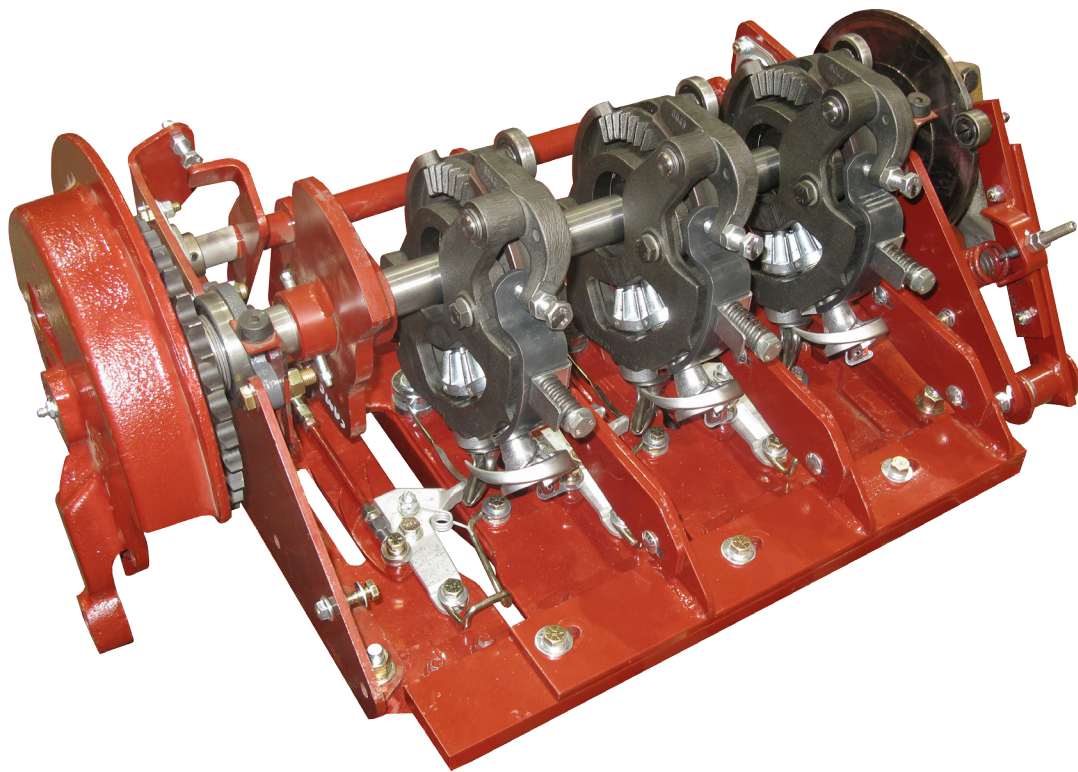


375/385 Operator's and Parts Manual Addendum

Tailless Knotters



Starting With Side Feed Baler Serial Numbers:

ASC-0375-008

385E16-106

(For earlier serial numbers, see publication PB00000176)

Safety

General

The following pages contain general safety warnings which supplement specific warnings and cautions appearing elsewhere in this manual. All electrical and hydraulic equipment is potentially hazardous. You must thoroughly review and understand this Safety Section before attempting to operate, troubleshoot, maintain or service this baler.

Time, money and effort have been invested in making your Baler a safe product. The dividend from this investment is **YOUR PERSONAL SAFETY**.

However, it must be realized that no power-driven equipment can be any safer than the person behind the controls. If you don't operate and maintain your Freeman Baler safely, our efforts will have been in vain.

The safety instructions and warnings, as documented in this manual and shipped with the machine, provide the most reliable procedures for the safe operation and maintenance of your Baler. It's your responsibility to see that they are carried out.

Allied Systems Company cannot anticipate all worksite conditions, local regulations, etc. It is the responsibility of the end user to be aware of and obey any specific worksite, local, state, or national regulations or procedures that are applicable to operating this baler.

NOTE: All possible safety hazards cannot be anticipated so as to be included in this manual. Therefore, you must always be alert to potential hazards that could endanger personnel and/or damage the equipment.



Figure 1 - Freeman 370 Baler

Safety Symbols

The following symbols/terms are used to emphasize safety precautions and notices in this manual:



DANGER

The "DANGER" symbol indicates a hazardous situation which, if not avoided, will result in death or serious injury. Carefully read the message that follows to prevent serious injury or death.



WARNING

The "WARNING" symbol indicates a hazardous situation which, if not avoided, could result in death or serious injury. Carefully read the message that follows to prevent serious injury or death.



CAUTION

The "CAUTION" symbol indicates a hazardous situation which, if not avoided, could result in minor or moderate injury, or equipment damage. Carefully read the message that follows to prevent minor or moderate injury.

NOTICE

The "NOTICE" symbol alerts to a situation that is not related to personal injury but may cause equipment damage.

NOTE: ...

The term "NOTE" highlights operating procedures or practices that may improve equipment reliability and/or personnel performance, or to emphasize a concept.

Intended Use Statement:

This baler is intended to gather and compress loose, fibrous material (i.e., hay) and form it into rectangular bales. Use in any other way is considered to be contrary to the intended use. If you are unsure of the material you intend to bale, consult the factory.

Operation Warnings



WARNING

Failure to observe the following safety rules may result in extreme personal injury, dismemberment or death. It is the operator's responsibility to understand the proper and safe use of this baler.

- Make sure that you read, understand, and obey all of the safety precautions and operating instructions in this Operator's Manual.
- Keep this Operator's Manual and the Safety Card (Allied form #89-028) with the baler at all times.
- Do not operate the baler unless you are authorized and trained to do so. If it has been some time since you last operated the baler, re-familiarize yourself with the baler before starting, then proceed slowly.
- Do not operate the baler if you are aware of any malfunctions, needed maintenance or repairs.
- Stop the baler immediately if any problems arise.
- Never allow others to ride on the baler.
- Never allow anyone within 10 ft of the baler while the baler is in operation.
- Never operate the baler without all safety shielding in place.
- Keep hands, feet, hair, jewelry and clothing away from moving parts, including but not limited to the pickup, knottter, and PTO shaft.
- Avoid wearing loose clothing which can easily be caught in moving parts.
- Use appropriate signs (i.e., Slow Moving Vehicle sign), signals or warning lights when transporting on highways.



- Always use lights when working at night or in low light conditions.
- Know your job-site rules. Some have site specific directions and procedures. The methods outlined in this manual provide a basis for safe operation of the baler. Because of special conditions, your company's baling procedures may be somewhat different from those shown in this manual.
- Do not start the tractor if the key had been marked with a "DO NOT START" or "RED" tag.
- Never operate any of the tractor's controls from anywhere other than the operator's seat.
- Alert personnel in the area before starting the engine, and make sure everyone is clear. Be sure that all controls are in neutral and the baler is disengaged before starting the engine.
- Each country has its own safety legislation. It is in the operator's own interest to be conversant with these regulations and to comply with them in full. This also applies to local bylaws and regulations in force on a particular worksite.
- Should the recommendations in this manual deviate from those in the user's country, the national regulations should be followed.
- Never attempt to disconnect any of the safety devices built into the baler or tractor.
- Maintain proper clearance from energized equipment, energized power lines or other power sources. High voltage electricity can discharge to ground without direct contact with the baler's or tractor's structure. If the baler or tractor contacts energized equipment, or if electrical energy does discharge through the machine—stay clear, and prevent anyone else from coming in contact with the baler or tractor. If you are on the tractor, stand fast, avoid contact with metal surfaces, and do not permit anyone to come into contact with the tractor or baler. Finally, **Do not jump off.**

Hydraulic Hazards

Be aware of the hazards of pressurized hydraulics:

- Wear personal protective equipment, such as gloves and safety glasses, whenever servicing or checking a hydraulic system.
- Assume that all hydraulic hoses and components are pressurized. Relieve all hydraulic pressure before disconnecting any hydraulic line.
- Never try to stop or check for a hydraulic leak with any part of your body; use a piece of cardboard to check for hydraulic leaks.
- Small hydraulic hose leaks are extremely dangerous, and can inject hydraulic oil under the skin, even through gloves.
- Infection and gangrene are possible when hydraulic oil penetrates the skin. See a doctor immediately to prevent loss of limb or death.

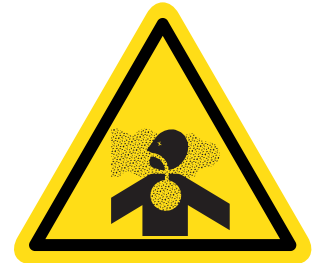


Maintenance Safety

- Perform all routine maintenance outlined in this Operator's Manual in the time intervals indicated.
- Maintenance, lubrication and repair of this machine can be dangerous unless performed properly. In order to ensure safety, each person working on this baler must have the necessary skills, information, tools and equipment, and satisfy himself that his work method is safe, correct, and meets his own company's requirements.
- Do not attempt to make adjustments, or perform repairs unless you are authorized and qualified to do so.
- Never attempt to service energized equipment.
- Do not rely on the hydraulic system to support any part of the baler during maintenance or lubrication. Never stand under a baler component that is supported only by the hydraulic system. Ensure components are resting on their mechanical stops or supported with appropriate safety stands during maintenance or lubrication.
- Never attempt servicing while the baler is moving. Shut off the tractor and secure power.

- Shut off tractor and baler engine, engage the parking brake, disengage the baler, and wait for all movement to stop before adjusting, lubricating, cleaning, or servicing the baler.
- Tag the key switch with a "DO NOT START" sign and/or remove the key.
- Always perform all maintenance and lubrication procedures with the baler on level ground, parked in a safe area.
- Block the tires to keep the machine from rolling.
- Any unauthorized modifications made to the baler by the customer or parties other than Allied Systems will relieve Allied Systems Company and your Freeman dealer of any liability for damage or injury.
- Replace any worn parts only with genuine Freeman parts. Call your dealer for assistance.
- Unless specified in service procedures, never attempt maintenance or lubrication procedures while the baler is moving or the engine is running.

- Engine exhaust fumes can cause death. If it is necessary to run the engine in an enclosed space, remove the exhaust fumes from the area with an exhaust pipe extension. Use ventilation fans and open shop doors to provide adequate ventilation.



- DO NOT remove the radiator cap when the engine is hot. The coolant will be under pressure and can flash to steam with explosive force, causing severe burns. To prevent burns, remove the radiator cap only when the engine is cool.
- Batteries contain sulfuric acid which can cause severe burns. Avoid contact with skin, eyes or clothing.



- Batteries produce explosive gases. Keep sparks, flame and cigarettes away. Ventilate when charging or servicing in an enclosed space. Always shield your eyes when working near batteries. When removing battery cables, disconnect the negative (-) cable first. When installing a battery, always connect the positive (+) cable first. This procedure will help to prevent a spark which could cause an explosion.
- Before making adjustments to the engine or chassis electrical system, disconnect the battery. An electrical spark could cause a fire, explosion or severe burns.



Safety Equipment

- Ensure test equipment is in good condition.
- If an instrument must be held while taking measurements, ground the case of the instrument before energizing equipment.
- Do not touch live equipment or personnel working on live equipment while holding a multimeter. Some types of measuring devices should not be grounded—do not hold such devices while taking measurements.
- Prevent personal injury or equipment damage by using a lifting device with a lifting capacity greater than twice the weight of any equipment to be lifted.
- Always use personal protective equipment (PPE) appropriate to the situation. This may include the use of hearing protection, eye protection, a respirator, a hard hat, leather gloves, steel toed boots, etc.



Electrical Hazards

- An electric shock could be fatal. Ensure power to the baler is “OFF” before opening electrical panels.
- All electrical cables and connectors must be in good condition (free of corrosion, damage, etc). Use caution in wet weather to avoid danger from electrical shock. Never attempt electrical testing or repair while standing in water.
- Do not wear electrically conductive jewelry, clothing, or other items while working on the electrical system.



Welding

Before conducting any welding on the baler:

- Thoroughly clean the baler.
- Disconnect both the positive (+) and negative (-) battery cables from the baler’s battery.
- Disconnect the highway light cord (7 Pole Connector), the ICM (In Cab Monitor), and the XA2 module, located behind the baler control panel (as applicable).
- Connect the welding ground cable directly to the part to be welded, as close as possible to the weld location to reduce the possibility of welding current damage to other parts.
- Welding on the engine or engine mounted components is not recommended as damage to the engine or components may result.

Hot Oil Hazards

- Burns from hot oil can be severe—Always allow lubricating and hydraulic oil to cool before draining.

Compressed Air Hazards

- When using compressed air to dry parts, pressure should not exceed 30 psi (200 kPa).
- Air pressure penetrating your skin can be fatal. Never direct compressed air at anyone.

Fire Safety



WARNING

Diesel fuel and hydraulic oil are flammable. Never smoke while handling fuel or working on the fuel system. The fumes in an empty fuel container are explosive. Never cut or weld on or near fuel lines, tanks, or containers. Keep open flames and sparks away from the machine.

Reduce the Risk of Fire

- Keep the baler free of oil, grease, hay, and trash accumulations. Regular cleaning is recommended for fire prevention and general safety. Use an approved solvent to clean machine parts. Never use gasoline or diesel fuel.
- Shut off the engine and electrical equipment while filling the fuel tank. Use extra caution when fueling a hot engine. Always ground the fuel nozzle against the filler neck to avoid sparks.
- Never overfill the fuel or hydraulic tanks. Any overflow could cause a fire. Immediately repair any hydraulic or fuel leaks and clean up any spills.
- Handle all solvents and dry chemicals according to procedures identified on manufacturer's containers. Work in a well-ventilated area. Make sure you know where fire extinguishers are kept and how to use them.
- Avoid spilling fuel or other hazardous liquids. If a spill occurs, follow local or state regulations for clean-up. Contact your state's OSHA office for details.
- Always ensure that excess grease and oil accumulation, including spillage, is cleaned up immediately.
- Inspect the baler daily for potential fire hazards and make any necessary repairs immediately.
- Check all the electrical wiring and connections for defects, and repair or replace as necessary. Keep battery terminals clean and tight.
- Never perform welding operations until the entire machine has undergone a thorough cleaning. In addition, cover rubber hoses, disconnect the bat-



tery, and have at least a fire extinguisher at hand.

- Hydraulic fluid is flammable. Do not weld on or near pipes, tubes, or hoses that are filled with fluid. Do not smoke when checking or filling the tank. Keep open flames and sparks away from the baler.
- Hay dust is combustible. Do not have an open flame or weld in dusty environments.
- Maintain the engine cooling system to avoid overheating.
- Remember, there is always a risk of fire.

Fire Fighting Equipment

- It is recommended to carry an "ABC" fire extinguisher on the baler or in the pull vehicle at all times. Install it within easy reach of the operator in a position that protects it from damage. Use only a "quick release" type of mount. It is also recommended to carry a four gallon water container with a pump, or as required by local and state law.
- Keep your fire extinguisher(s) fully charged and in good working order. Know how to use them.
- Read and understand the instructions printed on the canisters and learn how to operate them. Learn how to remove the canisters from their mounting brackets in the shortest amount of time.
- Service the extinguisher according to the manufacturer's specifications. Service after every use, no matter how short a time.

Fire Suppression

- Do not panic. At the first sign of trouble (burning smell, smoke, visible flame, etc), stop the tractor and turn off the engine in the clearest area available, with the tractor upwind from the baler if possible.
- If the fire cannot be extinguished safely, immediately evacuate the area. DO NOT attempt to extinguish it. DO NOT risk personal injury. Contact your local fire department.
- If you have determined that the fire may be safely extinguished, use the fire extinguisher according to the manufacturer's instructions, or use the water pump, aiming water at the base of the fire.
- When the baler has fully cooled, thoroughly inspect, and make all necessary repairs to return the baler to normal operation.
- Recharge or replace the extinguishers before returning to work.

Serial Number Location

Each Freeman Baler is identified by means of a baler model number and baler serial number. As a further identification, all power units are provided with a serial number. The serial number is an important piece of information about the machine and it may be necessary to know it before obtaining the correct replacement part. The serial number is located on the top chamber rail on the rear left-hand side, above the tool box. To ensure prompt, efficient service when ordering parts or requesting repairs from your authorized Freeman dealer, record the serial numbers in the spaces provided.

Baler Serial Number

Rear, left side of baler on upper frame.

Power Unit Serial Number

Deutz Diesel-forward side of engine on block.

Driveline P.T.O. 540 RPM - top of gearbox.

NOTE: Reference to left-hand and right-hand used throughout the manual are understood to mean from a position facing in the direction of travel.

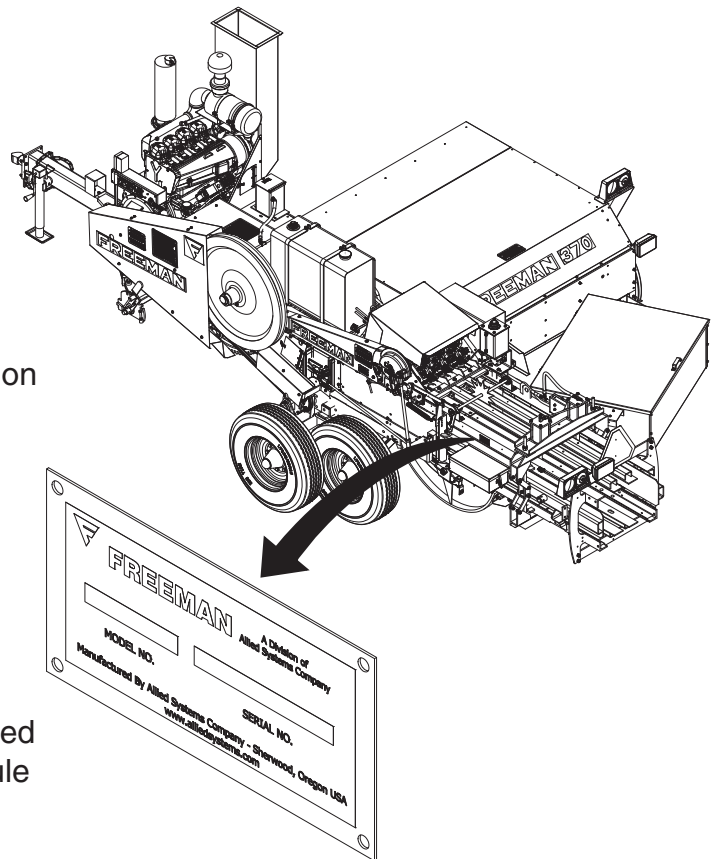
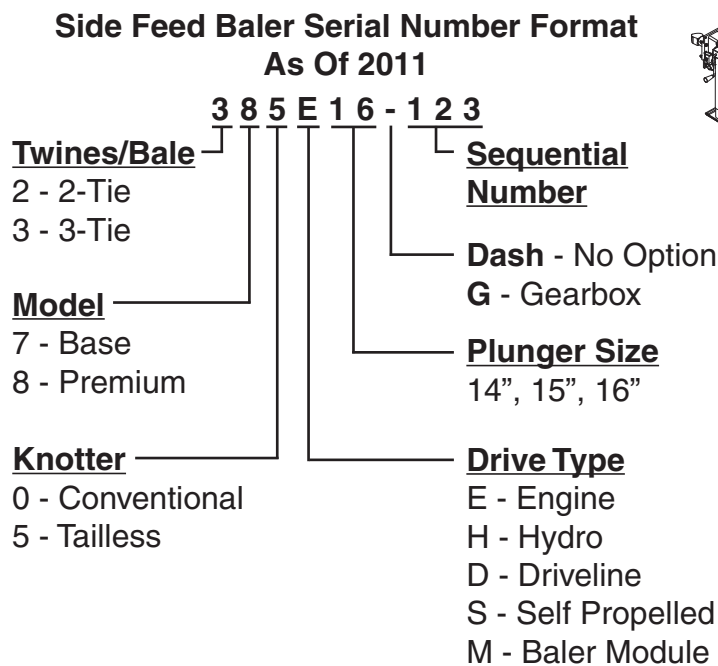


Figure 2 - Baler Serial Number Location

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Knotter Settings

The Freeman 375/385 baler is similar to the 370/380 baler except for the knotter system. The 375/385 baler employs the optional "Tail-less Twine Knotter" style knotters as opposed to the "Conventional Twine Knotter" style knotters traditionally used on Freeman balers. The key difference in the 375/385 knotter is that it has no knife arm to strip the knot from the bill hook. Instead, the knot remains on the bill hook for a few plunger strokes until the advancing bale pulls it off. The simple design uses fewer moving parts resulting in lower maintenance. Additional benefits of the 375/385 knotter are replaceable no-lube bushings for bill hook and holder, bow style knot for high strength ties, and less twine waste deposited on the baler and in the field.

