

John Deere 500 Round Baler



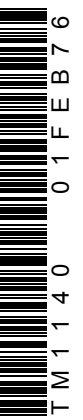
TECHNICAL MANUAL

John Deere 500
Round Baler

TM1140 (01FEB76) English

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ENGLISH



500 ROUND BALER

TECHNICAL MANUAL

TM-1140 (Feb-76)

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All information, illustrations and specifications contained in this technical manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

SI (International System) Units of Measure Metric equivalents have been included, where applicable, throughout this technical manual.

New and revised information is identified by vertical lines in the margin of the pages.

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INTRODUCTION



Use FOS Manuals for Reference

This technical manual is part of a twin concept of service:

The two kinds of manuals work as a team to give you both the general background and technical details of shop service.

•FOS Manuals—for reference

Fundamentals of Service (FOS) Manuals cover basic theory of operation, *fundamentals* of trouble shooting, *general* maintenance, and *basic* types of failure and their causes. FOS Manuals are for training new people and for reference by experienced technicians.



When a service technician should refer to a FOS Manual for more information, a FOS symbol like the one at the left is used in the TM to identify the reference.

•Technical Manuals—for actual service

Technical Manuals are concise service guides for a *specific* machine. Technical manuals are on-the-job guides containing only the vital information needed by an experienced technician.



Use Technical Manuals for Actual Service

Some features of this technical manual:

- *Table of contents at front of manual*
- *Exploded views showing parts relationship*
- *Photos showing service techniques*
- *Specifications grouped for easy reference*

This technical manual was planned and written for you—a service technician. Keep it in a permanent binder in the shop where it is handy. Refer to it whenever in doubt about correct service procedures or specifications.

Using the technical manual as a guide will reduce error and costly delay. It will also assure you the best in finished service work.


SI (INTERNATIONAL SYSTEM) UNITS OF MEASURE

Metric equivalents have been included, where applicable, throughout this technical manual.

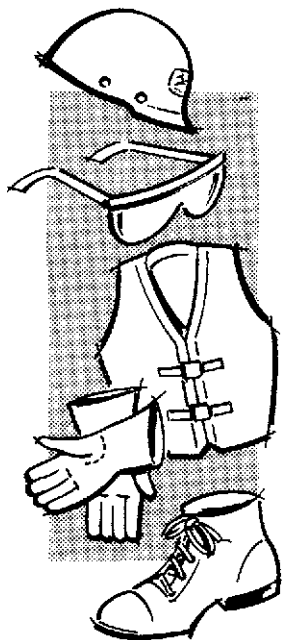
MAINTENANCE WITHOUT ACCIDENTS WORK SAFELY



T27999N

 This safety alert symbol identifies important safety messages in this manual and on the round baler. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follows.

EVERY EMPLOYER HAS A SAFETY PROGRAM. KNOW WHAT IT IS!



T27501N

Consult your shop supervisor for specific instructions on a job, and the safety equipment required.

For instance, you may need: Hard hat, safety shoes, safety goggles, heavy gloves, reflector vests, ear protectors, respirators.

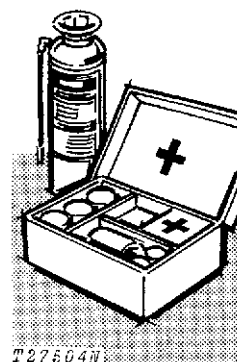


ALWAYS AVOID

Loose clothing or any accessory—flopping cuffs, dangling neckties and scarves, or rings and wrist watches—that can catch in moving parts and put you out of work.

BE ALERT!

Plan ahead—work safely—avoid accidental damage and injury. If a careless moment does cause an accident or fire, react quickly with the tools and skills at hand—know how to use a first aid kit and a fire extinguisher—and where to get aid and assistance. In an emergency, split-second action is the key to safety.



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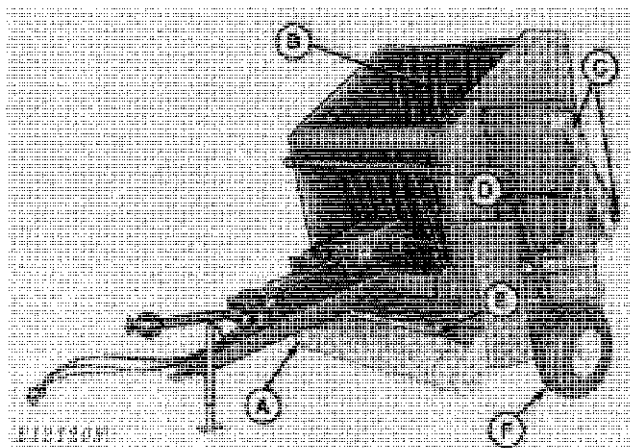
Section 10 GENERAL

