rise as tongue cylinder closes up.
- Hold hydraulics in this position for a few moments. With control valve fully open and tongue cylinder fully closed, oil will be forced through internal valve in tongue cylinder into top of centre cylinder. (See fig 2.)
- Open both cylinders momentarily then repeat the above procedure.

NOTE: The above mentioned procedure of opening and closing cylinders should be repeated until the piston movement of both cylinders is synchronised.

- Fully cycle hydraulic system and recheck that cylinders are synchronised.
- Recommended operating hydraulic pressure - 1800 psi (12.4 mPa).

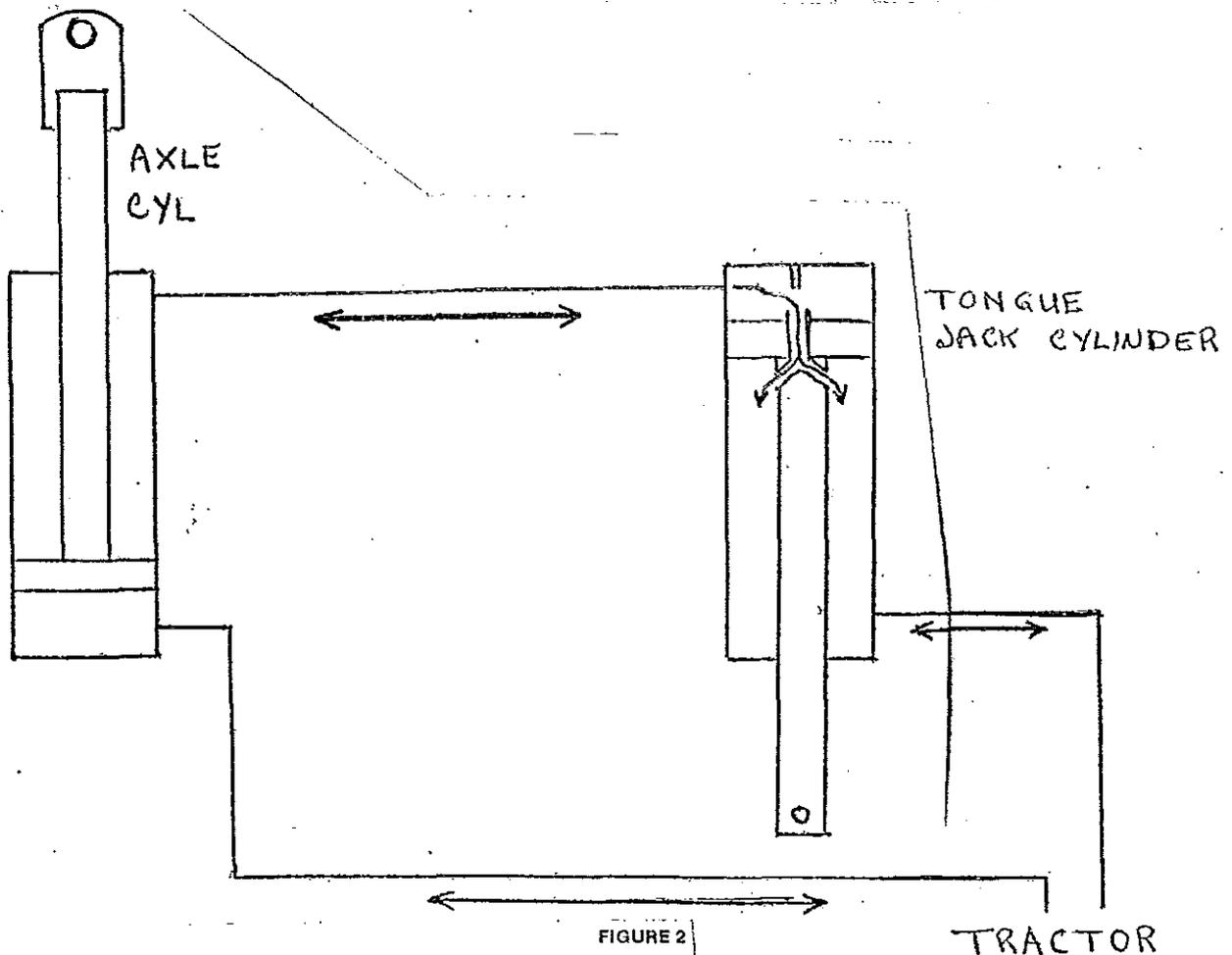
### HITCHING MOWER TO TRACTOR

- Connect as per ASAE tractor hitch (Fig. 3). Lock drawbar in central position. (Preferred drawbar height 16" - 17" [450mm - 430mm]). See also Fig 4.
- Connect tongue, hydraulic hoses and PTO shaft to tractor.
- Align PTO and secure hoses.
- Locate tongue in appropriate field work position. (See Fig. 5).

- Disconnect transport latch.
- Set skids to desired cutting height (12-15mm) on level ground.  
NOTE: Skids should be set approx 12mm LOWER at REAR to achieve correct rotor tilt.
- Adjust centre ram adjustable stop until cutting platform is slightly raised at rear.
- Adjust tongue jack to achieve correct flotation (20-35kg) measured at front edge of cutting platform.

NOTE: With correctly primed hydraulics and properly adjusted flotation, platform should be level when raised.

NOTE: Where difficulty to achieve satisfactory flotation is encountered, perhaps due to low tractor drawbar or because a high cutting height is required, or simply due to torsion bar fatigue, shift the torsion lever to the upper pair of holes and adjust the torsion bar anchor for maximum twist.



