

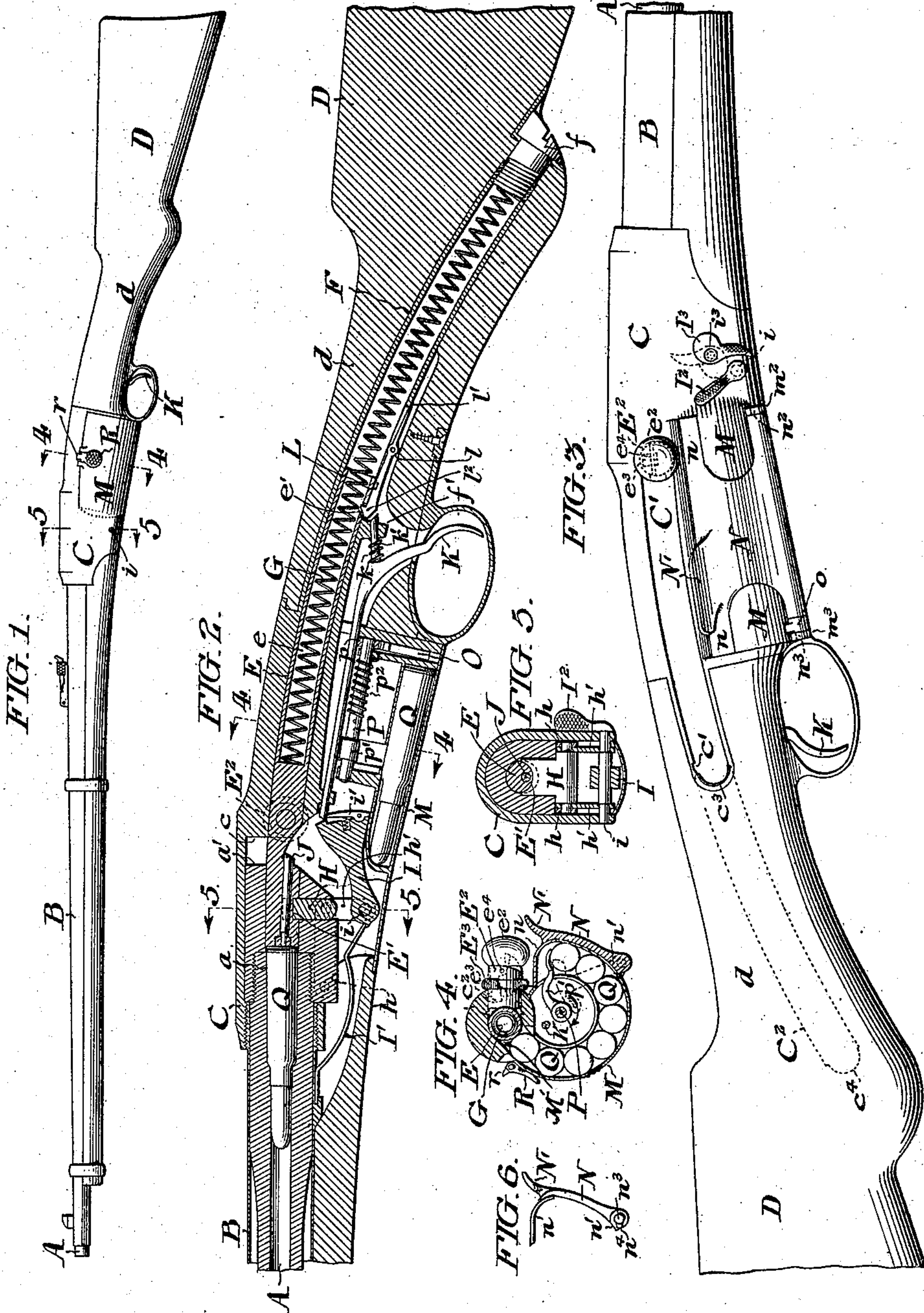
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T. M. THORSEN.
AUTOMATIC FIREARM.

(Application filed Feb. 20, 1901.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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AUTOMATIC FIREARM.

SPECIFICATION forming part of Letters Patent No. 696,118, dated March 25, 1902.

