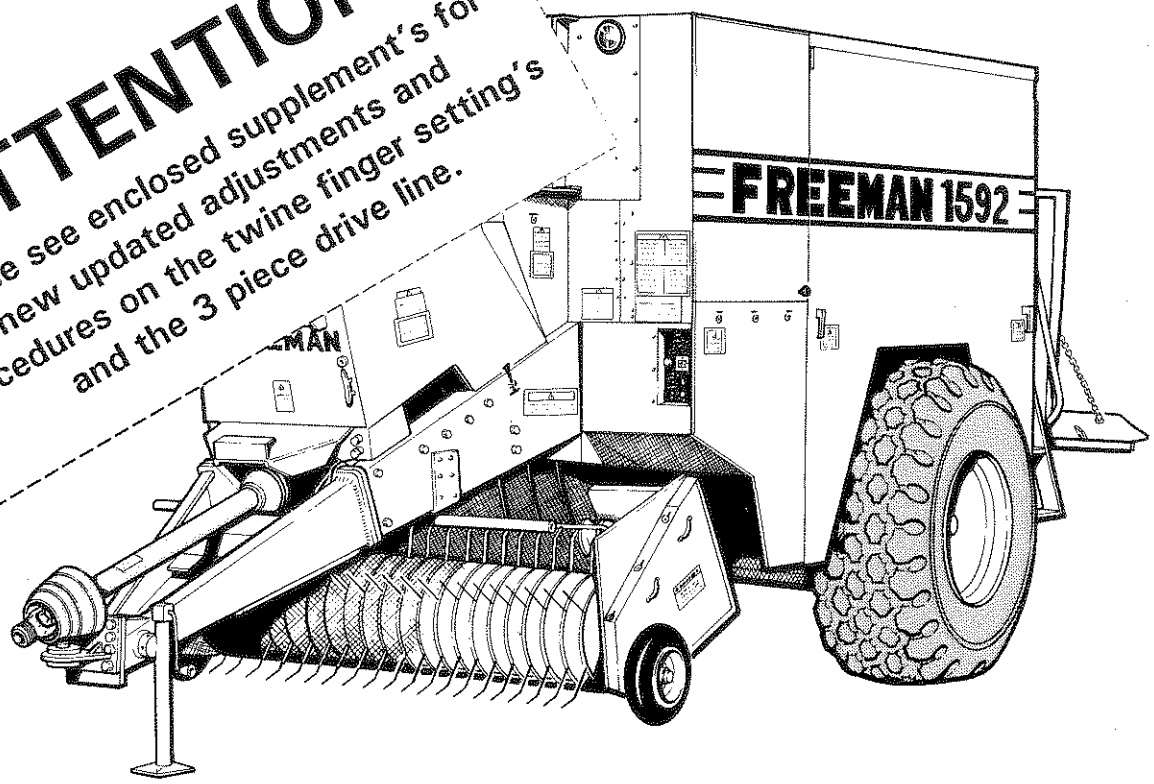
FREEMAN

MODEL 1592 BALER

ATTENTION:

Please see enclosed supplement's for new updated adjustments and procedures on the twine finger setting's and the 3 piece drive line.



OPERATOR'S MANUAL

manufactured and distributed by

J. A. FREEMAN & SON, INC.
2034 N.W. 27TH. AVENUE
PORTLAND, OREGON
PHONE: 503-222-1971 FAX: 503-228-9668

PB 0159200

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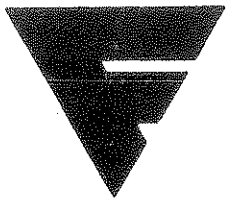

TO OUR CUSTOMER

Your decision to buy a Freeman 1592 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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LIMITED WARRANTY

J.A. Freeman & Son, Inc. guarantees all new equipment manufactured by them to be free from defects in material and workmanship for one season or part thereof from date of delivery to the retail purchaser. One copy of the "EQUIPMENT DELIVERY AND WARRANTY REGISTRATION" must be correctly completed and returned to J.A. Freeman & Son, Inc. in order to validate the warranty. The obligation under this warranty is limited to the replacement or repair at our Portland, Oregon factory or at a point designated by us of such parts that appear to us upon inspection to have been defective in material or workmanship.

J.A. Freeman & Son, Inc. obligation under this warranty is limited to repairing or replacing, at its option, any part that in the J.A. Freeman & Son, Inc. judgment is defective when returned to the factory.

The provisions of this warranty shall not apply to any equipment which has been subject to misuse, negligence, alteration or accident, or which shall have been repaired with parts other than those obtainable through J.A. Freeman & Son, Inc.

Except as set forth, J.A. Freeman & Son, Inc. shall not be liable for injuries or damages of any kind or nature, direct, consequential, or contingent, to person or property. This warranty does not extend to loss of crops, loss because of delay or loss incurred for labor, supplies, substitute machinery, rental or for any other reason.

J.A. Freeman & Son, Inc. makes no warranties whatsoever in respect to tires, engines, alternators, batteries, or other trade accessories, inasmuch as they are usually warranted by their respective manufacturers.

NOTE: J.A. Freeman & Son, Inc. reserves the right to make improvements in design or changes in specifications without notice at any time and without incurring any obligation to owners of units previously sold.

THE BALER REGISTRATION REPORT MUST BE CORRECTLY COMPLETED AND RETURNED TO J.A. FREEMAN & SON, INC. IN ORDER TO VALIDATE THE LIMITED WARRANTY.

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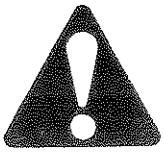
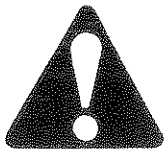



SAFETY

1. KEEP ALL SHIELDS IN PLACE AND IN SERVICEABLE CONDITION. ENSURE SAFETY WARNING SIGNS ARE IN PLACE, PROPERLY MAINTAINED AND REPLACED AS NECESSARY.

2. SHUT OFF TRACTOR, DISENGAGE P.T.O., AND LOCK TRACTOR TRANSMISSION AND/OR BRAKES BEFORE ADJUSTING, LUBRICATING, CLEANING OR SERVICING BALER.

3. KEEP HANDS, FEET, AND CLOTHING AWAY FROM POWER DRIVEN PARTS.

4. AVOID WEARING LOOSE CLOTHING WHICH CAN EASILY BE CAUGHT IN MOVING PARTS.

5. USE APPROPRIATE SIGNS OR WARNING LIGHTS WHEN OPERATING ON PUBLIC ROADWAYS.

6. MAKE CERTAIN EVERYONE IS CLEAR OF THE BALER BEFORE ENGAGING P.T.O. OR RUNNING BALER.

7. PERIODICALLY CHECK ALL NUTS AND BOLTS FOR TIGHTNESS.

8. ALWAYS USE LIGHTS FOR NIGHT WORK.

9. AT ALL TIMES CARRY A MINIMUM 2A-10B FIRE EXTINGUISHER AND A FOUR GALLON WATER CONTAINER WITH PUMP ON BALER.

10. AT ALL TIMES KEEP AWAY FROM PICKUP MECHANISM. KEEP ALL PERSONNEL AWAY FROM BALER.

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.

SAFETY DECALS FALL INTO THREE CATEGORIES AS LISTED BELOW

⚠ **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.**

GENERAL INFORMATION

INTRODUCTION

The purpose of this manual is to assist the operator in maintaining and operating a Freeman 1592 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.

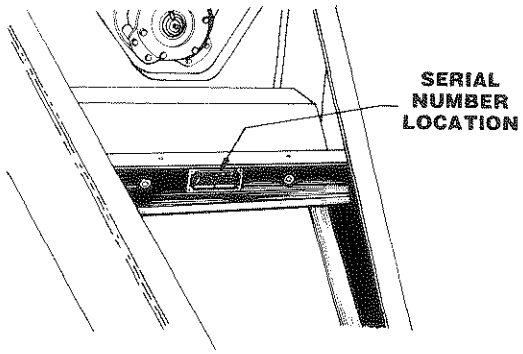
REPLACEMENT PARTS

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.

TABLE OF CONTENTS

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SPECIFICATIONS

General

length, working (with bale chute) 30 feet (9.144 m)
width, working 10 feet (3.05 m)
height, working 9 feet 8 inches (2.95 m)
height, shipping (w/o wheels) 8 feet 10 inches (2.69 m)
tires 23.1 x 26 (12 ply)
weight 20,900 pounds (9,480 kg)
capacity Up to 45 tons per hour (41 metric tons)

Bale chamber

height 38 inches (0.965 m)
width 46 inches (1.17 m)
bale length Adjustable up to 9 feet (2.74 m)
bale weight up to 1,600 pounds (726 kg)

Pickup

working width 80 inches (2.03 m)
including 6 inch side flares 92 inches (2.34 m)
drive system Hydraulic drive
protection Slip and overrunning clutches
pickup lift Hydraulic cylinder

Feed system

feeder crankshaft Three-crank crankshaft
feeder crank bearings 6 tapered roller bearings
feeder crank drive system Reversible hydraulic drive
feed fork drive system Reversible hydraulic drive

Plunger

speed To 21 strokes per minute
stroke length 30 inches (0.76 m)
drive 4 inch (10.16 cm) bore hydraulic cylinder

Drive system

pto speed 1,000 rpm
drive protection Clutches and pressure relief valves
hydraulic pump capacity 80 gallons per minute
Oil cooler Radiator with automatic reversing electric fan

Tying mechanism

knotters Six heavy duty twine knotters
knotter spacing 7 inches (17.78 cm)
knotter lubrication Automatic oil lubrication system
twine storage capacity 18 balls
twine type Plastic 300- or 325-pound knot strength

Bale chamber density control

type Automatic hydraulic density control
density system Four hydraulic cylinders

Tractor requirements

Horsepower 140 pto hp or greater recommended
Hydraulics Single remote
Electrical ASAE seven-pin connector outlet

PERIODIC MAINTENANCE AND LUBRICATION

TYPE OF MAINTENANCE OR LUBRICATION	FREQUENCY
Grease PTO Shaft and U-joints (See Walk-Around)	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
Oil Pickup clutch	Daily
Grease Pickup Shaft Bearing	Daily
★ 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 overrunning clutch	80 hours
★★ 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
Grease First Feeder Crank 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

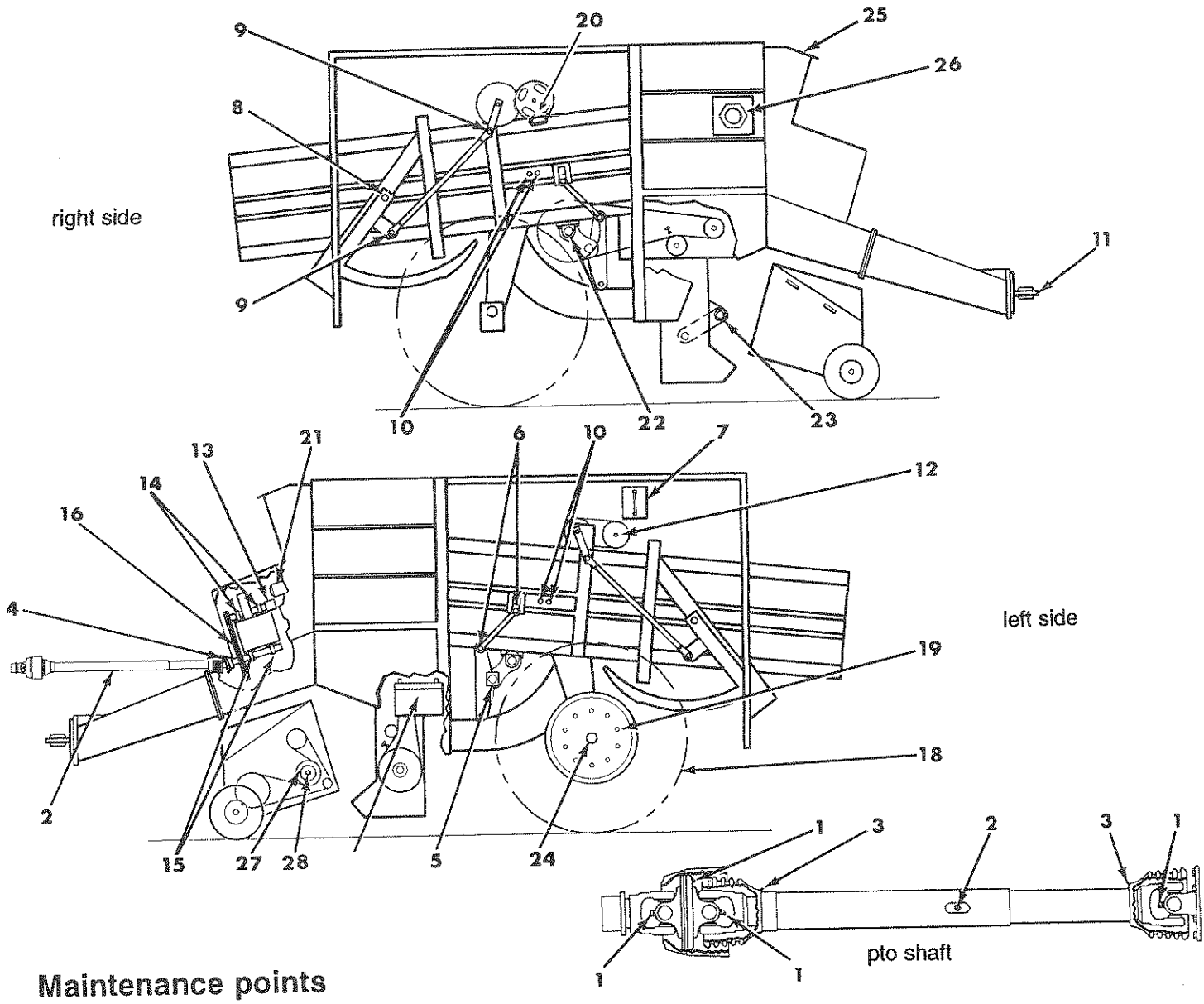
Pump Drive Coupling Lubricant: NLGI rating No. 2 lithium base. Base oil viscosity 900-2, 150 SUS at 100°F (200-470 cSt at 38° C). Minimum dropping point 374°F (190°C) Maximum thickener content 11 percent. Minimum Timken rating 40 lb (18 kg).

★ Do not steam clean for it can cause problems if contact points are contaminated with moisture.

★★ *How to grease coupler on page 39.*

★★★ Check new belts after first 8 hours of operation.

*Some operating conditions may require increased lubrication. Consult your Freeman representative for more information.



