THE UNITED STATES ARMY MARKSMANSHIP TRAINING UNIT

USAMTU
ACCURIZED NATIONAL MATCH
CAL. 45 PISTOL & CAL. 38 SPECIAL
WADCUTTER PISTOL

FOREWORD

The United States Army Marksmanship Training Unit receives many requests for technical information in regard to accurizing the .45 Caliber and .38 Caliber Colt Semi-Automatic Pistols. These inquiries come from individual pistol accuracy specialists and organizations both within and without the military services. In this publication the USAMTU offers a brief coverage of the procedures to be followed in order to improve upon the accuracy of these weapons.

Suggestions and constructive criticisms are invited. Please address your correspondence to: Commanding Officer, United States Army Marksmanship Training Unit, Fort Benning, Georgia 31905

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ROBERT M. PIPER
Colonel, Infantry
Commanding

THE UNITED STATES ARMY MARKSMANSHIP TRAINING UNIT
STANDARDS AND PROCEDURES
FOR
REBUILD OF PISTOL CAL .45 M1911A1 TO MEET
USAMTU SPECIFICATIONS

1. Coverage:

The requirements for accuracy and reliability of a pistol used at the USAMTU level is much more refined than those used by the average soldier. The following rebuild specifications, testing procedures and grouping characteristics must be demanded for each pistol.

2. Requirements:

The procedures or characteristics specified here are in addition to those of Army weapons command for the National Match Pistol and supercede them when requirements are more specific or exacting.

3. Testing:

The pistol will be set up and held in a recoiling type test cradle or machine rest such as the Heg Rest or equivalent.

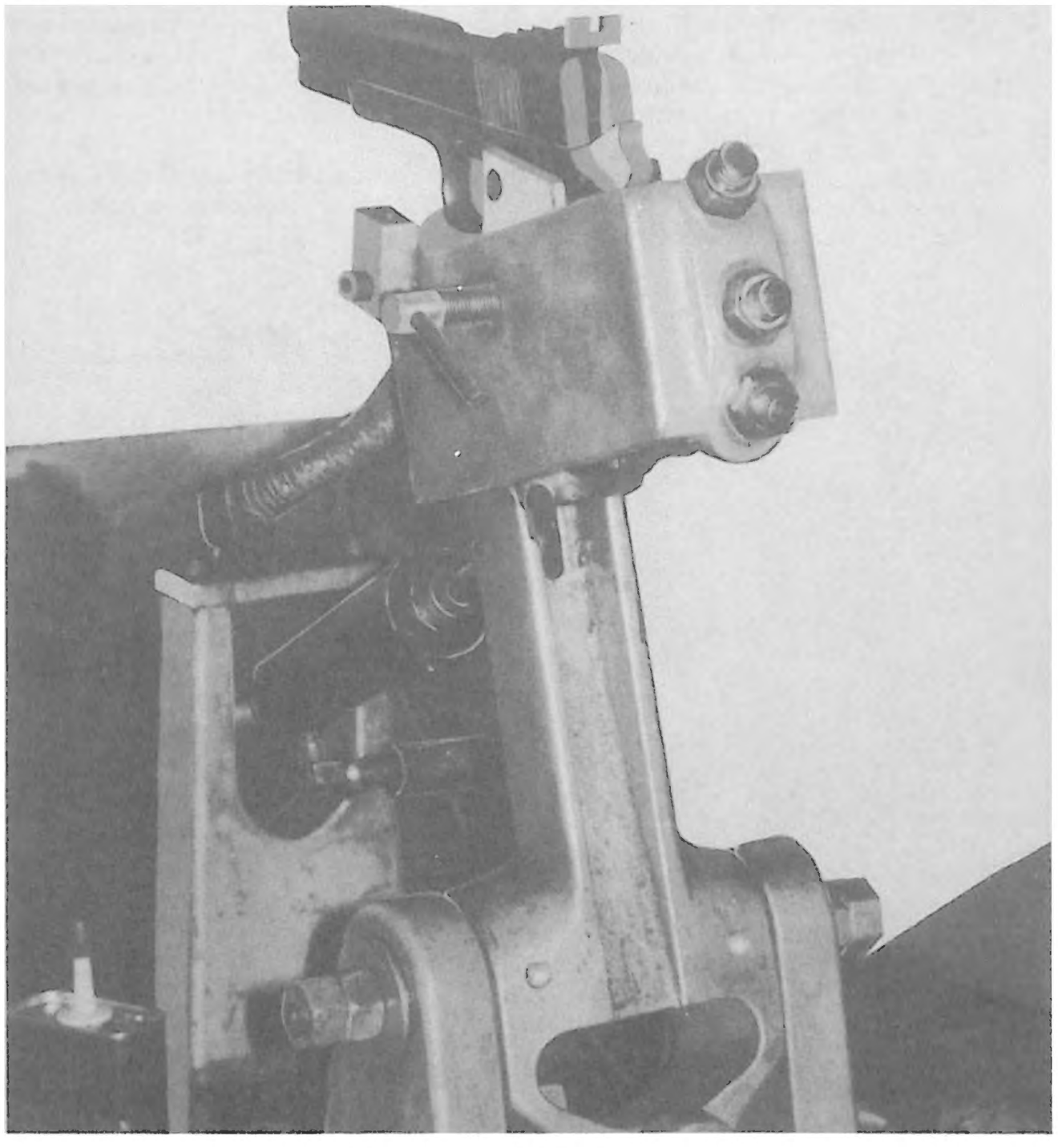

Figure 1. Heg Rest.

Test ammunition shall be Caliber .45 Match Hard Ball or Wadcutter as appropriate. Average extreme spread for three consecutive groups of ten rounds each not to exceed 2.5" with no group larger than 3" for wadcutter pistols, and 3" average for hard ball but no group will exceed 3.5"

4. Fitting the Slide to Receiver: Select a slide which fits as close as possible on the receiver, having a minimum of horizontal or vertical movement on the receiver. Relieve the outer edges of the rails on receiver to remove all phosphate finish from bearing surfaces. The slide is now ready for its initial fit to the receiver.

Place slide (with muzzle end upright) into smooth jawed vise approximately 3" from muzzle end. Gently squeeze in steps of 1" at a time, for the complete length of the slide.

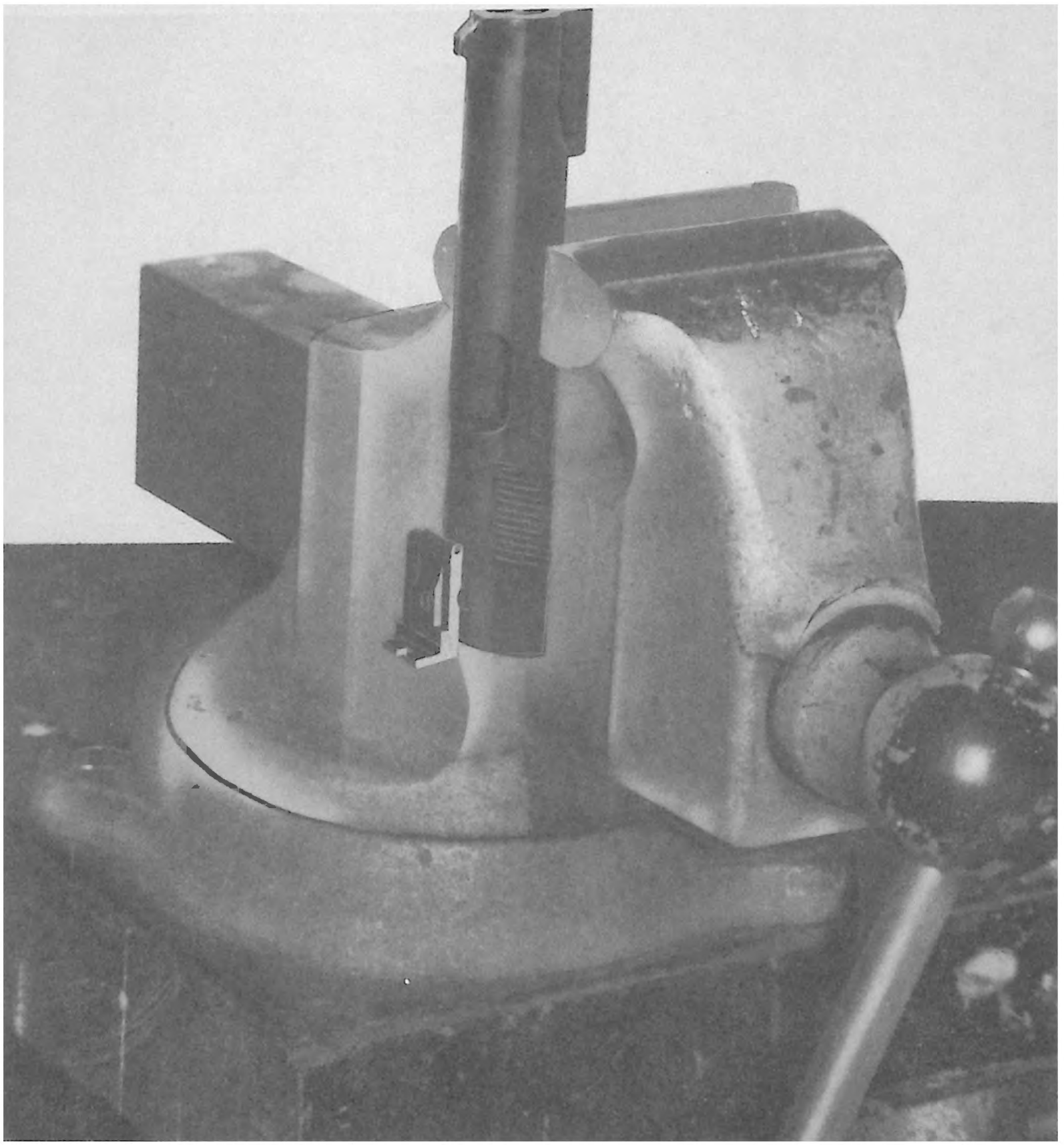

Figure 2. Heavy Duty Vise and Slide.