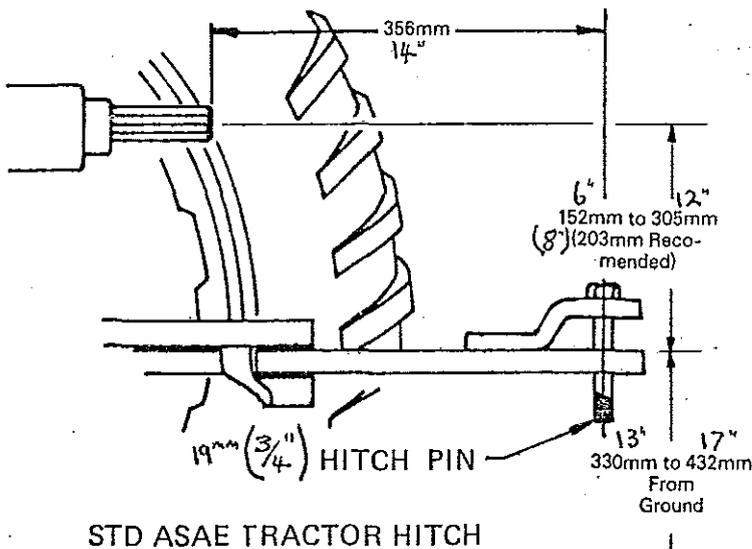


FIGURE 3

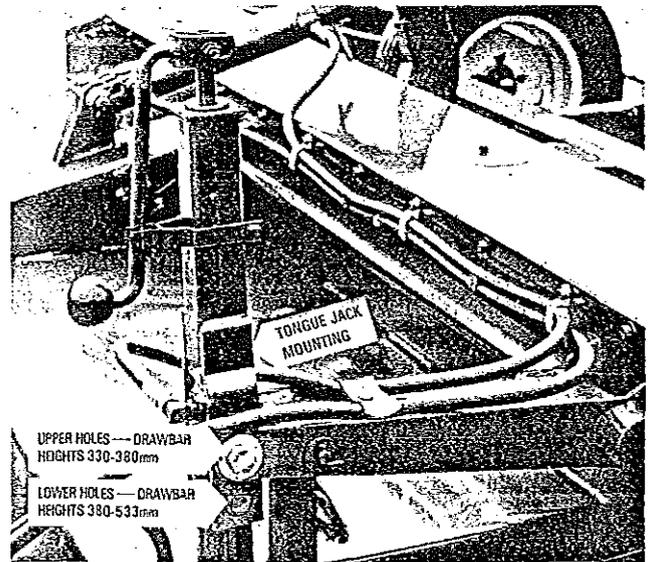


FIGURE 4

## P.T.O. SPEED

Always maintain 540 r.p.m. on the tractor P.T.O. shaft. Slower P.T.O. speed will result in ragged cutting and excessive power consumption. Higher speed may produce excessive crop laceration.

**CAUTION:** ALWAYS DISENGAGE THE TRACTOR P.T.O. SHAFT BEFORE LEAVING THE TRACTOR SEAT. NEVER ALLOW ANYONE TO RIDE THE ROTARY HAY MOWER OR TO STAND NEAR THE MACHINE WHEN IT IS OPERATING.

## TIPPING BEARING ADJUSTMENT

The height of the tipping bearing support can be adjusted to eight positions to ensure correct P.T.O. shaft alignment on various tractors. The tipping bearing should be adjusted so that the drive line is as straight as possible when the machine is in the operating position.

After altering the height of the tipping bearing support, make sure the nut on the adjusting bolt is firmly tightened and check that the upper and lower supports are free to turn on their pivots. Ensure that the rear P.T.O. shaft can telescope freely.

## MOWER SUSPENSION

The front of the main platform is suspended by a torsion bar and lever suspension system to provide flotation over uneven ground.

## TORSION BAR LATCH

To allow the torsion bar to function correctly during normal operation, the spring loaded latch must be in the disengaged position (Figure 5).

The only time the latch should be engaged is when the mower is being transported.

## TORSION BAR ADJUSTMENT (Figure 4A)

To check the torsion bar adjustment, hitch the mower to the tractor and ensure the transport link is in the disengaged position.

Raise the mower so that it is approximately 152 mm from the ground and front and rear height is equal.

Bounce the mower to settle the suspension and check dimension 'H' (Figure 4A) from the top of the platform to the centre of the jack mounting bolt which should be 257 mm to 270 mm.

To adjust the torsion bar, slacken off the locknut and screw the adjusting bolt down to raise the mower platform or up to lower the mower platform.

When adjustment is complete, tighten the locknut, bounce the mower and recheck dimension 'H'.

