

BOLT ACTION RIFLES

EXPANDED 4TH EDITION

By Frank de Haas and
Dr. Wayne van Zwoll

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- Take-down and assembly
- Strengths and weaknesses
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- How to shoot them
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Steyr-Mannlicher Model SL Rifle

AROUND 1864, IN the city of Steyr, Austria, an arms factory was established to make military firearms. It was not long afterward that they branched out and began to make sporting arms as well. In an earlier chapter, I introduced two men whose names have long been synonymous with one of the sporting rifles this firm made, a sleek turnbolt repeating rifle having a rotary magazine, short barrel and a slim forend which extended to the muzzle—namely, the Mannlicher-Schoenauer. This firm, now greatly expanded and diversified, is still making rifles under the name of Steyr Daimler Puch. When the Mannlicher-Schoenauer rifle was discontinued in the late 1960s, it was replaced with one of the more modern design, the now-familiar Steyr-Mannlicher. The SL model described in this chapter is but one of several models of Steyr-Mannlicher rifles being made.

Ferdinand von Mannlicher and Otto Schoenauer were firearm designers; Mannlicher became famous for the many military rifle actions he designed, but it was the rotary magazine that Schoenauer is best known for. The Mannlicher-Schoenauer rifle was based on an action design of Mannlicher's, but the magazine in it was Schoenauer's. As time went by and the Mannlicher-Schoenauer rifle became popular, it was because of its short barrel, full-length slim forend, and, in time, that style became known as the Mannlicher forend. It is that way today—mention "Mannlicher" to the average rifleman and he will no doubt connect that name with the full-stocked, short-barreled hunting carbine. It is not known who designed the original Mannlicher-Schoenauer sporting stock, but it probably was not Mannlicher. Anyway, what I am leading up to is that the Steyr-Mannlicher-Schoenauer rifle should have been named the Steyr-Schoenauer instead. There is nothing "Mannlicher" about this rifle, but the magazine belongs to Schoenauer. Be that as it may, Mannlicher is a good name to tack on to any rifle and Steyr's present line of turnbolt sporting rifles is a fine line

to bear that name.

The Steyr-Mannlicher SL was introduced in the U.S. in 1967, and at that time was imported by Stoeger Arms Company. For the past few years these rifles have been imported and distributed by GSI, Inc. of Trussville, Alabama. The letters "SL" stand for Super Light, and a super light rifle it is. It was designed and made especially for the 222 family of cartridges and Steyr did a fine job of it. Almost every shooter who sees and handles this rifle for the first time will remark favorably about its looks, lightness and feel. It is that kind of rifle.

The SL Rifle

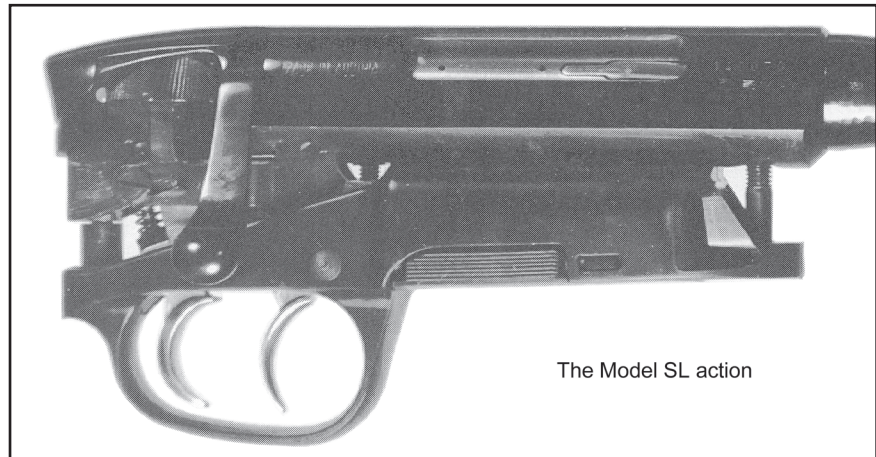
The Steyr-Mannlicher Model SL rifle averages about 6.5 pounds in weight and is 42.5" in overall length. It is fitted with a standard-weight, sporter contoured barrel 23.6" long, with a breech diameter of 1.180" and a muzzle diameter of .600". In 1994 it was available in calibers 222, 222 Magnum or 223 (5.6x45mm). The entire rifle is sized for these cartridges. There are open sights mounted on the barrel, a blade front mounted on a hooded ramp, and a U-notched rear dovetailed into a base.

The barrel is rifled by the hammer-forg-

ing method, a process used by a number of rifle manufacturers. When the rifling has been properly formed by other manufacturers, the barrel is removed from the machine to be crowned, threaded, chambered, finish ground on the outside and fitted to the action. But Steyr omits one of these operations—they alone leave the outside of the barrel as it come out of the rifling machine—with all the hammer marks showing. And, believe it or not, it is striking, or rather an eye-catching finish with row upon row of oval hammer marks swirling around the barrel. It is a beautiful finish.

