991,962.

J. EASTWICK.

AUTOMATIC SMALL ARM.

APPLICATION FILED JAN. 30, 1911.

Patented May 9, 1911.

2 SHEETS—SHEET 1.

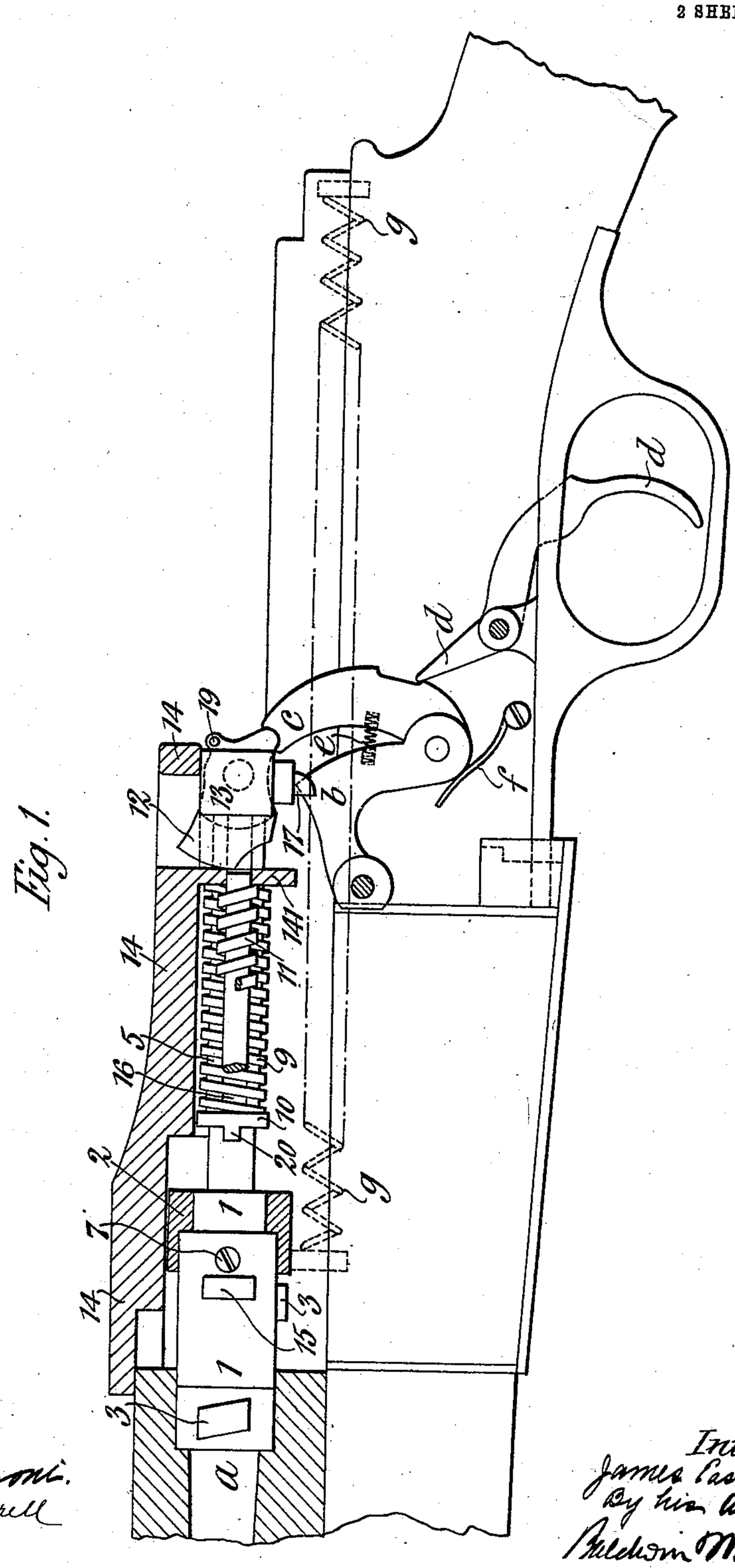

Fig. 1.

