

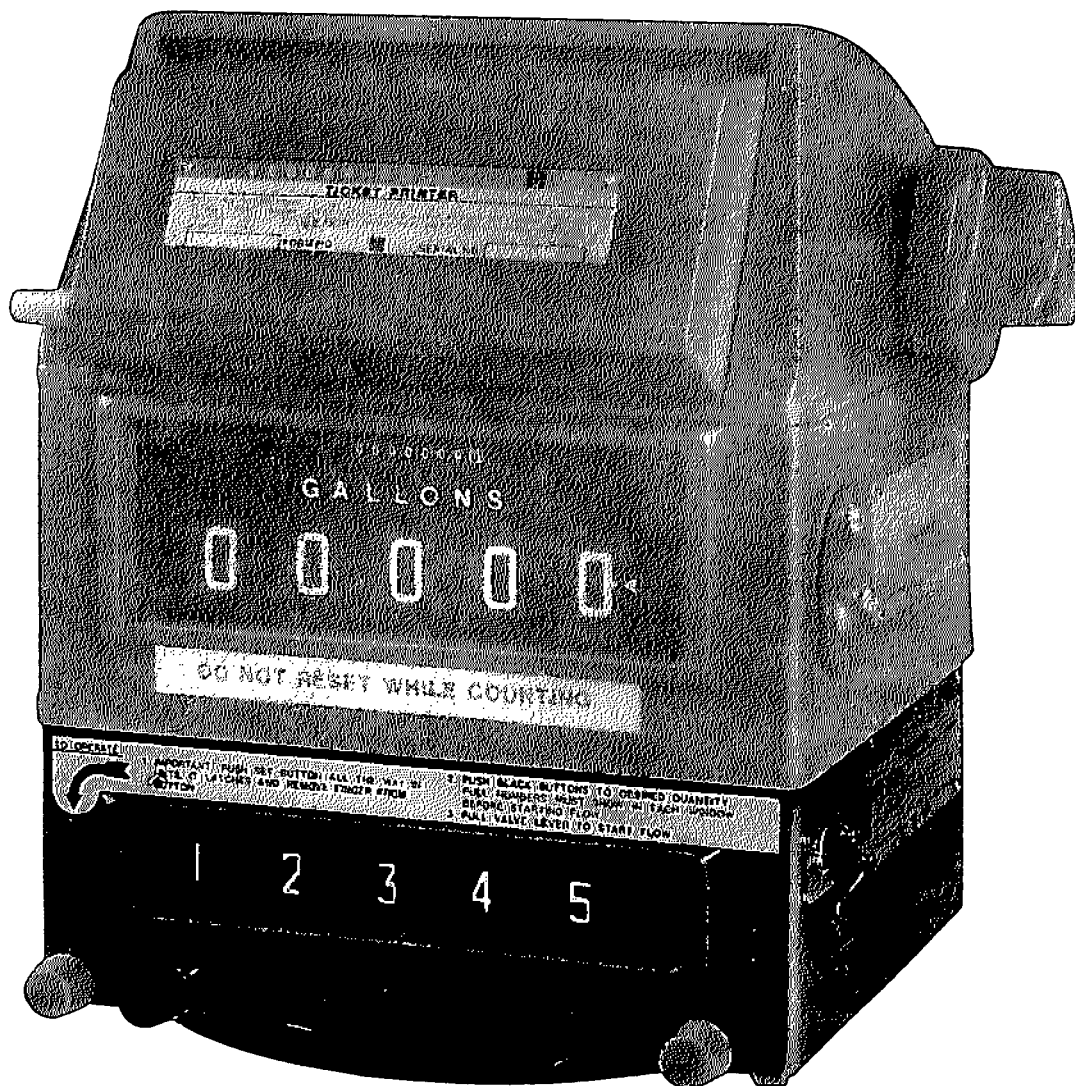


VEEDER-ROOT  
INSTALLATION, OPERATION  
AND SERVICE INSTRUCTIONS

Technical Manual  
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Rev B

# SERIES 7889 METER PRESET

Manual No. 251278





## TABLE OF CONTENTS

	Page		Page
<b>SECTION 1. INTRODUCTION</b> .....	1	<b>SECTION 5. SERVICE</b> .....	6
A. General .....	1	A. General .....	6
B. Damage Claims .....	1	B. Cleaning .....	6
C. Return Shipping .....	1	C. Recommended Lubricants .....	6
		D. Lubrication .....	6
<b>SECTION 2. DESCRIPTION</b> .....	1	E. Temporary/Emergency Rake Adjustment .....	6
A. General .....	1	F. Troubleshooting .....	7
B. Specifications .....	2	G. Preset Pawl Replacement .....	10
		H. Rack Replacement .....	10
<b>SECTION 3. INSTALLATION</b> .....	2	<b>SECTION 6. DAMAGE CLAIMS AND WARRANTY</b> ....	11
A. Mounting .....	2	A. Damage Claims .....	11
B. Trimming Right-Hand Wheel to Zero .....	3	B. Return Shipping .....	11
C. First Stage Knockoff Change .....	4	C. Warranty and Conditions .....	11
D. Operational Check .....	5	1. Warranty .....	11
<b>SECTION 4. OPERATION</b> .....	5	2. Inspection .....	11
		3. Limitation of Remedy and Warranty .....	11
		4. Limitation of Damages .....	11
		5. Limitation of Actions .....	11
		6. Collateral Promises .....	11
		7. Interpretation .....	11

## SECTION 1. INTRODUCTION

### A. GENERAL.

1. These instructions are for installation, operation and service of the Series 7889 Meter Preset, manufactured by Veeder-Root Company, 6th Avenue at Burns Crossing, Altoona, Pennsylvania 16603. Phone (814) 695-4476.
2. When a vertical bar | appears adjacent to text or illustrations, information has been added or changed at the last issue date.
3. Repair or replacement of parts beyond that described in this manual is not recommended.

### B. DAMAGE CLAIMS.

1. Thoroughly examine all components and units as soon as received. If damaged, write a complete and detailed description of the damage on the face of the freight bill. Insist that the carrier's agent verify the inspection and sign the description.
2. Immediately notify the delivering carrier of damage or loss. This notification may be given either in person or by telephone. Written confirmation must be mailed within 48 hours. Railroads and motor carriers are understandably reluctant to make adjustments for damaged merchandise unless inspected and reported promptly.
3. Risk of loss of, or damage to merchandise remains with the buyer. It is the buyer's responsibility to file a claim with the carrier involved.
4. Immediately advise your Veeder-Root representative, distributor, or the factory so that we may assist you.

**C. RETURN SHIPPING.** All shipments of Veeder-Root products must be prepaid. Equipment must be packed in a strong exterior container and surrounded by shock absorbing material. Veeder-Root will accept no liability for damage caused by improper packing. It is suggested that the original shipping container be used if it is available. Address shipment to Veeder-Root Co., 6th Avenue at Burns Crossing, P.O. Box 1673, Altoona, Pennsylvania 16603.

## SECTION 2. DESCRIPTION

### A. GENERAL.

1. The Series 7889 Meter Preset is used in fluid flow applications where it is desired to close a valve after a predetermined amount of liquid has passed through.
2. In technical terms, the Preset is a non-repeating, predetermined counter that is driven by and normally mounted on a flow meter. It has a two-stage output that is normally used to close a valve in two stages.
3. The Preset is used in combination with other Veeder-Root meter accessories. Typical applications include metering of home fuel oil from a tank truck, pipe-line monitoring and bulk loading.
4. Consult Veeder-Root on any unusual application, installation or possible modification of this basic design.

