THE FORSYTH PERCUSSION SYSTEM

By Clay P. Bedford

CLAY P. BEDFORD

Welcome to amateur night at the Arms Society. When I see Harry Knode, Red Jackson, Bob Abels, and many, many other long-time collectors -- all experts and all most knowledgeable people in the field of gun collecting -- I cannot help but feel that this is really amateur night when I get up to make a talk. I feel a little bit like the story of Nelson when the 50 ships came over the horizon; but I am sure you are more interested in Forsyth than you are in my stories.

In my talk this evening I am going to follow the article which was published in the September issue of "GUNS" magazine in regard to Forsyth fakes, but I will add some additional material. Incidentally, "GUNS" magazine was delinquent in not stating that the article was written by Clay Bedford AND Jim Serven. Jim was very kind in aiding me to assemble the information in readable form, which he has such a great ability to do.

"The only man in the world in whose honor a salute was fired every day in the year." Such was the tribute paid to the Reverend Alexander John Forsyth by the president of the National Rifle Association of Great Britain in 1930, explaining that every time the sportsman or the soldier fired his gun, he unconsciously paid tribute to the modest Scottish minister who invented the percussion lock. Forsyth gunlocks, employing a loose detonating compound, were the big initial step from the old sparking flintlocks to the cap lock in its best-known form. Further, his invention of a detonating compound opened the way to the development of primers such as are used in today's cartridges. This was quite a history-making accomplishment for the young Presbyterian minister of Belhelvie Parish, a short distance north of Aberdeen. And it was accomplished in a field with which a minister (whose father and maternal grandfather were both men of the cloth) might not be thought to show a dedicated interest. But, in addition to his pastoral duties, Alexander Forsyth, M. A., L. L. D., had a great interest in mechanics and chemistry; he loved to hunt the wild fowl which were to be found in the lochs and marshes near the manse where he lived. He had what the parishoners called a "Smiddy" (smithy) in his garden where he conducted chemical and mechanical experiments.

It is not the purpose here to recite extensive events of the Reverend Alexander Forsyth's life or detail his endeavors. This will be capably done in a forthcoming book by the noted English arms experts, W. Keith Neal, an American Arms Society member, and David H. L. Back, authors of "THE MANTONS - GUN-MAKERS" and other respected works. We shall deal here primarily with the development of Forsyth's gunlock and shall endeavor not only to acquaint you with an outline of this great step in firearms evolution but also to provide information which will aid in identifying the many forgeries of Forsyth locks which, from the 1920s, have been offered to unsuspecting dealers and collectors at high prices.

As has been noted in several treatises of the period, Samuel Pepys, in his diary for 11th November 1663, noted that a grain of fulminate of gold "will give a blow like a musquett." In the late 1700s Claude Berthollet, a French chemist, experimented with fulminates of silver and potassium chlorate; and in England, Edward Howard extracted for the first time a working compound of fulminating mercury. Both of these were trying to find a substitute for gunpowder, and both came to the conclusion that the fulminates were too unstable and violent to be used in a gun. Somewhere around 1800, the Reverend Alexander John Forsyth, the Minister of Belhelvie in Aberdeenshire, had read the reports of these discoveries and began experiments to see whether the new fulminating powders could be used, not in the place of gunpowder, but as an agent to set it off. To make this a practical proposition, he had also to devise a mechanism in which the fulminate could be stored safely but be detonated when required.

In 1805, then 37 years old, Forsyth produced his first successful percussion lock, using a chemical compound on which he had spent many long hours in experiment. Early the next year he took his novel gunlock down to London where it came to the notice of Lord Moira, Master-General of Ordnance. Lord Moira was impressed, and arrangements were made by which Dr. Forsyth might obtain a leave of absence from his parish. He was given quarters in the Tower of London workshops and proceeded to the task of perfecting his gunlock.

Reprinted from the American Society of Arms Collectors Bulletin 19:4-13
Additional articles available at http://americansocietyofarmscollectors.org/resources/articles/

As with any drastic firearms innovation of those days, workmen were prejudiced and not especially cooperative. The attitude generally was that, "the flintlock has been a good gun for 200 years and is good enough for me." The detonating compounds were sensitive and of varying, dangerous strength; few persons liked to work with them. Despite these difficulties, Forsyth made fair progress. Lord Moira was succeeded by the Earl of Chatham as Master-General of Ordnance. A champion of the flintlock, the Earl of Chatham ordered Forsyth to remove his "rubbish" forthwith from the Tower of London.

Although Forsyth's dismissal was seemingly very discourteous, freedom from official ties favored Forsyth's fortunes. In April, 1807, he was granted a very broad patent on his invention. Forsyth's chief claims to novelty were that he closed the firing vent to damp and the open air, prevented escape of explosibe gas outward and, by a new system of creating the ignition with a fulminate rather than loose powder and flint, contained the fire and sent it directly to the main charge without waste into the air. What this meant is that a shooter, no longer limited by the fire of a burning wick as in the primitive matchlock or flying sparks as in the wheel lock or flintlock, now had sure and instantaneous ignition response from the simple blow of a hammer -- from percussion.

Obtaining sufficient financial support and an excellent group of workmen under the master gunmaker James Purdey, Forsyth established a gunmaking firm under the name Forsyth & Co., an event recorded in the December 23, 1808, issue of London's "MORNING POST" in this manner: "To Sportsmen, The Patent Gunlock invented by Mr. Forsythe (sic) is to be had at No. 10 Piccadilly, near Haymarket. Those who may be unacquainted with the excellence of this invention are informed that the inflammation is produced without the assistance of flint, and is much more rapid than in the common way. The Lock is so constructed as to render it completely impervious to water, or damp of any kind, and may in fact be fired under water."

Several lock styles were produced on the Forsyth premises at 10 Piccadilly and at 8 Leicester Street where the business was moved about 1817 (various sources give the address change as 1817, 1818, 1819). Not only were these arms of original designs but the quality of workmanship was superb. Our major concern here is with the novel Forsyth lock designed to employ a rotating magazine of flask-like shape resembling a scent-bottle -- and thus it has come to be known as "The Forsyth Scent-bottle Lock." This is the rather glamorous mechanism which, because of its historic interest and relatively high value, became the target of an English mechanic who proceeded to go into the business of antique gun forgery about 1925.

