The all inclusive AK tutorial

So, you are ready to build an AK and you need some help. Hopefully this tutorial can be of some help to you as it took me quite a while to take the pics and write the tutorial up. I tried to include as many pics as I could to show as many angles of detail. Be warned there are almost 190 pics in this tutorial and it may take some time to download.

Let's start with some basics.

Kits? Did you select a kit, maybe like one of these?

Romanian AK kit from DPH Arms

Yugoslavian Under folder from Centerfire Systems

Those are examples of 2 popular kits around these days in caliber 7.62X39. You can select many different kits from different vendors and even board members.

Here are some places to purchase your kits, accesories, builds, and receivers from.

http://www.dpharms.com
http://www.centerfiresystems.com
http://www.ohiorapidfire.com
http://www.polytechparts.com/
http://www.akronarmory.com
http://www.copesdist.com
http://www.nodakspud.com
http://www.ak-builder.com/ak/index.php
http://www.weaponeer.net
http://www.prexis.com/sten/
http://www.coldsteelsolutionsincorpo...tions,_inc.htm

Screw kits from one of our members (fkrfxr)
http://www.gunco.net/forums/showthread.php?t=16577

Builders if you are not into doing it yourself.
http://www.inrangec2.com
http://www.redstick-firearms.com
http://www.globalmilitarygunsmithing.com
http://www.azexarms.com/

Buy it built.
http://www.atlanticfirearms.com/

Get it re-finished
http://www.salboarms.com/

Other places
http://www.k-var.com/store.asp
http://www.aimsurplus.com/

You can get a variation of different kits and calibers too. 5.45X39, 7.62x39 from Poland, Bulgaria, Romania, Yugoslavia, and even Russian Milled kits. If you are looking for Chinese parts and pieces try Polytech parts for some items and The Firing line for a milled receiver with the 19 mm front trunion or barrel size. Occasionally you will see a Galil kit in 5.56 as well.,
Once you have a kit you need to figure out what you options are. Do you want to assemble it on a ready made receiver

from one of the companies that produce them?

Global trades
OOW
DCI
The Firing line
Eubanks

Or do you want to assemble on a flat from DPH Arms or Tapco?

Or, how about a bent blank from Coldsteel solutions, Robert Ibe at Bent metal. You may even have an old Ace blank lying around or possibly one of the Ace style blanks that DPH Arms was selling for a while this past year.

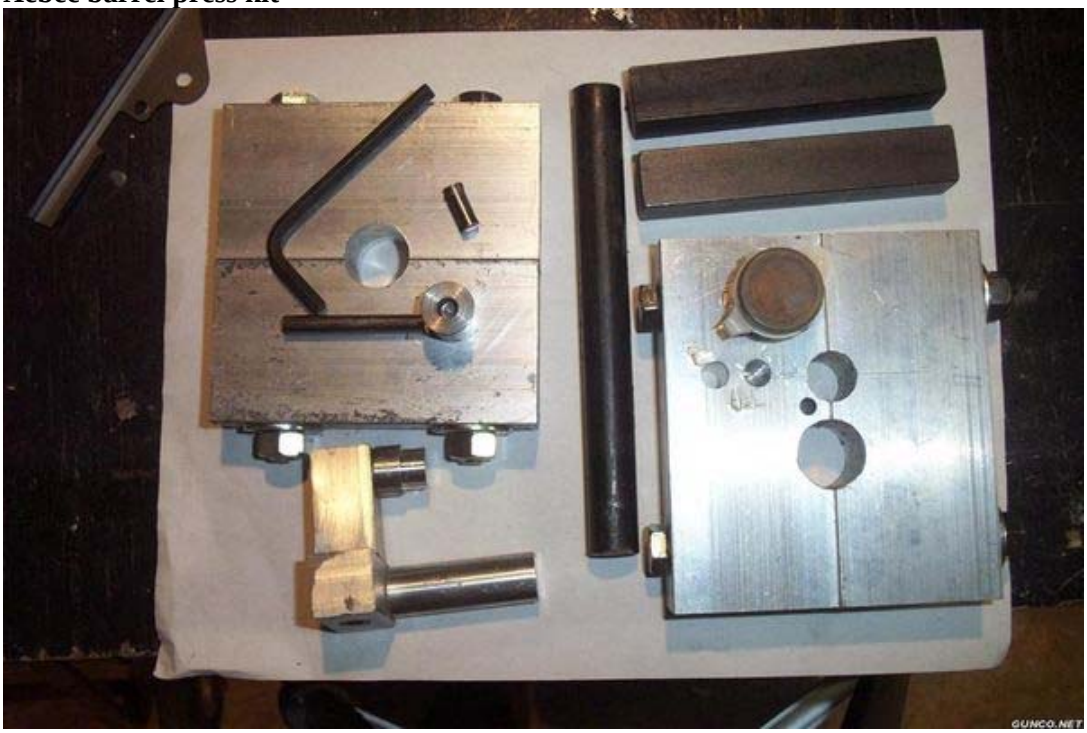
This is the original 7.62X39's bent blank tutorial and screw build. I learned a lot from it and it why I got into building.
http://www.gunco.net/forums/showthread.php?t=6806

Next is tooling and your options.

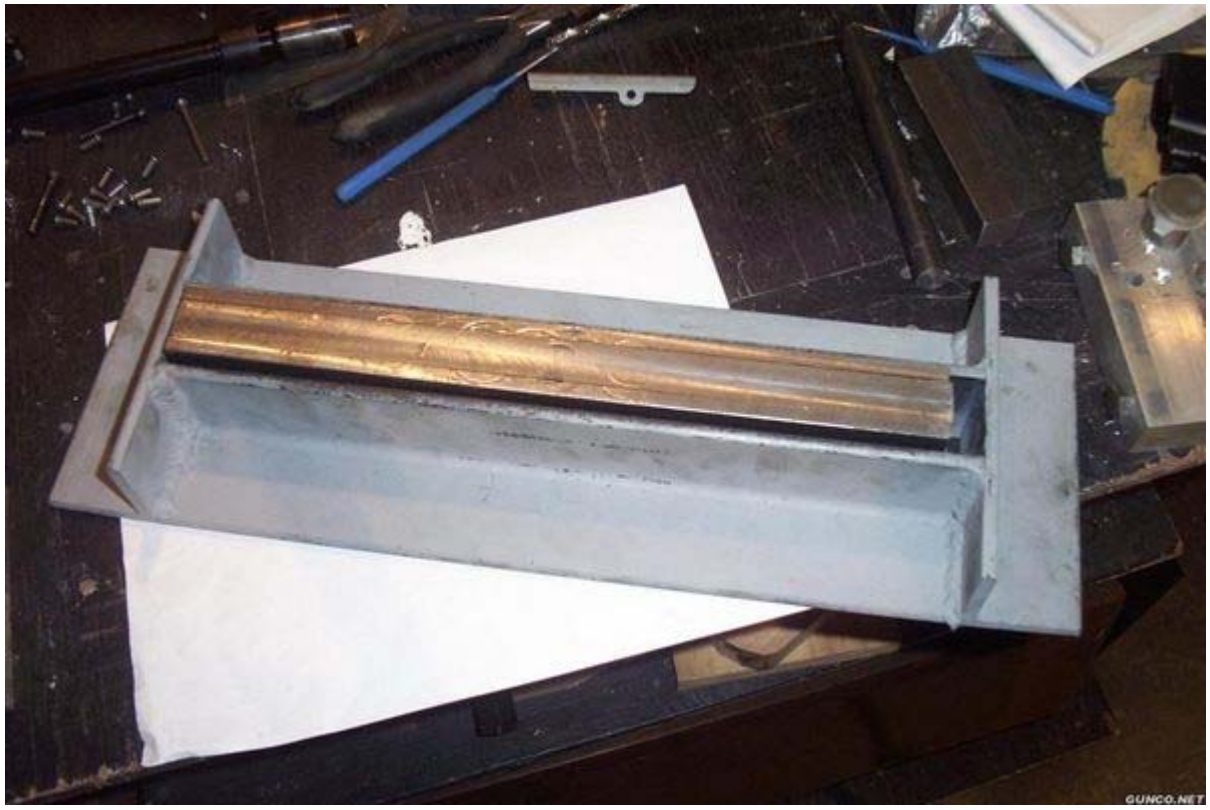
AK Builder.com is one of the few vendors I know of that is selling specific tooling geared toward putting an AK together.

I will list what tools I have used here for this build. You may have access to make you own jigs or maybe you have bought some of the tools from various members like Xebec, Plinker, 555th, and even my Dremel accessory for trimming rails.

Xebec barrel press kit



555th style bending jig. This one came from DPH Arms. Here are plans for building your own as well.
http://www.gunco.net/forums/showthread.php?t=7028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Trigger guard riveting jig.

Bolt Cutter rivet tool with jaws from Greenlight arms.

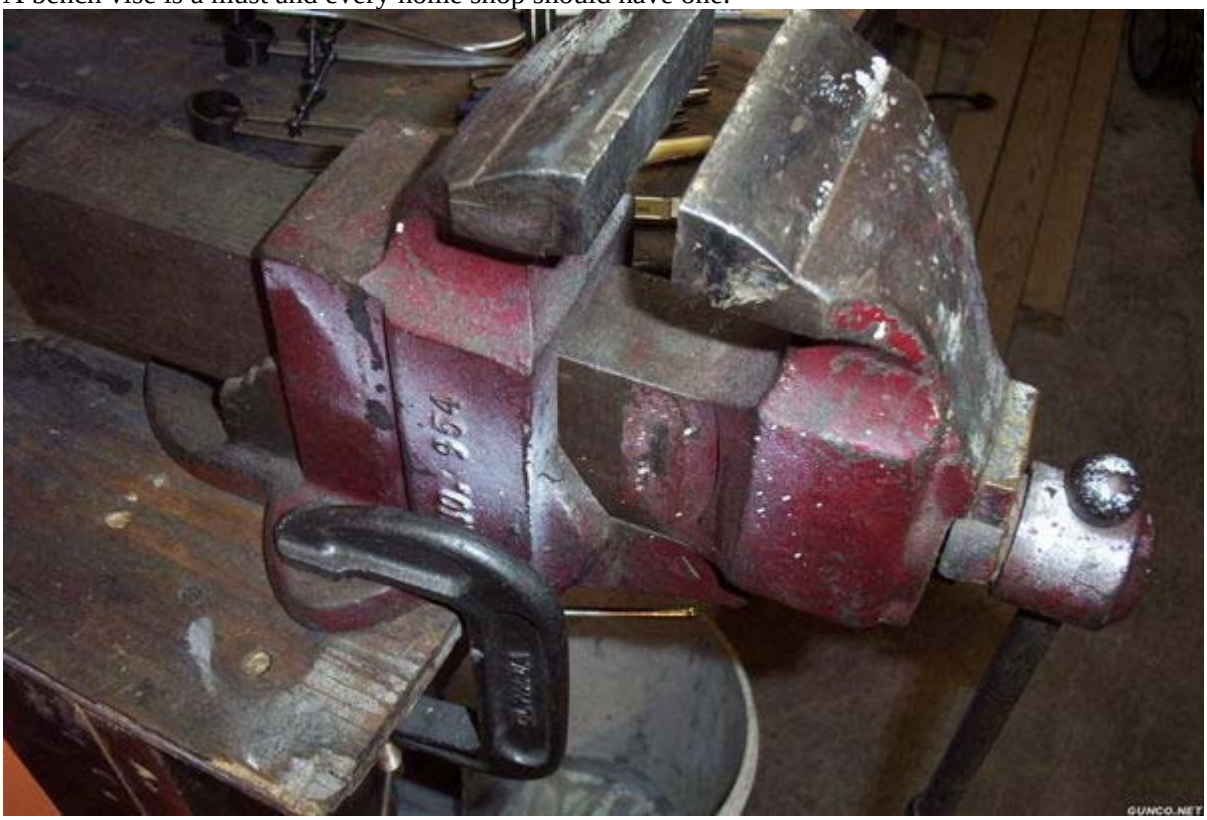
Rivet mold that came with my rivet jaws.

