MID-RIVERS MACHINERY, LLC

AIR-CAM Clinching Machine



*Model AC-3-26: 26” Throat: $21,950
Shipping Weight 1600 lbs

*Model AC-3-14: 14” Throat: $17,900
Shipping Weight 800 lbs

- Simple Construction for easy gauge adjustment
- Low Maintenance
- Uses standard BTM Tooling
- Lazer Light for accuracy included
- 3 Year Warranty
- Air Operated: 80 - 100 PSI required
- Patented Safety Feature

Mid-Rivers Air Cam Clinching Machines use our Patented press design. We offer the most simple and economical method to clinch two pieces of same, dissimilar or painted metal with 28 - 16 gauge capacity.

Clinching Machine Tooling Options:

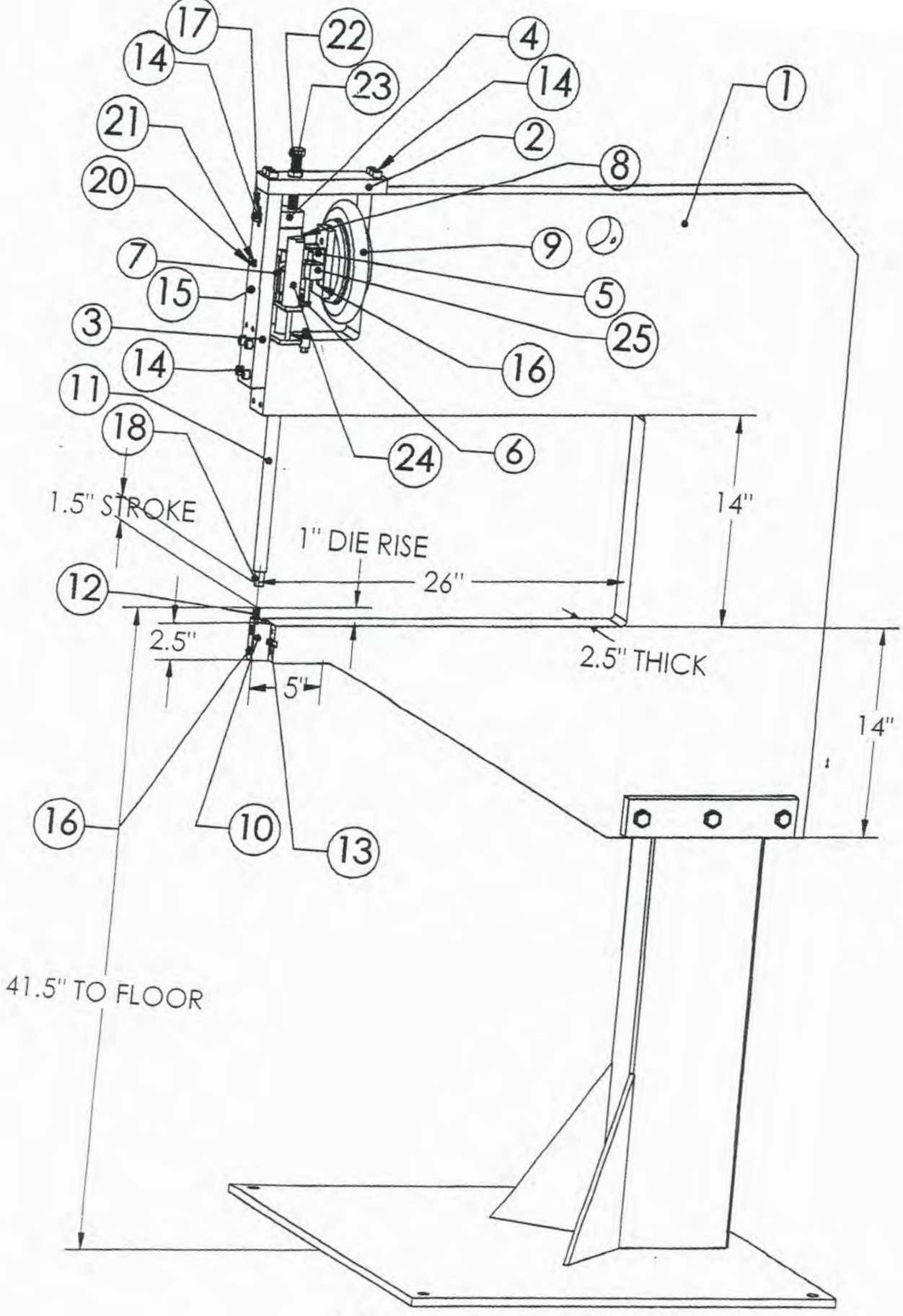
- Die C & Punch C 28-20 gauge capacity
- Die D & Punch D 22-18 gauge capacity
- Die E & Punch E 18-14 gauge capacity

Tooling Pricing:

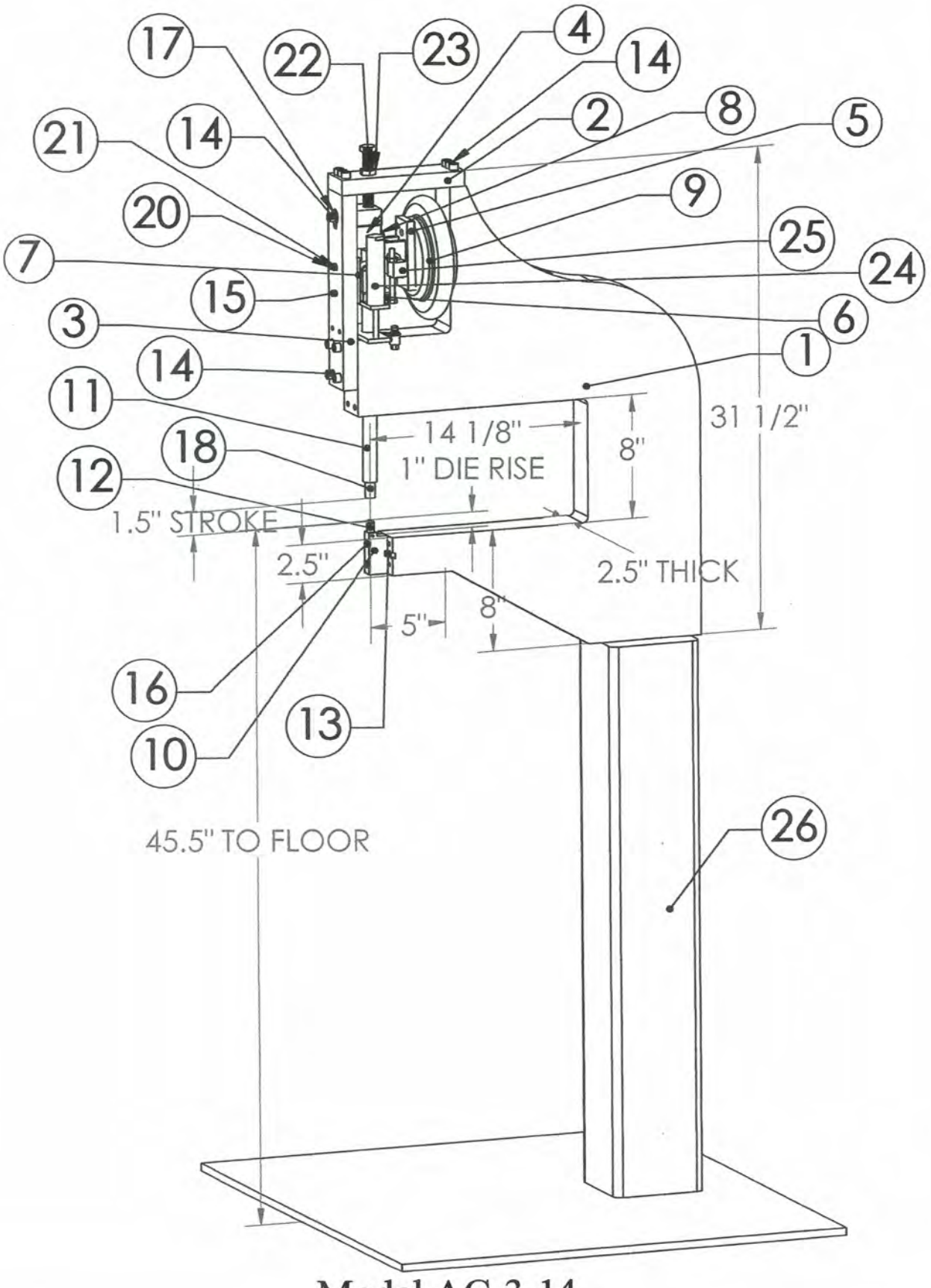
Die $320
Punch $159
Die Leaf (EACH)$62
Die Leaf Band $18
Stripper $82
Die Guard$78

