

John H. Hall and the Origin of the Breechloader

by Dwight B. Demeritt, Jr.

John H. Hall's activities between 1812 and 1826 to convince the United States government to adopt his breech loading mechanism and to introduce a practical mechanical means of achieving the manufacture of weapons with interchangeable parts has been thoroughly discussed by such authors as Col. Roy T. Huntington in his book "Hall's Breech Loaders." However, very little is known about the circumstances which led to the invention and its reduction to practical use while Hall was still in Portland and North Yarmouth, Maine.

Hall's father, a Harvard University graduate, had died when John was 13 and nothing has been found to indicate what education or vocational training Hall received. It is likely that prior to his father's death he was tutored by his father. In 1803, Hall at age 22, executed the muster roll of the Portland Light Infantry, an independent militia company organized in that year.

In 1808, his mother died and at age 27 Hall took over the responsibilities of the family, which included two younger brothers and a sister. The following year he borrowed \$750 from a friend in York, and on the mortgage he listed his occupation as "cooper." We do not know whether he ever had his own cooperage or whether he was working with some other individual. It appears that by the time he conceived his breech loading mechanism in 1811 he was indirectly involved in boat building or working with others who were so involved. However, there is little other than secondary evidence of such boat building activities. He was a partner in outfitting a small sloop named the YANKEE which put to sea as a privateer in 1812 and never returned.

It is quite clear that his experience in the Portland Light Infantry played a major role in the development of his breech loading mechanism. In correspondence with ordnance officials in 1817 he indicated that he conceived his mechanism in February of 1811. This statement is supported by a letter which Hall wrote to President James Madison dated February 21, 1811, in which he advised the President that he had constructed a firearm

"... greatly to increase the force of our militia, it is such as will enable a man to load a rifle either lying on the ground or sitting on horseback in less time and with less trouble than is now taken in loading smooth bore guns standing on foot; bayonets may be used on such rifles as conveniently as on common muskets, . . ."

Hall indicated that he wished to bring this invention to the notice of the American government and asked the President's assistance in accomplishing this end.

The President apparently forwarded the letter to William Eustis, Secretary of War, who wrote Hall on March 4, 1811, reporting that the President had received his letter and pointed out that Hall had failed to convey any idea of the type of improvement which Hall had invented and suggested that he con-



fer with others who were familiar with firearms and

"... in case of meeting with the approbation of known judges, to forward the same to this Department together with their opinion, when it will be duly considered."

On March 16, only two weeks later, Hall executed his patent application, which became part of the letters patent issued to him and William Thornton. Shortly thereafter he must have transmitted his patent application to Thornton, who was then in charge of the Patent Office. Although this transmittal letter has not been discovered, a letter from William Thornton to Hall dated April 20, refers to a Hall letter of April 10 to Thornton. On April 20, 1811, Thornton pointed out that he had already conceived the idea for which Hall was submitting a patent application.

This gave rise to an interesting controversy between Hall and Thornton and raised the question of by whom and when and where this rear pivoted, tip-up breech loading mechanism originated. In a frequently quoted letter which Hall wrote to Col. George Bomford in January, 1815, he insisted that as of the time of his invention of his breech loading mechanism he was

"... perfectly ignorant of any method whatever of loading guns at the breech except that practiced with pocket pistols by unscrewing the barrel."

In the context of this statement, Thornton's statements in his April 20, 1811, letter are most interesting. His letter reads in part:

"In the year 1785 I brought to this country a rifle, made by Mortimer, the King's gunsmith in London, invented by Major Ferguson which was charged at the breech . . ." (See Fig. 1)

Thornton, after discussing a tip-up breech mechanism which he claimed to have submitted to the Secretary of the Navy in 1809, noted:

"... I invented the patent chambers in guns and pistols which were patented in England two years after I invented them by the King's gunsmith in London to whom I sent them