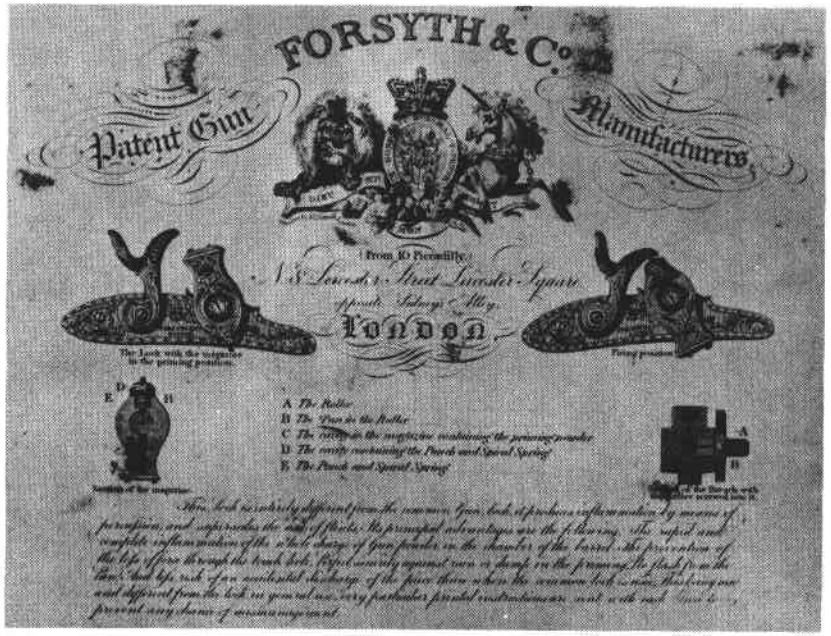
No present advantage could be had by naming this ambitious entrepreneur, although his true name is well known to some of the older English collectors. For our purposes here, and to save embarrassment to innocent persons of the same name, we shall use the fictitious name John Swindel.

A young English gentleman inherited from his father, a gunmaker, a collection of antique weapons in which there was a genuine Forsyth scent-bottle ignition pistol. This collection was purchased by Bannerman in New York. When Bannerman received this piece, it excited such interest and was given such a high value by collectors that Bannerman immediately contacted the young Englishman to determine if any more of the Forsyth scent-bottle ignition weapons were available. The young Englishman had visions of a better life and, with an English gunmaker named Swindel, began the manufacture of scent bottle arms for collectors. Swindel soon got his enterprise under way on a large scale. An English collector who chanced into his shop spied a poorly-concealed keg of scent-bottle castings just delivered. Either by obtaining the original plate or by having a copy made, Swindel reproduced Forsyth's original label, thus giving to cased arms an additional appearance of genuineness.

Unlike replicas of today, which are usually new throughout, Swindel did not have a major manufacturing problem. He could take genuinely old flintlocks, for the most part made by Forsyth, and convert them back to the scent-bottle type of ignition. It was then a simple matter to have Forsyth & Co. Patent inlaid in gold on the top of the barrel of the gun or pistol. The fact that Forsyth & Co. themselves had, upon request, converted many arms to their patented new percussion system made Swindel's job simpler and gave him greater confidence in the production of his forgeries. It is apparent that he did fool a lot of people, for in a modest amount of research at least 20 of these fake Forsyths are known to us. Not all of these fake Forsyths are scent bottle, although no slide action Forsyths -- the second type of percussion ignition developed by Forsyth -- seem to have been made. As illustrated in Winant's "EARLY PERCUSSION FIREARMS" other fakes were made.

After developing the scent-bottle ignition, Forsyth developed a slide-action ignition, still using the percussion principle, with small grains or pellets of fulminate of mercury mixed with black powder. Out of a total of 4,000 genuine Forsyth & Co. arms produced, slide action numbers begin at about #1500, and a total of approximately 500 were made.

While the London gunmakers began to make Forsyth's lock under license, many devoted themselves to the task of designing a perfected percussion lock. Some kept to the original powder magazine idea. Others became more complicated, and the more complicated they became, the more they suffered from mechanical failures. The simplest of the early percussion locks was the tube lock. In this a small copper tube contain-



FORSYTH & CO. LABEL USED IN CASED SETS.

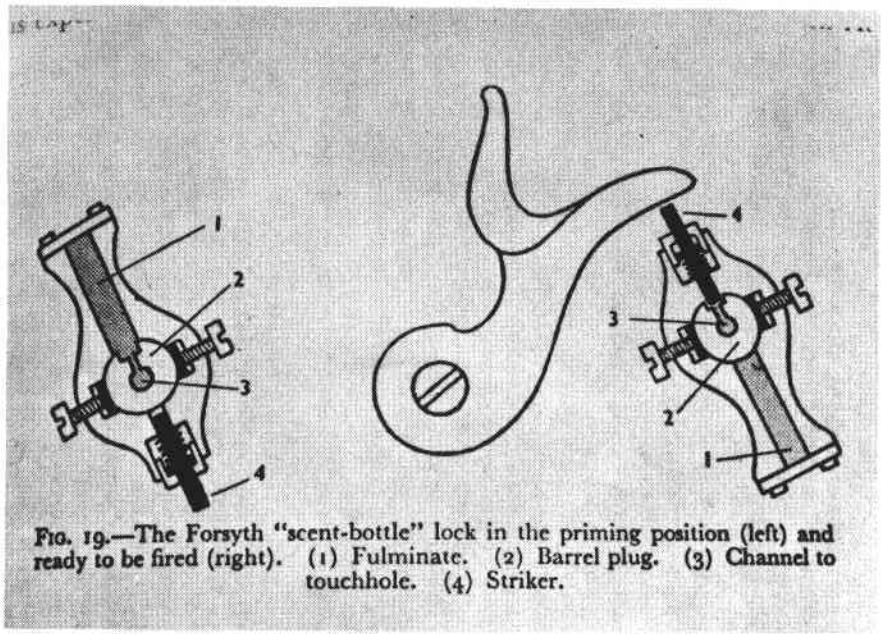
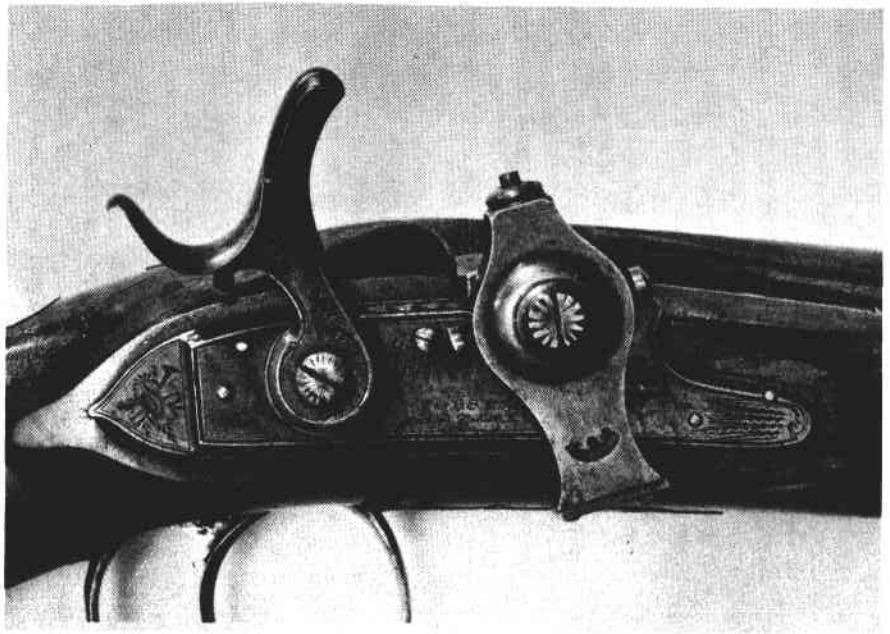
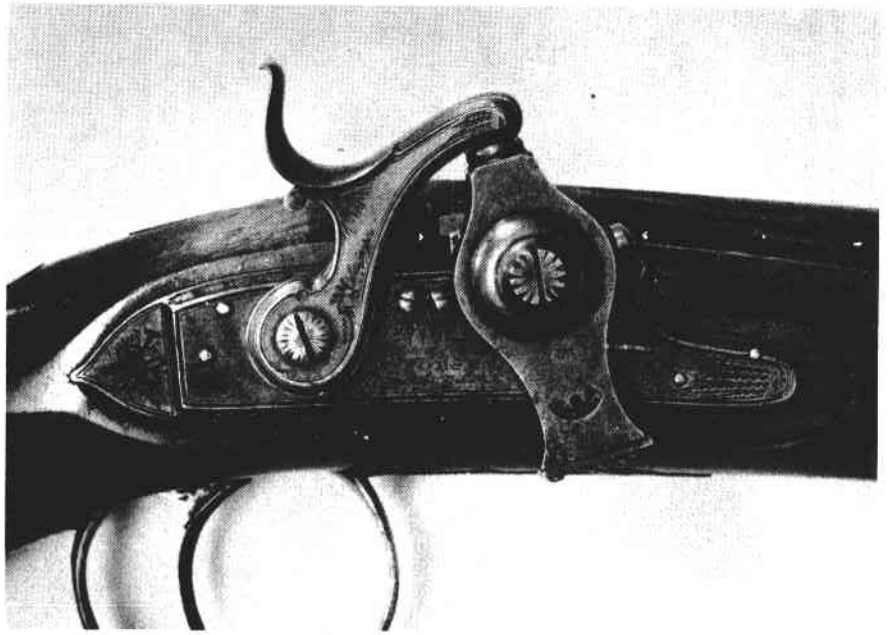


