

251 and 1550 POWR-TILL™ Seeders



JOHN DEERE

TECHNICAL MANUAL 251 and 1550 POWR-TILL™ Seeders

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251 AND 1550 POWR-TILL SEEDERS

TECHNICAL MANUAL
TM-1201 (Apr-83)

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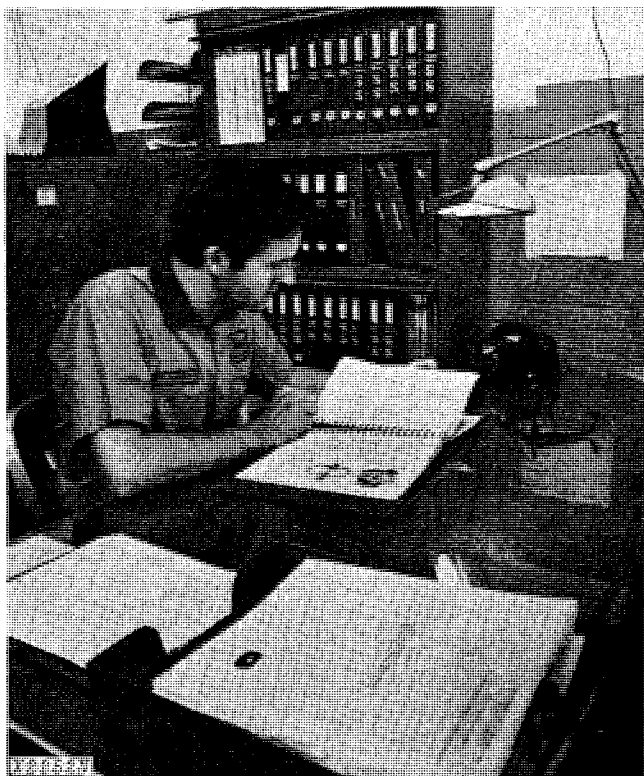
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INTRODUCTION



Use FOS Manuals for Reference

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

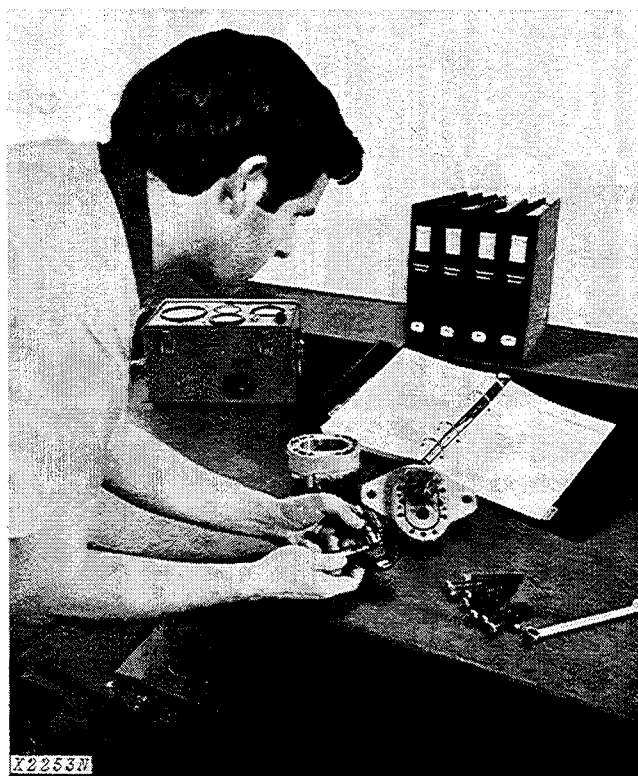
- **FOS Manuals—**for reference
- **Technical Manuals—**For actual service

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

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

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 mechanic.

When a service person should refer to a FOS Manual for more information a FOS note is used in the TM to identify the reference.



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—an experienced mechanic. 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.

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

“Right-hand” and “left-hand” sides are determined by facing the direction the seeder will travel when in use.

This publication contains both the U.S. customary units of measurement and the SI Metric equivalents. Throughout this manual dimensions are shown as follows: (1.75 mm) .069 in. The measurement in parentheses was converted from the design dimension.

SAFETY AND YOU

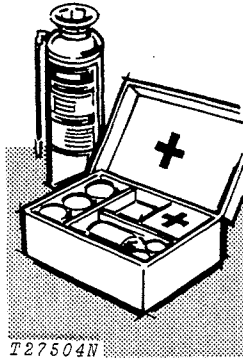


T27999N

INTRODUCTION



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



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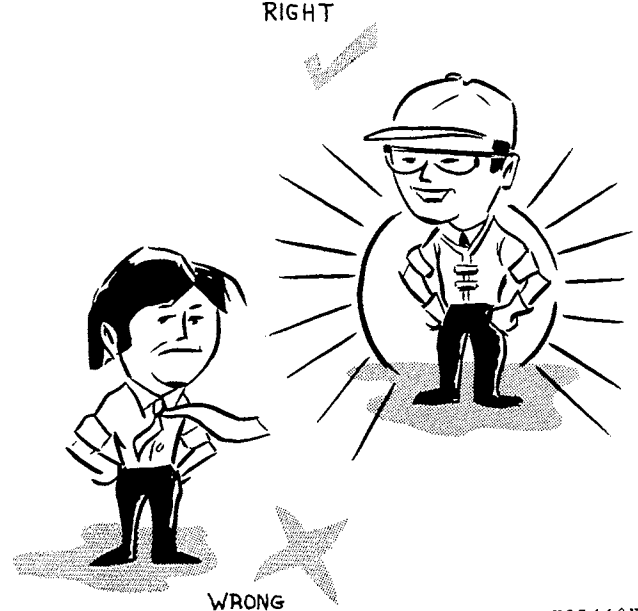
Be prepared if an accident or fire should occur. Know where the first-aid kit and the fire extinguishers are located—know how to use them.

