AMP* Model "TII" Terminating Unit No. 768793–[ ] (Single–Cycle Bench Model with Manual Precision Adjustment Base)

409–5836
(was CM 5836)
11 APR 94 Rev A

AMP

customer manual

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AMP Incorporated, Harrisburg, PA 17105 TECHNICAL ASSISTANCE CENTER 1–800–722–1111
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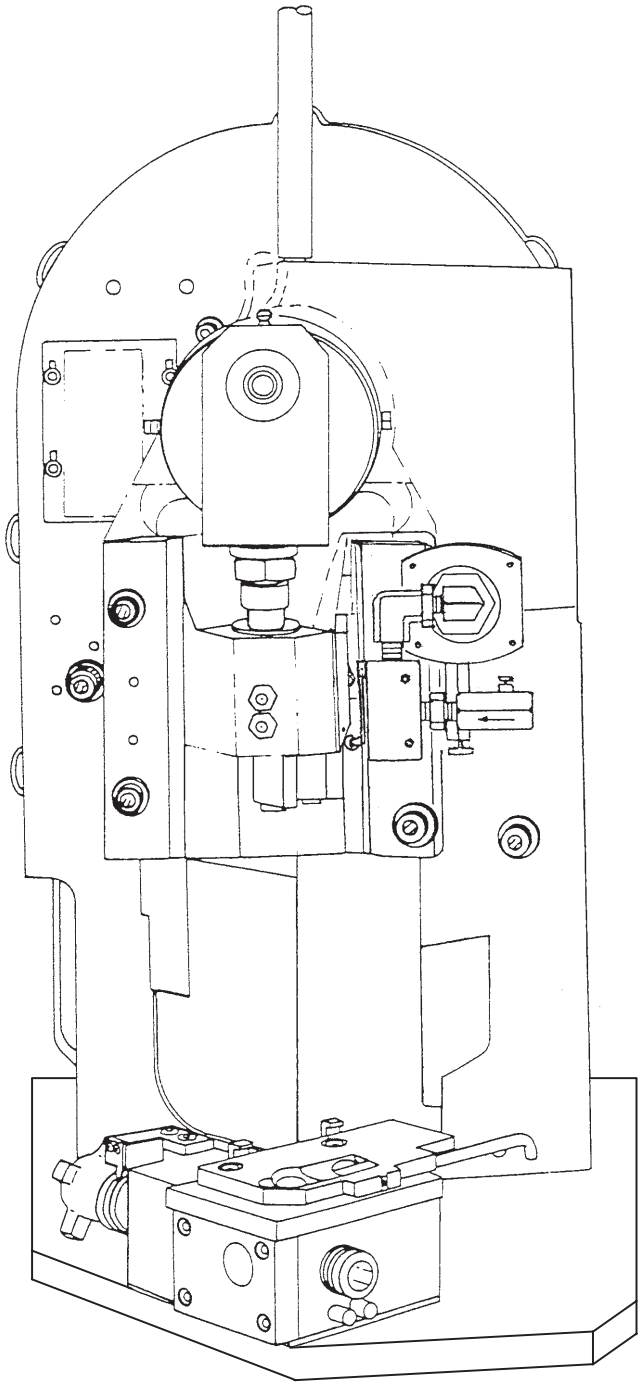

Frontispiece: AMP Model "TII" Terminating Unit No. 768793–[ ]
(Single–Cycle Bench Model With Manual Precision Adjustment Base)

91–381B

DANGER

SAFETY PRECAUTIONS PREVENT INJURY

Safeguards are designed into AMP machines to protect operating personnel from most hazards during normal machine operation. However, as with most machinery, certain precautions must be taken by the operator and repairman.

Never insert hands into an installed machine/applicator, or any part of a machine that is operated by electricity or compressed air, without first pulling the machine power cable plug from the outlet receptacle and/or shutting off the compressed air at the line valve and disconnecting the air hose. This will prevent injury in the event that switches or other controls are accidentally activated.

A grounded electrical outlet should always be used to receive the plug on the machine power cable.

To improve clarity, photographs and drawings may not show machine/applicator guards. In some cases, it is impractical to show the variety of guards designed to meet specific safety requirements, as set forth in codes and standards adopted by customers and/or enforced in a given locale.

Though a guard may not be shown, and procedures may not reflect the need for its removal, the guard **must** be in place during normal operation of the machine/applicator.

TECHNICAL ASSISTANCE CENTER

CALL TOLL FREE 1–800–722–1111

(CONTINENTAL UNITED STATES AND PUERTO RICO ONLY)

GENERAL MACHINE POLICY

All machines remain the property of AMP Incorporated. The customer shall have no title to the machine(s) and his interest shall be limited to the use of said machine(s) for the purpose indicated, during the stated term, at the specified plant.

No major change or modification shall be made without written consent of AMP Incorporated. Spare and component parts are available at nominal prices.

A list of component parts is included in the instructional material or drawings supplied with each machine.

The customer shall be fully responsible for the maintenance of the machine(s) including servicing, repair, and replacement of damaged or broken parts. Each machine shall be returned in usable condition — reasonable wear and tear excepted. Before returning the machine, contact AMP Incorporated, Harrisburg, Pennsylvania requesting instructions for shipping and disposition.

AMP Field Service Engineers are available to provide assistance in the adjustment or repair of the machine when problems arise which your maintenance personnel are unable to correct. Contact AMP Incorporated Service Products Business for applicable fees.

INFORMATION REQUIRED WHEN CONTACTING SERVICE PRODUCTS BUSINESS

AMP Service Products Business offers the **Technical Assistance Center** as a means of providing technical assistance when required.

When contacting AMP Service Products Business by telephone regarding service to a machine or tool, it is suggested that a person familiar with the device be present with a copy of the manual (and drawings) to receive instructions. Many difficulties can be corrected in this manner.

When calling the Technical Assistance Center, be ready with the following information:

1. Customer name
2. Customer address
3. Person to contact (name, title, telephone number and extension)
4. Person calling
5. Machine or tool number (and serial number if applicable)
6. Product part number (and serial number if applicable)
7. Urgency of request
8. Nature of problem
9. Description of inoperative component(s)
10. Additional information/comments that may be helpful

CONTENTS

ILLUSTRATIONS

1. INTRODUCTION

This manual covers the basic AMP Model "TII" Terminating Unit No. 768793–[ ] for open–barrel terminations. The manual does not include the electrical controls, modifications, and additional components required to adapt the unit to an automatic machine, such as an AMPOMATOR* Machine. These adaptations are covered in the respective machine manual(s).

The various applicators that can be used in the unit are described in applicator instruction (408) sheets packaged with the applicator. Applicator instruction sheets provide information on applicator installation, care, and adjustment.

Also packaged with every applicator is a parts list identifying the required terminating unit number for that applicator. The parts list also identifies the accessories necessary to convert the machine to the required configuration.

This manual contains information on preventive maintenance, adjustments, and parts replacement for the basic Model "TII" unit with precision adjustment base.

NOTE *Measurements are in metric units [followed by U.S. customary units in brackets].*

When reading this manual, pay particular attention to DANGER, CAUTION, and NOTE statements.

DANGER *Denotes an imminent hazard that may result in moderate or severe injury.*

CAUTION *Denotes a condition that may result in product or equipment damage.*

NOTE *Highlights special or important information.*

Reasons for reissue are provided in Section 7, REVISION SUMMARY.

2. DESCRIPTION

Model "TII" Terminating Unit No. 768793–1 was designed for use with automatic application equipment, and it accepts a wide variety of AMP Miniature Quick–Change Applicators, thus providing for a wide selection of terminals for almost any application.

The applicator is quick–change both in its easy installation/removal and in the simple adjustment of crimp heights for wire and insulation. A precision adjustment base is mounted in the base of the terminating unit to provide quick and accurate shut–height adjustments.

Special positioning systems for the terminating unit are generally provided on the automatic application equipment to allow the "TII" unit to be moved "in" or "out" on the machine platen.

2.1. Functional Description

The "TII" terminating unit provides the force required to crimp terminals in the applicator. The terminating unit consists of six functional areas (Figure 2–1, 2–2, and 2–3) as follows:

A. The *motor–flywheel group* includes a 120V, single–phase, 1/4–hp motor which drives a flywheel by a ribbed V–belt. The motor and flywheel run continuously whenever electrical power is supplied from the machine on which the terminating unit is installed.

B. The *crankshaft–ram group* converts the flywheel's rotational force to the up–and–down action of the ram for driving the applicator during the crimping cycle.

C. The *clutch*, when actuated by the trip mechanism, connects the rotating flywheel to the crankshaft for one cycle of operation.

