

July 20, 1965

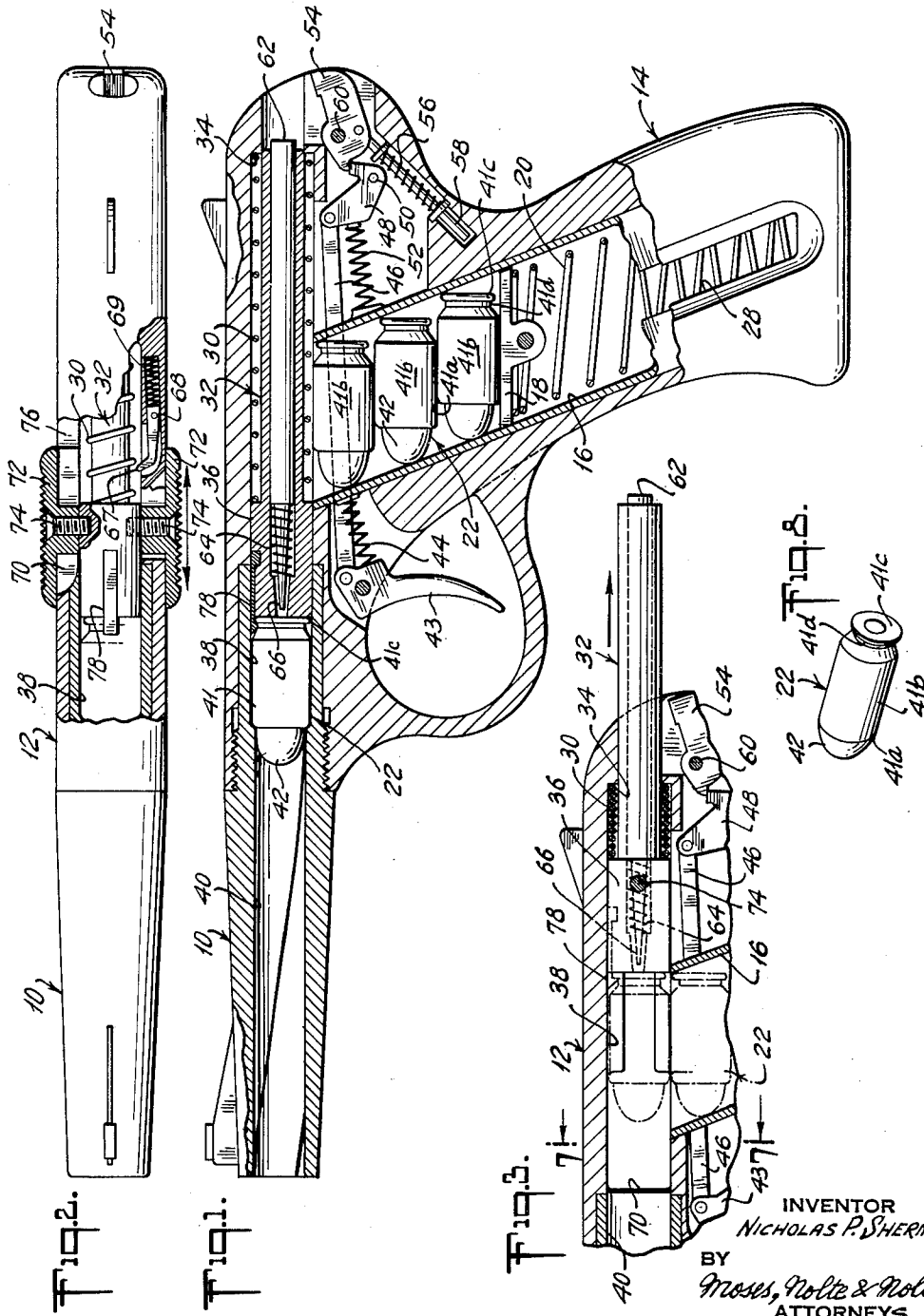
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3,195,408