Witnesses.
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2 SHEETS—SHEET 2.

Fig. 2.

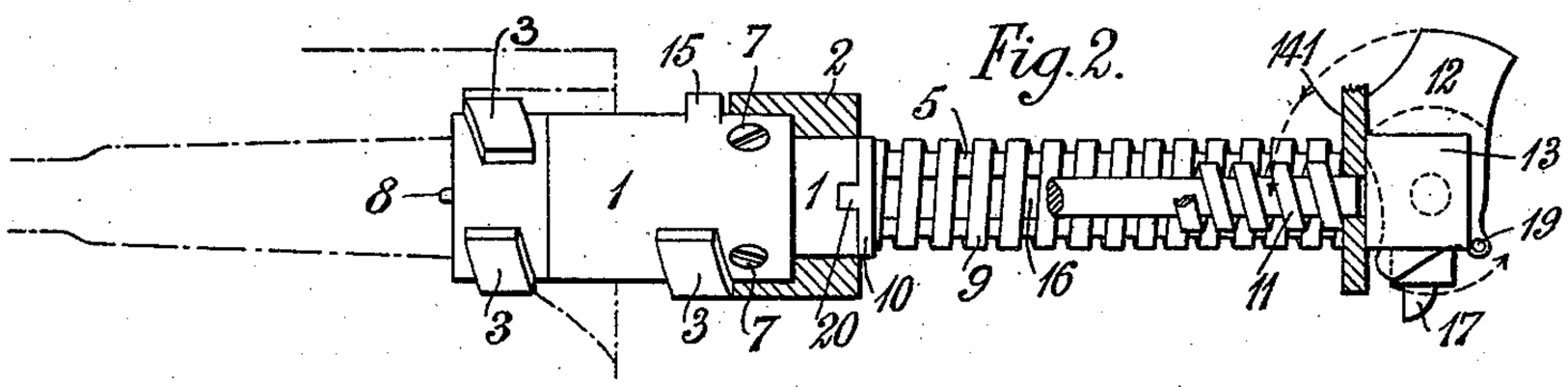


Fig. 3.