The following instructions will help you understand the Tail-less Twine style knotter and the adjustments necessary to maintain and keep the system tying at the optimum level of performance. Periodic checks of these adjustments will help alleviate tying problems and reduce the risk of equipment damage.

Note: Adjustments may vary for different crops.



WARNING

Always shut off baler and tractor before adjusting, lubricating or servicing the baler.

Twine Finger

The Twine Fingers have two independent adjustments, fully extended and fully retracted. Unlike the "Conventional Twine Knotter" style knotter, the Tail-less Twine knotter system keeps the Twine Finger extended while the bale forms. The extended position of each Twine Finger adjusts separately and is determined by the length of the Twine Finger drive rod. The fully retracted position of all the Twine Fingers is managed by the Twine Finger Stop Bolt (see Figure 7).

The Twine Finger fully extended position should be set with the needles in the home position (see Figure 3), with the Twine Finger drive cam holding the Twine Fingers extended.

Needles are in home position when bolt "A", Figure 3, is 1/4" to 1/2" past center between "B" and "C". Before adjusting the Twine Fingers, ensure the Twine Finger drive shear bolt is tight and in good condition and not partially sheared (see Figure 7).

With light, forward pressure applied at the tip of the Twine Finger, the finger should be between flush and 1/16" behind the nose of the Twine Guide Plate (see Figure 4).

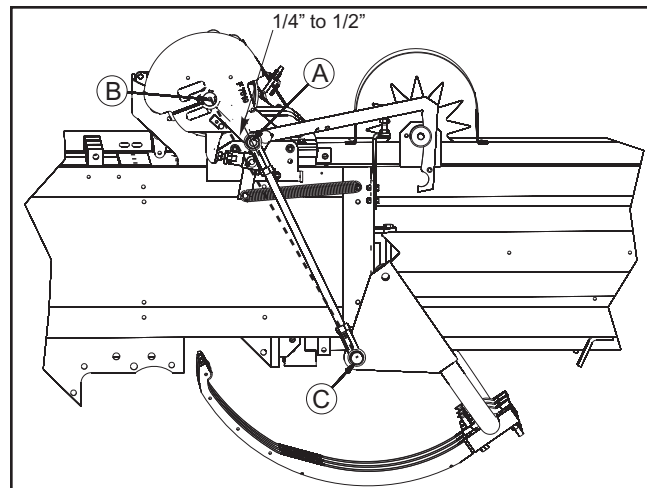


Figure 3 - Needles In Home Position

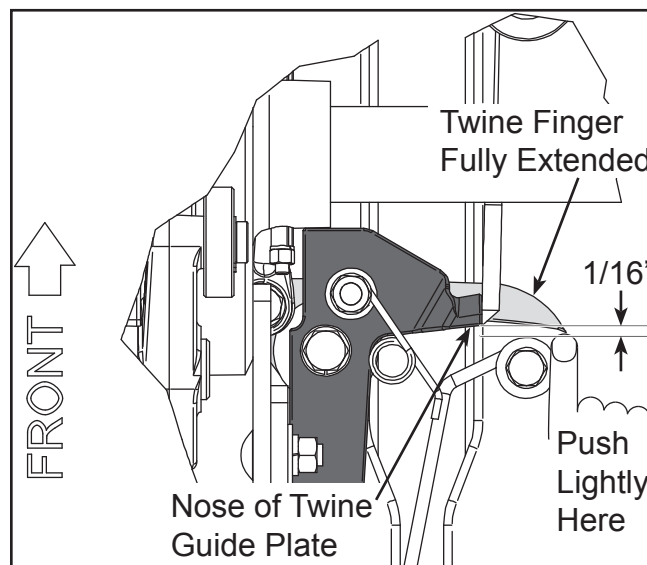


Figure 4 - Twine Guide and Twine Finger Extended

To adjust the Twine Finger extended position, loosen the jam nuts on the Twine Finger drive rod and rotate the rod clockwise to increase travel (see Figure 4 & Figure 5).

Note: The jam nut toward the front is left-hand thread and the rear is right-hand thread.

To check the Twine Finger retracted position, turn the knotted shaft with a wrench (see Figure 17 on page 14) until the Twine Finger drive cam releases the cam follower. The fingers should retract far enough so that the tips are completely clear of the needle slot (see Figure 6 & Figure 7).

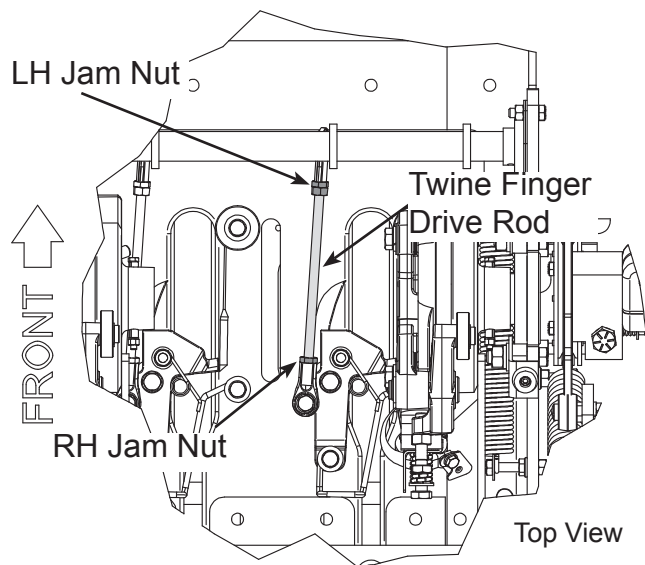


Figure 5 - Twine Finger Clearance Retracted Position

The retracted position must be adjusted if the tip of any finger is hanging over the needle slot, or if all three finger tips are more than 1/8" from the edge of the slot (see Figure 6). Adjust the retracted position by adjusting the Twine Finger Stop Bolt (see Figure 7) located just ahead of the Twine Finger drive shaft. A single adjustment affects all three Twine Fingers.

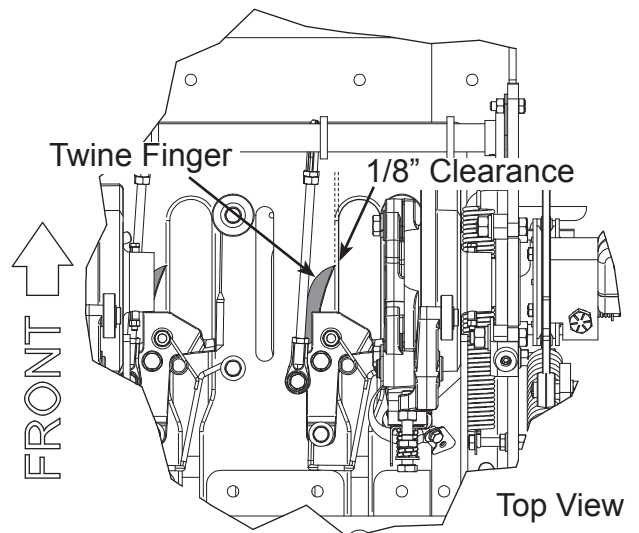


Figure 6 - Twine Finger Clearance

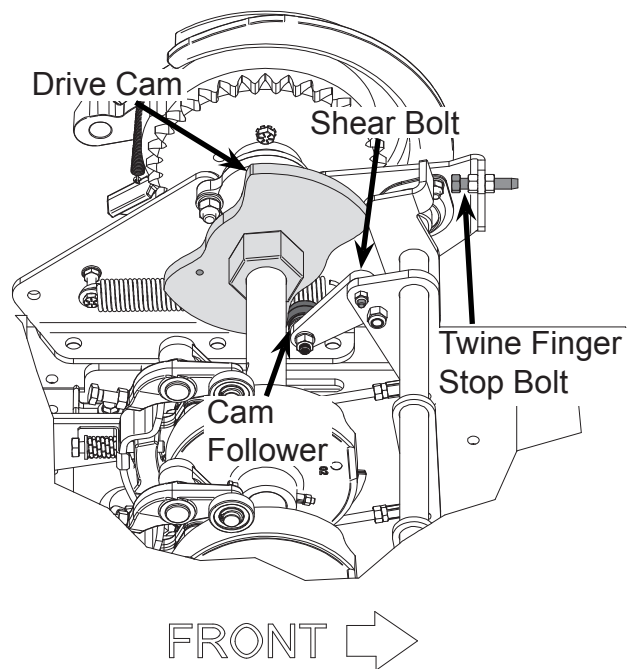


Figure 7 - Twine Finger Stop Bolt Location

Needle Settings

Note: The Twine Fingers must be adjusted before resetting the needles (see “Twine Finger” on page 10).

There are three needle adjustments:
Needle Alignment, Needle Height and Full Travel.

WARNING

Always shut off baler and tractor before adjusting, lubricating or servicing the baler.

Needle Alignment

Adjust your needle alignment when the needles are at top dead center (TDC). TDC is when the needles are at the highest point of travel. At this time the Needle Yoke Drive Rod is in the 11 o'clock position (see Figure 8).

Adjust the needle alignment by loosening the bolts at the needle base and sliding the needle left or right as necessary (see Figure 11).

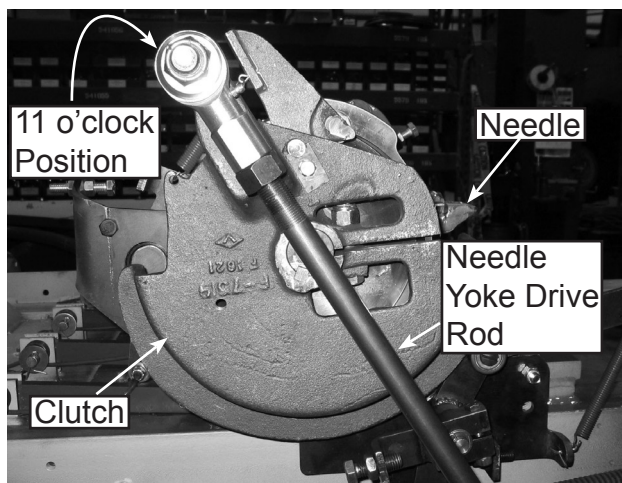


Figure 8 - Needles at TDC, left-hand view.

At TDC the needles should be close to or make light contact with the knotter frames. Make sure there is no more than 1/16" gap between the needle and the knotter frame (see Figure 9). Light contact between the needle side and the knotter is actually preferred, and is acceptable as long as no more than a 3 lb force is required to move the needle away.

The needles may be bent side to side as needed, if the needles are centered in the bottom slots but the tips of the needles do not match the conditions described above.

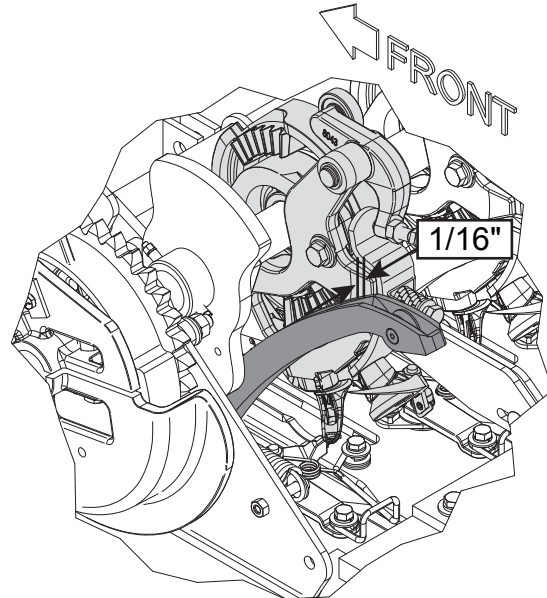


Figure 9 - Needle/Knotter Clearance

Needle Height

The height of the needle is determined as it passes the Twine Finger while the tip of the Twine Finger is in the middle of the needle slot (see Figure 10). The needles should be set such that there is 1/8" to 1/4" clearance between the needle and the edge of the Twine Finger at the closest point (see Figure 10). Take this measurement as the needles are on the upward stroke through the chamber top plate.

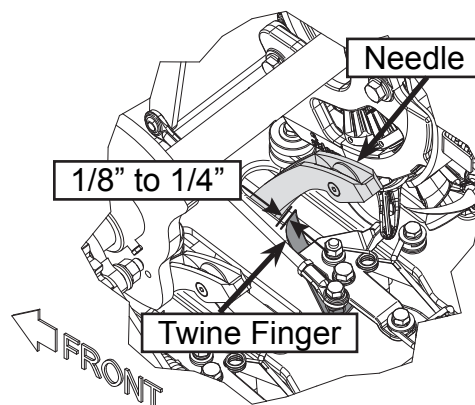


Figure 10 - Needle/Twine Finger Clearance

If necessary, adjust the needle position by loosening and tightening the appropriate bolts at the base of the needle. Tightening the front bolt to raise the needle, tightening the rear bolt to lower the needle (see Figure 11).

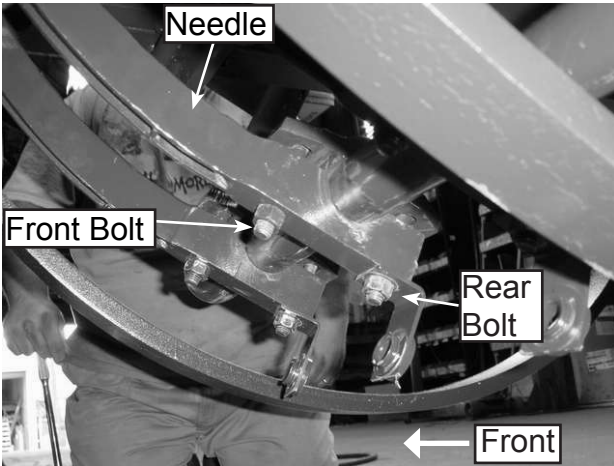


Figure 11 - Position Needles Adjustment

Needle Full Travel

Measure the needle's full travel position at TDC. The center of the needle roller should measure 6" \pm 1/4" from the back side of the knotter shaft (see Figure 12).

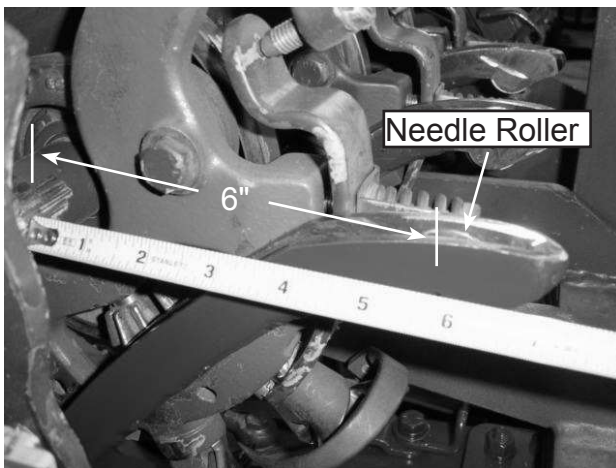


Figure 12 - Needle Measurement

Adjust the amount of needle travel by turning the needle yoke drive rods attached to each end of the knotter shaft (see Figure 13). Loosen the jam nuts and turn each rod an equal amount in order to keep them equally loaded. Note that the upper rod end bearing has left-hand thread.

NOTICE

At TDC, the load on both needle yoke drive rods must be equal. If one is too tight and the other loose, adjust accordingly.

If the Twine Finger collides with the needle roller on the down stroke (or needle side near the roller) adjust the needle yoke drive rods shorter to raise the needle closer to 6 1/4" position at the instant the Twine Fingers activate (see Figure 12).

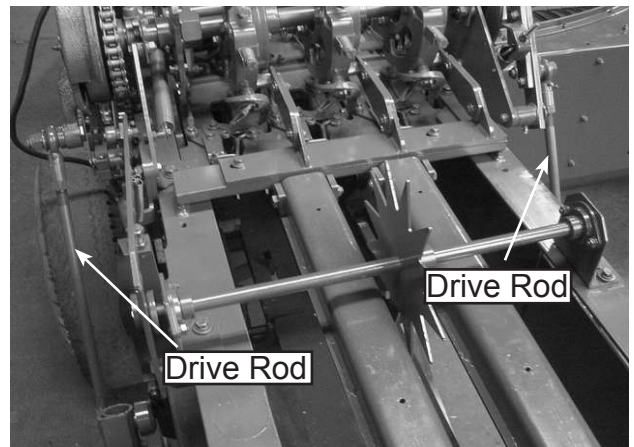


Figure 13 - Adjusting Drive Rods

Knотter Position

A properly positioned bill hook is essential for consistent tying. The proper position of knотter is determined by gauging the bill hook to the twine guide distance. Check the knотter position by turning the knотter shaft with a wrench until the bill hook is pointing straight forward. The distance from the front edge of the twine guide to the tip of the bill hook (see Figure 14) should be 5/8" \pm 1/16".

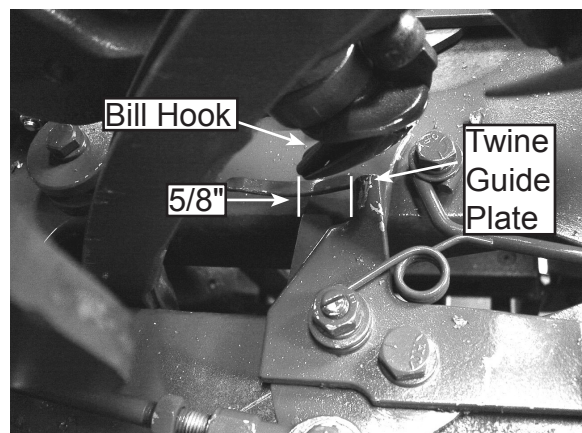


Figure 14 - Twine Guide/Bill Hook Distance

Adjust the knotter position by loosening the two bolts in the anchor plate and sliding the anchor forward or rearward as required (see Figure 15).

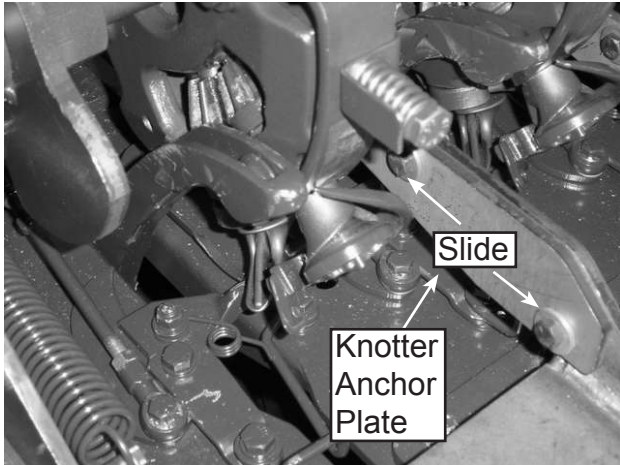


Figure 15 - Knotter Anchor Plate

Position the knotter with a wrench as shown in Figure 17 to check the clearance between the Twine Guide Plate and Bill Hook. Rotate the knotter shaft until the Needle Yoke Drive Arm is in the 12 o'clock position (See Figure 18). This will rotate the bill hook above the twine guide plate. If any knotter on the baler has clearance less than 1/64", the knotter mounts should be shimmed (see "Knotter Mount Shimming Instructions" on page 15).