Spot welder with lower modified tong.

Mapp/Oxy Bernz-O-Matic torch. $50 at Home Depot.

A press is a great tool to have. This is a 20 ton Harbor Freight model.

A bench vise is a must and every home shop should have one.



A drill press. Mine is the 7 inch Harbor Freight model. I got it for $39 on sale.

Hand tools. Files, hand drill, calipers, punches, bits, piece of scrap stock are all helpful.

Extra peices of bar stock and other items that can make "adjusting"things eaiser.

Bench grinder.

A wire wheel mounted either like mine or one that can be mounted in a drill. This is great to clean up and polish metal. I can mount polishing buffers on this one as well for fine finishes.

The one tool you cannot do without and you cannot enter into the WECSOG membership without is a Dremel tool. In reality to get you full WECSOG membership you must bleed while working or operating one of your builds.

My special Dremel tool mod that my Dad actually came up with. If you want one you can get one from me here.
Dremel mod

Before taking the kit apart you may want to head space the original factory built kit to make sure it will be good to put back the way it was. Check these posts for head space details and remember it could be your life, face, or hands if you fail to check the head space.
http://www.gunco.net/forums/showthread.php?t=2557
http://www.gunco.net/forums/showthread.php?t=17715
http://www.gunco.net/forums/showthread.php?t=892

No go head space gauges.

Now we move on to building something or should I say deconstructing the kit you have chosen to build.

Most kits come 2 ways. One way will be with the receiver stubs still attached to the front and rear trunions. The other way is no receiver stubs, but the rivets will still be attached or in the trunion rivet holes.

For removing the rivets on a kit that still has the receiver stubs I use my bench grinder to grind the rivets down and then I pry the stubs off. From there I usually drill the tops of the rivets off down flush with the trunions. Be very careful to not drill into the trunions here on this step. On kits without the stubs of the old receiver I use the dremel fiber cut off wheels to carefully grind the rivets down flush and then drill if I have too. I can usually punch them out with a hammer and punch.

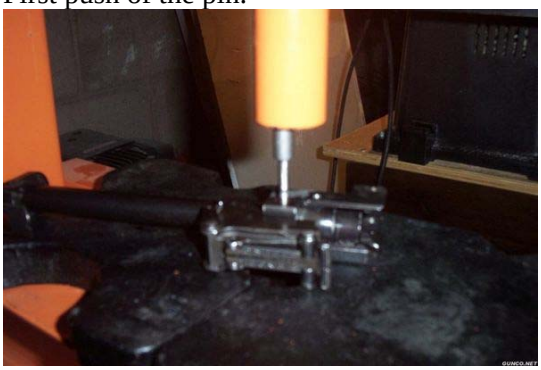
The rear long rivets can be more of a pain. I have driven them out and I have drilled them out part way and then driven them out. Only once did I have to drill a rivet out almost all the way.

Before going on to remove the pin and barrel I have a tip that can make your life easier. Heat the trunion area up around the barrel and pin until it is very warm like 200 degrees or so. Spray penetrating oil on it or drop it into a bucket of used oil. The heat will relax the press fit slightly and allow oil to be wicked into the seams. When I first did this I was amazed that I found pockets of oil in places I didn't think it would be after removing the trunion. Spray off or clean with a degreaser, so it doesn't slip out of your hands or equipment after it is done soaking.

After that it is time to tackle the barrel pin. The barrel pin can be one of the most frustrating pieces to this whole puzzle. I have come across 2 pins that gave me fits. One I drilled out after I tried everything to remove and the other I have yet to pop. I'm actually waiting on a tool to arrive to make my like easier on this one.

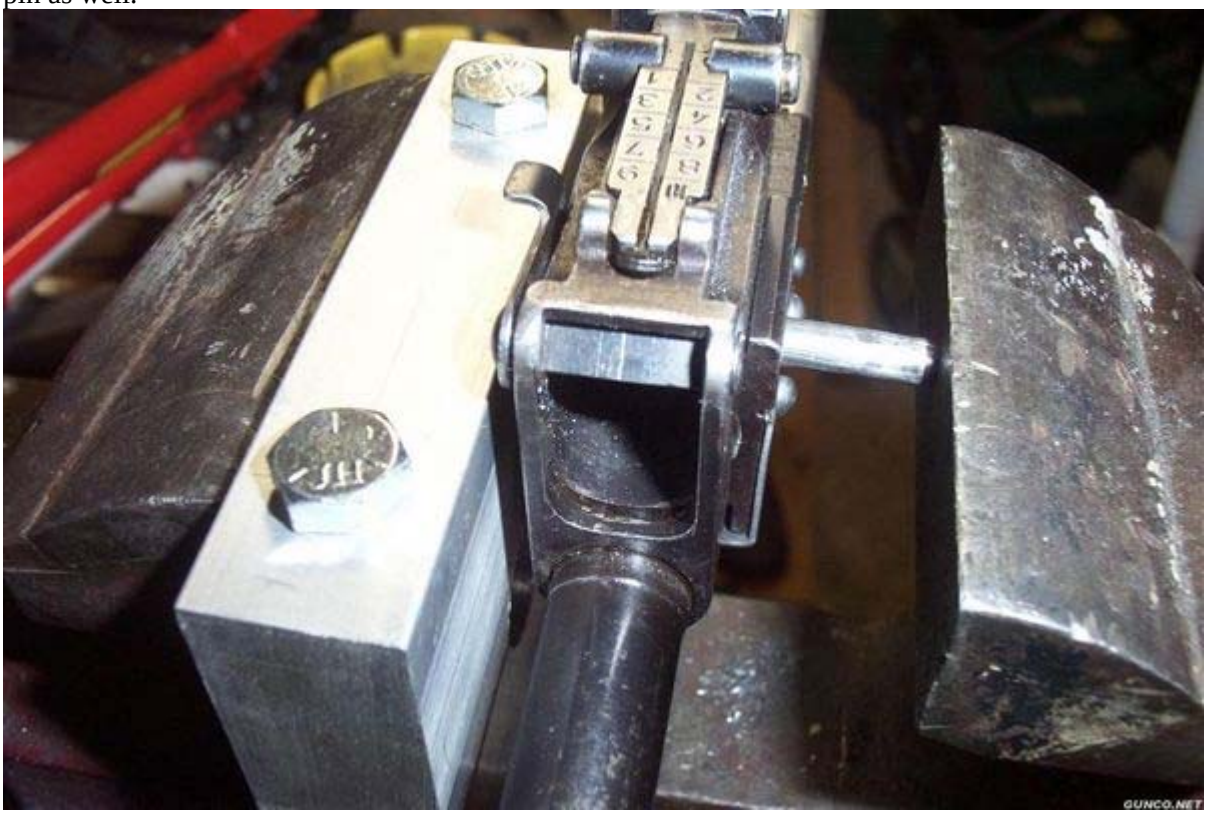
Here are some pics of how to deal with pins.
Alternate threads on barrel pin removal.
http://www.gunco.net/forums/showthread.php?t=787
http://www.gunco.net/forums/showthread.php?t=4216
http://pookieweb.dyndns.org:61129/AKM/akm.htm

First push of the pin.



Now it is going as you can tell in the pic.

Here is the pin going back in using a vice and the Xebec press kit. You can reverse this and use it to remove or start the pin as well.



Pin being finished off. The Yugo’s like this one have flush side to their trunions. It makes it easier.

Once the pin is out you can start on removing the barrel.

Starting.....

Going....

Gone....

Other ways to remove the barrel can bee seen in these threads.

Power steering pulley puller method.
http://www.gunco.net/forums/showthread.php?t=15280

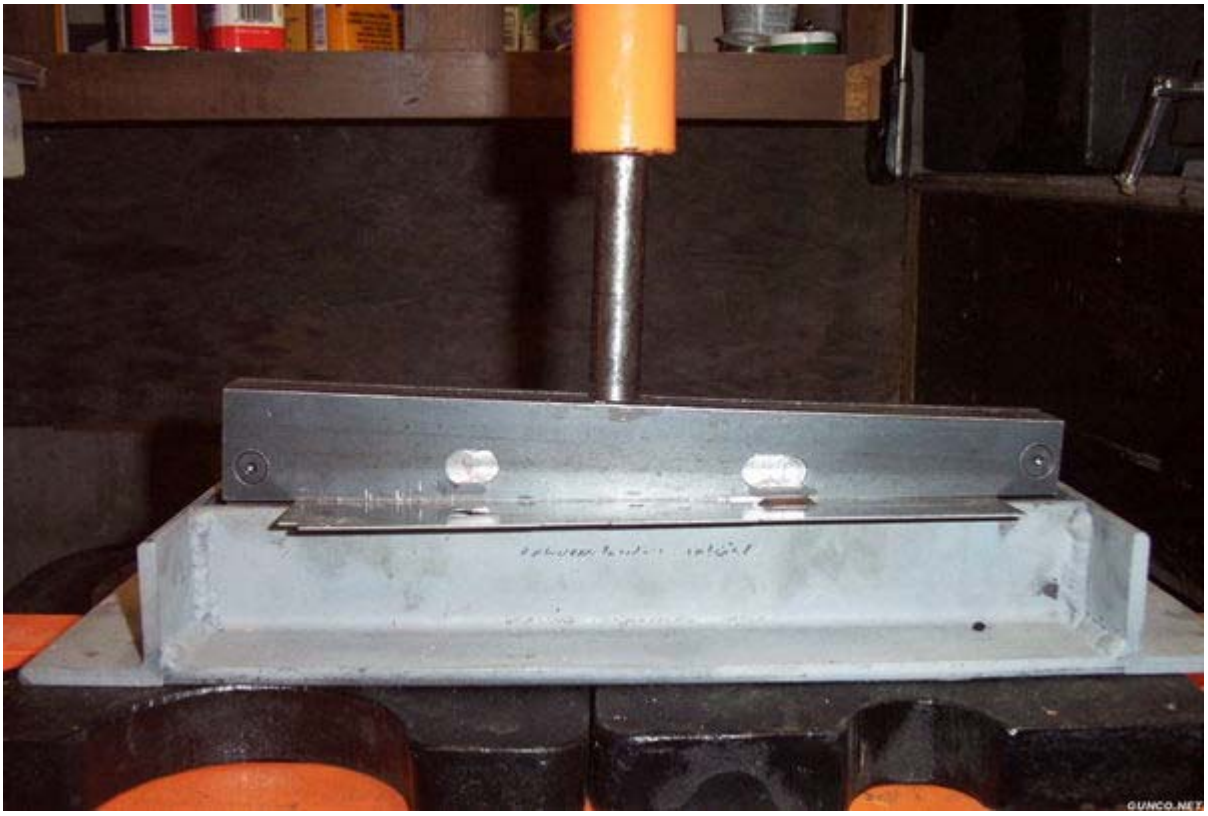
Using a brass or copper nut as a buffer for pressing.
http://www.gunco.net/forums/showthread.php?t=4548

