

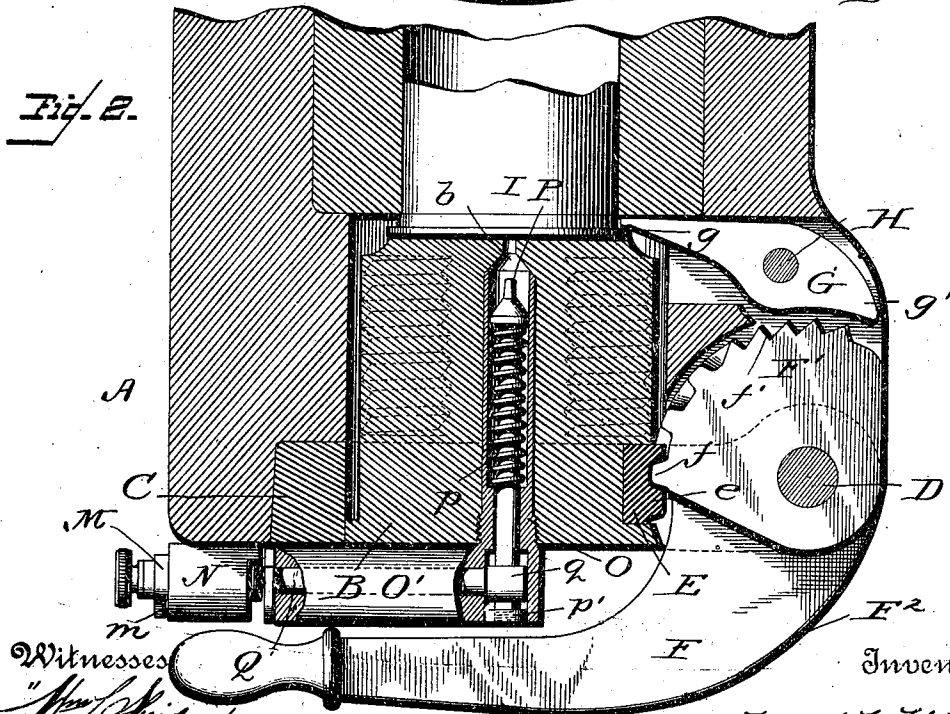
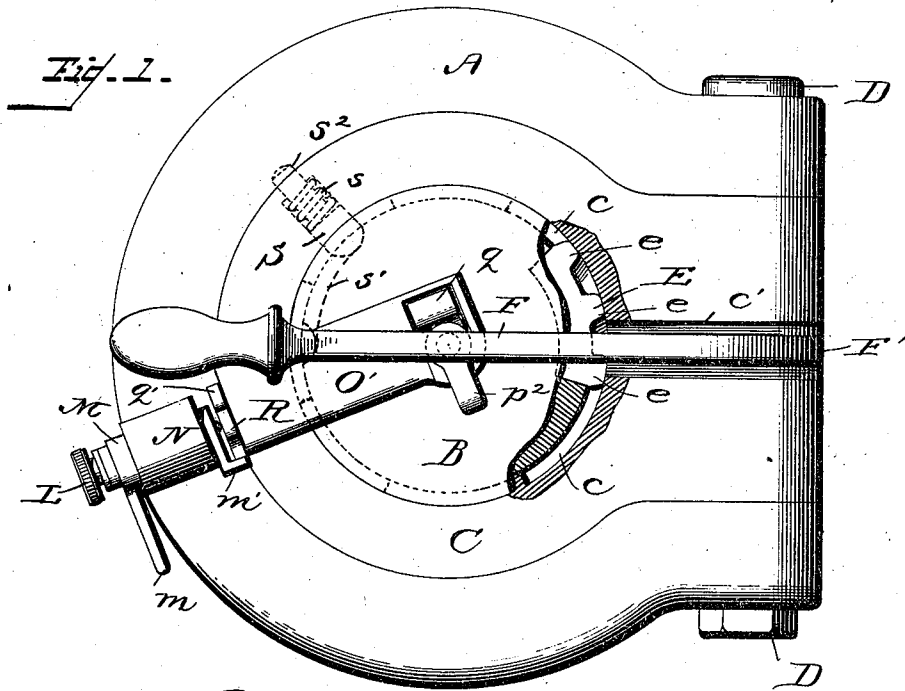
(No Model.)

