





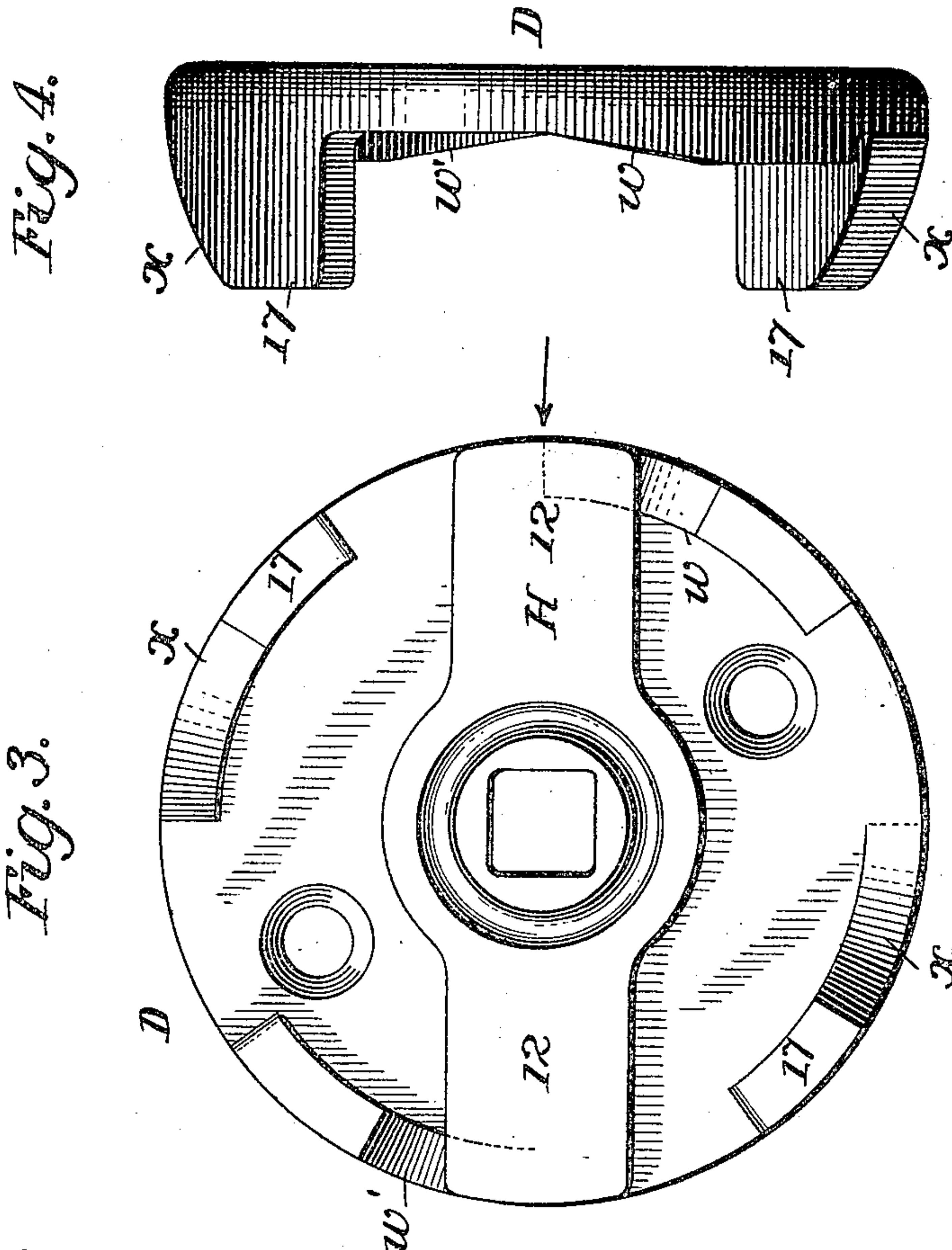
No. 795,440.

PATENTED JULY 25, 1905.

S. A. S. HAMMAR.  
FIRING MECHANISM FOR BREECH LOADING GUNS.

APPLICATION FILED JAN. 10, 1902.

3 SHEETS—SHEET 2.



Witnesses,  
*J. G. Hunkel*  
*Sam. Gillman, Jr.*

Inventor  
*S. A. S. Hammar*  
by *Forster & Freeman*  
Attorneys

No. 795,440.