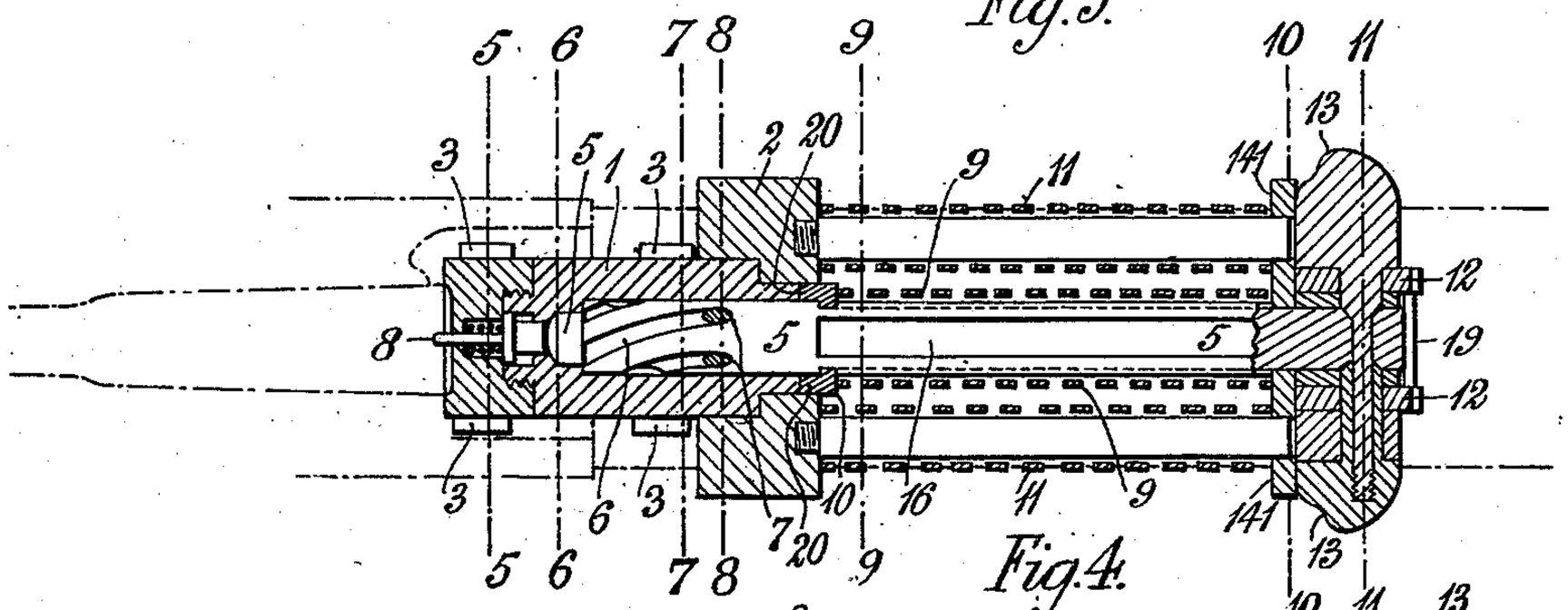


Fig. 4.

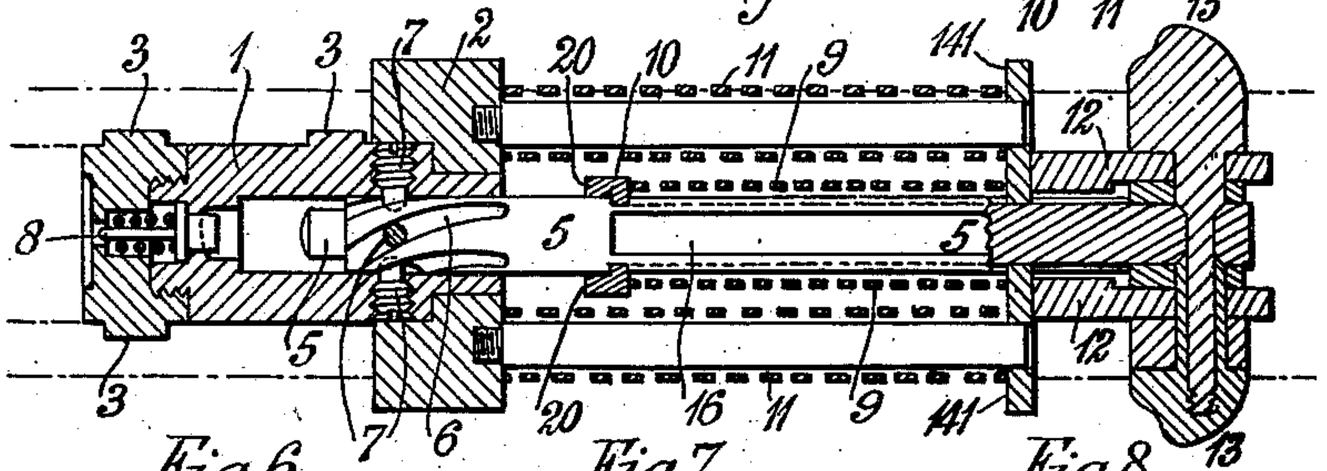


Fig. 5.

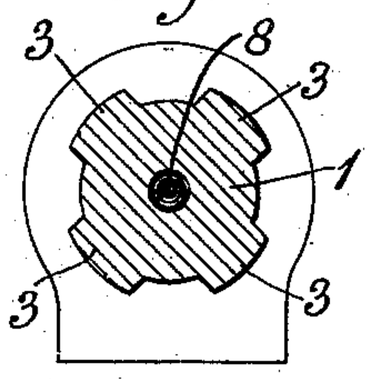


Fig. 6.