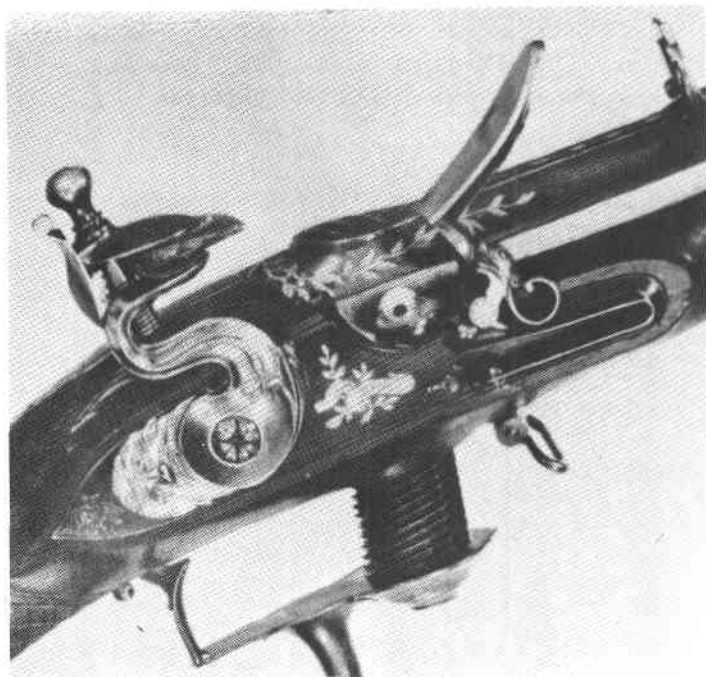


Fig. 1. Details of a Ferguson-type breechloading flintlock by Durs Egg.

in the year 1791 or 92 by Governor Nugent of the Virgin Islands, where I then was, and where I was born. From this discovery I derived no advantages though the person did who took out the patent." (sic)

It would thus appear that Thornton was well aware of tip-up breeches, which were not uncommon in England in the 1780s and early 1790s. While Hall claims to have been unaware of such mechanisms, they already had a fairly long history.

The rear pivoted tip-up breech appears to date from March 3, 1664, when Abraham Hill of London secured a patent for "six different plans for breech loading."

One of such plans is described as

"... a new way of making a gun or pistol, breech whereof rises upon a hinge, by a contrivance of a motion from under it, by which it also let down again and bolted fast by one and the same motion."

An existing flint lock fowler incorporating such a mechanism and signed "John Bicknell, Londini" is in the collection of the Tower of London (No. XII-1617). John Bicknell is recorded as having been active in London between 1660 and 1680.

This fowler has a long slender trigger guard which is pivoted at its front immediately under the breech. When the tail of the guard is thrown down and forward its forward edge pushes the front end of a breech block at the rear of the barrel upward causing the breech to tip up on a hinge. The breech is then muzzle loaded and pushed downward to match the barrel (see Fig. 2).

Sequentially the next tip-up breech mechanism appears to be the work of Peter Düringer of Mainz, Germany, who worked around 1680. A surviving combined match lock/flint lock gun in which the barrel is joined to a breech chamber by an interrupted screw thread exists in the collection of the Rotunda, at Woolwich (IX-9). The breech of this gun is hinged at the rear and tips up after the barrel is unscrewed and slid forward in a sleeve (Fig. 3).

Following Düringer's invention there appears to be no fur-

ther tip-up breech guns until the 1770s when two Italian machinists, Ambrogia Gorla and Giuseppe Crespi picked up the challenge of a practical tip-up breech loading mechanism. Although the respective roles of Gorla and Crespi in the design of this mechanism are not clear, the mechanism has always been known as the *Crespi System*.

The mechanism was designed to be used as a conversion of standard muzzle loading flint-lock carbines of the period. It consisted of a breech hinged at the rear which tips up for loading. The breech is secured to the barrel when in the horizontal position by a locking lever and lugs secured to both sides of the barrel.