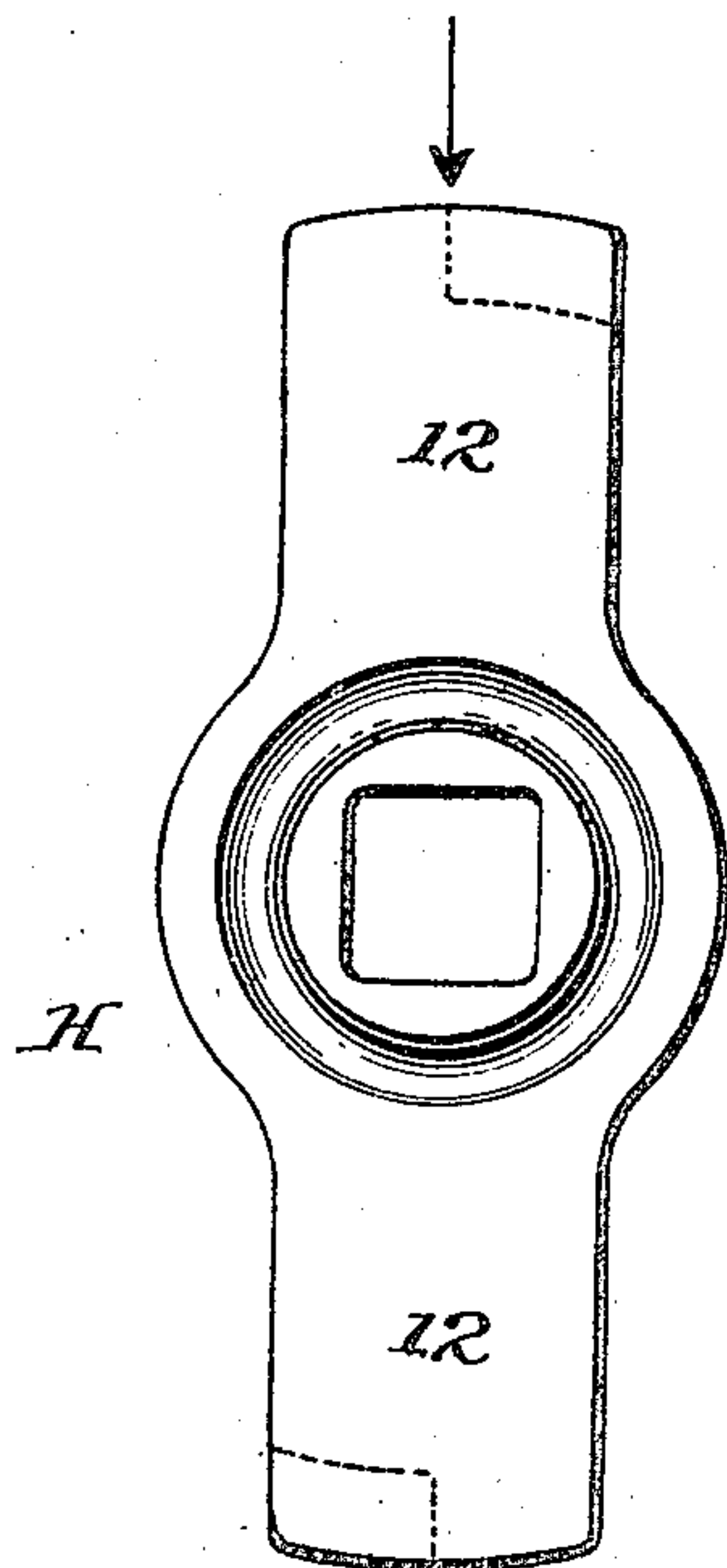
PATENTED JULY 25, 1905.

