RIFLE PATENTS

by STUART OTTESON

Colt Sauer Safeties

IN THE COURSE of developing the Colt Sauer high-power rifle, J.P. Sauer & Sohn of Eckernforde, West Germany, ended up with two U.S. patents related to safety mechanisms. The first concerned an inertia-block mechanism for use with the toggle-link trigger they were adapting to the rifle, and the second was for a releasable bolt lock.

3,707,796

Toggle triggers go back a long way but have never been widely applied to the bolt action because of a tendency to be unstable if set up for truly fine letoff. Determined to apply this type of trigger to their new rifle, Sauer tried stabilizing it with an inertia block, another basic concept with a long history, having been used for years to prevent doubling in certain kinds of double-barreled shotguns.

Sauer ultimately abandoned the inertia block, choosing instead to simply detune their toggle back to a point where it became inherently stable. Application of an inertia block to a bolt action was an interesting idea, however, well worth examining. Besides, the patent also does a nice job of showing how Sauer's toggle trigger works.

The trigger comprises a trigger piece (12) pivoted on pin 11 and biased into set position by a poundage-spring assembly (15). Screw 16 limits trigger overtravel, while block 16' establishes

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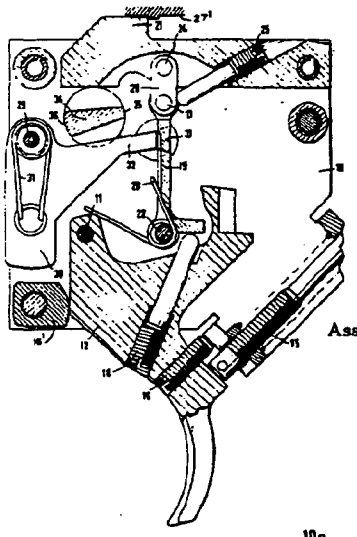
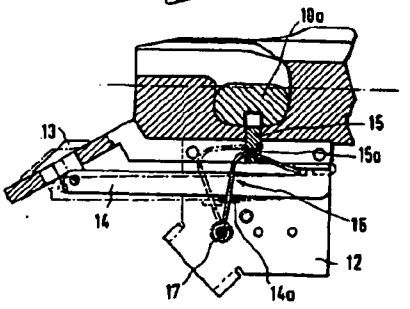
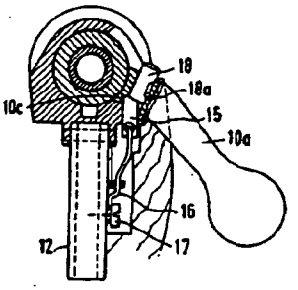


U.S. Patent 3,707,796
Heinz Bielfeldt
Assigned to J.P. Sauer & Sohn
Issued January 2, 1973

U.S. Patent 3,782,022
Heinz Bielfeldt and Manfred Birkenhagen
Assigned to J.P. Sauer & Sohn
Issued January 1, 1974





Rifle Patents

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its return position. Screw 18 determines any initial free play before the trigger contacts the toggle linkage supporting sear (21).

The toggle is made up of a lower link (19) pivoted to the trigger-housing (10) by pin 22 and an upper link (20) hinged to the lower link by pin 23 and to the sear (21) by pin 24. A torsion spring (28) flexes the toggle back against limit-stop screw 25 to a straight or an overcenter position supporting the sear. Adjustment of this screw determines how close the toggle is initially to the breakover point, where it collapses forward to release the firing pin (27').

The inertia piece (30), normally held in the null position shown in the drawing by wire spring 31, is eccentrically proportioned about pivot pin 29 so that it readily rotates in response to a jolt or impact. Its stop arm (32), lying in front of the lower link (19), is normally aligned with a clearance (33) formed to allow the toggle to break forward unimpeded. But any shock to the rifle causing rotation of the inertia piece in either direction momentarily misaligns the parts, thus blocking the toggle.

Working the kinks out of such a system is obviously a little tricky. It must respond instantly to any impact capable of breaking the toggle, then just as quickly return to null position to avoid interfering with normal functioning of the rifle. On the other hand, it can't be so sensitive that intentional movements such as swinging the rifle into position for a quick shot causes blockage.

