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Heartland Bowling Supply

Distributor 101 Training School





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Distributors 101

- **Safety:**

- **When performing any kind of maintenance on a Pin-Spotter it is essential that . . .**
 - **1) Disconnect the main power to the Machine**
 - **2) Wear safety glasses**
- **Heartland Bowling Supply recommends following the safety procedures that are published in the Service Manuals which came with the Pin-Spotter**



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- **Tools Required:**

- Combination Wrench Set (3/8 to 3/4)
- Deep Socket Set (3/8 to 3/4)
- Allen Wrench Set
- Drive Punch Set
- Crescent Wrench
- Ball Peen Hammer
- Snap Ring Pliers
- Channel Locks
- Spring Puller
- Tape Measure

- **Parts Required:**





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- **Theory:**

- **The Distributor is one of the subassemblies on the Pin-Spotter that can cause the most stops per frame when it is . . .**
 - **Poorly Maintained**
 - **Maladjusted**
 - **And/or, Just Misunderstood**
- **A Distributor like its name “Distributes” Pins to the Bin Assembly. And, if not properly maintained can cause serious damage to the machine. Such as: (Broken Spotting Cups and Yoke Assemblies) which can be very costly.**



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- **Theory:**

- Properly Maintaining a Distributor Assembly can eliminate machine stops which will increase the Frames per Stop.
- It is the Frames per Stop that is the Industry standard on how well the machines are being maintained and running while the Pin-Spotter is in operation.
- This class will cover the aspects of how to inspect, service, and build a Distributor Assembly.
- There are over 100 different part #'s that make up a Distributor Assembly and Heartland Bowling Supply has every part needed to build a Distributor Assembly complete.



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Removal





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- **Removal:**
 - Distributor must be the #1 pin position. If needed power up Pinspotter and engage trip arms until the Distributor is at the #1 pin position.





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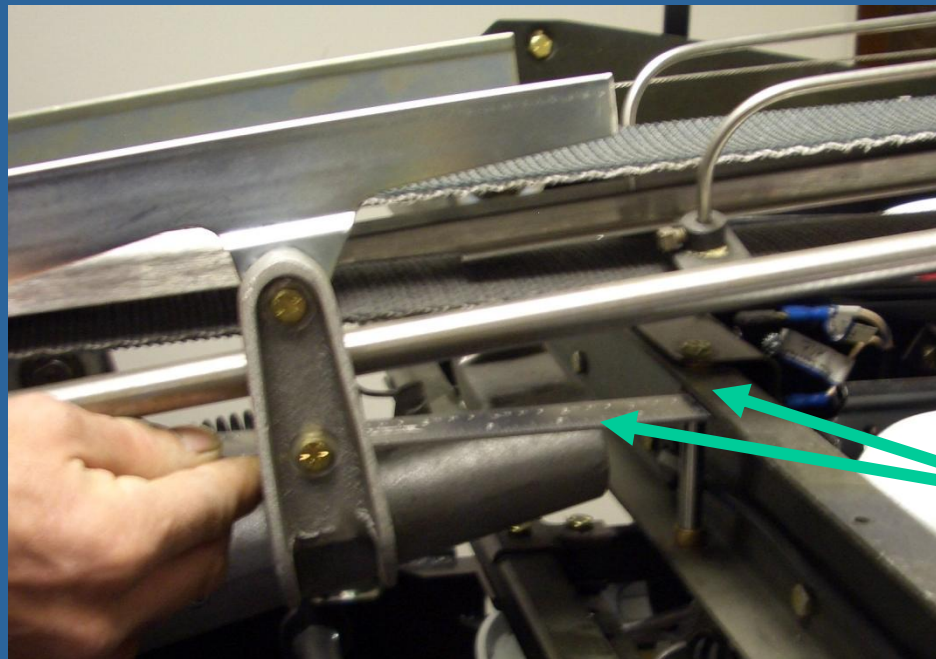
- **Safety is # 1:**
 - **Disconnect Power from Pinspotter**
 - **Lockout/ Tagout Power Plug**
 - **Always remove main Power Disconnect Plug**
 - **Shut Off Main Breaker to Pinspotter**
 - **Follow local OSHA requirements**
 - **Tag Pinspotter “Out Of Service” at Front Counter**



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- **Removal:**
 - **Distributor Height Adjustment**
 - **Distributor Carriage Support Casting must be level with the Bin Assembly**



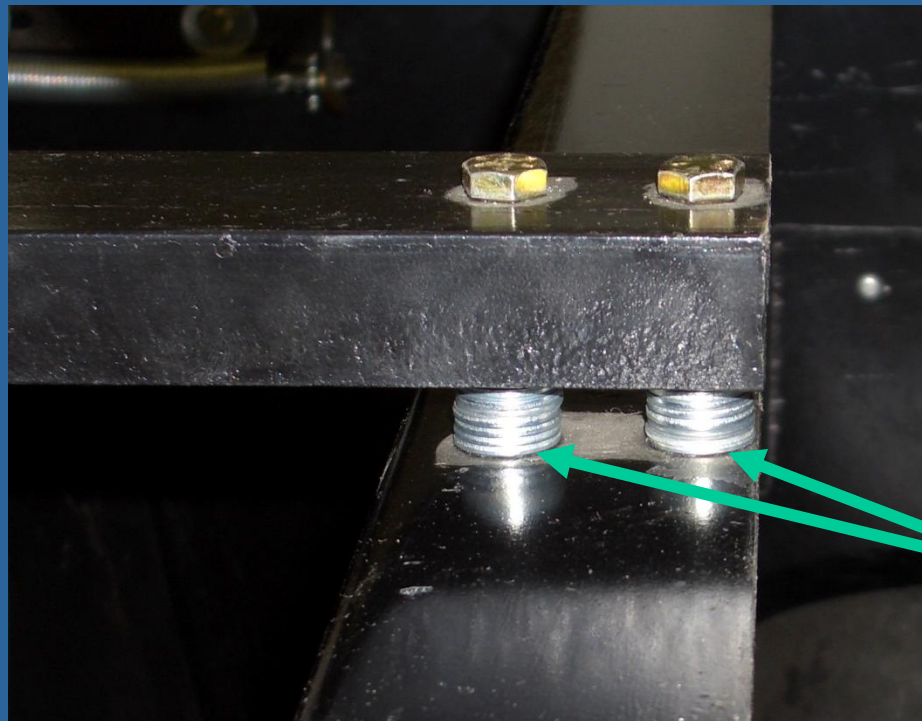
EVEN



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- **Removal:**
 - To achieve this add or subtract spacers to the Post Assembly



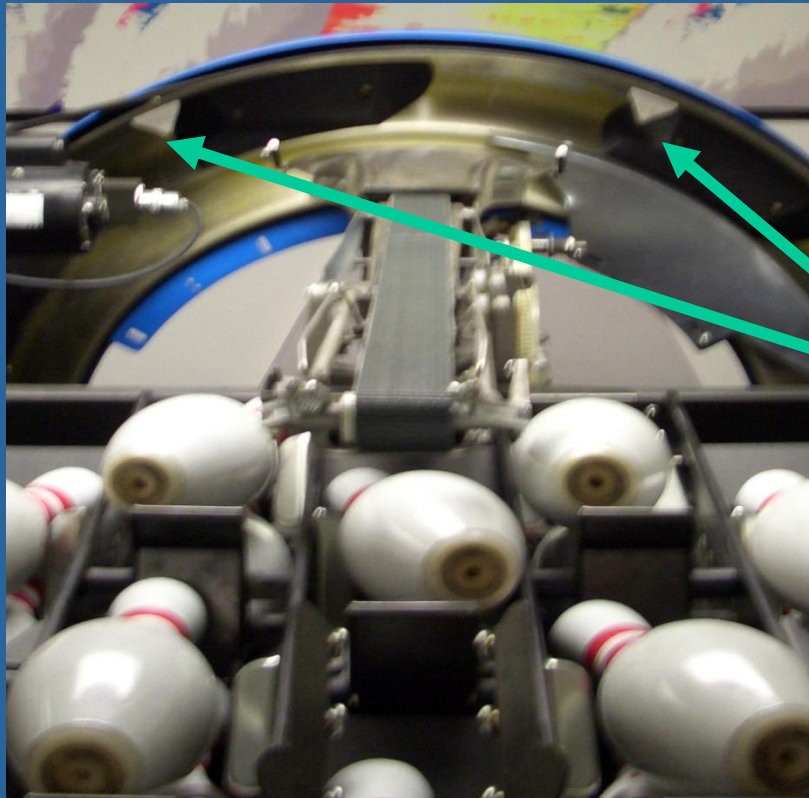
SPACERS



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- **Removal:**
 - Move Pinwheel so Pin brackets are on both sides of the Orientor pan.



BRACKETS



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Distributors 101

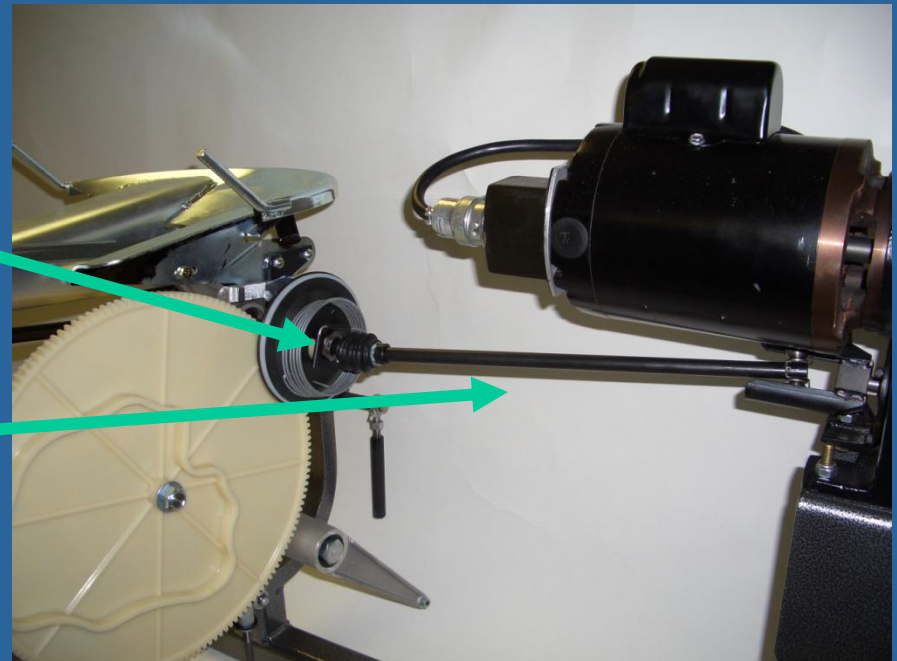
- **Removal:**

- **Distributor Drive Shaft Removal**

- **Rotate Drive Pulley Shaft by pulling on the Distributor Belt so that the roll pin can disconnect from U-Joint**

ROLL PIN

DRIVE SHAFT

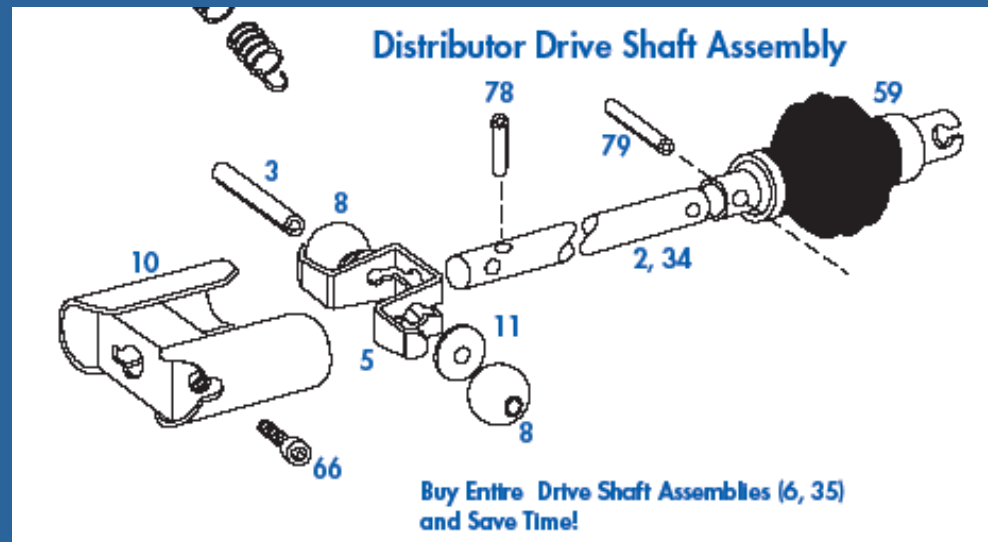




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- **Removal:**
 - **Distributor Drive Shaft Inspection**
 - **Shaft Straightness**
 - **Ball Bearing and Retainer Wear**
 - **Housing Grooved**
 - **U-Joint Wear and Leakage**

