Warranty

The Chicago Rivet & Machine Company warrants automatic rivet setting machines, and parts (excluding Tools, Driver Jaws and Anvils) to be free from defects in material and workmanship under normal use and service for a period of one (1) year from the date of shipment by the Company. The Company's obligation under this warranty is limited to repair or replacing, at its option, any goods which upon inspection by the Company shall disclose to the Company's satisfaction to have been defective in material or workmanship. The Buyer must return the goods to the Company's designated factory, shipping charges prepaid, with complete information as to alleged defects and the installation, operation and service of the goods.

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Introduction

Chicago Rivet mechanical machines include a complete line of both electrically- and foot-powered, general-purpose rivet-setting machines. They are designed to meet a wide range of applications requirements, including multi-rivet setting. In addition, Chicago Rivet manufactures a line of pneumatic machines which employ the steady, even force of air for riveting fragile materials, or those of varying thickness.

This Set-up & Service Manual provides all general descriptions and instructions for the unpacking and set-up, inspection and adjustment, lubrication and troubleshooting of all models of mechanically-operated rivet-setting machines manufactured by Chicago Rivet & Machine Company. It also outlines procedures for rivet-size changeover. Where specific information or drawings for a particular model are referred to, consult the Parts & Assembly Prints for your model of machine. These Parts & Assembly Prints, one for each model of machine model, and this Set-up & Service Manual are organized to be complementary. Before attempting to uncrate, set up, adjust or operate the machine, be sure to read and understand all instructions, especially all safety precautions. They will enable you to put the machine into operation efficiently, safely, and without machine damage. The manual is concise and the short reading time required will be more than offset by savings in set-up time.

All Chicago Rivet machines and accessories are designed for a long life of high-production, trouble-free service, and are warranted for a period of one year (see warranty, inside cover), but they must be given the inspections and adjustments, lubrication and cleaning as specified in this manual. By carefully following procedures and maintenance outlined here, you can be assured of the best possible results from your Chicago Rivet machine, and also avoid personal injury or damage to the machine during set-up, operation and maintenance.

Handling & Safety Precautions

General Safety: Keep in mind one very important point; about rivet-setting machines; they are basically top-heavy—especially pedestal machines. Usually, safe practices also avoid machine damage as well as personal injury, whether in handling, set-up, adjustment or operation of the machine. Never wear jewelry, long sleeves, or neckties in handling or operating machinery. Always wear face mask or respirator and use ventilation fans if necessary when using toxic solvents or other chemicals, when cleaning machines.

Uncrating and Handling: Immediately upon arrival, visually check the outside of crates before opening, for visible evidence of rough handling or damage (sometimes an important point in the success of damage claims with common carriers). If there is, so note with a short description in signing the carrier's bill of lading, or don't sign at all until checking with officials of the carrier. Uncrate first the top boards and then sides, using tools carefully to avoid damage to machine. Leave base of crate intact with machine on it and inspect machine for concealed damage.

Check bill of lading against purchase order and invoice to be sure all items were delivered, including the box of tools (extra driver, jaw and anvil) fastened within the crate.

Use a fork lift or hand truck under the base to transport the machine and, since it is top-heavy, secure the upper machine column to the fork lift with a heavy strap, belt or rope. Do not use a sling in handling the machine; and do not use the hopper or raceways as a handhold. Wear safety shoes and gloves in handling the machine, and remove (as stated above) any loose items of clothing and all jewelry, especially rings.

Slowly move the machine, on the crate base, to the desired location with the fork lift, and move the machine off the crate base to the floor or bench.

Operating Safety: Be sure anyone allowed or assigned to operate a Chicago Rivet machine: (1) is thoroughly familiar with machine operation and has read and understands Page 3, "Operation and Description," of this service manual; (2) wears safety glasses and safety shoes; (3) removes or secures all items of loose clothing; (4) removes all rings and other jewelry.