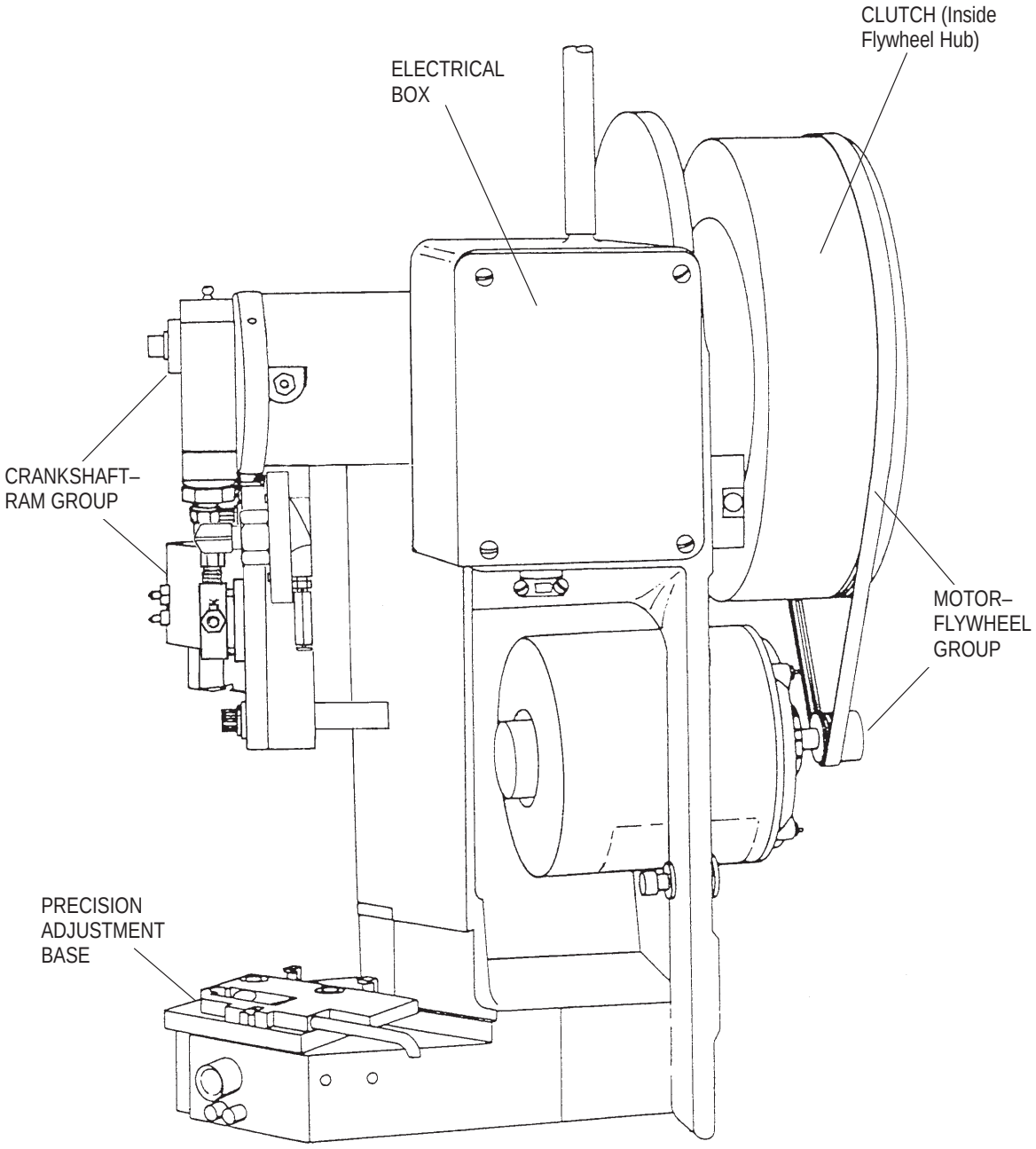

Figure 2–1. Functional Areas

91–382B

D. The *clutch trip mechanism* trips the clutch when the solenoid is energized by the control circuit of the machine. See Figure 2–2.

E. The *base plate* provides the mounting surface on which the applicator is installed. The quick–release latching feature permits fast, easy installation and removal of the applicator.

F. The *precision adjustment base* uses a combination of a wedge and a fine pitch threaded adjusting screw to provide accurate adjustment of the base. Using the precision adjustment base, the base can be adjusted reliably in increments of 0.013 mm [.0005 in.]. The adjustment is achieved by turning the adjustment knob either clockwise or counterclockwise. Turning the knob clockwise will increase the crimp height; turning the knob counterclockwise will decrease the crimp height. See Figure 2–3.