S. A. S. HAMMAR.  
FIRING MECHANISM FOR BREECH LOADING GUNS.

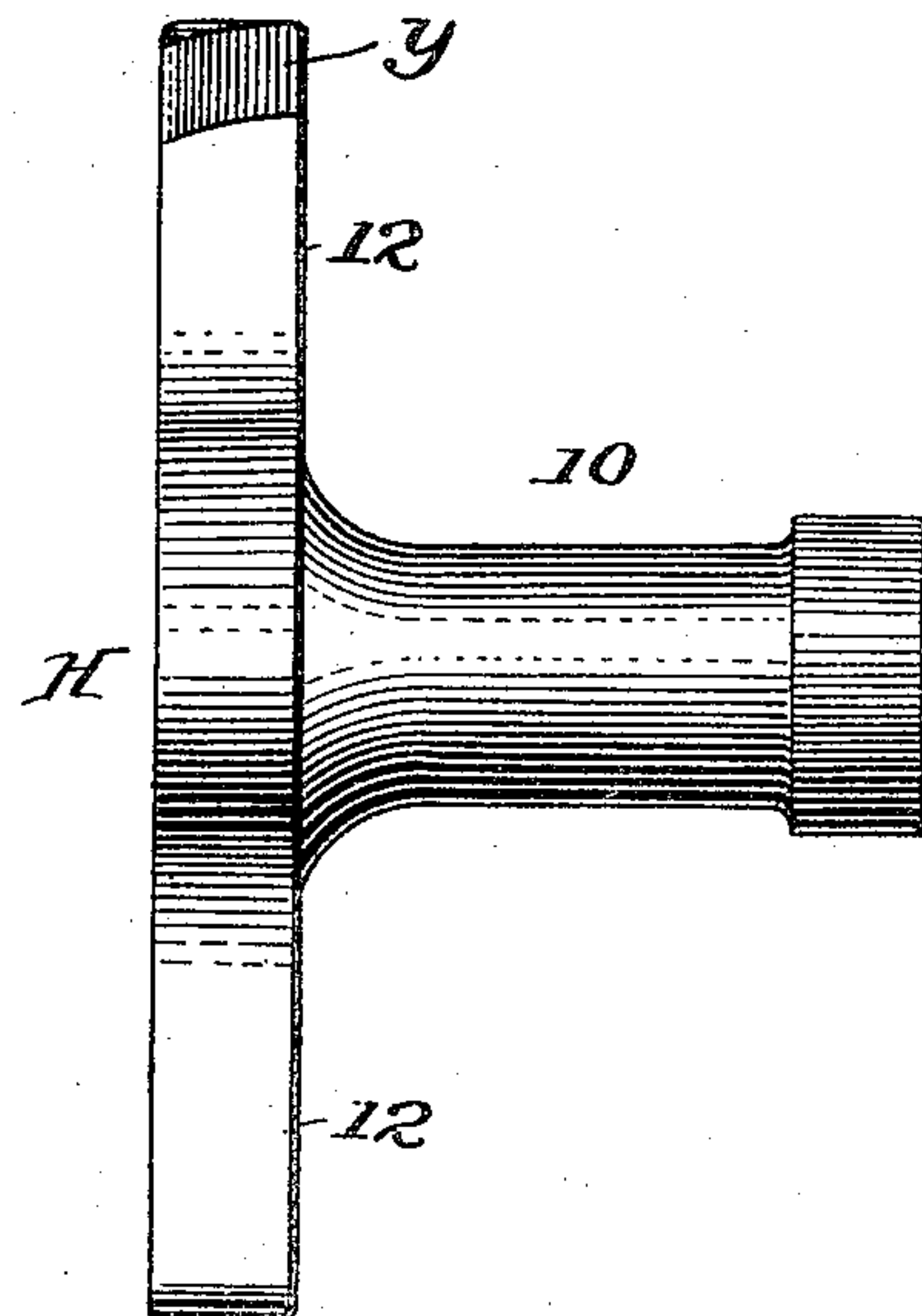
APPLICATION FILED JAN. 10, 1902.