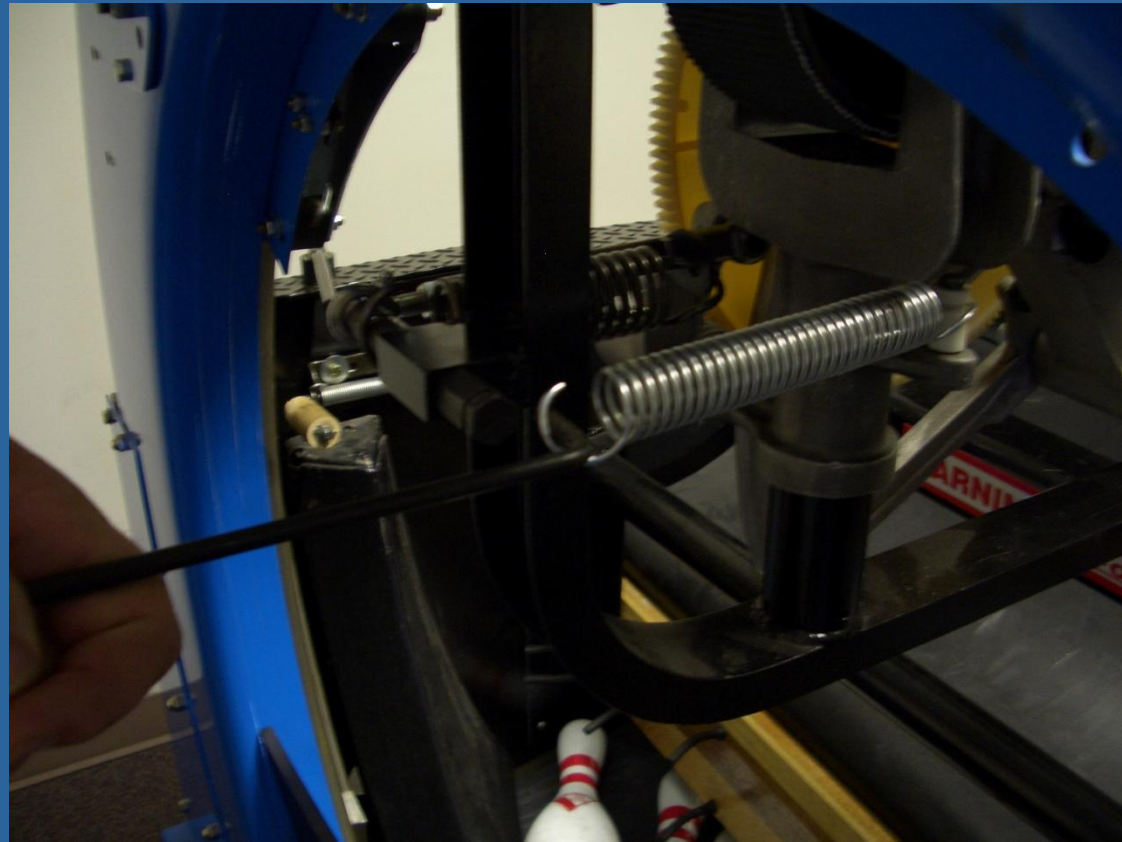




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- **Removal:**
 - **Replace All Springs:**

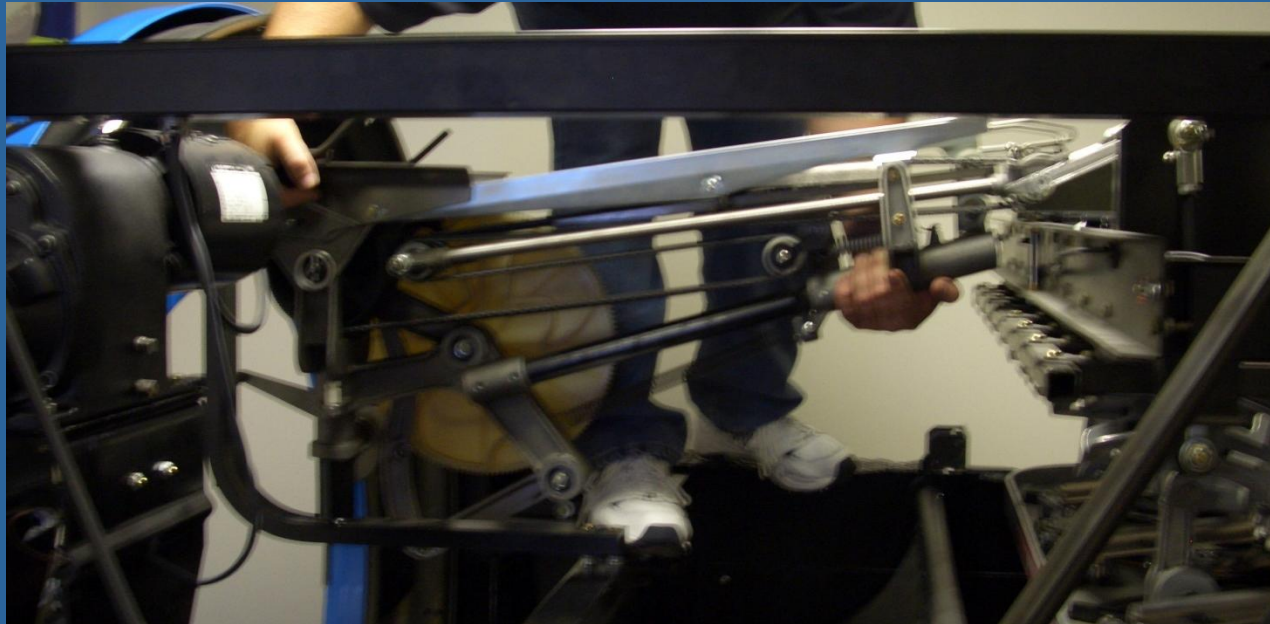




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- **Removal:**
 - **Slide Distributor Carriage all the way back and lift Distributor Assembly up and off Distributor Post**





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- **Test Bench:**
 - ***Heartland Bowling Supply Recommends***
 - **Each center have a rebuild station for the Distributor Assembly with a Motor and Gearbox set-up for bench testing the Distributor Assembly prior to installing the Distributor on the Pinspotter.**
 - **This will allow each mechanic to make most adjustments prior to installation and then can fine tune the distributor on the Pinspotter.**



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Disassembly and Inspection

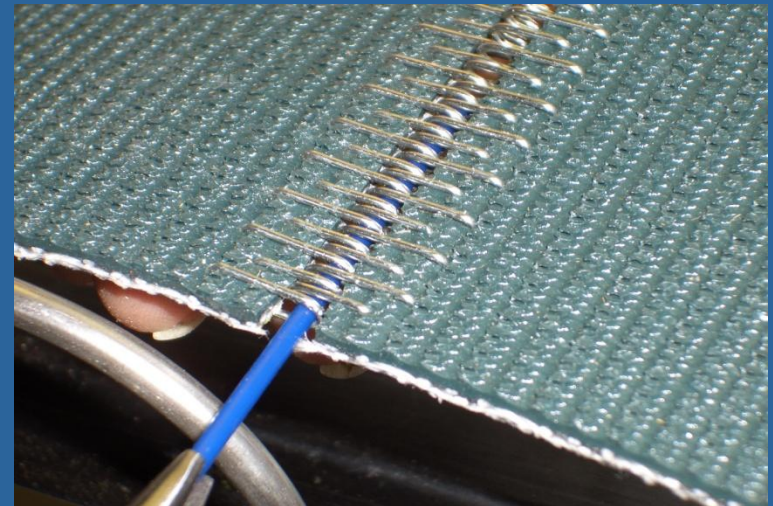
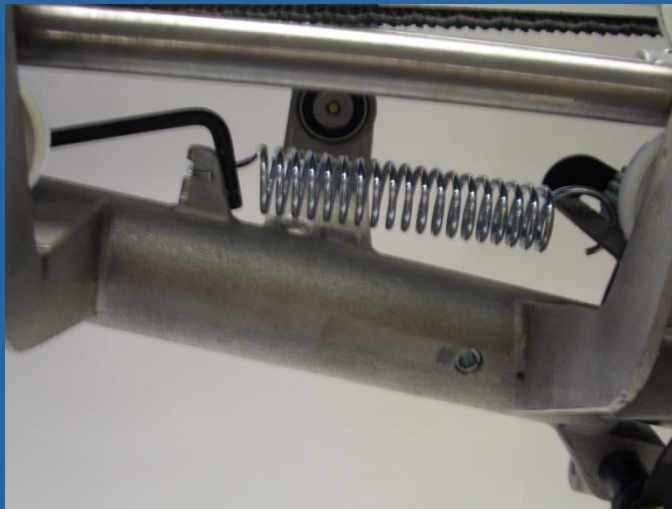




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- **Disassembly and Inspection:**
 - **Belt Removal**
 - **Remove Tension Spring**
 - **Remove Lacing Pin**
 - **Pull Belt Through Assembly**
 - **Belt Inspection**
 - **Cracks, Tears, Broken Lacings and Pins**





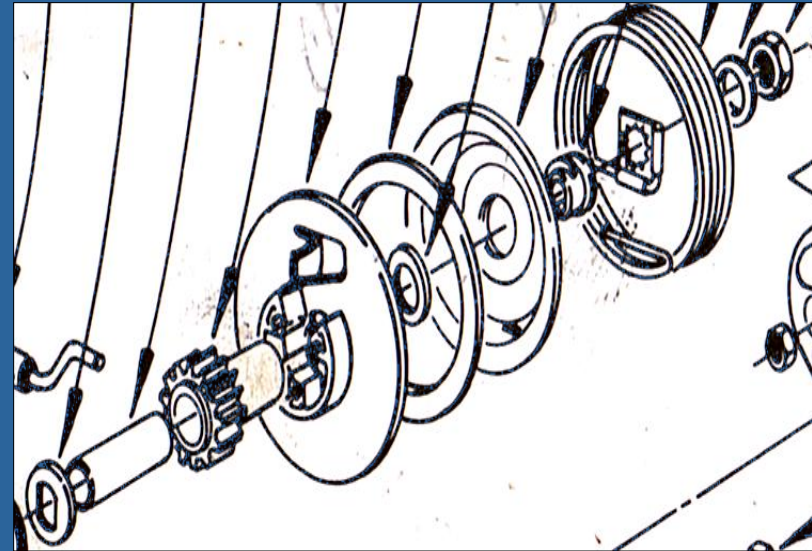
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- **Disassembly and Inspection:**

- **Clutch Assembly**

- Thrust Washer
 - Pinion Sleeve
 - Pinion Bushing
 - Pinion
 - Clutch Plate
 - Friction Disc
 - Washer
 - Worm Gear
 - Spring
 - Nut

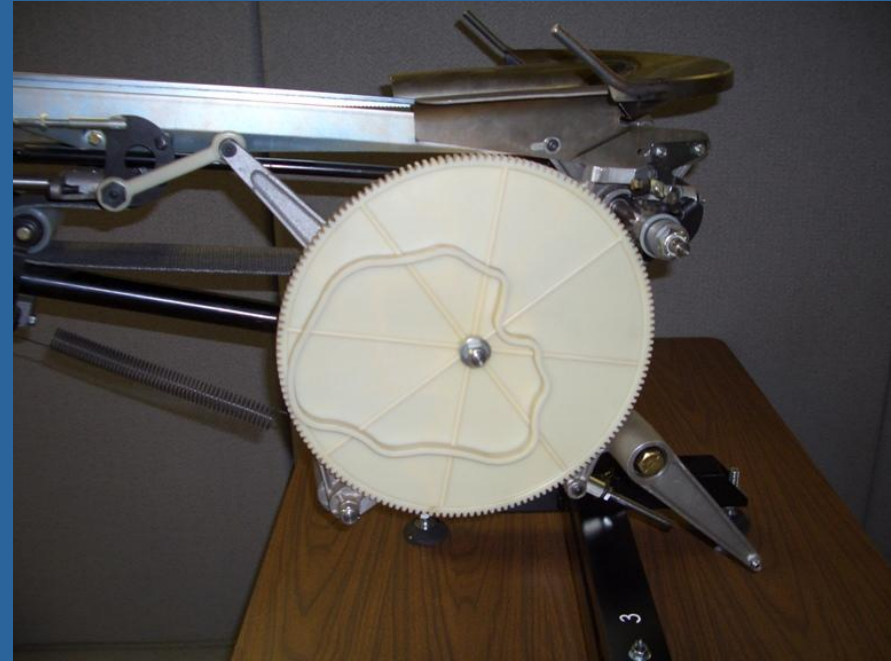




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- **Disassembly and Inspection:**
 - **Cam**
 - Warped
 - Broken Teeth
 - Flat Spots
 - Cracks





