# HOME WORKSHOP GUNS for Defense and Resistance

Volume IV

## The 9mm Machine Pistol

Bill Holmes

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**Bill Holmes**

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by Bill Holmes


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# Warning

At the time this book was written, federal law stated that any person legally eligible to own or possess a firearm could legally build or manufacture a firearm for his own use (as long as it wasn't a full-auto version), provided that the maker's name and address and a serial number were inscribed on the weapon. However, since then, Congress, at the instigation of President Clinton, has passed the so-called "Crime Bill." This bill, while doing little if anything to prevent "crime," contains a provision that prohibits any further manufacture of "assault weapons." This effectively bans manufacture of all versions of the firearm described in this book. Govern yourself accordingly.

With this in mind, this book is offered for *academic study only*. Neither the author, publisher, nor distributors of this book are responsible for any legal problems encountered by anyone who attempts to construct this firearm.

# Introduction

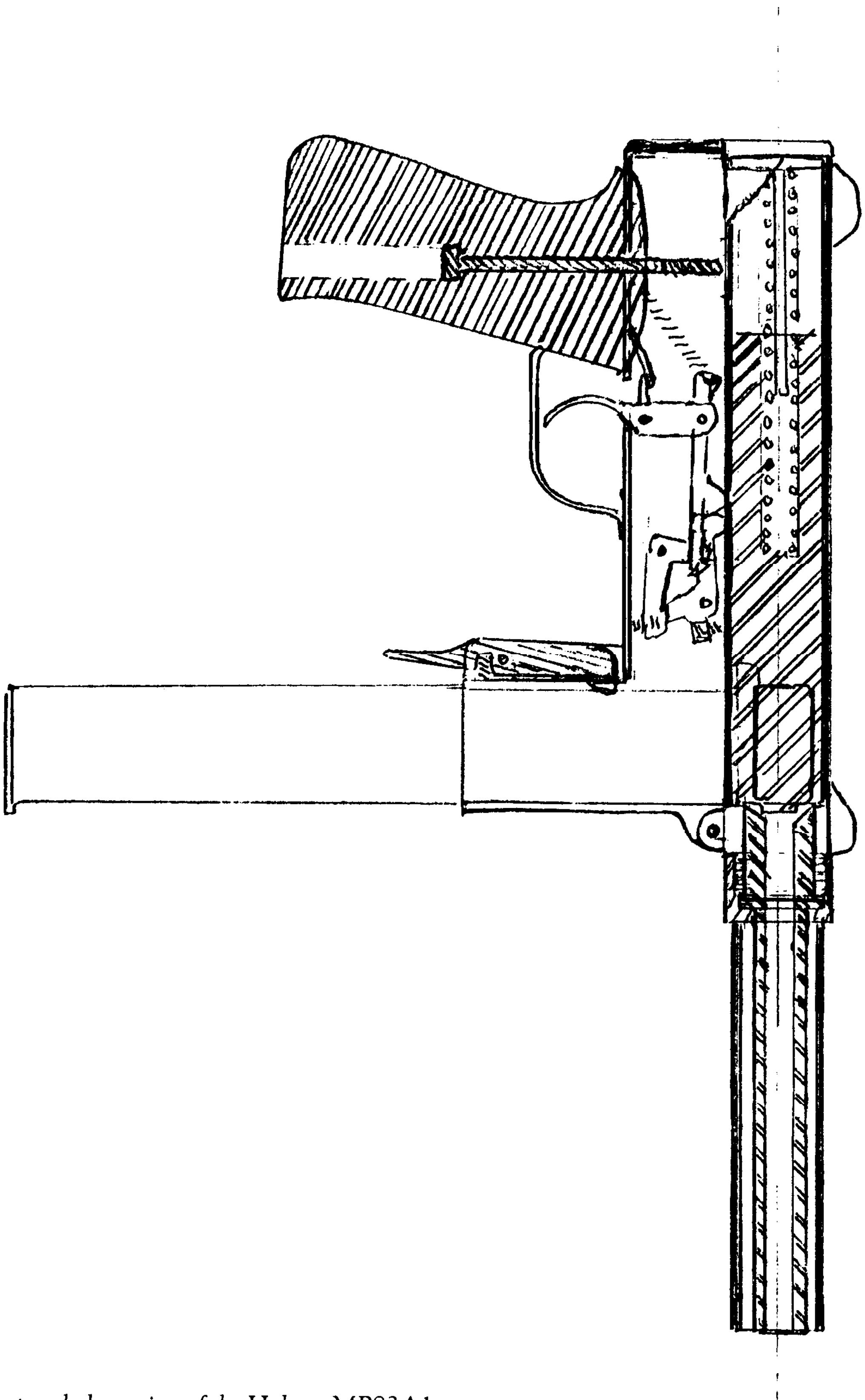
The Holmes MP83A1 firearm described herein is the culmination of several designs. The first of which was created in 1976 and was the subject of my first book, *Home Workshop Guns for Defense and Resistance: Vol. I, The Submachine Gun*, hereinafter referred to as *Vol. I.*

*Vol. I* has been sold in most countries of the free world and smuggled into several Third World and communist countries. After 17 years in publication, it still sells as well as it did when first introduced.

In 1982 the Naval Weapons Procurement Center, acting for the joint military services, solicited proposals from interested parties for a new military submachine gun design. Of course, I thought I should submit one. So I built a prototype gun that fulfilled the stated requirements, mainly to make sure it would work the way I thought it would. Happily, it worked the way it was supposed to, so I submitted my proposal, which I called the MP82. Unhappily, mine was rejected in favor of the Heckler & Koch MP5.

While awaiting a decision by the government (it took the bureaucrats almost a year to make up their minds), I shot the prototype several hundred times, and, although it worked the way it was supposed to, I thought improvements could be made. I then built another gun incorporating the changes. This one was designated the MP83. Though it didn't actually function any better than the original, it was shorter and lighter in weight. It was also considerably more streamlined, making for a much improved appearance. Shortly after making these improvements I was notified that H&K had gotten the contract. The government didn't even look at my gun.

At this point, since most people who saw and fired the MP83 wanted one, I started building and marketing a semiautomatic model in several versions. Included were open-bolt; closed-bolt; locked-breech, closed-bolt in 9mm, 10mm, and .45ACP calibers; and long-barreled carbine versions complete with detachable butt stocks. I continued to build these firearms for more than six years, until the government suddenly decided that the guns were illegal and prohibited me from building them. The bureaucrats also stopped my



*The open-bolt version of the Holmes MP83A1.*

*Left: The MP83A1 disassembled.*

*Below: The upper receiver tips up to allow bolt and trigger assembly removal.*

*Above: Removable trigger assembly of the MP83A1.*

*Right: Safety and magazine release are centrally located for easy access by either hand.*

*Left: Completed MP83A1 shown with interchangeable bolt and trigger assembly, which allows conversion to open-bolt operation.*

*Below: Gun with action open, with both trigger and bolt assemblies.*

manufacture of a similar .22-caliber gun that I was building at the same time.

As might be expected, my interest in pistols of this type diminished considerably because of these developments, and I didn't build any for sale to the public. Some two years went by before I decided to build another gun, one which would be legal. This one would be a hammer-fired, closed-bolt gun. It would be longer and with a heavier bolt, making it easier to control. I built two guns and intended to market them, but continuous harassment by federal agents forced me to give up on even this. The end result is what you see in this book.

For a time, a small, lightweight, extremely fast firing gun with the magazine housed in the grip was thought to be ideal, and I embraced this philosophy. However, I eventually realized that a heavier gun with slightly more bulk and a slower rate of fire was far more controllable. Moving the grip as far to the rear as possible and using a separate magazine housing as a foregrip also enhanced controllability and stability, as well as accuracy.

The gun described in this book, then, is some 16 inches in overall length, using a 6-inch barrel. It weighs approximately 5 pounds The magazine housing is positioned several inches forward from the grip. It has a two-stage trigger, eliminating any switches or levers to contend with when changing the mode of fire. It has a rate of fire of approximately 600 rounds per minute (rpm) and very little muzzle climb or recoil.

As I have always tried to do with all my books, this book is in easy-to-follow, plain English that most readers should be able to understand. I am not trying to impress anyone by using big words or complicated sentences. Frankly, since my vocabulary is very limited, I couldn't even if I wanted to.

At the risk of being considered repetitious, let me remind you once more that the manufacture or possession of this gun is illegal and punishable by rather harsh penalties. Therefore, this book is offered for *academic study only*.

CHAPTER 1

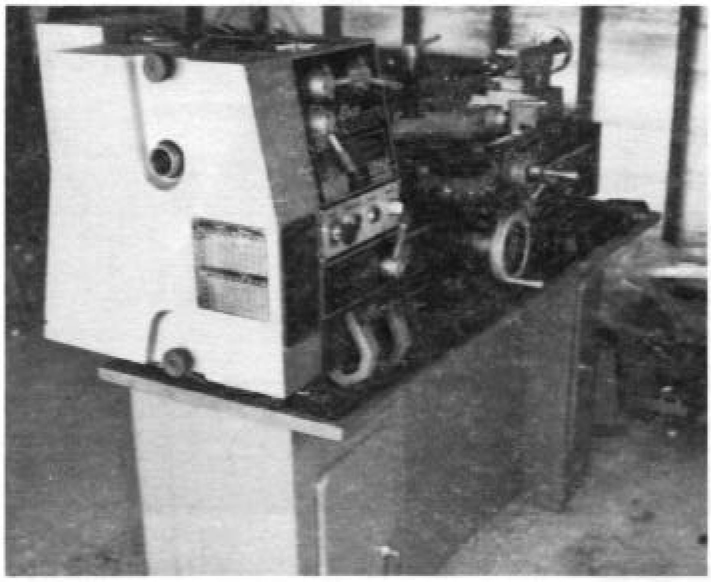
# Tools and Equipment

Proof that a firearm such as this can be built without the use of a milling machine can be found in the gun used in *Vol. I*. At the time it was built my home and shop had just burned to the ground, destroying everything my family owned. This left me without access to, or use of, any type of milling machine. All operations that would normally have been done with the mill I accomplished by using files, chisels, and a hand drill. Although I hope I never have to do such a thing again, it can be done as evidenced in *Vol. I*.

Since I have retired from active gun work and sold my shop, I only have the small milling machine shown in the accompanying photographs. Although it is somewhat clumsy and takes more time to perform certain operations than the full-sized "Bridgeport" types that I formerly owned, this little machine will do anything the others will. While I do not recommend them, even the oversized drill press types sold by most machine tool companies can be used, provided the table clamps are kept tight and slow, light cuts are taken. These are better than doing it by hand, but just barely.

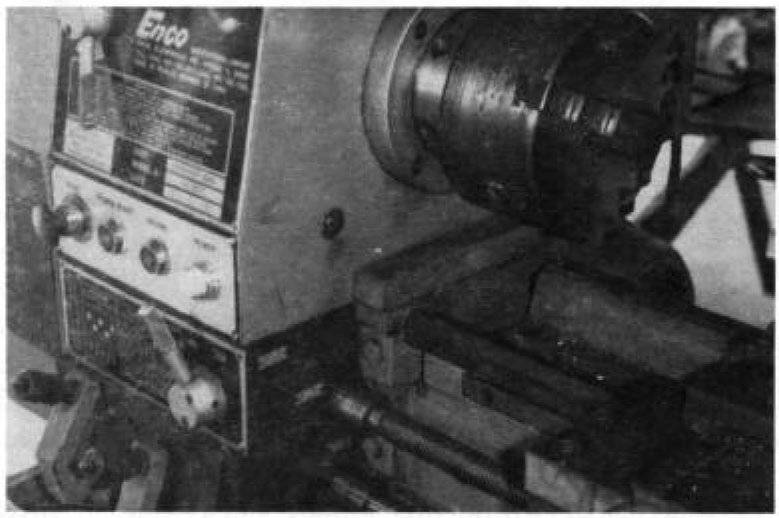
Use of a lathe can hardly be avoided if any hope of concentricity is to be maintained. Though I am partial to lathes in the 15- to 16-inch swing range, the only one I have at present is a 12 x 36-inch machine. Since this lathe has a hole through the headstock of slightly more than 1 1/2 inches in diameter, it serves its purpose adequately. The geared-head version, as shown, costs several hundred dollars more than a similar belt-driven model offered by the same company, but such features as a cam-lock spindle make it well worth the difference. Although the electrical systems on these Chinese-made machines are usually somewhat cruddy, the machines themselves are sound and represent good values for the money.

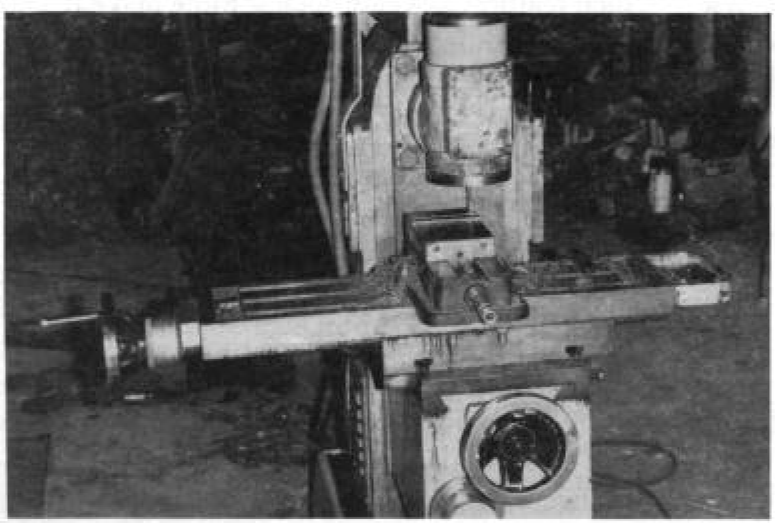
A small, high-speed grinder such as the Dremel tool can be used to perform many of the operations usually done with the milling machine. Receiver openings are easily cut and finished by using one of these tools, provided that the corners or ends are formed using suitable drills. With the aid of a hand drill and a few files and chisels, all required mill work can be accomplished by this method.

