A. T. DAWSON & G. T. BUCKHAM.

LOCK MECHANISM OF BREECH LOADING GUNS.

APPLICATION FILED AUG. 16, 1913.

1,095,558.

Patented May 5, 1914.

5 SHEETS—SHEET 1.

Fig. 1.

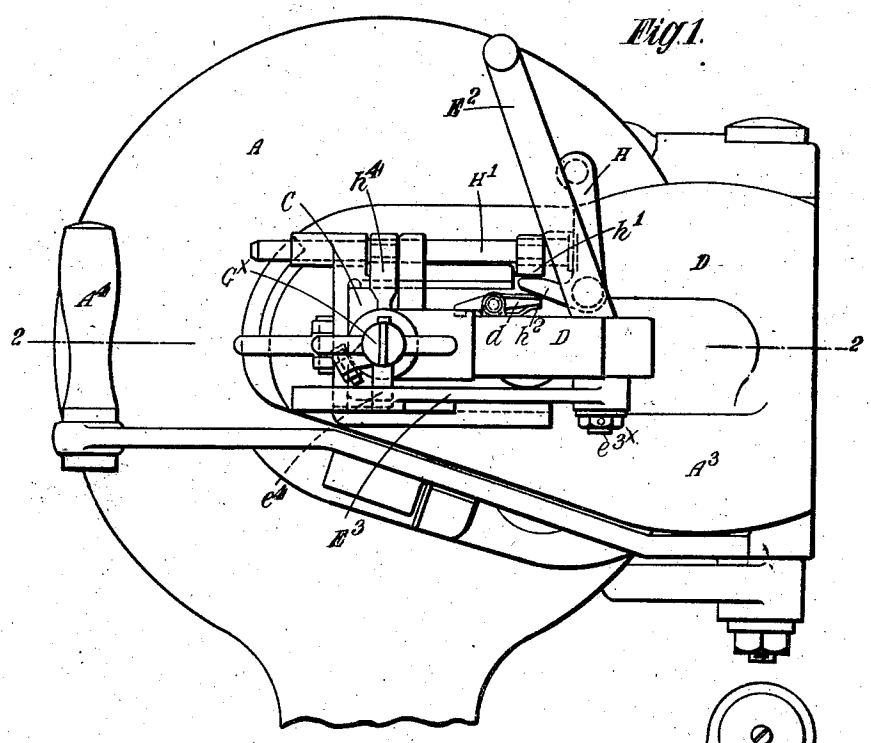
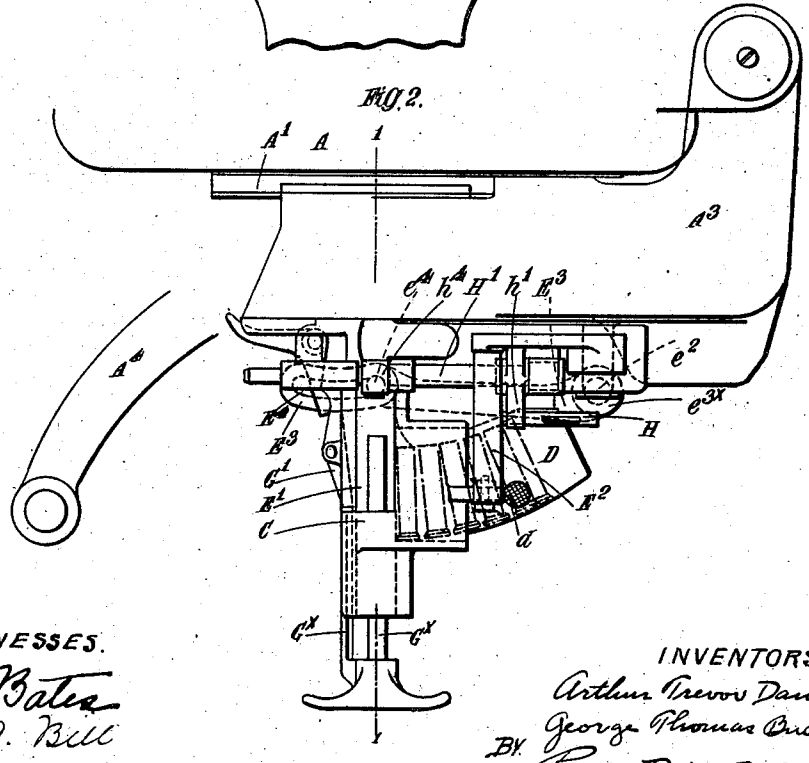


Fig. 2.