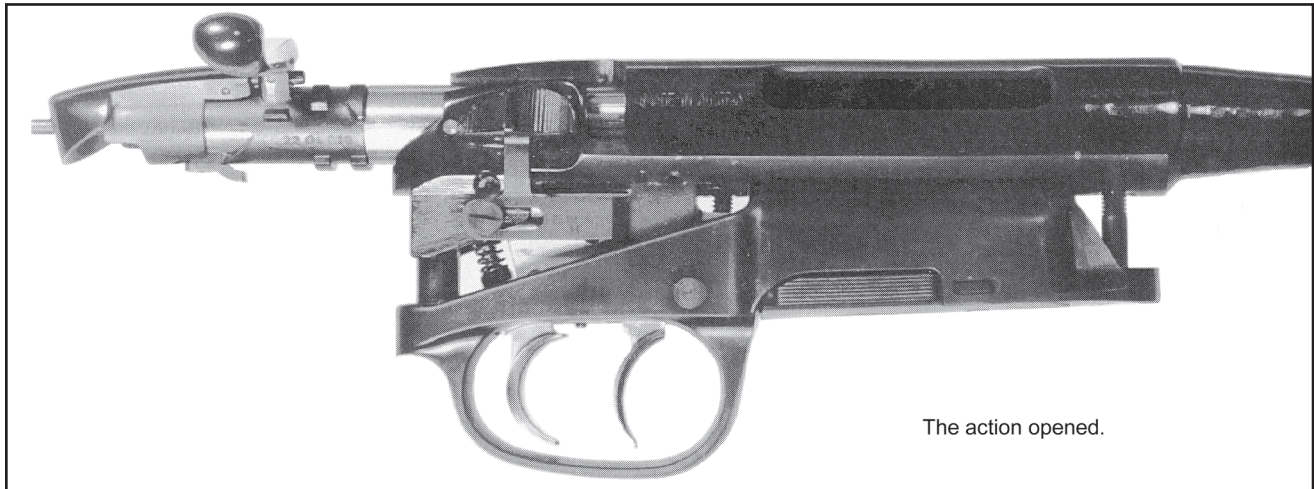
Steyr uses fine walnut to make the stocks for their sporting rifles and the piece of wood on my SL rifle is no exception. It is dense and hard, with a wavy figure through most of it. My photographs do not do it justice. It was machine inletted with precision for a close fit between metal and wood. The shaping was probably done by machine also, and all the final finishing done by hand. As I have grown older I have also grown fussier

(Above) The Model SL Steyr-Mannlicher half-stock sporting rifle. As shown this rifle weighs only 6.5 pounds and the model letters SL stand for Super Light. In any one of its three calibers, namely the 222, 222 Magnum, or 223, 5.6x50 Mag. it makes an excellent lightweight varmint rifle.



The Model SL action

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about the stocks on my rifles, and just as I like the barrel on my SL rifle, I also like the stock very much. If I had shaped and finished this stock myself there would be only one minor change that I would have made, and that would be in the forend. As Steyr shaped it, the forend decreases in width very noticeably just in front of the action, before it begins to taper toward the tip. I would not have made the side dips into it, but would have made it a straight taper from the widest part over the action to the tip. Regardless, Steyr did a wonderful job of it. The surface of the stock is sanded dead level and very smooth. The oval grip cap, which appears to be made of horn, is perfectly fitted and its edges are even with the wood. The same is true for the rubber buttpad. And there is the oil finish that I admire, and the perfect job of checkering. I especially like the shape of the pistol grip and the cheekpiece.

There are three variations or types of the Steyr-Mannlicher SL. They are the SL half-stock sporter with open sights on a 23.6" barrel, the carbine model with open sights on a 20" barrel and full length stock, and the varmint model with varmint-style stock

and a 25.6" heavy barrel without sights. The varmint model is chambered only in the 222 caliber, while the other two are made in 222, 222 Magnum, and 223 calibers. All three have identical actions. There are several other models of Steyr-Mannlicher rifles on longer actions than the Model SL, and in a large variety of American and foreign calibers from the 22-250 to the 458 Win. Magnum. Except for size, all the Steyr-Mannlicher rifles have essentially the same action and description of one should suffice for the others.

The SL Rifle

The receiver is machined from a single piece of steel. It is round on top with a radius of .590". The sides of the receiver are flattened making its width 1.180". At the bottom it is mostly rounded except at the magazine well opening and at the rear where the recoil lug is located. This lug is rather massive with a flat rear surface approximately .575" x .750", which is more than adequate to prevent the barrel and action from moving rearward in the stock upon firing the rifle.

