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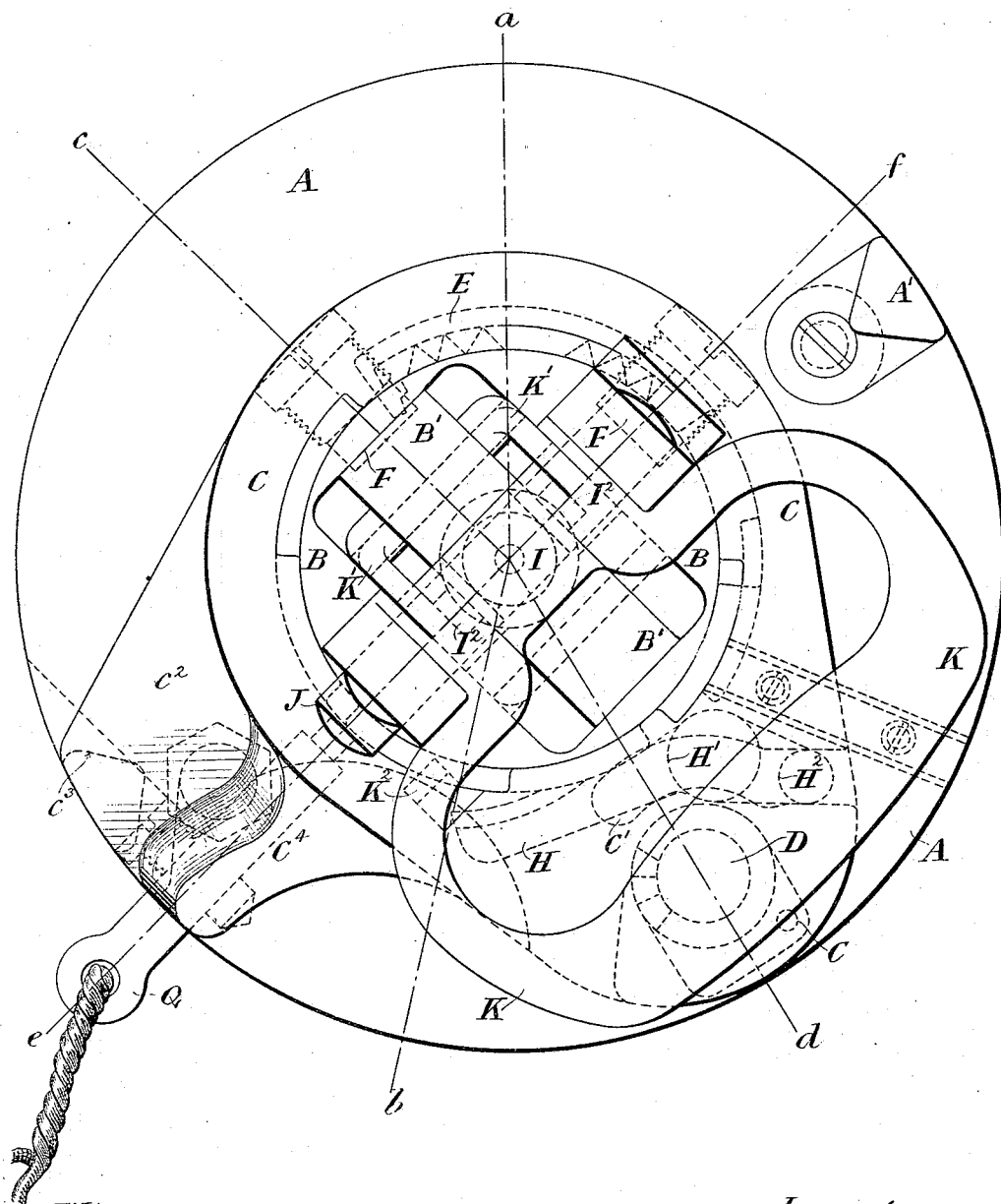
11 Sheets—Sheet 1.

T. NORDENFELT.  
BREECH MECHANISM FOR ORDNANCE.

No. 422,965.

Patented Mar. 11, 1890.

*Fig. 1.*



Witnesses  
Baltus D. Long.  
B. Miller.

Inventor  
Thorsten Nordenfält,  
By his Attys.  
Baldwin Davidson & Wright

(No Model.)

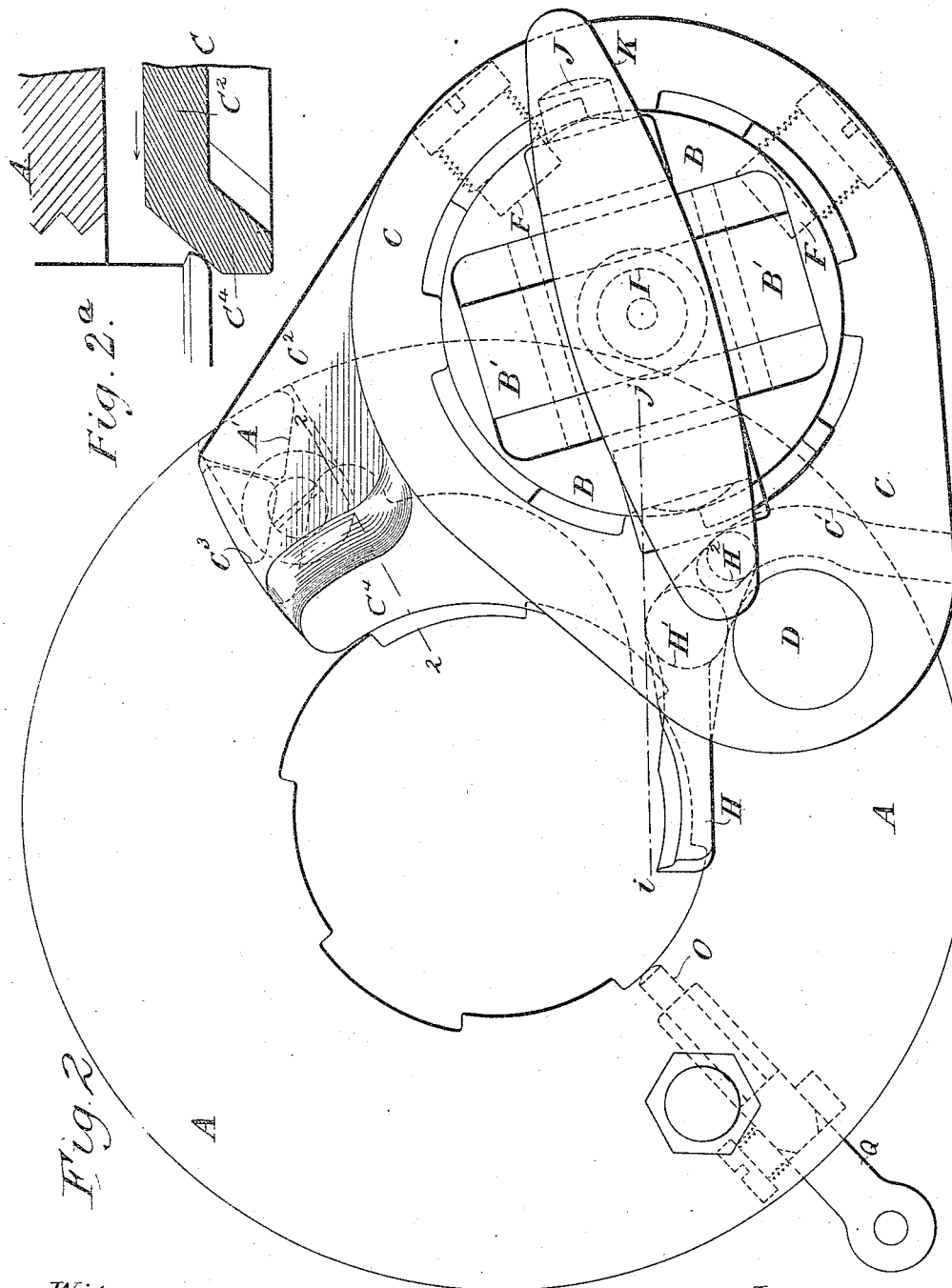
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T. NORDENFELT.