FIG. 19.—The Forsyth "scent-bottle" lock in the priming position (left) and ready to be fired (right). (1) Fulminate. (2) Barrel plug. (3) Channel to touchhole. (4) Striker.

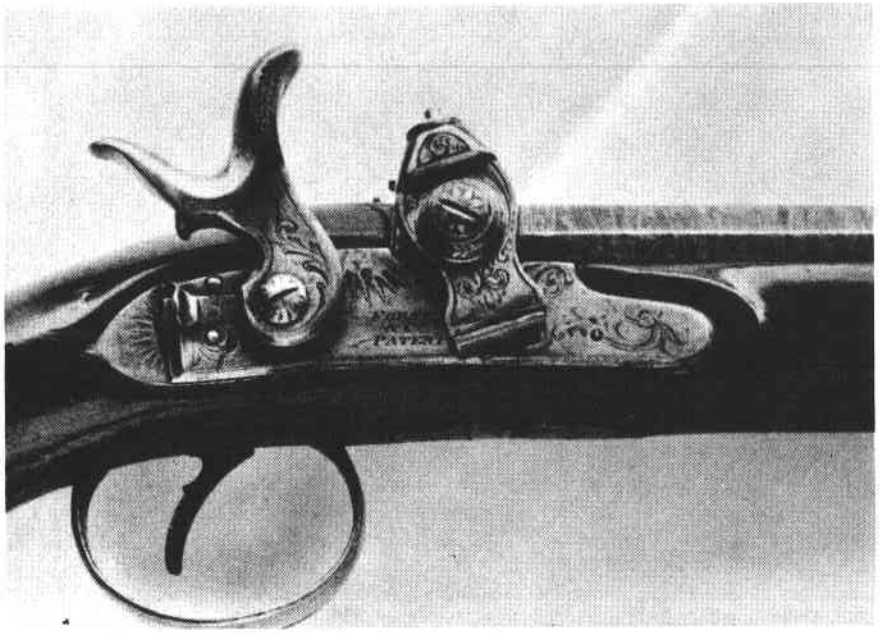
DRAWING OF THE FORSYTH "SCENT BOTTLE" LOCK



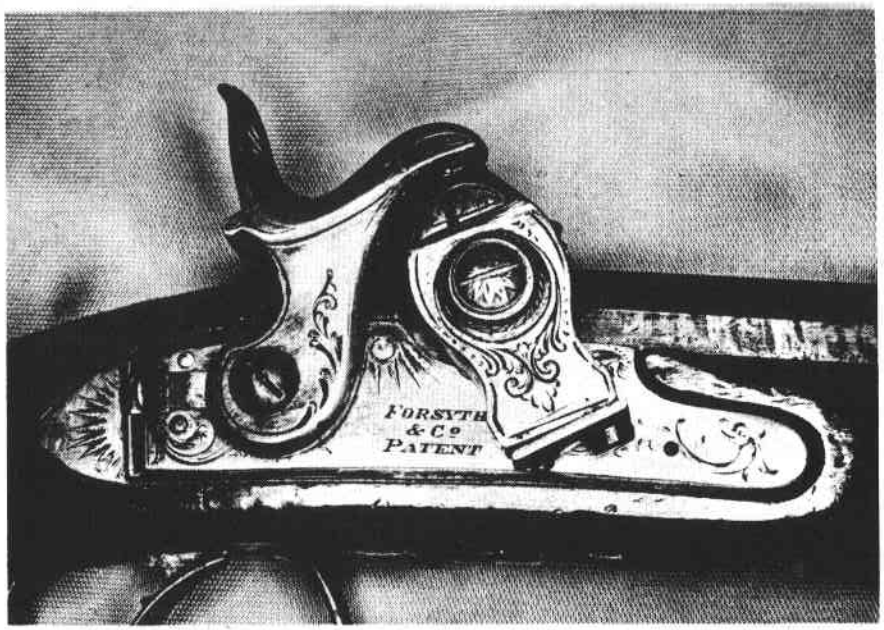
GENUINE PISTOL #203, HAMMER AT FULL COCK. NOTE SCREWS ON EACH SIDE TO TIGHTEN CORK INSERTS AGAINST SHAFT PREVENTING DETONATION FLASH FIRING FULMINATE IN MAGAZINE.



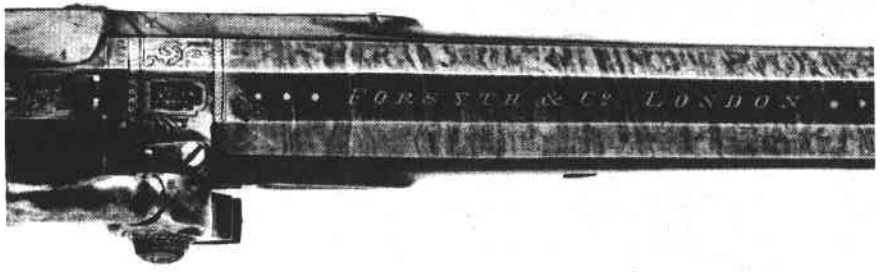
SCENT BOTTLE PISTOL #203 IN FIRED POSITION.



