

(No Model.)

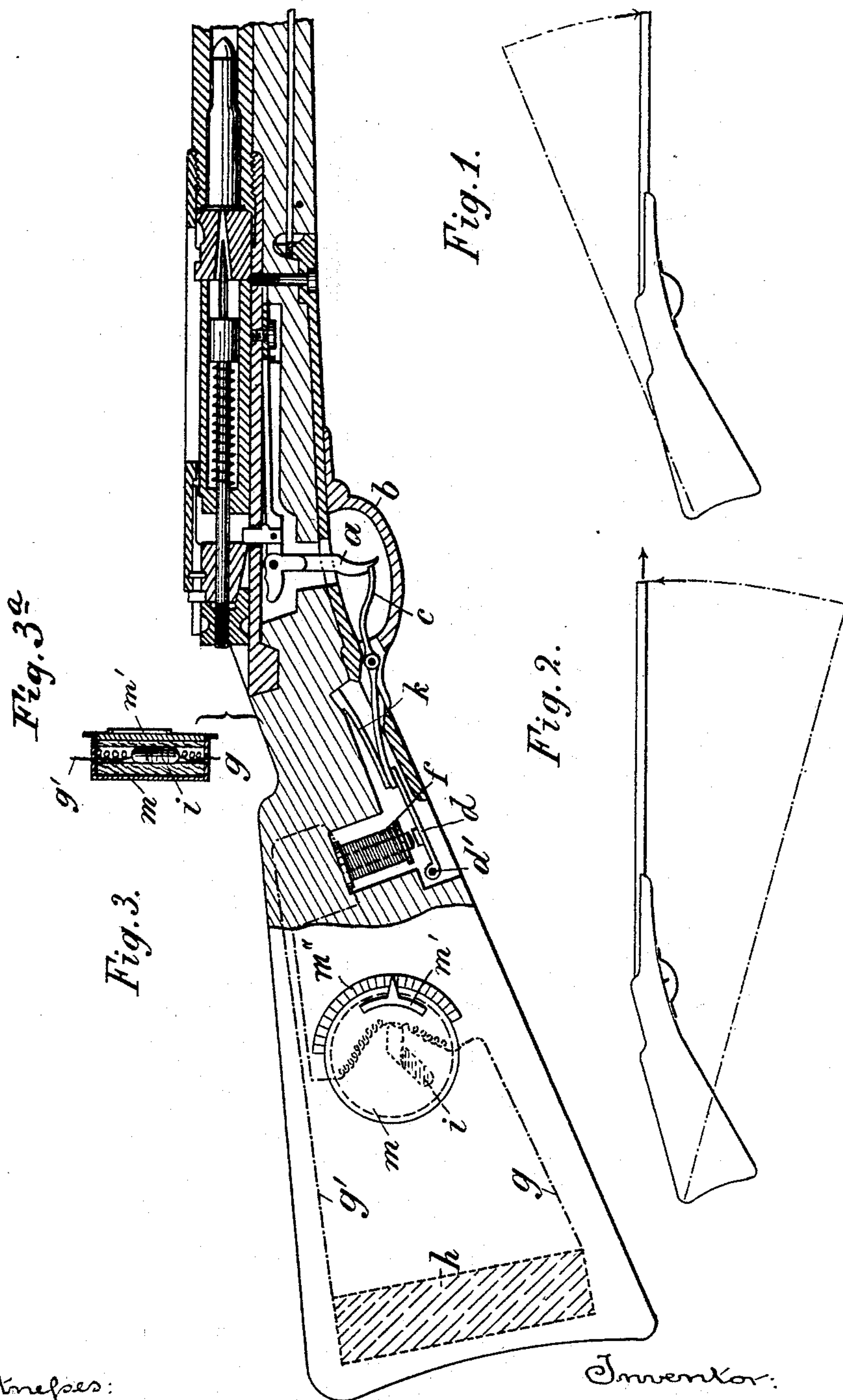
2 Sheets—Sheet 1.

A. VON DÉRSCHAU.

ELECTRICALLY CONTROLLED LOCK FOR FIRE ARMS.

No. 439,055.

Patented Oct. 21, 1890.



