A.D. 1879, 21st MARCH. N° 1141.

SPECIFICATION

OF

JOHN RIGBY AND THOMAS BISSELL.

BREECH-LOADING FIRE-ARMS.

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Breech-loading Fire-arms.

LETTERS PATENT to John Rigby, of 24, Suffolk Street, Dublin, and Thomas Bissell, of 75 and 77, Cranham Road, Rotherhithe, in the County of Surrey, for the Invention of "IMPROVEMENTS IN BREECH LOADING FIRE ARMS,"

Sealed the 5th September 1879, and dated the 21st March 1879.

PROVISIONAL SPECIFICATION left by the said John Rigby and Thomas Bissell at the Office of the Commissioners of Patents on the 21st March 1879.

JOHN RIGBY, of 24, Suffolk Street, Dublin, and THOMAS BISSELL, of 75 and 77, Cranham Road, Rotherhithe, in the County of Surrey. "IMPROVEMENTS IN BREECH LOADING FIRE ARMS."

This Invention has for its object improvements in breech loading fire arms.

Our Invention relates to the class of guns in which the barrels and the breech piece are connected together by a hinge or joint beneath the barrels, and the breech is opened for insertion of the cartridge by dropping down the barrels or the stock.

In such guns, in order to secure the closing of the breech, the top rib between the barrels is frequently made to project in rear of them, and when the barrels are closed this projection (which commonly has an enlarged head or end) fits into a corresponding recess in the breech piece. To keep the projection down in its place bolts have been applied to hold it in a variety of ways; turning bolts have been used, and so also have vertical and horizontal bolts. The strain upon these bolts is very severe, and as even a small amount of yielding is injurious, the bolts do not efficiently serve the purpose for which they are applied unless they are very effectually supported and cannot in the least degree bend or yield to the strain. The surfaces in contact of the bolt and projection must also be of adequate dimensions. We meet these requirements by the application of a vertically moving bolt which is supported throughout the entire depth of the projection by the metal forming the front of the cavity into which the projection is received and which bolt is so far drawn down in unlocking the gun that the projection does not require to be tapered or inclined on the part facing the bolt to admit of the projection leaving its recess.

[*Price 6d.*]

The bolt may be round and pass up through a slot formed through the projection, and which slot also admits through it the portion of the breech piece by which the bolt when shot is supported, or the top of the bolt may be forked or divided into two studs either round or square, so far separated that the neck of the projection lies between them. When this bolt is shot the studs rise in front of the head of the projection completely filling the space between the head and the part of the breech piece supporting the bolt, and so the barrels are firmly held against the breech piece until the bolt is withdrawn. We connect the vertical bolt with the horizontal bolt usually placed under the barrels by a cranked lever working on a pin in the breech piece in such a manner that when one bolt is forced back the other is drawn down and the barrels released. In some cases a convenient position for the pivot of the cranked lever is at the back of the action.

We sometimes form rack teeth on the horizontal bolt to engage with corresponding teeth on one arm of the cranked lever, and we cause the horizontal bolt when shot to support the vertical bolt.

With a locking lever lying on the top of the stock and moving about an horizontal axis, it is convenient to work each bolt by an arm of the locking lever.

Or the cranked lever may be provided with a third arm and be worked by a screw and nut in connection with a turn lever on the top of the stock.

When it is desired to use the ordinary double bite Lefaucheux lever beneath the barrels for locking them one arm of the cranked lever is attached to a slide and link, the other end of which is connected with the double bite lever.

