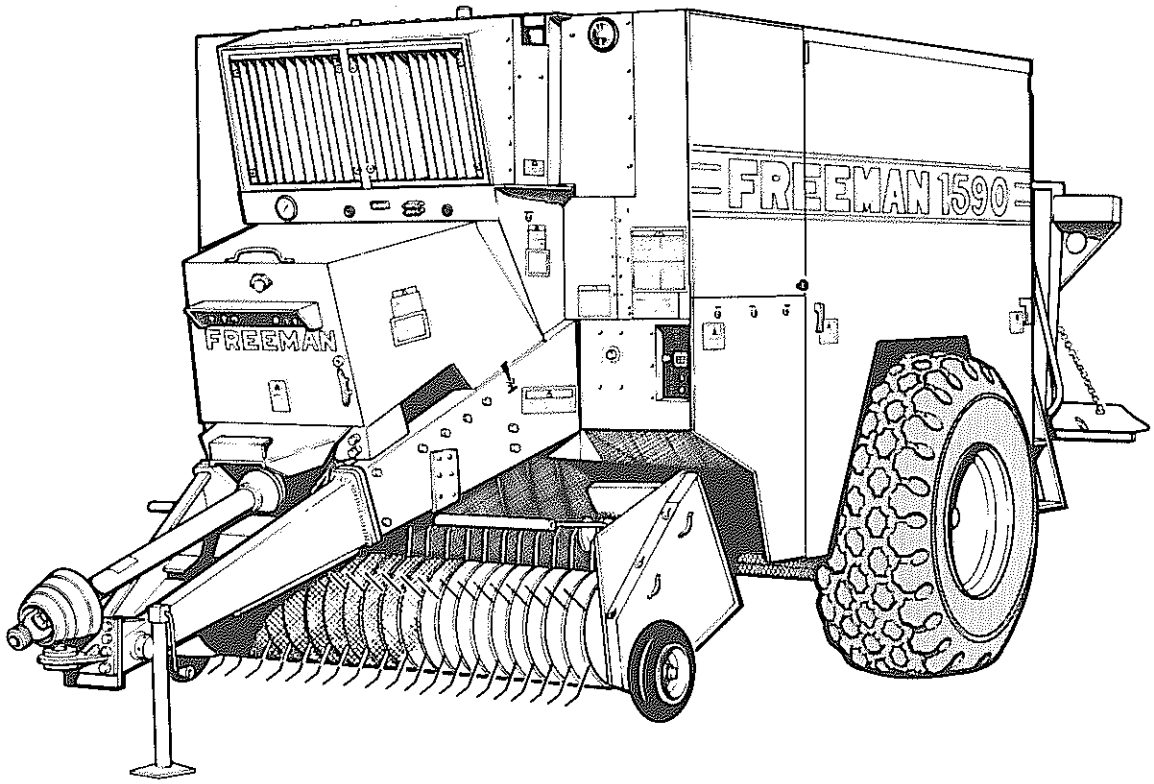
FREEMAN

MODEL 1590 BALER



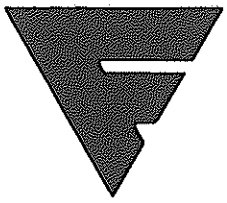
OPERATOR'S MANUAL

manufactured and distributed by

J. A. FREEMAN & SON, INC.

PORTLAND, OREGON

PB 0159000



TO OUR CUSTOMER

Your decision to buy a Freeman 1590 Big Baler was a wise decision. When it comes to harvesting hay, Freeman equipment is a solid investment. Dollar per dollar, ton per ton, Freeman equipment brings down costs and brings up profits. Freeman equipment has satisfied and will continue to satisfy their owners all over the world for years to come.

You will find your baler has come from the drawing boards of superior engineers who take their ideas to the field for testing and revision before you receive them. Superior engineering coupled with professional craftsmanship makes your Freeman Baler the leader in the industry.

At J.A. Freeman & Son, safety is not just a word, it is a rule. Safety to the operator is of great concern to Freeman engineers. Special care has been taken while designing your Freeman Baler to make it as safe and efficient as possible.

We recommend that you carefully read this entire manual before operating your baler. Time spent in becoming fully acquainted with its performance features, adjustments, and maintenance schedules will be repaid in the long and satisfactory life of the product.

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SAFETY

1. KEEP ALL SHIELDS IN PLACE AND IN SERVICEABLE CONDITION.
2. SHUT OFF TRACTOR BEFORE ADJUSTING, LUBRICATING, CLEANING OR SERVICING BALER.
3. KEEP HANDS, FEET, AND CLOTHING AWAY FROM POWER DRIVEN PARTS.
4. USE APPROPRIATE SIGNS OR WARNING LIGHTS WHEN OPERATING ON PUBLIC ROADWAYS.
5. MAKE CERTAIN EVERYONE IS CLEAR OF AND OFF THE BALER BEFORE ENGAGING P.T.O. OR RUNNING BALER.
6. PERIODICALLY CHECK ALL NUTS AND BOLTS FOR TIGHTNESS.
7. ALWAYS USE LIGHTS FOR NIGHT WORK.
8. AT ALL TIMES CARRY A MINIMUM 2A-10B FIRE EXTINGUISHER AND A FOUR GALLON WATER CONTAINER WITH PUMP ON BALER.
9. AVOID WEARING LOOSE CLOTHING WHICH CAN EASILY BE CAUGHT IN MOVING PARTS.
10. AT ALL TIMES KEEP HANDS AND FEET CLEAR OF PICKUP.
11. AT ALL TIMES KEEP THE MANUAL CONTROL CABLE IN A SAFE LOCATION AWAY FROM POWER DRIVEN PARTS.
12. REMEMBER **SAFETY** IS ONLY A WORD UNTIL IT IS PUT INTO PRACTICE.

CAUTION: GENERAL REMINDER OF GOOD SAFETY PRACTICE OR TO DIRECT ATTENTION TO UNSAFE PRACTICE. THE DECAL ON THE BALER WILL HAVE THE COLOR COMBINATION OF YELLOW AND BLACK.

WARNING: DENOTES SPECIFIC POTENTIAL HAZARD. THE DECAL ON THE BALER WILL HAVE THE COLOR COMBINATION OF YELLOW AND BLACK.

DANGER: DENOTES MOST SERIOUS POTENTIAL HAZARD. THE DECAL ON THE BALER WILL HAVE THE COLOR COMBINATION OF RED AND WHITE.

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GENERAL INFORMATION

INTRODUCTION

The purpose of this manual is to assist the operator in maintaining and operating a Freeman 1590 Big Baler. Read it carefully for it provides information and instructions that will help you achieve years of dependable performance.

NOTE: Reference to left-hand and right-hand used throughout the manual refers to the position when seated in the operator's seat facing forward.

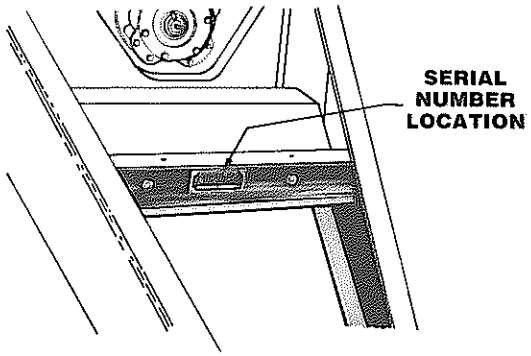
REPLACEMENT PARTS

Only genuine Freeman replacement parts should be used to service the baler. These parts are available from the local Freeman dealer. To ensure prompt, efficient service when ordering parts or requesting repairs, always remember to give the dealer the following information:

1. Correct part description or part number.
2. Model number of the baler.
3. Serial number of the baler.

SERIAL NUMBER LOCATION

The serial number is an important piece of information about the machine and it may be necessary to know it before obtaining the correct replacement part. The serial number is located on the forward front center of the brace between the baler drawbar.



⚠ WARNING: SOME PICTURES AND ILLUSTRATIONS IN THIS OPERATOR'S MANUAL SHOW THE BALER WITHOUT SAFETY SHIELDS TO ALLOW FOR A BETTER VIEW OF THE AREA BEING ADDRESSED. THE BALER SHOULD NEVER BE OPERATED WITH ANY OF THE SAFETY SHIELDS REMOVED.

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SPECIFICATIONS

Overall Length: 24 feet (7.32 m.)

Overall Width: 10 feet (3.05 m.)

Working Height: 117 inches (2.97 m.)

Hauling Height: 112 inches (2.84 m.)

Weight: 21,700 pounds (9863.4 kg.)

Capacity: Up to 40 tons per hour

Bale Chamber: 38 inches High, 46 inches Wide
(96.52 cm. High, 116.84 cm. Wide)

Bale Length: Adjustable

Bale Weight: Up to 1600 pounds (727.27 kg.)

Plunger Speed: 0-16 S.P.M. at 1000 R.P.M. P.T.O. speed
depending upon feed rate.

Plunger Length Stroke: 30 inches (76.2 cm.)

Pickup Width: 80 inches (2.03 m.)

Hitch: Adjustable height

Tires: 23.1 X 26 (12 ply) or 18.4 X 26 (14 ply)

Feeder System: Center Line Flow Through

Drive System: P.T.O./Hydraulic

Tension System: Hydraulic 3-Way Squeeze

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PERIODIC MAINTENANCE AND LUBRICATION

TYPE OF MAINTENANCE OR LUBRICATION	FREQUENCY
Grease PTO Shaft and U-joints (See Walk-Around)	4 hours
Grease overrunning clutch	4 hours
Grease Feed Fork Journals (Crank Throw Bearings) [2]	4 hours
Grease Feed Fork Link Bearings (4)	4 hours
Lubricate Knot Sensor Pivots	4 hours
Check Chain Oilers	8 hours
★ Blow Clean with Compressed Air	Daily
Grease Needle Yoke Pivot Bearings (2)	Daily
Grease Needle Yoke Drive Connecting Rod Ends (2)	Daily
Check Oil Level in Knotter Luber Tank	Daily
Grease Plunger Rollers	Daily
★★ Grease Main Pump Drive Coupler	80 hours
Grease Bearings on Upper (Fly Wheel) Drive Shaft (2)	80 hours
★★★ Check Belts	80 hours
Grease Bearings on Lower (Primary) Drive Shaft (2)	80 hours
Knotter Brake Adjustment	500 hours
Feed Fork Journals (3)	Annually
Change Main Charge Pump Filter	Annually
Grease Needle Yoke Crank Shaft Bearings (3)	Annually
Grease Feed Fork Crank Main Bearings (2)	Annually
Grease Knotter Shaft Bearings (2)	Annually
Repack Wheel Bearings	Annually
Change System Oil	Annually
Change Oil Tank Filter or as indicated by filter condition indicator	Annually

SPECIFIC OILS AND GREASES

Main System Hydraulics: Standard Oil Co. AW46 Hydraulic or equivalent
Grease Zerks: Multi-purpose grease
Automatic Knotter Luber: SAE 80 GL5 gear oil
Coupling: Special grease

★ Do not steam clean for it can cause problems if contact points are contaminated with moisture.
★★ How to grease coupler on page 34.
★★★ Check new belts after first 8 hours of operation.

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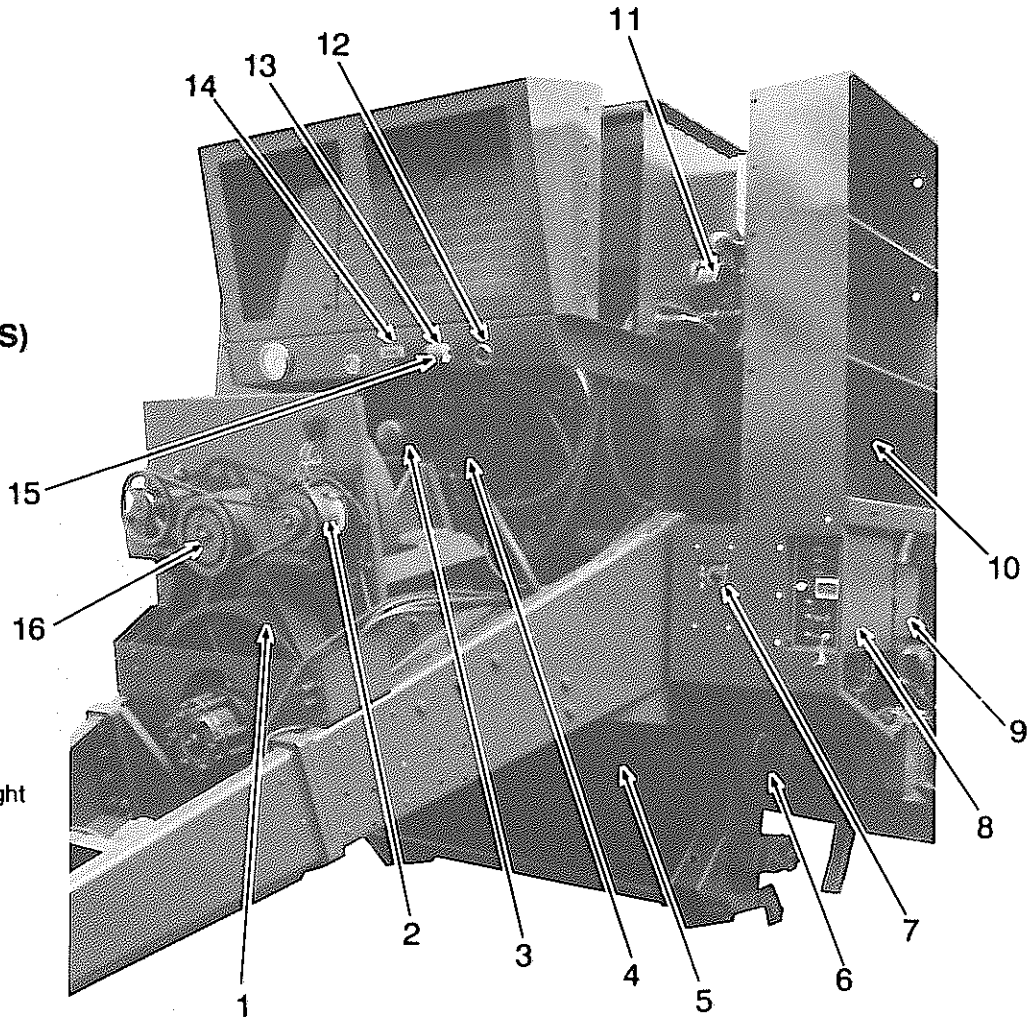
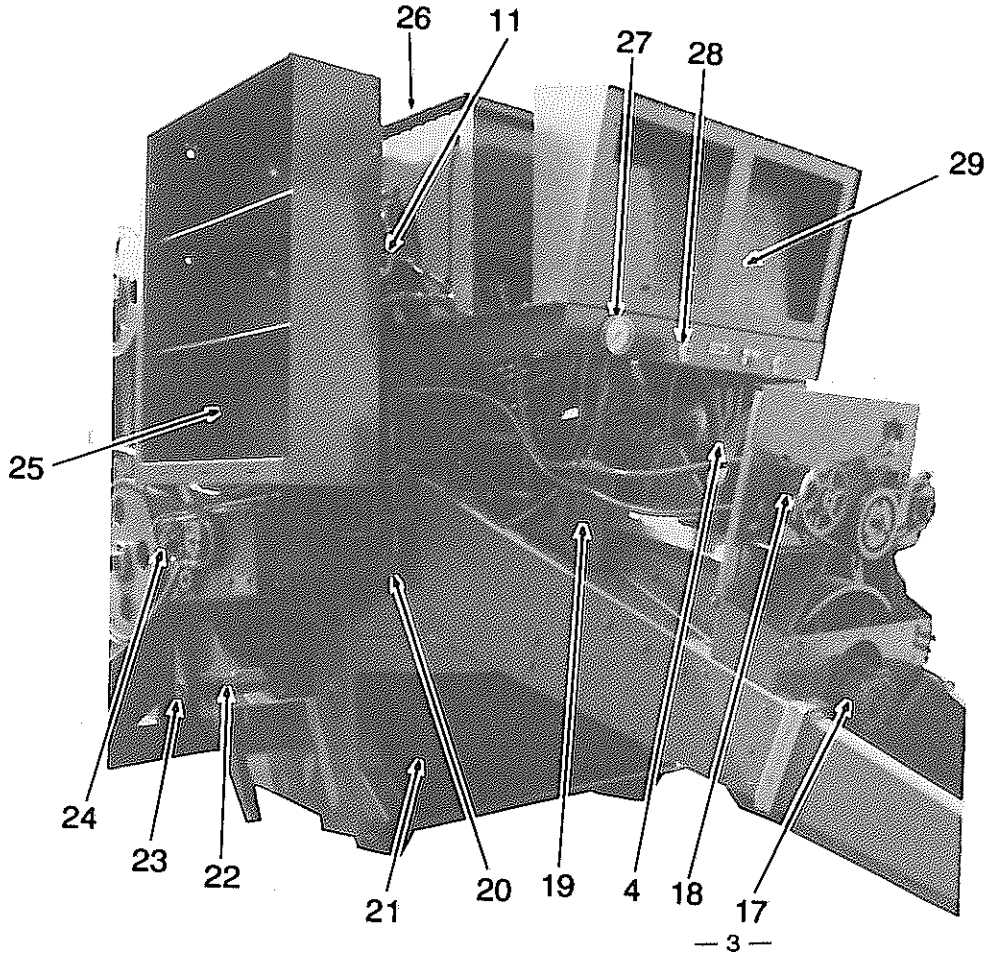
L-SIDE FRONT
WALK-AROUND (CALL-OUTS)

1. lower drive sheave
2. alternator
3. Sunstrand charge pump filter
4. Sunstrand pump series 90
5. infeed chute guards
6. feeder sprocket
7. tension control knob
8. main control box
9. fan control box
10. left-side twine box
11. oil tank filter
12. oil temperature gauge
13. low oil warning light
14. filter indicator
15. high temperature/low oil shut down light
16. upper drive sheave





