(No Model.) 3 Sheets—Sheet 1.

# D. VICKERS & G. T. BUCKHAM.

## BREECH LOADING ORDNANCE.

No. 602,785. Patented Apr. 19, 1898.

Fig. 2.

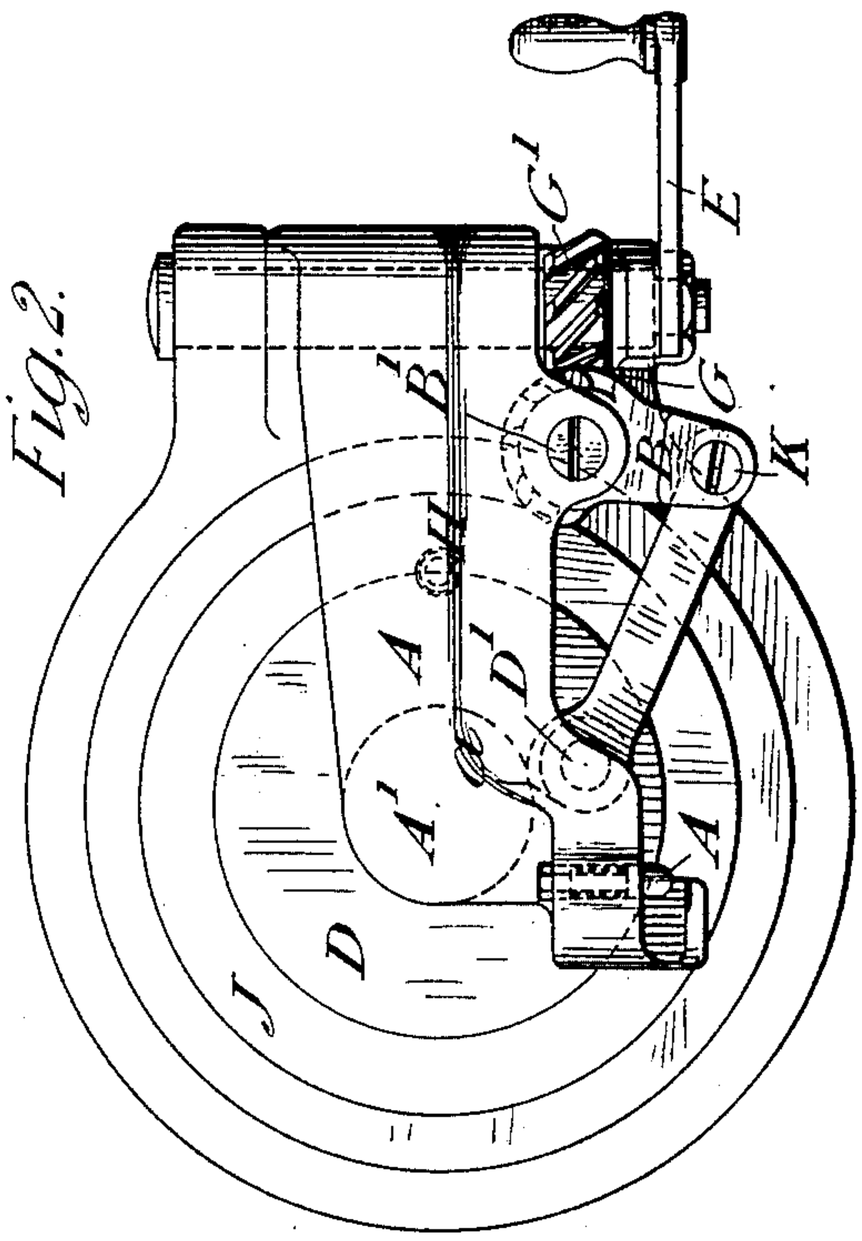



Fig. 3.