In guns which have a top locking lever and a horizontal transverse bolt working through a hole in the projection from the top rib between the barrels we work the bolt by means of a small intermediate lever, one end of which is pivotted to the top lever and the other enters the slot in the bolt. Between these points a pin fixed in the breech piece passes through a slot in the small intermediate lever. By this arrangement the leverage requisite to start the bolt or force it home is increased without diminishing its range. In order to cock and bolt the locks of such guns automatically in the act of opening or closing the breech we employ a sliding piece working along side of the usual horizontal sliding bolt, and in the same slot hole with it. We make the forward lump on the underside of the barrel into which the sliding bolt locks with two studs or projections, one on each side of the barrel lump. When the breech is opened these studs give motion to a rocking piece which lies in the bed of the breech piece behind the hinge, which rocking piece then comes in contact with the foremost end of the sliding piece and forces it back, and its hinder end then pushes back the hammers and cocks the locks. We also use the rocker in a Lefaucheux action in conjunction with a sliding piece working in guide passages above the lever hole.

Sometimes for the purpose of raising the hammers to full cock when the gun is opened, we arrange the cross pin to turn in the body, moving with the barrels. We then fix on the cross pin two cams and these give motion to a slide passing back to the hammers. We sometimes construct the lever by which the breech is locked in such a way that after it has drawn back the bolt and released the barrels a projection on it tilts up the breech ends and so facilitates greatly their movement, the extraction of the fired cartridges and cocking of the locks.

For the purpose of bolting the locks we apply an horizontal axis in front of the hammer; it passes through the breech piece and can be turned round by an external lever or finger piece attached to it by preference on the right side of the gun. On the horizontal axis there are two stops so placed that when the gun is bolted the fall of the hammers is intercepted by them. The bolting is automatically performed by another projection on the axis with which the cocking slide comes in contact when this moves back on the gun being opened, or the under locking lever itself may be provided with a horn which in unlocking comes into contact with an intermediate lever, and this with the projection moves the axis round. The unbolting is performed by the external finger lever. The intermediate lever above

mentioned may be provided with an arm for giving motion to the vertical locking bolt. The intercepting blocks or parts on the horizontal axis may be so formed that should the trigger be pulled inadvertently without unbolting, the hammers may be moved again back to full cock by a pressure on the external finger lever without the loss of time involved in lowering the barrels. This arrangement is equally applicable where the bolt is not worked automatically.

In some cases we arrange a finger lever to unbolt the locks within the trigger guard and in front of the ordinary trigger but working in the opposite direction, so that the act of placing the finger on the trigger to discharge the gun causes the bolting trigger to be pushed forward, and so the possibility of omitting to unbolt before pulling the trigger is removed. This arrangement is equally applicable to military and other breechloaders.

SPECIFICATION in pursuance of the conditions of the Letters Patent filed by the said John Rigby and Thomas Bissell in the Great Seal Patent Office on the 20th September 1879.

JOHN RIGBY, of 24, Suffolk Street, Dublin, and THOMAS BISSELL, of 75 and 77, Cranham Road, Rotherhithe, in the County of Surrey. "IMPROVEMENTS IN BREECH LOADING FIRE ARMS."

This Invention has for its object improvements in breech loading fire arms. Our Invention relates to the class of guns in which the barrels and the breech piece are connected together by a hinge or joint beneath the barrels, and the breech is opened for insertion of the cartridge by dropping down the barrels or the stock.

In such guns in order to secure the closing of the breech the top rib between the barrels is frequently made to project in rear of them, and when the barrels are closed this projection (which commonly has an enlarged head or end) fits into a corresponding recess in the breech piece. To keep the projection down in its place bolts have been applied to hold it in a variety of ways; turning bolts have been used, and so also have vertical and horizontal bolts. The strain upon these bolts is very severe, and as even a small amount of yielding is injurious the bolts do not efficiently serve the purpose for which they are applied unless they are very effectually supported and cannot in the least degree bend or yield to the strain. The surfaces in contact of the bolt and projection must also be of adequate dimensions. We meet these requirements by the application of a bolt moving vertically or nearly so, and which is supported throughout the entire depth of the projection by the metal forming the front of the cavity into which the projection is received, and which bolt is so far drawn down in unlocking the gun that the projection does not require to be tapered or inclined on the part facing the bolt to admit of the projection leaving its recess.

