

**MacDon<sup>®</sup>**

**Model D-Series Draper Header  
and Model FD-Series FlexDraper<sup>®</sup>  
with  
Pick-Up Reel**

**REEL CAM SHIM INSTALLATION  
INSTRUCTIONS**



# FOREWORD

This document is for installing alignment shims into the reel cam system to improve the clearance between the cam arms and the cam disc. These instructions pertain to the MacDon Model D-Series Draper Headers and Model FD-Series FlexDraper Headers equipped with the Pick-Up Reel.

Please read this instruction booklet thoroughly before attempting to install this optional equipment. The installation can be accomplished without the use of special tools. Consult the header operators manuals for additional instructions.

Left and right hand are referenced from the operator's seat and looking forward.



## WARNING

If header is attached to combine under no circumstances should any service procedure be performed without the combine safety locks engaged, engine shut off, and key removed.

Refer to Safety section in operator's manual before performing any service procedure.

## PARTS REQUIRED

KIT #245207 Consisting Of:

Part Number	Description	Qty
137753	Shim Ring 4 Bolt Flange	2
164061	Shim – Hub To Cam (1.2 mm)	4
245199	Shim – Hub To Cam (0.6 mm)	2
169844	Instructions – Cam Shim Kit	1

## GENERAL

Sufficient clearance between the cam arms and cam disc must be maintained to prevent the cam arms from contacting the cam disc during operation. If contact is evident, the cam disc should be re-aligned and/or the clearance between the cam arms and cam disc should be adjusted.

## STEP 1. CHECK CAM ARM CLEARANCE

- a. Lower header onto 6 in (150 mm) wooden blocks or equivalent.
- b. Lower reel fully and place in full forward position.
- c. Shutdown engine and remove key.
- d. Choose one reel arm and mark it.
- e. On the cam track plate, locate and mark each inspection location (C1, C2, C3, C4). (Figure 1)
- f. Rotate the reel and measure the clearance (C) between the cam arm (B) and the outer cam ring (A) at each inspection point. (Figure 2)
- g. Determine the cam tilt using the dimensions in the in the following table.

	C1-C3	C2-C4
No shims	0-0.08 in (0-2 mm)	0-0.08 in (0-2 mm)
Shim MD #245199 (qty: 1)	0.08-0.12 in (2-3 mm)	0.08-0.12 in (2-3 mm)
Shim MD #164061 (qty: 1)	0.12-0.16 in (3-4 mm)	0.12-0.16 in (3-4 mm)
Shim MD #164061 (qty: 2)	0.16-0.20 in (4-5 mm)	0.16-0.20 in (4-5 mm)

- h. Subtract measurements C1 from C3. The difference between the two numbers determines how many shims are required. The inspection point with the higher number determines the shim location.
- i. Once completed, repeat step h and subtract measurements C2 from C4 to see if any shim(s) are required.
- j. If shims are required, proceed to STEP 2. REALIGN CAM TRACK PLATE.
- k. If no shims are required and there is still contact or insufficient clearance between the cam arm and the cam track plate ring, proceed to STEP 4. INSTALL "C" SHIMS