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FIG. 3.

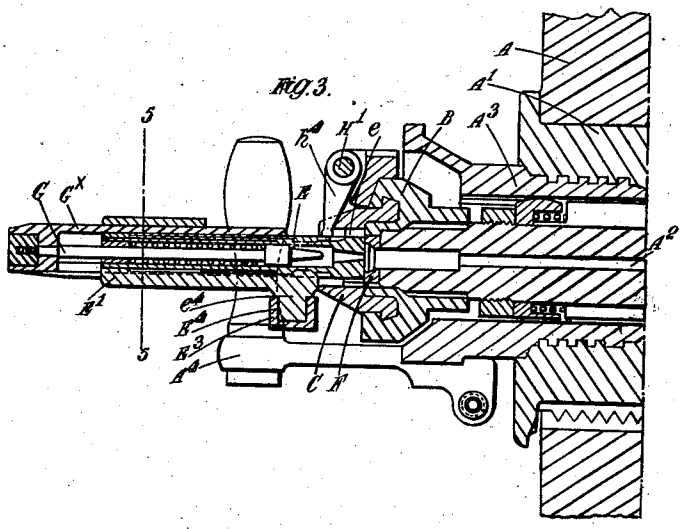


FIG. 6.

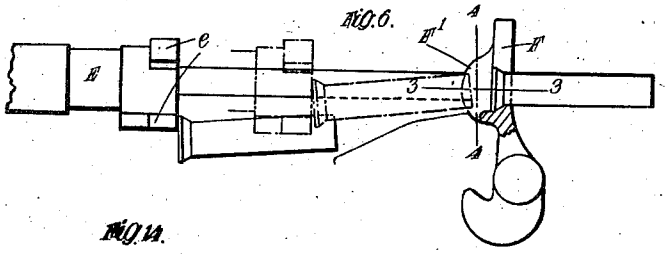


FIG. 8.

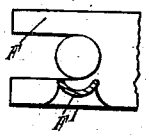


FIG. 11.

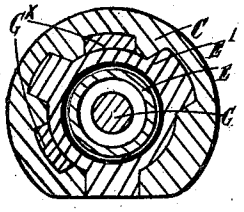


FIG. 7.

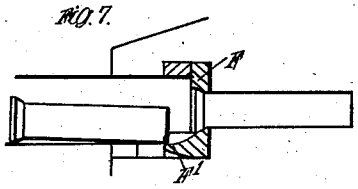


FIG. 12.

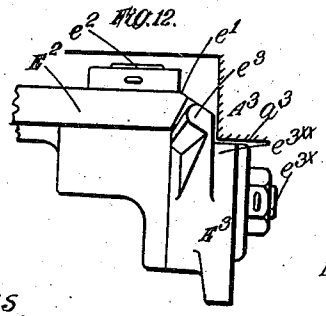
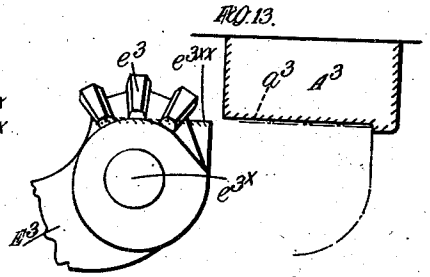


FIG. 13.



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FIG. 4.

