

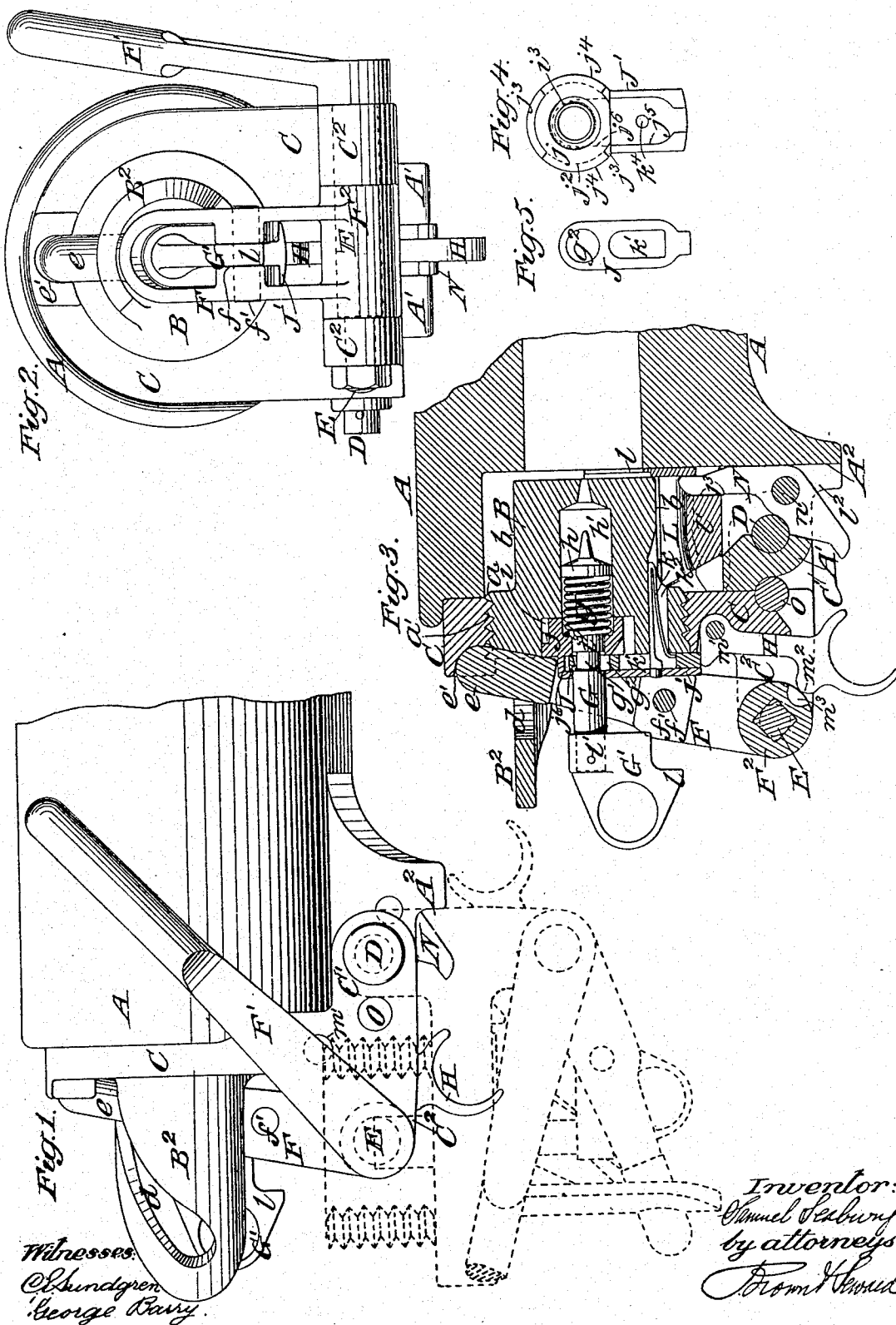
(No Model.)

4 Sheets—Sheet 1.

S. SEABURY.
BREECH LOADING CANNON.

No. 514,967.