FIREARM CONSTRUCTION

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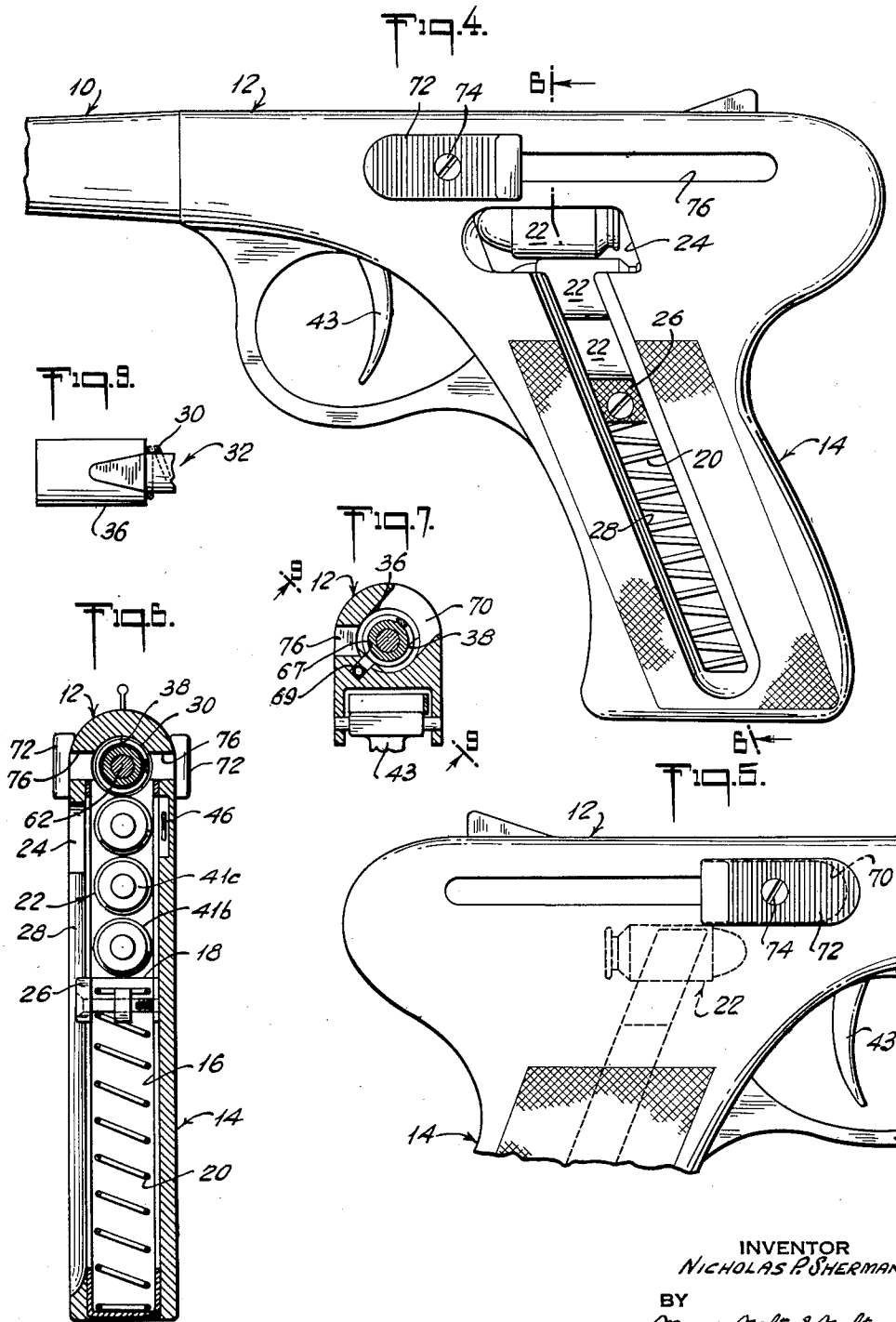
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FIREARM CONSTRUCTION

