

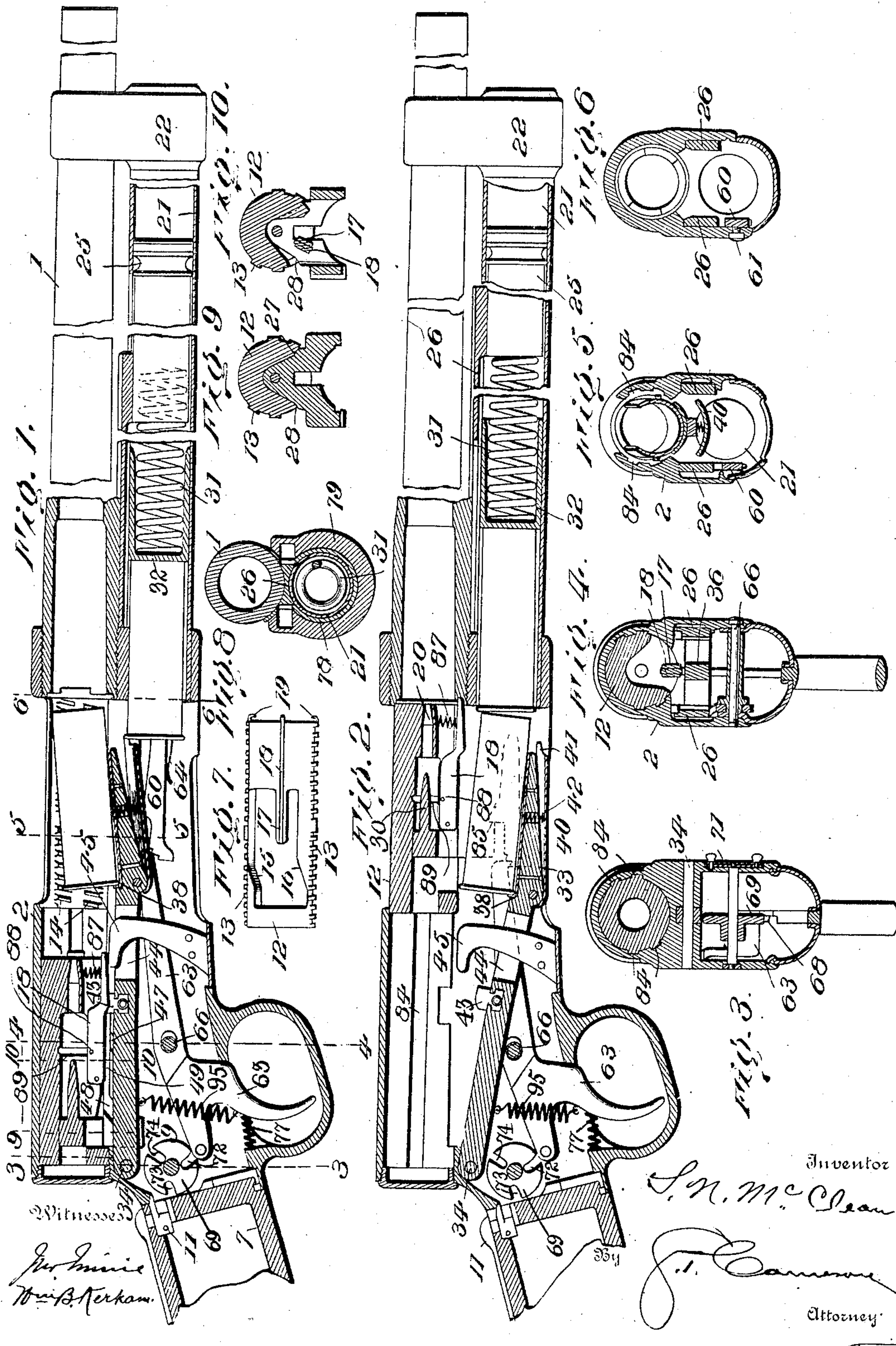
No. 785,971.

PATENTED MAR. 28, 1905.

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GAS ACTUATED MAGAZINE GUN.