Patented Feb. 20, 1894.



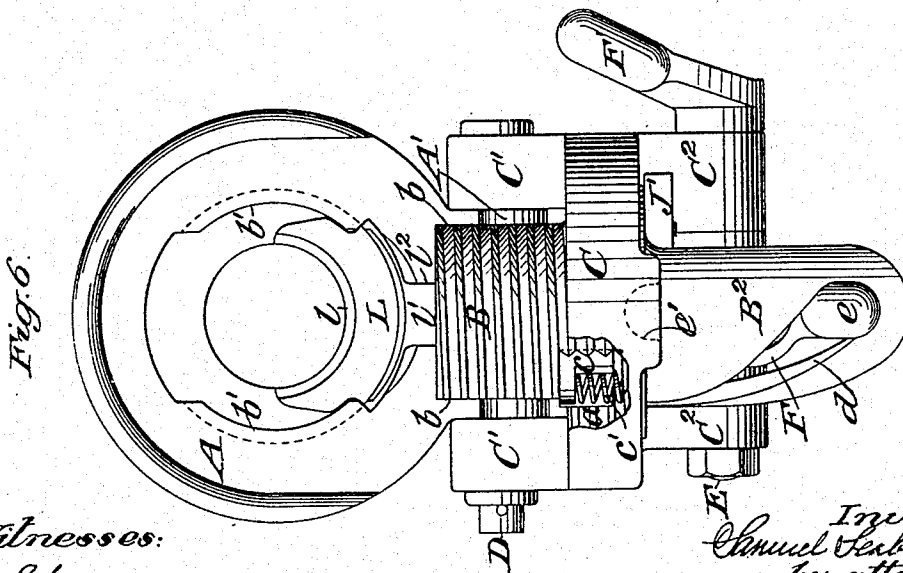
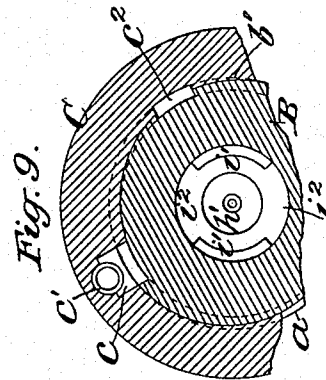
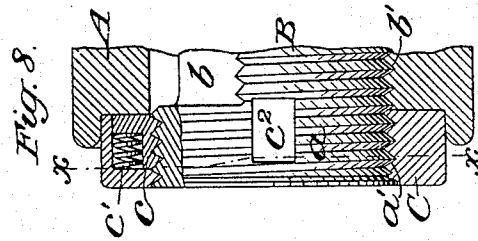
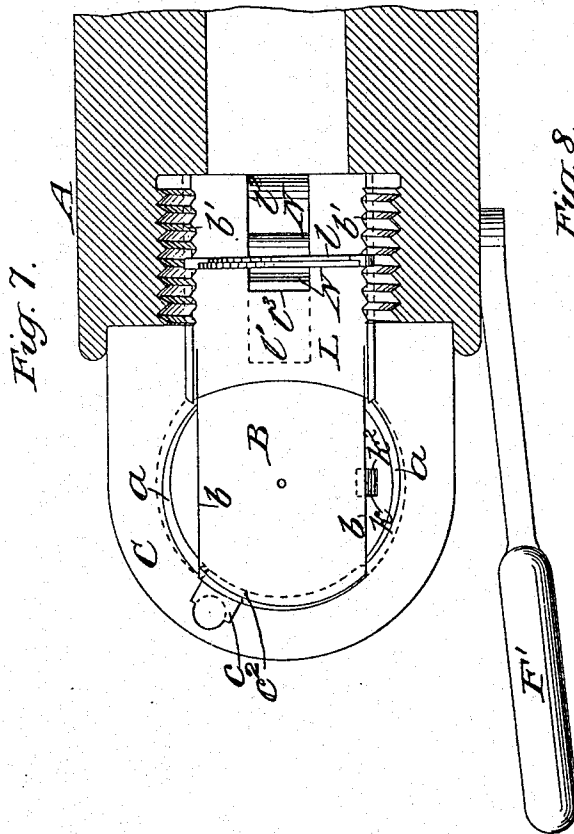
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4 Sheets—Sheet 2.