Be sure, before anyone touches any machine component for servicing and maintenance of machine, that power is shut off/disconnected, and safeguarded so it cannot be mistakenly turned on by anyone, except at the direction of the person doing the servicing.
Set-up Procedure:
1. Make certain intended location of machine leaves ample clearance space around machine for both operator and set-up and maintenance personnel.
2. Level machine and anchor with bolts to floor but leveling need not be perfect. Bench-type machines must be solidly attached.
3. Clean all preservative grease from machine with degreasing fluid, or similar solvent (avoid gasoline or inflammable materials which are too dangerously explosive and toxic, respectively). Also clean raceways of dirt with brush and cleaning fluid.
4. Completely inspect and lubricate machine according to the lubrication chart and schedule on Page 5, "Inspections & Lubrication". Use SAE 20 oil for lubricating the machine, but do not lubricate raceways.
5. Connect the electrical control panel to the electrical supply (be sure voltage, amperage, phase and frequency—Hertz—match the requirements of the machine). This hook-up should be done by a competent electrician. Be sure not to cover the identification plate of machine.
6. With power off make all inspections, in order, outlined below (in this Section) and any adjustments necessary, following procedures on Page 4 and 5, "Adjustments & Part Replacements".
7. After various rivet-setting components are adjusted to specification, clear machine of rivets and turn off hopper feed and lower the anvil so machine can be cycled (without setting a rivet).
8. Place a work assembly on anvil and turn flywheel to bring driver down to riveting position, and raise anvil until assembly is snug between driver and anvil.
9. Return machine to "home" position by turning flywheel.
10. Fill hopper with rivets to proper level (half full) and release transfer slide lock. Transfer a rivet into the jaws.
11. Turn power supply or control switch "on", and trip machine.
12. Check rivet clinch for tightness. If too tight or too loose follow procedure outlined in Rivet Clinch on Page 4, "Adjustments & Part Replacements" to adjust tightness of rivet clinch and recheck it by repeating steps on Page 4.
13. Machine is set up and ready for production which will yield the final-adjusted clinch.
Scope of Machine Capabilities:
Chicago Rivet mechanical machines can set rivets of a wide range of size and head style. They require, in one case (with slight variations in only rivet shank length) only machine adjustments, in the other cases (variations in shank diameter or head style) a changeover to a new set of various machine components. The dual head models, for multi-rivet setting, can be adjusted to set rivets on various centers. These changes are completely outlined on Page 12, 'Rivet Size Changeover'. In addition, common operating adjustments must be made, and machine maintenance, from time to time, but no special tools are required.

The same type of component changeover expands machine versatility, adapting it for setting eyelets, drive screw, tacks, grommets and other similar fasteners. Components and accessories available for changeover include a wide variety of horns, anvil holders and special anvil fixtures. Contact your Chicago Rivet representative, or the home office for complete current information.

Elements of Operation: These machines are foot-powered or electric-motor powered for the rivet-setting process, the latter operating cycle electrically controlled with a footswitch or handswitches. The electric motor power is transmitted through a clutch—which also acts as a brake—and is converted by an eccentric crank to the reciprocating motion required for setting rivets. Each rivet-setting cycle of operation normally requires an individual operation of the switch(s). The reciprocating motion, acting through the plunder, forces the driver against the rivet held in the jaws, upsetting the rivet against the anvil. The anvil is held in an anvil holder, horn or fixture supported by the horn, which is attached to the machine column or head.

Anvil—actually determines the shape and quality of the clinch because it does the forming or upsetting of the rivet. So it is one of the most important accessories to the machine, and is available in many styles and lengths. It is a factory-assembled unit consisting mainly of the anvil shell, nut, spring, and a pilot. The rivet presses against a pilot as it is guided by it through the assembly until it meets the anvil shell, which forms the rivet clinch. Because the rivet-setting machine stroke is fixed, the clinch is adjusted with the anvil raising/lowering it, until the clinch is satisfactory, but also requires machine adjustment (see Clinch, Page 4.)

Jaw & Driver—hold the rivet in place and force it against the anvil, respectively, to form clinch on the rivet(s).

Raceways & Transfer Slide—deliver the rivet from the hopper to the jaw, and consist of an upper raceway and lower raceway. These which comprise a group of plates between which the rivets slide, and the transfer slide which, spring-loaded and actuated by the transfer slide lever, transfers rivet from the upper to the lower raceways, once each operating cycle.

Hopper—feeds rivets, synchronized with the rivet-setting operation, through a slotted selector bowl, into the upper race-way. Driving speed is adjustable, with two or three speeds available (depending upon machine model), to accommodate rivets of different length (any shank length up to, but not exceeding, the depth of the hopper bowl slots). A given hopper accommodates one combination of rivet head size and shank diameter however it is designed for quick change when these rivet requirements vary, except for a few models for which the original hopper must be factory-modified. The hopper should not be overfull, and for best machine operation, should be half full of rivets. The hopper is emptied of rivets by loosening and removing knurled nut, washer and spring from hopper shaft(s). Place container under bowl to catch rivets, rotate and remove bowl from shaft. Finally, slide all rivets out of the race-way. When reassembling hopper part number on washer must be visible (off outside of washer).

