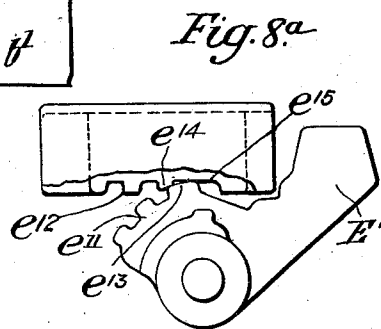
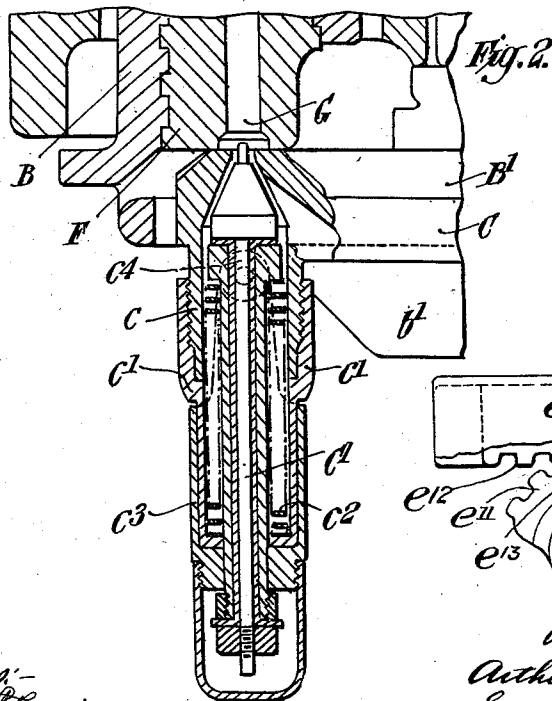
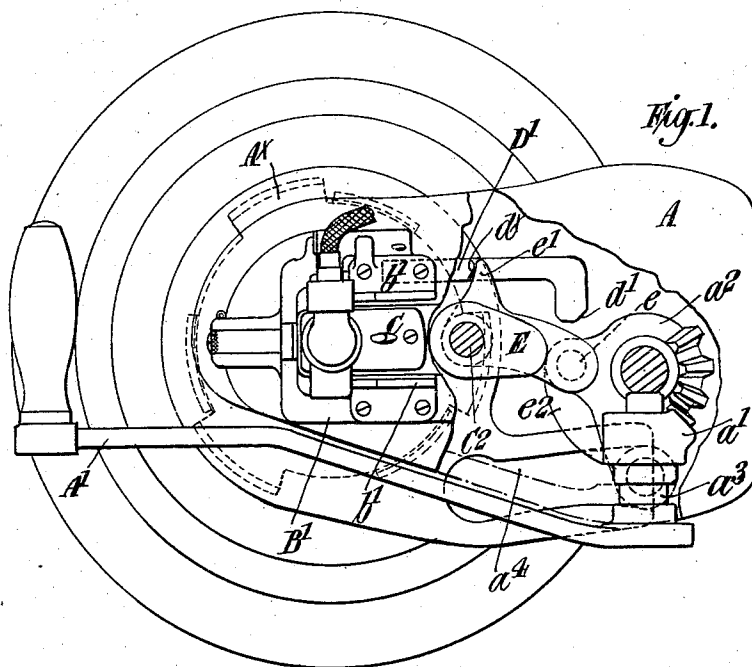


A. T. DAWSON & G. T. BUCKHAM.
FIRING MECHANISM OF BREECH LOADING GUNS.
APPLICATION FILED MAR. 8, 1910.

994,703.

Patented June 6, 1911.

