

A. T. DAWSON & G. T. BUCKHAM.

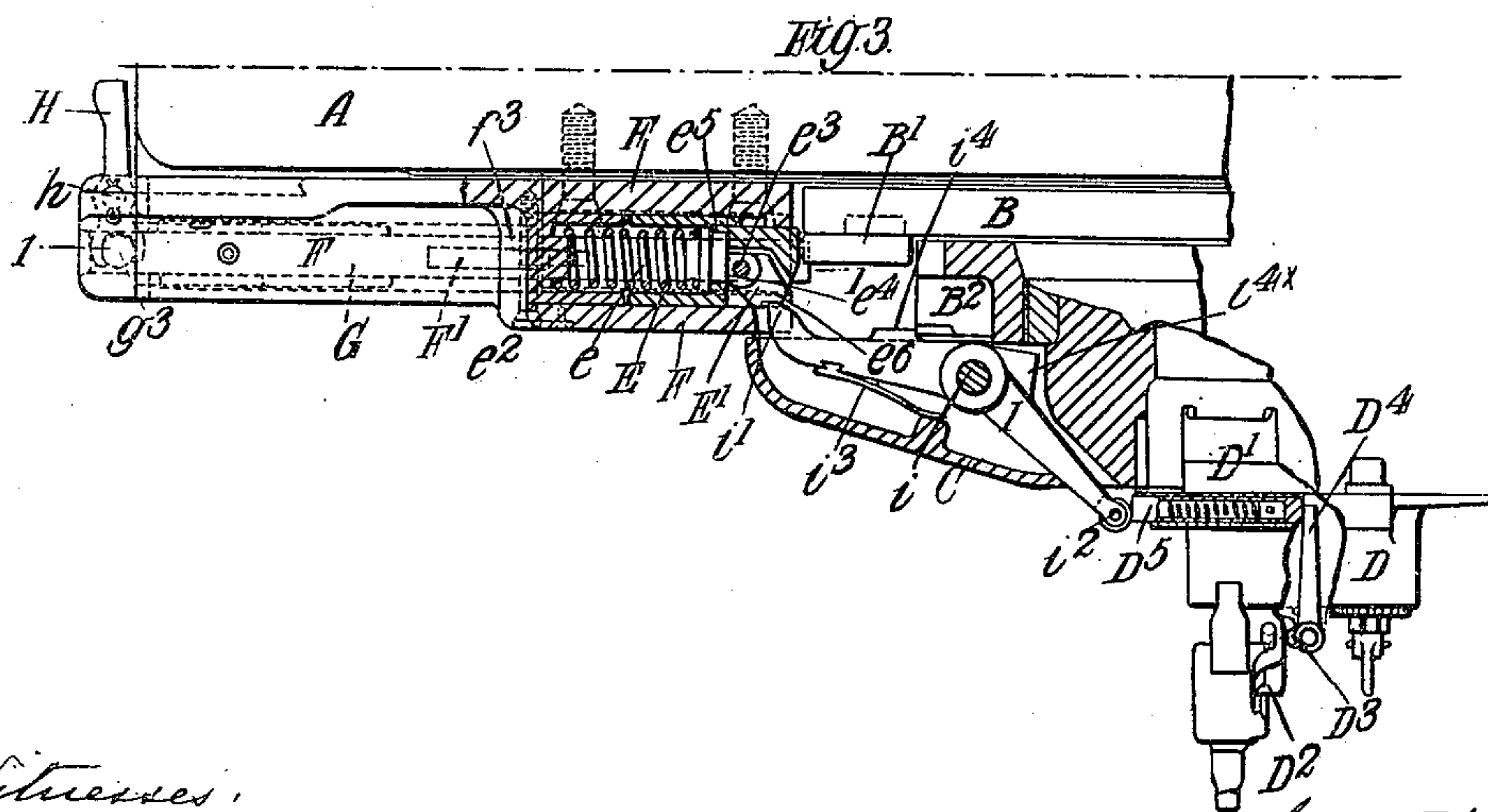