Maintenance points

ref no	when, or interval	identification	service type	svc sites	lubricant
1	4 hours	pto univ joints	lube	4	grease[1]
2	4 hours	pto sliding spline	lube	1	grease[1]
3	4 hours	pto cover	lube	2	grease[2]
4	80 hours	drive shaft clutch	lube	1	grease[1]
5	4 hours	feed fork journals	lube	2	grease[1]
6	4 hours	feed fork link brgs	lube	4	grease
all[3]	daily	all[3]	clean	all[3]	
7	daily	knotter oil tank level[4]	check	1	gear oil[4]
8	daily	needle yoke pivot bearings	lube	2	grease[1]
9	daily	needle yoke rod ends	lube	2	grease[1]
10	daily	plunger rollers	lube	4	grease[1]
11	daily	ball hitch	lube	1	grease
27	daily	pickup clutch	lube	2	oil
28	daily	pickup shaft bearing	lube	1	grease[1]
12	80 hours	knotter shaft brgs	lube[5]	2	grease
13	80 hours	main pump drive coupler	lube[5]	1	special grease[5]

ref no	when, or interval	identification	service type	svc sites	lubricant
14	80 hours	upper drive shaft bearings	lube	2	grease[1]
15	80 hours	lower drive shaft bearings	lube	2	grease[1]
16	80 hours	drive belts	check[6]	1	
17	80 hours	battery water[7]	check[7]	1	
18	80 hours	tire inflation[9]	check[9]	4	
19	80 hours	wheel fasteners[10]	check[11]	28	
20	500 hours	knotter brake adj	check	1	
21	yearly	main pump filter	change	1	
22	yearly	feed fork crank main bearings	lube	2	grease[1]
23	yearly	feed crankshaft brgs	lube	3	grease[1]
24	yearly	wheel bearings[8]	lube	4	grease[8]
25	yearly	hydraulic fluid	change[8]	1	fluid[8]
26	yearly	oil tank filter	change	1	

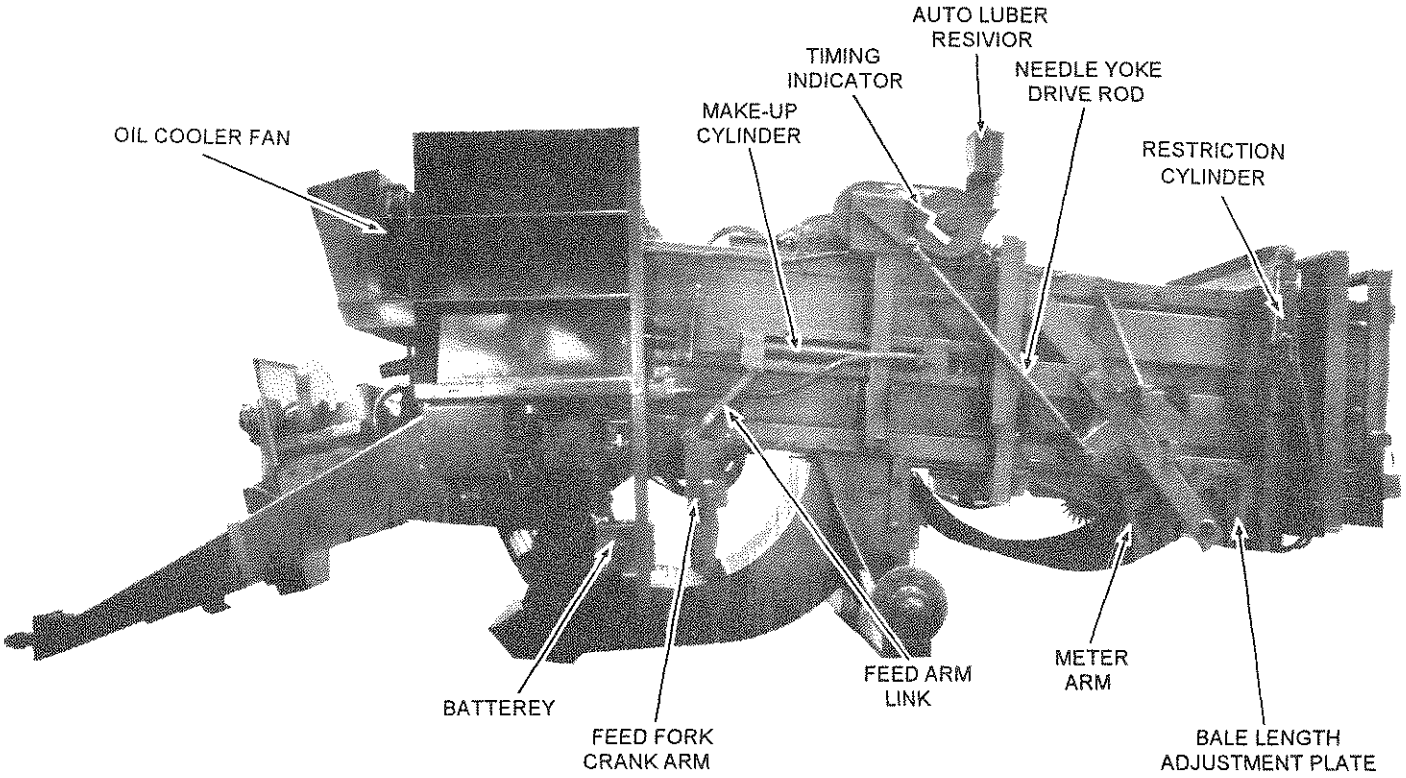


Fig. 4 Left Side

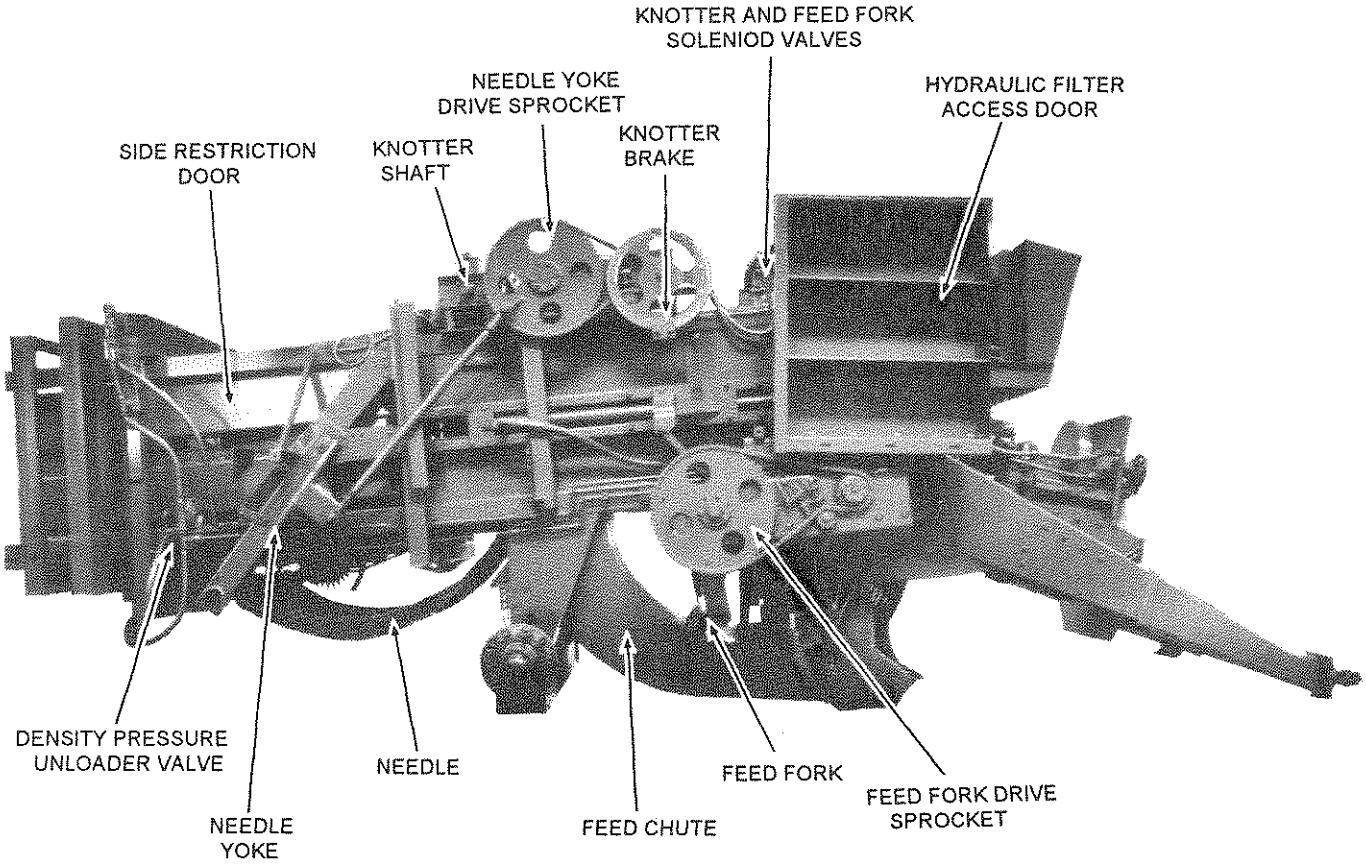
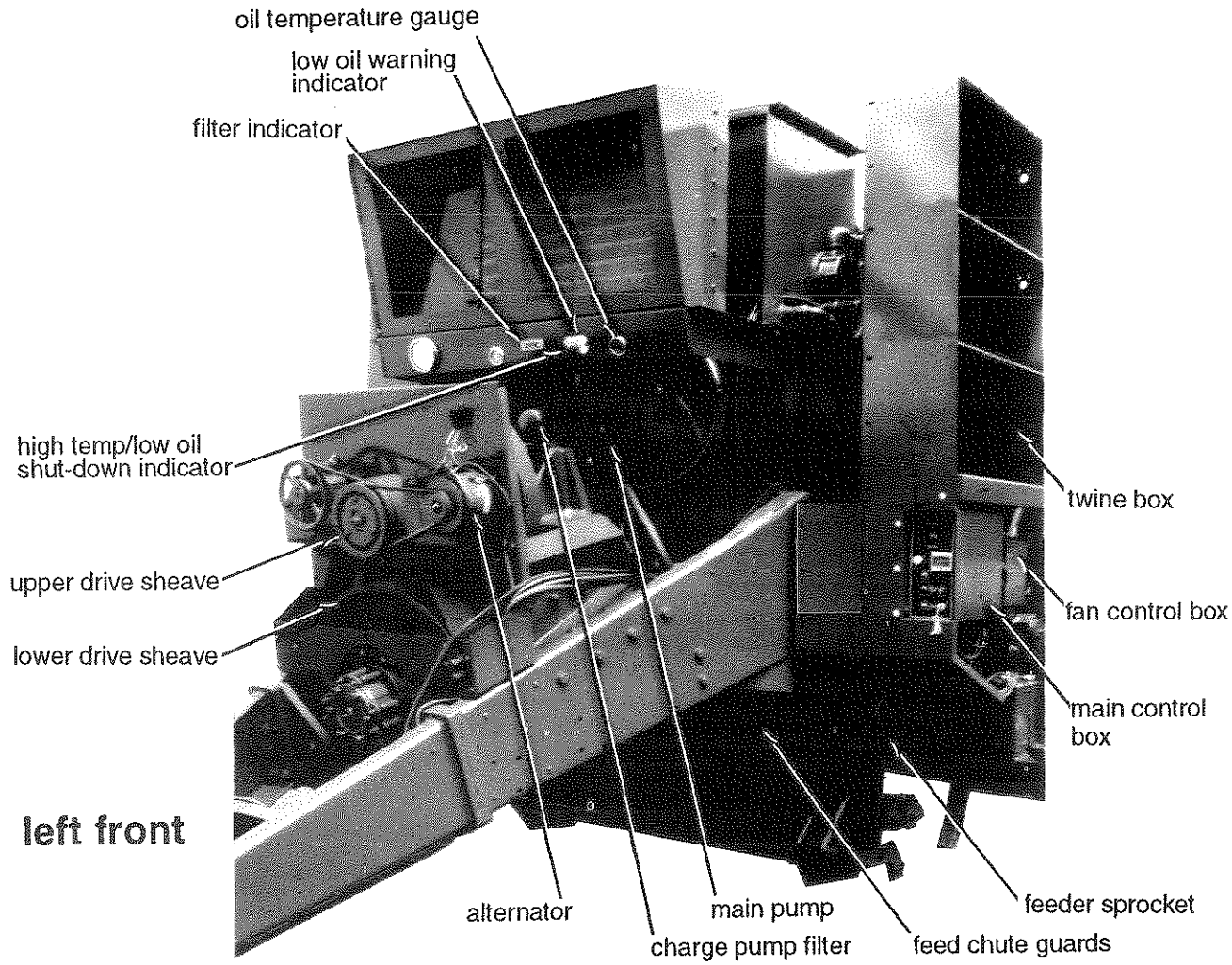
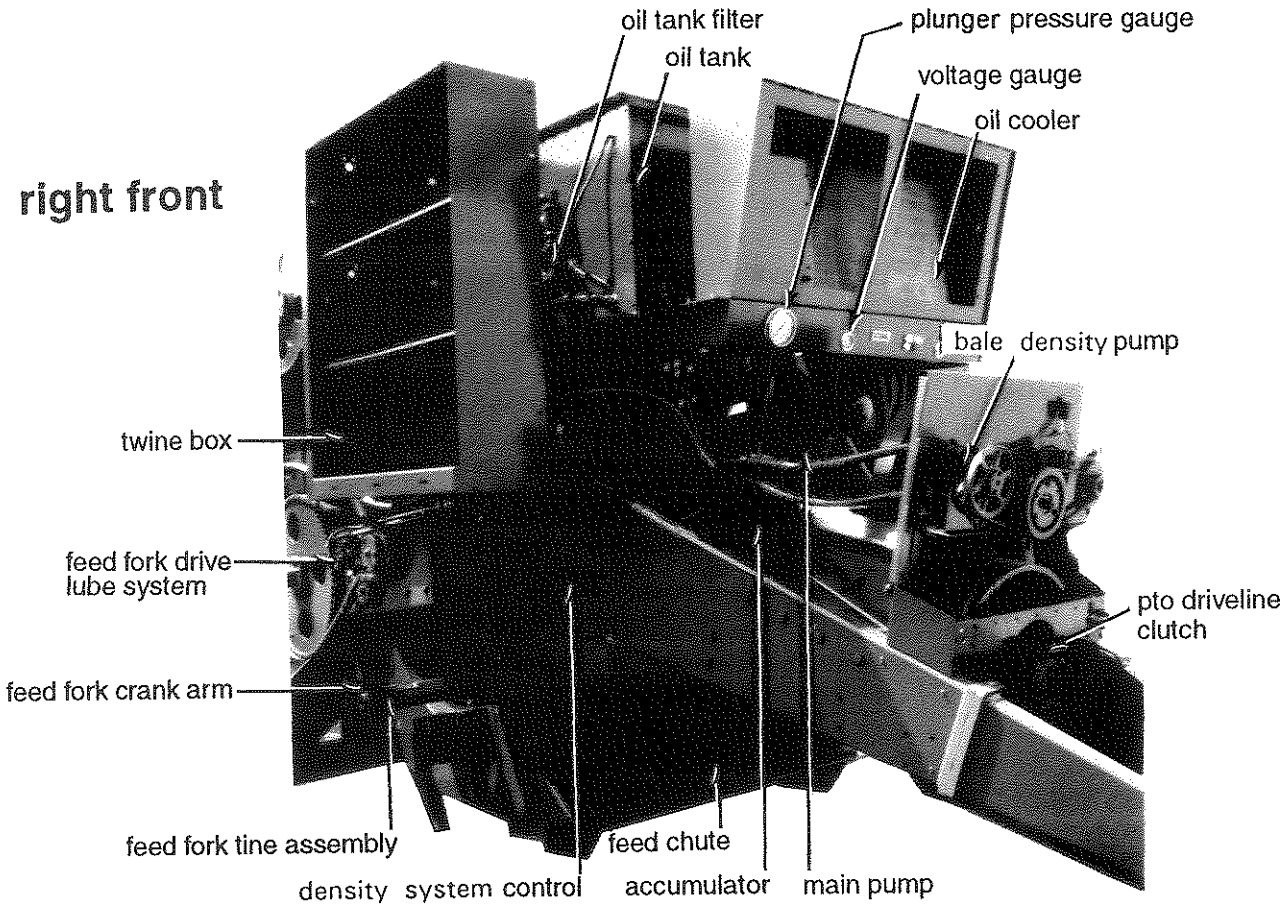


Fig. 5 Right Side


oil temperature gauge
low oil warning indicator
filter indicator
high temp/low oil shut-down indicator
upper drive sheave
lower drive sheave
left front
twine box
fan control box
main control box
alternator
charge pump filter
main pump
feed chute guards
feeder sprocket


right front
oil tank filter
oil tank
plunger pressure gauge
voltage gauge
oil cooler
bale density pump
twine box
feed fork drive lube system
feed fork crank arm
pto driveline clutch
feed fork tine assembly
density system control
feed chute
accumulator
main pump

GENERAL OVERVIEW OF THE FREEMAN 1592 BALER

The 1592 Big Baler is a high density mechanical baler operated by an electrically controlled hydraulic system. The 1592 can handle the toughest jobs of baling, including alfalfa, coastal Bermuda, Sudan, haylage, or cornstalks.

