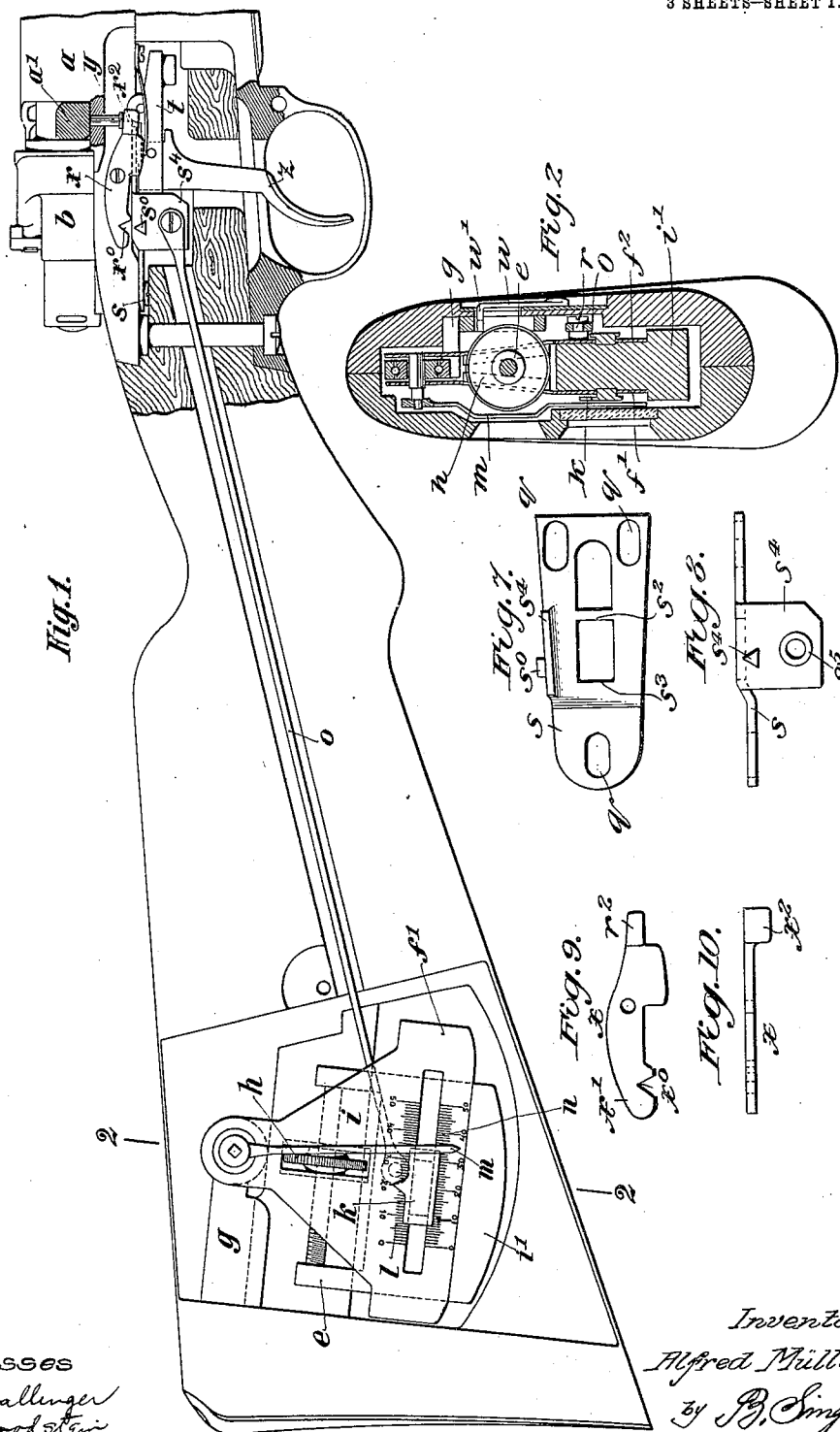


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APPLICATION FILED APR. 13, 1910.

1,058,886.

Patented Apr. 15, 1913.