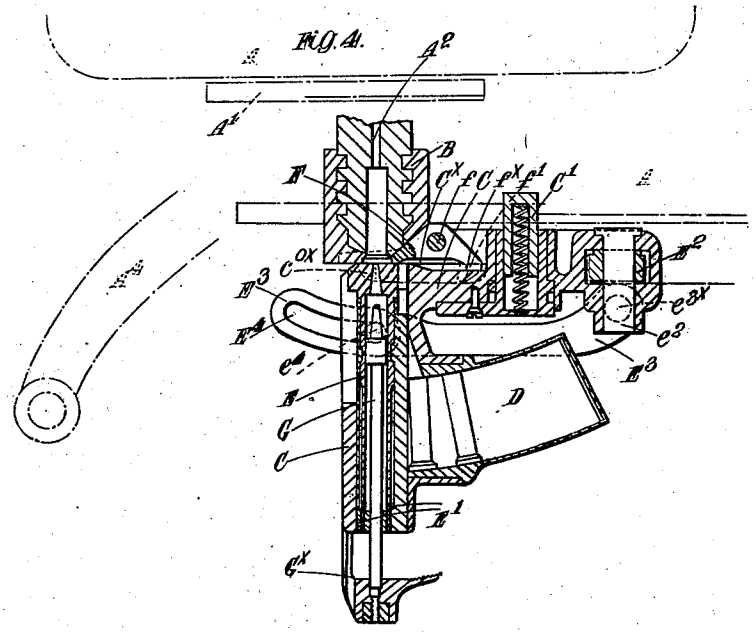
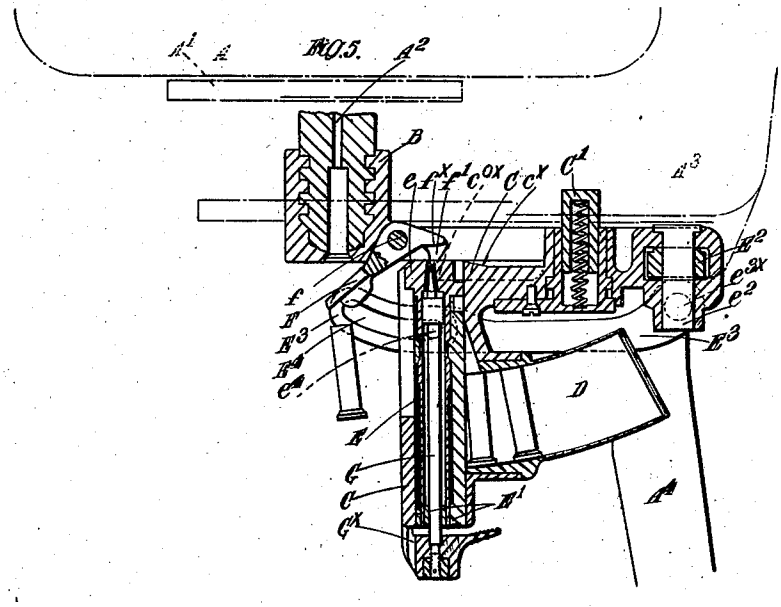


FIG. 5.



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FIG. 9.

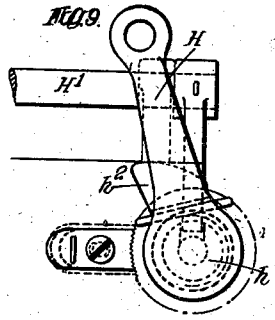


FIG. 10.

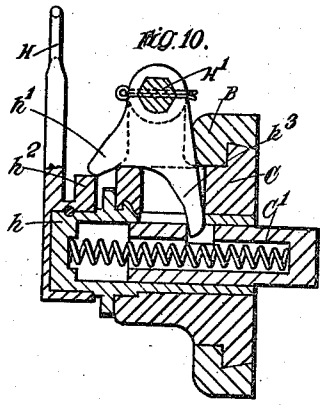


FIG. 11.

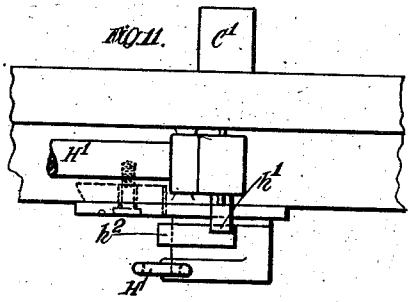


FIG. 20.

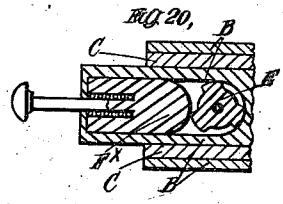
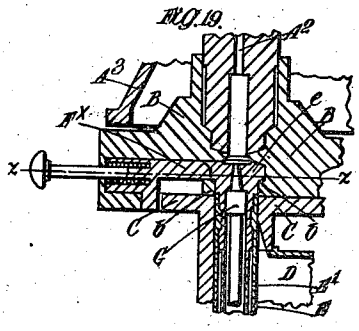


FIG. 19.



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5 SHEETS—SHEET 5.

FIG. 15.