The bolt may pass up through a slot formed through the projection, and which slot also admits through it the portion of the breech piece by which the bolt when shot is supported; or the top of the bolt may be forked or divided into two studs, either round or square, so far separated that the neck of the projection lies between them. When this bolt is shot the studs rise in front of the head of the projection, completely filling the space between the head and the part of the breech piece supporting the bolt, and so the barrels are firmly held against the breech piece until the bolt is withdrawn.

This part of our Invention relating to the more secure bolting of the projecting top rib of the barrels into a recess in the breech piece is illustrated by the Figures 1, 2, and 3. Figure 1 is a longitudinal section, and Figure 2 is a plan, of parts of a double barrelled breech loading fire arm, in which this bolting is effected in accordance with our Invention. a, a, are the barrels, and b is the breech piece; c is the joint by which these parts are connected, and about which the barrels move when the breeches are opened; a^1 is the portion of the top rib between the barrels, which projects and is received into a corresponding recess in the breech piece; d is the rising and falling bolt for locking the projection a^1 in its place; in this case it is somewhat inclined to the rear, and it passes up through a hole in the projection; these however are features which may be varied; b^1 is the portion of the breech piece against which the bolt d slides up and down, and which supports it in front, so that it is impossible for the bolt to yield or bend, which it might do under the severe strain to which it is exposed were it not thus supported to its extreme upper end. Figure 3 shews a back view, partly in section, of the breech piece b; Figure 4 shews a plan of a gun in which the projection from the top rib of the barrels is T headed, and the bolt forked to pass up on either side of the head; but in all essential features the arrangement is as already described; the bolt is supported right up to the top by the parts b^1, b^1, of the breech piece, and when in place

entirely fills the space between the shoulders of the projection and the supporting parts b^1 of the breech piece.

The bolt d is shown separately by the Figures 4^a.

Another part of our Invention relates to the means for working the vertical or nearly vertical bolt d. We connect this bolt with the horizontal bolt usually placed under the barrels by a cranked lever working on a pin in the breech piece in such a manner that when one bolt is forced back the other is drawn down and the barrels released.

We sometimes form rack teeth on the horizontal bolt to engage with corresponding teeth on one arm of the cranked lever.

This part of our Invention relating to the coupling together of the vertical bolt d and a horizontal locking bolt beneath the barrels is also illustrated by the Figures 1, 2, and 3; e is the horizontal bolt engaging in the usual way with the lumps a^2, a^2, beneath the barrels. The way in which the bolt e receives motion is by a locking lever acting on it through an upright spindle and projecting finger, an arrangement not in itself new for actuating the horizontal bolt. The bolt e is shewn separately by the Figures 5; it is provided with an arm, in which is a notch e^1. This notch receives into it the finger f^1 projecting from the lower end of the spindle f, which at its upper end has the hand locking lever g fixed upon it. The spindle f and the parts formed with it are shewn separately by the Figures 6. The passage in which the bolt e works is marked $e^\times$ in Figure 3, and in the same Figure $f^\times$ is the hole into which the spindle f is inserted; f^2 is a second finger upon the spindle f; it receives the pressure of a coiled spring which is lodged in a recess $g^\times$ in the breech piece. This spring serves to return the bolt to its holding position whenever it is set free. h is the cranked lever by which the bolts d and e are coupled; it turns on a pin inserted into the breech piece at h^1; this lever is represented separately by the Figures 7; $h^\times$ in Figure 3 shews the recess in the breech piece into which the lever h is received.

The two ends of the lever h enter the one into a slot at e^2 in the bolt e and the other into a slot d^1 in the bolt d. The Figures 8 shew separately a side and a back view of the bolt d; the notch seen in the side of the bolt is simply to avoid interference with the spring in the cavity g. The coupling lever h thus compels the bolts d and e to move simultaneously. Figure 9 shews a modification, in which the bolt e is formed with teeth engaging with corresponding teeth on the lever h.

