

Oct. 2, 1923.

A. Y. LEECH, JR

1,469,663

FIRING MECHANISM

Filed Dec. 26, 1922

2 Sheets-Sheet 1

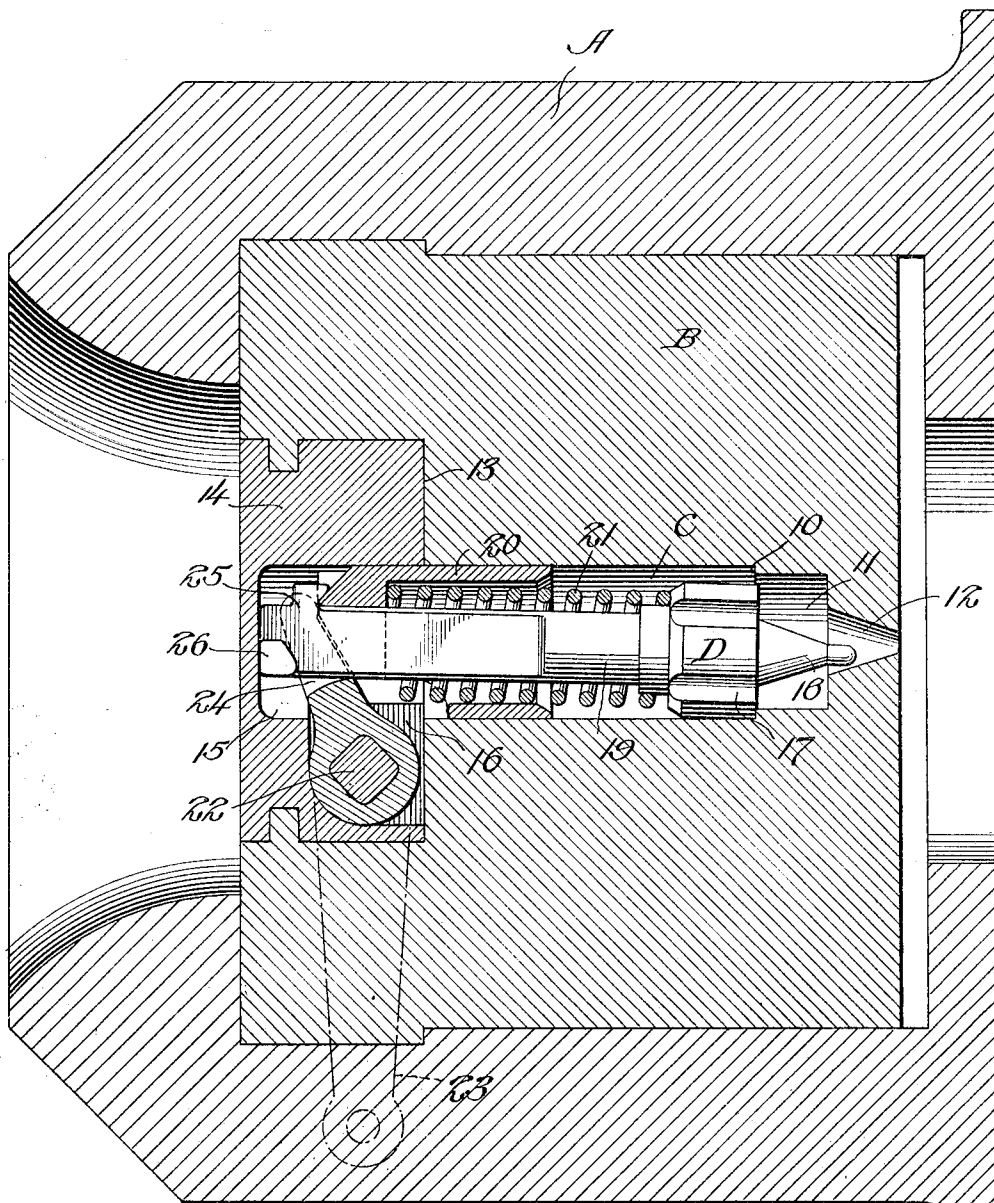


Fig. 1.

Inventor

Abner Y. Leech Jr,

By

Bright & Bailey

Attorneys

Oct. 2, 1923.

