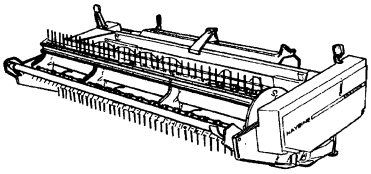


NEW HOLLAND

2212 2214 2216 2218 2322 2324 2326 2328

REPAIR MANUAL

NEW HOLLAND

SERVICE

86637553 10/01

2200/2300 REPAIR MANUAL CONTENTS

The sections used through out all New Holland product Repair manuals may not be used for each product. Each Repair manual will be made up of one or several books.

The sections listed above are the sections utilized for the 2200/2300 Series Headers.

SECTION 00 - GENERAL INFORMATON

Chapter 1 - General Information

CONTENTS

FOREWORD

Appropriate service methods and correct repair procedures are essential for the safe, reliable operation of all equipment, as well as the personal safety of the individual performing the repair.

This Repair Manual provides troubleshooting and overhaul instructions using recommended procedures and equipment. Following these instructions will ensure the safe, efficient, and timely completion of the service or repair.

The manual is divided into sections which are subdivided into chapters. Each chapter contains information on general operating principles, detailed inspection, overhaul and, where applicable, specific troubleshooting, special tools, and specifications.

Any reference in this manual to right, left, rear, front, top, or bottom is determined by standing behind the machine and looking in the direction of travel.

All data and illustrations in this manual are subject to variations in build specification. This information was correct at the time of issue, but New Holland policy is one of continuous improvement, and the right to change specifications, equipment, or design at any time, without notice, is reserved.

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.*

SAFETY

PRECAUTIONARY STATEMENTS

A careful operator is the best operator. Most accidents can be avoided by observing certain precautions. To help prevent accidents, read the following precautions before operating this equipment. Equipment should be operated only by those who are responsible and instructed to do so.

Carefully review the procedures given in this manual with all operators. It is important that all operators be familiar with and follow safety precautions.

1. **Always disengage the PTO, lock the tractor brakes, and shut off the tractor engine before:**
   - **Leaving the tractor seat.**
   - **Lubricating.**
   - **Cleaning or unplugging any part of the machine.**
   - **Adjusting the machine.**
2. **Always lower the header to the ground or engage the transport stops when parking.**
3. **Always use the header transport stops and spring-loaded tongue safety lock when transporting the machine.**
4. **Never work under a raised header unless it is securely locked with the header transport stops.**
5. **Always block the wheels before working on or under the machine.**
6. **Do not start the machine until you know that everyone is clear of the machine and have made sure no tools are lying on it.**
7. **Keep all shields in place. Never work around the machine in loose clothing that could catch in a moving part.**
8. **Do not modify any shields or operate the machine with any shields removed.**
9. **Always use adequate lights and safety warning devices when transporting the machine on public roads or after dark. Check with your local law enforcement agencies for specific requirements.**
10. **Limit towing speeds to 40 km/hr (25 MPH) maximum.**
11. **Never stand behind the mower-conditioner while it is running.**
12. **Operate the machine only at the PTO speed for which it is designed. Attach a 540 RPM implement only to a 540 RPM PTO and a 1000 RPM implement to a 1000 RPM PTO.**
13. **Long exposure to loud noise can damage your hearing. Wear a suitable hearing protection device such as earmuffs or ear plugs if you are exposed to uncomfortable noise levels.**
14. **Be sure no one is standing near or touching the machine before raising or lowering the header.**
15. **Use of the optional safety chain is recommended when operating on a public road.**

GENERAL INFORMATION

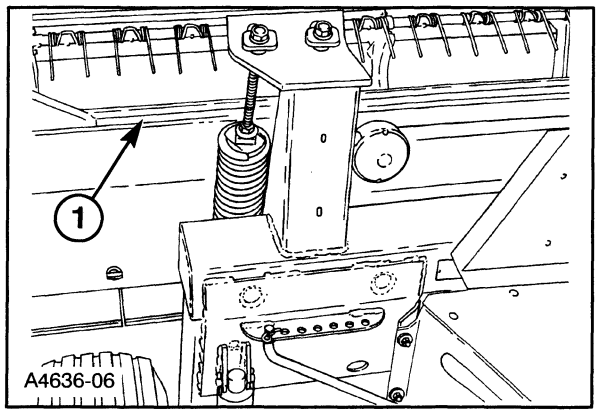
This manual describes the disassembly, repair, and reassembly procedures for all 2200 and 2300 Series headers. These headers are designed to attach to the Model 1475 pivot tongue frame, 2300BF Bidirectional TV140 tractor adapter frame, and 2450, 2550, HW300, HW320, and HW340 windrowers.

NOTE: *The Model 2212 and 2322 headers are not designed to attach to the 1475 Pivot Tongue Mower Conditioner or the HW340 windrower.*

On this equipment, left and right are determined by standing behind the unit, looking in the direction of travel.

SERIAL NUMBERS

The 2200 and 2300 Series header serial number is located at 1 on the left hand top beam. Give your dealer the model and serial number of your header when ordering parts. Always order genuine factory parts from your authorized dealer.



1

LUBRICATION

Adequate lubrication and maintenance on a regular schedule is vital to maintaining your equipment. To ensure long service and efficient operation, follow the lubrication and maintenance schedules outlined in this manual. The use of proper fuels, oils, grease and filters, as well as keeping the systems clean, will also extend machine and component life.

IMPORTANT: *Always use genuine* ***New Holland*** *replacement parts, oils and filters to ensure proper operation, filtration of engine and hydraulic systems. See your* ***New Holland*** *dealer for additional oil quantities.*

RECOMMENDED LUBRICANTS AND COOLANTS

Lubricant	Location Used	Type and Description	Part Number	Quart or Liter	Gallon or Tube
Oil	Engine and Pivot Points without Grease Fittings, Chains	SAE 30 API CF-2SJ	9613286	1Qt.	
		SAE 30 API CF-2SJ	9613289		2.5 Gal.
		SAE 30 API CF-2SJ	9613366*	4 L	
		5W-30 API SG/CD	9673589DS	1 Qt.	
		5W-30 API SG/CD	9624590*	4 L	
		10W-30 API SG/CD	9613313	1 Qt.	
		10W-30 API SG/CD	9613314		2.5 Gal.
		10W-30 API SG/CD	9673508DS		5 Gal.
		10W-30 API SG/CD	9613358*	1 L	
		10W-30 API SG/CD	9613359*	4 L	
		15W-40 API CF-4	9613290	1 Qt.	
		15W-40 API CF-4	9673730DS		1 Gal.
		15W-40 API CF-4	9613303		2.5 Gal.
		15W-40 API CF-4	9613292		5 Gal.
		15W-40 API CF-4	9613350*	1 L	
		15W-40 API CF-4	9613351*	4 L	
Coolant	Engine	ESE-M97B18-D, Ethylene Glycol New Holland Spec. Coolant Concentrate	FGCC2701DS		1 Gal.
		Propylene Glycol Concentrate	FGCC2711DS		1 Gal.
Hydraulic Oil	Hydraulic System, Hydrostatic System Front Axle Oil	134D – ESN-M2C134-D New Holland Spec. Hydraulic oil	9624450		2.5 Gal.
		134D – ESN-M2C134-D	9624451		5 Gal.
		134D – ESN-M2C134-D	9613367*	4 L	
		134D – ESN-M2C134-D	9624785*	10 L	
Hydraulic Oil	Optional, Multi-Seasonal Use, Recommended for Low Temperatures	F200	86523625DS	1 Qt.	
		F200	86523626DS		5 Gal.
		F200	86509446*	20 L	
Gear Oil	Gearboxes	80W90 EP Gear Oil API GL5	9613295	1 Qt.	
		80W90 EP Gear Oil API GL5	9613294		2.5 Gal.
		80W90 EP Gear Oil API GL5	9613375*	5 L	
		85W140 EP Gear Oil API GL5	9613297	1 Qt.	
		85W140 EP Gear Oil API GL5	9613296		2.5 Gal.
		85W140 EP Gear Oil API GL5	9613376*	4 L	
Grease	All Grease Fittings	Lithium base EP high temperature	9861804DS		Tube
		Lithium base EP high temperature	9861804CDS*		Tube
Brake Fluid		Mineral Based Oil	1QM6C34A or 86541699DS	1 Qt.	

