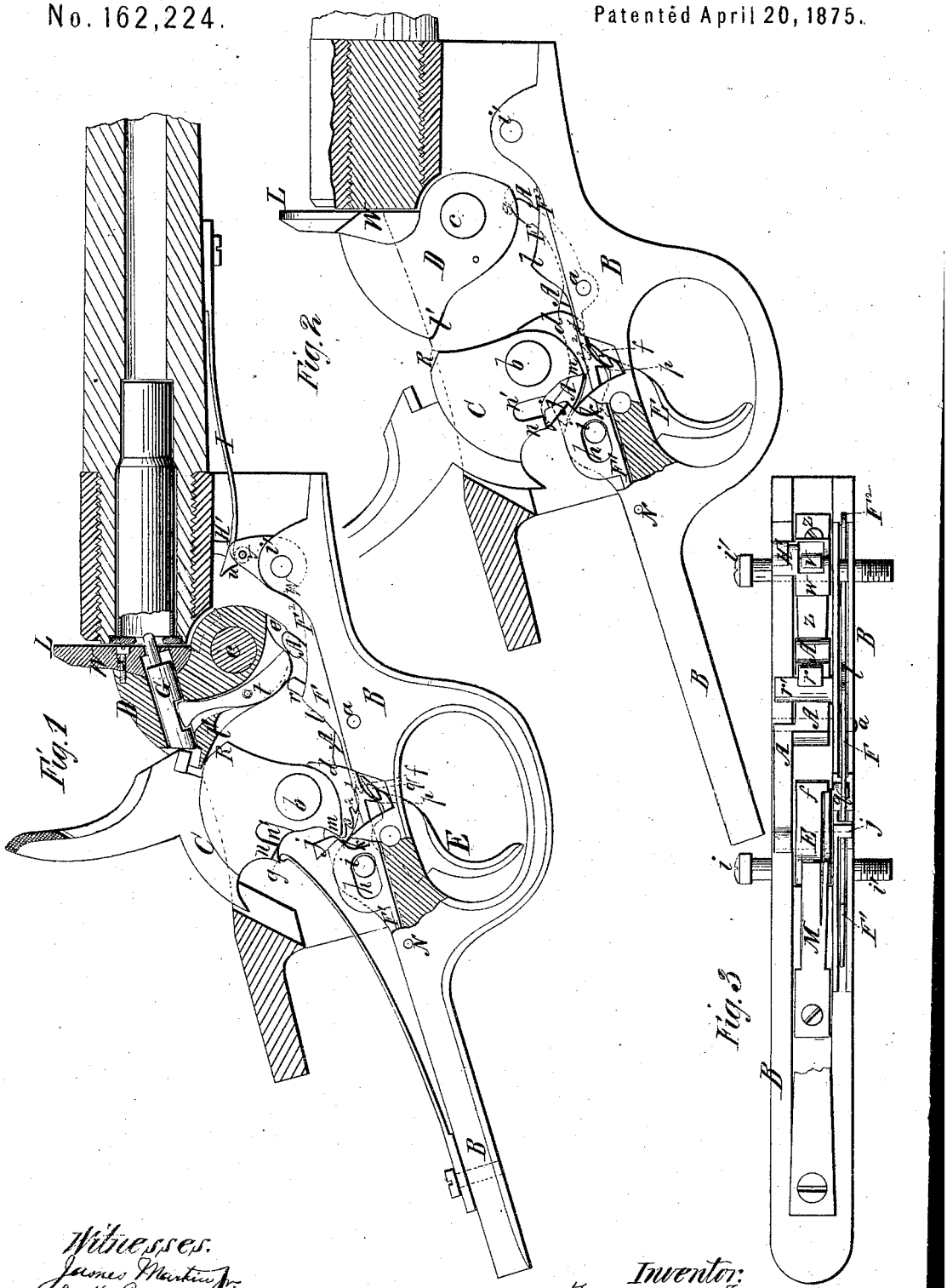
3 Sheet 1.

F. W. FREUND.

Breech-Loading Fire-Arm.

No. 162,224. Patented April 20, 1875.



Witnesses.
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3 Sheets--Sheet 2.

F. W. FREUND.

Breech-Loading Fire-Arm.

62,224. Patented April 20, 1875.