These prices effective October 1, 2026

Contact Us
636.947.1513 | MidRiversMachinery@outlook.com
www.MidRiversMachinery.com


17
22
4
14
14
23
1
21
2
8
20
9
7
5
15
25
3
16
14
11
18
24
6
1.5" STROKE
1" DIE RISE
14"
26"
12
2.5"
2.5" THICK
5"
14"
16
10
13
41.5" TO FLOOR

Model AC-3-26


17
22
23
4
14
2
8
5
21
14
9
20
25
7
24
15
6
3
1
14
11
14 1/8"
1" DIE RISE
8"
31 1/2"
18
12
1.5" STROKE
2.5"
2.5" THICK
5"
8"
16
13
10
45.5" TO FLOOR
26

Model AC-3-14

Mid Rivers Clinching Machine Parts List

(Based on number diagram)

1. **Steel Frame**
2. **Top Plate**
3. **Face Plate**
4. **Top Cam Holder**
5. **Center Cam Holder**
6. **Bottom Cam Holder**
7. **Bottom Cam Holder**
8. **Top Cam**
9. **Air Bag**
10. **Die Block**
11. **Punch Shaft**
12. **Die**
13. **Die Block Key**
14. **Face Plate Allen Bolt(s)**
15. **Bottom Cam Face Plate Holder**
16. **Center Cam**
17. **Top Cam Adjust Allen Bolt**
18. **Punch**
19. **_Null_**
20. **Center Cam Limiter Bolt**
21. **Center Cam Limiter Nut/Washer**
22. **Top Adjust Bolt**
23. **Top Adjust Nut**
24. **Safety Cylinder**
25. **Safety Bolt** Note: Safety Valve, not numbered, is just below the Safety Bolt
26. **Clinching Machine Stand**

MID-RIVERS MACHINERY AIR CAM CLINCHER USER MANUAL

ATTENTION!!

BEFORE OPERATING THIS TOOL, READ THIS MANUAL AND UNDERSTAND THE SAFETY WARNINGS AND INSTRUCTIONS. SAVE THIS MANUAL FOR FUTURE REFERENCE.

The AIR-CAM CLINCHER is a precision-built machine designed for high speed and volume use. When used correctly and with care, you can count on this tool to deliver efficient, dependable service. As with any power tool, for the best performance please follow all manufacturer's instructions and safety warnings. Instructions covering installation, operation and maintenance should be read carefully and saved for reference.

Additional safety measures may be required for your specific application.

MID-RIVERS MACHINERY, INC.

P.O. Box 186

St. Peters, Mo. 63376

Bus. (636) 947-1513

Fax. (636) 723-0648

IMPORTANT SAFETY INSTRUCTIONS:

1) WEAR APPROVED EYE PROTECTION. Safety glasses should be worn by the operator and others in the work area at all times.

2) ALWAYS DISCONNECT THE AIR SUPPLY. Before making adjustments, clearing jams, or servicing tool, and when it is not in use.

3) AIR SUPPLY, NEVER use oxygen or other combustible gasses as a power source for this tool.

4) PREVENT ACCIDENTAL INJURIES. NEVER place hand or other body part in the pinch point area while connected to air supply

5) AIR SUPPLY SOURCES. DO NOT use an air source which can potentially exceed 125 PSI. (THIS TOOL IS RATED TO OPERATE AT 100 PSI OR LESS.)

6) BE SURE ALL GUARDS AND COVERS ARE IN PLACE BEFORE OPERATING THIS TOOL.

HOW THE AIR-CAM WORKS

80 to 100 lbs. of air is supplied to inflate the air spring (9), extending the cam follower (8), forcing the ram (11) downward. As the cam follower moves the ram a large force is generated near the bottom of the stroke.

A tool steel plate (7) acts as a bearing surface to eliminate any lateral force on the ram reducing bushing wear.

Item 20, is a hardened stop bolt to stop the cam follower (8) from traveling over center. If machine ram sticks in down position, adjust stop bolt (20) in clockwise direction to limit cam follower travel.

The shut height is controlled by loosening jam nut (23) and adjusting top bolt 22. (Up for heavier gauge, or down for lighter gauge.) Only slight adjustments are necessary to make a difference in shut height, never move more than 1/8 of a turn at a time. The shut height should be adjusted to obtain the proper clearance for the thickness of the material to be joined.

When mixing gauges, it is preferable to put the heavier gauge on top of the lighter gauge.

Be sure the proper tooling is installed for your application.

Contact the manufacturer to find out more about the tooling you need for your application.

SETTING THE CORRECT PRESSURE:

100 PSI Max. 90 PSI is sufficient for most applications. The air requirements will vary depending on the metal size and material. Do not use more air pressure than is required for the specific job. Using excess pressure wastes compressed air.

To determine best setting, start at low pressure and test, increasing the pressure until the setting is satisfactory for the job.

DO NOT EXCEED 100 PSI

MAINTENANCE

The Air-Cam bearings are sealed and lubricated for the life of the tool. No lubrication is required for the air supply. If your unit is equipped with a grease fitting for the ram, 1 small shot of grease is required once every 6 months.