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4 Sheets-Sheet 2



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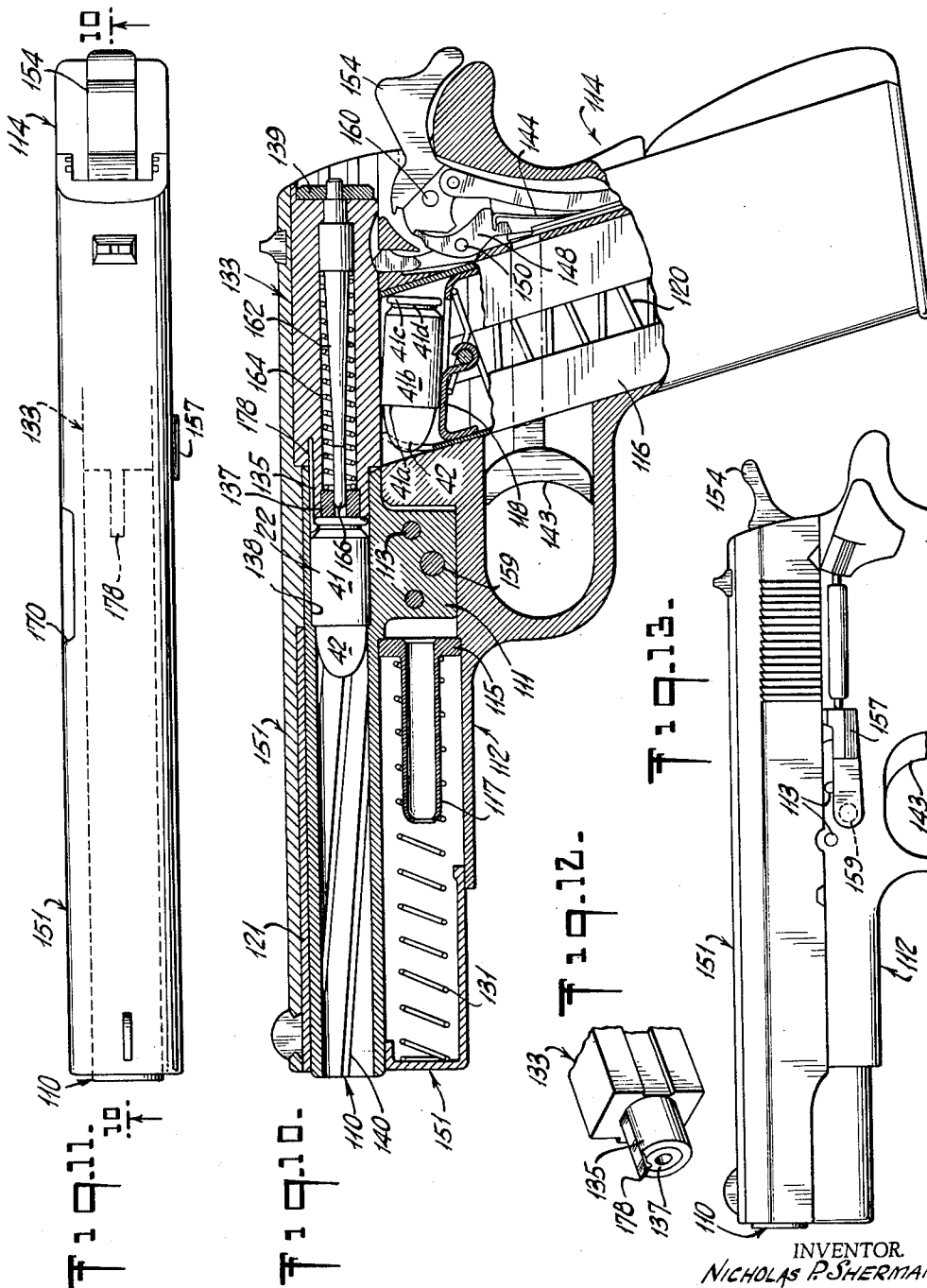
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FIREARM CONSTRUCTION

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4 Sheets-Sheet 3



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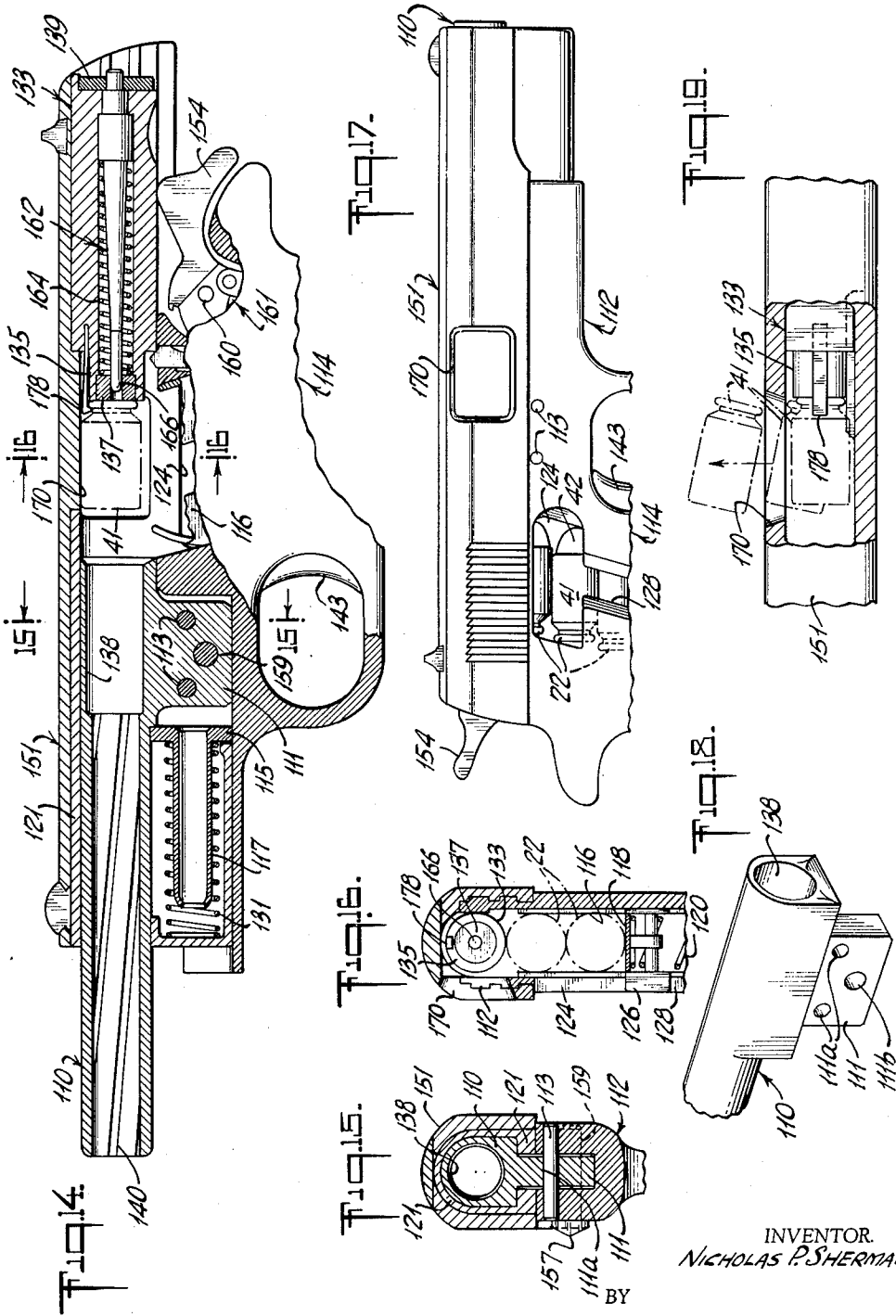
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FIREARM CONSTRUCTION