1,469,663

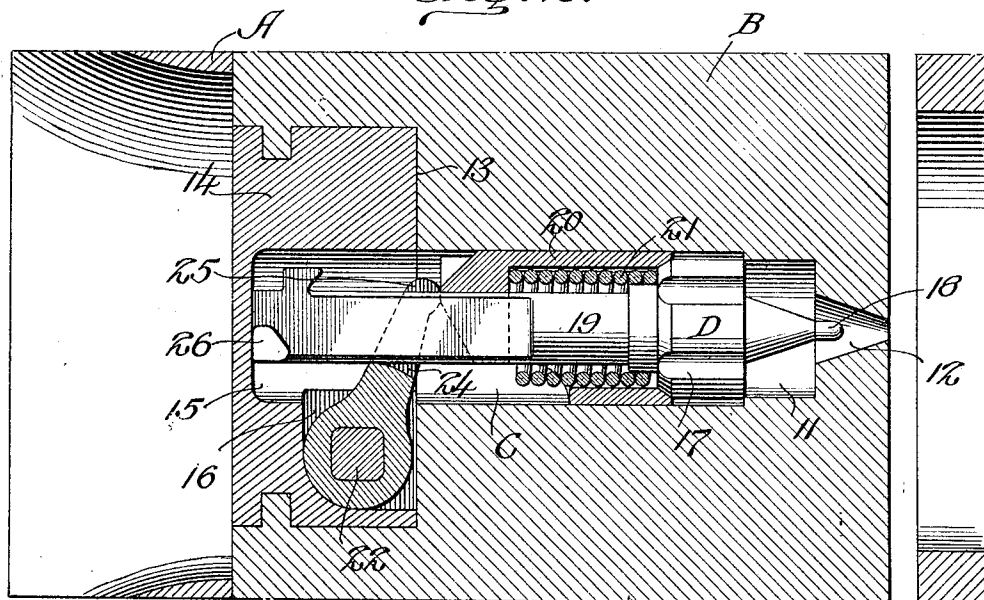
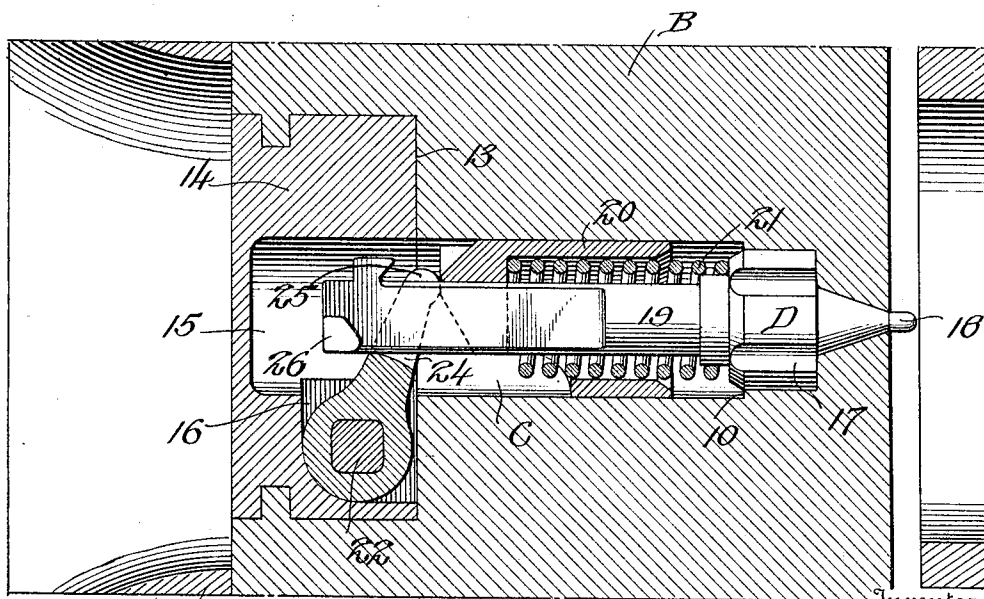
A. Y. LEECH, JR

FIRING MECHANISM

Filed Dec. 26, 1922

2 Sheets-Sheet 2

Fig. 2.



Inventor

Fig. 3. Abner Y. Leech Jr,

By Bright & Bailey

Attorneys

UNITED STATES PATENT OFFICE.

ABNER Y. LEECH, JR., OF WASHINGTON, DISTRICT OF COLUMBIA.

FIRING MECHANISM.

Application filed December 26, 1922. Serial No. 609,039.

To all whom it may concern:

Be it known that I, ABNER Y. LEECH, JR., a citizen of the United States, and resident of Washington, in the District of Columbia, have invented certain new and useful Improvements in Firing Mechanism, of which the following is a specification.

