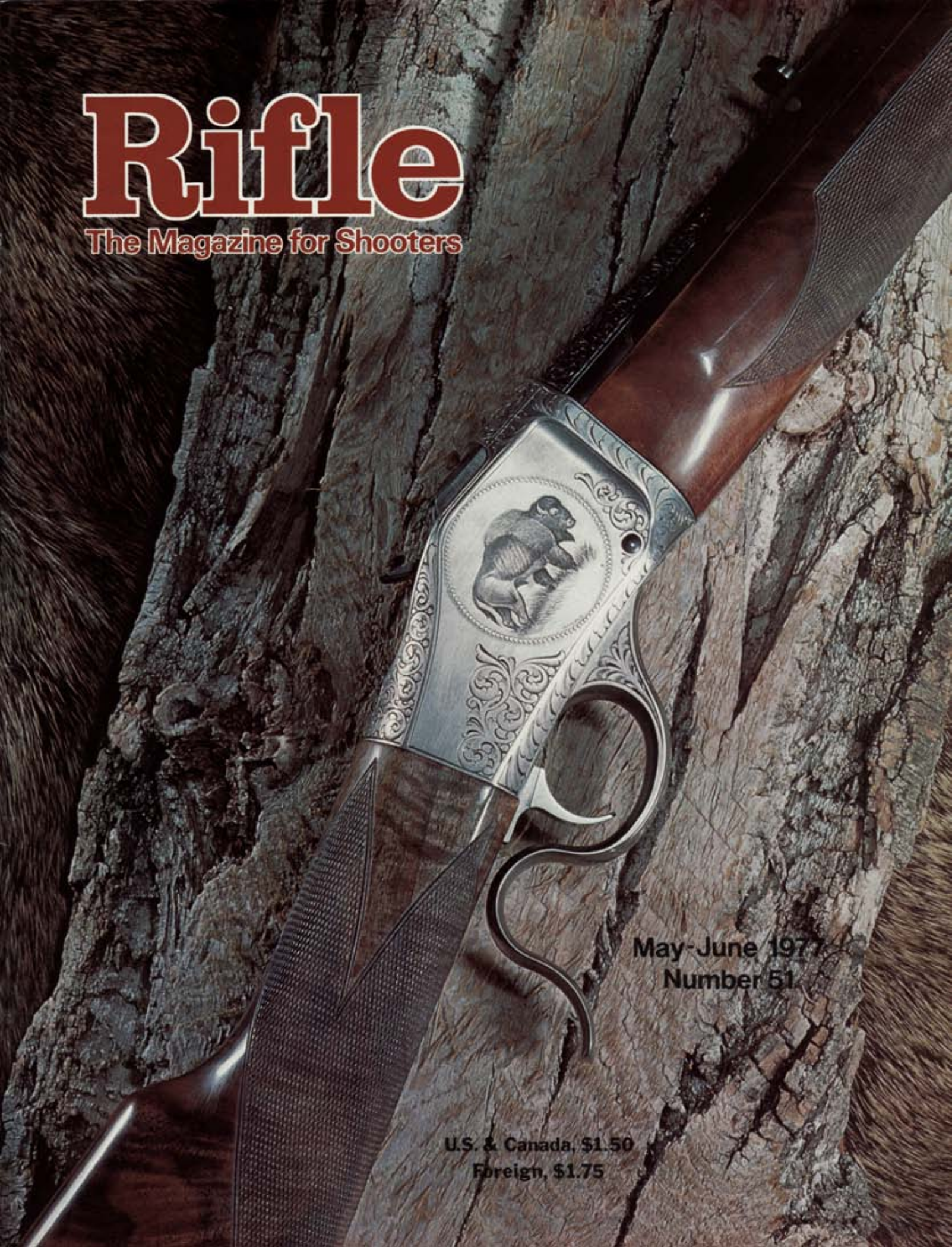

Rifle

The Magazine for Shooters

May-June 1977
Number 51

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Rifle

The Magazine for Shooters

"Only accurate rifles are interesting"
— Col. Townsend Whelen

Volume 9, Number 3
May-June 1977

IN THIS ISSUE

DEPARTMENTS

Adopted in August 1969 as Official Publication For National Bench Rest Shooters Association

This Month's Cover

The Browning B-78 rifle on this month's cover is one of the 1,000 limited edition Belgium-engraved bicentennial models. Each rifle has a serial number beginning with 1776 and ending with numbers 1 to 1,000. The .45-70 has an octagonal bull barrel topped with iron sights and tapped to accept scope mounts. Photo by Bob Hills.

