SBX520, SBX530, SBX540, SBX550 SQUARE BALER REPAIR MANUAL COMPLETE CONTENTS

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SECTION 35 - HYDRAULIC SYSTEM 4

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The following pages are the collation of the contents pages from each section and chapter of the SBX520, SBX530, SBX540, and SBX550 Repair manual.

The sections used through out all Case IH product Repair manuals may not be used for each product. Each Repair manual will be made up of one or several books. Each book will be labeled as to which sections are in the overall Repair manual and which sections are in each book.

The sections listed above are the sections utilized for the SBX520, SBX530, SBX540, and SBX550 Square Balers.

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PRECAUTIONARY STATEMENTS

PERSONAL SAFETY

Throughout this manual and on machine decals, you will find precautionary statements ("**DANGER**", "**WARNING**", and "**CAUTION**") followed by specific instructions. These precautions are intended for the personal safety of you and those working with you. Please take the time to read them.

⚠ DANGER ⚠

This word "DANGER" indicates an immediate hazardous situation that, if not avoided, will result in death or serious injury. The color associated with Danger is RED.

⚠ WARNING ⚠

This word "WARNING" indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury. The color associated with Warning is ORANGE.

⚠ CAUTION ⚠

This word "CAUTION" indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. The color associated with Caution is YELLOW.

FAILURE TO FOLLOW THE "DANGER", "WARNING", AND "CAUTION" INSTRUCTIONS MAY RESULT IN SERIOUS BODILY INJURY OR DEATH.

MACHINE SAFETY

The precautionary statement ("**IMPORTANT**") is followed by specific instructions. This statement is intended for machine safety.

IMPORTANT: *The word "IMPORTANT" is used to inform the reader of something he needs to know to prevent minor machine damage if a certain procedure is not followed.*

INFORMATION

NOTE: *Instructions used to identify and present supplementary information.*

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MINIMUM HARDWARE TIGHTENING TORQUES

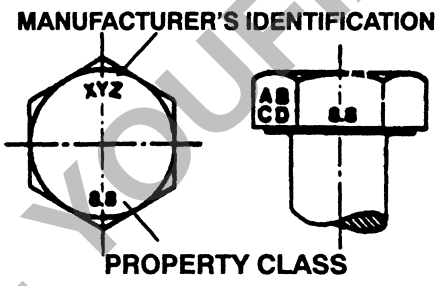
IN NEWTON-METERS (FOOT POUNDS) FOR NORMAL ASSEMBLY APPLICATIONS

METRIC HARDWARE AND LOCKNUTS

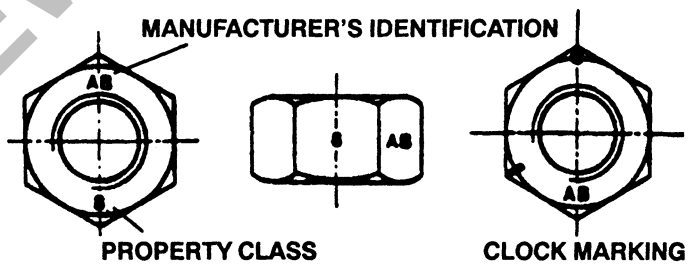
	CLASS 5.8		CLASS 8.8		CLASS 10.9		LOCKNUT
NOMINAL SIZE	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr	CL.8 w/CL8.8 BOLT
M4	1.7 (15*)	2.2 (19*)	2.6 (23*)	3.4 (30*)	3.7 (33*)	4.8 (42*)	1.8 (16*)
M6	5.8 (51*)	7.6 (67*)	8.9 (79*)	12 (102*)	13 (115*)	17 (150*)	6.3 (56*)
M8	14 (124*)	18 (159*)	22 (195*)	28 (248*)	31 (274*)	40 (354*)	15 (133*)
M10	28 (21)	36 (27)	43 (32)	56 (41)	61 (45)	79 (58)	30 (22)
M12	49 (36)	63 (46)	75 (55)	97 (72)	107 (79)	138 (102)	53 (39)
M16	121 (89)	158 (117)	186 (137)	240 (177)	266 (196)	344 (254)	131 (97)
M20	237 (175)	307 (226)	375 (277)	485 (358)	519 (383)	671 (495)	265 (195)
M24	411 (303)	531 (392)	648 (478)	839 (619)	897 (662)	1160 (855)	458 (338)

NOTE: Torque values shown with * are inch pounds.

IDENTIFICATION
HEX CAP SCREW AND CARRIAGE BOLTS
CLASSES 5.6 AND UP



HEX NUTS AND LOCKNUTS
CLASSES 05 AND UP



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SPECIFICATIONS

MODEL SBX520

GENERAL

Overall width	2745 mm (108″)
Overall height (PTO)	1463 mm (57.6″)
Overall length (Bale chute not included)	5036 mm (198.3″)
Weight - PTO twine	1432 kg (3137 lbs)
Wheel tread	2731 mm (107.5″)
Wheel bearings	Tapered roller
Maximum road speed	32 km/hr (20 MPH)

PTO

Type	Category III - 3-joint - ASAE standard
Protection	Slip clutch plus overrunning clutch

TIRES

Right	25 x 7:50 - 15 6-ply - 207 kPa (30 PSI)
Left	27 x 9.50 - 15 6-ply - 207 kPa (30 PSI)
Pickup	3.00 x 12 semi-pneumatic

PICKUP

Width (including flare)	1788 mm (70.4″)
Pickup drive	V-belt to roller chain to lost motion reel drive
Protection	V-belt slippage and lost motion reel drive
Number of tooth bars	4
Tooth bar bearings	Sealed ball
Number of teeth	88
Wind guard	8-finger
Tooth spacing	67 mm (2 5/8″)

FEEDING SYSTEM

Type	Flow-Action®
Drive	Chain
Protection	Shear bolt
Tines	Four aluminum and two steel tilting
Feed opening	1826 cm^2 (283 sq. in.)
Bearings	Sealed ball

BALE CHAMBER

Size	356 x 457 mm (14 x 18″)
Bale length	305 - 1321 mm (12 - 52″)

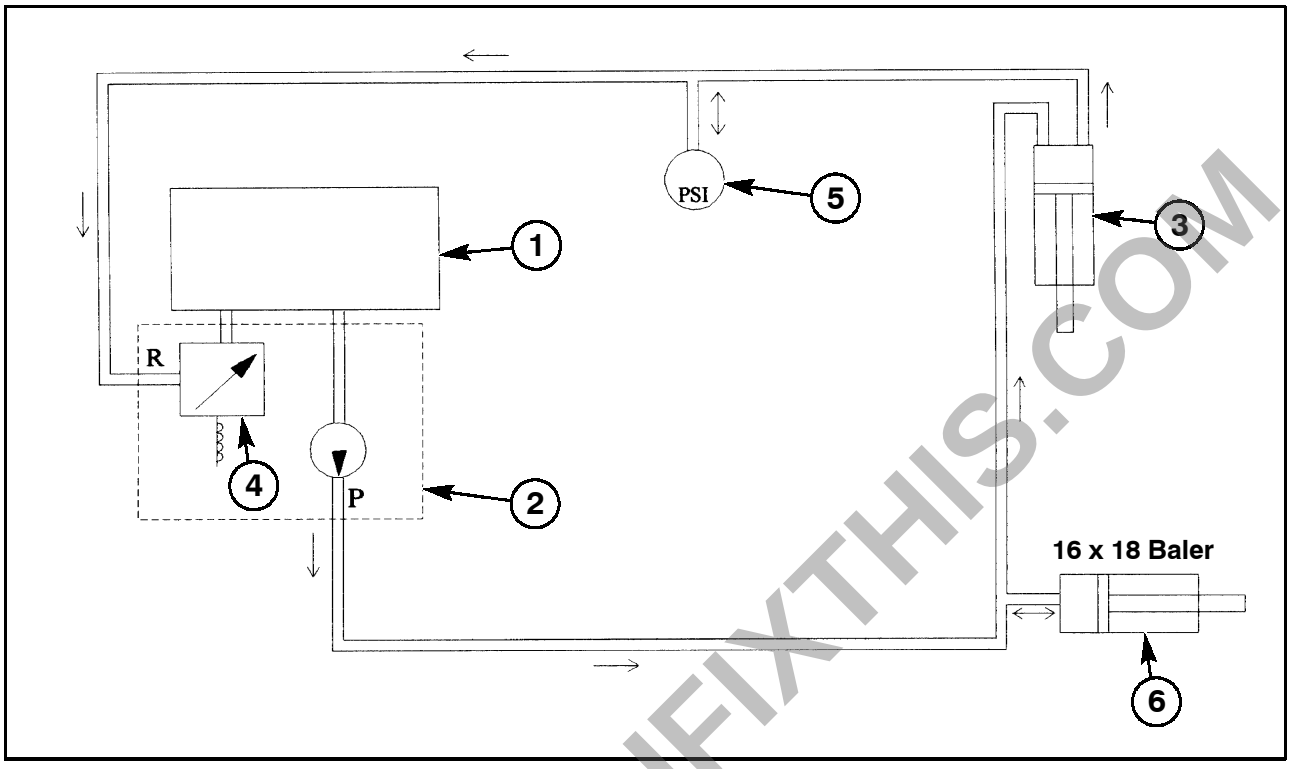
KNOTTER

Protection	Shear bolt
Tying	Plastic or natural fiber twine

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HYDRAULIC DIAGRAM



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The reservoir, 1, is mounted on top of the pump assembly, 2. Oil from the reservoir moves into the pump and is then sent to top of the cylinder, 3. The return line from the cylinder goes to the adjustable relief valve, 4, in the pump and reservoir assembly. The setting of this relief valve determines the pressure in the system by restricting the return flow. The pressure in the system is displayed on a gauge. 5. The 16 x 18 baler uses a second cylinder, 6, to apply pressure to the side doors.

