MacDon

D2 Series
Draper Header for M and M1 Self-Propelled Windrowers

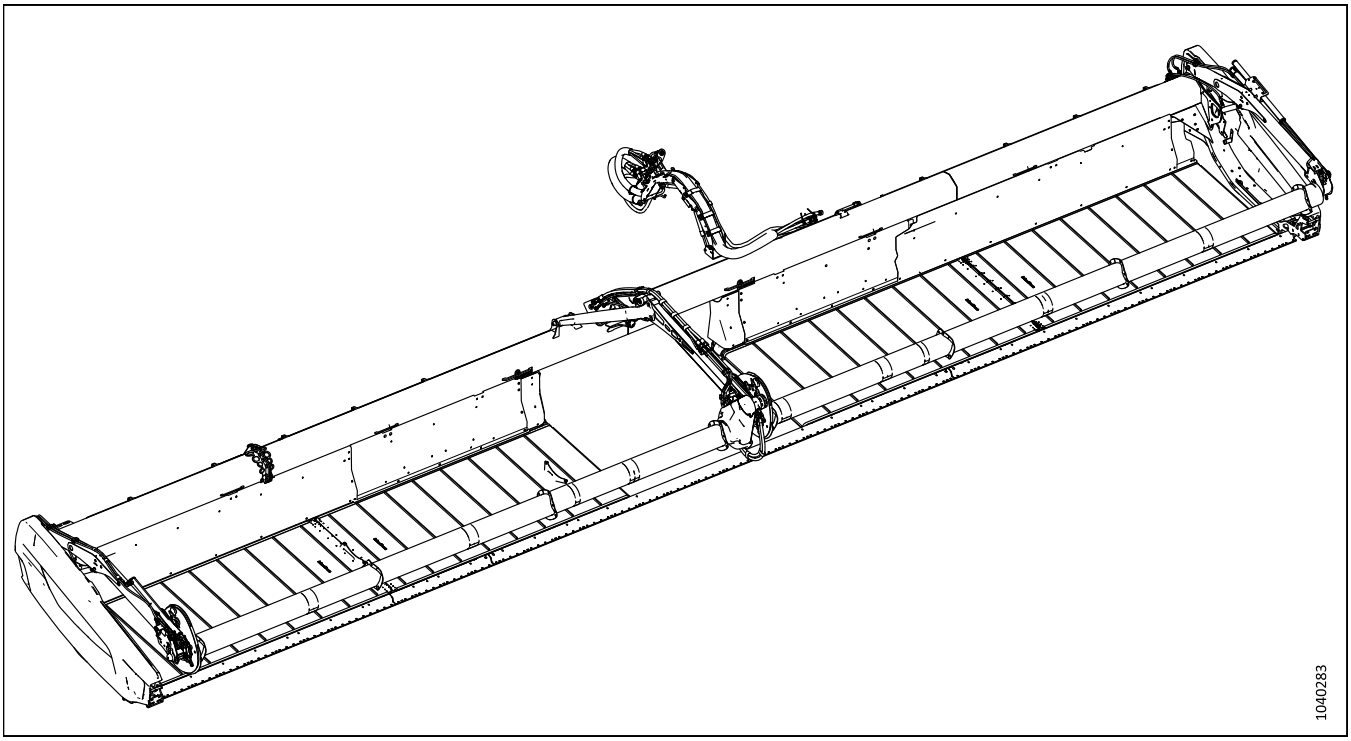
Unloading and Assembly Instructions (North America)

214510 Revision A

Original Instruction

The Harvesting Specialists.

D2 Series Draper Header For Windrowers



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Introduction

This instruction manual describes the unloading, setup, and predelivery requirements for the MacDon D2 Series Draper Header for windrower.

To ensure the best performance from this product and the safety of your customers, carefully follow the unload and assembly procedure from the beginning through to completion.

Some sections/steps do not apply to all header configurations and sizes. Refer to the instructions for your specific header.

Carefully read all the material provided before attempting to unload, assemble, or use the machine.

If the shipment is damaged or is missing parts, contact *shortageanddamage@macdon.com*.

Retain this instruction for future reference.

This document is currently available in English only.

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Chapter 1: Safety

Understanding and consistently following these safety procedures will help to ensure the safety of those operating the machine and of bystanders.

1.1 Safety Alert Symbols

The safety alert symbol indicates important safety messages in this manual and on safety signs on the machine.

This symbol means:

- **ATTENTION!**
- **BECOME ALERT!**
- **YOUR SAFETY IS INVOLVED!**

Carefully read and follow the safety message accompanying this symbol.

Why is safety important to you?

- Accidents disable and kill
- Accidents cost
- Accidents can be avoided

Figure 1.1: Safety Symbol

1.2 Signal Words

Three signal words, **DANGER**, **WARNING**, and **CAUTION**, are used to alert you to hazardous situations. Two signal words, **IMPORTANT** and **NOTE**, identify non-safety related information.

Signal words are selected using the following guidelines:

DANGER

Indicates an imminently hazardous situation that, if it is not prevented, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation that, if it is not prevented, could result in death or serious injury. It may also be used to alert you to unsafe practices.

CAUTION

Indicates a potentially hazardous situation that, if it is not prevented, may result in minor or moderate injury. It may also be used to alert you to unsafe practices.

IMPORTANT:

Indicates a situation that, if not prevented, could result in a malfunction or damage to the machine.

NOTE:

Provides additional information or advice.

1.3 General Safety

Operating, servicing, and assembling machinery presents several safety risks. These risks can be reduced or eliminated by following the relevant safety procedures and wearing the appropriate personal protective equipment.

CAUTION

The following general farm safety precautions should be part of your operating procedure for all types of machinery.

Wear all protective clothing and personal safety devices that could be necessary for the job at hand. Do **NOT** take chances. You may need the following:

- Hard hat
- Protective footwear with slip-resistant soles
- Protective glasses or goggles
- Heavy gloves
- Wet weather gear
- Respirator or filter mask

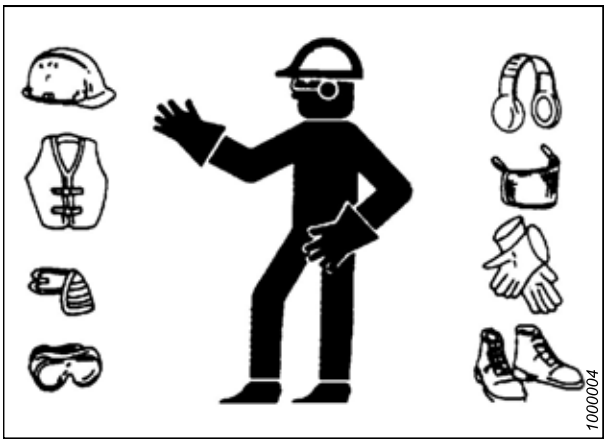


Figure 1.2: Safety Equipment

In addition, take the following precautions:

- Be aware that exposure to loud noises can cause hearing impairment. Wear suitable hearing protection devices such as earmuffs or earplugs to help protect against loud noises.

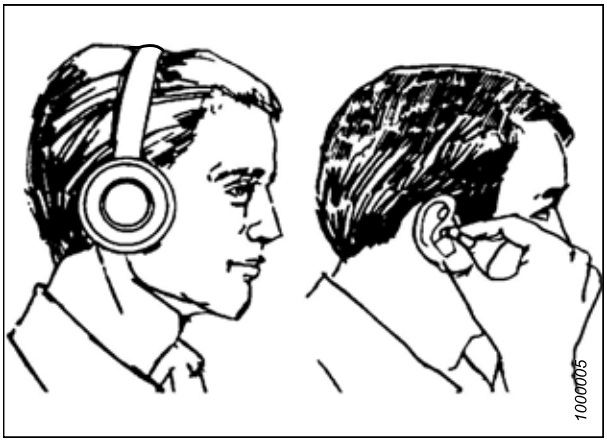


Figure 1.3: Safety Equipment

- Provide a first aid kit in case of emergencies.
- Keep a properly maintained fire extinguisher on the machine. Familiarize yourself with its use.
- Keep young children away from machinery at all times.
- Be aware that accidents often happen when Operators are fatigued or in a hurry. Take time to consider the safest way to accomplish a task. **NEVER** ignore the signs of fatigue.

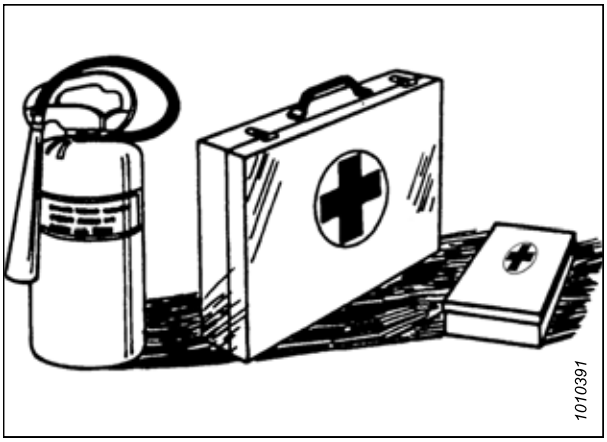


Figure 1.4: Safety Equipment

- Wear close-fitting clothing and cover long hair. **NEVER** wear dangling items such as hoodies, scarves, or bracelets.
- Keep all shields in place. **NEVER** alter or remove safety equipment. Ensure that the driveline guards can rotate independently of their shaft, and that they can telescope freely.
- Use only service and repair parts made or approved by the equipment manufacturer. Parts from other manufacturers may not meet the correct strength, design, or safety requirements.

Figure 1.5: Safety around Equipment

- Keep hands, feet, clothing, and hair away from moving parts. **NEVER** attempt to clear obstructions or objects from a machine while the engine is running.
- Do **NOT** modify the machine. Unauthorized modifications may impair the functionality and/or safety of the machine. It may also shorten the machine's service life.
- To avoid injury or death from the unexpected startup of the machine, **ALWAYS** stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

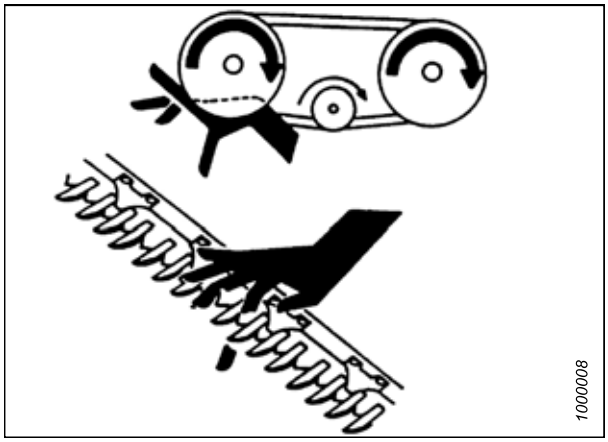


Figure 1.6: Safety around Equipment

- Keep the machine service area clean and dry. Wet and/or oily floors are slippery. Wet spots can be dangerous when working with electrical equipment. Ensure that all electrical outlets and tools are properly grounded.
- Keep the work area well-lit.
- Keep machinery clean. Straw and chaff on a hot engine are fire hazards. Do **NOT** allow oil or grease to accumulate on service platforms, ladders, or controls. Clean machines before they are stored.
- **NEVER** use gasoline, naphtha, or any volatile material for cleaning purposes. These materials may be toxic and/or flammable.
- When storing machinery, cover any sharp or extending components to prevent injury from accidental contact.

Figure 1.7: Safety around Equipment

1.4 Hydraulic Safety

Because hydraulic fluid is under extreme pressure, hydraulic fluid leaks can be very dangerous. The proper safety procedures must be followed when inspecting for hydraulic fluid leaks and servicing hydraulic equipment.

- Always place all hydraulic controls in Neutral before leaving the operator's seat.
- Ensure that all the components in the hydraulic system are kept clean and in good condition.
- Replace any worn, cut, abraded, flattened, or crimped hoses and steel lines.
- Do **NOT** attempt any makeshift repairs to hydraulic lines, fittings, or hoses by using tapes, clamps, cements, or welding. The hydraulic system operates under extremely high pressure. Makeshift repairs can fail suddenly and create hazardous conditions.

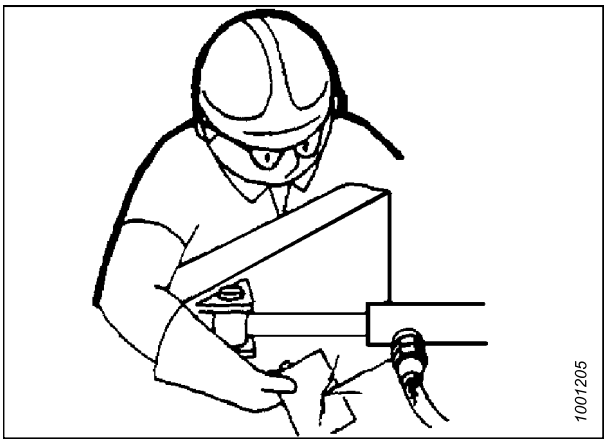


Figure 1.8: Testing for Hydraulic Leaks

- Wear proper hand and eye protection when searching for high-pressure hydraulic fluid leaks. Use a piece of cardboard as a backstop instead of your hands to isolate and identify a leak.
- If injured by a concentrated, high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop from hydraulic fluid piercing the skin.

Figure 1.9: Hydraulic Pressure Hazard

- Ensure that all components are tight and that steel lines, hoses, and couplings are in good condition before applying pressure to a hydraulic system.

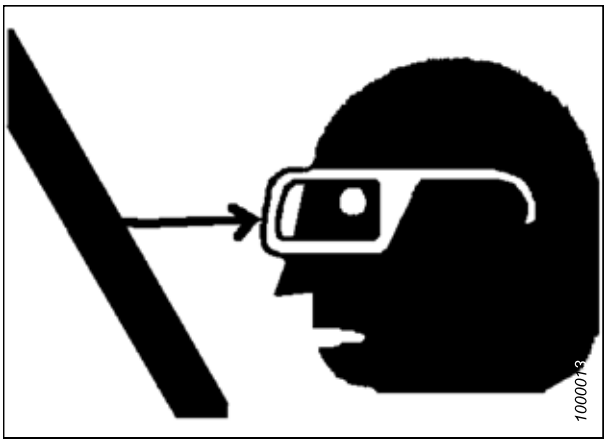


Figure 1.10: Safety around Equipment

1.5 Welding Precaution

To prevent damage to sensitive electronics, welding should never be attempted on the header while it is connected to a windrower.

WARNING

Severe damage to sensitive, expensive electronics can result from welding on the header while it is connected to the windrower. It can be impossible to know what effect high current could have with regard to future malfunctions or shorter lifespan. It is very important that welding on the header is not attempted while the header is connected to the windrower.

For further welding precautions, consult the windrower operators manual.

If it is unfeasible to disconnect the header from the windrower before welding, refer to the windrower's technical manual for welding precautions detailing all electrical components that must be disconnected first for safe welding.

1.6 Safety Signs

Safety signs are decals placed on the machine where there is a risk of personal injury, or where the Operator should take extra precautions before operating the controls. They are usually yellow.

- Keep safety signs clean and legible at all times.
- Replace safety signs that are missing or illegible.
- If the original part on which a safety sign was installed is replaced, ensure that the repair part displays the current safety sign.

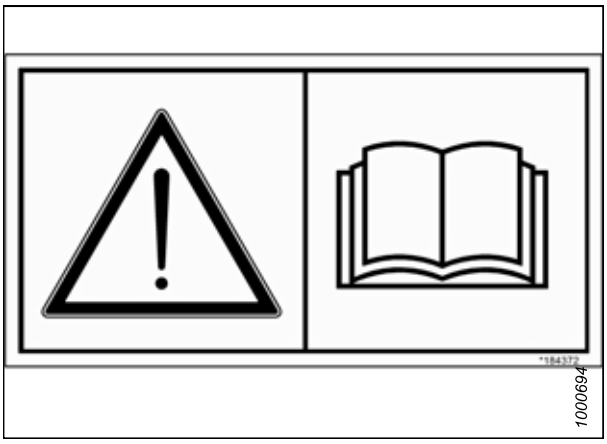


Figure 1.11: Operator's Manual Decal

Chapter 2: Unloading Header

Unload all header parts before beginning assembly. Carefully follow these procedures in the order in which they are presented.

2.1 Header Specifications for Unloading and Assembly

Header dimensions, weight, and spreader bar specifications are provided so that you can choose the correct equipment to lift, tip, or transport the header safely.

DANGER

The equipment used for loading or unloading a header must meet or exceed the requirements specified in this document. Using inadequate equipment may result in chain breakage, vehicle tipping, machine damage or bodily harm to operators or bystanders.

Refer to the following specifications:

- For header weight, refer to Table *2.1, page 9*.
- For header dimensions (fully assembled header attached to shipping stands), refer to Table *2.2, page 10*.

Table 2.1 Header Weight

IMPORTANT:

These are approximate weights for a **SINGLE HEADER** that include the bare header and shipping stands. When additional optional kits are installed, the weight will increase.

Header Model	Weight
D215	1689 kg. (3723 lb.)
D220	1852 kg. (4081 lb.)
D225	2163 kg. (4768 lb.)
D230	2622 kg. (5779 lb.)
D235	2843 kg. (6266 lb.)
D241	2946 kg. (6493 lb.)

IMPORTANT:

Forklifts are normally rated for a load center 610 mm (24 in.) ahead of back end of the forks. To obtain the forklift capacity for a load center (A) at 1220 mm (48 in.) (B), check with your forklift distributor. The minimum fork length (C) is 1981 mm (78 in.).

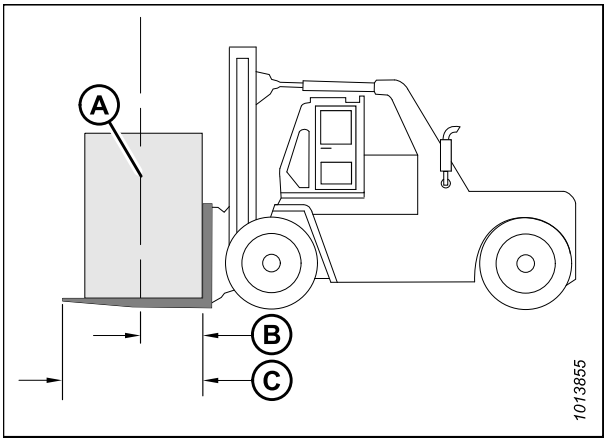
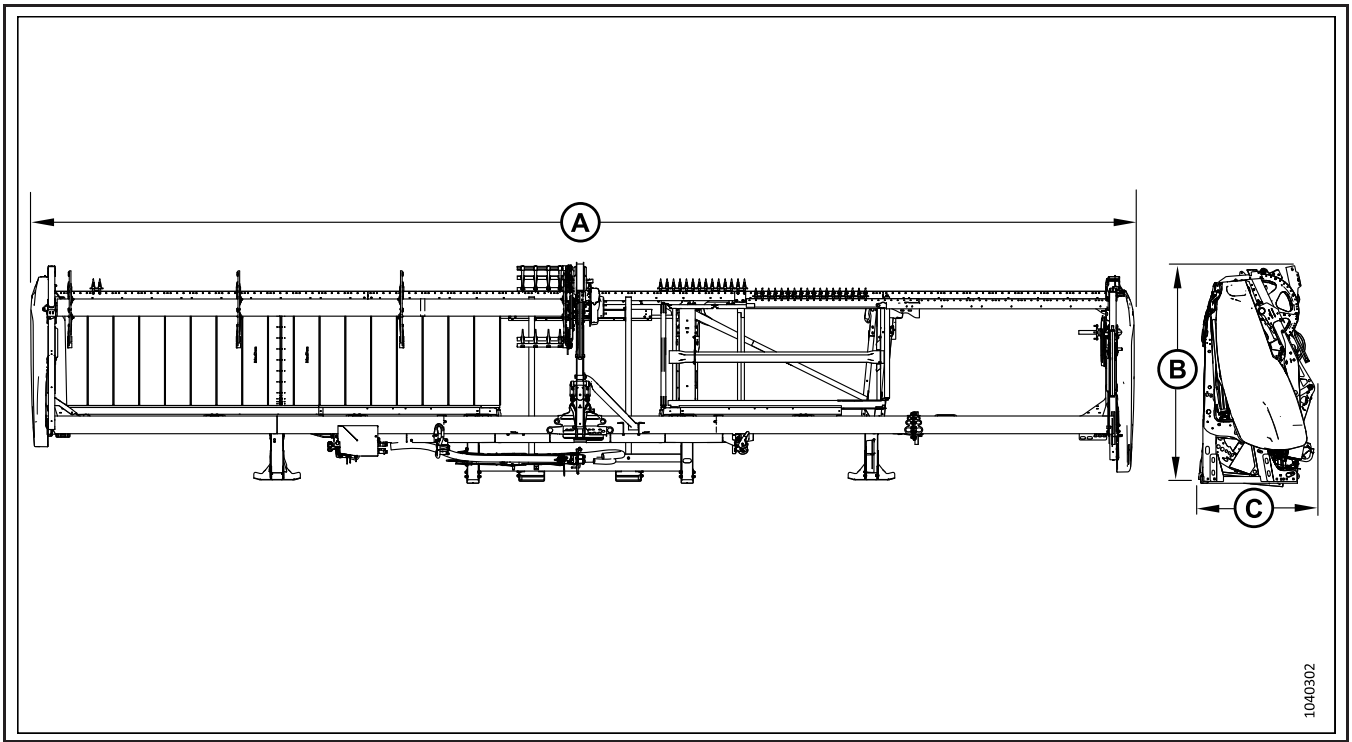


Figure 2.1: Minimum Lifting Capacity

A - Load Center of Gravity
B - Load Center 1220 mm (48 in.) from Back of Forks
C - Minimum Fork Length 1981 mm (78 in.)

Table 2.2 Header Dimensions – Fully Assembled and Attached to Shipping Stands



IMPORTANT:

These approximate dimensions are provided to help you choose the correct size of vehicle to lift or transport the header. These dimensions assume the header is assembled and attached to the shipping stands.

Header Model	Dimensions		
	A	B	C
D215	5.1 m (16 ft. 7 in.)	2.6 m (8.4 ft.)	1.5 m (4.9 ft.)
D220	6.6 m (21 ft. 7 in.)		
D225	8.1 m (26 ft. 7 in.)		
D230	9.6 m (31 ft. 7 in.)		
D235	11.2 m (36 ft. 7 in.)		
D241	13.0 m (42 ft. 7 in.)		

2.2 Unloading Header from Trailer

To ensure that the header is unloaded safely and without damage, follow the recommended unloading procedure provided here.

DANGER

To prevent injury to bystanders caused by being struck by machinery, do NOT allow people to stand in the unloading area.

DANGER

The equipment used for loading or unloading a header must meet or exceed the requirements specified in this document. Using inadequate equipment may result in chain breakage, vehicle tipping, machine damage or bodily harm to operators or bystanders.

IMPORTANT:

For minimum lifting equipment requirements, refer to *2.1 Header Specifications for Unloading and Assembly, page 9*.

1. Move the trailer into position and block the trailer wheels.
2. Lower the trailer storage stands.
3. Approach one of the headers with a forklift, and slide forks (A) through shipping support (B) as far as possible without contacting the shipping support of the second header.

   IMPORTANT:

   Avoid lifting the second header and ensure the forks do not interfere with the shipping frame. If the forks contact the second header, the header could be damaged.
4. Remove the hauler's tie-down straps, chains, and wooden blocks.
5. Slowly raise the header off the trailer deck.

   NOTE:

   Raise the header just enough to clear the trailer deck.

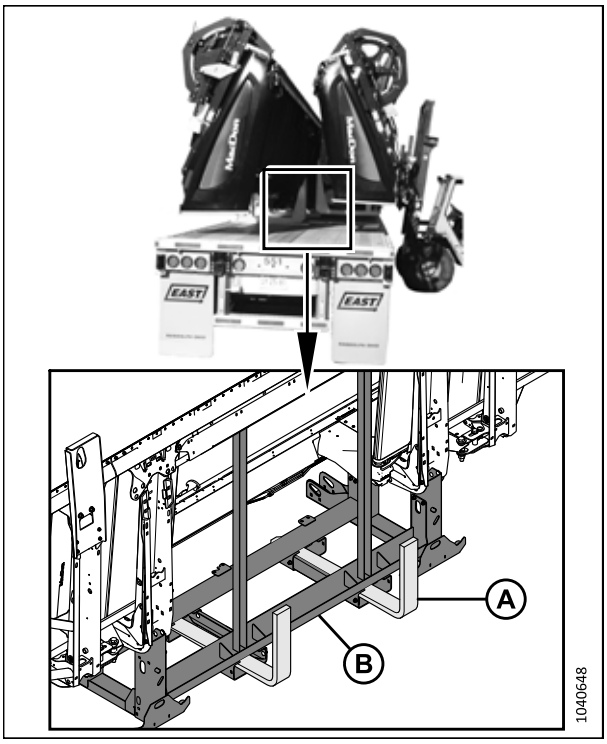


Figure 2.2: Header Shipping Supports

6. Back up until the header clears the trailer and slowly lower it to 254 mm (10 in.) from the ground.

7. Take the header to the storage area, and set it down securely on level ground. Ensure the ground is flat and free of rocks or debris that could damage the header.

8. Check for shipping damage and missing parts.

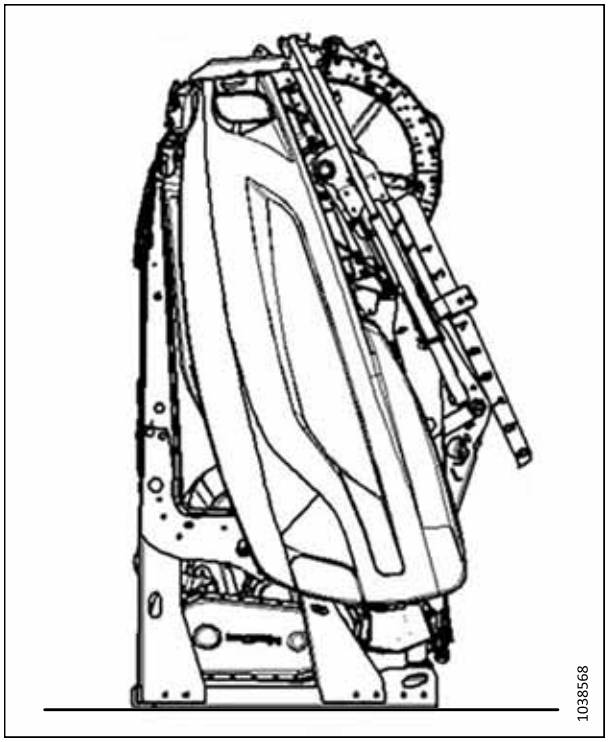


Figure 2.3: Header on Level Ground

2.3 Removing Upper Cross Auger from Shipping Location – Option

If the header was ordered with an upper cross auger (UCA), it will be secured to the front of the header. The UCA components will need to be removed from the header before the header can be lowered into field position.

If the header was shipped without a upper cross auger (UCA), proceed to *2.4 Removing Parts from Shipping Location, page 15*.

If the header was shipped with a has a UCA, follow this procedure to remove it.

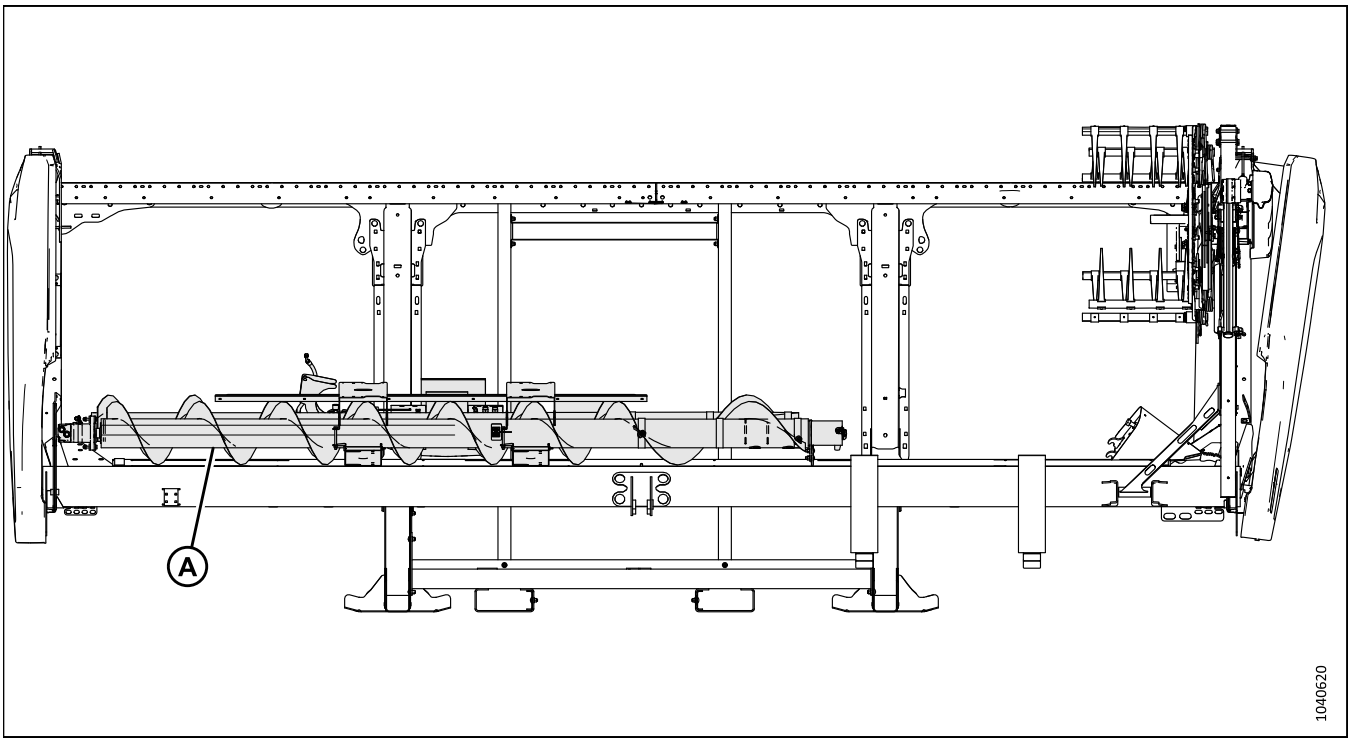


Figure 2.4: Single-Reel Header with One-Piece UCA

NOTE:

The illustration above shows a D225 header configured for shipment outside of North America. One-piece UCA's are shipped in the same position on all single-reel headers, regardless of where they are being shipped.

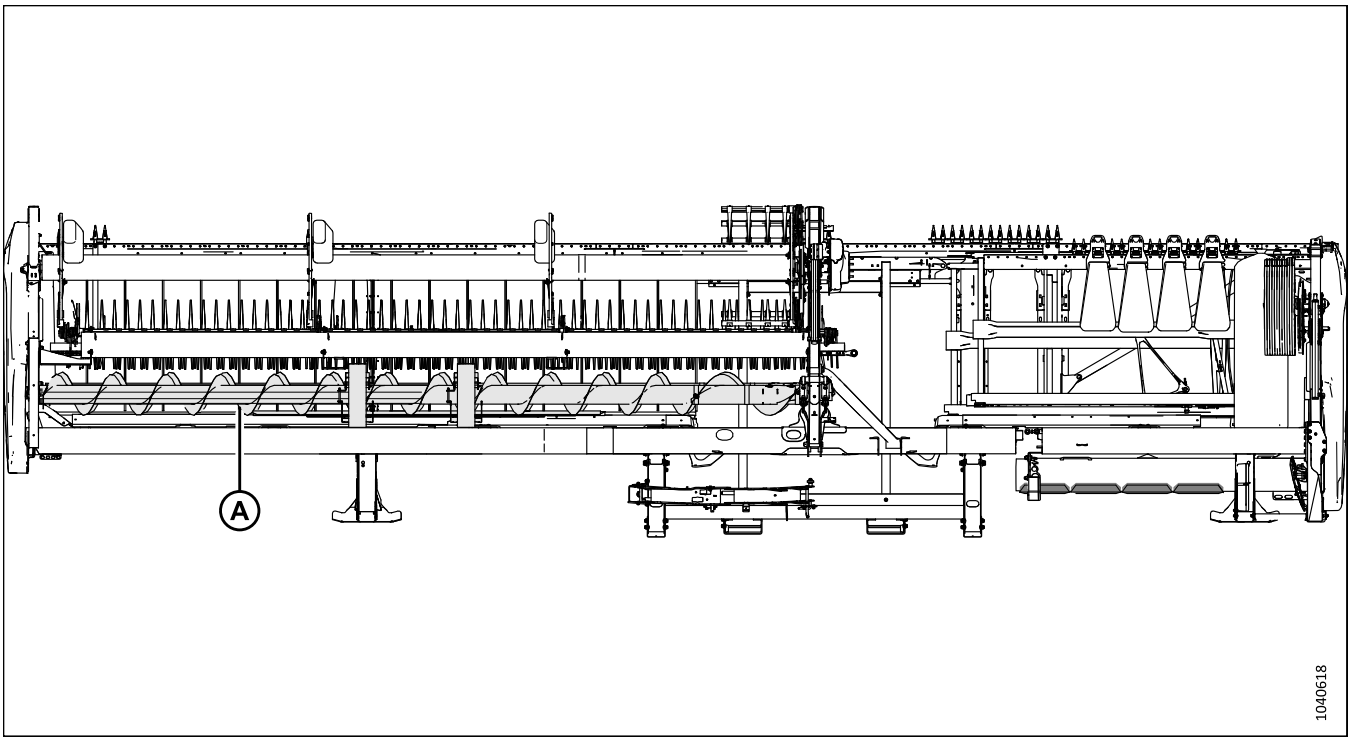


Figure 2.5: Double-Reel Header with Two-Piece Upper Cross Auger (UCA)

NOTE:

The illustration above shows a D241 header configured for shipment outside of North America. Two-piece UCAs are shipped in the same position on all double-reel headers, regardless of where they are being shipped.

1. Remove any banding and blocks securing the UCA (A) to the header.

   IMPORTANT:

   When positioning a forklift or lifting device use the pockets on the UCA shipping bracket, avoid damaging the attached aluminum deflectors.

2. Set the UCA aside.

2.4 Removing Parts from Shipping Location

The header was shipped with several parts strapped to the draper deck and reel. They will need to be removed from the header.

NOTE:

Parts can also be removed after the header is lowered to the field position.

1. Remove and set aside left clearance light (A).

Figure 2.6: Parts Secured to Header

2. **D215, D220, D225:** Remove and set aside left divider cone (A).

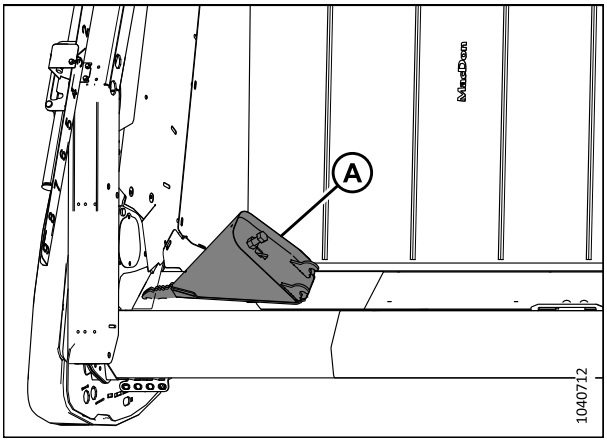


Figure 2.7: Parts Secured to Header

3. Remove and set aside reel endshield bags (A).

   NOTE:

   This bag can be removed after the header is lowered to field position.

4. Remove and set aside right clearance light (B).

5. **D215, D220, D225:** Remove and set aside right divider cone.

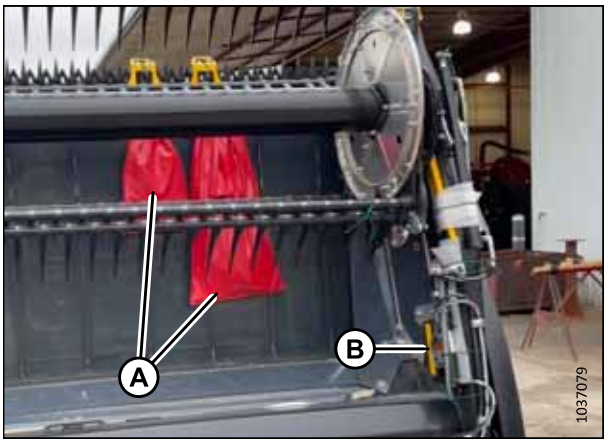


Figure 2.8: Parts Bags Secured to Draper Deck

6. Remove the straps securing windrower boots (A) to the center shipping stand, and set them aside.

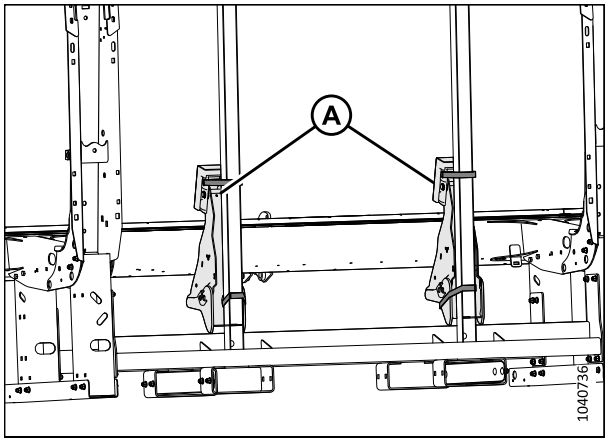


Figure 2.9: Windrower Boots

2.5 Lowering Header to Field Position

Headers are shipped resting on their backs, and must be lowered into field position before assembly can continue. The procedure for lowering the header differs depending on whether the header has a single or double reel.

To lower the header, follow the relevant procedure:

- **Single-reel headers:** refer to *2.5.1 Lowering Header to Field Position – Single Reel, page 17*.
- **Double-reel headers:** refer to *2.5.2 Lowering Header to Field Position – Double Reel, page 19*.

2.5.1 Lowering Header to Field Position – Single Reel

The header will need to be lowered into field position to prepare it for further assembly.

IMPORTANT:

For information on lifting equipment requirements, refer to *2.1 Header Specifications for Unloading and Assembly, page 9*.

1. Approach header (A) from its underside.
2. Raise forklift forks (B) until they are jus t below the cutterbar. Attach chain (C) to the shipping stand. Secure the other end of the chain to the lifting vehicle.

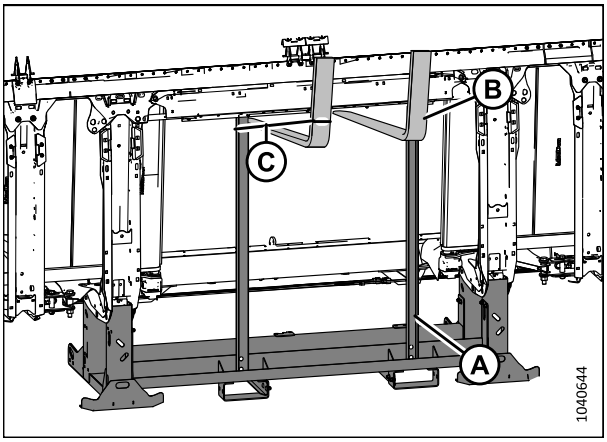


Figure 2.10: Shipping Frame

CAUTION

Stand clear when lowering the header; the machine may sway from side to side.

3. Back the forklift up **SLOWLY** while lowering the forks until the header is 254 mm (10 in.) from the ground, as shown in the numbered steps in the illustration.

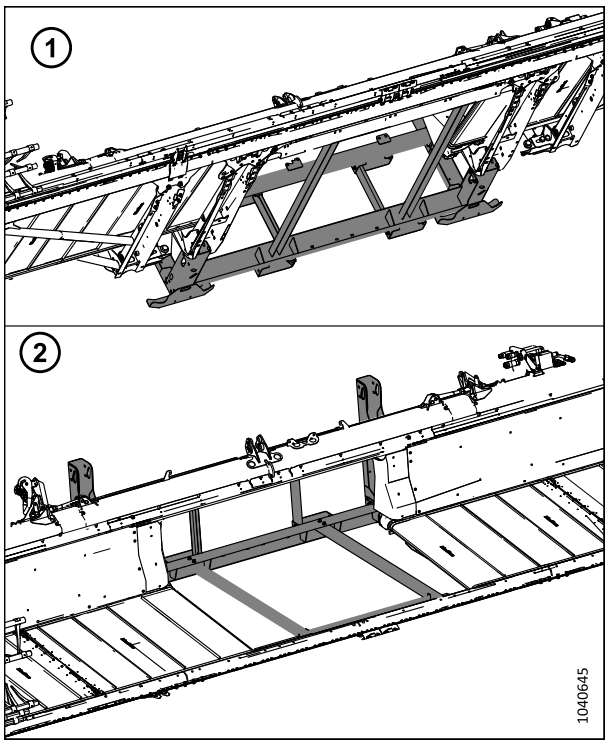


Figure 2.11: Lowering the Header

4. At shipping frame (A), place one 254 mm (10 in.) block (B) under each side of the center opening

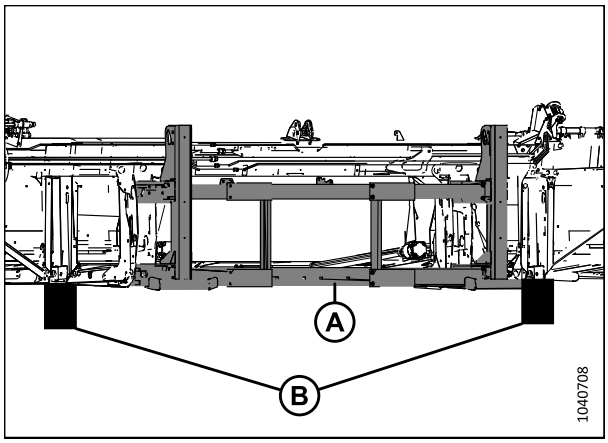


Figure 2.12: Blocks Under the Frame

5. At the cutterbar, place 254 mm (10 in.) blocks (A) under each end of the header, and one block on each side of the center opening. Continue lowering the header onto the blocks.
6. Remove the chain from the shipping support.

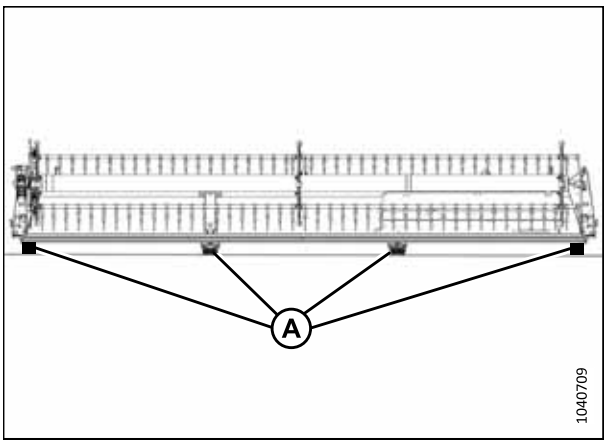


Figure 2.13: Blocks Under the Cutterbar

2.5.2 Lowering Header to Field Position – Double Reel

The header will need to be lowered into field position to prepare it for further assembly.

DANGER

The equipment used for loading or unloading a header must meet or exceed the requirements specified in this document. Using inadequate equipment may result in chain breakage, vehicle tipping, machine damage or bodily harm to operators or bystanders.

For information on lifting equipment requirements, refer to *2.1 Header Specifications for Unloading and Assembly, page 9*.

1. Approach the underside of the header with the lifting vehicle.

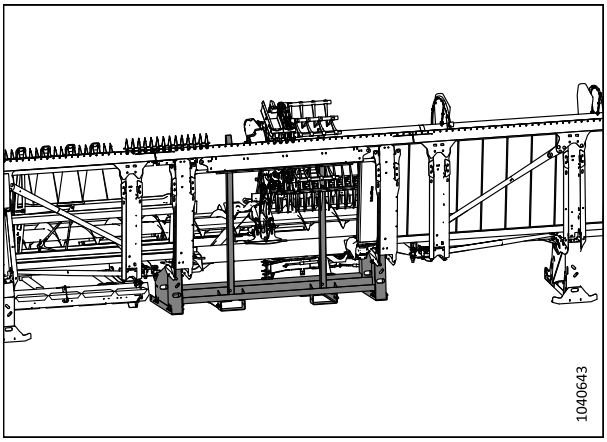


Figure 2.14: Underside of Header

2. Attach a chain to shipping support (A) at the center reel arm.

   IMPORTANT:

   Do **NOT** lift at the cutterbar when unloading from the trailer. This procedure is **ONLY** for laying the machine over into working position.

CAUTION

Stand clear of the header when lowering it. The machine may swing.

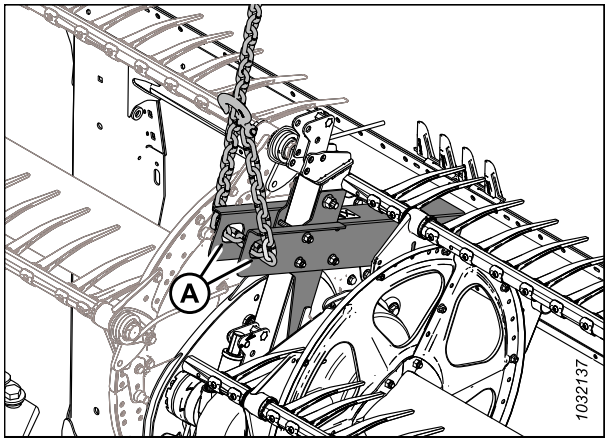


Figure 2.15: Chain Attachment Location – Double Reel

3. Back the forklift up **SLOWLY** while lowering the forks until the header is 254 mm (10 in.) from the ground, as shown in the numbered steps in the illustration.

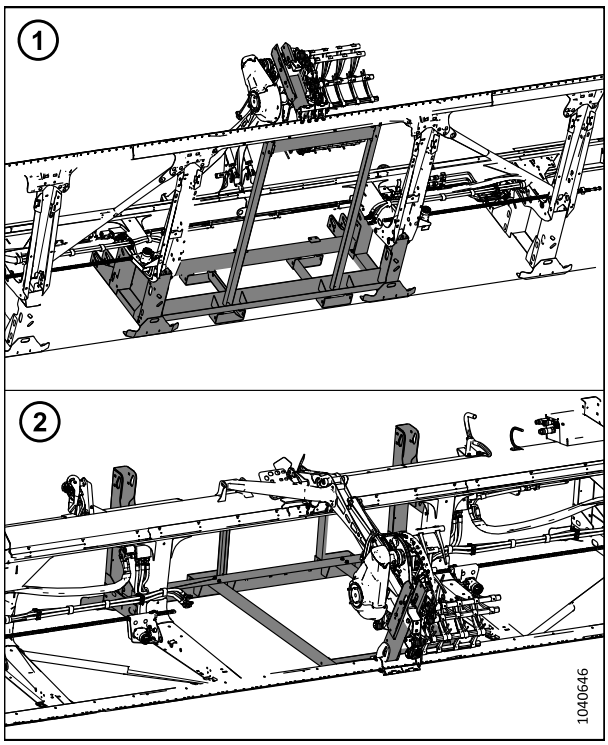


Figure 2.16: Header Lowered onto Ground

4. At shipping frame (A), place one 254 mm (10 in.) block (B) under each side of the center opening

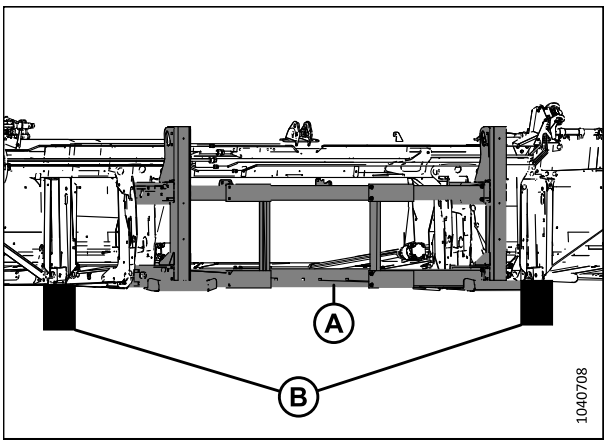


Figure 2.17: Blocks Under the Frame

5. At the cutterbar, place 254 mm (10 in.) blocks (A) under each end of the header, and one block on each side of the center opening. Continue lowering the header onto the blocks.
6. Remove the chain from the shipping support.

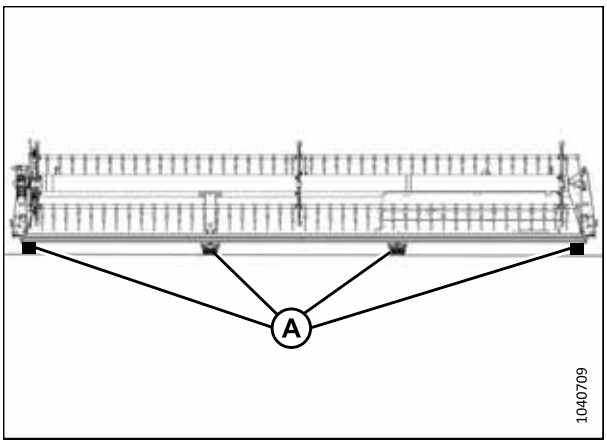


Figure 2.18: Blocks Under the Cutterbar

2.5.3 Removing and Installing Hydraulic Hose Management System

The hydraulic hose management system must be moved from the shipping position to the working position. Lifting equipment is required to complete this task; the hydraulic hose management system weighs approximately 54 kg (120 lb.).

NOTE:

The hydraulic hoses have been removed from the illustrations in this procedure for the sake of clarity.

1. Cut and remove any wire securing hydraulic hose management system (A) to the shipping stand.
2. Route sling (F) between the gas strut and the hose management frame, then attach it to the forklift or lifting device.
3. Remove the two bolts securing shipping support (B). Discard the bolts and the shipping support.
4. Remove the three bolts securing shipping support (C). Discard the bolts and the shipping support.
5. Remove the bolt securing shipping support (D). Discard the bolts and the shipping support.

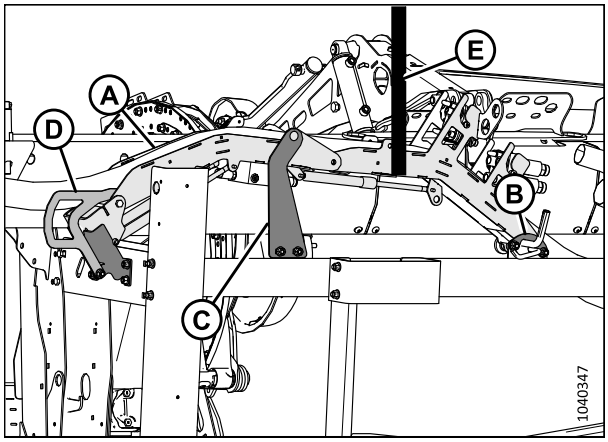


Figure 2.19: Hydraulic Hose Management System

6. Remove nut and bolt (A) and retain them.
7. Align and lower hydraulic hose management mount (B) onto shaft (C) on the hose support mount.

   NOTE:

   The plastic bushing may come out when lowering the hydraulic hose management system.
8. Install nut and bolt (A).

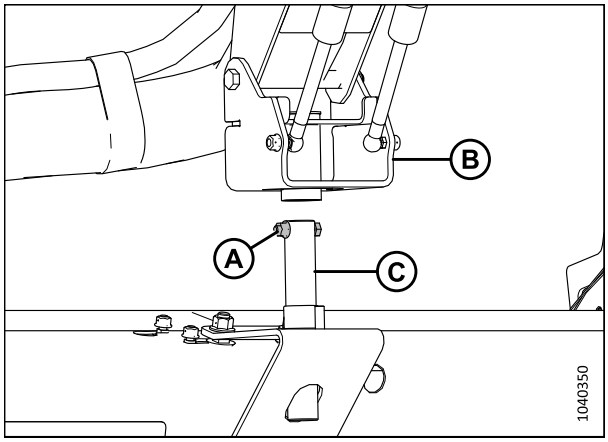


Figure 2.20: Hydraulic Hose Management System

9. **D215 Only:** Remove four bolts and nuts (B) and reposition latch assembly (A) from the shipping position. It should point towards the back of the header.

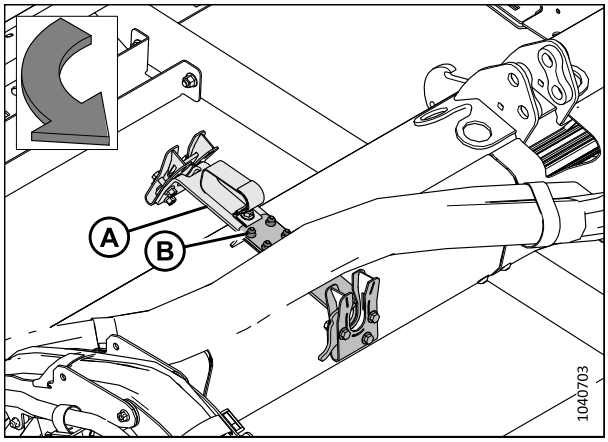


Figure 2.21: Hydraulic Hose Management Latch

2.6 Removing Shipping Stands and Supports

Unless otherwise specified, discard stands, shipping material, and hardware.

1. Support shipping stand (B) with a forklift.
2. Remove four bolts (A) from the four shipping stand attachment points.
3. Remove shipping stand (B).

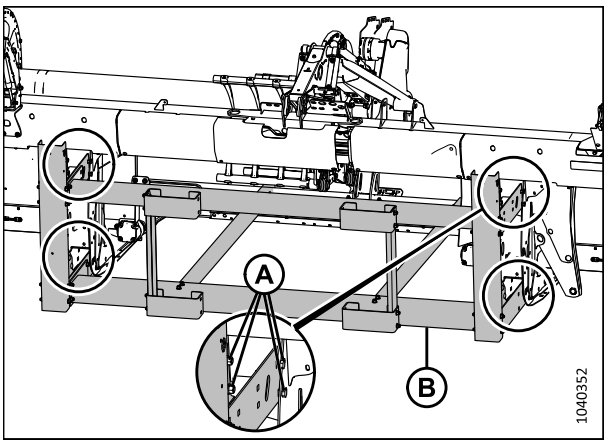


Figure 2.22: Shipping Stand

4. **D230, D235, D241:** Loosen bolt (A) securing divider cone (B) to the header leg shipping stand.
5. **D230, D235, D241:** Slide the divider cone forward so that the bolt clears the keyhole, and remove divider cone from shipping position.
6. **D230, D235, D241:** Remove and discard bolt (A).
7. **D230, D235, D241:** Remove the second divider cone on the opposite shipping stand.
8. **D230, D235, D241:** Set divider cones aside for installation at a later time.

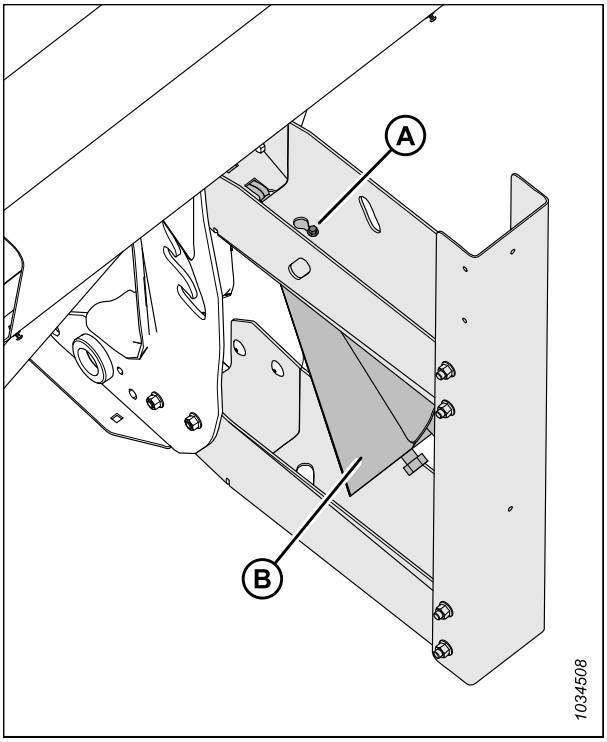


Figure 2.23: Divider Cone in Shipping Position – D230, D235, D241

9. **D230, D235, D241:** Remove the eight bolts (A) and shipping stand (B) from both outboard header legs.

   NOTE:

   Four of the bolts are on the opposite side of the shipping stand.

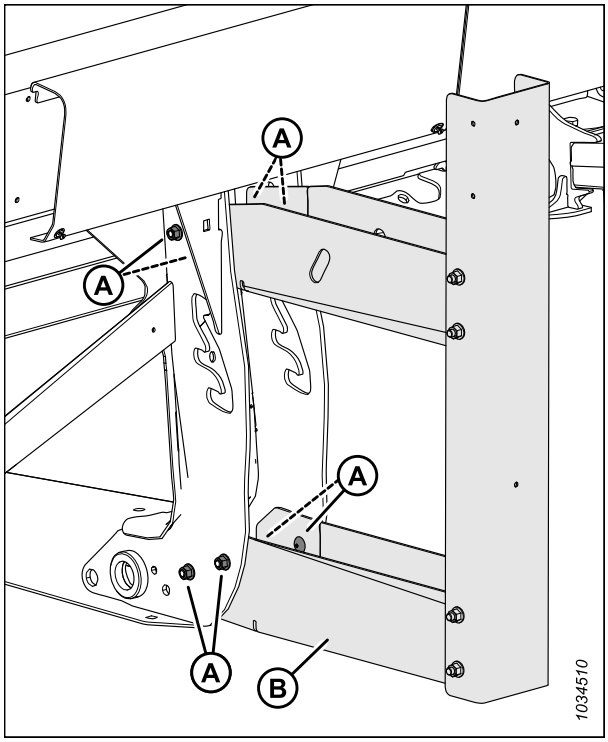


Figure 2.24: Shipping Stands at Outboard Legs – D230, D235, D241 (Right Side Shown)

CAUTION

To avoid injury from rotating reel, remove the tine tubes from shipping position before attempting to remove the anti-rotation strap.

10. Remove the shipping wire securing tine tubes (A) to reel (B), and remove the tine tubes.

11. Remove the hardware bag (MD #347598) that is wired to the tine tube.

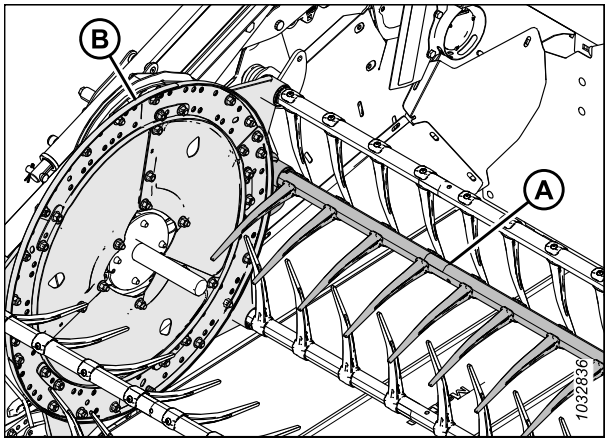


Figure 2.25: Tine Tube in Shipping Position

12. At the right end of the header, between the reel and the endsheet, remove and discard hardware (A), and (B) and anti-rotation strap (C).

13. Install the new bolt (M10 X 1.5 X 30), washer (M10), and nut (M10 center loc) at location (A) from hardware bag (MD #347598). The bolt head should face towards the reel.

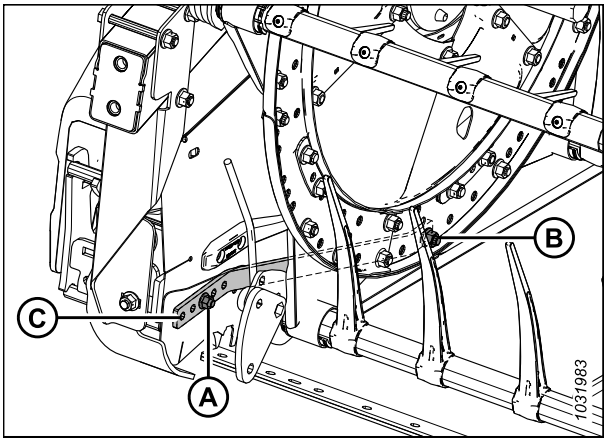


Figure 2.26: Reel Anti-Rotation Strap

14. Remove and discard hardware (A) and shipping tag (B) from the inboard deck support. Repeat on the opposite deck.

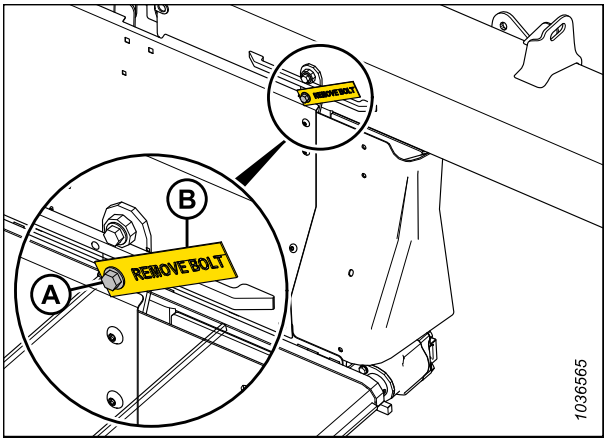


Figure 2.27: Deck Support Shipping Bolt

Chapter 3: Assembling Header

When the header is prepared for shipping, some parts are removed or relocated to prevent shipping damage. These parts need to be reinstalled before the header can be used.

Not all procedures in this chapter will apply to your header. Perform the ones that do in the order in which they are listed, starting with

- *3.1 Installing Reel Lift Cylinders – Single Reel, page 27*
- *3.2 Installing Reel Lift Cylinders – Double-Reel, page 33*

3.1 Installing Reel Lift Cylinders – Single Reel

The reel lift cylinders are detached for shipping. They need to be reinstalled on the header.

CAUTION

Do NOT REMOVE reel fore-aft shipping supports (A). The reel fore-aft hydraulic cylinders must be connected to the reel before fore-aft shipping supports (A) can be removed. If the fore-aft shipping supports are removed before the hydraulic cylinders have been connected, the reel can slide forward, which may result in injury.

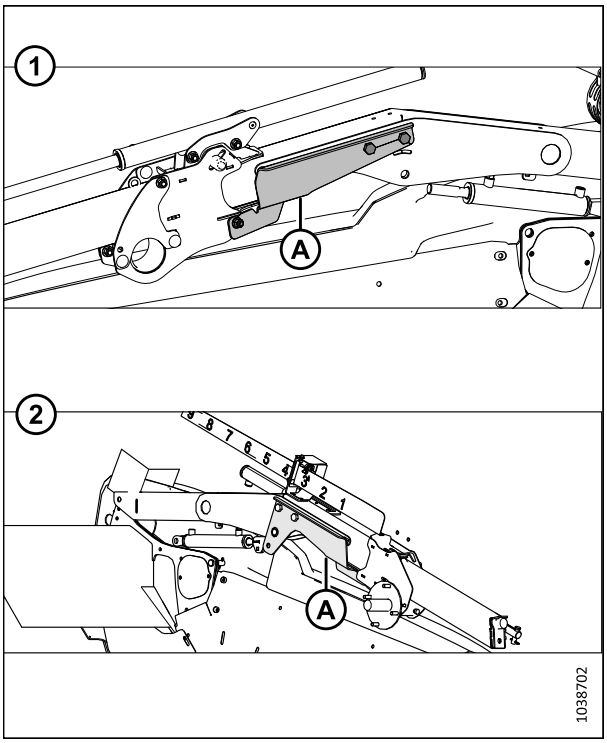


Figure 3.1: Fore-Aft Shipping Supports

1 - Right Reel Arm **2 - Left Reel Arm**

1. Remove top two bolts (A) from both reel arm supports.

   IMPORTANT:

   The top two bolts (A) must be removed from the reel arm supports before connecting any of the lift cylinders to prevent the reel from twisting.

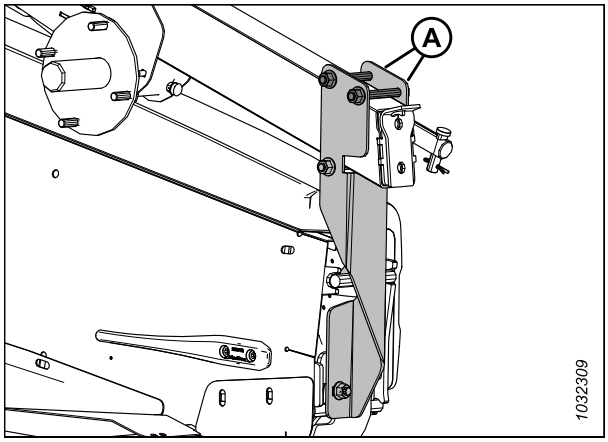


Figure 3.2: Left Arm Shipping Support

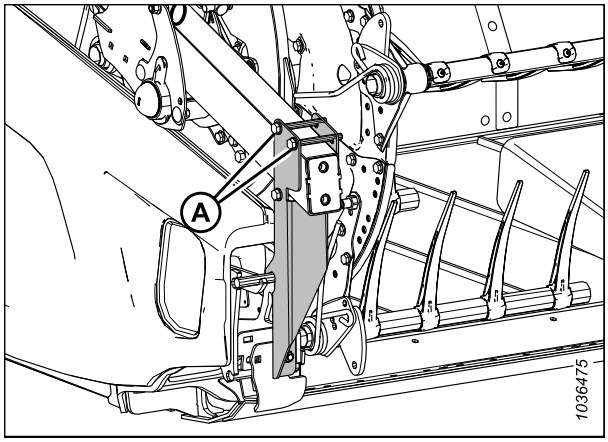


Figure 3.3: Right Arm Shipping Support

2. On the left end of the reel, wrap sling (A) around the reel tube as shown. Attach the sling to the fork of a forklift.

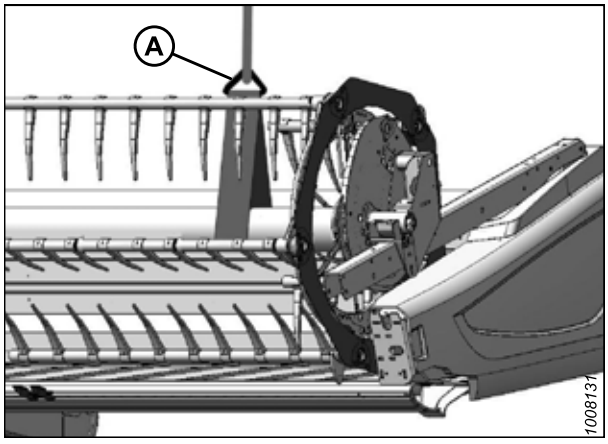


Figure 3.4: Sling Positioned on Left Side of Reel

3. Remove the shipping wire securing reel lift cylinder (A) to the left reel arm.

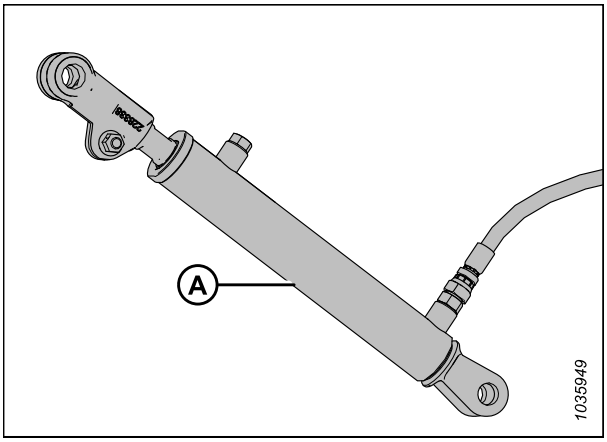


Figure 3.5: Reel Lift Cylinder

4. Remove and retain two sets of pins (A) from the lug on the endsheet and the reel arm.

   NOTE:

   The safety prop may fall when the upper pin is removed.

5. Use the forklift to lift the reel so that the reel lift cylinder mounting holes line up with the lug on the endsheet and the hole in the reel arm.

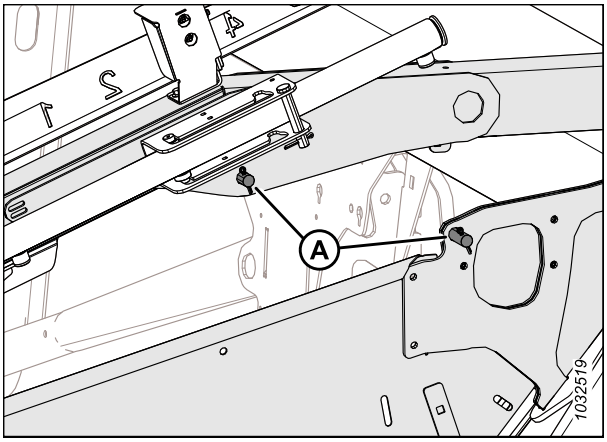


Figure 3.6: Left Reel Lift Cylinder Pins

6. Install the rod end of lift cylinder (A) and safety prop (B) using clevis pin (C) and cotter pin (D).

   IMPORTANT:

   Install cotter pin (D) on the outboard side of the header.

7. Move reel safety prop (B) up onto the hook under the reel arm.

8. Secure the base of cylinder (A) to the endsheet using clevis pin (E) and cotter pin (F).

   IMPORTANT:

   Install cotter pin (F) on the outboard side of the header.

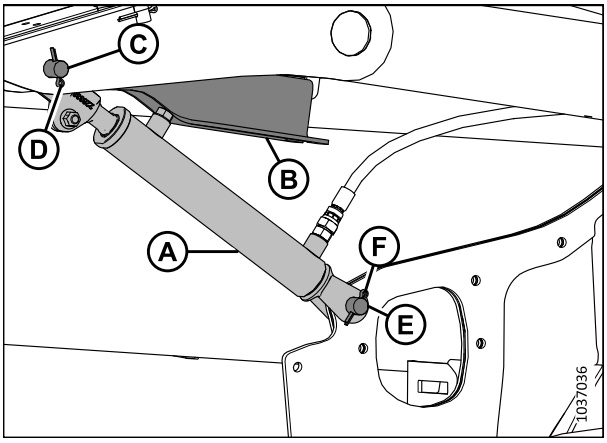


Figure 3.7: Left Lift Cylinder

9. Remove hardware (A) from outboard arm support (B). Remove the support.

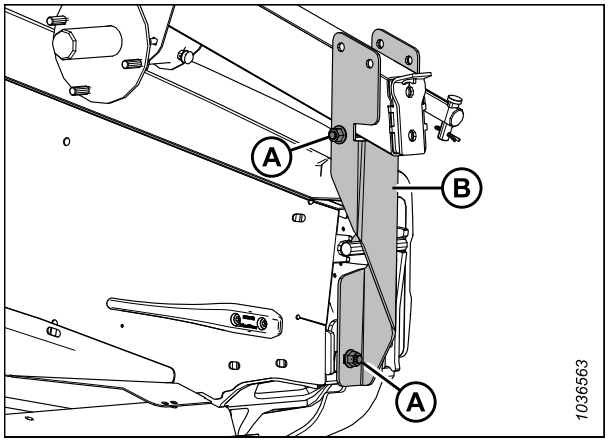


Figure 3.8: Reel Left Arm Support

10. Retrieve one M12 x 30 mm carriage bolt (B) and center lock nut from the shipping bag (MD #347581). Install the hardware on knifehead guard (A) as shown.

11. Position knifehead guard (A) as close as possible to the bottom of guard (C). The inboard edge of shield (A) should be in line with or just inboard of the center of the first guard point.

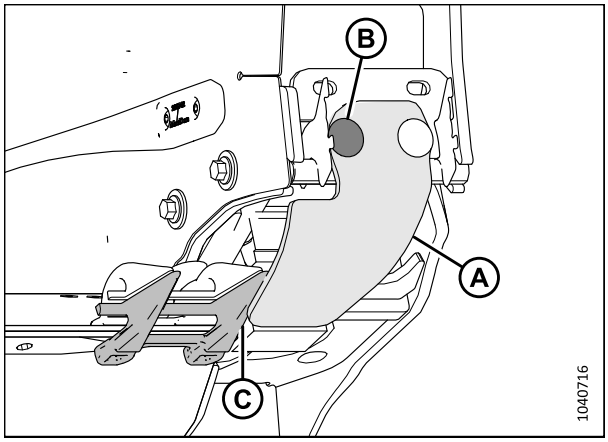


Figure 3.9: Left Knifehead Guard

12. On the right end of the reel, wrap sling (A) around the reel tube as shown. Attach the sling to the fork of a forklift.

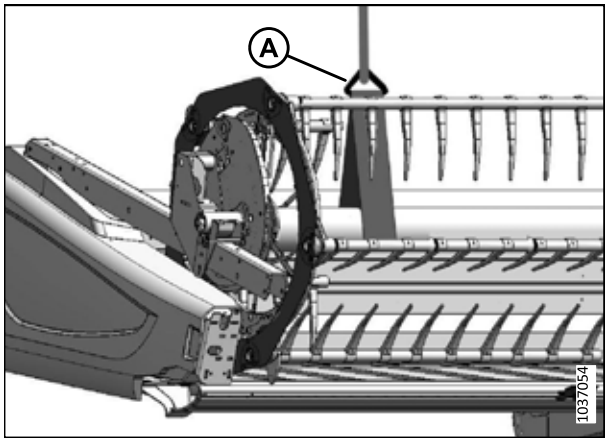


Figure 3.10: Sling Positioned on Right Side of Reel

13. Remove the shipping wire securing reel lift cylinder (A) to the right reel arm.

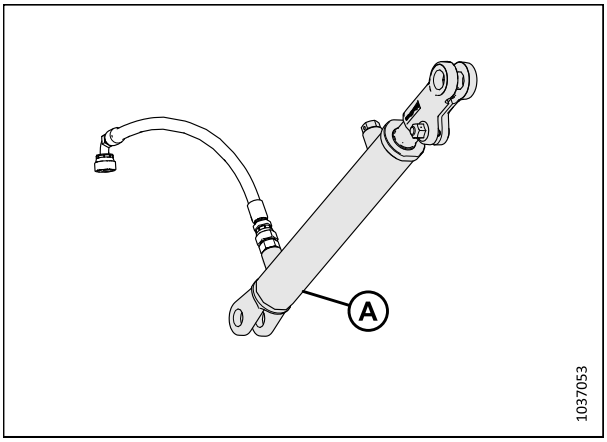


Figure 3.11: Reel Lift Cylinder

14. Remove and retain two sets of pins (A) from the lug on the endsheet and the reel arm.

    NOTE:

    The safety prop may fall when the upper pin is removed.

15. Lift the reel so that the reel lift cylinder mounting holes line up with the lug on the endsheet and the hole in the reel arm.

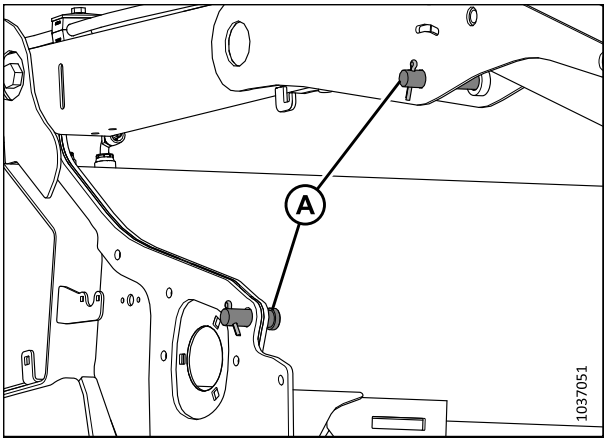


Figure 3.12: Right Reel Lift Cylinder Pins

16. Install rod end of lift cylinder (A) and safety prop (B) using clevis pin (C) and cotter pin (D).

    IMPORTANT:

    Install cotter pin (D) on the outboard side of the header.

17. Move reel safety prop (B) up onto the hook under the reel arm.

18. Secure the base of cylinder (A) to the endsheet using clevis pin (E) and cotter pin (F).

    IMPORTANT:

    Install cotter pin (F) on the outboard side of the header.

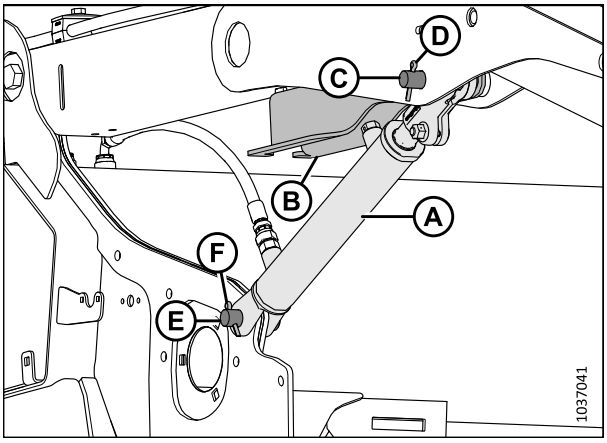


Figure 3.13: Right Lift Cylinder Installed on Reel Arm

19. Remove hardware (A) from outboard arm support (B). Remove the support.

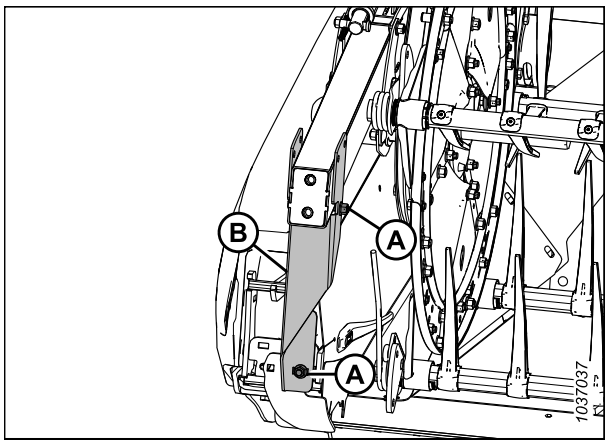


Figure 3.14: Right Reel Arm

20. Retrieve one M12 x 30 mm round head square neck bolt (B) and center lock hex flange nut from the shipping bag (MD #347581). Install the hardware on knifehead guard (A) as shown.

21. Position knifehead guard (A) as close as possible to the bottom of guard (C). The inboard edge of shield (A) should be in line with or just inboard of the center of the first guard point.

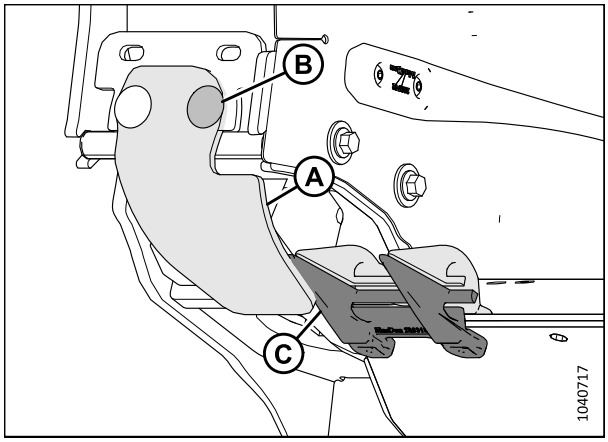


Figure 3.15: Right Knifehead Guard

3.2 Installing Reel Lift Cylinders – Double-Reel

The left, center, and right reel lift cylinders on double-reel headers have been detached from the reel lift arms for shipping purposes. They will need to be installed on the header.

CAUTION

Do NOT REMOVE reel fore-aft shipping supports (A). The reel fore-aft hydraulic cylinders must be connected to the reel before fore-aft shipping supports (A) can be removed. If the fore-aft shipping supports are removed before the hydraulic cylinders have been connected, the reel can slide forward, which may result in injury.