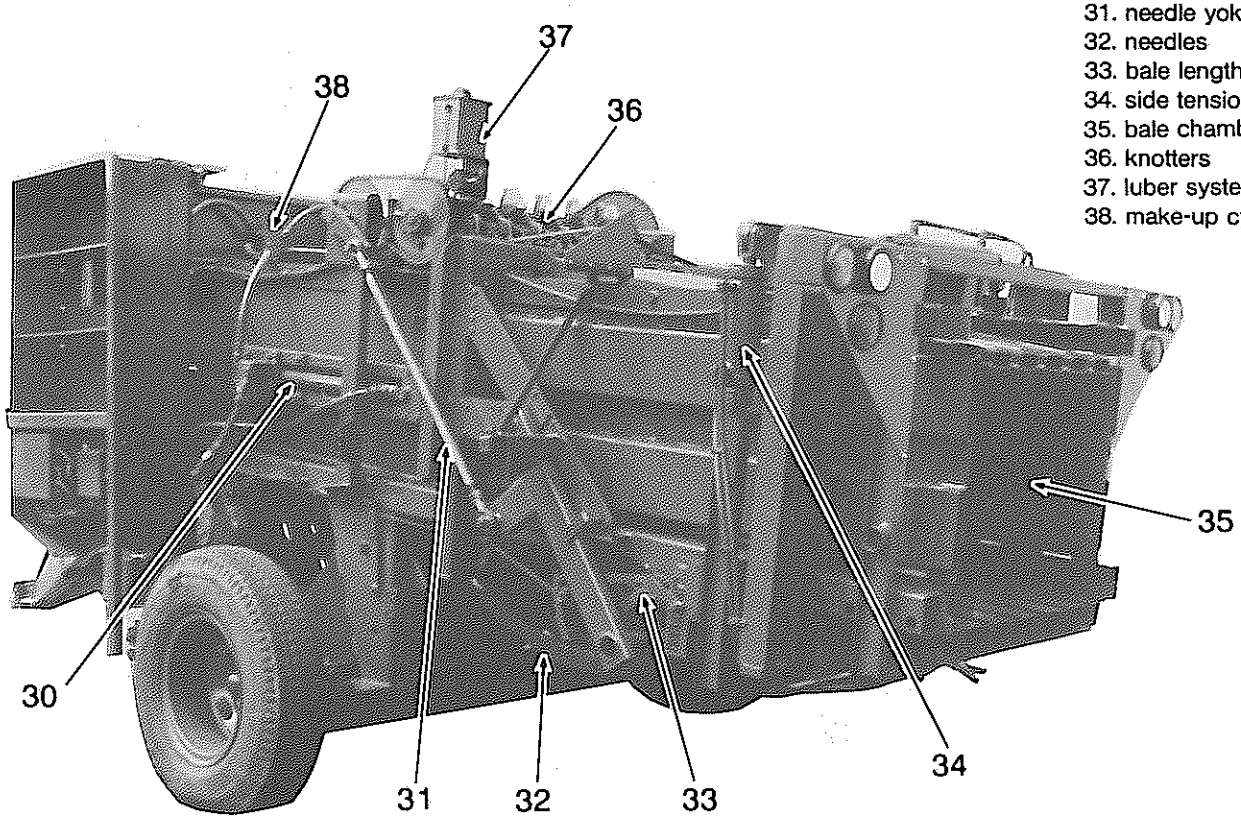
R-SIDE FRONT
WALK-AROUND (CALL-OUTS)

17. P.T.O. driveline clutch
18. tension pump
19. accumulator
20. tension control
21. infeed chute
22. feed fork tine assembly
23. feed fork crank arm
24. feed fork drive luber system
25. right-side twine box
26. oil tank
27. bale tension/plunger pressure gauge
28. voltage gauge
29. oil cooler

WALK-AROUND

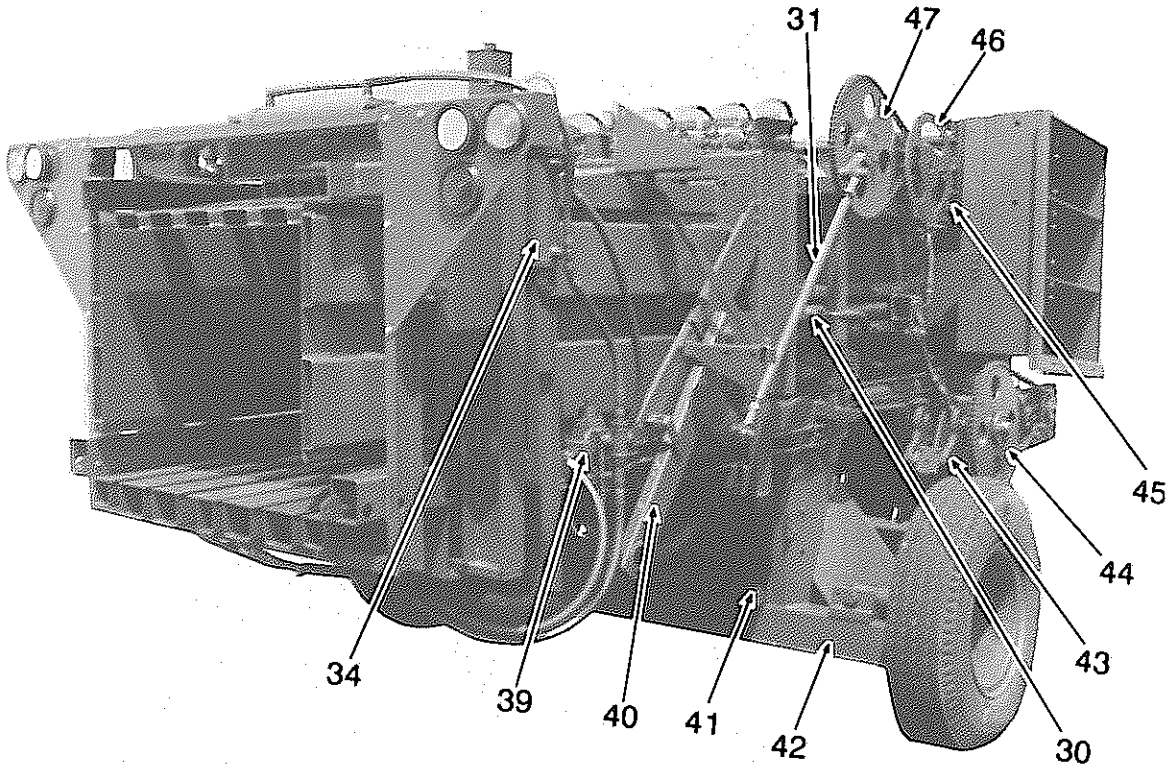
L-SIDE REAR
WALK-AROUND (CALL-OUTS)

30. make-up cylinder
31. needle yoke drive rod
32. needles
33. bale length adjustment bar
34. side tension cylinders
35. bale chamber
36. knotters
37. luber system tank
38. make-up cylinder check valve

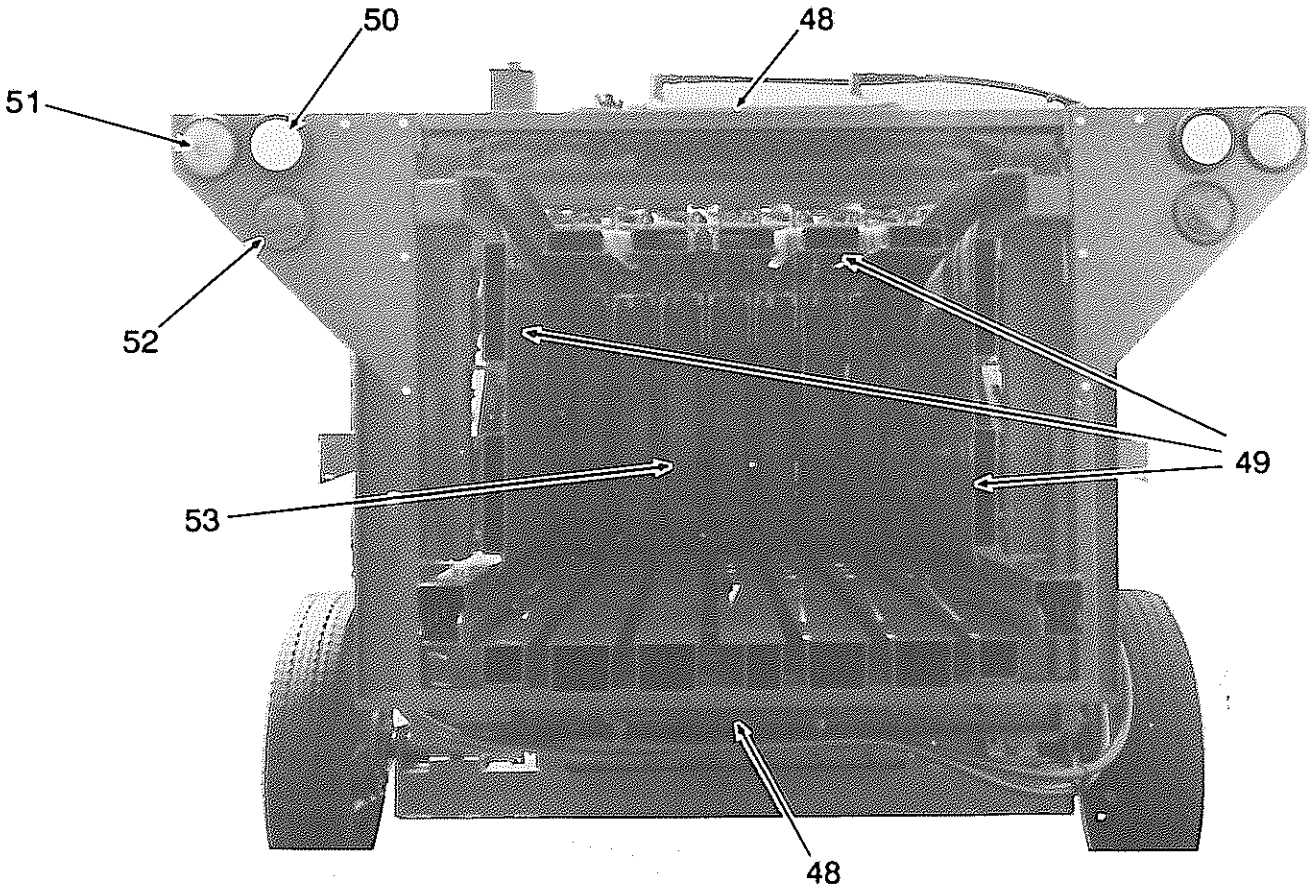


R-SIDE REAR
WALK-AROUND (CALL-OUTS)

39. tension unloader valve
40. needle yoke
41. twine tensioner
42. axle
43. feed fork crank shaft
44. feed fork drive sprocket
45. knotter/feeder manifold
46. knotter brake
47. needle yoke drive sprocket



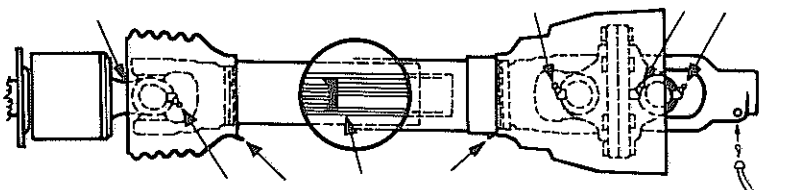
WALK-AROUND



REAR VIEW

WALK-AROUND (CALL-OUTS)

48. upper/lower tension cylinders
49. tension rails
50. halogen light
51. warning light
52. stop light
53. plunger



P.T.O. SHAFT & U-JOINTS

LUBRICATION POINTS

GENERAL OVERVIEW OF THE FREEMAN 1590 BALER

The 1590 is a high-density mechanical hay baler operated by an electrically controlled hydraulic system. The function of the baler is to bale hay or straw. A group of subfunctions work in logical order to complete this baling process.

Subfunction 1.

Hay is gathered by the continuously rotating pickup and delivered to the feeder.

Subfunction 2.

Hay is taken by the continuously operating feeder and delivered to the feed fork.

Subfunction 3.

Hay is taken intermittently by the feed fork through the infeed chute to the main chamber.

Subfunction 4.

The hay, when forced to the top of the main chamber, activates the charge sensor. When the sensors are activated the feed fork momentarily stops at the top of the infeed chute. The plunger is then activated compressing the hay behind the hay dogs clearing the feed opening for more hay.

While a complete plunger stroke takes roughly 3 seconds, the feed fork is stopped for roughly 2 seconds. The feed fork leaves its rest position before the plunger gets back to the home position. Thus, there is no compaction of hay in the infeed chute.

Subfunction 5.

While the baler is operating, bale tension is automatically maintained by the self-regulating tension control system which is controlled by the main plunger pressure and the tension control solenoid valve.

Subfunction 6.

The remaining major subfunction of the 1590 baler is the tying process of the knotters. While subfunctions 1,2,3,4,5 are occurring, the knotters are idle until the bale reaches its adjustable preset length. At this time the Knotter Trip Switch (LS-11) is activated with the plunger fully extended. The plunger then retracts a short distance and stops, signalling the knotters to tie. When the knotters reach the midpoint of their cycle, the plunger returns to its home position. The travel of the needles is time with the travel of the plunger to avoid needle breakage.

PREPARATION

Attaching Baler to Tractor

1. Before attaching the baler to the tractor make sure the baler is securely resting on a level place. The baler must be powered by a tractor with a minimum of 140 Horsepower with a 1000 R.P.M. P.T.O. **NOTE:** Adverse conditions, such as soft ground and hilly terrain, may require greater horsepower for maximum performance.

2. The front drawbar hitch on the baler is adjustable depending on the height of your tractor drawbar. The drawbar hitch can be adjusted up or down or turned over 180 degrees, see **Fig.1**, to achieve the proper adjustment. Avoid serious equipment damage by following the S.A.E. Standards in **Fig.2** and **Table 2.** Different dimensions are required depending on the size of tractor P.T.O. shaft to be used.

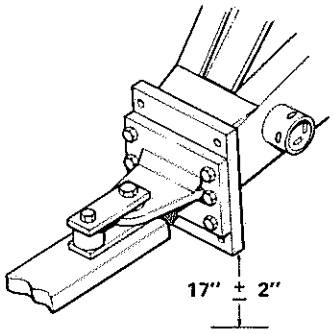


Fig. 1

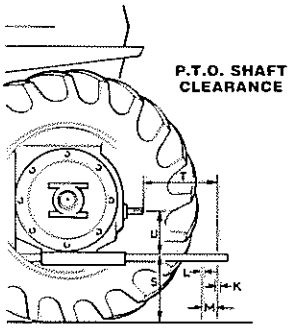


Fig. 2

3. When hitching the baler to the tractor, follow the illustration in **Fig.1**. The distance from the bottom of the baler hitch mount to the ground should be 17 inches with a 2-inch tolerance. Ensure all fasteners are tightened in their proper position.

DIMENSIONS ASSOCIATED WITH TRACTOR DRAWBAR AND POWER TAKE-OFF

	1⅜" Diameter	1¾" Diameter
K – Hitch pin hole diameter	13/16"	15/16"
L – Auxiliary hole diameter	11/16"	11/16"
M – Auxiliary hole spacing	4"	4"
S – Height of drawbar with popular sized tire:		
Min.	13"	13"
Max.	22"	22"
T – End of P.T.O. shaft to center of hitch pin hole	16"	20"
U – Top of drawbar to P.T.O. centerline		
Preferred	8"	10"
Min.	6"	8"
Max.	12"	12"

Table 2.

4. Connect the baler pickup lift hydraulic lines to the tractor remote hydraulic ports. Be certain connecting ends are free of foreign matter.

5. Connect the 7-wire trailer cable from baler to the S.A.E. socket on the tractor.

6. Route the STOP/REVERSE control rope and fasten it to a position accessible for the operator during operation.

7a. On a level surface, pull the baler and turn the tractor left or right until the rear wheel of the tractor is touching or nearly touching the baler drawbar. Attach the baler P.T.O. drive line to the tractor P.T.O. shaft. Ensure the drive line does not bind or interfere with the baler hitch.

7b. Disconnect the baler P.T.O. drive line and drive the tractor forward until the baler is straight behind the tractor. Reattach the baler P.T.O. drive line to the tractor P.T.O. shaft. Ensure the drive line does not interfere with the baler hitch.

NOTE: If the P.T.O. drive line binds or interferes with the baler hitch in steps 7a or 7b, consult your authorized Freeman Service Representative.

Attaching A New Baler

When attaching a baler to the tractor for the first time, be sure to check the following areas:

1. Ensure the wheel nuts are torqued to 320 foot-pounds with the threads and face of nut lubricated with the grease specified for pump coupling, page 34. After the nuts have been torqued, tow baler ½ mile and recheck the nuts for proper torque.

2. Inflate 12 ply tires (23.1 X 26) to a maximum of 22 p.s.i.

CAUTION: Do not overinflate the tires.

Twine Installation And Threading

1. Load 18 boxes of twine into the twine boxes, (9 on each side). **NOTE:** We suggest using Bridon SR-300 Polypropylene baler twine or equivalent.

2. Route twine through the three guides (located top, center, and bottom) on the rear of the twine box, see **(A), Fig. 3.**

3. Route twine through the guides near the middle of the chamber, **(B)**; and, through the guides mounted forward of the baler tires near the bottom of the chamber, **(C)**; then, through the guides just above the baler axle, **(D)**; see **Fig. 3.**

4. Route twine through the guides located near the twine tensioners, **(E)**; proceed, pulling the twine through the twine tensioners, see **Fig. 4.** **(NOTE:** A button hook is useful to pull twine through the twine tensioners.

5. Thread the twine through the needle rollers, **(F)**, located 22 inches from the tip of the needles; then through the needle eyes, **(G)**, located at the tip of the needles.

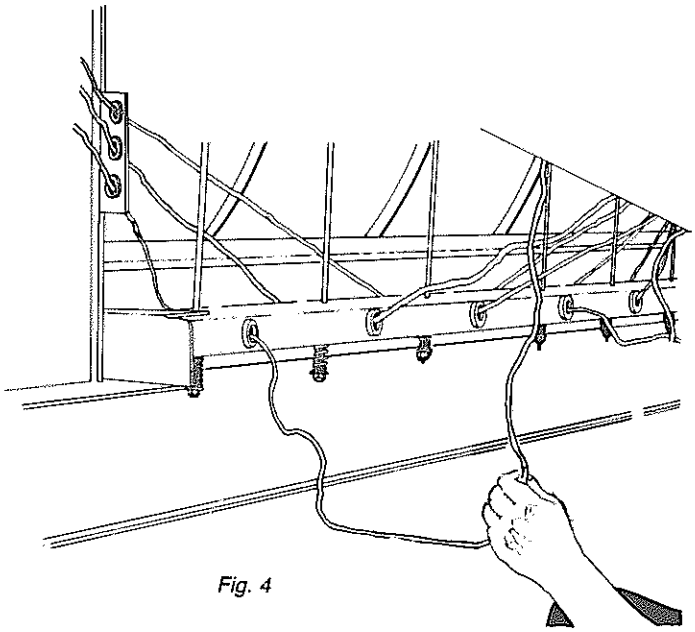


Fig. 4

6. Tie each twine to the cross member located above the twine tensioners on the bottom of the chamber, **(H)**. Each twine should be individually tied directly above the twine tensioner through which it is threaded.

