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Patented Oct. 16, 1900.

J. M. BROWNING.
RECOIL OPERATED FIREARM.

(Application filed June 6, 1900.)

(No Model.)

4 Sheets—Sheet 1.

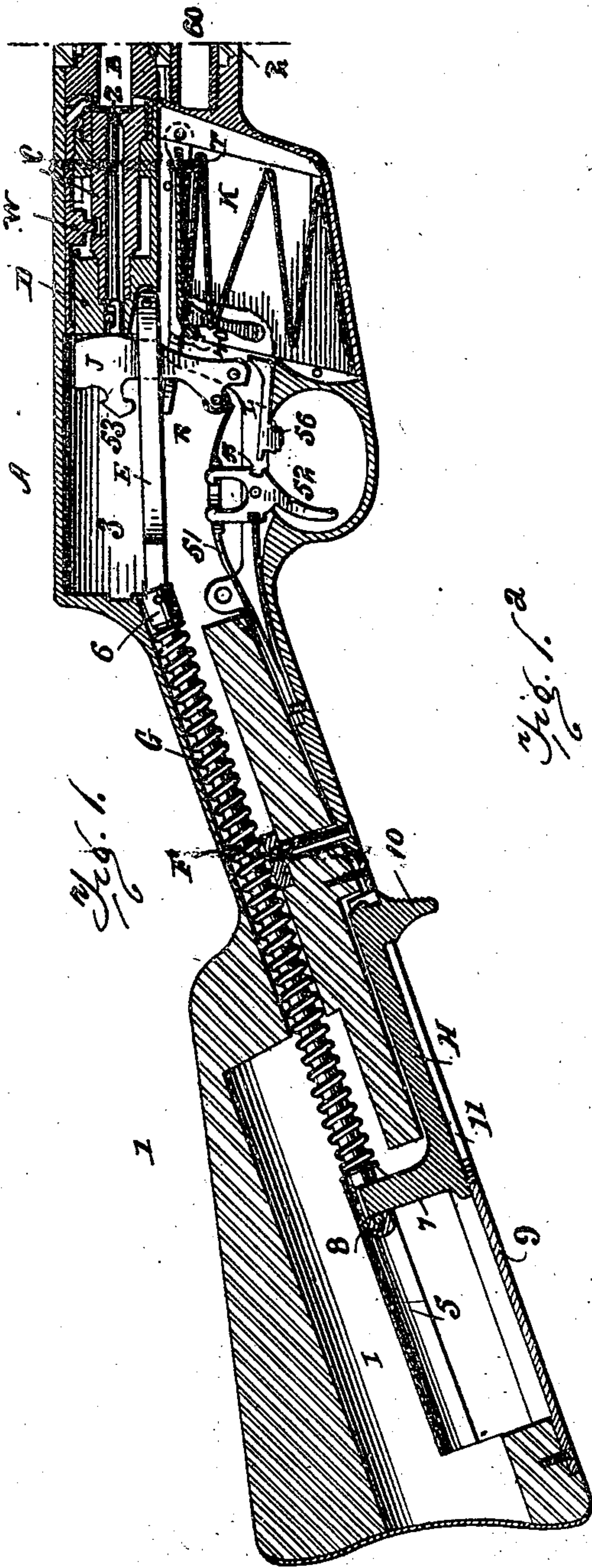


Fig. 1.

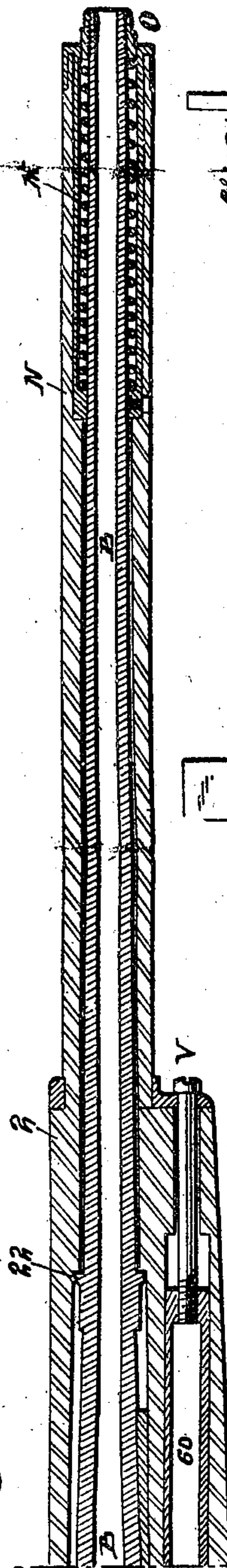


Fig. 2.