BREECH MECHANISM FOR ORDNANCE.

No. 422,965.

Patented Mar. 11, 1890.



Witnesses:  
Baltus D. Long.  
B. Miller.

Inventor:  
Thorsten Nordenfelt.  
By his Attys.  
Baldwin, Davidson & Wright

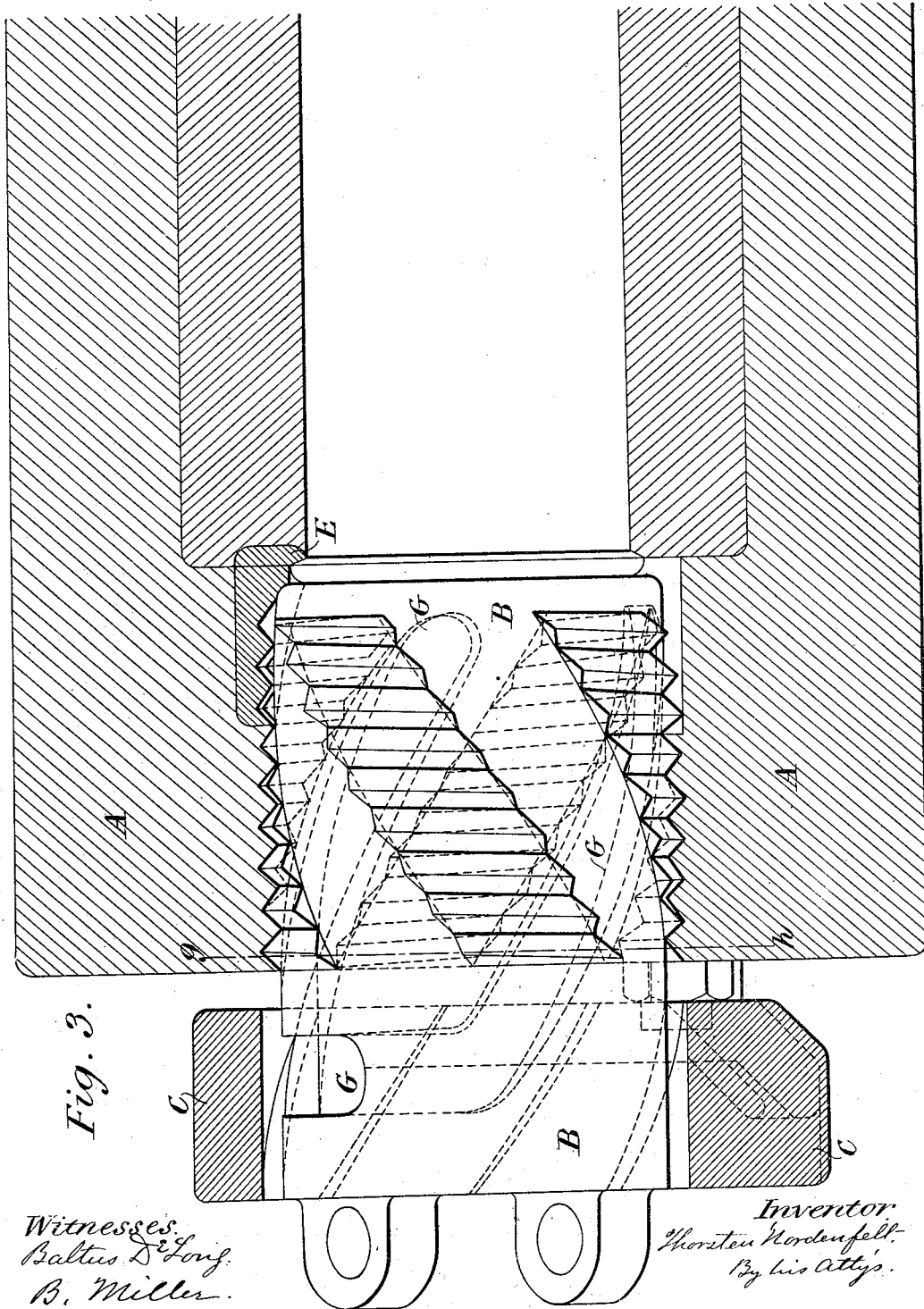
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Patented Mar. 11, 1890.