The hydraulically driven components of the 1592 Big Baler make it unique in the agricultural implement industry. An electrical system of solid state components, relays and switches control the hydraulic functions as they need to occur. Three separate hydraulic systems are interconnected by valving and electrical signals to allow the machine to produce solid, uniform bales with a minimum of operator effort. This state-of-the-art design will provide years of dependable service and low operating cost.

The baling process begins as the product enters the baler by means of a conventional rotating pick-up. The pick-up delivers material directly to the feed chute. Material is then pushed further into the feed chute by the continuously rotating first feeder, a three throw crank shaft with cantilevered fork tines.

The feed fork then carries material into the bale forming chamber. When an adequate volume of material is delivered to the bale chamber by the feed fork, a feed sensor mounted on the top of the bale chamber signals the feed fork to stop thus holding the material up in the bale chamber. At the instant the feed fork stops at its top dead center position the plunger begins to extend compressing the product.

While the plunger extends, pressure required to compress the material increases. This increase occurs because the bale density system applies pressure to the top and sides of the forming bale. The density system will exert pressure on the forming bale until the plunger pressure reaches a maximum of 6500 PSI. At this point, density pressure is released to allow continued extension of the plunger at a pressure no greater than 6500 PSI. The plunger reaches the end of it's travel and is signaled to return. At the same time the plunger begins to return, the feed fork starts it's cycle, the plunger reaches the home position and the feed fork once again will carry material into the bale chamber. The density control system applies pressure to the forming bale only while the plunger is extending. The afore mentioned chain of events requires approximately three seconds to occur.

During the tying process, the functions occur as explained in the preceding section. Additional functions occur as follows.

As a bale moves through the chamber, the length of the bale is measured by a wheel located in the bottom of the chamber. When adequate bale length is achieved a switch signals the control circuitry to begin a tie cycle. The plunger advances as during normal baling. Upon reaching the fully extended position the knotter assembly begins to operate and the plunger begins to return. While the knotter is in operation, the plunger may stop briefly at a preset point to allow the knotter to complete the first half of it's cycle. When the knotter has completed the first half of the tying process the plunger will continue to return, the feed fork will start and the knotter continues to operate completing the tying cycle. This chain of events occurs in approximately three seconds.

The 1592 baler is fully automatic. Bale length and bale density are adjustable. Six heavy duty knotters secure the bale with 300 pound knot strength twine (recomended). Individual knot sensors monitor the tying system. To ease service and maintenance each function of the baler can be operated manually, in forward or reverse. Pressure relief valves protect the baler's systems from overload. Relief valves eliminate the need for shear bolts. These features add up to make the Freeman 1592 Big Baler an efficient and reliable machine for all your baling needs.

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.

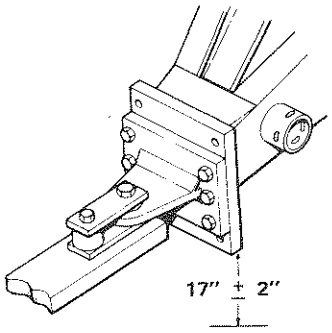


Fig. 1

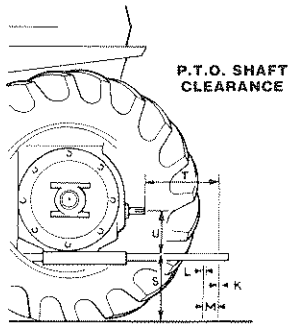


Fig. 2

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.

Wheel Nut torque and Inflation pressure

1. Ensure the rear wheel nuts are torqued to 450 foot-pounds. Do not lubricate wheel nuts.
After the nuts have been torqued, tow the baler one half mile and recheck the nuts for proper torque.

2. Inflate 12 ply tires(23.1 x 26) to 28 p.s.i.

3. Inflate pick-up tires (4.00 x 8) to a maximum of 40 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.**

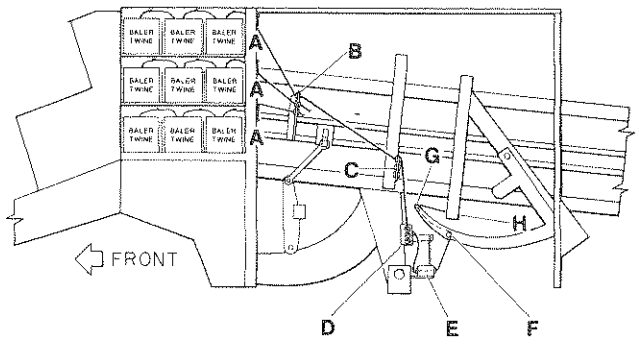


Fig. 3

4. Route twine through the guides located near the twine tensioners, **(E)**; proceed, pulling the twine trough the tensioners, see **Fig. 4.** The three twines from the left twine box are to be routed through the right hand side of the twine tensioner and the three twines from the right hand twine box go through the left hand side of the twine tensioner. This crossover at the tensioner will prevent the twine from rubbing on the axle support leg. (**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.

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.**

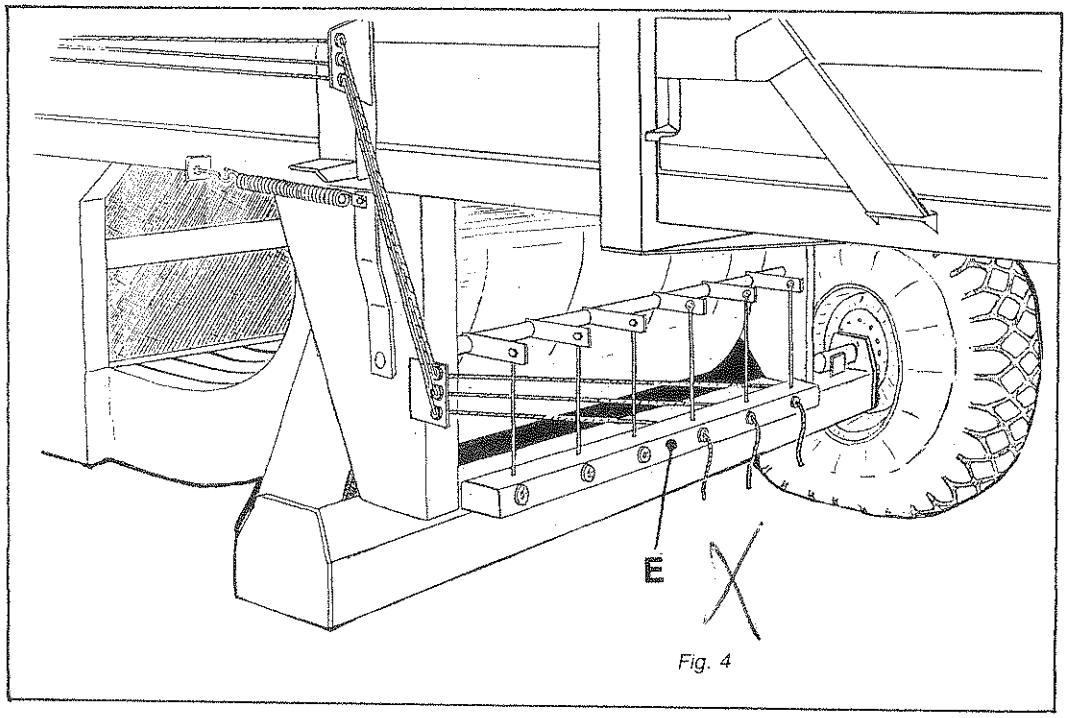


Fig. 4

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.**

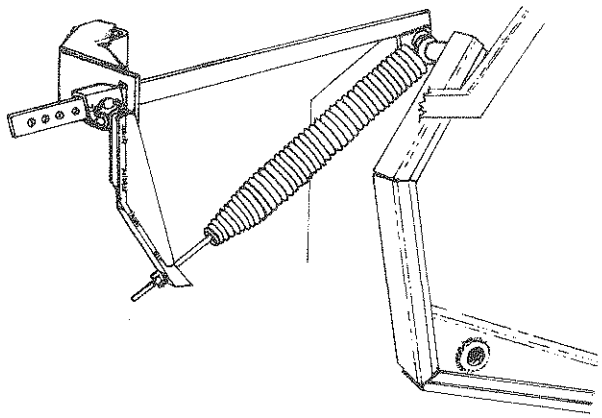


Fig. 5

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.

Operating the Baler

The baler should be allowed a warm up period before actual baling. During this warm up period operate the PTO at approximately 500 RPM. The control mode switch should be in the "Auto" position. Hydraulic oil temperature must be a minimum of 32 degrees F. (0 degrees C.)before baling.

To begin baling, increase PTO speed to 1000 RPM. Move baler over the windrow and proceed forward. Ideal ground speed should provide the baler enough material to activate the plunger with every cycle of the second feeder or about 21 times per minute. Rough ground conditions that limit travel speed, or uneven windrows will have little effect on bale quality because the 1592 plunger is activated only when the chamber is full.

Excesive ground speed and windrow volume may cause the feed system to stall, plugging the baler. The operator can unplug the first feeder by simply pulling the control rope and reversing the feeder. A plugged feed chute and chamber will require manually operating the plunger. Refer to the Manual Control section of this book for instructions for manual operation. After unplugging the baler, select a ground speed to prevent further overfeeding.

The 1592 will be most efficient when operated at peak capacity. Greatest bale density is obtained by providing many small feeds to each bale. Peak production capacity of the baler will not necessarily be achieved by producing bales of highest obtainable density. For information pertaining to feed rates, density control and bale length refer to sections of this book covering feed sensor adjustment, density adjustment and bale length adjustment.

Manual Control

The 1592 Baler is equiped with a Manual Control System. This allows the operator to control the feed fork, plunger and knotters independantly. This feature is to be used when servicing , adjusting or unplugging the machine.

⚠ **Clear all personel away from the machine and keep clear of moving parts while using the manual control.**

To operate the Manual Control, set the control mode switch (fig. 6) to the manual position. Plug the remote cable into one of the six sockets on the control panel. Each socket contols a baler function in either forward or reverse. The tractor PTO should be operated at or below 500 RPM while operating the baler manually.

⚠ **Clear all personel and stand clear of the machine!**

Push the button on the remote control to activate the desired function.

Certain manual functions are limited to prevent damage to machine components.
*The plunger will not advance if the needle yoke is away from it's home position.
*The needle yoke and knotter assembly will not operate in reverse through a portion of it's total cycle.

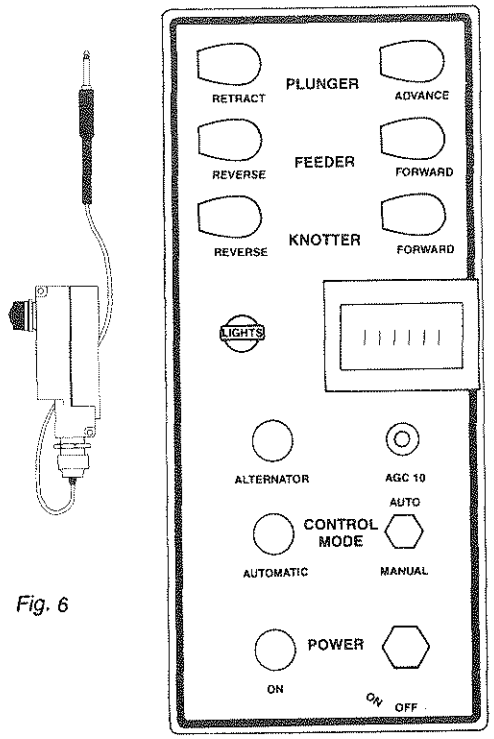


Fig. 6

⚠ **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.

⚠ **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.

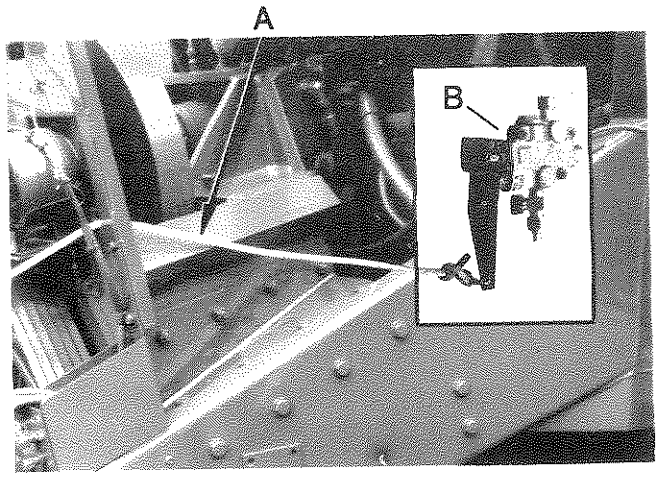


Fig. 7

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.

⚠ **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.

Unplugging The Feed Fork

If the Feed Fork should become stalled due to a plugged feed chute, proceed with the following steps to clear the obstruction.

1. Check the position of the needle yoke and ensure it is in the home position. Use the manual control to reposition the needle yoke if necessary.

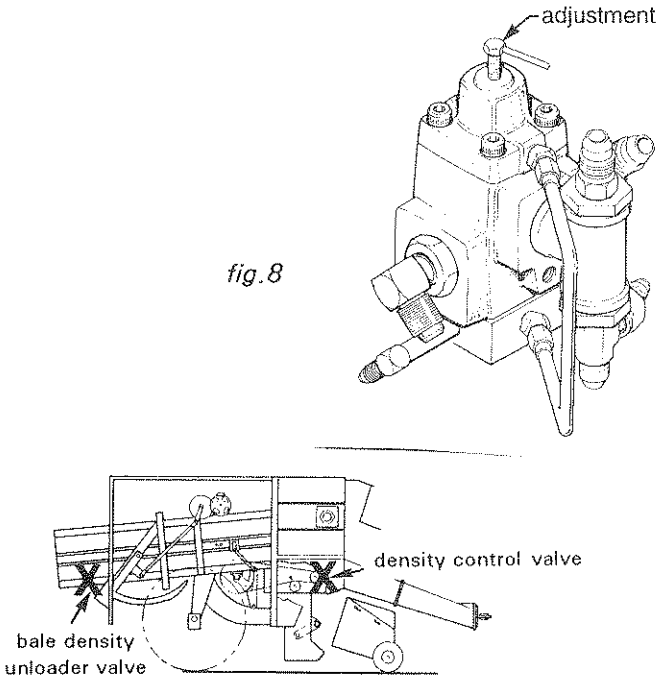
2. Set the control mode switch to Manual. Use the manual control to extend the plunger in order to clear the feed section of the chamber. Fully extend the plunger.

3. Set the control mode switch to automatic. This will cause the plunger to return and start the feed fork operating. The remaining material in the feed chute will be moved into the chamber. If the quantity of material is sufficient the plunger will be activated, further clearing the feed chute.

4. Repeat steps 2 and 3 as necessary

5. Resume baling and adjust ground speed to prevent plugging.

fig.8



BALE DENSITY

Bale density is regulated by applying pressure to the top and sides of the forming bale. Four hydraulic cylinders exert force on the top and side restriction rails. These hydraulic cylinders are pressurized by a pump mounted on the main drive assembly at the front of the baler. This pump maintains a constant but variable pressure applied to the bale as it is being formed. An increase or decrease in bale density is acomplished by regulating this pressure during the advance of the plunger. The amount of restriction on the bale being formed affects the amount of plunger pressure required to compress and move the bale through the machine.