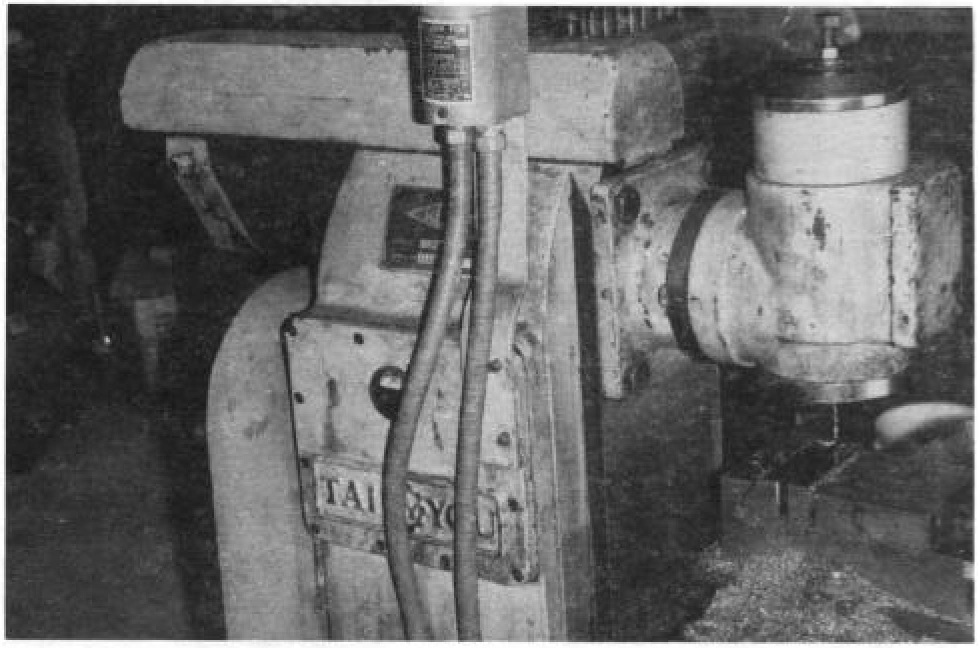


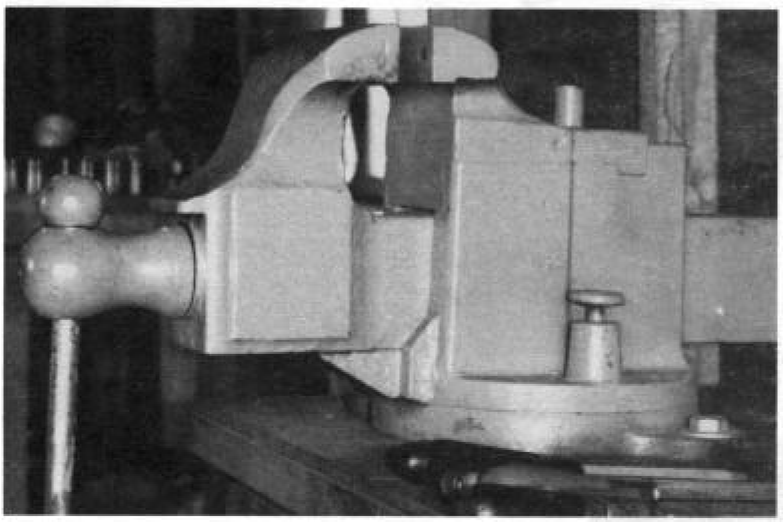
*Above and Right: The 12 x 36-inch geared-head lathe pictured has a 1 1/2-inch hole through the spindle, making it ideal for most gun work. It costs about $3,000. Although these Chinese-made machines usually have inferior electrical systems, they are mechanically sound.*

*Below: A milling machine, regardless of type or size, is almost indispensable for operations required here.*





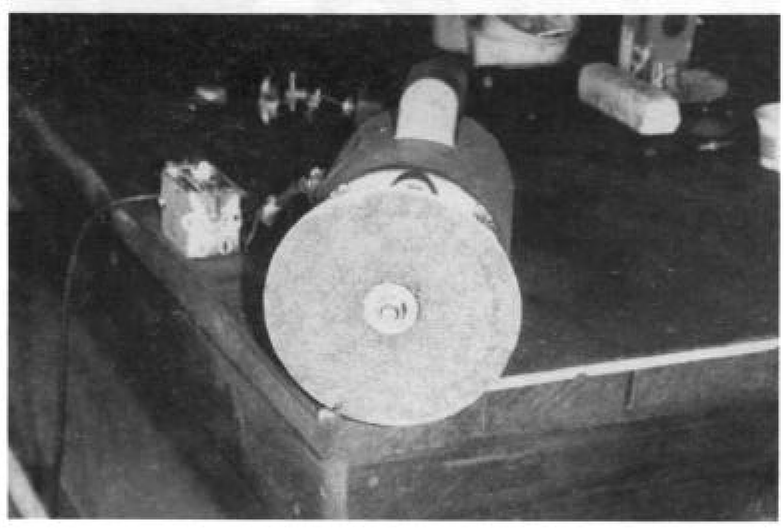


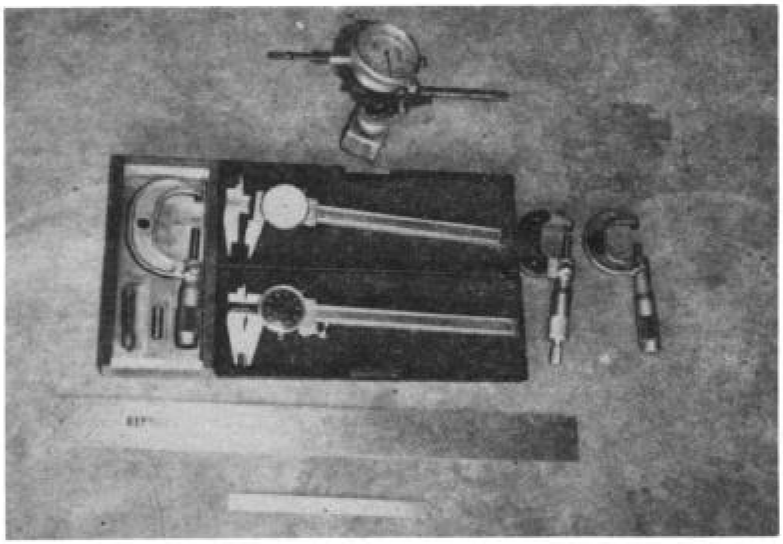


*Above: This little mill is a combination vertical and horizontal mill. The universal table makes it even more desirable.*

*Left: A heavy vise, as shown, can substitute for a press or a sheet metal brake, and has many other uses.*

*Below: A sanding disc mounted on a large motor is useful to form parts.*

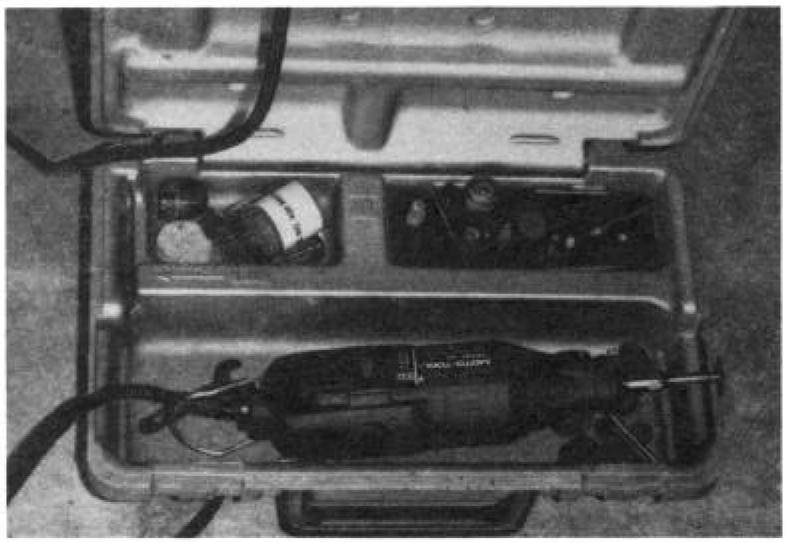


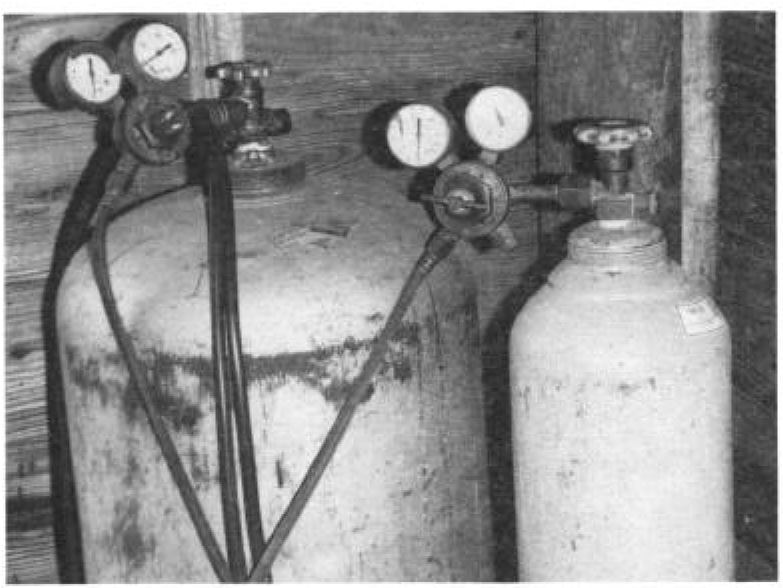


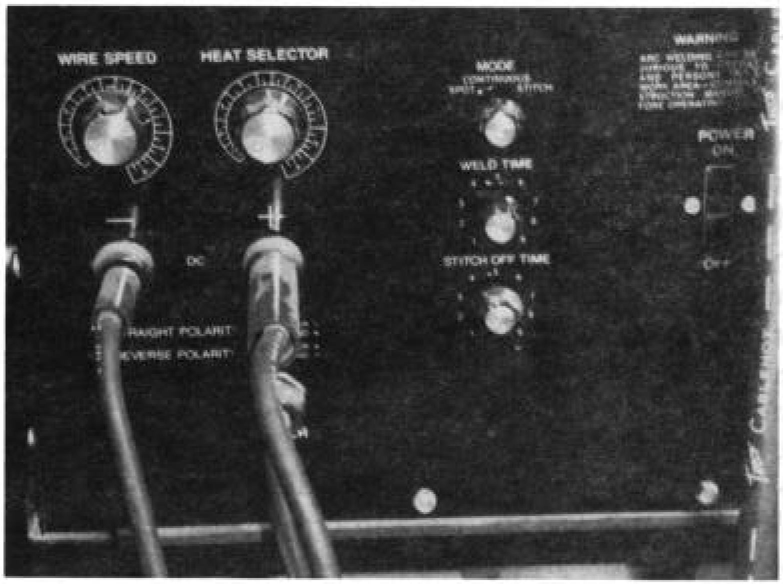
*Above: Measuring tools include micrometers, vernier calipers, scales, and dial indicator. However, a single vernier caliper will suffice.*

*Right: The small high-speed hand grinder can perform many of the operations that usually require the use of a milling machine. It just takes longer.*

*Below: An oxygen-propane combination is handy for brazing and heat-treating operations.*

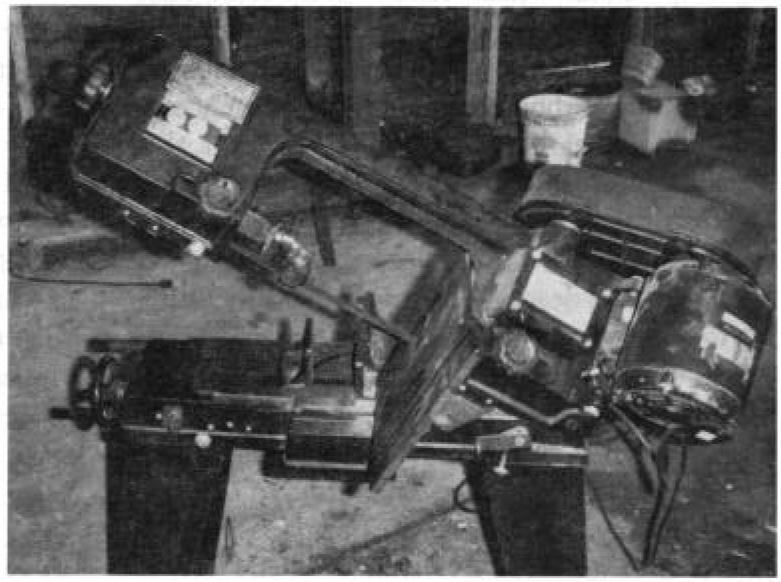







*Left: This welding machine is capable of MIG, TIG, and stick welding.*

*Below: A small metal cutting band saw such as this can save a lot of manual labor.*



A good, sturdy vise, the larger the better, is not only useful to secure parts while working on them but can be used as a press or a sheet-metal brake to form the sheet-metal parts used in the lower receiver and trigger housings. The small cast-iron vises sold by discount houses won't last long under such usage. What is required is a good heavy-duty model with at least 6-inch jaws. The discount-house jobs will break, or the screw will strip, when very much pressure is exerted between the jaws. Either way, the vise is rendered useless. The one depicted in this chapter was already several years old when my father bought it in a secondhand store more than 50 years ago. Even though it has been through a fire and used as an anvil on occasion, it still works better than a new one would.

Some measuring equipment is also required. At the very least, you'll need a 6-inch vernier caliper, and preferably, you should have access to micrometers up to 2 inches, a depth mike, and a 12-inch scale or ruler. A dial indicator also comes in handy, especially for use in stopping inside lathe cuts at a precise point.

One of the small metal cutting band saws will save a lot of wear and tear on your arm muscles, as required when using a hand hacksaw. This tool usually sells for around $200 and does its job fairly well as long as light cuts are taken and a sharp blade is in place. As soon as the blade begins to dull, it starts jumping off the drive wheels. Blades made from so called "bimetal" will last far longer than the ones that come with the saw. With the saw in the vertical position and a sharp blade in place, small parts such as hammers, triggers, and sears can be cut to rough shape and finished by milling, filing, or sanding.

The use of welding equipment is also a necessity. Preferably, it should be of the "heli-arc" or TIG type. Lacking this, a wire feed (MIG) or stick welder can be used. The welding machine shown in the photo is capable of all three. Some type of gas welding equipment should also be available. In my case, I use a combination propane and oxygen setup. Acetylene can be used instead of propane if desired, but I only use it for brazing and silver soldering, hardening small parts, and imparting case colors as a finish. Because the propane combination actually has a hotter flame than acetylene and is far more economical to buy, it is ideal for my purposes. Acetylene must be used if actual welding is attempted. The propane combination, at welding temperatures, will actually cook the carbon out of the steel, ruining it. The acetylene setup will not disturb the carbon content and can actually impart more carbon if desired by using an acetylene-rich, or "carburizing," flame. However, this actually has little to do with our usage here because an electric welding process should be used whenever possible.

The items described above, together with a normal assortment of hand tools and a few taps and drills, will allow a competent operator to turn out a finished firearm in short order. *Vol. I* goes into considerable detail about making parts with a minimum of equipment. I suggest you obtain a copy if you don't already have it.

A list of the bare minimum of necessary tools includes the following:

- 1/4- or 3/8-inch drill motor or hand-type drill
- Drill bits, sizes 1/8, 3/16, 1/4, and 3/8 inch
- A hacksaw with several blades
- 10-inch mill bastard file
- 3-cornered (triangular) files
- Round files, 1/8, 3/16, or 1/4 inch (preferably all)
- Small square files
- Cold chisels, 1/8, 1/4, and 1/2 inch in width
- Center punch
- Scriber
- 12-inch ruler
- Protractor
- Micrometers or vernier caliper
- Appropriate taps with corresponding drills
- Tap wrench
- Plus the use of a lathe, welding equipment, and grinder

CHAPTER

2

# Materials

Locating sources for materials was covered rather thoroughly in several of my other books. But since not everyone may have these books available, we will take a short trip through it one more time. Of course, the easiest method of obtaining these is to buy new materials from an appropriate supplier. When this is not possible, alternate sources must be found.

The body, or receiver, of this gun is made from 1 1/4-inch outside diameter (OD) seamless tubing that has a wall thickness of .065 inch. An overall length of 9 1/2 inches is required. If commercial tubing is available, buy what is called 4130, also known as chrome-moly aircraft tubing. At present, this is available all over the free world. If the time should come when it is no longer available, high-pressure pipe or boiler tubing can be used. Drive shafts from some of the older, rear-wheel-drive foreign cars are also close to the proper size. Certain motorcycle front forks can also furnish material for this, as well as shock-absorber bodies. If nothing else is available and it is absolutely necessary, I would not hesitate to use water or gas pipe—but only as a last resort and by doubling the wall thickness.

A barrel blank, 6 inches long and 1 inch in diameter, will be needed. This can be obtained at present by buying a blank from any of several manufacturers (one 24-inch barrel blank will provide material for four 6-inch barrels). If these are no longer available, one way to obtain a usable barrel is to obtain a discarded military barrel of .30 caliber, or similar caliber, and ream the bore to size. Then you can cut new rifling as described in the chapter on barrel manufacture in *Vol. I*. Failing this, you will be required to drill, ream, and rifle a length of quality steel bar stock. One should be selective in choosing material for this. It should be good steel. An iron bolt or shaft of low-carbon steel will not last long enough in use to make it worthwhile. Automobile axles and, in some cases, steering shafts are a good source. Car and truck transmissions contain shafts made from suitable material for this.

Another section of better-quality steel, 1 1/8 inches in diameter and 6 inches long, is required to make the bolt, or breechblock. This should be a tough, shock-resistant material such as 4140 or similar. Here again, various truck or tractor axles are sources, as are shafts from various farm implements.

In many instances, these substitute materials will be too hard to machine or work. This does not present a serious problem if firewood is available. Simply build up a good-sized wood fire and place the material to be softened (annealed) in the middle. After the fire burns down, the material will be surrounded by hot coals and ashes and should be allowed to cool slowly, preferably overnight. It should then be soft enough to machine freely.

A plate of 14-gauge sheet metal, 20 inches long and 4 inches wide, is required for the frame and magazine housing. Normally, you would get this from a sheet-metal shop. If such shops no longer exist, it can be cut from a junk car frame.

Strips of steel in 1/4-, 3/8-, and 1/2-inch thickness will be required to fabricate the trigger, hammer, sear, and magazine latch. A drill rod, stems from broken drills or taps, or—if nothing better is available—nails can be used for the various pins. And if suitable coil springs are not available, they can be wound from music wire.

Valves from gasoline and diesel engines are a source of high-quality round stock. Farm implement, car, and truck springs and frame material yield flat stock of sufficient thickness for triggers, sears, and other parts. In many cases, these will also require annealing in the wood fire before they can be worked.