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- **Disassembly and Inspection:**
 - **Connecting Link and Trip Rocker Arm**
 - **Remove Flat Head Cap Screw and special nut from Top of the Link**





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Distributors 101

- **Disassembly and Inspection:**
 - **Connecting Link and Trip Rocker Arm**
 - **Remove Retaining Ring, Spring, and Collar**

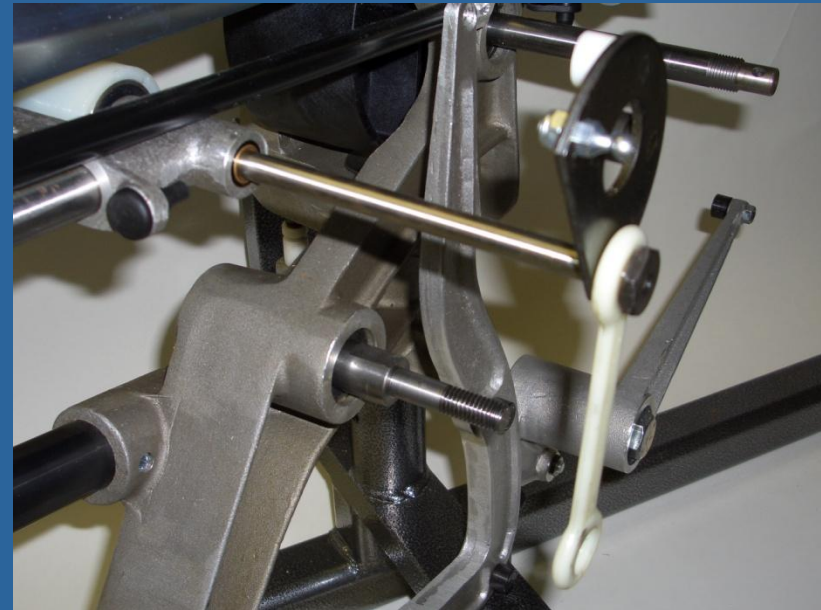




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Distributors 101

- **Disassembly and Inspection:**
 - **Connecting Link and Trip Rocker Arm**
 - **Slide Assembly from Casting**





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Distributors 101

- **Disassembly and Inspection:**
 - **Connecting Link and Trip Rocker Arm**
 - Nylon Bushings
 - Retaining Ring
 - Tension Spring
 - Linkage

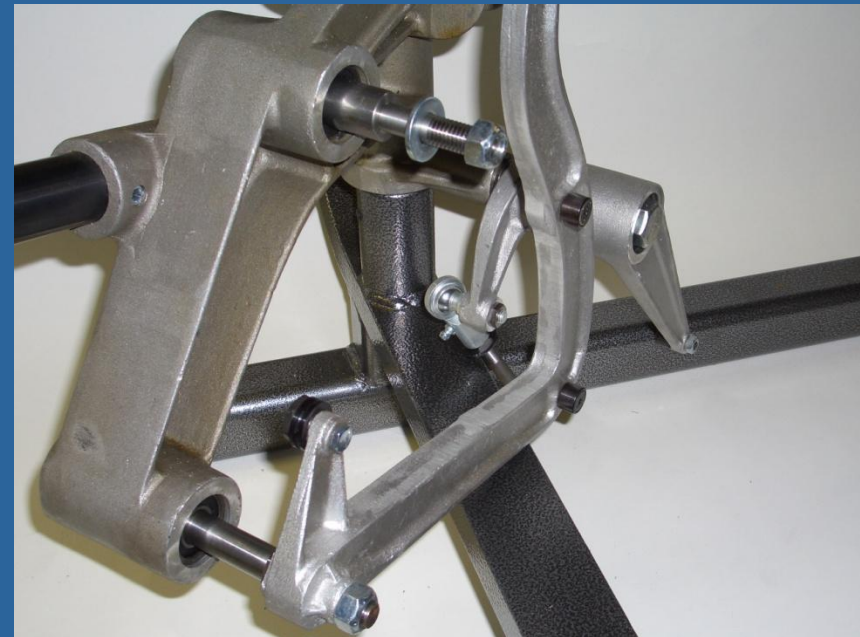




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- **Disassembly and Inspection:**
 - **Arm Assembly**
 - **Slide Arm away from Casting and inspect all Bearings**





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- **Disassembly and Inspection:**

- **Drive Arm Assembly**

- **Special Bolt**
 - **Female Rod End**
 - **Spring Support**
 - **Safety Link**
 - **Cam Follower & Bearing**
 - **Drive Arm**
 - **Clamp Race**





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Distributors 101

- **Disassembly and Inspection:**
 - Trip Stop Rod Assembly Removal





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- **Disassembly and Inspection:**
 - **Trip Stop Rod Assembly**
 - Rod Bent
 - Bearing Worn
 - Stop Blades





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- **Disassembly and Inspection:**
 - **Trip Stop Support Bracket**





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- **Disassembly and Inspection:**
 - **Orienter Pan**
 - **Cracked**
 - **Bent**
 - **Stops Dimension**
 - **13 1/4"**

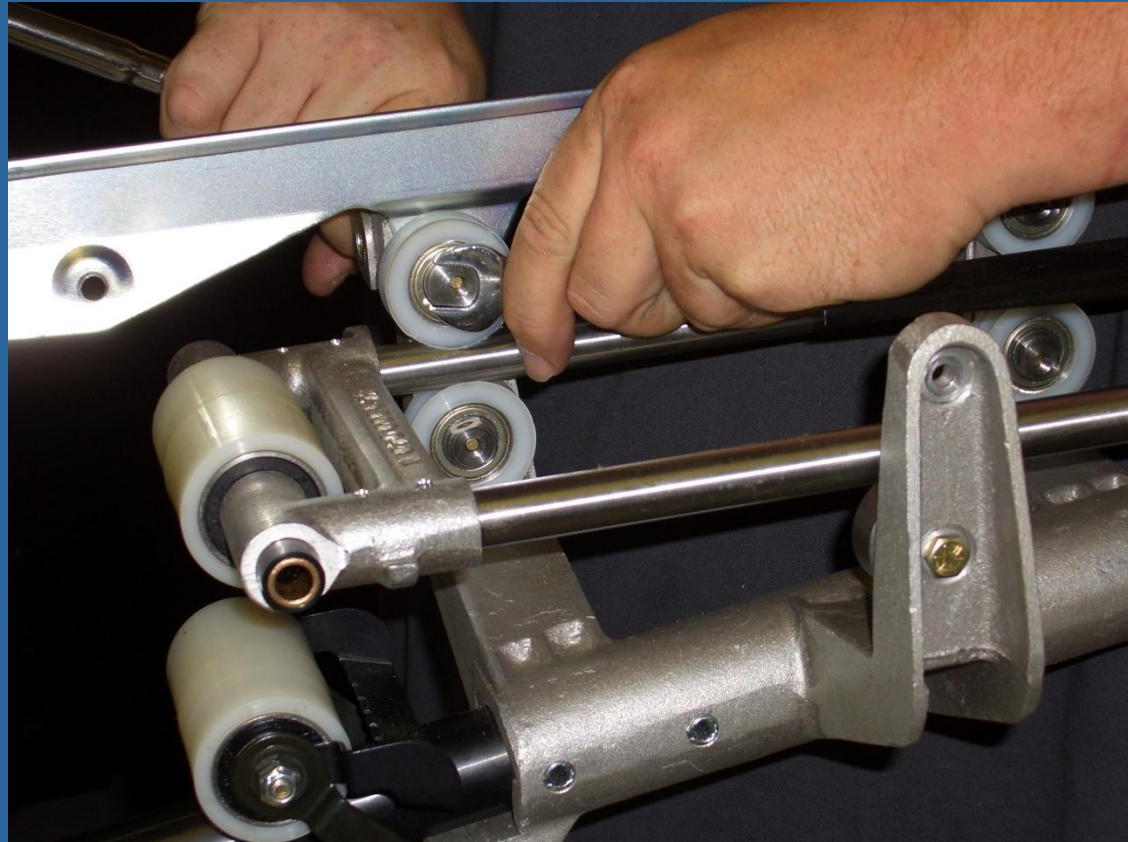




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- **Disassembly and Inspection:**
 - **Top Eccentric Bearings**

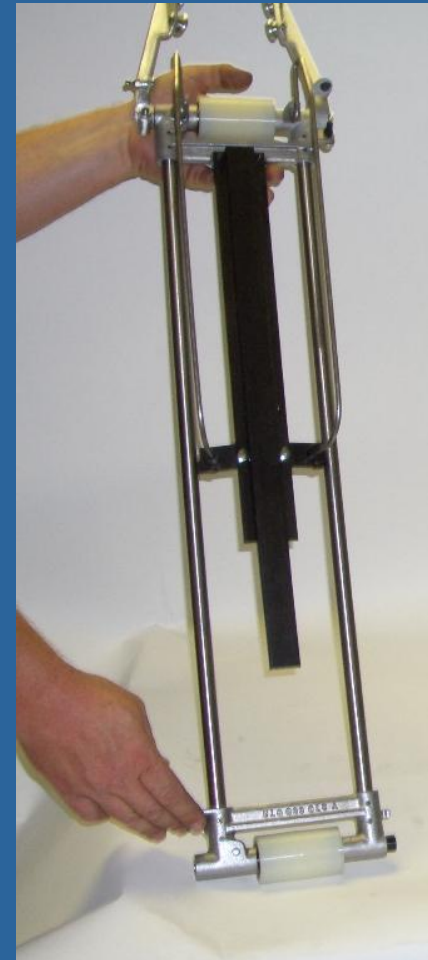




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- **Disassembly and Inspection:**
 - **Carriage Assembly**
 - **Speed of the Carriage**
 - **Final Distance of the Carriage**
 - **Runs Free without Binding**





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- **Disassembly and Inspection:**
 - **Nylon Guide Pulley Assembly**
 - **Replace all Bearing**





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- **Disassembly and Inspection:**
 - **Trip Arm Assemblies**
 - **Roller Bearings**
 - **Width and level of the Arms**





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- **Disassembly and Inspection:**
 - **Tubes, Belt Runners, and Guides**
 - **Grooves**





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- **Disassembly and Inspection:**
 - **Right and Left Support Guides**





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- **Disassembly and Inspection:**
 - **Lower Eccentric and Concentric Bearing**

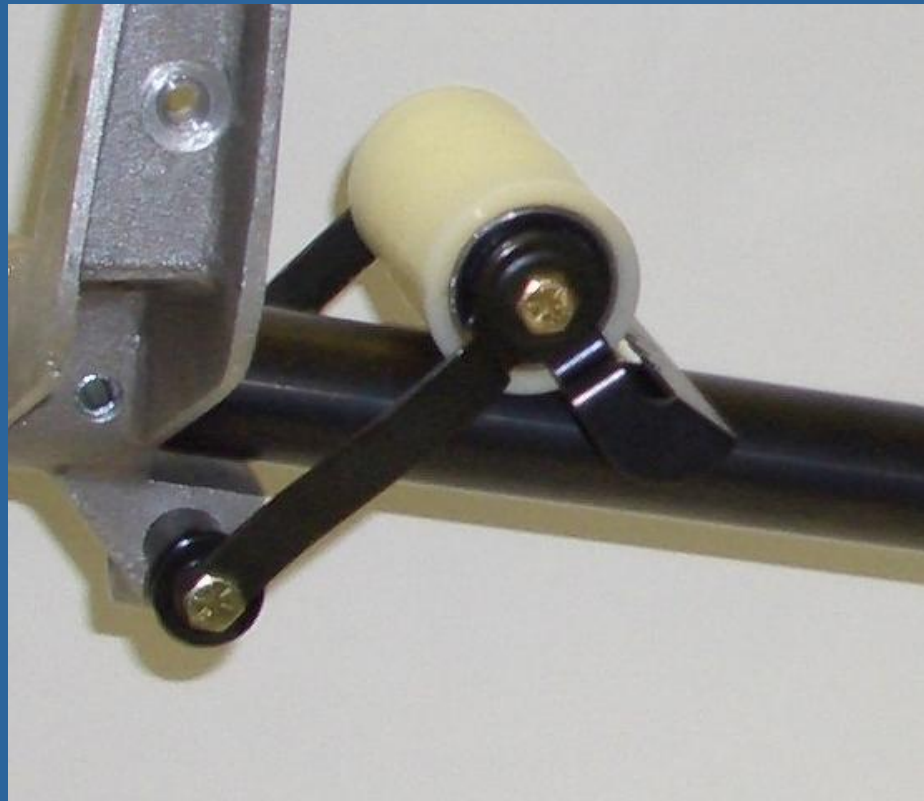




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- **Disassembly and Inspection:**
 - **Tracking Bracket**





