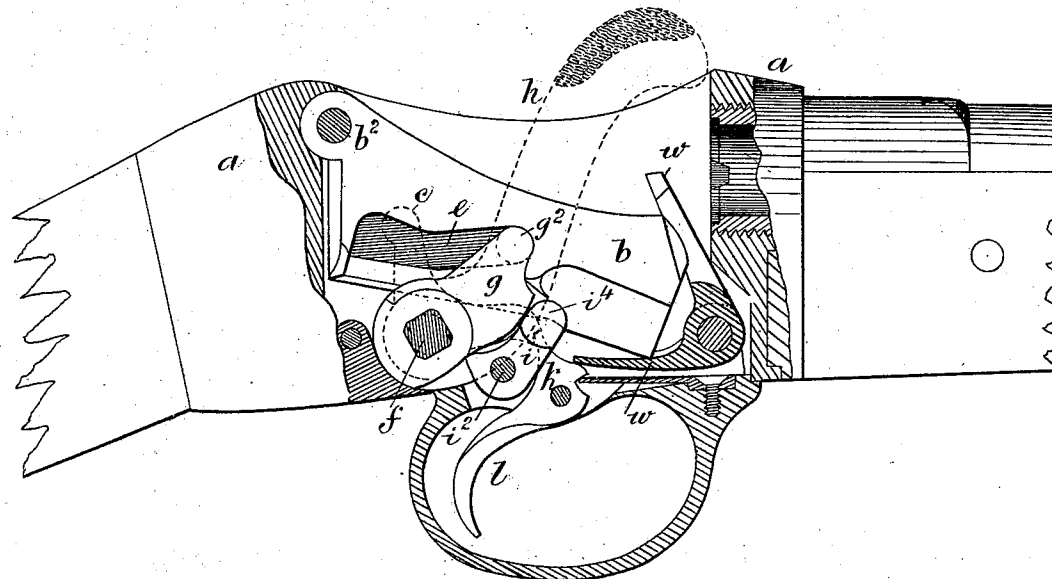
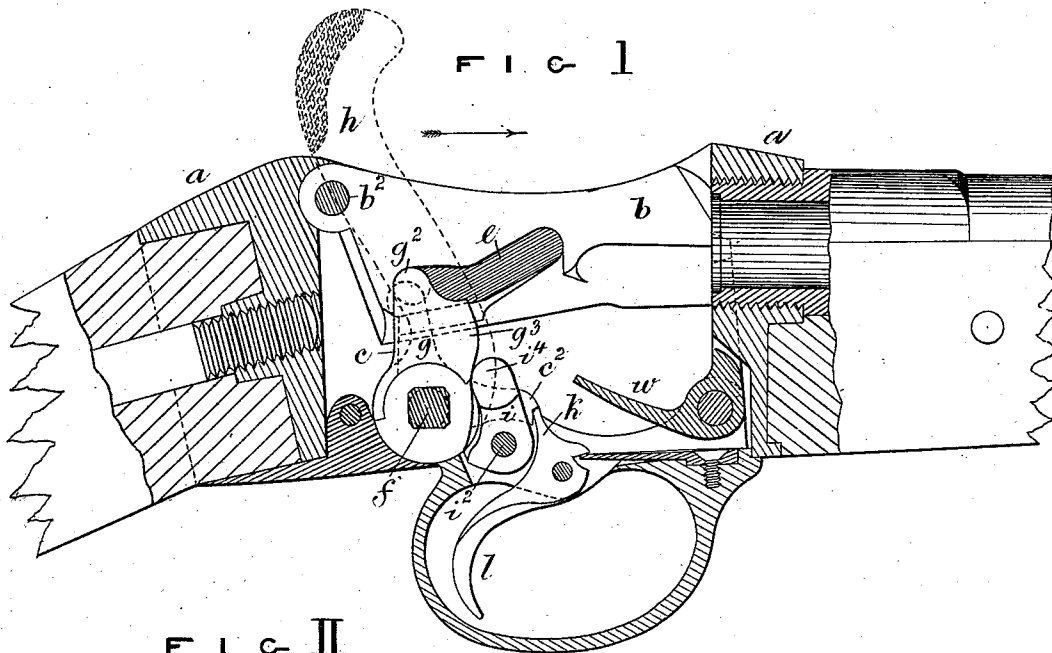


W. FIELD.
Breech-Loading Fire-Arms.

No. 200,041.

Patented Feb. 5, 1878.