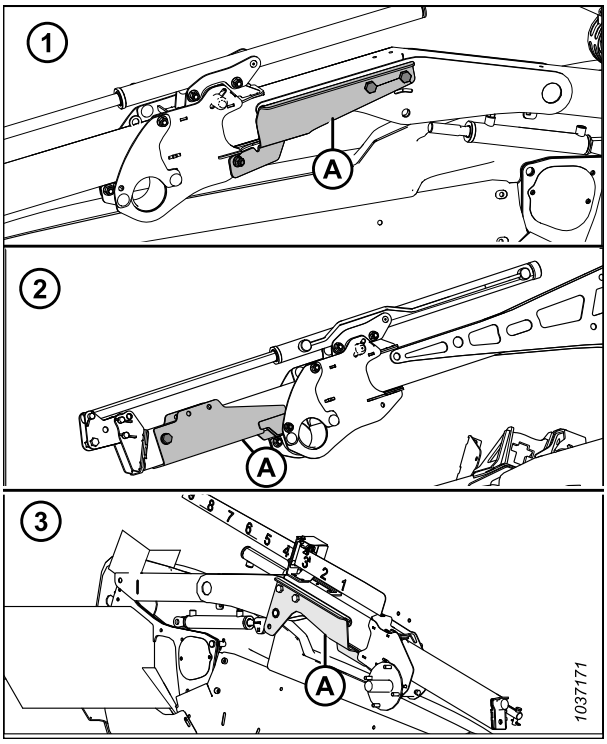


Figure 3.16: Fore-Aft Shipping Supports

1 - Outer Right Reel Arm **2 - Center Reel Arm**

3 - Outer Left Reel Arm

1. Remove top two bolts (A) from all three reel arm supports.

   IMPORTANT:

   The top bolts **MUST** be removed from both reel arm supports before the lift cylinders are connected.

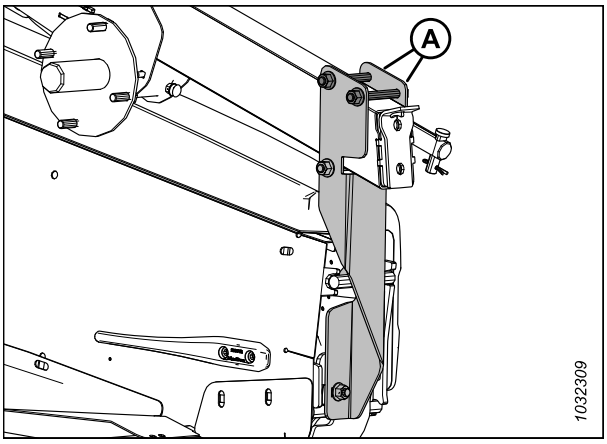


Figure 3.17: Right Reel Arm Shipping Support

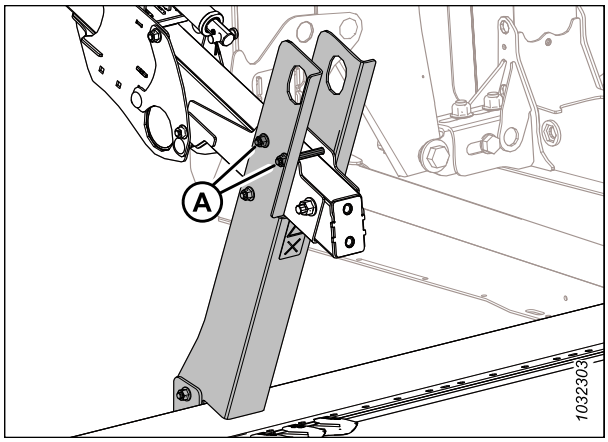


Figure 3.18: Center Arm Shipping Support

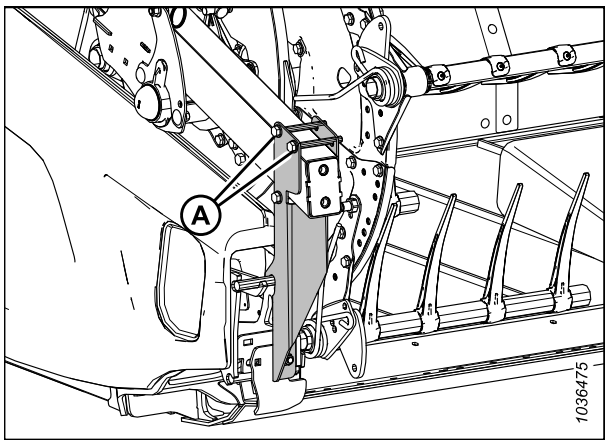


Figure 3.19: Left Reel Arm Shipping Support

2. On the left end of the left reel, wrap sling (A) around the reel tube as shown. Attach the sling to the fork of a forklift.

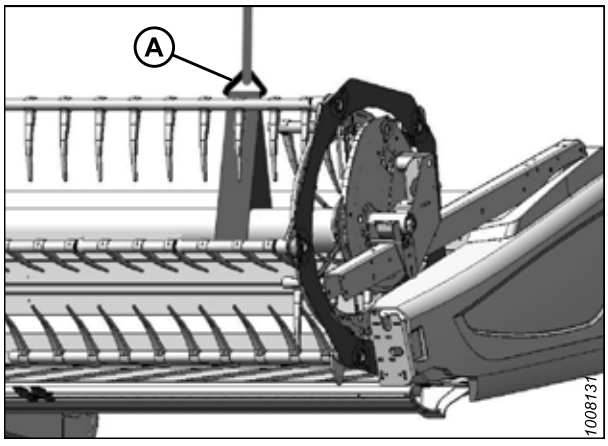


Figure 3.20: Sling Positioned on Left Side of Reel

3. Remove the shipping wire securing reel lift cylinder (A) to the left reel arm.
4. Remove and set aside the left light assembly strapped to the reel lift cylinder.

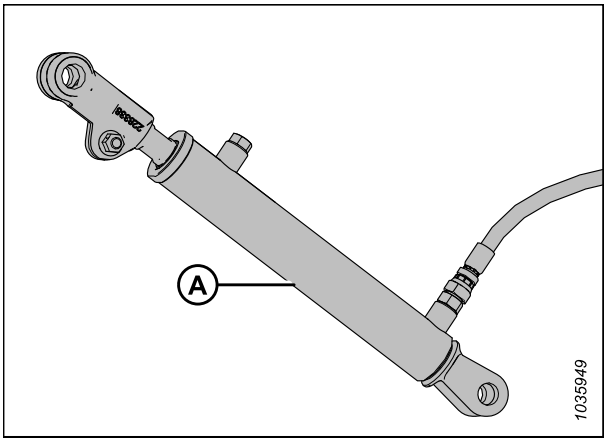


Figure 3.21: Reel Lift Cylinder

5. Remove and retain two sets of pins (A) from the lug on the endsheet and the reel arm.

   NOTE:

   The safety prop may fall when the upper pin is removed.

6. Use the forklift to lift the reel so that the reel lift cylinder mounting holes line up with the lug on the endsheet and the hole in the reel arm.

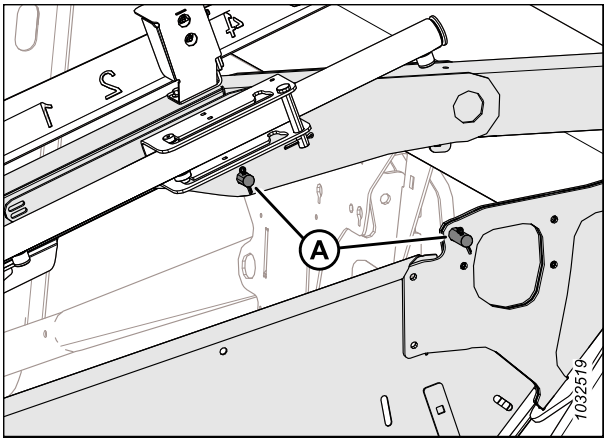


Figure 3.22: Left Reel Lift Cylinder Pins

7. Install the rod end of lift cylinder (A) and safety prop (B) using clevis pin (C) and cotter pin (D).

   IMPORTANT:

   Install cotter pin (D) on the outboard side of the header.

8. Move reel safety prop (B) up onto the hook under the reel arm.
9. Secure the base of cylinder (A) to the endsheet using clevis pin (E) and cotter pin (F).

   IMPORTANT:

   Install cotter pin (F) on the outboard side of the header.

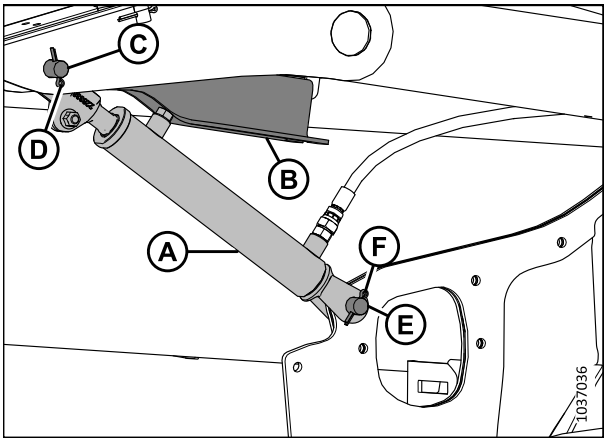


Figure 3.23: Left Lift Cylinder

10. Remove hardware (A) from outboard arm support (B). Remove the support.

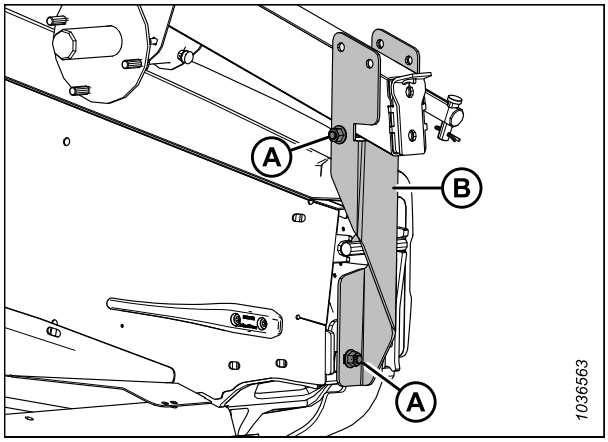


Figure 3.24: Reel Left Arm Support

11. Retrieve one M12 x 30 mm carriage bolt (B) and center lock nut from the shipping bag (MD #347581). Install the hardware on knifehead guard (A) as shown.

12. Position knifehead guard (A) as close as possible to the bottom of guard (C). The inboard edge of shield (A) should be in line with or just inboard of the center of the first guard point.

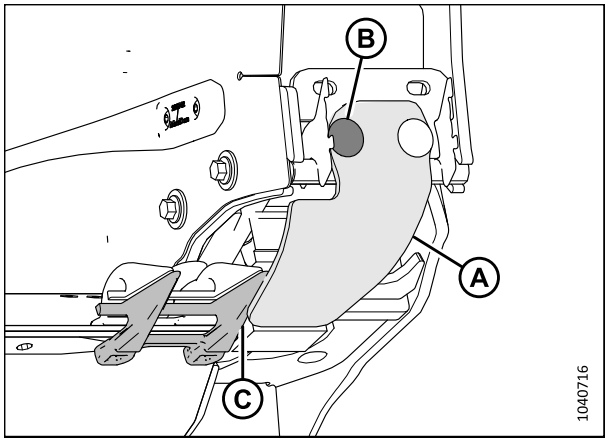


Figure 3.25: Left Knifehead Guard

13. Reposition sling (A) near the reel center support arm.

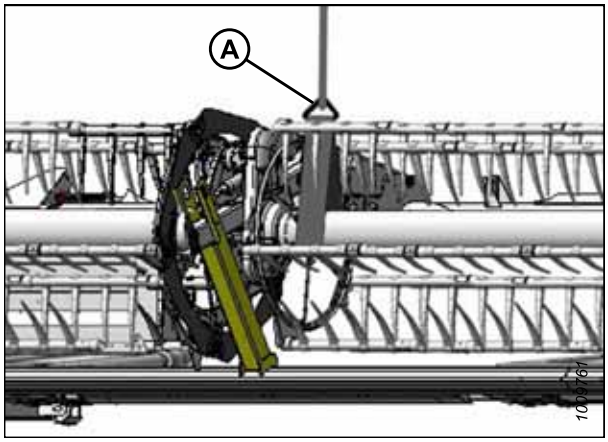


Figure 3.26: Center Arm Shipping Support

14. Remove the shipping wires securing lift cylinders (A) to the center reel arm.
15. Remove and retain the pins from the rod ends of both lift cylinders.

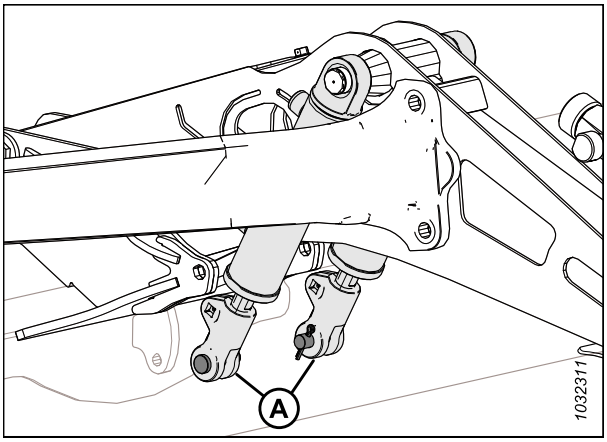


Figure 3.27: Lift Cylinders Secured to Center Reel Arm

16. Use the forklift to lift the reel. Align the holes on cylinders (A) with the holes on the reel support plates. Secure the cylinders with clevis pins and cotter pins (B).

    IMPORTANT:

    Install cotter pins (B) on the inboard side as shown.

17. Ensure that the hydraulic fittings on cylinders (A) are tight.

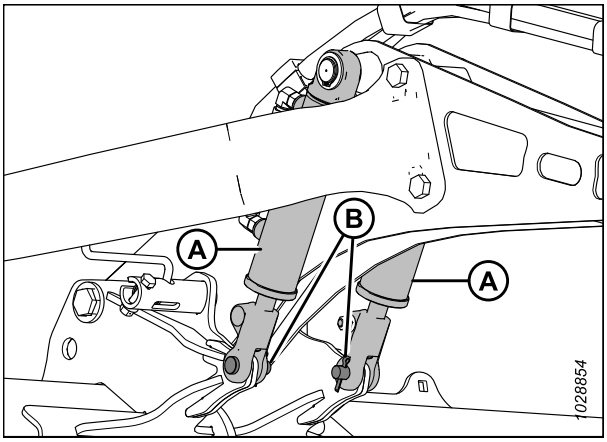


Figure 3.28: Lift Cylinders at Center Reel Arm

18. At the center arm, remove bolt (A).
19. Remove four bolts (B) (two bolts are shown) securing the shipping support to the cutterbar. Remove and discard shipping support (C).

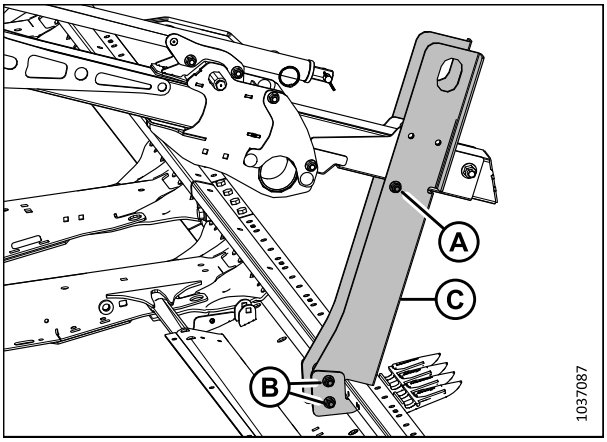


Figure 3.29: Center Reel Arm Support

20. On the right end of the right reel, wrap sling (A) around the reel tube as shown. Attach the sling to the fork of a forklift.

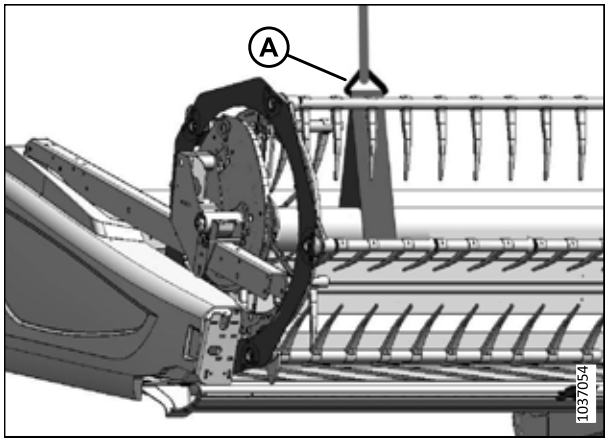


Figure 3.30: Sling Positioned on Right Side of Reel

21. Remove the shipping wire securing reel lift cylinder (A) to the right reel arm.

22. Remove and set aside the right light assembly strapped to the reel lift cylinder.

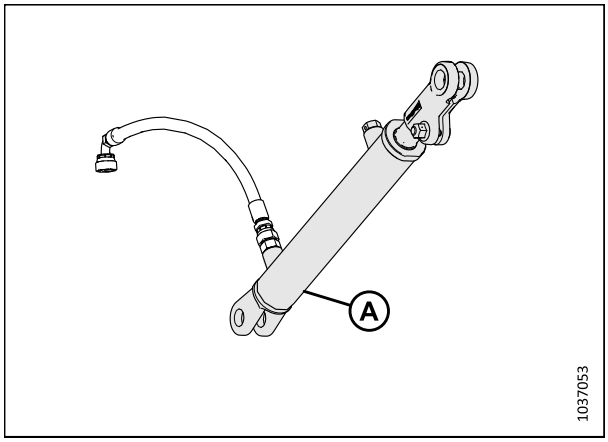


Figure 3.31: Reel Lift Cylinder

23. Remove and retain two sets of pins (A) from the lug on the endsheet and the reel arm.

    NOTE:

    The safety prop may fall when the upper pin is removed.

24. Lift the reel so that the reel lift cylinder mounting holes line up with the lug on the endsheet and the hole in the reel arm.

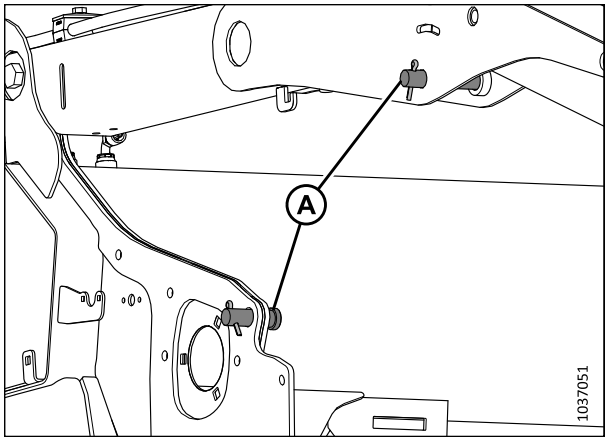


Figure 3.32: Right Reel Lift Cylinder Pins

25. Install rod end of lift cylinder (A) and safety prop (B) using clevis pin (C) and cotter pin (D).

    IMPORTANT:

    Install cotter pin (D) on the outboard side of the header.

26. Move reel safety prop (B) up onto the hook under the reel arm.

27. Secure the base of cylinder (A) to the endsheet using clevis pin (E) and cotter pin (F).

    IMPORTANT:

    Install cotter pin (F) on the outboard side of the header.

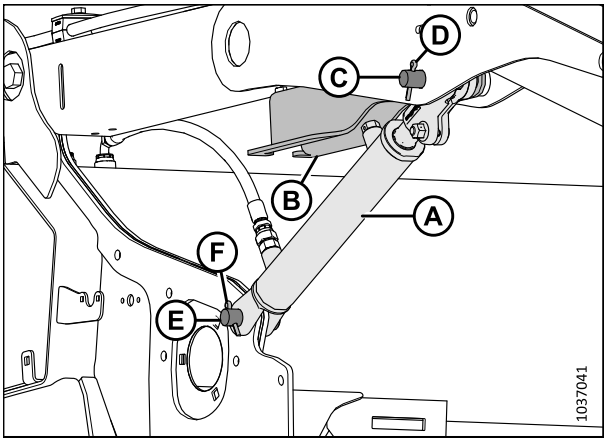


Figure 3.33: Right Lift Cylinder Installed on Reel Arm

28. Remove hardware (A) from outboard arm support (B). Remove the support.

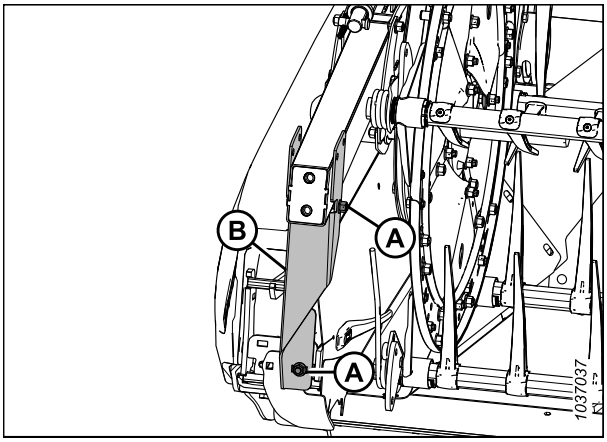


Figure 3.34: Right Reel Arm

29. Retrieve one M12 x 30 mm round head square neck bolt (B) and center lock hex flange nut from the shipping bag (MD #347581). Install the hardware on knifehead guard (A) as shown.

30. Position knifehead guard (A) as close as possible to the bottom of guard (C). The inboard edge of shield (A) should be in line with or just inboard of the center of the first guard point.

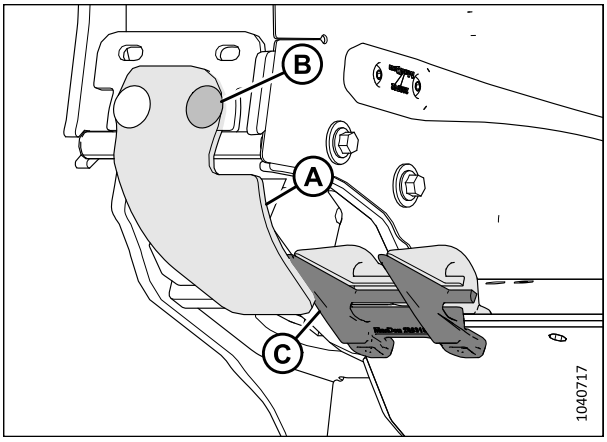


Figure 3.35: Right Knifehead Guard

Chapter 4: Attaching Header to M Series Windrower

To attach a D2 Series Draper Header for windrower to an M Series Windrower, follow the procedures provided here in the order presented.

4.1 Adding Tire Ballast

Adding fluid ballast to the windrower's caster tires will improve the windrower's stability when it is paired with a large header.

With respect to ballast capacity, a tire is considered to be full of ballast fluid when 75% of the inner volume of the tire is occupied by ballast fluid, or else when the ballast fluid is level with the wheel's valve stem when the stem is positioned at the 12 o'clock position and the windrower is on level ground. When adding ballast fluid to the caster wheels, always add an identical amount to each wheel. The caster wheels can safely hold any volume of ballast fluid up to and including their maximum capacity, as specified in the table below.

Table 4.1 Ballast Fluid Capacity of Various Caster Wheel Tires

Tire Size	Ballast Fluid Volume per Tire at 75% Capacity Liters (US gal.)	Total Weight of Ballast Fluid in Both Tires When Filled to 75% Capacity kg (lb.)[1]
7.5 x 16	38 (10)	91 (200)
10 x 16	69 (18)	170 (380)
16.5 x 16.1	158 (41)	377 (830)

Table 4.2 Recommended Ballast

Header Size	Applicable Windrower	Rec. Tire Size	Recommended Ballast			
			Level Ground		Hills	
			Fluid Per Tire liters (U.S. Gal.)	Both Tires kg (lb.)[2]	Fluid Per Tire liters (U.S. Gal.)	Both Tires kg (lb.)[2]
D215	All	7.5 x 16 10 x 16 16.5 x 16.1	0	0	0	0
D220, D225	All	Level ground: 10 x 16 16.5 x 16.1 Hills: 16.5 x 16.1	69 (18)	170 (380)	115 (30)	288 (630)
D230, D235, D241	All	16.5 x 16.1	158 (41)	377 (830)	158 (41)	377 (830)

1. The weights provided in this column rely on the assumption that the tires will be filled with a standard mixture of calcium chloride and water. If you intend to fill the tire with only water (for example, in regions where the ambient temperature does not fall below freezing), then multiply the relevant fill weight specified in this column by 0.8 to learn the weight of both tires when they are filled with water alone.
2. The weights provided in this column rely on the assumption that the tires will be filled with a standard mixture of calcium chloride and water. If you intend to add water alone, then increase the volume of water added by 20% (up to the maximum allowable volume per tire) to compensate for the difference in density between calcium chloride and water.

4.2 Attaching Draper Header Supports

Draper header supports are required to attach a D2 Series draper header for windrower to an M or M1 Series Windrower.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

1. Shut down the engine, and remove the key from the ignition.
2. Remove the hairpin from clevis pin (B) on draper header support (A). Remove clevis pin (B).

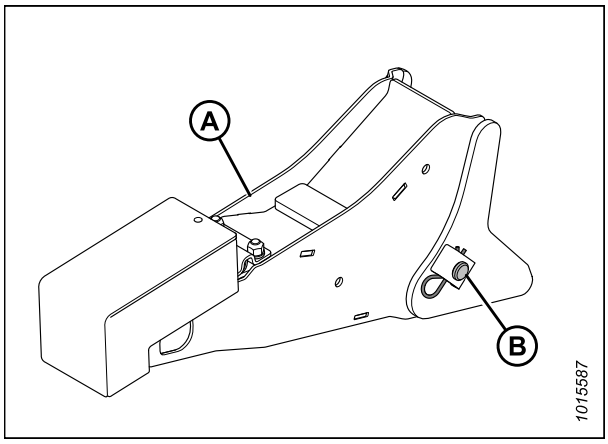


Figure 4.1: Draper Header Support

3. Position draper header support (B) on windrower lift linkage (A). Reinstall clevis pin (C).

   NOTE:

   To ensure that the pin doesn't snag the windrow, install the clevis pin on the outboard side of the draper header support.

4. Secure clevis pin (C) with hairpin (D).
5. Repeat Step *2, page 42* to Step *4, page 42* to install the remaining draper header support.

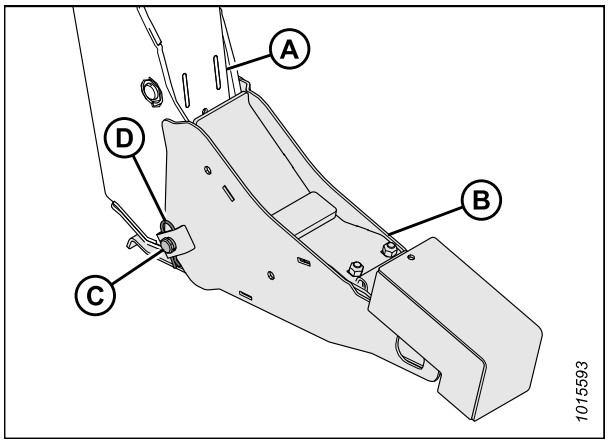


Figure 4.2: Draper Header Support

4.3 Attaching Header to an M Series Windrower – Hydraulic Center-Link with Self-Alignment

The header will need to be physically attached to the windrower, and the hydraulic connections completed. The windrower may be equipped with an optional self-aligning hydraulic center-link, which allows the Operator to control the vertical position of the center-link from the cab.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

1. Shut down the engine, and remove the key from the ignition.
2. Remove ring (A) from pin (B), and remove the pin from the header leg. Repeat this step on the other side of the header.

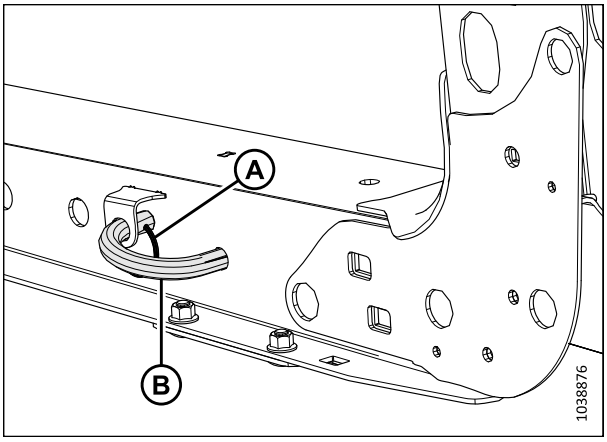


Figure 4.3: Header Leg

DANGER

Ensure that all bystanders have cleared the area.

3. Start the engine and activate HEADER DOWN button (A) on the ground speed lever (GSL) to fully retract the header lift cylinders.

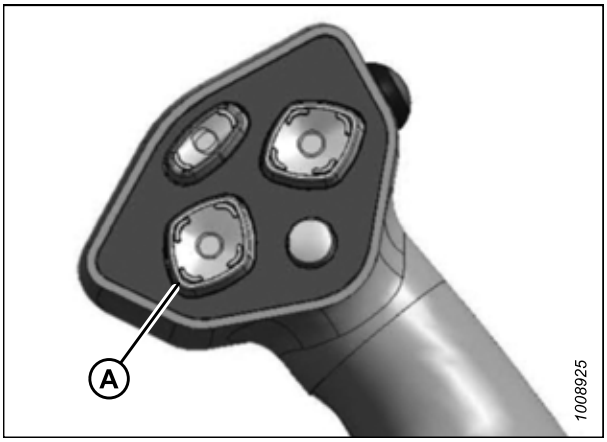


Figure 4.4: Ground Speed Lever

4. Press REEL UP switch (A) on the GSL to raise the center-link until the hook is above the attachment pin on the header.

   IMPORTANT:

   If the center-link is too low, it may contact the header as the windrower approaches the header for hookup.

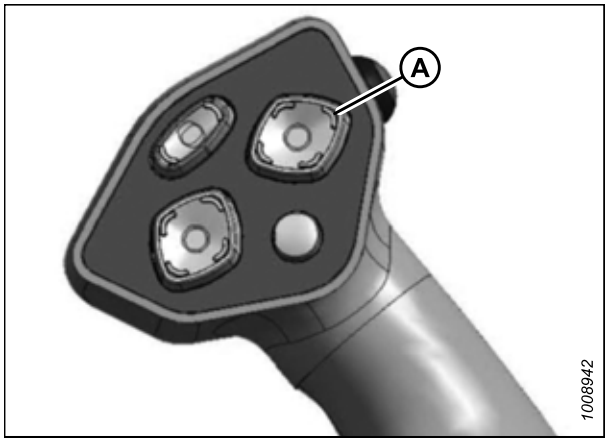


Figure 4.5: Ground Speed Lever

5. Drive the windrower slowly forward until header supports (A) enter header legs (B). Continue driving slowly forward until the lift linkages contact the support plates in the header legs and the header is nudged forward.

6. Ensure that the lift linkages are properly engaged in the header legs and are contacting the support plates.

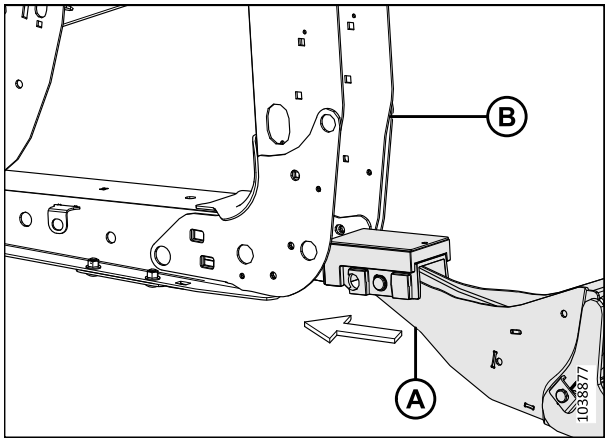


Figure 4.6: Header Leg and Boot

7. Use the following GSL functions to position the center-link hook above the header attachment pin:

   - REEL UP (A) to raise the center-link
   - REEL DOWN (B) to lower the center-link
   - HEADER TILT UP (C) to retract the center-link
   - HEADER TILT DOWN (D) to extend the center-link

   IMPORTANT:

   The hook release must be down to enable the self-locking mechanism. If the release is open (up), manually push it down after the hook engages the header pin.

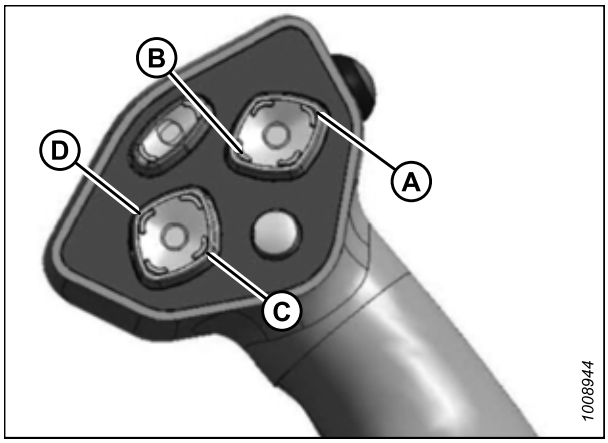


Figure 4.7: Ground Speed Lever

8. Lower center-link (A) onto the header with the REEL DOWN switch on the GSL until it locks into position (hook release [B] is down).

9. Check that center-link (A) is locked onto the header by pressing the REEL UP switch on the GSL.

DANGER

Ensure that all bystanders have cleared the area.

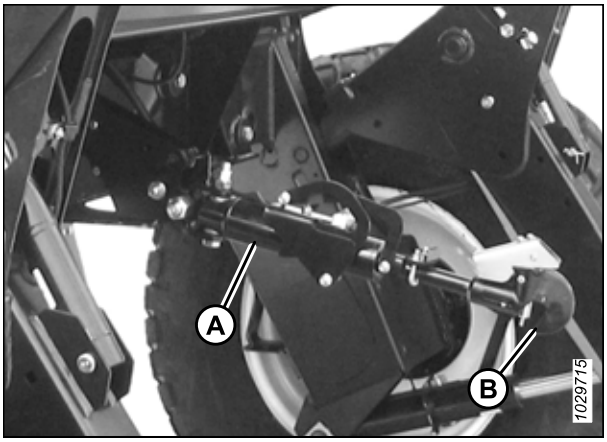


Figure 4.8: Hydraulic Center-Link

10. Press HEADER UP switch (A) to raise the header to its maximum height.

11. If one end of the header does **NOT** fully rise, rephase the lift cylinders as follows:

    a. Press and hold the HEADER UP switch until both cylinders stop moving.

    b. Continue to hold the switch for 3–4 seconds to fully phase the cylinders.

    NOTE:

    It may be necessary to repeat this procedure if there is air in the hydraulic system.

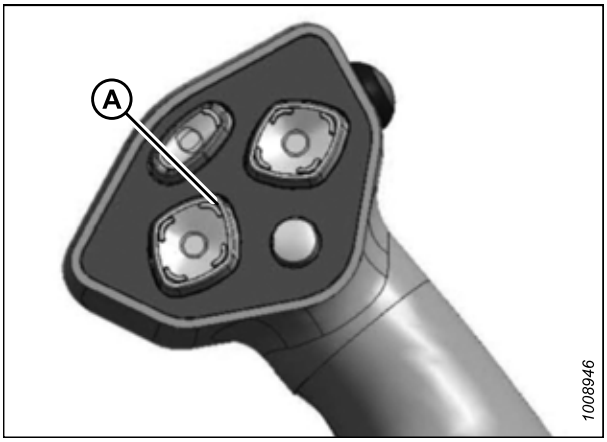


Figure 4.9: Ground Speed Lever

12. Engage the safety props on both lift cylinders:
    a. Shut down the engine, and remove the key from the ignition.
    b. Pull lever (A) and rotate it towards the header to release and lower safety prop (B) onto the lift cylinder.
    c. Repeat the previous steps for the opposite lift cylinder.

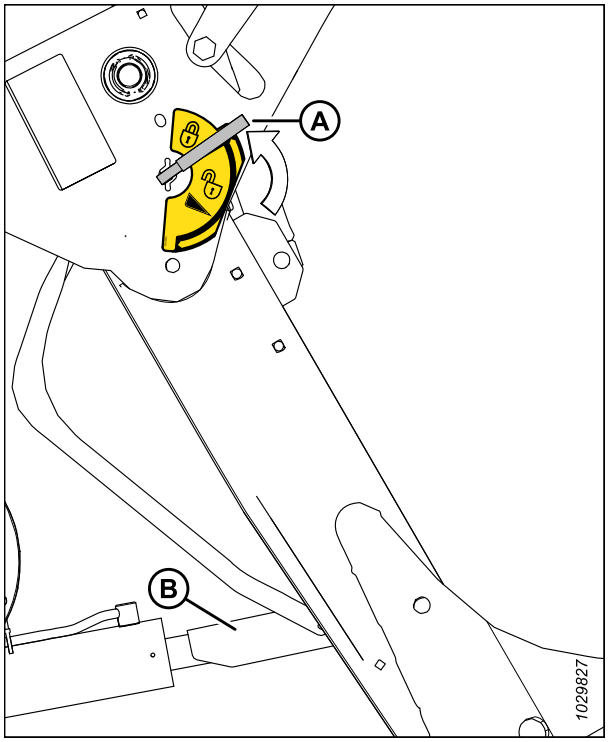


Figure 4.10: Safety Prop

13. Install pin (B) through the header leg, engaging the header support in the lift linkage. Secure the pin with ring (A).
14. Repeat the previous step on the other side of the header.

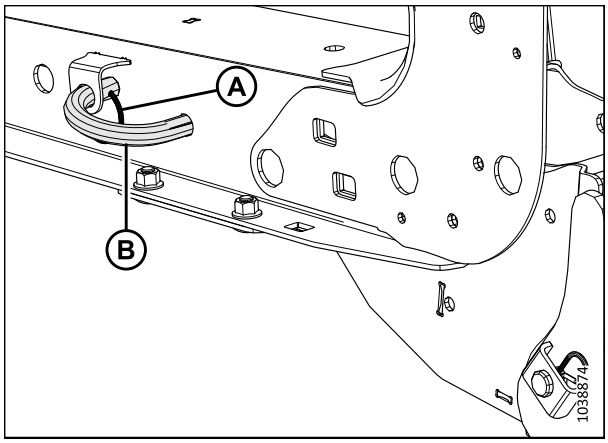


Figure 4.11: Header Leg

15. Remove the clevis pin from storage position (B) in the linkage and insert it into hole (A) to engage the float springs. Secure it with the hairpin. Repeat this step on the opposite float linkage.

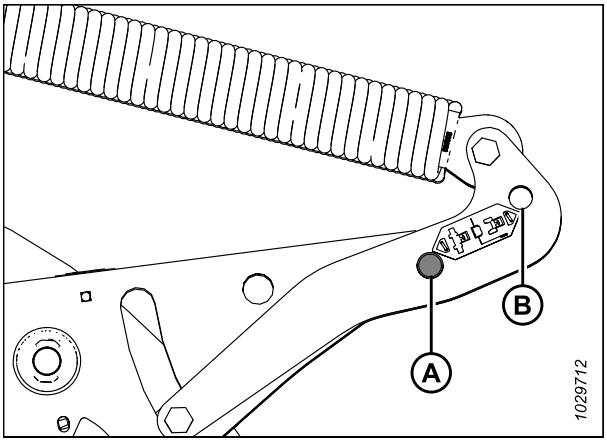


Figure 4.12: Header Float Linkage

16. Disengage the safety prop by turning lever (A) downwards until the lever locks into the vertical position.
17. Repeat the previous step to disengage the other safety prop.

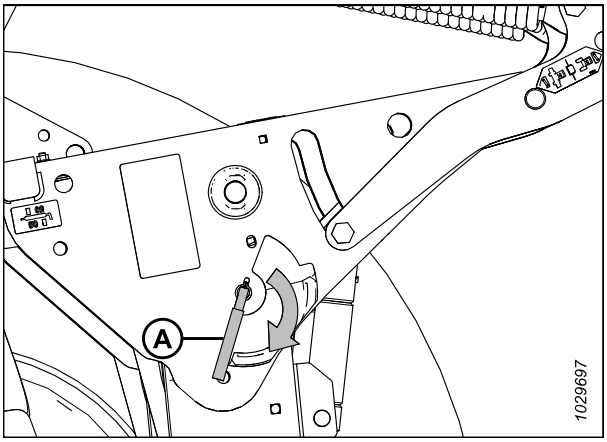


Figure 4.13: Safety Prop Lever

DANGER

Ensure that all bystanders have cleared the area.

18. Start the engine, and press HEADER DOWN switch (A) on the GSL to fully lower the header.
19. Stop the engine, and remove the key from the ignition.

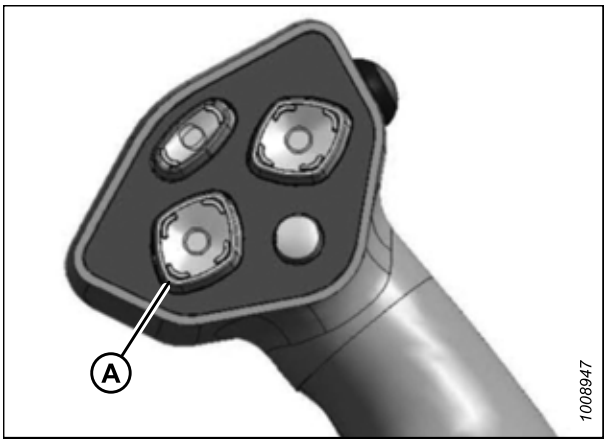


Figure 4.14: Ground Speed Lever

4.4 Attaching Header to an M Series Windrower – Hydraulic Center-Link without Self-Alignment

The header will need to be physically attached to the windrower, and the hydraulic connections completed. If the windrower is equipped with a hydraulic center-link that lacks the self-alignment capability, the Operator will have to manually attach the hydraulic center-link's hook to the header's center pin.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

1. Shut down the engine, and remove the key from the ignition.

DANGER

Ensure that all bystanders have cleared the area.

2. Start the engine and activate HEADER DOWN button (A) on the ground speed lever (GSL) to fully retract the header lift cylinders.

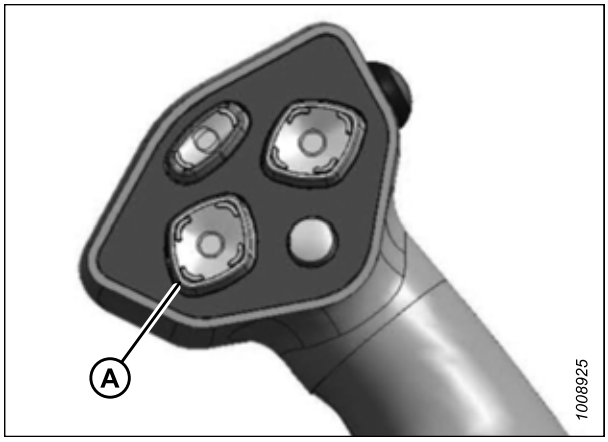


Figure 4.15: Ground Speed Lever

3. Remove pin (A) from the frame linkage and raise center-link (B) until the hook is above the attachment pin on the header. Replace pin (A) to hold the center-link in place.

   IMPORTANT:

   If the center-link is too low, it may contact the header as the windrower approaches the header for hookup.

4. Ensure that the lift linkages are properly engaged in the header legs and are contacting the support plates.

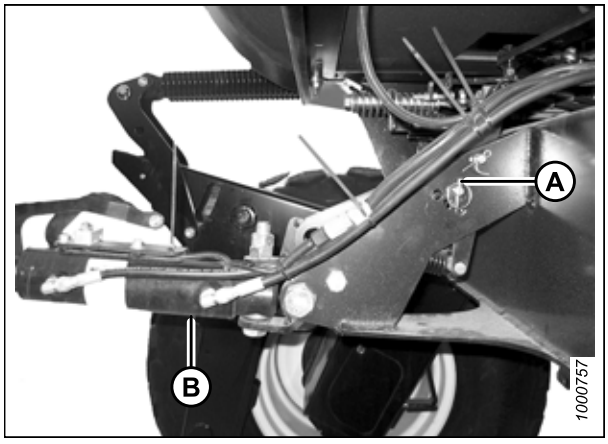


Figure 4.16: Hydraulic Center-Link

5. Use the following GSL functions to position the center-link hook above the header attachment pin:
   - HEADER TILT UP (A) to retract the center-link
   - HEADER TILT DOWN (B) to extend the center-link
6. Shut down the engine, and remove the key from the ignition.

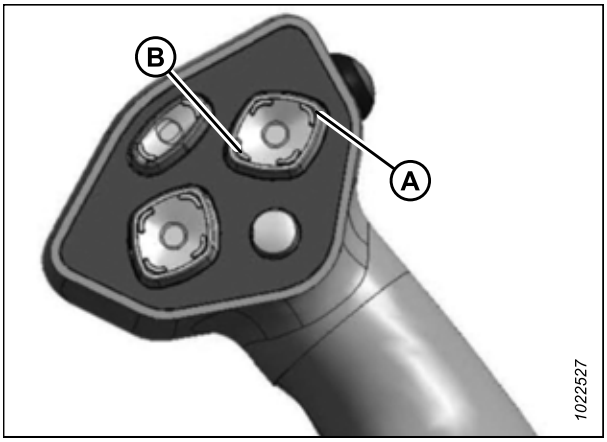


Figure 4.17: Ground Speed Lever

7. Push down on the rod end of link cylinder (A) until hook (B) engages and locks onto the header pin.

   IMPORTANT:

   The hook release must be down to enable the self-locking mechanism. If the release is open (up), manually push it down after the hook engages the header pin.
8. Check that center-link (A) is locked onto the header by pulling upward on the rod end of the cylinder.

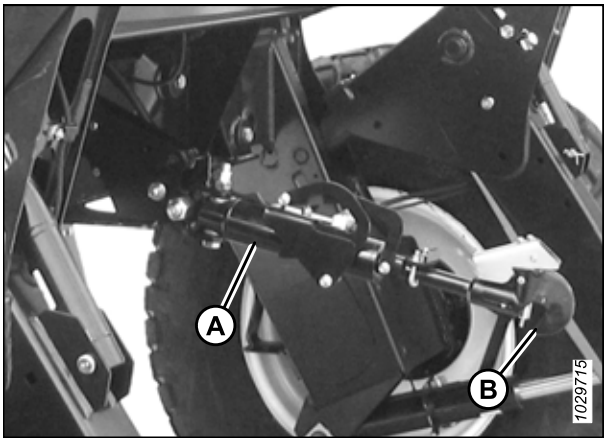


Figure 4.18: Hydraulic Center-Link

DANGER

Ensure that all bystanders have cleared the area.

9. Start the engine.
10. Press HEADER UP switch (A) to raise the header to its maximum height.
11. If one end of the header does **NOT** fully rise, rephase the lift cylinders as follows:
    a. Press and hold the HEADER UP switch until both cylinders stop moving.
    b. Continue to hold the switch for 3–4 seconds. The cylinders are now phased.

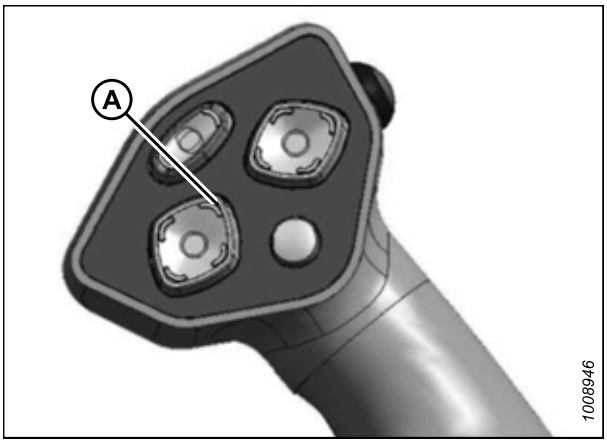


Figure 4.19: Ground Speed Lever

NOTE:

It may be necessary to repeat this procedure if there is air in the hydraulic system.

12. Engage the safety props on both lift cylinders:

    a. Shut down the engine, and remove the key from the ignition.

    b. Pull lever (A) and rotate it towards the header to release and lower safety prop (B) onto the lift cylinder.

    c. Repeat the previous steps for the opposite lift cylinder.

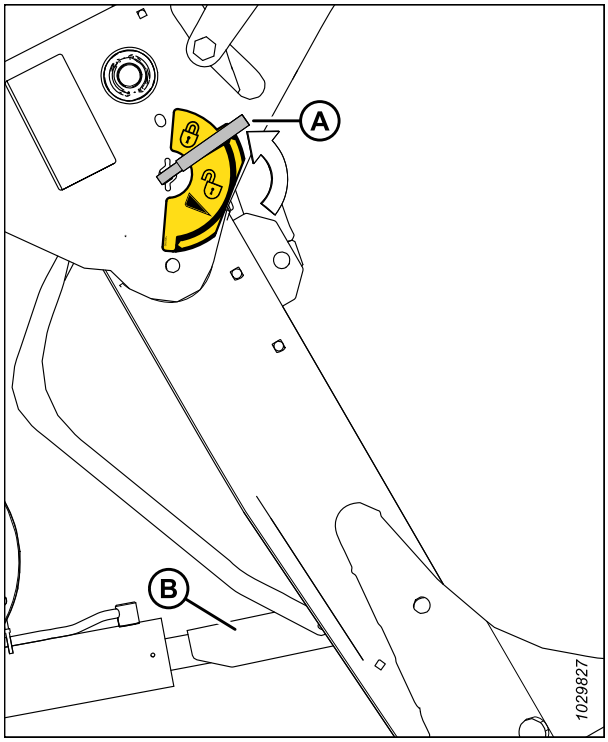


Figure 4.20: Safety Prop

13. Remove the clevis pin from storage position (B) in the linkage and insert it into hole (A) to engage the float springs. Secure it with the hairpin. Repeat this step on the opposite float linkage.

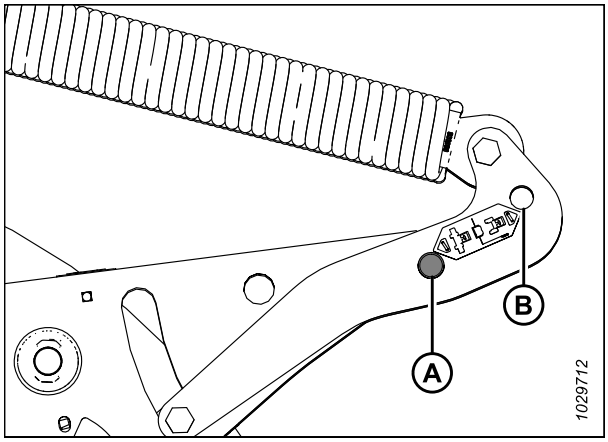


Figure 4.21: Header Float Linkage

14. Disengage the safety prop by turning lever (A) downwards until the lever locks into the vertical position.
15. Repeat the previous step to disengage the other safety prop.

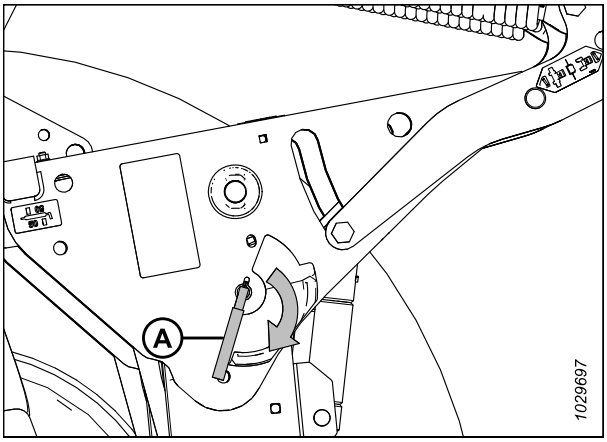


Figure 4.22: Safety Prop Lever

DANGER

Ensure that all bystanders have cleared the area.

16. Start the engine, and press HEADER DOWN switch (A) on the GSL to fully lower the header.
17. Shut down the engine, and remove the key from the ignition.

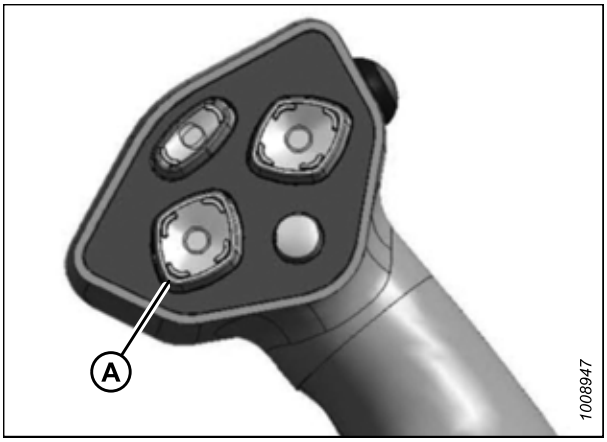


Figure 4.23: Ground Speed Lever

4.5 Attaching Header to an M Series Windrower – Mechanical Center-Link

To attach a D2 Series header for windrower to an M Series windrower equipped with a mechanical center-link, the center-link will need to be manually connected to the header's center pin.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

1. Shut down the engine, and remove the key from the ignition.
2. Remove ring (A) from pin (B), and remove the pin from the header leg. Repeat this step on the other side of the header.

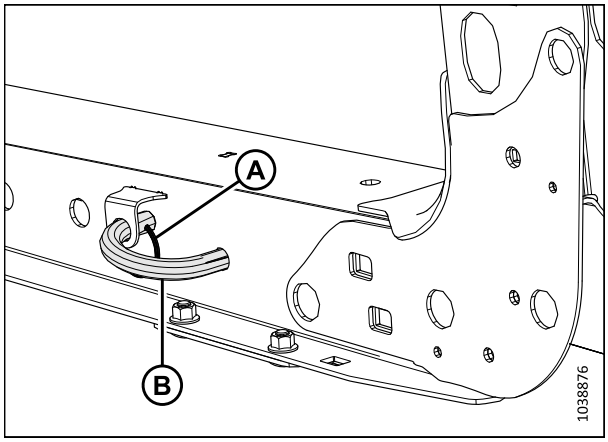


Figure 4.24: Header Leg

DANGER

Ensure that all bystanders have cleared the area.

3. Start the engine and activate HEADER DOWN button (A) on the ground speed lever (GSL) to fully retract the header lift cylinders.

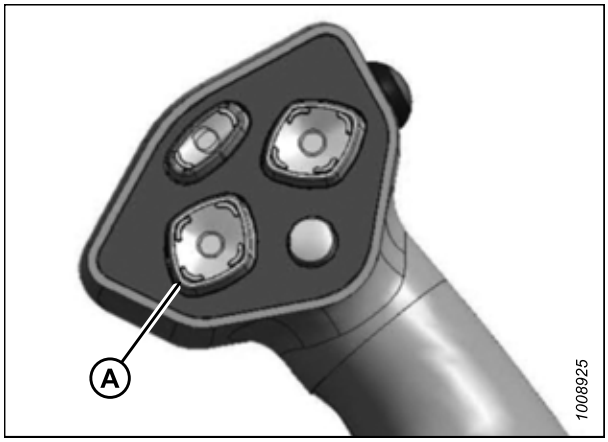


Figure 4.25: Ground Speed Lever

4. Drive the windrower slowly forward until header supports (A) enter header legs (B). Continue driving slowly forward until the lift linkages contact the support plates in the header legs and the header is nudged forward.
5. Ensure that the lift linkages are properly engaged in the header legs and are contacting the support plates.

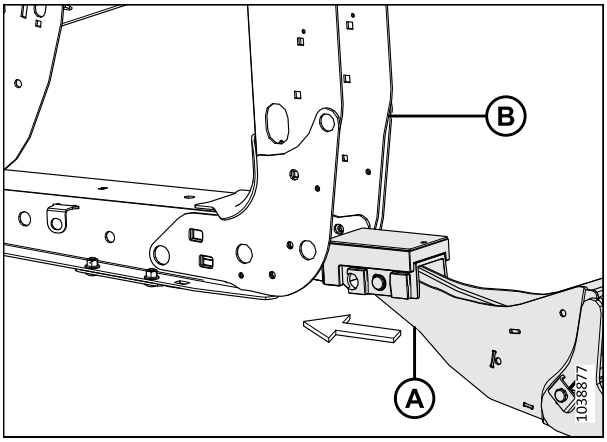


Figure 4.26: Header Leg and Boot

6. Shut down the engine, and remove the key from the ignition.
7. Loosen nut (A) and rotate barrel (B) to adjust length until the link is aligned with the header bracket.
8. Install clevis pin (C) and secure it with cotter pin (D).
9. Adjust the length of the link to achieve the proper header angle by rotating barrel (B). Tighten nut (A) against the barrel (a slight tap with a hammer is sufficient).

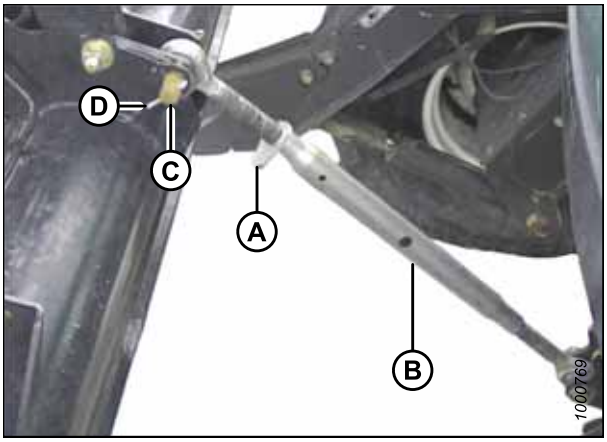


Figure 4.27: Mechanical Center-Link

DANGER

Ensure that all bystanders have cleared the area.

10. Start the engine.
11. Press HEADER UP switch (A) to raise the header to its maximum height.
12. If one end of the header does **NOT** fully raise, rephase the lift cylinders as follows:
    a. Press and hold the HEADER UP switch until both cylinders stop moving.
    b. Continue to hold the switch for 3–4 seconds. The cylinders are now phased.

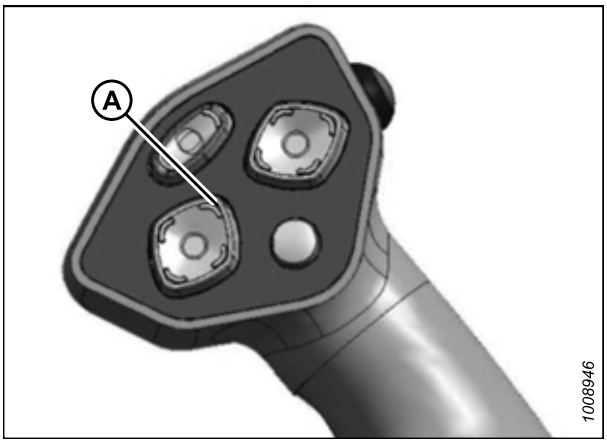


Figure 4.28: Ground Speed Lever

NOTE:

It may be necessary to repeat this procedure if there is air in the hydraulic system.

13. Engage the safety props on both lift cylinders:

    a. Shut down the engine, and remove the key from the ignition.

    b. Pull lever (A) and rotate it towards the header to release and lower safety prop (B) onto the lift cylinder.

    c. Repeat the previous steps for the opposite lift cylinder.

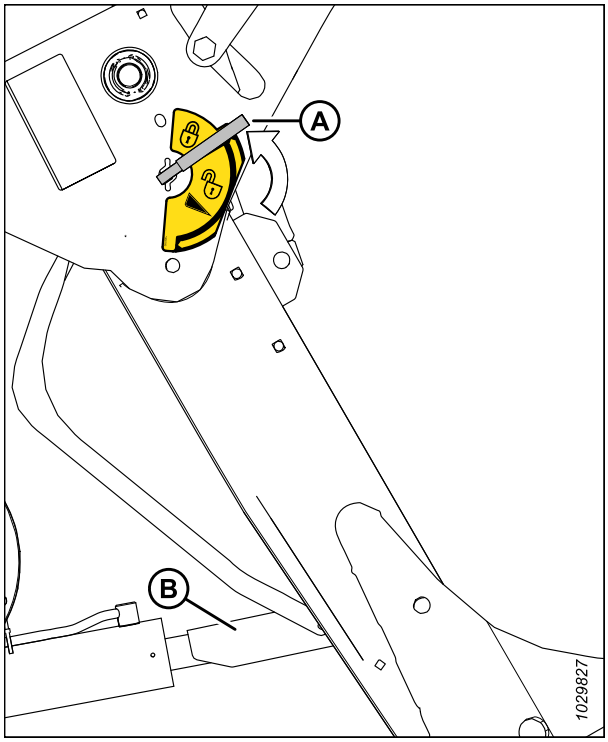


Figure 4.29: Safety Prop

14. Install pin (B) through the header leg, engaging the header support in the lift linkage. Secure the pin with ring (A).

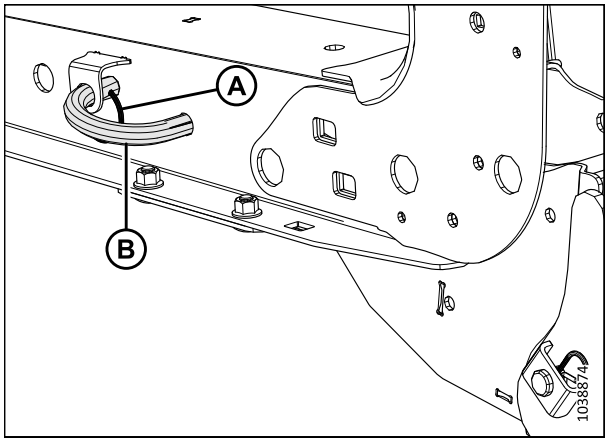


Figure 4.30: Header Leg

15. Remove the clevis pin from storage position (B) in the linkage and insert it into hole (A) to engage the float springs. Secure it with the hairpin. Repeat this step on the opposite float linkage.

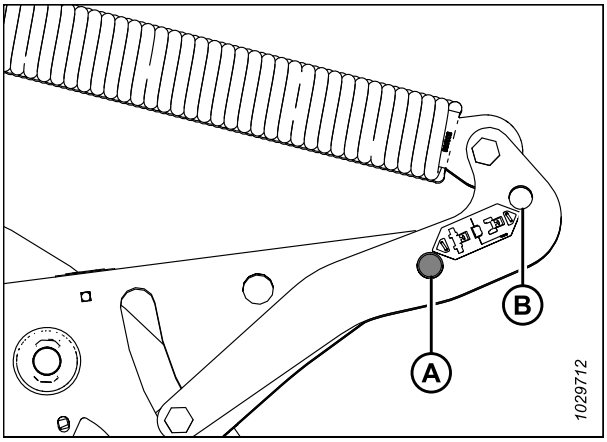


Figure 4.31: Header Float Linkage

16. Disengage the safety prop by turning lever (A) downwards until the lever locks into the vertical position.
17. Repeat the previous step to disengage the other safety prop.

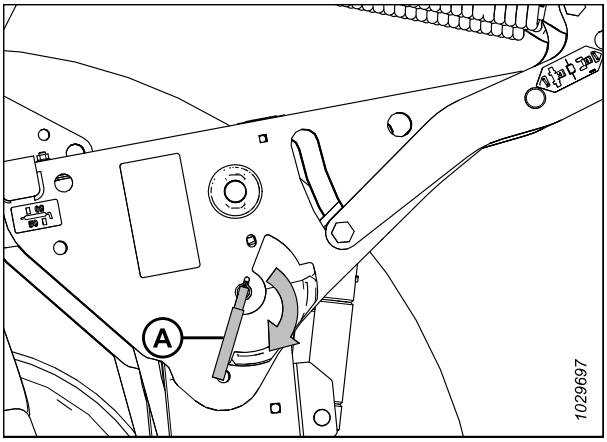


Figure 4.32: Safety Prop Lever

DANGER

Ensure that all bystanders have cleared the area.

18. Start the engine, and press HEADER DOWN switch (A) on the GSL to fully lower the header.
19. Shut down the engine, and remove the key from the ignition.

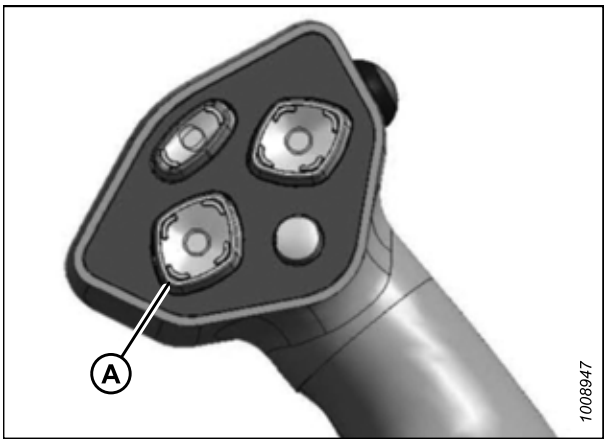


Figure 4.33: Ground Speed Lever

4.6 Connecting Header Hydraulic and Electrical Systems to an M Series Windrower

Header drive hydraulic hoses and electrical harness are located on the left cab-forward side of the windrower. The reel drive and control hoses are located on the right cab-forward side.

1. Before connecting header drive hydraulics (A) and electrical harness (B) to header, check fittings and connectors. Clean them if required.

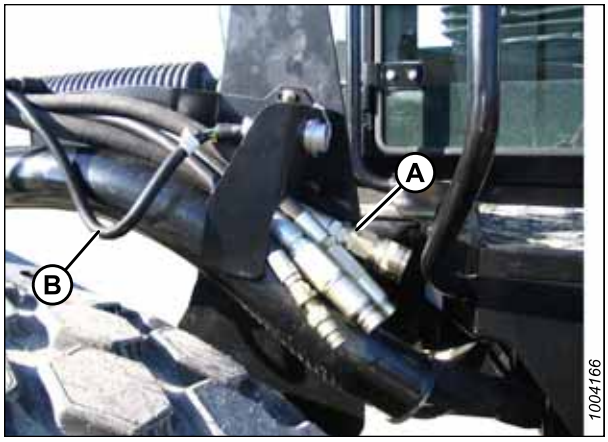


Figure 4.34: Header Drive Hoses

2. Disengage and rotate lever (A) counterclockwise to fully up position.
3. Remove cap (B) securing the electrical connector to the frame.
4. Move hose bundle (C) from the windrower hose support and route it along the header hose guide.

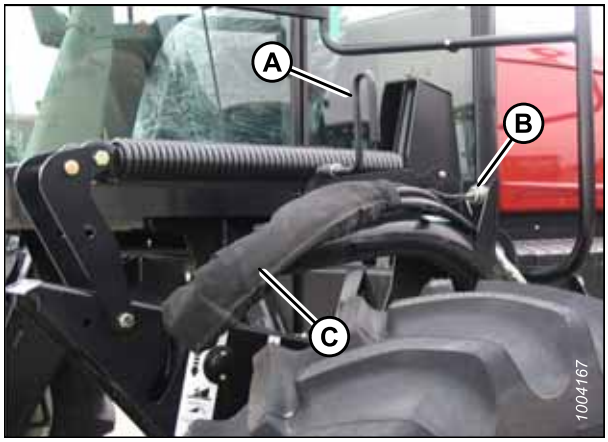


Figure 4.35: Header Drive Hoses

5. Push the hose connectors onto the mating receptacle until the collar on the receptacle snaps into locked position.
6. Remove the cover from electrical receptacle (A).
7. Push the electrical connector onto the receptacle and turn the collar on the connector to lock it in.
8. Attach the cover to the mating cover on the windrower's wiring harness.

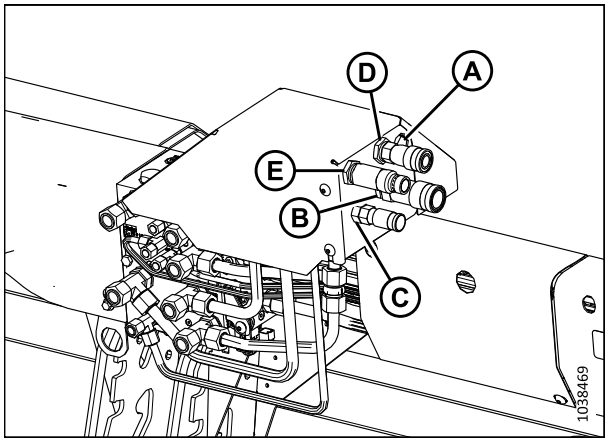


Figure 4.36: Header Receptacles

A - Electrical Receptacle
B - Knife Drive
C - Case Drain (Double Knife)
D - Draper Drive
E - Return

9. Lower lever (A) and engage it in down position.

Figure 4.37: Hose Storage

10. Before connecting the reel hydraulics, check the fittings. If the fittings are dirty, clean them.

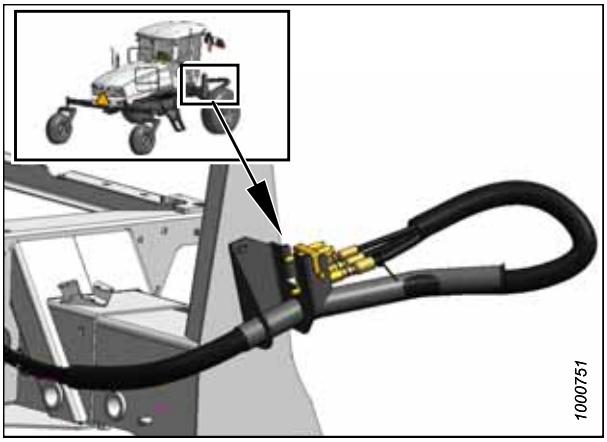


Figure 4.38: Reel Hose Storage

11. Open cover (A) on header receptacle (B).
12. Push in lock button (C) and pull handle (D) to the half-open position.

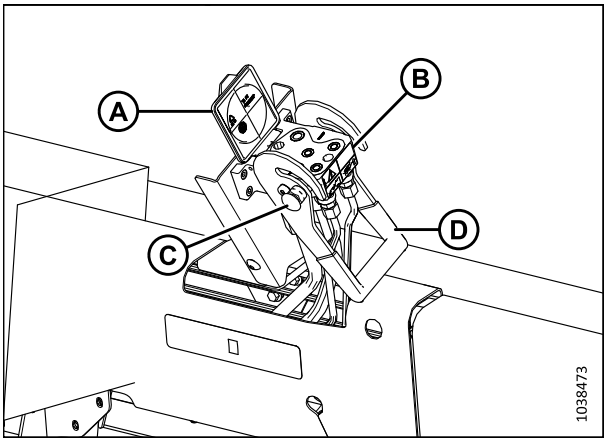


Figure 4.39: Reel Hydraulics Receptacle

13. Remove the hose bundle with multicoupler (C) from the windrower, place the multicoupler onto the header receptacle, and push handle (B) to engage the connector pins.

14. Push the handle away from the hoses until lock button (A) snaps out.

15. Raise and lower the header and the reel a few times to allow trapped air to pass back to the reservoir.

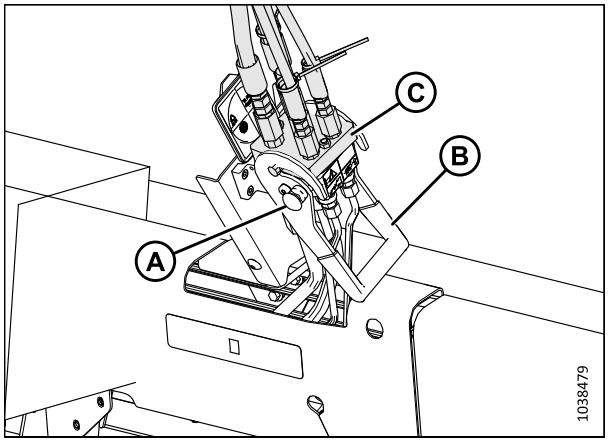


Figure 4.40: Reel Hose Connection

Chapter 5: Attaching Header to M1 Series Windrower

To attach a D2 Series Draper Header for windrower to an M1 Series Windrower, follow the procedures provided here in the order presented.

5.1 Adding Rear Ballast Weights

An M1 Series Windrower paired with a large header needs rear ballast in order to maintain its balance. Ballast can be added to the windrower using a ballast kit.

Ballast kits include eight counterweights and the necessary mounting hardware. A ballast kit adds 163 kg (360 lb.) of weight to the rear of the header. An M1 Series Windrower can be equipped with a maximum of 24 counterweights, for a total possible ballast weight of 490 kg (1080 lb.).

Table lists the number of counterweight kits required for each D2 Series configuration when the header is paired with an M1 Series Windrower. Install the counterweights according to the instructions supplied with each kit.

IMPORTANT:

Attach the counterweights to the windrower **BEFORE** attaching the header.

Table 5.1 Ballast Kits Required for M1 Series Windrowers Paired with D2 Series Headers

Header Type	Description	Header Configuration	Initial Rear Ballast Kit[3]	Additional Rear Ballast Kits[4]
D215	4.6 m (15 ft.) single reel, double knife, timed	Base	—	—
D220	6.1 m (20 ft.) single reel, double knife, timed	Base	—	—
D225	7.6 m (25 ft.) single reel, double knife, timed	Base	1	—
D230	9.1 m (30 ft.) double reel, double knife, timed	Base	1	—
		Transport	1	1
		Transport, Upper cross auger, Vertical knives	1	1
D235	10.7 m (35 ft.) double reel, single knife	Base	1	1
		Transport	1	2
		Transport, Upper cross auger, Vertical knives	1	2
D235	10.7 m (35 ft.) double reel, double knife, timed	Base	1	2
		Transport	1	2
		Transport, Upper cross auger, Vertical knives	1	2
D241	12.5 m (41 ft.) double reel, double knife, timed	Base	1	2

3. Consists of 1 package of weights (M1170, M1240: B6053, M1170NT5: B9070)
4. Consists of 2 packages of weights (M1170, M1240: B6054)

5.2 Adding Tire Ballast

Adding fluid ballast to the windrower's caster tires will improve the windrower's stability when it is paired with a large header.

With respect to ballast capacity, a tire is considered to be full of ballast fluid when 75% of the inner volume of the tire is occupied by ballast fluid, or else when the ballast fluid is level with the wheel's valve stem when the stem is positioned at the 12 o'clock position and the windrower is on level ground. When adding ballast fluid to the caster wheels, always add an identical amount to each wheel. The caster wheels can safely hold any volume of ballast fluid up to and including their maximum capacity, as specified in the table below.

Table 5.2 Ballast Fluid Capacity of Various Caster Wheel Tires

Tire Size	Ballast Fluid Volume per Tire at 75% Capacity Liters (US gal.)	Total Weight of Ballast Fluid in Both Tires When Filled to 75% Capacity kg (lb.)[5]
7.5 x 16	38 (10)	91 (200)
10 x 16	69 (18)	170 (380)
16.5 x 16.1	158 (41)	377 (830)

Table 5.3 Recommended Ballast

Header Size	Applicable Windrower	Rec. Tire Size	Recommended Ballast			
			Level Ground		Hills	
			Fluid Per Tire liters (U.S. Gal.)	Both Tires kg (lb.)[6]	Fluid Per Tire liters (U.S. Gal.)	Both Tires kg (lb.)[6]
D215	All	7.5 x 16 10 x 16 16.5 x 16.1	0	0	0	0
D220, D225	All	Level ground: 10 x 16 16.5 x 16.1 Hills: 16.5 x 16.1	69 (18)	170 (380)	115 (30)	288 (630)
D230, D235, D241	All	16.5 x 16.1	158 (41)	377 (830)	158 (41)	377 (830)

5. The weights provided in this column rely on the assumption that the tires will be filled with a standard mixture of calcium chloride and water. If you intend to fill the tire with only water (for example, in regions where the ambient temperature does not fall below freezing), then multiply the relevant fill weight specified in this column by 0.8 to learn the weight of both tires when they are filled with water alone.
6. The weights provided in this column rely on the assumption that the tires will be filled with a standard mixture of calcium chloride and water. If you intend to add water alone, then increase the volume of water added by 20% (up to the maximum allowable volume per tire) to compensate for the difference in density between calcium chloride and water.

5.3 Attaching Draper Header Supports

Draper header supports are required to attach a D2 Series draper header for windrower to an M or M1 Series Windrower.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

1. Shut down the engine, and remove the key from the ignition.
2. Remove the hairpin from clevis pin (B) on draper header support (A). Remove clevis pin (B).

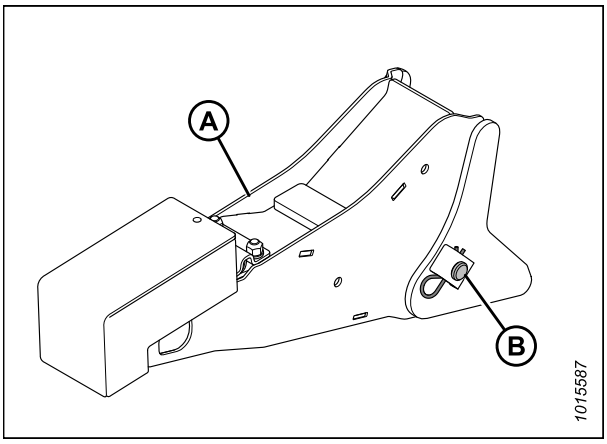


Figure 5.1: Draper Header Support

3. Position draper header support (B) on windrower lift linkage (A). Reinstall clevis pin (C).

   NOTE:

   To ensure that the pin doesn't snag the windrow, install the clevis pin on the outboard side of the draper header support.

4. Secure clevis pin (C) with hairpin (D).
5. Repeat Step *2, page 61* to Step *4, page 61* to install the remaining draper header support.

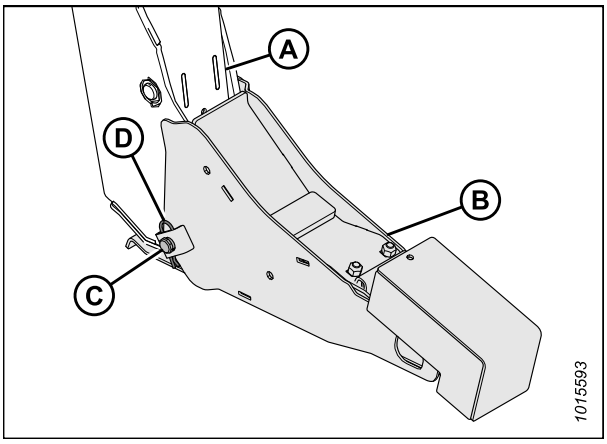


Figure 5.2: Draper Header Support

5.4 Connecting Center-Link

The windrower's support feet and center-link will need to be connected to the draper header. The windrower may be equipped with an optional self-aligning hydraulic center-link, which allows control over the vertical position of the center-link from the cab.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

1. Shut down the engine, and remove the key from the ignition.
2. **Windrowers without the self-aligning center-link kit:** Relocate pin (A) in the frame linkage as needed to raise center-link (B) until the hook is above the attachment pin on the header.

   IMPORTANT:

   Ensure that the center-link is positioned high enough that it does not contact the header as the windrower approaches the header.

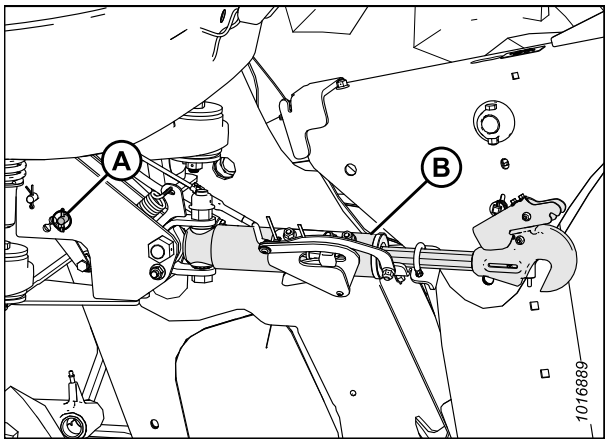


Figure 5.3: Center-Link without Self-Alignment

3. Remove ring (A) from pin (B), and remove pin (B) from the header leg. Repeat this step on the opposite header leg.

DANGER

Ensure that all bystanders have cleared the area.

