Excerpts from a conversation with a guy who got a forming set:

"I was thinking about your comment that you are getting set to do a bunch of these, and are expecting to learn welding in the process. MIG is a funny thing. i was a welder for 12 years, qualified in MIG, stick, and TIG. Lots of people cold weld MIG, and don't get the fusion they need. You should get lots of practice in before you start welding on your flats and rails (btw, did you see that Tony dropped the flat/rail price to $15?). Practice welding thru drilled sheet to 1/4" steel, and twist a few apart with a vise grips to test your fusion. When doing your actual welding, wrap areas you don't want to spatter in 2 thickness of masking tape, or a damp cloth.

Don't expect that making your ak will be as easy as cranking together an FAL. The assembly is cake, but building a receiver is trickier. I had a SAR-1 handy for assembly reference when i built my first kit (polish under-folder on an Ohio), and had several together before folding a flat. The location of the lower rails is predetermined by the center support holes in the rails and flat, but you may get some binding of the carrier on first assembly that will need to be worked out by finding the point of interference and removing a few thousandths.

One area of interference I've seen is the lower right side of the bolt face as it over rides the mag feed lips. Some mags seem to ride a little high and need to have their feed lips broomed off a few thousandths to reduce interference with the bolt. This doesn't affect their use in other guns. I had to grind a small (1/16) bevel on the bolt face in this area on one build, and have had to adjust lower rails slightly so that they allowed the clearance cut in the left side of the bolt to ride the rail. trimming the inside edge of the ejector will be required if you are building a '47, as it has a larger bolt face, and shallower clearance cut than a '74, as built for the 5.45 X 39.

The forming set I'm sending you has a square corner on the top of the sideplates. Be sure to tamp this corner square, or you will have binding on the upper rails, as i did in my first flat build (the prototype forming set has a radius here).

If you are welding lower rails, you should set them in place on the center support, and align with a 9/32 (?) bit between the lower and upper rails. You may want to drill holes in the receiver flat, and plug weld the rails thru these. The rails will be held tight by the center support (make sure your width is right here), but you should have a small clamp out on their ends when welding or brazing there. I was able to reach inside the receiver from the mag well with a stick welding wire in one case, but am silver brazing, now. It's much easier, and if you can get a MAAP gas torch ($40 at Wal-Mart) and some flux coated silver brazing wire at your welding supply house you will not regret it. I will send you a few sample food grade rods (expensive stuff, but the flux is a powerful cleaner). when using MAAP and silver solder, clean the parts before assembly, clamp them together, bring them up to a temperature that will make the rod flow (just beginning to get red), and let it wick between the parts. Cleanliness is less important with these very reactive fluxes, but should be attended, anyway. Flux is removed after soldering with a hot water scrub. A MAAP torch will also allow you to spot harden and temper your ejector and axis pin holes.

If you are gonna plug weld, open up the trunnion hole diameters to 1/4-5/16, and only weld one of the front and rear trunnion holes on each side while test fitting, but all before firing. The bolt carrier should slide freely on the rails. Get this part right before you install the FCG (the hammer in the cocked position will put pressure on the underside of the bolt). take your time and be patient in this build. i have more time in fitting in these flat builds than when building with an Ohio or Vulcan.

Building an ugly weld together with a Vulcan would take me less than 2 hours. A well done flat is another animal, entirely. Estimated times to complete work, after having done a few: maybe 30 minutes to shape the flat, an hour to set a screwed in center support and silver brase lower rails in place. an hour to properly harden and temper as required. An hour to fit and weld one hole each trunnion each side. An hour to try fit carrier with a dremmel and carbide and trim upper rails. An hour to finish welding. 30 min to grind welds smooth without diviting. An hour to file and polish receiver with a palm sander and 200 grit paper. An hour to install trigger guard with 8-32 screws and nuts ground to fit the limited space inside the receiver (do this with hardware, even if you weld everything else). 30 min to assemble all internals, stocks, etc.

Then there's finishing and customizing...sounds pathological, eh? Guess we all gotta have a hobby.

Regarding the specifics of welding: use an .030 wire, about 90-120 amps, and about 15 CFH on your gas regulator. Try short welding times, like 1-2 second for a 1/4" plug in sheet to thick, and about 1/2" wire stickout. More gas flow will cool a weld. CO_2 only will increase heat and penetration. AR/CO_2 will reduce spatter and smooth out a weld. "

AK 47 Tapco Flat Bending Form

At this writing (Feb 2004) there is on the market a flat for bending into an AK 47 receiver which I believe to be from the same stamping that is used in the making of the Hesse, now Vulcan receiver. I have put a few Vulcan's on European AK kits, and can say that I like them very much. The Vulcan receivers are in spec, and build functional guns. The flats which I have received from Tapco, and which are also available at JoeKen, are of the same quality and material, and also build fine guns. Many individuals are making their own flats, often by tracing a Tapco flat, or calculating dimensions and doing some good old fashioned layout. A variety of sheet thicknesses may be used for an AK flat, but stock around .040 is optimal. Thicker receivers could be built with a form, but there is no discernable advantage to a thicker receiver wall for the average gun. Thicker receivers also need to have their off side holes dished to catch the axis and selector pins.

A word on the legality of building an AK 47: know the law in the state in which you live. ATF 5300.5 is a synopsis of all relevant state gun laws, and is a better source than any kid with a cool avatar on your favorite .net gunboard or any drinking buddy you find at the local brewpub. You are responsible for any gun you build, so take it seriously, and caveat manufactor.

My design for forming the flat was something I dreamed up while sitting at the desk one day. I had drawn plans for a very small vee die and knife assembly that could be used in any good-sized vise, but decided there had to be an easier way to form these shapes. The biggest problem with this shape is that it is a closed C shape, with 4 sides, one of them interrupted. There is also an area near the magwell that will resist bending in any vee die over ¼" wide. To overcome these difficulties, I designed a form that avoids the use of a vee die and controls the lower segment of the flat in compression. My form is made of steel stock, but it may be copied in aluminum, brass, or even wood, with a little imagination and adjustment of dimension in part size. If you go with hardwood (maple would be my choice) a one piece internal block may be used if the magwell dimples are lengthened to the front edge so that the form may be slid out of the back of the formed receiver (see sketch). Thru bolting of the base plate to form block would be necessary.

The objective in bending these flats is to achieve a certain set of inside dimensions, square corners, and correctly center all bends. If you miss on your interior dimensions your trunnions and axis pins may not fit and engage. If your corners aren't square, your axis pins won't line up, and other parts won't fit right. If your bends aren't correctly centered to within a few thousandths the axis pins won't hold the FCG in it's correct position, and the selector holes won't line up. Things get worse from there. My first set of inside forms had a long radius under the top rail bend. I have revised this to a more square corner to eliminate occasional binding of the carrier.

