

Thames Valley Guns

Armourers Report

Upgrading a Lee Enfield No4

Introduction

In 2018 I was searching the Internet for another rifle that offers an element of uniqueness and to be honest I wasn't enjoying much success. This research went on for weeks with no joy and the level of frustration was growing and quiet frankly I was at a bit of a loss. I fancied something in .308/7.62 and was looking at the venerable Lee Enfield No4 but for someone who works on No4's all the time, nothing was "floating my boat". I came across the rifle below, it was a



typical post war target rifle conversion done by Alfred G Parker of Birmingham and judging by the pictures and the price, it had seen better days and needless to say I was not interested.

Continuing my research I noticed some No4's that had been fitted with aluminium adaptor blocks in the butt socket and fitted with a AR15 pistol grip and butt, which consisted as a mixture of aluminium, plastic and wooden fore end, that produced an innovative bush carbine. They were different but not enough to be classed as unique and from my perspective they were a mixture of old and new technology and therefore looked a bit odd. I don't know what generated the spark, but that gave me an idea, which in turn generated the following specification:



1. Lee Enfield 7.62 chassis
2. New 22" heavy tapered barrel
3. Modified No4 beech forend and upper handguard.
4. New beech thumbhole butt
5. Picatinny rail for scope

Whilst this project wasn't particularly amazing, it was going to be one of my biggest and challenging as I had never manufactured a complete butt assembly before. I started my research and purchased the 7.62mm A.J.Parker rifle that I had looked at previously and can be seen in the image above. The receiver was in good condition, but the barrel had 40-50% wear, which was okay and to be expected. The forend had been butchered by some "amateur expert" in the past but was repairable, the butt was okay and I planned to keep it as a fall back, in case I mucked up the manufacture of the new thumbhole butt. The thumbhole butt was going to be the real challenge as it would have to be designed and largely built by hand as I didn't have any specialised stock making tools. I did have a small milling machine, a band saw, drum sander kit and various different types of sanding machines which should produce the required results and as long as I planned the build correctly.

Donor Rifle

In the 1954 the 7.62x51mm cartridge was select as the standard cartridge for NATO and as a result countless ex military rifles of all types left over from WWII were converted to 7.62mm target rifles. In the United Kingdom, larger contractors such as BSA went on to produce the L42A1 and the L39A1 for the Military, the Enforcer for the Police and the Envoy for the civilian market. Smaller contractors such as Parker Hale produced the T4, specifically aimed

Thames Valley Guns

Armourers Report

Upgrading a Lee Enfield No4

at the civilian target rifle market. I have no intention of describing the Lee Enfield No4 7.62mm action as there are plenty of publications out there, that go into great detail and are written by people who are more knowledgeable than I. What I will highlight is the main differences between the 7.62 and .303 versions. The 7.62 version differs in the following ways; barrel, extractor, ejector, proofing to 19T or 20T, altering the magazine well to accommodate the new magazine, the magazine with different dimensions, feed ramp and ejector.

My particular rifle, is a No4 Mk1 (F) which was manufactured at Fazakerley, it was FTR'd at a date unknown and then converted to a 7.62 target rifle by A.G. Parker with its serial number being AG0652. The barrel is unmarked except for the customary proof marks and unlike the L42/L39 barrel is not the hammer forged type. Interestingly, if my research is correct A.G & A.J Parker were father and son. A.J Parker went on to develop his own business producing sights and ancillaries, whilst his father, working closely together with Arthur Hale, renamed his own business to Parker Hale Ltd.

Barrel

The old heavy target barrel had some life left in it, but if I was going to invest all this time and effort, it should justify a new barrel. The new barrel was a heavy tapered 22" model that I had spare. The reason for the taper was to reduce some weight, to allow kneeling and standing position shooting, yet retain some of the benefits of a heavier target barrel. As I planned to fit an upper handguard, I had a shoulder fitted to permit the fitting of an upper handguard ring and the muzzle was turned with an inverted crown as can be seen in the images below.



Thumbhole butt

I am writing this report in the order I restored the rifle. Describing this process is fairly important as the "woodwork" is integral part of the rifle system and getting it wrong will effect the rifles performance, plus I didn't want to waste my time if I was going to fall over at the first hurdle.

The butt was the most difficult part as I had never seen a thumbhole version before and therefore I had to research the layout and the best way to manufacture it. I produce a design drawing with all the various dimensions and as my stock was to be produced in beech, I ordered a beech block to the size I required from the Internet. I also ordered a AR15 A2 pistol grip which was to be my model for the grip and a small Hogue (grind to fit) butt pad which would not only be the recoil pad but also provide the profile for the rear of the butt.