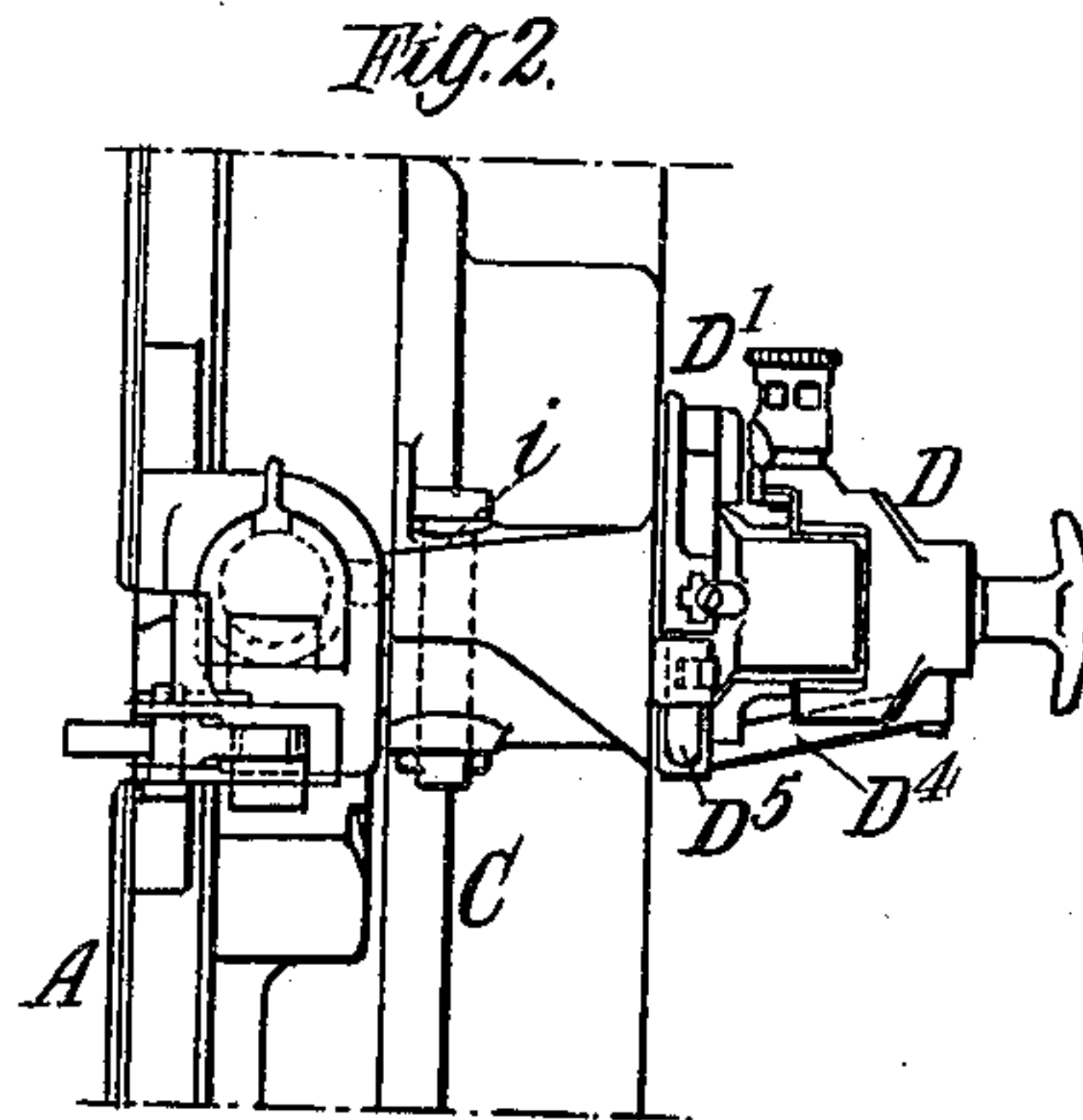
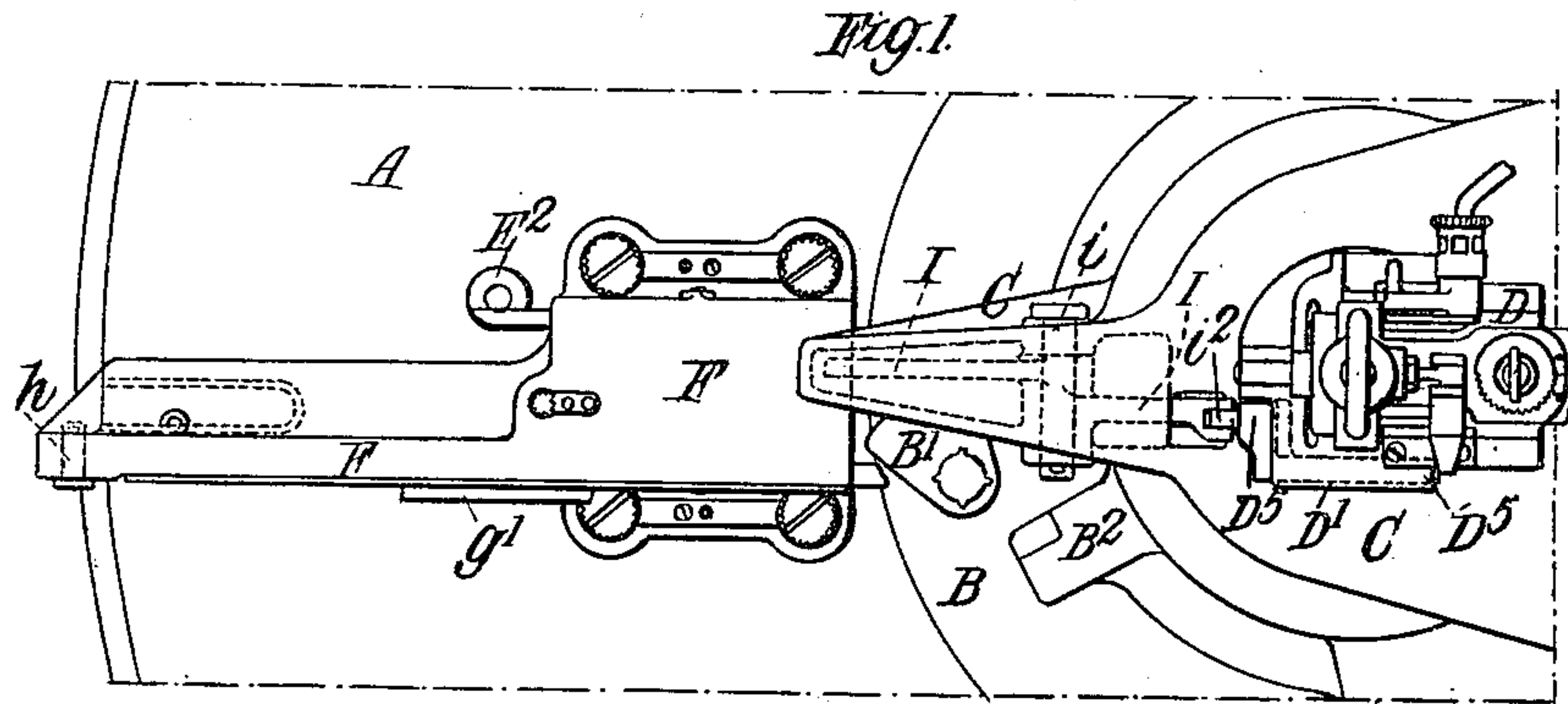
FIRING GEAR OF ORDNANCE.

