

Aug. 18, 1931.

F. C. H. HANSEN

1,819,954

AUTOMATIC SHOOTING MACHINE

Filed June 26, 1929

5 Sheets-Sheet 1

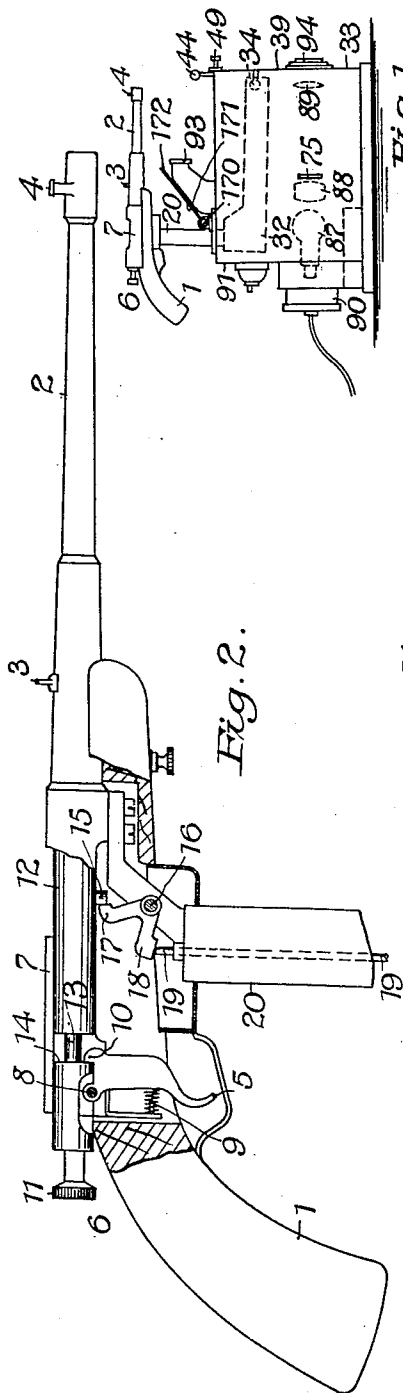


Fig. 2.

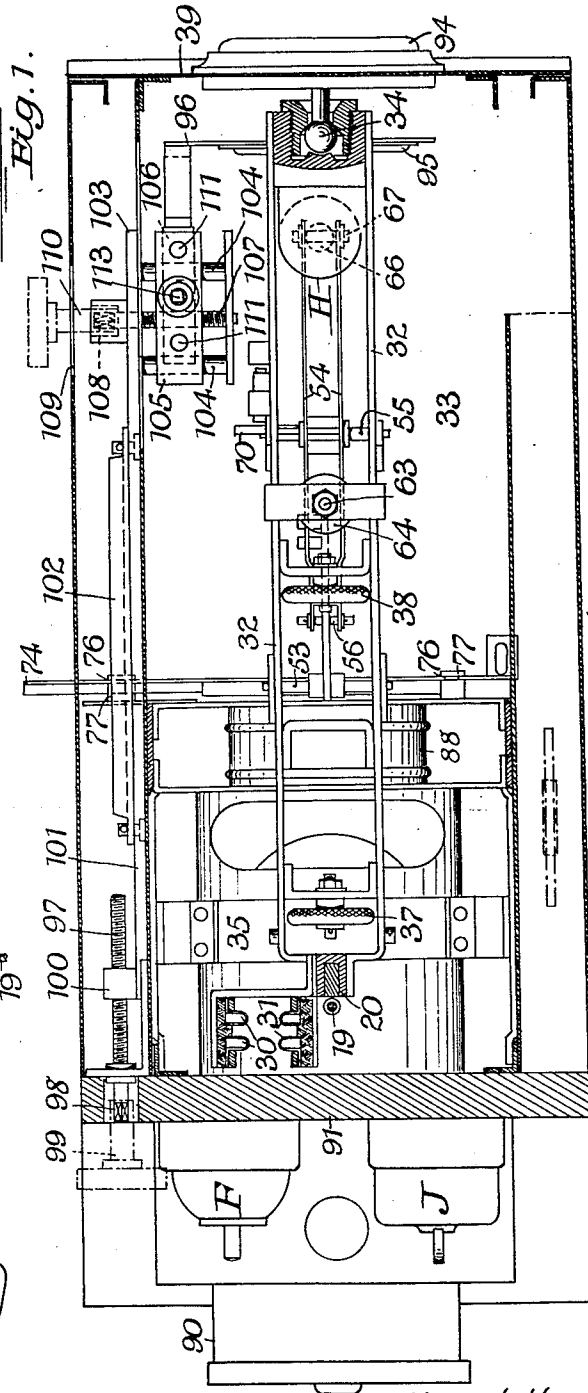


Fig. 4.

7. C. H. Hansen
INVENTOR
By: Maurice
ATTY.

Aug. 18, 1931.