4. Start the engine.

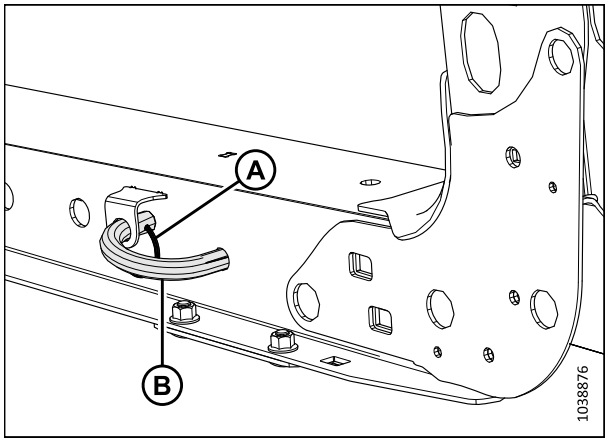


Figure 5.4: Header Leg

5. **If the header lift legs will be lowered WITH a header or weight box attached**, proceed to Step *9, page 64*.

   If the header lift legs will be lowered WITHOUT a header or weight box attached to the windrower, fully release the tension in header float springs (A):

   - If the Harvest Performance Tracker (HPT) displays a message saying that the float should be removed, then remove the float and proceed to Step *9, page 64*.
   - If the HPT does **NOT** display a message saying that the float should be removed, then proceed to Step *6, page 63* to remove the float manually.

   IMPORTANT:

   To lower the header lift legs without a header or weight box attached to the windrower, ensure that the tension on the float springs is fully released. This will prevent damage to the header lift linkages.

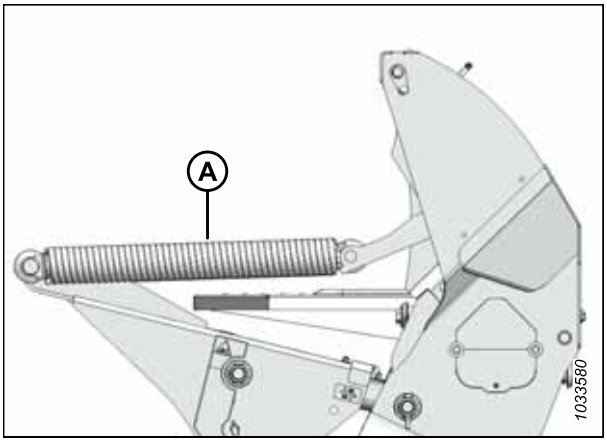


Figure 5.5: Header Float Springs

6. In the windrower cab, press scroll knob (A) on the HPT to display the QuickMenu page.

7. Rotate scroll knob (A) to highlight HEADER FLOAT symbol (B) and press the scroll knob to select it.

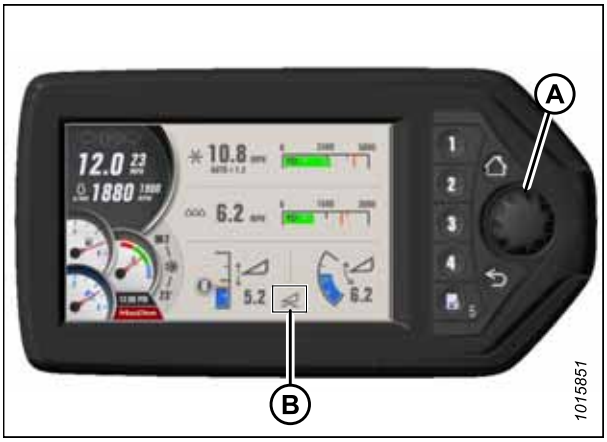


Figure 5.6: HPT Display

8. On the FLOAT ADJUST page, press soft key 3 (A) to disable the float.

Figure 5.7: HPT Display

9. **Windrowers equipped with the self-aligning center-link kit:**

   a. Press HEADER DOWN switch (E) on the ground speed lever (GSL) to fully retract the header lift cylinders.

   b. Press REEL UP switch (B) on the GSL to raise the center-link until the hook is above the attachment pin on the header.

   IMPORTANT:

   If the center-link is too low, it may contact the header as the windrower approaches the header.

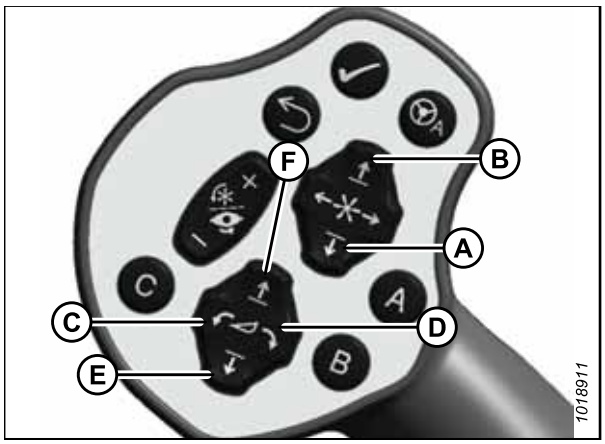


Figure 5.8: GSL Switches

A - Reel Down
B - Reel Up
C - Header Tilt Down
D - Header Tilt Up
E - Header Down
F - Header Up

10. Drive the windrower slowly forward until draper header supports (A) enter header legs (B). Continue driving slowly forward until the lift linkages contact the support plates in the header legs and the header is nudged forward.

11. Ensure that the lift linkages are properly engaged in the header legs and are in contact with the support plates.

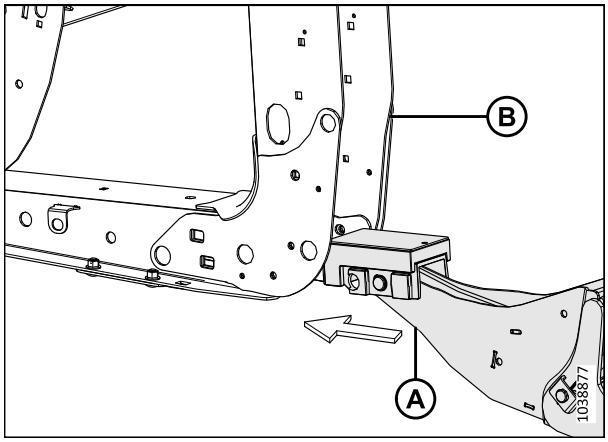


Figure 5.9: Header Leg and Draper Header Support

12. **Windrowers equipped with the self-aligning center-link kit:**

   a. Adjust the position of center-link cylinder (A) with the switches on the GSL until hook (B) is above the header attachment pin.

   IMPORTANT:

   Hook release (C) must be down to enable the self-locking mechanism to function.

   b. If hook release (C) is open (in the up position), shut down the engine, and remove the key from the ignition. Manually push hook release (C) down after the hook engages the header pin.

   c. Lower center-link (A) onto the header with the REEL DOWN switch on the GSL until the center-link locks into position and hook release (C) is down.

   d. Check that the center-link is locked onto the header by pressing the REEL UP switch on the GSL.

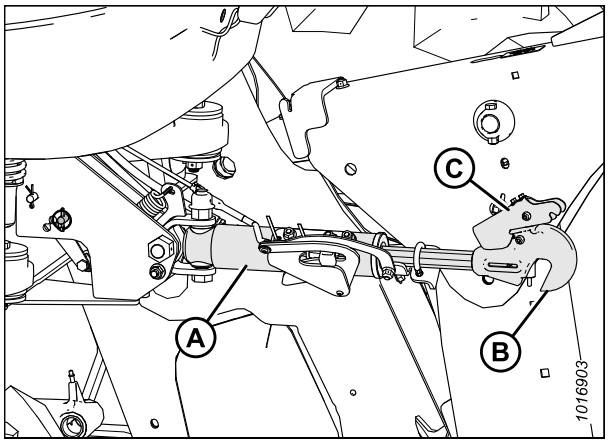


Figure 5.10: Hydraulic Center-Link

13. **Windrowers without the self-aligning center-link kit:**

    a. Press the HEADER TILT UP or HEADER TILT DOWN cylinder switches on the GSL to extend or retract the center-link cylinder until the hook is aligned with the header attachment pin.

    b. Shut down the engine, and remove the key from the ignition.

    c. Push down on rod end (B) of the link cylinder until the hook engages and locks onto the header pin.

    IMPORTANT:

    The hook release must be down to enable the self-locking mechanism to function. If the hook release is open (in the up position), manually push it down after the hook engages the pin.

    d. Check that center-link (A) is locked onto the header by pulling upward on rod end (B) of the cylinder.

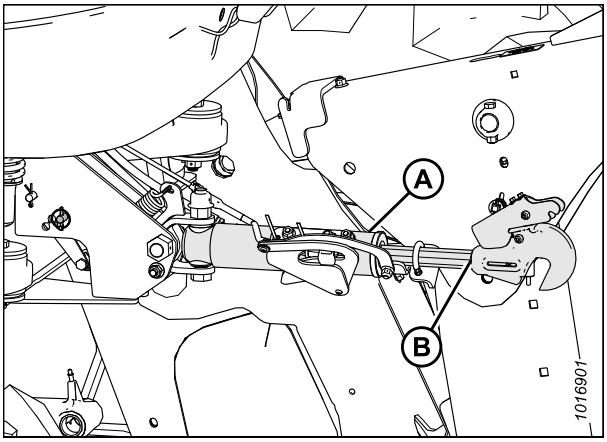


Figure 5.11: Hydraulic Center-Link

DANGER

Ensure that all bystanders have cleared the area.

    e. Start the engine.

14. Press HEADER UP switch (A) to raise the header to its maximum height.

15. Shut down the engine, and remove the key from the ignition.

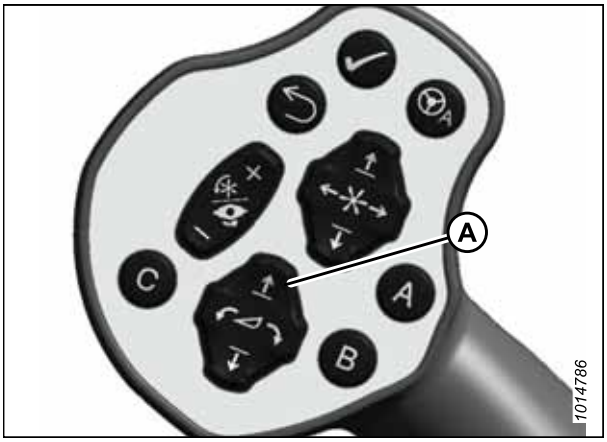


Figure 5.12: GSL

16. Engage the safety props on both lift cylinders as follows:

    a. Pull lever (A) toward you to release it, and then rotate it toward the header to lower the safety prop onto the cylinder.

    b. Repeat the previous step for the opposite lift cylinder.

    IMPORTANT:

    Ensure that the safety props engage over the cylinder piston rods. If the safety prop does **NOT** engage properly, raise the header until the safety prop fits over the rod.

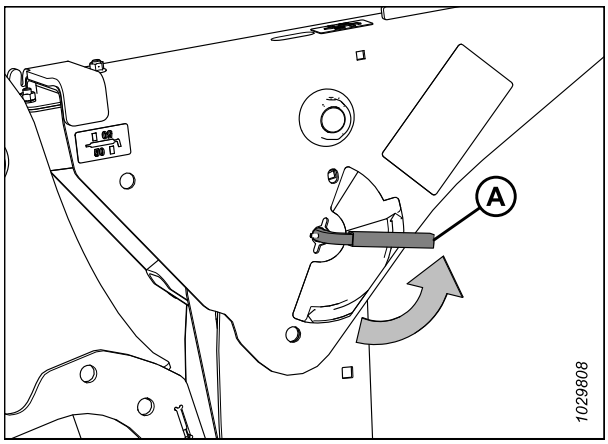


Figure 5.13: Safety Prop Lever

17. Install pin (B) through the header leg. Ensure that the pin engages the U-bracket in the draper header support. Secure the pin with ring (A). Repeat this step on the other side of the header.

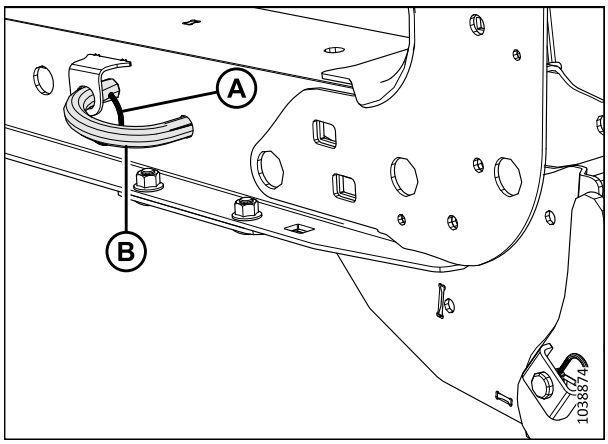


Figure 5.14: Header Leg

18. Disengage the safety props on both lift cylinders as follows:

    a. Turn lever (A) away from the header to raise the safety prop until the lever locks into the vertical position.

    b. Repeat the previous step for the opposite cylinder.

    NOTE:

    If the safety prop will **NOT** disengage, raise the header to release the prop.

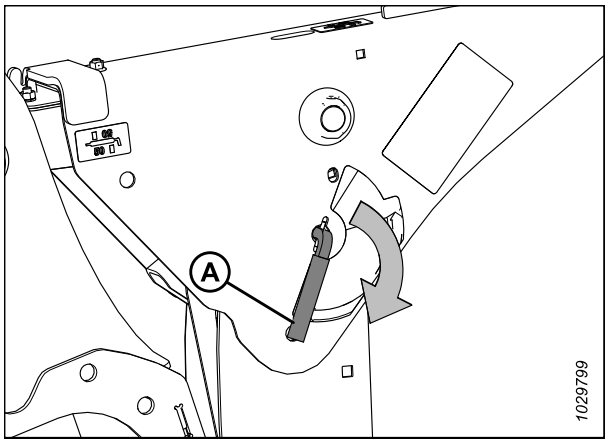


Figure 5.15: Safety Prop Lever

DANGER

Ensure that all bystanders have cleared the area.

19. Start the engine and press HEADER DOWN switch (A) on the GSL to fully lower the header.

20. Shut down the engine, and remove the key from the ignition.

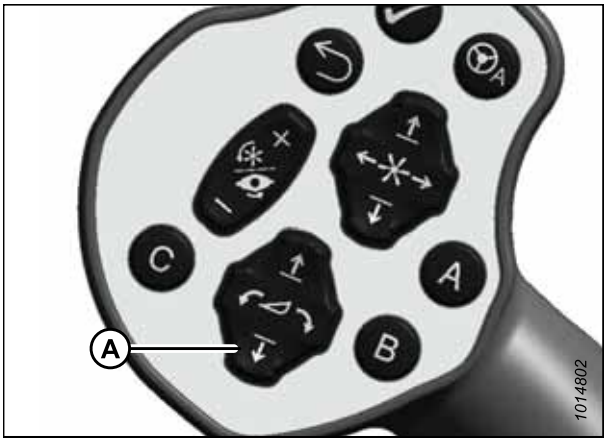


Figure 5.16: GSL

5.5 Connecting Hydraulics

The header's hydraulic hose multicoupler will need to be connected to the windrower.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

IMPORTANT:

To prevent contamination of the hydraulic system, use a clean rag to remove dirt and moisture from all hydraulic couplers.

1. Shut down the engine, and remove the key from the ignition.
2. Approach platform (A) on the left cab-forward side of the windrower. Ensure that the cab door is closed.
3. Push latch (B) and pull platform (A) toward the walking beam until it stops and the latch engages.

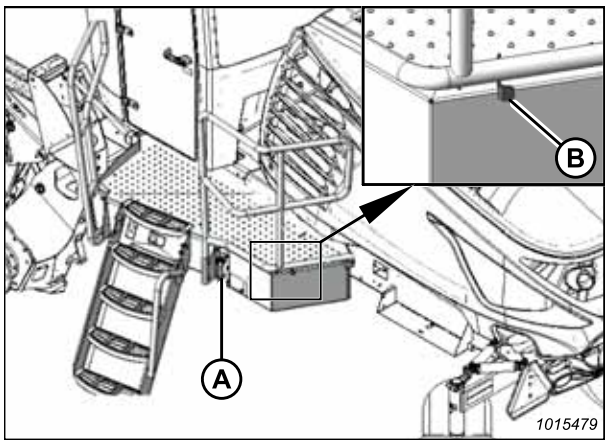


Figure 5.17: Left Cab-Forward Platform

4. **All draper headers except D215:** Push lever (A) up and pull arm (B) to get pin (C) out of latch (D).

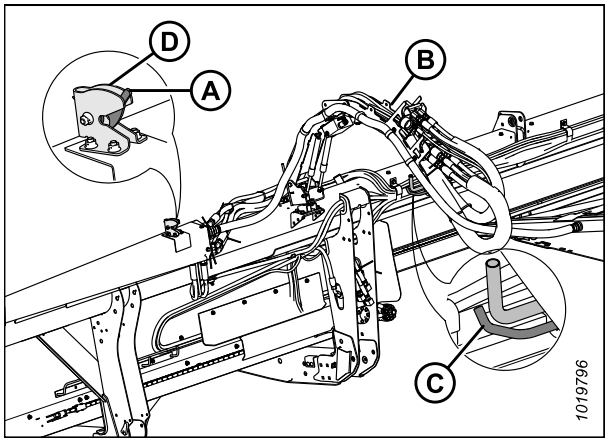


Figure 5.18: Hydraulic Hose Management System – All Headers Except D215

5. **D215 Draper Headers:** Pull hydraulic hose management system (A) towards the left outboard end of the header, disengage ball stud (B) from the cradle in support (C).

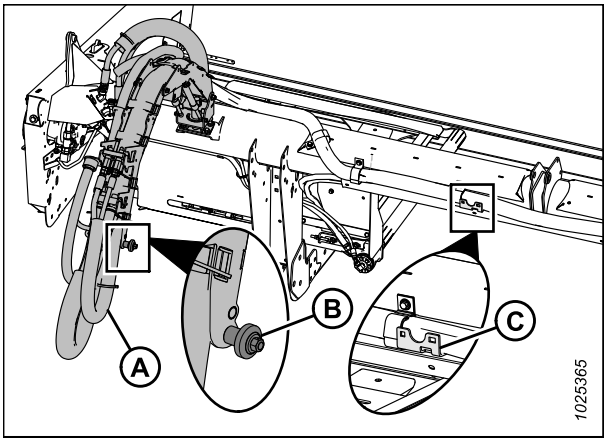


Figure 5.19: Hydraulic Hose Management System – D215

6. Push the link on latch (C) and pull handle (A) on hydraulic hose management system (B) rearward to disengage the arm from the latch.
7. Move hydraulic hose management system (B) toward the left cab-forward side of the windrower.

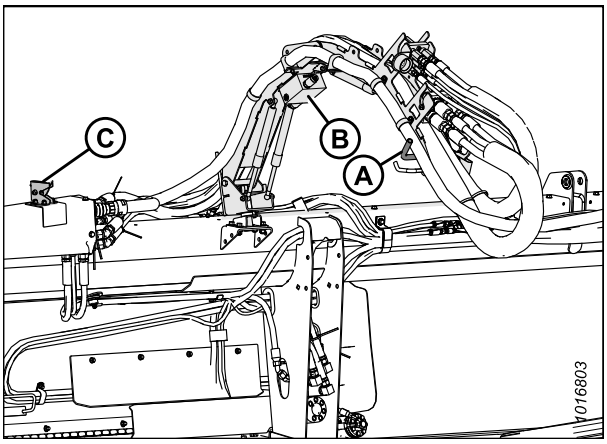


Figure 5.20: Hydraulic Hose Management System

8. Connect hydraulic hose management system (A) to the left outer leg of the windrower by pushing ball stud (B) into ball stud latch (C).

   NOTE:

   The hydraulic hoses have been removed from the illustration for clarity.

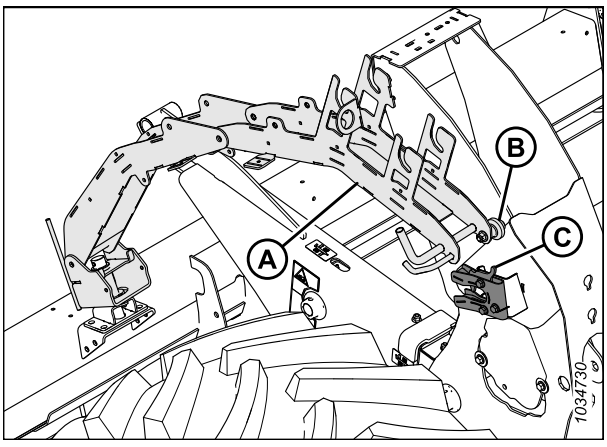


Figure 5.21: Windrower Left Outer Leg

9. Retrieve draper drive and reel control multicoupler (A) from the hydraulic hose management system.

10. Push knob (B) on the hydraulic receptacle and pull handle (C) fully away from the windrower.

11. Open cover (D) and position the coupler onto the receptacle. Align the pins in the coupler with the slots in handle (C) and push the handle toward the windrower so that the coupler locks onto the receptacle and knob (B) pops out.

12. Remove the cover from electrical connector (E), push the electrical connector onto the receptacle, and secure it by turning the collar on the electrical connector clockwise.

13. Remove hose quick disconnect (F) from its storage location and connect it to the receptacle on the frame.

    NOTE:

    Hose quick disconnect (F) is only present on M1240 Windrowers configured for draper headers and on M1170 Windrowers configured for rotary disc headers.

14. Retrieve knife and reel drive multicoupler (A) from the hydraulic hose management system.

15. Push knob (B) on the hydraulic receptacle and pull handle (C) fully away from the windrower.

16. Open cover (D) and position the coupler onto the receptacle. Align the pins in the coupler with the slots in handle (C), and push the handle toward the windrower so that the coupler locks onto the receptacle and knob (B) snaps out.

17. Ensure that the hydraulic hose routing is as straight as possible.

    IMPORTANT:

    Straight routing will prevent abrasion damage to the hydraulic hoses.

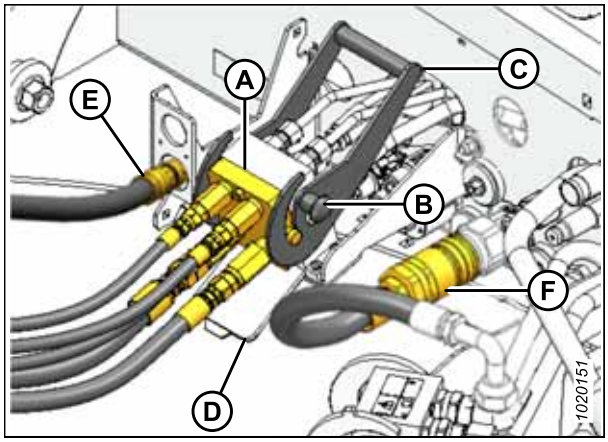


Figure 5.22: Draper/Reel Multicoupler

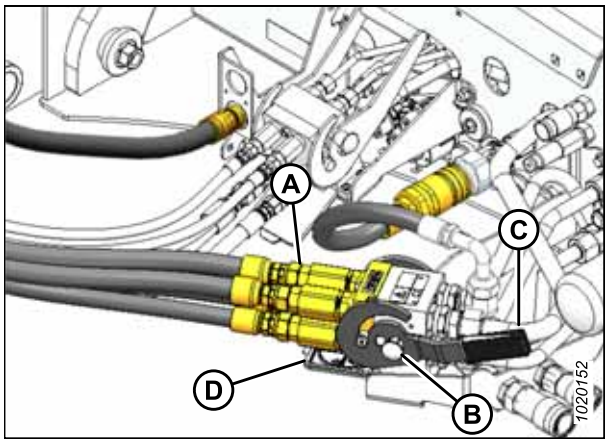


Figure 5.23: Knife/Reel Drive Multicoupler

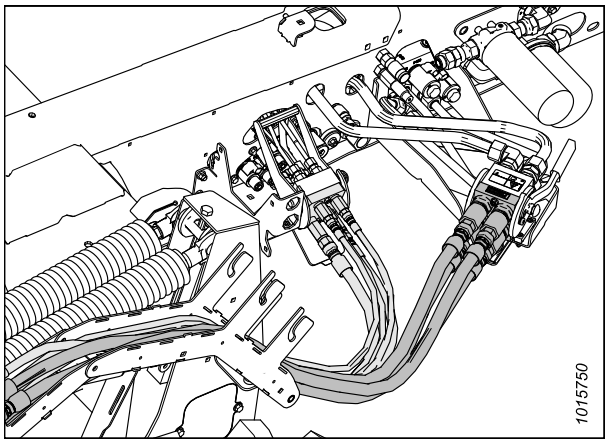


Figure 5.24: Hydraulic Multicouplers and Hose Routing

18. Push latch (A) to unlock platform (B).

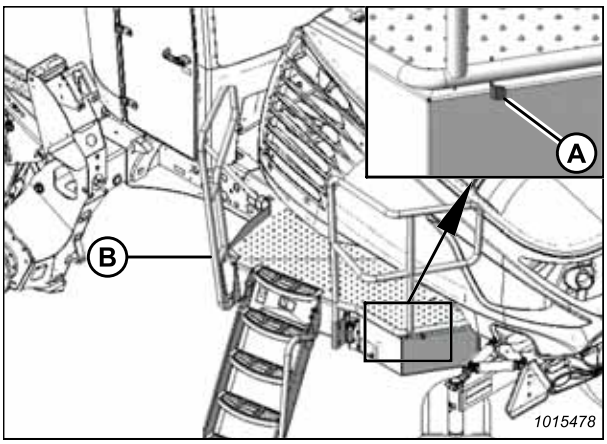


Figure 5.25: Left Cab-Forward Platform

19. Pull platform (A) toward the cab until it stops and the latch is engaged.

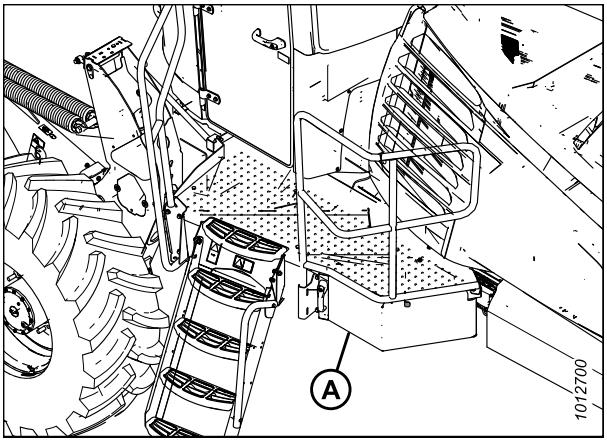


Figure 5.26: Left Cab-Forward Platform

Chapter 6: Completing Header Assembly

The header will need further assembly before it can be run up and tested.

6.1 Installing Clearance Lights

Clearance lights are used when transporting the header. They are secured to the sides of the reel arms for shipping purposes and must be repositioned for field use.

DANGER

To prevent bodily injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before making adjustments to the machine.

1. Shut down the engine, and remove the key from the ignition.
2. Retrieve previously removed left clearance light assembly (A).
3. Remove two M10 locking flange nuts (C) and two M10 X 1.5 X 35 mm bolts (B).

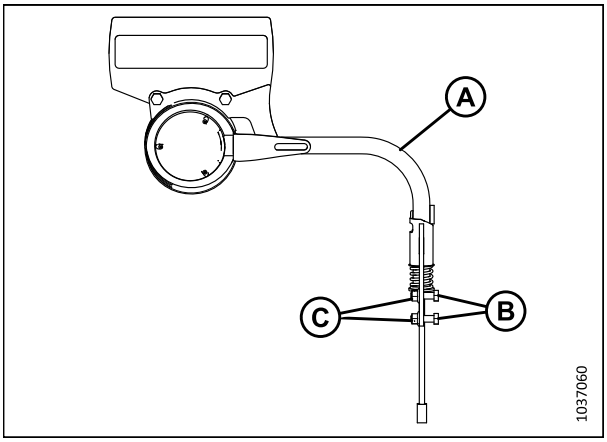


Figure 6.1: Left Clearance Light

4. Position left clearance light assembly (A) on the outboard side of the left reel arm support.
5. Secure left clearance light assembly (A) to the left reel arm support with two M10 X 1.5 X 35 mm bolts (B) and two M10 locking flange nuts (C).
6. Connect electrical harness (D) to the header harness.

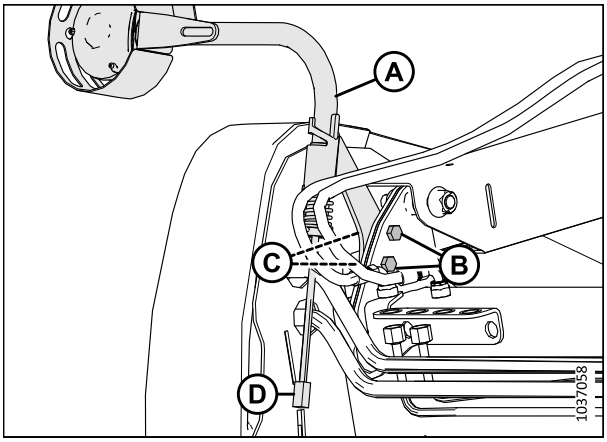


Figure 6.2: Left Clearance Light

7. Retrieve previously removed right clearance light assembly (A).
8. Remove two M10 locking flange nuts (C) and M10 X 1.5 X 35 mm bolts (B).

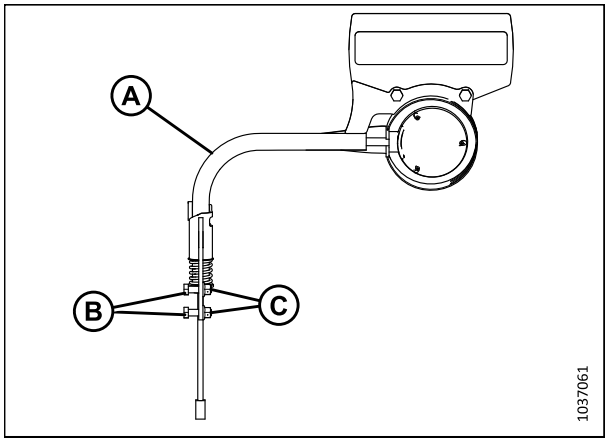


Figure 6.3: Right Clearance Light

9. Position right clearance light assembly (A) on the outboard side of the right reel arm support.
10. Secure right clearance light assembly (A) to the right reel arm support with two M10 X 1.5 X 35 mm bolts (B) and two M10 locking flange nuts (C).
11. Connect electrical harness (D) to the header harness.
12. Proceed to the next appropriate procedure for your header:
    - *6.3 Connecting Reel to Fore-Aft Cylinders – Single-Reel, page 78*
    - *6.4 Connecting Reel to Fore-Aft Cylinders – Double-Reel (Parts Bags MD #347593, MD #347580), page 83*

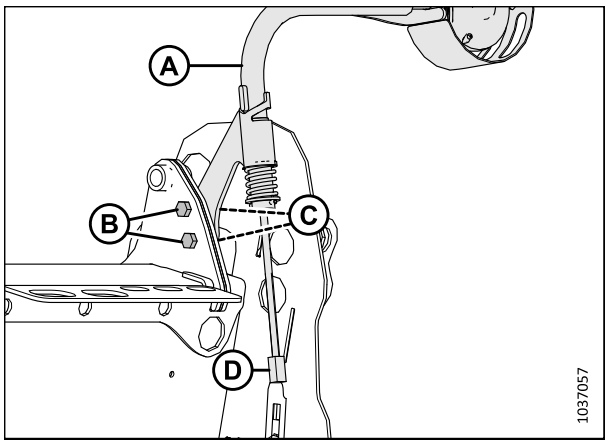


Figure 6.4: Right Clearance Light

6.2 Installing Fore-Aft Indicator and Sensor Spring (Parts Bag MD #368002)

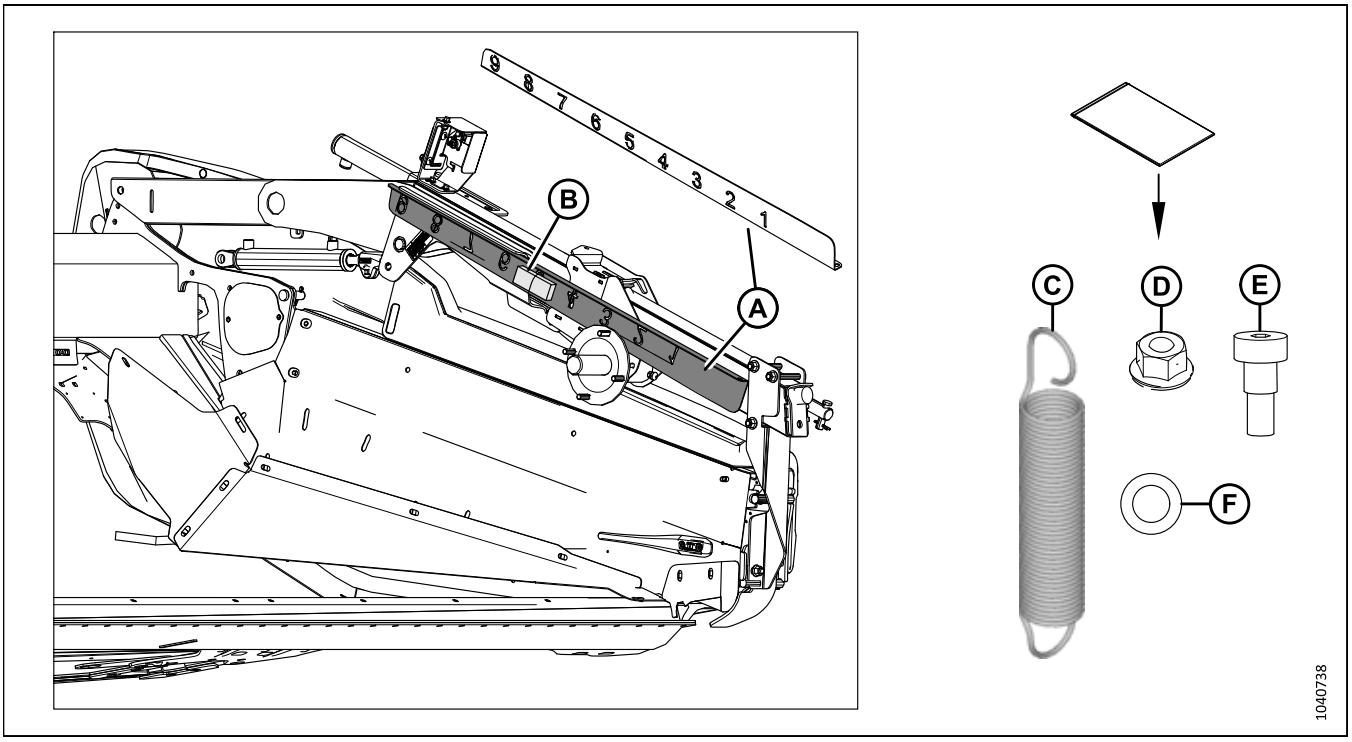


Figure 6.5: Fore-Aft Indicator Shipping Location, Parts Bag MD #368002

1. Retrieve fore-aft indicator (A) and parts bag (B) MD #368002 from the left reel arm. This bag contains the following:
   - One spring (C)MD #328556
   - One M8 nut (D) MD #135337
   - One M10 hex socket shoulder bolt (E) MD #135894
   - One M10 washer (F) MD #184711

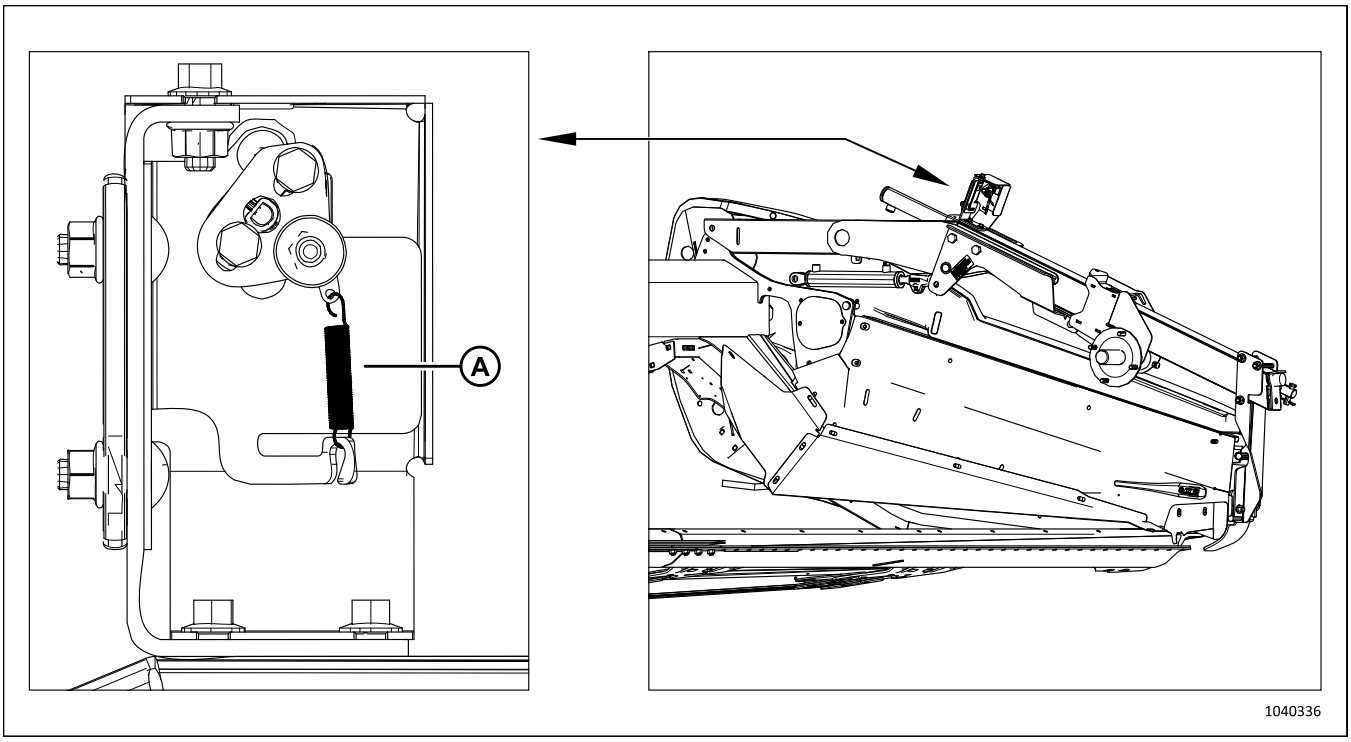


Figure 6.6: Fore-Aft Sensor Spring Installation

2. Attach spring (A) to the sensor assembly.

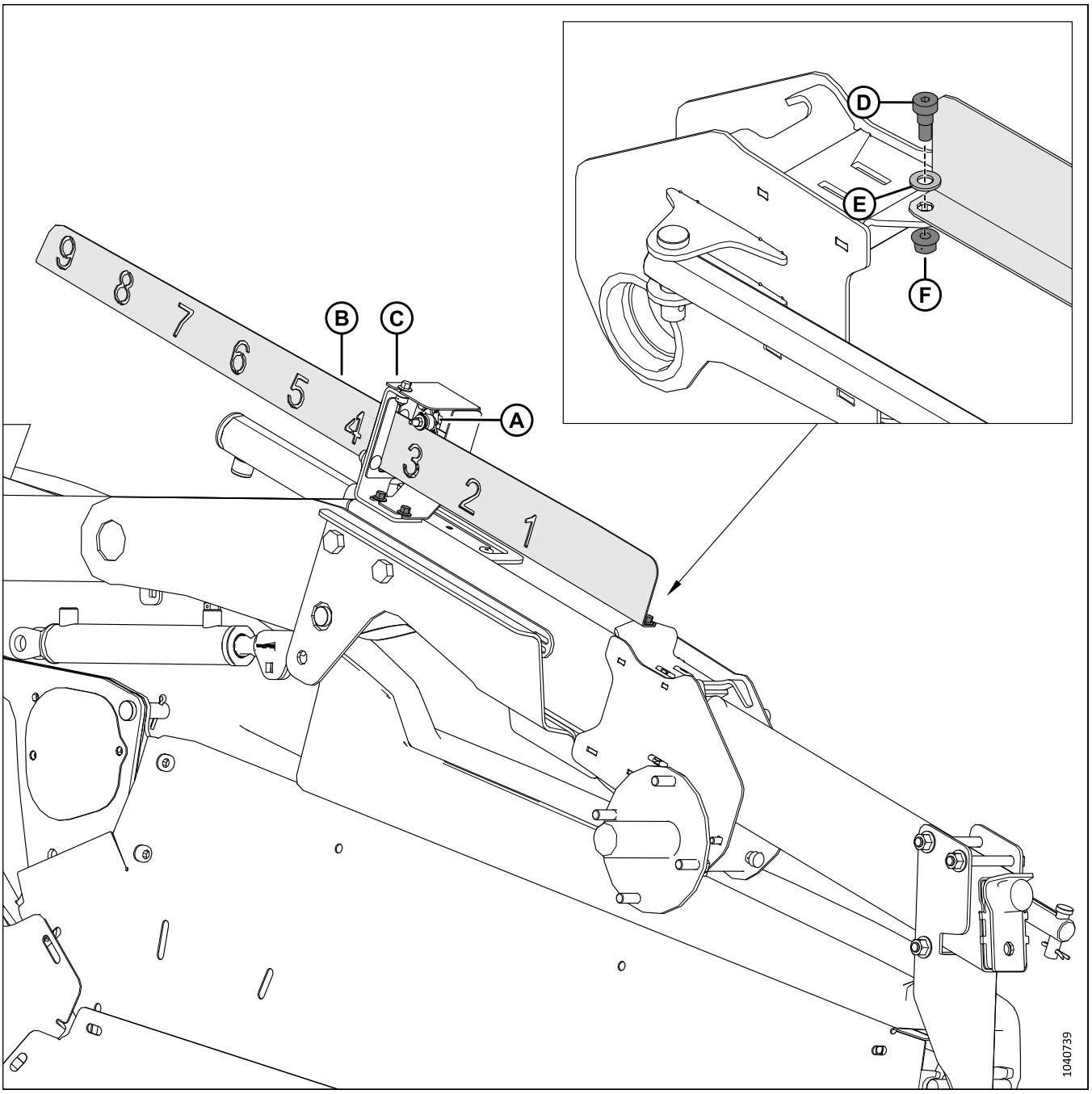


Figure 6.7: Fore-Aft Indicator Installation

3. Lift sensor arm (A) up, and slide fore-aft indicator (B) through sensor bracket (C).
4. Secure the indicator using shoulder bolt (D), washer (E), and M8 nut (F).
5. Torque nut (F) to 8.2 Nm (6 lbf·ft).

6.3 Connecting Reel to Fore-Aft Cylinders – Single-Reel

Fore-aft cylinders move the reel fore and aft on the reel arms. The hydraulic connections fore-aft cylinders on single-reel headers will need to be completed.

DANGER

To prevent bodily injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before making adjustments to the machine.

DANGER

Ensure that all bystanders have cleared the area.

CAUTION

Ensure that the header hydraulics are connected to the windrower. Lift the reel to level the reel support arms; this will prevent the reel from moving when the fore-aft shipping supports are removed.

CAUTION

The reel fore-aft hydraulic cylinders must be connected to the reel before fore-aft shipping supports (A) are removed. Failure to do so may result in the reel sliding fully forward when the supports are removed.

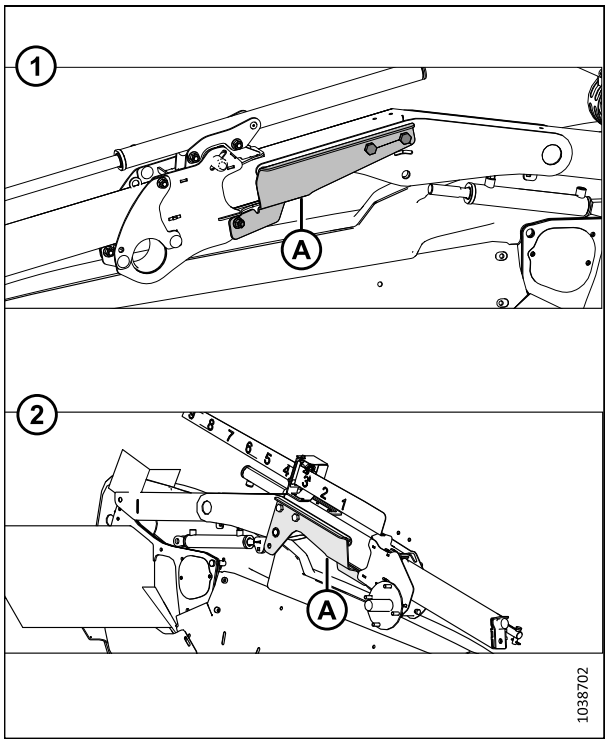


Figure 6.8: Fore-Aft Shipping Supports

1 - Right Reel Arm **2 - Left Reel Arm**

1. Start the engine.
2. Raise the reel arms until they are parallel with the ground
3. Shut down the engine, and remove the key from the ignition.

4. Retrieve fore-aft support parts bags (MD #357467) from one of the reel discs on the reel.

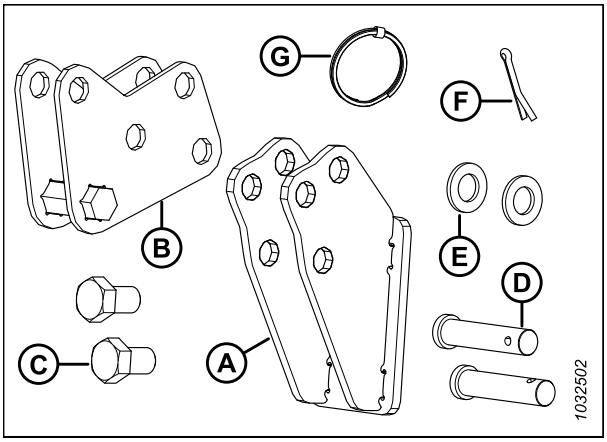


Figure 6.9: Fore-Aft Support Parts Bag (MD #357467)

Table 6.1 Fore-Aft Support Parts Bag MD #357467

Ref	Part Number	Description	Quantity
A	311237	SUPPORT – FRONT ANCHOR	1
B	311238	ANCHOR – FORE-AFT	1
C	136143	BOLT – HEX HD TFL M16 X 2 X 30-10.9 AA1J	2
D	18704	PIN – CLEVIS	2
E	184717	WASHER – FLAT REG M16-200HV-AA1J	2
F	18607	PIN – COTTER 5/32 DIA X 1.5 ZP	1
G	320207	RING – SPLIT	1

Preparing right reel arm

5. Install front anchor support (A) on the end of the right reel arm using two M16 x 30 mm bolts (B) as shown. Torque the bolts to 249 Nm (184 lbf·ft).

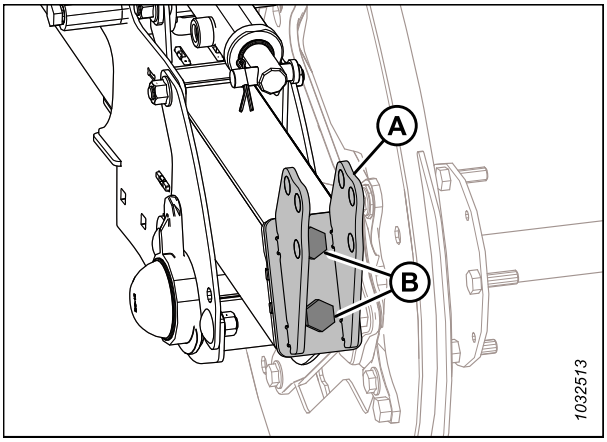


Figure 6.10: Front Anchor Support

6. Attach fore-aft anchor (A) to the front support using two clevis pins (B) and two washers.

   IMPORTANT:

   Ensure that anchor (A) is installed in the forward position as shown. The cylinder on the left arm is installed in the forward position from the factory; all fore-aft cylinders must be installed in the same position to prevent damage to the reel during operation.

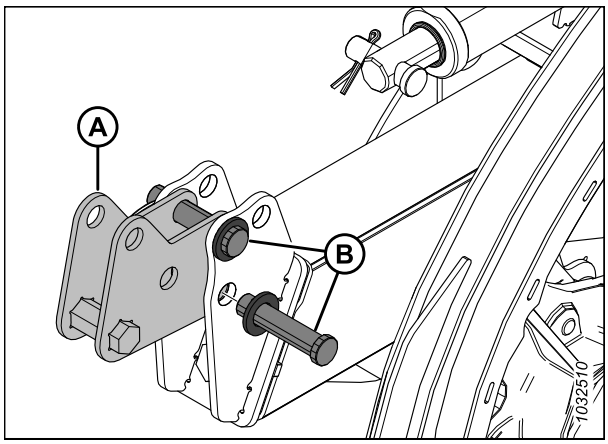


Figure 6.11: Fore-Aft Anchor

Preparing left reel arm

7. On the left reel arm, remove and retain cotter pin (A) and clevis pin (B) from the fore-aft cylinder rod. Remove the shipping wire securing the cylinder rod to the reel support.

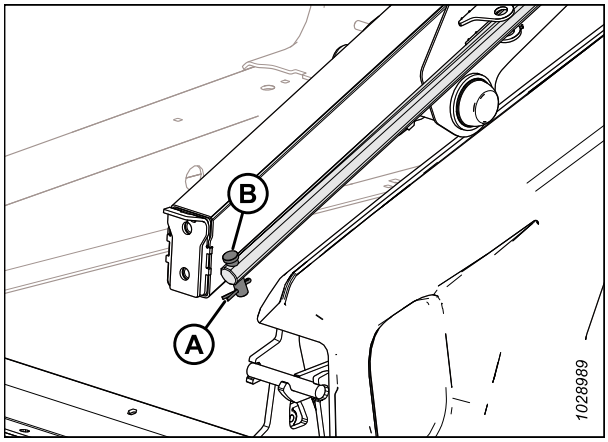


Figure 6.12: Left Reel Arm

DANGER

Ensure that all bystanders have cleared the area.

8. Start the engine.

Securing cylinders to reel arms

9. Use the windrower controls or move the reel by hand to align the reel arm mounting holes with the fore-aft cylinders.

10. On the right arm, attach fore-aft cylinder (A) to fore-aft anchor (B) with the retained clevis pin and cotter pin (C).

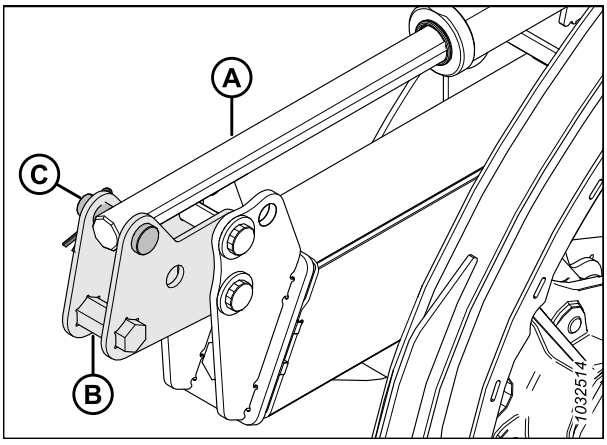


Figure 6.13: Cylinder Secured to Right Reel Arm

11. On the left arm, secure fore-aft cylinder (A) to reel end support (B) with clevis pin and cotter pin (C).

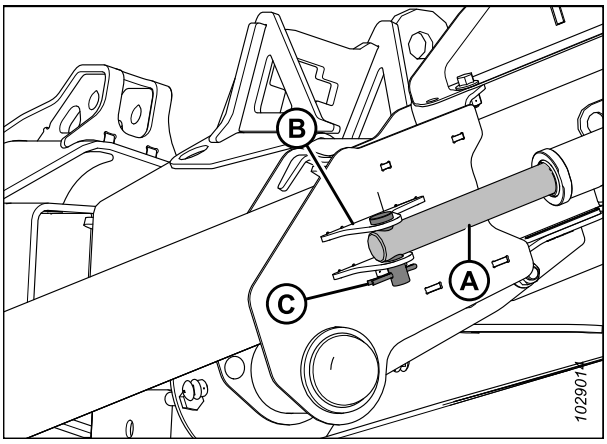


Figure 6.14: Cylinder Secured to Left Reel Arm

12. On the left reel arm, remove hardware (A) and shipping support (B).

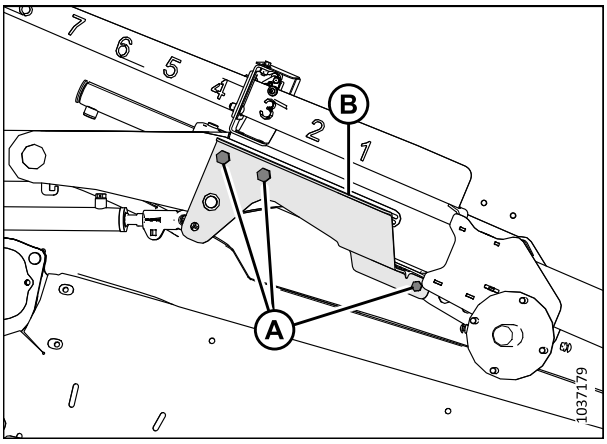


Figure 6.15: Left Reel Arm Shipping Support

13. On the right reel arm, remove hardware (A) and shipping support (B).

14. Phase the fore-aft cylinders by adjusting the reel fully forward and fully rearward two or three times.

15. Shut down the engine, and remove the key from the ignition.

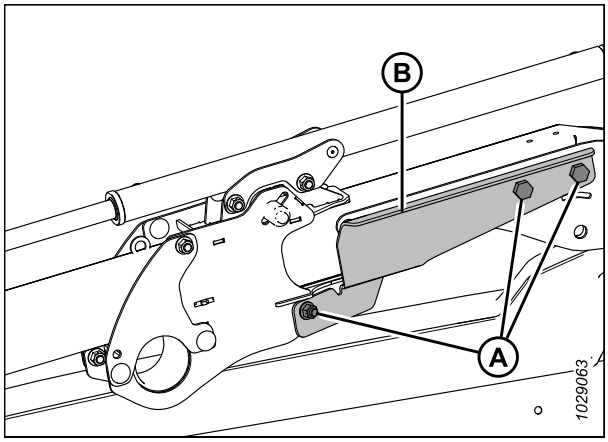


Figure 6.16: Right Reel Arm Shipping Support

NOTE:

From the factory, the reel is set in the fore position. This allows the reel to reach lodged crop ahead of the cutterbar to carry it onto the drapers. For delicate and shatter-prone crops, it may be necessary to reposition the fore-aft cylinders to the aft position. Doing so allows the reel to be positioned over the drapers, which prevents seed loss. For further instructions, refer to the header operator's manual.

NOTE:

To install vertical knives, the fore-aft cylinders will need to be in the aft position. For further instructions, refer to the header operator's manual.

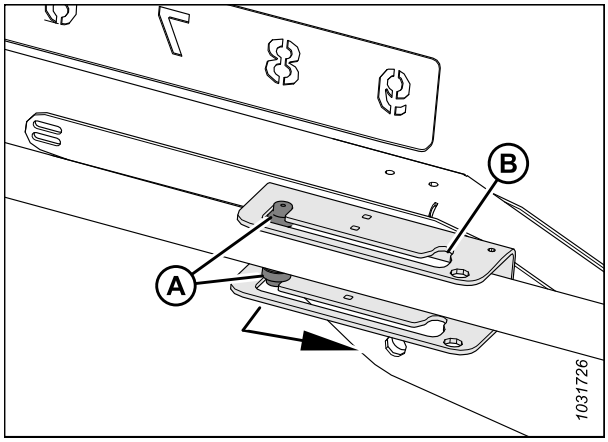


Figure 6.17: Left Arm Cylinder – Forward Position

6.4 Connecting Reel to Fore-Aft Cylinders – Double-Reel (Parts Bags MD #347593, MD #347580)

The fore-aft cylinders move the reel fore and aft on the reel arms. The cylinders on double- and triple-reel headers will need to be installed.

DANGER

To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

CAUTION

Ensure that the header hydraulics are connected to the windrower. Lift the reel to level the reel support arms; this will prevent the reel from moving when the fore-aft shipping supports are removed.

CAUTION

The reel fore-aft hydraulic cylinders must be connected to the reel before fore-aft shipping supports (A) are removed. Failure to do so may result in the reel sliding fully forward when the supports are removed.

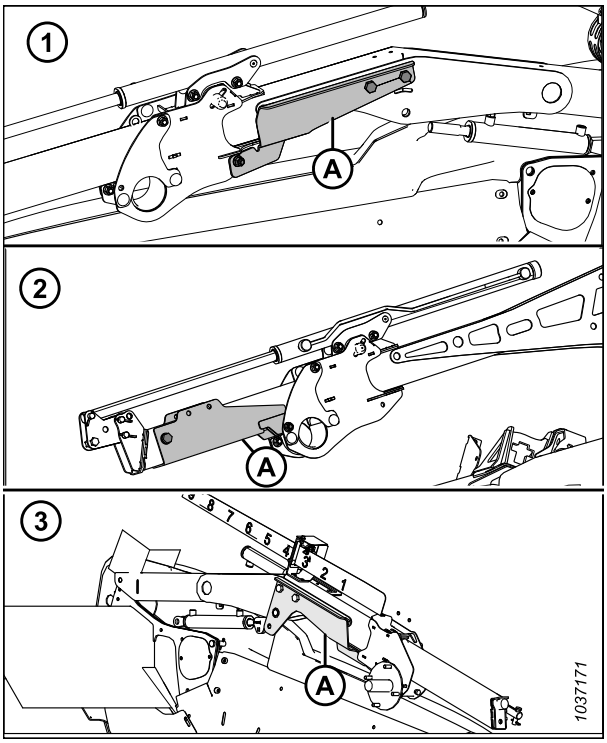


Figure 6.18: Fore-Aft Shipping Supports

1 - Outer Right Reel Arm **2 - Center Reel Arm**

3 - Outer Left Reel Arm

DANGER

Ensure that all bystanders have cleared the area.

1. Start the engine.
2. Raise the reel arms until they are parallel with the ground.
3. Shut down the engine, and remove the key from the ignition.

Center arm

4. Retrieve the fore-aft support parts bags (MD #347580) from one of the reel discs on the reel.

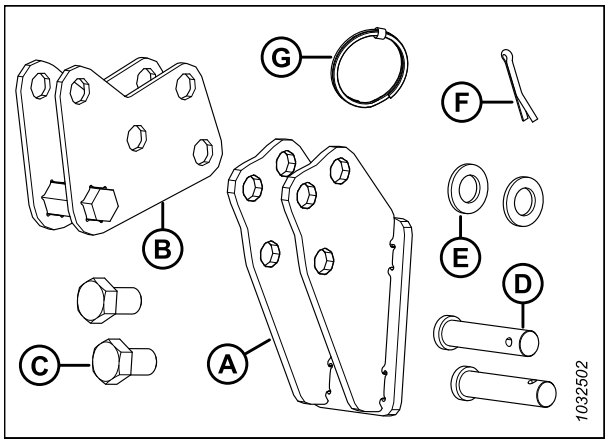


Figure 6.19: Fore-Aft Support Parts Bag MD #347580

Table 6.2 Fore-Aft Support Parts Bag MD #347580

Ref	Part Number	Description	Quantity
A	311237	SUPPORT – FRONT ANCHOR	2
B	311238	ANCHOR – FORE-AFT	2
C	136143	BOLT – HEX HD TFL M16X2X30-10.9 AA1J	4
D	18704	PIN – CLEVIS	4
E	184717	WASHER – FLAT REG M16-200HV-AA1J	4
F	18607	PIN – COTTER 5/32 DIA X 1.5 ZP	2
G	320207	RING – SPLIT	2

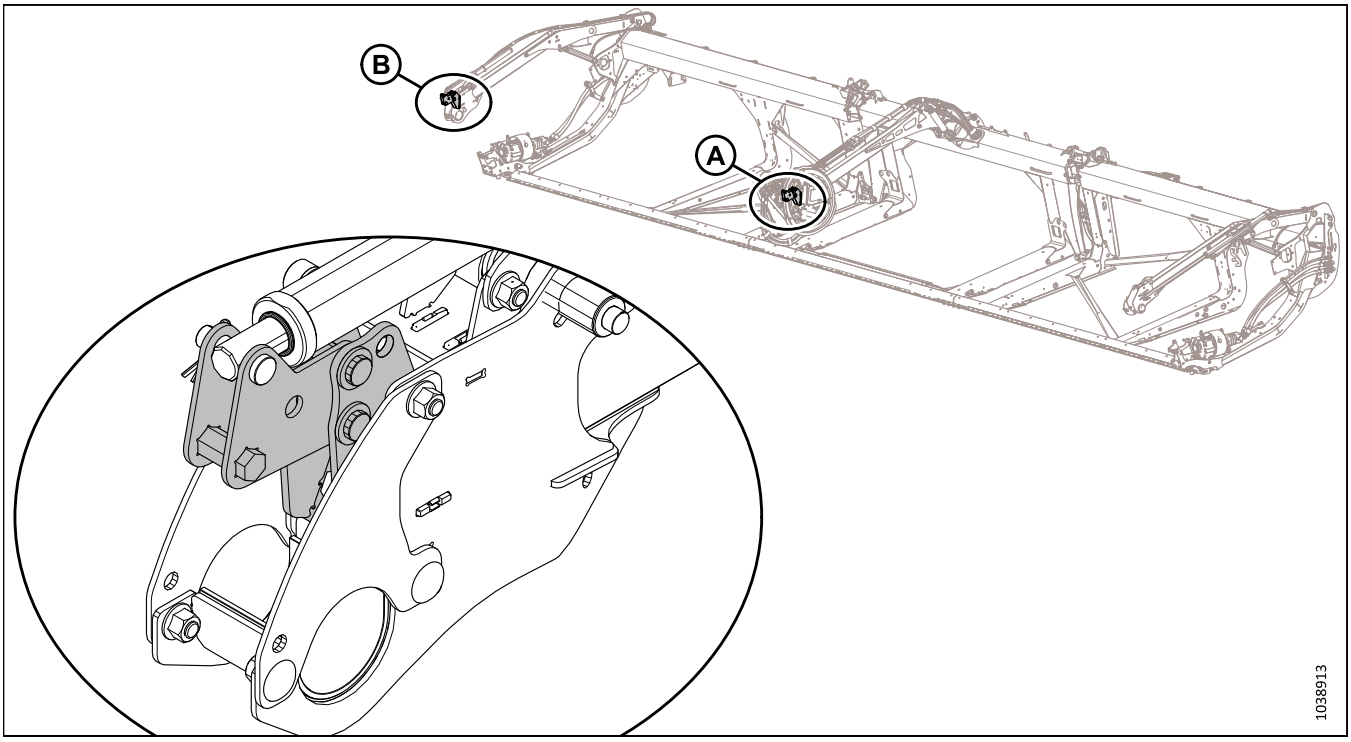


Figure 6.20: Fore-Aft Support Locations

5. Install the fore-aft support parts on center arm (A) and right arm (B).

Right and center reel arms

6. At the end of the reel arm, Install front support (A) using two M16 x 30 mm bolts (B) as shown. Tighten the hardware to 249 Nm (184 lbf·ft).

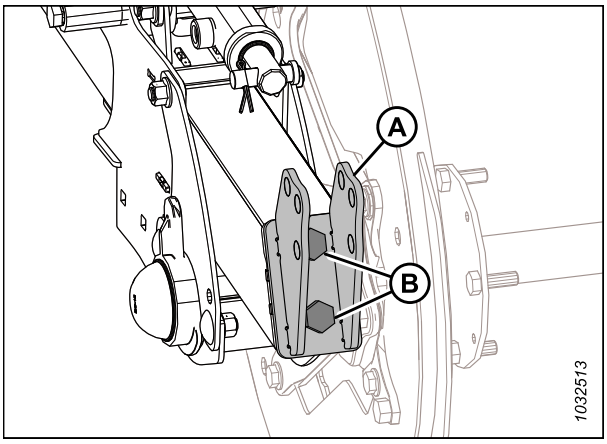


Figure 6.21: Front Support – Center Arm Shown

7. Attach fore-aft anchor (A) to the front support using two clevis pins (B) and two washers.

   IMPORTANT:

   Ensure that anchor (A) is installed in the forward position as shown. The cylinder on the left arm is installed in the forward position from the factory; all fore-aft cylinders must be installed in the same position to prevent damage to the reel during operation.

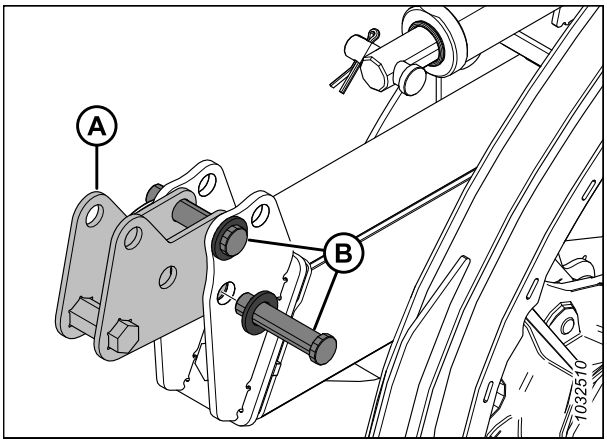


Figure 6.22: Fore-Aft Anchor – Center Arm

8. Secure the top clevis pin with split ring (A). Secure the bottom clevis pin with cotter pin (B).

   NOTE:

   The split ring gets installed on the top clevis pin to make it easier for the Operator to toggle between the two cylinder positions.

9. Remove and retain the cotter pin and clevis pin (C) from the cylinder rod.

10. Repeat Step *6, page 85* to *9, page 85* to install the second set of fore-aft support parts on the other reel arm.

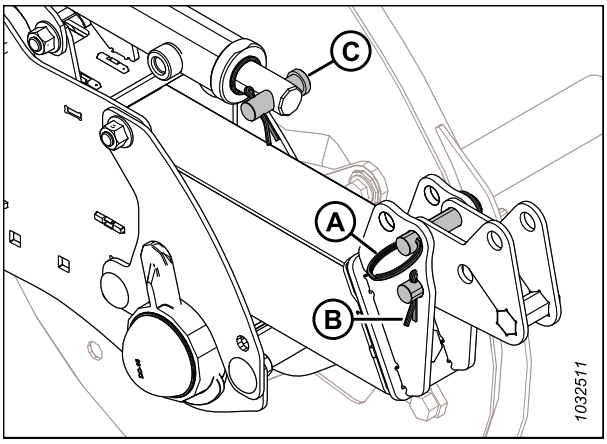


Figure 6.23: Center Arm

Left reel arm

11. On the left reel arm, remove and retain cotter pin (A) and clevis pin (B) from the fore-aft cylinder rod. Remove the shipping wire securing the cylinder rod to the reel support.

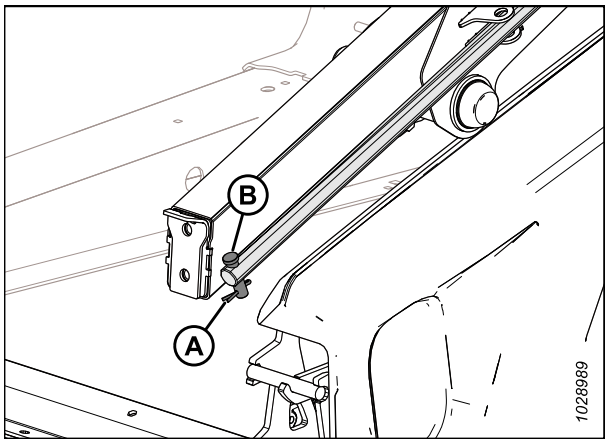


Figure 6.24: Left Reel Arm Shown

DANGER

Ensure that all bystanders have cleared the area.

12. Start the engine.

Securing the cylinders to the reel arms

13. Use the windrower controls or move the reel by hand to align the reel arm mounting holes with the fore-aft cylinders.

14. On the right and center arms, attach fore-aft cylinder (A) to fore-aft anchor (B) with retained clevis pin and cotter pin (C).

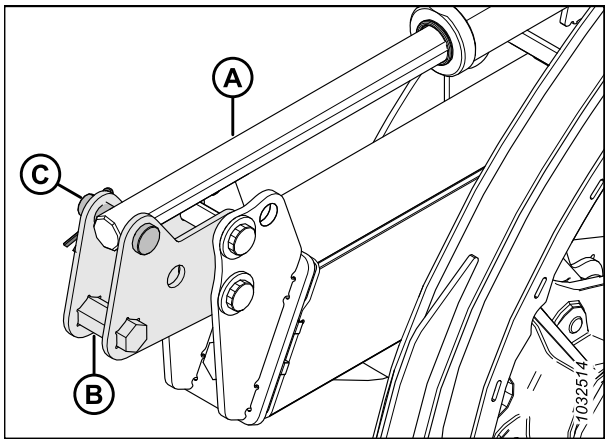


Figure 6.25: Cylinder Secured to Reel Arm

15. On the left arm, attach fore-aft cylinder (A) to reel end support (B) with clevis pin and cotter pin (C).

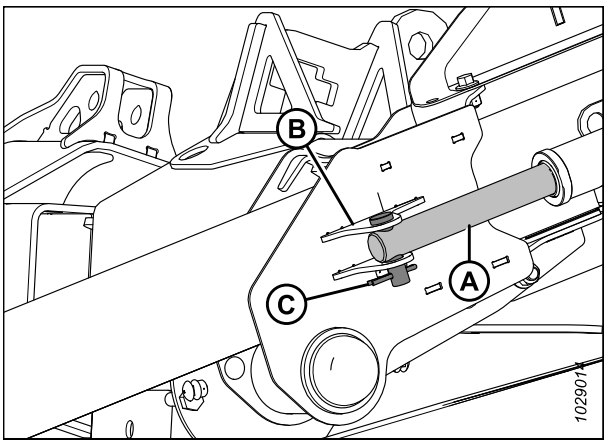


Figure 6.26: Cylinder Secured to Left Reel Arm

16. On the left reel arm, remove hardware (A) and shipping support (B).

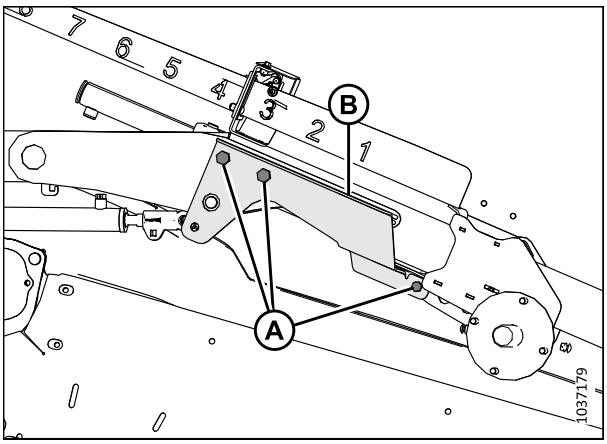


Figure 6.27: Left Reel Arm Shipping Support

17. On the center reel arm, remove hardware (A) and shipping support (B).

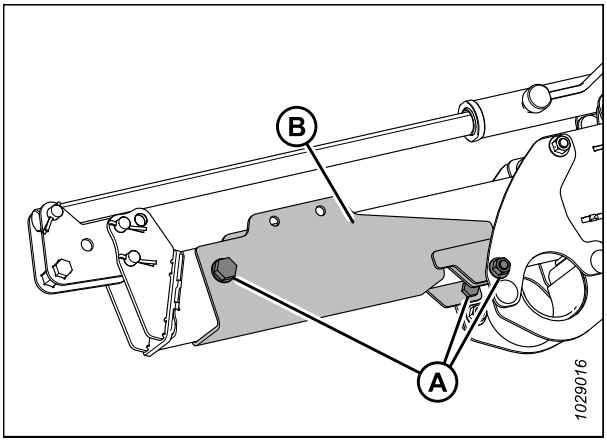


Figure 6.28: Center Reel Arm Shipping Support

18. On the right reel arm, remove hardware (A) and shipping support (B).

19. Phase the fore-aft cylinders by adjusting the reel fully forward and fully rearward two or three times.

20. Shut down the engine, and remove the key from the ignition.

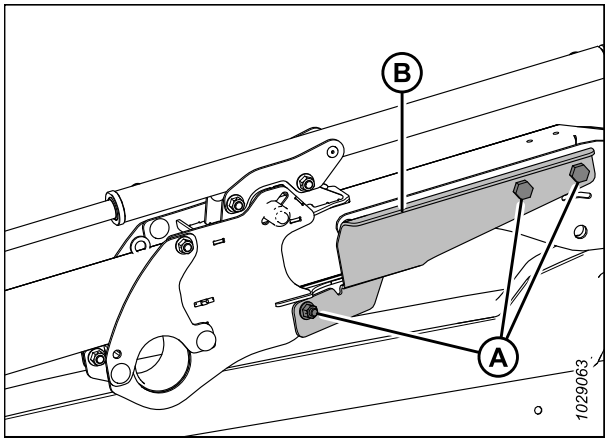


Figure 6.29: Right Reel Arm Shipping Support

NOTE:

The reel from factory is set up in the fore position. This allows the reel to reach lodged crop ahead of the cutterbar and carry it onto the drapers. For delicate and shatter prone crops, you may need to reposition the fore-aft cylinders to the aft position. This allows the reel to be positioned over the drapers preventing seed loss. For instructions, refer to the operators manual.

NOTE:

To install the vertical knives kit, the fore-aft cylinders will need to be in the aft position. For further instructions, refer to the operator's manual.

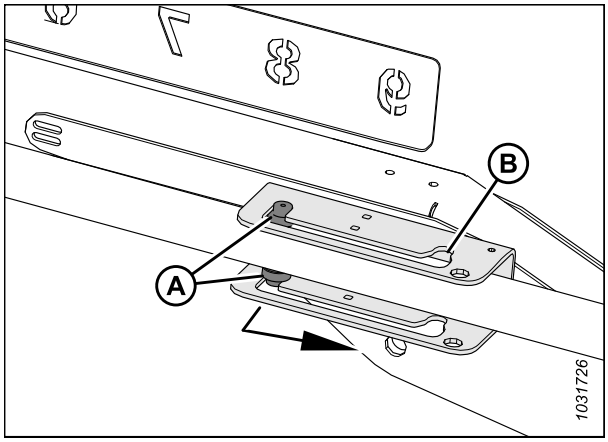


Figure 6.30: Left Arm Cylinder – Forward Position

6.5 Attaching Reel Height Sensor

The reel height sensor linkage inside the right endshield was disconnected to prevent shipping damage. It will need to be reconnected.

NOTE:

If the header is being used with an M Series Self-Propelled Windrower, the reel height sensor will not be usable. However, to prevent damage to the sensor, it should still be connected following the procedure provided here. The sensor is usable with M1 Series Windrowers.

1. Open the right header endshield. For instructions, refer to *9.2.1 Opening Header Endshields, page 208*.

2. Remove cable ties (A) securing reel height sensor rod (B) to the top of the end panel.

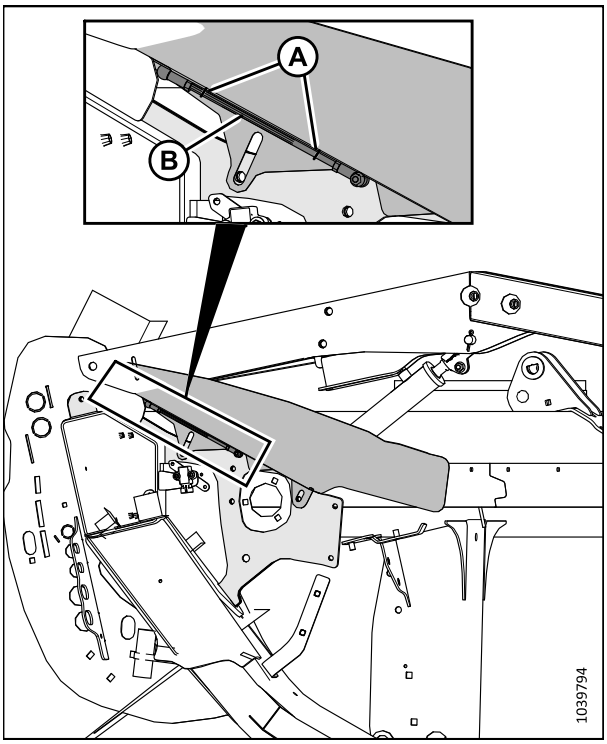


Figure 6.31: Reel Height Sensor Location

3. Ensure that sensor arm (C) and pointer (D) are configured properly for the paired windrower. For instructions, refer to Figure .

   NOTE:

   The arrow indicates that the pointed end of the sensor arm and pointer, is towards the front of the header.

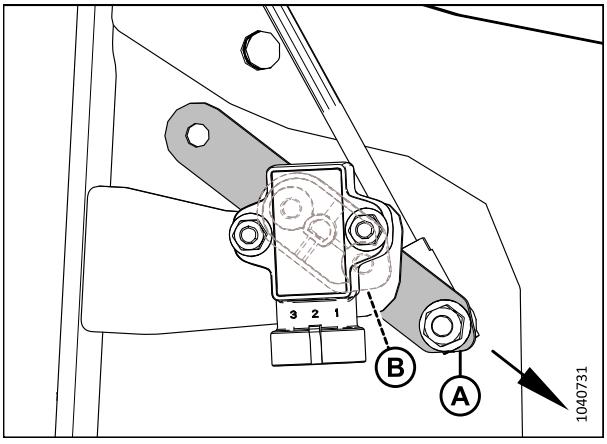


Figure 6.32: Sensor Arm/Pointer Configurations

A - Sensor Arm

B - Sensor Pointer (Shown Under Sensor Arm)

4. Attach reel height sensor rod (A) to reel arm bracket (B) with already installed nut (C). Secure the other end of the rod to the sensor arm with nut (D). Torque nuts (C) and (D) to 8 Nm (6 lbf·ft).

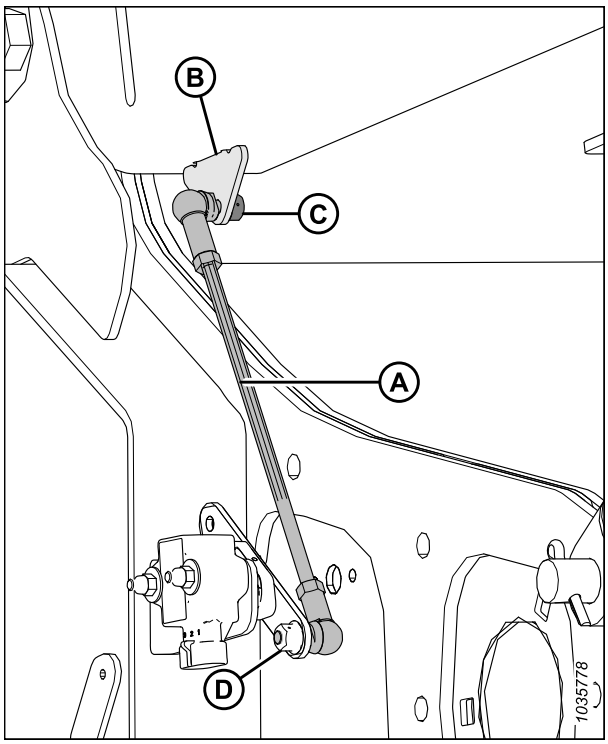


Figure 6.33: Reel Height Sensor

NOTE:

Dimension (A) is set to 165 mm (6 1/2 in.), but might need to be adjusted in *6.14.1 Checking and Adjusting Reel Height Sensor, page 160* to achieve the correct voltage range.

