

The Journal of the

Historical Breechloading Smallarms Association



A View of the HULKS, at WOOLWICH in KENT,

*with some of the CONVICTS heaving up Ballast, and others on Shore wheeling it to the Places
where the Embankments are made by them*

Vol 2 No 8

THE GABBETT-FAIRFAX MARS PISTOLS

by Dr G L Sturgess

For many years the Mars pistols designed by Hugh W Gabbett-Fairfax were held in some awe by pistol shooters and collectors as the most powerful ever made. Although surpassed in muzzle energy over the past 30 years by a few modern magnum auto-pistol cartridges, during its short life the Mars series overshadowed all putative competitors at the turn of the century.

However, it is not only for its ballistics that the Mars is remembered. The pistols themselves are immense, impressive and of truly Heath Robinson complexity, which appears to border on the obscure in some aspects of their operation, the feed-mechanism being the feature that usually baffles the casual observer in its seeming perversity of functioning.

The root of Gabbett-Fairfax's seemingly over-enthusiastic engineering would appear to lie with the two themes that run through all his pistol patents from the first in 1895. These are a complete disregard for any actuating system but long recoil, due to his perception of its safety of operation, and his similar preoccupation with the exceptional strength of artillery style rotary multi-lug breech locking. The consequence of the first is far greater operational complexity than any other self-loading mechanism, due to the timing requirements of the barrel and breech motions in counter-recoil. This is also evidenced by the very limited success of long-recoil weapons (only the Austro-Hungarian Krnka/Roth/Frommer pistol designs ever achieving commercial or military production status).

The second, exacerbated by the first, causes the designer considerable cartridge feed problems, especially in the restricted space of a pistol frame, where inevitably with long recoil the barrel (and any attached feed ramp) must recoil over the magazine while locked to the breech. The sheer distance over which a relatively short pistol cartridge must be launched from the magazine lips, between the co-axial locking lugs of the barrel extension and into chamber inevitably results in feed complexity and a propensity for jamming. The result of the immense strength of the action, however, is that truly impressive external ballistics, comparable with contemporary attempts to produce a self-loading rifle, were achieved.

EARLY DEVELOPMENTS — THE PATENTS OF 1895-6

Gabbett-Fairfax's first pistol patent, GBP 18686 of 1895 (Figure 1) describes an ungainly design utilising a rotary magazine actuated by the barrel recoil and feeding via an otherwise conventional feed ramp, with the long recoil/rotating head bolt characteristic of all his designs. The bolt head rotation is controlled by cam ways in the side of the fixed frame with a spring loaded 'switch' between recoil and counter recoil rotations, so arranged as to unlock the action during recoil, before a system of latches and levers retains the bolt at the full recoil position. This leaves the barrel free to return forward under control of its separate coil spring, during which counter-recoil it first

actuates a complex multi-link ejector arm to flick the empty from the stationary bolt face and finally releases the bolt via the latches and link to chamber the next round.

As no example of this design is known to survive, it is not known what calibre was envisaged. However, the patent drawings indicate a long, rimmed straight revolver case, which, scaled from the grip and trigger reach dimensions of the drawings, approximates to a .45" Long Colt (Muzzle Energy, $E_0 = 420\text{lbft}$). This perhaps indicates the ballistic ambitions of Gabbett-Fairfax from the beginning, at a time when the only auto-pistol cartridges in common circulation were the 7.65mm Borchardt ($E_0 = 300\text{lbft}$) and the Bergmann M94 5mm No 2 and 6.5mm No 3 with E_0 s of 26 and 72lbft respectively.

Realising perhaps the potential danger whilst firing such a powerful cartridge of opening the breech during the recoil phase when chamber pressures would still be high, his next patent in the following year, GBP 17672/96, covered an improvement of the same design to the classic long recoil cycle, whereby the frame cams rotated the breech to open on counter-recoil, and the latching system then checked the bolt just forward of the full recoil position, allowing the barrel to run fully forward, the empty case being extracted and ejected, the bolt released and a fresh cartridge loaded as before.

Gabbett-Fairfax envisaged the use of his design for both self-loading rifles and machine guns, and makes reference in GBP 18686/95 to fully automatic searing of the hammer and to belt feed of cartridges or substitution of "feed-apparatus of any kind capable of maintaining a continuous supply according to the requirements of the services in respect of such guns". He therefore patented in 1896 (GBP 17808/96) a form of endless chain feed as applied to the pistol (Figure 2) using semi-open "wire clips" to hold the cartridges, which were pushed forward through the belt by the advancing bolt — a feature not re-invented for machine gun feeding until the advent of the MG34 40 years later, and which was copied very closely in the chain-feed magazine of the Italian Sosso pistol in 1941. At the same time, GBP 17809/96 protected a change lever/disconnector mechanism for the pistol, which allowed selective fire as an integral feature of the mechanism — another of Gabbett-Fairfax's concepts which was many years ahead of his time, since fully automatic firing of pistol type weapons,

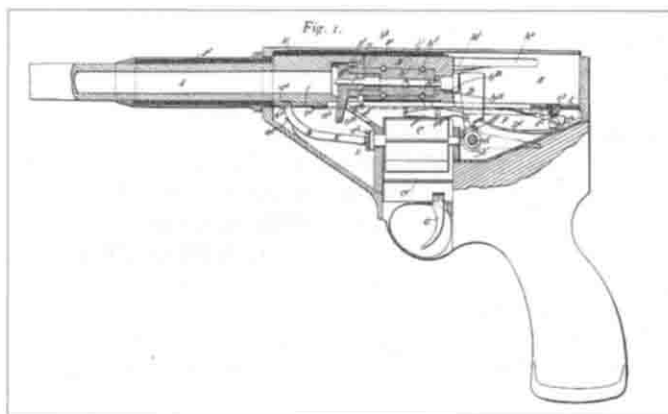


Figure 1: GB Patent 18686/1895, showing Gabbett-Fairfax's first pistol design with distinctive rotary magazine.

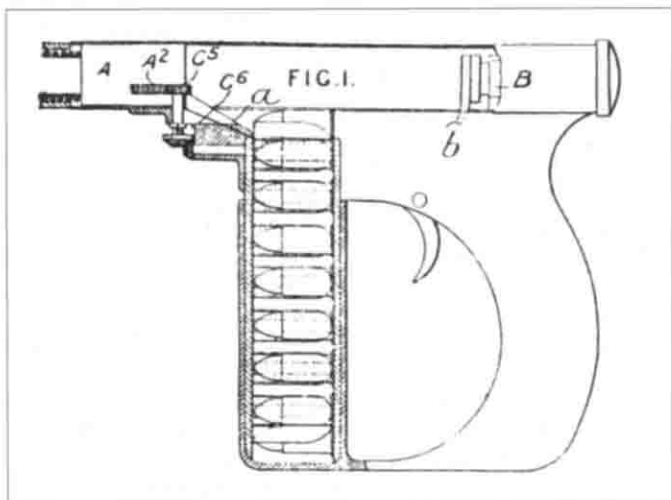
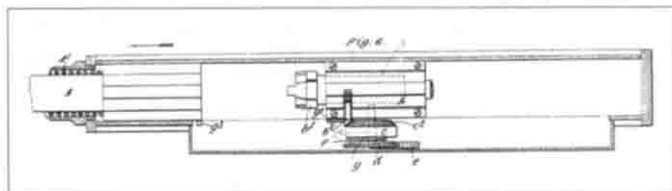


Figure 2: GB Patent 17808/1896, a continuous chain feed system for automatic fire.

Figure 3: The wonderful complexity of the rack and pinion/bevel gear bolt locking control of GB Patent 21664/1896.



road from Ludwig Loewe's then London representative, H F L Orcutt, who was promoting the Borchardt pistol from 145 Cannon Street) and with registered capital of £20,000, for the purpose of acquiring his inventions for automatic arms. The first directors were John Lowles, MP, Alexander McDonnell, Maj-Gen Harding Stewart, CMG, Capt Frederick Harvey, RN, and Robert Wheeler. The principal object of the company as stated in its Memorandum of Association was "to purchase from Hugh William Maunsell Gabbett-Fairfax his inventions for automatic firearms having Patents in the United Kingdom and improvements thereon pursuant to an agreement between H W M Gabbett-Fairfax and Robert Wheeler & Company".

This appears to be the archetypal type of patent exploitation company that *Arms & Explosives*¹ had in mind some months later when reporting on the lax state of the Patent Laws at that time and the apparent lack of critical scrutiny of inventions by the Patent Office officials: "The Board of Directors is chosen, the capital arranged, and the salary of the inventor fixed by himself, before he has made a workable model of his idea, and it is the Patent Office which lends a form of official recognition to such futile endeavour." The constitution of the Board of Directors is typical also of companies of the time wishing to exploit contacts with the Government and its military authorities to gain acceptance of new inventions for lucrative contracts.

However, only Robert Wheeler, merchant, of 79½ Gracechurch Street was a promoting shareholder, the other six (seven initial subscribers being necessary for a limited company under the 1856 Joint Stock Companies Act) being make-weight solicitors clerks etc, and only the £7 minimum initial capital was ever subscribed. In May 1900 the registered address was moved to 14 Billiter Street, EC, and in the Statutory Return of 1901 it was noted: "There are no current Directors — The Company has been inactive recently but is now being re-cast and Directors will shortly be appointed." When the next year's return was due in January 1902, the solicitors wrote to the Registrar of Companies, reporting, "The arrangement to carry out which the Company was incorporated [*sic*] fell through and no shares have ever been allocated. We now understand from Messrs Francis & Johnstone they are solicitors for a Company which is proposed to be formed to carry out the amended scheme of purchase of the invention and desirous to register under the same name precisely."

The Registrar, however, was not prepared to co-operate, and, in view of the fact that the company had never traded, replied requiring it to be liquidated, which it duly was by notice in the *London Gazette* of 18 November 1902, having done nothing at all to exploit Gabbett-Fairfax's designs. Having apparently agreed to sell the rights to the 1895 Patent and possibly the 1896 Applications, which pre-date the company formation and contain no assignment to the company, but were not granted until late 1897, Gabbett-Fairfax appears to have ignored the Mars Automatic Firearms Syndicate, since his next commercial enterprise was the proposed licensing of his 1898 Patents to the Webley company.

THE TRANSITIONAL DESIGN OF 1898

The next step in the evolution of the design was in April 1898, when four patents were applied for. Two are minor, GBP 8929/98 (Figure 5) relating to a simple detachable butt-stock fastened by a hook and screw or bridle piece and GBP 9066/98 describing an improvement in the ejector mechanism of GBP 17672/96.

GBP 9068/98 (Figure 6) is a modification of the rotating head locking lug principle whereby, instead of four lugs being

carried on the rotating bolt head, as all Gabbett-Fairfax's other designs, the head carries two diametrically opposed locking lugs, and the bolt body, which is also able to rotate, carries the other two. When locked, the lugs are disposed at 90° to each other under control of a torsion spring within the bolt, engaging the locking faces at the rear of the recesses in the barrel extension, which were now stepped axially instead of being coplanar. On being rotated by the frame cam ways on unlocking, the two sets of lugs are each rotated by 45° towards the other so as to lie one behind another and be able to pass through a single pair of diametrically opposed passages in the barrel extension lock ring. It was this reduction in the number of passages through the barrel lock ring from four to two, with consequent increase in breech strength that was the main claim of the patent, despite the consequent increase in the number of parts and the difficulty and complexity of machining.