There are numerous sources for coil springs of the type needed. Most hardware stores and automotive supply houses keep a stock of various sizes on hand. Many electrical switches, fuel pumps, and carburetors contain such springs, as do clocks, locks, radio, and television sets and various kitchen appliances, even mousetraps.

If you search diligently, something will turn up that can be adapted or rebuilt into the part you need. A visit to an automotive salvage yard will usually turn up all the materials you need.

Wood for the grip can be found at lumber yards, cabinet shops, or as scraps from custom gun stock makers.

I suggest that you carefully study the chapters on heat treatment in both this book and *Vol. I* before you begin gathering your material.

CHAPTER

# 3

# Receiver

The receiver, or body, of the gun should be built first because all other parts and components are attached to it or fit inside it.

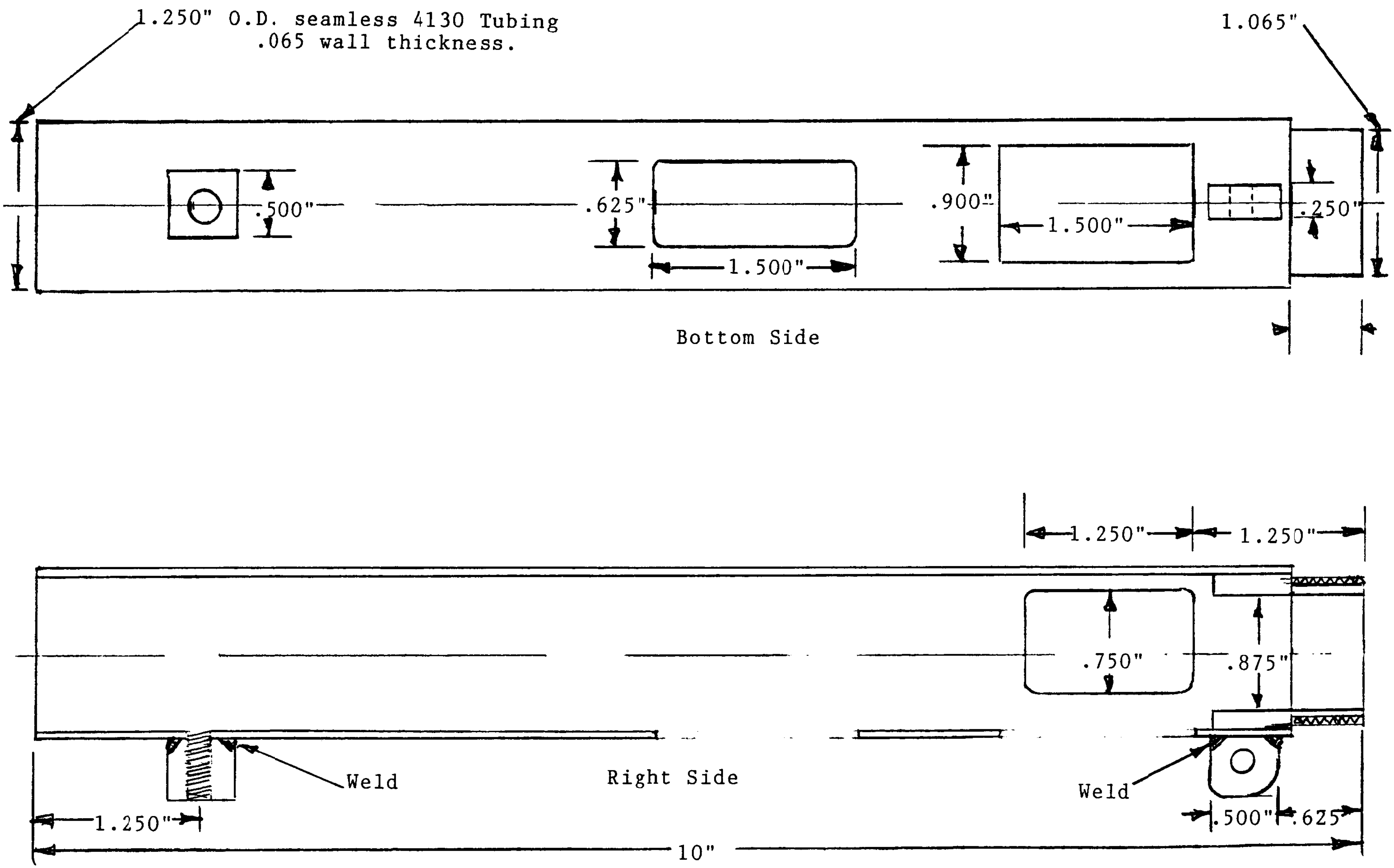
Cut to length (9 1/2 inches) and square both ends of the 1 1/4-inch OD seamless tubing. Determine which end the barrel will fit into; this will be hereafter referred to as the forward end. Three-eighths inch back from the front face, locate and drill four 1/4-inch holes that are spaced at intervals of 90 degrees around the diameter.

Slip a bushing, 1 1/8 inches long, snugly into the front receiver body to a depth of 5/8 inch. This leaves 1/2 inch exposed. Weld shut the four holes previously drilled, securing the bushing in place. The welds are preferably done with a TIG welder, sometimes referred to as "heli-arc." These should be built up above the receiver's surface and dressed back flush with the surface of the metal. Properly done, these welds will be undetectable when the gun is finished.

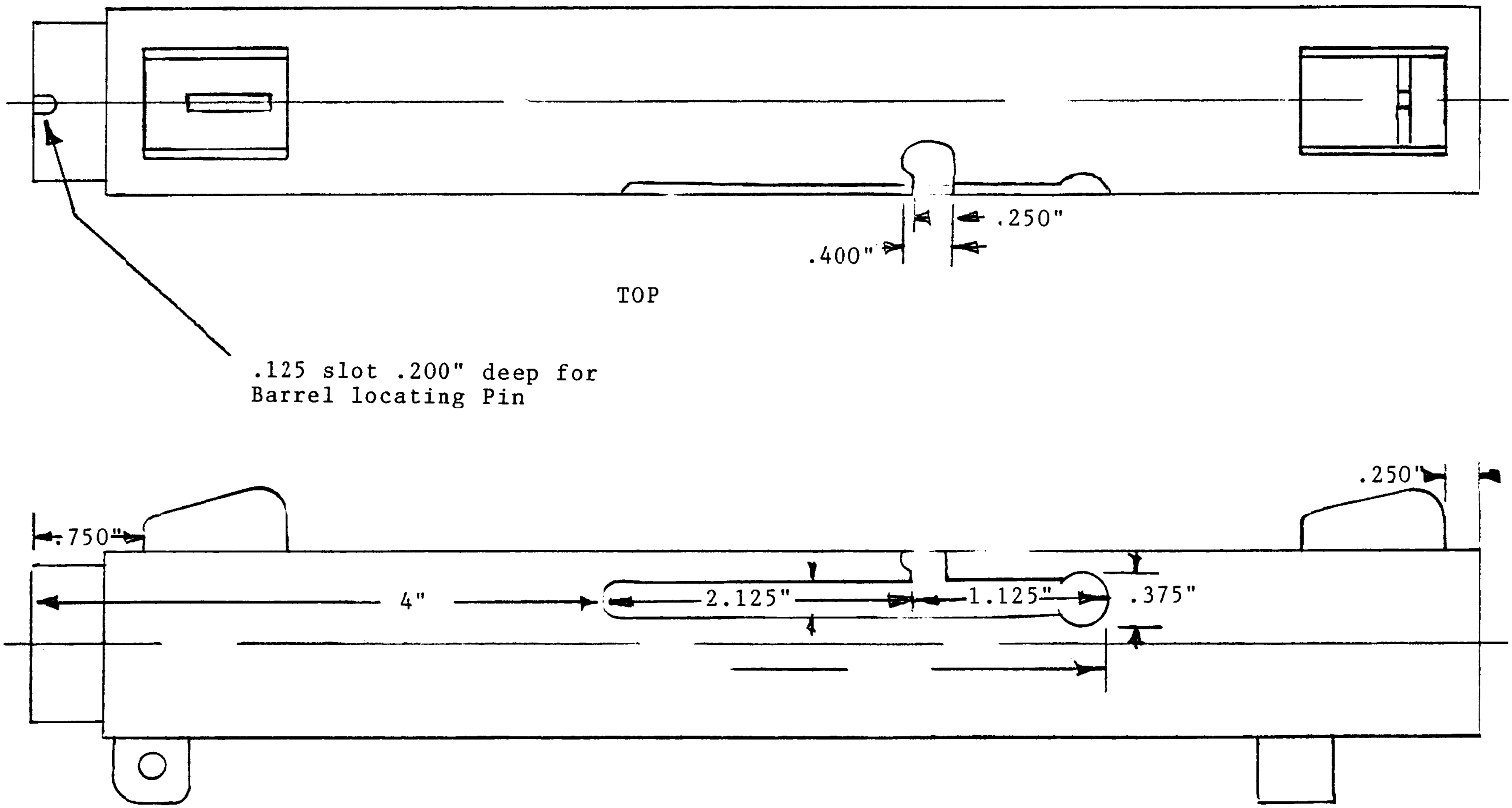
Now bore or ream the bushing to an inside diameter (ID) of .875, to accept the barrel shank. Turn the exposed 1/2-inch portion to a diameter of 1 1/16 inches (1.065) and thread it 24 threads per inch.

Locate a centerline along the top of the receiver, with another centerline on the exact bottom side, 180 degrees apart. Lay out still another line on the right side 45 degrees below the top line, or in a nine o'clock position when viewed from the rear. These lines can be located and marked easily by mounting a cutting tool with a sharp conical point ground on it in the lathe tool post, exactly on the centerline. The point is drawn up against the work and drawn lengthwise along it, with the lathe carriage being cranked by hand. After the line is marked, rotate the work 180 degrees and repeat the procedure. Then do it once more for the third line. This will result in very straight and accurate lines, especially if the headstock is locked, or fixed, in place while the carriage is moved along the work.

The extreme front ends of both the ejection port and the magazine opening will be 1 1/4 inches rearward from the front face of the receiver (since the barrel bushing is now welded in place,




*Upper receiver.*




*Upper receiver, right side.*

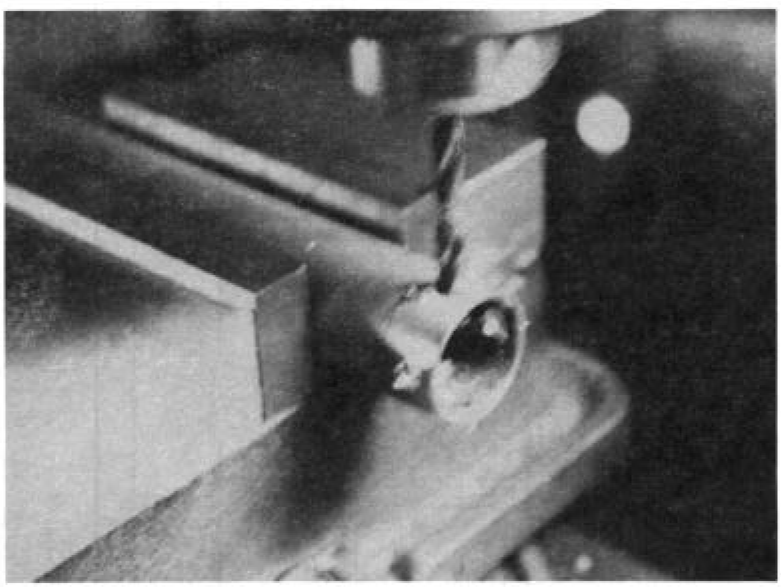
its front face will now be considered the front face of the receiver). From this point, on the right side measure to the rear another 1 1/4 inches. This is the rear edge of the ejection port. Then, 3/8 inch to the right of the top centerline, scribe a longitudinal line between these two vertical lines. Next, scribe another 3/4 inch below this line. This forms an outline of the ejection port.

Lay out another opening beginning 1 1/4 inches behind the receiver face and centered over the bottom centerline. If a Sten magazine is used, this opening should be 1 1/2 inches long and 7/8 inch wide (7/161, on each side of the centerline). The corners of this opening should be cut square, without any radius. Material inside these outlines can now be removed, with the milling machine, the hand grinder, or the interconnecting holes method described in *Vol. I.*

Lay out the cocking-lever slot and cut in the same fashion. Form the slot, 1/4 inch wide by 3 inches long, and enlarge it to 3/8 inch in diameter at the extreme rear to permit installation or removal of the cocking lever.

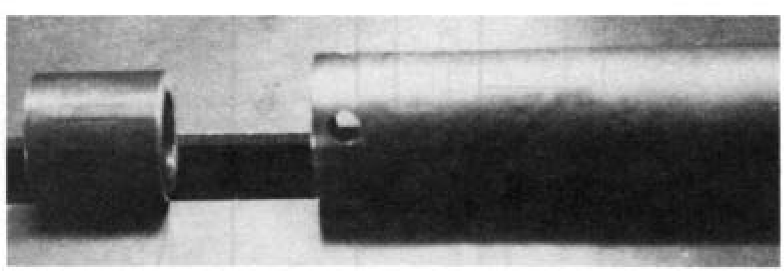
Cut an opening to clear the hammer and disconnector in the same fashion along the bottom centerline and to the dimensions shown in the drawings.

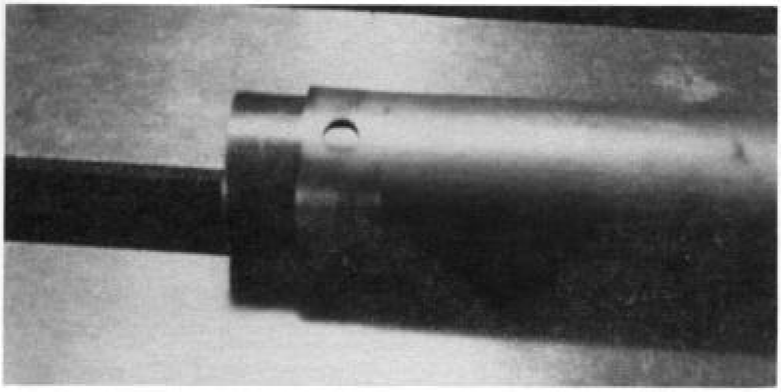
Cut two small blocks from some type of steel that will not air harden when it is welded. You can use 1018, 4140, or similar for this The block used to form the front hinge bracket is cut 1/2 by 1/2 by 1/4 inch. Weld this to the receiver on the bottom centerline and just behind the threaded portion. The other block, which is welded in place at the lower rear of the receiver as shown in the drawing, is cut 1/2 by 1/2 by 1/2 inch. The edges of these blocks that join the receiver should be beveled to allow proper "filling" with welding wire or rod. The welds should be filed, or milled, back square and flat. This is probably unnecessary, but it looks better, so take a few minutes and do it, even if it doesn't show.



