

Thames Valley Guns

Armourers Report

Restoring a BSA CF2 Varmint

Introduction

Having restored the BSA Hunter, Monarch and CFT, the CF2 varmint was the last model in my collection, that to date, I have restored. Even in the UK, varmint models are fairly uncommon and therefore when this .222 became available I was keen to purchase. However the seller was honest and informed me that the rifle had seen substantial use and that the barrel was at the tail-end of its life. Therefore once again, if I was to go ahead, this rifle would require a new barrel and a complete restoration, which would mean being out of pocket once again.



The seller was supportive and I got the rifle relatively cheap which helped. Once I received the rifle, I stripped it down and cleaned and checked the rifles condition. Despite the worn barrel, the action was sound, the ejector was rusty and therefore wasn't working efficiently and the stock was showing signs of wear of a typically well used thirty year old rifle, however all, was easily repairable.

I had a period scope in the form of a Leupold M8 x24 long range target scope and a selection of some Parker Hale 1" rings to choose from. Having identified the rings were the correct height, I fitted the scope and scrubbed the barrel to remove any excess deposits. Shooting at 100 yards from a bench, using a bag, the first step was to roughly zero the rifle. Again there is no need for pin point accuracy, its just wasting ammunition because at this point all you want to know is how the rifle performs. The next step was to see what groups the rifle was capable off, I didn't expect much and the first few rounds confirmed that barrel performance wasn't up to much at 1½ to 2.0" groups.

History

With the first BSA short action Hunter appearing in 1954, BSA continued to produce a series of quality sporting rifles, which incorporated design improvements, brought on by market research, advancement in manufacturing techniques and improvements in production. These advancements were reflected in the Majestic, Monarch and finally the CF2 models. The CF2 was the last of BSA's successful centrefire rifles and was introduced in late 1972, with production running to 1986.

Unlike previous models such as the Majestic and Monarch, the CF2 was not a product update but a completely new design. The rifle was exceedingly well made, the new bolt design was forged from a single ingot and incorporated a full length precision rib which supported the bolt throughout its full cycle. The receiver was also machined from a solid forging with the bottom of the receiver being flat to permit better receiver to weld weld and less flexing caused by the stresses of firing.

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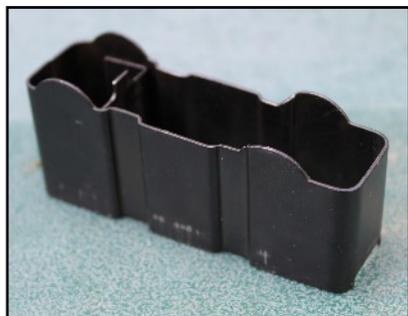
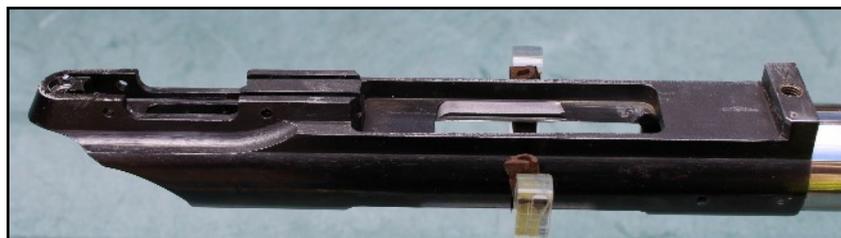
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Initially launched in .270 Win and 30.06, other popular calibres soon followed such as .308, .243, 7x57, .222 and magnum calibres such 7mm and .300WM. However all these rifles were in a light sporting or hunting configuration and at the beginning of the 1980's, BSA introduced a heavy barreled varmint model based on experiences in the US. Mechanically the rifle differed little from the light sporting rifles, with the exception of a heavy target barrel and a American style stock. Varmint models were produced in all calibres up to and including the .300 Win mag. However in the last two years, whilst watching the UK market, I have only seen two varmint models, one in .222 and one in .308, which may indicate most rifles went to the US market.

Receiver

The receiver is machined from a solid steel ingot and is 8½" long and 1¼" wide. The barrel screws into the receiver in the traditional way. Running internally down either side of the receiver, are the guides for the bolts twin locking lugs, which when fully engaged, rotate and locked in corresponding lugs in the receiver. However what is unique on this rifle is a guide rib that seats behind the left hand locking lug and runs the full length of the bolt to the rear of the bolt handle. The purpose of this guide rib is to produce stability and avoid "bolt wobble" as typically found on Mauser style actions.