Gabbett-Fairfax's other design of this year, GBP 9067/98, although applied for on the same day as 9068/98, 19 April 1898, was actually deposited as a complete specification at the Patent Office on 20 February 1899, two days after that for 9068/98. This claimed protection for the first manifestation of the complex multi-step feeding system that is perhaps the best known characteristic of the ensuing Mars pistol. Gabbett-Fairfax also changed his design from the earlier rotating magazine, presumably for greater capacity and better space utilisation, to a more conventional in-line system, though not a removable

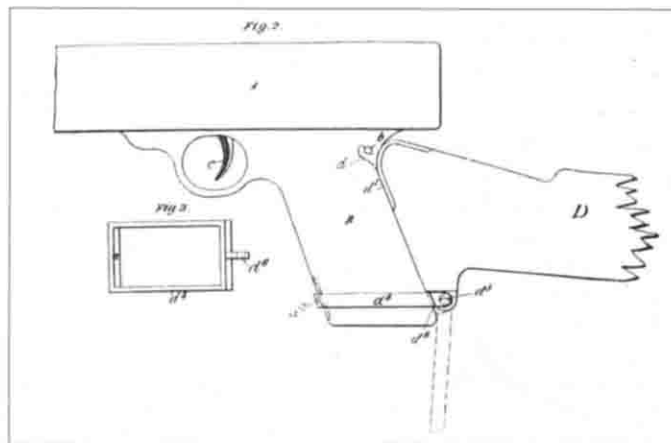
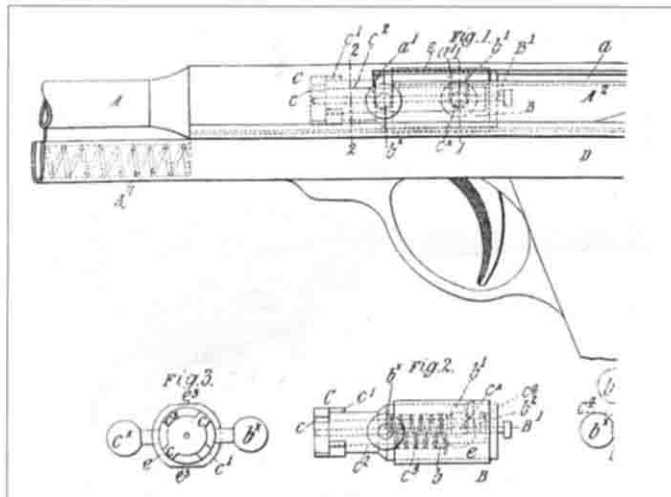


Figure 5: Gabbett-Fairfax's removable stock fitting, GB Patent 8929/1898.

Figure 6: The complex double acting split bolt of GB Patent 9068/1898, intended to minimise the area of the cuts in the breech ring.



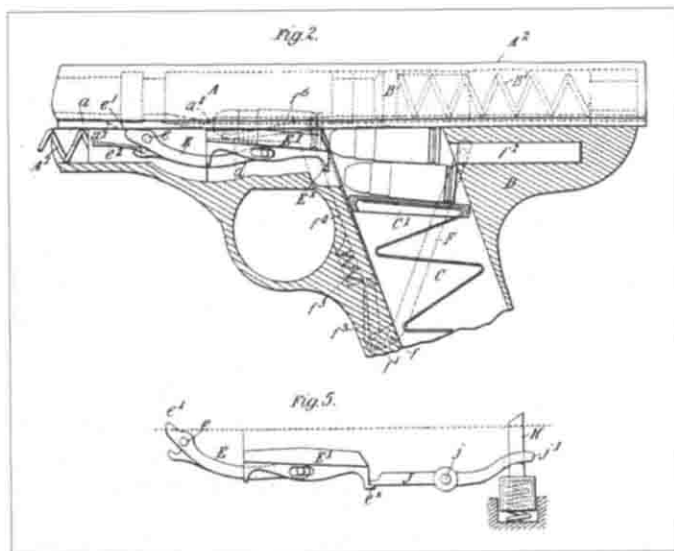
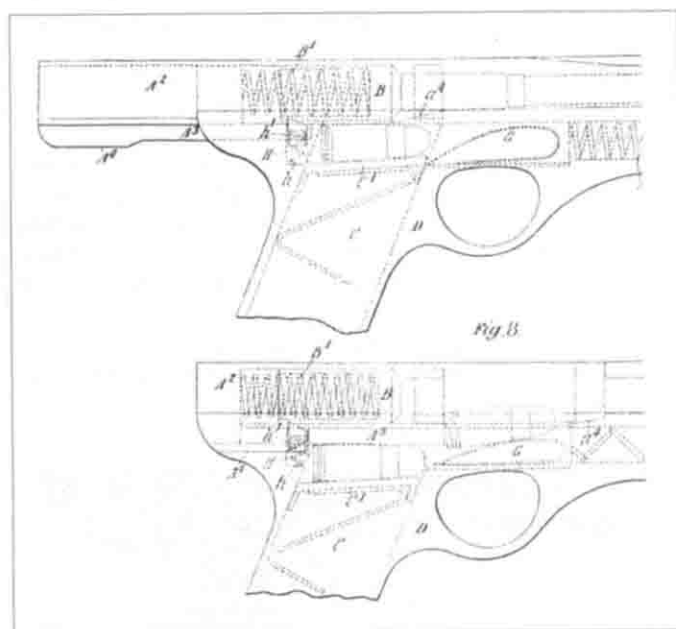


Figure 7: Version I of the forward feeding/elevator system of GB Patent 9067/1898, using a complex system of levers to move the cartridge forward from the magazine.

Figure 8: Version II of GB Patent 9067/1898, with a simplified spring elevator and cartridge feed lugs under the barrel.



box, within the grip. However, the necessity to have both bolt and barrel recoil and the barrel then counter recoil over the top cartridge, which then must be presented to the bolt face at an appropriate angle for feeding through the barrel extension locking lug ring into the chamber, evidently created problems Gabbett-Fairfax sought to overcome by increased complexity.

The designs of this patent provide for a cartridge lifter, which presents the fresh cartridge to the bolt face, angled for loading, in the time interval between the counter recoil of the barrel and the forward stroke of the bolt. The cartridge is fed longitudinally to the lifter, which was positioned in front of the magazine, by either a complex system of multiple levers, plungers and springs actuated by the barrel recoil (Figure 7) or by direct action of lugs or a barrel actuated spring plunger under the barrel extension engaging the cartridge during the barrel forward stroke and pushing it from the magazine (Figure 8). In the former case, the lifter itself forms part of the train of levers,

and is tripped and raised at the appropriate moment by a coil spring. The latter version, closer to the eventual realisation of the Mars pistol, utilises a simple leaf spring to elevate the nose of the cartridge.

This design relied, in the first version described (Figure 7), upon the movement of the cartridge lifter and in the second (Figure 8) upon the final forward movement of the barrel to release the bolt to fly forward. This automatic bolt release was perhaps asking too much of the timing of a mechanical system involving violent movements of a heavy component, the barrel, over relatively large distances generating considerable momentum transfer and vibration which could disturb the position and attitude of the cartridge on the lifter, causing mis-feeds. That this must have been a problem is evident by the bolt release timing control of the eventual Mars pistol, which sought to overcome the difficulty by locking the bolt to the rear after each shot until the trigger was released, thereby allowing the moving parts, especially the barrel, to have transferred their recoil and counter recoil momentum to the firer's wrist, and to have achieved relative dynamic stability before the bolt was unlatched to feed the next round.

Both versions shown in the patent incorporate a shutter, to block the upward motion of the second cartridge in the magazine so as to permit the bolt an unobstructed run forward to feed the cartridge sitting on the lifter. The first version uses the plunger that feeds the top cartridge forwards from the magazine also as the shutter; the second incorporates rearward elongations of the feed lugs under the barrel extension for the same purpose. This patent also depicts, for the first time, the characteristic bottlenecked rimless cartridge, evidently the .360" version, whose extraordinary ballistics were to distinguish the Mars pistol.

That these were transitional patents to the eventual perfected Mars pistol is shown, in addition to the introduction of the feed lifter, by the re-location of the barrel return spring to lie below the barrel, instead of being coaxial with it as previously. That the location of springs was uncertain in the inventor's mind is shown by the complete absence of a bolt return spring in GBP 9068/98, and its location directly behind the bolt in GBP 9067/98, unlike the known examples based on this patent.

THE WEBLEY COLLABORATION

This uncertainty over spring location and other matters not specified in the 1898 patent, such as the firing mechanism, was resolved in the prototype shown in Figures 9 and 10, which was the product of Gabbett-Fairfax's short lived co-operation with Webley & Scott Ltd, and a further development of GBP 9067/98, following the non-development of relations with the Mars Automatic Fire-Arms Syndicate. The advent of automatic pistols and their promotion as the future for hand gun design, commencing with the Borchardt and Bergmann designs which were marketed in the UK from 1895, was reinforced by the commercial success of Mauser's C96, which was represented and publicised by the leading gun-makers Westley-Richards & Co (who were also agents for Bergmann) from February 1898. This led to the country's leading revolver manufacturer, Webley & Scott Ltd, looking to its laurels and seeking to promote a British design to compete with the new German imports.

Webley 1790-1953² quotes a critical article in the *Daily Chronicle* of 2 February 1899 which, referring to the Borchardt, Mauser and (Pieper manufactured) Bergmann pistols as seeming replacements for the revolver, accused Webley's of being too slow and conservative in replacing the business it

appeared likely to lose. T W Webley's riposte was published in the *Birmingham Daily Post* of 2 April 1899, revealing that Mr Gabbett-Fairfax's Mars pistol had been submitted to the company and that, being very impressed, they had undertaken to refine the design and to become sole licensee under the patents. This announcement may also have been made to forestall confusion arising from a report appearing in *Arms & Explosives* the previous month, which ascribed the development of "a new automatic revolver" (prototypes of the Webley-Fosbery) that had been recently demonstrated by Webley's in Birmingham to "Captain Gabbett-Fairfax". Curiously, however, Gabbett-Fairfax, in his own written disclaimer to the same journal in the next edition, did not take the opportunity of putting forward his own developments, which may indicate a certain delicacy in relations with Webley's and/or Col Fosbery at this date.

The Webley made prototype illustrated is clearly a refinement of GBP 9067/98, using the patented four lug rotary bolt head locking, and forward feeding on to the lifter of the cartridge from a conventional box magazine, now removable from the grip by means of a latch built into the magazine base rather than the grip frame. As a further development of GBP 9067/98, it has a feed control shutter linked to the barrel spring lug, which serves both to feed the top cartridge forward on to the lifter, to restrain the upward motion of the second cartridge and to act as a hammer blocking safety, preventing the hammer from reaching the firing pin if the barrel should jam, unlocked, short of its fully forward position. The lock work is relatively simple and the dual bolt return springs were re-

located below and to the sides of the bolt. The bolt is engraved "Mars Auto. Pistol (cal.36.)" Made by the Webley & Scott Revolver & Arms Co', and the pistol bears neither proof marks nor serial number. GBP 9067/98 is completely unspecific on the location and functioning of the bolt head rotation control cam, which on this prototype is prominently located externally on the left side, controlling rotation directly via a follower lug machined in the bolt head extension.

Although reasonably simple by the standards of the day, particularly in view of its power, the pistol was excessively large, especially in its overall length of 320mm (12.6 inches) in relation to the barrel length of 168mm (6.6 inches), and the moving parts, barrel and bolt, had a recoil stroke of approximately 100mm (4 inches) while locked together. The dimensions of the bolt and the overall length were dictated by the feed mechanism, and it was necessary for Gabbett-Fairfax to revise this to shorten the locked action recoil stroke, in order to make the pistol slightly more wieldy.

Why he did not persist with Webley's to achieve this, when they had publicly declared their support for his design is unknown. Certainly, the Webley-Fosbery was closer to production status during 1899/1900, but this was probably not initially seen as a direct competitor by Gabbett-Fairfax; indeed, he commends it as "excellent" in his letter of April 1899 to *Arms & Explosives*, but notes of Col Fosbery's invention that "it has been considerably modified by the Webley & Scott Co. Ltd". It may be that what he perceived as interference with his ideas by Whiting and others in Webley's management as they attempted to turn his design into a viable product provoked the split, but this had evidently taken place before Gabbett-Fairfax filed his next patent design for the final and definitive Mars design in August 1900.

Figure 11 shows an unidentified, unfinished, unmarked prototype which has long been associated with Gabbett-Fairfax and Webley, and which was photographed with the Webley Mars 1898 patent prototype when both were in the Webley collection in the 1950s. However, examination shows, as do

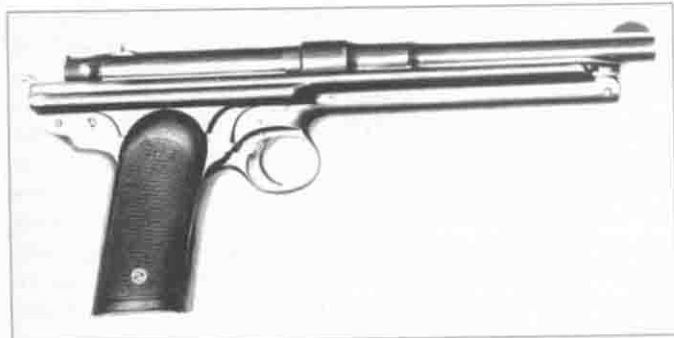


Figure 9: The Webley made prototype Mars pistol, developed from GB Patent 9067/1898, with forward feeding from magazine to lifter. Note the distance forward of the grip that the chamber lies.

Figure 10: The Webley Mars field stripped. Note the bolt head locking lugs and the shutter which controls cartridge elevation from the magazine in synchronism with barrel motion. The prominent protrusion above the frame is the bolt rotation control cam.