3 SHEETS—SHEET 3.

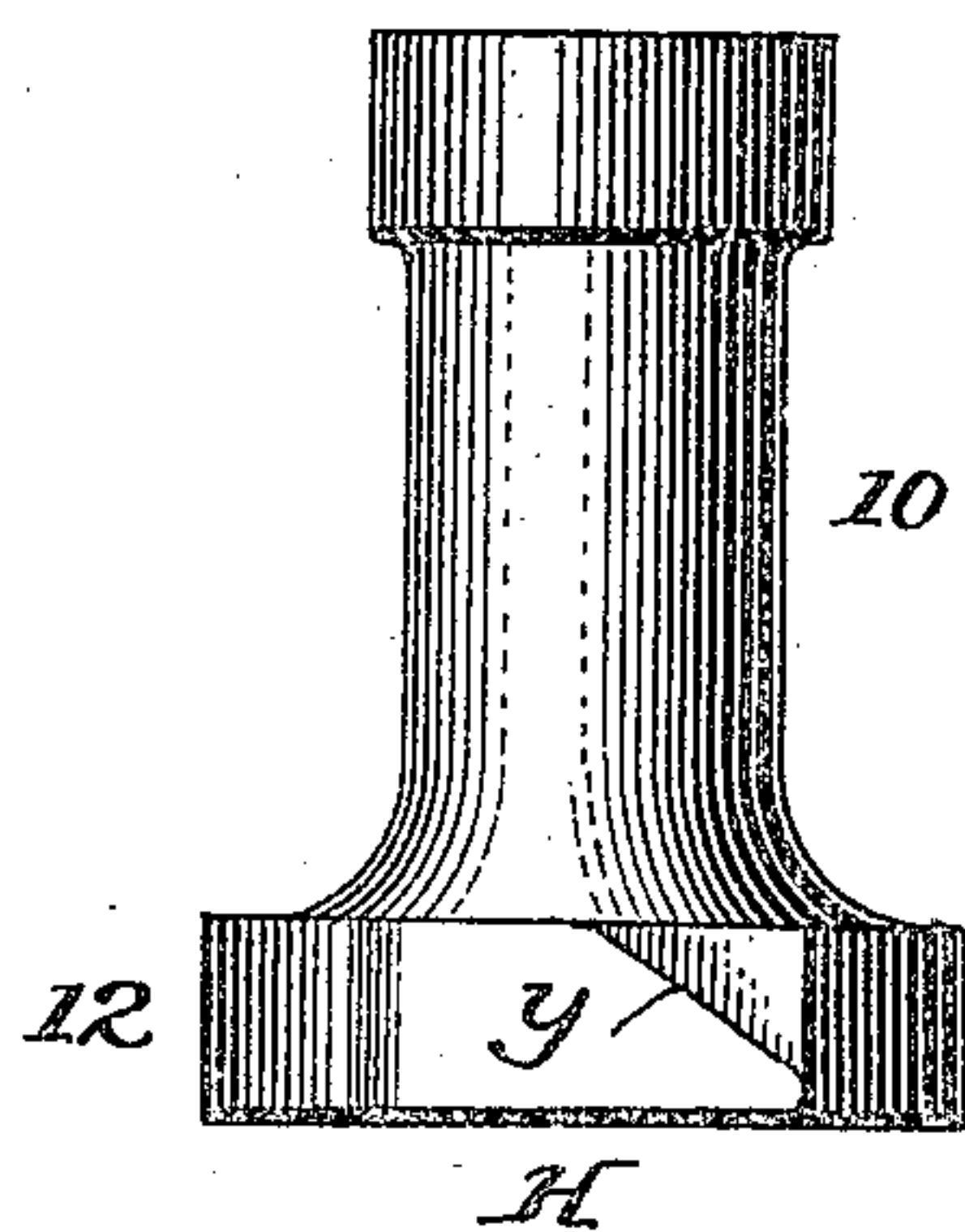
*Fig. 5.*



*Fig. 7.*



*Fig. 6.*



Witnesses

*J. G. Hinkel*  
*John J. Gellman Jr.*

Inventor

*Sigard A. S. Hammar*  
By *Forster & Freeman*

Attorneys



# UNITED STATES PATENT OFFICE.

SIGARD A. S. HAMMAR, OF BETHLEHEM, PENNSYLVANIA, ASSIGNOR TO  
BETHLEHEM STEEL COMPANY, OF BETHLEHEM, PENNSYLVANIA, A  
CORPORATION OF PENNSYLVANIA.

## FIRING MECHANISM FOR BREECH-LOADING GUNS.

No. 795,440.

Specification of Letters Patent.

Patented July 25, 1905.

Application filed January 10, 1902. Serial No. 89,173.