Witnesses:

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

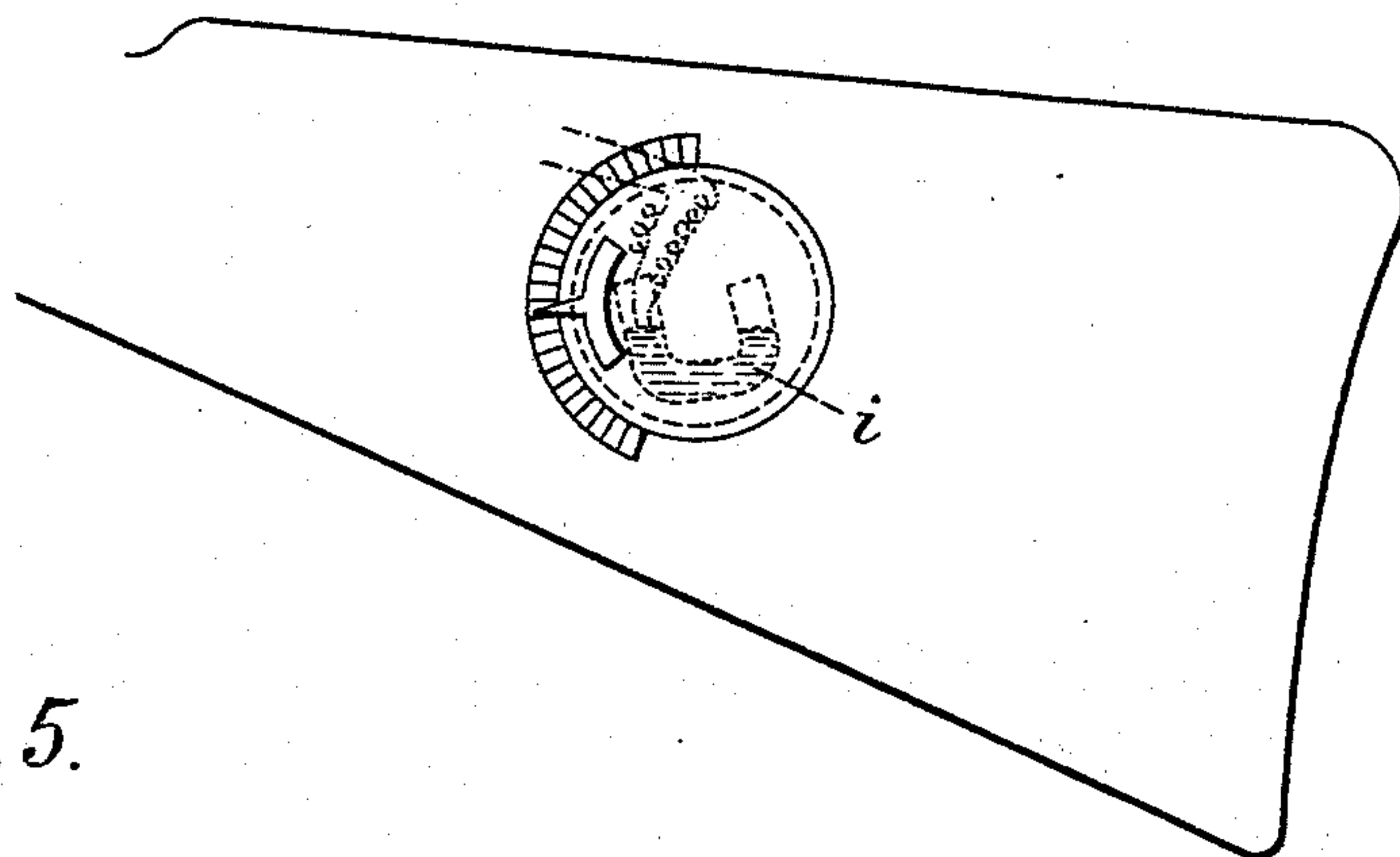


Fig. 5.