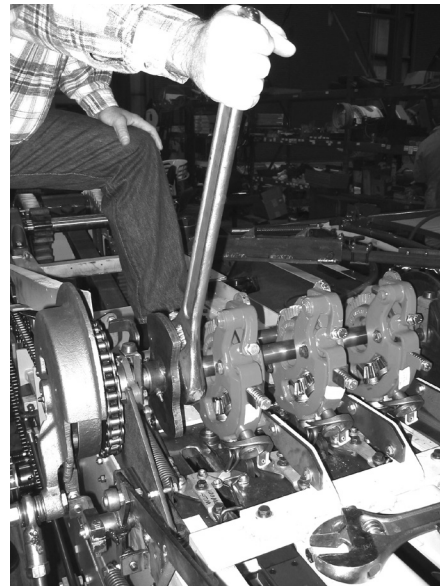


Figure 17 - Positioning the Knotter



WARNING

Always shut off baler and tractor before adjusting, lubricating or servicing the baler.

Bill Hook Twine Guide Clearance

Moving the knotter position affects the clearance of the bill hook over the twine guide plate, and the clearance over the twine guide plate will change.

The proper clearance between the twine guide plate and bill hook is 1/64" to 1/16" (see Figure 16) at the point of bill hook rotation which brings it closest to the guide plate.

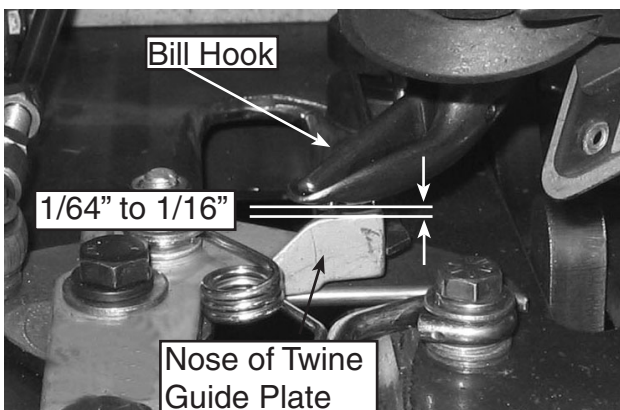


Figure 16 - Bill Hook Clearance

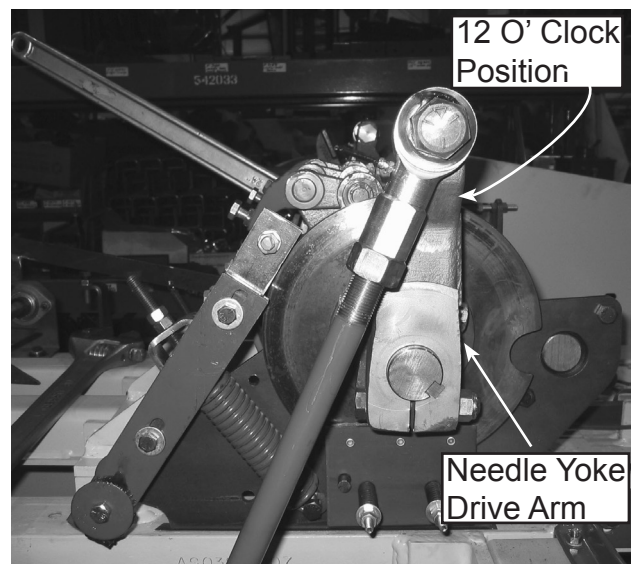


Figure 18 - Needle Yoke Arm in 12 o'clock Position, Right-Hand Side View

Knotter Mount Shimming Instructions

If the clearance between the Bill Hook and the Twine Guide Plate is less than 1/64", then you need to install Knotter Mount Shims. Install 1 shim (see Figure 20) under each knotter mount. Insure that the slots are pointing to the inside of the chamber, towards the knotter assembly.

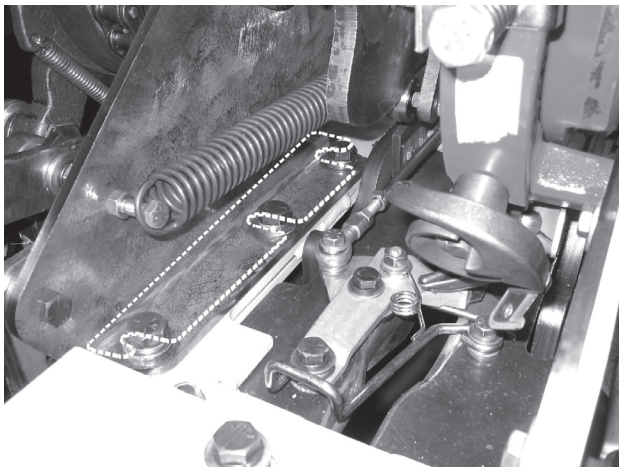


Figure 19 - Left-Hand Knotter Mount

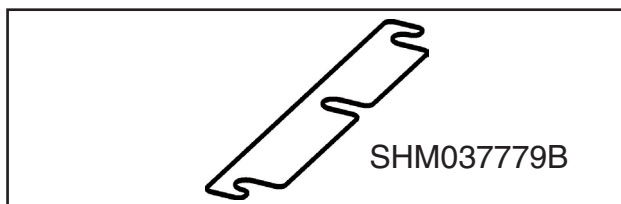


Figure 20 - Knotter Mount Shim

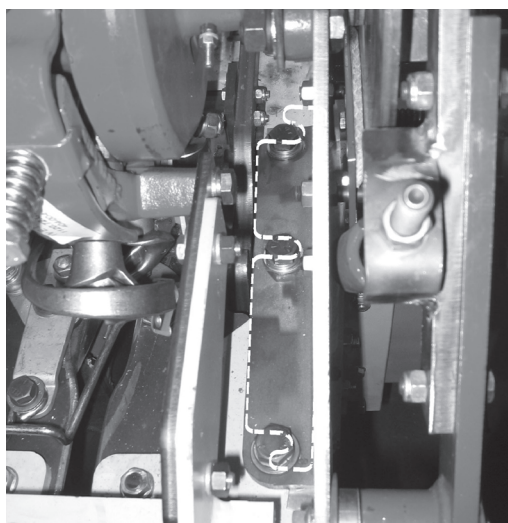


Figure 21 - Right-Hand Knotter Mount

Once the shims are in place and you have tightened the knotter mounts (torque bolts to 75 ft-lbs.), check the clearance between the bill hook and twine guide plate. Make sure the clearance is between 1/64" and 1/16". Add another shim to each side, if needed.

Twine Holder

There are two adjustments for setting the twine holder tension. The Tying Holder Bolt controls how firmly the twine is held while the knotter is turning, the Bale Forming Bolt controls how firmly the twine is held while the bale is being formed (see Figure 22 & Figure 23).

Adjust the Tying Holder bolt so that the spring is compressed to 1-1/2" (see Figure 22). This adjustment will vary slightly with different grades and sizes of twine. This setting may be too tight if you notice excessive twine strands building up in the twine holder. Material in the holder will affect tying, keep the holders clean.

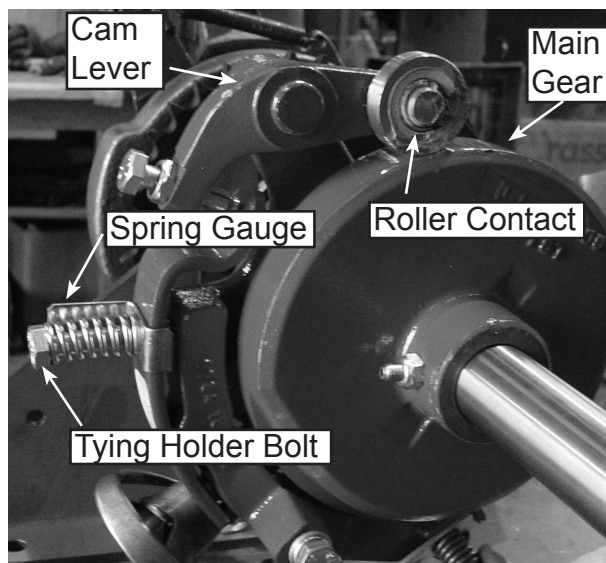


Figure 22 - Tying Holder Bolt

To set the Bale Forming tension, first remove all twine from the twine holder (see Figure 23). The bale forming tension is set by loosening the jam nut and turning the Bale Forming Bolt until it just contacts the Twine Holder Clamp Leaf Spring. Turn the bolt 3-1/2 additional turns to compress the Twine Holder Clamp Leaf Spring. Remember to tighten the jam nut. Because of variations in Leaf Springs, the bolt settings may differ visually from one knotter to the next. This adjustment must be made with no twine in the holder.

It is acceptable to increase the Bale Forming Bolt tension as needed, but it is important that the Twine Holder Clamp completely releases tension while the knotter cycles. After adjusting the Bale Forming Bolt tension, always rotate the knotter shaft to make certain the Tension Lever releases tension from the Twine Holder Clamp Leaf Spring during the tie cycle.

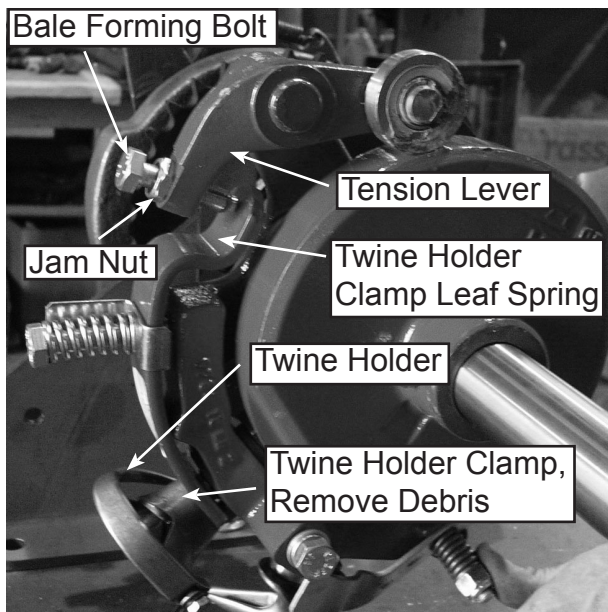


Figure 23 - Set the Bale Forming Holder

Bill Hook Trigger

There is one adjustment for setting the Bill Hook trigger tension. If the bill hook trigger is too tight, the knot may stay on the Bill Hook and the twine may break. If the trigger is too loose, the tail of the knot may release too early and will not form a good knot. To adjust the trigger tension, turn the nut to compress the spring to a length of 1-1/4" (see Figure 24). Due to variations in the Bill Hook Trigger Spring Force, the adjustment length may have to be adjusted to 1-1/8". This is especially required if the Bill Hook Trigger is causing the twine in the loop to fray when the knot is pulled from the Bill Hook.

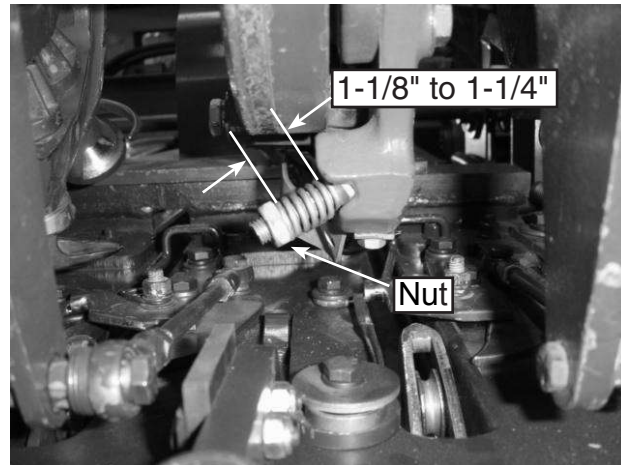


Figure 24 - Trigger Tension

Twine Stop And Angle Spring

The twine stop spring must maintain slight pressure (2-3 lb) against the end of the twine guide plate. The twine guide spring helps hold the twine when the Twine Finger rotates around. If the spring is too loose then the knotter will not tie a good knot. If necessary, adjust the stop spring as required (see Figure 25). The Angle and Stop spring help hold the twine while the bale is being formed.

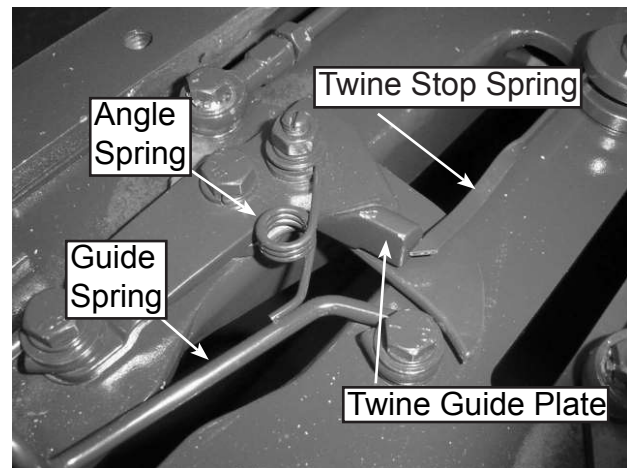


Figure 25 - Twine Stop Spring

Twine Routing



Always shut off baler and tractor before threading the knotter.

1. Feed twine through twine guides in the twine box.

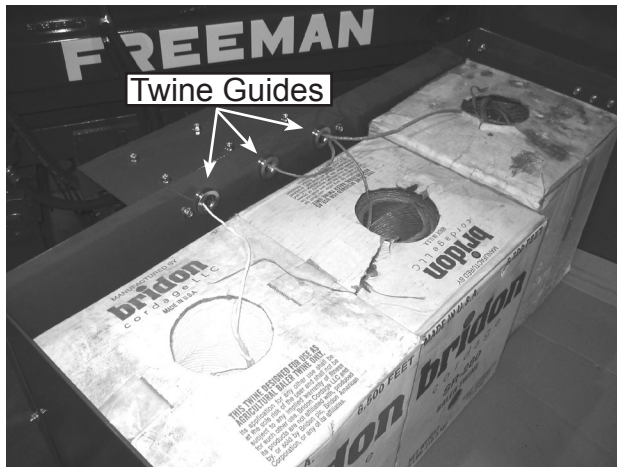


Figure 26 - Twine in Twine Box

2. Feed twine through twine tension assemblies.

It is important that the three twine tension assemblies (see Figure 27) are adjusted so that there is a slight amount of drag on the twine (4lbs of tension on the twine when the knotter is tying).

If the twine tensioner is too loose, the twine lashes out and the Twine Fingers are not able to grasp the twine, or both. If the twine tensioner is too tight, it may break or come out of the twine holder.

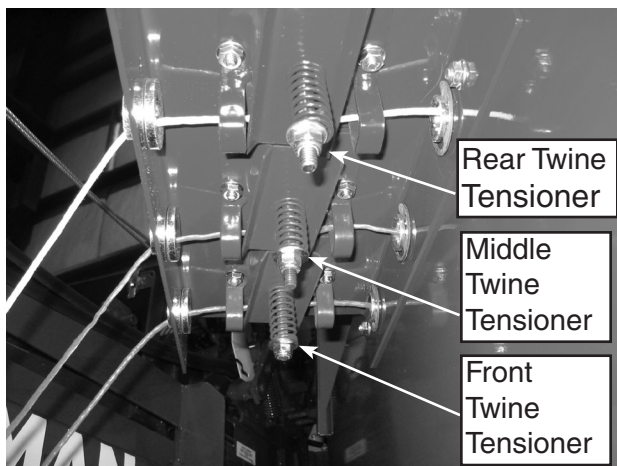


Figure 27 - Twine Tension Assemblies

3. Feed twine through guides on lower chamber.

Twine from rear tensioner should go to the top guide in bracket mounted to the lower right side of chamber (see Figure 28).

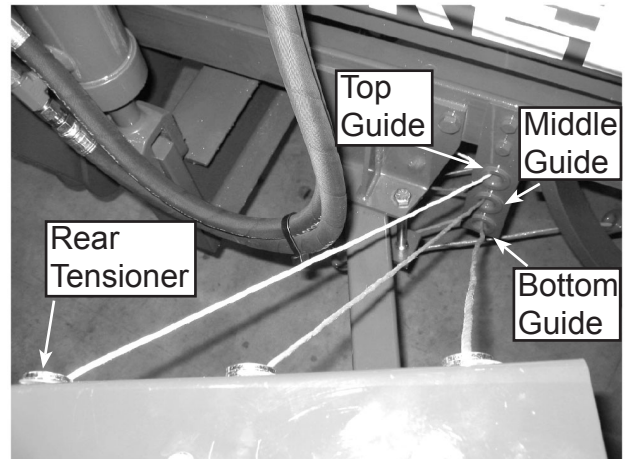


Figure 28 - Twine Box to Bottom Twine Guide Bracket

4. Feed twine through the slack pullers. Twine from top guide should go to the left slack puller (see Figure 29).

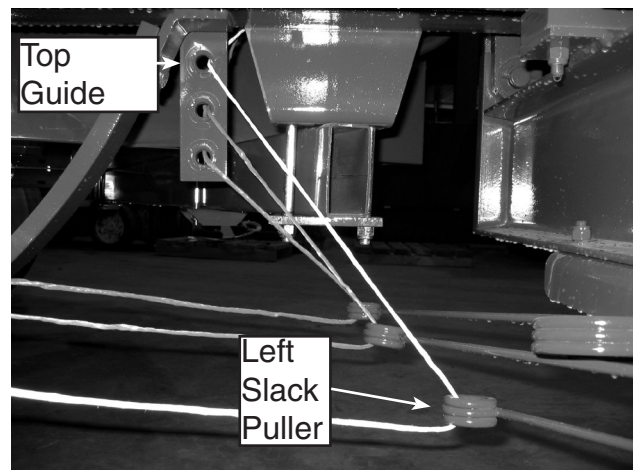


Figure 29 - Chamber Guides to Slack Pullers

5. Feed twine through the twine guides on the back of the needles (see Figure 30).

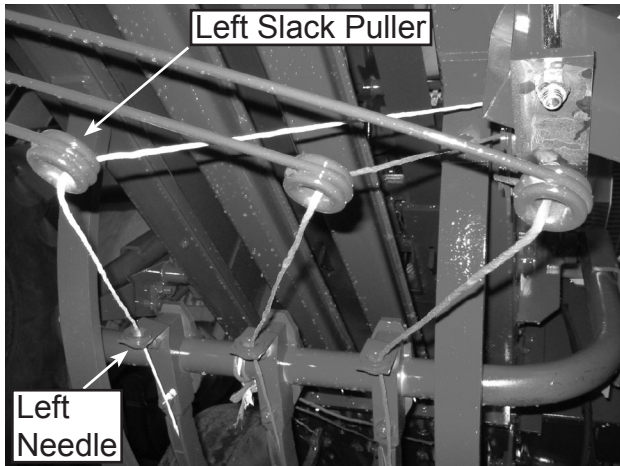


Figure 30 - Slack Pullers to Needles

6. Route twine so it glides on top of the roll pins that are in the twine needles (see Figure 31). Each Needle has 3 roll pins.

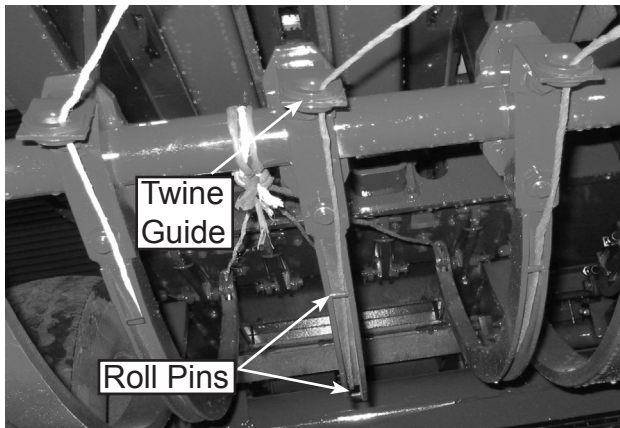


Figure 31 - Twine Needles

7. Route Twine through eye of needle and over the roller (see Figure 32).

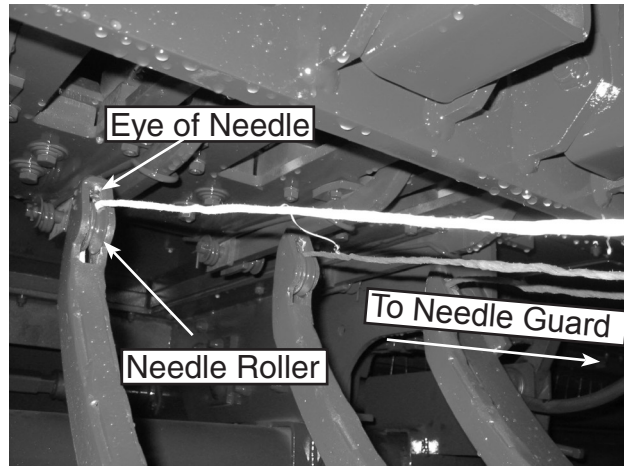


Figure 32 - Twine Over Rollers

8. Tie twine to the top of the Needle Guard (see Figure 33). This is to hold the twine in place while the first bale is being formed. You are now ready to bale.