* ***NOTE:*** *Canada Part Numbers ONLY.*

RECOMMENDED SEALANTS

SEALANTS

Description	Part Number	Typical Applications	Strength	Color
Thread Lock	L22200 (222) L24231 (242) L29000 (290) L26231 (262)	Small screws/hardware Small screws/hardware Wicking Type Nuts & Bolts	Low Medium Medium High	Purple Blue Green Red
Thread Sealant	L54531 (545) L56531 (565) L56747 (567)	Hydraulic/Pneumatic Pipe Sealant Pipe Sealant	Non-fouling Controlled strength High Temperature	
Silicones	L81724 (3.5 oz. tube) L58775 (10.2 oz. cartridge) L82180 (3.35 oz. tube) L59875 (10.2 oz. cartridge)	Ultra Blue RTV Gasket Ultra Blue RTV Gasket Ultra Blue RTV Gasket Ultra Blue RTV Gasket	Non-corrosive Non-corrosive Non-corrosive Non-corrosive	Blue Blue Black Black
518 Gasket Eliminator	L51831DS	Mating machined surfaces	Flexible	Red

HARDWARE TORQUE VALUES

Check the tightness of hardware periodically.

Use the following charts to determine the correct torque when checking, adjusting or replacing hardware on the tractor.

IMPORTANT: *DO NOT use the values listed in the charts if a different torque value or tightening procedure is specified in this manual for a specific application. Torque values listed are for general use only.*

Install a lock washer on all bolts unless a locknut or jam nut is specified.

Install a flat washer at all slotted holes unless a carriage bolt or flanged head bolt is specified.

Make sure fastener threads are clean and not damaged.

NOTE: *A torque wrench is necessary to properly torque hardware.*

MINIMUM HARDWARE TIGHTENING TORQUES

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

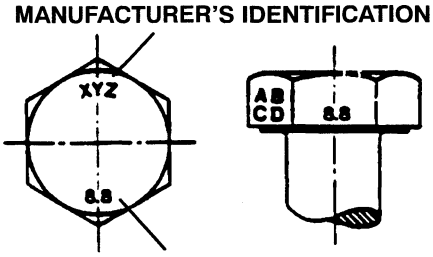
METRIC HARDWARE AND LOCKNUTS

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

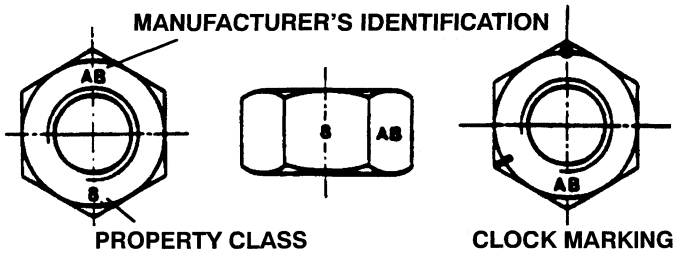
NOTE: Torque values shown with * are inch pounds.

IDENTIFICATION

HEX CAP SCREW AND CARRIAGE BOLTS
CLASSES 5.6 AND UP



HEX NUTS AND LOCKNUTS
CLASSES 05 AND UP



MINIMUM HARDWARE TIGHTENING TORQUES

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

INCH HARDWARE AND LOCKNUTS

NOMINAL SIZE	SAE GRADE 2		SAE GRADE 5		SAE GRADE 8		LOCKNUTS		NOMINAL SIZE
	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	GR.B w/GR5 BOLT	GR.C w/GR8 BOLT	
1/4	55* (6.2)	72* (8.1)	86* (9.7)	112* (13)	121* (14)	157* (18)	61* (6.9)	86* (9.8)	1/4
5/16	115* (13)	149* (17)	178* (20)	229* (26)	250* (28)	324* (37)	125* (14)	176* (20)	5/16
3/8	17 (23)	22 (30)	26 (35)	34 (46)	37 (50)	48 (65)	19 (26)	26 (35)	3/8
7/16	27 (37)	35 (47)	42 (57)	54 (73)	59 (80)	77 (104)	30 (41)	42 (57)	7/16
1/2	42 (57)	54 (73)	64 (87)	83 (113)	91 (123)	117 (159)	45 (61)	64 (88)	1/2
9/16	60 (81)	77 (104)	92 (125)	120 (163)	130 (176)	169 (229)	65 (88)	92 (125)	9/16
5/8	83 (112)	107 (145)	128 (174)	165 (224)	180 (244)	233 (316)	90 (122)	127 (172)	5/8
3/4	146 (198)	189 (256)	226 (306)	293 (397)	319 (432)	413 (560)	160 (217)	226 (306)	3/4
7/8	142 (193)	183 (248)	365 (495)	473 (641)	515 (698)	667 (904)	258 (350)	364 (494)	7/8
1	213 (289)	275 (373)	547 (742)	708 (960)	773 (1048)	1000 (1356)	386 (523)	545 (739)	1

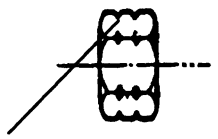
NOTE: Torque values shown with * are inch pounds.

IDENTIFICATION
CAP SCREWS AND CARRIAGE BOLTS

SAE GRADE 2 | SAE GRADE 5 | SAE GRADE 8

REGULAR NUTS | SAE GRADE 5 HEX NUTS | SAE GRADE 8 HEX NUTS

LOCKNUTS



GRADE IDENTIFICATION

GRADE A NO NOTCHES

GRADE B ONE CIRCUMFERENTIAL NOTCH

GRADE C TWO CIRCUMFERENTIAL NOTCHES

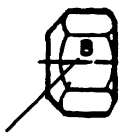
GRADE IDENTIFICATION

GRADE A NO MARKS

GRADE B THREE MARKS

GRADE C SIX MARKS

MARKS NEED NOT BE LOCATED AT CORNERS



GRADE A NO MARK
GRADE B LETTER B
GRADE C LETTER C

GRADE IDENTIFICATION

ECOLOGY AND THE ENVIRONMENT

Soil, air, and water are vital factors of agriculture and life in general. When legislation does not yet rule the treatment of some of the substances which are required by advanced technology, common sense should govern the use and disposal of products of a chemical and petrochemical nature.

The following are recommendations which may be of assistance:

- Become acquainted with and ensure that you understand the relative legislation applicable to your country.
- Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, antifreeze, cleaning agents, etc., with regard to their effect on man and nature and how to safely store, use and dispose of these substances. Agricultural consultants will, in many cases, be able to help you as well.

HELPFUL HINTS

1. Avoid filling tanks using cans or inappropriate pressurized fuel delivery systems which may cause considerable spillage.
2. In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of them contain substances which may be harmful to your health.
3. Modern oils contain additives. Do not burn contaminated fuels and or waste oils in ordinary heating systems.
4. Avoid spillage when draining off used engine coolant mixtures, engine, gearbox and hydraulic oils, brake fluids, etc. Do not mix drained brake fluids or fuels with lubricants. Store them safely until they can be disposed of in a proper way to comply with local legislation and available resources.
5. Modern coolant mixtures, i.e. antifreeze and other additives, should be replaced every two years. They should not be allowed to get into the soil but should be collected and disposed of safely.
6. Do not open the air-conditioning system yourself. It contains gases which should not be released into the atmosphere. Your dealer or air conditioning specialist has a special extractor for this purpose and will have to recharge the system properly.
7. Repair and leaks or defects in the engine cooling or hydraulic system immediately.
8. Do not increase the pressure in a pressurized circuit as this may lead to a component failure.
9. Protect hoses during welding as penetrating weld splatter may burn a hole or weaken them, allowing the loss of oils, coolant, etc.

INTERNATIONAL SYMBOLS

As a guide to the operation of your tractor, various universal symbols have been utilized on the instruments, controls, switches, and fuse box. The symbols are shown below with an indication of their meaning.