F. C. H. HANSEN

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5 Sheets-Sheet 2

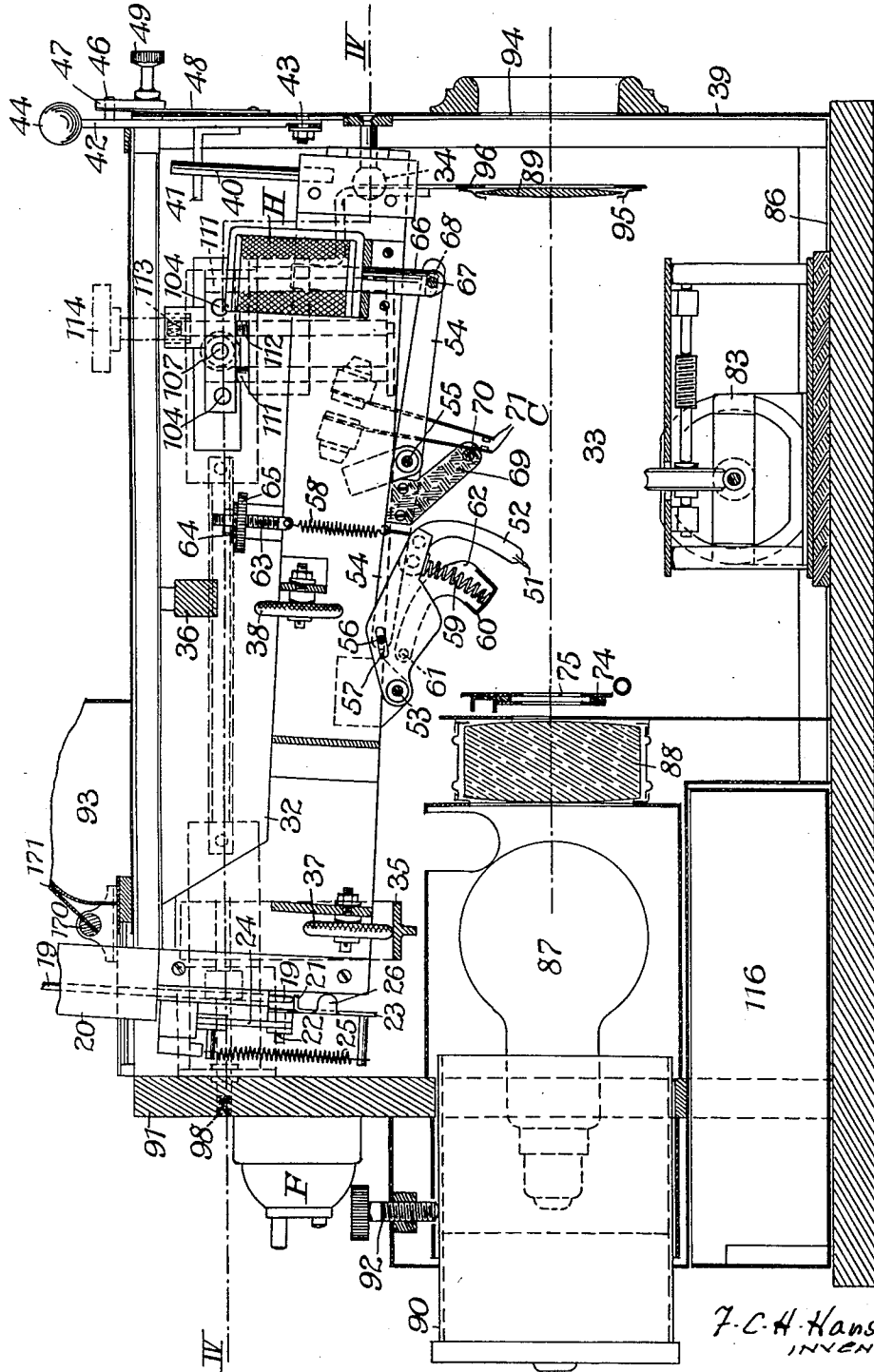


Fig. 3.

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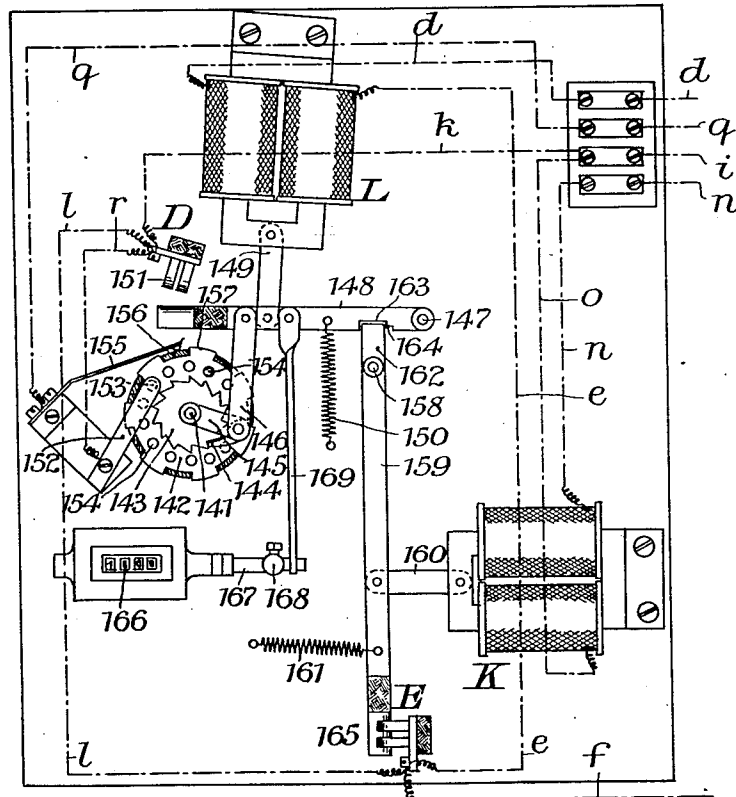
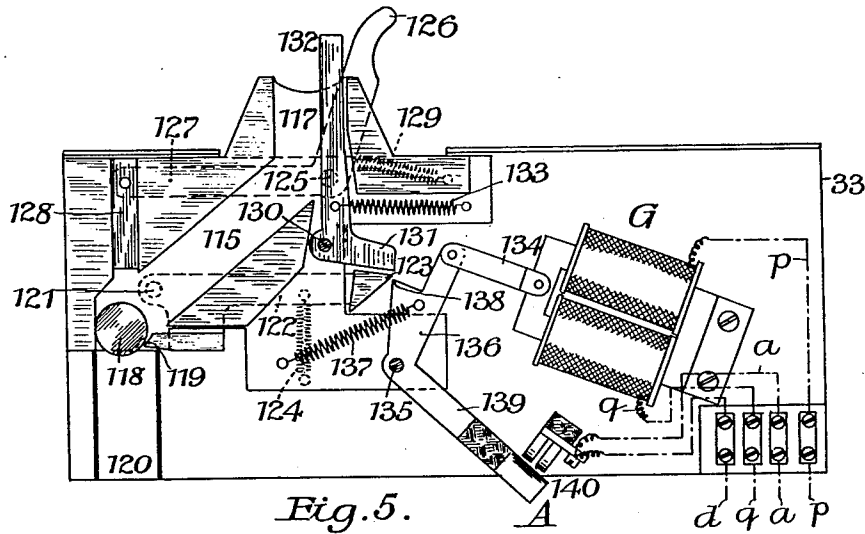
F. C. H. HANSEN

1,819,954

AUTOMATIC SHOOTING MACHINE

Filed June 26, 1929

5 Sheets-Sheet 3



F. C. H. Hansen
INVENTOR
BY: Mails & Co.
ATTYS.

Aug. 18, 1931.

