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Patented Dec. 18, 1900.

A. BURGESS.
AUTOMATIC FIREARM.
(Application filed Dec. 10, 1897.)

(No Model.)

3 Sheets—Sheet 1.

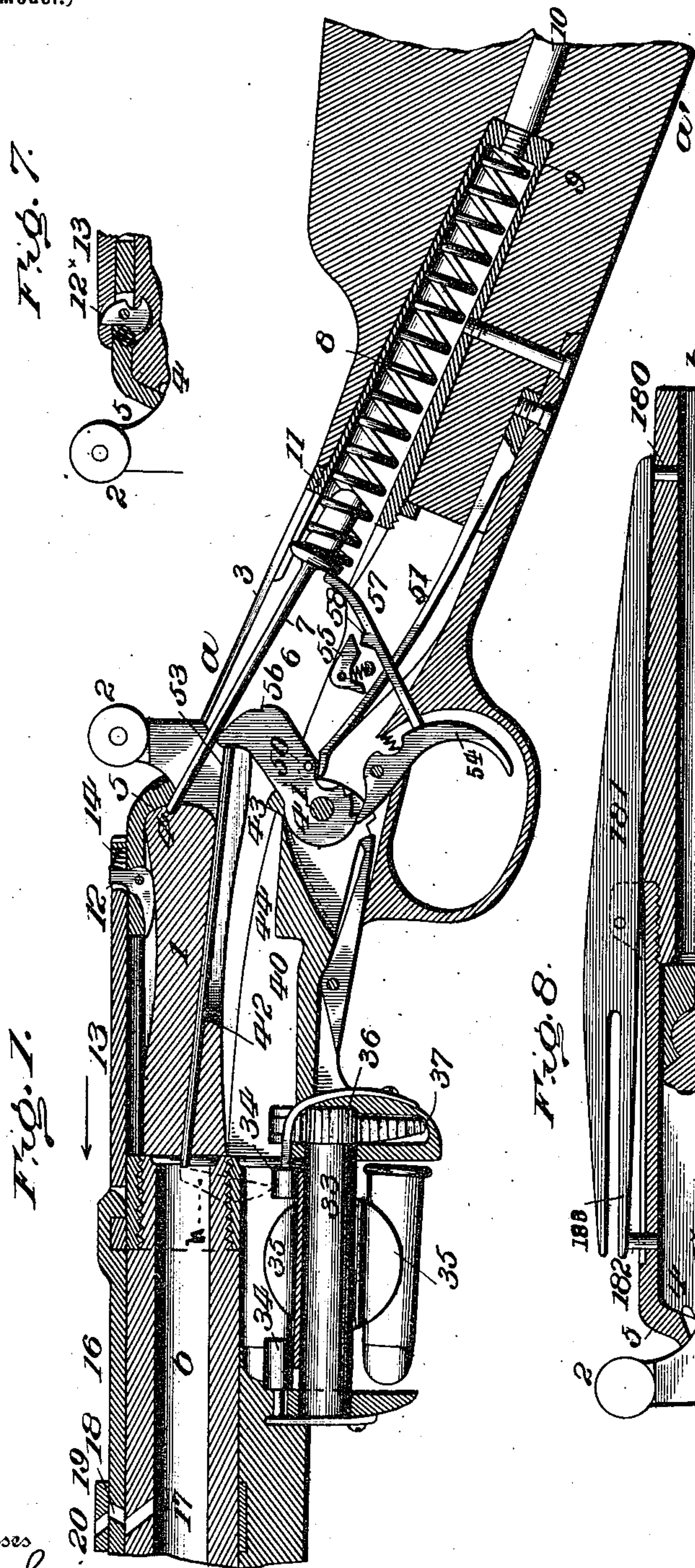
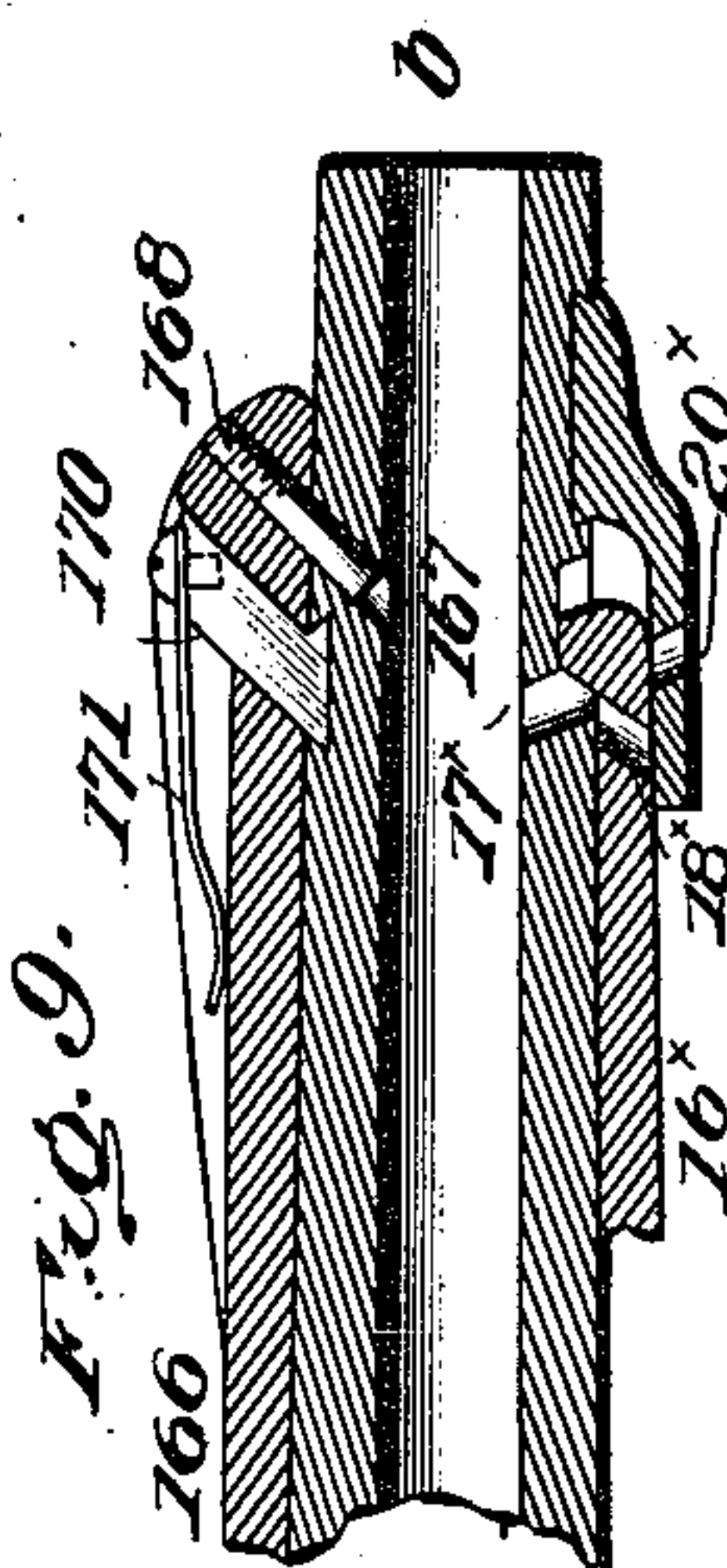
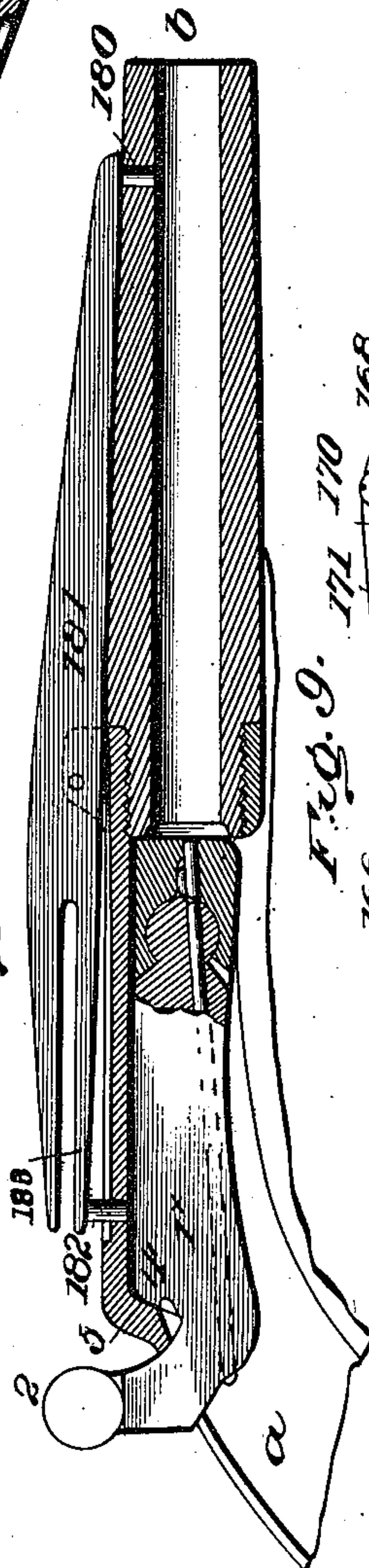