My invention relates to firing mechanism for guns and is particularly designed as an improvement on the firing mechanism illustrated and described in U. S. Patent 710,124, granted to Vernon C. Tasker, September 30, 1902. In the firing mechanism of the patent cited a single spring is employed to effect the three-fold function of projecting the firing pin to fire the gun, maintaining the firing pin normally retracted, and returning the firing lever to its normal position. In my present invention I employ a single spring having the threefold function enumerated and in addition possessing a fourth function of effecting engagement of the firing pin, when the latter is in a retracted position, with the detent which holds said firing pin during compression of the spring preliminary to firing the gun. By imparting this fourth function to said spring I am enabled to dispense with the use of a detent in the form of a spring sear, or any other type of detent movable with respect to the containing case of the mechanism, and utilize for the same purpose a suitable shoulder formed on the wall of the chamber containing the firing mechanism, which arrangement materially increases the sturdiness of the mechanism and at the same time simplifies construction and assembly with resultant economy. To effect this end I associate and proportion the parts of the mechanism, so as to provide for lateral movement of the firing pin element thereof which movement in one direction I produce through the instrumentality of said spring and in the opposite direction by direct action of another element of the mechanism on the firing pin.

I will describe my invention as incorporated in a firing mechanism characterized by prior patent 710,124, but it will be understood that the same is adapted for incorporation in other types of firing mechanism and in devices, other than firing mechanism, which utilize as an elementary portion a spring projected plunger.

In the drawings chosen to illustrate my

invention, the scope whereof is set forth in the claims—

Figure 1 is a horizontal central section through the breech mechanism of a gun embodying a firing mechanism having my invention incorporated therein, said firing mechanism being shown in its normal position;

Fig. 2, a view similar to Fig. 1 with the firing pin released from the detent ready to be projected by the actuating spring; and

Figure 3, a view similar to Fig. 2 with the firing pin fully projected.

Referring to the drawings A represents a gun of the wedge block type, and B, the breech block of the same. The block B is provided with a bore C which alines with the axis of the gun when the block is in closed position. The bore C is stepped adjacent its forward end to form a shoulder 10 and a reduced section 11. Forward of the section 11 the bore C is further reduced and shaped to provide a tapered section 12 in which the point of a firing pin is adapted to seat when such pin is projected to firing position. The rear end of the bore C is enlarged as at 13 and this enlarged portion detachably receives a plug 14 which closes the rear end of the bore, and is provided with a recess 15 forming a rearward continuation of said bore. I further provide this recess 15 with a lateral extension 16 for a purpose that will presently appear.

My improved firing mechanism is shown as comprising a projectile and retractile firing pin D, operating in the bore C and recess 15 and having a head 17, point or striker 18, and a shank or stem 19. Operating over the shank 19 is a spring sleeve 20 whose rear end forms a bearing for a spring 21 encircling the shank 19, the forward end of which spring bears against the head 17 of the firing pin. In other words, the spring 21 transmits its force in one direction to the firing pin and in the opposite direction to the sleeve 20. Bearing in the block B and plug 14 is a shaft 22 which has fixed on its lower end a firing lever 23 and on its upper end within the recess extension 16 an arm 24. This arm 24 is bifurcated to embrace the shank 19 of the firing pin. The extremities 25 of the arm 24 receives through the rear end of the sleeve 20 the force of the spring 21 in one direction, while the force of said spring in the opposite direction is

also transmitted to the arm 24 through the medium of lugs 26 formed on the rear end of the firing pin shank 19 and bearing on the other side of the arm and with a different leverage. It will now be observed by reference to Fig. 1 that the portions of the lugs 26 which engage the arm 24 are curved and as a result a rolling contact is provided which will permit the forward end of the firing pin to swing laterally, unless otherwise restrained. It will be further observed that the points of contact between the lugs 26 and arm 24 are at one side of the axis of the pin D, and as a result, the spring 21 will act, when the parts are in their normal position as shown in Figure 1, to move the forward end of the firing pin D behind the shoulder 10, so that the latter will serve as a detent to restrain the firing pin during a certain period of the operation of the mechanism.

With the parts in their normal position, as shown in Figure 1, the operation is as follows: The lever 24 is pulled to the rear by a lanyard or otherwise. The extremities 25 of the bifurcated arm 24 move the sleeve 20 forward, compressing the spring 21. Meanwhile the firing pin is held stationary by the shoulder or detent 10 until the forward end of the sleeve 20 acts directly on the firing pin head 17 and moves the pin out of engagement with the shoulder 10 (see Figure 2). Upon such release the firing pin flies forward under the influence of the compressed spring 21 and the striker 18 strikes and explodes the primer, the parts being then in the position shown in Figure 3. When the pull on the lever 23 is released, the spring through the sleeve 20 forces the arm 24 to the rear, when it encounters the lugs 26 on the firing pin. Since the spring 21 exerts equal pressures in both directions—rearwardly against the arm 24 and forwardly against the firing pin—the rearward pressure of the spring against the extremities 25 of the arm is equal to the forward pressure of the lugs 26 against an intermediate portion of said arm and they tend to move the arm in opposite directions, but as the point of application of the force at 25 is at a greater distance from the pivot of the arm 24 than that of the force at 26, the greater leverage predominates and the arm with the firing pin is returned to its normal position, when the spring 21 acts to move the head of the firing pin laterally to a position behind the shoulder or detent 10.