The Staff

Aiming for Answers

Timken Steel Barrel

Could you tell me where I might purchase a Timken steel barrel? I understand that the company stopped production a few years back. The reason for wanting this particular make is that I have a custom takedown Mauser with two barrels — .338-06 and 7x57 and would like a .22-250 with the same contours.

Leonard Wright
Quebec, Canada

From time to time over the years a number of independent barrel makers have used different varieties of Timken steel for barrels. Whether any barrel maker does so at this time could be determined only by contacting those individual makers. In this respect I can only suggest that you write those barrel makers which advertise in the various shooting publications and ask if they are prepared to supply barrels of Timken steel.

You should also be aware that the name "Timken" is applied to a wide variety of steels, only a few of them suitable for rifle barrels. The fact that a barrel is made of Timken steel really doesn't tell us anything about the exact characteristics of that steel.

You should also be aware that simply ordering a barrel of Timken steel will not *produce a barrel with the contour you desire. If you wish another barrel contoured exactly as those you have, it will be necessary to either go back to the original maker and have him duplicate that profile, or send one of the old barrels to a maker who is equipped to copy it.*

George C. Nonte, Jr.

ANSWERS POLICY

We will be pleased to ask the members of the staff to answer your questions. However, due to their heavy volume of correspondence we must ask that you enclose two dollars and a stamped, self-addressed envelope to partially defray the cost of researching and writing each answer. Please limit each letter to one specific question, for many general questions require a lengthy article to answer adequately, and cannot possibly be answered in a letter. Questions should be addressed to Aiming for Answers, *Rifle Magazine*, P.O. Box 3030, Prescott, Arizona 86301.

M-99 Hammer(less)?

I enjoyed Ken Waters' article on the Savage M-99 in the November-December issue. However, I suggest he take another look at the Model 99 sear and cocking arrangement. The 99 is a *true* hammerless firearm, in that the sear engages directly with the firing pin similar to most bolt-action rifles. Upon sear-release the firing pin is free to move forward. No hammer is involved.

Doug Murray
Westbury, N.Y.

It's a matter of terminology. If Murray will look back at one of the old Savage catalogs or parts lists, he'll find that it refers to the Model 99 having a "hammer," "hammer retractor" and "hammer indicator." I believe the reason for this is because of the large appendage on the rear of what we would call the striker. My reference is the 1900 Savage catalog.

Incidentally, the sear engages this appendage or hammer — not *the firing pin. Again your terminology is wrong, as the "firing pin" is only the small pin at the front of the striker rod* [*or hammer as they called it*], *which pin contacts cartridge primers.*

Phil Sharpe, long respected authority, also spoke of the 99 as having a concealed hammer. Notice also that reference is made to a "hammer indicator," where we would today probably call it a cocking indicator.

Ken Waters

.30 Gibbs Loads

I acquired a .30 Gibbs rifle made from a 1917 Enfield action with a .30 caliber barrel of unknown make and a custom stock. I was able to obtain some loading data from the P.O. Ackley books. However, I wish to have more extensive loading information, including the case dimensions, bullet seating depth and overall cartridge length.

John R. Westerhausen
Aurora, Colo.

There is little information available on the Gibbs rifle cartridges where loads are concerned. Not having tested this

rust spots, pits and case-hardening. Such work as that spells ruination for any gun.

If you have ever seen the work done by Brian Ebbs of England in the restoration of old double rifles, or by Del Grego of this country on Parker shotguns, you'll know what I mean by real craftsmanship. I would far rather have one of their products than many of the touted "originals" we see so often. But perhaps that's because I like guns which are in top conditions.

But getting back to your piece, it may well be more important to you to have a nice looking rifle to carry afield than one to display as a collector's original. If this is the case, or if your rifle has been abused or neglected, then my inclination would be to have it restored by a really capable 'smith.

On the other hand, if you wish to preserve its originality, or don't intend to spend the money to have the job done right, then I'd leave it as is.

Ken Waters

Neck Turning and Accuracy

I'm wondering what accuracy advantages would be obtained by thinning cartridge case necks. Considering the Marquart neck turner, the Lee reamer or the Wilson inside neck reamer, which would have the most favorable effect of accuracy?

