

ACCURIZING The M1 Rifle

Glass-bedding substantially enhanced the accuracy of the author's Service Grade Garand, but more improvements were in order.

By J. B. Roberts, Jr.



When the glass-bedding job on my DCM-M1 was completed, the rifle, which had sprayed hits all over the SR bullseye, shot well within acceptance criteria for the National Match M1 rifle. Those limits were not tough: 3 1/2" average extreme spread for three 10-shot groups at 100 yds. range; no single group over 5" extreme spread. That, according to the 1961 *National Match Rifle Bulletin*, was all it took, though in all fairness, most rifles did better.

Those criteria were also geared to the accuracy requirements of the old five-point targets, a 12" five-ring for 200 and 300 yds., a 20" five-ring for 600 yds., and 36" at 1000 yds. They won't really get the job done on the current 10-point series of targets; nor will they suffice for real competition on the

600-yd. stage of the 200-yd. reduced course where the 10-ring is just larger than 3 3/4" diameter. My rifle, for example, after it had been glass bedded, would group 50 consecutive shots in the 7"-diameter, 10-ring of the SR target, good for scores in the 80s on 600-yd. reduced target. Fortunately, where my M1 was concerned, there was something more that could be done.

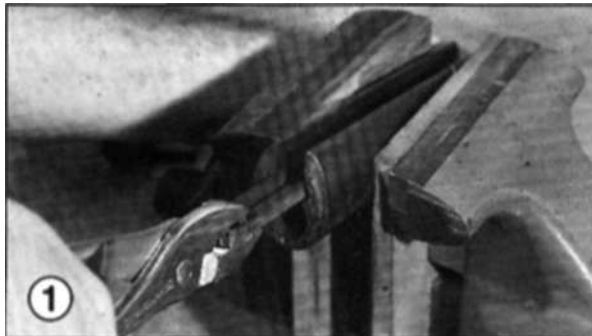
The U.S. Navy, in the late 1960s, did a considerable amount of

pre-planned tinkering with M1 rifles, both cal. .30 and converted to 7.62 mm NATO, for match use. They turned up a number of kinks having to do with the wood- and metal-to-metal fit—not the bed-

ding—of the M1 that resulted in a more precise-shooting rifle. That is to say the Navy's M1s would shoot rounder groups that were smaller by virtue of having fewer fliers. These procedures have been published, but there is no harm in recapping them and revising the techniques so that the hobby gunsmith can make the modifications.

Begin by disassembling the rifle, removing all metal and wooden parts from the barrel. Set the stock group and trigger housing group aside. They won't be needed until it's nearly time to reassemble the rifle.

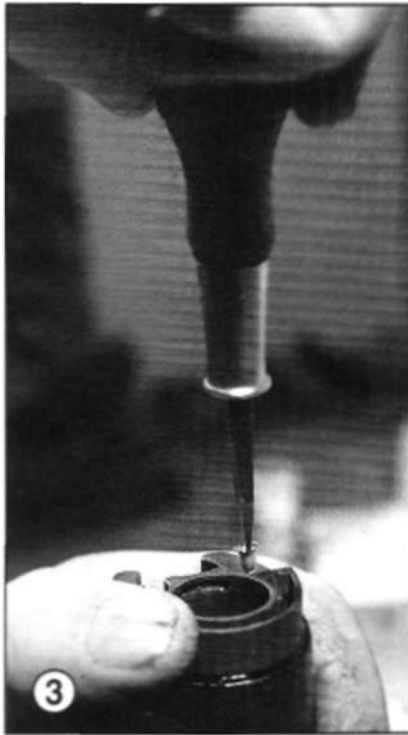
Inspect the operating rod to insure that it is *straight*. Looked at from the side, there are two bends in the rod. They are intentional, providing clearance so the operating rod will not strike the breech portion of the barrel. The section of rod between the bends and the two end sections must be straight and the front (on which the gas piston is fitted) and rear portions (the operating rod handle) must be parallel. Checking the rod from above, it must be like an arrow.



The liner in the M1's front handguard is not needed in a target rifle. Its removal helps grouping, but renders the handguard itself useless as a protection for the barrel.



2 The barrel should not contact the front handguard. Peening the reinforce to clear the barrel helps achieve this condition.



