HOLDING IT ALL TOGETHER

RICHARD RAWLINGSON LOOKS AT HOW GUN MAKERS HAVE COME UP WITH MANY DIFFERENT SOLUTIONS TO ONE BASIC PROBLEM

It is one of the irritating facts about life and the universe that the solution to one problem invariably produces another. Gun making is like that, for every step forward there is often a half pace back.

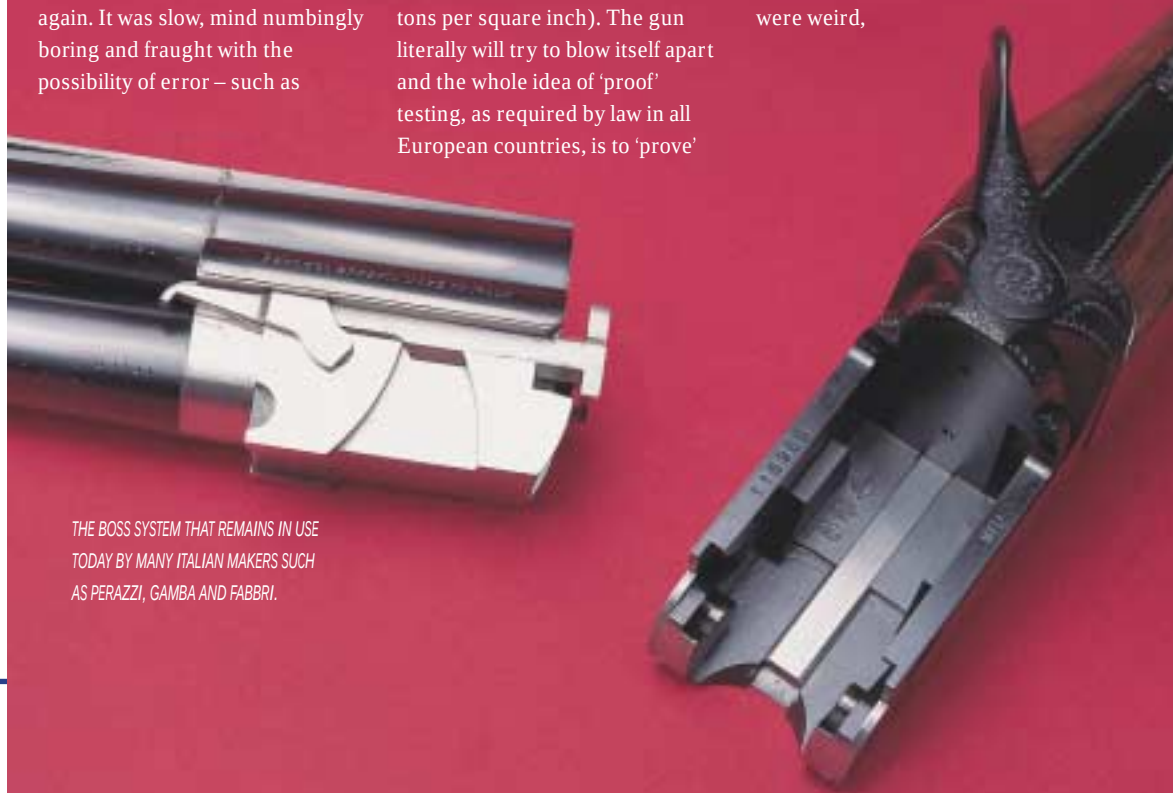
Which is exactly what happened in the middle of the 19th century. Until around 1850 every shotgun ever made had been a muzzle loader. After every two shots you had to go through a laborious process of pouring powder and shot down the barrel and ramming it down with wadding so that it didn't immediately fall out again. It was slow, mind numbingly boring and fraught with the possibility of error – such as loading twice as much powder as was needed and blowing the barrels apart! It was a good thing that clay target shooting hadn't been invented; it would have taken a week to shoot 100 clays.

It was no wonder then that the invention of the breech loading break-action gun proved such a hit. Suddenly the shotgunner found he could be reloaded and ready for action in seconds. In a flash, the lot of the pioneer, trying to put food on the table, was transformed and the dream of high volume shooting became reality. Not only was target shooting made feasible, but the British style of driven game shooting too, a sport that had a massive influence on the design of the modern sporting shotgun and which is the spiritual home of sporting clays.

Except of course that it was not that simple. Making a gun that opens at the breech is the easy bit; making one that stays shut when fired is much harder. The pressures generated when a shotgun is fired are enormous (remember that old proof standards used to be expressed in tons per square inch). The gun literally will try to blow itself apart and the whole idea of 'proof' testing, as required by law in all European countries, is to 'prove' that the gun is not going to do just that. The test involves firing the gun with loads far in excess of those it will face in normal service. If it stays in one piece it passes, simple as that.