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4 Sheets-Sheet 4



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FIREARM CONSTRUCTION

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 6 Claims. (Cl. 89-195)

This is a continuation-in-part of application Serial No. 650,184, filed April 2, 1957 and application 845,947, filed October 12, 1959, both now abandoned.

This invention relates in general to firearms and in particular to a new and useful automatic repeating type firearm including a stationary barrel and having an elongated chamber therein longer than the cartridge which it uses and having a breech bolt which moves into the chamber to position a cartridge therein for firing.

The invention also relates to another embodiment of an automatic repeating type firearm having a stationary barrel in combination with a novel slide which has an extension entering into an elongated cartridge chamber.

The present invention is an improvement over firearms of this type particularly in the construction in which the barrel is held stationary and the chamber is made of a greater longitudinal extent than the cartridge which is used with the firearm. The construction permits the delivery of the full power of the burning powder gases to the bullet before the shell case leaves the chamber of the gun.

The powder gases effect a rapid return of the recoiling elements along with the shell to cause the latter's ejection and to effect the positioning of a new shell in the chamber on the return stroke. Since the mechanism operates with a stationary barrel, the firing accuracy of the gun is greatly increased over previous firearms of this character. The backward kick due to the firing of the bullet is taken up by the reciprocating slide and breech-bolt elements.

One of the major features of the invention is that the barrel is rifled from the forward end to the location of the cartridge chamber and this permits positioning of the cartridge in a firing position with the forward walls of the shell case abutting against the end of the rifled portion of the barrel as well as the chamber itself. When the gun is fired the bullet is projected out through the rifled portion of the barrel while the case is retained in the slightly widened area of the cartridge chamber.

Another feature of the present firearm construction is the provision of a magazine type handle which may be loaded through a window by retracting the spring of the magazine follower portion, without requiring any withdrawal of a magazine clip. Loading of the firearm is simple and easy and firing is both quick and accurate.

In a preferred first embodiment, the mechanism includes a breech bolt which reciprocates into and out of the chamber in order to position the bullet in the chamber for firing purposes. The breech bolt has a forwardly rest position near the barrel chamber, so that firing is immediate and does not require the releasing and forward moving actions of the breech bolt from a tensioned rearwardly rest position, as used in some previous firearm constructions.

In another embodiment of the invention, a reciprocating slide member is used in conjunction with a stationary barrel, the latter having a mounting lug for fixing the barrel solid to the gun frame. A novel breech bolt extension protrudes into the deep cartridge chamber.

According to a further feature, the slide member has a top rib added thereto with a step in it to fill in the top of the customary ejection port, so as to act as the magazine cartridge stop and to put the cartridge in direct line for being fed into the barrel chamber. The top rib in the

slide also carries the front and rear sights of the firearm.

The ejection port of the slide is cut down lower on the right side than usual, and the cartridge ejector has a new configuration to throw the shell cases out to the right, when viewed from the top of the firearm pointing forward, instead of up and out of the firearm.

Accordingly, it is an object of this invention to provide an improved firearm construction.

A further object of the invention is to provide a firearm, including a stationary rifle barrel portion arranged in direct alignment with a cartridge chamber of greater length than the cartridge which it uses, and having a breech bolt which reciprocates into and out of the cartridge chamber during the firing.

A further object of the invention is to provide a pistol having a chamber of greater length than the cartridge which it uses, and including a reciprocating breech bolt which enters into and out of the chamber during the firing operation, and including means for loading cartridges through an upper side window in the handle of the pistol against the force of a magazine spring which may be retracted by a retractor grip which extends outwardly in the handle.