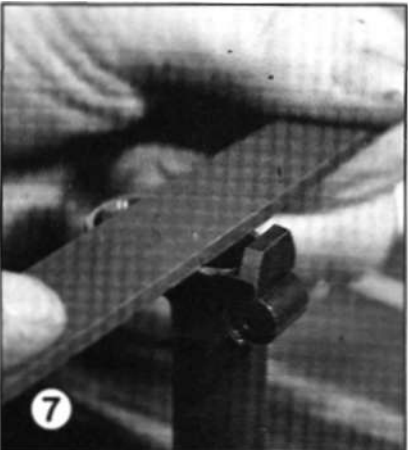
3 The floated handguard is attached to the middleband using bedding compound. Two woodscrews increase the joint's strength.



4 Grind the woodscrews flush with the surface of the middle band to provide clearance for reassembling the rifle.



5 Ream or bore out the rear ring on the gas cylinder to give about 0.01" radial clearance between the rear ring and the barrel.



To hold the gas cylinder in place, peen over the cylinder splines on the barrel. A bore spud prevents damage to the lands.

7 File 30° bevels on the edges of the guide tang on the gas cylinder and shorten the cylinder by milling or by careful filing.

There are gauges to check rod straightness, but the hobbyist will have to depend on a "calibrated eyeball." If the operating rod is bent badly enough to need replacement, the bends can be seen.

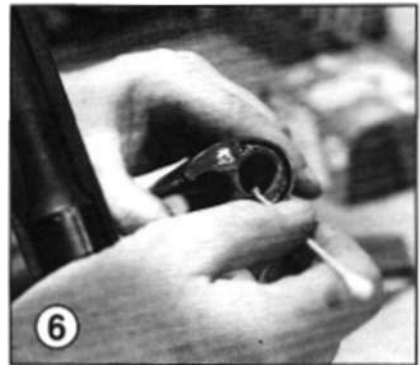
Next, measure the diameter of the bright steel gas piston attached to the front of the operating rod. It must be at least .525". If the rod is bent, or if the diameter of the piston is less than .525", the operating rod will have to be replaced.

One may also wish to check the inside diameter of the gas cylinder. Make the check at a point about 1/4" below the clearance hole for the gas port. Maximum diameter is .532". Above that dimension, replace the cylinder. (Note: Unlike glass bedding, reworking the metal parts of an M1 may not be inexpensive. Parts that are unserviceable will have to be replaced, and the job calls for tools that may not be in the average tool box.)

Presuming that the operating rod and gas cylinder are serviceable, let's shift our attention to the lower band and handguards.

Start actual work with the rear handguard and trim 1/16" or 3/32" from its back end. Shortening the rear guard by that amount will prevent it from contacting the receiver when the rifle is assembled.

The front handguard requires a little more work. It must be modified so that, when attached to the lower band, it does



6 If the middle band is not tight on the barrel, a high temperature adhesive may be used to permanently bond the parts.



not contact either the barrel or the operating rod.

The first step in reworking the front handguard is to remove the sheet metal liner from inside the operating rod channel. It's easy to do. The liner is held in place by tabs at either end. Bend them straight, grab the liner with a pair of pliers, and jerk it out. Then throw it away.

Now, with a round-faced punch and a pair of pliers, bend the sheet metal cap on the forward end of the front handguard so that it does not contact the barrel. There will be some trial fitting involved, here, but the desired end result is that the barrel floats inside the guard. Since the operating rod must also move freely inside the guard, now is a good time to check that and to relieve the sides of the operating rod channel.

Once the barrel and the operating rod are free of contact with the front handguard, we are going to permanently attach the front handguard to the lower band.

The best way to do that is to drill clearance holes for two No. 6 woodscrews in the portions of the lower band where the area of contact with the guard is the greatest. Turn the band over and, on the flat rear surface, countersink the holes to at least partially accommodate the screw heads. Then, use two No. 6 x 1/2" woodscrews to join the two parts.

It is also wise, at this point, to reinforce the screw attachment by gluing the handguard to the metal. Brownell's ACRAGLAS works fine for this purpose. So does Devcon. There is a third alternative, to be discussed shortly. Whatever is used, when the adhesive has dried, use a small flat file or hand grinder to dress off the protruding screw heads.

At this point we fit the rear handguard and the assembled lower band and front handguard to the rifle.

The lower band must be a driving fit on the band. If it is not (and it probably isn't after being disassembled and reassembled for glass bedding and for trial fitting of the front handguard) it must be lightened. This is best done by peening the edges of the barrel clearance hole on the rear of the band—and on the front, too, if a long drift punch is available—and then gluing the band in place on the barrel.

The adhesive used for this step must be of a type that does not deteriorate at relatively high temperatures. Fiberglass bedding and common epoxies will not do the job here, since two strings of rapid fire will generate sufficient barrel heat to begin breaking them down. I use General Electric RTV-106, a silicone base adhesive that will hold at temperatures of up to 500°F for long periods and at 600°F for 15 or 20 minutes.