NOTICE

A knot will form and may stay on the Bill Hook after the first tie cycle and cause the twine to tangle in the next tying cycle. This happens because the first bale is usually not heavy enough to pull the knot off the Bill Hook. Remove the knot before the next tie cycle.

Also remove the ends of twine from the needle guard after the first tie cycle so they don't tangle with the incoming twine.



Figure 33 - Needle Yoke

Proper Twine Position

Proper twine position with the needles in the home position. Twine must rest on the trigger side of the bill hook and pass over the twine guide (see Figure 34).

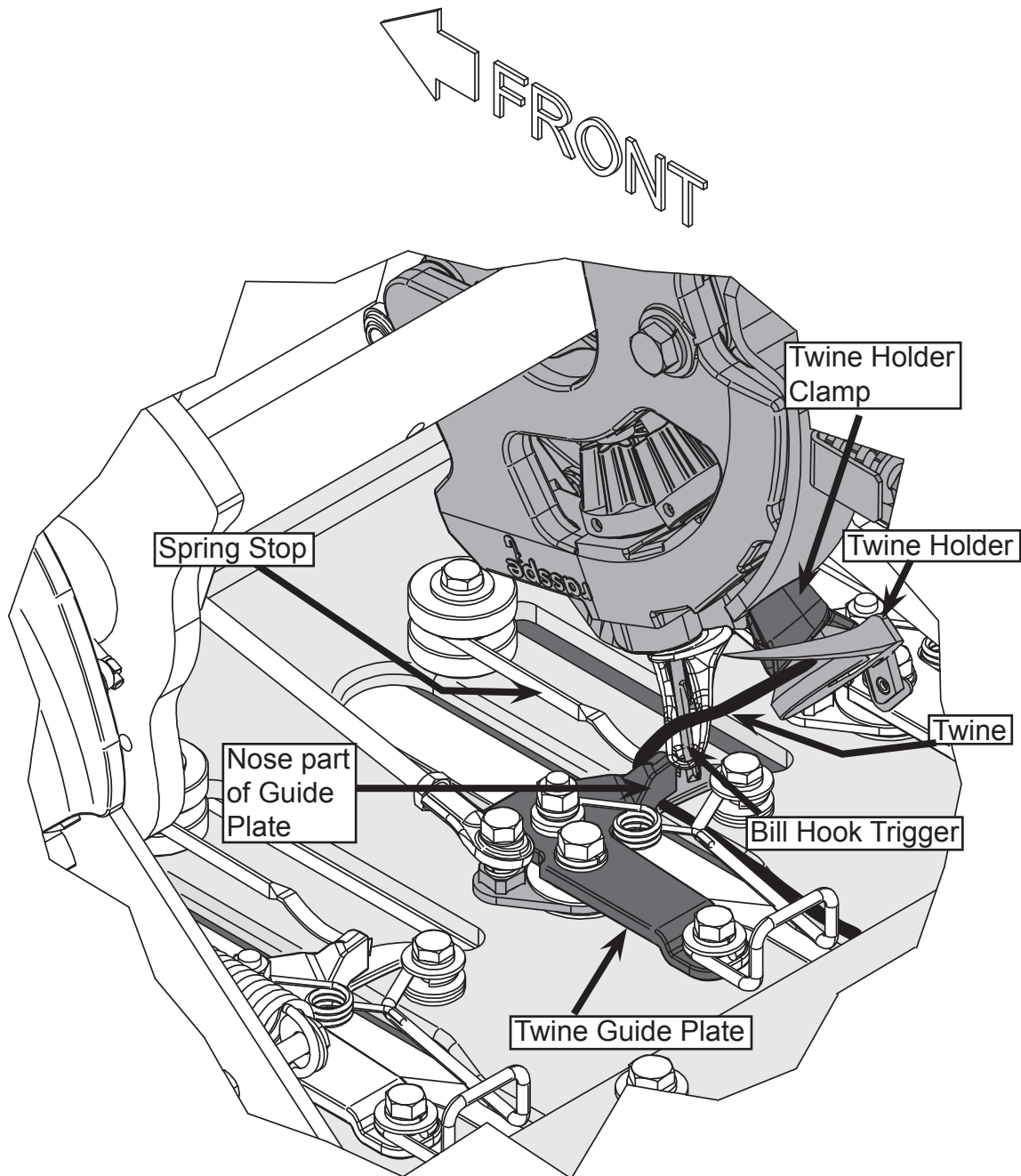


Figure 34 - Twine Position

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Knotter Troubleshooting

When having a knotter problem, or missing a knot on one twine or another, it is important to determine which twine is not tying properly. The TOP twine is the twine that is being held in the knotter while the bale is being formed. The BOTTOM twine is the twine that the needle delivers to the knotter to tie the bale. When a mis-tie occurs you must locate the problem twine (Top or Bottom) and determine:

1. Is the end of the untied twine frayed, or cut off square?
2. Is there any damage to the twine? Frayed along the length? Frayed beyond the knot?
3. Is the twine long enough to wrap around the bale?
4. Is there twine tangled in the knotter?

Miss-ties during the knotting process will not always be a malfunction of the knotter frame components. Always check the following before appraising the knotter frame components.

1. Check twine delivery from the twine box. Are the twine boxes correctly tied together so as not to obstruct free feeding?
2. Is the twine properly routed to the needles?

3. Ensure the twine guides and/or needles have no sharp or worn edges.
4. Slack pullers must be properly threaded and operate freely.
5. Twine tensioners are properly adjusted when the twine has approximately 4 pounds of pull, while the knotter is tying.
6. Check hay dogs for proper operation, and or broke or missing springs. Hay dogs will wear, and are very important. If unable to correct a twine finger mis-tie, it is possible that the hay dogs have worn and are not properly holding the end of the bale.
7. Check bale weight/density. Too light of a bale may cause the knot to hang on the bill hook, and too heavy of bale can cause several different mis-ties (see chart on next page).
8. Are all the necessary components in proper adjustment? Remember any time you replace or adjust a needle, the twine finger must be checked and probably adjusted at the same time.
9. Next to the hay dogs, the twine fingers are important to keep in good operating condition. They cannot have excessive play in the pivot, and they must be free of any nicks or burrs that may damage the twine.

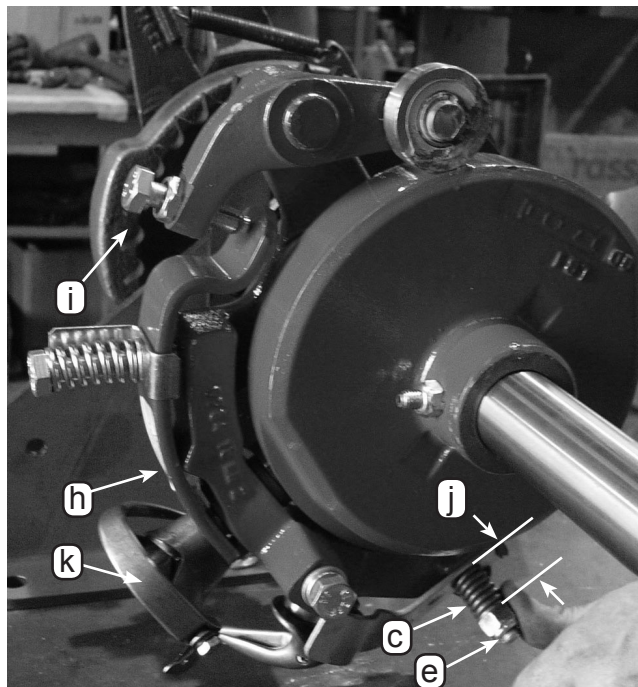


Figure 35 - Tailless Twine Knotter

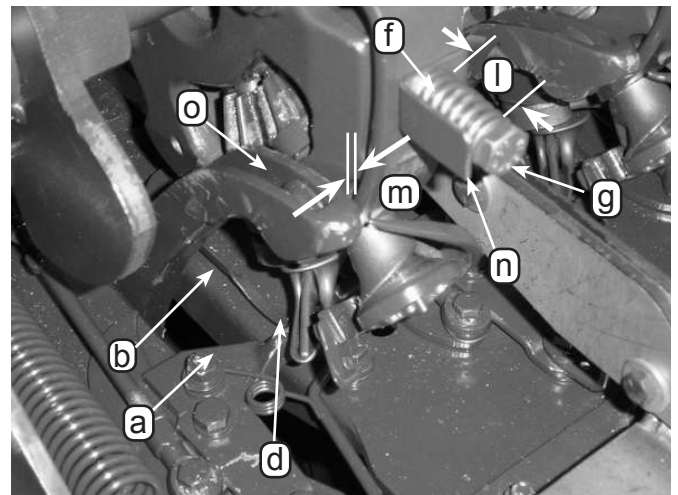







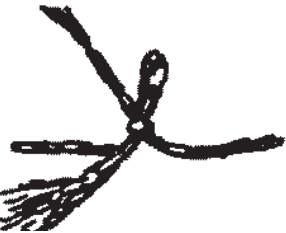




Figure 36 - Tailless Twine Knotter

The “Knotter Troubleshooting Table” on page 22 includes the most common examples of failed knots, along with possible causes, and possible remedies. Refer to Figure 35 and Figure 36 for the letters referenced in the table.

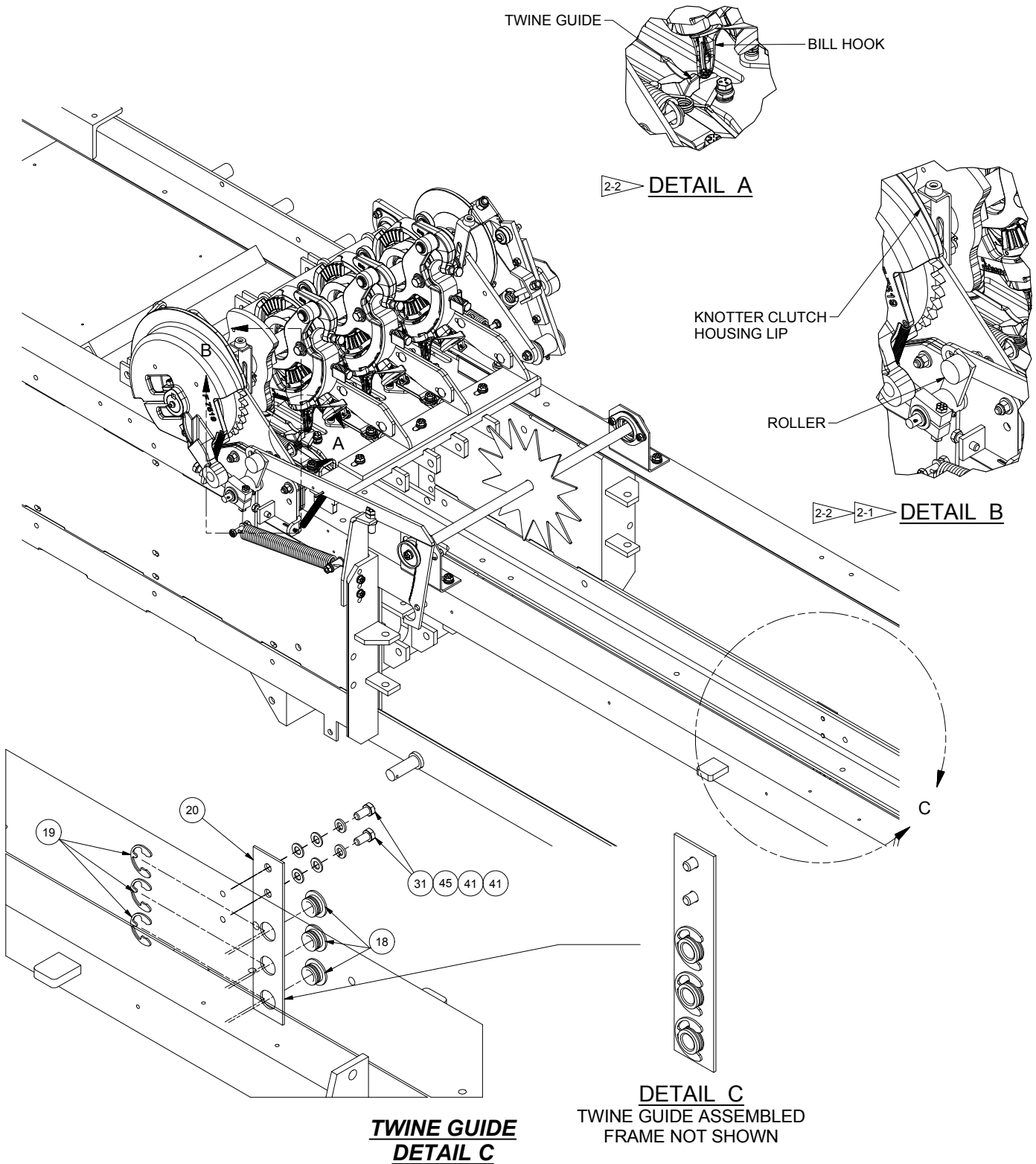
Knotter Troubleshooting Table

Problem	Possible Cause	Possible Remedy
 <p>Knot well formed but too tight, twine torn off.</p>	Twine tensioners (see Figure 27 on page 17) are too loose; after knotting cycle, the twine continues to go past the nose of twine guiding plate (a).	Tighten springs on the twine tensioner (Figure 27 on page 17)
	Twine finger does not hold twine; after knotting turn, the twine continues pass the noose of twine guiding plate (a).	Correctly adjust twine finger (Figure 4 on page 10)
	Paint or dirt causes spring (b) to jam.	Clean Spring (b).
 <p style="text-align: center;">Short Loop</p>	Spring (c) is not tight enough, twine is not held tight enough by bill hook (d).	Tighten nut (e). Comply with control measurement (j) See "Bill Hook Trigger" on page 16.
 <p style="text-align: center;">Knot is not tied</p>	Spring (c) is much too loose. Bill hook (d) holds twine much too loosely.	
 <p>Long end of twine frays out. Twine rest in twine holder</p>	Spring (f) is too tight.	Loosen screw (g) , comply with control measurement (l). The measuring guide beside the the spring indicates the correct height. Use screw (g) to correct deviations.
 <p>Ends are torn off, twine rest of approx 5 cm fall off</p>	Spring (f) is much too tight.	

Problem	Possible Cause	Possible Remedy
 <p data-bbox="167 499 605 548">Knots seem to be tight, but when stressed, an end is pulled out</p>	<p data-bbox="621 289 1060 317">Bill hook (d) does not close correctly.</p>	<p data-bbox="1076 289 1515 380">Tighten nut (e) , comply with control measurement (j), if necessary clean the knotter.</p>
 <p data-bbox="167 804 605 852">Only knotter twine end knotted, loop end too short</p>	<p data-bbox="621 569 1060 659">Spring (h) is not tight enough, twine holder (k) does not hold twine during baling.</p>	<p data-bbox="1076 569 1515 625">Tighten screw (i), To set the bale forming holder.</p>
 <p data-bbox="167 1108 605 1157">Tied in a single knot, whereby the twine goes back to the next bale.</p>	<p data-bbox="621 873 1060 963">Needle is too far from baling frame. Twine holder (k) and knotter do not get to the twine.</p>	<p data-bbox="1076 873 1515 963">Adjust needle closer to leaf spring plate (m): No more than 1/16" clearance.</p>
 <p data-bbox="167 1430 605 1478">Only one twine end knotted, loop end long.</p>	<p data-bbox="621 1178 1060 1304">Knottter (d) does not get the twine brought up by the needle. Crop between ram and upper chamber pushes twine from bill hook (d).</p>	<p data-bbox="1076 1178 1515 1331">See "Needle Settings" on page 12. Check twine finger and needle clearance on upward stroke. Remove crop between ram and upper ground.</p>
 <p data-bbox="167 1734 605 1759">Correctly tied knot</p>	<p data-bbox="621 1497 1060 1554">All control measurements are correct and springs are correctly tightened.</p>	

Knotter Installation, Tailless

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TWINE GUIDE
DETAIL C

DETAIL C
TWINE GUIDE ASSEMBLED
FRAME NOT SHOWN

Knotter Installation, Tailless

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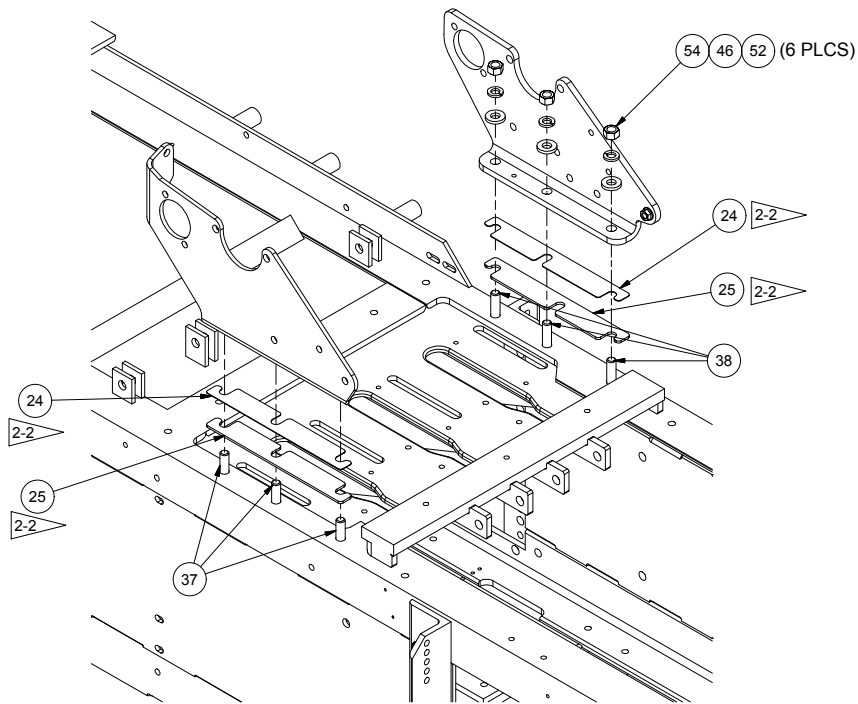
Item	Part No.	Qty	Description	Item	Part No.	Qty	Description
906850				Knotter Installation, Tailless			
1	ROD037018B	3	. Rod, Drive	34	R13801813	2	. Capscrew
2	BRG0001300	3	. Bearing, Rod End	35	221569W	1	. Capscrew
3	BRG0001301	3	. Bearing, Rod End	36	Y09C-M1025	3	. Capscrew
4	906848	3	. Twine Finger, Tailless	37	Y09G-0832	3	. Capscrew
5	WAS037715A	6	. Washer	38	Y09G-0836	3	. Capscrew
6	WLG0000003	3	. Spring, Stop	39	233972	6	. Bolt, Carr
7	WLG0000001	3	. Knotter Twine Guide Plate	40	223428	23	. Flat Washer
8	WLG0000002	3	. Knotter Stop Spring	41	223427	24	. Flat Washer
9	WLG0000005	3	. Knotter Angle Spring	42	WCTM100080	6	. Flat Washer
10	* 903301	1	. Knotter Sub-Assembly, Tailless	43	296420W	3	. Hard Washer
11	ANC0033729	1	. Anchor, Knotter	44	R13812513	16	. Lockwasher
12	** SAL0000004	1	. Meter Wheel Assembly	45	R13812514	12	. Lockwasher
13	*** SAL0000580	1	. Mounting Assembly, Knotter Trip	46	R13812516	6	. Lockwasher
14	SHM037348B	2	. Pivot Plate Shim, 1/4"	47	WLKM000080	3	. Lockwasher
15	SHM037350B	2	. Pivot Plate Shim, 1/8"	48	WLKM000100	3	. Lockwasher
16	SHM037349B	2	. Pivot Plate Shim, 3/16"	49	Y22E-05	3	. Washer, High Collar
17	906846	3	. Bushing	50	R13802914	2	. Hard Washer
18	F000000856	3	. Bushing	51	Y27E-06	2	. Washer
19	F000000857	3	. Ring, Snap	52	221771W	6	. Washer
20	F000000525	1	. Plate, Holder	53	221705W	10	. Hex Nut
21	F000001632	1	. Plate, Stop	54	221712W	6	. Hex Nut
22	SPC0033118	1	. Spacer	55	R13803725	3	. Hex Nut
23	BKT0033732	3	. Bracket	56	NCHM008125	3	. Hex Nut
24	SHM037779B	6	. Shim, 20GA	57	NFL0003125	3	. Jam Nut
25	906854	2	. Shim, 10GA	58	234218	2	. Jam Nut
26	F000001517	1	. Spring, Trip	59	232939	2	. Nut, Esna
27	R13810838	3	. Capscrew	60	R13811191	2	. Locknut
28	18496W	3	. Capscrew	61	WAS3751500	6	. Washer, Fender
29	R13811015	2	. Capscrew				
30	R13811016	6	. Capscrew				
31	162572W	6	. Capscrew				
32	Y17C-0616	6	. Capscrew				
33	221499W	3	. Capscrew				

