AMP INCORPORATED
Harrisburg, Pa. 17105

AMP★ MINIATURE APPLICATORS FOR INSERTING AMPMODU★ MOD I AND MOD II VERTICAL RECEPTACLES (Ladder Type) WITH AMP INSERTION MACHINE MODEL "U" NO. 691679-1

Applicator Instruction
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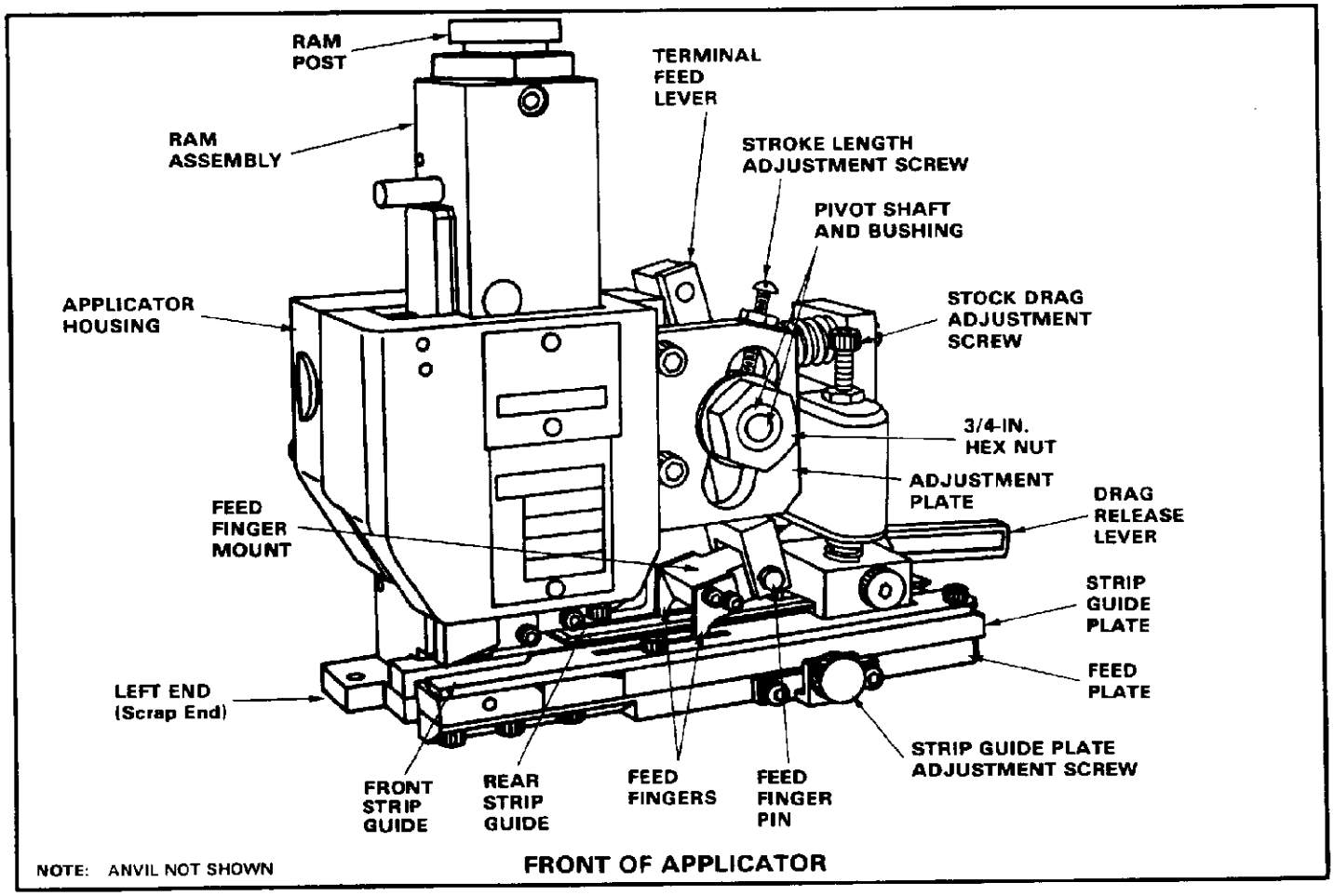

Fig. 1

1. INTRODUCTION

The AMP miniature applicator for inserting AMPMODU MOD I and MOD II vertical receptacles (ladder type) is used in machine No. 691679-1. Refer to Customer Manual CM 5174 for the operation and maintenance of the machine.