7. Once the needles have cycled and the knotters are loaded with twine, remove the twine ends from the cross member, **(H)**; then, manually pull the knot sensor fingers, located on top of the chamber underneath the knotters, see **Fig. 13.**

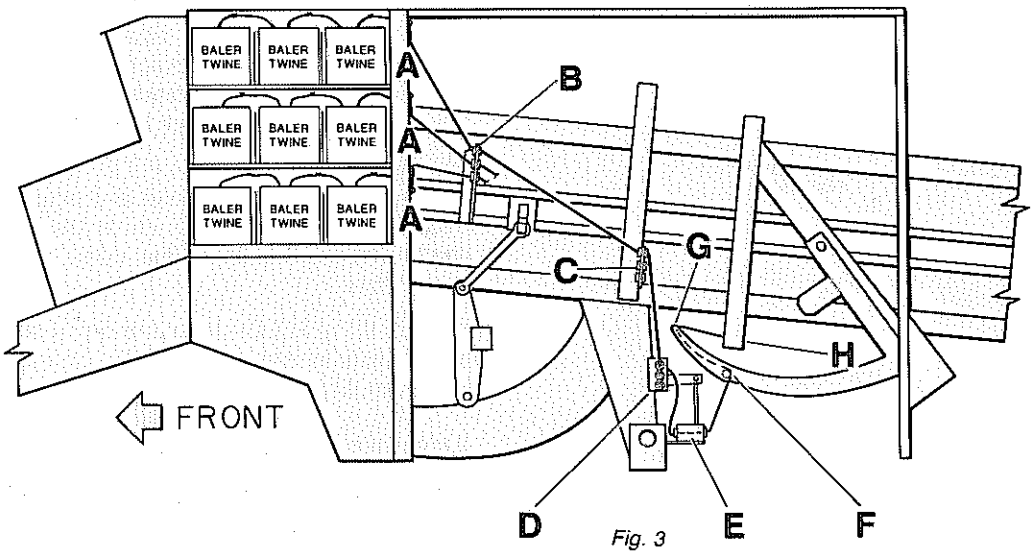


Fig. 3

OPERATION

Field Start-Up Procedure

With the baler properly attached to the tractor, proceed with the following steps:

1. Before operating baler, make certain the hydraulic oil tank is filled with Chevron AW 46 hydraulic oil or equivalent. The filter cap on top of the tank maintains 10 p.s.i. on the system. Do not replace the cap with anything else. The oil level can be determined by the sight/temperature gauge on the front of the hydraulic oil tank, see **Fig. 49.** Appearance of the oil in the sight gauge should be clear, not cloudy or dirty. Coloring agents used by oil manufacturers vary from light brown to purple.

2. Ensure the Knotter Luber Oil Tank is filled with SAE 80 GL5 gear oil.

3. Lower the pickup to the baling position and make sure the pickup fingers do not dig into the ground while operating. Adjust the maximum pickup depth with the depth stop, see **Fig. 5.**

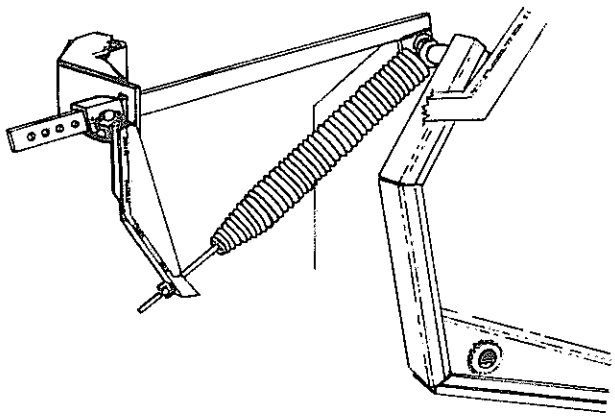


Fig. 5

4. Ensure the knotters are properly threaded with Bridon SR-300 Polypropylene baler twine or equivalent and that the twine boxes are full. See Twine Threading, page 8.

5. With the tractor R.P.M. at low speed and with Baler Power Switch "OFF", gently engage the tractor P.T.O. Slowly increase the tractor to 500 P.T.O. R.P.M.

6. Be sure the needle yoke is in home position and if not, return it to home position with the manual control. See Manual Control. **NOTE:** DO NOT EXCEED 500 P.T.O. R.P.M. SPEED WHEN OPERATING THE NEEDLE YOKE WITH THE MANUAL CONTROL.

7. Turn the Baler Power Switch to the "ON" position and set the Control Mode Switch to the "AUTO" position.

8. Ensure that the toggle switch (**C**) next to the Tension Adjustment knob, see **Fig. 6**, is switched to the number two position. **NOTE:** If the baler is equipped with the optional remote box for the tractor cab, then toggle switch (**C**) should be switched to the number one position.

Baler Operating Speeds

When starting the baler, run it at or below 500 P.T.O. R.P.M. speed until the oil temperature reaches a minimum of 32 degrees Fahrenheit (0 degrees Celsius).

The baler should be run at 1000 P.T.O. R.P.M. speed while baling. The ground travel speed should be regulated according to ground conditions and windrow volume of hay.

The windrow volume of hay going into the baler should be regulated according to the work load on the feed system. If the hay is fed at too high a rate, the pickup and feeder will stall.

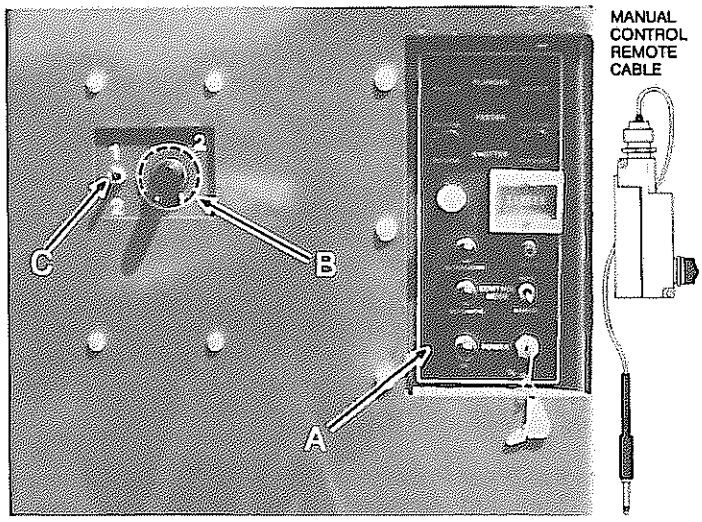
NOTE: If operating in temperatures below 10 degrees Fahrenheit (—12 degrees Celsius), consult the Freeman factory for oil recommendations.

Manual Control

The 1590 Big Baler is equipped with a Manual Control System, see **Fig. 6.** This allows the operator to operate the Knotters, Plunger, and Feed Fork independently. This feature is to be used when making adjustments or servicing the baler.

To operate the Manual Control, set the Control Mode switch, see **Fig. 6**, down to the manual position. Plug in the remote cable into one of the six sockets depending on which operation is required. There are two sockets for each of the three components, one for each direction of travel.

Once the manual control remote cable is in the proper socket, the component is activated by depressing the button on the manual control operator.



⚠ **CAUTION:** When using the manual control operator, first clear the area of all personnel and check for safe operation before activating component.

NOTE: Do not exceed 500 R.P.M. P.T.O. speed when using the manual control to operate the feed fork and knotter.

NOTE: The knotter will not run with the plunger fully extended.

⚠ **CAUTION:** WHEN THE KNOTTERS ARE ACTIVATED THE NEEDLES WILL OPERATE DUE TO THE FAST TRAVEL OF THE NEEDLES, STAY CLEAR OF THE MOVING PARTS.

Stop/Reverse Control Rope

The baler is equipped with a Stop/Reverse Control Rope (**A**) which is attached to a three-way valve (**B**), see **Fig. 7.** Its function is to reverse the pickup and feeder systems and operates as follows:

With Rope in the Relaxed Position: The pickup and Feeder will operate in the normal baling mode.

With The Rope Pulled Half Way: The pickup and Feeder will stop.

With The Rope Pulled Full Distance: The feeder will reverse while the pickup remains stopped.

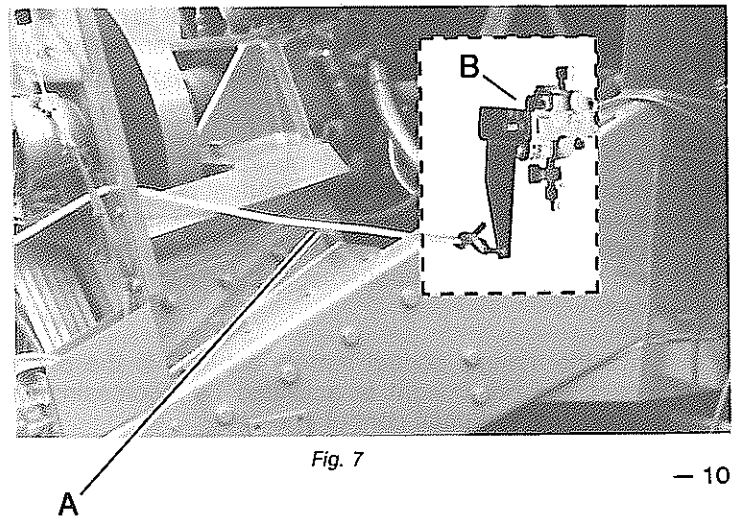


Fig. 7

Unplugging The Feed System

Unplugging The Feeder

If the feeder should become plugged, pull the stop/reverse control rope the full distance to reverse the feeder. This allows the hay or foreign material to escape from the baler. It may take two or three cycles of this process to unplug the feeder.

Once the excess hay or foreign material is cleared out of the feeder area, continue to operate the baler at a slower ground travel speed and have foreign material cleared from the path of the baler.

Unplugging The Feed Fork

If the Feed Fork should become plugged, ensure the needle yoke is in the home position (bottom dead center) and LS-1 is activated as described in LS-1 adjustment, page 20. When unplugging the feed fork with needles in the home position, do the following:

1. Set the Control Mode Switch to Manual.
2. Use the manual control to fully extend the plunger in order to clear the infeed section of the chamber area.
3. Set the Control Mode Switch back to Automatic.
4. Repeat if necessary.
5. After unplugging the feed fork of excess hay or foreign material, operate the baler at a slower ground travel speed.

If the needle yoke is away from home position, use the remote control and return it to its home position. Then follow the aforementioned procedure.

Tension Control

The self-regulating Tension Control System is controlled by the main plunger pressure and the tension control solenoid valve. Bale tension is determined by plunger pressure which in turn is controlled by the amount of restriction created by the tension control system as the hay moves through the bale chamber.

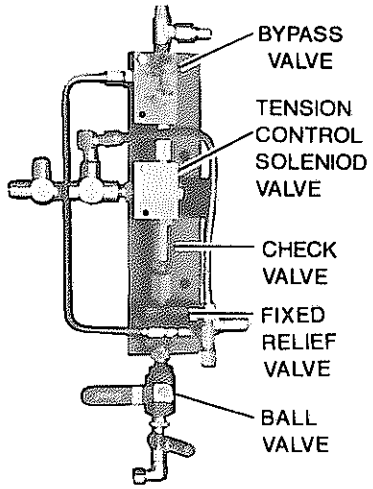


Fig. 8

The function of the Tension Control Solenoid Valve is to automatically apply hydraulic pressure to the tension control system. Only when the plunger advances is the tension control solenoid valve de-energized, pressurizing the tension control system. At all other times the tension control solenoid valve is energized allowing the tension control pump to feed oil back to the reservoir while a check valve holds the tension control system at the pressure attained during the previous plunger advance stroke.

Example: Assume tension system is adjusted to produce a plunger pressure of 3,500 p.s.i., see Bale Tension Adjustment section for adjustment procedure. As the plunger pressure reaches 3,500 p.s.i. on a compression stroke, the tension pressure is automatically regulated to keep the plunger pressure at or near 3,500 p.s.i.

NOTE: The maximum tension system pressure is fixed at 2,150 p.s.i. and CANNOT be adjusted.

Bale Tension Adjustment

The Bale Tension is regulated by the the Tension Unloader Valve located on the right rear side of the baler, see **Fig. 9.** This valve is controlled by an electrical relief valve and the Tension Adjustment knob.

The Tension Adjustment Knob (**B**), located right of the control panel (**A**) on the forward side of the baler see **Fig. 6,** is used to adjust the plunger pressure and the bale tension. To increase the plunger pressure turn the Adjustment Knob clockwise, to decrease the plunger pressure turn the Adjustment Knob counter-clockwise. **NOTE:** Any adjustment cannot be detected until the baler has put out four bales of hay after the adjustment has been made. The Tension Adjustment Knob will adjust plunger pressure from 2500 to 5000 p.s.i.. The peak plunger pressure range should be between 3200 and 4000 p.s.i. depending n the condition of the hay. **NOTE:** The plunger pressure is initially adjusted at the factory at 2500 p.s.i.

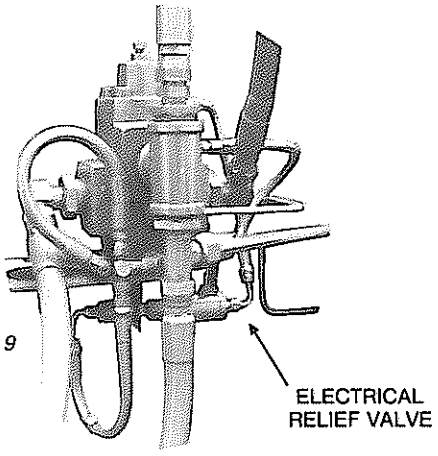


Fig. 9

Bale tension pressure is shown on the plunger pressure gauge located front right side of the baler, see **Fig. 59,** bottom of the oil cooler. The actual pressure reading is the momentary pressure peak when the plunger is on a compression stroke while baling. **NOTE:** Several plunger strokes may be necessary to normalize the pressure setting.

Bale Length Adjustment

The Bale Length Adjustment, see **Fig. 10,** is located on the left rear side of the baler. To change the length of the bale, pull the locking pin, (**A**), out and move the bar, (**B**), either down to make the bale shorter or up to lengthen the bale. **NOTE:** Each slot represents approximately 1⅝" change in bale length.

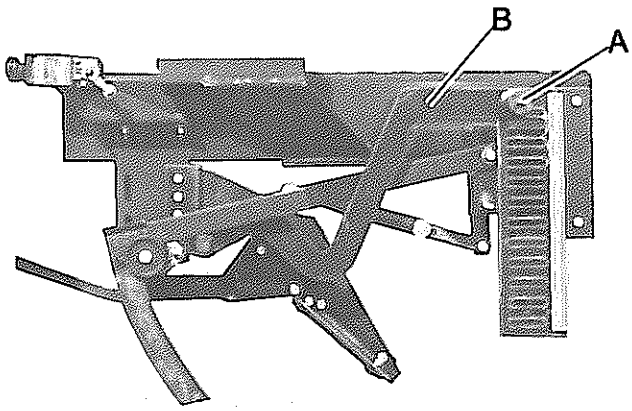


Fig. 10

Cleaning Material From Bale Chamber

For ease of cleaning baled material from the chamber, follow the steps below:

1. Turn the ball valve to the "CLOSED" position, see **Fig. 11**; see also Walk-Around.

2. Operate the baler for the length of time it takes to produce one soft, light bale that is easy to remove from the bale chamber.

3. Clean out the bale chamber.

4. After cleaning bale chamber, turn the ball valve to the "OPEN" position, see **Fig. 11. NOTE:** Failure to do so will result in lack of tension pressure.

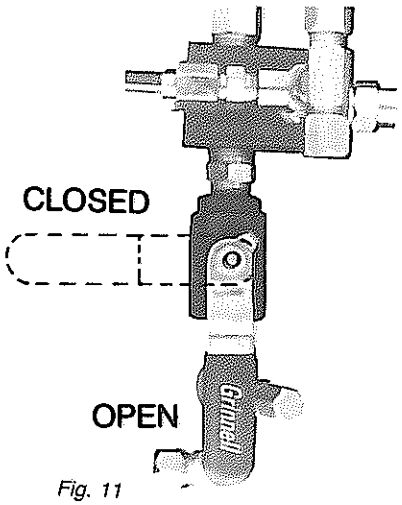


Fig. 11

Knot Sensor Operation

The knot sensor alerts the operator of a mistie on any of the six knotters.

While the knotter is cycling, the twine finger sets the knot sensors and the knot sensor indicators will light. After a knotter has completed its tying cycle, the bale advances two or three plunger strokes and a properly tied knot will pull the sensor finger causing the indicator lights located on front of the baler, see **Fig. 12**, to go off.

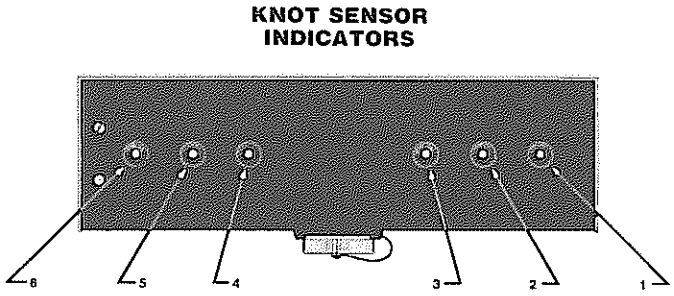


Fig. 12

In the event of a mistie, the appropriate indicator will remain lit. To turn off the indicator light, manually pull the knot sensor finger rearward, see **Fig. 13.**

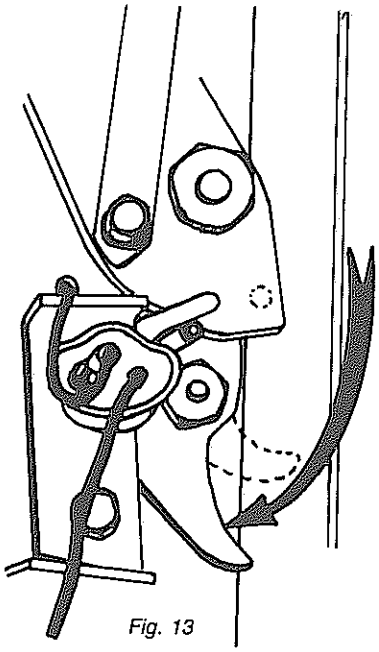


Fig. 13

NOTE: The knot sensor finger must be manually pulled rearward if a knot has been mistied and/or new twine is being installed or rethreaded through the system or if starting with an empty bale chamber.

Knotter Timing Adjustment

NOTE: Knotters are viewed from the left side to the right side of the baler.

Timing Knotters

1. Use the manual control to advance the knotter until the head of the needle yoke drive rod bolt is centered on the rear edge of the shaft support bracket, see **Fig. 14.**

2. Loosen and disconnect the knotter shaft drive chain.

3. Use a prybar to advance the knotter in order to align the timing pointer located on the sprocket with the timing mark as illustrated in **Fig. 15.**

4. Reinstall the knotter shaft drive chain located on the left side of the baler so that after properly tensioned the timing mark will be within the flat on the end of the timing pointer, see **Fig. 15.**

5. Use the manual control to return needles to home position.

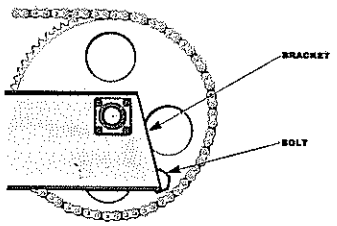


Fig. 14

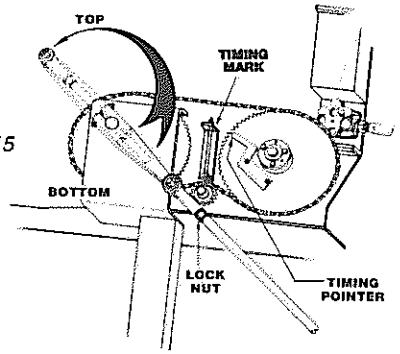


Fig. 15

Twine Needle Adjustment

1. Clear the bale chamber of all baling material. Use the manual control to jog the needles up through the bale chamber until the needle eye is next to the knotter frame, see **Fig. 16. NOTE:** Check to see that the base of needles are centered with the bottom chamber needle slots. Adjustment is done by sliding the needle brackets on the needle anchors on the needle yoke.

2. With the needle eye next to the knotter frame, the needles should be adjusted left or right so that there is 0 to 1/32 inch clearance between the knotter frame and the side of the needle. To adjust the needles can be moved left or right 1/16 inch by moving the needle at the needle yoke anchors. **NOTE:** DO NOT MOVE THE BASE OF THE NEEDLE MORE THAN 1/16 INCH IN EITHER DIRECTION FROM THE BOTTOM NEEDLE SLOT CENTER. If additional adjustment is needed, retract the needles far enough so that they clear the inside of the top needle slots of the bale chamber and pry them left or right with a long leverage bar.

