No. 610,110. Patented Aug. 30, 1898.

D. VICKERS, A. T. DAWSON & G. T. BUCKHAM.

FIRING MECHANISM FOR BREECH LOADING ORDNANCE.

(Application filed Nov. 9, 1897.)

(No Model.) 3 Sheets—Sheet I.

Fig. 1.

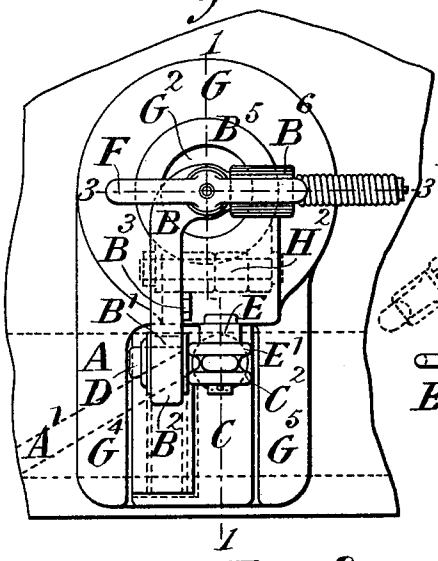


Fig. 2.

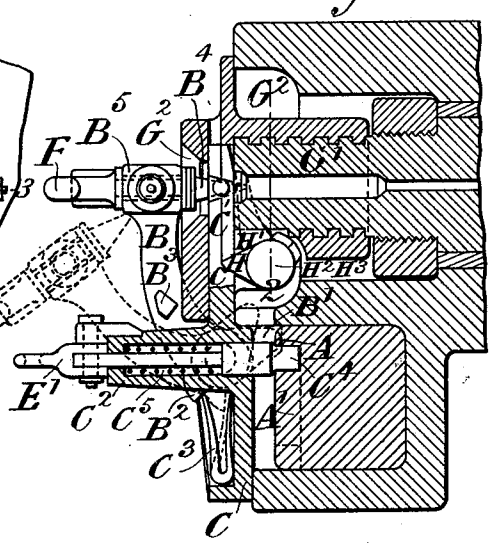


Fig. 3.

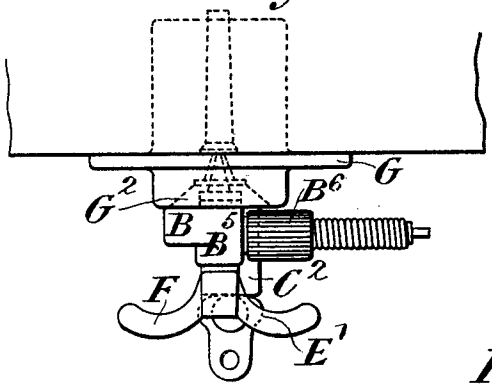


Fig. 3a.

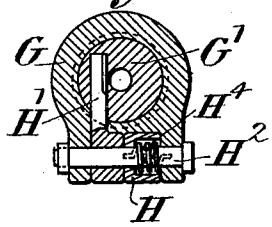
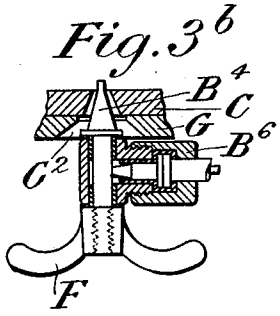


Fig. 3b



Witnessess.

Robert Everett.

Inventors

Douglas Vickers

Arthur T. Dawson

George T. Buckham

By James L. Norris.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C

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Fig. 4.

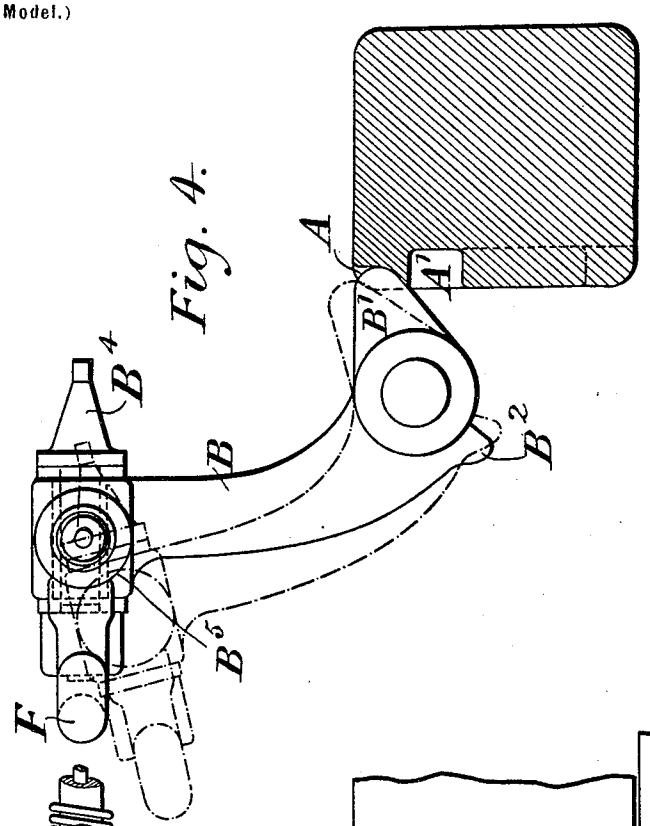


Fig. 5.