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FIG III

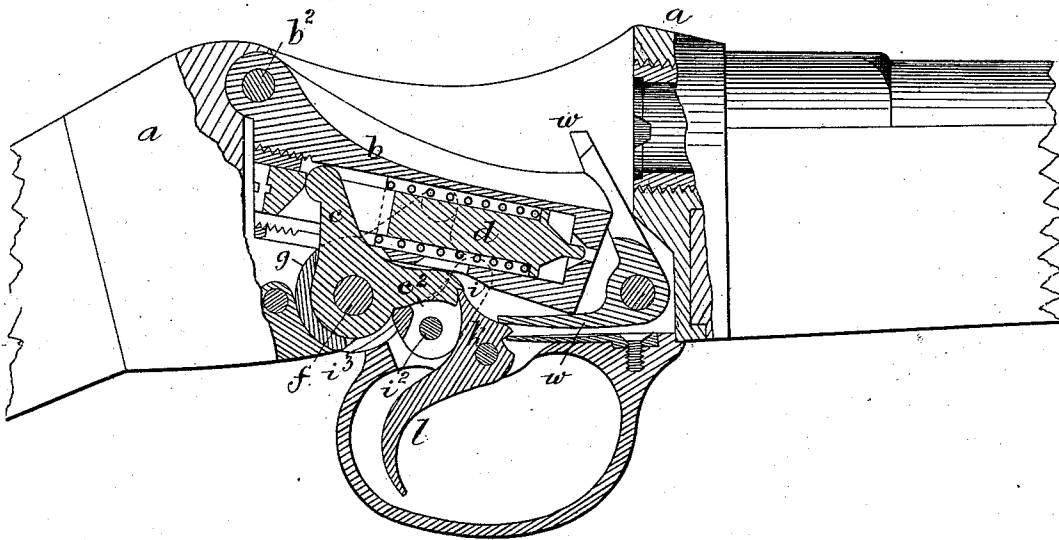


FIG IV

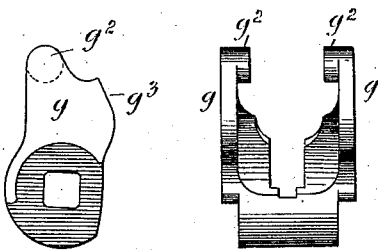
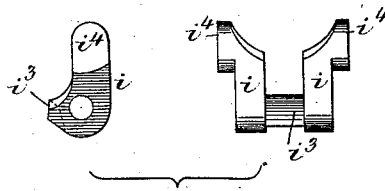