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Group 5 DESCRIPTION

GENERAL



- | | | |
|---------------|----------------------|--------------|
| A—Pickup | C—Rear Gate | E—Lower Belt |
| B—Upper Belts | D—Hydraulic Cylinder | F—Wheels |

Fig. 1-500 Round Baler

The 500 Round Baler is a large size baler for handling loose hay and corn stover. It will produce high-density bales 5 ft. 3 in. (1.6 m) wide by 6 ft. (1.83 m) in diameter weighing approximately 1500 lbs. (680 kg).

The basic components of the round baler include the main frame and wheels (F), pickup (A), upper (B) and lower (E) forming belts, rear gate and mechanism (C), and bale wrapping mechanism.

Operating power for the round baler is provided from a 540 rpm tractor power take-off (PTO).

Two hydraulic cylinders operating in series from the tractor hydraulic system are used to raise and lower the rear gate of the baler. A double acting hydraulic cylinder is used to operate the bale wrapping mechanism.

Tractor Requirements

The baler is set for use on tractors with two sets of hydraulic outlets; one for the two hoses which control the rear gate and one for the two hoses to wrap the bale.

A selector control valve, with the shift mechanism, allows the use of the baler hydraulics on tractors with only one hydraulic outlet. The selector control valve is available as an attachment.

The tractor must have a 540 rpm PTO with a minimum of 60 horsepower (45 Kw) to obtain the maximum capacity from the baler.

Tractor Hookup

When servicing the baler, pay particular attention to the tractor-baler hookup geometry, Fig. 2.

IMPORTANT: Unequal angles occur if the tractor drawbar is not set for the proper length relative to the PTO operating speed. If the equal angles are not maintained, the following problems could occur:

1. Premature failure of the powerline components.
2. Excessive noise and vibration.

The proper equal angle hitch hookup dimensions are illustrated in Fig. 2.

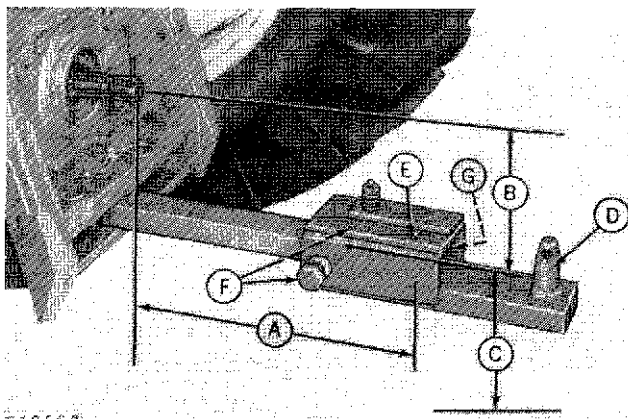


Fig. 2-598

- A—14 in. (356 mm)
- B—6 to 12 in.
(152 to 305 mm)
- C—13 to 17 in.
(330 to 432 mm)

- D—Equal Angle Hitch
- E—Hitch Pin
- F—Adjusting Bolts
- G—Shims

Fig. 2-Hookup Dimensions

Pickup

The pickup is 72-inches (1.82 m) wide to adequately cover up to 5 foot (1.52 m) windrows. It allows for variations in windrows and minimizes hay loss when turning.

The pickup is driven at 108 rpm by a spring loaded belt off the left-hand roll drive chains. The pickup operating height is adjusted by setting a stop bolt on each side. The pickup should be adjusted to run as high off the ground as possible and still pick up all the hay. See 50-10-7 for adjustment.

Bale Forming Belts

There are upper and lower belts to form the bale as hay is moved through the compression and starter rolls. The upper set consists of nine repairable rubber-coated forming belts. These belts can be repaired or replaced individually or as a set. (See page 40-10-1).

The upper belts are tensioned by the large springs on the sides of the baler. (See page 40-10-3).

The continuous lower belt minimizes leaf loss while the bale is being formed. Lower belt tension is controlled by a spring adjustment on rear roll.

Bale Wrapping System

The bale wrapping system is controlled by the tractor hydraulic system.

A check valve is used in the system to allow full flow to the cylinder for moving the twine arm to the right. The flow is metered on return by a flow control valve. This controls the number of wraps of twine on the bale.