In some cases we impart motion from the hand locking lever to the cranked lever h, and so to the bolts d and e.

This part of our Invention is illustrated by Figure 10. The cranked lever is here shewn provided with a third arm, and this arm as the Drawing clearly shews is controlled by a screw and nut in connection with a turn lever on the top of the stock. The screw passes up through the nut upon which the locking or turn lever or handle is fixed. The nut is held in a recess in the tang, and serves as the axis for the turn lever. Figure 11 shews an arrangement in which the cranked lever h takes its movement from a locking lever hinged at the top of the body, and which is raised to withdraw the bolts. A link jointed at one end to the under side of the locking lever, and at the other to the additional arm of the lever h, transmits the motion.

Another part of our Invention relates to the means for actuating the vertical or nearly vertical bolt d in arms of the Lefaucheux construction.

When it is desired to use the ordinary double bite Lefaucheux lever beneath the barrels for locking them, a cranked lever corresponding to the lever h already referred to is employed; its upper arm is connected with the bolt, and its lower arm with a slide, and a link connects the slide with the double bite lever. Figures 12 and 13 illustrate this arrangement. Figure 12 is a vertical and longitudinal section of a portion of a Lefaucheux gun; Figure 13 is a plan of the trigger plate with the parts carried upon it, and also of the locking lever; a are the barrels; b, the body; d, the upright bolt; h, the cranked lever as before. The lower end of the lever h is received into a slot in the slide i, which is held in guides i^1 formed

for it upon the trigger guard. A transverse section of the slide with its guides is seen at Figure 14. k is the Lefaucheux bolt lever, and k^1 is a link pin jointed to its head, and also to the slide i, so that when the bolt lever is turned to unlock the barrels on the under side the bolt d is also drawn down, and the projection a^1 at the top from the centre rib is also released.

Another part of our Invention relates to guns which have a top locking lever and a horizontal transverse bolt working through a hole in the projection from the top rib between the barrels. We work the bolt by means of a small intermediate lever, one end of which is pivotted to the top lever, and the other enters the slot in the bolt. Between these points a pin fixed in the breech piece passes through a slot in the small intermediate lever. By this arrangement the leverage requisite to start the bolt or force it home is increased without diminishing its range.

This arrangement is illustrated by Figure 15, which is a plan partly in section of a portion of an arm of this construction; a, a, are the barrels, and a^1 the projection from the top rib; g is the locking lever; m is the intermediate lever; and n is the horizontal transverse bolt. One end of the lever m is received into a notch in the bolt n, and the other end is jointed to the locking lever g; m^1 is a slot in the lever m; and m^2 is a fulcrum pin fixed in the body, and passing through the slot.

Another part of our Invention relates to cocking the locks of guns in which the barrels are secured by means of an horizontal bolt e beneath them. In order to cock the locks of such guns automatically in the act of opening or closing the breech, we employ a sliding piece working along side of the usual horizontal sliding bolt, and in the same slot hole with it. We make the forward lump on the under-side of the barrel, into which the sliding bolt locks, with two studs or projections, one on either side of the barrel lump. When the breech is opened these studs give motion to a rocking piece, which lies in the bed of the breech piece behind the hinge, which rocking piece then comes in contact with the foremost end of the sliding piece and forces it back, and its hinder end then pushes back the hammers and cocks the locks.

Figure 16 illustrates this part of our Invention. As in Figure 1, a, a, are the barrels connected to the body b by the joint at c; e, the horizontal bolt actuated by the spindle f and locking lever g. For the purpose of cocking the locks, a slide o, shewn separately by the Figures 17, is provided to work in the same hole in the body with the bolt e. The slide is operated by the rocker p, which is inserted into the cavity in the body, and secured by a pin inserted through it at p^1. The rocker is also shewn separately by the Figures 18. The rocker is moved when the breech is opened by the projections $a^{3\times}$, $a^{3\times}$, from the lump a^3 upon the under side of the barrels.