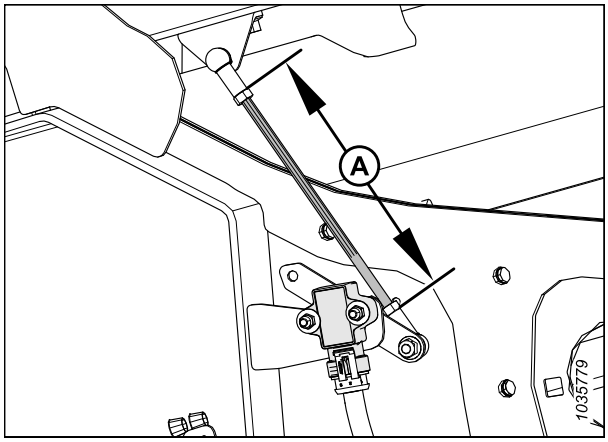


Figure 6.34: Reel Height Sensor – Right Reel Arm with Reel Down

5. Close the right header endshield. For instructions, refer to *9.2.2 Closing Header Endshields, page 209*.

6.6 Installing Reel Fore-Aft Hose Clamps – Double-Reel Headers

Some or all of the reel fore-aft hose clamps have been detached from the reel arms for shipping purposes.

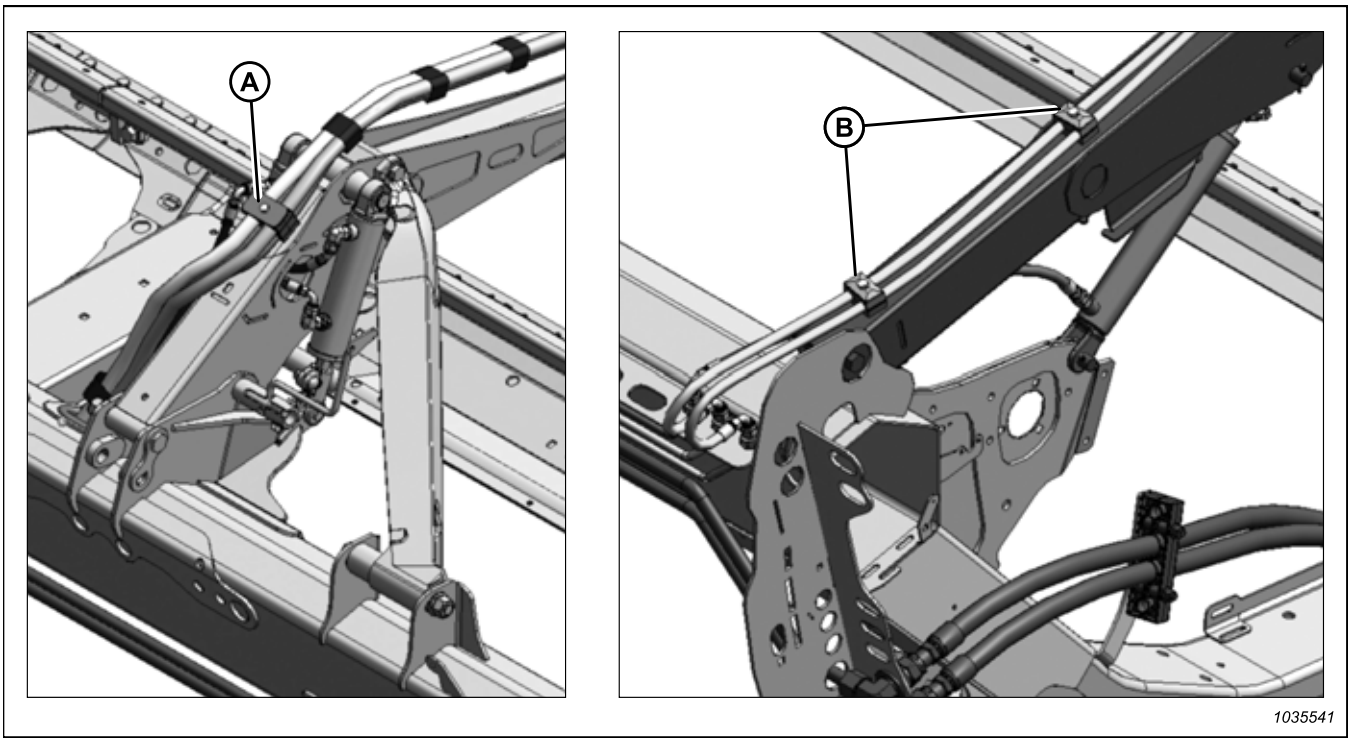


Figure 6.35: Reel Arm Fore-Aft Hose Clamps

1. A nut is installed on the bottom of the following fore-aft hose clamps for shipping purposes. Discard the nut and reinstall the clamp(s) at the following locations:

   - **D230 and D235:** Center reel arm (A)

     NOTE:

     Align the mark on the hoses with the bottom of the clamp. Ensure there is a loop in the hose bundle to allow the reel to move forward.

   - **D241:** Center reel arm (A) and right reel arm (B)

     NOTE:

     Align the mark on the hoses with the bottom of the clamp. Ensure there is a loop in the hose bundle to allow the reel to move forward.

6.7 Attaching Cam Arms

For some headers, the cam arms are disconnected from the tine tubes for shipping. If so, they will need to be reconnected.

DANGER

To prevent bodily injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before making adjustments to the machine. NEVER climb onto or go underneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

NOTE:

The cam arm installation is easier when it is completed one row at a time. Leave the shipping wire on other rows until you are ready to rotate the reel to the next position.

1. Start the engine.
2. Adjust the reel fully forward.
3. Shut down the engine, and remove the key from the ignition.
4. Rotate tine bar crank (A). Position link (B) so that the attachment holes in the bar crank are aligned with the hole in the link.
5. Install bolt (C) in the link. Position shim (D) on the bolt so that the shim is between link (B) and tine bar crank (A).

   IMPORTANT:

   Ensure that shim (D) is installed in the correct location to prevent damage to the bar crank.

   NOTE:

   The bolts are precoated with threadlocker.
6. Realign link (B) and tine bar crank (A) and the thread in bolt (C).
7. Torque the bolts to 165 Nm (120 lbf·ft).
8. Repeat Step *4, page 92* to Step *6, page 92* for the remaining tine bars.

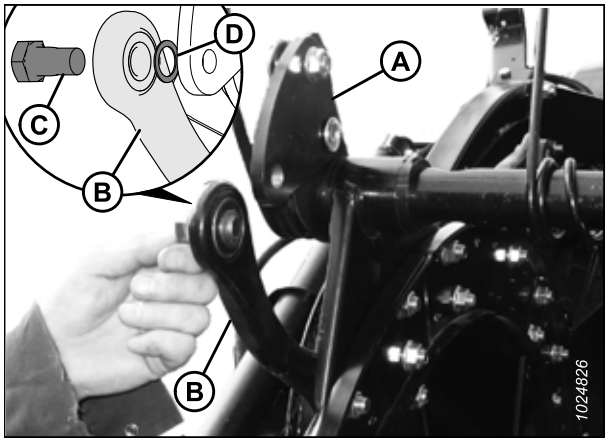


Figure 6.36: Bar Crank Attachment Holes and Link Alignment

6.8 Retrieving Single-Reel Endshields

On single-reel headers, there are two kinds of reel endshields: tail-end and cam-end. They are shipped in separate bags. Be sure to install each endshield in the correct location.

1. Retrieve shipping bag (A) containing the reel endshield parts that were removed from the cutterbar.

   - Five-bat single reel: MD #311739
   - Six-bat single reel: MD #311362
   - Nine-bat single reel: MD #311363

   The contents of shipping bag (A) are shown and listed below. The shipping bag contains multiple smaller bags. Do **NOT** mix up the contents of the smaller bags.

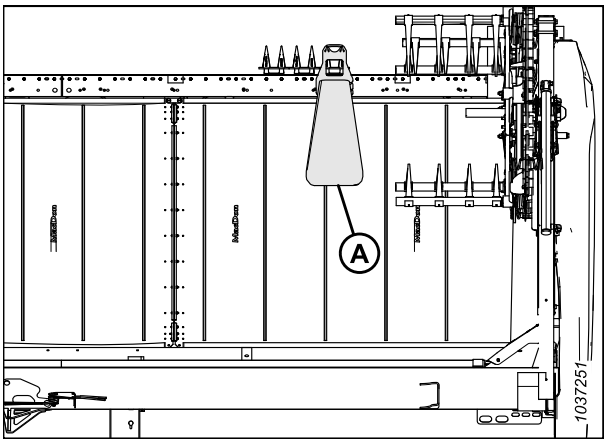


Figure 6.37: Reel Endshield Parts

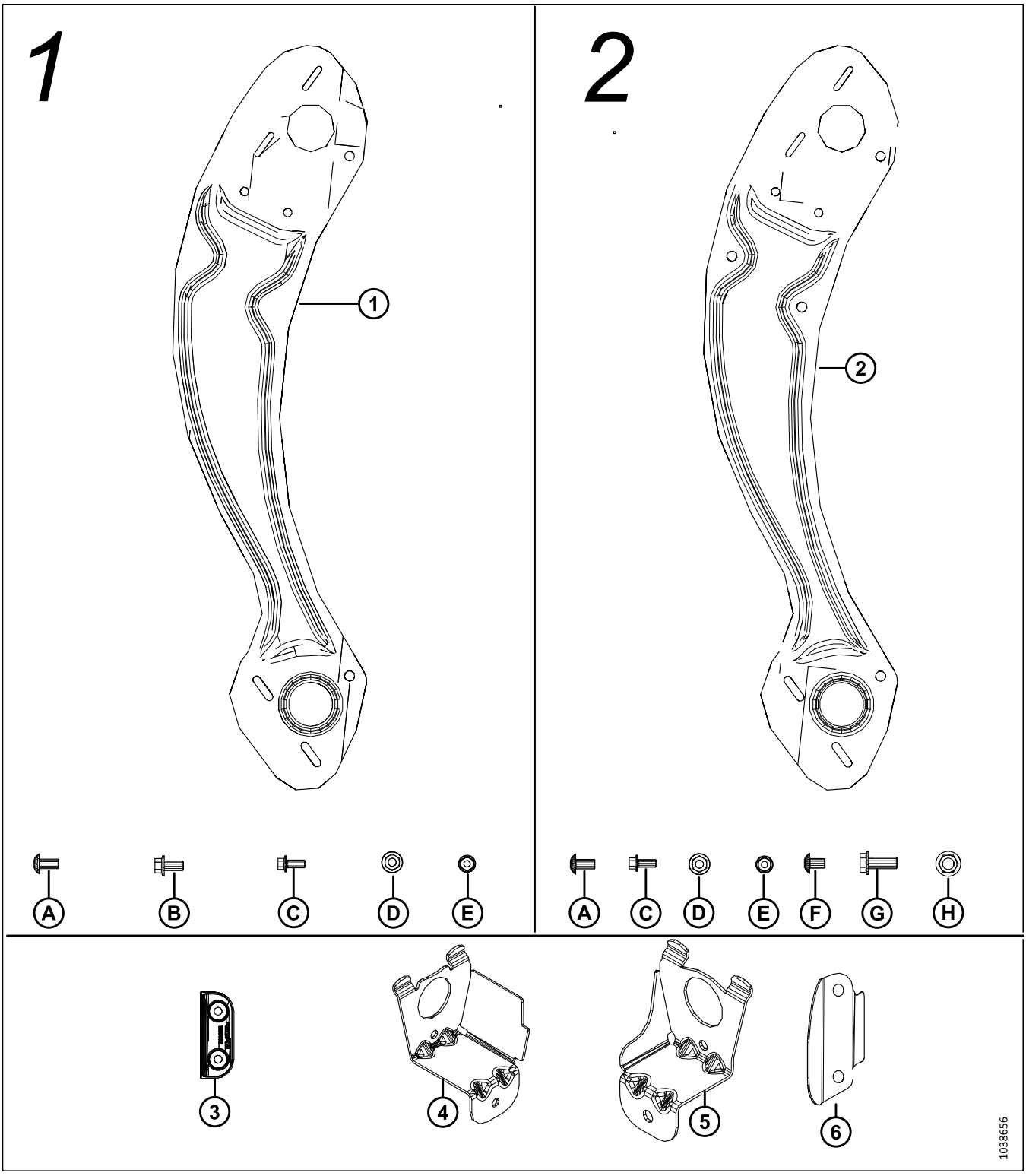


Figure 6.38: Single-Reel Five-Bat Endshields (MD #311739)

Table 6.3 Five-Bat Single-Reel Endshields Bag (MD #311739)

Ref	Part Number	Description	Qty
4	311965	SUPPORT – WELDT TAIL END	5
5	311964	SUPPORT – WELDT CAM END	5
6	311729	DEFLECTOR – CAM OUTBOARD	5
		Bag 1 (Tail-End Endshields)	
1	311695	SHIELD – 5-BAT LH OUTBOARD TAIL END	5
A	136395	SCREW – TORX TRUSS HD M10 X 1.5 X 20 X SPCL-8.8-A3L	5
B	152655	BOLT – HEX FLG HD M10 X 1.5 X 20-8.8-AA1J	5
C	136300	BOLT – HEX FLG HD TFL M8 X 1.25 X 20-8.8-AA3L	6
D	135799	NUT – HEX FLG CTR LOC M10 X 1.5-10	5
E	135337	NUT – HEX FLG CTR LK M8 X 1.25-8-AA1J	6
		Bag 2 (Cam-End Endshields)	
2	311694	SHIELD – 5-BAT RH OUTBOARD CAM END	5
A	136395	SCREW – TORX TRUSS HD M10 X 1.5 X 20 X SPCL-8.8-A3L	5
C	136300	BOLT – HEX FLG HD TFL M8 X 1.25 X 20-8.8-AA3L	6
D	135799	NUT – HEX FLG CTR LOC M10 X 1.5-10	15
E	135337	NUT – HEX FLG CTR LK M8 X 1.25-8-AA1J	6
F	136640	SCREW – TORX TRUSS HD M10 X 1.5 X 16 X SPCL-8.8-AA1J	10
G	320180	BOLT – HEX FLG HD M12 X 1.75 X 30-SPCL-8.8-ZINC	5
H	136431	NUT – HEX FLG CTR LOC M12 X 1.75-10	5
		Unlabeled Bag	
3	313035	PADDLE – REEL END, HYTREL	6

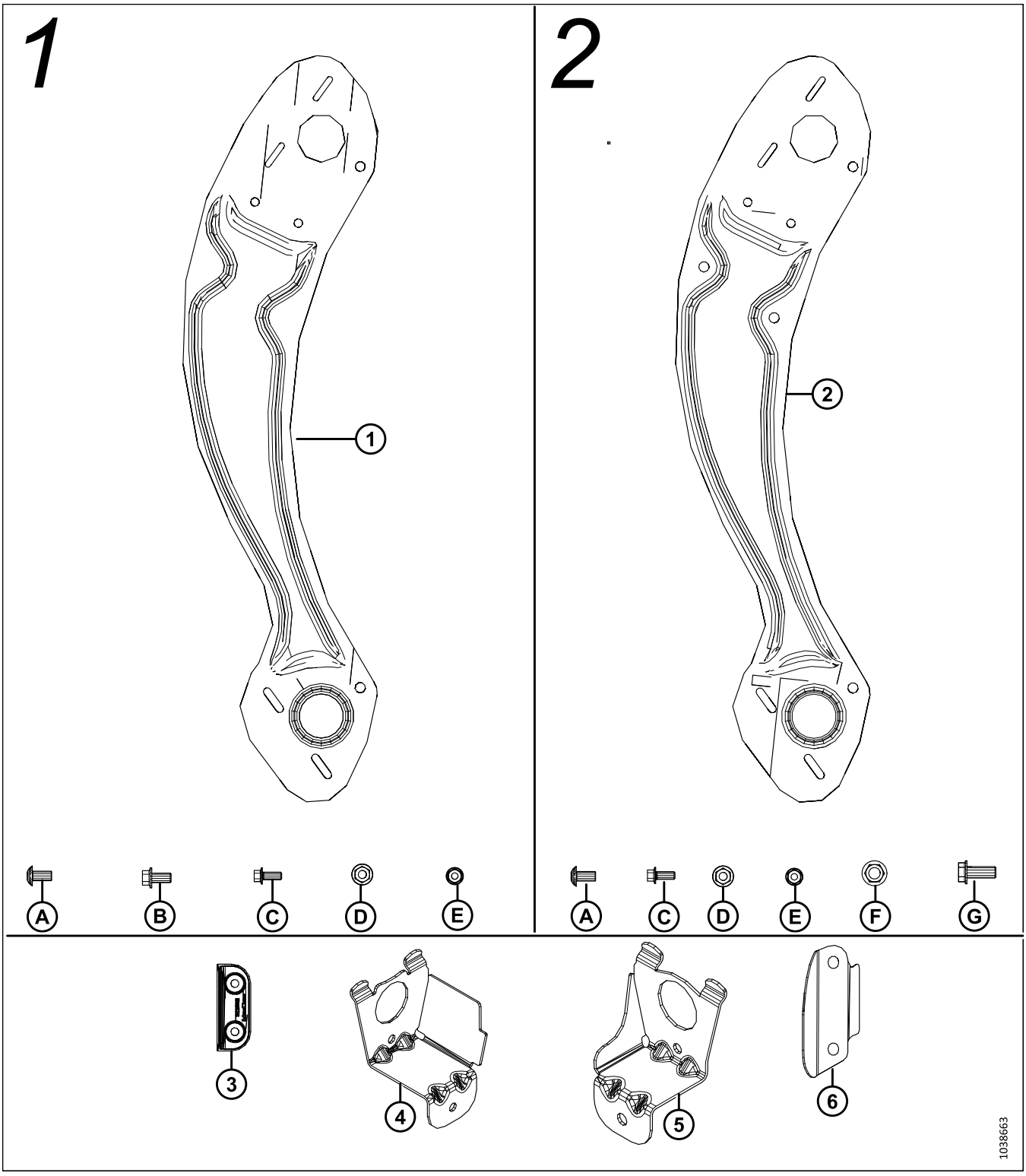


Figure 6.39: Single-Reel Six-Bat Endshields (MD #311362)

Table 6.4 Six-Bat Single-Reel Endshields Bag (MD #311362)

Ref	Part Number	Description	Qty
4	311965	SUPPORT – WELDT TAIL END	6
5	311964	SUPPORT – WELDT CAM END	6
6	311729	DEFLECTOR – CAM END	6
Bag 1 (Tail-End Endshields)			
1	311753	SHIELD – OUTBOARD LH 6 BAT	9
A	136395	SCREW – TORX TRUSS HD M10 X 1.5 X 20 X SPCL-8.8-A3L	6
B	152655	BOLT – HEX FLG HD M10 X 1.5 X 20-8.8-AA1J	6
C	136300	BOLT – HEX FLG HD TFL M8 X 1.25 X 20-8.8-AA3L	6
D	135799	BOLT – HEX FLG HD TFL M8 X 1.25 X 20-8.8-AA3L	12
E	135337	NUT – HEX FLG CTR LK M8 X 1.25-8-AA1J	6
Bag 2 (Cam-End Endshields)			
2	311752	SHIELD – OUTBOARD RH 6 BAT	6
A	136395	SCREW – TORX TRUSS HD M10 X 1.5 X 20 X SPCL-8.8-A3L	6
C	136300	BOLT – HEX FLG HD TFL M8 X 1.25 X 20-8.8-AA3L	6
D	135799	BOLT – HEX FLG HD TFL M8 X 1.25 X 20-8.8-AA3L	18
E	135337	NUT – HEX FLG CTR LK M8 X 1.25-8-AA1J	6
F	136431	NUT – HEX FLG CTR LOC M12 X 1.75-10	6
G	320180	BOLT – HEX FLG HD M12 X 1.75 X 30-SPCL-8.8-ZINC	6
Unlabeled Bag			
3	313035	PADDLE – REEL END; HYTREL	6

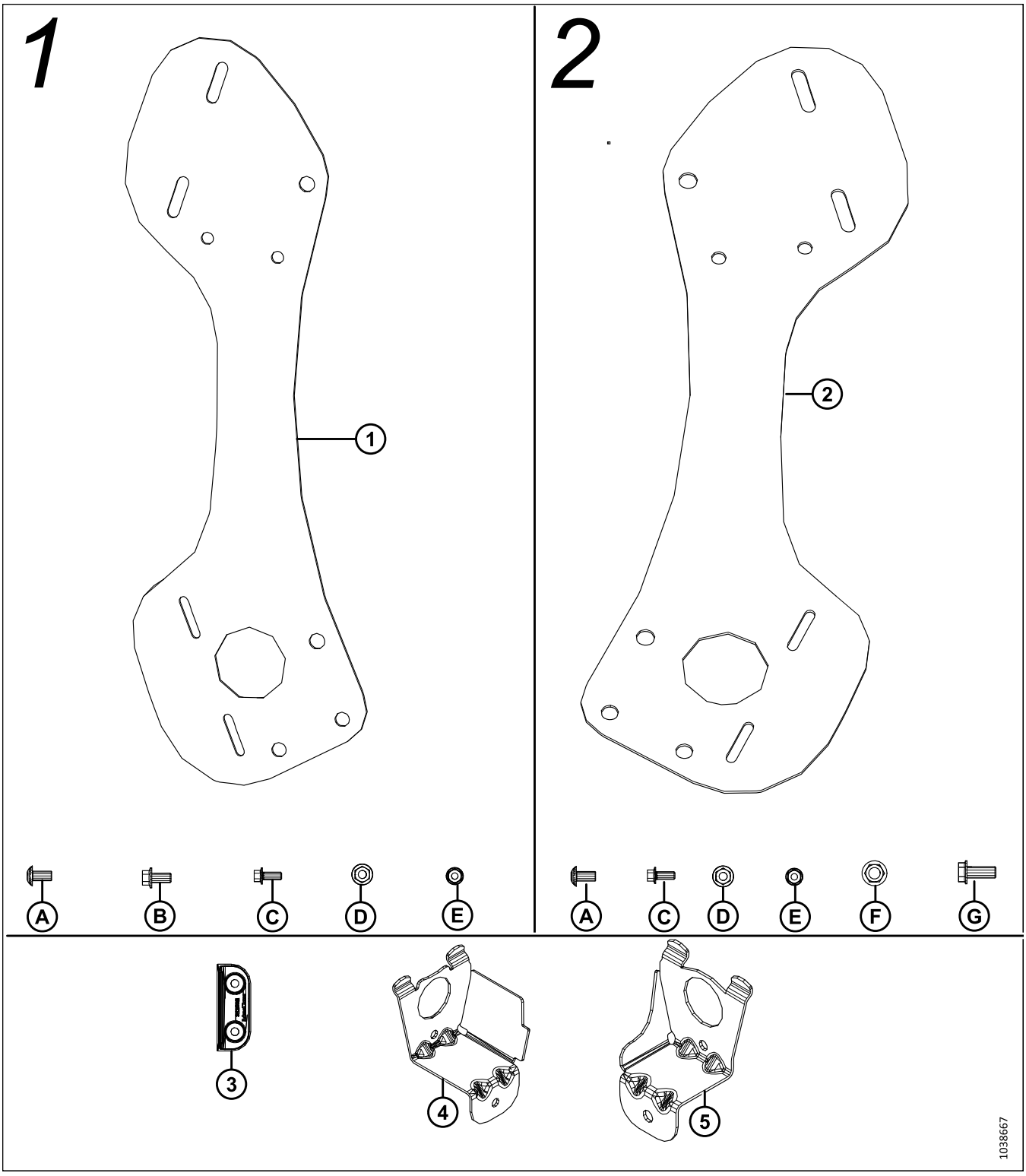


Figure 6.40: Single-Reel Nine-Bat Endshields (MD #311363)

Table 6.5 Nine-Bat Single-Reel Endshields Bag (MD #311363)

Ref	Part Number	Description	Qty
4	311965	SUPPORT – WELDT TAIL END	9
5	311964	SUPPORT – WELDT CAM END	9
Bag 1 (Tail-End Endshields)			
1	311864	SHIELD – OUTBOARD LH 9 BAT	9
A	136395	SCREW – TORX TRUSS HD M10 X 1.5 X 20 X SPCL-8.8-A3L	9
B	152655	BOLT – HEX FLG HD M10 X 1.5 X 20-8.8-AA1J	9
C	136300	BOLT – HEX FLG HD TFL M8 X 1.25 X 20-8.8-AA3L	6
D	135799	BOLT – HEX FLG HD TFL M8 X 1.25 X 20-8.8-AA3L	18
E	135337	NUT – HEX FLG CTR LK M8 X 1.25-8-AA1J	6
Bag 2 (Cam-End Endshields)			
2	311863	SHIELD – OUTBOARD RH 9 BAT	9
A	136395	SCREW – TORX TRUSS HD M10 X 1.5 X 20 X SPCL-8.8-A3L	9
C	136300	BOLT – HEX FLG HD TFL M8 X 1.25 X 20-8.8-AA3L	6
D	135799	BOLT – HEX FLG HD TFL M8 X 1.25 X 20-8.8-AA3L	9
E	135337	NUT – HEX FLG CTR LK M8 X 1.25-8-AA1J	6
F	136431	NUT – HEX FLG CTR LOC M12 X 1.75-10	9
G	320180	BOLT – HEX FLG HD M12 X 1.75 X 30-SPCL-8.8-ZINC	9
Unlabeled Bag			
3	313035	PADDLE – REEL END; HYTREL	6

6.8.1 Installing Single-Reel Endshields at Cam End

Endshields need to be installed at the cam (right) end of the reel to prevent crop from wrapping around the reel.

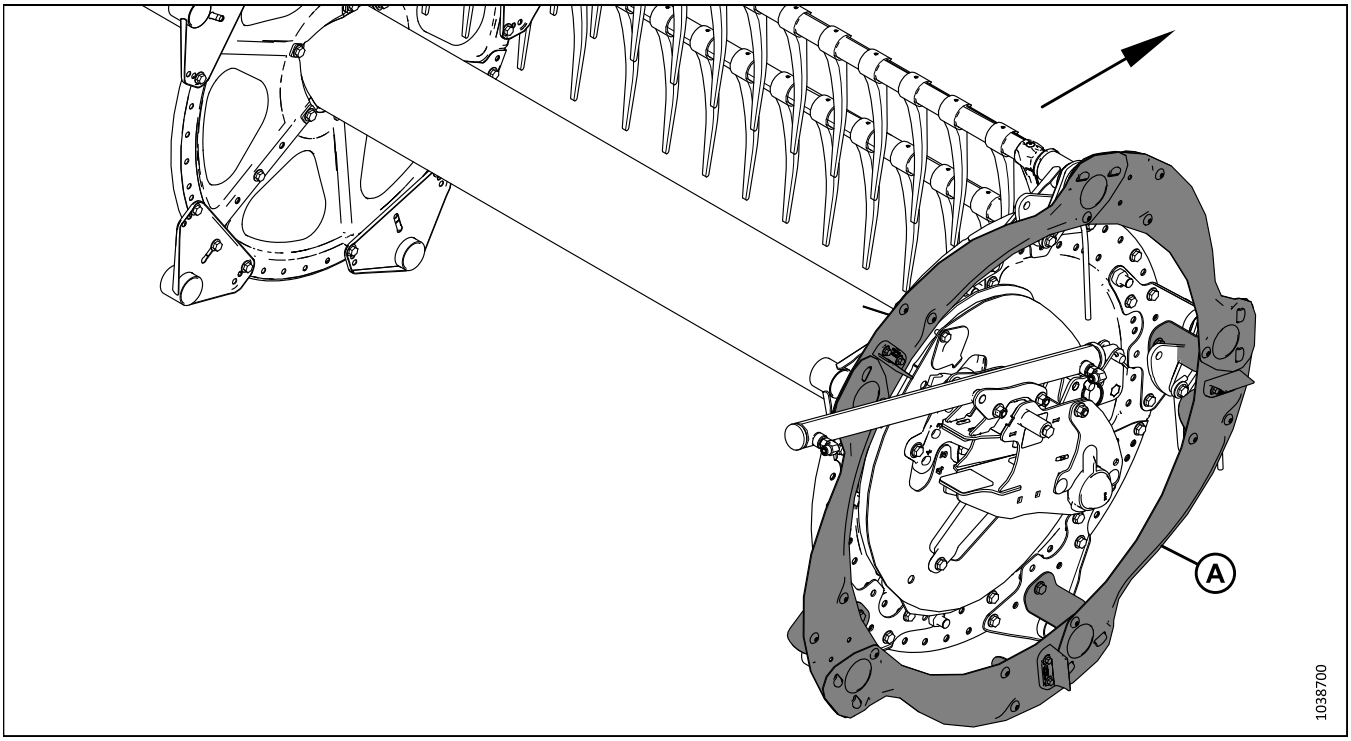


Figure 6.41: Cam End of Reel

A - Five-Bat Cam-End Shield (MD #311694)

NOTE:

The arrow points to the front of the machine.

1. Retrieve bag 2 from inside the reel endshield shipping bag (MD #311739, 311362, or 311363 depending on the number of reel bats).

   NOTE:

   The illustrations in this procedure all show five-bat reel endshields. The procedure for installing six- and nine-bat endshields is almost the same; nine-bat endshields do not require deflectors and the number of parts is different. The parts required for your specific reel type are all provided in bag 2.

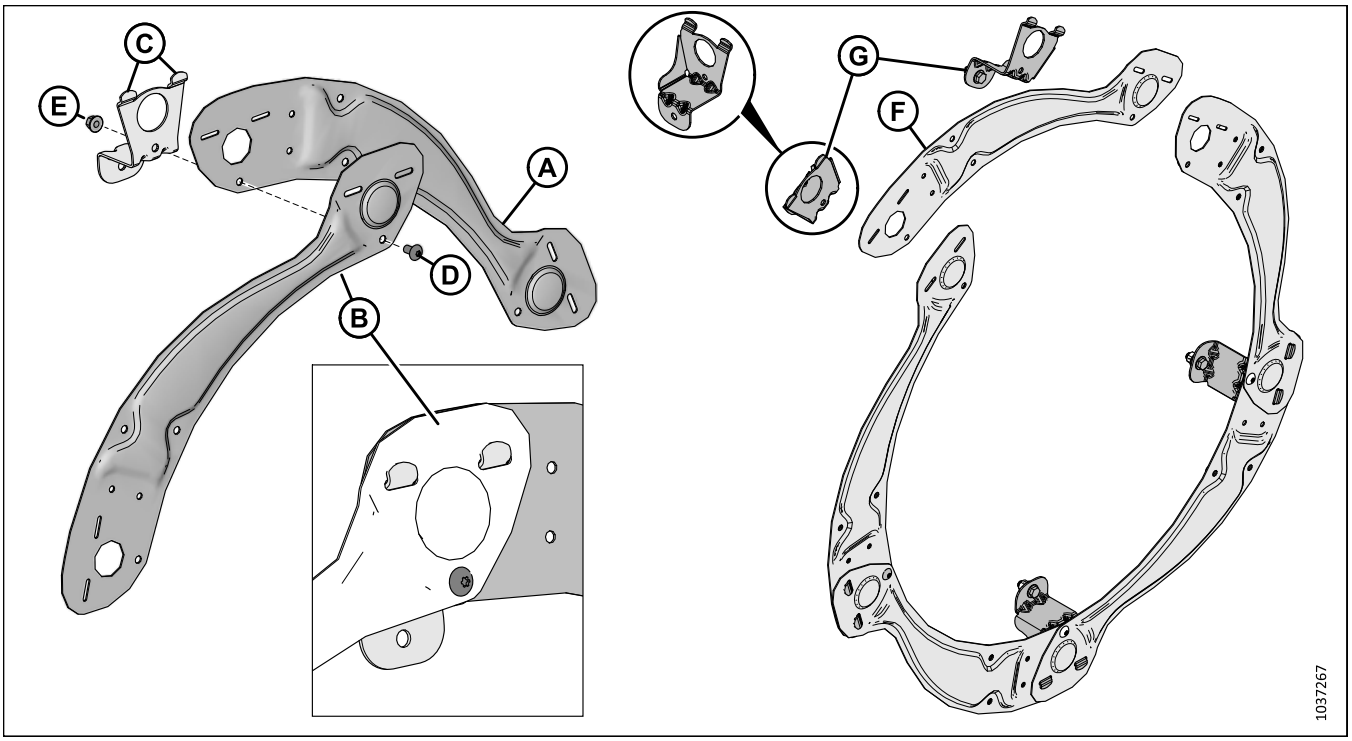


Figure 6.42: Five-Bat Reel – Initial Endshield Assembly

2. Assemble the endshield as follows:

   a. Position endshield segment (A) behind segment (B). Engage endshield support tabs (C) through both segments. Secure the segments with M10 X 1.5 X 20 Torx® screw (D) and hex nut (E). Do **NOT** tighten the hardware yet.

   b. Repeat step a) for the remaining segments. Do **NOT** install last segment (F) and two support tabs (G) yet.

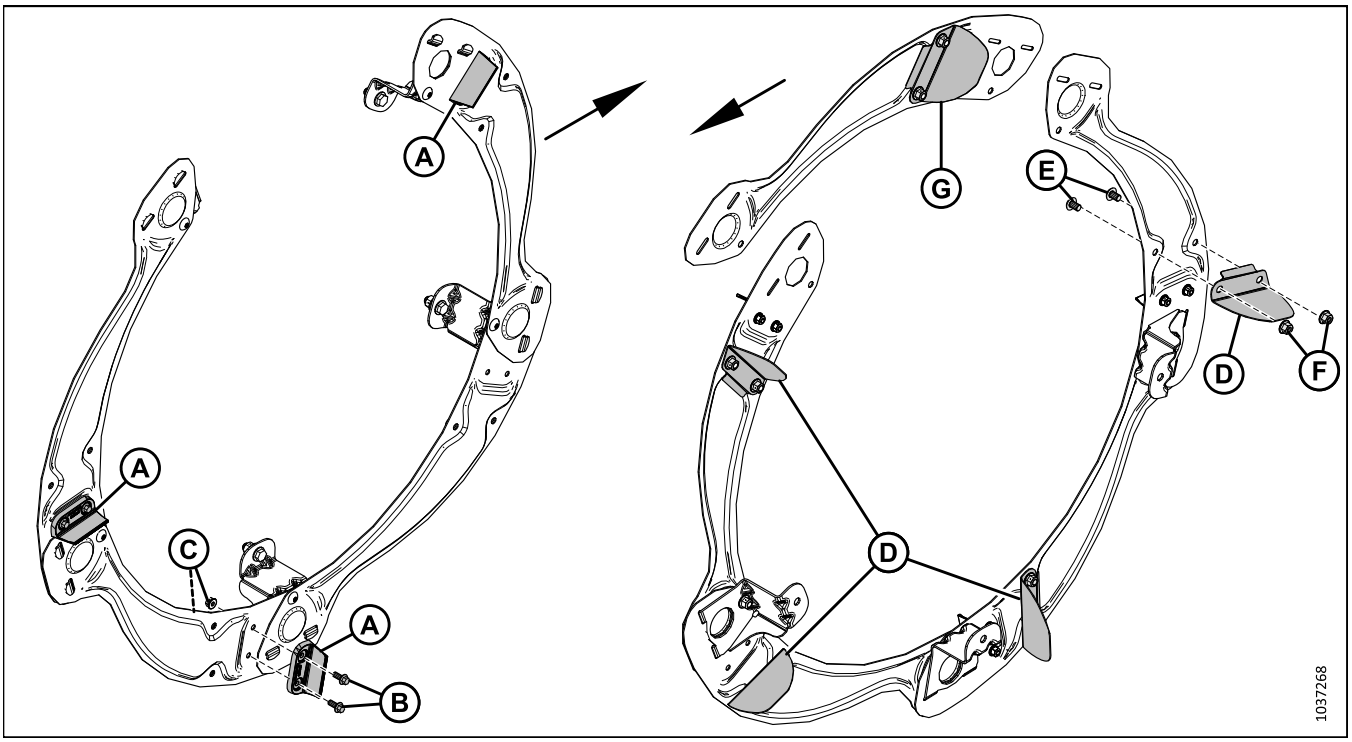


Figure 6.43: Five-Bat Reel – Rubber Paddles and Aluminum Cam Deflectors

3. Install three rubber reel end paddles (A) on the outboard face of the endshield assembly using two M8 X 1.25 X 20 hex bolts (B) and nuts (C) per paddle.

   IMPORTANT:

   Ensure that the rubber paddles and cam deflectors are oriented as shown.

4. **Five and six-bat reels:** Install four **ALUMINUM** cam deflectors (D) (MD #311729) on the **INBOARD FACE** of the endshield assembly shown using two M10 X 1.5 X 16 Torx® screws (E) and hex nuts (F).

5. **Five and six-bat reels:** Install **ALUMINUM** cam deflector (G) (MD #311729) on the last segment as shown using two M10 X 1.5 X 16 Torx® screws and hex nuts.

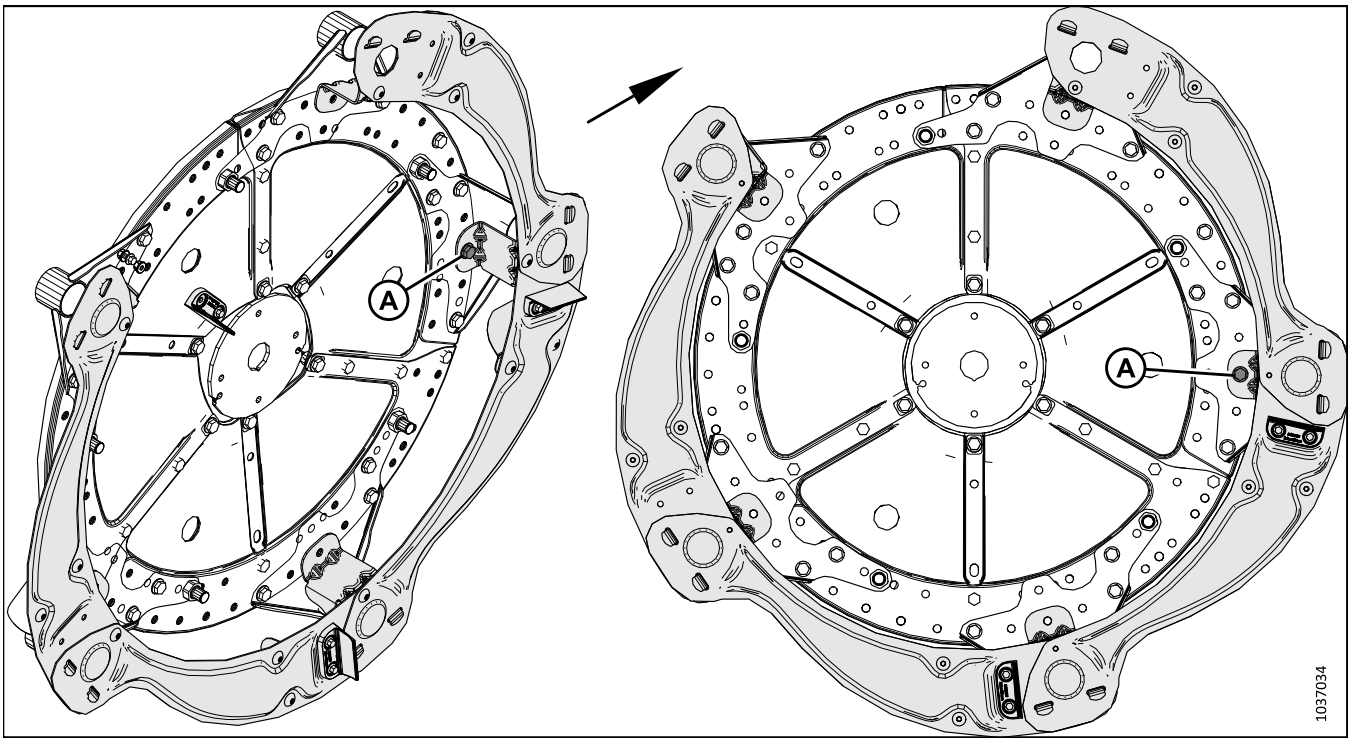


Figure 6.44: Five-Bat Reel – Partially Assembled Reel Endshields on Reel

6. Position the partially assembled reel endshield on the reel.

7. Secure the endshield to the reel with one M12 X 1.75 X 30 hex bolt and nut (A). Do **NOT** tighten the hardware yet.

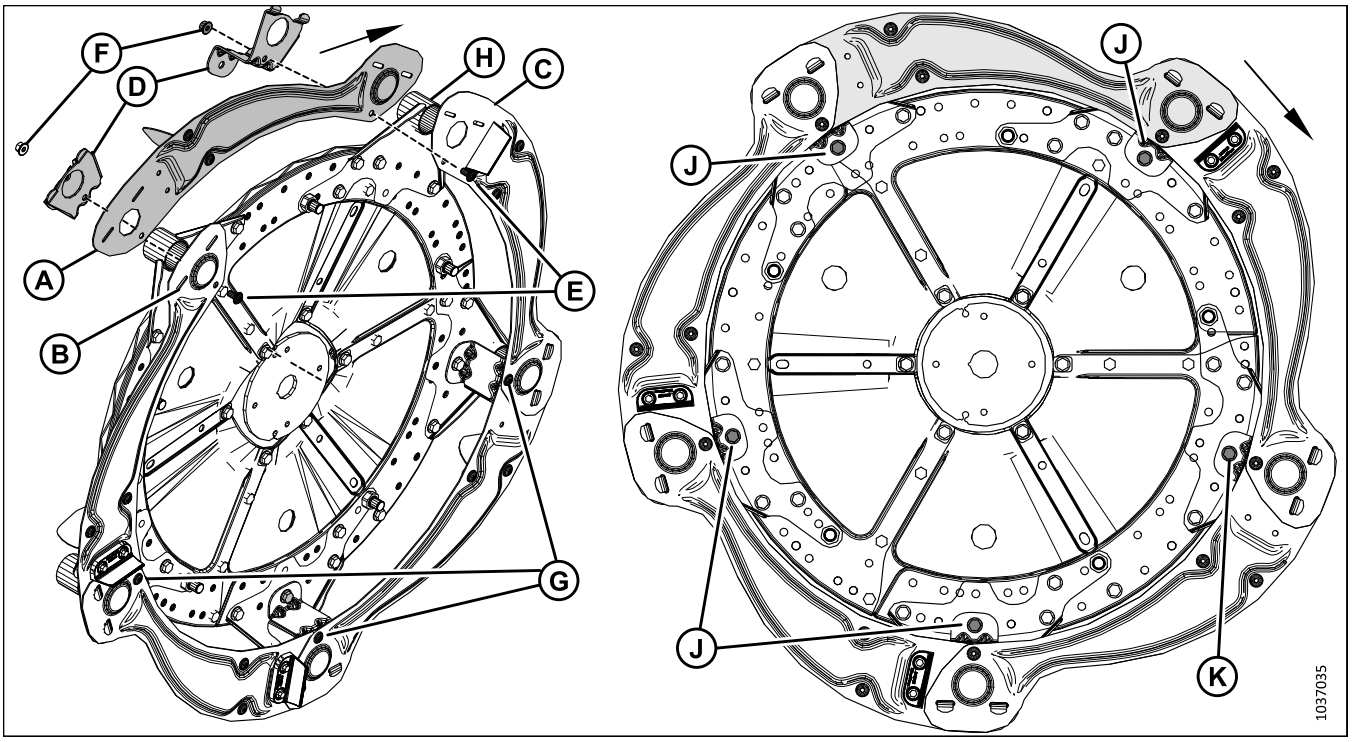


Figure 6.45: Five-Bat Reel – Partially Assembled Reel Endshields on Reel

8. Install the last segment of endshield (A) as follows:
   a. Position the wide end of last segment (A) behind segment (B). Position the other end of the last segment on top of segment (C).
   b. Insert the tabs of endshield supports (D) through the endshield segments.
   c. Secure the endshield supports using two M10 X 1.5 X 20 Torx® screws (E) and nuts (F).
   d. Torque five M10 X 1.5 X 20 Torx® screws (E) and (G) to 39 Nm (29 lbf·ft). Rotate the reel to reach the screws if required.
9. Install the endshield supports on tine tubes (H).

   NOTE:

   Not all of the tine tubes are shown in the illustration.
10. Secure the remaining endshield supports to the reel disc using one M12 X 1.75 X 30 hex bolt (J) and nut per endshield support.
11. Tighten M12 X 1.75 X 30 hex bolts (J) and (K) and the nuts securing the endshield supports to the cam discs to 68.5 Nm (50.5 lbf·ft).

6.8.2 Installing Single-Reel Endshields at Tail End

Endshields need to be installed at the tail (left) end of the reel to prevent crop from wrapping around the reel.

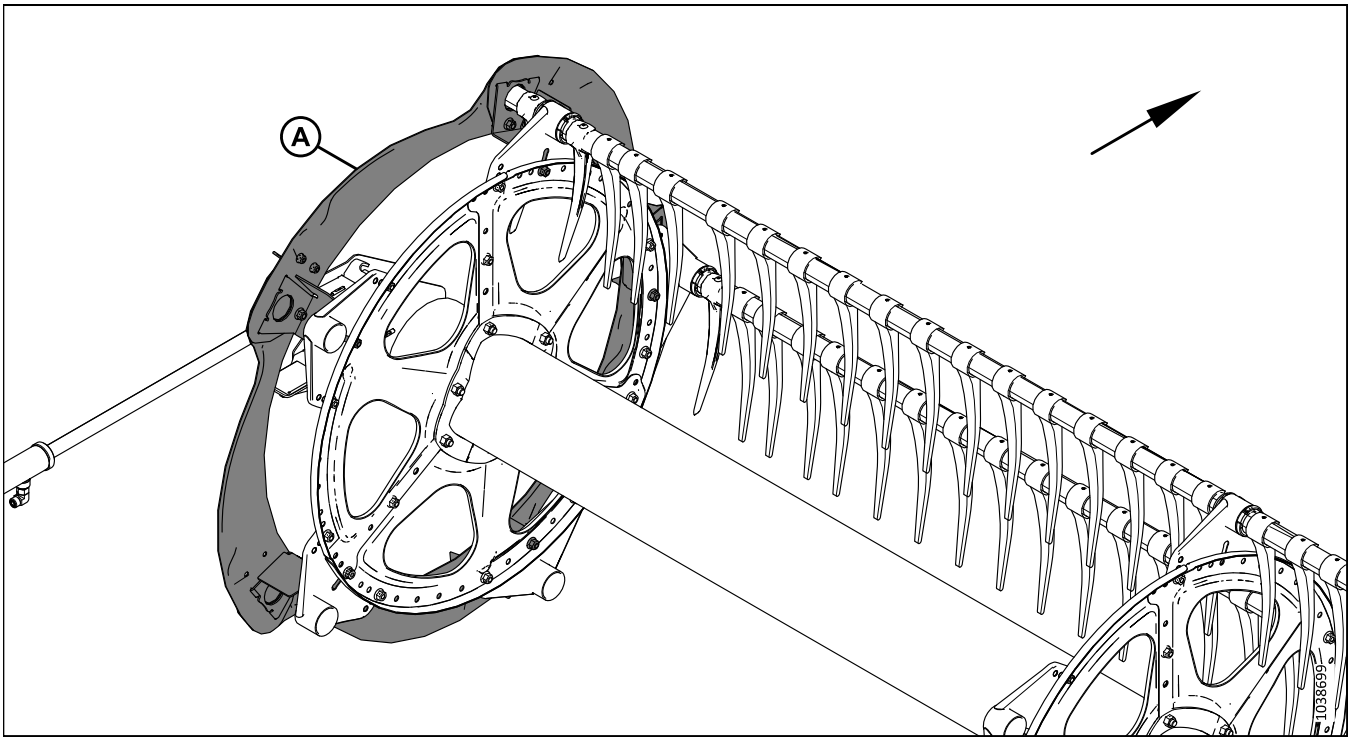


Figure 6.46: Tail End of Reel

A - Five-Bat Tail-End Shield (MD #311695)

1. Retrieve bag 1 from inside the reel endshields shipping bag (MD #311739, 311362, or 311363 depending on the number of reel bats).

   NOTE:

   The illustrations in this procedure all show five-bat reel endshields. The procedure for installing six- and nine-bat endshields is the same, only the number of parts is different. The parts required for your specific reel type are all provided in bag 1.

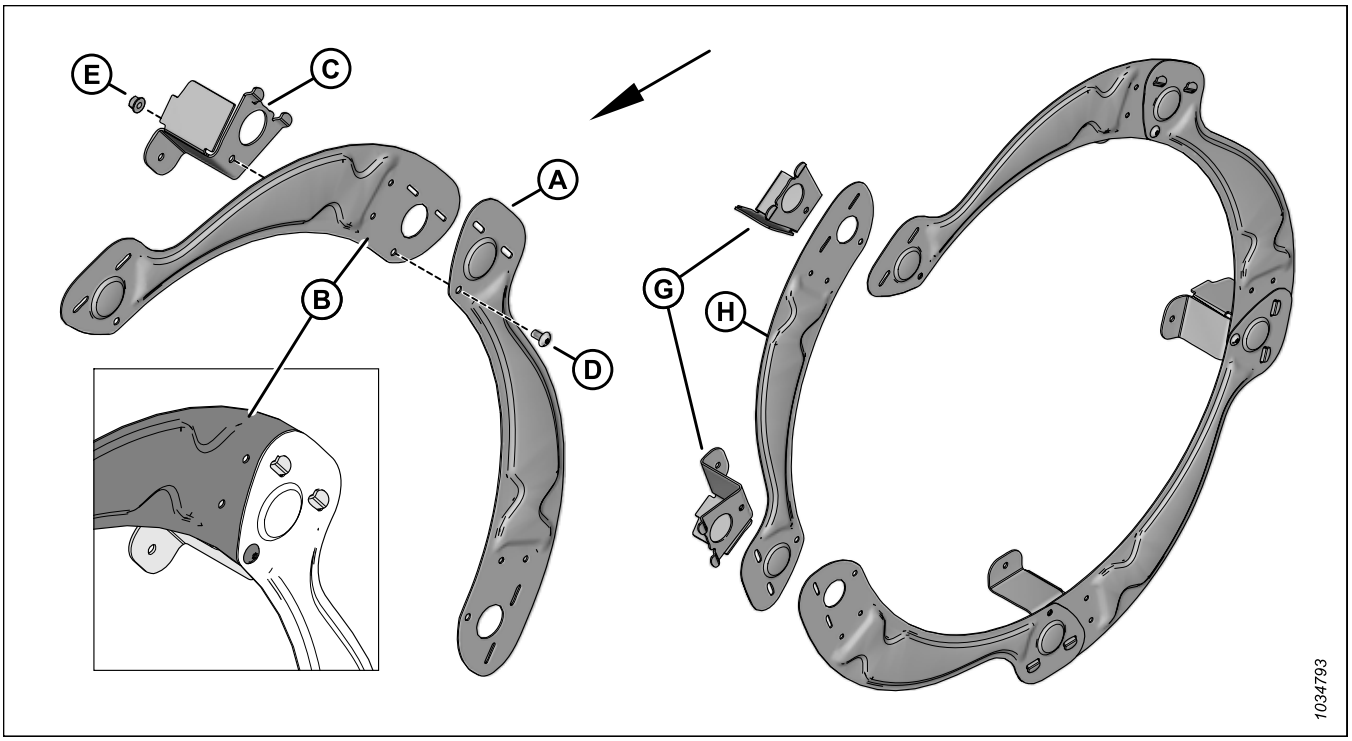


Figure 6.47: Five-Bat Reel – Initial Endshield Assembly

2. Assemble the endshield as follows:

   a. Position endshield segment (A) in front of segment (B). Engage endshield support tabs (C) through both segments. Secure the segments with M10 X 1.5 X 20 Torx® screw (D) and hex nut (E). Do **NOT** tighten the hardware yet.

   b. Repeat the previous step to assemble the remaining segments. Do **NOT** install last segment (H) and two support tabs (G) yet.

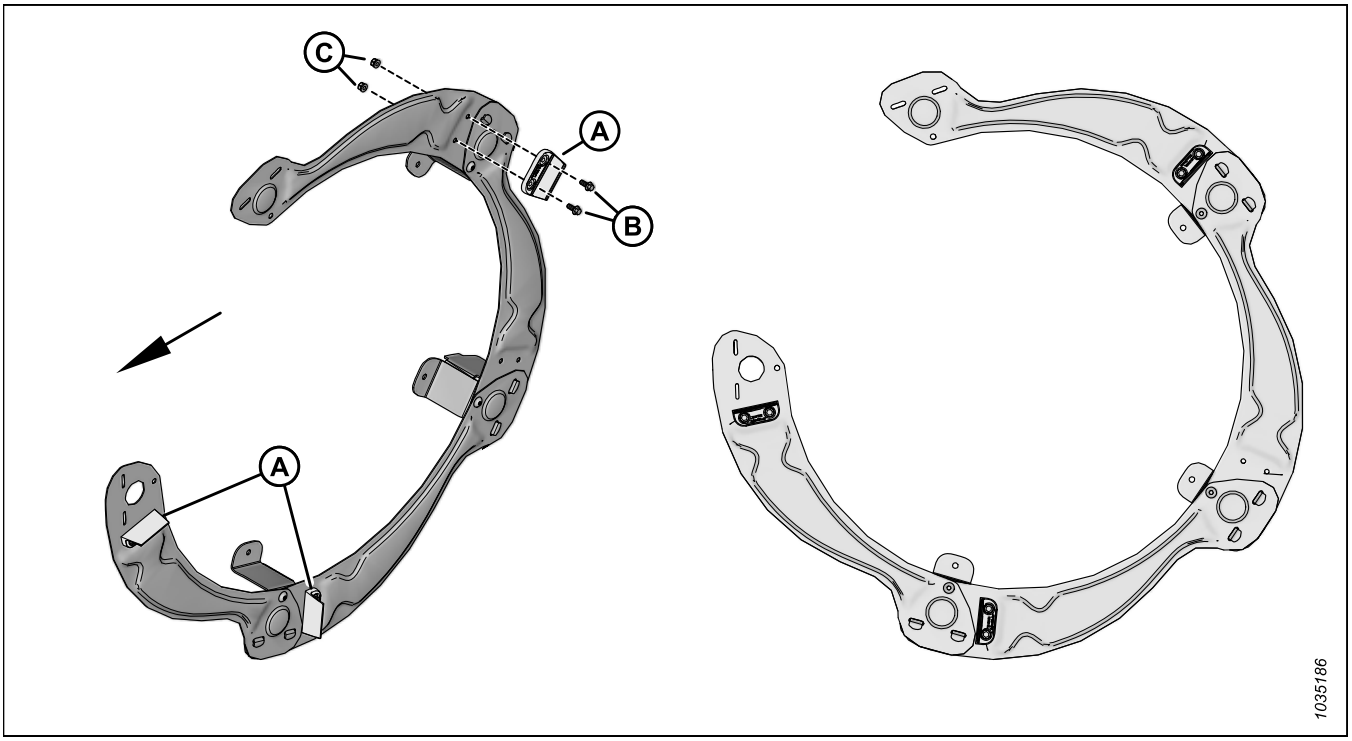


Figure 6.48: Five-Bat Reel – Rubber Paddles

3. Install three rubber reel end paddles (A) on the outboard face of the endshield assembly using two M8 X 1.25 X 20 hex bolts (B) and nuts (C) per paddle.

IMPORTANT:

Ensure that the rubber paddles are oriented as shown. The rubber paddles on both ends of the reel (the outboard cam and outboard tail ends) should be aligned.

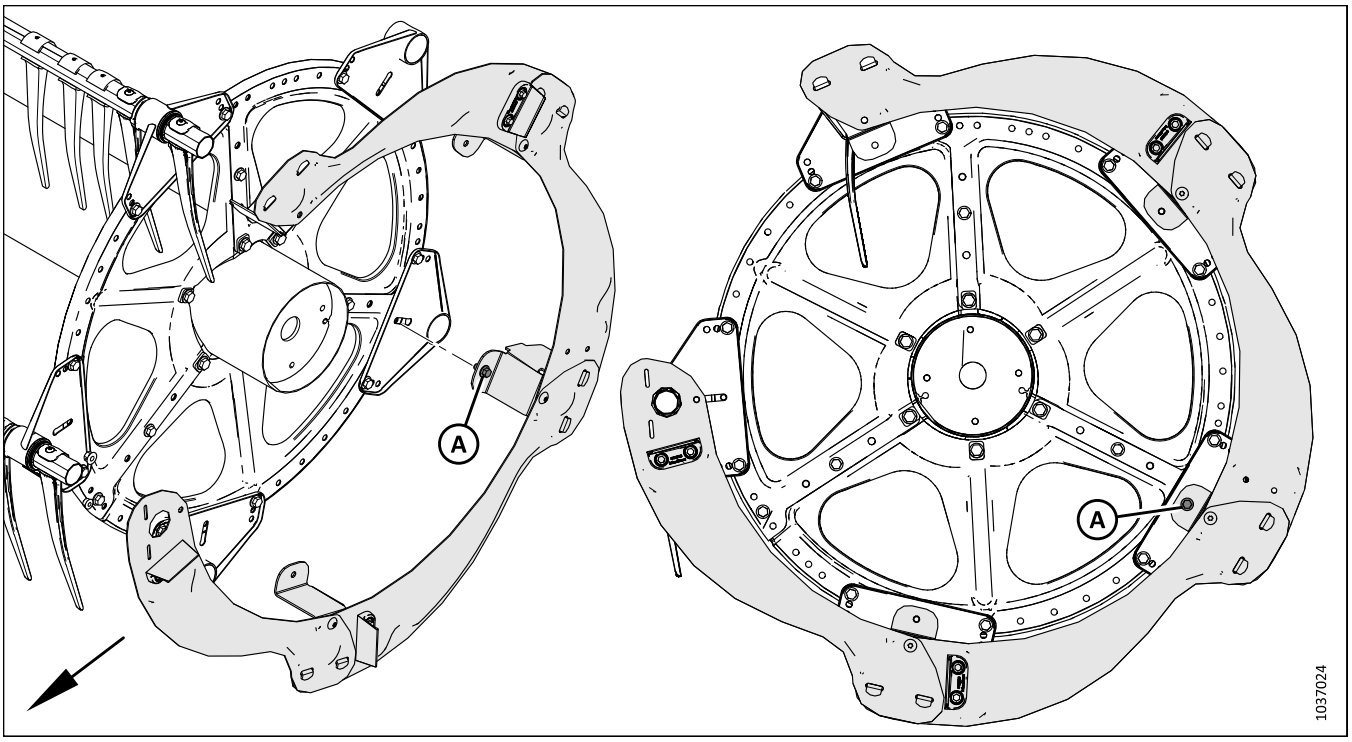


Figure 6.49: Five-Bat Reel – Partially Assembled Reel Endshields on Reel

4. Position the partially assembled reel endshield on the reel and tine tubes.

5. Identify the endshield support tab opposite the opening in the circle of endshield segments. Secure that support tab to the reel with one M10 X 1.5 X 20 hex bolt (A) and nut. Do **NOT** tighten the hardware yet.

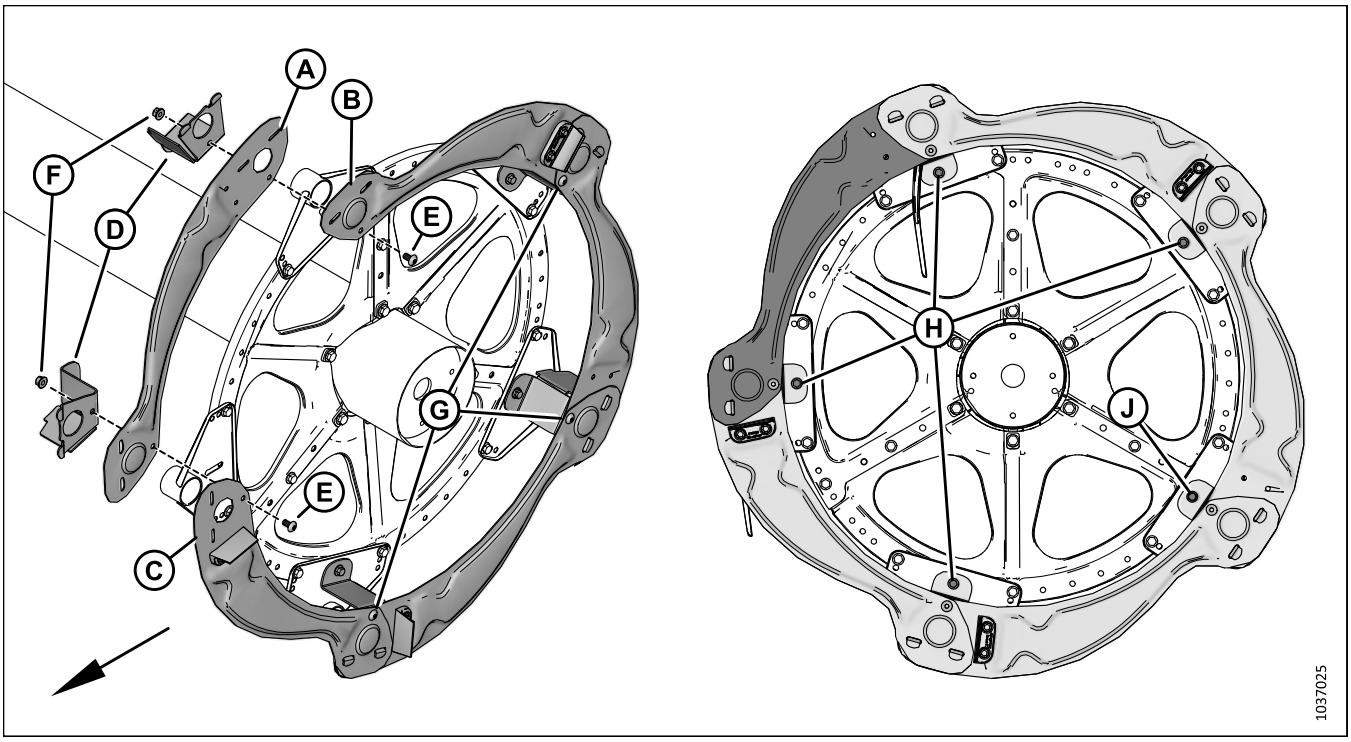


Figure 6.50: Five-Bat Reel – Partially Assembled Reel Endshields on Reel

6. Install the last segment of endshield (A) as follows:
    a. Position the wide end of last segment (A) behind segment (B). Position the other end of last segment on top of segment (C).
    b. Insert the tabs of endshield supports (D) through the endshield segments.
    c. Secure the endshield supports using two M10 X 1.5 X 20 Torx® screws (E) and nuts (F).
    d. Torque M10 X 1.5 X 20 Torx® screws (E) and (G) to 39 Nm (29 lbf·ft). Rotate the reel to reach the screws if necessary.
7. Secure the endshield supports to the reel disc using one M10 X 1.5 X 20 hex bolt and nut (H) per endshield support.
8. Torque M10 X 1.5 X 20 hex bolts (H) and (J) and the nuts that secure the endshield supports to the cam discs to 68.5 Nm (50.5 lbf·ft).

6.9 Installing Double-Reel Endshields – Parts Bags MD #340985 (Five-Bat Reels) or MD #340986 (Six-Bat Reels)

The reel endshields on double-reel headers have been removed for shipping purposes. The reel endshields will need to be unpacked and installed on the header.

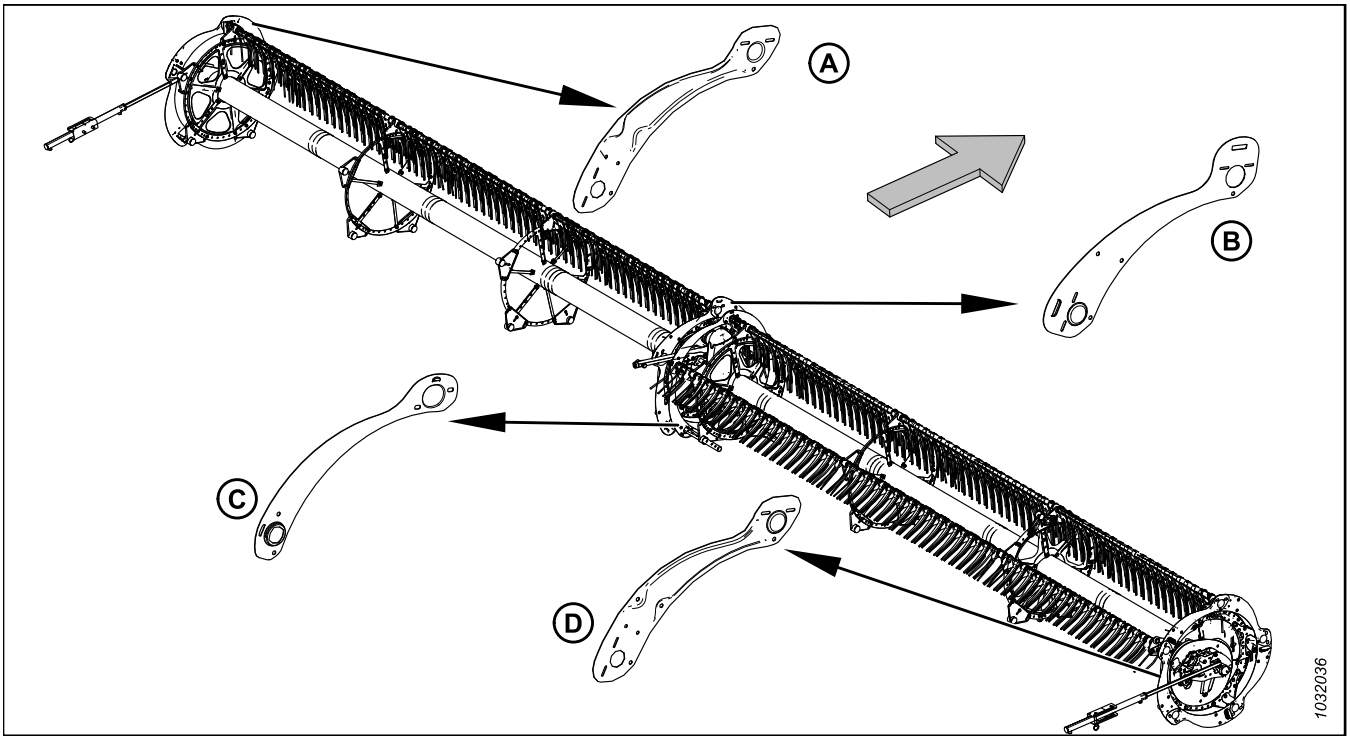


Figure 6.51: Reel Endshields – Double-Reel (MD #340985)

A - Tail End, Outboard (MD #311695), Bag 1
B - Cam End, Inboard (MD #273823), Bag 2
C - Tail End, Inboard (MD #311795), Bag 3
D - Cam End, Outboard (MD #311694), Bag 4

NOTE:

The large arrow indicates the front of the header.

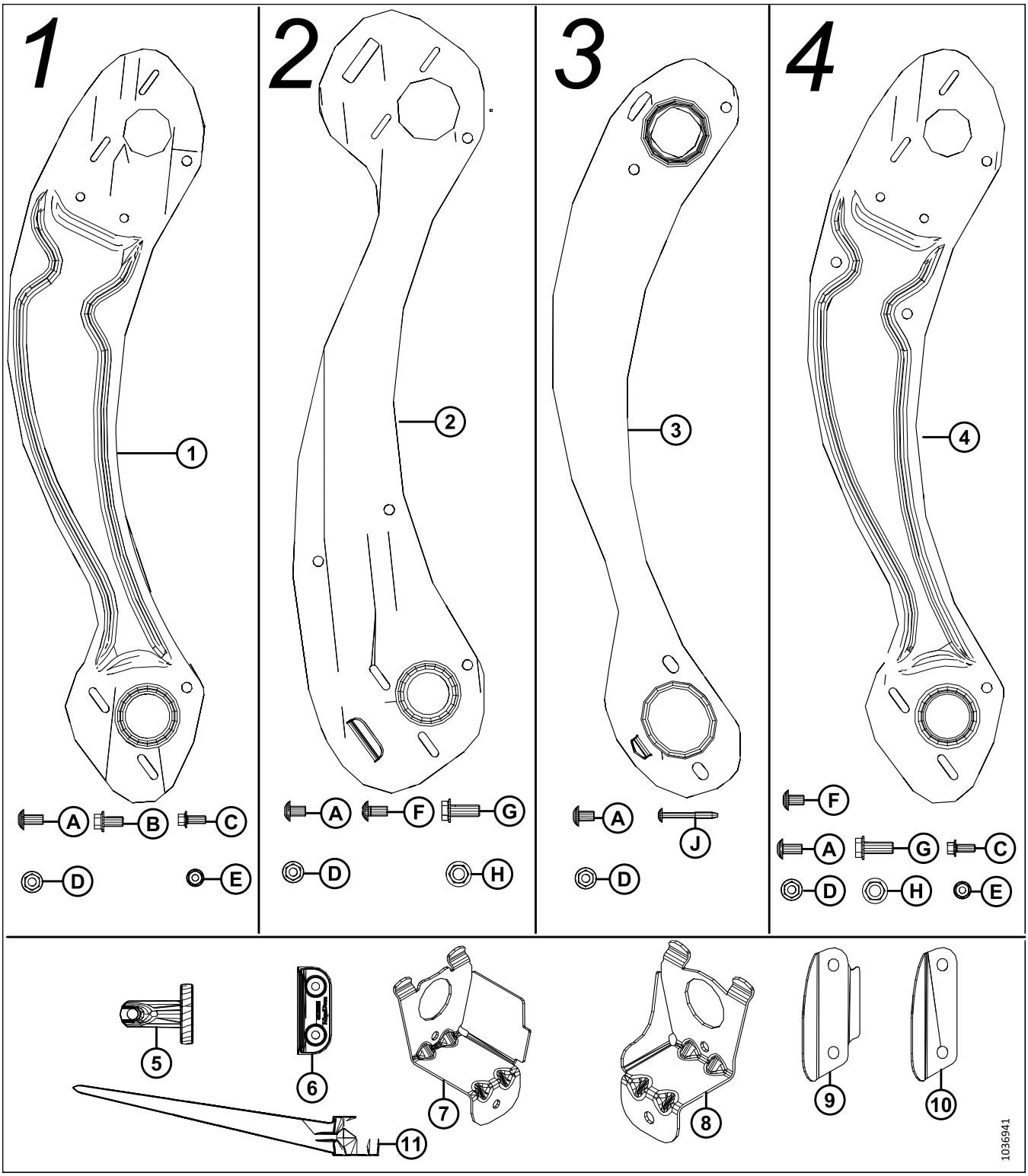


Figure 6.52: Five-Bat Double Reel Endshields – MD #340985

Table 6.6 Five-Bat Double Reel Bag – MD #340985

Ref	Part Number	Description	Qty
Bag #1			
1	311695	SHIELD – 5-BAT LH OUTBOARD TAIL END	5
A	136395	SCR – TORX TRUSS HD M10X1.5X20XSPCL-8.8-A3L	5
B	152655	BOLT – HEX FLG HD M10X1.5X20-8.8-AA1J	5
C	136300	BOLT – HEX FLG HD TFL M8X1.25X20-8.8-AA3L	6
D	135799	NUT – HEX FLG CTR LOC M10X1.5-10	10
E	135337	NUT – HEX FLG CTR LK M8X1.25-8-AA1J	6
Bag #2			
2	273823	SHIELD – 5-BAT LH REEL CAM END	5
A	136395	SCR – TORX TRUSS HD M10X1.5X20XSPCL-8.8-A3L	5
D	135799	NUT – HEX FLG CTR LOC M10X1.5-10	15
F	136640	SCR – TORX TRUSS HD M10X1.5X16XSPCL-8.8-AA1J	10
G	320180	BOLT – HEX FLG HD M12X1.75X30-SPCL-8.8-ZINC	5
H	136431	NUT – HEX FLG CTR LOC M12X1.75-10	5
Bag #3			
3	311795	SHIELD – 5-BAT RH REEL TAIL END	5
A	136640	SCR – TORX TRUSS HD M10X1.5X16XSPCL-8.8-A3L	10
D	135799	NUT – HEX FLG CTR LOC M10X1.5-10	10
J	252687	SCREW – 48° PLASTITE TWIN HELIX	5
Bag #4			
4	311694	SHIELD – 5-BAT RH OUTBOARD CAM END	5
A	136395	SCR – TORX TRUSS HD M10X1.5X20XSPCL-8.8-A3L	5
C	136300	BOLT – HEX FLG HD TFL M8X1.25X20-8.8-AA3L	6
D	135799	NUT – HEX FLG CTR LOC M10X1.5-10	15
G	320180	BOLT – HEX FLG HD M12X1.75X30-SPCL-8.8-ZINC	5
H	136431	NUT – HEX FLG CTR LOC M12X1.75-10	5
E	135337	NUT – HEX FLG CTR LK M8X1.25-8-AA1J	6
F	136640	SCR – TORX TRUSS HD M10X1.5X16XSPCL-8.8-AA1J	10
Contained in MD #340985, but outside of Bags #1–#4			
5	273968	BUSHING – ENDSHIELD	5
6	313035	PADDLE – REEL END, HYTREL	6
7	311965	SUPPORT – WELDT TAIL END	5
8	311964	SUPPORT – WELDT CAM END	10
9	311729	DEFLECTOR – CAM OUTBOARD	5
10	311906	DEFLECTOR – CAM INBOARD	5
11	NSS[7]	FINGER-PLASTIC – LH ANGLED 52 MM	5

7. Not sold separately. This part can be ordered as a pack of 10 (MD #360540)

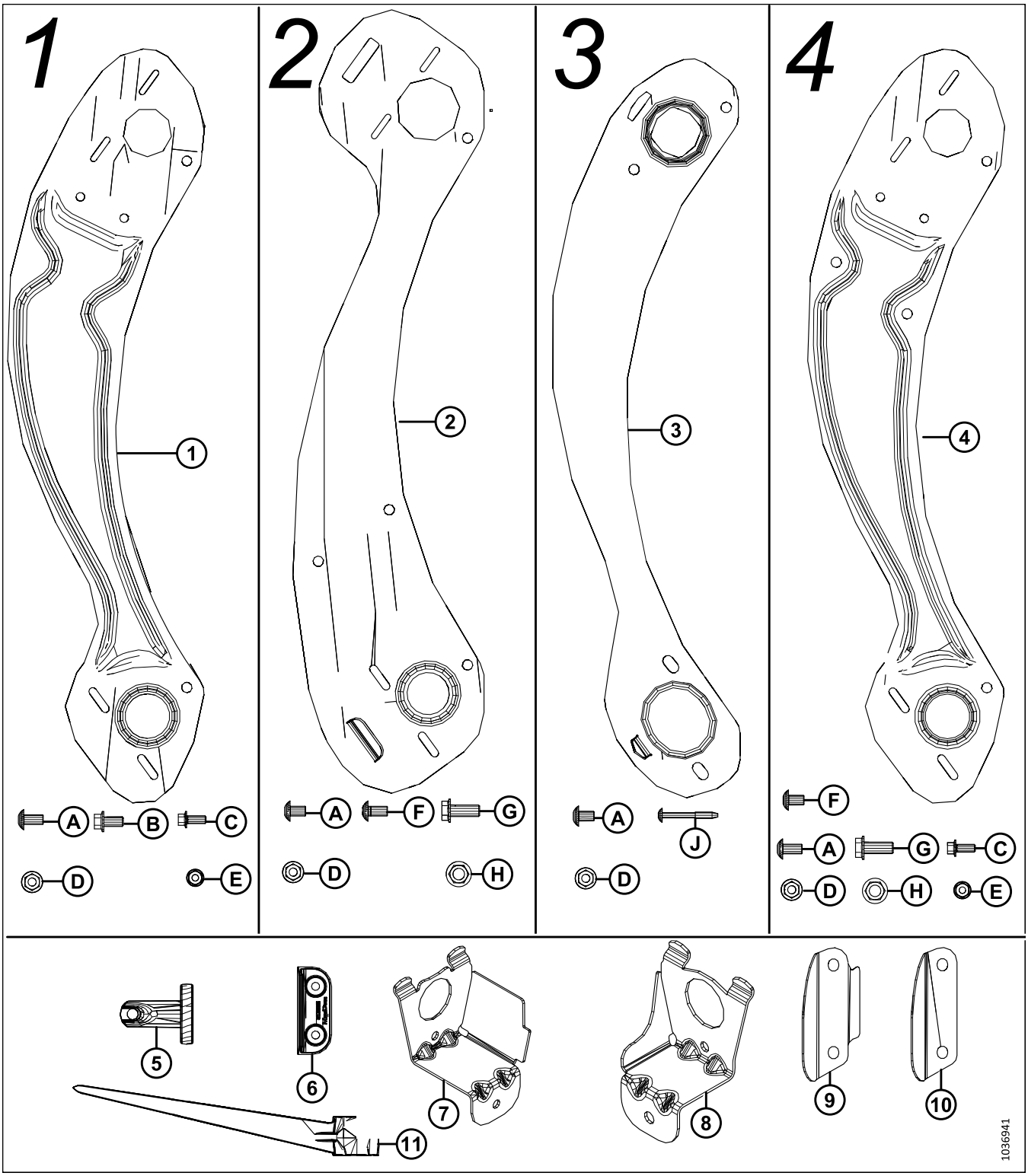


Figure 6.53: Six-Bat Double-Reel Endshields – MD #340986

Table 6.7 Six-Bat Double-Reel Bag – MD #340986

Ref	Part Number	Description	Qty
Bag #1			
1	311753	SHIELD – OUTBOARD LH 6 BAT	6
A	136395	SCR – TORX TRUSS HD M10X1.5X20XSPCL-8.8-A3L	6
B	152655	BOLT – HEX FLG HD M10X1.5X20-8.8-AA1J	6
C	136300	BOLT – HEX FLG HD TFL M8X1.25X20-8.8-AA3L	6
D	135799	NUT – HEX FLG CTR LOC M10X1.5-10	12
E	135337	NUT – HEX FLG CTR LK M8X1.25-8-AA1J	6
Bag #2			
2	273813	SHIELD – 6-BAT LH REEL CAM END	6
A	136395	SCR – TORX TRUSS HD M10X1.5X20XSPCL-8.8-A3L	6
D	135799	NUT – HEX FLG CTR LOC M10X1.5-10	18
F	136640	SCR – TORX TRUSS HD M10X1.5X16XSPCL-8.8-AA1J	12
G	320180	BOLT – HEX FLG HD M12X1.75X30-SPCL-8.8-ZINC	6
H	136431	NUT – HEX FLG CTR LOC M12X1.75-10	6
Bag #3			
3	311822	SHIELD – 6-BAT RH REEL TAIL END	6
A	136640	SCR – TORX TRUSS HD M10X1.5X16XSPCL-8.8-A3L	12
D	135799	NUT – HEX FLG CTR LOC M10X1.5-10	12
J	252687	SCREW – 48° PLASTITE TWIN HELIX	6
Bag #4			
4	311752	SHIELD – 6-BAT RH OUTBOARD CAM END	6
A	136395	SCR – TORX TRUSS HD M10X1.5X20XSPCL-8.8-A3L	6
C	136300	BOLT – HEX FLG HD TFL M8X1.25X20-8.8-AA3L	6
D	135799	NUT – HEX FLG CTR LOC M10X1.5-10	18
G	320180	BOLT – HEX FLG HD M12X1.75X30-SPCL-8.8-ZINC	6
H	136431	NUT – HEX FLG CTR LOC M12X1.75-10	6
E	135337	NUT – HEX FLG CTR LK M8X1.25-8-AA1J	6
F	136640	SCR – TORX TRUSS HD M10X1.5X16XSPCL-8.8-AA1J	12
Contained in MD #340986, but outside of Bags #1–#4			
5	273968	BUSHING – ENDSHIELD	6
6	313035	PADDLE – REEL END, HYTREL	6
7	311965	SUPPORT – WELDT TAIL END	6
8	311964	SUPPORT – WELDT CAM END	12
9	311729	DEFLECTOR – CAM OUTBOARD	6
10	311906	DEFLECTOR – CAM INBOARD	6
11	NSS[8]	FINGER-PLASTIC – LH ANGLED 52 MM	6

8. Not sold separately. This part can be ordered as a pack of 10 (MD #360540)

6.9.1 Installing Double-Reel Endshields at Outboard Cam End

Endshields need to be installed at the cam end of the right reel to prevent crop from wrapping around the reel.