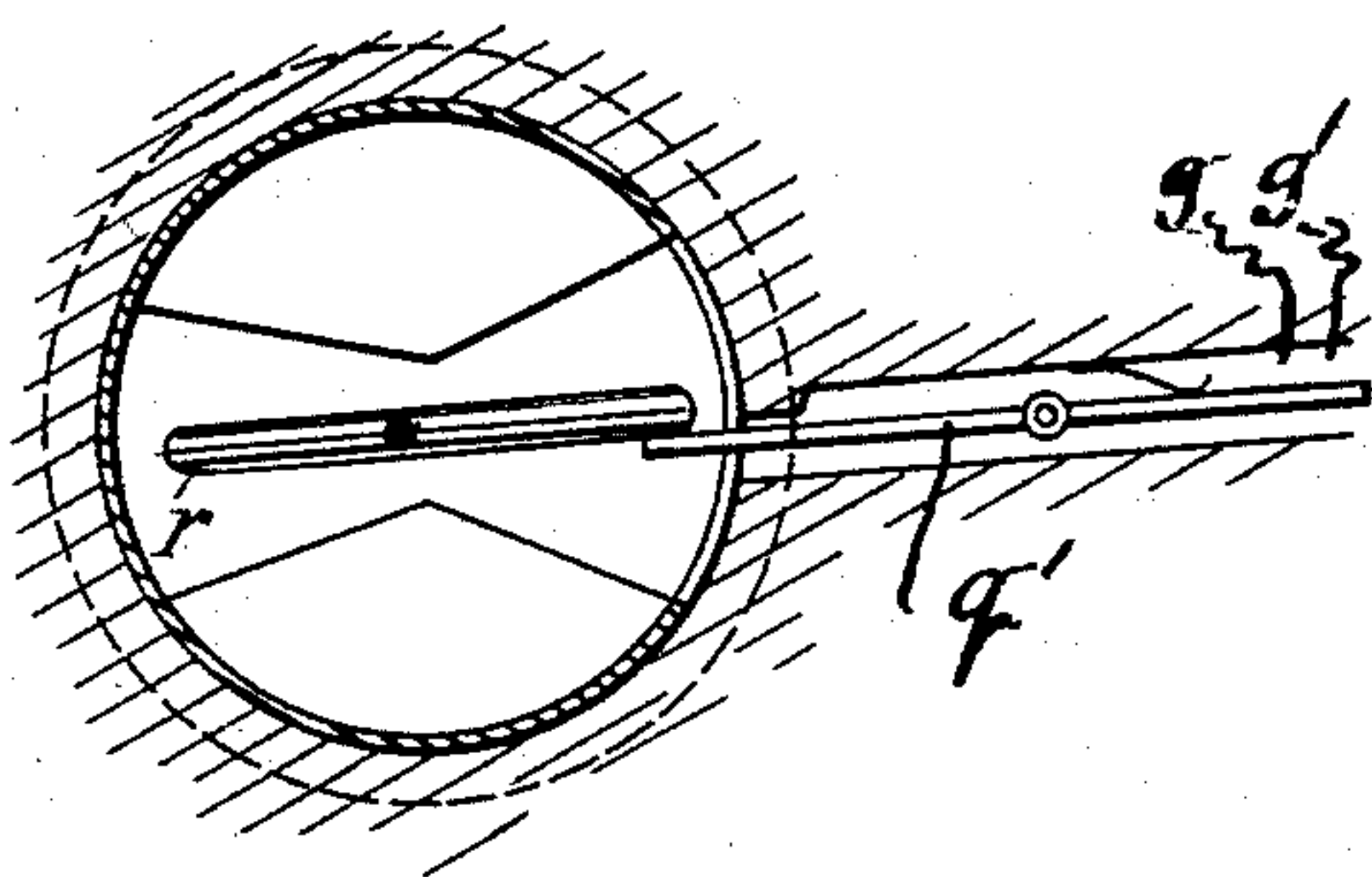