Figures 11a & b: An unidentified 'in the white' prototype, which may have some association with Mars development, but appears unlikely to be a Gabbett-Fairfax design.

the photographs, that the chamber lies immediately in front of the magazine well in the grip, and despite there being no magazine, it is apparent that there is no form of cartridge lifter/elevator, and feeding is conventional, directly into the chamber. The locking mechanism also bears no relationship to Gabbett-Fairfax's *idée fixe* of a rotary bolt head locked by lugs; the cocking handle, when pulled back cams upward the front of the locking lever seen at the front of the bolt, which acts as a pivoted locking wedge, allowing the bolt to be withdrawn. The bolt return stroke is not controlled by trigger release and in this has no similarity to the later 1900 patent.

However, the pistol is long recoil, is of approximately .38" calibre and is chambered for a bottlenecked cartridge, fired by an internal shrouded hammer. The dissimilarities, especially the locking system, from the thread of Gabbett-Fairfax's development, in which the rotary bolt is a constant and unchanging feature of every patent, indicate that it is probably not a Gabbett-Fairfax design, but by another associated with Webley's of the era, possibly using some aspects of the Mars, such as the long recoil principle and possibly the .360" cartridge

THE MODEL 1900 MARS PISTOL

UK Patent 14777/1900 lays out the design which is generally known as the Mars pistol today, the major features of which are shown in Figure 12. The feed mechanism was reversed from that of 1898, so that a feed tray, sliding in an elevator (components 12 and 9 respectively in the drawings) grasped the rim and body of the top cartridge in the removable box magazine, and when the pistol was fired, the elevator, being pivoted on the bolt carrier, received the cartridge as it was forced rearwards from the magazine by lugs on the front of the bolt carrier. The trigger being held pressed, when the barrel and bolt reached the end of their rearward recoil stroke of 75mm together, a spring actuated bolt retaining detent kept the bolt to the rear when counter-recoil started, while an unlocking slider, also carried on the bolt carrier, was pushed to the rear by the detent, so rotating the prominent bell-crank carried on the left side of the bolt. The forward end of the bell-crank depressed the bolt actuating lug, rotating the bolt through 45°, unlocking the bolt from the barrel extension as for previous designs, and tensioning the bolt locking spring, a coil spring lying coaxially around the bolt stem which returned the bolt lugs to the locked position upon counter-recoil. The bolt was held in this unlocked position by a latch on the rear of the bolt carrier.

The barrel, now free, was returned to its forward position by the central spring (provided with a heavy buffer to cushion

Figure 12: The definitive Mars pistol, GB Patent 14777/1900, showing all major parts in their final disposition to each other, and the troubling first version lockwork, wherein the bolt detent, k, is held up to the bolt carrier solely by leaf spring y.

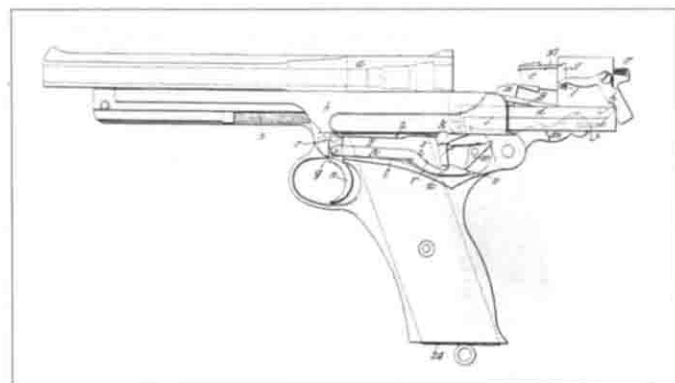


Figure 13: The Mars action at the moment of feeding. Note the cartridge in the elevator.

Figure 14: The major parts of the Mars action, field stripped.



the final part of the recoil stroke and protect the main spring). This in turn released the elevator/feed tray, which was forced upward by the tip of the over-tensioned hammer, the rising tray acting as an ejector at this point to knock the empty case, held on the breech face by the extractor, out of the gun. The fresh cartridge was now presented between the bolt face and breech at an appropriate angle for feeding; at this point everything stopped until the firer recovered his wits and released the trigger. Figure 13 shows the relative positions of the components at this moment. Release of the trigger in turn released the bolt detent, allowing the bolt to fly forward, powered by the dual return springs to which it was connected by long forward facing connecting rods, feeding the cartridge and then causing the elevator/feed tray to drop down to be ready to grip the next round as the tray was returned to its rest position beneath the chamber. These internal parts of a typical mid-range pistol (serial number 41) are shown in their approximate relative dispositions in Figure 14, which also show the complexity of the action as 'field-stripped'.

Manual operation is catered for by the bolt handles, twin cylindrical knobs which protrude behind the bolt, which may be twisted by a quarter turn anti-clockwise to release the bolt and then pulled to the rear, bringing with the bolt the charging mechanism and a cartridge, for initial loading of the weapon without the necessity of compressing the powerful barrel re-



Figure 15: M1900 Serial number 6. Note the lack of lightening hole in the frame above the trigger guard and the safety lever at the rear of the lock work cover.

turn spring. The extractor is located on the top of the bolt head and, as it turns with the bolt, the top recess in the barrel extension ring is cut approximately double the width of the corresponding lug to allow the extractor to enter. The bolt and the barrel extension locking ring are an exceptionally complex shape to machine, as the bolt and locking lug outer surfaces are all conical in form, including the tapering interstices between the lugs, which must have been broached or hobbled, as they cannot be generated by simple turning or rotary milling. This complexity, and an associated quality of fitting and finish, characterise all aspects of the Mars pistols, which are a tribute to the skills of the inventor and the abilities of the Birmingham gun trade at the turn of the century.

Figure 15 shows a very early variant of this Model 1900, engraved "No 6 MARS PISTOL .360" on the action side, which like the patent drawing does not have, as do later pistols, the characteristic lightening hole through the frame body above the trigger guard, which appears to serve no useful purpose, and varies greatly in size from 8.5 to 17.3mm and may variously be circular or oval in shape. Number 6 also exhibits a sear blocking external safety catch which is omitted from later pistols. Figures 16a and b show a typical late Model 1900, serial number 23, which is the last example known to exhibit the original M1900 lock work, as the Patent (see Figure 21a) wherein the sear bar lies at a downward angle from the trigger to sear (the cover plate being tapered to match) and the detent is operated solely by the pressure of the long horizontal 'S' shaped leaf spring in the top of the housing, which doubles as trigger return spring. This was to be the cause of

Figures 16a & b: M1900 Serial number 23, 8.5mm calibre, one of the last pistols with lock work exactly as the 1900 Patent. Note the distinctive tapered shape of the lock work cover and that the magazine is fully inserted, despite its protrusion.

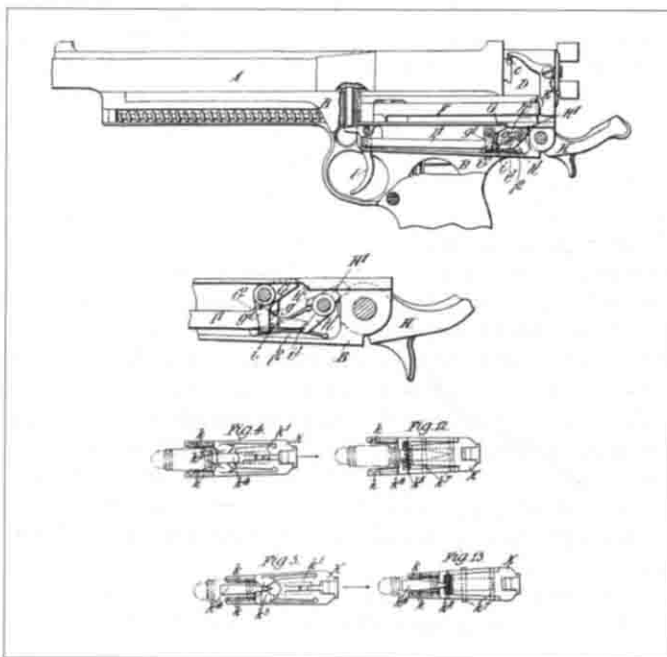


many functioning problems during military trials, as detent control was not sufficiently positive and could be over-ridden by the bolt return springs, causing premature bolt release and feed jamming, unless the trigger was held very firmly.

THE MODEL 1905 MARS PISTOL

Since there has been much confusion nomenclature for these pistols, and the apparent existence of a multiplicity of 'models' of the Mars, it is convenient at this point to consider the mechanical differences between the earlier and later pistols in comparison with each other. It is certainly true that there are many variants of the pistol; indeed, examination of extant models suggest there are at least minor differences between all examples, whether in calibre, markings or minor details, and in the interchangeability of parts, which is generally very limited, even between pistols of the same calibre of near-sequential serial numbers. Although it can be said to be two basic but very similar models, generally following the Patent of 1900 and the Patent of 1905 (GBP 25656/05, Figure 17), the major-

Figure 17: GBP 25656/1905 shows the Clement Brown improvements — simplified feed elevator, the detent (G in Fig 17) firmly cammed upwards at g by the trigger bar and i' by the sear all controlled by a single 'V' spring and the trigger/barrel interlock pin a preventing trigger release until the barrel is fully forward.



ity of pistols exhibit characteristics from both designs and, while the first approximately 25 pistols follow the first design fairly closely, only one pistol has been observed with all the characteristics of the 1905 Patent.

The three basic improvements claimed in the 1905 Patent, which owes nothing to Gabbett-Fairfax, but was applied for by Clement Brown (believed to have been his works manager) and the Mars Automatic Pistol Syndicate Ltd, are a) the simplified one piece cartridge feed lifter, working in conjunction with a lug on the bolt extension which initiated the rearward extraction of the cartridge from the magazine, b) simplification and revision of the lockwork and bolt detent to make the bolt holding detent action mechanically positive via cams rather than sprung, to prevent the detent being overridden by the bolt return springs at the wrong point in the cycle, and c) the incorporation of a trigger interlock pin, which prevents the trigger from returning forwards to release the bolt retaining detent until the barrel has first returned fully forward. The latter two were necessitated by continual complaints of feed jams caused by sensitivity to trigger operation resulting from military firing trials.

Despite these three improvements constituting the basis of the 1905 Patent, it is apparent that a) the simplified lifter (see Figure 18) was introduced as a running change much earlier than 1905, since serial number 23 and earlier guns have the two piece tray and elevator of the 1900 patent, but serial numbers 27 to 41 have a simplified one piece lifter, which is the precursor of that fitted to numbers 43 to 57, which is exactly as the first (one piece) version illustrated at Figures 4 to 9 of the 1905 Patent. Only the 'Pocket Pistol', serial number 0, (Figures 25a and b) is known to have the more complex four part coil spring actuated lifter of Figures 12 and 13 of the 1905 Patent. Since number 57 is the highest reported serial number of any Mars pistol, and Pocket Pistol number 0 obviously postdates this mechanically as the only example known with all the features of the 1905 Patent, number 0 is probably the Patent Model. The opening of the feed grippers of the one piece lifter, to permit them to pass around the base of the cartridge in the magazine was controlled by a hardened wedge, inserted into the top of the frame, as shown in Figure 26, which compares this with the hinged cam flap of the earlier pistols which controlled the tray/elevator device of the 1900 Patent weapons.

The lock work revision to eliminate the premature bolt release problem also started at around serial number 27. This pistol, in 8.5mm calibre (see Figure 19), has several unusual features, including the 12" barrel and fitting for detachable stock (Figure 20) per GB 8929/98 referred to in Gabbett-Fairfax's first presentation to the Small Arms Committee on 11 March 1901. This suggests that this second version lock



Figure 19: Serial number 27, with early transitional lock work (note the cover plate is now near parallel sided) and 12 inch 8.5mm barrel.



Figure 20: The stock fitting slot of Serial number 27, per GB Patent 8929/1898.

work (see Figure 21b) was in existence, as was this pistol, at this date. Although a coil spring and cam wedge (to force the rear of the trigger bar upwards to re-engage the sear after slipping under it in disconnection after each shot) has been substituted for the 'S' leaf spring controlling the bolt detent, the detent is still spring controlled, not cammed, and can be overridden by the bolt return springs. Additionally, three separate springs are still used for trigger/trigger bar, detent and sear control, essentially as the 1900 patent.