Fig. 4

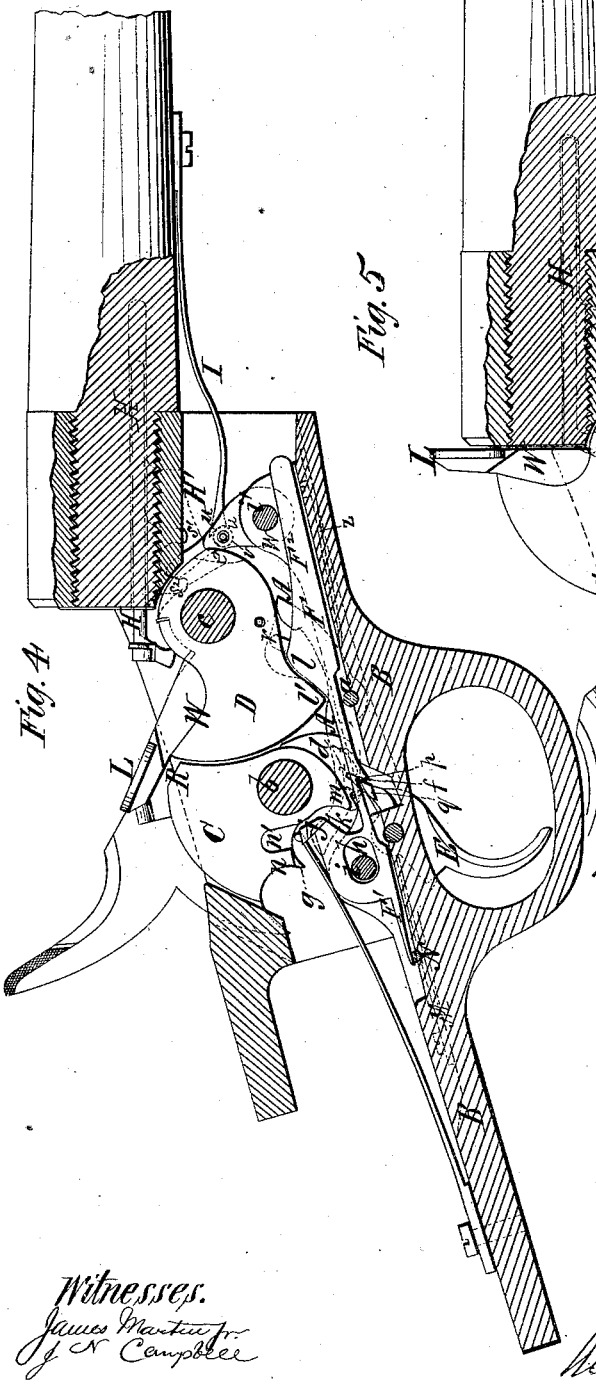
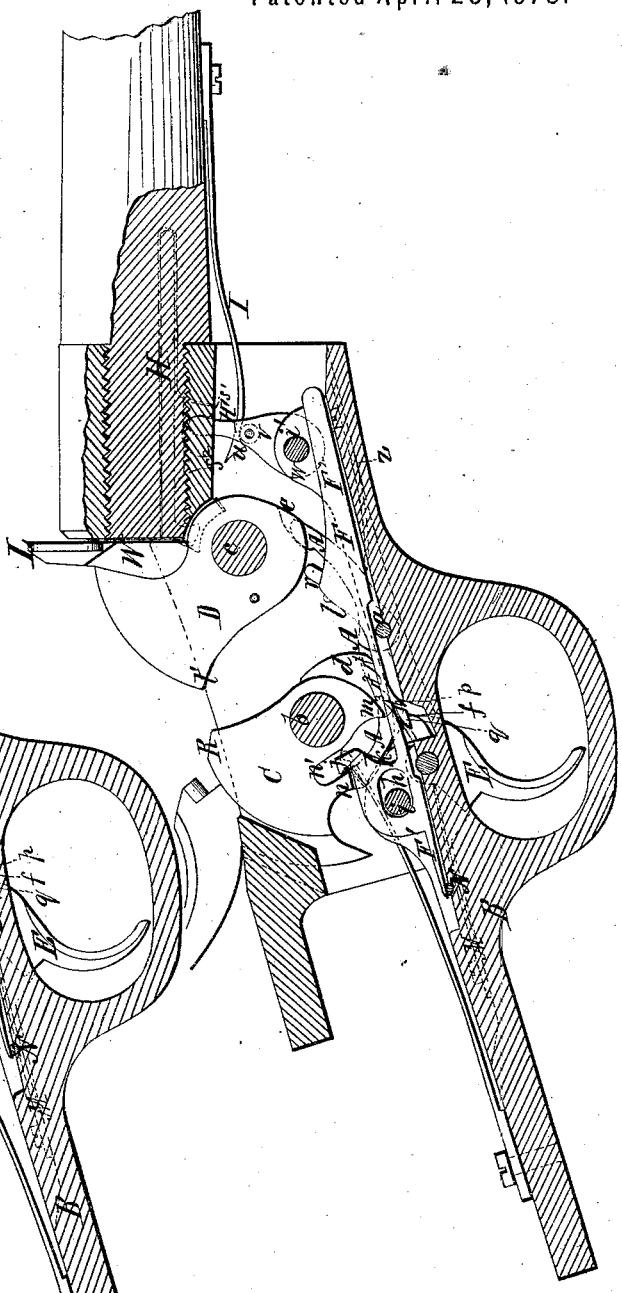