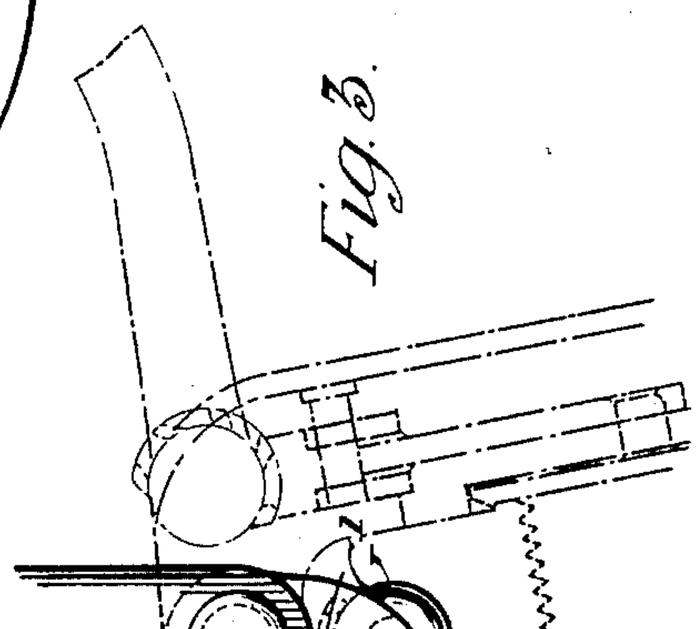
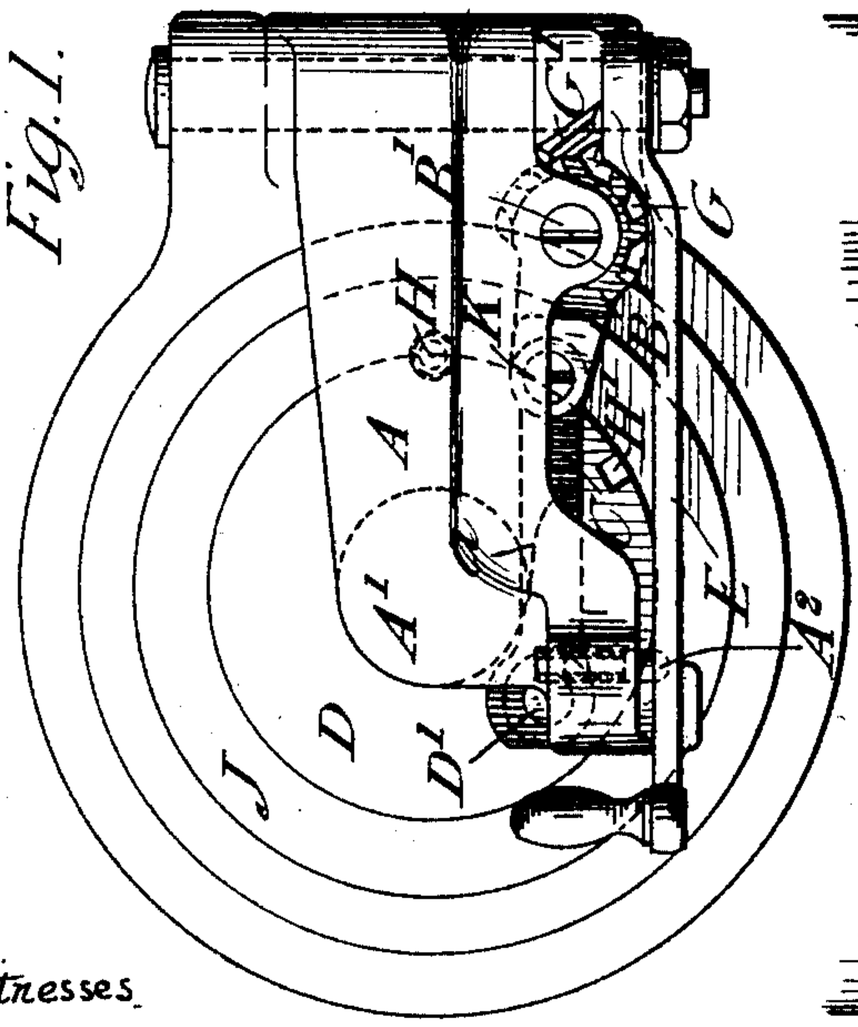



Fig. 1.