## B. SPECIFICATIONS.

- Input.** The Preset is driven by a rotating shaft from a customer-supplied flow meter. The type of input coupling should be specified when ordering. Maximum torque to drive the Preset (with a 60 lb. valve load) through a knockoff is 40 ounces per inch. Average running torque is below 4 ounces per inch.
- Mounting.** See Figure 1. There are eight tapped mounting holes for use with ¼-28 screws. The Preset is designed to mount directly on a Liquid Controls, Smith or Tokheim Flow Meter. Adapters are available for mounting on Brodie, Neptune, Rockwell or Keene (Bowser) meters.
- Valve and Switch Connections.** The Preset can be connected to a two-stage valve by customer-supplied, direct linkage or by an electrical switch with linkage. Either linkage connects to a rotating knockoff plate on the bottom of the Preset case with a ¼-28 screw (Figure 1). The rated first-stage valve load is 60 pounds.
- Outline Dimensions.** See Figure 1.
- Flow Rate.** The maximum speed of the right-hand wheel (least significant digit) is 250 rpm. With a 1:1 ratio between the input and the right-hand wheel, the maximum input speed would also be 250 rpm. If one revolution of the right-hand wheel represents 10 gallons, the maximum flow rate would be 2500 gallons per minute. One revolution of the right-hand wheel can represent 10 gallons, 1 gallon, 0.1 gallon, liters, barrels, cubic feet, etc., depending upon the application and the input gear ratio. Veeder-Root gear plates are available to provide various ratios of input revolutions of the right-hand wheel.
- Preset Number.** 4 or 5 digits. Preset in additive direction by individually actuating five preset buttons (maximum preset capacity 99999).

- Display.** 4 or 5 wheels with ½ inch white digits on black background.
- Output (Knockoff).** Two-stage knockoff. Unit counts down from preset number. First stage knockoff point is set at the factory to customer's specification at 90, 80, 70, 60, 50, 40, 30, 20, 10, 9, 8, 7, 6, 5, 4, or 3. An optional three-finger rake provides first stage knockoff at a number between 900 through 100 in increments of 100. The setting can be internally changed by the customer in the field. Second (final stage) knockoff occurs when all wheels reach zero. See Figure 1 for angular travel of knockoff plate.
- Interlock.** The Preset has a unique interlock feature. The Preset buttons cannot be actuated until the SET button is depressed (latched). The SET button cannot be latched with the valve load applied. Therefore, the preset number cannot be changed while fluid is flowing.

**WARNING: IF THE PRESET OPERATING HANDLE IS MOUNTED IN THE 5 O'CLOCK POSITION, THE HANDLE COULD STRIKE THE OPERATOR'S HAND WHEN DEPRESSING THE EMERGENCY STOP BUTTON.**

- Emergency Stop.** The STOP button will "dump" both first and final stages of the valve to provide complete shutdown.
- Options.** Presets are available with a Series 7856 explosion-proof switch for use with electrically operated valves. The Preset can be integrally mounted to a Veeder-Root Meter Register or to a Meter Register with Ticket Printer.

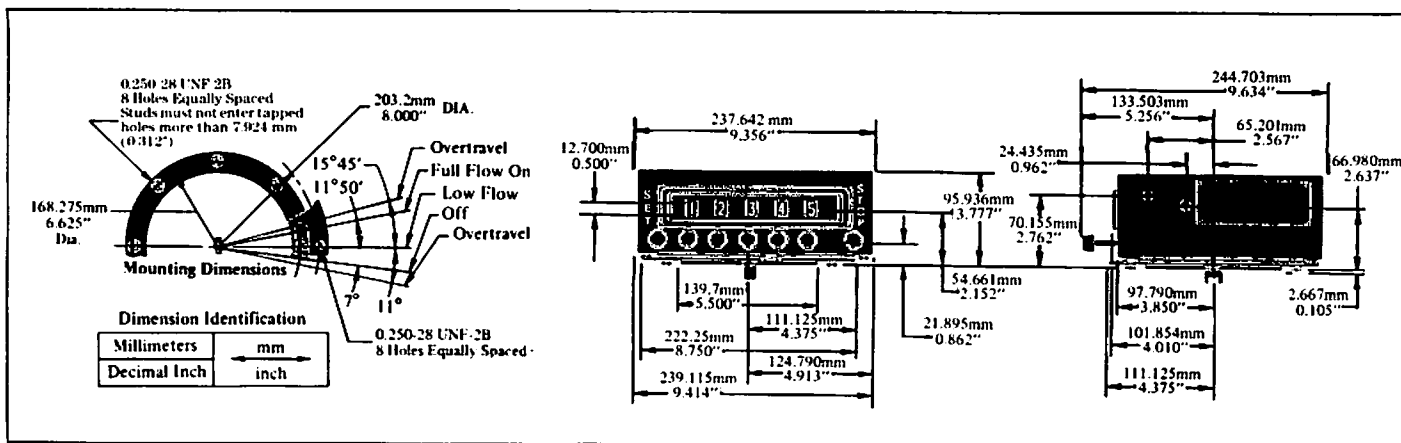


Figure 1. Exterior and Mounting Dimensions — Series 7889 Preset.

## SECTION 3. INSTALLATION

**WARNING: WHEN THE PRODUCT IS USED TO CONTROL A MACHINE OR PROCESS WHERE PERSONAL INJURY OR EQUIPMENT DAMAGE MIGHT OCCUR AS A RESULT OF FAILURE OF ANY ELECTRICAL OR OTHER PRODUCT FUNCTION, YOU ARE URGENTLY RECOMMENDED TO INSIST ON INSTALLATION OF SAFEGUARDS WHICH WOULD PROTECT THE OPERATION AND/OR MACHINE IN THE EVENT OF ANY UNEXPECTED OPERATION OF THE MACHINE OR PROCESS.**

### A. MOUNTING.

**CAUTION: BEFORE INSTALLING THE METER PRESET, REMOVE AND DISCARD THE TWO HEX HEAD SCREWS AND WASHERS THAT SECURE THE KNOCK-OFF PLATE TO THE BOTTOM OF THE PRESET. THEN, HOLD THE SPRINGLOADED KNOCKOFF PLATE AGAINST THE PRESET UNTIL INSTALLED ON A FLOW METER OR ADAPTER. FAILURE TO COMPLY MAY RESULT IN DAMAGE TO THE KNOCKOFF PLATE RETURN SPRING.**



## Installation, Operation and Service Instructions Series 7889 Meter Preset

1. Remove and discard the two hex head screws and washers that secure the springloaded knockoff plate to the bottom of the Preset (Figure 2). Ensure that the knockoff plate does not fall away from the Preset or damage to the the knockoff plate return spring may result.

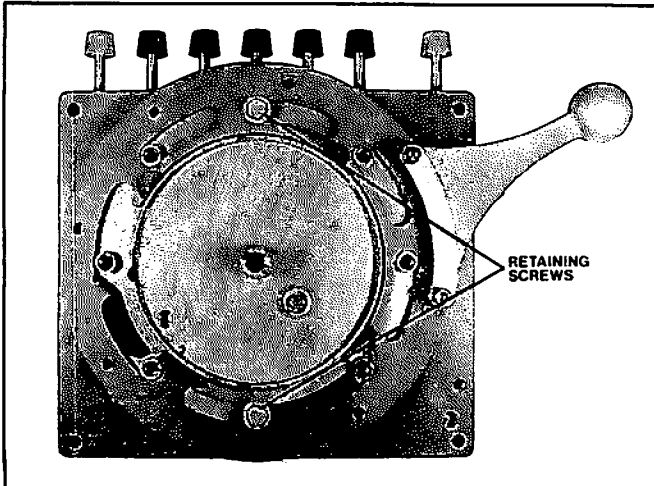


Figure 2. Removal of Preset Retaining Screws.