The two limbs of the rocker as will be seen embrace the lump a^3, and they are so curved and placed as to overlap the pins or projections $a^{3\times}$ in such manner that when the breeches are opened the projections push the rocker back. The rocker then in turn pushes back the slide o, and this by acting against the smaller rollers q^1 provided upon the hammers q cocks the piece. In the act of closing the breeches the under side of the lump a^3 comes against the tail p^2 of the rocker p, and so the rocker is brought back. One of the projections $a^{3\times}$ is elongated and so formed, as the Drawing shows, that in attaching the barrels to the body it will push back the rocker, the head of which is also suitably formed. But for this arrangement there would be difficulty in putting the gun together when the hammers have been let down. We also use the rocker in a Lafaucheux action in conjunction with a sliding piece working in guide passages above the lever hole.

Figure 12 illustrates this arrangement, and the parts are lettered in accordance with the foregoing description.

Another part of our Invention relates to bolting the locks to prevent accidental discharge.

For the purpose of bolting the locks we apply an horizontal axis in front of the hammer; it passes through the breech piece, and can be turned round by an

external lever or finger piece attached to it, by preference on the right side of the gun. On the horizontal axis there are two stops so placed that when the gun is bolted the fall of the hammers is intercepted by them. The bolting is automatically performed by another projection on the axis, with which the cocking slide comes in contact when this moves back on the gun being opened; or the under locking lever itself may be provided with a horn, which in unlocking comes into contact with an intermediate lever, and this with the projection, thereby moving the axis round. The unbolting is performed by the external finger lever. The intermediate lever above mentioned may be provided with an arm for giving motion to the vertical locking bolt.

Figure 19 is a longitudinal section, and Figure 20 a transverse section of an arm illustrating this part of our Invention, and provided with a bolt or intercepter to prevent accidental the discharge of the piece. The barrels *a*, body *b*, and bolts *d* and *e* are lettered as in Figure 1; *q*, *q*, are the hammers, and *s* is the horizontal axis carrying the stops or intercepters s^1, s^1, on to which the hammers fall when the triggers are pulled, unless the axis *s* has been previously turned into such a position as to move the intercepters out of the way. This axis, with the intercepters, is shewn separately by the Figures 21; s^2 is a small handle or finger piece on the right end of the axis *s*. When this handle is raised to the position in which it is drawn in Figures 19 and 20, the gun is ready for firing, but when it is depressed to the position of the dotted line s^x, in Figure 19, the intercepters stand in the way of the hammers; *t* is an underlocking lever turning upon a pin t^1; it has a horn t^2 engaging as shown with the horizontal bolt *e*, and withdrawing it when the lever *t* is depressed. The horn t^2 acts also on the intermediate lever *u*, and by this means depresses the vertical bolt *d*. The lever *u* has an arm u^1, which, as the bolt *d* is drawn down comes against the finger s^3 on the axis *s*, and turns it in such manner as to bring the intercepters into position to prevent the full fall of the hammers, and after the breeches are closed the hande s^2 has to be raised by hand before the piece can be fired.

The locking lever *t* has also a horn t^3, which operates during the unbolting operation, to raise the hammers to full cock by acting against the projections q^1. The same horn also in relocking pushes back the bolt *e*, and operating on the arm u^2 of the lever *u* raises the bolt *d*; Figure 22 is a plan of part of the bolt *e*.

Figure 12 illustrates the arrangement in which a cocking slide effects the automatic locking. The cocking slide *o*, at the same time that it forces back the hammers, acts also on the finger s^3 (which is somewhat differently formed from that seen in Figure 19), and brings the intercepters into position. In this arrangement also the triggers are bolted by means of a slide *v* on the trigger plate carrying a pin v^1 working in guide slots v^2 over the top of the triggers.