T.C. Fleming
Augusta, Ga.

Since you don't specify the type of rifle in which you will use the ammunition or the purpose for which the ammunition will be used, it's difficult to give a definitive answer to your questions. In the typical big-game hunting rifle, for example, it's doubtful that any of the three proposed neck treatments is likely to make a significant difference in grouping, unless thinning the necks is a mechanical necessity resulting from reforming brass or some similar operation.

In a couple of pretty good factory-built varmint rifles chambered to the .22-250 cartridge, I've found neck-turning clearly shows up on the target, if not in the form of much smaller *groups, at least in the form of* rounder *groups. In a bench rest competition rifle, proper neck-turning is a necessity, usually making a glaring difference at the target. In other words, the finer the rifle's inherent accuracy and the more precision is needed, the more important case-neck preparation becomes.*

Of the three methods you listed, my personal preference is for the Marquart Case Neck Turner.

John Wootters

.280 National Match Rifle

I reread and studied the July-August 1972 *Handloader* article on the .280 Remington. I had Remington make up a .280 on the M-700 action. It is a 9½-inch twist barrel and does well with bullets up to and including the 154-grain. This is to be used for 200, 300 and 600-yard shooting over the National Match Course. In getting a new barrel that will handle the 162-grain Hornady Match or 168-grain Sierra Match bullets, which twist should be used?

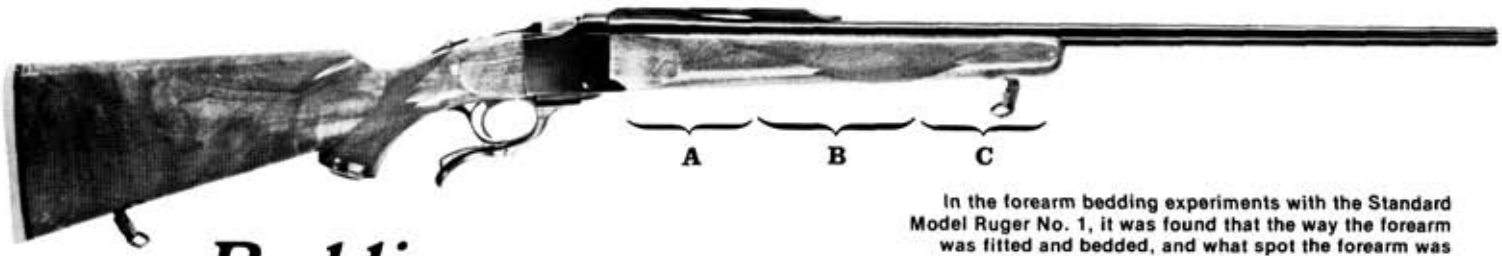
Dan Haigh
Evanston, Ill.

Personally, I feel that nine or 9½ inches of twist in your .280 Remington will properly stabilize the heavier bullets out to the ranges you require — providing *they are driven at full-charge velocities. I have no specific data to back this up, for I have never attempted to shoot such bullets in a .280 Remington Rifle at ranges beyond 300 yards. Certainly you do not want the twist any more rapid than is necessary, so I would suggest that you stick with 9 or 9½ inches. If this does* not *prove to be satisfactory, then I'd appreciate hearing of it.*

George C. Nonte, Jr.

RUGER NUMBER 1

By FRANK de HAAS



In the forearm bedding experiments with the Standard Model Ruger No. 1, it was found that the way the forearm was fitted and bedded, and what spot the forearm was rested on during firing, greatly affected the accuracy, point of impact and zero retention. Three forearm rest positions were used during the tests: [A] rear of forearm, [B] center of forearm, and [C] front of forearm. The test rifle always gave the best accuracy with the rifle resting on the rear end of the forearm. Sighted in with the forearm rested on its forward end, the point of impact would drop if the rifle were then fired from the center position, and drop still more if fired from the rear position.