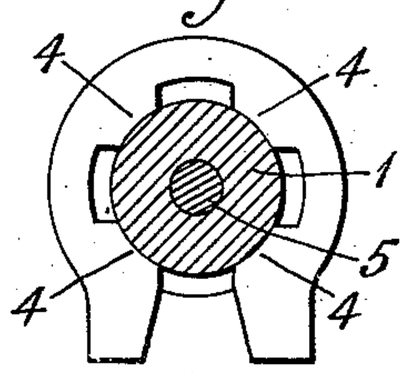


Fig. 7.

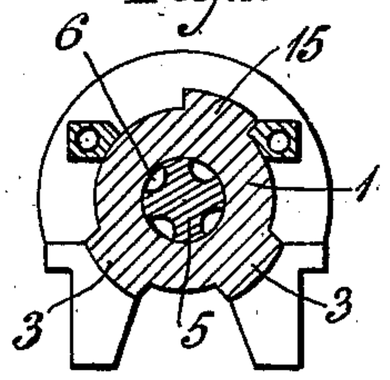


Fig. 8.

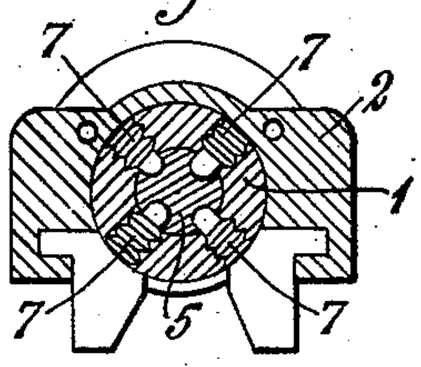
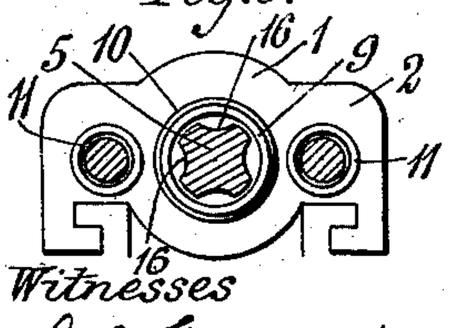


Fig. 9.



Witnesses

C. B. Franzoni.

M. E. Bubell

Fig. 10.

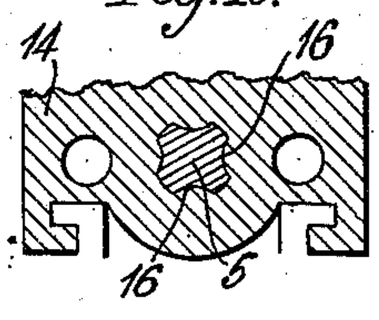


Fig. 11.

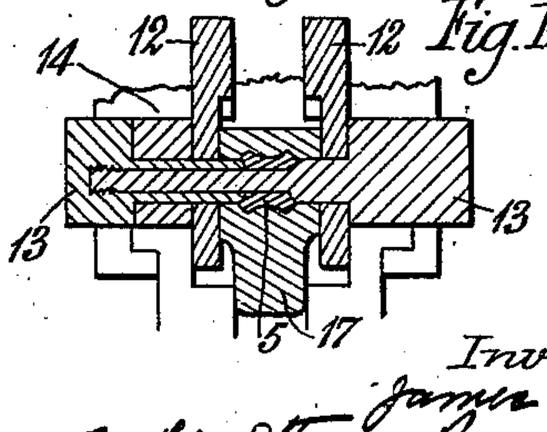
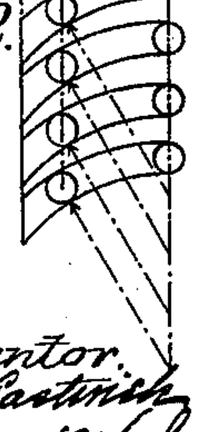


Fig. 12.



Inventor.

James Eastwick

By his Attorneys, Bredow & Wyllt

UNITED STATES PATENT OFFICE.

JAMES EASTWICK, OF LONDON, ENGLAND.

AUTOMATIC SMALL-ARM.

991,962. Specification of Letters Patent. Patented May 9, 1911.

Application filed January 30, 1911. Serial No. 605,463.