2. Install the Preset on a flow meter or adapter, taking care to properly engage mating couplings. Secure with  $\frac{1}{4}$ -28 screws and lockwashers. CAUTION: Screws must not enter tapped holes more than 0.312 in.

**WARNING: IN INSTALLATION AND USE OF THIS PRODUCT WITH AN ELECTRICAL SWITCH, COMPLY WITH THE NATIONAL ELECTRICAL CODE; FEDERAL, STATE AND LOCAL CODES; AND TURN OFF POWER AND TAKE OTHER NECESSARY PRECAUTIONS DURING INSTALLATION, SERVICE AND REPAIR TO PREVENT PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.**

**CAUTION: VALVE LOAD OF UP TO 60 LBS. CAN BE APPLIED TO THE PRESET, BUT ANY LOADING OR FORCE ON THE KNOCKOFF PLATE MUST BE IN A DIRECTION THAT CAUSES THE VALVE TO CLOSE (KNOCKOFF PLATE TO ROTATE IN A COUNTERCLOCKWISE DIRECTION WHEN VIEWED FROM ABOVE). ANY LOADING OR FORCE IN A CLOCKWISE DIRECTION, INCLUDING HIGH FRICTION IN VALVE OR LINKAGE, COULD DAMAGE THE PRESET.**

3. Install the linkage between the knockoff plate and valve or switch. If the Preset is equipped with a Veeder-Root Series 7856 explosion-proof switch, connect wires per installation instructions packed with the switch.
4. Ensure that there is still some knockoff plate overtravel after the valve is fully open.
5. Verify that after the valve closes, the knockoff plate has rotated the correct distance of  $15^\circ$ ,  $45^\circ$  plus  $7^\circ$  (Figure 1) and that there is some overtravel still left in the plate.

**B. TRIMMING RIGHT-HAND WHEEL TO ZERO.** If the right-hand wheel does not read zero after product flow stops, adjust as follows:

**Note:** SET button must be released (unlatched) during trimming procedure.

1. Remove the lockwired plate covering the trim holes on the right side of the Preset. Older models have trim hole plugs. Insert one small screwdriver blade in each of the two trim holes (Figure 3).

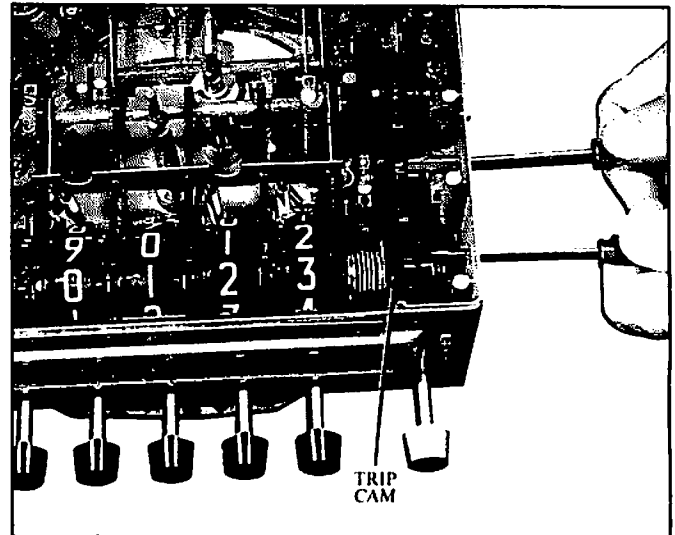


Figure 3. Trimming the Right-Hand Wheel.

2. Fit the tips of the screwdrivers into the slots in the side of the plastic parts. By prying with the front screwdriver and holding the gear train stationary with the rear screwdriver, adjust the knockoff cam as follows:

**CAUTION: ADJUST THE KNOCKOFF CAM ONLY IN THE DIRECTION INDICATED IN THE FOLLOWING STEPS. ADJUSTMENT OF THE CAM IN THE WRONG DIRECTION COULD DAMAGE THE INTERNAL STOP AND CAUSE A RUNAWAY DELIVERY. IF STRONG RESISTANCE IS ENCOUNTERED IN ONE DIRECTION DURING ADJUSTMENT, THE INTERNAL STOP HAS BEEN REACHED. DO NOT ATTEMPT FURTHER ADJUSTMENT IN THAT DIRECTION.**

- a. If the final knockoff point is greater than zero, adjust the cam backward (clockwise when looking into the trim hole) only. Do not attempt to adjust the cam forward since you cannot reach zero without breaking the internal stop. The cam must be adjusted 10 clicks for a 1 digit change in the right-hand wheel. For example, if a Preset final knockoff point was 0003, the cam would be moved 30 clicks.
  - b. If the final knockoff point is less than zero, adjust the cam forward (counterclockwise when looking into the trim hole) only. Do not attempt to adjust the cam backward since you cannot reach zero without breaking the internal stop. The cam must be adjusted 10 clicks for a 1 digit change in the right-hand wheel. For example, if a Preset final knockoff point was 9998, the cam would be adjusted 20 clicks.
3. After adjustment, set a small number into the Preset and deliver product. The final knockoff point should be zero. If not, repeat the adjustments until zero is reached.
  4. Install the trim hole plugs or plate. Secure the plate with screws and a new lockwire.

**C. FIRST STAGE KNOCKOFF CHANGE.** Proper operation of the Preset depends on the correct relationship between the first and second stage rakes and the notches in the wheels. If this factory setting is disturbed, the unit will not operate properly. To change the first stage knockoff setting, perform the following procedure:

1. Cut the lockwire that is threaded through the four bolts securing the Register to the Preset.
2. Remove the four mounting bolts.
3. With the assembly in an upright position, lift the Meter Register from the Meter Preset.

**CAUTION: DO NOT BEND OR TWIST RAKES WHEN SETTING FIRST STAGE KNOCKOFF. IF RAKES ARE DAMAGED, SEE SECTION 5 FOR TEMPORARY EMERGENCY ADJUSTMENT.**

4. Lift both rakes away from the wheels in the Preset (Figure 4).

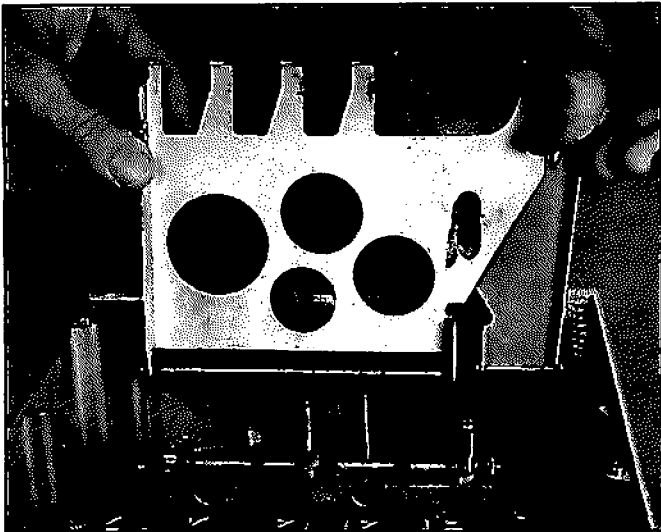


Figure 4. Lifting Rakes.

