

J. A. DEPORT.

BREECH CLOSING MECHANISM FOR RAPID FIRE GUNS.

No. 567,224.

Patented Sept. 8, 1896.

Fig. 1

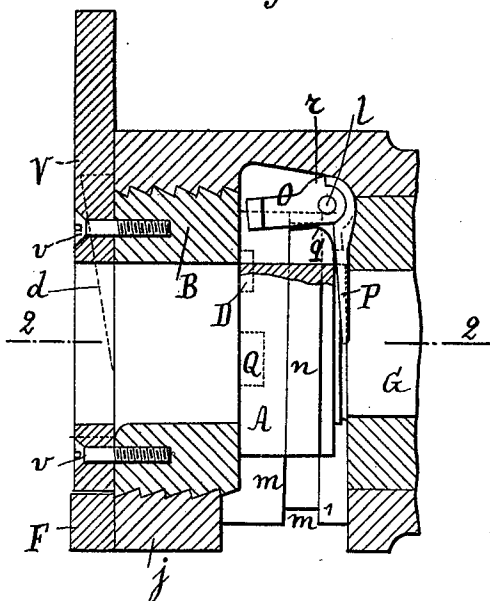


Fig. 2

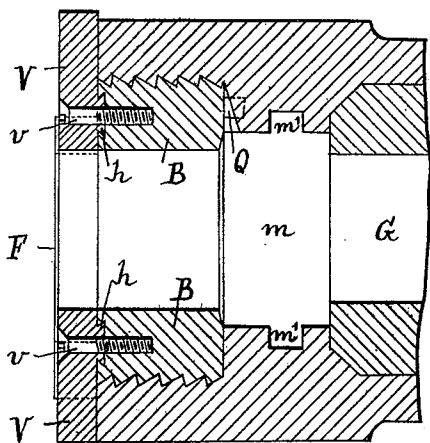


Fig. 3

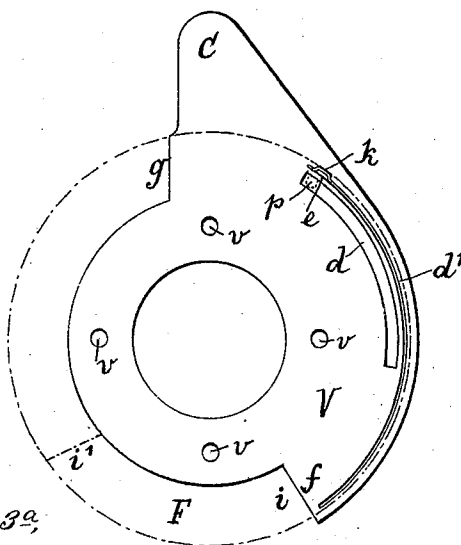
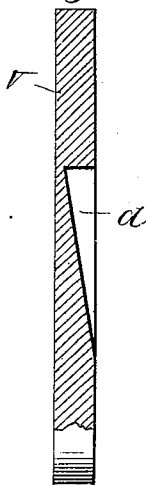
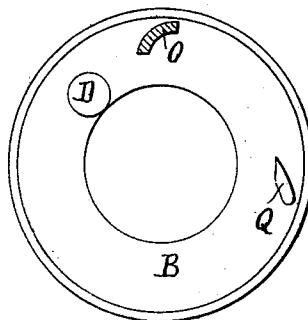
Fig. 3^a,

