

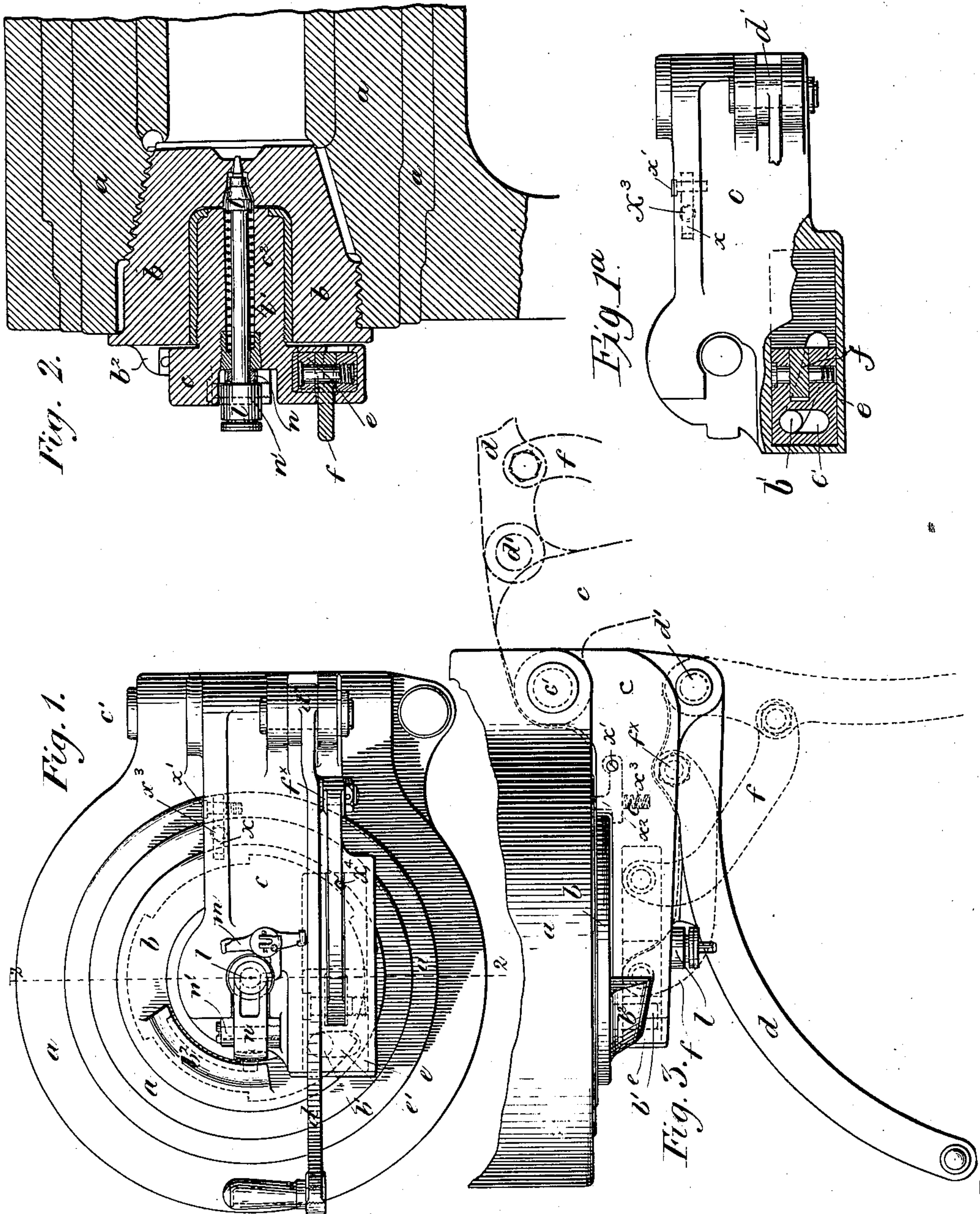
(No Model.)

4 Sheets—Sheet 1.

A. NOBLE & G. HENDERSON.
BREECH LOADING ORDNANCE.

No. 492,942.

Patented Mar. 7, 1893.



Witnesses.
B. Washington Miller.
George D. Smith

Inventors,
Andrew Noble,
and
George Henderson.
By their Attorneys
Balwin Davidson & Wright.

(No Model.)

4 Sheets—Sheet 2.

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Fig. 5.