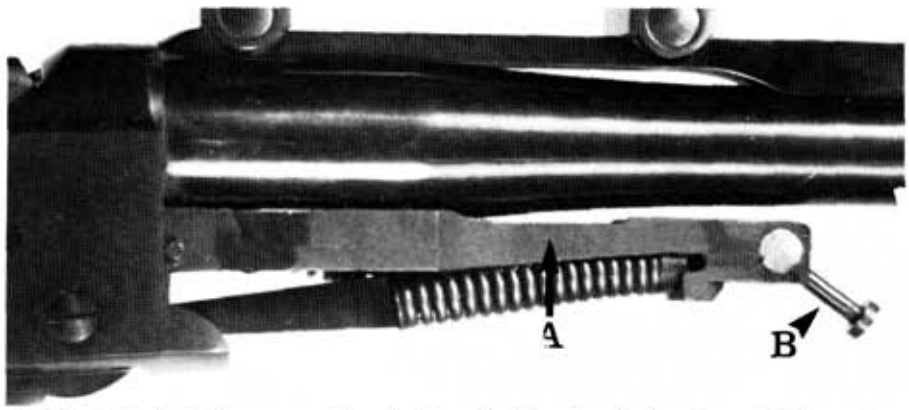
Bedding the fore-end to improve accuracy and zero retention

THE RUGER NO. 1 falling block single shot rifle has a 2-piece stock and forearm. The butt stock is securely attached to the action with a through stock bolt, the best method. With the wood well mortised and fitted to the receiver, as is the case with the No. 1, and the stock bolt drawn up tight, the stock is about as secure as it can be made; accuracy and zero retention of the rifle is in no way affected. The separate forearm, however, and the way it is attached and bedded can, and often does, affect both accuracy and zero retention. This is especially true in regard to the Ruger No. 1.

While most Ruger No. 1 shooters are interested in getting the best accuracy from their rifles, those who use this rifle for hunting are just as interested in having the rifle stay in zero. One is as important as the other. By manipulation of the forearm on the No. 1, it is often possible to get the finest accuracy that the barrel is capable of delivering, and have the rifle stay perfectly sighted-in over a long period of time as well. But obtaining and maintaining both with the factory bedded forearm is often difficult, if not impossible.

A great amount of time and effort was spent in designing the Ruger No. 1 rifle, with special emphasis on the forearm and its attachment and bedding. Due to the design of the action, some of its parts had to be mounted in front of the receiver below the barrel. Not wishing to attach any of these parts to the barrel, the designers chose to make a projecting arm forward of the receiver on which to mount the parts, and making this arm a permanent part of the receiver. In so doing they made it long and heavy enough so that it could also double as a hanger for the forearm.

A single screw was used to attach the forearm to the hanger, but instead of putting the screw at a 90-degree angle through the forearm and into the hanger, Ruger drilled the hole at a rearward angle so that on tightening the screw the forearm would be drawn up against the hanger and back against the receiver. This fastening method positively prevents the forearm from moving forward due to recoil. On early No. 1 rifles the forearm screw was threaded directly into the hanger. Now the hanger is made deeper at its end, a hole drilled across it for a heavy pin, and this pin drilled and tapped for the forearm screw. This improved fastening arrangement allows torque-free tightening of the screw and some lateral

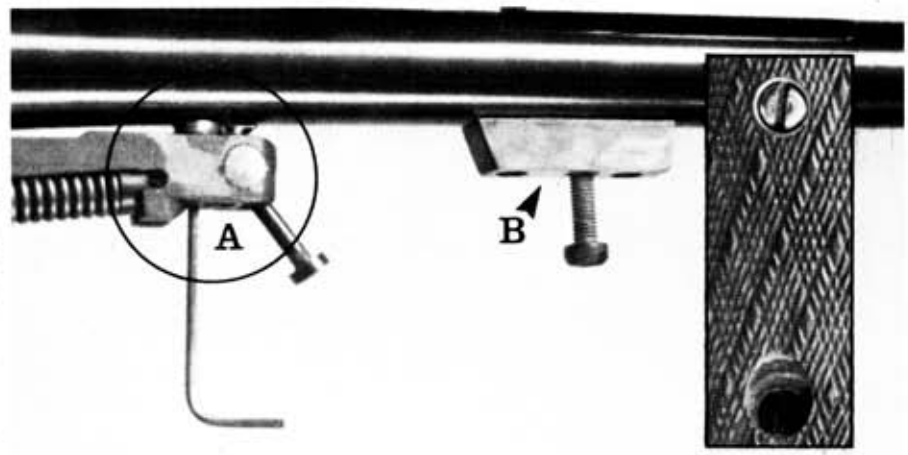


The Ruger No. 1 rifle has an arm [A] made integral with, and projecting forward of the receiver, with the forearm being attached to it by the single forearm screw [B]. The screw is positioned at a rearward angle as shown, and draws the forearm tight against the hanger and barrel, and against the receiver. This arm, which is generally referred to as the forearm hanger, also houses and holds some of the mainspring and ejector parts. Although appearing rigid, the end of this arm can be flexed by finger pressure.