This system can be used with either plastic or sisal twine.

Rear Gate

After the bale is formed, the rear gate is raised and the bale is discharged from the baler.

The rear gate is controlled by two large cylinders supplied with oil by the tractor hydraulic system.

There are two rollers on the gate which must follow the channel along the lower belt. These rollers must also be held in position to start the core of the bale. See page 50-5-3 for adjustment.

HOW THE BALE IS FORMED

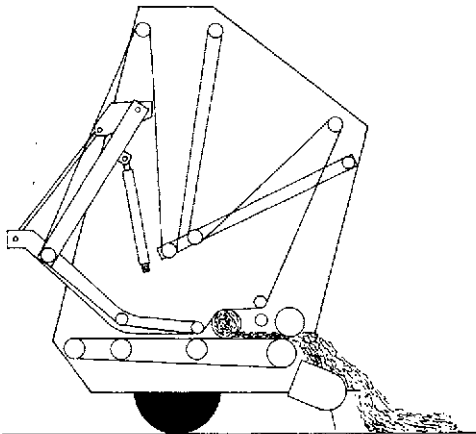


Fig. 3-Forming the Core

The starting of the bale is extremely important. The core must be carefully made to insure a satisfactory bale. To start the bale, set the tractor at 3/4 throttle and start placing hay in the middle of the pickup. As the core begins to form, weave the tractor and baler across the windrow to get an even core. Once the bale has become 2-foot (60.9 cm) in diameter, do not weave as often. Crossing over too often will fill the center of the bale and a "barrel-shaped" bale may result. Always drive to the extreme sides and cross over as quickly as possible so that the sides of the bale will be square and well shaped.

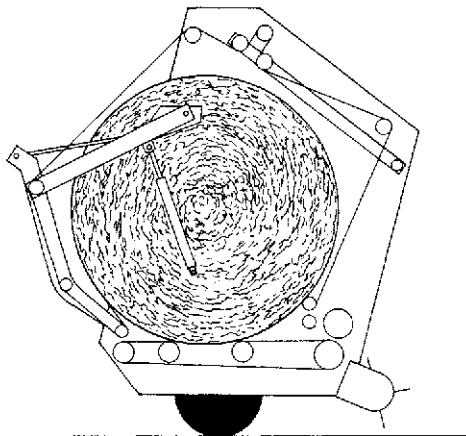


Fig. 4-Full Size Bale

When the bale is full size, the word "Stop" will appear at the indicator on the right-hand side of the baler.

IMPORTANT: The bale must be stopped at the indicator setting to insure that the idler rolls will not interfere with the top roller shaft.

At this time, the bale is ready to be wrapped with twine.

Actuate the tractor hydraulic controls to start the twine arm across the bale. The twine is then fed into the baler, wrapping the bale. When the twine has been fed into the last bunch of hay and into the compression rolls, stop forward travel. As the tying arm reaches the left-hand end of the bale, place the hydraulics in neutral to allow the twine to wrap several times on the end of the bale.

NOTE: The wrapping cycle can be altered by the flow control valve. (See page 30-15-5).

Again, actuate the hydraulics to move the arm back across the bale. As the arm moves to the right-hand side, stop movement before it reaches the automatic cutoff. Again wrap the end of the bale several times. Continue the arm to the right until the automatic cutoff cuts the twine.

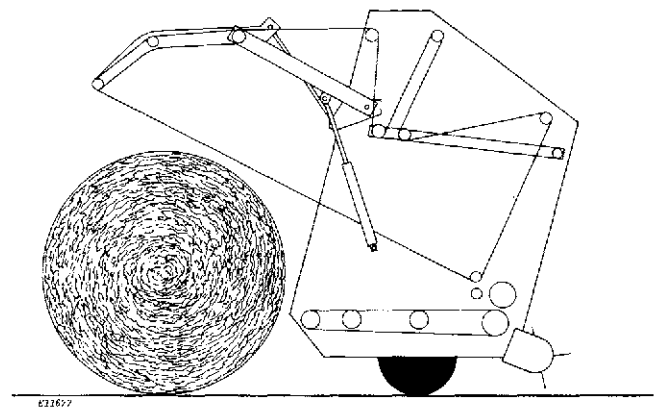


Fig. 5-Removing The Bale

After the bale is tied it can now be removed from the baler. Disengage the tractor PTO and place throttle at idle speed. Back up the tractor eight to ten feet (2.4 to 3.0 m) away from the windrow. Raise the rear gate and re-engage the PTO shaft. After the bale falls from the rear of the baler pull the tractor forward and lower the gate.