APPLICATION FILED MAR. 20, 1909.

994,983.

Patented June 13, 1911.

2 SHEETS—SHEET 1.



Witnesses:

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E. G. Schuermann.

Inventors:  
Arthur Trevor Dawson,  
George Thomas Buckham,  
by Lemuel Goldsborough  
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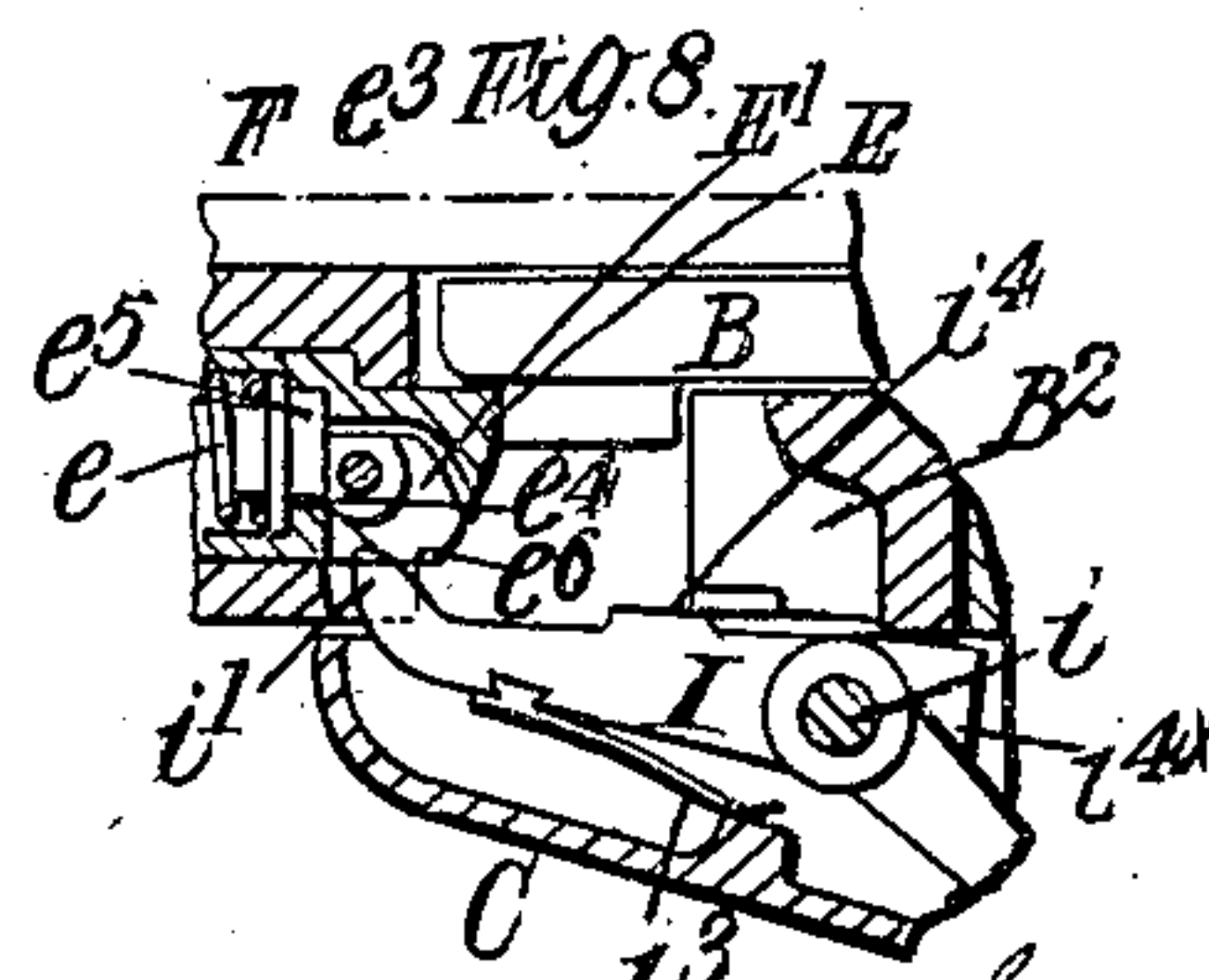
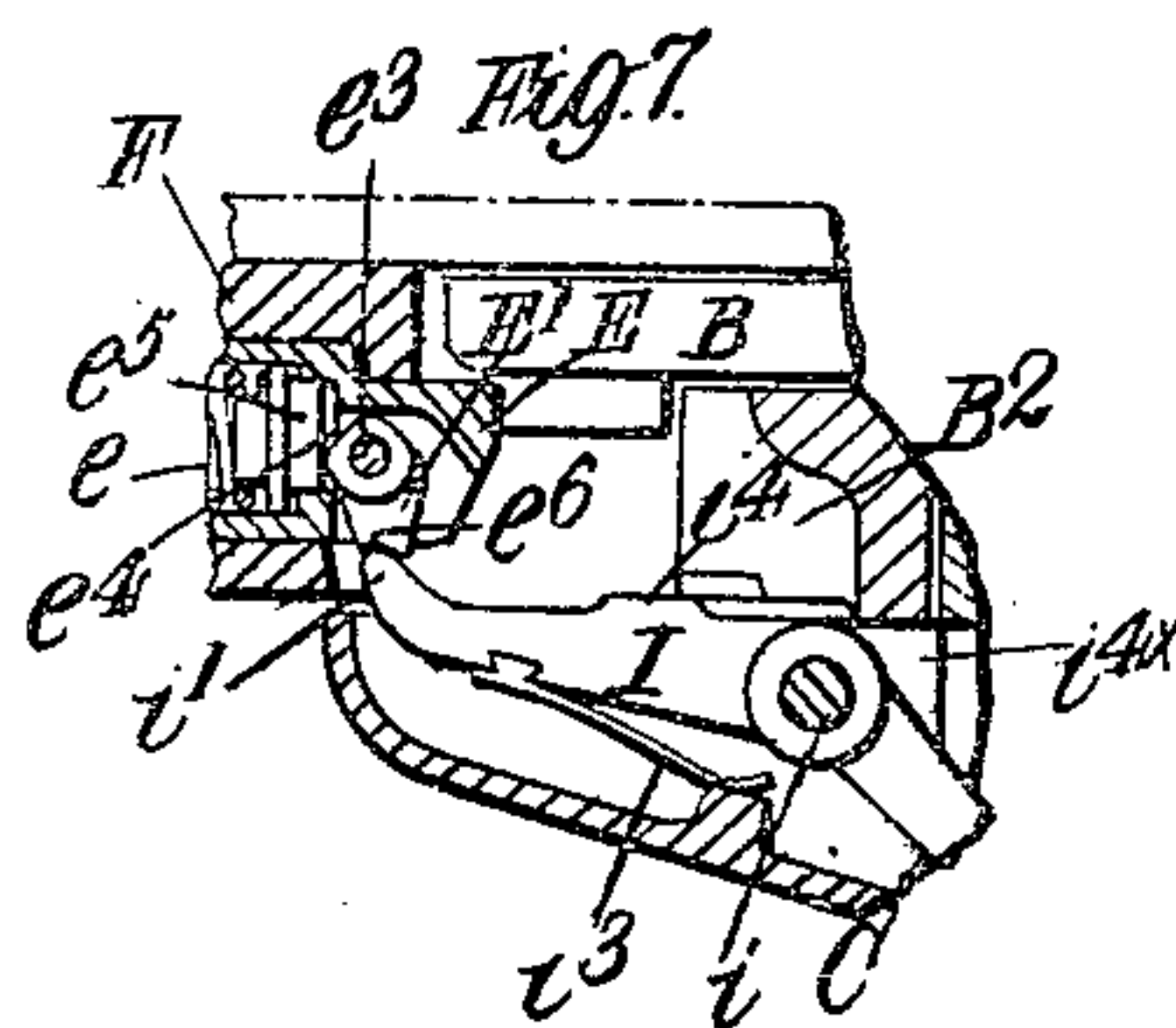
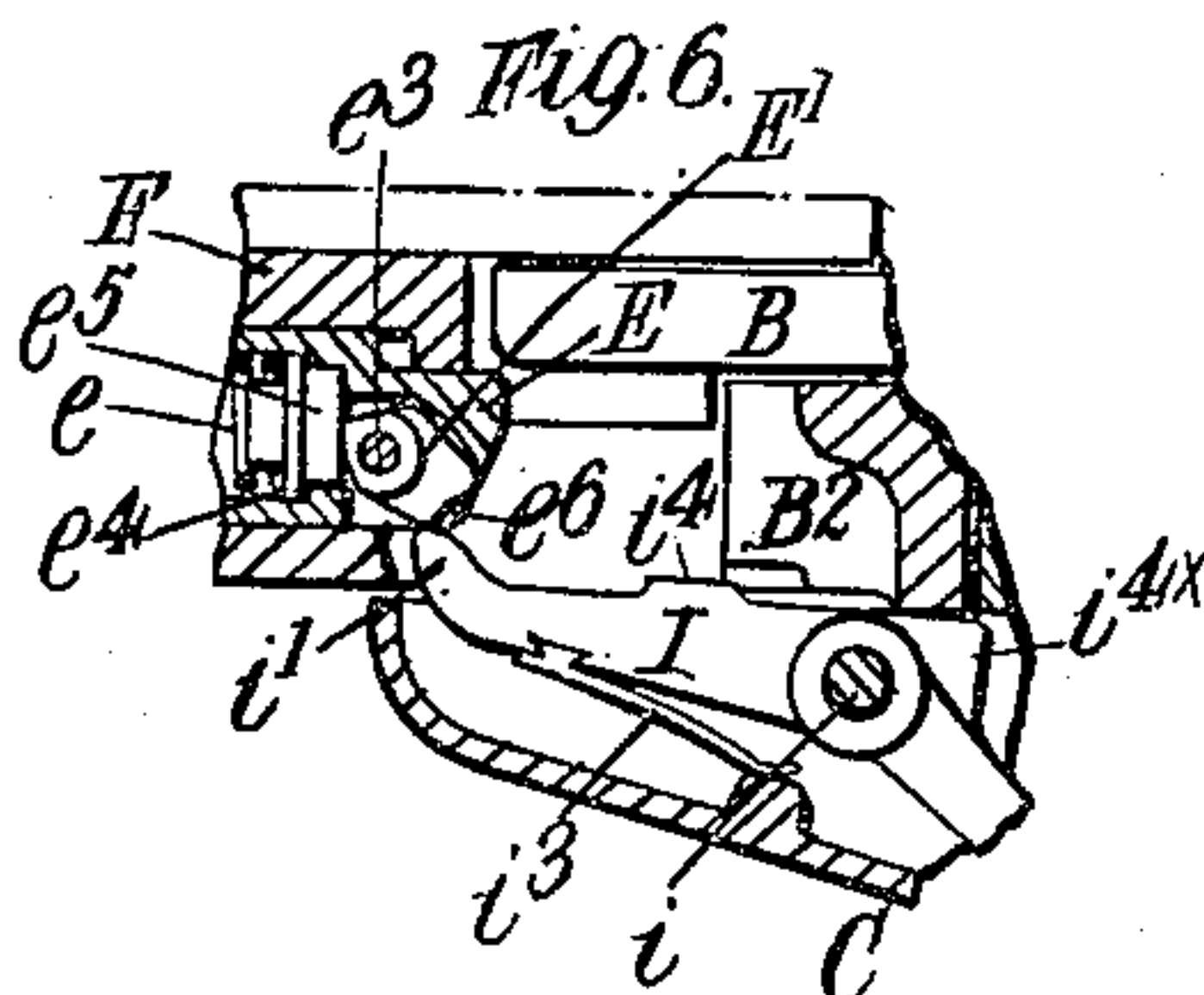