Fig. 1.

Fig. 8.



Witnesses
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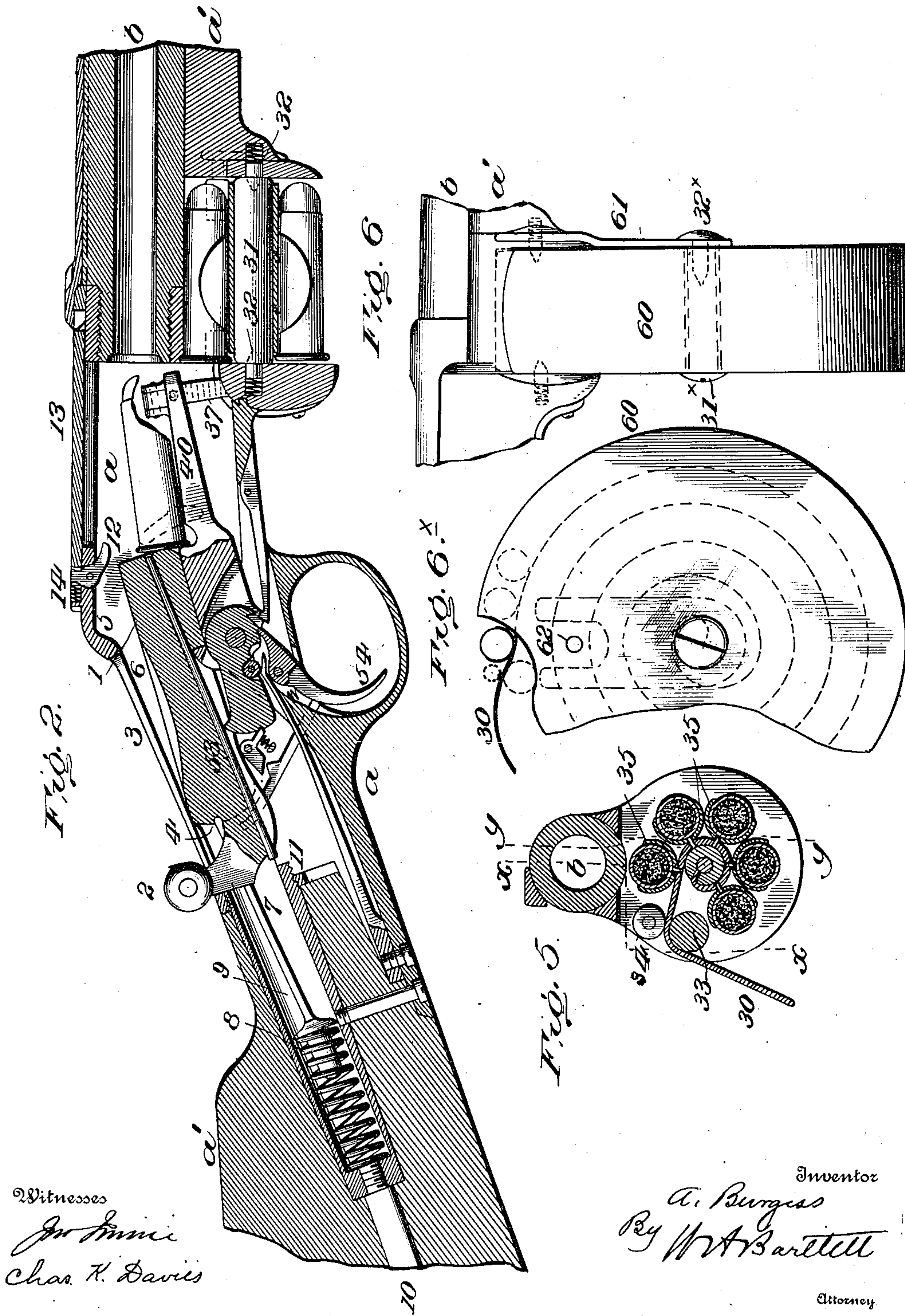
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3 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE

ANDREW BURGESS, OF BUFFALO, NEW YORK.

AUTOMATIC FIREARM.

SPECIFICATION forming part of Letters Patent No. 663,954, dated December 18, 1900.

Application filed December 10, 1897. Serial No. 661,335. (No model.)

To all whom it may concern:

Be it known that I, ANDREW BURGESS, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Guns, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to automatic firearms in which the loading operation is or may be effected by gas-pressure.

The object of the invention is to produce a gun of the kind named in which the parts are of simple construction and convenient in operation.

The gun is intended to be used either with a small or large magazine.

The special improvements of the present invention are intended to be pointed out in the claims.

Figure 1 is a broken longitudinal nearly-central section, the magazine being on line xx of Fig. 5, of the working parts of a gun involving the invention, showing the breech closed. Fig. 2 is a similar view with magazine on the line yy of Fig. 5, showing the breech open. Fig. 3 is a side elevation of the same parts. Fig. 4 is a broken plan showing a modification of the breech-operating mechanism by which pressure to unlock the breech is taken from the muzzle. Fig. 5 is a cross-section through the magazine and feeder. Fig. 6 is a broken side elevation showing large cartridge-case carrying elongated feed-belt in the magazine or feeder, shown in reduced scale. Fig. 6* is a broken end elevation of large magazine on reduced scale. Fig. 7 is a broken detail section of a modified locking-catch. Fig. 8 is a broken detail section of a modification to delay the opening movement, and Fig. 9 is a broken detail section of a modification.

Automatic guns must be adapted to the ammunition with which they are fired. With one kind of ammunition—for instance, blank cartridges or shot-cartridges—it may be desirable to open the breech in the early part of the pressure to conserve force enough for the further operations. With another kind, as for long-range shooting and high pressure, a little delay is desirable that the bullet may leave the gun before the parts have changed position materially to insure accuracy and

force in the firing. The same gun may have constructions for both purposes. In this specification I desire to explain how the same principle may be available for such different purposes, with trifling modifications in construction, including the use also on the same gun of large and small packages or magazines full of cartridges.