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BREECH LOADING CANNON.

No. 514,967.

Patented Feb. 20, 1894.



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Inventor:
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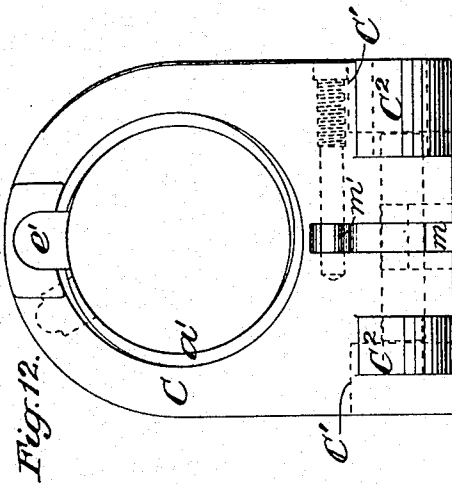
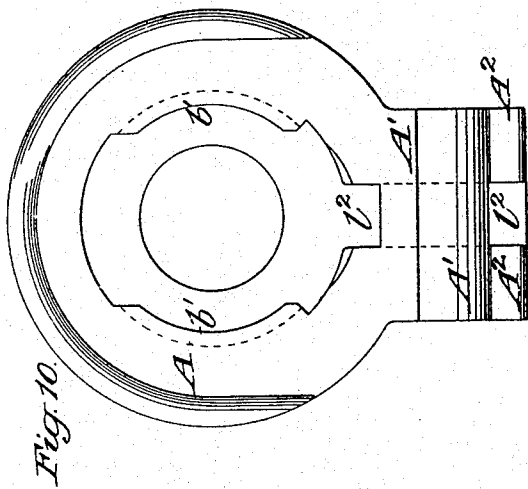
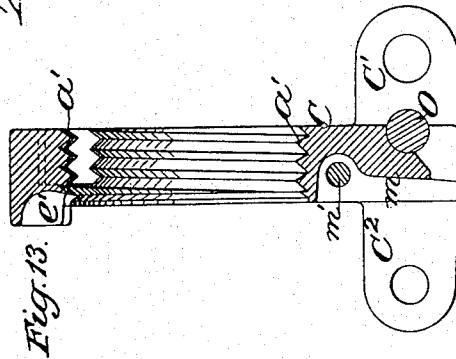
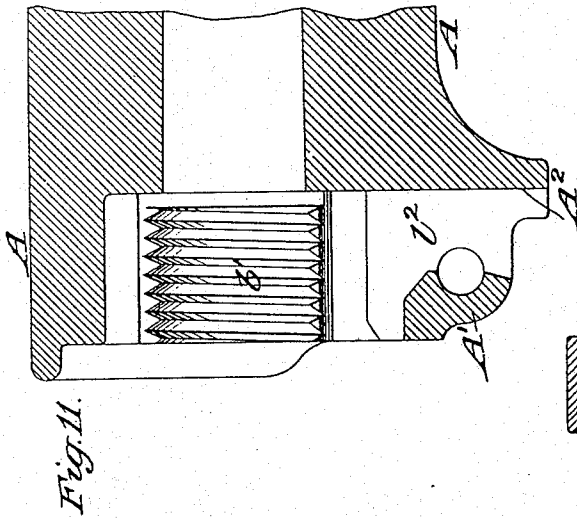
(No Model.)

4 Sheets—Sheet 3.

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BREECH LOADING CANNON.

No. 514,967.

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(No Model.)

4 Sheets—Sheet 4.

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BREECH LOADING CANNON.

No. 514,967.

Patented Feb. 20, 1894.

Fig. 16.