*Left: Drill the upper receiver to allow for welding the barrel bushing in place.*

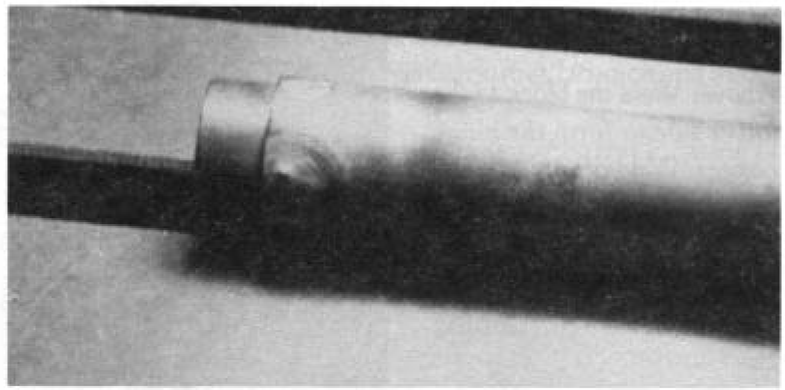
*Below: Barrel bushing, ready to be installed and welded.*

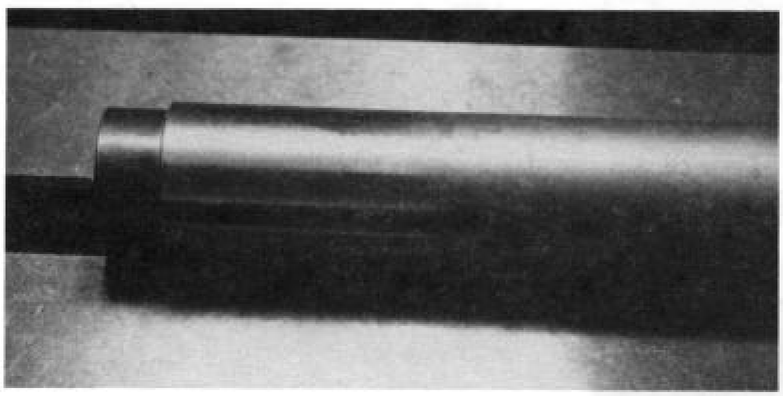




*Above: Welding is accomplished by filling holes in the receiver.*

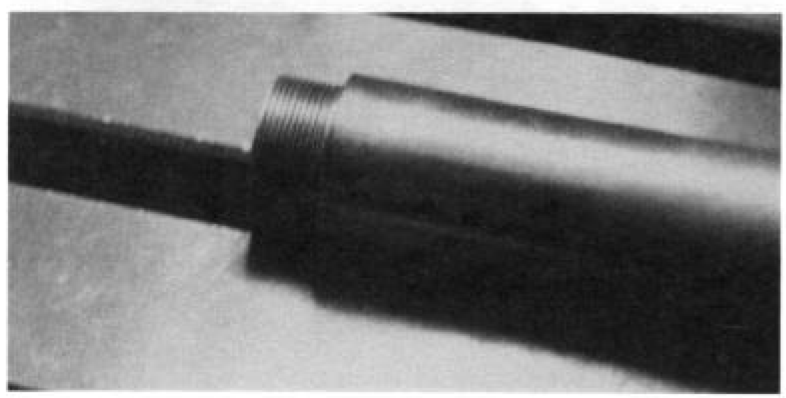
*Right: Welded in place.*

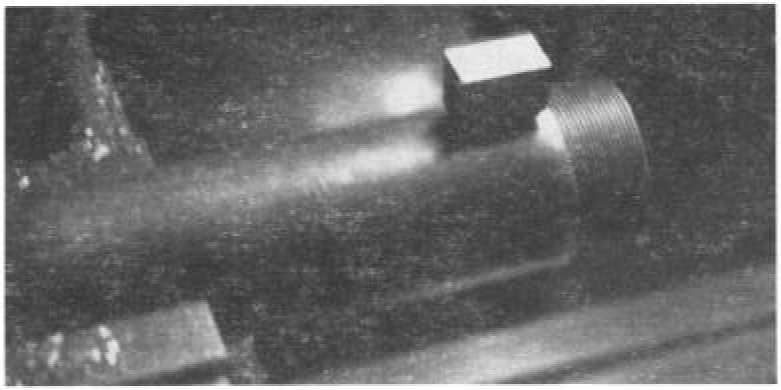




*Above: Dress the welds flush with surface. They are undetectable if properly done.*

*Right: Thread the barrel bushing to mate with barrel retaining nut.*

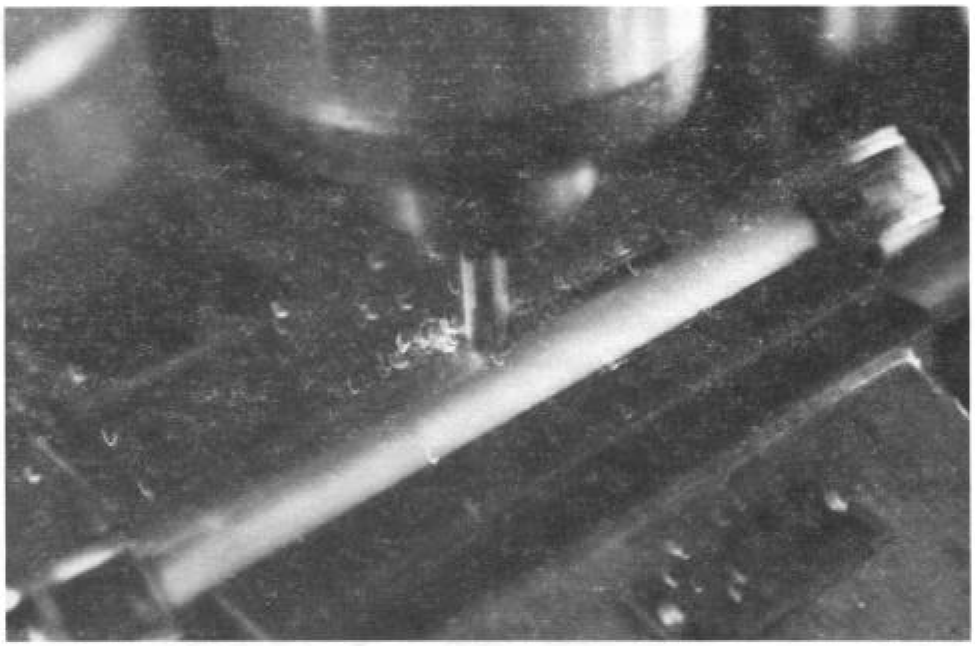


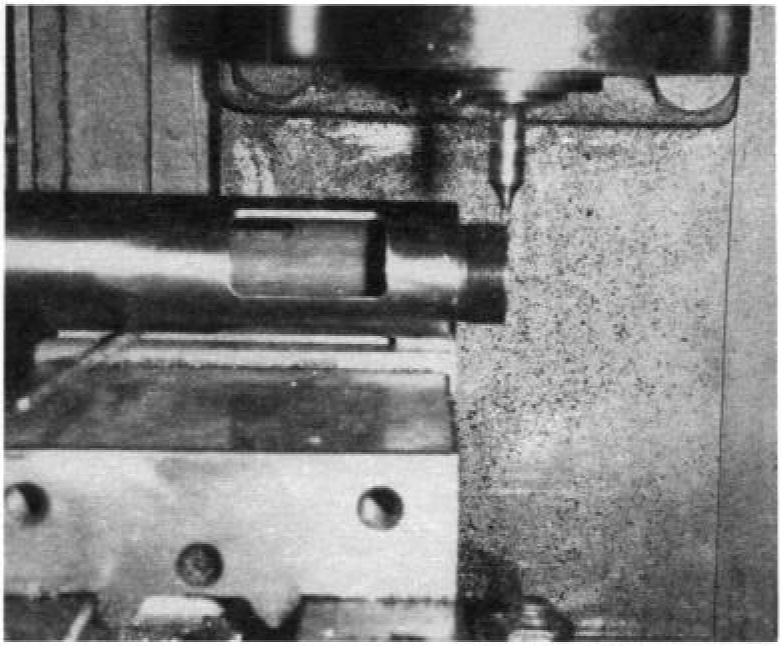


*Above: Weld the block to the lower side to form the hinge hanger. Weld a similar block at rear to accept the grip bolt.*

*Right: Openings in receiver are easily cut with milling machine.*

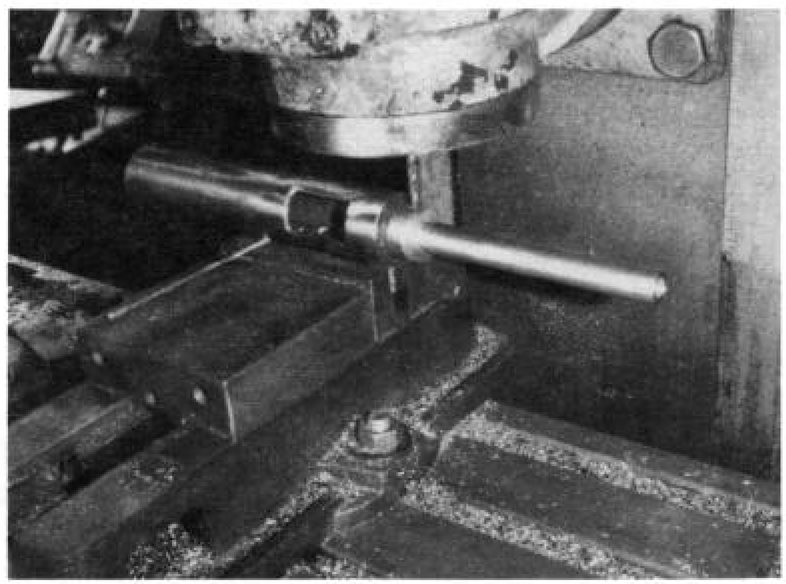
*Below: It will take a little longer, but the same result can be accomplished using a hand grinder.*





*Left: Cut a slot to accept the barrel locating pin in the receiver using 1/8-inch end mill.*

*Below: Drill a hole for barrel locating pin through the slot, assuring alignment.*



# CHAPTER 4

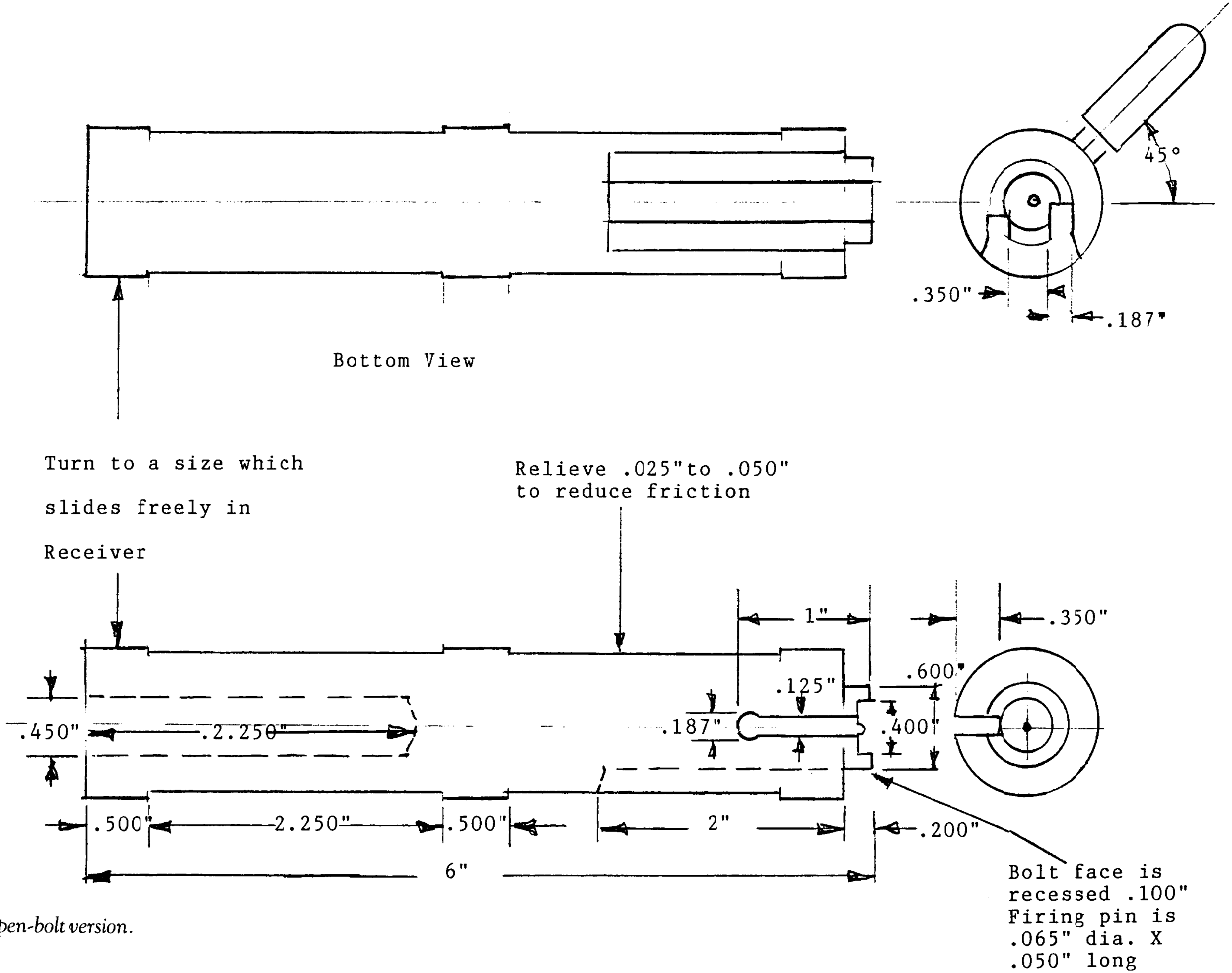
# Bolt

The bolt, or breechblock as some insist on calling it, is made from 1 1/8-inch-diameter round stock, 6 inches long. To prevent battering and undue wear, it should be made from material that can be hardened. If commercial steel is available, buy a type that you (or someone with the facilities) can harden to between 35 and 40 on the Rockwell "C" scale. If none is available, automobile axle material will serve admirably. It will almost always require annealing, as described in Chapter 2, because most of these have an extremely hard exterior surrounding a softer inner core.

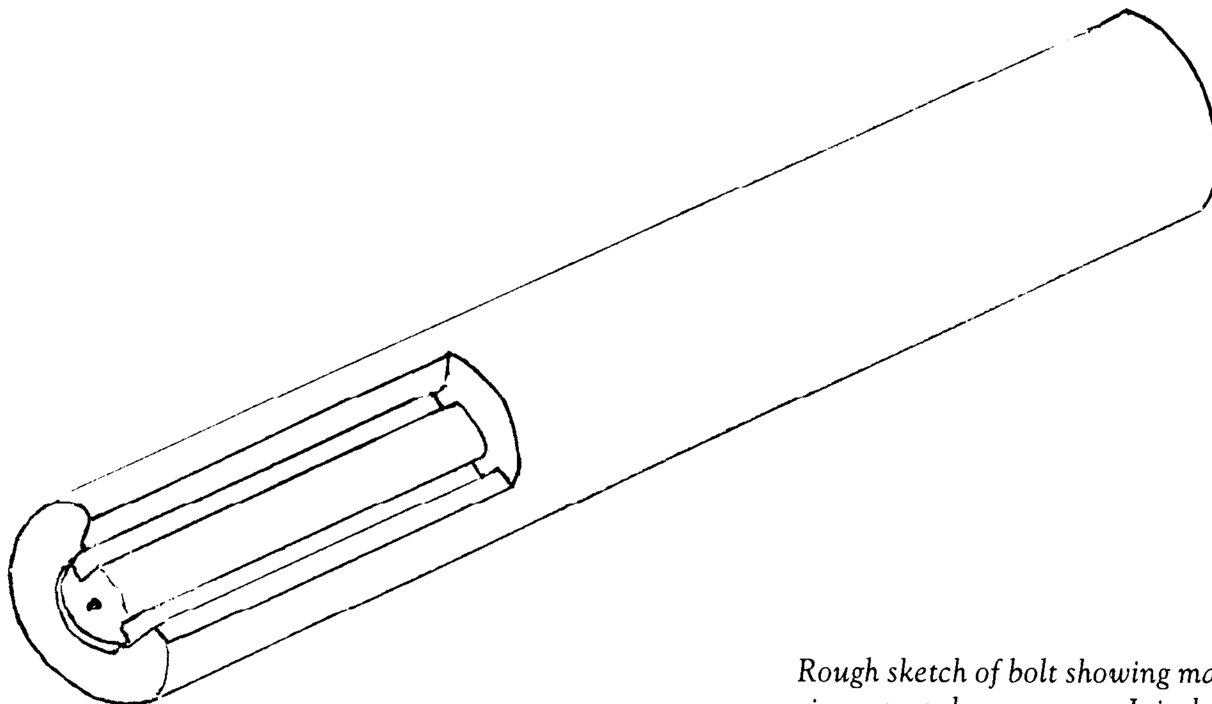
Although this book is supposed to describe how to build a submachine gun, I will show two different bolt and trigger assemblies. One will deal with an open-bolt, full-automatic design; the other is a closed-bolt, hammer-fired weapon. The latter is harder to make into a full-automatic weapon.

Whichever configuration you desire, they are made in the same manner and can actually be converted by switching the bolt and trigger assemblies. Be warned again. Don't let the feds catch you with the open bolt and corresponding trigger assembly, even if you don't have the rest of the gun.

