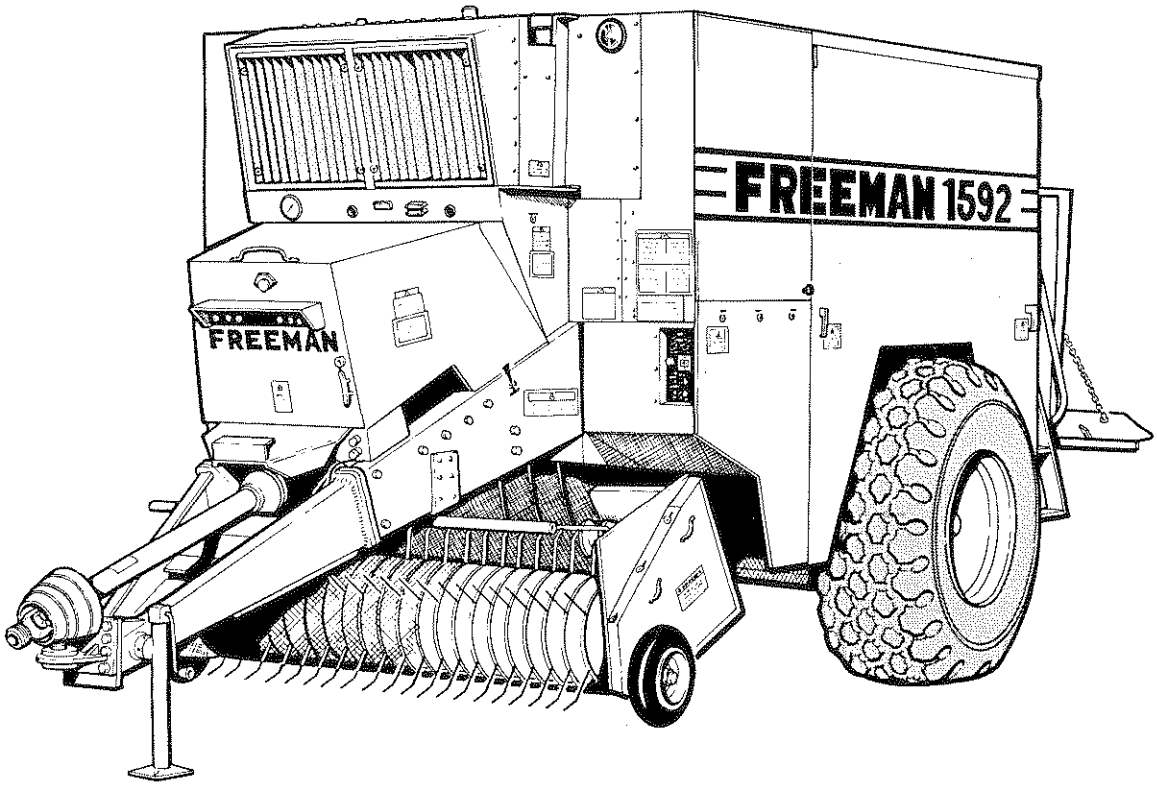
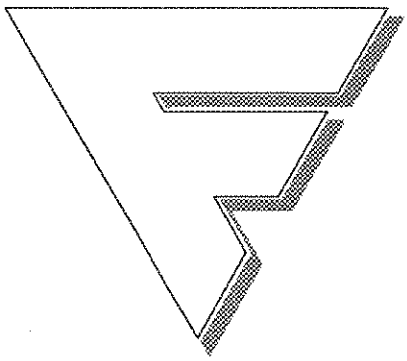
FREEMAN



MODEL 1592 BALER

OPERATOR / SERVICE MANUAL

PB00000178



TO OUR CUSTOMER:

Your decision to buy a Freeman 1592 Big Baler will be a solid investment. When it comes to baling hay, the Freeman 1592 offers design features unmatched by the competition. This results in the most efficient and productive baling equipment on the market today. Dollar per dollar, ton per ton, your Freeman equipment reduces baling costs while increasing profits.

Safety to the operator is of great concern at Freeman. 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 becoming fully acquainted with its performance features, adjustments, maintenance and service schedules will be repaid in the long and satisfactory life of the equipment.

TABLE OF CONTENTS

SAFETY!

IMPORTANT SAFETY REMINDERS!

- KEEP ALL SHIELDS IN PLACE AND IN SERVICEABLE CONDITION. ENSURE SAFETY AND WARNING SIGNS AND DECALS ARE IN PLACE, PROPERLY MAINTAINED AND REPLACED AS NECESSARY.
- SHUT OFF TRACTOR, DISENGAGE PTO, LOCK TRACTOR TRANSMISSION AND/OR BRAKES BEFORE ADJUSTING, LUBRICATING, CLEANING OR SERVICING BALER.
- MAKE CERTAIN EVERYONE IS CLEAR OF THE BALER BEFORE ENGAGING PTO OR OPERATING BALER.
- AVOID WEARING LOOSE CLOTHING WHICH CAN EASILY BE CAUGHT IN MOVING PARTS.
- WHEN CLEARING FEEDER CHUTE AND THE FEEDER CRANK IS BEING OPERATED IN REVERSE, DO NOT RAISE THE PICKUP.
- KEEP HANDS, FEET AND CLOTHING AWAY FROM POWER DRIVEN PARTS.
- AT ALL TIMES, BE CONSIOUS OF FIRE DANGER. A WATER SUPPLY AND SHOVEL SHOULD BE ACCESSIBLE. THE OPERATION OF THE BALER SHOULD COMPLY WITH LOCAL AND STATE FIRE CODES.
- USE APPROPRIATE SIGNS AND WARNING LIGHTS WHEN OPERATING ON PUBLIC ROADWAYS.
- AT ALL TIMES, KEEP THE MANUAL CONTROL CABLE IN A SAFE LOCATION AWAY FROM POWER DRIVEN PARTS.
- PERIODICALLY CHECK ALL NUTS AND BOLTS FOR TIGHTNESS.
- REMEMBER, SAFETY IS JUST A WORD UNTIL IT IS PRACTICED.

NOTE: SAFETY DECALS FALL INTO FOUR CATEGORIES

- **INSTRUCTIONAL:** GENERAL INSTRUCTIONS AS TO OPERATION, PROCEDURES AND SERVICE. SIGNAL WORDS WILL BE ATTENTION, NOTICE, ETC.; WILL HAVE NO SAFETY-ALERT SYMBOLS AND WILL BE DIFFERENT IN APPEARANCE TO THOSE 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 Big Baler Model 1592. Please read it carefully as it provides important information and instructions that will help you achieve years of dependable equipment performance.

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

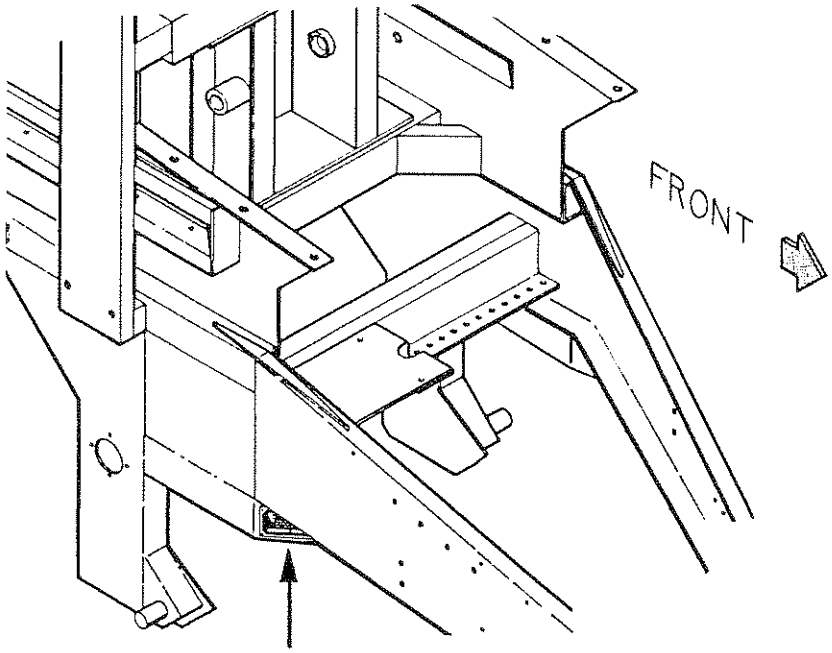
Replacement Parts:

Only genuine Freeman replacement parts should be used to service the baler. These parts are available from your authorized Freeman dealer. To ensure prompt and efficient service when ordering parts or requesting service repairs, remember to provide the dealer with the following information.

1. The correct **part description** or **part number**.
2. The **model number** of the baler.
3. The **serial number** of the baler.

Serial number location:

The serial number is very important in effectively transacting a parts order or service repair with the dealer. Use the serial number in all correspondence to ensure proper identification of your Freeman baler. The serial number is located on the right front tongue brace as shown.



SERIAL NUMBER LOCATION

CAUTION: 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.

GENERAL OVERVIEW OF THE FREEMAN 1592 BIG BALER

The Freeman 1592 Big Baler is a high density mechanical baler operated by an electrically controlled hydraulic system. The 1592 can handle the toughest jobs including the baling of Alfalfa, Coastal Bermuda, Sudan, Haylage and cornstalks.

The hydraulically driven components of the 1592 Big Baler make it unique in the agricultural baling industry. A system of electrical 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 feeder, a three throw crank shaft with cantilevered fork tines.

The feed fork then carries material from the feeder into the bale forming chamber. When an adequate volume of material is delivered to the bale chamber by the feed fork, the 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 bale plunger pressure reaches that preset by the operator to yield the desired bale density). At this point, density pressure is modulated to maintain the desired forming pressure on the extruding bale. The maximum hydraulic pressure available for forming the bale is 6,500 psi. The plunger reaches the end of its travel and is signaled to return. As the plunger returns, the feed fork starts its 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. This complete cycle requires approximately three seconds to occur.

During the tying process, as a bale moves through the chamber, the length of the bale is measured by a metering wheel located in the bottom of the chamber. When an 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 plunger begins to return and the knotter assembly begins to operate. 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 its 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 cycle also occurs in approximately three seconds.

The 1592 baler is fully automatic. Bale lengths and bale densities are adjustable. Six heavy duty knotters secure the bale with 370 pound knot strength twine, (recommended). Individual knot sensors monitor the tying system. To ease service and maintenance each function of the baler can be operated manually, either 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 baler a very efficient and reliable machine.

SPECIFICATIONS

GENERAL:

working length with bale chute	30' 0" (9144 mm)
working width	10' 2" (3048 mm)
working height	9' 8" (2946 mm)
shipping height (w\o wheels)	8' 10" (2694 mm)
tires (16 ply)	23.1 x 26"
weight	22,200 lbs. (10,070 kg)
capacity	up to 45 tons per hour (41 metric tons)

TRACTOR REQUIREMENTS:

horsepower	140 PTO HP or greater recommended
hydraulics	single remote
electrical	ASE seven pin connector

DRIVE SYSTEM:

PTO speed	1000 RPM
drive protection	clutches and pressure relief valves
hydraulic pump capacity	80 GPM
oil cooler	radiator with automatic reversing electric fan

PICKUP:

working width	93" (2362 mm)
including 6" side flares	105" (2667 mm)
drive system	hydraulic drive
protection	slip and overrunning clutches
pickup lift	hydraulic cylinder

FEED SYSTEM:

feeder crank	three crank crankshaft
feeder crankshaft 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" (762 mm)
drive	4" (101.6 mm) bore hydraulic cylinder

TYING MECHANISM:

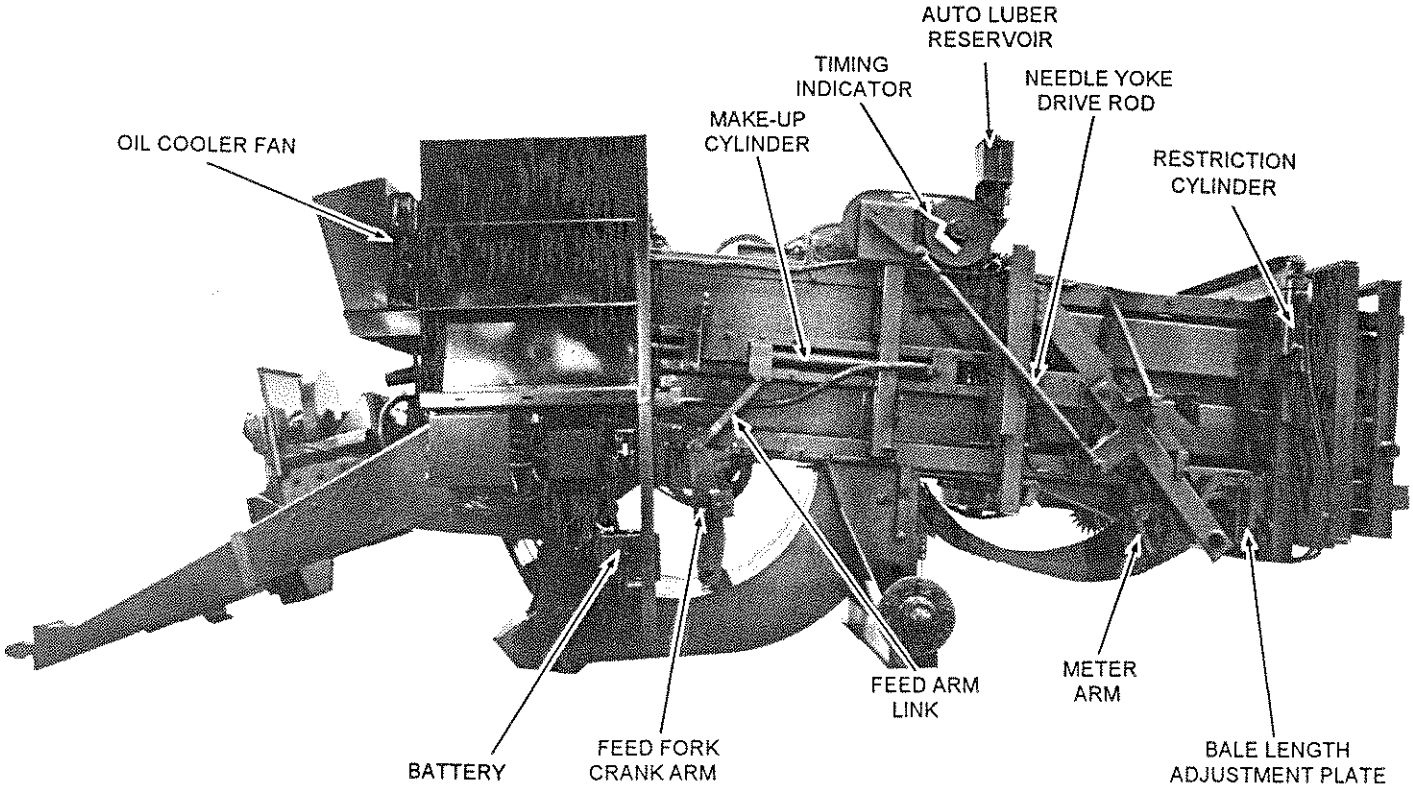
knotters	6 heavy duty twine knotters
knotter spacing	7" (178 mm)
knotter lubrication	automatic oil lubrication system
twine storage capacity	18 balls
twine type	plastic 370 lbs. (168 kg) knot strength

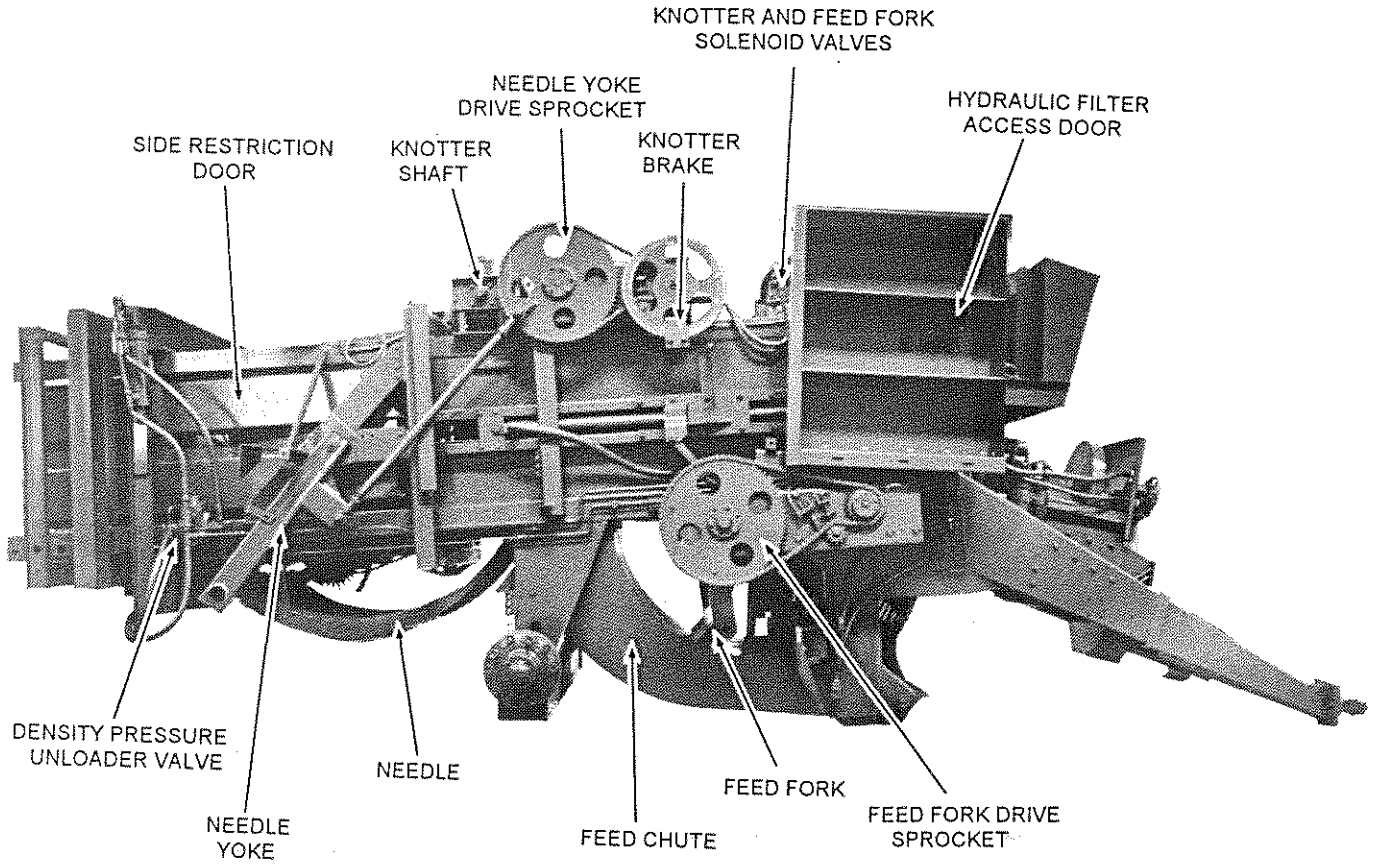
BALE CHAMBER:

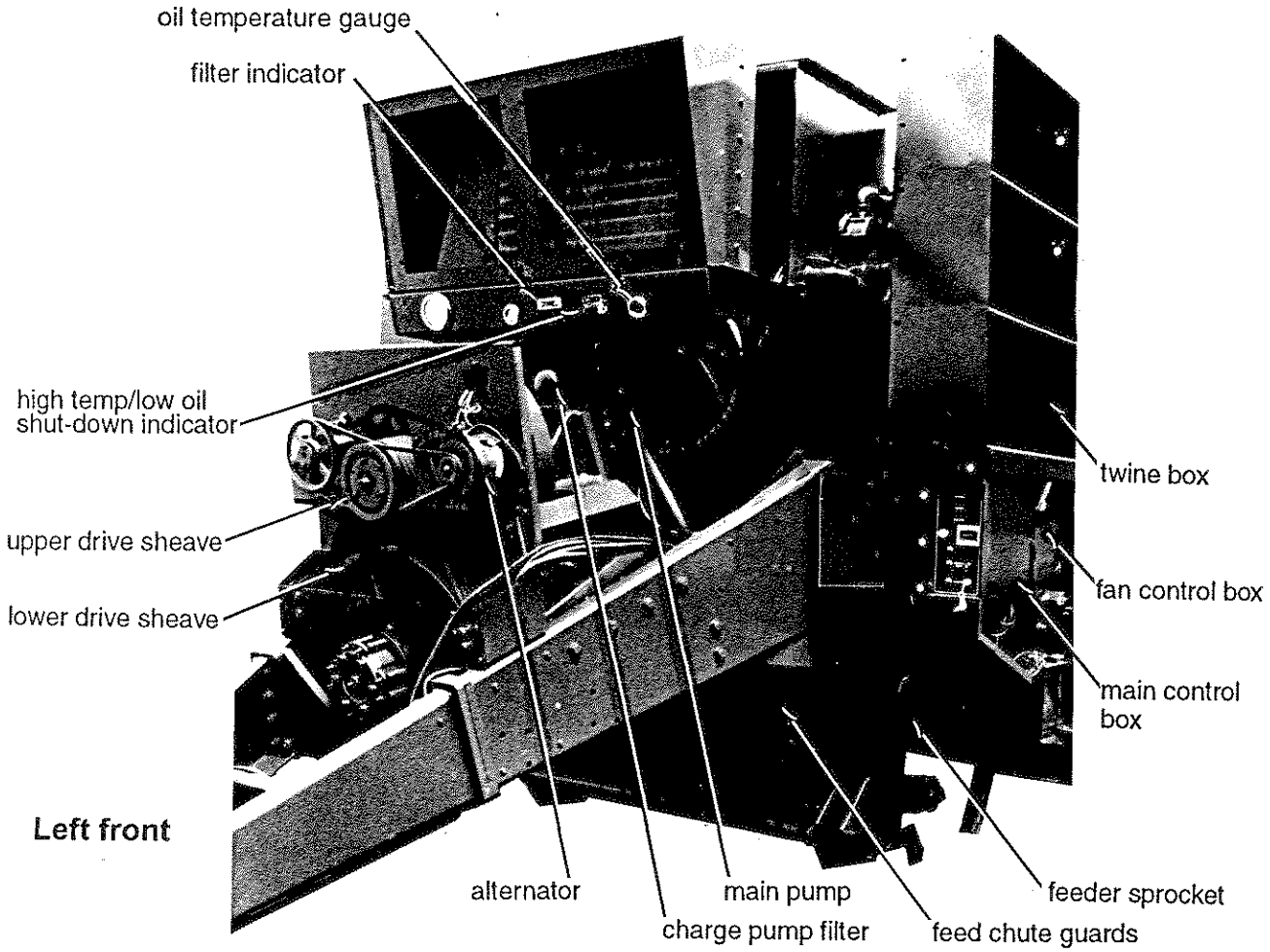
height	38" (965 mm), 36" (914 mm) optional
width	46" (1168 mm)
bale length	adjustable up to 9' (2743 mm)
bale weight	up to 1,600 lbs. (726 kg)

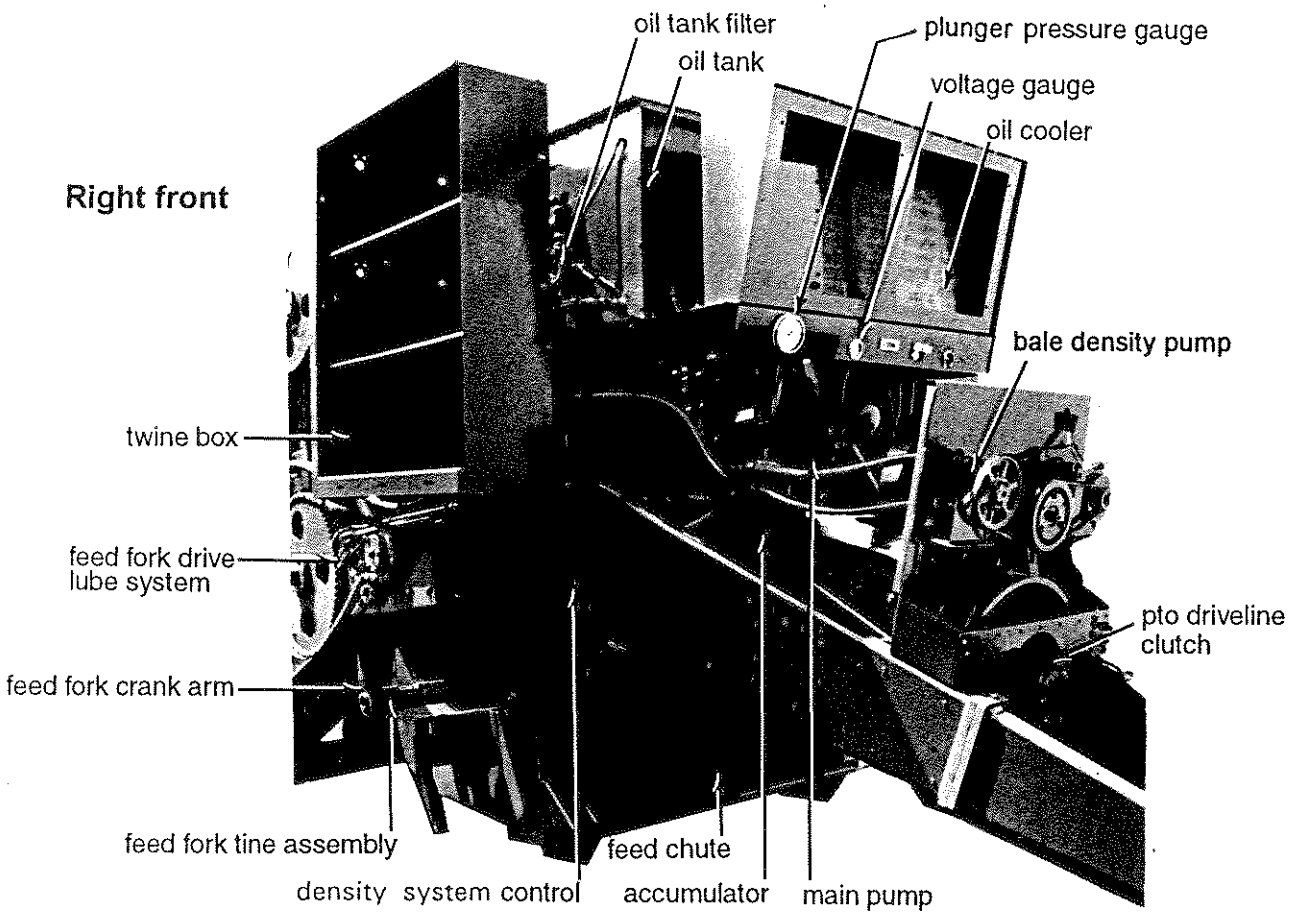
BALE CHAMBER DENSITY CONTROL:

type	adjustable hydraulic density control
density system	4 hydraulic cylinders


AUTO LUBER RESERVOIR
TIMING INDICATOR
NEEDLE YOKE DRIVE ROD
MAKE-UP CYLINDER
OIL COOLER FAN
RESTRICTION CYLINDER
FEED ARM LINK
METER ARM
BATTERY
FEED FORK CRANK ARM
BALE LENGTH ADJUSTMENT PLATE


KNOTTER AND FEED FORK SOLENOID VALVES
NEEDLE YOKE DRIVE SPROCKET
HYDRAULIC FILTER ACCESS DOOR
SIDE RESTRICTION DOOR
KNOTTER SHAFT
KNOTTER BRAKE
DENSITY PRESSURE UNLOADER VALVE
NEEDLE
FEED FORK
FEED FORK DRIVE SPROCKET
NEEDLE YOKE
FEED CHUTE


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


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

LUBRICATION / SERVICE SCHEDULE

Only through timely service, maintenance and making the proper adjustments can you realize the optimum performance and long life expected from this equipment. Follow these recommended service checks at their suggested intervals to maximize the baler's performance and service life.

MAIN SYSTEM HYDRAULIC OIL:
Chevron AW-46 or equivalent

GREASE FITTINGS:
Multi-purpose grease

AUTOMATIC AUTO LUBER:
SAE 80 GL5 gear oil

PUMP DRIVE COUPLING LUBRICANT:
NGLI Rating #2 Lithium base lubricant. 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 lbs. (18 kg).
(See page 38 for grease instructions)

CHECK / SERVICE EVERY 4 HOURS:

- Lube PTO shaft, u-joints and covers (4) (See page 10)
- Lube feed fork arm bearings (4)
- Lube feed fork link bearings (4)
- Lubricate knot sensor pivots (6)
- Check hydraulic tank level

CHECK / SERVICE DAILY:

- Check chain oilers
- Lube PTO overrunning clutch
- Lube needle yoke pivot bearings (2)
- Lube needle yoke drive connecting rod ends (4)
- Check oil level in knotter luber tank
- Lube plunger rollers
- Blow clean with compressed air **(NOTE: Do not steam clean)**
- Lube ball hitch

CHECK / SERVICE WEEKLY:

- Lube pickup overrunning clutch

CHECK / SERVICE EVERY 80 HOURS:

- Lube main pump drive coupler (See page 38 & 39)
- Lube bearings upper flywheel drive shaft (2)
- Lube bearings lower (primary) drive shaft (2)
- Check belts (Check new belts at 8 hours)
- Lube feed sensor shaft (1)
- Check battery water (Electrolyte)
- Check tire inflation
- Check wheel fasteners

CHECK / SERVICE EVERY 250 HOURS:

- Change pump filter (Freeman FIL0164056) (Located on top of main Sunstrand pump)

CHECK / SERVICE EVERY 500 HOURS:

- Check knotter brake adjustment
- Check / clean battery terminals

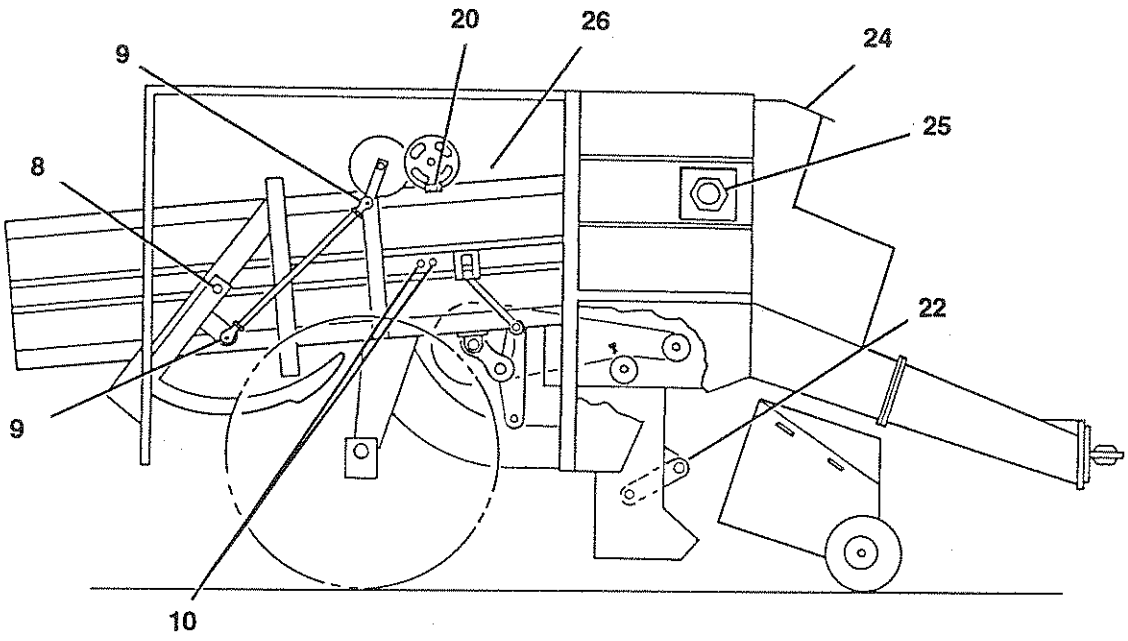
CHECK / SERVICE ANNUALLY:

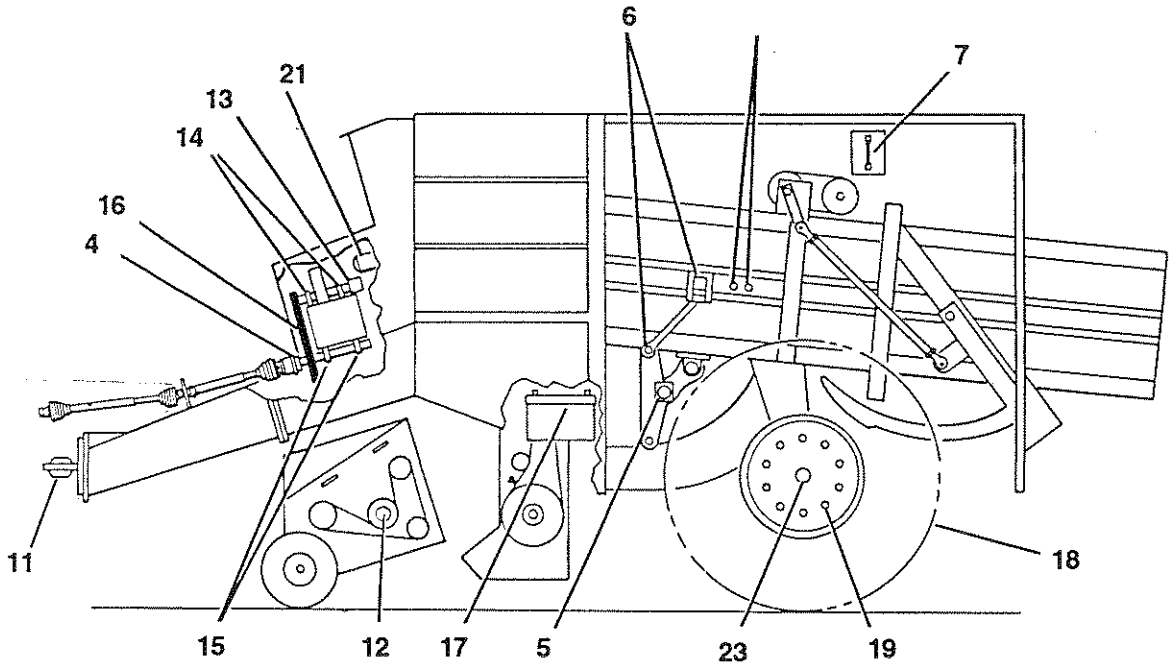
- Lube feeder crank journals (3) (Lube until grease is visible at breather)
- Change system hydraulic oil
- Change oil tank filters (or as indicated by filter condition indicator) (See page 39)
- Lube needle yoke crank shaft bearings (3)
- Repack wheel bearings

CHECK / SERVICE - END OF SEASON:

- See page 39 for storage information
- Check drive / accessory belts tension and condition
- Check hydraulic accumulator (150 psi nitrogen charge)
- Prepare equipment for off season storage

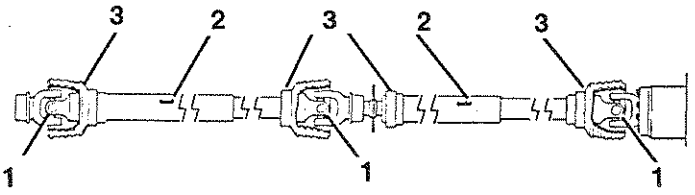
LUBRICATION / SERVICE





3 - JOINT DRIVELINE

1. PTO universal joints
2. PTO sliding spline
3. PTO covers



4. PTO overrunning clutch
5. Feed fork arm bearings
6. Feed fork link bearings
7. Knotter oil tank level
8. Needle yoke pivot bearings
9. Needle yoke rod ends
10. Plunger rollers
11. Ball hitch
12. Pickup overrunning clutch
13. Main pump drive coupler
14. Upper drive shaft bearings
15. Lower drive shaft bearings
16. Drive belts
17. Battery (terminal/electrolyte)
18. Tires (inflation)
19. Wheel fasteners (torque)
20. Knotter brake adjuster
21. Main pump (charge) filter
22. Feeder crank journal bearings
23. Wheel bearings
24. Hydraulic oil
25. Hydraulic oil tank filter
26. Feed sensor shaft

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 year from date of delivery or first use by the retail purchaser, except for designated stationary products, I.E., Freeman water extractors and stationary balers which will carry a 90 day limited warranty. 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's, Inc. obligation under this warranty is limited to repairing or replacing, at its option, any part that in J.A. Freeman & Son's, Inc. judgement is defective when returned to the factory.