Application filed February 20, 1901. Serial No. 48,039. (No model.)

To all whom it may concern:

Be it known that I, THEODORE M. THORSEN, of Philadelphia, in the State of Pennsylvania, have invented certain new and useful
5 Improvements in Firearms, whereof the following is a specification, reference being had to the accompanying drawings.

My invention relates generally to that class of firearms wherein the breech mechanism is
10 arranged to be automatically operated by the recoil of the barrel, and my improvements are particularly applicable to magazine-arms. Such arms are usually so constructed that the breech mechanism projects exterior to the
15 breech-casing and stock during some portion of its operation.

My present invention provides a breech mechanism which may be concealed by and be automatically operated entirely within the
20 confines of the frame or stock.

In the accompanying drawings I have shown a convenient embodiment of my invention in a rifle which may be operated automatically for magazine fire, or at the will of
25 the operator the magazine may be held in reserve and the rifle operated for single fire.

Figure 1 is a side elevation of the rifle. Fig. 2 is a longitudinal sectional view of the rifle, showing the breech mechanism. Fig. 3
30 is a fragmentary elevation of the side of the rifle opposite to that shown in Fig. 1. Fig. 4 is a sectional view taken on the line 4 4 in Figs. 1 and 2. Fig. 5 is a sectional view taken on the line 5 5 in Figs. 1 and 2. Fig. 6 is a detail
35 view of the magazine-gate. Fig. 7 is a detail view of the gearing connecting said gate with the carrier-shaft.

In said figures, A is the barrel, which is mounted to reciprocate within the barrel-casing B, which latter is fixed to the frame C in
40 the stock D. The breech-bolt E is mounted for reciprocation in an arc within the frame C and the bolt-casing F fixed thereto, which latter extends rearwardly within the grip portion *d* of the stock D. Said bolt-casing is en-
45 gaged at its rearward end with the screw *f*, which is socketed in the stock and serves to maintain the parts aforesaid in their assembled position.

50 The mainspring G, which serves to actuate the bolt E, is seated within the well *e* of the latter and abuts at its rear extremity against

the screw *f*. Said bolt E embodies a recess E', arranged to register with the locking-plunger H, which is carried back and forth
55 by the barrel, and thus caused to reciprocate vertically by its linked connection with the frame. Said locking-plunger H is conveniently connected with the barrel by the links *h* and is also pivotally connected with the
60 frame by the links *h'*, which rock freely upon the hammer-spindle *i*, which is journaled in the walls of the frame. The hammer I is arranged to be thrown by the spring I' against the firing-pin J. Said hammer is provided
65 with the spring-actuated sear *i'*, which in the cocked position of the hammer engages the front extremity of the trigger K, which is normally thrust forward by the spring *k*, which encircles its rear stud *k'*. Said stud extends
70 through the lug *f'* in alinement with the safety-key L, which being pivoted to the receiver F at *l* is normally maintained in the position shown in Fig. 2 by its spring-tang *l'*, which bears against said receiver. In said position
75 the trigger K may be operated to release the hammer I. However, the cam-head *l²* of said key L, which enters the recess *e'* of the bolt E when the parts are in the proper position for the discharge of the arm, is in every other
80 position of the parts thrust downward into opposition with the trigger-stud *k'* and prevents the operation of the latter.

The cylindrical magazine M merges into the frame C, as shown in the several figures,
85 and is provided with a gate *n*, hinged to the magazine by the gate-lever N. Said gate is normally maintained in closed position by the contact of the heel *n'* of said lever with the resilient side of the magazine-casing, as shown
90 in Fig. 4, the trunnions *n²n³* of said lever N being journaled in the lugs *m²m³*, fixed upon said casing. As shown in Fig. 6, the trunnion *n³* is provided with a rib *n⁴*, which extends within the hub *o* of the gear-sector O.
95 Said hub *o* is cut away circumferentially, as indicated in Fig. 7, so as to permit the rocking movement of said sector independently of said lever N, as hereinafter described.