At any rate, chuck a suitable piece of material in the lathe with the ends squared and true. Turn the forward end, forming a square shouldered projection .200 inch long by .600 inch in diameter. This forms the bolt nose, which is bored to a depth of .100 inch with an ID of .400 inch. In the center of this, form a fixed firing pin .060 inch to .065 inch in diameter and projecting .050 inch above the bolt face. This should have a rounded, hemispherical tip, which is formed by using a cutting tool ground for this purpose. This is used in the open-bolt gun. The closed bolt is made in the same manner and to the same dimensions, except that where the fixed firing pin was formed for the open bolt, a hole is drilled instead, using an .065-inch drill. This hole should be started with a number one center drill, which is only used to establish the center, followed by the drill. The hole should be drilled deep enough (at least 1/2 inch) to meet a larger .156-inch hole, which is




*Open-bolt version.*



*Rough sketch of bolt showing magazine cutout clearance cuts. It is shown upside down for clarity.*

drilled from the other end. Extreme care must be taken when using this small drill. It must be fed in very slowly, well lubricated, and cleaned frequently. If overloaded it will almost certainly break off in the hole, which will spoil the work because it will require more time and effort to remove it than to simply start over with another piece of material.

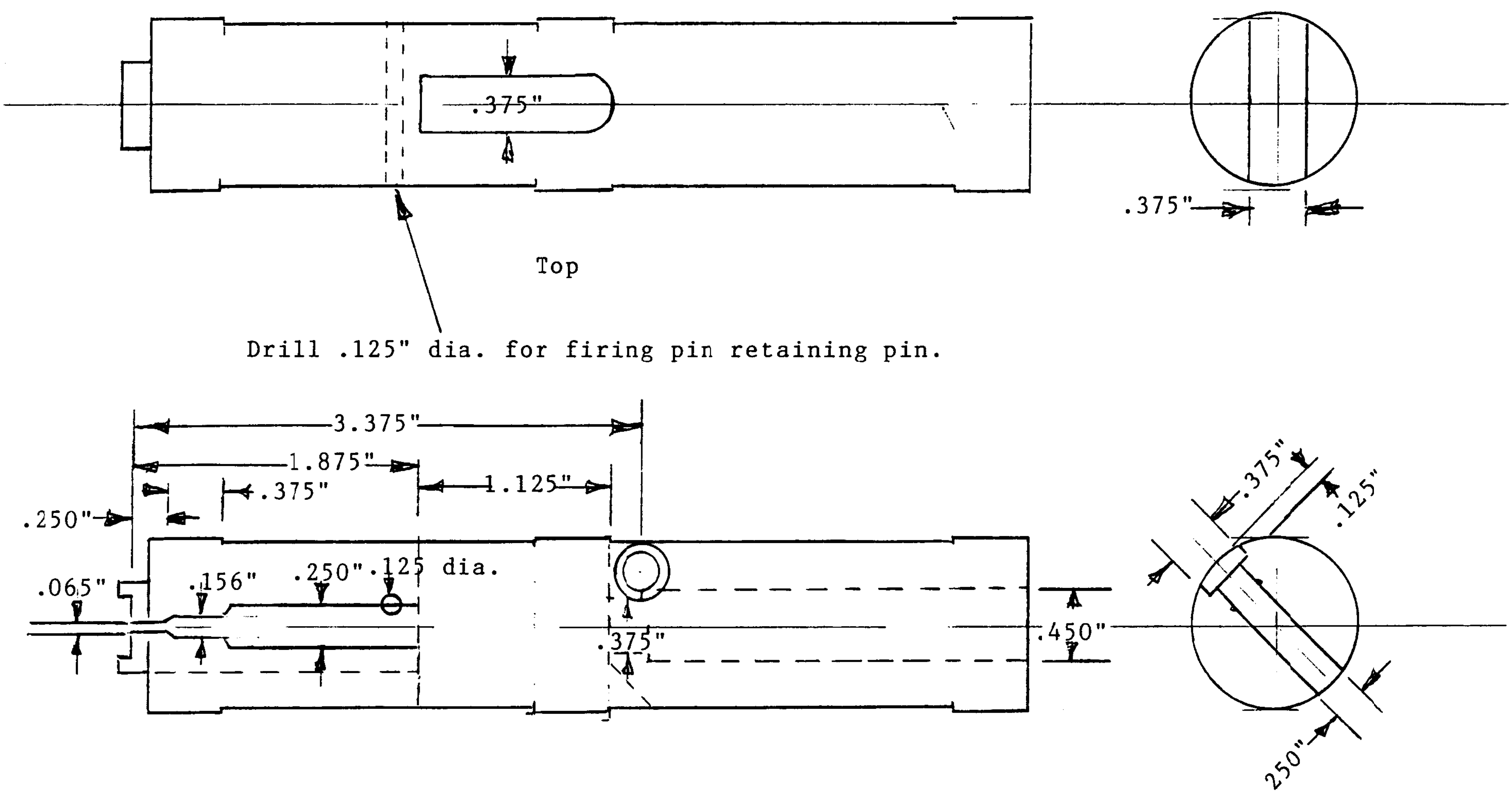
Reverse the bolt in the chuck and drill a hole to accept an M1911 Colt recoil spring. Since these springs measure approximately .435 inch in diameter, use a slightly larger drill to provide clearance. Either a 11.5-millimeter drill measuring .4528 inch or a 29/64 inch that measures .453 inch will suffice for this. The hole should be 2 1/2 inches deep.

The closed bolt must be drilled using three different diameters: one for the recoil spring, which is the same size and depth as for the other bolt; a smaller size to clear the firing pin head; and another for the firing pin body and return spring. These should be drilled to the depths and sizes shown in the drawing.

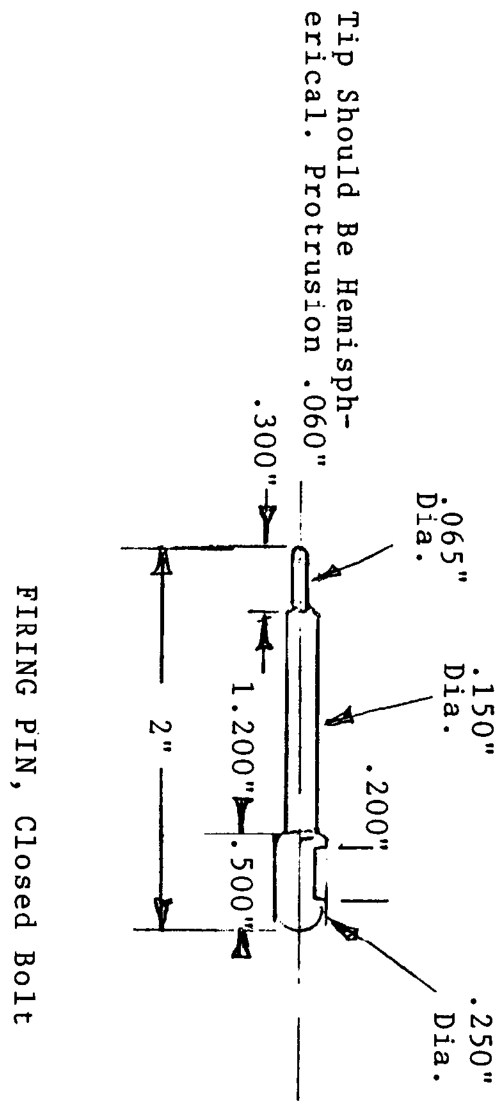
You can reduce friction by turning the bolt body to a diameter some .025 inch smaller than required, leaving three full diameter bands 3/8 to 1/2 inch wide, one at each end and one in the middle.

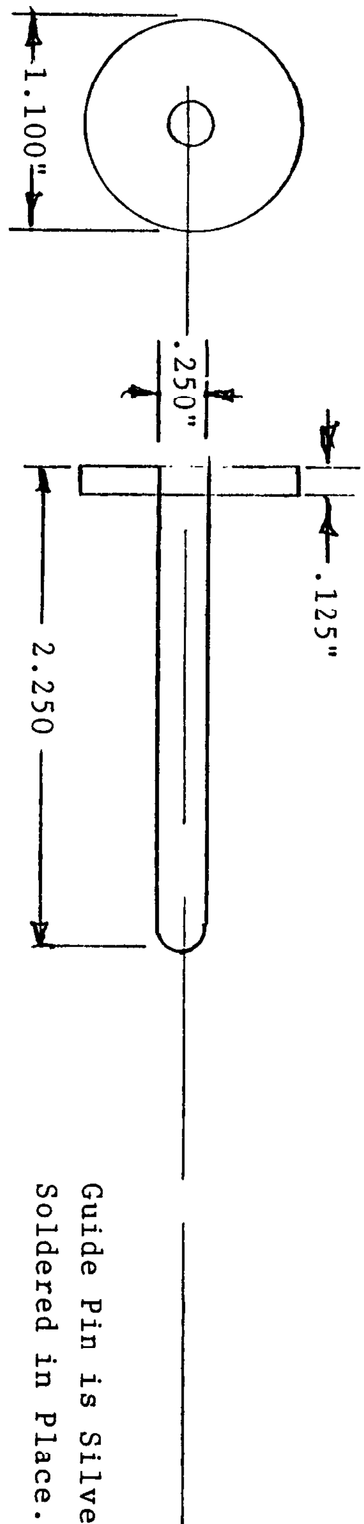
Cut a slot to allow installation of the extractor in the right side at the forward end. This will be in a nine o'clock position when viewed from the front. This should be 1/8 inch wide, 1 inch long, and .350-inch deep. Make a 3/16-inch-diameter spring pocket at the extreme rear end of the slot. This slot is easily cut with a 1/8-inch end mill and the spring pocket with a 3/16-inch end mill. It can also be done with the hand grinder or by hand by drilling intersecting holes to remove the bulk of the material and finishing with files and chisels.

Turn the bolt upside down, with the extractor slot in the three o'clock position when viewed

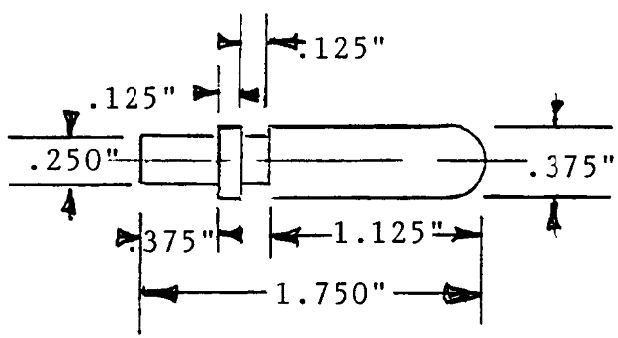



*Closed-bolt, right side.*

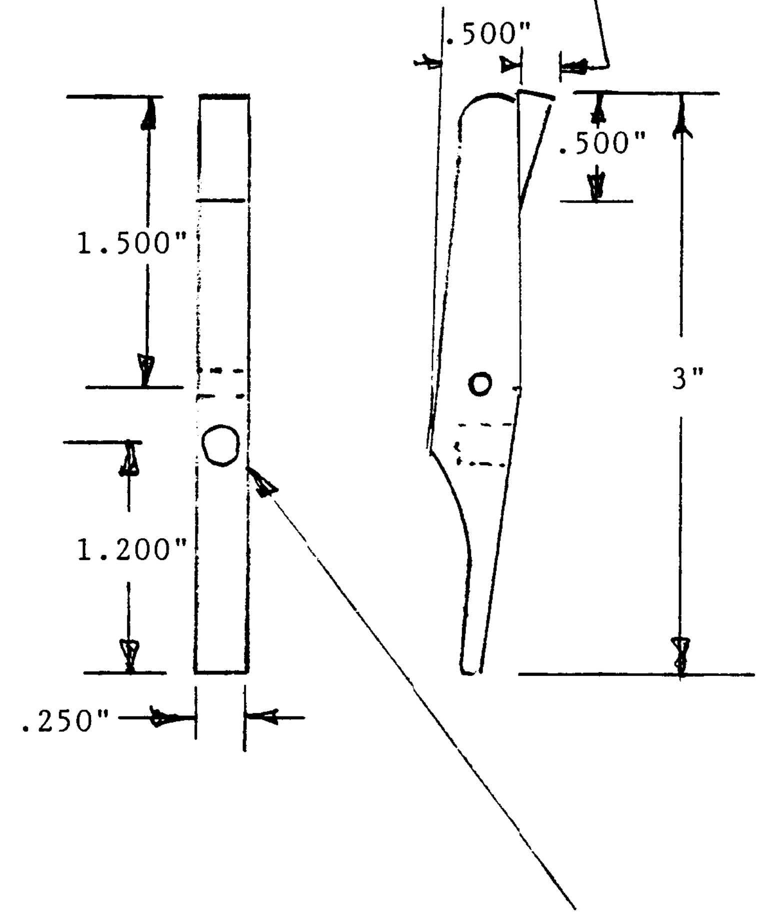



*Recoil spring guide.*




COCKING LEVER




Spring pocket is .187" dia.
..300" deep

Note: Hole for magazine release pivot pin is drilled with
Magazine in place and release pushed up against it.

*Magazine release.*

from the front. A slot is first cut, 5/8 inch wide, 2 inches long, and 1/4 inch deep, measured from the front bolt face and on the bottom centerline. Then rotate the bolt 15 degrees and make an angled cut down one side of the opening. Rotate 30 degrees in the opposite direction, which will enable the same 15-degree angle to be cut along the other wall. Then, using a 3/16-inch end mill, cut a slot along each side of the bottom, leaving a strip .350 inch wide at the bottom of the bolt face. These are to provide clearance for the ejector as well as the magazine lips. The one on the left side, as viewed from the front and with the bolt upside down, provides clearance for the ejector and should be cut .225-inch deep. This is the one on the inside, on the opposite side from the ejection port. The other slot needs only to be .100 inch deep. The strip between the two grooves should be rounded on the edges and polished as smooth as possible, because this surface contacts and rubs against the top cartridge in the magazine as the bolt reciprocates.

If the closed bolt is used, you must cut a slot 3/8 inch wide and 1 1/4 inches long, beginning 1 1/2 inches back of the bolt face and extending along the centerline to the rear. The radiused corners of the slot, at least at the forward end, should be filed square. The back edge, at the bottom, should be relieved at a 45-degree angle. The hammer travels in this slot and contacts the firing pin at the front face. Though not really necessary, if you cut this slot entirely through the top of the bolt, it will make access to the firing pin easier.

It is possible to cut these openings by hand, but it certainly isn't easy. By the time you are finished you'll wish that you had gone out and bought a milling machine or at least paid someone with one for an hour's work to do it for you. But if you must, it can be done.

Locate and scribe a centerline down the bottom side of the bolt. This can be done with the lathe, the same way we did the receiver. Locate and scribe two more lines, 3/8 inch from the centerline, and one on each side. Draw these lines, parallel to the centerline, from the front edge of the bolt to a point two inches to the rear. Draw another line connecting the two. Now, scribe another series of parallel lines 1/8 inch inside these lines.

A template can be made, either by tracing the drawing or by measuring directly off the magazine you intend to use. The template and dimensions shown in the drawings are correct for a Sten gun magazine. An outline of the opening to be made should be scribed on the bolt face.

The material inside these scribed lines must be removed by some means. If done with the milling machine, as already described, it isn't much of a job. If, however, you are required to do it by hand, you can figure on most of a day's work, several blisters, some sore muscles, and assorted cuts and bruises. You will probably decide that it can't be done several times before you finish. But don't give up; it can be done. The reason I am sure of this is because I had to do it on the first gun of this type I made.

Some type of depth stop is needed to prevent your drilling deeper than required. If a drill press is used, there will be no problem. Simply use the depth stop on the drill press. However, if a hand drill is the only kind available, some sort of stop must be attached directly to the drill bit. A collar can be made from a piece of tubing that is epoxied or soldered in place, or from a nut or washer that will just slip over the drill. Make up both a 1/8- and 1/4-inch drill in this manner by securing a depth-limiting collar in place on each.

Center punch marks are made 1/4 inch apart around the inside scribe lines and drilled on the punch marks using the 1/8-inch drill first and then the 1/4-inch drill. The holes parallel to the centerline must be angled inward, toward the center, at an angle of 15 degrees. The included angle of the finished sides will be 30 degrees.

After these are drilled along both sides and the end, stand the bolt on end, face up, and drill another series of holes two inches deep. Enough material must be left to form the radiused portion as shown in the drawing. If you have to cut this opening in this fashion, I strongly recommend that you obtain a drill press with a good vise for the job.

With all the outline holes drilled to the proper depth and correctly spaced, there will be very little surplus metal remaining in the cavity that we want empty. To remove any remaining material, just slide a small chisel under one corner and hit it with a hammer. The entire slug of surplus material should fall free.