movement so that the forearm tip automatically aligns itself with the barrel. By altering the bedding of the forearm against the hanger, the entire forearm could be made to be free of the barrel, contact the barrel its entire length, or just have the front part of the forearm contact the barrel with various amounts of pressure. Testing in the Ruger factory must have revealed that the best accuracy was usually obtained with the forearm bedded so that its tip contacted the barrel with considerable upward pressure, and this is the bedding method Ruger now employs on all No. 1 rifles.

Most Ruger No. 1 rifles are reasonably accurate with the forearms bedded in this manner, but accuracy and zero retention can usually be improved by experimenting with individual rifles, which the factory cannot economically do. However, some owners have reported experimenting with the forearms on their No. 1's and have found that better accuracy is often possible with a minor bedding change. We have also heard from shooters who are well satisfied with the accuracy they are getting from their No. 1's, but state that their rifles do not maintain zero.

Wood is a rather unstable material; if the forearm is bedded so that its tip exerts pressure against the barrel, any slight change in the forearm such as warpage, shrinkage or swelling is apt to have some effect on the barrel and consequently on the zero of the rifle. Varying the tension of the forearm screw, has the same effect. Further, in rest shooting, both point of impact and grouping ability is affected if the rifle is not always fired with the forearm supported at the same point.



Bedding Method No. 3, shown here within the circle [A], consisted of a small setscrew [its location is indicated by the Allen wrench] installed in the end of the forearm hanger. Tightened against a small V block, this setscrew props the end of the hanger slightly away from the barrel, making the hanger very rigid to support the forearm free of the barrel. The anchor block and forearm screw is shown at point [B] which was installed for Bedding Method No. 4. The anchor block is attached to the barrel by two scope mounting screws and the forearm is inletted over it. De Haas recommends this method of forearm fastening on No. 1 rifles in calibers producing considerable recoil or if the sling swivel is attached to the forearm. The inset shows the anchor block forearm screw above, and the regular angled forearm screw in the forearm.

The Ruger No. 1 rifle we used for our forearm bedding experiments was the Standard Model in .22-250 caliber with 26-inch heavy sporter barrel. Frank stocked it with a Fajen semi-finished stock and forearm, making the forearm the same size and length as Ruger does on this model and bedded it the same way with the forearm tip exerting up to 12 pounds pressure against the barrel. All the test shooting was done from bench rest using a handload of 41.0 grains of 4831 powder behind the 53-grain Sierra match bullet. Four to ten 5-shot groups were fired for each test, sighting with a 10X scope, under ideal weather conditions. Some tests were repeated several times, and in most instances 20 shots (four 5-shot groups) comprised a test, starting with the barrel cold and the bore uncleaned since the previous firing, and

Forearm Bedding Test Results

RIFLE: Ruger No. 1, Standard Model, .22-250
RANGE: 100 yards, 5-shot groups
LOAD: 41.0 grains IMR-4831 with 53-grain Sierra HP Match bullet

		TIP REST		CENTER REST		REAR REST	
		Average Group Size, Inches	Point Of Impact, Inches	Average Group Size, Inches	Point Of Impact, Inches	Average Group Size, Inches	Point Of Impact, Inches
Bedding Method No. 1 (Factory bedding, forearm tip pressure against barrel)	Light pressure	1.115	-1.4			.750	-2.7
	*Medium pressure	1.275	0*			.540	-.9
	Heavy pressure	1.420	+1.0			1.305	-.6
Bedding Method No. 2 (Barrel floated, forearm free of barrel)		.693	-2.2			.678	-2.6
Bedding Method No. 3 (Hanger pressure against barrel, forearm free of barrel)		.929	-2.1	.925	-2.2	.673	+2.4
Bedding Method No. 4 (Forearm attached to barrel with anchor block & screw)	No pressure	1.265	-4.6			1.150	-5.2
	Light pressure			1.070	+.2		
	Heavy pressure	1.025	+.9			.630	+.4

*All point-of-impact figures are based on the rifle sighted-in to strike on point of aim and the forearm as factory bedded with medium tip pressure against the barrel.