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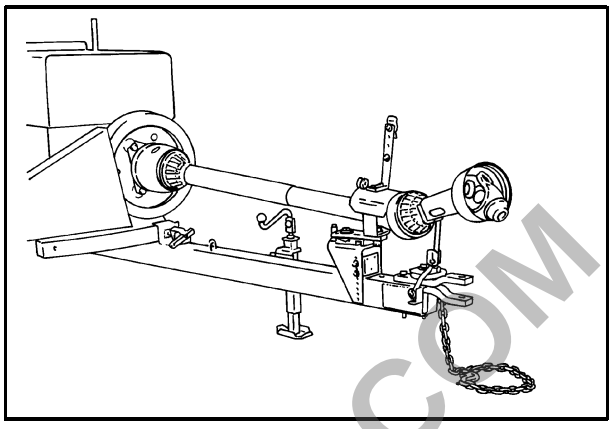
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CHECKING A SLIP CLUTCH

For proper operation of the baler and to protect the baler from damage, the PTO slip clutch must slip at the specified setting.

NOTE: *To check a slip clutch setting, the flywheel must be blocked and the force required to slip the clutch measured.*

Move the Models SBX530, SBX540 and SBX550 from the transport position toward the operating position to check the clutch setting. It will be easier to check the Model SBX520 clutch setting if the baler is not in the transport position. The tongue does not have to be moved completely to the operating position, only enough to install a tool over the yoke ears.

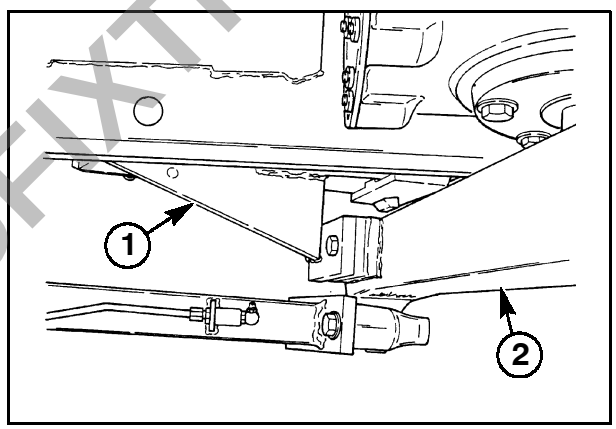


11

Block the Flywheel

Block the flywheel and crank as follows:

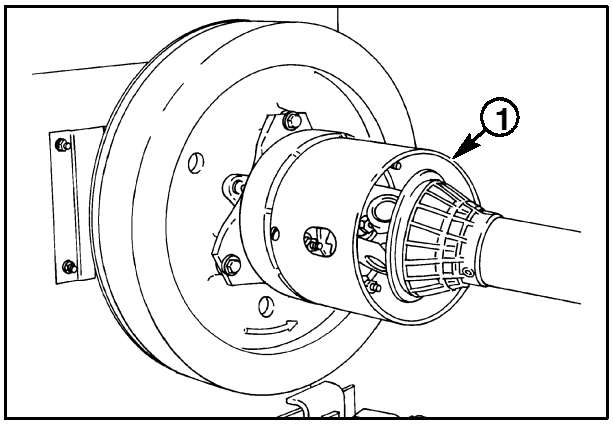
- Trip the knotter and turn the flywheel to start a tying cycle.
- Continue to turn the flywheel until the needle safety stop, 1, moves completely inside the frame. The stop will be to the front of the crank arm, 2.
- Turn the flywheel in the opposite direction until the crank moves to the front of the stop. As the crank moves past, it will push the stop out of the way. The stop will “snap” back into position.
- Turn the flywheel forward again until the crank contacts the stop as shown.



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Remove the Clutch Shield

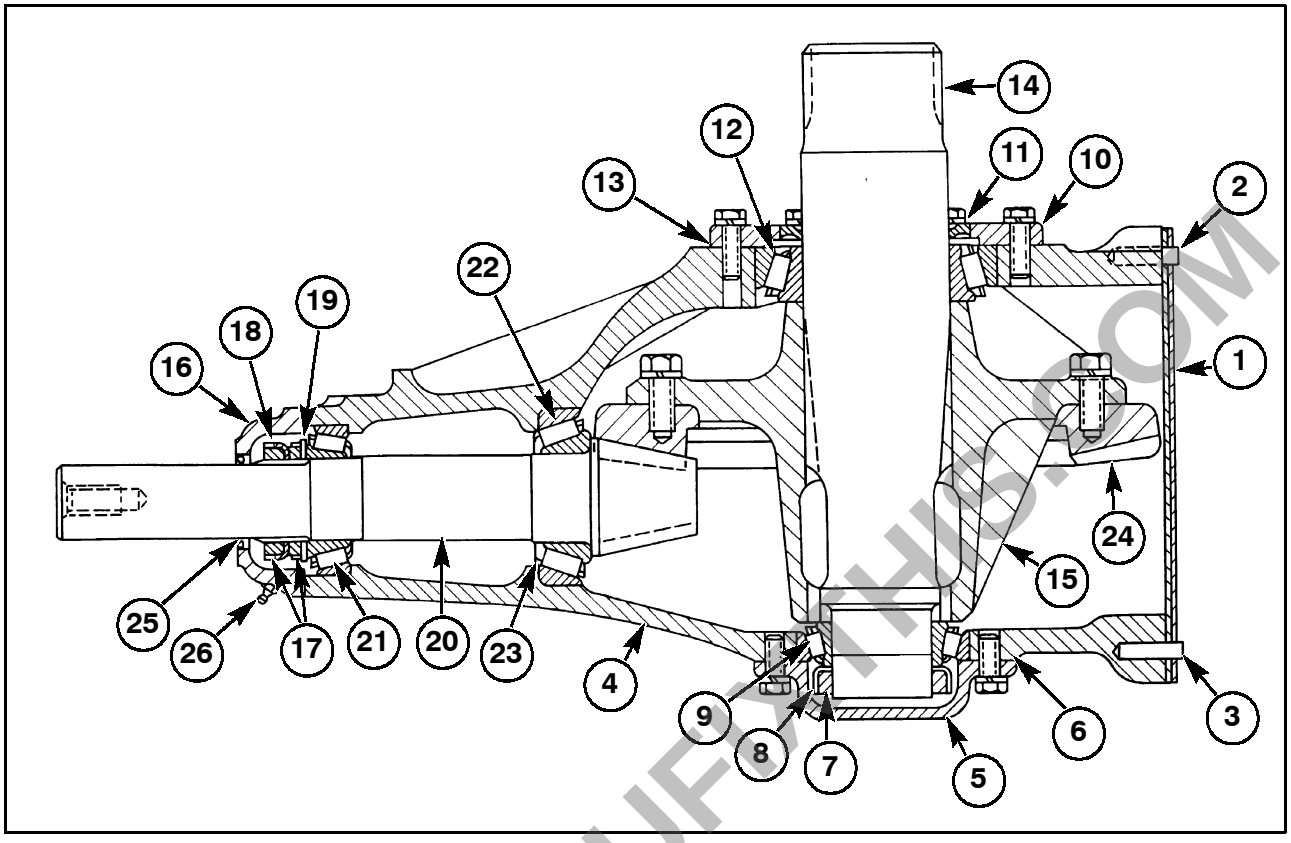
Remove the mounting screws for the PTO clutch shield, 1, and slide the shield forward on the PTO.



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Disassembly of the Gearbox

When only a bearing is being replaced, dismantle the gearbox only to the point where the questionable bearing can be removed.

If replacing the ring gear and pinion set, remove the gearbox from the baler and completely disassemble it.