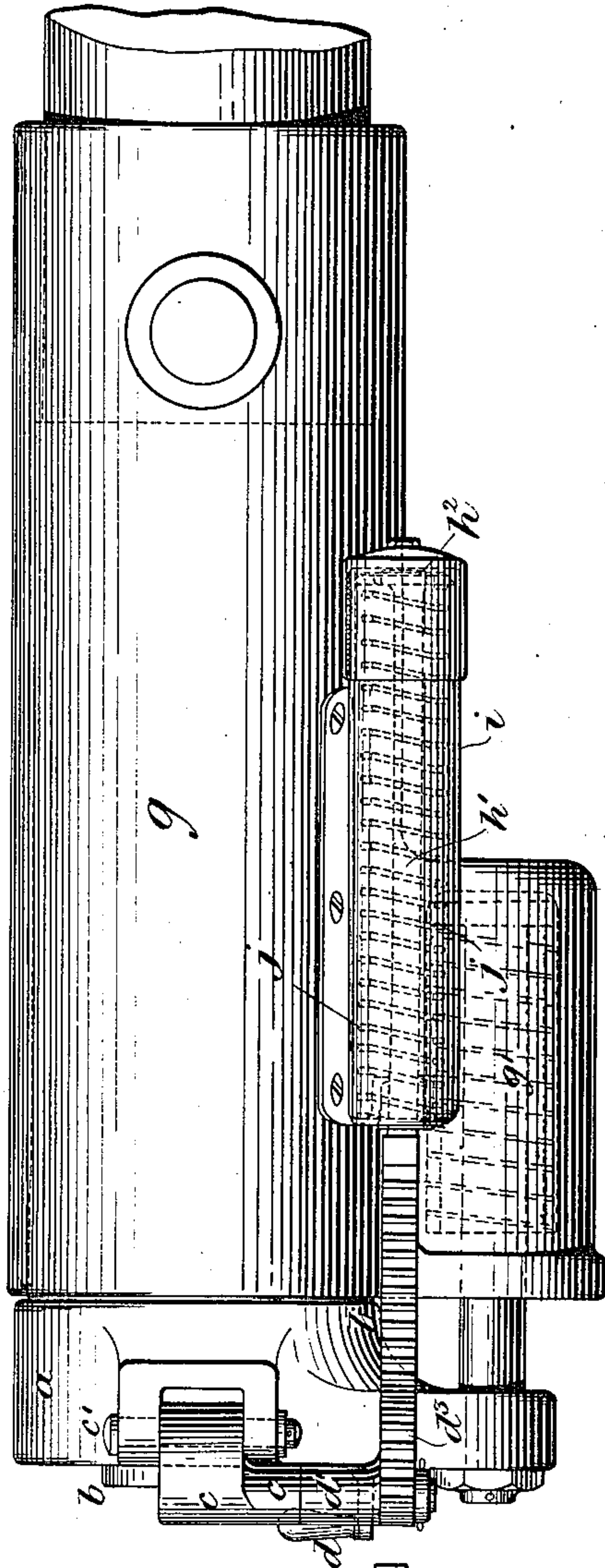


Fig. 6.