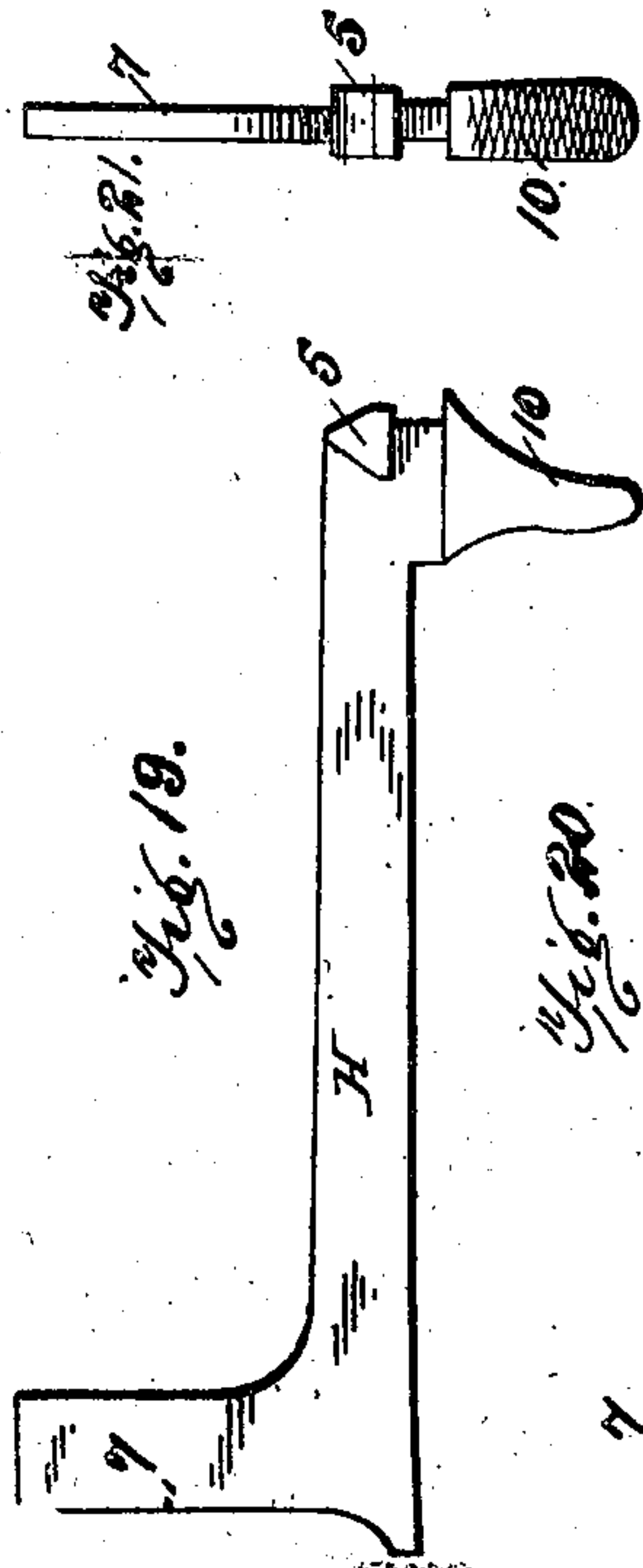


Fig. 19.

Fig. 20.

Fig. 18.



Fig. 13.

Fig. 14.