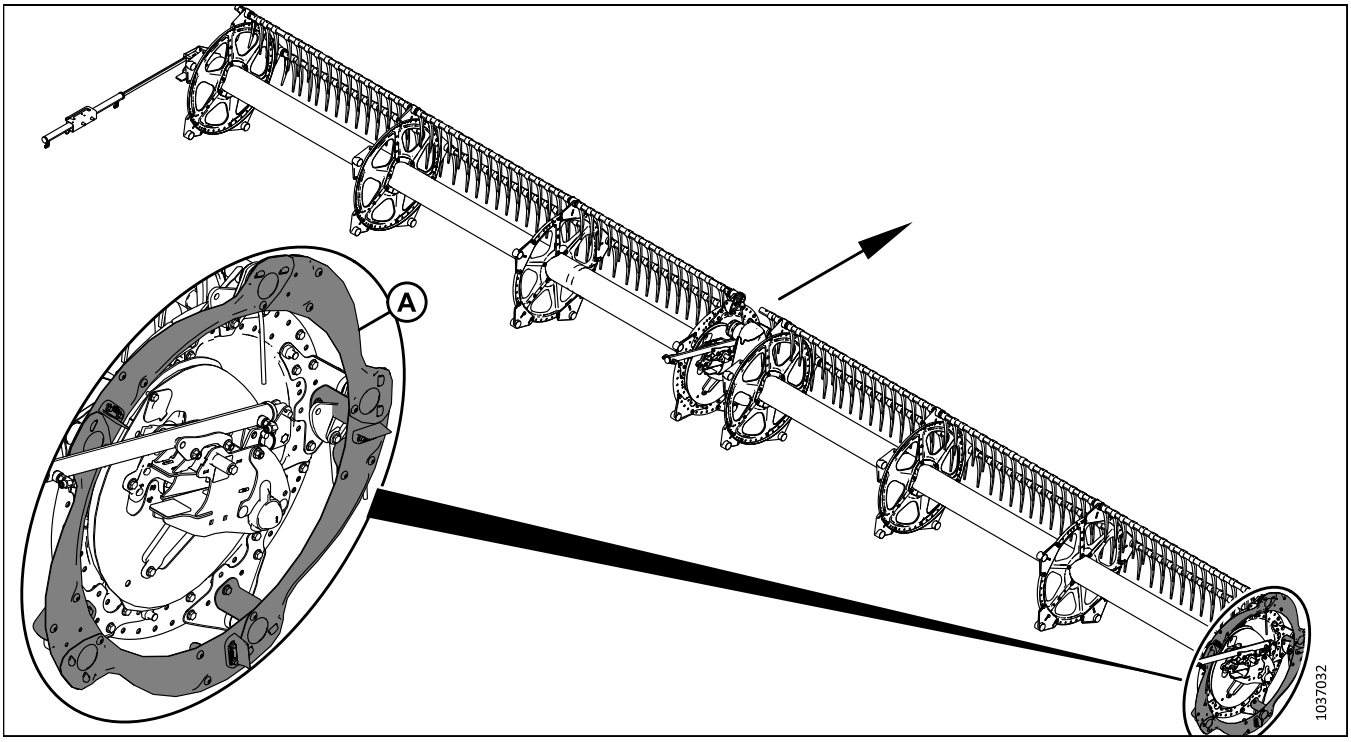


Figure 6.54: Five-Bat Double Reel

A - Five-Bat Cam-End Outboard Shield (MD #311694)

NOTE:

The arrow in the illustrations indicates the front of the header.

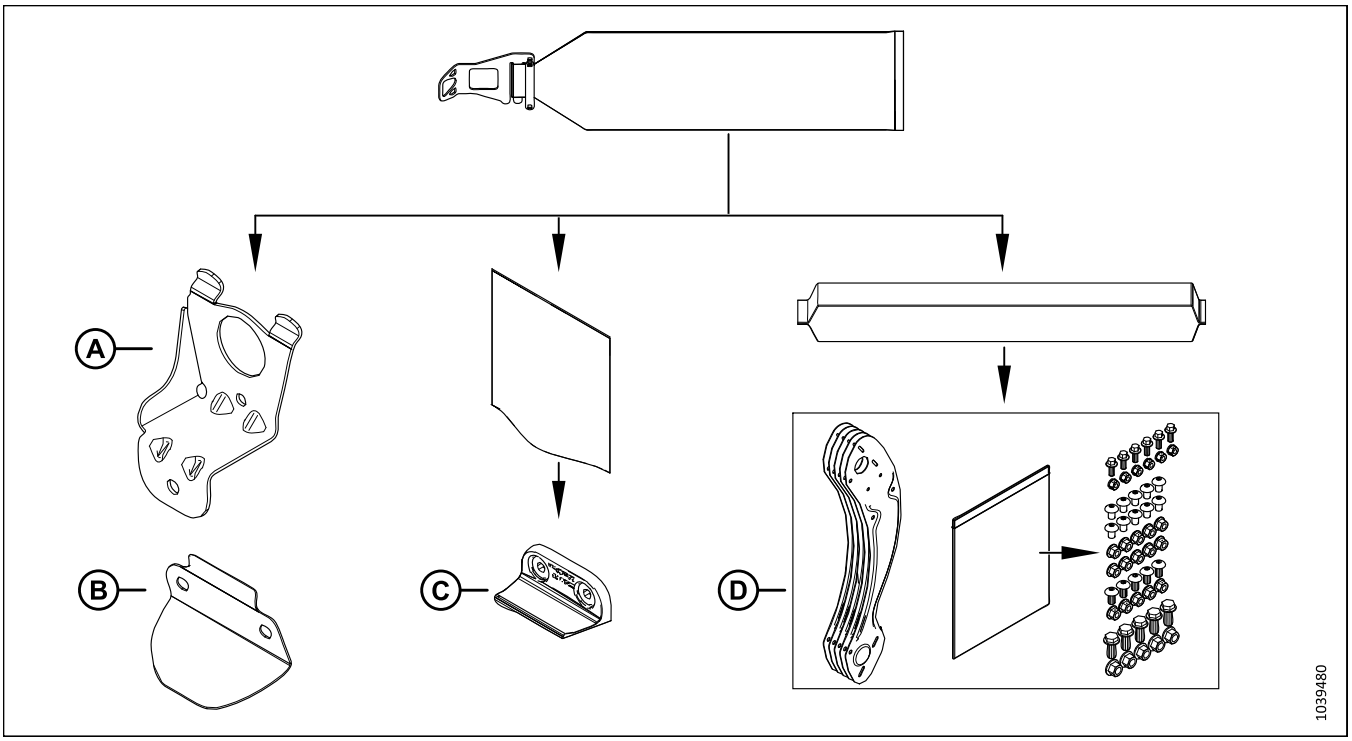


Figure 6.55: Reel Endshield Parts Bag (MD #340985)

1. Retrieve the following parts supplied in shipping bag (MD #340985 for five-bat reel):
    - Five supports (A) (MD #311964)
    - Five cam deflectors (B) (MD #311729)
    - Three rubber paddles (C) (MD #313035)
    - The bag labeled “Bag #4” (D)

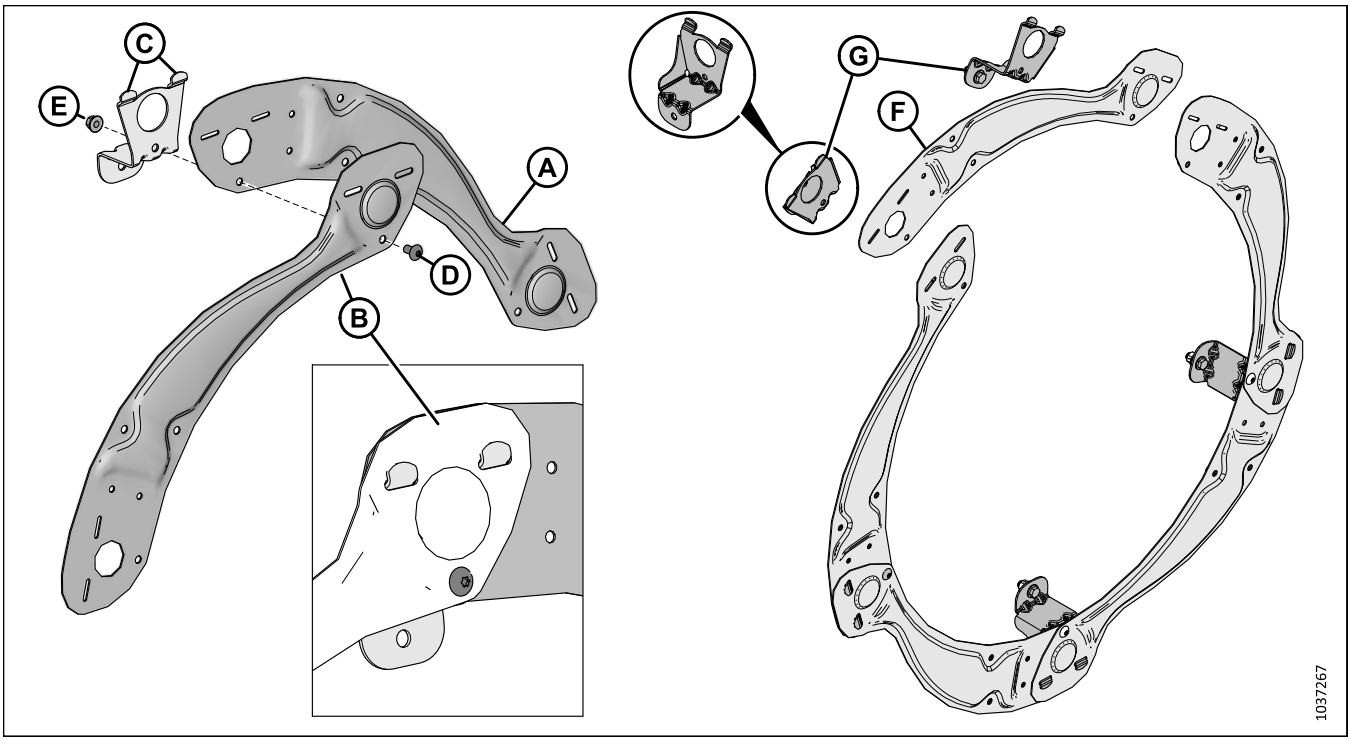


Figure 6.56: Five-Bat Reel – Initial Endshield Assembly

2. Assemble the endshield as follows:

   a. Position endshield segment (A) behind segment (B). Engage endshield support tabs (C) through both segments. Secure the segments with M10 X 1.5 X 20 Torx® screw (D) and hex nut (E). Do **NOT** tighten the hardware yet.

   b. Repeat step a) for the remaining segments. Do **NOT** install last segment (F) and two support tabs (G) yet.

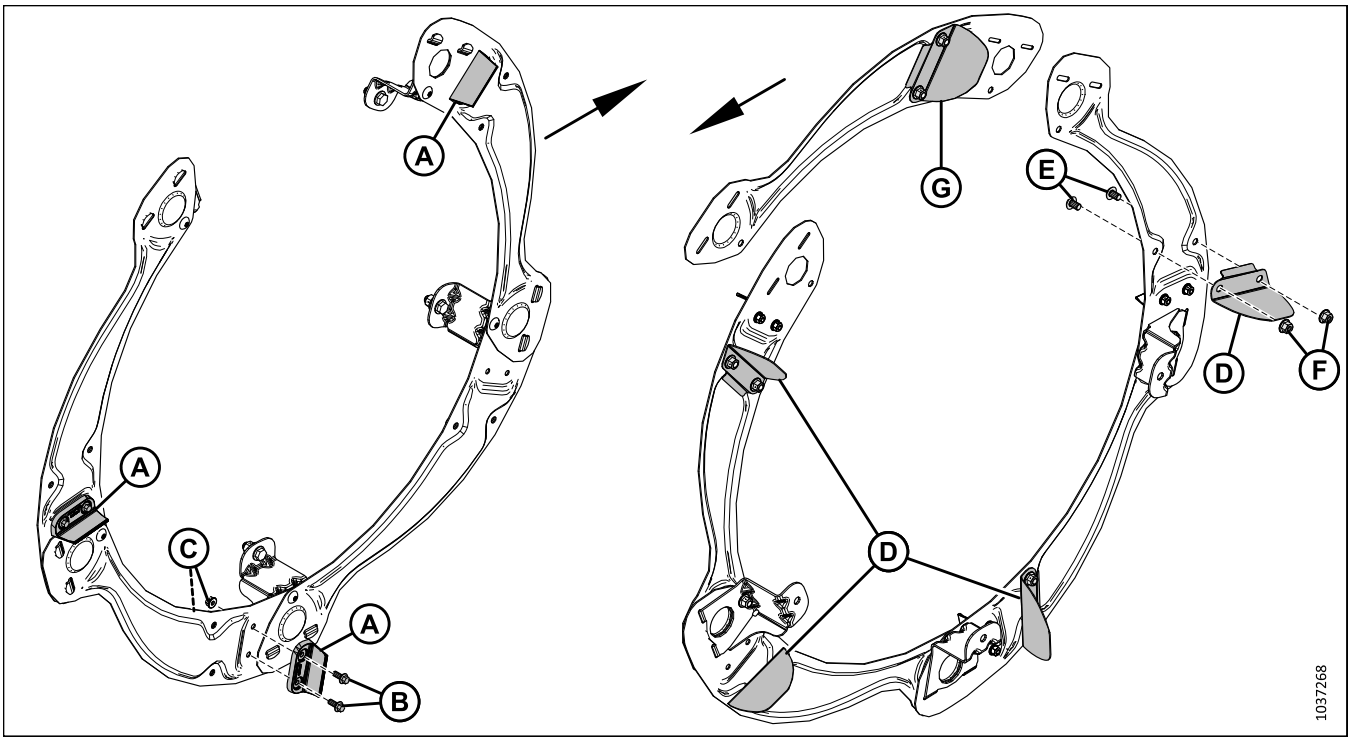


Figure 6.57: Five-Bat Reel – Rubber Paddles and Aluminum Cam Deflectors

3. Install three rubber reel end paddles (A) on the outboard face of the endshield assembly using two M8 X 1.25 X 20 hex bolts (B) and nuts (C) per paddle.

   IMPORTANT:

   Ensure that the rubber paddles and cam deflectors are oriented as shown.

4. Install four aluminum cam deflectors (D) (MD #311729) on the inboard face of the endshield assembly shown using two M10 X 1.5 X 16 Torx® screws (E) and hex nuts (F).

5. Install aluminum cam deflector (G) (MD #311729) on the last segment as shown using two M10 X 1.5 X 16 Torx® screws and hex nuts.

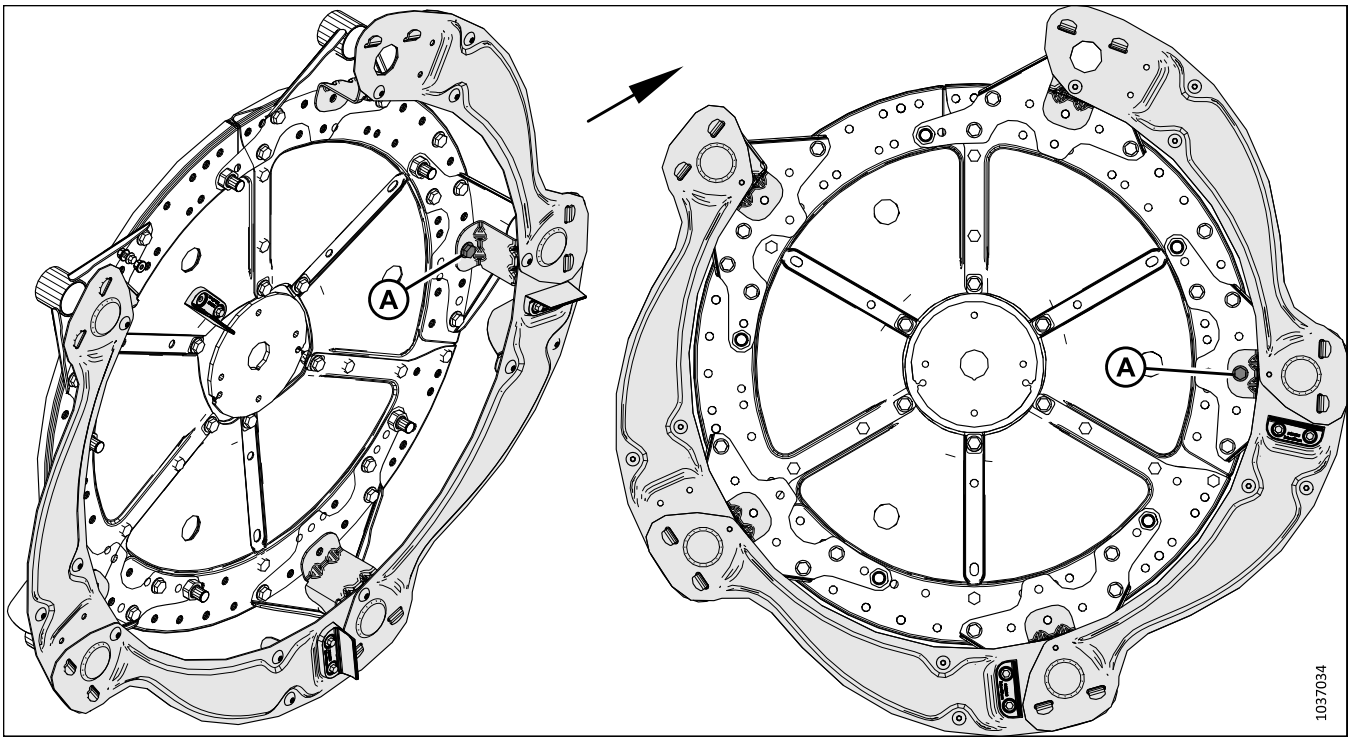


Figure 6.58: Five-Bat Reel – Partially Assembled Reel Endshields on Reel

6. Position the partially assembled reel endshield on the reel.

7. Secure the endshield to the reel with one M12 X 1.75 X 30 hex bolt and nut (A). Do **NOT** tighten the hardware yet.

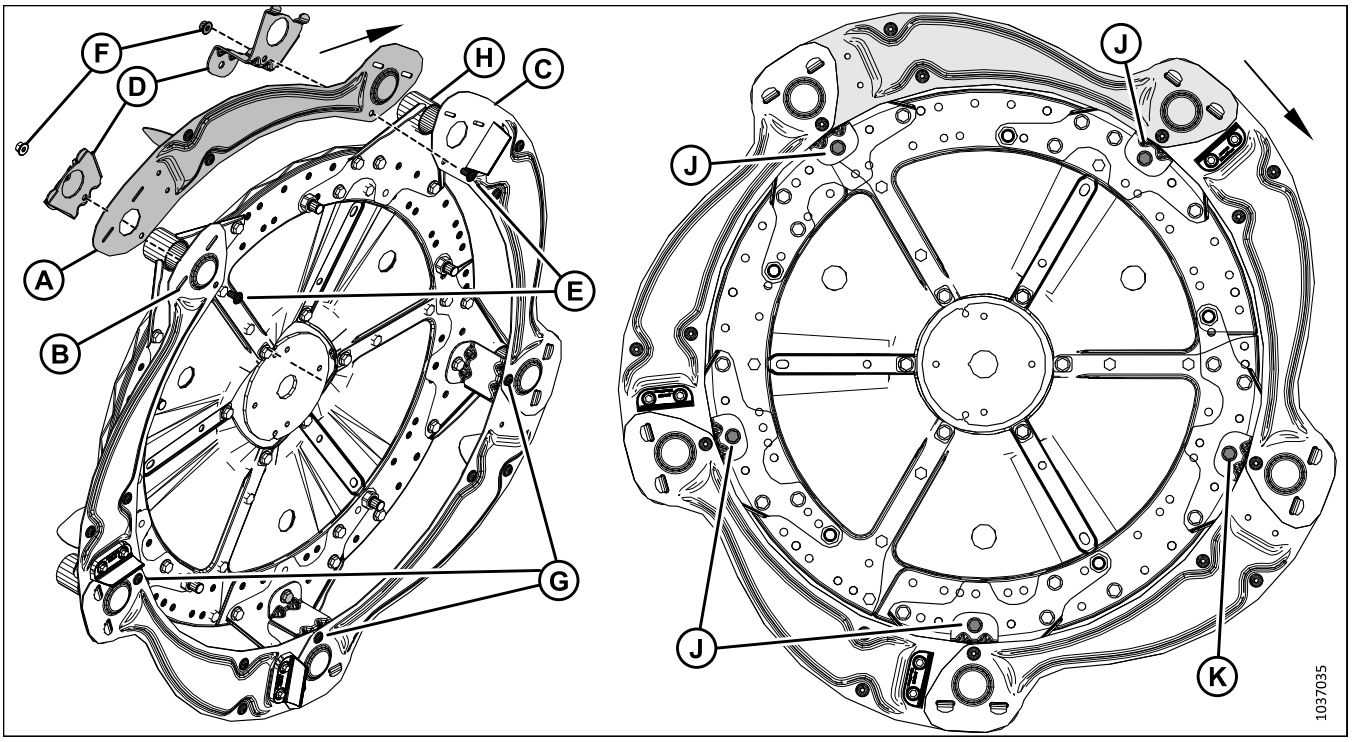


Figure 6.59: Five-Bat Reel – Partially Assembled Reel Endshields on Reel

8. Install the last segment of endshield (A) as follows:
   a. Position the wide end of last segment (A) behind segment (B). Position the other end of the last segment on top of segment (C).
   b. Insert the tabs of endshield supports (D) through the endshield segments.
   c. Secure the endshield supports using two M10 X 1.5 X 20 Torx® screws (E) and nuts (F).
   d. Torque five M10 X 1.5 X 20 Torx® screws (E) and (G) to 39 Nm (29 lbf·ft). Rotate the reel to reach the screws if required.
9. Install the endshield supports on tine tubes (H).

   NOTE:

   Not all of the tine tubes are shown in the illustration.
10. Secure the remaining endshield supports to the reel disc using one M12 X 1.75 X 30 hex bolt (J) and nut per endshield support.
11. Tighten M12 X 1.75 X 30 hex bolts (J) and (K) and the nuts securing the endshield supports to the cam discs to 68.5 Nm (50.5 lbf·ft).

6.9.2 Installing Double-Reel Endshields at Inboard Tail End

Endshields need to be installed on the tail end of the right reel to prevent crop from wrapping around the reel.

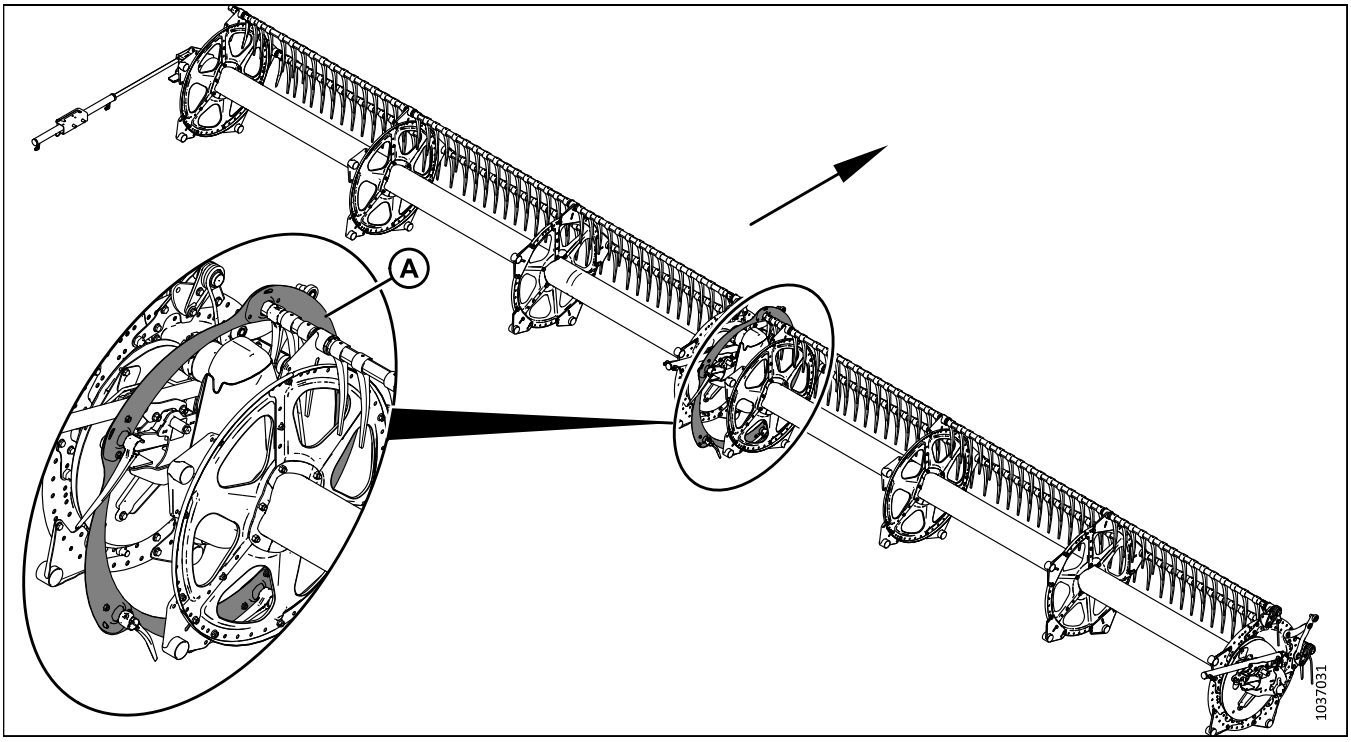


Figure 6.60: Five-Bat Double Reel

A - Five-Bat, Inboard, Tail Endshield (MD #311795)

NOTE:

The arrow in the illustrations indicates the front of the header.

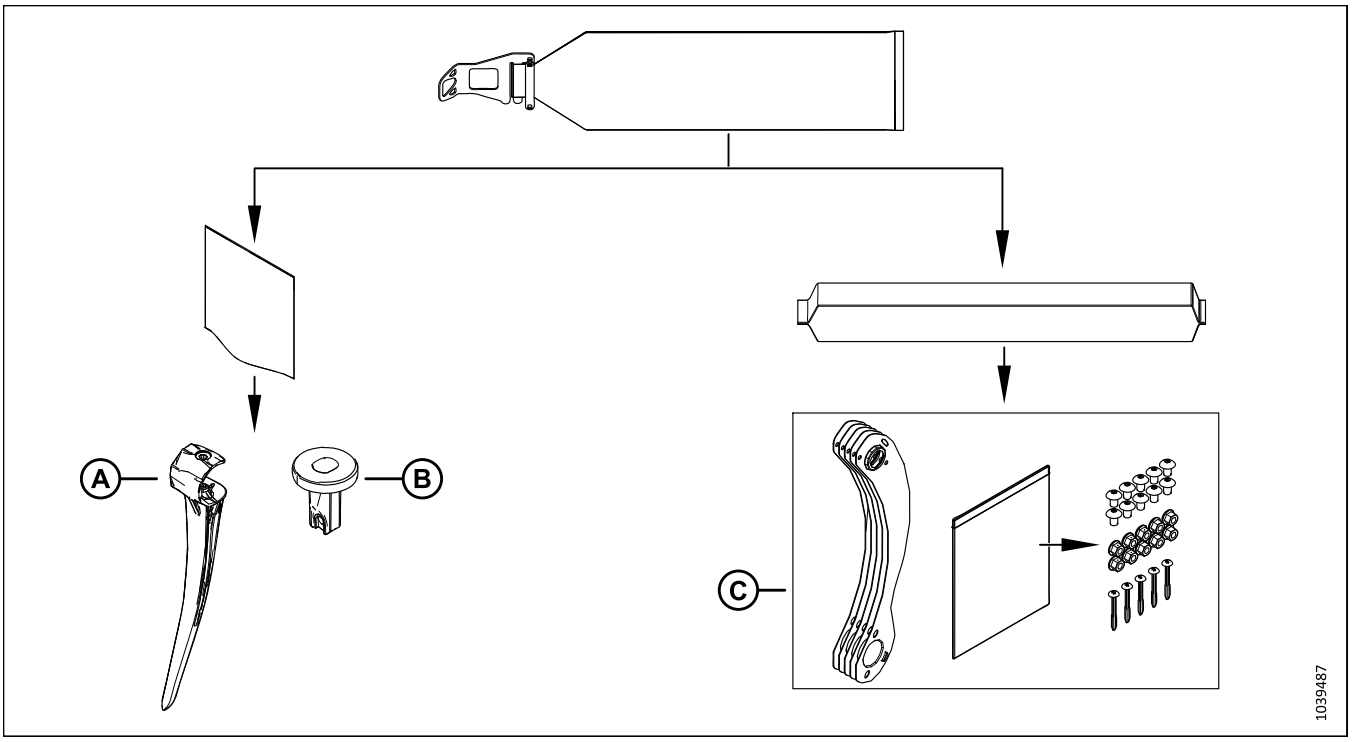


Figure 6.61: Reel Endshield Parts Bag MD #340985

1. Retrieve the following parts supplied in shipping bag (MD #340985 for five-bat reel):
    - Five fingers (A)
    - Five bushings (B)
    - The bag labeled “Bag #3” (C)

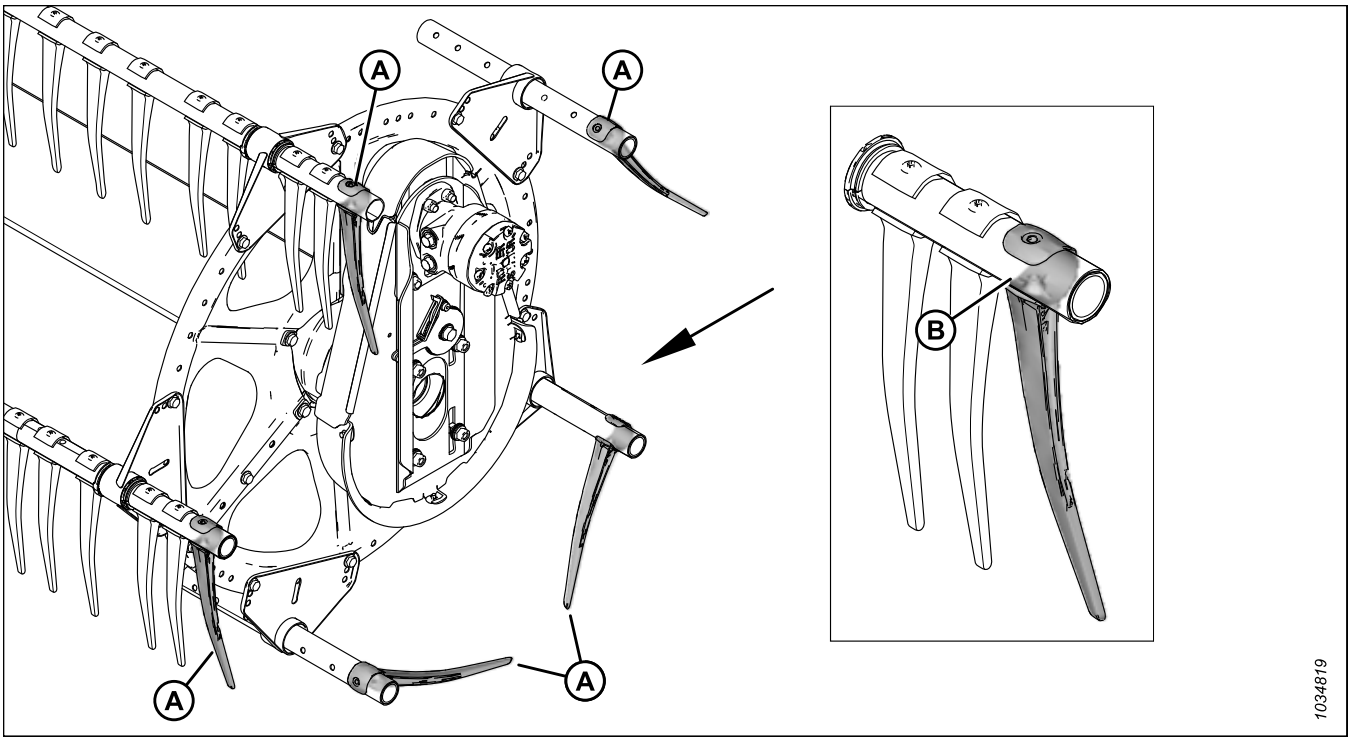


Figure 6.62: Fingers Placed on Tine Tubes

2. Place one finger (A) onto each tine tube. Ensure that open face (B) of each finger faces the front of the header.

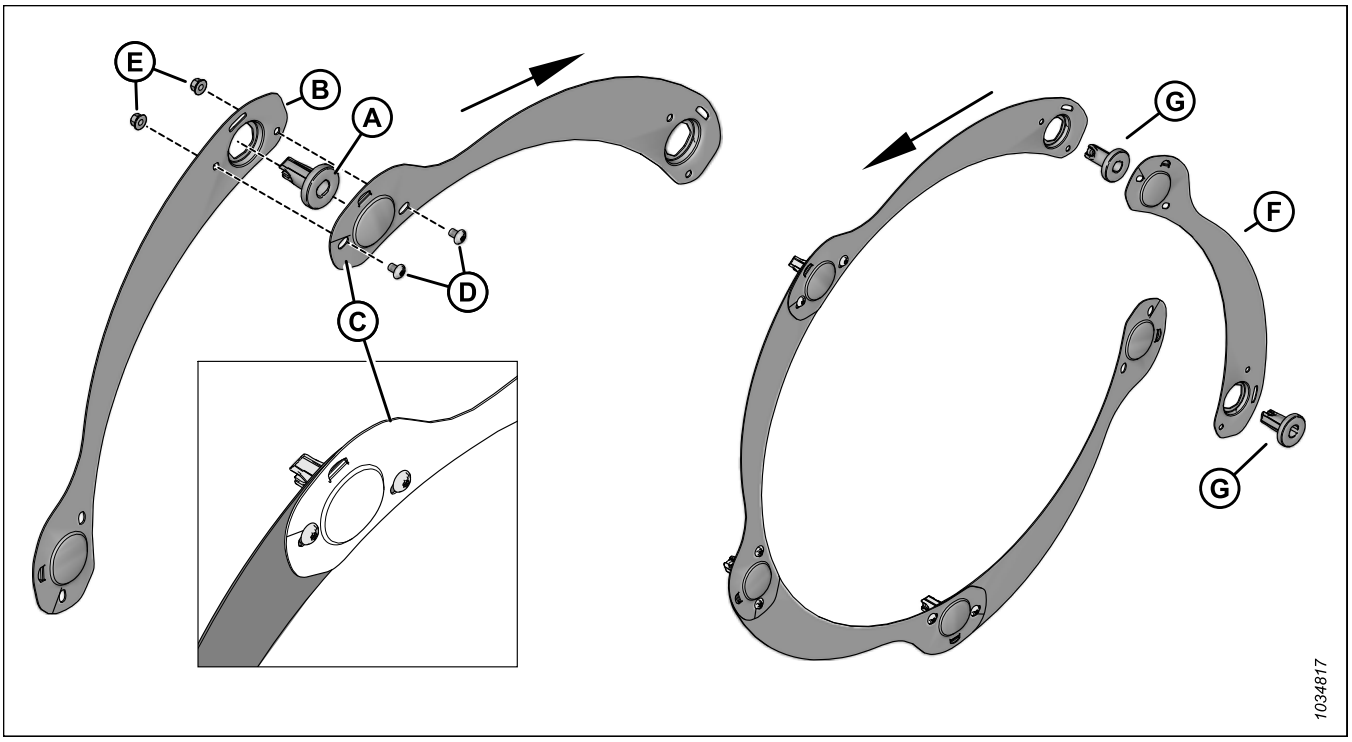


Figure 6.63: Endshield Subassembly

3. Assemble the endshield as follows:

   a. Insert bushing (A) into endshield segment (B).

   b. Place the cupped end of endshield segment (C) on top of segment (B). Secure the segments using two M10 X 1.5 X 16 Torx® screws (D) and nuts (E). Do **NOT** tighten the hardware yet.

   c. Repeat steps a) and b) to install the remaining segments. Do **NOT** install last segment (F) and two bushings (G) yet.

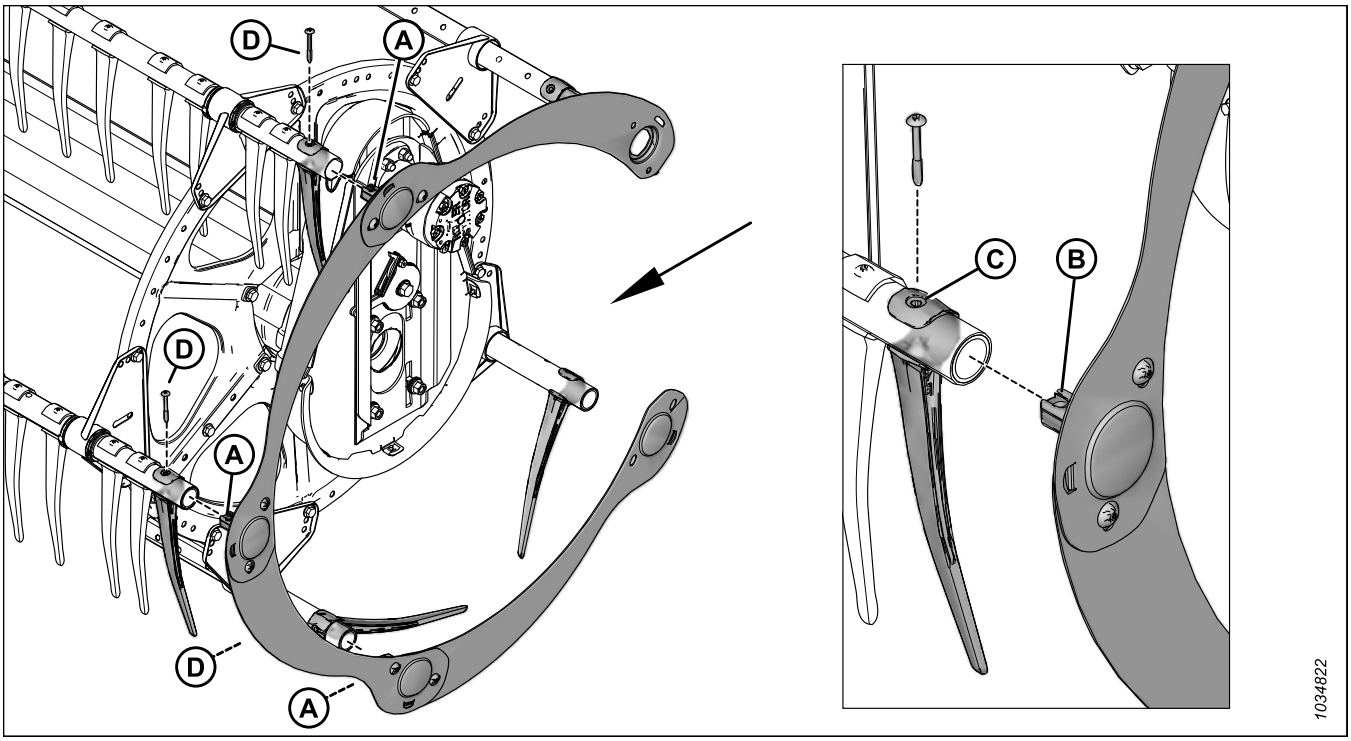


Figure 6.64: Endshield Mounted onto Reel

4. Mount the endshield onto the reel as follows:

    a. Insert three bushings (A) into the tine tubes. Align the holes in bushing (B) and finger (C) with the hole in the tine tube.

    b. Secure the bushings and the fingers using Torx® Plastite® screws (D). Do **NOT** tighten the hardware yet.

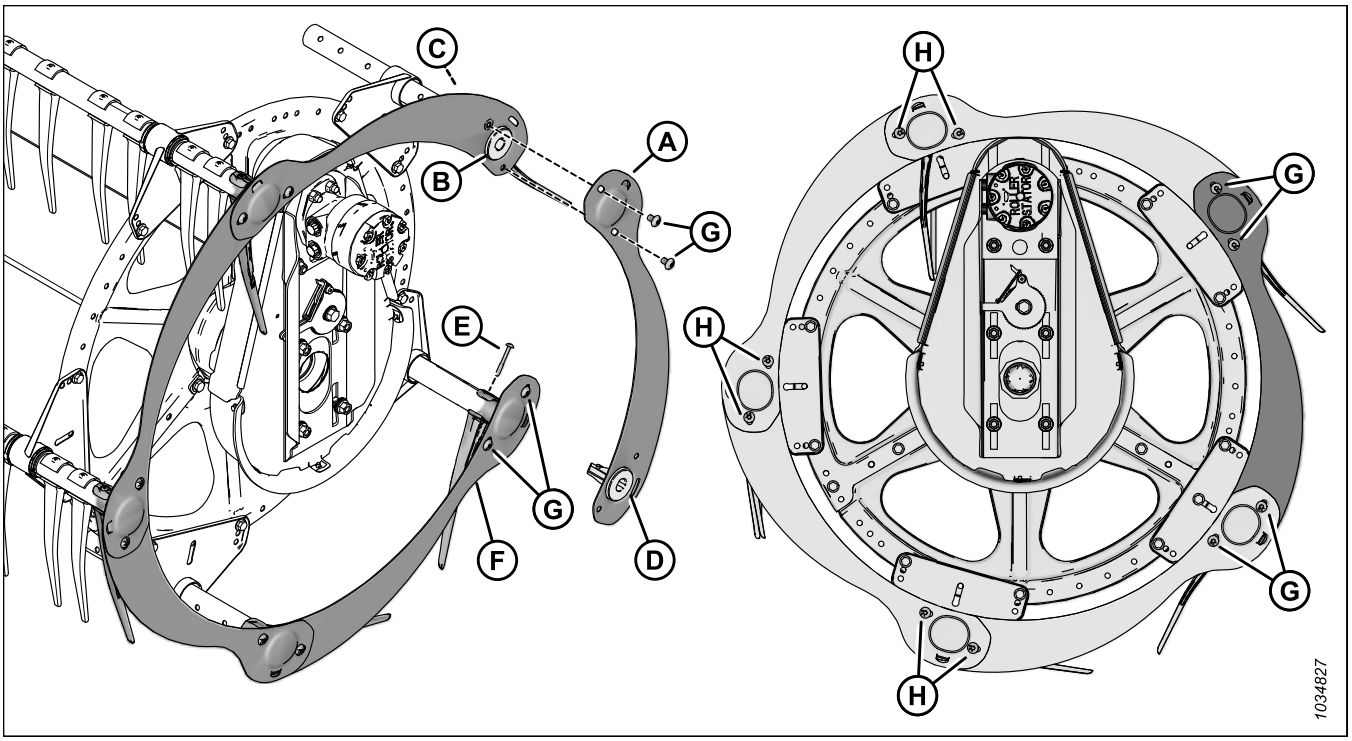


Figure 6.65: Completed Endshield Assembly

5. Install remaining endshield segment (A) as follows:

    a. Install bushing (B) into the endshield segment and the tine tube. Secure the bushing with Torx® Plastite® screw (C). Do **NOT** tighten the hardware yet.

    b. Install bushing (D) into the endshield segment.

    c. Insert the end of the segment with bushing (D) into the tine tube. Secure it with Torx® Plastite® screw (E). Do **NOT** tighten the hardware yet.

    d. Place the cupped end of segment (F) on top of segment (A).

    e. Secure the endshield segments with M10 X 1.5 X 16 Torx® screws and nuts (G).

6. Tighten all the tine tube finger Torx® Plastite® screws to 9 Nm (7 lbf·ft). Do **NOT** overtighten the screws; overtightening will flatten the tubes.

7. Torque all M10 X 1.5 X16 Torx® screws (G) and (H) to 39 Nm (29 lbf·ft).

6.9.3 Installing Double-Reel Endshields at Inboard Cam End

Endshields need to be installed at the cam end of the left reel to prevent crop from wrapping around the reel.

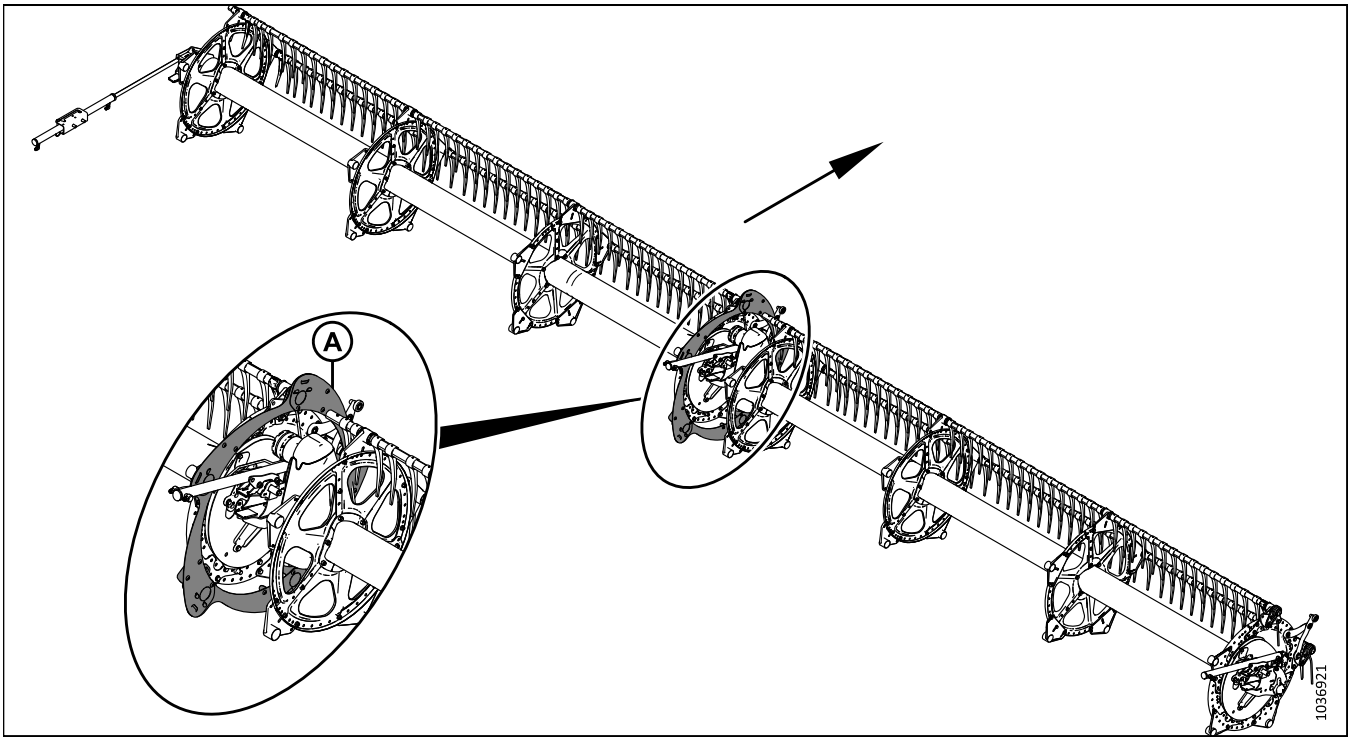


Figure 6.66: Five-Bat Double Reel

A - Five-Bat, Cam-End, Inboard Shield (MD #273823)

NOTE:

The arrow in the illustrations in this procedure indicate the front of the header.

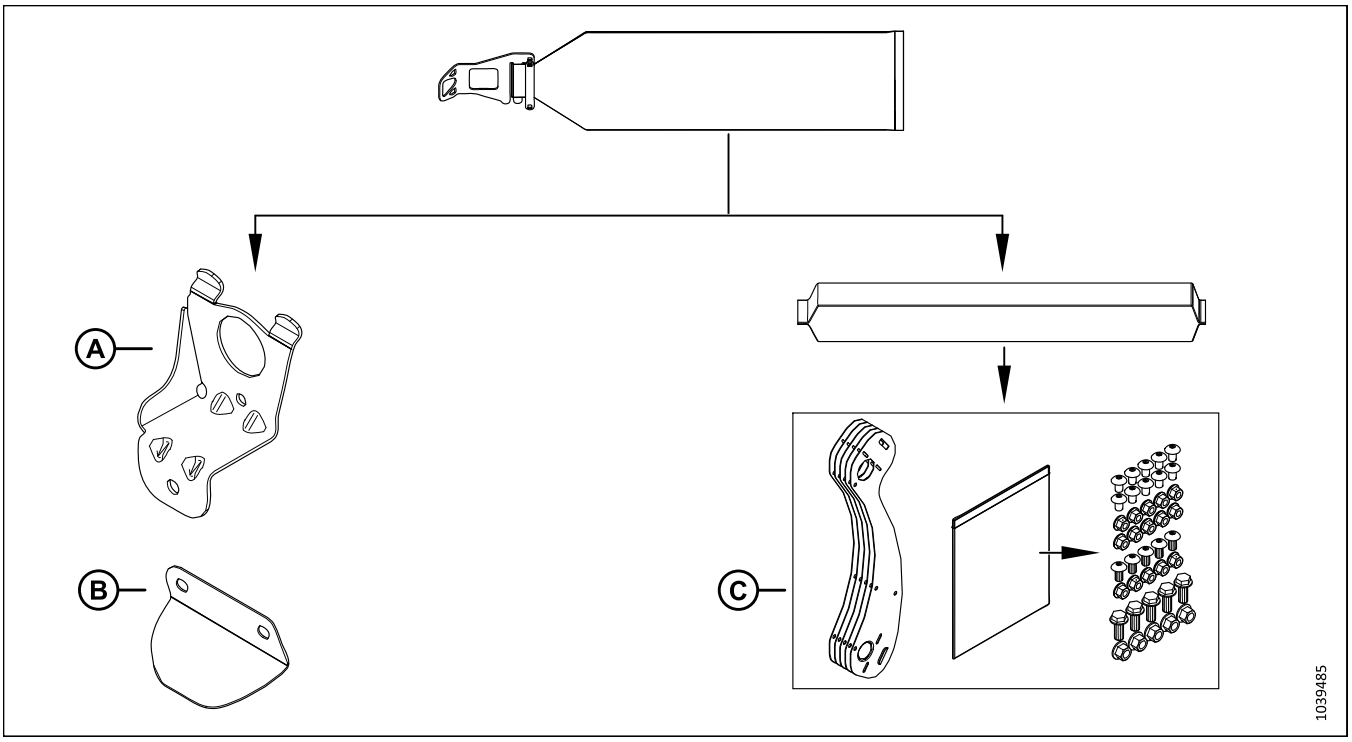


Figure 6.67: Reel Endshield Parts Bag MD #340985

1. Retrieve the following part supplied in shipping bag (MD #340985 for five-bat reel):
    - Five supports (A) (MD #311964)
    - Five cam deflectors (B) (MD #311906)
    - The bag labeled “Bag #2” (C)

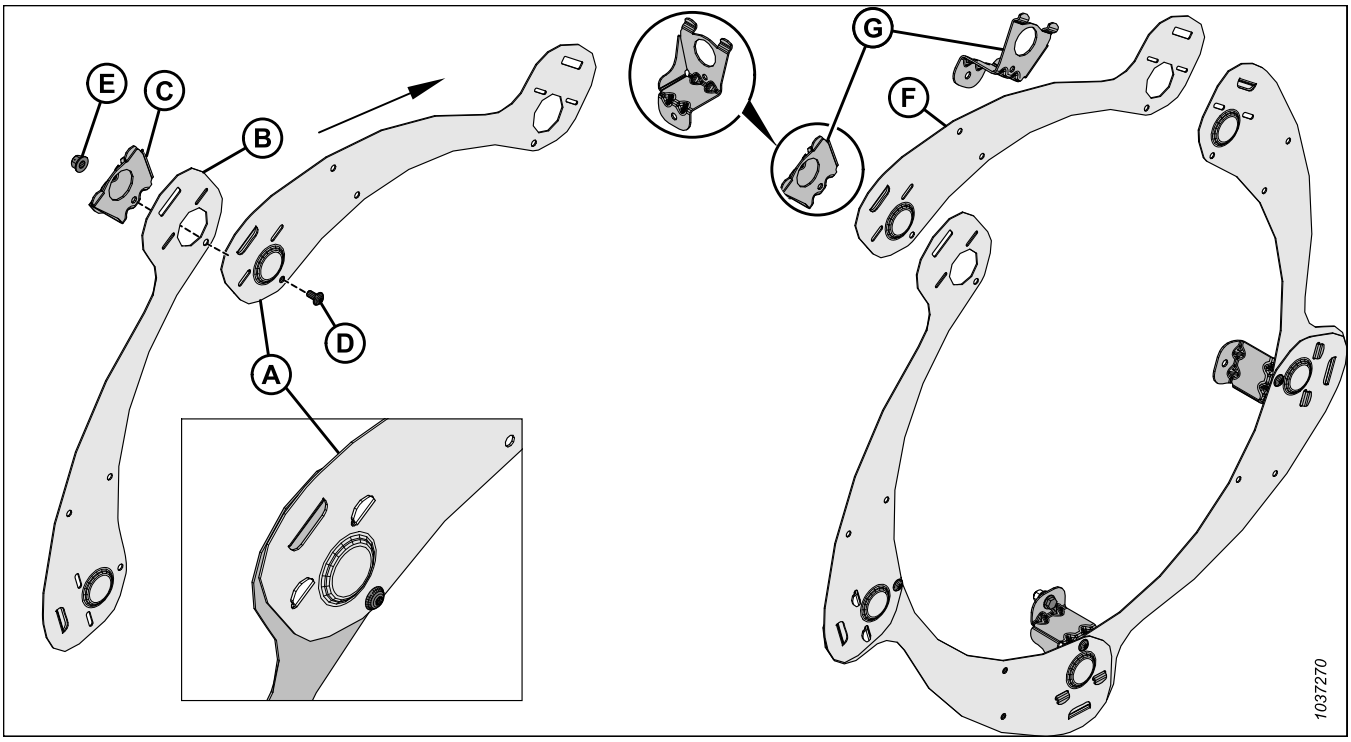


Figure 6.68: Five-Bat Reel – Initial Endshield Assembly

2. Assemble the endshield as follows:

   a. Position endshield segment (A) behind segment (B). Engage endshield support tabs (C) through both segments. Secure the segment with M10 X 1.5 X 20 Torx® screw (D) and hex nut (E). Do **NOT** tighten the hardware yet.

   b. Repeat the previous step to install the remaining segments. Do **NOT** install last segment (F) and two support tabs (G) yet.

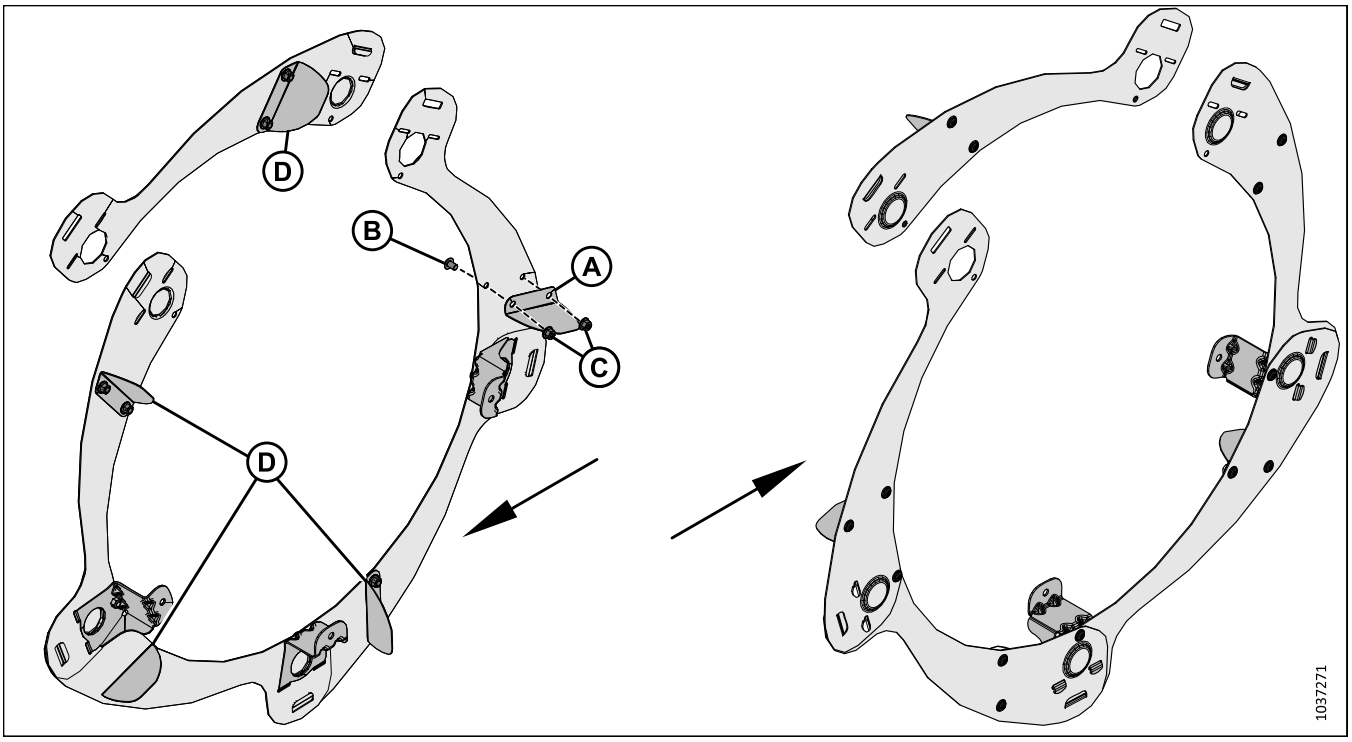


Figure 6.69: Five-Bat Reel – Aluminum Cam Deflectors

3. Install four aluminum cam deflectors (A) (MD #311906) on the inboard face of the endshield assembly using two M10 X 1.5 X 16 Torx® screws (B) and hex nuts (C).

4. Install aluminum cam deflector (D) (MD #311906) on the last segment as shown using two M10 X 1.5 X 16 Torx® screws and hex nuts.

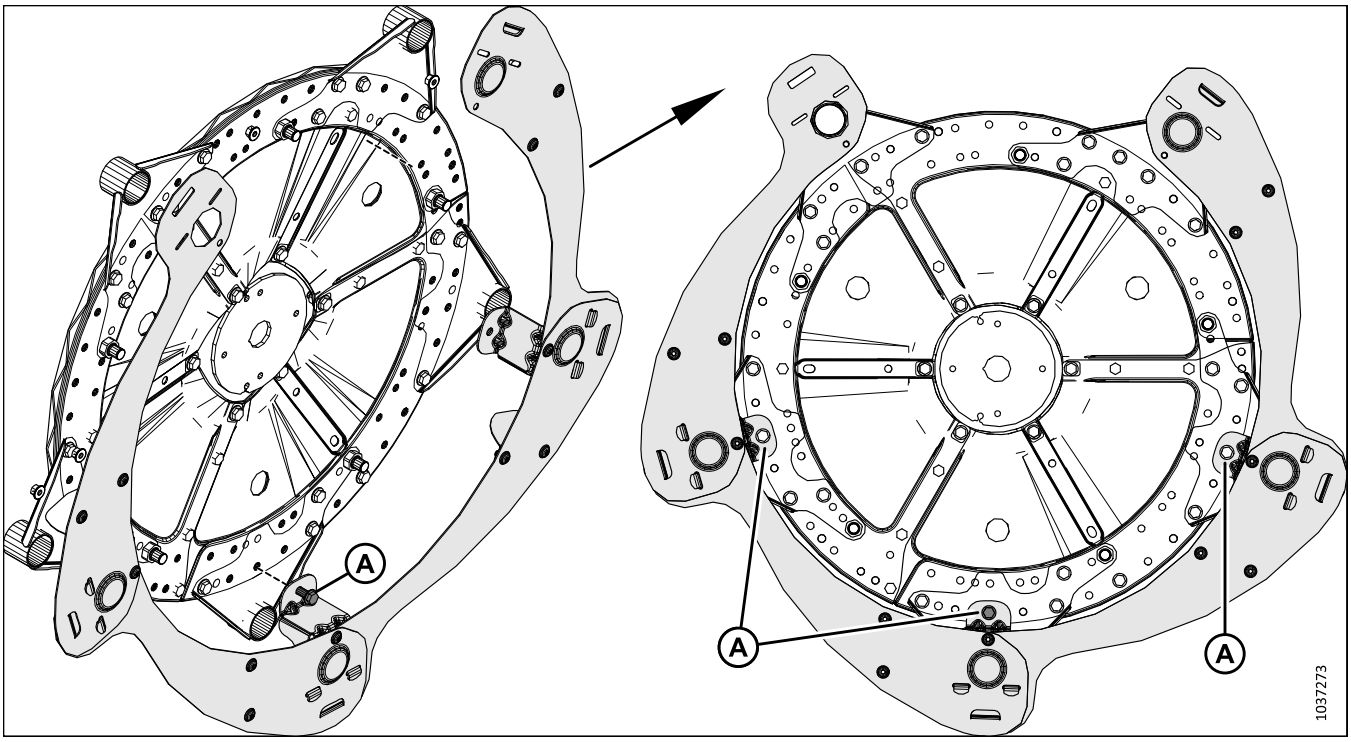


Figure 6.70: Five-Bat Reel – Partially Assembled Reel Endshields on Reel

5. Position the partially assembled reel endshield on the reel.

6. Secure the endshield with three M12 X 1.75 X 30 hex bolts (A) and nuts. Do **NOT** tighten the hardware yet.

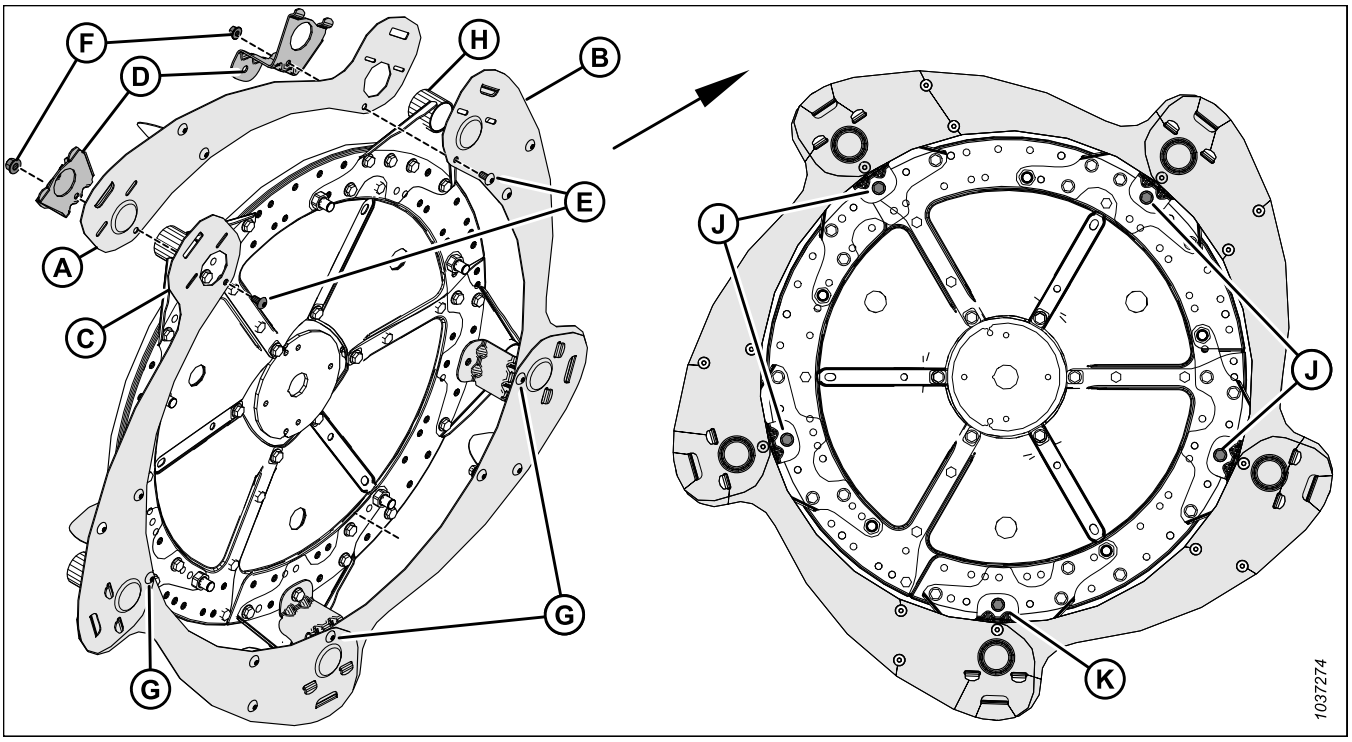


Figure 6.71: Five-Bat Reel – Assembled Reel Endshields on Reel

7. Install the last segment of endshield (A) as follows:
   a. Position the wide end of last segment (A) behind segment (B). Position the other end of last segment on top of segment (C).
   b. Insert the tabs of endshield supports (D) through the endshield segments.
   c. Secure the endshield supports using two M10 X 1.5 X 20 Torx® screws (E) and nuts (F).
   d. Torque five M10 X 1.5 X 20 Torx® screws (E) and (G) to 39 Nm (29 lbf·ft). Rotate the reel to reach the screws if necessary.
8. Slip endshield supports onto tine tubes (H).

   NOTE:

   Not all of the tine tubes are shown in the illustration.
9. Secure the remaining endshield supports to the reel disc using one M12 X 1.75 X 30 hex bolts (J) and nut per endshield support.
10. Torque M12 X 1.75 X 30 hex bolts (J) and (K) and the nuts that secure the endshield supports to the cam discs to 68.5 Nm (50.5 lbf·ft).

6.9.4 Installing Double-Reel Endshields at Outboard Tail End

Endshields need to be installed on the tail end of the left reel to prevent crop from wrapping around the reel.

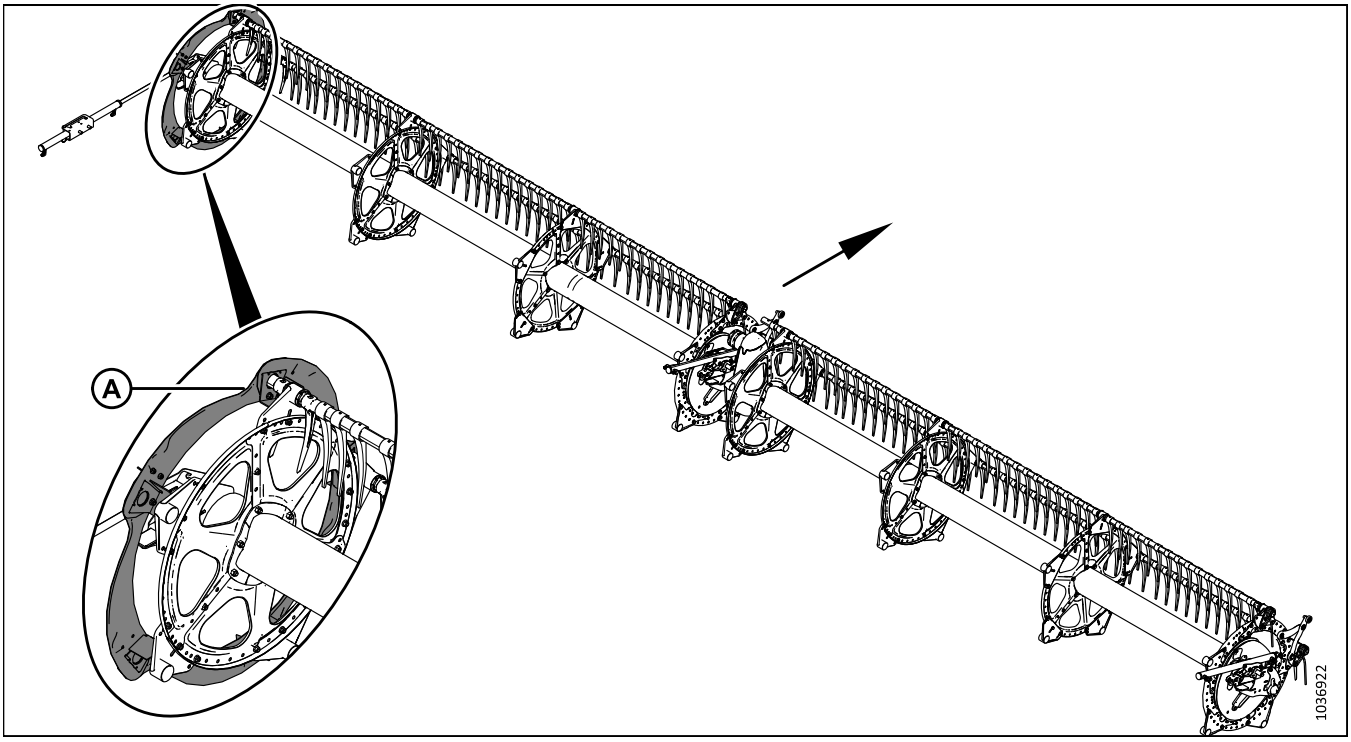


Figure 6.72: Five-Bat Double Reel

A - Five-Bat Outboard Tail End Endshield (MD #311695)

NOTE:

The arrow in the illustrations indicates the front of the header.

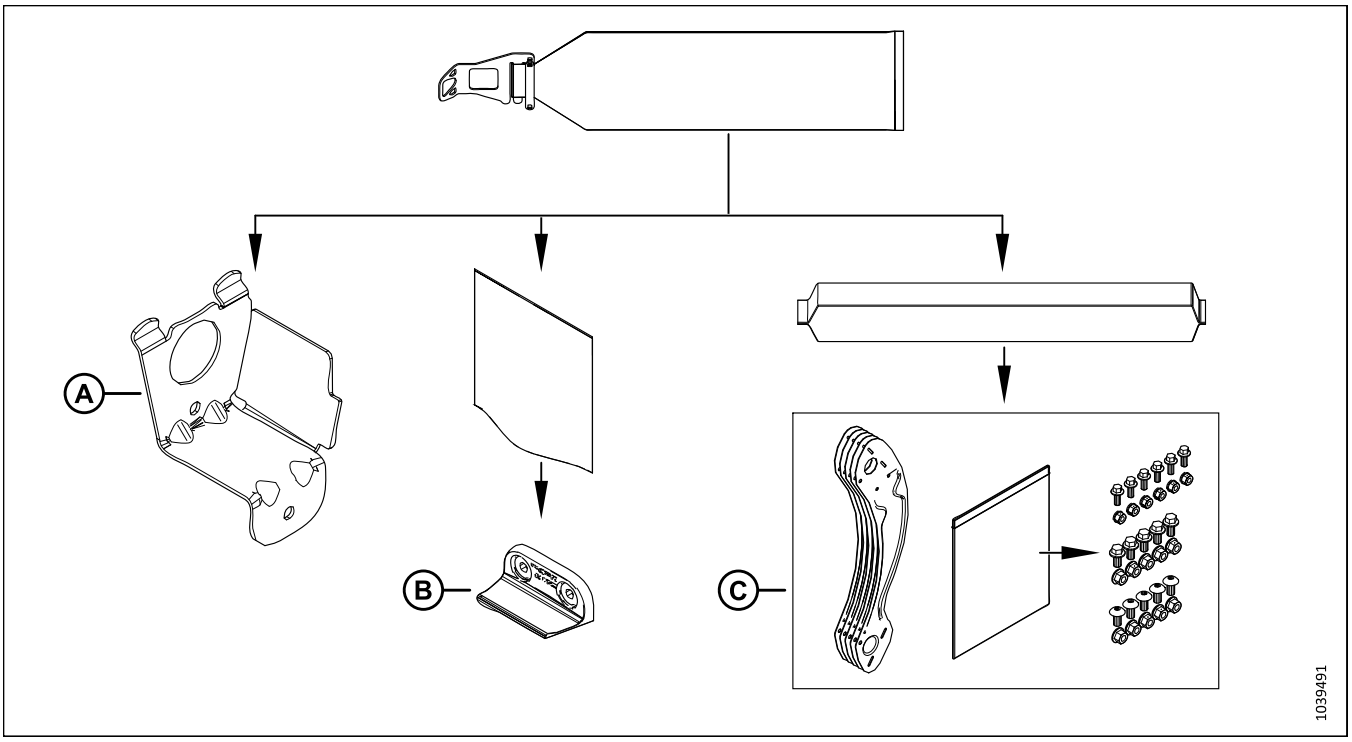


Figure 6.73: Reel Endshield Parts Bag MD #340985

1. Retrieve the following part supplied in shipping bag (MD #340985 for five-bat reel):
    - Five supports (A)
    - Three rubber paddles (B)
    - The bag labeled “Bag #1” (C)

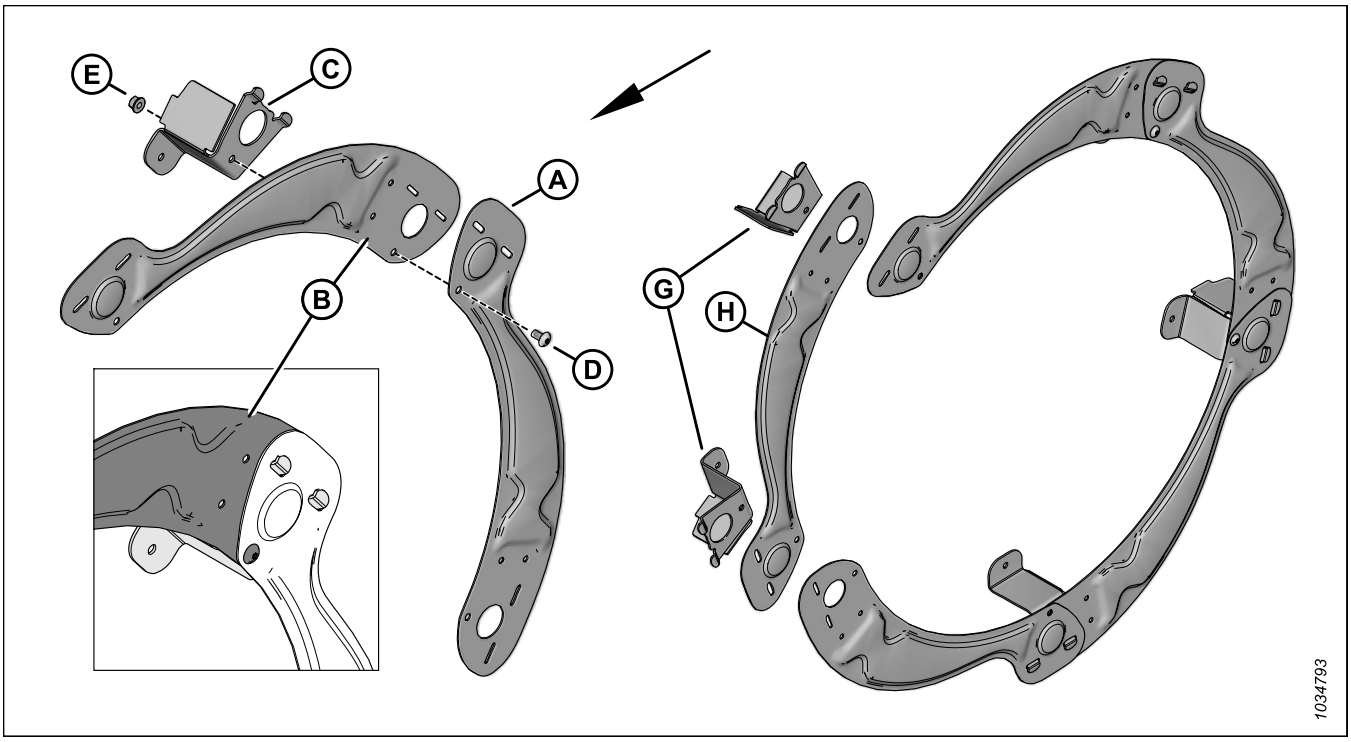


Figure 6.74: Five-Bat Reel – Initial Endshield Assembly

2. Assemble the endshield as follows:

   a. Position endshield segment (A) in front of segment (B). Engage endshield support tabs (C) through both segments. Secure the segments with M10 X 1.5 X 20 Torx® screw (D) and hex nut (E). Do **NOT** tighten the hardware yet.

   b. Repeat the previous step to assemble the remaining segments. Do **NOT** install last segment (H) and two support tabs (G) yet.

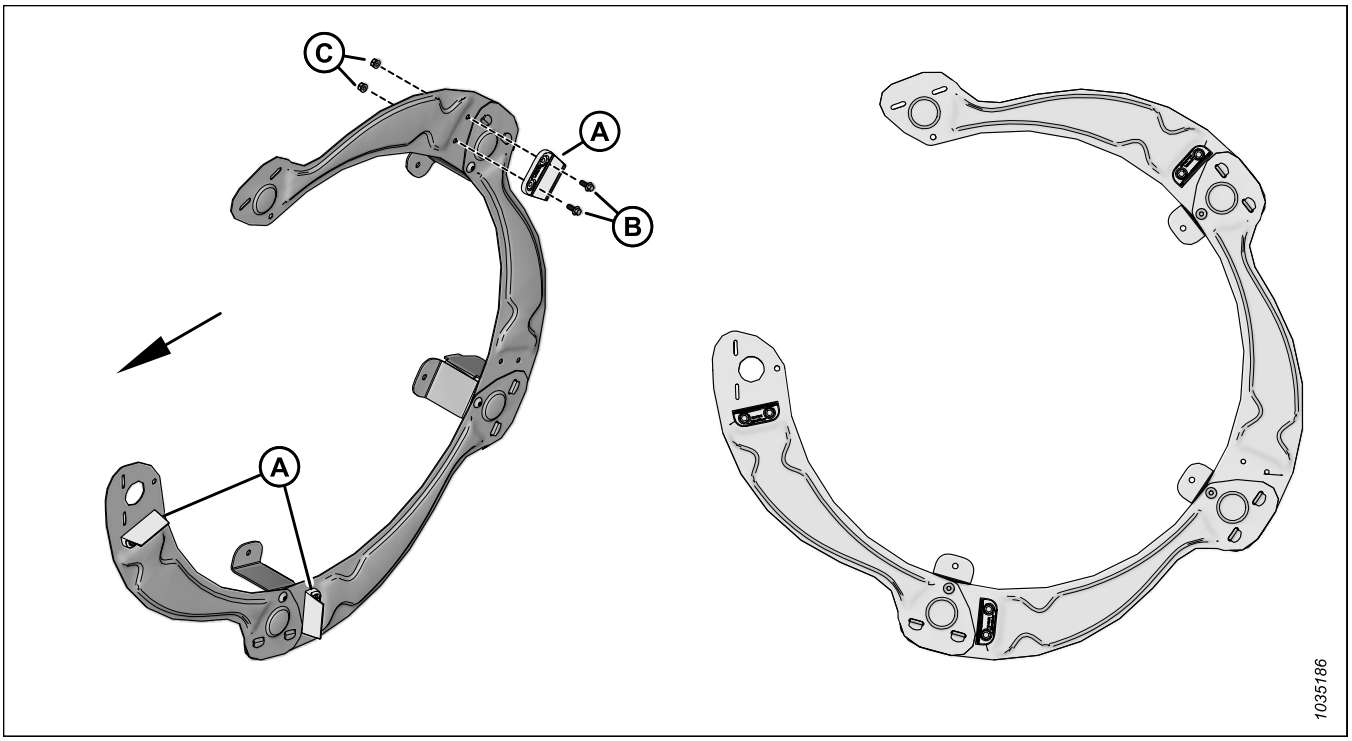


Figure 6.75: Five-Bat Reel – Rubber Paddles

3. Install three rubber reel end paddles (A) on the outboard face of the endshield assembly using two M8 X 1.25 X 20 hex bolts (B) and nuts (C) per paddle.