While in the present disclosure of my invention I have shown the block B and plug 14 as directly constituting a casing for certain portions of the mechanism, it will be apparent that such or all portions could be contained in a separate casing adapted to be detachably secured in a suitable recess in the block, or in the block carrier, if it is de-

sired to utilize the mechanism in association with a swinging screw block.

I claim:—

1. In a firing mechanism for guns, the combination with a firing pin; of mechanism for effecting the projection and retraction of the firing pin, a detent into engagement with which the firing pin is laterally movable when in a retracted position, spring means operable to both project the firing pin and to laterally move the same, when in a retracted position, into engagement with the detent, and means for disengaging the firing pin from said detent.

2. In a firing mechanism for guns, the combination with a firing pin; of mechanism for effecting projection and retraction of the firing pin, a detent into engagement with which the firing pin is laterally movable under the influence of another element of said mechanism when said firing pin is in a retracted position, and means for disengaging the firing pin from said detent.

3. In a firing mechanism for guns, the combination with a firing pin; of mechanism operating through the medium of a single spring to project and retract the firing pin, a detent into engagement with which the firing pin is laterally moved under the influence of said spring when said firing pin is in a retracted position, and means for disengaging the firing pin from said detent.

4. In a firing mechanism for guns, the combination with a firing pin; of mechanism operating through the medium of a single spring to project and retract the firing pin, a detent into engagement with which the firing pin is laterally moved under the influence of said spring when said firing pin is in a retracted position, and means acting directly on the firing pin to disengage the same from said detent.

5. The combination with a plunger; of a spring for actuating the plunger, means for energizing said spring to project said plunger, means operated by said spring to maintain the plunger normally retracted, a detent into engagement with which the plunger is laterally moved under the influence of said spring when said plunger is in a retracted position, and means for disengaging the plunger from said detent.

6. The combination with a plunger; of a fulcrumed arm adapted to retract said plunger; a spring actuating said arm to retract said plunger, said arm energizing said spring on its reverse movement, a detent into engagement with which said plunger is movable laterally under the influence of said spring when the plunger is in a retracted position, and means for disengaging the plunger from said detent.

7. The combination with a plunger, of a fulcrumed arm adapted to retract said plunger; a member engaging said arm, a

spring urging said member to act on said arm to retract said plunger and reacting on said plunger, a detent into engagement with which the plunger is laterally movable under the influence of said spring when in a retracted position, said arm energizing said spring on its reverse movement and operating said member into engagement with the plunger to disengage the latter from the detent.

8. In a firing mechanism for guns, the combination with a casing; of a projectile and retractile firing pin within the casing, mechanism for effecting projection and retraction of the firing pin, a shoulder formed on the interior wall of the casing into engagement with which the firing pin is laterally movable when in a retracted position, means operable to both project the firing pin and to laterally move the same, when in a retracted position, into engagement with the shoulder, and means for disengaging the firing pin from said shoulder.

9. In a firing mechanism for guns, the combination with a casing; of a projectile and retractile firing pin within the casing, mechanism for effecting projection and retraction of the firing pin, a shoulder formed on the interior wall of the casing into en-

gagement with which the firing pin is laterally movable under the influence of another element of said mechanism when said firing pin is in a retracted position, and means for disengaging the firing pin from said shoulder.

10. In a firing mechanism for guns, the combination with a casing; of a projectile and retractile firing pin, mechanism operating through the medium of a single spring to project and retract the firing pin, a shoulder formed on the interior wall of the casing into engagement with which the firing pin is movable under the influence of said spring when said firing pin is in a retracted position, and means for disengaging the firing pin from said shoulder.

11. The combination with a plunger; of mechanism for effecting projection and retraction of the plunger, a detent into engagement with which the plunger is laterally movable, when in a retracted position, under the influence of another element of the mechanism and disengageable from said detent by direct action of still another element of said mechanism.

In testimony whereof I hereunto affix my signature.

ABNER Y. LEECH, JR.