FIG V



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FIG VI

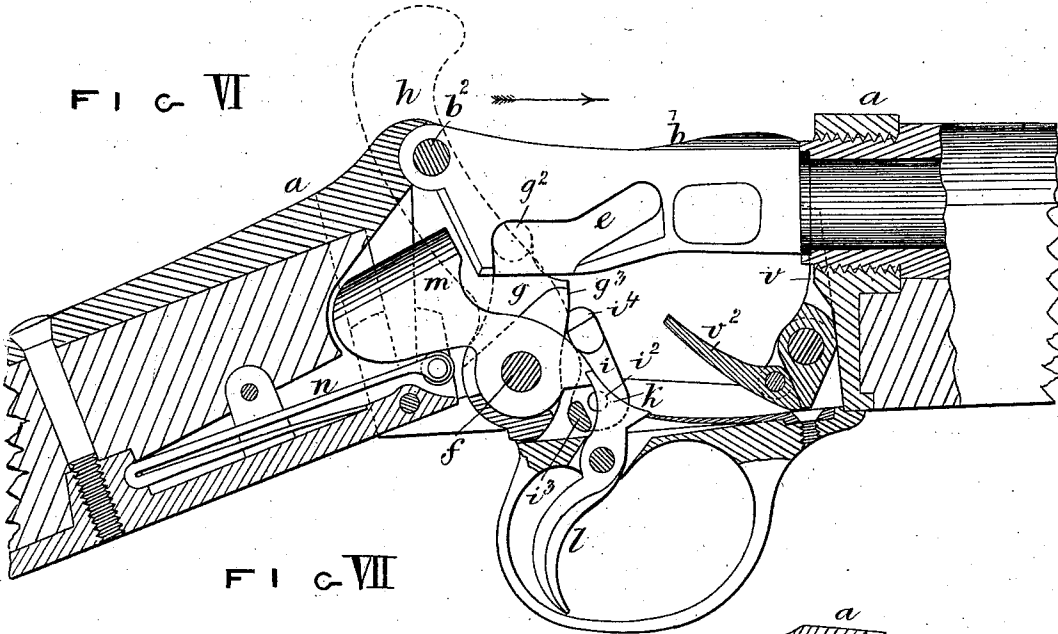


FIG VII

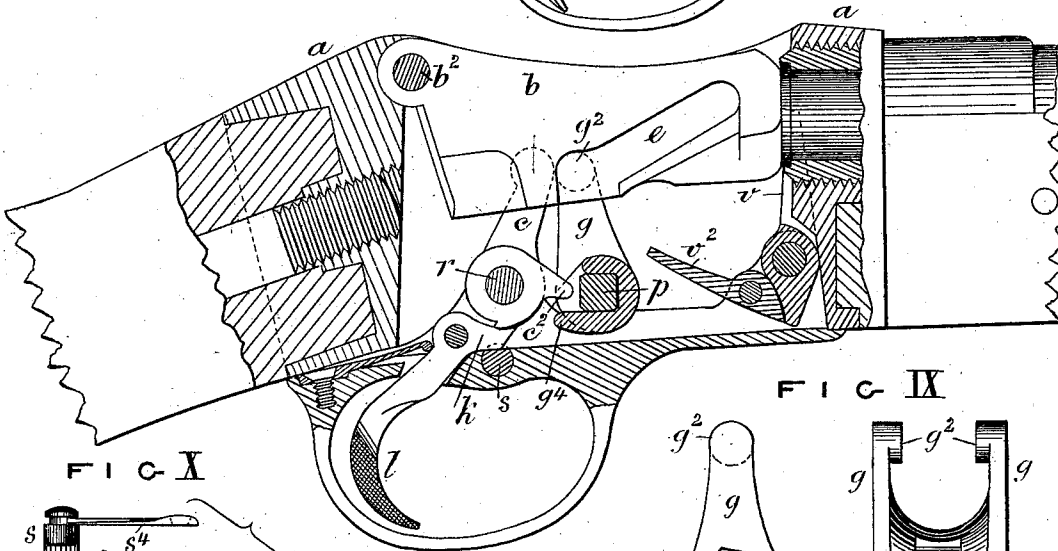


FIG IX

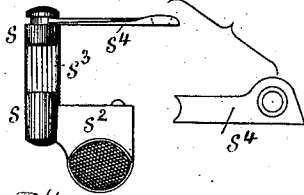
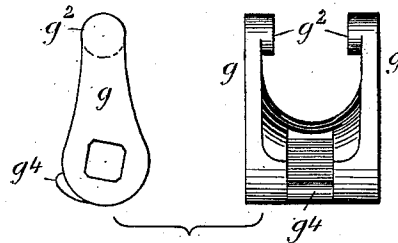