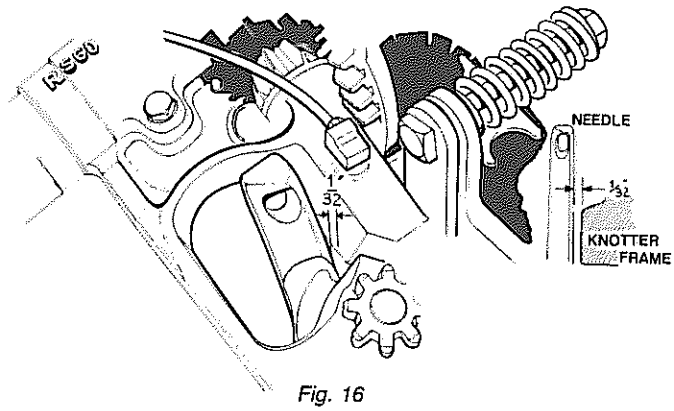


Fig. 16

3. With the needle eye directly over the twine disc, the needles should clear the twine disc by 1/8 inch, see **Fig. 17.**

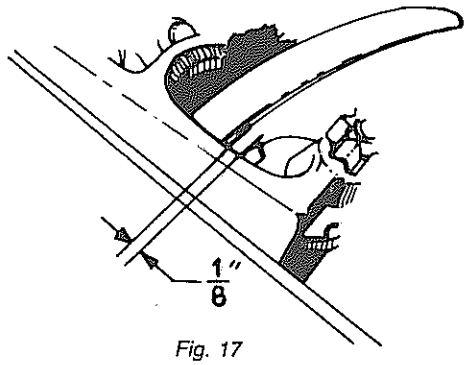


Fig. 17

To increase the distance between the needle and the twine disc, loosen the upper and tighten the lower needle anchor bolts on the needle yoke, see **Fig. 18.** To decrease the clearance, reverse the procedure.

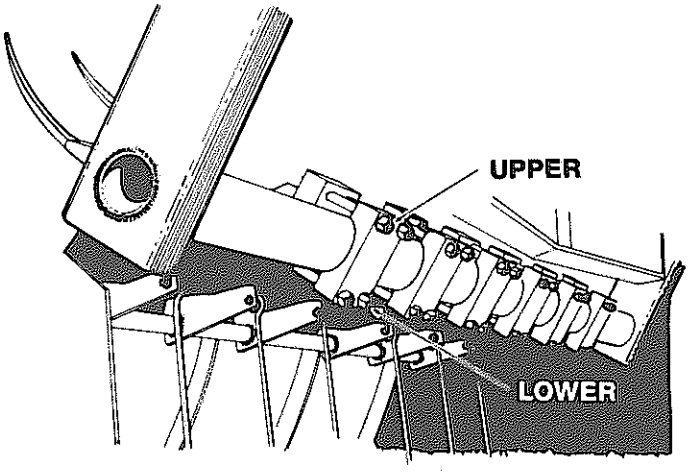


Fig. 18

4. Use the manual control to advance the needles to the uppermost position. The distance from the bottom of the needle eye to the twine disc should be 4½ inches, see **Fig. 19.**

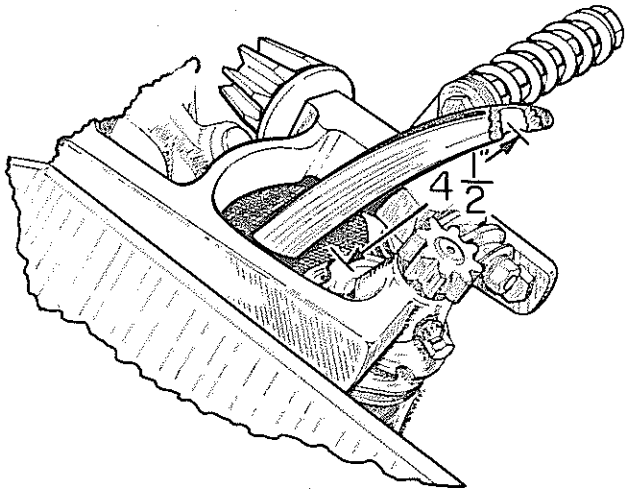


Fig. 19

5. Adjust the needle height by loosening the lock nuts on the needle yoke drive rods, see **Fig. 20.** Turn the rods to the right or left for the desired setting. Be sure both are adjusted for equal load at top dead center.

6. Check the twine finger adjustment after adjusting needles.

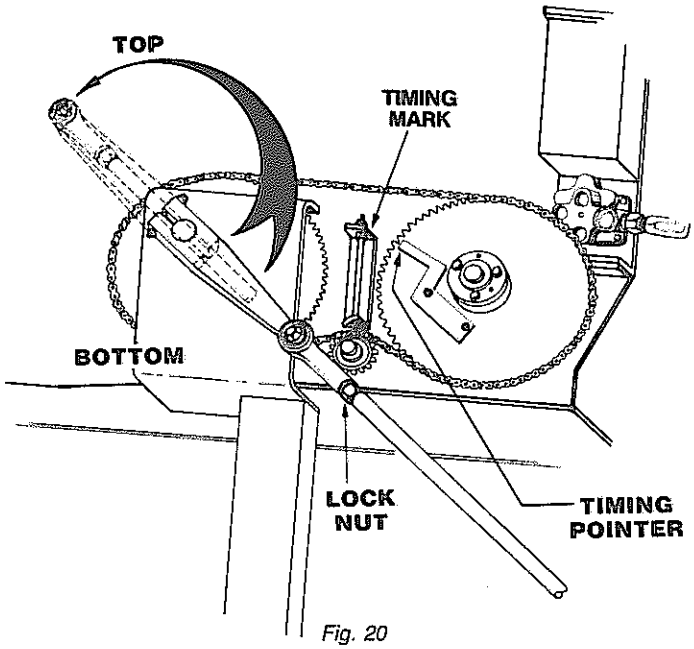


Fig. 20

Twine Finger Adjustment

The twine finger guides the twine into the twine holder and bill hook.

1. Use the manual control to advance the knotter until the point of the twine finger is just passing the inside edge of the needle. The point of the twine finger should clear the needle 3/16 inch, see **Fig. 21.**

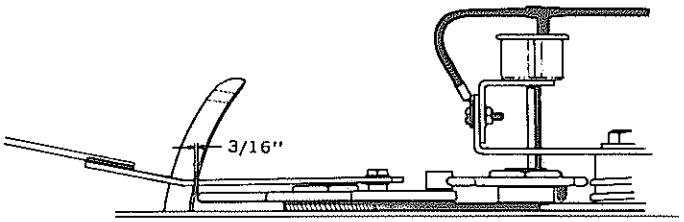


Fig. 21

This adjustment is made by loosening the twine finger anchor bolt (**A**) and knot sensor finger pivot bolt (**B**) and sliding them to the front or back of the slotted holes in the bale chamber top, see **Fig. 22.**

2. Use the manual control to advance the knotter until the twine fingers reach the most rearward point of travel.

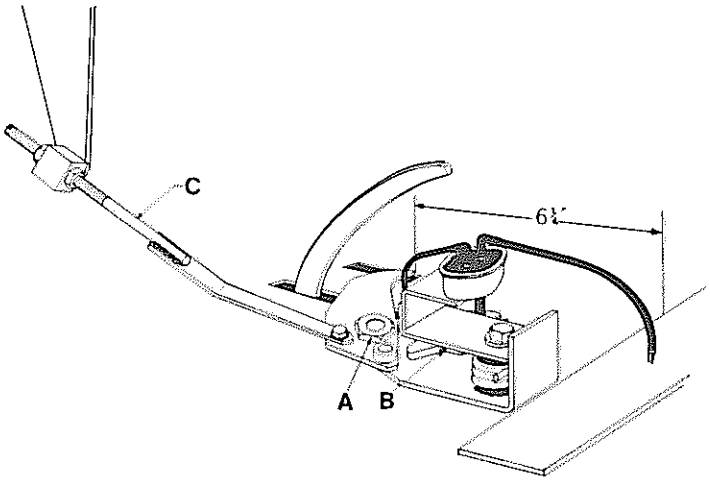


Fig. 22

Measure the distance from the tip of the twine fingers back to the chamber brace behind the knotter, see **Fig. 22.** This measurement should be 6½ inches. Adjustment i s made by lengthening or shortening the twine finger drive rods, see (**C**), **Fig. 22.**

After adjusting the twine fingers, use the manual control to advance the knotter until the twine fingers are in their rest position. Check to see that there is a minimum distance of 1/16 inch from the tips of the twine fingers to the edge of the needle slots, see **Fig. 23.** Before measuring, push twine finger toward needle slot and make certain to consider any slack in the system.

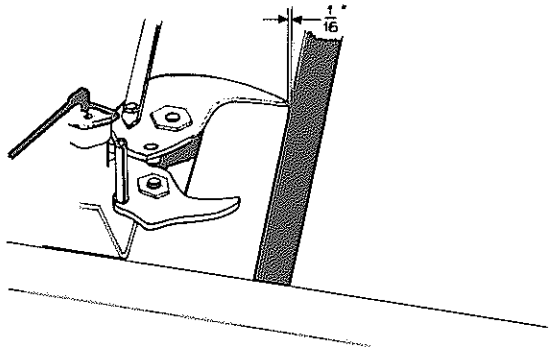


Fig. 23

4. Adjust the position of the twine fingers at the needle slots with the return stop bolts on each twine finger drive shaft, see **Fig.24.** Remember to adjust both sides.

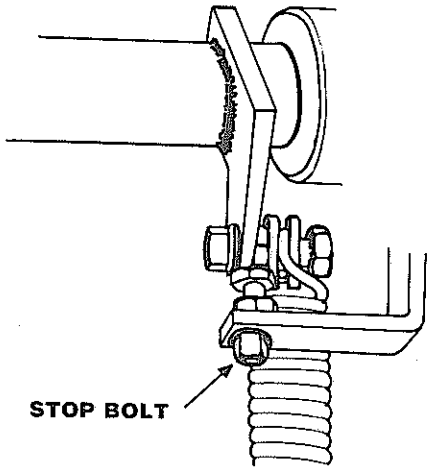


Fig. 24

Twine Holder Adjustment

The twine holder holds the twine in the twine disc while the bale is being made and tied. The pressure is regulated by bolt (**A**), see **Fig. 25.**

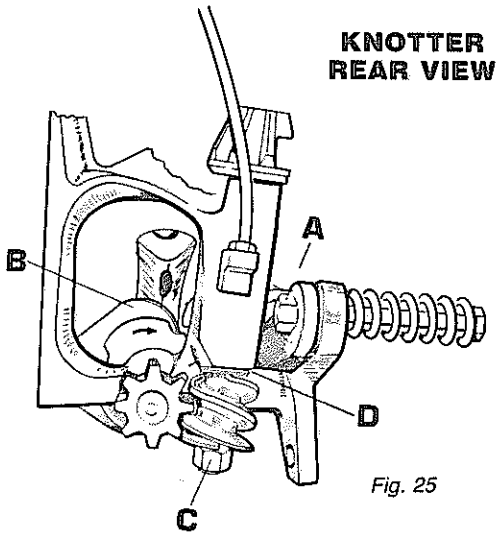


Fig. 25

Adjust the twine holder tightly to prevent the twine from pulling from the disc or from producing bow knots. Make adjustments on bolt (**A**) in 1/6 of full turn increments. Proper adjustment is achieved when the knotter is producing a clean and smooth knot.

Twine Disc

The twine disc receives twine from the needle and places it into the twine holder during the rotation of the knotter.

1. With the knotters in their home position, make certain that the slots in the twine disc cleaner are free of compacted dust and chaff.

2. Adjust the twine disc notch so the left-hand side of the notch is even with the cleaner (**B**), see **Fig. 25.** Do this by loosening nut (**C**) several turns. Tap the nut end of the shaft to loosen the worm.

3. After the disc is set, turn the worm against the spacer washers (**D**), see **Fig. 25**, and tighten the nut.

4. After the knotter has completed one cycle, check the notch setting again.

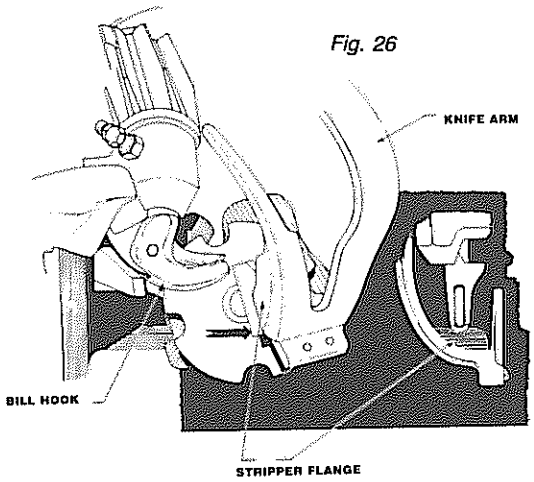


Fig. 26

Knife Arm

The knife arm cuts the twine and strips it off the bill hook during the tying process.

1. The stripper flange on the knife arm should just touch the knotter bill hook with light pressure as the stripper flange pushes the knot past the end of the knotter bill hook, see **Fig. 26.** Adjustment is made by bending the knife arm.

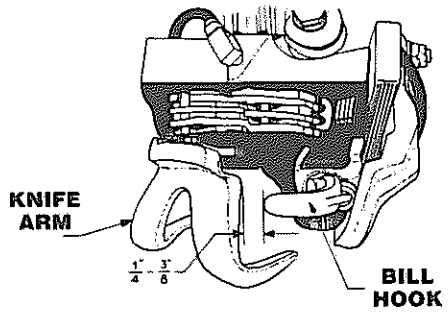


Fig. 27

2. The knife arm should be ¾ inch to ⅞ inch past the end of the knotter bill hook when the knife arm is in the most extreme position, see **Fig. 27.** Correct the adjustment of the knife arm by replacing it. **NOTE:** On knotters with a coiled twine holder spring measurements are ¾ inch to ⅞ inch.

Cam Gear Adjustment

The cam gears are used as timing mechanisms for the knotter tying process.

1. Both flat surfaces of the knotter bill hook and worm gear pinions must be held flat with 0 to .005 interference (when assembled with new parts) on the smooth face of the cam gears, see **Fig. 28.**

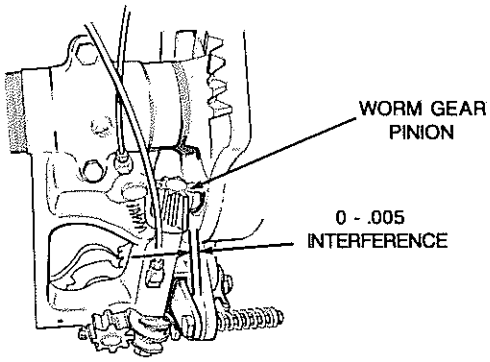


Fig. 28

This adjustment is made with shims between the cam gears and knotter frames. Shimming must be done between the cam gears and knotter frames any time a knotter is assembled.

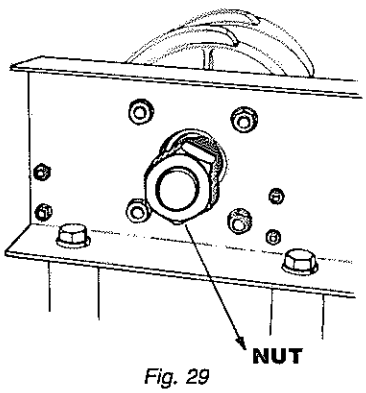


Fig. 29

2. End play is removed by tightening the nut on the end of the knotter shaft, see **Fig. 29.** Adjustment should be distributed among all six knotters in the knotter assembly. Do not overtighten. Each knotter should be free enough to raise easily by hand yet not so free as to drop.

⚠ **CAUTION:** Failure to keep shaft assembly tight or failure to keep slack from developing between cam gears and pinion gear surfaces will result in knotter frame breakage.

Twine Tensioner Adjustment

The twine tensioners put enough drag on the twine so that the twine fingers and knotters have a taut twine while working.

1. With the needle yoke in home position, adjust the twine tensioner operating linkage on the left side of the bale chamber until the six operating levers on the twine tensioner drive shaft are parallel with the bale chamber.

2. Adjust the twine tensioner at (**A**), see **Fig. 30.** Place twine through the tensioners during adjustment, the twine itself serves as a gauge. The correct adjustment is when twine can be PUSHED through the tensioners while having a minimum amount of clearance between the tensioners. If tensioners are worn 1/32 inch or more, replace them.

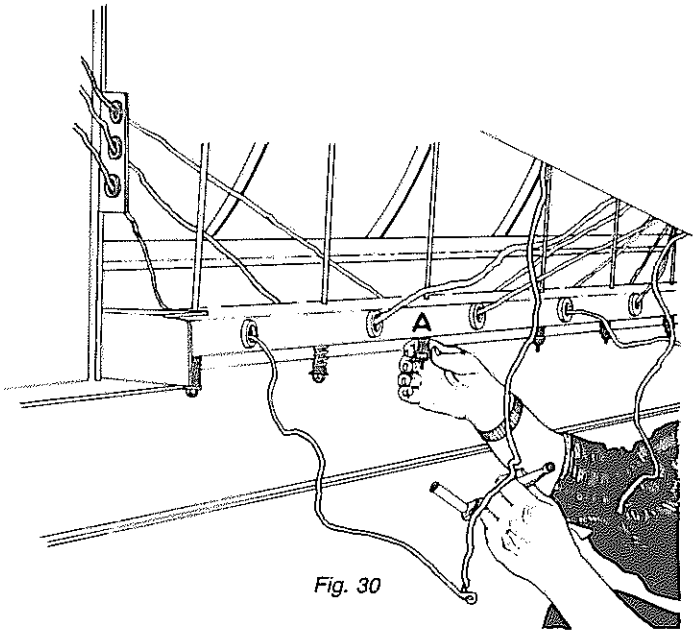


Fig. 30

3. Use the manual control to advance the needle yoke away from home position to completely release the reset lever. For information on operation, see Manual Control, page 8.

⚠ **CAUTION:** When using the manual control, first clear the area of all personnel and check for safe operation before activating component.

4. Adjust the twine tensioner drive shaft stop, see **Fig. 31**, until the springs (**A**), **Fig. 30**, are compressed ½ inch from relaxed length. The relaxed length is when twine can be pushed through the twine tensioner.