There is also an adequate flat area on the

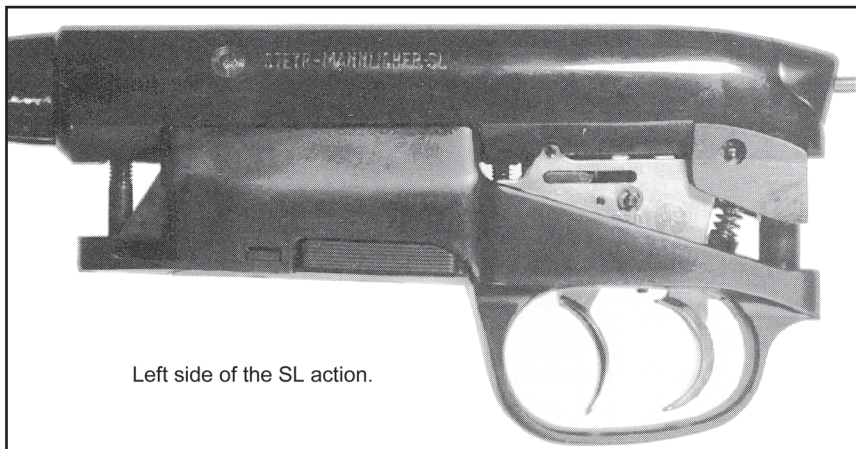
bottom of the lug and receiver at this point to provide a solid bottoming of the receiver in the stock. Wall thickness of the receiver at the top radius is about .215". Four scope mounting screw holes are provided with metric threads.

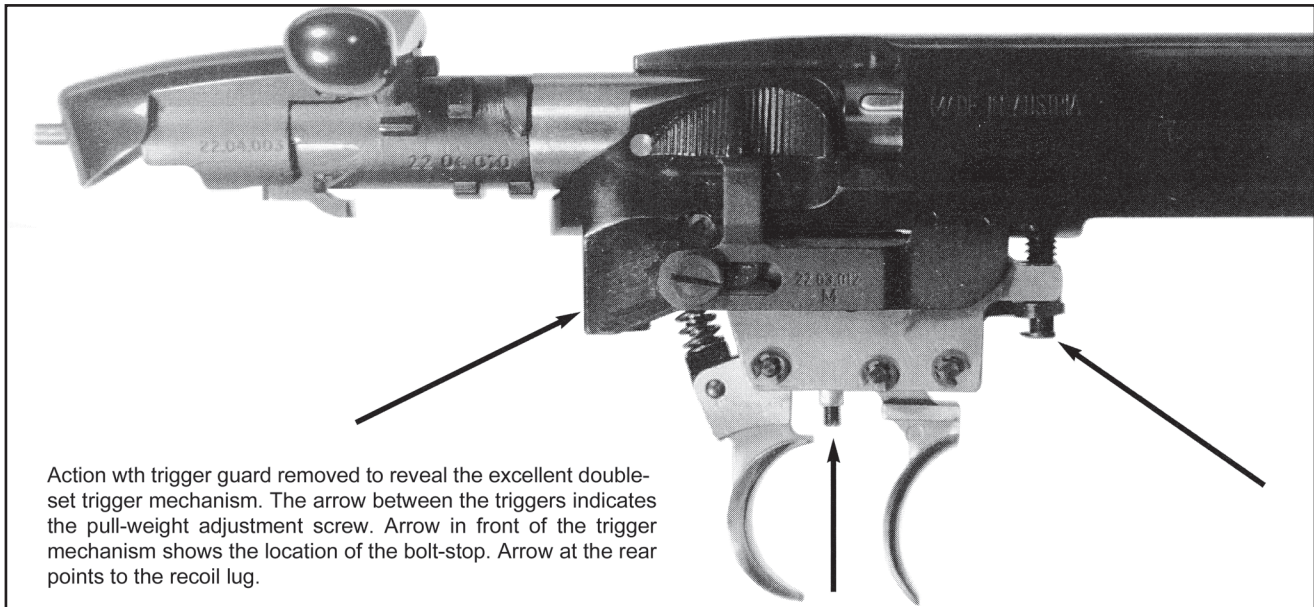
The barrel has a flat breech end and it is threaded tightly into the receiver. Both the magazine well and the ejection port are narrow and small, but adequate to allow the cartridges to pass through them. The magazine well is positioned slightly to the left of the center line of the receiver and the ejection port opens to the right side.

The bolt proper is of two-piece construction, the bolt body and the bolt handle sleeve. On this short sleeve are the three rows of locking lugs, two lugs on each evenly spaced row. These lugs engage in matching recesses inside the rear part of the receiver. Bolt lift is a short 60-degrees.

Of rather unusual shape, the bolt handle is neither flat, spoon, butter-knifed, or curved, nor a combination of any of them. It seems to have started out as a straight, round and slightly tapered handle and then the outer part of it, except the end, ground flat. I would not want this bolt handle on all of my turnbolt rifles, but on this lightweight it is not at all bad. In fact, I rather like it.