Fig. 4



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Fig 5

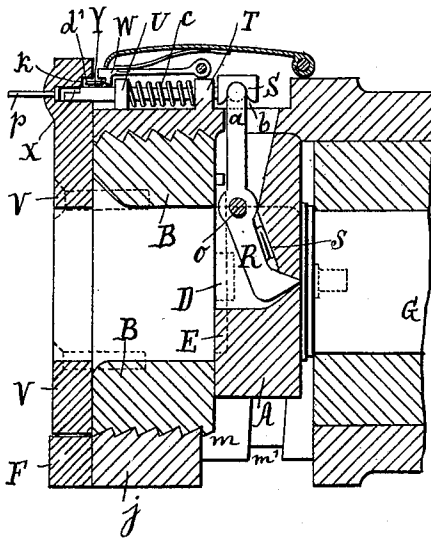


Fig 6

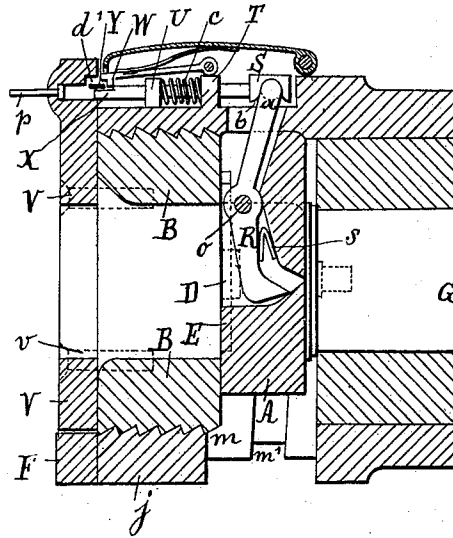


Fig 7

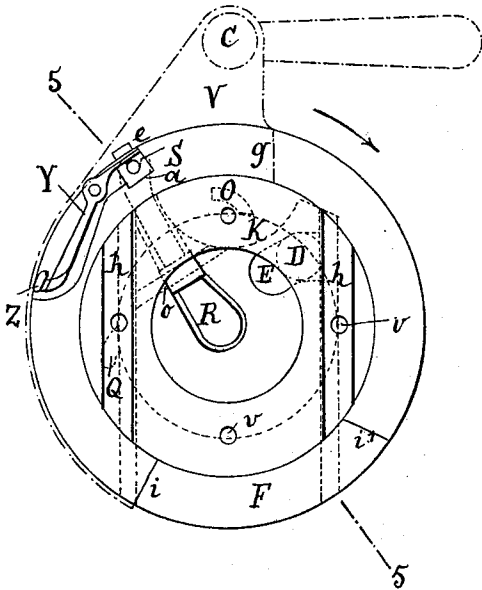
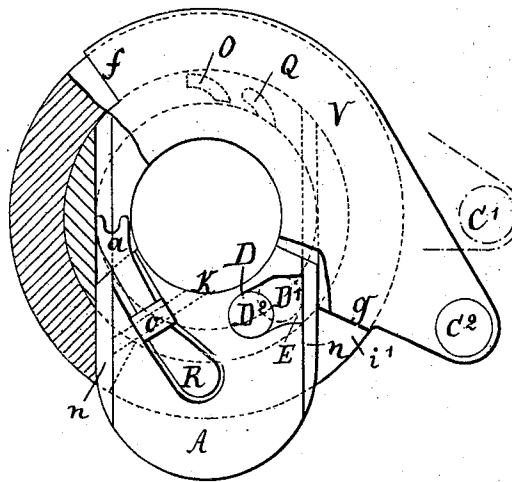