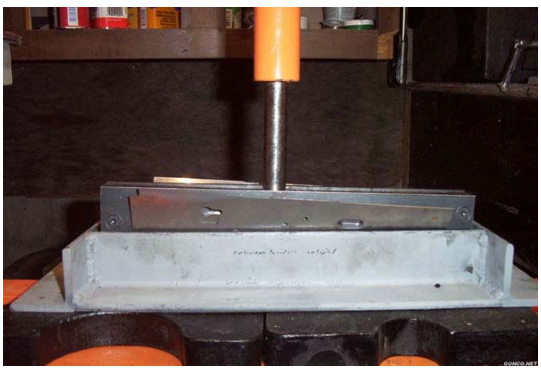
Now that it's all apart knock the rivets out of the front trunion holes as I described in rivet removal above. Then you will be ready to move on.

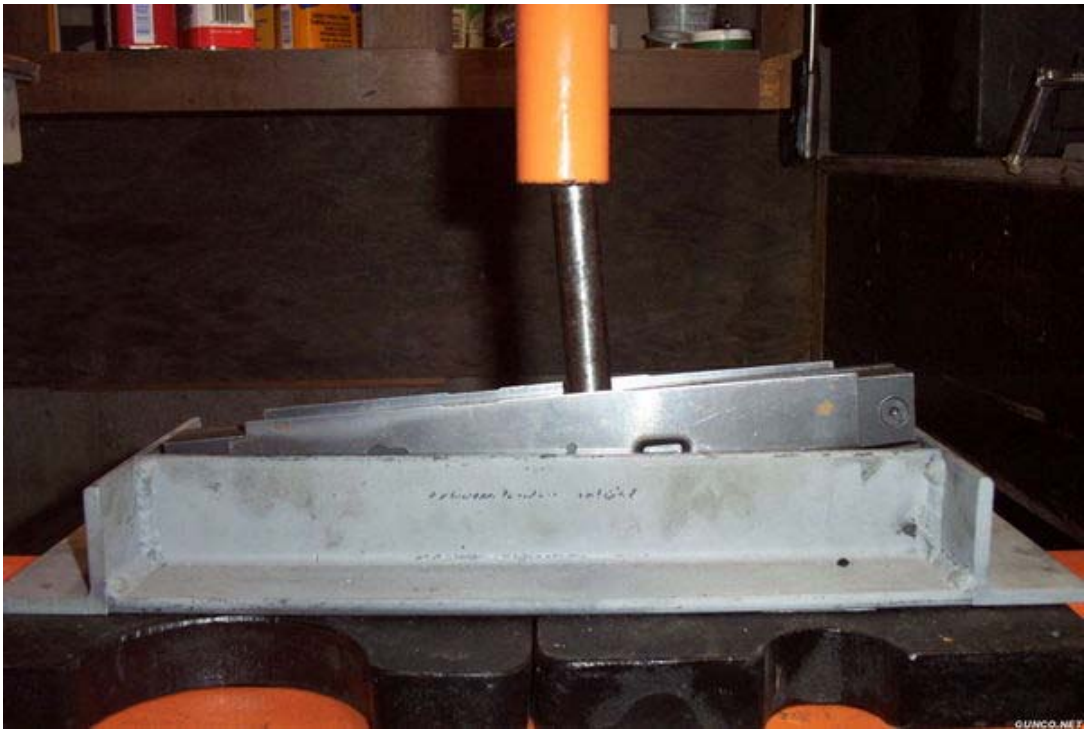
Let’s bend up a DPH Arms flat for this one.

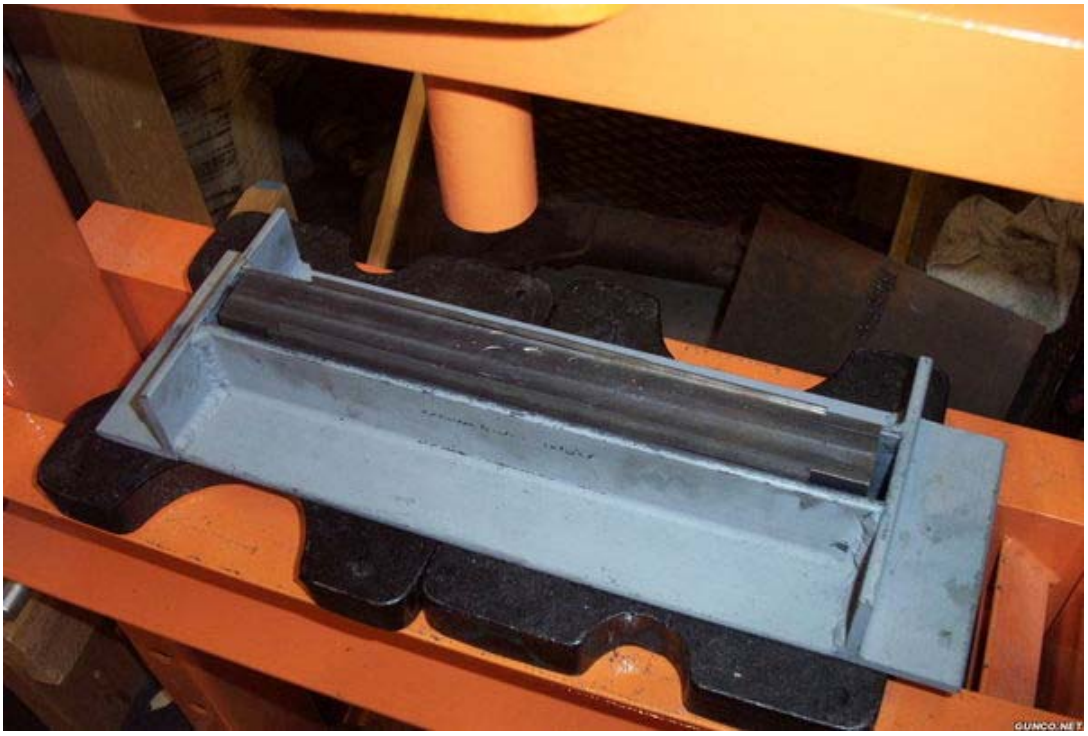
This is a pretty involved section of this post. Please skip down if you already have a flat bent, pre-bent blank, or commercial receiver.

The jig and the pressing operation.





