

A. MÜLLER.
FIRING MECHANISM FOR FIREARMS.
APPLICATION FILED MAR. 20, 1908.

956,593.

Patented May 3, 1910.
2 SHEETS—SHEET 1.

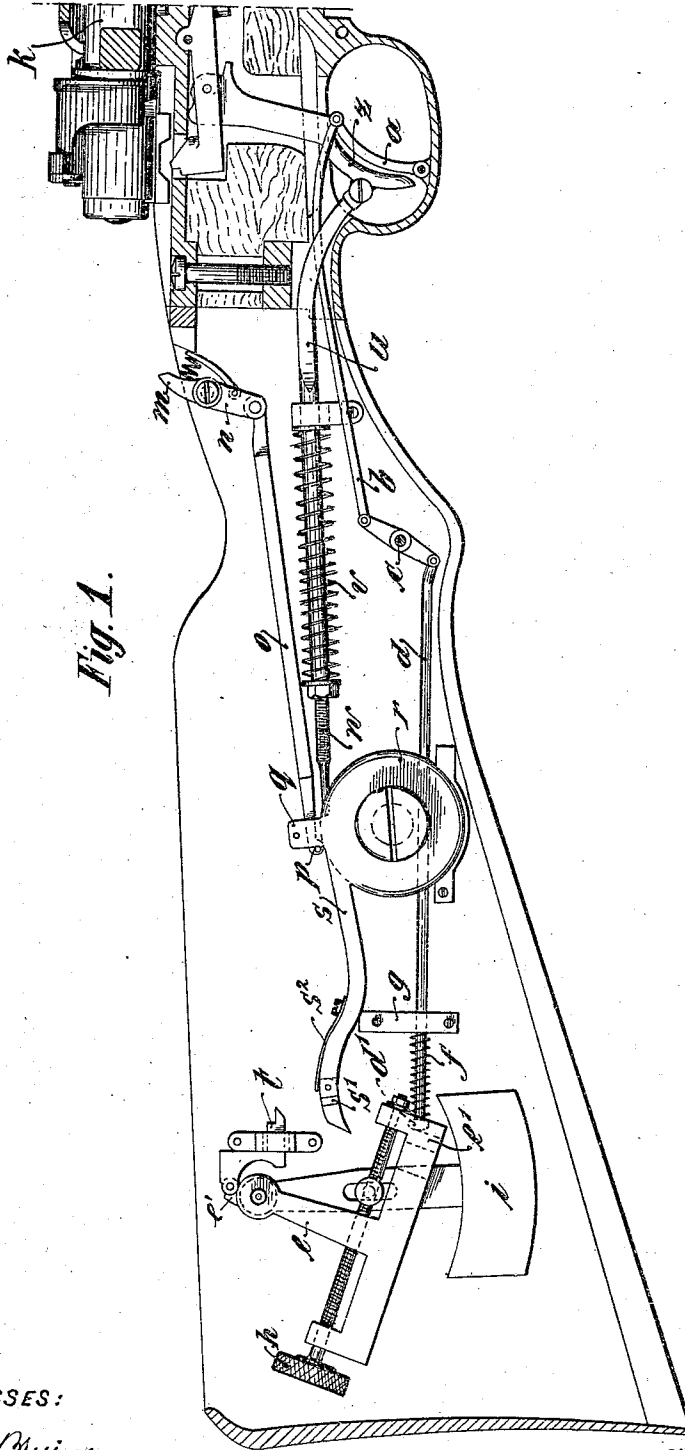


Fig. 1.

WITNESSES:

Rene' Duine
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INVENTOR:

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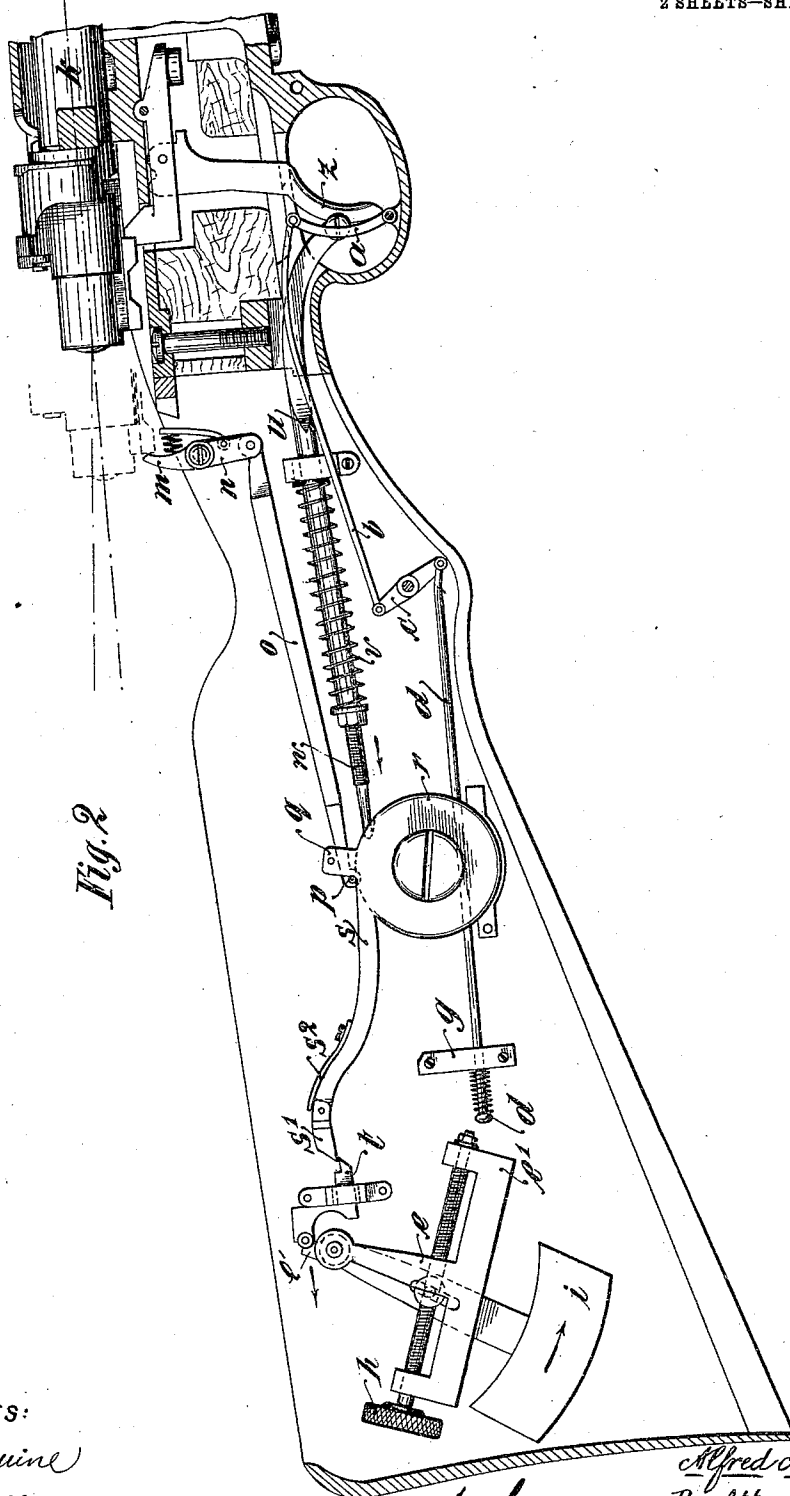


Fig. 2

WITNESSES:

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UNITED STATES PATENT OFFICE.

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FIRING MECHANISM FOR FIREARMS.

956,593.

Specification of Letters Patent.

Patented May 3, 1910.

Application filed March 20, 1908. Serial No. 422,337.

To all whom it may concern:

Be it known that I, ALFRED MÜLLER, retired major, a subject of the German Emperor, residing at Domaine Ruhleben, near Spandau, in the Empire of Germany, have invented new and useful Improvements in Firing Mechanisms for Firearms, of which the following is a specification.

This invention relates to improvements in automatic device for discharging firearms and especially military guns, which device can only come into action when the firearm reaches the proper aiming position when lowering the firearm with the muzzle in conformity with the actual distance and angle, and certain discharging devices of that kind in which the automatic release of the locked trigger, that is to say, the firing off, is effected by means of a part (for instance a weighted lever or tumbler) previously adjusted by the adjusting mechanism.

Discharging apparatus of the general type is already known, for instance in the German Patents Nos. 179,443 and 181,705. In the constructions shown in these patents the automatic firing takes place by means of a cocking mechanism and a locking device, and intermediate parts and moving members. The firing does not, however in the constructions take place in all cases instantaneously at the moment the central axis of the weapon has reached the correct position corresponding to the distance and trajectory for which the sighting mechanism has been previously adjusted.