APPLICATION FILED DEC. 12, 1901

2 SHEETS—SHEET 1.



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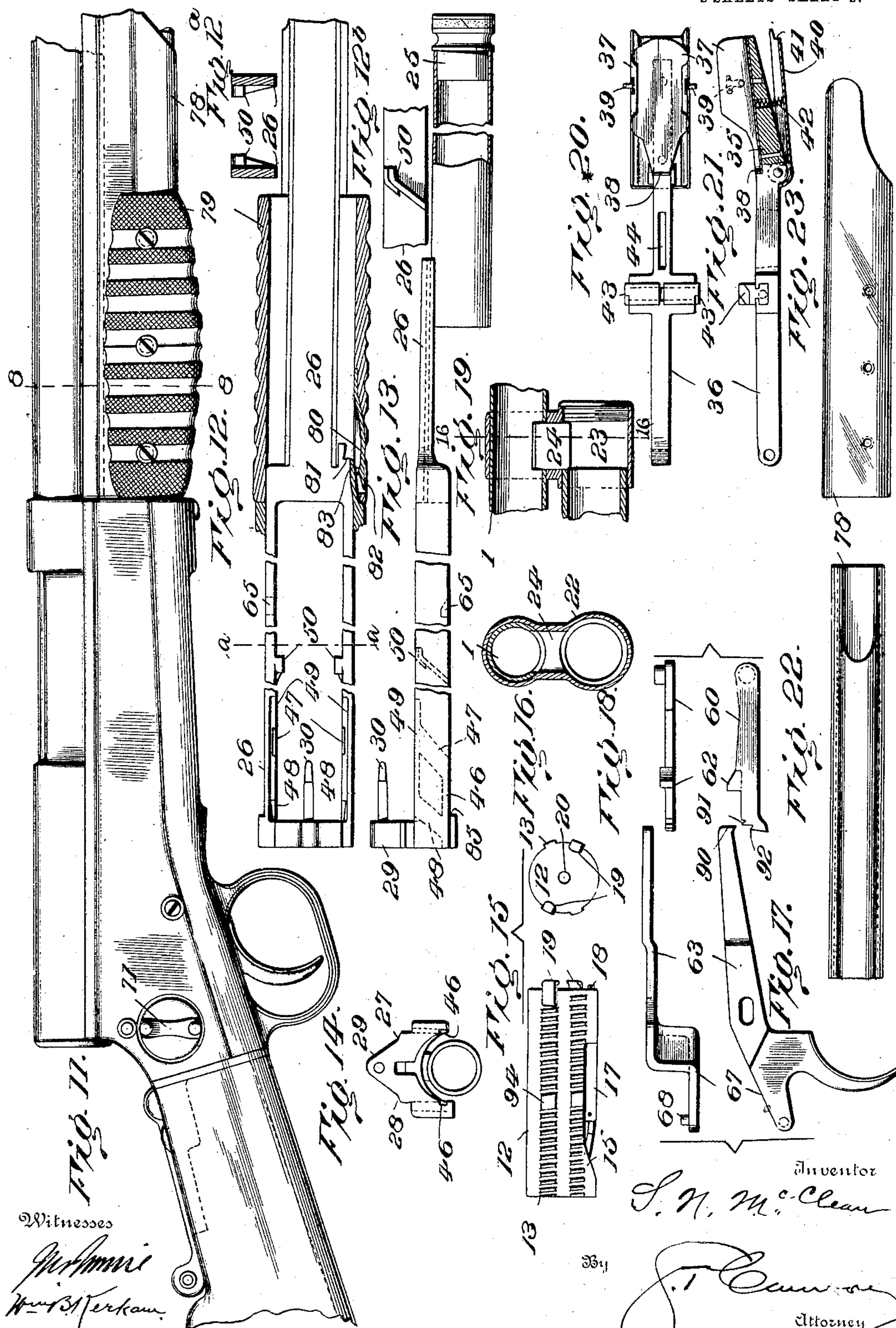


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UNITED STATES PATENT OFFICE.

SAMUEL N. McCLEAN, OF CLEVELAND, OHIO.

GAS-ACTUATED MAGAZINE-GUN.

SPECIFICATION forming part of Letters Patent No. 785,971, dated March 28, 1905.

Application filed December 12, 1901. Serial No. 85,688.

To all whom it may concern:

Be it known that I, SAMUEL N. McCLEAN, a resident of Cleveland, Ohio, have invented a new and useful Improvement in Gas-Actuated Magazine-Guns, which invention is fully set forth in the following specification.

My invention relates to automatic breech-loading magazine-guns, and has for its object to simplify the construction of guns of this class and at the same time increase their efficiency, durability, and accuracy of operation.