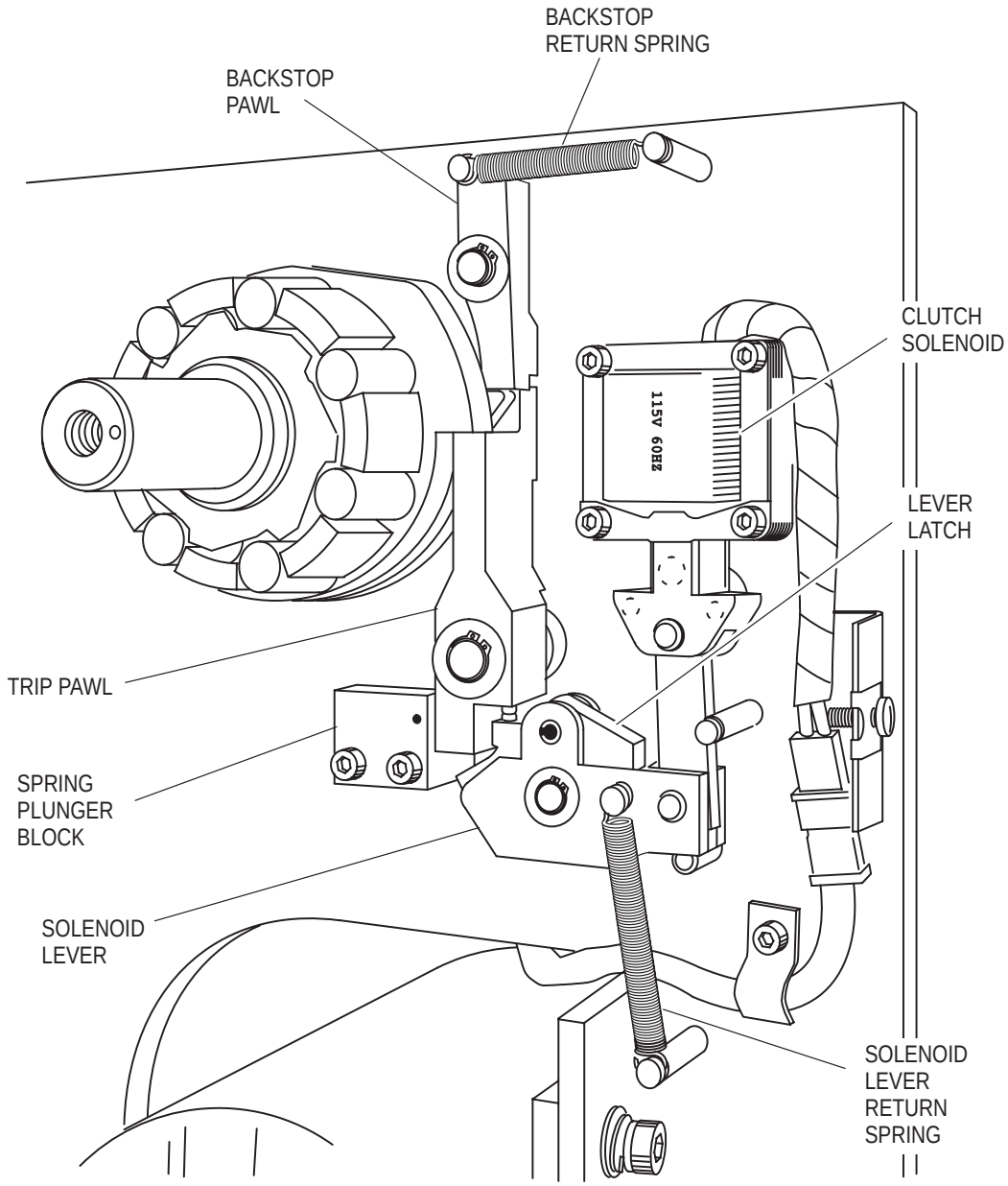

Figure 2–2. Clutch Trip Mechanism

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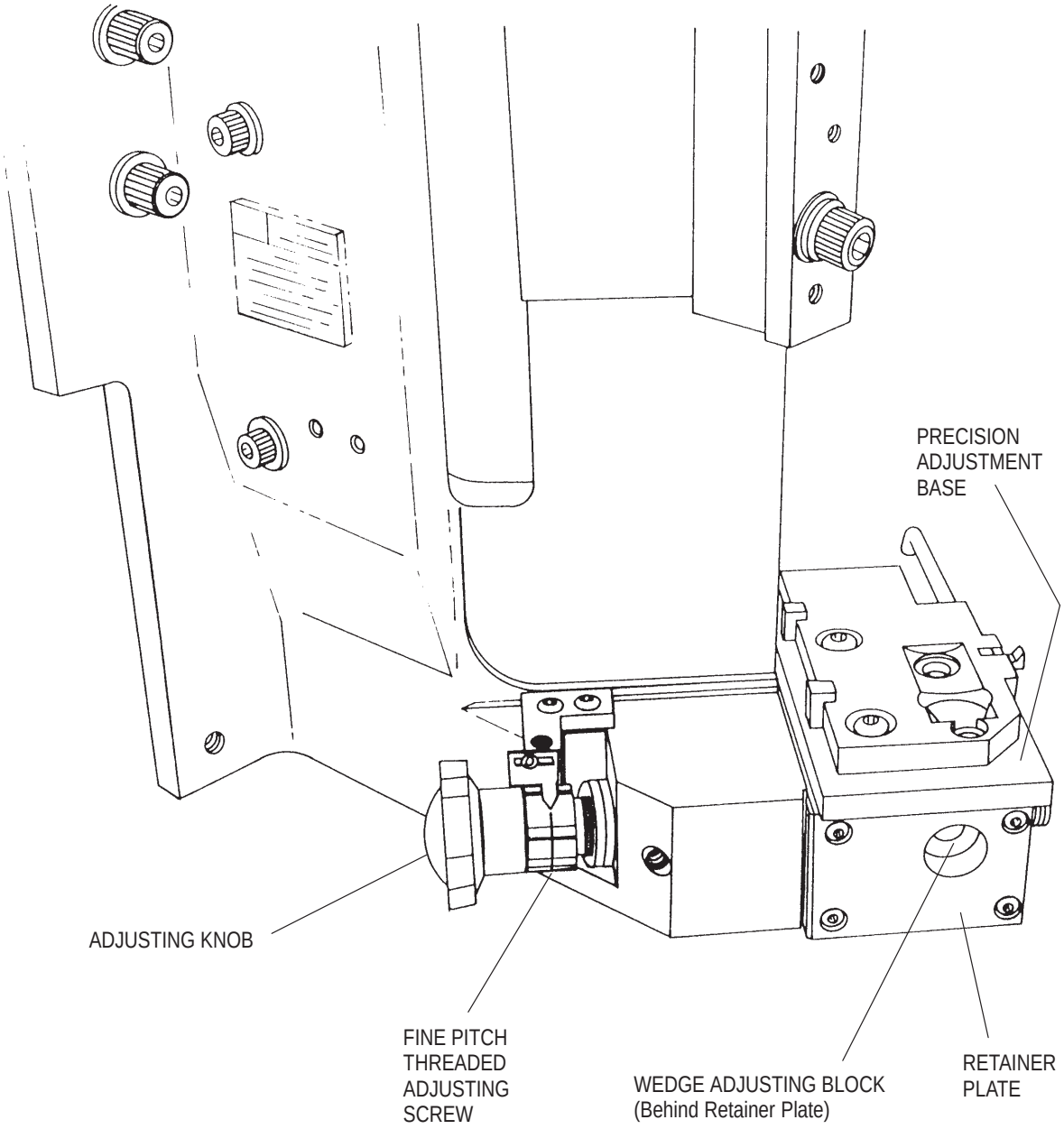

91–383A

Figure 2–3. Precision Adjustment Base

A positive “click” is heard when the adjustment knob is turned. This click indicates a crimp–height change of 0.013 mm [.0005 in.]. This positive click is accomplished by a detented collar with grooves at 60° intervals over its diameter.

A mechanical feature is included within each “TII” unit that prevents double tripping of the unit, thus ensuring against damage to the “TII” unit.

2.2. Electrical Description

Model “TII” Terminating Unit No. 768793–1 electrical components consist of the motor, clutch solenoids, solenoid valve, and work light. The components will be specified on the applicable electrical assembly parts list. See Assembly Drawing No. 768767 for the electrical system description.

The electric motor that drives the “TII” unit uses 120V, 60 Hz, single–phase power, as identified by the dash number of the “TII” unit. The motor is equipped with a manually reset thermal overload on the end opposite the shaft.

3. OPERATION

3.1. Operating Cycle

The operating cycle of the unit begins the moment the electrical circuit within the machine is “closed.” This energizes the clutch solenoid, which pulls upward on the solenoid lever, releasing the lever latch. The solenoid should be energized only momentarily; if the solenoid remains energized after the unit has completed one cycle, the unit cannot cycle again until the solenoid is de–energized and re–energized.

The lever latch and trip pawl are spring–loaded, so that when the engager ratchet rotates approximately 45°, the trip pawl returns to the standby condition. This acts as a stop for the engager ratchet after the cycle is completed.

The release of the trip pawl unlocks the engager ratchet, and the engager is rotated slightly by three springs (Figure 3–1). This rotation locks the seven rollers to the crankshaft. Backward rotation of the crankshaft is prevented by the spring–loaded backstop pawl as it drops off the backstop ratchet on the rear cam ring

With the “TII” unit in standby condition, the crankblock—which drives the ram—is up. During the first half of the cycle, the crankshaft rotates and the the crankblock drives the ram downward to crimp the terminal in the applicator. During the second half of the cycle, the ram is raised by the upward travel of the crankblock, and the terminal is released from the applicator.

3.2. Hand–Cycling

DANGER *Do NOT attempt to hand–cycle the “TII” unit at any time when the machine main power switch is “ON.” The machine main power switch MUST be “OFF.”*

To hand–cycle the “TII” unit during setup, adjustment, or repairs, lift the retaining pin protruding through the frame in back of the clutch solenoid. This releases the trip pawl. With the trip pawl released, the unit may be hand–cycled in two ways: (1) remove the flywheel cover and manually turn the flywheel CLOCKWISE (as viewed from the rear of the unit); (2) install a spanner wrench (AMP Part No. 244908–1) on the ring behind the crankblock. The spanner wrench is supplied with the unit.

CAUTION *MAKE CERTAIN that the crankblock is at TOP–DEAD–CENTER and that the upper trip pawl is latched behind the engager ratchet BEFORE operating the machine under power. If the trip pawl is not latched when power is applied to the machine, the “TII” unit will cycle and possibly damage the applicator.*