Now the present invention has for its object in the first place, while simplifying the respective mechanisms, to so organize the coöperation of the latter that the release of the locking device and the pull of the trigger always take place instantaneously when the part causing the release is in the releasing position. For this purpose, the said part is so directly connected with that part of the locking device, whose displacement enables the disengagement of the locking device and the pulling of the trigger to be effected, that at or about the same time as the releasing position is reached by the operative member (weighted lever etc.) the corresponding part of the locking device may also assume the disengaged position. It is immaterial whether the part causing the release is a falling member or an oscillatory weighted lever after the manner of a pendu-

lum on which the present construction is based.

The invention is shown by way of example in the accompanying drawing.

Figure 1 represents the position of the parts after the release of the weighted lever or after the pulling of the trigger, thus in the discharged state; Fig. 2 represents the locking device in action before pulling the trigger, thus before the weighted lever, which effects the release, has entered into action again.

In the present construction, with regard to setting the firing mechanism into operation, the arrangement is such that the mechanism (cocking and locking parts) affecting the pull of the trigger is automatically adjusted in its operative position (cocked and locked position) by means of the locking member when loading the firearm. For this purpose, the double lever *m n* forming the adjusting arm of the cocking and locking mechanism is adapted to oscillate at the rear end of the path of the breech bolt in such a manner that when withdrawing the breech bolt or the chamber *k*, the lever *m n* and the respective mechanism are brought into the cocked and locked position. With regard to the sight adjusting mechanism, the arrangement in the present construction is such that the adjusting or operating mechanism *e h* directly effects the adjustment of the oscillatory weighted lever or pendulum *i* to the proper level.

Now according to the present invention, the central actuating member of the locking and cocking mechanism is a pivoted disk *r* which carries the locking arm *s* and its periphery forms the abutment or support for the spring-controlled rod *u* connected directly with the trigger *z*. The coöperation of the disk *r*, arm *s* and rod *u* is such that when cocking or throwing the locking and cocking mechanism into gear, the oscillation of the double lever *m n* will cause the disk to rotate in one direction and thereby adjust the rod *u* in the locking position of the trigger. For this purpose, the front end of the rod *u* is linked to the trigger tongue, while its rear end *v* engages with a point or the like in the periphery of the disk *r*. The engagement is maintained by the spiral spring *v* on the rod *u*, which spring is tensioned in the locked position and when slackened after the release of the locking de-

vice, it withdraws the rod *u*, thereby causing the trigger to be pulled. This pulling movement takes place as soon as the firearm has assumed the proper level *i. e.*, when the weighted lever *i* has effected the release and as hereinafter described, the disk *r* rotates in an opposite direction to that when cocking, so that the rod *u* will be moved rearward by the spring *v* and effect the pulling of the trigger. For the purpose of producing the instantaneous action, there is connected to the oscillatory weighted lever *i* a catch device or supporting lever *t* which acts as an abutment in the locked position for the adjusting arm *s* of the locking mechanism. The said adjusting arm is integral with the disk *r*. The connection between the weighted lever *i* and the supporting lever *t* is made through the medium of a lever *e* to the shorter arm *e'* of which the lever *t* is jointed, and the relation of which to the lever *i* is variable by means of an adjusting screw *h*. When adjusting the firearm to the proper level, the supporting lever *t* is also positively subjected to such an action through the displacement of the weighted lever *i* that when the firearm assumes the proper level and the lever *i* is in the required position for the release, the supporting lever *t* has already been withdrawn to such an extent that the adjusting arm *s* deprived of the support is free and can return to the released position. The rearward movement of the rod *u* effects the aforesaid rotation of the disk *r* in an opposite direction to that during the cocking operation, the corresponding moving impulse being imparted by the spring *v* which also withdraws the rod *u* simultaneously with the rotation of the disk *r* so that the rearward movement of the arm *s*, the rotation of the disk *r* and the withdrawal of the rod *u* *i. e.* the pulling of the trigger, take place simultaneously and instantaneously with the adjustment of the weighted lever *i* in the firing position. It may also be stated that the rotation of the disk *r* into the cocked and locked position is effected from the lever *m n* by means of a rod *o*, the rearward end of which bears with a pin-like abutment *p* against a projection *q* of the disk *r*. Moreover, this rod *o* is capable of a sliding movement so that when the disk *r* is turned into the cocked and locked position, the rod *o* may simultaneously return with the lever *m n* to the original or normal position, while the disk *r* remains in the cocked and locked position as the locking arm *s* bears upon the supporting lever *t*. The locking arm *s* has at its rear end a hinged dog *s'* which is under the action of a spring *s''*, which yields during its upward movement to pass above the tooth of the lever *t*.