TOO MUCH GREASE WILL CAUSE THE MACHINE TO SLOW DOWN OR FAIL TO FIRE

If there is any other information you need please feel free to contact us at:

MID-RIVERS AIR-CAM, INC.

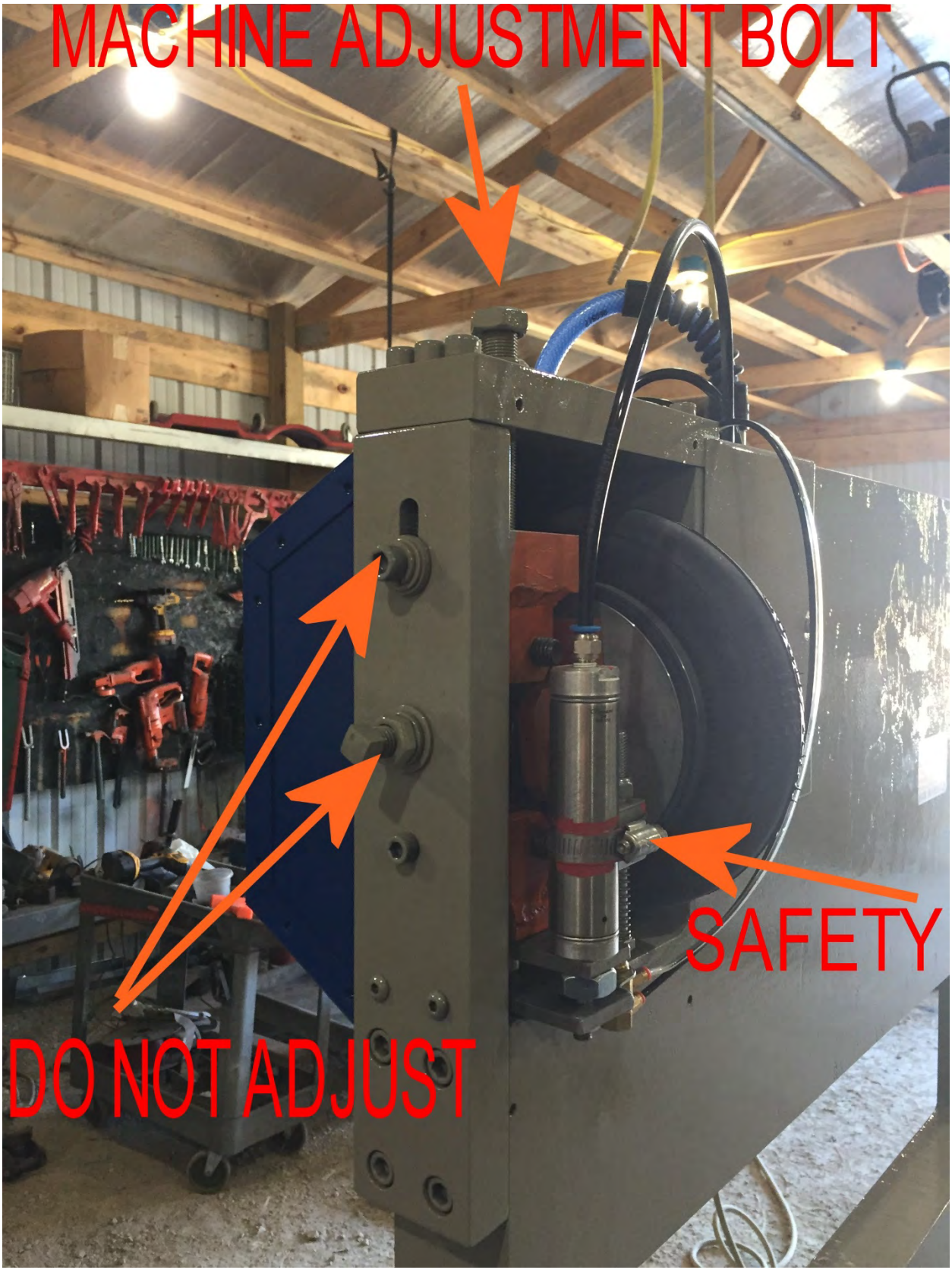
P.O. Box 186

St. Peters, Mo. 63376

Bus. (636)947-1513

Fax. (636)723-0648


DO NOT REMOVE STRIPPER


MACHINE ADJUSTMENT BOLT
SAFETY
DO NOT ADJUST

WARRANTY FOR AIR-CAM CLINCHING MACHINES.

Mid-Rivers .Air-Cam Clinching Machines are carefully designed, fabricated, inspected and tested before shipment.

We make every effort to assure that our products meet high quality and durability standards, and warrants to the original purchaser that this product is free from defects in materials and workmanship for the period of 3 years from the date of shipment to the original purchaser. This warranty does not apply to equipment that has been subject to abuse, misapplication, negligence or accidents; lack of maintenance, alteration or failure to follow Mid-Rivers Air- Cam Machinery, Inc. Instructions. This warranty does not apply to consumables (BTM Tooling).

To take advantage of this warranty the product or part must be returned to us with transportation charges Prepaid. At Mid-Rivers Air-Cam Machinery, Inc. option, machines may be repaired at the customers plant. Proof of Purchase date and an explanation of the complaint must accompany the merchandise. If our inspection verifies the defect, we will either repair or replace the product at our election. We will return the product at our expense, but if we determine there is no defect, or that the defect resulted from causes not within the scope of our warranty, then you must bear the cost of returning the product.

All repairs made after the 3 year warranty period are guaranteed for a period of three months from the date of repair, on the repaired parts only, and if the repairs are made by one of our service technicians.