* See Seperate Coverage Page 31
 ** See Seperate Coverage Page 39
 *** See Seperate Coverage Page 40

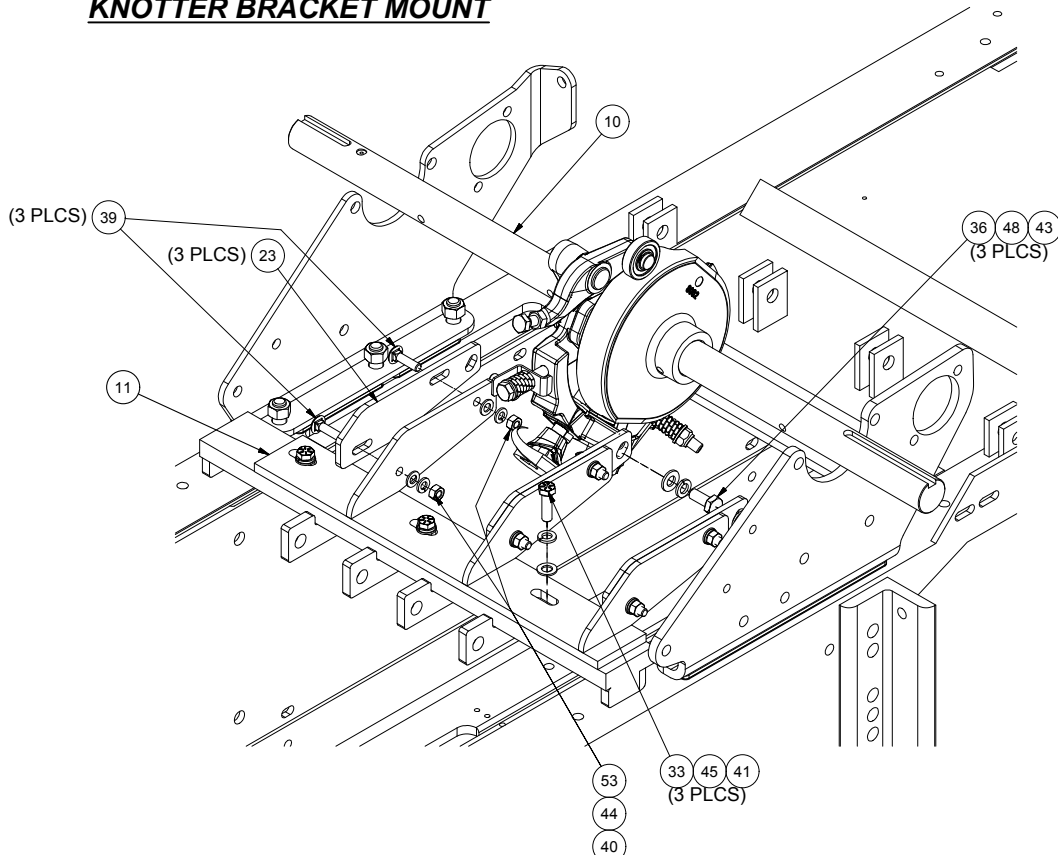
Rev B

Knotter Installation, Tailless

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KNOTTER BRACKET MOUNT

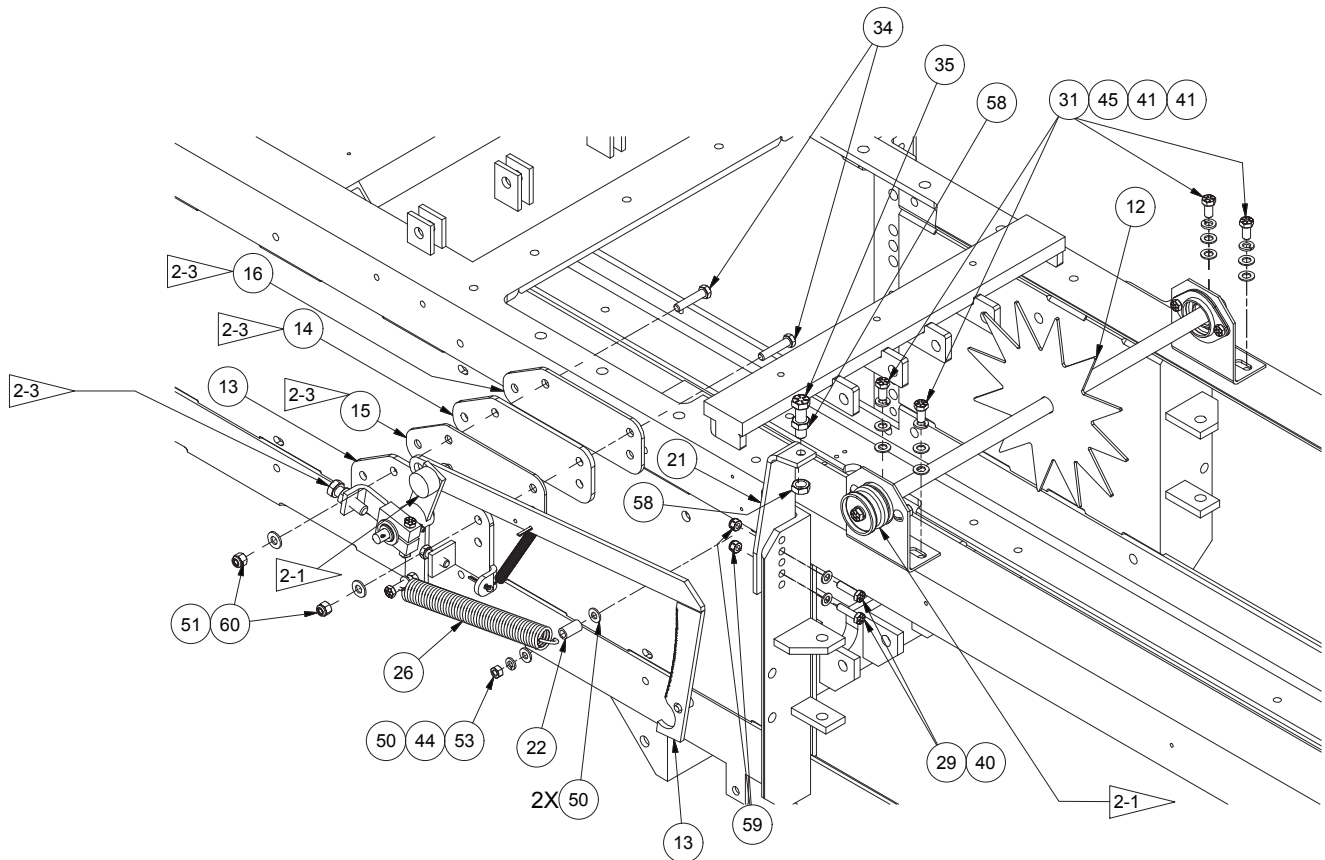


KNOTTER ANCHOR AND BRACKETS (3 PLCS)

NOT KNOTTER ASSEMBLY
PARTS SHOWN FOR CLARITY

Knotter Installation, Tailless

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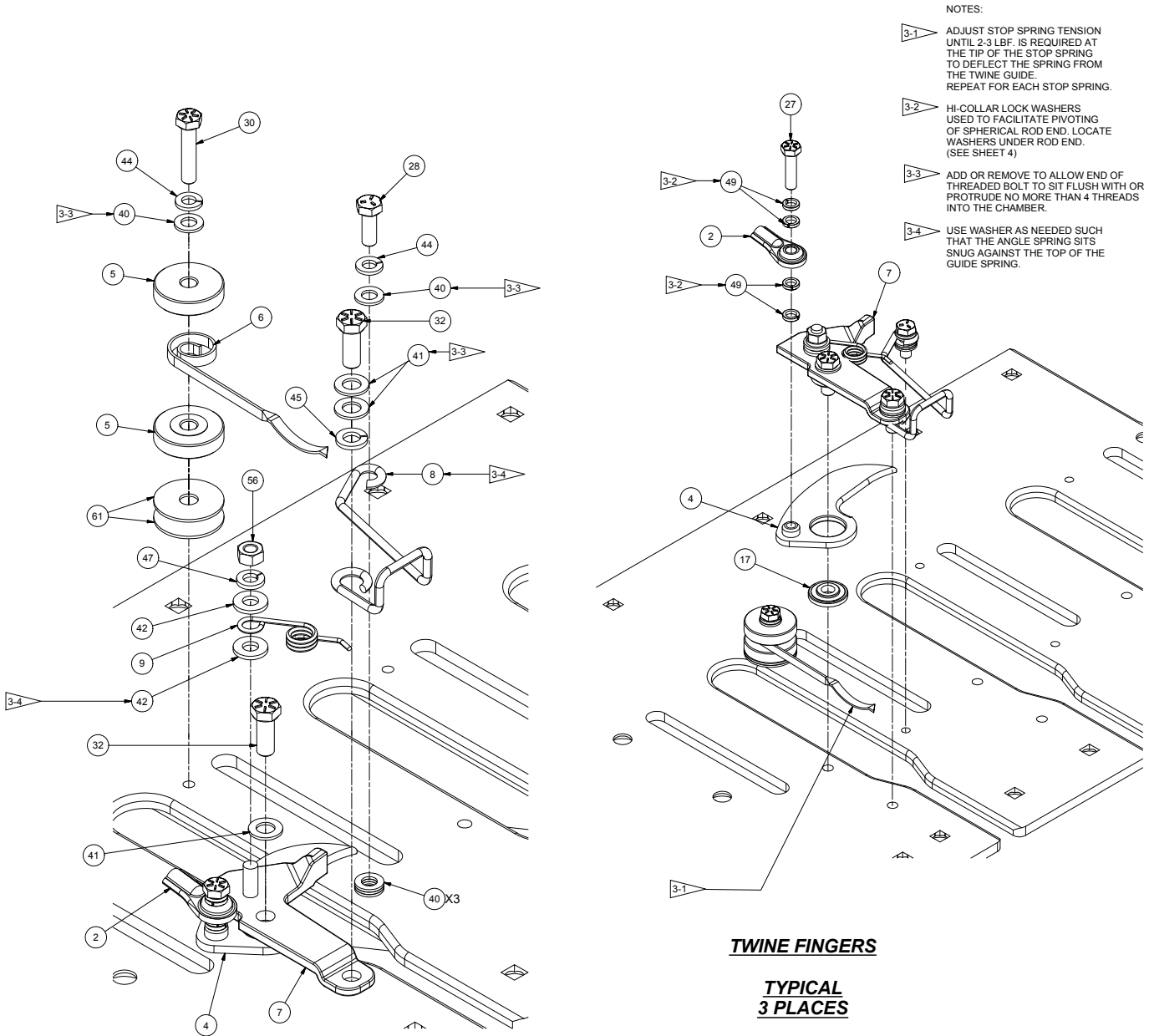
KNOTTER TRIP ASSEMBLY AND WHEEL ASSEMBLY

NOTES:

- 2-1 **METER WHEEL INSTALLATION**
 1/8" CLEARANCE BETWEEN METER WHEEL TRIP ARM AND KNURLED DISC. THE CAM-FOLLOWER MUST RIDE ON THE CLUTCH HOUSING LIP.
- 2-2 SHIM USING 10 & 20 GA SHIMS (ITEM #24 AND ITEM #25) UNTIL KNOTTER SHAFT IS PARALLEL TO BALER FRAME AND THE BILLHOOK TO TWINE GUIDE DISTANCE IS 1/16" BUT NO LESS THAN 1/64" SEE DETAIL A PAGE 1
- 2-3 SHIM WITH ITEMS # 14, 15, & 16 UNTIL ROLLER IS CENTERED ON THE LIP OF THE KNOTTER CLUTCH HOUSING. SEE DETAIL B PAGE 1

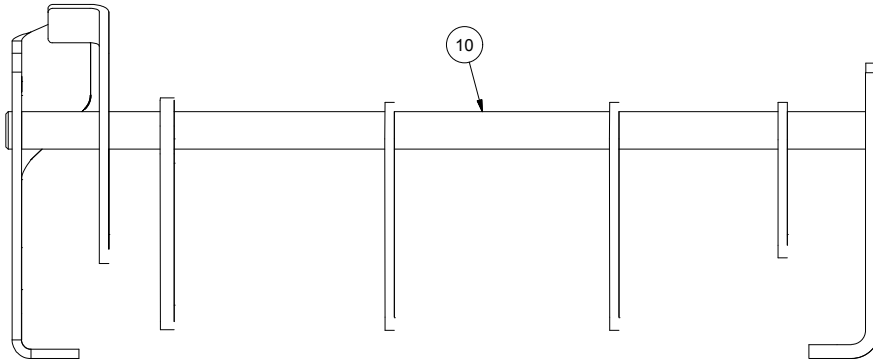
Knotter Installation, Tailless

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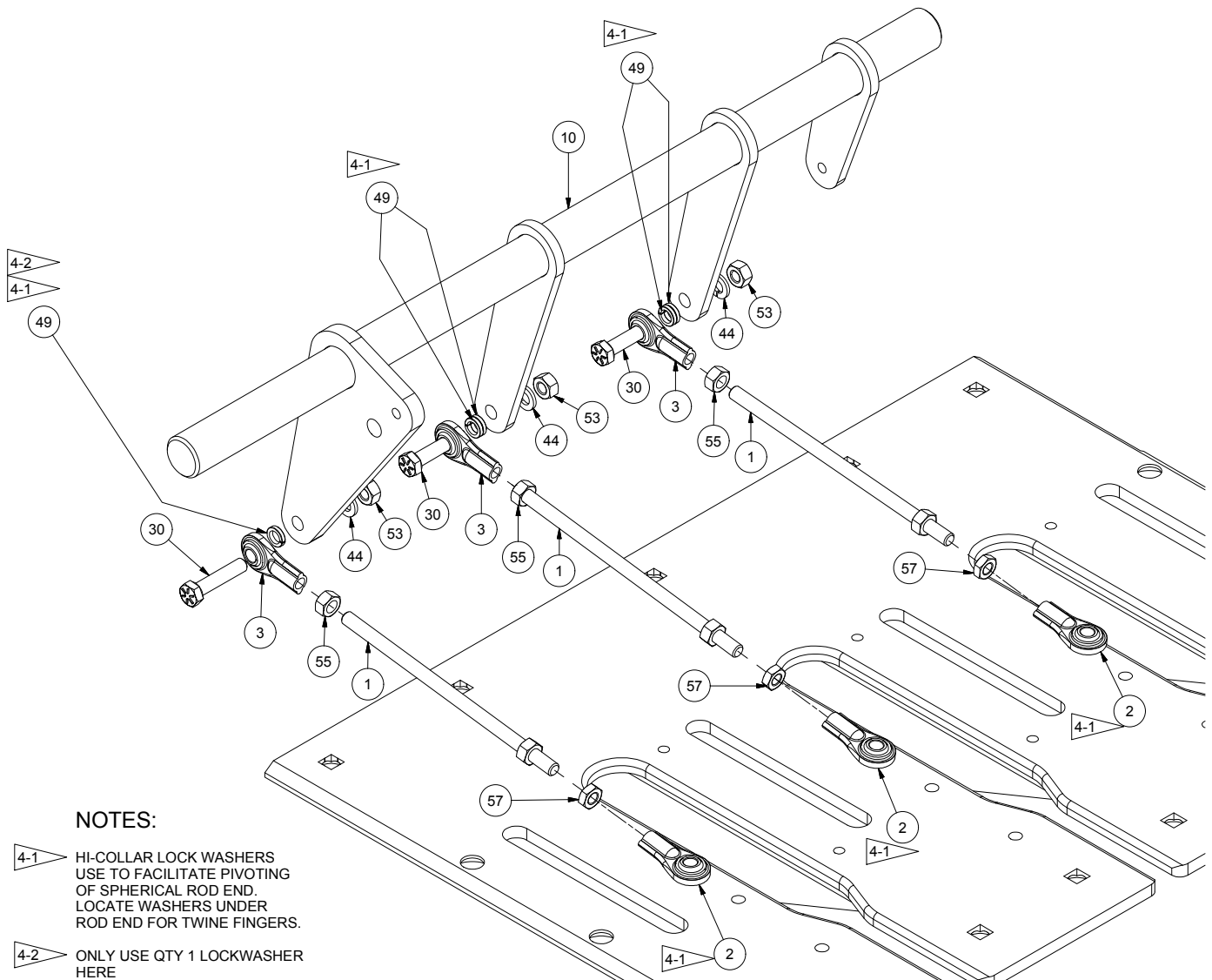


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TWINE FINGER DRIVE ROD LOCATION