The provisions of this warranty shall not apply to any equipment which has been subject to missuse, negligence, alteration or accident, or which shall have been repaired with parts other than those obtained 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 in as much as they are usually warranteed by their respective manufacturures.

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.

NOTE: The equipment registration report must be correctly completed and returned to J.A. Freeman & Son, Inc. in order to validate the limited warranty.

J.A. FREEMAN & SON, INC.
2034 N.W. 27th Ave.
Portland, OR 97210

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 minumum of 140 horsepower at 1,000 RPM PTO. Note, adverse conditions such as soft ground or hilly terrain may require greater horsepower for maximum performance.

2. The front drawbar hitch on the baler can be adjusted up or down or inverted 180°, see **Fig. 1**, to achieve proper alignment with the tractor drawbar. The distance from the bottom of the baler hitch mount to the ground should be 17" ± 1". Ensure all fasteners are tightened and in their proper position.

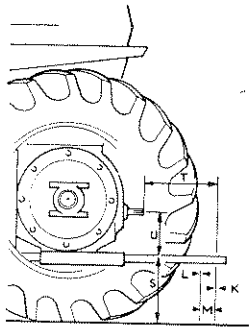


Fig. 1

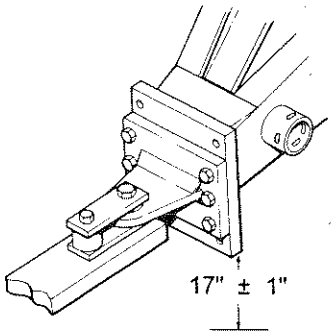


Fig. 2

3. The baler can be equipped or modified as required to work with tractors using either a 1 3/8" or 1 3/4" diameter PTO shaft. The tractor drawbar must be adjusted to provide the proper distance from the end of the tractor PTO shaft to the center of the hitch pin. Follow the SAE standards in **Fig 2** and **Table 1** for correct adjustment of the tractor drawbar.

4. When the baler is connected to the tractor, the PTO drivelines can now be installed and properly adjusted. The correct driveline adjustment is achieved by positioning the carrier bearing support bracket either forward, back, up or down. (See **Fig. 3**). The rear (baler) driveline fits either size front driveline.

TABLE 1

DIMENSIONS ASSOCIATED WITH TRACTOR DRAWBAR AND POWER TAKE-OFF

	1 3/8" DIA.	1 3/4" DIA.
K Hitch pin hole diameter	13/16"	1 5/16"
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 PTO shaft to center of hitch pin hole		
U Top of drawbar to PTO centerline	16"	20"
Preferred	8"	10"
Min.	6"	8"
Max.	12"	12"

5. The PTO shaft bearing mount angles, ANG0027391, are designed to be used with either size (1 3/8" or 1 3/4") drivelines. The 3" flange angle bolts to the baler tongue side plates while the 2 1/2" leg mounts the carrier bearing support bracket, MNT0028883. With the 3" flange towards the front of the baler, dimension 'A' is 19", with angle flanges towards rear of baler, dimension 'A' is 15". (See **Fig. 3**). (See parts manual page 27 for parts description).

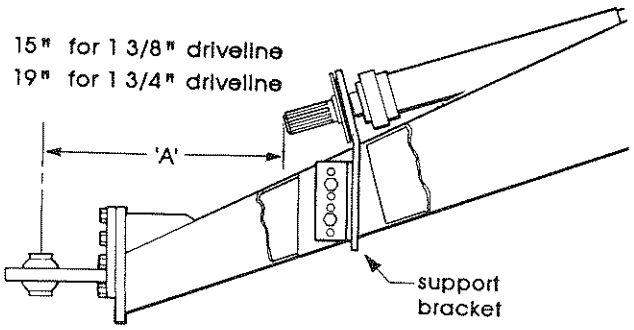


Fig. 3

6. Assemble rear driveline to the baler clutch and the carrier bearing support. Install the front driveline between the bearing support and the tractor PTO shaft, making sure the proper diameter shaft has been selected.

7. The drivelines must be adjusted so the angle of the tractor u-joint, 'A' **Fig. 4**, and the angle of the center u-joint, 'B' **Fig. 4**, are equal. To achieve equal angles at 'A' and 'B', adjust the vertical position of the carrier bearing support bracket. If, after repositioning the support bracket, the angles are not equal, select the bracket position that allows the closest angle setting. The objective is, to achieve as closely as possible, equal angles as described above while keeping the angle of the u-joint at the slip clutch to a minimum.

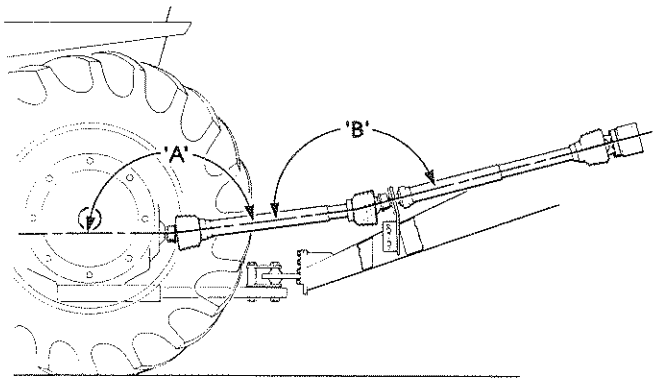


Fig. 4

8. If equal angles are achieved at 'A' and 'B', (**Fig. 4**), either driveline phasing, (alignment of u-joint yokes), illustrated in **Fig. 5** is acceptable. If the angles cannot be made equal, then reposition the driveline yokes as shown. If the angle at 'B' is greater than at 'A', phase the driveline yokes as shown in **Fig. 5**, (E). If angle at 'A' is greater than the angle at 'B', phase the yokes as shown in **Fig. 5**, (D).

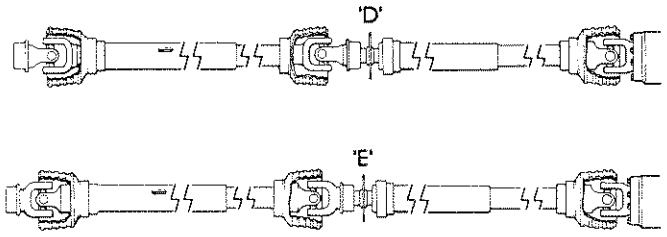


Fig. 5

9. When all adjustments have been properly completed, ensure that the driveline does not interfere with the tractor drawbar, PTO shields or baler drawbar. On a level surface, pull the baler and turn the tractor left or right until the rear wheel of the tractor is nearly touching the baler drawbar. Attach baler PTO driveline to tractor PTO shaft. Ensure driveline does not bind or interfere with the baler hitch.

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

11. Connect the 7-wire trailer cable from baler to the SAE socket on the tractor.

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

Wheel nut torque and tire inflation pressure:

1. Ensure the rear wheel nuts are torqued to 450 ft. lbs. Do not lubricate wheel nuts. After the nuts have been torqued, tow the baler 1/2 mile and recheck the nuts for proper torque. CAUTION: Do not overinflate tires.

2. Inflate 12 ply tires to 28 psi., 16 ply to 36 psi. Inflate pickup tires (4.00 x 8) to 40 psi.

Twine installation and threading:

1. Load 18 boxes of twine into twine boxes, (9 on each side). Note, we suggest using Bridon SR-370 Growers Choice 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. 6**.

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. 6**.

4. Route twine through the guides located near the twine tensioners, (E); proceed pulling the twine through the tensioners, see **Fig. 33**. 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), see **Fig. 6**, 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 crossmember, (H); then, manually pull the knot sensor fingers, located on top of the chamber underneath the knotters, see **Fig. 14**.

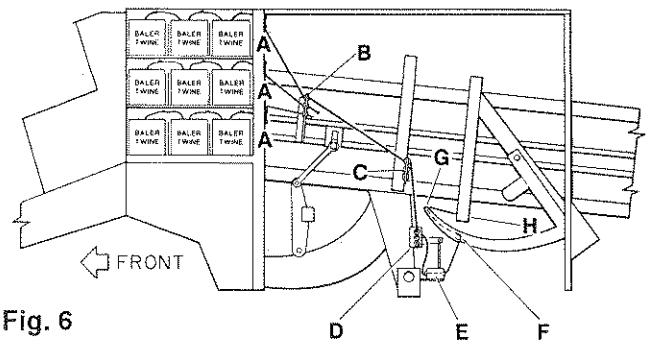


Fig. 6

OPERATION

Field start up procedure:

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

1. Before operating the baler, make sure the hydraulic oil tank is filled with Chevron AW 46 hydraulic oil or equivalent. The breather on top of the tank maintains up to 10 PSI. Do not replace the cap with any other pressure rated cap. The oil level can be determined by the sight/temperature gauge on the front of the hydraulic oil tank, see **Fig. 52**. 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. 7**.

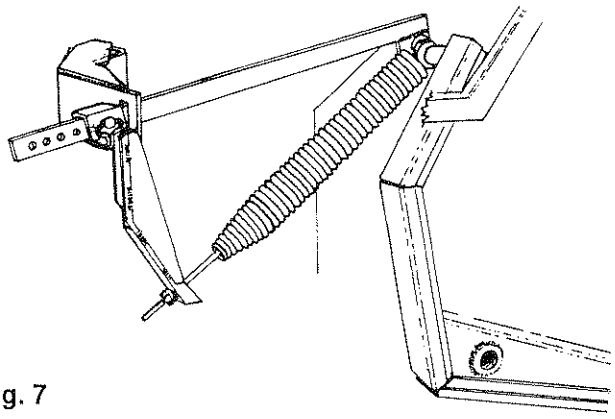


Fig. 7

4. Make sure the knotters are properly threaded with Bridon SR-370 polypropylene baler twine or equivalent and that the twine boxes are full.

5. With the tractor RPM at low speed and with baler power switch "OFF", gently engage the tractor PTO. Slowly increase the tractor to 500 PTO RPM.

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 section) NOTE: DO NOT EXCEED 500 PTO RPM 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 actually 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° F (0° C) before baling.**

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.

To begin baling, increase PTO speed to 1,000 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 feedfork 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.

Excessive feed rate and may cause the feeder or feedfork to stall. The operator can unplug the first feeder by simply pulling the control rope and reversing the feeder.

IMPORTANT! DO NOT OPERATE FEED CRANK IN REVERSE WITH PICKUP IN FULL RAISED POSITION.

Manual control:

The 1592 baler is equipped with a manual control system. This allows the operator to control the feed fork, plunger and knotters independently. This feature is to be used when servicing, adjusting or unplugging the machine.

To operate the manual control, set the control mode switch, see **Fig. 8**, to the manual position. Plug the remote cable into one of the six sockets on the control panel. Each socket controls a baler function in either forward or reverse. The tractor PTO should be oper-

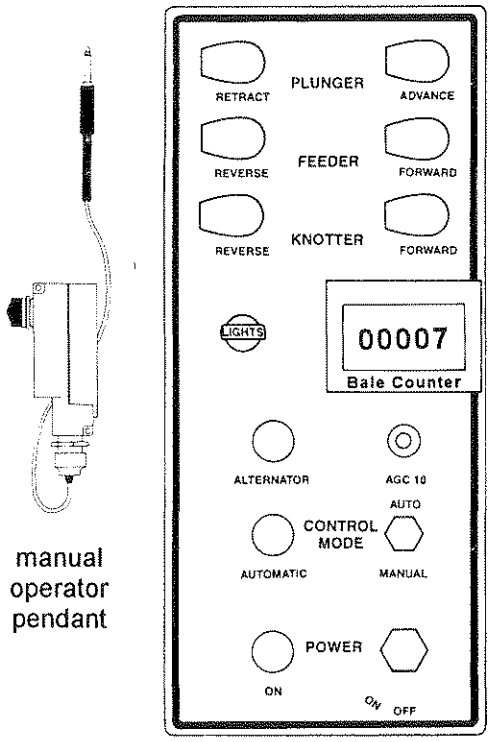
IMPORTANT! KEEP PERSONNEL AWAY FROM MACHINE WHILE USING MANUAL OPERATOR PENDANT.

Manual control: (Con't)

-ated at or below 500 RPM while operating the baler manually. Push the button on the manual operator pendant (MOT), to activate the desired function.

Certain manual functions are limited in operation. This helps prevent damage to machine components.

- The plunger will not advance if the needle yoke is away from its home position.
- The needle yoke and knotter assembly will not operate in reverse through a portion of its total cycle.



manual operator pendant

Fig. 8

CAUTION: WHEN USING THE **MANUAL OPERATOR PENDANT (MOP):**

- DO NOT EXCEED 500 RPM PTO SPEED.
- CHECK FOR SAFE OPERATION.
- WHEN THE KNOTTERS ARE ACTIVATED, THE NEEDLES WILL OPERATE.

Stop / reverse control rope:

The baler is equipped with a stop/reverse control rope, see A, **Fig. 9**, which is attached to a three-way valve, (B). Its function is to reverse the feeder system to facilitate service or cleaning the feed chute. Its operation is as follows:

- WITH THE 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.

Unplugging the feeder:

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

After the feeder is cleared, reduce feed rate, if necessary, to prevent over-feeding the baler.

IMPORTANT! DO NOT OPERATE FEEDER CRANK IN REVERSE WITH PICKUP IN FULL RAISED POSITION.

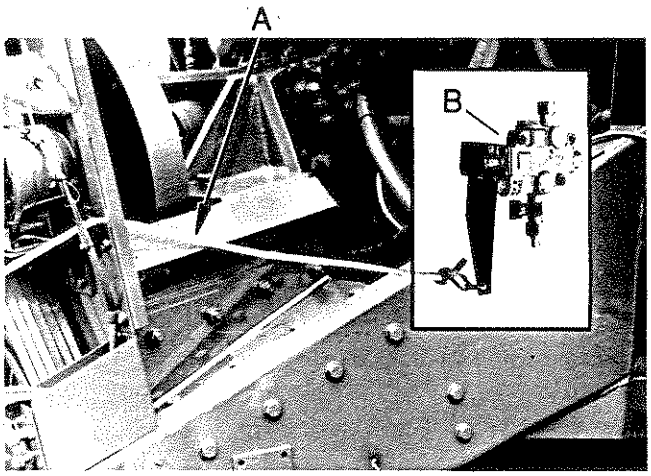


Fig. 9

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 rest, (fully retracted), position. Use the manual operators pendant to reposition the needle yoke if necessary.

2. Set the control mode switch to manual. Use the manual operator pendant 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

Unplugging the feed fork: (Con't)

be moved into the chamber if the feed fork reaches top dead center (TDC). If the quantity of material is sufficient, the plunger will activate.

4. Repeat steps 2 and 3 as necessary.

5. Resume baling and adjust feed rate to prevent plugging.

CAUTION: KNOTTERS MAY CYCLE WHEN THE SWITCH IS TURNED TO AUTOMATIC.

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 accomplished 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 baling 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. This pressure will be held until the plunger begins its next advance at which time full density pressure will again be applied to the restriction cylinders.

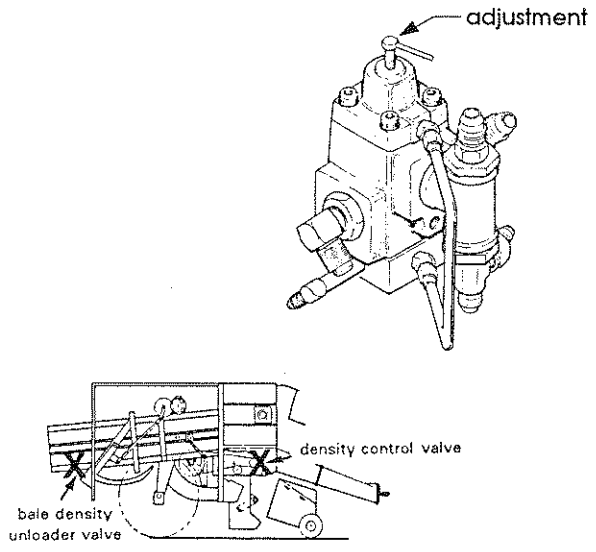


Fig. 10

Bale density adjustment:

Plunger pressure indicated by the plunger pressure gauge is relative to bale density. Most baling operations require plunger pressure in the 3,800 to 4,500 PSI range.