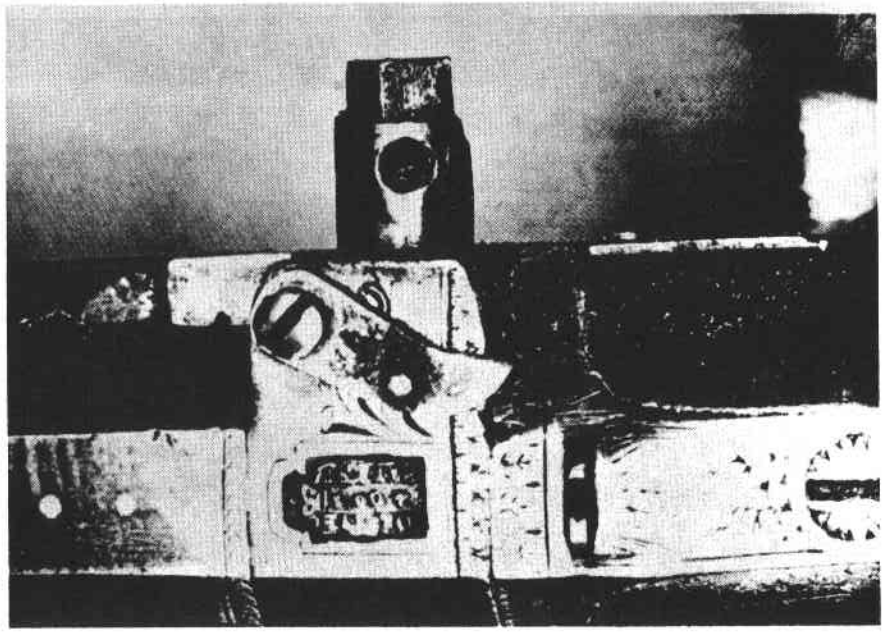
THIS PHONEY "SWINDEL'S" PISTOL ILLUSTRATES THE LACK OF QUALITY IN ALL HIS WORK. POOR ENGRAVING, NO POSITION KEEPER AND NO "PATENT" AND F ON SCENT BOTTLE.



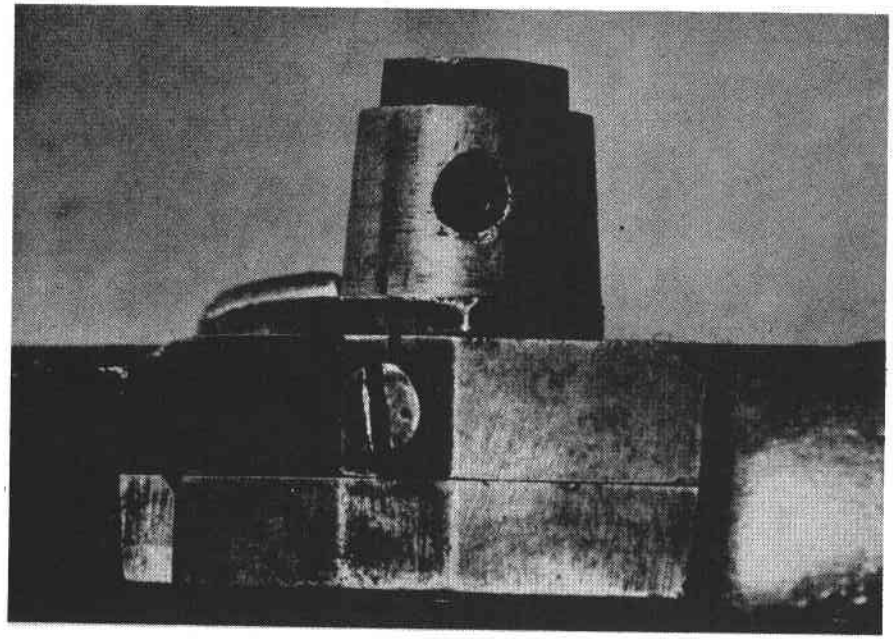
SAME "SWINDEL" PISTOL IN FIRED POSITION, NOTE BAD FIT ON BOTTOM COVER.



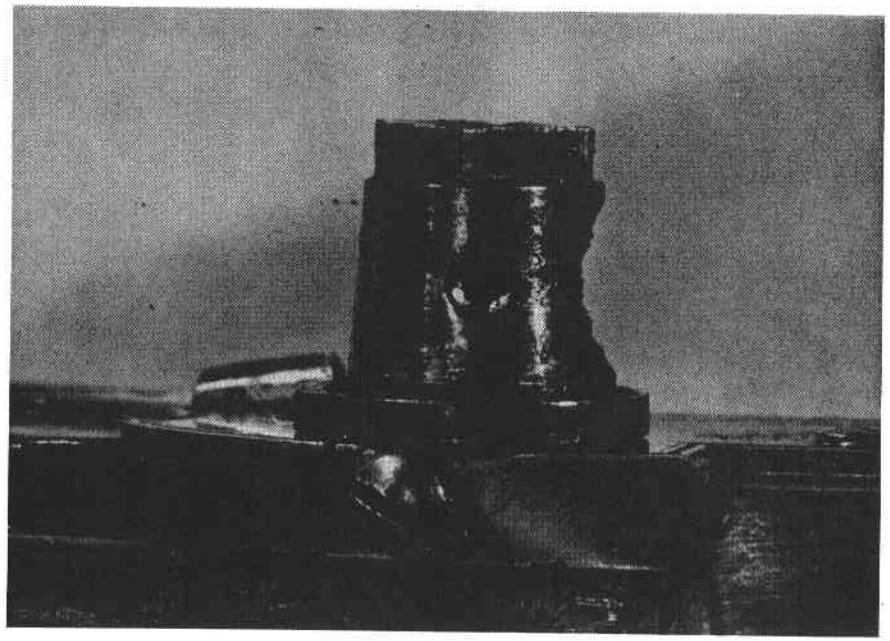
GOLD INLAY BARREL MARKINGS ON THE "SWINDEL" PISTOL, LOOKS RATHER GOOD.



INCORRECT STRAIGHT SHAFT ON "SWINDEL" PISTOL. FORSYTHE USED TAPERED SHAFT ASSURING CLOSE FIT TO PREVENT PRIMER FLASH FROM REACHING MAGAZINE. THE CATCH TO HOLD SCENT BOTTLE IN POSITION IS COMPLETELY WRONG.