Figure 21: Mars pistol lockwork development:

- a) Serial number 23, per the 1900 patent — note the horizontal 'S' spring at the top of the recess controlling both trigger and detent;
- b) Serial number 27, a coil spring and wedge cam substitutes for the 'S' spring, but the detent is still wholly spring actuated;
- c) Serial number 39, the detent is now wedged up by the trigger bar cam, but the toe of the bar slips under the sear to disconnect;
- d) Serial number 54, fully cam locked detent action per the 1905 Patent, using modified versions of earlier components;
- e) P P Serial number 0, 'pure' 1905 Patent fully cam locked detent.

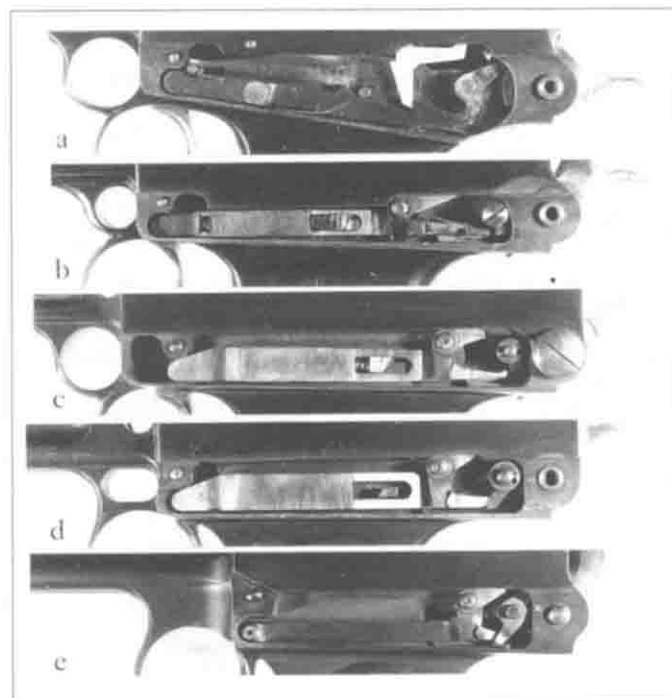


Figure 18: Feed elevator variants (top to bottom):

- Serial number 23, per 1900 Patent, two part tray and slider/elevator;
- Serial number 41, simplified one piece precursor to 1905 Patent design — note the grooves in the gripper for the rim;
- Serial number 54, the one piece design of the 1905 Patent — note that the gripper grooves have disappeared;
- P P Number 0, the four part/coil spring version of the 1905 Patent.



Figure 22: Serial number 39, .45" Long calibre, with late transitional lockwork and short (8 shot) magazine. Note the Kynoch inventory number (93/646) scratched on the left side and the Eley Shield Trade Mark and inventory number (195) on the right frame.

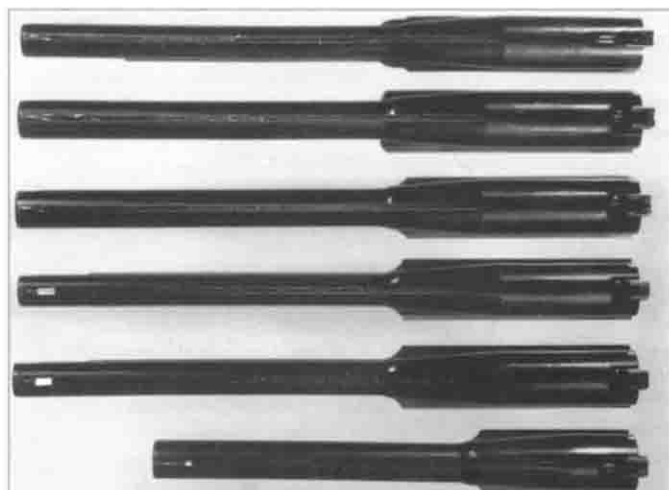
By serial 39 (Figures 22a and b) the separate detent spring has been eliminated, and sear and detent are controlled by a single 'V' spring. The detent is now positively cammed, but the trigger bar still slips under the sear in disconnection. However, the trigger/trigger bar are still separately controlled by the heavy coil spring and wedge (see Figure 21c) and the trigger bar, having lower clearance to the frame when the trigger is pulled, can still be forced down against the spring pressure so releasing the detent, although this is at such a mechanical disadvantage through the wedge cam in the trigger bar that it is much less unlikely than with the second version lockwork. It is probable that it is a pistol of this type, with improved (two spring) lockwork that was presented for trial in April 1902, as it was a .45 pistol with "mechanism altered and simplified" which was submitted to the CISA on this occasion. Both number 39 and number 41 (which is unique in having a grip safety [see Figure 14]) are .45 pistols and it is possible that one of these or an adjacent serial number is the trial pistol.

The final improvement (Figure 21d), from approximately serial number 50, embodies the principle of the 1905 Patent but incorporates modified third version trigger bars, without the coil spring/wedge cam assembly (although the fixed cam is present in the frame). This was probably done to use up existing components inherited by the Mars Auto Pistol Syndicate from Gabbett-Fairfax's bankrupt stock of components. This eliminated the trigger/trigger bar coil spring entirely and relied on a single 'V' spring to control trigger, trigger bar, detent and sear as shown in Figure 21d. The important point is that the toe of the trigger bar no longer slips under the sear to disconnect as the trigger is pulled. The toe and sear have been re-profiled so that the sear (in conjunction with the hammer and hammer spring) traps the toe of the trigger bar, locking it so it is impossible for it to move downwards when the trigger

is pulled, and the detent and bolt release were finally under positive control at all times. A secondary claim for this feature was that, since the trigger bar no longer jumps back from under the sear when the trigger is released to re-engage, the "objectionable clicking noise" this caused was prevented.

It is notable that the pistols incorporating this improvement (as well as the second version one piece lifter) have the word 'Patented' incorporated in their barrel inscription, which earlier versions do not (see Figure 23). This seems to positively

Figure 23: Barrel inscriptions, from top: number 23, MARS PISTOL 8.5MM; number 39, MARS PISTOL 0."450"; number 41, MARS PISTOL .0"45.; number 54, MARS PISTOL .85M"M. PATENTED; number 57, 360 MARS PISTOL ('PATENTED') BIRMINGHAM; P P number 0 is totally unmarked.



Figures 24a & b: Serial number 54, 8.5mm calibre, Mars AP Syndicate production with oval grip plates and 1905 Patent lockwork.





Figures 25a & b: P P (Pocket Pistol?) Serial number 0, .45 Short calibre, with full 1905 Patent characteristics.

date these few pistols (approx serial numbers 50 to 57) to post-December 1905, when the patent was applied for. Figures 24a and b shows serial number 54, which is typical of these late pistols from approximately serial number 43. The immediate visual difference is in the grip plates, which are a smooth oval, as opposed to the shaped and chequered grips of all earlier pistols. This feature first appears between serial number 41 (Figure 14) with early chequered grips, and number 43, which has the late oval grips, but is not marked 'Patented' and has the third type lockwork, not the final 1905 patent version. It appears quite probable that the oval grip plates mark the inception of production by the Mars Automatic Pistol Syndicate from November 1903, following Gabbett-Fairfax's bankruptcy in May 1903. The chronology of improvements, as well as can be derived from the SAC Minutes, which is the only reliable published record, indicates that the improvements incorporated up to serial number 39/41 correspond to those offered to or tested by the SAC up to the months immediately before Gabbett-Fairfax's bankruptcy.

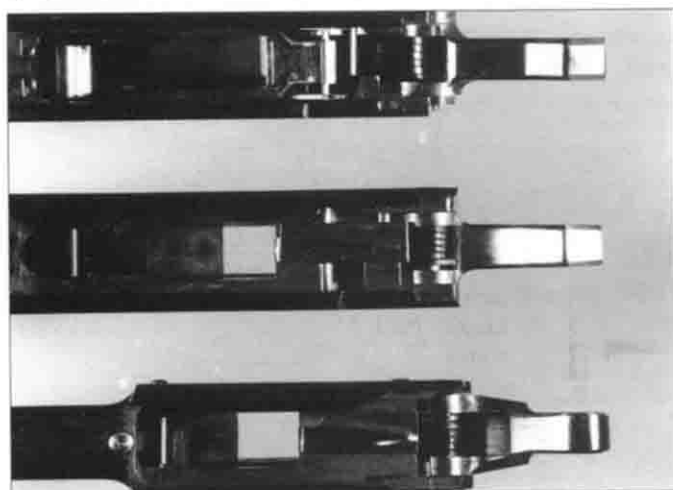
The final version of this patented lockwork improvement, which is exactly as the Patent drawings (Figure 21e), with thin trigger bar, but exactly as Figure 21d in function, is the Mars

P P serial number 0 (Figures 25a and b), which is chambered for the .45" Short cartridge. As mentioned above, this pistol is the only example known with the trigger/barrel interlock pin, shown in Figure 26, which positively holds the trigger back as soon as recoil commences and until the barrel has fully counter-recoiled, so adding a belt to the braces of the improved lockwork by doubly ensuring correction of the most persistent mis-feeding fault of which the military complained throughout their trials. Interestingly, this pistol is completely unmarked apart from the '0' serial number on major parts, and the finish is much duller than all other Mars pistols, which uniformly have a very high gloss dark blacking. The very late characteristics of this pistol, which undoubtedly dates from 1905/6, makes it impossible that it was the "P P pattern" pistol successfully demonstrated to the SAC at Wormwood Scrubs on 16 February 1902, despite its correspondence with the minutest characteristics of the demonstration pistol being in .45 calibre, with a shorter barrel and lighter weight.

Other unpatented characteristics of these pistols were subject to development and experimentation over the range of serial numbers known. The magazine is totally unique to the Mars pistols and presents a bizarre appearance to modern eyes, having an all-enveloping rear facing hook which arrests the top cartridge in the correct position to be grasped by the feed tray or lifter. Figure 27 shows the development sequence by way of examples of each of the four calibres. That of serial 23, 8.5mm calibre, is an early long magazine for 10 rounds, with solid sides, machined follower and two retaining catch cuts to allow the magazine to be held in reserve while manually loading the pistol, in the manner of the militarily approved cut-off of the day, as adopted by the Army for the Lee Enfield rifle and later the Model 1912 Webley Self Loading pistol.

That for serial number 39 is similar, but for 8 rounds of .45 Long, as specified for the 1902 trials. This has an elaborate base catch permitting relatively easy dismantling for cleaning. Early magazines of this style have a multi-folded leaf spring (a fairly obvious copy in its bending form of the C96 Mauser magazine spring) and an elongated slot running the full length of the front spine, in which a follower lug runs. This controls the follower attitude at the top of its stroke and, due to the close fitting of the machined follower, keeps it horizontal when the magazine is empty, obviating the need for lips to retain the follower, which would have been difficult to accommodate when feeding backwards. Additionally, the 1900 Patent drawings show this follower lug actuating a trigger stop, which acts as a bolt hold open when the magazine is empty, but pistols examined do not have this feature.

Figure 26: Frame interiors, from top: number 23, showing the hinged cam flap directly behind the magazine well which controls the feed tray motion on the slider/elevator; number 39, showing the hardened wedge used with the one piece lifter to control gripper closing & opening; P P number 0, showing the barrel/trigger interlock pin directly in front of the feed mechanism well. Note the stout square section hammer coil spring in all versions.



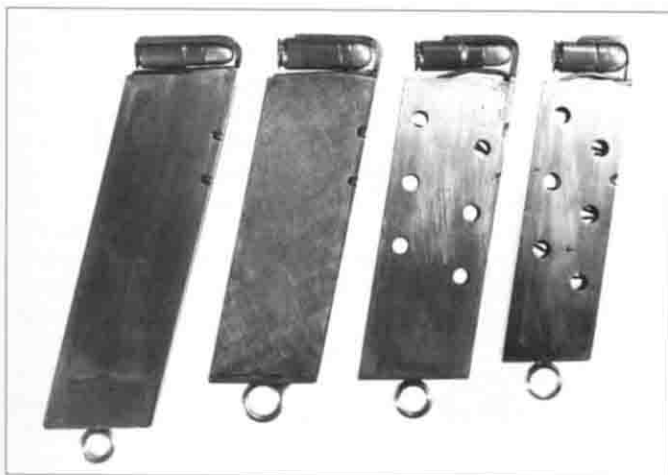


Figure 27: Magazine development (left to right):
 number 23, 10 shot 8.5mm, machined lifter;
 number 39, 8 shot .45 Long, machined lifter, quick release base;
 number 57, 8 shot .360, Mars AP Syndicate production with pressed follower, coiled wire spring and sight holes;
 P P number 0, 8 shot .45 Short, note absence of the second 'cut-off' retaining latch recess.