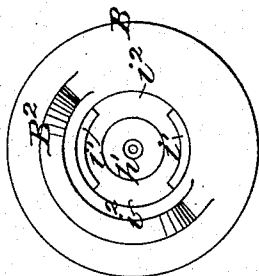


Fig. 15.

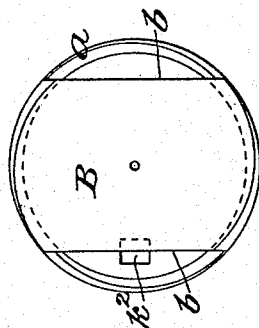
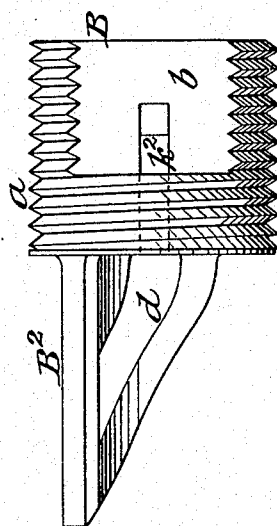


Fig. 14.



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UNITED STATES PATENT OFFICE.

SAMUEL SEABURY, OF THE UNITED STATES NAVY.

BREECH-LOADING CANNON.

SPECIFICATION forming part of Letters Patent No. 514,967, dated February 20, 1894.

Application filed April 22, 1893. Serial No. 471,436. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL SEABURY, lieutenant, United States Navy, at present residing at Bayonne, in the county of Hudson and State of New Jersey, have invented a new and useful Improvement in Breech-Loading Cannon, of which the following is a specification.

This improvement relates to breech-loading cannon having a mutilated screw-threaded breech-block and a carrier therefor which is hinged to the breech of the cannon for the purpose of opening and closing the chamber thereof, and in which the said block is capable of turning for the purpose of engaging and disengaging the mutilated screw-thread of the block with and from a corresponding mutilated screw-thread in the bore of the cannon.

The improvement consists in the combinations hereinafter described and claimed in the breech mechanism of such a cannon whereby the construction and operation are much simplified and liability to premature discharge is obviated.

It also consists in certain novel features in the firing mechanism and in the cartridge shell extractor of such a cannon.

I will now proceed to describe the improvement with reference to the accompanying drawings and afterward point out its novelty in claims.

Figure 1 is a side view of the breech parts and breech mechanism of a cannon embodying my improvement. Fig. 2 is a rear view of the same with the breech closed. Fig. 3 represents a central vertical section of the same corresponding with Fig. 2. Fig. 4 is a front view of the sear case. Fig. 5 is a front view of the sear. Fig. 6 is a rear view of the breech and breech mechanism showing the breech open. Fig. 7 is a central horizontal sectional view corresponding with Fig. 6. Fig. 8 represents an axial section of part of the breech and of the carrier and also shows the breech-block partly in section, and shows in section the device for locking the breech-block against turning in the carrier when the breech is open. Fig. 9 represents a section of parts of the breech-block and carrier at right angles to Fig. 8 in the line $x x$ showing also the locking device just mentioned. Fig. 10 is a rear view of the breech of the gun, the

breech-block and carrier and their mechanism being omitted. Fig. 11 represents a central vertical section corresponding with Fig. 10. Fig. 12 is a rear view of the carrier detached from the cannon. Fig. 13 represents a central vertical section of the carrier. Fig. 14 is a side view of the breech-block. Fig. 15 is a front view of the said block, and Fig. 16 is a rear view of the same.

A is the breech of the gun.

B is the breech-block and C is the breech-block-carrier hinged to swing upward and downward on a horizontal pin D which attaches it to the lower part of the breech, the said pin passing through two widely spaced lugs C' C' on the front of the carrier and through a lug A' on the breech. The carrier has also two lugs C² C² on its rear which contain bearings for the pin E which constitutes the fulcrum of the operating lever F F' of the breech mechanism which will presently be described.