3 SHEETS—SHEET 1.



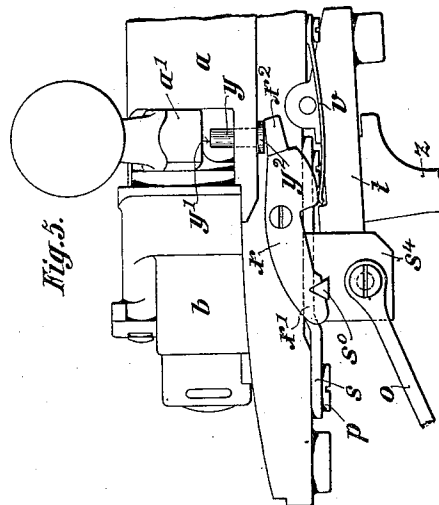
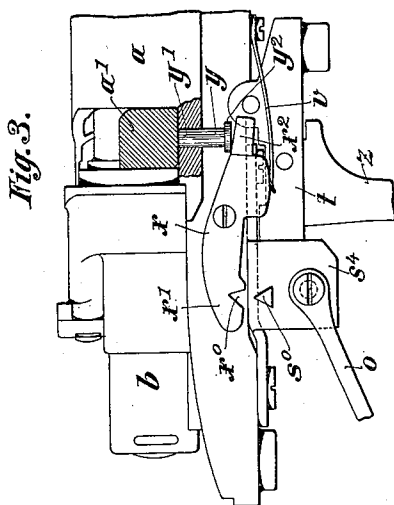
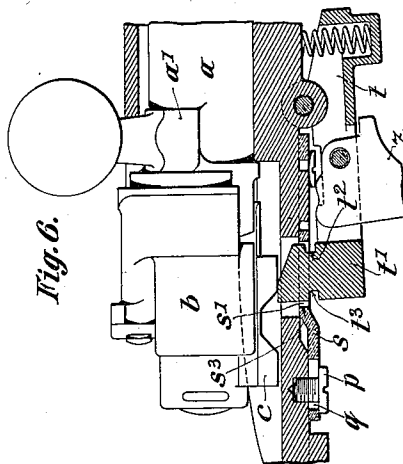
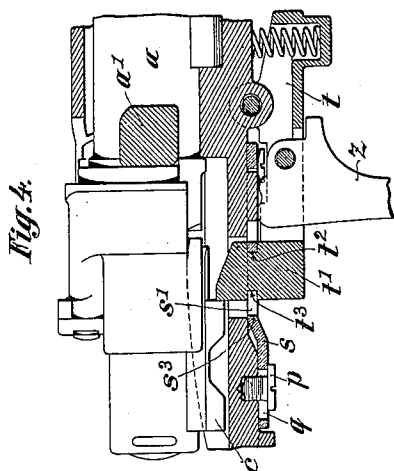
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

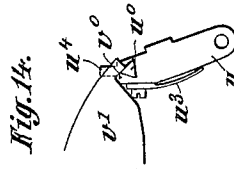
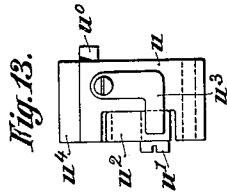


Fig. 12.

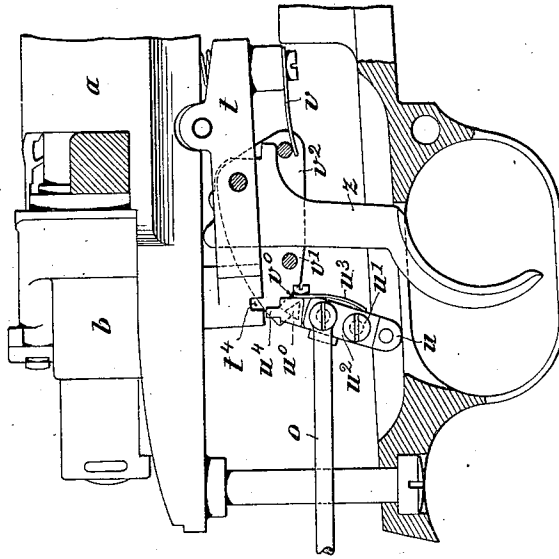
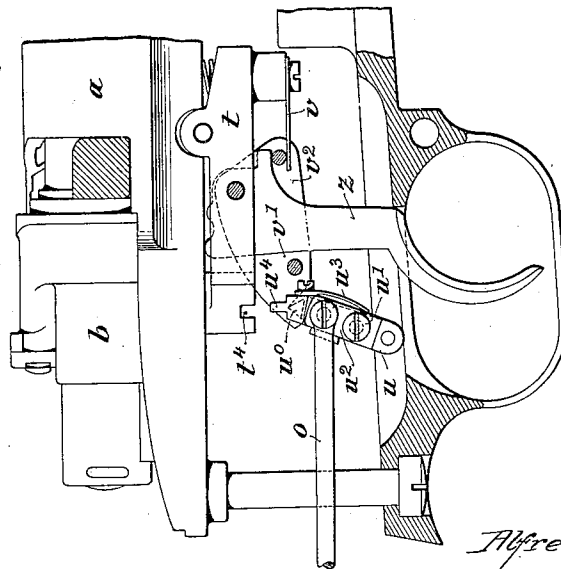