The safety locking lug is the bolt handle recess at the rear of the receiver. As this rifle was originally designed for the



.222 Remington, the loading/ejection port is a shade over 3¼" which accommodates calibres up to .308 Winchester. Unlike the CFT discussed in my previous Armourers Report, the upper receiver does not have a 17mm scope rail machine into the receiver, but instead it is drilled and tapped for two scope bases. This is advantageous, as it permits scope bases suitable for other international markets to be fitted, thus making the rifle more attractive, which was essential for the likes of the US market.

The lower receiver is secured to the stock via the traditional master screws and a single recoil lug. The bottom of the receiver is flat for an accurate and strong receiver to stock bond. Like the ejection port, the magazine well is designed to accommodate calibres up to .308. However the magazine box is fitted with a spacer to permit the efficient loading and feeding of the .222 cartridge. Another difference between the CFT and the CF2 is the feed ramp. As rounds are staggered in the magazine, the receiver has two feed ramps as seen in the image. To the rear of the receiver is the trigger assembly well, where the one piece trigger unit is secured using two pins. On the left of the receiver is the gas vent and receiver proof mark. On the opposite side, the serial number and the text "Made in England. Overall machine finish is to a high quality with a deep traditional bluing.

In summary the receiver is an excellent, strong design with a high quality finish, minimal parts and a smooth cycling action.

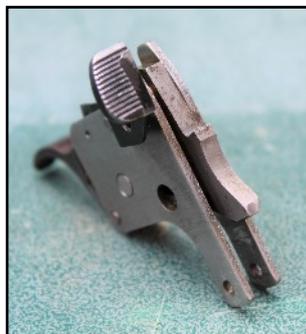
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Trigger Assembly

The early BSA trigger assemblies were quite unique for their time in that it was a one piece unit that contained the trigger, trigger pawl, sear, sear trip, various springs and ejector. With the introduction of the CF2 models the trigger unit had been improved slightly. The side plates now consisted of two steel plates with the axis pins supporting the working parts and the safety catch. The sears secondary role is to act as the bolt stop but unlike earlier models, the whole unit was secured in the trigger well with two roll pins.



On the CF2, the safety catch is part of the trigger assembly and the safety can only be applied when the firing pin is cocked. When the bolt is cocked and closed, applying the safety catch

also locks the bolt in the closed position. However applying the safety catch, when the bolt is open, allows the bolt to be cycled and thus clearing of the chamber.

Removing the bolt

Removing the bolt differs from model to model. In the case of the BSA CF2. Simply open the bolt and depress the trigger. Keeping the trigger dressed will allow you to remove the bolt.

Bolt

As mentioned earlier, the CF2 models were an all new design, which was also reflected in the bolt assembly. Whilst the bolt uses the traditional twin locking lugs, unlike the Hunter series, the claw extractor has disappeared and has been replaced by a spring loaded extractor located in the bolt face, something which was carried forward from the Monarch models.



The recessed bolt face also houses the ejector and when the bolt is fully closed, it is completely encased in the rear of the barrel, making for an extremely strong and safe design. Like previous designs, the cranked bolt handle and bolt body are part of the same forging, which adds considerable strength to the design. The purpose being, that the bolt handle acts as the third safety lug, when engaged in the receiver. However I have seen shooters grind down the bolt handle to increase the clearance for the scope, not realising this is a dangerous practice when the bolt handle acts as the safety lug.



As previously mentioned in the receiver section, a unique feature to the CFT and CF2 was the introduction of the bolt rib, which runs along the entire length of the bolt. The purpose of this rib is to act as a guide and prevents bolt wobble which was common in Mauser type designs.

Compared to older models, the steel cocking piece has a new profile, and contains the firing pin and the gun state indicator. The gun state indicator is a brass plunger which protrudes from the top of the cocking piece and is superior to the plastic versions used in previous models. When the action is cocked, it protrudes and when the firing pin is released it lays flush with the surface, thereby giving a clear state as to the rifle condition.

As previous models, the bolt cocks on opening and therefore lifting and rotating the bolt body, cams the firing pin to the rear and engages in the bent on the bolt body. At the same time the cam on the top of the bolt handle engages in a corresponding cam in the receiver, which in turn generates primary extraction.

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The bolt has now reached its maximum rotation, the main locking lugs have disengaged and it is now possible to pull the bolt to the rear. Rearward movement of the bolt is arrested by the sear as it engage in the bent on the bottom of the bolt body. The position of the bent or recess in the bottom of the bolt body varies depending on the rifles calibre. As can be seen in the upper right hand image, the bent for the .222 cartridge is situated 2" from the bolt face. As the bolt is withdrawn past the rim of the cartridge, the sear rises and engages in the bent and rearward movement of the bolt is arrested.