*To all whom it may concern:*

Be it known that I, SIGARD A. S. HAMMAR, a subject of the King of Sweden and Norway, residing at Bethlehem, in the county of Northampton and State of Pennsylvania, have invented certain new and useful Improvements in Firing Mechanism for Breech-Loading Guns, of which the following is a specification.

My invention relates to the firing mechanism of breech-loading guns; and it consists of means whereby the rotation of the breech-block when unlocked from the breech may be the means of retracting the firing-head, so that the firing-pin cannot possibly contact percussively with the cartridge when the breech-block is again inserted and locked and so that when the gun is to be fired percussively the firing-head will be held in retracted position until released by draft upon the lanyard or other actuating means; and my invention consists in so constructing the parts as to secure these results, as fully set forth hereinafter and as illustrated in the accompanying drawings, in which—

Figure 1 is a central horizontal plan of the rear portion of a gun, showing sufficient thereof to illustrate my improvements. Fig. 2 is a rear view of the cocking-ring, showing the position of the cocking-head for percussive firing prior to the unlocking of the breech-block; Fig. 3, a similar view showing the position of the cocking-head for electric firing prior to unlocking the breech-block. Fig. 4 is an edge view of the cocking-ring looking in the direction of the arrow, Fig. 3. Fig. 5 is a face view of the cocking-head looking from the rear thereof. Fig. 6 is a view looking in the direction of the arrow, Fig. 5; and Fig. 7 is a side view of the cocking-head.

To the breech B of the gun is pivoted in any suitable manner the carrier ring or plate A, to which is bolted the hub or boss K, threaded exteriorly to receive the breech-block C, which turns upon the hub and which has interrupted threads adapted to corresponding threads in the breech, so that the parts may be firmly locked together by carrying the threads of the breech-block between those of the breech and then turning the breech-block a part of a revolution, as usual. The rotation of the breech-block in

turning it to a position to enter the breech is made the means of carrying the firing-head, which includes the firing-pin and the parts connected to move therewith, automatically to a cocked position for percussion firing and of withdrawing the firing-head to a position to prevent percussion firing when it is intended to fire by means of an electric current. For the purpose of securing these results the firing-head J, in which the pin is seated and which is practically part thereof, extends centrally through the hub and through an axial opening in the breech-block and terminates in the firing-pin 4 at the inner end, and near the outer end there is an angular portion of the stem, which fits so as to slide in a corresponding opening in the hub, and there is a shoulder 5 upon the firing-head which may be an annular shoulder, at the rear of which is an incline 6 for engaging an incline upon the sear 7, which is thus forced back, when the firing-head is carried backward until the shoulder 5 passes to the rear of the sear, when the latter will be forced inward by a spring 36 to engage the shoulder 5 and lock the firing-head in its retracted position.

The firing-head is provided with arms 37 37, forming a suitable handle by means of which it may be drawn back by hand when desired.

A part of the stem of the firing-head passes through a cocking-head H, having a tubular stem 10, which constitutes a support for the firing-head and its pin and from which projects laterally arms 12 12, the said stem 10 being somewhat shorter than the distance between two shoulders 1 2 upon the firing-head, which therefore can slide to a limited extent in the cocking-head, and against the latter bears one end of a spring M, the other end of which bears upon a washer N to hold the latter against a shoulder 15 on the firing-head, said washer also at times bearing upon a shoulder 16 of the hub.

The firing-head may be drawn back by the handle to carry the angular part 25 out of the opening and then turned quarter round and the firing-head again pushed forward, and thus the cocking-head may be set in either of the two positions shown in Figs. 2 and 3; but in either position it is prevented from rota-



tion. When the firing-head is thrown forward, the shoulder 2 acts as a stop, limiting this forward movement.