Fig. 5



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3 Sheets--Sheet 3.

F. W. FREUND.

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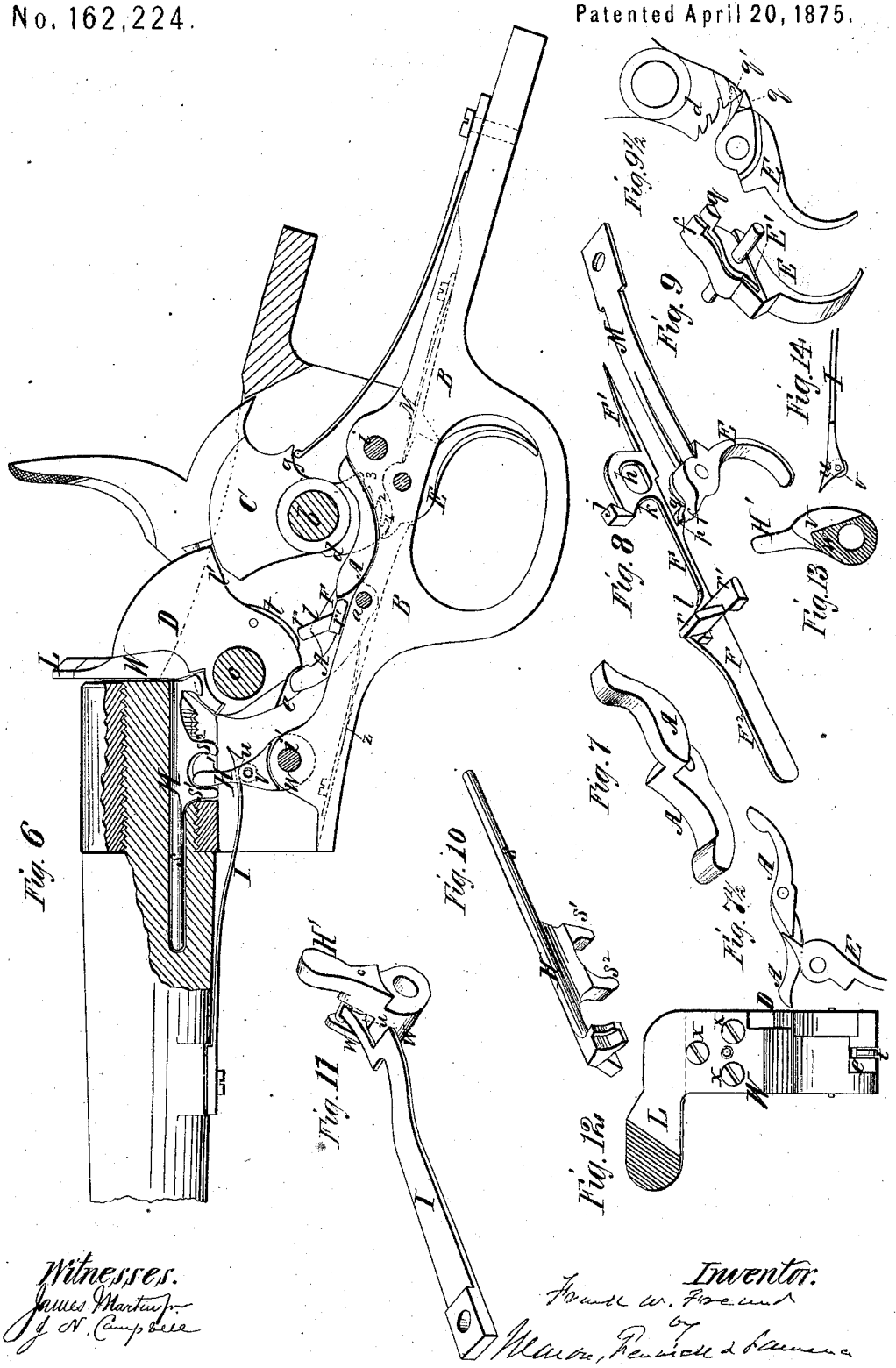

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UNITED STATES PATENT OFFICE.