It is a still further object of the invention to provide a firearm having a stationary rifle barrel with a chamber adapted to accommodate the entire cartridge length, and a reciprocable slide member having a breech bolt extension adapted to enter into said chamber.

A still further object of the invention is to provide a novel ejection port allowing the shell cases to be thrown out laterally instead of upward from the firearm.

A further object of the invention is to provide a pistol which is simple in design, rugged in construction and economical to manufacture.

It is considered the major object of the present invention to overcome the disadvantages of the two widely known automatic systems of firearms. These are the "straight blow back" and the "moving barrel locked to breech bolt during firing only" systems. The present invention uses a fixed barrel and a breech bolt extension moving into the chamber itself. Therefore, as the gun is fired the heavier breech bolt and recoil spring combination allows the lighter weight bullet to move through the barrel at a faster rate of speed than the breech bolt extension which is moving rearward at the same time.

According to the present invention, the bullet leaves the barrel under full power of the burning powder gases before the extension of the heavier breech bolt can leave the gun chamber. Thus, the inventive embodiments of firearms perform in a better and more accurate way than hitherto known automatic systems because the fixed barrel is delivering a bullet at full power from the gun, as noted above.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and specific objects obtained by its use, reference should be had to the accompanying drawings and descriptive matter in which there are illustrated and described preferred embodiments of the invention.

In the drawings:

FIG. 1 is a partial side elevation and partial transverse section of one embodiment of a pistol constructed in accordance with the invention;

FIG. 2 is a partial top plan view and a partial horizontal section of the pistol indicated in FIG. 1;

FIG. 3 is a fragmentary sectional view similar to FIG. 1, but indicating the breech bolt in the retracted position it assumes immediately after firing;

FIG. 4 is a side elevation of the pistol of FIGS. 1 and 2;

FIG. 5 is a fragmentary side elevation of the opposite side of the pistol from that indicated in FIG. 4;

FIG. 6 is a section taken on the line 6—6 of FIG. 4;

FIG. 7 is a section taken on the line 7—7 of FIG. 3;

FIG. 8 is a perspective view of the cartridge for the firearms of FIGS. 1—7 and 9—19;

FIG. 9 is a fragmentary side elevation indicating a cut-off portion of the breech bolt to permit by-passing of the ejector lever arm;

FIG. 10 is a partial side elevation and a partial transverse section of another embodiment of a pistol constructed in accordance with the invention, taken on the line 10—10 of FIG. 11, and using the cartridge shown in FIG. 8;

FIG. 11 is a top plan view of the pistol indicated in FIG. 10;

FIG. 12 is a fragmentary perspective view of the breech bolt extension;

FIG. 13 is a fragmentary side elevation of the pistol appearing in FIGS. 10 and 11;

FIG. 14 is a fragmentary sectional view similar to that of FIG. 10, but indicating the slide in the recoil position it assumes immediately after firing, with an empty shell case ready for ejection;

FIG. 15 is a section taken on the line 15—15 of FIG. 14;

FIG. 16 is another section taken, in opposite direction than FIG. 15, on the line 16—16 of FIG. 14;

FIG. 17 is a fragmentary side elevation of the other side of the pistol from that shown in FIG. 13;

FIG. 18 is a fragmentary perspective view of the barrel; and

FIG. 19 is a top plan view, corresponding to a portion of FIG. 14, with certain parts sectioned, and illustrating the ejection process.

Referring to the drawings in particular, the first embodiment of the invention as illustrated in FIGS. 1—9 includes a pistol having a stationary barrel, generally designated 10, which is affixed to a frame portion, generally designated 12, having a pistol grip magazine handle generally designated 14. The barrel 10 is secured to the frame portion 12 by threading it into its open end.

In accordance with one feature of the invention, the handle portion 14 includes an elongated magazine chamber 16 including a spring mounted follower member 18 which is biased upwardly by a coil spring 20. Cartridges generally designated 22 are loaded through an enlarged window opening 24 (FIG. 4) in the side of the pistol after a magazine depressing member or retractor grip 26 is urged downwardly in an exposed elongated slot 28 of the handle 14 to lower the height of the member 18 against the upward biasing of the spring 20 (FIG. 6). When the magazine is loaded the upper one of the cartridges 22 is urged against the underside of a coil spring 30 which extends around an elongated cylindrical breech bolt generally designated 32.