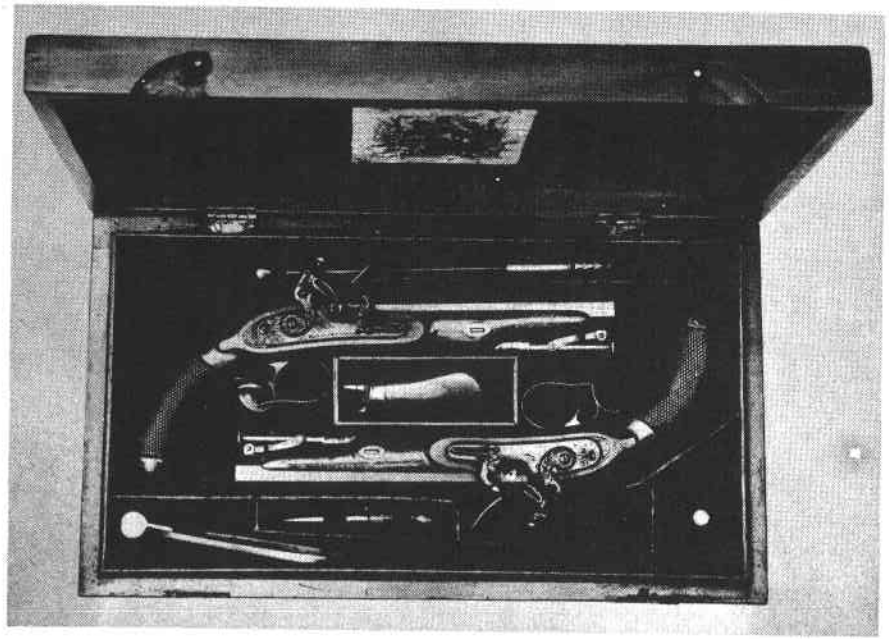


A CORRECT FORSYTH TAPERED SHAFT FOR SCENT BOTTLE. ON DEMONSTRATOR #62. THIS ONE IS SLEEVED WITH PLATINUM TO PERMIT A TIGHTER SEAL AND REDUCE CORROSION.



CORRECT TAPERED SHAFT ON PISTOL #203 IN ADDITION TO THE POCKET FOR DEPOSIT AND DETONATION OF FULMINATE ON TOP OF SHAFT NOTE ROUGHENED RECESS ON SIDE OF SHAFT PRESUMABLY TO CLEAN FIRING PIN AS BOTTLE IS ROTATED FOR RECHARGING THE FIRING POCKET.

CASED PAIR OF FORSYTH "SLIDE ACTION" PISTOLS WITH ACCESSORIES.



FORSYTH MADE FIREARMS WITH OTHER TYPES OF IGNITION SYSTEMS. SHOWN IS AN ORIGINAL CASED PAIR OF VERY RARE FLINTLOCK PISTOLS.

ing fulminate was partly inserted into the touch-hole, and the uncovered end crushed by the hammer. The snag here was that the tubes were dangerous to handle and were sometimes blown out of the touch-hole.

All these experiments were conducted in the face of legal actions, which Forsyth brought successfully against gunsmiths whom he claimed had infringed his patent. Joseph Manton was one of his victims, but managed to continue his work. He patented a pellet lock in 1816, a tube lock in 1818, and in 1834 nearly persuaded the Ordnance to adopt another lock using wooden plugs filled with detonating powder. A most ingenious lock was invented by Baron Heurteloup, the distinguished French urologist, which employed a long strip of soft metal containing priming that was fed automatically into position when the lock was cocked. When the hammer fell, a small piece was cut off and detonated, this action giving the lock its name of Koptiteur.

The percussion device which was finally adopted in nearly every country was a copper cap in the shape of a hat, with a small portion of fulminate in its crown. This was placed on an iron nipple which was screwed into the breech and acted as both anvil and flash channel. There are many claimants to the invention of the percussion cap, and Joseph Egg went so far as to print trade labels which bore the words "Inventor of the Copper Cap." Nevertheless, his first percussion patent, dated 26th November 1822, related to a tubular magazine for percussion powder. A slightly earlier patent, No. 4648 of 12th February, 1822, by Sampson Davis, a combined percussion and flintlock, while incorporating a nipple, also does not mention a cap. The action depended on "a cavity under the jaw of the cock falling on the top of the nipple, which is primed with the percussion powder." The first British patent to mention a copper percussion cap was that of John Day of Barnstaple (No. 4861 dated 12 - 11 - 1823). The only safe conclusion that can be drawn is that sometime after 1815 experiments were made with percussion caps but that they did not immediately oust other forms of primings. In fact, it is doubtful whether they achieved much popularity before 1824.

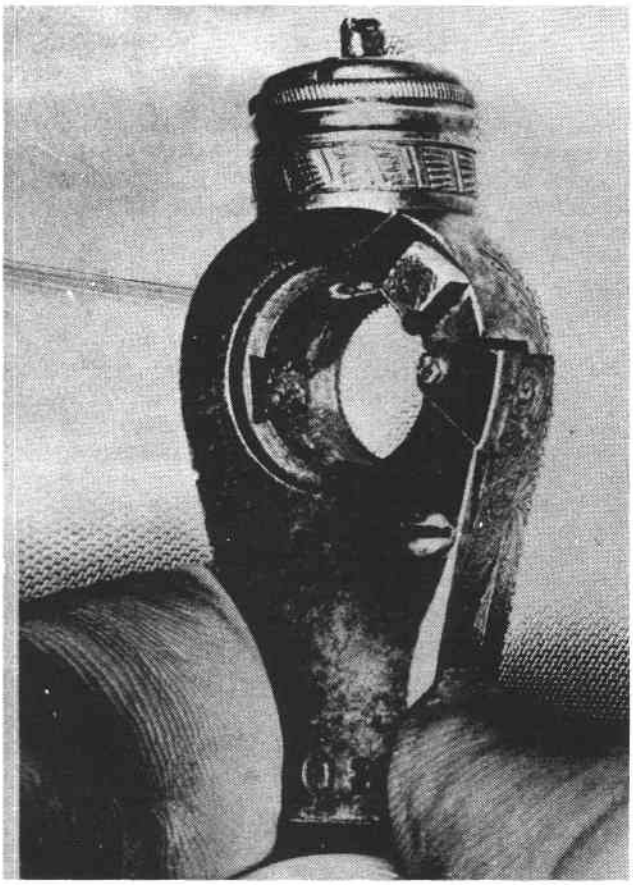
The reason for this lay in the choice of fulminate. We have seen that Howard first successfully produced fulminate of mercury in 1799 and that Forsyth invented a lock which would detonate any of the known fulminating powders. Forsyth seems to have favoured a mixture containing chlorate of potash, which had a strong corrosive action. The problem of properly applying fulminate of mercury, which did not have this effect on copper caps, does not seem to have been solved until 1823. On 18th September, E. Goode Wright of Hereford wrote a letter to the Editor of "THE PHILOSOPHICAL MAGAZINE" (Vol. LXII, p. 203) describing how he had successfully made copper caps with this type of priming (he coated the powder with gum benzoin).

The value of his discovery was acknowledged by Shaw in America in a letter to the "FRANKLIN JOURNAL" of 1829, and there is little doubt that it was to this new discovery that the Franklin Institute report of 1824 referred when it excused Shaw's use of corrosive fulminate with the words: "It has been the only vehicle in use till within some few months when a new discovery was made of a metallic preparation perfectly neutral." The process was teken over and brought to a manufacturing stage by the London chemist, Frederick Joyce. Col. Hawker in the third edition of his "INSTRUCTIONS TO YOUNG SPORTSMEN," 1824, p. 469, wrote: "Since the first part of this work was printed off, a letter has been received from Mr. Joyce, chemist, 11 Old Compton Street, Soho, commenting, as he is fully justified in doing, on the injury to firearms by the oxymuriate of potash; and inclosing a specification of a new 'Anti-corrosive percussion powder'." Joyce appears in the London Directories as an "Operative Chemist" from 1823-27, but from 1828 becomes F. & E. Joyce, Percussion Powder Manufacturers. Later Joyce described himself as "Inventor and sole manufacturer of the anti-corrosive gun cap."