These applicators insert AMPMODU MOD I and MOD II vertical receptacles in printed circuit boards 1/16-, 3/32-, or 1/8-in. thick. The receptacles are supplied in a strip form having dual carrier strips, which is commonly known as a ladder-type strip.

The receptacles are available in two types: Type A is used when post entry into the receptacle is from the tine end; Type B is used when post entry into the receptacle is from the end opposite the tines. Each type is supplied in three different tine lengths for the various board thicknesses. A different applicator must be installed each time a different board thickness is to be used.

NOTE

When changing from one type of receptacle to the other, it is necessary to re-adjust the feed finger, as described in Section 4, to accommodate the differences in carrier strip feed-hole positions.

2. APPLICATOR DESCRIPTION

The applicator is self-contained except for the anvil. The main assembly is fastened to the machine mounting plate with two screws. The ram post (also referred to as the ram mounting post) engages the machine ram post adapter.

The anvil mount is fastened to the anvil adjustment assembly with two screws after being properly aligned with the terminal ram. Rubber pads on each side of the anvil allow the board to be pushed down slightly as the ram assembly bottoms. The board then strips the receptacle from the anvil as the ram assembly begins its upstroke.

The receptacle strip enters the applicator between the strip guides and passes under the stock drag. The stock drag applies a slight pressure to the receptacle strip to keep it from moving as the feed fingers retract. The tips of the front and rear feed fingers move in slots in the strip guides. They engage the feed holes of the carrier strips to feed one receptacle during each cycle of the machine.

The cycle begins with the ram assembly in the raised position and a printed circuit board in position over the anvil. The lead receptacle, still attached to the front carrier strip, was advanced under the terminal ram during the last half of the previous cycle.

As the ram assembly begins its downstroke, the lead receptacle, already bent to the vertical position, enters the terminal ram and is sheared from the front carrier strip. The receptacle is held in the terminal ram by the terminal ram spring. The tines of the receptacle are pushed down through the hole in the board, and are bent apart by the anvil.

As the ram assembly reaches the end of its downstroke, the receptacle bottoms on the board and pushes it downward slightly, compressing the rubber pads. At the same time, the tines are clinched to the underside of the board.

While the lead receptacle is being inserted into the board, some other action is taking place farther back on the receptacle strip. The tooling in this applicator is equivalent to a multiple-stage die. Several different functions are performed with each stroke of the ram. If MOD I receptacles are being used, the second receptacle is bent downward (while still connected to the front carrier strip), and the third receptacle is sheared from the rear carrier strip. If MOD II receptacles are being used, the third receptacle is bent downward and the fifth receptacle is sheared from the rear carrier strip. In both cases, the rear carrier strip is bent back away from the receptacle after shearing, so that it won't interfere with the bending operation.

Also during the downstroke of the ram assembly, the feed fingers retract to pick up the next feed holes in the carrier strip. The feed fingers have a slight overtravel on the retract stroke to ensure engagement in the carrier strip on the advance stroke.

During the upstroke of the ram assembly, the feed fingers are actuated by the feed cam to advance the receptacle strip one position.

As the ram assembly reaches the end of the upstroke, the lead receptacle aligns with the terminal ram. This completes one cycle of operation.

3. APPLICATOR LOADING AND UNLOADING

3.1. Receptacle Strip Loading

1. Be sure ram assembly is fully raised. If it isn't, turn air "on" to raise ram assembly.
2. Turn "off" or disconnect air supply to machine.
3. Install reel of receptacles on reel support so receptacle strip enters applicator with receptacles UP and tines pointing toward rear strip guide.
4. Clip first FIVE receptacles from lead end of receptacle strip, leaving empty carrier strips in place.

NOTE *Remove any burrs from carrier strips, and make sure strips are not kinked or bent.*

5. Depress drag release lever, and pull section of old receptacle strip out of applicator from left end (scrap end). Feed new receptacle strip into applicator. Strip should move easily between strip guides, with no unnecessary drag, yet guides should be close enough to strip to keep it properly aligned under tooling. Advance receptacle strip until EMPTY CARRIER STRIPS appear at left end (scrap end) of applicator, then retract receptacle strip slightly until feed fingers engage feed holes in carrier strips.
6. Hand-cycle machine (see CM 5174) until lead receptacle is under terminal ram.
7. SLOWLY hand-cycle machine while observing alignment and pickup of lead receptacle by terminal ram. If receptacle is not in proper position, re-adjust forward limit of feed fingers as described in Section 4.
8. Continue to SLOWLY hand-cycle the machine while observing receptacle alignment with anvil. If necessary, align anvil as described in Section 4.
9. With a printed circuit board over anvil, continue hand-cycling machine until ram assembly has fully bottomed. Observe retraction of feed fingers. Feed fingers MUST be retracted slightly beyond feed holes in carrier strip. If feed fingers are not retracted far enough, adjust feed finger stroke length as described in Section 4. If necessary, adjust stock drag as described in Section 4.
10. Hand-cycle machine until ram assembly is fully raised, then remove printed circuit board and inspect the inserted receptacle. If tines are not properly clinched, adjust anvil height as described in Section 4.
11. Connect air supply. The applicator is now ready for operation.