IMPORTANT: Make certain to return hydraulic lever to neutral after returning rear gate to its home position.

Place tractor at 3/4 throttle and continue into the windrow to make another bale.

Group 10 SPECIFICATIONS

Overall Length:

Gate Open 17 ft. 5 in. (5.3 m)
Gate Closed 14 ft. 6 in. (4.4 m)
Overall Width 7 ft. 11 in. (2.4 m)
Overall Height 9 ft. 3 in. (2.8 m)

Weight 3835 lbs. (1740 kg)

Tires 11L-14, 6 PR (28 psi [193 kPa])

Pickup:

Width 6 ft. (1.8 m)
Cylinder Diameter 10 in. (25.4 cm)
Teeth 48
Speed 108 rpm

Belts:

Upper 9 rubber coated belts
Lower One continuous rubber coated belt

Bale:

Diameter 6 ft. (1.83 m) maximum
Width 5 ft. 3 in. (1.6 m)
Weight Approx. 1500 lbs. (680.4 kg)

Tractor Requirements:

Size 60 hp (45 Kw) minimum with dual hydraulics or single hydraulics
with use of selector control valve attachment.
PTO Shaft Speed 540 rpm

TORQUE CHART

RECOMMENDED TORQUE IN FT-LBS (Nm) COARSE AND FINE THREADS			
Bolt Diameter	Plain Head	Three Dashes	Six Dashes
1/4	Not used	10 (14)	14 (19)
5/16	Not used	20 (27)	30 (41)
3/8	Not used	35 (47)	50 (68)
7/16	35 (47)	55 (75)	80 (108)
1/2	55 (75)	85 (115)	120 (163)
9/16	75 (102)	130 (176)	175 (237)
5/8	105 (142)	170 (230)	240 (325)
3/4	185 (251)	300 (407)	425 (576)
7/8	160 (217)	445 (603)	685 (929)
1	250 (339)	670 (908)	1030 (1397)
1-1/8	330 (447)	910 (1234)	1460 (1980)
1-1/4	480 (651)	1250 (1695)	2060 (2793)

E11579M

The types of bolts and cap screws are identified by head markings as follows:

Plain Head: regular machine bolts and cap screws.

3-Dash Head: tempered steel high-strength bolts and cap screws.

6-Dash Head: tempered steel extra high-strength bolts and cap screws.

Machine bolts and cap screws 7/8-inch and larger are sometimes formed hot rather than cold, which accounts for the lower torque.

Group 15 LUBRICATION

GENERAL INFORMATION

Carefully written and illustrated lubrication instructions are included in the operator's manual furnished with your customer's machine. Remind the customer to follow these instructions.

For your convenience, the following chart shows capacities and types of lubricants for the round baler. Specifications for lubricants follow the chart.

Component	Capacity	Type of Lubricant	Interval of Service
Roller Chains	John Deere PT 508 Special Lubricant or SAE 30 engine oil	Daily
Lower Roll Bearings (10 fittings)	John Deere Multi-Purpose Lubricant or an equivalent SAE multi-purpose-type grease.	Every 30 Hours
Upper Roll Bearings (6 fittings)	John Deere Multi-Purpose Lubricant or an equivalent SAE multi-purpose-type grease.	Every 30 Hours
Rear Gate (8 fittings)	John Deere Multi-Purpose Lubricant or an equivalent SAE multi-purpose-type grease.	Every 30 Hours
Powerline (4 fittings)	John Deere Multi-Purpose Lubricant or an equivalent SAE multi-purpose-type grease.	Every 30 Hours
Jaw Clutch (1 fitting)	John Deere Multi-Purpose Lubricant or an equivalent SAE multi-purpose-type grease.	Every 30 Hours
Gear Case	Check and fill 2 qts. (1.89 l)	SAE 90-140 API-GL5 Gear Lubricant	Once Each Season

GREASES

John Deere Multi-Purpose Lubricant or an equivalent SAE multipurpose-type grease is recommended for all grease fittings. Application of grease as instructed in the lubrication chart will provide proper lubrication and will prevent contamination of bearings.

HYDRAULIC OIL

Use only John Deere Hy-Gard Transmission and Hydraulic Oil or its equivalent. Other types of oil will contaminate the hydraulic oil in the tractor

system and will not give satisfactory service. Other oil may result in eventual damage. Check tractor hydraulic system level every 100 hours.

NOTE: John Deere Hy-Gard Transmission and Hydraulic Oil may be added to or mixed with John Deere Type 303 Special Purpose Oil.