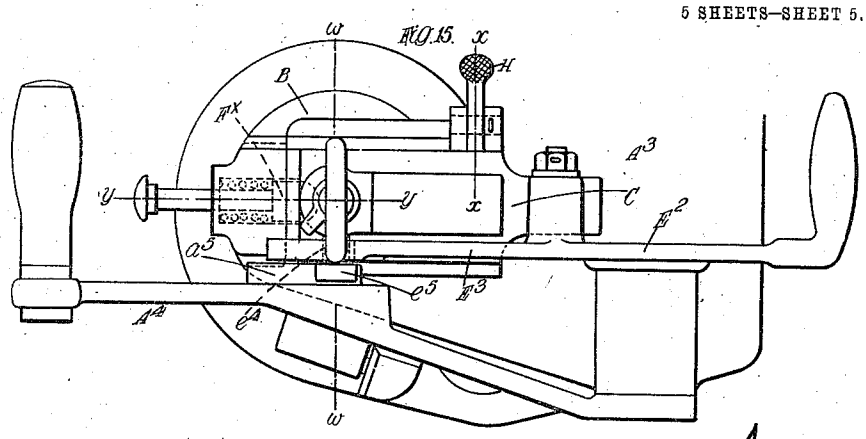


FIG. 16.

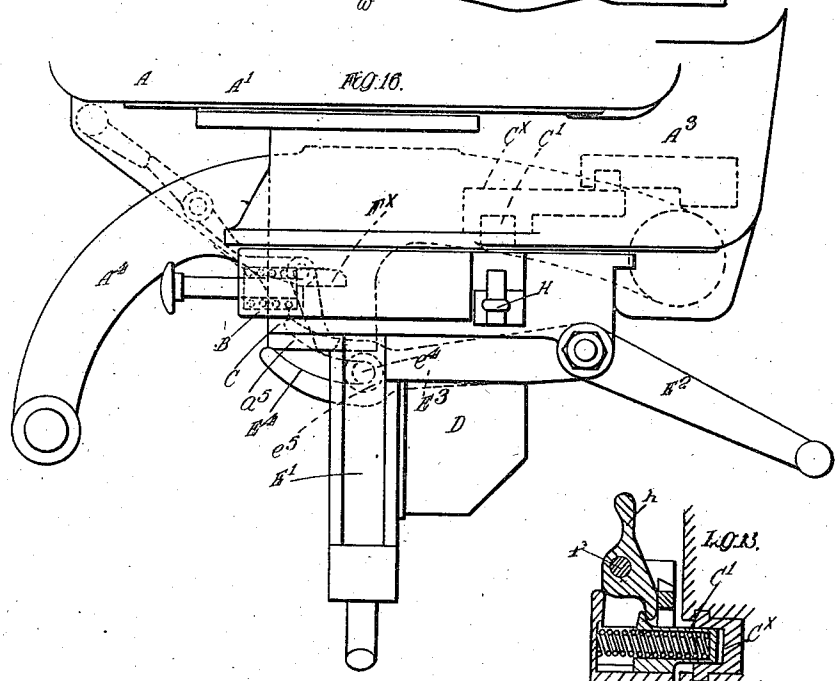
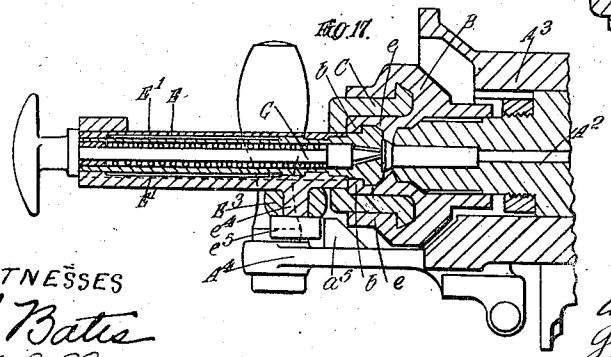


FIG. 13.

FIG. 17.



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UNITED STATES PATENT OFFICE.

ARTHUR TREVOR DAWSON AND GEORGE THOMAS BUCKHAM, OF WESTMINSTER, LONDON, ENGLAND, ASSIGNORS TO VICKERS LIMITED, OF WESTMINSTER, ENGLAND.

LOCK MECHANISM OF BREECH-LOADING GUNS.

1,095,558. Specification of Letters Patent. Patented May 5, 1914.

Application filed August 16, 1913. Serial No. 785,018.