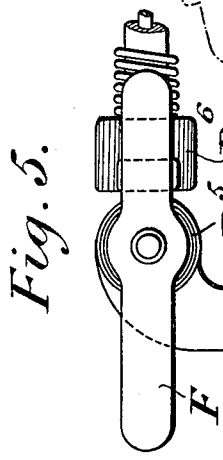
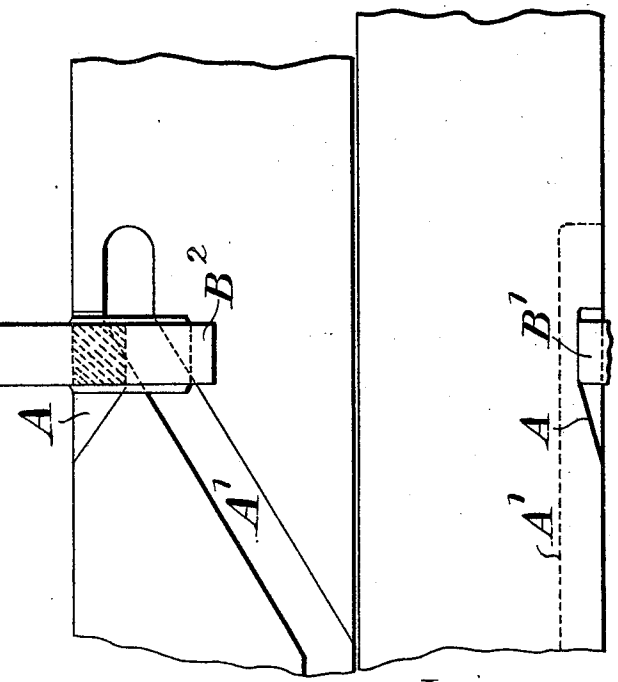


Fig. 6.



Witnessess

J. B. Keeler

Robert Everett.

Inventors.

Douglas Vickers

Arthur T. Dawson

George T. Buckham

By James L. Norris

Atty.

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Fig. 7.

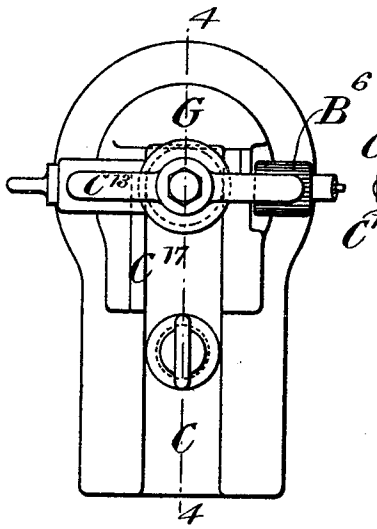


Fig. 8.

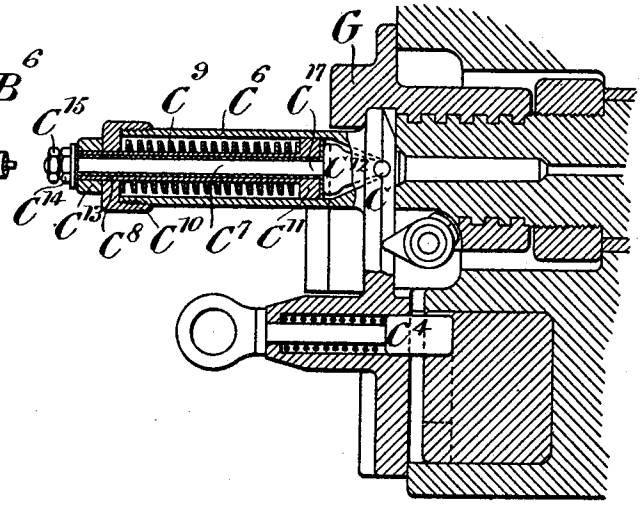
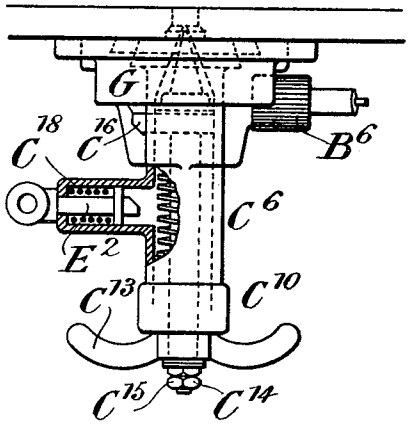


Fig. 9.