While the inventive idea is applicable to all classes of magazine-guns, I have herein shown it as applied to a magazine-shotgun, and in carrying out my invention I provide a magazine, preferably tubular in form and located beneath the barrel, and a cartridge-carrier for transferring the cartridges from the magazine to the barrel, which carrier is operated by means of a gas-actuated slide which may be and preferably is employed to also operate the breech-block, the operative connections between the slide and carrier being such as to present the carrier with a cartridge at the breech of the barrel when the breech is open and to return the carrier to the magazine for another cartridge when the breech is closed. Preferably I connect the gas-actuated slide to a reciprocatory and rotary breech-block which carries an automatic ejecting device and provide the slide and carrier with means which coact to clamp the cartridge securely in the carrier during the sudden and rapid elevation of the carrier by the gas-actuated slide.

Other details of improvement will be described in the body of the specification and then pointed out in the claims.

One expression of the inventive idea involved is illustrated in the accompanying drawings; but these are to be regarded as illustrative only and not as defining the limits of the invention.

In said drawings, Figure 1 is a longitudinal vertical section with parts in elevation and the breech open. Fig. 2 is a like view with the breech closed. Fig. 3 is a cross-section on line 3 3, Fig. 1. Fig. 4 is a like view on line 4 4, Fig. 1; and Figs. 5 and 6 are similar views on the lines 5 5 and 6 6, respectively, of Fig. 1. Fig. 7 is a bottom plan of the breech-

block. Fig. 8 is a cross-section on line 8 8, Fig. 11; and Figs. 9 and 10 are like sections on the lines 9 9 and 10 10, Fig. 1. Fig. 11 is a broken side elevation showing the receiver and the rear portion of the barrel with the operating-handle. Fig. 12 is a broken plan of the operating-slide or drive-rod. Figs. 12^a and 12^b are respectively a cross-section on line *a a* and a broken side elevation of parts of Fig. 12. Fig. 13 is a broken side elevation of said slide or drive-rod. Fig. 14 is a rear end view thereof. Fig. 15 shows the breech-block in side and in front elevation. Fig. 16 is a transverse section on line 16 16 of Fig. 19. Fig. 17 shows the trigger in plan and in side elevation, and Fig. 18 shows like views of the sear. Fig. 19 is a broken central section showing the means of attaching the gas-cylinder to the barrel. Fig. 20 is a plan, and Fig. 21 a side elevation with parts in section, of the cartridge-carrier; and Figs. 22 and 23 are a side elevation and a bottom plan view, respectively, of the operating-handle.

Referring to the drawings, 1 is the barrel, 2 the receiver, and 7 the stock, which may be provided with the usual connection 11 to enable it to be readily attached and detached.

The breech-block 12 is of the interrupted screw-thread type, having reciprocatory and rotary movements in opening and closing the breech. As here shown, the threads 13 lie on the opposite sides of the block and extend preferably the full length thereof, and when the block is in locked position these threads 13 engage corresponding threads 14, Fig. 1, formed in the side walls of the receiver 2. The block is hollow and has two cams 15 16 and a rearwardly-projecting lower part or tongue 17, Fig. 7. A slot or channel extends from the rear end of this tongue 17 to the front end of the block, and in this channel an ejector 18 is pivoted, as shown in Figs. 1, 2, and 7. Suitably-formed extractors 19 are mounted one on each side of the block 12, which is also provided with the usual passage 20 for the firing-pin.

Suspended under the barrel is a tube 21, the rear end of the tube being supported by the receiver and the front end by a sleeve 22, Figs. 1, 2, 16, and 19, surrounding the barrel and