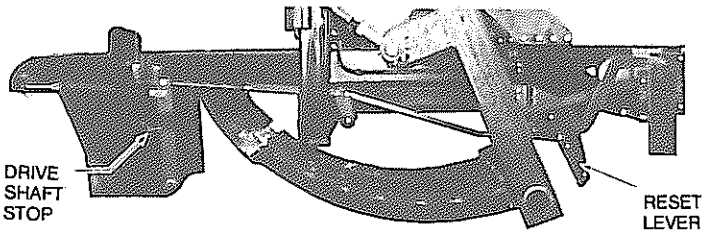


Fig. 31

Knotter Brake Adjustment

The knotter brake is used to hold the needle yoke and knotter in the rest position and is always applied. To adjust compress the springs on screws (**A**) and (**B**) to 1¾ inches length, see **Fig. 32.**

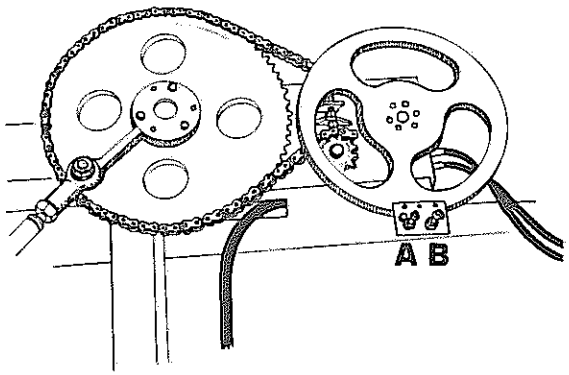


Fig. 32

Plunger Adjustment

The plunger is adjustable both vertically and horizontally. It is important that the plunger is adjusted properly to avoid needle breakage and collision of the knives.

Adjustment is done by shimming the roller rails, plunger slide rails, and front plunger rollers.

When adjusting the plunger, follow the sequence below. Depending on the condition of your plunger, not all the steps may be necessary but it is recommended to check all steps to ensure proper plunger adjustment.

⚠ **CAUTION:** Avoid serious equipment damage of the knives colliding while adjusting the plunger by ensuring there is adequate clearance between stationary and plunger knives. Do this by removing or inserting shims under the bottom roller rails, see **Fig. 33A.**

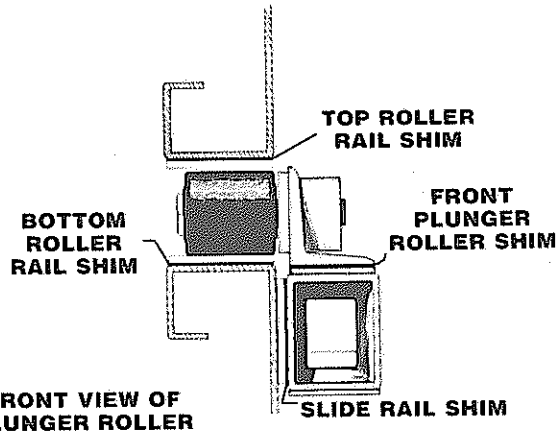


Fig. 33A

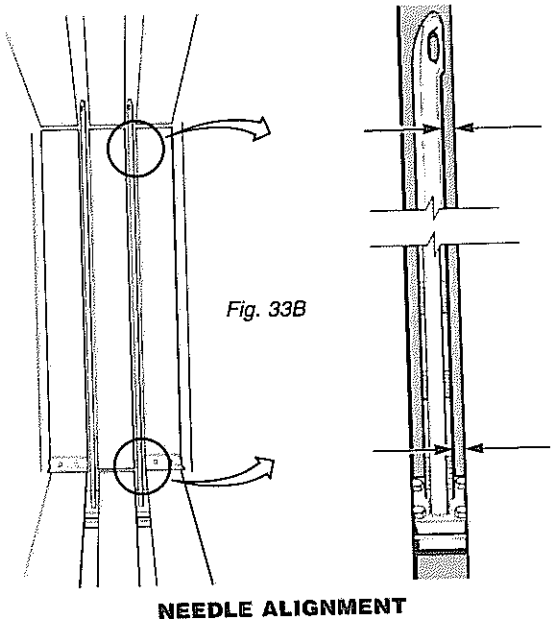


Fig. 33B

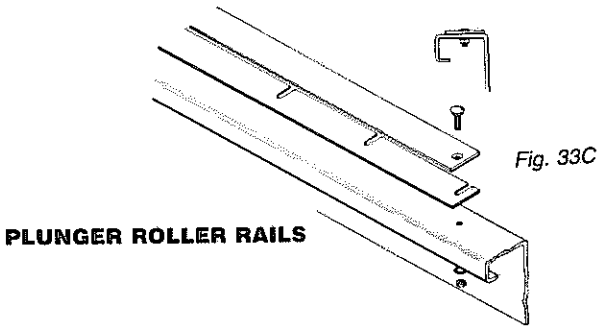


Fig. 33C

Step 1. Adjusting plunger to the bale chamber and needle slot alignment:

The plunger needle slots need to be aligned with their mating slots on the top and bottom of the bale chamber in order to ensure the proper travel of the needles, see **Fig. 33B.**

If the needle slots in the plunger are orientated at an angle in the chamber, the plunger will have to be raised or lowered on one side or the other by removing or inserting shims under the bottom roller rails, see **Fig. 33A.**

If the bottom plunger needle slots are offset to the left while the top plunger slots are offset to the right, remove shim(s) from under the bottom left roller rail or insert shim(s) under the right plunger roller rail or both, see **Fig. 33C.**Do this until the needle slots in the plunger are aligned to the mating slots on the top and bottom of the bale chamber.

To further adjust plunger horizontally, remove or insert shims behind the plunger slide rails, see **Fig. 33A.** Shim the left side to move plunger to right and visa/versa. Shim the plunger side rails with only a 1/32" between them and the bale chamber. Ensure the plunger is not bound or restricted anywhere in its area of travel.

⚠ **CAUTION:** Changing the amount or location of shims on the plunger roller rails will have an effect on knife clearance. Make sure there is adequate clearance between the stationary and plunger knife to avoid collision of knives.

Step 2. Adjust plunger rollers:

The front plunger rollers are adjusted vertically by shimming, see **Fig. 33A.** Use the manual control to slowly cycle the plunger and observe roller activity to see if all four rollers are touching at one time or another the bottom plunger roller rails. If not, adjust the front rollers by shimming them up or down until all rollers are touching. Rear rollers (on the face end of the plunger) are not adjustable.

⚠ **CAUTION:** This can change knife clearance. Be certain there is adequate clearance between the stationary and plunger knives.

Step 3. Shim the top plunger roller rails, see **Fig. 33A**, to be approximately a 1/16 inch from the four plunger rollers. After adjusting top rollers rails, use the manual control to slowly cycle the plunger to ensure the rollers do not bind anywhere in their area of travel.

Step 4. After the plunger is adjusted, readjust the plunger knives as stated in Knife Adjustment.

Knife Adjustment

The knives are used to shear the hay and should be kept sharp and in good condition for maximum performance. Dull, broken or missing knives will reduce capacity and cause a ragged appearance on the bottom of the bale. There are a total of nine knives on the baler, seven adjustable plunger knives and two stationary knives.

Clearance of plunger knives and stationary knives should be maintained at approximately 1/32 inch. Adjustment is made on the plunger knives only. To adjust plunger knives,

move the plunger with the manual control until the cutting edges of the knives are even or overlapping. Shim the knives, see **Fig. 34.** Clearance from knife segment to knife segment may vary, therefore individual adjustments may be required.

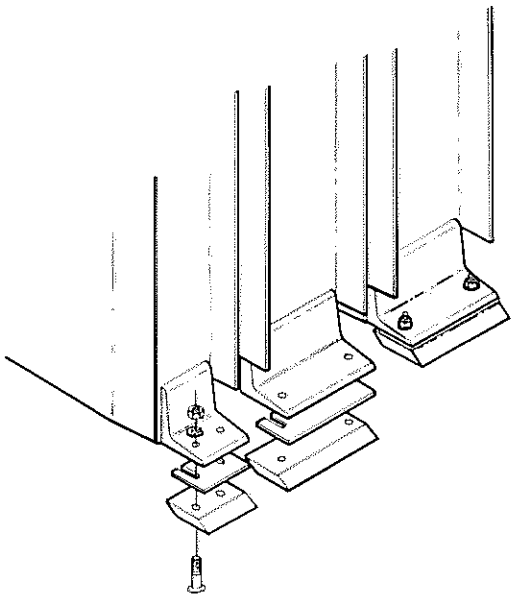


Fig. 34

********** WARNING **********

WARNING: Knife area is extremely hazardous. All care must be taken to prevent serious injury from occurring. Watch out for sharp knives.

Plunger Speed Adjustment

Decelerated Plunger Return:

1. Disengage tractor P.T.O. and ensure Power Switch is in "OFF" position.

2. Open the control box, located on the forward left side of the baler, and disconnect white wire from TB3-7. This will cause the plunger retract speed to be reduced to approximately ¼ of the maximum speed.

3. Attach test string to LS-3 (Full Charge Switch), see **Fig. 35,** roller arm. Route the string so that the switch can be easily activated and released while standing on the ground.

4. Ensure Power Switch in "ON" position and Control Mode in "AUTO" position. Engage tractor P.T.O. and run baler at 1,000 P.T.O. R.P.M.

5. Pull test string and release when the feed fork stops and the plunger advances.

6. Use a stopwatch to accurately measure plunger return time, it should be between **2.4** and **2.8** seconds from plunger full extend to home position.

7. To adjust Decelerated Return speed, loosen clamp screw of red wire slider on Plunger Retract resistor, the brown tube to the left in the control box. Move slider on the resistor upward to decrease or downward to increase the plunger speed as necessary to attain correct plunger return time. When adjusting ensure approximately ⅛ inch clearance between green wire slider (Manual) and red wire slider (Auto).

8. Repeat Step 5 and 6 until Step 7 is achieved.

9. Disengage tractor P.T.O. and ensure Power Switch is in "OFF" position.

10. Reconnect white wire to TB3-7 in the control box.

11. Remove test string.

Decelerated Plunger Advance:

1. Disengage tractor P.T.O. and ensure Power Switch is in "OFF" position.

2. Open the control box, located on the forward left side of the baler, and disconnect the white wire, **NOTE:** this is in a 5 conductor cable, from TB3-9 and connect to TB2-1. **NOTE:** Leave other white wire in place. This will cause the plunger advance speed to be reduced to approximately ¼ of the maximum speed.

3. Attach test string to LS-3 (Full Charge Switch), see **Fig.35,** roller arm. Route the string so that the switch can be easily activated and released while standing on the ground.

4. Ensure Power Switch is in "ON" position and Control Mode in "AUTO" position. Engage tractor P.T.O. and run baler at 1000 P.T.O. R.P.M..

5. Pull test string and release when the feed fork stops and the plunger advances.

6. Use a stopwatch to accurately measure plunger advance time, it should be between **2.4** to **2.8** seconds from plunger home to full extend position.

7. To adjust Decelerated Advance speed, loosen clamp screw of orange wire slider on Plunger Advance resistor, the brown tube to the right in the control box. Move the slider on the resistor upward to decrease or downward to increase the plunger speed as necessary to attain correct plunger advance time. When adjusting ensure approximately ⅛ inch clearance between yellow wire slider (Manual) and orange wire slider (Auto).

8. Repeat Steps 5 and 6 until Step 7 is achieved.

9. Disengage tractor P.T.O. and ensure Power Switch is in "OFF" position.

10. Disconnect white wire from TB2-1 and reconnect to TB3-9 in the control box.

11. Remove test string.

Limit Switch Adjustment

See **Fig. 35** for a general outline of the limit switches.

NOTE: The assumption is made that the limit switch arms are set to the specified factory angle, contact Freeman Service for angle. Plunger switches (5,4,6,8,9,10) are viewed from inside baler looking out to the left, see **Fig. 36.**

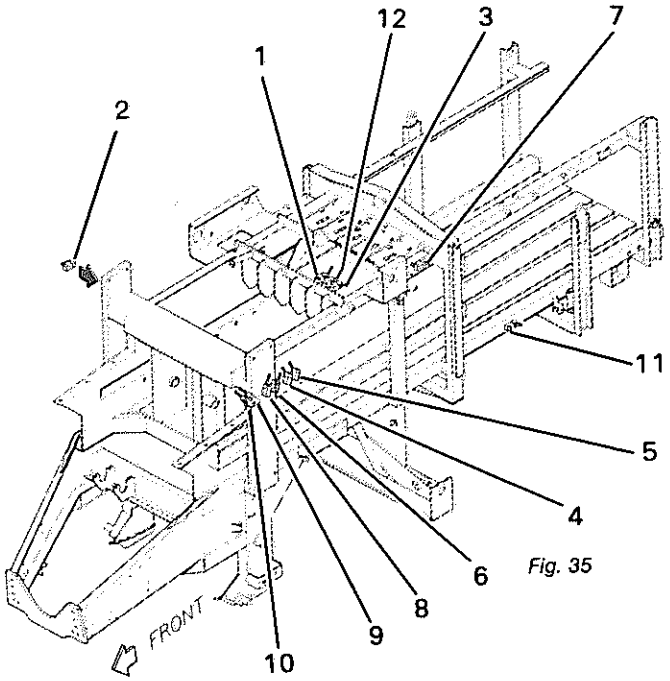


Fig. 35

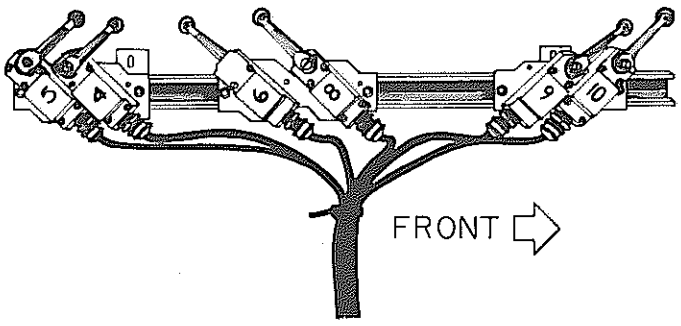


Fig. 36

CAUTION:

For all switch functions:

1. Shut off the tractor before making any switch adjustments.

2. It will be necessary to operate the baler while observing the different functions of the machine to determine necessary adjustments.

3. Stay well clear of all moveable parts while observing the machine functions.

LS-1 "Knotter Stop/Plunger Safety Knotter Switch"

Function:

LS-1 has 2 functions, (1) to stop the knotter when it is completing its cycle and (2) to ensure the plunger will not advance with the needle yoke away from its home position (bottom dead center).

Adjustment objective:

LS-1 is to be activated when the needle yoke is in the home position.

Adjustment:

NOTE: Adjustment of LS-1 should be made prior to actual baler operation. Ensure oil at air temperature.

1. Cut twines at knotters.

2. Remove twines completely from the needles.

3. Attach test strings around the switch roller arms of LS-11 (Knotter Trip Switch) and LS-3 (Full charge Switch). Route strings so that the switches can be easily activated and released while standing on the ground.

4. Engage tractor P.T.O. and run baler at less that 500 P.T.O. R.P.M.

5. Use the manual control to position needle yoke at bottom dead center (home position), see **Fig. 37.**

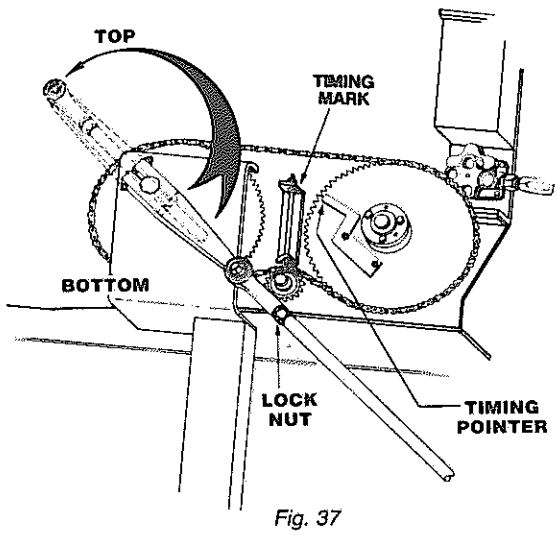


Fig. 37

6. Disengage tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

7. Loosen and tighten appropriate clamp bolts (**A**) and (**B**) in order to rotate cam as necessary to center it on the switch arm roller, see **Fig. 38.**

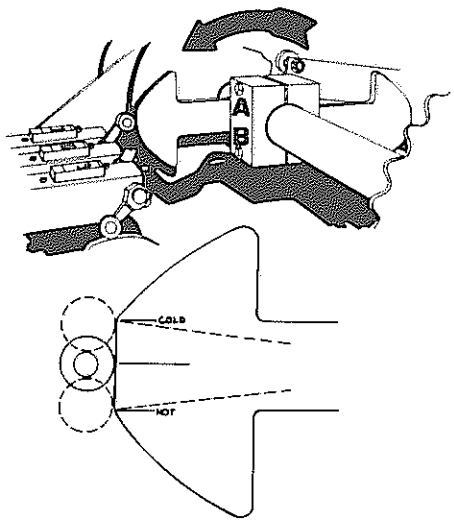


Fig. 38

8. Engage tractor P.T.O. and run baler at 1,000 P.T.O. R.P.M. in automatic mode.

9. Pull string from LS-11 (Knotter Trip Switch) and hold.

10. Pull string from LS-3 (Full Charge Switch) and release after plunger starts to advance.

11. Release LS-11 (Knotter Trip Switch) string when knotters start.

12. Plunger and knotters will cycle and return to rest position.

13. Disengage tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

14. Check needle yoke stopping position. The cam should stop with the switch arm roller near the center or slightly beyond the center of the cam as illustrated in *Fig. 38* (Cool and hot oil location).

15. If not, mark the location of the switch roller arm on the switch shaft to indicate the original position.

16. Adjust the needle yoke stopping position by lowering or raising the switch roller arm to either stop the needle yoke earlier or later respectively. **NOTE:** The switch arm roller should not be moved more than 1/16 inch for each trial.

17. Repeat Steps 8-16 omitting Step 15 until the cam is in required location, see **Fig. 38.**

18. Engage tractor P.T.O. and run baler at 1,000 P.T.O. R.P.M. in automatic mode until oil reaches at least 140 degrees Fahrenheit (60 degrees Celsius).

19. Once the oil has reached at least 140 degrees Fahrenheit (60 degrees Celsius), run the baler at 500 P.T.O. R.P.M.

20. Repeat Steps 9-13.

21. Ensure needle tips are completely withdrawn from the chamber bottom. If not, repeat Step 16 to stop the needle yoke later.

22. Repeat Steps 9-13 and Step 21 at 500 P.T.O. R.P.M. until adjustment is achieved.

23. Disengage tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

24. Remove test strings.

25. Rethread twine, see steps 5 and 6 of Twine Installation and Threading, page 8.

26. Engage tractor P.T.O. and run baler at less than 500 P.T.O. R.P.M.

27. Use the manual control to cycle the knotter forward to load twine into knotters and return knotters to home position.

LS-2 "Plunger Delay/Feed Fork Switch"

Function:

LS-2 delays plunger advance until the feed fork travels to its highest position and stops.

Adjustment objective:

LS-2 is to have the feed fork stop at its highest point of travel in the bale chamber after LS-3 (Full Charge Switch) has been activated. The switch roller arm must be on the high part of the cam.

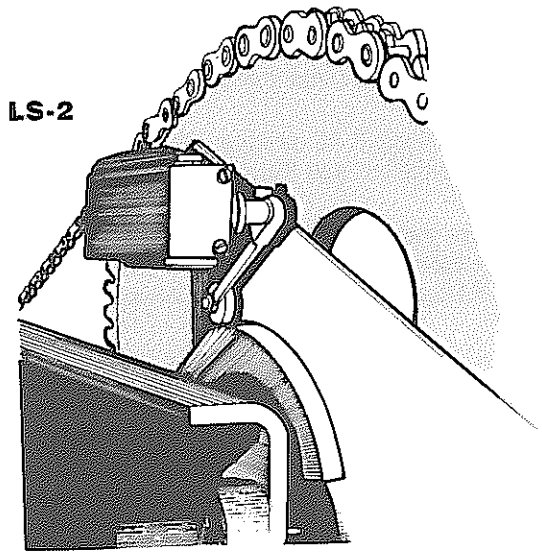


Fig. 39

Adjustment:

NOTE: Adjustment to be made with oil hot (170 degrees Fahrenheit, 77 degrees Celsius or greater).