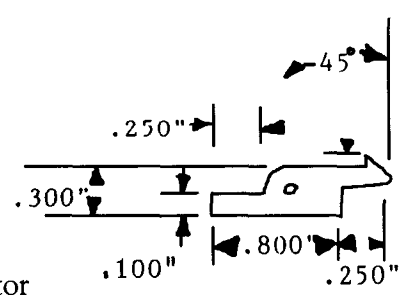
All that remains now is to remove enough additional metal to form an opening in the shape of the template. This will enable the bolt body to slide freely over and around the loaded magazine, allowing the radiused portion to pick up a cartridge and chamber it. Put a sturdy handle on a 10-inch file and wrap several layers of tape around the 4 or 5 inches adjacent to the handle. Then, by using both hands near the handle end, the forward end of the file can be used to greater advantage, together with chisels, to properly form and smooth the opening.

Make the extractor, as shown in the drawing, from 1/8-inch flat stock. Don't try to use common sheet metal for this. It will batter and deform at the hook end. Use high-grade material even if it means cutting a piece of car spring to the correct thickness or sawing a thin slice from the end of an axle to make it from. When cut to the shape and dimensions shown, put it in place in the extractor slot and drill the hinge pin hole. Place a close-fitting coil spring in the spring pocket and pin the extractor in place. It should open far enough at the front for the hook to snap over a case rim without binding. If the open-bolt version is used, you must use an unprimed case to test it.

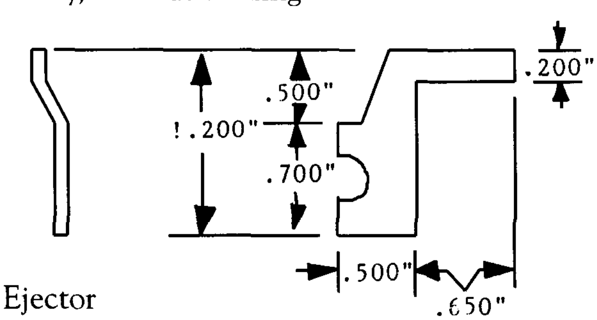
When using the closed-bolt version, a firing pin must be made to the dimensions shown. A hole is drilled in the location shown for a cross pin to retain the firing pin. A close-fitting plug should be inserted in the firing pin hole to support the drill as it starts through the opening. If unsupported, the drill will deflect, or crawl, to the unsupported side and probably break. The firing pin must have a slot cut on one side to clear the retaining pin. It is assembled by putting the return spring in place over the firing pin body and inserting it in the bolt where it is held in place by the cross pin. The firing pin protrusion should be from .050 to .060 inch. This can be checked by holding a flat object flush against the end of the firing pin and opening. This will cause the tip to protrude from the bolt face, just as it would if pushed forward by the hammer. The firing pin should be made slightly longer than specified and cut to length after assembly and trial.

With the bolt inside the receiver and in its correct closed position, indicate the location for the cocking lever by marking through the slot in the receiver. The cocking lever must not contact the end of the slot. Remove the bolt from the receiver and drill the hole, first with a 1/4-inch drill, which can go all the way through the *open* bolt but must stop at the hammer slot in the *closed* bolt. The hole is enlarged to 3/8-inch diameter for the first 1/4 inch. This will provide a shoulder to keep the cocking lever at its proper depth.

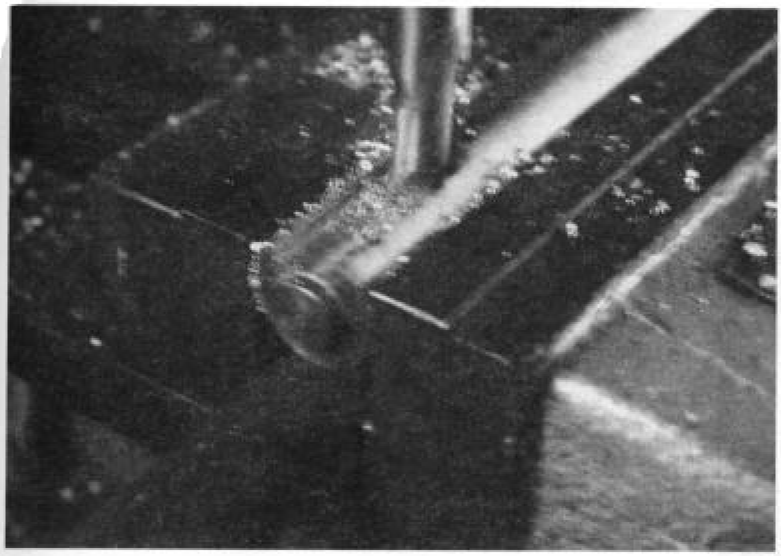
Make the cocking lever to the dimensions shown, at least for the end that fits into the bolt. The portion that protrudes outside the receiver can be of any shape or length desired. When assembled, the bolt must move back and forth freely, without binding.

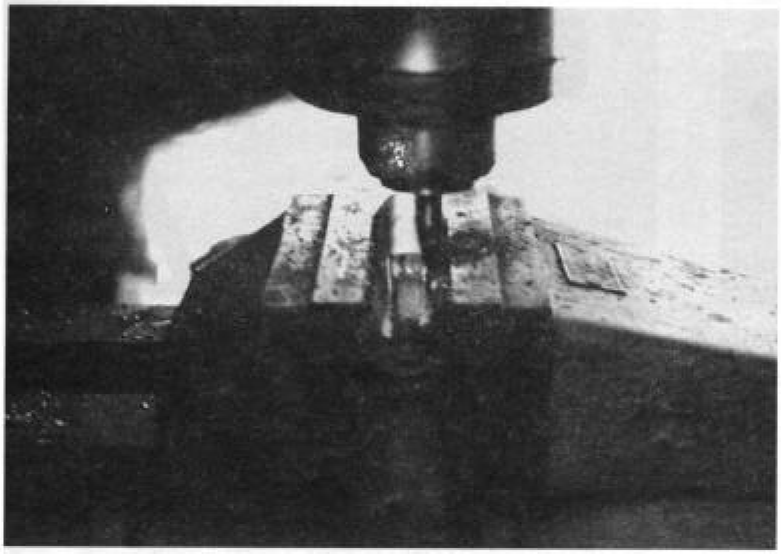


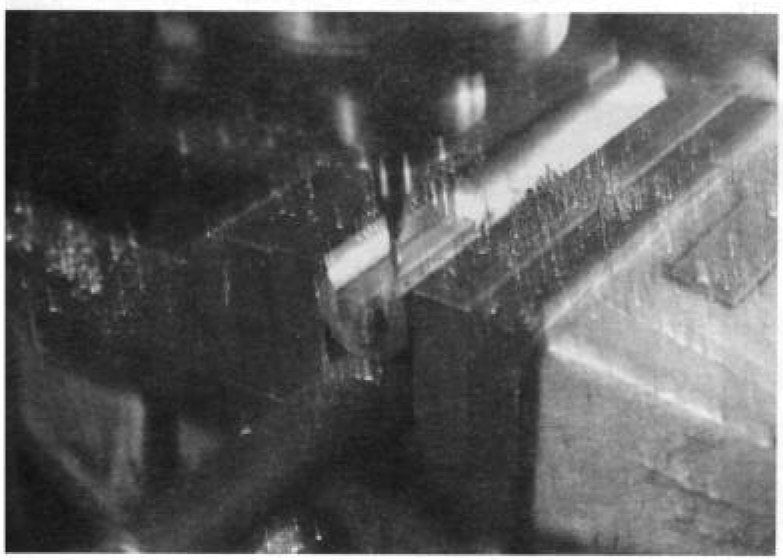
Extractor



Ejector







*Above: Make magazine clearance cuts with milling machine.*

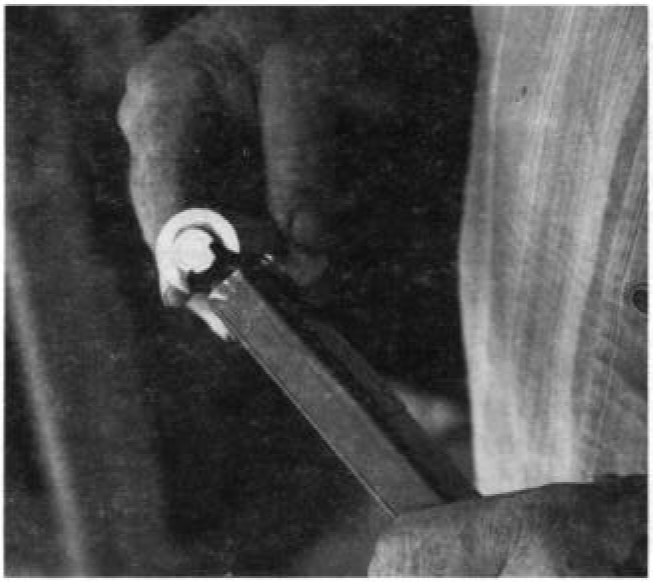
*Right: Angle sides of bolt cuts by using end mill.*

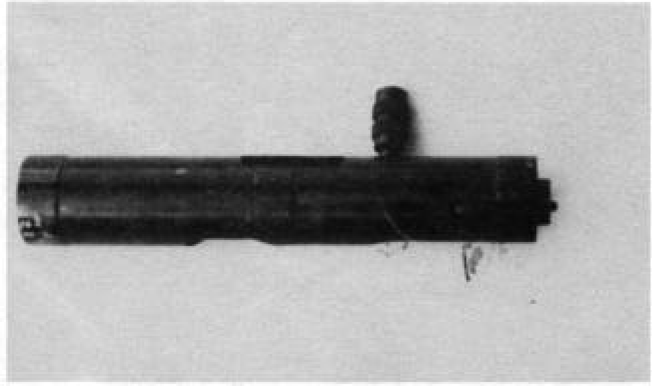
*Below: Make ejector and magazine lip clearance cuts by using end mill.*

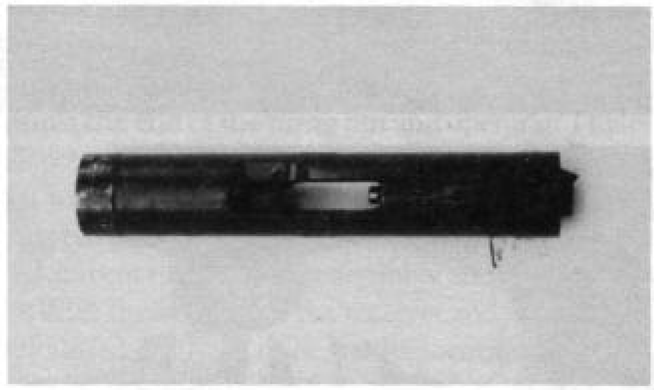
CAPTIONS FOR DRAWINGS ON FACING PAGE.

Extractor: Cut from 1/8-inch flat stock. Pivot pin hole is drilled through bolt body and extractor simultaneously. Hook end should be left slightly oversize-fitted to snap over cartridge rim during assembly.

Ejector: Cut from 12-gauge material. Semicircular cutout at rear to clear hammer spring. Horizontal leg is left oversize-fitted during assembly to almost contact bolt slot. Silver-soldered in place, flush with the inside left front edge of trigger housing bent as shown for alignment.





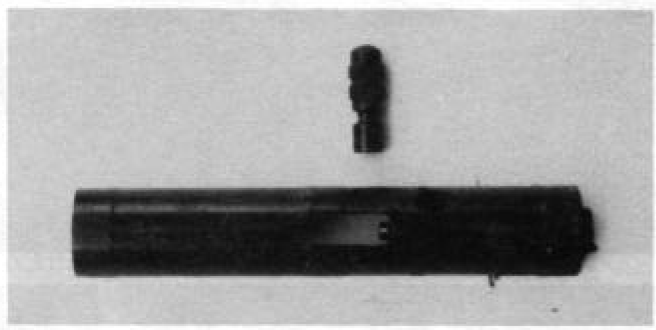


*Top Left: Front view of bolt, showing relationship to magazine.*

*Top Right: Right side of finished bolt.*

*Upper Middle Right: Bottom view of finished bolt.*

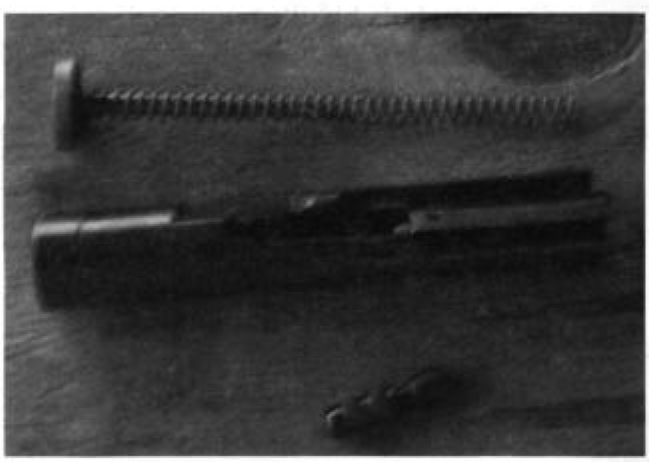
*Middle Left: Bolt, front view.*

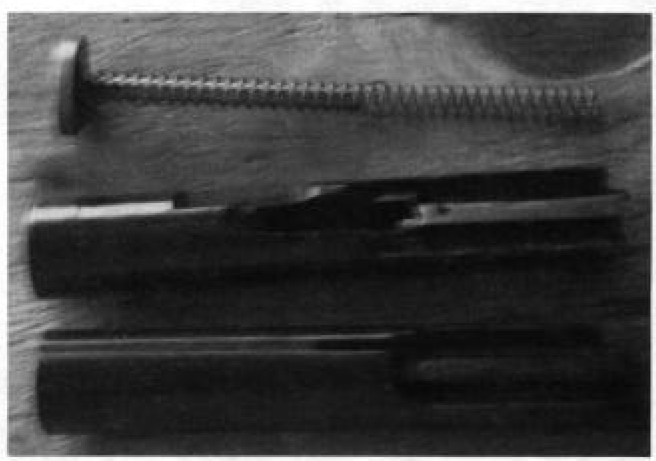


*Lower Middle Right: Bolt, top view with cocking handle.*

*Bottom Left: Closed bolt shown with recoil spring, guide, and cocking lever.*

*Bottom Right: Open bolt (lower) shown with closed bolt. The same recoil spring and guide are used on both versions.*





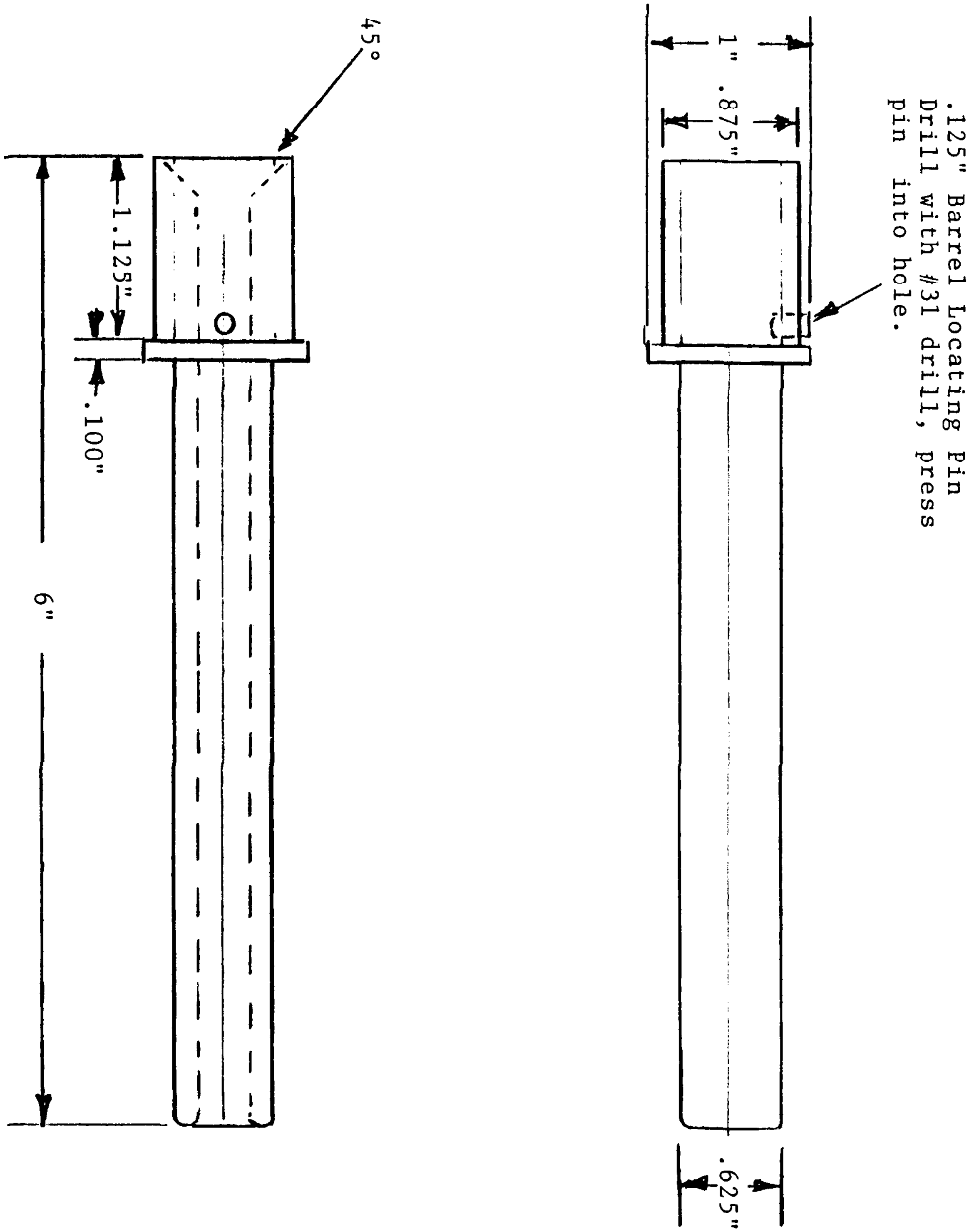
CHAPTER 5

# Barrel

At the present time there are at least 10 barrel manufacturers that can supply .35-caliber barrel blanks. Although a true 9mm bore is usually .003 to .004 inch smaller than the .357-inch groove diameter common to the .35-caliber barrel, several suppliers will send you the same size regardless of which one you ordered. In use you will never notice a difference. These blanks are available in many configurations ranging from featherweight blanks to bull barrels up to 1 1/2 inches in diameter for an entire length of 30 inches or more. Since this project requires a 6-inch-long section with a 1-inch diameter, it would seem to make sense to acquire a barrel blank slightly more than 24 inches long. Full-diameter blanks are usually somewhat longer than their advertised length. This length, with a minimum diameter of 1 inch, will give you enough material for four barrels. Barrel suppliers will charge you almost as much for a short length as they will for the long one. So even if you don't need it, the extra won't cost much, and it may be valuable property in the future.