Crespi brought his mechanism to the attention of Emperor Josef II of Austria who ordered testing of the system in October of 1770. Two commissions approved the guns and Emperor Josef ordered 351 guns converted to the Crespi system, which were completed by June of 1771. Like many subsequent inventors, Crespi soon found that the government was not anxious to pay the expenses of such a mechanism and he was involved in controversy with the Emperor before he was paid.

By 1772 the Austrian government ordered an additional 2,000 Crespi type guns and in a competition for the contract, the Gunmakers Association in Ferlach, Austria, won. Shortly thereafter Crespi, realizing that his services were probably of no further value to the government, asked that he either be given a governmental position, a government pension or a lump sum settlement for his invention. In late 1772 the Austrian government made a lump sum settlement with Crespi. Crespi's problems in obtaining remuneration for his invention from the Austrian government were quite similar to John Hall's financial problems with the United States government throughout his career.

An interesting sidelight to the Crespi invention is the fact that his "partner," Ambrogia Gorla, a fellow mechanic in Milan, attempted to obtain a share of the financial settlement which Crespi got from the Austrian government. This situation is not dissimilar to an attempt made by William Thornton in 1819 to obtain a share in the financial arrangement Hall received from the United States government. Gorla took one step that Thornton never did: in 1771 Gorla sued Crespi in Milan; it wasn't until February 1778 that the court found that Gorla had no claim.

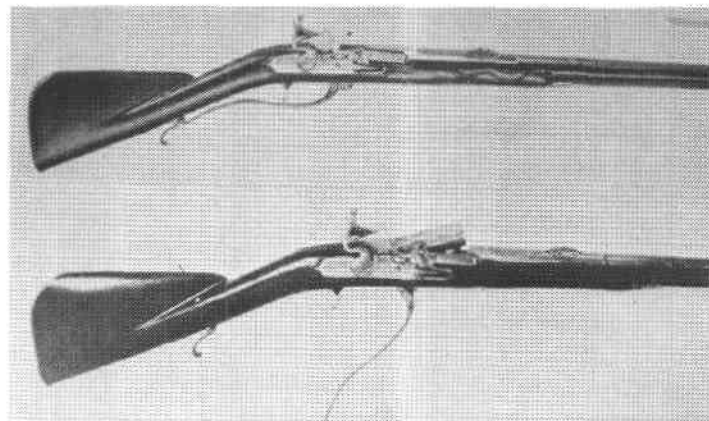


Fig. 2. The John Bicknell breechloading fowler with breech closed and open. (circa 1670)

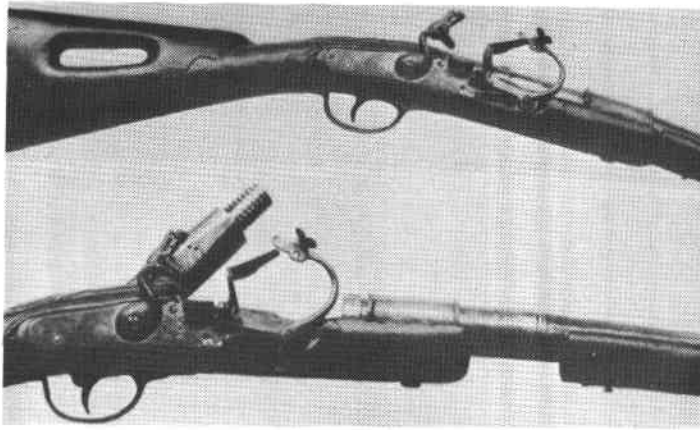


Fig. 3. Peter Durringer's breechloading combined flintlock/matchlock with breech open and closed (circa 1680).

The Crespi mechanism quickly came to the attention of at least one English gunsmith, and by 1784 Durs Egg of London had faithfully copied the mechanism for a cavalry carbine. An existing specimen of such a carbine in the Tower of London collection has a 35" barrel of 65 caliber. (Fig. 4)

Egg's carbine was examined by a board of general officers in July, 1784, and in January, 1785, the board recommended that such guns be made for the regiments of light dragoons. A number of these guns were issued to five regiments of light dragoons in 1786. The Egg mechanism was almost identical to the Crespi mechanism.