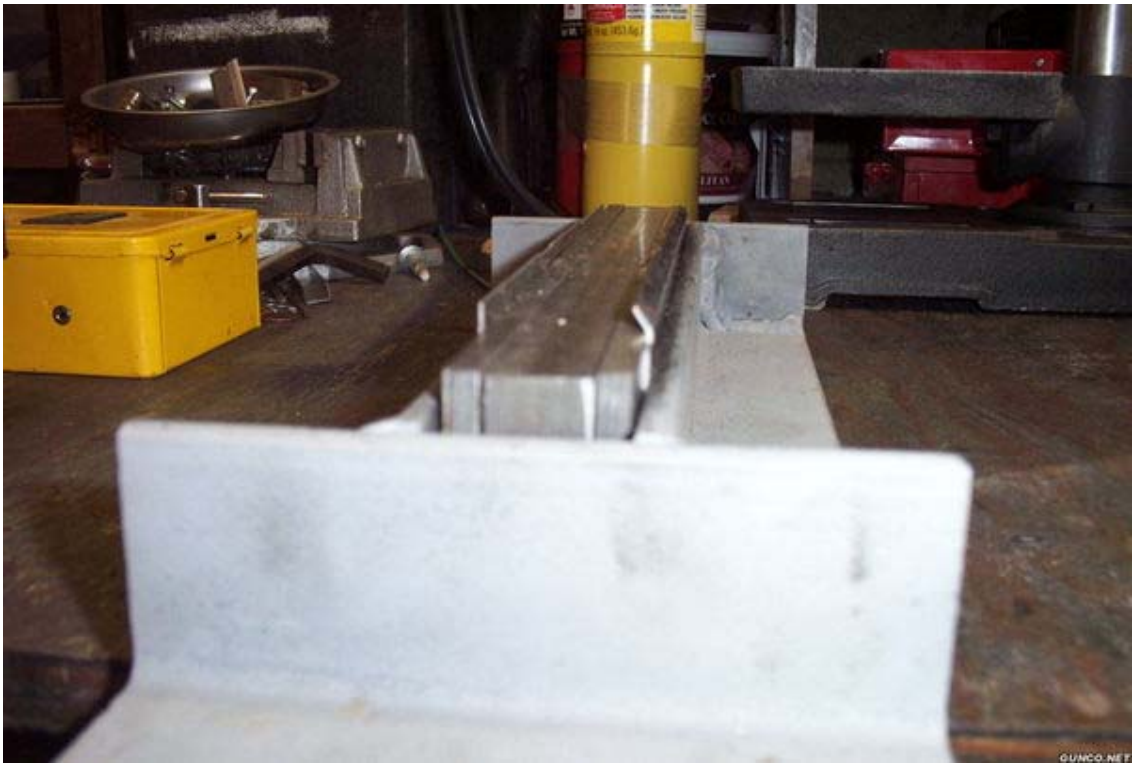


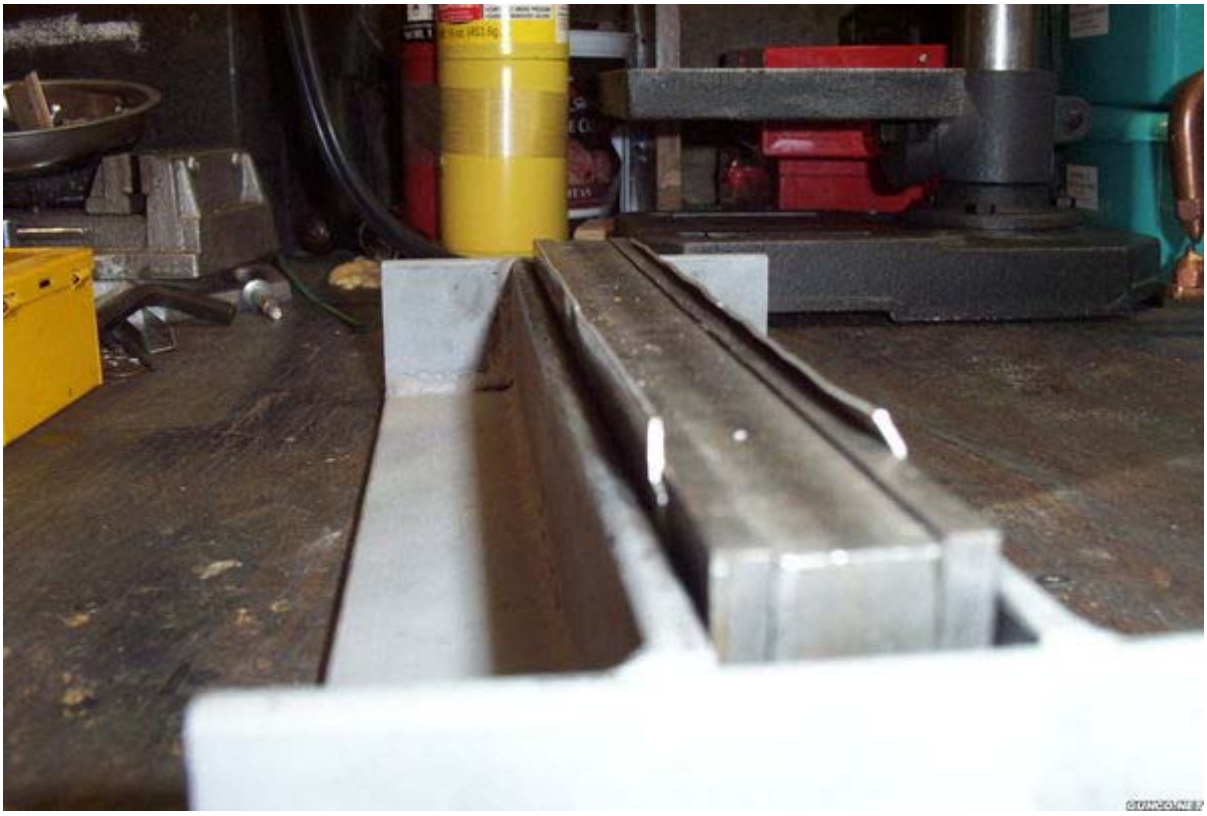


Now we form the top rails.

In the first pic you can see the top rails are still straight up. Bending and hammering down the top rails needs to be done with a little patience.

Now you can see the rail on the right is starting to be bent over. The best way I have found is to strike at the rail from the outboard side at a 45 degree angle to the rail. Being sure that you are hitting low enough to form that crease with the bending jig inside form.



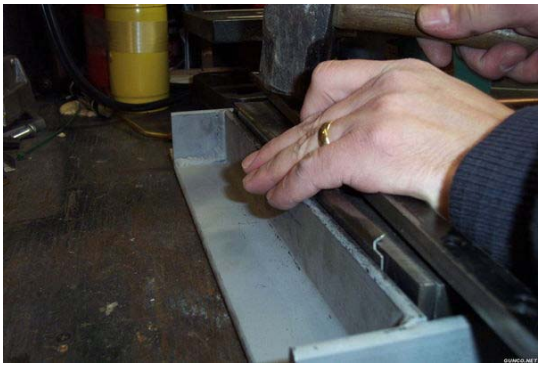


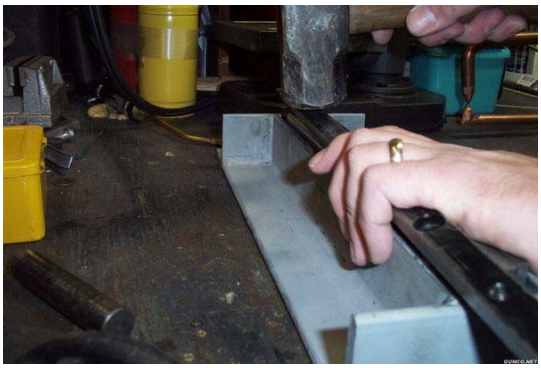
These tools will be your best friend during this part of the build.
2 lb hammer, flat piece of steel or brass rod, and the round scrap bar stock I use for trouble spots and all kinds of thing.

In this pic I have the rails down almost to the point where I can start using the flat rod.

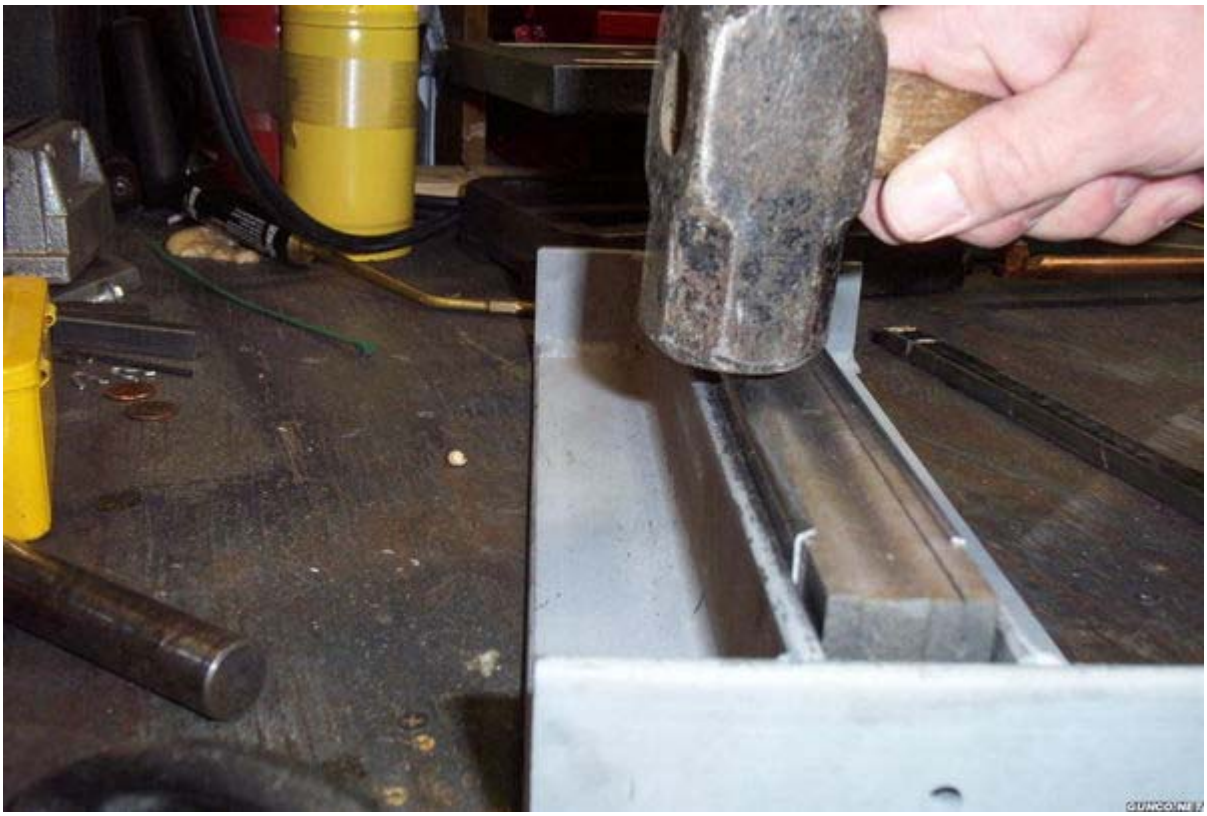
Tapping a few high spots, and I do mean tapping! No hard strikes here. See where my hand is on the handle? That is the best spot and you want to let the weight of the hammer head do the work.

Here I am starting to use the flat piece of steel to beat the rails down flat. This is where you use more striking power.