5. Set the first stage knockoff at a number from 3 through 900 by first depressing the SET button, then one, two or three character wheel Preset buttons. The Preset must be equipped with an optional three-finger rake to obtain a first stage knockoff at a number between 100 and 900.
6. Release the SET button by rotating the knockoff plate.
7. Ensure that the character wheel disc inserts (Figure 5) are located as follows:
  - a. For first stage knockoff at a number from 3 through 9, ensure that all disc inserts are installed in the second character wheel (second wheel from right).
  - b. For first stage knockoff at a number from 10 through 90, remove the disc insert nearest the top of the second character wheel and install it in any other open position in the wheel. Save the disc insert for future changes in knockoff settings if there are no open positions.
  - c. For first stage knockoff at a number from 100 through 900, remove the disc insert nearest the top of the second and third character wheels. Install them in any other open positions in these two wheels. Save the disc inserts for future changes in knockoff settings if there are no open positions.

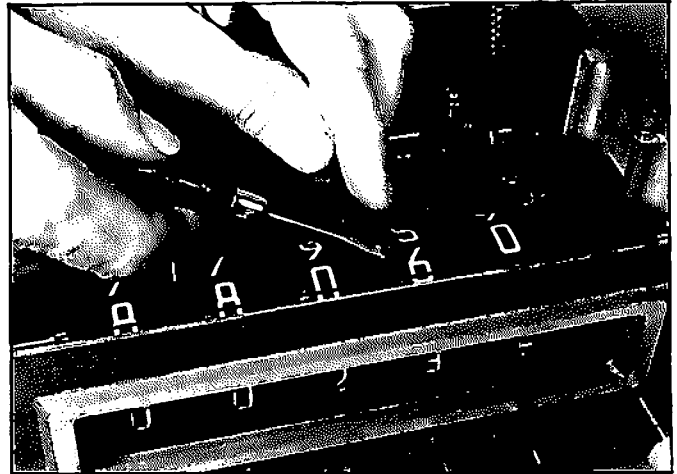


Figure 5. Removal of Disc Insert from Wheel.

8. Push the trip cam to the left to disengage it from the drive gear (Figure 6).
9. Rotate the trip cam until its operating surface is straight up (Figure 6). In this position, the operating surface pulls the rake when the desired number on the first character wheel is displayed in the window.

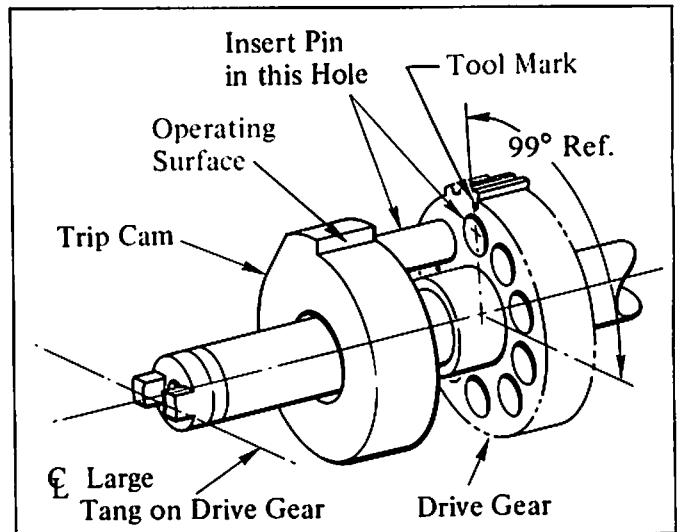


Figure 6. Trip Cam Positioning for First Stage Knockoff.

10. Engage the trip cam with the drive gear (Figure 6).

**Note:** If the first stage knockoff number is set very low, both the first and final knockoffs could appear to occur simultaneously during a high flow rate.

11. Lower the rakes toward the front of the Preset to their operating position.

**CAUTION: DO NOT BEND OR TWIST RAKES. BE SURE RAKES ARE PROPERLY POSITIONED OVER ECCENTRIC WHEN METER REGISTER IS LOWERED ONTO THE PRESET. BE SURE PROTRUDING SHAFTS DO NOT CONTACT THE RAKES. IF RAKES ARE DISTURBED, SEE "TEMPORARY/EMERGENCY ADJUSTMENT" IN SECTION 5.**



## Installation, Operation and Service Instructions Series 7889 Meter Preset

12. Install the Meter Register on top of the Meter Preset with attention to proper alignment of the two "up-down" shafts (Figures 7 and 8). Secure the units together with the four bolts and a new lockwire.

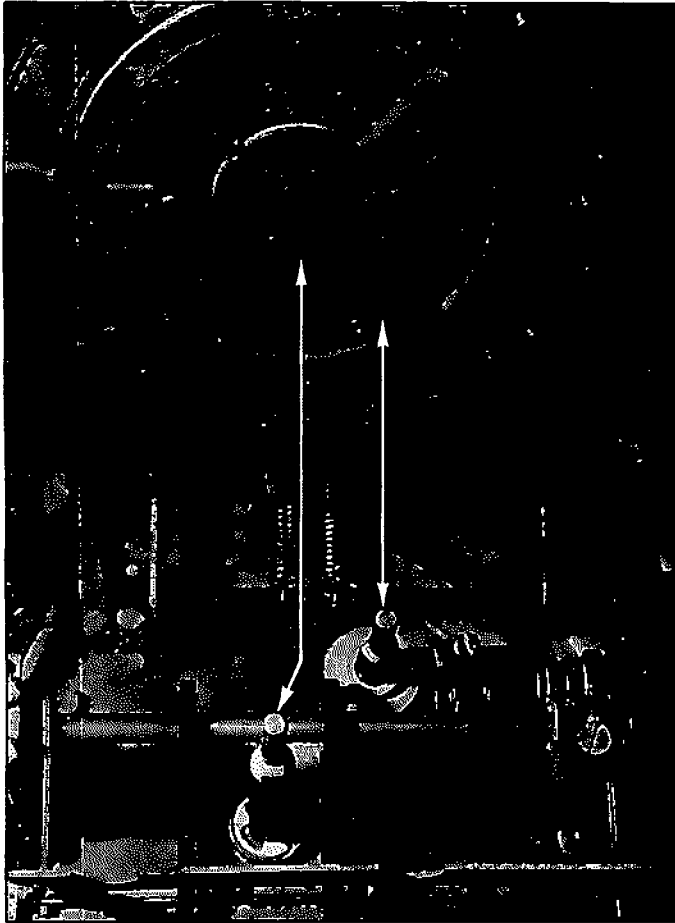


Figure 7. Shaft Alignment Before Installation of Meter Register on Meter Preset.

- D. OPERATIONAL CHECK.** Before putting the Preset into use, perform a complete check of the unit and associated delivery equipment per Section 4.