On the lower part of the breech forward of the lugs A' there is a downward projection or offset A² the front of which is, as shown in Fig. 11, approximately square with the bore of the gun, and presenting a broad flat bearing against which the carrier will be arrested and supported as indicated in dotted lines in Fig. 1, in the horizontal position to which it comes in opening the breech.

The breech-block B consists of a short screw having its whole length threaded. The rear portion a of its screw-thread by which it is attached to the carrier is so screwed into a corresponding screw-thread a in the carrier as to turn therein, and is un mutilated, except at one point c^2 (Figs. 8 and 9) for the reception of a locking bolt c as hereinafter explained; but the other and greater portion of the length of the screw which enters into the breech is mutilated to the extent of two quarter sections by being cut away or flattened on two opposite sides as shown at b in Figs. 6, 7, 14, and 15. The screw-thread b' in the breech being correspondingly mutilated, a quarter turn will properly engage the block with and disengage it from the breech. On the back of this breech-block is a rearwardly projecting slotted yoke B² through which passes the arm F of the operating lever F F', which arm is secured in any suitable manner, as by a square

fit, to the portion of the fulcrum pin E which passes through it; the other arm F' of the said lever, which is represented as made in the same piece with the fulcrum pin, serving as a handle by the manipulation of which all the operations of the breech mechanism, the cocking of the firing pin and the extraction of the discharge cartridge shells are effected.

The yoke B² above mentioned on the back of the breech-block is represented as made in the same piece with the breech-block, and is a portion of a hollow cylinder concentric with the axis of the breech-block. The forward portion of the slot d in the said yoke is straight and parallel with the axis of the breech-block and from this front portion the slot takes a spiral form that the solid round upper end e of the arm F of the operating lever working in it may perform the operation of turning the block in the carrier and in the breech of the gun. The said end e, when the arm F is in its most forward position in which the breech-block is screwed up, enters a notch e' in the upper part of the rear of the carrier C and so assists in locking the breech-block as will be hereinafter more fully explained.

For the purpose of locking the breech-block against turning in the carrier while the said block and carrier are withdrawn from the breech and thereby insuring the proper relation between the mutilated portions of the screw-threads of the block and breech when the block is returned for closing the breech, the locking bolt c hereinbefore mentioned (see Figs. 8 and 9) is fitted to slide back and forth in a mortise cut in the interior of the carrier across its screw-thread a'. This locking bolt is substantially square in transverse section as shown in Fig. 9 and is hollowed out from the rear as shown in Fig. 8 to receive a spiral spring c' (see Fig. 8) which abuts against the back of the mortise in the carrier and exerts a constant tendency to push forward the bolt c. The inner or under side of the said bolt is screw-threaded to correspond with the threads on the breech and in the carrier, and while the breech is closed the front end of the said bolt bears against the breech of the gun as shown in Fig. 8, and is thereby held back so that the threads on the bolt match with those of the breech and carrier and permit the turning of the breech in the carrier to produce the engagement of the screw-threads of the block and breech to lock the breech-block for firing and to unlock it for opening; but in that part of the block which comes opposite the bolt c when the block is turned to the position for withdrawing it from the breech there is the mutilation c² (Figs. 9 and 10) before mentioned. This is simply a groove cut across the screw-threads and long enough to allow the spring c', as soon as the carrier begins to be drawn back, to push the bolt so far that the screw-thread on the bolt does not match with those in the block and carrier. The block is thus prevented from turning and so is locked in the carrier during the loading

of the gun and until by the closing up of the carrier after loading, the bolt is pushed back in the carrier, by its front end coming against the breech, far enough to bring its screw-threads into matching relation with those of the block and carrier and permit the turning of the block.