For a normal double gun, over-and-under or side-by-side, there are two main forces to consider. Taking the line of least resistance, the gun will first of all try to reverse the closing procedure, that is, rotate back around the hinge point in the direction it has just come. If that path is blocked the forces of the explosion will try to separate the action and barrels at the breech face (or standing breech as the old time gunmakers called it). Guns that allow this movement are said to be 'off the face'. Any locking system has to combat both tendencies and keep on doing so for thousands of rounds.

Whole books have been written on the rapid pace of development in the second half of the 19th century and hundreds of patents were taken out relating to various aspects of gun design. Some were weird,



THE BOSS SYSTEM THAT REMAINS IN USE TODAY BY MANY ITALIAN MAKERS SUCH AS PERAZZI, GAMBA AND FABBRI.

some wonderful, but, remarkably, by the end of the century few survived in commercial use. For that, two of those inventions must take the credit – the Scott spindle and the Purdey bolt, which, working in tandem, produced a remarkable degree of standardization in sporting gun design by 1900, at least as far as the side-by-side gun is concerned.

The Scott spindle remains at the heart of virtually every modern gun. It is the vertical post that rotates behind the breech face when we push the top lever over to open a gun. It is an action we take for granted now, but once there were many other methods – side levers, under-bolts, sliding breeches and more – but the top lever is now universal.

The spindle is connected to whatever bolting system the maker is using and as it rotates it slides the bolt out of contact with the barrels. The Purdey bolt, that remains the standard choice on most s/s guns today, runs horizontally in the floor (or flat) of the action. It has two slots cut into it and when the gun is closed these engage matching slots (or bites) in the barrel lumps, locking the gun together. Retracting the bolt allows the barrels to pivot freely.

And that pretty much was that. The only argument left was over the need for some extra locking power at the top of the action, an agrugment that saw a variety of top fastening systems offered for sale from simple projections that married matching cut outs in the breech (the Westley Richard 'doll's head' for example) to sliding bolts. The most famous of these is the Greener cross bolt used in the firm's famous 'Triple Wedge Fast' guns. In truth, for all except the heaviest loads, these were just 'belt and braces' back up that added little extra to the gun's longevity.

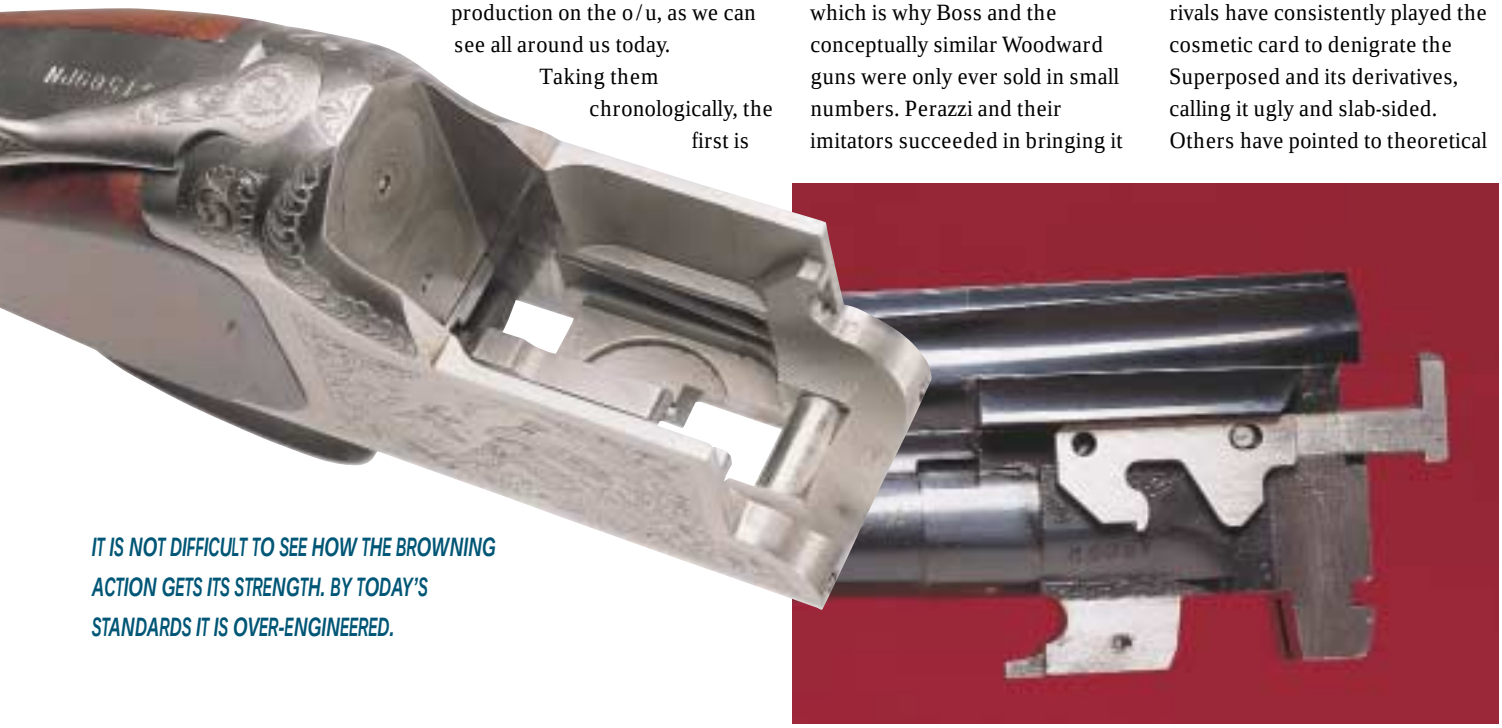
That uniformity of design, however, has never been achieved with the over-and-under guns that came to dominate the 20th century scene. For whatever reason – cost, patent protection or design philosophy – many more locking systems have made it into full scale production on the o/u, as we can see all around us today.