2 SHEETS—SHEET 1.

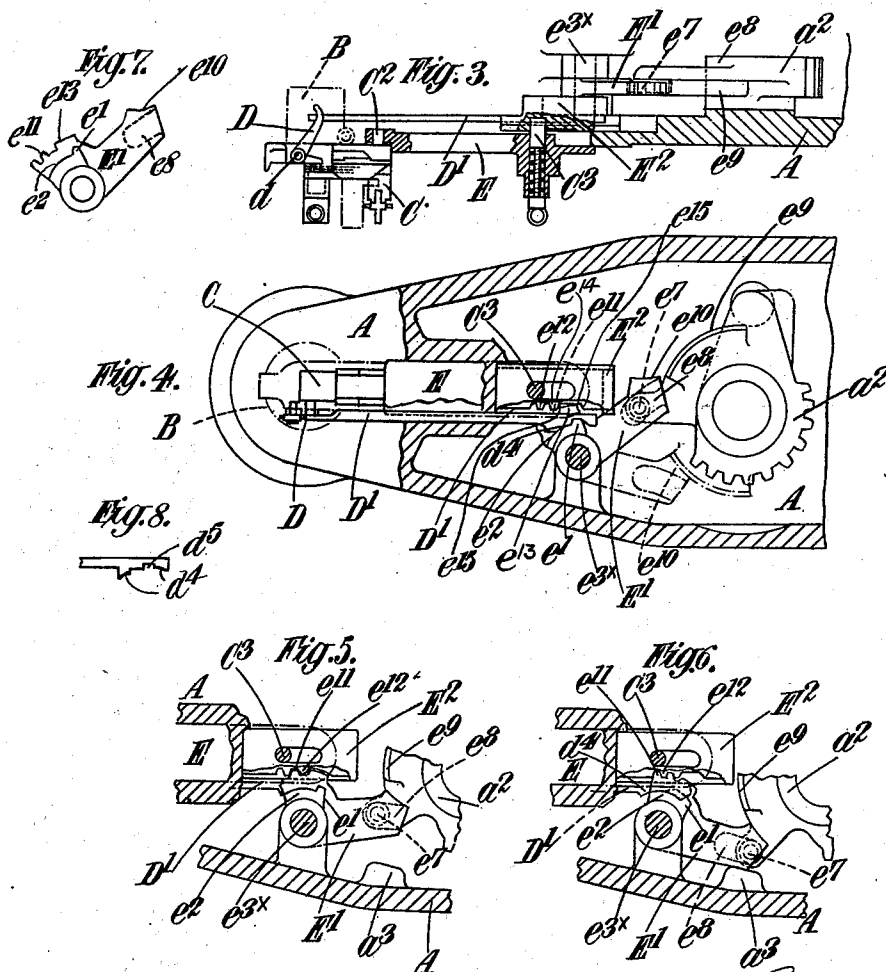
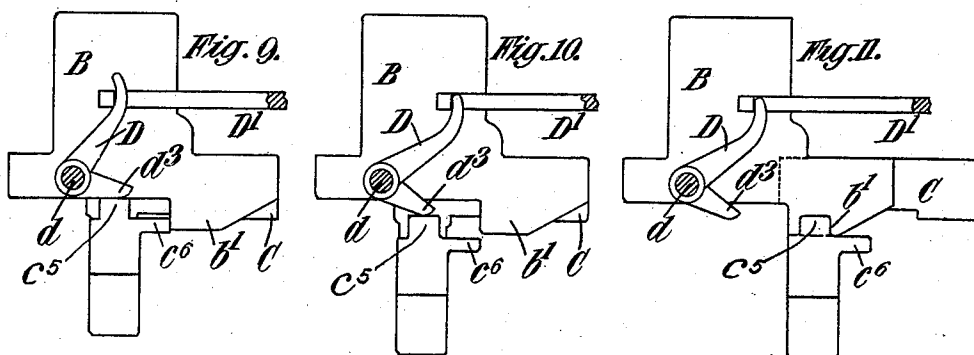


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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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

FIRING MECHANISM OF BREECH-LOADING GUNS.

994,703.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, ARTHUR TREVOR DAWSON and GEORGE THOMAS BUCKHAM, both subjects of the King of Great Britain, residing at 32 Victoria street, Westminster, in the county of London, England, have invented certain new and useful Improvements in Firing Mechanism of Breech-Loading Guns, of which the following is a specification.