The correct interior dimensions for an AK receiver are 1.250 width at all locations, 1.170 from underside of top rail to interior of bottom plate at the front opening of the bent, and 1.62 as measured similarly at the rear of the bent. An overall length of 10.180 is correct, and will allow dust covers to lock in correctly. The flats I have from Tapco were cut to the correct overall length, but had excess stock in the area of the top rails, which is an aid to bending (a good thing).

The form I have designed is made of 5 pieces, with associated hardware. A bottom interior plate (measuring ¼ X 1.250 X 14") is mated with 4 clearance drilled holes to an exterior plate of the same dimensions with tapped holes. Side plates varying in height from .920 to 1.370 and 10.25 length are divoted to allow folding without damaging the mag dimples of the flat, and are slightly radiused at the top. The center spacer is of ¾ stock, and can be wood or metal, and is shaped as

the interior sidebars. A small bucking bar should be used to avoid dings in turning the metal into this form. A decent vise is good to have, but a tabletop and a few c clamps will do the trick. A softwood forming spacer of 1.25 X 2 X 10" is also needed. A caliper should be used in this work, but is not absolutely necessary.

The first step in the folding process is centering the bottom clamping interior and exterior plates. A caliper is nice to have, but a steel rule and a Mark 1 eyeball can also be used. The plates should be screwed together finger tight capturing the flat, and the flat centered with respect to the trunnion holes, which make a good, consistent reference point. If you are working some weird flat without trunnion holes, you are far enough off the beaten path that you oughta be able to figure this out yourself. Draw the screws wrench tight, and recheck your center, and do it again if it's not right.

Clamp the flat facing away in a wide vise, maybe padding the jaws of a standard vise with 2 X 2 X ¼" angle, or down to a tabletop. Use a 2 pound hammer and work your bucking bar along the sheet to turn the projecting sheet sidewall to a 30* angle. Turn the flat for access to the other sidewall, clamp it on your softwood spacer, and repeat, going to 90* with the second side. Rotate the flat to finish the bend on the first side. When using the bucking bar on sheet, move it down the length, bend a little at a time, and all points of the sheet at once to avoid stretching the metal.

Put your center spacer and inside forms into the fold, and sit the folded flat on a hard surface. Use the hammer and bucking bar to tighten the corners of your fold. Do this to both sides, watching to insure that the corners are square. This tamping tight will set the angle of the bend in your sheet, and must be done to guarantee the 1.250 interior dimension the axis pins depend on.

After tamping corners, capture the folded sheet and form in your vise up to the level of the top rails, and buck them over, tamping square. Tighten up any loose areas before you remove the form pieces. Look your work over before you let it go.

Remove the center spacer, tap out the side plates, and remove the bottom plates. Make any adjustment to the general shape you might need by hand.

Next step is installing the center support. I use steel ¼" tubing, and 8-32 screws. The holes in the Tapco flat and lower rails are correctly sized for 8-32. 10-32 I have also done by reaming the tube and flat/rails holes. The center support tube length should be 1.250" minus the combined thickness of the lower rails, which are .059" in my sample. In the Tapco flat kit the lower rails have holes that line up with the center support holes. Your center support screws or rivet, then, will position the lower rails. After installing the center support tube and rails, the rails may be rotated into a parallel position by putting a 9/32 drill bit between the upper and lower rails. The lowers may then be attached to your receiver by drilling and tapping a few screws into them, silver soldering, or welding. Dropping the hammer on the center support tube while the bolt and carrier are out will bend it and reduce your receiver width, binding the carrier. A riveted tube, or a solid rod blind tapped would be better.

In the context of this discussion we are building a gun with the barrel installed in the trunnion, and the trunnion drilled and tapped for 10-32 screws. This is a good fit to the size of the original rivet holes in the forged trunnion, which is hardened, and difficult to work. When drilling out the old rivets, grind them flush, center punch, and pilot with a small bit before opening the hole to the correct diameter for a 10-32. Do not over drill and cut into the chamber. Tap with a starter and then a blind tap to about ¼" depth.

As an alternative, you may rivet, or you may enlarge the holes to 5/16" diameter and mig or stick plug weld and grind smooth. You might also use an oxy acetylene torch and c clamp to silver solder a receiver to a trunnion. MAAP might not get your heat fast enough. If you do this, avoid heating the barrel, and be quick, working a few areas, not the entire trunnion side. If your kit comes with trunnion separate from barrel, it's easier to drill and tap before pressing your barrel, but don't pull a Guccione and crank a receiver on crooked before you have the barrel installed to emphasise your error. Riveting increases the likelihood of this kind of failure. A barrel .0015 oversize for your trunnion hole is to be expected. This is a deliberate interference fit, and can be pressed with hydraulics, or carefully bashed into place with B F'n Hammer. Use a little plumber's anti-seize that you can get in a hardware store. Sit the trunnion on a wood block, lube it up, orient the barrel, and press/bash it in till the cross pin hole is perfectly aligned. Check this with a pointed wire. A sacrificial muzzle nut/flash hider will protect your threads while under the BFH. The cross pin will need to be pressed or hammered into place in the same way.

With your receiver now bent and center spaced, the next step in your rebuild is the installation of your front trunnion. Trim the front area of your upper rails to allow the trunnion to slide into the front of your receiver and pull it up tight against an inserted magazine. The holes in your flat should be close, but may need to be opened in one direction or another to line up with your drilled and tapped trunnion holes. Use a drill or a small die grinder to enlarge the holes to accept your 10-32 screws in the correct alignment, and dry fit them.

With the front trunnion in place, slide the rear trunnion into the receiver, and clamp it when inserted flush. At this point, try the top cover to see that it will just clear the shoulder of the rear trunnion, sitting down to it's correct position. If necessary, adjust the location of your trunnion, and install it as your front trunnion. Trunnions for folder stocks will require special modification of the receiver, and modifications should be made as required.

The upper guide rails may now be trimmed to allow function of the bolt carrier. It is helpful to have an example handy to check your work, but my drawing attached provides some guidance in dimensions. Use a die grinder or file to remove much of the upper rails to the required dimensions. Do not trim the upper rails before installing trunnions. After the carrier is installed, the inside face of the ejector may need to be trimmed, as it is smaller for the 47 cartridge than for the 74 cartridge. At this point it is recommended that the ejector and axis pin holes be heat-treated. This is done with a maap gas torch, the kitchen faucet, and a bit of sandpaper. Use your torch to quickly bring the ejector face to a bright red color (1600*), and quench it under running water. Brighten it up with sandpaper, hold your torch a little farther back, and warm the ejector thru the brown colors (300-400*) up into a deep blue (800*). shut off your torch and allow the ejector to air cool. Repeat this process with each axis pin hole separately.