Take extreme care not to squeeze excessively. Desired fit at this stage is a snug fit, yet slide should be capable of being moved on the receiver by hand (NOTE:) slide may be squeezed much harder at rear without crushing. After this squeezing process apply lapping compound to both sides of the slide (GK-7A). Slip on to receiver which is held with the vise. Work back and forth until slide moves freely without binding on receiver rails. Wash out the compound with solvent, replace the slide on receiver, and check for movement by placing slide in firing position. Grasp muzzle end of slide in one hand and receiver in the other, move each part in opposite directions and check for movement. If any movement is detected, repeat the above steps as necessary until the slide moves freely on the receiver with no perceptable horizontal movement. After all horizontal play is removed, the slide is then ready for vertical fitting. With the slide in firing or battery position, grasp muzzle end of slide and determine the amount of vertical movement. Remove slide and insert parallel bar selected for swaging the receiver rails, normally a bar .1170 thick is a good one to start with. A set of 10 bars needed graduating from .1100" to .1200" thickness 5" long 3/4" wide.

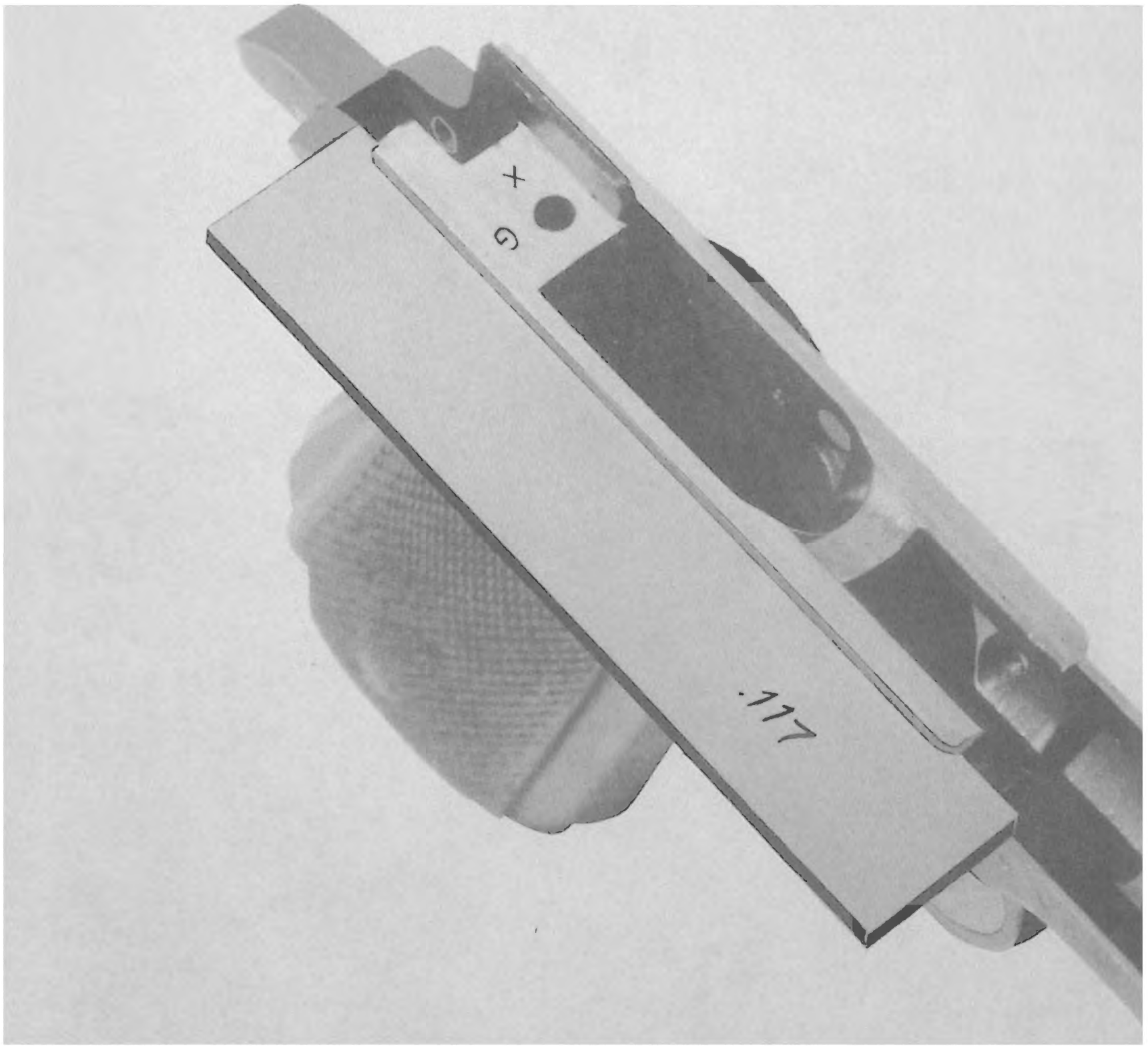

Figure 3. Receiver and Parallel Bar.

Using a 1/4-lb ball peen hammer, swage the receiver rails, holding the bar snugly and straight against the channel surface of rails on receiver. Recommended technique for swaging is to use a highly polished hammer which has had the edges of head broken slightly and to employ an overlapping stroke with the hammer face being held as nearly parallel as possible. Rails must be swaged as smoothly and even as possible. With both rails indicating an even fit on the parallel bar, again relieve the edges of the rails to remove the high spots. Apply GK-7 Compound for lapping. After lapping, recheck for vertical movement. If movement still exists repeat the swaging with next smaller parallel bar. Continue the swaging process until no perceptable movement is noted vertically. Lap the slide and receiver until the slide will move of its own weight when the receiver is tilted and no loose play is noted either horizontally or vertically. Polish all work surface to remove hammer strike marks or file marks and other blemishes.

NOTE: At this point check the fit most carefully as this fit is the foundation of the entire operation. Repeat any above steps if a perfect fit is not achieved.