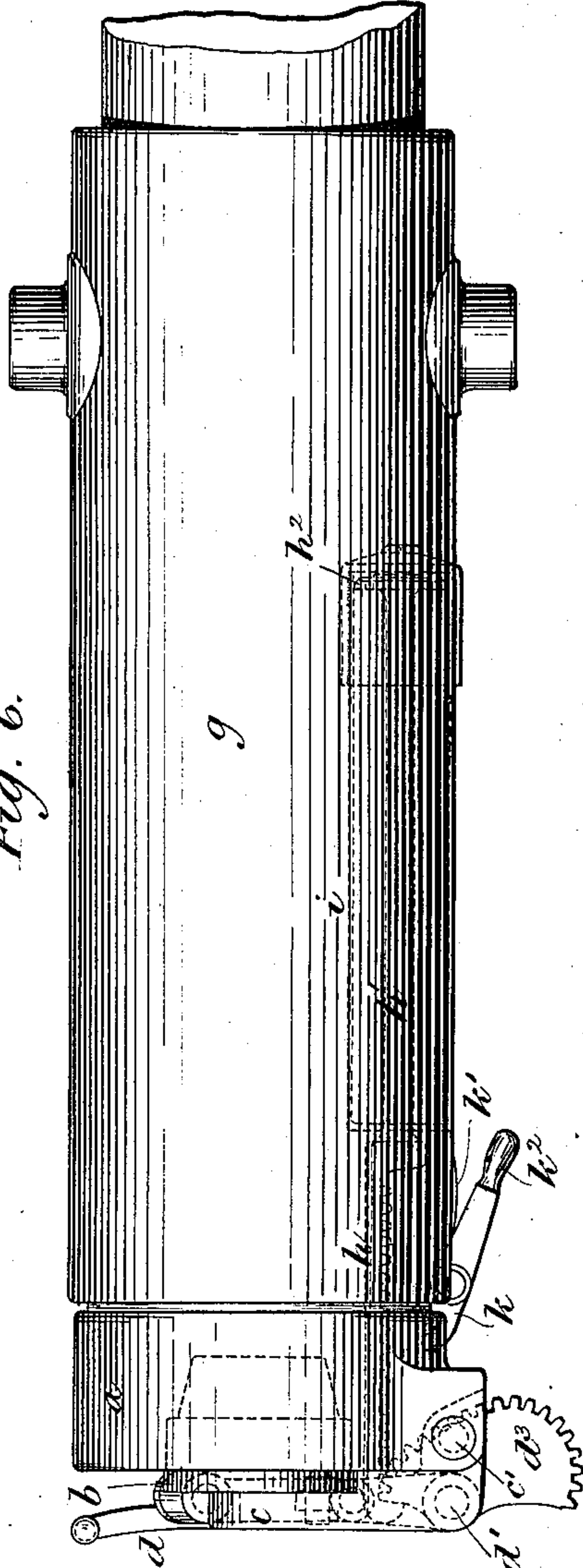
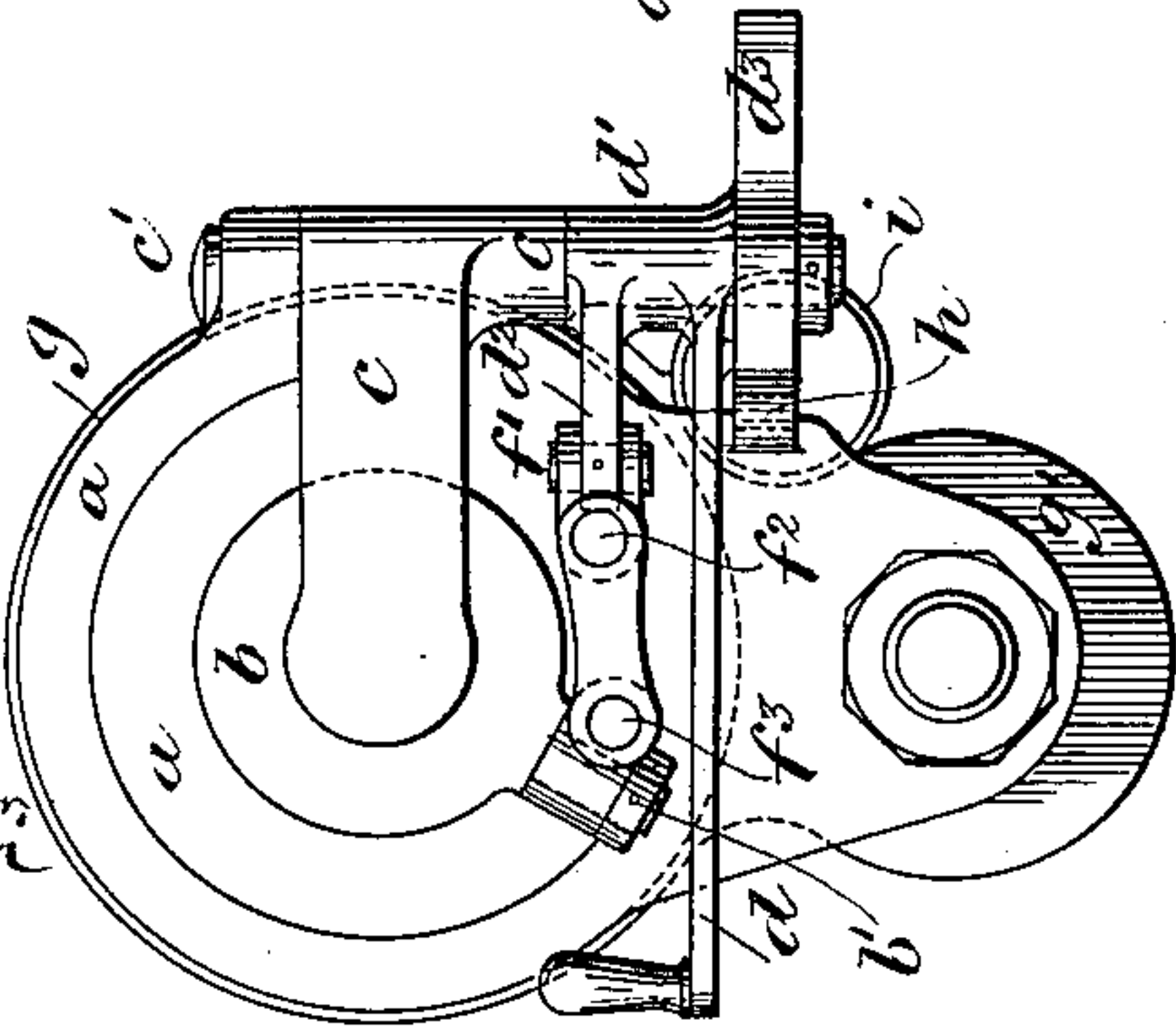


Fig. 4.



Witnesses
B. H. Miller
G. D. Smith

Inventors
Andrew Noble,
and
George Henderson,
By their Attorneys
Baldwin, Davisson & Wright.

(No Model.)