The one-piece firing pin (striker) has a short threaded section and threaded on it is the double-headed cocking cam. The coil mainspring is positioned between the cocking cam and a collar on the firing pin, and small set-screw threaded in the lower part of the cocking cam prevents the firing pin from turning. A U-shaped fork positioned on the rear end of the firing pin and over the cocking cam compresses the mainspring when the bolt is assembled. Dual opposed cocking cam notches on the rear of the bolt handle sleeve engage the cam surfaces on the cocking cam, which slides in a slot cut into the rear of the bolt body. Everything is held to-





Action with trigger guard removed to reveal the excellent double-set trigger mechanism. The arrow between the triggers indicates the pull-weight adjustment screw. Arrow in front of the trigger mechanism shows the location of the bolt-stop. Arrow at the rear points to the recoil lug.

gether by the bolt sleeve, which engages in a circular groove at the rear of the bolt body to place the firing pin under tension when it is cocked by the upturn of the bolt handle. An extension on the rear of the firing pin, extending through the rear of the bolt sleeve, serves as a cocking indicator. The bolt sleeve is a very complex piece of machine work. It includes a projection that contains a spring-backed plunger and which, when the bolt is closed, fills the bolt handle slot in the receiver. Also, when the bolt handle is raised it holds the bolt handle in that position until the bolt is closed and locked. The bolt sleeve not only closes the rear of the bolt, but also closes the rear end of the receiver when the action is closed. Only the bolt handle sleeve rotates when the bolt handle is raised and lowered, the bolt body does not rotate with it.

The face of the bolt body is recessed for the cartridge head, and on the edge of it is fitted the spring-backed ejector plunger. The extractor is a slender piece of spring steel dovetailed lengthwise into the side of the bolt. This extractor is very similar to the ones used in the Italian Carcano and Model 1922 22-caliber U.S. Springfield.

The trigger mechanism is built into a lightweight alloy metal housing. It fits in a recess machined into the bottom of the receiver and is held in place by two pins. The entire double-set mechanism has a weight of pull adjustable down to a few ounces. To use it, the rear or cocking trigger is pulled back until it is cocked; touching the front trigger releases the cocked rear trigger which, in turn, releases the sear and striker. Or, the rifle can be fired by merely pulling the front trigger which has a normal weight of pull of about three to four pounds. This indicates

that the trigger mechanism is an intricate one, with several springs, pins and other parts. The small set-screw positions between the two triggers is to adjust the weight of pull for the set trigger only.

Besides the trigger mechanism, the trigger housing also contains the bolt-stop mechanism. The bolt-stop is similar to the sear and the bottom of the bolt body is grooved for it. In addition to halting the bolt in its rearward travel, the bolt-stop also prevents the bolt body from rotating. To remove the bolt from the receiver, the front trigger is pulled back about as far as it will go and the bolt pulled out.

The safety is positioned on the right side of the receiver where, if it is slid to the rear, it locks the sear and the bolt. If it is pushed forward, the rifle can be fired and the bolt operated. There is a pronounced click when it is engaged, but it's nearly silent when disengaged. It appears to be well built throughout with plenty of serrated and hollowed surface to slide it backward and forward.

The trigger guard and magazine holder is a single piece of moulded black nylon or plastic. Guard screws through holes at each end, and threaded into the receiver, anchor the barreled action in the stock. The trigger guard moulding is a complicated affair with an opening in it to accept the rotary magazine. The magazine is also a precision moulding of a black material. Inside it is a spring-tensioned rotary spool. The rear end of the magazine is clear plastic and the heads of the cartridges inside can be seen through it. At the bottom of the magazine are two spring-backed latches that engage in slots in the magazine holder to hold the magazine in place and to allow for its quick and easy removal. Although I dislike plastic or nylon

parts on any gun, these parts seem somehow to belong.

The receiver and bolt sleeve are highly polished and blued. Not blued, but highly polished are the bolt body and the triggers. The trigger guard and the magazine are a dull black.

Markings

My SL Steyr-Mannlicher rifle is marked as follows: On the left side of the receiver is stamped:

STEYR-MANNLICHER - SL

On the center left of the barrel:

STEYR, SECAUCUS, NJ

The caliber is stamped on the left side of the barrel. The serial number is on the right side of the receiver ring, under the barrel and the last two numbers are on the bottom of the bolt handle. **MADE IN AUSTRIA** is stamped on the right side of the receiver.

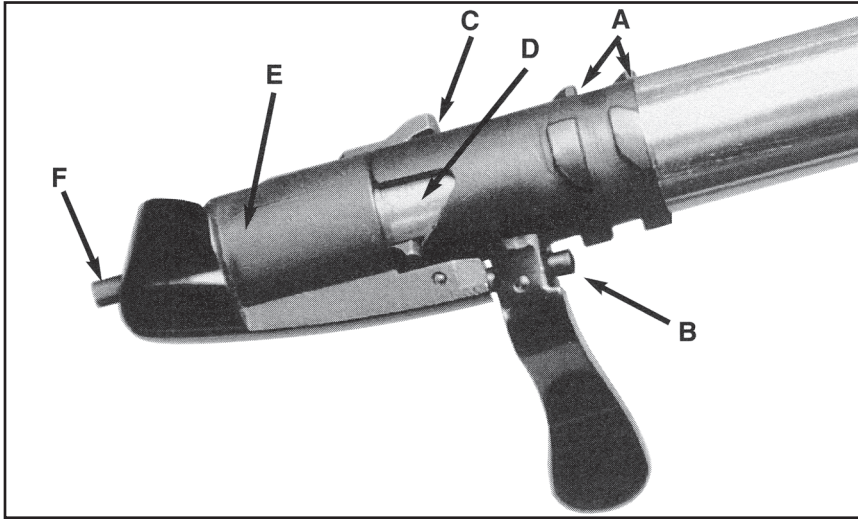
Takedown and Assembly

Make sure the rifle is unladed by opening the bolt and removing the magazine.