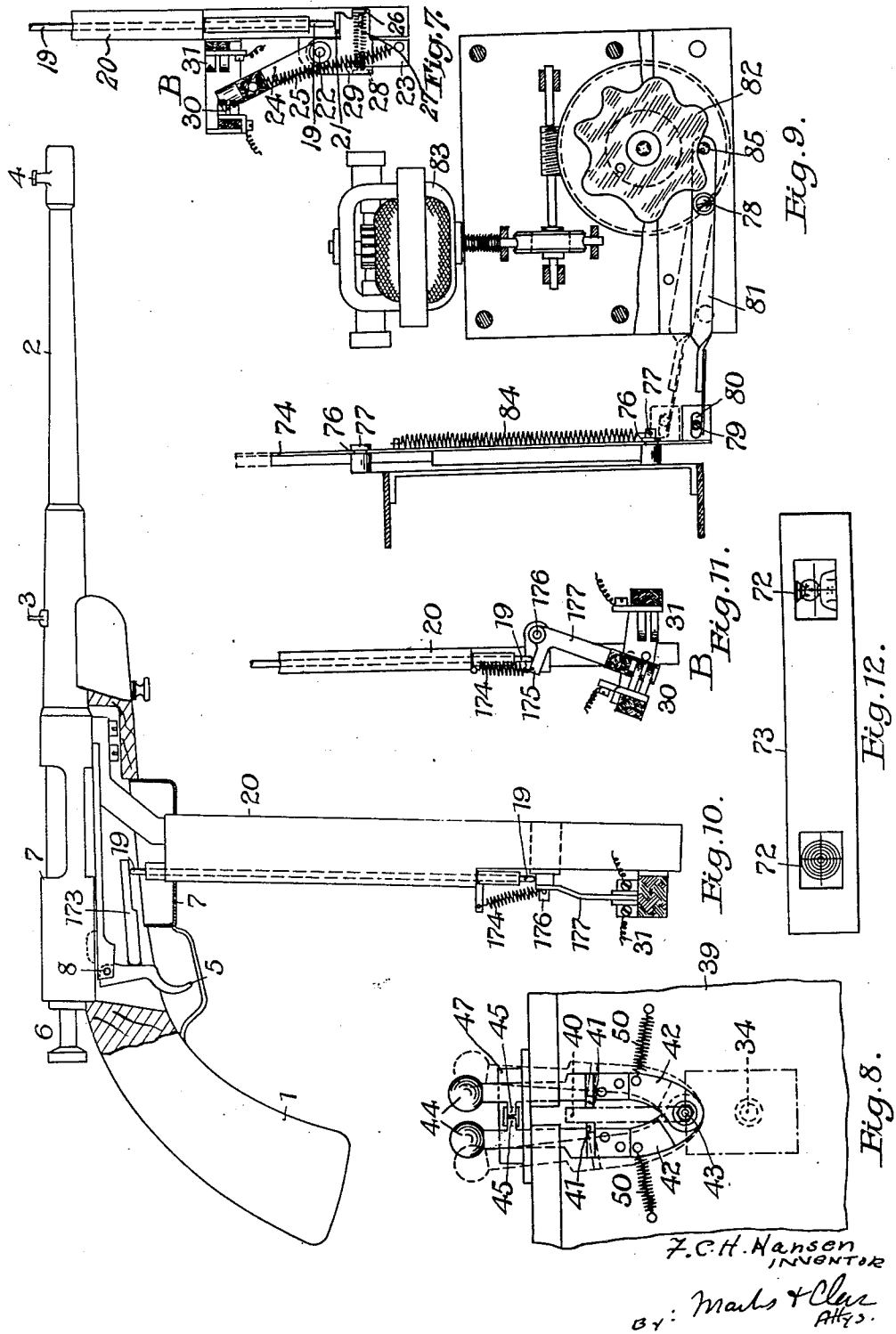
F. C. H. HANSEN

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F. C. H. HANSEN

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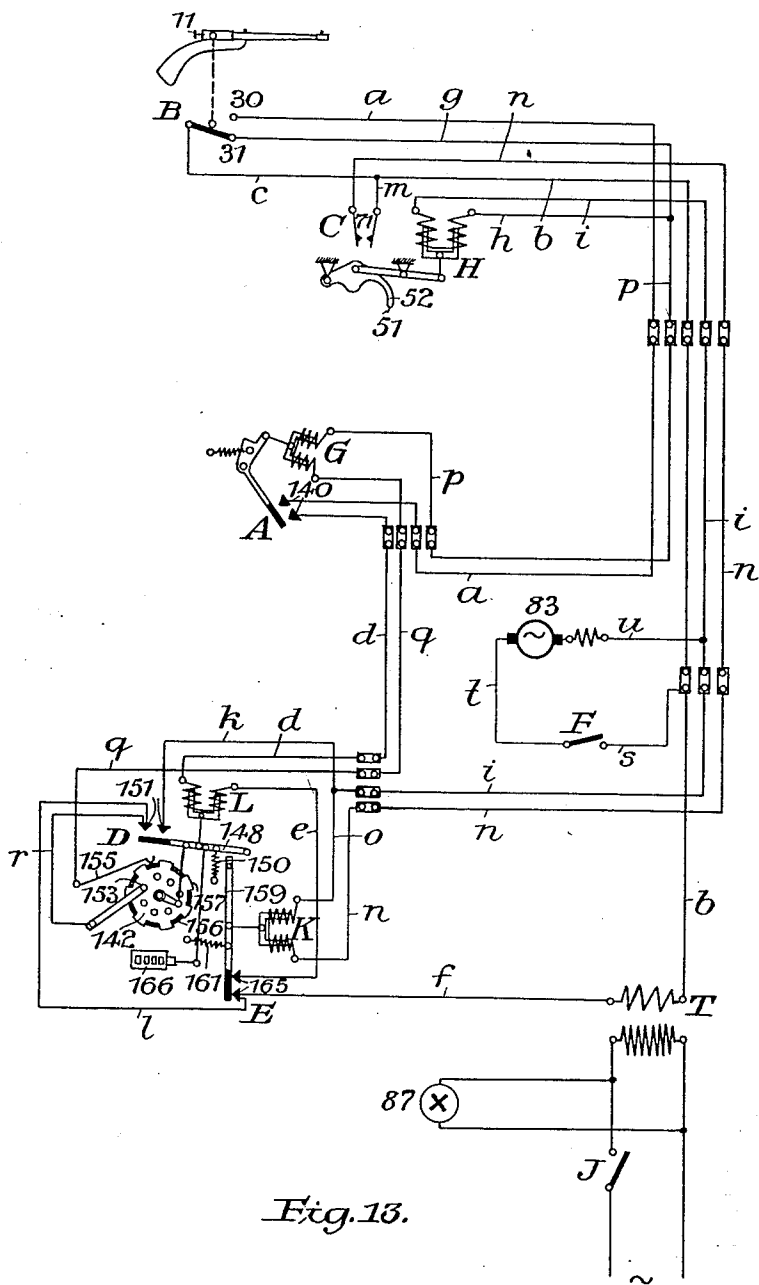


Fig. 13.

INVENTOR:

7. C. H. Hansen

By: Mark & Clare
Attys.

UNITED STATES PATENT OFFICE

FRIEDRICH CLAUS HEINRICH HANSEN, OF HAMBURG, GERMANY

AUTOMATIC SHOOTING MACHINE

Application filed June 26, 1929, Serial No. 373,844, and in Germany February 27, 1929.

The invention relates to a coin-freed automatic shooting machine of the kind comprising a dummy rifle supported by a universal joint and adapted, on the firing of the shot against a target, to operate the registering device whereby the aim at the moment of firing can be indicated on the target without the use of a missile, and the invention consists essentially in the provision of a transparent miniature target, an optical projection apparatus whereby an enlarged light image of said target is projected on to a wall or a screen for use in aiming the rifle, and means for perforating the target so as to produce a corresponding effect on the image at the exact spot towards which the rifle is aimed at the time of firing the shot.

The registering device is operated by electric means which are freed by the insertion of a coin, prepared by the tensioning of a loading bolt, and caused to operate by the pulling of the trigger.

Means are provided for allowing a plurality of shots to be fired after each coin insertion.

Fig. 1 of the accompanying drawings is a view of the complete machine,

Fig. 2 is a view of the dummy rifle on an enlarged scale,

Fig. 3 is a central longitudinal section of the machine without the rifle,

Fig. 4 is a horizontal section of the same on the line IV—IV of Fig. 3,

Fig. 5 is a view on a still more large scale of the coin slot and of the switch operated by the coin,

Figs. 6 and 7 are views of further switches employed in the machine,

Fig. 8 is a view of a device for preventing lateral tilting of the rifle,

Fig. 9 is a view of a device for imparting movement to the target,

Fig. 10 is a view of the rifle showing a modified construction of the mechanism,

Fig. 11 is a view at right-angles to Fig. 10,

Fig. 12 is a view of a slide showing two forms of targets, and

Fig. 13 is a diagram of the electric connections.

The automatic shooting machine comprises