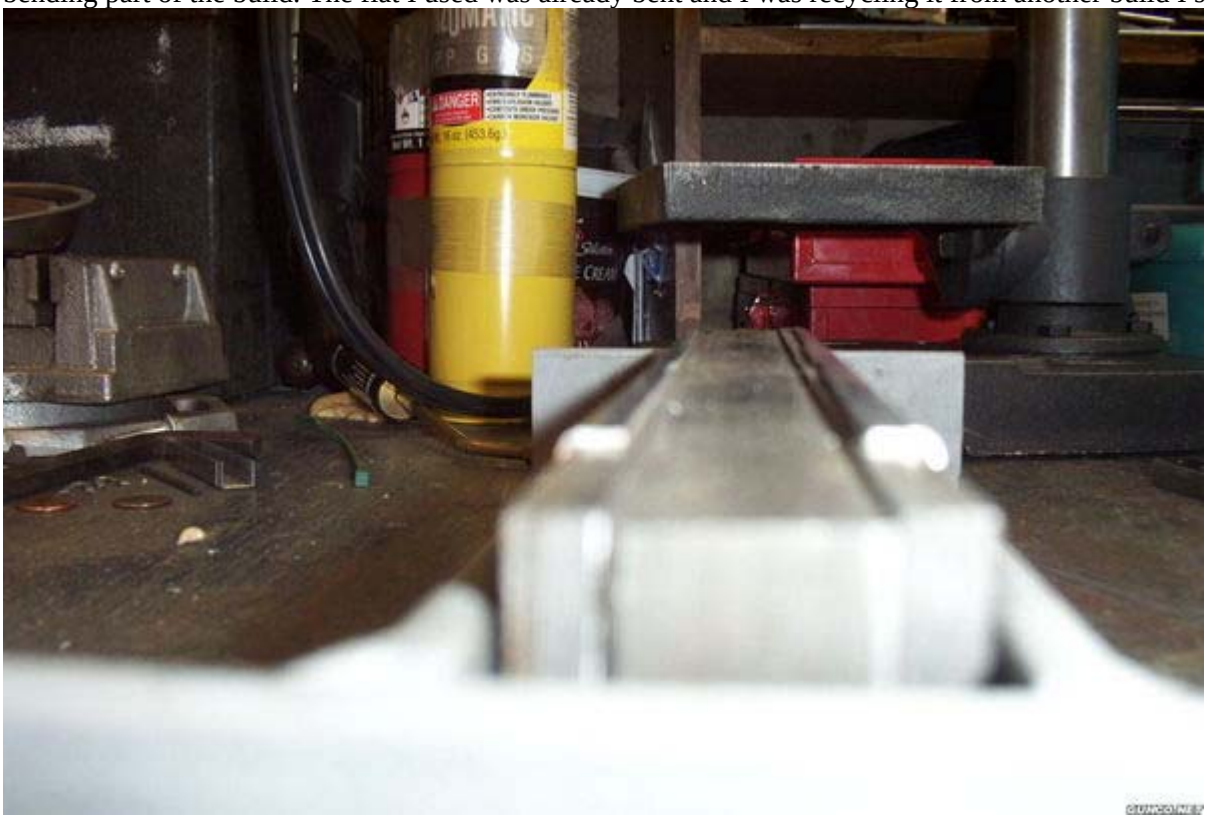


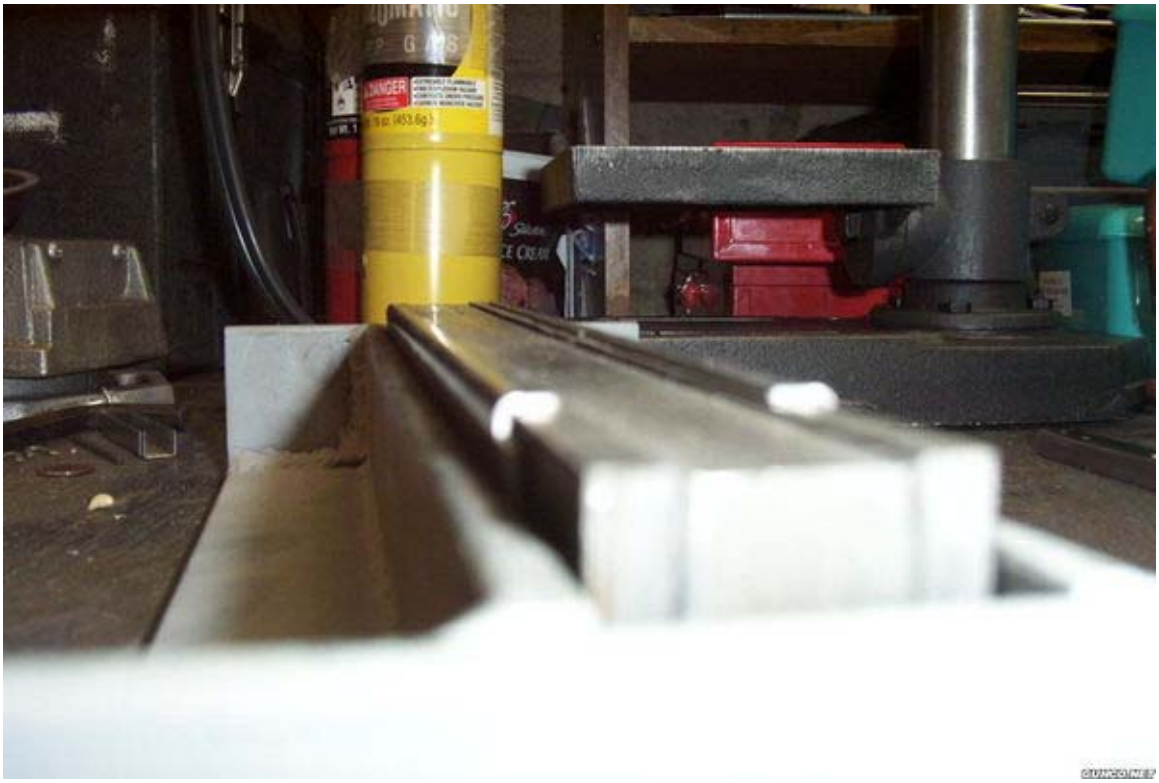


Smacking down a few high spots.



Now the rails are down and fairly flat. Be sure to double check a few times. This one I was doing too fast and when I popped it out of the jig it was a little bumpy. I actually bent this flat after my build was done, just to show the flat bending part of the build. The flat I used was already bent and I was recycling it from another build I started.

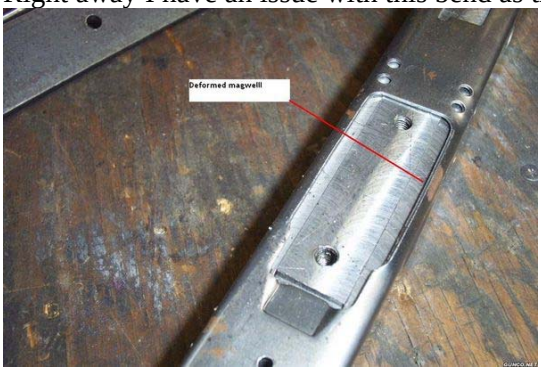




Now we are ready to pop it fresh from the jig and do the final touches.

Using my bar stock scrap I will hammer it out of the jig,

Right away I have an issue with this bend as the magwell is deformed. No problem, I will show you how to fix it.



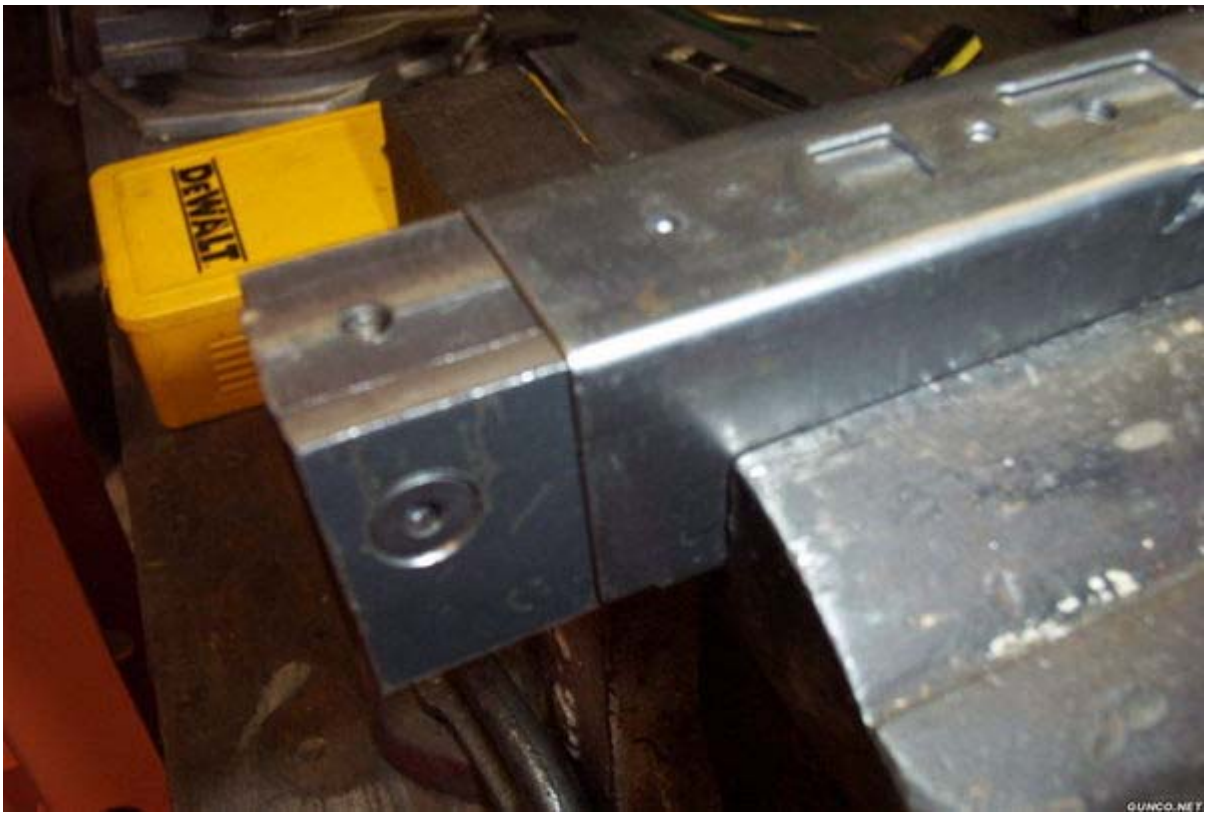
I will put it in my trusty vise very tight and pound down the deformed part.

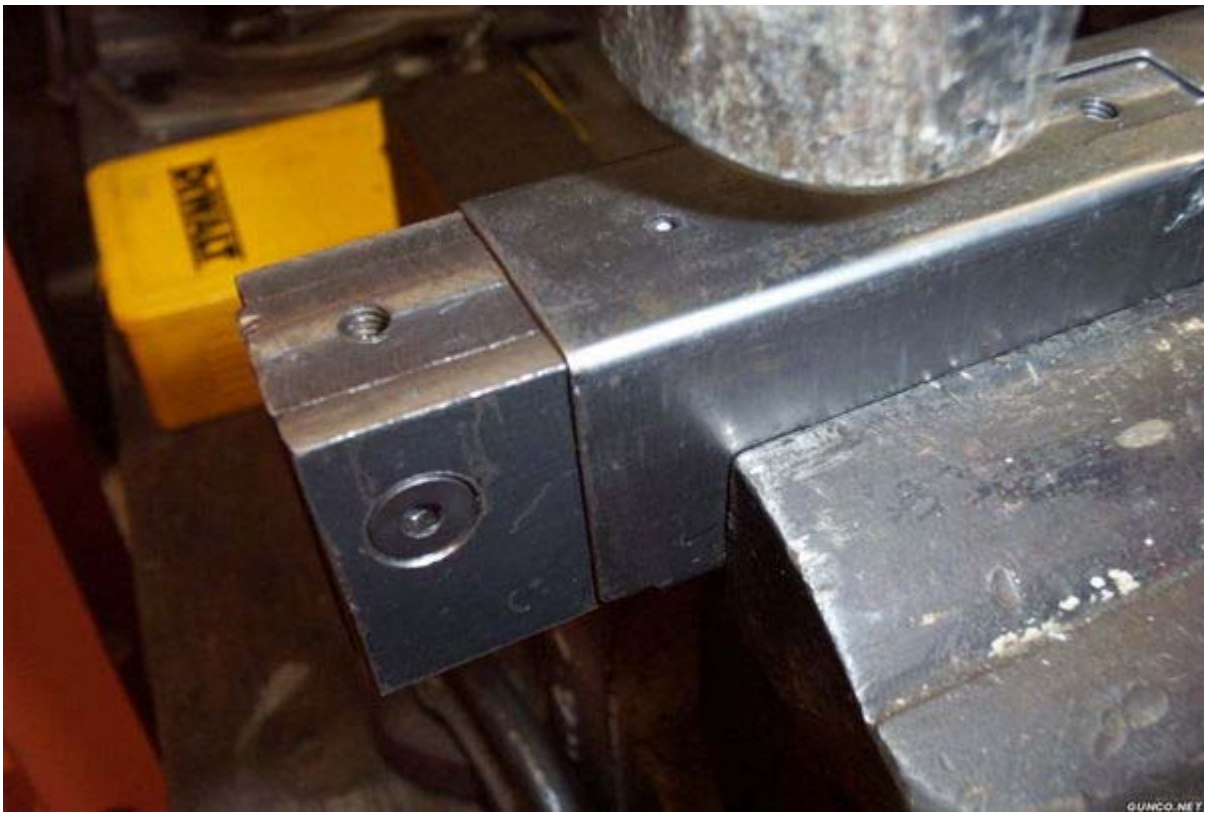
You can see the deformed part is coming back into shape easily.