   IMPORTANT:

   Ensure that the rubber paddles are oriented as shown. The rubber paddles on both ends of the reel (the outboard cam and outboard tail ends) should be aligned.

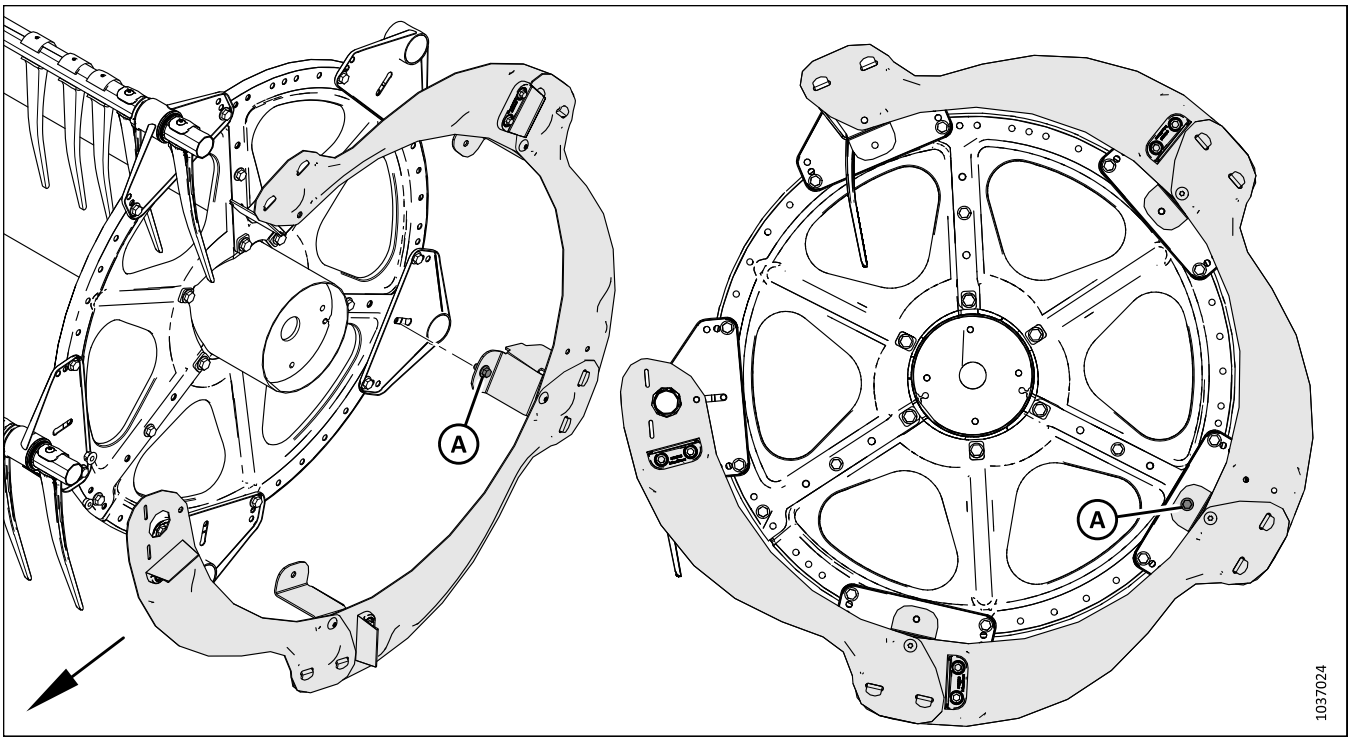


Figure 6.76: Five-Bat Reel – Partially Assembled Reel Endshields on Reel

4. Position the partially assembled reel endshield on the reel and tine tubes.

5. Identify the endshield support tab opposite the opening in the circle of endshield segments. Secure that support tab to the reel with one M10 X 1.5 X 20 hex bolt (A) and nut. Do **NOT** tighten the hardware yet.

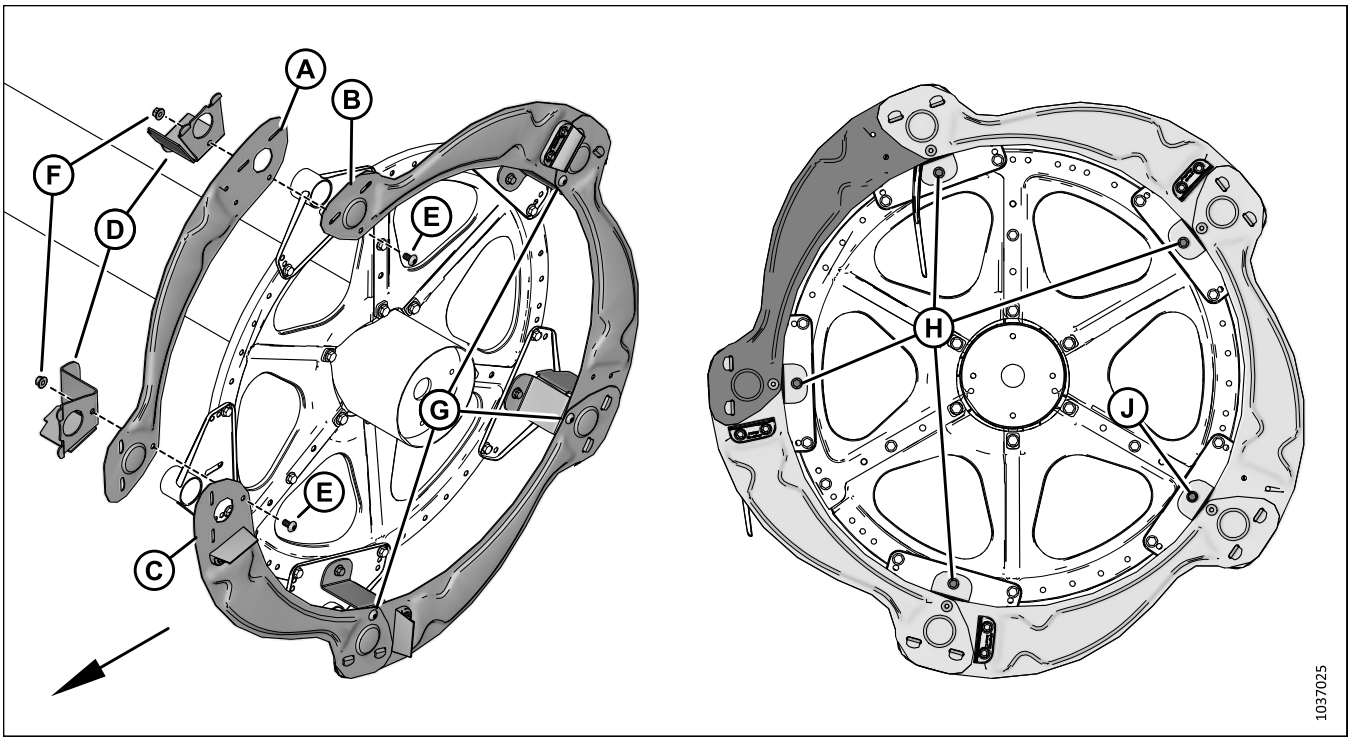


Figure 6.77: Five-Bat Reel – Partially Assembled Reel Endshields on Reel

6. Install the last segment of endshield (A) as follows:
    a. Position the wide end of last segment (A) behind segment (B). Position the other end of last segment on top of segment (C).
    b. Insert the tabs of endshield supports (D) through the endshield segments.
    c. Secure the endshield supports using two M10 X 1.5 X 20 Torx® screws (E) and nuts (F).
    d. Torque M10 X 1.5 X 20 Torx® screws (E) and (G) to 39 Nm (29 lbf·ft). Rotate the reel to reach the screws if necessary.
7. Secure the endshield supports to the reel disc using one M10 X 1.5 X 20 hex bolt and nut (H) per endshield support.
8. Torque M10 X 1.5 X 20 hex bolts (H) and (J) and the nuts that secure the endshield supports to the cam discs to 68.5 Nm (50.5 lbf·ft).

6.10 Installing Single-Reel Endshields – Parts Bag MD #311363 (Nine-Bat Reel)

The reel endshields on single-reel headers have been removed for shipping purposes. The reel endshields will need to be unpacked and installed on the header.

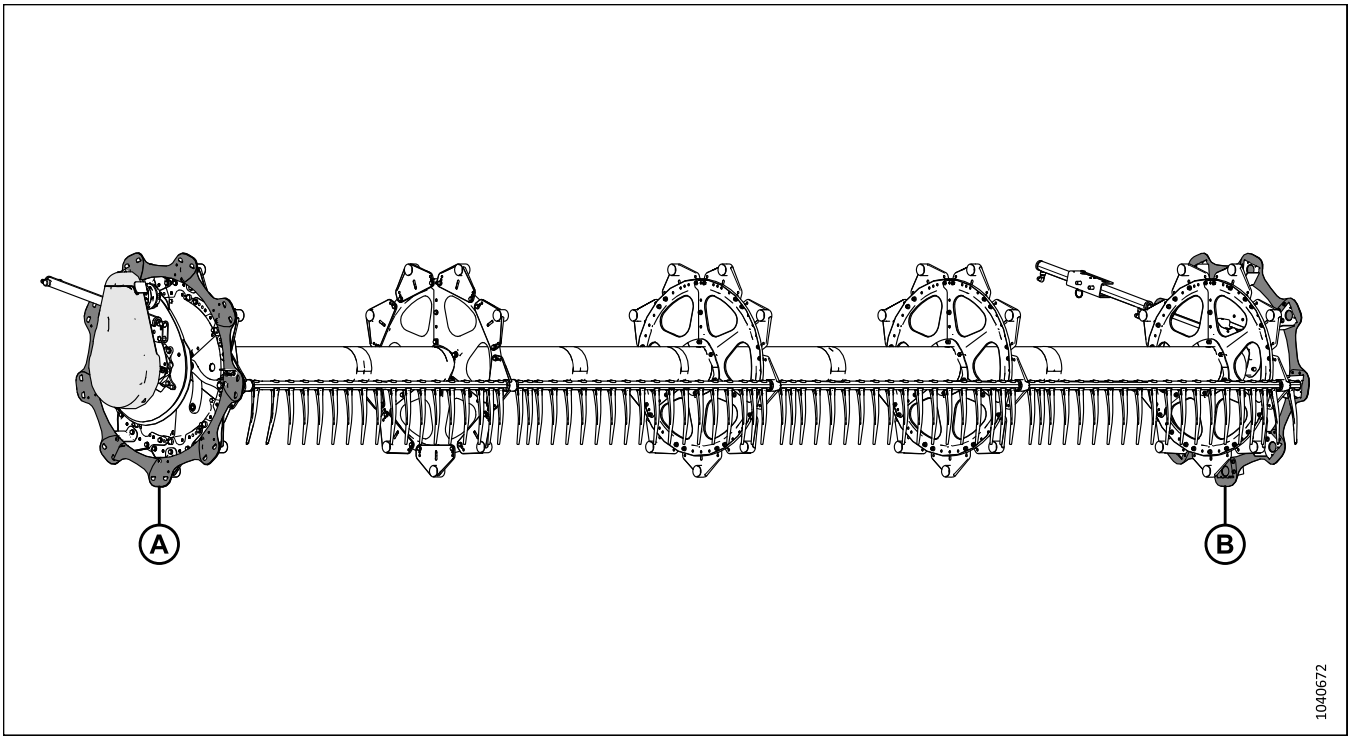


Figure 6.78: Nine-Bat Single-Reel

1. Retrieve parts bag MD #311363.

   NOTE:

   Parts lists and illustrations are included in the procedures referenced in the steps below.

2. Install cam-end endshields (A). For instructions, refer to *6.10.1 Installing Single-Reel Endshields at Cam End, page 139*.

3. Install tail-end endshields (B). For instructions, refer to *6.10.2 Installing Single-Reel Endshields at Tail End, page 146*.

6.10.1 Installing Single-Reel Endshields at Cam End

Single-reel headers have had the cam-end (right) reel endshield parts removed for shipping purposes. These parts will need to be assembled and installed on the reel.

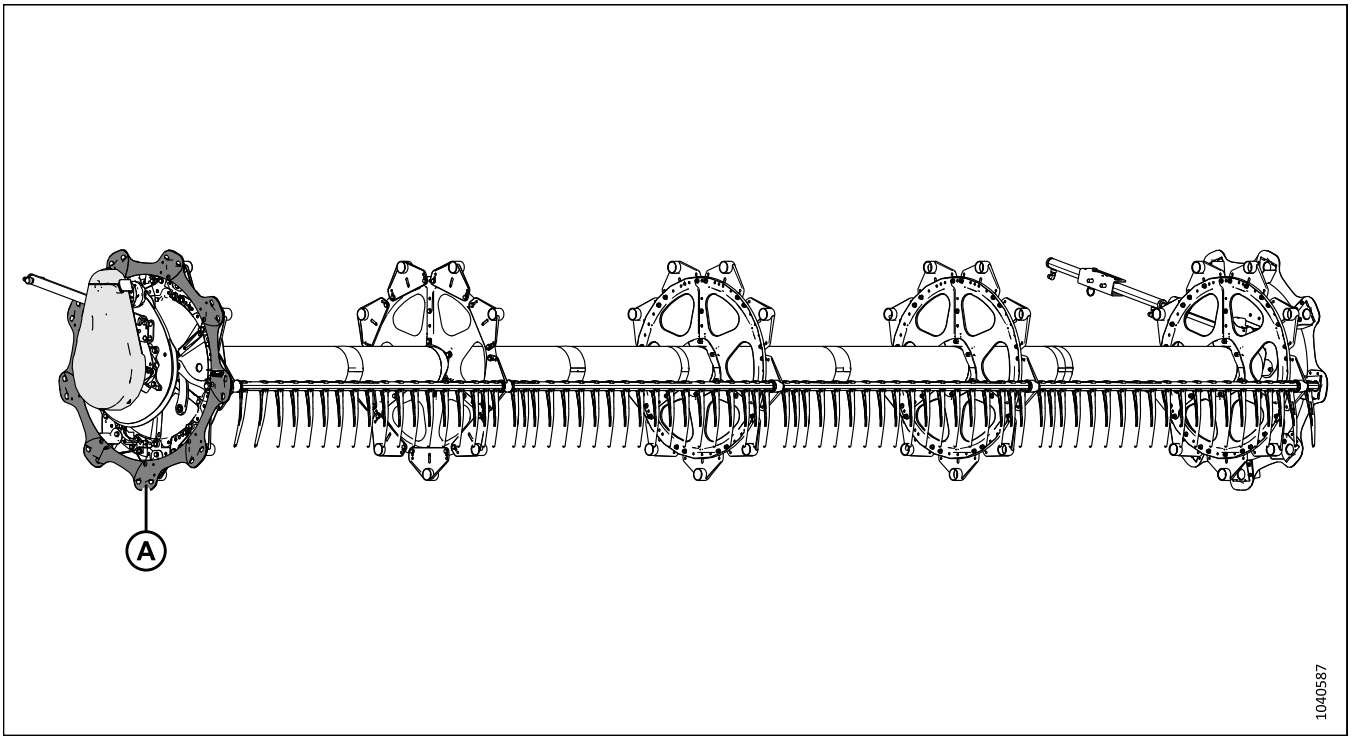


Figure 6.79: Nine-Bat Single-Reel

NOTE:

Cam-end endshields (A) are installed on the right of the reel.

1. Retrieve parts bag (1) labeled with MD #311363. From that bag, retrieve the parts listed in Table *6.8, page 140*.

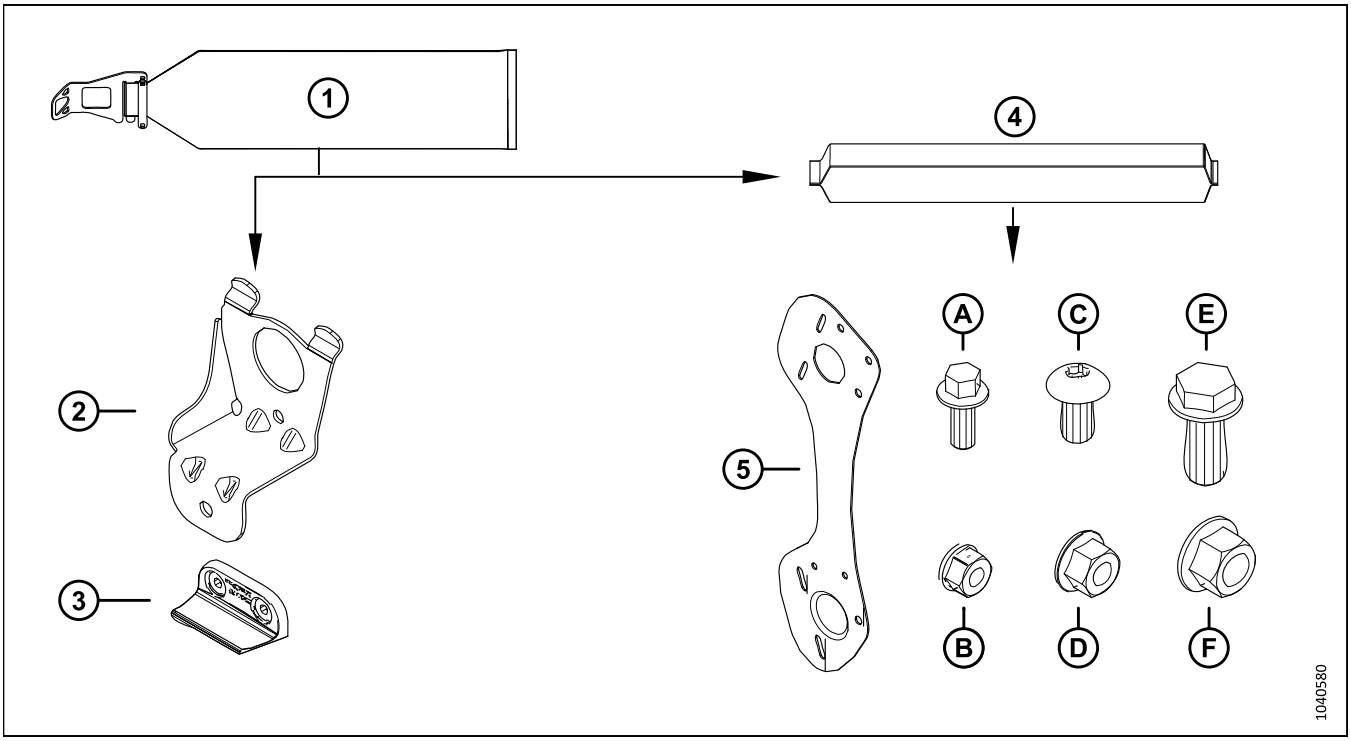


Figure 6.80: Parts to Retrieve from Nine-Bat Reel Endshields Parts Bag – MD #311363

Table 6.8 Parts to Retrieve from Nine-Bat Reel Endshields Parts Bag – MD #311363

Ref	Part Number	Description	Quantity to Retrieve
2	311964	SUPPORT – CAM END	9
3	313035	PADDLE – REEL END; HYTREL	3
4	360020 or "BAG 1"	**NOTE:** This parts bag is labeled with "BAG #1" and/or MD #360020. This bag contains the parts listed below.	1
5	311863	SHIELD – OUTBOARD RH 9 BAT	9
A	136300	BOLT – HEX FLG HD TFL M8X1.25X20-8.8-AA3L	6
B	135337	NUT – HEX FLG CTR LK M8X1.25-8-AA1J	6
C	136395	SCR – TORX TRUSS HD M10X1.5X20XSPCL-8.8-A3L	9
D	135799	NUT – HEX FLG CTR LOC M10X1.5-10	9
E	320180	BOLT – HEX FLG HD M12X1.75X30-SPCL-8.8-ZINC	9
F	136431	NUT – HEX FLG CTR LOC M12X1.75-10	9

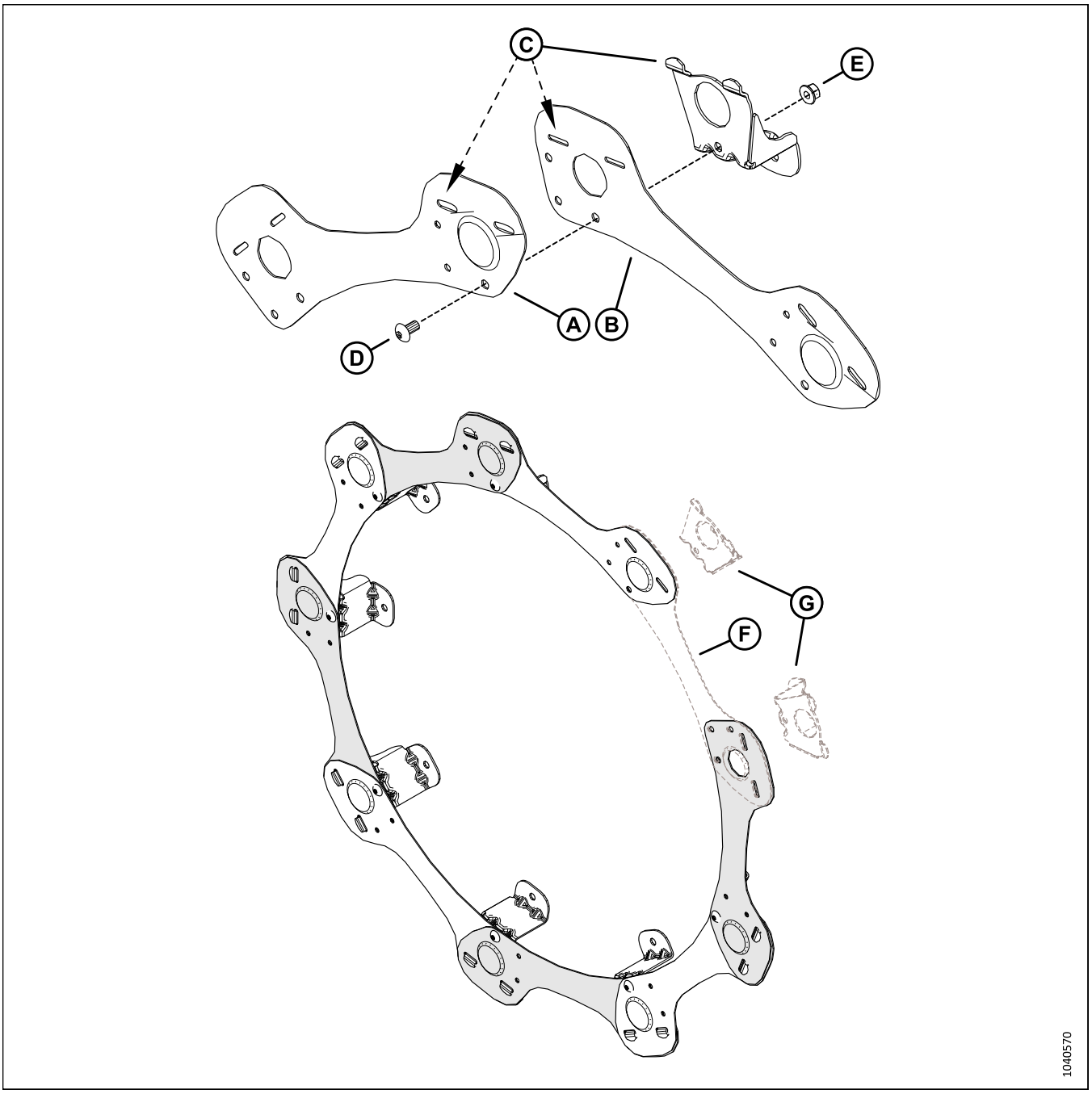


Figure 6.81: Nine-Bat Reel – Initial Endshield Assembly

2. Position one endshield segment (A) on top of another segment (B). Engage endshield support tabs (C) through both segments.

3. Secure the segments with M10 Torx® screw (D) (MD #136395) and nut (E) (MD #135799). Do **NOT** tighten the hardware yet.

4. Repeat the previous step for the remaining segments, except do **NOT** install last segment (F) and two supports (G) yet.

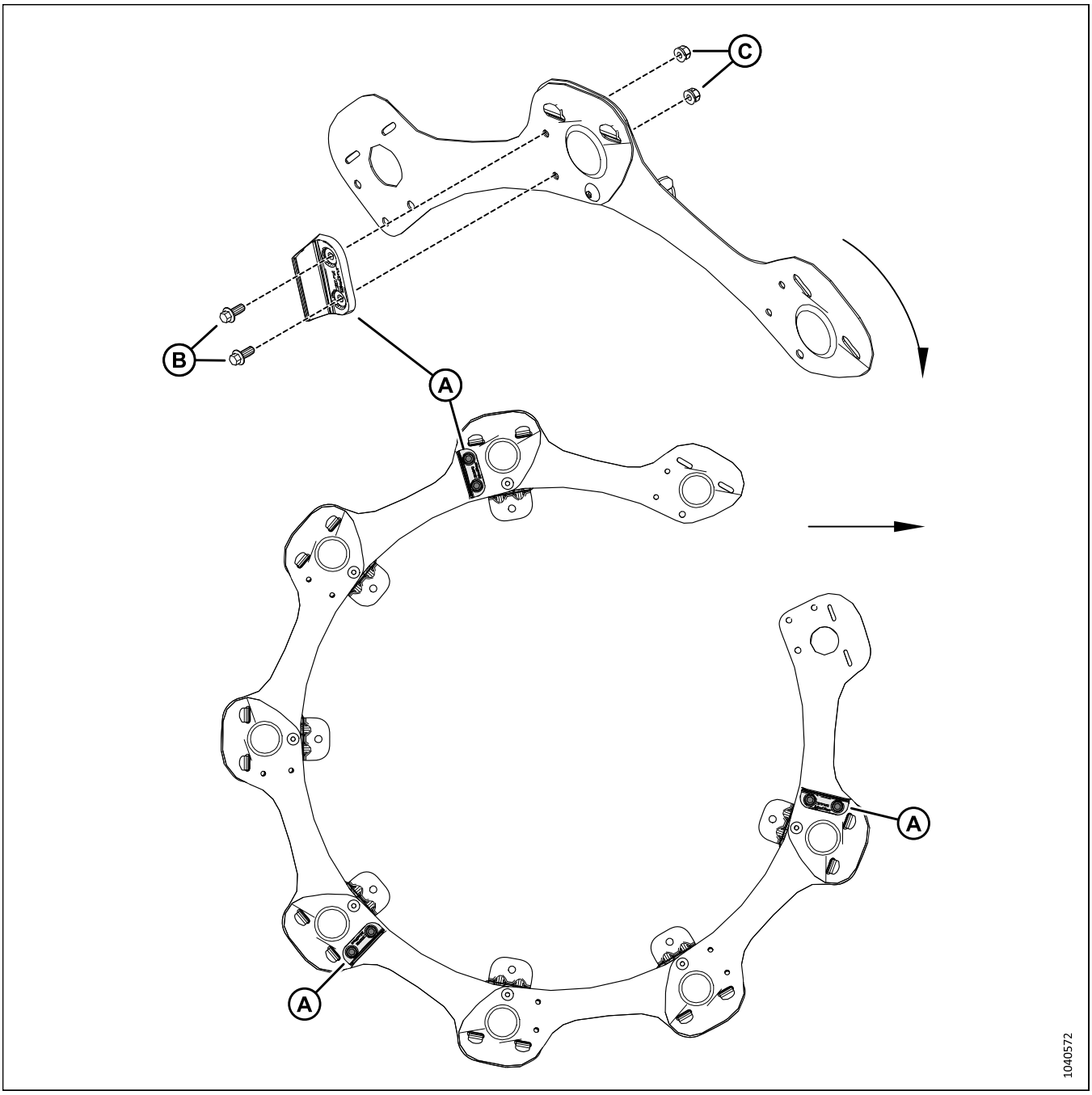


Figure 6.82: Nine-Bat Reel – Initial Endshield Assembly

5. Install three rubber reel end paddles (A) on the outboard face of the endshield assembly using two M8 bolts (B) (MD #136300) and nuts (C) (MD #135337) per paddle.

   IMPORTANT:

   The arrow points to the front of the machine. Ensure that the rubber paddles are oriented as shown.

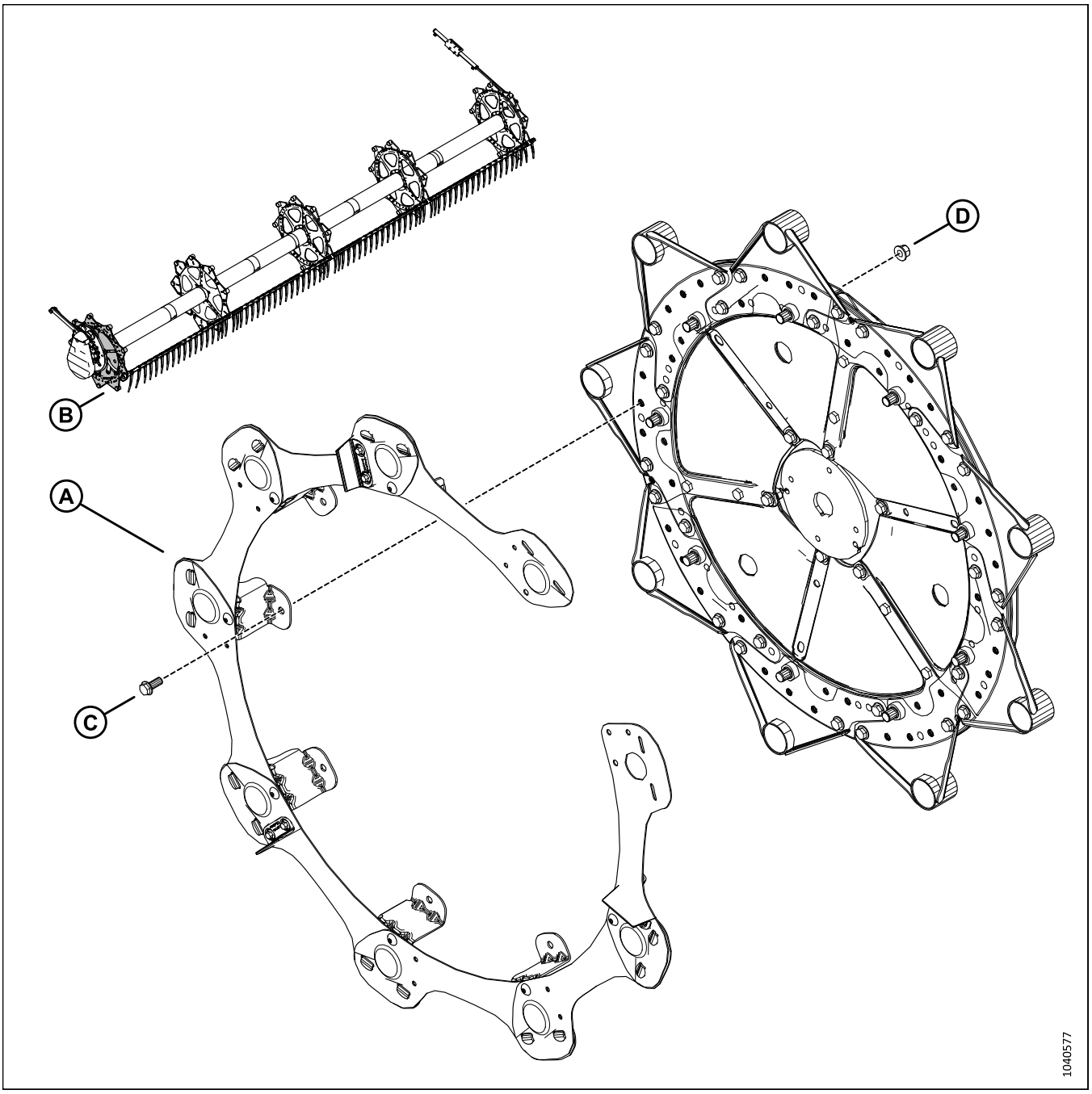


Figure 6.83: Nine-Bat Reel – Initial Endshield Assembly

6. Attach endshield assembly (A) to the cam-end reel disc (B) with one M12 bolt (C) (MD #320180) and nut (D) (MD #136431). Do **NOT** tighten the hardware yet.

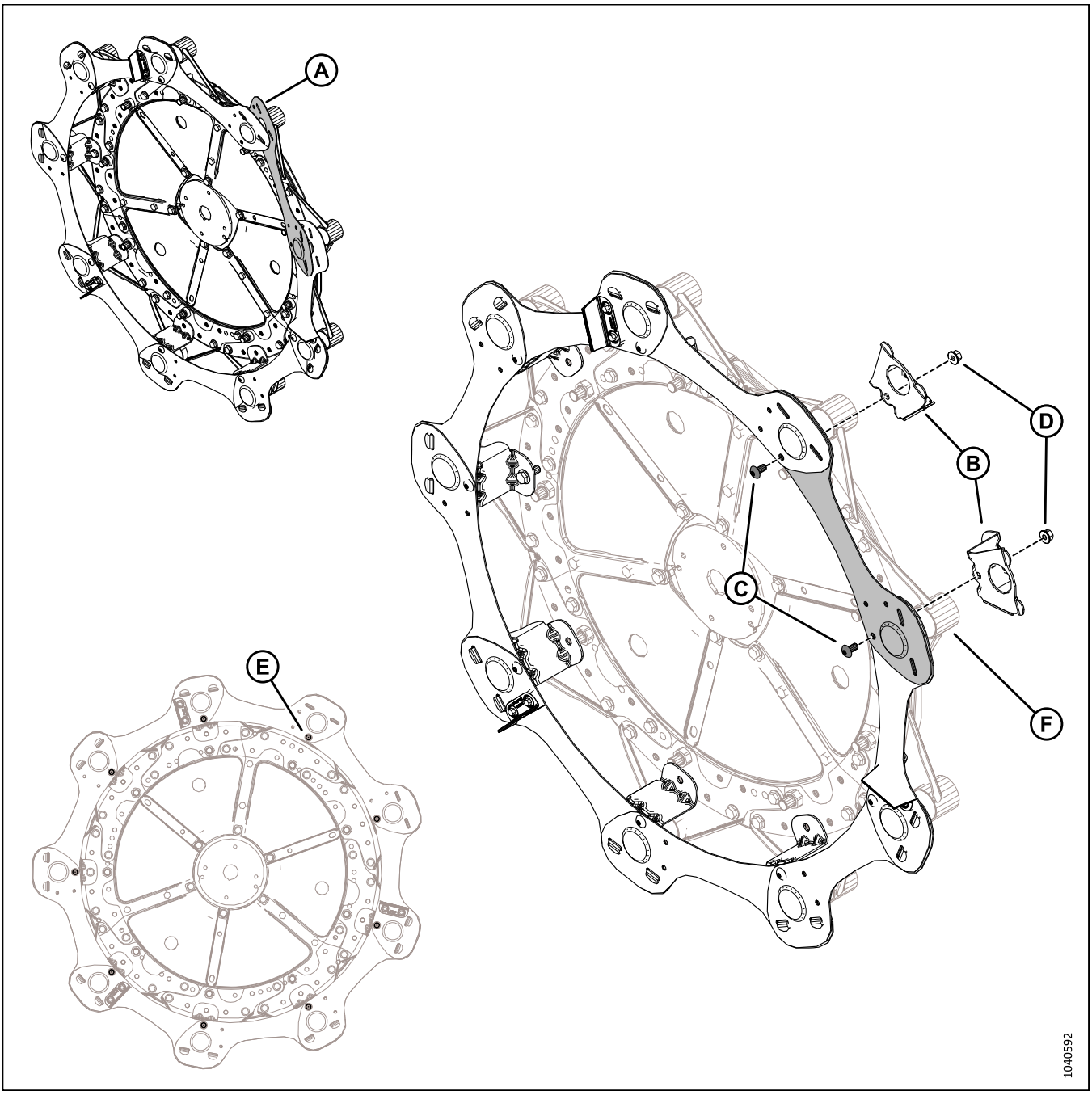


Figure 6.84: Nine-Bat Reel – Initial Endshield Assembly

7. Position ninth endshield (A) into place.
8. Insert the tabs of two endshield supports (B) through the endshield segments. Secure the endshield supports with two M10 Torx® screws (C) (MD #136395) and nuts (D) (MD #135799).
9. Tighten all nine M10 Torx® screws (E) to 39 Nm (29 lbf·ft).
10. Install the endshield supports on tine tubes (F).

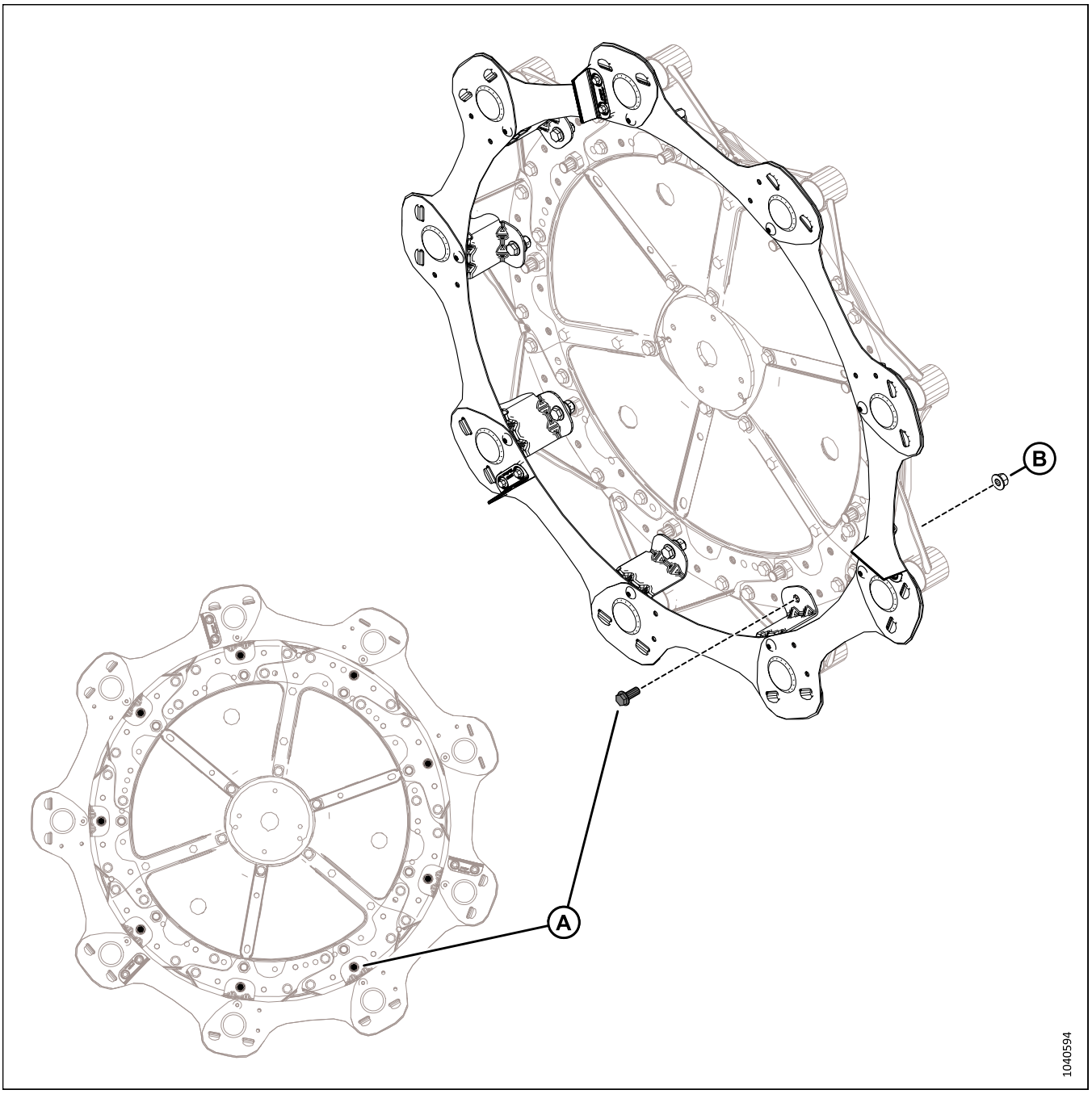


Figure 6.85: Nine-Bat Reel – Initial Endshield Assembly

11. Secure the remaining eight endshield supports to the reel disc using one M12 bolt (A) (MD #320180) and nut (B) (MD #136431).

12. Tighten all nine M12 bolts (A) to 68.5 Nm (50.5 lbf·ft).

6.10.2 Installing Single-Reel Endshields at Tail End

Single-reel headers have had the tail-end reel endshield parts removed for shipping purposes. These parts will need to be assembled and installed on the reel.

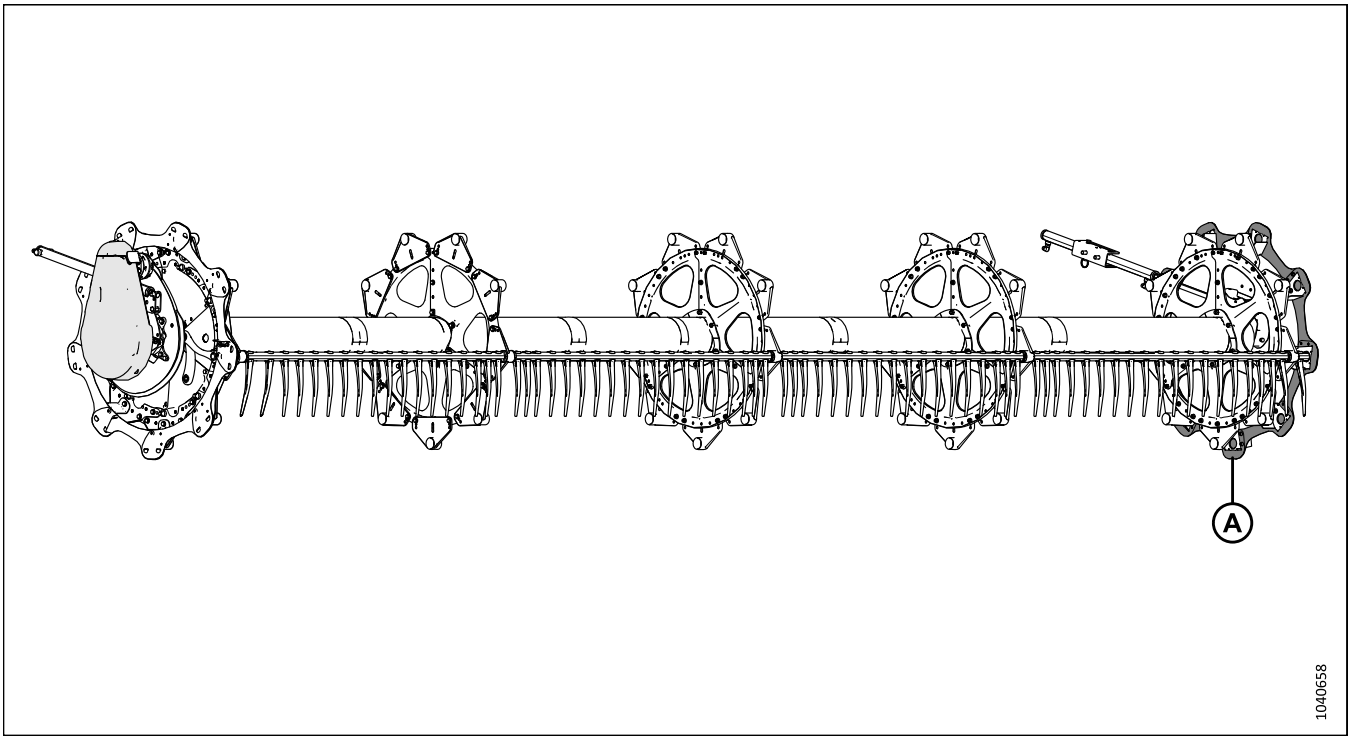


Figure 6.86: Nine-Bat Single-Reel

NOTE:

Tail-end endshields (A) are installed on the left of the reel.

1. Retrieve parts bag (1) labeled with MD #311363. From that bag, retrieve the parts listed in Table*6.9, page 147* .

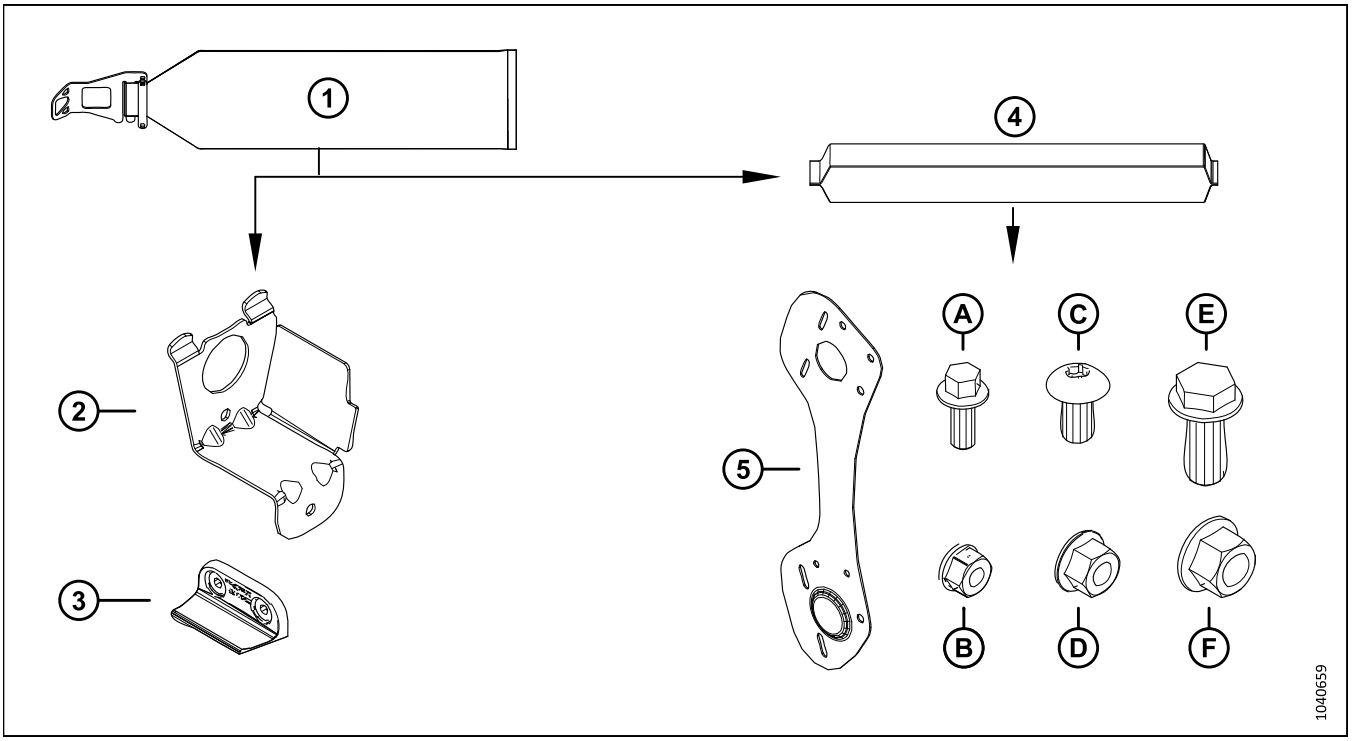


Figure 6.87: Parts to Retrieve from Nine-Bat Reel Endshields Parts Bag – MD #311363

Table 6.9 Parts to Retrieve from Nine-Bat Reel Endshields Parts Bag – MD #311363

Ref	Part Number	Description	Quantity to Retrieve
2	311965	SUPPORT – TAIL END	9
3	313035	PADDLE – REEL END; HYTREL	3
4	360019 or “BAG #2”	**NOTE:** This parts bag is labeled with “BAG #2” and/or MD #360019. This bag contains the parts listed below.	1
5	311864	SHIELD – OUTBOARD LH 9 BAT	9
A	136300	BOLT – HEX FLG HD TFL M8X1.25X20-8.8-AA3L	6
B	135337	NUT – HEX FLG CTR LK M8X1.25-8-AA1J	6
C	136395	SCR – TORX TRUSS HD M10X1.5X20XSPCL-8.8-A3L	9
D	135799	NUT – HEX FLG CTR LOC M10X1.5-10	9
E	320180	BOLT – HEX FLG HD M12X1.75X30-SPCL-8.8-ZINC	9
F	136431	NUT – HEX FLG CTR LOC M12X1.75-10	9

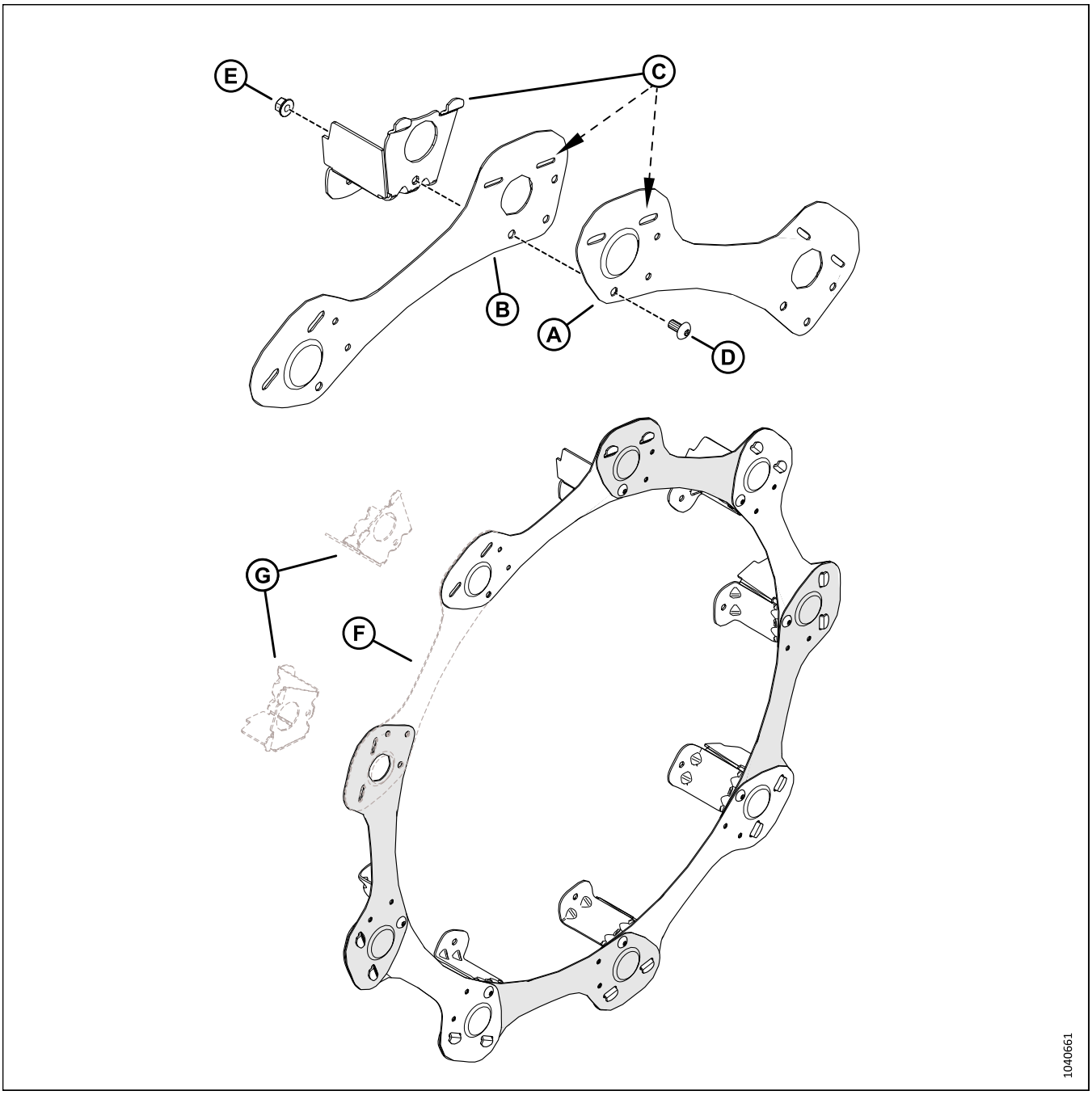


Figure 6.88: Nine-Bat Reel – Initial Endshield Assembly

2. Position one endshield segment (A) on top of another segment (B). Engage endshield support tabs (C) through both segments.

3. Secure the segments with M10 Torx® screw (D) (MD #136395) and nut (E) (MD #135799). Do **NOT** tighten the hardware yet.

4. Repeat the previous step for the remaining segments, except do **NOT** install last segment (F) and two supports (G) yet.

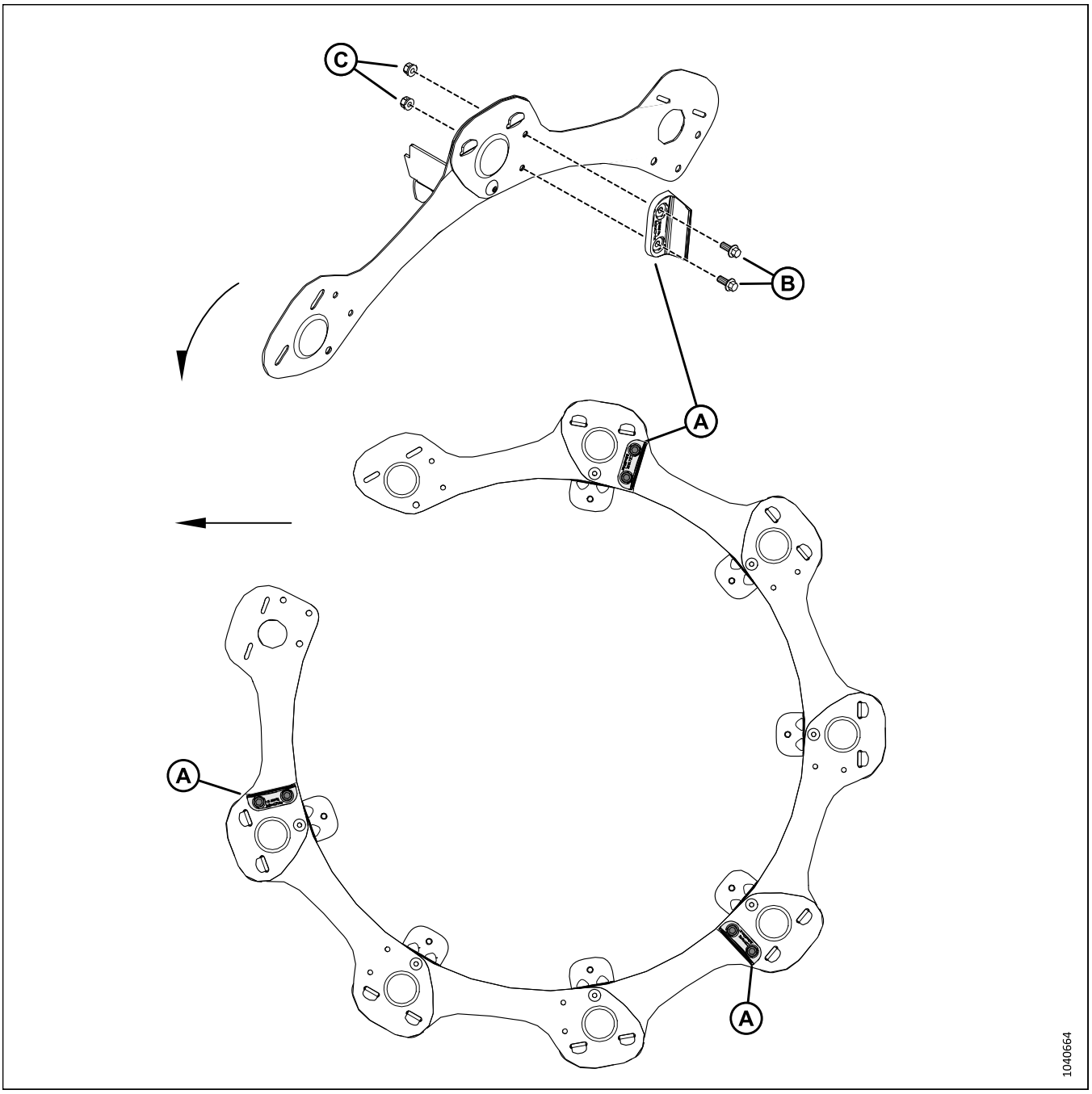


Figure 6.89: Nine-Bat Reel – Initial Endshield Assembly

5. Install three rubber reel end paddles (A) on the outboard face of the endshield assembly using two M8 bolts (B) (MD #136300) and nuts (C) (MD #135337) per paddle.

   IMPORTANT:

   The arrow points to the front of the machine. Ensure that the rubber paddles are oriented as shown.

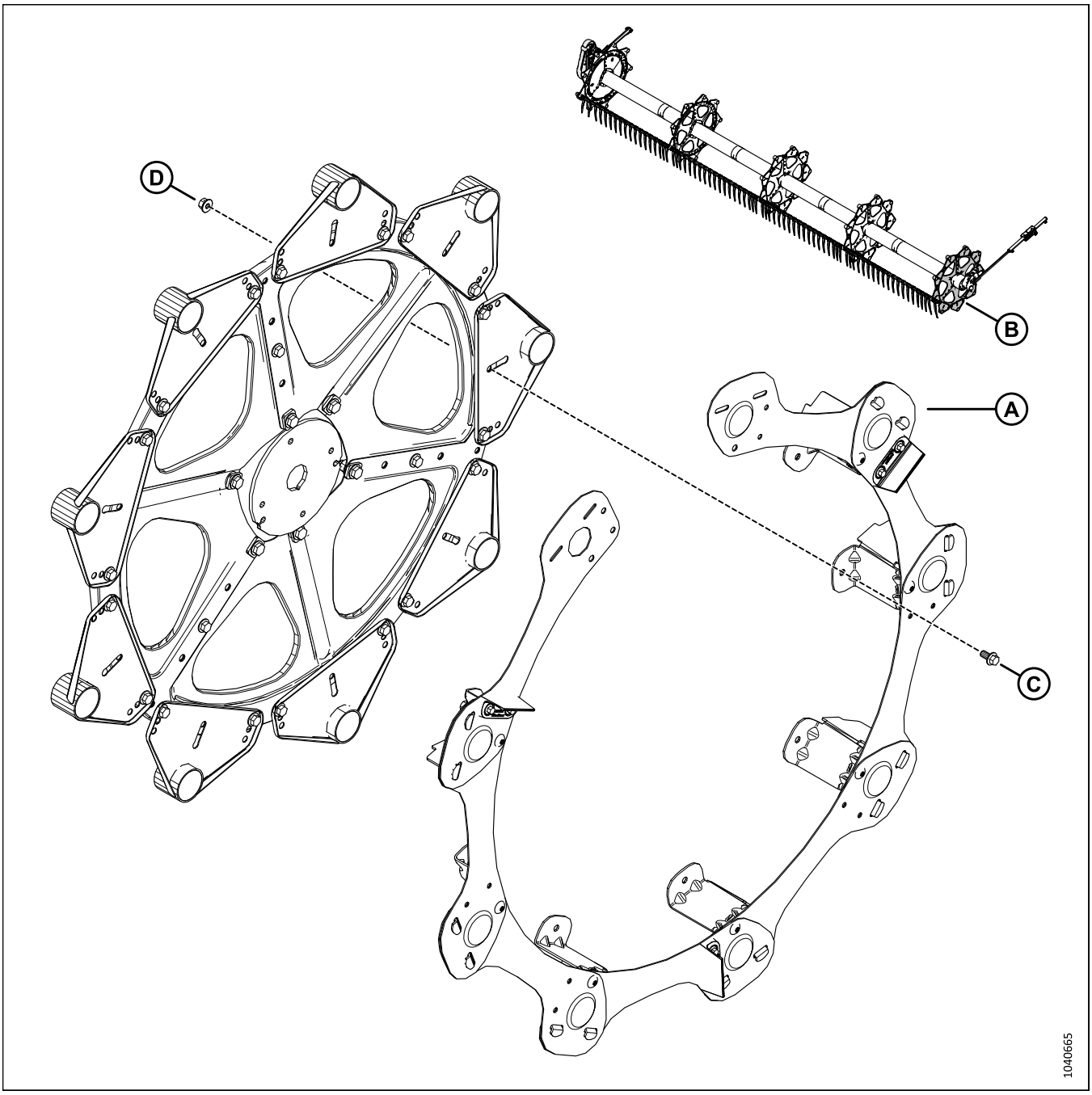


Figure 6.90: Nine-Bat Reel – Initial Endshield Assembly

6. Attach endshield assembly (A) to the cam-end reel disc (B) with one M12 bolt (C) (MD #320180) and nut (D) (MD #136431). Do **NOT** tighten the hardware yet.

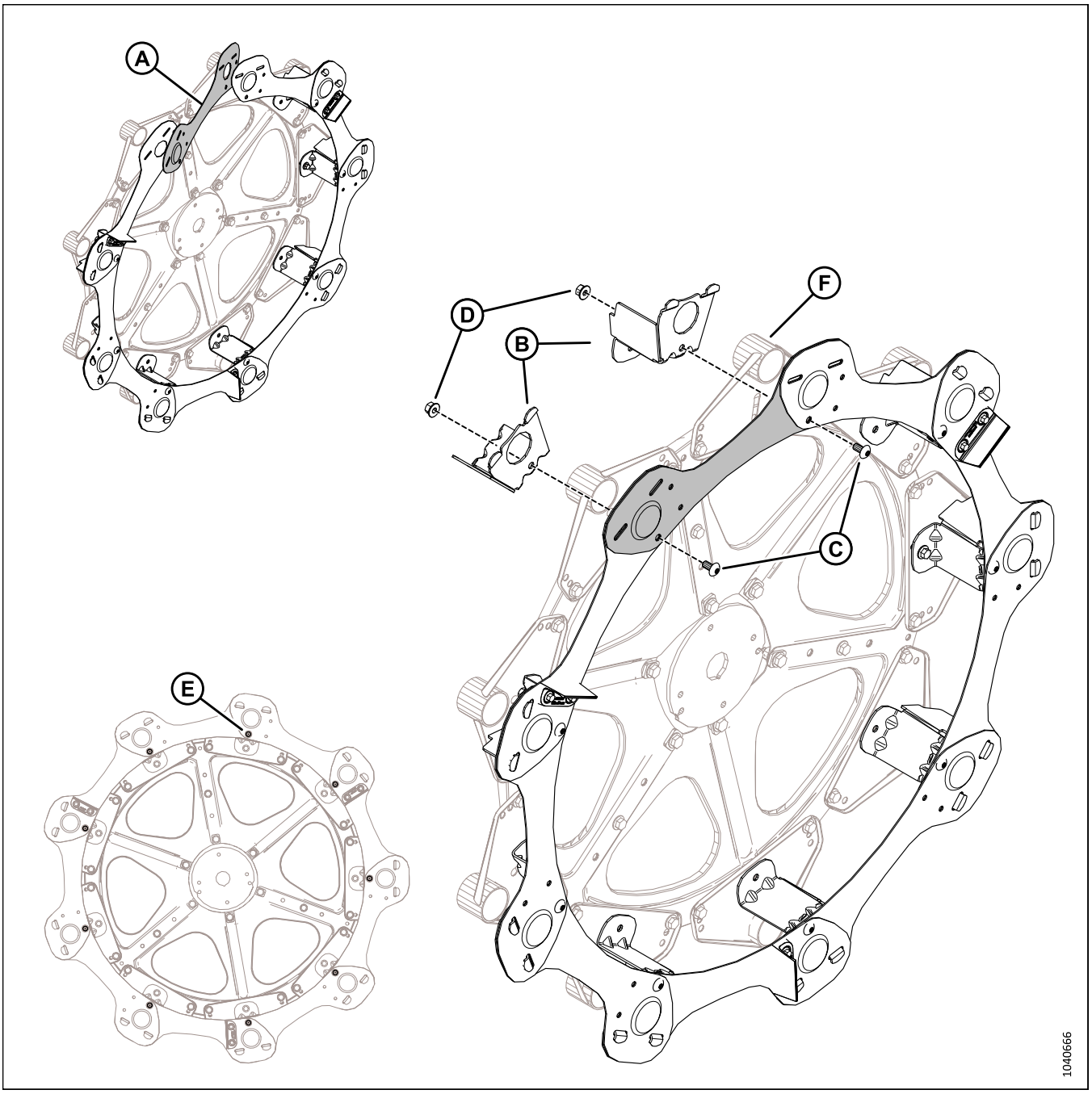


Figure 6.91: Nine-Bat Reel – Initial Endshield Assembly

7. Position ninth endshield (A) into place.
8. Insert the tabs of two endshield supports (B) through the endshield segments. Secure the endshield supports with two M10 Torx® screws (C) (MD #136395) and nuts (D) (MD #135799).
9. Tighten all nine M10 Torx® screws (E) to 39 Nm (29 lbf·ft).
10. Install the endshield supports on tine tubes (F).

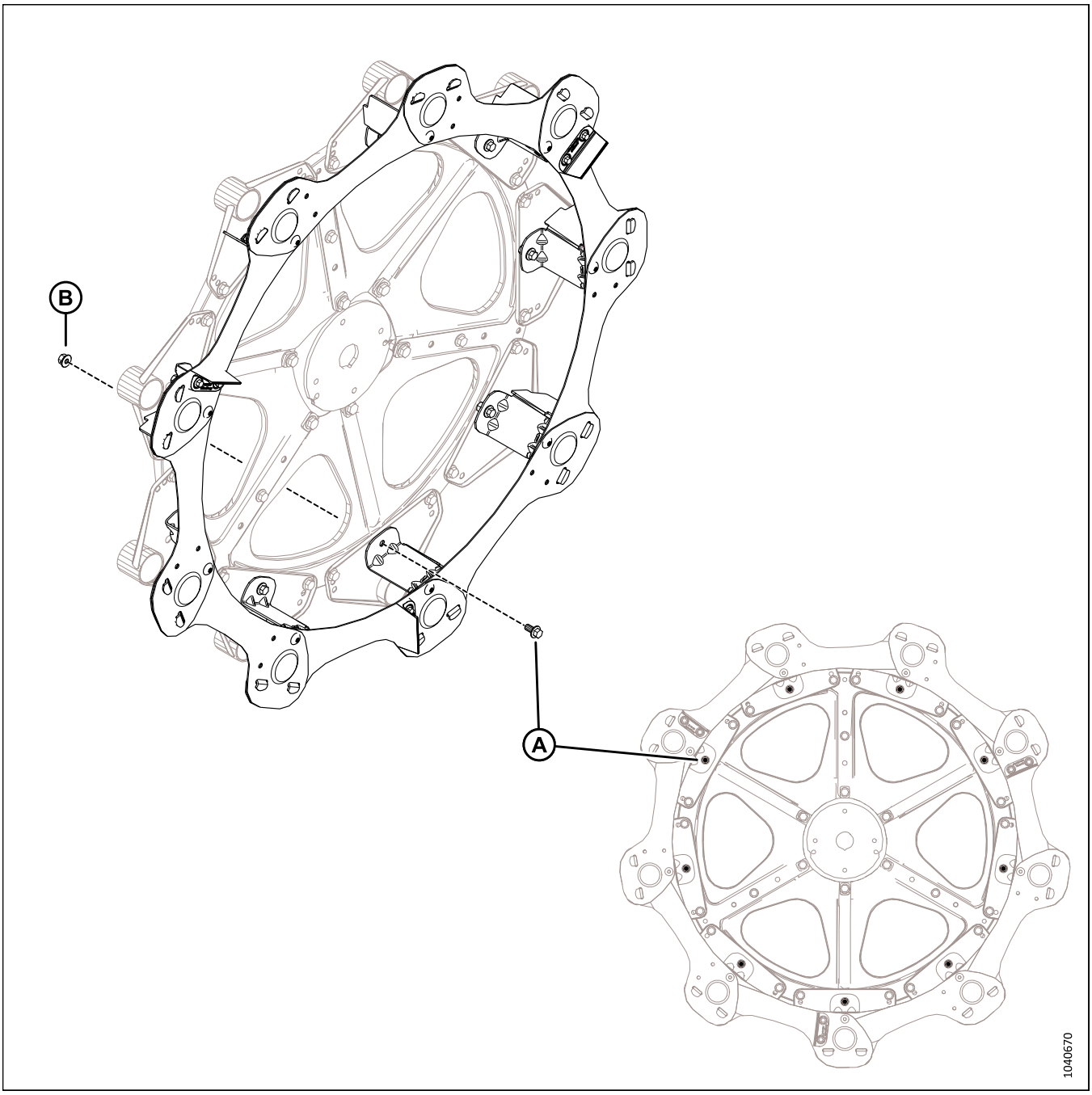


Figure 6.92: Nine-Bat Reel – Initial Endshield Assembly

11. Secure the remaining eight endshield supports to the reel disc using one M12 bolt (A) (MD #320180) and nut (B) (MD #136431).

12. Tighten all nine M12 bolts (A) to 68.5 Nm (50.5 lbf·ft).

6.11 Removing and Installing Cutterbar Seal – D215, D220, D225, D230, D235

The center cutterbar seal plate(s) need to be moved from the shipping location and installed.

1. Remove shipping wire (A) securing the cutterbar seal plate (B) and hardware bag MD # 135488 from the shipping location.

   NOTE:

   For D235, there are two cutterbar seal plates removed.

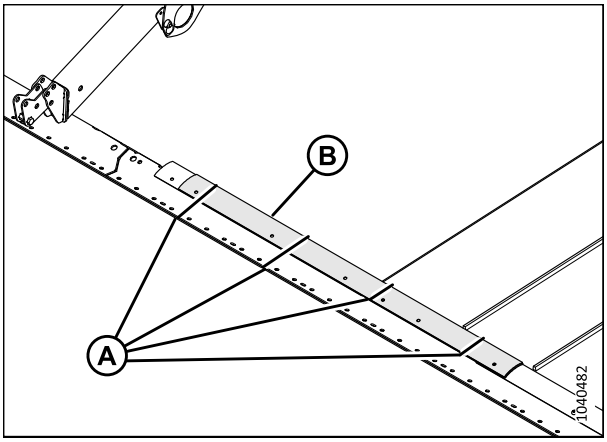


Figure 6.93: Cutterbar Seal Plate

2. Install cutterbar seal plate (A) on the cutterbar. Secure it with five M8 X 1.25 X 20 torx screws (B).

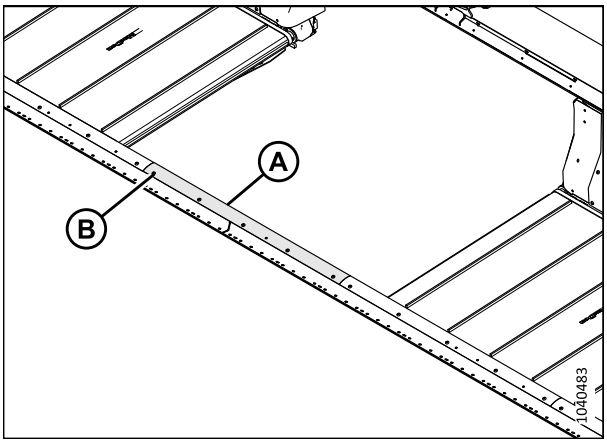


Figure 6.94: Cutterbar Seal Plate – D215, D220, D225, D230

3. Install cutterbar seal plate (A) (MD #319430) on the cutterbar. Secure it with five M8 X 1.25 X 20 torx screws (B).

4. Install cutterbar seal plate (B) (MD #319431) on the cutterbar. Secure it with five M8 X 1.25 X 20 torx screws (B).

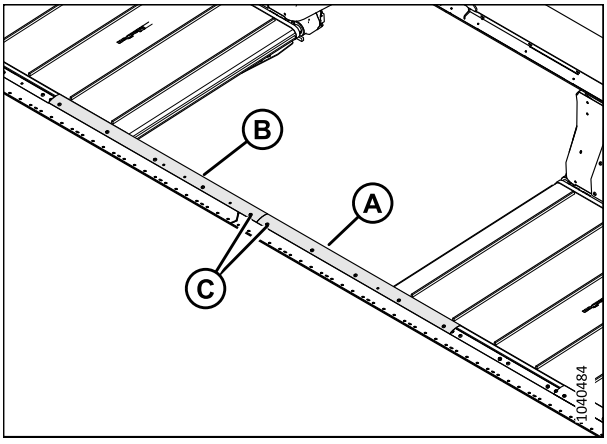


Figure 6.95: Cutterbar Seal Plates – D235

5. Ensure that clearance (A) between draper (B) and metal seal (C) is 1–4 mm (0.04–0.16 in.).

6. If the draper clearance is not within the correct range , adjust the deck height. For instructions, refer to *7.8 Checking Draper Seal, page 178*.

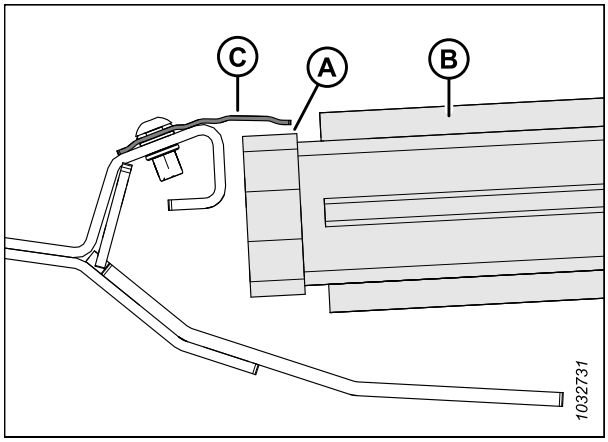


Figure 6.96: Draper Seal

6.12 Removing and Installing Deck Cutterbar Seals – D241

On split-frame headers, the right deck cutterbar seals have been removed from the cutterbar for shipping purposes. They will need to be installed.

1. Remove shipping wire (A) securing the cutterbar seal plate (B) and hardware bag MD # 135488 from the shipping location.

   NOTE:

   For D235, there are two cutterbar seal plates removed.

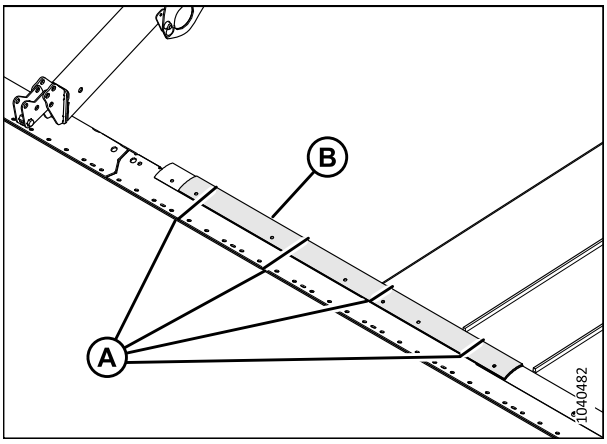


Figure 6.97: Cutterbar Seal Plate

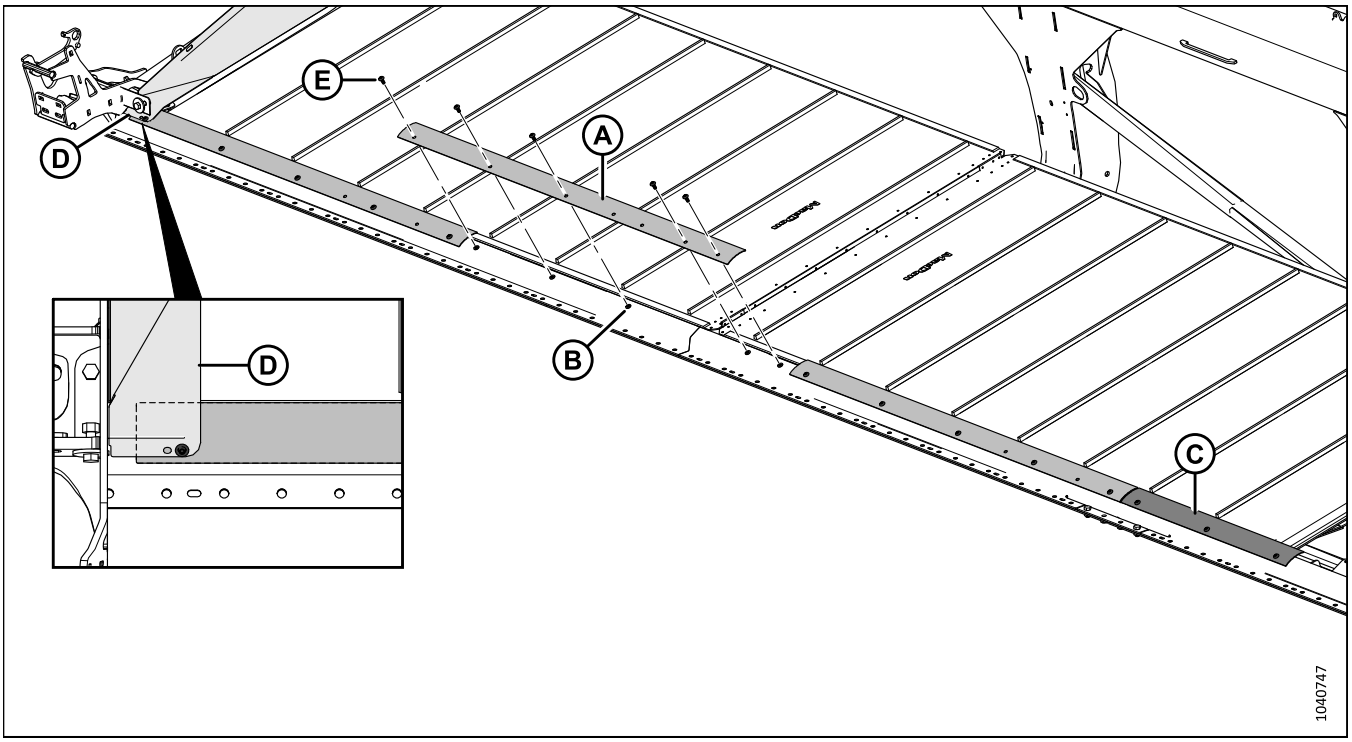


Figure 6.98: Draper Seals – Right Deck

2. Align four metal seals (A) with rivets (B) in the cutterbar; short seal (C) goes on the inboard end. Position the seals under deflector (D).

3. Secure the seals to the cutterbar using 18 M8 x 20 mm Torx® screws (E). Torque the screws to 29 Nm (21 lbf·ft).

4. Ensure that the ends of each seal are aligned with the one beside it.

   NOTE:

   If necessary, bend the seal upward to align the seals.

5. Ensure that clearance (A) between draper (B) and metal seal (C) is 0–2 mm (0.004–0.08 in.).

6. If the draper clearance is not within the correct range , adjust the deck height. For instructions, refer to *7.8 Checking Draper Seal, page 178*.