The sector O is in toothed engagement with
100 the pinion *p*, fixed upon the rock-shaft P, to which the cartridge-carrier *p'* is also fixed. Said shaft is provided with the spring *p²*, secured at one extremity to the shaft and at the

opposite extremity to the frame, so as to thrust the lever p' in the direction indicated by the arrow upon Fig. 4, and thereby progress the cartridges Q within the magazine to deliver them in succession in axial alinement with the chamber a of the barrel A .

It is to be understood that the cut-away portion of the hub o is of such extent that the shaft P and carrier p' are free to rock in the direction of the arrow in Fig. 5 until the last cartridge is carried into alinement with the chamber a , in which position the hub of the sector encounters the rib n^4 on the trunnion n^3 of the lever N . Said lever N is provided with a thumb-piece N' , by which it may be thrown outwardly to open the magazine-gate n , and the relation of the lever N and sector O is such that when the gate is opened the lever-trunnion rib n^4 contacts with the sector-hub o and oscillating the latter rocks the shaft P and carrier-arm p' to the initial extremity of its throw, so that when the gate n is opened said carrier-arm p' is so far above the position shown in Fig. 4 that the cartridges Q may be freely inserted beneath it. Thereupon the gate n being returned to the closed position (shown in Fig. 4) the rib n^4 is shifted out of contact with the hub o and the carrier-arm p' is thrust against the last cartridge Q by the spring p^2 .

The operation of said rifle for magazine fire is as follows: The parts being in the position shown in Fig. 2, the trigger K is pulled out of engagement with the sear i' , releasing the hammer I , which being thrown by the spring I' drives the firing-pin J into the head of the cartridge Q in the chamber a , and thereby discharges said cartridge. Thereupon the barrel A recoils until its rear face a' encounters the abutment c in the frame C , during which movement of the barrel the locking-plunger H is withdrawn from the recess E' by the links h' , which rock freely upon the stationary hammer-spindle i , and the shock of recoil projects the released bolt E rearwardly within the receiver F , compressing the spring G until the head of said bolt is in the rear of the magazine M , thus opening the slot C' in the side of the frame C and permitting the cartridge-shell to be discharged therethrough. Thereupon the first cartridge in the magazine is carried through the cartridge-inlet M' into alinement with the bolt E by the lever p' pressing upon the last cartridge, and said bolt E being returned by the spring G the cartridge is thereby thrust into the chamber a and the barrel shifted forward to its normal position, the locking-plunger H being returned to its initial position by the links h' . The aforesaid rearward movement of the barrel A also returns the hammer I to its cocked position, the sear i' rocking upon its pivot to clear the front end of the trigger K and snapping beneath the latter to retain the hammer in the cocked position. (Shown in Fig. 2.) Extending through said slot C' in the right-hand side of the frame

C is the bolt-handle E^2 , whose knob e^2 serves to operate the detent-lever e^3 , which is pivoted at e^4 in the handle. During the operation of the arm for magazine fire said detent-lever is retained in the position shown in Fig. 4 by the split ring E^3 . However, during the operation of the device for single fire said ring is rotated upon the handle E^2 until the gap therein registers with the lever e^3 , thus freeing the latter for vertical movement. The result of the adjustment aforesaid is that upon discharge of the arm the bolt E is projected rearwardly and the emptied shell discharged, as during magazine fire; but said bolt is retained in its rearward position by the engagement of said lever e^3 in the recess c' in the margin of the slot C' , so that the operator may manually insert a cartridge through the slot C' , and thereupon uptilt the knob e^2 to disengage the detent e^3 from the recess c' and permit the bolt E to thrust the cartridge into the firing position. During the operation of the rifle for single fire the cut-off R , which is normally maintained in the position shown in Figs. 1 and 4, by contact with the resilient side of the magazine-casing M may be upturned until its toe r projects within the magazine and prevents the delivery of the cartridges Q therefrom.

I find it desirable to provide the slot in with a dust-cover C^2 , whose edges slide C' the undercut channels c^2 (indicated in Fig. 4) in the frame C . Said cover is provided with an outwardly-projecting flange c^3 , by which it may be manually closed, and its rearward extremity c^4 is resilient and so shaped as to snap outwardly into engagement with the margin of the slot when the cover is in its closed position. Said cover is conveniently opened into the position shown in Fig. 3 by thrusting inwardly upon its rear extremity c^4 to release it from engagement with the slot and thereupon shifting the breech-bolt E rearwardly by the handle E^2 .