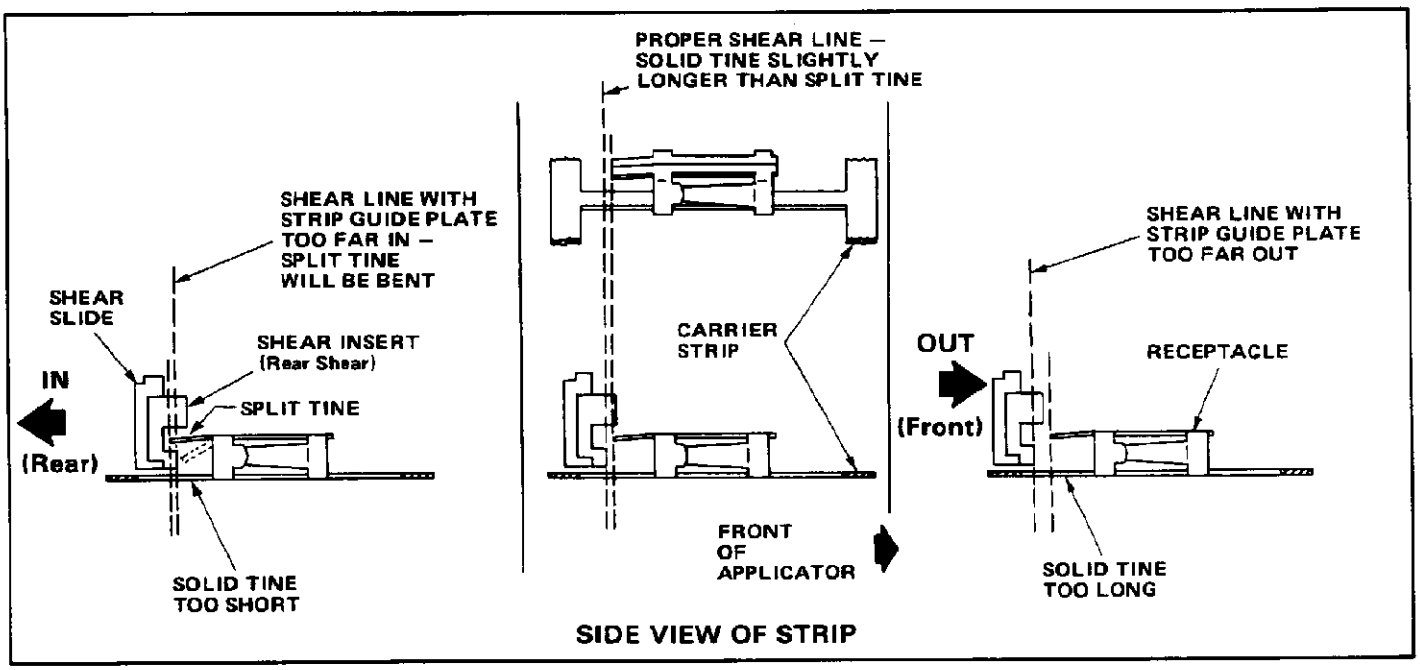

Fig. 2

3.2. Receptacle Strip Unloading

NOTE *The applicator should never be unloaded unnecessarily. A section of receptacle strip should always be left in the unit to identify the type of receptacle to be used in it. It is not necessary to remove the strip section for cleaning, lubrication, or repair.*

1. Turn "off" or disconnect air supply to machine.
2. Be sure ram assembly is fully raised. If necessary, hand-cycle machine to obtain this condition. (See CM 5174.)
3. Cut receptacle strip next to applicator on right end (reel end).
4. If necessary to completely unload applicator, depress drag release lever, lift feed finger, and pull strip section out of applicator from left end (scrap end).