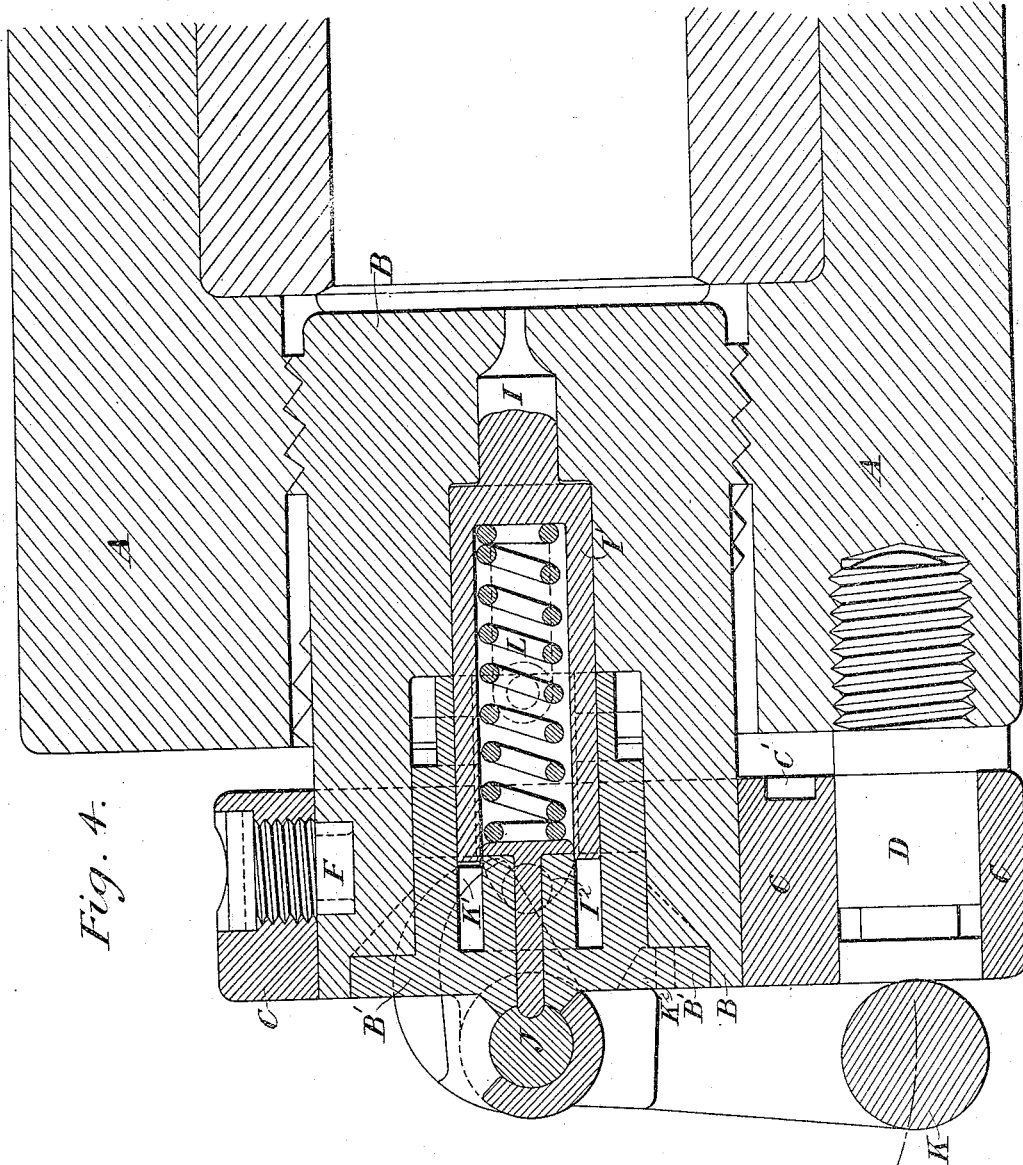


Fig. 4.

Witnesses:  
Baltus DeLong.  
B. Miller.

Inventor:  
Thorsten Nordenfelt.  
By his Attys.  
Baldwin, Washburn & Wright

(No Model.)

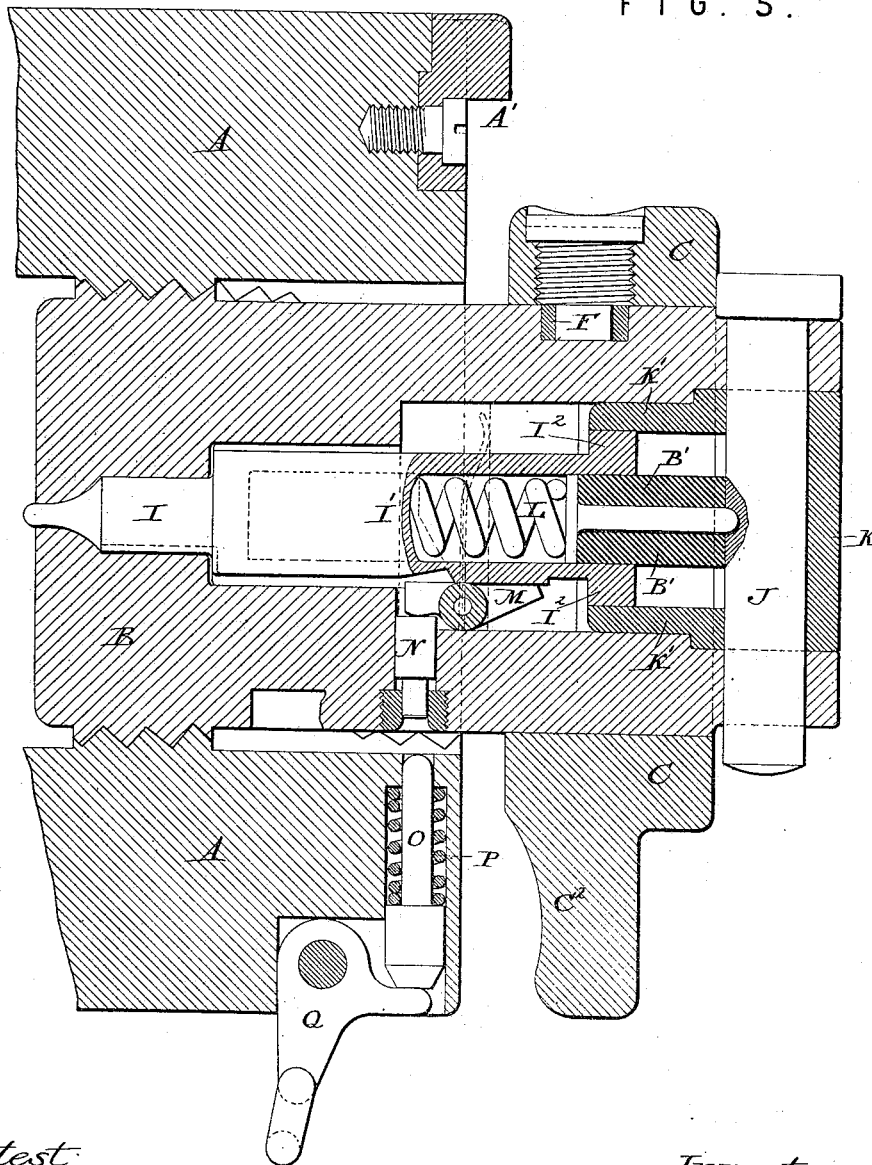
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T. NORDENFELT.  
BREECH MECHANISM FOR ORDNANCE.