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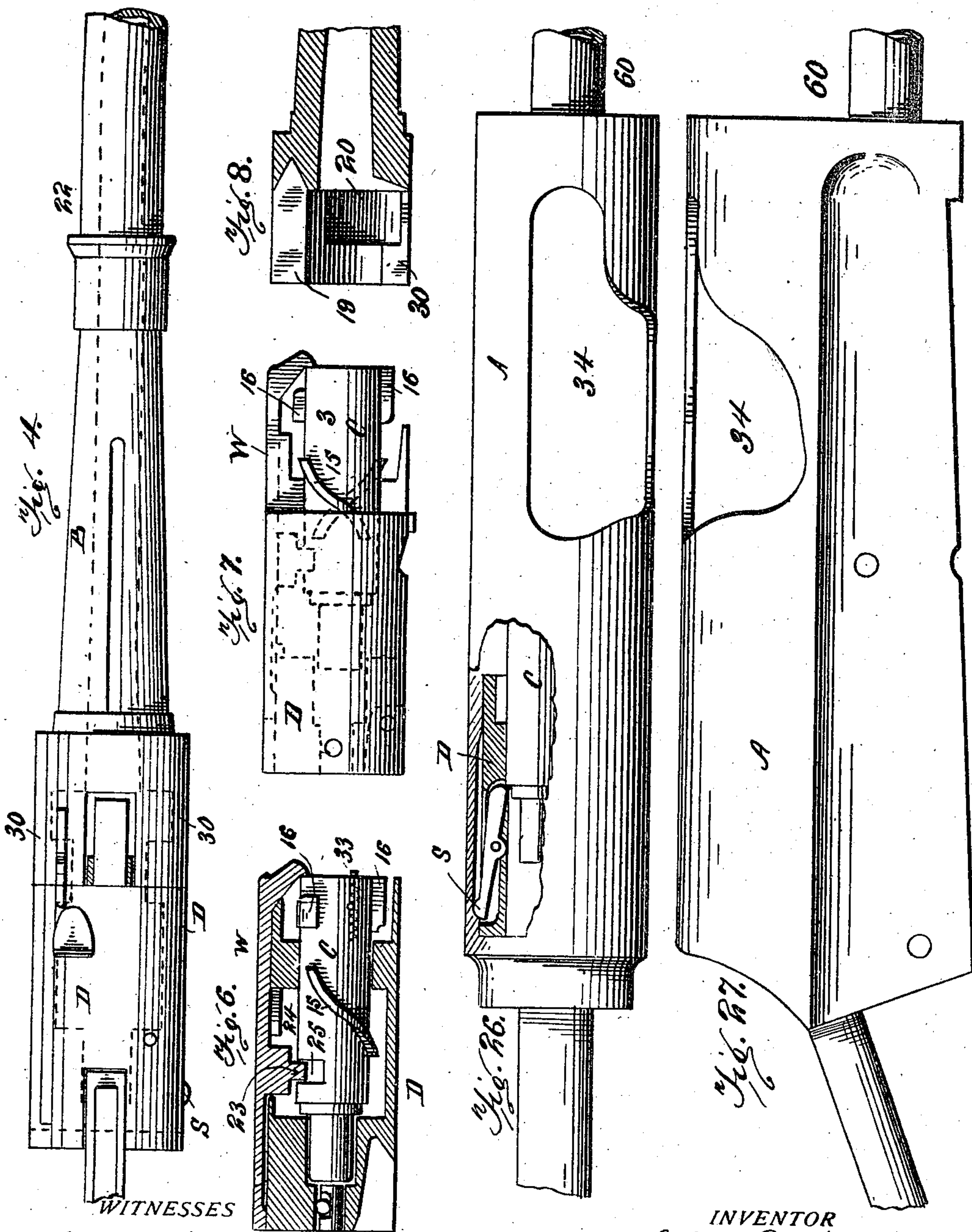
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JOHN M. BROWNING, OF OGDEN, UTAH.

RECOIL-OPERATED FIREARM.

SPECIFICATION forming part of Letters Patent No. 659,786, dated October 16, 1900.

Application filed June 6, 1900. Serial No. 19,260. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. BROWNING, a citizen of the United States, residing at Ogden, in the county of Weber and State of Utah, have invented certain new and useful Improvements in Automatic Guns, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to automatic or recoil-operated guns.

The object of the invention is to improve the construction and combination of parts of a gun of this character and to make the operation of the bolt-carrier and the bolt dependent on the condition of usage, so that the working may be automatic or manual, as may be desirable.

