F. D. ELY.

FIREARM.

APPLICATION FILED MAY 8, 1907.

908,982.

Patented Jan. 5, 1909.

2 SHEETS—SHEET 1.

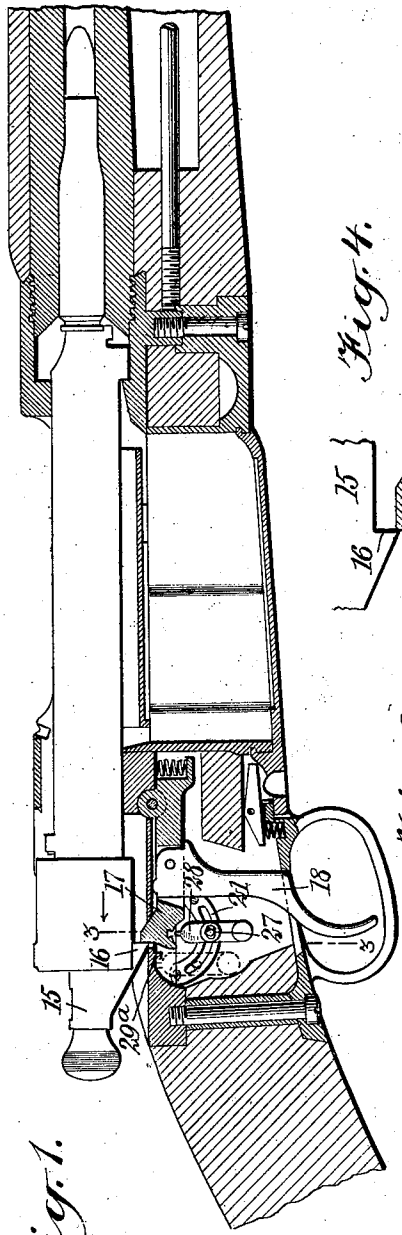


Fig. 1.

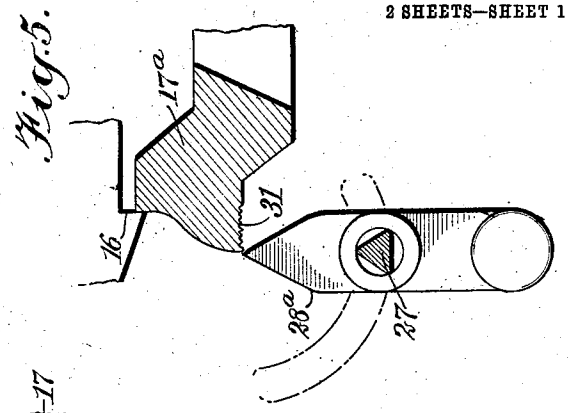


Fig. 5.

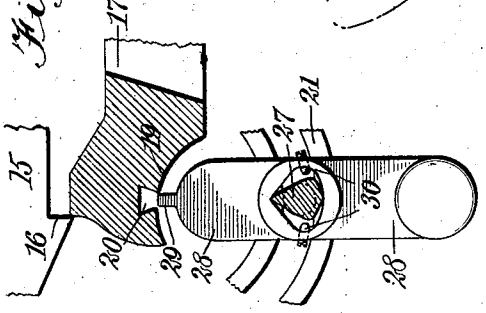


Fig. 4.

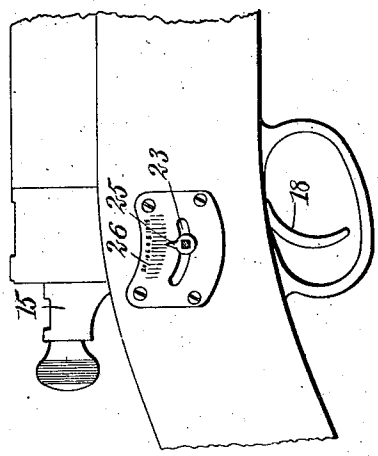


Fig. 2.

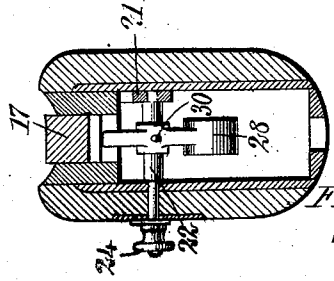


Fig. 3.

WITNESSES

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2 SHEETS—SHEET 2.

Fig. 10.

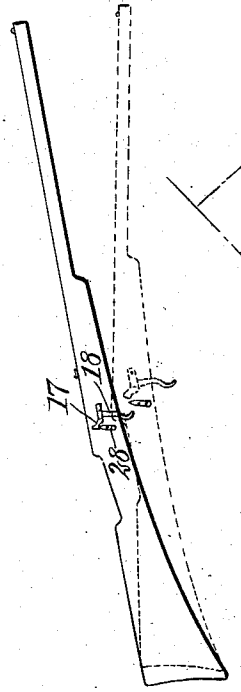


Fig. 11.