Fig 8



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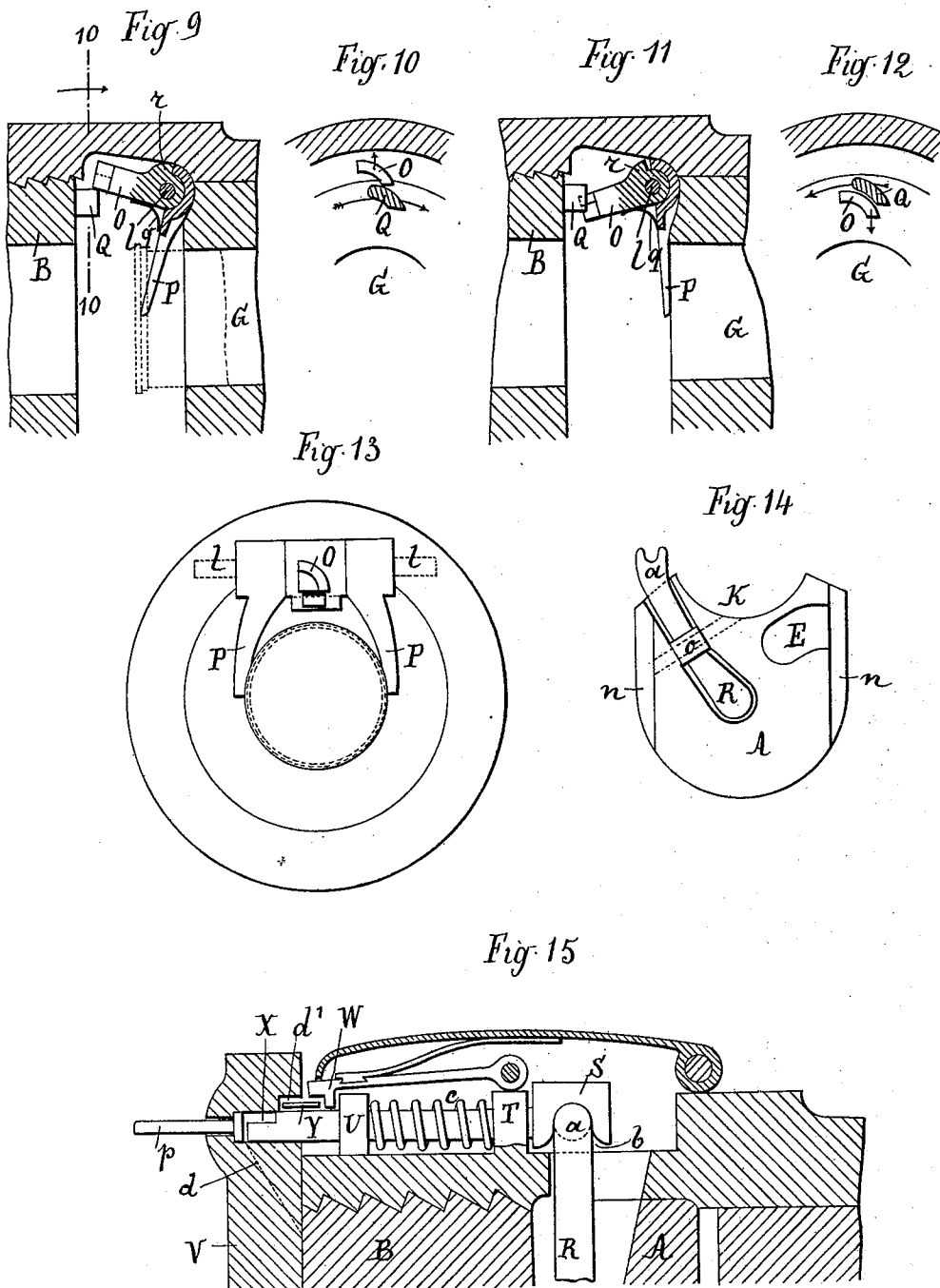
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UNITED STATES PATENT OFFICE.

JOSEPH ALBERT DEPORT, OF PARIS, FRANCE.

BREECH-CLOSING MECHANISM FOR RAPID-FIRE GUNS.

SPECIFICATION forming part of Letters Patent No. 567,224, dated September 8, 1896.

Application filed May 27, 1895. Serial No. 550,814. (No model.) Patented in England March 4, 1895, No. 4,571; in Belgium March 15, 1895, No. 114,420, and in Hungary March 27, 1895, No. 2,599.

To all whom it may concern:

Be it known that I, JOSEPH ALBERT DEPORT, a citizen of the Republic of France, residing in Paris, France, have invented certain new and useful Improvements in Breech-Closing Mechanism for Rapid-Fire Guns, of which the following is a specification.

This invention is patented in Great Britain by Patent No. 4,571, dated March 4, 1895; in Belgium by Patent No. 114,420, dated March 15, 1895, (issued March 15, 1895,) and in Hungary by Patent No. 2,599, dated March 27, 1895, (issued March 27, 1895.)