FRANK W. FREUND, OF DENVER, COLORADO TERRITORY.

IMPROVEMENT IN BREECH-LOADING FIRE-ARMS.

Specification forming part of Letters Patent No. **162,224**, dated April 20, 1875; application filed March 19, 1875.

CASE D.

To all whom it may concern:

Be it known that I, FRANK W. FREUND, of Denver, county of Arapahoe and Territory of Colorado, have invented an Improvement in Breech-Loading Fire-Arms; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings making part of this specification, in which—

Figure 1 is a longitudinal view of the gun, partly in elevation and partly in section, as it appears just after being fired. Fig. 2 is a similar view of a portion of the gun as it appears when the hammer is cocked on the second notch, and before the breech has been opened and the empty shell extracted. Fig. 3 is a top view of the trigger-plate and its attachments. Fig. 4 is a longitudinal section of the gun as it appears when cocked on the second notch and when the breech-block has been opened and the empty cartridge-shell extracted. Fig. 5 is a similar section of the gun as it appears after it has been recharged, breech fully closed, and the hammer cocked on the third notch. Fig. 6 is a longitudinal view of the gun, partly in section and partly in elevation, the parts being in the same position as in Fig. 1, but viewed from the opposite side. Fig. 7 is a perspective view of the lever which fastens the breech block. Fig. 7½ shows a modification of the lever shown in Fig. 7, and which locks and controls the hammer. By this modification the trigger, as well as the breech-block and hammer, is controlled by said lever—that is, the trigger is locked against casual displacement. Fig. 8 is a perspective view of the slide carrying the hammer-check and firing-pin holder, and also of the slide-sear, trigger-sear, and forked sear-spring. Fig. 9 is a perspective view of the trigger and its sear, and of the slide-sear, showing clearly how the latter is hung independently on the trigger-pin and lies upon a shoulder of the trigger below said pin, and is operated by the trigger-sear as soon as it is released from the notches of the hammer-tumbler. Fig. 9½ shows a modification of the trigger, auxiliary sear, and tumbler of the hammer. By this modification the auxiliary sear *q* is unlocked by the projection *q'* of the tumbler *d* after the hammer has passed from the trigger beyond the first notch, No. 1, instead of by the trigger. Fig. 10 is a perspective view of the extractor. Fig. 11 is a perspective view of the lever, its hub, and the spring for operating the extractor. Fig. 12 is a front face view of the breech-block. Figs. 13 and 14 show a modification of the lever and its hub and spring for operating the extractor.

The object of my invention is: First, to provide for loading the gun while the hammer is held in a partly cocked and loading position without a possibility of its being fully cocked until the breech-block has been opened to admit the charge and again closed; second, to move and hold the firing-pin out of contact with the cartridge when the cartridge is in the chamber and the breech-block fully closed, and during the operation of closing the breech-block against the cartridge, and also during the operation of full-cocking the hammer and only to release the firing-pin when the trigger is pulled for firing the charge, and the hammer entirely free from the trigger; third, to permit the hammer to be lowered to the second or first notch without releasing the firing-pin, and also to permit the hammer to be full-cocked after it has been thus lowered, without releasing the firing-pin; fourth, another object is to modify and improve the mechanism employed for fastening the breech-block and preventing casual displacement thereof while the hammer is on the full-cock; fifth, to simplify the mechanism employed for holding the hammer when partly cocked; sixth, to make the rear end of the lever, which fastens the breech-block against casual displacement, act as a check against the full-cocking of the hammer in cases where the breech-block is left partly open; seventh, to effect a simultaneous movement of the slide which has the hammer-check connected to it, and of the shell-extractor, at the moment that the breech-block has been fully opened; eighth, to readjust the safety-checking mechanism at the last part of the movement of the hammer toward the firing-pin, or fulminate, and also by the same motion and at the same stage of the movement release the firing-pin; ninth, to improve cartridge-extractors so that they may

be operated by percussive blows, both in their inward and outward movement; and, further, to lessen the expense of manufacturing and applying these extractors.