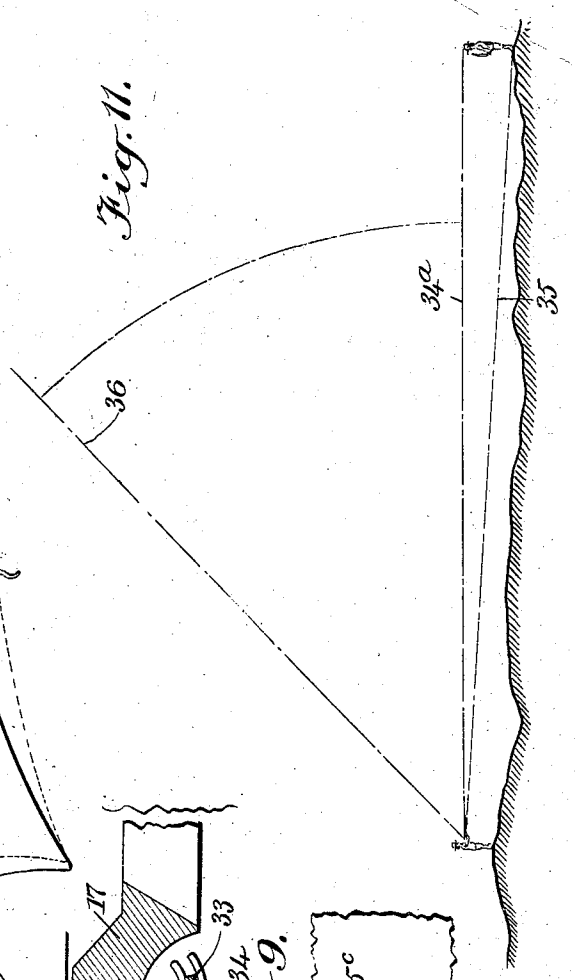


Fig. 8.

Fig. 9.

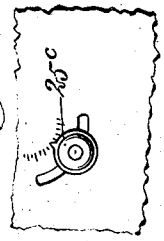


Fig. 6.

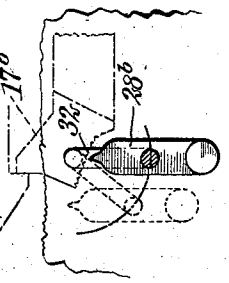
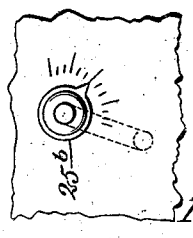


Fig. 7.



WITNESSES

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UNITED STATES PATENT OFFICE.

FRANK D. ELY, OF PLAINFIELD, NEW JERSEY.

FIREARM.

No. 908,982. Specification of Letters Patent. Patented Jan. 5, 1909.

Application filed May 6, 1907. Serial No. 372,599.

To all whom it may concern:

Be it known that I, FRANK D. ELY, a citizen of the United States, and a resident of Plainfield, in the county of Union and State of New Jersey, have invented a new and Improved Firearm, of which the following is a full, clear, and exact description.

This invention is an improvement in firearms, designed to prevent the firing of the rifle or other like weapon should it at the instant of attempted discharge, be held at an angle materially different from that previously determined upon as the desired angle of the piece on discharge.

The invention is of particular value in warfare since the practice of troops firing in battle is to fire too high; viz.,—well over the enemy, thus decreasing the efficiency of the fire and increasing the difficulty of supplying ammunition to the firing line.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a central, vertical section through the intermediate portion of a rifle with one embodiment of my improvement applied thereto; Fig. 2 is a fragmentary side view of the rifle shown in Fig. 1 illustrating the means for changing the angle at which the piece may be discharged; Fig. 3 is a section on the line 3—3 of Fig. 1 looking in the direction of the arrow; Fig. 4 is an enlarged detail view to better illustrate the nature of the invention; Fig. 5 is a view similar to Fig 4 showing a modified form of the invention; Fig 6 illustrates another form of the invention; Fig. 7 is a face view of the means for adjusting the relative position of that form of the improvement shown in Fig. 6; Fig. 8 is a fragmentary view showing a still further modified form of the invention; Fig. 9 is a face view of the adjusting means for the form of invention shown in Fig. 8; Fig. 10 is a side view of a rifle with my invention applied thereto, illustrating the action of the same in full lines when the piece is elevated at an angle above the line of effective fire and in dotted outline when the piece falls within this angle, and Fig. 11 illustrates the effective angle of fire and the wasted angle, the latter being included between the effective angle and the approximate limit of high fire.