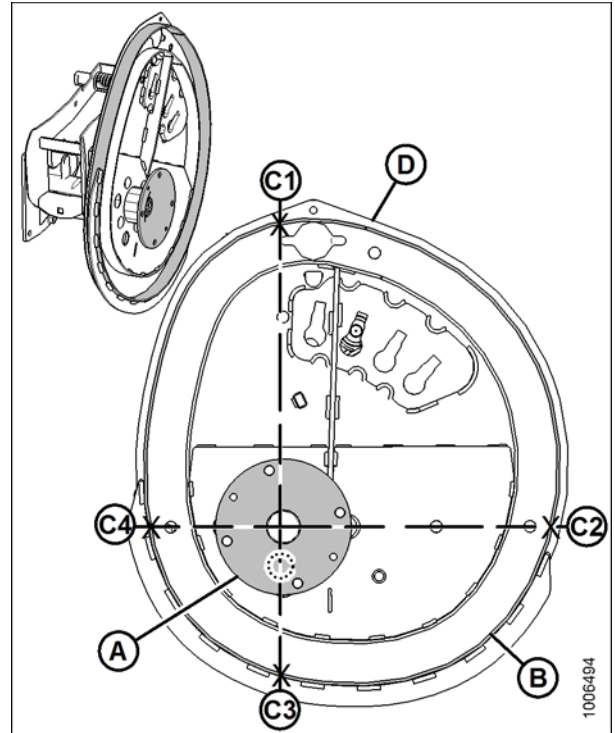


Figure 1 Inspection Locations

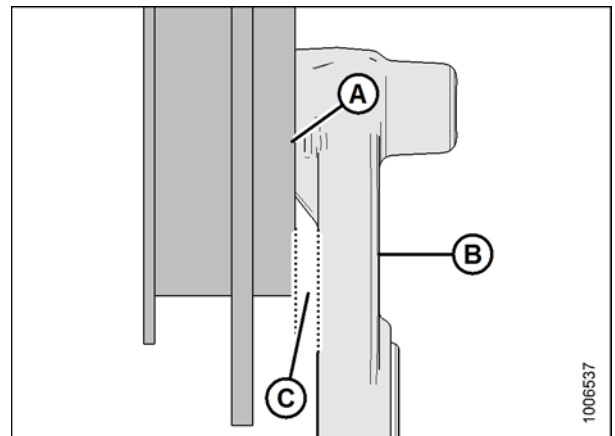


Figure 2 Cam Arm Gap

## STEP 2. RE-ALIGN CAM TRACK PLATE

### NOTE:

Use an appropriate lifting device that can support approximately 1000 lbs. to support the reel(s).

- Loosen the four nuts that secure the cam track plate (D) to the reel drive hub (A). (Figure 3)
- Using the measurements from the checking section, follow the table below and insert shim(s) at location(s) (1, 2, 3, or 4) between the reel drive hub and the cam track plate.

	C1-C3	C2-C4
No shims	0-0.08 in (0-2 mm)	0-0.08 in (0-2 mm)
Shim MD #245199 (qty: 1)	0.08-0.12 in (2-3 mm)	0.08-0.12 in (2-3 mm)
Shim MD #164061 (qty: 1)	0.12-0.16 in (3-4 mm)	0.12-0.16 in (3-4 mm)
Shim MD #164061 (qty: 2)	0.16-0.20 in (4-5 mm)	0.16-0.20 in (4-5 mm)
Shim Location	If C1 > C3, insert at # 1	If C2 > C4, insert at # 2
	If C1 < C3 insert at # 3	If C2 < C4, insert at # 4

- Retighten nuts. Torque to 75 ft lbf (102 N·m).
- Manually rotate reel and recheck clearances between cam arms and outer cam ring.
- If there is excessive clearance between the cam arm and the cam track plate ring, proceed to STEP 3. ROLLER BEARING LOCATION.
- If there is still contact or insufficient clearance between the cam arm and the cam track plate ring, proceed to STEP 4. INSTALL "C" SHIMS.
- If shimming procedures are complete, proceed to STEP 5. RUN UP CHECK.