FIG IX



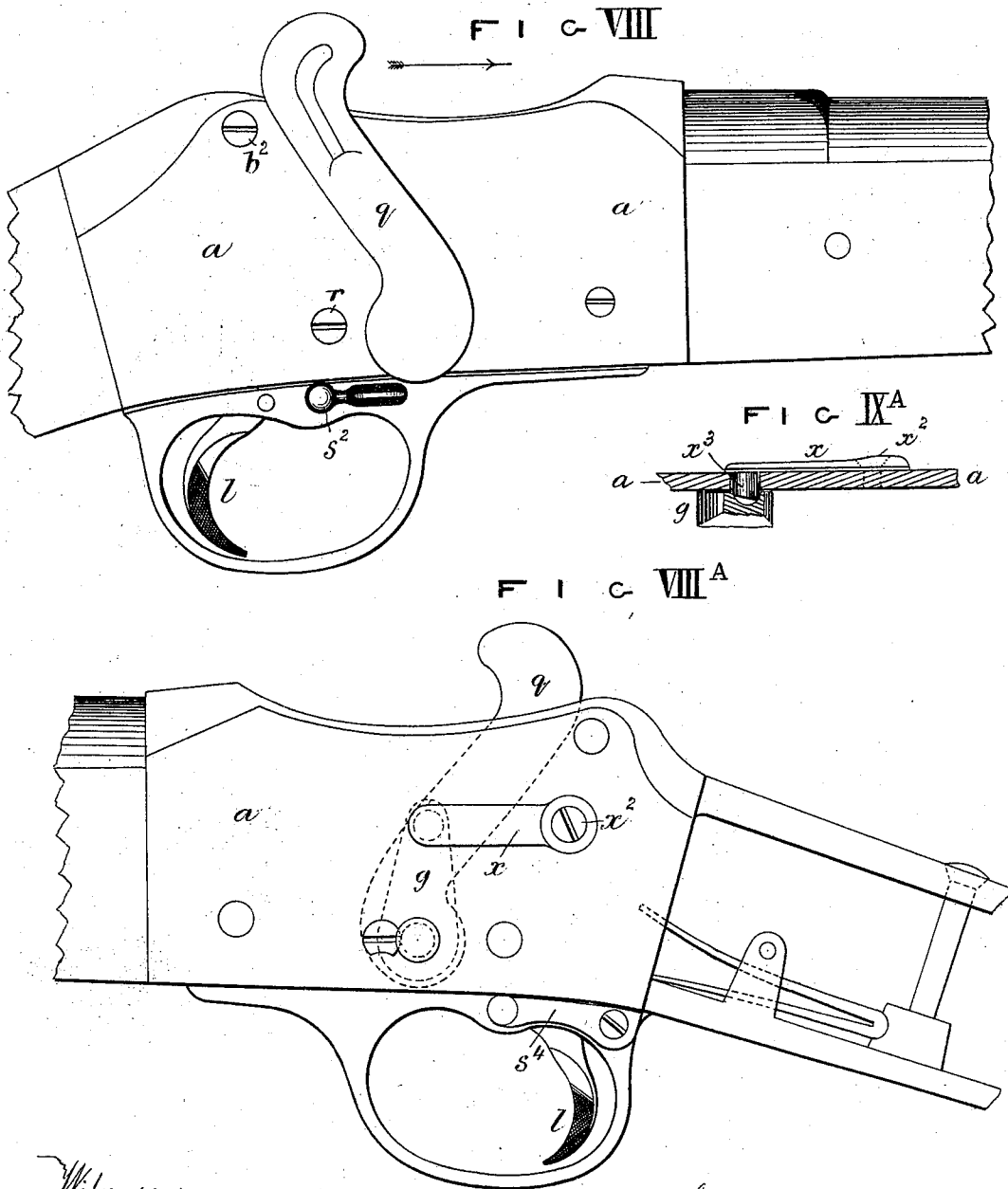
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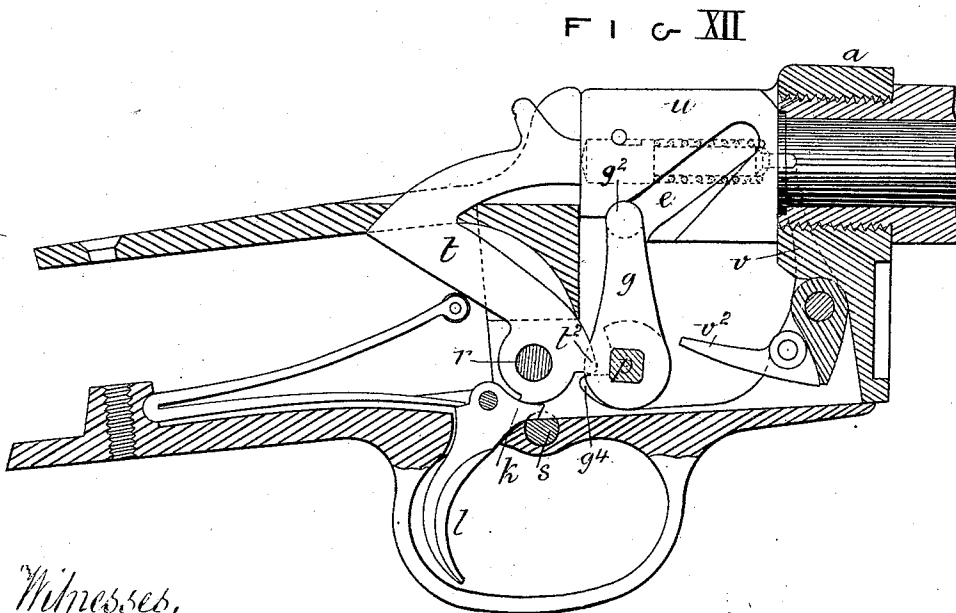
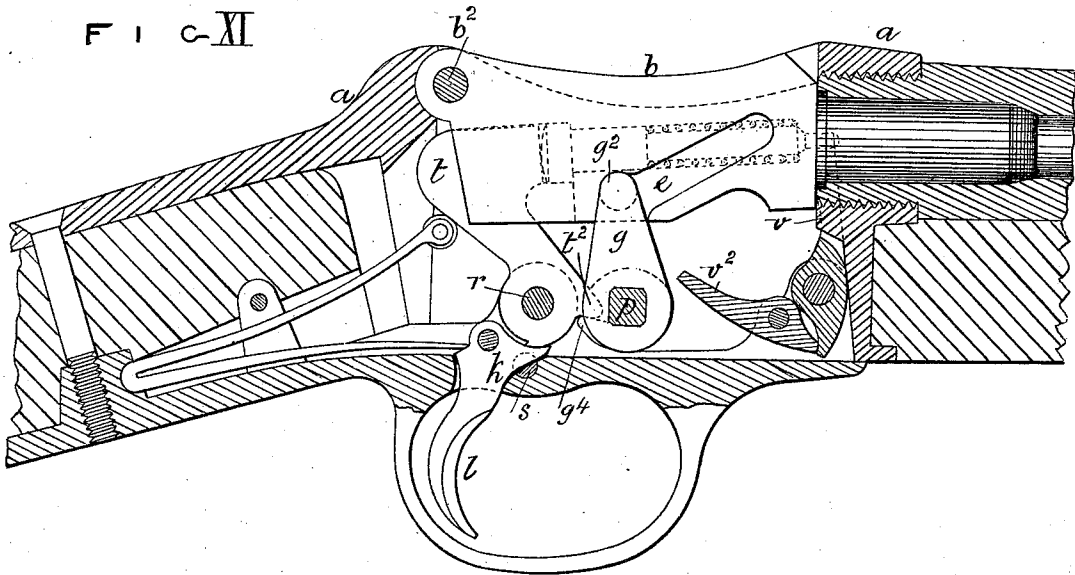
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UNITED STATES PATENT OFFICE.