Another well known London gunsmith, Henry Nock, made an experimental tip-up breech loading mechanism in 1787, and patented his system in that year (No. 1598). An existing specimen of Nock's gun in the Tower of London collection (No. XIII-250) consists of a breech sleeve which fits in the rear of a standard rifle barrel and is removed rearward from the barrel by pulling a vertical pin and then sliding the sleeve rearward until it clears the rear of the barrel and tips up for loading. This mechanism was never adopted by the British government.

Whether or not Thornton ever saw any of these guns in addition to the Ferguson screw down-breech mentioned in Thornton's April, 1811, letter is difficult to determine. However, considering the number of breech loading carbines which were made by Durs Egg in the 1780s, it would appear that Thornton may well have seen one before he returned to his native Virgin Islands from Scotland where he had attended medical school. It is quite likely that Hall never saw any of these earlier tip-up breech mechanisms.

After the receipt of Thornton's April 20, 1811, letter, Hall immediately proceeded to Washington and confronted Thornton. Again, in a letter to Col. Bomford in 1815 Hall described this meeting:

"Upon my arrival there a gun was shown to me, the barrel of which was made broad at the butt with a mortise in it as large as to receive a piece of metal with a chamber in it sufficient to contain a charge of powder and ball—such a contrivance it appeared to me could never have been of any utility, at any rate it was very different from mine. In conversation upon it he remarked that finding inconveniences attended it he had thought of a plan which would have resembled mine and had given orders for its construction but nothing (except the drawings) had been done toward it (and they were not to be found). This he conceived authorized him to claim the inven-

tion. But if this method which he had said he had contemplated had ever been executed still (as I conceived it) it would have been of no service as no shoulders were thought of by him, which he at the time of our conversation looked upon as of no consequence although I then told him they were very important if not essential to the utility of the improvement . . . as Dr. Thornton delayed furnishing the patent unless in connection with himself, and the utility of such a connection was not at first very apparent to me—I called upon Mr. Monroe then just appointed Secretary of State to have the matter adjusted in the method provided by law in cases of conflicting claims.

While at his office I was advised that it would be more to my interests to be connected with Dr. Thornton even at the expense of half my right than to have it wholly to myself, because his influence in that case would be exerted in my favor but otherwise would be exerted against me, in the one case he would be friendly and disposed to render assistance in case of any attempts of others to interfere with my rights by attempting the obtainment of patents for the same invention connected with alterations, an event frequently occurring with patents likely to prove important. He would also by his information upon the subject and his connections in other countries be able to render important services in the obtainment of foreign patents. Upon reflecting upon the subject I concluded to become connected with him by taking out a patent which should include both his invention and mine and this was done."

The early guns made by Hall incorporating his mechanism were equipped with bronze receivers and barrels. As production during the War of 1812 increased, he switched to steel receivers and barrels. The design of these early guns is illustrated in Figures 5, 6 and 7.

In early 1815 or thereabouts he decided to modify the hammer and frizzen mechanism on top of the receiver and improved it and reduced the overall size of his guns, which by this time were essentially being utilized as sporting weapons by local Portland residents.

Hall described this change in a letter to Col. Bomford in January, 1816, in the following terms:

"Although the guns had acquired a high degree of perfection, yet within the last nine months a very considerable degree of improvement has been made in them—in rifling the barrels on a true taper—in the hammer spring—in the upper shaft—in the apron—in the form and proportions given to the hammer tail and in the work generally. Much improvement has been made in the tools for executing the work with accuracy by not very expert workmen . . ."