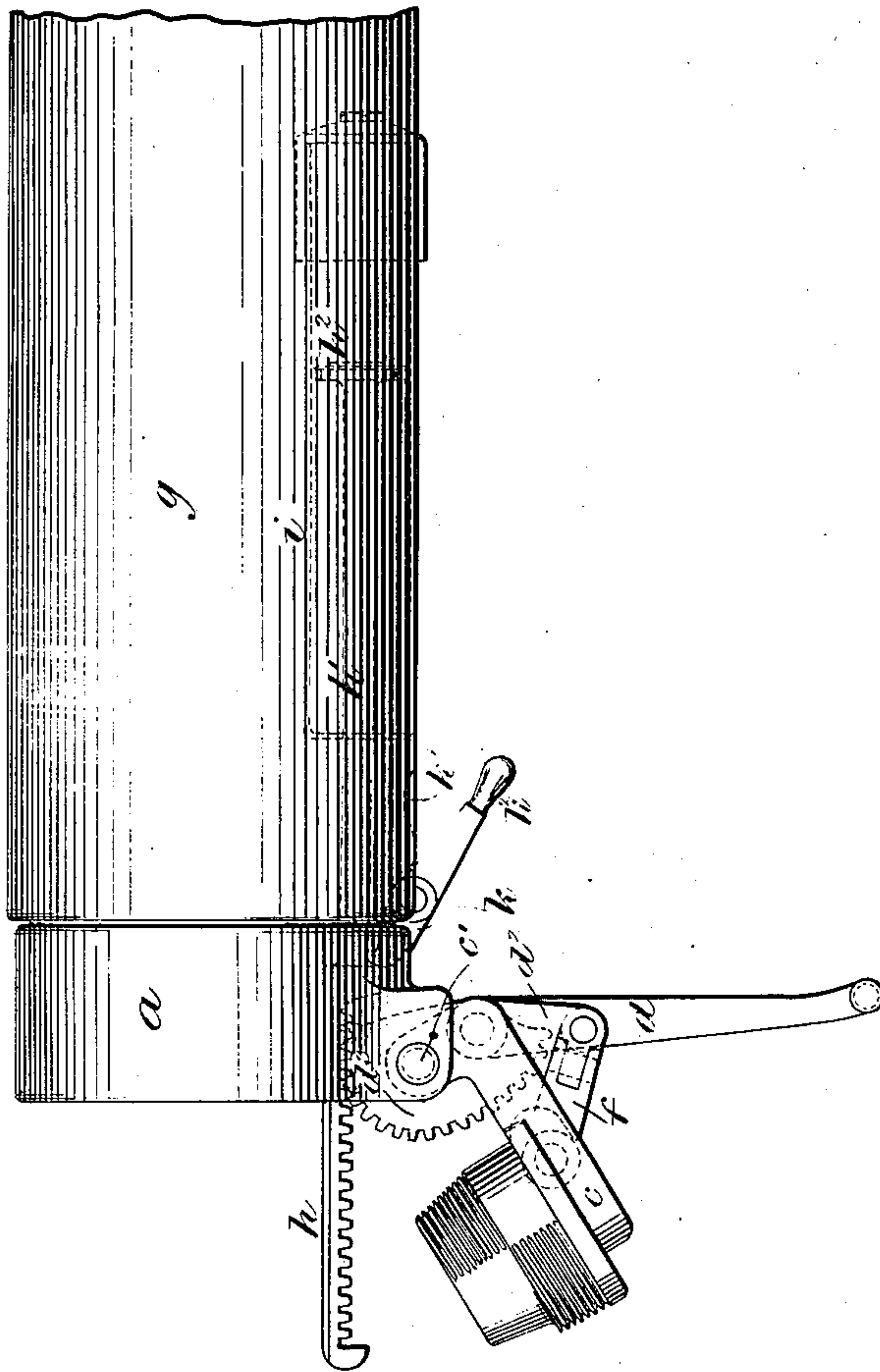
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Fig. 7.



Witnesses.
B. Washington Miller.
G. D. Fox

Inventors
Andrew Noble
and
George Henderson.
By their Attorneys
Baldwin, Davidson & Wright.