3 Sheets—Sheet 1.

F. F. FLETCHER.
BREECH MECHANISM FOR ORDNANCE.

No. 541,042.

Patented June 11, 1895.



Witnesses
Albert Spinden

Inventor
Frank F. Fletcher
By his Attorney *Anthony Lavery*

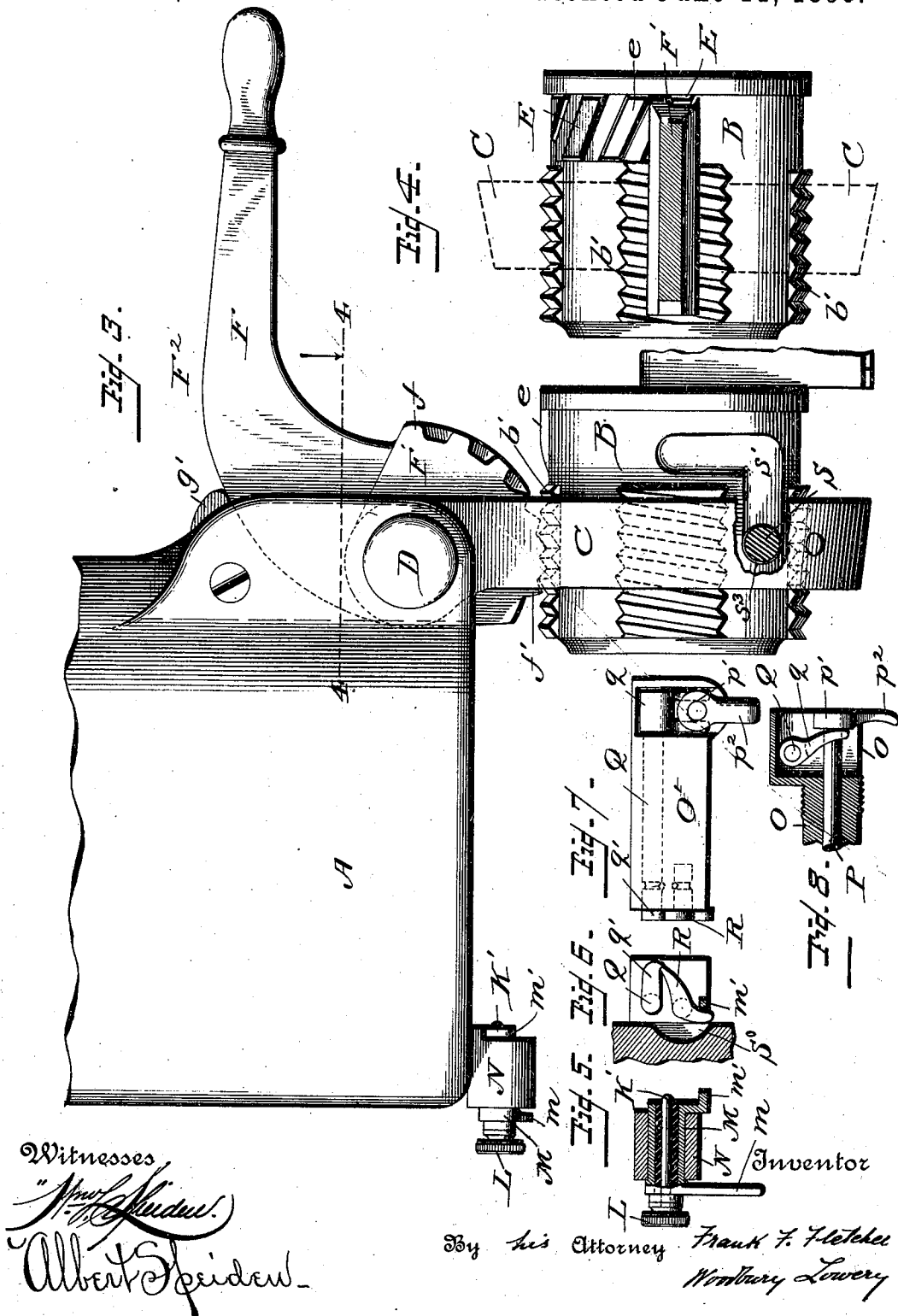
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3 Sheets—Sheet 2.