Power/Actuating Mechanism—consists of a clutch assembly, including the cam, shaft, roller cage and latch. Trip mechanism, flywheel and motor (excluding foot operated machines). These are controlled by the foot pedal or switch to permit one complete setting cycle. On some models, there also is a brake; on other models, the clutch acts as a brake.

Periodic Maintenance & Adjustments: Machine parts should be inspected periodically for wear or need of adjustment or lubrication. Some should be oiled or greased weekly; some even daily. See Page 8 for a complete schedule of required lubrication, and the Parts & Assembly Guide for your model of machine.

Replacement Parts: Chicago Rivet machine parts are stamped with easily identified part numbers of one or two letters and a dash, followed by numerals. Parts are described in the Parts & Assembly Guide for each machine. Each machine nameplate shows machine model/serial numbers, and part numbers of the original driver, jaws and anvil supplied with the machine. Part numbers, and dates, of any parts changed, added or modified should be recorded on this nameplate. An up-to-date history of the machine is then immediately available right where it's needed—at the machine.
Unplug machine power, if possible, or be sure power is off and cannot be accidentally turned on by someone else. Read Safety Precautions on Page 1 before working on machine.

**Clinching Adjustment**

**Symptom of Adjustment Need:** New anvil or replacement. Rivet is too tight or too loose in assembly, or clinch is off-center.

**Machine Specification:** Distance from top surface of anvil to driver at its lowest position, must equal the minimum thickness of the work material assembly.

**Procedure:** If rivet is too tight or loose, adjust rivet clinch by first bringing driver down to lowest position, by turning the flywheel. Then adjust the anvil to the **Machine Specification** (above). Set a few trial assemblies typical of the work material thickness in each. If not satisfactory, repeat the procedure to fine-tune the adjustment. If driver does not center properly, with anvil, when in “down” position, inspect driver, anvil and anvil holder for wear, misalignment, damage, and replace if necessary (see respective section on these components in this Section). If these are in good condition, align driver and anvil by simply loosening the four capscrews securing head to column, shifting the head as necessary and re-tightening the screws. In cases where the horn is mounted to the head, align horn to bring the file lines near the driver.

**Anvil Replacement/Adjustment**

Using a rod through the anvil holder, push the old anvil out from below. Check pilot setting of new anvil as follows: holding anvil assembly in a drill or lathe chuck, remove nut and spring, replace nut. Then check pilot projection distance “B” (as shown in Pilot Setting detail drawing Figure 1).

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**Figure 1**

The anvil is a precision made tool designed to clinch semi-tubular rivets. Unless adequate facilities are available in your shop for repair of anvils they should be returned for proper reconditioning or replacement.

**NOTE:**
- Pilots are supplied oversize and must be carefully fitted to the shell. If hole in shell is worn or bell-mouthed it should be relapped before fitting the pilot.

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<th>B</th>
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</thead>
<tbody>
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<td>9/64</td>
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<td>3/16</td>
<td>.005/.008</td>
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<tr>
<td>1/4</td>
<td>.006/.010</td>
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<tr>
<td>5/16</td>
<td>.006/.010</td>
</tr>
<tr>
<td>3/8</td>
<td>.006/.010</td>
</tr>
</tbody>
</table>

Pilot should be set as shown see table for correct dimensions.

To check pilot setting:
1. Hold shell securely in a drill chuck or lathe chuck and remove nut.
2. Remove spring and replace nut.
   - If pilot is too high, grind off bottom of pilot.
   - If pilot is too low, grind off bottom of shell.

Edge must be sharp.
- Do not grind or polish pilot diameter shown as edge of rivet will be forced into opening and buckle instead of clinching properly. Foreign matter also may settle in crevice causing pilot to lodge in shell.
**Jaws**
**Symptom of Adjustment Need:**
Rivets may topple and/or tend to feed improperly from the jaws to the work assembly.

**Machine Specification:** In the lowered position, jaws should clear anvil pilot tip or assembly by approximately 1/32 inch, slightly more with longer rivets, and in the upper position, should leave .003 to .005 inch vertical clearance with bottom surface of lower race plates. "C" distance (see illustration, Figure 4 & 5 Jaw/Driver/Race Plate adjustment) Page 7 from top surface of jaws to bottom of driver should be less than the rivet head diameter.