a dummy rifle, an optical projection apparatus whereby the enlarged light image of a miniature target is thrown on a wall or a screen, a registering device whereby the target is perforated so as to produce a corresponding effect on the image at the exact spot towards which the rifle is aimed at the time of firing the shot, and a coin-freed device whereby the registering device is prepared for operation.

The rifle has a butt 1 and a barrel 2, the latter being provided with the usual back sight 3 and fore sight 4. The butt 1 and the barrel 2 are connected together by means of a lock casing 7 containing a trigger 5 and a loading device 6, like an ordinary fire arm.

The trigger 5, which is mounted on a pivot 8 and controlled by a spring 9, has a nose piece 10 whereby it co-operates with the loading device 6 for maintaining the latter in operated, i. e., retracted position.

The loading device 6 according to Fig. 2 consists of a bolt 13, provided with an external gripping knob 11 and guided longitudinally in a cylindrical chamber 12. This bolt has a shoulder 14 which is engaged by the nose piece 10 of the trigger for retaining the bolt in retracted position. The bolt is controlled by a spiral spring which, on the bolt being released by the pulling of the trigger, causes it to fly back to its normal position.

The rifle is mounted rigidly but exchangeably upon a carrier 20, which is movably supported so as to enable the rifle to be moved about freely for taking aim. A rod 19, which is longitudinally guided in the carrier 20, is engaged by an arm 18 of a bell crank, the other arm 17 of which is engaged by a lug 15 which projects from the bolt 13 through a slot in the casing 12. On the bolt being tensioned, the bell crank is rocked about its pivot 16 so as to depress the rod 19. The lower end of the latter bears against a lug 21 on a lever 23 mounted on a pivot 22. A compression spring 27 bears against another lug on the lever, and against a lug 28 on a rigid bracket 29 secured to the carrier 20. The spring thus supports the rod 19 and opposes the operation of the bell crank 17, 18. The switch arm 24 of a two-way switch B is

mounted on the same pivot as the lever 23 and moves between two electric contacts 30 and 31. A spring 25 connects the arm 24 with the lever 23 at a point which passes the dead centre position and therefore causes the arm to spring over from one contact to the other on the lever being rocked.