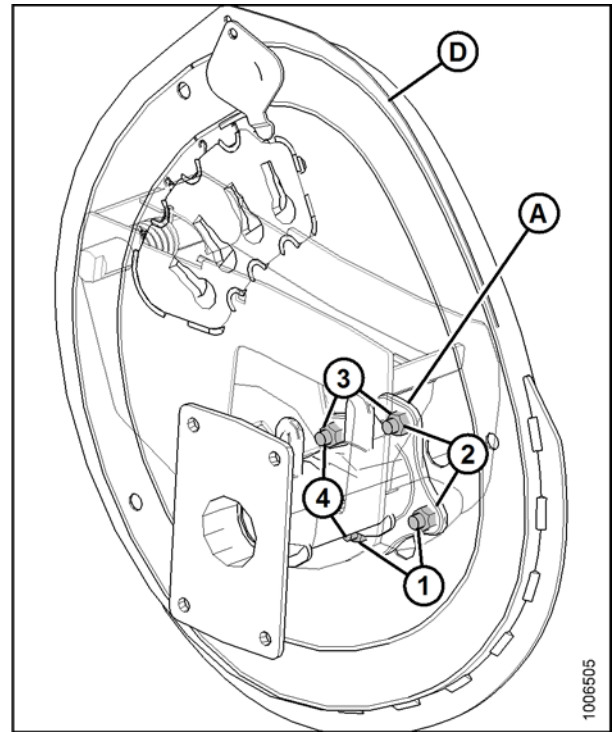


Figure 3: Shim Location

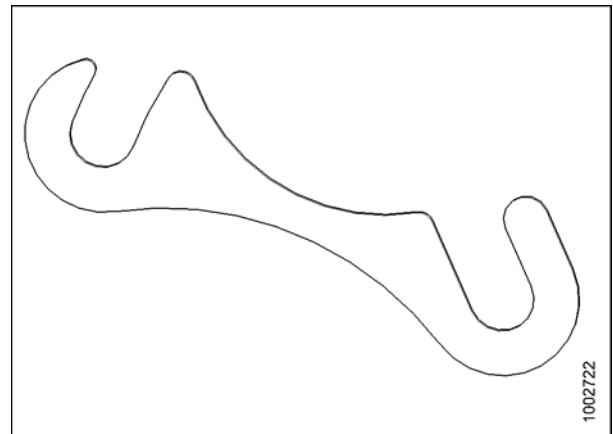


Figure 4: Two Shims Available:

MD #245199 Thickness: 0.02 in (0.6 mm)  
MD #164061 Thickness: 0.05 in (1.2 mm)

### STEP 3. ROLLER BEARING LOCATION

**NOTE:**

*Use an appropriate lifting device that can support approximately 1000 lbs. to support the reel(s).*

- a. Using the same reel arm and inspection locations as in STEP 1. Rotate the reel and measure gap (C) between the inside edge of the cam arm roller bearing (A) and the outer edge of cam ring (B) at each inspection point. (Figure 5)
  
- b. Inspect the cam arm roller bearing if it is 0.08 in (2 mm) or closer to the edge of the cam track. Then install shim (MD #164061) at two locations.
  
- c. Install the shims (A) between reel drive hub and cam track plate at locations 2 and 4. The addition of these shims will push the cam into the cam arms. (figure 6)
- d. Re-tighten nuts and manually rotate the reel to check that the rollers are sitting inside the cam track 0.08 in (2 mm) or more.
- e. Torque nuts to 75 ft-lbf (102 N·m).
- f. Manually rotate reel and recheck clearances between cam arm bearings and outer cam track plate ring.
- g. If shimming procedures are complete, proceed to STEP 5. RUN UP CHECK.