Witnesses

J. B. Keeler

Robert Everett

Inventors

Douglas Vickers

Arthur T. Dawson

George T. Buckham

By James L. Norris

Atty

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

DOUGLAS VICKERS, ARTHUR TREVOR DAWSON, AND GEORGE THOMAS BUCKHAM, OF SHEFFIELD, ENGLAND, ASSIGNORS TO VICKERS SONS & CO., LIMITED, OF SAME PLACE.

FIRING MECHANISM FOR BREECH-LOADING ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 610,110, dated August 30, 1898.

Application filed November 9, 1897. Serial No. 657,991. (No model.) Patented in England May 16, 1896, No. 10,606; in Belgium March 8, 1897, No. 126,799; in France March 8, 1897, No. 264,776; in Spain April 17, 1897, No. 20,528; in Austria April 30, 1897, No. 47/1,524, and in Italy May 8, 1897, XXXII, 44,074.

To all whom it may concern:

Be it known that we, DOUGLAS VICKERS, a managing director of Vickers Sons & Co., Limited, ARTHUR TREVOR DAWSON, late lieutenant, R. N., superintendent of ordnance department, and GEORGE THOMAS BUCKHAM, engineer, citizens of England, residing at River Don Works, Sheffield, in the county of York, England, have invented certain new and useful Improvements in Breech-Loading Ordnance and Their Mountings, (for which we have obtained patents in the following countries, viz: Austria April 30, 1897, No. 47/1,524; Belgium March 8, 1897, No. 126,799; France March 8, 1897, No. 264,776; Great Britain May 16, 1896, No. 10,606; Italy May 8, 1897, Vol. 32, No. 44,074, and Spain April 17, 1897, No. 20,528,) of which the following is a specification.

Our invention relates to mechanism applied at the breech of a breech-loading gun for firing the charge either by percussion or electrically, as we shall describe, referring to the accompanying drawings.

Figure 1 is a rear elevation of the firing-gear according to our invention. Fig. 2 is a section on line 1 1, and Fig. 3 is a plan. Fig. 3^A is a section on line 2 2 of Fig. 2, and Fig. 3^B is a section on line 3 3 of Fig. 1. Figs. 4, 5, and 6 show some of the parts to an enlarged scale, Fig. 4 being a part transverse section, Fig. 5 a rera elevation, and Fig. 6 a plan. Figs. 7, 8, and 9 show a modification of the firing-gear, Fig. 7 being a rear elevation, Fig. 8 a section on the line 4 4 of Fig. 7, and Fig. 9 is a plan.

In Figs. 1, 2, 3, 3^A, 3^B, 4, 5, and 6 the construction is as follows: In and on the sliding bar of a breech mechanism, preferably of the type described in Letters Patent of Great Britain No. 9,780 of 1895, is formed a groove A of varying depth, also an inclined groove A′. B is a firing-hammer pivoted to a slide C by an axis-pin D and having a toe B′ engaging in the groove A. A projection B^2 on the hammer B engages with a firing-spring C^3 of any suitable form. Another projection B^3 on the hammer B engages with the trigger E when the hammer is cocked for percussion firing. A handle F is fitted to the hammer B for cocking it. A pin B^4 is fitted and suitably insulated in the boss B^5 of the hammer B. This pin B^4 forms an electric contact for electric firing and a striker for percussion firing and passes through a hole in the slide C. The slide C is retained and guided in a nut G and when in the firing position covers the head of a tube or primer. The nut G is carried on the end of the obturating-bolt G′ and is fitted to it by interrupted rings. In the front of this nut G is a hole G^2, through which the pin of the hammer passes to reach the tube or primer. A guide for the slide C is formed by jaws G^4 and G^5, projecting downward from the nut G and so arranged as to allow the boss C^2, formed on the slide C, to move vertically between them. An extractor for ejecting the empty tube or primer is carried in the nut G and consists of two levers H and H′, carried on a pin H^2, fitted in bosses provided on the nut G. Around this pin H^2 is a torsion-spring H^4, which actuates the lever H, its one end being connected to the nut G and the other to the lever H. The lever H has on it a projection H^3, which engages with the extractor-lever H′ and is so arranged that on the lever H being forced out it brings the extractor-lever H′ with it, but is free to return to its original position without it. The torsion-spring H^4 keeps the lever H in a suitable position. On the slide C is a boss C^2, which contains the retaining-bolt C^4. This bolt enters and fits the groove A′, the incline of which is so arranged that on the horizontal bar being moved it gives the necessary vertical motion to the slide C and also serves to retain it in the locked position. In the boss C^2 and round the bolt C^4 is a helical spring C^5 to enable the retaining-bolt C^4 to be withdrawn from the groove A′ when necessary for detaching the firing-gear. The spring C^3, which actuates the hammer, is carried in a recess cut in the slide C. The trigger E, for holding the hammer B in cocked position for percussion firing, is pivoted to the end of the retaining-bolt C^4

and is actuated by a double lever-cam E′, which allows the trigger to be released from either side or the rear of the gun. A suitable insulated contact-piece is carried in the nut B^6, which is screwed to the boss on the hammer B and makes an electric contact with the firing-pin B^4.