RTV-106 is available from dealers in building materials and adhesives.

If there is no chance that the handguard will ever be removed, RTV-106 may be used to bond the handguard to the band. It will, however, be a part of a permanent installation. The heat needed to break down the RTV-106 will ruin the barrel—thus limiting removal of the band to occasions upon which the barrel is to be changed—and burn the handguard to cinders. For my part, I used RTV-106 on the band; Brownell's ACRAGLAS on the handguard.

There is one thing to keep in mind from now on. Call it a handling instruction, if that seems appropriate, but remember it—never (**NEVER!**) pick up an accurized M1 rifle by the front handguard, ever again.

Let's turn our attention back to the gas cylinder. Just as the barrel must not contact the handguards, except where absolutely necessary, the gas cylinder must not contact the barrel, except at the front where the two join together. The gas cylinder must not contact the front handguard either.

Start modifying the cylinder by filing a 30° bevel on each side of the tongue that extends rearward from the stacking swivel and, in the unmodified rifle, protrudes about 3/8" into the operating rod channel in the front handguard. That keeps the tongue from touching the handguard.

Then, remove about 1/32" from the rear end of the cylinder and the ring above the cylinder. This operation is best done on a milling machine since the back of the cylinder must be straight and square. Lacking a mill, or the convenient services of a machine shop, the job can be done with a file. It is, when done that way, a job requiring skill and painstaking care. When it is completed, the gas cylinder assembly will not contact the front handguard.

The final modification to the gas cylinder assembly is the enlargement of the inside diameter of the rear mounting ring so that it does not touch the barrel. This, too, is a job for a machine shop, although it can be done with an expandable reamer.

If the latter method is selected, a pilot will be required—and must be fabricated—to keep the reamer straight. Turn the pilot on a lathe, .520" ± .003" diameter and 8" long. That diameter will slide easily through the three splines that hold the gas cylinder on the barrel, and that length will provide guidance for the reamer for its entire cutting length.

Ream the rear ring from its nominal .620" i.d., up to .640", a radial increase of .010" —and be careful. The web between the gas cylinder and the ring is about .050" thick before reaming. The .040" of metal left after reaming is still thick enough, but

only just. Do not thin the web too much. A Critchley "C" expandable reamer with a working range between .5938" and .6562" is the tool to use.

When the gas cylinder is reassembled on the barrel, there are two criteria governing the way it fits. First, it must be tight. Second, when seated so that the gas port in the barrel is aligned in the clearance hole in the cylinder assembly, the gas cylinder lock must not turn more than 60° past bottom dead center before stopping against the face of the cylinder. If this last condition is not met it can be corrected artificially, but there is no permanent cure short of procuring a supply of gas cylinders and cylinder locks and trial fitting them until a combination is found that will work. For economy's sake the artificial correction is the better choice.

To tighten the gas cylinder on the barrel, lightly peen the spline cuts on the barrel until the cylinder has to be driven lightly into place. Drive the gas cylinder onto the barrel until the gas port is wholly visible at rear of the clearance hole. Reassemble the remaining parts of the barrel and receiver group. Close the bolt.

Then, using the gas cylinder lock as a tool, swage the gas cylinder rearward until two conditions are met. The gas piston (the chromed head of the operating rod) must be completely inside the cylinder and the gas cylinder lock must not be more than 60° past bottom dead center. When those two conditions are met, stake the rear of the splines on the barrel to keep the gas piston from moving further to the rear. When staking is completed, turn the gas cylinder lock screw back to bottom center, insert the gas cylinder lock screw, and put it down *tight*.

The job is almost done, but there is one more thing. The operating rod must not bind or rub against the ferrule on the stock group. To insure that it doesn't, coat the inside of the ferrule with Prussian blue or a similar spotting compound, reassemble the rifle, and cycle the action several times. Any rubbing will show up as spotting compound on the rod. If there is binding, relieve the inside of the ferrule with a round file until it ceases. Now, the job is complete.

Test shooting my M1 following performance of these modifications resulted in a reduction of group size (a 50-shot composite group) from a 6 3/4" X 5" oval to a 5 3/4" circle at 200 yds. That's plenty good enough to hold the nine-ring on my personal nemesis, the MR 52 target.

Maybe, by experimenting with reloads, I can do better. I don't think so. I think I've reached the barrel's limit. But, I'm going to try. Meantime, I'm going to take my DCM-M1 to some rifle matches and try to make Sharpshooter.