Thermostart starting aid


Alternator charge


Fuel level


Automatic Fuel shut-off


Engine speed (rev/min x 100)


Hours recorded


Engine oil pressure


Engine coolant temperature


Coolant level


Tractor lights


Headlamp main beam


Headlamp dipped beam


Work lamps

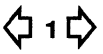

Stop lamps

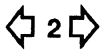

Horn


Radio

KAM Keep alive memory


Turn signals


Turn signals -one trailer


Turn signals -two trailers


Front wind-screen wash/wipe


Rear wind-screen wash/wipe


Heater temp-erature control


Heater fan


Air conditioner


Air filter blocked


Parking brake


Brake fluid level


Trailer brake


Roof beacon


Warning! Corrosive substance


P.T.O.

N Transmission in neutral


Creeper gears


Slow or low setting


Fast or high setting


Ground speed


Differential lock


Rear axle oil tem-perature


Transmission oil pressure


FWD engaged


FWD disengaged


Warning!


Hazard warning lights


Variable control


Pressurized! Open carefully


Position Control


Draft Control


Accessory socket


Implement socket


%age slip


Hitch raise (rear)


Hitch lower (rear)


Hitch height limit (rear)


Hitch height limit (front)


Hitch disabled


Hydraulic and transmission filters


Remote valve extend


Remote valve retract


Remote valve float


Malfunction! See Operator's Manual


Malfunction! (alternative symbol) See Operator's Manual

SECTION 58 - ATTACHMENTS / HEADERS

Chapter 1 - Cutter Bar

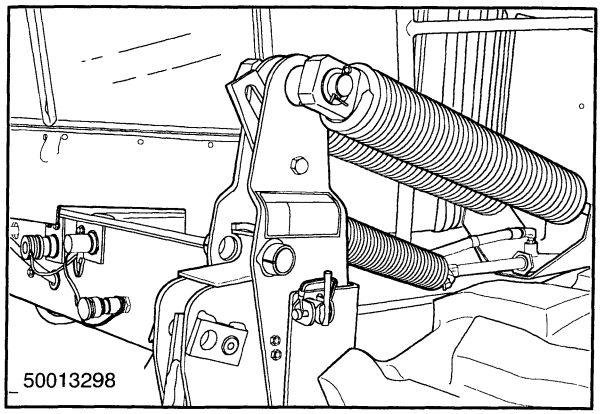
CONTENTS

⚠ DANGER ⚠

The header may fall rapidly if the hydraulic lift system should fail. Always engage the header lift locks when working around a raised header. Failure to use the lift locks may result in serious injury or death.

⚠ WARNING ⚠

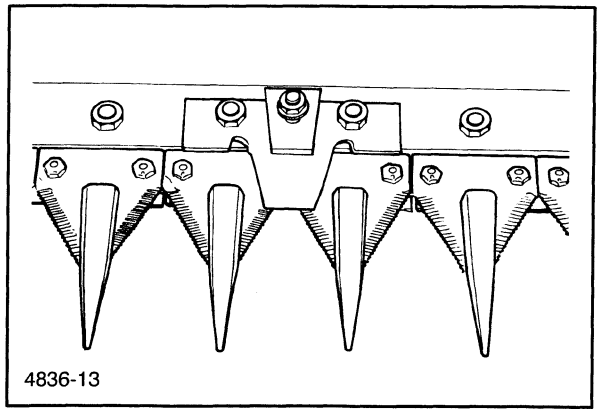
Always wear protective safety glasses when working on the cutter bar to protect your eyes from metal chips, chaff, or dirt.



1

The cutter bar is like a pair of shears. The cutting edges of the guards and knife sections must be sharp and close together for smooth, clean cutting.

NOTE: *Many mowing problems are caused by improper adjustment or poor maintenance of the cutter bar.*



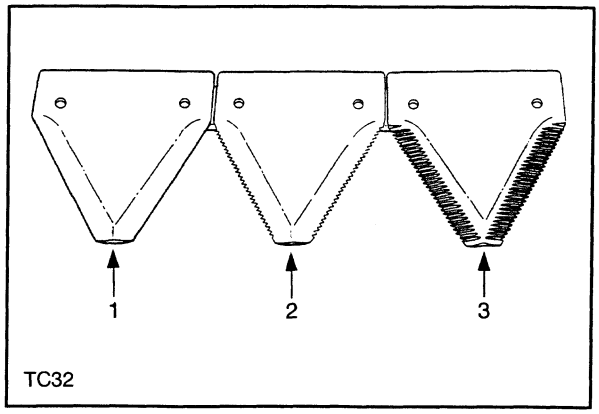
2

Overserrated sections, 3, stay sharp longer than smooth or underserrated sections and cause less wear to the cutting edges of the guards. Resharpening will remove the overserrations and is not recommended.

Underserrated sections, 2, can be resharpened, but do not stay sharp as long and may cause faster guard wear.

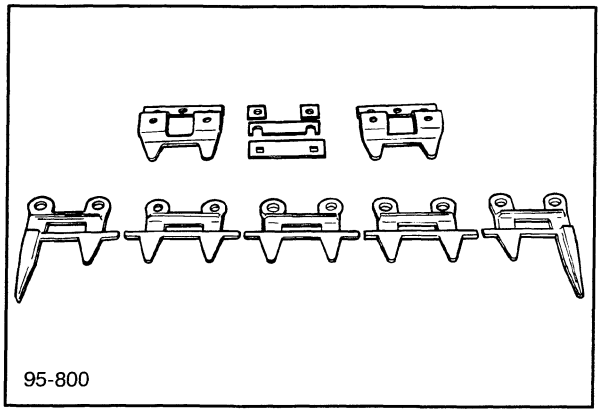
Smooth sections, 1, provide good cutting action in grass hay, but require frequent sharpening, good guards, and frequent knife hold-down clip adjustment.

Chrome knife sections may stay sharp longer but may be nicked by gravel or small stones very easily.



3

Stub guards reduce plugging at the cutter bar but require frequent alignment, good sharp knives, and closely adjusted knife clips. Stub guards do not protect the front of the knife sections from stone damage. They may also not leave as nice a looking stubble as a standard cutter bar.



4

KNIFE ASSEMBLY REMOVAL

⚠ WARNING ⚠

When removing or installing a knife assembly, do not hold down the sections with fingers or any short object that could slip and result in loss of, or injury to, fingers.

⚠ WARNING ⚠

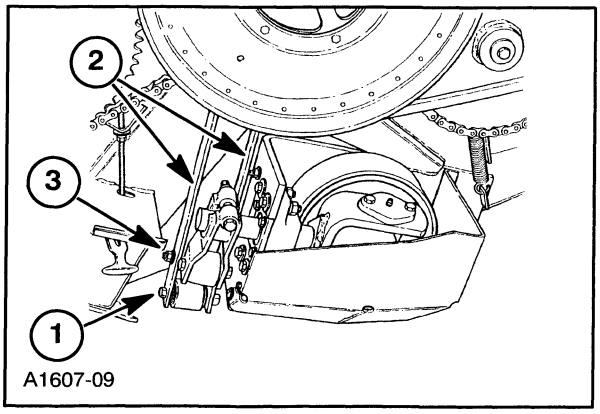
Be very careful when installing a knife assembly. Do not touch the sections if another person is installing the knife assembly. If the end of the knife does not line up with the opening in the guard, use a hammer or other tool to position it correctly.

Remove the knife head bolt, 1. The knife head bushings are tapered to fit countersunk holes in the rocker arms, 2.

Loosen the bolt, 3, that attaches the rocker arms to the connector assembly. Drop the knife head out of the rocker arms.

Pull the knife assembly out of the header. If the knife is hard to remove because the knives or guards are bent, loosen the guard bolts.

Remove the other knife assembly in the same manner.



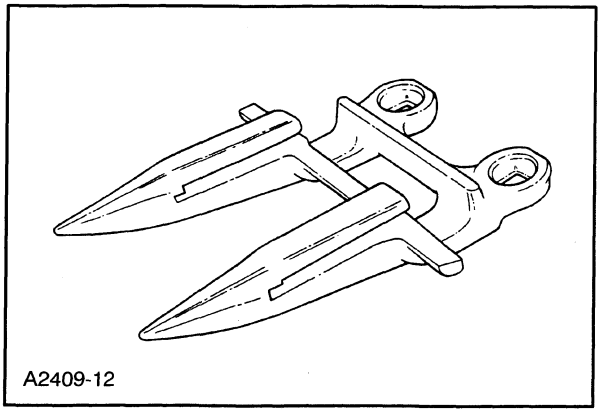
5

KNIFE ASSEMBLY INSTALLATION

Straighten the guards so that the ledger surfaces are lined up. This will allow easier installation of the knife assembly. A final guard straightening procedure will be done after the knife assembly is installed.