In illustrating the nature, construction and operation of my improvements, I have shown the same applied to a well-known type of magazine rifle, this being adopted for the convenience of illustration only as it will be apparent as the description proceeds that the improvement is equally applicable to fire-arms of other constructions. The rifle shown comprises the usual firing-pin 15 having a shoulder 16 formed on its under face, which is engaged by a sear 17 when the rifle is cocked. The sear 17 is located within the lock-chamber and carries a trigger 18 which passes to the outside of the chamber and is ordinarily surrounded by the guard as shown. The rear or extended end of the sear 17 in that form of my invention illustrated in Figs. 1 to 4 inclusive, is constructed with a curved under face 19 with a recess 20, preferably of dovetail shape, located at a point intermediate its length.

Secured to one of the lock plates of the rifle or otherwise affixed within the lock chamber, is a slotted arc 21 which receives the squared inner end of a supporting pin 22. The opposite end of said pin projects through an arc-shaped slot 23 formed in the side of the piece in alinement with and of the same curvature as the slot in the arc 21, and is provided with a threaded extremity and an adjacent squared portion which respectively receive a thumb-nut 24 and a pointer 25, the latter traversing a graduated scale 26 formed at one side of the slot 23, when the pin is slid back and forth in the arc.

As best shown in Fig. 4, a portion of the pin 22 intermediate the locking plate is constructed with a knife-edge or other shaped bearing 27, said bearing being arranged radially with respect to the arc 21 and supporting a pendulum 28 which is weighted at its lower end and is provided with a lug or other projection 29 at its opposite and upper extremity, designed to enter the recess 20, on the discharge of the rifle. The pendulum 28 is preferably provided with adjusting screws 30 threaded therein at each side of the pin 22, to limit its oscillations. It is observed that the distance between the upper end of the projection 29 and the entrance to the recess 20 is slightly less than the length of the shoulder 16 engaged by the sear 17, when the piece is cocked. The entrance of the projection 29 into the recess 20 takes place at the instant prior to that in which the sear is disengaged from the bolt. At the instant of discharge of the rifle the

recess 20 always occupies exactly the same relative position with respect to the arc or other fixed point of the lock. The pendulum being free to swing, it is plain that it will always occupy a vertical position due to the force of gravity, and every point of the pendulum other than the point of suspension will constantly change its position relatively to the arc as the rifle is moved in azimuth either above or below a horizontal plane. If the muzzle of the piece is elevated, the projection 29 moves forward under the curved under face of the sear; or if the muzzle of the piece is depressed, the movement of the projection 29 is obviously in the opposite direction.

If it be desired to fire at any fixed angle of elevation, it is plain that by moving the point of suspension of the pendulum along the arc, by shifting the supporting pin 22, a point will be found at which the projection 29 of the pendulum will register with the recess 20. It is likewise apparent that should the angle of elevation or depression of the rifle at the instant of attempted discharge be in ever so slight a degree greater or less than the fixed angle referred to, the top of the pendulum will have moved respectively forward or rearward, carrying with it the projection 29 out of alinement with the recess 20 and preventing the discharge of the piece until the trigger is first released and the elevation of the rifle corrected.

The zero of the graduated scale 26 as shown in Fig. 2 is so positioned, that when the pointer 25 registers therewith the projection 29 and the recess 20 are in alinement when the barrel of the piece is horizontally disposed. Should it be desired to fire the piece in an elevated or depressed position, the pointer is slipped along the scale, carrying with it the supporting pin and the pendulum, until the graduation indicating the desired degree of elevation or depression is reached. The piece may then be discharged when it is brought to the angle determined upon.

If it is desired to use the piece in the ordinary manner, it is only necessary to slide the pendulum to the inoperative position at the rear of the sear, as disclosed in dotted outline in Fig. 1. A projection 29^a depending from the top of the lock chamber, prevents the swinging of the pendulum in the direction of the sear when the pendulum is in this position.

In Fig. 5 I have illustrated a slightly different form of my invention in which the extended rear end of the sear 17^a is constructed with a flat under face and provided with teeth 31 which are adapted to be engaged by the knife-edge extremity of a pendulum 28^a, the mounting and construction of the pendulum being otherwise substantially the same as that illustrated in Fig. 4. In this form of my invention the pendulum intercepts the sear only when the muzzle of the piece is elevated above the angle intended, the firing being possible when the rifle is directed either at or below this angle; in either case the top of the pendulum 28^a swings to the rear and out of the path of the toothed portion of the sear.