having in the lower portion thereof a chamber 23, communicating with the bore of the barrel by a passage 24, so that the gases of explosion have free entrance to the chamber. Within the tube 21 is a piston 25, Figs. 1 and 13, connected to a drive-rod 26, the front end of which plays between the barrel and the tube 21, while the rearward bifurcated end is guided on the side walls of the receiver, Figs. 4, 5, 6, 12, and 13, and is provided with shoulders 27 28, Fig. 14, for engaging the cams 15 and 16 on the breech-block to rotate the block to lock and unlock it. This drive-rod 26 also has a part or head 29 projecting up into the block and carrying the firing-pin 30, though if preferred the firing-pin may be mounted in the breech-block in the usual way so as to be struck by the head 29 during its terminal forward movement. The piston 25 is bored out at its rear portion to receive the end of a coiled spring 31, which bears at its rear end upon a follower 32, so that the spring is compressed between the piston and the follower and reacts upon them both so as to drive the piston forward and the follower rearward. The rear end of the tube 21 opens into the receiver immediately under the breech end of the barrel, and a cartridge-carrier 33 is pivotally mounted at 34 so as to receive a cartridge from the tube 21 when the carrier is depressed, as in Fig. 2, and present the same to the breech of the barrel when the carrier is elevated, as in Fig. 1. The construction of this carrier will be best understood from Figs. 20 and 21. It consists of the plate or bed-piece 35, rigidly secured to the arm 36, and has flexible side wings 37 projecting upward so as to receive and embrace the cartridge as it is forced from the tube 21 by the spring 31, a stop-shoulder 38 being provided on the carrier-arm to limit the outward feed of the cartridge, while the wings 37 have lugs 39 for engaging with the drive-rod to cause the wings 37 to securely clamp the cartridge during the upward movement of the carrier. As here shown, Figs. 12^a and 12^b, the lugs 39 abut cam-surfaces 50 on the inner faces of the bifurcations of the drive-rod immediately after the carrier starts on its upward movement, and as these cam-surfaces approach each other toward their tops they act to compress the resilient wings 37, and thus clamp the cartridges in the carrier. This clamping action is maintained until the carrier comes to rest in its uppermost position, when it is relieved by the lugs 39 escaping from the cam-surfaces 50. Pivoted to the under side of the carrier-plate 35 is a stop-plate 40, provided with a shoulder 41 and normally held depressed below said plate 35 by a spring 42, while the arm 36 is provided with two laterally-projecting spring-pressed pins 43 and a central vertical slot 44, through which slot the ejector-operating abutment 45 projects into the path of the ejector as it moves rear-

ward with the breech-block, Figs. 1 and 2. The inner faces of the arms of the bifurcated driving-rod 26 have, near the rear end of the rod, cam-surfaces which engage the pins 43 on the carrier to elevate and depress the latter by the reciprocating action of the drive-rod. This construction is illustrated in Figs. 1, 12, and 13, and as the construction of the two faces of the drive-rod is identical a description of one will suffice for both. Referring to Figs. 1, 12, 13, and 14, 46 is a groove cut on the inner face of the drive-rod and extending out to the rear end of the rod, as shown in Figs. 13 and 14, and communicating with cam-grooves 47 and 48, extending from said groove 46 near the bottom edge of the face to a groove 49 near the top edge of the face, which groove 49 is deeper than groove 47. (See Fig. 12.) The grooves 46 and 47 are of equal depth, while the groove 48 is the same depth at its lower end as the groove 46 and gradually deepens toward the top, where it is the same depth as groove 49. When the carrier is depressed, the pins 43 lie in such a position that they enter the grooves 46 as the drive-rod moves rearward and are struck by the front walls of the grooves 47, which act to lift the carrier till the pins 43 reach the grooves 49, which under the influence of their springs they enter to the full depth of said grooves, thereby supporting the carrier in its raised position until on the forward movement of the drive-rod the rear walls of the grooves 48 strike the pins and depress the carrier, which action occurs just after the breech-block has advanced far enough to cause the cartridge to be well started into the bore of the barrel. The rapid elevation of the carrier would have a tendency to displace the cartridge in the carrier and might even hurl it through the resilient wings 37 and out of the gun when the carrier reached the limit of its upward movement, and provision is made to avoid this by locking the wings 37 against opening during the upward movement of the carrier and until the instant after it has reached the limit of such movement. This locking action is accomplished by confining the resilient wings between the bifurcated portions of the drive-rod 26, the lugs 39 engaging with the cam-surfaces 50 on the drive-rod for this purpose, as hereinbefore described.