5. Fitting Barrel and Barrel Bushing:

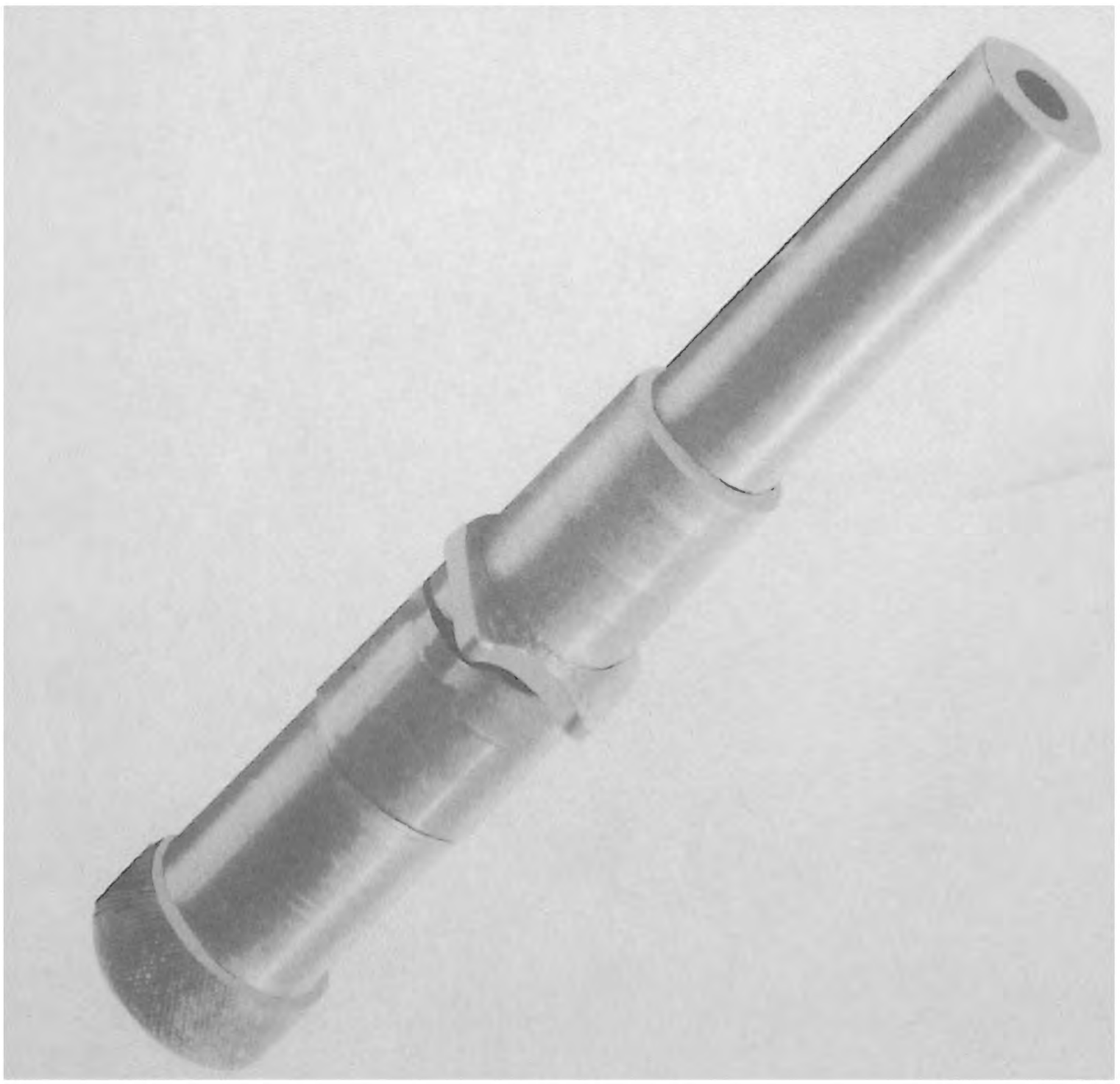

Figure 4. Arbor For Turning Bushing.

Place oversize bushing on arbor as shown in above illustration set up on lathe between centers and turn to achieve good press fit. Nominal diameter of outside bushing is .7020. While turning the bushing be careful not to deform the retaining lug. Measure barrel diameter at muzzle end. With a precision reamer in the lathe, ream inside of bushing to the exact size of muzzle end of barrel which should be .5790. With a hi-speed hand grinder, grind a slight radius in bushing to allow the barrel to swivel slightly, permitting it to enter locking lugs in slide without binding. Take extreme care when grinding the inside radius not to remove metal from center of bushing as this is an important fit and must be precision ground. Barrel must slide back and forth in bushing without any horizontal or vertical play. The bushing should be a press fit and should require the use of a bushing wrench to remove from slide. Lay the fitted bushing aside and use regular factory bushing for the fitting of new barrel. The factory bushing should be a relatively close fit but loose enough to be easily removed as it will be necessary to remove it frequently for checking the fit of barrel to the slide. Insert new oversize barrel into the slide, moving it as far to the rear as possible. Observe quantity and area of steel to be removed from barrel tang to achieve desired fit of the barrel hood and lugs into battery position of slide.

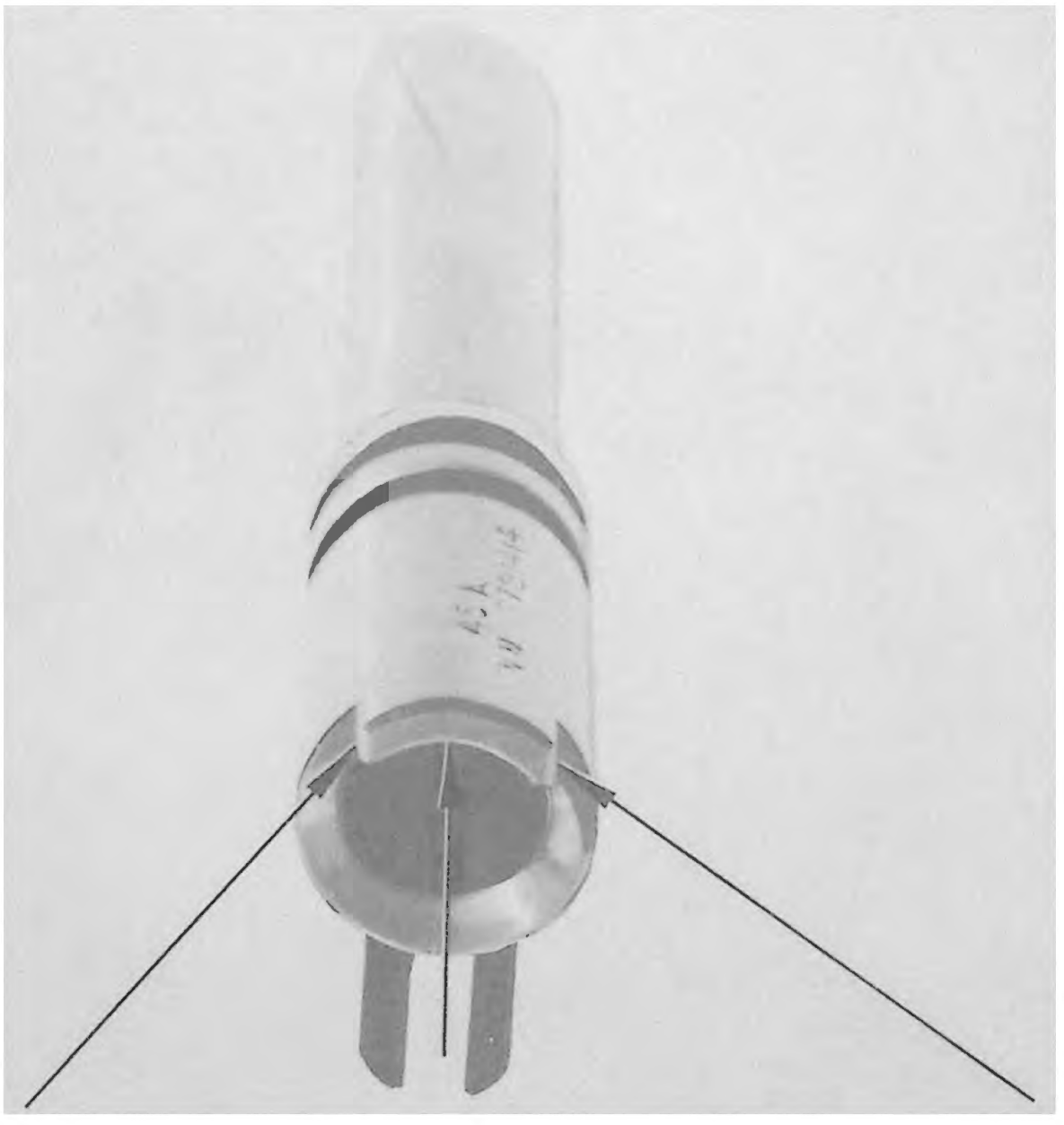

Figure 5. Oversize Barrel.

CAUTION: The tang must be cut in a manner to maintain original 90° angles to match the slide locking recess. This is to insure that the barrel tang will enter the locking recess of the slide without binding the tang or locking lugs, as the barrel locks up into firing position. When the tang is fitted to recess in slide start to remove metal from flat surface of tang to fit hood and lugs into the slide. Care is taken not to remove too much metal. This fit should be tight as possible to assure a good fit when the slide and barrel is in firing position. A layout die is recommended to fit the tang squarely to the slide. After fit has been made use alignment gage 8" X .4375" with a 3/32" X 1/2" tip inserted with small tip to rear of slide to check alignment of barrel with firing pin. If the barrel is perfectly aligned. The small end of tip will enter the firing pin aperture center and assure a center strike of firing pin on the cartridge primer. If barrel locks in slide too high for gage to enter the firing pin aperture it is necessary to weld an appropriate thickness of metal into the slide above the barrel in order to achieve the proper alignment of firing pin and barrel.

With new barrel and bushing fit into slide, place slide with barrel, on receiver making certain that the locking lugs on the bottom of barrel fits into recess of receiver without binding either side. If there is rubbing on either side, necessary adjustments will be necessary to assure a loose fit in recess. At this point there must be a snug fit in the barrel tang and hood; also a snug fit of bushing to the barrel and slide.

Using the locally manufactured lug cutter shown below or such other device as may be available cut the locking lugs.