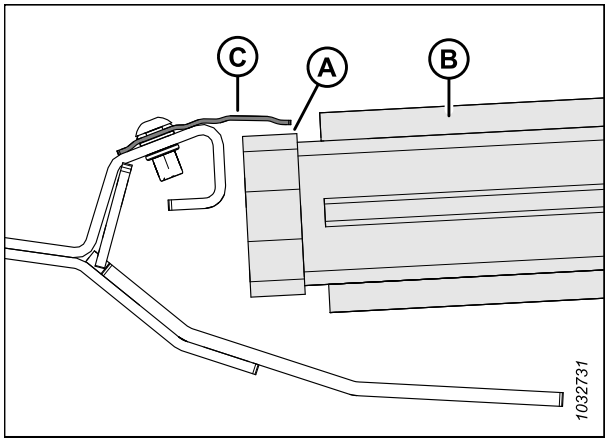


Figure 6.99: Draper Seal

6.13 Crop Dividers

Crop dividers are used to separate the crop when harvesting. They are removable to allow the installation of vertical knives, and to decrease transport width.

6.13.1 Installing Crop Dividers

The crop dividers were removed from the header for shipping purposes. They will need to be installed.

NOTE:

This procedure applies to the standard crop dividers shipped with every header. If you are installing the optional Floating Crop Dividers kit (MD #B7346), refer to the installation instructions provided with the kit.

1. Open the left endshield. For instructions, refer to *9.2.1 Opening Header Endshields, page 208*.
2. Remove hairpin (A) securing multi-tool (B) to the bracket on the left endsheet.
3. Remove multi-tool (B). Insert the hairpin in the bracket.
4. Retrieve the previously removed crop dividers.

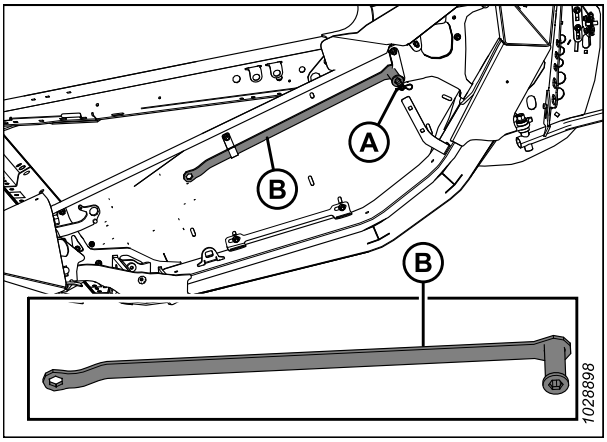


Figure 6.100: Left Endsheet

5. Insert lugs (A) on the crop divider into the holes in the knife drive box support as shown.
6. Remove lynch pin (B) from latch (C).

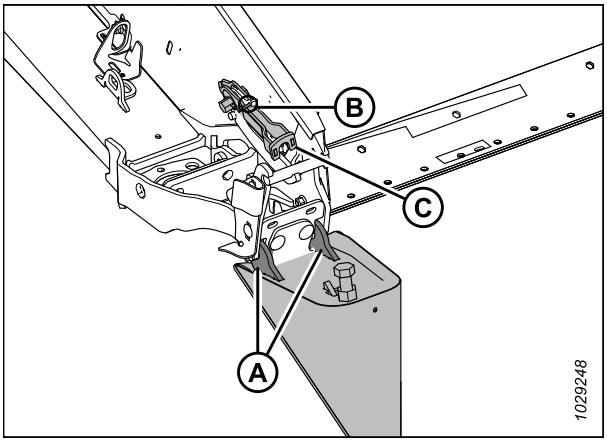


Figure 6.101: Crop Divider

7. Lift the forward end of latch (A) and crop divider (B).

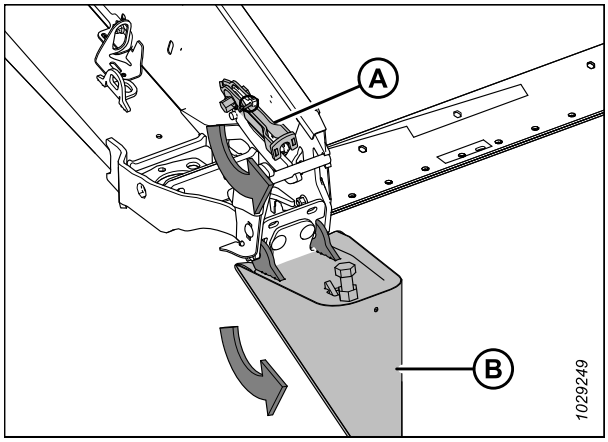


Figure 6.102: Crop Divider

8. Insert latch (A) into crop divider bolt (B).
9. Attach the multi-tool to latch-locking hex shaft (D). Rotate the multi-tool counter-clockwise to lock latch (A).
10. Secure latch (A) with lynch pin (C).
11. To close the latch, torque hex shaft (D) to 40–54 Nm (30–40 lbf·ft).
12. Tighten bolt (B) to increase the torque required to close the latch, or back the bolt off to decrease the torque required to close the latch.

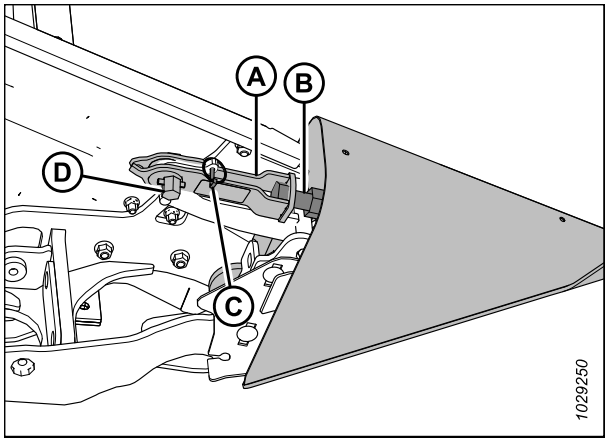


Figure 6.103: Crop Divider

13. Ensure that there is contact between plate (A) and guide (B).
14. Return the multi-tool to its storage location on the left end panel.
15. Close the left endshield. For instructions, refer to *9.2.2 Closing Header Endshields, page 209*.

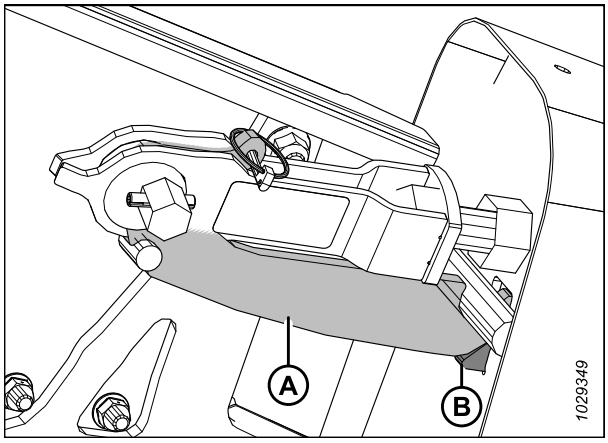


Figure 6.104: Crop Divider's Latch

IMPORTANT:

Ensure that there is no contact between front support (A) and the back of crop divider (B). If there is too much contact, the front support may bend. There should be a gap of 10 mm (3/8 in.) (C) from the end panel and the front support to allow the crop divider to expand.

NOTE:

Part of the crop divider is illustrated as though it were transparent for the sake of clarity.

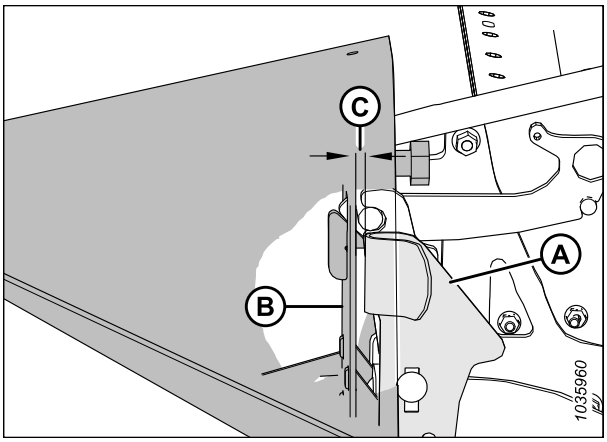


Figure 6.105: Front Support

6.13.2 Installing Crop Divider Rods

The crop divider rods can be installed on the ends of the crop dividers to help separate bushy crop.

1. Open the right endshield. For instructions, refer to *9.2.1 Opening Header Endshields, page 208*.
2. Undo lynch pin (A) securing divider rods (B) to the header endsheet. Remove the divider rods from their shipping location.
3. Reinstall lynch pin (A).

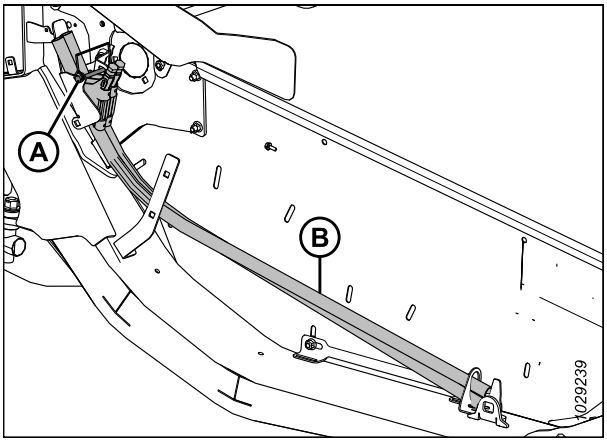


Figure 6.106: Divider Rods in Shipping Storage at Right Header Endsheet

4. Position crop divider rod (A) on the tip of the crop divider as shown. Tighten bolt (B).
5. Repeat this procedure to install the crop divider rod on the the opposite end of the header.
6. Close the right endshield. For instructions, refer to *9.2.2 Closing Header Endshields, page 209*.

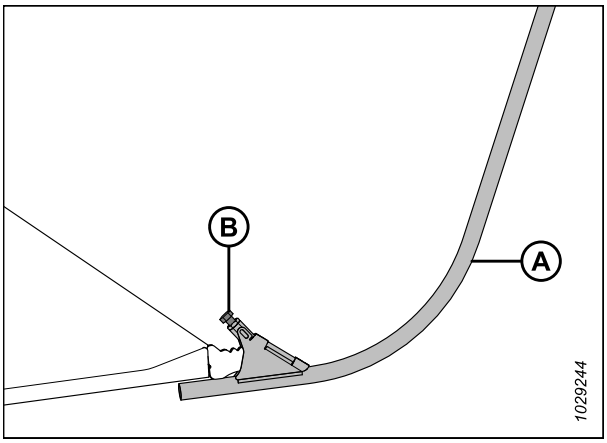


Figure 6.107: Divider Rod on Crop Divider

6.14 Setting up Reel Position Sensors – M1 Series Only

The header has multiple sensors to inform the operator where the reel is positioned.

6.14.1 Checking and Adjusting Reel Height Sensor

The orientation of the reel height sensor arm must be checked manually at the sensor. The output voltage range of the sensor can be checked either manually at the sensor or from the cab. This procedure is not required for headers used with M Series Windrowers.

IMPORTANT:

Ensure that the minimum reel height is set before adjusting the reel height sensor. For instructions, refer to *7.9 Reel-to-Cutterbar Clearance, page 181*.

NOTE:

For in-cab instructions, refer to the windrower operator's manual.

DANGER

To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

DANGER

Ensure that all bystanders have cleared the area.

1. On the right endsheet, locate reel height sensor (A). It connects to the right reel arm.

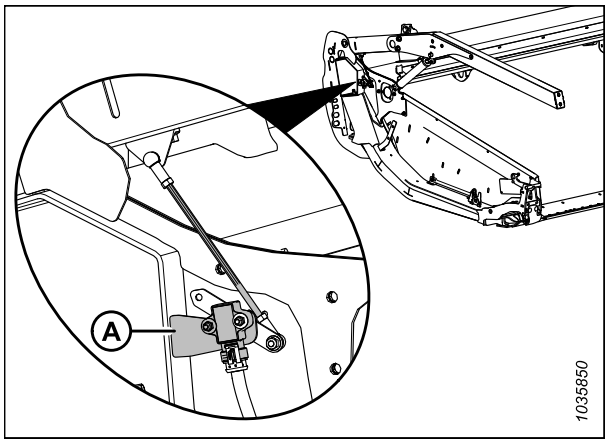


Figure 6.108: Reel Height Sensor Location

Checking and adjusting sensor output voltage when reel is lowered

2. Engage the parking brake.
3. Start the engine. For instructions, refer to the windrower operator's manual.
4. Lower the reel fully.
5. Use the windrower display or a voltmeter (if measuring the sensor manually) to measure the voltage range when the reel is lowered. Refer to Table *6.10, page 161* for range requirements.

   IMPORTANT:

   To measure the output voltage of the reel height sensor, the engine needs to be running and supplying power to the sensor.

Table 6.10 Reel Height Sensor Voltage Limits

Voltage with Reel Raised	Voltage with Reel Lowered
0.7–1.1 V	3.9–4.3 V

6. Shut down the engine, and remove the key from the ignition.
7. Using a voltmeter, measure the voltage between the ground (pin 2 wire) and the signal (pin 3 wire) at reel height sensor (B).
8. Ensure that the voltage is within the recommended voltage range. If the voltage is not within the range, loosen jam nuts (D) and (E), and adjust the rod length. Hand-tighten the jam nuts. Tighten the jam nuts by another quarter-turn.

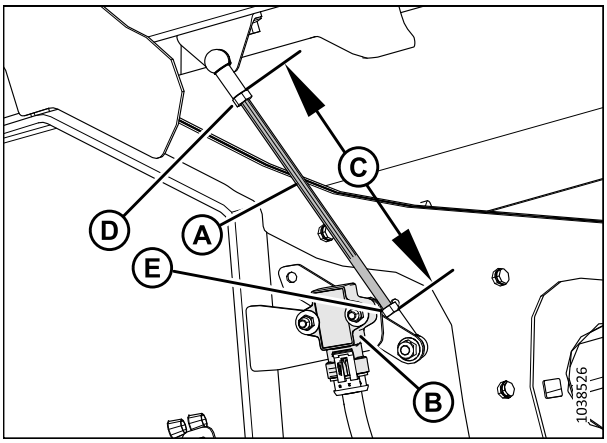


Figure 6.109: Reel Height Sensor – Right Reel Arm with Reel Down

Checking and adjusting sensor output voltage when reel is raised

9. Start the engine.
10. Fully raise the reel.
11. Use the windrower display or a voltmeter to measure the voltage range when the reel is raised. Refer to Table *6.10, page 161* for the recommended voltage ranges.
12. Shut down the engine, and remove the key from the ignition.
13. Using a voltmeter, measure the voltage between the ground (pin 2 wire) and the signal (pin 3 wire) at reel height sensor (A).
14. If the voltage is not within the recommended range, loosen two M5 hex nuts (B) and rotate sensor (A) to achieve the recommended voltage range. Tighten nuts (B) to 2.5 Nm (2 lbf·ft).
15. Repeat this procedure until the voltage range is within the range specified.
16. Start the engine.
17. Lower the reel fully.
18. Recheck the voltage range. Ensure that the voltage range is still within the specified values. Repeat this procedure as needed.

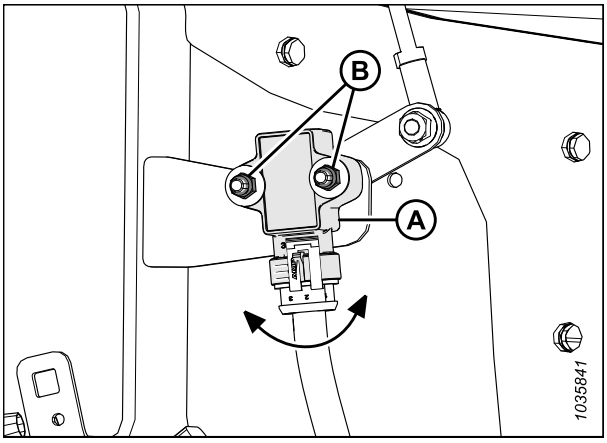


Figure 6.110: Reel Height Sensor – Right Reel Arm with Reel Up

6.14.2 Checking and Adjusting Fore-Aft Position Sensor

The fore-aft position sensor indicates the position of the reel in the fore-aft plane. The sensor arm's orientation and the sensor's output voltage range must be calibrated. This procedure is not required for headers used with M Series Windrowers.

Checking and adjusting sensor arm orientation

DANGER

To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

1. Park the windrower on a level surface.
2. Shut down the engine, and remove the key from the ignition.

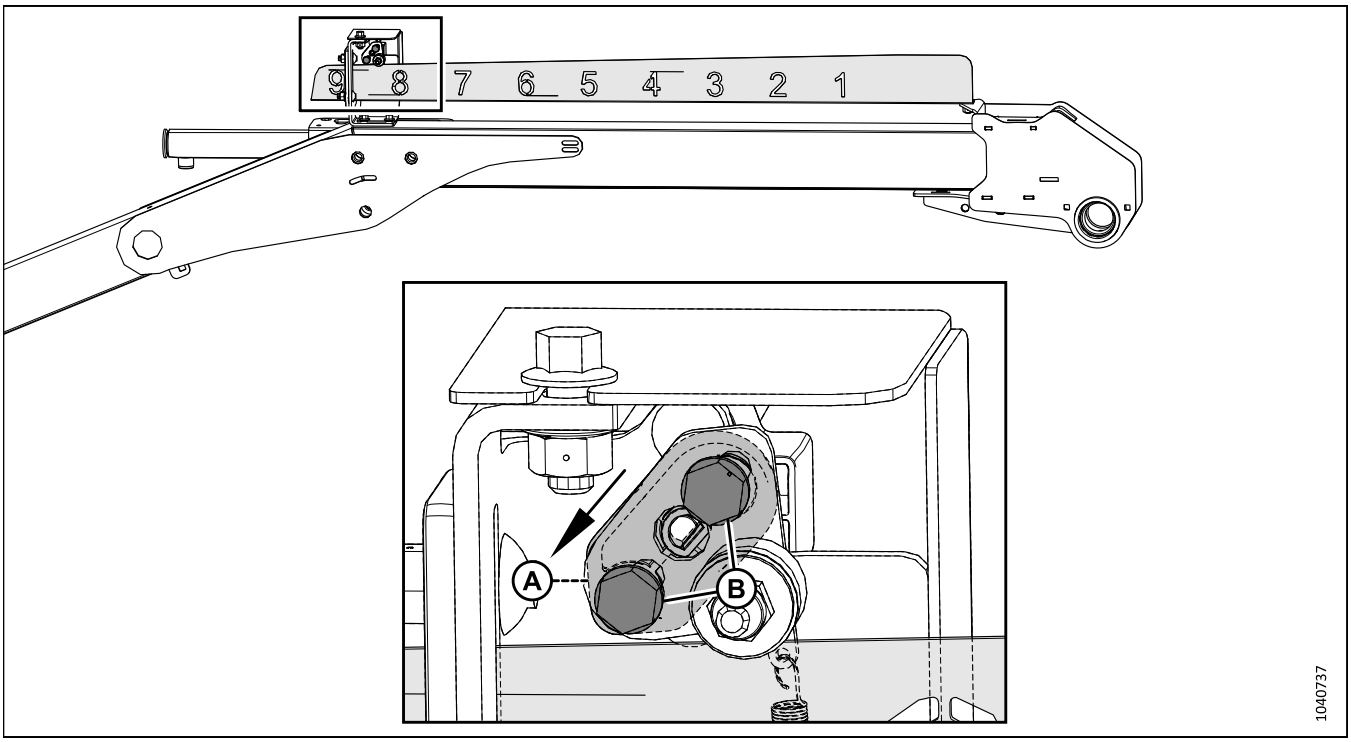


Figure 6.111: Sensor Arm Configurations

A - Sensor Arm **B - Mounting Hardware**

3. Check the orientation of sensor arm (A) and hardware (B). If sensor arm (A) is not oriented correctly, remove it and reinstall it in the correct orientation.

Checking and adjusting sensor output voltage

DANGER

Ensure that all bystanders have cleared the area.

4. Engage the parking brake.

   IMPORTANT:

   To measure the output voltage of the fore-aft sensor, the engine needs to be running and supplying power to the sensor.

5. Start the engine.

6. Adjust the reel to the fully forward position. Ensure that dimension (B) (from the sensor bracket to the end of the indicator) is 62–72 mm (2.4–2.8 in.).

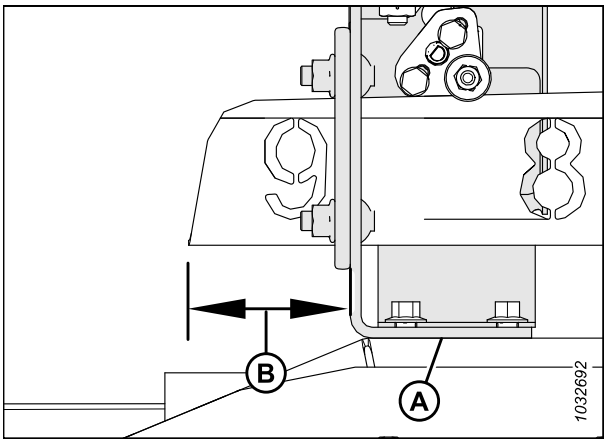


Figure 6.112: Fore-Aft Bracket

7. Use the windrower display or a voltmeter (if measuring the sensor manually) to measure the voltage range. If using a voltmeter, check sensor (A) voltage between pin 2 (ground) and pin 3 (signal). The range should be 3.9–4.3 V.

8. Shut down the engine, and remove the key from the ignition.

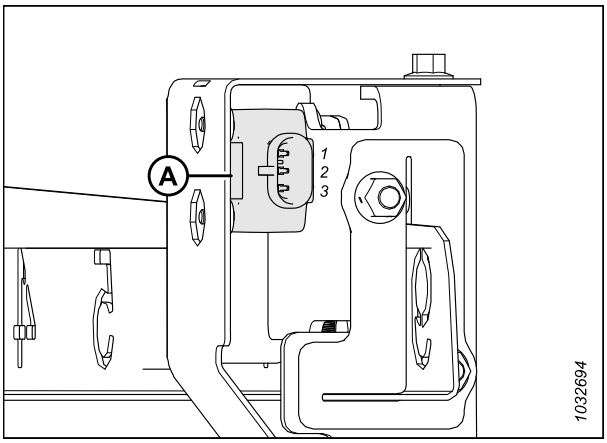


Figure 6.113: Fore-Aft Sensor

9. If adjustment is required, loosen hardware (A) and rotate sensor (B) until the voltage is in the correct range.

10. Once sensor adjustment is complete, torque the hardware to 2.1 Nm (22 lbf·in).

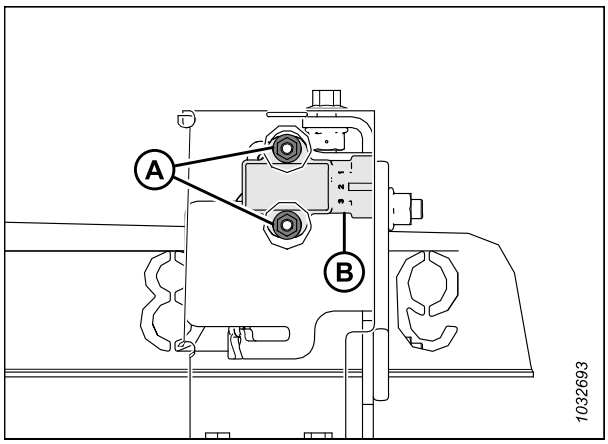


Figure 6.114: Fore-Aft Sensor

6.15 Installing Options

Once primary assembly of the header is complete, the optional kits included with the shipment will need to be installed.

1. Retrieve the kits supplied as options with the header, and install them according to the instructions supplied with each kit.
2. Proceed to Chapter *7 Performing Predelivery Checks, page 167*.

Chapter 7: Performing Predelivery Checks

Once the header has been assembled and the optional kits have been installed, the header will need to be run up and its performance tested.

DANGER

To prevent bodily injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before making adjustments to the machine.

IMPORTANT:

Ensure that shipping material has not fallen into the header.

Perform the final checks listed on the Predelivery Checklist () to ensure that the header is field-ready. Refer to the procedures in this chapter for detailed instructions on performing the tasks listed in the Predelivery Checklist.

The completed Predelivery Checklist should be retained by the Operator or the Dealer.

7.1 Checking Tire Pressure – Option

Some headers may have stabilizer wheels installed. If so, the tire pressure levels will need to be checked and, if necessary, adjusted.

Check the pressure of the stabilizer wheels. If necessary, inflate or deflate the tires to the pressure specified below:

Table 7.1 Tire Inflation Pressure

Size	Load Range	Pressure
225/75 R15	E	552 kPa (80 psi)

7.2 Checking Wheel Bolt Torque

The wheel bolts securing the transport wheels must be torqued correctly before the header can be safely transported.

1. Measure the torque value of each wheel bolt. A correctly torqued wheel bolt will show a torque reading of 115 Nm (85 lbf·ft).
2. If a wheel bolt is not set to the correct torque value, adjust its torque as needed.
3. Tighten all wheel bolts according to the bolt-tightening pattern depicted in the illustration at right.

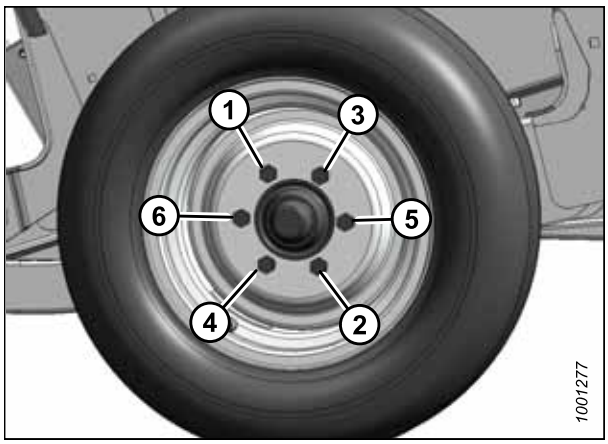


Figure 7.1: Sequence for Tightening Bolts

7.3 Checking Oil Level in Knife Drive Box

There must be a sufficient level of oil in each knife drive box for the knife drive to work correctly. The knife drive's oil level can be inspected using the dipstick installed in each knife drive.

DANGER

To prevent bodily injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before making adjustments to the machine.

1. Lower the header fully.
2. Adjust the header angle so that the top of the knife drive box is level with the ground.
3. Shut down the engine, and remove the key from the ignition.
4. Ensure that the header is level.
5. Open the endshield.
6. Remove oil level dipstick (A). Check the oil level. The oil level must be within range (B), between the lines near the bottom of the dipstick.
7. Add oil to the knife drive box if needed. For instructions on adding oil, refer to the operator's manual.
8. Reinstall oil level dipstick (A). Tighten the dipstick to 23 Nm (17 lbf·ft).
9. If the header has two knife drives, repeat this procedure to check the oil level on the other knife drive.

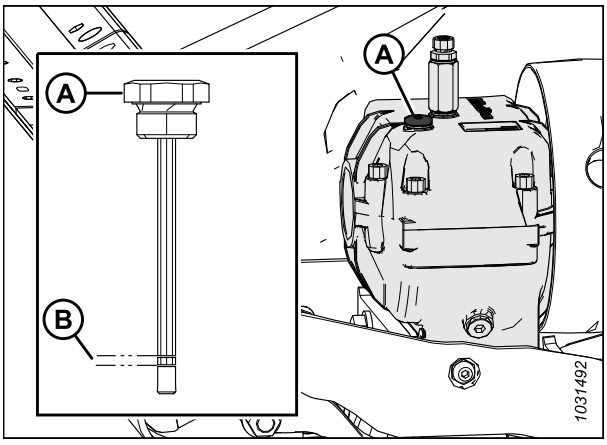


Figure 7.2: Knife Drive Box

7.4 Checking and Adjusting Reel Clearance

Reel clearance refers to the side distance between the outboard edge of the reel and the endsheets on the header. If the reel clearance is not satisfactory, it will need to be adjusted.

DANGER

To prevent bodily injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before making adjustments to the machine.

WARNING

Ensure that all bystanders have cleared the area.

Checking reel clearance

1. Start the engine.
2. Raise or lower the header until the cutterbar sits 254–356 mm (10–14 in.) above the ground.
3. Lower the reel fully.
4. Extend or retract the reel until the **5** on reel fore-aft indicator (A) is hidden by sensor support (B).
5. Shut down the engine, and remove the key from the ignition.

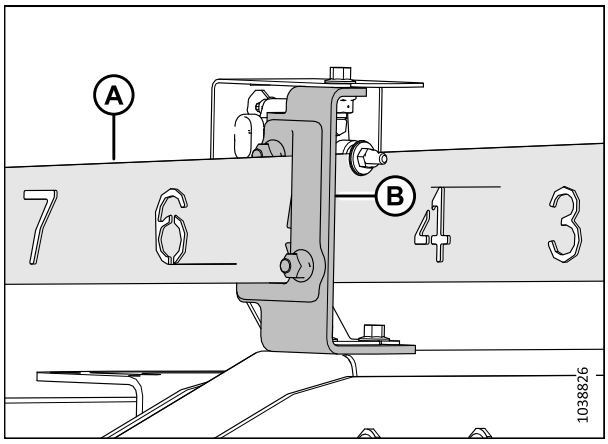


Figure 7.3: Reel Fore-Aft Indicator

6. Manually rotate the reel to position a tine tube above the cutterbar.

7. Measure clearance (A) at locations (B) between the reel tine tube and the endsheet at both ends of the header. If the reel is centered, the clearances will be identical. If the clearance needs to be adjusted, proceed to the next step.

   NOTE:

   If reel end shields are pre-installed, measure between the reel end shield and the header end sheet, at the location of the tine tube, as shown.

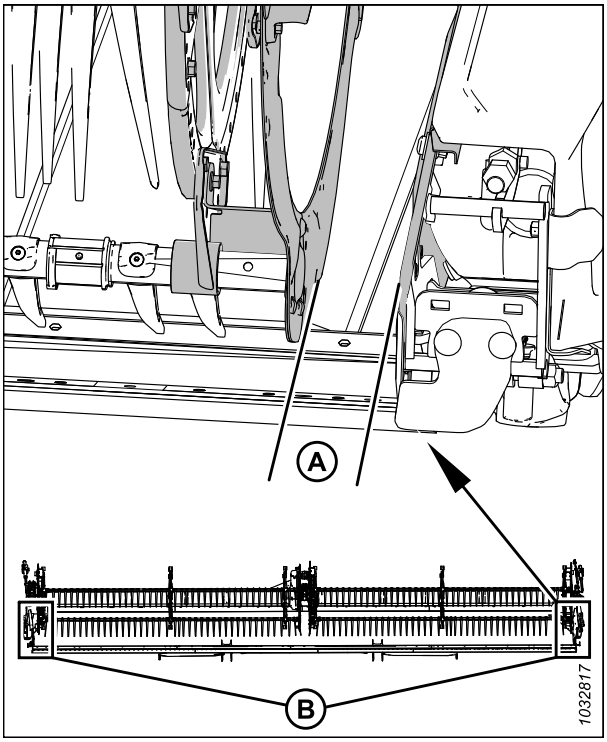


Figure 7.4: Reel Clearance – Double-Reel Header

Adjusting reel clearance – single-reel headers

8. Center the reel as follows:

   a. Loosen bolt (A) on brace (B) on the right reel arm.

   b. Move the forward end of reel support arm (C) laterally as needed to center the reel.

   c. Torque bolts (A) to 457 Nm (337 lbf·ft).

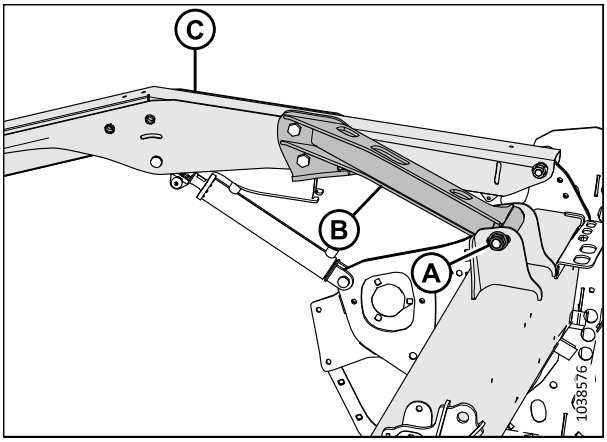


Figure 7.5: Right Support Arm – Single Reel Header

Adjusting reel clearance – double- and triple-reel headers

9. Center the reel as follows:
   a. Loosen bolt (A) on brace (B) at the center support arm.
   b. Move the forward end of reel support arm (C) laterally as needed to center the reel.
   c. Torque bolt (A) to 457 Nm (337 lbf·ft).

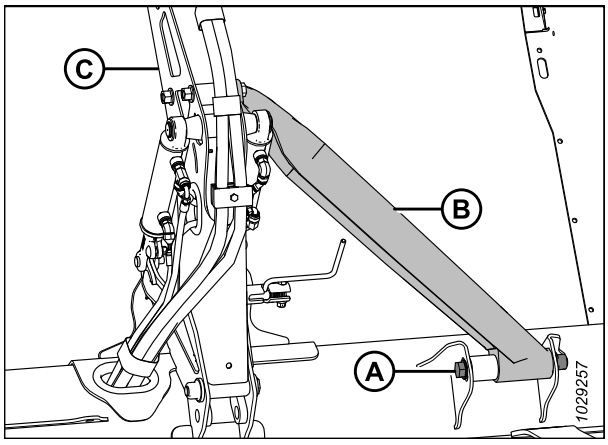


Figure 7.6: Center Support Arm – Double Reel Header

7.5 Lubricating Header

All of the lubrication points on the header will need to be inspected to ensure that they can accept grease.

Use the proper lubricant for the application. Refer to the table below for information on the type of lubricant to use:

Table 7.2 Recommended Lubricant

Lubricant Specification	Description	Application
SAE multipurpose	High temperature, extreme pressure (EP2) performance with 1% max molybdenum disulphide (NLGI Grade 2) lithium base	All other lubrication points

7.5.1 Greasing Procedure

Greasing points are identified on the machine by decals showing a grease gun and grease interval in hours of operation. Grease point layout decals are located on the header.

DANGER

To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

1. Wipe the grease fitting with a clean cloth before greasing to avoid injecting it with dirt and grit.

   IMPORTANT:

   Use clean, high-temperature, extreme-pressure grease only.

2. Inject the grease through the fitting with a grease gun until grease overflows the fitting (except where noted).
3. Leave the excess grease on the fitting to keep the dirt out.
4. Replace any loose or broken grease fittings immediately.
5. Remove and thoroughly clean any fitting that will not take grease. Also clean the lubricant passageway. Replace the fitting if necessary.

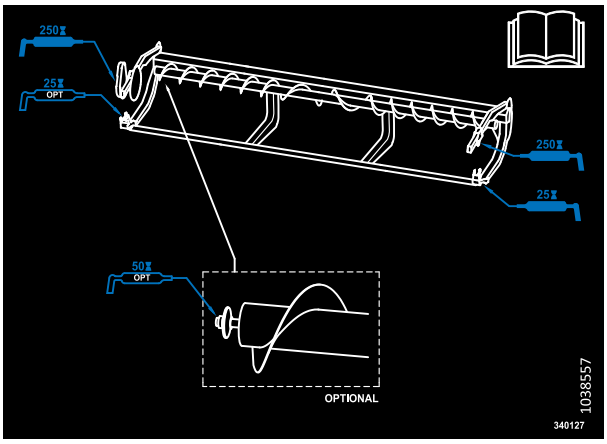


Figure 7.7: Grease Point Decal for Single-Knife Header with One-Piece Upper Cross Auger

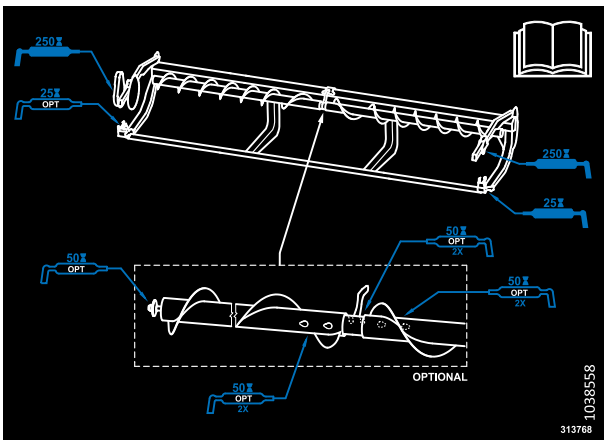


Figure 7.8: Decal for Single-Knife Header with Two-Piece Upper Cross Auger

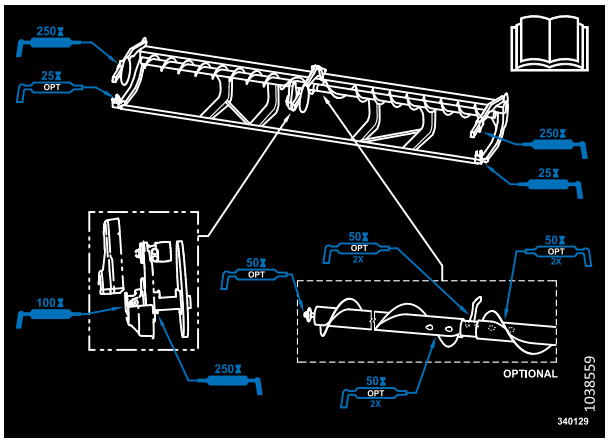


Figure 7.9: Decal for Double-Knife Header with Two-Piece Upper Cross Auger

7.6 Checking and Adjusting Header Float

D2 Series Draper Headers are designed to ride on the skid shoes when cutting on the ground. The windrower float system reduces the ground pressure so that the header floats over obstacles and follows ground contours instead of being supported by the windrower lift cylinders.

Refer to your windrower operator's manual for details about header float adjustments.

7.7 Checking and Adjusting Draper Tension

The tension on the drapers can be adjusted using the draper tension adjusters on the end of each draper.

DANGER

To prevent bodily injury or death from the unexpected start-up or fall of a raised machine, always stop the engine, remove the key, and engage the vehicle's safety props before going under the machine for any reason.

IMPORTANT:

The draper tension is set at the factory, and should not require adjustment. If adjustment is necessary, ensure that the tension is set so that the draper does not slip or sag below the cutterbar. Excessive tension on the draper can damage the draper drive and rollers.

1. Ensure that tension indicator (A) covers the inboard half of the window.

DANGER

Ensure that all bystanders have cleared the area.

2. Start the engine.
3. Raise the header fully.
4. Shut down the engine, and remove the key from the ignition.
5. Engage the header safety props.

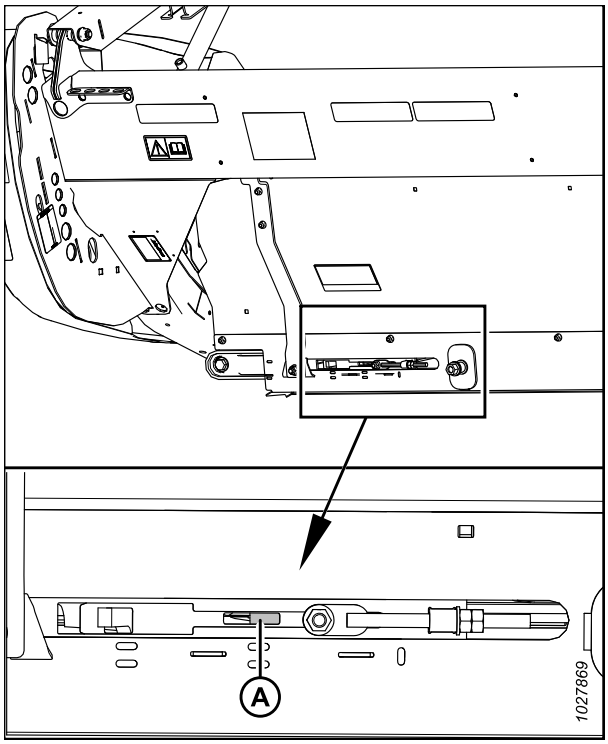


Figure 7.10: Checking Left Tension Adjuster

6. Ensure that the draper guide (the rubber track on the underside of the draper) is properly engaged in groove (A) of the drive roller.

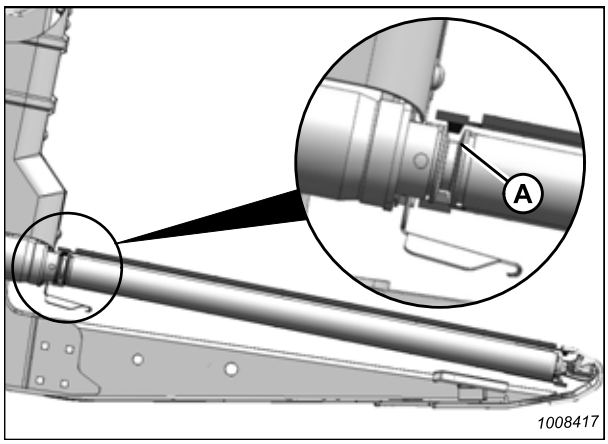


Figure 7.11: Drive Roller

7. Ensure that idler roller (A) is between guides (B).

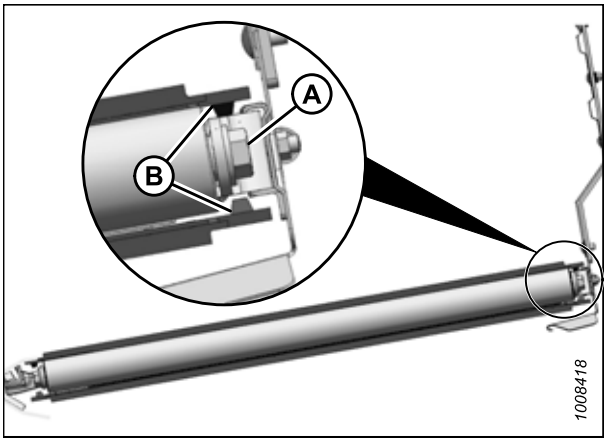


Figure 7.12: Idler Roller

IMPORTANT:

Do **NOT** adjust nut (C). This nut is used for draper alignment only.

8. Turn adjuster bolt (A) clockwise to increase the tension on the draper; turn bolt (A) counterclockwise to decrease the tension on the draper. Tensioner indicator (B) will move inboard to show that the draper is tightening. Tighten the adjuster bolt until the tensioner indicator covers the inboard half of the window.

IMPORTANT:

To avoid premature failure of the draper, draper rollers, and/or tightener components, do **NOT** operate the header when the tension indicator is not visible.

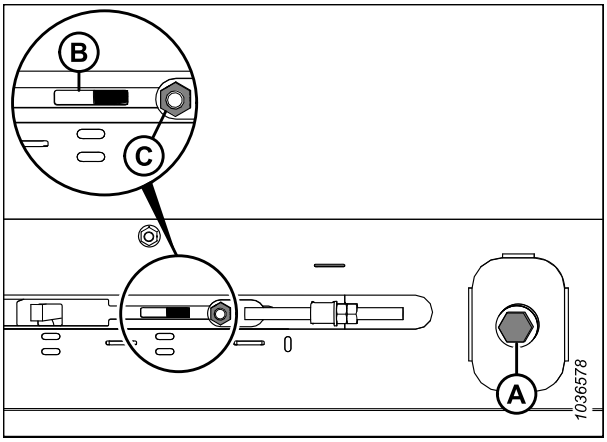


Figure 7.13: Adjusting Left Tensioner

7.8 Checking Draper Seal

Draper seal refers to the clearance between the draper belt and the cutterbar seal plate. A properly sealed draper should have as small a gap as possible between the draper and the cutterbar seal plate. If the draper seal is unsatisfactory, it will need to be adjusted.

Checking draper seal

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key before adjusting the machine.

1. Start the engine. For instructions, refer to the windrower operator's manual.
2. Lower the header to the working position.
3. Shut down the engine, and remove the key from the ignition.

   NOTE:

   The draper deck is support by deck front hooks (A). The number of deck front hooks varies according to the size of the header; larger headers have more hooks.

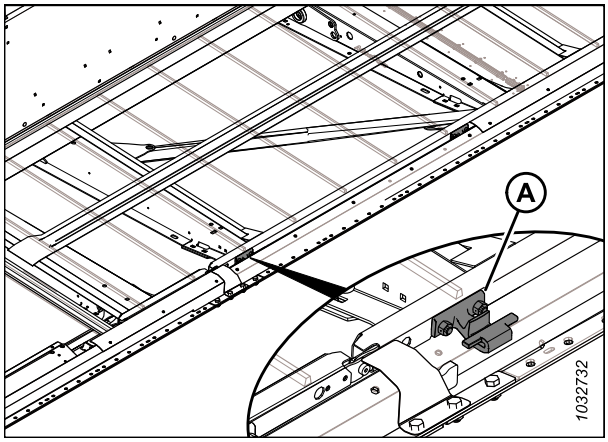


Figure 7.14: Draper Deck Front Hooks

4. Measure clearance (A) between draper (B) and cutterbar seal plate (C). The clearance should be 0.5–2 mm (0.02–0.08 in.). If the clearance requires adjustment, proceed to the next step.

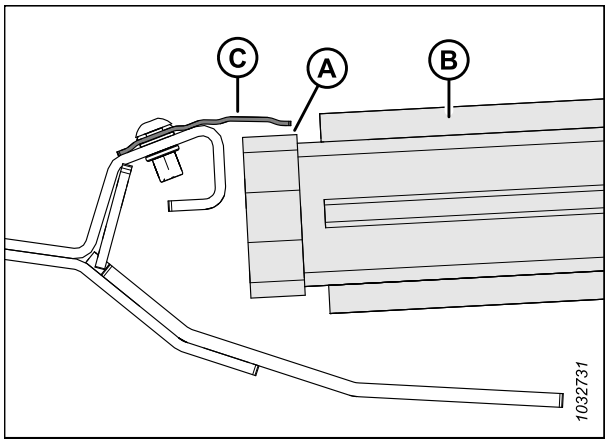


Figure 7.15: Draper Seal

Adjusting draper seal

5. Release the tension on the draper. For instructions, refer to *7.7 Checking and Adjusting Draper Tension, page 176*.

6. Lift the front edge of draper (A) past cutterbar (B) to expose the front hook.
7. Measure the thickness of the draper belt.

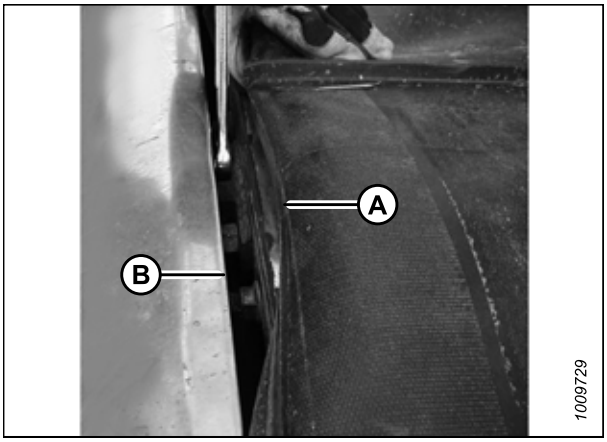


Figure 7.16: Deck Front Hook

8. Remove screws (B) and cutterbar seal (A) above the cutterbar.

   NOTE:

   This step is not strictly necessary, but performing it allows better access to the front hooks.

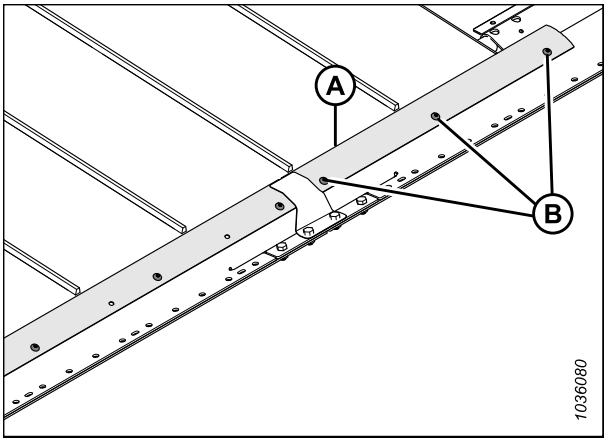


Figure 7.17: Deck Seal Plate

9. Loosen two lock nuts (A) on deck front hook (B) by one half-turn **ONLY**.
10. Tap deck (C) with a hammer and a block of wood to lower the deck relative to the deck front hooks. Tap deck front hook (B) using a punch to raise the deck relative to the deck front hooks.

    NOTE:

    The deck is shown with parts removed for clarity. The number of deck front hooks (B) is determined by the header width as follows:

    - **D215 and D220:** Four deck front hooks
    - **D225 and D230:** Six deck front hooks
    - **D235:** Eight deck front hooks
    - **D241:** Ten deck front hooks

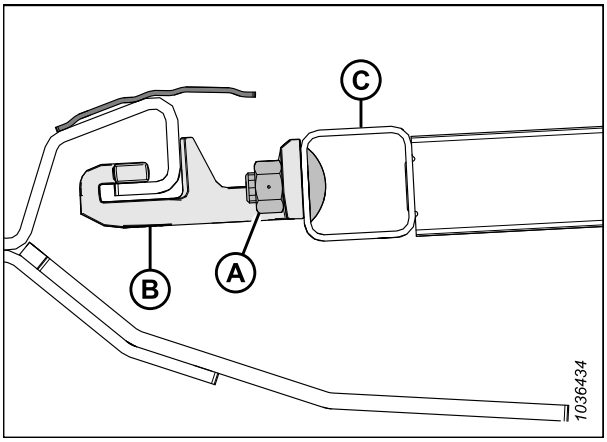


Figure 7.18: Deck Support

11. Use a feeler gauge of the same thickness as the draper belt, plus 1 mm (0.04 in.). Slide the feeler gauge along deck (A) under cutterbar seal plate (C) to set the clearance.
12. To create a seal, adjust deck (A) so that clearance (B) between cutterbar seal plate (C) and the deck is the same as the thickness as the draper belt plus 1 mm (0.04 in.).

    NOTE:

    To check the clearance at a draper roller, measure from the roller tube, **NOT** the deck.
13. Tighten hardware (D).
14. Measure gap (B) again using the feeler gauge. For instructions, refer to Step *11, page 180*.
15. If removed, install cutterbar seal (A) and screws (B).

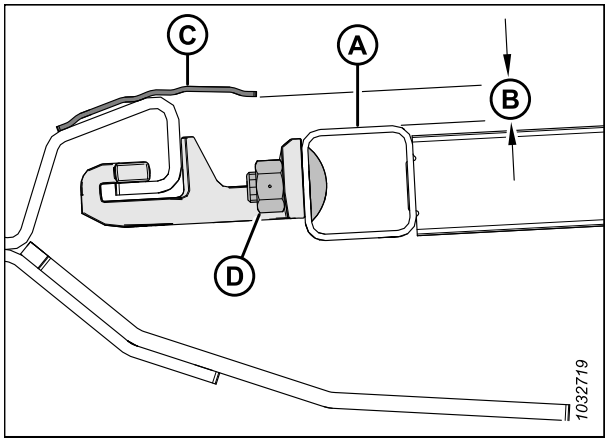


Figure 7.19: Deck Front Hook

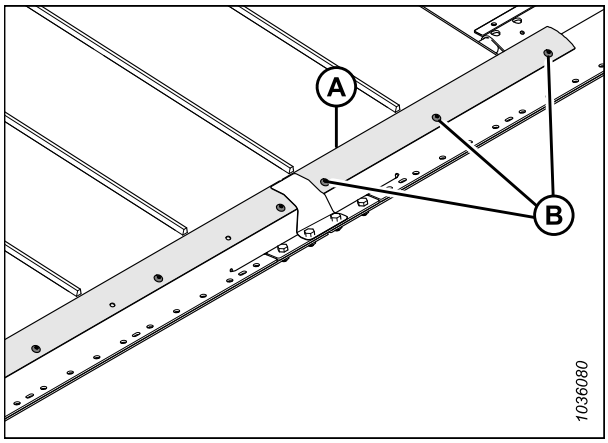


Figure 7.20: Deck Seal Plate

7.9 Reel-to-Cutterbar Clearance

There must be sufficient clearance between the reel fingers and the cutterbar to ensure that the reel fingers do not contact the cutterbar during operation. The clearance is set at the factory, but some adjustment may be necessary before the header can be operated.

Measure clearance (A) between the tip of the reel finger and the guard: guard (B) or short guard (C), depending on the configuration of the header. Compare the measurement to the specifications listed in the table below:

Table 7.3 Finger to Guard/Cutterbar Clearance – Single Reel

Header	End Panels
D215	20 mm (0.80 in.)
D220	20 mm (0.80 in.)
D225	25 mm (1 in.)

Table 7.4 Finger to Guard/Cutterbar Clearance – Double Reel

Header	End Panels	Beside Center Arm
D230 D235 D241	20 mm (0.80 in.)	20 mm (0.80 in.)

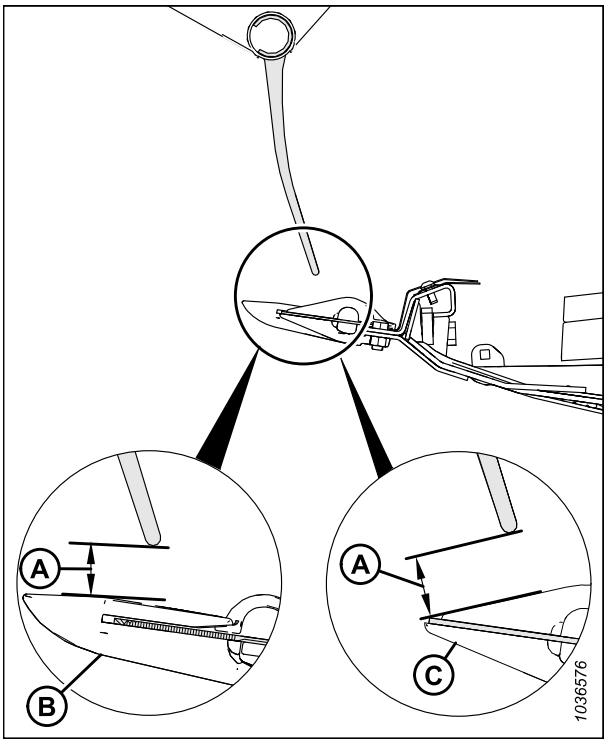


Figure 7.21: Finger Clearance

7.9.1 Measuring Reel Clearance

Make sure there is sufficient clearance between the reel and the cutterbar to prevent the knife from cutting reel finger tips off during operation.

DANGER

To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

DANGER

Ensure that all bystanders have cleared the area.

1. Start the engine. For instructions, refer to the windrower operator's manual.
2. Park the windrower on a level surface.
3. Position the header so that the cutterbar is 254–356 mm (10–14 in.) off the ground.

4. Adjust the reel fore-aft position until sensor support (B) hides the number seven on fore-aft indicator (A).

5. Shut down the engine, and remove the key from the ignition.

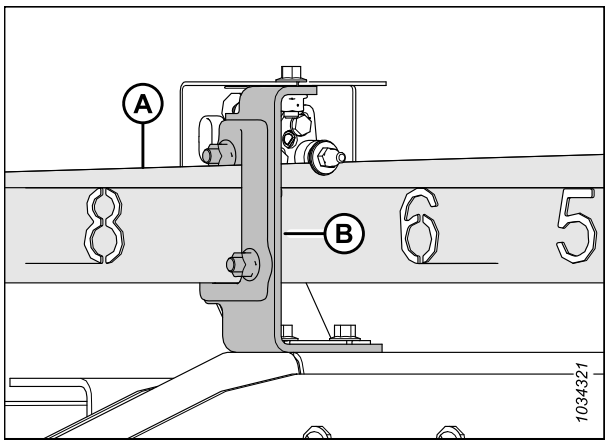


Figure 7.22: Fore-Aft Position

6. Rotate the reel by hand until a tine tube is directly above the cutterbar.

7. Measure and record clearance (A) from the finger tip to the top of pointed guard (B), or short guard (C). For clearance specifications, refer to *7.9 Reel-to-Cutterbar Clearance, page 181*

   For measurement locations, refer to:

   - Figure *7.24, page 183* – single reel
   - Figure *7.25, page 183* – double reel

8. Adjust the reel clearance, if required. For instructions, refer to *7.9.2 Adjusting Reel-to-Cutterbar Clearance, page 183*.

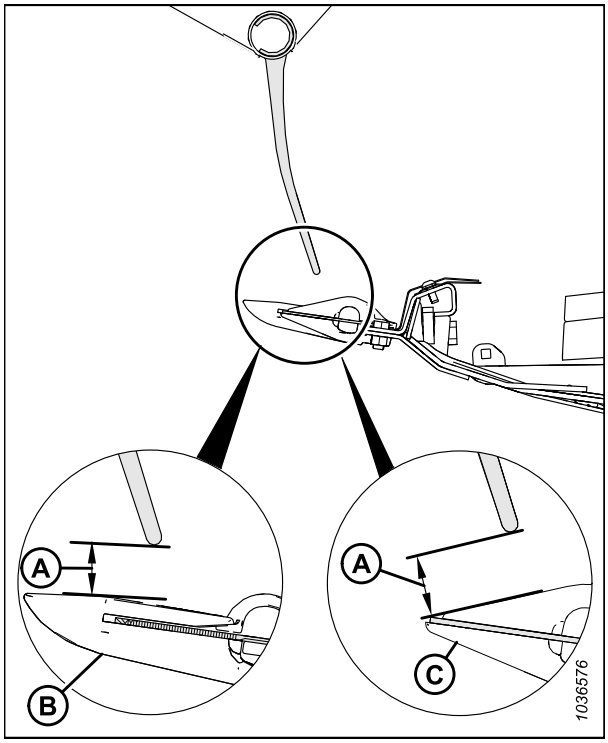


Figure 7.23: Measurement from Finger Tip to Guard

Single-reel measurement locations (A): Outer ends of the reel (two places).

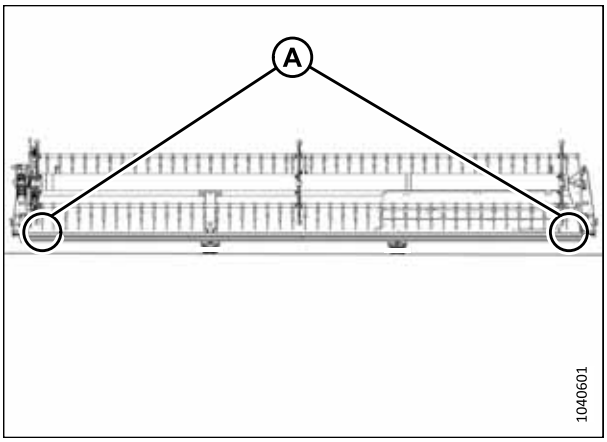


Figure 7.24: Single-Reel Measurement Locations

Double-reel measurement location (A): Both ends of both reels (four places).

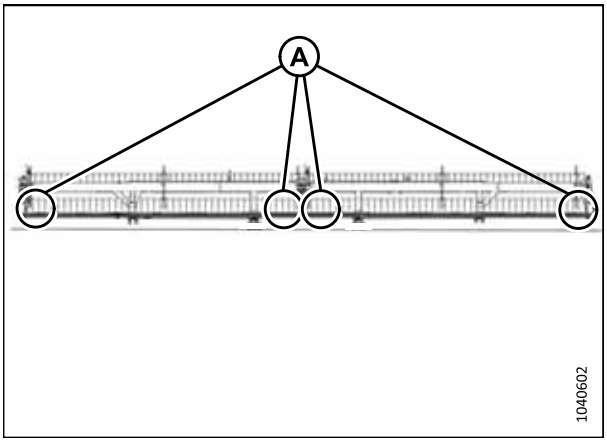


Figure 7.25: Double-Reel Measurement Locations

7.9.2 Adjusting Reel-to-Cutterbar Clearance

If the clearance between the reel fingers and the cutterbar is insufficient, it will need to be adjusted so that damage to the equipment does not occur.

NOTE:

This procedure can be performed with the reel fore-aft cylinders in either the standard position or the canola-harvesting position, as long as the fore-aft cylinders remain in that position for the duration of the procedure.

DANGER

To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

WARNING

Ensure that all bystanders have cleared the area.

1. Measure the reel-to-cutterbar clearance. For instructions, refer to *7.9.1 Measuring Reel Clearance, page 181*.
2. Start the engine.

3. Position the header so that the cutterbar is 254–356 mm (10–14 in.) off the ground.
4. Lower the reel fully, and continue holding the control button down to phase the cylinders.
5. Shut down the engine, and remove the key from the ignition.
6. Adjust the clearance at the outboard ends of the reel as follows:
   a. Loosen bolt (A) on the outer arm cylinder.
   b. Adjust cylinder rod (B) as needed:
      - To increase the clearance between the reel fingers and the cutterbar, turn cylinder rod (B) out of the clevis.
      - To decrease the clearance between the reel fingers and the cutterbar, turn cylinder rod (B) into the clevis.
   c. Tighten bolt (A).
7. Repeat Step *6, page 184* on the opposite side of the header.
8. Loosen bolts (A) on both center arm cylinders.
9. Adjust the clearance as follows:

   IMPORTANT:

   Adjust both cylinder rods equally.

   - To increase the clearance between the reel fingers and the cutterbar, turn cylinder rods (D) out of the clevis.
   - To decrease the clearance between the reel fingers and the cutterbar, turn cylinder rods (D) into the clevis.
10. Ensure that distance measurement (B) is identical on both cylinders.

    NOTE:

    Distance measurement (B) runs from the center of mounting pins (C) to the tops of the notches in cylinder rods (D).
11. Ensure that both mounting pins (C) are **NOT** able to be rotated by hand. If one of the mounting pins is can be rotated, adjust cylinder rods (D) as needed:
    - Turn the cylinder rod out of the clevis to increase the load on the cylinder rod.
    - Turn the cylinder rod into the clevis to decrease the load on the cylinder rod.
12. Tighten bolts (A).

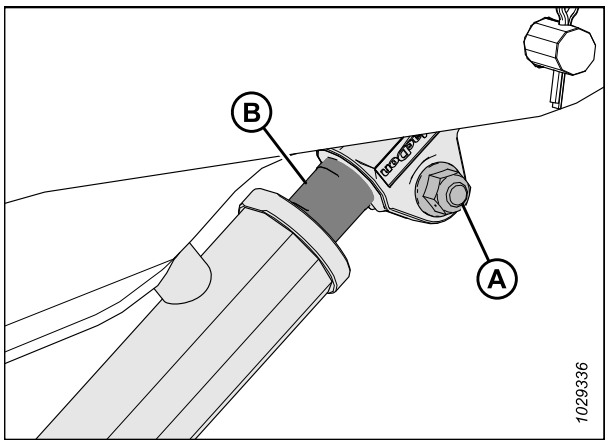


Figure 7.26: Outside Arm Cylinder

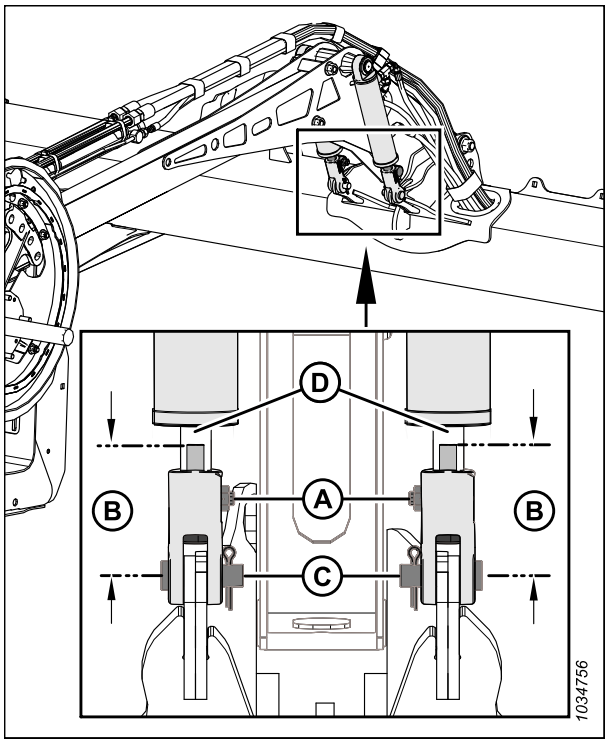


Figure 7.27: Center Arm Cylinders

DANGER

Ensure that all bystanders have cleared the area.

13. Start the engine.
14. Raise the reel fully.
15. Lower the reel fully, and continue holding the control button down to phase the cylinders.
16. Shut down the engine, and remove the key from the ignition.
17. Check the reel-to-cutterbar clearance measurements again. If necessary, repeat the adjustment procedures.
18. Move the reel back to ensure that the steel end fingers do not contact the deflector shields.
19. If the reel fingers contact the deflector shields, adjust the reel upward to maintain the clearance at all reel fore-aft positions. If contact still occurs after the reel is adjusted, trim the steel end fingers as needed.
20. Periodically check for evidence of contact during operation. Adjust the reel-to-cutterbar clearance as needed.

7.10 Guard Identification

There are two different knife guard options available: pointed knife guards and the shorter PlugFree™ (or short) knife guards. Each type of guard has its own checking and adjusting procedures.

The following knife guards and hold-downs are used in pointed guard configurations:

NOTE:

Pointed knife guard configurations require two short knife guards, one at each end of the cutterbar.

NOTE:

A Four-Point Guard kit can be used to replace knife guards. They are ideal for use in rocky conditions, or for harvesting shatter-prone crops such as lentils. Refer to the header parts catalog for more information.

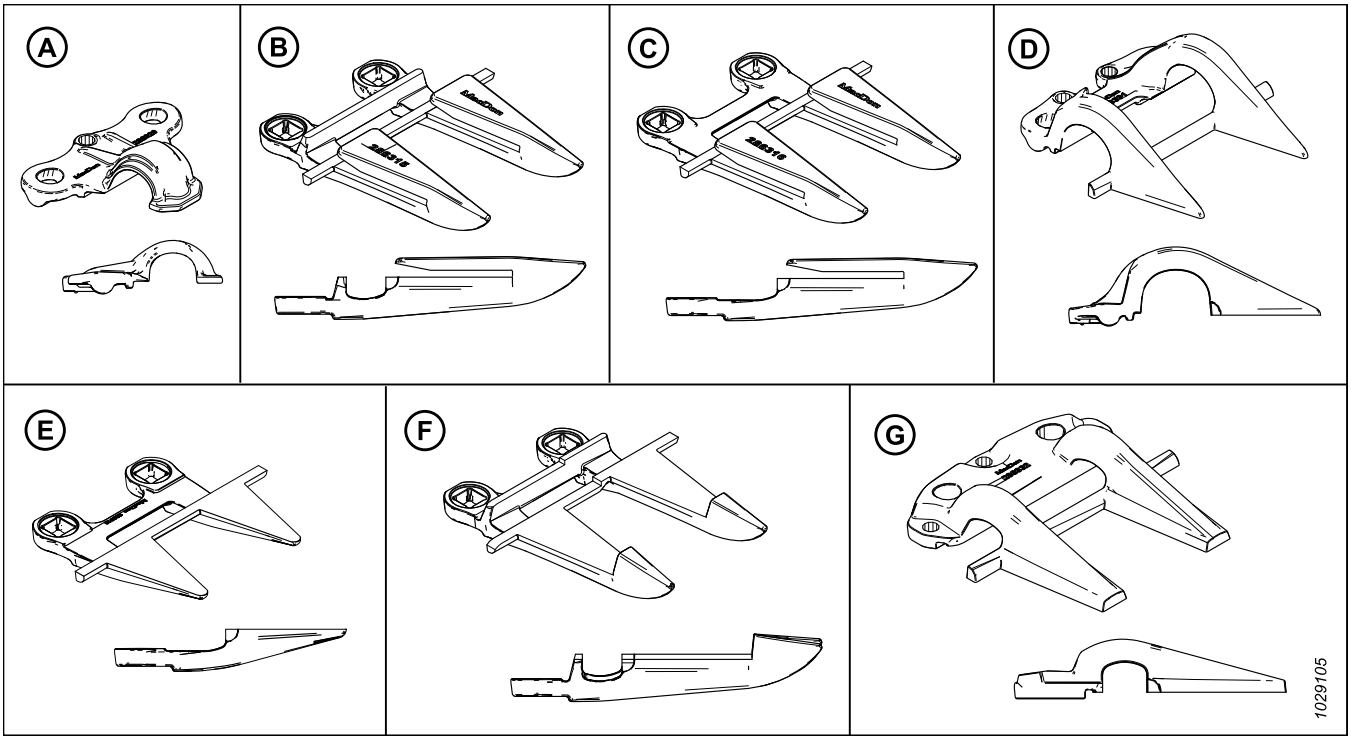


Figure 7.28: Guard and Hold-Down Types Used in Pointed Knife Guard Configurations

A - Pointed Hold-Down (MD #286329)
B - Pointed Knife Guard (MD #286315)
C - Pointed-End Knife Guard (without Wear Bar) (MD #286316)[9]
D - PlugFree™ End Hold-Down (MD #286331)
E - PlugFree™ End Knife Guard (without Wear Bar) (MD #286319)[10]
F - Pointed Center Knife Guard (MD #286317)[11]
G - Pointed Center Hold-Down (MD #286332)[11]

Follow these procedures for checking and adjusting pointed knife guards:

- *7.10.1 Checking Hold-Down – Pointed Knife Guards, page 187*
- *7.10.2 Adjusting Hold-Down – Pointed Knife Guards, page 188*
- *7.10.3 Checking Center Hold-Down – Pointed Knife Guards, page 189*
- *7.10.4 Adjusting Center Hold-Down – Pointed Knife Guards, page 190*

9. Installed in positions 2, 3, and 4 on drive side(s).
10. Installed in position 1 on drive side(s). Single-knife headers use standard guard (MD #286318) on the right end.
11. Double-knife headers only.

The following knife guards and hold-downs are used in short knife guard configurations:

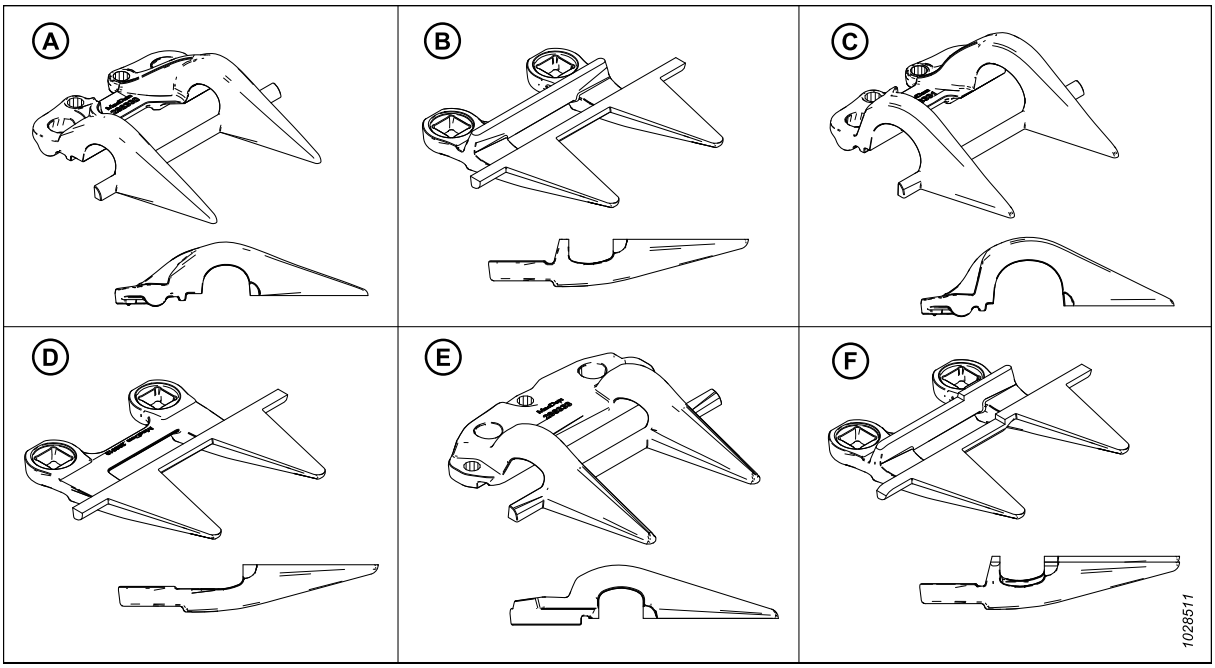


Figure 7.29: Guard and Hold-Down Types used in Short Knife Guard Configurations

A - PlugFree™ Hold-Down (MD #286330)
B - PlugFree™ Knife Guard (MD #286318)
C - PlugFree™ End Hold-Down (MD #286331)[12]
D - PlugFree™ End Knife Guard (without Wear Bar) (MD #286319)[13]
E - PlugFree™ Center Hold-Down (MD #286333)[14]
F - PlugFree™ Center Knife Guard (MD #286320)[14]

Follow these procedures for checking and adjusting short knife guards:

- *7.10.5 Checking Hold-Down – Short Knife Guards, page 191*
- *7.10.6 Adjusting Hold-Down – Short Knife Guards, page 192*
- *7.10.7 Checking Center Hold-Down – Short Knife Guards, page 193*
- *7.10.8 Adjusting Center Hold-Down – Short Knife Guards, page 193*

7.10.1 Checking Hold-Down – Pointed Knife Guards

The pointed knife guard hold-downs prevent the knife sections on the cutterbar from lifting off of the guards, while still allowing the knife to slide. The hold-downs will need to be inspected to ensure that there is adequate clearance between the hold-downs and knife sections.

This procedure is for standard hold-downs. To check the center hold-down on double-knife headers, refer to *7.10.3 Checking Center Hold-Down – Pointed Knife Guards, page 189*.

DANGER

To prevent bodily injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key before leaving the operator's seat, and always engage the safety props before going under the machine for any reason.

12. Installed in positions 1–3 on drive side(s); installed in position 1 at right end of single-knife headers.
13. Installed in positions 1–4 on drive side(s). Single-knife headers use standard guard (MD #286318) on the right end.
14. Double-knife headers only.

WARNING

Wear heavy gloves when working around or handling knives.

1. Start the engine.
2. Raise the reel fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the reel safety props. For instructions, refer to *9.1.1 Engaging Reel Safety Props, page 205*.
5. Open the endshield. For instructions, refer to *9.2.1 Opening Header Endshields, page 208*.
6. Rotate the flywheel attached to the knife drive box to manually stroke the knife to position knife section (A) under hold-down (B).
7. Push down on knife section (A) with approximately 44 N (10 lbf) of force, and use a feeler gauge to measure the clearance between hold-down (B) and the knife section. Ensure the clearance is 0.1–0.5 mm (0.004–0.020 in.).
8. If adjustment is required, refer to *7.10.2 Adjusting Hold-Down – Pointed Knife Guards, page 188*.
9. Close the endshield. For instructions, refer to *9.2.2 Closing Header Endshields, page 209*.

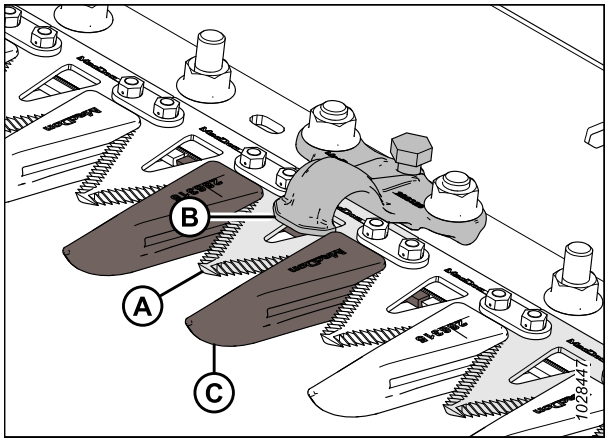


Figure 7.30: Pointed Hold-Down

7.10.2 Adjusting Hold-Down – Pointed Knife Guards

If a pointed knife guard hold-down is binding its knife, the hold-down will need to be adjusted.

This procedure applies to standard hold-down. To adjust the center hold-down on double-knife headers, refer to *7.10.4 Adjusting Center Hold-Down – Pointed Knife Guards, page 190*.

DANGER

To prevent bodily injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key before leaving the operator's seat, and always engage the safety props before going under the machine for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

1. Raise the reel fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the reel safety props. For instructions, refer to *9.1.1 Engaging Reel Safety Props, page 205*.

4. Adjust the hold-down clearance as follows:

   a. To lower the front of hold-down (A) and decrease clearance, turn adjuster bolt (B) clockwise.

   b. To raise the front of hold-down (A) and increase clearance, turn adjuster bolt (B) counterclockwise.

   NOTE:

   For larger adjustments, it may be necessary to loosen nuts (C) before turning adjuster bolt (B). After adjustment, retighten nuts to 85 Nm (63 lbf·ft).

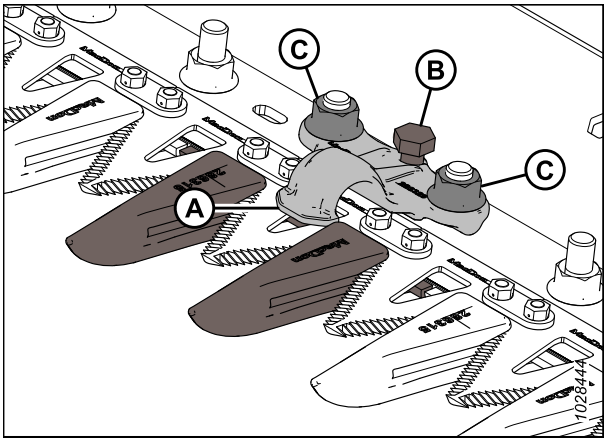


Figure 7.31: Pointed Hold-Down

5. Run the header at low engine speed, and listen for noise caused by insufficient clearance. Readjust as necessary.

   IMPORTANT:

   Insufficient hold-down clearance will result in overheating of the knife and guards.

7.10.3 Checking Center Hold-Down – Pointed Knife Guards

The pointed center knife guard hold-down prevent the center knife section on the cutterbar from lifting off of the guard, while still allowing the knife to slide. The center hold-down will need to be inspected to ensure that there is adequate clearance between the hold-down and the center knife section.

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

1. Raise the reel fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the reel safety props. For instructions, refer to *9.1.1 Engaging Reel Safety Props, page 205*.
4. Open the endshield. For instructions, refer to *9.2.1 Opening Header Endshields, page 208*.

5. Rotate the flywheel attached to the knife drive box to manually stroke the knife fully inboard until the knife sections are under hold-down (A). Repeat this step to move the other knife.
6. Push down on the knife section with approximately 44 N (10 lbf) of force, and use a feeler gauge to measure the clearance between hold-down (A) and the knife section. Ensure the clearance is as follows:
   - At tip (B) of hold-down: 0.1–0.5 mm (0.004–0.020 in.)
   - At rear (C) of hold-down: 0.1–1.0 mm (0.004–0.040 in.)
7. If adjustment is required, refer to *7.10.4 Adjusting Center Hold-Down – Pointed Knife Guards, page 190*.
8. If no adjustment is required, tighten nuts (D) to 85 Nm (63 lbf·ft).
9. Recheck clearance after tightening nuts, and adjust if necessary.
10. Close the endshield. For instructions, refer to *9.2.2 Closing Header Endshields, page 209*.

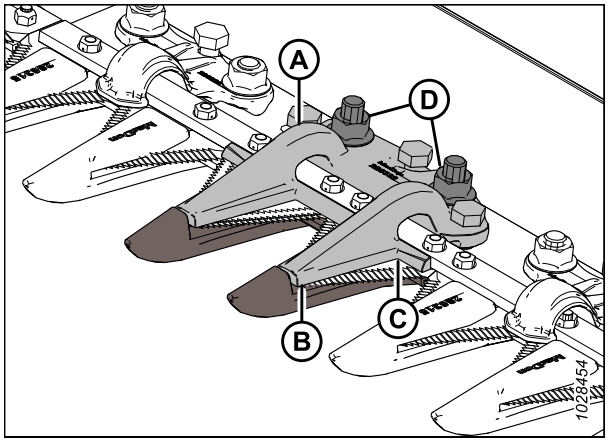


Figure 7.32: Pointed Center Hold-Down

7.10.4 Adjusting Center Hold-Down – Pointed Knife Guards

If the pointed center knife guard hold-down is binding its knife, the center hold-down will need to be adjusted.