Although the hammer I is arranged to be cocked automatically by the recoil of the barrel, as above described, I find it convenient to fix upon the hammer-spindle i , exterior to the frame C , a cocking-piece I^2 , which is so shaped as to be readily manipulated. I also find it convenient to provide said hammer with a safety-lock I^3 , which under normal conditions is in the position shown in full lines in Fig. 3, but when turned upon the stud i^3 to the position shown in dotted lines in said figure bears against the side of the cocking-piece and prevents accidental movement of the hammer I .

It is to be understood that the form of my invention hereinbefore described is capable of three distinct operations—viz., first, single cartridges may be inserted through the slot C' , delivered directly to the barrel A and discharged at such intervals as the operator may elect; second, cartridges may be delivered from the magazine M to the barrel A and discharged at such intervals as the oper-

ator may elect by pulling and instantly releasing the trigger, or, third, the operator may maintain the pressure on the trigger, and thus effect the successive discharge of all of the cartridges from the magazine at intervals determined solely by the automatic action of the mechanism, the safety-key L thrusting the trigger forward against the finger of the operator when the bolt E is thrown rearwardly by the recoil.

I do not desire to limit myself to the precise construction which I have shown and described, as it is obvious that various modifications may be made therein without departing from the essential features of my invention.

I claim—

1. In a firearm, the combination with a receiver; of a breech-bolt mounted to reciprocate in said receiver; a slot in the side of said receiver; a handle fixed upon said bolt and extending through said slot; a recess in the margin of said slot; and a detent-lever secured to said handle and adapted to engage said recess, substantially as set forth.

2. In a firearm, the combination with a receiver; of a hammer inclosed by said receiver; a spindle for said hammer; a cocking-piece fixed upon said spindle exterior to said receiver; and a safety-lock for said cocking-piece, exterior to said receiver, substantially as set forth.

3. In a firearm, the combination with a hammer; of a spring-actuated sear pivoted to and carried by said hammer; and a reciprocatory trigger arranged to engage said sear, substantially as set forth.

4. In a firearm, the combination with a reciprocatory barrel; of a reciprocatory breech-bolt; means to automatically engage and disengage said breech-bolt with respect to said barrel; a hammer; a trigger; and a safety-key operated by said breech-bolt to automatically return said trigger to its normal position when the barrel and breech-bolt are disengaged, substantially as set forth.

5. In a firearm, the combination with a reciprocatory barrel; of a reciprocatory breech-bolt; a locking mechanism; means to automatically operate said locking mechanism, by the recoil of the barrel, to disengage and reengage said breech-bolt and barrel; a hammer; a spring-actuated sear pivoted to and carried by said hammer; and a reciprocatory trigger arranged to engage said sear, substantially as set forth.

6. In a firearm, the combination with a reciprocatory barrel; of a reciprocatory breech-bolt; a locking mechanism; means to automatically operate said locking mechanism, by the recoil of the barrel, to disengage and reengage said breech-bolt and barrel; a hammer; a trigger; means to automatically operate said hammer repeatedly when said trigger is compressed; and a safety-key operated by said breech-bolt to automatically return said trigger to its normal position when the

barrel, and breech-bolt are disengaged, substantially as set forth.

7. In a firearm, the combination with a receiver; of a breech-bolt mounted to reciprocate in said receiver; a slot in the side of said receiver; a handle fixed upon said bolt and extending through said slot; a slide-cover for said slot arranged to be opened by said handle; a recess in the margin of said slot; and a detent-lever pivoted to said handle, and adapted to engage said recess, substantially as set forth.

8. In a firearm, the combination with a receiver; of a breech-bolt mounted to reciprocate in said receiver; a hammer inclosed by said receiver; a spindle for said hammer; a cocking-piece fixed upon said spindle exterior to said receiver; a safety-lock for said cocking-piece exterior to said receiver; a trigger; and a safety-key operated by said breech-bolt to automatically return said trigger to its normal position when the breech-bolt is disengaged, substantially as set forth.