The action is as follows: On the first movement of the sliding bar of the breech mechanism in unlocking the breech-plug the hammer B is caused to move away from the tube or primer by means of the toe B′ being forced outward by the varying depth of the groove A, thus breaking the electric circuit between the firing-pin B^4 and the tube and preventing the pin B^4 from striking the percussion-tube. On the continued movement of the sliding bar the toe is brought out of the groove A and rides on the face of the bar, thus insuring safety while the breech mechanism is unlocked. At the same time the slide C is moved vertically away from the tube or primer, leaving its end uncovered, by means of the retaining-bolt C^4 being actuated by the groove A′. This vertical movement of the slide C causes the projection C′ to engage with the extractor-lever H, which in turn forces the lever H′ backward, thereby ejecting the tube or primer. On withdrawing the retaining-bolt C^4 from the groove A′ in the sliding bar the slide C can be moved vertically downward and the lock worked without moving the sliding bar of the breech. To cock the hammer B for percussion firing, it is drawn rearward by hand until it is caught by the trigger E, which can be released from either side or rear of the gun.

In Figs. 7, 8, and 9, showing a modification, instead of the swinging hammer B, pivoted on the slide C, we use a sliding hammer C^7. This hammer C^7 is suitably insulated in a tube C^8, which works inside a boss C^6, formed on the slide C. The hammer is held against an electric tube by means of the helical spring C^9, which also gives it the percussive force when a percussion-tube is used and is placed around the tube C^8 and held in position by the screwed cap C^{10} at one end and a collar C^{11}, formed on the tube C^8, at the other. The firing-pin C^7 has a head C^{12} formed on its end bearing against the insulated collar C^{11} of the tube C^8. On the end of the tube C^8 is placed a suitable handle C^{13}, which is kept in place by the nuts C^{14} and C^{15}. The head C^{11} of the tube C^8 has a toe C^{16} projecting through and working in a slot in the side of the boss C^6. The projection C^{16} works against an inclined ledge C^{17}, formed on the nut G. It also forms a sear for engaging with trigger E^2 when cocked for percussion firing. The trigger E^2 is the ordinary form of spring-trigger and is carried in a projecting boss C^{18} from the side of the boss C^6. A suitable electric contact is carried in the nut B^6, screwed on a boss provided on the nut G. The connection between the contact and the firing-pin is made on the head C^{12} of the pin C^7. The retaining-bolt C^4 is formed on the outer end in the shape of a ring or loop for withdrawing purposes.

The action is as follows: On the first movement of the sliding bar of the breech mechanism in unlocking the breech-plug the head C^{12} of the needle C^7 is caused to move away from the tube or primer by means of the toe C^{16} riding up the inclined ledge C^{17} of the nut G, thus breaking the electric circuit between the firing-head C^{12} and the tube and preventing the head C^{12} from striking the percussion-tube. On the continued movement of the sliding bar the toe C^{16} continues to ride on the ledge C^{17}, thus insuring safety while the breech mechanism is unlocked. The movement downward of the slide and action of the extractor is the same as that described in reference to Figs. 1 to 7, inclusive. To cock the head C^{12} for percussion firing, it is drawn rearward by hand until it is retained by the trigger E^2.

Having thus described the nature of this invention and the best means we know for carrying the same into practical effect, we claim—

1. In firing mechanism for a breech-loading gun, in combination with the breech-plug carrier and its horizontal slide-bar, a hammer having an insulated striker, a spring-trigger, a nut on the obturating-bolt, and a sliding plate thereon adapted to cover and uncover the head of a firing-tube, or primer, and to actuate an extractor, substantially as described.

2. In firing mechanism for a breech-loading gun, in combination with the breech-plug carrier and its horizontal slide-bar, an insulated sliding striker and its spring-trigger, a nut on the obturating-bolt, and a sliding plate thereon adapted to cover and uncover the head of a firing-tube, or primer, and to actuate an extractor, substantially as described,

In witness whereof we have signed our names to this specification, in presence of two subscribing witnesses, this 4th day of October, A. D. 1897.

DOUGLAS VICKERS.
ARTHUR TREVOR DAWSON.
GEORGE THOMAS BUCKHAM.

Witnesses:
HENRY GLOVER COOLEY,
F. V. JACKSON.