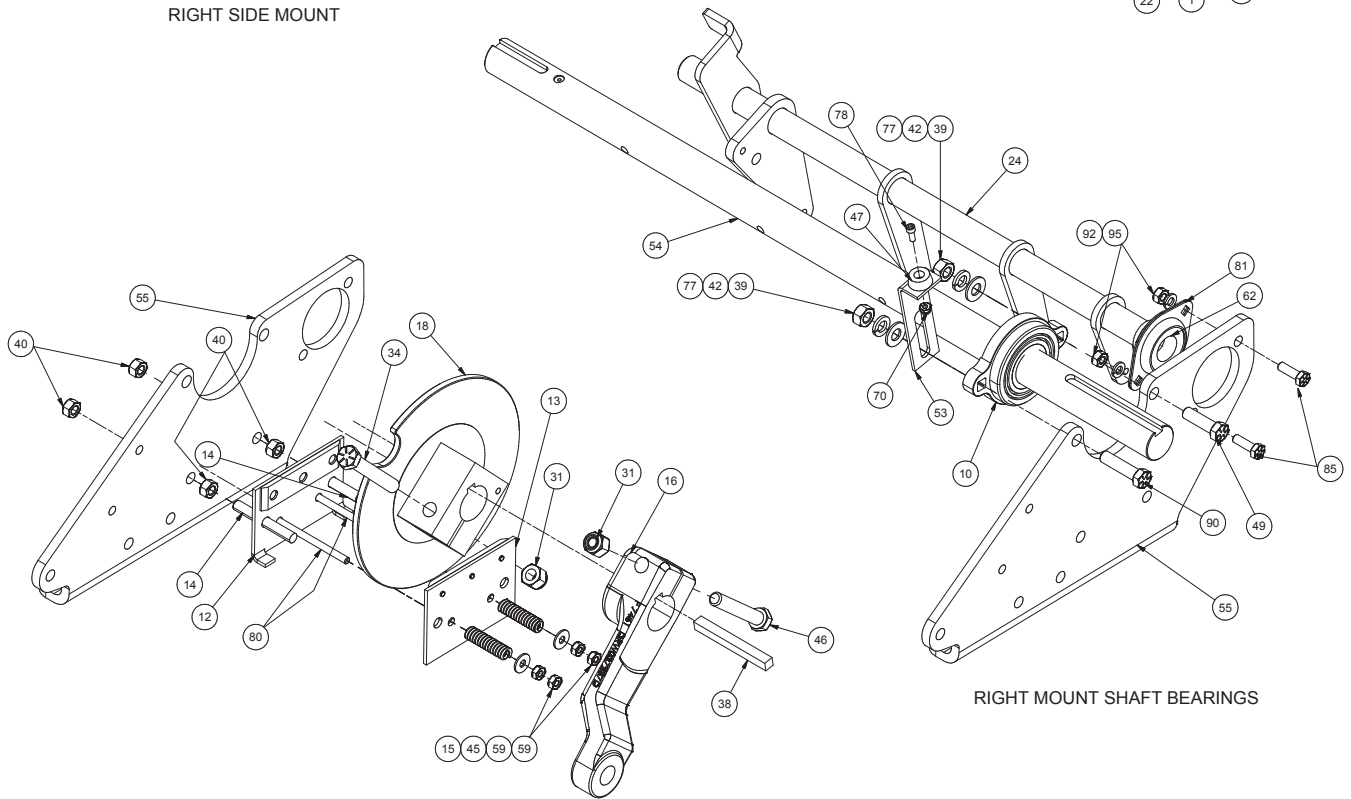
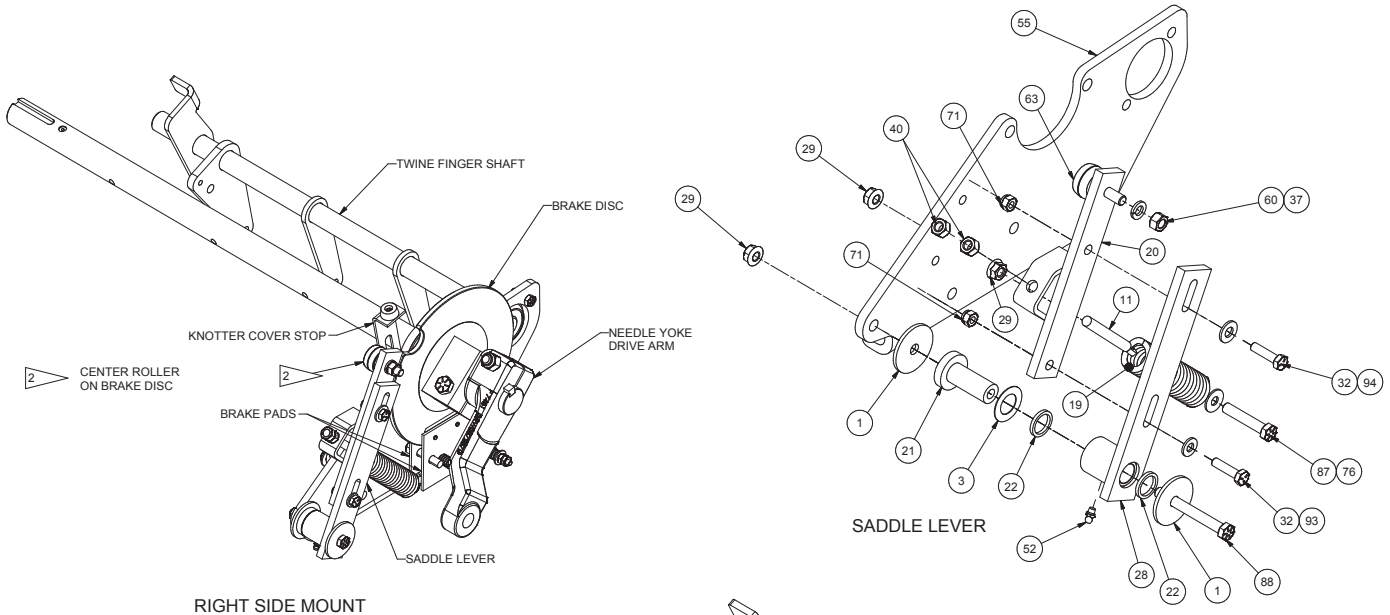
NOTES:

- 4-1 HI-COLLAR LOCK WASHERS USE TO FACILITATE PIVOTING OF SPHERICAL ROD END. LOCATE WASHERS UNDER ROD END FOR TWINE FINGERS.
- 4-2 ONLY USE QTY 1 LOCKWASHER HERE

DRIVE RODS

Knotter Sub-Assembly, Tailless

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Knotter Sub-Assembly, Tailless

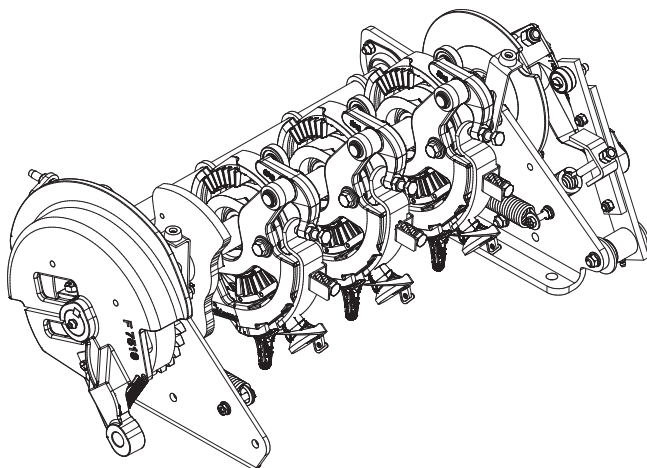
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Item	Part No.	Qty	Description	Item	Part No.	Qty	Description
903301 Knotter Sub-Assembly, Tailless							
1	F000000246	2	. Washer	51	900249	1	. Clutch Disc & Brg Assembly
2	F000000755	1	. Sprocket, Clutch		F000004133	1	.. Bearing
3	F000000802	1	. Feed Arm Washer	52	F000004089	1	. Zerk
4	F000004136	3	. Washer	53	STO0022419	2	. Bar, Stop
7	F000004135	1	. Race, Inner	54	SHF0035600	1	. Shaft, Knotter
8	F000004160	5	. Mach Bushing	55	903197	1	. Plate, RH Mounting
9	F000004161	2	. Mach Bushing	56	903198	1	. Plate, LH Mounting
10	F000007063	2	. Bearing	57	CAM0033569	1	. Cam
11	F000007448	1	. Saddle Lever Spring Eyebolt	58	LEV0035616	1	. Plate, Lever
12	F000007449	1	. Brake Plate, Inside W/Lining	59	221703W	4	. Hex Nut
13	F000007450	1	. Outside Brake Plate W/Lining	60	221708W	6	. Hex Nut
14	F000007451	2	. Brake Plate Stud	61	18466W	1	. Capscrew
15	F000007453	2	. Brake Plate Spring	62	F000006003	2	. Bearing
16	F000007461	1	. Drive Arm, Needle Yoke	63	F000001572	2	. Follower, Cam
17	* F000007519	1	. Housing Assembly, Knotter Clutch	65	WLG0001064	4	. Hex Bolt
18	F000007528	1	. Brake Disc	66	WLG0001065	4	. Hex Nut M5
19	F000007559	1	. Saddle Lever Spring	67	R13812482	4	. Lockwasher
20	F000007560	1	. Lever	68	WLG0001063	4	. Pin, Expanding
21	F000007585	1	. Sleeve, Lever	69	09416918	4	. Nut, Serrated
22	F000007587	2	. Seal	70	223799	2	. Nut, Esna
23	F000007904	1	. Key	71	232939	2	. Nut, Esna
24	903196	1	. Drive Shaft	73	235620	1	. Nut, Esna
25	WES0000375	2	. External Star Washer	76	223428	4	. Flat Washer
27	HTB0030006	1	. Capscrew	77	R13811432	4	. Hard Washer
28	LEV0025133	1	. Lever Assembly	78	234991	2	. Capscrew
	F000007586	1	.. Bushing	79	** 255675	3	. Knotter, Tailless
29	09411507	3	. Nut, Serrated	80	234867	2	. Capscrew
30	R13811016	2	. Capscrew	81	F000006004	4	. Flangette
31	223587	2	. Nut, Esna	82	F000007977	1	. Shim
32	18498W	2	. Capscrew	83	R13801783	2	. Capscrew
34	R13811082	1	. Capscrew	85	R13811014	4	. Capscrew
37	R13812514	2	. Lockwasher	86	R13811017	2	. Capscrew
38	ZZ00000419	1	. Key	87	R13811039	1	. Capscrew
39	R13803713	4	. Hex Nut	88	221518W	1	. Capscrew
40	221707W	8	. Hex Nut	89	221532W	1	. Capscrew
41	F000007978	1	. Shim	90	R13801834	3	. Capscrew
42	223595	4	. Lockwasher	91	222677	2	. Flat Washer
43	F000001517	2	. Spring, Trip	92	R13812513	4	. Lockwasher
44	11079	1	. Fitting, Lube	93	R13802914	1	. Hard Washer
45	R13811443	4	. Flat Washer	94	Y27E-06	1	. Washer
46	R13801850	1	. Capscrew	95	221705W	6	. Hex Nut
47	BMP0004243	2	. Bumper, Rubber	96	224119	1	. Nut, Esna
48	16805W	2	. Capscrew				
49	134328W	2	. Capscrew				
50	00274218	4	. Nut, Serrated				

* See Seperate Coverage Page 35

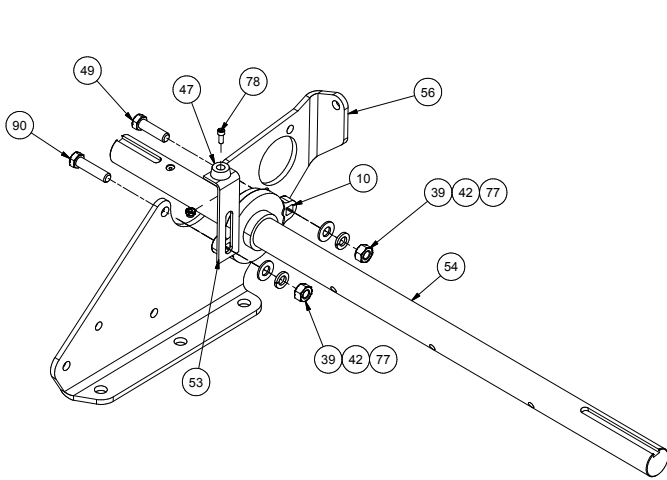
** See Seperate Coverage Page 37

Rev F

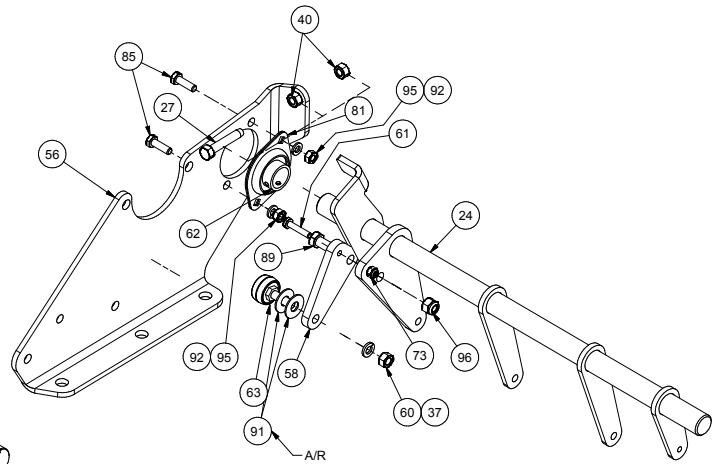


Knotter Sub-Assembly, Tailless

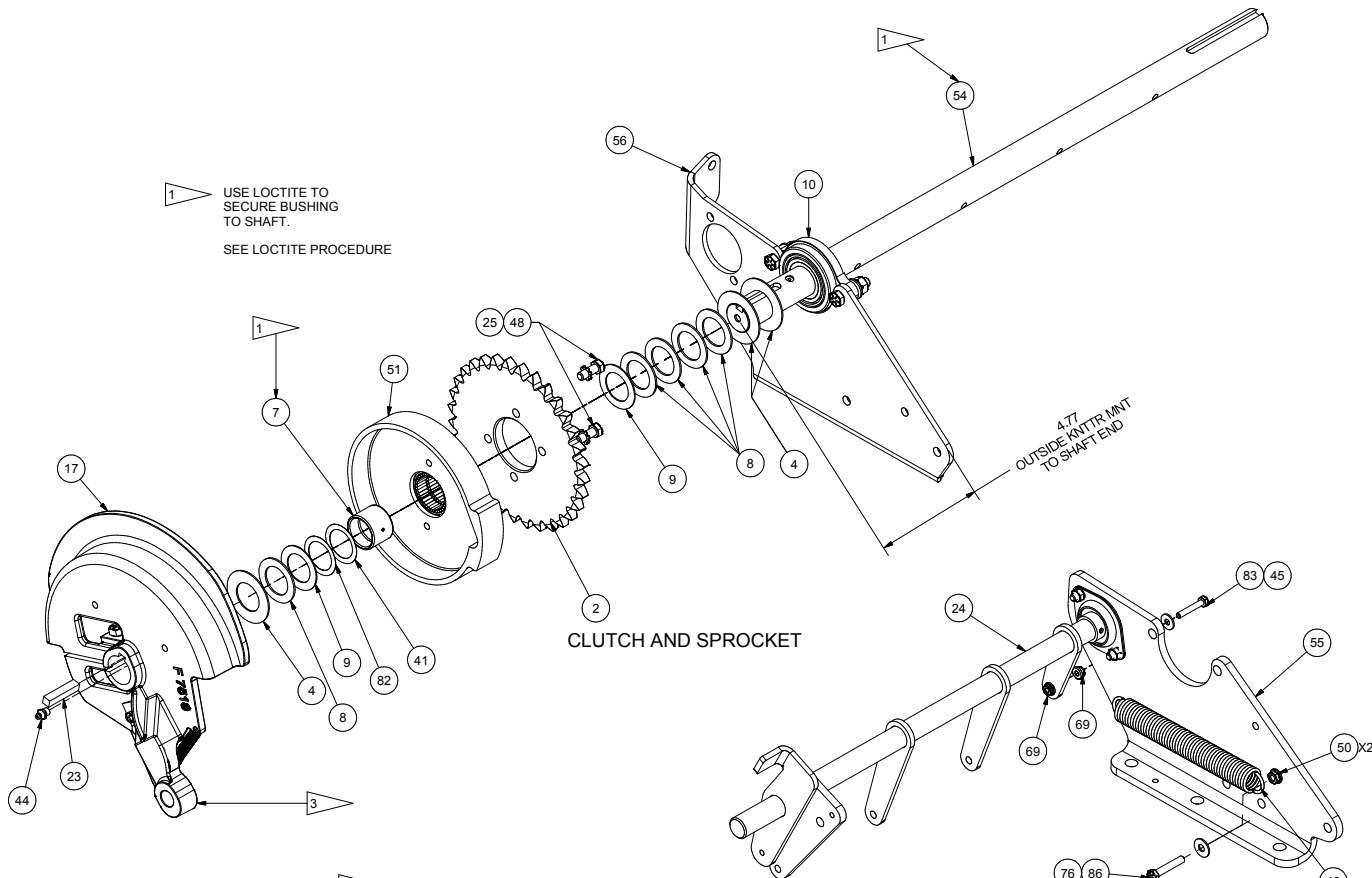
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LEFT SIDE KNOTTER SHAFT BEARING



LEFT SIDE TWINE SHAFT

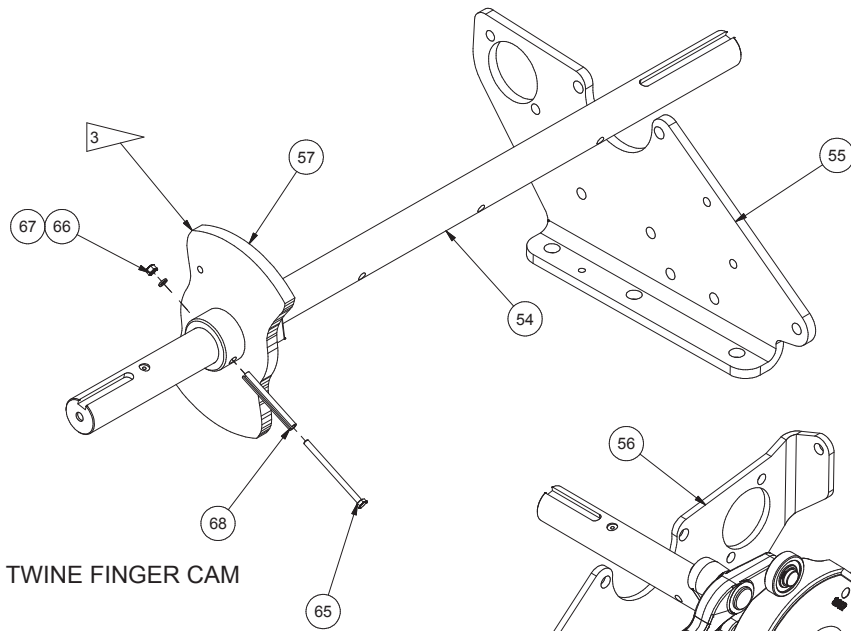
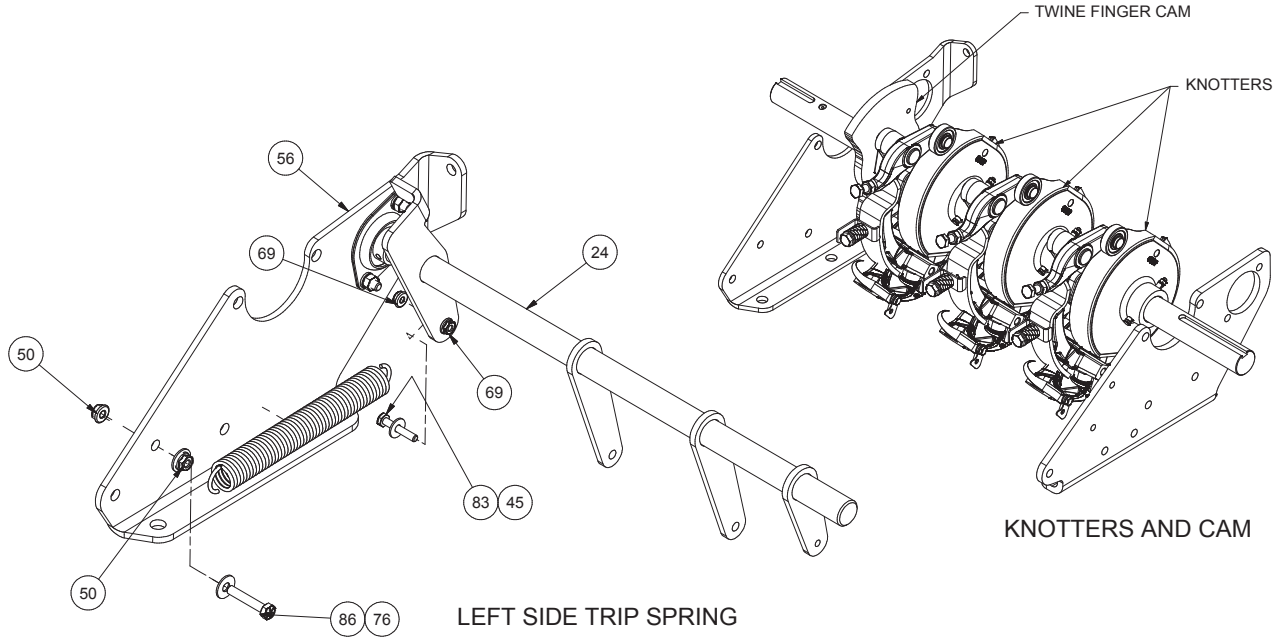