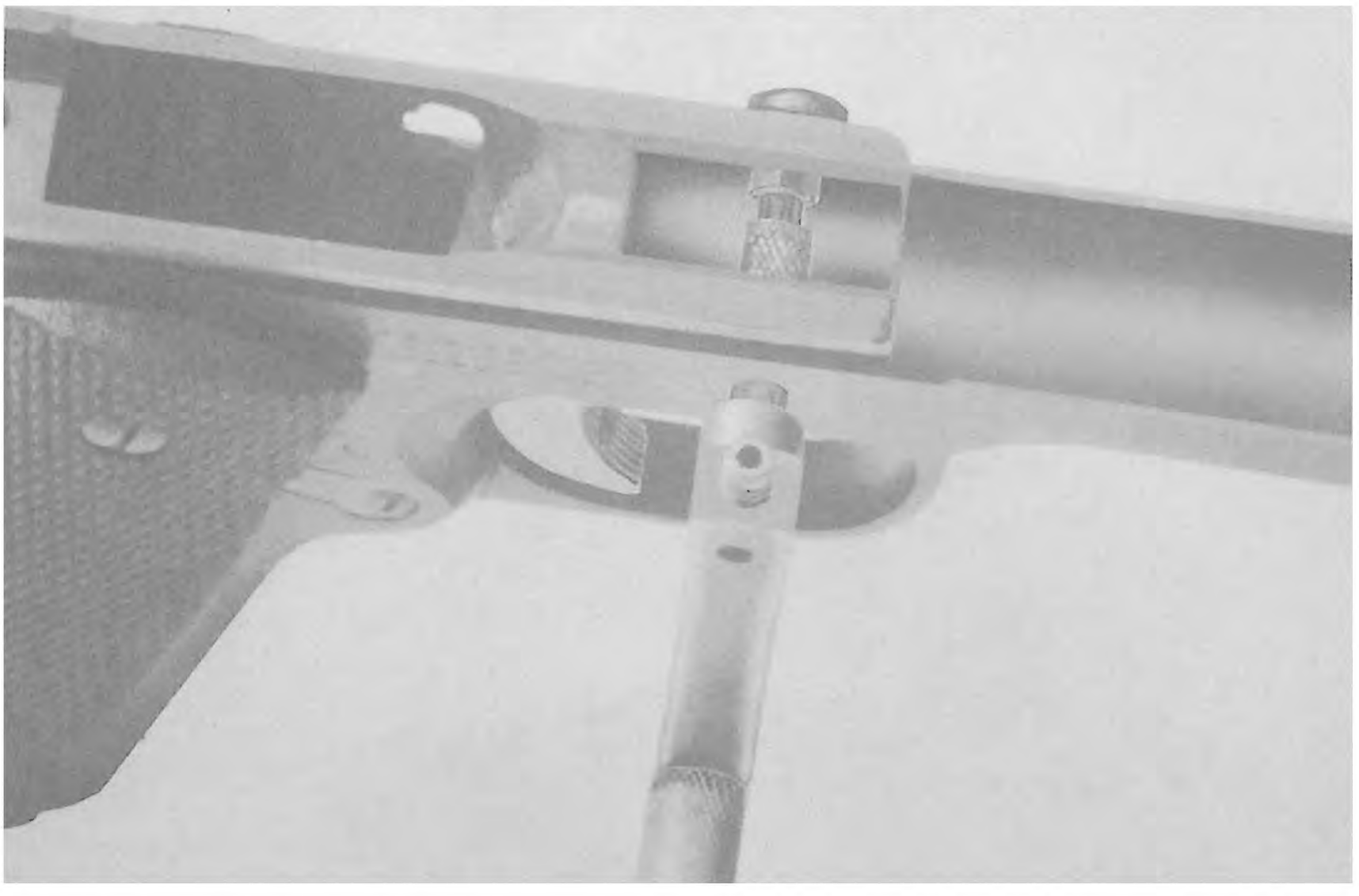

Figure 6a. Lug Cutter in Receiver.

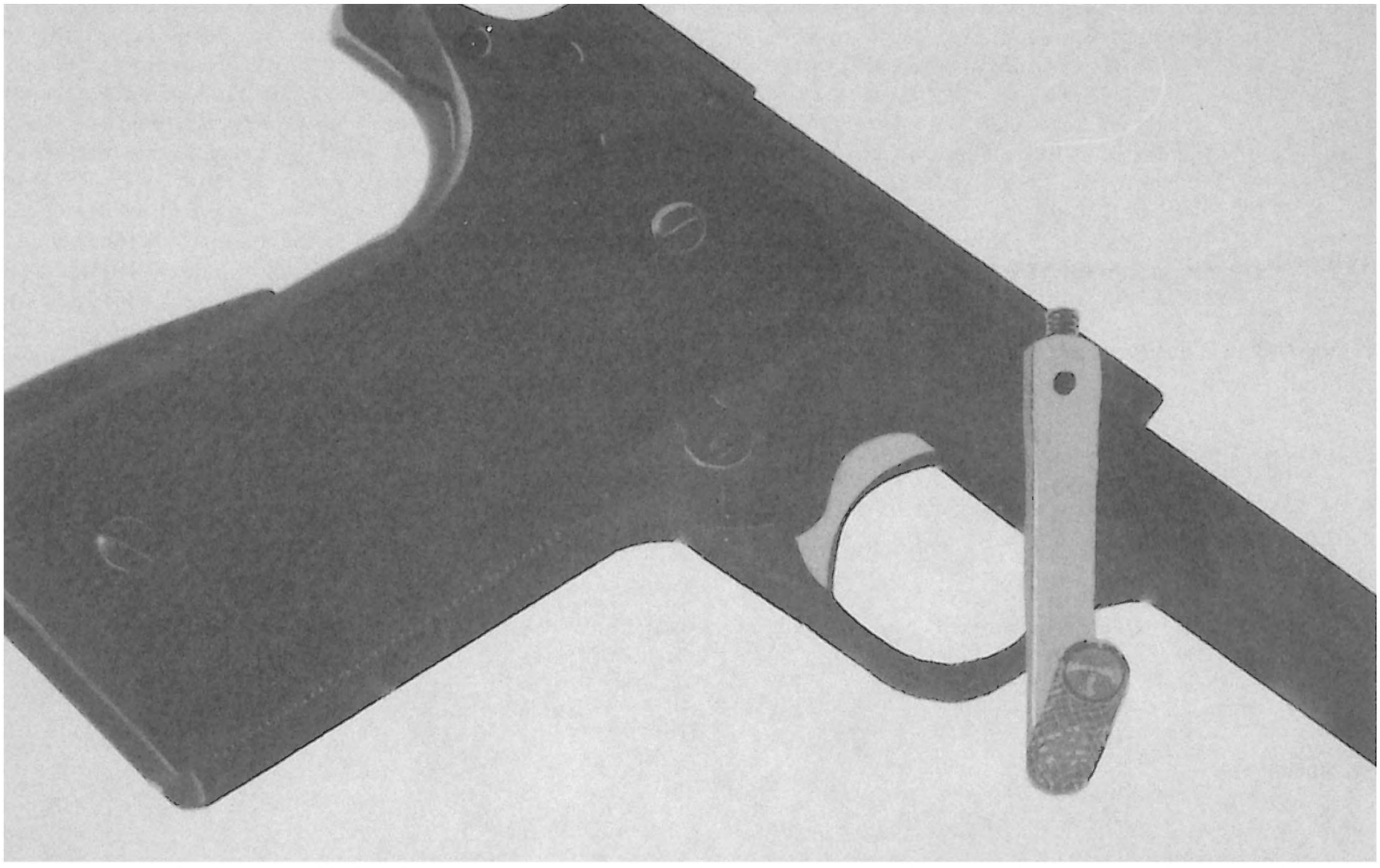

Figure 6b. Lug Cutter in Receiver.