Secured to or constituting a part of the breech-block C and within a central chamber or recess of the latter is the cocking-ring D, which ring is secured to the breech-block to turn therewith and is provided with two symmetrically-disposed lugs or cams 17, each projecting to the rear and having an inclined edge  $\alpha$ , adapted to engage an inclined face  $\gamma$  upon one of the arms 12 of the cocking-head, so that the rotation of the breech-block and its cocking-ring in turning the breech-block to open the gun will result in bringing the inclined faces  $\alpha$ , Fig. 2, beneath the inclined faces  $\gamma$ , and thereby as the breech-block is turned to disengage its threads from those of the breech, exert a cam action that carries rearward the cocking-head and the firing-head axially, compressing the spring M, the firing-head sliding without turning until the shoulder 5 passes the sear 7, which then engages said shoulder and locks the firing-head in its retracted position. When the breech-block is rotated in inserting it, the lugs 17 are carried out of their position in front of the arms 12, so that the latter can move inward when the sear is retracted. By then drawing the sear outward by means of a lanyard or otherwise the firing-head is released, when the pressure of the spring M will force the firing-head forward and explode the cartridge.

For firing electrically, while it is desirable to avoid the projecting of the pin beyond the face of the breech-block in closing, as it might then explode the cartridge percussively, it is equally desirable that the pin shall project beyond this face and bear firmly against the cartridge to secure a proper contact when the electric current is transmitted for firing. I therefore provide means whereby in electric firing the pin may be retracted when the breech-block is inserted in the breech and then slowly moved forward to secure contact with the cartridge as the breech-block is turned to lock it and whereby the pin is drawn back as soon as the breech-block begins to turn to open the breech. To secure this result, the firing-head is first set for electric firing by seizing the handle and drawing it back until the angular portion 25 is out of the angular opening in the hub, after which the head is then turned part of a revolution to bring the arms 12 12 to the crosswise position. (Shown in Fig. 3.) As the firing-head is drawn back the washer N seats on the shoulder 16 and the spring M becomes compressed, so that when the draft on the handle is relaxed the firing-head will move inward, its angular portion again entering the recess and the firing-head in its new position being thus held from turning.

Upon the cocking-ring D are two slight inclines  $w w'$ , which as the breech-block is turned in the direction of the arrow  $a$ , Fig. 3, for the purpose of unlocking the breech-block are brought beneath the arms 12 of the cocking-head and force the latter backward until the shoulder 2 is met by the end of the stem of the cocking-head, which acts as a stop to prevent further rearward movement. It will be seen that this stop and the shoulder 1, also acting as a stop while movable axially, serve to limit the forward and rearward movement of the firing-pin in the cocking-head. The pin 4 is thus retracted back of the forward face of the breech-block, so that when the latter is carried inward to locking position there will be no projection of the pin and no danger of a percussive action on the cartridge. As the breech-block is now turned to lock it in position in the breech the inclines  $w w'$  will be gradually carried from beneath the arms 12 12, and the cocking-head will be allowed to move slowly forward under the action of the spring M until it rests firmly in contact with the cartridge. The current is then passed through the conductor 30, carried by the firing-head, to explode the cartridge.

It will be seen from the above that the firing-head may be set in two positions—one for percussive firing and one for electric firing—and that when in position for percussive firing it is retracted by being carried back, with its support H, to compress the firing-spring and is then locked in retracted position as the breech-block is unlocked, while when in position for electric firing the firing-head and its support are retracted in like manner to a less extent on unlocking the breech-block and are slowly carried forward as the breech-block is turned to lock it in the breech.

Without limiting myself to the precise construction shown and described, I claim—

1. The combination with a rotatable breech-block, of a firing-head extending axially through and sliding in said block, cams carried by the breech-block to engage parts carried with the firing-head to retract the latter as the breech-block is turned to unlock it from the breech, means for locking the firing-head in its retracted position, and other cams arranged to move back the firing-head as the breech-block is unlocked and to permit the slow forward movement of the firing-head as the breech-block is locked in the breech, and means for engaging the firing-head with the different cams, substantially as set forth.

2. The combination with the carrier-plate and rotatable breech-block of a gun, of a firing-head sliding without turning in a part connected with the carrier-plate and extending through the breech-block, and two different devices for moving the firing-head to the rear as the breech-block is turned to unlock



it from the breech, whereby the firing-head may be moved to different position for percussive or electric firing accordingly as it is placed in engagement with one or the other of said devices, substantially as set forth.

3. The combination with the rotatable breech-block of a gun and its support, of a firing-head sliding in and extending through said breech-block and support and adapted to be set in different positions, and different sets of projections carried by the breech-block arranged, one set to retract the firing-head to firing position, and the other to merely carry the point of the head back of the face of the breech, when the latter is turned to unlock it, substantially as set forth.