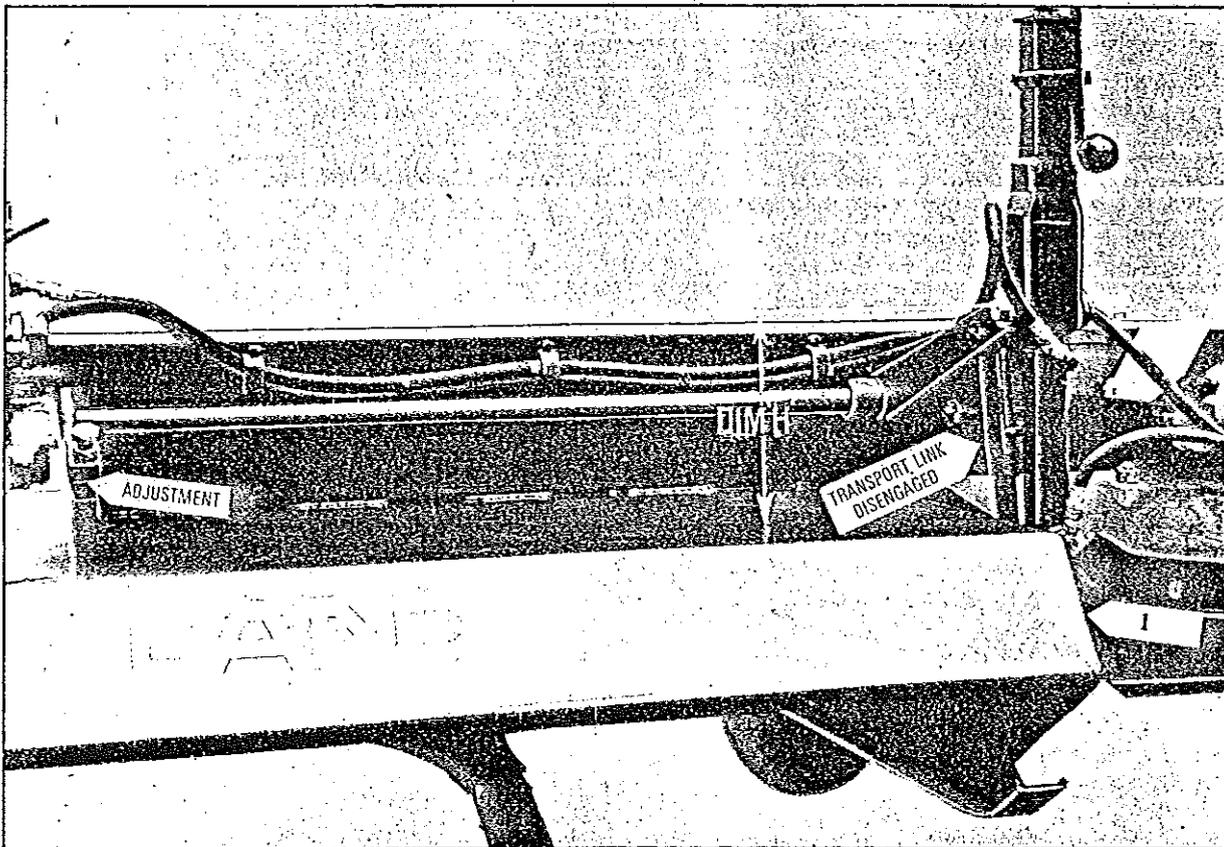


FIGURE 4A

# NOTES

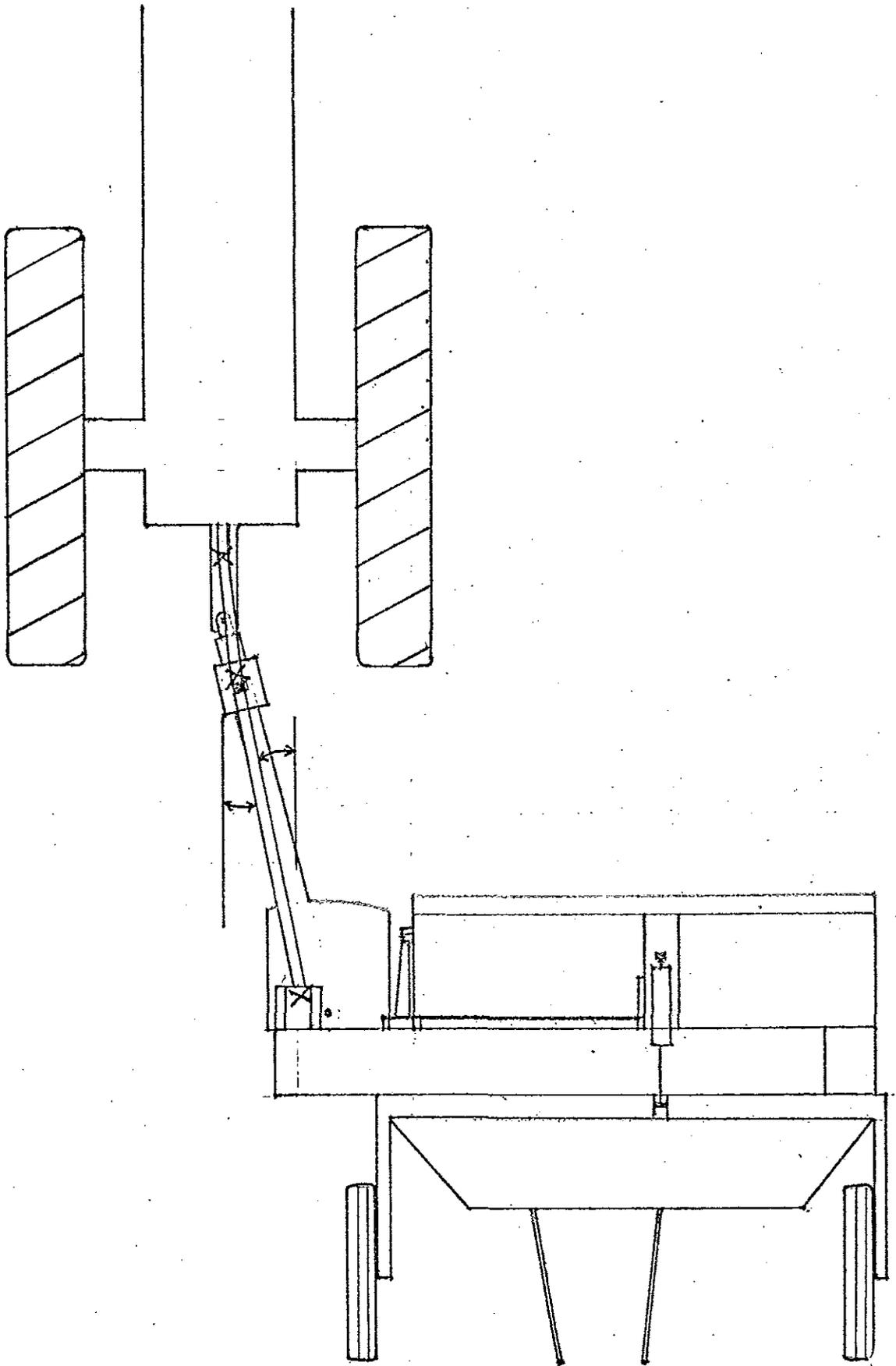


FIGURE 5

# OPERATION AND FIELD ADJUSTMENTS

## HEIGHT CONTROL (Figure 6)

The Mower hydraulic lift system is designed to operate on a minimum tractor hydraulic pressure of 126,5 bar.

Front height is altered by means of a double acting cylinder fitted to tongue screw jack and rear height is controlled by a double acting cylinder connected to the axle.

The two cylinders operate simultaneously to provide a parallel lifting action to raise the mower from 13-158 mm for operation and to a maximum height of 375 mm for transportation.

The axle cylinder is fitted with an adjustable stop to allow the mower to be lowered to a pre-set position. This enables the correct relationship between blades and the ground to be maintained at all times.

To adjust the stop, screw out until desired cutting height is achieved when the axle cylinder is fully retracted against the stop and secure with the locknut.

The relationship between the front and rear height of the mower can be regulated with the tongue screw jack.

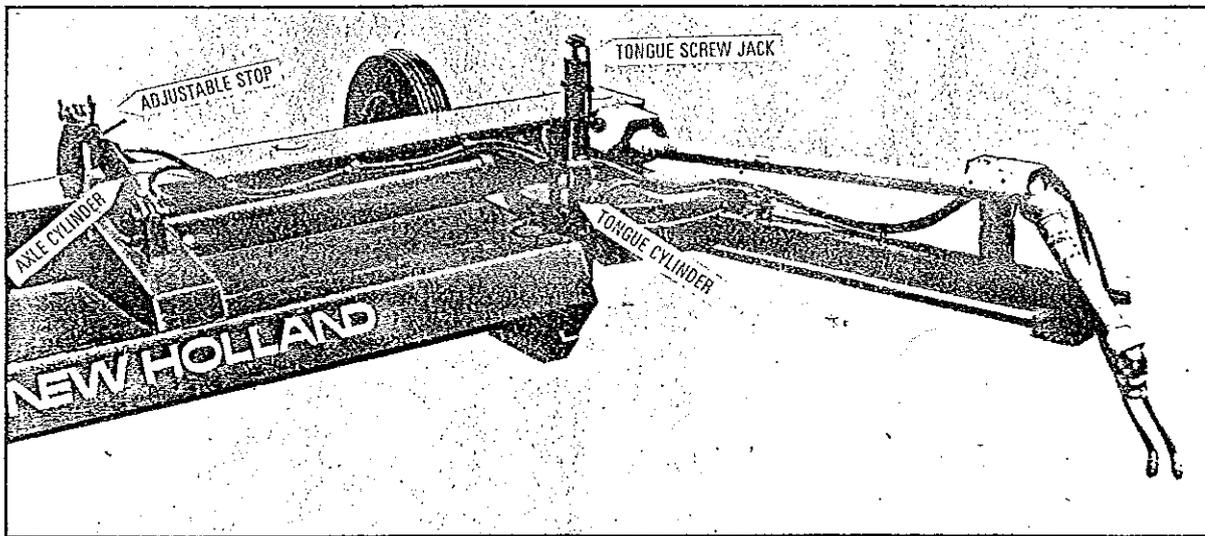


FIGURE 6

## CUTTING HEIGHT

Correct cutting height is achieved when the mower is set up so that the blade tips are 13 to 25 mm higher at the rear than the front.

When the rear sweep of the blades drags on the cut stubble the power requirement increases greatly. If the rear of the mower is too high an uneven stubble height will result.