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- **Disassembly and Inspection:**
 - **Drive Pulley**





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- **Disassembly and Inspection:**
 - **Main Casting and Bearing**





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- **Disassembly and Inspection:**

- **Main Casting and Bearing**

- If bearing removal is required turn casting over and remove cap by tapping lightly
 - Remove Snap Rings and spacers and remove bearings



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Repair and Assembly

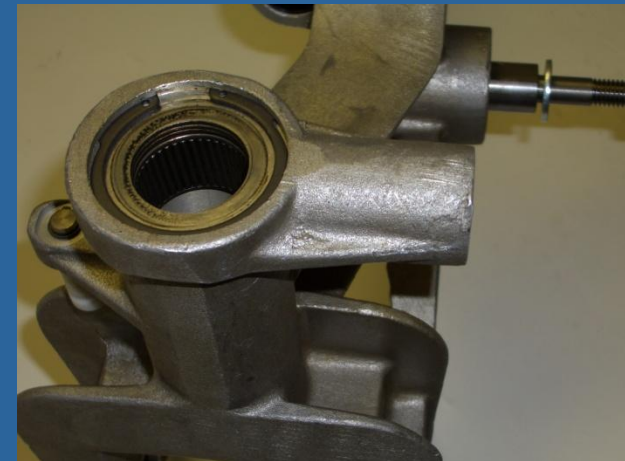




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- **Repair and Assemble:**
 - **Main Casting and Bearing**
 - **Replace needle bearings all spacers and washers in main casting**
 - **Secure with Snap Ring**





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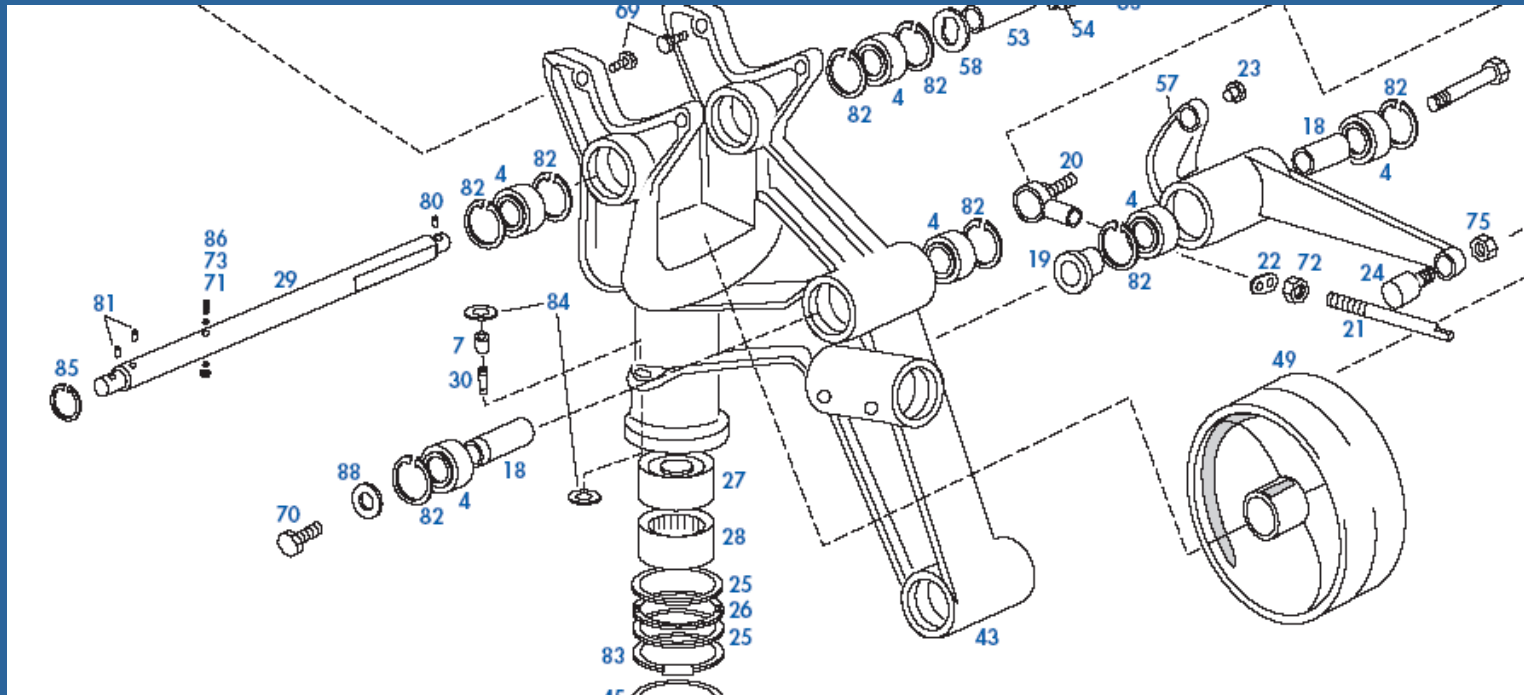
- **Repair and Assemble:**
 - **Drive Pulley**
 - **If there isn't (2) 1/4- 20 x 1 1/4 bolts in the middle of your orientor mounting holes you need to put them in at this time.**
 - **Hold pulley in place while sliding New shaft to through the left side.**
 - **Replace, Bracket if applicable, and socket Head Cap screw.**



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Distributors 101

- **Repair and Assembly:**
 - **Drive Pulley**

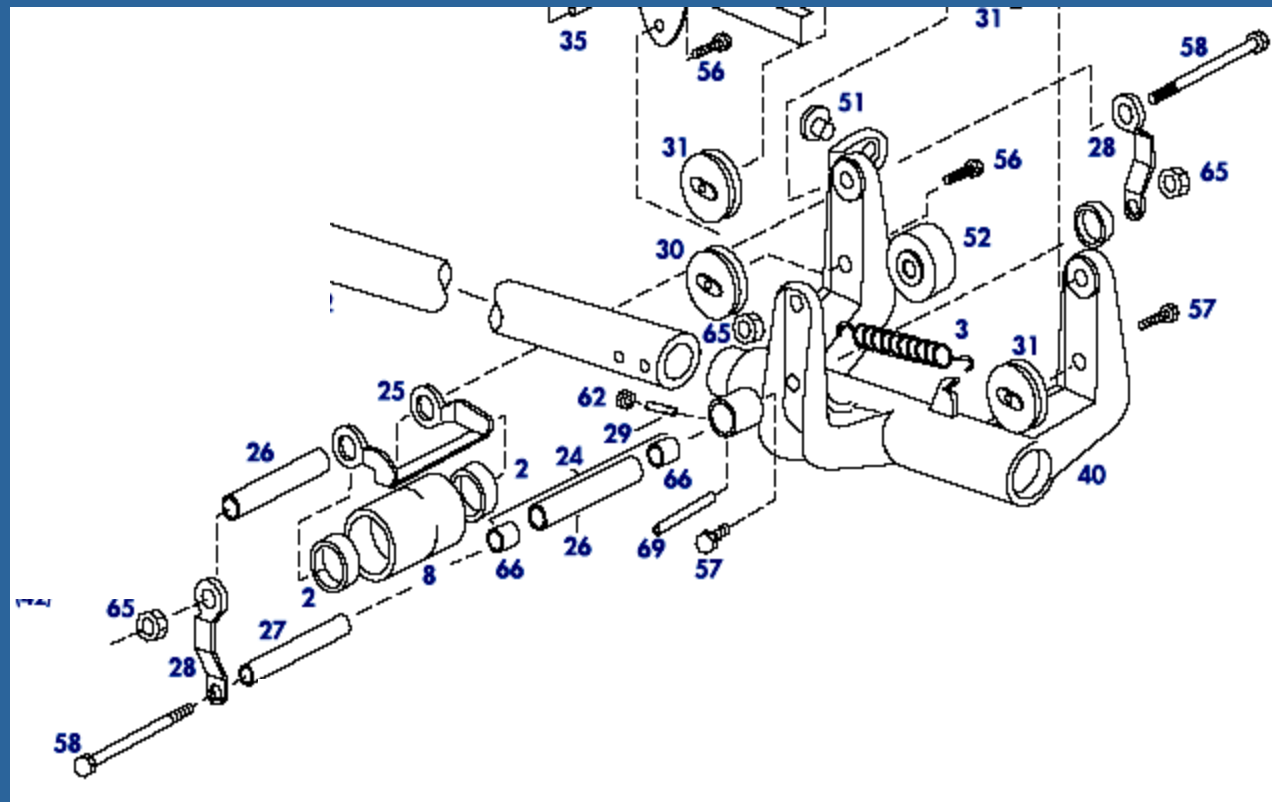




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Distributors 101

- **Repair and Assemble:**
 - **Tracking Bracket**

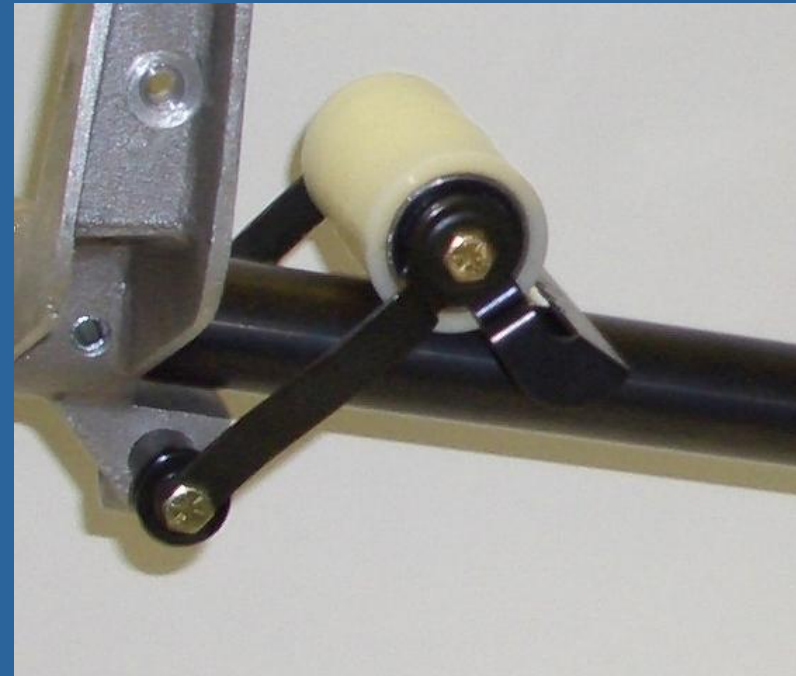




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Distributors 101

- **Repair and Assemble:**
 - **Tracking Bracket**
 - **Press Bearings**
 - **Replace Bushings**