The maximum obtainable pressure generated by the plunger drive system is controlled by the density control system. An adjustable valve is provided to control plunger pressure. Pilot pressure from the plunger drive system signals the bale density system to regulate pressure on the restriction rails during plunger advance. When the plunger is not advancing a check valve maintains density pressure at the pressure attained during the previous plunger advance. This pressure will be held until the plunger begins it's next advance at which time full density pressure will again be applied to the restriction cylinders.

BALE DENSITY ADJUSTMENT

Plunger pressure indicated by the plunger pressure guage is relative to bale density. Most baling operations require plunger pressure in the 3800 to 4500 PSI range.

The Density Pressure unloader valve located on the right rear of the machine (**Fig. 8**) is equipped with an adjusting screw to allow the operator to make changes in bale density. Turning the adjusting screw clockwise will increase bale density. A counterclockwise adjustment will reduce bale density. Observe changes in plunger pressure after each adjustment of the unloader valve. Several plunger strokes may be necessary to normalize the pressure setting.

Bale Length

The Bale length adjustment mechanism (Fig.9), is located on the left rear side near the service ladder. Bale length is measured by a meter wheel as material moves through the bale chamber. The meter wheel rotates and raises the meter arm until LS 11 is activated. While the knotters operate tying the bale, the meter arm is reset and the process begins again. The distance the meter arm travels from the reset position to the point where LS 11 is activated determines bale length. Total meter arm travel is controlled by moving the bale length adjustment bar up or down.

⚠ Caution: Disengage tractor PTO and wait for all motion to cease before adjusting or servicing the machine.

Adjusting Bale Length:

Pull the locking pin outward to unlock the bale length adjustement bar. Move the bar up to increase bale length or down to decrease bale length. Each adjustment slot selects a different bale length. Push the locking pin in to lock the bar into the selected position. Any change of adjustment will affect the length of the next bale made.

Cleaning Bale Chamber

For ease of cleaning baled material from the chamber a valve can be closed to prevent pressure from being applied to the restriction rails. This valve is located at the right front corner of the baler. Follow the steps listed below to clear the bale chamber.

1. Turn the ball valve to the "CLOSED" position, see **Fig. 10;**

2. Switch the baler control mode to "MANUAL" and with the manual control operator extend the plunger to it's fully advanced position. Operate the control momentarily stalling the plunger at the end of it's stroke. This will cause density pressure to be released from the restriction cylinders. Return the control mode switch to the auto position.

3. 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.

⚠ **Caution: Disengage tractor PTO and lock tractor brakes and/or transmission before cleaning the bale chamber.**

4. Clean out the bale chamber.

5. After cleaning the bale chamber, turn the ball valve to the "OPEN" position, see **Fig.10. NOTE:** Failure to do so will result in lack of density pressure.

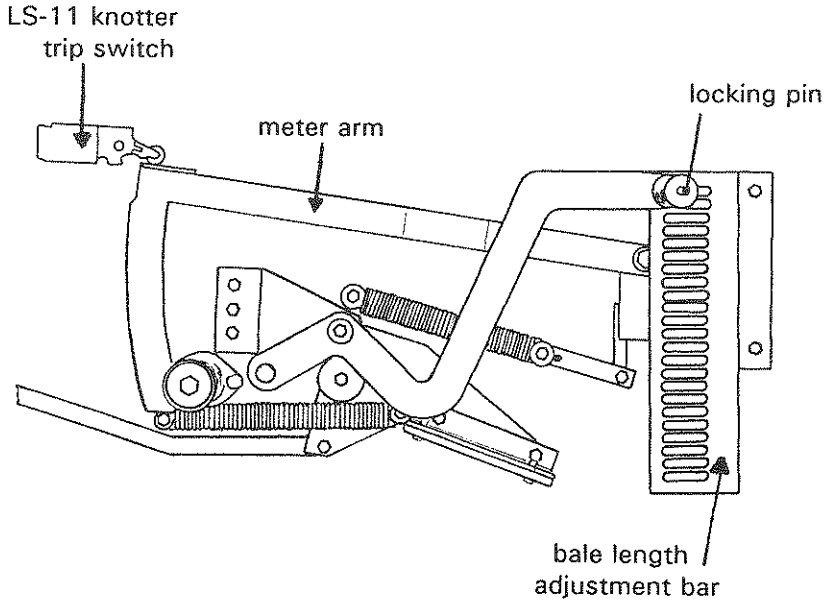


fig. 9

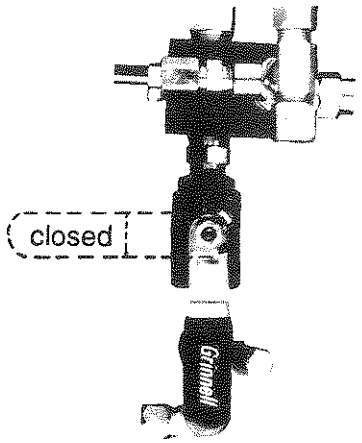


fig. 10

Bale Ejector (optional)

The bale ejector option uses hydraulic pressure provided by a tractor remote to clear the bale chamber. Three valves control the bale ejector. The system selector diverts hydraulic pressure from the pickup lift to the bale ejector. The restriction rail selector releases pressure on the restriction rails to eliminate the restriction on the bale to be ejected. The Bale eject valve controls the extension or retraction of the ejection mechanism.

Before using the bale ejector, tie the remaining bale by manually operating the knotter system. Follow the steps listed below to eject the bale.

1. Move the system selector to the bale eject position.

2. Move the restriction rail selector to the ejecting mode.

3. Operate the bale eject control lever to extend and retract the bale ejector as many times as necessary to eject the bale.

4. Once the bale is ejected, return the bale ejector to the retracted position, move the restriction rail selector to the baling mode and return the system selector to the pickup lift mode.

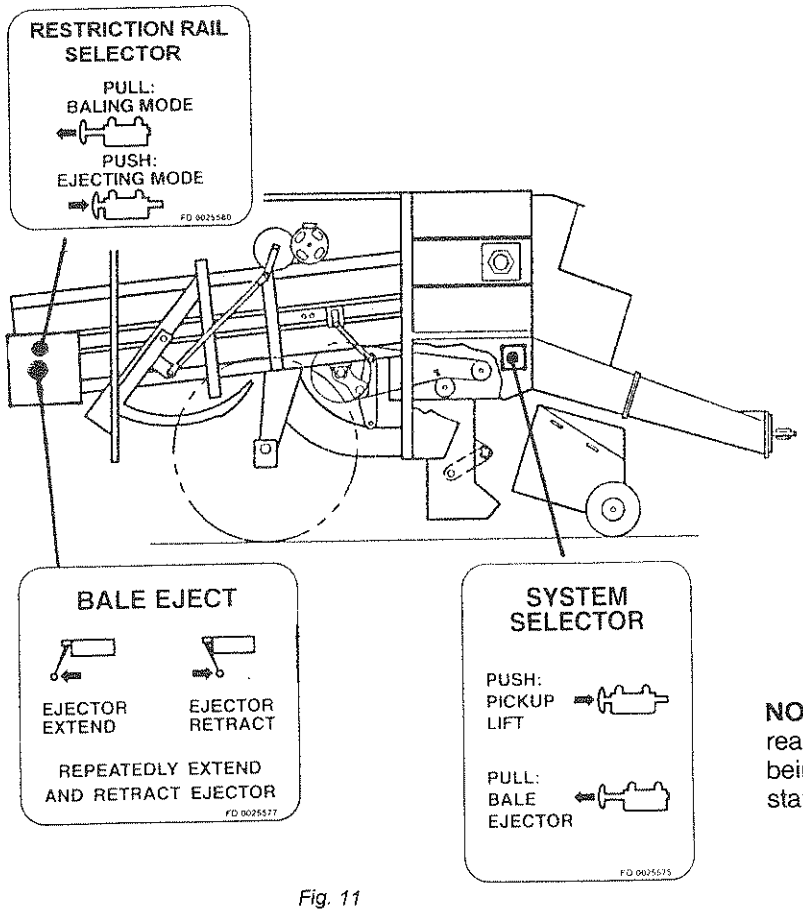


Fig. 11

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.

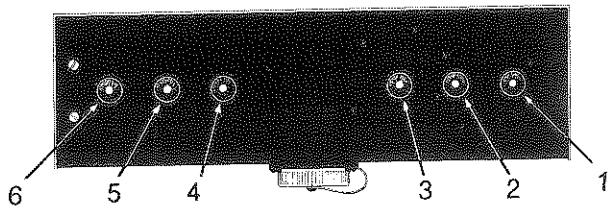


Fig. 12

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.**

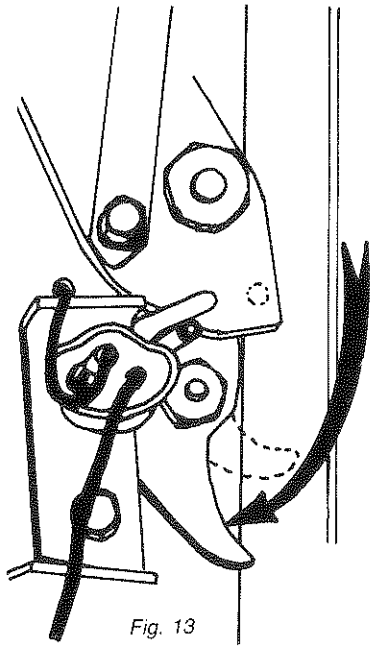


Fig. 13

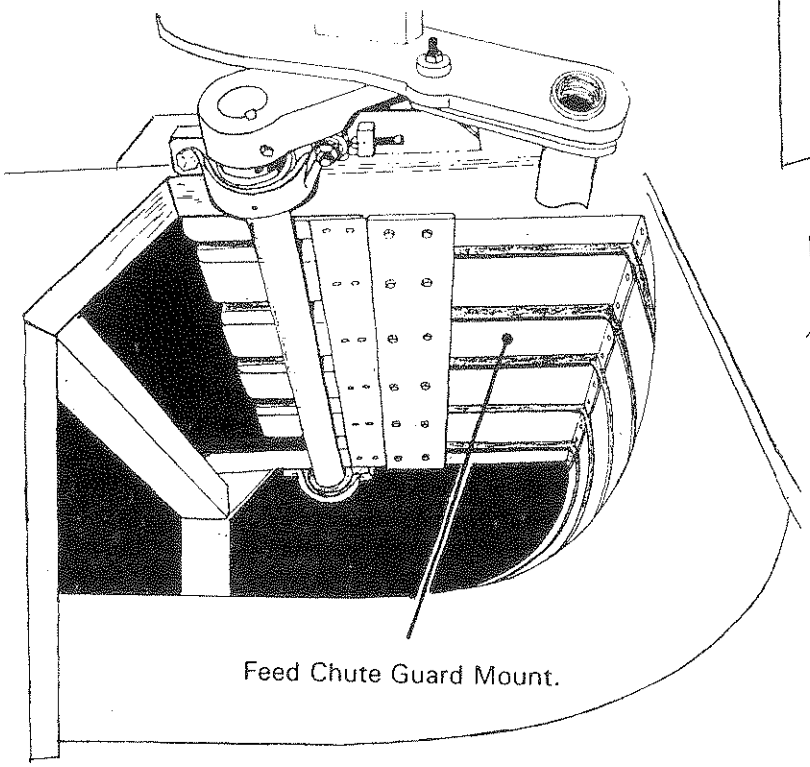
NOTE: The knot sensor finger must be manually pulled rearward if a knot has been mistied and/or new twine is being installed or rethreaded through the system or if starting with an empty bale chamber.

Variable feed Chute

The variable feed chute allows the operator to physically limit the size of each charge delivered to the bale chamber by the feed fork. This is accomplished by narrowing the feed chute. The standard feed chute measures 15 inches at the bale chamber opening. Optional settings reduce this opening by 3 inches or 4 1/2 inches.

Adjustment;

Increase or decrease the feed opening by changing the position of the Feed Chute Guard Mount. The Feed Chute Guard Mount is located below the plunger at the top of the feed chute (Fig. A). Three sets of holes are provided to allow adjustment. Spacer plates are installed or relocated at the feeder guard support assembly (Fig. B) at the front of the feed chute.



Feed Chute Guard Mount.

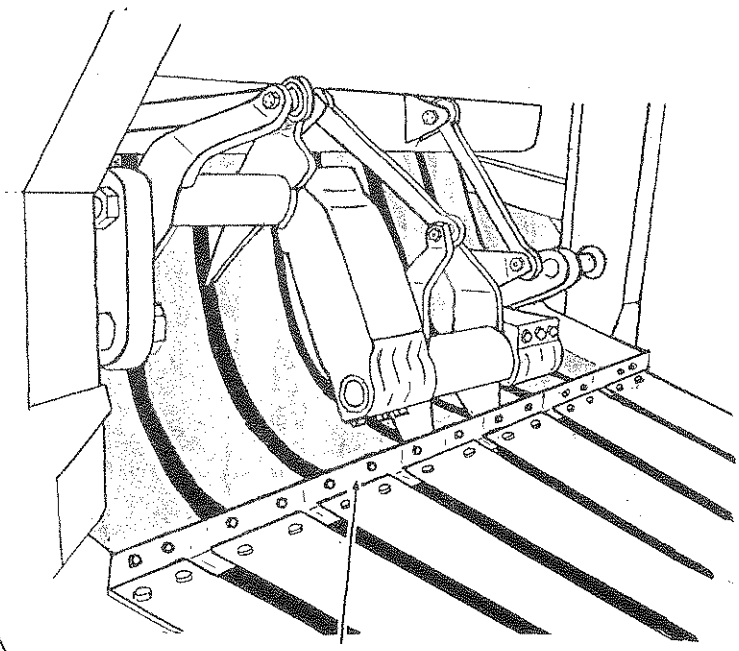
fig A.

To change the position of the feed chute guard mount

1. Remove the nineteen 5/16 inch bolts connecting the chute guards to the feeder guard support assy.

2. Remove fourteen 1/2 inch bolts holding the feed chute guard mount to the main frame.

3. Slide the guard mount to the desired position and install the mounting bolts.



Feeder Guard Support Assembly.

fig. B.

4. Assemble seven feed guard adaptor plates to the feed guards.

5. Position the adaptor plates relative to the position chosen for the feed chute guard.

6. Re-attach the feed guards and adaptor plates to the feeder guard support assy. Tighten all bolts.

7. Reposition the Plunger Slot Cleaners at the top of the chamber.

8. Adjust plunger return stop switches, LS 9 and LS 10. See page 15.

Variable Feed Chute, Limit Switch Adjustemts

Anytime the feed chute opening is changed it is necessary to adjust the plunger home position. The home, or retracted position of the plunger is determined by the position of limit switches 9 and 10. LS 9 and LS 10 are located inside the baler at the left front above the feeder crank assembly. See Fig. C

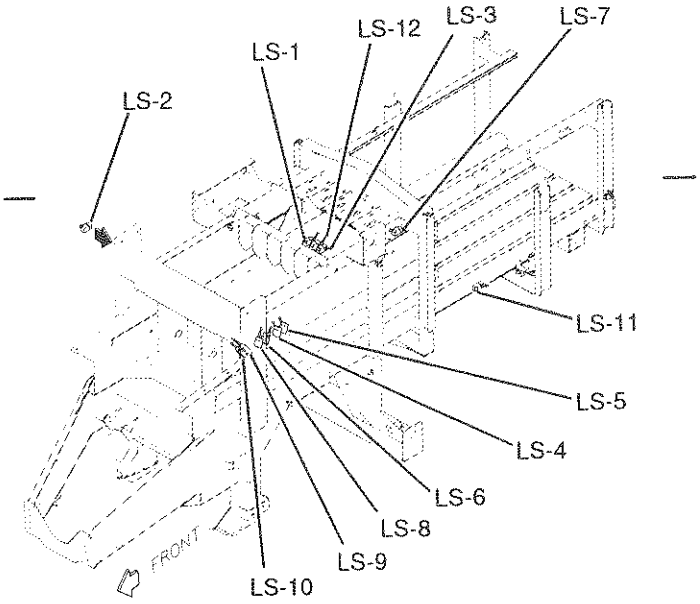


fig. C

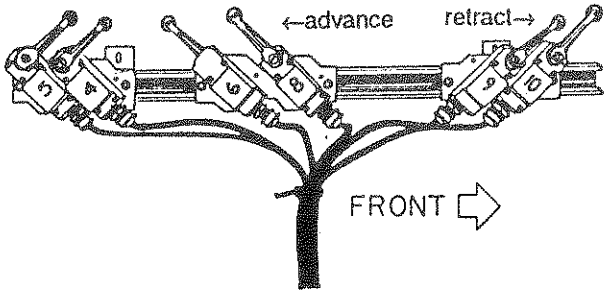
Adjustment objective:

With the feed chute in the fully open position the plunger must stop on the return stroke within 1 inch of the end of it's available travel. This prevents bottoming of the plunger cylinder. LS 9 and 10 are to be adjusted to accomplish this. Follow the instructions described on pages 30 and 31 for detailed information regarding proper adjustment of LS 9 and LS 10.