The drawing also shows means for manual operation. The cylinder (34), controlled by an outside thumbpiece and linkage assembly, is shown deactivated in the figure. When rotated counterclockwise, edge 35 moves underneath the sear (21) to block it, while edge 36 simultaneously cams the stop arm (32) down to block the toggle.

3,782,022

The second patent shows the type of safety layout that actually ended up in the Colt Sauer rifle and more particularly concerns its bolt lock.

Three-position safeties are seldom found in new bolt-action designs, as it is difficult to achieve quick and convenient operation with three distinct thumbpiece positions. When the simpler two-position type is used instead, the choice then arises whether to lock the bolt with the safety, thus guarding against misfires from partially lifted bolt handles, or to allow the bolt to function independently so that cartridges can be worked through the rifle more safely. Usually the former is chosen.

Here Sauer devised a most clever and practical little *releasable* bolt-lock mechanism, which avoids the above compromises by combining, in one design, the functional advantages of the classic three-position arrangement with the mechanical simplicity and ease of operation of a two-position sliding safety.

The thumbpiece (13) operates lever 14, which is folded at the front to form a lug for blocking the trigger mechanism (not shown). A wire spring (16) pivoted on the trigger housing (12) by screw 17 threads through flange 14a of lever 14 and also through hole 15a in the bolt-lock plunger (15).

When the safety is slid forward to the *fire* position (solid lines in figure 1), flange 14a pivots wire spring 16 forward, in the process pulling the bolt-lock plunger (15) down out of its recess (10c) in the bolt handle (10a). This frees the bolt to be lifted and operated in the normal manner.

When the thumbpiece (13) is slid back to the *safe* position (dotted lines in figure 1), spring 16 pivots backward, lifting the bolt-lock plunger (15) upward into the bolt handle, as shown in figure 2, to lock the bolt.

So far, this is not that untypical of the way two-position sliding safeties work. The novelty lies in button 18, working in the root of the bolt handle (10a) and captured there by pin 18a. When this button is pressed, spring 16 yields to allow plunger 15 to be displaced from recess 10c. Holding button 18 down with the thumb thus creates in effect a *third* position, where the safety remains fully engaged, while the bolt at the same time may be cycled to load or unload cartridges.

Marlin .357 Magnum

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half-cock hammer position holds the hammer face away from the firing pin.

Perhaps a word of warning is in order here for those who are not familiar with lever-actions with exposed hammers. According to directions, the hammer is released from the full-cock (fire) position with the thumb holding it from moving forward, and as soon as pressure is felt when the trigger release is made, you release the trigger and then lower the hammer to the half-cock position. This works fine if you release the trigger *fully*. If you don't, the sear may hang up on the end of the hammer notch instead of seating fully. When this happens, it is possible to release the hammer from the half-cock position by pulling the trigger. I prefer to let the hammer *all* the way down with the thumb, release the trigger, then pull the hammer back until I hear and feel the sear drop into the half-cock notch. The rifle probably won't fire if the hammer is accidentally released from the half-cock position, but it's a lot better to be safe than sorry, and be certain the sear is solidly engaged with the hammer notch in the half-cock position.

For test firing of various loads, the rifle was mounted with a Leupold M8-4X Compact scope in Marlin mounts. The Marlin mount rings are similar to Weaver's in the clamp setup that binds them to a dovetail base. The base is of one-piece design and is grooved so the iron sights can be used when the scope is removed. This is an excellent idea for a rifle that will be used as much without a scope as with one. While I didn't try removing and replacing the scope to see whether it would return to zero, it will at least be close enough to hold sighting shots to a minimum.

A unique feature of the 1894C is that it handles both full-length .357 cartridges and .38 Special ammunition. In fact, according to the instruction manual, it functions with cartridges as short as 1.40 inches long. This includes about anything likely to be loaded in the .38 Special case for hunting use. Normal loaded length is no less than 1.455 inches, and about anything except wadcutter target loads functions. Most wadcutter loads in the .357 case are also a little short. I did find that the longest .357 rounds loaded with long semiwadcutter bullets functioned perfectly, as did any other normal hunting handload in either the .357 or .38 Special case. The magazine handles nine .357 or ten .38 Special rounds.