Taking them chronologically, the first is the Boss system that remains in use today by many Italian makers such as Perazzi, Gamba and Fabbri. Stacking a shotgun's barrels vertically immediately makes it taller, something that was anathema to English makers who had spent years making their guns sleek and elegant. Hang lumps under the barrels to create pivot points and locking bites and you compound the problem. The Boss solution was to take conventional lumps and in effect split them down the middle (hence the term bifurcated lumps) and stick them to either side of the barrel. Here they engage matching projections in the receiver walls, preventing any fore and aft movement. Rotational movement is blocked by two lugs either side of the bottom chamber that engage slots in the breech face and are locked by a bolt. The resulting action gains width as it loses height, but not to any extreme for those used to side-by-side guns.

From a technical viewpoint, the Boss action is extremely strong but it is very complex to make, which is why Boss and the conceptually similar Woodward guns were only ever sold in small numbers. Perazzi and their imitators succeeded in bringing it to a wider audience with the use of modern production techniques, although still at premium prices. Only recently have we seen fully automated production methods be used with Boss-style actions, Marocchi and Armi Salvinelli being the two companies to pursue this route to date.

The next gun of significance is Browning's Superposed of the late 1920s and here is where design philosophy comes to the fore. Browning had no history with double guns, and no emotional investment with sleek, low profile actions. He saw no problem with a tall and narrow gun and that is exactly what he produced. In effect, he took the standard s/s methods and just rotated the barrels 90 degrees. So we see a full width hinge pin of massive proportions allied to a full width locking bolt running under the bottom barrel. For good measure both front and rear barrel lumps engage slots cut out of the receiver floor. Subtle it is not; strong it most certainly is.

Unable to win the argument on the strength issue, Browning's rivals have consistently played the cosmetic card to denigrate the Superposed and its derivatives, calling it ugly and slab-sided. Others have pointed to theoretical



IT IS NOT DIFFICULT TO SEE HOW THE BROWNING ACTION GETS ITS STRENGTH. BY TODAY'S STANDARDS IT IS OVER-ENGINEERED.

disadvantages in terms of recoil in relation to the higher bore axis, but for millions of users it has been just that – of theoretical rather than actual importance. For all their extra height, Browning guns have always been remarkably 'shootable' and forgiving, even in novice hands.

Although by no means in the Boss league, the Superposed was still an expensive gun to build and it took Miroku of Japan to turn the design into something everyone could afford. Others have tried to simplify it further; the Winchester 101 and derivatives for example had a smaller hinge pin and did away with the cut outs for the lumps and in the process undoubtedly sacrificed some long-term strength. In Italy a number of makers have ditched the hinge pin altogether in favor of stub pins, while retaining just the locking bolt. This hybrid design has proved sound and reliable when well made and is favored by several Rizzinis, Fabarm and Sabatti among others.

Greener's cross bolt idea found favor with the rifle makers of Austria and Southern Germany where it became known as the Kersten bolt. It turns up in our next gun, Beretta's SO sidelock of the early 1930s, not surprisingly given the close proximity of the Val Trompia to Austria.