1. Attach test string to LS-3 (Full Charge Switch) roller arm and route string so that switch cam can be easily activated and released while standing on the ground.

2. Engage tractor P.T.O. and run baler at 1,000 P.T.O. R.P.M. in automatic mode.

3. Pull test string and release when the feed fork stops and the plunger advances.

4. Turn power "OFF" at Control panel.

5. Disengage tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

6. Check stopping position of switch arm roller on cam. It should be on the high part of cam, see **Fig. 39.**

7. If not on high part of cam, mark the location of the switch roller arm on the switch shaft to indicate the original postion.

8. If feed fork stops with switch arm roller on forward slope of cam, raise the switch roller arm. If feed fork stops with switch arm roller on rearward slope of cam, lower the switch roller arm.

9. Turn power "ON" at Control panel.

10. Repeat Steps 2 through 5 and Step 8 until the switch arm roller is on the high part of the cam, see **Fig. 39.**

11. Again turn power "ON" at Control panel and repeat Steps 2 through 5.

12. Measure from rear side of feed fork crankshaft to front side of feed fork tine mounting tube, see **Fig. 40.** When the feed fork is at its highest point of travel in the chamber, the measurement should be 12½ to 13 inches when switch arm roller is on the high part of the cam.

13. Mark original cam location on feed fork driven sprocket.

14. The feed fork is stopping early if the measurement is more than 12½ to 13 inches. Rotate the cam rearward.

15. The feed fork is stopping late if the measurement is less than 12½ to 13 inches. Rotate the cam forward.

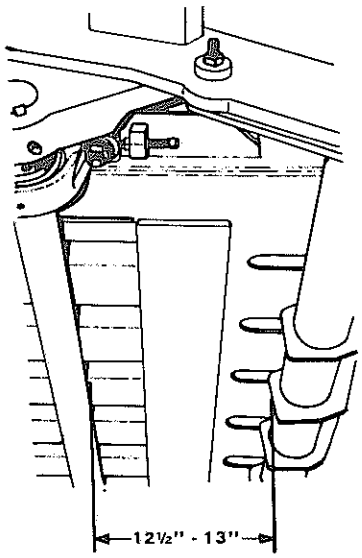


Fig. 40

16. Repeat Steps 2 through 5 until required measurement is achieved.

17. Remove test string from LS-3 (Full Charge Switch).

LS-3 "Full Charge Switch"

Function:

LS-3 signals the control circuit that the feed chamber has been filled by feed fork, thus causing the plunger to advance when the feed fork has stopped at its highest point of travel in the bale chamber.

Adjustment objective:

After raising the feed sensor paddles to operate the switch, LS-3 (Full Charge Switch) should release and come within ½ inch of the rubber bumper when lowering the feed sensor paddles.

Adjustment:

1. Adjust the cam with the feed sensor paddles down, see **Fig. 41.**

2. Loosen clamp bolt (**A**) and rotate cam forward until the switch clicks to operate.

3. Rotate the cam rearward until switch clicks to release.

4. Tighten clamp bolt (**A**).

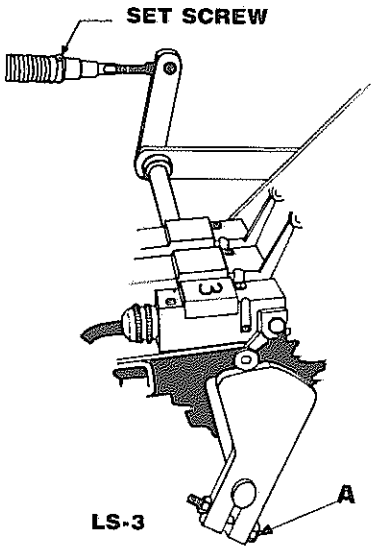


Fig. 41

LS-4 "Plunger Advance Decelerate Switch"

Function:

LS-4 decelerates the plunger to ¼ of full speed just prior to the end of its extend stroke and ensures the knotter automatic control circuit is activated only with the plunger near its full extension.

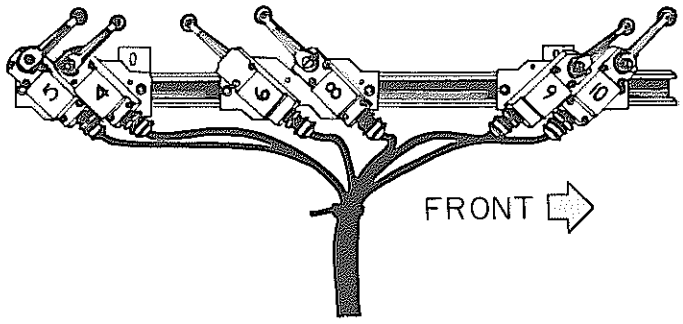
Adjustment objective:

LS-4 is to ensure the plunger decelerates prior to activating LS-5 (Plunger Return Switch).

Adjustment:

1. Ensure LS-5 (Plunger Return Switch) is properly adjusted.

2. Loosen mounting bolt and slide switch and mount as close to LS-5 (Plunger Return Switch) as possible, see **Fig. 42.**



LS-4

Fig. 42

LS-5 "Plunger Return Switch"

Function:

LS-5 signals the plunger to return at the end of its 30 inch extend stroke.

Adjustment objective:

LS-5 is to stop and reverse the plunger 1 inch prior to reaching its fully extended position.

Adjustment:

CAUTION: It will be necessary to have the large side door on the baler open to observe the plunger operation. At all times keep a safe distance.

1. Ensure proper plunger speed adjustment, see page 18.

2. Engage tractor P.T.O. and run baler at 500 P.T.O. R.P.M.

3. Use the manual control to advance the plunger until it is fully extended.

4. Disengage tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

5. Mark the location of the plunger fully extended. Also mark 1 inch forward of this position, see **Fig. 43.**

6. Engage the tractor P.T.O. and use the manual control to return the plunger to its home position.

7. Disengage tractor P.T.O. and go to the control box and remove the white wire in 5 conductor cable from TB3-9 and connect to TB2-1. This will cause the plunger to advance at approximately ¼ of its full speed.

8. Attach the test string to LS-3 (Full Charge Switch) roller arm. Route the string so that the switch can be easily activated and released while standing on the ground.

9. Engage tractor P.T.O. and run baler at 1,000 P.T.O. R.P.M. in automatic mode.

10. Pull LS-3 (Full Charge Switch) string and release when feed fork stops and plunger advances.

11. Observe the position at which the plunger stops advancing.

12. Reduce baler speed to 500 P.T.O. R.P.M.

13. Use the manual control to advance the plunger to full extension and to rotate the feed fork out of the way. This step will make limit switch adjustment easier.

14. Disengage tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

15. Loosen the mounting bolt and slide the switch and mount forward or rearward. Position the switch to ensure the plunger returns when it is 1 inch forward from its fully extended position.

16. Repeat Steps 9 through 14 as necessary until Step 15 is achieved.

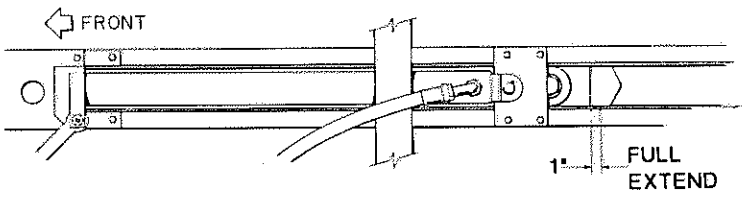


Fig. 43

17. Remove test string and disconnect the white wire from TB2-1 and reconnect to TB3-9.

18. Adjust LS-4 (Plunger Advance Decelerate Switch), see page 23, after LS-5 (Plunger Return Switch) is properly adjusted.

LS-6 "Plunger Return Delay Switch"

Function:

When baling the plunger retracts at its decelerated speed until it reaches LS-6 (Plunger Return Delay Switch), at which point the plunger accelerates to full speed retract, **NOTE:** This does not happen during a tying cycle. During a tying cycle, the knotter is delayed until the plunger retracts, activates LS-6 (Plunger Return Delay Switch) and stops.

Adjustment Objective:

The plunger should retract approximately *9 inches,* before LS-6 (Plunger Return Delay Switch) is activated to stop the plunger. The plunger has retracted approximately 9 inches when the front edge of the make-up cylinder bolt is on the rearward edge of twine box mount, see **Fig. 44.**

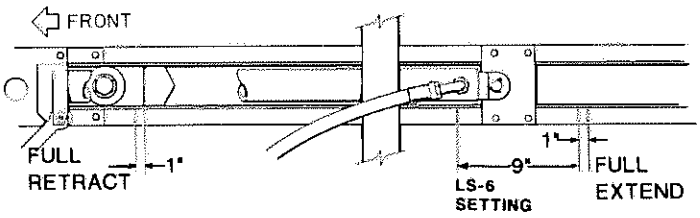


Fig. 44

Adjustment:

⚠ **CAUTION:** It will be necessary to have the two large doors on the baler open to observe the plunger operation. At all times stay at a safe distance.

NOTE: Adjust LS-6 (Plunger Return Delay Switch) together with LS-8 (Feed Fork Delay Plunger Switch). For Function and Adjustment Objective of LS-8 (Feed Fork Delay Plunger Switch) see page 26.

1. Cut twine at all six knotters.

2. Pull twine down through bale chamber and completely remove from needles.

3. Attach test strings to LS-3 (Full Charge Switch) and LS-11 (Knotter Trip Switch) roller arms. Route string so that switch can be easily activated and released while standing on the ground.

4. Engage tractor P.T.O. and run baler at 1,000 P.T.O. R.P.M. in the automatic mode.

5. Pull test string from LS-11 (Knotter Trip Switch) and hold.

6. Pull test string from LS-3 (Full Charge Switch) and release when feed fork stops and plunger starts to advance.

7. Release test string from LS-11 (Knotter Trip Switch) as soon as the knotter starts to move.

8. Quickly turn power "OFF" at Control panel before knotter has completed the first half of its cycle.

9. Observe plunger stopping position and make sure feed fork has not yet started and is still at its highest point of travel in the bale chamber.

10. Reduce baler speed to 500 P.T.O. R.P.M.

11. Turn power "ON" at Control panel.

12. The knotter will start and continue through its cycle. Halfway through its cycle, the plunger will start to complete its retract stroke. After approximately 3 inches of plunger forward movement (retracting), the feed fork will start to operate.

13. Use the manual control to advance the plunger to its full extension and to rotate the feed fork out of the way. This will make limit switch adjustment easier.

14. Disengage tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

15. Slide LS-6 (Plunger Return Delay Switch) forward or rearward as necessary to cause the stopping position observed in Step 9 to be approximately 9 inches from the fully extended position as illustrated.

16. Slide LS-8 (Feed Fork Delay Plunger Switch) so that the center of the switch shaft is 3 inches forward of the center of the switch shaft on LS-6 (Plunger Return Delay Switch), see **Fig. 45.**

17. Repeat Steps 4 through 16 as necessary until the plunger stops when it is 9 inches from its fully extended position, see **Fig. 44.**

18. Disengage tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

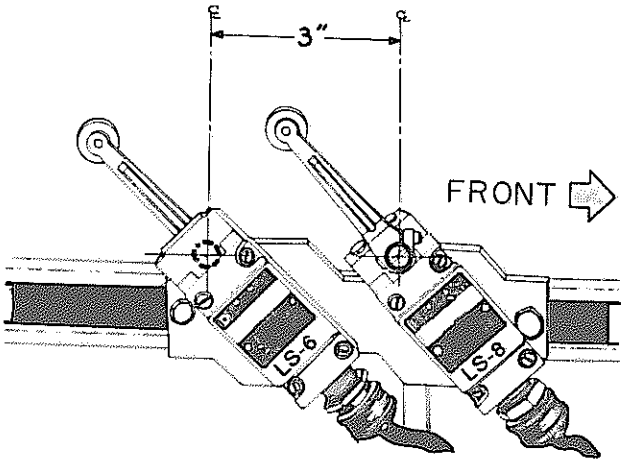


Fig. 45

19. Remove test strings.

20. Rethread twine, see Steps 5 and 6 of Twine Installation and Threading, page 8.

21. Engage tractor P.T.O. and run baler at less than 500 P.T.O. R.P.M.

22. Use the manual control to cycle the knotter forward to load twine into knotters and return knotters to home position.

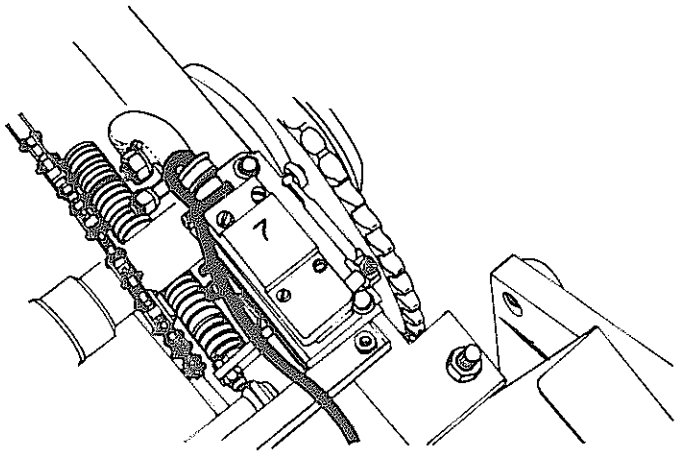


Fig. 46

LS-7 "Knotter Reverse Safety Switch"

Function:

LS-7 prevents the knotter from rotating in reverse at those points at which the bill hook would rotate. This prevents possible damage to the knotter due to reverse bill hook rotation.

Adjustment objective:

LS-7 is to prevent any reverse rotation of knotter when it has rotated forward to the point where the bill hook has begun to turn.

Adjustment:

1. To increase the duration of the non-reversing portion of the knotter cycle, lower the switch roller arm. To decrease this duration, raise the switch roller arm, see **Fig. 46.**

LS-8 "Feed Fork Delay Plunger Switch"

Function:

LS-8 allows the feed fork to start before the plunger has completely retracted to its home position. It also keeps the feed fork stopped to ensure no compaction of hay in the infeed chute while the plunger is stopped during the first half of the tying cycle.

Adjustment objective:

Allow the feed fork to operate during approximately the last half of the plunger retract stroke.

Adjustment:

1. LS-6 (Plunger Return Delay Switch) must be properly adjusted, see page 24.

2. Loosen the mounting bolt and slide LS-8 (Feed Fork Delay Plunger Switch) forward or rearward so that the center of the switch shaft is 3 inches forward of the center of the switch shaft on LS-6 (Plunger Return Stop Switch), see **Fig. 45.**

LS-9 "Plunger Return Decelerate Switch"

Function:

LS-9 decelerates the plunger to ¼ of its full speed just prior to stopping on its retract stroke to prevent the plunger from overrunning LS-10 (Plunger Return Stop Switch).

Adjustment objective:

While the baler is running at full speed, LS-9 is to cause the plunger to stop at LS-10 (Plunger Return Stop Switch).

Adjustment:

1. Ensure LS-10 (Plunger Return Stop Switch) is properly adjusted.

2. Loosen the mounting bolt and slide the mount and switch forward as close to LS-10 (Plunger Return Stop Switch) as possible.

3. Attach the test string to LS-3 (Full Charge Switch) roller arm. Route the string so that switch can be easily activated and released while standing on the ground.

4. Engage tractor P.T.O. and run baler at 1,000 P.T.O. R.P.M. in automatic mode.

5. Pull test string and release when the feed fork stops and plunger advances.

6. Observe plunger stopping position.

7. Reduce baler speed to 500 P.T.O. R.P.M.

8. Use the manual control to advance the plunger to full extend and to rotate the feed fork out of the way. This step will make limit switch adjustment easier.

9. Disengage tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

10. If the plunger stops forward of the LS-10 (Plunger Return Stop Switch) stopping position, slide LS-9 (Plunger Return Decelerate Switch) and LS-10 (Plunger Return Stop Switch).

11. Repeat steps 4 through 10 until the plunger stops at the stopping position of LS-10 (Plunger Return Stop Switch).

12. At this point a smooth deceleration from full speed retract to a complete stop should be observed. There should be no noticeable slow speed retract between LS-9 (Plunger Return Decelerate Switch) and LS-10 (Plunger Return Stop Switch).

13. Remove test string.

LS-10 "Plunger Return Stop Switch"

Function:

LS-10 stops the plunger at the end of its 30 inch stroke (home position).

Adjustment objective:

To stop the plunger 1 inch prior to reaching its fully retracted position.

Adjustment:

⚠ **CAUTION:** It will be necessary to have the two large doors on the baler open to observe the plunger operation. At all times stay at a safe distance.

1. Ensure proper plunger speed adjustment, see page 18.

2. Attach test string to LS-3 (Full Charge Switch) arm roller. Route the string so that the switch can be easily activated and released while standing on the ground.

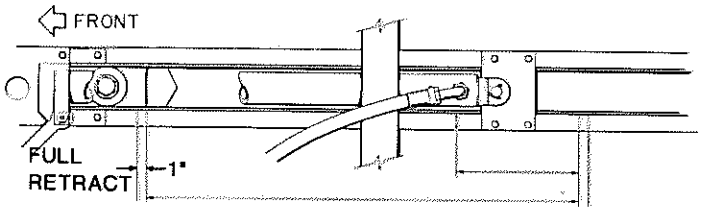


Fig. 47

3. Engage tractor P.T.O. and run baler at 500 P.T.O. R.P.M. in manual mode.

4. Use the manual control to retract the plunger until it reaches its full retract position.

5. Disengage tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement to cease.

6. Mark the location the plunger reached fully retracted. Also mark 1 inch rearward of this position, see **Fig. 47.**

7. In the control box remove the white wire from TB3-7. This will cause the plunger retract speed to be reduced to approximately ¼ of its maximum speed.

8. Engage tractor P.T.O. and run baler at 1,000 P.T.O. R.P.M. in automatic mode.

9. Pull test string on LS-3 (Full Charge Switch) and release when the feed fork stops and plunger advances.

10. Observe plunger stopping position.

11. Reduce baler speed to 500 P.T.O. R.P.M.

12. Use the manual control to advance the plunger to full extend and to rotate the feed fork out of the way. This step will make limit switch adjustment easier.

13. Disengage tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement to cease.

14. LS-10 (Plunger Return Stop Switch) should be positioned so that the plunger stops one inch prior to its full retract position, see **Fig. 47.**

15. Loosen the mounting bolt and slide the switch and mount forward or rearward as necessary.

16. Repeat Steps 7 through 13 until Step 13 is achieved.

17. Remove test string.

18. Reconnect white wire onto TB3-7.

19. After LS-10 (Plunger Return Stop Switch) is properly adjusted, adjust LS-9 (Plunger Return Decelerate Switch), see page 26.