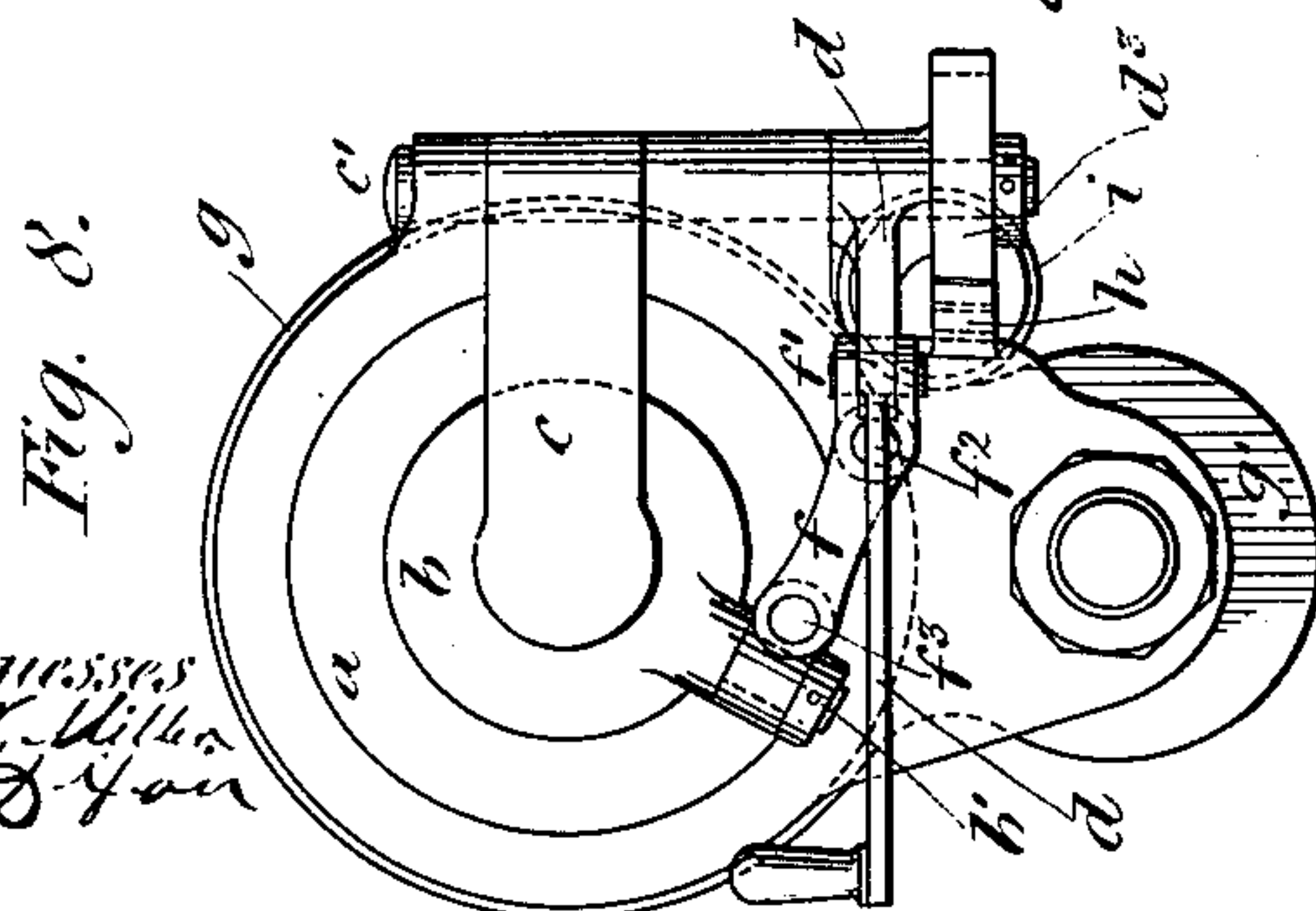
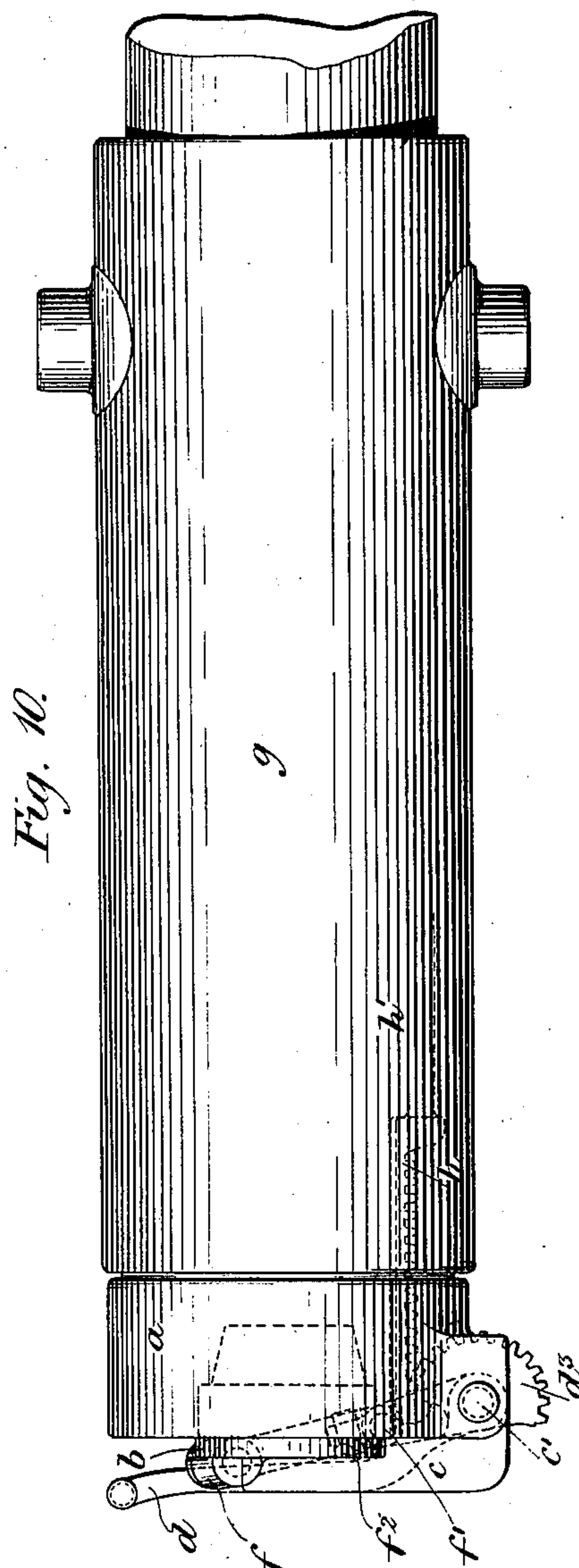