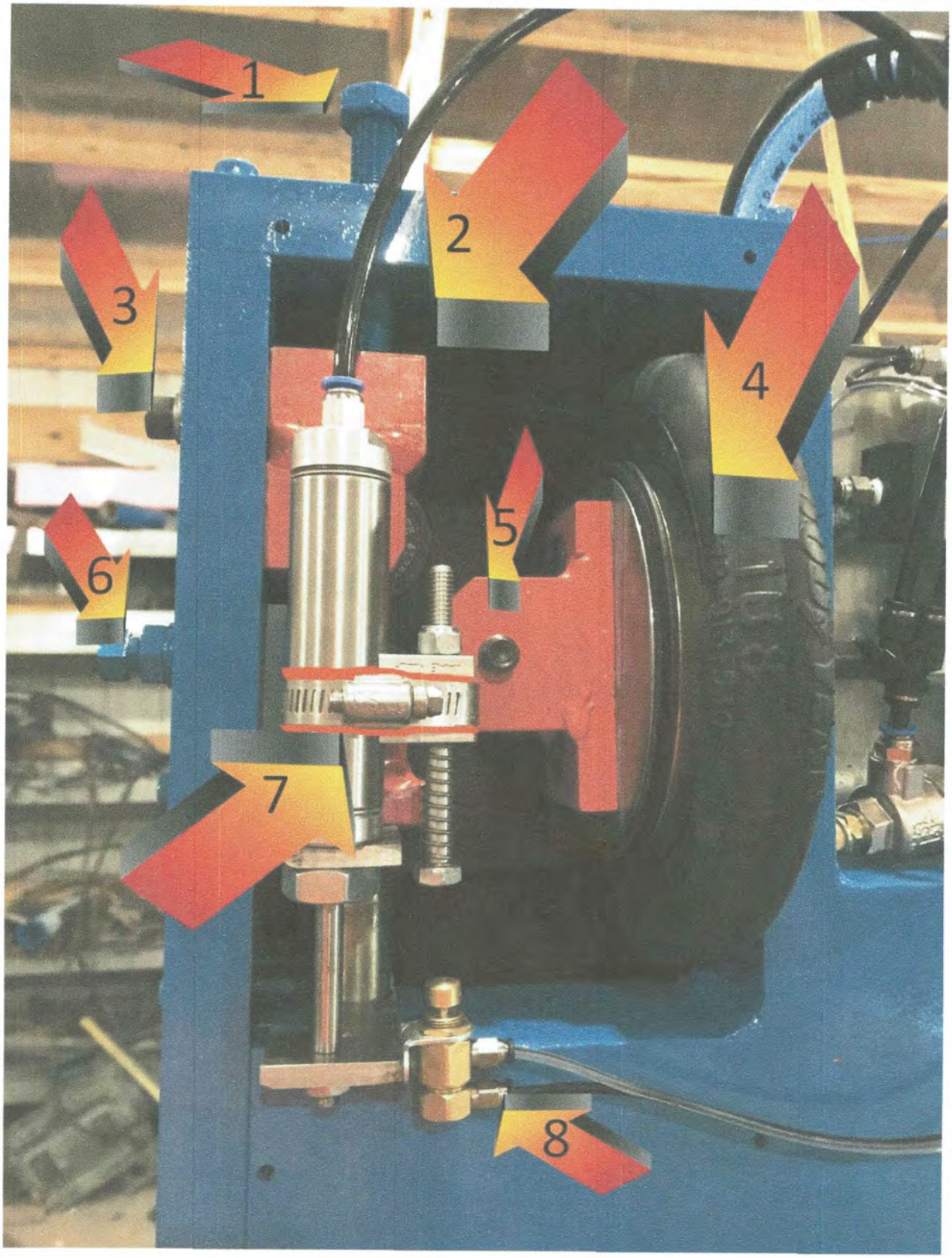
MID-RIVERS AIR-CAM MACHINERY, INC. Shall in no event be liable for consequential damages or injury to persons or property arising from the use of our product or for the cost of any repairs or work done without written approval.

No other warranties or representations, express or implied, made by either the dealer, distributor or manufacturer or their representatives shall be valid. This warranty supersedes any previously issued.

TROUBLE SHOOTING & PARTS DIAGRAMS

MIDRIVERSMACHINERY.COM

MIDRIVERSMACHINERY@OUTLOOK.COM


1
2
3
4
5
6
7
8

1. 15/16 adjustment bolt. This is the only bolt that should be adjusted to dial in the lock. A small adjustment goes a long way, over adjusting this bolt can result in tooling breakage

2. Upper Cam block

3. Upper Cam block retainment bolt

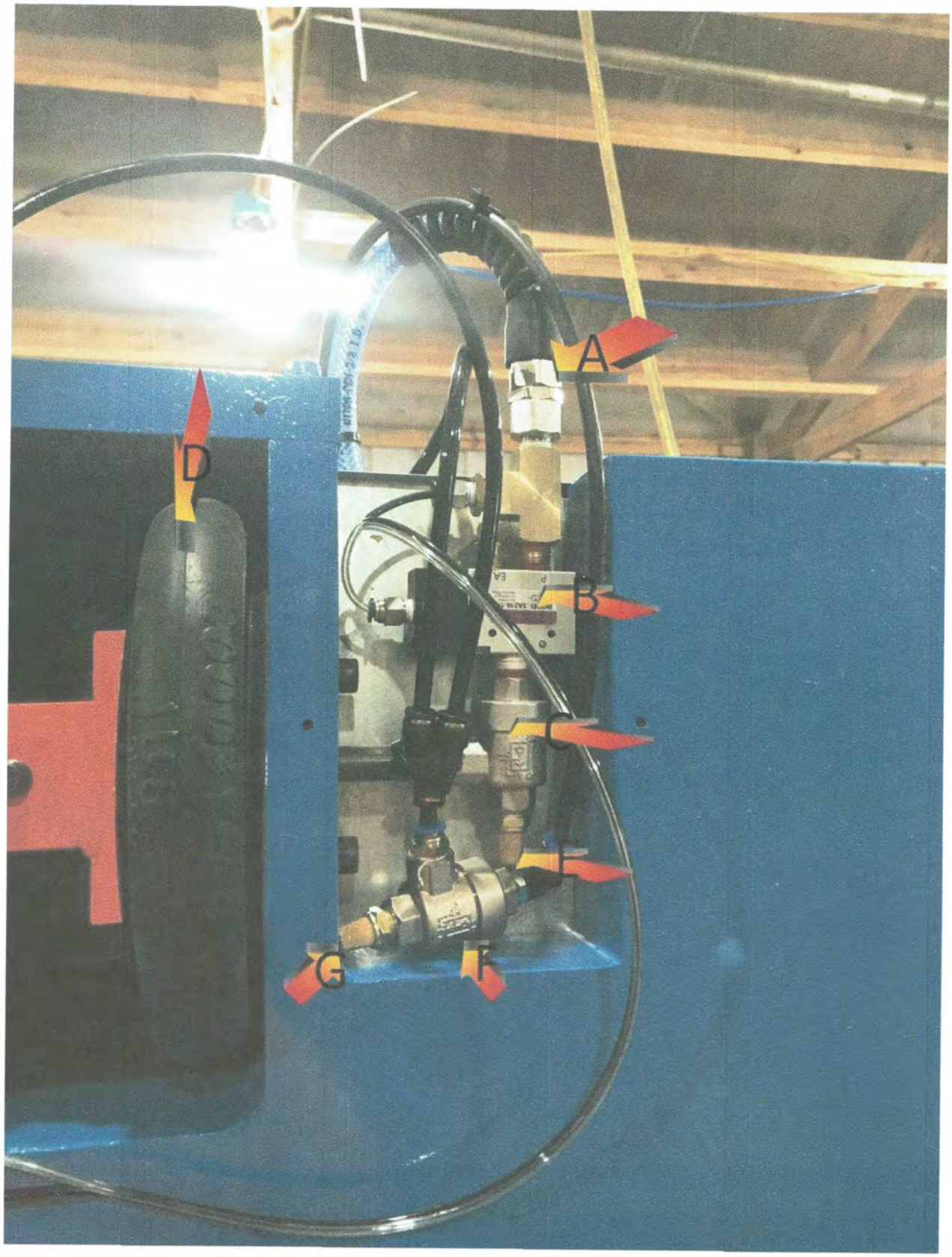
4. Air bag

5. Center Cam block

6. Center Cam stop adjustment bolt – DO NOT ADJUST THIS BOLT, TOOLING DAMAGE CAN OCCUR FROM IMPROPER ADJUSTMENT OF THIS STOP

7. Safety cyl showing clamp. Your machine has been labeled from the factory with a red paint pen showing where the safety cyl clamp was set. Behind the safety is the lower cam block .