No. 422,965.

Patented Mar. 11, 1890.

F I G . 5 .



Attest:

*Inventor.*

Sidney P. Hollingsworth  
W. H. Smith.

THORSTEN NORDENFELT

by his attorneys

Baldwin Davidson & Wright

(No Model.)

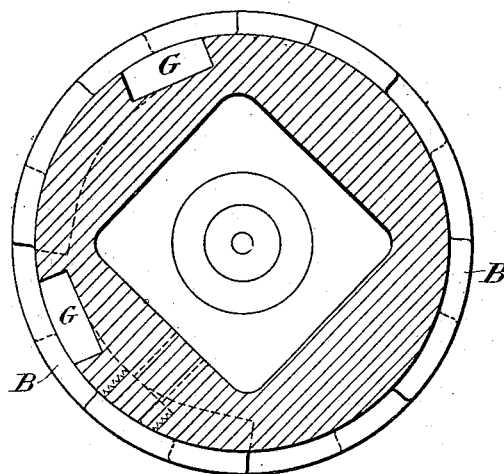
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T. NORDENFELT.  
BREECH MECHANISM FOR ORDNANCE.

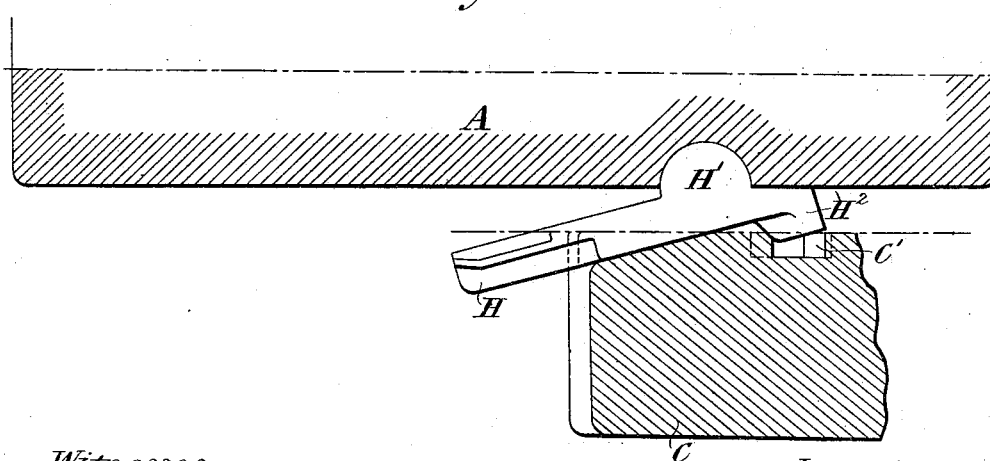
No. 422,965.

Patented Mar. 11, 1890.

*Fig. 6.*



*Fig. 7.*



Witnesses  
Baltus D. Long.  
B. Miller.

Inventor  
Thorsten Nordenfelt.  
By his Att'y.

Baldwin Davidson & Wright

T. NORDENFELT.  
BREECH MECHANISM FOR ORDNANCE.

No. 422,965.

Patented Mar. 11, 1890.

Fig. 8.

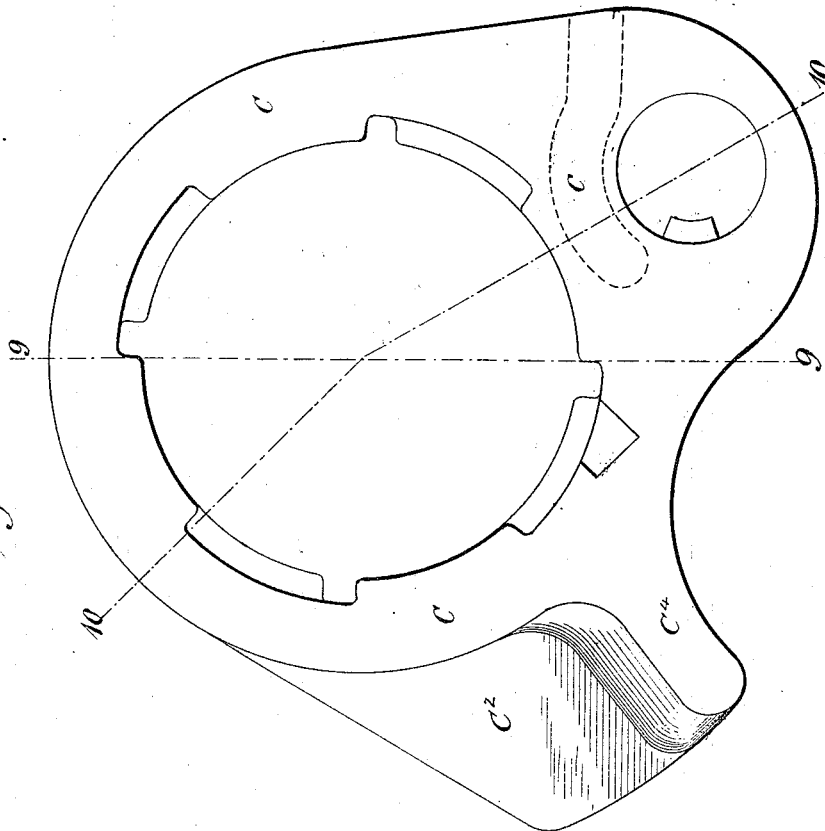


Fig. 9.