One point I feel I must make before I go on. This exercise will generate huge amounts of wood dust, exposure to wood dust has long been associated with a variety of adverse health effects and therefore with safety in mind, anybody attempting a project like this should wear a dust mask and eye protection as absolute minimum.

Thames Valley Guns

Armourers Report

Upgrading a Lee Enfield No4

The most difficult part to manufacture as I didn't have the tools, was the butt socket. Therefore I obtained one from an old butt that I had in stock. I cut the block to the correct size and removed the wood that would eventually become the pistol grip. I cut the face at the correct angle for the butt socket, generated a recess, inserted and super glued the butt socket in place. Whilst normally I use a wood super glue for all my permanent wood bonding, I purchased a thick gel type two pack epoxy resin that would absorb the stresses and strains of the butt socket during the firing cycle.



Using the butt socket screw hole as a guide I drilled the hole for the butt screw, but had to do this by hand as I didn't have a suitable pillar drill. It is essential that the hole is square and therefore the pillar drill is the preferred tool of choice.

With the new design, the butt screw is much shorter than the original and therefore had to be cut to length and rethreaded, plus its recess had to be countersunk so the screw head didn't protrude. This was the first critical stage of the build as the butt socket had to be seated correctly and the cheek pad and the butt face had to be at the correct angles.

The next stage was to cut the butt to its final shape and machine the pistol grip. This process took a long time as a lot of wood had to be removed to obtain the correct pistol grip dimensions. It was also critical that the butt remain a "square slab" during this stage, to permit it to be clamped successfully to the bed of the milling machine.

The last and final stage was to fit the recoil pad and profile the butt to look like a thumbhole butt and less like a slab of wood. Whilst a lot of work was done with electrical tools, milling machine etc, this last phase required a lot of good old fashioned hand work. Whilst I successfully manufactured the butt, two points of note from my perspective; from design to manufacture of the butt, took me a long time, approximately 32hrs.



If I was to produce a second butt, this long time scale probably could be halved as I now have the basic template. However whilst I was pleased with the results the butt does look like it has been produced on a milling machine and lacks that factory look.

Forend & Upper Handguard

Stripping the rifle down upon receipt, revealed that the forend was a mess having been butchered by some "amateur expert". The lightning slots had been jammed with lead to add weight and where touching the barrel. Most of the wood around the recoils stops had been hacked away and therefore bedding was non existent, why the recoil stops had been chiseled out was a complete mystery to me as they are essential to the rifles function and accuracy. The front sling swivel mounting was a QD stud and may have been used to mount a bipod, however the forend was in such poor condition, that its only use was to keep the users fingers away from the barrel. How this rifle hit the target is beyond me.



Thames Valley Guns Armourers Report Upgrading a Lee Enfield No4



Whilst the damage was quiet bad, I had thought that restoring the forend and upper handguard was going to be a much more easier task than manufacturing the butt, as it was going to be a case of restoring, rather than manufacturing, however I was sadly mistaken. The first phase was to machine all the old bedding out, clean up the barrel channel to ensure a floating barrel and re-bed. However this is where I came up against my first issues. Although tapered, the new barrel was larger at the chamber than the original and therefore sat higher in the barrel channel which meant that the standard No4 upper handguard wouldn't work.



The only upper handguard that I had that was close to fitting was from an old Kongsberg M59A1. However even that was too small and required a further 3mm of height to clear the barrel. To do this I ordered a 5mm sheet of beech and super glued it onto the base of the forend and then machined it all down to 3mm.

Once the upper handguard had been successfully modified and repaired, I then needed to modify the forend to the same length as the handguard, plus fit a front sling swivel band, thereby securing the upper handguard. The original forend was designed for target use and never to work in conjunction with a handguard and therefore its diameter had to be reduced to permit the fitting of a large sling swivel as can be seen in the image above.



To finalise the stock a rear sling swivel and a front QD stud was fitted. The front QD stud was fitted to permit the fitting Harris bipod.

Scope & Scope Mount

In my opinion Armalon Ltd manufacture the best non gunsmithing picatinny rail for the No4. Build quality is very good, it sits on the charger bridge providing a 30 moa downward cant, its clamps using a cam block and

a horizontal screw rather than the usual vertical screw and it fits first time, where most other models have to be fitted.