Figure 1 is a longitudinal nearly-central section of the stock, magazine, and the main portions of the operating mechanism of a rifle involving the principles of this invention with breech closed and in firing position. Fig. 1^a is a similar section of the front stock and barrel portions of the gun. Fig. 2 is a broken longitudinal section and partial elevation of the bolt, bolt-carrier, and associated mechanism in recoiled position with breech locked and magazine omitted. Fig. 3 is a similar view showing breech unlocked, barrel returned to forward position, and bolt-carrier in rear position with bolt-carrier about to spring forward. Fig. 4 is a bottom plan of a portion of the barrel with bolt and bolt-carrier in locked position. Fig. 5 is a detail plan of slideway guide-strip. Fig. 6 is a detail section of bolt-carrier, showing bolt in locked position and extractor in operative position. Fig. 7 is an elevation of the bolt-carrier, showing bolt in unlocked position. Fig. 8 is a broken section of the rear part of the barrel. Figs. 9 and 10 are detail elevation and plan of the bolt-carrier stop. Figs. 11 and 12 are plan and elevation of magazine-follower. Fig. 13 is a side elevation, Fig. 14 a plan, and Fig. 15 a cross-section, of the cartridge-extractor. Fig. 16 is a detail horizontal section of the magazine, showing stop and latch-lever in plan. Fig. 17 is a plan, and Fig. 18 an elevation, of the bolt-locking pawl. Fig. 19 is an elevation, Fig. 20 a plan, and Fig. 21 an end elevation, of the operating-slide detached. Fig. 22 is a top plan of the bolt-carrier; Fig. 23, a side elevation of the same, and Fig. 24 a front elevation of the bolt-carrier and bolt in locked

position. Fig. 25 is an elevation of the bolt. Fig. 26 is a plan of the receiver or shoe, partly broken away to show the engagement of extension bolt-lock with bolt-carrier and receiver. Fig. 27 is an elevation of the receiver. Fig. 28 is a vertical longitudinal section of the bolt-carrier.

To avoid complication, some of the springs and minor parts are omitted in some of the figures, but their location will generally be apparent.

The receiver, shoe, or frame A is of suitable form and material to receive and support the operative parts of the gun and is suitably connected to the butt-stock 1 and to the forestock 2. The receiver has a longitudinal generally-cylindrical chamber 3, in which the rear end of the barrel B and the bolt-carrier D may have longitudinal movement. The bolt-carrier D is connected by a link or pitman E to the action-rod F, the link E being pivoted to both parts. The action-rod F moves in a suitable guideway I in the butt-stock and partakes of the longitudinal movement of the bolt-carrier D. The action-spring G surrounds the rod F, having its rear bearing against the front of the guideway I or other suitable support fixed to the stock and its front end bearing against the head 6 of the action-rod, thus tending to always press the action-rod and the bolt-carrier connected thereto to the forward position of said parts. The operating-slide H has a stem 7, which connects with the action-rod G and moves with the action-rod by means of a pin-and-shoulder engagement 8, Fig. 1, or other suitable connection. The slide H is guided in the slideway 9 by reason of the handpiece 10, projecting through a slot 11 in said slideway. (See Figs. 19, 20, and 21.) An enlarged opening 12 in the slideway permits the assembling of these parts, and the slideway forms a convenient closing and strengthening piece for the bottom of the butt-stock, a boss 5 of the operating-slide extending above the slideway.

To first open the gun, as for loading the magazine, draw back the slide H by the hand or plunger piece 10. This draws back the action-rod, link, and bolt-carrier, as will be readily understood. The bolt-carrier D being pivoted to link E cannot rotate in the receiver. It may be otherwise supported to move lengthwise only in said receiver. The bolt-carrier D is cored lengthwise to receive

bolt C. Bolt C has spiral wings 15, which engage corresponding grooves 18 in the bolt-carrier. The bolt C has locking-lugs 16, which engage with spiral or circumferential grooves 20 in the rear extension 30 of the barrel in the usual manner of engagement of a mutilated screw or bayonet-catch engagement for locking the bolt to the barrel. Both spiral and circumferential locking-grooves are old, and this invention is applicable to either form. The barrel B is normally held forward in the fore stock 2, Fig. 1*, by spring M, which is inclosed in housing N, and a collar O on the barrel receives the thrust of the spring M. A shoulder 22 serves as a forward check or stop to the barrel, and the barrel is held against rotation in the stock in any suitable or usual way and cushioned in usual manner. When the bolt C is in its forward position relatively to the bolt-carrier D, as will be hereinafter explained, the lugs 16 of the bolt are in position to enter the longitudinal grooves 19 of the barrel extensions. When so entered, a forward movement of the bolt-carrier rotates the bolt on its axis by reason of the engagement of the wings 15 on the bolt with the spiral grooves 18 in the bolt-carrier, and the lugs 16 of the bolt are carried around to locked position in the recesses 20 of the barrel extensions 30, the bolt at the same time having a spiral telescopic movement into the carrier, which closes up the barrel extensions. The extractor W has a lug 23, which extends down into a slot 24 in bolt-carrier D. The bolt of the extractor rests in a groove in the carrier and has a longitudinal movement therein limited by the contact of lug 23 with the ends of the slot 24. Bolt C has a transverse groove or notch 25, into which the lug of the extractor extends, and this engagement of the bolt with the extractor-lug limits both the rotary and the longitudinal movement of the bolt relatively to its carrier. The extractor slides in the receiver, and thus serves to hold the bolt and carrier together. The firing-pin Z is carried by the bolt-carrier and partakes of the longitudinal movement of the carrier, but not of the separate movement of the bolt. Suppose, now, the parts to be in the position of Fig. 1. To open the breech, draw back on the handle 10. This draws back the bolt-carrier through the connections stated, partly rotating the bolt by means of the spiral wing-and-groove connections, and when the bolt has turned far enough, the bolt-carrier having meanwhile moved back relatively, the bolt will move back with the carrier, the barrel being all the while held forward by its spring M. When the bolt-carrier has completed its backward movement under such conditions, the bolt will extend forward from the carrier. An extension bolt-lock S, Fig. 26, which lies in a recess in the bolt-carrier, is actuated by a spring to project its front end behind the bolt and so hold the bolt in its forward position, in which the lugs 16 are in line with