LS-11 "Knotter Trip Switch"

Function:

LS-11 completes the knotter trip circuit to allow the knotter to cycle when the plunger has reached LS-6 (Plunger Return Delay Switch) on its retract stroke.

Adjustment objective:

LS-11 completes the knotter trip circuit to allow the knotter to cycle when the plunger has reached LS-6 (Plunger Return Delay Switch) on its retract stroke. LS-11 also cause knotter to stop at midpoint of the knotter cycle if the meter wheel has failed to reset.

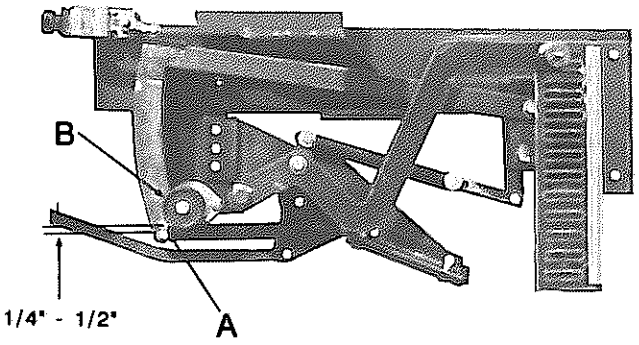
Adjustment:

1. Push forward on the rear of the meter bar. This will disengage knurled teeth on meter bar from the knurled teeth on friction disc.

2. Raise the meter bar until cam contacts switch arm roller and the switch clicks to operate, see **Fig. 48.**

3. Release rear of the meter bar allowing knurled teeth to engage.

4. Measure from top of roll pin, **(A)** to bottom of guide washer, **(B)**.



5. If measurement is less than ¼ inch, lower the switch roller arm as necessary. If more than ½ inch, raise the switch roller arm.

6. Return the meter bar to its rest position.

LS-12 "Plunger Early Start Knotter Switch"

Function:

LS-12 has two functions (1) to cause the plunger to complete its retract stroke after the knotter has completed the first half of its cycle and (2) to operate the bale counter.

Adjustment objective:

LS-12 is to be activated by its cam at approximately the mid-point of the knotter cycle.

NOTE: If the baler is in automatic mode, when the switch operates the bale counter will count.

Adjustment:

1. Cut twine at all six knotters.

2. Pull twine down through bale chamber and completely remove from needles.

3. Attach test strings to LS-3 (Full Charge Switch) and LS-11 (Knotter Trip Switch) roller arms. Route strings so that the limit switches can be easily activated and released while standing on the ground.

4. Engage tractor P.T.O. and run baler at 500 P.T.O. R.P.M. in the automatic mode.

5. Pull test string from LS-11 (Knotter Trip Switch) and hold.

6. Pull test string from LS-3 (Full Charge Switch) and release when feed fork stops and plunger starts to advance.

7. Release test string from LS-11 (Knotter Trip Switch) as soon as the knotter starts to move.

8. When the knotter is halfway through its cycle, LS-12 (Plunger Early Start Knotter Switch) should be activated by its cam and the plunger should complete its retract stroke.

9. If the plunger did not retract at the mid-point of the knotter cycle, use the manual control to retract the plunger.

10. Disengage tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

11. Rotate the switch roller arm of LS-12 (Plunger Early Start Knotter Switch) toward the rear of the machine ¼ inch.

12. Repeat Steps 4 through 11 to ensure the plunger returns to its home position.

13. Disengage tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

14. Remove test strings.

15 Rethread twine, see Steps 5 and 6 in Twine Installation and Threading, page 8.

16. Engage tractor P.T.O. and run baler at less than 500 P.T.O. R.P.M.

17. Use the manual control to cycle the Knotter forward to load twine into knotters and return knotters to home position.

Proper Operating Pressures

Main System Extend Pressure:

1. Ensure plunger decelerated return and advance speeds are adjusted, see Plunger Speed Adjustment page 19.

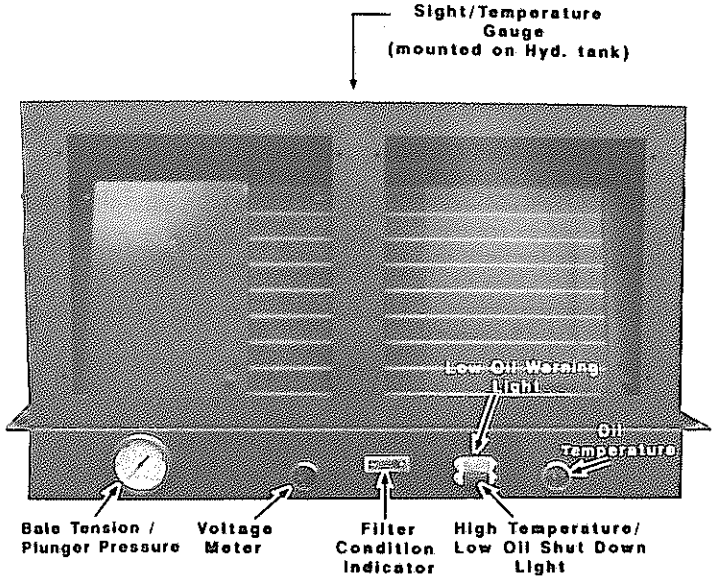
2. Engage the tractor P.T.O. and run the baler at 700 P.T.O. R.P.M.

3. Set the control mode switch to manual.

4. Insert the remote cable plug into the Plunger Advance socket.

5. Continue depressing the remote cable button until the plunger stalls.

6. Read the main system pressure on the right side of the front gauge panel of the baler as illustrated. It should read approximately 5300 p.s.i.



Tension Pressure:

1. Disengage tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

2. Remove the ¼ inch JIC cap on gauge port (**A**), see **Fig. 50.**

3. Connect a 5,000 p.s.i. hand-held gauge onto the tension gauge port (**A**).

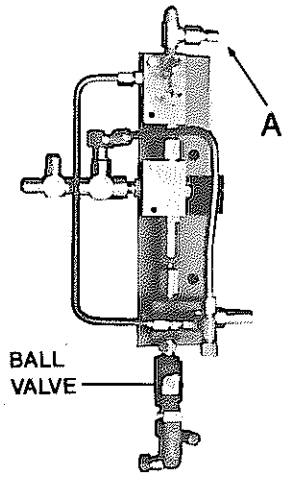


Fig. 50

4. Engage tractor P.T.O. and run the baler at 500 P.T.O. R.P.M.

5. Ensure the Power Switch is in the "OFF" position.

6. Ensure the Ball Valve is in the "OPEN" position.

7. Read the pressure on the 5,000 p.s.i. hand-held gauge. It should read 2,150 p.s.i.

NOTE: Tension pressure cannot be adjusted.

Main System Retract Pressure:

1. Disengage tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

2. Remove the ¼ inch JIC cap from gauge port (**A**), see **Fig. 51.**

3. Connect a 5,000 p.s.i. hand-held gauge onto the retract gauge port (**A**).

4. Set the control mode switch to manual.

5. Start-up tractor, engage the tractor P.T.O. and run the baler at 700 P.T.O. R.P.M.

6. Insert the remote cable plug into the Plunger Retract socket.

7. Depress the remote control button until the plunger stalls.

8. Read the pressure on the 5,000 p.s.i. hand-held gauge. It should read 2,500 p.s.i.

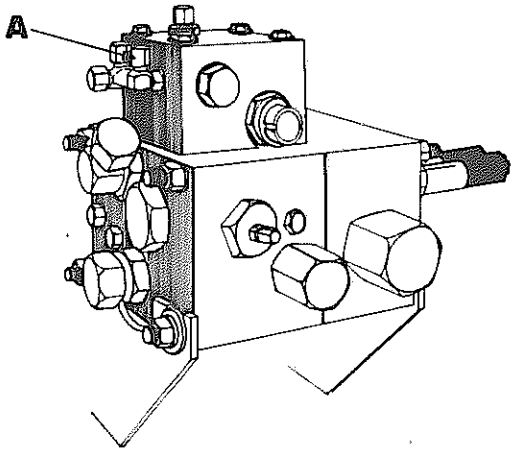


Fig. 51

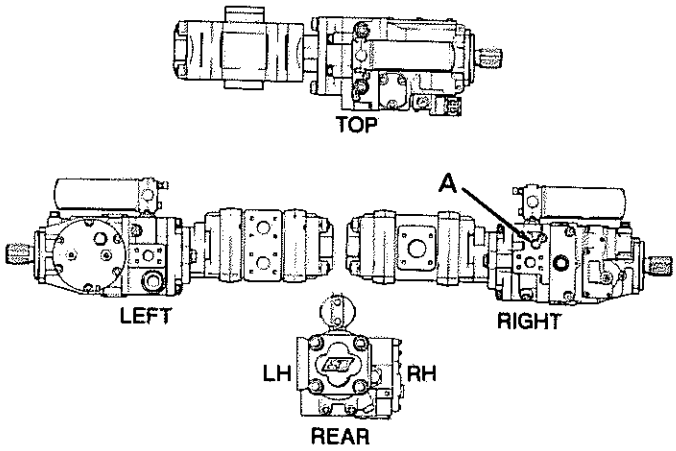


Fig. 52

Charge Pressure:

1. Ensure the oil is at least 170 degrees before starting this procedure.

2. Disengage tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

3. Remove the ¼ inch JIC cap on gauge port (**A**), see **Fig. 52.**

4. Connect a 600 p.s.i. hand-held gauge onto port (**A**).

5. Engage the tractor P.T.O. and run the baler at 700 P.T.O. R.P.M.

6. Read the pressure on the 600 p.s.i. hand-held gauge. It should read 350 p.s.i.

7. Set the control mode switch to manual.

8. Insert the remote cable plug into the Plunger Retract socket.

9. Depress the remote cable button and read the pressure on the 600 p.s.i. hand-held gauge. It should read a minimum of 300 p.s.i.

Feeder Pressure:

1. Disengage tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

2. Remove the ¼ inch JIC cap from gauge port (**A**), see **Fig. 53.**

3. Connect a 5,000 p.s.i. hand-held gauge onto port (**A**).

4. To prevent the feed fork from rotating, strap it to the frame with a ⅜" chain.

5. Pull the stop/reverse control rope half-way to prevent the pickup and feeder from rotating and secure the stop/reverse control rope onto the rope anchor.

6. Engage the tractor P.T.O. and in manual mode run the baler at 700 P.T.O. R.P.M.

7. Release the stop/reverse control rope from the rope anchor and allow the rope to return to its relaxed position. **NOTE:** Feeder will attempt to move forward but will be stalled by the ⅜" chain.

8. Read the pressure on the 5,000 p.s.i. hand-held gauge. It should read 3,200 p.s.i.

NOTE: Contact Freeman Service for adjustment.

⚠ **CAUTION:** REMAIN CLEAR OF BALER AT ALL TIMES AND ONLY START BALER AFTER CHAIN IS HOOKED UP.

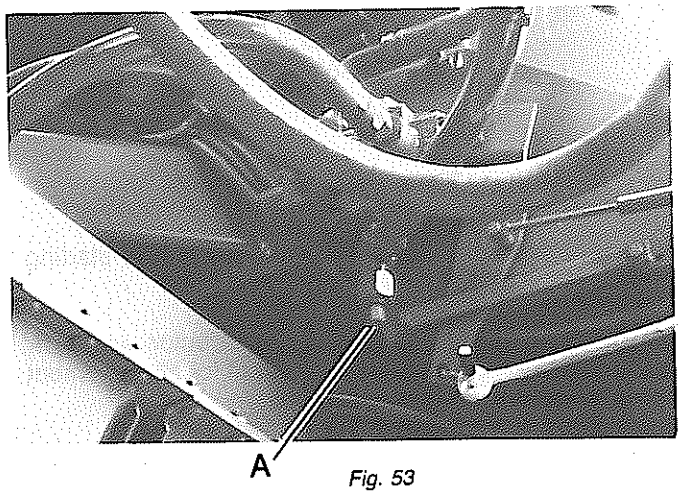


Fig. 53

Knotter and Feed Fork Manifold Main System Pressure (Forward):

1. Disengage tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

2. Remove the ¼ inch JIC cap from gauge port (**A**), see **Fig. 54.**

3. Connect a 5,000 p.s.i. hand-held gauge onto port (**A**).

4. To prevent the feed fork from rotating, strap it to the frame with a ⅜" chain.

5. Set the control mode switch to manual.

6. Insert the remote cable plug into the Feed Fork Forward socket.

7. Engage the tractor P.T.O. and run the baler at 700 P.T.O. R.P.M.

8. Depress the remote cable button and read the pressure on the 5,000 p.s.i. hand-held gauge. It should read 3,500 p.s.i.

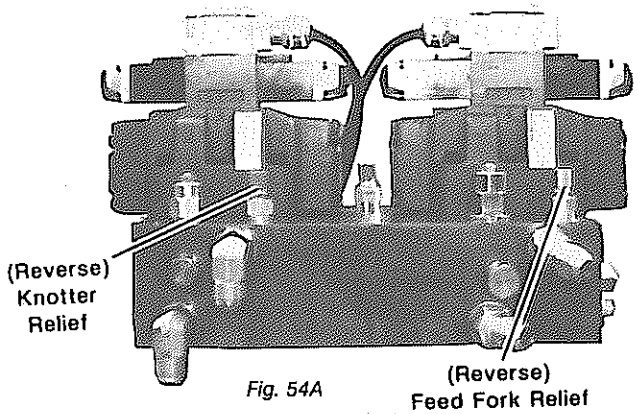


Fig. 54A

RIGHT SIDE

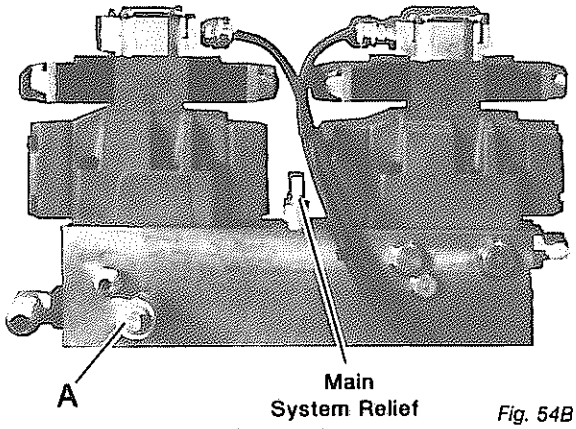


Fig. 54B

LEFT SIDE

Feed Fork Pressure (Reverse):

1. Disengage tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

2. Remove the ¼ inch JIC cap from gauge port (**A**), see **Fig. 54B.**

3. Connect a 5,000 p.s.i. hand-held gauge onto port (**A**).

4. To prevent the feeder crank shaft from moving forward, strap it to the frame with a ⅜" chain.

5. Set the control mode switch to manual.

6. Insert the remote cable plug into the Feed Fork Reverse socket.

7. Engage the tractor P.T.O. and run the baler at 700 P.T.O. R.P.M.

8. Slowly reverse the feed fork with the remote cable until the chain becomes taut. **NOTE:** The feeder will stall.

9. Depress the remote cable button and read the pressure on the the 5,000 p.s.i. hand-held gauge. It should read 2,000 p.s.i.

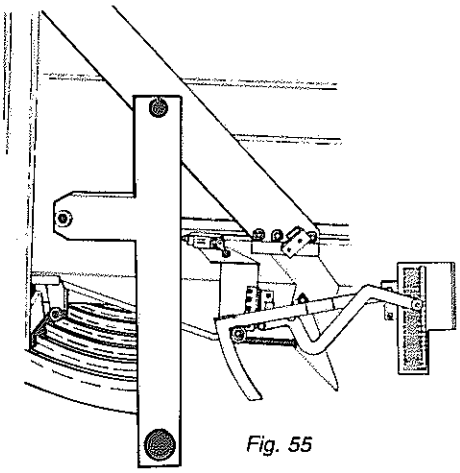


Fig. 55

Knotter Pressure (Reverse):

1. Engage the tractor P.T.O. and run the baler at or below 500 P.T.O. R.P.M.

2. Set the control mode switch to manual.

3. Insert the remote cable plug into the Knotter Reverse socket.

4. Slowly reverse the knotter with the remote control cable until the needle yoke is at mid-stroke, see **Fig. 55.**

5. Disengage the tractor P.T.O. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

6. Remove the ¼ inch JIC cap from gauge port (**A**), see **Fig. 54B.**

7. Connect a 5,000 p.s.i. hand-held gauge onto port (**A**).

8. To prevent the knotter from moving in reverse, strap a ⅜" chain around the middle of the needle yoke to the frame, see **Fig. 56. NOTE:** Ensure that the ⅜" chain is in the middle of the needle yoke, this will prevent bending of the needle yoke.

9. Engage the tractor P.T.O. and run the baler at 700 P.T.O. R.P.M.

10. Slowly reverse the knotter with the remote cable until the chain is taut. **NOTE:** The knotter and needle yoke will stall.

11. Depress the remote cable button and read the pressure on the 5,000 p.s.i. hand-held gauge. It should read 2,000 p.s.i.

⚠ **CAUTION:** REMAIN CLEAR OF BALER AT ALL TIMES AND ONLY START BALER AFTER CHAIN IS HOOKED UP.

NOTE: Contact Freeman Service for adjustment.

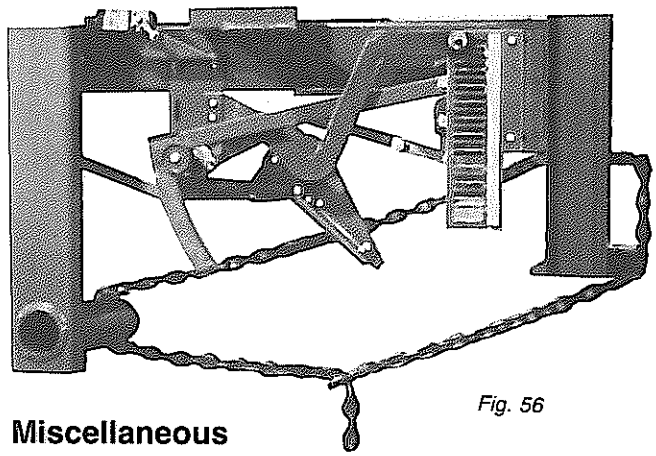


Fig. 56

Miscellaneous

Slip Clutches

P.T.O. Shaft Slip clutch adjustment, see **Fig. 57.**

1. Completely loosen all nuts (8) so that the springs just make contact OR loosen all the way then re-tighten until they just make contact.
2. Tighten each of the eight nuts 7.4 complete turns for required setting.

NOTE: Inside the P.T.O. shaft slip clutch there is an overrunning clutch. No adjustment is necessary but it is recommended that it be greased every four hours.