**Procedure:** At the top and bottom of the plunger cover plate (see Machine Front View illustration, Figure 3, Page 6), an adjustment sockethead setscrew, secured with a locknut, bears on the stop block of the jaw carrier bar, limiting the bar's vertical movement. Loosen these locknuts, adjust the two limit-stop setscrews until the jaws are set to Machine Specification above, and then retighten the locknuts to secure the setscrews in adjustment. At the same time, make sure the screw and nut securing the jaws and auxiliary jaw springs (the inward-bowed leaf-type centering springs) to the carrier are tight. These springs prevent "spitting" of the rivets in the jaws.

**Driver**
**Symptom of Adjustment Need:**
Driver tends to drop slightly, and possibly rivets fail to drop properly into the jaws, both caused by long-term wear on toggle pins/holes.

**Machine Specification:** .003 to .005 inch horizontal clearance between driver and back plate of lower race plates, and vertical alignment of the bottom end of the driver slightly below lower edge of the back plate to clear head of rivet, (the upper plate of the lower race plate assembly) when the driver is set at its vertical "Home" position—on the top of its vertical travel (see illustration Jaw/Driver/Race Plate Adjustment Page 7).

**Transfer Slide**
**Symptom of Adjustment Need:**
Rivets do not feed into lower raceway, even though upper raceway contains rivets, and transfer slide is unlocked.

**Machine Specification:**
Approximately 3/8 inch between end of transfer slide and end of transfer slide lever, to give rivet enough travel time to drop into lower raceway. Transfer slide opening must align with both upper and lower race plates in order to pick-up and release rivet. The transfer slide is spring-loaded, and should move freely with only slight thumb pressure.

**Procedure:** Check transfer slide movement and adjust transfer slide and transfer slide lever. Adjust if necessary, as follows: first, be sure driver is in full down position (see Driver Adjustment in this Section). Measure distance from end of transfer slide to end of transfer slide lever. Adjust to Machine Specification by adjusting position of transfer slide lever pusher on toggle eccentric bar as necessary, and secure by tightening the pusher capscrew. (or) Adjust to Machine Specification by adjusting position of collar on transfer slide lever rod. (or) Adjust to Machine Specification by adjusting position of transfer slide lever adjusting screw.
Figure 4

A: .003- to .005-inch clearance for vertical driver movement.

B: .003- to .005-inch maximum clearance. (Jaws should be as close to the lower race plate assembly as possible without touching them.

C: This gap must be smaller vertically than the diameter of the rivet head being used to prevent the rivet from turning over in the jaws. This is particularly important when using extremely short rivets.

Figure 5

A: .003- to .005-inch clearance for vertical driver movement.

B: Top inlet of jaws should be even with, or slightly below, the upper edges of the lower race plates.

C: This gap must be smaller vertically than the diameter of the rivet head being used to prevent the rivet from turning over in the jaws. This is particularly important when using extremely short rivets.
**Inspection & Lubrication**

**Inspection**

Hopper & Raceway Screws ........... for tightness
Transfer slide ...................... for freedom of movement, and adjustment
Hopper bowl ....................... for fill level, and freedom from dirt, also bowl slots for chips
Raceways ........................ for uniform plate spacing free from oil, nicks and dirt
Flywheel belt ..................... for tightness (1/2" deflection)
Clutch assembly .................. for strange noises, dirt and congealed oil
Trip mechanism .................. for dirt accumulation, oil and grease
Toggles ........................... for pin/hole wear, driver-drop
Plunger & jaw carrier bar ........ for excessive side play
Hopper shaft ...................... for free-turning

**Lubrication**

**Daily Lubrication Schedule:**
(with SAE 20 oil)
- Toggle Eccentric Strap
- Lift Lever Stud & Pin
- Trip Cut-off Lever Pin
- Upper & Lower Treadle Yoke Pins
- Treadle Shaft
- Transfer Slide Lever Shaft
- Jaw Carrier Bar
- Clutch Stop Latch & Screw
- Hopper Connecting Bar Stud
- Lower, Center & Upper Toggle Pins
- Clutch Roller Cage
- Pawl Rocker & Connecting Lug
- Pawl Pin
- Plunger

**Weekly Lubrication Schedule:**
(with No. 2 Cup Grease)
- Cut-off Stud
- Flywheel
- Knock-off Pin
- Clutch Shaft

**Weekly Lubrication Schedule:**
(with SAE 20 oil)
- Hopper Shaft
- Motor Bearings (sleeve type)
Figure 6

Center Toggle Pin (Thru hole in top of head casting) OD
Clutch Roller Cage OD
Lower Toggle Pin OD
Flywheel (\(\frac{1}{8}\) " Zerk fitting) GW
Jaw Carrier Bar OD
Transfer Slide Level Shaft OD

Upper Toggle Pin (\(\frac{1}{4}\) " ball cup) OD
Pawl Rocker Connecting Lug OD
Pawl Rocker OD
Hopper Shaft OW
Pawl Pin OD
Plunger OD

NOTE: Do not lubricate hopper raceways. Clean with compressed air to remove dust and dirt.