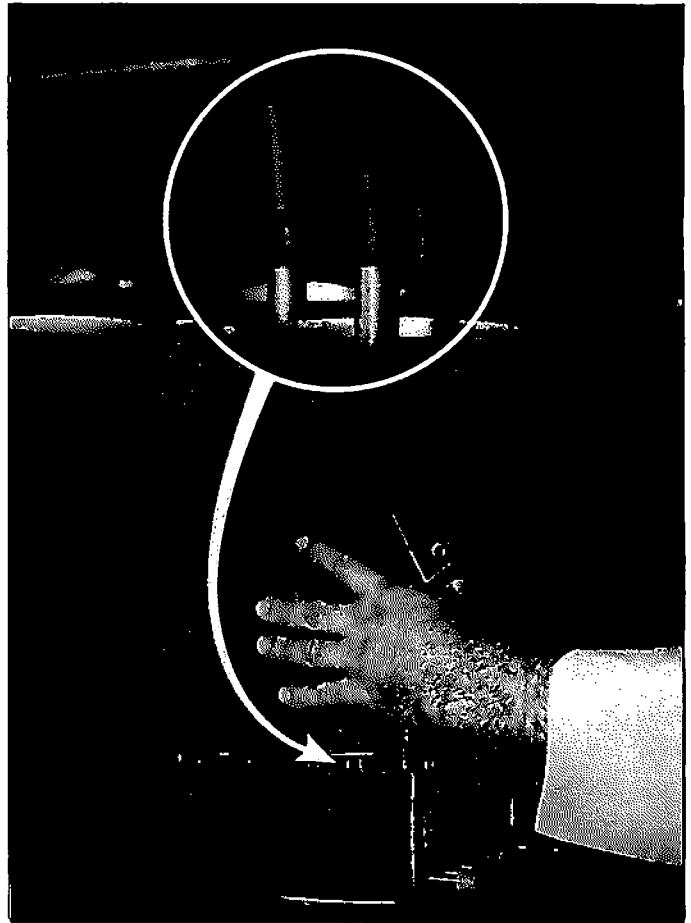


Figure 8. Installation of Meter Register on Meter Preset.

### SECTION 4. OPERATION

1. Depress the SET button into its latched position. The inward movement of the SET button causes:
  - a. The input drive to de-clutch so that its internal parts are disconnected from the flow meter.
  - b. A "gate" to open that had blocked the Preset buttons from operating.
2. Depress the appropriate Preset buttons to display the quantity of fluid to be delivered. One depression of each button will rotate its corresponding wheel 1/10 revolution or one digit in an additive direction. Presetting one wheel will not affect other wheels.
3. Open the valve to start fluid flow by moving the linkage between the Preset and the valve. (A handle is normally supplied by the valve or meter manufacturer for this function. Units with Series 7856 Switch are equipped with a handle.) This action rotates the knockoff plate on the bottom of the Preset case and:
  - a. The SET button pops out which locks out the Preset buttons and engages the clutch between the input shaft and the wheels.
  - b. The knockoff plate on the bottom of the Preset case has two tabs that project into the case. When the valve load is applied and the knockoff plate rotates, the tabs move internal latches into their "loaded" positions.
  - c. The knockoff movement locks out the SET button.
  - d. Fluid starts to flow. The flow meter drives the Preset wheels directly in a subtractive direction.
  - e. When the first stage knockoff number is reached, a series of notches in the wheels becomes aligned and the first stage rake drops into the notches. Then, a cam pulls the rake forward to release one of the previously loaded latches. The release of the latch allows the knockoff plate to move back approximately 15°, 45' for a partially closed valve.
  - f. When the wheels reach zero, a second rake drops into the notches and another cam pulls this rake forward. This action releases the final latch and allows the plate to move another 7° for a fully closed valve.

## SECTION 5. SERVICE

**A. GENERAL.** The Meter Preset is adjusted and lubricated at the factory, but periodic cleaning and lubrication is required for maximum service. Service intervals must necessarily be left to individual users due to varying conditions of operation.

**B. CLEANING.** Remove dirt from character wheels and all drive gears with a small brush.

### C. RECOMMENDED LUBRICANTS.

**OIL:** Temperature Range  $-65^{\circ}\text{F}$  to  $+275^{\circ}\text{F}$   
Chemlube 201 Oil (MIL-L-6085A)  
Exxon Instrument Oil (MIL-L-7870A)  
Aeroshell Fluid No. 12 or Equivalent (MIL-L-6085A)

**GREASE:** Temperature Range  $-65^{\circ}\text{F}$  to  $+300^{\circ}\text{F}$   
Vischem 352 or equivalent

Chemlube and Vischem products are manufactured by Ultrachem Inc., 1400 N. Walnut St., P.O. Box 2053, Wilmington, DE 19899.

### D. LUBRICATION.

1. Apply oil to all rotating parts.
2. Apply grease to all other moving metal parts.

### E. TEMPORARY/EMERGENCY RAKE ADJUSTMENT.

1. If the Preset fails to knock off due to damaged rakes caused by banging, bending or twisting, temporary adjustments can be made while waiting for a replacement unit.
2. Using extreme caution, bend the rake fingers to obtain proper rake positioning (Figure 9).

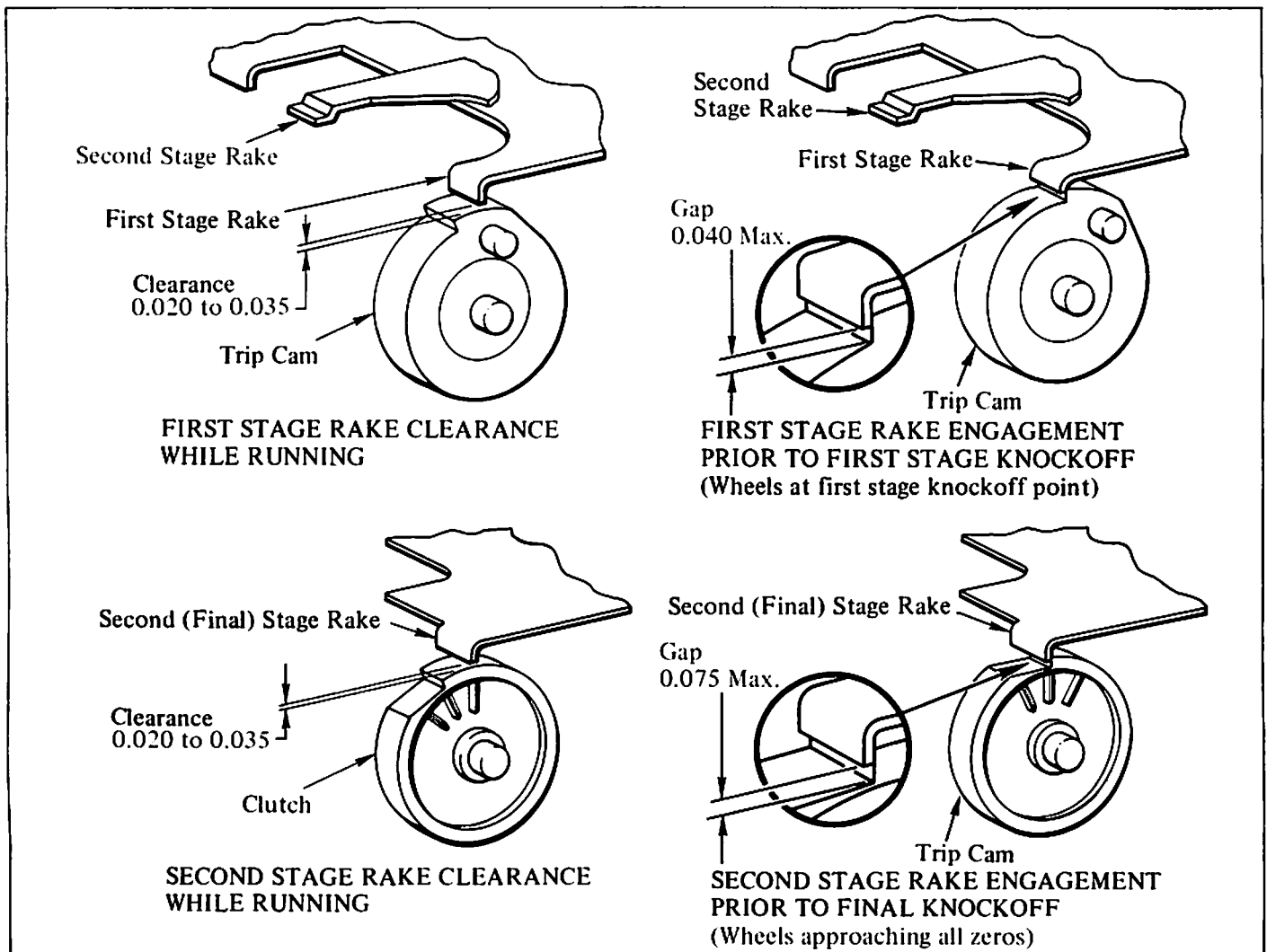


Figure 9. Rake Positioning.