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Witnesses

Albert Spiden

By his Attorney *Frank F. Fletcher*
Winbury Lowery

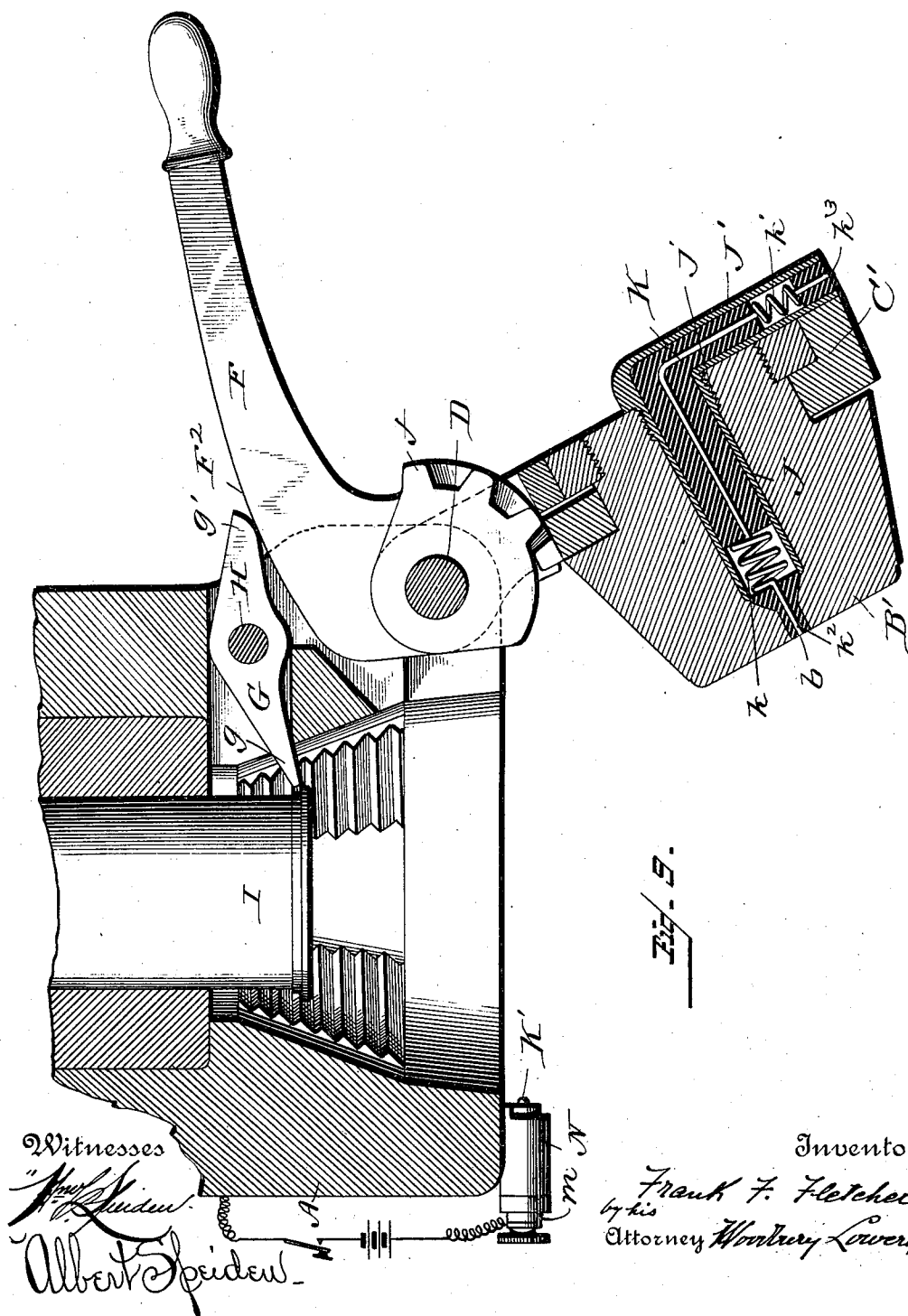
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3 Sheets—Sheet 3.

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UNITED STATES PATENT OFFICE.

FRANK F. FLETCHER, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR
TO ALBERT ORDWAY, OF SAME PLACE.

