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## Mounting a modern scope on a classic rifle

### Editor's Introduction

*Although the following article does not specifically address a military surplus rifle project, I felt it has appropriate content. In the spirit of self-made firearm accessories I felt that a similar mount could be easily adapted for several of the surplus rifles we shoot today, to use full-size scopes. Also I have been planning for some time to address drilling and tapping a scope mount on a rifle.*

### By R. Ted Jeo and Mark Trope



I had not shot a 4 position small-bore match for over 12 years when I started up again at the local indoor league at the St. Croix-Hudson Gun club in Wisconsin in January of 2000.

I did not have the expensive equipment that the other shooters had in my league, just an old Stevens 416 with iron sights. The 416 worked for a while until the trigger gave out and became erratic. Eventually, I traded the 416 for a CMP Harrington and Richardson M-12 rifle, brand new with new Redfield Palma sights. I managed to get quite respectable scores with this set up.

But then I noticed that my eyes were not as good as when I was back in college and my scores started to show it.

Like many target rifles of that earlier era, my H&R M-12 was equipped with the scope blocks mounted in front of the receiver on the barrel.

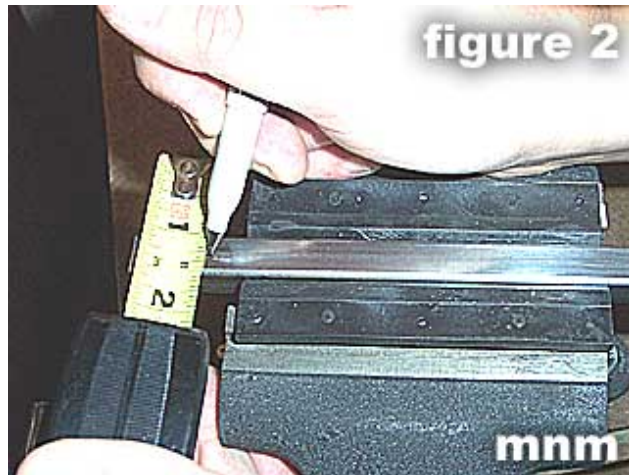
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To help my ailing scores I wanted to mount a scope on the rifle, so a teammate of mine lent me his spare Unertl 20x target scope. Again, I was able to bring up my scores. As the season ended that second year, I started looking into purchasing a Unertl type of scope for my rifle...and nearly fainted at the price tag! 36X Unertl scopes were selling for as much as \$1,500.00. What to do? I could have the receiver drilled and tapped for standard scope bases, but I did not want to alter the original rifle configuration. Eventually, it led me on a search via the Internet that ended up with me discovering Mark Trope.

Mark, a bench rest shooter, had designed a scope mount using one inch steel bar and Tasco scope mounts that allowed him to attach a regular "modern" scope to his H&R M-12 without any modification of the original rifle. The problem for me was that his mount would put the scope high above the receiver (on the order of several inches), which, of course, would be way too high for my 4 position shooting. Over a period of several weeks we collaborated and came up with mount design that could be used for position as well as bench rest shooting and was easy to build. The main objectives we had was to use materials and tools that are common to most shooters workbenches and not break the bank doing it. The total cost for parts and any special tools was just under \$30, well within my cheap budget and many magnitudes less than the cost of any Unertl, Fecker, or Lyman classic target scope. Just like those classic scopes, our base allows a scope and base assembly to be moved from rifle to rifle without dismounting the scope from the rings (**Figure 1**).