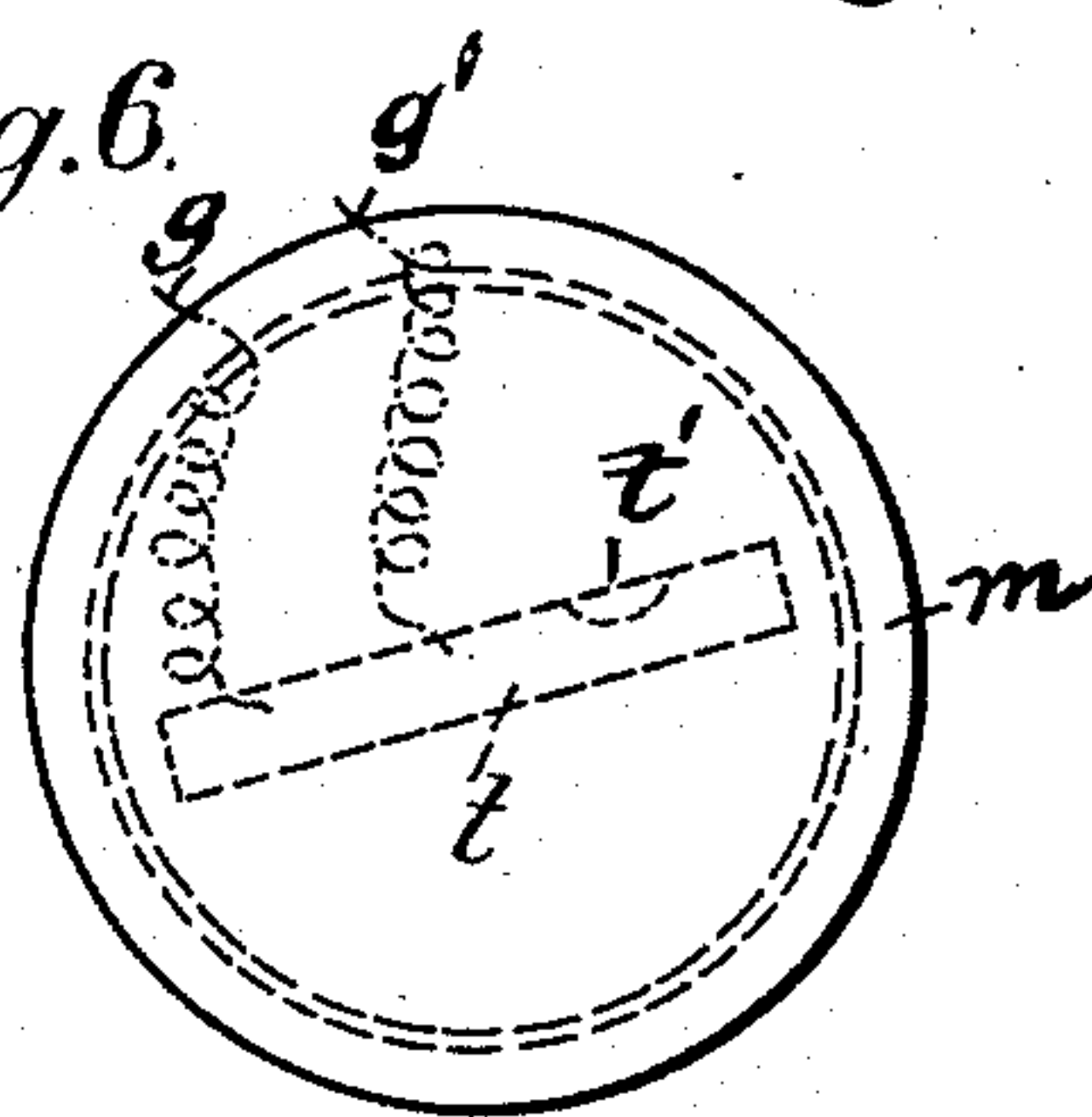