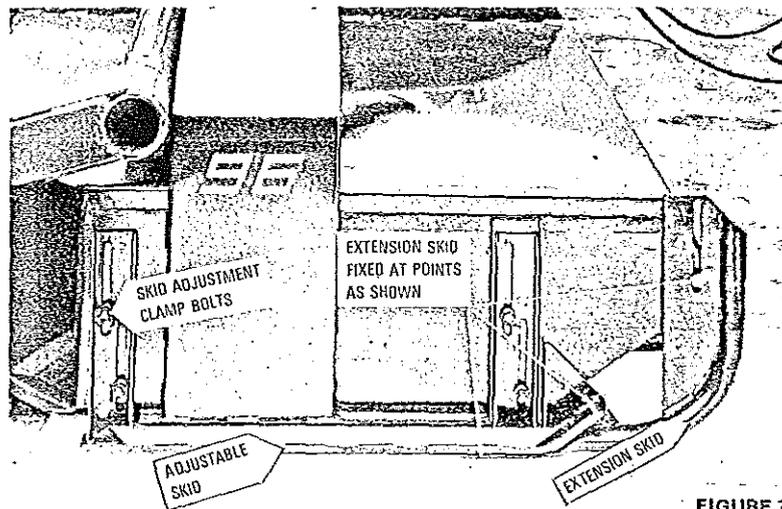
## SKID ADJUSTMENT (Figure 7)

The full length steel skids fitted to each side of the main platform can be adjusted to contact the ground for all cutting heights from 13 mm to 158 mm. The skids are flanged to eliminate any tendency to dig in on corners.

To adjust the skids, raise the mower to the desired cutting height and lower each skid evenly until it is just clearing the ground. Then use the tongue screw jack to lower the mower until the skids settle on the ground.

When the adjustment is correct the front of the skids should be bearing lightly on the ground and the rear clearing by approximately 13 mm.

**CAUTION: IT IS ESSENTIAL THAT THE SKIDS CONTACT THE GROUND AT ALL TIMES DURING OPERATION.**



## TRANSPORTING THE MOWER

The spring loaded torsion bar latch, (Figure 9) engages into a telescoping transport link. When engaged, the latch locks the link and stops the torsion bar from operating. The mower may then be transported over rough ground without it pitching excessively.

The safety clamp, (Figure 9), should be fitted to the axle cylinder to hold the mower in a raised position in case of hydraulic leakage or to enable the mower to be towed by a vehicle not fitted with a hydraulic lifting device.

When the clamp is not in use it can be stored on the mower by placing it over the torsion bar and fitting the bolt and nut to secure it in position.

## WINDROW SHIELDS (Figure 8)

The mower is fitted with two windrow shields which are adjustable for varying crop conditions. Each shield is fitted with a flexible flap to ensure a clean windrow by preventing any cut hay from passing under the shield.

The windrow shield on each side is provided with two front pivot points and five locating holes in the rear edge of the main frame. A single nut and clamp is used on each shield for simple adjustment.

Slacken nuts at the front pivot points when changing rear position of windrow shields. Ensure that the locating pin on the windrow shield is correctly seated in the rear locating hole.

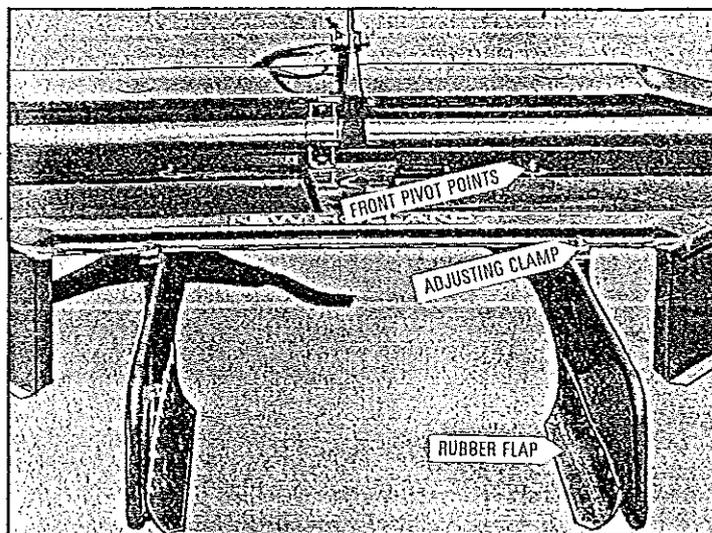


FIGURE 8

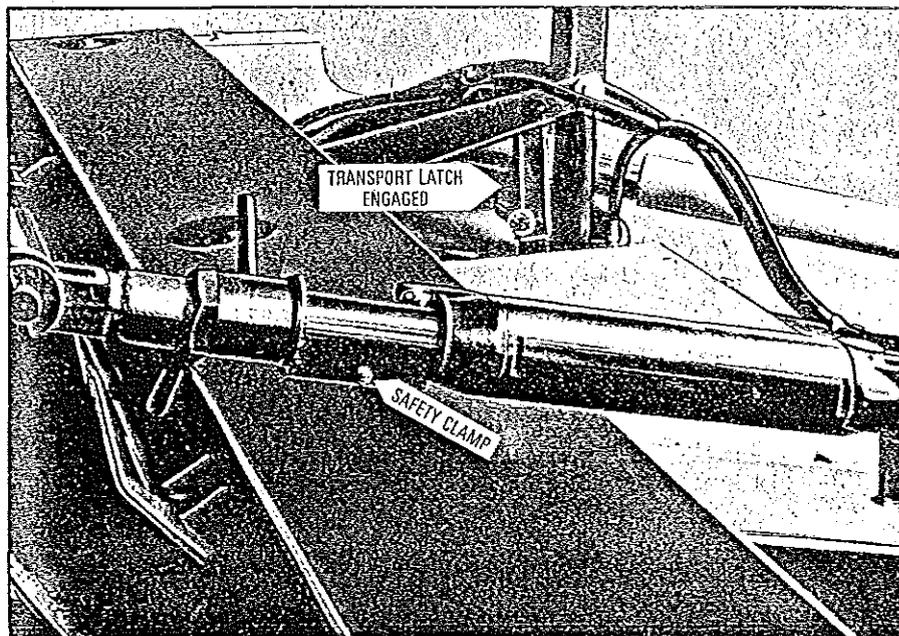


FIGURE 9

# MAINTENANCE

## INSTALLING THE BLADES (Figure 10)

**CAUTION:** DON'T OPERATE THE MACHINE WITH DAMAGED BLADES AS THIS CAUSES THE ROTORS TO BECOME UNBALANCED AND WILL RESULT IN UNDUE VIBRATION.

BEFORE ATTEMPTING ANY BLADE ADJUSTMENT MAKE SURE THE TRACTOR ENGINE IS SWITCHED OFF AND THE P.T.O. DISENGAGED.

INSTALL SAFETY CLAMP ON AXLE CYLINDER.

A slot is provided in each end of the blade and in each arm of the rotor (Figure 8). The blade is attached to the rotor by means of the case-hardened blade pin which is shaped to enable it to pass through the blade and rotor slots. The flat spring bolted to the top of each rotor arm locks the pin in position.

To remove the blades, the spring is levered up with a screwdriver, the blade pin is turned 90° using the special spanner supplied and pushed back to align with the slot in the rotor. Push the blade in to align the slot with the rotor slot and remove the blade pin.

To install the blades, reverse the above procedure and ensure that the flat spring is properly seated behind the head of the blade pin.