9. In a firearm, the combination with a frame; of a barrel arranged to reciprocate in said frame; a reciprocatory breech-bolt; a locking-plunger carried by the barrel; a link pivoted at one extremity to said locking-plunger, and at the other extremity to the barrel; and another link pivoted at one extremity to said locking-plunger and at the other extremity to the frame, whereby said locking-plunger is withdrawn and the barrel and breech-bolt disengaged by the recoil of the barrel, substantially as set forth.

10. In a firearm, the combination with a frame; of a barrel arranged to reciprocate in said frame; a reciprocatory breech-bolt; a locking-plunger carried by the barrel; a link pivoted at one extremity to said locking-plunger, and at the other extremity to the frame, whereby said locking-plunger is withdrawn and the barrel and breech-bolt disengaged by the recoil of the barrel, substantially as set forth.

11. In a firearm, the combination with a frame; of a barrel arranged to reciprocate longitudinally in said frame; a receiver fixed in said frame and curved in the direction of its length; a cartridge-inlet in said receiver; a breech-bolt curved in the direction of its length to reciprocate in said receiver and normally closing said inlet; mechanism connecting said barrel and breech-bolt, said breech-bolt being shifted to uncover said inlet by the rectilinear recoil of said barrel; a cartridge-magazine fixed beneath said receiver in registry with said inlet; a rock-shaft mounted in said magazine; a cartridge-carrier lever fixed upon said rock-shaft to force the cartridges of the magazine charge through said inlet into the receiver; a spring in operative relation with said carrier-lever; a gate for said magazine; and means operatively connecting said carrier-lever and said gate, arranged to permit the movement of said lever independently of said gate when the latter is

closed, and to reset said lever in its initial position when said gate is opened, substantially as set forth.

12. In a firearm, the combination with a
5 frame; of a barrel arranged to reciprocate longitudinally in said frame; a receiver fixed in said frame and curved in the direction of its length; a cartridge-inlet in said receiver; a breech-bolt curved in the direction of its
10 length to reciprocate in said receiver, and normally closing said inlet; mechanism connecting said barrel and breech-bolt, said breech-bolt being shifted to uncover said inlet by the rectilinear recoil of said barrel; a cartridge-magazine fixed beneath said receiver
15 in registry with said inlet; a rock-shaft mounted in said magazine; a cartridge-carrier lever fixed upon said rock-shaft to force the cartridges of the magazine charge through said
20 inlet into the receiver; a spring in operative relation with said carrier-lever; the cut-off lever R, provided with the toe r, normally retained exterior to the magazine; and means to secure said lever with its toe r, projecting
25 within the magazine, to prevent the delivery of the cartridges through said inlet, substantially as set forth.

13. In a firearm, the combination with a frame, and a receiver; of a barrel arranged
30 to reciprocate in said frame; a breech-bolt mounted to reciprocate in said receiver; a locking mechanism operated by the recoil of the barrel to disengage and reengage said bolt

and barrel; a hammer; a spindle for said hammer; a cocking-piece fixed upon said spindle
35 exterior to said receiver; a sear pivoted to and carried by said hammer; a trigger arranged to engage said sear; and a safety-key operated by said breech-bolt to automatically return said trigger to its normal position when
40 the breech-bolt is disengaged, substantially as set forth.

14. In a firearm, the combination with a frame; of a barrel arranged to reciprocate longitudinally in said frame; a receiver fixed in
45 said frame and curved in the direction of its length; a breech-bolt curved in the direction of its length and fitted to reciprocate in said receiver; locking mechanism, operated by the recoil of the barrel, to disengage said bolt and
50 barrel; a spring, operative to return said bolt and barrel to the initial position; a hammer; a sear pivoted to and carried by said hammer; a trigger arranged to engage said sear; and a safety-key operated by said breech-bolt
55 to automatically return said trigger to its normal position when the barrel and breech-bolt are disengaged, substantially as set forth.

In testimony whereof I have hereunto signed my name, at Philadelphia, Pennsylvania, this 18th day of February, 1901.

THEODORE M. THORSEN.

Witnesses:

ARTHUR E. PAIGE,
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