BREECH MECHANISM FOR ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 541,042, dated June 11, 1895.

Application filed October 24, 1892. Serial No. 449,773. (No model.)

To all whom it may concern:

Be it known that I, FRANK F. FLETCHER, a citizen of the United States, residing at Washington, in the District of Columbia, have invented new and useful Improvements in Breech-Operating Mechanism, of which the following is a specification.

My invention relates to breech loading ordnance of the class wherein a breech plug of conical or cylindrical form having interrupted screw threads is employed for closing the breech, and the object of my invention is to provide means for operating the screw plug, the electric or percussion firing mechanism and for extracting and ejecting the cartridge case; and my invention consists in a lever pivoted to one side of the gun and terminating at one extremity in a toothed sector, one portion of which sector revolves the breech plug by engaging with a worm rack thereon, whereupon the other portion withdraws it by engaging with the screw threads of the breech plug or with a suitable rack thereon. Simultaneously with the withdrawal of the plug the exterior edge of the lever arm operates as a cam surface to actuate a combined extractor and ejector lever. I also provide the breech plug with a central bore or chamber adapted to receive interchangeable cases containing respectively electrical or mechanical firing apparatus, while permanently fixed to the rear of the gun is an attachment adapted to trip the firing pin or to complete the electrical circuit.

In the accompanying drawings, which illustrate my invention, Figure 1 is a rear elevation of my invention as applied to a breech-loading gun having the slotted-screw system of fermeture. Fig. 2 is a horizontal section of the same. Fig. 3 is a plan view of the same, showing the screw-plug withdrawn and swung clear of the breech-opening. Fig. 4 is a side elevation, partly in section, on the line 4-4 of Fig. 3, showing the breech-plug with the breech omitted and the ring shown in dotted lines. Fig. 5 is a vertical section through the permanent attachment, showing the electrical and mechanical connections of the firing devices. Figs. 6, 7, and 8 are details of the firing-pin mechanism; and Fig. 9 is a plan

view of my invention as applied to a gun having a conical breech-plug, showing the plug swung clear of the breech-opening without the necessity of first withdrawing it. It also shows in cross-section the electrical firing device.

A is the breech of the gun.

B is the screw plug having the screw thread b' , and is supported by and capable of partial rotation and withdrawal in the carrier ring C which is free to swing in and out upon its hinge pin D by which it is secured to the breech of the gun A.

E is a circular worm rack attached to the periphery of the screw plug B near its head and immediately under the carriage ring C which latter is cut away at c forming a recess to receive the projecting teeth e of the rack and of sufficient length to permit of the rotation of the screw plug to unlock it from the breech. The teeth e on this rack are inclined at an angle between a line parallel to the transverse axis of the plug and a line at right angles to it. See Fig. 4.

F is a lever pivoted on the hinge pin D and carries a toothed arc or sector F' provided with the worm teeth f and the cog teeth f' . The sector end F' of the lever F turns in a slot c' in the carrier ring C in such wise that when the screw plug B is locked, its teeth f which have the same inclination with the teeth e of the screw plug rack E engage therewith and revolve the screw plug B until the screw threads in the plug are opposite the blank spaces in the screw box of the breech, in the position for withdrawing. At this point the cog teeth f' on the sector F' engage with the screw thread of the plug and the further turning of the lever F withdraws the screw plug within the carrier ring C into the position shown in Fig. 3.

S (Figs. 1 and 3) is a latch bolt seated in a transverse chamber in the carrier ring C and having a coiled spring s which tends to press it into engagement with the groove s' in the cylindrical face of the screw plug B. S^2 is a recess in the gun-breech which registers with the bolt S and into which the bolt enters while resting in the slot s' of the plug B, locking the carrier ring C to the gun-breech. On

turning the screw plug within the carrier ring C and then withdrawing it therefrom, the latch bolt S traveling in the grooves' locks the carrier ring to the gun-body, until the screw plug has been withdrawn sufficiently to allow it to revolve with the carrier ring to open the breech when the head of the latch bolt S registers with the beveled scofe or socket s^3 at the end of the groove s' in the cylindrical side of the screw plug, into which it is thrust by the tension of the spring s , unlocking the carrier ring from the gun-body and locking it to the screw plug, preventing the further withdrawal of the screw-plug from the carrier ring, and thereby causing the carrier-ring and screw-plug to revolve together on the pivot D with the further movement of the lever. On closing the breech the tension of the coiled latch spring forcing the bolt into the beveled socket s^3 is sufficient to resist the action of the lever until the carrier-ring is held fast against the body of the gun, whereupon the order of the above operation is reversed. The screw plug is then swung clear of the breech by the further movement of the lever F.