The cartridge 22 shown in FIG. 8 is of special design and includes a shell case portion 41 having a front portion 41a which is beveled outwardly from a bullet nose or head portion 42, and a central body portion 41b of constant diameter. This constant diameter central portion 41b fits into a cartridge chamber 38 as will be explained hereunder in more detail. The cartridge 22 also includes a rear rim portion 41c of slightly smaller diameter than the portion 41b which is separated from the portion 41b by a recessed small diameter portion 41d. The rim portion 41c is sized to permit an extractor hook 78, secured to the forward end of the breech bolt 32, to move around the end of the rim portion 41c when the cartridge is placed in the cartridge chamber 38 (FIG. 2). Since only the beveled forward portion 41a is in contact with a smaller diameter rifled portion 40 of the barrel 10, the case portion 41 is held against forward movement into the rifled portion 40 during the firing of the bullet portion 42. Since the intermediate portion 41b of the shell is of uniform diameter, there is no danger

that there would be any portion of this shell which would be out of contact with the cartridge chamber and which would permit side rupturing of the shell and jamming in the firearm.

The coil spring 30 abuts at one end against a ledge area 34 formed in the hollowed interior of the frame portion 12 and at the other end on a widened portion 36 of the breech bolt. In this position, as indicated in FIG. 1, the breech bolt 32 has moved forwardly after picking up the top cartridge 22 and advancing it into the cartridge chamber 38. The cartridge chamber is longitudinally elongated to a greater extent than the cartridge 22 and is in alignment with the rifled portion 40 of the barrel 10. The cartridge 22 is moved forwardly by the breech bolt 32 until a forward edge of the shell case portion 41 of the cartridge 22 abuts against the rifled portion 40 of the barrel 10. The bullet head portion 42 of the cartridge 22 is made to a diameter sufficient to permit its propulsion through the rifled portion 40 upon the firing of the cartridge.

In accordance with the invention, the pistol is fired by pulling backwardly on a pivotally mounted trigger arm 43 which may be depressed backwardly against the force of a small spring 44. The trigger is connected through an arm 46 to a detent crank member 48 which is rocked about its pivot 50 against the force of a spring 52 to become disengaged from the firing hammer 54. In the cocked position the firing hammer 54 effects the compression of a spring 56 which is affixed to a rod member 58 and biases the rod member in an upward direction. When the detent member 48 is released from the hammer 54 the latter rotates counterclockwise about its pivot 60, as viewed in FIG. 1, and strikes an elongated firing pin 62 which reciprocates within the breech bolt 32. The firing pin 62 is urged to the right, as viewed in FIG. 1, by a coil spring 64 which abuts against the widened portion of the pin in a hollowed interior portion of the breech bolt. Backward movement of the breech bolt upon firing of the cartridge effects cocking of the hammer 54 (see FIG. 3).

When the bullet is fired by the pointed striker portion 66 of the firing pin striking the cartridge 22, the bullet is propelled through the rifled portion 40 of the barrel 10 and thereafter the force of the burning powder gas causes backward movement of the shell portion 41 to cause movement of the breech bolt 32 against the force of the spring 30. An ejector lever arm 67 is pivotally mounted at 68 on a portion of the frame 12 and has one arm biased outwardly by a spring 69 to cause another arm to be urged against the breech bolt 32 (see FIG. 9). When the breech bolt 32 is moved backwardly beyond the ejector lever arm 67, the arm which is biased against the breech bolt moves inwardly into the path of the cartridge case and causes its ejection through an opening 70 (see FIG. 7).

The breech bolt 32 is advantageously provided with finger grip members 72 on each side which are mounted on bolts 74 which extend through an elongated slot 76 on each side of the frame 12 (FIGS. 4 and 5). The finger grips 72 may be manipulated to move the breech bolt 32 backwardly against the force of the spring 30 for the purposes of effecting the initial loading of a cartridge into the chamber 38. Normally, however, when the breech bolt 32 moves backwardly to the position indicated in FIG. 3, it deflects the hammer 54 downwardly into locking engagement with the detent member 48. When the breech bolt moves beyond the magazine portion 16, a cartridge 22 is moved upwardly ahead of the bolt and against the cartridge extractor hook 78. The extractor hook fits around the rim portion 41c during the entry and retraction of the breech bolt 32 in and out of the cartridge chamber 38. The cartridge 22 is securely held by the extractor hook 78 when the cartridge is in a firing position as indicated in FIG. 1. Expansion of the spring 30 causes the breech bolt 32

to move the cartridge 22 into this position. When the trigger is pulled the pin 62 strikes the cartridge to fire the pistol and the full force of the powder gas is imparted to the bullet head 42 as the cartridge case is held by the barrel and the extractor hook 78. After the bullet leaves the end of the gun the force of the powder acts on the shell case portion 41 of the cartridge 22 to cause the breech bolt 32 to be reciprocated backwardly against the force of the spring 30 and to accomplish ejection of the shell case, cocking of the pistol and repositioning of a fresh cartridge in the chamber upon its return movement.

Referring to FIGS. 10-19 of the drawings, a second embodiment is described, certain structural elements of which are identical with or closely resembling those of the just described first embodiment. For ready correlation, these elements have the same numerical designation, with "1" (one hundred) added thereto.