4. ADJUSTMENTS

WARNING *During all adjustment procedures, the machine air supply MUST be turned "off," or disconnected. Refer to CM 5174.*

NOTE *The tooling in this applicator is equivalent to a multiple-stage die. The various shearing, bending, and clinching functions must be carried out correctly in order to produce properly inserted receptacles. If any individual function is not performed properly, all the succeeding actions will be out of alignment, and the applicator will jam. Much valuable production time can be saved by making ALL adjustments extremely carefully, as described in this section.*

4.1. Strip Guide Plate Adjustment (Figure 2)

The successful operation of this applicator depends very much on the shearing of the receptacle from the rear carrier strip. The applicator operates best when the receptacle is sheared in such a way that the lower tine (the solid tine connected to the carrier strip) is slightly longer than the upper tine (split tine). See Figure 2. This difference is only a few thousandths of an inch, but should be visible when the receptacle is inspected. If the solid tine is not slightly longer than the split tine, the applicator will very probably jam.

The length of the solid tine is determined by the position of the receptacle strip under the rear shear. This position is adjusted by moving the strip guide plate toward the front or back of the applicator.

If the strip guide plate is moved too far to the rear, the shear will bend the split tine as it moves downward, and then it will cut the solid tine too short. The bent tine will prevent the receptacle from being inserted into the board properly.

If the strip guide plate is moved too far toward the front of the applicator, the bender will hit the carrier strip as it moves downward and the applicator will jam.

This rear shearing process should be checked by running a test cycle with receptacles in the applicator and the lead receptacle under the terminal ram. Hand-cycle the machine until the terminal ram nears the board. Then remove the receptacle from the terminal ram and inspect it. The solid tine must have been cleanly sheared, and must be slightly longer than the split tine. The split tine should be parallel to

the solid tine. If the receptacle has these characteristics, go on to Paragraph 4.2. Otherwise, follow this procedure:

1. Remove applicator from machine as described in Section 7.

2. Remove and inspect shear plate and shear slide as described in Section 7. Some shearing problems are caused by dull or damaged shearing surfaces. Replace and adjust these parts as required. Re-install the applicator, then hand-cycle the machine and inspect the receptacle alignment. If further adjustments are needed, go on to Step 3.

3. Remove applicator from machine. Remove ram assembly from applicator. From bottom side of feed plate, loosen two screws that hold strip guide plate.

4. While observing alignment of receptacle strip under rear shear, (from left, or scrap end of applicator), turn strip guide plate adjustment screw CLOCKWISE to move strip guide plate toward the rear, or COUNTERCLOCKWISE to move it toward the front.

NOTE

The strip guide plate should not need to be moved more than several thousandths of an inch (approximately 1/8 of a turn of the screw). Feed fingers can slide this small distance on the feed finger pin without requiring separate adjustment.

5. Tighten screws to secure strip guide plate to feed plate.

6. Put ram assembly back into applicator and install applicator in machine.

7. Run several test cycles, and repeat adjustment as required.

4.2. Feed Finger Alignment (Figure 1)

1. With receptacle strip in applicator and lead receptacle advanced to the forward limit, observe alignment of feed fingers on feed finger mount. Forward edges of feed fingers must be parallel in order for both feed fingers to engage carrier strip in the same location in relation to the feed holes. If adjustment is needed, go on to Step 2.

2. Remove two screws from adjustment plate (DO NOT loosen 3/4-in. hex nut).

3. Remove adjustment plate, bushing, and pivot shaft from applicator.

4. Remove terminal feed lever and attached feed finger mount and feed fingers from applicator.

5. Hold forward edges of feed fingers against a flat surface and loosen two screws on each feed finger to allow them to align themselves against flat surface. Tighten two screws on each feed finger.

6. Install parts in applicator by using reverse procedure.

NOTE

Before tightening two screws which hold adjustment plate to applicator housing, push adjustment plate UP as far as it will go, then tighten two screws.

4.3. Feed Finger Forward Limit Adjustment (Figure 4)

1. Turn air "on" to fully raise ram assembly, then turn air "off".

2. With receptacle strip in applicator, and lead receptacle advanced to the forward limit, as described in Section 3, determine direction of adjustment required to line up lead receptacle under terminal ram.

3. Loosen screw on top of pivot block.

4. To move forward limit of feed fingers TOWARD anvil, turn forward limit adjustment screw COUNTERCLOCKWISE until proper alignment with terminal ram is obtained.

5. To move forward limit of feed fingers AWAY FROM anvil, turn forward limit adjustment screw CLOCKWISE until proper alignment with terminal ram is obtained. Receptacle strip must be pulled back toward reel during adjustment to keep feed fingers engaged in carrier strip feed holes.