## Installation, Operation and Service Instructions Series 7889 Meter Preset

**F. TROUBLESHOOTING.** Refer to Figures 10, 11, and 13 for parts identification when using Troubleshooting Table 1.

Table 1. Series 7889 Meter Preset Troubleshooting.

TROUBLE	POSSIBLE CAUSE	CORRECTION
Any wheel cannot be preset.	Broken preset pawl (Figure 11). Displaced extension spring between base of Preset and Preset pawl (Figure 11).	Install new preset pawl (Paragraph G). Replace extension spring.
Any wheel split (Number not centered in window).	Broken rack (Figure 11), pinion or mating eccentric (Figure 13). Pinion out of time. Stud on wheel shaft pinion is not straight up (Figure 13). Groove pin not flush with bottom of rack (Figure 11).	Install new rack (Paragraph H), or pinion or mating eccentric. Remove wheel shaft group (Paragraph G). Rotate pinion until stud on pinion is straight up. Drive groove pin flush with bottom of rack.
First knockoff fails.	Bent rake.	Align rake for proper clearance and engagement with wheels (Figure 9).
Final knockoff fails.	Misalignment of rake with wheels. Knockoff plate binds. Broken extension spring between strap securing left side of wheel shaft and knockoff plate (Figure 10). Broken meter coupling.	Align rake for proper clearance and engagement with wheels (Figure 9). Clean and lubricate knockoff plate (Paragraphs B, C and D). Install new extension spring. Install new meter coupling.
Preset shuts off at first knockoff.	Improperly adjusted rakes. Broken first stage knockoff pawl (Figure 10).	Adjust rakes (Figure 8). Install new first stage knockoff pawl.
Knockoff plate binds.	Missing knockoff plate insert. Dirty knockoff plate.	Install new insert where necessary. Clean and lubricate knockoff plate (Paragraphs B, C and D).
Can't trim right-hand wheel to consistent zero after knockoff.	Variations in fluid flow rate caused by fluctuating fluid pressure.	Stabilize fluid pressure.
Set button fails to return to "OFF" position.	Broken rack (Figure 11), pinion or mating eccentric (Figure 13). Pinion out of time. Stud on wheel shaft pinion is not straight up (Figure 13).	Install new rack (Paragraph H), or pinion or mating eccentric. Remove wheel shaft group (Paragraph G). Rotate pinion until stud on wheel shaft pinion is straight up.



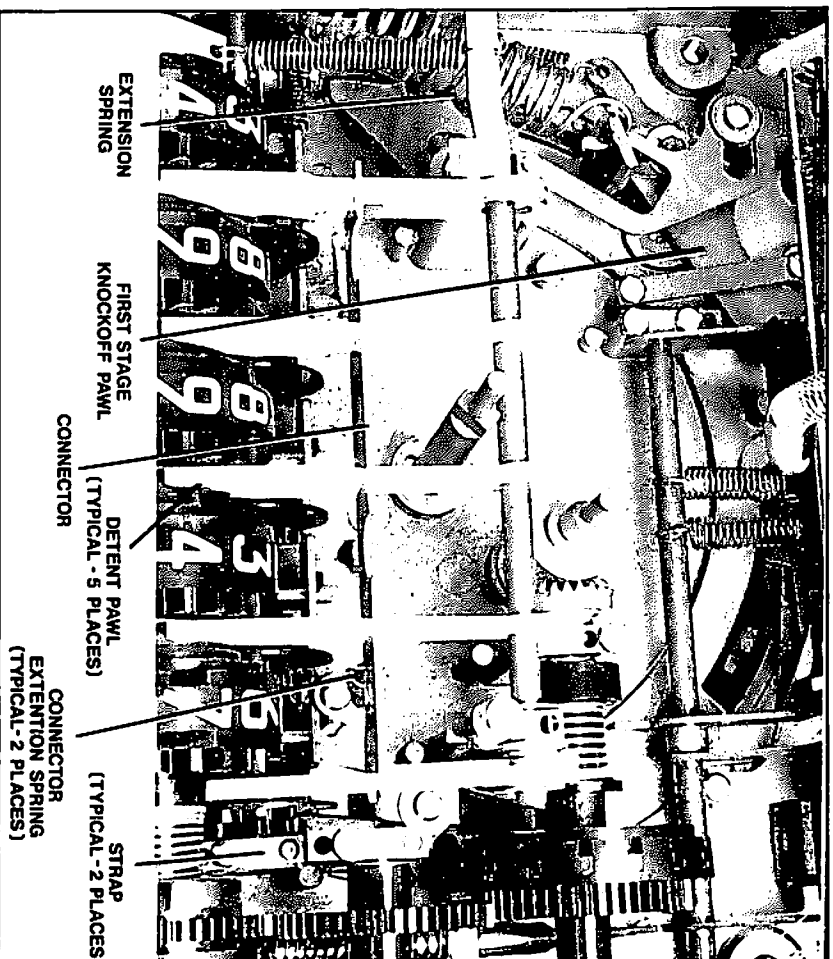


Figure 10. Meter Preset Parts Identification (Wheels Installed).

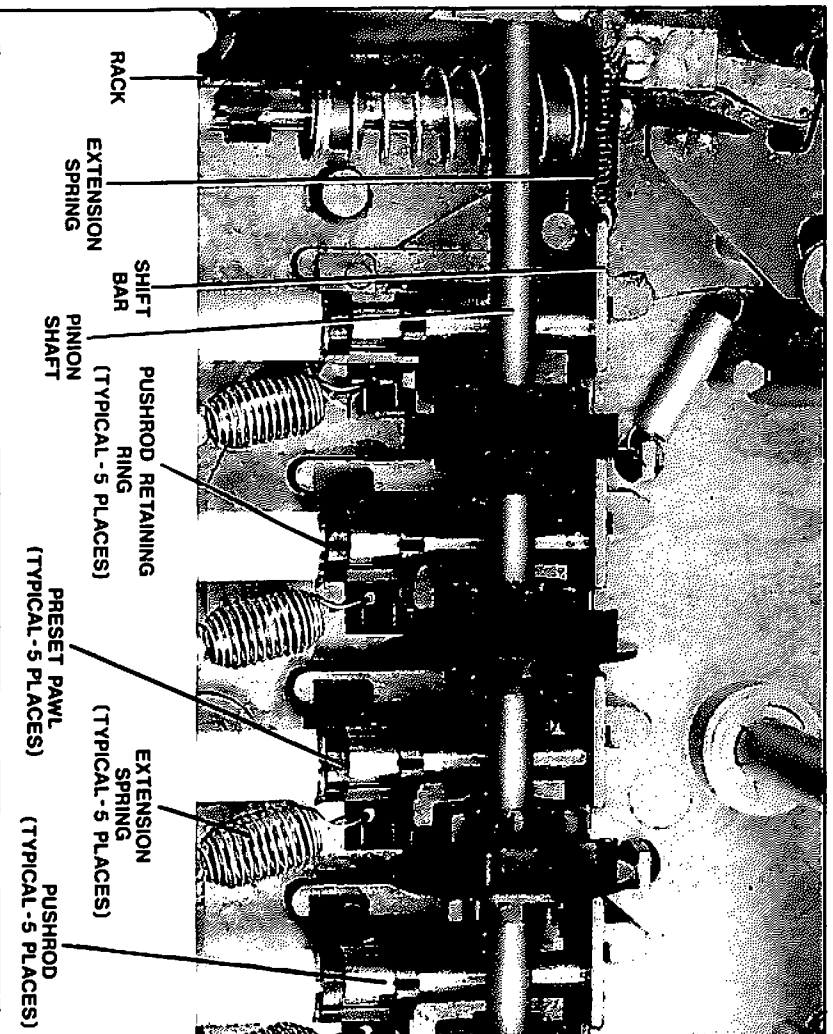


Figure 11. Meter Preset Parts Identification (Wheels Removed).