When the trigger 5 of the rifle is pulled, the nose piece 10 releases the shoulder 14 of the bolt 13, which then, in consequence of the spring pressure snaps forward. The lug 15 taking part in this movement releases the bell-crank 17, 18 and allows the rod 19 to be moved upwardly under the pressure of the spring 26 acting upon the lever 23. The rocking movement of the lever 23 caused by the pressure spring 26 is transmitted to the arm 24 which springs over from the contact 30 to the contact 31.

If by means of the gripping knob 11 the bolt 13 is again tensioned the nose piece 10 of the trigger 5 again snaps behind the shoulder 14 of the bolt and secures the same in the tensioned position. During the tensioning of the bolt 13 the lug 15 presses against the bell-crank 17, 18 and depresses the rod 19 which then rocks the lever 23 and moves the arm 24 from the contact 31 to the contact 30.

The carrier 20 of the fire-arm is rigidly secured at its lower end to a frame 32 which is arranged within a casing 33 and connected to the front wall 39 of the latter by means of a universal joint 34. In the casing 33 are located two cross struts 35, 36 which limit the upward and downward movement of the frame 32 and thus of the carrier 20 of the rifle to a sufficient amount for aiming. Wheels or rollers 37, 38, tyred with elastic rubber and mounted in the frame 32, prevent hard impact with the cross struts 35, 36 which are wide enough to ensure contact with the rollers 37, 38 at any lateral positioning of the frame 32. By means of the roller 37 the frame 32 is held in the position of rest upon the cross strut 35.

On the front wall 39 of the casing 33 a device is provided for preventing, normally, lateral tilting of the carrier 20 and of the rifle. This device comprises an arm 40 in the form of a round rod rising from the frame 32 over the ball-joint 34, and a slot guide formed of two brackets 41 between which the rod is free to be oscillated only in the vertical longitudinal plane of the casing 33 for varying the altitude of the aim. For varying the aim in lateral direction the frame 32 is turned about the rod 40.

The two brackets 41 are mounted on different arms 42 which are deflectable about a pivot 43 on the front wall 39 of the casing 33 and project upwardly through slots in the casing over the cover thereof. Upon the projecting parts of the arms 42 stops 45 are provided which normally abut against each other, and pins 46, which project from said

stops at right angles thereto, engage in a slot in a plate 47 so as to maintain the brackets 41 at a distance from each other corresponding exactly to the diameter of the rod 40. The plate 47, which is carried by a blade spring 48 connected to the outside of the wall 39, can be disengaged from the pins 46 by means of a knob 49, and springs 50 then force the arms apart, as shown by dotted lines in Fig. 8, as far as the slot in the casing allows, so as to enable the frame 32 and the rifle to be laterally tilted if required, the rifle being thus freely movable like any ordinary rifle. The arms 42 are provided with knobs 44 whereby they can be restored to closed up position. Aiming with the rifle corresponds therefore completely with that of an ordinary rifle and the practice acquired upon aiming with it aids considerably the ability in shooting with ordinary fire-arms.

The target at which the rifle is aimed consists of a light image projected from a miniature target, arranged within the casing 33, on to a wall or screen, and the frame supporting the rifle is provided with a perforating needle whereby said miniature target is perforated so as to produce a corresponding effect on the image at the exact spot towards which the rifle is aimed at the time of firing the shot. The perforating needle 51 is connected to a hammer 52 arranged on a shaft 53 in the central longitudinal axis of the frame 32. The hammer is controlled by a double-armed lever 54 which is arranged to rock within the frame about a shaft 55 and which engages in a slot 57 in the hammer by means of a pin 56. When the lever 54 is rocked in opposition to a controlling spring 58, the hammer is actuated for perforating the target. A quick return of the hammer is ensured by a buffer 60 which is applied to the target support and which then compresses a spring 59. The buffer is carried by a lever 62 which is pivoted at 61 to the hammer 52. The spring 58 which controls the lever 54 is connected to an adjusting screw 63 which is held in a bracket 64 in the frame 32 and which can be operated by means of a milled nut 65 for regulating the tension of the spring. The rocking of the lever 54 is effected by means of an electromagnet H the armature 66 of which is attached to one end of the lever through the medium of a pin-and-slot connection 67, 68. The energization of the magnet H is effected through the medium of the trigger 5, the rod 19, the lever 23 and the switch-arm 24.

On the lever 54 being rocked for operating the perforating needle, a second circuit, including a switch C, is closed through the medium of two contact springs 71 which are secured to the frame 32, one of the springs being for this purpose deflected by a pin 70 connected to an insulated arm 69 on the lever 54.

Two forms of miniature targets are illustrated in Fig. 12. The targets 72 are made of

transparent and penetrable material, for instance film strips, and are supported in a suitable slide 73 so as to remain flat under the operation of the needle.

5 The slide 73 may be made of paste-board or similar yieldable but stiff material, which will not break or blunt the needle, should the shot be aimed at a point on the frame outside the target.

10 The slide 73 is inserted for use in a holder 74, which is accessible through a slot in the side wall of the casing and which has a gateway 75 for the transmission of the light and for admitting the needle 52 to the target. 15 The slide may be made long enough to hold two targets, as illustrated in Fig. 12, and is shifted for bringing the second target into operative position after one target has been used. The target may either display concentric rings or figures and may be taken 20 away by the marksman as a check and souvenir.

The slide holder 74 is adapted to co-operate with the buffer 60 for ensuring a quick 25 return of the hammer 52.