The density pressure unloader valve located on the right rear of the machine, (**Fig. 10**), 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. 11**), 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 **LS11** 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 **LS11** is activated determines bale length. Total meter arm travel is controlled by moving the bale adjustment bar up or down.

CAUTION: DISENGAGE TRACTOR PTO AND WAIT FOR ALL MOTION TO CEASE BEFORE SERVICING OR ADJUSTING THE MACHINE.

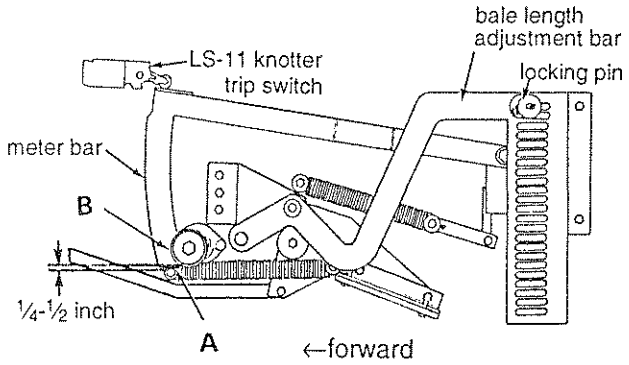


Fig. 11

Adjusting the bale length:

Pull the locking pin outward to unlock the bale length adjustment 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 started.

Cleaning the 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. 12.**

2. Switch the baler control mode to "MANUAL"; increase RPM's. With the manual operator pendant, fully extend the plunger. Operate the control momentarily stalling the plunger at the end of its 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 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. 12**. NOTE: Failure to do so will result in lack of density pressure.

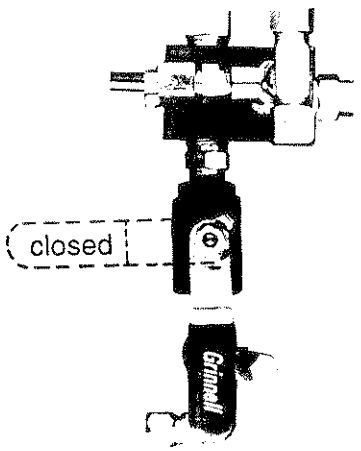


Fig. 12

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 sensor indicators. After a knotter has completed its tying cycle and the bale advances two or three plunger strokes, a properly tied knot will pull the sensor finger causing the indicator lights located on the front of the baler to go out. See **Fig. 13**.

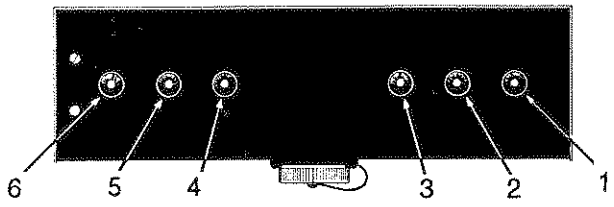


Fig. 13

In the event of a mistie, the appropriate indicator will remain lit. To turn the indicator light off, you must manually pull the knot sensor finger rearward, see **Fig. 14. Care must be taken to ensure that the roller on the under side of the twine finger does not accidently fall behind, (left side), the upper leg of the sensor finger**. See diagram below.

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.

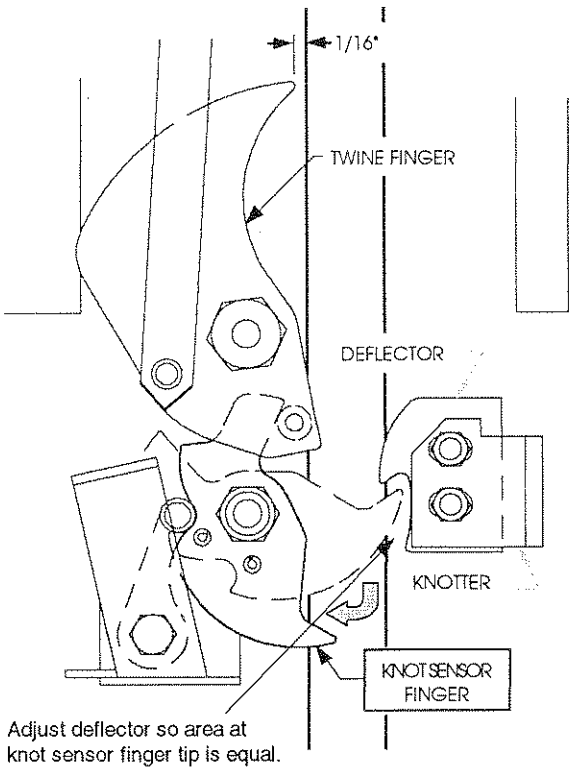


Fig. 14

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

ADJUSTMENTS / MAINTENANCE

Knotter timing adjustment:

NOTE: Knotters, as well as the complete vehicle, are viewed based on sitting in the tractors seat looking forward. Knotters are viewed from left to right.

1. Use the **manual operator pendant**, (**MOP**), to advance the knotter until the head of the needle yoke drive rod bolt is centered on the rear edge of the RH shaft support bracket, see **Fig. 15**.

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. 16**.

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. 16**. This is home position.

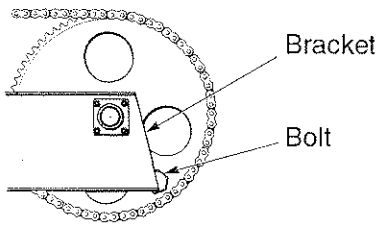


Fig. 15

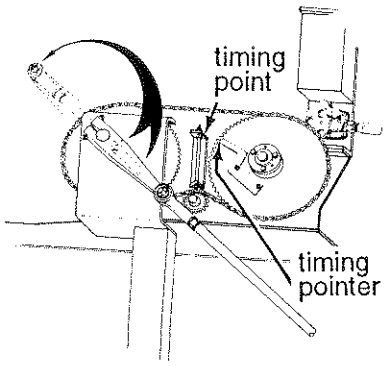


Fig. 16

1. **Clear the bale chamber of all baling material.** Use the manual operator pendant to jog the needles up through the bale chamber until the needle eye is next to the knotter frame, see **Fig. 17**. NOTE: Check to see that the base of the needles are centered with the bottom chamber needle slots. Adjustment is made by loosening the bolts at the needle mounts and repositioning the needle.

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" clearance between the knotter frame and the side of the needles. To adjust, the needles can be moved left or right 1/16" by moving the needle at the needle yoke anchors. NOTE: DO NOT MOVE THE BASE OF THE NEEDLE MORE THAN 1/16" 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.

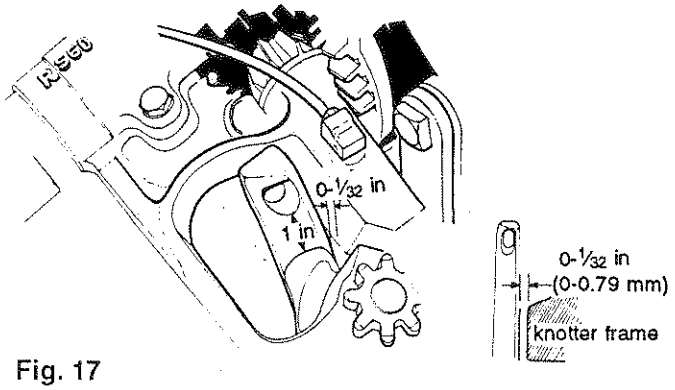


Fig. 17

3. With the needle eye directly over the twine disc, the needles should clear the twine disc by 1/8", see **Fig. 18**.

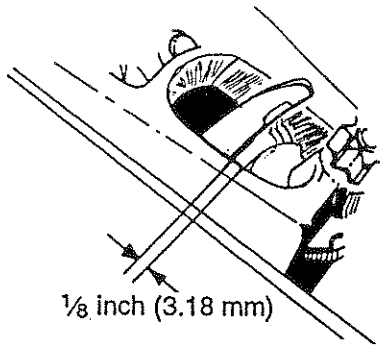


Fig. 18

NOTE: 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. 19**. To decrease the clearance, reverse the procedure.

4. Use the manual operator pendant to advance the needles to the uppermost position. The distance from the bottom of the needle eye to the twine disc should be 4 3/4 to 5", see **Fig. 20**.

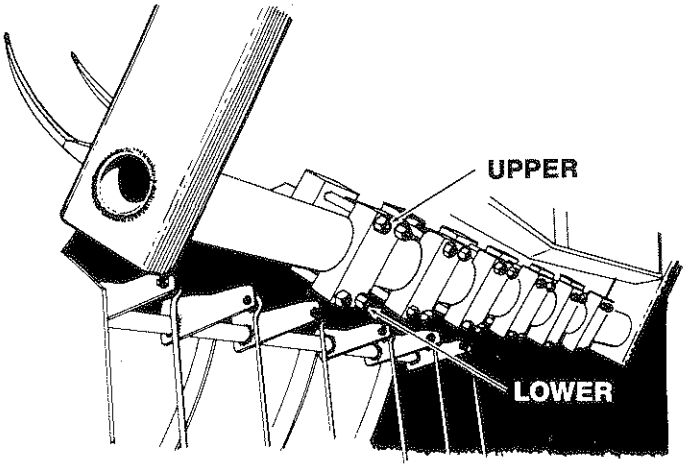


Fig. 19

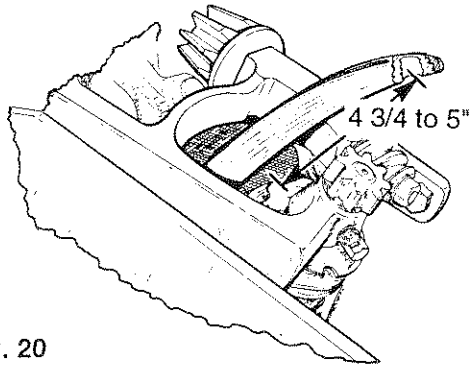


Fig. 20

5. Adjust the needle height by loosening the lock nuts on the needle yoke drive rods, see **Fig. 21**. Turn the rods to the right or left for the desired setting. Be sure both are adjusted for equal load at top dead center.

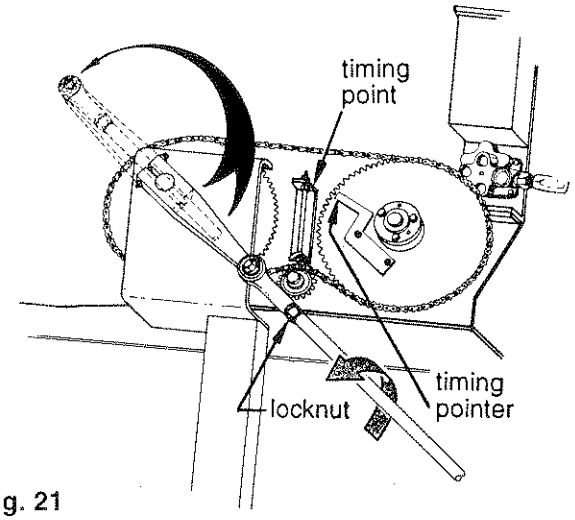


Fig. 21

6. Check the twine finger adjustment after adjusting needles.

Twine finger adjustment:

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

1. Use the manual operator pendant 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", see **Fig. 22**.

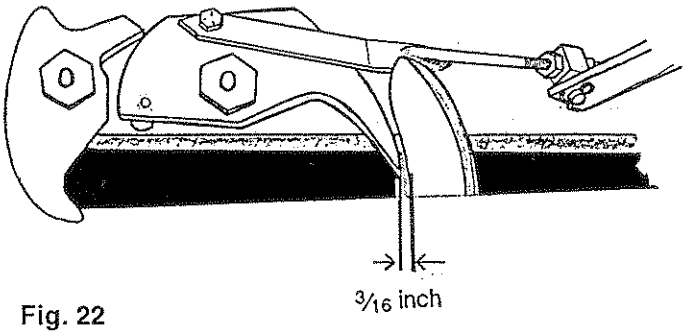


Fig. 22

NOTE: This adjustment is made by loosening the twine finger anchor bolt, (**A**), and knot sensor finger pivot bolt, (**B**), and sliding the assembly toward the front or back in the slotted holes in the bale chamber top, see **Fig. 24**. Retighten bolts after adjustment.

2. Use the manual operator pendant to advance the knotter until the twine fingers reach the most rearward point of travel and the cam rollers are positioned as in **Fig. 23**

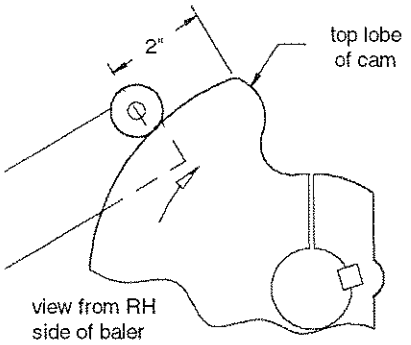


Fig. 23

3. Adjust the twine finger drive rods so the tips of the twine fingers are set to the dimension shown in **Fig. 24.**

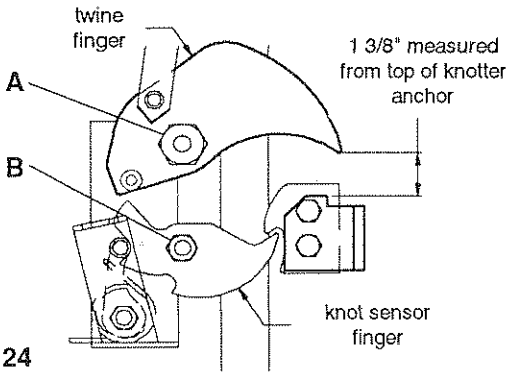


Fig. 24

4. Next rotate the knotter assembly until the cam rollers are off the cam surface as shown in **Fig. 25**. At this point, push the twine fingers by hand toward the needle slots to take up the slack in the assembly. Adjust so the twine finger tips are **1/16" minimum**, some may be more, from the left edge of the needle slots as shown in **Fig. 26**. Make this adjustment with the stop bolts, both LH and RH, located at either end of the twine finger drive shafts. See **Fig. 27**.

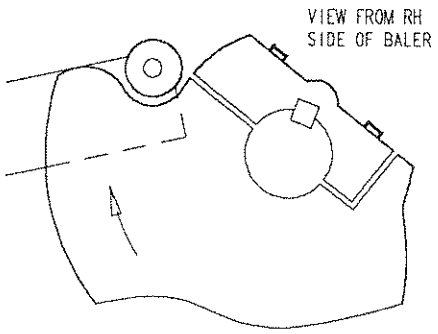


Fig. 25

NOTE: The twine finger drive cams should be checked to ensure that both cam rollers, (followers), initiate contact with the cam surface at the same time. If required, adjustment is made by appropriate loosening of one and tightening of the other cam clamping bolt located on each cam. See **Fig. 25**.

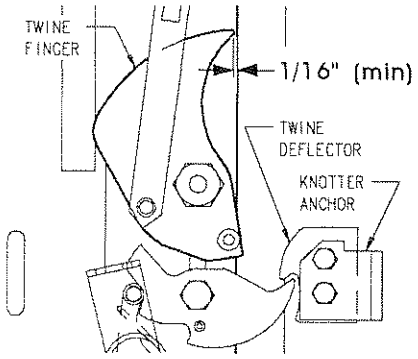


Fig. 26

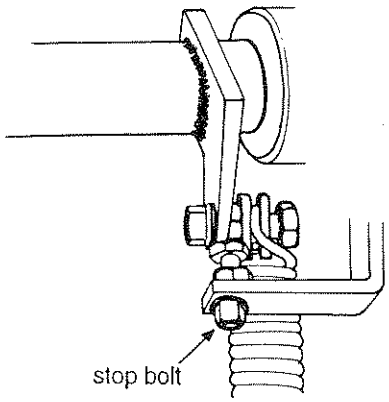


Fig. 27

Twine deflector:

Note top view of deflector in **Fig. 26**. Make sure the clearance around the tip between the knot sensor finger and the deflector is uniform and from 1/32" to 3/32". If adjustment is necessary, loosen the nuts on the knotter anchor, reposition the deflector and retighten the nuts. Note this adjustment may effect the knotter hold down pin hole position.

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. 28**.

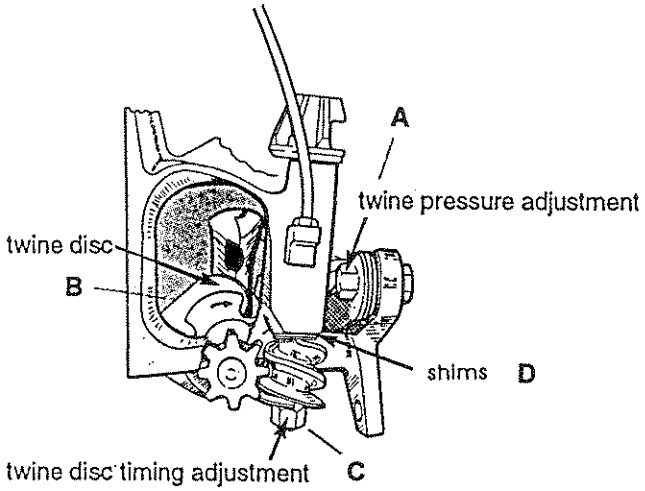


Fig. 28

Adjust the twine holder enough 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. (One hex flat per turn). Proper adjustment is achieved when the knotter is producing a clean and smooth knot. **Do not over tighten.**

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 cleaners 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. 28**. 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. 28**, and tighten the nut.

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

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 29**. Adjustment is made by bending the knife arm.