After the mower has been operating for some time grass or other foreign matter will lodge in the rotor arm behind the blade. It is, therefore, necessary to clean this area thoroughly to avoid difficulty in pushing the blade in to align the slots when removing the blade pin.

**NOTE:** DULL CUTTING EDGES GREATLY INCREASE POWER REQUIREMENTS; FOR BEST RESULTS ALWAYS MAKE SURE YOUR MOWER BLADES HAVE A SHARP, CLEAN CUTTING EDGE.

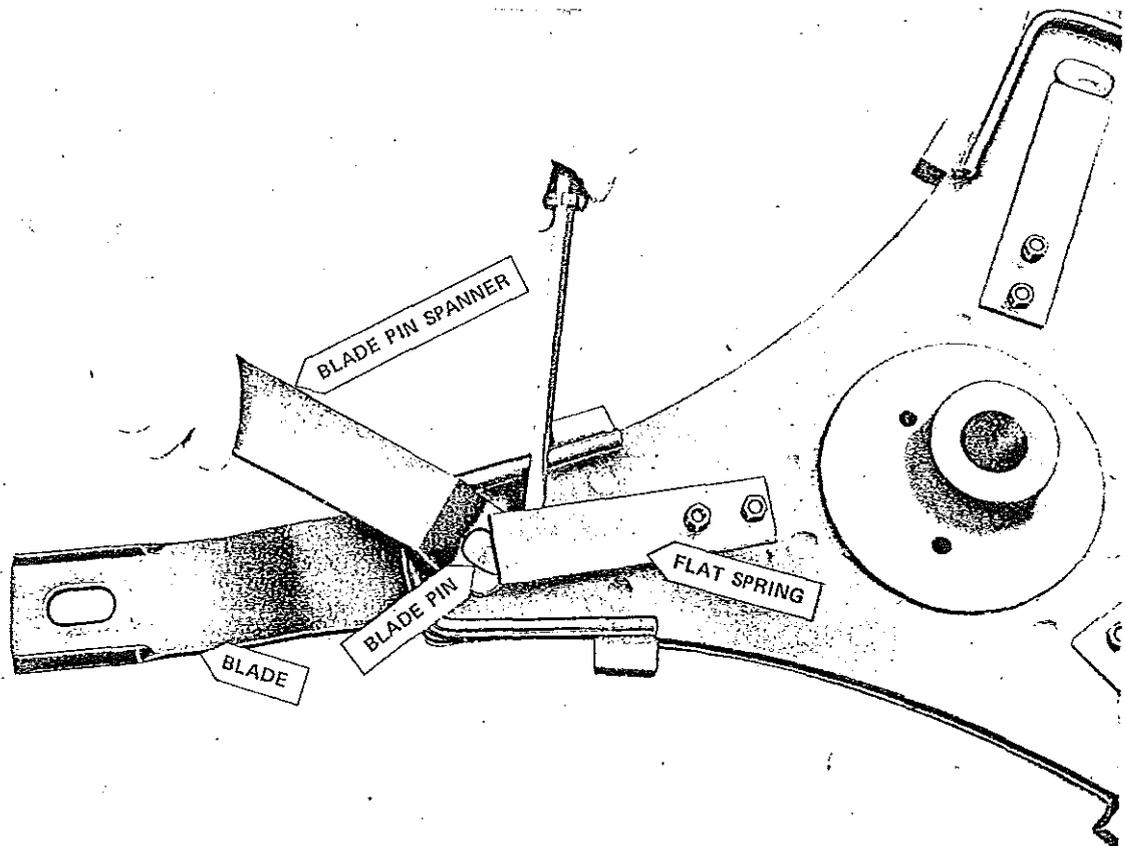


FIGURE 10

### CHECKING AND ADJUSTING SLIP CLUTCH (Fig. 11)

- All mowers with shearbolt and pin protection incorporate a heavy duty slip clutch which should be checked in the following manner prior to each season.
- Dismantle clutch and examine discs, plates and bushing. Replace parts as required.
- Thoroughly clean with wire brush, all friction components of accumulated rust, dust, etc.
- If discs are contaminated with grease, clean with suitable solvent. In extreme cases, replace discs.
- Re-assemble clutch and adjust spring tension evenly.
- Examine drive pin - if wear is evident or if the pin is the superseded type, replace it with No 190548 pin assembly.
- Place measured bar through PTO yoke adjacent to clutch.
- Apply measured force on bar and slip clutch - clutch should slip when a force of 6,800-7,200 ins/lbs is applied. (Max 44.7kw 60 PTO hp).

NOTE: 100lbs applied 72" from the clutch centre equals 7,200 ins/lbs.

- Adjust tension springs evenly and in small increments when nearing the prescribed tension.
- Always service the slip clutch if an excess shearbolt failure problem is encountered. Clutch should operate at skin temperature.

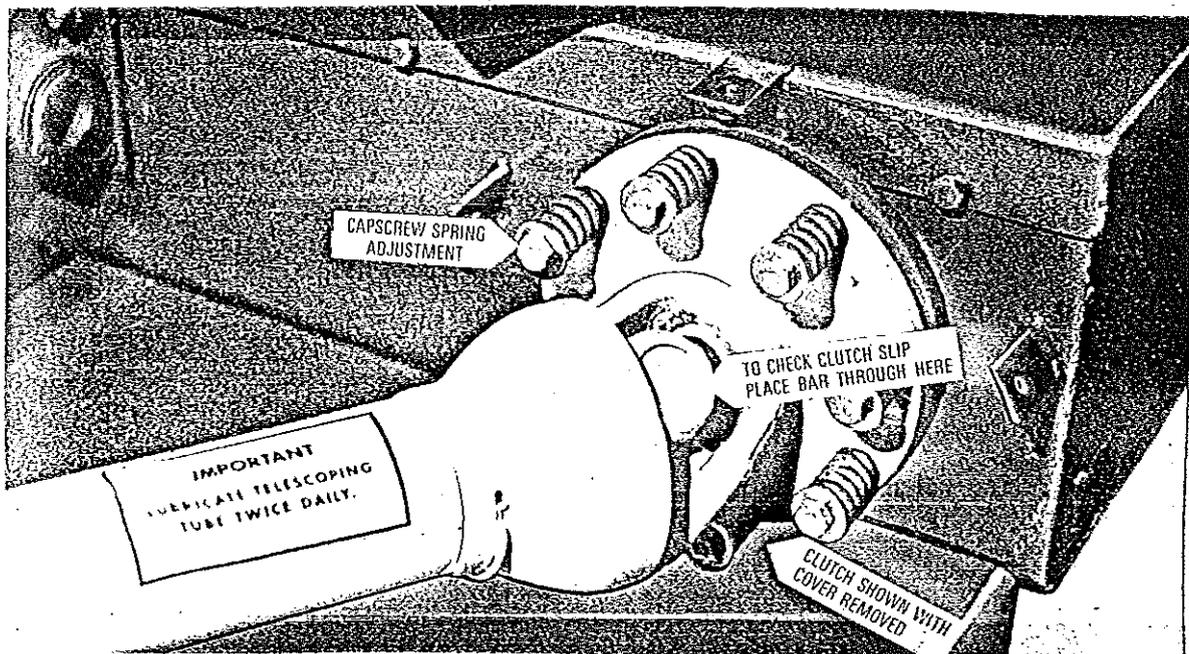


Fig. 11

TIMING ROTORS FOLLOWING SHEARPIN BREAKAGE (Fig. 12)

- Rotate the left-hand rotor until a rotor projection is pointing due left and at the same time, the block on the right-hand connecting shaft and pin hole is located in the centre of the right-hand access opening.
- Insert special spanner through opening and over block. This will hold left-hand rotor in position.
- Rotate right-hand rotor until the rotor is also pointing left and the pin holes in both shafts are perfectly aligned.
- Install and secure shear pin No 170543.