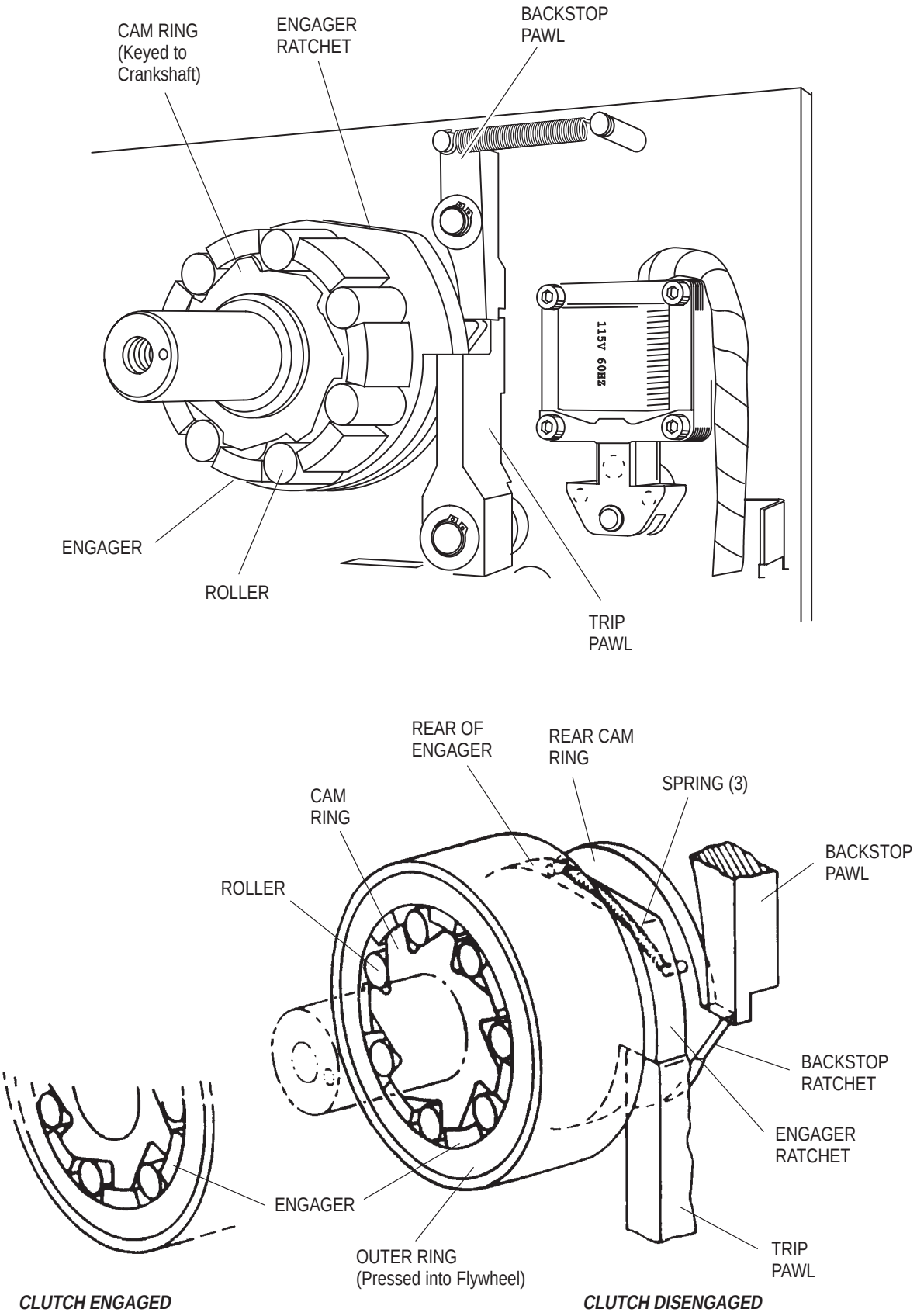

Figure 3–1. Operation of the Clutch

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4. PREVENTIVE MAINTENANCE

Preventive maintenance consists of keeping the "TII" unit in good working order to ensure maximum reliability and service from all of its components. It includes regular inspection, cleaning of the components, and lubrication.

4.1. Inspection

A. Hardware

Once each month, make sure that all the screws and nuts are tight. Pay particular attention to the motor mounting screws, the ram retainer screws, and the retaining screws for the flywheel and crankshaft.

B. Clutch Trip Mechanism

Once each month, make sure the retaining rings in the mechanism are secure. Inspect the O–rings that hold the solenoid retaining pin in place. Also check the extension springs to make sure they are not stretched or bent out of place. MAKE SURE both trip pawl studs are tight in the frame; otherwise, frame damage could occur.

C. Drive Belt

Inspect the drive belt for the proper tension. Check for particles of rubber below the unit. These indicate that the flywheel and motor are misaligned. Adjust belt as described in Section 5, ADJUSTMENTS.

4.2. Cleaning

The parts of the clutch should be cleaned periodically. Usually this is only necessary when the clutch has been disassembled for another reason. If, however, the unit is in a particularly dusty location, it may be necessary to clean the clutch more often. Simply wash the parts in a solvent and dry them thoroughly. For removal and installation of the clutch assembly, refer to the replacement procedure in Section 6, REPAIR AND REPLACEMENT, and lubricate the clutch rollers with SANTOTRAC† 50 lubricant.

4.3. Lubrication

The moving parts of the "TII" unit require regular lubrication to ensure reliable service and long life. Use only the following lubricants:

— Grease: NLGI● No. 2 grease (for example, MARFAK■ Multi–Purpose No. 2 grease).
— Oil: SAE No. 10 non–detergent motor oil.
— Lubricant: SANTOTRAC 50 lubricant (Part No. E802).

A. Crankshaft–Ram Group (Figure 4–1)

The ram and crankshaft should be greased once each week at the following points:

— Fittings 1 and 2 for the arm.
— Fitting 3 for the crankblock.
— Fittings 4 and 5 for the crankshaft (sparingly in Fitting 5).

NOTE *If too much grease is used in the rear crankshaft fitting, it may work its way into the clutch and cause it to malfunction. The clutch must then be removed, cleaned, and lubricated with SANTOTRAC 50 lubricant.*

B. Clutch

Once each week, fill both oil cups on the back of the flywheel with SANTOTRAC 50 lubricant for the clutch rollers. If the clutch seems to be slipping, loosen the flywheel retaining bolt and slip the flywheel

† Trademark of Monsanto Co. Available from: Stoner Inc., P.O. Box 65, Quarryville, PA 17566 (717) 786–7355
● National Lubricating Grease Institute
■ Trademark of Texaco, Inc.

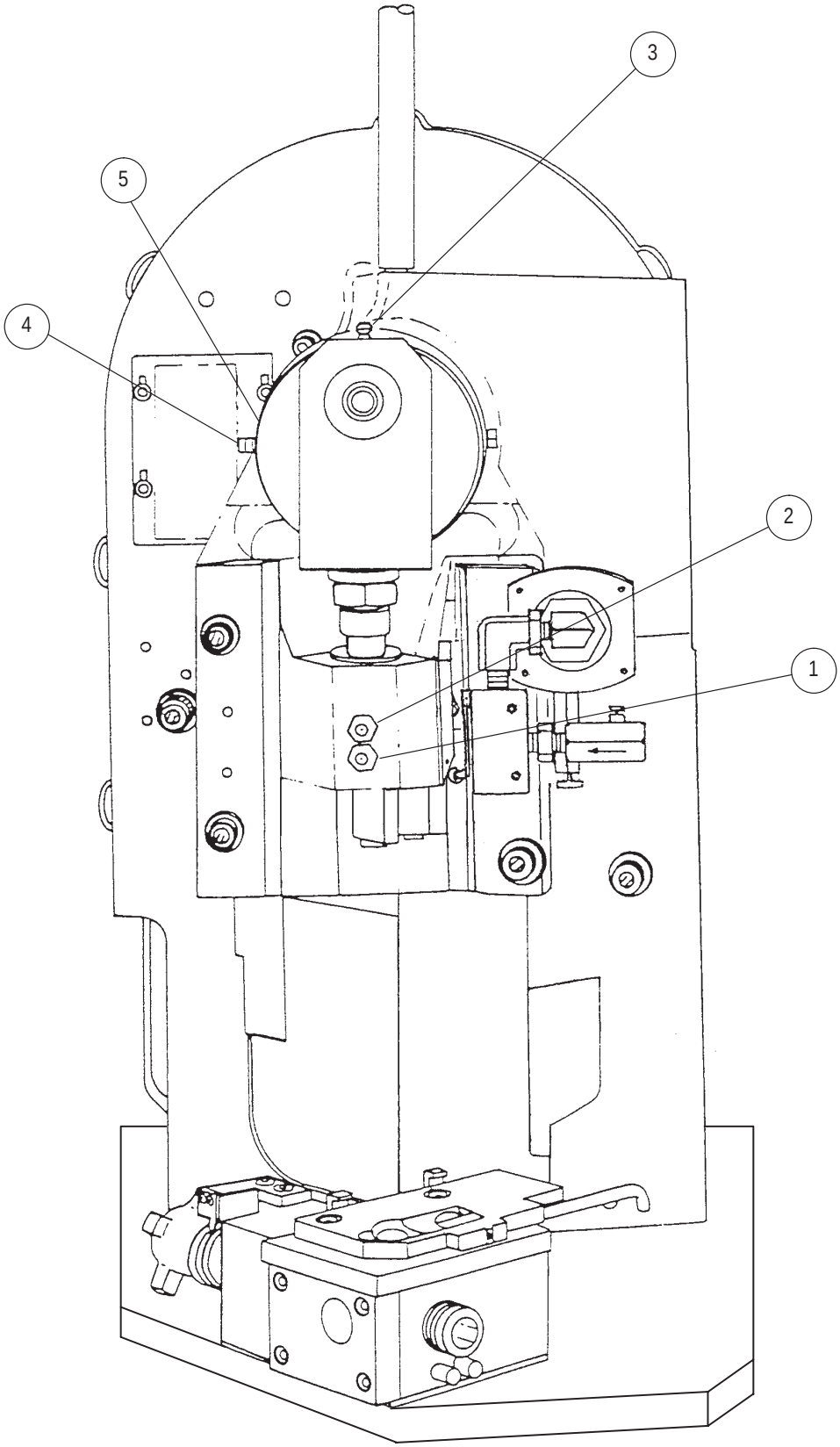

Figure 4–1. Lubrication Locations

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toward the rear until the rollers are partially exposed. If the clutch appears gummy, disassemble and clean it as described in Paragraph 4.2. Before re–assembly, apply a few drops of SANTOTRAC 50 lubricant to the rollers.

C. Clutch Linkage (Figure 4–2)

Once each week, apply a few drops of SAE No. 10 non–detergent motor oil to the following points:

1 – Backstop pawl pivot stud.
2 – Top surface of pivot pawl.
3 – Trip pawl pivot stud.
4 – Mating surfaces of trip pawl and lever latch.
5 – Lever latch pivot pin.
6 – Solenoid lever pivot stud.
7 – Solenoid link retaining pin.
8 – Spring plunger.