Now we can move on to the final touches of making sure the creases are all good and the bottom of the receiver is flat and true.

Clamped in the vise very tight I will rap the top rails one more time.

Let’s flip it over and do the bottom.





While truing the bottom we need to take care of the trigger axis pin hole that deforms slightly when bending a flat.

I use a ball peen hammer or a light hammer to start out.

When I see the shape is okay on the axis hole I hammer the under side with a larger hammer. When you go to put the pins in you may have to clean the hole up with a drill bit.

Time to take the inside form of the jig out.

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Now we have a bent flat.

Now that we have a flat bent we can trim it and fit it to the front trunion. I use my nifty Dremel accessory that I mentioned earlier. On this flat the holes were already in the front and they match almost perfect for the non-bulged Yugo trunion much as they do for the Romanian kits.

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Once the front rails are cut to fit the trunion in we can move on to riveting the front trunion in place.
TotenKopf a member here has been key to making great tutorials on building AK's and I suggest you look over all of his stuff. Here is his tutorial on riveting the front trunion.
http://www.gunco.net/forums/showthread.php?t=4516

Pookie's how to make your own rivet squeezers.
http://www.gunco.net/forums/showthread.php?t=979

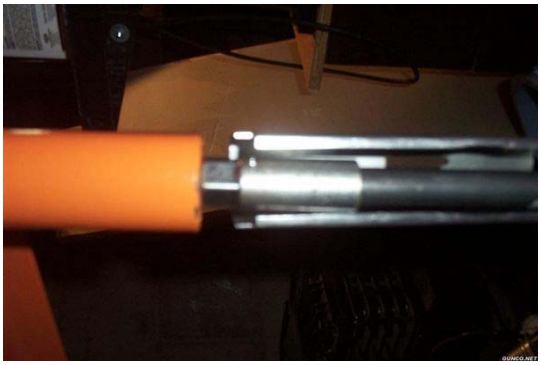
Now that front trunion is in lets press the barrel back in so the trigger guard and top cover can be located correctly.

Here I used the Xebec kit plates against the FSB to support the barrel.

Start

It's in

I used the Xebec provided bars of steel to push the barrel in, but I needed more length. I often use sockets for extra length and stability.



Now that the barrel is back in we can check the mag fit and top cover fit. This will make sure we can locate the trigger guard correctly.

Here is where I tested the trigger guard fit and drilled the holes for the rear of the trigger guard as the Yugo is different.

!Important note! These DPH flats and the Tapco flats fit most standard AK kit very well on the front trunions with no major issues. Using a blank or a commercial receiver could be very different. The front rivet holes line up well on this flat with Romanians, AMD's SA-85, non-bulged Yugos, and some Bulgarians.

I made the decision after making sure the trigger guard lined up and a mag would fit that it was time to drill the holes for the rear under folder trunion.

I started by laying the rear trunion on the bent flat to get it lined up. One way to tell is to put the recoil spring into the trunion and make sure it runs parallel with the top of the receiver. I'm sort of a hack and I often eyeball these things. Since I was a kid I often built things out of scrap with no measurements or math. This may drive some people crazy, but I have mindset that works that way.

You can see in this photo I have scribed marks on the flat with a razor knife.

Now I can make sure again that my cut on the lower rear of the flat is correct.

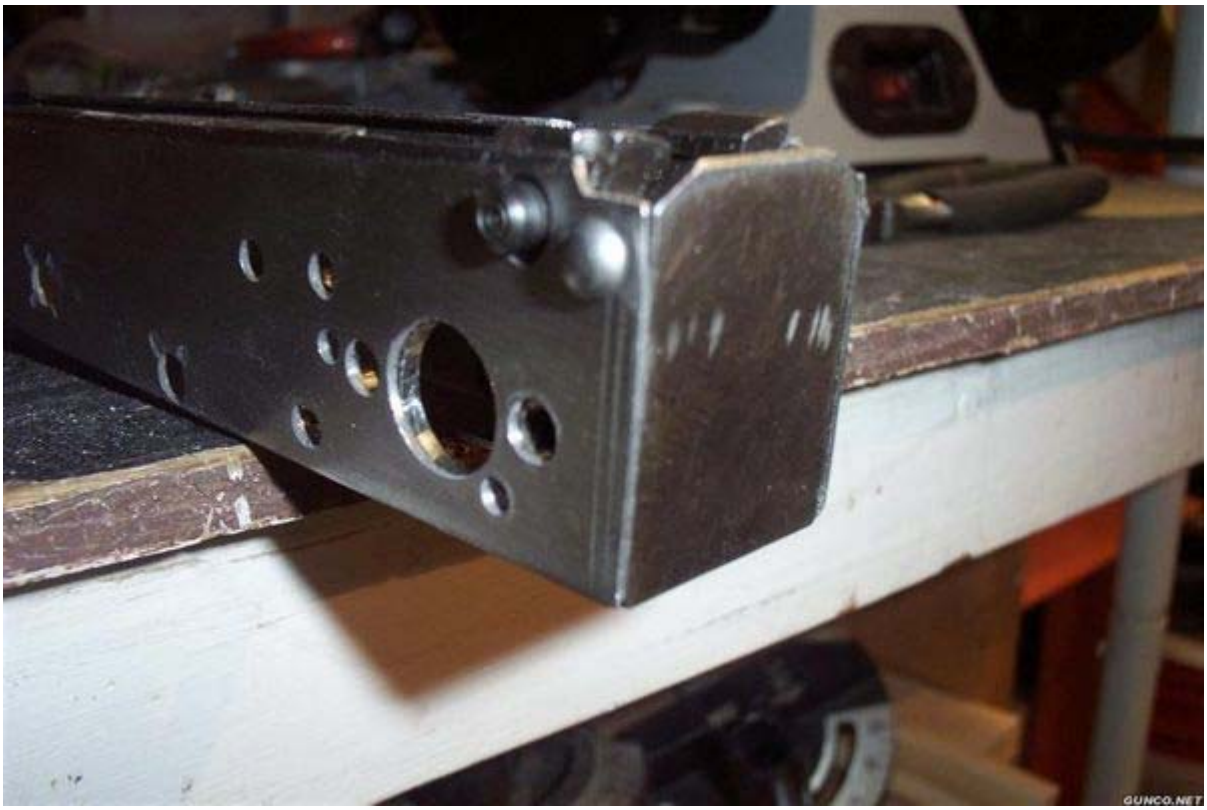
I used a punch to mark my first hole and drilled a pilot hole. As it was I messed up a little and had to egg this first hole out just a little. From there I bolted the trunion to the flat as you can see in this pic. This allowed me to get the rest of the holes lined up.

Here I am discovering that the P-grip bolts are the exact same size at the UF locking holes. This came in handy big time!

Unfortunately I missed a few photos here. Here is the rear trunion being held by 2 P-grip bolts and the rear upper rivet. To make matters easier or harder I drilled all of these holes with a hand drill and not my drill press. I used the rear trunion as a guide for the drill bits to keep it in line and I was very careful to drill a little and inspect.

I have also drilled the under folder pin access holes in the shot on the bottom of the flat.

The regular upper rear rivet hole is almost in line with the Yugo top cover and recoil spring lock mechanism. I almost left this out when I was deciding on what flat to use. As it is, I decide to us a flat I had started to drill for something else and stopped. Since the upper hole is there on this flat I went with it. This was one of the most difficult tasks as the hole needed to egged out and enlarged. I could have done a better job on this, I had planned on this being a beater build.



Rear trunion has been fitted and now the excess needs to be cut off.

You can see I have fitted the rear trunion here and cut off the excess from the flat. In the pic it looks like the rear trunion doesn't line up with the rear edge very well. It's actually very close and not noticeable.

At this time I decided I should cut the small extra amount off the front of the receiver that was keeping me from locking in the lower forward hand guard.

As you can see the fit is just right.

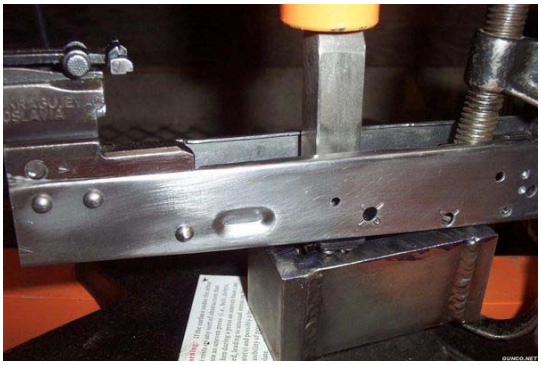
Riveting the trigger guard.

The riveting jig was made by a member here that is long gone. I bought this jig from another member even though it was built horribly, but it gets the job done for me.