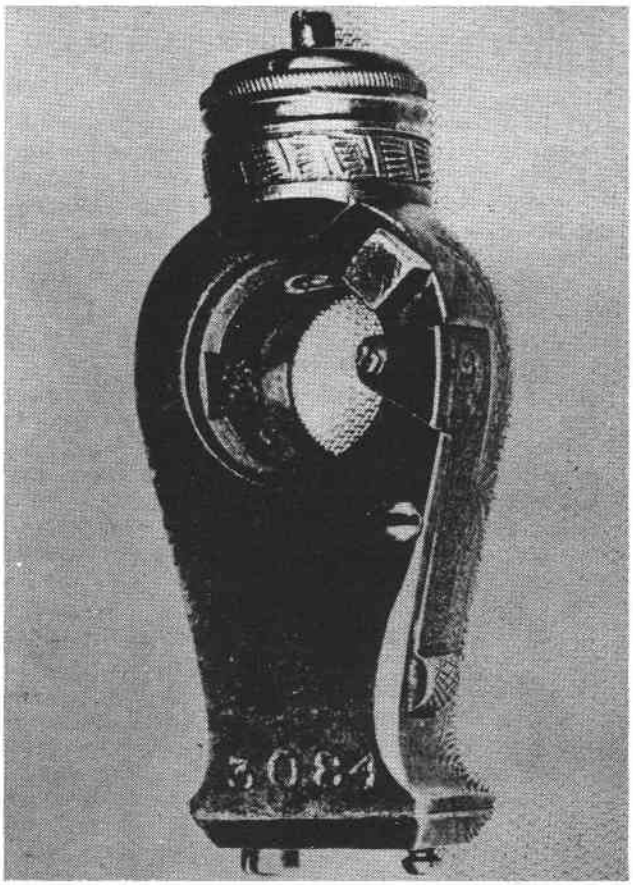
The early copper caps of the 1820s can have inspired little confidence. In some the metal was too soft and jammed in the orifice of the nipple; in others the metal was too brittle and the unlucky sportsman could be blinded by splinters. The priming compound could vary considerably in strength, so that one cap might deliver a soft misfire and the next nearly blow the lock off. However, as manufacturing methods improved, the copper cap became a less precarious device. By 1830, Hawker, in his 6th Edition (pp. 72-75), thought it appropriate to include a special section on Copper Caps which were "now in general use as detonators," and to gracefully suggest that he had designed the first caps for Joe Manton to make.

The man who had the best claim, apparently, was the English artist, Joshua Shaw. In 1815 he patented a glaziers diamond and began making the percussion cap, first of iron, then of pewter and finally of copper. Because of the legal difficulties raised by Forsyth, he was obliged to go to America in order to sell his new primers. Here he was granted a patent in 1822, and after his invention received official recognition, he was awarded $18,000 by the American Government. In England it was 1839 before the percussion cap musket was finally approved by Ordnance.

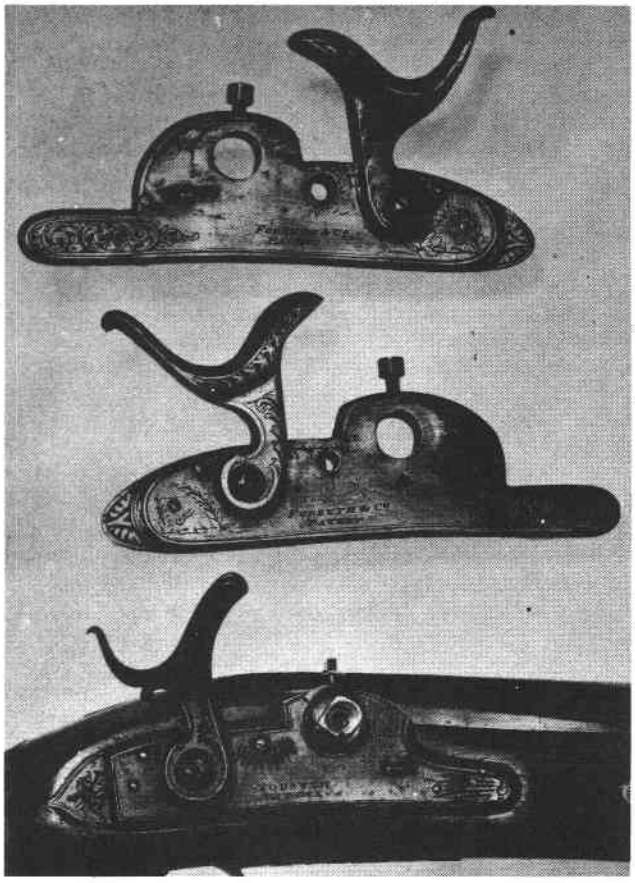
One characteristic of all of the genuine Forsyth work was very high quality workmanship. There are other major differences between the original arms and Swindel's forgeries, as you can see by examining the fake Forsyth scent bottle and the genuine one. The forsyth foreman, James Purdey, having learned his trade with the famous Joe Manton, would countenance nothing less than top-quality work. After leaving Forsyth & Co. about 1814, he went on to establish a firm under his name that maintains the Purdey tradition for quality to this day. However, those workmen who carried on the Forsyth shop after Purdey's departure continued to maintain a very high grade of work.



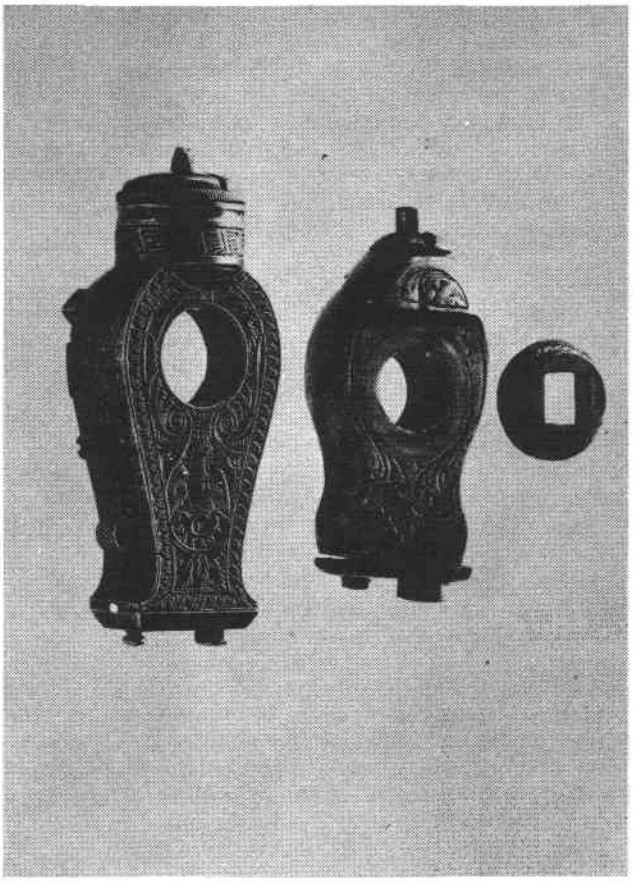
SAME SCENT BOTTLE AS PREVIOUS PICTURE EXCEPT IN UNLOCKED POSITION.