Fig. 11.



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UNITED STATES PATENT OFFICE.

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FIRING MECHANISM FOR FIREARMS.

1,058,886.

Specification of Letters Patent.

Patented Apr. 15, 1913.

Application filed April 13, 1910. Serial No. 555,211.

To all whom it may concern:

Be it known that I, ALFRED MÜLLER, retired major, a subject of the King of Prussia, residing at No. 95 Berlinerstrasse, Charlottenburg, near Berlin, in the Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Firing Mechanism for Firearms, of which the following is a full, clear, and exact description.

The invention relates to firing mechanism for fire-arms of all kinds in which firing (that is to say the release of the trigger and percussion mechanism) is only possible when the fire-arm is aimed in the proper direction corresponding to the range and the nature of the district. In this connection it is known to combine with the firing mechanism a locking device acted upon by a special adjusting mechanism and which temporarily holds the trigger and which is automatically released when the weapon is correctly aimed (elevation or depression of the mouth of the fire-arm) by the action of a part previously suitably set by the adjusting mechanism, preferably a weighted lever.

The present invention has for its object an exceedingly simple arrangement of firing mechanism in accordance with this known principle in which in addition to the simplicity, which could not be so completely attained with the devices heretofore constructed, assures absolute locking of the trigger not only for every position of elevation not corresponding with the mark but also every position of depression. This is extremely important because it is only by such an arrangement that absolute certainty that the shot can only be fired at the proper elevation of the fire-arm is insured. With the devices heretofore constructed this certainty of preventing firing in a position of depression also was either non-existent or else was only attainable by means of complicated devices, while by means of the extremely simple device embodying the present invention such locking is insured in both directions, that is to say, above and below the correct line of fire.

An embodiment of the invention is illustrated by way of example in the accompanying drawing in which:

Figure 1 shows the rear part of the fire-arm with the firing mechanism in longitudinal elevation, the trigger or the trigger rod being locked by engagement from the front

as is the case in the elevated position. Fig. 2 is a vertical cross section on the line 2—2 in Fig. 1, showing the mounting of the pendulum and the arrangement for fixing the locking device in the inoperative position. Figs. 3 and 4 show the lock with the firing mechanism in the same position as in Fig. 1, to a larger scale, Fig. 3 showing the parts in longitudinal elevation and Fig. 4 in section. Figs. 5 and 6 are similar representations to Figs. 3 and 4 showing the position of the locking members in case the fire-arm is to be used independently of the locking mechanism as heretofore, that is to say, without utilizing the means for firing only in the proper line of fire. Figs. 7 and 8 show the locking slide in underneath view and in side elevation. Figs. 9 and 10 show the operating lever for adjusting the locking slide in the middle position in inside elevation and top view. Fig. 11 is a view partly in section and partly in elevation showing a modified form of my invention with the parts in one position. Fig. 12 is a view similar to Fig. 11 showing the parts in another position. Fig. 13 is a detail front elevation of the part *u* shown in Fig. 11. Fig. 14 is a side elevation, looking in the opposite direction to the direction in which Fig. 12 is viewed, showing the operative connection between parts *v'* and *u*.

As is the case with the known devices, as regards the general principle, the arrangement is such that a locking device is provided in combination with the firing mechanism and which is acted upon by a sight adjusting mechanism; this locking mechanism locks the trigger which is released automatically as soon as the axis of the bore of the fire-arm reaches the correct position, that is to say, the position corresponding to the range and the nature of the district for which the adjusting mechanism has previously been set.