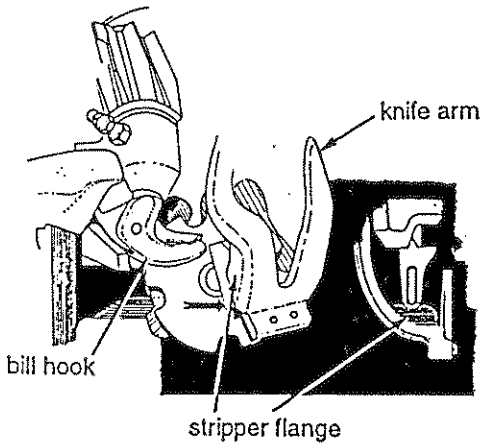


Fig. 29

2. The knife arm should be 3/4" to 7/8" past the end of the knotter bill hook when the knife arm is in the most extreme position, see **Fig. 30**. Correct the adjustment of the knife arm by replacing it.

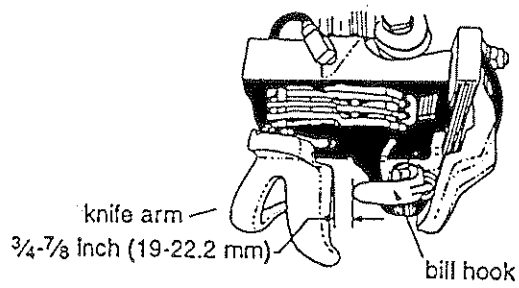


Fig. 30

Cam gear adjustment:

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

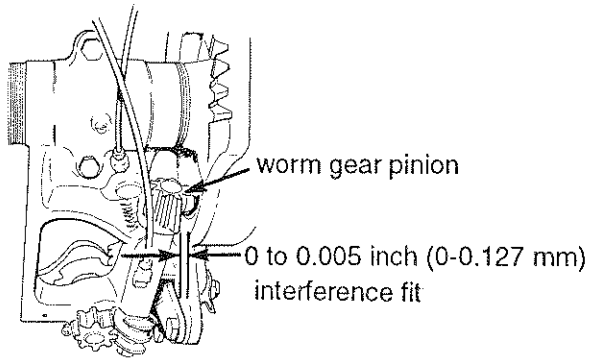


Fig. 31

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 31**.

NOTE: 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.

2. End play is removed by tightening the nut on the end of the knotter shaft, see **Fig. 32**. 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.

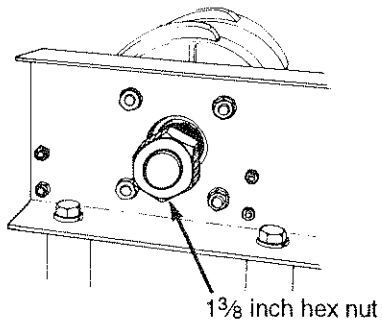


Fig. 32

CAUTION: FAILURE TO KEEP SHAFT ASSEMBLY TIGHT OR FAILURE TO KEEP SLACK FROM DEVELOPING BETWEEN CAM GEARS AND PINION GEAR SURFACES WILL RESULT IN CAM GEAR 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 drive shaft stop bolt, (A), See **Fig. 31**.

2. Use the manual operator pendant to advance the needle yoke away from home position to completely release the reset lever. For information on operation, see Manual control, page 14.

3. Adjust the twine tensioner, see **Fig. 30**. If tensioners are worn mor than 1/32", replace them.

4. Adjust the twine tensioners, see **Fig. 30**, until the springs are compressed to 1 1/2 " from their relaxed length. The reladed length is determined when the twine can be pushed through the twine tensioner.

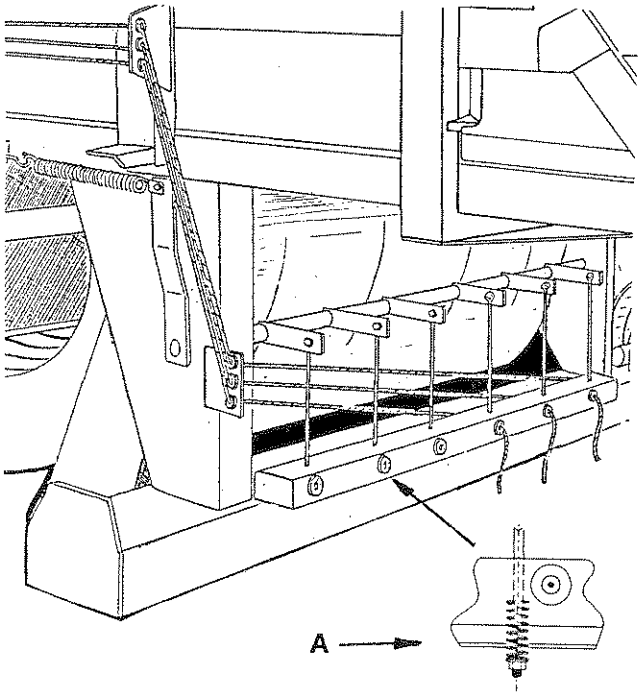


Fig. 33

CAUTION: BEFORE MAKING ADJUSTMENTS, CLEAR THE AREA OF ALL PESONNEL AND CHECK FOR SAFE EQUIPMENT OPERATION.

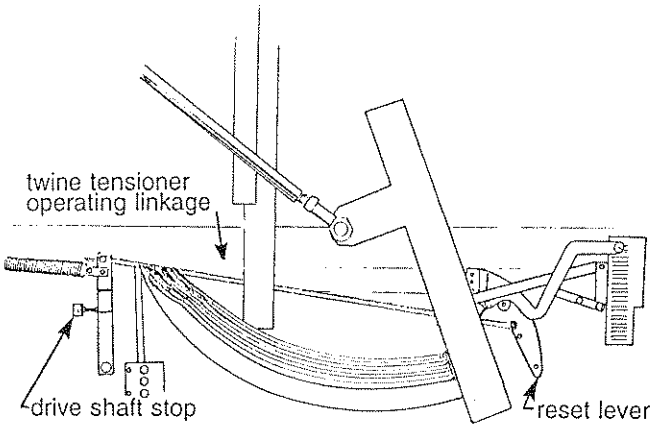


Fig. 34

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 1 3/4" length, see **Fig. 35**.

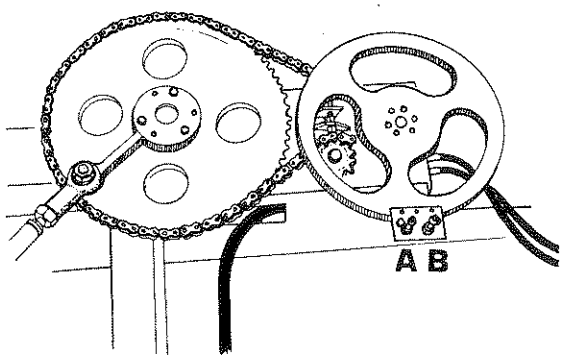


Fig. 35

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: WHEN ADJUSTING THE PLUNGER, MAKE SURE THERE IS ADEQUATE CLEARANCE BETWEEN THE STATIONARY AND PLUNGER KNIVES. DO THIS BY REMOVING OR INSERTING SHIMS UNDER THE BOTTOM ROLLER RAILS, SEE **FIG. 36**. THIS WILL AVOID DAMAGE TO KNIVES.

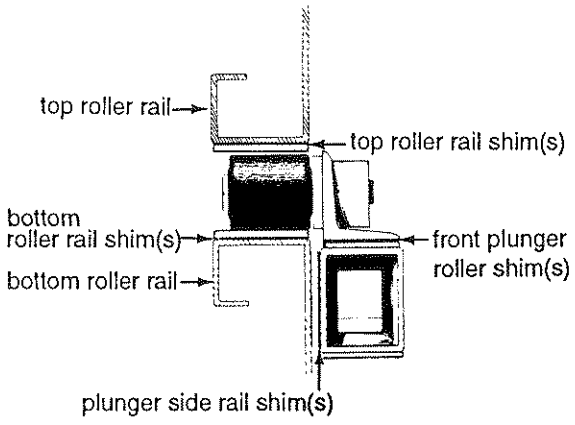


Fig. 36

STEP 1: ADJUST 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. 37**.

If the needle slots in the plunger are oriented 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. 36**.

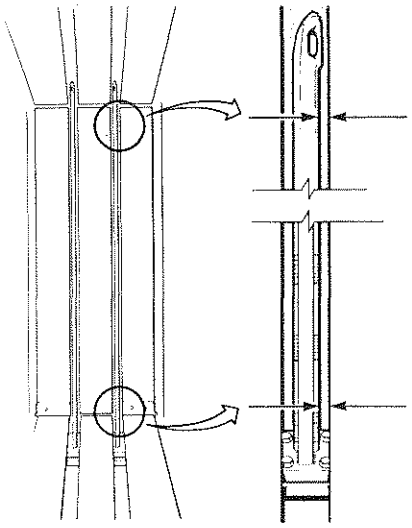


Fig. 37

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. 38**. Do this until the needle slots in the plunger are aligned to the mating slots on the top and bottom of the bale chamber.

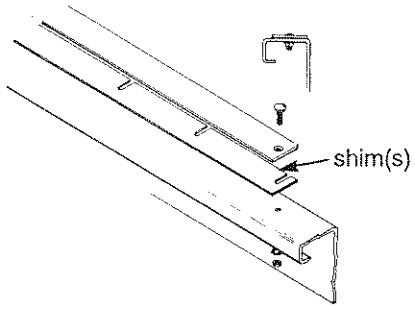


Fig. 38

To further adjust plunger horizontally, remove or insert shims behind the plunger slide rails, see **Fig. 36**, 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

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. 36**. Use the manual control to slowly cycle the plunger. Observe the roller activity to ensure that all four rollers touch and turn at some time during the complete plunger cycle. This indicates the load is shared by all the rollers. If not, adjust the front rollers by shimming them up or down. 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 KNIVES AND THE PLUNGER KNIVES.

STEP 3. SHIM TOP PLUNGER ROLLER RAILS:

Shim top plunger roller rails, see **Fig. 36**, to approximately 1/16" from the four plunger rollers. After adjusting top roller rails, use the manual operator pendant to slowly cycle the plunger to ensure the rollers do not bind anywhere in their area of travel.

STEP 4. ADJUST PLUNGER KNIVES:

After the plunger is adjusted, readjust the plunger knives as explained in the following.

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.

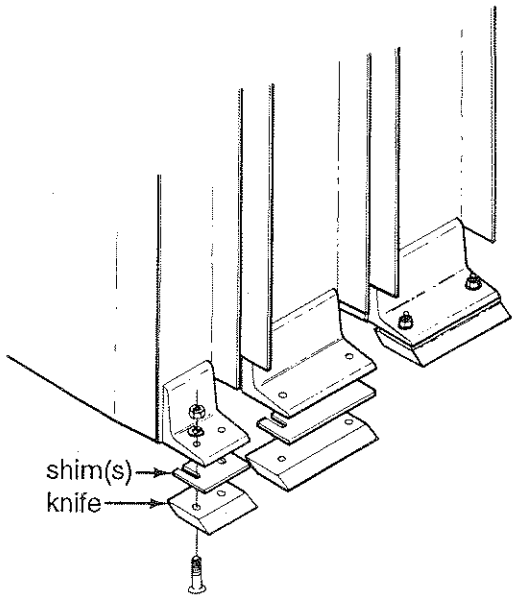


Fig. 39

Clearance of plunger knives and stationary knives should be maintained at approximately 1/32". Adjustment is made on the plunger knives only. To adjust plunger knives, move the plunger with the manual operators pendant until the cutting edges of the knives are even or overlapping. Shim the knives, see **Fig. 39**, using a **minimum** of one shim per knife segment for projected blade wear. Clearance from knife segment to knife segment may vary, therefore individual adjustments may be required.

WARNING: KNIFE AREA IS EXTREMELY HAZARDOUS. ALL CARE MUST BE TAKEN TO PREVENT SERIOUS INJURY FROM OCCURRING. **BE CAREFUL WITH SHARP KNIVES!**

COMBINED PLUNGER 'STROKE AND SPEED' AND LIMIT SWITCH (LS5 & LS10) ADJUSTMENTS:

NOTE: LS5 and LS10 limit switches should be adjusted at the same time the Plunger stroke and speed adjustments are made. This will provide convenience and accuracy in setting the controls.

Decelerated plunger return:

1. Disengage tractor PTO 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 1/4 of the maximum speed.

3. Attach test string to **LS-3,** (Full Charge Switch), roller arm, see Page 26. 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 PTO and run baler at 1,000 RPM.

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 stopwatch to accurately measure plunger return time. Return time should be 2.4 - 2.8 seconds with plunger stopping 1" from the fully retracted position. See **Fig. 40**.

7. To adjust Decelerated Return Speed, turn off key, loosen clamp screw of red wire slider on Plunger Retract resistor, the brown tube to the left 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 return time. When adjusting, ensure approximately 1/8" clearance between green wire slider (MANUAL) and red wire slider (AUTO). Take care to keep sliders from touching posts, etc.

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

NOTE: At this point, if limit switch **LS10** is to be adjusted, do not go to step 9, continue with step 4 in the next section for adjusting the **LS10** Plunger Return Stop Switch.

9. Disengage tractor PTO and ensure Power Switch is in 'OFF' position.

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

11. Stroke once to ensure cylinder is not bottomed out. Remove test string.

LS10 Plunger Return Stop Switch:

Function: LS10 stops the plunger at the end of its return stroke.

Adjustment Objective: The plunger must stop one inch from the end of its stroke to prevent bottoming of the plunger cylinder.

Adjustment: Ensure proper plunger decelerated speed 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. Attach a test string to **LS3** (Full Charge Switch) arm roller. Route the string so that the switch can be easily activated and released while standing on the ground.

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

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

4. Disengage tractor PTO. Shut off tractor and lock tractor brakes and/or transmission. Wait for all movement to stop.

5. Mark the location the plunger reached fully retracted. Also mark the desired stopping position at 1" rearward of this mark.

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

7. Engage tractor PTO and run baler at 1,000 PTO

RPM in the automatic mode.

8. Pull test string on **LS3** (Full Charge Switch) and release when the feed fork stops and plunger advances. The plunger will automatically retract.

9. Observe plunger stopping position.

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

11. 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.

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

13. **LS10** (Plunger Return Stop Switch) should be positioned so that the plunger stops 1" prior to its full retract position. To achieve the correct adjustment it will be necessary to reposition **LS9** and **LS10** on their mounting plates. See **Fig. 40**.

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

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

16. Reconnect white wire onto terminal **TB3-7**. Key off.

17. After **LS10** (Plunger Return Stop Switch) is properly adjusted, adjust **LS9** (Plunger Return Decelerate Switch), see page 31. If not further adjustment is necessary, remove test string.

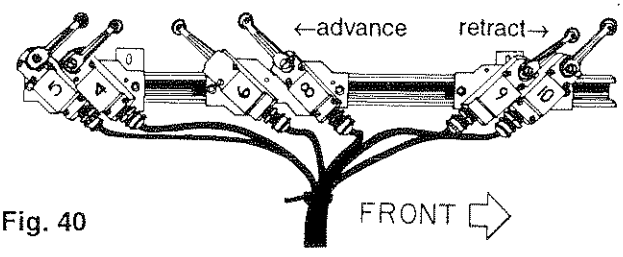


Fig. 40

Decelerated Plunger Advance:

1. Disengage tractor PTO and ensure Power Switch is in the '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 the 5 conductor cable, from terminal TB3-9 and connect to terminal TB2-1. **NOTE:** Leave other white wire in place. This will cause the plunger advance speed to be reduced to approximately 1/4 of the maximum speed.

3. Attach test string to **LS3** (Full Charge Switch), see **Fig. 46**, 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' positon and Control mode in 'AUTO' position. Engage tractor PTO and run baler at 1,000 PTO RPM.

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

6. Use a stopwatch to accurately measure the plunger advance time. Advance times should be 2.4 - 2.8 seconds with the stroke beginning 1" 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 1/8" clearance between yellow wire slider (Manual) and orange wire slider (Auto). If no further adjustments are necessary, disconnect test string.

8. Repeat steps 5 and 6 until step 7 is achieved.

NOTE: At this point, if limit switch **LS5** is to be adjusted, do not go to step 9, continue with step 3 in the next section for adjusting the **LS5** 'Plunger Return Switch'.

9. Disengage tractor PTO 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.

LS5 'Plunger Return Switch'

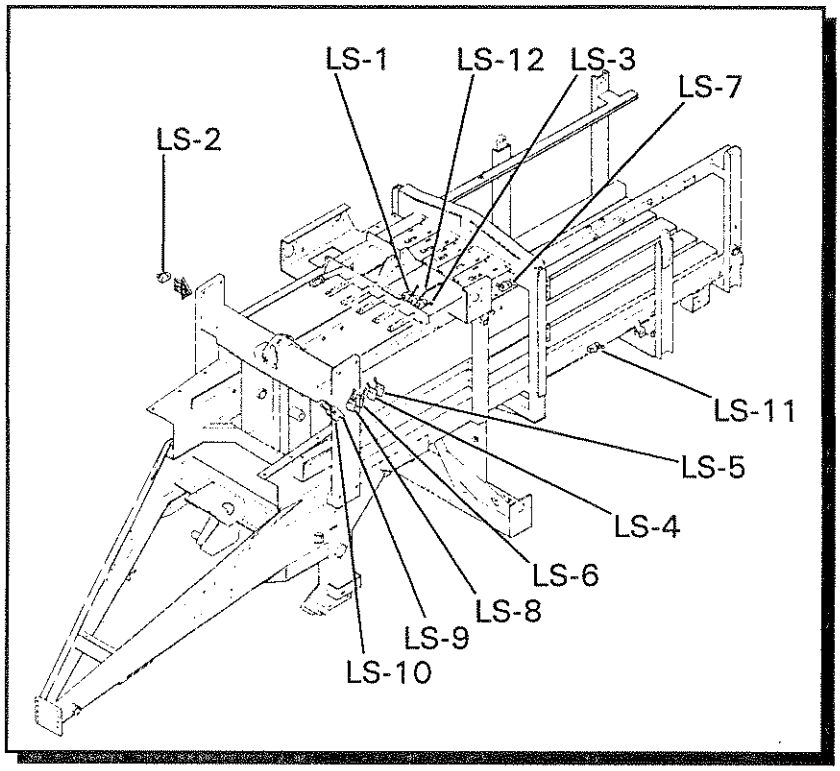
Function: **LS5** signals the plunger to return at the end of its extend stroke. **LS5** also signals the knotter to begin its cycle.