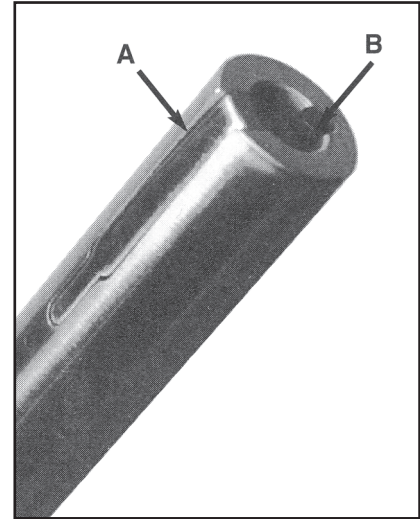
To remove the bolt, push the safety forward to disengage it, raise the bolt handle and pull the bolt rearward, then pull the front trigger back as far as it will go and remove the bolt.

To disassemble the bolt proceed as follows: Grasp the bolt body firmly in one hand and with the thumbnail of that hand or with a piece of wood, fully depress the plunger in the root of the bolt handle. With the other

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Rear end of bolt showing: (A) two of the six locking lugs on bolt handle sleeve, (B) bolt sleeve lock plunger, (C) cocking piece, (D) one of the dual cocking cam notches, (E) bolt sleeve, and (F) cocking indicator.



The Steyr-Mannlicher SL bolt head showing: (A) one-piece extractor, and (B) ejector.

hand rotate the bolt sleeve counterclockwise 180 degrees or until it snaps free of the bolt. With the bolt sleeve removed, the firing mechanism and the bolt handle sleeve can be removed from the bolt. It is not advisable to remove the mainspring, but if this is necessary, first carefully measure the distance from the rear of the cocking cam to the tip of the firing pin, so that on reassembly you can return the cocking cam to the same position and thus not alter the firing pin tip protrusion. Loosen the set-screw in the cocking cam and unscrew the firing pin from the cam. Reassemble the remainder of the bolt in reverse order. This is best done by having the firing pin and cocking cam fully forward in the cocking cam notches. Then, with the front of the bolt on the bench top or the bolt body held firmly in a padded vise, place the bolt sleeve over the rear end of the firing pin with its extension opposite the root of the bolt handle, at a point where the bolt sleeve can be fully pushed forward to compress the mainspring, and rotate it clockwise until the forward extension is about 90 degrees from the bolt handle. Using a tool such as a screwdriver, draw back the cocking cam while at the same time rotating the bolt sleeve until it engages with the bolt handle. The firing pin is now cocked and the bolt can be reinserted into the receiver.

To remove the barrel and action assembly from the stock, turn out the rear guard screw and then the front guard screw and carefully lift the barrel and the action from the stock. The trigger guard and the trigger plate can then be removed from the stock. Never remove the trigger mechanism or disassemble it unless you are skilled in this work. To reassemble the barrel and action into the stock again, first place the small trigger plate in

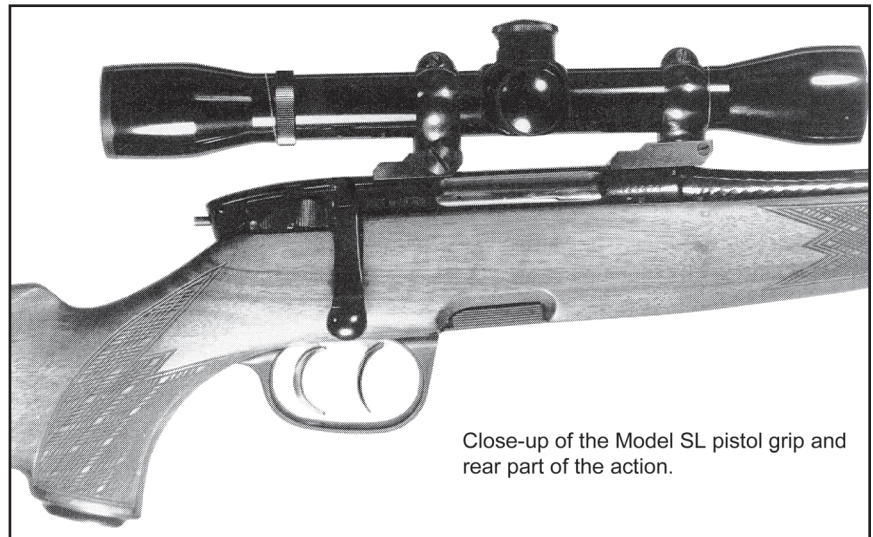
place on the trigger mechanism and the trigger guard in the stock, and then carefully reinsert the barrel and action into place and turn in the guard screws.