Heretofore breech-closing mechanisms have been used having a screw with coarse continuous thread concentric with the bore and a removable wedge or block with obturator-ring for receiving from this screw a heavy initial pressure in order to effect the closure of the breech. The breech-closing mechanism for rapid-fire guns which constitutes the subject of my application for patent includes likewise a coarse breech-screw, by which the charge is introduced, and a sort of block, but the block is connected to the screw, as will be explained hereinafter, by a mechanical connection which causes it to move in such manner as to effect the opening or closing of the breech, when the screw is given a rotative movement in one direction or the other, and which permits of reducing the block to a simple plate or slide. The cocking of the percussion mechanism and the ejection of the empty shell are effected during the opening movement. By the inverse movement the breech is closed, and the firing may be effected immediately by pressing on a detent. The breech-case may be concentric or parallel to the bore, and as the charge is contained in primed shells the block need not comprise an obturator-ring.

To enable my invention to be well understood, I have represented in the accompanying drawings, as one example thereof, a construction of breech for rapid-fire cannon in accordance with my system.

Figure 1 is a vertical longitudinal section through the breech portion of the cannon coincident with the axis of the screw and of the bore. Fig. 2 is a horizontal section on the line 2 2 in Fig. 1. Fig. 3 is a view of the in-

ner or front side of the crank-plate of the breech. Fig. 3^a is a section of the crank-plate V along the groove *d*. Fig. 4 is a view of the front or inner face of the breech-screw, the end of the arm O (hereinafter described) being in section. Fig. 5 is a longitudinal diametrical section on the line 5 5 in Fig. 7. Fig. 6 is a similar section showing the percussion mechanism cocked. Fig. 7 is a rear view showing the breech closed, the crank-plate V being removed and its position indicated in dotted lines. Fig. 8 is a rear view showing the breech open and partly broken away to show the slide. Fig. 9 is a fragment of Fig. 1, showing the action of the extractor at the moment of expelling the shell. Fig. 10 is a section on the line 10 10 in Fig. 9, showing how the cam Q on the breech-screw acts on the extractor-arm O for extracting the shell. Fig. 11 is a similar view to Fig. 9, but showing the parts during the closing movement, the extractor-arm first being drawn down idly by the cam Q in passing. Fig. 12 is a sectional view answering to Fig. 10, but showing the operation as in Fig. 11. Fig. 13 is a rear view of the breech, showing the extractor. Fig. 14 is a rear view of the breech-block removed, showing the hammer. Fig. 15 is an enlargement of part of Fig. 5.

The movable block A is a simple sliding plate which slides vertically in a mortise *m*, formed in the cannon. This mortise presents two guiding-grooves *m' m'*, inclined with reference to the mortise, (see Fig. 1,) and in each are arranged slide projections *n n*, formed on the block A. The inclination of the grooves corresponds to the inclination of the threads of the breech-screw B. When the breech is closed, the plate A bears against the screw B, with which it forms a non-reciprocal system by reason of the inclination with reference to the mortise of the slides of the plate engaged in the guide-grooves; that is to say, so that the plate is held by the screw alone and cannot descend, whatever effort may be exerted upon it, until the breech-screw is acted upon for releasing it. The connection between the screw B and the block A is established by means of a tenon D on the breech-screw, (shown in Figs. 4 and 8 and in dotted lines in Figs. 1, 5, and 7,) which

engages in a groove E in the block A, Figs. 6, 8, and 14. This groove E is partly in a circular arc such that when the block A is lowered, so that its upper margin K forms a coincident prolongation of the bottom of the chamber, this circular part is concentric with the axis of the breech-screw, Fig. 8.

The crank-plate V is fixedly attached to the screw B in any manner, as, for example, by means of screws *v*, Figs. 1 and 3, with or without dovetail grooves *h*, Figs. 2 and 7. The plate V presents at *f* a shoulder destined to abut against the end *i* of the projecting abutment F (see Figs. 1, 3, and 7) of the rear part of the gun, which limits the extent of rotation of the screw in the closing movement. The shoulder *g* is arranged to be stopped against the end *i'* of the abutment in the opening movement of the breech.