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

Adjustment: Ensure proper speed adjustment, see page 24.

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.

LIMIT SWITCH LOCATION \ ARM ANGLE



Limit switch description:

LS1 Knotter stop / plunger safety knotter switch

LS2 Plunger delay feed fork switch

LS3 Full charge switch

LS4 Plunger advance decelerate/knotter arming plunger switch

LS5 Plunger return switch

LS6 Plunger return delay switch

LS7 Knotter reverse safety switch

LS8 Feed fork delay plunger switch

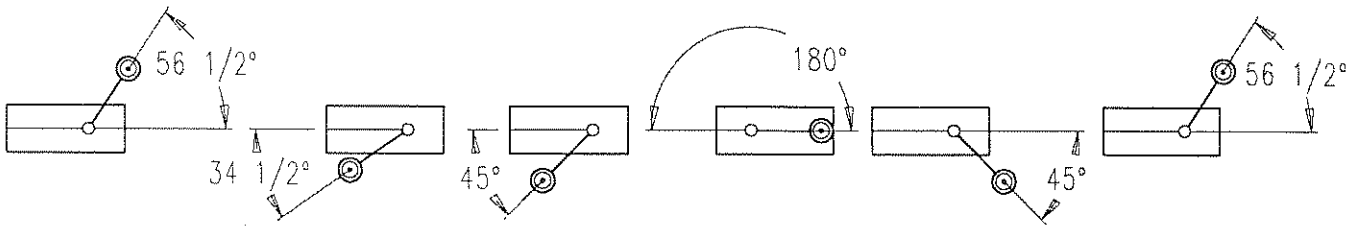
LS9 Plunger return decelerate switch

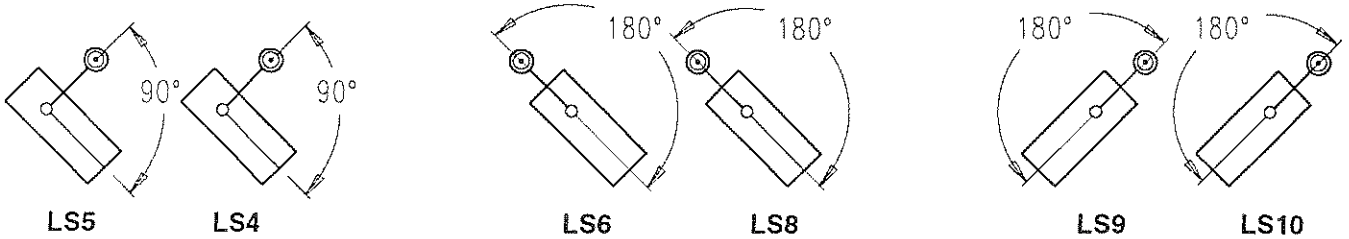
LS10 Plunger return stop switch

LS11 Knotter trip switch

LS12 Plunger early start knotter switch

THE FOLLOWING DIAGRAM ILLUSTRATES THE CORRECT ARM ANGLE FOR ALL LIMIT SWITCHES. BEFORE MAKING ANY LIMIT SWITCH ADJUSTMENTS CHECK THAT THE ARM IS MOUNTED AT THE CORRECT ANGLE. SWITCHES LS4, LS5, LS6, LS8, LS9 AND LS10 ARE VIEWED FROM INSIDE BALER.





1. Engage tractor PTO and run baler at 500 PTO RPM.

2. Use the manual operator pendant to advance the plunger until it is fully extended.

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

4. Mark the location of the plunger fully extended. Also mark 1" forward of this position, see Fig. 41.

5. Engage the tractor PTO and use the manual operator pendant to return the plunger to its home position.

6. Disengage tractor PTO and go to the control box and remove the white wire in 5 conductor cable from terminal TB3-9 and connect to terminal TB2-1. This will cause the plunger to advance at approximately 1/4 of its full speed.

7. Attach the test string to **LS3** (Full Charge Switch) roller arm. Route the string so that the switch can be easily activated and released while standing on the ground.

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

9. Pull **LS3** string and release when feed fork stops and plunger advances.

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

11. Reduce baler speed to 500 PTO RPM.

12. Use the manual operator pendant 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.

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

14. 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" forward from its fully extended position.

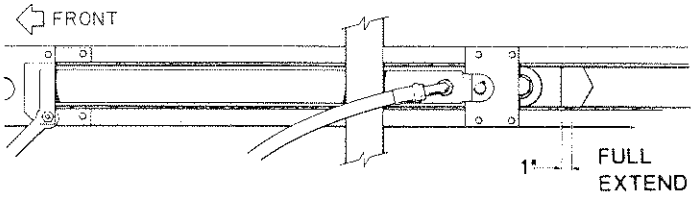


Fig. 41

15. Repeat steps 9 through 14 as necessary until objective is achieved.

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

17. Adjust **LS4** (Plunger Advance Decelerate Switch) is properly adjusted.

Limit switch adjustment:

Proper limit switch adjustment is necessary to maintain accurate and dependable baler functions. Before making any adjustments make sure the limit switch arms are set at the correct angle. Page 26 illustrates correct switch arm angle for each individual switch. The diagram on page 26 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.

LS5 and LS10 are adjusted while setting plunger stroke and speed and are covered on pages 24/25.

CAUTION: IT WILL BE NECESSARY TO OPERATE THE BALER WHILE OBSERVING DIFFERENT FUNCTIONS OF THE MACHINE TO DETERMINE REQUIRED ADJUSTMENTS. STAY CLEAR OF MOVING PARTS WHILE OBSERVING FUNCTIONS. SHUT DOWN TRACTOR BEFORE MAKING ANY SWITCH ADJUSTMENTS.

LS1 Knotter stop/plunger safety knotter switch:

Function: **LS1** has two 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 fully retracted position.

Adjustment objective: **LS1** is to be activated when the needle yoke is in the home positon.

Adjustment: **NOTE:** Adjustment of **LS1** should be made prior to baler operation. Make sure hydraulic oil is warmed to operating temperature.

1. Cut twines at knotters.

2. Remove twines completely from the needles.

3. Attach test strings around the switch roller arms of **LS11** (knotter trip switch) and **LS3** (full charge switch). Route strings so that the switches can be easily activated and relased while standing on the ground.

4. Engage tractor PTO and run baler at less than 500 PTO RPM.

5. Use the manual operator pendant to position needle yoke precisely at bottom dead center, (home position), see **Fig. 42**.

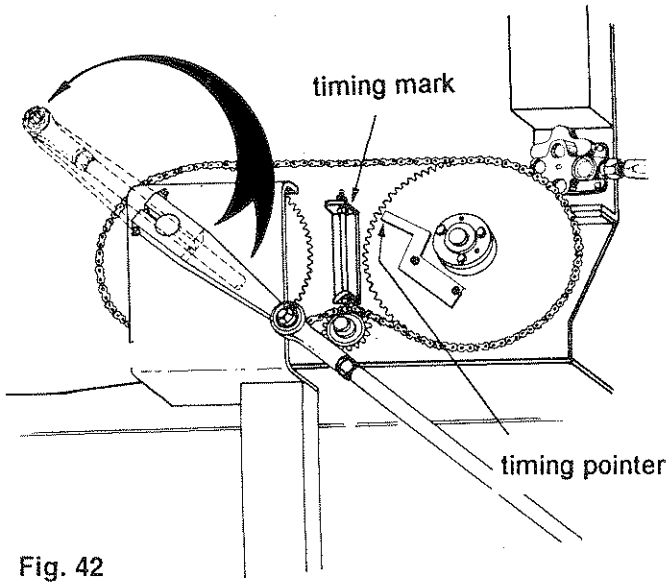


Fig. 42

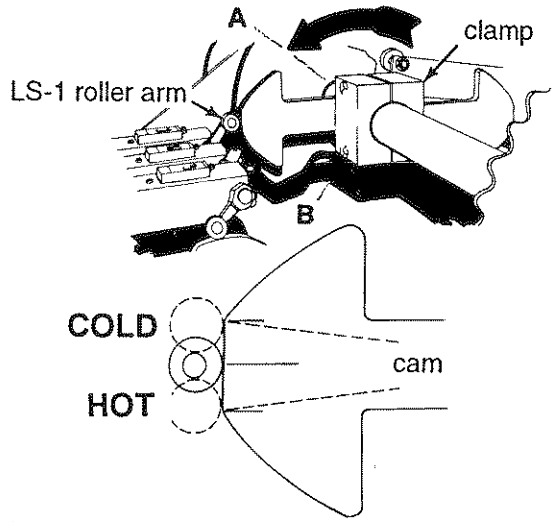


Fig. 43

6. Disengage tractor PTO. 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. 43**.

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

9. Pull string from **LS11** (knotter trip switch) and hold.

10. Pull string from **LS3** (full charge switch) and release after plunger starts to advance.

11. Release **LS11** (knotter trip switch) string when knotters start.

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

13. Disengage tractor PTO. 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. 43.** Note **HOT** and **COLD** cam locations.

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

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

17. Repeat steps 8 thru 16, (omitting step 15), until the cam is in the required location, see **Fig. 43**.

NOTE: When adjusting **LS1**, ensure cam lifts arm not lowers it.

18. Engage tractor PTO and run baler at 1,000 PTO RPM in the automatic mode until oil reaches at least 140° F (60° C).

19. Once the oil has reached at least 140° F, run the baler at 500 PTO RPM.

20. Repeat steps 9 thru 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 thru 13 and step 21 at 500 PTO RPM until adjustment is achieved.

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

24. Rethread twine, see steps 5 and 6 of **Twine installation and threading**, see page 13.

25. Engage tractor PTO and run baler at less than 500 PTO RPM.

26. Use the manual operator pendant to cycle the knotter forward to load twine into knotters and return knotters to home position.

LS2 Plunger delay / feed fork switch:

Function: **LS2** delays start of plunger advance until the feed fork travels to its highest position and stops.

Adjustment objective: **LS2** is to have the feed fork stop at its highest point of travel in the bale chamber after **LS3** (full charge switch) has been activated. The switch roller arm must be on the highest part of the

cam.

Adjustment: NOTE: Adjustment to be made with hydraulic oil hot, (140° F, 77° C), or greater. (Before making any adjustments make sure the drive chain is properly adjusted.

1. Attach test string to **LS3** (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 PTO and run baler at 1,000 PTO RPM in the 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 PTO. Shut off tractor and lock brakes and/or transmission. Wait for all movement in baler to stop.

6. Check stopping position of switch arm roller on cam. It should be on the high part of the cam, see **Fig. 44**.

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

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

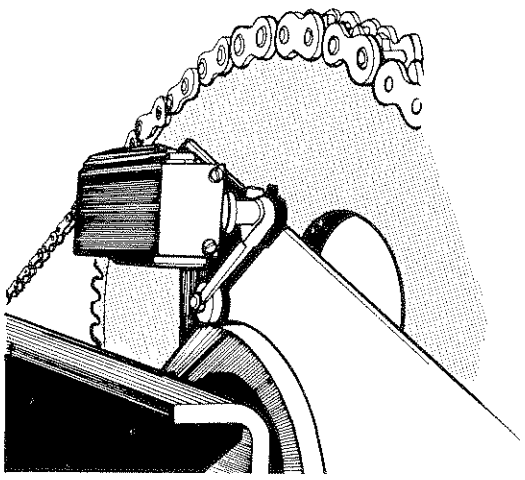


Fig. 44

9. Turn power "ON" at control panel.

10. Repeat steps 2 thru 5 and step 8 until the switch arm roller is on the high part of the cam, see **Fig. 44**.

11. Again, turn power "ON" at control panel and repeat steps 2 thru 5.

12. Measure from rear side of feed fork crankshaft to front side of feed fork tine mounting tube, see **Fig. 45**. When the feed fork is at its highest point of travel in the chamber, the measurement should be 12 1/2" to 13" 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 late if the measurement is less than 12 1/2" to 13". Rotate the cam rearward.

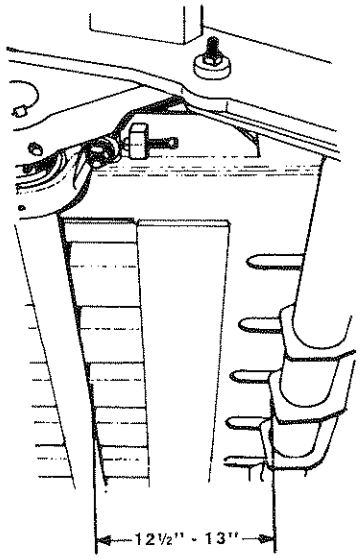


Fig. 45

15. Repeat steps 2 thru 5 until required measurement is achieved.

16. Remove test string from **LS3** (full charge switch).

LS3 Full charge switch:

Function: **LS3** signals the control circuit that the feed chamber has been filled by the 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: **LS3** should be operated by the charge sensor cam in about the first 2" of upward travel of the charge sensor paddles. As the charge sensor is returned to its rest position, **LS3** should be released within 1/2" of the paddles rest position. Measure at the rubber bumper for the right hand paddle.

Adjustment: Adjust the cam with the feed sensor paddles down, see **Fig. 46**.

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

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

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

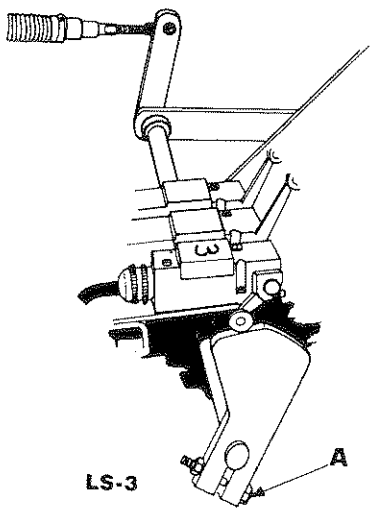


Fig. 46

LS4 Plunger advance decelarate switch:

Function: **LS4** decelerates the plunger to 1/4 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: **LS4** ensures the plunger decelerates prior to activating **LS5** (plunger return switch).

Adjustment: Make sure **LS5** is properly adjusted.

1. Loosen mounting bolt and slide switch and mount as close to **LS5** as possible, see **Fig. 47**.

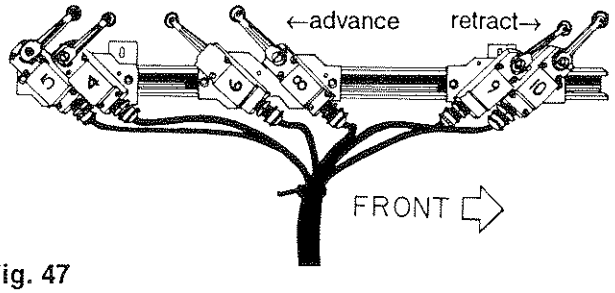


Fig. 47

LS5 Plunger return switch: (see page 25).

LS6 Plunger return delay switch:

Function: **LS6** delays plunger retract during the tie cycle until the knotter is halfway through the tie cycle and **LS12** is operated. This brief 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" before **LS6** is activated to stop the plunger. The plunger has retracted approximately 9" when the front edge of the make-up cylinder bolt is on the rearward edge of the twine box mount, see **Fig. 48**.

Adjustment: NOTE: Adjust **LS6** (plunger return delay switch) together with **LS8** (feed fork delay plunger switch). For function and adjustment objective of **LS8**,

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.**

see page 31.

1. Cut twine on all six knotters

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

3. Attach test strings to **LS3** and **LS11** 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. Remove green wire from TB1-6.

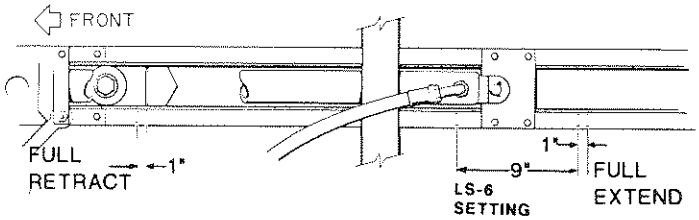


Fig. 48

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

5. Pull test string from **LS11** and hold.

6. Pull test string from **LS3** and release when feed fork stops and plunger starts to advance.

7. Release test string from **LS11** as soon as the knotter starts to move.

8. Observe the plunger as it retracts. It should stop, approximately 9" from the fully extended position as it returns to its home position.

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

10. Adjust **LS6** forward or rearward as necessary to cause the stopping position observed in step 8 to be approximately 9" from the fully extended position.

11. Slide **LS8** so that the center of the switch shaft is 3" forward of the center of the switch shaft on **LS6**.

12. Repeat steps 4 thru 11 as necessary until the plunger stops when it is 9" 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. Reconnect green wire.