LEGEND:
OD—Oil Daily, SAE 20
OW—Oil Weekly, SAE 20
GW—Grease Weekly

NOTE: Clean all surplus lubricant from the machine after lubricating.
Figure 7

Clutch Shaft (Two grease cups) GW

Toggle Eccentric Strap (⅛" ball cup) OD

Motor Bearing (Sleeve bearing motors only) OW

Hopper Connecting Bar Stud OD

Clutch Stop Latch OD

Clutch Latch Screw OD

LEGEND:
OD—Oil Daily, SAE 20
OW—Oil Weekly, SAE 20
GW—Grease Weekly

NOTE: Clean all surplus lubricant from the machine after lubricating.
Figure 8

Plunger Lever Pin (2) OD
Plunger Lever Link Pin (2) OD
Plunger Lever Yoke Pin (2) OD
Transfer Slide Lever Eccentric (2) OD
Flywheel Bushing GW
Transfer Slide Level Shaft (2) OD

Figure 9

Jaw Carrier (2) OD
Plunger (2) OD
Hopper Connecting Link Stud (4) OD
Hopper Shaft (2) OD
Pawl Rocker (2) OD
Pawl Pin (2) OD

NOTE: Do not lubricate hopper raceways. Clean with compressed air to remove dust and dirt.

NOTE: Clean all surplus lubricant from the machine after lubricating.

Motor Bearing (Sleeve bearing motors only) OW

Figure 10

Eccentric (2) OD
Main Shaft Bearings (4) OD

Clutch Latch OD

LEGEND:
OD—Oil Daily, SAE 20
OW—Oil Weekly, SAE 20
GW—Grease Weekly
Rivet Size Changeover

Rivet Shank Length
(Slight Differences)
If rivets of only a new length are to be used, changeover of machine components is unnecessary. Merely change driving speed. This is governed by the location of the hopper pawl rocker link in any of three holes (two holes in some models) in the pawl rocker (normally it is in the center one).

Procedure: To accommodate slightly longer or shorter rivets simply relocate the link to the hole nearest the hopper shaft (faster operation) for longer rivets, or farthest from the shaft (slower operation) for shorter rivets.

Rivets of a new length will also require an adjustment of the anvil.


Rivet Shank
Diameter/Head Design
If rivets of a different shank diameter or of a different head design are to be used, the rivet-setting machine must be modified with new components as listed below.

Components Required: Quick change hopper assembly driver, jaws and anvils; in some cases, also the horn and anvil holder.

Procedure:
a. Remove present jaws and their auxiliary springs by first removing the attachment screw and nut. Empty the hopper of rivets, following the procedure described on Page 3, “Operation & Description”.
b. Remove present hopper, first removing the link end of the pawl rocker attached with a cap screw and nut; then the cap screw (under the bowl) which secures the hopper to machine head; finally, slide hopper dowels in machine head.
c. Install new driver by first lowering the plunger, by turning the flywheel, to expose the setscrew retaining the driver. Loosen setscrew in the front of the plunger, remove present driver and replace with new driver, then re-tighten the setscrew.
d. Install new hopper, securing it to machine head with capscrew (under bowl), attaching link end to pawl rocker with cap screw and nut in reverse order of step “b” above.
e. Install new jaws and auxiliary jaw springs, attaching them to the carrier with the old attachment screw and nut, locating auxiliary jaw springs on the same sides of the jaws as they were before. See Page 5.
f. Install new horn (if required, by positioning horn at desired height on machine column or head and carefully aligning it with column keyway for precise verticality, and marking the location for four new holes to be drilled. Drill and tap the four holes for the horn-mounting capscrews. (A complete range of anvil length and styles are available for relocated horns).
g. Change anvils (see Machine Left Side View and follow procedure on Page 4).
h. Adjust driver/jaws/race plates, first setting the machine to “home” position, then following the procedure outline on Page 4.
i. Adjust jaw travel and anvil height, first lowering the driver to full “down” position by means of the flywheel.
j. Test the adjustments with a few trial rivet-sets as outlined on Page 4.