NOTE: Rotors may require several rotations before achieving correct timed positions - allow for slack in drive line.

- Recheck timing by attempting to manually force blades from opposing rotors to touch. If blades touch, timing is incorrect.

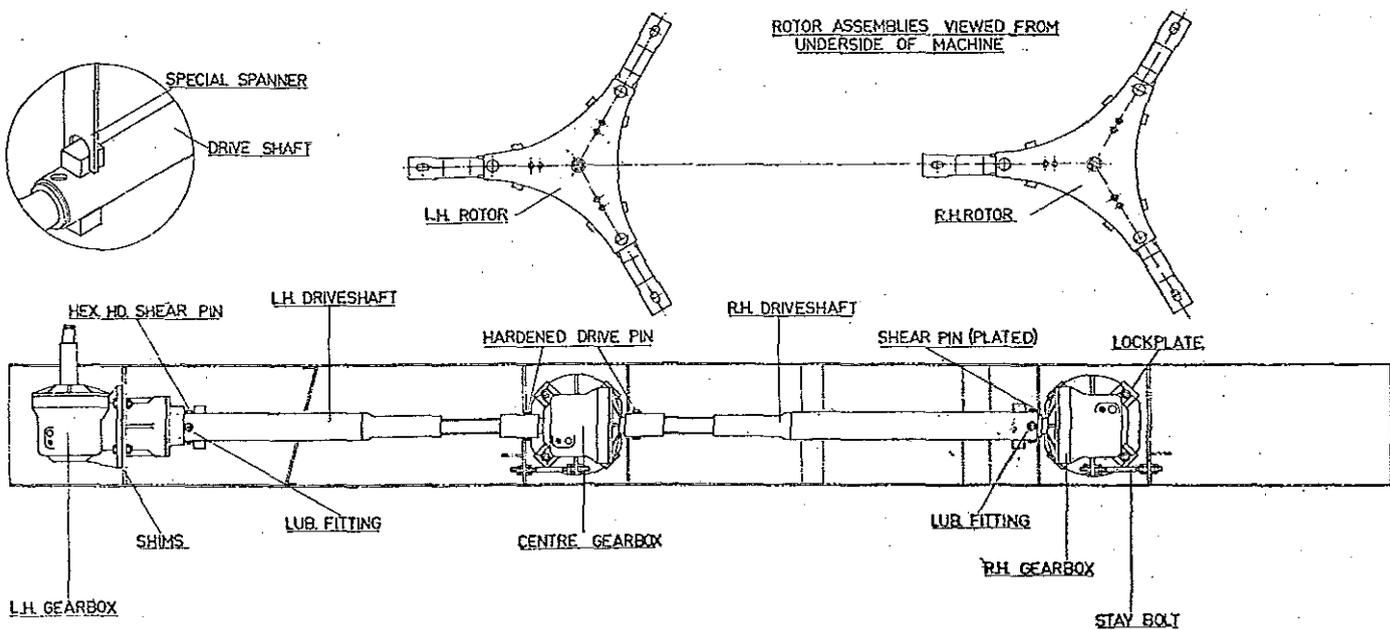


Fig. 12

# LUBRICATION

Regular lubrication is needed to ensure trouble free operation of your mower. The following points should be lubricated at each specified time interval. (Refer Figure 13).

P.T.O. Shafts	— Points 1, 2, 3	Grease once daily
	— Point 4	Grease twice daily
Tongue Jack	— Point 5	Grease once daily
Tongue Wear Pad	— Point 6	Smear with grease for free movement
Tongue Latch Pin	— Point 7	Smear with grease for free movement
Axle Bearings	— Points 8, 9, 10	Oil every 20 hours
Gearboxes	— Points 11, 12, 13	Check oil level every 50 hours. Top up with SAE 90 as needed. (Refer note below.) Do not fill above level mark on dipstick.
Drive Line Shearpins	— Points 14, 15	Grease daily or if replacing shear pin
Wheel Hubs	— Points 16, 17	Re-pack with wheel bearing grease every 12 months.

## GEARBOXES

GEARBOX OIL MUST BE CHANGED ANNUALLY. TO DRAIN OIL, RUN MACHINE FOR A SHORT TIME TO WARM UP THE OIL.

**NOTE:** It is necessary when filling the gearboxes to run the machine again for a short time to allow the oil to drain through the bearings and fill the lower portion of the housing. The oil level should then be rechecked and topped up as required. The quantity required to fill each gearbox is as follows: Rotor gearboxes — 1,7L (per); Gearbox L.H. — 0,8L.

When checking gearbox oil level, check that the breather tube adjacent to the dipstick is free from all foreign matter.