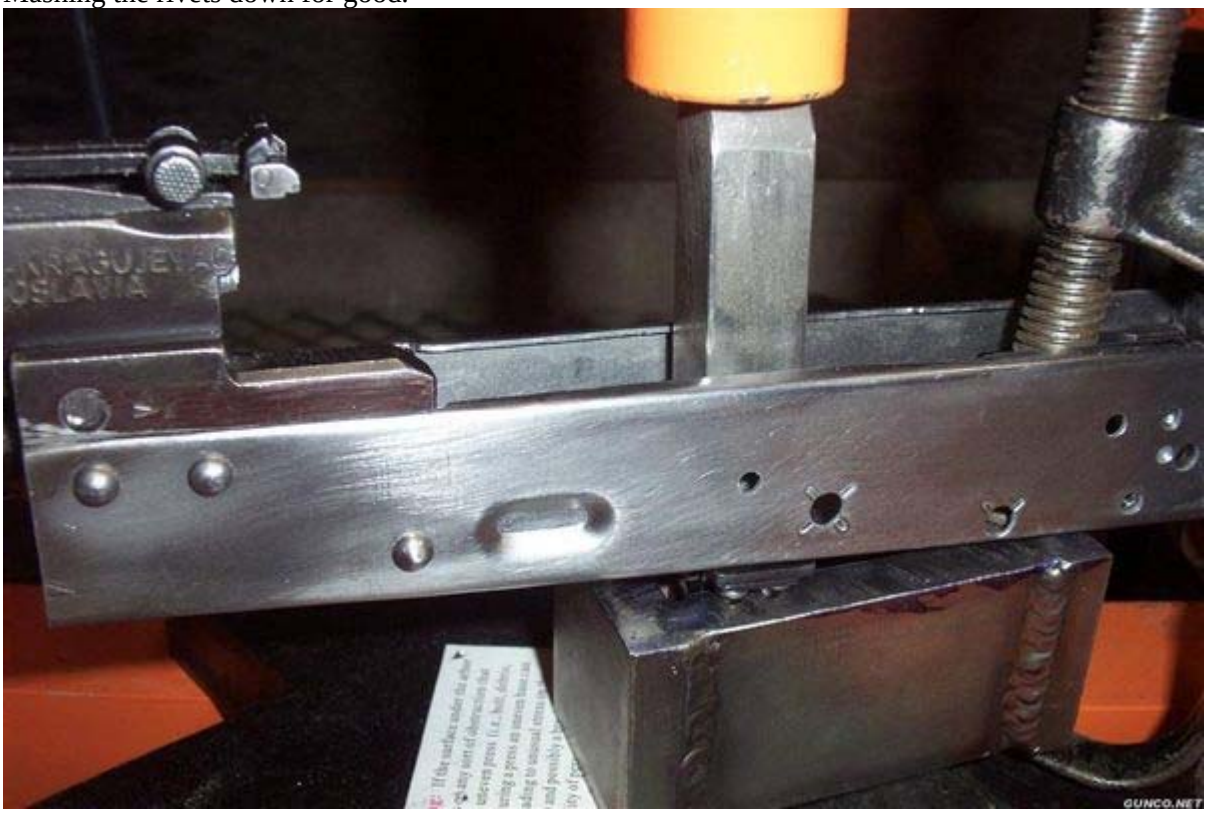
I would recommend a better rivet guard jig than mine.
http://ak-builder.com/ak/modules.php...showpage&pid=4

Green light arms used to make tools. I'm not sure of his status as he had some business issues. His tools were very nice.
http://www.greenlightarms.com/

Here is another post on using a trigger guard jig which is much better than mine.
http://www.gunco.net/forums/showthread.php?t=1743



Mashing the rivets down for good.

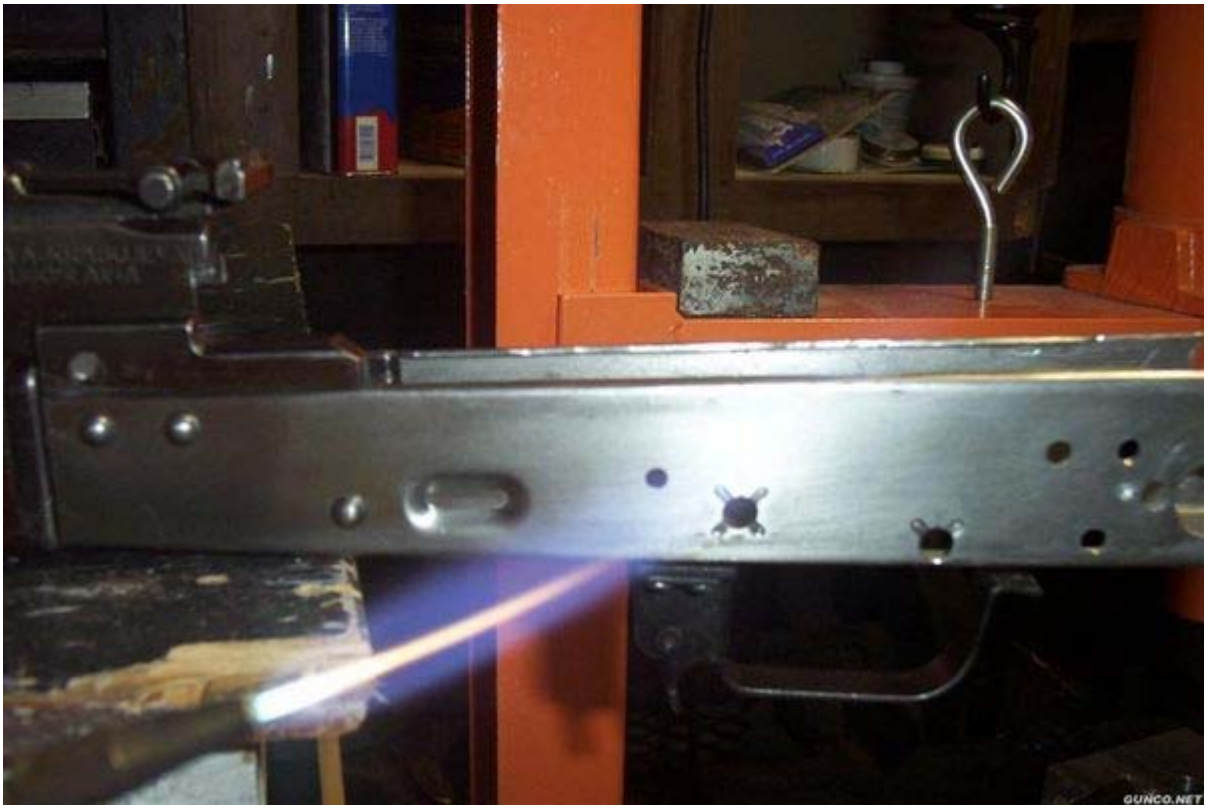


Before I put the rails in I decided to heat treat the axis pin holes. I'm no expert at heat treating and have only done it 3 times. I'm hopeful that my treatments stand the test of time.

For some good reads on heat treating I would check these sources.
http://www.gunco.net/forums/showthread.php?t=8227
http://www.gunco.net/forums/showthread.php?t=7792
http://www.gunco.net/forums/showthread.php?t=17076
http://pookieweb.dyndns.org:61129/AK.../heattreat.htm

My ejector rail was a pre-heat treated piece that I had from a while back. Someone used to sell the ejector rails heat treated which is the most critical piece that needs to be heat treated. If it is not treated it can deform very quickly as the steel casing of ammo mashes against it over and over. If I knew of a vendor that sold heat treated rails I would list them here.

Let’s move on to the pics.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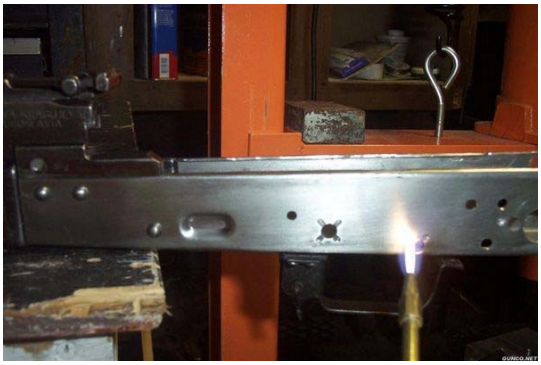
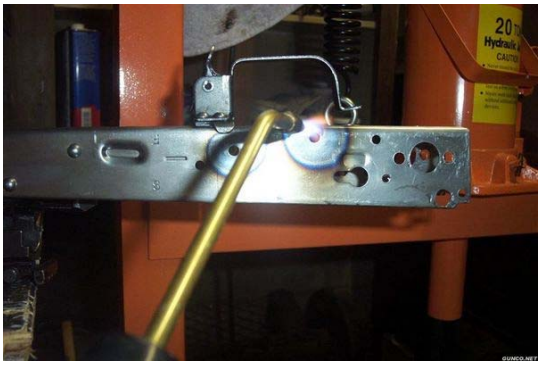




I did the garage gun builder method of using a Mapp/Oxy torch from Bernz-O-Matic. I used a quick circular motion with the flame around the axis holes. When they got to be a dull dark red I quenched in a bucket of water then did each hole that way.

After the 1st stage I went back and heated each hole until I got that dull blue look. Then you let it cool without quenching. This makes the metal less brittle.

If you have not done this before it is very easy to over heat the holes on the first stage. The dark red color is one of the first ranges the steel goes through. After that it will get orange followed by bright yellow and then it is too late.

Spot welding the rails.

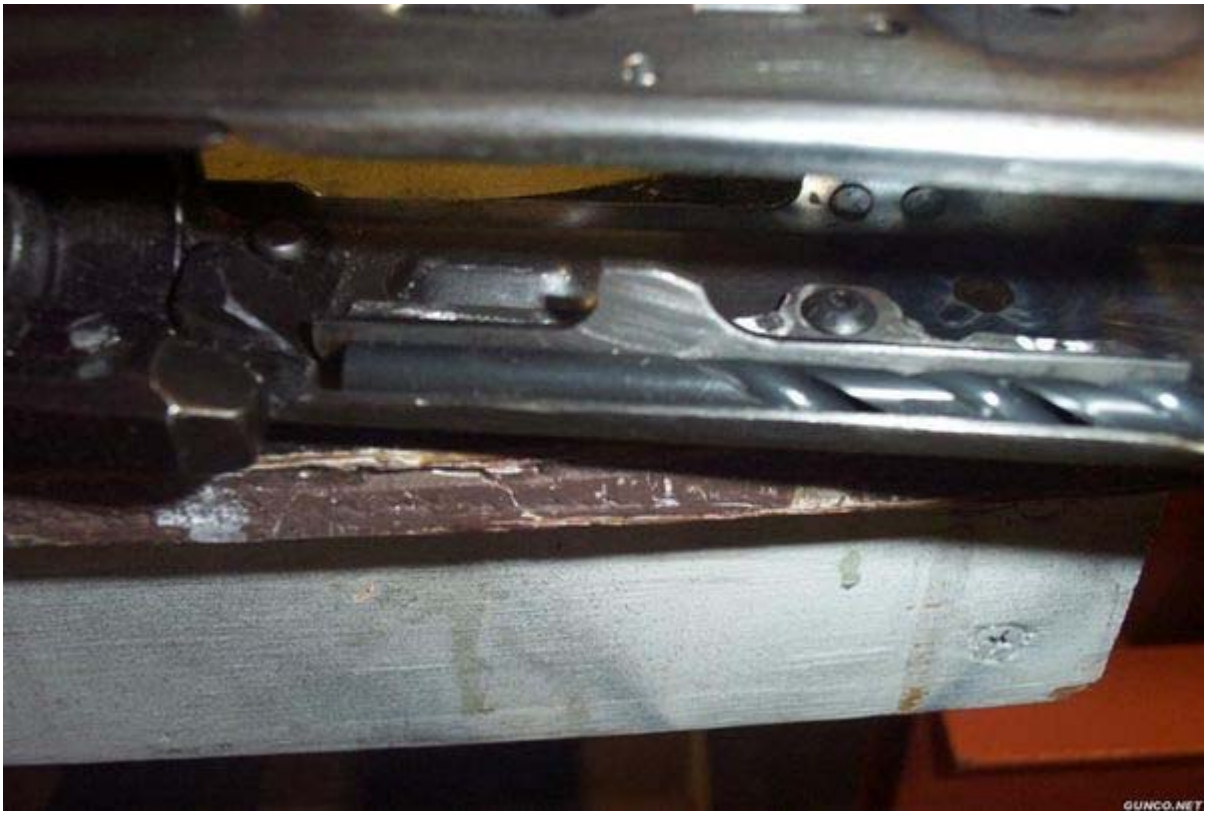
First we need to make sure the rails will fit. I have found that a small amount needs to be ground off the right side rail magazine stabilizer. It can be seen in the pic and is the one on the right compared to a rail that is not trimmed.