Rivet Centers (On Some Models)
On dual models, the right-hand head is adjustable to vary the rivet spacing.

Procedure: Loosen the two 5/8 inch hex nuts at the base of the right-hand head, and the two Allen-head setscrews in the righthand eccentric on the main shaft. Then adjust the right-hand head position for the desired rivet spacing by turning the crank handle. Secure head in new position by; first, retightening the two 5/8 inch hex nuts; second, turning the main shaft one complete revolution be sure new rivet centers have been maintained and finally, re-tightening the two Allen-head setscrews on the right-hand eccentric.
## Troubleshooting Mechanical Rivet-Setting Machine

### Malfunctioning Part Or Machine

<table>
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<th>Corrected by: (see reference for details)</th>
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<td>Power (or)</td>
<td>Power disconnected, (or)</td>
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<tr>
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<td>incorrect type of solenoid</td>
<td>connecting electrical power or supply.</td>
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<tr>
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<td>Linkage binding.</td>
<td>Having electrician check solenoid type,</td>
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<td></td>
<td></td>
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<td>and circuitry.</td>
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<td>cut-off stud</td>
<td>Stud adjustment screw too far out.</td>
<td>Turning cut-off stud adjusting screw in.</td>
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<tr>
<td>Machine trips but doesn’t cycle</td>
<td>Power (or)</td>
<td>Power disconnected.</td>
<td>Checking connections to all components</td>
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<td>Machine not in &quot;home&quot; position, (or)</td>
<td>Adjusting driver/jaws to &quot;home&quot; position</td>
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<td>foot pedal not adjusting properly.</td>
<td>of machine cycle (see Page 5)</td>
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<td>Weak or broken clutch spring, (or)</td>
<td>Replacing spring.</td>
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<td>Replacing cage.</td>
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<td>clutch cam loose on shaft, (or)</td>
<td>Replace clutch shaft.</td>
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<td></td>
<td>broken clutch cam, (or)</td>
<td>Replacing cam.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>grease in clutch stiff from extreme low temperature.</td>
<td>Start machine about ½ hour early to allow clutch grease to warm up and soften.</td>
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<tr>
<td>Machine repeats</td>
<td>Binding in machine component (or)</td>
<td>Linkage binding</td>
<td>Checking components for binding, then</td>
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<td></td>
<td></td>
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<td>adjusting appropriate machine components (see Pages 4 and 5)</td>
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<td>spring (or)</td>
<td>Incorrect cut-off spring</td>
<td>Replace with correct spring see parts list for part number</td>
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<td>Stud adjustment screw too far in.</td>
<td>Turning cut-off stud adjusting screw out.</td>
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<td>Adjusting stop collar so that vertical movement of trip cut-off is approx. ⅛&quot;.</td>
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<td>stop collar</td>
<td>Incorrect stop collar adjustment.</td>
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<td>Pilot sticks in &quot;down&quot; position</td>
<td>Pilot (or)</td>
<td>Pilot set too low, (or)</td>
<td>Adjusting pilot setting. (see Anvil Page 4)</td>
</tr>
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<td>bent pilot pin.</td>
<td>Replacing pilot pin</td>
</tr>
<tr>
<td></td>
<td>anvil</td>
<td>Dirt or foreign material collected in anvil, (or)</td>
<td>Disassembling anvil, cleaning, lubricating and reassembling.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>broken anvil spring</td>
<td>Replacing anvil spring (see Page 4.)</td>
</tr>
</tbody>
</table>

Note: For Solenoid Trip, also see page 14
## Troubleshooting

**Mechanical Rivet-Setting Machine**

### Malfunctioning Part Or Machine  (Solenoid Trip)

<table>
<thead>
<tr>
<th>Problem:</th>
<th>Is with:</th>
<th>Caused by:</th>
<th>Corrected by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine trips but won’t cycle</td>
<td>Solenoid</td>
<td>Solenoid being incorrectly adjusted to plunger</td>
<td>Re-locate solenoid and cut out switch for proper clearance to plunger</td>
</tr>
<tr>
<td>Machine repeats</td>
<td>Solenoid and cut out switch (or) spring</td>
<td>Solenoid plunger pin failing to activate cut out switch. Incorrect cutoff tension spring</td>
<td>Same as above Replace with correct spring. See parts list for part number of spring.</td>
</tr>
</tbody>
</table>
## Troubleshooting Mechanical Rivet-Setting Machine