Assembly of the trigger guard to the receiver can be done with 8-32 bolts, but the nuts will have to be shaped with a grinder to fit, as the holes are rather close together. The pistol grip may now be installed, and the screw that holds it in place. The hammer and spring should be installed on their axis pin, and the trigger group put in place, but not on the pin. Be certain to include the sear spring in your assembly of your trigger group. Install your selector lever, push the trigger group forward, and rotate the selector to the fire position. Slide the trigger group into alignment, and install the axis pin. Hook the spring over the rear arms of the trigger group, and slide your shepherd's crook under the rear axis pin, and over the front axis pin. Spring wire is preferred for a shepherd's crook, but any similar sized wire will work for awhile, and aftermarket manufacturers make a plate similar to that used in an FAL lower.

After completing these stages of your build you should be able to do a full assembly of your AK rifle and make any minor adjustments necessary to enable full function. Here are a few:

One adjustment I find helpful is to trim the hammer so as to allow the underside of the bolt to over run the hammer when it is in cocked position. Many kits will bind at this point, and a little lightening of the hammer at this point will not adversely affect operation. See the attached sketch.

Magwells will be a little tight in many instances, and should be opened with a file or stone to allow for easy mag insertion.

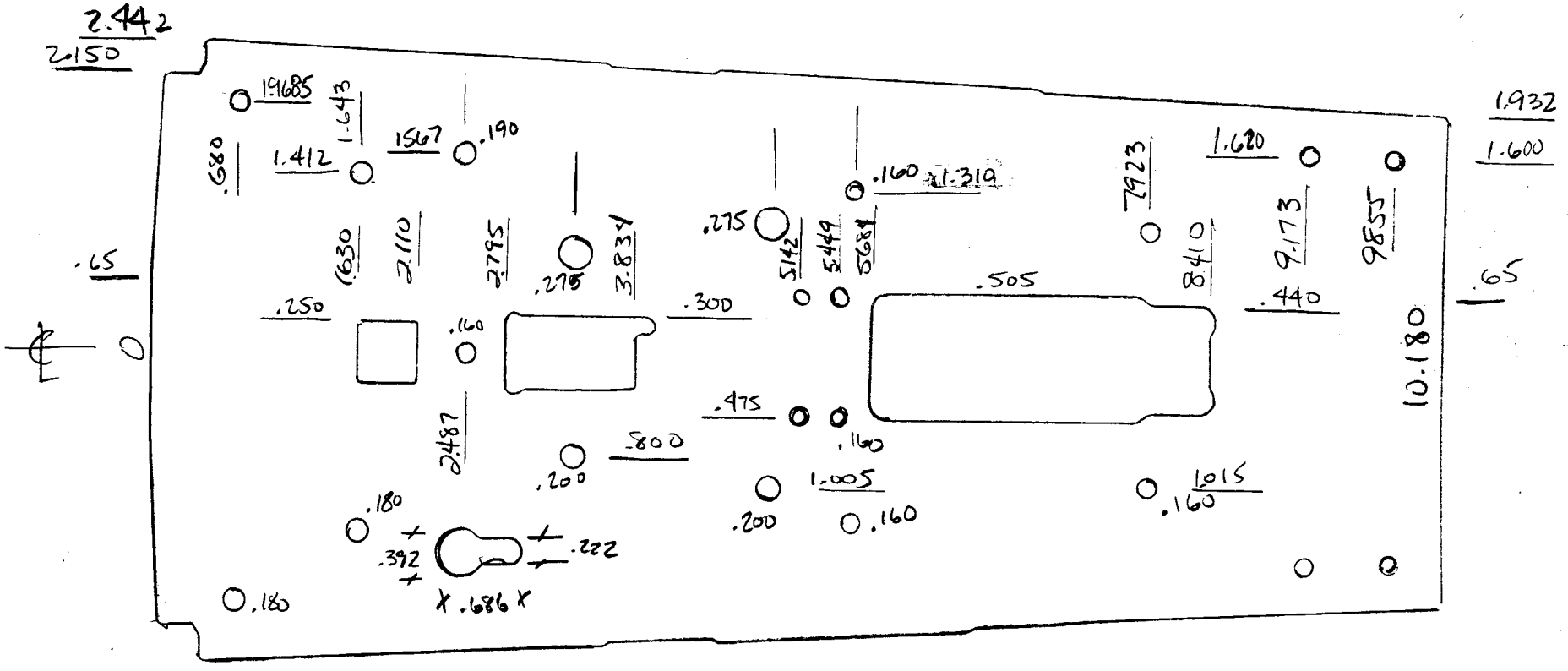
Mag catch issues should be addressed, and I sometimes have to remove a little material from the edge of the mag catch to get it to lock mags correctly into place. Try a variety of mags when doing this and prove them all in your adjustment. They should lock in tight, but should release easy, and all fit.

Dust covers will sometimes need to be shaped with a wrench or by hand to fit on your receiver.

After a full assembly proves the fit of your AK kit to your homebent receiver, disassemble your gun and finish it as per your taste. Reassemble your gun using locktite on your screws, and torquing up tight. Some like to add a little locktite between the receiver sides and the trunnions to improve the bond. As an alternative, you might want to finish your permanent assembly and function test before finishing. Of course, its an AK, so…

Options abound in your homebuilding of an AK rifle. Welding, silver soldering, and riveting are viable alternatives to the screw together method. Custom stocks, front ends, sight systems are all available, or in your imagination. Best of luck to you all in your work, and hope that this little tutorial has been of some use in your effort.

J.A.S. 3-5-04



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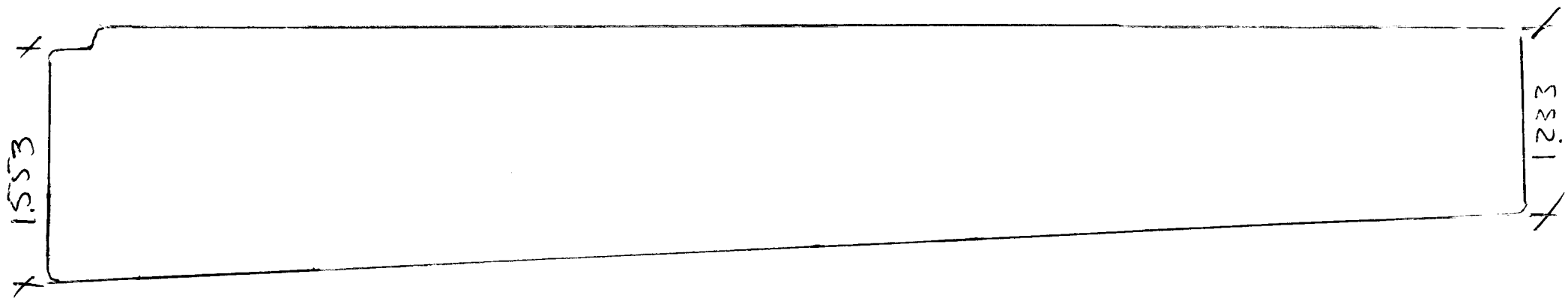