D. Motor

Once a year, lubricate the two oil cups with SAE No. 10 non–detergent motor oil.

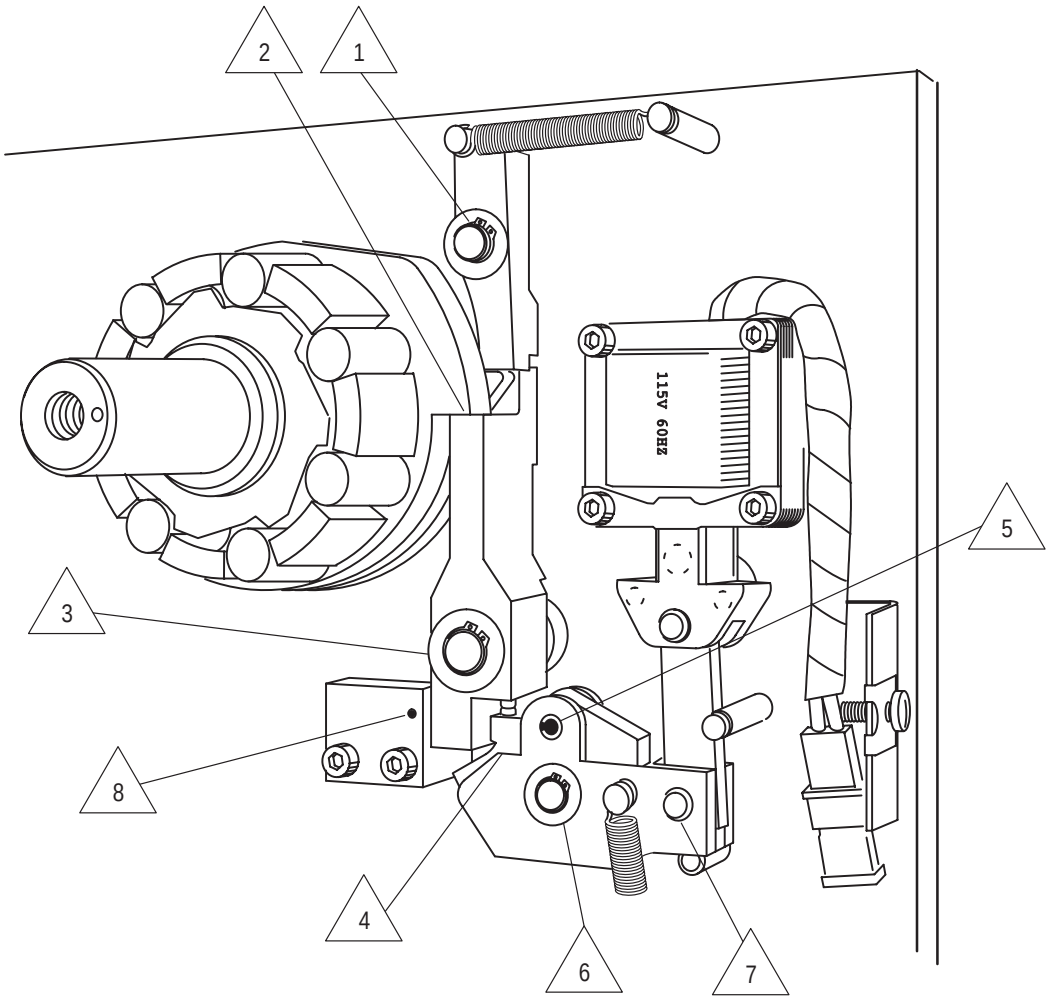

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Figure 4–2. Clutch Linkage Lubrication

5. ADJUSTMENTS

The adjustments in this section are required to maintain the terminating unit in continuous operation and to set it up following the replacement of parts.

DANGER *ALWAYS disconnect electrical and air power before performing adjustments.*

5.1. Crimp–Height (Precision Adjustment Base) Adjustment

1. Set the adjusting knob assembly in the TOP–DEAD–CENTER position. See Figure 5–1.
2. Install the miniature quick–change applicator in the terminating unit.
3. Cycle the unit to crimp three sample terminations. Check the crimp height of the samples. If the crimp heights are not to specification, adjust according to Step 4.
4. Adjust the crimp height by turning the adjusting knob: **COUNTERCLOCKWISE** to raise the base and reduce crimp height; or **CLOCKWISE** to lower the base and increase the crimp height.

NOTE *Turning the adjusting knob — clockwise or counterclockwise — will change the crimp height in increments of approximately 0.013 mm [.0005 in.].*

5. When finished with the applicator run, remove the applicator and return the adjusting knob to the TOP–DEAD–CENTER position.

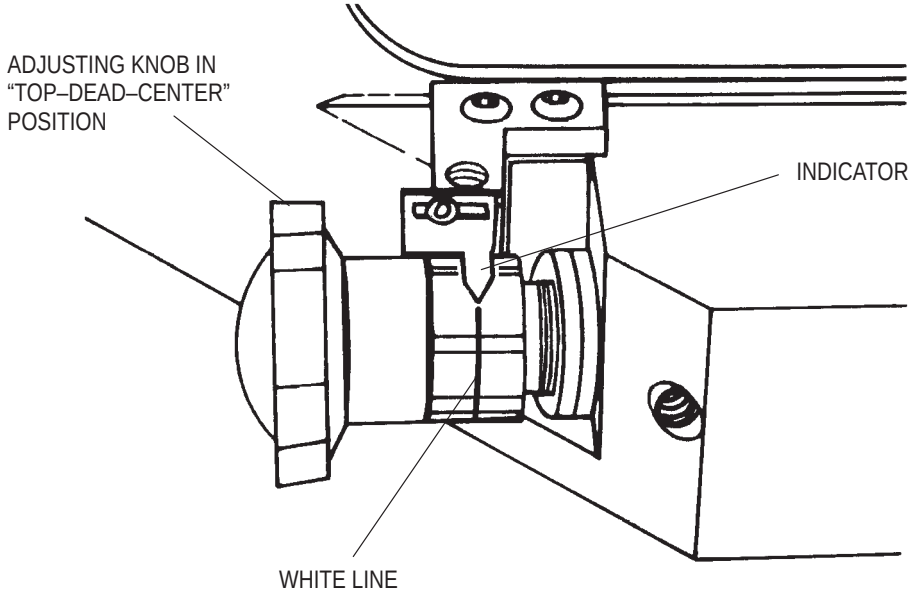

Figure 5–1. Crimp–Height Adjustment 91–385

5.2. Shut–Height Adjustment

The shut height of the terminating unit is the distance between the applicator mounting plate and the bottom of the ram when the machine is at BOTTOM–DEAD–CENTER.

The miniature quick–change applicator has the upper tooling, lower tooling, and the means for adjusting their relationship all incorporated in an integrated assembly. This type applicator requires a fixed shut height. That is, the distance between the base mount and ram at the bottom of the stroke is a given dimension not subject to change. The required changes in crimp height are made as described in Paragraph 5.1, and by using the wire and insulation discs within the applicator. Refer to the applicator instructions shipped with the applicator.

The shut height is factory set and should require no further adjustment unless it is necessary to replace parts.

Before you make any changes to the "TII" Unit shut height, contact your local AMP Field Service Engineer, or call the Technical Assistance Center at 1–800–722–1111.

CAUTION *NEVER attempt to adjust the shut height without FIRST trying another applicator that is known to produce terminations of the correct crimp height. If this applicator produces correct terminations, the trouble is in the original applicator and the shut height MUST NOT BE CHANGED.*

5.3. Drive Belt Tension and Alignment (Figure 5–2)

DANGER *Turn the main power to the machine "OFF" before making adjustments.*

The drive belt tension is adjusted by positioning the motor closer to or farther from the flywheel. Too little tension allows the belt to slip; too much tension strains the motor's shaft bearings. The tension is correct when you can deflect the belt about 6 mm [1/4 in.] with moderate pressure. Make sure that the motor's shaft and crankshaft are parallel, and that the drive belt travels from the motor pulley to the flywheel in a straight line.