6. Retighten screw on pivot block.

4.4. Feed Finger Stroke Length Adjustment (Figure 1)

NOTE

The forward limit adjustment, as described in Paragraph 4.3, must be correct before performing this procedure.

1. With receptacle strip in applicator, hand-cycle machine until ram assembly is at bottom of stroke.

2. Observe position of feed fingers in relation to feed holes in carrier strip. Feed fingers MUST be retracted slightly beyond feed holes to ensure proper feeding. To adjust, continue with Step 3.

3. Loosen the 3/4-in. hex nut slightly to allow bushing and pivot shaft to move in slot.

4. Loosen locknut on stroke length adjustment screw.

5. To SHORTEN feed finger stroke, turn stroke length adjustment screw CLOCKWISE.

6. To LENGTHEN feed finger stroke, turn stroke length adjustment screw COUNTER-CLOCKWISE.

7. Be sure pivot shaft bushing is up against stroke length adjustment screw, then retighten the 3/4-in. hex nut. Tighten locknut on stroke length adjustment screw.

8. Hand-cycle machine to fully raise ram assembly.

9. Check alignment of lead receptacle with terminal ram. If necessary, re-adjust feed finger forward limit as described in Paragraph 4.3.

4.5. Anvil Alignment Adjustment (Figure 3)

1. With lead receptacle correctly positioned under terminal ram as described in Section 3, SLOWLY hand-cycle machine to lower the ram assembly to pick up lead receptacle and shear it from the front carrier strip.

2. As receptacle tines approach anvil, observe side-to-side alignment of tip of anvil between tines. Tip of anvil should be midway between tines. If adjustment is required, go on to Step 3.

3. Loosen two screws securing anvil mount to anvil adjustment assembly.

4. Move anvil mount in required direction to obtain proper alignment. Retighten two screws to secure the mount.

5. Additional side-to-side and front-to-back adjustment of anvil can be obtained by turning two anvil location adjustment screws in machine frame.

4.6. Anvil Height Adjustment (Figure 3)

The anvil height MUST be adjusted when the receptacle fit in the board is too loose or too tight. When too loose, the receptacle doesn't grip the board properly; when too tight, its sides buckle inward. Adjustment is made by raising or lowering the anvil adjustment assembly which holds the anvil mount.

When the anvil height is changed, a series of test cycles MUST be made to determine the correct setting.

Change the anvil height by loosening the locknut and rotating the anvil adjustment assembly screw in the desired direction. Retighten the locknut to secure the assembly.

4.7. Stock Drag Adjustment (Figure 1)

The stock drag applies friction to the carrier strips to prevent forward movement of the receptacle strip after the feed fingers stop, and backward movement of the strip during retraction of the feed fingers. Too much friction may damage the receptacle strip or the feed fingers. To increase or decrease the drag, perform the following procedure.

1. Be sure stock drag is contacting carrier strips and has not jumped out of its slot in strip guides.

2. Loosen locknut on stock drag adjustment screw.

3. Turn stock drag adjustment screw CLOCK-WISE to INCREASE drag, or COUNTERCLOCK-WISE to DECREASE drag.

4. Retighten locknut to secure stock drag adjustment screw.

5. Run several test cycles to ensure proper adjustment.

5. CLEARING OF RECEPTACLE STRIP JAMS IN APPLICATOR

This procedure is designed to clear any strip jam. Some jams are more difficult to remove than others. Start with Step 1, and go only far enough to clear the jam.

1. Cut receptacle strip close to right end (reel-end) of applicator.

2. Depress drag release lever and try to pull receptacle strip out of applicator from left end (scrap end).

NOTE *BE SURE ram assembly is fully raised before proceeding.*

3. Remove front strip guide by removing two screws (Figure 1).

4. Depress drag release lever, raise feed fingers, and CAREFULLY try to pull receptacle strip out of applicator with needle-nose pliers.

5. Remove shear plate by removing two screws from bottom of feed plate (Figure 3). Repeat Step 4.

6. Remove applicator from machine as described in Section 7.

7. Remove ram from applicator, then remove feed plate from bottom of applicator by removing two screws (Figure 1).

8. Try to pull jammed strip from under rear strip guide or, if necessary, loosen two screws securing rear strip guide and pull out receptacle strip.

9. Install shear plate by pushing down on rear shear, and slide the shear plate into the assembly until it just touches the rear shear. Install and tighten two screws to secure shear plate (Figure 3).