Comments

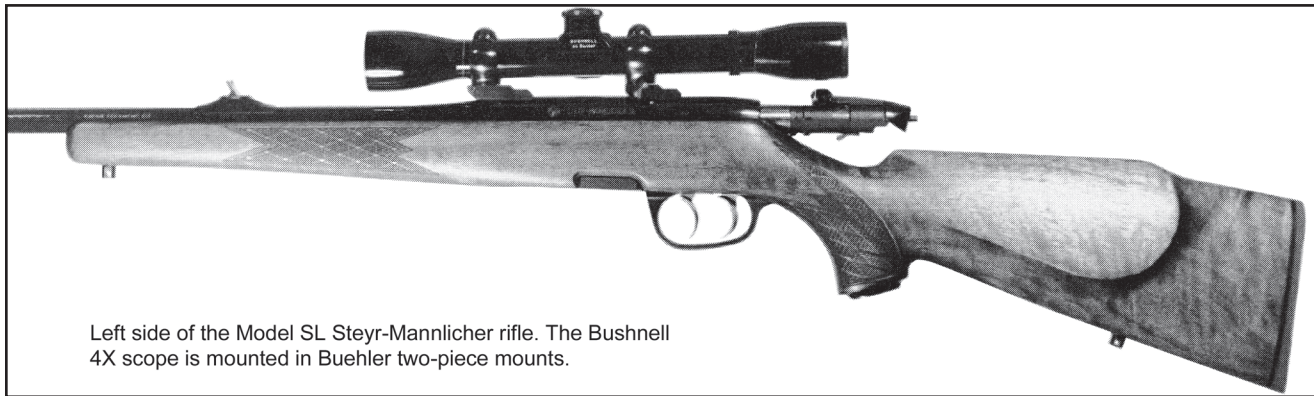
After reading the NRA Dope Bag report on the Steyr-Mannlicher SL rifle in the March, 1968 issue of *The American Rifleman*, I noted that some changes have been made in the rifle since then. For one thing, the sights have been improved and now there are both windage and elevation adjustments that can be easily made. The white line spacers have been omitted and the stock fitted with an excellent solid rubber buttpad. The safety has only two positions, rather than three as in the first rifles. However, the greatest im-

provement is in the magazine catches. Previously, it required two hands to remove the magazine with the magazine catch located in front of the trigger guard bow. However, on my gun, with twin catches built into the bottom of the magazine, it is quickly and easily removed and replaced with one hand.

I would like to see a further change made, one that would strengthen the stock. The stock wood over the action is quite thin with the result that the forend is not very rigid. If my advice were followed there would be a small block attached to the underside of the barrel, with two screws about 3" ahead of the receiver and threaded to accept a forend screw. The block would be closely bedded into the forend to serve as a pressure point and as a recoil lug, and the channel ahead of it would be made free of contact with the

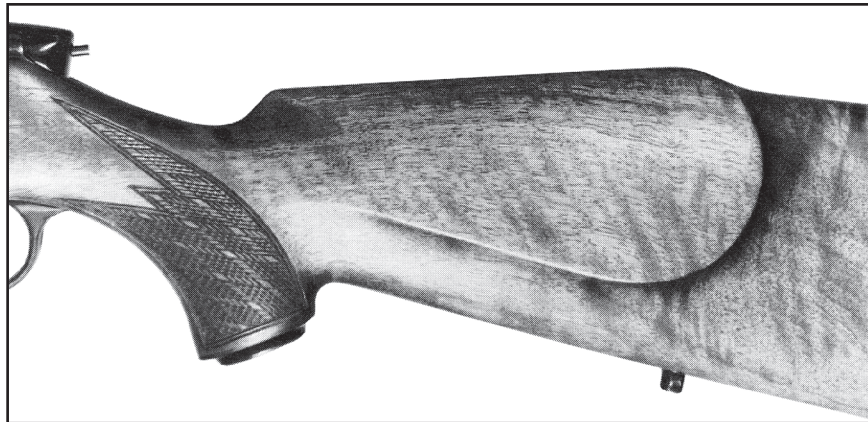


Close-up of the Model SL pistol grip and rear part of the action.



Left side of the Model SL Steyr-Mannlicher rifle. The Bushnell 4X scope is mounted in Buehler two-piece mounts.

(Right) The SL cheekpiece on the SL stock. Note its clean lines.



barrel.

I would not mind at all if my SL rifle weighed 8 or 10 ounces more, if that weight was in a highly polished steel trigger guard made by the investment casting process. Still, I do not mind too much that the guard and magazine are made of a black plastic, because, to most shooters, its lightness probably gives the rifle more class than would the heavier polished steel guard.

Although I believe that almost all users of the Steyr-Mannlicher rifle will want a scope on it, the manufacturer nevertheless installs a set of fine open sights. The parts of both front and rear sights are steel and both are attached with cap screws to the barrel. A shooter with good eyesight should be able to aim very accurately with these sights.