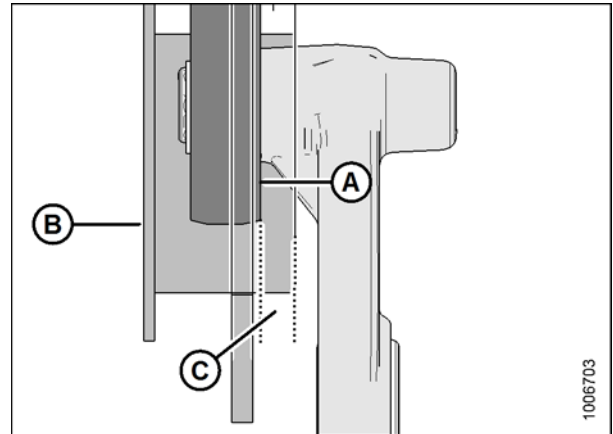


Figure 5: Bearing Gap

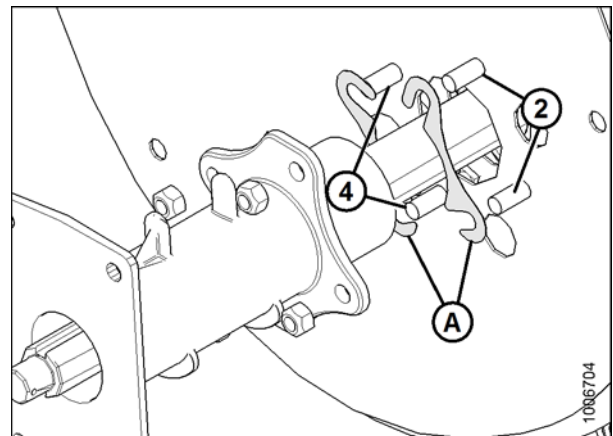
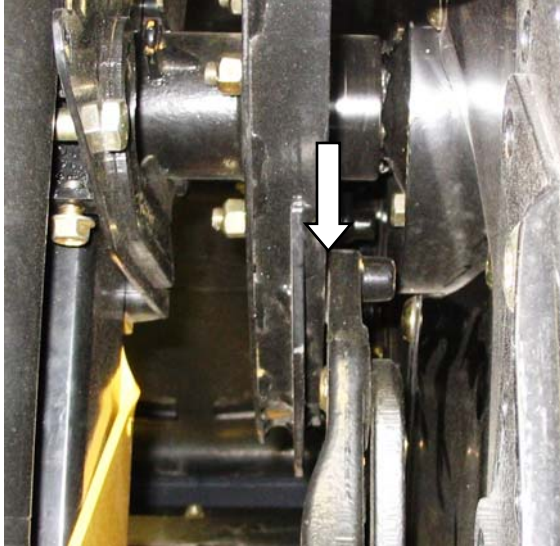


Figure 6: Bearing Shim Location

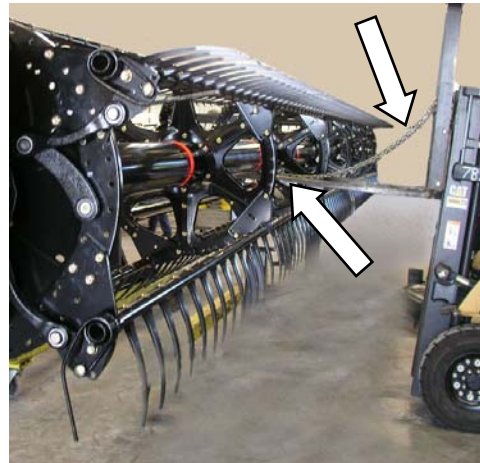
## STEP 4. INSTALL "C" SHIMS

Perform this step only if necessary to achieve the required gap at all locations around the cam edge. Otherwise, proceed to STEP 5. RUN-UP CHECK. The installation is at the cam end of the reel.



- a. Manually rotate reel and determine the minimum clearance between the cam disc and the cam arm.
- b. The gap between the cam edge and the linkage should be 0.010 in. (0.25 mm) minimum, and 0.2 in. (5.0 mm) nominal and should be approximately equal at all locations around the cam.
- c. Determine the quantity of "C" shims (MD #137753) required to achieve the required gap.
  1. Example: If the minimum clearance is less than 0.010 inches, adding one shim (0.04) will increase the clearance to at least 0.04 inches. Adding two shims increases the clearance to at least 0.08 inches.

## A. SINGLE REEL HEADERS



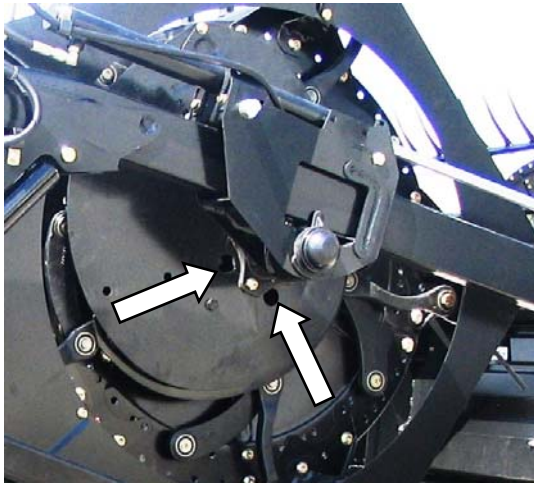
- a. Locate forks under reel tube at approximately the center disc and secure tube to forklift with a chain, OR locate a sling around reel tube and attach to a forklift or equivalent (See B DOUBLE REEL HEADERS).