WILLIAM FIELD, OF BIRMINGHAM, ENGLAND.

IMPROVEMENT IN BREECH-LOADING FIRE-ARMS.

Specification forming part of Letters Patent No. **200,041**, dated February 5, 1878; application filed December 20, 1877.

To all whom it may concern:

Be it known that I, WILLIAM FIELD, of Birmingham, in the county of Warwick, England, gun-maker, have invented new and useful Improvements in Breech-Loading Small-Arms, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

My invention has reference principally to breech-loading small-arms in which the breech is opened and closed by a hinged rising and falling block; but my said invention may also be applied to breech-loading small-arms in which the breech is opened and closed by a vertically-sliding breech-block.

My improvements consist of the construction and combination of parts, hereinafter described, for opening and closing the breech-blocks of the said small-arms, and for operating the cocking mechanism of the said small-arms.

I will first describe my improvements as applied to a hinged falling-block rifle.

For lowering and raising the hinged breech-block of the said rifle, I make in each side of the said breech-block a diagonal or inclined groove, and I place on the same axis as that on which the cocking-tumbler works a forked arm or lever, the inner forked ends of the said arm or lever being furnished with horns or projections, which horns or projections engage with and work in the diagonal or inclined grooves described, in the sides of the breech-block. The said axis carrying the forked lever, and on which the cocking-tumbler works, is actuated by a hand-lever external to the body of the rifle. The said hand-lever may be situated on the side or under side of the rifle; or, for cavalry purposes, the said hand-lever may be prolonged upward to the top of the body of the rifle. When the hand-lever is moved so as to cause the forked arm or lever to turn toward the muzzle of the rifle, the horns of the said arm or lever, by working in the inclined or diagonal grooves of the breech-block, cause the said block to descend and to open the breech. On returning the hand-lever to its normal position, the forked lever and its horns raise the said block and close the breech.

The mechanism for cocking the striking-pin

of the rifle is constructed and arranged as follows: On the lower half of the forked lever by which the breech-block is raised and lowered, and on the front face thereof, flat or curved projections or shoulders are made, and below the lower arm or tail end of the cocking-tumbler, which said tumbler is cranked, a small forked (or single) lever is jointed, for operating upon the tumbler for cocking the rifle. The rear face of the said cocking-lever bears against the flat or curved projections or shoulders of the opening and closing arm or lever. The cocking-tumbler is situated within the fork of the last-named lever, and also within the fork of the small cocking-lever. When the hand-lever is moved for opening the rifle, the flat or curved shoulders or projections of the opening and closing lever, moving toward the muzzle of the rifle, act upon and give motion in the same direction to the upper arm of the small cocking-lever, and the latter, by acting on the tail end or lower arm of the tumbler, causes its upper arm to move toward the butt of the rifle and cock the striking-pin, the cocking-tumbler being held in its cocked position by the engagement of the sear of the trigger with the bent on the tail or lower arm of the said tumbler.

In place of the tumbler hereinbefore described, a hammer actuated by a mainspring may be employed. In this arrangement the hammer, when liberated, drives forward the striking-pin to discharge the rifle.

Instead of placing the opening and closing arm or lever and the cocking tumbler or hammer on the same axis, as in the rifle hereinbefore described, the said arm or lever and cocking tumbler or hammer may be placed on independent parallel axes, the hand-lever for working the rifle being placed on the axis of the opening and closing arm or lever. In this arrangement I make on the front or boss part of the cocking tumbler or hammer a projection, and on the rear of the opening and closing arm or lever I make a shoulder, against which the projection on the tumbler or hammer bears, so that when the said opening and closing arm or lever is moved to open the rifle, the said shoulder, bearing against the projection of the tumbler, raises it for cocking the striking-pin, and in case of a hammer raises

it to full-cock. In this arrangement the sear is situated behind the tumbler or hammer, instead of in front thereof, as in the first-described arrangement.

I will now proceed to describe, with reference to the accompanying drawings, the manner in which my invention may be performed.