In the present case the pendulum *i* is utilized as the operating and releasing member; this pendulum is adjustable by the setting mechanism *e h* and is connected with the locking device in such a manner that on depressing the fire-arm and the proper elevation is reached the pendulum releases the locking device, that is to say, the locking member is caused to occupy the position in which firing is possible.

Now in accordance with the present invention a slide *s* is arranged beneath the cartridge ledge of the breech casing to serve

as the locking member; according as the fire-arm occupies the elevated or depressed position, that is to say, a position above or below the correct line of fire, this locking member holds the nib t^1 of the sear t by engagement from the front or from the rear, thereby rendering firing impossible. At the moment at which the fire-arm reaches the proper elevation the slide is released from its locking position, that is to say, is adjusted in such a manner that both the front edge s^2 and the rear edge s^3 of its recess s^1 are free of the nib and the latter is able to move downward unimpeded when the trigger is pulled so that the percussion mechanism can become operative.

In the present case the locking device has been shown adapted to the known Mauser lock by way of example; in this case the sear nib in the cocked position comes in front of the firing pin head c of the breech cylinder; in Figs. 3 and 4 the parts are shown in the position in which the front edge s^2 of the slide s engages in a notch or shoulder in the nib t^1 thereby preventing its displacement and consequently the pulling of the trigger and the actuation of the percussion mechanism. In the other cases when the firearm has been depressed below the correct line of fire the slide would be adjusted in such a manner, that the rear edge s^3 of its recess engages with the corresponding rear recess t^3 of the nib t^1 and thereby produces locking in this depressed position. The slide s which of course can be replaced by any other suitably constituted part is in the present construction arranged immediately beneath the ledge of the breech casing and held by screws p , the corresponding slots q in the slide through which the screws pass being of such a size that the displacement of the slide forward and backward is limited to the necessary amount. Laterally the slide is provided with a shield s^4 with which a rod o pivoted to the pendulum and passing forward through a corresponding passage in the stock engages.

An eye s^5 is provided on the shield s^4 enabling the front end of the rod to be rotatably fixed. By means of an eye the rear end of the rod engages a stud r mounted on the rear side of the hindmost of the two mountings and scale plates $f^1 f^2$ inclosing the pendulum proper i^1 and carrying the adjusting mechanism $e h$. In this manner the adjusting mechanism and the pendulum are combined to form a single operative part which by means of a central ball bearing is rotatably suspended on the base plate g arranged at the rear in a recess in the rear stock. The range indicator m is mounted in the usual manner on the front side of the pendulum and on the same pivot; this indicator together with its scale n on the lower side of the front plate f^1 serves for finding

the adjustment of the pendulum suited to the range for the time being. As heretofore, the upper of the scale l serves for the final adjustment of the pendulum for the marksman; the index k directly connected with the pendulum is provided for the scale l . Now in order to permit of opening the bolt a , in any position, that is to say, to release the nib so that the nose c of the cocking head b is able to slide over the nib t^1 , adjusting mechanism is provided, the active adjusting member of which positively sets the slide in the middle position when the breech is opened, that is to say when the breech bolt is rotated; in this position neither the front nor the rear edge of the recess s^1 engages the nib which is therefore free to move. In the present case this active adjusting member is a spring controlled lever x rotatably mounted laterally on the ledge of the breech casing and which normally, that is to say, when the breech is closed, is held in the inoperative raised position by a pin y passing through the breech chamber rail (Fig. 3). At its rear end the lever x is provided with an angular recess x^o which corresponds with a nose s^o provided on the plate s^4 of the slide s . The recess and the nose are formed in such a manner that when upon the opening of the breech, the front end x^2 of the lever is rocked upwardly, under the pressure of the spring v , the chamfered face of the recess x^o engages the chamfered face of the nose and continuing to descend, by the sliding of the faces one upon the other, imparts to the slide a forward or rearward movement according to its previous adjustment thereby causing it to assume the middle or intermediate position in which the nib is released (Figs. 5 and 6). The loading can proceed unimpeded by the trigger member which is temporarily locked. Now in order to adapt the fire-arm to be used permanently, as before, independently of the trigger lock, that is to say, without the necessity for adjusting the firing mechanism in the aiming position before firing, provision is made for permanently retaining the slide in its intermediate position in which the trigger or the trigger nib is released. This permanent retention of the slide is preferably effected in the present case by the permanent retention of the pendulum i which when the correct elevation is reached produces the automatic release of the locking device, that is to say, directly causes the adjustment of the slide in the intermediate position.