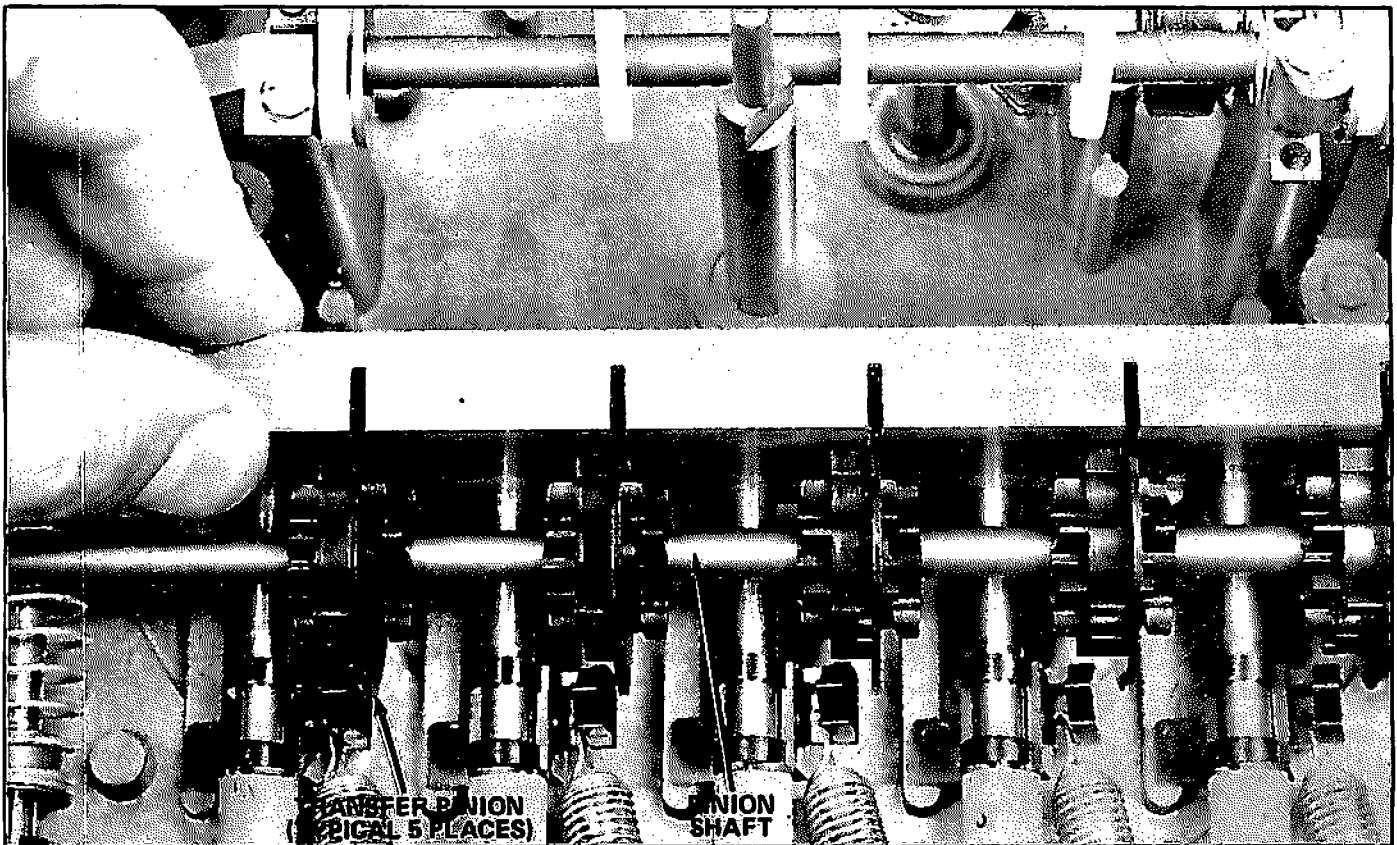


Figure 12. Aligning Transfer Pinions on Pinion Shaft.