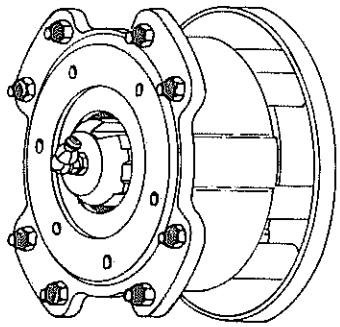


Fig. 57

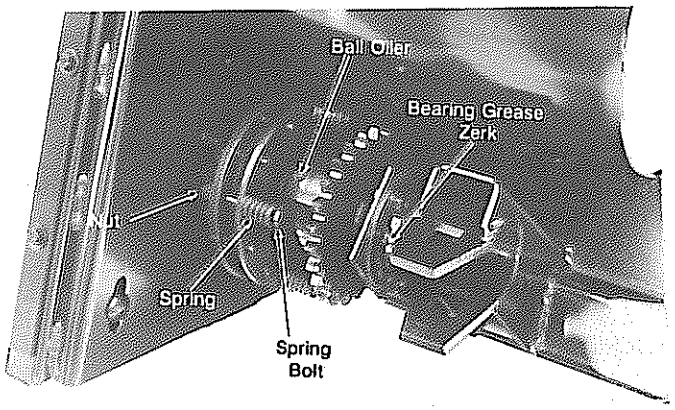


Fig. 58

Pickup Slip clutch adjustment, see **Fig. 58:**

1. Tighten bolts to completely compress the springs.
2. Back nuts off one complete turn.

NOTE: Inside the Pickup slip clutch there is a reversible clutch. No adjustment is necessary but it is recommended that the two ball oilers be lightly oiled weekly.

Oil Cooler

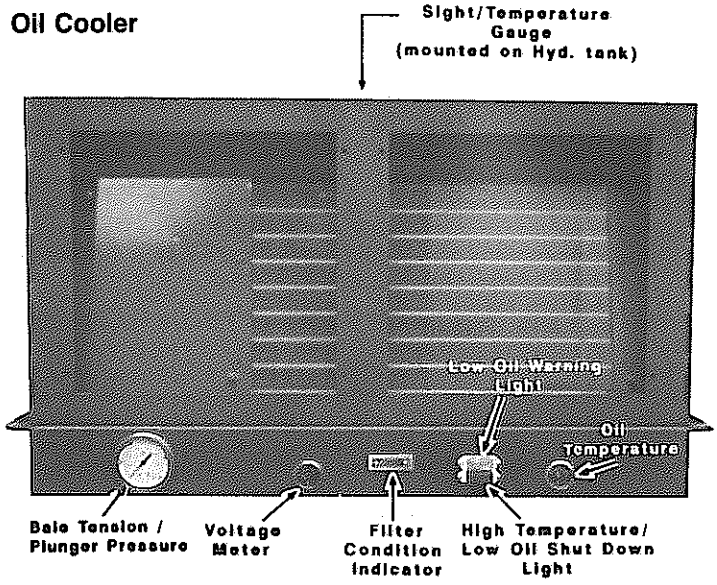


Fig. 59

Operating Temperature:

Baler should not be started when temperature is lower than 20 degrees Fahrenheit (approx. —6 Celsius). If it is necessary to operate the baler at these temperatures, consult the factory for oil recommendations. At oil temperatures of 20 to 32 degrees Fahrenheit (—6 to 0 degrees Celsius), operate baler at 500 P.T.O. R.P.M. in automatic mode. Once oil temperature reaches 32 degrees Fahrenheit (0 degrees Celsius), run the baler at 1,000 P.T.O. R.P.M.

NOTE: Feeder and pickup will continue to run for they are independent of electrical control.

⚠ **CAUTION:** Do not attempt to run the baler with oil temperature above 225 degrees Fahrenheit (107 degrees Celsius).

Hot Oil Shutdown:

If the oil temperature reaches 225 degrees (107 degrees Celsius), the thermostat will disconnect the electric supply to the baler control circuit, determine and correct the cause of overheating. Cooling may be expedited by continuing to run the fan (may switch "ON") and idling the tractor at or below 500 P.T.O. R.P.M. Ensure the pickup and feed system are running freely.

Low Oil Shutdown:

If the oil level in the tank becomes too low, the shutdown will disconnect the electric supply to the baler control circuit, the baler will shutdown, and the red light located on the front of the baler will come on. Repair oil leak. Check the sight glass and fill the tank to its proper level.

Low Oil Indicator:

If the oil level in the tank becomes low the low oil indicator will come on. The indicator is located above the low oil shut down light. If the low oil indicator should turn on: shut down baler, repair leak, and fill oil tank up using the sight/temperature gauge, see **Fig. 59.**

Proper Fan Operation

From 32 to 170 degrees Fahrenheit (0 to 77 degrees Celsius), the fan is not running. Once the oil has reached 170 degrees Fahrenheit (77 degrees Celsius) under normal baling conditions, the fan comes on.

The fan operates as follows whenever the power switch is on:

1. The fan draws air through the heat exchanger (oil cooler element) for approximately 5½ minutes.

2. The fan shuts down for approximately 10 seconds to allow the motor to stop.

3. The fan runs backwards to blow air for approximately 10 seconds to clear chaff and dust from oil cooler grill screens.

4. The fan shuts down once again for approximately another 10 seconds to allow the motor to stop.

5. The fan repeats the aforementioned procedure.

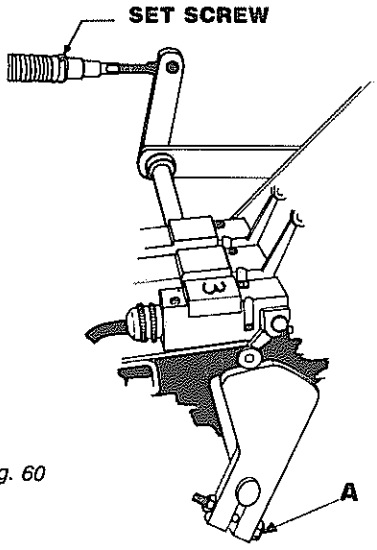
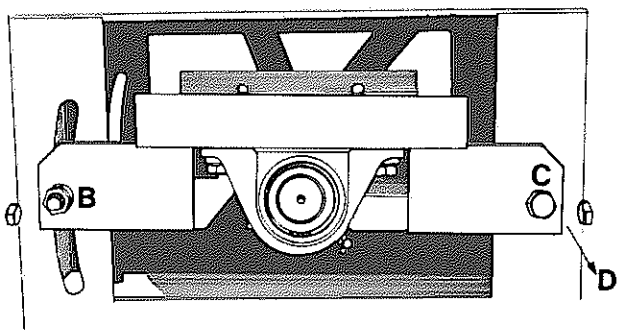


Fig. 60



TAKE-UP PLATE

Fig. 62

Charge Sensor Adjustment

1. Check for proper limit switch adjustment for LS-3 (Full charge), see page 22.

2. Spring Tension Adjustment:

   (1) Loosen set screw in locking collar, see **Fig. 60.**

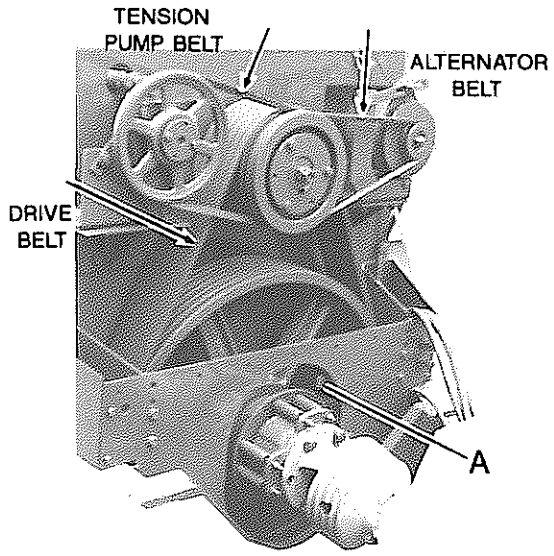
   (2) Slide locking collar on Feed sensor guide rod forward to compress spring 1 inch when the sensor paddle is against the rubber bumper.

Drive Belt Adjustment

NOTE: It is important to keep drive and driven belt sheave aligned.

1. Adjust to obtain a ⅜ inch deflection when a 15 to 19 pound force is applied at the center of the span length, see **Fig. 61**. Check each of the six main drive belts separately.

Fig. 61



2. If adjustment is needed, loosen clamp bolts (**A**) (front) and (**B**) (back) and pivot bolts (**C**) and (**D**), see **Fig. 61** and **Fig. 62.**

NOTE: The rear end of the drive unit belt take-up may be slightly tipped downward in comparison to the front end. Tighten take-up bolt until the rear end of the drive unit belt take-up has moved down approx. ¼ inch, see **Fig. 63.**

3. Tighten (**B**) see **Fig. 62.**

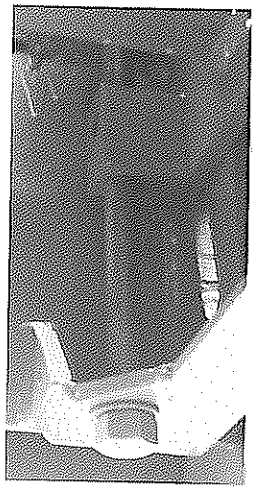


Fig. 63

5. Keep tightening take-up bolt until the drive and driven sheaves are aligned.

6. Check belts as in Step 1. If too loose, repeat the aforementioned procedure.

7. Tighten clamp bolts (**A**) and (**B**) and pivot bolts (**C**) and (**D**). see **Fig. 61** and **Fig. 62.**

Alternator Belt

Adjust to obtain a 3/16 inch deflection when a 2 to 3 pound force is applied at the center of the span length, see **Fig. 61.**

Tension Pump Belt

Adjust to obtain a 3/16 inch deflection when a 3 to 4 pound force is applied at the center of the span length, see **Fig. 61.**

Sunstrand Pump Coupler

To properly grease the coupler, follow the steps below and see **Fig. 64:**

1. Disengage tractor P.T.O. and wait for all movement in baler to cease.

2. Remove plugs.

3. Insert one zerk.

4. Flush zerk with the *specified grease until clean grease comes out of the opposite hole.

5. Remove zerk.

6. Insert plugs.

***Grease Specifications:**

1. N.L.G.I. rating #2 Lithium Base

2. Base oil viscosity 900 to 2,150 SUS at 100 degrees Fahrenheit (200 to 470 CsT at 40 degrees Celsius)

3. Minimum dropping point 374 degrees Fahrenheit (190 degrees Celsius)

4. Maximum thickener content 11%

5. Minimum timken rating 40 lbs. (approx. 18.18 kg.)

6. Recommended additives
   A. Extreme pressure (E.P.)
   B. Anti-oxidation
   C. Anti-rust

7. Should have good resistance to centrifugal oil separation

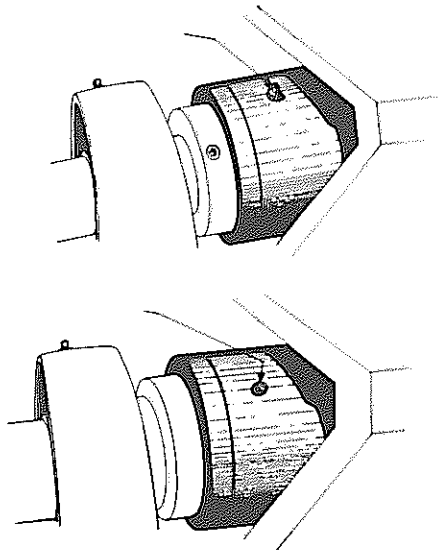


Fig. 64

STORING THE BALER

At the close of the season, remove all material from the bale chamber and thoroughly clean the complete baler. Any hay, chaff, or dust on the baler will collect moisture during the winter and cause unnecessary rusting.

Check the baler for any worn or damaged parts. Replace and order parts from the dealer as needed.

Coat the bale chamber lightly with grease to prevent rusting.

Check and lubricate all grease zerks and chains.

Provide adequate protection from the weather.

To increase tire life during storage, place the baler on blocks to remove the load from the wheels.

Disconnect the battery.

It is good practice to have the baler inspected at the end of the season and the complete machine put in top condition.

TROUBLE SHOOTING

PROBLEM	POSSIBLE CAUSE	REMEDY
Pickup will not operate but Feeder does operate.	a. Pins in overriding clutch stuck and/or broken springs.	a. Clean, inspect and lubricate. See Main Pickup section in parts book.
	b. Worn slip clutch disc(s).	b. Replace worn discs and adjust. See Slip Clutch Adjustment, page 31.
	c. Loose pickup slip clutch.	c. Adjust pickup slip clutch. See Pickup Slip Clutch Adjustment, page 32.
	d. Overfeeding.	d. Reduce feed rate.
	e. Foreign material in pickup.	e. Check for material in pickup. Remove if necessary.
	f. Mechanical failure.	f. Inspect for loose, misadjusted, missing or broken parts.
Pickup and Feeder stalled.	a. Overfeeding.	a. Reduce feed rate.
	b. Foreign material lodged in feed area.	b. Check for foreign material. Remove if necessary.
	c. Clogged stripper slots.	c. Inspect and clean if necessary.
	d. Stalled feed fork.	d. Refer to stalled Feed Fork.
	e. Feeder valve control mechanism broken.	e. Inspect for loose, misadjusted, missing or broken parts.
	f. Mechanical failure.	f. Inspect for loose, misadjusted, missing or broken parts.
	g. Oil temperature too high.	g. Inspect for proper fan operation, see section on Oil Cooler, page 32.
	h. Oil level too low.	h. Repair leak; and refill tank.
Feed fork stalled.	a. Auto/Manual selector switch in "MANUAL" position.	a. Move to "AUTO" position.
	b. Main power switch in "OFF" position.	b. Turn switch to "ON" position.
	c. Blown fuse.	c. Replace fuse and inspect wiring. Use only AGC 10 amp or 3AG 10 amp fuse.
	d. Low battery voltage.	d. Correct cause. Example: drive belt, alternator, etc.
	e. Overfeeding.	e. Reduce feed rate. See Unplugging Feed System, page 10.
	f. Charge sensor not adjusted properly.	f. See Charge Sensor section, page 33.
	g. Stalled Plunger.	g. See Stalled Plunger section in Trouble Shooting.
	h. Loose drive belts.	h. See Drive Belt Adjustment section, page 33.
	i. Mechanical failure.	i. Inspect for loose, misadjusted, missing or broken parts.
	j. Oil temperature too high.	j. Inspect for proper fan operation, see section on Oil Cooler, page 32.
	k. Oil level too low.	k. Repair leak; and refill tank.
Stalled plunger – will not leave retracted position.	a. Knotter out of home position.	a. Return knotters to home position using the Manual Control. See Manual Control section, page 9. After knotters are returned in the home position, see Unplugging The Feed System, page 10.
	b. Stalled feed fork.	b. Refer to Stalled Feed Fork.

PROBLEM	POSSIBLE CAUSE	REMEDY
Stalled plunger – will not leave retracted position – *(continued)*.	c. Plunger Return Stop switch out of adjustment.	c. See Plunger Return/Stop Switch Adjustment section, page 26.
	d. Oil temperature too high.	d. Inspect for proper fan operation, page 32.
	e. Oil level too low	e. Repair leak; and refill tank.
Stalled plunger – will not retract.	a. Charge sensor fails to return.	a. Inspect for foreign material and/or misadjustment, see Charge Sensor Adjustment section, page 33.
	b. Plunger return switch fails to operate.	b. Inspect for foreign material and/or misadjustment, see Plunger Return Switch Adjustment, page 23.
	c. Stalled knotter.	c. See Drive Belt Adjustment section, page 33.
	d. Plunger early start knotter switch out of adjustment.	d. Inspect for foreign material and/or misadjustment, see Knotter/Plunger Early Start Switch Adjustment, page 28.
	e. Loose main drive belts.	e. See Drive Belt Adjustment section, page 33.
	f. Loose PTO clutch.	f. See PTO Slip Clutch Adjustment section, page 31.
	g. Inspect fuse and replace as needed, use only AGC 10 amp or 3 AG 10 amp fuses.	g. Inspect and correct.
	h. Oil temperature too high.	h. Inspect for proper fan operation, see section on Oil cooler Fan, page 32.
	i. Oil level too low.	i. Repair leak; and refill tank.
Knots hanging on bill hook.	a. Dull twine knife.	a. Sharpen twine knife.
	b. Loose tension twine holder.	b. Tighten springs on twine holder.
	c. Foreign material in twine holder.	c. Clean twine holder.
	d. Worn twine disc.	d. Replace twine disc and holder.
	e. Twine too light or inferior grade of twine.	e. Use heavier knot strength twine or better grade of twine.
Knot on top twine only.	a. Improper needle adjustment.	a. See twine needle adjustment, page 13.
	b. Improper twine finger adjustment.	b. See twine finger adjustment, page 14.
	c. Top hay dog not working.	c. Replace hay dog spring if broken.
	d. Hay dogs worn so they do not hold the hay properly.	d. Replace worn hay dogs.
	e. Not enough tension on the twine.	e. Adjust tension on the twine so that e twine is taut (about 3 pounds pull), see page 17.
	f. Plunger Return Switch out of adjustment.	f. See Plunger Return Switch, page 23.
Knot on bottom twine only.	a. Uneven twine.	a. Use a good grade of twine.
	b. Not enough tension on twine holder spring.	b. See twine holder, page 15.
No knot on either end.	a. Ends of knot too short and twine knot pulls out.	a. Loosen twine holder.
	b. Twine breaks between disc and bill hook.	b. Twine holder too tight. See twine holder, page 15.
Knotters fail to operate.	a. Knotter trip mechanism malfunctioning.	a. Inspect for missing or maladjusted parts. Replace and adjust parts as needed.
	b. Plunger Return Delay Switch out of adjustment.	b. See Plunger Return Delay Switch adjustment, page 24.
	c. Mechanical failure.	c. Inspect for loose, misadjusted, missing or broken parts.

PROBLEM	POSSIBLE CAUSE	REMEDY
Knotter stops out of home position	a. Knotter trip bar fails to reset.	a. Clean, adjust, or lubricate trip arm and pivot.
	b. LS-11 malfunction	b. Replace the LS-11.
	c. LS-11 needs to be adjusted.	c. See adjustment, page 27.
	d. Knotter brake needs to be adjusted. (**NOTE:** Knotter brake ***DOES NOT*** stop the knotter, it only prevents the knotter from drifting.	d. See Knotter Brake Adjustment, page 17.
Knotter fails to stop operating.	a. Knotter Stop Switch out of adjustment.	a. See Knotter Stop Switch Adjustment section, page 20.
Improper bale shape.	a. Windrow too narrow.	a. Widen windrow to approximately 48 inches by widening out swather shields or raking two windrows together.
	b. Feeding to one side of the pickup.	b. Feed material to center of pickup.
	c. Overfeeding.	c. Reduce feed rate.
Insufficient bale density.	a. Ball valve is in the closed position.	a. Turn ball valve, **Fig.11**, page 11, to "OPEN" position.
	b. Loose or missing tension control pump drive belt.	b. Inspect drive belt, replace if necessary and adjust, see tension control drive belt adjustment, page 34.
	c. Baler running too low R.P.M.	c. Increase baler R.P.M. to PTO speed.
	d. Plunger pressure too low.	d. Adjust tension unloader valve **Fig.9**, page 11, in 1 turn increments until desired bale density is achieved. See Bale Density Adjustment, page 11.
	e. Overfeeding.	e. Reduce feed rate.
	f. Windrow too narrow.	f. Widen windrow to approximately 48 inches by widening out swather shields or raking two windrows together.
	g. Plunger pressure too low.	g. Check for loose PTO Clutch, see page 31. Bale Density Adjustment, see page 11.
	h. Windrow too narrow.	h. Widen windrow to approximately 48 inches by widening out swather shields or raking two windrows together.
	i. Inoperative tension unloader valve.	i. Repair or replace tension unloader valve.

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NOTES