Another simplified construction of the firing mechanism is illustrated in Figs. 11 to 14. In this construction the slide s is replaced by a pivoted member, that is to say, a rotary lever u , which when occupying an incorrect position, say too far forward or too far rearward, engages the sear t by its

free end u^4 or some other shoulder thereby rendering complete firing, that is to say, the release of the trigger nib from the breech nose, impossible; when, on the other hand, this lever occupies its correct position by entering a recess t^4 it permits of the free movement of the sear. With this object the pivoted lever u is rockably mounted beneath the sear, preferably in the trigger guard and like the slide is directed from the pendulum through a rod o . In order to absorb the recoil the arrangement is such that the rod o engages a special intermediate part u^2 rotatable about the stud u^1 , the spring u^3 screwed onto the upper end of the lever affording the resilient support (Fig. 13).

Now in order that the firearm may be used independently of the trigger lock in the ordinary manner, the arrangement here adopted is such that not only when opening the breech, as in the first construction, but also on releasing the trigger, that is to say, in adjusting the trigger tongue in the normal position, the rotary lever u is automatically set in the intermediate or released position (Fig. 11). With this object in view a bell crank lever $v^1 v^2$, subjected to the action of the spring v is suspended on the sear and like the lever x in the first construction a recess v^o of the rear lever arm v^1 engages over a lateral projection u^o on the lever u , thereby maintaining it positively set in the released or intermediate position (Fig. 11) so that the opening of the breech and the loading of the firearm can be effected without impediment.

The difference as compared with the first construction is that while in said construction this positive adjustment of the locking slide is effected on opening the breech, in the present case the locking lever assumes the released position when the trigger is released, that is to say, in the normal position of the trigger. Adjustment corresponding to the pendulum is given to the lever only when the trigger is pulled, whereby the bell crank lever $v^1 v^2$ is displaced upward so that the lever nose u^o is free from pressure and consequently the lever u is free to assume its adjustment corresponding to the elevation or depression as shown by way of example in Figs. 12 and 14. Obviously in this construction, as in that previously described, the pendulum can be fixed independently, preferably in the position in which the locking lever u is also situated in the intermediate or released position. An especially important feature of this construction is the arrangement that one part of the locking device, in the present case the locking lever u , is divided or is yieldingly resilient so that it is able to absorb the recoil, thereby relieving

various parts serving as engaging members and also the pendulum.

It will be apparent that the construction of the firing mechanism in accordance with the present invention is so simple that it can be utilized without difficulty not only for all existing military firearms but also for hand firearms of all kinds and likewise for larger weapons, guns and so forth.

What I claim as my invention and desire to secure by patent is:

1. In a firearm, the combination with a firing pin, a sear and bolt handle, a pendulum, means operated by the pendulum for preventing or permitting release of the sear in accordance with the angular position of the firearm, and mechanism controlled by the bolt handle for locking said means in a non-acting position with respect to said sear.

2. In a firearm, the combination with a firing pin, a sear and a bolt handle, a pendulum, means operated by the pendulum for preventing or permitting release of the sear in accordance with the angular position of the firearm, and mechanism controlled by the unlocking movement of the bolt handle for moving said means into and locking said means in a non-acting position with respect to said sear.

3. In a firearm, the combination with a firing pin, a sear and a bolt handle, a pendulum, means operated by the pendulum for preventing or permitting release movement of the sear in accordance with the angular position of the firearm, and a cam lever operatively controlled by the bolt handle for moving said means into and locking said means in a non-acting position with respect to said sear, said means having a cam portion arranged for coöperation with said lever.

4. In a firearm, the combination with a firing pin, a sear therefor having projections, a pendulum, and a slide operatively connected with the pendulum and having portions to engage the projections of said sear to prevent or permit movement of the sear according to the angular position of the firearm.

5. In a firearm, the combination with a firing pin, a sear therefor having oppositely disposed projections, a pendulum, and a slide movably mounted beneath said sear and having shoulders arranged and disposed for engagement with said sear projections to prevent or permit movement of the sear according to the angular position of the firearm.

In testimony whereof I affix my signature in presence of two witnesses.

ALFRED MÜLLER.

Witnesses:

ROBERT MICHELSKI,
WOLDEMAR HAUPT.