- b. Raise forks slightly to take weight off reel.
- c. Remove bolt in LH reel arm brace so that reel arm and reel are free to move.

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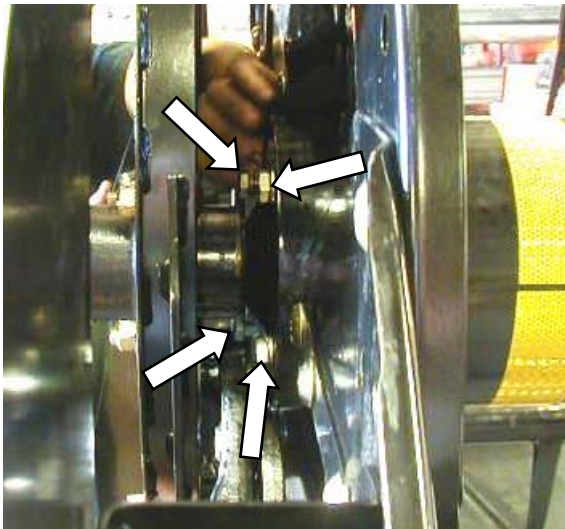


- d. At cam end, rotate reel to line up bolts attaching cam hub to reel tube with access holes in cam disc. This allows access to the bolts with a socket and extension.



### CAUTION

Reel may shift as last bolt is removed. Keep hands and fingers clear of work area.



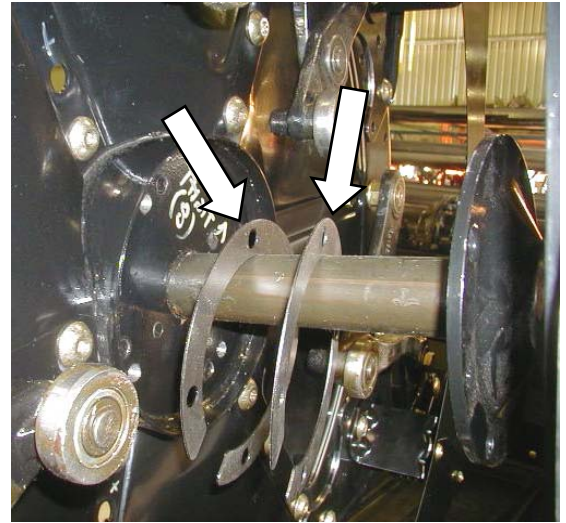
- e. Remove four ½ in bolts and washers attaching cam hub to reel tube using access holes in cam disc. Rotate reel as required.
- f. Install two ½ in bolts into jacking holes in cam hub and turn them to move cam hub away from reel tube.
- g. Continue to move reel outboard until shaft flange is exposed.



### CAUTION

Ensure reel is supported when shaft and reel are moved apart. Do not pull reel completely off shaft.

- h. Remove bolts from jacking holes.
- i. Apply Loctite® 243 to the four ½ in bolts and install with lockwashers through hub.



- j. Install “C” shims as determined in STEP 4c. onto bolts.
- k. Align bolts with holes in reel tube and slide reel onto shaft while engaging tine bar rollers into cam track.
- l. Install bolts into reel tube ensuring shims are in place.
- m. Torque bolts to 80 ft-lbf (108 N·m).
- n. Remove sling/lifting forks from reel tube.
- o. Manually rotate reel and check for interference with moving parts.