Disassemble the gearbox as follows:

Ref. No.	No. Used	Description
1	1	Rear cover
2	2	Dowel pin
3	1	Dowel pin
4	1	Gearbox Housing
5	1	Bearing cap and retainer
6	AR	Shim 0.003″
	AR	Shim 0.005″
	AR	Shim 0.007″
7	1	Locknut
8	1	Lock washer
9	1	Tapered roller bearing
10	1	Bearing retainer
11	1	Oil seal
12	1	Tapered roller bearing
13	AR	Shim 0.003″
	AR	Shim 0.005″
	AR	Shim 0.007″
14	1	Crankshaft
15	1	Ring gear hub
16	1	End cap
17	2	Locknut
18	1	Bearing lock washer
19	1	Keyed washer
20	1*	Pinion gear and shaft
21	1	Tapered roller bearing
22	1	Tapered roller bearing
23	AR	Shim 0.002″
	AR	Shim 0.005″
	AR	Shim 0.007″
	AR	Shim 0.010″
24	1*	Ring Gear
25	1	Oil seal
26	1	Lube fitting

**** IMPORTANT:*** *The ring gear and pinion are available only as matched sets. Numbers are etched on the outer circumference of the ring gear and the front end of the pinion shaft. The numbers must be the same. When replacing the ring gear and pinion, always replace as a matched set.*

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TROUBLESHOOTING

In troubleshooting knotter malfunctions, it is necessary to identify the characteristics of the knot mis-tie, then match the characteristic of the mis-tie to the concern column and to identify the possible cause and remedy. Operate the baler through the tying cycle manually or using the tractor engine at idle RPM. Thereby the items listed under “Possible Cause” can be observed to determine the concern. Refer to the knotter maintenance section for additional information and correct adjustment and procedure.

PROBLEM	POSSIBLE CAUSE	CORRECTION
GENERAL		
Irregular bale length.	Metering wheel out of adjustment.	Adjust to obtain 3 mm (1/8″), clearance between trip arm and friction disc.
	Trip arm does not pivot freely.	Check for deformed bushing or over tightened locknut.
	Worn trip arm.	Replace.
	Trip arm slips on drive disc.	Be sure spring is installed correctly.
	Worn friction disc.	Replace.
	Knotter stop misadjusted.	Adjust so it releases after trip arm “jumps” forward.
	Uneven feeding due to uneven windrows.	Vary ground speed according to windrows.
	Overfeeding due to pickup drive belt frozen or too tight.	Check and adjust pickup drive belt.
	Ground speed too fast.	Slow down.
	Knotter brake loose.	Adjust knotter brake to specifications.
	Incorrect density adjustment procedure.	To increase density, adjust in the following sequence: 1. Hydraulic Tension System or spring pressure to at least mid-range. 2. Side doors, if equipped. 3. Hay wedges, starting at the rearmost position.

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SECTION 31 – IMPLEMENT DRIVELINE

BOOK 1 - 87012152

Chapter 2 – Gearbox and Flywheel

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Section	Description	Page
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	Flywheel, Shear Hub, and Feeder Drive Sprocket	3
	Flywheel Bushing and Shear Bolt Sleeve	6
	Crank Arm	8
	Crank Bearing	10
	Gearbox - Models SBX520, SBX530, and SBX540	11
	Gearbox - Model SBX550	30

SECTION 35 – HYDRAULIC SYSTEM

BOOK 1 - 87012152

Chapter 1 – Hydraulic and Hydraulic Tension Systems

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Section	Description	Page
35 000	Hydraulic Tension System Description and Operation	2
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	Tongue Swing Cylinder	24

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CONVERSION CHARTS

	foot	yard	mile	inch	meter
1 foot	1	0.333	–	12	0.3048
1 yard	3	1	–	36	0.9144
1 mile	5280	1760	1	63360	1609.35
1 inch	0.0833	0.0277	–	1	0.0254
1 meter	3.281	1.0936	–	39.37	1

1 US bushel = 35.2391 liters

1 US quart = 0.9464 liters

1 UK bushel = 36.3687 liters

1 UK quart = 1.1365 liters

1 US gallon = 3.785 liters

1 UK gallon = 4.5461 liters

1 barrel = 158.987 liters

1 liter = 0.028 US bushel

1 liter = 1.056 US quart

1 liter = 0.027 UK bushel

1 liter = 0.879 UKquart

1 liter = 0.264 US gallon

1 liter = 0.22 UK gallon

1 liter = 0.0063 barrel

1 acre = 0.4047 ha

1 pound = 0.4536 kg

1 hp = 0.736 kW

1 lb/sq. in. = 0.0689 bar

1 ha = 2.471 acres

1 kg = 2.204 pounds

1 kW = 1.358 hp

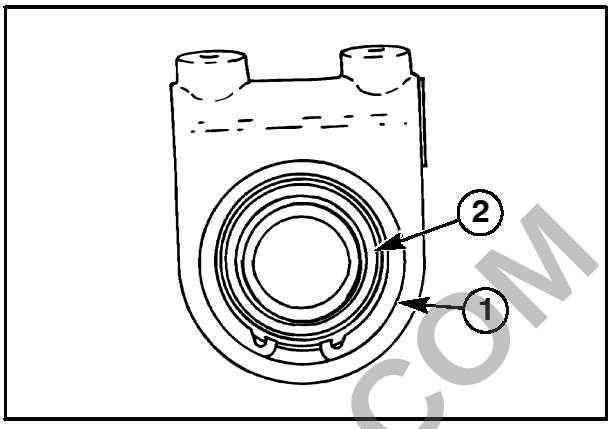
1 bar = 14.51bs./sq. in.

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Remove the snap ring, 1, from the housing.

Press the bearing, 2, out of the housing or use a soft punch and hammer to drive it out of the housing.



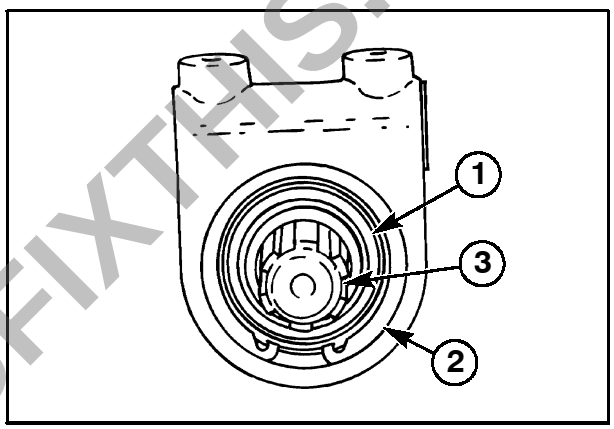
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Assembly and Installation

Press or drive the bearing, 1, into the housing. Be sure the bearing is seated against the housing.

Install the snap ring, 2.

Press or drive the bearing and housing on the shaft, 3. Be sure the snap ring, 2, is facing away from the shaft.



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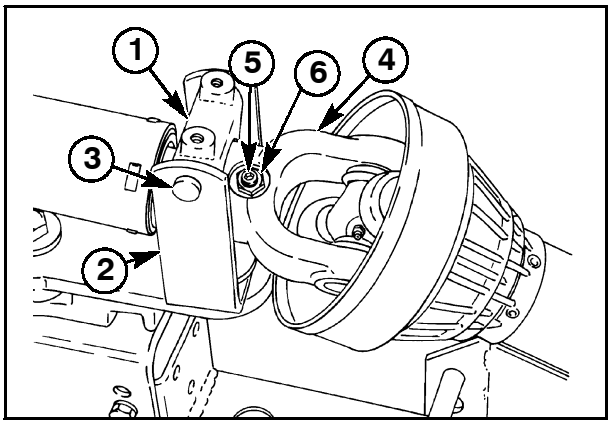
Install front half of the rear PTO in the rear half.

Place the bearing housing, 1, and rear PTO assembly in the support yoke, 2, and install the pivot pin, 3. Install a washer and cotter pin to secure the pin.

Clean the splines on the shaft of the rear PTO and the inside of the yoke on the front PTO.

Check for burrs or damage to the splines.

Install the splined yoke, 4, on the rear PTO shaft with the set screw hole in the yoke aligned with the tapered hole in a the splined shaft. Install the set screw, 5, and jam nut, 6. Tighten the setscrew.