The opening of the breech is complete when the crank which stands at C in Fig. 7, when the breech is closed, has been dropped to the position C', Fig. 8. In this figure the tenon D of the screw has come to the position shown in dotted lines at D'. It is then that the margin K of the plate is flush with the chamber of the cannon. But the rotation of the breech-screw may be continued until the crank reaches C². The tenon of the screw thus moves from D' to D² in the circular path of the groove E, which, as already stated, is now concentric with the axis of the breech. It is in this last movement of rotation, after the complete opening of the breech, that occurs the ejection of the shell. In this position, Fig. 6, the shoulder *g* of the crank-plate V abuts against the end *i'* of F.

The extractor consists of a lever-arm O and two branches P, constituting a fork, Figs. 1, 9, 11, and 13. The arm O of the extractor is pivoted at *l* for permitting it to move down, as shown in Fig. 11, by compressing a small spring *q*, interposed between this arm and the body of the fork; but a shoulder *r* renders it solid with the fork for the movement of ejection when the arm O is forced upward, as seen in Fig. 9. This movement is effected toward the end of the opening of the breech under the action of a cam Q, which is carried on the front of the breech-screw B, and seen in Figs. 2, 4, and 9. This cam Q acts progressively under the arm O of the extractor, and has for effect to loosen and then eject the empty shell. Fig. 10 shows how in this movement the cam Q lifts the cam O. As the breech-screw continues its rotation from C' to C² the ejection-cam Q passes beyond the arm O of the extractor to the position shown in Fig. 8, so that the extractor becomes free when the breech is completely open and may drop forward into its recesses formed in the cannon, so that it will not hinder the introduction of the cartridge.

In the closing movement the cam Q encounters the arm O of the extractor on the upper side, Fig. 12, and presses it downward, Fig. 11, by compressing the spring *q*, which

tends to maintain the arm uplifted and which returns it to its position after the passage of the cam. By reason of this arrangement the branches of the extractor are not thrown out to the extracting position at the moment of introduction of the cartridge, as occurs in other systems which do not permit of ramming the cartridge home while the breech is open.

The percussion mechanism is constructed (see Figs. 5, 6, 7, 8, and 15) of a hammer R, pivoted at *o* on the plate A and terminating at its upper end in a fork *a*, Fig. 14, which engages with a suitable recess *b*, Fig. 5, formed in the percussion-bolt S. This bolt is provided with a helical spring *c*, which presses in one direction against an abutment T on the cannon, serving as a guide and stop for the bolt, and in the other direction against a collar U, fixedly attached to the bolt. The extremity of the bolt engages a groove *d*, Figs. 3 and 3^a, in the crank-plate V of the breech-screw, this groove being of decreasing depth, forming an inclined plane or cocking-cam, Figs. 1, 3^a, and 15. In the operation of opening the breech this inclined plane presses against the end of the bolt S, compressing the spring *c*, and when the movement is sufficient the beak of the tumbler W falls into the notch X, as shown in Fig. 6, this beak holding the bolt cocked during the movement in the opposite direction for closing the breech. In the sliding movements of the block A the hammer R is maintained pressed backward by a small counter-spring *s*, Fig. 6. Under the rear end of the bolt is placed the beak *e* of a trigger Y, (see Fig. 7,) of which one part is engaged in a groove *d'*, formed in the plate V, Fig. 3, and concentric with the axis of the breech. This safety-groove, of which the shape is shown in Fig. 3, prevents the trigger Y from detaching the tumbler W by holding its beak down in all positions other than that which corresponds to the closure of the breech. In this position the groove *d'* presents over the beak *e* of the trigger Y a notch *k*, (see Figs. 3 and 5,) which permits it to be raised sufficiently, when the button Z is pressed upon, to displace the tumbler and disengage its beak from the notch X.

The crank-plate V carries a tampion *p* at the end of the cam-groove *d*, (see Figs. 3, 5, 6, and 14 and the detail view Fig. 15,) so that in the firing position it coincides with the firing-bolt S. It has a projecting head which, in case of missing fire, permits of immediately resetting the firing-bolt by pushing its projecting end forcibly inward, thus recocking the gun without having to open the breech.