The frame and stock may be designated by a a' and the barrel by b . Such parts will be readily recognized in the drawings by persons skilled in the art. The frame a is the main gun-frame and not a secondary sliding frame.

The breech-closing bolt 1 moves in a curved recess in the frame, the handle 2, by which the bolt may be worked by hand when desirable, extending through a slot 3 in the top of the frame. The bolt has a locking-shoulder 4, which moves upward behind the abutment 5 in the frame in locking the bolt. In unlocking and opening the breech the rear end of the bolt first moves down from in front of the abutment 5 to unlock, and the bolt then moves back in the recess 6 in the frame or receiver, the handle only projecting outside the frame. A push-bar, piston, or plunger 7 bears against the rear end of the bolt in the examples shown, and a spiral spring 8 in a spring-chamber 9 pushes forward on this bar, thus tending not only to close the bolt, but to swing it to locked position, this connection of the push-bar to the bolt permitting considerable variation of the position of parts, while maintaining the general direction of spring-pressure forward and upward. The spring-chamber 9 can be screwed into the rear of the frame, as at 11, and the stock-supporting rod 10 may screw into the spring-chamber from the butt. A detaching-lever 12, pivoted in the frame above the rear of the bolt in its locked position, is connected to a draw-rod 13, which rod extends forward on the gun. A spring 14 is interposed when desirable, so that the movement of the lever 12 may be retarded and not be too abrupt. The form of the lever, shown as a cam or crank lever, also provides for an easy bearing of the lever on the breech-bolt.

It will be seen from Figs. 1 and 2 that a movement of the draw-rod 13 in the direction of the arrow, Fig. 1, will rock the lever 12 into

the position of Fig. 2, thus crowding down the locking-shoulder at the rear end of the bolt from the abutment 5 and permitting the bolt to be moved back, as in Fig. 2, either by hand on the handle or by pressure in the bore of the gun acting on the face of the breech-bolt, or by both manual and gas pressure compressing the return-spring 8, as in Fig. 2, and when such pressure is removed the spring and plunger will close and lock the bolt, the bolt-guideway in the frame providing for such a movement of the bolt. The draw-rod 13 may be given such a longitudinal movement in any one of several ways. In Fig. 1 the slide-piece 16 is shown with the hook in engagement with the rod 13, so that the parts may be readily separated. An inclined aperture 17 in the barrel communicates with the edge of the inclined aperture 18 in the piece 16, the ring or band 19 having also a perforation 20, covering the end of the slide-piece 16. The explosion of a cartridge in the barrel drives a gas-jet through the openings referred to, and the inclined relation of the openings causes such gas-escape to move the slide 16 and rod 13, thus causing the lever 12 to unlock the breech-bolt, when the gas-pressure in the barrel will drive back the cartridge-shell and breech-bolt.

In Fig. 4 the slide-piece 160 is elongated and extends about to the muzzle of the gun, the parts between being shown in said figure as partly broken away. The front end of the piece 160 is turned back and extends, as at 161, in the form of a small piston into a cylindrical hole formed in a lug 162. A minute opening 163 communicates with the bore of the barrel. When the gun is fired, gas from the bore passes through this opening and acts like steam in an engine to propel the piston, thus drawing the rod 160 forward and so operating the draw-bar 13 and lever 12 to unlock the breech.

Another modification, Fig. 9, shows the piece 166 extending forward, the connection with the slide 13 being understood as before. The barrel *b* has an inclined opening 167, in which there is a pin 168, closely fitting as a piston. This pin or piston 168 is attached to the front end of the rod 166. An inclined piece 170 is dovetailed into the barrel and passes through an inclined opening in the rod or bar 166. A spring 171, attached to this piece 170, bears the end of the rod 166 inward toward the barrel. The gas-pressure in the opening 167 presses out on the piston 168, and both this piston and the inclined piece 170 tend to move the rod 166 forward as it moves outward under the piston-pressure. When the pressure is removed, the spring 171 restores former positions.