The magazine for serial number 57, of .360 calibre, is typical of pistols with oval grips (probably Mars Syndicate production), which have obviously been re-engineered and modernised, not least, as with the grip style change, to differentiate their manufacture from Gabbett-Fairfax's, as well as incorporating the best features of Browning's and Colt's magazines, which they closely resemble constructionally. The sides now have sight perforations, the spring is an oval coil of piano wire, the follower is of pressed plate and the top hook has been shortened to approximately half the cartridge length. The .45 Short magazine from P P pistol number 0 is constructionally identical, with the exception of the omission of the 'cut-off' catch recess.

The bolt locking actuation also evolved, Figure 28 showing the basic similarity through the range, all having the characteristic four locking lugs and extractor alongside the top lug, retained by a coaxial flange on Gabbett-Fairfax made pistols (up to number 41 or 42) but by a dovetail cut thereafter. The early pistols all had the firing pin controlled by a creep spring retained by a threaded nut, whereas Syndicate pistols, post number 43, had a loose firing pin controlled by a triangular cam way into which the locking pin protruded, which positively held the pin retracted when the bolt was rotated into the unlocked position and during feeding.

All have a very similar coaxial square section locking spring, which was responsible for the 45° locking rotation of the bolt. The pre-tension in this spring is, however, less than half a turn, and the resulting locking force is quite feeble, which caused many mis-fires in the military trials due to incomplete locking, particularly when fouled, which causes the safety cam between the bolt actuating handles to prevent the hammer reaching the firing pin. The locking spring is released on the bolt reaching battery by a latch on the rear of the bolt carrier striking the frame on the early Gabbett-Fairfax guns and by a spring latch along the

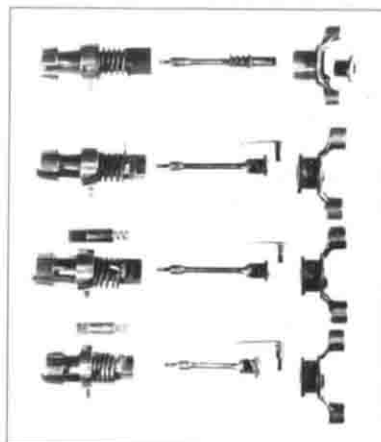
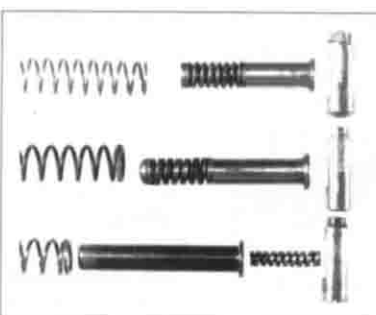


Figure 28: Bolt development, from top:
 number 23, ring mounted extractor, spring retraction of firing pin and threaded assembly retainer;
 number 54, cam controlled firing pin, threaded pin assembly retainer, self triggered locking as head sets back;
 number 57, as 54 but plunger triggered locking by impact with barrel ring;
 P P number 0, as 54 but shorter and bayonet locked assembly pin.
 Note the round wire locking spring of 23 compared with the heavy square section wire of later pistols.

Figure 29: Buffer spring development, from top:
 number 23 (L to R, barrel spring, buffer, locking pin), integral drawn wire spring assembly;
 number 39, integral machined spring assembly;
 number 54, late simplified solid guide and small machined spring.



right side of the bolt striking the rear of the breech ring on Syndicate Guns after number 43. Serial number 54, however, has an experimental bolt, having an internal latch which is released by set back of the bolt by about 1mm within the bolt carrier as the bolt strikes the rear of the chambered cartridge. This was obviously prone to premature locking rotation if the bolt head was obstructed by a feed jam before chambering had occurred.

The main (barrel) recoil spring was fitted with a buffer to absorb the impact of the barrel/bolt assembly with the frame. Initially this was captive wound wire coil spring integral with a spring guide (Figure 29), but, as described by Gabbett-Fairfax in the 1900 Patent, this was later modified to use a very stiff spring machined as a helix from solid tube. The later Syndicate pistols used a simplified assembly which contained a smaller diameter, but exceedingly stiff, machined spring in a solid steel spring guide.

As described above, there is no hard and fast line that can be drawn between 1900 Model and 1905 Model pistols; there was a gradual development from 'pure' 1900 Patent characteristics which were superseded commencing between serial numbers 23 and 27, with progressive development of the lockwork and the introduction of the one piece lifter at this same point by Gabbett-Fairfax, which developments continued up to between numbers 41 and 43. Thereafter pistols were probably assembled by the Syndicate, which certainly inherited considerable quantities of parts from Gabbett-Fairfax, with their modifications to magazine, bolt locking latch, lifter and grips being introduced at serial number 42 or 43, and final lock work being introduced (still using old Gabbett-Fairfax trigger bars and frames) around number 50, for which, up to the highest serial number noted, number 57, (1905) patent protection was proclaimed on the barrel. As remarked, P P pattern pistol number 0 appears to be the only example with 'full' 1905 Patent Model characteristics.

MILITARY TRIALS

The holy grail for inventors of military equipment of all kinds during the Victorian era was official adoption of their design by the military authorities of, preferably, a major power. Hence the assiduity with which men such as Maxim and his rivals, Georg Luger, Paul Mauser and their numerous competitors pursued the military purchasing and evaluation commissions of Europe, Asia and America at the turn of the century. None more so than Gabbett-Fairfax, despite not having the resources of a major concern be-

hind him, who made over half a dozen submissions to the Small Arms Committee and submitted his pistol to eight separate trials or demonstration firings between March 1901 and April 1903. This is in addition to a submission to the French authorities in 1901 (by his representative M Guinard, whose address, 8 Avenue de l'Opera, is inscribed on at least one pistol), which was unsuccessful due to defective ammunition and to being abortively sought to submit a pistol for trial by the Dutch in 1905, who were insatiable in their quest for a military self-loading pistol at the time.

The War Office Small Arms Committee Minutes⁴ detail his first appearance before the Committee (Minute 415, 11.3.01) with one of his financial backers, Col F F Johnson, to explain his pistol, and to offer the following "standard models of Mars pistols":

XI	10mm or	0.394"	calibre, charge	12grs	flake	cordite, and	175grs	projectile
X	9mm or	0.354"	"	"	12	"	"	160
IIIF	8.5mm or	0.335"	"	"	10	"	"	150
VI	-	0.360"	"	"	12	"	"	156
VII	-	0.360"	"	"	12	"	"	156

Length of barrel, 9.2"; number of shots in magazine, 10.

NB: These pistols are shorter overall than revolvers with 7½" barrel.

Weight of pistols: XI, 2lbs 14ozs; X, 2lbs 13ozs; IIIF, 2lbs 9ozs; VI, 2lbs 10½ozs; VII, same as Number VI in every respect except that the barrel is 12" long and weight is 2lbs 15ozs.

Gabbett-Fairfax's presentation goes on to describe shooting with the 12" barrel model and detachable stock at up to 600 yards, to offer long and short barrels on all models and to refer further to proposals to offer automatic rifles and shotguns of comparable quality except for finish to "the very best London hand-made double-barrel shot guns" but "marketable (with a handsome profit) at about 20 percent of the cost of the latter". Having made a strong point also of the "absolute" safety of his system due to its long recoil action, the Secretary was instructed to arrange for the first of many firing trials, at Enfield Lock before the Superintendent of the RSAF.

Minute 427 (25.3.01) gives a generally favourable report: "As with all automatic pistols, the mechanism is rather complicated, but still it seems to work well, and appears worthy of further trial." However, the first of many problems concerning the ammunition arose: "The pistol ... was fired with a charge of 10 grains cordite (the proper charge of 12 grains could not be obtained in time for the experiments)" and "Owing to the charge not being sufficient, there were one or two failures ...". The report concluded with Gabbett-Fairfax offering to produce a pistol with a calibre of .47" and a muzzle velocity of 1,000 feet (per second). The Committee considered this promising, and requested two pistols of .45" bore be sent for trial to the School of Infantry, Hythe, and also to HMS *Excellent* for Naval evaluation.

Minute 441 of 15.4.01 notes a letter from Gabbett-Fairfax in response to this request, complaining that the .45" pistol is "a new and experimental one", and estimating the price at £100 each to produce (the equivalent of £7,000 today), but nevertheless, he was willing to supply these samples free of charge, provided that "even if tested to destruction, such part ... as may remain shall be returned to me within six months of their submission for trial". The Committee responded by calling his bluff and requested, in the circumstances, the two pistols of .47 calibre instead which Gabbett-Fairfax had first volunteered to the Superintendent RSAF.

Gabbett-Fairfax replied, as noted in Minute 450 of 6.5.01, that the .45 inch pistols were well in hand, and would be sub-

mitted as soon as tested, with a 220 grain bullet propelled by 12 grains of cordite, with a possible alternative of 250 grain bullets and 10 grains of cordite. Delivery was promised for 15 June and 1 July, with 500 rounds for each pistol at a cost not exceeding £5/1,000 rounds. He went on to say that he would not consider the .472" calibre further until the .45" had been tested, due to the expense of getting out the .45s.

It took until late October 1901, however, for these first two .45 pistols to be delivered, with 450 rounds of ammunition. Minute 553 of 4.11.01 records the Chief Inspector of Small Arms' initial trial, which was reasonably positive, recording an empty weight of 3lbs 1oz (3lbs 9oz with full magazine), a velocity at 90ft of 1,137fps and penetration of 16 to 18" deal boards at 25 yards. Fifty rounds were initially fired without mishap, and with good accuracy at 25 and 100 yards, the pistol handling comfortably. However, presaging continuing complaints in service testing of the pistol, recoil was heavy, the parts were "numerous and complicated", tools were required for stripping, ejection was "straight to the rear and sometimes the empty cartridges strike one in the face". At a second trial, 31 cartridges were fired, the last round causing breakage of a connecting piece, preventing further firing. The pistols were returned for repair, lightening of the pull off and to remedy the ejection angle. The Committee in-

structed further trials to be undertaken by the CSOF at Woolwich on their return to compare stopping power with the "Borchardt" (actually the Model 1900 Parabellum, then commonly known as the Borchardt-Luger), and for accuracy and functioning at Hythe and also by the Navy at HMS *Excellent*.

The School of Musketry at Hythe then tested the pistol in early January 1902, shortly after the Captain of HMS *Excellent* reported on the Navy's trials on 17 December 1901. The reports of these trials, detailed in SAC Minute 587 of 3.2.1902, were not good. Whilst the SoM found accuracy and accuracy with rapidity compared well against the regulation Webley revolver (using Mk III ammunition with 'man-stopper' bullets), the pull-off, at 10lb, the recoil, weight and ejection of empty cases into the face were again cause for complaint, as was functioning, which was unsatisfactory until the recoil spring was lightened by Gabbett-Fairfax's representative. The Navy had worse experiences with reliability, despite finding the shooting to be generally good, with recoil being light, as they experienced five mis-fires due to defective ammunition in the first 100 rounds fired, and continual failures to reload and extract at the end of this series. These failures were attributed to wear of the mechanism and the pistol was returned to the makers for repair, but to no avail, as after its return, 14 further rounds produced continual mis-fires preventing further firing. In addition to the same complaint as all other firers over cases being ejected into the face, the Navy disliked the sights and noted for the first time the inherent defect of failure to reload due to the trigger being released too soon; ie, immediately after the shot and before the barrel had fully returned forward.

The Committee recommended no further trials of the .45" Mars in its current state of development and sent their comments on the faults to Gabbett-Fairfax, requesting, however, the return of the .35" bore (.360" calibre) pistol previously tested by the Superintendent RSAF and reported on in Minute 427 of the previous year for tests of man-stopping power.

Gabbett-Fairfax responded on 10 March 1902 (Minute 603), excusing the mis-fires and extraction defects by blaming

defective ammunition, promising to reduce the pull-off to 6lbs and claiming that the recoil was less than with the service .455" revolver and black powder. The ejection into the face of the firer was blamed on too rigid a grip of the pistol, but he was vague as to proposals for improvement.

The further stopping power trials of the .36" pistol were conducted, in comparison with a .45" on 21 April 1902. SAC Minute 615 reports that the .45" was of an "improved" type (probably with modified lockwork aimed at preventing premature bolt release and mis-feeding) and that the .36 was one previously submitted, but similarly altered, which is interesting documentary evidence that these pistols were modified to use new ideas as development vehicles. The results record a velocity at 90 feet of 1,470fps for the .36 and 1,142fps for the .45. The .36 at 25 yards penetrated the whole apparatus, 22" planks plus a 1" rear frame, and was then fired again with "bullets with special thin envelopes", which penetrated 17 and 20 planks, with nose flattening. The .45 performance was similar, penetrating 18 and 19 planks.