Below the solid part e of the arm F of the operating lever the said arm is slotted for the passage through it of the firing pin G, the slot being contracted as shown at f in Fig. 2, that it may constitute a guide to the flattened downwardly projecting head G' of the said pin while room is left above the so contracted portion for the passage of the body of the firing pin. Through this contracted portion f of the lever arm is inserted and firmly fixed the transverse pin f' which operates on the lower part of the head G' for the purpose of cocking the said pin. The firing pin has in it a groove g' to engage with the sear J and is provided with a collar h which fits the central cavity h' provided in the breech-block for the said pin and behind which the coil main spring g surrounds the said pin, the said spring being contained, as shown in Fig. 3, partly within the said central cavity and partly within a corresponding cavity in the box or sear-case J' within which the sear J slides up and down across the back of the breech-block.

The sliding sear J is like that which constitutes part of the subject matter of my United States Letters Patent No. 474,974, dated May 17, 1892, having in it a hole g² through which the firing pin G passes and a slot k' for the sear spring k. The sear-case J' is like that shown in the same patent except that, instead of being simply a straight plate within which the sear slides, it consists of a plate having on the upper part of its face a circular boss j as shown in Fig. 4 which fits a counterbore i provided in the breech-block at the back of the central cavity. The lower part of the said plate J' is grooved as shown at j³ in Fig. 4, to form a guide to the sear and this guide is continued in the form of a mortise j⁶ in the upper part of the said case within or behind the boss j. The said boss j through which the firing pin passes has in front a countersunk cavity i³ which comes opposite the central bore or cavity h' provided in the breech-block for the firing pin and main spring, and receives a portion of the length of the main spring. The said boss j has in its outer circumference a groove indicated by the dotted lines j² in Fig. 4, and the flange formed in front of this groove is mutilated as indicated at j³ in the same figure to form two quadrantal lugs j⁴ to engage with corresponding quadrantal lugs i' (see Fig. 16) formed by a groove and mutilated flange within the counterbore i in the breech-block. The placing of this sear-case at the back of the breech-block with the lugs j⁴ opposite the corresponding mutilations i² in the groove of the counterbore i permits the said lugs to enter the

groove in the latter and by giving the sear-case a quarter turn when so entered, the lugs j^4 will be brought behind the corresponding lugs i' in the counterbore and the case thereby secured in a position in which the sear is opposite the trigger H. If the case should not be turned to this position the trigger could not operate upon it when the breech is locked, as the lower end of the groove j^5 in the sear case is only just wide enough for the trigger to enter. In this position the sear-plate is secured by the sear spring k which consists of a double or forked strip of steel, has its upper end tightly inserted into a hole k^4 in the sear-case and its lower end presses upon the bottom of the slot k' in the sear, the greater part of its length being contained within a mortise k^2 which runs through the breech-block from the back of the latter into one of the side cavities b formed in the latter by the mutilations of its screw-thread. To insert the firing mechanism into the breech-block, the sear is first placed in its plate J' and the firing pin G, having its head detached, is inserted into the plate J' and through the sear from the front of the said plate J' which is then placed and secured in the breech as hereinbefore explained. The sear spring K is then inserted through the mortise k^2 of the breech-block from the rear thereof and through the slot k' in the sear and into the hole k^4 in the sear plate J' , and it is retained in place by its lower end projecting over the front of the mortise while at the same time, by its upper part fitting the mortise k^2 laterally, it serves as a key to lock the sear plate against turning in the breech-block and to secure the sear in the only position in which the trigger can act upon it. The head G' of the firing pin, having a ring for cocking it by hand and a downward projection l for cocking it automatically by the pin f' in the arm F of the operating lever, is put on the firing pin and secured thereto by a small transverse pin l' after all the other parts of the firing mechanism are in place.

The sear-plate or case constructed with counterbored boss having a mutilated flange and fitted to the breech-block as hereinabove described, provides for the easy insertion of the firing mechanism into the breech-block and also provides for a long or deep bearing for the main spring, the abutment for which is in the back of the counterbore i^3 in the boss of the plate.