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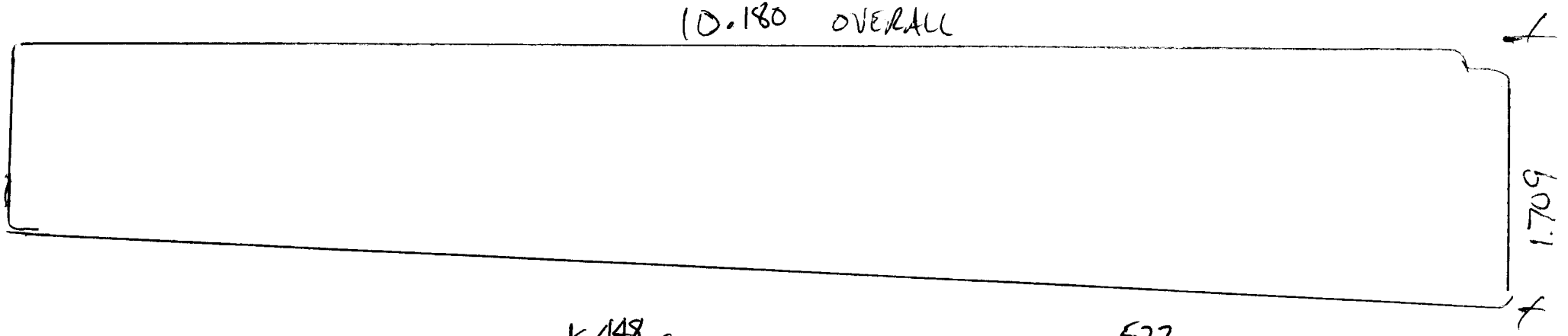