8. Safety valve the clear line will always be on top, then black line will always be on bottom


A
B
C
D
F
G
R

A. Air input hose

B. Safety master valve

C. Quick release valve for air bag.

D. Air bag

E. Muffler for air bag quick release , if your machine is ever slow to let the air out of the air bag, remove this muffler and clean or replace

F. Quick release for safety system

G. Muffler for quick release for safety system

USPTO Patent Full-Text and Image Database

United States Patent **7,114,436**
Mueller **October 3, 2006**

Safety interlock and retraction mechanism for clinching, crimping, and punching presses

Abstract

A safety interlock and retraction mechanism for all types of presses comprising a sensing or activating valve which does not apply full force to a press ram until the ram displaces to the expected work material thickness and a pneumatically operated retraction mechanism which eliminates the need for a return spring. The art differentiates between the thickness of an operator's finger relative to a work material thickness in order to promote safety. The art further provides an increased press ram force by eliminating the return spring force subtracting from the ram force.

Inventors: **Mueller; Thomas L.** (St. Louis, MO)
Appl. No.: **11/128,599**
Filed: **May 13, 2005**

Related U.S. Patent Documents

Application Number	Filing Date	Patent Number	Issue Date
60570764	May., 2004		

Current U.S. Class: 100/347 ; 100/269.02; 100/269.14; 100/341; 100/35; 192/130; 72/21.5; 72/3
Current International Class: F16P 3/00 (20060101); B21D 55/00 (20060101)
Field of Search: 100/35,269.01,270,269.02,269.14,269.15,341,342,347,269.16 72/1,3,4,21.2,21.4,21.5 29/708 192/130,134

References Cited [Referenced By]

U.S. Patent Documents

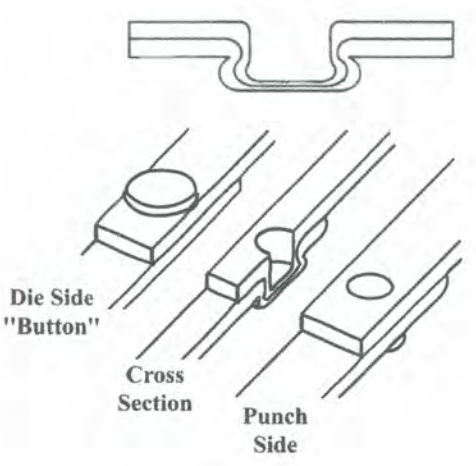
2222851 November 1940 MacMillin

BTM

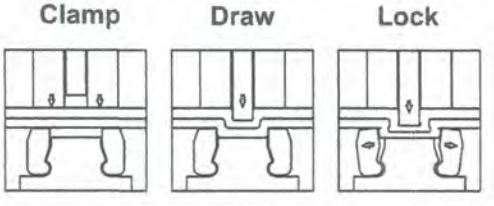
Joining Systems Description

BTM's Tog-L-Loc and Lance-N-Loc joining systems produce clean, strong and consistent joints in most coated or uncoated metals. The joints are characterized by a "button" formed on the die side layer of metal and a recess formed in the punch side layer. The button is a good indicator of joint quality and therefore, simplifies quality control. Two or more layers of metal typically ranging in thickness from .008" (0.2mm) to .157" (4.0mm) per sheet can be reliably joined in most cases.

Tog-L-Loc®

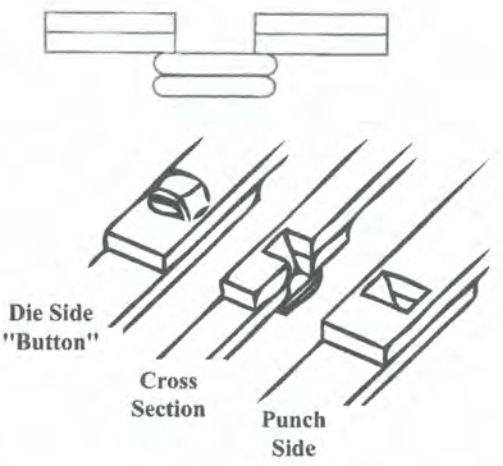


Tog-L-Loc is a circular, leakproof joint formed by drawing the metals into a circular "cup" and expanding the diameter to form a 360° lock below the bottom sheet.

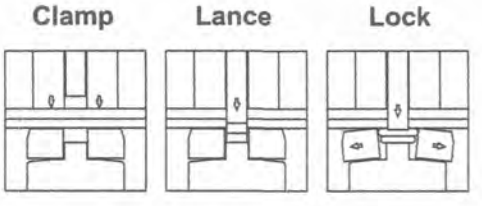


Tog-L-Loc is generally preferred due to its omnidirectional strength characteristics, excellent fatigue properties and exceptional tool life.

Lance-N-Loc®



Lance-N-Loc is a joint formed by lancing the metals on 2 sides, drawing them through the thickness and expanding the width to form a lock on 2 sides.



Lance-N-Loc is commonly used where metals are insufficiently ductile to join with Tog-L-Loc or in certain dissimilar combinations or multiple layers.

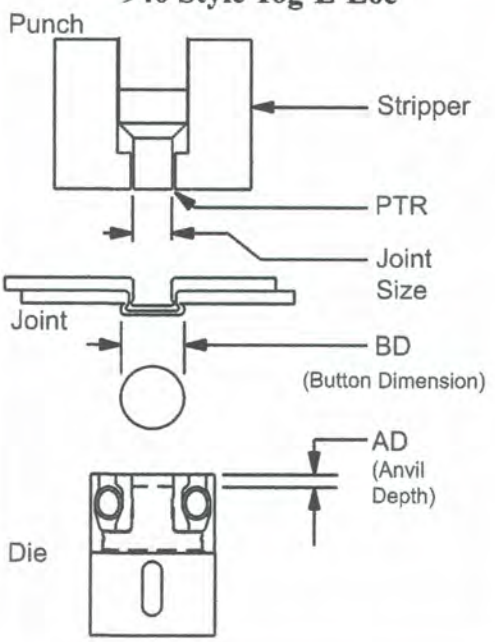
Joint Data

BTM sheet metal joining tools are furnished with joint data documentation expressed in the following terms.