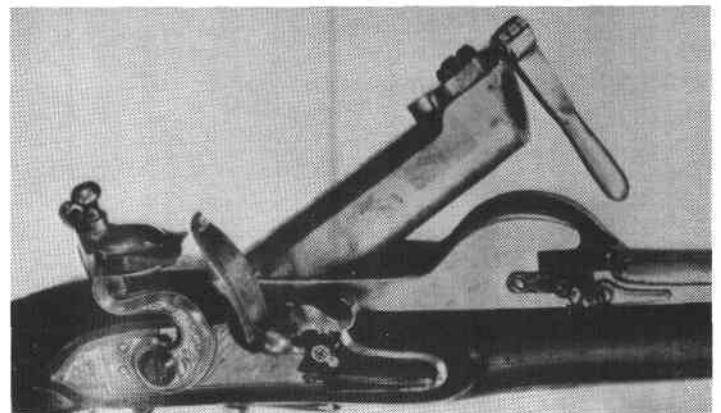


Fig. 4. A Durs Egg carbine with breech open (London-circa 1785).

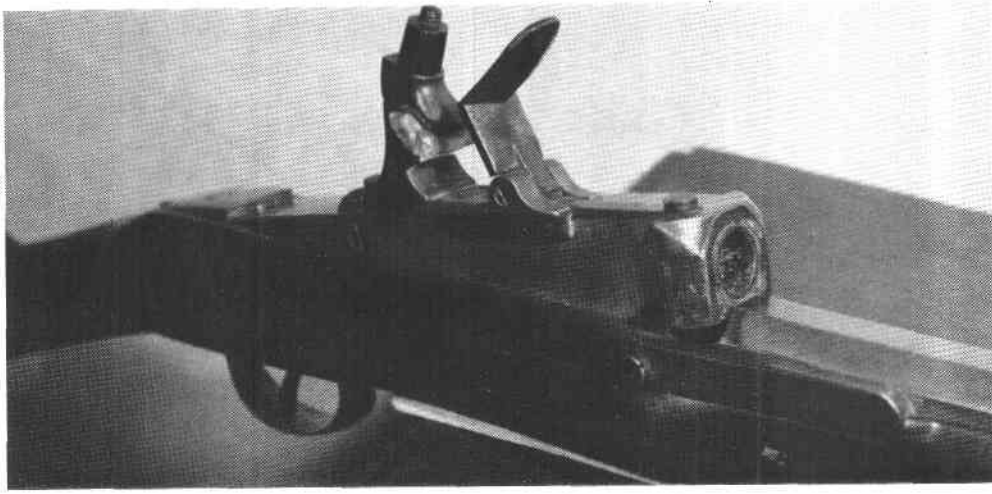


Fig. 5. An early Hall flintlock rifle with bronze breechblock and barrel; breechblock open (serial no. 1 - circa 1811).



Fig. 6. An early Hall breechloader with breech open, converted to percussion and frizzen removed (circa 1812).