Center rest figures not given can be calculated as being the average between the tip and rear rest position data.

ending with the barrel quite warm after firing at a rate of one shot per 60 to 90 seconds.

Frank worked out and installed the different bedding methods, as well as working out the testing routine in order to get the best possible test data. Before any test firing was done the rifle was carefully sighted-in to hit on point of aim at 100 yards with the forearm bedded by the factory method, and supported on the front third; no change was made in scope adjustment through all the subsequent test firing. The rifle was tested for point of impact changes with each bedding method over a period of several months. All of this required a test period of nearly two years.

After this groundwork of extended test firing was done, Mark took over the test shooting on his range, and in a planned and routine order over a period of several successive fine shooting days, repeated all of the test firings, shooting with utmost care and precision. He did all the firing in 10-shot (two 5-shot groups) relays, letting the rifle cool to about starting temperature, or up to one half hour or more, between relays. In the test shooting to determine the point of impact change from different forearm resting positions, he fired alternating shots on twin targets, alternating the forearm resting position with each shot. This resulted in the two groups being fired with an even temperature rise of the barrel while any variations in shooting conditions were equalized. With this method the point of impact change from one forearm rest position to another was instantly apparent.

Afterward, we also tested the rifle with the forearm resting on the center third, the normal holding and resting position. In all cases with the four different bedding methods tried, the center rest position group sizes and point of impact change was midway between those fired from the front and rear rest positions of the same bedding method. Following are the tests we conducted, with a description of the forearm bedding method employed in that test or tests. Bedding method No. 1 was the same as factory bedding, with forearm tip pressure against the barrel. Our test rifle was quite accurate bedded in this manner, certainly accurate enough for varmint shooting. Without changing the load, sight setting, shooting position or the tension of the forearm screw, our test rifle retained its zero and accuracy during the first months of the test period. Then the point of impact began to drop, enough so that after another three or four months the groups centered at least 1.5 inches lower than at the beginning. Checking the forearm to barrel pressure at the tip we found that the pressure had decreased so that now the forearm tip could be easily pulled away from the barrel. Apparently the forearm had warped or shrunk reducing tip pressure and lowering the point of impact. With the lessening of the tip pressure came a slight increase in group size.

It was at this point that we made a demonstration as to the effect the forearm has on the point of impact and accuracy of the Ruger No. 1 rifle. Loosening the forearm, inserting a 3-layer strip of target paper between the forearm tip and barrel and retightening the forearm screw, pressure between tip and barrel was restored to approximately what it had been in the beginning. Doing this, the rifle returned to its former zero and accuracy. Repeating the test with the strip removed and again with it in place, the same results occurred.

More dramatic evidence of the effect the forearm has on the rifle is to carefully test fire several groups with the rifle as factory bedded, then follow it up after the rifle has cooled by firing the same number of groups with the barrel free floating. This is easily done by merely removing the forearm and firing the rifle with the tip of the forearm hanger supported. With our Number 1 this change resulted in approximately three inches drop in the point of impact.

Another easily made test which may show similar results, but less dramatically, is to test fire several groups with the rifle resting on the tip of the forearm as against the rifle rested on the rear part of the forearm. In this test the Ruger No. 1 Sporter Model is likely to show a greater change in the point of impact, and perhaps in accuracy as well, than the heavier barreled Standard Model, and the still heavier barreled Varmint Model. With the forearm of our test rifle bedded with fairly light tip pressure (estimated at about 5 to 10 pounds), with the rifle resting on the rear third of the forearm, the point of impact would drop 1.3 inches at 100 yards as compared to resting the rifle on the front third of the forearm. With the forearm bedded with fairly heavy tip pressure against the barrel (approximately 20 pounds), the point of impact at 100 yards was about 1.6 inches lower with the rear forearm support as compared to the front forearm support position. This last point of impact difference may seem insignificant at first glance, but to the varmint shooter it means that unless the rifle was rested on the same portion of the forearm as when the rifle was sighted-in, he would miss most shots at small varmints at ranges of 150 yards and over.

In the above tests we discovered that accuracy was also affected as to forearm resting position. Whether the forearm was bedded with light or heavy tip pressure against the barrel, the best accuracy was always obtained when the rifle was rested on the rear third of the forearm, although the rifle was more difficult to hold steady in this position. It

was most accurate with the heavy pressure bedding at the tip.