15. Rethread twine.

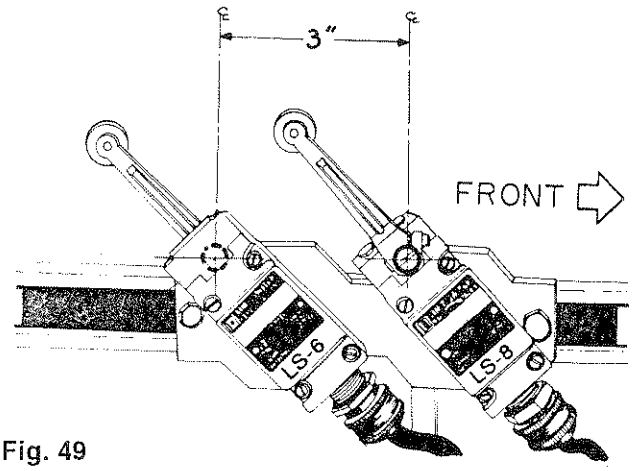


Fig. 49

LS7 Knotter reverse safety switch:

Function: **LS7** 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: **LS7** 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: 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. 50**.

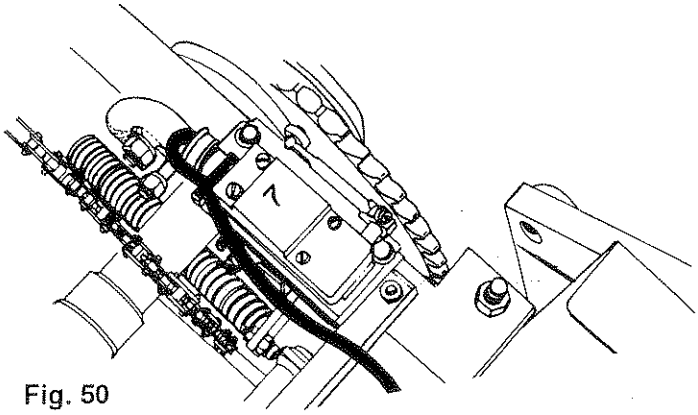


Fig. 50

LS8 Feed fork delay plunger switch:

Function: **LS8** 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: **LS6** (plunger return delay switch) must be properly adjusted, see page 30.

1. Loosen the mounting bolt and slide **LS8** forward or rearward so that the center of the switch shaft is 3" forward of the center of the switch shaft on **LS6**, see **Fig. 49**.

LS9 Plunger return decelerate switch:

Function: **LS9** decelerates the plunger to 1/4 its full speed just prior to stopping on its retract stroke to prevent the plunger from overrunning **LS10** (plunger return stop switch).

Adjustment objective: While the baler is running at full speed, **LS9** causes the plunger to stop at **LS10**.

Adjustment: Ensure **LS10** is properly adjusted.

1. Loosen the mounting bolt and slide the mount and switch forward as close to **LS10** as possible.

2. Attach the test string to **LS3** (full charge switch) roller arm. 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 1,000 PTO RPM in the automatic mode.

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

5. Observe plunger stopping position.

6. Reduce baler speed to 500 PTO RPM.

7. Use the manual operator pendant 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.

8. Disengage the tractor PTO, shut off the tractor and lock the tractor brakes and/or transmission. Wait for all movement in baler to cease.

9. If the plunger stops forward of the **LS10** stopping

position, slide **LS9** rearward 1/2".

10. Repeat steps 4 thru 10 until the plunger stops at the stopping position of **LS10**.

11. 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 **LS9** and **LS10**.

12. Remove test string.

LS10 Plunger return stop switch: (See page 24)

LS11 Knotter trip switch:

Function: **LS11** completes the circuit to allow the knotter to cycle when the plunger has reached **LS5** at the end of the plunger advance stroke. **LS11** also will cause the knotter to stop at midpoint of the tie cycle if the meter arm has failed to reset.

Adjustment objective: **LS11** must be operated before the meter arm reaches the end of its travel. Incorrect adjustment may result in inconsistent bale length or failure to tie altogether.

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

1. Raise the meter bar until cam contacts switch arm roller and the switch clicks to operate, see **Fig. 51**.

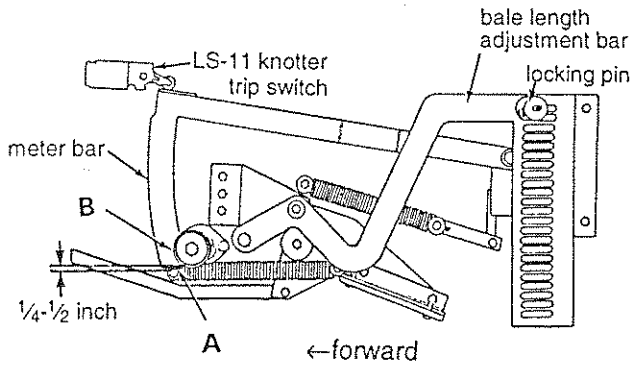


Fig. 51

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

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

4. If measurement is less than 1/4", lower the switch roller arm as necessary. If more than 1/2", raise the switch roller arm.

5. Return the meter bar to its rest position.

LS12 Plunger early start knotter switch:

Function: **LS12** 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: **LS12** is to be activated by its cam at approximately the mid-point of knotter cycle.

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

1. Cut the twine at all six knotters, pull twine down through bale chamber and completely remove from needles.

2. Attach test strings to **LS3** (full charge switch) and **LS11** (knotter trip switch) roller arms. Route strings so that the limit switches can be easily activated and released while standing on the ground.

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

4. Pull test string from **LS11** and hold.

5. Pull test string from **LS3** and release when feed fork stops and plunger starts to advance.

6. Release test string from **LS11** as soon as the knotter starts to move.

7. When the knotter is halfway through its cycle, **LS12** should be activated by its cam and the plunger should complete its retract stroke.

8. If the plunger did not retract at the mid-point of the knotter cycle, use the manual operator pendant to retract the plunger.

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

10. Rotate the switch roller arm of **LS12** toward the rear of the machine 1/4".

11. Repeat steps 4 thru 11 to ensure the plunger returns to its home position.

12. Disengage tractor PTO, shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease. Remove test strings.

13. Rethread twine, see steps 5 and 6 in Twine Installation and Threading, page 13.

14. Engage tractor PTO and run baler at less than 500 PTO RPM.

15. Use the manual operator pendant 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**, see page 24.

2. Engage the tractor PTO and run the baler at 700 PTO RPM.

3. Set the control mode switch to manual.

4. Insert the remote cable plug into the **Plunger advance socket**.

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

6. Read the main system pressure on the right side of the front gauge panel of the baler as illustrated in **Fig. 52**. It should read approximately 6,000 psi for balers with serial numbers **168** and below. For baler numbers **169** and above, main system pressure should read 6,500 psi.

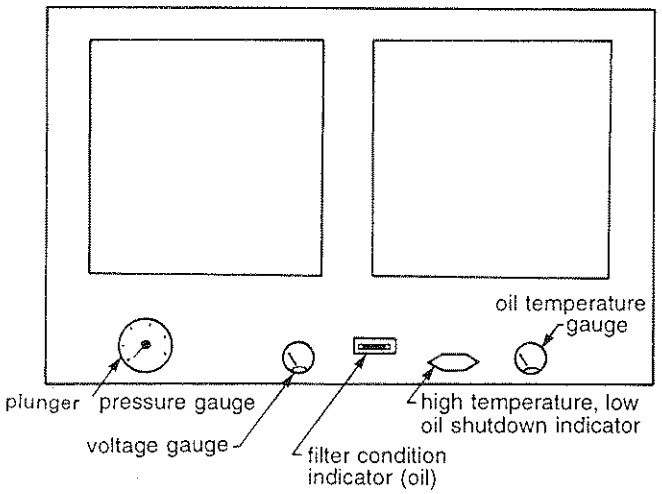


Fig. 52

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" JIC cap on the main valve retract pressure port, see **Fig. 53**. (Retract pressure gauge port is labeled with a stamped "**B**"). Connect a 5,000 psi 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 gauge. It should read 2,500 psi.

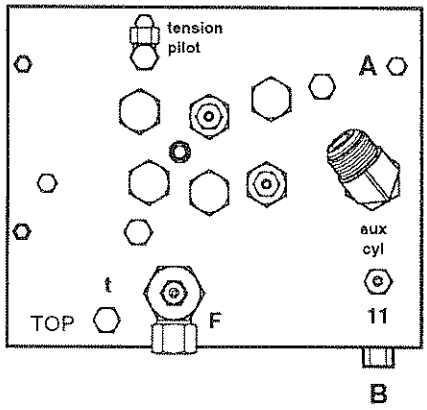


Fig. 53

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" JIC cap on gauge port (**A**), see **Fig 54**.

3. Connect a 5,000 psi gauge onto the density gauge port (**A**).

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

5. Set the control mode switch to manual and turn the power switch to the "OFF" position.

6. Ensure the ball valve is in the "open" position.

7. Read the pressure on the 5,000 psi gauge. It should read 2,150 psi.

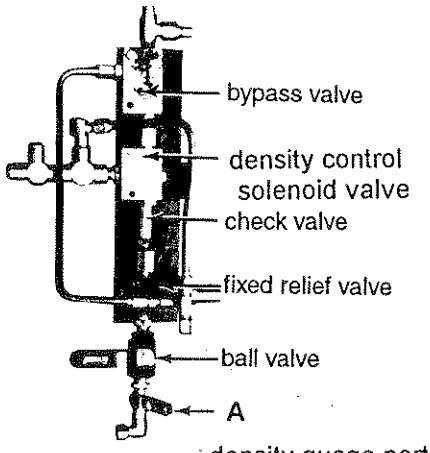


Fig. 54

Charge pressure:

1. Ensure the oil is at least 140° F. before starting this procedure.

2. Disengage tractor PTO, shut off tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

3. Remove the 1/4" JIC cap on gauge port (**A**), see **Fig. 55.**

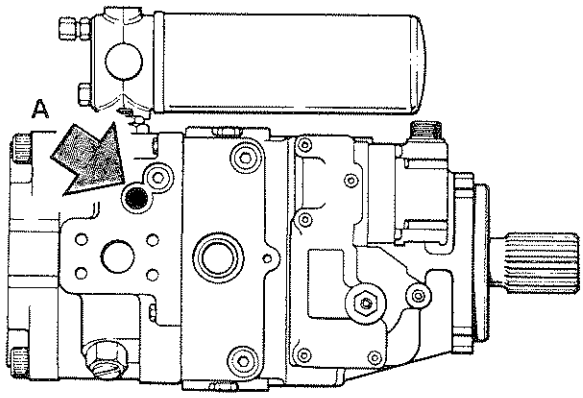


Fig. 55

4. Connect a 1,000 psi gauge onto port (**A**).

5. Engage the tractor PTO and run the baler at 700 PTO RPM.

6. Read the pressure on the 600 psi gauge. It should read 400 psi.

7. Set the control mode switch to manual.

8. Insert the manual operator pendant cable plug into the **Plunger retract socket.**

9. Depress the remote button and read the pressure on the 600 psi gauge. It should read a minimum of 350 psi while plunger is moving.

Feeder 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" JIC cap from gauge port (**A**), see **Fig. 56.**

3. Connect a 5,000 psi gauge onto port (**A**).

4. To prevent the feeder from rotating, secure it to the frame with a 3/8" 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 PTO and in the manual mode run the baler at 700 PTO RPM.

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 3/8" chain.

8. Read the pressure on the 5,000 psi gauge. It should read 3,200 psi.

NOTE: Contact Freeman service for adjustment.

CAUTION: REMAIN CLEAR OF BALER AT ALL TIMES AND ONLY START BALER AFTER CHAIN IS SECURED ON FEED FORK.

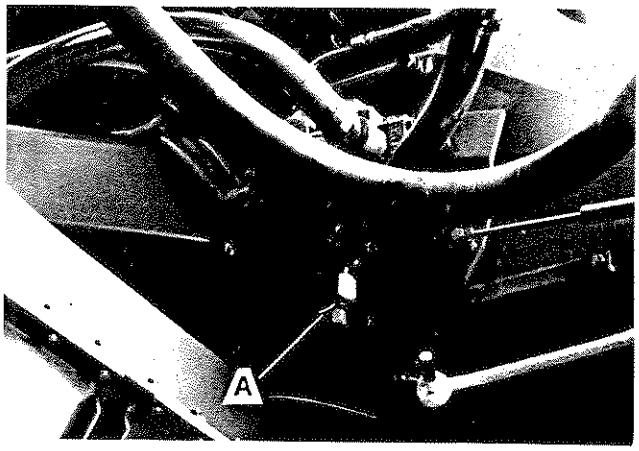


Fig. 56

KNOTTER AND FEED FORK MANIFOLD:

Main system pressure (forward):

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" JIC cap from gauge port (**A**), see **Fig. 57.**

3. Connect a 5,000 psi gauge to port (**A**).

4. To prevent the feed fork from rotating, secure the feed fork to the frame with a 3/8" 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 PTO and run the baler at 700 PTO RPM.

8. Depress the remote cable button and read the pressure on the 5,000 psi gauge. It should read 3,500 psi.

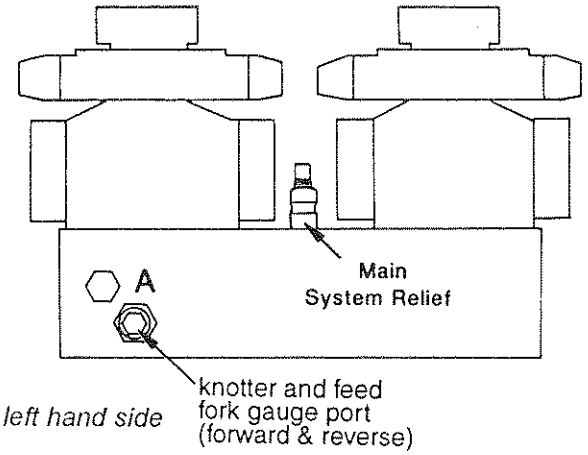


Fig. 57

Feed fork pressure (reverse):

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

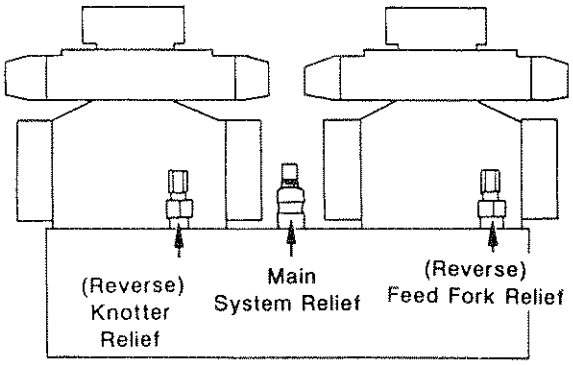
2. Remove the 1/4" JIC cap from gauge port (**A**), see **Fig. 57**.

3. Connect a 5,000 psi gauge to port (**A**).

4. To prevent the feeder crank shaft from moving forward, strap the feeder crank to the frame with a 3/8" chain.

5. Set the control mode switch to manual.

6. Insert the remote cable plug into the **Feed fork reverse socket.**



right hand side

Fig. 58

7. Engage the tractor PTO and run the baler at 700 PTO RPM.

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 5,000 psi gauge. It should read 2,000 psi.

Knotter pressure (reverse):

1. Engage the tractor PTO and run the baler at or below 500 PTO RPM.

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. 59**.

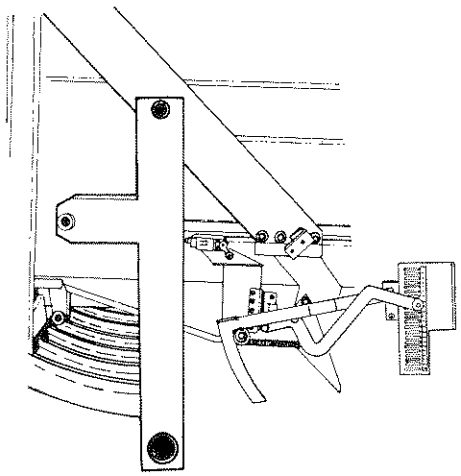


Fig. 59

5. Disengage the tractor PTO, shut off the tractor and lock tractor brakes and/or transmission. Wait for all movement in baler to cease.

6. Remove the 1/4" JIC cap from gauge port (**A**), see **Fig. 57**.

7. Connect a 5,000 psi gauge to port (**A**).

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. 60**. 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 tractror PTO and run the baler at 700 PTO RPM.

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

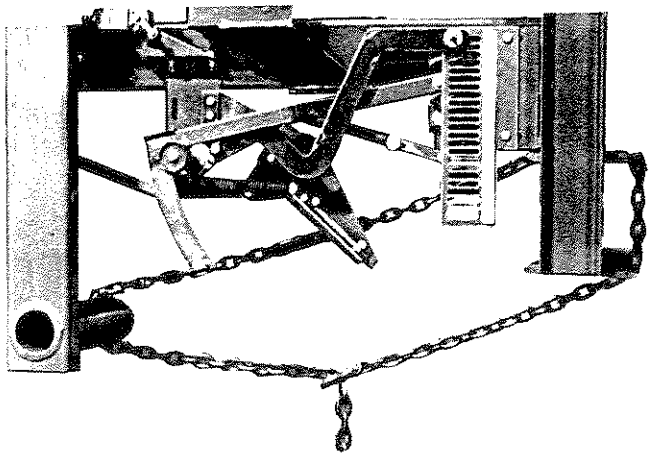


Fig. 60

11. Depress the remote cable button and read the pressure on the 5,000 psi gauge. It should read 2,000 psi.

NOTE: Contact Freeman service for adjustment.