STORING LUBRICANTS

This round baler can operate efficiently only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture, and other contaminants.

Group 20

DIAGNOSING MALFUNCTIONS

Drive Train—Section 20

PTO Hookup—Group 10

- Powershaft Will Not Telescope Properly
 - Tractor drawbar not adjusted, page 10-5-2.
 - Powershaft bent or twisted, page 20-10-1.
- Powershaft Vibrates Excessively
 - Powershaft bent or twisted, page 20-10-1.
 - Tractor operating at an angle, see operator's manual.
 - Powershaft cross bearings defective, page 20-10-2.
- Powershaft Won't Stay Engaged
 - Splines on push button yoke worn, page 20-10-1.

Main Gear Case and Input Shaft—Group 15

- Excessive Input Shaft Vibration
 - Input shaft bearings worn, page 20-15-1.
- Noisy Gears
 - Gears are misaligned with each other, page 20-15-6.
 - Lack of proper lubrication, page 10-15-1.
 - Main gear case not aligned with input or roll drive shaft, page 20-15-1.
- Gears Wear Prematurely
 - Lack of lubrication, page 10-15-1.
 - Incorrect gear alignment, page 20-15-6.
- Slip Clutch Wear Prematurely
 - Slip clutch springs out of adjustment, page 20-15-8.
 - Too frequent or prolonged use of slip clutch.

Rolls and Roll Drives—Group 20

- Excessive Drive Shaft Vibration
 - Worn drive shaft bearing, page 20-20-2.
 - Gear case coupling worn, page 20-20-2.
- Premature Belt Wear
 - Belts too loose, page 40-10-3.
 - Belts not tracking properly, page 40-10-1.
 - Top rolls are bent, page 20-20-2.

Hydraulic System—Section 30

General Information—Group 5

- Tractor Hydraulic Pressure Too Low
 - Tractor pump defective or out of adjustment—See tractor Technical Manual.
 - Rear hydraulic outlets defective—See tractor Technical Manual.
- Hydraulic Oil Volume Too Low
 - Tractor pump defective or not adjusted for maximum flow—See tractor Technical Manual.
 - Breakaway couplers dirty or defective—See tractor Technical Manual.

Rear Gate—Group 10

- Hydraulic Fluid Leaking from Hoses or Cylinder
 - Defective hoses or worn cylinder parts, page 30-5-1.
- Gate Will Not Operate
 - Defective cylinders or hoses, page 30-10-4.
 - Foreign objects block gate.
 - Out of adjustment, page 50-5-3.
- Hay Passes Through Baler
 - Cylinder relief pressure low, page 30-10-4.
 - Gate not in home position, page 50-5-3.

Twine Wrapping—Group 15

- Not Enough Twine on Bale
 - Flow control valve not adjusted properly, page 30-15-5.
 - Oil filter screen plugged, page 30-15-4.
- Cylinder Moving Too Fast or Slow
 - Flow control valve not adjusted properly, page 30-15-5.
 - Cylinder or lines leaking, page 30-15-3.

Belts—Section 40

Upper Belts—Group 10

- Belts Not Turning
 - Adhesive worn off top two drive rolls, page 20-20-11.
- Broken Belts
 - Material too wet, see operator's manual.
 - Lacing worn, page 40-10-1.
 - Not weaving properly causing end of belts to go under bale, see operator's manual.
- Top Belts Not Tracking Properly
 - Belts have stretched, page 40-10-1.
 - Top rollers bent, page 20-20-1.

Lower Belt—Group 15

- Hay Wraps on Drive Roller
 - Scraper out of adjustment, see operator's manual.
- Belt Not Turning
 - Adhesive worn on drive roll, page 20-20-8.
 - Rear compression springs not adjusted, page 20-20-11.

Miscellaneous—Section 50

Pickup—Group 10

- Pickup Plugging
 - Belt slipping, page 50-10-1.
 - Windrows too large.
 - Pickup set too low, page 50-10-7.