In the accompanying drawings, A represents a vertically-vibrating lever pivoted to the trigger-plate at *a*. One arm of this lever occupies a position within the channel of the trigger plate B and the other arm a position over one of the sides of said plate. This lever is curved, and its rear arm is on a higher plane than its front arm. The rear arm terminates in rear of the pin *b* of the hammer C, and the front arm a little in rear of the axis *c* of the breech-block D, and rests upon a flat spring, Z, attached to the trigger-plate. The rear arm is seated in a curved recess cut in one edge of the trigger-plate, and the front arm occupies a position in the channel of said trigger-plate. The pivot of the lever is supported by the side pieces of the trigger-plate. This construction of the lever affords room in rear of its pivot for the hammer-tumbler and other mechanism to be applied and operated in, and also prevents straining of the pivot of the lever when the hammer has been moved up as far as it is intended it shall be moved. *d* is a tumbler provided on the hammer, said tumbler having three cocking-notches, 1 2 3, two of which are safe. *e* is a socket formed on the under side of the breech-block. The hammer is chamfered off very slightly at the point R, so as to wedge very slightly upon the breech-block as it passes the hammer and breech-block. This is done in order to prevent hanging of the hammer upon the breech-block when the breech-block is slightly open, and to insure a perfect closing of the breech-block by the hammer as it is falling to fire the charge. The hammer is so shaped that the latter can be swung open past the former when the sear *f* of the trigger E is in notch 2 of the tumbler *d*. *g* is a shoulder formed on the hammer C for preventing the lever A from ceasing its hold upon the breech-block when the breech is closed and the hammer full-cocked, and the sear of the trigger is in notch No. 3. This shoulder comes against the rear end of the lever A when the hammer is full-cocked, and prevents a casual release of the breech-block. When the hammer is cocked on notch No. 1 or No. 2, or when it is bearing against the firing-pin, there is room for the rear end of the lever to move up and down in between the shoulder *g* and the trigger-plate B, as is plainly shown in Fig. 6. The curved rear side of the breech-block is so formed that the forward end of the lever A is depressed, and the rear end thrown up, by the act of opening the breech-block for charging the gun, and owing to this it is impossible to cock the hammer on notch No. 3 before the breech-block is again closed. F is a slide for preventing the hammer being fully cocked after the charge has been fired, and before a new charge has been put into the chamber, and thus avoiding accidental discharges during the charging operation. This slide is placed in a groove on the other side of the trigger-plate, and along the main portion of its length between its ends it is supported by the trigger plate or frame. A rear-spring extension, F^1, and a front tapering tail, F^2, are formed on it. It is held in place by a pin, *i*, passed through a slot, *h*, cut horizontally through it.

The rear end F^1 of the slide rests with a spring action upon a pin, N, and the forward end is passed under another pin, *i'*. The spring portion F^1 bearing down on pin N keeps the slide from moving casually after it is thrown back, and the tapering portion bearing against the pin *i'* effects the same result when the slide is thrown forward. Upon the slide near its rear end a check, *j*, and a hooking-offset, *k*, are constructed, and forward of these an inclined elevated projection, *l*, is formed on the upper edge of the slide. *m* is a hooking-tail on the hammer C, corresponding to the hooking-offset *k*. *n'* is a slot, and *n* a check, formed in and on the hammer. The check *n* corresponds with the check *j* in form, and the slot *n'* is of a form to admit the check *j* into it. The rear of the breech-block is curved or made with a slight concave, as at *l'*, near its top. By providing the slide F, and constructing it and the parts just mentioned as described and shown, the hammer will, in falling to discharge the gun, quickly throw the slide backward by means of its tail *m* coming against the offset *k*, and thereby bring the check *j* in such a position with respect to the check *n*, as shown in Figs. 1 and 2, that it will prevent the hammer being full-cocked before the breech-block has been fully opened, and while the breech-block is being opened for recharging the gun the curved rear side *l'* of the breech-block takes hold of the projection *l* of the slide and forces the slide forward, and thereby brings the check *j* in such a position with respect to the slot *n'* that the said check will enter the slot *n'* when the hammer is moved for the purpose of full-cocking it, and thus all interference with full-cocking the hammer is withdrawn, when the arm is loaded and the breech-block closed; but not until this has been effected, and all is safe, does this occur. *p* is a stop-notch on the slide F, and *q* a slide-sear on the trigger E, for preventing the firing-pin G moving to a firing position while charging the gun, and while the breech-block is either partly or fully closed, and while carrying the gun loaded with the hammer either partly or full cocked.