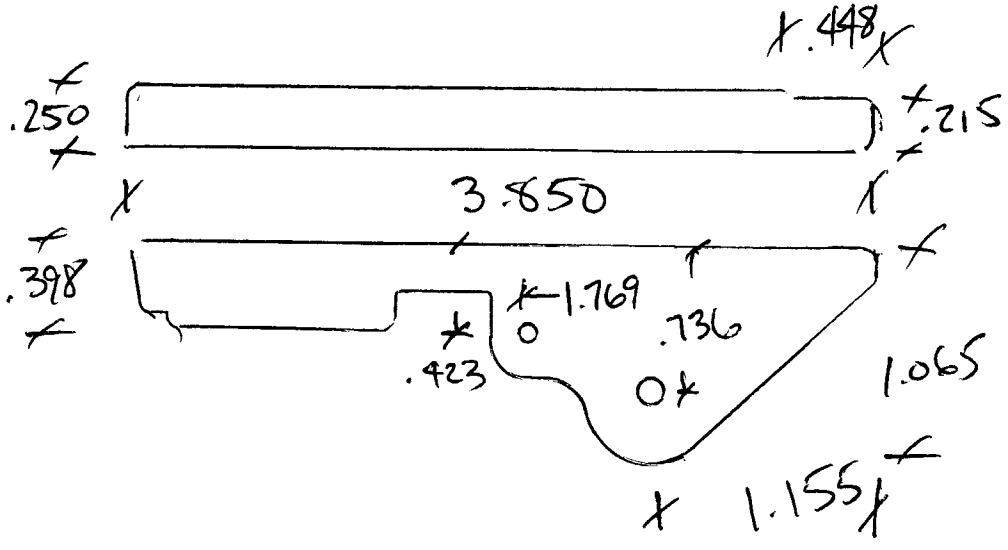

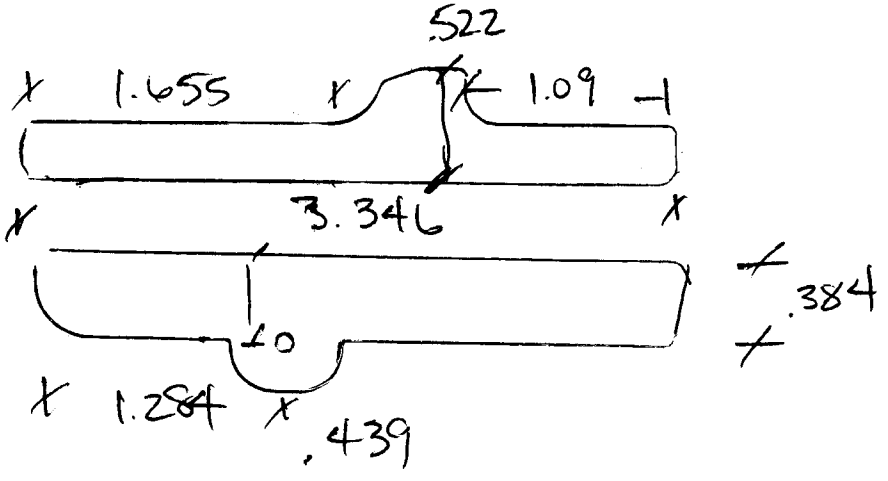

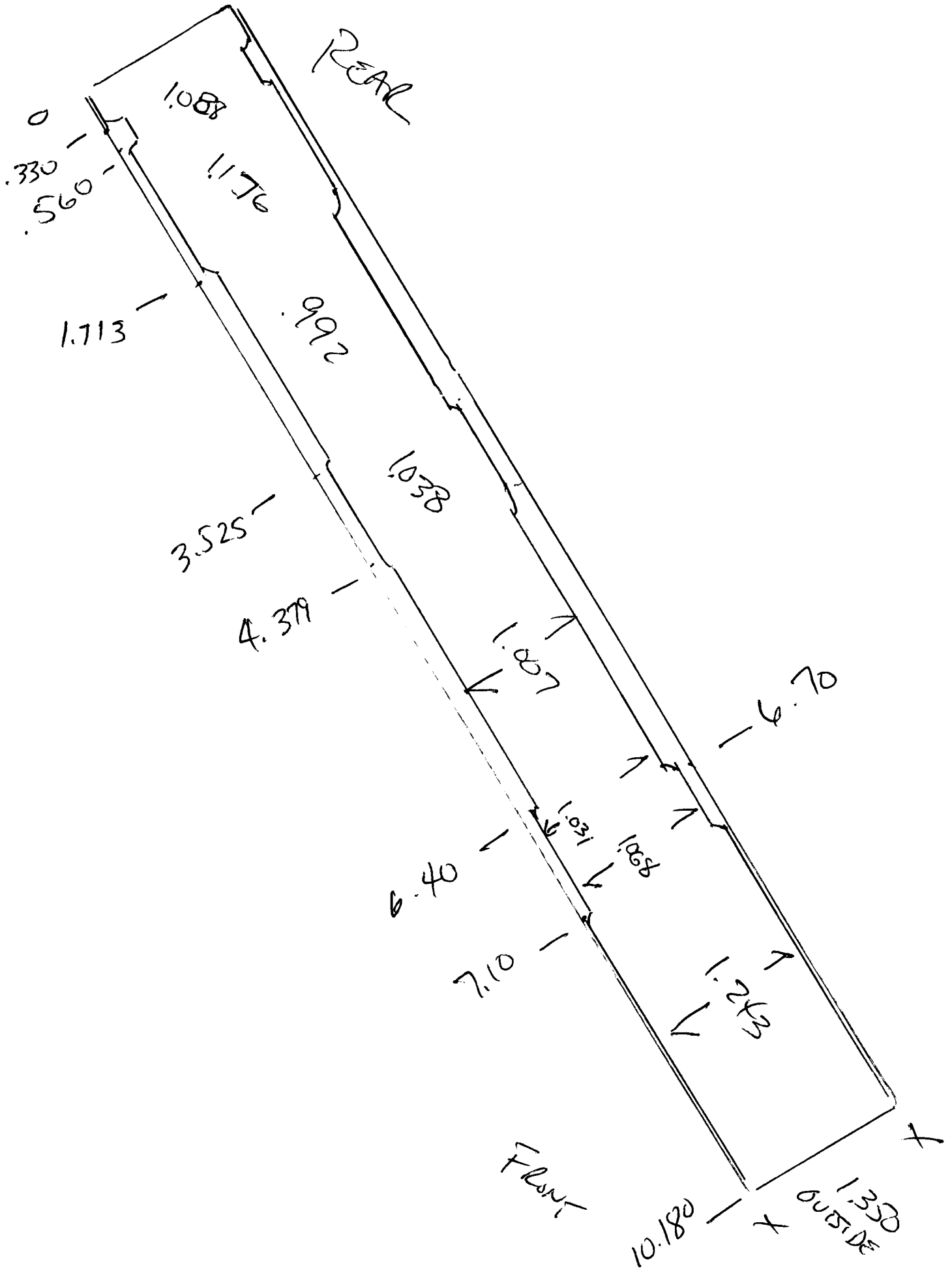
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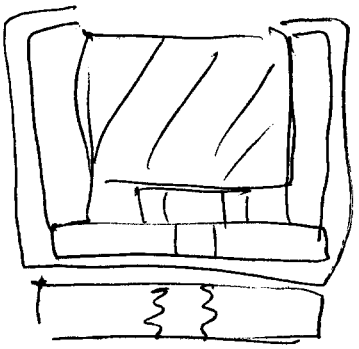
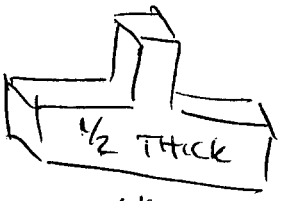
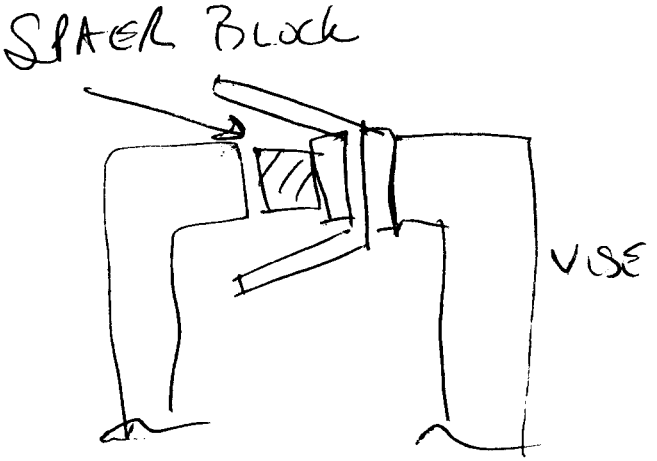
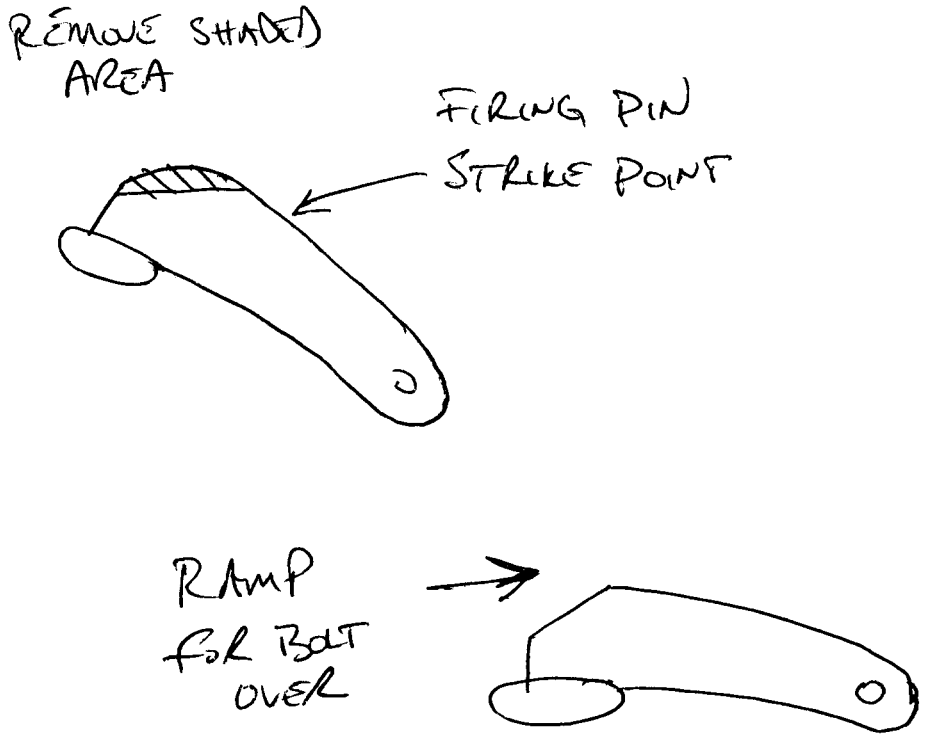