The broken detail, Fig. 7, shows the rear shoulder of the bolt inclined, so that it will release itself by back pressure. This is held locked by a hook 12^x, carried by the slide 13. The forward movement of the slide 13 unhooks this hook from the bolt and permits the bolt

to open. Fig. 9 also shows how the inclined openings of Fig. 1 may be carried to near the muzzle of the gun, the same figures of reference, with "x" added, being used to denote the parts in this position.

In Fig. 8 a direct connection is shown wherein the gas-pressure drives out a pin 180, rocking the lever 181, which lever is pivoted to the frame or barrel, and pressing in a pin 182 to unlock the bolt 1^x. The lever 181 is shown as forked at the rear end, one branch of the fork acting as a spring-arm, so that the movement may be retarded and not be too abrupt. Bolt 1^x is shown as having the front portion jointed to the bolt proper, as would be of advantage in a pistol-stock. Both forms of bolt illustrated are old in principle.

In Figs. 1 to 4 the magazine or cartridge support is shown under the rear end of the barrel. The cartridges are supported in clasps or loops on a belt 30 of ordinary construction. The belt or web is wound on a cylinder 31, which cylinder is supported on spring-pins 32, Fig. 2. The magazine may contain but a single coil of belt, as shown in Fig. 5, or it may contain several coils. In either case the cylinder 31, with its roll of cartridges, may be readily detachable, so that a new belt carrying cartridges may be quickly substituted for an exhausted one. The belt 30 passes over the roughened or toothed cylinder or roll 33 and is clasped between said cylinder and the short rollers or cylinders 34, which bear on the upper face of the belt and may bear down with spring-pressure. The distance between the ends of the rollers 34 is sufficient to allow the cartridge-clasps 35 to pass, but not the cartridges. The cylinder 33 has a ratchet-wheel 36 attached, and this ratchet-wheel is directly under a lug on the front end of the carrier 40. A rack-bar 37, pivoted in said lug to the carrier, projects down and engages this ratchet-wheel or pinion 36. The rack-bar 37 is pressed by a spring into engagement with the ratchet-wheel, and when the carrier rises the rack-and-pinion engagement rotates the cylinder 33 and feeds the belt along one space. The cartridges being longer than the space between cannot pass by the rolls 34, so they serve as a stop to prevent the cartridges from moving too far.

When the bolt is closed, as in Fig. 1, the extractor-hooks *h*, (dotted lines, Fig. 1,) connected to the bolt and similar in construction to the extractors shown in my Patent No. 557,360, of March 31, 1896, and others, close over the head of the cartridge. When the bolt is drawn or pressed back, these hook extractors, engaging the cartridge-flange, take the cartridge with them onto the floor of the carrier 40, and the cartridge is lifted into the line of the bore by the carrier, and in lifting the carrier feeds the belt 30 forward, so that the next succeeding cartridge is in position to be drawn from the belt by the next rearward movement of the bolt.

The cartridge carrier or lifter 40 is pivoted to the hammer-pivot 41 and is lifted by the engagement of a shoulder 42 on the bolt with a projection 43 above the carrier-pivot, such combination being common in magazine-guns. The shoulder 44 on the carrier stops the cartridge in the usual manner, and the lifting of the cartridge by the carrier may eject the old shell, or any usual ejector may be used in addition. The old shell is thrown out of opening 45 in the frame in the usual manner.

The hammer 50 is pivoted on the pin 41 and pressed upward by mainspring 51, working on a friction-roll on the hammer. The firing-pin 53 extends lengthwise of the bolt and is struck by the hammer in a common way. The opening movement of the bolt cocks the hammer, which is held cocked by trigger 54 engaging a notch in the hammer, as is common.