To all whom it may concern:

Be it known that we, ARTHUR TREVOR DAWSON, knight, and GEORGE THOMAS BUCKHAM, both subjects of the King of Great Britain, residing at Vickers House, Broadway, Westminster, in the county of London, England, have invented certain new and useful Improvements in or Relating to the Lock Mechanism of Breech-Loading Guns, of which the following is a specification.

This invention relates to lock mechanism of the kind in which the lock frame is capable of moving laterally in a box slide on the breech-screw carrier and in which a re-priming device is employed, the said device comprising a primer magazine or hopper and a bolt which carries the firing pin or striker and operates to insert a new primer from the magazine into the primer chamber of the vent axial.

According to one form of the invention the aforesaid bolt is mounted on the laterally moving lock frame and is so constructed and arranged that the firing pin or striker remains in the uncocked condition during the lateral opening and closing movements of the lock frame, but after the said lock frame has completed its lateral closing movement, the bolt can be unlocked and retracted to enable a new primer from the magazine to assume a position in front of the bolt-head, and then move forward to insert this primer into the primer chamber, this forward movement also effecting the cocking of the striker. By these means the primer is not inserted into the primer chamber until the lock frame has assumed its completely closed position and the breech screw has become fully closed and locked, so that if the primer should accidentally be fired no serious consequences would result. Furthermore during the opening and closing movements of the lock frame the primers in the magazine are effectually cut off from the vent axial by the bolt so that if the primers in the magazine should ignite by accident, the flash from them cannot enter the vent axial and fire the powder charge before the breech is closed and locked, since the bolt is retracted only after the latter operation has been performed. The primer extractor may be independent of the bolt and so constructed and arranged that it prevents the direct insertion of a primer into the primer chamber by hand while the lock frame is open or partially open, the primer being inserted from the magazine by the bolt as aforesaid, when the lock frame is in the closed position. The said extractor may furthermore be so contrived as to serve the purpose of a loading tray or guide for the primers when they are inserted by the aforesaid forward movement of the bolt, so that the necessity for, and the disadvantages that result from the tapering of the ends of the primers, are obviated.

According to another form of the invention, the aforesaid bolt is carried by the laterally movable lock frame and is adapted to be automatically unlocked and retracted during the initial unlocking movement of the breech mechanism and to thereby effect the ejection of the used primer in a similar manner to the ejection of a rifle cartridge case. The bolt is moved forward to insert a new primer from the magazine and is locked to the box slide by means of a handle so arranged that the operator can stand out of the path of recoil of the gun, this forward movement of the bolt also effecting the cocking of the firing pin or striker. A plate or shutter may be provided and so arranged that as the lock frame commences its lateral opening movement, the said plate or shutter will assume a position to close the rear end of the vent axial and will only move into the open position when the lock frame is completing its lateral closing movement. In this manner there is no liability of a flame resulting from the accidental ignition of the primers in the magazine or from any other cause, entering the vent axial while the lock frame is in the open or partially open condition and the breech screw therefore unclosed or unlocked. The lock frame may be provided with a conical recess to guide the primers into the primer chamber in the vent axial during the forward movement of the bolt, whereby a more efficient introduction of the primers is obtained as compared with the arrangements heretofore employed.

In order that the said invention may be clearly understood and readily carried into effect we will describe the same more fully with reference to the accompanying drawings in which:—

Figures 1 and 2 are a rear elevation and a plan of the breech end of a gun showing our improved lock mechanism applied thereto in the form first above stated. Fig. 3 is a longitudinal vertical section, taken approximately on the line 1—1 of Fig. 2. Figs. 4 and 5 are horizontal sections taken approximately on the line 2—2 of Fig. 1; Fig. 4 showing the lock in the closed position and Fig. 5 showing it in the open position. In these figures it is to be observed that certain of the constructional features differ slightly from those of Figs. 1 and 2. Fig. 6 is a plan showing the extractor adapted to also serve as a loading tray or guide for the primers. Figs. 7 and 8 are sections taken approximately on the lines 3—3 and 4—4 of Fig. 6. Figs. 9, 10 and 11 are respectively a rear elevation, a sectional side elevation and a plan showing a device for retracting the striker and guide bolt. Figs. 12 and 13 are respectively a side elevation and a plan showing a device hereinafter described, and Fig. 14 is a section on an enlarged scale taken approximately on the line 5—5 of Fig. 3. Figs. 15 and 16 are respectively a rear elevation and a plan of the breech end of a gun showing our improved lock mechanism applied thereto in accordance with the second form of the invention hereinbefore set forth. Figs. 17 and 18 are vertical sections taken approximately on the lines $w\ w$ and $x\ x$ of Fig. 15. Fig. 19 is a horizontal section on an enlarged scale, taken approximately on the line $y\ y$ of Fig. 15, and Fig. 20 is a vertical section taken approximately on the line $z\ z$ of Fig. 19.