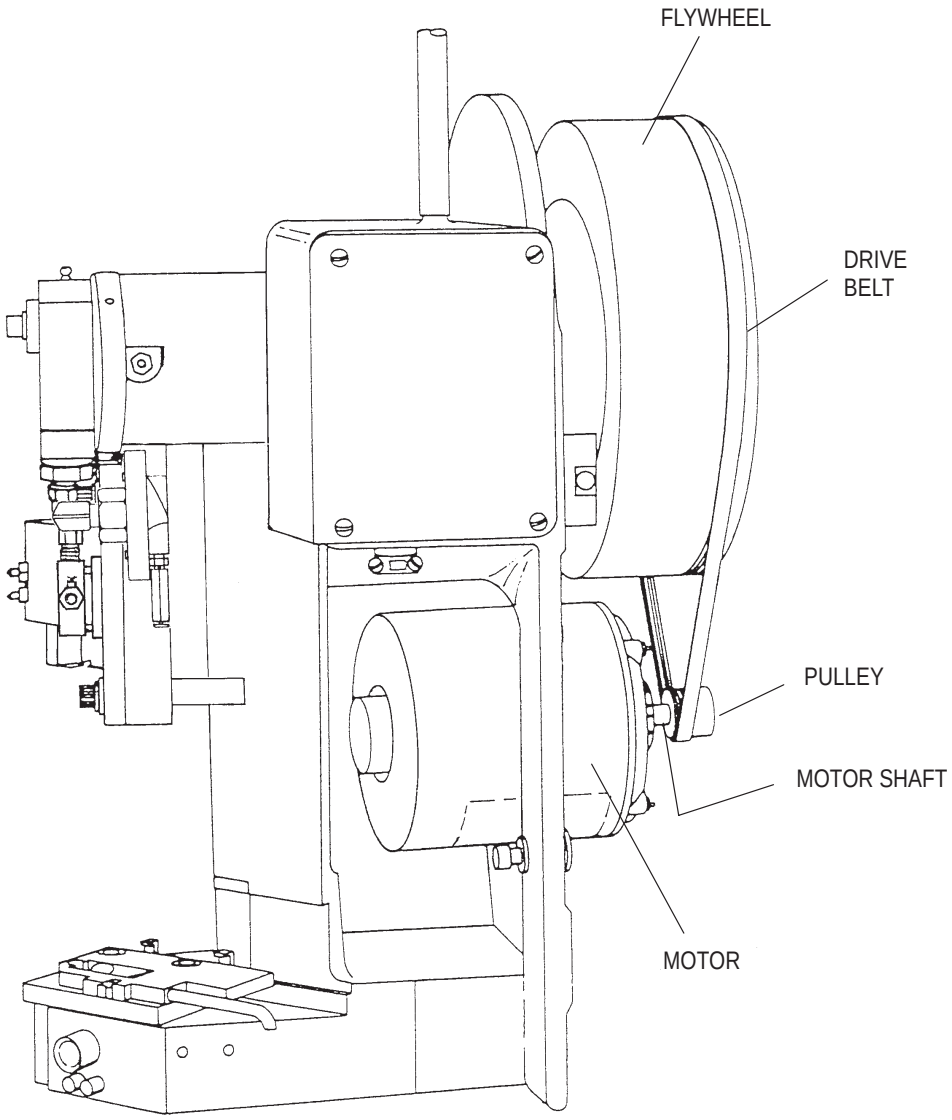

Figure 5–2. Drive Belt Tension

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6. REPAIR AND REPLACEMENT

This section describes repairs or replacing parts as may be required when inspection shows that excessive wear or damage has occurred. **When ordering parts, refer to the assembly drawings supplied with the "TII" unit to locate the parts required**, then to the parts list by item number for the correct part number, description, and quantity per assembly. Some parts differ between "TII" units. Therefore, BE SURE to use the quantity column that corresponds to the dash number on the "TII" unit. Refer to the General Machine Policy in the front of the manual.

6.1. Drive Belt Replacement (Figure 6–1)

1. DISCONNECT POWER TO THE "TII" UNIT.
2. Remove the flywheel guard from the "TII" unit.
3. Loosen four screws enough to slide motor upward and release tension on drive belt.
4. Remove drive belt from motor pulley and flywheel.
5. Install new drive belt, using the reverse procedure. Before tightening screws to secure motor, adjust tension of drive belt as described in Section 5, ADJUSTMENTS.

6.2. Motor Replacement (Figure 6–1)

1. DISCONNECT POWER TO THE "TII" UNIT.
2. Remove drive belt as described in Paragraph 6.1.
3. Disconnect electrical cable at motor.
   a. Loosen screws on the protective plate and slide plate out of the way.
   b. Disconnect two FASTON* terminals.
   c. Disconnect ring–tongue terminal.
4. Remove motor from "TII" unit by removing four screws, lockwashers, and flat washers. Also remove two tie bars.
5. Loosen setscrew, then slide motor pulley from motor shaft.
6. Install replacement motor using the reverse procedure.

NOTE *Be sure motor rotates in the proper direction after completing the installation. Correct direction is CLOCKWISE as viewed from the pulley–end of the motor.*

6.3. Flywheel Removal and Installation (Figure 6–1)

Although the flywheel is not considered a replaceable part, it must be removed to maintain the clutch assembly or to replace bearings.

1. DISCONNECT POWER and remove the drive belt as described in Paragraph 6.1.
2. Remove the screw, lockwasher, and retaining ring securing the flywheel assembly on the crankshaft.
3. Pull the flywheel toward the rear of the unit about 13 mm [1/2 in.], and then stop.

NOTE *It may be necessary to use a gear puller to remove the flywheel from the crankshaft.*

4. In back of the flywheel, tie a piece of string around the clutch rollers to hold them in the clutch engager, since the outer ring will be removed with the flywheel.

CAUTION *Be EXTREMELY CAREFUL when removing the flywheel because it weighs approximately 35 kg [77 lb.]. ALWAYS lay it flat to prevent rolling and possible damage to the grooves for the drive belt.*

NOTE: Refer to Assembly Drawing No. 768793 shipped with the machine for part numbers and quantities.

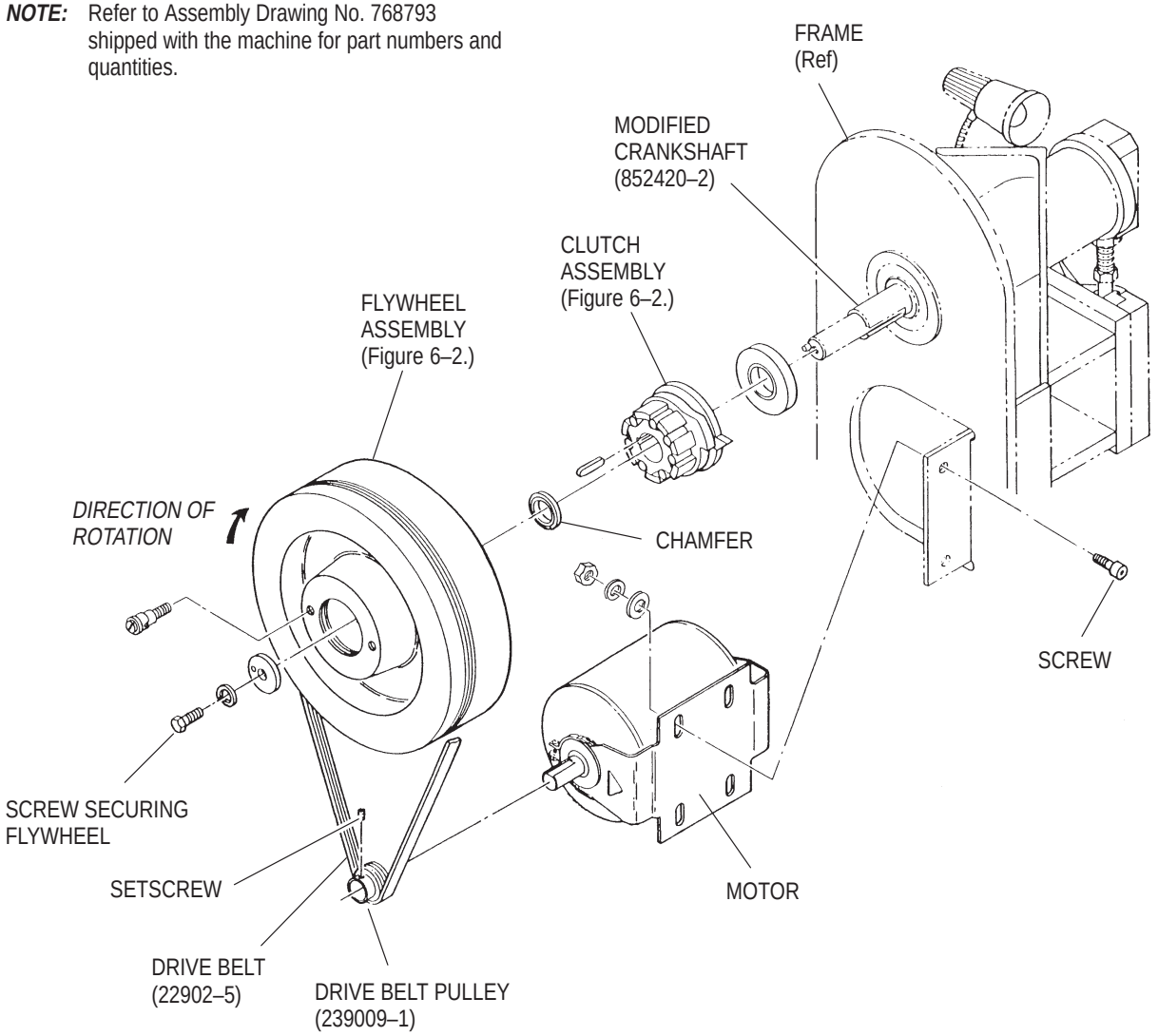


Figure 6–1. Motor–Flywheel Group Replacement 90–490B

5. Continue to pull the flywheel from the crankshaft.

6. To install the flywheel, reverse this procedure. Be sure to remove the string around the clutch rollers before pushing the flywheel all the way onto the crankshaft.