We started out with just trying to find a suitable metal bar that would fit the distance between the barrel mounts. We settled on ½ inch square mild steel tubing that you can pick up at almost any hardware store for around \$6. A standard length of 36 inches is enough to build two scope mounts, or give you more than enough to practice drilling and tapping. Of course, you will need to make sure that it is square and straight which is not a problem as the tubing does not bend easily. We also found the tubing to be light as well as strong. A completed assembly with Weaver base, tube and Millett claws weighs only 7.9 ounces. Mounted to the ½ inch tubing will be a Weaver 63B scope base. We selected this base because it very closely fits the ½ tubing width and is designed to be used on a flat receiver and is average in height. The one thing that we did not want to do is add too much height to the entire contraction. Before you start the project, you should test fit your scope with rings to determine if you have enough clearance for the scope objective. Both Mark and I have built and used the scope mount on our H&R M-12 rifles using different scopes and rings. He has a BSA Platinum 36 x 44mm and a Weaver 36 x 40mm and uses Burris Signature Zee high rings. I also have a BSA

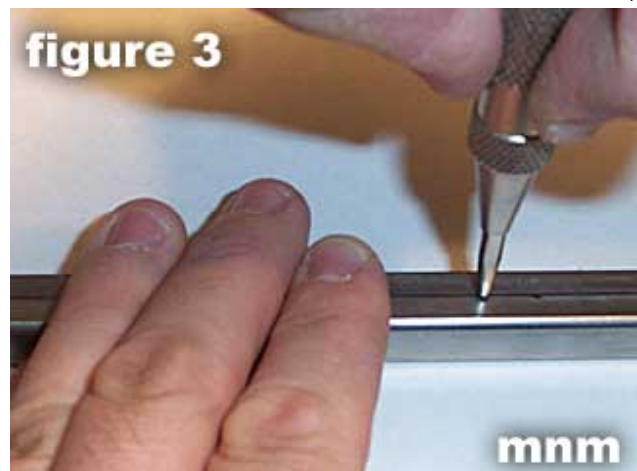
Platinum scope as well as a Simmons 6.5-20 x 40mm Mag 44 scope with Millett mid-height rings. We chose our configurations for different reasons. Mark is rather tall in stature and likes the height and strength of the Burris rings. I like the adjustability and fact the Millett rings do not add unnecessary height. I just needed enough height to clear the bell of the scope. There is probably an infinite combination of scopes and rings that would work for this mount, as long as you clear the bell of the scope. I also like the Millett windage adjustable rings because it allows me to compensate for "not so perfect" workmanship when mounting the ½ tube on to the rifle.



The first step in the process is to determine how long of a tubing piece you will need for your particular scope and rifle combination. To do this, you will to mount the scope to the tubing and then mark where the barrel mounts meet the tubing. This way, you can adjust for eye relief and also make sure that the tubing

does not interfere with the action of the rifle. To accomplish this measurement, you will need to attach the Weaver 63B base to the tubing and then attach your scope to that base. Before starting the step, cut the ½ inch tubing into two 18 inch sections, this makes it easier to work with. Next, measure and mark, using a Sharpie type marker pen, a centerline that runs from one end of the tubing for about 8 inches or so (**Figure 2**).

Place the 63B base so that the rear end of the base is flush with the end of the tubing. Align the holes in the mount with the centerline and, using a center punch (as shown in **figure 3**), mark at least two of the holes where you will need to drill for mounting the 63B base to the tubing.

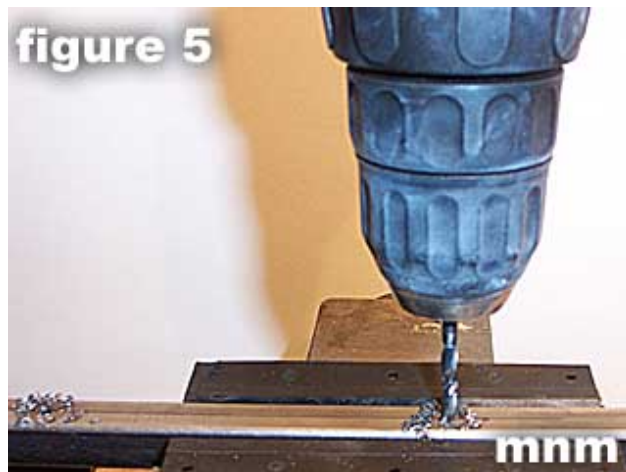




You will need to use the #28 drill bit to make the correct sized holes for these screws (**figure 4**).