Straighten the knife assembly before it is installed.

Slide the knife assembly into the guards.



6

Install the knife head bolt with the head to the front. Do not tighten at this time.

IMPORTANT: *The knife head bolt, 1, both connector assembly bolts, 2, upper rocker arm bolt, 3, and drive link clamp bolt, 4, are all Grade 8 bolts. Be certain to install only Grade 8 bolts when repairing the sickle drive components.*

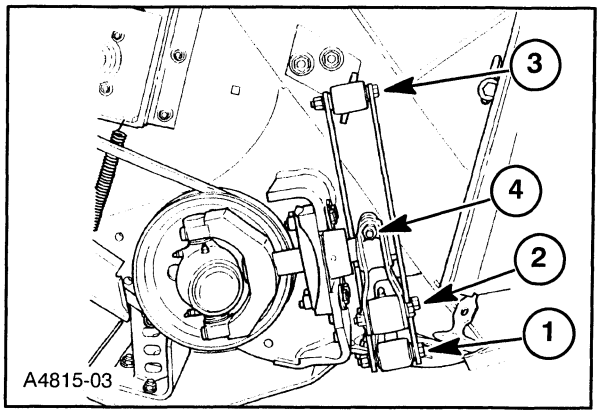
Using the sickle drive pulley on the right side of the header, position the sickle at the center of its stroke. Tighten all of the 1/2" Grade 8 bolts to 159 N·m (117 ft. lbs.).

IMPORTANT: *The rubber bushings in the knife head, connector assembly, and upper rocker arm mount will last much longer if the knife is moved to the center of its stroke before tightening their bolts.*

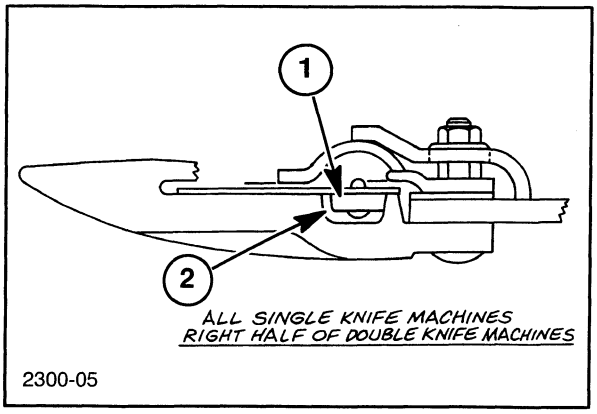
Check to be sure the knife back, 1, is centered, front to back, in the opening of the guard, 2. If the knife back is too far forward or back, or the outer section is too high or too low, refer to "Rocker Arm Adjustment" later in this section.

Align the guards. Refer to "Guard Alignment" later in this section.

Install the other knife assembly in the same manner.



7



8

GUARD INSTALLATION

The 2200 and 2300 Series headers use two counterstroking knives, which overlap by two sections in the center, to cut smoothly and efficiently. To prevent the knives from becoming damaged at the overlap, the cutter bar components must be properly shimmed so that the left knife assembly is slightly lower than the right knife assembly. When removing and installing guards and knife hold-down clips, ensure that shims are installed as follow:

Standard Guards With One Piece Hold-Down Clips

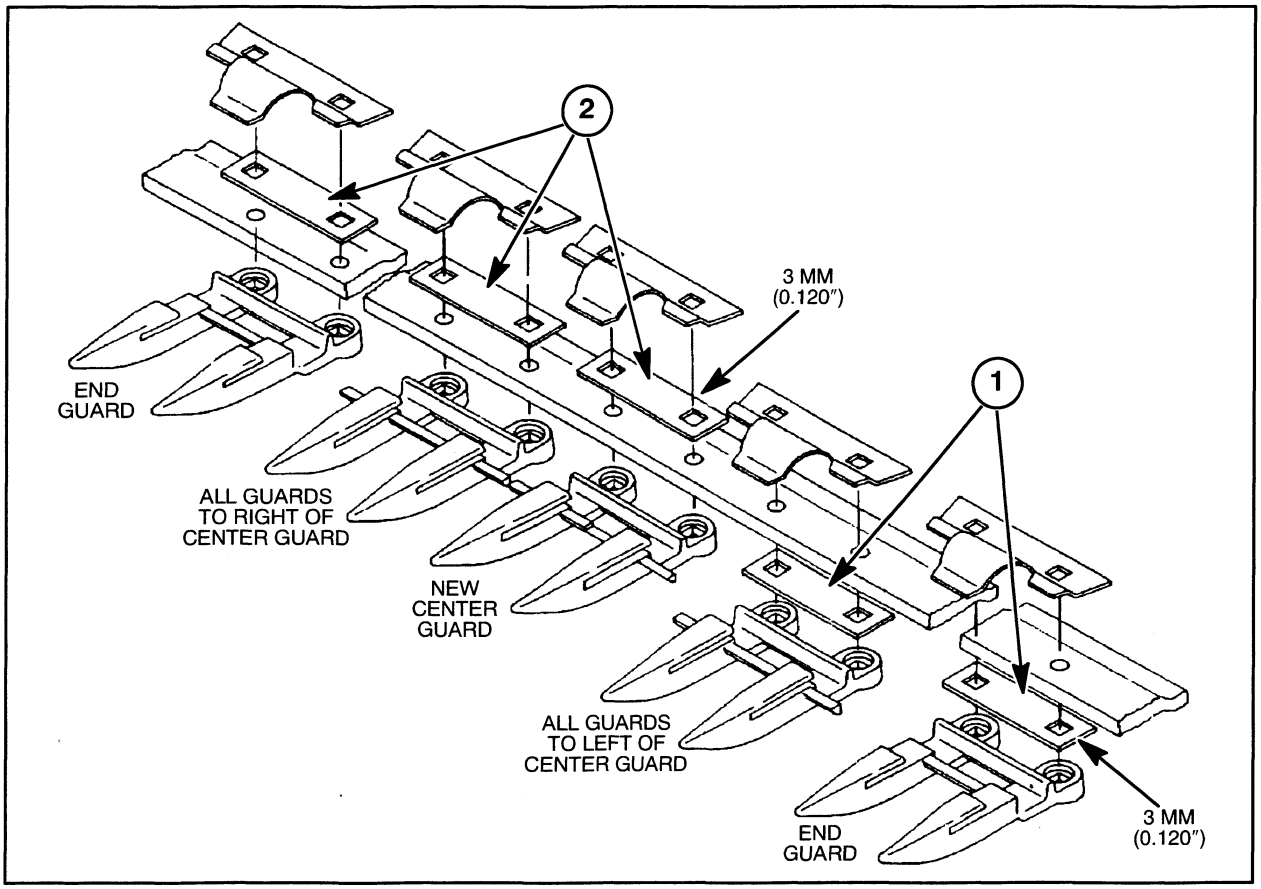
All guards to the left of the center guard

One 3 mm (0.120″) shim, 1, between guard and cutter bar frame.

Center guards and all guards to the right of center

One 3 mm (0.120″) shim, 2, between knife hold-down clip and cutter bar frame.

Between the knife clip and the cutter bar frame 0.25 mm (0.010″) shims may be installed, as required, to provide proper clearance to the knife assembly.



9

Standard Guards With Two Piece Adjustable Hold-Down Clips

All guards to the left of the center guard

One 3 mm (0.120″) shim, 1, between guard and cutter bar frame.

One 1.5 mm (0.060″) shim, 2, between knife hold-down clip and cutter bar frame.