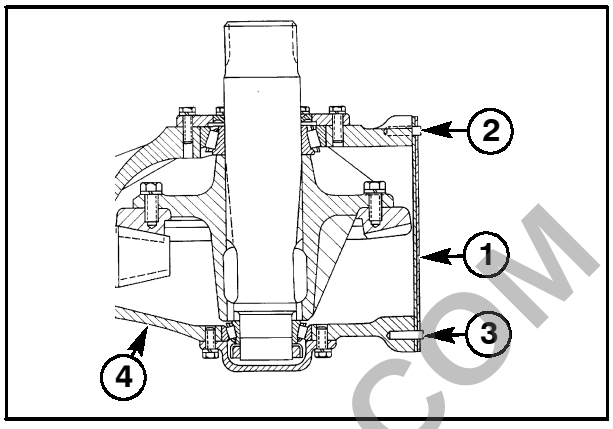


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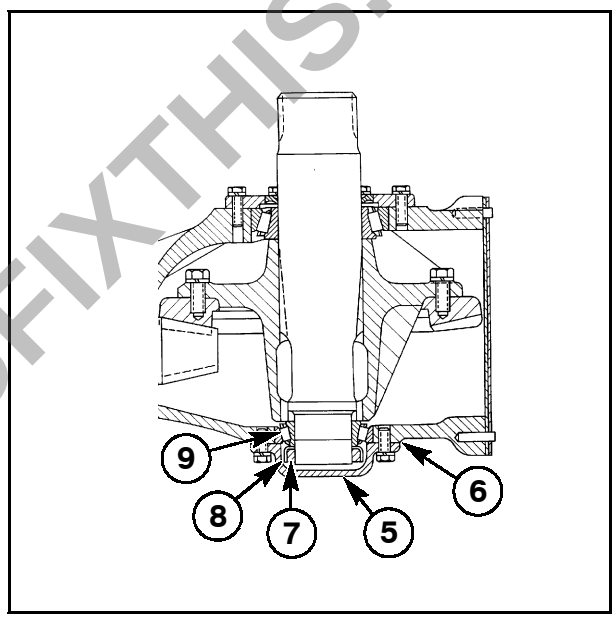
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1. Remove the gearbox cover assembly, 1, by removing twelve hex head cap screws. It is not necessary to remove the dowel pins, 2 and 3, from the gearbox housing, 4.



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2. Remove the bearing cap and retainer, 5, by removing four hex head cap screws and lock washers.
3. Remove the shims, 6, which were between the bearing retainer and the gearbox. Save these shims for use when reassembling the gearbox.
4. Bend the tab of lock washer, 8, away from locknut, 7,
5. Remove the locknut and lock washer. The cup for bearing, 9, can also be removed at this time, if it is free.



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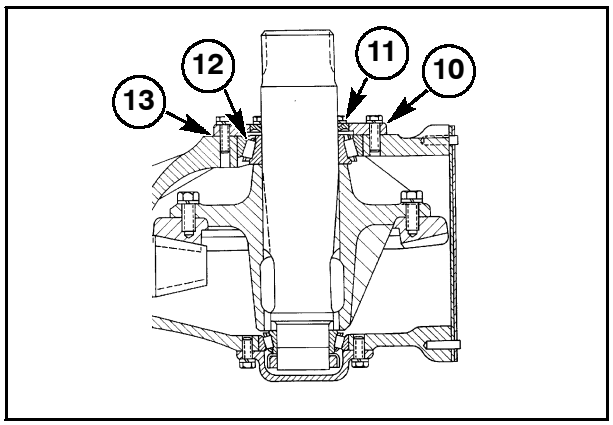
6. Remove the bearing retainer, 10, on the opposite side of the gearbox by removing six hex head cap screws and lock washers.

IMPORTANT: *Be careful not to damage the oil seal, 11, when removing this bearing retainer if the seal is to be reused.*

Remove the seal from the retainer.

The cup for bearing, 12, can also be removed at this time, if it is free.

7. Remove the shims, 13, and save them for use when reassembling the gearbox.

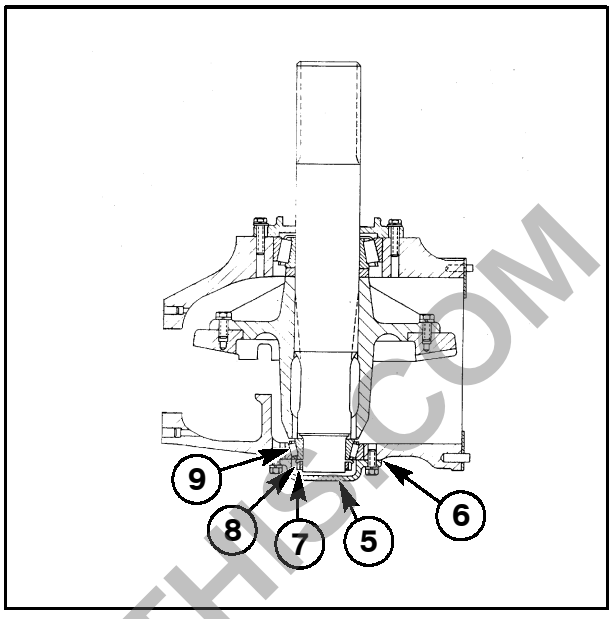


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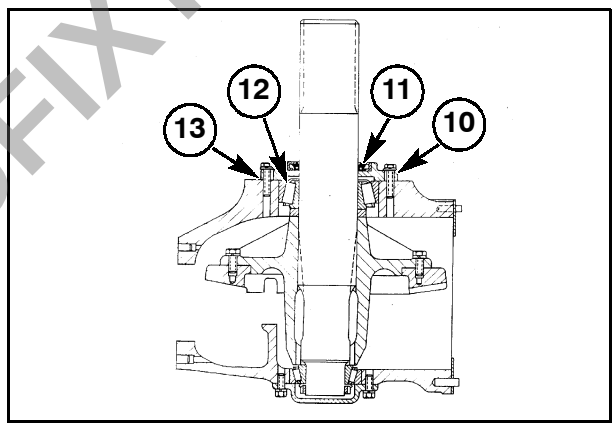
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18. Install the cone half of bearing, 9, on the crankshaft. Be sure it is seated tight against the ring gear hub all the way around.
19. Place the cup half of bearing, 9, on the crankshaft and install lock washer, 8, and locknut, 7. Tighten the locknut securely and bend one segment of the lock washer into a notch of the locknut to hold it securely in position.
20. Install the same number of shims at 6 as were removed from the gearbox, and install bearing retainer, 5. If a new gearbox or a new ring gear hub is being used, install one 0.003″ shim, one 0.005″, and one 0.007″ shim at this time.



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21. Turn the gearbox over on the left side, and install the cone half of bearing, 12. Be sure it is seated tight against the ring gear hub all the way around.
22. Place the cup half of bearing, 12, in position. Install the bearing retainer, 10. If the original bearing is being used, install the same shims at 13 as were originally used. However, if a new bearing or a new gearbox is being used, install one 0.003″ shim, one 0.005″ shim, and one 0.007″ shim at this time. Do not install seal, 11, at this time.



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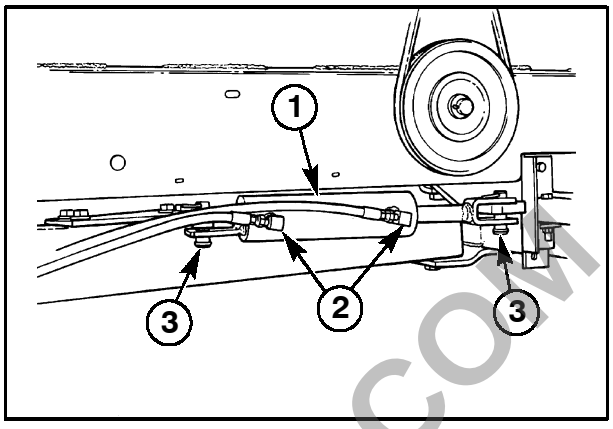
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TONGUE SWING CYLINDER

The tongue swing cylinder, 1, is used to move the tongue from the transport to operating position and back again.

A non-adjustable relief valve in the cylinder prevents damage to the baler when the cylinder reaches the position to latch the tongue in position.



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Removal

Clean the area around the cylinder.

Be sure there is no pressure in the lines to the cylinder and disconnect the hoses from the fittings, 2.

Remove the cylinder, 1, from the baler by removing the cotter pins and drilled pins at 3.

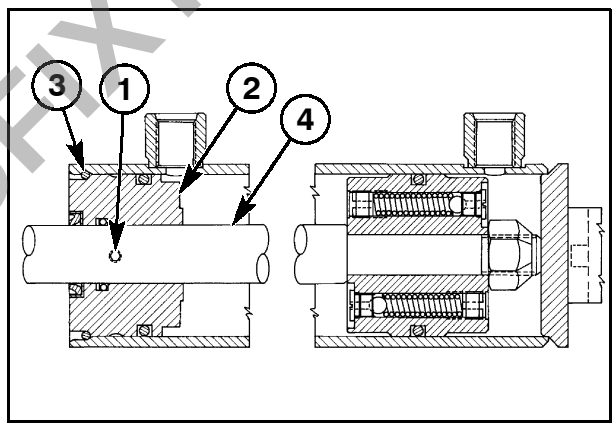
Disassembly

Remove the set screw, 1, from the side of the barrel.