PERSONAL SAFETY

Shut off tractor engine and remove switch key before working on the seeder, when it is attached to the tractor.

Avoid working on equipment with the tractor engine running. If it is necessary to make checks with the engine running, **ALWAYS USE TWO PEOPLE**—one, the operator, at the controls, the other person checking so as to be visible to the operator on the tractor seat. **KEEP HANDS AWAY FROM MOVING PARTS.**

RIGHT



WRONG

H23440N

Always avoid loose clothing or any accessory—flopping cuffs, dangling neckties and scarves—that can catch in moving parts and put you out of work.

Always wear your safety glasses while on the job.

SERVICE AREA

Keep the service area clean and dry. Wet or oily floors are slippery. Wet spots can be dangerous when working with electrical equipment.

Make sure the service area is adequately vented.

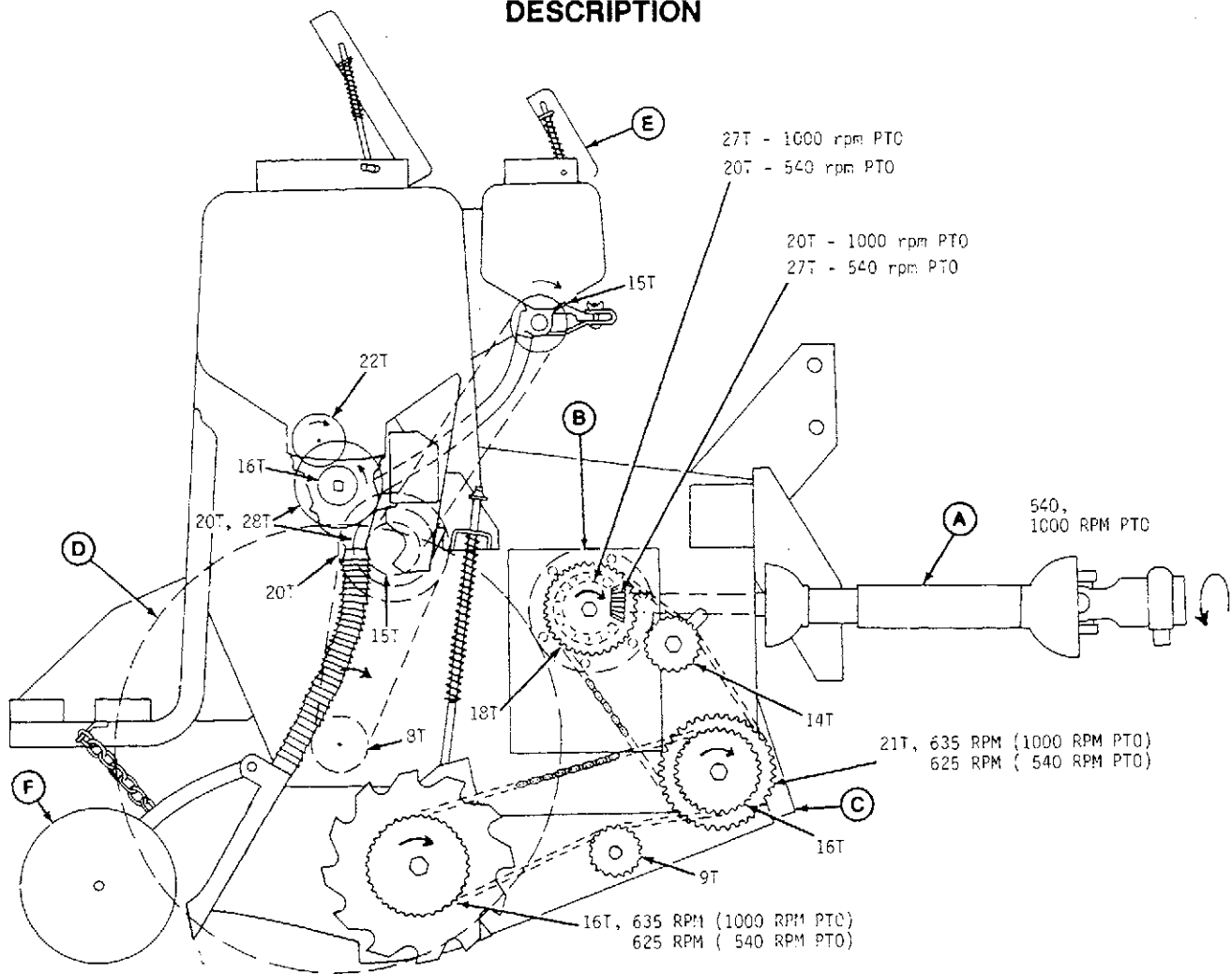
Periodically check the shop exhaust system for leakage. Engine exhaust gas is dangerous.

Be sure all electrical outlets and tools are properly grounded.

Use adequate light for the job at hand.