As this is written, there are several companies in the business of manufacturing and selling chamber reamers. These range in price from a low of around $30 each to a high of nearly $100. These are usually available in the form of roughing reamers, which are used to remove the bulk of the excess metal, and finish reamers, which are intended, as the name suggests, to cut the chamber to its finished size and shape. Because only a small amount of metal is removed in a chambering job such as this, a finishing reamer will suffice. Specify that it will be used in a rifled barrel when you order it. If you don't, the manufacturer may send you a reamer with a pilot too big to enter the bore because many pistol caliber reamers are made with the pilot ground to groove diameter for use in pistol cylinders. I am aware that the 9mm cartridge is used primarily in full and semiautomatics, but there are revolver cylinders chambered for it on occasion, so to avoid a foul-up, specify that the reamer will be used in a rifle barrel.

Incidentally, the higher priced reamers will usually come with an integral throat reamer, *Barrel.*


45°
1.125"
.100"
6"
1"
.875"
.125" Barrel Locating Pin
Drill with #31 drill, press
pin into hole.
.625"

allowing you to perform the entire chambering operation with a single reamer. The cheaper ones often require the additional use of a separate reamer to cut the throat portion. In most cases the higher priced reamers, such as those made and sold by Clymer Manufacturing Company, will prove to be the cheapest in the long run.

The barrel proper is rather simple to make. Cut a section of the barrel length to the desired length (it isn't written in stone that this barrel must measure exactly 6 inches) and square the ends in the lathe. Turn the breech end to a diameter of .875 inch for a length of 1.125 inches. Directly in front of this, form a flange .100 inch wide and 1 inch in diameter. The remainder is turned to a diameter of .600 to .625 inch, as you prefer.

The breech end of the barrel should have a 45-degree approach cone to facilitate feeding. With such an angled approach cone, if the cartridge ever moves far enough forward for the bullet to contact the barrel, it will be guided into the chamber without the stovepiping or hangups common in other designs. Crown the muzzle end by using a lathe tool ground for the purpose. Both the crown and the breech cone should be polished to the highest degree attainable, using progressively finer grits of abrasive cloth or paper.

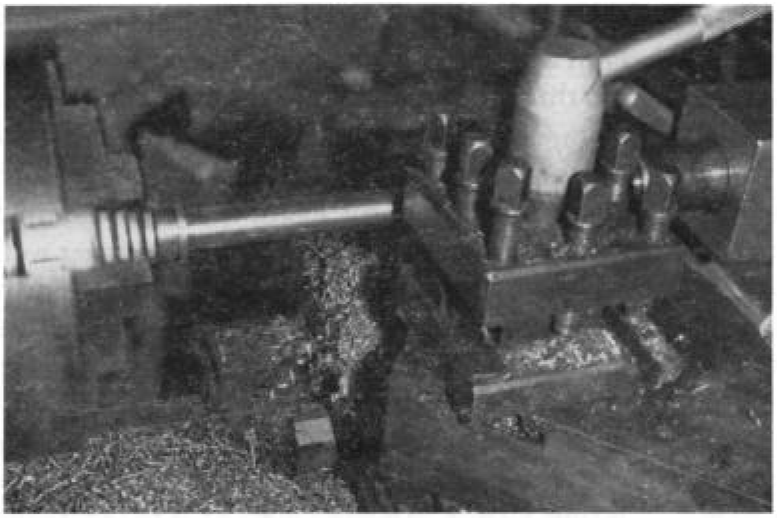
Determine chamber depth by measuring the distance from the front face of the receiver to the bolt face with the bolt held forward as far as it will go. The breech end of the barrel is also measured from the end of the approach cone to the flange. This length is slightly longer than the first measurement, so subtract the first measurement from this one. The result will be the depth of the cartridge head below the end of the approach cone.

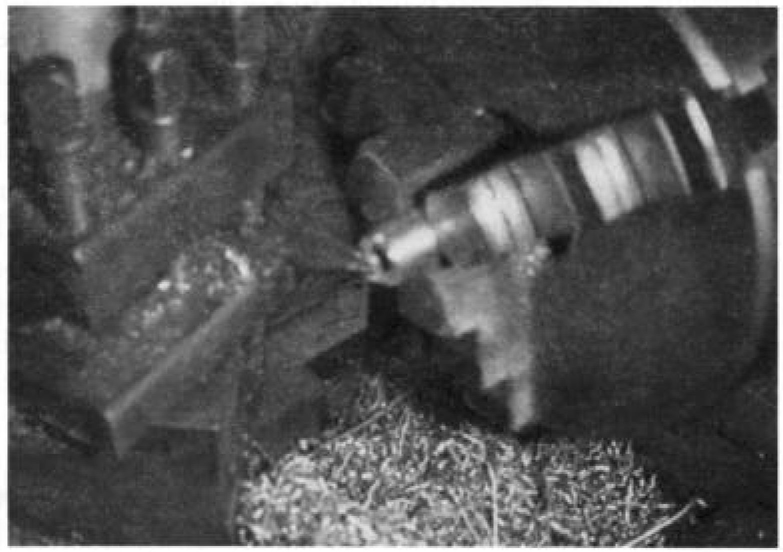
Cut the chamber by feeding the chamber reamer into the breech end of the barrel with the barrel chucked in the lathe while turning at the slowest speed available; pressure from the tail stock ram will be used to feed the reamer into the bore. Do not attempt to hold the reamer in a rigid tail stock chuck. Keep it from turning through the use of a hand-held tap wrench, clamp, small wrench, or some similar arrangement that can be released and allowed to turn with the barrel in the event the reamer should suddenly decide to seize. Keep the reamer well lubricated, and withdraw and clean frequently. As you approach the finished depth, clean the chamber and check your progress frequently. When the measurement between the chambered case head and the barrel end coincides with the previously established measurement, it is time to stop. Another method is to secure the barrel by clamping it between blocks in a vise. Then turn in the reamer by hand using a tap wrench or reamer drive. If this method is used, care must be taken to hold the reamer straight, in line with the bore, with no side pressure exerted in any direction.

Drill a hole, as shown in the drawing, to allow a locating pin to be pressed into it. This ensures that the barrel is located in the same position each time it is removed and replaced. This pin fits into a matching slot cut in the threaded end of the receiver. The hole is drilled with a #31 drill and a slightly tapered 1/8-inch pin pressed into it. Care should be taken not to drill into the bore.

Locate a slot to clear the extractor by coating the extractor front face with some sort of marking compound such as lipstick or Prussian blue and, with both barrel and bolt installed in the receiver, pushing the bolt forward against the barrel. Remove the barrel and the resulting imprint left by the marking compound will show the location of the slot to be cut. This can be cut either with a milling cutter or the hand grinder.

If the time should ever come when commercial barrels are no longer available, we will have to make our own. A method for doing this is included in *Vol. I*.

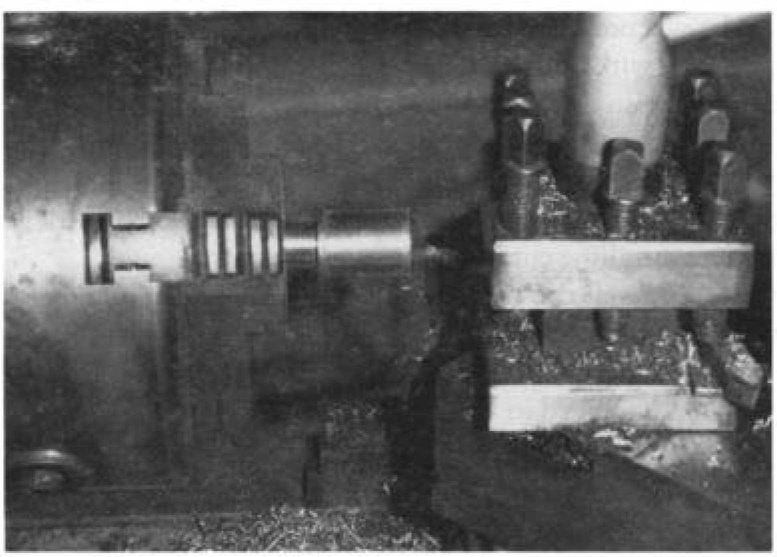


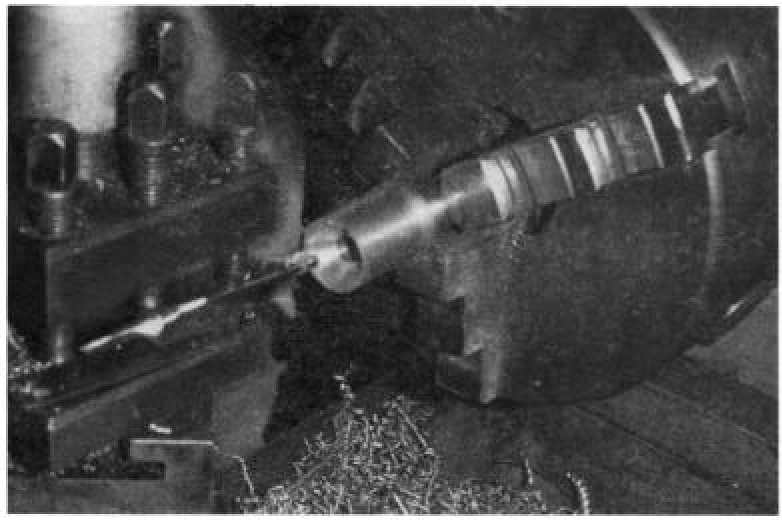


*Above: Barrel is turned to required dimensions.*

*Right: Muzzle end is crowned using lathe tool ground for this purpose.*

*Below: Breech end is cut to length.*



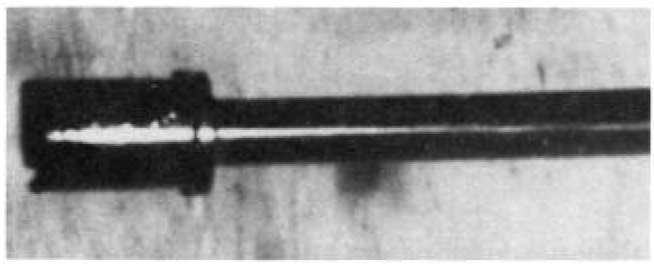


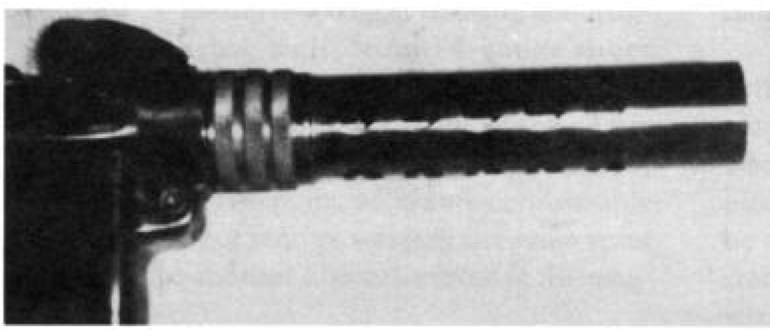
*Right: Approach cone is cut using compound feed.*

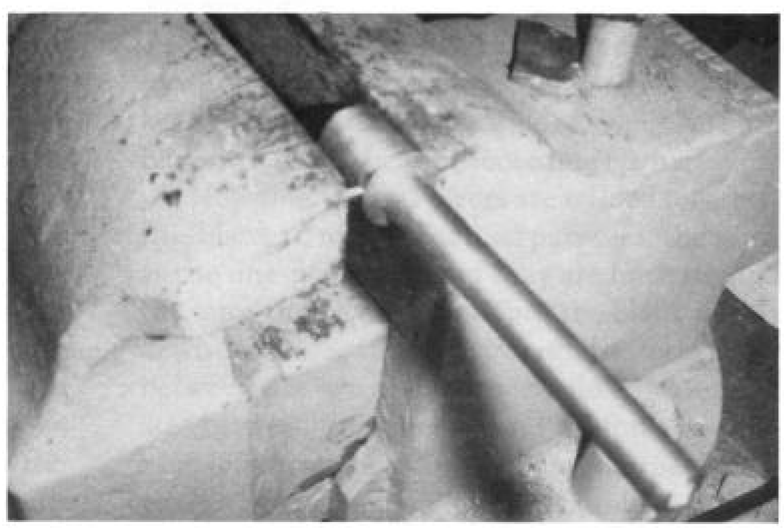
*Below Right: Finished barrel.*

*Below: Barrel in place is secured by being threaded on barrel shroud.*

*Bottom Right: Locating pin can be pressed into barrel hole by using a vise, as shown.*







# CHAPTER 6

# Trigger Assembly

You can make a lower receiver, consisting of a trigger housing and magazine well, from 14-gauge sheet metal. It can be cut in one piece and bent around a form block. This requires welding a seam along the bottom. Or it can be made in two parts, which are considerably easier to form but require welding the same seam as before plus another down the front of the magazine well.