Witnesses.

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(No Model.) 3 Sheets—Sheet 2.

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## BREECH LOADING ORDNANCE.

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*Fig. 4*

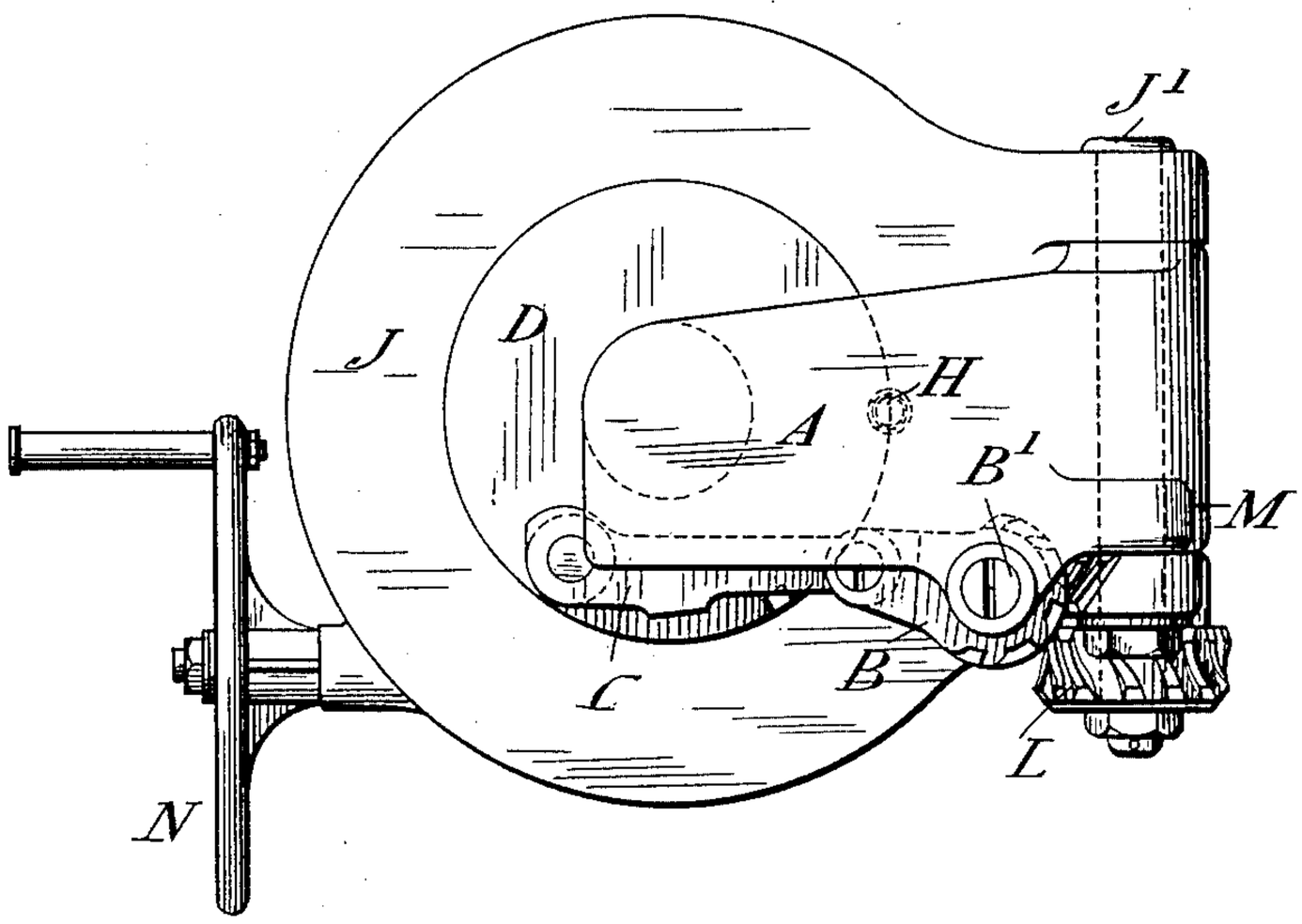
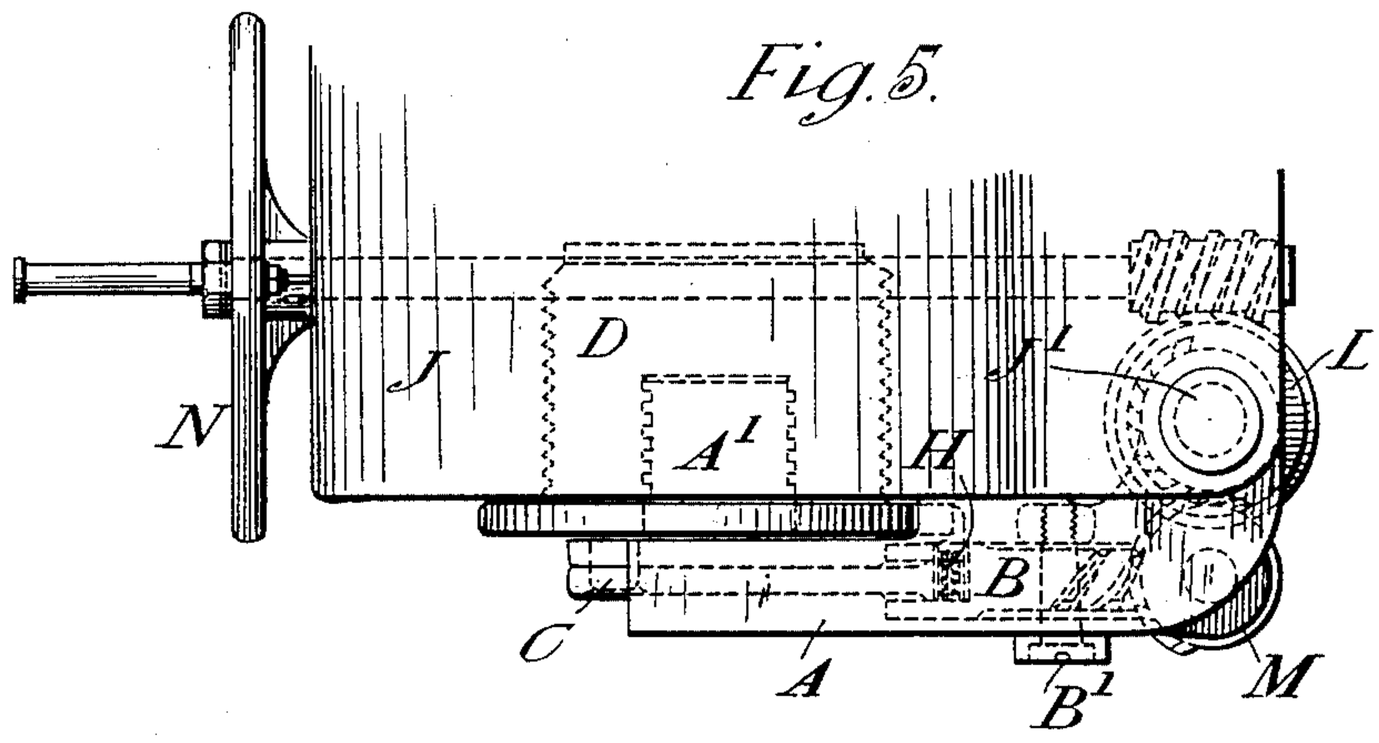



*Fig. 5.*




Witnesses

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## BREECH LOADING ORDNANCE.