The rear is a U-notched blade dovetailed into a base. This blade is angled forward. The face of the blade is dull black to eliminate light reflections. Windage adjustment is easily made by loosening the screw on top of the base, moving the sight to one side or the other, and then tightening the screw to lock the blade in place. The entire sight can be removed by first removing the blade and then turning off the cap nut underneath and turning out the threaded stud from the barrel. To adjust the sight for a windage error,

move the blade in the direction you want the group to move.

The front sight is a hooded blade mounted in a ramp base. The blade is adjustable for elevation; turning the screw at the rear of the blade clockwise will raise the group, counterclockwise will lower it. To remove the entire sight, first drive out the pin, that holds the blade in place, remove the blade, and then unscrew the cap nut underneath and the threaded stud from the barrel.

As mentioned earlier, I would like the forend made in a straight taper instead of being dished ahead of the receiver. I would also like the action and the trigger guard placed from $\frac{1}{4}$ " to $\frac{3}{8}$ " farther forward in the stock or that much farther ahead of the pis-

tol grip. This would, I believe, improve the looks a bit.

I sold my Model SL half-stock to a friend and it is one of the few rifles described in this book which was tested for accuracy. In this rifle, which was chambered for the 223, and using Federal ammunition, practically every shot of two boxes of ammunition stayed well within a 1-inch circle at 100 yards. The sighting was done with a 4x Bushnell scope. If a better and higher powered scope had been used, and if the firing had been done on a bench rest instead of over a log, many of the five-shot groups would have printed .500" or less.

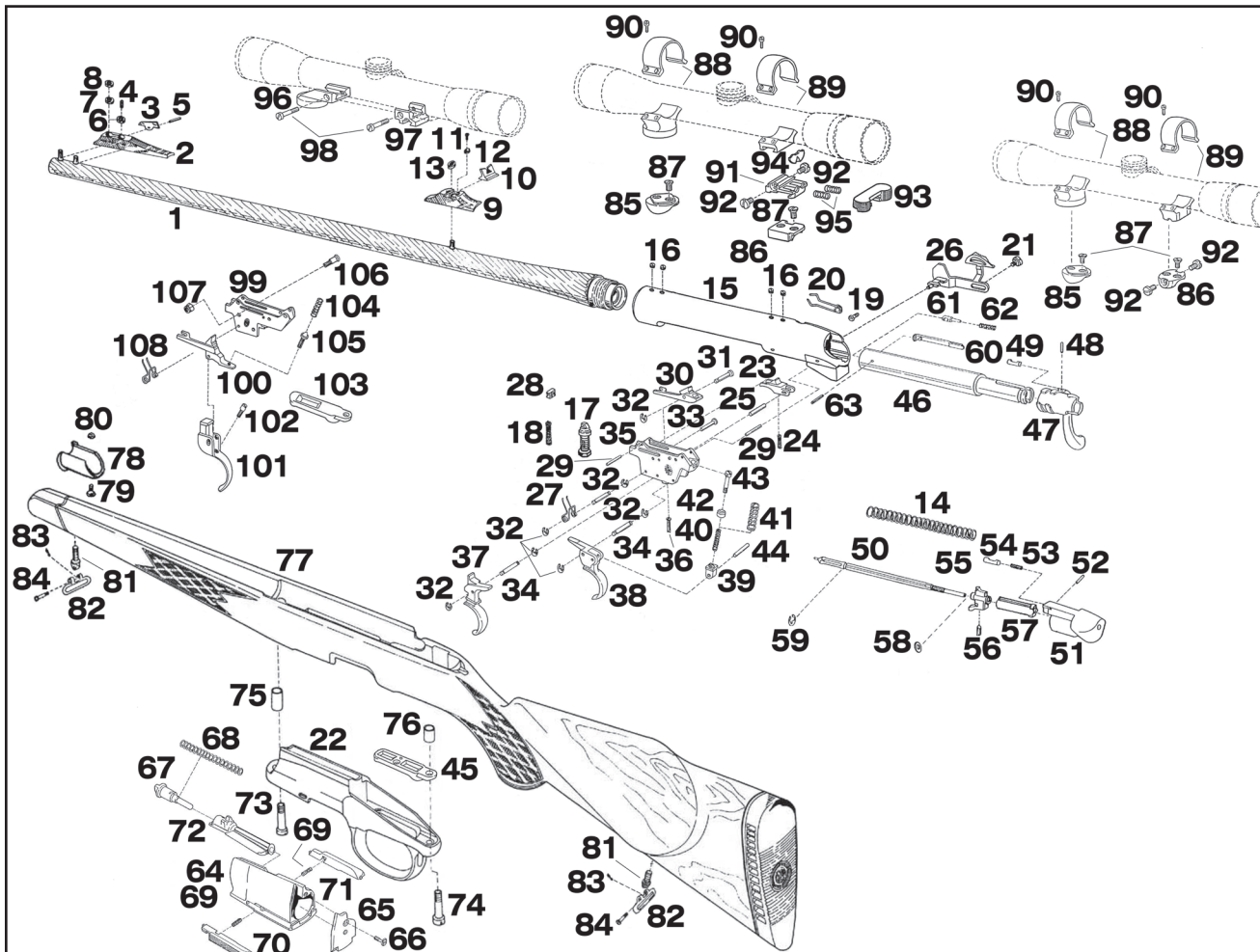
Dimensional Action Specifications

Receiver length	7.062"
Receiver width	1.180"
Bolt diameter	.745"
Bolt travel	3.000"
Striker travel	.250"