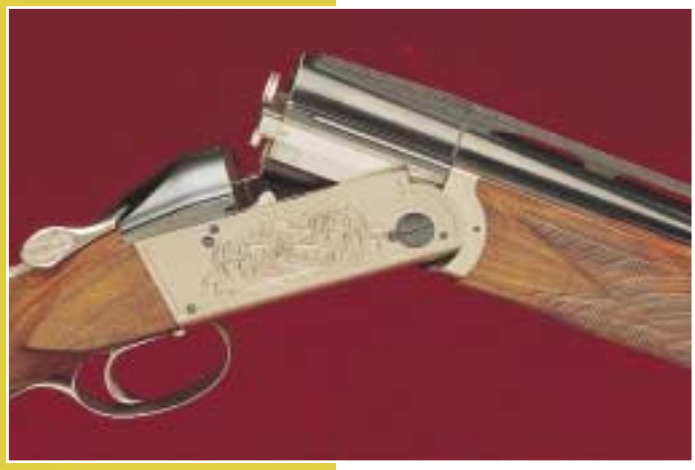
Philosophically the Italian trade has always considered itself closer in spirit to the ideals of the English Gunmakers than the 'industrial' approach embodied by Browning and his partners Fabrique Nationale of Belgium. So when Beretta turned their focus on the over-and-under market both form and function were important. Their gun had to compete with Boss and Woodward in looks, if not in production complexity.

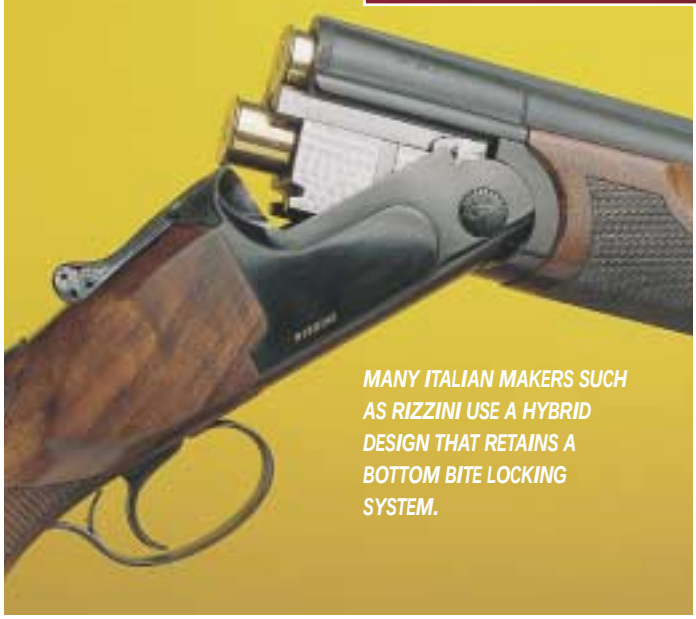
The SO combines the Kersten bolt with stub pins on which the barrels pivot. In the open position the bolt protrudes from the upper left side of the action body, sliding back in to engage projections either side of the top barrel as the gun is closed. The control of rotational forces is good, but the stub pins bear the brunt of any fore-aft pressure. The main disadvantage with the design however is the locking lugs that can hinder rapid reloading, although for target shooting it is of little importance. The Kersten bolt system has proved versatile, being used by Beretta on three generations of guns: the original sidelocks, the boxlock ASE and latterly the detachable trigger version the DT10. Of other makers to use this system, the most notable are Merkel of Suhl in Germany and SKB of Japan, whose guns are to Merkel what Miroku is to Browning.

In America meanwhile, Browning's great rivals Remington clearly felt the need to be represented in this new market sector against the Superposed. With time short, they purchased the rights to a French patent for a sliding breech cover that runs in grooves along the top of the receiver. When closed it overlaps the barrels holding them in place. Combined with stub pins and a small lug that gives positive location in the floor of the receiver,

THIS VIEW CLEARLY SHOWS THE KERSTEN CROSS BOLT OF THE BERETTA SO.

KRIEGHOFF CONTINUE TO USE THE SLIDING BREECH COVER OF THE REMINGTON MODEL 32.





MANY ITALIAN MAKERS SUCH AS RIZZINI USE A HYBRID DESIGN THAT RETAINS A BOTTOM BITE LOCKING SYSTEM.