The finger s^3 moves the slide *v* to push it back by coming into contact with the slide at v^3; the pin v^1 is thus brought into position to prevent the triggers working. In unbolting by means of the handle s^2, the spindle is turned until the finger s^3 comes against the slide at v^4, and moves it back. The intercepters may in this arrangement be dispensed with.

Another part of our Invention is also illustrated by Figure 19. This consists in so forming the bolts *d* and *e* that the bolt *e*, when shot, supports the bolt *d*, and so adds to the firmness of the top lock.

Another part of our Invention relates to the means for unbolting the locks. We arrange a finger lever to unbolt the locks within the trigger guard, and in front of the ordinary trigger, but working in the opposite direction, so that the act of placing the finger on the trigger to discharge the gun causes the bolting trigger to be pushed forward, and so the possibility of omitting to unbolt before pulling the trigger is removed. This arrangement is equally applicable to military and other breach-loaders; it is illustrated by the Figure 16. The slide *o*, at the same time that it forces back the hammers, acts upon a horizontal bolt *w* centrally placed between them. The bolt *w* carries pins w^1, which when the bolt is pushed back restrain the triggers in the way already described in respect to the pins v^1 in Figure 12.

The fore end of the bolt w is slotted to receive the head of the small lever x, which is carried upon a pin at x^1, and has teeth at its lower end, with which teeth other similar teeth on the trigger like instrument y gear. This bolt trigger y can turn upon the pin y^1, and when the bolt w is forced back by the act of opening the breeches the bolt trigger assumes the position in which it is indicated in the Drawing. The finger then cannot be passed around the front lock trigger z until the bolt trigger y is displaced and moved forward in such manner as to unbolt the triggers. Thus, without appreciable loss of time, the unbolting is effected at the moment of firing.

Having thus described the nature of our said Invention, and the manner of performing the same, we would have it understood that we claim,—

First. Our improvement illustrated especially by the Figures 1, 2, 3, 4, and 4^a, and relating to the bolt d for securing the projection from the top rib between the barrels.

Second. Our improvement illustrated especially by the Figures 1, 2, 3, 10, 11, and 12, and consisting in coupling together of an horizontal bolt e and a vertical or nearly vertical bolt d by means of a cranked lever h.

Third. Our improvement illustrated by the Figures 11 and 12, and consisting in working the said bolts d and e by causing the movement of the locking lever to be communicated to the cranked lever h, and through it to the bolts d and e.

Fourth. Our improvement illustrated by the Figures 12, 13, and 14, and relating to guns with the Lefaucheux locking bolt, and consisting in connecting the Lefaucheux bolt by a link with a cranked lever operating the vertical or nearly vertical bolt d.

Fifth. Our improvement illustrated by Figure 15, and consisting in working the horizontal transvere bolt n from the locking lever by means of the intermediate slotted lever m.

Sixth. Our improvement illustrated by Figures 12, 16, 17, and 18, and consisting in effecting the cocking the locks on opening the breech by projections on the barrel lump operating on a rocker p and slide o.

Seventh. Our improvement illustrated by Figures 16, 17, and 18, and consisting in arranging the slide o to work in the same slot in the body which contains the bolt e.

Eighth. Our improvement illustrated by Figures 12, 19, 20, and 21, and consisting in the horizontal spindle s carrying intercepters s^1 automatically brought into action when the breeches are opened to prevent accidental discharge.

Ninth. Our improvement illustrated by Figure 19, and consisting in causing the horizontal bolt e when home to block and support the vertical or nearly vertical bolt d.

Tenth. Our improvement illustrated by Figure 16, and consisting in unbolting the locks by means of the trigger like instrument y, which has to be displaced before the finger can be applied to the trigger z.

Eleventh. Our improvements, substantially as described and as shewn by the Drawings annexed.

In witness whereof, I, the said Thomas Bissell, on behalf of myself and the said John Rigby, have hereunto set my hand and seal, this Nineteenth day of September, in the year of our Lord One thousand eight hundred and seventy nine.

THOS. BISSELL. (L.S.)

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