CAUTION: REMAIN CLEAR OF BALER AT ALL TIMES AND ONLY START BALER AFTER CHAIN IS INSTALLED.

FRICTION CLUTCHES:

PTO shaft friction clutch adjustment:

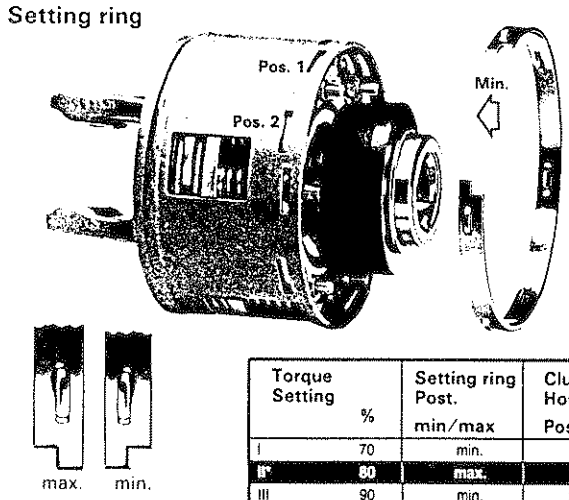
The power take off friction clutch mounted at the front of the mechanical drive unit may require occasional adjustment. The clutch is factory adjusted to torque level II, see **Fig. 61**. If the clutch is slipping under normal operating conditions and the friction disks are in serviceable condition, reposition the clutch setting ring to the torque setting III position. If the clutch disks are contaminated with grease etc., or are severely worn, replace the disks.

The torque setting can be modified with the aid of the setting ring and two alternative location slots in the clutch housing. These allow four torque settings. The setting ring can only be removed in the relieved condition which is obtained by tightening the nuts.

1. The setting ring provides for a **min.** position and a **max.** position.

2. The clutch housing incorporates two locating positions for the setting ring, (1 and 2), which are situated at different levels.

3. Tighten the nuts to relieve spring pressure on the ring. Remove the ring. Reposition the ring to affect the proper torque setting required, see table, **Fig. 61**. Back off the nuts to the end of the studs. The unit is now assembled for the torque value shown.



Torque Setting	%	Setting ring Post. min/max	Clutch Housing Pos.
I	70	min.	1
II*	80	max.	1
III	90	min.	2
IV	100	max.	2

Fig. 61

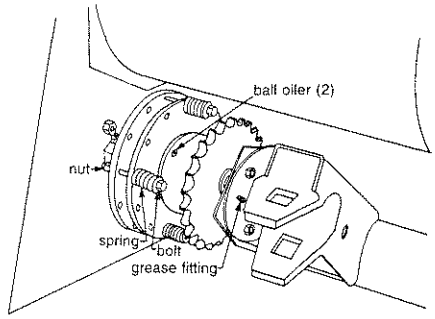


Fig. 62

Pick up friction clutch adjustment:

1. Tighten bolts to completely compress the springs.

2. Back nuts off one complete turn.

NOTE: Inside the pickup friction clutch there is a reversible clutch. No adjustment is necessary but it is recommended that the two ball oilers be lightly oiled weekly, see **Fig. 62**. **Do not over lubricate.**

OIL COOLER:

Operating temperature:

The baler should not be operated when temperature is lower than 20° F (-6° C). If it is necessary to operate the baler at these temperatures, consult the factory for oil recommendations. At oil temperatures of 20° to 32° F (-6° to 0° C), operate baler at 500 PTO RPM

in automatic mode. Once oil temperature reaches 32° F (0° C), run the baler at 1,000 PTO RPM.

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

CAUTION: DO NOT OPERATE THE BALER WITH OIL TEMPERATURES **ABOVE 225°** F (107° C). SEE HOT OIL SHUTDOWN PROCEDURE BELOW.

Hot oil shutdown:

If the oil temperature reaches 225° F (107° C), the thermostat will disconnect the electrical 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 PTO RPM. 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 shut down and the red light located on the front of the baler will illuminate. Repair oil leak or other cause. Check the sight glass and fill the tank to its proper level.

Low oil indicator:

If the oil level in the tank is too low, the low oil indicator will illuminate. The indicator is located above the low oil shut down light. If the low oil indicator should illuminate, immediately shut down the baler, repair the cause or leak and refill tank with oil using the sight gauge, see **Fig. 63**.

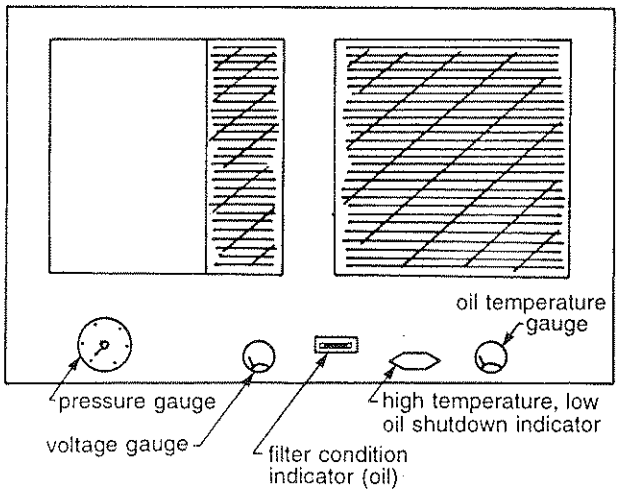


Fig. 63

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 for approximately 10 seconds to clear chaff and dust from the oil cooler grill screens.

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

5. The fan will repeat the above sequence.

Charge sensor adjustment:

1. Check for proper limit switch adjustment for **LS3** (full charge), see page 29.

2. Spring tension adjustment:

   (A) Loosen set screw in locking collar, see **Fig. 64.**

   (B) Slide locking collar on feed sensor guide rod forward to compress spring 1" when the sensor paddle is against the rubber bumper.

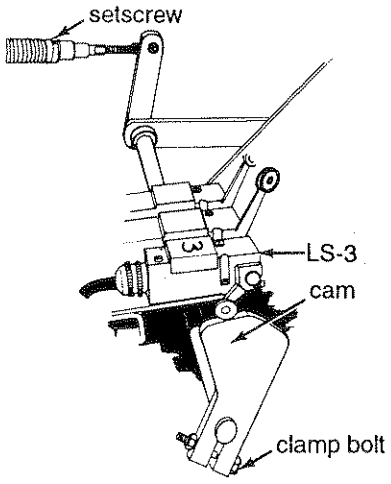


Fig. 64

Drive belt adjustment:

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

1. Adjust to obtain a 3/8" deflection when a 15 to 19 lb. force is applied at the center of the span length, see **Fig. 65**. Check each of the six drive belts separately.

2. If adjustment is necessary, loosen clamp bolts (**A**)

(front) and (B) (back) and pivot bolts (C) and (D), see **Fig. 65** and **Fig. 66**.

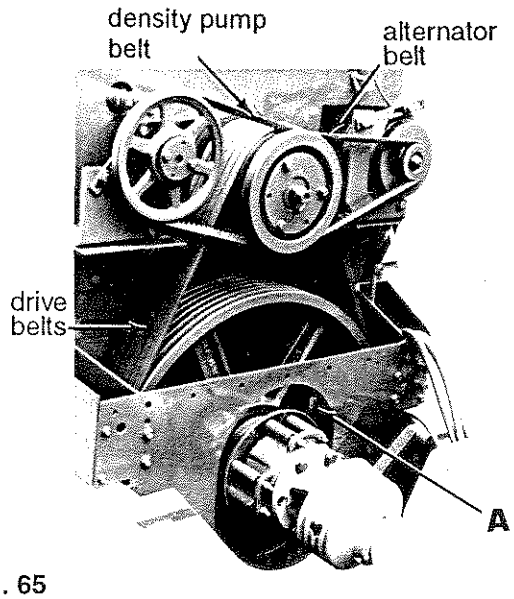


Fig. 65

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 approximately 1/4", see **Fig. 67**.

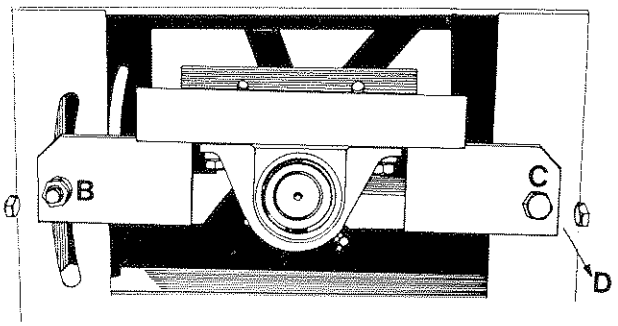


Fig. 66

3. Tighten (B), see **Fig. 66**.

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

5. Check belts as in step 1. If too loose, repeat the above procedure.

6. Tighten clamp bolts (A) and (B) and pivot bolts (C) and (D), see **Fig. 65** and **Fig. 66**.

Alternator belt / Density pump belts:

Adjust to obtain a 3/16" deflection when a 2 to 3 lb. force is applied at the center of the span length, see **Fig. 65**.

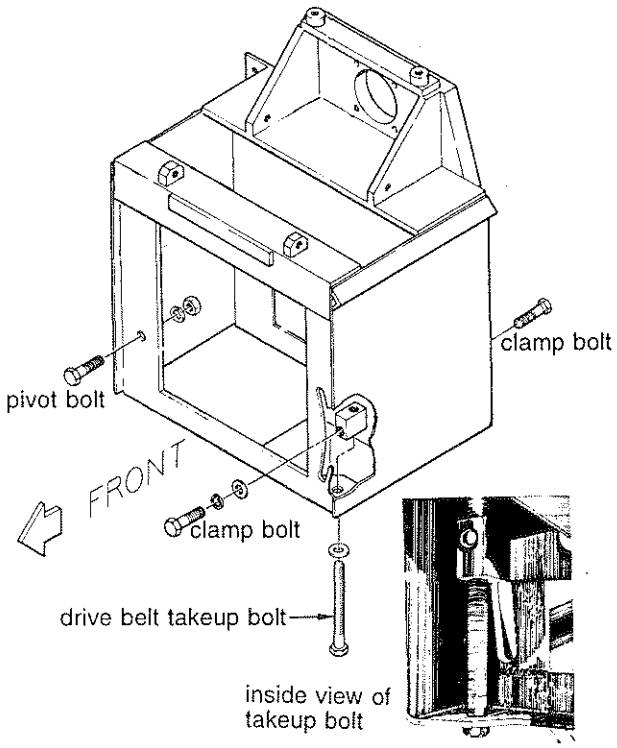


Fig. 67

SUNSTRAND PUMP COUPLER:

To properly grease the pump coupler, follow the steps below, see **Fig. 68**.

1. Disengage the tractor PTO and wait for all movement in baler to cease.

2. Remove both plugs.

3. Insert one zerk fitting.

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

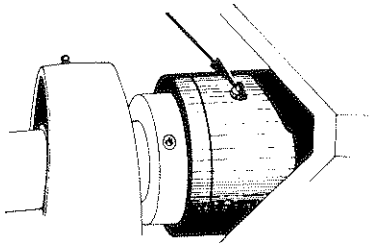


Fig. 68

Grease specifications:

(For the Suntrand pump coupler)

- N.L.G.I. rating #2 Lithium base.
- Base oil viscosity 900 to 2,150 SUS at 100° F (200-470 CsT at 40° C)
- Minimum dropping point 374° F (190° C).
- Maximum thickener content 11%.
- Minimum Timken rating 40 lbs. (approx. 18.8 kg.).
- Recommended additives:

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

- Should have good resistance to centrifugal oil separation.

Oil filter replacement:

Annually replace the main system filter elements (2) located in the hydraulic tank. See Freeman Model 1592 Baler parts manual, page 98 for a parts breakdown. (See Service schedule, page 9 for filter part numbers) These are accessible through a service panel in the right hand twine box. The hydraulic tank does not require draining in order to change the elements, however, you will need a container to catch the oil contained in the filter elements and housing. A check valve at the inside end of the housing will prevent oil draining from the tank. A ball valve is provided just below the filter housing to allow for draining the tank while changing the hydraulic fluid.

The charge system filter is a spin-on canister located on top of the main Sunstrand pump housing. It is not necessary to drain the main tank in order to replace this filter, however, some hydraulic fluid will be able to escape from the system while the filter is removed.

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 and cause unnecessary corrosion.

- Check the baler for any worn or damaged parts. Replace or repair as required.
- Coat the bale chamber lightly with grease to prevent rusting.
- Inspect, lubricate and adjust chains.
- Check and lubricate all grease fittings.
- Provide adequate protection from the weather.
- To increase tire life during storage, place the baler on blocks to remove the load from the tires.
- Disconnect the battery.

It is good practice to have the baler inspected at the end of the season and the entire machine placed in good serviceable condition prior to the next baling season.

TROUBLESHOOTING

Problem:	Possible cause:	Remedy:
Pickup will not operate but feeder does.	**a.** Pins in overriding clutch stuck and/or broken springs.	**a.** Clean, inspect and lubricate. See Main Pickup section in parts manual.
	b. Worn or dirty friction disks.	**b.** Replace worn disks and adjust. See Friction clutch adjustment, page 36.
	c. Loose pickup friction clutch.	**c.** Adjust pickup clutch, see Pickup 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 matter 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 section, page 15.
	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 36.
	h. Oil level too low.	**h.** Repair leak or other cause, 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.	**d.** Correct cause. Example: drive belts, alternator, etc.
	e. Overfeeding.	**e.** Reduce feed rate. See Unplugging Feed System, page 15.
	f. Charge sensor not adusted	**f.** See Charge Sensor section, page 37.

TROUBLESHOOTING

Problem:	Possible cause:	Remedy:
Feed fork stalled. (Cont'd.)	**g.** Stalled plunger.	**g.** See Stalled Plunger section in Trouble-shooting.
	h. Loose drive belts.	**h.** See Drive Belt Adjustment section, see page 37.
	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 36.
	k. Oil level too low.	**k.** Repair leak or other cause, refill tank.
Stalled plunger will not leave retracted position.	**a.** Knotter out of home position.	**a.** Return knotters to home position using the Manual Operator Pendant. See Manual Control section, page 14. After knotters are returned to the home position, see Unplugging the Feed System, page 15.
	b. Stalled feed fork.	**b.** Refer to stalled feed fork.
	c. Plunger return Stop switch out of adjustment.	**c.** See Plunger Return / Stop Switch Adjustment section, page 24.
	d. Oil temperature too high.	**d.** Inspect for proper fan operation, page 37.
	e. Oil level too low.	**e.** Repair leak or other cause, refill tank.
Stalled plunger-will not retract.	**a.** Charge sensor fails to return.	**a.** Inspect for foreign material and/or mis-adjustment, see Charge Sensor Adjust-ment section, page 37.
	b. Plunger return switch fails to operate.	**b.** Inspect for foreign material and/or mis-adjustment, see Plunger Return Switch Adjustment section, page 25.
	c. Stalled knotter.	**c.** See Drive Belt Adjustment section, page 37.
	d. Plunger early start knotter switch out of adjustment.	**d.** Inspect for foreign material and/or mis-adjustment, see Knotter/Plunger Early Start Switch Adjustment, page 32.
	e. Loose main drive belts.	**e.** See Drive Belt Adjustment section, page 37.
	f. Loose PTO clutch.	**f.** See PTO Clutch Adjustment section, page 36.

TROUBLESHOOTING

Problem:	Possible cause:	Remedy:
Stalled plunger-will not retract. (Cont'd.)	**g.** Inspect fuse and replace as needed, use only AGC 10 amp or 3AG 10 amp fuse.	**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 or other cause, 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 18/22.
	b. Improper twine finger adjustment.	**b.** See Twine Finger Adjustment, page 19.
	c. Top hay dog not working.	**c.** Replace hay dog string 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 the twine is taut (about 3 lbs. pull), see page 21.
	f. Plunger Return Switch out of adjustment.	**f.** See plunger return switch adjustment, page 25.
Knot on bottom twine only.	**a.** Uneven twine.	**a.** Use a good grade of twine.
	b. Need more spring tension	**b.** See Twine Holder, page 20.
No knot on either end.	**a.** Ends of knot too short, knot pulls out.	**a.** Loosen twine holder.
	b. Twine breaks between disc and Bill Hook.	**b.** Twine holder too tight, See twine holder, Page 20.
Knotters fail to operate.	**a.** Knotter trip mechanism malfunction.	**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 30.
	c. Mechanical failure.	**c.** Inspect for loose, misadjusted, missing or broken parts.

TROUBLESHOOTING

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. **LS11** malfunction.	**b.** Replace the **LS11**.
	c. **LS11** 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 22.
Knotter fails to stop operating.	**a.** Knotter Stop Switch out of adjustment.	**a.** See Knotter Stop Switch Adjustment section, page 27.
Improper bale shape.	**a.** Windrow too narrow.	**a.** Widen windrow to approximately 48" 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 in the closed position.	**a.** Turn ball valve, **Fig. 12**, page 17 to 'OPEN'.
	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 37.
	c. Baler running too low RPM.	**c.** Increase baler RPM to PTO speed.
	d. Plunger pressure too low.	**d.** Adjust density unloader valve, Fig. 10, page 16, in one (1) turn increments until desired bale density is achieved. See Bale Density Adjustment, page 16.
	e. Overfeeding.	**e.** Reduce feed rate.
	f. Windrow too narrow.	**f.** Widen windrow to approximately 48" 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, page 16.
	h. Windrow too narrow.	**h.** Widen windrow to approximately 48" by widening out swather shields or raking two windrows together.
	i. Inoperative density unloader valve.	**i.** Repair or replace density unloader valve.

INDEX

INDEX

CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

INTENTIONALLY BLANK