This invention relates to the firing mechanism of breech loading guns of the class wherein the breech screw is opened and closed by means of a hand lever adapted to impart a partial rotation in one direction or the other to a pinion carried by a swinging carrier and arranged to transmit through a suitable connection a corresponding movement to the breech screw and a lateral movement to a slide which normally covers the axial vent of the gun when the breech is closed. In mechanism of this class it is customary to mount the striker or firing pin upon the aforesaid slide, and to utilize the lateral movement thereof simultaneously to retract the striker to its cocked position, this operation being effected by projections on the striker which engage with cam surfaces on the frame in which the slide works when the hand lever is operated to withdraw the slide to uncover the axial vent. It has been found in practice that when the aforesaid projections and cam surfaces become worn, a sufficient movement of the slide takes place before the commencement of the retraction of the striker to break or materially damage the same in the event of its end being embedded in the head of the primer.

The present invention is particularly applicable to heavy guns and consists in causing the striker to be partly retracted before any movement is imparted to the slide by means of a retracting lever adapted to be actuated by a pull imparted to a rod that receives a positive endwise motion in each direction from a lever that is actuated by the sector pinion, the said lever being also arranged to impart a positive endwise motion in each direction to the aforesaid slide and to be capable of becoming disconnected from the sector pinion to permit of the latter continuing its movement for the purpose of unscrewing and opening the breech.

In order that the said invention may be clearly understood and readily carried into effect, the same is described with reference to the accompanying drawings, in which:—

Figure 1, is an end elevation of a gun breech showing the ordinary mechanism for actuating the same and mechanism actuated by the sector pinion for retracting the striker. Fig. 2, is a horizontal section of part of Fig. 1, drawn to an enlarged scale. Fig. 3, is a plan of a portion of a gun breech part of which is shown in section to show the application thereto of the improved striker retracting and slide actuating mechanisms. Fig. 4 is an end elevation of a portion of the swinging carrier partly broken away to show the aforesaid mechanisms. Fig. 5, is a view of part of Fig. 4 showing the position of the parts when a partial rotation has been imparted to the sector pinion. Fig. 6, is a similar view showing the position of the parts when the lever that is actuated by the sector pinion has received its full amount of movement in one direction. Fig. 7 is a detached view of the lever shown in Figs. 4, 5, and 6. Fig. 8 is a detached view showing the end of the retracting rod that engages with such lever. Fig. 8^a is an enlarged view showing the connection between the sector and the rack. Figs. 9, 10 and 11, are detached views drawn to a larger scale showing various positions of the striker retracting lever and of the slide that carries the striker.

The following is a description of an existing type of breech mechanism to which the invention is applied:—A represents the swinging carrier which is hinged to one side of the breech end of the gun and supports the breech screw A^x. A¹ is the breech actuating hand lever to which is connected a sector pinion a¹ gearing with a similar sector pinion a² pivoted on the carrier. This pinion is provided with a roller crank pin a³ which engages with a groove a⁴ formed in a projection extending from a portion of the breech screw, so that a partial rotary motion is imparted to such screw by the pinion a² when the hand lever is moved in a direction away from the breech with the result that a threaded portion of the breech screw is disengaged from a corresponding threaded portion in the gun, whereupon the breech screw

can be opened by continuing the movement of the hand lever in the direction above mentioned. Mounted on the carrier A is a piece of mechanism technically termed a "slide box" one portion B of which embraces the spindle F of the axial vent and another portion B¹ constitutes a slide bed for a slide C. Projecting from the latter is a hollow boss c Fig. 2 on which is mounted a casing c¹ and situated within these parts is the striker C¹ and spring c² for actuating the same. The striker is connected to a sleeve c³ which is slidably mounted on the casing c¹ and carries projections or rollers c⁴ adapted to be brought into engagement with projections b¹ on the slide bed B¹ for retracting and cocking the striker when the slide C is moved laterally toward the right to uncover the axial vent. This movement is effected by a bolt C² which passes through such slide and forms a pivot for one end of a link E the other end of which is connected to a crank pin e on the sector wheel a². When the breech is closed, the slide is moved by the aforesaid bolt C² and link E to bring the end of the striker C¹ into line with the axial vent as shown in Fig. 2. In this view the end of the striker is shown embedded in the head of the primer G and it will be readily understood that if any wear takes place between the roller c⁴ and the projection b¹ on the slide bed B¹ the slide will move before the commencement of the retraction of the striker and the latter will be damaged or broken.

With reference to the mechanism constructed in accordance with this invention, D represents a two armed retracting lever pivoted at d to the slide bed B¹ and provided with a toe piece d³ that is capable of engaging with a projection c⁵ on the striker sleeve.