**CAUTION:** DO NOT OVERGREASE P.T.O. JOINTS AS THIS MAY DAMAGE THE SEALS.

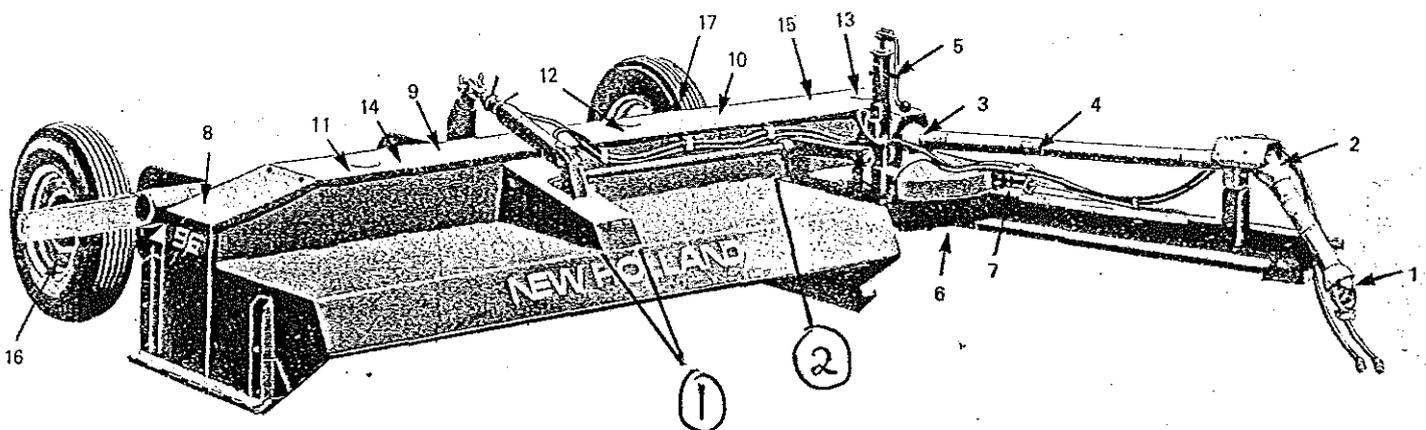


FIGURE 13

## NOTES

## SERVICE CHART

PROBLEM	POSSIBLE CAUSE	CORRECTION
Machine not rising horizontally.	<ol style="list-style-type: none"> <li>1. Air in hydraulic system.</li> <li>2. Transport stop not removed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Purge hydraulic system as per Operators Manual.</li> </ol>
Blades clashing.	<ol style="list-style-type: none"> <li>1. Incorrect rotor timing.</li> </ol>	<ol style="list-style-type: none"> <li>1. Re-time rotors as per Operators Manual Page 13 Fig. 9.</li> </ol>
Slip clutch failure.	<ol style="list-style-type: none"> <li>1. PTO speed too slow.</li> <li>2. Excessively large tractor.</li> <li>3. High ground speed.</li> <li>4. Blunt blades.</li> <li>5. Incorrect torque setting.</li> <li>6. Weak clutch springs.</li> </ol>	<ol style="list-style-type: none"> <li>1. Operate at 540 PTO RPM under load.</li> <li>2. Match tractor to machine.</li> <li>3. Slow down.</li> <li>4. Keep blades sharp.</li> <li>5. Set torque to maximum 7,200 in/lbs.</li> <li>6. Replace clutch springs and linings.</li> </ol>
Drive Line failure.	<ol style="list-style-type: none"> <li>1. Clutch not working.</li> <li>2. Turning too sharp.</li> <li>3. Incorrectly hitched to tractor.</li> <li>4. PTO speed too slow.</li> <li>5. Lack of or over lubrication.</li> <li>6. Excessively large HP tractor.</li> <li>7. Rotors hitting obstructions or uneven ground.</li> <li>8. Ground speed too high or tough grass.</li> <li>9. Blades blunt.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean and correctly adjust clutch.</li> <li>2. Don't turn sharp.</li> <li>3. Hitch correctly as per Operators Manual.</li> <li>4. Run at 540 PTO RPM under load.</li> <li>5. Lubrication as per Operators Manual.</li> <li>6. Match tractor HP to machine.</li> <li>7. Raise rotors as high as possible off ground.</li> <li>8. Slow forward speed.</li> <li>9. Rotate or sharpen blades.</li> </ol>

PROBLEM	POSSIBLE CAUSE	CORRECTION
Excessive Shearpin failure P/N 170543.	<ol style="list-style-type: none"> <li>1. Hitting on obstruction.</li> <li>2. Hitch misalignment.</li> <li>3. Turning too sharp.</li> <li>4. Incorrect rotor timing.</li> <li>5. Using foot throttle particularly while topping.</li> </ol>	<ol style="list-style-type: none"> <li>1. Situation normal - replace shearpin.</li> <li>2. Hitch as per Operators Manual.</li> <li>3. Don't turn sharp.</li> <li>4. Time rotors as per Operators Manual.</li> <li>5. Never use foot throttle. Always use constant 540 PTO RPM underload.</li> </ol>
Excessive Shear Bolt failure P/N 170674.	<ol style="list-style-type: none"> <li>1. Incorrect flotation.</li> <li>2. Hitting an obstruction with left rotor.</li> <li>3. Speed too fast.</li> <li>4. Blunt blades.</li> <li>5. Using foot throttle.</li> </ol>	<ol style="list-style-type: none"> <li>1. Readjust.</li> <li>2. Situation normal, replace shear bolt.</li> <li>3. Reduce ground speed.</li> <li>4. Rotate blades or sharpen.</li> <li>5. Use only constant 540 PTO RPM under load.</li> </ol>
Drive pin breakage P/N 190548.	<ol style="list-style-type: none"> <li>1. Chatter in drive line due to PTO or hitch misalignment.</li> <li>2. Slip clutch seized.</li> <li>3. Hitting an obstruction.</li> <li>4. Using foot throttle on high HP tractor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Hitch as per Operators Manual.</li> <li>2. Clean and free slip clutch. Set to specified torque.</li> <li>3. Situation normal. Replace drive pin.</li> <li>4. Use only constant 540 PTO RPM under load.</li> </ol>
Right side skid bending inwards (possible interference with right side rotor blades).	<ol style="list-style-type: none"> <li>1. Turning in rough country without lifting machine.</li> <li>2. Turning with excessively heavy flotation or skids</li> </ol>	<ol style="list-style-type: none"> <li>1. Lift machine on corners.</li> <li>2. Set to correct flotation.</li> </ol>
Flotation too heavy.	<ol style="list-style-type: none"> <li>1. Torsion bar weakened.</li> <li>2. Creeping of hydraulic tongue jack cylinder.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace torsion bar if no adjustment left.</li> <li>2. Internal leakage of tongue jack cylinder. Dismantle and repair.</li> </ol>

## SERVICING GEARBOXES

### ROTOR GEARBOX REMOVAL FROM MACHINE

- Raise machine as high as possible and fully support platform.
- Remove top cover.

### TO REMOVE ROTOR

- Tie rotors together with piece of chain.
- Loosen 1-1/2" retaining nut all but a few threads.
- Attach puller to rotor with 3-5/16" x 2-1/4" bolts.
- Install puller and pull rotor downwards until it is supported by nut. Remove nut and rotor.

NOTE: Rotor gearboxes can be completely dismantled and serviced in the machine by locating the machine over a pit or ramp. However, a major overhaul is easier with box separated from the machine.

### DISMANTLING ROTOR OR MAIN DRIVE GEARBOX

- Remove gearbox if required.
- Drain oil.
- Remove side plate, input shaft, gear and bearings and dismantle parts as required.
- Remove bearing cups from side plate and gearbox housing only if replacement of housing or bearings is intended.
- Remove pinion end cap and bearing.
- Drive pinion, upper bearing, spacer, etc., down from the top with brass punch or similar aid.
- Remove bearing if required.
- Thoroughly wash all parts and inspect for wear, fractures, etc. Particular attention should be paid to the gear and pinion, bearings and pinion spacer - replace early type spacers with new, improved type 190877 or 190876 spacers.

IMPORTANT

PINION SHAFT AND BEVEL GEARS STAMPED 'H' WERE INTRODUCED ON AND ABOVE SERIAL NO 2144. BELOW SERIAL NO 2144 PINION SHAFT AND BEVEL GEAR WERE STAMPED 'Q' AND ARE NO LONGER SERVICED. 'H' AND 'Q' COMPONENTS SHOULD NOT BE ASSEMBLED TOGETHER.

IN THE EVENT OF INSTALLING REPLACEMENT GEARBOX HOUSINGS, PART NO 170788 (TYPE A) IN LIEU OF 156269 OR 157548 ON MACHNES BELOW SERIAL NO 301. DIFFERENT HOUSINGS MAY BE REQUIRED TO SUIT 3/8 DIAMETER HARDWARE AS EARLY HOUSINGS USE 5/16 HARDWARE.