Center guard

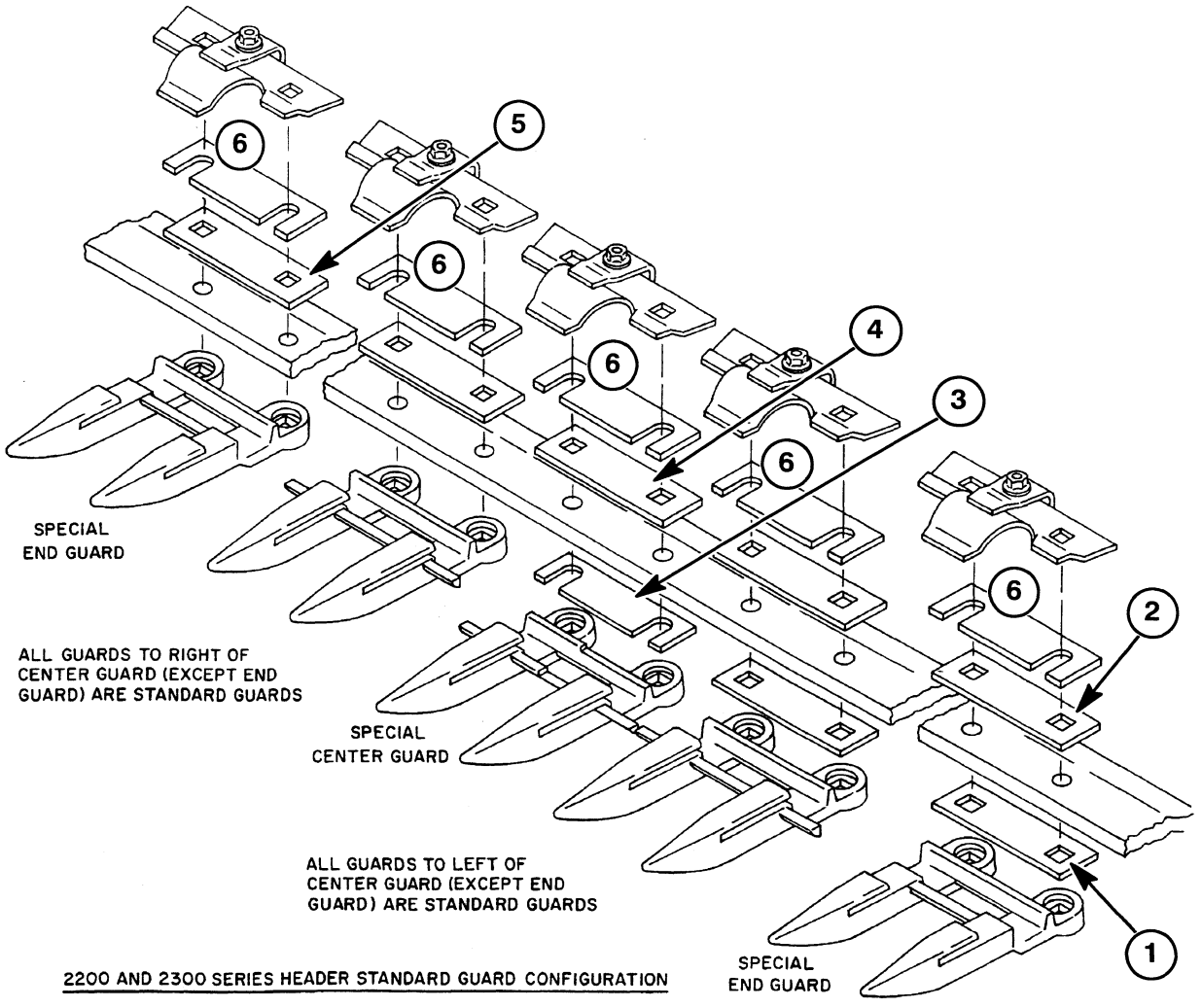
Between guard and cutter bar frame 0.25 mm (0.010″) shims, 3, may be installed as required, to provide correct alignment to the left side guards.

One 4.8 mm (0.188″) shim, 4, between the knife hold-down clip and the cutter bar frame.

All guards to the right of the center guard

One 4.8 mm (0.188″) shim, 5, between knife hold-down clip and cutter bar frame.

Between the knife hold-down clip and the cutter bar frame 0.25 mm (0.010″) shims, 6, may be installed as required, to provide proper clearance to the knife assembly.



2200 AND 2300 SERIES HEADER STANDARD GUARD CONFIGURATION

2300-01

10

Stub Guards

Center guard and all guards left of center

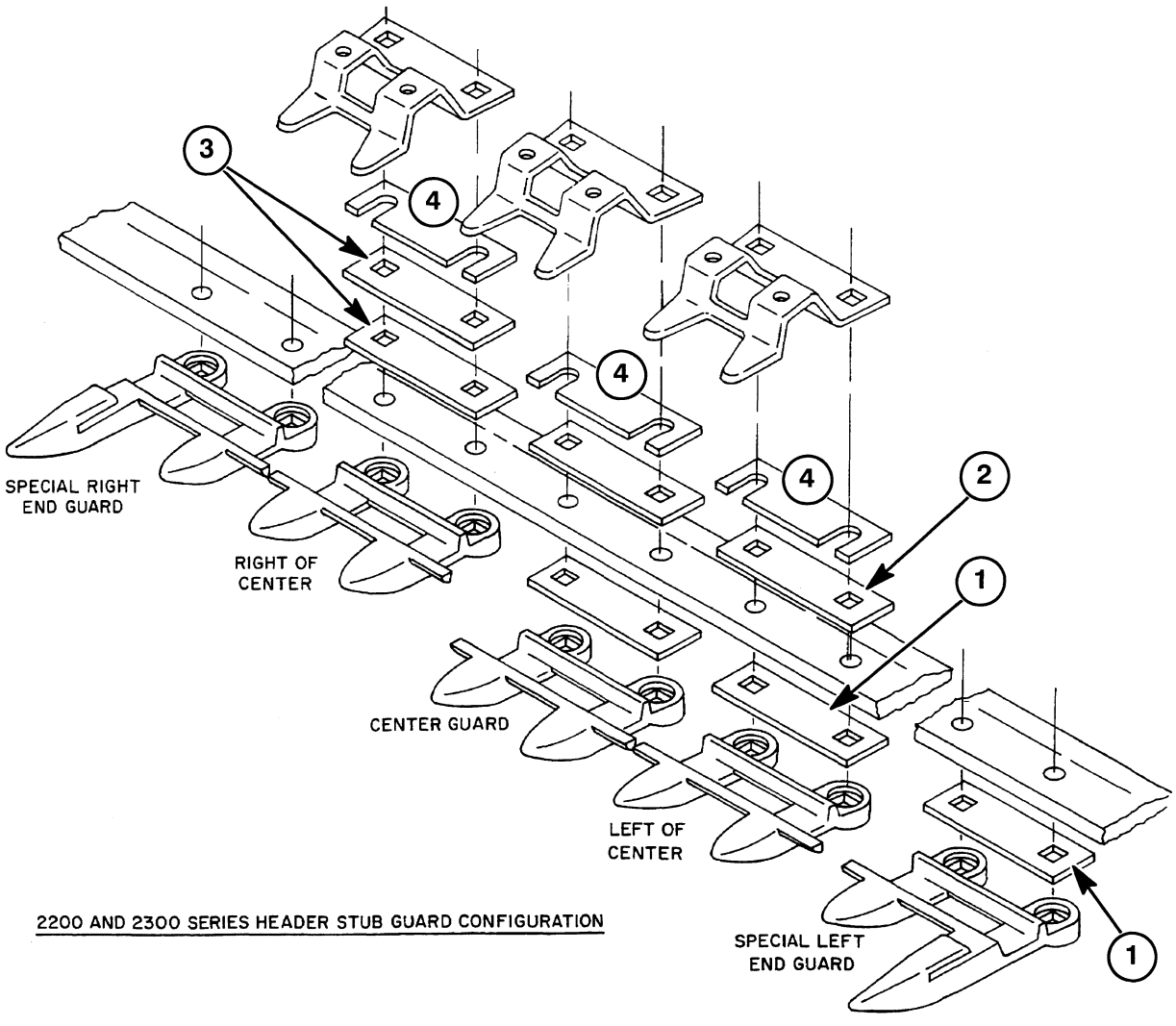
One 3 mm (0.120″) shim, 1, between guard and cutter bar frame.

One 3 mm (0.120″) shim, 2, between the knife hold-down clips and cutter bar frame.

All guards to the right of the center guard

Two 3 mm (0.120″) shims, 3, between the knife hold-down clip and cutter bar frame.