6.4. Clutch Assembly Replacement (Figure 6–2)

To replace the clutch assembly, or any parts of it, proceed as follows:

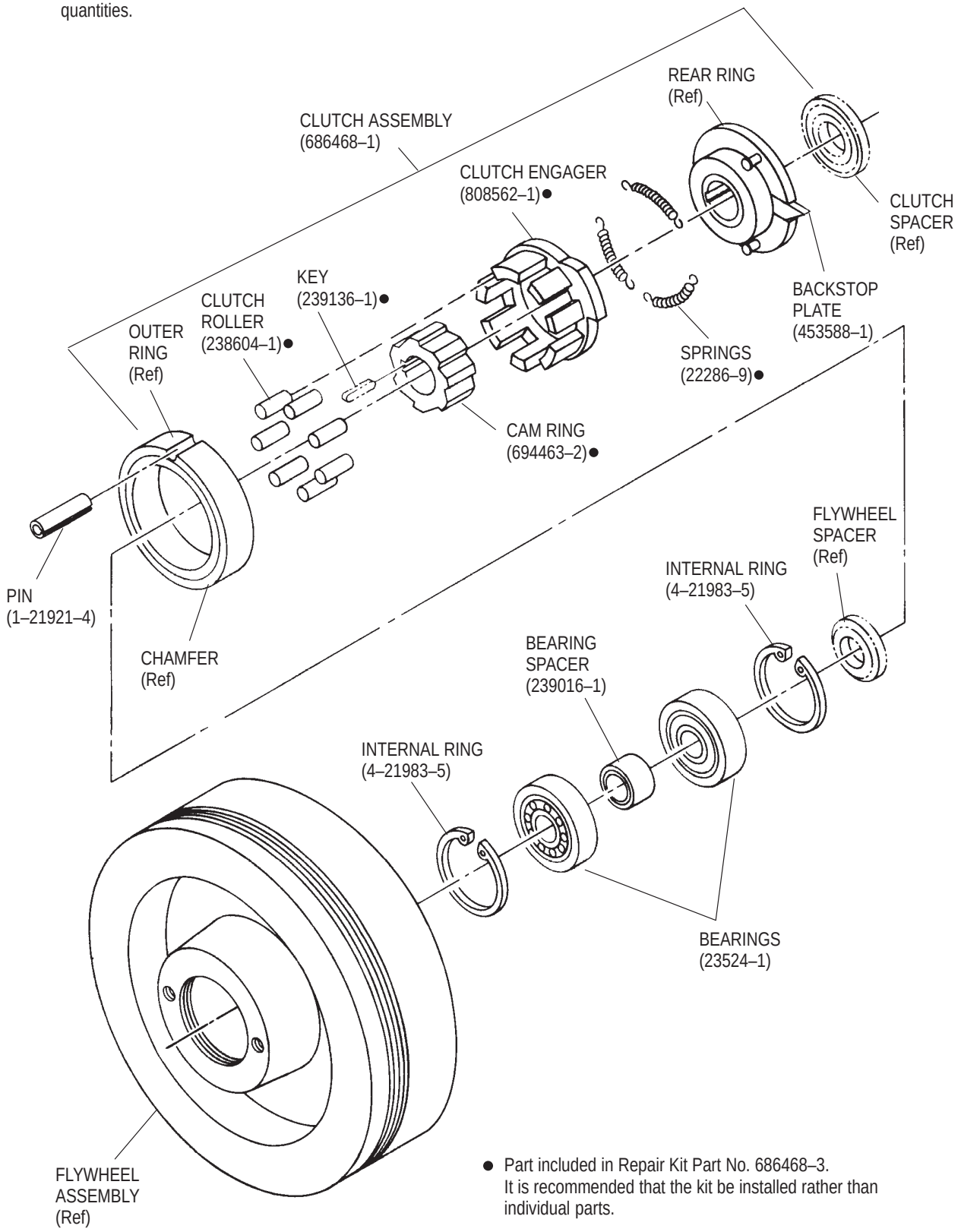
NOTE *A repair kit which extends the life of the clutch assembly is available.*

1. DISCONNECT POWER and remove the flywheel as described in Paragraph 6.3. The flywheel contains the outer ring of the clutch.

2. Remove the rollers, and disengage the three springs from the pins on the rear cam ring and clutch engager. Slide the engager off the rear ring and the cam ring. Refer to Figure 2–2.

3. Slide the flywheel spacer and cam ring off the crankshaft. Penetrating oil may be used. Remove the key, and then slide the clutch spacer off the crankshaft.

NOTE: Refer to Assembly Drawing No. 768793 shipped with the machine for part numbers and quantities.



● Part included in Repair Kit Part No. 686468–3. It is recommended that the kit be installed rather than individual parts.

Figure 6–2. Flywheel Assembly Replacement

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4. If the outer ring must be removed from the flywheel, use a drift punch through the two holes in the flywheel. The pin will come out with the ring.

5. Inspect all parts, and remove all burrs as necessary. Thoroughly clean all parts, including the ends of the rollers. If installing new parts, remove any rust preventive. Lubricate clutch parts, as described in Paragraph 4.3, before installing.

6. During re–assembly, make sure the outer ring is fully seated in the flywheel with the LARGE chamfer inserted first. Insert the pin to lock the ring in the flywheel.

7. Install the clutch spacer on the crankshaft, and then insert the key. Slide the assembled clutch assembly onto the crankshaft (with string around the engager to hold the rollers).

8. Install the flywheel as described in Paragraph 6.3. Be sure to remove the string from around the engager.

6.5. Flywheel Bearings Replacement (Figure 6–2)

1. DISCONNECT POWER and remove the flywheel as described in Paragraph 6.3.

2. Remove the two internal retaining rings. Use TRUARC■ Internal Pliers No. 2500, or an equivalent.

3. Use an arbor press to press the two bearings and spacer from the flywheel.

NOTE *ALWAYS replace bearings in pairs. It is NOT necessary to remove the outer ring to replace the bearings.*

4. Install new bearings using the reverse procedure.

6.6. Clutch Trip Mechanism Replacement (Figure 2–2)

1. DISCONNECT POWER TO THE "TII" UNIT.

2. Loosen screw in end of crankshaft, but do not completely remove it. Pull the flywheel back to gain access to the clutch trip mechanism.

3. To remove either solenoid, first remove the plunger pin by removing the O–ring, and then remove the four screws and lockwashers securing the solenoid. Disconnect the wire leads at the connector.

4. If any of the springs need to be replaced, it is recommended that all three be replaced at the same time.

5. Removing the remaining parts does not require detailed instruction. Retaining rings may be removed with TRUARC Pliers No. 2209 (right angle), or an equivalent, without removing the flywheel.

6. Closely inspect all parts for excessive wear or damage that may cause a malfunction. Replace them as necessary.

7. Re–install parts in the reverse order of disassembly.

NOTE *When installing either trip pawl or backstop pawl, be sure they correctly engage with the clutch engager and the rear cam ring. If not, hand–cycle the unit one revolution.*

6.7. Crankshaft–Ram Group Replacement (Figure 6–3)

CAUTION *BEFORE attempting to disassemble or remove the crankshaft or ram, FIRST measure the shut height so that the ball screw can be properly adjusted at re–assembly.*

DANGER *BE SURE POWER TO THE "TII" UNIT is disconnected before replacing parts.*

To replace parts related to the crankshaft and ram, disassemble them as shown in Figure 6–3. Re–assemble parts in reverse order of assembly. After assembly, adjust the shut height to the EXACT dimension measured before disassembly, as described in Section 5, ADJUSTMENTS.

■ Trademark of Waldes Kohinoor, Inc.

NOTE: Refer to Assembly Drawing No. 768793 shipped with the machine for part numbers and quantities.