In all of the above figures like letters of reference indicate similar parts.

A is the breech end of the gun, A' the breech screw, A^2 the vent axial, A^3 the breech screw carrier, and A^4 the breech actuating hand lever. B is the box slide, and C the lock frame laterally movable therein. D represents the primer magazine or hopper, E the bolt, and G the firing pin.

Referring first more particularly to Figs. 1 to 14, the bolt E is carried in a bolt sleeve E′ which engages therewith by means of the usual helical grooves and projections and which is mounted so that it can slide rearwardly in the lock frame C. The head of the bolt is provided with the usual locking lugs e which are adapted to engage with interrupted collars in the lock frame. The firing mechanism is shown as being percussive (although it may be electrical or a combination of the two) and the firing pin or striker G is mounted co-axially within the bolt E. The bolt sleeve E′ is connected by suitable gearing with a handle E^2 which we term the cocking handle and which is pivoted on a horizontal axis pin e^2 (Figs. 2, 4 and 5) situated on the right hand portion of the lock frame C. This handle is arranged in such a position that the operator can actuate it while standing out of the path of recoil of the gun. The said gearing comprises in the example shown, a bevel segment e' on the cocking handle E^2, gearing with a corresponding segment e^3, (Figs. 12 and 13) on an arm E^3. This arm which we term the cocking arm is pivoted on the lock frame by the vertical pin $e^{3\times}$ and has a cam slot E^4 which engages with a pin or stud e^4 on the under side of the bolt sleeve E′.

When the breech is being opened, the lock frame C moves laterally toward the right to assume its open position in the usual manner, carrying with it the bolt E and its parts, together with the cocking handle E^2 and the parts operated thereby. When the breech is being closed, the lock frame moves laterally toward the left to assume its closed position. During both these movements of the lock frame, the striker G remains in its uncocked position and the bolt E locked to the lock frame by means of the lugs e as aforesaid, the magazine opening through which the primers escape being therefore at such times kept closed by the bolt. The parts remain in this condition until the cocking handle E^2 is actuated, which operation is not performed until the breech screw is fully closed and locked. When the cocking handle is displaced in a clockwise direction (Fig. 1) the cocking arm E^3 is rocked in an anticlockwise direction (Figs. 4 and 5) and the bolt sleeve E′ drawn rearwardly, thereby unlocking and retracting the bolt E and enabling a new primer to escape from the magazine and take up a position in front of the bolt. The cocking handle E^2 is then displaced in the reverse direction to that indicated above, and the bolt E thereby moved forward to insert the new primer in the place of the used primer which has previously been extracted during the opening movement of the lock frame. The forward movement of the bolt causes it to be angularly displaced as aforesaid so that it becomes locked to the lock frame C; the striker G is left in the cocked condition (Fig. 4) by its engagement with the usual sear G′ (Fig. 2).

The magazine or hopper D which is carried by the lock frame C, is shown as being curved and of the type in which the primers are pushed into position in front of the bolt E by a spring. The said magazine is preferably detachably held in position in the lock frame by a spring catch d (Figs. 1 and 2) so

that when the magazine is empty it can be readily detached and a charged one substituted for it.

F is the extractor which is pivoted on the box slide B at f (Figs. 4 and 5) and is adapted to be displaced to extract a used or defective primer, by the coöperation of an inclined projection $e^{\times}$ of the lock frame C with a toe-piece $f^{\times}$ of the extractor. The ejection of the primer is effected by the cooperation of another projection $e^{\circ\times}$ on the lock frame with another toe-piece f' on the extractor. The said projections on the lock frame are so arranged that while the latter is in the open or partially open condition, the extractor F is retained in its rearward position and its jaws thus serve to prevent a primer from being inserted by hand into the primer chamber, as is clearly seen in Fig. 5. The extractor is formed with a horizontal lug or lip F′ (Figs. 6, 7 and 8) which is curved as shown to serve as a loading tray or guide for the primers during their insertion into the vent axial.