Section 20 DRIVE TRAIN

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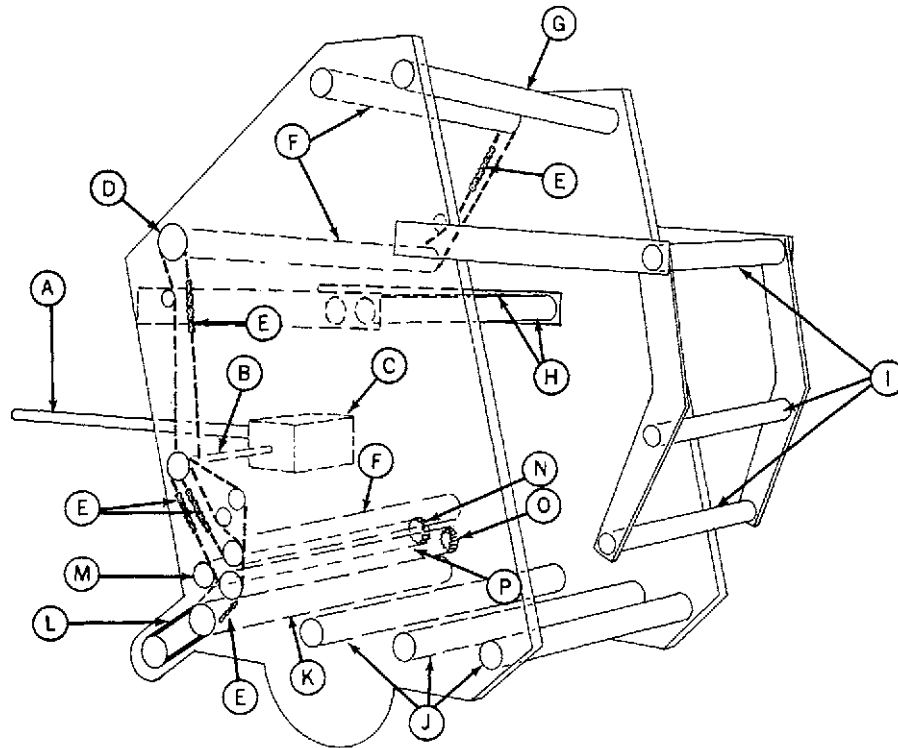
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Group 5 GENERAL INFORMATION

OPERATING RPM

All operating power for the baler is supplied from a tractor hydraulic system and power take-off. The baler is shipped from the factory equipped for 540 rpm PTO operation only.

DRIVE TRAIN



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- A—Input Shaft
- B—Roll Drive Shaft
- C—Gear Case
- D—Jaw Clutch
- E—Roll Drive Chains

- F—Upper Belt Drive Rolls
- G—Driven Roll
- H—Tension Rolls
- I—Rear Gate Rolls
- J—Lower Belt Driven Rolls

- K—Lower Belt Drive Roll
- L—Pickup Drive Belt
- M—Compression Roll
- N—51-Tooth Gear
- O—22-Tooth Gear
- P—Starter Roll

Fig. 1—Mechanical Drive Diagram

The drive train (mechanical power flow) diagram is shown in Fig. 1. The hydraulic system operation is given in Section 30 of this manual.

Input power for the tractor PTO is transmitted by the PTO hookup through universal joints to the input shaft (A) and then to the gear case (C). The drives are protected by a slip clutch attached to the input shaft.

The gear case contains right-angle gears to increase the 540 rpm input power to 735 rpm. The gear case output is coupled to the roll drive shaft (B).

Power is transmitted from the roll drive shaft to a set of four roll drive chains (E) on the left-hand side of the baler. A belt (L) off the lower roll drive shaft drives the pickup.

A chain (E) off the right-hand side of the upper belt drive roll drives a second upper belt drive roll (F).

A 22-tooth gear (O) off the right-hand side of the starter roll (P) drives the 51-tooth gear (N) on the compression roll (M).

The upper rolls, which drive the upper forming belts, consist of three drive rolls (F), four driven rolls (G and I) and two tension rolls (H). The middle front drive rolls have a knurled surface for contact to help drive the belts.

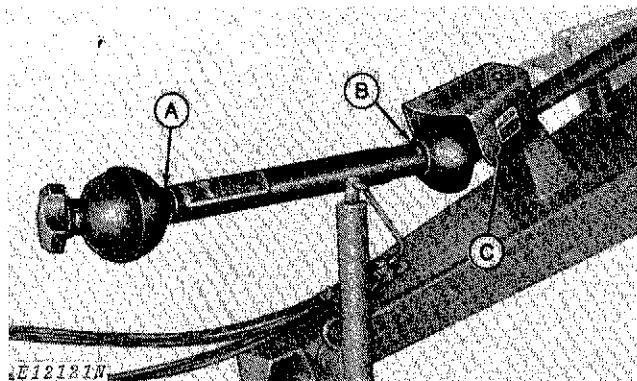
The lower rolls, which drive the lower belt, consist of one drive roll (K) and three driven rolls (J). The drive roll has a knurled surface for contact in driving the belt.