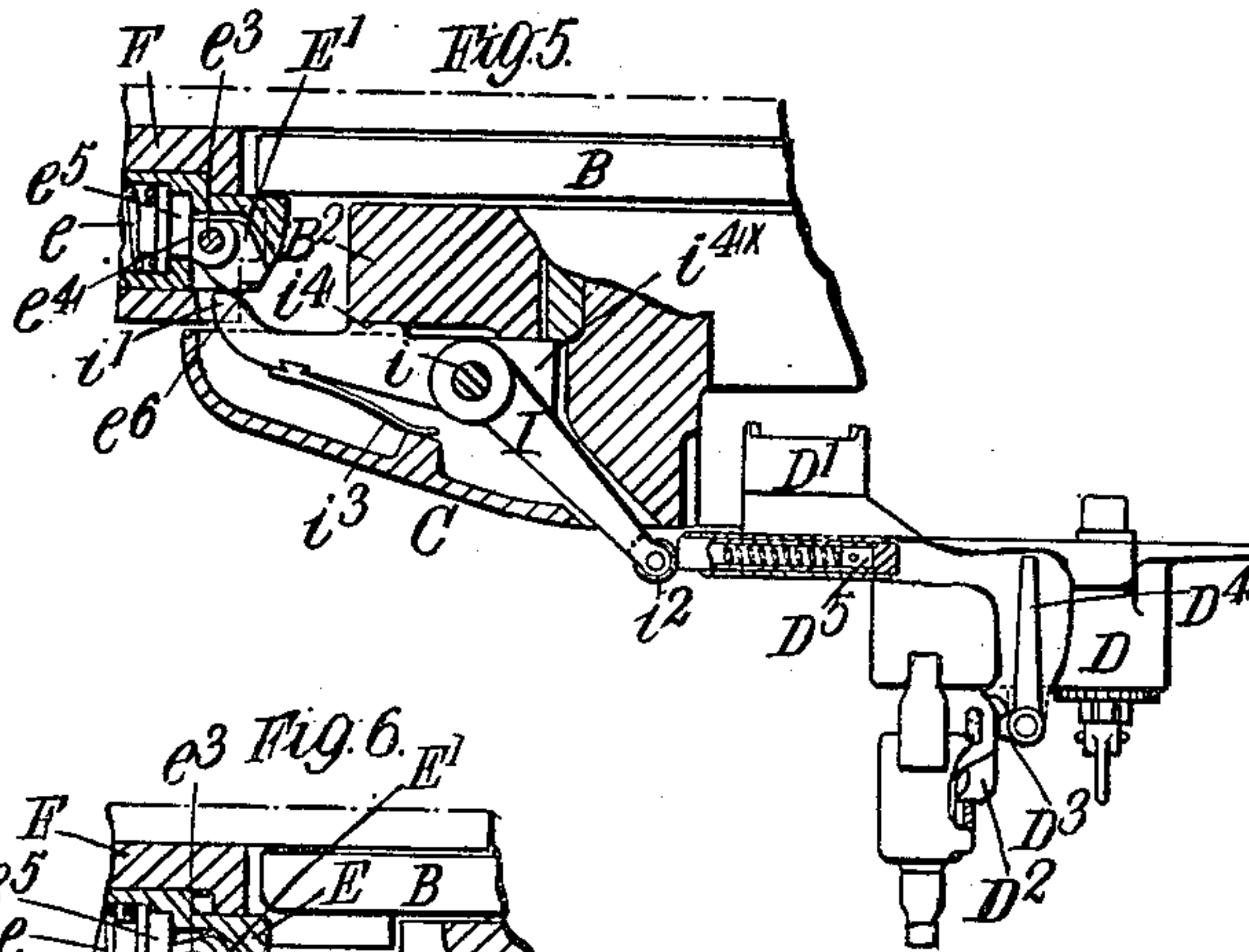
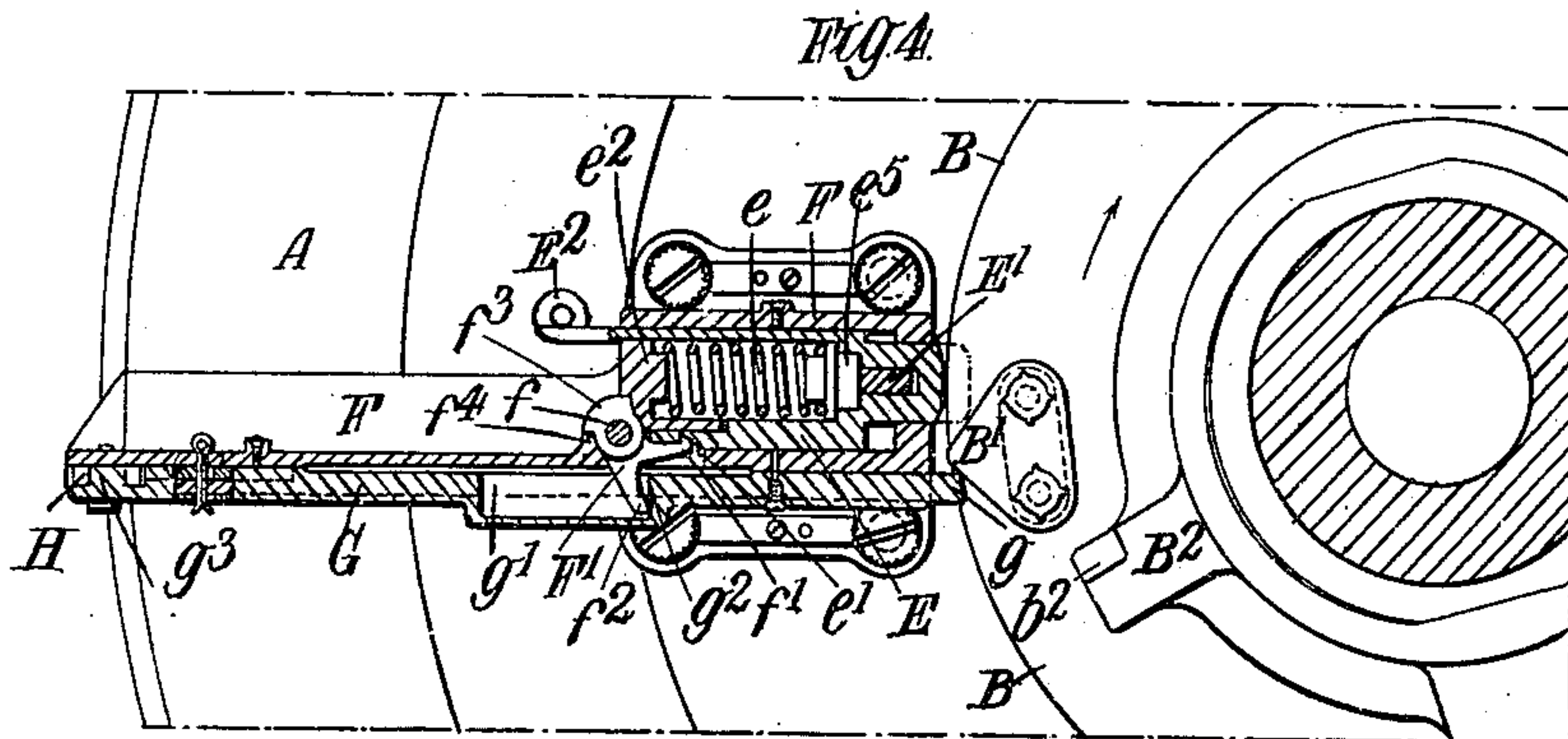
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George Thomas Buckham,  
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# UNITED STATES PATENT OFFICE.