Push the head, 2, into the cylinder just far enough to clear the snap ring, 3.

Remove the snap ring.

Pull the rod assembly, 4, out of the cylinder barrel.



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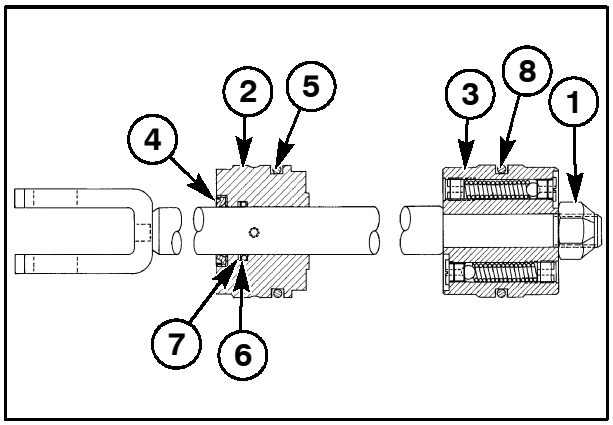
Place the yoke on the rod in a vise.

Remove the locknut, 1, from the rod.

Slide the head, 2, and piston, 3, off the rod.

Remove the seal, 4, and O rings, 5 and 6, and backup washer, 7, from the head.

Remove the O ring, 8, from the piston.



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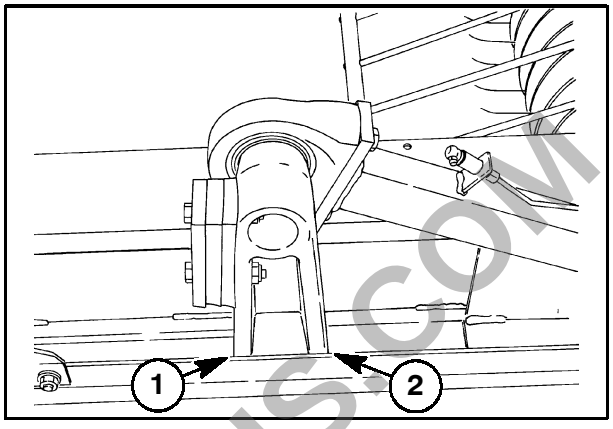
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MODEL SBX520

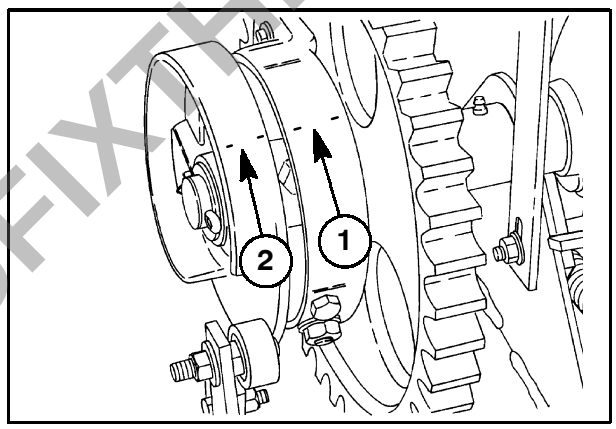
FEEDER BAR TIMING

1. Check (and adjust if required) the knotter timing.
   a. Rotate the flywheel in the normal direction until the plunger crank arm is in the vertical position between the marks, 1 and 2, on the bale case.



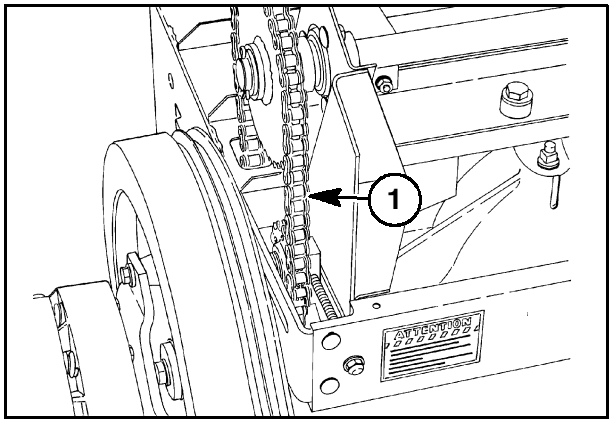
1

   b. Remove the backlash in the knotter clutch by pulling the needle yoke rod to the rear. The knotter timing marks, 1 and 2, should align within 6 mm (1/4″).



2

   Reposition the front drive chain, 1, to change the timing.

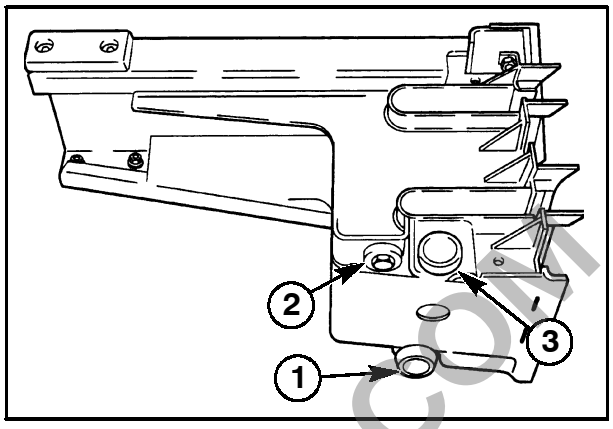


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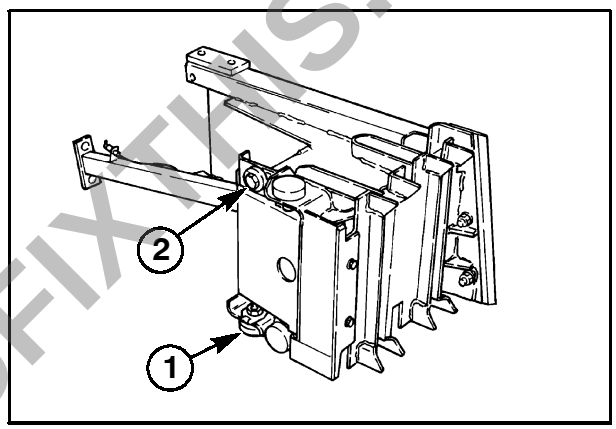
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On the left side of the plunger there are three bearings. The bottom bearing, 1, is in a fixed position. The upper vertical bearing, 2, and horizontal bearing, 3, are adjustable.



4

The 16 x 18 baler plunger is similar to the 14 x 18 plunger. The plunger is taller and has one additional horizontal bearing, 1, on the right side plus a lock plate for the vertical bearing, 2.



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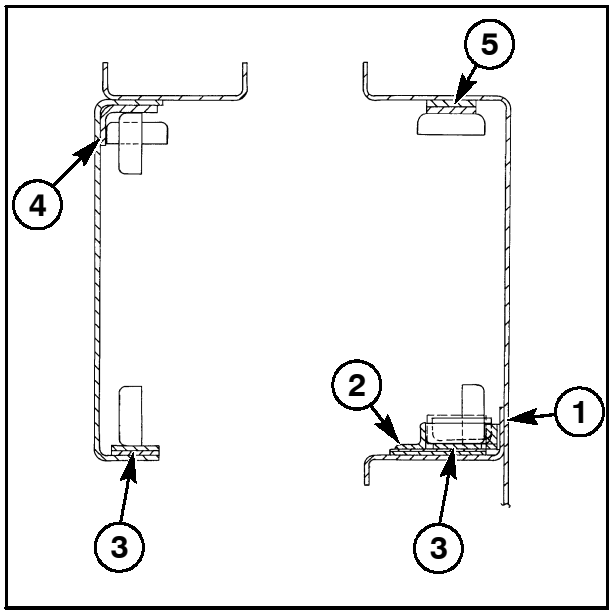
The right horizontal bearing rides against a rail, 1, at the side bale chamber.

An adjustable angle, 2, guides the lower slide block between the angle and the side rail.

The plunger vertical bearings ride on two rails, 3, in the bottom of the bale case.

An angled rail, 4, in the upper left corner of the bale case provides a contact surface for the adjustable bearings.