END VIEW OF ASSEMBLY FORM

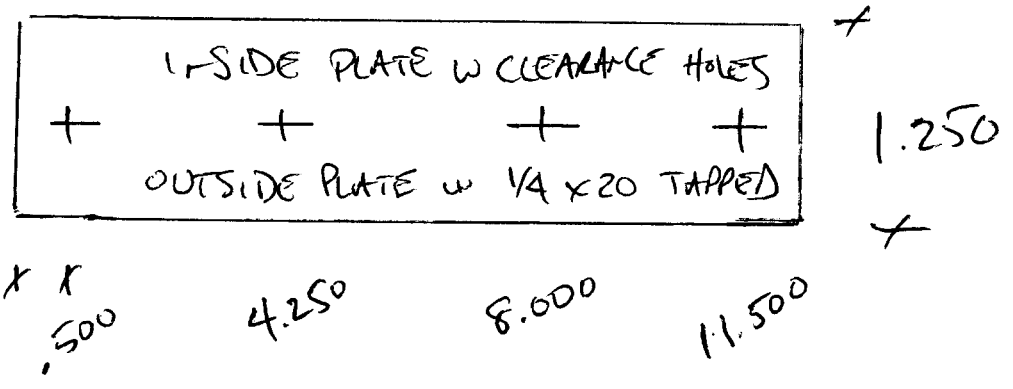


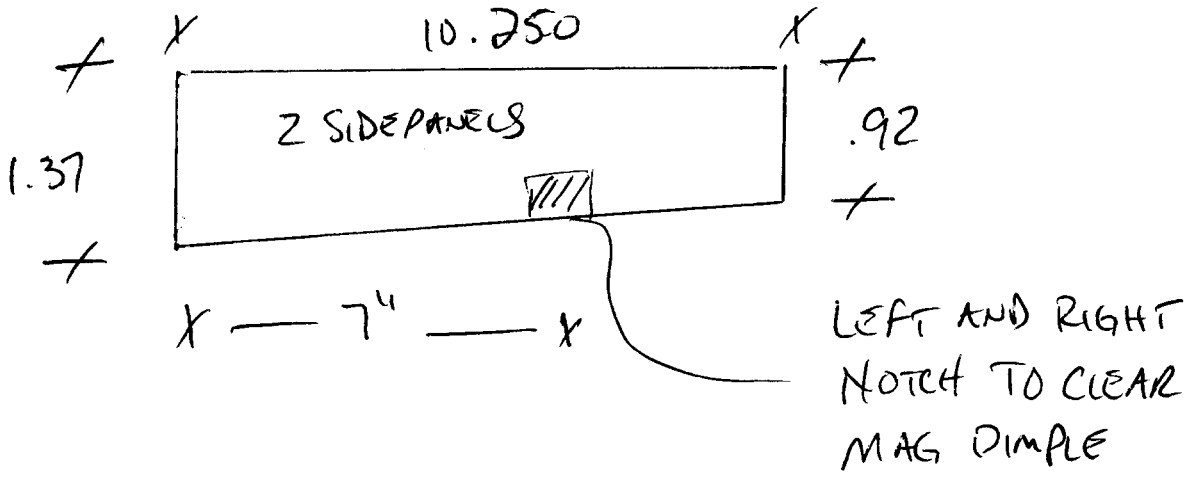


HOW TO MOD HAMMER TO EASE BOLT OPERATION

FORM PARTS

12 X 1.25 X .25





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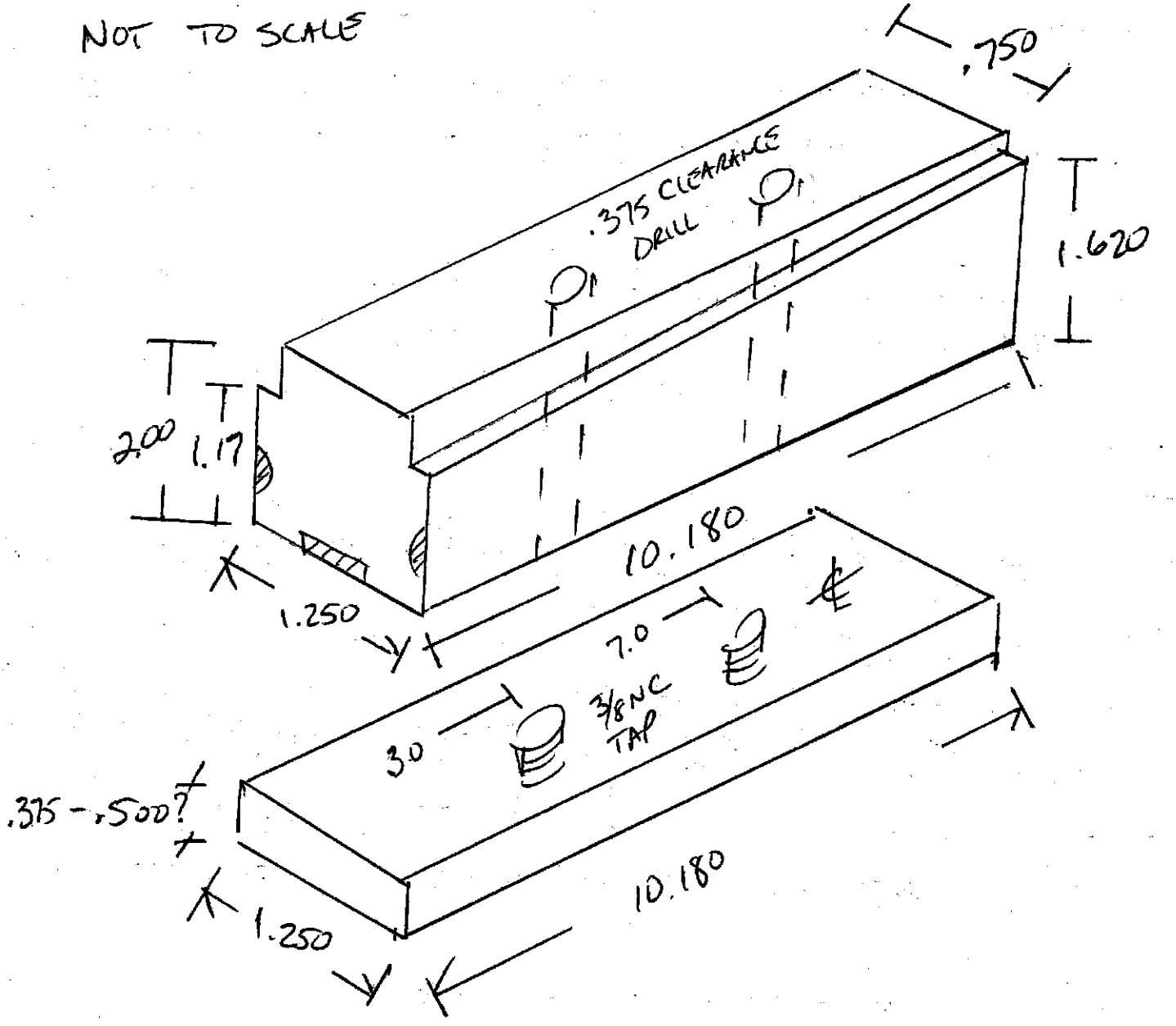