Scope choice was a Sightron STAC 3-10x32 with a 30mm tube. Lee Enfield's have relatively small receivers, so large scopes not only look odd, disproportionate and out of place, but the big object lens often impacts on the upper handguard and therefore require high rings to offset the problem which in turn effects check weld. Sightron's scope provides sufficient magnification, low ring height and smaller dimensions suitable for the No4.

Range Test

As this rifle had been altered quite significantly, the initial range test was not just about accuracy but to test the following:

- Butt assembly - I needed to check the cheek weld, eye relief, butt length, effectiveness of the new butt bolt and was the butt socket assembly sufficiently robust.

Thames Valley Guns Armourers Report

Upgrading a Lee Enfield No4



- Forend - the forend had been substantially rebuilt around the recoil lugs, the receiver had been bedded, the barrel channel enlarged, and a new front band fitted. Therefore was the rebuild effective and sufficiently robust.

- Upper Handguard - the upper handguard had been repaired and its height increased to provide sufficient barrel clearance.

The initial test was at 100yds, shooting fully supported from the bench. Zeroing the scope highlighted the magazine spring was weak which caused inconsistent feed. Upper handguard and forend remained secure with a good solid feel. Checking the butt, I noticed the recoil pad was slightly loose, but otherwise check weld and butt security was all good. Feed, extraction and ejection all performed well and even as I zeroed, the group sizes were maintaining regular 1-1.5" groups.

As I have a fairly large number of rifles, I only chronograph those that I shoot in competitions, I simply don't have the time to chrono and build specific loads for every rifle. Therefore this rifle, I use a generic load and generally aim to keep pressures at a lower level as many of them are based on WWII designs. As a result I use a .308 150gr Sierra bullet, generating approximately 2560fps, which puts less stress on the actions and minimises barrel wear. Having zeroed the rifle, I shot the remaining rounds, generating a number of groups, all ranging from 24mm with the target shown, up to 40mm, not bad I thought for a No4 action and for the first trip out of the workshop.

Back at the workshop I made the repairs to the magazine, but ultimately had to replace it. I stripped of the woodwork



and checked for any damage, none was found and therefore I was very pleased with the results. For the second range test I produced another 50rds, measured the lead and seated the bullet 0.0025" of the lands and went to shoot prone at 200yds. This was the first time I had shot of the bipod and was keen to see how the rifle performed. Unfortunately the weather was atrocious, it rained so heavy I couldn't see the target very well and then the paper targets got washed off the screen. It was at this point, I gave up and decided to call it a day.

Summary

I have been working on Lee Enfield's, every week of my life for nearly forty years and I know when a rifle will shoot well, just little things that all fit into place, barrel condition, woodwork fitting, general feel and how the rifle functions, which all adds up to give a sensation of increased performance and this rifle had it in bucket loads. The change to the butt, forend, barrel and fitting of the scope assembly and bipod has placed the centre of gravity directly on the master screw, however a full magazine moved it back to the trigger guard. The use of a pistol grip/thumbhole style stock, together with the shorter forend and handguard vastly improves the rifles overall handling.

Thames Valley Guns

Armourers Report

Upgrading a Lee Enfield No4

This improved handling also extends to the cycling of the bolt as the pistol grip provides superior support during cycling and especially when cocking the bolt on closing.

The two most difficult parts of the project was manufacturing the butt socket and ensuring all the angles where correct, plus increasing the



height of the upper handguard. As I didn't have the appropriate tools to manufacture from scratch, both jobs would had it not been possible if it wasn't for modern permanent bond adhesives. I was amazed by this adhesive technology. I glued a 5mm beech sheet onto the upper handguard, cut out the inner section and then milled to shape and size with absolutely no bond failure.

Whilst this rifle and the changes I made to it, generated a huge amount of work, I got an equal amount of satisfaction. I had salvaged a rifle that would have otherwise been heading for the guillotine. I had changed the rifle sufficiently to make it fairly unique as Enfield's go, as you don't see many No4's with thumbhole butt and heavy barrel with a fully enclosed forend.

Whilst I have obtained my element of uniqueness, the rifle still needs to be "fined tuned". At the time of finalising this report, the new magazine had arrived and in doing so ,eradicated my feed problem. Summer was at its height when I tested this rifle and I noticed an excessive amount of sweat between my cheek and butt, therefore I planned to fit an Sorbothane, recoil absorbing rubber cheek pad and may lower the scope a few millimetres to give a better cheek weld.

Although a personal feeling, restoring and putting hours of work into this rifle, creates a sense of pride, something that you cannot purchase of the shelve or get someone else to build.

Paul Green
Thames Valley Guns
www.thamesvalleyguns.co.uk
Email: paul.tvg@ntlworld.com

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