GENERAL INFORMATION

DESCRIPTION



- A—Powershaft
- B—Slip Clutch (2)
- C—Cutter Wheel Unit
- D—End Wheel
- E—Grass Seed Box
- F—Press Wheels
- RPM—Revolutions Per Minute
- PTO—Power Take-Off
- T—Teeth

N37013

Fig. 1—Power Train Diagram - 1550 POWR-TILL Seeder

The 1550 POWR-TILL Seeder grain box holds (352 L) 10 bushels and may be powered by a 540 or 1000 rpm PTO. A (88 L) 2-1/2 bushel grass seed attachment (E) may be added to make a combination grain and grass seeder (as illustrated).

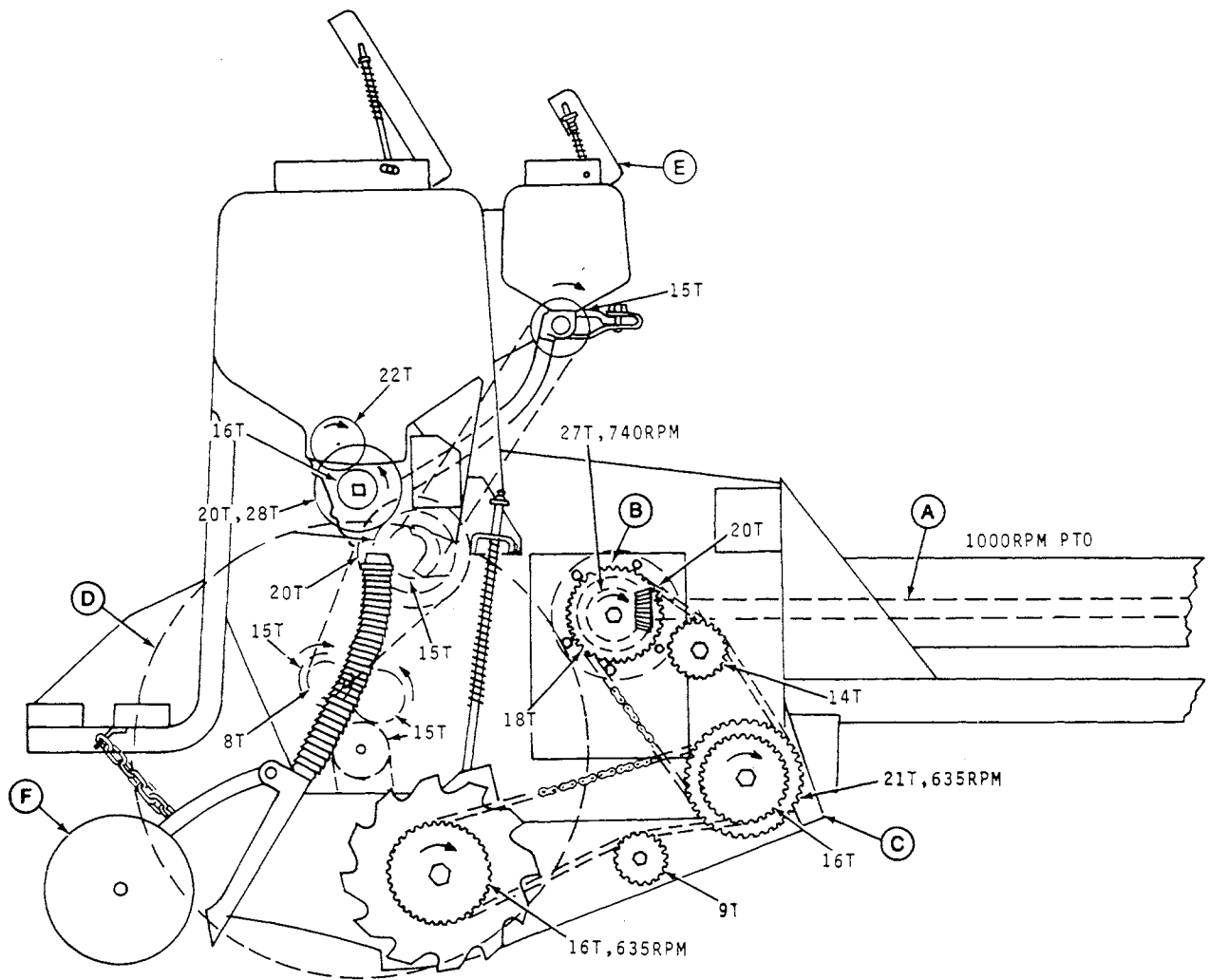
The PTO drive (A) is shielded from the tractor to the implement gear case. Power is transmitted from the gear case by two output shafts through disk-type slip clutches (B) and output shafts to enclosed drive housings on each end of the seeder. No. 80 roller chains, running in grease, couple the output shaft sprockets to the cutter wheel unit (C) drive shaft drive sprockets. Cutter wheel units are supported independently, with individual drive shafts connected by coupling sprockets, allowing removal of a single unit. Each pair of cutter wheels is driven by an enclosed, lubricated, No. 80 roller chain.

The seed metering system is ground driven by the right-hand end wheel (D), and uses fluted force feeds.

The 12 power-driven cutter wheels (2 per unit) spaced on (203 mm) 8-in. centers, till an area about (13-19 mm) 3/4-inch wide. An adjustable down pressure spring controls the vertical floating action of each unit.

The seeding rate is controlled by a single lever on either the grain or grass box. Seeds drop through rubber tubes, through the spring-loaded seed spouts, into the seed furrow. Furrow depth is adjustable for varying moisture conditions and/or seed requirements.