Fig. 6 shows a further modified form of the invention in which a pendulum 28^b is pivotally suspended by a link 32 from the lock plate or other fixed point within the lock chamber, the construction of the pendulum being substantially the same as the pendulum 28^a shown in Fig. 5. The sear 17^b in this form of the invention as shown in dotted outline, is provided with teeth arranged on an arc on the under face of its rear extremity, which are designed to be engaged by the pendulum in the same manner as in the construction shown in Fig. 5 should the muzzle of the piece be elevated above the intended angle, this angle being varied by the pointer 25^b traversing the scale at the outside of the lock plate.

In Fig. 8 is illustrated a still further modification of the invention, in which the sear 17 is provided at its rear extremity with a pendulum 28^c which is pivotally suspended therefrom and is adapted to engage with a member 33 slidably carried by the arc 21^c, the member having an intermediate recess or opening 34 which is designed to serve in the same capacity as the recess 20 in the sear 17 of Fig. 4 and prevent the discharge of the piece only when it is directed at the angle indicated by the pointer 25^c located at the outside of the lock plate, as shown in Fig. 9.

The invention is more especially designed to be used in warfare, in which case ordinarily the captain will observe the enemy through his clinometer and read the angle of elevation or depression. To the angle so determined he adds or subtracts the angle of sight and announces the result to his command. The soldier, by turning the thumb-nut 24 on the outside of the lock plate can set and lock the pointer at the proper figure on the scale which will carry the pendulum to the required relative position to point of firing the piece at the angle just determined. With the pendulum secured in this position, by tightening the thumb-nut 24, the entire fire of the rifle when discharged by the soldier, will pass within the effective angle included between the lines 34^a and 35 shown in Fig. 11, and will therefore intersect the enemy and will not pass in the angle included between the lines 34^a and 36, which is the wasted angle, the line 36 indicating the present approximate limit of high fire.

While I have shown several different constructions embodying my invention and carrying the principles of the same into effect practically, it is, nevertheless, apparent that

the construction may be otherwise considerably modified within the scope of the annexed claims.

Having thus described my invention I claim as new and desire to secure by Letters Patent:

1. In a firearm, a firing pin, a sear adapted to engage with the firing pin, a pendulum for preventing the release of the sear except when the firearm is disposed in a predetermined angular position, and means for shifting said pendulum whereby said angular position at which the arm may be discharged may be varied.

2. In a firearm, a firing pin, a sear adapted to engage therewith, a pendulum suspended under the sear and operating to prevent the release of the sear from the firing pin except when the firearm is disposed in a predetermined angular position, and a pointer adapted to traverse a scale for indicating the angular position at which said arm must be disposed to admit of the release of the sear from the firing pin.

3. In a firearm, a firing pin, a sear adapted to engage with said pin, and pivoted means having its center of gravity normally below its point of suspension for engaging with the sear and preventing the release thereof from the firing pin except when the firearm is disposed in a predetermined angular position.

4. In a firearm, a firing pin, a sear adapted to engage with said pin, means movably mounted under the sear for engaging therewith to prevent the release of the sear from the firing pin, except when the firearm is disposed in a predetermined angular position, and means for varying the angle at which the firing pin may be released.

5. In a firearm, a pendulum unimpeded in its movement relatively to the arm within certain limits and having means coöperating therewith for automatically controlling the vertical angle of fire.

6. In a firearm, a pendulum unimpeded in its movement relatively to the arm within certain limits and having means coöperating therewith for preventing the firing of the arm except when it is disposed at a predetermined angle with respect to the vertical.

7. In a firearm, a firing pin, a sear adapted to engage with said pin, and a pendulum freely suspended under the sear and adapted to engage therewith and prevent the release of the sear from the firing pin, except when the firearm is disposed in a predetermined angular position.

8. In a firearm, a firing pin, a sear adapted to engage with said pin, a pendulum suspended at a point intermediate its length having a weighted lower end and adapted to engage directly with the sear and prevent the release thereof from the firing pin, except when the firearm is disposed in a predetermined angular position.

9. In a firearm having a lock chamber, a firing pin, a sear located within the chamber adapted to engage with said pin, and a pendulum within the chamber located under the sear for engaging directly therewith to prevent the release of the sear from the firing pin, except when the firearm is disposed at a predetermined angle with respect to the vertical.

10. In a firearm, a pendulum having means coöperating therewith for automatically controlling the vertical angle of fire, and provided with a laterally movable axis.

11. In a firearm, a pivoted member having means coöperating therewith for controlling the vertical angle of fire, and means carried by said member operating in connection with its pivot to limit it in its oscillations.

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

FRANK D. ELY.

Witnesses:
W. W. Holt,
John P. Davis.