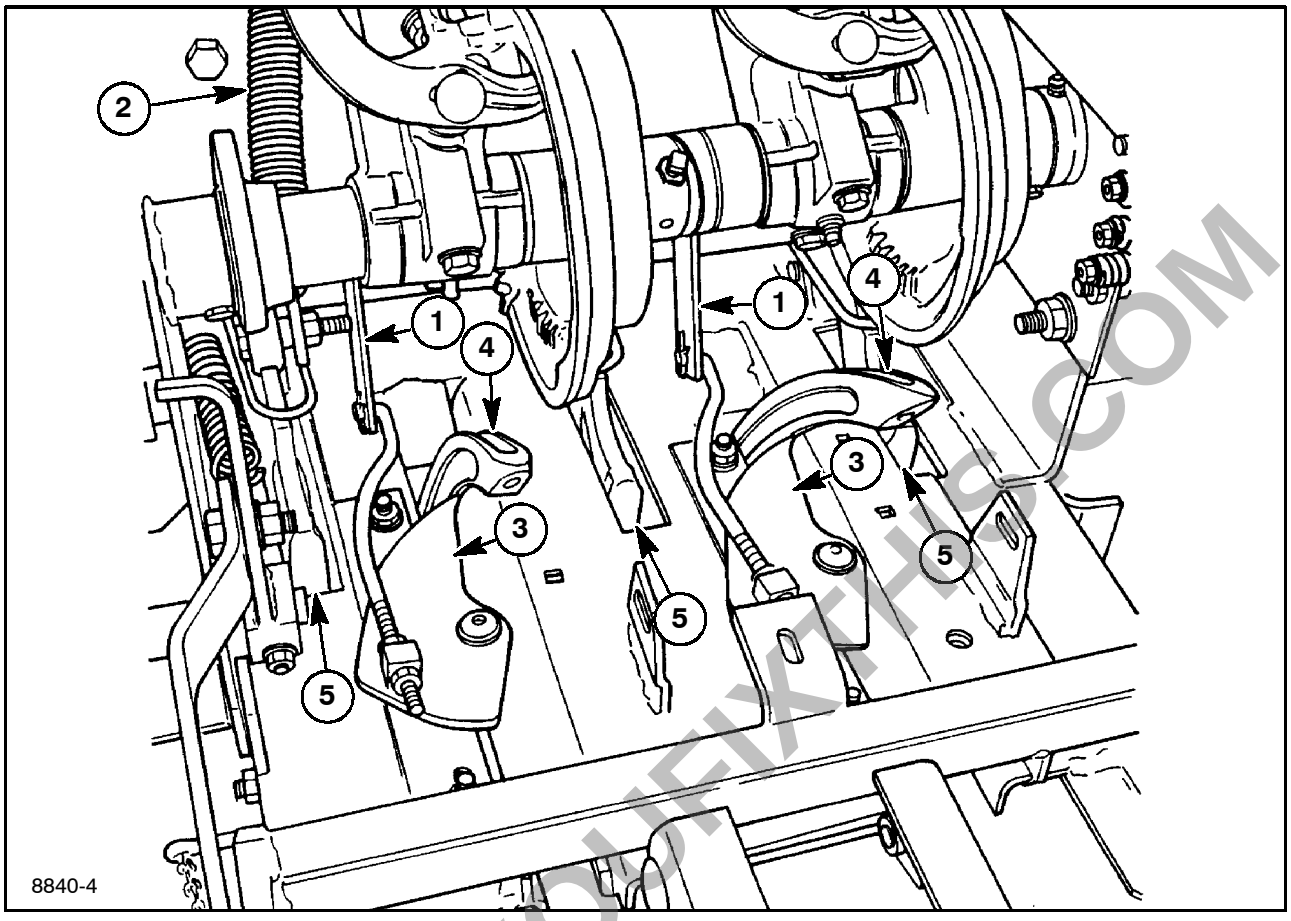
A rail, 5, at the upper right provides a wear surface for the upper slide block.



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5

Other Parts that Affect Knotter Performance

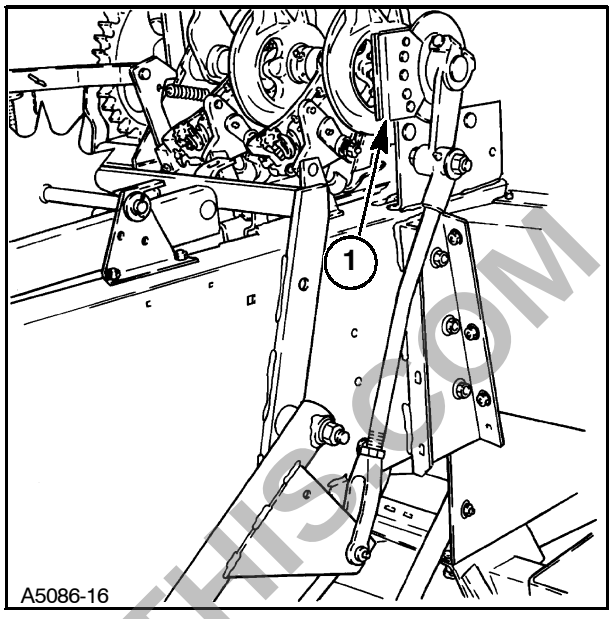
1. Twine finger lever
2. Twine finger lever spring
3. Twine finger
4. Needle
5. Hay dogs

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KNOTTER BRAKE

The knotter brake pads, 1, hold the needle yoke in the home position except during a tying cycle. The brake keeps the needles from drifting out of the home position during transport. The brake also keeps the knotter assembly from overrunning the knotter drive clutch during the tying cycle and allowing the clutch to disengage.



72

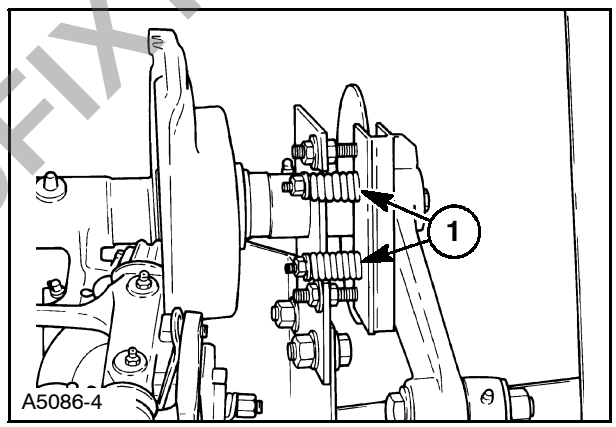
Springs, 1, apply pressure to the brake pads. There are 2 springs on the standard knotter. There are three springs on the heavy duty knotter.

Tighten the springs down until collapsed. Loosen each locknut one full turn.

If the springs are too loose the needles may drift into the bale chamber causing the needle safety latch to contact the crank and shear a flywheel shear bolt.

If the springs are too tight, excessive knotter shear bolt failures will occur.

IMPORTANT: *Never grease or lubricate the lining.*

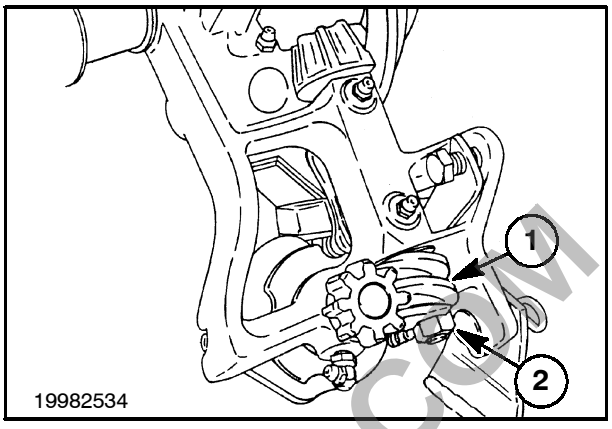


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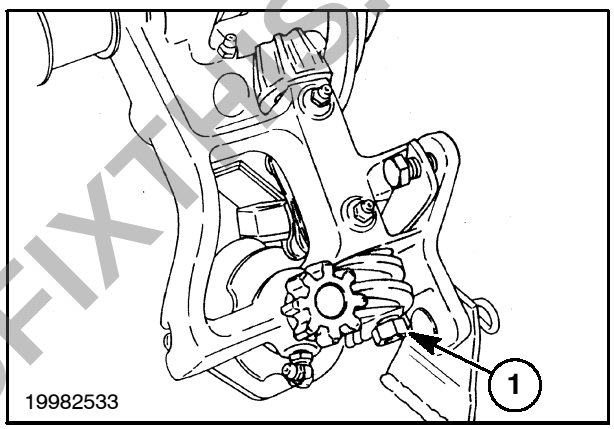
Change the twine disc timing by repositioning the worm gear, 1, on its shaft. Both the bore of the worm gear and the worm area on the shaft are tapered. The nut, 2, at the end of the shaft wedges the two tapers together.