Ideally, a drill press would be the best tool to make the holes; however, I have found that if you are careful a hand drill will do the job fine.

The key is to drill the holes as perpendicular as possible (**figure 5**). Use a few drops of oil to lubricate the bit as you drill.

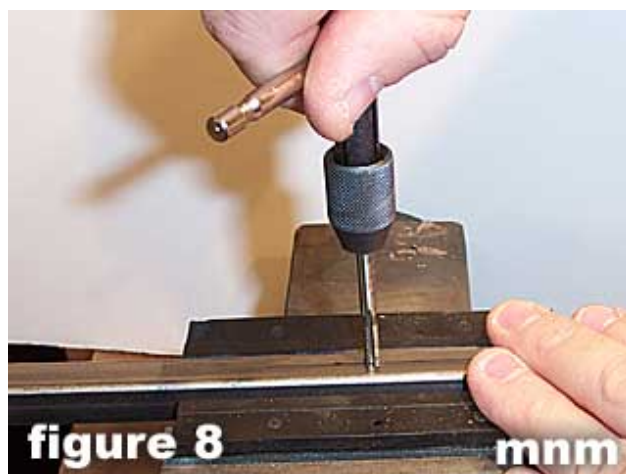


Once the holes have been drilled, carefully clean them of metal shavings. Use the 8-40 tap (**figure 6**), set up your tap handle (**figure 7**).



Add a few drops of oil to the hole/tap and carefully start to cut the threads by turning the tap. As the metal is not so thick, it only takes a few turns to accomplish the threading.

You will feel the tap take hold and then it will turn very easily (*as shown in figure 8*).

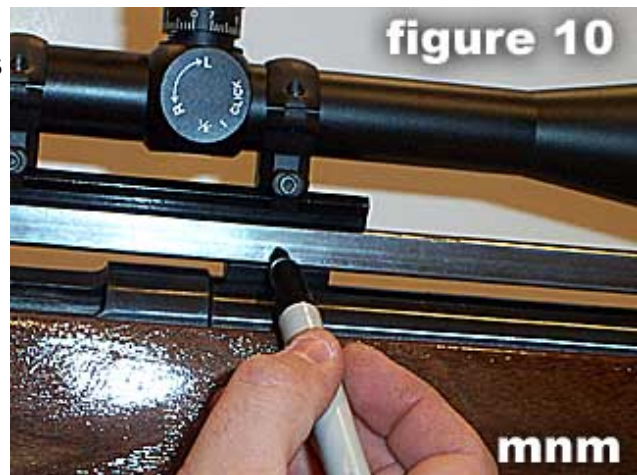


At this point, you have cut the threads into the tubing and you can back the tap out. Be sure not to over cut the hole making it too big for the screws. Before you try to mount the base, make sure you clean out the excess oil and any metal shavings in the hole. If you leave the shavings you will ruin the thread and the screw will not hold.



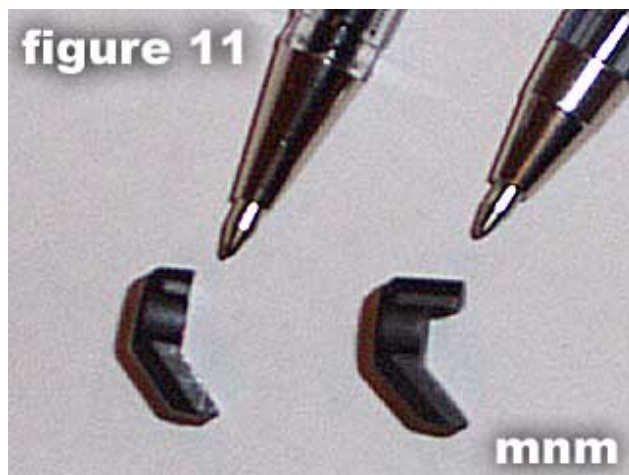
Attach the 63B to the tubing and tighten the screws snugly (as shown in **figure 9**). Mount the scope to the 63B base using whatever Weaver style rings work for the scope. You can now use the scope to determine eye relief and also locate where the barrel mounts meet the  $\frac{1}{2}$  inch tubing.