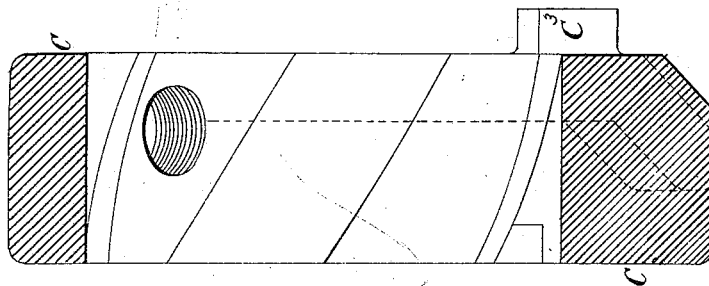
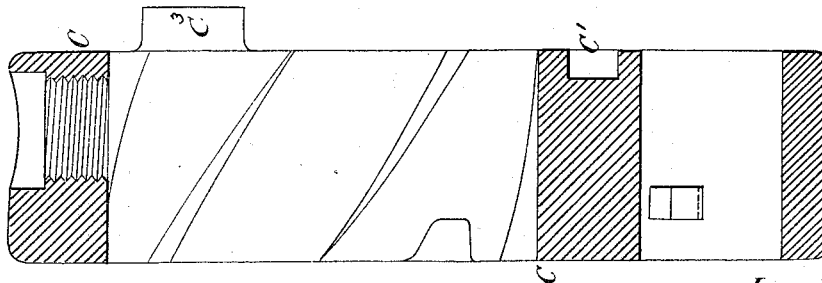


Fig. 10.



Witnesses.  
Baltus J. Long.  
Chas. H. Smith

Inventor,  
Thorsten Nordenfelt,  
By his Attys.

Baldwin Davidson & Wright

T. NORDENFELT.  
BREECH MECHANISM FOR ORDNANCE.

No. 422,965.

Patented Mar. 11, 1890.

Fig. 12.

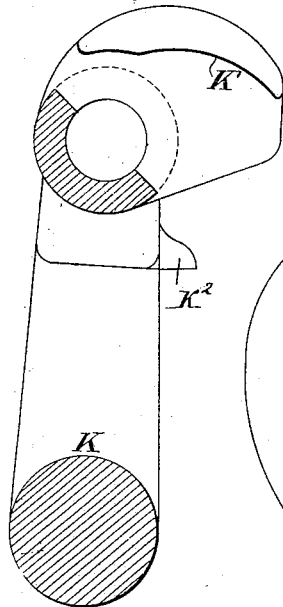


Fig. 11.

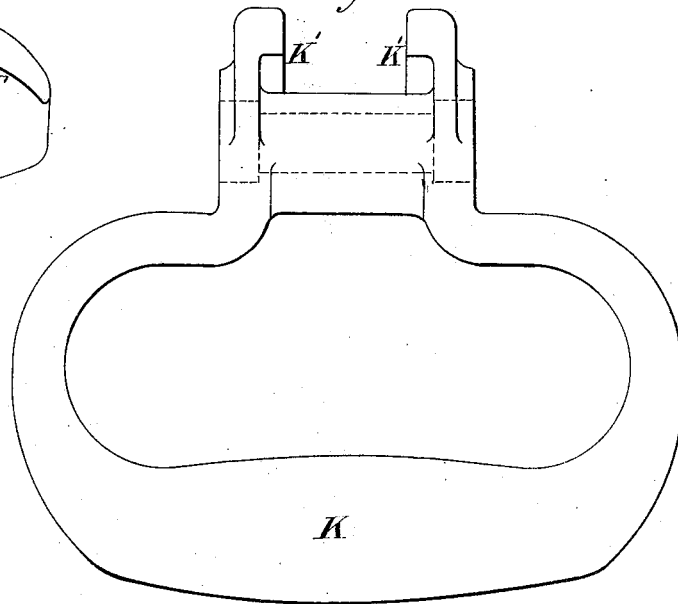


Fig. 13.

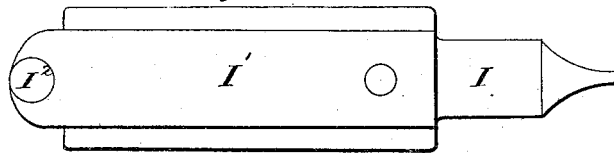


Fig. 15.

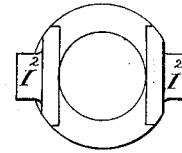


Fig. 14.

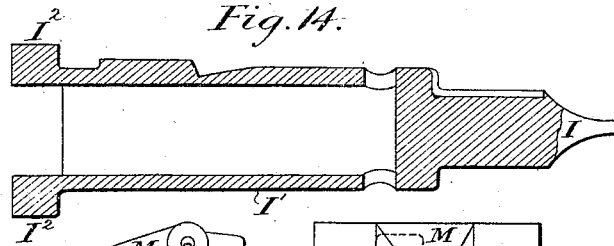


Fig. 17.

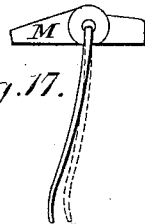


Fig. 16.

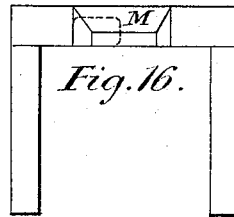
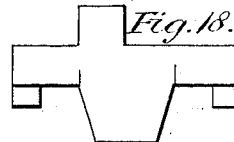


Fig. 18.



Witnesses  
Balthus D. Long,  
N. H. Smith.

Inventor  
Thorsten Nordenfelt,  
By his Att'y.

Baldwin Davidson & Wright



(No Model.)