To all whom it may concern:

Be it known that I, JAMES EASTWICK, a subject of the King of Great Britain, residing at No. 12 Old Square, Lincoln's Inn, in the county of London, and at Fyning Wood, in the parish of Rogate, in the county of Sussex, England, have invented a new and useful Automatic Small-Arm, of which the following is a specification.

The object of this invention is to provide means for utilizing force derived from the discharge of a rifle or other similar small arm in working the bolt, *i. e.* in unlocking it from the barrel and on a fresh movement of the trigger locking the bolt and firing again.

This invention relates merely to the full cocking and unlocking of the bolt and the converse movements of locking and firing. The intermediate movements and the arrangements by which they are caused and regulated may be of any desired and available type.

My invention is illustrated in the accompanying drawings in which:—

Figure 1 is a longitudinal section of part of a rifle. Fig. 2 is an elevation of the bolt partly in section. Figs. 3 and 4 are horizontal sections in the locked and unlocked positions. Figs. 5 to 11 are cross sections on the various lines indicated in Fig. 3. Fig. 12 is a development of part of the mechanism.

1 is the bolt, part of which is formed as a crosshead 2, and which is provided with locking lugs 3. The bearings corresponding to those lugs nearest the chamber *a* are shown at 4.

5 is the firing pin which has formed in it grooves 6 in which work studs 7 in the bolt. The grooves 6 are in the form of a progressive screw, that is to say, their outline is to follow the arc of a circle (not a straight line) wound around a cylinder as seen in Fig. 12. The striker 8 is controlled by a light spring in the manner now commonly practiced.

Mounted on the bolt are two helical springs or sets of springs capable of being both compressed at the same time by the movement of the inertia cover described later. One of these which I call the locking spring 9 butts against a collar 10 on the pin 5, while the others which I call the unlocking springs are shown at 11.

12, 12 are two blocks or intercepting tumblers pivoted on a second crosshead carrying the handle 13.

14 is a heavy cover free to slide over the mechanism for a short distance. It carries an abutment 141 adapted to engage the tumblers.

15 is a stop on the bolt to prevent undue rotation thereof.

The trigger gear consists of a sear or lever *b* pivoted on the frame and adapted to engage a bent 17 formed on or attached to the handle 13. This sear also carries at its farther end two pivoted teeth *c* which when the gear is in position before firing engage with and hold the projecting bases of the tumblers 12. These teeth are united at their lower ends where the head of the trigger *d* presses against them. When the trigger is not pressed they are kept in their backward position by a spring *e*. A sear spring *f* presses against the underside of the sear. This trigger gear will form the subject of a subsequent application. When the trigger *d* is pressed, it first presses forward the teeth *c* and so raises the tumblers 12, the teeth thus acting as a primary sear. As the tumblers rise above their dead point, this pressure while still acting on the tumblers presses down the sear *b* which is thus freed from the bent 17; but until this sear is so freed it holds back the bent and so saves friction on the motion of the tumblers. On the commencement of recoil the inertia cover 14 with its abutment 141 remains relatively stationary and the springs 9 and 11 are compressed. During this movement the tumblers 12 impinge upon the rear of the inertia block and are thrown forward as shown by the circular dotted lines in Fig. 2, falling behind the abutment 141 and holding it away from the crosshead 13. Then the cover and the abutment 141 partake of the recoil movement and are driven backward partly by this movement, partly by the expansion of the springs 11. The parts 13 and 14 move rearward relative to the bolt 1 and