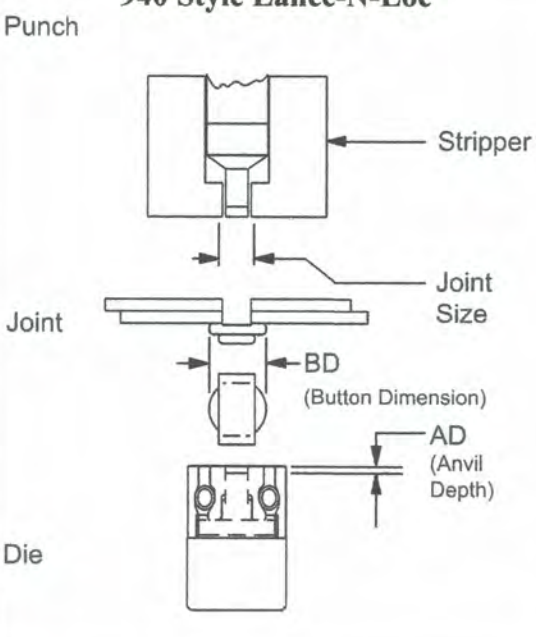
1. Joint Size: Expressed as the punch tip diameter (Tog-L-Loc) or width of the die anvil (Lance-N-Loc). For example, a .18" Tog-L-Loc has a punch tip diameter of .180" (4.6mm). Common sizes are: .12" (3.0mm), .18" (4.6mm) and .25" (6.4mm) with special sizes used on occasion.

2. PTR: (Punch Tip Radius): Tog-L-Loc only. Expressed as a decimal figure example: .010" (0.25mm). This dimension is determined at BTM to suit the application.

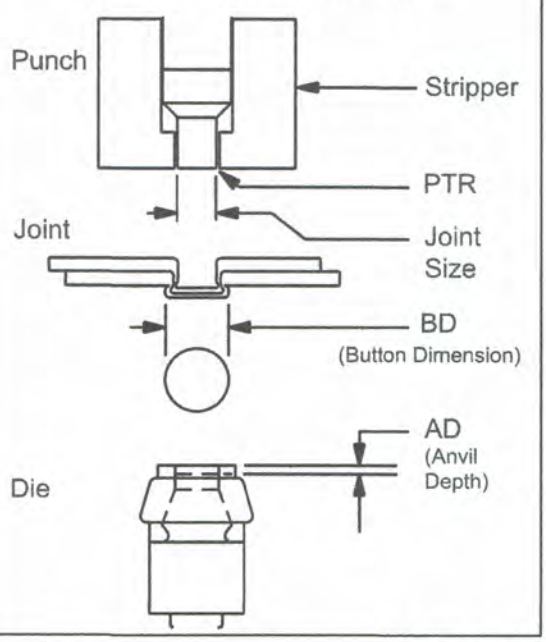
940 Style Tog-L-Loc



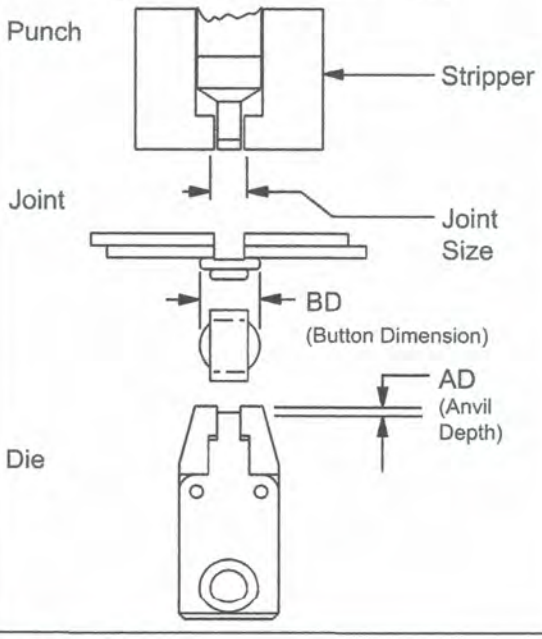
940 Style Lance-N-Loc



Elastomer Style Tog-L-Loc



Special Style Lance-N-Loc



Joint Data continued

3. **BD** (Button Dimension): Diameter or width of the formed joint "Button." BD is expressed as a decimal figure and given a tolerance. Example: .295" + .010" -.000" (7.49mm + .25mm -.000mm). This highly repeatable dimension is used for quality control and is directly linked to joint strength.

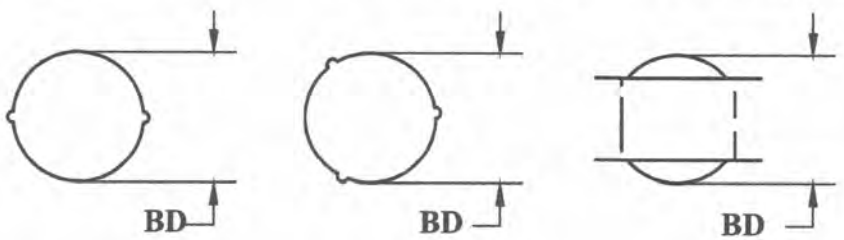
4. **AD** (Anvil Depth): Depth from the top of the die blades to the top of the die anvil. Expressed as a decimal figure Example: .035" (0.9mm). This dimension is determined at BTM to suit the application.

Measuring Button Dimension (BD)

2 Bladed Tog-L-Loc® Die
BD=Maximum obtainable measurement in direction of blades opening

3 Bladed Tog-L-Loc® Die
BD=Minimum obtainable measurement

2 Bladed Lance-N-Loc® Die
BD=Minimum obtainable measurement in direction of blades opening



Joint quality (strength) is monitored by measurement of the button dimension (BD). Button dimension is controlled by adjusting punch penetration. Button dimensions specified by BTM are intended to give the optimum combination of joint strength and tool life. BD specification includes a tolerance to accomodate standard mill tolerances in the metals.

OTHER PERTINENT INFORMATION INCLUDES THE FOLLOWING:

1. BTM numbers of punch and die tooling for reference and re-ordering.
2. Metal type and thickness as specified by the customer, as well as orientation - (i.e. punch side/die side.)
3. Location of Tog-L-Loc tooling within machinery where applicable.

Joining Theory and Quality Control

In order to function reliably, a Tog-L-Loc or Lance-N-Loc system must conform to the following guidelines.

1. The parts to be joined must allow adequate access for the tooling and mate without gaps at the joint locations.
2. The metals to be joined must be sufficiently ductile, within the thickness capabilities of the system and the parts must conform to the tolerances the machine was designed around.
3. The machine must consistently produce sufficient force to form the joints.
4. The machine must contain the force without excessive flexing.
5. The stripper/clamp must apply sufficient force to contain the flow of metal within the die.
6. The tooling must be appropriate to the metals being joined, (i.e. Tog-L-Loc or Lance-N-Loc, joint size, AD and PTR.) Tools purchased for one metal type and thickness may not give the best results with a different metal.
7. The tooling must be adjusted & aligned to properly form the joints, and be secured to maintain these settings.
8. The machine and tooling must be maintained properly so that all components perform their intended function. For example, worn seals can reduce force output thereby affecting joining ability.