CLUTCH AND SPROCKET

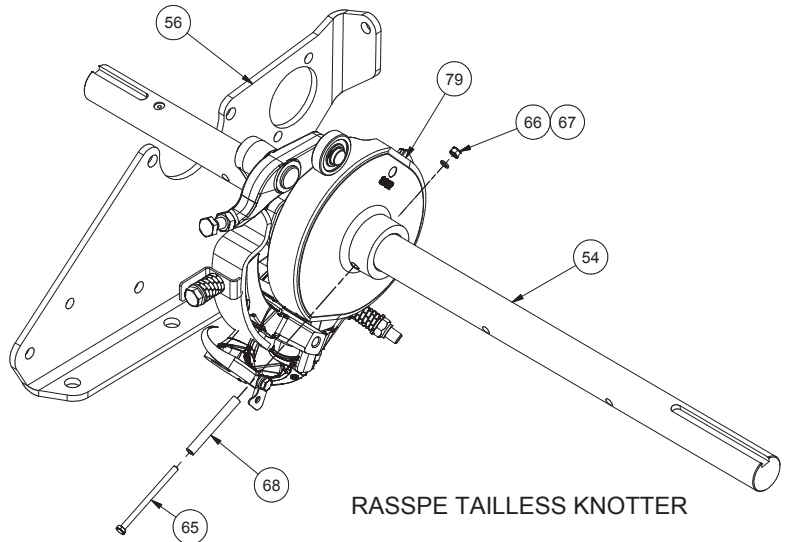
TRIP SPING, RIGHT MOUNT

Knotter Sub-Assembly, Tailless

Page 4 of 5



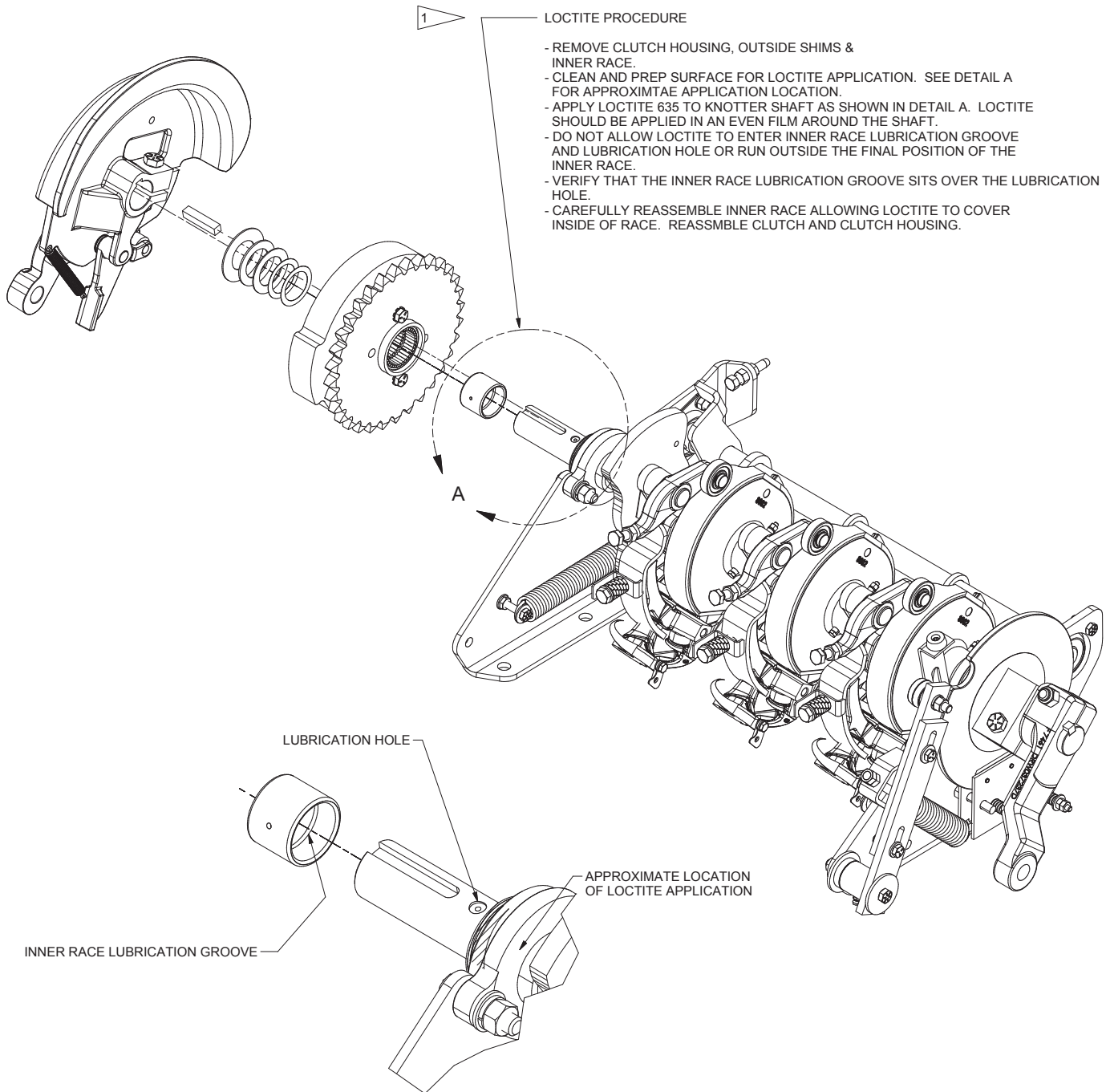
3 ADD ANTI-SEIZE TO THE INSIDE SURFACE OF THE MOUNTING COLLAR.



TYPICAL
3 PLACES

Knotter Sub-Assembly, Tailless

Page 5 of 5



LOCTITE PROCEDURE

- REMOVE CLUTCH HOUSING, OUTSIDE SHIMS & INNER RACE.
- CLEAN AND PREP SURFACE FOR LOCTITE APPLICATION. SEE DETAIL A FOR APPROXIMATE APPLICATION LOCATION.
- APPLY LOCTITE 635 TO KNOTTER SHAFT AS SHOWN IN DETAIL A. LOCTITE SHOULD BE APPLIED IN AN EVEN FILM AROUND THE SHAFT.
- DO NOT ALLOW LOCTITE TO ENTER INNER RACE LUBRICATION GROOVE AND LUBRICATION HOLE OR RUN OUTSIDE THE FINAL POSITION OF THE INNER RACE.
- VERIFY THAT THE INNER RACE LUBRICATION GROOVE SITS OVER THE LUBRICATION HOLE.
- CAREFULLY REASSEMBLE INNER RACE ALLOWING LOCTITE TO COVER INSIDE OF RACE. REASSEMBLE CLUTCH AND CLUTCH HOUSING.

LUBRICATION HOLE

APPROXIMATE LOCATION OF LOCTITE APPLICATION

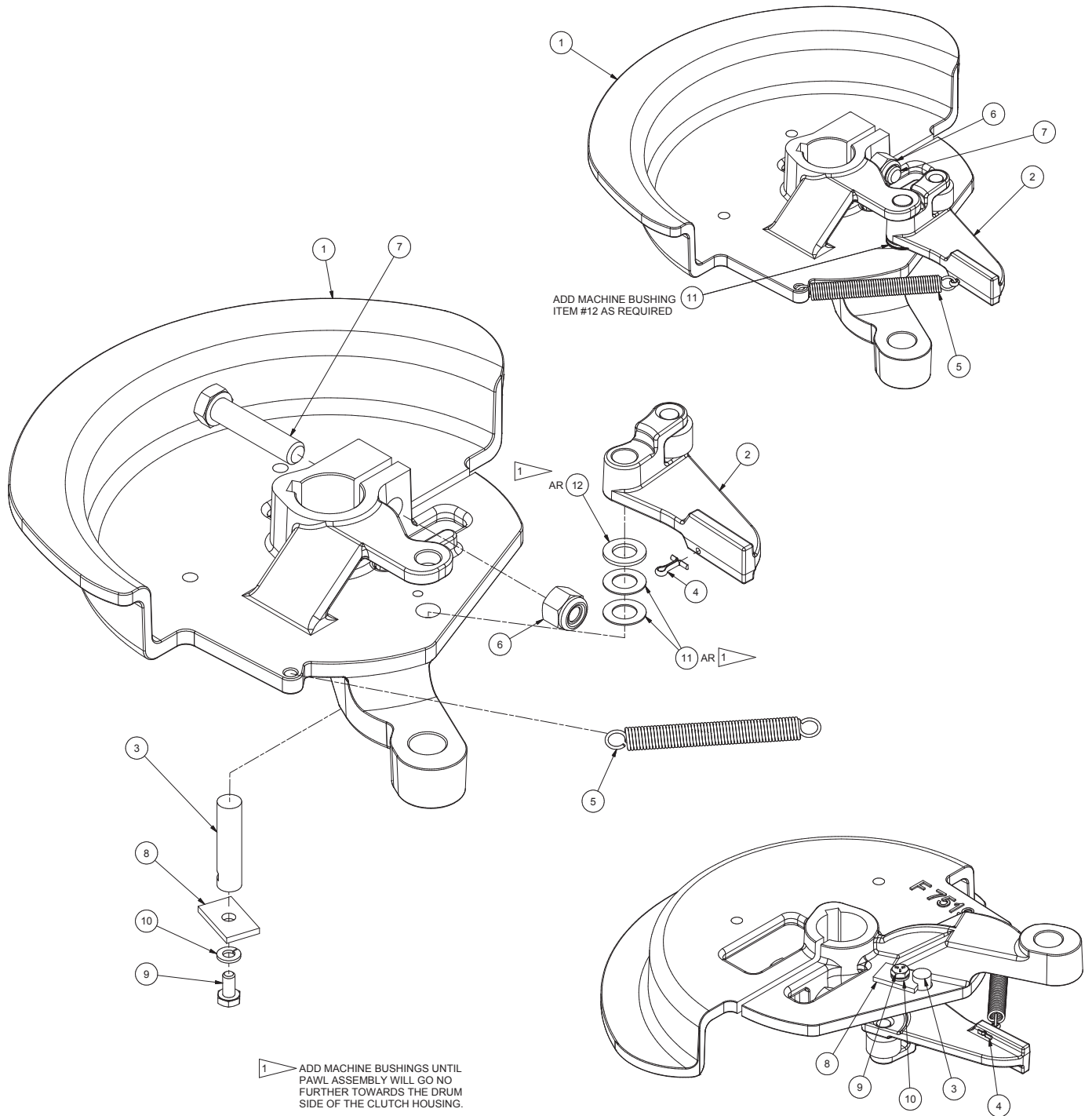
INNER RACE LUBRICATION GROOVE

DETAIL A

SOME ITEMS NOT SHOWN FOR CLARITY

Clutch Housing Assembly

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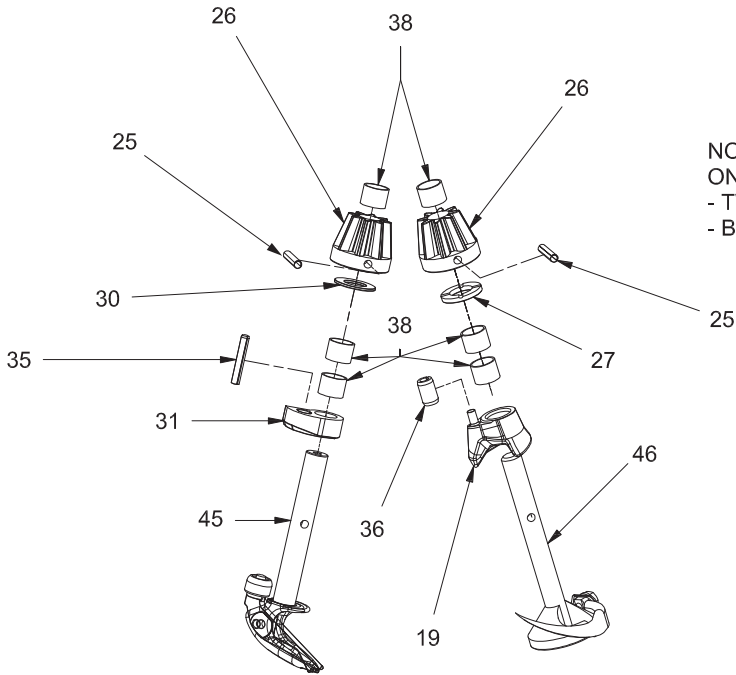
Item	Part No.	Qty	Description	Item	Part No.	Qty	Description
	F00007519		Clutch Housing Assembly				
1	CLH035959D	1	. Housing, Knotter Clutch	8	KPR0020740	1	. Plate, Keeper
2	CLH0020799	1	. Pawl, Knotter Clutch	9	133469W	1	. Capscrew
3	PIN0020739	1	. Pin	10	R13812512	1	. Lockwasher
4	00103384	1	. Cotter Pin	11	F000008315	2	. Washer
5	F000004115	1	. Spring, Ext	12	ZZ00000210	1	. Mach Bushing
6	223587	1	. Nut, ESNA				
7	221574W	1	. Capscrew				

Rev C

Knotter Assembly, Tailless

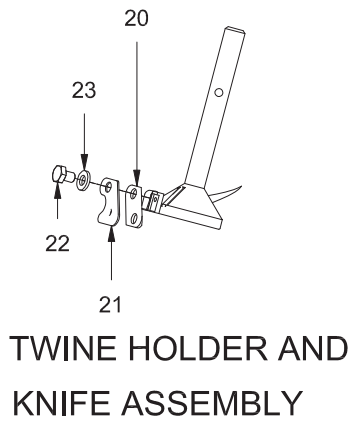
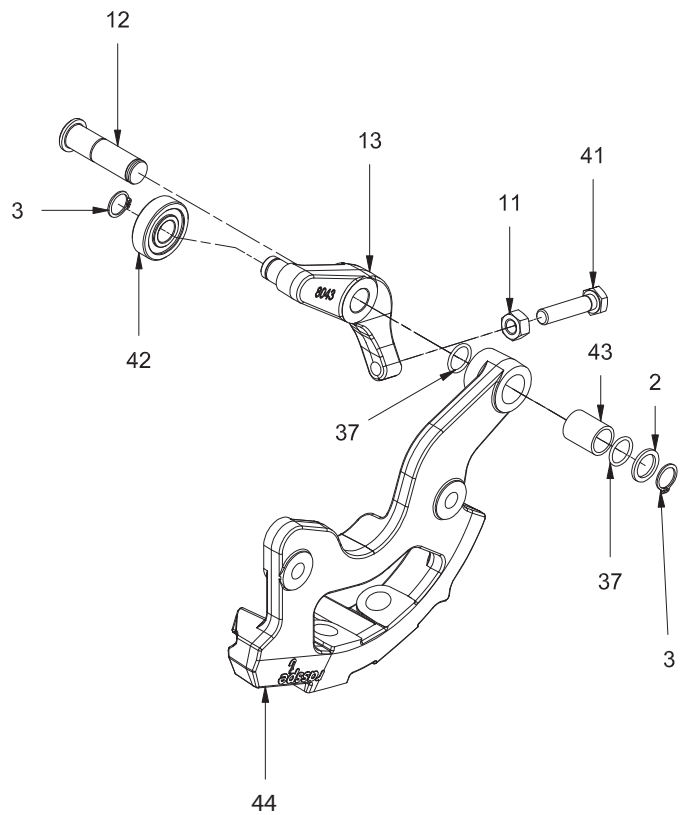
Page 1 of 3

SHAFTS AND COMPONENTS



NOTE ORIENTATION OF THRUST WASHERS
ON TWINE HOLDER AND BILL HOOK
- TWINE HOLDER: GROOVES TOWARDS PINION GEAR
- BILL HOOK: LUBRICATING MATERIAL TOWARDS PINION GEAR

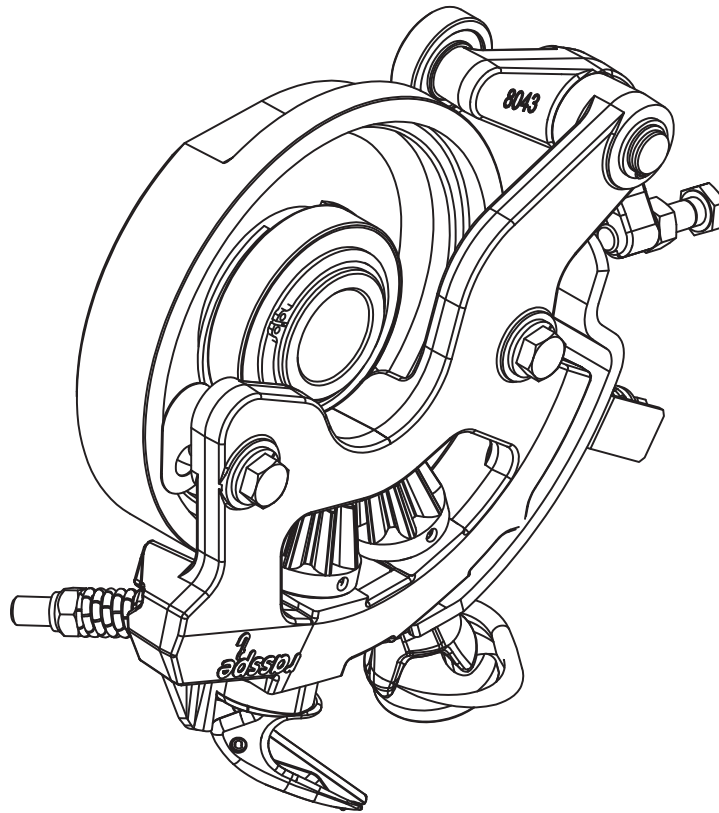
TENSION LEVER ASSEMBLY



TWINE HOLDER AND
KNIFE ASSEMBLY

Knotter Assembly, Tailless

Page 2 of 3



Item	Part No.	Qty	Description	Item	Part No.	Qty	Description
	255675		Knotter, Tailless				
1	255311	2	. Frame Shim	26	255849	2	. Pinion Gear
2	255822	1	. Washer	27	255848	1	. Twine Holder Thrust Washer
3	255841	2	. Tension Lever Snap Ring	30	255850	1	. Bill Hook Thrust Washer
4	255823	2	. Knotter Frame Bolt	31	255845	1	. Bill Hook Trigger Cam
5	255838	1	. Shim	32	255846	1	. Trigger Pressure Spring
6	255839	1	. Snap Ring	33	255858	1	. Trigger Pressure Plate
7	255836	1	. Bearing Rear Snap Ring	34	255852	1	. Bill Hook Trigger Pres Spr Blt
8	255835	1	. Bearing	35	255853	1	. Bill Hook Trigger Cam Loc Pin
9	255834	1	. Bearing Flange	36	255854	1	. Twine Clamp Locating Pin
10	255837	1	. Main Cam Gear	37	255826	2	. Tension Lever O-Ring
11	282655W	1	. Nut	38 *a*b	255856	6	. Frame Bushing
12	255843	1	. Tension Lever Pin	40	255825	2	. Split Ring Washer
13	255844	1	. Tension Lever	41	255828	1	. Bale Forming Bolt
14	255859	1	. Tying Pressure Bolt	42	255842	1	. Tension Lever Roller
15	296420W	1	. Washer, Hard	43	255855	1	. Frame Bushing, Tension Lever
16	255851	1	. Tying Pressure Spring	44	255857	1	. Knotter Frame, W/Bushing
17	255829	1	. Tying Bolt Adjustment Bkt	45 *a	NSS	1	. Bill Complete
18	255840	1	. Tying Holder Clip Leaf Spg	46 *b	NSS	1	. Twine Holder Complete
19	255847	1	. Twine Holder Clamp	47	255824	1	. Bill Hook Trigger Pres Spr Nut
20	255861	1	. Twine Holder Knife				
21	255860	1	. Twine Holder Knife Cover				
22	255862	1	. Twine Holder Knife Bolt				
23	296417W	1	. Washer, Hard				
25	254811	2	. Pinion Gear Pin				