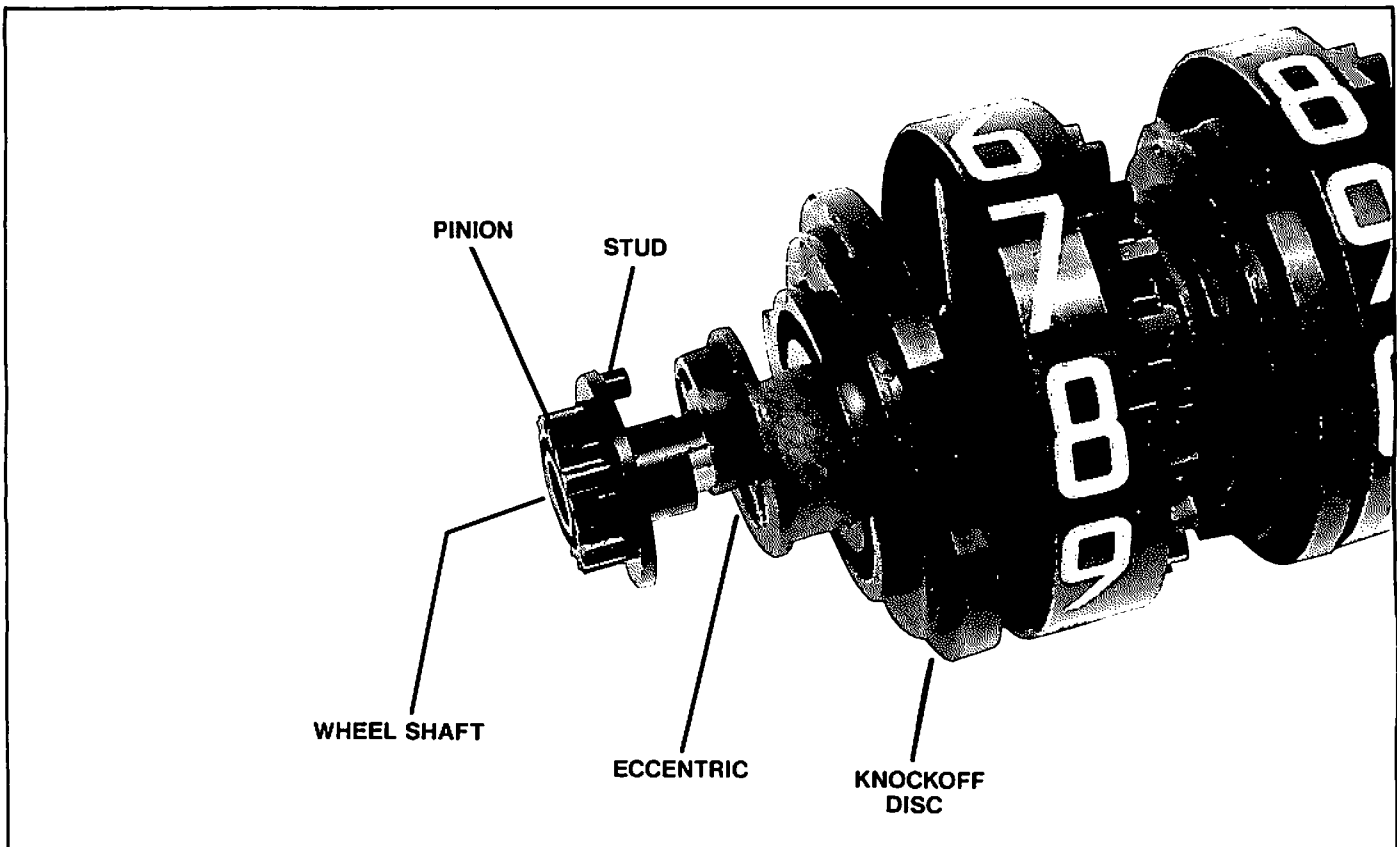


Figure 13. Character Wheel Shaft Group Parts Identification.

## G. PRESET PAWL REPLACEMENT.

### Wheel Shaft Group Removal.

1. Lift first and second stage rakes to rear of preset.
2. Remove two connector extension springs (Figure 10).
3. Remove extension spring from between strap securing left side of pinion shaft and shift bar (Figure 10).
4. Swing connector and detent pawls (Figure 10) away from wheel shaft group to rear of Preset.
5. Remove large extension spring from between strap that secure left side of wheel shaft and tab on knockoff plate (Figure 10).
6. Remove pan head retaining screws and two straps securing wheel shaft group (Figure 10).
7. Hold both ends of wheel shaft group and remove it from Preset.

### Preset Pawl Replacement.

1. Remove extension spring from between Preset base and applicable Preset pawl (Figure 11).
2. Depress pushrod and remove retaining ring (Figure 11).
3. Remove pushrod and damaged Preset pawl (Figure 11).
4. Install new Preset pawl (Figure 11).
5. Install pushrod and retaining ring (Figure 11).
6. Install extension spring between Preset base and Preset pawl (Figure 11).

### Wheel Shaft Group Installation.

1. Hold alignment tool (TD-42457) behind pinion shaft with notched end of tool on right side facing down (Figure 12).
2. Align transfer pinions on pinion shaft to engage with corresponding slots in alignment tool (Figure 12). Then, seat alignment tool in place.

**Note:** When installing wheel shaft group in Preset, ensure that stud on wheel shaft pinion (Figure 13) is straight up and SET button is out in the "run" position.

3. Install wheel shaft group in Preset.
4. Check each wheel to ensure that knockoff disc pin or variable knockoff disc pin is engaged with slot in character wheel. Ensure that full figures are showing in the windows.
5. Remove pinion alignment tool from Preset.
6. Install two straps and the pan head screw that secure the wheel shaft (Figure 10).
7. Install large extension spring between tab on knockoff plate and strap that secures left side of wheel shaft (Figure 13).
8. Swing detent pawls and connector down toward front of Preset (Figure 10).
9. Install extension spring between strap securing left side of pinion shaft and shift bar (Figure 10).
10. Install two connector extension springs between connector and base of Preset (Figure 10).
11. Swing first and second stage rakes down to front of Preset.

## H. RACK REPLACEMENT.

1. Remove wheel shaft group from Preset (Paragraph G).
  2. Break rack with pliers, then rotate pushrod so that groove pin can be driven out of rack.
  3. Drive groove pin out of rack.
- Note:** Before removing SET pushrod, note location of parts in assembly.
4. Slide SET pushrod out front of Preset and remove damaged rack.
  5. Insert SET pushrod through front of Preset, then install new rack and parts in assembly as removed.
  6. Depress pushrod until groove pin hole in pushrod aligns with groove pin hole in rack.
  7. Drive groove pin through rack and pushrod. Ensure that groove pin is flush with bottom of rack.
  8. Install wheel shaft group (Paragraph G).



## **SECTION 5. DAMAGE CLAIMS AND WARRANTY**

### **A. DAMAGE CLAIMS**

1. Thoroughly examine the enclosure as soon as it is received. If damaged, write on the face of the freight bill a complete and detailed description of the damage. Have the carrier's agent sign the description.

**Note:** Insist that the carrier's agent verify the inspection and sign the description.

2. Immediately notify the delivering carrier of damage or loss. This notification may be given either in person or by telephone. Written confirmation must be mailed within 48 hours. Railroads and motor carriers are undrestandably reluctant to make adjustments for damaged merchandise unless inspected and reported promptly.
3. Risk of loss of, or damage to merchandise remains with the Buyer. It is the Buyer's responsibility to file a claim with the carrier involved.
4. Immediately advise your Veeder-Root representative, distributor, or the factory so that we may assist you.

**B. RETURN SHIPPING.** All shipments of Veeder-Root products must be prepaid. Equipment must be packed in a strong exterior container and surrounded by shock absorbing material. Veeder-Root will accept no liability for damage caused by improper packing. It is suggested that the original shipping container be used if it is available. Address shipment to Veeder-Root Co., 6th Avenue at Burns Crossing, P.O. Box 1673, Altoona, PA 16603-1673.

### **C. WARRANTY AND CONDITIONS**

1. **WARRANTY.** We warrant that our products shall be free from defects in material and workmanship for a period of one year from the date of shipment thereof or the product's total rated life, whichever first occurs. Within the warranty period we shall repair or replace such products which are returned to us with shipping charges prepaid and which are determined by us to be defective. This warranty will not apply to any product which has been subjected to misuse, negligence, or accident; or misapplied; or used in violation of product manuals, instructions or warnings; or modified or repaired by unauthorized persons; or improperly installed.

2. **INSPECTION.** You shall inspect the product promptly after receipt and shall notify us at our Altoona office, in writing, of any claims, including claims of breach of warranty, within thirty days after you discover or should have discovered the facts upon which the claim is based. Your failure to give written notice of a claim within the time period shall be deemed to be a waiver of such claim.

3. **LIMITATION OF REMEDY AND WARRANTY.** The provisions of Paragraph 1 are our sole obligation and exclude all other remedies or warranties, express or implied, including warranties of MERCHANTABILITY and FITNESS FOR A PARTICULAR PURPOSE, whether or not purposes or specifications are described herein. We further disclaim any responsibility whatsoever to you or to any other person for injury to person or damage to or loss of property or value caused by any product which has been subjected to misuse, negligence, or accident; or misapplied; or used in violation of product manuals, instructions, or warnings; or modified or repaired by unauthorized persons; or improperly installed.

4. **LIMITATION OF DAMAGES.** Under no circumstances shall we be liable for any incidental, consequential or special damages, losses or expenses arising from this contract or its performance or in connection with the use of, or inability to use, our product for any purpose whatsoever.

5. **LIMITATION OF ACTIONS.** No action regardless of form arising out of this contract may be commenced more than one year after the cause of action has accrued, except an action for nonpayment.

6. **COLLATERAL PROMISES.** There are no representations, warranties, or conditions express or implied, statutory or otherwise except those herein contained, and no agreements or waivers collateral hereto shall be binding on either party unless in writing and signed by you and accepted by us at our Altoona office.

7. **INTERPRETATION.** Rights and liabilities arising out of any contract with us shall be determined under the Uniform Commercial Code as enacted in Connecticut.