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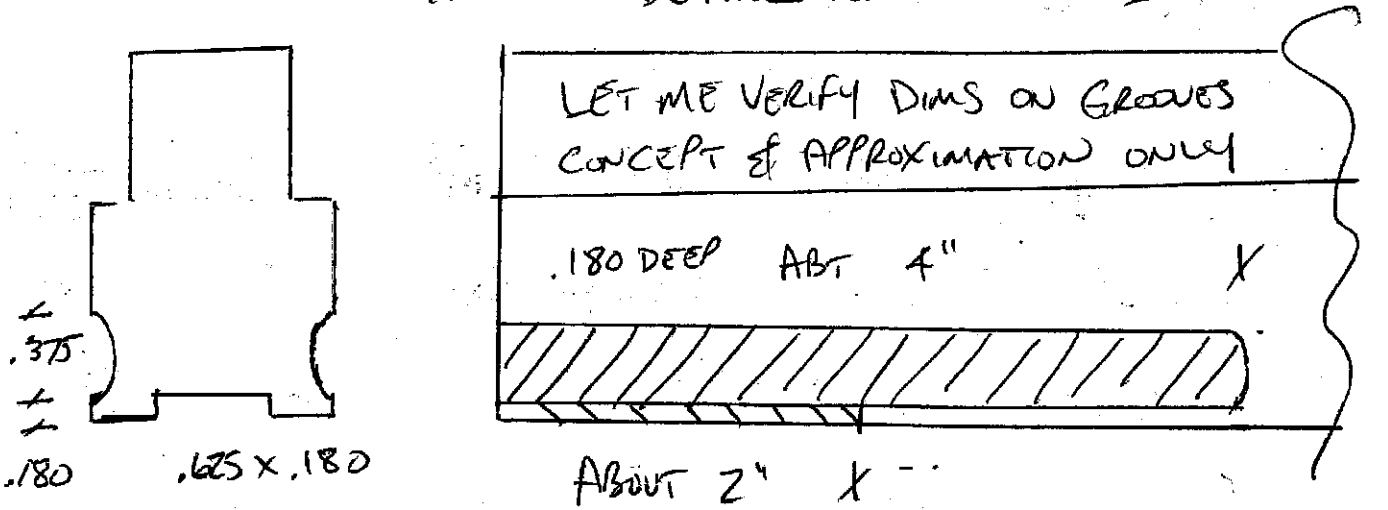

JAS. 3-22

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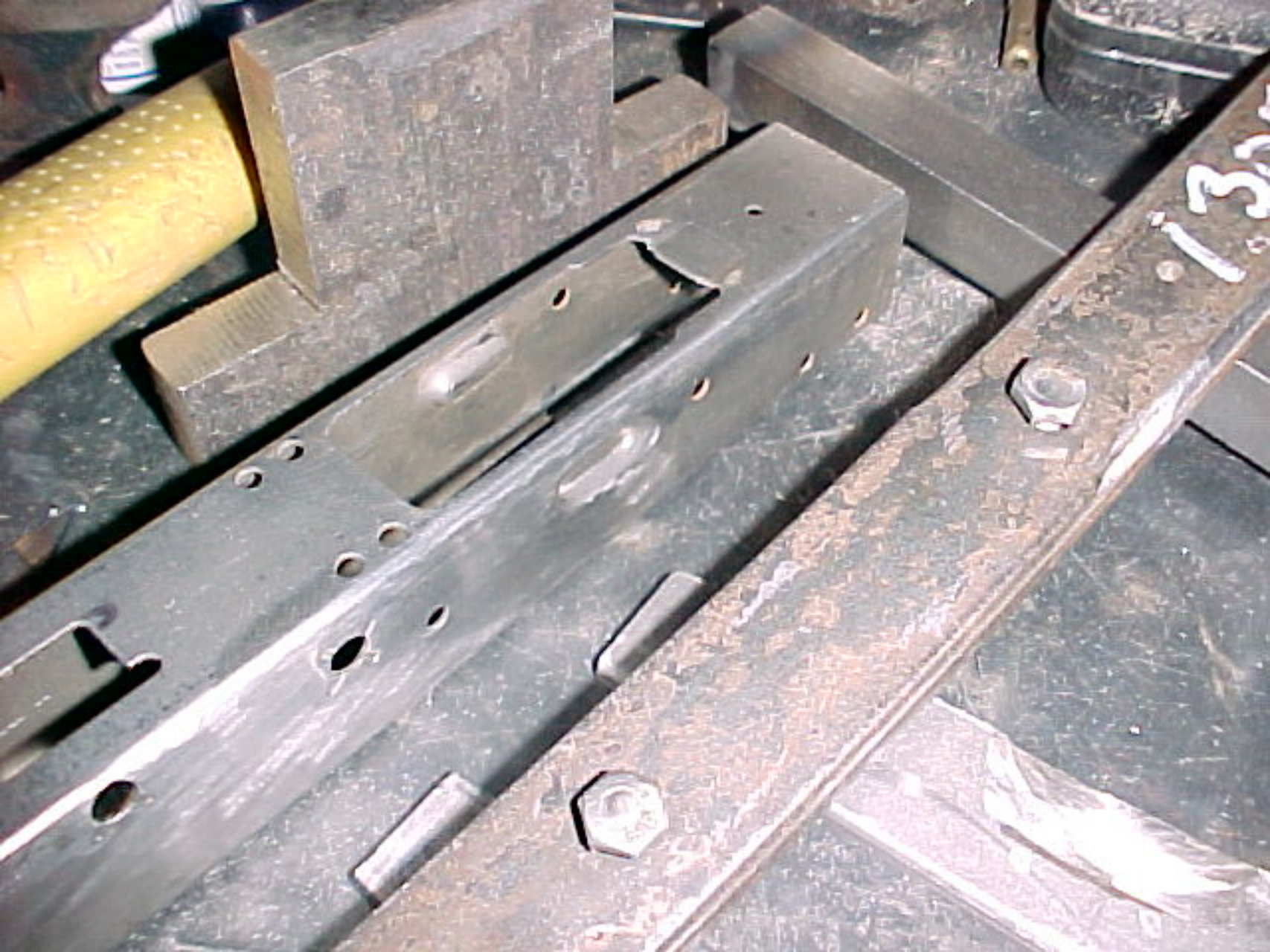