Press wheels (F) are available (optional equipment) to improve seed-to-ground contact for better germination.



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- | | | | | |
|-------------------|---------------------|----------------------|----------------------------|---------|
| A—Input Shaft | C—Cutter Wheel Unit | E—Grass Seed Box (2) | RPM—Revolutions Per Minute | T—Teeth |
| B—Slip Clutch (2) | D—End Wheel | F—Press Wheels | PTO—Power Take-Off | |

Fig. 2—Power Train Diagram - 251 POWR-TILL Seeder

The 251 POWR-TILL Seeder grain box holds (573 L) 16.25 bushels and may be powered only by a 1000 rpm PTO. A (141 L) 4 bushel grass seed attachment (E) may be added to make a combination grain and grass seeder (as illustrated).

The PTO drive (A) is shielded from the tractor to the implement gear case. Power is transmitted from the gear case by two output shafts through disk-type slip clutches (B) and output shafts to enclosed drive housings on each end of the seeder. No. 80 roller chains, running in grease, couple the output shaft sprockets to the cutter wheel unit (C) drive shaft drive sprockets. Cutter wheel units are supported independently, with individual drive shafts connected by coupling sprockets, allowing removal of a single unit. Each pair of cutter wheels is driven by an enclosed, lubricated, No. 80 roller chain.

The seed metering system is ground driven by the right-hand end wheel (D), and uses fluted force feeds.

The 16 power-driven cutter wheels (2 per unit), spaced on (244 mm) 10-in. centers, till an area about (13-19 mm) 3/4-inch wide. An adjustable down pressure spring controls the vertical floating action of each unit.

The seeding rate is controlled by a single lever on the grain box, and two levers on the grass box. Seeds drop through rubber tubes, through the spring-loaded seed spouts, into the seed furrow. Furrow depth is adjustable for varying moisture conditions and/or seed requirements.

Press wheels (F) are available (optional equipment) to improve seed-to-ground contact for better germination.

LUBRICATION

System	Capacity	Type of Lubricant
Unit Drive Housings	(1.4 kg) 3 lbs.	John Deere Corn Head Lube or an equivalent lubricant.
Powershaft (center fitting)		John Deere Multipurpose Lubricant or an equivalent multipurpose-type grease.
Powershaft U-joints		John Deere Multipurpose Lubricant or an equivalent multipurpose-type grease.
Press Wheel Axles		John Deere Multipurpose Lubricant or an equivalent multipurpose-type grease.
Roller Chains (end wheel drive and grass seed drive)		John Deere PT-508 spray lubricant or equivalent, or John Deere TORQ-GARD SUPREME® or an equivalent SAE 40 oil.
Cutter Wheel Housings	(1.6 kg) 3-1/2 lbs.	John Deere Corn Head Lube or an equivalent lubricant.
Gear Case	(1.9 L) 2 qts.	John Deere SAE 85W/140 Gear Lubricant or an equivalent SCL multipurpose-type gear oil.
Wheel Bearings		John Deere Multipurpose Lubricant or an equivalent SAE multipurpose-type grease.
Input Shaft Coupler at Gear Case (251)		John Deere Multipurpose Lubricant or an equivalent SAE multipurpose-type grease.
Rockshaft Bearings (251)		John Deere Multipurpose Lubricant or an equivalent SAE multipurpose-type grease.

DIAGNOSING MALFUNCTIONS AND TESTING

ORGANIZING THE DIAGNOSIS

1. Know the Unit

Study this manual to know how the individual components work and their function in the over-all system.

Keep up with the latest service information. Read it and store it in a handy reference file.

2. Consult the Operator

Ask the operator how the unit was performing when the problem occurred. Find out if any corrective measures were already taken. Ask if the unit was serviced regularly as prescribed in the operator's manual.

3. Operate the Unit

If the unit can be safely operated, see for yourself how it malfunctions—don't rely completely on the operator's diagnosis.

4. Inspect the Unit

Visually check the unit. Look at the components for any cracked welds, loose hardware, damaged linkages, worn or broken lines, or anything that looks out of the ordinary.

5. List the Probable Causes

Write down the information you have learned by steps 1 through 4. What are the signs you found while inspecting the unit and what are the most probable causes as outlined under "Diagnosing"?

6. Reach Some Conclusions

Look over the possible causes and decide which ones are most likely. Reach your decision on the most probable cause and plan to check it first.

7. Test Your Conclusions

Before disassembling any components, test your conclusions to see which are correct. Tests narrow the possibilities and soon the actual cause will be pinpointed.

DIAGNOSING

Power train damage

- Incorrect PTO speed - page 4
- Slip clutch incorrectly assembled - page 23 or 24

Slip clutch overheating

- Incorrectly assembled - page 23 or 24
- Clutch facings worn - page 23 or 24

Slip clutch does not slip

- Incorrectly assembled - page 23 or 24

Powershaft damage

- Poor lubrication - page 6
- Improper tractor hookup - See Operator's Manual

Machine vibrates

- Powershaft sections not properly phased - page 11
- Unit drive shafts bent - page 25

Twisted powershaft

- Overload on powershaft - reduce load
- Slip clutch does not slip - page 23 or 24

Powershaft not telescoping properly

- Worn bearings - page 11
- Rotating shields rusted - page 11
- Poor lubrication - page 6
- Shaft packed with dirt - clean and lubricate