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## FIRING-GEAR OF ORDNANCE.

994,983.

Specification of Letters Patent. Patented June 13, 1911.

Application filed March 20, 1909. Serial No. 484,747.

*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 and Relating to the Firing-Gear of Ordnance, of which the following is a specification.

This invention relates to firing gear of the kind in which there is at the breech end of the gun a firing plunger which operates through a firing lever and tripping cam and other appropriate mechanism to release the firing pin or striker mounted in the usual manner in a sliding lock casing carried by a box slide attached to the axial vent. The firing plunger is released by the pulling of the usual trigger and is cocked by the angular movement of the breech screw in opening the breech, through the intervention of a cocking cam on the said breech screw.

The chief object of our present invention is to so construct and arrange the aforesaid firing plunger that it will perform the double function of releasing the firing pin or striker, through suitable intervening parts, and of retaining the breech screw against the breech face when the swinging carrier is slammed in closing the breech; it therefore constitutes a combined firing plunger and rebound catch.

In order that our said invention may be clearly understood and readily carried into effect, we will describe the same more fully with reference to the accompanying drawings, in which:—

Figure 1 is an elevation of a portion of the breech end of a gun showing our improved mechanism applied thereto. Fig. 2 is a side elevation as seen from the left of Fig. 1. Fig. 3 is a sectional plan taken approximately through the center of the combined firing plunger and rebound catch. Fig. 4 is a sectional elevation taken on the line 1. 1. of Fig. 3, with the firing gear removed. Figs. 5, 6, 7 and 8 are fragmentary sectional plans showing the firing lever and the tripping cam in various positions; Fig. 5 representing the parts in the position they occupy when the carrier is slammed in closing the breech and prior to the locking movement of the breech screw; Fig. 6 when

the firing plunger is being retracted or cocked; Fig. 7 when the firing plunger has been liberated from its cocked position and is advancing with its tripping cam in the act of operating the firing lever for firing the gun; and Fig. 8 when the firing plunger has fully advanced and its tripping cam has released the firing lever and resumed its normal position after the firing has taken place.