The sear 60, Figs. 1, 6, and 18, is pivoted at 61 to the side of the receiver and has a sear-nose 62, which when the sear is not acted upon by the trigger 63 rises under the influence of the sear-spring 64, so as to engage the sear-notch 65, here shown as on the left-hand side of the bifurcated drive-rod (see dotted lines, Figs. 12 and 13) and hold the said rod in its rearmost position against the tension of spring 31, with the breech open. The trigger 63 is pivoted at 66 through an oblong pivot-opening, which permits it to have a slight longitudinal movement on its

pivot and is provided with a rearwardly-projecting offset arm 67, having a laterally-projecting lug 68, whose path of movement as the trigger turns on its pivot comes within
 5 the area of a plate 69, here shown as in the form of a disk keyed to and revolving with a shaft 70, having bearing in the frame, and a crank 71 on the outside of the frame for turning the shaft and disk, which latter has slots
 10 formed therein whose openings at the periphery of the disk are in the path of the lug 68 as the disk is turned to bring the slots one at a time into position. One of these slots, 72, is slightly eccentric to the pivot 66 of the trigger, and when the latter is pulled and the lug
 15 68 engages the slot and to draw the trigger rearward as the trigger-nose presses the sear downward until the trigger is finally drawn entirely off of the sear. Another slot, 73, is of less length than slot 72 and its eccentricity to
 20 the trigger-pivot 66 is such that it will withdraw the nose of the trigger from notch 91 of the sear to notch 92, but will not withdraw it from the latter. A third slot, 74, is concentric with the trigger-pivot 66, and when this slot
 25 is in the path of the lug 68 the trigger has no longitudinal movement on its pivot. The trigger-spring 77 tends to keep the nose of the trigger elevated and the trigger thrown forward on its pivot, as in Figs. 1 and 2.

Embracing the rear end of the combined magazine and gas tube 21 is a slide 78, Figs. 8, 11, 12, 22, and 23, to which a grip 79 is secured. This slide is free to move forward
 35 on the tube and when the drive-rod 26 is in its foremost position and the slide is advanced it slides over the magazine-tube until a suitable spring-catch 80 engages a notch 81 in the drive-rod, whereupon the rearward movement of the slide 78 carries the drive-rod 26
 40 rearward against the tension of the spring 31 until the rod is engaged by the sear. This occurs just before the drive-rod has reached its rearmost position and while the slide 78 and grip-handle 79 are still free to move a slight distance farther rearward before striking against the front end of the receiver. The terminal movement of the slide is utilized to disengage the latter from the drive-rod by
 45 causing a cam-nose 82 on the catch to engage a portion 83 of the gun frame or receiver, and thus lift the catch out of the notch 81 on the drive-rod, thereby leaving the latter free to reciprocate past the slide.

The operation of the gun is as follows: To fill the magazine, the breach is opened, as in Fig. 1, by grasping the grip 79 and advancing the slide 78 till the catch 80 engages the notch 81 on the drive-rod and then drawing
 50 the slide rearward till the sear-nose 62 engages the sear-notch 65 on the rod. With the parts in this position cartridges are inserted into the magazine-tube against the tension of the spring 31, which is thus compressed between the follower and the piston, the rear-

most cartridge in the magazine being retained by any suitable stop, here shown as the forward end of the pivoted plate 40, Fig. 1, which plate also serves as a gate to close the lower opening into the receiver when the carrier is depressed, as in Fig. 2. Assuming the slot 72 on the disk 69 to be in the path of the lug 68 on the trigger and a cartridge to be in the carrier, all as in Fig. 1, a pull on the trigger will depress the sear-nose out of engagement with the sear-notch 67 on the driving-rod and permit the latter to move forward under the influence of the spring 31 and advancing the breech-block, which is prevented from turning while the lines of screw-threads thereon are in the grooves 84, Figs. 2, 3, and 4, formed in the walls of the receiver, and within which grooves the screw-threads on the block reciprocate. As the block advances it engages the cartridge and pushes it into the barrel, and just as the cartridge has become well started into the barrel the rear faces of cam-grooves 48 on the drive-rod engage pins 43 on the carrier and depress it, the resilient wings 37 expanding to escape the cartridge. At the instant when the cartridge is almost but not quite driven home the threads on the block escape from the grooves 84 in the receiver, and the shoulder 28 on the drive-rod, acting on the cam 16 on the breech-block, turns the block so that the threads on the block engage the corresponding threads on the receiver, which firmly locks the block to the receiver and pushes the cartridge fully home, the extractors snapping over the rim of the cartridge. The pull of the trigger on the sear has not only disengaged the latter from the driving-rod, but by reason of the engagement of the lug 68 in the slot 72 on disk 69 has also drawn the trigger rearward so that it slips entirely off of the sear, and the latter under the influence of its spring rises in time for the sear-nose to engage the shoulder 85 on the rear end of the drive-rod before the firing-pin 30 strikes the cartridge, as shown in Fig. 2. The pull on the trigger being now released, the trigger-spring 77 acts to turn the trigger on its pivot, so as to again elevate the front end of the trigger and also advance it so that it engages the sear. A second pull on the trigger frees the drive-rod, which is advanced by the spring 31 till the firing-pin 30 strikes and explodes the cartridge, whereupon the gases of explosion enter the chamber 23 through the passage 24 and act on the piston 25 to force the drive-rod 26 rearward, and the shoulder 27 on the rod engages the cam 15 on the block and turns it, so as to free the threads on the block from those on the receiver and permit the block to be carried straight to the rear by the drive-rod, withdrawing the empty shell in the clutch of the extractors, with the ejector 18 resting under the rim thereof. At the instant when the shell is under the top open-