cross-head 2 and since the pin 5 is fast with the rear cross-head 13, the pin is drawn back also, the spring 9 remaining compressed between the abutment 141 and the collar 10. This motion of the pin draws the grooves 6 past the studs 7 which are thus rotated and the bolt 1 is turned so as to free the lugs 3, the screw form of these lugs causing a slight backward movement which effects the primary extraction. The bolt 1 being now unlocked by the expansion of the springs 11 travels backward compressing the closing spring *g* and the intermediate operations of extracting, ejecting and inserting a new cartridge are performed by mechanism which forms no part of the present invention and is therefore not shown. The closing spring *g* now drives the bolt and cover forward again closing the breech but the tumblers 12 remain in their forward position preventing the pin 5 from moving forward relatively to the abutment 141 and keeping the spring 9 compressed. This all takes place practically instantaneously and before the pressure on the trigger has been relaxed. When the pressure on the trigger is removed the spring *e* and sear springs *f* restore the trigger gear to its normal position. But the spring *e* acting on a point close to the pivot and therefore through a small arc acts first so that the gear always rises to its normal position with the teeth fully back and thus they are not caught and held down by the underside of the tumblers. A fresh movement of the trigger gear throws back the tumblers 12, the locking spring 9 is released and expands by which expansion the pin 5 is driven forward first rotating and locking the bolt and then impinging on the striker 8 and firing again. To prevent the rotation of the firing pin 5, longitudinal grooves 16 are formed on it and engage with the abutment 141. These grooves also engage with the collar 10 and hold it in correct position.

The handle 13 (on the axis of which the tumblers 12 are pivoted) is placed on the firing pin. By drawing this handle backward the locking spring 9 is compressed, the tumblers 12 are thrown forward and the bolt is rotated and unlocked. A pin 19 may be placed on the tumblers to prevent them moving too far.

To facilitate dispersing and reassembling, the handle 13 may be formed of separate portions and held together by an axle or pin formed on or attached to the outer portion on one side and screwed into that on the other.

If the studs 7 were accidentally omitted in assembling, the result would be that the piece might be fired when the bolt had not rotated and consequently was not locked. To guard against this I form on or attach to the collar 10 a pair of studs 20 adapted when the bolt is properly rotated and locked to fit into corresponding recesses in the rear of the bolt. But if the bolt be not properly rotated these studs do not fit so that the action of the spring 9 and the movement of the firing pin 5 are arrested and the piece does not fire.

What I claim is:—

1. In an automatic small arm, the combination of a cylindrical bolt, an axial firing pin adapted to move longitudinally therein, means for preventing the rotation of the pin, and studs and grooves connecting the pin and bolt and adapted to rotate the bolt as the pin moves longitudinally.

2. In an automatic small arm, the combination of a cylindrical bolt, an axial firing pin, an unlocking spring adapted to move the pin rearward, means for preventing the rotation of the pin, a locking spring adapted to move the pin forward, means actuated by the recoil for compressing both springs, a trigger, means controlled by the trigger for retaining the locking spring compressed, and means whereby the movement of the pin effects the unlocking of the bolt.

3. In an automatic small arm, the combination of a cylindrical bolt, an axial firing pin, an unlocking spring adapted to move the pin rearward, means for preventing the rotation of the pin, a locking spring adapted to move the pin forward, a heavy cover free to slide relatively to the bolt and adapted to compress both springs, a trigger, means controlled by the trigger for retaining the locking spring compressed, and means whereby the movement of the pin effects the unlocking of the bolt.

4. In an automatic small arm, the combination of a cylindrical bolt, an axial firing pin therein, a heavy cover free to slide relatively to the bolt, an unlocking spring between the cover and the bolt, a locking spring between the pin and the cover, a trigger, means controlled by the trigger for retaining the locking spring compressed, and means whereby the movement of the pin effects the unlocking of the bolt.

5. In an automatic small arm, the combination of a cylindrical bolt, an axial firing pin therein, a heavy cover free to slide relatively to the bolt, an unlocking spring between the cover and the bolt, a locking spring between the pin and the cover, a trigger, means controlled by the trigger for retaining the locking spring compressed, and studs and grooves connecting the pin and bolt and adapted to rotate the bolt as the pin moves longitudinally.

6. In an automatic small arm, the com-

bination of a cylindrical bolt, an axial firing pin therein, a heavy cover free to slide relatively to the bolt, an unlocking spring between the cover and the bolt, a locking spring between the pin and the cover, a tumbler pivoted on the pin and adapted to engage the cover and retain the locking spring compressed and a trigger for controlling the tumbler.

JAMES EASTWICK.

Witnesses:
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