Like letters of reference indicate similar parts in all the figures.

A is the breech end of the gun.

B is the flange of the breech screw to which the cocking cam B' is affixed.

C is the swinging carrier.

D is the sliding lock casing and D' the box slide in which said lock casing moves in the well known manner. The said lock casing is provided with the usual striker which is actuated by the trigger-sear D<sup>2</sup> controlled by the trigger D<sup>3</sup>, the said trigger being mounted on the axis pin of the trigger lever D<sup>4</sup> which, when the lock casing is in the firing position, lies with its free end contiguous to the inner end of the spring push rod D<sup>5</sup> carried by the box slide.

E is the firing plunger which is mounted to slide in a bracket F secured to the rear face of the gun. The said bracket also carries the plunger sear F' (Fig. 4) for retaining the firing plunger retracted or cocked; it also carries a rod G for actuating the sear F' to release the firing plunger as hereinafter explained. The firing plunger is made hollow to receive the tripping cam E' and the actuating spring e whose outer end is surrounded by and abuts against a movable end cap e<sup>2</sup> which is retained in place by the plunger sear F'. The said tripping cam E' is pivotally mounted on an axis pin e<sup>3</sup> carried by the firing plunger and near its pivot it has a shoulder e<sup>4</sup> against which a loose plug e<sup>5</sup> bears under the influence of the spring e. The plunger sear F' is mounted on an axis pin f carried by the bracket F and it has three arms or projections f<sup>1</sup> f<sup>2</sup> f<sup>3</sup> (Fig. 4) of which one (f<sup>1</sup>) has a hooked extremity to engage with a corresponding notch or recess e' in the under side of the firing plunger, another (f<sup>2</sup>) engaging with a shoulder g<sup>2</sup> in the actuating rod G, and the other (f<sup>3</sup>) engaging at its forward part with the said movable end cap e<sup>2</sup> and at its rear part with a stop or



shoulder  $f^4$  on the bracket F. It will therefore be seen that the sear  $F'$  is constantly subject to the influence of the spring  $e$  which tends to keep it in the cocking position represented in Fig. 4 and that the projection  $f^3$  of the sear, by bearing against the said stop  $f^4$ , prevents the movable end cap  $e^2$  from being pushed out of its proper position in the bracket F by the said spring.

The outer end of the firing plunger is formed with a loop or eye  $E^2$  for enabling it to be re-cocked by hand when required.

The actuating rod G is mounted on the lower part of the bracket F and to facilitate the assembling of the parts, it is interrupted or recessed at  $g'$  (Fig. 4). The forward end  $g$  of this rod normally projects into a position to engage with the flange B of the breech screw when the latter, together with its carrier C, is swung to or from the breech face. The other end of said actuating rod engages with the releasing lever H which is pivoted at  $h$  to the bracket F (Fig. 3) and is operated by a lever (not shown in the drawings) on a non-recoiling part of the mounting, the said lever being under the control of the usual trigger or other form of mechanism used for firing the gun. The said releasing lever H is shown with a forked extension to engage with a stud  $g^3$  on the actuating rod G.

I is the firing lever which is pivotally mounted at  $i$  in an extension of the swinging carrier C. One extremity or arm  $i'$  of the firing lever is adapted to engage with the notched portion  $e^6$  of the tripping cam  $E'$  and the other, which may be fitted with a roller  $i^2$ , is adapted to engage with the said push rod  $D^5$  on the box slide. The said firing lever is fitted with a flat spring  $i^3$  for returning it to the normal position after firing. Near its axis and on either side of the same are projections  $i^4$  and  $i^{4x}$  which come into engagement with the lug  $B^2$  of the breech screw when the latter is in the unlocked position only.

The action of the firing gear is as follows:—During the angular movement of the breech screw in the direction of the arrow in Fig. 4 to unlock the breech, the firing plunger E is forced outward from the dotted position shown in that figure, against the resistance of its spring  $e$ , by means of the cocking cam  $B'$  on the breech screw acting upon the nose of the said plunger. The extent of this outward movement is sufficient to enable the notch  $e'$  in the said plunger to engage with the hooked arm  $f'$  of the plunger sear  $F'$  as shown by the full lines, the said sear giving way to the plunger and quickly returning under the influence of the said spring  $e$  acting through the agency of the movable end cap  $e^2$ . This quick return movement of the sear  $F'$  also causes its arm  $f^2$  to push inward the actuating rod G so