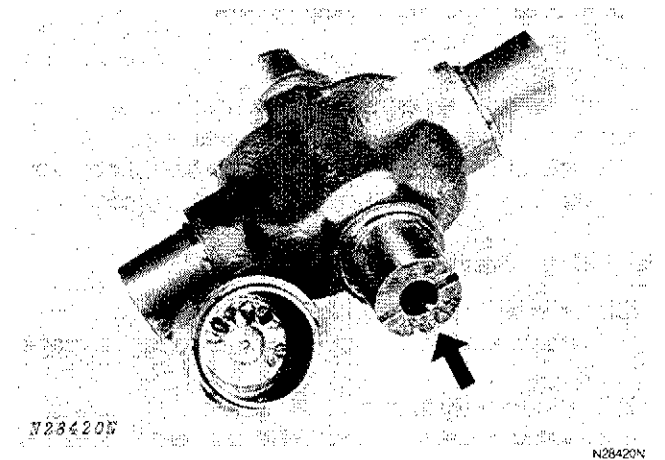


Fig. 2A-U-joint Damage

Galling or brinelling of U-Joint journal (Fig. 2A)

- Drive shaft rpm too high - page 4
- Incorrect powershaft phasing - page 11

Journal cross end and cup chipping

Improper tractor hookup - See Operator's Manual

Abrasive corrosion on PTO shaft

Extreme low angle operation - See Operator's Manual

Noisy gears in gear case

Low on lubricant - page 6
Backlash incorrect - page 22
Rolling torque incorrect - page 22

Cutter wheels coming loose

Cutter wheel axle installed backwards - page 28

Excessive Vibration of Units

Drive shafts bent - page 29

Cutter wheels not turning

Hex shaft drive chain broken - page 26
Individual unit chain broken - page 26
Shaft or gear broken in gear case - page 19
Clutch drive splines worn - page 23 or 24
Slip clutch too loose - page 23 or 24

Acremeter tallying incorrectly

Improper tire inflation or size.
Inflate tires - page 45
Land area is not accurately known.
Remeasure land.
Acremeter out of adjustment.
Adjust acremeter, see Operator's Manual.
Excessive overlapping or double planting.
Avoid driving patterns (for various field conditions) which cause the acremeter to read higher.

Feed Cups Breaking (Early Models)

Cutter wheel units striking feed cups
Install longer, stiffer down-pressure springs - page 30.
Tilling extremely rough, rocky ground.
Level and clear ground, drive slower.

Fluted-Feed shifter lever difficult to shift

Feed gate position too high.
Lower feed gate, position grain shifter lever in place; then place feed gate in desired position - pages 40 and 41.

Fluted-Feed shifter does not stay in position

Bent or damaged shifter lever.
Replace entire assembly, page 40.

Varying quantities by individual feeds

Feed gates not all set the same.
Set all gates identically. (See Operator's Manual.)
Feed cup out of adjustment with the fluted-feed roll.
Set the shifter on zero and move any cups that are not completely closed. (See Operator's Manual.)

Quantities planted not agreeing with feed chart

Feed gates adjusted improperly.
Adjust gates, see Operator's Manual.
Heavier or lighter-than-average weight seed.
Check quantity drilled, see Operator's Manual.
Improper tire inflation.
Inflate tires - page 45
Excessive overlapping or double planting.
Avoid driving patterns (for various field conditions) which cause the feed chart information to seem incorrect.
Axle gear not engaging (251).
Lower seeder completely.

Seed distribution stops

Broken shear pin in axle assembly.
Replace pin and check torque, page 30 or 34.
Broken chain.
Replace chain and check drive shaft for ease of rotation, page 39.
Feed shaft or hub rounded or worn.
Replace parts, page 39.

POWERSHAFT

GENERAL INFORMATION

The powershaft consists of a front and rear section that slip-fit together. The front section couples to the PTO shaft of the tractor and the rear section is connected to the input shaft of the seeder gear case.

NOTE: When converting 1550 to operate from one PTO speed (540 or 1000 rpm) to another, the entire powershaft must be changed. Also, the input and output gears in the gear case must be reversed. (See page 19.)

REMOVAL AND INSTALLATION

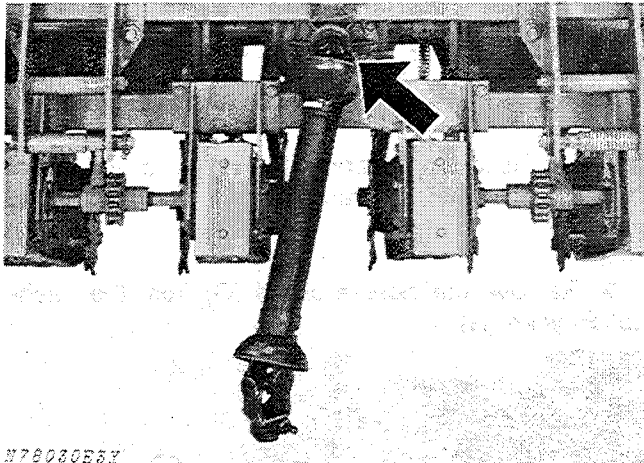
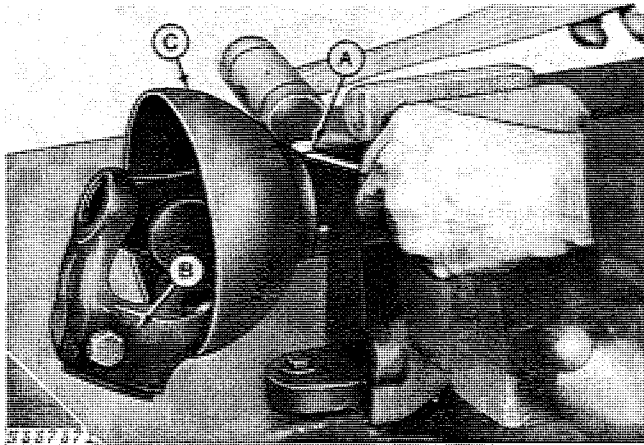


Fig. 3-Removing Powershaft (1550)

Remove the single bolt holding the powershaft yoke on the splined input shaft (Fig. 3); then pull the powershaft off.