D¹ represents a retracting rod that is hooked at one end to engage with one arm of the lever D. This rod is slidably mounted in a suitable guide way formed in the swinging carrier A and is provided at its outer end with concave surfaces d⁴ situated on either side of a recess d⁵ that is also formed in such rod. Pivoted to the carrier A below the end of the retracting rod D¹ is a lever E¹ formed with a segmental surface e² corresponding to the curvature of the concave surface d⁴ and with a tooth or projection e¹ adapted to engage with the recess d⁵. This lever is also formed with a slot or groove e⁸ for the reception of a roller pin e⁷ mounted on a projection extending from the sector pinion a². The latter is formed with a segmental flange e⁹ for engagement when required with a correspondingly shaped part e¹⁰ on the lever E¹. Extending from such lever beyond the segmental portion e² and projection e¹ is a toothed sector e¹¹ formed with a wide tooth e¹³. This toothed sector is adapted to engage with a rack e¹² forming

part of a block E² that is connected with the slide actuating link E by means of a guide bolt C³. One of the rack teeth e¹⁴ is curved to enable the wide tooth e¹³ on the lever E¹ to slide thereon and so to permit a relative movement between the said lever and the rack, a recess e¹⁵ being formed in the latter to receive the wide tooth e¹³ during the said relative movement.

When the parts occupy the position shown in Fig. 9, the breech is fully closed and the slide C occupies its normal position for covering the vent axial, the projection e¹ on the lever E is in direct engagement with the recess d⁵ in the retracting rod and the wide tooth e¹³ is capable of sliding slightly to the right upon the curved tooth e¹⁴ before the wide tooth e¹³ interlocks with the recess e¹⁵ in the block E². In this position the end of the striker C¹ may be embedded in the head of the primer G as shown in Fig. 2, and the striker retracting lever D and striker sleeve c³ may occupy the position shown in Fig. 3. Upon rotating the crank pinion a² in an anti-clockwise direction the rod D¹ is pulled to the right by the direct engagement of the projection e¹ with the recess d⁵. This movement turns the retracting lever D to the position indicated in Fig. 10, before any movement is transmitted to the slide owing to the relative movement which takes place between the sector e¹¹ and the rack e¹². The toe piece d³ engaging with the projection c⁵ on the striker sleeve retracts the latter to the position indicated in Fig. 10, in which position the end of the striker is retracted clear of the primer head and the surface of a projection c⁶ on such sleeve is brought linable with a parallel surface formed on a projection b¹ extending from the slide bed B¹. At the completion of this retracting movement the tooth e¹ leaves the recess d⁵ and engages with the curved surface d⁴ thereby retaining the retracting rod and lever in their retracted condition until the slide C has been moved sufficiently far to the right to enable the projection c⁶ to rest upon the projection b¹, the said movement of the slide being effected by the engagement of the sector teeth with the rack teeth as shown in Fig. 5. A continuation of the rotary motion of the sector pinion a² turns the lever E¹ to the position indicated in Fig. 6, further movement of such lever being prevented by a stop a³ projecting from the carrier A. This movement of the lever moves the slide C to its extreme position to the right for uncovering the vent axial to permit of the removal of the expended primer. The rotary motion of the sector pinion can now be continued for the purpose of completing the unscrewing of the breech, the roller pin e⁷ leaving the slot or groove e⁸ and the segmental flange e⁹

engaging with the concave surface e^{10} and thereby retaining the lever E^1 in the proper position for insuring the reengagement of the roller pin e^7 with the groove e^8 when the sector pinion a^2 is rotated in the opposite direction to close the breech.

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

1. In firing mechanism of the character described, the combination with the slide, the striker, the striker retracting lever and the sector pinion, of a tension member operatively connected with the striker retracting lever and the sector pinion, and caused by the latter in the act of opening the breech to exert a pull on the striker retracting lever to initially retract the striker prior to the commencement of the lateral movement of the slide.

2. In firing mechanism of the character described, the combination with the slide, the striker, and the sector pinion, of a pivoted lever operatively connected with the sector pinion, a retracting rod arranged to be actuated in each endwise direction by the said lever, and a retracting lever actuated to retract the striker preparatory to the lateral movement of the slide, by a pulling action of the retracting rod.