Figure 1 represents, partly in side elevation and partly in longitudinal section, the breech end of a hinged falling-block rifle, the mechanisms for opening and closing the breech and for cocking the striking-pin being constructed and arranged according to my invention, the breech of the rifle, Fig. 1, being represented closed and the parts in position for discharge. Fig. 2 represents the same view as Fig. 1, but with the parts in the positions they respectively occupy when the breech is opened for the introduction of a fresh cartridge and the discharging mechanism cocked by the opening of the breech. Fig. 3 represents the same view as Fig. 2, but with the whole of the breech mechanism in section. Fig. 4 represents, in side and front elevation, the opening and closing lever of the breech-block separately; and Fig. 5 represents, in side and front elevation, the cocking-lever separately.

The same letters of reference indicate the same parts in Figs. 1, 2, 3, 4, and 5.

a is the breech-shoe, to the rear end of which the rising and falling block *b* is hinged at *b*². *c* *c*² is the cocking-tumbler which cocks the striking-pin *d* of the rifle, (see Fig. 3,) the said striking-pin being of the usual kind. In the said breech-block *b*, and on each side thereof, a diagonal or inclined groove, *e*, is made, and on the same axis *f* as that on which the cocking-tumbler *c* *c*² loosely turns, a forked arm or lever, *g* *g*, is rigidly fixed.

The forked arm or lever *g* *g* is shown separately in Fig. 4. The upper and inner ends of the branches of the said forked lever *g* *g* are provided with horns or projections *g*² *g*², which engage with and work in the diagonal or inclined grooves *e* *e* in the sides of the breech-block *b*.

On the end of the axis *f*, carrying the forked lever *g* *g* and cocking-tumbler *c* *c*², and external to the shoe or body *a*, is a hand-lever, *h*, by which the opening and closing and cocking mechanisms are worked. The said hand-lever *h* is prolonged upward to the top of the gun, and is especially fitted for use by cavalry; or a short hand-lever at the side of the rifle may be employed, or the rifle may be worked by a hand-lever on the under side of the body.

When the hand-lever *h* is moved in the direction of the arrow, Fig. 1, so as to cause the forked lever *g* *g* to move toward the muzzle end of the rifle, the horns *g*² *g*² of the said forked lever *g*, by working in the inclined or diagonal grooves *e* *e* in the breech-block *b*, cause it to descend and open the breech, as illustrated in Figs. 2 and 3, where the breech is represented open ready for recharging the rifle. The opening of the breech also effects the cocking of the tumbler-lever *c* *c*² and the

striking-pin *d*, as hereinafter described. After the introduction of a cartridge into the barrel through the open breech, the hand-lever *h* is returned to its normal position, or the position represented in Fig. 1. The forked lever *g* is thereby caused, by its horns *g*² working in the inclined or diagonal grooves *e* of the block *b*, to raise the said block and to close the breech.

Instead of the forked lever *g* *g*, a single arm or lever may be used.

The mechanism for cocking the striking-pin *d* is as follows: Below the lower arm or tail end *c*² of the cranked tumbler-lever *c* *c*² a cocking-lever, *i*, is jointed at *i*² to the guard-plate of the gun. The said cocking-lever *i* is shown separately in Fig. 5. The arm or tail end *c*² of the tumbler-lever is situated within the fork of the opening and closing lever *g* *g*, and also within the fork of the cocking-lever *i* *i*. The cocking-lever *i* is provided with a cross-bar, *i*³, on which the tail end *c*² of the tumbler-lever bears, as best seen in Fig. 3. On the front face of each of the branches *g* *g* of the opening and closing lever projections or shoulders, marked *g*³ *g*³, are made, which bear against projections or shoulders *i*⁴ *i*⁴ on the upper end of the arms of the cocking-lever *i* *i*. The shapes of the respective shoulders of the opening and closing lever *g* and cocking-lever *i* are best seen in the separate views, Figs. 4 and 5.

On moving the hand-lever *h* from the position represented in Fig. 1 to that represented in Fig. 2 for opening the breech of the rifle, the projections or shoulders *g*³ *g*³ of the opening and closing lever *g* act upon the shoulders *i*⁴ *i*⁴ of the cocking-lever *i*, and give motion in the same direction to the upper arms of the said cocking-lever. By this motion of the cocking-lever its lower arms, carrying the cross-bar *i*³, are lifted, and the said bar *i*³, by acting on the tail end or lower arm *c*² of the tumbler-lever *c* *c*², turns the said tumbler-lever on its axis *f*, and causes its upper arm *c* to move toward the butt-end of the rifle and cock the striking-pin *d*. The cocking-tumbler is held in its cocked position by the engagement of the sear *k* of the trigger *l* with the bent on the tail or lower arm *c*² of the said tumbler.