### Malfunctioning Rivet Feed

<table>
<thead>
<tr>
<th>Problem:</th>
<th>Is with:</th>
<th>Caused by:</th>
<th>Corrected by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rivets not feeding into upper raceway</td>
<td>Hopper or raceway</td>
<td>Hopper not connected, (or) hopper bowl slot or upper raceway jammed with odd-size rivet or foreign matter, (or) excessively worn hopper.</td>
<td>Connect hopper. Loosen hopper bowl, pulling it outward on shaft, and removing obstruction with pointed wooden stick (metal may damage it) Replace with new hopper.</td>
</tr>
<tr>
<td>Rivets not feeding from upper raceway</td>
<td>Transfer slide</td>
<td>Locked transfer slide, (or) binding transfer slide, (or) incorrectly adjusted transfer slide lever</td>
<td>Unlocking transfer slide Adjusting transfer slide (see Page 5)</td>
</tr>
<tr>
<td>Rivets tumbling in jaws</td>
<td>Driver (or)</td>
<td>Driver set too high.</td>
<td>Adjusting driver (see Page 5).</td>
</tr>
<tr>
<td>Rivets &quot;spitting&quot; out of jaws</td>
<td>Rivet not seating in jaws (or)</td>
<td>Rivet tumbling in jaws.</td>
<td>(see above corrections for &quot;tumbling rivets&quot;) Page 5. Replacing with lighter spring.</td>
</tr>
<tr>
<td>Jaw bar (or)</td>
<td>Excessive jaw bar spring (or) binding jaw bar</td>
<td></td>
<td>Replacing with lighter spring. Removing jaw bar, cleaning and replacing then lubricating.</td>
</tr>
<tr>
<td>Jaws (or)</td>
<td>Jaws incorrectly paired (or) worn jaws, (or) incorrect jaw travel, (or) jaws loose on bar, (or) jaws loose on springs (or) jaws incorrect for rivet size auxiliary jaw springs (or)</td>
<td></td>
<td>Installing jaws with matching numbers Replacing with new jaws Adjusting jaws (see Page 5) Fix nut on screw Replace with correct springs for being used.</td>
</tr>
<tr>
<td>Auxiliary jaw springs</td>
<td>Jaw springs too weak, (or) jaws springs installed backwards.</td>
<td></td>
<td>Increasing the amount of &quot;bow&quot; in springs with heavier spring Reverse direction of &quot;bow&quot; in springs.</td>
</tr>
<tr>
<td>Driver</td>
<td>Driver tip &amp; radius too large for rivet head, (or) bent driver</td>
<td></td>
<td>Replace with correct driver (see Page 5) Replace driver</td>
</tr>
</tbody>
</table>
## Troubleshooting Mechanical Rivet-Setting Machine

### Imperfect Rivet Formation

<table>
<thead>
<tr>
<th>Problem:</th>
<th>Is with:</th>
<th>Caused by:</th>
<th>Corrected by: (see reference for details)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rivets marked by jaws</td>
<td>Jaws/springs</td>
<td>Unpolished jaws, (or)</td>
<td>Polishing the jaws</td>
</tr>
<tr>
<td></td>
<td></td>
<td>jaw springs too strong, (or)</td>
<td>Easing the bow in auxiliary jaw springs or use lighter springs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>jaws being set too low.</td>
<td>Adjusting level of jaws (see Page 5)</td>
</tr>
<tr>
<td>Rivets marked by driver.</td>
<td>Driver</td>
<td>Radii of driver and rivet not matching, (or)</td>
<td>Changing driver to the correct one for rivets being used.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>driver diameter too small, (or)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>driver edge too sharp</td>
<td>Buffing the driver tip</td>
</tr>
<tr>
<td></td>
<td>Clinching</td>
<td>Excessive force required to clinch the rivet.</td>
<td>Adjusting the clinch, Page 5</td>
</tr>
<tr>
<td>Poor clinches</td>
<td>Anvil</td>
<td>Worn out anvil, (or)</td>
<td>Replacing the new anvil</td>
</tr>
<tr>
<td></td>
<td></td>
<td>improperly set anvil (or)</td>
<td>Adjusting the anvil (see Page 4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>anvil misaligned with driver, (or)</td>
<td>Align driver to anvil Page 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>incorrect anvil clinch diameter</td>
<td>Checking with the Chicago Rivet office</td>
</tr>
<tr>
<td></td>
<td>Rivet</td>
<td>incorrect rivet length</td>
<td>Changing to rivet of correct length (see back cover)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Incorrect hole size in work assembly, (or)</td>
<td>Checking chart (back cover) for correct hole size.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>defective rivet hole</td>
<td>Return sample lot to Chicago Rivet for analysis.</td>
</tr>
</tbody>
</table>