G is the extractor and ejector lever pivoted at H in a chamber in the breech and having the extremity g which takes under the rim of the cartridge case I while the arm g' is acted upon by the cam or curved surface F^2 of the lever F when the lever is thrown back to swing out the plug after it has been withdrawn. The form of the cam surface is such that it first imparts to the lever G a slow motion with great power to extract the cartridge case and then a rapid motion to eject it.

In order to fire the gun either by electricity or by a firing pin I provide the screw plug B with a central chamber b adapted to receive a removable case containing the mechanical device, Figs. 1, 2, and 6 to 8 or the electrical device, Fig. 9.

For firing by electricity I provide a removable tubular case J screw threaded at j in order to secure it in the chamber b of the screw plug and having a tubular right angled prolongation J' extending across the back of the plug as shown in Fig. 9.

K is an electric wire surrounded by insulating material. At K and k' the wire is in the form of a helical spring so as to press out the insulated points $k^2 k^3$. The contact k^2 presses against the electric primer in the cartridge case and the contact k^3 against the insulated wire K' attached to the binding screw L to which is also secured one terminal of a battery, the other terminal of which is attached to the gun through the firing key, see Fig. 9, or is otherwise in metallic circuit therewith to complete the circuit to the primer in the cartridge case.

The insulated wire K' and its binding screw L are carried in a hollow sleeve M having the trigger m and lever m' for firing the percussion device, as hereinafter described and rocking in the tubular case N perma-

nently attached to the breech of the gun in position to connect with either firing device after the plug has been locked.

For firing by percussion I provide a case O O' interchangeable with the electric firing case J J' and secured in the axis of the screw plug B in the same way. See Figs. 2 and 5 to 8.

P is the firing pin or striker and p the firing spring.

p' is a shoulder secured to the end of the firing pin by which it is drawn back and the spring compressed.

q is a lever acting against the shoulder p' and secured to the shaft Q which rocks in its bearings in the extension O' of the case O. On the other end of the shaft Q is a catch lever q' which engages one end of the cocking lever R pivoted to the end of the case. Against the other arm of the cocking lever R bears the extremity of the lever m' forming part of the permanent attachment X, as already described.

S^0 is a small score cut in the breech face of the gun A so as to permit the lower end of the cocking lever R to enter it when the shaft Q is turned either in cocking or releasing the firing pin P. The position of the score in the breech face of the gun is such that the cocking lever R can enter it only when the plug is in the firing position. At all other positions the lever R bears against the breech face and the shaft Q cannot turn.

The operation of my invention is as follows: The screw plug B being in the position for firing the gun, Figs. 1 and 2, the hand lever F is thrown in with its sector teeth in engagement with the first teeth on the plug sector and the small end g of the extractor and ejector lever G is under the head of the cartridge case. The firing pin P is pressed back against its spring p in which position it is held by the engagement of the lever q' over the end of the cocking lever R. On pulling the lanyard attached to the trigger m the sleeve M turns, depresses the lower extremity of the tripping lever m' in the recess S^0 of the breech, disengages the cocking lever R from the lever q' permitting the shaft Q to rotate and the firing pin P to plunge forward with the force of the firing spring p . To remove the screw plug B preparatory to reloading the hand lever F is revolved on the hinge bolt D and the worm teeth f on its sector F' gear with the teeth e on the screw plug B revolving the screw plug in its carrier ring C to the withdrawing position, at which point it is held both by the impinging of its rack E against the end of the recess c and by the number of teeth on the rack and sector. The withdrawing teeth f' of the sector F' now engage with the screw thread b' of the plug B and a continued movement of the lever F withdraws the screw plug within the carrier ring and finally swings the plug and carrier clear of the breech opening. As the lever F swings around its cam surface F^2 impinges on the arm g' of the extractor and ejector