The teeth on the pickup cylinder, rotating at 108 rpm lift the loose hay or corn stover to the compression and starter roll and between the forming belts.

When the rear gate is raised, to unload a bale, the upper roll drives are disengaged by means of a jaw-type clutch (D).

Group 10 PTO HOOKUP

GENERAL INFORMATION



A—Front Section
B—Rear Section

C—Drive Shield

Fig. 1-PTO Hookup

The PTO hookup is located as shown in Fig. 1.

The PTO operating speed of the tractor and baler must be the same. The tractor half of the hookup is factory equipped with six splines for 540 rpm PTO operation.

CAUTION: Never connect a round baler to a 1000 rpm tractor.

REMOVAL AND INSTALLATION

Removal

The PTO hookup has a front (A) and rear (B) section that slip fit together. The front section couples to the tractor PTO shaft and the rear section is connected to the baler input shaft.

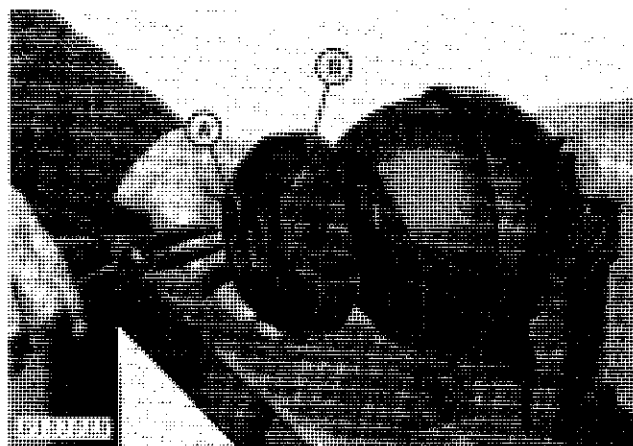
Remove the drive shield (C) and remove the coupler nut, bolt, and washer from the rear section of the hookup. Slide the rear section off the input shaft.

Installation

Install the hookup rear section over the input shaft and bolt in place. Slide the front section into rear section.

DISASSEMBLY

Place powershaft front section in vise.



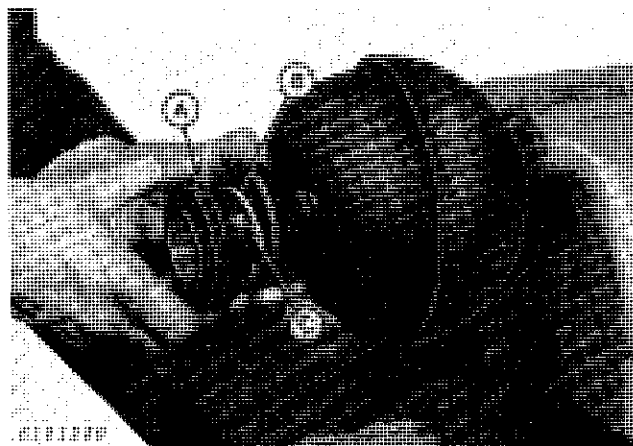
A—Snap Ring

B—Push Collar Assembly

Fig. 2-Removing Snap Ring

Support the push collar assembly as shown; then remove the snap ring (Fig. 2).

Remove push collar and push-button latch.



A—Collar Retainer

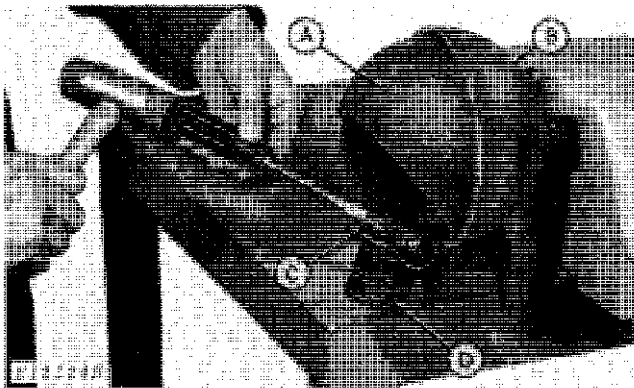
B—Spring

C—Steel Ball

Fig. 3-Removing Collar Retainer

Remove the three steel balls from the push-button yoke; then remove the collar retainer and spring (Fig. 3).