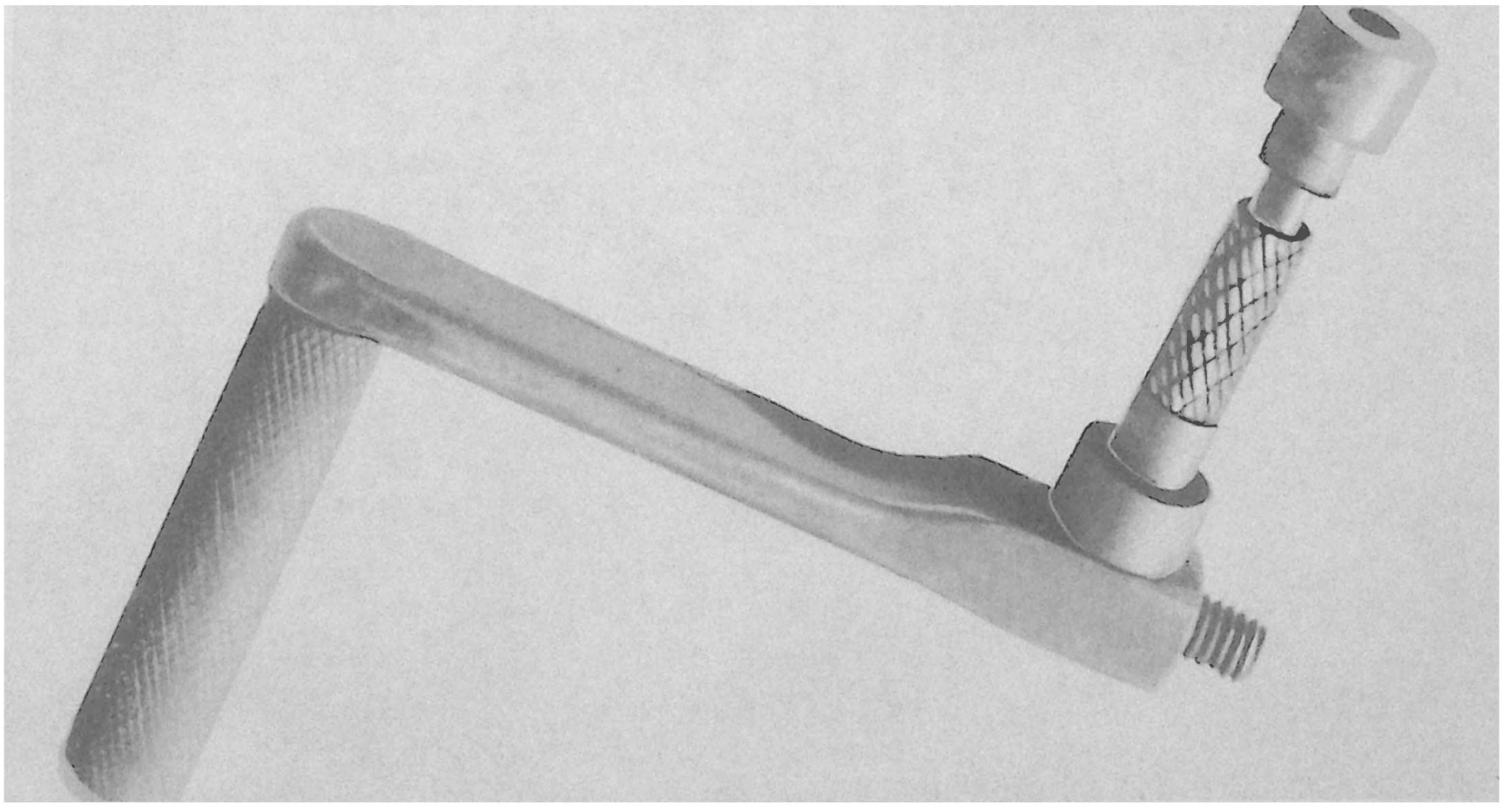

Figure 7. Lug Cutter.

Regardless of the method used, the principle is the same. The lugs must ride smoothly onto the slide stop pin, with slide stop pin holding the barrel snugly against the top of slide when the barrel and slide is in firing position. After a tight fit has been accomplished, polish the locking lugs with a high speed hand grinder and suitable rubberized abrasive tips. Take extreme care during polishing not to polish more on one side than the other; lugs are to be kept perfectly level. Frequent checks should be made using lay out dye on the lugs to assure perfect fit on the slide stop pin. Continue polishing until lock up is smooth but snug and resting equally on both sides of lugs. At this point if the barrel hood and tang is too tight remove a light cut from the tang to allow smooth lock up. It is good practice to use lapping compound to get a perfect fit. After this fit is obtained check the feed ramp on barrel to be certain that the feed ramp on the barrel is forward of the feed ramp on the receiver approximately 1/32". This will assure that the nose of the cartridge does not hang up as the pistol loads. Keep the angle on the barrel feed ramp the same as the ramp on receiver (approximately 33°). The barrel feed ramp includes approximately 1/2 the lower diameter of barrel ground on lower half of chamber end. The feed ramp on barrel must not over hang the ramp on receiver; however, it may set forward of the receiver ramp as much as 3/32". The two feed ramps may be checked by locking the slide to rear.

Fitting the Trigger: There are two types of triggers used in the N.M. .45 Cal and the .38 Cal Automatic Pistols, the Colt Steel and the N.M. Aluminum. Each come in two different lengths, long and short. The Aluminum long trigger is slightly shorter than the long Colt trigger. The first step to fitting the trigger, after length has been selected, using the Gig below is as follows:

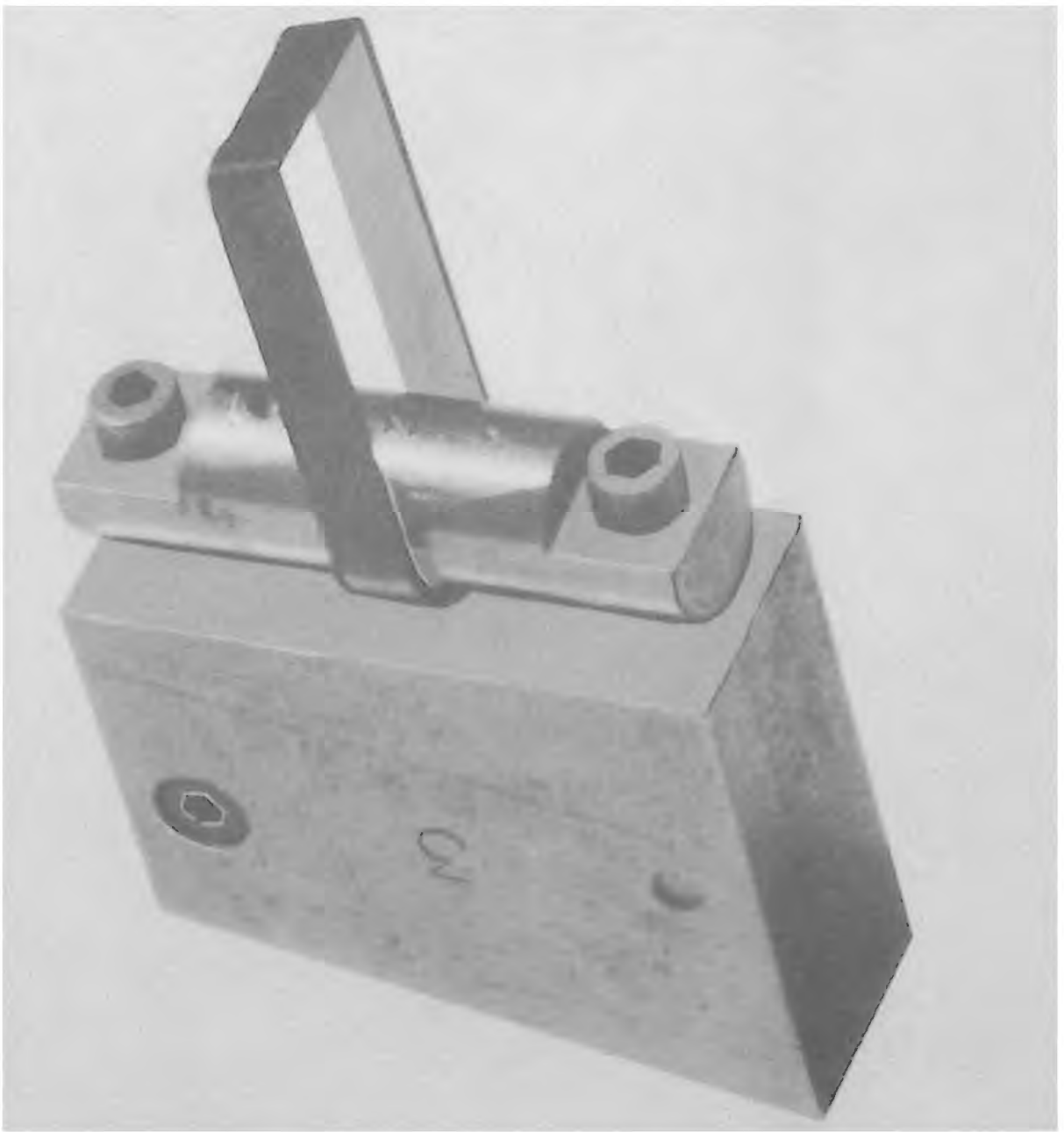

Figure 8. Gig for Drilling Trigger for Stop Screw.

Using a no. 36 drill, drill hole for 6/32 tap. After tapping hole install a 6-32 X 1/2" Allen Head set screw for trigger stop screw. After this operation, check the trigger in the trigger opening of the receiver. The triggers being oversize in width, in most cases, it is necessary to remove metal from each side of the trigger until the trigger will fit into the receiver without horizontal or vertical movement. When this fit is achieved the next step is the trigger job which includes fitting the sear and hammer. It is important that All Original Angles be Maintained on the Hammer and Sear. The hammer hooks are cut down to .0200 inch by using a thickness gage as shown in illustration below.