G and forces its arm *g* to extract and eject the cartridge case I. The firing pin P is also drawn back and locked in the firing position by the turning of the screw plug B and lever F previous to withdrawing the plug. After firing, one arm of the cocking lever R is in the recess S⁰ and when the screw plug begins to unlock impinges against the side of the recess causing it to turn. At the same time its other arm against which rests the extremity of the lever *q'* forces back the lever *q'*, causing the shaft Q to turn and draw back the firing pin P by means of lever *q* and the pin head *p'* against the pressure of the spring *p* until finally the arm of the cocking lever R engages with the catch at the extremity of the lever *q'* and then retains the pin P in the firing position. It is evident that during the operation of turning the screw plug B the cocking lever R cannot be tripped, because its lower arm impinges against the breech face of the gun until it arrives opposite the recess S⁰ at which time the screw plug is in the firing position.

To close the breech opening the movement of the lever F is reversed, the screw-plug being first swung opposite the opening, then advanced in its carrier ring and finally revolved and locked in place.

In Fig. 9 I have shown my invention applied to a conical screw plug B' in which the cog teeth *f'* on the sector lever F are omitted and the plug is swung clear after being unlocked. In this instance the plug has no axial motion in the carrier ring C'.

In Figs. 1, 7, and 8 I have shown the mechanical firing device supplemented by a trigger *p*² attached directly to the firing pin P and projecting through a slot *o* in the case O of sufficient length to permit of firing and cocking the pin.

Among the various advantages presented by my invention is that of the pivoted lever terminating in a sector, which sector is adapted to perform three independent and successive functions, at one operation of the lever, *i. e.*, that of rotating the screw-plug, that of withdrawing the screw-plug from the breech and that of extracting and ejecting the cartridge case, when used with a screw-plug and ejector of suitable construction, while the lever performs the additional office of swinging the carrier ring upon its pivot both in opening and closing the breech.

The removable firing attachment mounted in the breech-plug permits of the entire removal of the same from the breech-plug in one piece, and its immediate substitution by a new one without the dismounting of one or more parts of the firing device, and this is the case irrespective of the kind of breech-plug used. I am thus enabled to greatly increase the rapidity of fire of a gun operated by the sector lever which I have invented; and am enabled to replace with the greatest rapidity and simplicity the damaged firing device in

any breech-block provided with my removable firing attachment.

I do not limit myself to the particular kind of extractor and ejector shown and described in my drawings and specification, provided always that it be an extractor and ejector adapted to be actuated by a cam upon the sector of my pivoted lever. Neither do I limit myself to any particular kind of removable firing attachment mounted in the breech-plug, as it may be either mechanical or electrical, as I have shown, provided always that the entire firing device mounted in the breech plug, be removable as one piece irrespective of the particular class of ferreture to which the breech-plug may belong.

I have shown the sector teeth of the lever as engaging with the screw threads of the breech plug, but I do not limit myself to this particular form of rack.

It is also evident that the racks may either be cast with or otherwise secured to the screw plug.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a breech loading gun having the slotted screw system of ferreture, the combination with a pivoted lever having a cam surface, of a lever pivoted in a recess in the breech of the gun and having one arm adapted to engage with the rim of the cartridge and the other arm to bear directly against the lever cam surface as described.

2. In a breech loading gun having the slotted screw system of ferreture, the combination of a pivoted extractor and ejector lever having one arm adapted to engage with the rim of the cartridge case, a slotted screw plug having a toothed rack, and a pivoted lever having a toothed arc engaging directly with the rack on the plug and a cam surface engaging directly with the free arm of the extractor and ejector lever, as described.

3. In a breech loading gun having the slotted screw system of ferreture, the combination of a pivoted extractor and ejector lever, a slotted screw plug having a peripheral toothed rack, a hinged carrier and a pivoted lever having a toothed arc engaging directly with the rack on the plug and a cam surface engaging directly with the free arm of the extractor and ejector lever, as described.

4. In a breech loading gun having the slotted screw system of ferreture, the combination, of a pivoted extractor and ejector lever, a slotted screw plug having a peripheral and a longitudinal rack, a hinged carrier and a pivoted lever having a toothed sector engaging directly with the racks on the plug and a cam surface engaging directly with the extractor and ejector lever, as described.