For avoiding an arbitrary release of the cocking and locking mechanism in the event

of non-firing or in order to prevent manipulations with the loaded firearm and the weighted lever *i* from getting into the released position, a special safety device is provided, whereby the weighted lever or another corresponding part of the respective mechanism can be locked temporarily. In the present case, the arrangement is such that the safety device is always automatically adjusted in the locked position so that a special manipulation will be necessary each time the firearm is loaded, whereby when it is not intended to fire, the arbitrary release is prevented when manipulating the firearm. For the sake of simplicity, the arrangement of the safety device is such that the part, which is to be actuated for unlocking, is located in the trigger guard before the trigger so that for the purpose of firing (for pulling the trigger) it is only necessary to actuate this operative member by pressing it back and thereby to release the lever *i*. In the construction as shown, the safety device consists of the lever mechanism *a b c d* the front lever member *a* being adapted to oscillate in the trigger guard. The rod *d* has at its rear end a shoulder or a button *d'* which may enter a recess *e'* of the guard or lever *e* of the sight adjusting means to which the weighted lever *i* is coupled by the screw *h*. The rod *d* has at its rear end a spiral spring *f* which holds the lever mechanism *a b c d* in the locking position. When the rod *d* is thrust rearwardly (Fig. 1) its end *d'* abuts against the part *e* and thus prevents the parts *e i* from moving forwardly, and hence prevents the lever *t* from moving to release the arm *s*.

The operation of the present mechanism is as follows:—When the breech bolt or the chamber *k* is withdrawn the latter strikes against the lever *m n* in such a manner that the lever oscillates and the disk *r* is caused to rotate by means of the rod *o* whereby the adjusting arm *s* connected with the disk *r* engages the supporting lever *t* linked to the oscillatory weighted lever *i*. When adjusting the firearm to the proper level the supporting lever *t* is also positively subjected to such an action through the displacement of the weighted lever *i* that when the firearm assumes the proper level and the lever *i* is in the required position for the release, the supporting lever *t* has already been withdrawn to such an extent that the adjusting arm *s* deprived of the support is free and can return to the released position. By the springing downward of the arm *s* the before mentioned disk *r* is caused to turn in the opposite direction to that of the cocking, the moving impulse being imparted by the spring *v*, which simultaneously with the turning of the disk *r* also draws back the rod *u*, so that the springing downward of

the arm *s*, the turning of the disk *r* and the drawing back of the rod *u*, that is to say, the firing, takes place simultaneously and instantaneously with the adjustment of the weighted lever *i* into the firing position.

The described operation can only take place if the front lever member *a* is withdrawn (Fig. 2) otherwise the displacement of the weighted lever *i* is arrested by the shoulder or button *d'* provided at the rear end of the rod *d*. Immediately the front lever mechanism *a* is set free the spiral spring *f* pushes the lever mechanism in the locked position, that is to say, the weighted lever cannot oscillate and the firearm cannot be fired (Fig. 1).

The adjusting screw *h* connecting the parts *e*, *i* serves to adjust the weighted lever for several angles. In Fig. 1 for instance the weighted lever is adjusted for another angle than in Fig. 2. This adjustment depends on the predetermined angle of elevation in which the discharging of the firearm is desired.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a firearm, the combination of a rotatable disk having a locking arm, a rod, a spring for moving said rod rearwardly, a trigger connected with said rod, said disk being in one position adapted to hold said rod in its locked position, a breech bolt and

means adapted to be operated by said breech bolt for turning said disk to its locking position, a catch device for holding said disk in its locked position and a gravity operated mechanism for releasing said catch device.

2. In a firearm having a gravity operated mechanism for controlling the firing of the cartridge when said firearm reaches a given elevation, a safety mechanism adapted to prevent the arbitrary release of said controlling mechanism when it is not intended that the latter shall act, and means for adjusting said safety mechanism to its locking position automatically.

3. In a firearm having a gravity operated mechanism for controlling the firing of the cartridge when said firearm reaches a given elevation, a safety mechanism adapted to prevent the arbitrary release of said controlling mechanism when it is not intended that the latter shall act, means for adjusting said safety mechanism to its locking position automatically, and a finger operated device at or near the trigger guard for releasing said safety device.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

ALFRED MÜLLER.

Witnesses:

WOLDEMAR HAUPT,
JOHANN DYE.