that the inner extremity  $g$  of this rod lies in the path of the breech screw flange B when the carrier C is swung outward to open the breech. The firing lever I, which as aforesaid is pivotally mounted in the carrier, is moved slightly outward or to the rear about its pivot  $i$  during the unlocking of the breech screw, by means of a beveled surface  $b^2$  on the lug  $B^2$  on the breech screw, engaging with the projection  $i^4$  on the firing lever, while the other projection  $i^{4x}$  on the said firing lever, by coming into contact with the unbeveled portion of the said breech-screw lug  $B^2$ , insures that the said firing lever shall be held stationary on its pivot and prevented from performing any further rotary movement during the outward and inward movement of the swinging carrier. By the aforesaid small movement of the firing lever, the end  $i'$  thereof that lies adjacent to the tripping cam  $E'$ , is withdrawn from engagement therewith (see Fig. 5). As the breech screw swings out in opening the breech, the flange B of the said screw comes into contact with the end  $g$  of the actuating rod G, thereby forcing it outward and tripping the plunger sear  $F'$ , so that the hooked arm  $f'$  thereof is liberated from the firing plunger. The firing plunger is thus released and moved inward again under the influence of its spring  $e$ , its nose lying in a position in front of the flange B of the breech screw, so as to be acted upon by said flange when the carrier is again swung inward to close the breech. On slamming the carrier to close the breech, the flange B of the breech screw again engages with the end  $g$  of the aforesaid actuating rod G, thus pressing said rod outward and by its action on the arm  $f^2$  of the plunger sear  $F'$  keeping the hooked arm  $f'$  of the said plunger sear in a position of disengagement with the notch  $e'$  of the firing plunger E. The flange B of the breech screw at the same time engages with the nose of the firing plunger E, thereby forcing the latter outward to a sufficient extent to pass it, so that directly the flange B passes the firing plunger, the latter immediately flies inward under the action of its spring, thus preventing the carrier from rebounding and retaining the breech screw in such position that its threads can freely engage with those of the gun. The breech screw is then locked by the usual angular movement thereof, whereby the cocking cam  $B'$  is caused to act upon the nose of the firing plunger and push the plunger outward far enough to effect the re-engagement of its notch  $e'$  with the hooked arm  $f'$  of the sear  $F'$ . At the same time the lug  $B^2$  on the breech screw moves away from the projections  $i^4$ ,  $i^{4x}$  on the firing lever I so as to render it free to move about its axis pin. The firing gear is then in the cocked position (Fig. 3) and can be liberated



by pressing inward the releasing lever H through the aforesaid trigger mechanism in the ordinary manner. This inward movement of the releasing lever retracts the actuating rod G and causes its shoulder  $g^2$  to act upon the arm  $f^2$  of the plunger sear; thus removing the hooked arm  $f'$  of said sear from engagement with the firing plunger and permitting the latter to fly inward. This inward movement of the firing plunger causes the tripping cam  $E'$ , by coming into engagement with the end  $i'$  of the firing lever I, to turn about its axis pin  $e^3$  from the position shown in Fig. 3 to that shown in Fig. 7 (and subsequently to that shown in Fig. 8) whereby the firing lever I is actuated.

To re-cock the gear by hand when necessary, the re-cocking loop  $E^2$  is pulled sufficiently far toward the left for the plunger sear  $F'$  to engage with the firing plunger, the lock being of course re-cocked before firing. During re-cocking the tripping cam  $E'$  does not actuate the firing lever I but itself moves about its axis pin  $e^3$  as shown in Fig. 6.

The above described firing gear possesses the advantages that the assembling of the parts can be effected with great facility; all the springs in the arrangement are in the initial condition when the mechanism is in its normal position, thereby freeing them from undue stress; the firing lever is rendered immovable during the slamming of the swinging carrier; and the re-cocking of the firing plunger is effected without disturbing the firing lever, thereby obviating any danger of premature firing.

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

1. In firing gear for breech loading guns, the combination with the firing plunger, of means whereby the said plunger retains the breech screw against the breech face when the swinging carrier is slammed in closing the breech.

2. In firing gear for breech loading guns, the combination with a firing plunger, and means whereby said plunger operates to release the firing pin or striker, of means whereby said plunger is retracted without becoming cocked when the swinging carrier is slammed in closing the breech, means whereby said plunger is retracted and also cocked by the angular displacement of the breech screw, and means for enabling said plunger to be released from its cocked position.

3. In firing gear for breech loading guns, the combination with a firing plunger and means whereby said plunger operates to release the firing pin or striker, of a plunger

sear, means whereby said sear is moved into an inoperative position relatively to the plunger when the latter is retracted by the swinging carrier in closing the breech, means whereby said firing plunger is cocked by the angular displacement of the breech screw, and means whereby said plunger sear is moved into its inoperative position for releasing the firing plunger.

4. In firing gear for breech loading guns, the combination with a firing plunger and means whereby said plunger operates to release the firing pin or striker, of a plunger sear, an actuating rod for said sear, means whereby both the firing plunger and the sear actuating rod are operated simultaneously by the swinging carrier in closing the breech, means whereby the said plunger is cocked by the angular displacement of the breech screw and means whereby the said sear actuating rod can be operated independently of the firing plunger.

5. In firing gear for breech loading guns, the combination with the firing plunger, of a tripping cam, a firing lever pivoted to the swinging carrier and adapted to be actuated by said tripping cam, means whereby said firing lever operates to release the firing pin or striker, a plunger sear, an actuating rod for said sear, means for operating said actuating rod and firing plunger together when the swinging carrier is slammed to its closed position, means for cocking said firing plunger when the breech screw is angularly displaced, and means whereby said firing lever is held stationary during the inward and outward swinging motion of the carrier.

6. In firing gear for breech loading guns, the combination with the firing plunger, of a tripping cam, a firing lever pivoted to the swinging carrier and adapted to be actuated by said tripping cam, means whereby said firing lever operates to release the firing pin or striker, a plunger sear, a spring controlling the firing plunger, the tripping cam and the plunger sear, an actuating rod for said sear, means for operating said actuating rod and firing plunger together when the swinging carrier is slammed to its closed position, means for cocking said firing plunger when the breech screw is angularly displaced, and means whereby said firing lever is held stationary during the inward and outward swinging motion of the carrier.

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

ARTHUR TREVOR DAWSON.  
GEORGE THOMAS BUCKHAM.

Witnesses:

HENRY KING,  
ALFRED PEAKS.