Maintaining Joint Quality

The Lance-N-Loc Punch must have sharp angled edges. (See page 3 of this document.)

Lance-N-Loc die blades must be sharp to maintain consistent joint quality.

Correct anvil depth in Tog-L-Loc and Lance-N-Loc dies is required to obtain a superior joint.

The force unit should be in proper operating condition. A unit in poor condition could influence joint quality.

Tooling must be free from dirt, paint chips or sludge that may develop after long use. Inspect tooling at weekly intervals to ensure punches and dies are clean.

Punch and die must be in proper alignment to form a good joint.

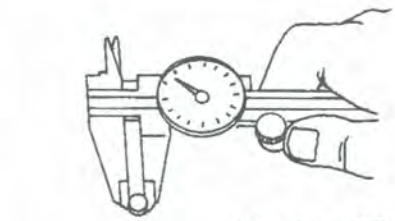
Inspect for weak, compressed or broken stripper springs and replace as necessary. BTM recommends changing springs every 100,000 cycles or when changing tooling.

Checking Button Dimension with Tolerance Gauge

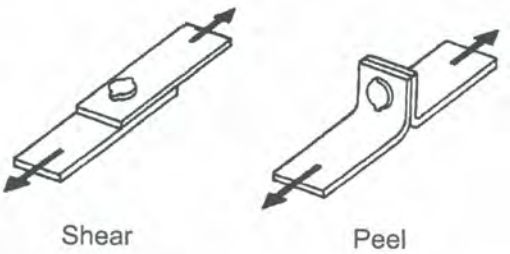
Joint quality (strength) is monitored by measurement of the button dimension (BD). Button dimension is controlled by adjusting punch penetration. As the shut height is adjusted down the button dimension increases. Backing off the shut height will decrease the button dimension.

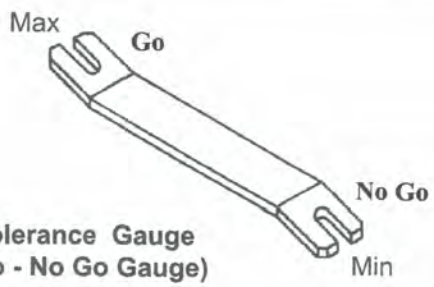
Button dimensions, as specified by BTM Corporation, are intended to give the optimum combination of joint strength and tool life. Increasing BD to exceed the recommended figure will increase peel strength without measurable effect on shear strength, but will reduce tool life. Reducing BD to less than the recommended figure will prolong tool life at the cost of reduced peel strength; again, shear strength is not greatly affected as long as a lock is achieved.

The joint button allows easy visual inspection. Broken, improperly adjusted or misaligned tools produce visually distorted buttons. Defective strippers and part nonconformity will also show up in visual inspection. Refer to "Trouble Shooting" pages 13-15 for specific information.



Checking BD with a caliper.

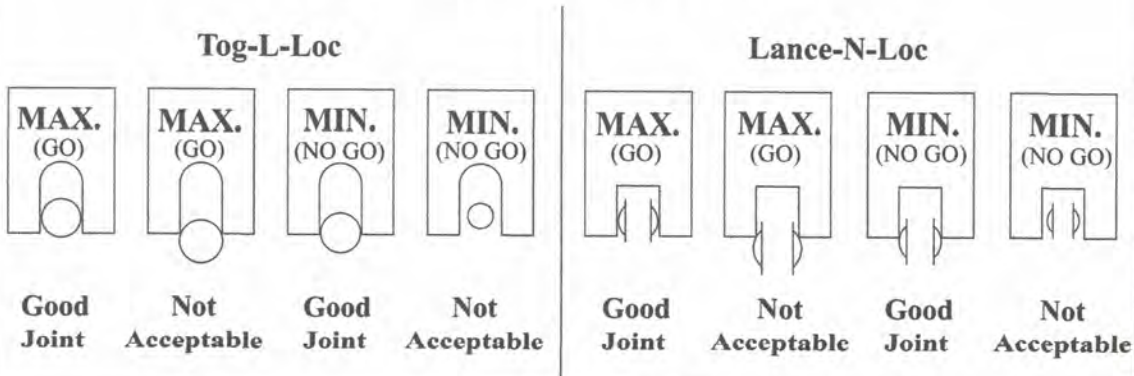




Tolerance Gauge (Go - No Go Gauge)

The tolerance gauge is a reliable and easy method of monitoring joint quality. These tools are made with a maximum and minimum gauge to allow for button growth resulting from standard mill tolerance within the metals being joined.

Monitoring Joint Quality With a Tolerance Gauge

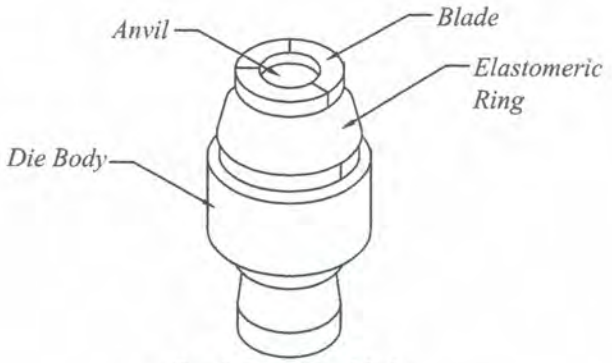


Changing the Die Blades

THREE BLADE TOG-L-LOC DIE ASSEMBLY:

1. Place the three blades on the anvil, surrounding the top.

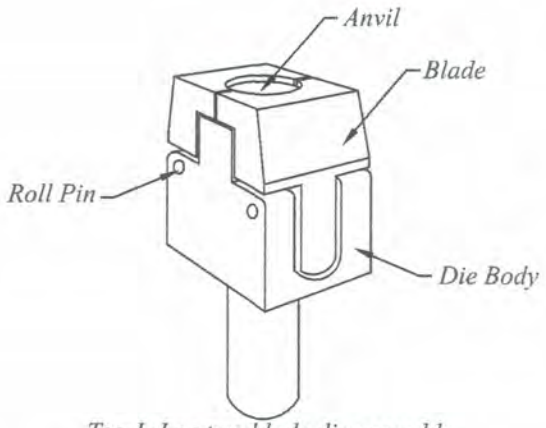
2. Slide the elastomeric ring over the top of the blades and into its groove.



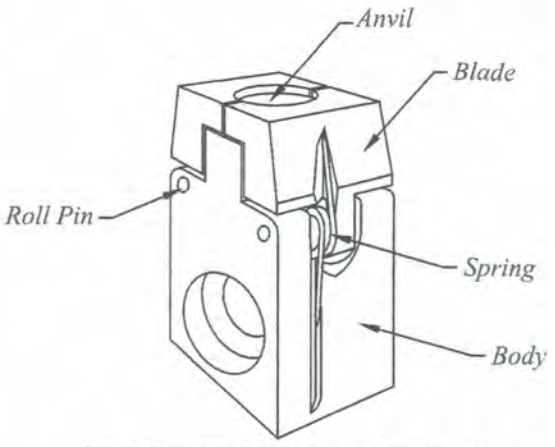
Tog-L-Loc three blade die assembly with elastomeric ring.