the grooves 19 in the barrel. A recess in the receiver permits the projection of the rear end of the extension bolt-lock S when in position of Fig. 26; but as the bolt-carrier moves forward an incline in the wall of the receiver forces in this end of the stop S, permitting the telescopic movement of bolt and carrier at the proper time. This automatic locking and unlocking of the bolt in its position relatively to the carrier insures the proper engagement of the bolt with the barrel. Now suppose a cartridge to be inserted in the barrel of the gun and the bolt closed thereon by a forward movement of the bolt-carrier. The bolt will present its wings 16 in line with the recesses 19 of the barrel extension and will enter therein. At this instant the bolt-lock S is released, and the forward movement of bolt-carrier D causes the bolt to rotate to locked position, the bolt-carrier closing over the bolt into close contact with the barrel, as in Fig. 4. If the cartridge is now fired, the recoil carries the barrel and bolt-carrier directly backward, as in Fig. 2, compressing both springs G and F. Latch P, pivoted in the receiver on the pivot 31 of the hammer, is pressed up by a spring 61 to engage a shoulder 32 on the bolt-carrier, thus retaining the carrier in its rearmost position. The barrel B moves forward under the impulse of spring M, and, pulling the bolt with it by means of the locking engagement described, causes the bolt C to partially rotate until it is unlocked, when the barrel continues to move forward, leaving the bolt in the position of Fig. 3. The extractor W engages the cartridge flange or groove as usual, and when the barrel has moved forward far enough the spring-ejector 33, Fig. 6, pressing on the lower part of the cartridge-head throws out the shell through the opening 34 in the receiver in usual manner. The further forward movement of the barrel B brings the lug 35 on the barrel into contact with the front portion 36 of the latch-lever Q, rocking said lever on its pivot 37 and also rocking the latch P, with which said lever engages, as indicated in Figs. 2 and 3. As soon as the latch P is rocked far enough to be released from the bolt-carrier D said carrier jumps forward under the impulse of the action-spring G, carrying a cartridge with it, if one be present, and closing and locking the breech, as before described. When the barrel, with the bolt locked to it, moves back under the recoil impulse, the lug 38 on the bolt-carrier, striking the surface 36 of the latch-lever Q, depresses said lever so that the lug 35 on the barrel rides over the latch-lever; but when the bolt-carrier is drawn back by pulling on the operating-slide H the lug 38 rides over the lever Q, which immediately rises and its front end is in position to engage the lug 35 on the barrel and to hold the barrel against backward movement even should the cartridge stick in the barrel. The gun then opens, as in Fig. 3. The magazine K is of any usual construction.