The manner in which the opening and closing lever *g* *g*, when the hand-lever *h* is moved in the direction of the arrow, Fig. 1, acts upon the cocking-lever *i*, and the latter upon the tumbler-lever *c* *c*², for cocking the striking-pin *d*, will be readily understood by an examination of Figs. 1 and 2, and the manner in which the tumbler-lever *c* *c*² is held in its cocked position will be understood by an examination of Fig. 3.

On returning the hand-lever *h* to the normal position, Fig. 1, the opening and closing and cocking levers *g* *g* and *i* *i* also take their normal positions, as seen in Fig. 1, leaving the tumbler-lever *c* *c*² and striking-pin *d* in their cocked positions. The rifle is then ready for discharge by pressing upon the trigger *l*, the releasing of the tumbler-lever *c* *c*² and the advance of

the striking-pin d effecting the discharge of the rifle.

Fig. 6 represents, in longitudinal section, another breech-loading rifle containing my improvements. In this rifle a hammer, m , actuated by the flat mainspring n , is used in place of the tumbler-lever c c^2 and the coiled mainspring described and represented in the arrangement, Figs. 1, 2, and 3, and the said hammer m drives forward, when discharged, a striking-pin of the ordinary kind in the block b , and as shown in the rifles, Figs. 11 and 12, hereinafter described.

In the arrangement, Fig. 6, the hammer m is represented in its cocked position, ready to discharge the rifle; and it will be seen by reference to the said Fig. 6 that the tumbler of the hammer is acted upon by the cross-bar i^3 of the cocking-lever i , instead of the said cross-bar acting upon the tail end of the tumbler-lever c c^2 , when a tumbler-lever is employed. The action of the breech-block raising and depressing mechanism and the cocking mechanism of the hammer-rifle, Fig. 6, is the same as the action of the mechanisms of the falling-block rifle hereinbefore described, and corresponding parts are marked with the same letters of reference.

Fig. 7 represents in longitudinal section, and Fig. 8 in side elevation, a hinged falling-block rifle in which the opening and closing lever and the cocking-tumbler are situated on independent parallel axes. Fig. 8^A represents an elevation of the gun taken on the side opposite to that at which the elevation, Fig. 8, is taken. Fig. 9 represents the opening and closing lever detached, and Fig. 9^A represents a portion of the breech-shoe in section, and shows the action of the spring-arm by which the opening and closing lever is locked.

In this arrangement, g g^2 is the opening and closing lever fixed on the axis p , the horns g^2 of the said lever engaging with the inclined or diagonal slots e in the block b , for raising and lowering it, in the manner hereinbefore described. On the said axis p is the hand-lever q (shown in Fig. 8) for operating the opening and closing lever g g^2 , and also the cocking-tumbler c c^2 . The cocking-tumbler c c^2 turns loosely on the axis r and the arm c of the said tumbler engages with the striking-pin in the breech-block. At the base or boss part of the opening and closing lever g g^2 is a shoulder, g^4 , which is made to bear against the projection c^2 of the tumbler c . A sear, k , on the trigger l engages with the bent in the tumbler c , and holds the said tumbler in its cocked position.

In the drawing the tumbler is represented in its discharged position. When the hand-lever q is moved in the direction of the arrow, Fig. 8, the lever g g^2 depresses the block b , in the manner before described, and, by the action of the shoulder g^4 on the said lever g g^2 against the projection c^2 of the tumbler, the arm c of the tumbler is raised into its cocked position, and the striking-pin connected with

the said tumbler-arm, also brought to its cocked position for firing.

By means of the safety-bolt s s^2 s^3 , (shown separately in Fig. 10,) the trigger may be prevented from being pulled. The cylindrical axis s of the safety-bolt is cut away at s^3 , and when the said axis is turned so as to present the cut-away part s^3 to the sear k of the trigger, the said trigger may be pulled and the rifle discharged. When, however, the safety-bolt is turned by its thumb-plate s^2 through a quadrant, so as to bring an uncut-away part of the axis s under the sear k , the said sear cannot descend by pressure on the trigger, and the accidental discharge of the rifle is prevented.

In order to prevent the accidental turning of the safety-bolt, a spring-arm (marked s^4 in Figs. 8^A and 10) works in a depression or neck at the end of the axis s of the said bolt, the free end of the said spring-arm s^4 being notched for the axis to work in.

On the handle s^2 of the safety-bolt is a stud, and two holes are made in the guard, into one or other of which the said stud snaps by the pressure of the spring s^4 when the safety-bolt s is in its acting or non-acting position.