Even though our No. 1 Ruger rifle was quite accurate with the forearm bedded as the factory would have bedded it, we wanted to find out if there were not some other bedding method that perchance could make it a bit more accurate, and more importantly, eliminate changes in impact and group size due to the effect of the unstable wood forearm. Bedding method No. 2 consisted of the barrel free of contact with the forearm and hanger. Since the forearm hanger of the No. 1 Ruger is made free of the barrel, nothing had to be done with it in this bedding method and test. Two ways are open in test firing the rifle with this bedding method: (1) with the forearm removed and resting the rifle on the tip of the forearm hanger, or (2) with the forearm in place and either the channel sanded out or the forearm propped away from the hanger so that it is entirely free of the barrel while the rifle is supported on the forearm. We chose to use both methods, and with the forearm in place we chose to prop it away from the hanger rather than sand out the channel, since we may have wanted to repeat some of the other bedding tests with an unaltered forearm. To hold the forearm away from the barrel, we merely placed folded cardboard between the forearm and the tip of the forearm hanger.

While the forearm hanger of the No. 1 appears to be rigid, it is actually quite flexible. With the forearm removed it does not take much finger strength to flex the end of the hanger several thousandths of an inch, either by squeezing toward the barrel or pulling it away from the barrel. With the forearm attached and free of the barrel, the effect on the hanger is about the same as doubling its length, thus making it even more flexible. To us, this condition was intolerable, because with the rifle not resting on the forearm the gap between the forearm tip and barrel became considerable.

At any rate, test firing our rifle with the barrel floated, both with the forearm removed and with it in place, the rifle was fully as accurate as with any of the other bedding methods tried. To our surprise, however, there was a small, but noticeable lowering in the point of impact when resting the rifle on the rear of the forearm. We cannot explain this, nor do we care to put forth a theory for the cause. In any event, had our rifle proved decidedly more accurate with this bedding method, we could not have tolerated the forearm gap necessary to achieve a free floating barrel or the very limber forearm condition, and would have gladly chosen the second best bedding method instead.

Not unexpected, however, was that with this bedding method there was no change in the zero of the rifle over the entire period of our testing as we returned the rifle to this bedding at frequent intervals.

Bedding Method No. 3 we called "forearm hanger pressure against barrel," a method which we found worked best on our Browning M-78 single shot rifle, which also has a forearm hanger. This method is one in which a setscrew is used near the front end of the hanger to contact the barrel, and in which the forearm is attached in the normal manner but altered or otherwise adjusted to be free of the barrel. In other words, instead of having the tip of the forearm applying

damping pressure to the barrel, the forearm hanger is made to do this instead. Since the steel hanger is far more stable than wood, the pressure will be more constant; theoretically there should be less point-of-aim and accuracy change than with any other type of forearm pressure. The question was whether accuracy would be equal to other methods.

To achieve this type of metal-to-metal bedding, we merely installed a setscrew near the end of the hanger and adjusted it so that the hanger was pushed slightly away from the barrel. We used a 1/4-inch long 8x32 cupped end setscrew for this, drilling the hold for it approximately .650-inch back from the end of the hanger, or just forward of the mainspring strut with the hammer in the fired position. Then we made a thin V block to fit loosely between the hanger and the barrel, positioning it over the setscrew to serve as a pillar between the screw and barrel. A 3/8-inch flat or round ended setscrew could be used, eliminating the need for the pillar block. After considerable experimenting and test shooting we found that the best performance was obtained with the setscrew tightened at least one full turn, which moves the tip of the hanger .031-inch away from the barrel (with 32 thread setscrew).

We tested the rifle both with the forearm removed, resting the rifle on the tip of the hanger, and with the forearm in place but with cardboard between the forearm and hanger tip so the forearm did not touch the barrel even when supporting the rifle. We found it much more convenient to fire the rifle with the forearm in place. Bedded this way there was no change in the zero of the rifle for a period of several months, and as long as the forearm does not touch the barrel when the rifle is fired, no zero change is expected over a much longer period. We found that our test rifle was much more accurate bedded in this manner than with the factory method, and just as accurate as the full floated barrel Method No. 2.