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Distributors 101

- **Repair and Assemble:**
 - **Lower Eccentric and Concentric Bearing**

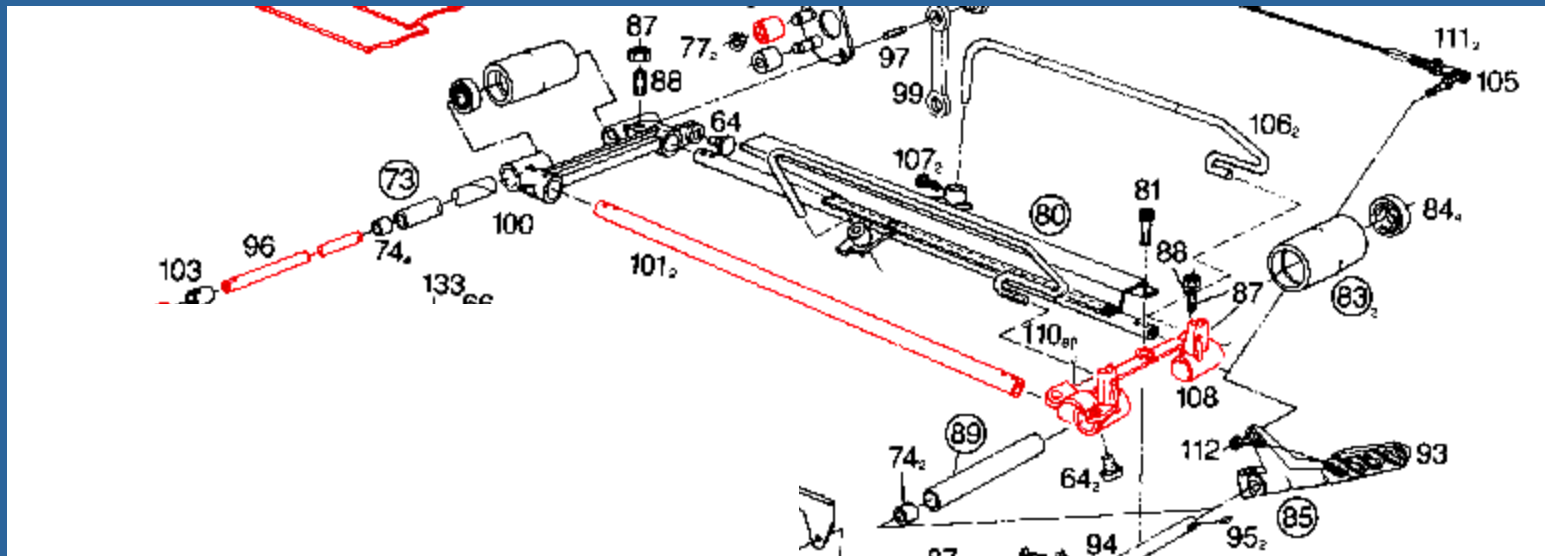




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- **Repair and Assemble:**
 - **Carriage Assembly**

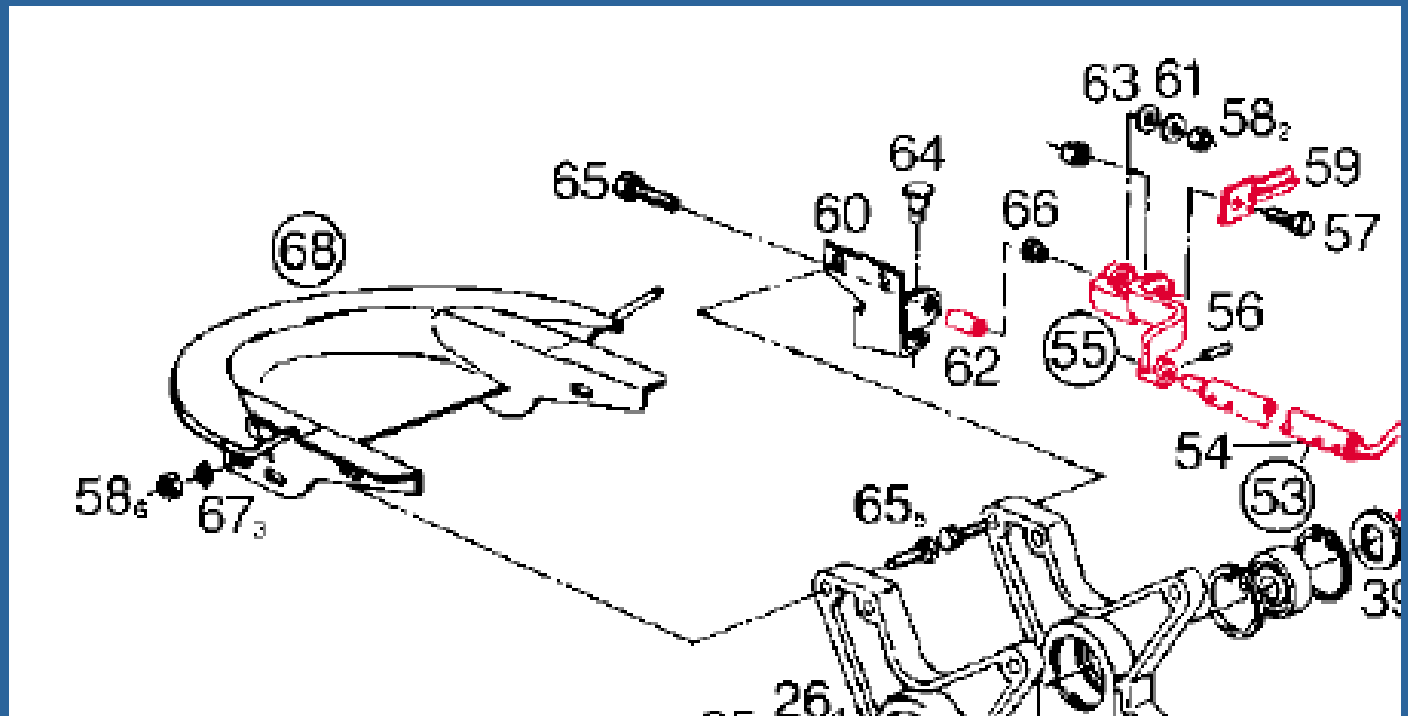




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- **Repair and Assemble:**
 - **Oriente Pan**