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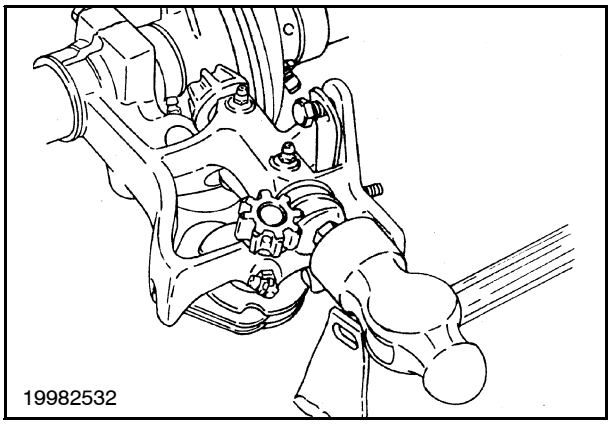
To change the timing:

Loosen the nut, 1, at the end of the worm shaft. Turn the nut out until it is flush with the end of the shaft.



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Tap the nut to loosen the worm on the shaft.



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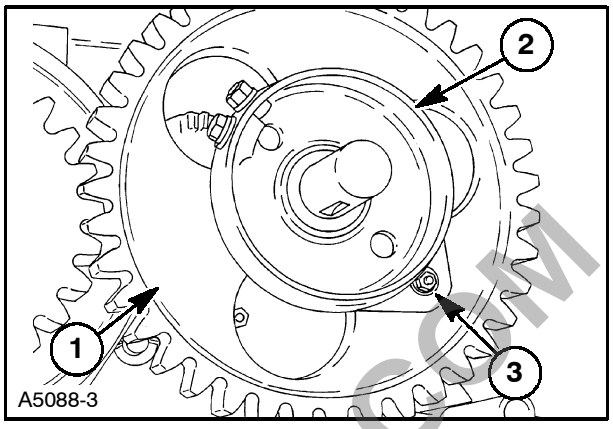
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Installing the Clutch and Drive Gear

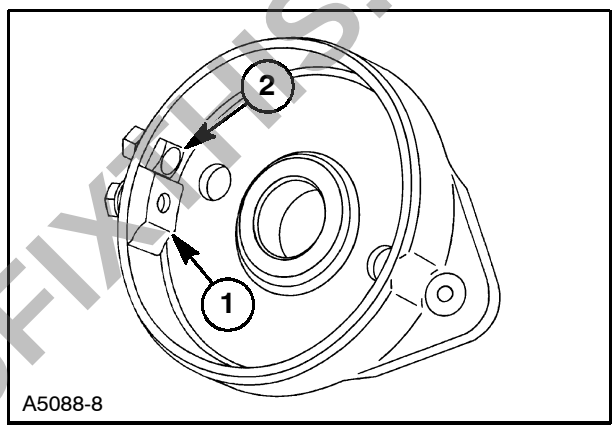
Place the drive gear, 1, and shear hub, 2, on the shaft. Install the shear bolt, 3.

If a new gear or shear hub is being installed, check the distance between the right edge of the bearing support plate and the left edge of the drive gear. If the distance is less than 100.5 mm (3 31/32″), remove the gear and large washer. Add additional shim washers to the shaft as required and reinstall the large washer and drive gear.



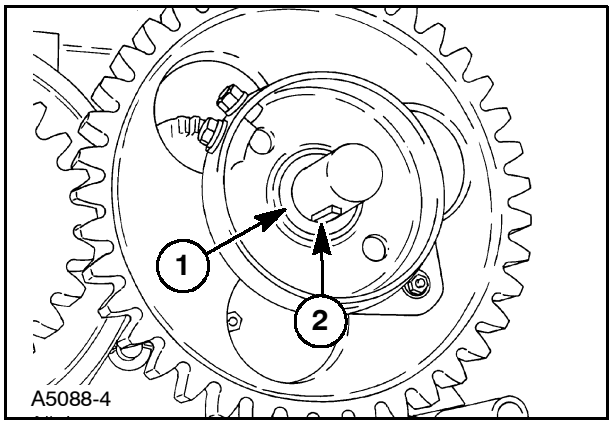
222

If a new shear hub is being installed, attach a new drive block, 1, to the clutch using a 3/8″ x 3/4″ Grade 5 UNF cap screw and lock washer. Install a 3/8″ x 3/4″ square head bolt, 2, lock washer and nut to keep the drive block from moving. Position the head of the bolt against the drive block.



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Place a 0.8 mm (1/32″) washer, 1, on the shaft and against the hub. Install the woodruff key, 2, in the shaft.

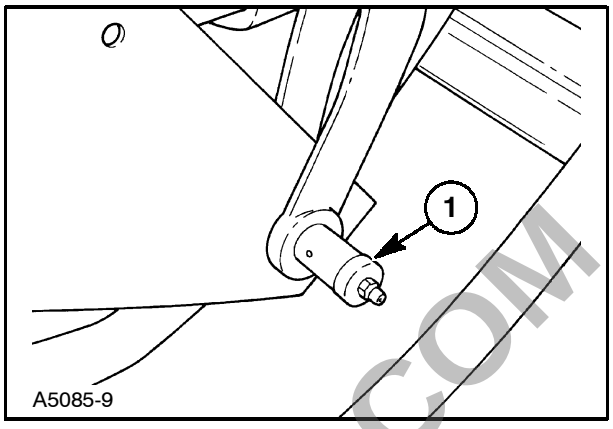


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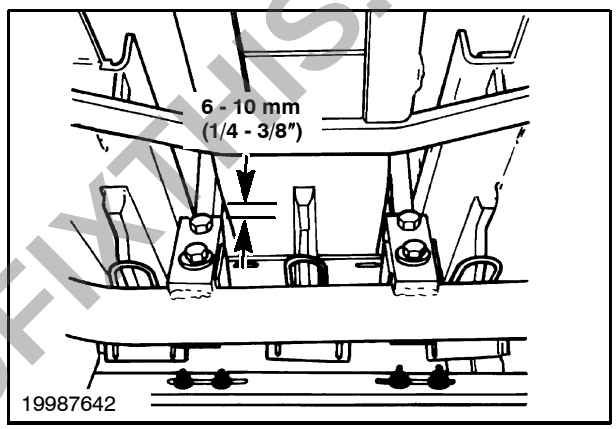
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Temporarily attach the needle yoke drive rod to the needle yoke using the pivot pin, 1.



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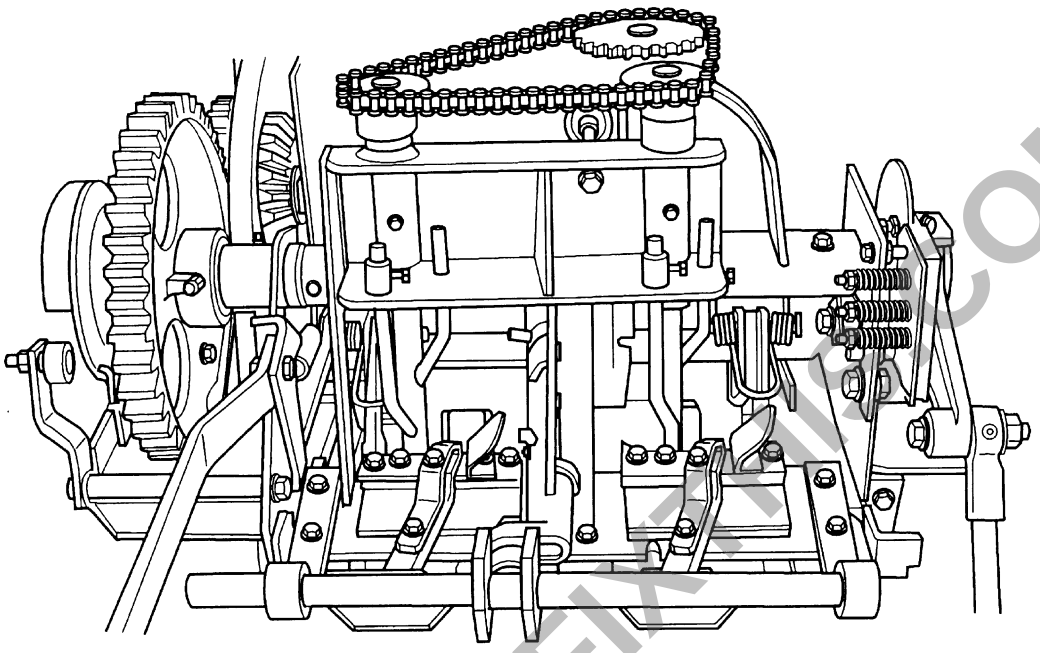
The needles and yoke must not contact the bale case at either end of the stroke. Trip the knotter and turn the flywheel by hand until the needles reach full penetration. The needle drive rod will align with the center of the knotter shaft. Check the clearance between the needle yoke and the frame at the closest point. It should be 6 - 10 mm (1/4 - 3/8″). Remove the pivot pin and adjust the clevis on the drive rod to change the clearance. When the penetration is correct, install a cotter pin to secure the pivot pin. Tighten the jam nut against the clevis on the rod.