10. Install front and rear strip guides with two screws each.

NOTE

It is EXTREMELY IMPORTANT that strip guides be installed properly. Install rear strip guide first, being careful to keep it parallel with front edge of feed plate. Place a section of receptacle strip against rear strip guide, and install front strip guide by placing it against receptacle strip without applying any pressure to strip. Front strip guide should also be parallel to front edge of feed plate. Remove receptacle strip section.

11. Install feed plate on applicator as described in Section 6.

12. Install applicator in machine as described in Section 7, and reload receptacle strip as described in Section 3.

13. Run several test cycles. It may be necessary to adjust strip guide plate as described in Section 4.

6. FEED PLATE INSTALLATION AND ADJUSTMENT (Figure 1)

1. Place feed plate on flat surface. Place applicator body on feed plate while holding feed finger up against body. Drag should be placed in space between strip guides, and feed fingers in slots in front and rear strip guide plates.

2. Carefully pick up body and feed plate, turn them upside down, and hold them together while lining up holes for screws. Fasten feed plate to body with two screws, leaving screws slightly loose.

3. Loosen screw holding terminal ram assembly to applicator ram, and insert the complete ram assembly in applicator (Figure 3).

4. Push the complete ram assembly down as far as it will go, then tighten two screws on bottom of feed plate.

5. Tighten screw holding terminal ram assembly to applicator ram.

7. REPLACEMENT PROCEDURES

WARNING

During all replacment procedures, the air supply MUST be turned "off" or disconnected. Refer to CM 5174 as required.

7.1. Applicator Replacement (Figure 3)

1. Turn air "on" to fully raise ram assembly, then turn air "off".

2. Disconnect spotlight wire connector.

3. Remove two screws securing applicator to machine mounting plate. (Refer to CM 5174.)

4. Slide ram post out of machine ram post adapter.

5. Install new applicator using reverse procedure.

6. If necessary, replace anvil as described in Paragraph 7.2.

7. Load applicator, and check for proper adjustment as described in Section 4.

7.2. Anvil Replacement (Figure 3)

1. Slightly loosen anvil mount screw, which secures anvil in anvil mount.

NOTE

It is not necessary to remove anvil mount to replace anvil.

2. Slide anvil up from between two sections of anvil mount and remove it. Insert new anvil and make certain that it is properly seated.

3. Retighten anvil mount screw.

4. Check anvil for vertical alignment, and for height adjustment, as described in Section 4.

7.3. Terminal Ram and Ram Spring Replacement (Figure 3)

NOTE

To replace ram spring ONLY, perform Steps 1 through 3; otherwise, begin with Step 4.

1. Hand-cycle machine to lower the ram assembly until ram spring is accessible below applicator housing.

2. Replace ram spring by removing two screws securing it to terminal ram. Be sure ram is clean before installing new spring.

3. Continue to hand-cycle machine until ram reaches bottom of stroke. Turn air "on" to fully raise ram assembly, then turn air "off".

4. To replace terminal ram, remove applicator from machine as described in Paragraph 7.1.

5. Remove ram assembly by pulling upward. It may be necessary to manually actuate feed fingers to release assembly.

6. Remove terminal ram by removing screw securing it to ram assembly. If a spacer is used, retain it for re-installation.

7. Replace parts and ram assembly using reverse procedure, but DO NOT tighten screws securing terminal ram until after ram assembly is installed in applicator.