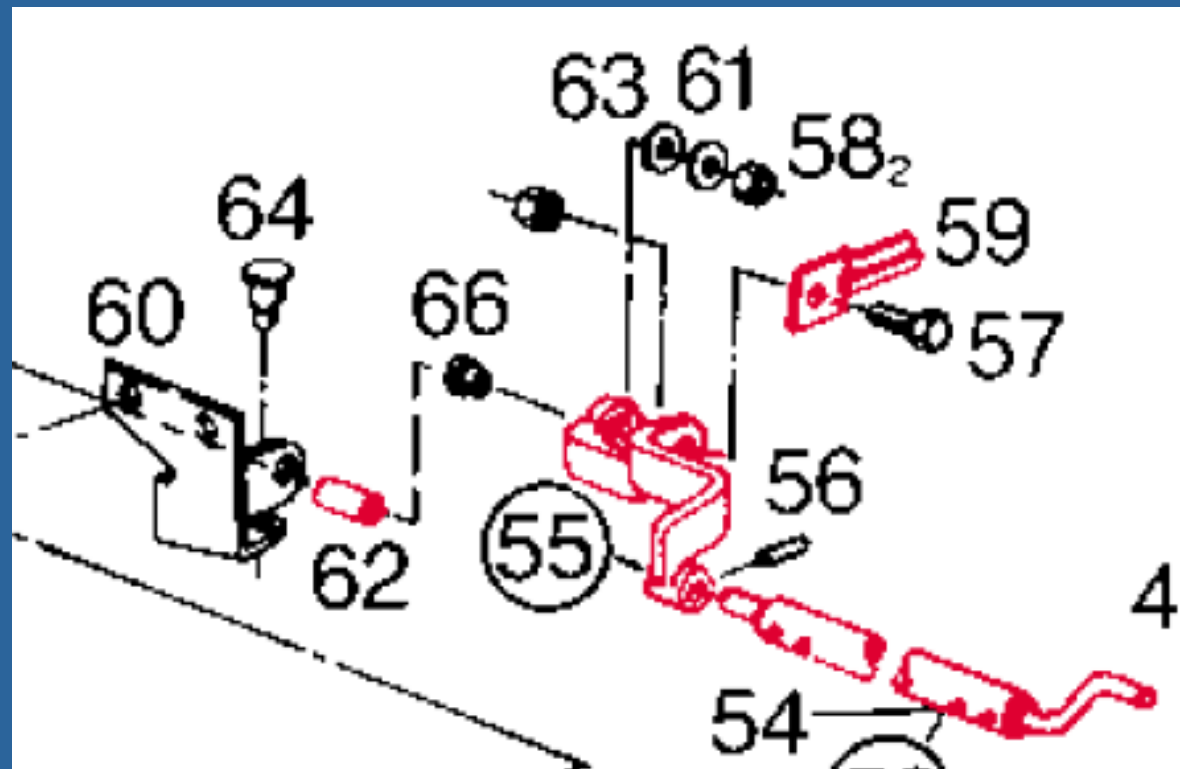




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Distributors 101

- **Repair and Assemble:**
 - **Trip Stop Rod Assembly**

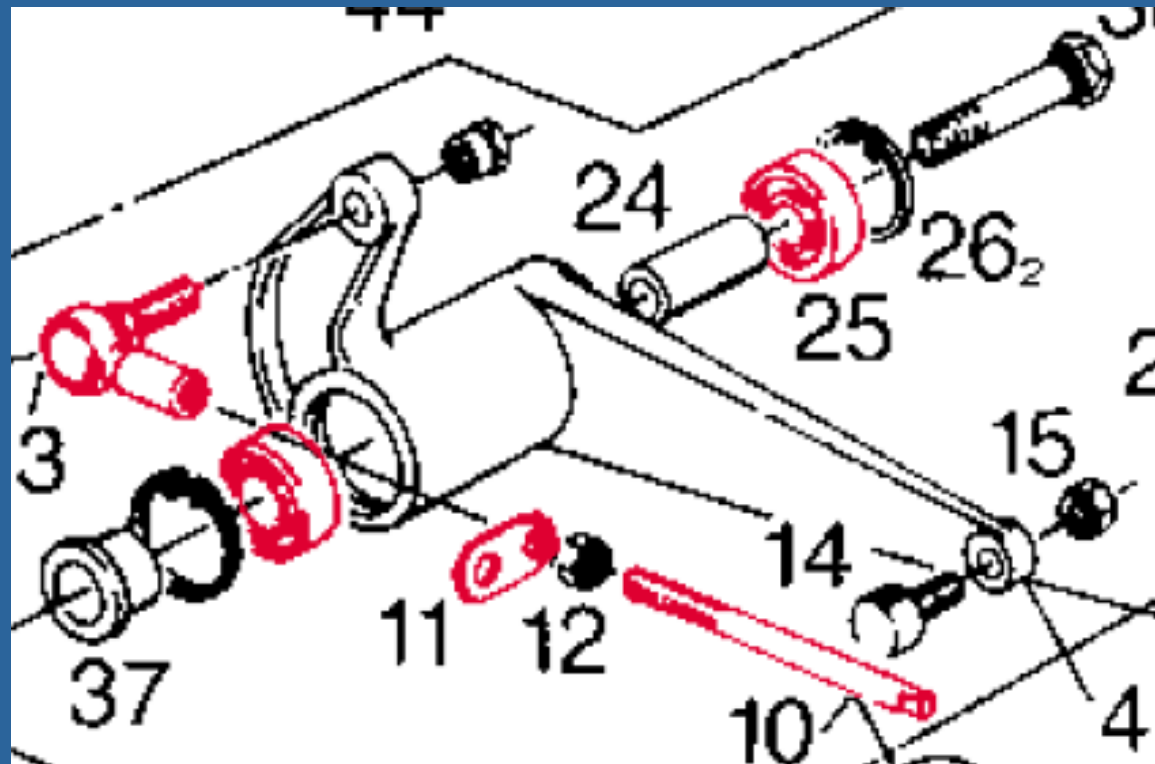




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Distributors 101

- **Repair and Assemble:**
 - **Drive Arm Assembly**

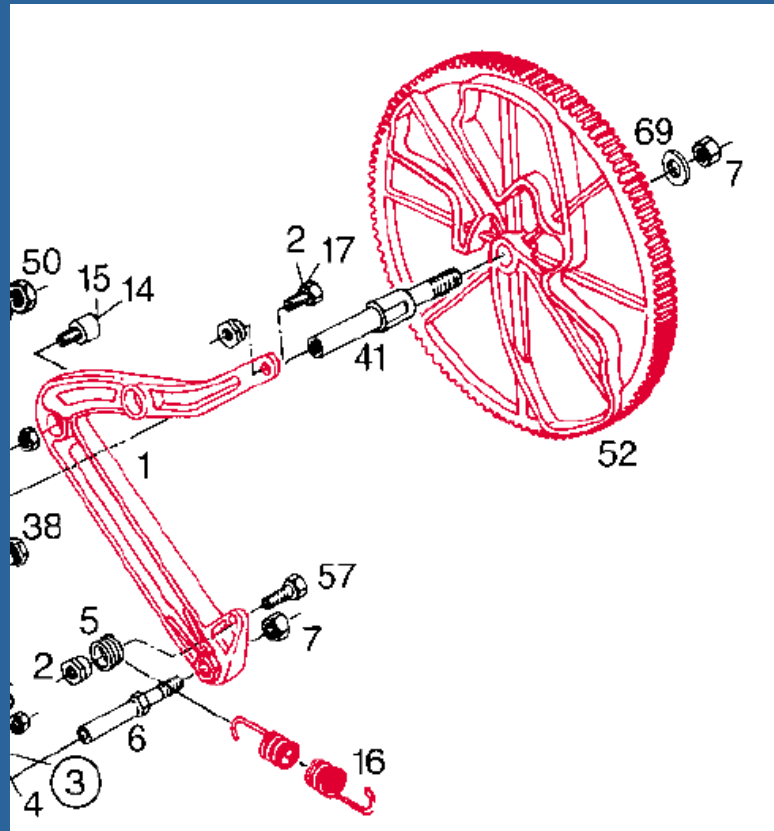




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Distributors 101

- **Repair and Assemble:**
 - **Arm Assembly**

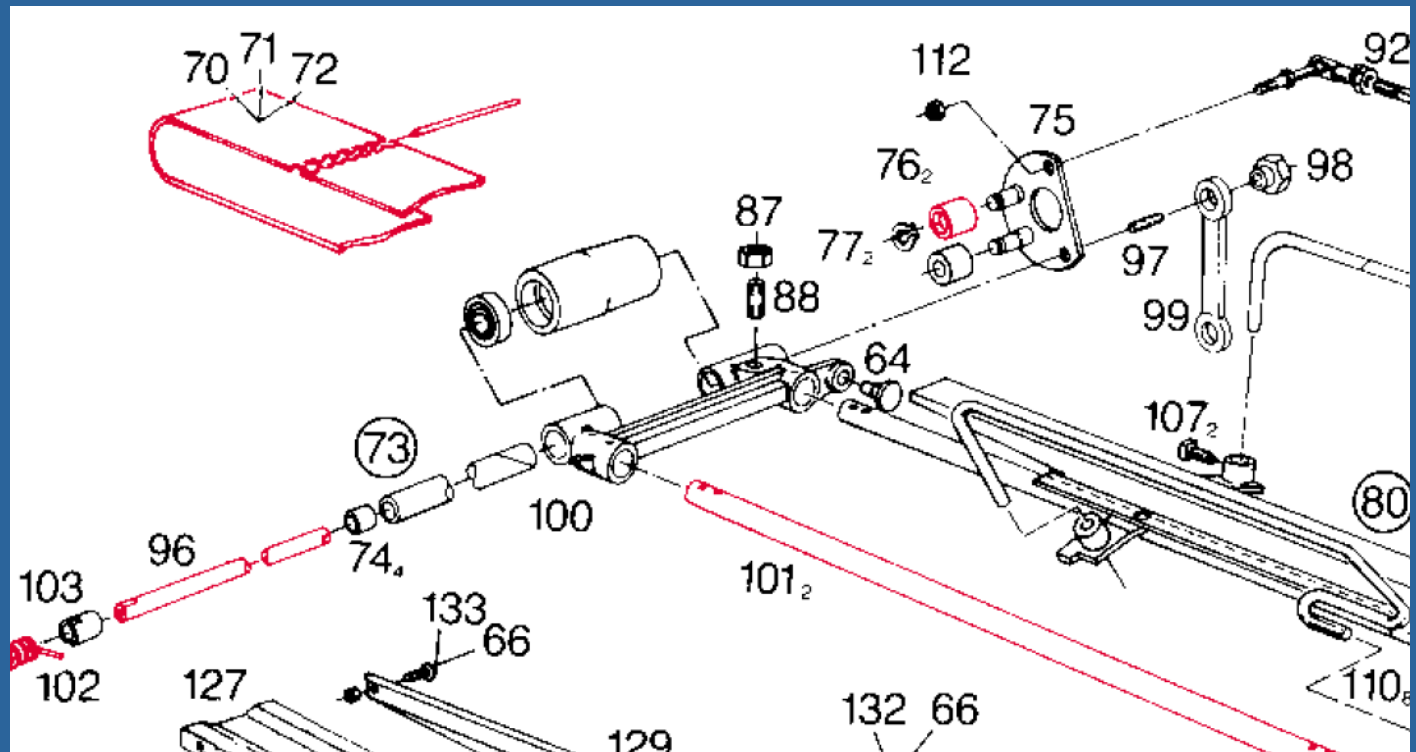




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- **Repair and Assemble:**
 - **Connecting Link and Trip Rocker Arm**

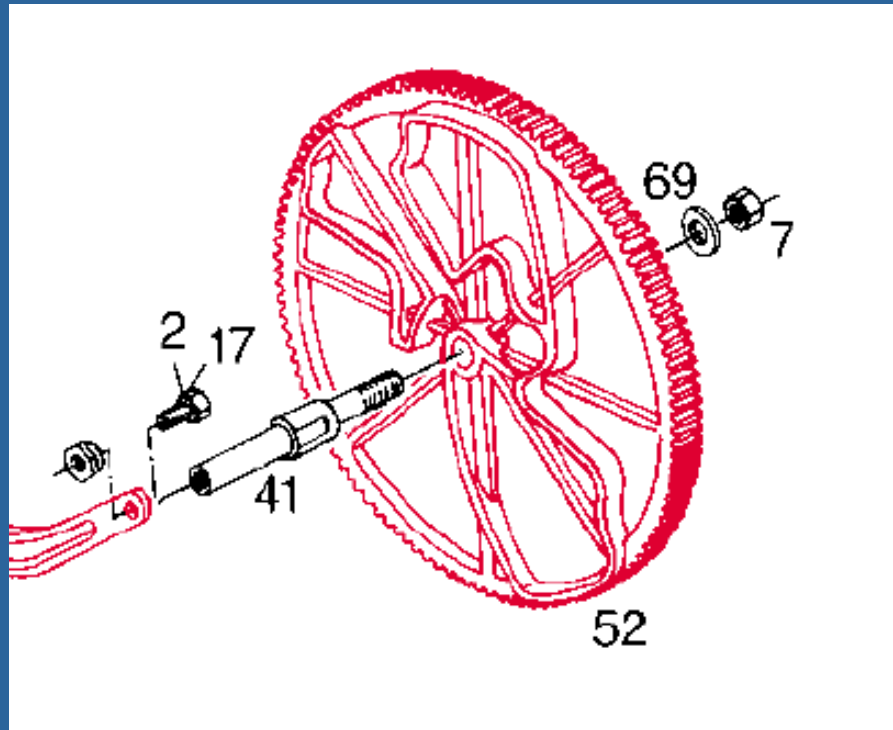




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- **Repair and Assemble:**
 - **Cam**

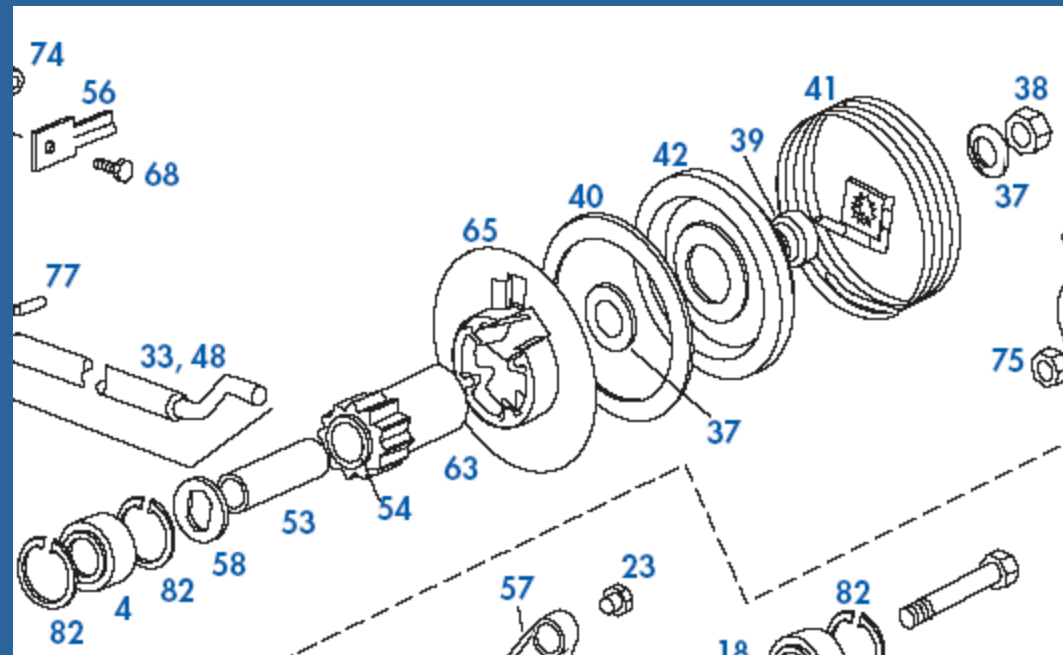




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- **Repair and Assemble:**
 - **Clutch Assembly**





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- **Cam, Pinion, and Clutch Assembly:**
 - Distributor must be aligned with the 1 pin bin and fully extended.
 - Aligning the Pinion and Cam at 0 Degrees
 - Different types of clutch's
 - Original Style
 - Super Clutch
 - Simplified Clutch
 - Roller Clutch
 - Positive Indexing Brake



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- **Distributor Belts:**

- Currently that we know of there are 10 different styles of Distributor belts on the market today.
- We feel that it is a mechanics preference on which belt works best for them.
- Heartland Bowling Supply offers 3 different styles.
 - Straight Groove
 - Rough Top
 - Standard
- The main key to all the belts is the proper length of the belt. The thicker the belt the longer the belt needs to be to run correctly.



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- **Repair and Assemble:**
 - **Belt**
 - **116 1/4" + or - for OEM style belts**
 - **116 1/2" -3/4" + or - for high profile belts**



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Maintenance and Adjustments

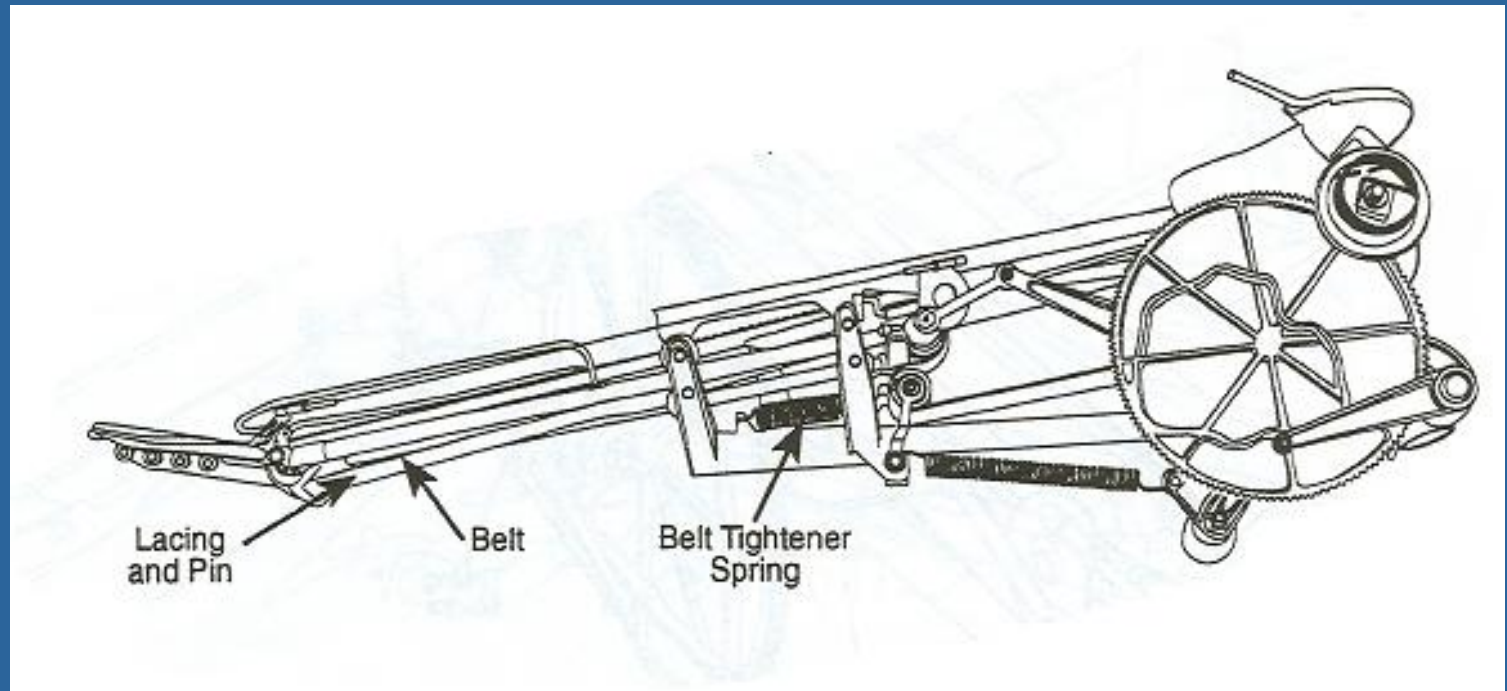




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Distributors 101

- **Maintenance and Adjustments:**





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Distributors 101

- **Maintenance and Adjustments:**
 - **Distributor Overview**
 - **The distributor transfers pins from the elevator wheel to the bin assembly. The distributor is driven by an adjustable clutch through its various positions. The large nylon gear serves a dual purpose.**
 1. **The outside of the gear contains a cam which moves the distributor to the various cup locations.**
 2. **The other side of the cam controls the telescoping action of the front portion of the distributor. Springs keep the cam followers against the cams.**