Additional shims, 4, of various thicknesses may be installed, as required, between each knife hold-down clip and cutter bar frame to provide the proper clearance to the knife assembly.



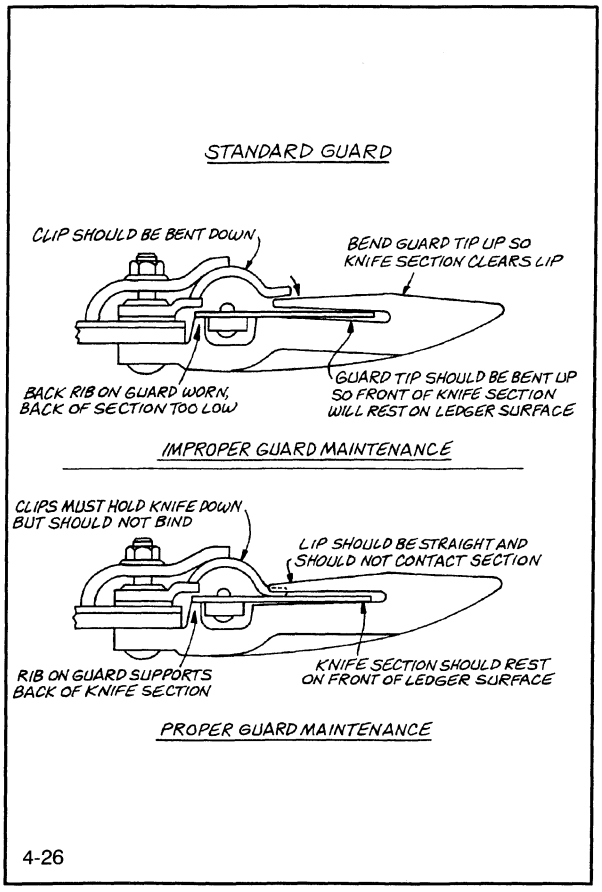
2200 AND 2300 SERIES HEADER STUB GUARD CONFIGURATION

2300-03

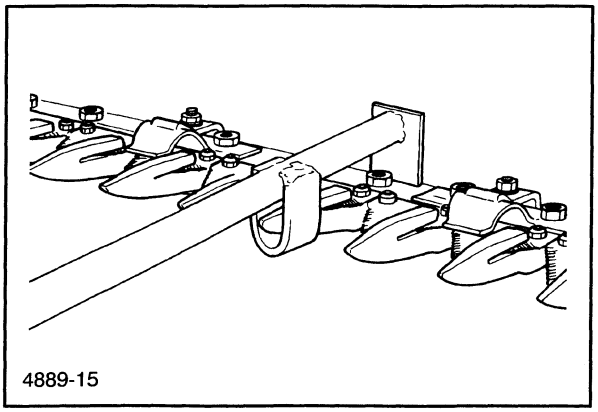
11

GUARD ALIGNMENT

Align the guards to a knife assembly that has been checked for straightness. A homemade guard straightening tool or a heavy hammer can be used to bend the guards up or down for alignment. If a hammer is used to bend the guards, be sure to hit the solid surface in front of the knife section to avoid breaking the lip. The points of the guard do not have to be in alignment as long as the ledger surfaces are in line and the knife assembly is straight. All knife sections must be within 0.07 - 0.7 mm (0.003 - 0.030") or the ledger surface of the guard.



12



13

KNIFE ASSEMBLY REPAIR

Replace cracked, broken, bent, or badly worn sections. If the front of a section is worn to a point, replace the section as the cutting edge will be too soft to stay sharp. Always clean the knife back so a new section will fit tight.

Install all knife sections with the bevel edge up, except the last section, 1, on the left sickle assembly. This "Tomahawk" section is installed with the bevel side down.

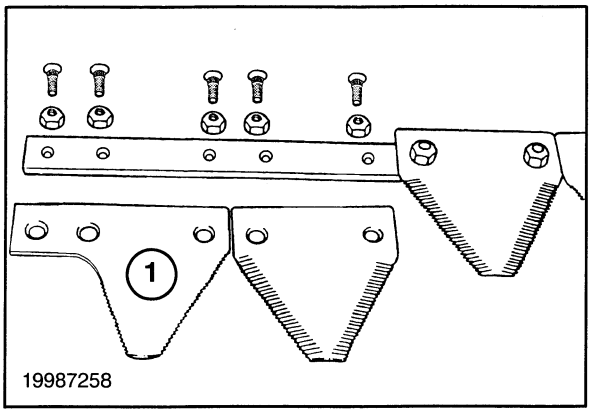
Knife assemblies meet and overlap at the center of the header. To prevent interference, the top of the left knife assembly and the bottom of the right assembly must be smooth at this location. Two special sections on the right knife have holes countersunk on the bottom and attach with special taper-head bolts. The two special sections on the left knife have holes countersunk on the top and also attach with taper-head bolts.

Grade 8, slotted, round-head Easy Bolts (TM) with serrated shanks are used in the other sections. Different lengths of bolts are used where the knife head and extension, 1, are attached.

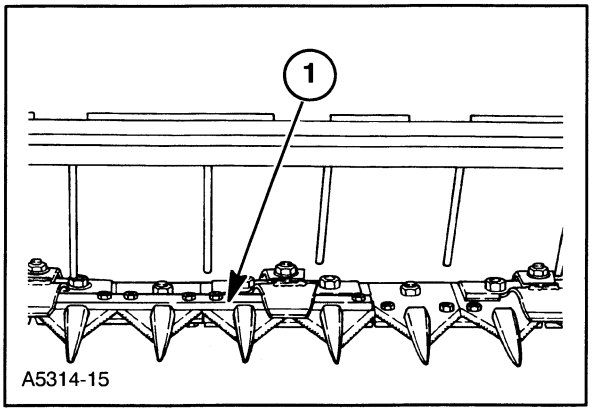
IMPORTANT: *If the locknut and wrench are used to install these bolts, the threads will strip before the bolts are fully seated. Use a hammer, vise, press, or special tool to seat the bolts. Remove the knife if many bolts have to be installed.*

Use a hammer or other device to drive the serrations into the knife back. Support the knife back on a block or plate with a hole. The serrations prevent the bolt from turning. If the bolts are not damaged, it is not necessary to replace them.

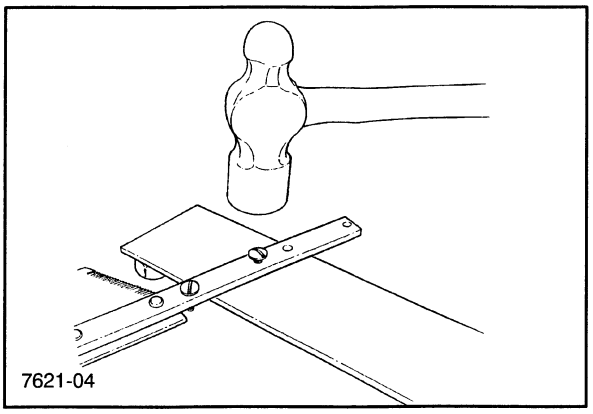
IMPORTANT: *Torque all knife bolts to 8 - 11 N·m (70 - 100 in. lbs.).*



14



15



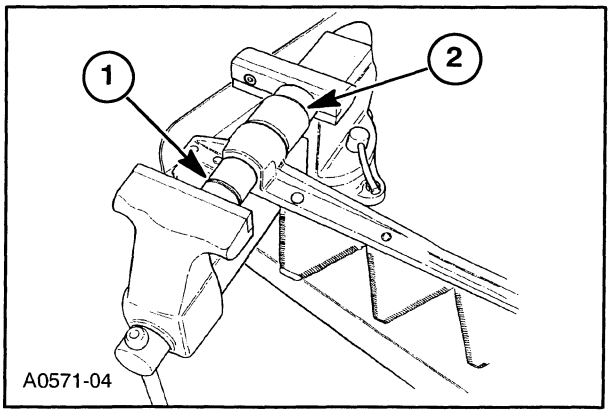
16

KNIFE HEAD BUSHING

Replace the knife head bushing if the rubber is loose or charred from heat.

Use a vise or press to remove the knife head bushing. Press against the outer shell of the bushing with a 32 mm (1-1/4″), outside diameter socket, 1, (a 15/16″ socket is about the right size). Press the socket and knife head against a 2″ long 1-1/4″ pipe nipple, 2.