Means are provided for keeping the target in movement during the aiming if such movement should be required. For this purpose the slide holder 74 is arranged to slide in 30 grooves 76 of pins 77 which are located in fixed position in the casing 33. The holder is reciprocated by means of a double-armed lever 81 arranged on a vertical pivot 78 and attached to the holder through the medium of a pin and slot connection 79, 80. The lever 35 carries a roller 85 which bears against an irregularly shaped, preferably exchangeable cam plate 82 which is driven through the medium of a suitable gearing by an electric motor 83. A tension spring 84 engaging the holder 74 co-operates with the cam 40 for reciprocating the holder.

The electric motor 83, the appertaining gearing, the cam plate 82 and the lever 81 are 45 mounted in a common frame disposed upon the floor 86 of the casing 33, which is accessible through a closable opening in the side wall of the casing for the exchange of the cam plate 82.

50 The enlarged light image of the target 72 is projected upon a suitable wall surface or screen for the rifle to be aimed at. The projection apparatus is arranged in the casing 33 in such a manner that the hammer 52 lies with its perforating needle in the position 55 of rest outside the beam of light.

The projection apparatus is of known construction and comprises a lamp 87, a condenser lens 88 and an objective lens 89.

60 The lamp 87 with its cylindrical holder 90, is withdrawably mounted in an opening of the rear wall 91 of the casing 33 and is adjustable with relation to the condenser lens 88 by means of a screw 92. A ventilating 65 hood 93 surmounts the casing 33 and opens

in the direction of the fore sight 4 of the rifle, so that the marksman will not be inconvenienced by the heat.

The slide holder 74 is arranged between the condenser lens 88 and the objective lens 89 70 with the gateway 75 in the optic axis which extends outwardly through a hole 94 in the front wall 39 of the casing 33.

The objective 89 is adjustable in space in all three directions. For this purpose the lens mount 95 is seated upon a holder 96 adjustable longitudinally and transversely as 75 well as vertically in the casing 33.

The adjustment in the longitudinal direction of the casing 33 for regulating the distance of the objective 89 from the condenser 80 88 is effected by means of a screw spindle 97 fixed against axial movement and formed with a square head 98 accessible through a hole in the rear wall 91 of the casing 33 for 85 the reception of an operating key 99. Upon the screw spindle 97 slides the screw box 100, which is fixed to a rectilinearly guided slide 101 coupled by the link 102 to a second, also rectilinearly guided slide 103 connected to 90 the holder 96 of the lens.

For the adjustment of the objective 89 in the transverse direction of the casing 33 the slide 103 guides a block 105 upon horizontal rods 104. Movable in a vertical direction in 95 the block 105 is a block 106 which serves as carrier for the holder 96 of the objective lens 89. The guide block 105 is penetrated horizontally in a screw threaded bore by a screw spindle 107 which is mounted upon the slide 100 103, and secured against axial movement. The square head 108 of the screw spindle is accessible through an elongated hole 109 in the side wall of the casing 33 for the reception 105 of a key 110 whereby it can be operated.

For the adjustment of the objective lens 89 in the vertical direction the block 106, which serves as carrier for the lens holder 96, is movable upwardly and downwardly in 110 the guide block 105 upon the rods 111 and is penetrated vertically in a screw threaded bore by a screw spindle 112 which is mounted upon the block 105 and secured against axial movement. The square head 113 of the screw spindle is accessible through a 115 hole of suitable size in the cover of the casing 33 for the reception of an operating key 114.

The heads of the screw spindles may be alike in which case the same key can be used 120 for all three adjustments of the objective.

The adjustment of the objective lens 89 in the vertical and in the transverse direction of the casing 33 serves for regulating the direction of the target, and the adjustment in the 125 longitudinal direction of the casing serves for focussing.

The rifle described, with the appertaining registering device and the projection apparatus, is formed as a coin-freed device 130

which renders the use of the rifle dependent upon the insertion of a definite coin. The coin slot 117 in the cover of the casing 33 leads through chutes 115 and 120 into a collecting box 116 which is accessible to authorized persons only. An inserted coin 118, which may first pass through a tester, is retained at the end of the chute 115 by a stop 119, as shown in Fig. 5. The stop 119 is seated upon a lever 122 which is adapted to rock about a pivot 121 and which is provided at its free end with the three cornered head 123. A spring 124 controls the lever and maintains the stop 119 in operative position.

By means of a hand lever 126 which is pivoted at 125, adjacent the coin slot 117 and which passes through a slot in the cover of the casing 33, the coin 118 can be driven forcibly into the coin chute 120. The hand lever 126 is for this purpose linked by the arm 127 to a longitudinally guided slide 128 which, upon the lever being operated, strikes against the coin 118 and forces it past the beveled end of the stop. A tension spring 129 restores the hand lever 126 to the starting position after being set free.

Under the pressure of the slide 128 against the coin the stop 119 yields and turns the lever 122 in opposition to the spring 124. Upon this movement of the lever a bell-crank 131, arranged on a pivot 130 with one arm in the path of the three cornered lever head 123 and with the other arm 132 in the coin slot 117, is turned by the head, in opposition to a spring 133, into a position wherein it blocks the coin slot. The lever is locked in the operated position by a catch 136 which rocks about a pivot 135 under the action of a spring 137 and which places a nose piece 138 under the head 123 so as to prevent the lever from returning. The return of the levers into the position wherein the coin slot is free is dependent upon the excitation of an electro-magnet G, whose armature is coupled through a link 134 with the catch 136.

The catch 136 carries a switch arm 139 which co-operates with contacts 140 in a switch A and which closes a circuit under the influence of the spring 137 and breaks it under the influence of the magnet G. Fig. 5 shows the elements in the normal position, i. e. with the coin slot free and with the circuit at A broken.

In the arrangement shown in the drawings the coin-freed device is adapted to allow two operations of the rifle after each insertion of a coin. For this purpose the electro-magnet G will not come into operation for clearing the coin-slot until two shots have been fired, the insertion of coins in the slot being prevented in the meantime.

The circuit whereby the excitation of the electro-magnet G is carried out contains a switch roller 142 rotatable about a shaft 141.