### NOTES

MODEL 96 ROTARY HAY MOWER  
ROTOR GEARBOX ASSEMBLY, CENTRE & R.H.

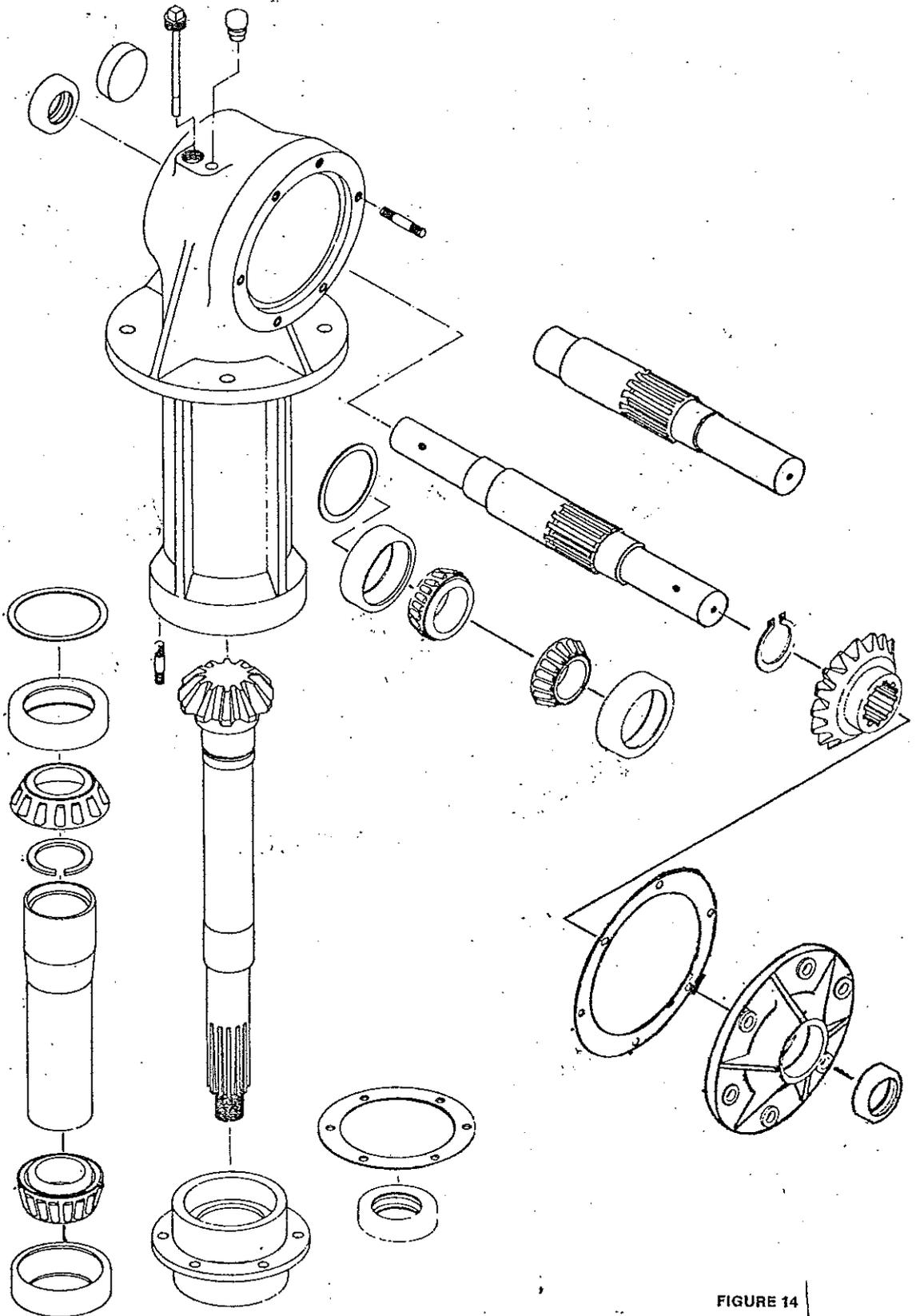


FIGURE 14



## RE-ASSEMBLY OF ROTOR GEARBOXES

- With dial indicator, measure distance inner core of upper bearing cone No 156326 protrudes through bearing cup No 39937. Compare measurement with dimension .077 and calculate the difference. Add differential to number stamped on outer periphery of box, adjacent to centre stud in side plate. Total figure represents the thickness of shims to be installed between the bearing cup and housing. This exercise ensures that pinion penetration will be correct.
- Install the required thickness of shims into housing.
- Install bearing cup and cone onto pinion shaft and secure with circlip.
- Install spacer and lower bearing cone onto pinion shaft. If machined ends of spacer are worn or uneven, replace spacer.
- Install pinion shaft, bearings, circlip, spacer, etc., into housing.
- Drive pinion and bearing cup firmly home against shims with piece of pipe 16" long x 3-3/8" I.D.
- Install lower bearing cup to end cap.
- Install end cap, with new seal, together with sufficient shims to obtain correct bearing pre-load.
- Bearings should be pre-loaded to 16-20 pounds pull when end cap hardware is tightened to 30-40 ft./lbs. with seal in place.

NOTE Seals and bearings should be lightly oiled, not greased, and shaft revolved prior to taking reading.

- If bearing pre-load is incorrect, add or subtract end cap shims as required.

NOTE: On early type gearboxes equipped with 5/16" hardware, tighten to 20 ft./lbs. and shim as required to obtain correct bearing pre-load. With pre-load correct, remove studs, cleanse them of all traces of oil, add loctite to the threads and allow to air for a few minutes. Re-install and re-tighten to 20 ft./lbs.

- Install gear onto input shaft with (0) mark on gear in line with (centre pop) mark on shaft. Seat gear firmly against circlip.
- Install both bearing cones - one up against the gear, the other flush against shoulder of the shaft.

RE-ASSEMBLY OF ROTOR GEARBOXES (continued ....)

- Face marked pinion spline of both boxes towards the left of the machine.

NOTE: Remember that both boxes actually face each other when assembled into machine.

- Install centre input shaft and gear with timing mark facing down towards floor.
- Install right-hand input shaft and gear with timing mark facing upwards.

NOTE: If new input shaft bearings are required, replace cups in housing and side plate but re-install original thickness shims.

- Install side plate complete with original thickness shims and evenly tighten hardware to 30-40 ft./lbs., taking care not to jam gear and pinion in the process.
- Bearing pre-load should now read 35-45 pounds pull total - with seals in place.
- Add or subtract shims under side plate as required to decrease or increase pre-load.
- Check backlash between gear and pinion. Backlash should not exceed .003 or be less than .002 and should be gauged at lip of pinhole in input shaft.
- If backlash is incorrect, remove side plate, together with shaft, gear and bearings.
- Remove bearing cup No 156325 from back of gearbox housing and add or subtract shims as required to adjust gear backlash.
- Adding shims increases backlash - subtracting shims decreases backlash.
- Re-install bearing cup No 156325 firmly into recess against shims.
- Re-install shaft, gear, bearings and side plate into housing, making sure shaft is in the timed position.