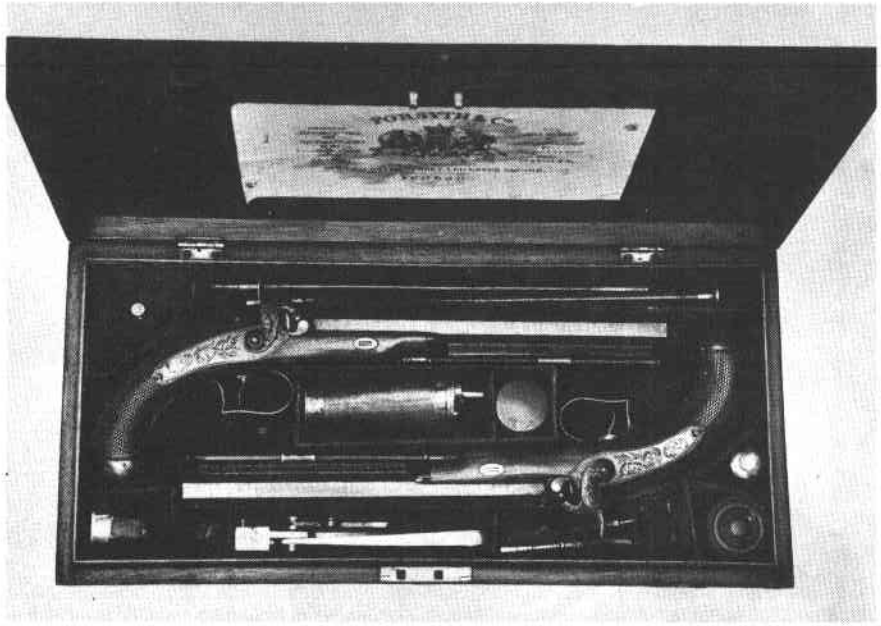
A QUICK REMOVABLE FORSYTH SCENT BOTTLE IN LOCKED POSITION. NOTE PLATINUM LINING IN FIRING PIN HOLE (INSIDE TOP) AND THE SINGLE SLOT WIPER ON LEFT FROM WHICH CORK HAS BEEN LOST.



THE GENUINE FORSYTH LOCK PLATE AT BOTTOM OFFERS A CONTRAST IN QUALITY OVER THE TWO REWORKED FORGERIES ABOVE IT.

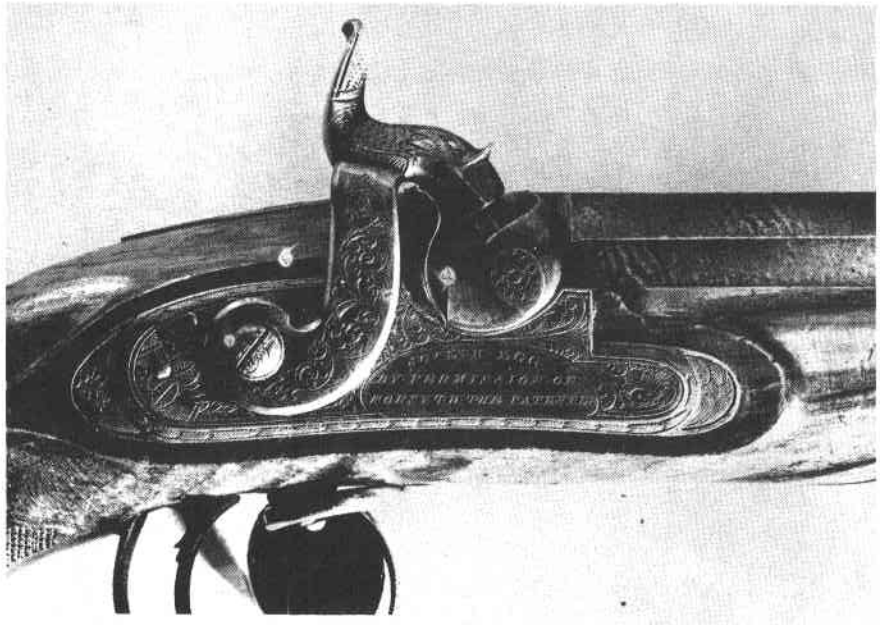


A LATE FORSYTH SCENT BOTTLE MAGAZINE #3084 (LEFT), WITH QUICK RELEASE CATCH ON SIDE. AND FOR COMPARISON A CRUDE FORGERY AT RIGHT.



AN ORIGINAL PAIR OF FINE PERCUSSION PISTOLS BY FORSYTH CASED WITH ACCESSORIES.

CASED SET OF FOREIGN SCENT BOTTLE PISTOLS WITH SPURIOUS LABELS.



ONE OF A PAIR OF JO. EGG PISTOLS ACKNOWLEDGING THE FORSYTH PATENT ON PERCUSSION DEVISES FOR IGNITION ON THE LOCK PLATE.

FORSYTH 4 BORE SHOTGUN WITH GENUINE SCENT BOTTLE IGNITION OF LATE TYPE HAVING QUICK TAKE-OFF, ENGRAVED, SCENT BOTTLE. BACK OF REMOVED LOCK ALSO SHOWN.

Before listing some distinguishing features of the genuine scent-bottle lock, it will be useful to give a quick outline of how it worked.

The Forsyth lock plate was quite similar to that of most bar action locks; the unique mechanism was the magazine, shaped with a narrowed waist something like scent bottles of that period. This magazine was pivoted on a steel shaft which was screwed at a right angle into the vent position in the barrel. The shaft was drilled through the center and channeled to form a contained flash chamber, the outer end closed by a screw.

A supply of fulminate sufficient for about 25 shots was placed in the base of the magazine; in the top was a steel firing pin. The magazine could be rotated on the shaft through an angle of 180 degrees and held in position by a stop, so that, in the firing position, the firing pin would be struck squarely by the hammer. The act of rotating the magazine measured out the proper charge of fulminate (detonating compound) into the chamber whence by a blow of the hammer the resulting fire was communicated through the drilled shaft to the main charge in the barrel. Forsyth locks of this sort were sometimes called "pistol locks."