This would be a good time to test fit the rails before spot welding. The holes in the rails can be the wrong size and I have found this to be the case every time. They are just slightly smaller and they can be off a little too. It is very hard to correct once welded in (ask me how I know)

The heat treated rail can be almost impossible to drill out unless you use very good bits of drill in small increments at a time to over size the hole.

Here is a great pic of a decent way to line it up.

Size C drill bit laid on the rail and the rail is bolted down.



On the last pic I removed the drill bit to show how well it is lined up.

With the rail bolted down it can be spot welded.

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Follow up with the same deal on the right side.(Non-ejector side)

My spot welder is a real piece of trash. It is a Homier model and I suggest you not waste the money on one. The Harbor Freight one is much better.

Here are some pics of the receiver now that it has been cleaned up.

I used my fiber cutting wheels on the Dremel to carefully grind away the welding flash. Then I used 240 grit sand paper to clean the heat treating effects off the receiver.

After sanding I buff it on the wire wheel that is pictured up above in the tool section.

Here is an earlier pic of a sanding down of the receiver after I got it out of the bending jig. That removed the scrapes and gouges from the bending process.
This was also wire wheel buffed.

Let us move on to rivetint the rear under folder trunion.

May I suggest looking around the site at other information on the board like TotenKopf's tutorial on rear rivets.

This shows the inside of the trunion and has some pointers to what I did to rivet them.

This is my cobbled together bucking bar I peiced together from the inside of the DPK arms bending jig center section and a file.

More pics.

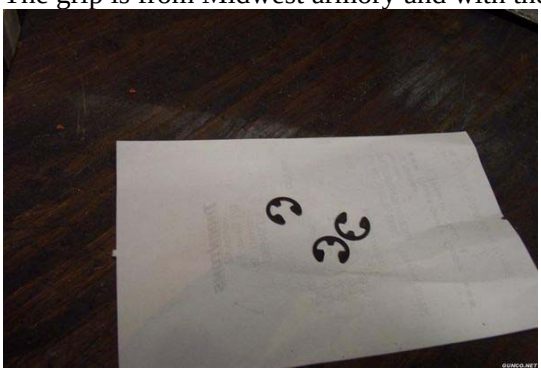
In this pic you can see the top rear rivet. It was peened over and crushed slightly in a vise. I might suggest getting a plinkers jig to do rivets better then I do.

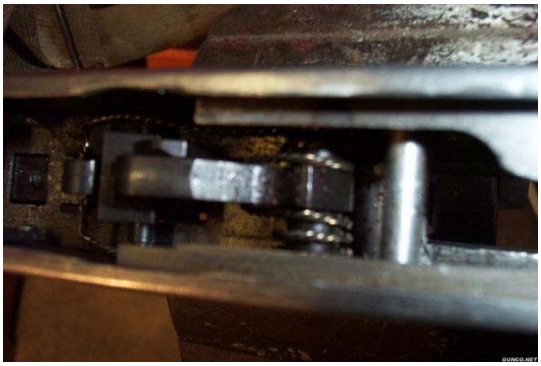
Time to put the center support in a button it up.

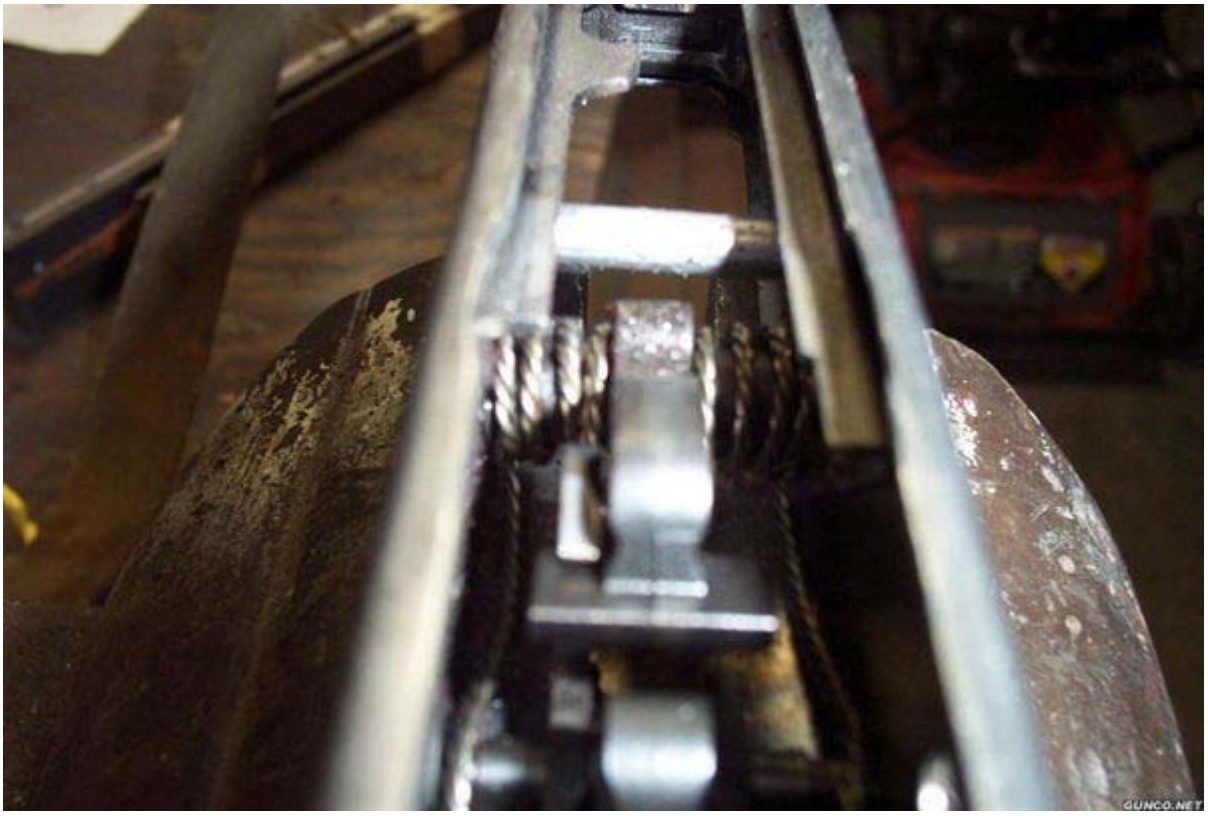
I use 1/4 inch brake line tubing for my center supports.

To rivet the center support I peen it over with a small hammer and do a little crushing in the vise. Do not over press this part as it is easy to cave in the receiver.

Time to put in the G2 trigger group. I use 7/32 E-clips to secure the pins.
The grip is from Midwest armory and with the grip, FCG, and receiver I have my parts count for legality.



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Here are some final pics.

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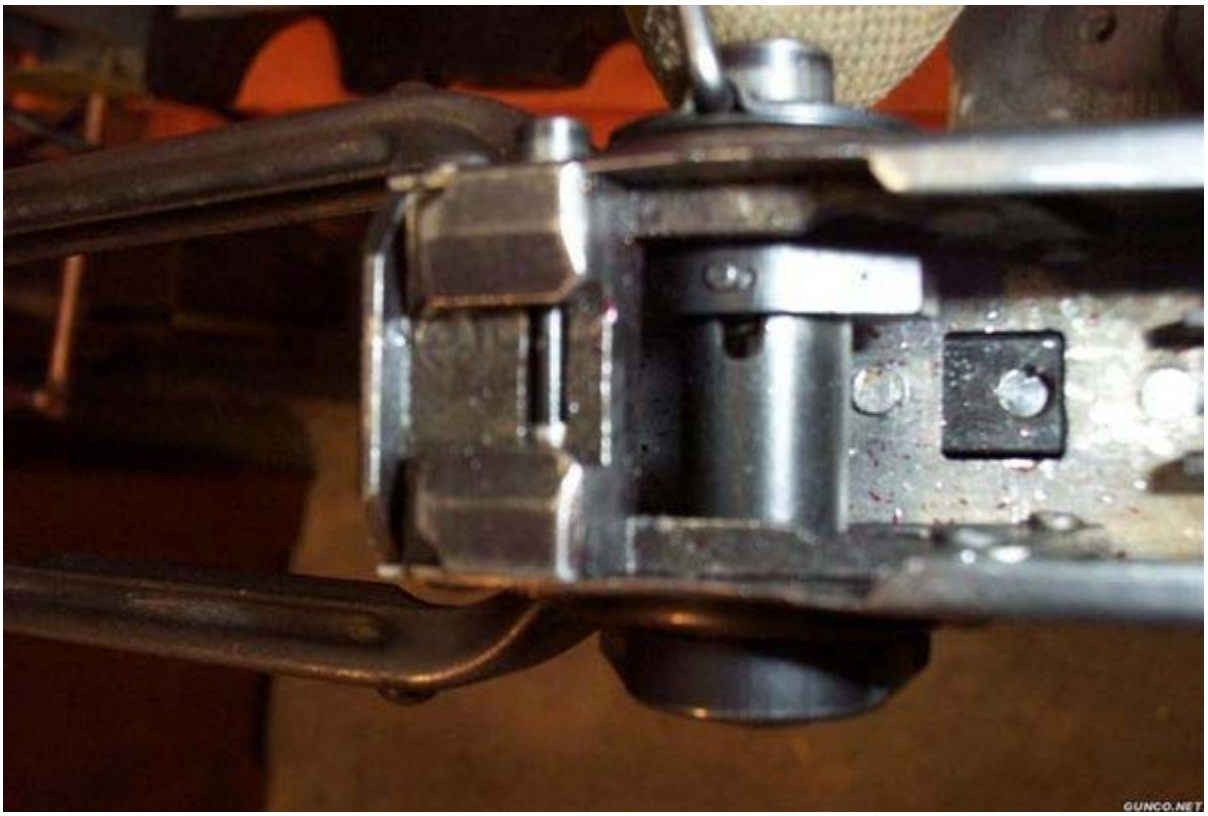
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Here it is all done and test fired after headspace was checked.

Dig that nasty sling for my battlefield pickup look. One of the kits I got had a sling in it. This thing has seen some rough use and it has been cleaned in heavy duty detergent to get the cosmo off it before I used it.

Now that the tutorial is done I hope it helps you make a decision on how to build your rifle. By no means am I an expert at building these kits. That was a big part of doing the tutorial and why I did it. To show that a hack can build one of these kits successfully.