Install powershaft yoke using reverse procedure. Tighten nut on retaining bolt to (115 N·m) 85 ft-lbs.

DISASSEMBLY



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

Fig. 4-Removing Rear Shield

1. Remove locking bearings (A, Fig. 4) from shields, to separate shields from tube and shaft assemblies.

2. Inspect shield bearings (10, Fig. 6). Remove, if necessary, by prying them out of bearing groove and sliding off the assembly.

3. Install new bearings using reverse of Step 2.

4. Remove retaining rings holding cross and bearings in yoke.

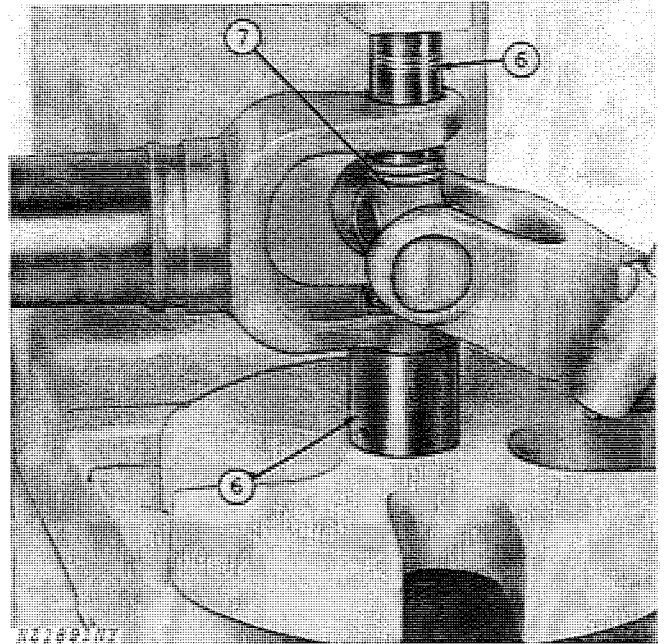


Fig. 5-Removing Cross and Bearings (1550)

5. Place yoke assembly (with shaft or tube) in a press.

6. Using appropriate size sockets or sleeves, press the cross bearings out of the yoke (Fig. 5).

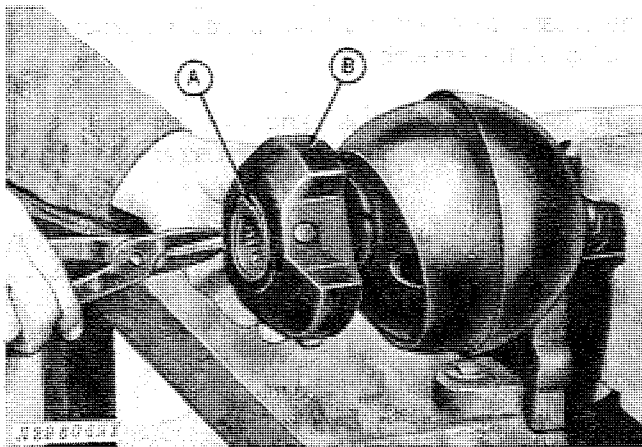
7. Remove bearings from cross; then remove cross from yoke.

8. Repeat procedure for remaining 1550 yoke. See page 10 for disassembly of 251 shield yoke.

9. (1550) Examine lock pin in tractor PTO yoke of powershaft (Fig. 3). If pin does not work freely with slight amount of spring tension, remove and examine components.

Shielded Yoke (251 Only)

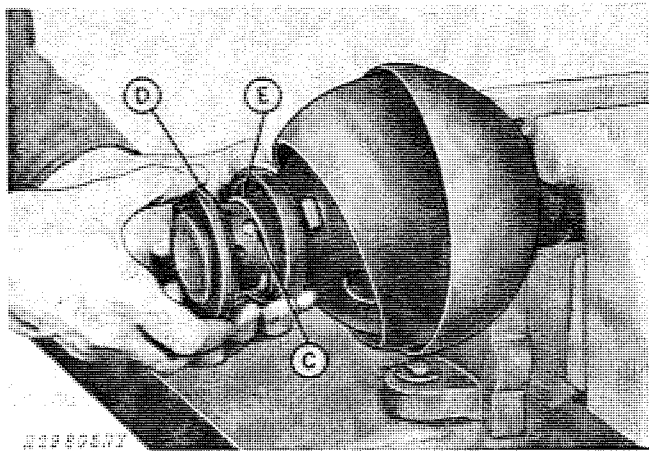
1. Place powershaft front section in vise. Support the push collar assembly as shown; then remove the snap ring (Fig. 6).