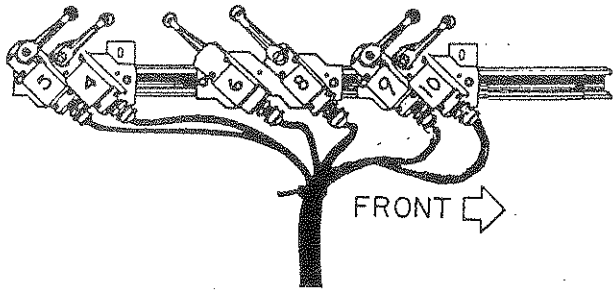
With the feed chute in the intermediate position, the feed opening is reduced by 3 inches. Proper adjustment of LS 9 and 10 will stop the plunger on the return stroke clear of the feed opening four inches from the end of it's available travel.

With the feed chute in the most restrictive position, the feed opening is reduced by four and one half inches. Proper adjustment of LS 9 and 10 stop the plunger on the return stroke clear of the feed opening 5 1/2 inches from the end of it's available travel. To achieve the required adjustment, limit switches 9 and 10 will have to be repositioned on their mounting plate (Fig. D).

For more information on limit switch adjustment see pages 30 and 31.



Limit switch arrangement for fully open and intermediate feed chute positions.



Limit switch arrangement for fully restricted feed chute position.

fig. D

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.

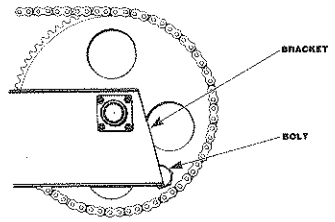


Fig. 14

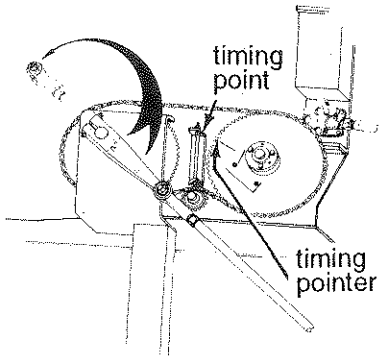


Fig. 15

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.

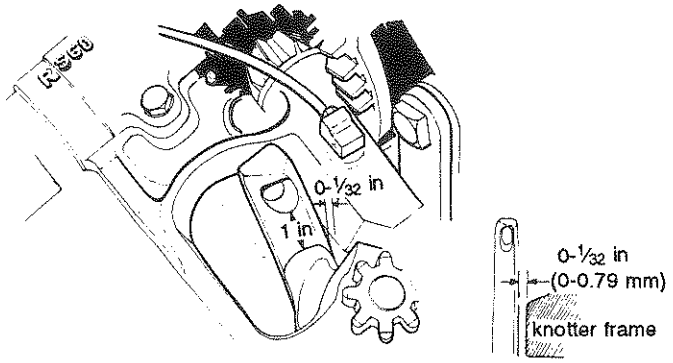


Fig. 16

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

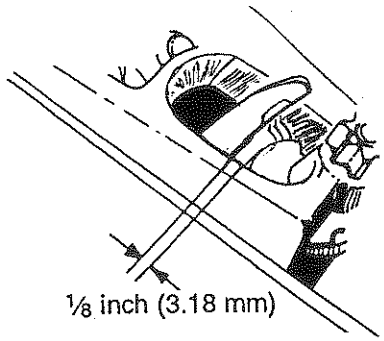


Fig. 17

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.

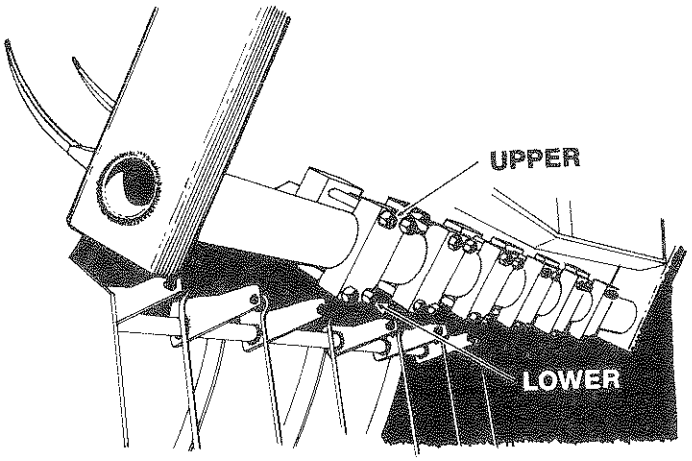


Fig. 18

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.**

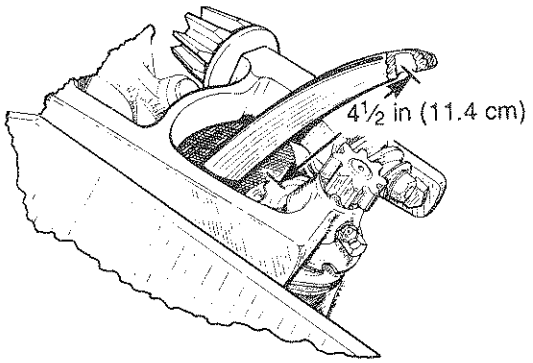


Fig. 19

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.

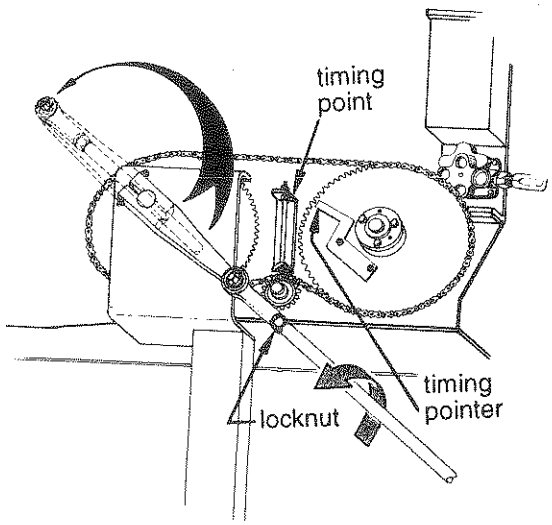


Fig. 20

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.**

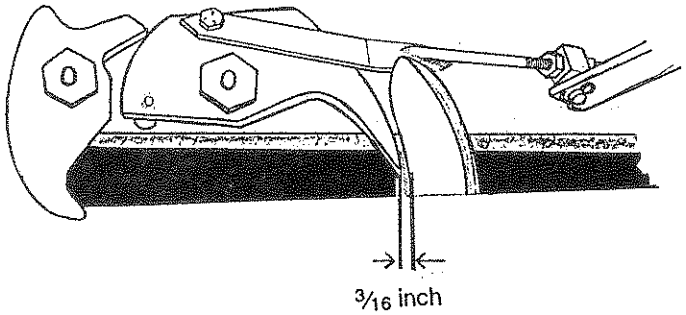


Fig. 21

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.

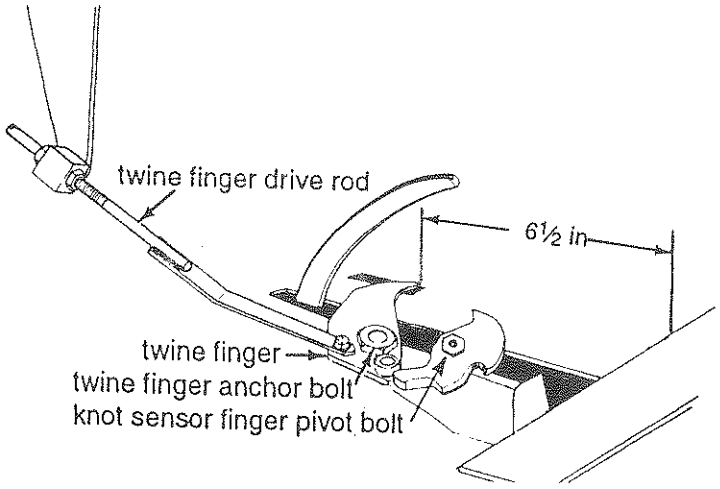


Fig. 22

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 is 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.

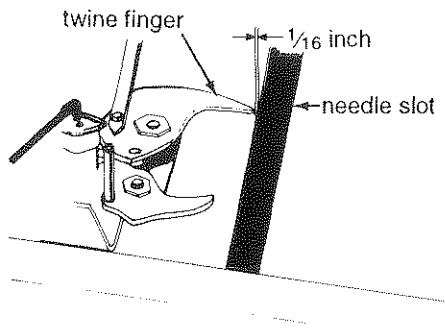


Fig. 23

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.

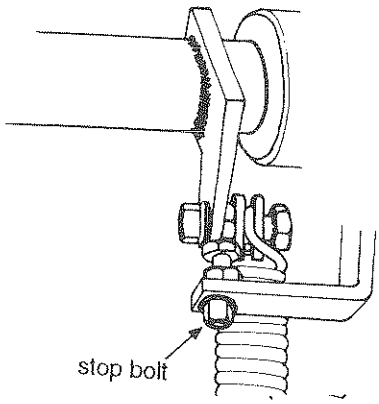


Fig. 24

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.**

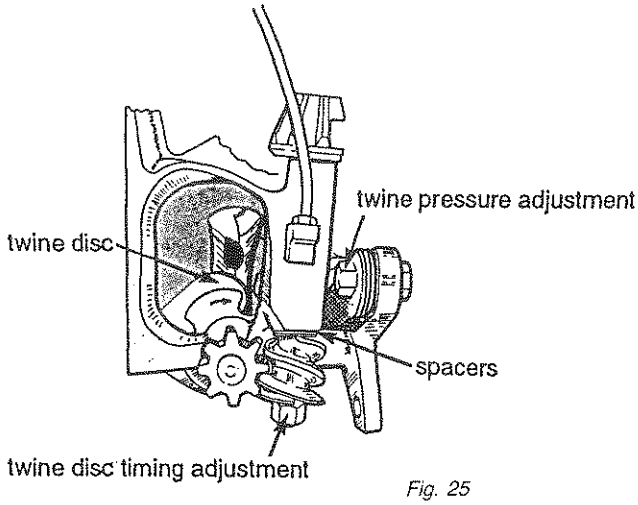


Fig. 25

Adjust the twine holder enought to prevent the twine from pulling from the disk 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.

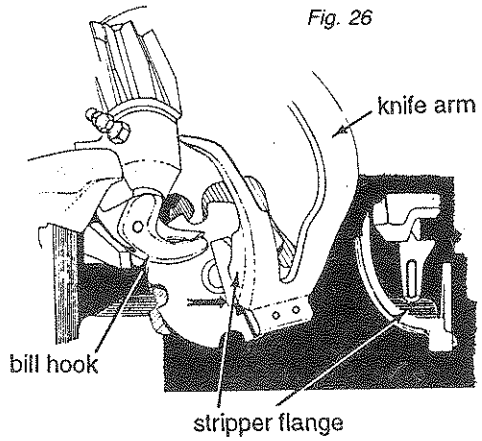
1. With the knotters in their home position, make certain that the slots in the twine disc cleaner are free of compacted dust and chaff.

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.

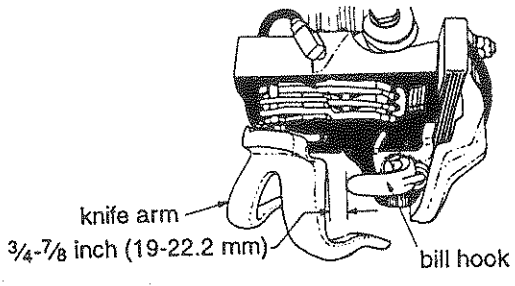


Fig. 27

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.

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.**

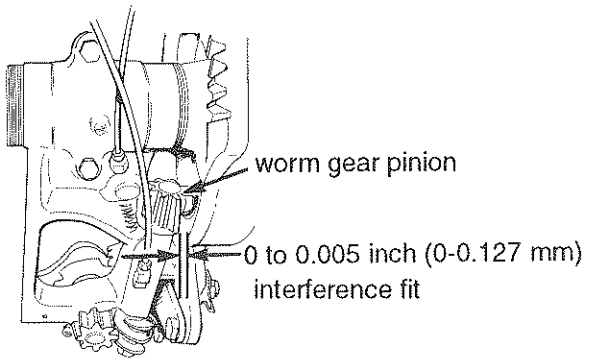


Fig. 28

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.

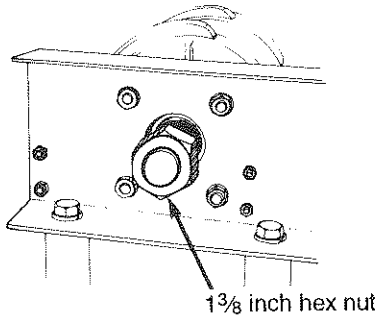


Fig. 29

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.

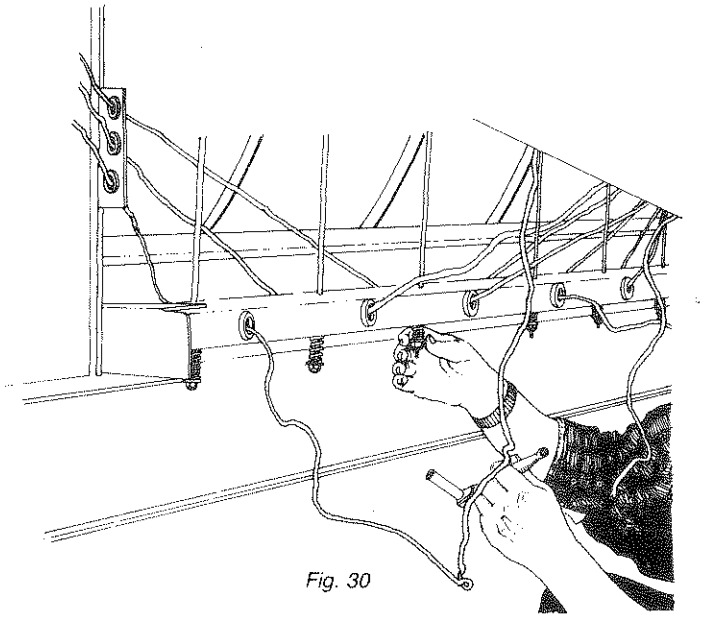


Fig. 30

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.