The safety-catch 55 is pressed by its spring into engagement with a notch 56 in the hammer-head when the hammer is thrown back. A detaching-slide 57 is loosely held in the frame, so as to bring its incline into position to trip the catch 55 when the top of the slide is held forward by the head of plunger 7, as in Fig. 1; but when the plunger is back, as in Fig. 2, the piece 57 may move lengthwise without engaging the catch 55 with sufficient force to detach it. The slide 57 is actuated by the trigger, but is not effective to unlock the hammer, save when plunger 7 is forward. Therefore the pull of the trigger when the bolt is open does not release the hammer.

In using the small magazines of Figs. 1 and 2 an outside case is not essential; but when the large roll of Figs. 6 and 6^x is used said roll cannot be conveniently attached at its center to the same gun. This large roll is shown incased in a circular box 60, having a central pivot 31^x; but such pivot is here used only to save friction, and the belt may be wound in the case without it. To attach this large case, with its roll of cartridges, to the gun, depressions 62 are made in its sides, near the rim, in position to receive the spring-pins 32, and to further support its greater height a bar 61 is fixed to its side to extend upward into grooves in the sides of the gun.

The operation of the gun will be generally understood from the foregoing. A magazine having a coiled belt of cartridges is applied to the gun, the end of the belt being passed between the roughened roll 33 and the small rolls 34. By drawing back the bolt by hand (by handle 2) a cartridge can be drawn back from the belt onto the carrier and the belt fed forward by means of the rack on the carrier operating on the belt-feed mechanism. The release of handle 2 permits the plunger 7 to be thrown forward by spring 8, which spring was compressed in opening the bolt, and the bolt will be locked by its shoulder 4 rising behind abutment 5. The trigger-pull

now releases both hammer-detents, so the hammer can fall and fire the gun. The gas-pressure having unlocked the bolt by any of the mechanisms described, the remaining pressure in the bore blows open the breech-bolt, carrying the cartridge-shell with it, and the subsequent operation of the gun is automatic until the cartridges are exhausted.

As has been explained, the construction may be modified for the various purposes for which a gun can be used. It will be within the knowledge of an expert mechanic to change the construction according to the character of the ammunition.

In Maxim's Patent No. 447,836, of March 10, 1891, a gun is described having an outer and inner frame, the inner frame having a recoil or longitudinal movement relatively to the outer frame, and a breech-bolt locking to the inner frame by a sidewise movement. I dispense entirely with such inner frame and mechanism for moving it and engage the bolt directly with the gun-frame, and I construct the gun so that when unlocked the bolt may be blown open by direct pressure and controlled in whole or in part, if desirable, by the hand of the operator.

I claim—

1. In a gun of the character described, the gun-frame and the barrel, a bolt reciprocating in the gun-frame and locking thereto to close the breech by rigid shoulders on the bolt engaging abutments on the frame, and means extending to the bore of the gun by which the bolt is pressed sidewise and unlocked by action of the gas-pressure on the firing of the gun, so as to be opened by pressure from the bore of the gun, substantially as described.

2. In an automatic gun, the barrel, gun-frame, and reciprocating bolt locking against abutments in said frame by a sidewise movement of the bolt, a spring-actuated presser operating against the bolt to close the same, a detaching-lever in position to press the bolt sidewise and unlock the same, and a draw-rod and connections as described serving to actuate said lever by means of gas-pressure, to unlock the bolt, all combined substantially as described.

3. In an automatic gun, the barrel, gun-frame, and bolt locking against abutments in said frame by a sidewise movement, means for holding the bolt in locked position, and means extending to the bore of the gun by which the bolt is released, pressed sidewise, and blown open by gas-pressure from the bore, substantially as described.

4. In an automatic gun, the gun-frame having locking-abutment, the bolt having rigid shoulders to engage said abutment by sidewise movement, and automatic means for moving said bolt sidewise to unlock the same, whereby the gas-pressure in the bore of the gun may blow the bolt to the rear without intermediate mechanism, substantially as described.