A—Snap Ring B—Push-Collar Assembly

Fig. 6-Removing Snap Ring

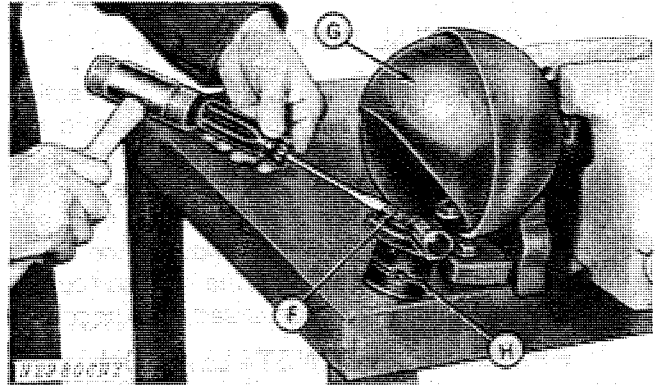
2. Remove push collar and push-button latch (B, Fig. 6).



C—Steel Ball D—Collar Retainer E—Spring

Fig. 7-Removing Collar Retainer

3. Remove the three steel balls (C, Fig. 7) from the push button yoke; then remove the collar retainer (D) and spring (E).

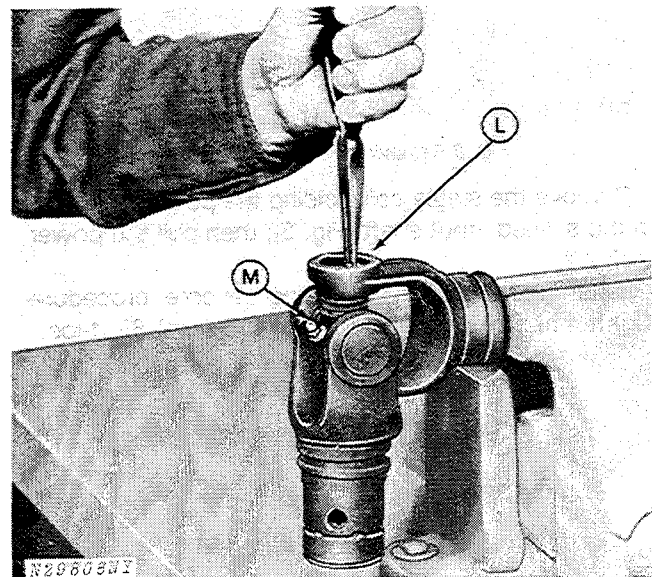


F—Locking Bearing G—Closure Shield
H—Push-Button Yoke

Fig. 8-Removing Front Closure Shield

4. Lift the locking bearing (F, Fig. 8) up and out of the assembly with a screwdriver; drive the bearings out.

5. Remove the closure shield (G) from the push-button yoke (H).



L—Retaining Ring M—Spider and Bearing Assembly

Fig. 9-Removing Retaining Rings

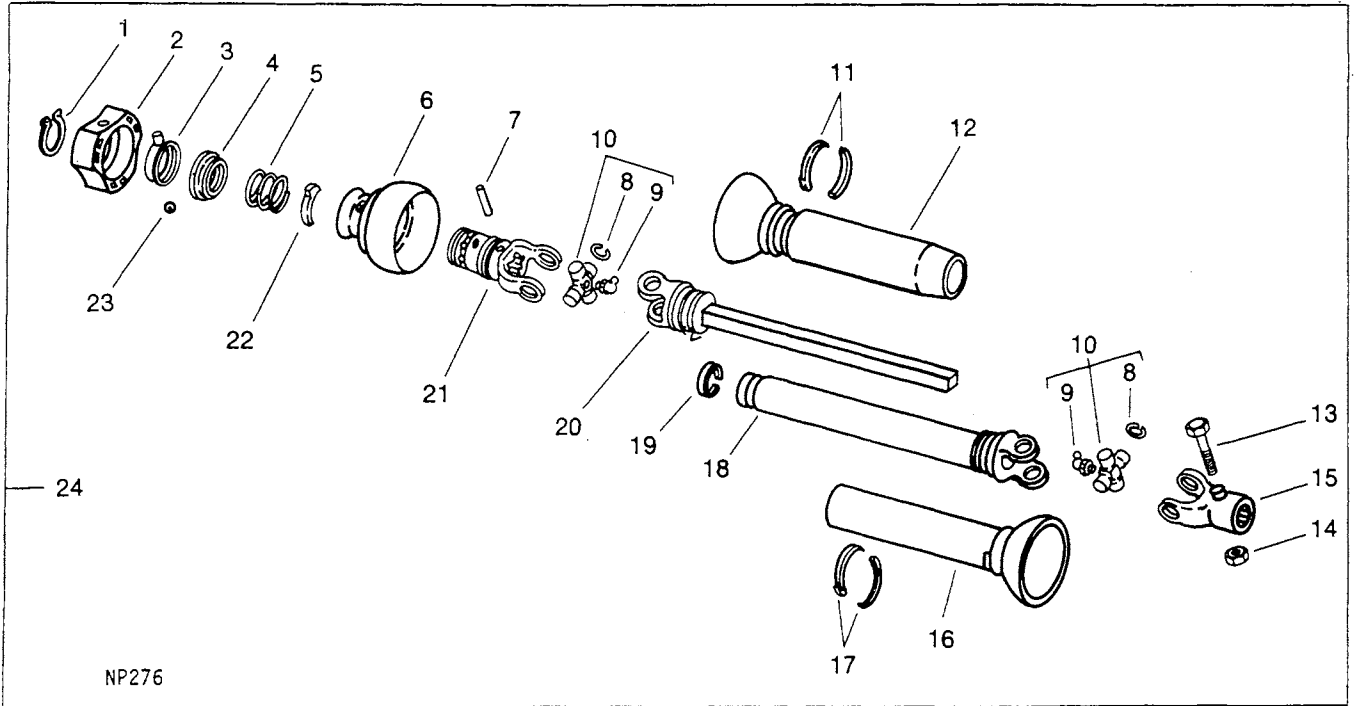
6. Support the yoke and shaft assembly in a vise; then remove the retaining rings (L, Fig. 9) from the spider and bearing assembly (M).