General Specifications

Style Turnbolt repeater.
Receiver One-piece steel construction, integral recoil lug drilled and tapped for scope mounts.
Bolt Two-piece construction, recessed bolt head, non-rotating bolt body, six locking lugs in three rows on bolt handle section, cocks on opening of bolt.
Ignition One-piece striker, coil mainspring.
Extractor One-piece spring claw dovetailed into bolt body.
Ejector Spring-backed plunger in bolt face recess.
Trigger Double-set mechanism, adjustable, in combination with single-stage trigger
Safety Sliding safety locks sear and bolt.
Bolt-stop Sear-like bolt-stop in bottom of receiver, released by front trigger.
Magazine Detachable box magazine with rotary spool. Five-shot capacity.

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Parts Legend

- | | | | |
|---------------------------------|---------------------------------|--------------------------------------|--|
| 1 Barrel | 27 Trigger Return Spring | 56 Blanking Screw | 85 Front Scope Mount Base |
| 2 Front Sight Ramp | 28 Slide Leaf | 57 Bolt Guide Sleeve | 86 Rear Scope Mount Base |
| 3 Front Sight Blade | 29 Trigger Housing Pins | 58 Bolt Guide Washer | 87 Scope Mount Base Screws |
| 4 Front Sight Blade Spring | 30 Set Trigger Sear Lever | 59 Striker Circlip | 88 Front Scope Rings |
| 5 Front Sight Pin | 31 Set Trigger Sear Lever Pin | 60 Extractor | 89 Rear Scope Rings |
| 6 Front Sight Blade Spring Nut | 32 Circlips | 61 Ejector | 90 Scope Ring Screws |
| 7 Front Sight Ramp Washer | 33 Trigger Stop Pin | 62 Ejector Spring | 91 Windage Base |
| 8 Front Sight Ramp Nut | 34 Trigger Pins | 63 Ejector Pin | 92 Windage Base Screws |
| 9 Rear Sight Base | 35 Trigger Housing | 64 Magazine Body | 93 Rear Scope Mount Slide |
| 10 Rear Sight blade | 36 Trigger Adjusting Screw | 65 Magazine End Cap | 94 Windage Slide Spring |
| 11 Rear Sight Screw | 37 Standard Trigger | 66 Magazine End Cap Screw | 95 Rear Mount Slide Springs |
| 12 Clamp Ring | 38 Set Trigger | 67 Magazine Rotor Axis Pin | 96 Front Mounting Rail Base |
| 13 Rear Sight Base Nut | 39 Trigger Coupling Link | 68 Magazine Follower Spring | 97 Rear Mounting Rail Base |
| 14 Mainspring | 40 Internal Set Trigger Spring | 69 Magazine Catch Spring | 98 Dovetail Base Screws |
| 15 Receiver | 41 External Set Trigger Spring | 70 Left Magazine Catch | 99 Standard Trigger Housing |
| 16 Scope Mount Filler Screws | 42 Trigger Coupling Link Spacer | 71 Right Magazine Catch | 100 Standard Trigger Sear Lever |
| 17 Bolt-stop | 43 Locking Screw | 72 Magazine Follower | 101 Single Trigger |
| 18 Bolt-stop Spring | 44 Trigger Coupling Pin | 73 Front Trigger Guard Screw | 102 Standard Trigger Set Screw |
| 19 Safety Catch Spring Screw | 45 Set Trigger Insert | 74 Rear Trigger Guard Screw | 103 Standard Trigger Housing Insert |
| 20 Safety Catch Spring | 46 Bolt Body | 75 Front Trigger Guard Screw Bushing | 104 Standard Trigger Spring |
| 21 Safety Catch Retaining Screw | 47 Bolt Handle | 76 Rear Trigger Guard Screw Bushing | 105 Standard Trigger Adjusting Screw |
| 22 Trigger Guard | 48 Bolt Handle Pin | 77 Stock | 106 Standard Trigger Eccentric Screw |
| 23 Sear | 49 Bolt Handle Key | 78 Forend Tip | 107 Standard Trigger Eccentric Screw Nut |
| 24 Sear Spring | 50 Striker | 79 Forend Tip Screw | 108 Standard Trigger Return Spring |
| 25 Sear Pin | 51 Bolt End Cap | 80 Forend Tip Screw Nut | |
| 26 Safety Catch Slide | 52 Bolt End Cap Pin | 81 Sling Swivel Stud | |
| | 53 Bolt End Cap Detent Spring | 82 Sling Swivel | |
| | 54 Bolt End Cap Detent | 83 Swivel Spring Washer | |
| | 55 Bolt Guide | 84 Sling Swivel Screw | |