Appropriate means are employed for slightly retracting the firing pin or striker G during the initial unlocking movement of the breech mechanism before the lock frame C commences to move, thus preventing the point of the firing pin from bearing against the face of the box slide B during the opening movement of the lock frame, as is well understood. The lock frame C is adapted to be moved laterally by hand, independently of the opening movement of the breech mechanism, in the event of a misfire or hang-fire occurring, the opening movement of the lock frame causing the defective primer to be ejected. For this purpose we employ an improved device, the actuation of which causes the guide bolt C′ (Figs. 5, 10, and 11) to be withdrawn from engagement with the actuating link (not shown) and the firing pin or striker G to be retracted, the pull on the said device then effecting the lateral opening movement of the lock frame C. This device comprises a lanyard lever H (see particularly Figs. 9 to 11) carried by a pivot h arranged in the lock frame C parallel to the axis of the gun and having an arm or cam h^2 for coöperating with a projection or arm h' on a spindle H′. This spindle is situated transverse to the axis of the gun and has two levers h^3, h^4 of which the lever h^3 engages with a slot in the guide bolt C′ (Fig. 10) and the lever h^4 (Figs. 1, 2 and 3) engages, when the striker is in the forward position, with the casing $G^{\times}$ to which the firing pin or striker G is attached. Suitable means are provided for limiting the angular movement of the lanyard lever H. After the lock frame has been closed by the operator pushing it toward the left, the cocking handle E^2 is actuated as aforesaid to unlock and retract the bolt E, move it forward to insert a new primer from the magazine into the primer chamber, and eventually lock it in its forward position, the firing pin or striker being left in the cocked position.

Means are provided between the lock frame C and the cocking handle E^2, to prevent the latter from being actuated when the breech is open. These means comprise, in the example shown, a flat portion $e^{3\times\times}$ (Figs. 12 and 13) formed on the boss of the cocking arm E^3 (which is connected by gearing as aforesaid to the cocking handle E^2) the position of this flat portion $e^{3\times\times}$ being such that when the breech screw is closed and locked the cocking handle E^2 can be actuated, while on opening the breech and thereby moving the lock frame C laterally, the said flat portion $e^{3\times\times}$ will slide over a corresponding flat surface a^3 formed on the carrier, thus preventing any angular movement of the lever and also preventing a new primer from being inserted until the breech screw is locked.

Referring now more particularly to Figs. 15 to 20, the bolt E is connected to the bolt sleeve E′ by means of helical grooves and projections in the usual manner. The head of the bolt is formed with an extracting groove for engaging with the heads of the primers and is also formed with the usual locking lugs e which are adapted to engage in front of similar lugs b (Figs. 17 and 19) on the box slide B. The bolt sleeve E′ is provided with a pin e^4 adapted to engage in a cam groove E^4 in an arm E^3 forming part of the aforesaid cocking handle E^2 which is carried by the right hand portion of the lock frame C. This pin e^4 has a roller e^5 which is disposed in the path of a projection a^5 on the breech actuating hand lever A^4. This arrangement is such that the initial movement of the hand lever A^4 in unlocking the breech screw causes the projection a^5 to coöperate with the aforesaid roller e^5 whereby the bolt E is unlocked and retracted and the used primer ejected. At the same time, owing to the pin e^4 engaging in the cam groove E^4 of the arm E^3, the latter and the cocking handle E^2 are moved in an anticlockwise direction (Fig. 16). When the bolt has been retracted the projection a^5 moves clear of the said roller e^5, leaving the bolt E together with the arm E^3 and the cocking handle E^2 in the displaced position. During the opening movement of the lock frame C the plate or shutter $F^{\times}$ which is carried by the box slide and is spring controlled, follows the movement of the lock frame and covers the vent axial A^2 as aforesaid, the said plate or shutter being displaced against the resistance of its spring as the lock frame resumes its closed position.

After the breech has been closed and the breech screw locked, the cocking handle E^2 is returned in a clockwise direction (Fig. 16) to its normal position, thereby moving the bolt E forward to insert a new primer from the magazine D into the primer chamber, and finally locking the bolt head to the box slide B. The striker G is thereby cocked and is left in engagement with its sear. The primer magazine D is shown as being of the usual kind in which the primers are under the influence of a spring in which case the magazine is preferably made readily detachable in order that, when empty, it may be replaced by a full magazine. In the event of a misfire or hang-fire occurring, the actuation of the cocking lever E^2 causes the bolt E to eject the defective primer and insert another in its place, leaving the striker G cocked as aforesaid. In order to enable the lock frame C to be displaced by hand independently of the breech mechanism we provide a handle or finger piece H, the actuation of which disengages the guide bolt C′ from the actuating link C^x (Fig. 18).