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|------------|----------------|----------------|----------------|
| 1—Ring | 7—Pin | 13—Screw | 19—Bearing |
| 2—Collar | 8—Ring (8) | 14—Nut | 20—Shaft |
| 3—Latch | 9—Fitting (2) | 15—Yoke | 21—Yoke |
| 4—Retainer | 10—Bearing (2) | 16—Shield | 22—Bearing (3) |
| 5—Spring | 11—Bearing (4) | 17—Bearing (2) | 23—Ball (3) |
| 6—Shield | 12—Shield | 18—Tube | 24—Joint |

Fig. 10-Powershaft Components (251)

INSPECTION AND REPAIR

Check the cross and bearings (10, Fig. 10) for wear. Replace if necessary.

Check the tube and shaft (18 and 20) for straightness. Replace if necessary.

Check the yoke compression spring (5) to see if it is broken or badly rusted. Replace if necessary.

Check the locking bearings (11, 17, 22) for wear. Replace if necessary.

Check lock pin in yoke (1550, not shown) and replace worn or rusted parts.

ASSEMBLY

1. Press the cross and bearing assemblies into the yokes, using reverse of disassembly procedure (Fig. 5).

2. Install cross and bearing retaining rings (Fig. 9).

3. Install lock pin and spring (1550, not shown) and secure with washer.

4. Liberally apply molydisulfide grease to all grooves that have nylon bearings. If the nylon bearings are stiff, soak them in boiling water for several minutes to soften them.

5. Install shields (6, 12, 16) and lock in place with locking bearings (22, 11, 17).

6. Grease shaft (see page 6) and slide two sections of powershaft together. Lubricate powershaft U-joints (see page 6).

IMPORTANT: Make sure tab and groove on tube and shaft (18 and 12) are aligned to assure proper phasing and balancing of powershaft sections.

GEAR CASE AND SLIP CLUTCHES

GENERAL INFORMATION

The 1000-rpm seeder gear case contains two bevel gears—a 20-tooth input gear and a 27-tooth output gear. The 540-rpm seeder gear case (1550 only) contains the same gears, but the order is reversed. (See page 18.)

A disk-type slip clutch is located on each end of the gear case cross shaft to protect the gear case and units. Two output shafts transmit the power to enclosed housings on each end of the seeder, where it is coupled through roller chains to drive the cutter wheel units on each side of the seeder.

TEST EQUIPMENT, SPECIAL TOOLS, AND MATERIALS

The following items, or their equivalents, are recommended when performing this job. For increased efficiency, gather them together before beginning the job.

Special Tools

Drivers (Not illustrated)

1. (29 mm) 1-1/8-inch O.D. x (64 mm) 2-1/2-inch minimum length.
2. (48 mm) 1-7/8-inch O.D. x (41 mm) 1-5/8-inch I.D. x 4-inch (102 mm) minimum length.
3. (38 mm) 1-1/2-inch O.D. x (32 mm) 1-1/4-inch I.D. x 1-inch (25 mm) minimum length.
4. (56 mm) 2-3/16-inch O.D., any length.

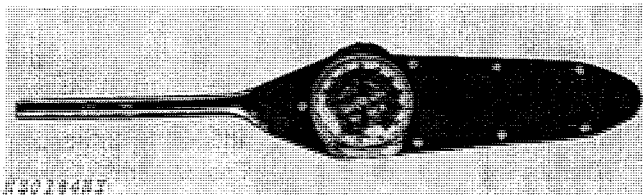


Fig. 11-Torque Wrench (In/Lb [N·m])*

*Order No. 2735 from Central Tool Co., Inc., Cranston, RI 02910; P.O. Box 314, Owatonna, MN 55060; or D-01064AA through the SERVICE-GARD™ Equipment Program.

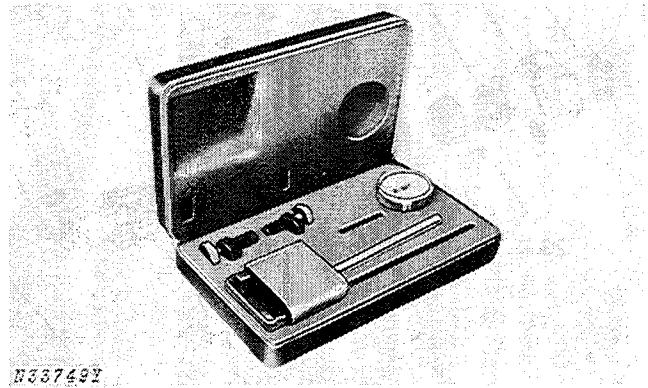


Fig. 12-Dial Indicator Set**

**Order D-17508C1 through the SERVICE-GARD Equipment Program.

Materials

SAE 85W/140 Gear Lubricant (TY6256) (SCL Type), Corn Head Lubricant (AN102562, AH80490) Sealant Compound (PT94).