No. 602,785. Patented Apr. 19, 1898.

*Fig. 6*

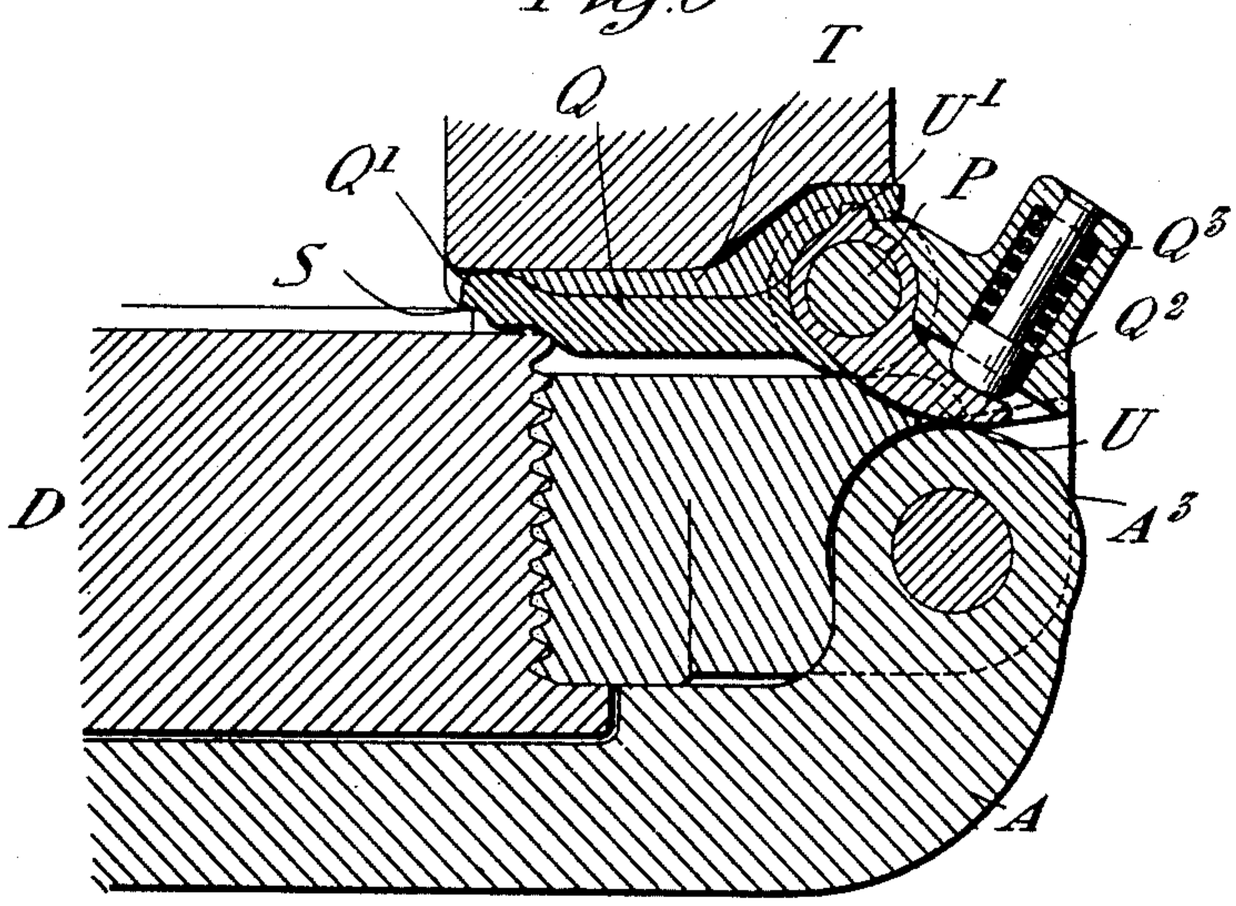
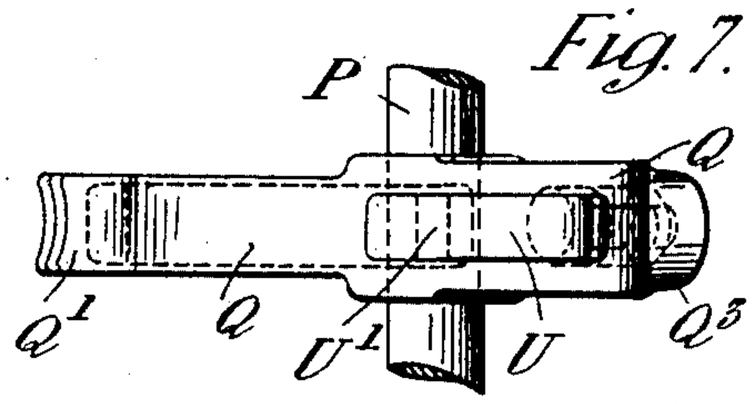