tion to receive its cartridges side by side or one above another, and the magazine has a spring-actuated follower T, Figs. 1 and 16. Alongside the magazine is the bolt-stop R, having a side projection 40, which extends over a nib 41 on the follower T. If there be a cartridge or cartridges in the magazine, the follower T cannot rise so far that nib 41 lifts the stop R, the follower being held down by the cartridge or cartridges thereon; but if the magazine be empty the follower is lifted by its spring until its nib encounters the bolt-stop, and this engagement of the follower with the stop lifts the stop R in front of the bolt-carrier, as in Fig. 3, holding the bolt in position to allow the charging of the magazine through opening 34. Any usual detent may hold the top cartridge from rising under the impulse of the follower T. The stop R, as shown, has a finger-piece 43, by which the stop may be released when desirable, said finger-piece extending alongside the magazine. The hammer J, pivoted at 31, is pressed upward by the spring 51, as heretofore, and the trigger 52 may engage the hooks of the projection 53, as heretofore. The safety-catch L has a tang 54, which may slide under the heel of the hammer when the hammer is turned back, Figs. 2 and 3, and at the same time the end of the catch L may enter notch 55 in the trigger and so lock both hammer and trigger, when the slide is drawn back by the finger acting on finger-piece 56. It is desirable to lock the hammer at full-cock, so that the other mechanism may slide over the hammer without interference therewith.

The front stock 2 is cored to receive the sleeve 60, which sleeve may screw into the front of the frame A. A bolt V, which screws into a threaded hole in the front of this sleeve, serves to hold the parts together. By removing this bolt the front stock and barrel may be separated from the rear stock.

The operations of the different parts have been separately explained. Supposing gun and magazine to be loaded, the gun may be fired by pulling the trigger when the safety-catch is forward. The hammer strikes the firing-pin and explodes the cartridge. The recoil carries back the barrel, bolt-carrier, and bolt and in moving back the hammer is cocked thereby and so held. The latch P, pressed up by the spring 61, holds the bolt-carrier back and the action-spring compressed. The barrel then moves forward, turning and unlocking the bolt and leaving the bolt in position to enter the locking-grooves in the barrel, the bolt-lock holding it in such position. The shell is ejected and a new cartridge rises in front of the bolt. The extreme forward movement of the barrel releases the bolt-carrier by the action on the latch and latch-lever, and when released the bolt-carrier moves forward under the influence of the action-spring, its forward movement unlocking the bolt from the carrier and then engaging and locking it with the barrel.

Thus the loading is entirely automatic or recoil-actuated, but the firing is by means of a pull on the trigger, as with most other guns. No time is lost in loading the gun, as the action is almost instantaneous and much quicker than the eye can follow; but the firing may be as deliberate as is desired. If there be no cartridges in the magazine, the barrel, bolt, and bolt-carrier move back together when a cartridge is fired and then the barrel moves forward and the bolt and carrier are held back by the latch, as has been explained, so that the magazine may be filled from the top.

Changes and modifications within the scope of the claims are contemplated. I have described the best form of the invention known to me at the present time, but do not limit to precise forms and constructions save as pointed out in the claims.

What I claim is—

1. In an automatic gun as described, the combination of a receiver in which the barrel moves as described, a barrel, bolt, and bolt-carrier, and means for locking the bolt to the barrel by a partial rotation of the bolt, and for holding back the bolt and unlocking the bolt from the barrel by a reverse rotary movement of the bolt and an extension bolt-lock for holding the bolt in forward position relatively to the bolt-carrier, when the barrel moves forward from its recoiled position, substantially as described.
2. In an automatic gun, the combination of the receiver, barrel, bolt, and bolt-carrier, spiral wing-and-groove connection between the bolt and bolt-carrier as described, locking-ribs on the bolt engaging corresponding grooves in the barrel, the pivoted extension bolt-lock operating as described and engaging the frame to release the bolt and permit its spiral telescopic movement as the bolt-carrier moves forward, all substantially as described.
3. In an automatic gun, the combination of the receiver in which the barrel may move longitudinally, the barrel, bolt-carrier, and bolt, the latter moving telescopically and spirally in the carrier, means for holding the barrel forward when the bolt-carrier is drawn to the rear, and an action-rod and connections to the bolt-carrier within the rear stock, by which the bolt-carrier and bolt may be manually retracted, the barrel remaining forward, substantially as described.
4. In an automatic gun, the combination of the receiver, bolt-carrier reciprocating therein, bolt having spiral telescopic connection to the bolt-carrier, and barrel to which the bolt may be locked by partial rotation as described, a link connected to the bolt-carrier and a reciprocating action-rod within the rear stock, connected to said link, and a spring bearing said rod forward, substantially as described.
5. In an automatic gun, the combination of the receiver, the barrel constructed to reciprocate therein, a spring acting to press the

barrel forward, a bolt-carrier and bolt having telescopic spiral connection as described whereby the bolt may be partially rotated and thereby locked or unlocked from the barrel as described, an action-spring carried by a slide-piece in the stock, said slide-piece having a link connection to the bolt-carrier to move said carrier forward, all substantially as described.