The accuracy was "decidedly good" when fired against the Webley revolver, but, as before, complaint was made of the recoil, pull-off weight and certainty of action, which was not very good, but partly attributed to deep set primers causing mis-fires. A sand test also produced 50 to 75 per cent mal-functions out of eight rounds fired in each pistol. The Committee remarked on the very severe recoil and requested of Gabbett-Fairfax whether he could supply a .45 pistol adapted to fire less powerful ammunition, with a muzzle velocity as close to 800fps as could be arranged, and whether a plain lead bullet similar to the Webley's could be used.

This led to a further ammunition trial in May 1902, when CISA reported (Minute 635, 23.6.02) on firing a .45 Mars with charges of 9, 8 and 7 grains of 1/0.05 Webley (pistol) Cordite, with 220 grain bullet. This gave velocities of 957, 833 and 753fps, and penetrations of 12, 9 and 8 boards respectively, so meeting the Committee's request. Accuracy was equally good for all loads and the recoil, particularly with the lower two loads, was no heavier than the revolver. However, defective ammunition, which had been hurriedly assembled over-length caused jamming, mis-firing and partial separations at the cannelure. An appended note from Gabbett-Fairfax claimed that he had fired on occasion over 100, and his works-manager over 300 rounds, "without inconvenience" from recoil. He detailed his results with lower charges and admitted that the pistol would only work at 9 grains of cordite/900fps if clean and that there was no margin of energy stored in the springs to ensure reliable functioning. He also declined to supply lead bullets, due to the probability of jamming on feeding, which was very wise, but offered jacketed bullets with specially thinned nose "at a very trifling cost" as an alternative.

The Director General of Ordnance, in forwarding the report to the SAC, observed that it was probably not worthwhile spending time and money on 900fps ammunition which would not give reliable functioning, and asked, in the absence of any competitor firing a bullet as heavy, whether the matter could not proceed to a troop trial with the Navy. The Committee, however, procrastinated by claiming insufficient experience with the pistol, and recommended a further trial with regular .45 ammunition, so reversing their earlier decision (Minute 587) not to consider the .45 any more, despite the persistence of the faults that caused its earlier rejection. They requested a further 1,000 rounds, of velocity less than 1,150fps, each for the SoM at Hythe and for HMS *Excellent*, prior to a decision on troop trials.

The resulting disastrous trials, carried out over the summer

of 1902, were the swan-song of British military interest in the Mars. The Director of Naval Ordnance reported on 23 October 1902 (Minute 691) on the firing of 140 rounds from two batches of 500 at HMS *Excellent*. The ammunition was improved and caused no mis-fires. However, there were several jams, attributed to canting and telescoping of cartridges in the magazine, the final jam requiring stripping of the pistol to remedy. The Captain's concluding remarks were a fitting epitaph for the Mars: "No one who fired once the pistol wished to shoot with it again ... Further trial I consider quite unnecessary ... this pistol is quite unsuitable for adoption in Navy." The specific complaints were against its liability to jam, weight, unwieldy shape, difficulty of holding steady in the aim, empty cartridge cases striking the firer in the face and the complexity of the mechanism. DNO rejected Gabbett-Fairfax's offer to send a representative to attend further trials.

The Commandant of the School of Musketry reported via DGO on the Hythe trials in Minute 707 on 12.1.1903. Accuracy firing with ammunition loaded with "Nobel's special 'Mars' powder" against the Webley with Mk III ammunition was inconclusive, the figure of merit in slow fire being worse than the Webley at 25 and 50 yards but slightly better at 100 yards, but the rapid fire course was better for both accuracy and speed. As before, however, there were many mis-fires due to incomplete closure of the breech and failures to extract; after 345 rounds a burr was removed by the factory's representative, but then the feed elevator broke and the pistol was taken for repair. On its return, the left bolt handle broke on the 410th round and the right handle on the 817th, rendering the pistol *hors de combat* as it could no longer be charged. The pull-off was still too heavy, cases still ejected into the firer's face, recoil was still too severe and the weight was excessive. The cause of jamming was clearly localised to the sensitivity of the lockwork to residual finger pressure after the shot, which frequently resulted in premature release of the bolt. Gabbett-Fairfax attended this meeting of the Committee and produced a "smaller model of his pistol, having a .45 bore, and firing a 220 grain bullet at 950fs", in view of which the Committee deferred any recommendation pending receipt of his proposals for trials of this model.

Minute 719 of 2.2.02 reports Gabbett-Fairfax's response, in which, by letter to the DGO on 20 January 1902, he records the cost to himself of the experiments and production of the .450 trials weapons and ammunition as being in excess of £2,000 (over £140,000 today). He goes on to admit that "while I am anxious to provide an arm which shall in all respects conform to the requirements of your Department, I cannot undertake further experiments to that end at my personal expense." He went on to request a grant of £1,000 from Public Funds, but this was not forthcoming. Gabbett-Fairfax wrote again on 27 January suggesting that he gave "an exhibition of the shooting of the 'Mars' pistols" before the Committee and requested a written statement of the trials results and the deficiencies of his pistol. He also made a further request for funds and expressed his confidence that he could modify the pistol to meet the SAC demands.

The Committee invited Gabbett-Fairfax to give the suggested demonstration of the new small model, now designated the P P pattern, with the large .45 pistol as previously tested, before the Committee at Wormwood Scrubs on 16 February 1903, which he did with apparent success. He then submitted his quotation for supply of lots of 500 pistols on 2 March 1903. Minute 730 of the same date records, however: "The Committee cannot recommend compliance with Mr Gabbett-Fairfax's proposal for supply of 500 pistols, but are still pre-

pared to carry out further trials of his new P P pattern pistol, should he wish to submit it."

Time and money had, however, run out for Gabbett-Fairfax. Minute 745 of 30 March 1903 records the DGO requesting, somewhat testily for an official minute, a report from the President of the Committee, possibly as a result of Gabbett-Fairfax's promptings, as to the position regarding selection of an automatic pistol, as the question "has been under consideration for a very considerable time now".

The Committee duly produced its report, Minute 759, recording eight firing trials of the Mars pistol over the preceding two years (a reiteration of the Minutes as related above), with its trials of the Borchardt (Borchardt-Luger), Bergmann (solid breech bolt), Bergmann (split breech bolt), Mannlicher, Roth, Browning, Mauser, Andrews and Colt pistols on 4 May 1905, the day before Hugh Gabbett-Fairfax was declared bankrupt by Warwick Crown Court.

It cannot be said that the Committee, despite their seeming procrastination, did not give Gabbett-Fairfax every opportunity to impress them. The Report shows that only the Roth received more than one trial, having been before the Committee five times in various guises. In fact, the bulk of the Committee's time and efforts on the auto pistol question were devoted to the Mars. It singularly failed to perform, however, and no real effort was made by Gabbett-Fairfax to correct the persistent, and to some degree fundamental, design and performance faults of which the testers continually complained.

The Committee's summary of the Mars is fair and impartial in view of the problems experienced: "A very powerful pistol. Its accuracy, penetration, and no doubt its stopping power, are good. It is, however, complicated, in its present form, would be difficult to clean, and is heavy. A great deal of firing has been carried out with it. The mechanism did not always work well, and the recoil was complained of. Much difficulty was experienced in obtaining satisfactory ammunition, and this was no doubt often the cause of defective working of the mechanism. A lighter model than those reported on was recently fired in the Committee's presence at Wormwood Scrubs. The pistol worked well. The calibre and bullet are the same as in .45-inch pistols already tried, but barrel is shorter and the pistol lighter." However, the Committee's overall conclusion was that "auto-hand firing arms is relatively in its infancy" and "So far no pistol has been submitted which is satisfactory both in working and wounding power." The conclusion of the Committee's report was yet another specification of service requirements for an auto pistol, but it was by now impossible for Gabbett-Fairfax to involve himself further.

GABBETT-FAIRFAX AND THE MARS AUTOMATIC PISTOL SYNDICATE

The origins of Hugh William Maunsell Gabbett-Fairfax (Figure 30 is the only known photograph of him, but in later years) are a mystery. Although his death certificate of 1920 records his age then as 71 years, no corresponding record of his birth in or around 1849 exists in UK records. This indicates that he may have been born abroad of British parents, and the birth registered there, or he may even have been of foreign extraction. None the less, he described himself as a Civil Engineer throughout his patent career, which encompassed well over 100 patents in many fields of civil, mechanical and hydraulic engineering as well as firearms and ammunition.

He was resident in London during the 1895-98 period, patents recording 29A Gillingham Street, SW, and 107 Lambeth Palace Road, SE, during this period. The first Syndicate, as detailed above, was also London based, although it appears never

Figure 30: Hugh W Gabbett-Fairfax in later life.



Figure 31: 47 Portland Street, Leamington, today, then Gabbett-Fairfax's residence during the 1900 pistol development.



to have traded. He moved to Leamington in Warwickshire by early 1899, residing first at 47 Portland Street (Figure 31 shows this solidly prosperous property in a quiet side street in the town centre as it is today) and on to Weston Lodge, Leamington, before mid-1901. His abortive collaboration with Webley and the ready access to the manufacturing facilities of the then huge Birmingham sub-contract gun parts trade were undoubtedly instrumental in this removal to the Midlands.

It is apparent that he was financing all the development of the 1900 Model personally at this time, since he had arranged over 40 loans, mostly of £50 to £300, from friends, relatives and business associates from Leamington, Birmingham, Surrey and Newcastle by mid-1901. On 27 August 1901 Gabbett-Fairfax came to a formal agreement with his creditors by assigning all his then subsisting firearms patents worldwide, and future improvements, to James Cartland, who died in

1903, and Samuel Sanders, a company director of Temple Court, Birmingham, acting on behalf of a total of 48 lienholders who were owed an aggregate of £12,500. This is the period of the first submissions to the SAC, which were encouraging, and the development of the .45 cartridge and pistol for the first full trial in late 1901.

Gabbett-Fairfax then took another step into debt by giving further indentures over the patents to one Alexander Grey, Engineer, of Sharrow, Sutton, Surrey, for a total further advance of £2,500 on 14 and 18 March 1902, when the results of the first .45 trials by the Army and the Navy were not so encouraging. The final step towards penury was his sale of his plant and equipment in Aston, Birmingham, to Grey for £2,328 on 19 June 1902. Everything was now going wrong for him and the financial straits that he was evidently in during 1902 must go a long way towards explaining the increasingly desperate tone of his communications with the War Office in early 1903 and the apparent lack of clear thought in the modification and development of the pistols, which never properly addressed the SAC's complaints over this period.

Commercial sales were never developed either, as Gabbett-Fairfax seems to have concentrated his efforts solely on military acceptance. He did, however, make a presentation to the Press on 23 November 1901, which was reported at some length in *Arms & Explosives*⁵ in, as was usual, very complimentary terms, but concludes, as did most reports of Gabbett-Fairfax's demonstrations: "Unfortunately, Mr Gabbett-Fairfax was not able to give extended displays of the rapidity of fire possible with his pistol, owing to the fact that he had not received the expected supply of ammunition, and had very few cartridges available." He also produced a .360 calibre version, with 12" barrel and detachable stock, but again could not make a proper demonstration. The Army & Navy Co-operative Society catalogue for 1902 carried a brief announcement of the shortly forthcoming launch of the pistol, with calibres of .335", .360" and .450"; availability to be announced. It never was, nor were any prices published, and the entry was not carried forward to the next year.

In fact, it seems very doubtful, from examination of surviving Mars pistols whether any were ever sold commercially, since none bears any proof marks at all. Then as now, ever since the Proof Act of 1868, it has been a requirement at law that all firearms offered for sale in, or exported from, the UK bear valid proof marks. Given the vigour with which the Proof Houses have always upheld this requirement, prosecutions even on seeming technicalities being frequently reported in the contemporary press, it is inconceivable that Gabbett-Fairfax or the Mars Syndicate, located as they effectively were in the Birmingham Proof House's backyard, and being relatively well publicised also, could have sold their products, even in trifling



(Top) Figure 32: Serial number 57, in its English oak case. The pistol cannot be fitted with the magazine in the grip.

(Above) Figure 33: Serial number 39 with its leather 'attaché case'

numbers, without the wrath of the Proof Master falling upon them. It is entirely probable that some pistols were presented as gifts, which would also require proofing, but would not be so obvious a contravention as public sale, as several bear initials, usually stamped under the original finish, indicating factory application, either on the base of the grip (eg, serial number 39, so marked "TJS") or the bottom of the front grip strap (eg, number 43, marked "ES" in this manner). Some were also cased, and Figures 32 and 33 show pistols in a conventional English oak trade case, and in an unusual leather 'attaché case', accessed from the end, which has an internal fixed compartment for a carton of ammunition.