In order to hold the horned raising and lowering lever firmly in the position in which the breech is closed, I place on the opposite side of the breech-shoe to that at which the hand-lever is situated a spring-arm, x , fixed to the shoe at x^2 . (See Figs. 8^A and 9^A.) The free end of this spring-arm carries a stud, x^3 , inclined at its end, which stud passes through a hole in the shoe, and, when the horned raising and lowering lever g has reached its highest position, springs into a cupped recess made on the outside of one of the horns of the said lever g , and thereby holds the said lever firmly in its raised position.

Fig. 9^A represents the spring-arm x in conjunction with the horn described of the lever, and with a portion of the breech-shoe, and illustrates the manner in which the stud of the spring-arm drops into the recess in the said horned lever. When the hand-lever h is moved to open the breech the stud x^3 is lifted from the recess in the horned lever, and the said lever is released.

Fig. 11 represents, in longitudinal section, a rifle in which a hammer, t , is placed on the axis r , instead of a tumbler, the tumbler or boss part of the hammer t having a projection, t^2 , against which the shoulder g^4 of the opening and closing lever bears. The action of this rifle is the same as that last described, and corresponding parts are marked with the same letters of reference.

Fig. 12 represents, in longitudinal section, the last-described arrangement applied to a rifle having a vertically-sliding breech-block. In the said Fig. 12, u is the vertically-sliding breech-block, working in a mortise in the breech-shoe a , the said block u being provided with inclined or diagonal grooves e , as described, with respect to the hinged rising

and falling block *b*. The construction and action of the raising and lowering and cocking mechanisms of the vertically-sliding block rifle, Fig. 12, are the same as those described with reference to Fig. 11, and corresponding parts are marked with the same letters of reference.

The mechanism hereinbefore described and illustrated in Fig. 6, where the opening and closing lever and hammer are situated on the same axis as the hand-lever, may be applied to rifles having vertically-sliding breech-blocks.

In Figs. 1, 2, and 3, an ordinary bell-crank-lever extractor, marked *w*, is represented; but in Figs. 6, 7, 11, and 12, an extractor of a different construction is represented. The said extractor, Figs. 6, 7, 11, and 12, consists of a compound lever, the two parts of the said lever being marked respectively *v* and *v*². The upper arm of the vertical lever *v* carries the extractor-fork, and the outer arm of the nearly-horizontal lever *v*² is acted upon by the falling block *b* or *u*. By the depression of the outer arm of the lever *v*² the short arm or tail end of the said lever *v*² acts upon the short arm or tail end of the other lever, *v*, and the extracting-lever proper, *v*, is thereby made to start and extract the empty cartridge-case with great power.

The extractor last described may be used with the rifle, Figs. 1, 2, and 3, instead of the bell-crank extracting-lever represented.

Having now described the nature of my invention, and the manner in which the same is to be performed, I wish it to be understood that I claim as my invention of improvements in breech-loading small-arms—

1. The construction and combination of parts hereinbefore described, and illustrated in the several figures of the accompanying drawings, for lowering and raising the hinged rising and falling breech-blocks and vertically-sliding breech-blocks of breech-loading small-arms—that is to say, a breech-block provided with an inclined or diagonal groove in one or in both of its sides, and having combined with it and placed on the axis of the hand-lever of the rifle or gun a single or forked horned lever, the horn or horns of which single or forked lever engage with and work in

the inclined groove or grooves in the block, and by their action lower or raise the breech-block when the hand-lever is moved in the required direction, substantially as described and illustrated.

2. The construction and combination of parts hereinbefore described, and illustrated in Figs. 1, 2, 3, 4, and 5 of the accompanying drawings, for cocking the tumblers or tumbler-levers and striking-pins of hinged rising-and-falling block guns or rifles—that is to say, a cocking-lever placed in front of the horned raising and lowering lever of the rifle, and below the tail end of the tumbler or tumbler-lever, which cocking-lever is arranged to be acted upon by projections on the front of the said raising and lowering lever, and made to act upon the tail end of the tumbler or tumbler-lever, and cock the said tumbler or tumbler-lever when the hand-lever is moved in the proper direction to open the breech, the several parts of the raising and lowering lever and cocking-lever being constructed, arranged, and operating substantially as described and illustrated.

3. The combination, with the hand-lever and horned lever, engaging a diagonally-grooved either hinged or vertically-sliding breech-block, of a spring-hammer and percussion-pin and cocking mechanism, substantially as herein shown and set forth.

4. The combination of a diagonally-grooved breech-block, to be operated by a hand-lever through the medium of a horned lever, both of which are fixed on one and the same axis, with a cocking mechanism operated by the hand-lever referred to, but arranged upon an independent axis and parallel with that of the hand-lever, substantially as set forth.

5. The combination, with a hand-lever actuating a breech-block to cause the same to rise and fall, as described, of a compound extracting-lever operated by the breech-block, as and for the purposes set forth.

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