6. In an automatic gun, the combination of the receiver, barrel, bolt-carrier reciprocating in the receiver, and bolt reciprocating in the bolt-carrier, and an extension bolt-lock engaging the bolt and bolt-carrier to retain the bolt in its forward position relatively to its carrier, and in position to make first locking engagement with the barrel by direct forward movement, substantially as described.

7. In an automatic gun, the combination of the receiver, the barrel, bolt-carrier, and bolt, constructed to reciprocate in the receiver substantially as described, a spiral telescopic connection between the bolt-carrier and bolt, and a pivoted extension bolt-lock, automatically holding the bolt forward when the bolt-carrier is in rearmost position, and automatically disengaged by the forward movement of the bolt-carrier, substantially as described.

8. In an automatic gun, the combination of the bolt-carrier, action-rod connected thereto and extending backward in the rear stock, the slide connected to said action-rod and having a finger-piece extending outside the stock, and the slideway having a slot therein, and serving as a longitudinal guide for said slide, substantially as described.

9. In a gun of the character described, the receiver, the bolt-carrier and bolt having spiral telescopic connection, and the extractor having a lug engaging slots or openings in the bolt-carrier and bolt, whereby the longitudinal and rotary movements of the bolt relatively to its carrier are limited, all combined substantially as described.

10. In a gun of the character described, the combination of the receiver, barrel, bolt-carrier and bolt, a sliding action-piece and a link connecting the carrier thereto for moving the bolt-carrier rearwardly; and a spring pressing the carrier forward, and a carrier-latch, engaging the bolt-carrier to lock it in its rearmost position, substantially as described.

11. In a gun of the character described, the receiver, barrel reciprocating therein, and pressed forward by a spring, bolt-carrier and bolt having spiral telescopic engagement, substantially as described, a sliding action-piece in the stock and a link connecting the same to the bolt-carrier and a carrier-latch engaging the bolt-carrier at its rearmost position, to hold the carrier back while the barrel by its engagement with the bolt moves the same spirally forward, substantially as described.

12. The combination of the receiver, bolt-

carrier reciprocating therein and bolt having spiral telescopic connection to the carrier, of the carrier-latch pivoted in the frame in position to engage the carrier and hold it in rear position, the reciprocating barrel, and means connecting to the barrel by which the carrier-latch is released by the forward movement of the barrel, substantially as described.

13. The combination with the receiver, bolt-carrier and barrel reciprocating in the receiver, and bolt having telescopic connection to its carrier and locking engagement as described with the barrel, of a carrier-latch engaging said carrier to hold it back as the barrel moves forward, and the bolt extension-lock engaging the bolt to hold the same forward relatively to its carrier, as the barrel engagement moves the bolt forward from the latched carrier, substantially as described.

14. The combination of the receiver, bolt-carrier reciprocating therein, bolt having spiral telescopic connection with carrier, and the barrel sliding in the receiver and having locking engagement with the bolt as described, of the bolt-carrier latch engaging the bolt-carrier to hold it in open position, and the carrier-latch lever engaged by the barrel in its forward movement, and acting on the carrier-latch to disengage the same, substantially as described.

15. The combination of the receiver, bolt-carrier and barrel reciprocating in the receiver, and bolt telescoping in its carrier substantially as described, of the carrier-latch lever, a lug on the carrier in proximity to the barrel when the parts are in locked relation, and a lug on the barrel with which the latch-lever engages to hold the barrel forward when not released by the action of the carrier-lug, all substantially as described.

16. In a gun of the character described, the combination with the receiver and bolt-carrier reciprocating therein, the magazine having a spring-actuated follower, and the bolt-stop pivoted in the frame and having a projection in line of movement of the magazine-follower, and actuated thereby to stop the forward bolt movement when the magazine is empty, and a finger-piece by which said stop may be manually released, substantially as described.

17. In a gun of the character described, the pivoted hammer, the notched trigger, and a slide in the frame having a tang which comes under the heel of the hammer while the slide enters the notch in the trigger, whereby the hammer is locked at full-cock and the trigger separately locked by the same slide-piece.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN M. BROWNING

Witnesses:

JOSIE ZITZMAN,

JOHN EVANS.