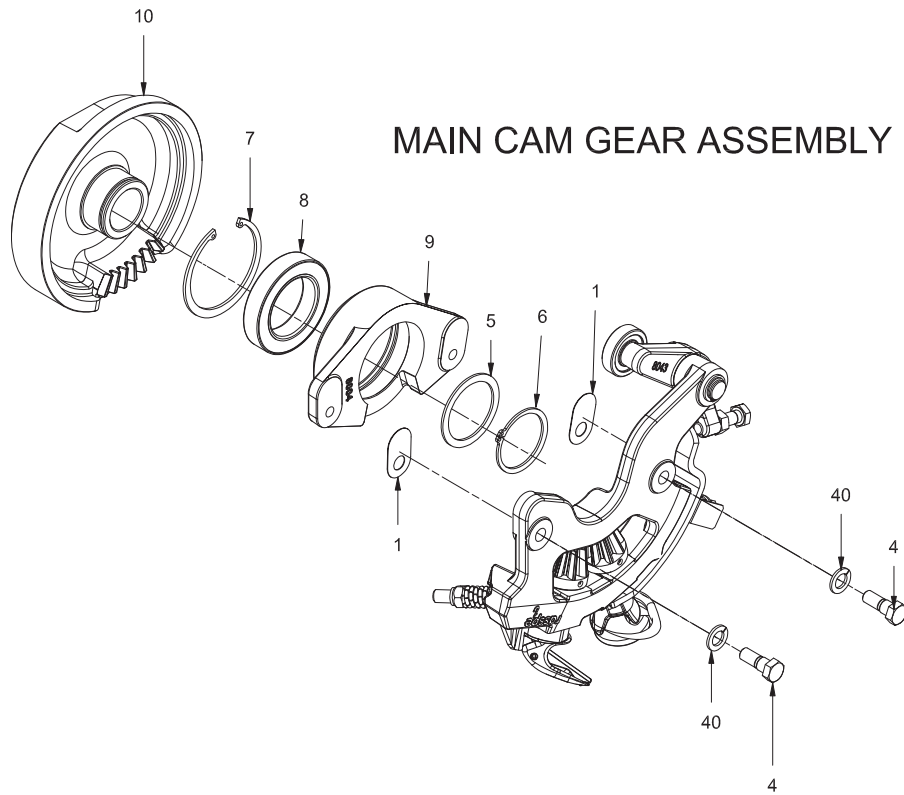
*a Bill Hook Included in kit 904776 (item 45 QTY 1, item 38 QTY 3)

*b Twine Holder Included in kit 904777 (item 46 QTY 1, item 38 QTY 3)

Rev C

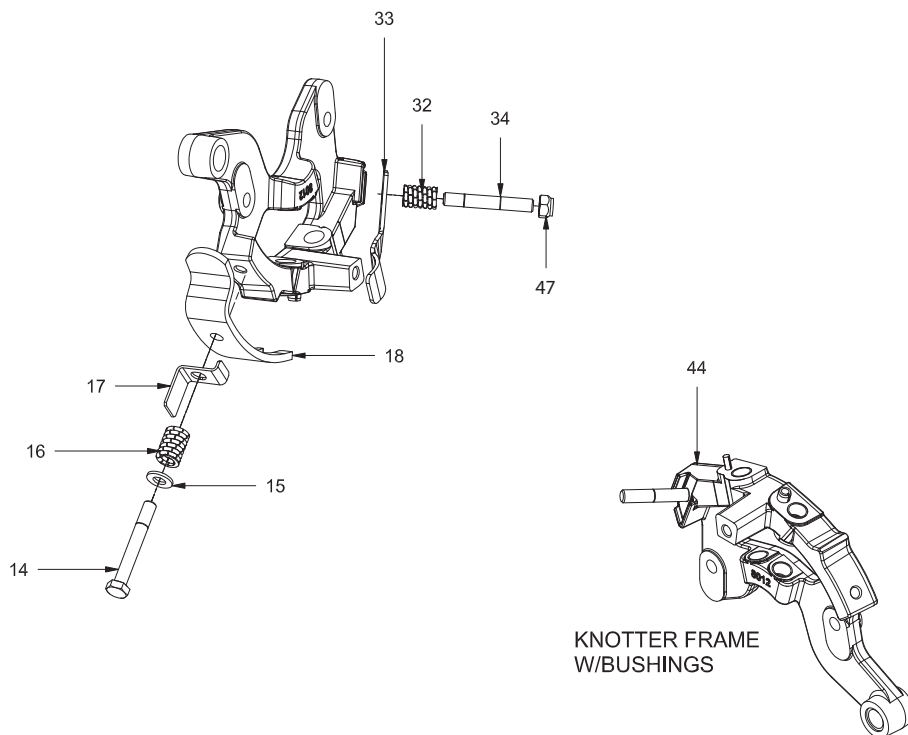
Knotter Assembly, Tailless

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MAIN CAM GEAR ASSEMBLY

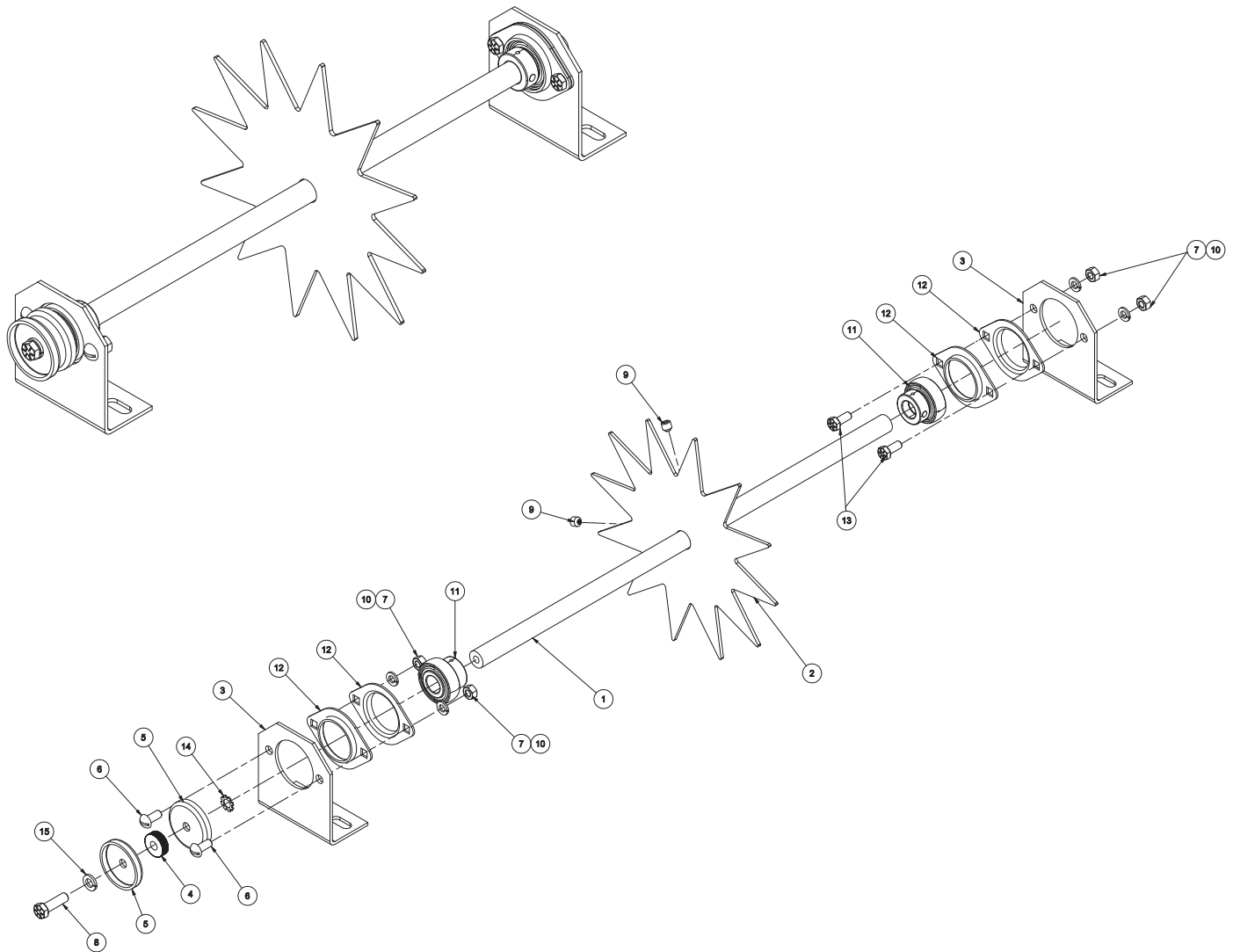
FRAME BOLTS AND SPRINGS



KNOTTER FRAME
W/BUSHINGS

Meter Wheel Assembly, 3-Tie

Page 1 of 1

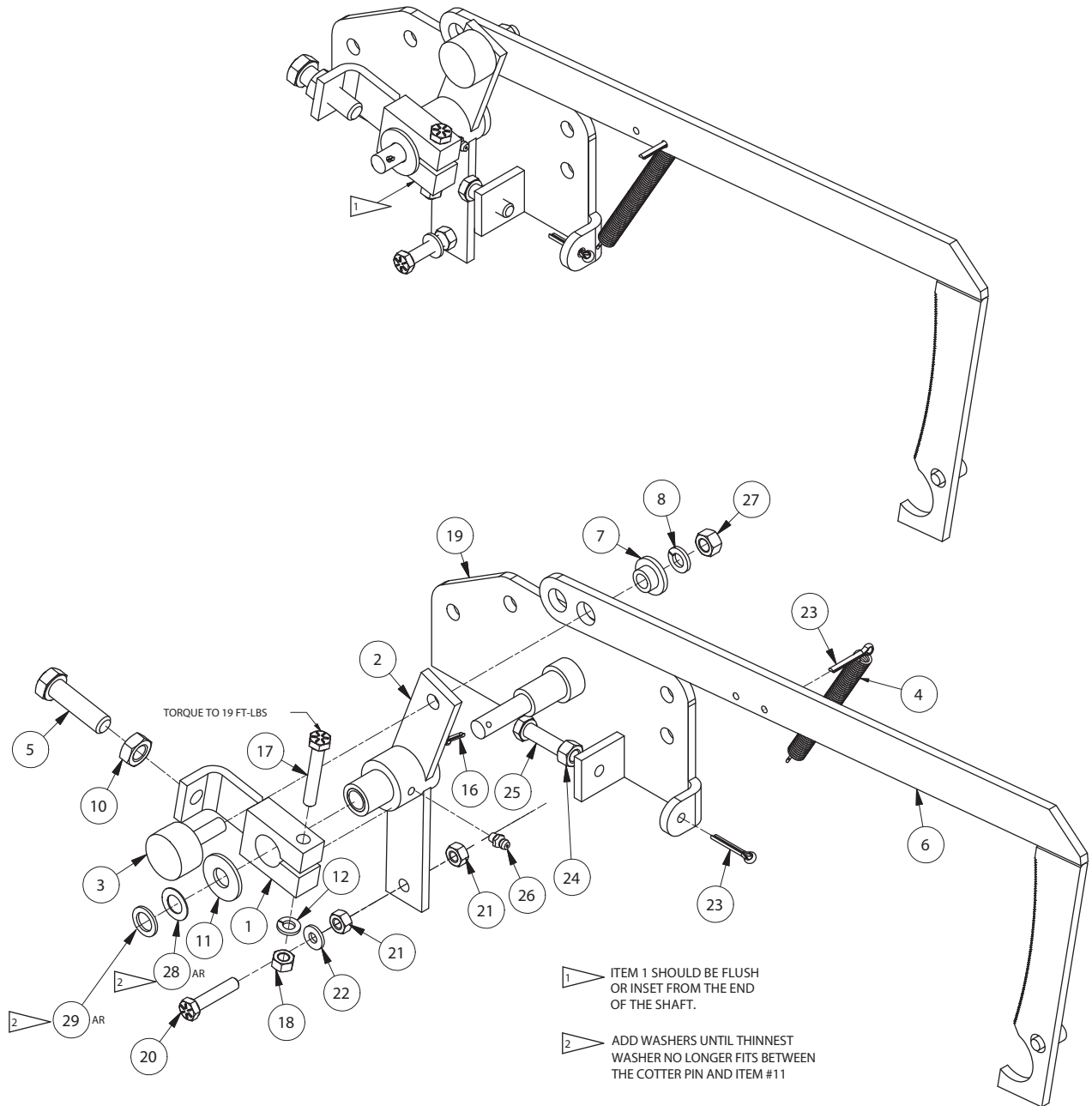


Item	Part No.	Qty	Description	Item	Part No.	Qty	Description
	SAL0000004		Meter Wheel Assembly				
1	F000008022	1	. Shaft	9	STS3750375	2	. Socket Set Screw
2	F000001531	1	. Meter Wheel	10	R13812513	4	. Lockwasher
3	F000001617	2	. Meter Wheel Shaft Bracket	11	F000001619	2	. Insert, Bearing
4	F000001687	1	. Disc, Friction	12	F000001889	4	. Flange, Bearing
5	F000008023	2	. Guide Washer	13	R13801791	2	. Capscrew
6	246125	4	. Capscrew	14	WES0000375	1	. External Star Washer
7	R13811512	4	. Hex Nut	15	R13812514	1	. Lockwasher
8	221499W	1	. Capscrew				

Rev B

Trip Mount Assembly, Tailless

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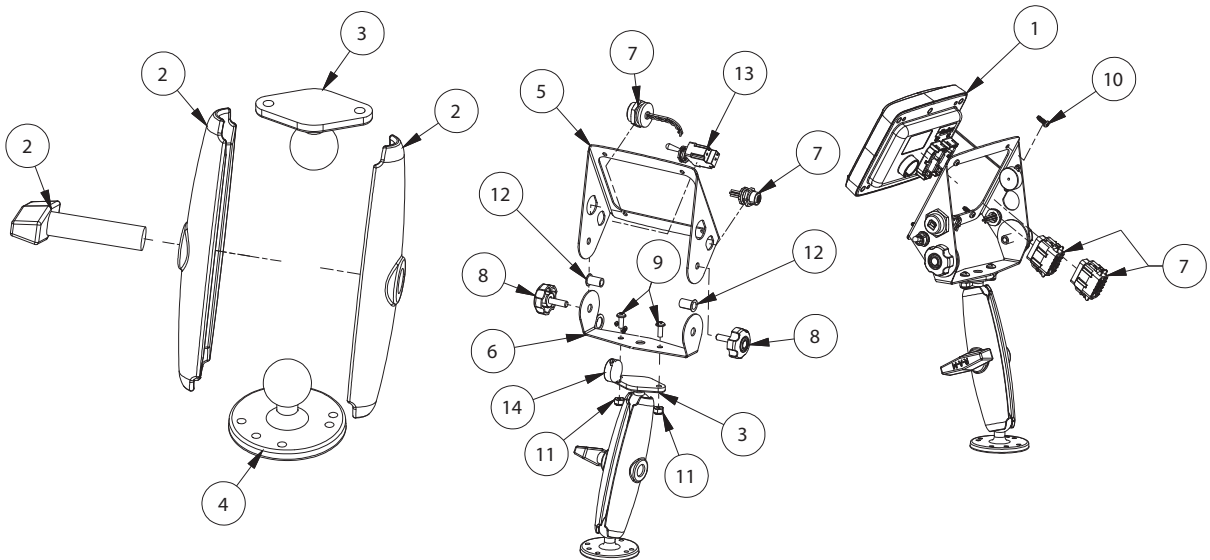
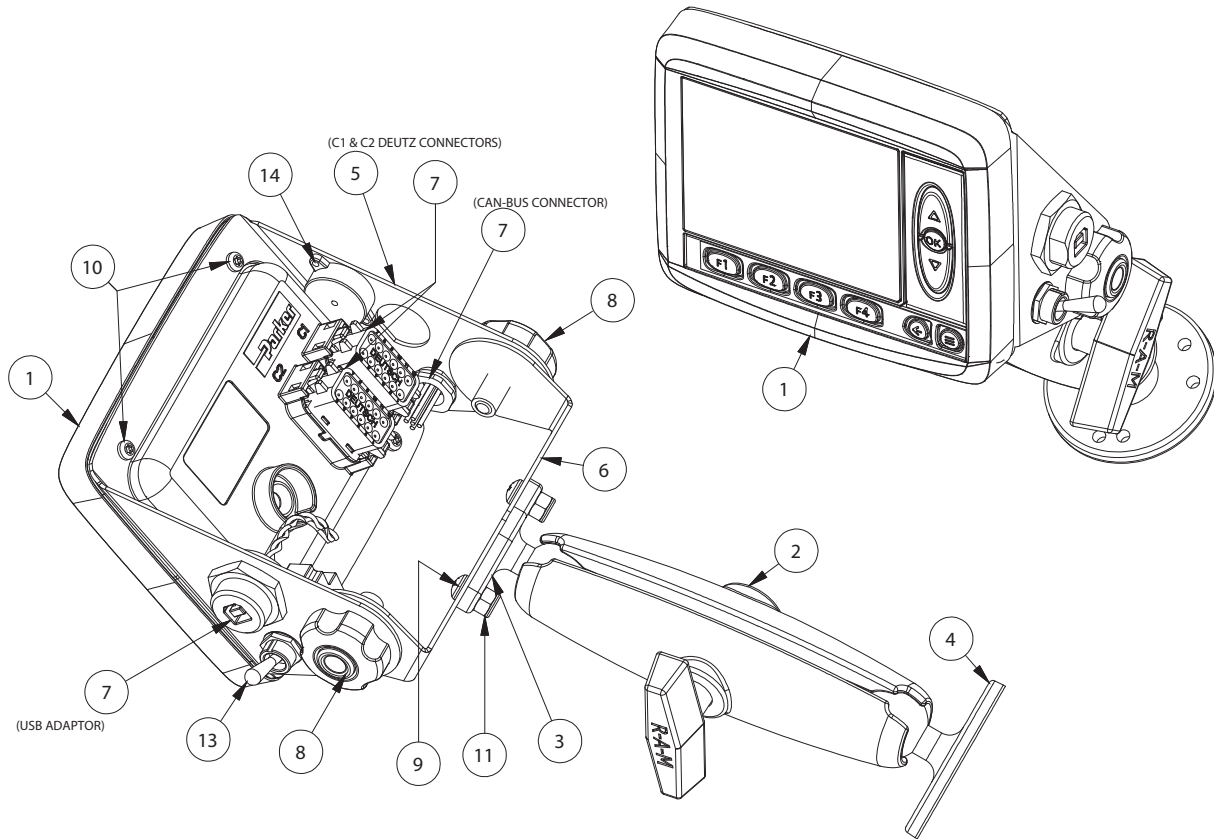


Item	Part No.	Qty	Description	Item	Part No.	Qty	Description
SAL0000580 Trip Mount Assembly							
1	F000001515	1	. Lever	18	R13803725	1	. Hex Nut
2	F000001514	1	. Lever, Reset	19	MNT037346D	1	. Mount
3	BRG0001572	1	. Follower, Cam	20	R13811016	1	. Capscrew
4	F000000278	1	. Spring, Tension	21	R13811512	2	. Hex Nut
5	221569W	1	. Capscrew	22	221763W	1	. Washer
6	KNT0032132	1	. Bar	23	00103409	2	. Cotter Pin
7	F000000440	1	. Ferrule	24	221707W	1	. Hex Nut
8	234135	1	. Lockwasher	25	221499W	1	. Capscrew
10	234218	1	. Jam Nut	26	11079	1	. Fitting, Lube
11	239519	1	. Flat Washer	27	221708W	1	. Hex Nut
12	R13812513	1	. Lockwasher	28	F000008315	AR	. Washer
16	00103385	1	. Cotter Pin	29	zz00000210	AR	. Bushing
17	221475W	1	. Capscrew				

Rev K

Remote Assembly, MD3

Page 1 of 1



Item	Part No.	Qty	Description	Item	Part No.	Qty	Description
	-----		Remote Assembly, MD3	9	R13809461	2	. Machine Screw
1	* -----	1	. MD3 IQAN Display, Programmed	10	255260	4	. Screw
2	255242	1	. Mount, Ram	11	R13809543	2	. Locknut
3	255246	1	. Base, Ram	12	222470	2	. Insert
4	255247	1	. Base, Ram	13	229289	1	. Toggle Switch
5	902894	1	. Plate, Mounting	14	256838	1	. Buzzer
6	902895	1	. Plate, Base				
7	903471	1	. Wire Harness				
8	KOB0000102	2	. Knob				

* Consult Factory for part number of programmed display.

Rev C



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