At each use of the rifle the roller experiences a partial rotation, but effects the circuit closure only at every other partial rotation. To the switch roller 142 is connected a ratchet wheel 143 in which engages a spring controlled ratchet pawl 144 mounted upon a crank-arm 145 which rocks about the shaft 141. The crank arm is operatively connected by means of the link 146 with a switch lever 148 mounted on a pivot 147. The switch lever 148 is connected by a link 149 to the armature of an electro-magnet L, upon the excitation of which it is turned, against the tension of a spring 150, into engagement with contacts 151 in a switch D so as to close an electric circuit, while, by means of the link 146, the crank arm 145 with the pawl 144 is caused to slide over the teeth of the ratchet wheel 143.

The switch roller 142 is continually in current-conducting connection with a contact pin 153 pressed under the action of a leaf spring 152 against one of its frontal surfaces. On this frontal surface the switch roller 142 is provided with a circular row of shallow holes 154, in which the contact pin 153 snaps successively upon rotation of the switch roller. The holes 154 correspond in their number and position to the teeth of the ratchet wheel 143, so that after each partial rotation of the switch roller 142, the latter will be secured and prevented from retrograde movement during the idle stroke of the ratchet pawl 144 through the snapping of the contact pin 153 into one of the holes 154.

Against the peripheral surface of the switch roller 142 bears a contact finger 155, which co-operates with the contact pin 153 for closing the circuit. In order that this circuit shall be closed at each second partial rotation of the ratchet roller 142, the peripheral surface of the ratchet roller is divided up into equal sections which are alternately current-conducting and insulated. In the position of the switch roller 142 according to Fig. 6 the contact finger rests against an insulated section 156, so that the circuit is broken. Upon the next partial rotation of the switch roller 142, effected by the spring 150, the contact finger 155 will come to rest on a current-conducting section 157 and consequently produce the circuit closure. The closing of the circuit at D then causes the electro-magnet G to be excited for clearing the coin slot and allowing another coin to be inserted.

The switch lever 148, turned upon the excitation of the electro-magnet L and thereby causing the idle stroke of the ratched pawl 144 by means of the crank arm 145, is retained in operated position, i. e., with the circuit at D closed, by a detent lever 159 pivoted at 158 and controlled by a spring 161. The lever 148 has a notch 163 wherein one end 162 of the lever 159 is normally accom-

modated and prevented by the shoulder 164 from moving under the influence of the spring 161. The lever 148, on being operated by the magnet L, frees the lever 159 which is then turned by the spring 161 so as to place the end 162 of the lever under the shoulder 164 and prevent the lever 148 from returning. A link 160 connects the lever 159 with the armature of an electro-magnet K which, on being excited, turns the lever into the normal position and allows the lever 148 to break the circuit at D and to turn the switch roller 142.

The detent lever 159 also co-operates with contacts 165 in a switch E for closing and breaking a circuit, the magnet K effecting the closing and the spring 161 the breaking of the circuit.

A counting mechanism 166 of known type serves for counting the shots fired by means of the rifle. The driving shaft 167 of this mechanism is connected to the switch lever 148 by a crank arm 168 and a link 169 so that each operation of the switch lever by the electro-magnet L moves the counting mechanism to the extent of one number.

Instead of counting the shots, the counting mechanism 166 can serve for counting the coins inserted, in which case the driving shaft 167 preferably receives its drive from the lever 122 which carries the stop 119.

In order to facilitate the initial positioning of the target image it is advisable to employ a holder for the rifle by means of which the latter can be fixed in a central aiming position. In the construction according to the drawings a supporting plate 171, capable of pivoting upon the cover of the casing 33 about a transverse pivot 170 serves for this purpose. The plate has an opening 172 in which, upon the plate being turned into an upright position, the rifle can be secured against movement.

The operation of the apparatus will now be described with reference to the circuit diagram shown in Fig. 13, it being assumed that an alternate current supply is used for the operation.

The projection lamp 87 is connected directly to the high tension current, while the switch mechanism is operated by low tension current over a transformer T.

The insertion of a coin is the condition for the use of the automatic shooting machine, such insertion causing a circuit to be closed at A through the contacts 140.

Upon loading the rifle by means of the gripping knob 11 on the bolt 13 the lever 24 of the switch B is connected to the contact 30 and occasions the following flow of current. From the transformer T over lead *b*, *c*, switch B over contacts 31, lead *a*, switch A over contacts 140, lead *d*, electro-magnet L, lead *e*, switch E over contacts 165, lead *f* back to the transformer T. Hereby the magnet L is excited and closes the circuit at D over the con-

tacts 151 and opens the circuit at E by the tension of the spring 161.

Upon firing the rifle the switch B is changed over to contacts 31 and lead *g* and causes the following flow of current. From the transformer T over leads *b*, *c*, switch B over contacts 31, leads *g*, *h*, electric-magnet H, leads *i*, *k*, switch D over contacts 151, leads *l* and *f* back to the transformer T. Hereby the magnet H is excited and causes the hammer 52 with the perforating needle 51 to mark the target at the striking point. With the operation of the registering device the circuit is closed at C over the contacts 71 by the pin 70 and causes the following flow of current. From the transformer T over leads *b*, *m*, switch C over contacts 71, lead *n*, electro-magnet K, leads *o*, *k*, switch D over contacts 151, leads *l* and *f* back to the transformer T. Hereby the electro-magnet K is excited, which closes the circuit at E over the contacts 165 and releases the switch lever 148. By means of the tension spring 150 the switch lever 148 is freed from the contacts 151, the counting mechanism 166 is moved to the extent of one number, and the switch roller 142 is rotated so as to make electric contact with the spring 155.

Upon the loading of the rifle necessary for delivery of the next shot the switch B is again changed over through the contacts 30 to the lead *a* and thereby causes the flow of current already described, which excites the magnet L. Thereby the circuit is closed at D over the contacts 151, and the circuit at E and the contacts 165 is opened.