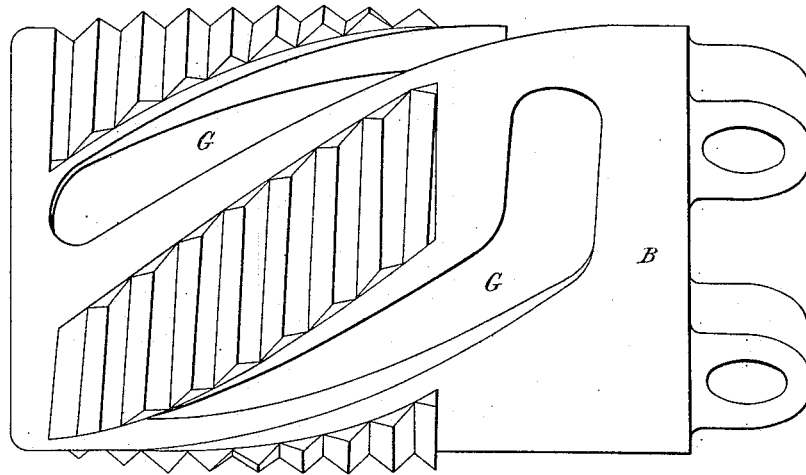
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T. NORDENFELT.  
BREECH MECHANISM FOR ORDNANCE.

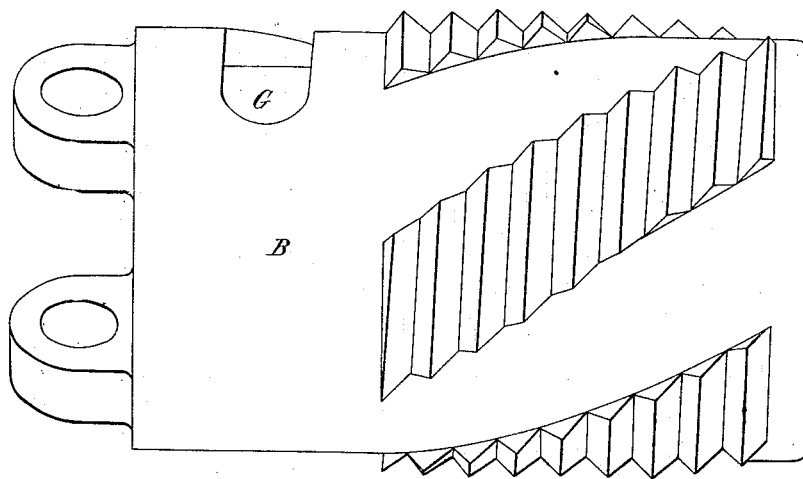
No. 422,965.

Patented Mar. 11, 1890.

*Fig. 19.*



*Fig. 20.*



*Witnesses.*  
*Baltus S. Long.*  
*W. H. Smith*

*Inventor.*  
*Thorsten Nordenfelt,*  
*By his Atty.*

*Baldwin Davidson & Wright*

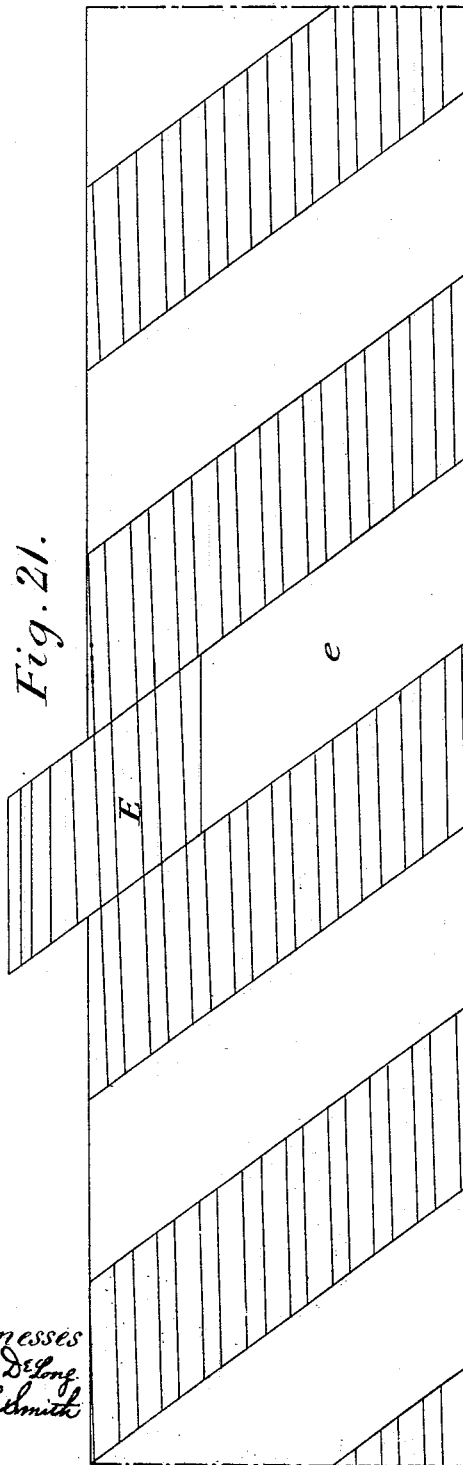
(No Model.)

11 Sheets—Sheet 10.

T. NORDENFELT.  
BREECH MECHANISM FOR ORDNANCE.

No. 422,965.

Patented Mar. 11, 1890.



Witnesses  
Bertie DeLong  
A. L. Smith

*Fig. 22.*



Inventor  
Thorsten Nordenfelt  
By his Attys.

Baldwin Davidson Wright

(No Model.)

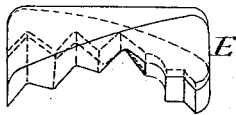
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T. NORDENFELT.  
BREECH MECHANISM FOR ORDNANCE.

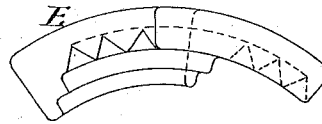
No. 422,965.

Patented Mar. 11, 1890.

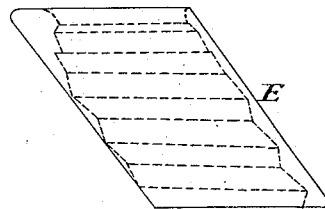
*Fig. 23.*



*Fig. 24.*



*Fig. 25.*



*Witnesses*

*Baltus D. Long.*  
*A. H. Smith*

*Inventor*

*Thorsten Nordenfelt,*  
*By his Atty.*

*Baldwin, Sanderson & Wright*

# UNITED STATES PATENT OFFICE.

THORSTEN NORDENFELT, OF WESTMINSTER, ENGLAND, ASSIGNOR TO THE  
MAXIM-NORDENFELT GUNS AND AMMUNITION COMPANY, (LIMITED,) OF  
SAME PLACE.