It will be seen that the trigger is formed with a side projection or depressed shoulder, E', below its pivot, and that the slide-sear is hung over this shoulder, so that when the trigger is pulled and the hammer-sear freed the shoulder will lift the rear end of the slide, and thereby free its front end from the notch of the slide. The hammer-sear and slide-sear are both controlled by the one sear-spring M, which is forked, and its prongs made relatively

weak and strong, the hammer-prong being strong and the slide-prong being weak, according to the work to be done by these respective prongs.

A projection, *r*, is provided on the slide for bearing against the lower end of the firing-pin lever *t*, and thereby preventing said lever from moving after it has withdrawn or forced back the firing-pin. This projection *r* can only move away from the lever *t* after the slide is forced back by the hook *m* of the hammer taking hold of the hooking-offset *k*, and this can only take place after the trigger has been pulled far enough to disengage the sear *f* from the notch 3 or the notches 1 and 2 of the hammer-tumbler, and the sear *q* from the notch *p*. The projection *r'* is sustained by resting on the sides of the trigger-plate.

It will be understood from Fig. 9 that the hammer-sear and the slide-sear are independent of each other when the hammer is being cocked, but combined in their movement when the trigger is pulled for firing the gun. The one spring, M, by being forked, acts against both sears, and yet permits either sear to operate independently, as occasion requires. The slide is readjusted in gear with the sear *q*, after the hammer is partly cocked, by the breech-block being opened and caused to strike the projection *l*, and thereby move the slide forward; such forward movement, as before stated, also moves the check *j* to the position shown in Figs. 4 and 5. Thus a two-fold object is obtained by this single slide and its connections.

The extractor H is very similar to the one heretofore patented by myself, so far as arrangement goes; but in this instance it is made with a round stem, *s*, which is fitted in a circular passage, formed either between the barrel and frame or in the frame itself.

This construction enables me to turn the stem in a lathe, and to channel or bore out the passage for its reception with boring and channeling tools of a lathe, and at very slight expense comparatively; and in order to use such stem, and not have it turn in its seat, flat-sided lugs s^1 s^2 are formed on the extractor in rear of the stem, which is dovetailed or made concave on its upper side, as shown, and the lugs are on a central offset, and the extractor is fixed in its position by inserting this offset in the barrel or frame in a corresponding dovetail. For moving the extractor a lever, H', and spring I are employed. The lever H' is pivoted to the trigger-plate B by the pin *i'*, and the spring I is attached to the barrel of the gun. This lever extends up between the lugs s^1 s^2, and plays freely back and forth between these lugs. The spring has a beveled or V-shaped projection, *u*, on the under side of its free end, which moves upon a friction-roller, V, or upon a projection without a roller, set or formed in an eccentric hub, W, of the lever. Instead of the roller V being on the pin, it may be attached to the spring and roll over an incline of the hub, as shown in Figs. 13 and 14.

Under this construction, when the breech-block is opened the extractor will be drawn out a certain distance, and the V-shaped projection *u* of the spring will then suddenly fall behind the roller or projection of the hub of the lever, and give it a sudden blow, which will cause the lever to fly backward and give a percussive blow against the rear lug s^2, and thereby cause the extractor to completely expel the empty shell from the chamber with great power and rapidity. This construction of the extractor is very free from friction, cheap, durable, and convenient, and it avoids the use of extra pins and holes for fastening it in place, and it cannot fall out when the breech-block is opened, and this is the case even when the spring and lever are removed or broken. For avoiding difficulty and expense, experienced in attaching the thumb-piece L to the breech-block, a face-plate, W, corresponding to the front face of the ordinary extracting breech-block, is provided, and on this plate the thumb-piece L is forged, as shown in Fig. 12. This plate, with thumb-piece, is fastened to the breech-block by means of screws *x x*.

In practice, I make the plate of iron, and case-harden the same, and with a gradually-increased thickness from top to bottom, and curved at its back, so that the pressure of the exploded charge shall not be exerted against the screws alone, but against the breech-block in an oblique direction, and also that sharp angles or corners, which are liable to break out, being determined lines of fracture, shall be avoided.