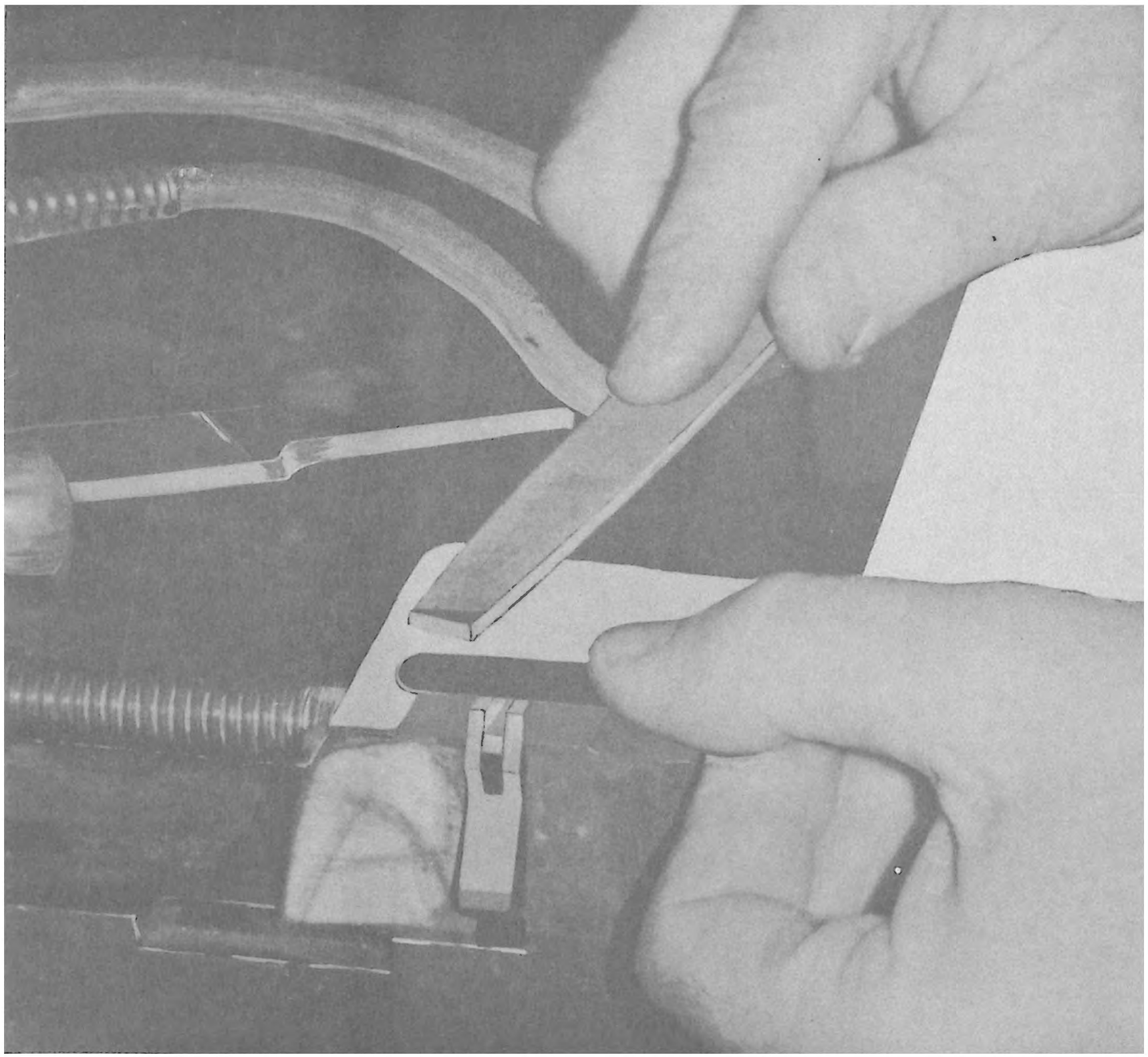

Figure 9. Thickness Gage.

Placing the thickness gage squarely on hammer with smooth mill file, cut hammer hooks to .0200 inch. At this point, using the hammer and sear mating fixture as shown below fit the angles and proper engagement of the sear and hammer.

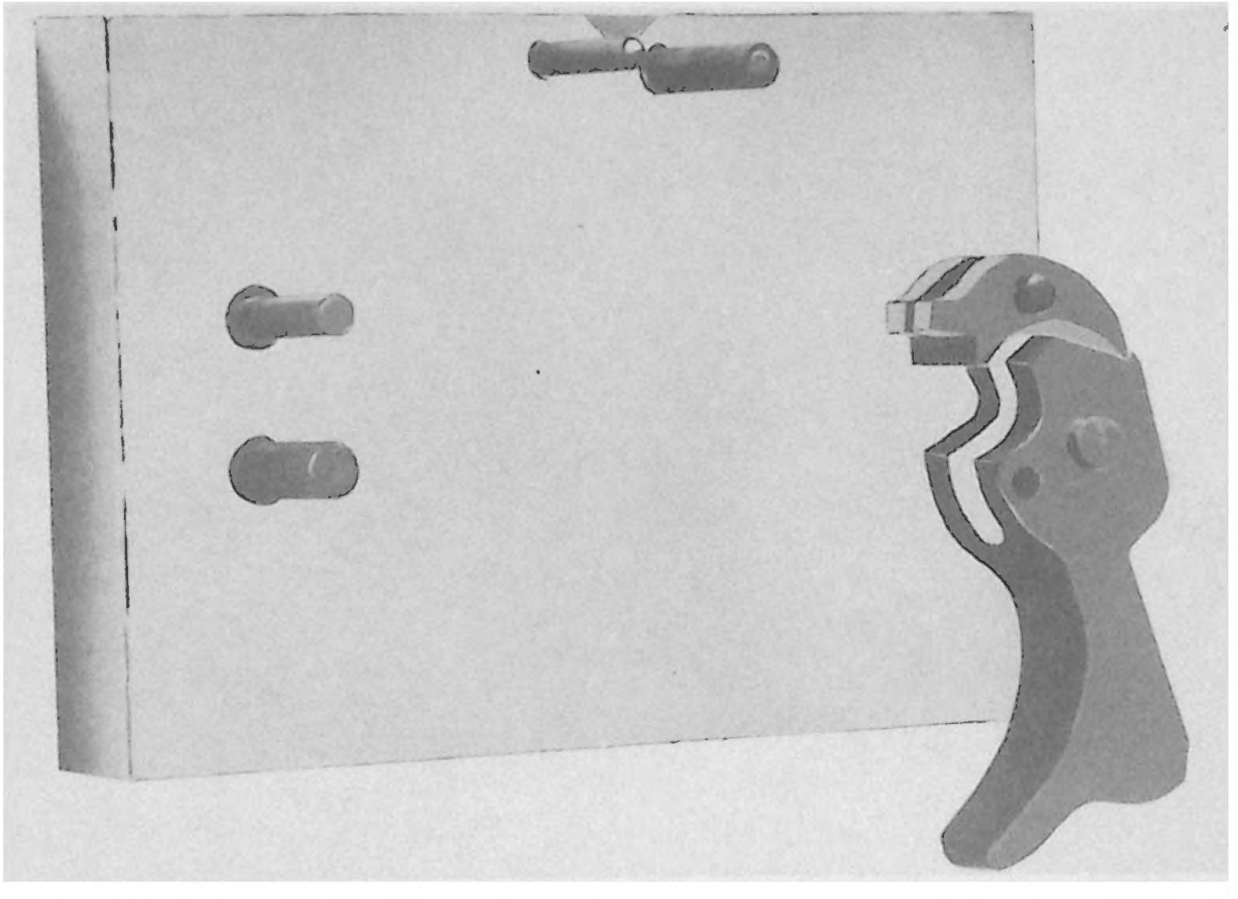

Figure 10. Sear & Hammer Mating Gig.

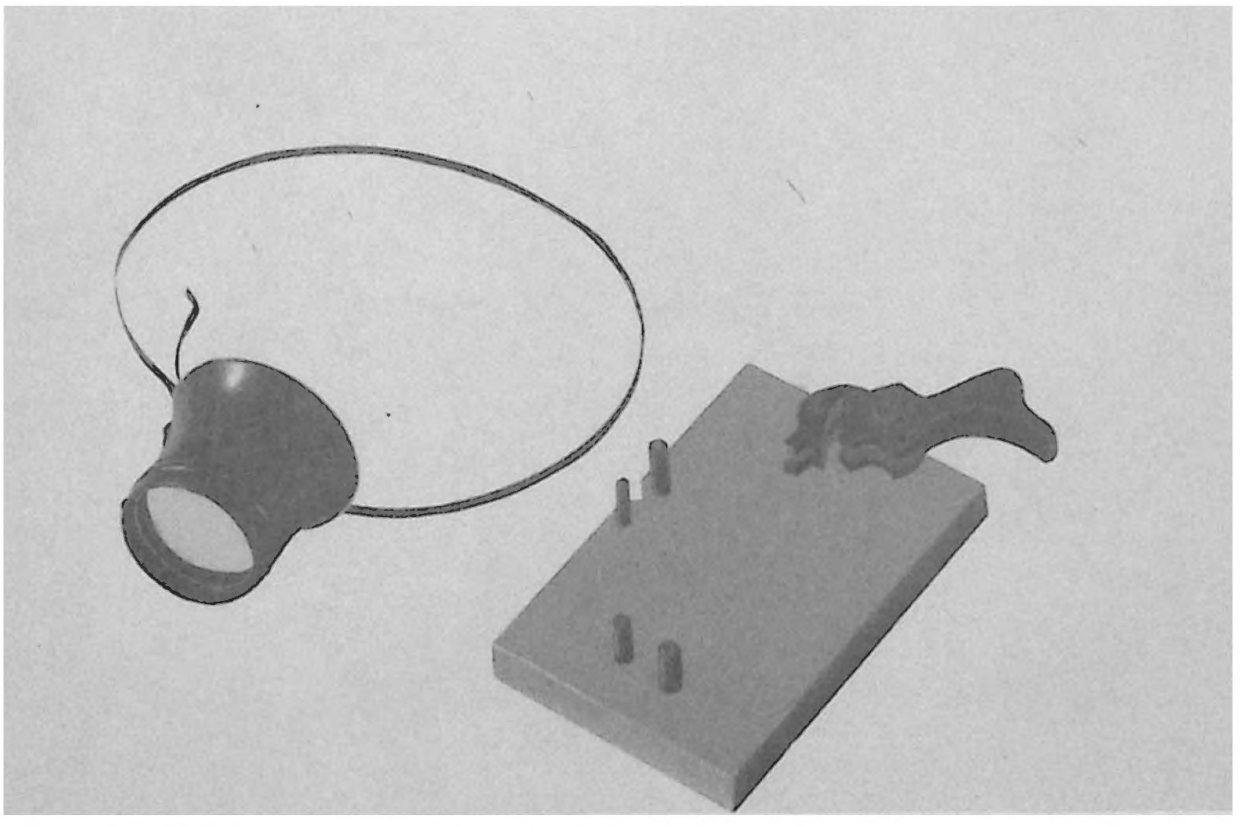

Figure 11. Showing Eye Loop and Sear Engagement.