*Fig. 7.*

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# UNITED STATES PATENT OFFICE.

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

## BREECH-LOADING ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 602,785, dated April 19, 1898.

Application filed October 4, 1897. Serial No. 654,034. (No model.) Patented in England October 10, 1895, No. 19,026.

*To all whom it may concern:*

Be it known that we, DOUGLAS VICKERS and GEORGE THOMAS BUCKHAM, citizens of England, residing at River Don Works, Sheffield, in the county of York, England, have invented new and useful Improvements in Breech-Loading Ordnance, (for which we have obtained a patent in England, No. 19,026, dated October 10, 1895,) of which the following is a specification.

Our invention relates to breech mechanism of the kind in which the breech is closed by a breech-plug with interrupted or segmental screw-threads or collars, the breech-plug being pivoted on a stem on a carrier-arm hinged to one side of the breech end of the gun and being of such a form that it can be swung out of the gun immediately after the partial turn for unlocking it from the threads or collars in the breech.

We shall describe our invention, referring to the accompanying drawings, in which similar letters of reference denote corresponding parts.

Figure 1 is a rear elevation of a gun having breech mechanism according to our invention. In this figure the breech-plug is in the locked position. Fig. 2 is a rear elevation showing the breech-plug in the unlocked position, but not swung out. Fig. 3 is a plan of the breech end of the gun and the breech mechanism, the full lines showing the mechanism locked and the dotted lines showing it unlocked and the breech-plug swung out. Figs. 4 and 5 show a worm-gear to be substituted in large guns for the lever E, shown in Figs. 1, 2, and 3, which for such gun would not be sufficiently powerful. Fig. 6 is a sectional plan, and Fig. 7 a part elevation, of the mechanism for extracting the cartridge-cases.

Referring to Figs. 1, 2, and 3, we pivot in a recess in the carrier-arm A an arm B, which is connected by a pin at its extremity to a link C, the pair forming a toggle-joint. The link C is connected to the breech-plug D by a stud D′, projecting from the rear face of the plug.

The arm B is capable of being turned around its pivot B′ in a plane at right angles to the axis of the gun by a hand-lever E, which moves in a horizontal plane and is pivoted to the carrier-arm A and imparts the turning motion to the arm B, preferably by helical teeth G and G′, formed on the bosses of the arm B and the hand-lever E, respectively.

The breech-plug D may be of any suitable form that will swing out clear of the gun immediately after being unlocked without requiring any longitudinal movement to the rear.

The breech-plug D is attached to a fixed stud A′, projecting inward from the carrier A, by screw-threads, preferably interrupted and equal in pitch to those on the breech-plug D.