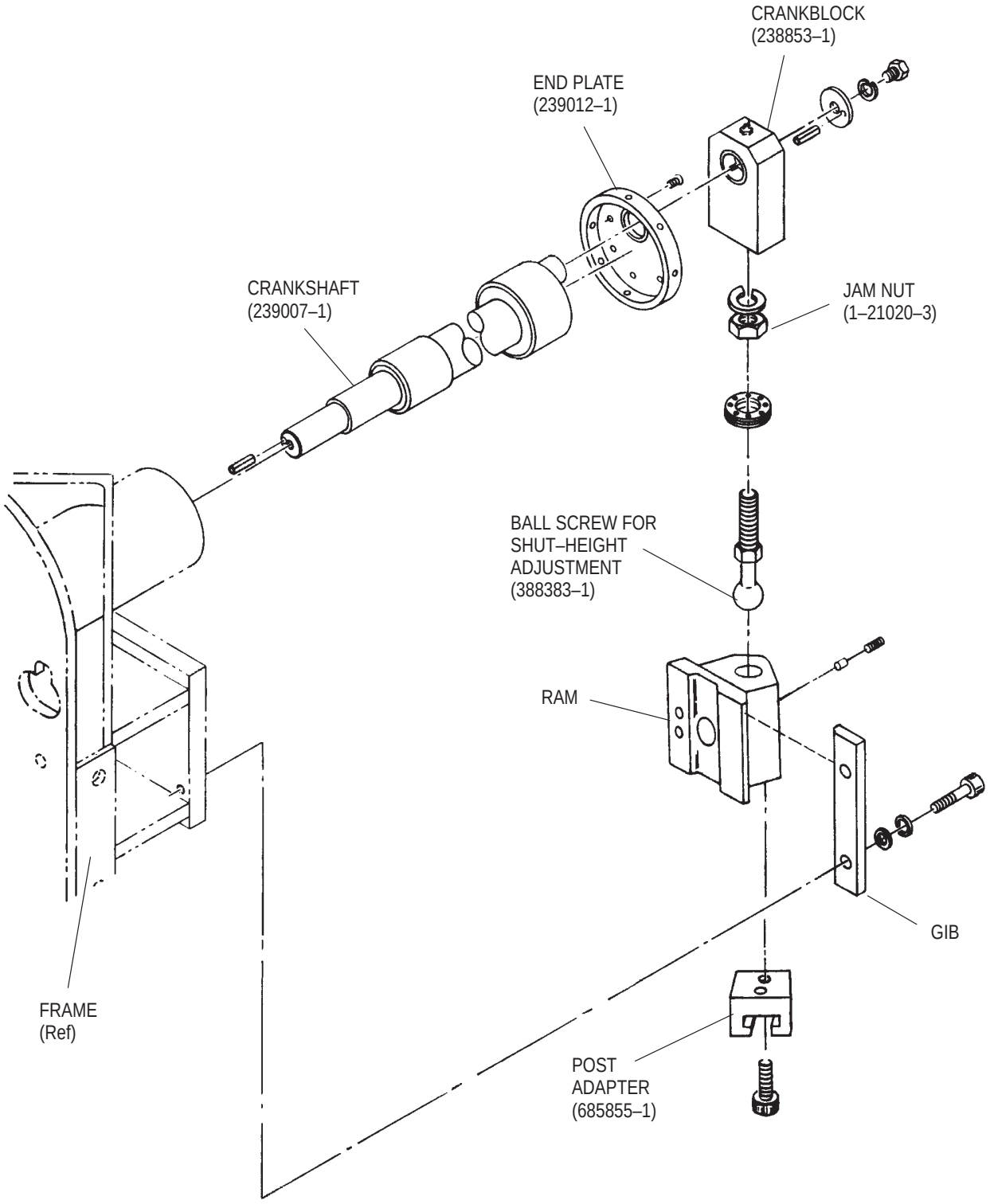

Figure 6–3. Crankshaft–Ram Group Replacement

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6.8. Precision Adjustment Base Replacement (Figure 6–4)

To remove and replace any of the parts in the base plate assembly that supports the applicator, first remove three screws attaching it to the frame, then disassemble. Replace any defective or excessively worn parts. When re–assembling, install an applicator and check the alignment to be sure the ram adapter does not bind the ram post of the applicator.

6.9. Electrical Components Replacement

DANGER *BE SURE POWER TO THE "TII" UNIT is disconnected before replacing parts.*

When making repairs or replacing parts in the electrical system, refer to the electrical assembly drawing(s) shipped with the "TII" unit.

NOTE: Refer to Assembly Drawing No. 768793 shipped with the machine for part numbers and quantities.

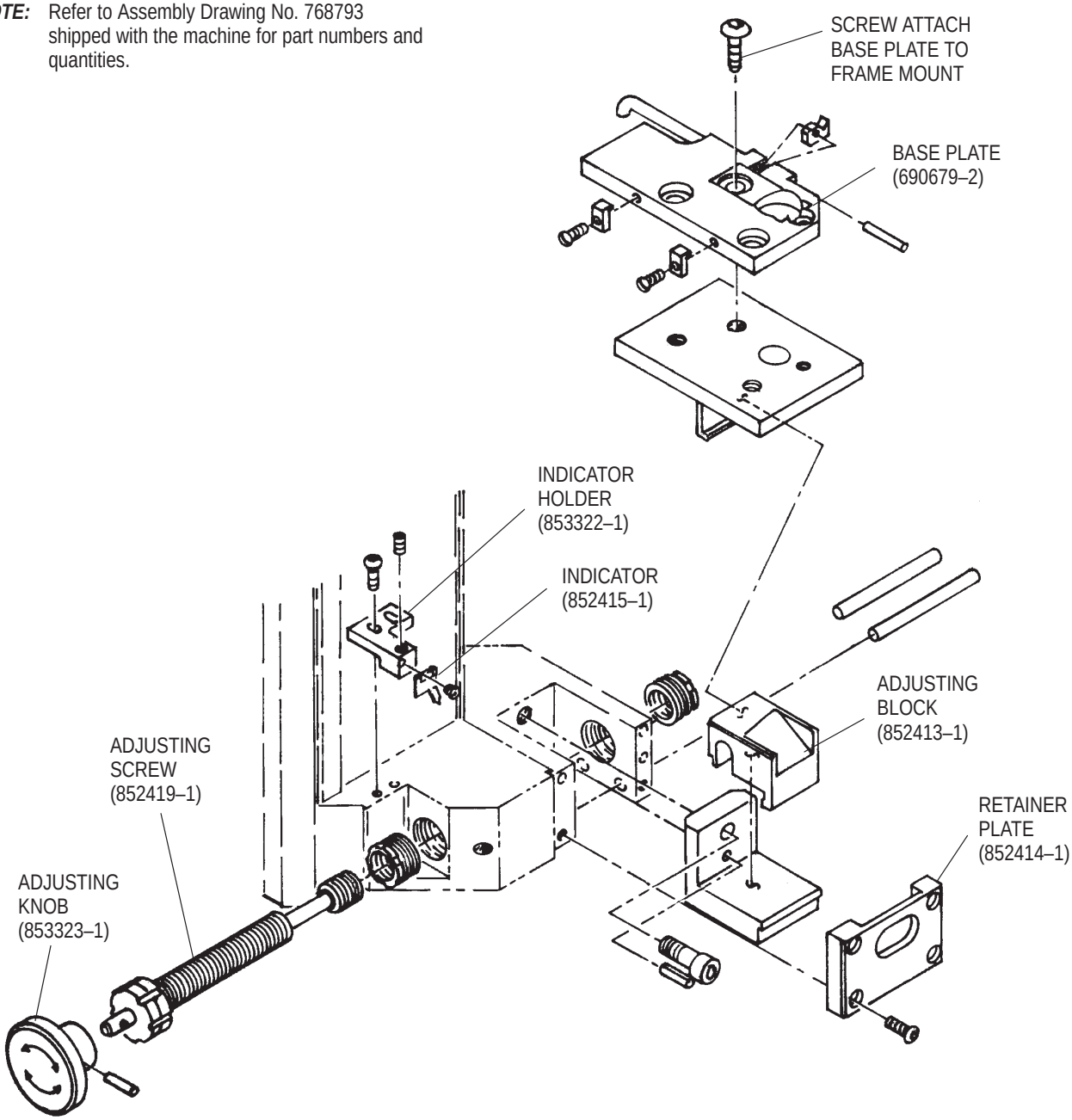

Figure 6–4. Precision Adjustment Base Replacement 90–493

7. REVISION SUMMARY

Per EC M–3132:

- Replaced “available from” information and part number for SANTOTRAC 50 lubricant under Paragraph 4.2
- Added replacement part numbers and note for repair kit in Figure 6–2

Per EC 0150–3224–94:

- Added ‘‘single–cycle bench model” to name of ‘‘TII” unit
- Modified Frontispiece and Figures 2–1, 4–1, 5–2, and 6–1 to reflect current design
- Changed ‘‘230V, 3–phase, 1/3–hp” motor to ‘‘120V, single–phase, 1/4–hp” motor
- Removed Paragraph 3.3
- Removed reference to manual for machine under Paragraph 6.9

Per EC 0990–0252–93:

- Updated format
- Added Section 7, REVISION SUMMARY