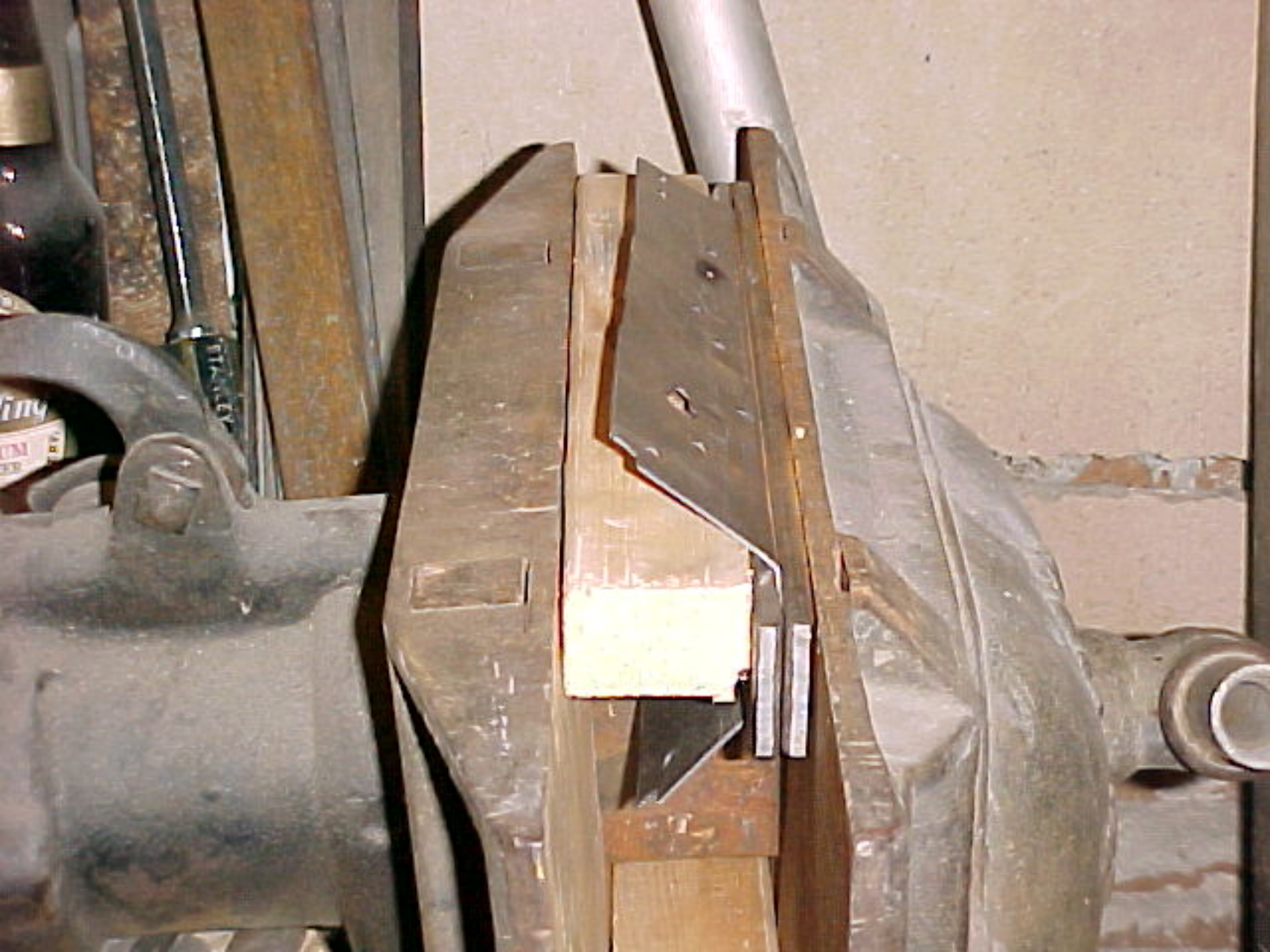
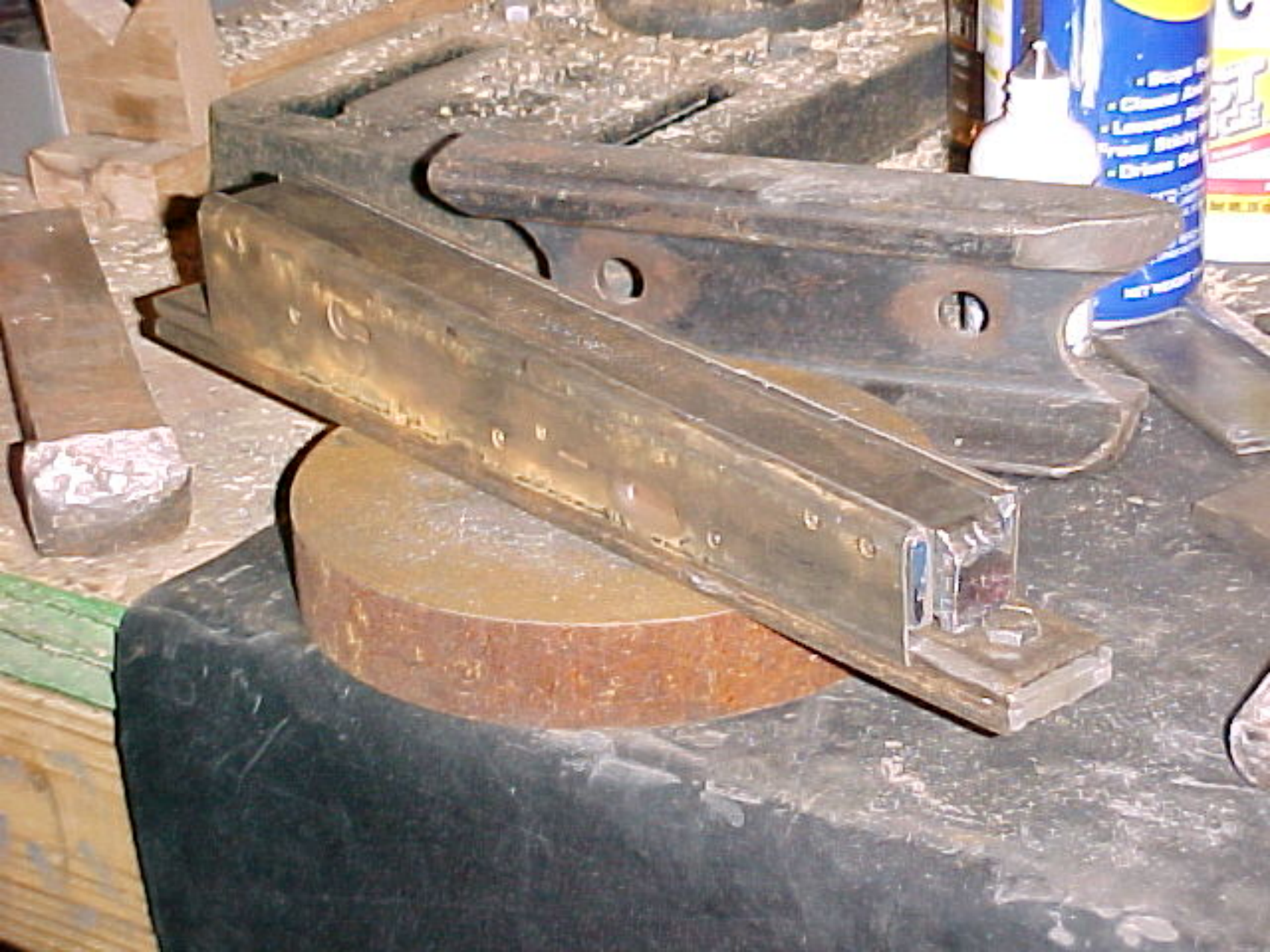
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