The action of opening the breech is as follows: On swinging the lever E away from the gun the arm B is turned downward by means of the helical teeth. This movement of the arm B through the connection of the link C to the stud D′ causes the breech-plug D to turn partly around, at first slowly and then more rapidly, owing to the toggle action of B and C, until it becomes unlocked, at which point the boss of the link around the stud D′ comes against a stop *a*, formed in the carrier-arm, and the plug can turn no farther. Then by continuing to swing the lever E away from the gun the carrier A is swung out, withdrawing the plug D from the breech. As the carrier recedes from the breech a spring-catch H (the end of which was bearing against the rear face of the gun) is liberated and enters a notch H′ in the flange of the breech-plug D, preventing the plug D from turning except when it is in position for locking with the threads of the breech J, the catch H being then pushed out of the notch. The breech is closed by swinging the lever E toward the gun. The plug D is thus first introduced into the breech J, and when in position for locking the catch H being pushed back has freed it, and then it is turned partly around and locked.

We arrange the travel of the arm B and the link C so that when the plug is locked the center of the pin K has passed the straight line joining the centers of D′ and B′, thus forming a locking arrangement such that the plug D cannot become unlocked by shock when the gun is fired.

We fit on the face of the plug-carrier A a spring-catch $A^2$, having a rounded end entering a hollow of the lever E, so as to hold the lever from dropping when the breech end of the gun is depressed, but to allow of its being pulled rearward.

In Figs. 4 and 5, in which is shown a worm-and-wheel gear in place of hand-lever E, the construction is as follows: We fix a worm-wheel L on the hinge-pin J′ of the carrier-arm A. This worm-wheel is also fitted with teeth which gear into a pinion M, pivoted on the carrier-arm. This pinion actuates the arm B and thereby the link C, as above described. The worm which gears with the worm-wheel is rotated by a hand-wheel or handle N.

In Figs. 6 and 7 we show mechanism for extracting the cartridge-case. For this purpose we pivot on an axis-pin P, fitted to the gun, a lever Q, one end of which bears under the rim of the cartridge-case at S, and the other end is so placed that it is struck by the carrier-arm A at the last part of its movement in swinging clear of the gun. Against the arm Q′ of the lever Q, which bears on the cartridge-rim, we fit a wedge-shaped piece T, one end of which is connected to and actuated by a projection U′, formed on a lever U. The toe of the lever U bears against a cam $A^3$, formed on the carrier A. Bearing against this toe of the lever U is a spring-bolt $Q^2$, which is held in a boss $Q^3$, formed on the lever Q. The action is as follows: On swinging the breech-plug D out of the breech the lever U is actuated by the cam $A^3$, which forces the wedge-piece T up the incline formed on the lever Q, thus starting the cartridge from its seat, and at the last part of the movement of the carrier A it strikes the lever Q and ejects the cartridge from the gun. On swinging the carrier toward the gun the spring-bolt $Q^2$, bearing against the toe of the lever U, forces it back and with it the wedge-piece T into its original position.

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 breech-loading ordnance, the combination with the breech-plug, and a pivoted carrier to which the breech-plug is pivotally attached, of a toggle-joint-lever mechanism working in a plane at right angles to the axis of the gun and composed of an arm pivoted on the plug-carrier and a link connecting said arm with the breech-plug, and gearing through which the said toggle-lever mechanism and plug-carrier are actuated, substantially as described.

2. In breech-loading ordnance, the combination with a pivoted breech-plug carrier, and a cam $A^3$ on the pivotal portion of said carrier, of a lever Q having an arm Q′ to bear on the cartridge-rim, a wedge-piece T movable along the lever Q and its arm Q′, a pivoted lever U engaged with said wedge-piece, and a spring-bolt $Q^2$ mounted on the lever Q and arranged to bear against the toe of the lever U, whereby on swinging the breech-plug outward the lever U is actuated by the cam $A^3$ so as to force the wedge-piece T along the lever-arm Q′ thus starting the cartridge-shell from its seat so that in the last part of its movement the carrier A will strike the lever Q and cause it to eject the said shell, substantially as described.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 23d day of September, A. D. 1897.

DOUGLAS VICKERS.
GEORGE THOMAS BUCKHAM.

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