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

1. Raise the reel fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the reel safety props. For instructions, refer to *9.1.1 Engaging Reel Safety Props, page 205*.

4. Loosen mounting hardware (B).
5. Turn adjuster bolts (A) as follows:
   - To increase the clearance, turn adjuster bolts (A) clockwise (tighten).
   - To decrease the clearance, turn adjuster bolts (A) counterclockwise (loosen).
6. To adjust clearance at tip only, adjust using only center (rear) adjustment bolt (C).
   - To increase the clearance, turn adjuster bolt (C) counterclockwise (loosen).
   - To decrease the clearance, turn adjuster bolt (C) clockwise (tighten).

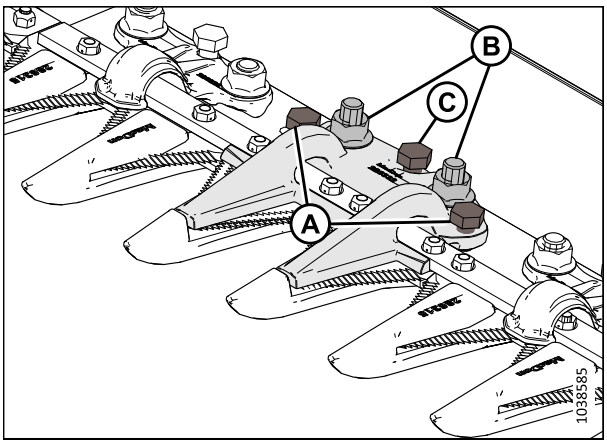


Figure 7.33: Pointed Center Hold-Down

7. Tighten nuts (B) to 85 Nm (63 lbf·ft).
8. Recheck the clearances. Repeat this procedure as needed.
9. Run the header at low engine speed, and listen for noise caused by insufficient clearance.

   IMPORTANT:

   Insufficient hold-down clearance will result in the knife and the guards overheating.

7.10.5 Checking Hold-Down – Short Knife Guards

The short knife guard hold-downs prevent the knife sections on the cutterbar from lifting off of the guards, while still allowing the knife to slide. The hold-downs will need to be inspected to ensure that there is adequate clearance between the hold-downs and knife sections.

To check the center hold-down on double-knife headers, refer to *7.10.7 Checking Center Hold-Down – Short Knife Guards, page 193*.

DANGER

To prevent bodily injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key before leaving the operator's seat, and always engage the safety props before going under the machine for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

1. Raise the reel fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the reel safety props. For instructions, refer to *9.1.1 Engaging Reel Safety Props, page 205*.

4. Manually stroke the knife to position the section under hold-down (A).
5. Push down on knife section with approximately 44 N (10 lbf) of force, and use a feeler gauge to measure the clearance between the tip of hold-down (B) and the knife section. Ensure the clearance is 0.1–0.5 mm (0.004–0.020 in.).
6. If adjustment is required, refer to *7.10.6 Adjusting Hold-Down – Short Knife Guards, page 192*.

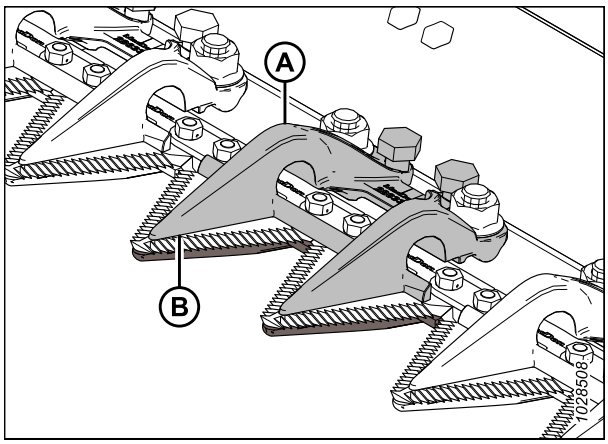


Figure 7.34: Short Knife Guards

7.10.6 Adjusting Hold-Down – Short Knife Guards

If a short knife guard hold-down is binding its knife, the hold-down will need to be adjusted.

To adjust the center hold-down on double-knife headers, refer to *7.10.8 Adjusting Center Hold-Down – Short Knife Guards, page 193*.

DANGER

To prevent bodily injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key before leaving the operator's seat, and always engage the safety props before going under the machine for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

1. Raise the reel fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the reel safety props. For instructions, refer to *9.1.1 Engaging Reel Safety Props, page 205*.
4. Adjust the hold-down clearance as follows:
   a. To decrease the clearance, turn adjuster bolts (A) clockwise.
   b. To increase the clearance, turn adjuster bolts (A) counterclockwise.

      NOTE:

      For larger adjustments, it may be necessary to loosen nuts (B) before turning adjuster bolts (A). After adjustment, retighten nuts to 85 Nm (63 lbf·ft).

   c. Recheck the first point after adjusting the second point, as adjustments to each side can influence the other.
   d. Make further adjustments as necessary.

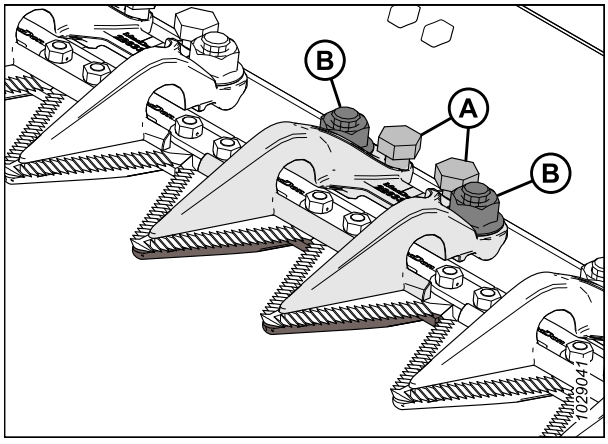


Figure 7.35: Short Knife Guard Hold-Down

5. Recheck clearances, and make further adjustments if necessary.
6. Run the header at low engine speed, and listen for noise caused by insufficient clearance. Readjust as necessary.

   IMPORTANT:

   Insufficient hold-down clearance will result in overheating of the knife and guards.

7.10.7 Checking Center Hold-Down – Short Knife Guards

The short center knife guard hold-down prevent the center knife section on the cutterbar from lifting off of the guard, while still allowing the knife to slide. The center hold-down will need to be inspected to ensure that there is adequate clearance between the hold-down and the center knife section.

DANGER

To prevent bodily injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key before leaving the operator's seat, and always engage the safety props before going under the machine for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

1. Raise the reel fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the reel safety props. For instructions, refer to *9.1.1 Engaging Reel Safety Props, page 205*.
4. Manually stroke both knives to their inboard end so that the knife sections are under hold-down (A).
5. Push down on the knife section with approximately 44 N (10 lbf) of force. Use a feeler gauge to measure the clearance between hold-down (A) and the knife section. Ensure that the clearance is as follows:
   - At tip (B) of hold-down: 0.1–0.5 mm (0.004–0.020 in.)
   - At rear (C) of hold-down: 0.1–1.0 mm (0.004–0.040 in.)
6. If adjustment is required, refer to *7.10.8 Adjusting Center Hold-Down – Short Knife Guards, page 193*.
7. If no adjustment is required, tighten nuts (D) to 85 Nm (63 lbf·ft).
8. Recheck the clearances. Repeat this procedure as needed.

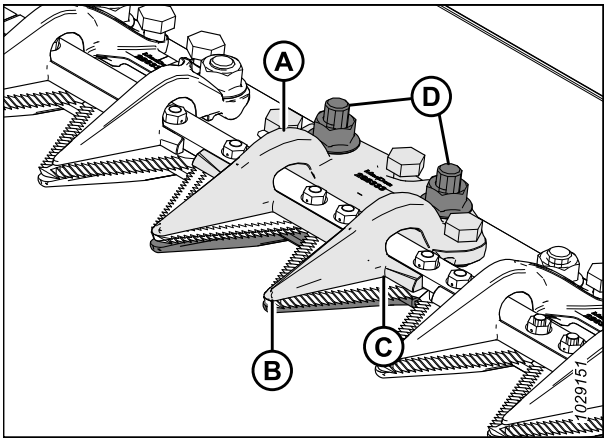


Figure 7.36: Center Knife Guard Hold-Down

7.10.8 Adjusting Center Hold-Down – Short Knife Guards

If a short knife guard hold-down is binding its knife, the hold-down will need to be adjusted.

DANGER

To prevent bodily injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key before leaving the operator's seat, and always engage the safety props before going under the machine for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

1. Raise the reel fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the reel safety props. For instructions, refer to *9.1.1 Engaging Reel Safety Props, page 205*.
4. Loosen mounting hardware (B).
5. Turn adjuster bolts (A) as follows:
   - To increase the clearance, turn adjuster bolts (A) clockwise (tighten).
   - To decrease the clearance, turn adjuster bolts (A) counterclockwise (loosen).
6. To adjust the clearance at the tip of the knife, turn adjustment bolt (C) as follows:
   - To increase the clearance, turn adjuster bolt (C) counterclockwise (loosen).
   - To decrease the clearance, turn adjuster bolt (C) clockwise (tighten).
7. Tighten nuts (B) to 85 Nm (63 lbf·ft).
8. Run the header at low engine speed, listening for noise caused by insufficient clearance. Readjust the knives as necessary.

   IMPORTANT:

   Insufficient hold-down clearance will result in the knife and guards overheating.

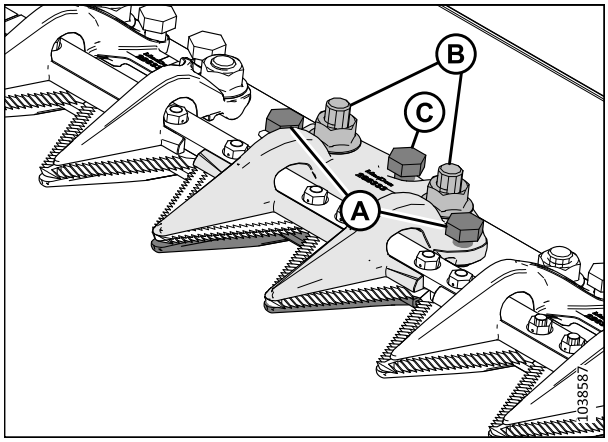


Figure 7.37: Center Hold-Down

7.11 Checking and Adjusting Header Endshields

Header endshields are subject to expansion or contraction caused by large temperature variations. The position of the header endshield can be adjusted to compensate for dimensional changes.

IMPORTANT:

The aluminum endsheet will be damaged if the weight of the plastic header endshield rests on it.

1. Measure clearance (A) between header endshield (B) and endsheet (C). The clearance should be 1–3 mm (0.04–0.12 in.).

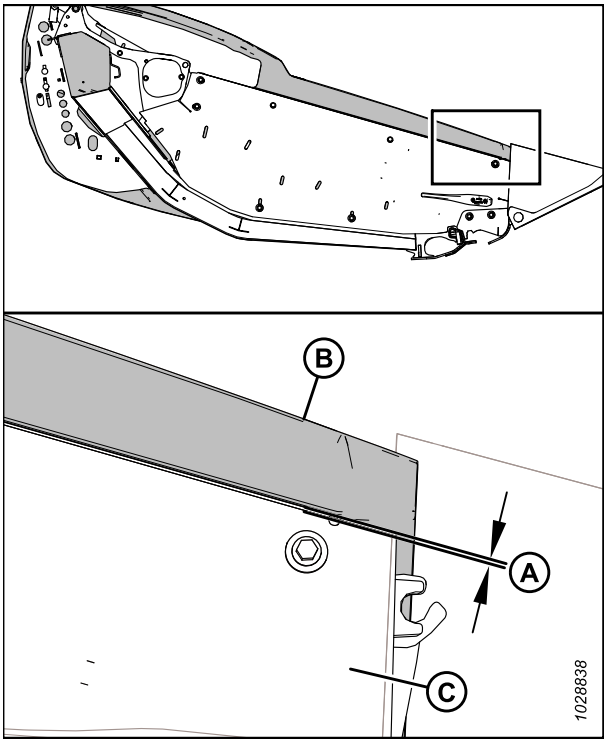


Figure 7.38: Clearance between Header Endshield and Endsheet

2. If the clearance between the header endshield and the endshield is insufficient, adjust support bracket (A) as follows:
   a. Loosen bolts (B).
   b. Move support bracket (A) up or down as needed.
   c. Retighten the hardware.

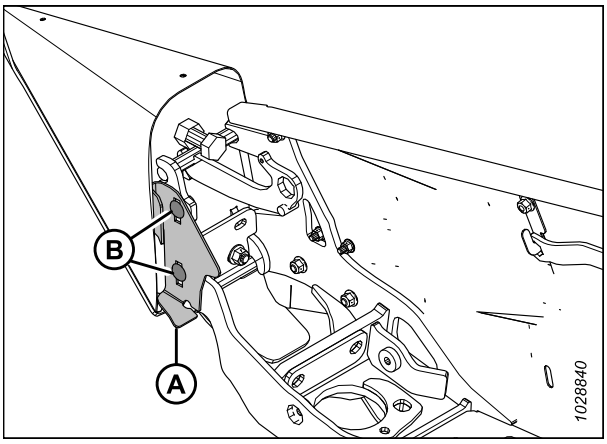


Figure 7.39: Header Endshield Support Bracket

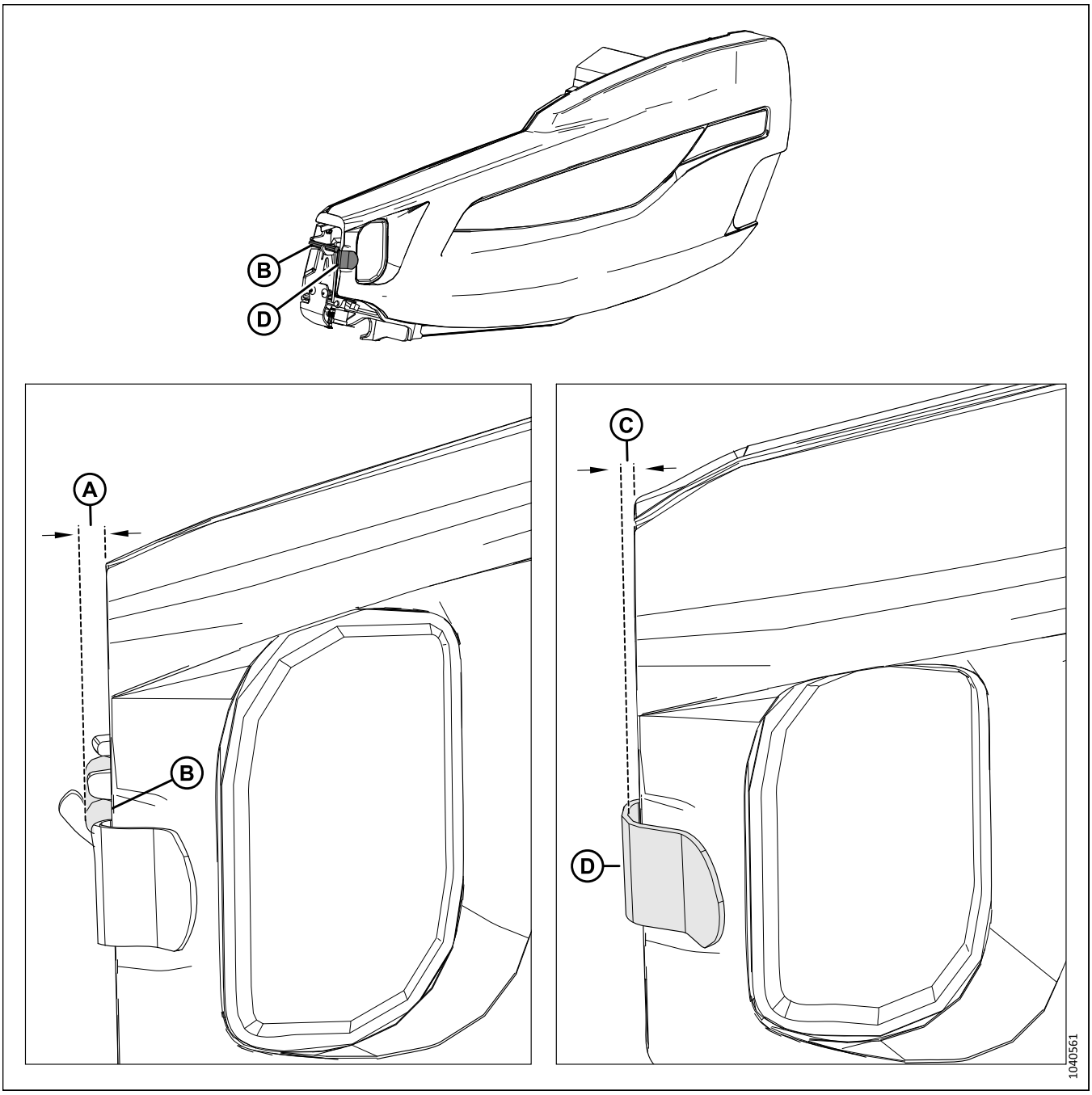


Figure 7.40: Clearance Specifications at the Front of the Endshield

3. Measure clearance (A) between the front of the header endshield and cylindrical weldment (B). The clearance should be 8–18 mm (0.3–0.7 in).

4. Measure clearance (C) between the front of the header endshield and support bracket (D). The clearance should be 6–10 mm (0.24–0.39 in).

5. If the clearances at the front of the endshield are insufficient, adjust the position of hinge arm (A) as follows:
   a. Loosen four nuts (B).
   b. Slide brackets (C) and hinge arm (A) fore or aft as required to achieve the correct clearance.
   c. Retighten the hardware.

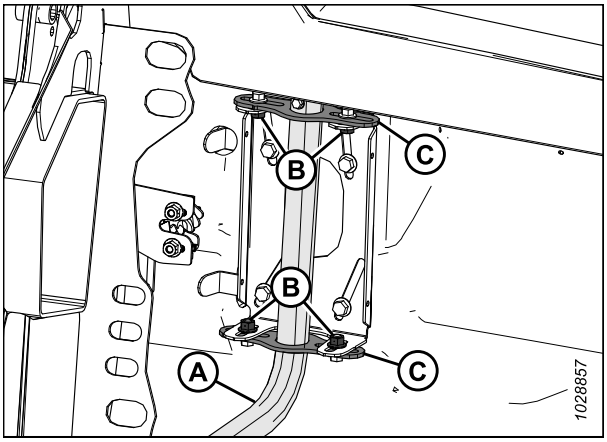


Figure 7.41: Left Header Endshield

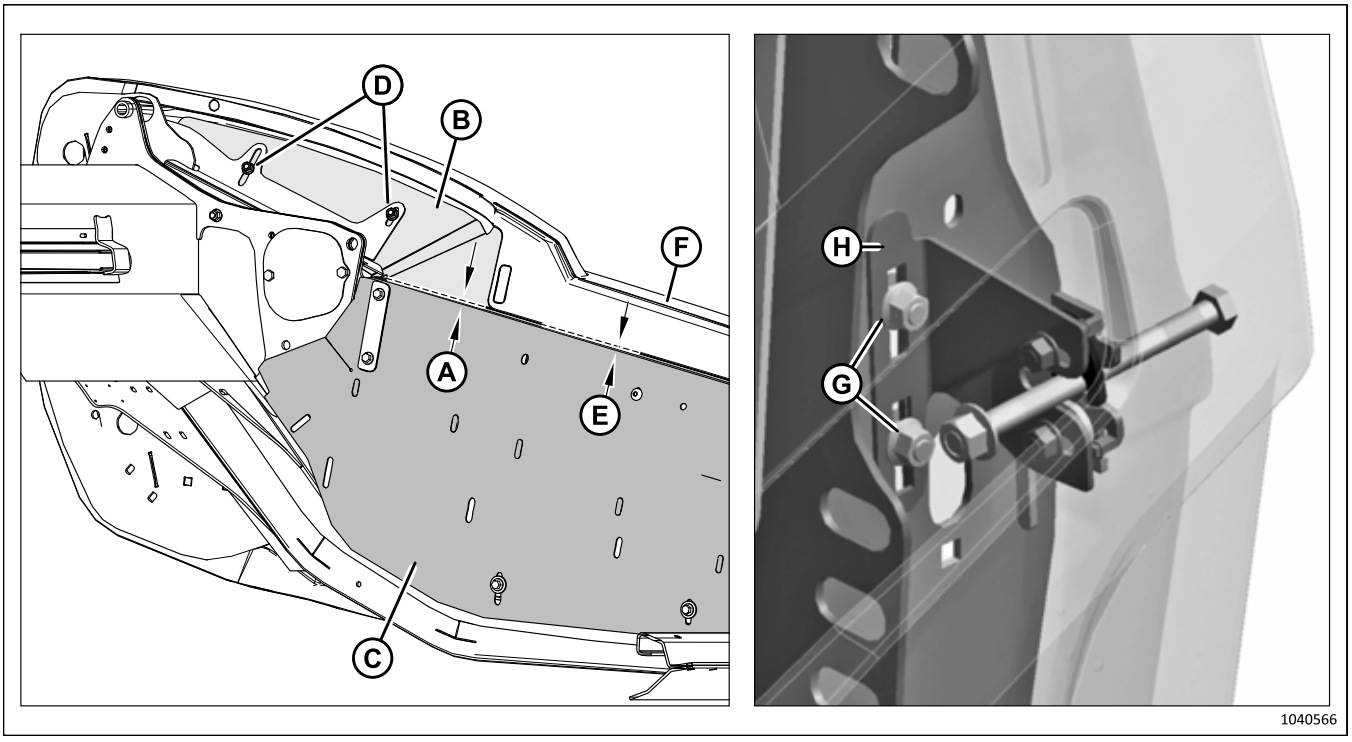


Figure 7.42: Clearance Specification between Neck Shield and Panel

6. Measure clearance (A) between neck shield (B) and panel (C). The clearance must be at least 3 mm (0.12 in.). To adjust the clearance, loosen two nuts (D), move neck panel (B), and tighten nuts (D).

7. Measure clearance (E) between panel (C) and endshield (F). The clearance must be 1–3 mm (0.04–0.12 in.). To adjust the clearance, loosen two nuts (G), slide bracket (H) up or down, and re-tighten the nuts. Make sure the endshield does **NOT** rest on neck panel (B).

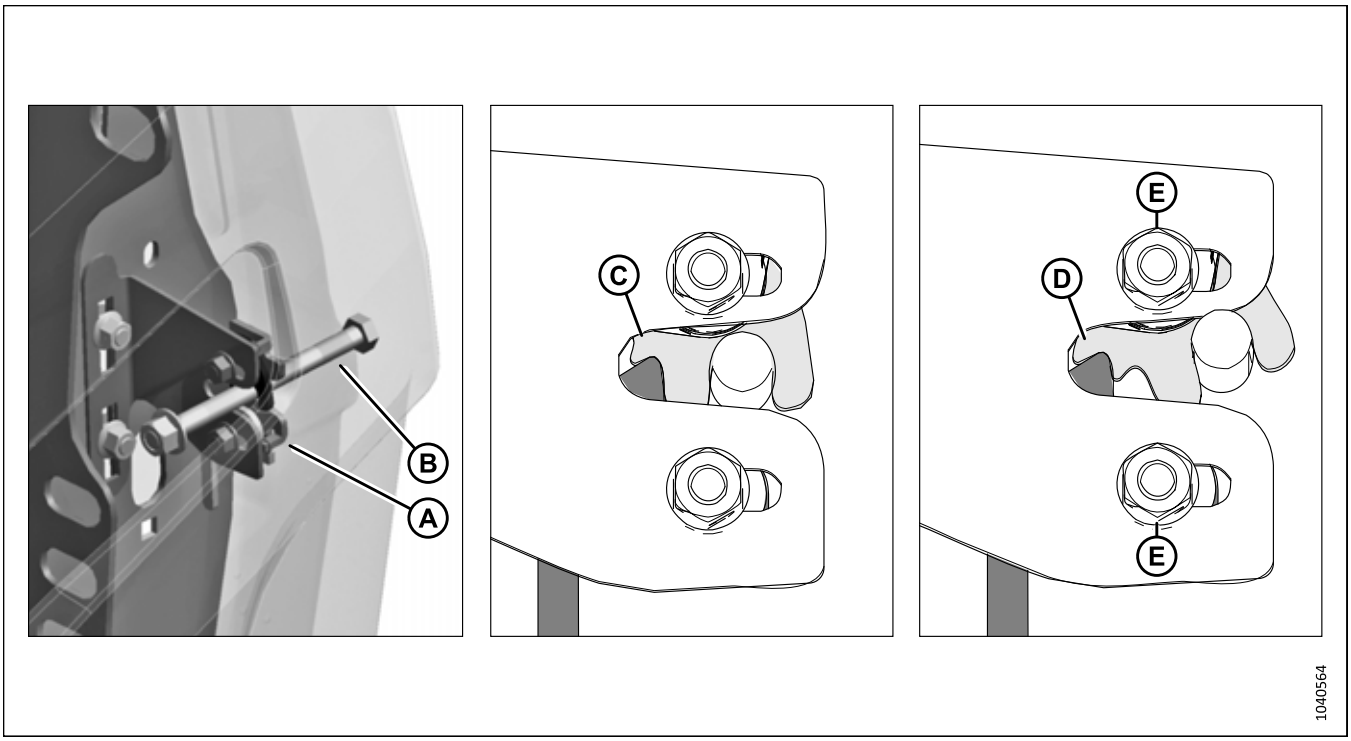


Figure 7.43: Two-Stage Latch

8. When the endshield is closed, two-stage latch (A) must engage first catch (C). This will allow second catch (D) to prevent the endshield from opening completely in case the endshield unlatches by accident. Confirm the endshield latches properly by following Step *9, page 198* to Step *11, page 198*.

9. Close the endshield. Confirm bolt (B) engages latch (A).

10. Release the latch.

11. Try to open the endshield.

    - If you can open the endshield partially, but **NOT** completely, then the latch is positioned properly. No further adjustment is necessary.
    - If you can open the endshield completely, then loosen two nuts (E), move the latch along the slotted holes, and then re-tighten the nuts. Repeat Step *9, page 198* to Step *11, page 198*.

7.12 Checking Manuals

Check the manual case contents. On D215, D220, and D225 Draper Headers, the manual storage case is located at the rear of the header, inboard of the left endsheet. On the larger draper headers, the manual storage case is located at the rear of the header, outboard of the right outer leg.

1. Remove the cable tie on manual case (A).
2. Confirm that the case contains the following manuals:
   - D2 Series Draper Header for Windrowers Operator's Manual
   - D2 Series Draper Header for Windrowers Quick Card
   - D2 Series Draper Header for Windrowers Parts Catalog
3. Close the manual storage case.

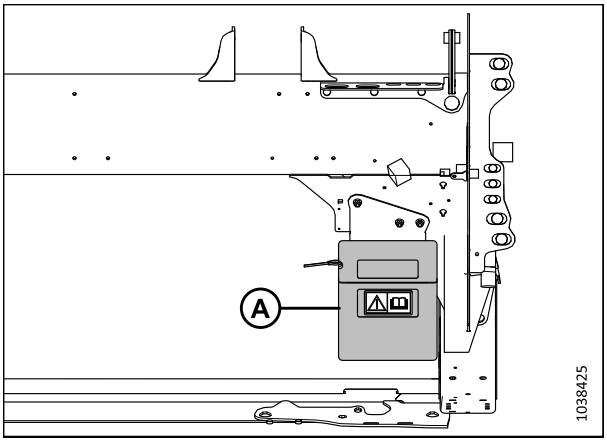


Figure 7.44: Manual Case – D215, D220, and D225

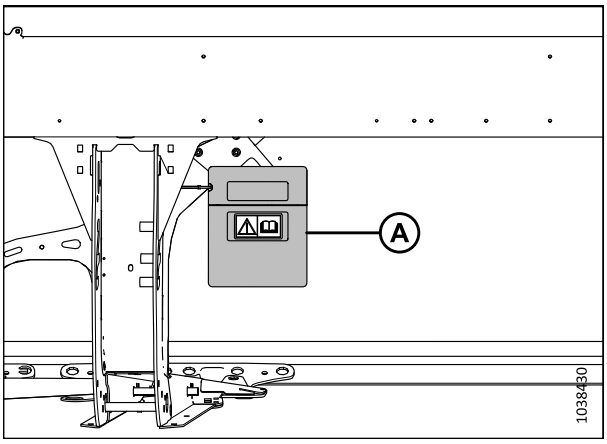


Figure 7.45: Manual Case – D230, D235, D241

Chapter 8: Running up Header

The header must be run up before it is delivered to the customer, to ensure that all its features are functional.

DANGER

To prevent bodily injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key before leaving the operator's seat, and always engage the safety props before going under the machine for any reason.

DANGER

Ensure that all bystanders have cleared the area.

1. Start the engine. For instructions, refer to the windrower operator's manual.
2. **M1 Series Only:** Calibrate the knife drive. For instructions, refer to the windrower operators manual.
3. **M and M1 Series:** Calibrate the header position sensors. For instructions, refer to the windrower operators manual.
4. Engage the header and let it run at low speed for 5 minutes while watching and listening **FROM THE OPERATOR'S SEAT** for binding or interfering parts.

   NOTE:

   The reel and side drapers will not operate until oil flow fills the lines.
5. Run the machine at operating speed for an additional 15 minutes while watching and listening **FROM THE OPERATOR'S SEAT** for any unusual sounds or abnormal vibration.
6. Shut down the engine, and remove the key from the ignition.
7. Perform run-up check as listed on *Predelivery Checklist, page 223* (yellow sheet attached to this instruction) to ensure the machine is field-ready.

8.1 Post Run-Up Adjustments

After the header has been run up for the first time, a few adjustments will need to be made.

Perform the post run-up checks listed in the Predelivery Checklist (the yellow sheet attached to this instruction) to ensure machine is field-ready.

8.1.1 Adjusting Draper Tracking

To ensure that the side drapers rotate smoothly without rubbing the side of the header frame, the side draper tracking may need to be adjusted.

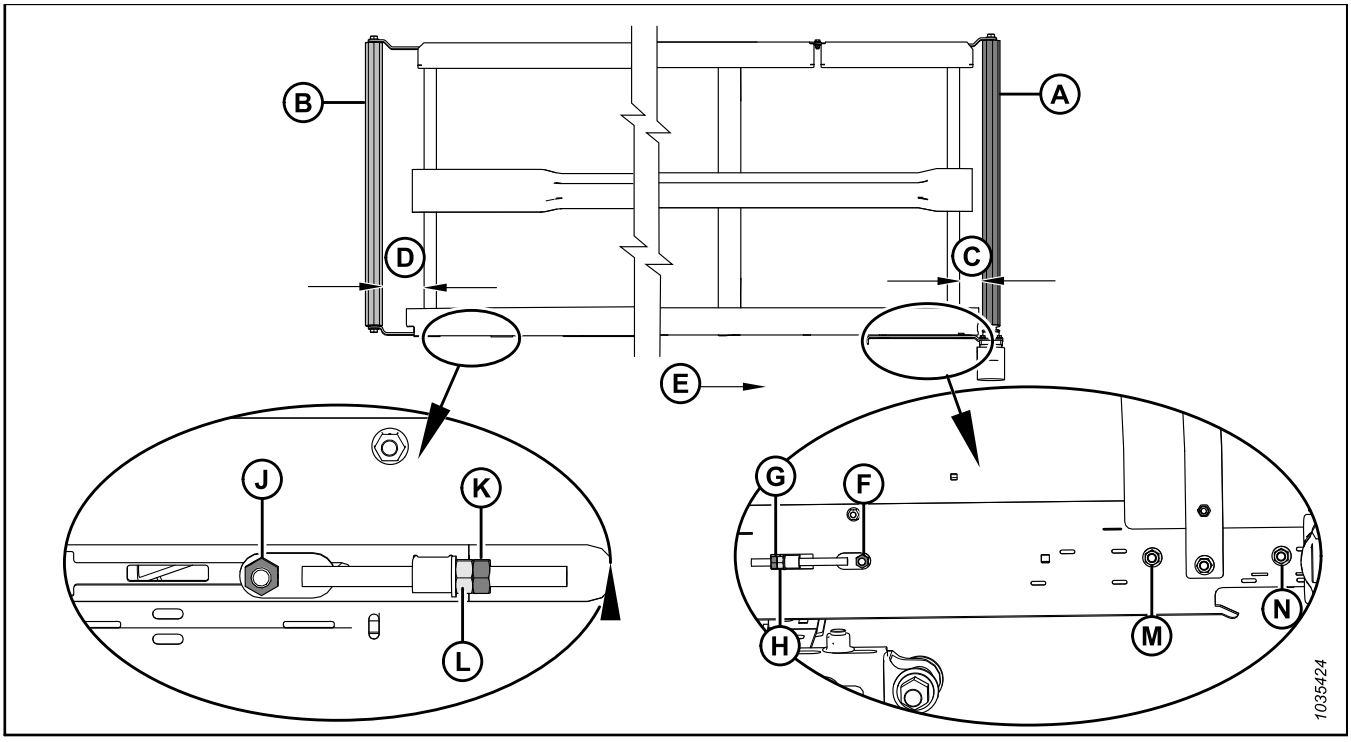


Figure 8.1: Draper Tracking Adjustments – Left Draper

A - Drive Roller
B - Idler Roller
C - Drive Roller Adjust
D - Idler Roller Adjust
E - Draper Direction
F - Nut on Drive Roller Side
G - Jam Nut for Drive Roller
H - Adjuster Nut for Drive Roller
J - Nut on Idler Roller Side
K - Jam Nut for Idler Roller
L - Adjuster Nut for Idler Roller
M - Nut on Drive Roller Side
N - Nut on Drive Roller Side

1. To determine which roller requires adjustment and which adjustments are necessary, refer to the following table:

Table 8.1 Draper Tracking

Tracking Tendency	Location	Adjustment	Method
Toward backsheet	Drive roller	Increase **C**	Tighten adjuster nut (H)
Toward cutterbar	Drive roller	Decrease **C**	Loosen adjuster nut (H)
Toward backsheet	Idler roller	Increase **D**	Tighten adjuster nut (L)
Toward cutterbar	Idler roller	Decrease **D**	Loosen adjuster nut (L)

2. Adjust drive roller (A) to change **C** (refer to Table *8.1, page 202* and Figure *8.1, page 202*) as follows:
   a. Loosen nuts (F), (M), and (N), and jam nut (G).
   b. Turn adjuster nut (H).
   c. Tighten nuts (F), (M), and (N), and jam nut (G).
3. Adjust idler roller (B) to change **D** (refer to Table *8.1, page 202* and Figure *8.1, page 202*) as follows:
   a. Loosen nut (J) and jam nut (K).
   b. Turn adjuster nut (L).

   NOTE:

   If the draper does not track at the idler roller end after the idler roller has been adjusted, the drive roller is likely not in line with the deck. Adjust the drive roller, and then readjust the idler roller.

   c. Tighten nut (J) and jam nut (K).

8.1.2 Checking Knife Position

The clearance between the knifehead and drive arm will need to be inspected.

DANGER

To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

1. Shut down the engine, and remove the key from the ignition.
2. Check the guards for signs of heating during run-up due to insufficient clearance between the guard and the knife.
3. Check clearance (C) between knifehead (A) and drive arm (B). There should be 0.2–1.2 mm (0.007–0.047 in.) of clearance.

   IMPORTANT:

   Overgreasing can cause the knife to bend and make contact with the guards closest to the knifehead. Check for signs of excessive heating on first few guards after greasing. If necessary, relieve some of the pressure by pressing the check-ball in the grease fitting, or by removing the grease fitting.
4. If the drive arm needs adjustment, refer to the header's technical manual for instructions.

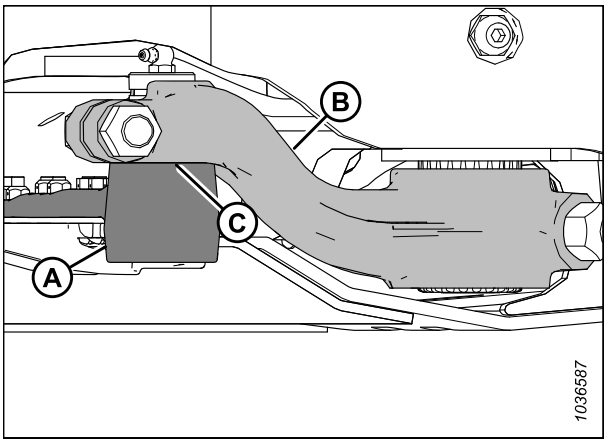


Figure 8.2: Knifehead and Drive Arm

Chapter 9: Reference

The procedures and information in this chapter can be referred to as needed.

9.1 Reel Safety Props

The reel safety props are located on the reel arms. When engaged, the reel safety props prevent the reel from falling unexpectedly.

IMPORTANT:

To prevent damage to the reel support arms, do **NOT** transport the header with the reel safety props engaged.

9.1.1 Engaging Reel Safety Props

Engage the reel safety props anytime you need to work around a raised reel. When engaged the reel safety props prevent the reel from unexpectedly lowering.

DANGER

To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

1. Shut down the engine, and remove the key from the ignition.

Outer reel arms

2. Raise the reel to its maximum height.
3. Lift up on safety prop (A) and push it forward to remove the prop from hook (B).

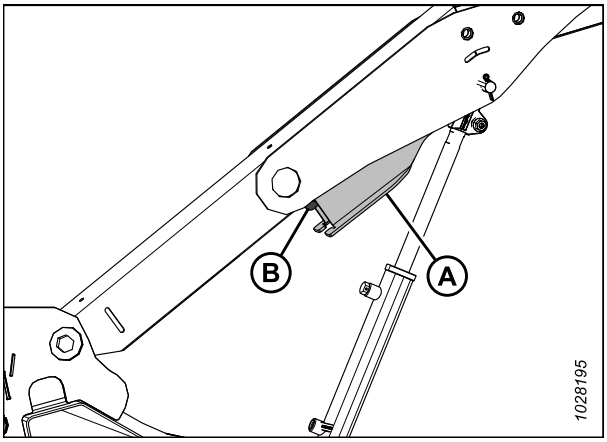


Figure 9.1: Outer Right Arm

4. Lower safety prop (A) and engage it on the cylinder shaft as shown. Repeat on the opposite arm.

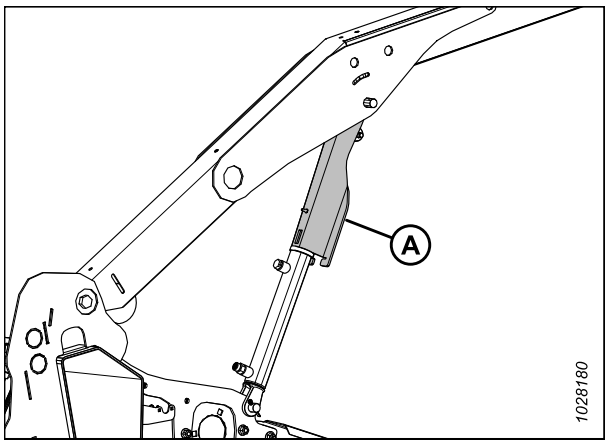


Figure 9.2: Engaged Reel Safety Prop – Outer Right Arm

Center reel arm – double- and triple-reel headers

5. Rotate handle (A) to release the spring tension and allow the spring to guide the pin into the locked position.
6. Lower the reel until the safety props contact the outer arm cylinder mounts and the center arm pins.

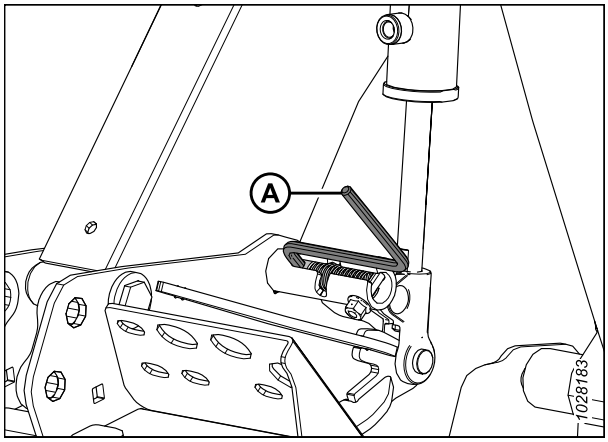


Figure 9.3: Engaged Reel Safety Prop – Center Arm

9.1.2 Disengaging Reel Safety Props

To ensure the proper operation of the reel and header, disengage the reel safety props once you have completed working on or around a raised reel.

DANGER

To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

1. Shut down the engine, and remove the key from the ignition.

Outer reel arms

2. Raise the reel to its maximum height.

3. Move reel safety prop (A) up onto hook (B) under the reel arm. Repeat this step on the opposite reel arm.

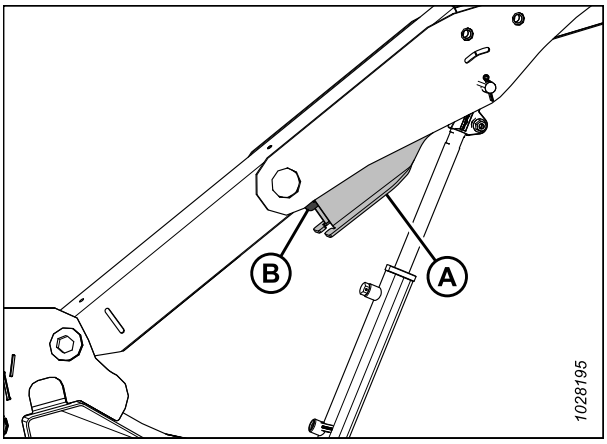


Figure 9.4: Reel Safety Prop – Right Outer Arm

Center reel arm – double- and triple-reel headers

4. Move handle (A) outboard and into slot (B) to put the pin into the unlocked position.

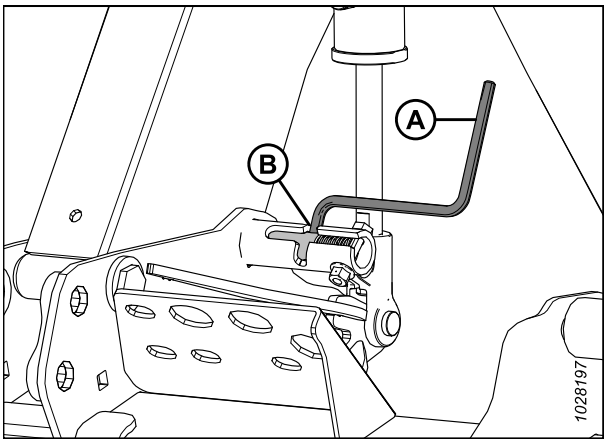


Figure 9.5: Reel Safety Prop – Center Arm

9.2 Header Endshields

A hinged, polyethylene endshield is fitted on each end of the header to protect critical drive components.

9.2.1 Opening Header Endshields

The header endshields covers knife drive components, hydraulic hoses, electrical connections, the header wrench, the spare knife, and the optional transport hitch. To access the components you will need to open the endshield.

1. Push release lever (B) using access hole (A) on the backside of the header endshield to unlock the shield.

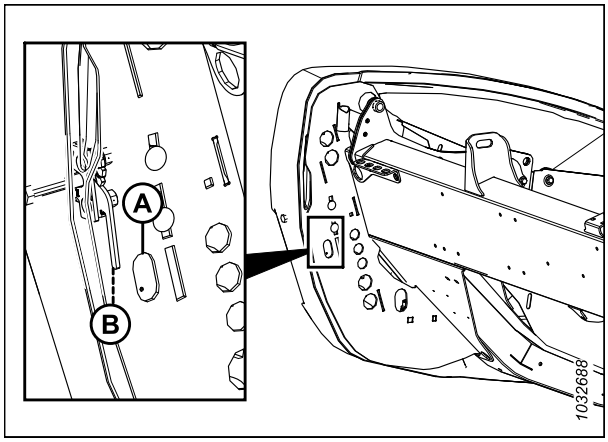


Figure 9.6: Left Header Endshield

2. Pull header endshield (A) open.

   NOTE:

   The header endshield is retained by tab (B) and will open in direction (C).

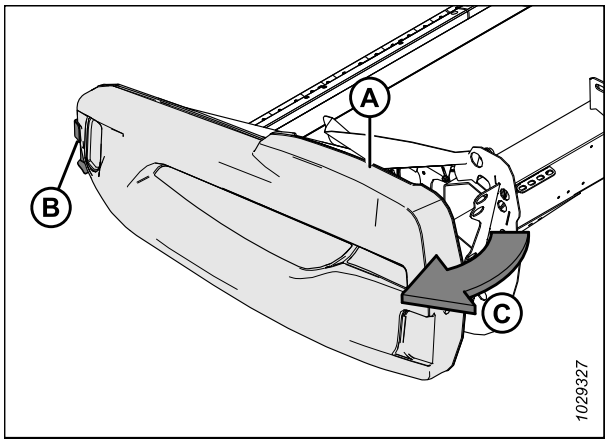


Figure 9.7: Left Header Endshield

3. If additional clearance is required, pull the header endshield free of tab (A) and then swing the shield toward the rear of the header.
4. Engage safety latch (B) on hinge arm (C) to secure the shield in the fully open position.

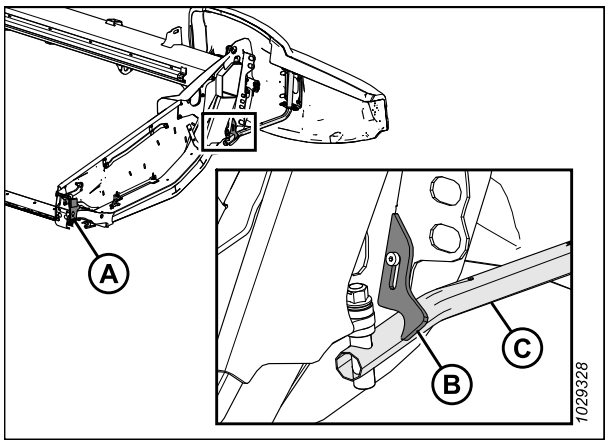


Figure 9.8: Left Header Endshield

9.2.2 Closing Header Endshields

The header endshields covers knife drive components, hydraulic hoses, electrical connections, the header wrench, the spare knife, and the optional transport hitch. After accessing the components you will need to close the endshield.

1. If the endshield is fully opened and secured behind the header, disengage lock (A) to allow header endshield (B) to move.
2. Rotate the header endshield toward the front of the header.

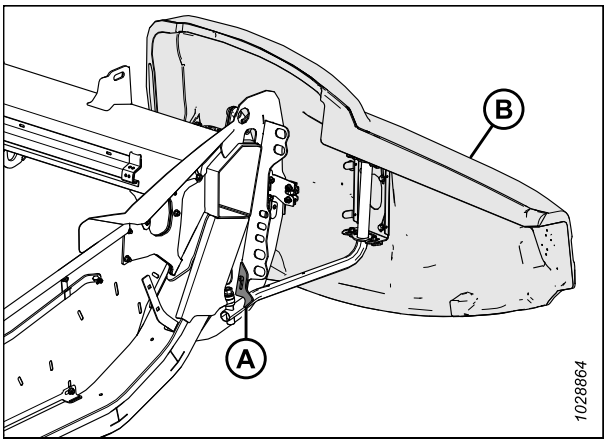


Figure 9.9: Left Header Endshield

3. While closing the endshield, ensure header endshield (A) does not contact the top of endsheet (B).

   IMPORTANT:

   The aluminum endsheet will be damaged if the weight of the plastic endshield rests on it.

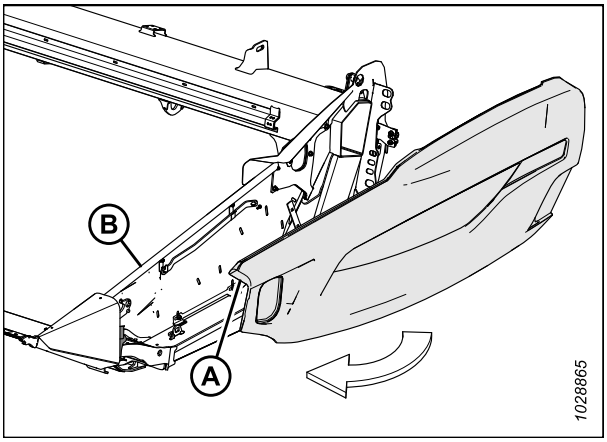


Figure 9.10: Left Header Endshield

4. Insert the front of the header endshield behind hinge tab (B) and into the divider cone.
5. Swing the header endshield in direction (A) into the closed position. Engage two-stage latch (C) with a firm push.

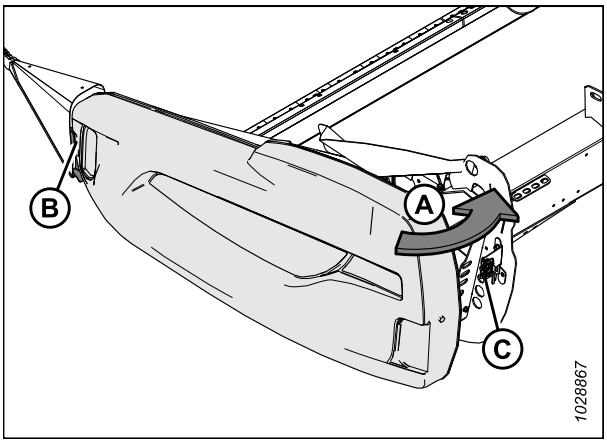


Figure 9.11: Left Header Endshield

IMPORTANT:

Check that the header endshield is locked. Ensure bolt (A) is fully engaged on two-stage latch (B) to prevent the header endshield from opening while operating the header.

NOTE:

The header endshield is transparent in the illustration to show the latch.

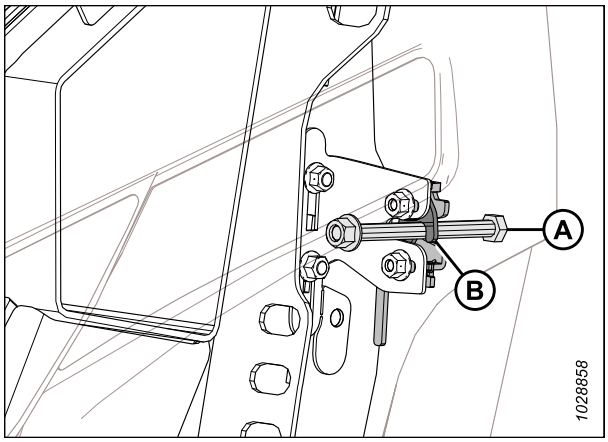


Figure 9.12: Two-Stage Latch

9.3 Torque Specifications

The following tables provide torque values for various bolts, cap screws, and hydraulic fittings. Refer to these values only when no other torque value has been specified in a given procedure.

- Tighten all bolts to the torque values specified in the charts below, unless you are directed otherwise in this manual.
- Replace removed hardware with hardware of the same strength and grade.
- Refer to the torque value tables as a guide when periodically checking the tightness of bolts.
- Understand the torque categories for bolts and cap screws by reading the markings on their heads.

Jam nuts

Jam nuts require less torque than nuts used for other purposes. When applying torque to finished jam nuts, multiply the torque applied to regular nuts by 0.65 to obtain the modified torque value.

Self-tapping screws

Refer to the standard torque values when installing the self-tapping screws. Do **NOT** install the self-tapping screws on structural or otherwise critical joints.

9.3.1 Metric Bolt Specifications

Specifications are provided for the appropriate final torque values to secure various sizes of metric bolts.

NOTE:

The torque values provided in the following metric bolt torque tables apply to hardware installed dry; that is, hardware with no grease, oil, or threadlocker on the threads or heads. Do **NOT** add grease, oil, or threadlocker to bolts or cap screws unless you are directed to do so in this manual.

Table 9.1 Metric Class 8.8 Bolts and Class 9 Free Spinning Nut

Nominal Size (A)	Torque (Nm)		Torque (lbf·ft) (*lbf·in)	
	Min.	Max.	Min.	Max.
3-0.5	1.4	1.6	*13	*14
3.5-0.6	2.2	2.5	*20	*22
4-0.7	3.3	3.7	*29	*32
5-0.8	6.7	7.4	*59	*66
6-1.0	11.4	12.6	*101	*112
8-1.25	28	30	20	23
10-1.5	55	60	40	45
12-1.75	95	105	70	78
14-2.0	152	168	113	124
16-2.0	236	261	175	193
20-2.5	460	509	341	377
24-3.0	796	879	589	651

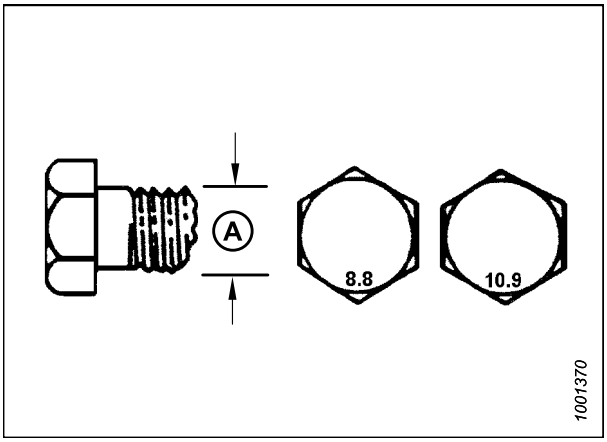


Figure 9.13: Bolt Grades

Table 9.2 Metric Class 8.8 Bolts and Class 9 Distorted Thread Nut

Nominal Size (A)	Torque (Nm)		Torque (lbf·ft) (*lbf·in)	
	Min.	Max.	Min.	Max.
3-0.5	1	1.1	*9	*10
3.5-0.6	1.5	1.7	*14	*15
4-0.7	2.3	2.5	*20	*22
5-0.8	4.5	5	*40	*45
6-1.0	7.7	8.6	*69	*76
8-1.25	18.8	20.8	*167	*185
10-1.5	37	41	28	30
12-1.75	65	72	48	53
14-2.0	104	115	77	85
16-2.0	161	178	119	132
20-2.5	314	347	233	257
24-3.0	543	600	402	444

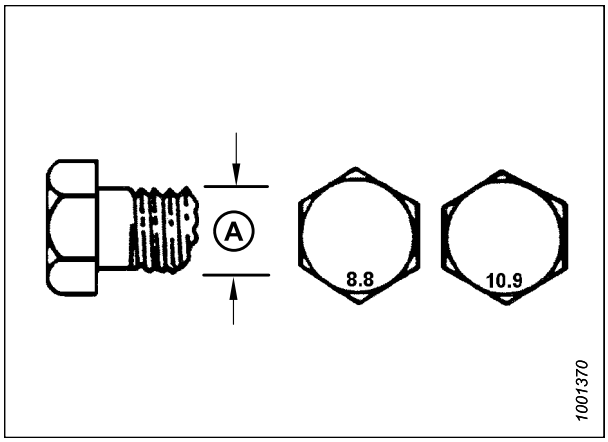


Figure 9.14: Bolt Grades

Table 9.3 Metric Class 10.9 Bolts and Class 10 Free Spinning Nut

Nominal Size (A)	Torque (Nm)		Torque (lbf·ft) (*lbf·in)	
	Min.	Max.	Min.	Max.
3-0.5	1.8	2	*18	*19
3.5-0.6	2.8	3.1	*27	*30
4-0.7	4.2	4.6	*41	*45
5-0.8	8.4	9.3	*82	*91
6-1.0	14.3	15.8	*140	*154
8-1.25	38	42	28	31
10-1.5	75	83	56	62
12-1.75	132	145	97	108
14-2.0	210	232	156	172
16-2.0	326	360	242	267
20-2.5	637	704	472	521
24-3.0	1101	1217	815	901

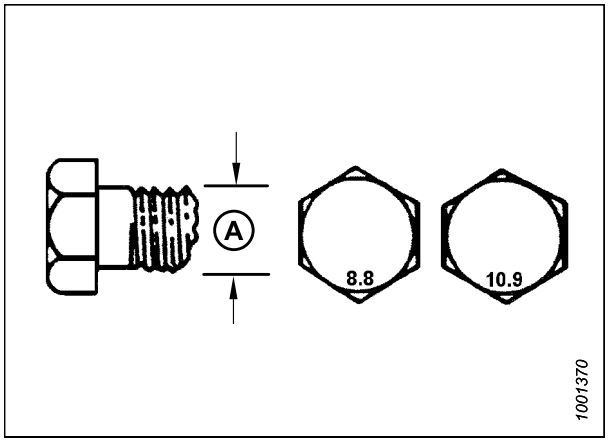


Figure 9.15: Bolt Grades

Table 9.4 Metric Class 10.9 Bolts and Class 10 Distorted Thread Nut

Nominal Size (A)	Torque (Nm)		Torque (lbf·ft) (*lbf·in)	
	Min.	Max.	Min.	Max.
3-0.5	1.3	1.5	*12	*13
3.5-0.6	2.1	2.3	*19	*21
4-0.7	3.1	3.4	*28	*31
5-0.8	6.3	7	*56	*62
6-1.0	10.7	11.8	*95	*105
8-1.25	26	29	19	21
10-1.5	51	57	38	42
12-1.75	90	99	66	73
14-2.0	143	158	106	117
16-2.0	222	246	165	182
20-2.5	434	480	322	356
24-3.0	750	829	556	614

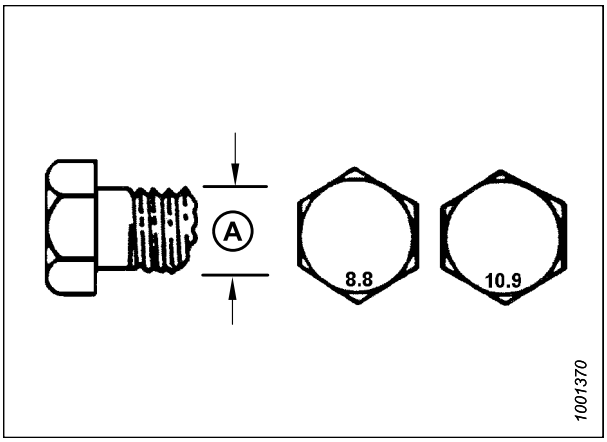


Figure 9.16: Bolt Grades

9.3.2 Metric Bolt Specifications – Cast Aluminum

Specifications are provided for the appropriate final torque values for various sizes of metric bolts in cast aluminum.

NOTE:

The torque values provided in the following metric bolt torque tables apply to hardware installed dry; that is, hardware with no grease, oil, or threadlocker on the threads or heads. Do **NOT** add grease, oil, or threadlocker to bolts or cap screws unless you are directed to do so in this manual.

Table 9.5 Metric Bolt Bolting into Cast Aluminum

Nominal Size (A)	Bolt Torque			
	8.8 (Cast Aluminum)		10.9 (Cast Aluminum)	
	Nm	lbf·ft	Nm	lbf·ft
M3	–	–	–	1
M4	–	–	4	2.6
M5	–	–	8	5.5
M6	9	6	12	9
M8	20	14	28	20
M10	40	28	55	40
M12	70	52	100	73
M14	–	–	–	–
M16	–	–	–	–

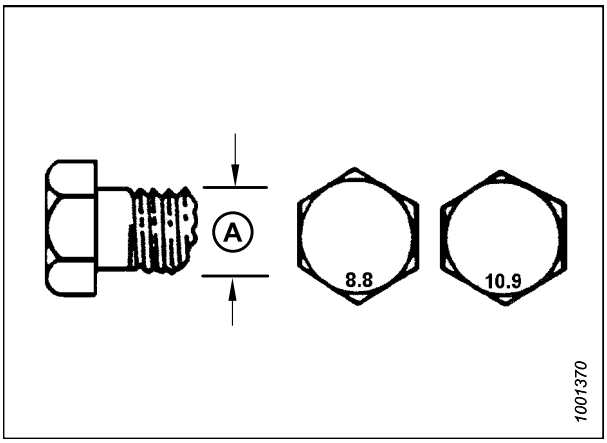


Figure 9.17: Bolt Grades

9.3.3 O-Ring Boss Hydraulic Fittings – Adjustable

The standard torque values are provided for adjustable hydraulic fittings. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, refer to the value specified in the procedure instead.

1. Inspect O-ring (A) and seat (B) for dirt or defects.
2. Back off lock nut (C) as far as possible. Ensure that washer (D) is loose and is pushed toward lock nut (C) as far as possible.
3. Ensure that O-ring (A) is **NOT** on the threads. Adjust O-ring (A) if necessary.
4. Apply hydraulic system oil to O-ring (A).

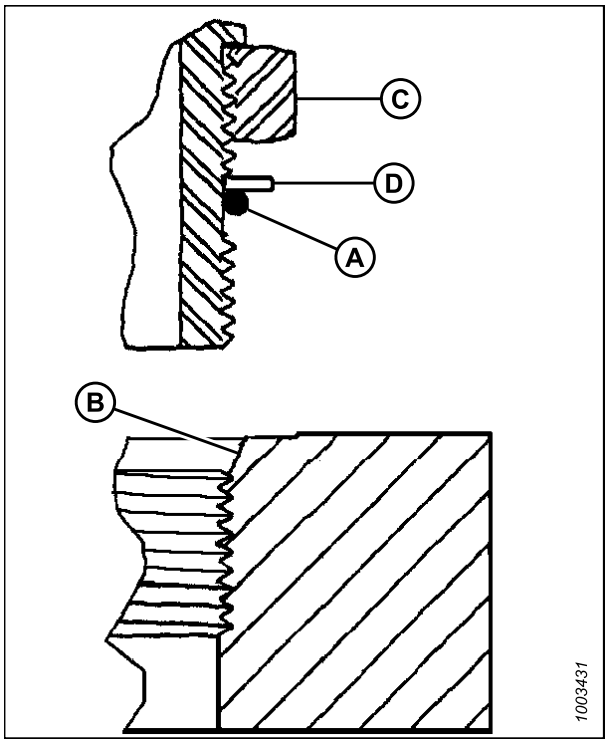


Figure 9.18: Hydraulic Fitting

5. Install fitting (B) into the port until backup washer (D) and O-ring (A) contact part face (E).
6. Position the angle fittings by unscrewing no more than one turn.
7. Turn lock nut (C) down to washer (D) and tighten it to the torque value indicated in the table. Use two wrenches, one on fitting (B) and the other on lock nut (C).
8. Verify the final condition of the fitting.

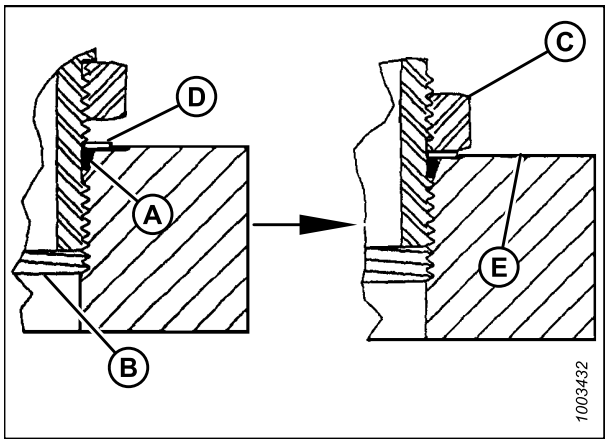


Figure 9.19: Hydraulic Fitting

Table 9.6 O-Ring Boss (ORB) Hydraulic Fittings – Adjustable

SAE Dash Size	Thread Size (in.)	Torque Value[15]	
		Nm	lbf·ft (*lbf·in)
-2	5/16–24	6–7	*53–62
-3	3/8–24	12–13	*106–115

15. Torque values shown are based on lubricated connections as in reassembly.

Table 9.6 O-Ring Boss (ORB) Hydraulic Fittings – Adjustable (continued)

SAE Dash Size	Thread Size (in.)	Torque Value[16]	
		Nm	lbf·ft (*lbf·in)
-4	7/16–20	19–21	14–15
-5	1/2–20	21–33	15–24
-6	9/16–18	26–29	19–21
-8	3/4–16	46–50	34–37
-10	7/8–14	75–82	55–60
-12	1 1/16–12	120–132	88–97
-14	1 3/8–12	153–168	113–124
-16	1 5/16–12	176–193	130–142
-20	1 5/8–12	221–243	163–179
-24	1 7/8–12	270–298	199–220
-32	2 1/2–12	332–365	245–269

9.3.4 O-Ring Boss Hydraulic Fittings – Non-Adjustable

The standard torque values for non-adjustable hydraulic fittings are provided. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, use the value specified in the procedure instead.

1. Inspect O-ring (A) and seat (B) for dirt or defects.
2. Ensure that O-ring (A) is **NOT** on the threads. Adjust O-ring (A) if necessary.
3. Apply hydraulic system oil to the O-ring.
4. Install fitting (C) into the port until the fitting is hand-tight.
5. Torque fitting (C) according to values in Table *9.7, page 215*.
6. Verify the final condition of the fitting.

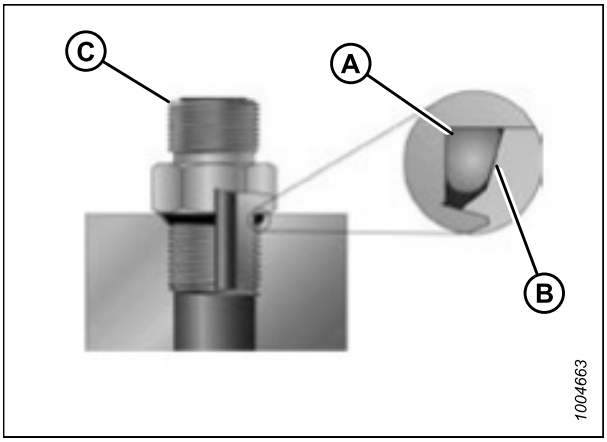


Figure 9.20: Hydraulic Fitting

Table 9.7 O-Ring Boss (ORB) Hydraulic Fittings – Non-Adjustable

SAE Dash Size	Thread Size (in.)	Torque Value[16]	
		Nm	lbf·ft (*lbf·in)
-2	5/16–24	6–7	*53–62
-3	3/8–24	12–13	*106–115
-4	7/16–20	19–21	14–15
-5	1/2–20	21–33	15–24
-6	9/16–18	26–29	19–21
-8	3/4–16	46–50	34–37

16. Torque values shown are based on lubricated connections as in reassembly.

Table 9.7 O-Ring Boss (ORB) Hydraulic Fittings – Non-Adjustable (continued)

SAE Dash Size	Thread Size (in.)	Torque Value[17]	
		Nm	lbf·ft (*lbf·in)
-10	7/8–14	75–82	55–60
-12	1 1/16–12	120–132	88–97
-14	1 3/8–12	153–168	113–124
-16	1 5/16–12	176–193	130–142
-20	1 5/8–12	221–243	163–179
-24	1 7/8–12	270–298	199–220
-32	2 1/2–12	332–365	245–269

9.3.5 O-Ring Face Seal Hydraulic Fittings

The standard torque values are provided for O-ring face seal hydraulic fittings. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, refer to the value specified in the procedure instead.

Torque values are shown in the Table *9.8, page 217*.

1. Ensure that the sealing surfaces and the fitting threads are free of burrs, nicks, scratches, and any foreign material.

Figure 9.21: Hydraulic Fitting

2. Apply hydraulic system oil to O-ring (B).
3. Align the tube or hose assembly so that the flat face of sleeve (A) or (C) comes into full contact with O-ring (B).
4. Thread tube or hose nut (D) until it is hand-tight. The nut should turn freely until it bottoms out.
5. Torque the fittings according to values in Table *9.8, page 217*.

   NOTE:

   If applicable, hold the hex flange on fitting body (E) to prevent the rotation of the fitting body and the hose when tightening fitting nut (D).

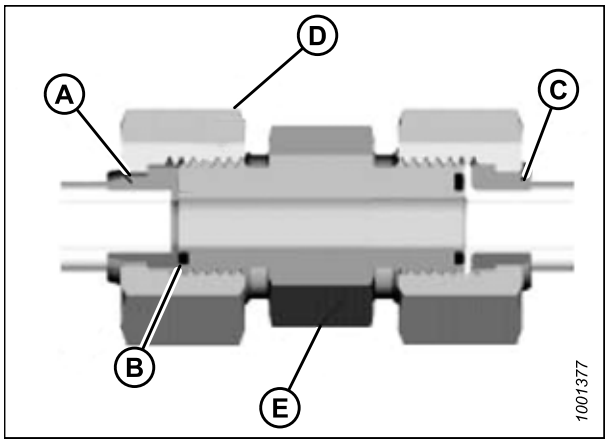


Figure 9.22: Hydraulic Fitting

17. Torque values shown are based on lubricated connections as in reassembly.

6. Use three wrenches when assembling unions or joining two hoses together.

7. Verify the final condition of the fitting.

Table 9.8 O-Ring Face Seal (ORFS) Hydraulic Fittings

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value[18]	
			Nm	lbf·ft
-3	Note[19]	3/16	–	–
-4	9/16	1/4	25–28	18–21
-5	Note[19]	5/16	–	–
-6	11/16	3/8	40–44	29–32
-8	13/16	1/2	55–61	41–45
-10	1	5/8	80–88	59–65
-12	1 3/16	3/4	115–127	85–94
-14	Note[19]	7/8	–	–
-16	1 7/16	1	150–165	111–122
-20	1 11/16	1 1/4	205–226	151–167
-24	1–2	1 1/2	315–347	232–256
-32	2 1/2	2	510–561	376–414

9.3.6 Tapered Pipe Thread Fittings

The standard torque values are provided for tapered pipe thread fittings. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, refer to the value specified in the procedure instead.

Assemble pipe fittings as follows:

1. Ensure that the fitting and the port threads are free of burrs, nicks, scratches, and any other form of contamination.

2. Apply paste-type pipe thread sealant to the external pipe threads.

3. Thread the fitting into the port until it is hand-tight.

4. Torque the connector to the appropriate torque angle. The turns from finger tight (TFFT) and flats from finger tight (FFFT) values are shown in Table *9.9, page 218*. Ensure that the tube end of a shaped connector (typically a 45° or 90° elbow) is aligned to receive the incoming tube or hose assembly. Always finish the alignment of the fitting in the direction of tightening. Never loosen the threaded connectors to achieve alignment.

5. Clean all residue and any excess thread conditioner with an appropriate cleaner.

6. Inspect the final condition of the fitting. Pay special attention to the possibility of cracks in the port opening.

7. Mark the final position of the fitting. If a fitting leaks, disassemble the fitting and check it for damage.

   NOTE:

   The failure of fittings due to over-torquing may not be evident until the fittings are disassembled and inspected.

18. Torque values and angles shown are based on lubricated connection as in reassembly.
19. O-ring face seal type end not defined for this tube size.

Table 9.9 Hydraulic Fitting Pipe Thread

Tapered Pipe Thread Size	Recommended TFFT	Recommended FFFT
1/8–27	2–3	12–18
1/4–18	2–3	12–18
3/8–18	2–3	12–18
1/2–14	2–3	12–18
3/4–14	1.5–2.5	12–18
1–11 1/2	1.5–2.5	9–15
1 1/4–11 1/2	1.5–2.5	9–15
1 1/2–11 1/2	1.5–2.5	9–15
2–11 1/2	1.5–2.5	9–15

9.4 Conversion Chart

Both SI units (including metric) and US customary units (sometimes referred to as standard units) of measurement are used in this manual. A list of those units along with their abbreviations and conversion factors is provided here for your reference.

Table 9.10 Conversion Chart

Quantity	SI Units (Metric)		Factor	US Customary Units (Standard)	
	Unit Name	Abbreviation		Unit Name	Abbreviation
Area	hectare	ha	x 2.4710 =	acre	acres
Flow	liters per minute	L/min	x 0.2642 =	US gallons per minute	gpm
Force	Newton	N	x 0.2248 =	pound force	lbf
Length	millimeter	mm	x 0.0394 =	inch	in.
Length	meter	m	x 3.2808 =	foot	ft.
Power	kilowatt	kW	x 1.341 =	horsepower	hp
Pressure	kilopascal	kPa	x 0.145 =	pounds per square inch	psi
Pressure	megapascal	MPa	x 145.038 =	pounds per square inch	psi
Pressure	bar (Non-SI)	bar	x 14.5038 =	pounds per square inch	psi
Torque	Newton meter	Nm	x 0.7376 =	pound feet or foot pounds	lbf·ft
Torque	Newton meter	Nm	x 8.8507 =	pound inches or inch pounds	lbf·in
Temperature	degrees Celsius	°C	(°C x 1.8) + 32 =	degrees Fahrenheit	°F
Velocity	meters per minute	m/min	x 3.2808 =	feet per minute	ft/min
Velocity	meters per second	m/s	x 3.2808 =	feet per second	ft/s
Velocity	kilometers per hour	km/h	x 0.6214 =	miles per hour	mph
Volume	liter	L	x 0.2642 =	US gallon	US gal
Volume	milliliter	mL	x 0.0338 =	ounce	oz.
Volume	cubic centimeter	cm^3 or cc	x 0.061 =	cubic inch	$in.^3$
Weight	kilogram	kg	x 2.2046 =	pound	lb.

9.5 Definitions

The following terms, abbreviations, and acronyms are used in this instruction.

Table 9.11 Definitions

Term	Definition
API	American Petroleum Institute
ASTM	American Society of Testing and Materials
Bolt	A headed and externally threaded fastener designed to be paired with a nut
Cab-forward	Windrower operation mode, in which the Operator's seat faces the header
Center-link	A hydraulic cylinder or manually adjustable turnbuckle type connection between the header and the vehicle, which is used to change the angle of the header relative to the vehicle
CGVW	Combined gross vehicle weight
D2 Series Header	MacDon D215, D220, D225, D230, D235, and D241 draper headers for windrowers
DK	Double knife
DR	Double reel
Engine-forward	Windrower operation with Operator and engine facing in direction of travel
Export header	The header configuration typical outside North America
FFFT	Flats from finger tight
Finger tight	Finger tight is a reference position in which the given sealing surfaces or components are making contact with each other and the fitting has been tightened by hand to a point where the fitting is no longer loose and cannot be tightened further by hand
GVW	Gross vehicle weight
Hard joint	A joint made with use of a fastener where joining materials are highly incompressible
Header	A machine that cuts and lays crop into a windrow when attached to a windrower
Hex key	A tool of hexagonal cross-section used to drive bolts and screws that have a hexagonal socket in the head (internal-wrenching hexagon drive); also known as an Allen key
HPT display	Harvest Performance Tracker display module on an M1 Series Windrower
JIC	Joint Industrial Council: A standards body that developed standard sizing and shape for original 37° flared fitting
M Series Windrowers	MacDon M100, M105, M150, M155, M155*E4*, M200, and M205 Windrowers
M1 Series Windrowers	MacDon M1170, M1170*NT5*, and M1240 Windrowers
n/a	Not applicable
North American header	The header configuration typical in North America
NPT	National Pipe Thread: A style of fitting used for low-pressure port openings. Threads on NPT fittings are uniquely tapered for an interference fit
Nut	An internally threaded fastener designed to be paired with a bolt
ORB	O-ring boss: A style of fitting commonly used in port openings on manifolds, pumps, and motors
ORFS	O-ring face seal: A style of fitting commonly used for connecting hoses and tubes. This style of fitting is also commonly called ORS, which stands for O-Ring Seal
PARK	The slot opposite the NEUTRAL position on operator's console of M1 Series windrowers
SAE	Society of Automotive Engineers
Screw	A headed and externally threaded fastener that threads into preformed threads or forms its own thread when inserted into a mating part
SKD	Single-knife drive

Table 9.11 Definitions (continued)

Term	Definition
Soft joint	A flexible joint made by use of a fastener in which the joining materials compress or relax over a period of time
spm	Strokes per minute
SR	Single reel
SST	Slow speed transport
Tension	An axial load placed on a bolt or screw, usually measured in Newtons (N) or pounds (lb.). This term can also be used to describe the force a belt exerts on a pulley or sprocket
TFFT	Turns from finger tight
Timed knife drive	Synchronized motion applied at cutterbar to two separately driven knives from a single hydraulic motor
Torque	The product of a force * the length of a lever arm, usually measured in Newton-meters (Nm) or foot-pounds (lbf·ft)
Torque angle	A tightening procedure in which a fitting is assembled to a specified tightness (usually finger tight) and then the nut is turned farther by a specified number of degrees until it achieves its final position
Torque-tension	The relationship between the assembly torque applied to a piece of hardware and the axial load it induces in a bolt or screw
UCA	Upper cross auger
Untimed knife drive	Unsynchronized motion applied at the cutterbar to two separately driven knives from a single hydraulic motor or from two hydraulic motors
Washer	A thin cylinder with a hole or a slot located in the center, used as a spacer, a load distribution element, or a locking mechanism
Windrower	The power unit for a header

Predelivery Checklist

Perform these checks prior to delivery to your Customer. **Adjustments are normally not required as the machine is factory-assembled and adjusted.** If adjustments are required, refer to the relevant page number in this instruction. Either the Operator or the Dealer should keep the completed checklist.

CAUTION

Carefully follow the instructions. Be alert for safety related messages that bring your attention to hazards and unsafe practices.

Header Serial Number: _____

Table .12 D2 Series Draper Header Predelivery Checklist

✓	Item	Reference
	Check for shipping damage or missing parts. Be sure all shipping dunnage has been removed.	—
	Check for loose hardware. Tighten hardware to the required torque values.	*9.3 Torque Specifications, page 211*
	Check the tire pressure (transport/stabilizer option).	*7.1 Checking Tire Pressure – Option, page 167*
	Check the wheel bolt torque (transport/stabilizer option).	*7.2 Checking Wheel Bolt Torque, page 168*
	Check the lubricant level in the knife drive box.	*7.3 Checking Oil Level in Knife Drive Box , page 169*
	Ensure the reel is centered between the header endsheets.	*7.4 Checking and Adjusting Reel Clearance, page 170*
	Grease all bearings and drivelines.	*7.5.1 Greasing Procedure, page 173*
	Check side draper tension.	*7.7 Checking and Adjusting Draper Tension, page 176*
	Check the draper seal.	*7.8 Checking Draper Seal, page 178*
	Check the header float.	Refer to the windrower operators manual
	Ensure all reel cams are in the same position.	—
	Check the reel tine-to-cutterbar clearance.	*7.9 Reel-to-Cutterbar Clearance, page 181*
	Test the reel safety props.	*9.1 Reel Safety Props, page 205*
	Check the knife hold-downs.	*7.10 Guard Identification, page 186*
	Ensure the skid shoes are evenly adjusted and at a setting appropriate for the crop.	—
	Check all in-cab control functions (draper speed, header tilt, etc.).	Windrower operator's manual
Run-up procedure		*8 Running up Header, page 201*
	Ensure the reel rotates in the correct direction.	—
	Check hydraulic hose and wiring harness routing for clearance when raising or lowering the header and reel.	—
	Ensure the reel lift cylinders can extend fully.	—
	Ensure the reel moves fully fore and aft.	—
	Check/adjust side draper tracking	*8.1.1 Adjusting Draper Tracking, page 202*
Post run-up check. Stop engine.		*8.1 Post Run-Up Adjustments, page 201*
	Check the knife and reel drives for heated bearings.	—

Table .12 D2 Series Draper Header Predelivery Checklist (continued)

✓	Item	Reference
	Check knife sections for discoloration caused by misalignment of components. Adjust hold-downs as required.	*8.1.2 Checking Knife Position, page 203*
	Check for hydraulic leaks.	—
	Check the fit of the endshields.	*7.11 Checking and Adjusting Header Endshields, page 195*
	Check that the manual storage case contains an operator's manual.	*7.12 Checking Manuals, page 199*

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