When installing the new bushing, press against the outer sleeve, not the inner sleeve. Press the bushing in until the inner sleeve is centered from side to side.



17

KNIFE TIMING

Both knives must reach the inner end of their stroke at the same time, or poor cutting and header vibration will result. The timing is correct if all the keyways in the sickle drive cross shaft, under the header, are lined up. At each end of the cross shaft there is a coupler which connects the cross shaft to the wobble shafts. The keys within these couplers must also be aligned.

KNIFE REGISTER

When the knife register is correct, the knife sections will move the same distance to the left and right of the guard center line. Cutting will be the same on each side of the section.

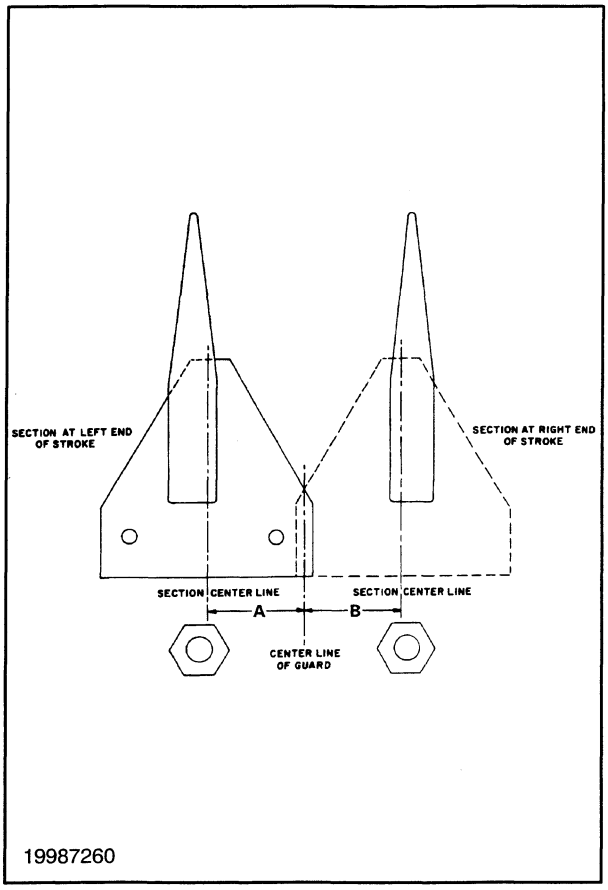
NOTE: *Knife stroke is 76.2 mm (2.75 in.). The sections will not be centered behind the point of the guard at the end of the knife stroke. When distances A and B are equal, the register is correct (see "Checking Knife Register" next).*

Checking Knife Register

The knife register should be checked and adjusted whenever installing a new or rebuilt sickle assembly, or when installing any new wobble component. Follow these steps:

1. Rotate the wobble flywheel so the knife assembly is at either end of the stroke.
2. Mark the center line of one section on both the left and right sickle assembly.
3. Measure the distance, A, from the section center line to the guard center line.
4. Turn the knife to the other end of the stroke.
5. Measure the distance, B, from the section center line to the guard center line.

The register is correct if distances A and B are the same.

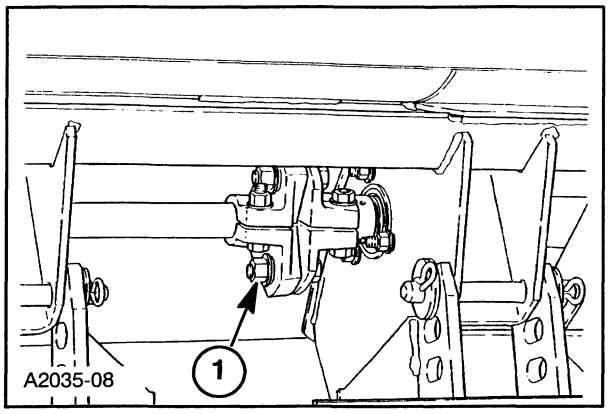


18

Adjusting Knife Register

To adjust knife register:

1. The three bolts, 1, that connect the wobble shaft to the cross shaft should not be installed at this time.



19

2. Loosen the four bolts, 1.

IMPORTANT: *Some headers may have a fifth bolt, 2, which must also be loosened to allow steady rest housing movement.*

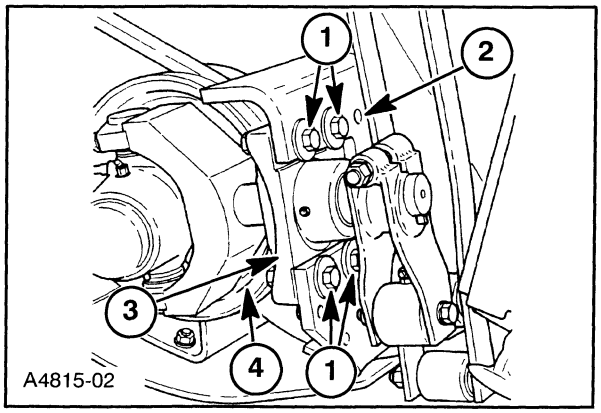
3. Move the steady rest bearing housing, 3, and wobble shaft, 4, left or right. Tighten all four bolts evenly to 115 N·m (85 ft. lbs.).

IMPORTANT: *Do not lose or misplace any shims installed between the steady rest housing and mount.*

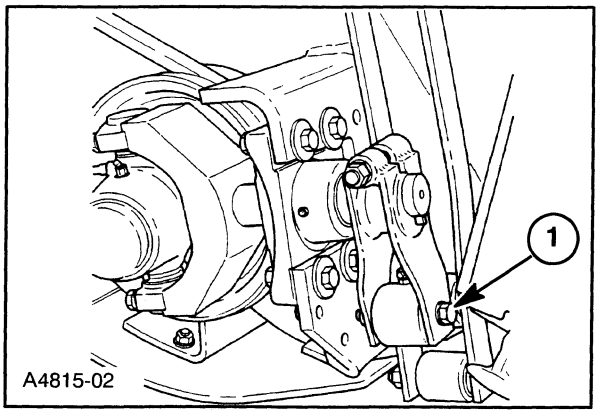
4. Turn the wobble through one revolution to recheck the measurements and be sure there is no interference.

IMPORTANT: *The following steps must be performed to ensure that the yoke shaft is parallel to the header side sheet. If the yoke shaft is not parallel to the side sheet, premature steady rest bearing failure could occur.*

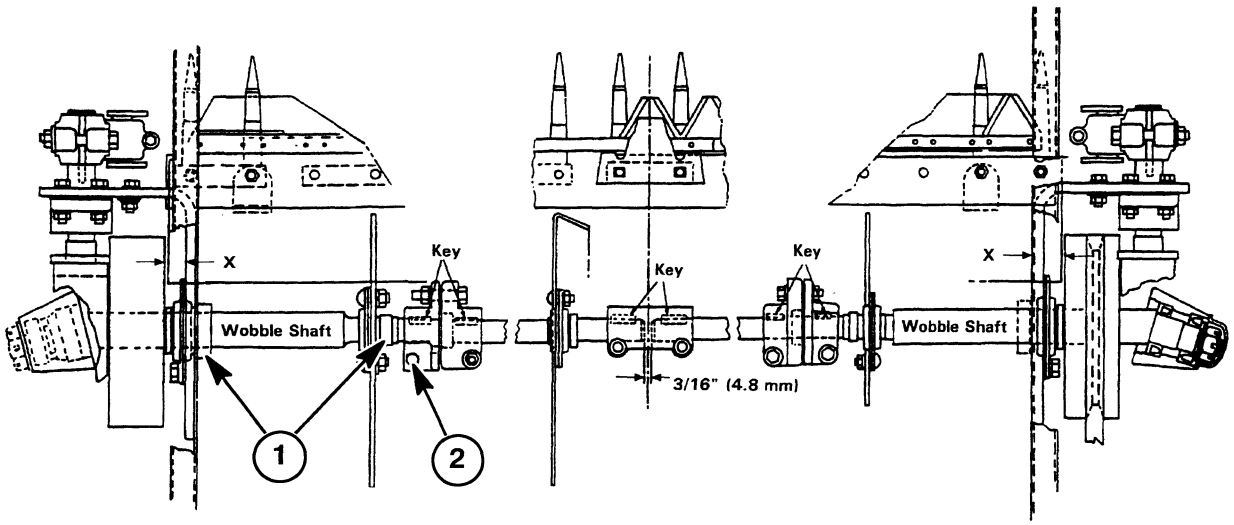
5. Remove the bolt, 1, that attaches the drive link to the connector link assembly.
6. Loosen or remove the sickle drive belt from the drive pulley (if checking the right-hand wobble assembly).