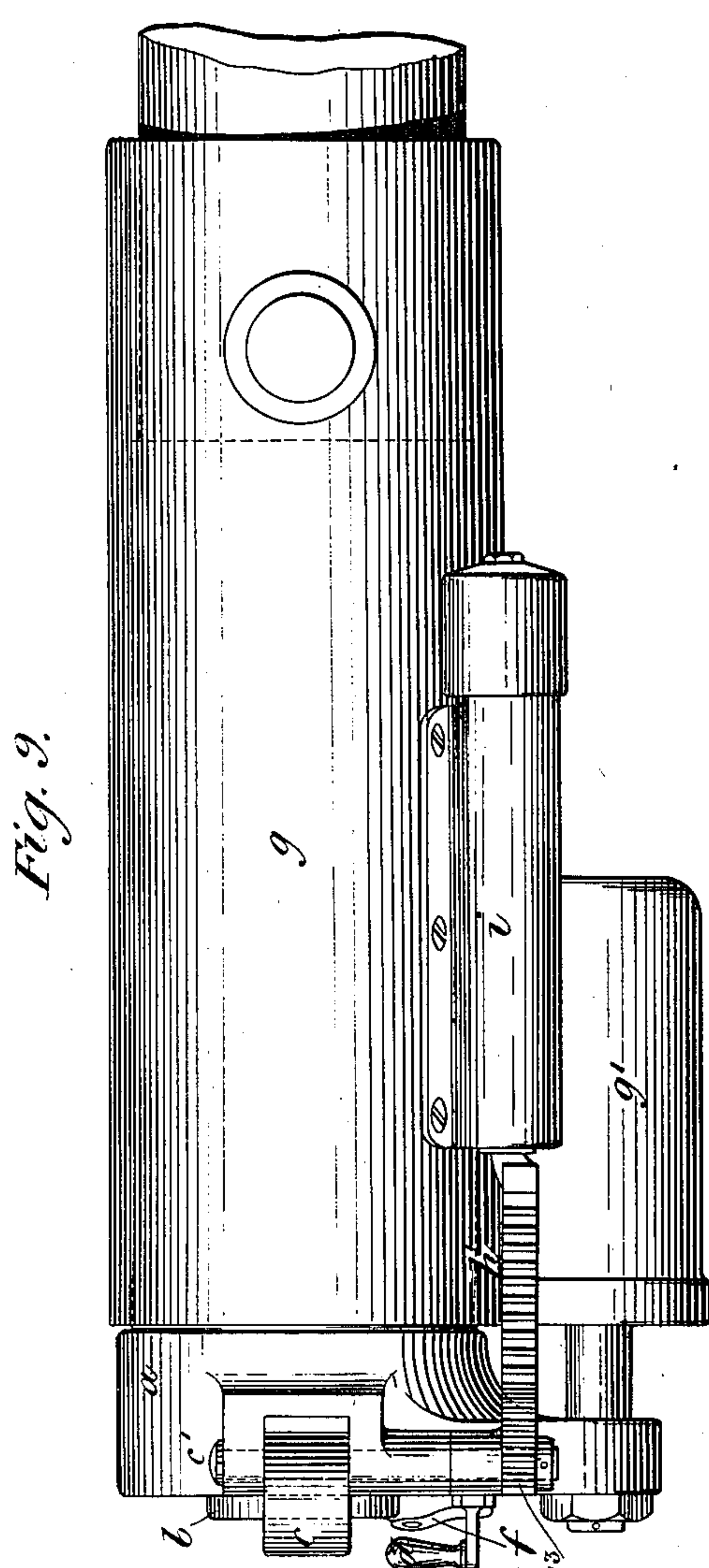
(No Model.)