### Machine Part Breakage

<table>
<thead>
<tr>
<th>Problem:</th>
<th>Is with:</th>
<th>Caused by:</th>
<th>Corrected by: (see reference for details)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jaws break</td>
<td>Jaws</td>
<td>Incorrectly adjusted jaws.</td>
<td>Adjust jaw setting (see Page 5).</td>
</tr>
<tr>
<td>Pilot breaks</td>
<td>Machine operator</td>
<td>Operator striking pilot with work.</td>
<td>Instructing operator in more careful handling.</td>
</tr>
<tr>
<td></td>
<td>(or)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Work assembly</td>
<td>Work material pushing sideways on pilot.</td>
<td>Installing a resting fixture to support load and hold assembly level.</td>
</tr>
</tbody>
</table>
RIVET LENGTHS

All rivet lengths except countersunk head rivets are measured from the underside of the head to the end of the shank. In applications involving countersunk head rivets, overall length is measured from the top of the head to the end of the shank. AND length under head must also be specified.

EXAMPLE . . . If a semi-tubular rivet of 1/8" dia. has been selected the length should be established as follows:
- Combined Material Thickness . . . . .110
- Clinch Allowance .................. .062
- Rivet Length ........................ .172 = 3/16" Long

CHART OF STANDARD CLINCH ALLOWANCES

As a guide in determining proper rivet length, Chicago Rivet engineers have compiled a chart of Standard Clinch Allowances for the most popular rivet diameters. The term “clinch allowance” applies to the part of the rivet extending beyond the material thickness of the assembly. (See illustration above.) The listed clinch allowances are considered minimum. To determine rivet length, add combined material thickness and clinch allowance, then use the next high applicable increment. Rivets with body diameters from .060 to .098 are available in 1/64" length increments; 1/8" and larger diameters in 1/32" length increments.

CAUTION: While long usage proves it generally satisfactory, this chart should be used as a guide only. Before recording the rivet length permanently, rivet and test a sample assembly. Certain assembly materials and various other conditions often cause a deviation from the established standard clinch allowances.

<table>
<thead>
<tr>
<th>RIVET SHANK DIAMETER</th>
<th>.060&quot;</th>
<th>.065&quot;</th>
<th>.088&quot;</th>
<th>.098&quot;</th>
<th>1/8&quot;</th>
<th>9/64&quot;</th>
<th>5/32&quot;</th>
<th>3/16&quot;</th>
<th>7/32&quot;</th>
<th>1/4&quot;</th>
<th>5/16&quot;</th>
<th>3/8&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLINCH ALLOWANCE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEMI TUBULAR</td>
<td>.032&quot;</td>
<td>.032&quot;</td>
<td>.045&quot;</td>
<td>.055&quot;</td>
<td>.062&quot;</td>
<td>.093&quot;</td>
<td>.093&quot;</td>
<td>.110&quot;</td>
<td>.140&quot;</td>
<td>.156&quot;</td>
<td>.187&quot;</td>
<td>.7/32&quot;</td>
</tr>
<tr>
<td>SPLIT AND DEEP HOLE</td>
<td>.062&quot;</td>
<td>.078&quot;</td>
<td>.093&quot;</td>
<td>.125&quot;</td>
<td>.125&quot;</td>
<td>.156&quot;</td>
<td>.175&quot;</td>
<td>.187&quot;</td>
<td>.210&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIAMETER OF HOLE IN ASSEMBLY</td>
<td>.067&quot;</td>
<td>.070&quot;</td>
<td>.093&quot;</td>
<td>.104&quot;</td>
<td>.128&quot;</td>
<td>.152&quot;</td>
<td>.165&quot;</td>
<td>.196&quot;</td>
<td>.15/64&quot;</td>
<td>.17/64&quot;</td>
<td>.21/64&quot;</td>
<td>.25/64&quot;</td>
</tr>
<tr>
<td>DRILL NUMBER</td>
<td>51</td>
<td>50</td>
<td>42</td>
<td>37</td>
<td>30</td>
<td>24</td>
<td>19</td>
<td>9</td>
<td>15/64&quot;</td>
<td>.17/64&quot;</td>
<td>.21/64&quot;</td>
<td>.25/64&quot;</td>
</tr>
</tbody>
</table>