The operation is as follows: Suppose the gun loaded and full-cocked, as in Fig. 5. Pull the trigger, so as to release the hammer-sear *f* and the slide-sear *g*, as in Fig. 1. The descent of the hammer forces and moves the check *j* directly in the path of the check *n*, and also releases the firing-pin. The raising of the hammer for reloading is arrested on the second notch by the check *j*, as shown in Fig. 2, and the opening of the breech fully starts the extractor, whereupon the empty cartridge-shell is expelled by a sudden percussive blow of the lever upon the lug s^1, caused by the V part of the spring I falling down forward of the eccentric hub and reacting against it, and at the same moment the projection *l* of the slide is struck by the part *l'* of the breech-block, and the check *j* is moved in the path of the slot *n'*, and the sear of the slide interlocked with the notch *p* of said slide, and the projection *r* is brought in position for fastening the firing-pin out of position while the breech-block is closed, and when closed, and until the hammer is set free to fire the arm and passes beyond the first notch. The closing of the breech after a cartridge is introduced into the chamber causes the lever A to fall into the socket *e*.

The full-cocking of the hammer causes the shoulder-stop *g* of the hammer to fasten the lever A against the breech-block, so that the

breech-block cannot be casually or otherwise opened or moved until the hammer is allowed to descend against the firing-pin, or to the second or first notch of the tumbler. The lowering of the hammer to the second notch or first notch does not change the position of the check *j*, but it releases the breech-block from the positive hold of the lever A. The firing of the gun on full-cock readjusts the check *j*, and releases the firing-pin from the projection *r*, said projection and its slide being forced back to the position shown in Fig. 1 by this movement, by the hammer-tail acting on the slide-offset *k*, in which position it is out of gear with the sear *q*. The recocking of the hammer on the second notch, and the opening and closing of the breech, readjust the parts to the position shown in Fig. 4, when the hammer can be full-cocked on the third notch, as shown in Fig. 5. The slide E is kept from any casual change in either of its extreme positions by pressing with its spring-extension F′, on its rear end, against its pin or support N, and by wedging slightly with its tapering front end E^2 under the pin *i′*, as illustrated in the drawings. The rear arm of the lever A is arrested and supported in its downward movement by the trigger-plate B, and thus the pin on which it turns cannot be strained to too great a degree.

By my invention a gun is made which can be safely carried while loaded, and such gun can be safely loaded without any possibility of its being brought to a full-cock while being loaded.

What I claim is—

1. The check *j* of the slide or part F, in combination with the hammer, for the purpose of preventing the full-cocking of the hammer, substantially as and for the purpose described.

2. The projection *k* of the slide or part F, in combination with the hammer, having a projection, *m*, for moving the slide back, substantially as and for the purpose described.

3. The projection *l* of the slide or part F, in combination with the breech-block, for the purpose of moving the slide forward to set the check, or to withdraw the firing-pin when the breech is open, substantially as and for the purpose described.

4. The sear-notch *p* of the slide or part F, in combination with the auxiliary sear *q*, and the hammer-trigger, substantially as described.

5. The combination of the projections *l* and *k* of the slide or part F, with the breech-block and hammer, for the purpose of moving the slide forward and backward, substantially as described.

6. The stop *r* of the slide or part F, suitably combined with the firing-pin, for preventing the firing-pin moving forward when the breech-block is fully closed, and while the part F is locked, substantially as described.

7. The lever A, in combination with the hammer, for fastening the breech-block when the hammer is full-cocked, substantially as described.

8. The combination of the lever A and the breech-block, for preventing the full-cocking of the hammer while the breech-block is open, or only partly closed, substantially as described.

9. The firing-pin, combined with and operated by the hammer and breech-block, and suitable means for withdrawing said pin, so that it is retracted when the breech-block is in any position in which the firing-pin might be brought in contact with the cartridge, and when the hammer is in any position except in contact with the firing-pin, substantially as described.

10. The combination of a hammer, a breech-block, a movable intermediate part, F, having suitable projections, and a lever, A, whereby the hammer is prevented from being cocked when the breech-block is open, and the breech-block prevented from being opened when the hammer is cocked, substantially as herein described.

11. A vibrating lever, H′, combined with a cartridge-shell extractor, having separated lugs or shoulders s^1 s^2, for producing a sudden percussive blow upon the extractor, substantially as described.

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