Fig. 6.



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UNITED STATES PATENT OFFICE.

ALBERT VON DÉRSCHAU, OF EMDEN, GERMANY.

ELECTRICALLY-CONTROLLED LOCK FOR FIRE-ARMS.

SPECIFICATION forming part of Letters Patent No. 439,055, dated October 21, 1890.

Application filed November 5, 1888. Serial No. 289,979. (No model.)

To all whom it may concern:

Be it known that I, ALBERT VON DÉRSCHAU, a subject of the King of Prussia, German Empire, and a resident of the city of Emden, Prussia, Empire of Germany, have invented certain Improvements in Fire-Arms, of which the following is a specification.

My invention relates to that class of fire-arms and ordnance wherein a gravity-controller is employed to effect the discharge of the gun at a given angle of elevation of the barrel when the gun is elevated or depressed by the soldier or gunner. Such devices have been applied to ordnance, the discharge being effected automatically through the medium of electricity when the firing circuit is closed by the elevation or depression of the gun to the predetermined angle.

My invention relates to small-arms in the main, and the object of my invention is to provide a trigger stop or lock which is controlled by an electrical gravity device in such a manner that the trigger cannot be drawn back and the piece discharged except when the muzzle is elevated or depressed to a predetermined vertical angle.

My gravity-controller is preferably made adjustable, in order that the angle or position at which the piece may be discharged may be varied at will.

My invention will be fully described hereinafter, and its novel features carefully defined in the claims.

In the accompanying drawings, illustrative of my invention, Figures 1 and 2 are merely diagraphic views illustrating the purpose of the invention. Fig. 3 is a sectional elevation of a "Mauser" rifle provided with my improvements, and Fig. 3^a is a detached transverse section of the main portion of the electrical gravity-controller employed in said rifle. Figs. 4, 5, and 6 are more or less fragmentary views illustrating different forms of the electrical gravity-controller.

In firing a gun at a distant object the muzzle of the weapon must be either elevated or lowered—that is, elevated from a horizontal position, as seen in Fig. 1, or lowered from a horizontal position, as seen in Fig. 2. The object of the device, which I will now describe with reference to Figs. 3 and 3^a, is to keep the trigger of the gun locked or estopped from operating

until the barrel of the gun shall have reached a position or angle which corresponds to the initial trajectorial angle of the bullet or projectile. When this position shall have been reached, the trigger will be unlocked or freed by the gravity-controller, and the gun can be fired by the pressure of the finger resting in readiness on the trigger. Hence the height of the object to be fired at need not be considered.

Fig. 3 illustrates the well-known Mauser rifle, and it will not be necessary to describe its firing mechanism any further than to say that it is discharged by a pull on the trigger *a*, which is arranged, as usual, within a trigger-guard *b*. The drawings show the gun "cocked." I will now describe my improvements as applied to such a gun.

c is a lever pivoted in the guard or at its plate. One end of this lever rests behind the trigger *a* and acts as a stop to prevent the trigger from being pulled. A spring *k* bears on the opposite or inner end of lever *c* and holds its outer end normally elevated and in position behind the trigger. The inner end of the lever *c* rests on the free end of an armature-lever *d*, pivoted at *d'* in a hollow in the gunstock. This lever *d* bears the armature of an electro-magnet *f*, also housed in the gunstock. When this magnet is excited and attracts its armature, the armature-lever *d* raises the inner end of the lever *c*, thus depressing the outer end of said lever below the trigger and freeing the latter. The wires *g g'* of the magnet *f* connect with the opposite poles of an electrical generator *h*, which may be an accumulator, dry battery, or the like, housed within the gunstock. There is a break in the circuit formed by the wires *g g'*, and the breaking and closing of this circuit is effected by the device I shall now describe. In the stock of the gun is mounted a bent glass tube *i*, partially filled with mercury, and the ends of the circuit-wires are passed into the upper or higher end of this tube and sealed therein, preferably, by heating the glass. When the gun is elevated or depressed (as the case may be) so as to cause the mercury to flow to the end of the tube where the wires are placed, it will close the electric circuit. In Fig. 3 the arrangement shown is such that when the muzzle of the gun is depressed the

mercury which fills the pendent branch will overflow and run along the horizontal branch to the wires, and thus establish a metallic connection between them. This excites the magnet f and relieves or frees the trigger.

If the rifle is held in a perpendicular or obliquely elevated position, with the index-finger pressed upon the trigger, and the muzzle is then gradually lowered until the barrel reaches a horizontal or nearly horizontal position, it will be seen that at a predetermined point in the movement a drop of mercury in the tube i will overflow into the branch thereof, and thus close the circuit between the terminals. At this instant the trigger a will be freed by means before described, and the pressure on the trigger will at once discharge the arm. The bullet, of course, will be governed by the well-known principles—that is to say, its range will be determined by the force of the explosion and the angle of elevation, and as my device renders the latter uniform, it follows that all the shots will strike at the same height. All deviation will be in a lateral direction.

In order to be able to vary the angle of elevation at which the firing may be effected the tube i is secured in a box m , pivotally mounted in the gunstock. I prefer to make this box cylindrical and fit it to turn in a correspondingly-shaped recess in the stock. Fig. 3^a shows the box m in transverse section. In order that the extent of rotation of the box m may be known, and this movement nicely adjusted, I provide the box with a pointer or index m' on its outer face, which plays over graduations m'' on the stock or on a plate set therein.