The firearm of the second embodiment comprises a stationary barrel generally designated 110 which has a depending lug portion 111 adapted to be press fitted into a frame portion, generally designated 112, having a pistol grip magazine handle generally designated 114. The barrel lug portion 111 has bores 111a (FIG. 18) adapted to take pins 113 with which the barrel is secured to the frame portion 112; the lug portion 111 also has a bore 111b for a slide stop pin 159 to be described somewhat later (see FIGS. 10 and 14). A bushing 121 is interposed between the latter and a slide assembly, generally designated 151 and to be described in detail somewhat later (see FIG. 15).

This firearm uses the same cartridges 22 shown in FIG. 8 and fully described in connection with the first embodiment. The bullet head portion 42 and the shell case portion 41 of the cartridge, as well as the front, central, rear and recessed portions 41a, 41b, 41c and 41d, respectively, of the case portion 41 are being shown in FIG. 10 again for the sake of correlation.

The handle portion 114 includes a magazine chamber 116, a follower member 118 and a biasing coil spring 120 for the follower, which are substantially identical in their function to the respective elements 16, 18 and 20 of the previous embodiment. The cartridges are loaded through an enlarged window opening 124 (FIG. 17) which, in this case, is provided on the opposite side of the pistol from that shown in FIGS. 10, 13 and 14. A depressing member or retractor grip 126 and an elongated slot 128 are provided on the same side as the opening 124 (see also FIG. 16) and their operation is very much like that described earlier for elements 26 and 28. Some other elements have been omitted for the sake of clarity.

The afore-mentioned slide assembly 151 is reciprocable with respect to the frame portion 112. FIGS. 11 and 14 illustrate the respective normal and recoiled positions. An elongated cylindrical breech bolt generally designated 133 is held by the top rear portion of the slide assembly 151. The breech bolt has a forwardly extension 135 adapted to protrude into a cartridge chamber 138 (FIG. 19) similar to chamber 38 of FIG. 2. The chamber 138 is longitudinally elongated to a greater extent than the cartridge 22 and is in alignment with a rifled portion 140 of the barrel 110. An extractor hook 178 is secured to the forward end of the breech bolt 133 and is adapted to enter the chamber 138, the same way as hook 78 enters chamber 38.

An elongated firing pin 162 is reciprocable within the breech bolt 133. The firing pin is urged to the right, as viewed in FIG. 10, by a coil spring 164 which abuts against the widened portion of the pin in a hollowed interior portion of the breech bolt. After insertion of the firing pin 162 into the interior of the breech bolt 133 or firing pin well from the front, a plate 137 is applied to the forward extension 135 of the bolt. A pointed striker portion 166 of the firing pin is adapted to pro-

trude through a bore of the plate 137 (FIG. 12). At the rear of the bolt 133, a stop 139 is applied in a manner known in the art.

Just forwardly of the barrel lug 111, the frame portion 112 has an upright member 115 attached thereto, into which a plug 117 is secured for a recoil spring 131 the forward end of which rests against the bottom front portion of the slide assembly 151 (see FIGS. 11 and 14).

FIG. 13 illustrates a slide stop 157 secured to pin 159. This conventional element, as well as the safety lock shown in this figure, and the mechanism related thereto, need not be explained in detail and does not form the subject matter of the present invention.

The second embodiment of the inventive firearm features a novel ejection port 170 arranged on the same side of the pistol as the loading opening 124 and the slot 128 for the retractor grip 126 (FIGS. 17 and 19).

A sear and disconnector assembly is generally designated 161 (FIG. 14); a trigger arm is shown at 143; a firing hammer is indicated at 154; and some of the associated elements, e.g. 144, 148, 150 and 160 are also illustrated which resemble in their operation that of the corresponding elements 44, 48, 50 and 60. It is deemed unnecessary to go into details of these conventional elements of the second embodiment.

The operation of the second embodiment is somewhat different from that of the first-described alternative. The cartridge chamber 138 is loaded when the slide assembly 151 moves forward, stripping the top cartridge 22 from the magazine chamber 116 and pushing it into the chamber 138. The hammer 154 is in the cocked position and the pistol is ready to be fired.

Each time a cartridge is fired, the slide 151 recoils and extracts, during its rearward motion, the cartridge case 41 from the chamber 138 and ejects it from the firearm through the opening 170. During rearward movement, the magazine 116 feeds another cartridge 22, the recoil spring 131 is compressed, and the hammer 154 is cocked. At the termination of the rearward movement of the slide 151, the recoil spring expands and forces the slide forward, and the cycle of operation continues until the last cartridge in the magazine is expended. In this event, the magazine spring 120 exerts upward pressure on the follower member 118 which strikes the slide stop 157 and raises it, forcing the latter to engage in a recess (see FIG. 13) at the lateral edge of the frontal slide portion and holding the slide assembly 151 in the rear position. This indicates that the magazine 116 is empty.