20



21

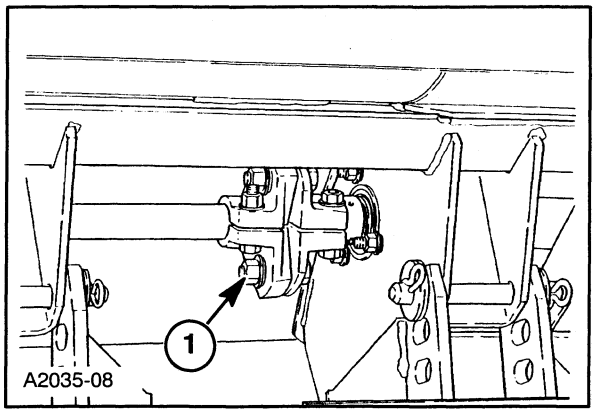


The X dimension is 27 mm (1-1/16") on 2200 Series headers, 23.83 mm (15/16") on 2300 Series headers.

19987259

22

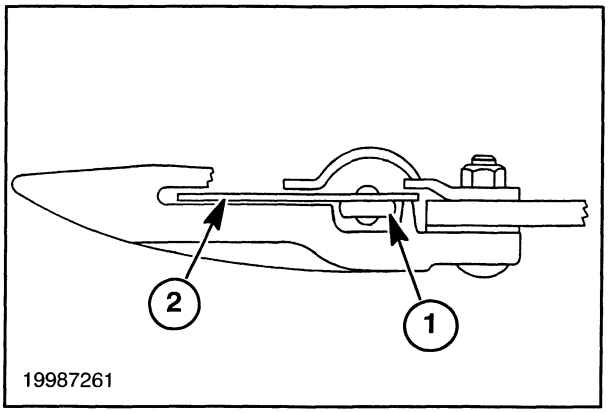
7. Rotate the wobble drive to determine if there is any binding of the wobble assembly. If there is binding, loosen the bearing lock collars, 1, and clamp bolt, 2, of the shaft coupler.
8. Position the wobble shaft in or out to align the yoke shaft parallel to the side sheet until there is no binding of the wobble assembly.
9. Tighten the bearing lock collars and clamp bolt.
10. Reinstall the knife drive bolts, 1. Torque to 159 N·m (117 ft. lbs.).
11. Reinstall the sickle drive belt.



23

ROCKER ARM ADJUSTMENT

The knife back, 1, must be centered from front to back in the guard opening. The outer knife section, 2, must be 0.07 - 0.7 mm (0.003 - 0.03″) above the ledger surface of the guard.



24

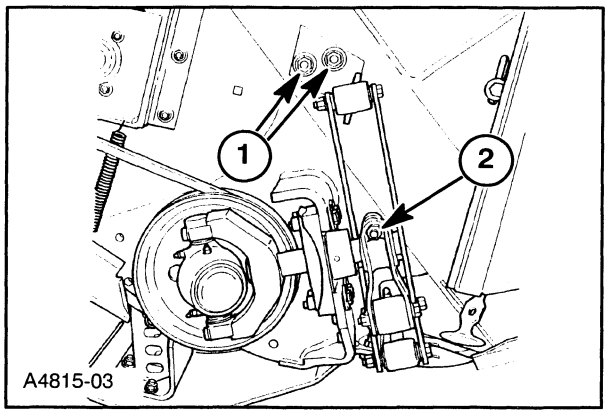
Loosen the bolts, 1, of the rocker arm mount and clamp bolt, 2, of the drive link.

Move the rocker arm mount and drive link forward or back to center the knife back in the guard.

Move the rocker arm support up or down to adjust the clearance between the knife and ledger surface. If more adjustment is needed, lengthen the slots of the rocker arm mount.

Tighten bolts 1 and 2.

Adjust the other sickle drive the same way.



25

LABOR GUIDE

DESCRIPTION OF OPERATION	TIME IN HOURS
SICKLE AND SICKLE DRIVE - SECTION 58 - CHAPTER 1 and 2	
Drive belt - Remove and replace (includes adjust)	1.0
Drive pulley - Remove and replace	0.5
Belt tightener - Remove and replace	0.3
Wobble assembly - Remove and replace (includes shields, belts, drop arm and bearing removal and replacement)	
Right side	2.0
Left side	1.8
Wobble assembly - Overhaul	2.0
Wobble yoke shaft - Remove and replace (includes trunnion and shaft bearing removal and replacement and adjust)	1.0
Wobble hub - Remove and replace	1.0
Connector link - Remove and replace	0.3
Connector link - Overhaul	0.5
Knife assembly - Remove and replace (each)	0.3
Sickle cross shaft - Remove and replace (includes bearing removal and replacement)	1.5
Sickle cross shaft coupler - Remove and replace (each)	1.0

SECTION 58 - ATTACHMENTS / HEADERS

Chapter 2 - Cutter Bar Drive / Wobble Drive / Wobble Drive Belt

CONTENTS

The wobble drive that is currently found on the 2300 Series auger headers has seen quite a few changes since the launch of the 2200 Series headers in 1993.

1993 LAUNCH OF 2200 SERIES HEADERS

1994 PRODUCTION CHANGES

- Swing arm straps material change and heat-treated.

	Old Part #	New Part #
Right	781166	86509170
Left	781167	86509171

- Steady rest housing mounting plate machining changed to reduce stress.
- Mount repair kit #86511467 was released to repair cracked mounts.
- Additional bearing support added to sickle drive shaft on 14, 16, and 18 ft. headers to minimize yoke clamp bolt loosening. Kit #86511559 released for use on 1993 production headers.

1995 PRODUCTION CHANGES

- Yoke shaft trunnion bearing bore tolerances tightened to minimize bearing cups spinning.

	Old Part #	New Part #
Yoke WA	9827713	86516186

- Wobble drive kits using the new yoke shaft released for service parts.

LH	#86518634
RH	#86518635

1996 PRODUCTION CHANGES (BLACK "HAYBINE" DECALS)

- Wobble drive speed slowed down 6% to 900 - 925 RPM (1800 - 1850 SPM)

Sheave	#86520329

- Heavier flangettes used on inner wobble shaft bearing. A third flangette used as backup for bolts on other side of mount.

	Old Part #	New Part #
Flangette	182937	269491

1997 LAUNCH OF 2300 SERIES HEADER

- New heavy duty wobble drive
  - Needle bearings in trunnions and steady rest assembly
  - Steady rest housing utilizes spherical spacer to eliminate need for shimming
  - Larger inner wobble shaft bearing
  - Heavier/larger yoke shaft
  - Rounded keyways in wobble shaft to eliminate stress point
  - Wobble hub is steel casting and has bearings spread further apart for more load capacity
  - Steady rest mounting plate thicker (15.875 mm; 5/8 in.); larger; ties header channel brace to cutterbar
- Heavy Duty Wobble Drive Kit #86531254 released for 2200 series headers

1998 PRODUCTION CHANGES

- Spring-loaded lip seal added to steady rest housing, felt washer dust seals and retainers added to yoke shaft on both sides of steady rest housing, and O rings added to trunnion assemblies to reduce dirt entering bearings.

	Old Part #	New Part #
Seal	59628	86552316
Felt Washer	N/A	86551944
Collar	N/A	86553182
Washer, special	N/A	86554045
O ring	N/A	134375

Model	Date	Serial #
2322	Oct '97	598143
2324	Aug '97	605266
2326	Aug '97	609837
2328	Sept '97	606133

- Wobble Drive Seal Kit #86553418 released for all previous 2300 Series auger headers and 2200 Series headers with the heavy duty wobble drive installed. Seal kit parts were added to kit #86531254.