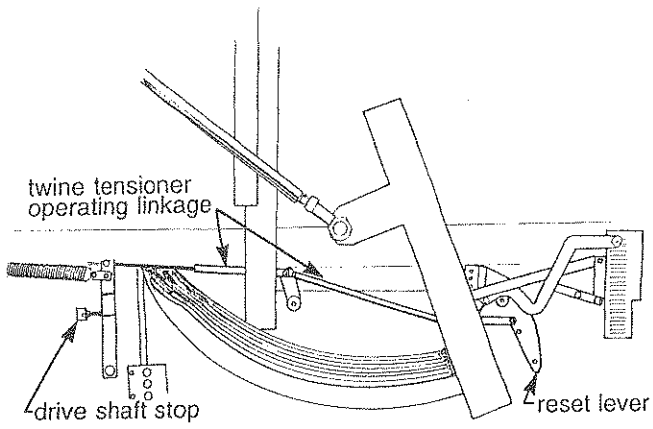


Fig. 31

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.**

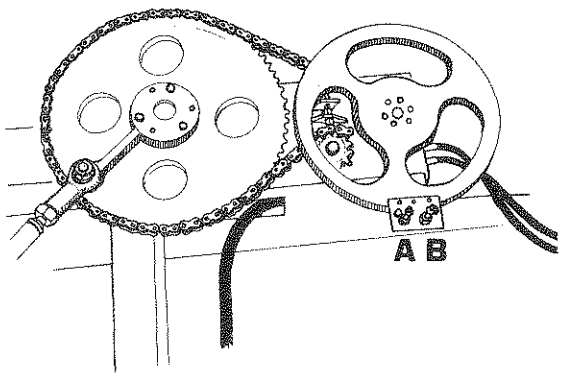


Fig. 32

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.**

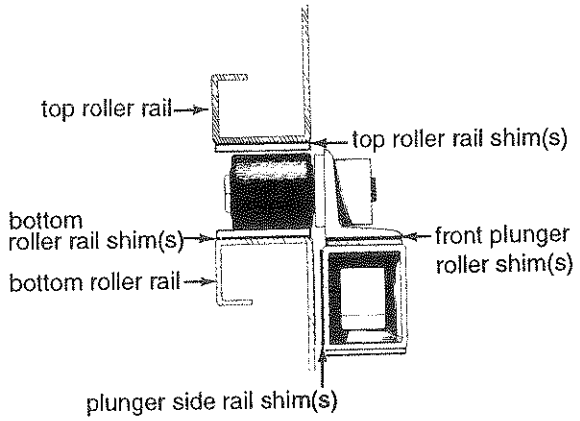


Fig. 33A

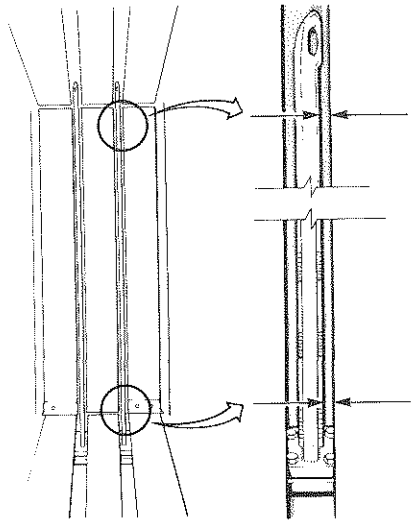


Fig. 33B

NEEDLE ALIGNMENT

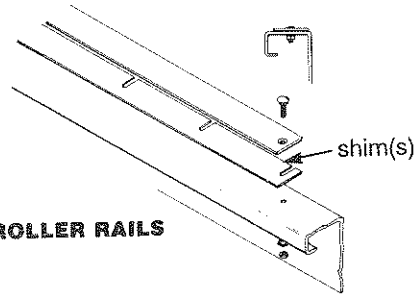


Fig. 33C

PLUNGER ROLLER RAILS

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.

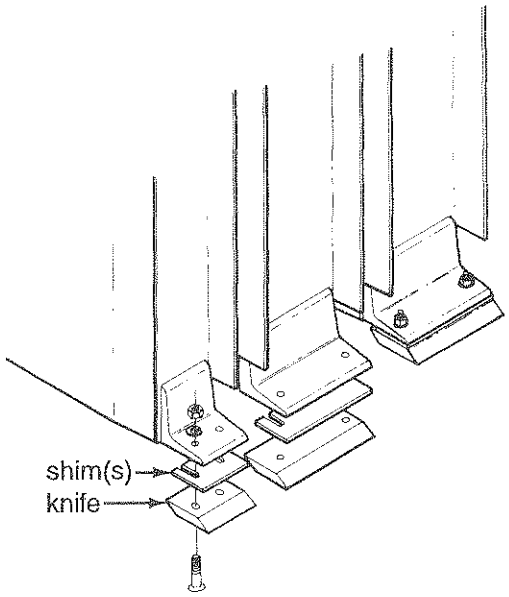


Fig. 34

********** 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. When the plunger reaches the end of the advance stroke it will automatically return to the home position.

6. Use a stopwatch to accurately measure plunger return time. Plunger return times vary depending upon the lenght of plunger stroke. See Variable Feed Chute information on pages 14 and 15. Return times should be as listed below.

2.4-2.8 seconds with plunger stopping 1 inch from the fully retracted position..
2.1-2.5 seconds with the plunger stopping 4 inches from the fully retracted position.
2.0-2.4 seconds with the plunger stopping 5 1/2 inches from the fully retracted 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 accuratly measure plunger advance time, Plunger advance times vary depending upon the length of plunger stroke. See Variable Feed Chute Adjustment on pages 14 and 15. Advance times should be as listed below.

2.4-2.8 second with the stoke beginning one inch from the fully retracted position.
2.1-2.5 seconds with the stroke beginning four inches from the fully retracted position.
2.0-2.4 seconds with the stroke beginning five and ond half inches from the fully retracted 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

Proper limit switch adjustment is necessary to maintain accurate and dependable baler function. Before making any adjustments make sure the limit switch arms are set at the correct angle. Fig. 36 illustrates correct switch arm angle for each individual switch. Fig. 35 shows limit switch locations throughout the baler. Limit switches 4,5,6,8,9 and 10 are located inside the baler above the first feeder on the left hand side.

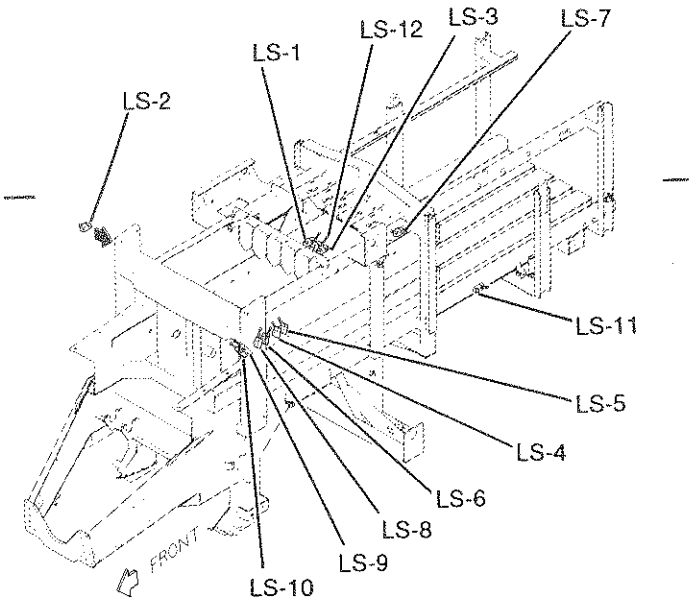
⚠ CAUTION:

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.



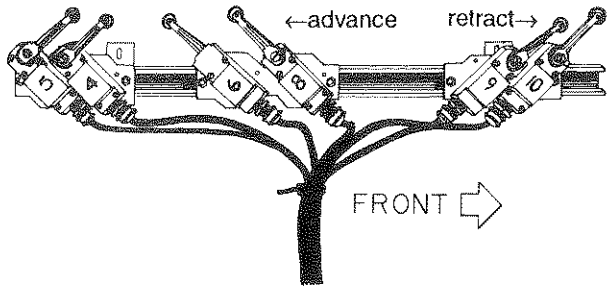
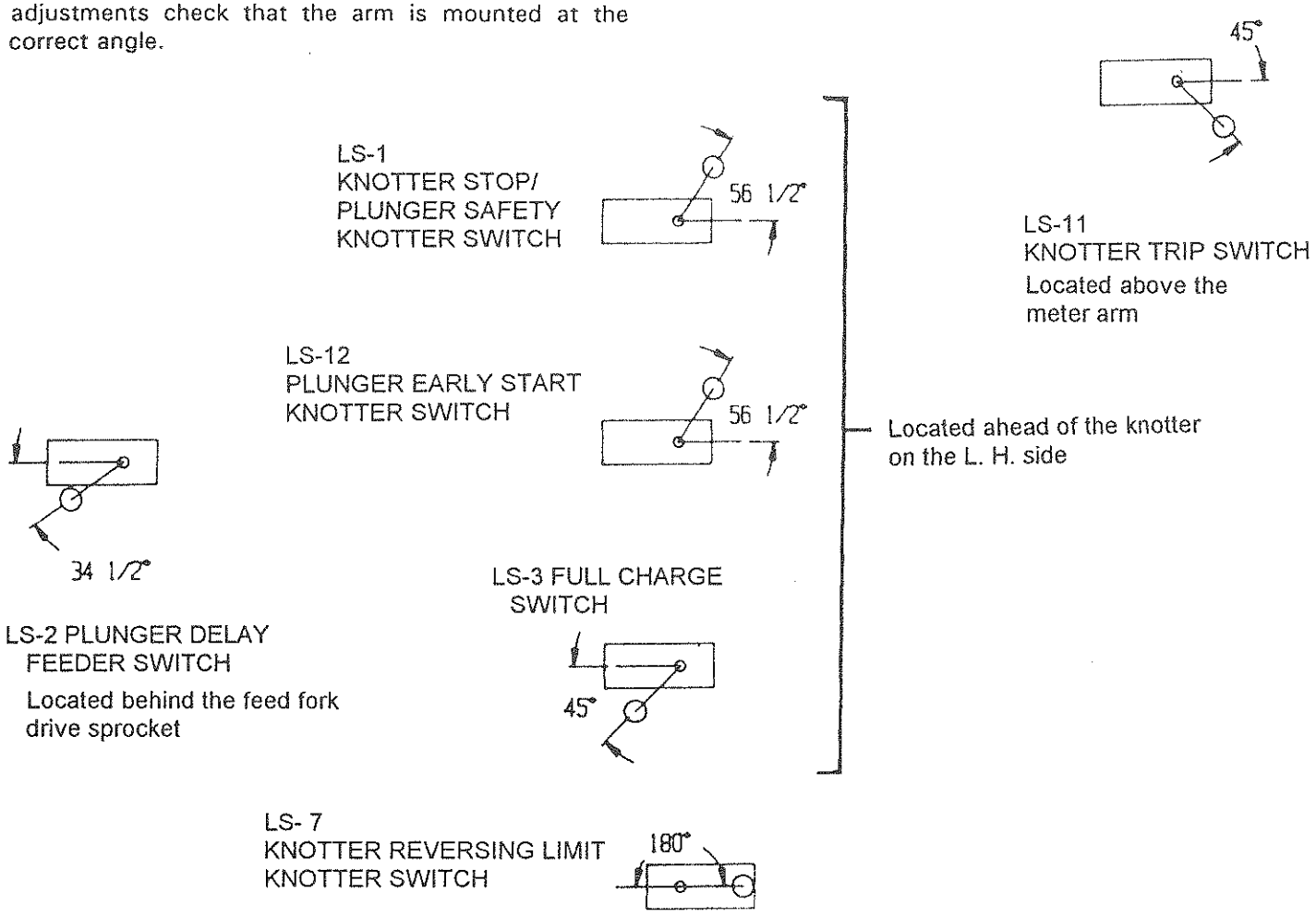


Fig. 35

Switch Arm Angle

The following diagram illustrates correct arm angle for all limit switches. Before making any limit switch adjustments check that the arm is mounted at the correct angle.



Limit switches 4,5,6,8,9,10 are shown below in the order they are arranged on the machine when viewed from inside.

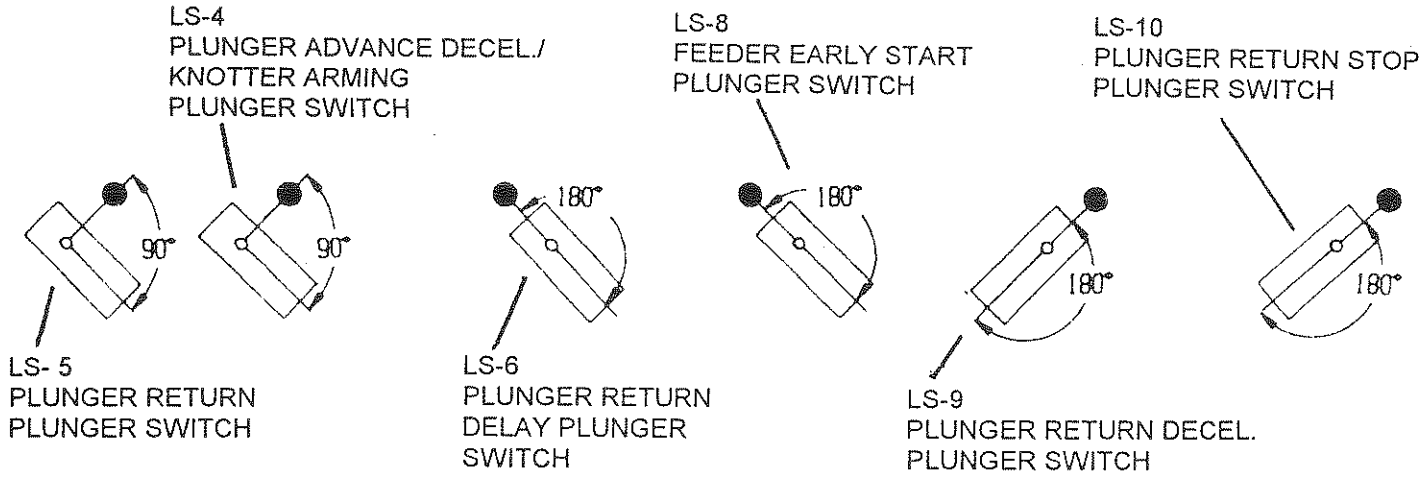


Fig.36

⚠ CAUTION:

Before making any adjustments:

1. Disengage Tractor PTO, shut off tractor, lock tractor brakes and/or transmission.

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.**

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.**

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.

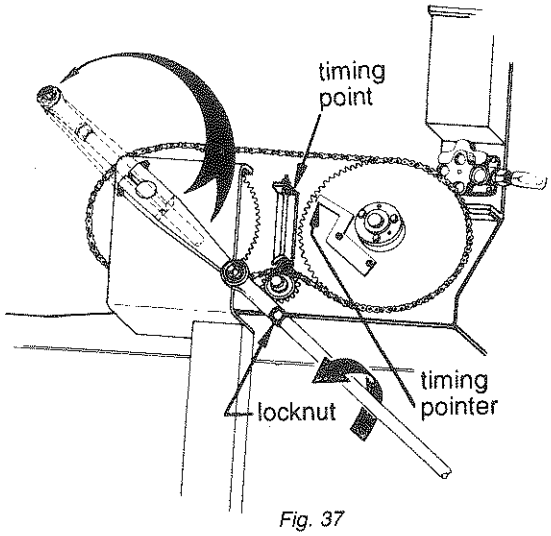


Fig. 37

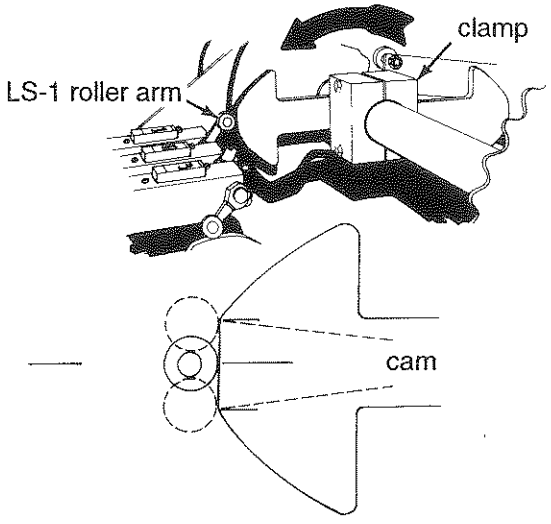


Fig. 38

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.