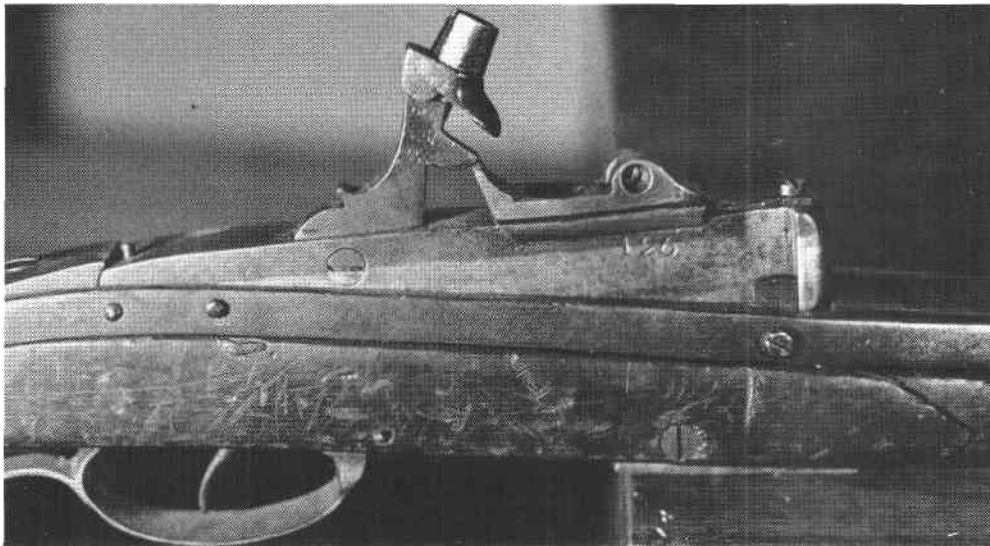


Fig. 7. Another early Hall breechloader with steel breechlock converted to percussion and frizzen removed. (Percussion striker missing from flintlock cock.)

These changes and improvements apparently made during the last nine months of 1815 show up quite clearly in the sporting guns illustrated in Figures 8, 9 and 10. It will also be noted that the proportions of these guns are much more delicate and graceful than his earlier weapons.

Hall's modifications of his rifles during 1815 can be more clearly demonstrated by comparing his pre-1815 rifles with those believed to be made in 1815 or thereafter. Putting the two types of rifle side by side and starting at the butt and progressing toward the muzzle, the material differences are readily noted:

Pre-1815	1815 and after
(a) Plain butt stock with no patchbox	Pierced brass patchbox
(b) Thick stock construction	Delicate-Kentucky style stock
(c) Cock of crude patent-illustration design	Cock more delicate and more similar to other fine rifles of period
(d) Large brass pan mounted on top of breech block	Small oval steel pan
(e) Large frizzen mounted on forward top of pan	Small delicate frizzen on pan
(f) Flat frizzen spring mounted on top of breech block	Shaped frizzen spring mounted forward of frizzen on frizzen
(g) Breech block bronze or steel 6½" to 7¼" long and 1" to 1⅜" wide	Breech block steel and 5¼" to 6½" long and ⅞" to 1¼" wide
(h) Breech block unmarked except numbers or letters on right side	Breech block marked on top at front: "John H. Hall Patent" and letters or numbers on right side (Fig. 11)
(i) Breech block catch plate rectangular	Breech block catch plate usually oval
(j) No cleaning rod or ramrod	Equipped with cleaning rod
(k) Caliber .50 to .58	Caliber .32 to .44 and rarely over .50

The 100 Hall rifles which were furnished to the United States government under the 1817 contract resemble the sporting rifles developed during the last nine months of 1815. The only major differences are that they are slightly larger, heavier and the forward 3¾" of the octagon barrel is turned round to accept a bayonet.

Thus, in the span of approximately 5½ years Hall succeeded in developing his breech loading system to a point at which he was able to convince a difficult-to-convince army bureaucracy that such guns had a future in the hands of U.S. government forces. Prior inventors of similar mechanisms had never, for whatever reason, been able to successfully market their product.

Hall went on to obtain a more important contract in 1819, moved to Harpers Ferry, and there developed the breech loading weapon that was issued in substantial numbers to various U.S. forces and state militia units during the 1830s.

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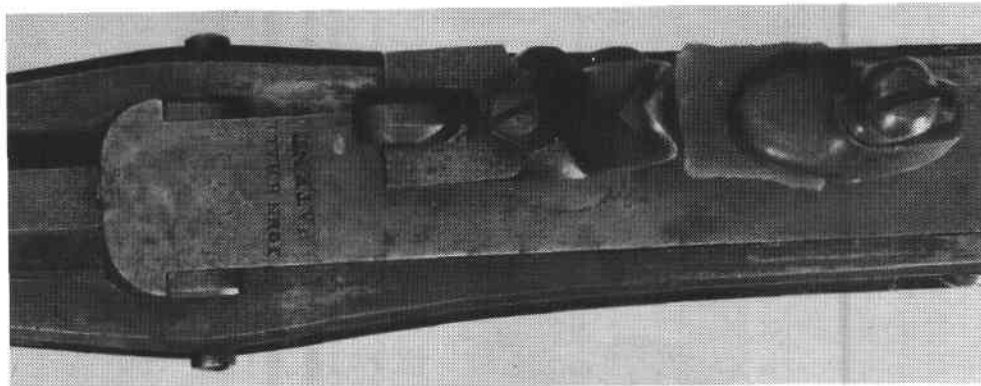


Fig. 11. Post-1815 Hall breechblock showing typical Hall markings.