TWO BLADE TOG-L-LOC DIE ASSEMBLY:

1. Drive the roll pins out of the die body with a punch & hammer.
2. Remove the springs and die blades.
3. Replace with new die blades (and springs if necessary).
4. Replace new roll pins in die body.



Tog-L-Loc two blade die assembly with internal spring.



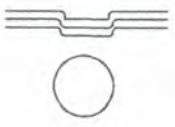
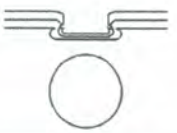
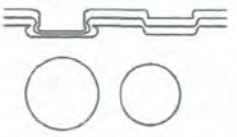
Tog-L-Loc two blade die assembly with external springs.

Tog-L-Loc Trouble Shooting

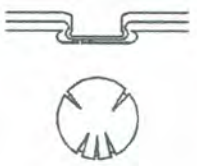
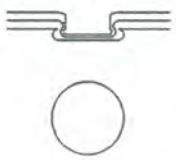
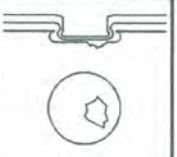
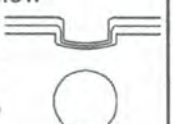
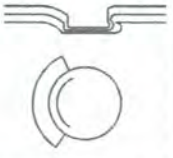


The symbol at left represents a properly formed TOG-L-LOC joint, viewed from the "button" (die) side and in section. BTM TOG-L-LOC tools can commonly produce in excess of 200,000 good joints. Problems can, however, occur. The illustrations below represent possible problem variations of the joint.

Problems, causes and their corrective actions are given in the order in which they should be checked.

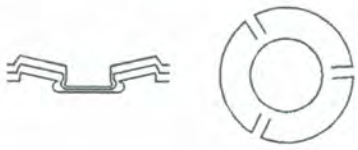
Problem	Probable Cause	Corrective Action
I. Total Failure of Joint (See also III. Deformed or Distorted Joints)		
A. No Button Formed	1. Broken Punch or Die	-Replace Tool
	2. Loss of Operating Pressure	-Restore Pressure
	3. Insufficient Force	-Check Force
B. Button Partially Formed No "Squeeze" 	1. Metals Not of Specified Thickness	-Use Specified Metals or Change to AppropriateTooling
	2. Die Elastomer or Die Spring Broken	-Replace Elastomer or Spring
	3. Pressure Drop	-Restore Pressure
	4. Incorrect Tooling for Metals	-Verify Joint Data / Change Tooling if Necessary
	5. Incorrect Shut Height / Tool Adjustment	-Adjust Shut Height for Correct BD *Refer to Maintenance Section (pg. 7)
C. Piercing or cracking of Punch Side Sheet Metal 	1. Metals Not of Specified Thickness	-Use Specified Metals or Change to appropriate Tooling
	2. Incorrect Tooling for Metals	-Verify Joint Data / Change Tooling if Necessary
	3. Weak or Broken Stripper Springs	-Replace Spring(s)
	4. Punch and Die Not Concentric	-Realign Tooling
II. Intermittent Failure		
A. Same Tooling Produces Intermittently Good and Bad Parts 	1. Insufficient Stripper Force to Compensate for Part Variation or Non-Mating Parts.	-Correct Parts to Conform. Increase Stripper Force
	2. Parts Do Not Fit Gauging / Nesting	-Correct Parts or Gauging to Fit
	3. Parts Interfere with Tooling Operation	-Correct Parts or Gauging to Allow Clearance

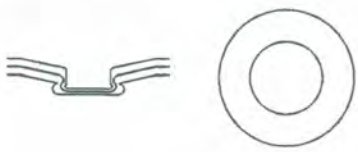
(Continued)

Problem	Probable Cause	Corrective Action
III. Deformed or Distorted Joints		
A. Cracks Appear on Button 	**1.** Metals Not of Specified Thickness or Hardness	-Use Specified Metals or Change to Appropriate Tooling
	2. BD Too Large, Tooling Over Adjusted	-Back Off Shut Height Adjustment.
	3. Incorrect Tooling for Metals	-Verify Joint Data / Change Tooling if Necessary
	4. Punch and Die Not Concentric	-Realign Tooling
	5. Excessive Deflection	- Check for Damage
B. Cracks Appear Inside Joint Cup 	**1.** Metals Not of Specified Thickness or Hardness	-Use Specified Metals or Change to appropriateTooling
	2. Tooling Incorrect For Metals	-Verify Joint Data / Change Tooling if Necessary
	3. Punch and die Not Concentric	-Realign Tooling
	4. Weak or Broken Stripper Spring(s)	-Replace Spring(s)
C. Lump or Irregularity on Button. 	**1.** Chipped Tool	-Replace Tool
D. Concentric Double Button 	**1.** Missing or Non-Functional Stripper	-Replace or Repair Stripper
	2. Double Hit	-Check Controls / Operator
E. No Backflow of Button- Round Top "Squeezed"  See also Item B pg. 8	**1.** Broken or Weak Stripper Springs	-Replace Springs
F. Partial Back Flow of Button 	**1.** Die Blade Missing or Opened Before Joining	-Replace Blade if Missing, or Check for Intererence Causing Blade to Open upon Part Loading.
	2. Deflection in Force Frame or Tool Holder	-Check for Damage
G. Dimpling and Unformed Button 	**1.** Die Blades Missing	-Replace Blades
	2. Elastomer or Die Spring Broken (Blades Open)	-Replace Elastomer or Spring

(Continued)

Trouble Shooting

Problem	Probable Cause	Corrective Action
H. Button Restricted Asymmetrically 	**1.** Blade is Not Opening	-Check for Interference
	2. Deflection is Binding Blades	-Check for Damage -Check Blade Guarding
I. Witnessing (Scarring) 	**1.** If Heavy: Stripper Spring is Bottoming - Insufficient Spring Travel	-Replace With Correct Stripper
	2. If Light: Dies are not Protected Adequately	-Add Blade Shielding
J. Button is Out of Round 	**1.** Flexing of Force Frame	-Check For Damage
	2. Punch and Die are not Concentric	-Realign Tooling
K. Button Restricted Symmetrically 	**1.** Metal is Thick for Joint Size or Metal is Soft	-Generally not Detrimental to Joint Strength

Problem	Probable Cause	Corrective Action
IV. Distortion of Parts		
A. Parts are Distorted During Joining 	**1.** Insufficient Stripper Force	-Replace Stripper Springs to Suit
	2. Stripper Tip too Small	-Replace with Large Diameter Tip
	3. Die Not Protected	-Add Blade Shield
	4. Die Blades Below Shield	-Adjust Shield Height
	5. Misgauging / Nesting	-Adjust or Replace Gauging / Nesting to Suit
	6. Incorrect Equalization of units on part	-Adjust Equalization Stop