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.

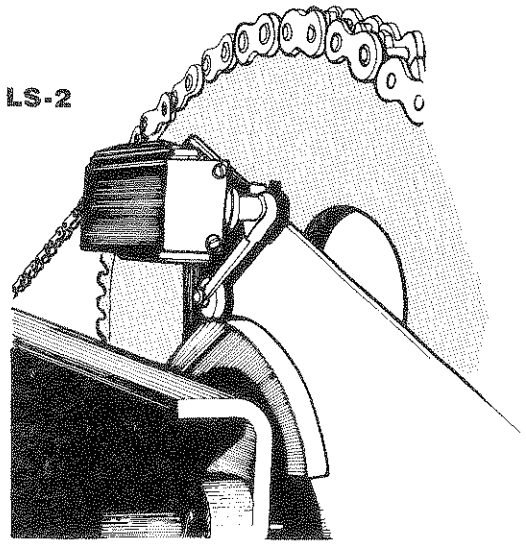


Fig. 39

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.

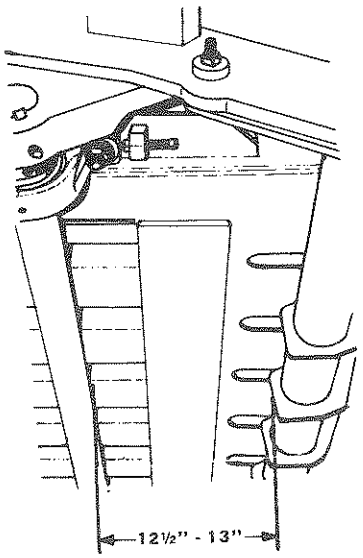


Fig. 40

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:

LS 3 should be operated by the charge sensor cam in about the first two inches of upward travel of the charge sensor paddles. As the charge sensor is returned to it's rest position LS 3 should be released within one half inch of the paddles rest position. Measure at the rubber bumper for the right hand paddle.

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**).

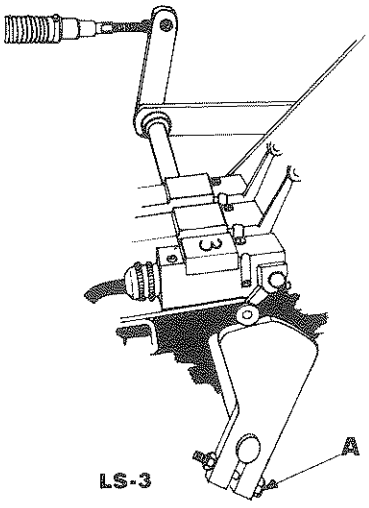


Fig. 41

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.

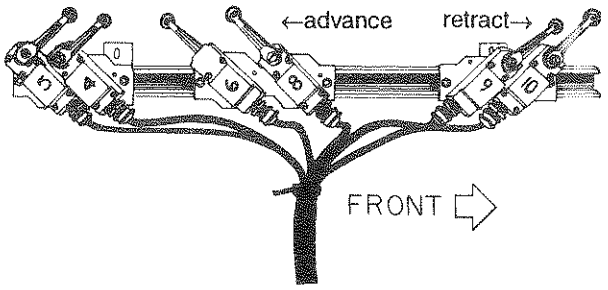
Adjustment objective:

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 it's extend stroke. LS 5 also signals the knotter to begin it's cycle.

Adjustement Objective;

The plunger must stop one inch prior to the end of the extend stroke to prevent bottoming of the plunger cylinder.

⚠ **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.

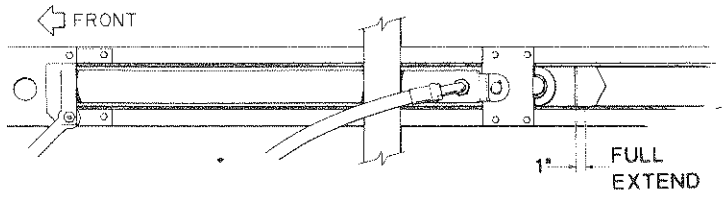


Fig. 43

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:

LS 6 delays plunger retract during the tie cycle until the knotter is halfway through the tie cycle and LS 12 is operated. This breif delay allows the plunger to hold the material in the bale chamber as it is tied. Twine placement is assisted by this action.

Adjustment objective:

The plunger should retract approximately 9 inches before LS 6 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 the twine box mount see 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 on all six knotters.

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

3. Attatch test strings to LS 3 and LS 11 roller arms. Route string so that switch can easily be activated and released while standing on the ground,clear of the machine and its moving parts.

4. Engage tractor PTO and run baler at 1000 R.P.M. in the automatic mode.

5. Pull test string from LS 11 and hold.

6. Pull test string from LS 3 and release when feed fork stops and plunger starts to advance.

7. Release test string from LS 11 as soon as the knotter starts to move.

8. Observe the plunger as it retracts. It should pause breifly approximately 9 inches from the fully extended position as it returns to it's home position.

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

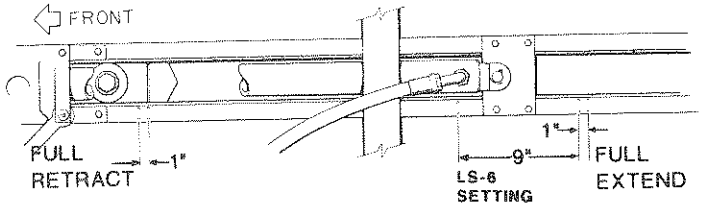


Fig. 44

10. Adjust LS 6 forward or rearward as necessary to cause the stopping position observed in step 8 to be approximately 9 inches from the fully extended position.

11. Slide LS 8 so that the center of the switch shaft is 3 inches forward of the center of the switch shaft on LS 6.

12. Repeat steps 4 through 11 as necessary until the plunger stops when it is 9 inches from it's fully extended position.

13. Disengage tractor PTO 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.

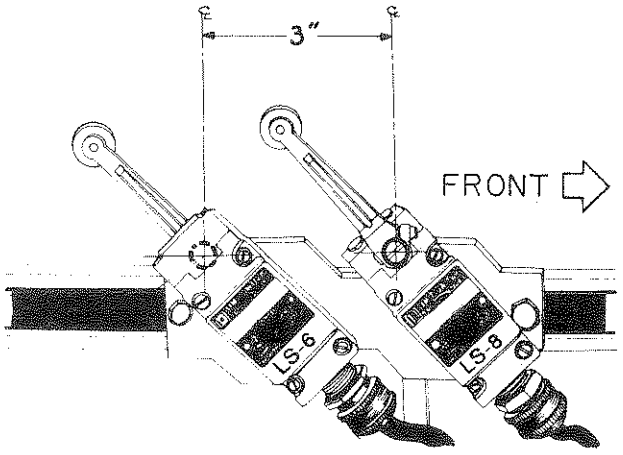


Fig. 45

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 29

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).

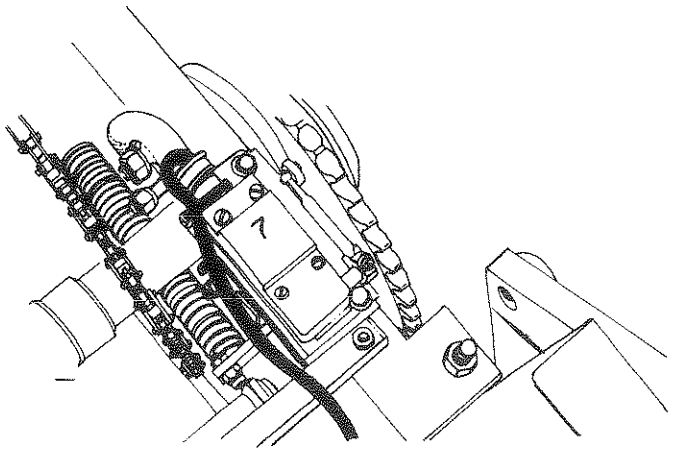


Fig. 46

Adjustment:

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

2. Loosen the mounting bolt and slide the mount and switch, approximately, 1/2 inch to the rear of limit switch # 10 (plunger return stop switch).

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 to the rear or baler. If the plunger stops to the rear of LS #10 stopping position slide LS #9 closer to LS #10.

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 it's return stroke.

Adjustment Objective:

The plunger must stop one inch from the end of it's stroke to prevent bottoming of the plunger cylinder. With the variable feed chute adjusted to the intermediate or extreme reduced positions the plunger should stop just clear of the feed opening.

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 decelerated speed adjustment. (Page 22).

2. Attach a 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.

3. Engage tractor PTO and run baler at 500 PTO RPM in manual mode.

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

5. Disengage tractor PTO. 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 the desired stopping position at 1 inch, 4 inches or 5 1/2 rearward of this mark depending upon feed chute adjustment. See **Fig. 47.** Also Page 15 "Variable Feed Chute".

7. In the control box, remove the white wire from TB3-7. This will cause the plunger retract speed to be reduced to approximately 1/4 of it's maximum speed.

8. Engage tractor PTO and run baler at 1,000 PTO RPM in automatic mode.

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

10. Observe plunger stopping position.

11. Reduce baler speed to 500 PTO RPM. Switch control mode to manual.

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

13. Disengage tractor PTO. 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;

A. One inch prior to its full retract position, with feed chute fully open.

B. Four inches prior to it's full retract position, with feed chute in the intermediate position.

C. Five and one half inches prior to it's full retract positon, with the feed chute in the extreme restricted position. To achieve the correct adjustment it will be necessary to reposition LS 9 and 10 on their mounting plates. See page 15 **Fig. D.**

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

16. Repeat steps 7 through 13 until step 14 is achieved.

17. Remove test string.

18. Reconnect white wire anto TB3-7.

19. After LS-10 (Plunger Return Stop Switch) is properly adjusted, adjust LS-9 (Plunger Return Decelerate Switch), see page 30.

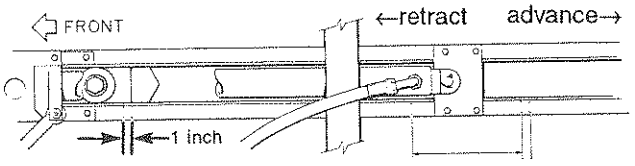


Fig. 47

LS-11 'Knotter Trip Switch"

Function

LS 11 completes the circuit to allow the knotter to cycle when the plunger has reached LS 5 (plunger return switch) at the end of the plunger advance stroke. LS 11 also will cause the knotter to stop at midpoint of the tie cycle if the meter arm has failed to reset.

Adjustment objective;

LS 11 must be operated before the meter arm reaches the end of it's travel. Incorrect adjustment may result in inconsistent bale lenght or failure to tie altogether.

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**).

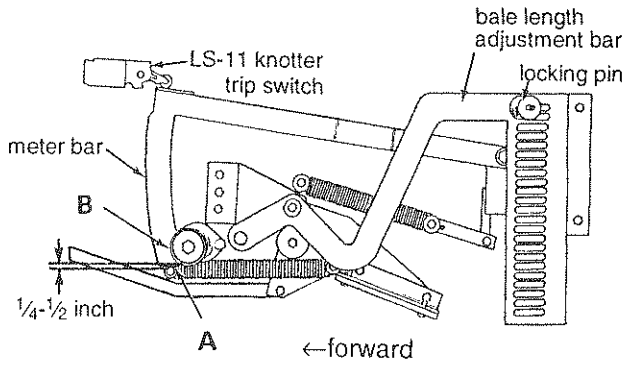


Fig. 48

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 22.

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 guage panel of the baler as illustrated in Fig 49. It should read approximately 6000 p.s.i. for balers with serial numbers 168 and below. For balers number 169 and above, main system pressure should read 6500 p.s.i.

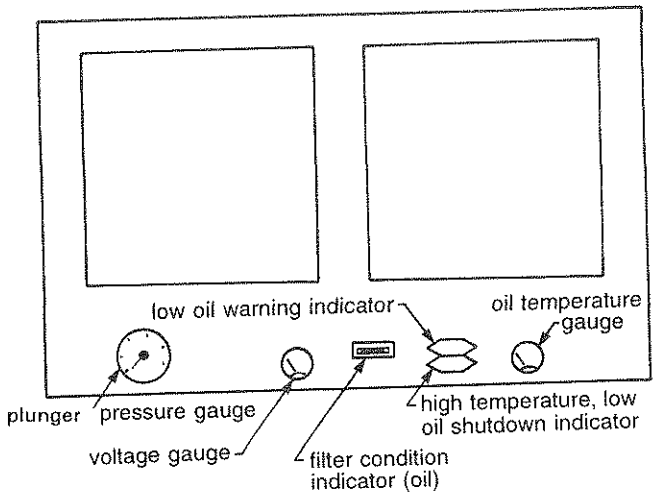


Fig. 49

Main System Retract Pressure;

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

2.Remove the 1/4 inch JIC cap on the main valve retract pressure port (fig. 50 retract pressure gauge port is labeled with a stamped "B"). Connect a 5,000 p.s.i. hand-held gauge to the retract pressure gauge port.

3. Switch the control mode to manual. Engage PTO

4. Fully retract the plunger with the manual control until it stalls.

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

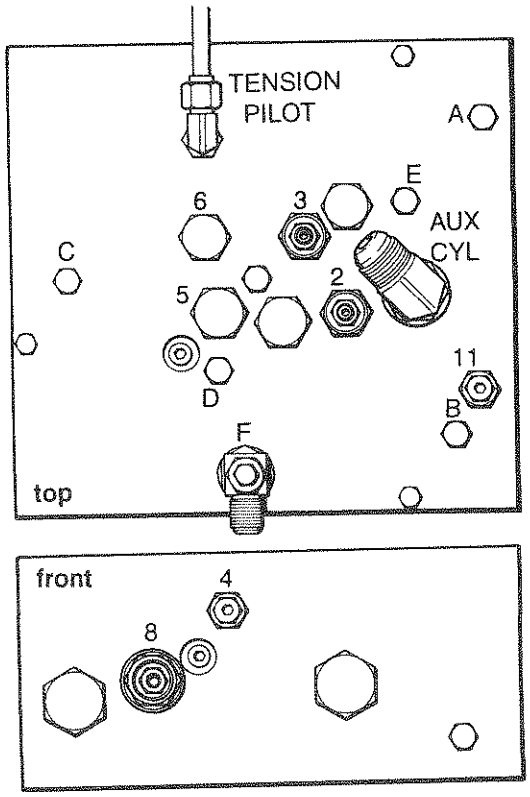


Fig. 50

Density Pressure:

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

2. Remove the 1/4 inch JIC cap on gauge port (A), see **Fig 51**

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

4. Engage Tractor PTO and run the baler at 500 PTO RPM.

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: Density pressure cannot be adjusted.