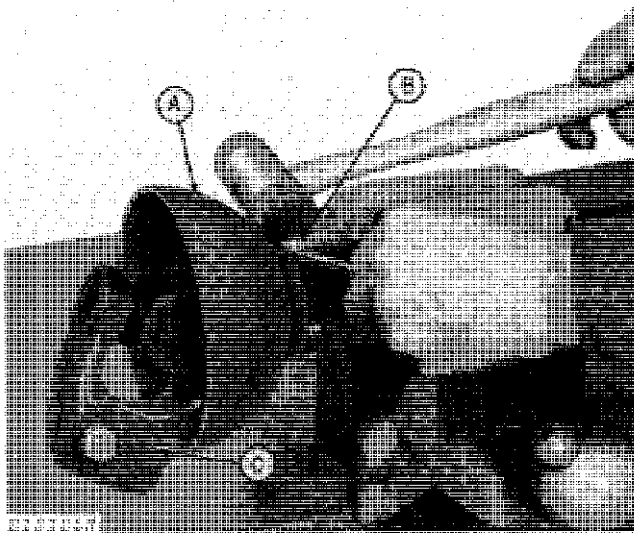
DISASSEMBLY—Continued



A—Closure Shield
B—Front Shield
C—Locking Bearing
D—Push-Button Yoke

Fig. 4-Removing Closure Shield

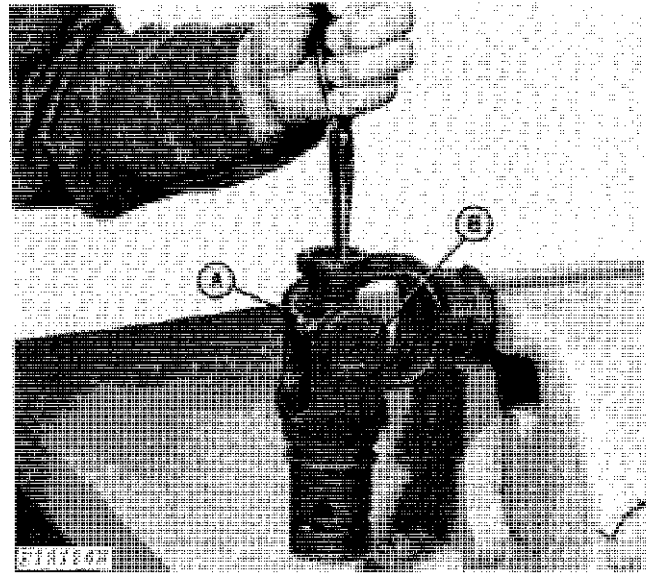
Position a small screw driver in slot in exposed head of locking bearing (C); then lift locking bearing up and out of assembly (Fig. 4). Drive locking bearing out. Remove closure shield (A) from push-button yoke (D).



A—Front Shield
B—Locking Bearing
C—Yoke and Shaft Assembly

Fig. 5-Removing Front Shield

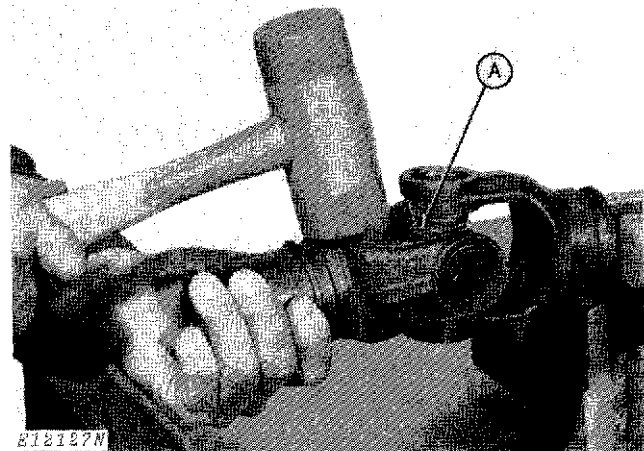
Remove locking bearings (B) from front shield (A) in the same manner (Fig. 5) then remove yoke and shaft assembly (C) from front shield.



A—Spider and Bearing Assembly
B—Retaining Ring

Fig. 6-Removing Retaining Rings

Support yoke and shaft assembly in vise (Fig. 6), and using pliers, remove the retaining rings (B) from the spider and bearing assembly (A).



A—Spider and Bearing Assembly

Fig. 7-Removing Spider and Bearing Assembly

Hold the push-button yoke as shown in Fig. 7; then use a rubber hammer to drive the spider and assembly (A) from the supported yoke.

Repeat procedures to remove the other two bearings.

Disassemble the rear section of the powershaft in the same manner as the front section.

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