There are certain distinguishing features for which one may look when checking the authenticity of a Forsyth scent-bottle pistol, rifle or shotgun. Here are a few conditions which should arouse your suspicions:

1. Poor engraving and shoddy workmanship on the magazine and shaft.

2. No number on the reverse side of magazine.

3. No deeply inset stamp of the letter F and the word PATENT in a curved line on face of magazine.

4. Barrel marking FORSYTH & CO. LONDON in gold on barrel.

5. No taper to the shaft on which the scent-bottle magazine rotates.

Things to look for in the genuine Forsyth arms are:

1. The hole of the washer which holds the magazine to the shaft is not truly square but is arched on one side.

2. The shaft is tapered about 0.05".

3. Almost all magazines bear a number on reverse side and an F centered over the word PATENT deeply stamped in the face.

4. Magazines up to No. 2100 were plain; thereafter they were engraved.

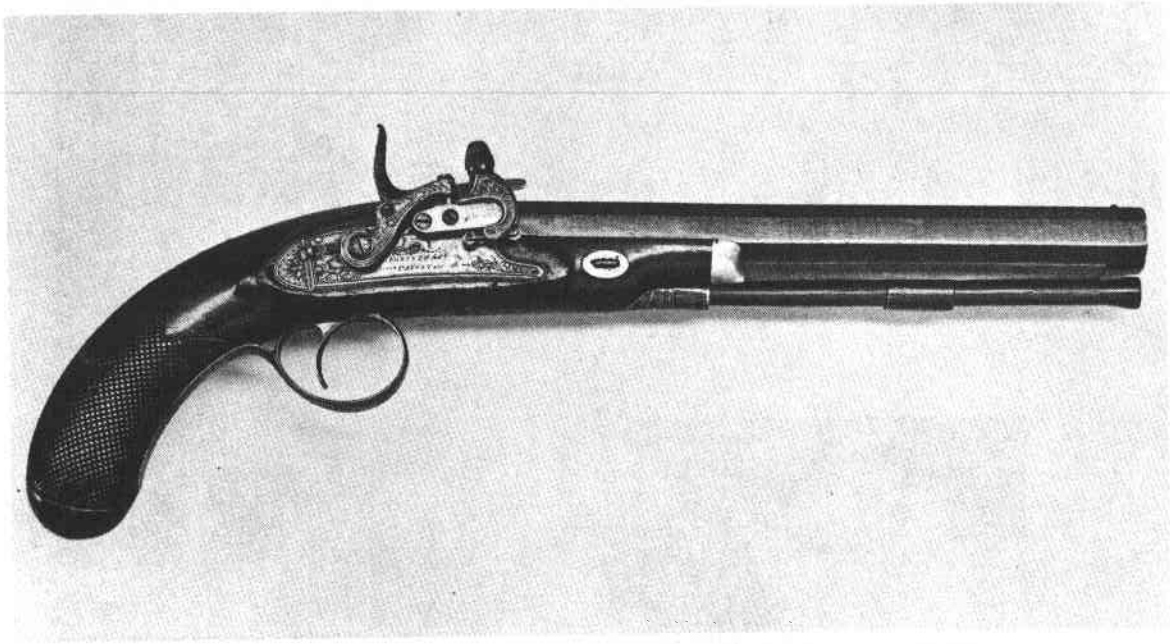
5. A quick release catch (as illustrated in No. 3084), making the washer and holding screw unnecessary, appeared on magazines numbered about 2450 and was used intermittently for several years.

6. Cork washers were installed inside the shaft aperture of the magazine to prevent a leakage into the storage compartment in its base. Screws to adjust pressure on the corks were used up to somewhere between the first 400 and 500 arms. After that, straight slots were employed for the cork bushings, and the screws were eliminated. You will note this change by comparing No. 205 and No. 982 in the exhibit. Some shafts were coated with platinum to prevent rust or corrosion and to assure a precise fit for the magazine.

7. The first few hundred magazines produced did not have an annular platinum lining around the firing pin hole, but over three quarters of all genuine Forsyth magazines did have this feature. None of the replica magazines has this platinum lining.

There are some additional differences between the Forsyth arms produced at 10 Piccadilly or 8 Leicester Street and those produced in Mr. Swindel's back room, but the differences shown here are sufficient to distinguish forgeries from originals. Mr. Swindel has had some company, too, in the Forsyth swindeling business, but he was the major culprit in the trade.

Could Alexander Forsyth see the prices genuine works of his invention now command, he might dourly recall the very meagre returns he received during his lifetime. After a few years in the operation of Forsyth & Co., during which he spent much time in court successfully defending his patent rights against others who had sought to capitalize on them, the minister of Belhelvie returned to his parish. Belatedly, in 1842 the Lords of the Treasury granted the Reverend Forsyth £ 200 "for remuneration as the original inventor of percussion arms." A public outcry resulted in a subsequent award of £ 1,000/0/0 which was distributed to his heirs. He died the following year and is buried in the Belhelvie churchyard.

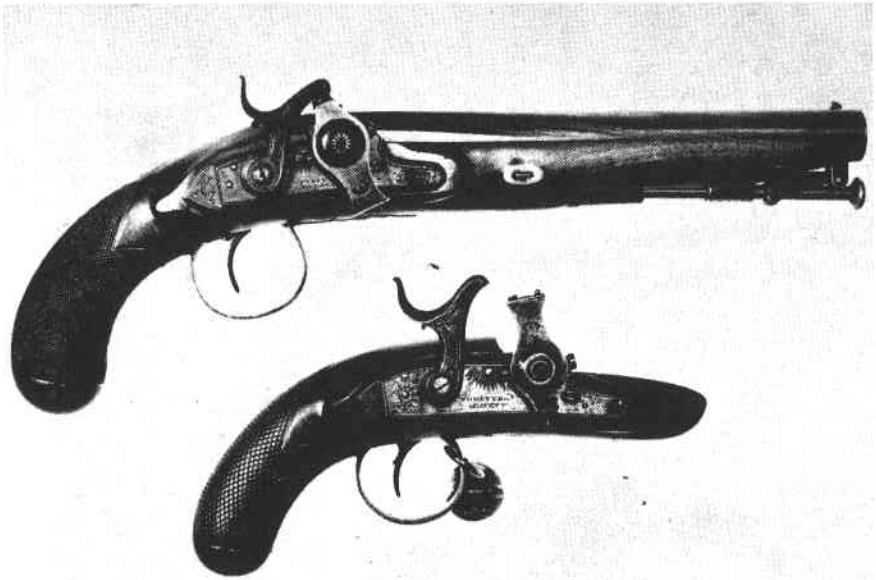


ANOTHER TYPE OF FORSYTH LOCK, THE SLIDING MAGAZINE. THE MAGAZINE BEING ACTUATED BY THE HAMMER.

Perhaps Alexander Forsyth's greatest reward was the high regard of his host of friends who always thought of him as "a godly man in the pulpit, a good man in the field with a gun, and a genius at his workbench." He gave to the Forsyth name the lustre of commendable accomplishment and left it untarnished.

ACKNOWLEDGMENTS

1. James E. Serven gave inestimable assistance in the narrative and research in his thorough way.
2. Appreciation is extended for source material to Howard Blackmore, Esq., Tower of London. Also to W. Keith Neal, Warminster, Wiltshire, and David H. Back, co-authors of Manton and authors of the forthcoming book on Forsyth.



TWO CORRECT EXAMPLES OF THE FORSYTH SCENT-BOTTLE LOCK. THE LOWER PISTOL IS A DEMONSTRATION MODEL FROM THE J. N. GEORGE COLLECTION, MADE ABOUT 1808. THE TWO POSITIONS OF THE MAGAZINE ARE DEMONSTRATED.

ANOTHER SLIDING MAGAZINE WITH HAMMER COCKED AND MAGAZINE IN PRIMING POSITION.