The operation is as follows: The breech being supposed to be closed and the hammer advanced, Fig. 5, as after firing, the crank C is turned down until stopped by contact with the shoulder *i'* of the abutment F, the percussion-bolt S is cocked by the cam-groove *d*, the breech-plate A is slid down to open the breech, and the cam Q lifts the arm O

and operates the ejector P to eject the empty shell. The cartridge being introduced, the reverse movement is given to the crank for closing the breech, and the hammer enters into engagement with the percussion-bolt S by its fork *a*, Fig. 6, which engages in a notch formed in the head of the bolt for receiving it. It then suffices to press the trigger for firing the gun. The trigger, if pressed, will not act until the breech is completely closed. The firing can thus follow immediately after the closing of the breech without any waste of time. The breech-block, instead of sliding downwardly to open and upwardly for closing, may be arranged to act in the opposite direction, or it may move horizontally. The connection by tenon and groove between the breech-screw and the breech-block may be reversed or replaced by any other equivalent. With my system of closing employment of complete cartridges is not necessary. The charge may be composed of a projectile and a charged and primed shell or of a projectile and a cartridge with primed base. The percussion mechanism, comprising hammer R, carried by the breech-block, sliding bolt S, carried on the breech, and means for actuating this bolt to operate the hammer, is claimed generically in another application which I have filed, Serial No. 550,916, May 28, 1895. I make no claim herein to anything claimed in that application.

I claim as my invention the following-defined novel features, substantially as hereinbefore specified, namely:

1. The combination in a breech-loading cannon, of a breech-screw, a sliding block arranged in front of said screw so as to close the chamber, and a connection between the screw and block consisting of a projection on the one part and a groove in the other part shaped to effect the sliding of the block by reason of the rotation of the screw.

2. The combination in a breech-loading cannon, of a breech-screw, a sliding block arranged in front of said screw so as to close the chamber, and a mechanical connection between said block and screw through which the block is slid to the open or closed positions by the movement of the screw, said connection constructed to admit of a supplementary movement of the screw after the block is moved to its open position.

3. The combination in a breech-loading cannon, of a breech-screw, a sliding block arranged in front of said screw so as to close the chamber, and a connection between the screw and block consisting of a projection on the one part and groove in the other part shaped to effect the sliding of the block by reason of the rotation of the screw, and to permit the screw to execute a supplementary rotative movement after the block reaches its open position.

4. The combination in a breech-loading cannon, of a breech-screw, a sliding block arranged in front of said screw so as to close the chamber, an eccentric tenon projecting from the screw, and a groove in the block engaged by said tenon for imparting sliding movements to the block by the oscillations of the screw, said groove being extended as a circular arc in the path traversed by the tenon during a supplemental movement of the screw after the block reaches its open position, whereby the block remains stationary in such position.

5. The combination in a breech-loading cannon, of a sliding breech-block, a hammer carried thereby, a bolt carried by the breech adapted to interlock with said hammer when the breech is closed, and a trigger and tumbler carried by the breech for operating said bolt.

6. The combination in a breech-loading cannon, of a sliding breech-block, a hammer carried thereby, a spring-bolt carried by the breech, and an operating crank-plate formed with an inclined plane adapted to act against said bolt for cocking it during the movement of said plate for opening the breech.

7. The combination in a breech-loading cannon, of a sliding breech-block, a hammer carried thereby, a spring-bolt carried by the breech, a tumbler for holding said bolt cocked, a trigger having a beak for displacing said tumbler, and an operating crank-plate formed with a safety-groove engaging the beak of said trigger to prevent the operative movement thereof while the breech is open, and formed with a notch which when the breech is closed coincides in position with said beak and permits the movement of the trigger.

8. In a breech-loading cannon, the combination of a sliding breech-block, a breech-screw, a mechanical connection between them by which the block is opened or closed by the oscillatory movements of the screw, an ejector-cam carried by the screw, and an ejector comprising a pivoted fork for engaging the shell, and an arm connected thereto and movable in one direction independent thereof, arranged to be operated by said ejector-cam and adapted to permit of ejecting the shell by the action of said cam upon the opening movement of the breech-screw, and when said cam has passed beyond it adapted to release the extractor-fork and permit the cartridge to be forced home while the breech is open.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOSEPH ALBERT DEPORT.

Witnesses:

CLYDE SHROPSHIRE,
JULES ARMENGAUD, Jeune.