Upon the second firing of the rifle the switch B is again changed over through the contacts 31 to the lead *g*, and the different circuits are closed and broken in the order already described. However, since the roller 142 is in electric contact with the spring 155 on the firing of the second shot, the change over of the switch B to contacts 31 causes another circuit to be closed wherein the current flows from the transformer T over leads *b*, *c*, switch B over the contacts 31, leads *g*, *p*, electro-magnet G, lead *q*, contact finger 153 and contact pin 153 of the switch roller 142, lead *r*, contacts 151 and leads *l* and *f* back to the transformer T. The electro-magnet G therewith opens the circuit at A and at the same time clears the coin slot.

The motor 83 for the movement of the target receives its current over a switch E. When the latter is closed, the motor is switched on automatically over the contacts 151 upon loading the rifle and switched out again upon firing. The flow of current is as follows: From the transformer T over leads *b*, *s*, switch F, lead *t*, motor 83, lead *u*, *i*, *k*, switch D over the contacts 151, leads *l* and *f* back to the transformer T.

The entire installation can, when not in

use, be rendered current-less by means of a master switch J.

When the apparatus is operated with direct current, a suitable ohmic resistance is employed in place of the transformer T.

It is obvious that, as compared with the illustrated example, modifications in the construction and in the size of the individual portions of the machine and in the electrical connection, can be adopted according to desire or requirement, without exceeding the scope of the invention.

One modification of the machine is illustrated in Figs. 10 and 11. In this modification the hand-operated loading device is replaced by an automatic one.

The trigger 5 rests according to Fig. 10 with an arm 173 upon the upper end of the spring-controlled rod 19 which is guided as previously described in the carrier 20 of the rifle. The rod 19 bears with its lower end against the arm 175 of a bell-crank 177 which is controlled by a tension spring 174 and mounted by means of a pivot 176 upon the carrier 20. The bell crank serves, like the levers 23 and 24 in Figs. 1 and 7, as a switch element for closing the circuits at the contacts 30, 31.

When, after aiming, the trigger 5 of the fire-arm is actuated, the arm 173 depresses the rod 19 in opposition to the spring 174. The bell-crank lever 177 is then turned and the switch B changes over from the contacts 30 to the contacts 31. On the trigger 5 being released the spring 174 restores it by means of the rod 19 to the initial position and changes the switch B over from the contacts 31 to the contacts 30. The rifle will therefore, without preparatory manipulation be ready for repeated use.

I wish it to be distinctly understood, that I do not limit myself to the precise constructions shown, variations in the arrangement and combination of the several parts being possible according to desire or requirement without departing from the scope and spirit of the invention.

What I do claim as my invention and desire to secure by Letters Patent is:—

1. An automatic shooting machine comprising an optical-projection apparatus, a preferable slide in said apparatus representing a target, a holder for said slide, a guide wherein said holder is movable in its own plane, a spring controlling the slide, a cam plate, means for rotating said cam plate, a lever coupled to said holder and bearing under the influence of the spring against said cam plate for imparting a reciprocated motion to the holder, a frame supported above said projection apparatus and universally adjustable about a fixed point, a dummy rifle mounted on and movable together with said frame for aiming at the projected light image of said target, a spring-controlled perforat-

ing hammer pivoted to said frame in position to perforate the target, on being rocked about its pivot, at the exact spot towards which the rifle is aimed, an electro-magnet for rocking said hammer and perforating the slide, a trigger on the rifle, and a switch controlled by said trigger and adapted to energize said magnet on the trigger being pulled.

2. A structure as claimed in claim 1 wherein the means for rotating the cam plate comprises an electric motor, means for setting the trigger for operation, means operated by said trigger setting means for starting the motor, and means controlled by the trigger for stopping the motor on the trigger being pulled.

3. The structure claimed in claim 1 in combination with cross rails for limiting the deflecting movement of the framing of the rifle, and rubber rimmed rollers connected to the frame so as to take the thrust of the rails.

4. The structure claimed in claim 1 in combination with means for preventing the frame and the rifle from being tilted about their longitudinal axes.

5. The structure claimed in claim 1 in combination with a vertical rod secured to the frame in alignment with its supporting point, and a pair of brackets guiding said rod so as to prevent the frame and rifle from being tilted about their longitudinal axes.

6. The structure claimed in claim 1 in combination with a vertical rod secured to the frame in alignment with its supporting point, a pair of pivotally supported vertical arms, parallel brackets in position to guide said rod to prevent the frame and the rifle from being tilted about their longitudinal axes, and means for releasing the arms so as to allow such tilting of the frame and of the rifle.

7. The structure claimed in claim 1 including a casing enclosing and supporting the frame and a projection apparatus, a rifle carrier secured to the frame and projecting through the top of the casing, a ventilating cowl on the casing having a forwardly opening discharge opening, and a support whereby the rifle can be secured in a definite position, said support being pivoted to the casing so as to allow of being turned out of operative position.

8. An automatic shooting machine comprising an optical-projection apparatus, a perforable slide in said apparatus representing a target, a substantially horizontal frame arranged above said apparatus, said frame being universally adjustable about a fixed point situated substantially above the objective of the projection apparatus, an upright secured to the free end of the frame, a dummy rifle mounted on the upper end of said upright in position to be moved together with the frame and aimed at the projected light

image of the target, a spring-controlled perforating hammer pivoted to said frame in position to perforate the target, on being rocked about its pivot, at the exact spot towards which the rifle is aimed, means in said
5 frame for rocking the hammer, a trigger on the rifle, and means under the control of the trigger for actuating the hammer rocking means when the trigger is pulled.

10 9. A structure as claimed in claim 8 wherein the hammer is acted upon through the medium of a doubled-armed lever.

In witness whereof I have hereunto signed my name this 5th day of June, 1919.

15 **FRIEDRICH CLAUS HEINRICH HANSEN.**

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