## B. DOUBLE REEL HEADERS

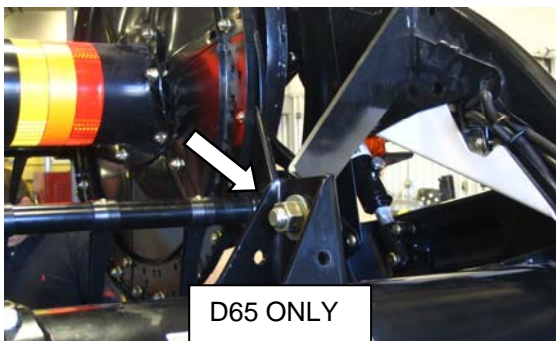
### I. RH REEL



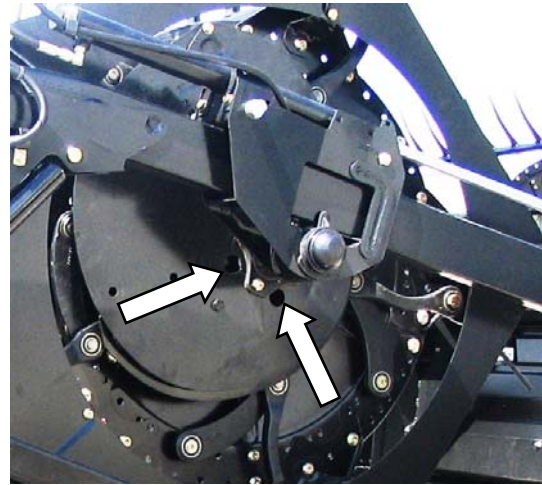
- Locate a sling around RH reel tube at approximately the center disc and attach to a forklift or equivalent, OR, locate forks under reel tube and secure tube to forklift with a chain (See A. SINGLE REEL HEADERS).
- Raise forks slightly to take weight off reel.

#### NOTE

*Outboard reel arms on FD-series FlexDraper headers are not braced, proceed to step d.*



- Remove bolt in RH reel arm brace so that reel arm is free to move.
- At cam end, rotate reel to line up bolts attaching cam hub to reel tube with access holes in cam disc. This allows access to the bolts with a socket and extension.



#### CAUTION

**Reel may shift as last bolt is removed. Keep hands and fingers clear of work area.**



- Remove four 1/2 in bolts and washers attaching cam hub to reel tube using access holes in cam disc. Rotate reel as required.
- Install two 1/2 in bolts into jacking holes in cam hub and turn them to move cam hub away from reel tube.
- Continue to move reel outboard until shaft flange is exposed.

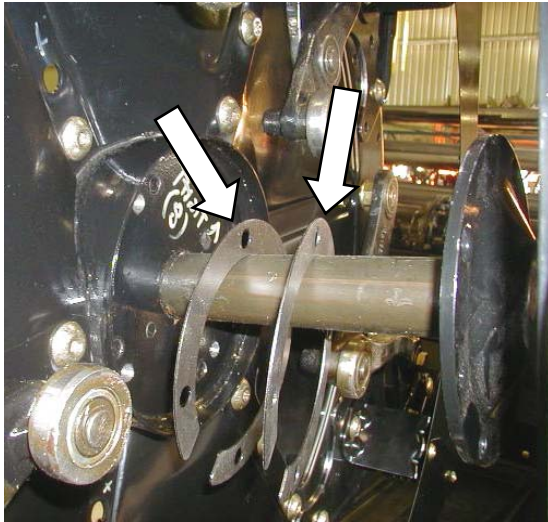


#### CAUTION

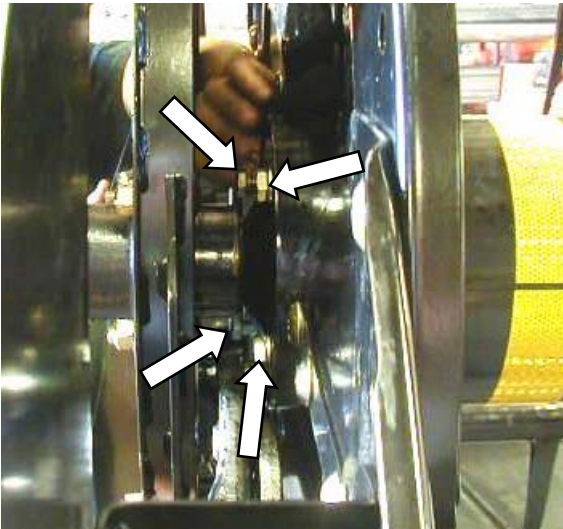
**Ensure reel is supported when shaft and reel are moved apart. Do not pull reel completely off shaft.**