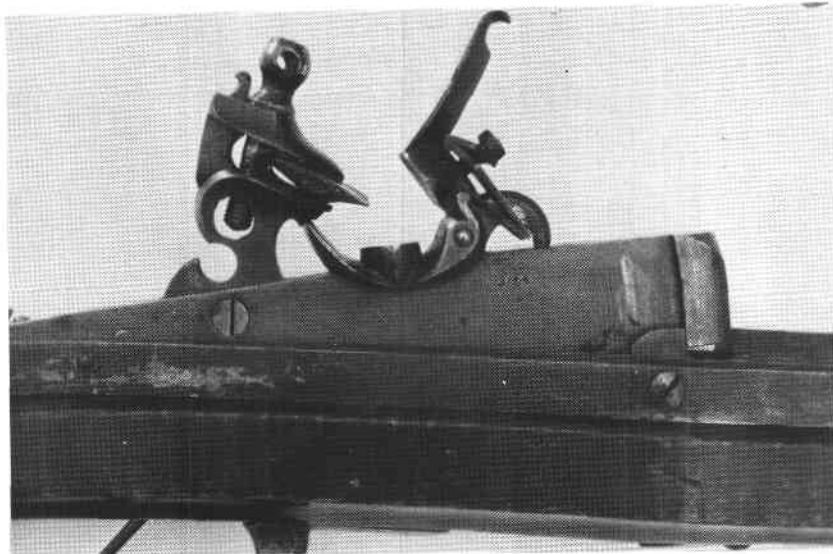


Fig. 8. An improved Hall breechloader showing changes in cock, frizzen, pan and frizzen spring. Circa 1816.



Fig. 9. Two post-1815 Hall breechloaders, one converted to percussion.

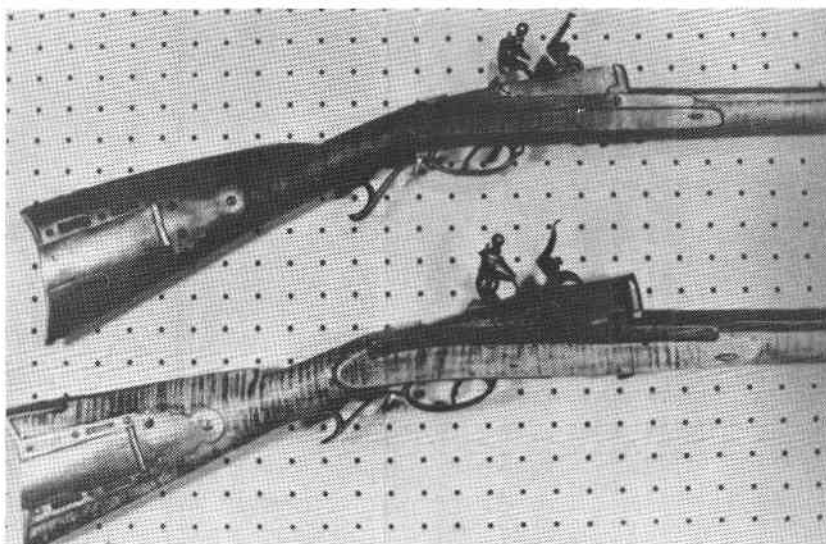


Fig. 10. Two more post-1815 Hall breechloaders with typical pierced brass patchboxes.