4. The combination with the rotatable breech-block of a gun, of a firing-head having a terminal contact-point normally extending beyond the inner face of the breech-block, means for including the firing-head in an electric circuit, and means for retracting the firing-head as the breech is unclosed and for moving it slowly inward into contact with the shell when the breech-block is locked in the breech, substantially as set forth.

5. The combination with the rotatable breech-block of a gun, of a firing-head having a terminal contact-point normally projecting beyond the inner face of the breech-block, means for connecting it with an electric conductor, means for retracting the firing-head as the breech is unclosed, and for moving it slowly forward as the breech-block completes its rotation in closing the breech, substantially as set forth.

6. The combination with the rotatable breech-block, the sliding firing-head adapted to be turned to different positions, and means for holding it in each position, of two different sets of inclines upon the breech-block, and an adjustable cocking-head for engaging either set of said inclines the firing-head having a limited sliding movement in the cocking-head, substantially as set forth.

7. The combination with the rotatable breech-block, and its support, of a firing-head sliding in said support, means whereby the said firing-head may be turned to different positions, a cocking-head connected to turn with the firing-head, and two sets of projections carried by the breech-block one adapted to engage the cocking-head when the same is in one position and the other to engage the cocking-head when the latter is in its other position, substantially as set forth.

8. The combination with the breech-block, and its support, of a sliding firing-head, means whereby it may be turned and secured in different positions, a shoulder upon the firing-head, a spring-actuated sear for engaging said shoulder, a spring for carrying the firing-head forward, and two sets of lugs carried by the

breech-block for engaging and retracting the firing-head to different distances when the latter is in different positions, substantially as set forth.

9. The combination with a firing-head, and means for setting it in different positions, of a cocking-head connected to turn with the firing-head, and two sets of projections carried by the breech-block and arranged one set to engage the cocking-head when in one position and other set to engage it when in the other position, substantially as set forth.

10. The combination with the rotatable breech-block, and its support, of a firing-head connected with an electric conductor and extending through the breech-block, and projections carried by the breech-block arranged to contact with part of the firing-head to retract the latter and carry its pin within the breech-block as the latter begins its rotation in opening the breech and to permit the firing-head to move slowly forward as the breech-block completes its rotation in closing the breech, substantially as set forth.

11. The combination with the rotatable recessed breech-block and the sliding firing-head, of adjustable devices within the recess of the breech-block for retracting the firing-head to different degrees as the breech-block is turned to open the breech, substantially as set forth.

12. The combination with a rotatable breech-block and its carrier, of two sets of devices for retracting the firing-pin upon rotation of the breech-block, and means for engaging the firing-pin operatively with either set of devices, substantially as set forth.

13. The combination with a rotatable breech-block and its carrier, of two sets of devices constructed respectively to retract the firing-pin different distances upon the rotation of the breech-block for electric or percussive firing, and means for bringing either set of devices into operation upon the firing-pin at will, substantially as set forth.

14. The combination with a rotatable breech-block and its carrier, of a firing-pin, two cams adapted to retract the firing-pin different distances for electric or percussive firing respectively, and means for engaging the firing-pin with either cam, substantially as set forth.

15. The combination with a rotatable breech-block and its carrier, of a cocking-head movable axially in said breech-block, means for retracting said cocking-head automatically when the breech-block is turned, and a firing-pin adapted to be retracted by said cocking-head, said firing-pin having a slight longitudinal movement relative to said cocking-head, whereby it is adapted both for electrical and percussive firing, substantially as set forth.

16. The combination with a rotatable breech-block and a firing-pin movable axially in said block and adapted for electrical or percussive firing, of means for holding said firing-pin normally in a partially-retracted position suitable for electric firing when the breech is closed, means for automatically retracting said firing-pin for percussive firing when the breech is opened, means for holding the firing-pin in its retracted position, means for releasing the firing-pin, and a firing-spring adapted

to throw the firing-pin beyond its normal position for percussive firing, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SIGARD A. S. HAMMAR.

Witnesses:

LEIGHTON N. D. MIXSELL,  
C. RESILLER.