Polish smooth the slides of the new National Match Sear to make sure it is free of burrs or rough tool marks; also polish the disconnector and the trigger yoke to assure smooth working condition, when the pistol is assembled and the moving parts are under normal working pressure.

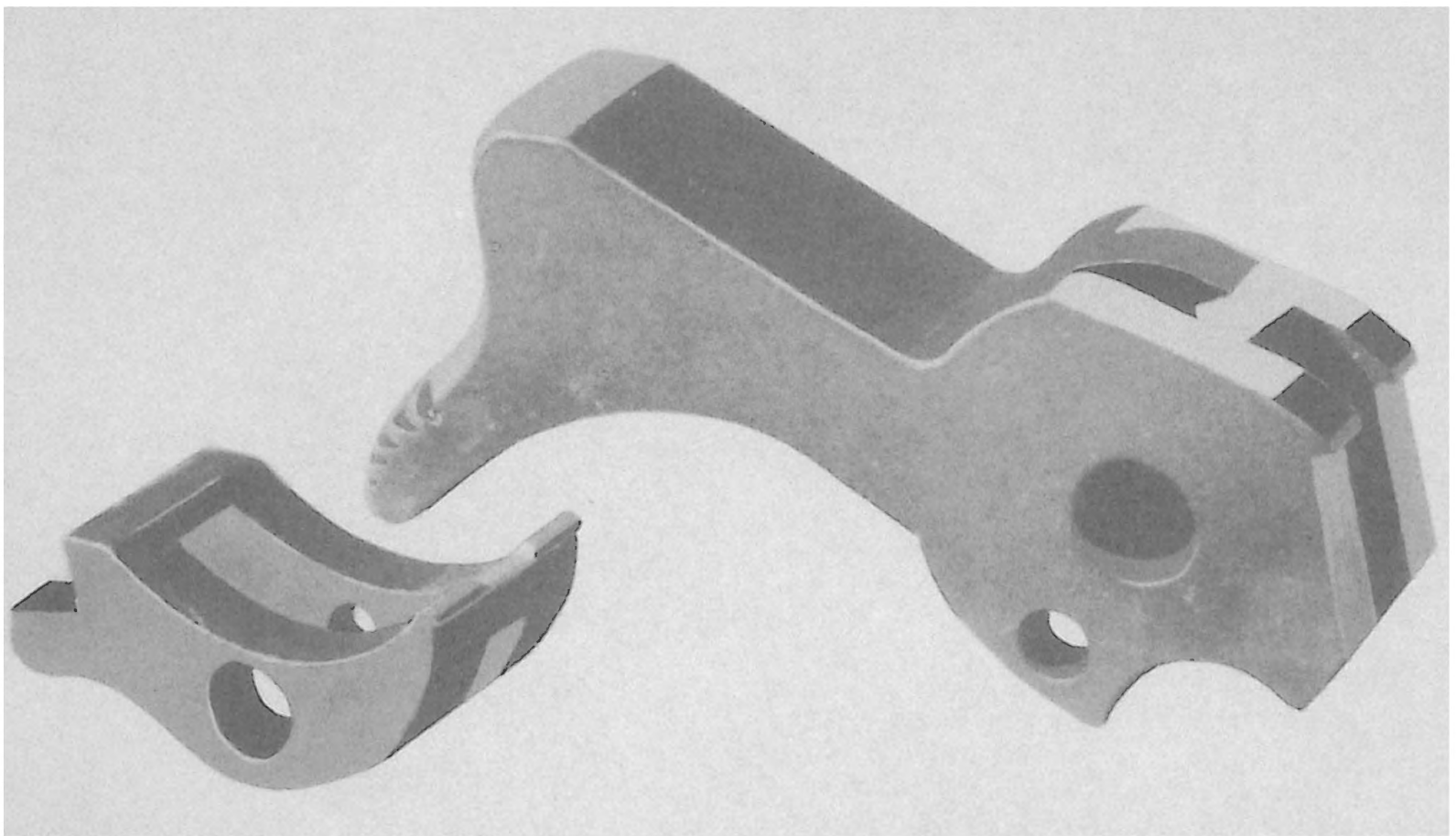

Figure 12 "A". Half Cock Notch and Relief of Sear.

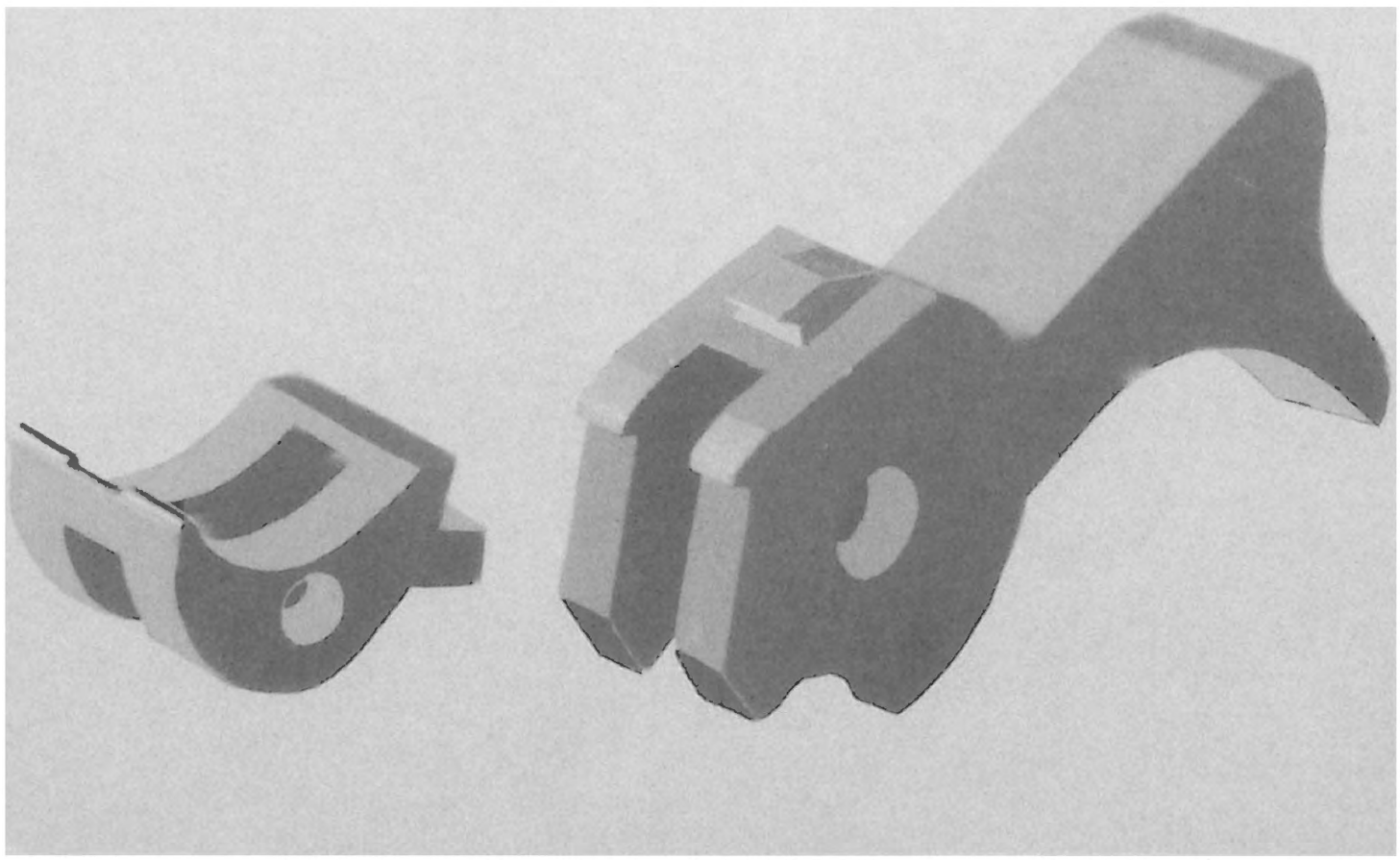

Figure 12 "B". Half Cock Notch and Relief of Sear.