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A. NOBLE & G. HENDERSON.
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Patented Mar. 7, 1893.



Witnesses
B. W. Wilton
G. D. You

Inventors
Andrew Noble
and
George Henderson
By their Attorneys
Calvin Davidson & Co.

UNITED STATES PATENT OFFICE.

ANDREW NOBLE AND GEORGE HENDERSON, OF NEWCASTLE-UPON-TYNE, ENGLAND, ASSIGNORS TO THE SIR W. G. ARMSTRONG, MITCHELL & COMPANY, LIMITED, OF SAME PLACE.

BREECH-LOADING ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 492,942, dated March 7, 1893.

Application filed July 5, 1892. Serial No. 439,020. (No model.)

To all whom it may concern:

Be it known that we, ANDREW NOBLE, manufacturing engineer, C. B., late captain in the Royal Artillery, residing at Jesmond Dene House, and GEORGE HENDERSON, engineer, residing at Elswick Works, Newcastle-upon-Tyne, England, subjects of the Queen of Great Britain, have invented certain new and useful Improvements in Breech-Loading Ordnance, of which the following is a specification.

This invention relates to breech loading guns which have a divided screw breech piece. The breech piece is mounted upon a carrier arm; the carrier arm is jointed to the breech of the gun and a hand lever or actuating part is provided; this lever or part is movable in a plane parallel to that in which the carrier arm moves and it imparts to the breech piece both the rotary motion necessary for locking and unlocking and the rearward motion necessary for opening and closing the breech.

The invention also relates to mechanism for automatically working the hand lever or actuating part.

The invention also relates to firing mechanism for guns having divided screw breech pieces mounted upon carrier arms.

Figure 1 is a rear elevation of a gun having breech mechanism and firing gear in accordance with our invention. Fig. 1^a is a detail view of the carrier arm and some of the parts connected therewith. Fig. 2 is a section on the line 2, 2, in Fig. 1 and Fig. 3 is a plan of some of the parts. Figs. 4, 5, 6 and 7 show a modification of the breech mechanism and also automatic gear in connection therewith. Fig. 4 is a rear elevation, Fig. 5 is a side elevation and Figs. 6 and 7 are plans with the parts in different positions. Figs. 8, 9 and 10 show another modification. Fig. 8 is an end elevation, Fig. 9 is a side elevation and Fig. 10 is a plan.

In Figs. 1, 2 and 3 the construction is as follows:—To the breech end of the gun *a* we hinge at *c'* a bar *c* which we call the carrier bar and on this bar there is a pivot piece *c*². The pivot enters a cavity in the breech piece *b* and the breech piece is mounted to turn on the pivot. The breech piece may be formed

with a step-divided screw thread in well known ways, (as indicated in Figs. 2 and 7) and when the breech piece is unlocked it can be withdrawn from the gun by a rearward movement of the bar *c* about the hinge *c'*. The bar *c* carries a block *e* which can slide upon it in direction to and from the hinge. This motion is imparted to the block *e* by a hand lever *d* which has its fulcrum *d'* upon the bar *c* near the hinge and the hand lever is connected with the block by a link *f*. The breech piece has a pin *b'* projecting from it and entering an elongated hole *e'* in the block *e*.

The action in opening the breech is that the block *e* is drawn by the hand lever *d* and link *f* along the bar *c* toward the hinge *c'* and the block being engaged with the breech piece *b* by means of the projecting pin turns the breech piece to unlock it. By this time the block *e* has moved along the bar *c* as far as it is able and the hand lever *d* then in its further movement carries the bar *c* rearward with it, the bar turning about the hinge *c'*. As soon as the bar recedes from the breech of the gun a catch *x* upon the bar is thereby liberated and it engages with the breech piece which then cannot turn. In closing the breech the movements occur in the reverse order, the hand lever carries the bar up to the breech, the retaining catch is thereby liberated and then the block moves along the bar away from the hinge thereby turning the breech block and causing the screw threads to engage. Any suitable catch may be employed. As shown, the catch *x* is mounted on a vertical pivot *x'*, on the carrier-bar *c*, and a nose *x*², on its inner front end, is normally pressed toward the rear end of the gun by a spring *x*³. When the breech is closed, the catch is disengaged from the breech-piece, which is free to turn, as the nose *x*², bears against the breech, and the catch is forced back against the force of the spring *x*³, (see Fig. 3.) When the breech-piece is turned to unlock the screw-threads the notch *x*⁴, is brought into position to be engaged by the catch, and when the breech-piece is withdrawn from the breech the catch engages with the notch *x*⁴, and prevents the breech-piece from moving in either direction. When

the breech-piece is moved back the nose x^3 , strikes against the breech of the gun, thereby releasing the catch from the notch and the breech-piece may then be turned and locked in the breech. When the gun is closed, the joint f^x , connecting the link with the hand lever is in front of a line drawn from the pivot d' , to the joint on the block e , and thus the mechanism is self-locking, i. e., it cannot be unlocked until the handle is positively actuated. The arrangement may be modified by dispensing with the sliding block and connecting an arm forming part of the hand lever with the pin projecting from the breech piece by a universally jointed link. This modification is seen in Figs. 4, 5, 6 and 7. The link f in addition to the joint f' which connects it with the hand lever has other joints $f^2 f^3$ and it terminates in a ring embracing the pin b' projecting from the breech piece. The hand lever d in this case is provided with an arm d^2 to receive the link f .