5. The combination with a breech loading gun, of the slotted screw plug B, having the worm rack E and the screw thread *b'*, the hinged carrier ring C recessed at *c* and slot-

ted at c' , the lever F pivoted in the slot c' of the carrier ring C and having the sector F' with the worm teeth f and the cog teeth f' , substantially as described.

5 6. The combination with a breech loading gun, of the slotted screw plug B having the worm rack E and the screw thread b' , the hinged carrier ring C recessed and slotted as described, the pivoted lever F having the cam surface F^2 and the sector F' with the worm teeth f and the cog teeth f' , and the lever G pivoted at H and having the arm g' engaging with the lever and the arm g engaging with the cartridge shell substantially as described.

25 7. The combination with a breech loading gun having the slotted screw system of ferreture, of the screw plug having racks as described, and an axial chamber containing a removable firing case, said firing case containing firing mechanism a permanent attachment secured to the gun breech adapted to register with and actuate the firing mechanism when the screw plug is locked, and a pivoted lever having a toothed arc to actuate the screw plug, substantially as described.

25 8. The combination with a breech loading gun having the slotted screw system of ferreture, of the screw plug having the axial chamber containing a removable case, said case containing firing mechanism, and a permanent attachment adapted to register with and actuate the firing mechanism, when the plug is locked, as described.

30 9. The combination with a breech loading gun having the slotted screw system of ferreture of the screw-plug having an axial chamber, a removable case located in said chamber, a firing pin and cocking mechanism automatically cocked by the rotation of the screw plug and contained within said case, and a permanent attachment adapted to register with and trip the cocking mechanism, when the screw-plug is locked, substantially as described.

45 10. The combination with a breech loading gun having the slotted screw system of ferreture of the screw-plug having an axial chamber, a removable case, located in said chamber and a firing pin and cocking mechanism, automatically cocked by the rotation of the screw plug and contained within said case, substantially as described.

50 11. In a breech loading gun having a score S^0 in the breech face of the gun, the combination with the slotted screw plug B having the axial chamber b of the removable case O O' having the section O located in said chamber and the section O' at right angles thereto across the face of the plug; the firing pin P located in said case section O, and having the shoulder p' , the firing pin spring p , the cocking shaft Q, located in the case section O', and having at one extremity the lever q in engagement with the shoulder p' of the firing pin, and at the other extremity the catch lever q' and the cocking lever R piv-

oted to the end of the case O' and having one arm bearing against the catch lever q' , substantially as described.

12. In a breech loading gun having a score S^0 and the tripping attachment, consisting of the tubular case N and the hollow sleeve M having the trigger m and lever m' at either extremity, both located on the breech face of the gun, the combination with the slotted screw plug B having the axial chamber b of the removable case O O' located as described, the firing pin P located in said case section O, and having the shoulder p' and the firing pin spring p , the cocking shaft Q located in said section case O' and having at one extremity the lever q in engagement with the shoulder p' of the firing pin, and at the other extremity the catch lever q' and the cocking lever R pivoted to the end of the case O' and having one arm bearing against the catch lever q' and the other arm registering with the score S^0 and the tripping attachment in the breech face, when the plug is locked, substantially as described.

13. The combination with a gun having the slotted screw system of ferreture, of the breech-plug, a removable firing device in the plug, and means which register with and actuate the firing device, when the breech plug is screwed home, substantially as described.

14. In a breech loading gun having the slotted screw system of ferreture, the combination of a cartridge extractor, a slotted screw plug having a toothed rack, and a pivoted lever having a toothed arc engaging directly with the rack on the plug and a cam surface which actuates the cartridge extractor, substantially as described.

15. In a breech mechanism of the slotted screw system, the combination with a breech block provided with screw threads thereon for locking the same in the gun, and worm threads in rear of said screw threads, of a rack provided with teeth to engage in said worm, and other teeth to engage in said screw threads; and a hand lever pivoted in the gun and integral with said rack, substantially as described.

16. In a breech mechanism of the slotted screw system, the combination with a breech plug provided with screw threads thereon for locking the same in the gun, and worm threads in rear of said screw threads; of a segmental rack pivoted to the gun and provided with teeth to engage in said worm and other teeth to engage in said screw threads, and a hand lever rigidly connected to said rack, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

FRANK F. FLETCHER.

Witnesses:

WOODBURY LOWERY,
ARMAT STODDART.