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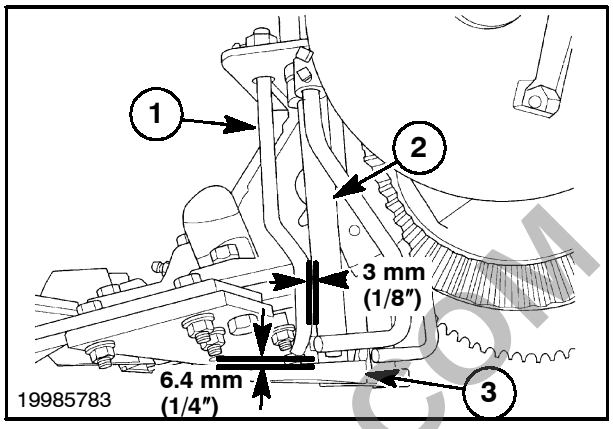
The Model SBX540 twister frame assembly is installed on a 35 mm (1-3/8″) diameter shaft.

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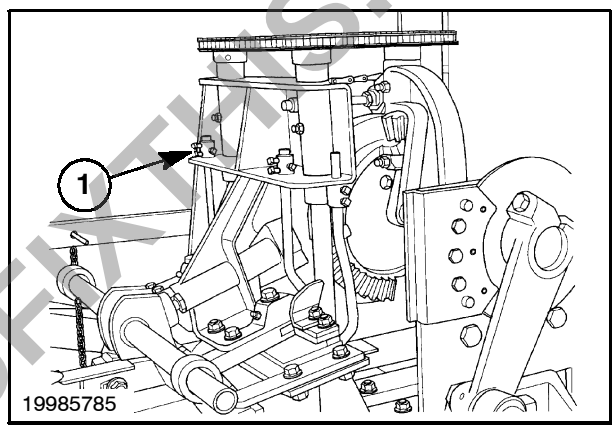
TWIST WRAPPER

The twist wrapper, 1, should have have 3 mm (1/8″) clearance with the twister hook shaft, 2, and be positioned directly to the rear of the shaft. The wrapper should be 6.4 mm (1/4″) above the twister hook, 3.



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Loosen the setscrews, 1, to reposition the twist wrapper. Be sure to securely tighten the setscrews when the twist wrapper is correctly adjusted.



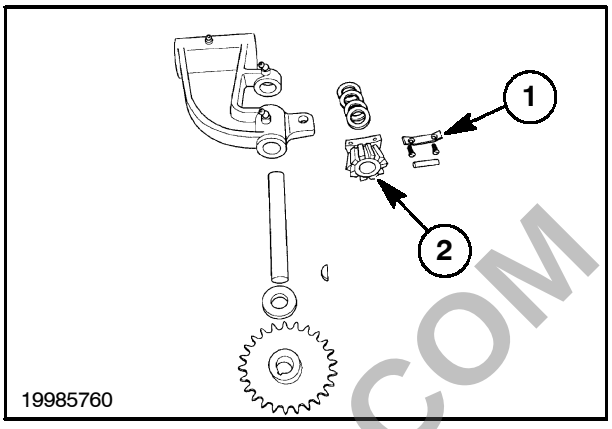
62

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Assembly

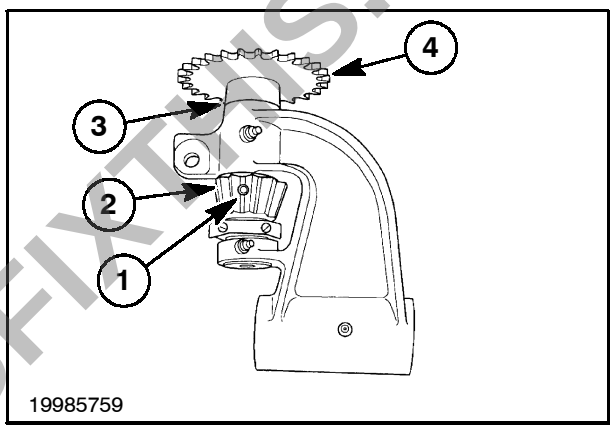
Attach the wear strip, 1, and shims to the pinion, 2, using two #6 x 1/2″ brass flat head screws.



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Place the pinion, 1, and shaft in the support. Align the drive pin hole in the gear with the hole in the shaft. Determine the amount of shims required between the pinion and frame at 2 to limit shaft end play to a maximum of 0.8 mm (1/32″). Slide the shaft out of the gear. Apply two drops of Loctite 271 to the shaft area for the pinion. Install the required thickness of shims at 2 and reinstall the shaft through the pinion and washer. Install a drive-loc pin to retain the pinion.

Place a washer over the shaft at 3. Install the woodruff key and sprocket, 4, on the shaft. Tighten the setscrews in the sprocket.



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Install the support assembly on the twister shaft.

Check the gear backlash. Add or remove shims from the shaft as required.

Install the right bushing assembly.

Install the brake assembly and needle drive arm. See the previous section for proper installation.

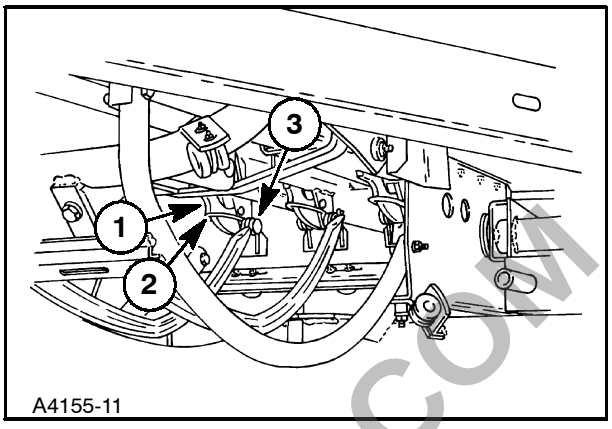
Install the twister hook drive chain.

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HAY DOGS

There are three spring loaded hay dogs, 1, on both the top and bottom of the bale chamber. Each hay dog and spring, 2, mounts on the bale chamber with a pin, 3, and hair pin cotter. The hay dogs rest on plastic stop blocks to prevent them from contacting the bale chamber.

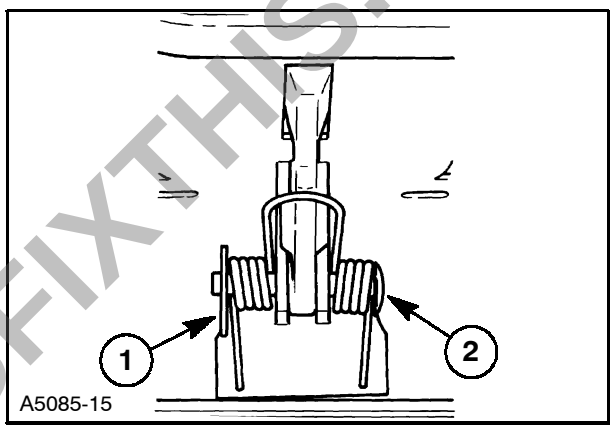


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To replace a hay dog or spring:

Remove the hairpin cotter, 1. Press on the spring and remove the pivot pin, 2. It may be necessary to drive the pin out of the hay dog. Separate the hay dog and spring.

Position the hay dog inside the spring. Place the hay dog and spring in position between the mounts. Press on the spring to align the hole in the hay dog with the hole in the mount and install the pin and hairpin cotter.



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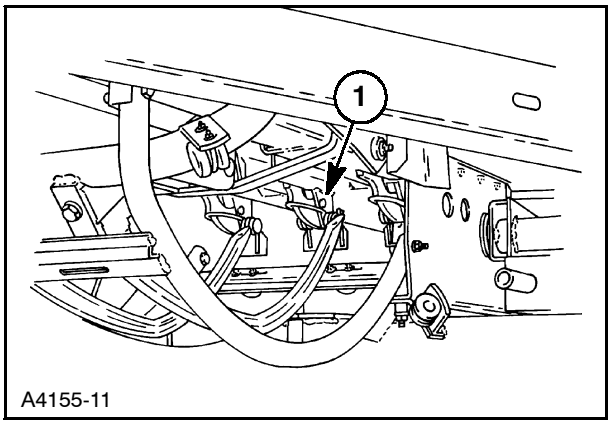
To replace the hay dog stop:

Remove the hay dog.

Remove the cap screw, 1, and lock nut to remove the stop.

Place the new stop in position between the mounts. Install the cap screw and lock nut.

Reinstall the hay dog. If the hay dog contacts the bale case, loosen the cap screw and reposition the stop.



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