8. Lower the ram assembly to the bottom of its stroke, then push up on terminal ram and tighten screw.

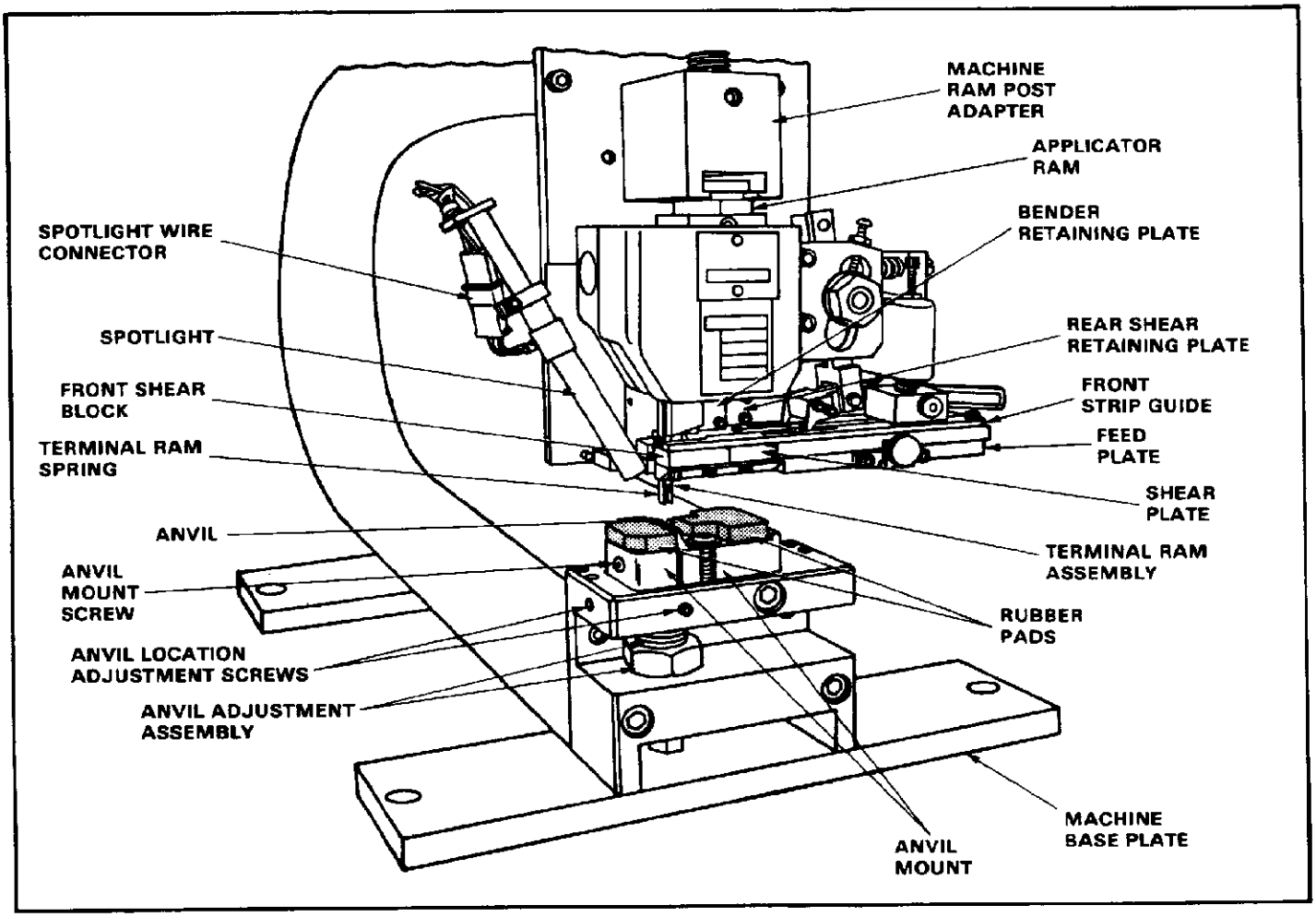

Fig. 3

NOTE *Tighten screw slowly and carefully to be sure that terminal ram is fastened in a straight, vertical position.*

7.4. Front Shear Block Replacement (Figure 3)

1. Hand-cycle machine to lower ram assembly as far as it will go.
2. Remove two screws holding front shear block to feed plate.
3. Replace front shear block.
4. Push front shear block squarely against terminal ram, then tighten two screws.

7.5. Rear Carrier Strip Shear Replacement (Figure 3)

1. Remove applicator from machine as described in Paragraph 7.1. Remove ram assembly from applicator.
2. To remove shear plate, remove two screws from underside of feed plate. Slide shear plate from under front strip guide.
3. To remove shear slide, remove two screws securing rear shear retaining plate, and slide retaining plate to the right to remove it.
4. Depress shear from above and push it out of slot.
5. Remove shear spring by turning applicator upside down.
6. Remove screw holding shear insert to shear slide. Replace parts as required with new parts, then fasten shear insert to shear slide, but DO NOT tighten screw.
7. Put shear (shear insert and shear slide) into its slot in applicator WITHOUT spring. Tighten screw holding shear insert to shear slide.
8. Remove shear from slot.
9. Put shear spring in slot.
10. Put bottom end of shear in slot, then depress shear and slide upper end under lip of applicator housing.

11. To re-install shear plate, depress rear shear slightly, then slide shear plate squarely against rear shear and tighten screws holding shear plate to feed plate.