In addition, we had a forearm sufficiently stiffened and rigid enough so that a wide gap was not needed to keep the forearm tip free of the barrel. There still was the point of impact change from the front to the rear forearm resting position, which we could not explain and which bothered us a bit. However, when shooting the rifle in the normal forearm rest position; that is, resting the center of the forearm on the sand bag, the accuracy delighted us. Further testing with the forearm resting just forward of the forearm screw and just to the rear of it, all within a five inch length of the center point of the forearm, accuracy and point of impact remained stable. This was exactly what we were looking and hoping for — rigid forearm, top accuracy, no point of impact change, all with a normal center-of-the-forearm hold or rest. What pleased us even more was the uniformity in accuracy and point of impact from the first shot fired from a cold and uncleaned barrel to the last shot fired after firing a string of 20 shots in four 5-shot groups.

Bedding Method No. 4 required that an anchor block be installed under the barrel, the forearm inletted over it and fastened to the barrel with a separate forearm screw through the forearm and threaded into the block. The block was made from a piece of 5/16-inch square rod about 1 1/4 inches long and attached to the barrel with two 6x48 scope mounting screws. The side that contacted the barrel was grooved to fit the barrel closely and the ends angled off as shown in the photo. It was attached about an inch forward of the hanger. Then a cavity somewhat larger than the block was chiseled into the forearm channel to allow the forearm to slip in place. A 10x32 forearm screw was then installed, along with a brass escutcheon in the forearm for the screw head. The forearm was then glass bedded over the block only, and both the factory and the new forearm screws used to hold the forearm in place while the bedding compound hardened. These screws were tightened so that the pressure between the forearm tip and barrel was approximately the same as the factory bedded forearm. After the compound had hardened and the forearm was removed, excess bedding compound in the forearm channel was sanded away leaving the channel exactly as factory made.

Reinstalled and fastened only by the new forearm screw, the forearm tip still exerted considerable upward pressure against the barrel. This was all done prior to the start of our experiments and all the prior testing was done with the block removed, which left the forearm as original except for the block cavity and forearm screw hole. Thus, we could proceed with the bedding experiments without disturbing any other part of the rifle which might have affected the zero. On testing the rifle with this forearm fastening and bedding method we found that the point of impact as compared to factory bedding changed little. Also, over a period of several months of changing weather conditions, the zero changed less than it did with the factory bedded forearm under similar conditions.

All of this is perhaps due to the fact that the point of attachment of the forearm with this bedding method is closer to the pressure bearing forearm area of the tip, which resulted in a more solid and stable pressure contact between forearm tip and barrel. With this forearm attachment method the forearm was held rigidly in place, much more so than the factory attachment. Even if there were no accuracy improvement

gained by the anchor block attachment method, this method would be the preferred one if the sling swivel is attached to the forearm and if the rifle is to be carried with a sling.

In regard to accuracy with the anchor block forearm attachment bedding method, we did this in two stages; first with the forearm tip exerting pressure on the barrel, and then with the forearm fitted free of contact with the barrel.

This last was done by merely placing a thick enough strip of cardboard between the bottom of the anchor block and forearm so that on tightening the forearm screw the forearm was just free of contact with the barrel; there was just enough free space so that a strip of target paper could be slipped between forearm and barrel with the rifle resting on the forearm. Also noted was that the point of impact changed but little from the first shot with the barrel cold and uncleaned, to the last shot with it warmed up, no more than that obtained with the rifle as factory bedded.

The anchor block forearm attachment method is a particular favorite of ours for use on full sized single shot rifles, and especially for hunting rifles chambered for a cartridge that produces considerable recoil. However, we have not found it a practical method to use on rifles having a forearm hanger such as with the Ruger No. 1 and Browning M-78 because we like to mount the block farther back than could be done in this particular instance. We believe the anchor block fastening method would prove to be better than the method Ruger now uses on heavy caliber rifles if the unused hanger tip (about .750-inch) were cut off and the block mounted .750-inch forward of the hanger, with the bottom of the block made with a forward lip to serve as an addition recoil lug.

After all the tests with the different forearm bedding and attachment methods on our Ruger No. 1 test rifle had been made, we spread the many targets that we had fired and made our evaluation as to which was the best forearm attachment-bedding method to use for that rifle. We wanted the best accuracy that the rifle was capable of producing, but we were just as much interested in zero retention. The targets and the notes we had made on them led us to the conclusion that with this particular rifle best performance was obtained with Bedding Method No. 3, the forearm hanger pressured against the barrel via the setscrew, with the forearm completely free of contact with the barrel.