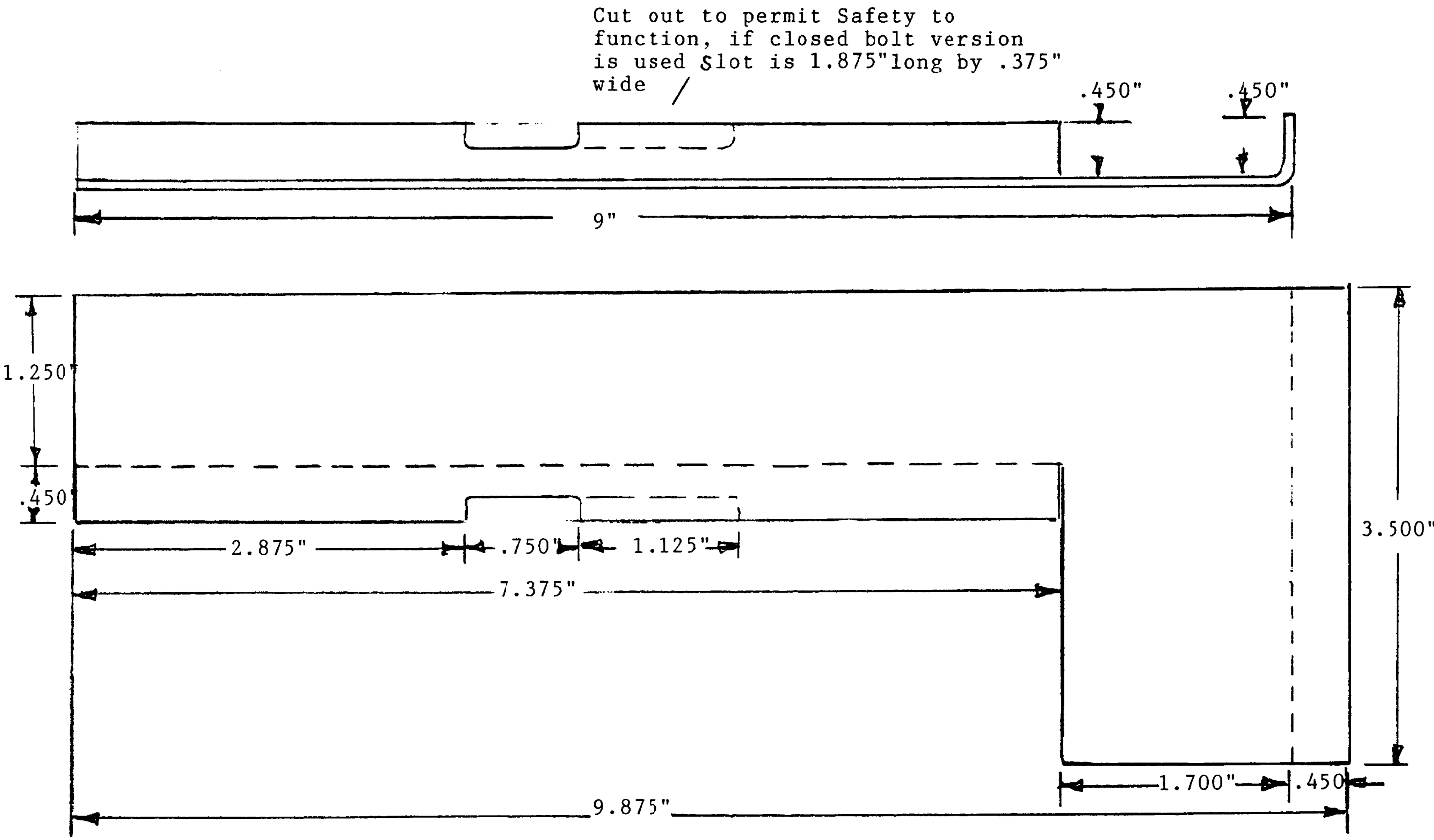
Regardless of which method is used, you have to make up a form block .900-inch thick, 1 1/2 inches wide, and 7 inches long. This will likely require cutting 1-inch-thick material thinner since material as thin as this is sometimes hard to find. It may be easier to bolt, rivet, or weld together a 3/8-inch thickness and a 1/2-inch thickness with an .025-inch shim in between; .22-gauge sheet metal is almost right for this.

Lay out a full-size pattern, or template, using the dimensions shown in the drawing. This is then scribed directly on the sheet metal and a full-sized blank cut to shape. This metal is too thick to cut with hand shears, so a fine tooth band saw should be used. It can be done with a hand hacksaw as a last resort, but it won't be fun.

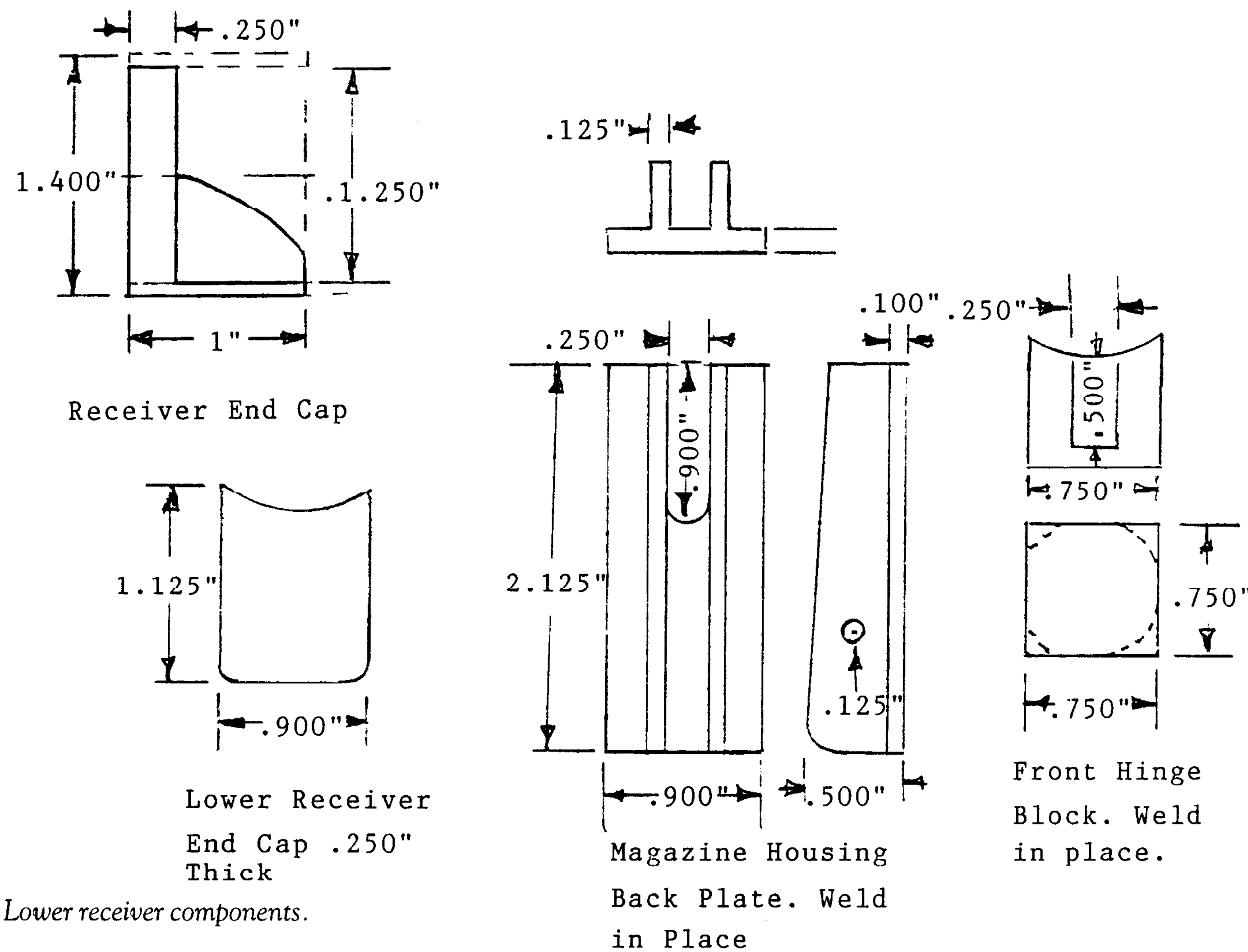
If you use the one-piece blank, bend the magazine well portion around the form block by clamping the blank and form block in a heavy vise and bending the exposed side to shape with a block and heavy hammer. The opposite side can't be formed completely in the vise. But it can be started and partially formed and then finished with the hammer after removal from the vise. The ends of the two-piece blanks are bent at right angles either by the same hammer-and-vise method or through the use of a sheet-metal brake. The seam should be welded, using the form block as a spacer, before proceeding further.

Now that the two pieces are welded together, this blank is, for all practical purposes, the same as the one-piece job, and they are both treated the same from here on in. Turn the blank upside down and clamp it in the vise with the form block between the two sides. You should block up the area between the vise slide and the form block to keep it from moving downward in the vise. Then, using a heavy hammer and block, fold the lower

Cut from 14 ga. sheet, two required




*Lower receiver template.*



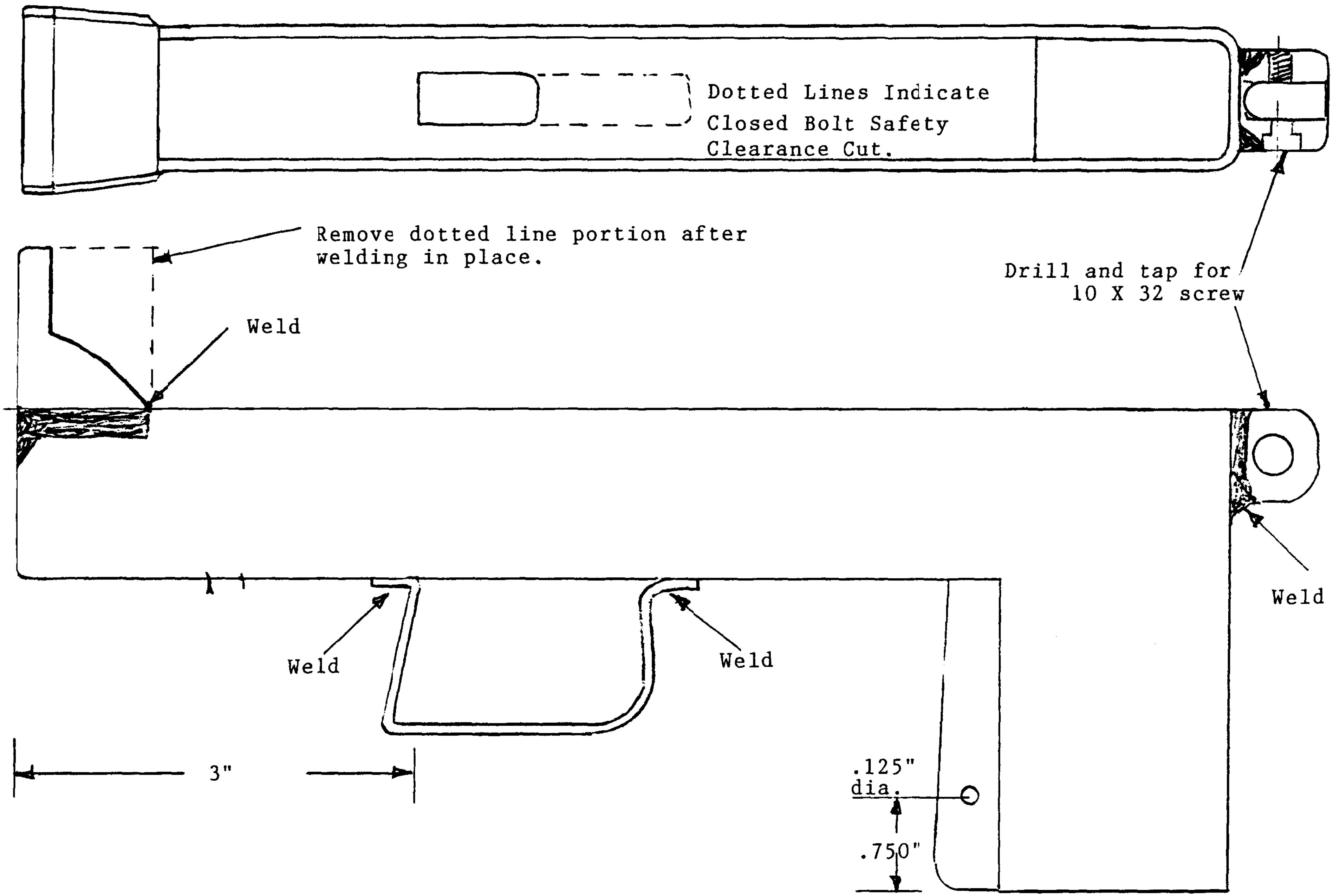

*Lower receiver components.*

sides over, forming the bottom of the lower receiver. Now weld the seam with the form block kept in place while the welding is done. Unsupported sheet metal has a bad habit of changing shape when heated.

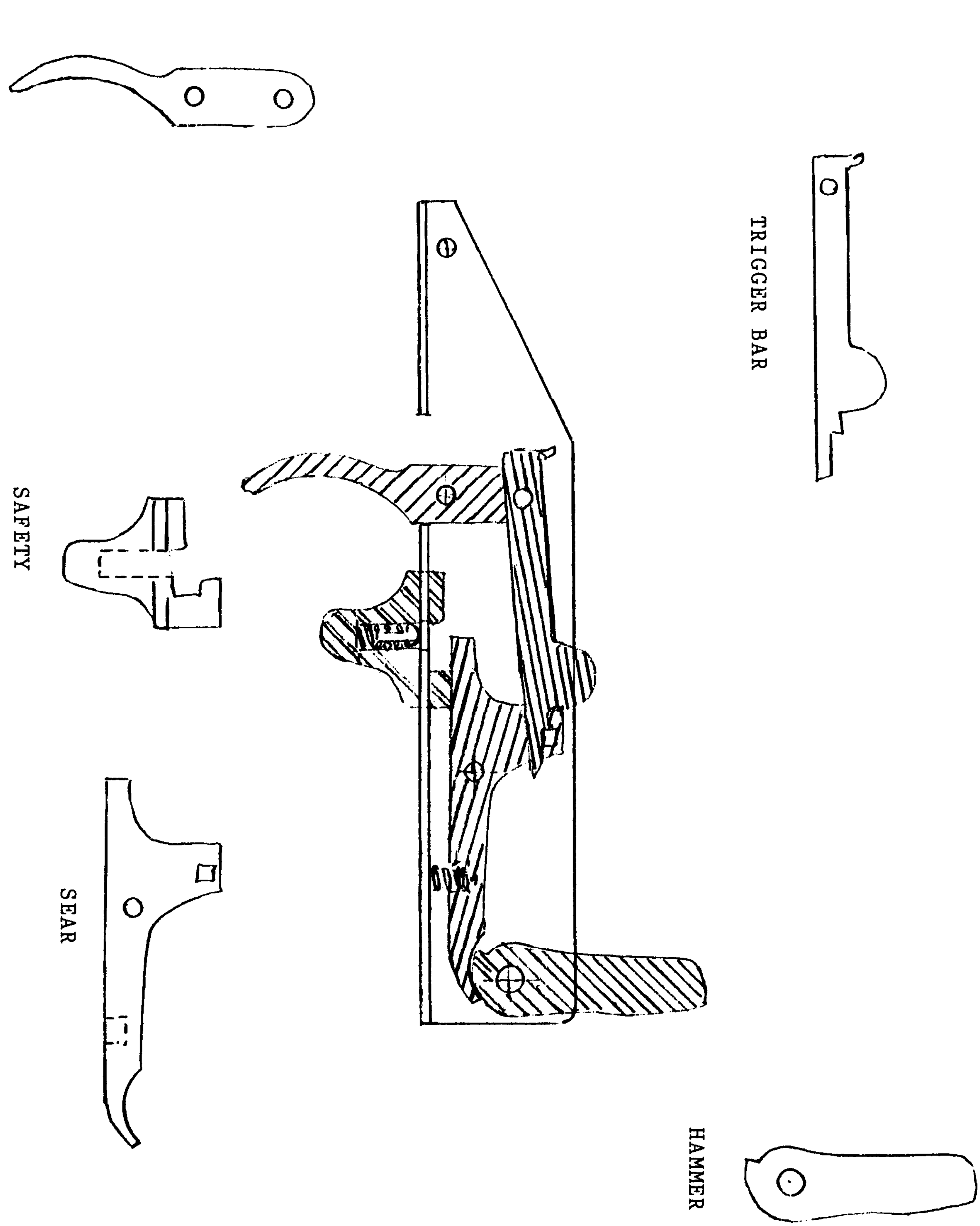
Cut a back plate to size and weld in place across the back of the magazine housing. If a milling machine is available, this can be made with the magazine release housing integral. If not, you will need to use a sheet-metal plate welded across the back and to fold the housing from sheet metal and weld it in place. A slot must be cut through the back plate to allow the magazine release to engage the magazine. Weld a similar filler plate in place at the extreme rear end of the trigger housing.

Weld a 3/4-inch steel cube to the upper front of the assembly. The edges should be beveled and welded all the way around and built up above the surface, depositing enough extra metal to form a concave fillet around both sides and the bottom. Slot this block on the top center to accept the front mounting lug of the upper receiver.

The upper surface of the assembly should now be machined flat and square and cut on the inside to a concave cross section to match the radius of the upper receiver. This includes the block welded to the front end. The easiest way to do this is with a ball cutter in the milling machine, but it could be done with files if required. Now slot the front block to accept the front receiver lug using a 1/4-inch end mill.




Lower receiver.




*Closed-bolt trigger assembly.*