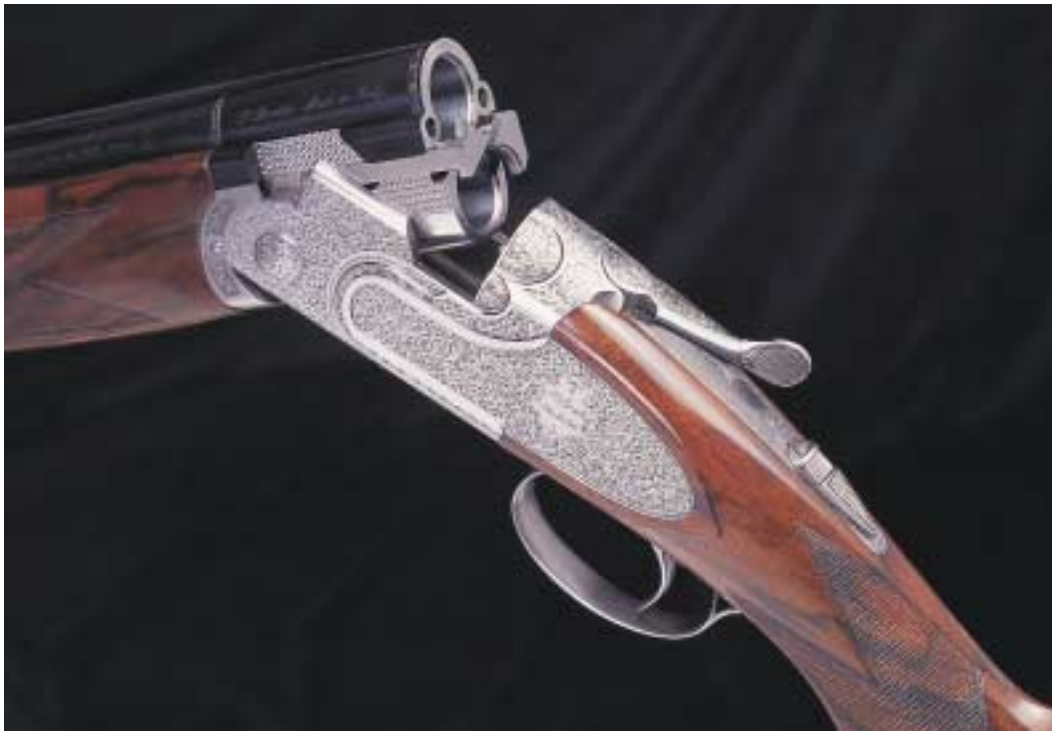
the Model 32 ,as it was called, had a relatively shallow and narrow action, while the locking breech cover did its job very effectively indeed and was also largely self-compensating for wear. As most readers will know, the Remington 32 had a very short life but the design has gone on to much greater glory as the Krieghoff K-80.

So far all the guns we have discussed have been fairly specialized (and expensive) when first introduced. In the post-war years however it became clear that the over-and-under configuration had the potential to dominate the market. The search was on to find a gun that could be produced cheaply and in quantity to exploit this latent demand. While the Japanese and other Italian firms tinkered with existing products, Beretta searched for a new solution. The result was the 'S' series, later to evolve into the 680 series guns that are now so familiar in all branches of shotgun sports. Brilliantly simple, the Beretta design has gone closest of all to ticking all the boxes of form, function and affordability.

For all its familiarity, it is worth reminding ourselves how ingenious the Beretta is. Nothing hangs below the barrels so the overall height is no more than the sum of barrels plus the thickness of the receiver floor. Instead of the bulk and complexity of Boss-style bifurcated lumps, the barrels carry 'shoulders' just above the ejector channels. These engage cut outs in the upper wall of the receiver giving positive location on the face. On higher grades these shoulders are replaceable to compensate for wear, although it will take years of high volume use for this to become necessary. Finally, the lock up is completed by a U-shaped bolt, the arms of which protrude out from the breech to engage holes in the face of the barrel shoulders. Again, replacement is simple and inexpensive. It works and even better it can be reproduced by the thousand on modern production lines and it is no exaggeration to say that this one gun underpins Beretta's current market position.

And there this piece would have rested had I been writing it in the middle of 2003, not 2004. After nearly 50 years of minimal change, we have suddenly seen two completely new concepts burst onto the scene. The first of course is Browning's Cynergy, the gun that finally addresses the issues John M. Browning chose to ignore with the Superposed. I analyzed it in detail in the last issue so will not go into it again here.

The second will be news to you, because it will not appear on the American market until 2005, although European sales begin in the next few weeks. It is the entry of German rifle manufacturer Blaser into the shotgun market with a new modular gun that will challenge Browning and Beretta head on in the vital mid-range price bracket. I will say no more other than to tell you it is packed full of clever and innovative features. Two brand new guns on one year – these are heady times indeed! ■



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