What we claim and desire to secure by Letters Patent of the United States is:—

1. In lock mechanism for ordnance, the combination with the laterally sliding lock frame, of a primer bolt carried thereby, a firing pin mounted in said bolt and means for retracting the bolt and moving it forward to insert a new primer into the primer chamber and to cock the firing pin after the lock frame has completed its lateral closing movement.

2. In lock mechanism for ordnance, the combination with the laterally sliding lock frame, of a primer magazine carried thereby, a bolt also carried by the said frame, a firing pin mounted in said bolt, and means for retracting the bolt and moving it forward to insert a new primer from the magazine into the primer chamber and to cock the firing pin after the lock frame has completed its lateral closing movement.

3. In lock mechanism for ordnance, the combination with the laterally sliding lock frame of a primer magazine carried thereby, a primer bolt also carried by the said frame, a firing pin mounted in said bolt, means for preventing the bolt from being moved when the lock frame is in the open position and means for retracting the bolt and moving it forward to insert a new primer into the primer chamber and to cock the firing pin after the lock frame has completed its lateral closing movement.

4. In lock mechanism for ordnance, the combination with the laterally sliding lock frame, of a primer magazine carried thereby, a primer bolt also carried by the said frame, a firing pin mounted in said bolt, and a handle for retracting the bolt and moving it forward to insert a new primer from the magazine into the primer chamber and to cock the firing pin after the lock frame has completed its lateral closing movement.

5. In lock mechanism for ordnance, the combination with the laterally sliding lock frame, of a primer magazine carried thereby, a primer bolt also carried by the said frame, a firing pin mounted in said bolt and a handle also carried by the lock frame for retracting the bolt and moving it forward to insert a new primer from the magazine into the primer chamber and to cock the firing pin after the lock frame has completed its lateral closing movement.

6. In lock mechanism for ordnance, the combination with the laterally moving lock frame, of a primer bolt also carried by the said frame, a firing pin mounted in said bolt, a handle carried by the lock frame, an arm, means for connecting said handle and arm and means interposed between the arm and the bolt for imparting movement to the latter after the lock frame has completed its lateral closing movement.

7. In lock mechanism for ordnance, the combination with the laterally moving lock frame, of a primer bolt also carried by the said frame, a firing pin mounted in said bolt, a handle carried by the lock frame, an arm, means for connecting said handle and arm, means for preventing the bolt from being moved when the lock frame is in the open position and means interposed between the arm and the bolt for imparting movement to the latter after the lock frame has completed its lateral closing movement.

8. In lock mechanism for ordnance, the combination with the breech screw carrier and the laterally moving lock frame of a primer bolt also carried by the said frame, a firing pin mounted in said bolt, a handle carried by the lock frame, an arm, means for connecting said handle and arm, a flattened portion of said arm, a corresponding flattened portion of the breech screw carrier with which latter portion the flattened portion of the arm is adapted to coöperate, and means interposed between the arm and the bolt for imparting movement to the latter after the lock frame has completed its lateral closing movement.

9. In lock mechanism for ordnance, the combination with the laterally moving lock frame, of a primer extractor, projections on the lock frame and the extractor which, when the lock frame is moved toward its open position, coöperate to displace the extractor into a position to prevent the direct manual insertion of a primer into the primer chamber and a horizontal lip on said extractor serving as a guide for the primers during their insertion into the primer chamber.

10. In lock mechanism for ordnance, the combination with the lock frame and its guide bolt, the firing pin and the casing carrying the latter, of a lanyard lever, a pivot pin for said lever arranged parallel to the axis of the gun, an arm on said lever, a spindle arranged transverse to the axis of the gun, a projection on said spindle in contact with said arm, two levers on said transverse spindle one of which engages with the guide bolt and the other with the casing of the firing pin.

In testimony whereof we affix our signatures in the presence of two witnesses.

ARTHUR TREVOR DAWSON.
GEORGE THOMAS BUCKHAM.

Witnesses:
JNO. R. CASWELL,
G. W. GIBSON.