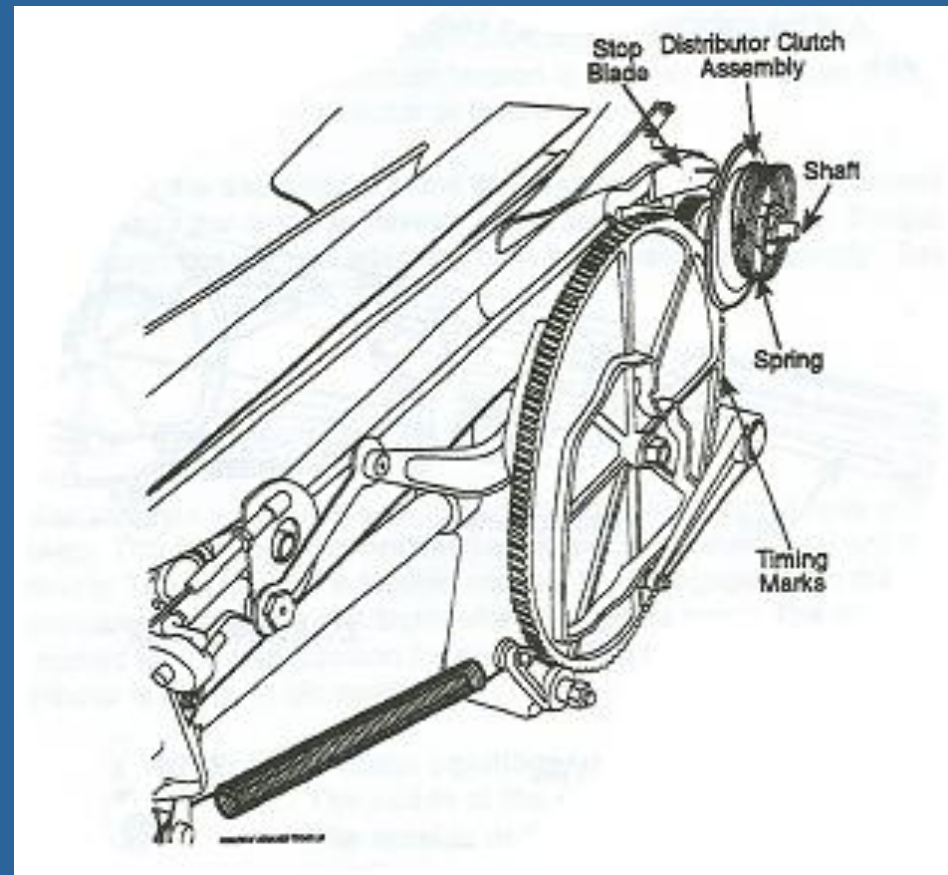


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- **Maintenance and Adjustments:**

- Timing Marks
- Clutch Spring
- Cam Follower
- Tension Spring





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- **Maintenance and Adjustments:**
 - **Distributor Replacement**
 1. Check level of the distributor mounting post. This should be level in both direction. If adjustment is needed, loosen the distributor bracket mounting bolts and position accordingly. Spacers are used between the distributor bracket and machine weldment to ensure that it will clear the bin assembly by at least 3/8".
 2. To replace the distributor drive assembly, do the removal procedure in reverse order.
 3. Distributor Post Spacer 070 006 143



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- **Maintenance and Adjustments:**
 - **Distributor Replacement**
 - 4. The clutch spring is to be set at one complete turn of the spring. The most difficult drive position is between the 6 and 10 pin feed positions.
 - a) If the spring tension is not strong enough, the distributor will stall between the 6 and 10 pin feed positions.
 - b) If too much tension is applied, it will cause stalling of the distributor or failure to index.
 - 5. When the distributor is at the #1 bin position, the distance between the distributor orientor pan and the elevator wheel should be 1/4" or less. If adjustment is necessary, loosen orientor pan attaching bolts and position accordingly.



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- **Maintenance and Adjustments:**
 - **Distributor Cam Operation**
 - The cam has a bump on each side of its outer edge at the base of the valley between the teeth. This locating mark and marked tooth of the pinion gear are to be matched for proper timing. The outer face of the large cam is marked for the feed position for each pin. The timing marks are in line only when the distributor is at the #1 bin position.

Note:

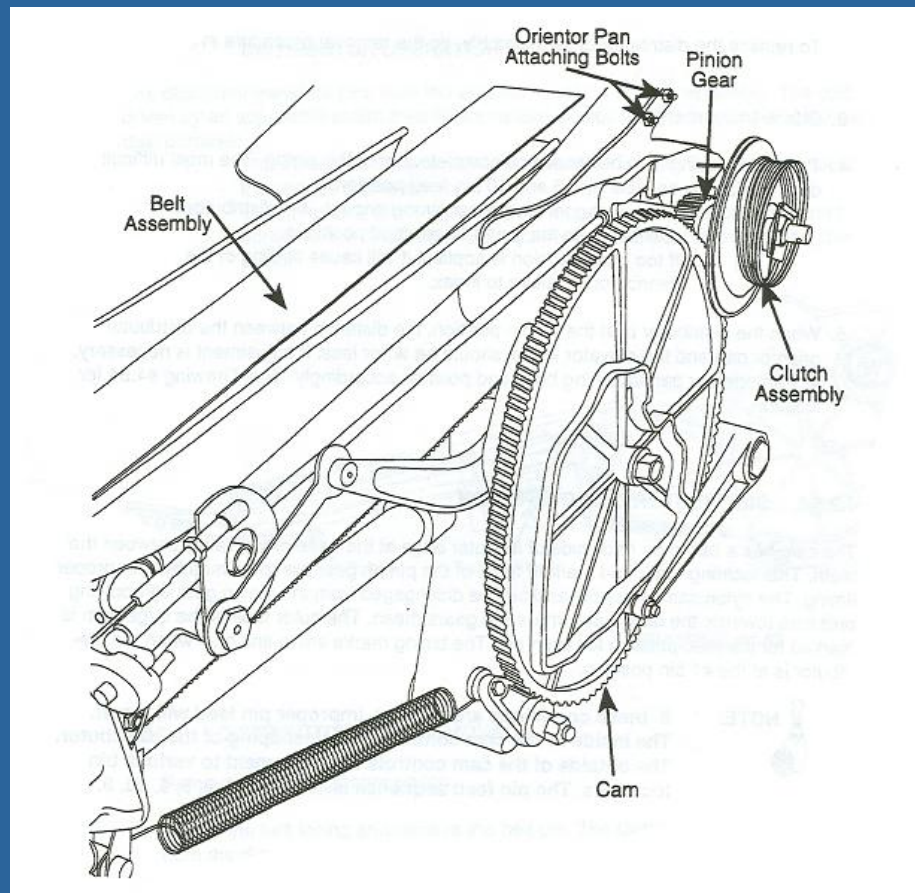
If these conditions are not met, improper pin feed will result. The inside of the cam controls the telescoping of the distributor. The outside of the cam controls the movement to the various bin locations. The pin feed sequence is 1, 3, 2, 4, 7, 8, 5, 6, 10, 9.



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- Maintenance and Adjustments:**





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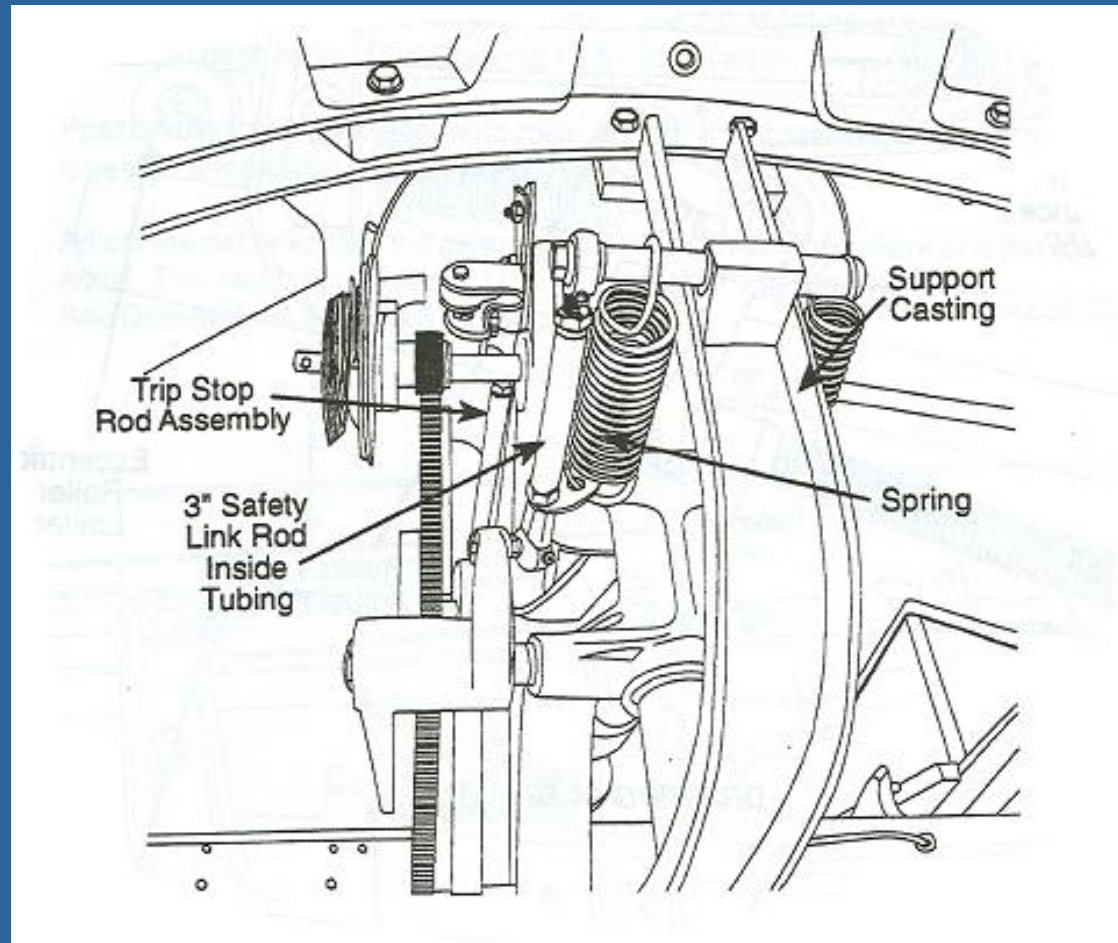
- **Maintenance and Adjustments:**
 - **Distributor Adjustments**
 1. Index the distributor trip stop rod assembly to position the distributor at the #1 bin pocket.
 2. Inspect the nylon cam gear to assure that the timing marks match with the pinion gear.
 3. Distributor should be in line with the #1 and #5 bins. If distributor is not in line, loosen the rod end and adjust the tubing accordingly.
 4. Operate machine and note the pin feed operation at the individual bin pockets. The tubing may have to be readjusted to obtain accurate feeding of the pins.