- Remove bolts from jacking holes.
- Apply Loctite® 243 to the four 1/2 in bolts and install with lock washers through hub.

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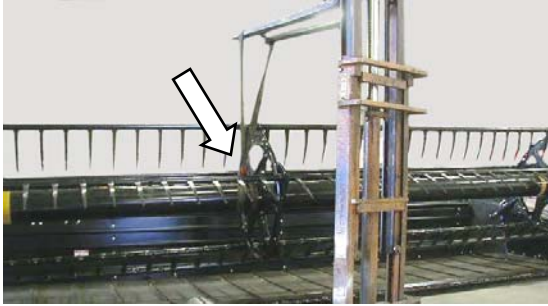


- j. Install "C" shims as determined in STEP 4c. onto bolts.
- k. Align bolts with holes in reel tube and slide reel onto shaft while engaging tine bar rollers into cam track.



- l. Install bolts into reel tube ensuring shims are in place.
- m. Torque bolts to 80 ft lbf (108 N·m).
- n. Remove sling/lifting forks from reel tube.
- o. Manually rotate reel and check for interference with moving parts.

## II. LH REEL



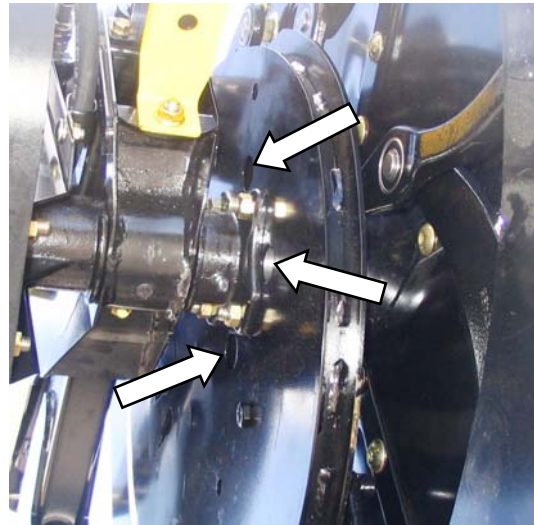
- a. Locate a sling around LH reel tube at approximately the center disc and attach to a forklift or equivalent OR, locate forks under reel tube and secure tube to forklift with a chain (See A. SINGLE REEL HEADERS).
- b. Raise forks slightly to take weight off reel.

### NOTE

*Outboard reel arms on FD-series FlexDraper headers are not braced, proceed to step d.*



- c. Remove bolt in LH reel arm brace so that reel arm is free to move when removing the reel.

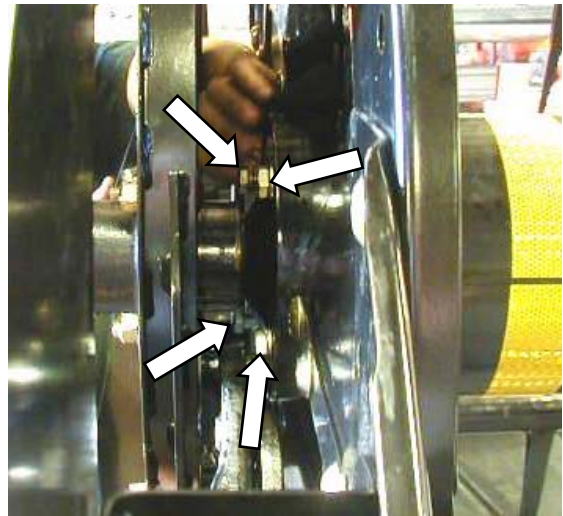


- d. At cam end, rotate reel to line up bolts attaching cam hub to reel tube with access holes in cam disc. This allows access to the bolts with a socket and extension.