By the rotary adjustment of the casing m in its recess or seat (in which it should fit snugly so that it may not rotate too easily) the position of the bent tube i may be so changed with reference to the axis of the gun-barrel as to cause the mercury to close the electrical circuit at any desired elevation in firing within limits.

It is not necessary to give the tube i the form shown in Fig. 3. In Fig. 4 a U-shaped tube i is shown. When this form of tube is employed, a float may be arranged in the tube to rest on the mercury therein, and this float may carry a metal contact-piece which is adapted to touch both wires and close the circuit.

In Fig. 5 the gravity device for controlling the discharge consists of a tube r , pivoted in a recess in the stock and partly filled with liquid, preferably mercury. The longer branch of this pivoted tube rests upon the end of a pivoted operating-lever q' . When the weapon is so depressed as to cause the mercury to flow to the longer end of tube r , the inner end of lever q' will be depressed by the weight of said tube and the outer end of said lever will be elevated into contact with the wires g g' of an electric circuit, thereby connecting them electrically and closing the circuit. The

oscillations of the tube r may be limited by stops in any desired manner.

Fig. 6 illustrates a gravity-controller adapted for use when working on a closed circuit, and the circuit is to be broken at the moment of discharge. In this construction a straight tube t is mounted in the casing m and nearly filled with mercury so as to leave a bubble t' of air. The wires g and g' tap the tube and normally stand in contact with the mercury therein. When the gun is elevated or depressed until the bubble t' moves to a position that will free the wires from contact with the mercury, the circuit will be broken and the trigger released.

The gravity-controller, as represented in the drawings, requires that the gun shall be lowered to fire it. If it be desired that the gun shall be elevated in order to effect the discharge, it will be obvious that the gravity devices in the stock of the gun should be reversed in position.

I have shown a number of variations in the form of my electrical gravity-controller; but others of an equivalent character may as well be employed.

My controlling device replaces in a great measure the sights on the gun, and it has the important advantage that it insures precision in range and is independent of vision or sight. Therefore it may be employed in many cases for night firing where the range has been previously obtained. The lateral aim might be determined where necessary by other means. For night firing at sappers' heads my improvement offers important advantages; also for firing from behind high works, with the gun elevated to a considerable extent, it insures great accuracy where the firing would otherwise be at random.

Having thus described my invention, I claim—

1. The combination, with a gun having a trigger to effect the discharge, of the movable stop behind the trigger to prevent it from being drawn back, the displacing-lever, which displaces said stop and frees the trigger, and an electrical gravity controlling mechanism, substantially as herein described, which actuates said displacing-lever when the gun is placed at a predetermined angle, all arranged to operate substantially as set forth.

2. The combination, with a rifle or similar small-arm, of a discharge-controlling electric circuit within the gunstock, an electrical generator within said stock and forming a part of said electric circuit, and a gravity-controller mounted in said stock, said controller consisting of a bent tube containing mercury fixed in a box pivotally mounted in the gunstock and adapted to be rotated in order to effect the adjustment of said bent tube, one of the conductors of said circuit extending into the hollow of said tube and having a break within the latter adapted to be closed by the mercury therein, as set forth.

3. The combination, with a gun having a

trigger to effect the discharge, of the movable stop arranged behind the trigger to prevent it from being drawn back, the armature-lever having its free end arranged in operative
5 connection with said stop, whereby the movement of said lever displaces said stop, the armature borne by said lever, the electro-magnet, with its pole adjacent to said armature, the electrical generator, the electric circuit connecting said generator with the coils
10 of said magnet, and the gravity circuit breaker and closer in said circuit, all of said elements being mounted on the gun and arranged to operate as set forth.

15 4. The combination, with a gun having a trigger for effecting the discharge, of the stop *c*, in the form of a lever with its forward end arranged behind the trigger, the spring *k*,

which holds said stop in its locking position, the armature-lever, the free end of which 20 takes under the rear end of lever-stop *c*, the armature borne by the armature-lever, the electro-magnet *f* in position to attract said armature when excited, the electrical generator, the circuit connecting the generator 25 with the coil of magnet *f*, and the gravity circuit breaker and closer in said circuit, all arranged to operate substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of 30 two subscribing witnesses.

ALBERT VON DÉRSCHAU.

Witnesses:

B. ROI,

A. VOGT.