The opening and closing of the breech may be rendered automatic in the manner shown by Figs. 4 to 7. The gun is upon a recoil mounting g and the springs of this mounting at g' yield when the gun is fired and then immediately bring the gun forward again. An arc of teeth d^3 , is secured to the hand-lever d , and engages with the teeth of a rack h , carried by the mounting g , but movable longitudinally relatively thereto. A rod h' , connects the rack to a piston h^2 , in a cylinder i , containing oil, and a spring j , which is interposed between the piston and the rear end of the cylinder, returns the rack to its front position when moved out of it, and when unobstructed by a catch k . The catch has a spring k' , and a handle k^2 , and is adapted to engage with the front end of the rack (see Fig. 7) and hold it to project from the breech of the gun against the force of the spring j . When the gun a , recoils, the inner end of the arc of teeth d^3 , engaging with a projection on the rear end of the rack, (see Fig. 6) draws the rack backward against the force of the spring j , and then the catch k , engages the rack and holds it stationary against the force of the spring, while the gun moves forward. As the gun moves forward the arc of teeth will be forced to roll on the rack h , and the breech block will be withdrawn and moved to the position shown in Fig. 7. The breech-block will be held in its position until the catch k is released, and while thus held may be loaded. Then if the catch is released, the spring j , will draw the rack forward, and the arc of teeth d^3 , will be moved to cause the breech-piece to be swung into the breech opening and locked therein, the piston h^2 moving in the cylinder i with a clearance adjusted to regulate the speed of movement. A valve gives free passage to the oil while the gun recoils. h' is a rod connecting the rack h and piston h^2 . The pawl k is provided with a spring k' and a handle k^2 .

The speed of closing the breech may be regulated in other well known ways. Sometimes instead of having a separate axis for the working lever the mechanism is made so that both the working lever and the breech screw carrier are carried on the same axis. This modification is shown by Figs. 8, 9 and 10. Again we sometimes dispense with the spring and cylinder of the automatic mechanism and merely use the rack and pawl for opening the breech mechanism while the closing is performed by hand by means of the working lever.

In Figs. 1 to 3 a suitable firing mechanism is shown. The firing mechanism may be arranged in the following manner:—Within the pivot c^2 on which the breech piece b is mounted the firing pin l and its spring l' are carried. A fork n embraces the stem of the firing pin and abuts upon a head at its rear end. The fork n is hinged at n' upon the bar c and a projection at its outer end engages with a flange or projection b^2 on the breech piece in which flange is an incline so arranged that as the breech block b is turned to unlock it, the firing pin l is moved rearward. The firing pin is then caught by a sear or hook m which retains it until the sear or hook is displaced by the pull of the lanyard in firing. The gun cannot be fired prematurely as until the breech piece is securely locked the fork n stands in the way of the advance of the firing pin.

What we claim is—

1. The combination of the gun, the breech piece locked in the gun by a divided screw-thread, a carrier arm hinged at one end to the gun and at its other end pivotally connected with the breech piece, a handle pivotally connected at one end with the carrier-arm, a link (f) pivotally connected with the handle at one end, a sliding block e , to which the other end of the link is pivotally connected and which is carried by a carrier-arm and adapted to move in a recess therein, and a pin b' on the breech block, extending into an elongated hole e' in the block e .

2. The combination of the gun, a mounting in which it is free to slide, the breech piece locked in the gun by a divided screw-thread, a carrier-arm on which the breech piece is pivoted and which is pivoted at one end to the gun, a lever arm connected to the carrier-arm, a link connecting the lever arm to the breech piece, an arc of teeth connected with said arm, a rack bar connected with the gun to move back with it during recoil before the breech is opened, and a catch for holding the rack in its retracted position.

3. The combination of the gun, a mounting in which it is free to slide, the breech piece locked in the gun by a divided screw-thread, a carrier-arm on which the breech piece is pivoted, and which is pivoted at one end to the gun, a lever arm connected to the carrier arm, a link connecting this lever arm to the breech piece, an arc of teeth connected with said arm, a rack bar connected with the gun

to move back with it during recoil before the
breech is opened, a catch for holding the rack
in its retracted position, means for moving
the gun forward after recoil, and means for
5 moving the rack forward after the catch is re-
leased.

4. The combination of the gun, a breech
piece locked in the gun by a divided screw-
thread, a swinging carrier on which the breech
10 piece is pivoted, the forked lever n pivoted

on the carrier, a flange or incline b^2 , on the
breech piece with which the forked lever en-
gages, and a sliding spring-actuated firing pin
with which the fork of the lever n engages.

A. NOBLE.
GEORGE HENDERSON.

Witnesses:

J. D. A. NOBLE,
T. PURVIS.