One way to accomplish this is to rest the rifle on a table. Place the tubing (with the scope mounted) such that it rests squarely on the two barrel mounts of the rifle. While kneeling down, try to get a good idea where the scope should be in relation to your eye. Another way to accomplish this task is to use



the eye relief distance as given by the manufacturer and use that to set the distance from the scope to your eye. It needs only to be an estimate as you will be able to move the scope forwards and backwards for fine adjustment either changing the position of the rings or moving the entire mount on the scope mount blocks on the rifle. Make sure that you also check that the tubing will not interfere with the action of your rifle. Once you have a rough idea where the correct eye relief lies, you will need to mark where the tubing rests on the scope mount blocks. Make the mark on the tubing where the middle of the scope mount block is. Do this for both blocks on both sides (**figure 10**).

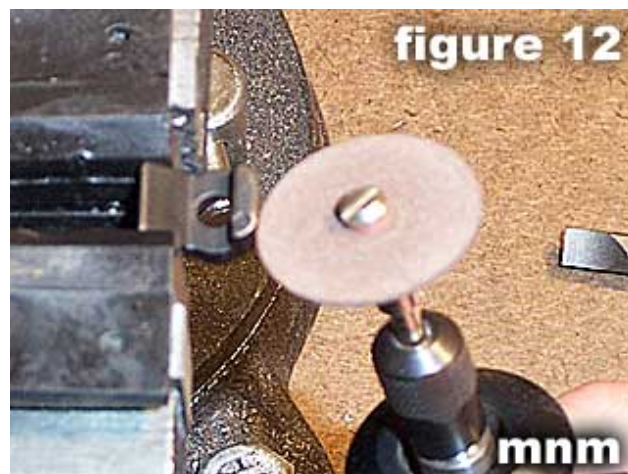
By marking the middle of the blocks, you will still have about  $\frac{1}{2}$  inch of forward and backward adjustment for the entire scope. Remove the scope from the 63B base before you go on to the next step.



Our target scope mount uses modified Millett "claws", the same ones that are used on their adjustable windage scope rings. As you look at them you will notice a tab that sticks out just above the hole used for mounting (**figure 11**). Normally, this tab latches into the Millett scope ring, but you will need to

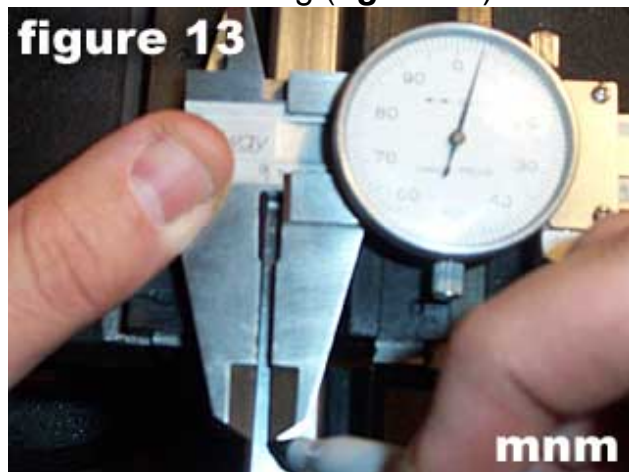
remove it so that it seats flush with the metal tubing.

You can use either a metal file or a rotary style tool with cutter wheel. Remove the tab piece from all four "claws". (as shown in **figure 12**)



With the "claws" modified and ready to be mounted, the next step is to mark, drill and tap the holes for the "claws" on the metal tubing.

The scope mount blocks used on the H&R M12 barrel require that a hole for the modified "claws" to be drilled at 0.14 inches from the bottom of the tubing (**figure 13**). This same measurement should



work for most all barrel mounts on other target rifles, such as the Winchester 52, BSA Martini, Remington 37, 513 T, etc. Measure the location of each of the four holes using a caliper and mark them. Using the center punch, make a starting hole for the drill. You will need to use the #31 bit for each hole,

again, using a few drops of oil to help in drilling. Make sure that you drill into the tubing as straight as possible if you are using hand drill. Do not drill completely through both sides of the tubing at each holding point.