## BREECH MECHANISM FOR ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 422,965, dated March 11, 1890.

Application filed May 22, 1889. Serial No. 311,710. (No model.)

*To all whom it may concern:*

Be it known that I, THORSTEN NORDENFELT, civil engineer, a subject of the King of Sweden, residing at 53 Parliament Street, in the city of Westminster, England, have invented certain new and useful Improvements in Rapid-Firing Guns, of which the following is a specification.

My improvements relate to that class of rapid-firing guns in which the breech is locked into the rear end of the barrel by interlocking segments of screw-threads. Such guns have commonly been made with an extractor, which draws back the empty cartridge-cases as the breech-block has been drawn back and the cartridge case has remained projecting partly into the barrel when the block has been turned to one side. I provide such guns not only with an extractor to draw the cartridge-case back as the breech-block is drawn back, but also with an ejector to throw out the case after the block has been moved away to one side. To effect this I employ an ejector-finger carried by the rear end of the gun and which when the breech-block is moved away from the breech of the gun is made to turn or move into a position to come in front of the rim of the cartridge-case, and then, when the block is finishing its movement, to clear the breech is made to turn quickly in a direction to thrust back the rim and eject the cartridge-case. In guns in which the breech-block when drawn back enters into a ring which can be turned around an axis at one side of it parallel with the bore of the gun, I preferably make this finger to form one arm of a lever, the axis of which is formed of a portion of a sphere projecting from it and entering a cup recess in the rear end of the gun, so that the lever can be turned on a universal joint. The tail end of the lever I form with a projection upon it to enter a groove formed in the front face of the ring used for carrying the breech-block when it is drawn back. The groove is so shaped that when the ring is turned around its pivot to carry the breech-block to one side the lever is first turned in a plane parallel with the end of the gun to move the finger toward the un-

der side of the cartridge-case and bring it in front of the rim which is around its rear end, and then, when the breech-block has been carried aside clear of the rear end of the cartridge-case, the lever is, by the formation of the groove, caused to turn quickly in a direction to cause it to throw back and eject the empty cartridge-case.

To turn the breech-block to lock and unlock it, I employ a handle jointed to the rear end of the block on a pin at right angles to the bore, so that it may either be turned into a position to stand out from the rear end of the block or be turned down to lie flat against the end. When in this latter position, the gun can be fired. When it is being turned into the former position, I cause it by a hook piece on its axis to draw back the firing-pin or striker of the firing mechanism until this firing-pin is caught by a sear-lever.

The firing-pin is held back by the hook until the handle is again turned down flat against the rear end of the breech-block and ring; and the handle is formed with a projection upon it which prevents its being turned into this position except when the breech-block has been turned into position to lock it securely within the breech end of the gun. The firing-pin is then only held back by the sear. Any suitable arrangement of mechanism may be used for tripping the sear when the gun is to be fired. Preferably I make the tail of the sear to rest against a pin which lies in a hole formed radially into one side of the breech-block. When the breech-block is turned into its locked position, the outer end of this hole comes opposite to a pin which lies in a radial hole at one side of the rear end of the gun. Normally this pin is pressed outward by a spring; but when the gun is to be fired it can be pressed inward by a crank-lever caused to press upon it by the pulling of a cord attached to the lever, or in other suitable ways. The inner end of the pin then presses against the pin which rests on the sear and pressing it inward disengages the sear from the striker, and the striker is then thrown forward by its spring and its front end ignites the cartridge-primer.

Cartridge-ejectors and firing mechanism arranged as above described are applicable to other forms of breech mechanisms in which the breech-block is locked within the breech by divided segments of screw-threads.

In the drawings annexed I have shown my improvements applied to a gun in which the breech-block is formed with spiral segments of screw-threads upon it to interlock with corresponding segments in the gun and in which the breech-block is withdrawn into a carrier-ring by giving to it a turning movement, and is then carried to one side by the ring being caused to turn around an axis which is parallel with the bore of the gun.

Figure 1 is a view of the breech end of the gun when the breech is closed. Fig. 2 is a view of the breech end when the breech is open. Fig. 2<sup>a</sup> is a detail view, partly in section, on the line 2 2 of Fig. 2, showing particularly the inclined edge on the arm of the breech-block carrier. Fig. 3 is a longitudinal section through the line *a b*; Fig. 4, a section through the line *c d*; Fig. 5, a section through the line *e f*, all on Fig. 1. Fig. 6 is a cross-section of the breech-block through the line *g h*, Fig. 3. Fig. 7 is a section through the line *i j*, Fig. 2. Fig. 8 is a rear elevation of the breech-block carrier or ring. Figs. 9 and 10 are sections of the same on the lines 9 9 and 10 10, respectively, of Fig. 8. Fig. 11 is a plan of the handle and claws for operating the firing-pin. Fig. 12 is a section of the same. Fig. 13 is a side elevation of the firing-pin; Fig. 14 a longitudinal section, and Fig. 15 a rear elevation, of the same; Fig. 16 a rear elevation, Fig. 17 a side elevation, and Fig. 18 a plan, of the sear with its springs. Figs. 19 and 20 are elevations of the breech-block. Fig. 21 is a diagram plan showing the interior of the breech of the gun developed with the extractor in place. Fig. 22 is a section and shows the deeper groove in the gun in which the extractor travels. Figs. 23, 24, and 25 are detail views of the extractor detached.—Fig. 23 is a side elevation, Fig. 24 is a rear elevation, and Fig. 25 a plan.

A is the breech end of the body of the gun; B, the breech-block; C, the carrier-ring; D, the axis around which it can be turned.

E is the extractor, made capable of being slid backward and forward in a spiral groove in the rear end of the gun. It has also screw-threads upon it into which some of the screw-threads of one of the screw-segments of the breech-block interlock when the breech-block has been turned into a position for the screw-segments upon it to be disengaged from the screw-segments in the gun, so that when the breech-block is drawn back the extractor goes back with it.

F is a roller carried by the ring C and entering a groove G in the side of the breech-block. The form of the groove is shown in Fig. 3.

So far the gun is constructed in the manner described in the specification of a former

patent granted to me, dated August 28, 1888, No. 388,576.