ing in the receiver a shoulder on the under side of the ejector strikes the abutment 45, which gives the ejector a quick flip upward and ejects the shell from the gun. The upward movement of the ejector occurs against the tension of the spring 87, and a guide-pin 88, extending through the ejector, enters a guide-groove 89, formed on the interior walls of the breech-block. Should it be desired to load the gun from the hand instead of the magazine, the cartridge can be placed in the carrier by hand when the parts are in the position shown in Fig. 1, the wings 37 readily yielding to permit the cartridge to be placed in the carrier. Should continuous automatic firing from the magazine be desired, the disk 69 is turned till the slot 74 is in position to be entered by the lug 68 on the trigger, and this slot being concentric with the trigger-pivot permits the trigger to be pulled and the sear lowered enough to clear both sear-notches 65 and 85 on the drive-rod and without freeing the trigger from the sear, so that the gun will automatically load and fire as long as the trigger is held and cartridges are supplied from the magazine. If it is desired to have the gun automatically load from the magazine, but with the firing of each cartridge to take place at the will of the gunner, the disk 69 is turned so that the slot 73 is in the path of lug 68 on the trigger. This slot is slightly eccentric to trigger-pivot 66 and is of shallow depth. The trigger normally rests with its nose 90, Fig. 18, in the sear-notch 91, and the pull of the trigger withdraws the sear-nose 62 from the notch 85 on the drive-rod and fires the gun; but as the trigger is pulled the slot 73 acts to draw the trigger slightly to the rear, so that the trigger-nose 90 slips from sear-notch 91 and is caught in sear-notch 92, at which instant lug 68 reaches the bottom of slot 73, so that the trigger can be pulled no farther. If the pull on the trigger be maintained, the sear-nose 62 will not be permitted to rise high enough to engage the notch 65 on the driving-rod, but will rise high enough to engage notch 85, so that the driving-rod will automatically move to the rear, open the breech, eject the empty shell, force a new cartridge into the gun, and close the breech, and then be caught and held by the sear, as shown in Fig. 2. The trigger being now released rises and at the same time advances enough to cause the trigger-nose 90 to again engage the sear-notch 91, and a second pull of the trigger repeats the operation.

While the spring 31 is here shown as a single continuous element from the piston 25 to the follower 32 in the magazine, it will be understood that a transverse partition or abutment may be placed in tube 21 and separate springs be used to actuate the piston and the magazine-follower. Reliance may be placed upon the engagement of the screw-threads 13 on the breech-block with the grooves 84 in the receiver to prevent the turning of the

breech-block except at the proper moment; but I sometimes provide an additional safeguard of this character in the shape of an enlarged or thickened thread 94, Fig. 15, which can only enter between the threads in the receiver when the block is fully advanced into locking position. I also prefer to attach a spring 95 to the carrier to insure its smooth and steady operation at all times.