Clean all the metal shavings from the holes and set up your taps. Use the 6-48 tap and carefully cut the threads for each hole using the same procedure as you used to tap the holes for the 63B base. Again, use a few drops of oil to help with this process. Be careful not to over cut and enlarge the drilled hole or the Millett screw will not fit. Once you have cut one hole, clean out the metal shavings and oil and try one of the Millett screws. It should start and snug up to the metal tubing with ease. Continue cutting with the other three holes and clean out any metal shavings and oil that are in the holes before trying each Millett screw.



Go ahead and attach the tab-less "claws" to the metal tubing and attach the scope to the 63B base. Attach the entire device to your rifle and snugly tighten the screws on the "claws". You should again make sure that the operation of the bolt is not impeded. If it is, loosen the claws and slide the mount

forward (**figure 14**). The scope is now ready to be sighted in.

The first thing you will want to do is make some coarse windage adjustments using the four Millett "claws" on the tube mount while bore sighting. We have found by careful adjustment of the claws we can almost zero our rifles with their use alone. This is as easy as loosening a claw on one side and tightening it on the opposite side. If you are using the adjustable windage scope rings from Millett, you will also be able to move the scope side to side on the 63B mount. It usually only takes us 3 or 4 clicks of windage to finish settling our shots in the X ring after a careful boring sighting with the claw adjustment. You may also need to adjust your eye relief by sliding the entire mount forward or backward as needed. If you need to drastically adjust the eye relief and you cannot slide the scope using the scope rings, you can always remove the device and drill new holes for the "claws" further forward or backward. To completely finish the project you may want to blue the bare steel tubing. A quick polishing of the tube with 400 grit wet and dry paper will allow it to take a nice cold blue.

On a side note, I have recently completed a custom x-course stock by Elkridge and will be using this new stock and scope combination in the upcoming season. Even though it would seem that the rifle would be too tall to fit in any off the shelf gun case, it does! I use a Plano AirGlide case (model 1301)



designed for a scoped rifle or shotgun (**figure 15**). After trimming down the foam pads a bit, there is enough room for the scope to clear the lid. There is also enough room left over in the case for such small items as front hand stops, hook buttplates and mini bipods. I would recommend this type of case because of its reduced weight and locking features, and, of course, it is a whole lot cheaper than a metal case.

Many older target and match rifles languish in gun cabinets due to not having a scope to fit the barrel mounted scope bases. It is understandable the owners of rifles such as Winchester Model 52's, Remington 37's and 513T's, BSA Matini's, etc. have no desire to drill and tap these classic match rifles. With our scope base, virtually any of these rifles can be set up with short, internally adjusted, modern rifle scopes by repositioning the location of the "claws" on the mount. Whatever your desire is, be it plinking, silhouettes, position shooting or bench rest, dust off those classic target rifles and mount a modern scope on them and get out for some shooting fun!

#### **What you'll need for the project:**

One ½ inch square mild steel tubing piece at least 18 inches long

One [Weaver 63B](#) scope base with mounting screws (8-40 thread)

Four Weaver style "claws" from [Millett](#) with mounting screws (6-48 thread)

#### **Tools and Supplies:**

Electric drill or drill press

Metal file or rotary tool with cutter wheel

Flat blade screwdriver

Hex wrench (5/32")

[Calipers](#) and measuring tape

Oil (Tap oil preferred)

Hack saw

Sharpie marker

Center punch
Hammer
Bench vise
<a href="#">6-48 taper tap</a> (drills, taps and handle are available from Brownells)
<a href="#">8-40 taper tap</a>
<a href="#">Tap handle</a>
<a href="#">#28 drill bit</a>
<a href="#">#31 drill bit</a>

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