Eventually the principal creditors had had enough, and the emphatic rejection by the SAC after the second series of full trials in late 1902, with the seemingly endless procrastination and changing requirements of the War Office must have served to convince his backers that progress with Gabbett-Fairfax, in view of his failure to address the design changes required, was pointless. Accordingly, they petitioned for his bankruptcy in Warwick Crown Court, and he was so adjudicated on 5 May 1903. The SAC report issued the day before must have appeared as justification

for their action to the lien holders.

The scale of his personal debt and commitment to his idea is enormous; the aggregate indebtedness was £17,300, which in today's terms equates to over £1.2 million, of which Grey was owed the equivalent of over £330,000. The examination in bankruptcy was adjourned until 11 December 1903, when, after examination of his assets, the final liabilities totalled £6,500 (£455,000 today), against which remained assets of £210 (£14,700 today) for distribution to the creditors as dividend. Ironically, the announcement of this is carried on the same page of *Arms & Explosives*⁶ as the announcement of the formation of the Mars Automatic Pistol Syndicate Ltd, to continue exploitation of his patents.

Having removed Gabbett-Fairfax from the scene, the lienholders appointed from among their number Herbert Dugard, Wiredrawer, of Trinity Road, Handsworth, and Arthur Cooper, also a Wiredrawer, of Bradford Street, Birmingham, as their trustees, and together drew up an agreement on 16 November 1903 with Alexander Grey, as second and third mortgagor of the patents and Frank Impey, Chartered Accountant of 37 Newhall Street, Birmingham, acting for the proposed company, the Mars Automatic Pistol Syndicate Ltd, which was to exploit the patent assets.

The agreement casts a little retrospective light on Gabbett-Fairfax and his workings, as, following the apportionment of the 14,500 £1 shares, of which Alexander Grey took 2,000 in return for his interest in the patent rights and plant and machinery, the various assets are scheduled. The patents included most of Gabbett-Fairfax's UK firearms and ammunition

patents from 1896 to 1901, plus the Model 1900 pistol patents in the USA, Germany, France, Belgium, Italy, Spain, Austria, Hungary, Sweden, Denmark, Switzerland, Victoria (Australia), New South Wales and Canada. The cost of obtaining these patents must represent a considerable proportion of Gabbett-Fairfax's debts and have absorbed a high proportion of early Mars pistol production, as many of these authorities then still required a working model to be deposited with the patent application to show that the invention was workable.

The bulk of the plant and machinery was stored at Messrs Cooper (one of the lienholder trustees) and Goode's premises in Birmingham and comprised four bench vices, one grindstone, one Milwaukee mill and dividing head, two Reed lathes, one shaping machine, one sensitive drill, one power hacksaw, one Van Norman mill, 18 wooden pulleys, a cupboard and a bucket full of pistol tools, three cupboards full of ammunition, several small boxes of ammunition and bars of barrel steel. Stored at 70 Aston Lane with Mr C Brown was one set of drawers full of old drawings and pistol parts, while Mr Grey held, at Sutton, original tracings for pistol P18, 19, 20, 21 and P22, "these comprising the new drawings for the latest improvements to comply with the requirements of the War Office".

This inventory suggests that Gabbett-Fairfax did considerably more manufacture than has previously been believed, the number and type of machines and the number of vices and pulleys (standard practice then being to distribute power throughout a workshop by overhead shafting from a central power source driving pulleys for each machine) suggesting that he may have had half a dozen or more workers, plus the works manager referred to in SAC Minute 635 of 23.6.02. Which would have given him the capability to manufacture most of

Mars Automatic Pistol Syndicate Limited.

Registered Office:

37, Newhall Street,

Birmingham.

Figure 34: The letter head of the Mars Automatic Pistol Syndicate.

the pistol's parts himself, apart from obvious specialities such as rifling and possibly finishing, which would have readily been sub-contacted into the Birmingham trade as it then was. It seems fairly evident that the Mr C Brown referred to was the works manager, and that 70 Aston Lane may have been the factory address, as the same Clement Brown, who obviously designed the improvements, appears later as co-applicant with the Syndicate for the 1905 patent, but gives his address then as 154 Trinity Road, Aston.

The reference to the drawings held by Grey is interesting, especially in view of the comment that they embody the latest improvements to satisfy the War Office. They seem to be, from their numbering, drawings of pistols with corresponding serial numbers and would, if so, bear out other comments of Gabbett-Fairfax to the SAC which imply that he drew up each pistol and its modifications individually, which certainly also bears out observation of surviving pistols and their multitude of minor variations. However, if these drawing numbers are also serial numbers, they belong to early, unmodified 1900 model pistols, with the feed jam prone original lockwork of which the SAC testers complained consistently, so it is felt either that these must refer to piece parts, which is not the sense of the wording in the agreement schedule, or that the

Figure 35: 37 Newhall Street, today re-developed, but with period buildings to the right.



drawing and serial numbers did not coincide, which is not very logical, or they are alterations updating drawings originally made for these serial number pistols, which is possible, or that someone was not being entirely frank in the description applied in the schedule, which is very possible in the circumstances.

The Mars Automatic Pistol Syndicate Ltd (see Figure 34, their letterhead) was eventually incorporated on 18 December 1903, Registration Number 79484, with its registered address at Frank Impey's offices at 37 Newhall Street, Birmingham (Figure 35 shows the current appearance of the address, where modern offices have been built, but the buildings next door give a good idea of the style of the original offices). The initial directors were Samuel Sanders, mentioned previously as one of Gabbett-Fairfax's major backers; James Fairley, of 10 Shadwell Street, Birmingham, a Steelmaker; Alexander Grey, previously met as Gabbett-Fairfax's main backer; and John Hutchinson, of The Hirst, Leamington, a "Gentleman of no Occupation". Little extra capital was raised; the statutory returns for 1904 show that of the 14,500 Ordinary shares authorised, all had been issued as paid up to the lienholders in lieu of cash, and an additional 825 Preference shares of the 2,500 authorised, with a fixed cumulative dividend of 10 per cent, had been allocated, and 530 paid up in cash, by some of the more optimistic lienholders (now shareholders).

However, this additional capital was all spent on maintenance and development of patents, fees (mainly to Frank Impey) and setting up charges for the company — printing, Stamp Duty, registration fees, etc. By the final return of 10 December 1906, the Preference shares issued had risen to 1,037 paid up, with all shares distributed among 61 shareholders. There is no evidence of trading activity in this period, and obviously the company had become unviable, as a notice for voluntary winding up was presented by the Chairman, Samuel Sanders, on 12 April 1907 and registered on 1 May 1907. The assets were £2.10.5d on account with the London, City and Midland Bank, of which £1.3.6d was spent advertising the liquidation in the *London Gazette*, plus "Patents of no realisable value". Liabilities stood at £479.18.8d when the notice was served, but Frank Impey, in administering the last rites over the following year, secured their discharge either by sale of stock or by persuading creditors to write off these debts. The final meeting was held on 5 June 1908 and the Mars Automatic Pistol Syndicate and the Mars pistol story became history.

Gabbett-Fairfax lived on, presumably in relative penury, and moved back to London before the First War, living with his wife Eugenie at 1B Upper Gloucester Place, NW1. He patented no further inventions until, having presumably discharged his bankruptcy (which was not then a straightforward matter of waiting for automatic discharge after three years as today), a spate of inventions were patented shortly before his death after the First War, between December 1918 and September 1920. These relate to machine guns, gas and long recoil operated, feed belts, locking mechanisms and muzzle brakes, some being very obviously impractical and even more Heath Robinson than his early pistol designs. It is curious, given his earlier more widespread approach to engineering, that he should persist with automatic weapons design at a time when all weapons were the subject of general disapprobation and arms markets had contracted drastically. It is especially curious that he should so continue, given that he had recently lost a son in the War; 2nd Lt Thomas Oliver Gabbett-Fairfax, of 11 Bn., The Rifle Brigade died on 14 August 1917, at the age of 23, in the Ypres salient, and is remembered there on the Menin Gate. Gabbett-Fairfax died himself of chronic myocarditis on

6 November 1920, whilst staying on vacation at the Royal Hotel, Weymouth, with his daughter, R M Gabbett-Fairfax.

MARS AMMUNITION

Mars pistol ammunition has become a classic collector's cartridge over the years, due to its relative rarity, and the reputation attaching to their power. The range of calibres is shown in Figure 36, and all have very similar basic characteristics. The blunt, hemispherical nosed bullet, with double cannellure, is based on Gabbett-Fairfax's 1899 patent GBP4426/99 (Figure 37), which illustrates this style of bullet, but seeks to cover the slitting of the jacket and means of manufacture of the same from tubing. The Geneva convention of the same year, however, made this idea obsolete for military use, which was his objective for the Mars, but the shape and the double cannellure were retained for the solid nosed military trials ammunition. The very heavy bevelled crimp of the case mouth into the front cannellure of the bullet was much admired by critics of the day as making "a particularly neat joint", and the periphery of the primer pocket was also heavily peened over the copper primer annulus.

This robustness of design was adopted primarily to resist the probability of deformation of the cartridge due to the acknowledged violence of the feeding action, a ring crimp being adopted in the .45" ammunition to further prevent the bullet being forced back either in the magazine, as happened in trials, or during feeding. The experimental variant .45 Short cartridge without cannellure, shown in Figure 36, was designed to take this requirement to an extreme, as internally it has a step turned into the wall of the case upon which the bullet is seated, making telescoping totally impossible. The rim is highly



(Left) Figure 36: The Mars cartridges, top row, left to right: 8.5mm; .360/9mm, solid bullet; .360/9mm, hollow point bullet; .360/9mm nickel plated hollow point bullet dummy; bottom row: .45 Short, ring crimped; .45 Short, internally stepped case; .45 Long.

(Below) Figure 37: GBP 4426/1899 showing the double cannellure round nosed bullet retained, without slits, for the Mars ammunition.

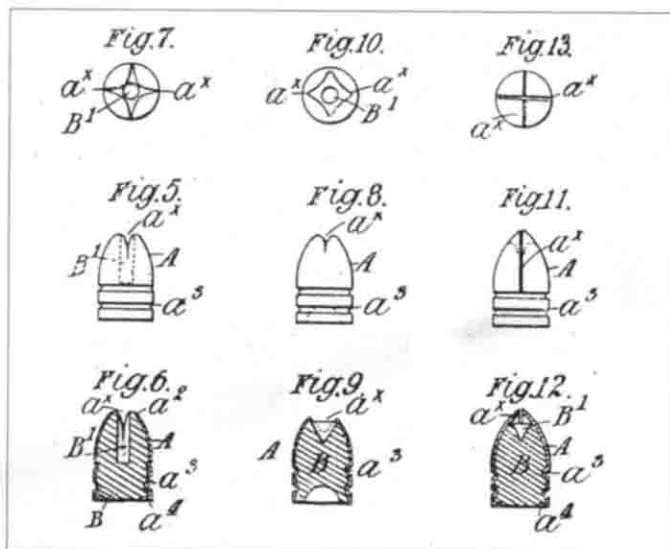


TABLE 1 — CONTEMPORARY BALLISTIC DATA FOR MARS AMMUNITION

Calibre	Powder	Charge Grains	Bullet Wt, Grns	Velocity fps	Source
8.5 mm	—	10	140	1750	A&E, 12/01
8.5mm(.330")	—	10	140 $\frac{1}{2}$	1750	A&E, 1/03
8.5 mm	Cordite	11.5	140	1550	"Kynoch"
8.5mm(.335")	Flake Cordite	10	150	—	SAC Minute 416
8.5 mm	—	—	139	1650	Pollard
8.5 mm	—	10	139	1748	Pollard (Wilson)
.360"	—	12	160	1640	A&E, 12/01
.354" (.360")	—	12	160	1640	A&E, 1/03
9 mm	Cordite	12	156	1400	"Kynoch"
9 mm (.354")	Flake Cordite	12	160	—	SAC Minute 416
.360"	Flake Cordite	12	156	—	SAC Minute 416
.35"	Cordite	10	155	—	SAC Minute 427
.36"	—	—	—	1470	SAC Minute 615
.360"	Ballistite	12	—	—	Eley Carton
9 mm	—	—	158	1640	Pollard
9 mm	Cordite	12 $\frac{1}{2}$	156	1600	Wilson
10 mm	Flake Cordite	12	175	—	SAC Minute 416
.45" Long	—	12	220	1250	A&E, 12/01
.45" (.440")	—	12 $\frac{1}{2}$	220	1250	A&E, 1/03
.45" Long	Pistol Cordite	11	220	1200	"Kynoch"
.45" Long	Cordite	10	220	1050	SAC Minute 441
.45" Long	Cordite	12	220	—	SAC Minute 450
.45" Long	Fine Cut Cordite	11.57	216	1137	SAC Minute 553
.45" Long	Nobel's Special Mars Pdr	—	—	—	SAC Minute 707
.45" Long	—	12.25	220	—	SAC Minute 587
.45" Long	—	—	—	1142	SAC Minute 615
.45" Long	Webley Cordite 1/0.05	9	220	957	SAC Minute 635
.45" Long	Webley Cordite 1/0.05	8	220	833	SAC Minute 635
.45" Long	Webley Cordite 1/0.05	7	220	753	SAC Minute 635
.45" Long	—	—	219	1211	Pollard
.45" Long	Cordite	12 $\frac{1}{2}$	222	1222	Wilson
.45" Short	—	9	220	850/950	SAC Minute 759
.45" Short	Ballistite	9 $\frac{1}{2}$	220	—	Wilson
.45" Short	Ballistite	8	220	—	Eley Carton
.47" (.472")	—	—	250/260	1000	SAC Minute 427

characteristic, being very thin for all calibres. The turning of the extractor groove is also usually uneven, the forward edge in particular exhibiting considerable axial deviation and presenting an angled appearance, which is probably the result of small batches being hand turned by the maker rather than going to the expense of setting up an automatic machine for the purpose.