5. In an automatic gun, the bolt with its rear end swinging upward to locked position, the locking-abutment, the spring acting on the bolt, and a lever in position to press the rear of the bolt sidewise in unlocking, and a slide extending forward and actuated by gas-pressure from the bore of the gun by which said lever may be actuated, all combined.

6. In an automatic gun, the gun-frame having locking-shoulders, the bolt engaging said shoulders by sidewise movement, the bolt-unlocking device and a slide connected thereto, and a longitudinally-movable piece in position to be driven forward by gas-pressure from the bore of the gun, to move said slide and unlock the breech, all combined substantially as described.

7. The magazine having a support for the cartridge-belt, the cylinder over which said belt passes and having frictional engagement with the belt, the ratchet on said cylinder, and the rack-piece connected to the carrier and operating on said rack to rotate the cylinder, all combined with the necessary coöperating adjunctive mechanism, substantially as described.

8. The magazine, the belt-feeding roller, the belt having frictional engagement with said roller, the pivoted carrier, and means connected to the carrier by which the belt-feed roll is actuated, all combined.

9. In a gun, a cartridge-feed belt having means for holding cartridges, a feed-roll and a presser-roll between which said belt passes and which bear on the belt, and means connected to the working part of the gun by which said feed-roll is operated and the belt moved forward intermittingly, all combined substantially as described.

10. The cartridge-belt, the feed-roll engaging said belt to move it, the short rolls bearing the edges of the belt toward the feed-roll but permitting the clasps to pass between them, and means for actuating the feed-roll, all combined substantially as described.

11. In an automatic gun, the rolled belt, the belt-feed roll and the short rolls for pressing the belt thereon, the carrier and means connected to the carrier by which the belt-feed roll is actuated, and means extending to the bore of the gun by which the breech is opened and the carrier actuated, all combined substantially as described.

12. In a magazine-gun, the wound magazine-belt, the frame having a recess under the rear of the barrel into which the wound belt may be introduced, the wound belt having a detachable box-casing, and detents in the frame of the gun engaging the front and

rear of said belt-casing, substantially as described.

13. In a magazine-gun, the frame having a transverse recess under the rear of the barrel and in front of the bolt when the bolt is closed, spring-actuated detents, and a cartridge-box containing cartridges in a coiled belt and means for moving the same, said box having an opening at its rear, and engaging said detents so that a cartridge may be drawn back from the belt and box by the rearward movement of the bolt, substantially as described.

14. In a magazine-gun the frame and bolt, the cylindrical box-magazine, the coiled belt in said magazine carrying cartridges, detents by which said box may be secured to the gun in a recess under the rear of the barrel, and means by which the belt is fed intermittingly by the opening and closing of the bolt, substantially as described.

15. In a magazine-gun, the recessed frame, the approximately cylindrical box, the detents by which the box is held in the frame with its axis parallel to the axis of the gun-barrel the feed-roll supported by the frame and means by which the roll is actuated by the operation of the gun, and the cartridge-feed belt coiled in said box and passing over said feed-roller, substantially as described.

16. In an automatic gun, the hammer, trigger, and safety-catch, and a releasing-slide in position to be operated by the trigger to release the safety-catch when held to position by the breech-closing mechanism when the breech is closed, but otherwise inoperative, substantially as described.

17. In an automatic gun, the reciprocating bolt, means for closing and locking the same, means extending to the bore of the barrel by which the breech may be unlocked and opened by direct pressure in the bore, and mechanism by which the unlocking may be delayed after the initial impulse is given, all combined substantially as described.

18. In an automatic gun the reciprocating bolt and means for closing and locking the same, a lever operating by impulse from the discharge to unlock the bolt and a retarding-spring connected to said lever to first be compressed by the unlocking impulse and then react to compensate for lost motion, substantially as shown and described.

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

ANDREW BURGESS.

Witnesses:

W. A. BARTLETT,

C. K. DAVIES.