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- **Maintenance and Adjustments:**

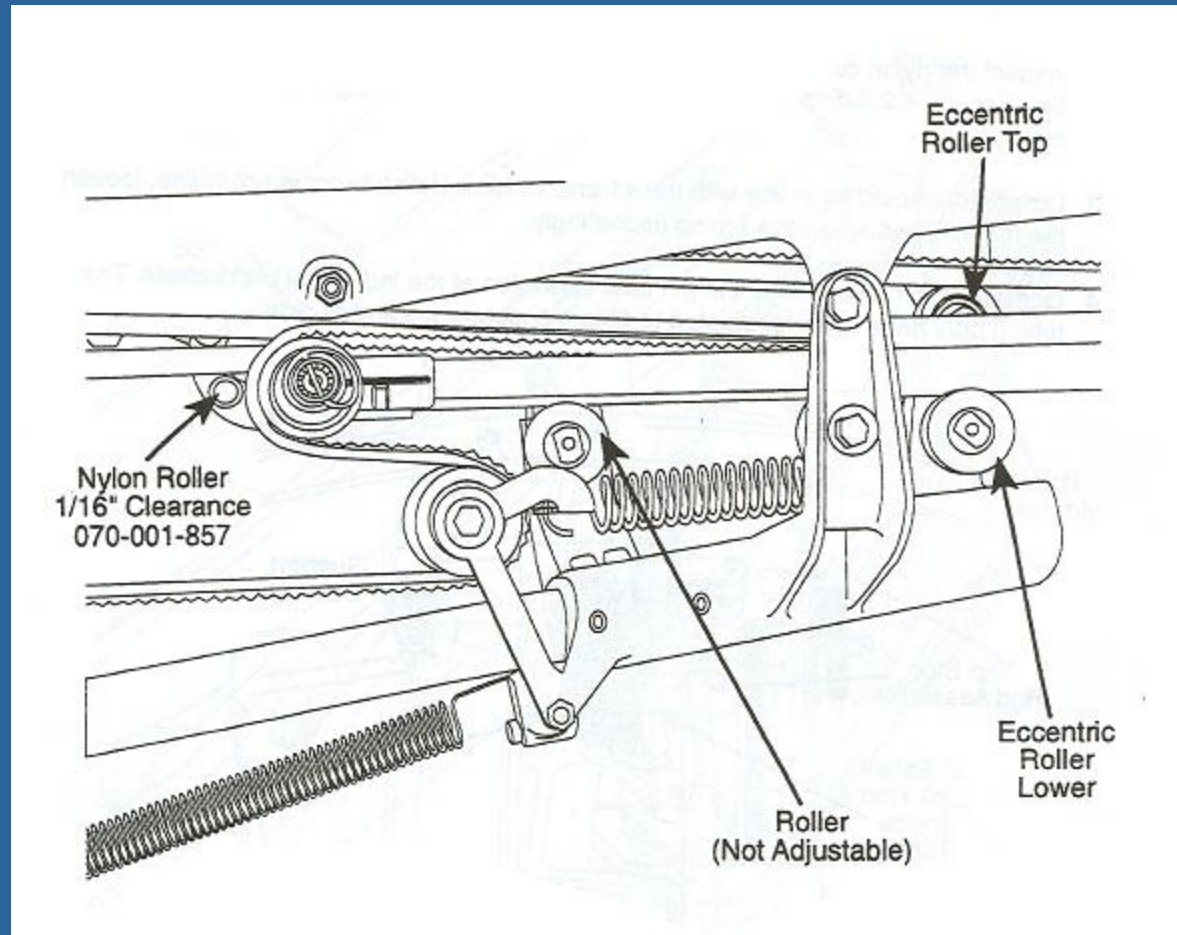




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Distributors 101

- Maintenance and Adjustments:**





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- **Maintenance and Adjustments:**
 - **Distributor Roller Adjustments**
 1. Starting with distributor at the #1 bin position, telescope so that it is at its' minimum length.
 2. Position the front lower eccentric roller in its' lowest position, so the distance between the roller and the carriage tube is at its maximum.
 3. Bring the top rear eccentric roller down until there is a noticeable drag against the carriage tube when you turn the roller.
 4. Adjust the upper front eccentric roller until the trip rod tube and carriage tube are parallel to each other.



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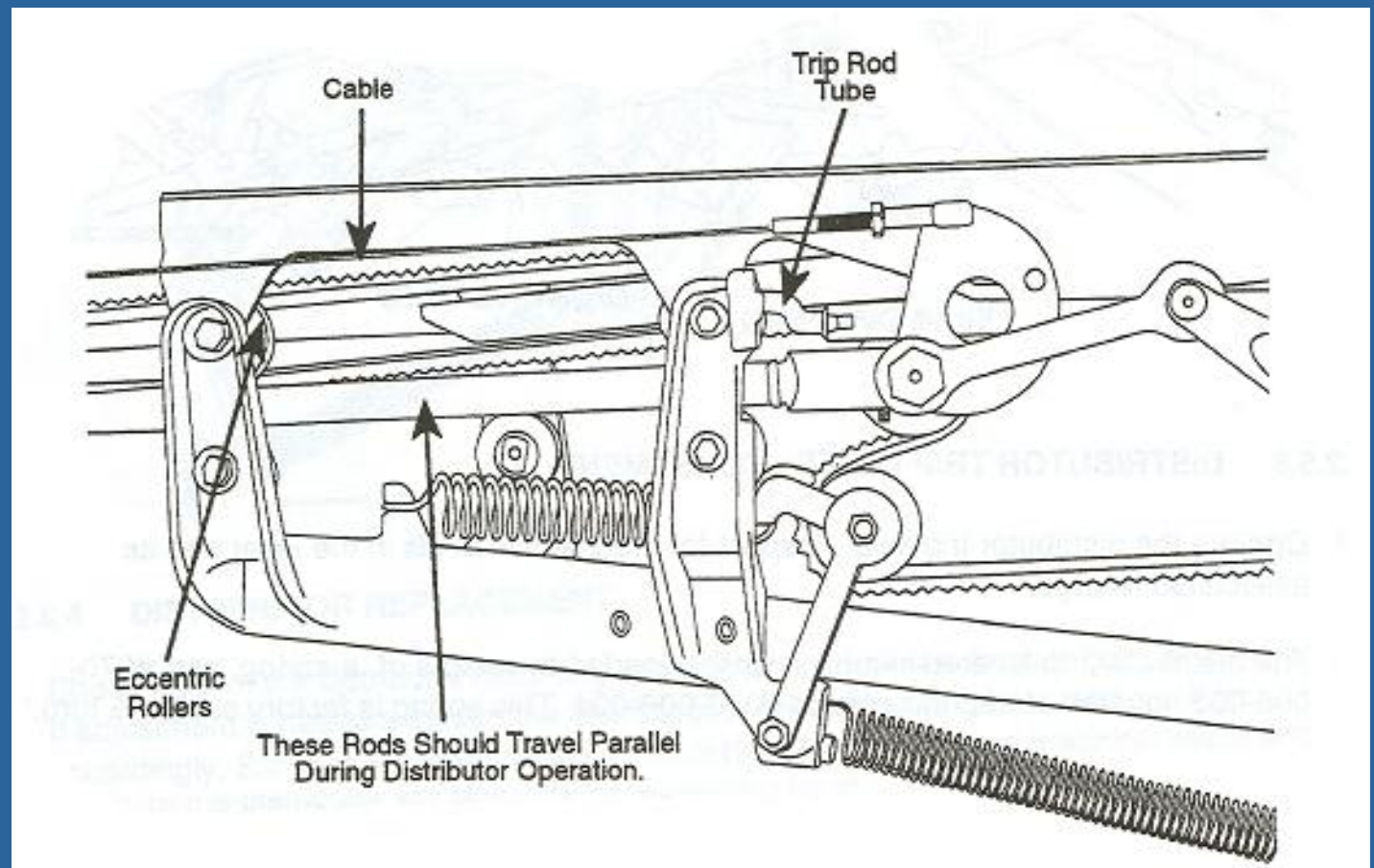
- **Maintenance and Adjustments:**
 - **Distributor Roller Adjustments**
 5. **Position the front lower eccentric roller up until it just makes contact with the carriage tube and are parallel to each other.**
 6. **Adjust the cable so that the clearance between the nylon rollers and the trip rod tube is equal. This clearance is about 1/16" in all position of the distributor.**



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Distributors 101

- Maintenance and Adjustments:**





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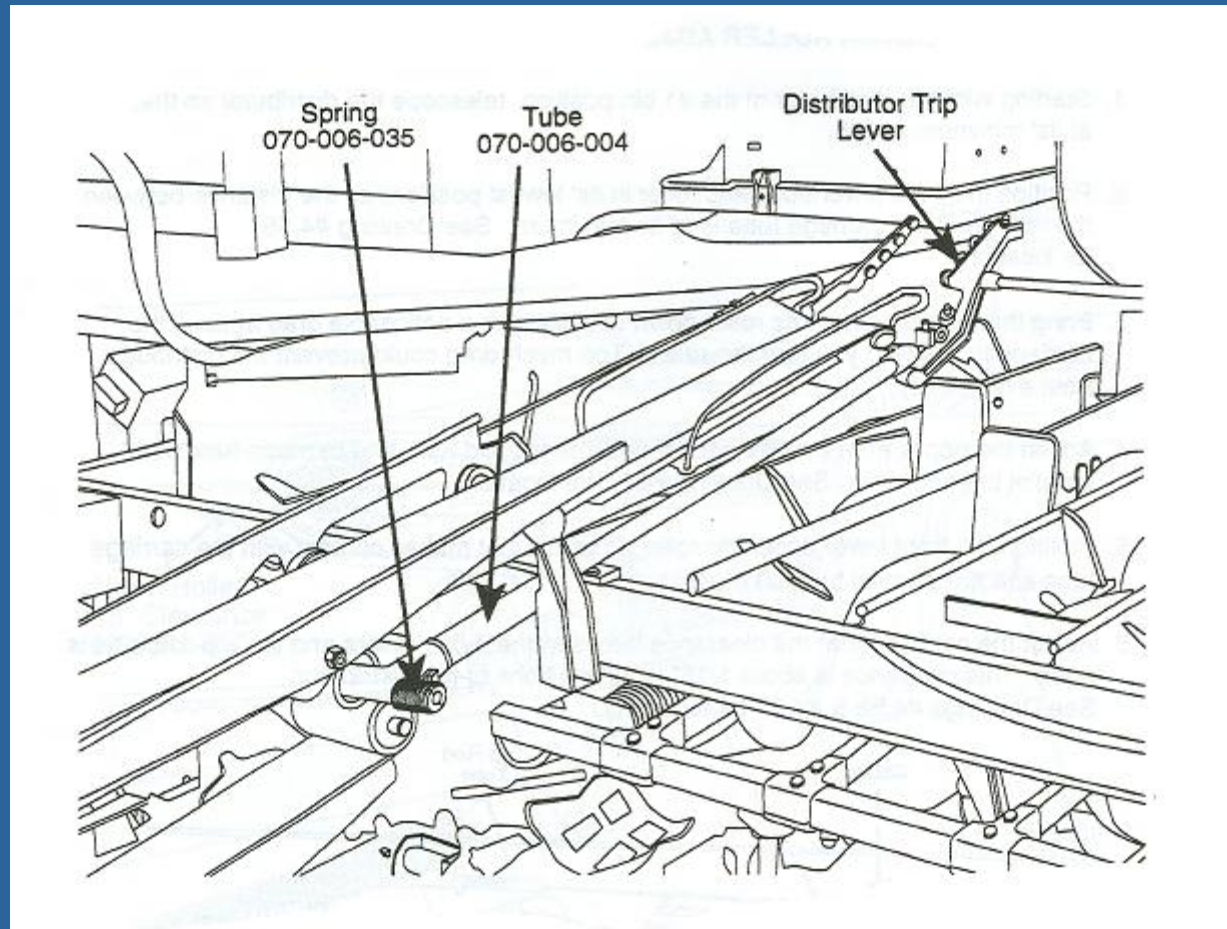
- **Maintenance and Adjustments:**
 - **Distributor Trip Lever Adjustments**
 1. Operate the distributor trip lever, inspect for mechanical binds in the lever and its associated linkage.
 2. The distributor trip lever assembly is spring loaded by means of a spring, part # 070-006-035, located at the rear of the tube # 070-006-004. The spring is factory set for 1/2 turn.



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Distributors 101

- **Maintenance and Adjustments:**





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Thank You