The trigger H is arranged to work on a pin m' in a mortise m (see Fig. 12) in the carrier C, the said pin m' being screwed into the carrier from one side as indicated in Fig. 12 where the said pin is shown in dotted outline. The trigger so applied projects down below the fulcrum hub of the operating lever F F' and is held forward against the carrier by the pressure of the sear spring on the sear, as may be understood by reference to Fig. 3, at all times but when pulled back for firing; and on that part of the back of the trigger opposite the fulcrum hub F² of the operating lever

there is a projection m^2 . In the said fulcrum hub there is a notch m^3 large enough to receive the said projection m^2 . This notch m^3 is only opposite the projection m^2 when the operating lever is in that position (shown in Fig. 3) which it is only in when the breech is closed and the breech-block locked ready for firing; and consequently it is only when the lever is in that position that the trigger can be pulled back to release the firing pin, the solid round portion of the hub being at all other times so close to the projection m^2 that the trigger cannot be pulled back.

The cartridge shell extractor consists of a slide L represented as having the form of a short tray fitted to guides in the lower part of the breech-block seat and having at its front end a grooved flange which conforms to the bore of the gun for the purpose of engaging with the edge of a cartridge shell therein. On the bottom of this tray L is a lug l' which enters a mortise l^2 provided in the lower part of the breech of the gun below the breech-block seat, the said mortise extending through the lug A' and also receiving the short extractor operating lever N which works on a pin n inserted through the said lug A' across the said mortise. The upper end of this extractor operating lever N enters a hole l^3 in the bottom of the extractor and its lower end projects downward below the lug A' of the breech-block to be acted upon through the movement of the carrier for the purpose of pulling back the extractor by means of a pin O which is arranged within the carrier between and within its lugs C'. The lower part of the lever N on which the pin operates has a forward bend near the extremity so that the pin O has a cam-like action on it, the said pin acting first upon the lever near the extremity at the greatest distance from the fulcrum to produce a strong leverage for the purpose of starting the shell and then coming nearer and nearer to the fulcrum and producing a gradually more rapid action until it jerks out the cartridge clear of all the breech mechanism. The extractor is returned into the gun by the act of inserting a new cartridge, the cartridge being placed with its flange behind the flange l of the extractor.

Having described the construction and separate operations of the different parts of a gun embodying my invention I will now proceed to summarize briefly the operations of the whole in proper order, first supposing the gun to have been fired and the parts left in the positions and conditions represented in full outline in Fig. 1 and in Figs. 2 and 3.

The several operations are all performed by pulling back the lever F F' from the position in which it is shown in bold outline in Fig. 1 and in which it is also shown in Figs. 2 and 3, to the position in which it is shown in dotted outline in Fig. 1 and afterward returning it to the first mentioned position. The first part of the backward movement of the lever withdraws the extremity of the part e of the

arm F from the notch e' in the carrier and by the continued movement of the said part of the lever in the slot d of the yoke B^2 the breech-block is turned in the carrier far enough to
 5 unlock it from the mutilated screw-thread in the breech, and at the same time the pin f' in the said arm F draws back the firing pin to the position to be engaged by the sear and
 10 cocked. The further continued movement of the lever after the part e comes to the rear end of the slot d withdraws the breech-block back from the gun and at the same time draws back the carrier. This movement is intended to be
 15 performed very quickly and after the carrier has been drawn back a certain distance it is caused by its own weight and that of the breech-block to fall down against the offset bearing A^2 of the breech, the position then being that shown in dotted outline in Fig. 1 and
 20 also shown in Figs. 6 and 7, the empty cartridge shell, if the gun had been previously loaded, having been thrown out by the movement of the carrier. The breech-block now remains locked against turning in the carrier by the
 25 action of the sliding threaded bolt c hereinbefore described, until the breech is again closed by returning the lever F F' to the position first described. During the first part of this return movement the arm F of the lever cannot turn the breech-block owing to
 30 being locked in the carrier and therefore the said arm by its pressure against one side of the slot d in the yoke B^2 raises and throws forward the block and the carrier together
 35 until the carrier comes close up to the breech and so causes the bolt c to be pushed back as hereinbefore described and leave the block free to turn in the carrier after which the continued movement of the lever carries its
 40 arm F along the slot d and so produces the turning of the block in the carrier and the breech and its engagement with the breech in condition for firing. The part e of the arm F of the lever is now in the straight portion of the slot d next the block and so positively locks the block against turning, and at the same time the arm is locked laterally against any tendency of the breech-block to turn by its extremity being received in the
 45 recess e' in the breech. All is now ready for firing, which can only take place after the breech-block has been securely locked as above described.