Various contemporary references, primarily the SAC Minutes, give the propellant a variety of descriptions: cordite, flake cordite (presumably chopped disc cordite), finely cut cordite, Webley Cordite 1/0.05 and Nobel's special "Mars" powder. The two Eley cartons illustrated in Figure 38 probably identify Nobel's 'special "Mars" powder' as Nobel's 'Ballistite' shot-gun powder. References also vary widely in their reporting of the charge weight and ballistics of these cartridges, which is hardly surprising given their experimental nature and the efforts made to reduce recoil of the .45 Long cartridge. Table 1 gives a compilation of these contemporary sources. It is felt that the SAC Minutes probably give the most accurate data, although these are subject to frequent misprints, reflecting the apparent haste with which they were typeset and printed in the days before photocopying. The *Arms & Explosives* data should be viewed with some suspicion, as it is based on Gabbett-Fairfax's claims, rather than independent testing. Pollard's ⁷ data is similarly a re-quoting of earlier references and appears to contain misprints as well (the 8.5mm velocity of 1,660fps (printed as 503m/sec in the first edition) is at variance with all other sources and was corrected, according to Wilson ⁸, to 533m/sec (1,748fps).

Wilson himself, writing in about 1934/5, quotes some ballistics that he was given by ICI from old Kynoch records, with the statement that they refer to Kynoch's first firing of Mars ammunition in March 1899. Regrettably, this is also dubious, as it includes data on the .45 Long cartridge, which Gabbett-Fairfax's own correspondence in SAC Minutes shows not to have been in the Mars range when he made his first presentation to the Committee on 11 Mar 1901 and only to have been considered for development following the Committee's request on 25 March 1901 in response to his offer of a .47 calibre. The associated statements that the quoted Kynoch ballistics and the ammunition in Wilson's possession at that time were cartridges of Kynoch manufacture are similarly doubtful, as he identifies the .45 Short cartridges that he had as being loaded with Ballistite, which appears to have been used exclusively by Eley at the time (for shot-gun as well as various pistol cartridges). Kynoch was a smokeless powder manufacturer in its own right and did not use Nobel's powders, but favoured cordite exclusively for smokeless pistol ammunition of all types at this time. Kynoch undoubtedly tested the Mars and its

ammunition and had several Mars pistols in its reference collection until the 1960s (identified by vandalistically electro-pencilled or scratched inventory numbers — see Figures 16a & 22a; pistol number 39 also bears Eley EB/Shield Trade Mark stamps, showing it to have been in its reference collection, presumably before the Explosive Trades merger in 1918). Nothing else but Wilson's comments suggests that the cartridges tested were of Kynoch manufacture, however, and since all other evidence points to Eley being the sole manufacturer, his comments must be doubted. Further evidence that Kynoch had nothing to do with the manufacture of Mars ammunition lies in the report of the introduction of the Mars pistol in *The Kynoch Journal*⁹ of 1901, evidently reporting the same public exposition to the press as *Arms & Explosives*⁵. This reports the ballistics (which are identical to those quoted in *Arms & Explosives*, referred to as A&E, 12/01 in Table 1) "given officially by the syndicate who have undertaken exploitation of the pistol", which, as Kynoch's house journal, it would hardly do if Kynoch had developed and manufactured the ammunition; the *Journal*'s usual style of reporting Kynoch developments was positively eulogistic. This report goes on to question the figures in quite derogatory terms: "These figures, especially in the large calibre, seem to us to be abnormally high, and unless the pistol possesses a practically unlimited capacity for absorbing recoil, we should be inclined to think they are somewhat exaggerated. We shall see." Knocking copy as pointed as this is would hardly have been the publicity department's house style for Kynoch's own products! The report also mentions the detachable stock and the possibility of fitting barrels up to two feet in length and a bayonet.

It is contradictory to state that this is puzzling, but it is, since Gabbett-Fairfax's works in Aston Lane were literally a stone's throw from Kynoch's Lion Works in adjacent Witton, and Eley's works were of course in London. It is possible that Kynoch did participate in the earliest .36" cartridge experiments c1898/9 during the abortive Webley collaboration, since there were close local ties between Webley's and Kynoch in Birmingham. However, when this relationship was severed, Gabbett-Fairfax may quite understandably have felt more comfortable with Kynoch's competitor, believing that Eley's were less likely to feed back information on his developments to Webley's, who were themselves both promoting the Webley-Fosbery in competition with Gabbett-Fairfax and continuing to consider self loaders using Whiting's ideas at this time. Wilson, however, was probably one of the last people to fire a Mars pistol with original ammunition and certainly the last to chronograph it, as he did in the 1930s, and his results, albeit with 30-year-old ammunition, must be regarded as reliable.

Chronologically, the first design developed was the .36, first used in the Model 1898 Webley made prototype. The 8.5mm was introduced near the beginning of the 1900 Patent Models, but was only tried militarily in France. The .45 Long was developed specifically for the SAC trials in mid-1901 and the .45 Short was developed in early 1903 for the smaller P P pattern pistol, of which very few were made, which explains their being the rarest of the range.

The SAC Minutes give tantalising details of numerous variants, particularly the first submission by Gabbett-Fairfax and Col Johnson which lists a 10mm or .394" calibre version of the pistol firing a 175 grain bullet propelled by 12 grains of flake cordite. No cartridge nor pistol is known that might meet this calibre specification and it is a distinct possibility that this is nothing but kite flying by Gabbett-Fairfax. The same listing of "standard models" of Mars pistols also differentiates between a 9mm or .354" calibre cartridge with 160 grain bullet, and the

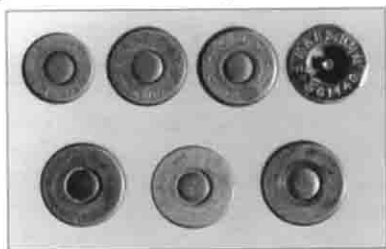


Figure 38: Eley cartons for Mars ammunition. The .360 style pre-dates the lower carton, and is typical of hand printed calibre/load data on limited run Eley production around 1900. The lower carton is fully letterpress printed for the .450 Long cartridge, but hand over-printed for the Short cartridge, and with the load data.

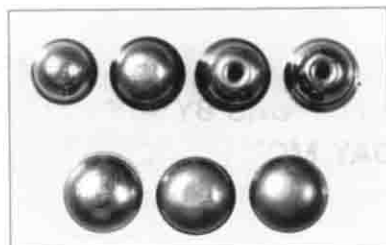
.360", with 156 grain bullet. This differentiation is also quite probably spurious, as known cartridges with 9mm headstamps, in fact, are loaded with .360" dia bullets weighing 160 grains, and the chambers and bores of pistols marked ".360" are dimensioned to accept such 9mm marked (actually .360") ammunition. It is believed that this apparent differentiation lies solely in the differing imperial and metric nomenclature of the same cartridge, as applied for marketing purposes to the various markets into which Gabbett-Fairfax hoped to sell. Minute 427 refers to Gabbett-Fairfax's offer to produce a pistol in .47" (later referred to as .472") calibre, but later Minutes show that he did not proceed with this proposal, concentrating instead on the .45".

The SAC minutes do give brief details, however, of other variants that must have actually existed, such as the "special thin envelope" .360" cartridges tested for reduced penetration against standard cartridges as reported in Minute 615. These may simply, however, have had the noses ground to thin the jackets from the exterior as an experimental expedient. A special series of reduced load .45 cartridges were tested as detailed in minute 635, with 9, 8 and 7 grains of cordite, but it would presumably be impossible to distinguish these from the regular 12 grain load without disassembly.

The manufacturer of the ammunition must stand indicted as a major contributor to Gabbett-Fairfax's failure, as virtually every report of tests contains criticism of the ammunition, ranging from inadequate loads via deep set caps causing misfires to telescoping of bullets into cases, splits at cannelures or simple failure to supply sufficient cartridges at the required time (which could equally be Gabbett-Fairfax's fault). The manufacturer is identified in Reference 5, the report of Gabbett-Fairfax's press demonstration in November 1901 as being Eley for all three calibres demonstrated (8.5mm, .360 and .45 Long). The only maker identified by headstamp is also Eley, as seen in Figure 39, this uncommon ELEY LONDON headstamp being particularly associated with the hollow-point bullet (shown in Figure 40). Also shown is a .360 dummy cartridge, nickel plated overall, loaded with the same bullet, but in the common type of .360/9mm case which bears only the registered design number for the ammunition and the calibre, no makers mark. This tends to identify all such cases as being of Eley manufacture, as well as the 8.5 mm, all known examples of which bear the same style of headstamp with registered number and calibre only. All known .45 ammunition, Long and Short cased, however, is unheadstamped, but its manufacturing characteristics, and the references in SAC Minutes to these being loaded with Nobel powder, as described above, make it unlikely that anyone other than Eley Bros can be



(Top) Figure 39: Mars cartridge headstamps, laid out as Figure 36. Note the similarity of the primer peening on all cases, indicative of common manufacture.



(Bottom) Figure 40: Mars bullet points, laid out as Figures 36 and 39, showing the .360 hollow points used with the ELEY LONDON headstamp and the dummy with the Registered Design number.



Figure 41: The Hamal prototype, per GB Patent 23790/1901, which is the only other pistol design known chambered for a Mars cartridge.

blamed for the poor performance of the ammunition during the numerous trials.

THE HAMAL MYSTERY

Previous writers have maintained that no other weapon was ever chambered for the Mars cartridges. However, Figure 41 shows the Hamal pistol prototype, which is made for the .360" Mars cartridge, the only other pistol known to be so chambered. Little is known of Monsieur V Hamal, a Belgian, who was granted British Patent 23790 of 1901 for this pistol design. It is a short recoil turning bolt locked design, which, perhaps thankfully, was never finished off (it is possibly a patent model, as it is totally unmarked) since the locking handle engagement is minimal, and would surely not have withstood the recoil forces developed by the Mars cartridge. Curiously, this pistol was photographed on the same negative as the Mars prototype (Figure 12a/b) during the 1960s, while both were in the Webley collection.

A second model Hamal also exists, using the same patent locking principle, but with the magazine more conventionally located in the butt. This is serial numbered one and marked 'Fabrique d'Armes Automatiques', but is chambered for the Webley .455" Auto Pistol cartridge. Evidently there was a connection between M Hamal and Webley's, but regrettably no details of this are known.

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- ⁴ Small Arms Committee Minutes, War Office Papers
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- ⁷ *Automatic Pistols*, Capt H B C Pollard, Pitman, London, 1920; Appendices
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- ⁹ *The Kynoch Journal*, The Kynoch Press, Vol 3 No 1; p37

ACKNOWLEDGEMENTS

Copyright of Figures 9, 10, 12 & 30 belongs to Birmingham Museums and Art Gallery; my thanks to the Keeper and staff of the Birmingham Museum of Science & Industry for their assistance. Small Arms Committee Minutes are preserved at the MoD QAD(W) Pattern Room, Nottingham; my thanks to the staff for permission to consult these.