What is claimed is—

1. In a gun, the combination of a barrel, a reciprocatory and rotary breech-block, a gas-driven slide engaging said block to reciprocate and rotate it to open and close the breech, a magazine-tube beneath the barrel, and a cartridge-carrier receiving cartridges from the magazine and actuated by said slide while under the influence of the gases of discharge to present said cartridges to the breech of the barrel.
2. In a gun, the combination of a barrel, a reciprocatory and rotary breech-block, a gas-driven slide engaging said block to reciprocate and rotate it to open and close the breech, a tubular magazine beneath the barrel, and a cartridge-carrier engaged by said slide to elevate it while under the influence of the gases of discharge and depress it on the return movement.
3. In a gun, the combination of a barrel, a breech-block, a magazine-tube beneath the barrel and communicating at its forward end with the bore thereof, a piston and a cartridge-follower in the magazine-tube, a spring interposed between said piston and follower and operative connections between said piston and breech-block.
4. In a gun, the combination of a barrel, a reciprocatory and rotary breech-block, a magazine-tube beneath the barrel and communicating at its forward end with the bore thereof, a piston and a cartridge-follower in the magazine-tube, a spring interposed between said piston and follower and operative connections between said piston and breech-block.
5. In a gun, the combination of a barrel, a breech-block, a magazine, and a cartridge-carrier, with a gas-actuated slide engaging and operating the breech-block and carrier while under the influence of the gases of discharge.
6. In a gun, the combination of a barrel, a breech-block, a magazine, and a cartridge-carrier, with a gas-actuated slide having a cam engagement with the breech-block and a cam engagement with the carrier, whereby said block and carrier are actuated by the slide while it is under the influence of the gases of discharge.
7. In a gun, the combination of a barrel, a reciprocatory and rotary breech-block, a magazine, and a cartridge-carrier, with a gas-actuated slide engaging and operating the breech-block and carrier while it is under the influence of the gases of discharge.

8. In a gun, the combination of a barrel, a reciprocatory and rotary breech-block, a magazine, and a cartridge-carrier, with a gas-actuated slide having a cam engagement with the breech-block and a cam engagement with the carrier, whereby said block and carrier are actuated by the slide while it is under the influence of the gases of discharge.

9. In a gun, the combination of a barrel, a breech-block, a magazine, and a cartridge-carrier, with a gas-actuated slide engaging and operating the breech-block and carrier while under the influence of the gases of discharge, and means positively clamping the cartridge in the carrier during the movement of the carrier from the magazine to the barrel.

10. In a gun, the combination of a barrel, a breech-block, a magazine, and a carrier oscillating between the magazine and barrel, and a gas-actuated slide operatively connected to the block and having a cam engagement with the carrier, whereby the latter is actuated by the movement of the slide while under the influence of the gases of discharge.

11. In a gun, the combination of a barrel, a reciprocatory and rotary breech-block carrying extractors, an ejector pivoted to the breech-block, an abutment in the path of the ejector when the block is moved rearward, a magazine, a pivoted cartridge-carrier oscillating between the magazine and the barrel, and a gas-actuated slide operatively connected to the breech-block and carrier.

12. In a gun, the combination of a barrel, a reciprocatory and rotary breech-block, cartridge-extracting means mounted on the block, an ejector pivoted to the block, an abutment in the path of the rearward movement of the ejector and a gas-actuated slide operatively connected to said breech-block.

13. In a gun, the combination of a barrel, a breech-block and a magazine, with a cartridge-carrier, and a gas-actuated slide having a cam

acting to shift the carrier from the magazine to the barrel as the slide is driven rearward by the gases of discharge.

14. In a gun, the combination of a barrel, a breech-block and a magazine under the barrel, with a pivoted cartridge-carrier and a gas-actuated slide having a cam engaging the carrier to elevate it from the magazine to the barrel and a reverse cam engaging the carrier to depress it from the barrel to the magazine.

15. In a gun, the combination of a barrel, a breech-block, a magazine, and a cartridge-carrier, with a bifurcated gas-actuated slide operatively engaging the carrier on opposite sides thereof as it moves rearward under the influence of the gases of discharge and also operatively engaging the breech-block.

16. In a gun, the combination of a barrel, a breech-block, a magazine, a cartridge-carrier, with a bifurcated gas-actuated slide having cam engagement with the carrier on opposite sides thereof as it moves rearward under the influence of the gases of discharge and also operatively engaging the breech-block.

17. In a gun, the combination of a receiver, a barrel, a breech-block and a magazine, with a cartridge-carrier oscillating between the magazine and barrel, a bifurcated gas-actuated slide whose bifurcations travel in ways on the walls of the receiver, cam engagements between the bifurcations of the slide and the carrier as the slide moves rearward under the influence of the gases of discharge and a cam engagement between the slide and the breech-block.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

SAMUEL N. McCLEAN.

Witnesses:

ROBERT MONTGOMERY, Jr.,
JOS. PROCHASKA.