### CAUTION

**Reel may shift as last bolt is removed. Keep hands and fingers clear of work area.**



- e. Remove four ½ in bolts and washers attaching cam hub to reel tube using access holes in cam disc. Rotate reel as required.
- f. Install two ½ in bolts into jacking holes in cam hub and turn them to move cam hub away from reel tube.
- g. Continue to move reel outboard until shaft flange is exposed.

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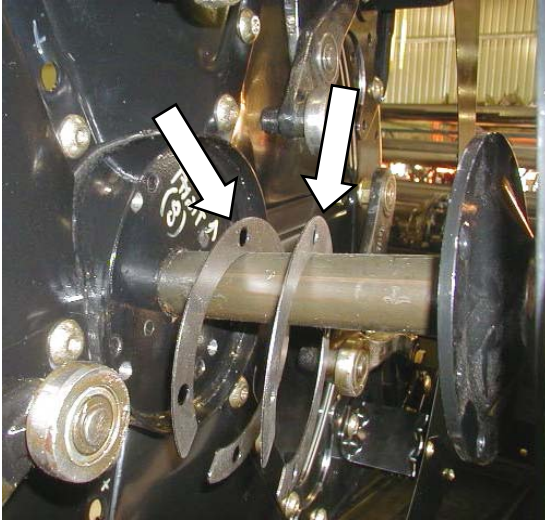




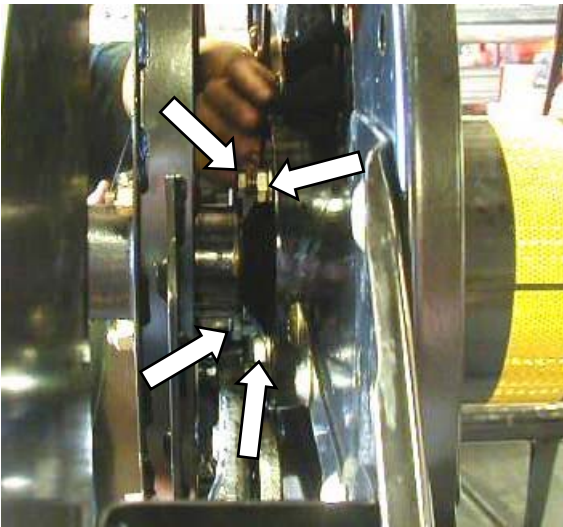
## CAUTION

Ensure reel is supported when shaft and reel are moved apart. Do not pull reel completely off shaft.

- h. Remove bolts from jacking holes.
- i. Apply Loctite® 243 to the four ½ in bolts and install with lockwashers through hub.



- j. Install “C” shims as determined in STEP 4c. onto bolts.
- k. Align bolts with holes in reel tube and slide reel onto shaft while engaging tine bar rollers into cam track.



- l. Install bolts into reel tube ensuring shims are in place.
- m. Torque bolts to 80 ft lbf (108 N·m).
- n. Remove sling/lifting forks from reel tube.
- o. Manually rotate reel and check for interference with moving parts.

- p. Re-install bolts at LH and RH reel arm braces (D65 only).

## STEP 5. RUN-UP CHECK



### CAUTION

Never start or move the machine until you are sure all bystanders have cleared the area.



### CAUTION

Keep all shields in place. Never alter or remove safety equipment. Make sure driveline guards can rotate independently of the shaft and can telescope freely.



### CAUTION

Before investigating an unusual sound or attempting to correct a problem, shut off engine, engage parking brake and remove key.



### CAUTION

Do not start the machine until work area is clear of tools, slings, chains, etc.

- a. Check header and reel fully assembled and clear area of tools, etc.
- b. Start engine and run header slowly for five minutes.
- c. Shutdown engine and check cam ends of reel for evidence of cam arms rubbing on cam or other interfering parts.
- d. Readjust as required.