H is the ejector-lever, turning on a ball-and-socket joint at H'.

H<sup>2</sup> is a projection on its tail end, entering a groove C' in the front face of the ring C.

C<sup>2</sup> is an arm standing out from one side of the ring C.

C<sup>3</sup> is a projection on the front face of this arm, which comes against a stop A' on the end of the gun when the breech is opened.

The edge C' of the arm is formed to incline backward, as shown at Figs. 1, 2, and 8. When the breech has been opened and a cartridge has been inserted into it so far as the ejector-finger will permit of its being inserted—that is, until the rim of the cartridge comes against the finger—and when the carrier-ring is again turned to the left to bring the breech-block into position to close the breech, the incline on the arm comes against the rear end of the cartridge and presses it forward until it is level with the face of the breech-block, so that the breech-block can pass behind it.

I is the firing-pin, lying in a central passage formed longitudinally through the breech-block. It is formed with a hollow cylindrical stem I', the rear end of which passes into a corresponding cavity in a block B', which closes the rear end of the passage through the breech-block. The stem I' has two lugs I<sup>2</sup> projecting from it, which enter corresponding grooves in the sides of the cavity in the block B' and keep the firing-pin from turning. The block B' is square on the exterior and fits into the rear end of the passage through the breech-block, which is of corresponding form. It is held in place by a pin J, which also forms the pivot for the handle K, by which a turning movement is given to the breech-block whenever the breech is to be opened or closed.

L is a coiled spring contained within the hollow stem of the firing-pin, and by which the firing-pin is thrown forward.

M is the sear-lever, by which the firing-pin is held in its cocked position when it has been drawn back.

N is a pin lying in a radial hole in the breech-block and resting against the tail end of the sear-lever.

O is a pin lying in a radial hole in the gun in a line with the pin N when the breech is closed.

P is a coiled spring pressing this pin outward.

Q is a crank-lever one arm of which rests against the outer end of the pin O and the other has a cord attached to it, by pulling on which the sear can be tripped whenever the breech-block has been turned into the position in which it is securely locked within the breech.

The handle K has eccentric hooks or claws K' formed with it, which pass into cavities at two opposite sides of the block B', and which, when the handle is turned to make it stand outward away from the end of the block, hook

over pins I<sup>2</sup>, which project from two opposite sides of the stem I' of the firing-pin I, and by drawing back the pins draw back the firing-pin into its cocked position. So long as the handle remains turned outward from the breech-block the hooks or claws K' come in front of the pins I<sup>2</sup> and the firing-pin cannot possibly be thrown forward far enough for its front end to strike against the cartridge-primer, and therefore the gun cannot be fired until the handle is turned down flat against the end of the breech-block. One arm of the handle has upon it a projection K<sup>2</sup>, which prevents the handle from being so turned except at the time when the breech-block is turned properly into its locked position within the breech. The projection on the handle is then able to enter a recess in the carrier-ring C. In this way it is rendered impossible for the gun to be fired before the breech-block is properly locked.

What I claim is—

1. The combination, substantially as hereinafore set forth, of the gun having a breech-opening, the breech-block detachably locked within the bore of the gun, an extractor-claw projecting forwardly from the breech-block, and an ejector pivoted to the gun at the rear end of the breech-opening and adapted to first move transversely to the axis of the gun and then to move parallel therewith to expel the cartridge.

2. The combination, substantially as hereinafore set forth, of the gun having a breech-opening, the removable breech-block therein, an extractor-claw projecting forwardly from the breech-block and engaging with the cartridge-case, and an ejector-finger pivoted at one side of the rear end of the breech-opening and moved first in one plane to bring it into position in front of the rim of the cartridge-case and then smartly in another plane to expel the cartridge-case.

3. The combination, substantially as hereinafore set forth, of a gun formed with segments of screw-threads at the rear end of its bore, a breech-block with segments of screw-threads on its exterior to lock into these segments, an extractor-claw adapted to engage with a cartridge-case to draw back the empty cartridge-case after firing when the breech-block is drawn back, and an ejector-finger in rear of the breech-block moved first in one plane to bring it into position in front of the rim of the cartridge-case and then smartly in another plane to cause it to throw back the empty cartridge-case when the breech-block is moved away out of line with the bore.

4. The combination, substantially as here-

inafore set forth, of the gun having a breech-opening, the removable breech-block therein, an extractor-claw projecting from the breech-block, a carrier pivoted horizontally at the rear end of the breech in which the breech-block is mounted, and a pivoted ejector interposed between the carrier and the rear end of the gun.

5. The combination, substantially as hereinafore set forth, of the gun having segments of screw-threads at the rear end of its bore, the breech-block having corresponding screw-segments, the carrier or ring mounted in bearings at the rear end of the gun, the extractor projecting from the breech-block for drawing back the cartridge-case, and the ejector pivoted at the rear end of the gun and engaging with a groove in the front face of the carrier, for the purpose specified.

6. The combination, substantially as hereinafore set forth, of the gun, the breech-block, the firing-pin within it, and a handle pivoted to the rear end of the breech-block and provided with a claw adapted to engage with the rear end of the firing-pin to draw the pin backwardly.

7. The combination, substantially as hereinafore set forth, of the gun, the breech-block, the firing-pin within it, and a handle jointed to the rear end of the breech-block and provided with a claw which engages with the rear end of the firing-pin to draw the pin backwardly.

8. The combination, substantially as hereinafore set forth, of the gun, the breech-block, the firing-pin within the breech-block, a spring for moving the firing-pin forward, a sear or detent engaging with the firing-pin when in its locked position, a handle jointed to the rear end of the breech-block, and claws on the handle engaging with projections at the rear end of the firing-pin.

9. The combination of the gun A, breech-block B, carrier C, turning on an axis at D, the firing-pin I, the handle K, jointed to the rear end of the breech-block, the eccentric hooks K', formed with it, the pins I', which project from the firing-pin for the hooks to act upon, the sear-lever M, the pin N, resting against the tail end of the sear-lever, and the pin O, lying in a radial hole in the gun in a line with the pin N when the breech is closed, and mechanism for forcing in the pin O when the gun is to be fired.

THORSTEN NORDENFELT.

Witnesses:

F. A. NOËL,  
RUDOLF LEFFLER.