One very important feature of this invention is the screwing of the breech-block into the carrier in such manner that it may turn freely therein to permit it to turn in its seat in the breech of the gun, the screw-thread a on the block and the corresponding thread a' in the carrier giving a larger bearing surface between the block and carrier. This larger bearing surface is especially advantageous in a rapid fire gun in which the breech-block carrier has a downward movement and in
 50 which the carrier is arrested against a bearing on the lower part of the breech as in the quick manipulation of the breech mechanism

this arrest must necessarily be attended with considerable jar. Moreover the screw attachment of the block to the carrier makes
 70 an extremely simple construction.

What I claim as my invention is—

1. The combination with the gun and the breech-block fitted to turn and move lengthwise therein, of a carrier which is hinged to
 75 the breech of the gun and into which the breech-block is screwed to turn freely, substantially as and for the purpose herein set forth.

2. The combination with a gun having a
 80 mutilated screw-threaded breech-block seat, a carrier which has an internal screw-thread of a pitch corresponding with that of the thread in the breech-block seat and which is hinged to the breech of the gun, and a breech-block
 85 having a screw-thread of uniform pitch throughout corresponding with that of the thread in the breech-block seat and carrier, one portion of the length of said screw-thread on said block being mutilated to correspond
 90 with the mutilations of the thread in the breech-block seat and the other portion of the length of said screw-thread being fitted to turn within the screw-thread of the carrier, substantially as herein set forth.

3. The combination with a breech-block-carrier and a breech-block having a screw-threaded attachment to said carrier and having a groove for a sliding bolt, of a spring-actuated sliding bolt arranged in said carrier
 100 and having in one face a screw-thread corresponding with the threads of the attachment between the carrier and the block, substantially as herein set forth.

4. The combination with the breech-block
 105 having a central cavity for a firing-pin and having a counterbore with a mutilated flange, of a sear case having a hub with a mutilated flange to engage with the mutilated flange in the counterbore of the breech-block, substantially as herein set forth.

5. The combination of the breech-block containing a central firing pin and counterbored centrally around said pin, a sear plate having an opening for said pin and having also
 110 a counterbored boss which enters the counterbore of the breech-block, and a spiral main spring contained partly within the breech-block and partly within the counterbore of the boss of the sear plate, substantially as
 120 herein set forth.

6. The combination with the breech-block having a central cavity for a firing pin and having a counterbore with a mutilated flange, of a sear case consisting of a plate having a
 125 hub with a mutilated flange to engage with the mutilated flange in the counterbore of the breech-block, a sear within said plate, and a sear spring entering a hole in said plate and partly contained within a mortise in the
 130 breech-block wherein it serves as a key to lock the engagement of the mutilated flanges of the sear case with those of the block, substantially as herein set forth.

7. The combination with the breech-block-carrier and the breech-block arranged to turn therein, of a sear case fitted to the said block to be engaged therewith by turning therein, 5 a sliding sear in said case, a trigger in said carrier, a sear spring entering said sear plate and partly contained in a mortise in said block, and a sear spring engaging with said sear plate and with the breech-block to lock 10 the said case to the breech in position to bring the sear opposite the trigger when the block is turned in the carrier to the position for firing, substantially as herein set forth.

8. The combination with the firing pin having a flat head with a downward projection *l*, 15 a breech operating lever containing a guide *f* for the said flat head, and a pin *f'* inserted through said guide *f* to act upon said projection *l* for cocking the pin and to serve as stop 20 to the firing pin to prevent premature discharge, substantially as herein set forth.

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