7.6. Terminal Bender Replacement (Figure 3)

1. Remove applicator from machine as described in Paragarph 7.1.
2. Remove two screws securing bender retaining plate.
3. Push out dowel pin securing bender to bender link, then remove bender.
4. Replace parts using reverse procedure. Parts are self-aligning and require no adjustment.

8. CLEANING AND LUBRICATION

For optimum performance and minimum down time, the applicator should be cleaned and inspected after each eight hours of operation, and each time it is removed from the machine to be placed in storage.

8.1. Cleaning

1. Remove applicator from machine as described in Section 7.
2. Remove ram assembly from applicator by pulling upward. It may be necessary to manually actuate feed fingers to release ram assembly.

NOTE *It is NOT necessary to remove section of receptacle strip to clean applicator.*

3. Using a clean, dry cloth, remove dirt, chips, or other foreign matter from applicator components. If desired, entire applicator may be immersed in a suitable commercial solvent (one that will not affect paint or plastic material) to flush out chips.
4. Lubricate applicator as described in Paragraph 8.2., before re-assembling.
5. Replace ram assembly in applicator, and install applicator in machine.

8.2. Lubrication

The applicator components are to be lubricated at the following points using SAE No. 20 motor oil (non-detergent) or, where specified, light grease.

CAUTION *DO NOT use too much lubricant on applicator. Any excess MUST be removed before placing applicator back in service.*

1. With ram assembly removed, apply a thin film of grease along four corners of ram, and along curved surface of feed cam — after they have been thoroughly cleaned.
2. Lay applicator carefully on its side and apply one drop of oil to bushing within the 3/4-in. hex nut (Figure 1). Then apply a drop of oil to feed finger pin. Wipe excess oil from feed finger pin and hex nut.
3. Apply a drop of oil to forward limit adjustment screw, and to feed rod into which it is turned (Figure 4).
4. Replace ram assembly in applicator, and remove any excess lubricant.

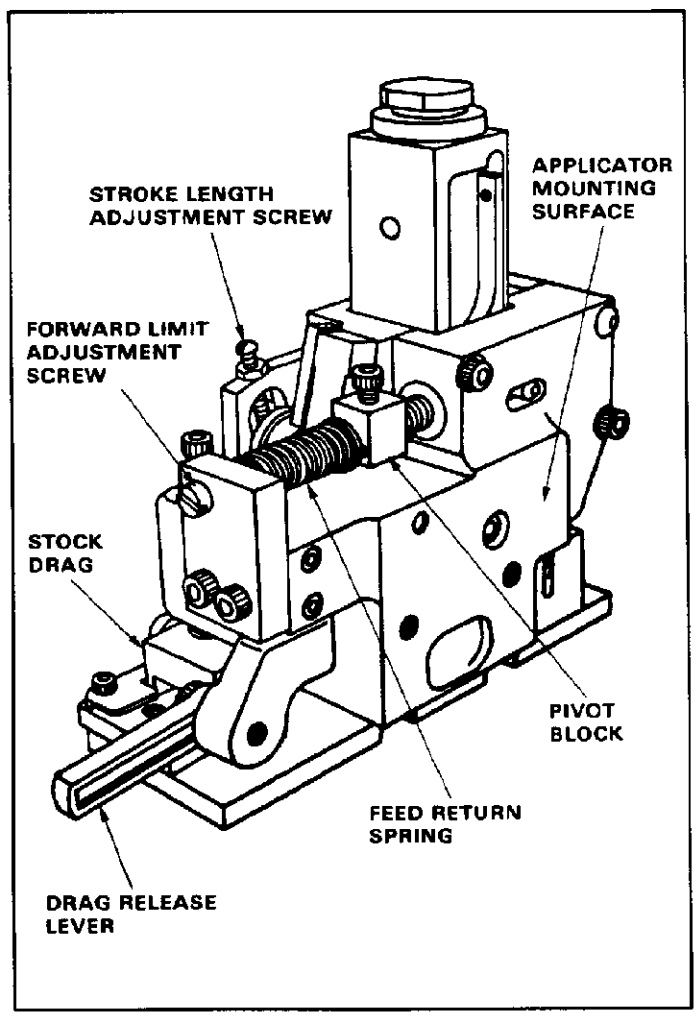

Fig. 4

9. APPLICATOR STORAGE

1. Cut receptacle strip one or two receptacles from entry to strip guides.
2. Remove applicator from machine as described in Section 7. Clean and lubricate it, as described in Section 8.
3. Lower the ram assembly to retain lead receptacle under terminal ram. This will identify the type of receptacle to be used when applicator is returned to service.