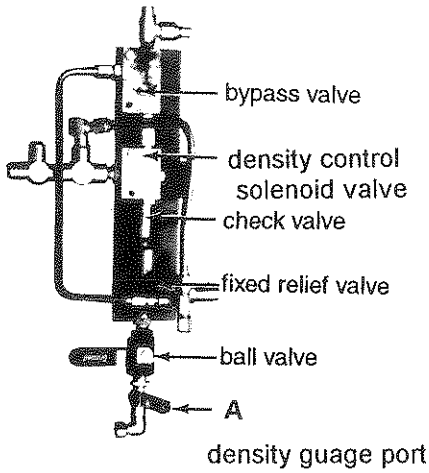


Fig. 51

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 1,000 p.s.i. gauge onto port (A)

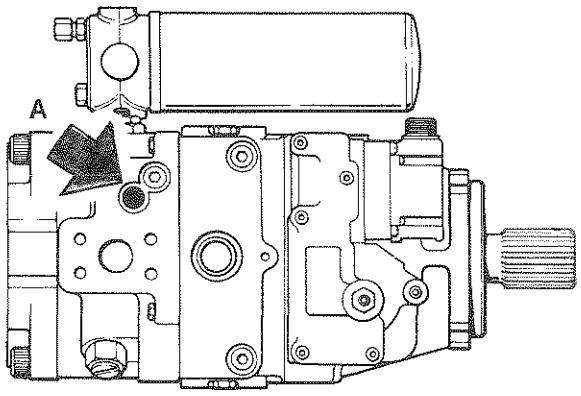


Fig. 52

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 1,000 p.s.i. gauge. It should read 400 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 1,000 p.s.i. gauge. It should read a minimum of 350 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).

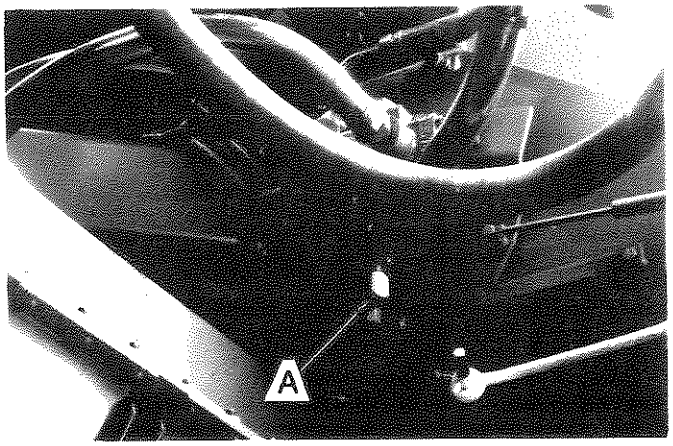


Fig. 53

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.

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**).

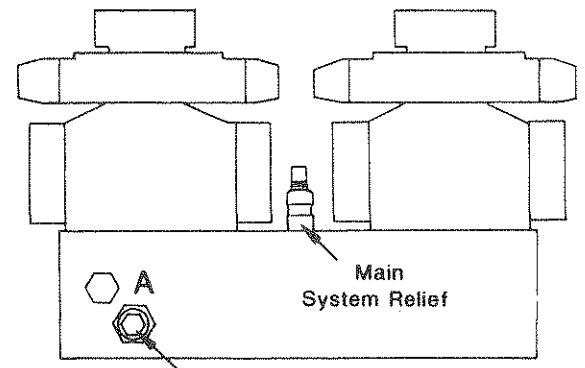
4. To prevent the feed fork from rotating, strap it to the frame with a ⅜" chain.

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.



left hand side

Fig. 54

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. 54**

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.

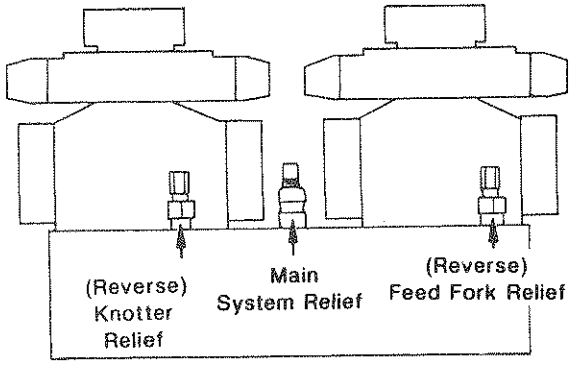
5. Set the control mode switch to manual.

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.



right hand side

Fig. 54B

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. 54**

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

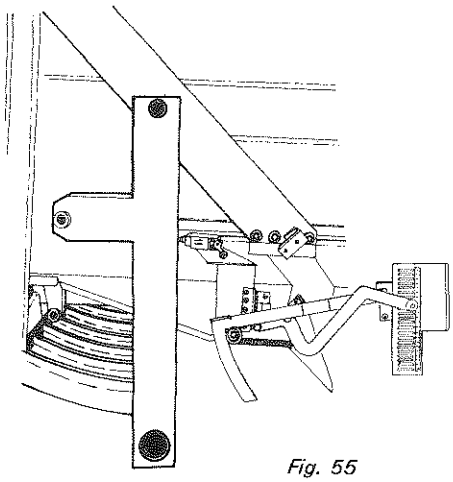


Fig. 55

8. To prevent the knotter from moving in reverse, strap a 3/8" chain around the middle of the needle yoke to the frame, see **Fig. 56. NOTE:** Ensure that the 3/8" 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.

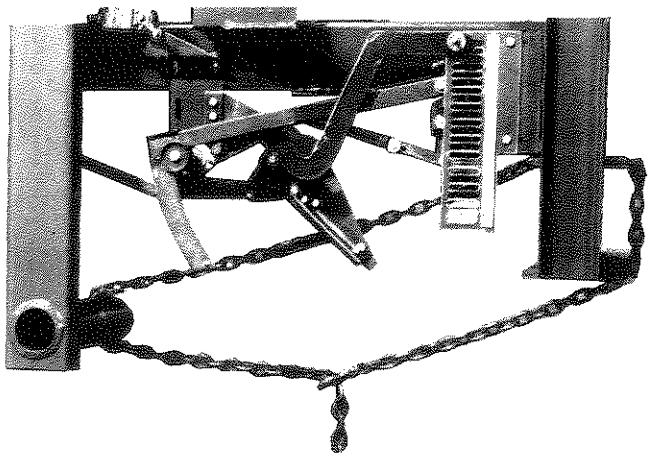


Fig. 56

Slip Cluthes

PTO Shaft Slip Clutch adjustment

The power takeoff shaft friction clutch occasionally requires an adjustment. It is important to maintain even spring tension.
Loosen the eight nuts (fig. 57) to the point where all of the springs barely lose contact, then tighten each nut until each spring just makes contact. Then tighten each nut by seven and one-half turns.

The Overunning portion of the clutch requires a minimum amount of lubrication. Excessive lubrication will result in contamination of the clutch friction material. Apply a small amount of multipurpose grease weekly.

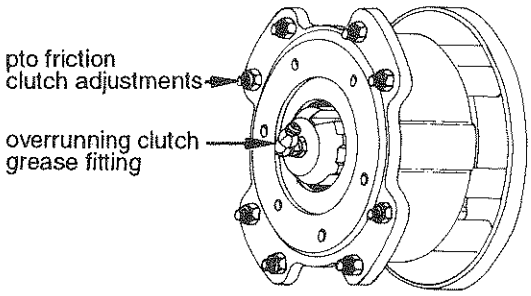


Fig. 57

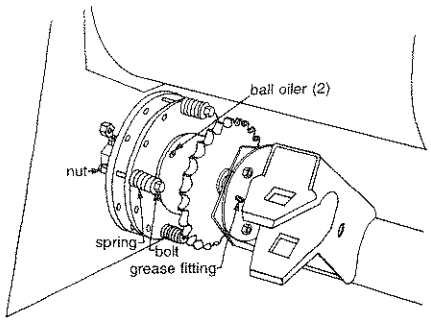


Fig. 58

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

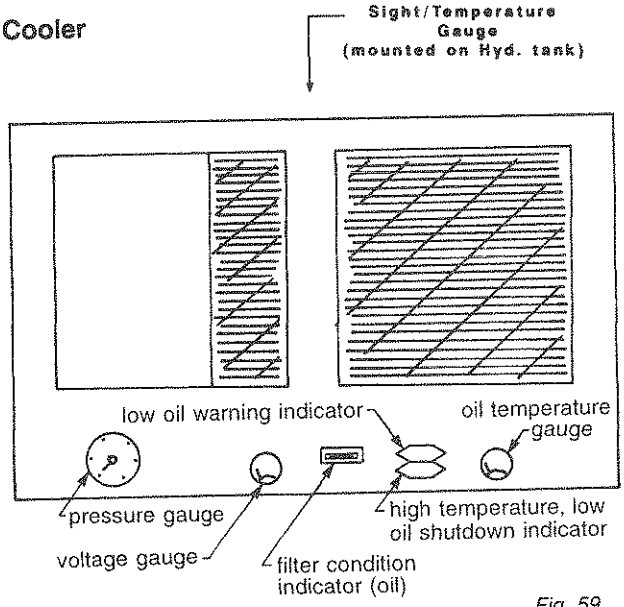


Fig. 59

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**.

Cooling Fan Operation

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

1. The fan draws air through the heat exchanger for approximately 5 1/2 minutes.

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

3. The fan runs in reverse 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.

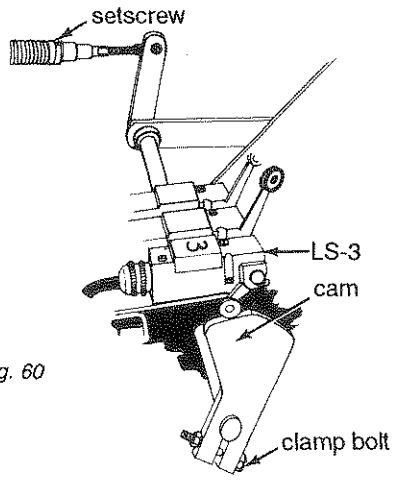


Fig. 60

Charge Sensor Adjustment

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

2. Spring Tension Adjustment:

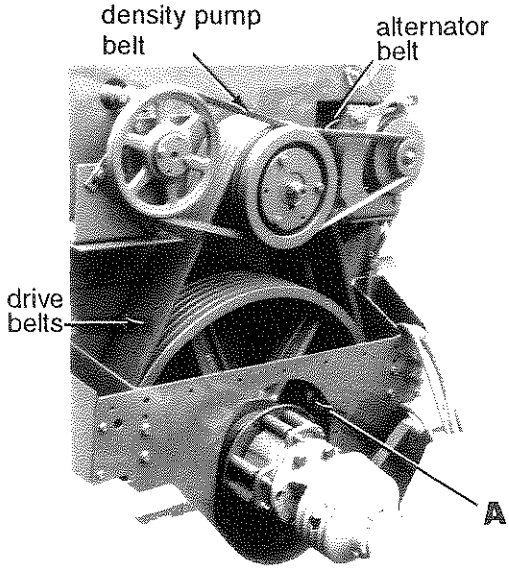
(1) Loosen set screw in locking collar, see **Fig. 60.**

(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.

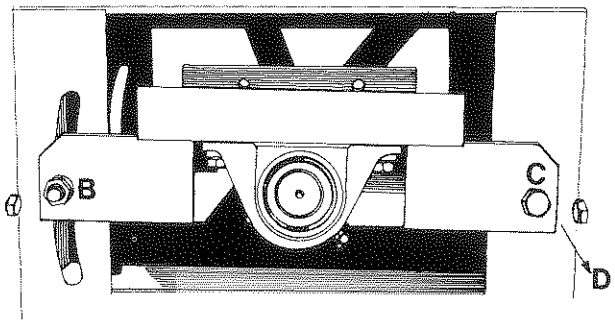
1. Adjust to obtain a ⅜ inch deflection when a 15 to 19 pound force is applied at the center of the span length, see **Fig. 61**. Check each of the six main drive belts separately.



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.**



TAKE-UP PLATE

Fig. 62

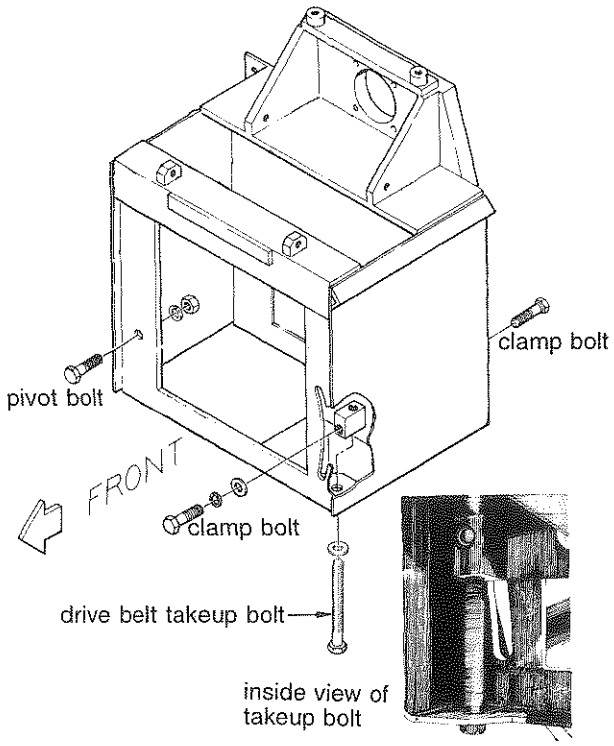


Fig. 63

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.**

Density 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.

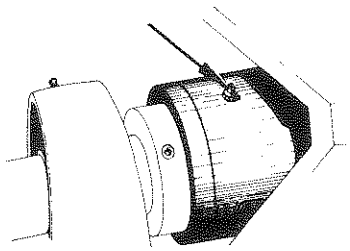


Fig. 64

***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

STORING THE BALER

At the close of the season, remove all material from the bale chamber and clean the baler with compressed air. Pressure washing or steam cleaning is not advised. Moisture can create problems with electrical components by promoting corrosion. 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 fittings 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 entire machine placed in top condition.

OIL FILTER REPLACEMENT

Annually replace the main system oil filters and the charge system filter.

The main system oil filters (2) are accessible through a service panel in the right hand twine box. The hydraulic oil must be drained before changing the filters. A ball valve is provided just below the filter housing to allow for draining the tank.

The charge system filter is a spin-on type located on the main pump. It is not necessary to drain the main hydraulic tank to replace the charge system filter. However, Hydraulic fluid will be able to escape from the system while the filter is removed.

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 36.
	c. Loose pickup slip clutch.	c. Adjust pickup slip clutch. See Pickup Slip Clutch Adjustment, page 36.
	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 37.
	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 37.
	g. Stalled Plunger.	g. See Stalled Plunger section in Trouble Shooting.
	h. Loose drive belts.	h. See Drive Belt Adjustment section, page 38.
	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 37.
	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 10. 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 31.
	d. Oil temperature too high.	d. Inspect for proper fan operation, page 37.
	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 37.
	b. Plunger return switch fails to operate.	b. Inspect for foreign material and/or misadjustment, see Plunger Return Switch Adjustment, page 28.
	c. Stalled knotter.	c. See Drive Belt Adjustment section, page 38.
	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 32.
	e. Loose main drive belts.	e. See Drive Belt Adjustment section, page 38.
	f. Loose PTO clutch.	f. See PTO Slip Clutch Adjustment section, page 36.
	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 37.
	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 16.
	b. Improper twine finger adjustment.	b. See twine finger adjustment, page 17.
	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 20.
	f. Plunger Return Switch out of adjustment.	f. See Plunger Return Switch, page 28.
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 18.
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 18.
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 29.
	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 32.
	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 20.
Knotter fails to stop operating.	a. Knotter Stop Switch out of adjustment.	a. See Knotter Stop Switch Adjustment section, page 25.
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.10**, page 12, to "OPEN" position.
	b. Loose or missing density system pump drive belt.	b. Inspect drive belt, replace if necessary and adjust, see density pump drive belt adjustment, page 38.
	c. Baler running too low R.P.M.	c. Increase baler R.P.M. to PTO speed.
	d. Plunger pressure too low.	d. Adjust density unloader valve **Fig.8**, 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 36. 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 density unloader valve.	i. Repair or replace density unloader valve.

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