As shown in previous illustration, the half cock notch is cut on each side an even amount, to leave the hammer notch .1250" wide and depth of sides cut down to base of hammer. This leaves the full half cock notch to catch the sear in case the hammer falls, and still have the complete safety on the same principle as is produced in the factory for the Gold Cup .45 Caliber and .38 Caliber Automatic.

Next step is to assemble the hammer, sear, disconnector and sear spring and check for desired break and weight of trigger pull. The trigger pull may be lightened by honing a slight radius on the point of the sear. To make a heavier pull, increase the engagement by increasing the angle on the point of the sear. After proper operation and trigger pull has been attained adjust trigger stop to have approximately 1/8" travel after the break. This is necessary to obtain the tolerances needed for the disconnector to work after each shot is fired. The next step is to insure that the weight of trigger pull is within the limits prescribed by NRA Rules and Regulations, and still maintain the required safety factors. The weight of trigger pull varies with the type of pistol being used. The required weights are as follows:

.45 Caliber Hard Ball	4 Lbs	Minimum
.45 Caliber Wad Cutter	3 1/2 Lbs	Minimum
.38 Caliber Special Auto	2 1/2 Lbs	Minimum

SIGHTS

Sights used on the .45 and .38 Caliber Automatic Target Pistols are of the micrometer adjustable type. The Bo-Mar Sight is recommended due to its durability and precise movement. The point of impact may be moved as little as 1/4" on the target. These sights are installed by manufacturers instructions, and must meet NRA specifications. Reference to distance between sights, the sight radius of the 45 H/B must not exceed 7" from rear face of rear sight to rear face of the front sight as it is the gun used in the National Trophy Individual Match; however, the .45 W/C and .38 Special may be of any length not to exceed 10 1/2".

STIPPLING

Stippling is a process of making the front strap or the mainspring housing rough to enhance the ability to hold a constant grip while shooting. An air operated riveting type tool with a diamond point chisel installed is used, to raise the surface of the metal during this operation. Special care should be taken to avoid excessive penetration into the receiver. It is necessary to use an oversize plug machined to fit into the receiver for support of the receiver walls.

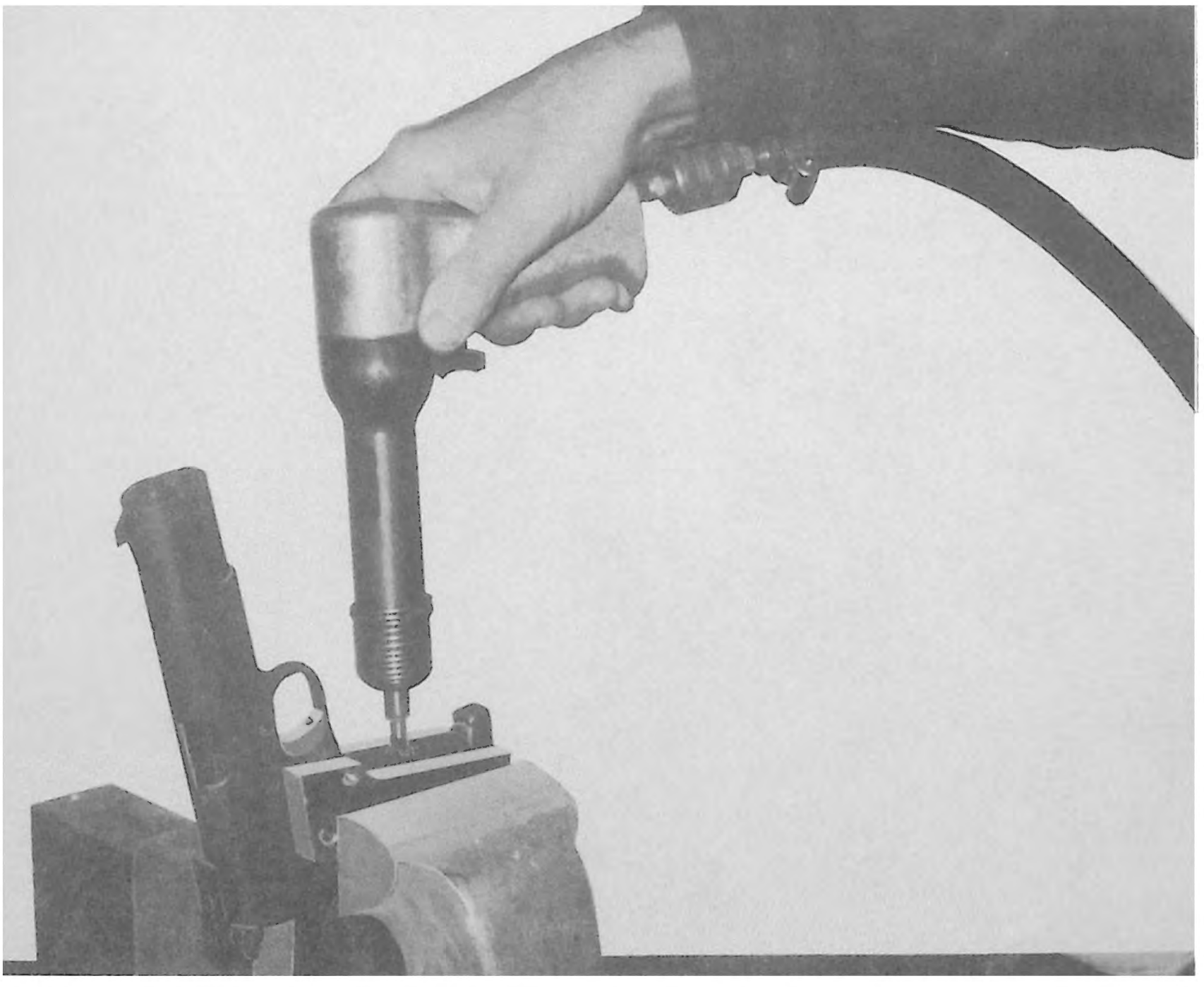

Figure 13. Stippling Tool.

MALFUNCTIONS

The following is a list of common malfunctions encountered when the pistol is being function tested, and the connective actions for the malfunctions listed.

a. Failure to feed properly. In most cases the cartridge will nose upward against the top of the barrel hood and chamber. This can be caused by the feed ramp on the barrel having less than the necessary angle or the feed ramp of barrel overhanging the feed ramp of the receiver. Correction: Grind the feed ramp on barrel to a more forward angle and make sure that the barrel does not overhang the ramp on receiver. Polish all feed surfaces to remove all tool marks. Very frequently the magazine follower is bent to improper angle, or lips of magazine may be too tight, not releasing the cartridge in time to allow the round to enter the chamber. If the cartridge noses up bend the follower down. The angle should be 70 to 75°.

b. Failure to Chamber: Characterized by slide stopping 1/8" to 1/4" out of battery. Correction: Relieve the tension on extractor and/or round off the bottom of the extractor to allow it to cam itself onto the base of the cartridge with more ease.

c. Stove pipe Cases: Correction: This malfunction is usually caused by recoil spring being too strong or an ejector not having a good square face. The hard ball spring normally has 29 to 33 coils. If necessary to cut the recoil spring, start cutting one coil at the time until corrected. If the ejector is round or worn file the face square and keep the original angles. Sometimes it is necessary to install an extended ejector on the wadcutter or .38 Caliber due to lack of power required to move the slide to the rear.

d. Misfires: Correction: First check the primer for indent, if it is not dented enough it could have a broken firing pin, or burred firing pin, or could be binding in the firing pin retainer plate. Check all these points. It is possible to have a weak mainspring or it could be hanging up in mainspring housing. Head space is very important and can cause misfire, if excessive. Normal headspace is .0080 inch to .0120 inch. Headspace should never exceed .0120 inch.

e. Pistol Fires Fully Automatic: This malfunction can be caused by several different factors:

(1) Maladjusted trigger mechanism, such as trigger stop too close.

(2) Trigger pull too light.

(3) Disconnector too short due to excessive wear or polishing.

(4) Center leaf of sear spring too weak.

Corrections to above in order as listed above.

(1) Adjust trigger stop to allow at least 1/8" travel after the break.

(2) Adjust trigger pull to 4 lb. By increasing engagement of the hammer and sear.

(3) Replace disconnector.

(4) If the center leaf has lost its temper and will not hold its set, replace the sear spring.

Differences Between .45 H/B, .45 W/C, .38 S/A.

Basically the .45 Hard Ball, .45 W/C, and .38 Special are built in the same manner; however, some differences do exist. Variations of the .45's are covered in Chapters on Sights and Trigger Pull.

The .38 Special differs in the following respects:

a. Recoil spring .0330 spring wire is softer.

b. Special extractor fitted with less tension.

c. Extractor claw deepened and shaped to cam onto cartridge base.

d. Trigger pull set at 2 1/2 lb, American, and 3 lbs, International.

e. Gold Cup type magazines are used.