Having overcome primary extraction and the firing pin has been withdrawn, the empty case is extracted from the chamber and is held on the bolt face by the extractor. The bolt face ejector is kept depressed until the empty case clears the ejection port. At this point, it is allowed to raise under the influence of its spring, push the rim of the cartridge, pivot it around the extractor and eject the empty case away from the rifle.



Unlike the CFT, the CF2 is a magazine fed rifle which consists of a magazine box, spring and double stack platform. Feeding a round from the platform, forces the cartridge up the feed ramp and into the chamber until forward movement is halted by the chamber shoulder. The bolt continues forward slightly as the ejector is depressed and the rim of the extractor overrides the cartridge rim. Forward momentum is halted and the bolt handle is rotated, the firing pin bent engages on the sear and the locking lugs, lock into the corresponding lugs in the receiver. Whilst the trigger can be depressed at this stage and the firing pin released, the firing pin cannot strike the cartridge until the bolt handle is fully depressed, thus ensuring mechanical safety.

In summary this is a nice bolt, cycling is smooth, ejection is highly effective, the safety catch engagement is positive and easy to apply and the gun state indicator is highly visual and easy to detect in the dark. However an Armourers note, when new, the spring loaded plunger type ejectors are extremely effective at ejecting a empty case away from the rifle, regardless of what speed the bolt is withdrawn, however as these springs wear and are effected by age, effectiveness drops of rapidly and the empty case is dropped within the receiver, until the spring is replaced. As the pin securing the ejector is a blind hole, repairing them can be a pain.

Barrel

The original tapered barrel is 27" long and is 1.8" at its widest point and narrows 0.8" at the muzzle. On this CF2 the original barrel was "shot out" and therefore I decided to have it re-barrelled and as I mentioned previously, this is not a cost effective solution as a new barrel costs more than the rifle is worth.



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Therefore this decision is based solely on the need to restore a classic rifle, not the resale value. The new barrel was to have the same dimensions as the original and I planned to cerakote both the receiver and barrel. Around the chamber of the original barrel was the various proof marks, which with the new barrel have been replaced by the current proof marks and their dates.

Stock

The CF2 stock differs considerably from its CFT counterpart. The CFT is a typical target stock, where as you can see from



these images, the CF2 is a sporting/varmint style stock which is lighter and designed for a box magazine. The original stock was produced in walnut and had been finished with a deep glossy lacquer, which had seen some heavy use and had many transit marks reflective of its age. Therefore, I decided to remove the finish and return the stock to a natural walnut oil finish.

As with most rifles of the period, the original stock was not bedded and was seated directly into the wood, therefore to maximise the rifles performance, I pillar bedded the action as can be seen in the image above. BSA was an innovative rifle company, therefore you must ask, why did manufacturers not bed their rifles to get the best performance from them, I appreciate modern epoxy resins where not available, but why use not use an aluminium block or pillars to improve accuracy. I don't know the answer, but I guess it was probably a combination of things such as cost, wrong time-wrong place, shooting altitudes and concepts.

Accuracy test

Unlike the CFT I did not complete any pre accuracy tests as the original .222 barrel was "shot out", therefore I decided to not only replaced the barrel but change the calibre to .223 Remington. As the rifle was fitted with a new barrel, some "running in" was required, plus I decided to carry out some load preparation. I chose N135, Lapua brass and Sierra 77gr bullets I produced 50 rounds and headed off to the range with my chronograph and cleaning rod.

Best results where 22gr of N135 and therefore back at the reloading bench, I produced a further 50 rounds. The next



trip to the range, shooting fully supported and at 100 yards produced the following three round groups, which were two 13mm's and one 5mm, producing an average group size of 10.3mm, which was perfectly acceptable for a barrel that was not even shot in yet.

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Summary

Together with the correct Parker Hale rings, I fitted a Leupold M8 x24 scope which was produced from 1975-1985 and



therefore made a fantastic period scope. Further trips to the range had revealed no issues and the rifle functioned flawlessly, with excellent accuracy. Having said that, I did experience a couple of misfeeds which I attributed to the magazine spring and duly replaced.

Returning a tired rifle from the precipice is always a pleasure, however the bedding, new barrel, cerakote and period scope generated an expenditure over a £1000, but for me it was worth it.

This is my fourth BSA that I have restored and added to my collection and to be honest its hard to find criticism, the rifles profile is sleek without the rough edges of the competitors, whose heritage was from a previous generation.

Sporting/varmint rifles are not rifles I tend to shoot regularly and therefore my experience is limited to Parker Hale

Ruger's, Remington's, the odd Savage, but none in my experience have the same finesse and good lines.

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