3. In firing mechanism of the character described, the combination with the slide, the striker, and the sector pinion, of a pivoted lever operatively connected with the sector pinion and capable of becoming disengaged therefrom, a retracting rod arranged to be actuated in each endwise direction by the said lever, a retracting lever actuated to retract the striker by a pull exerted upon the retracting rod by the pinion actuated lever, and means whereby the slide is actuated in one direction or the other by movement of the pinion actuated lever.

4. In firing mechanism of the character described, the combination with the striker, the striker retracting lever and the sector pinion, of a pivoted lever operatively connected with the sector pinion and capable of becoming automatically disengaged therefrom, a retracting rod operatively connected at one end with the retracting lever and at the other end with the aforesaid pivoted lever the connections between the said lever and rod being so arranged that the lever can impart an endwise movement in either direction to the rod, retain such rod in its forward or retracted condition, or move relatively to the rod.

5. In firing mechanism of the character described, the combination with the striker the striker retracting lever and the sector pinion, of a pivoted lever operatively connected with the sector pinion and capable of automatically becoming disengaged therefrom, the said lever having a concentrically

arranged segmental surface and a segmental projection extending radially therefrom, a retracting rod capable of exerting a pull upon the retracting lever and formed with a recess and with concave surfaces adapted to be engaged by the aforesaid segmental surface and projection.

6. In firing mechanism of the character described, the combination with the slide, the link for actuating the same, the striker, the striker retracting lever, and the sector pinion, of a pivoted lever operatively connected with the sector pinion and capable of becoming automatically disengaged therefrom, the said lever having a concentrically arranged segmental surface and a segmental projection extending radially therefrom, a retracting rod capable of exerting a pull upon the retracting lever and formed with a recess, and with concave surfaces on either side thereof for engagement with the aforesaid segmental surface and projection, a toothed sector wheel extending from the lever, a rack connected with the slide actuating link and formed with surfaces for interlocking with the sector wheel and also for permitting at certain periods a certain amount of relative movement of the sector wheel in either direction.

7. In firing mechanism of the character described, the combination with the slide, the link for actuating the same, the striker, the striker retracting lever and the sector pinion, of a pivoted lever operatively connected with the sector pinion and capable of becoming automatically disengaged therefrom, the said lever having in proximity to its pivot a concentrically arranged segmental surface, and a segmental projection extending radially therefrom, a retracting rod capable of exerting a pull upon the retracting lever and formed with a recess, and with concave surfaces on either side thereof for engagement with the aforesaid segmental surface and projection, a toothed wheel extending from the lever, a rack connected with the slide actuating link and formed with surfaces for interlocking with the sector wheel and also for permitting at certain periods, relative movement of the sector wheel in either direction, a stop for limiting the amount of movement of the said lever in one direction, and a segmental flange on the sector pinion for retaining at certain periods the said lever in a predetermined position.

8. In firing mechanism of the character described, the combination with the slide box, the slide, the slide actuating link, the striker, and the striker retracting lever, of a striker sleeve having a projection thereon adapted to be engaged by the retracting lever, and a projection adapted to be engaged by a raised surface on the slide box, a pivoted lever provided with a concentrically arranged segmental surface and a segmental

projection extending radially therefrom, a retracting rod operatively connected at one end with the retracting lever and formed at the other end with a recess and with concave
5 surfaces on either side thereof for engagement with the aforesaid segmental surface and projection, a toothed sector wheel extending from the lever and provided with a wide tooth, a rack connected with the slide actuating link and formed with surfaces for interlocking with the aforesaid sector wheel and also for permitting at certain periods, relative movement of the sector wheel in either direction, a stop for limiting rotary movement
10 of the lever in one direction, a sector pinion

provided with a roller pin and with a segmental flange, the said pin being adapted automatically to engage and to disengage with a groove formed in the aforesaid lever, and the segmental flange being arranged at
20 certain periods to make contact with a concave surface on the lever and thereby retain the latter in contact with the aforesaid stop.

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

ARTHUR TREVOR DAWSON.

GEORGE THOMAS BUCKHAM.

Witnesses:

HENRY KING,

C. A. SEARLE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