Feeding of a cartridge 22 toward the chamber 138 takes place along a straight line as the slide 151 moves forward. The expanding magazine spring 120 forces the follower 118 and the cartridges 22 up until the top cartridge is held by the magazine lips (FIG. 14), ready for chambering.

At the termination of the rearward movement of the slide 151 the expanding recoil spring 131 forces the slide forward. The lower portion of the face of the slide passes between the lips of the magazine 116, and pushes a cartridge to the chamfered rear face of, and thence into, the chamber 138. At this time, the extractor hook 178 enters the recessed portion 41d of the cartridge case 41. Chambering is complete when the cartridge is completely seated in the chamber 138, and the breech bolt extension 135 has entered the rear end of said chamber.

When the trigger 143 is squeezed, upon having first pressed inward the conventional grip safety (FIGS. 10 and 14), the movement is transmitted to the sear assembly 161. A spring pushes the hammer strut up, forcing the hammer 154 to rotate forward on its pivot 160 and strike the rear end of the firing pin 162. The inertia-type pin travels forward, compressing the firing pin spring 164. The firing pin striker 166 moves through the plate 137 in the face of the breech bolt 133 and strikes the cartridge primer. This fires the cartridge. The firing

pin spring 164 expands and withdraws the pin 162 from the face of the breech bolt extension 135.

The resistance of the recoil spring and the weight of the slide being much greater than the weight of the bullet, these parts react to the expanding powder gas forces more slowly than the bullet. After the bullet has left the barrel 110, the slide 151 starts moving backward. The extractor 178, engaged in the portion 41d of the cartridge case, withdraws the latter from the chamber 138. The case 41 is held against the face of the breech bolt extension 135 by the extractor hook 178. It strikes the ejector, pivots on the extractor, and is ejected from the pistol at 170.

Cocking begins as the slide 151 starts rearward in recoil. At this time, the firing pin stop pushes the hammer 154 rearward. As the slide moves forward, upon action of the expanding recoil spring, the hammer follows it for a short distance; then the sear, biased toward the hammer, enters an appropriate notch of the latter and holds it in the cocked position (FIG. 10)

As can be understood from the preceding description, the invention provides a very simple firearm construction which includes a breech bolt which moves into and out of the cartridge chamber in order to rapidly position the cartridge therein for firing purposes, and thereafter to rapidly eject the cartridge shell case and to move the next cartridge into position automatically. Since the barrel is stationary in both embodiments, there is very little upward kick of the barrel during firing and the accuracy of the pistol is greatly enhanced.

Subject matter disclosed above has also been disclosed in part in applications Serial No. 650,184 filed April 2, 1957 and Serial No. 845,947 filed October 12, 1959, both now abandoned.

It should be understood, of course, that the foregoing disclosure relates only to preferred embodiments of the invention and that it is intended to cover all changes and modifications of the examples described which do not constitute departures from the spirit and scope of the invention as set forth in the appended claims.

I claim:

1. A pistol for use with cartridges having a substantially uniform maximum diameter case portion, comprising a frame, a barrel having a rear portion integrally carrying a downwardly directed lug which has a press fit in a recessed portion of said frame and which is rigidly fixed to said frame by at least two cross pins extending through said lug and into said frame so that said barrel is thereby rigidly connected to said frame, said barrel including a rifled interior portion and a cartridge chamber portion in axial alignment therewith, said rifled portion being of slightly smaller diameter than said case portion, said chamber portion being of greater elongation than said cartridges and having a substantially uniform diameter accommodating said case portion, one of said cartridges being lodged within said chamber portion when the pistol is ready to be discharged, a substantially cylindrical breech bolt reciprocably mounted in said frame in axial alignment with said chamber portion and having an elongated forward portion of substantially uniform smaller diameter adapted to extend into said chamber portion, a slide assembly axially reciprocable with respect to said frame, said breech bolt being secured to said slide assembly for reciprocation therewith, recoil spring means interposed between said slide assembly and said frame for biasing said slide assembly and said breech bolt forwardly into a rest position in which said forward portion of the breech bolt extends into said chamber portion for seating said one cartridge, a substantially cylindrical firing pin concentrically lodged within an elongated recess of said breech bolt, a spring interposed between a frontal wall of said recess and a forward shoulder of said firing pin for biasing the latter away from said chamber portion, tensionable and releasable hammer means adapted to project said firing pin toward and into

contact with said one cartridge, whereby the latter is discharged from the pistol, said firing pin being acted upon while said breech bolt is in said rest position, said breech bolt including means to hold said one cartridge during said discharge, the reciprocation of said breech bolt consisting of a primary rearward motion upon firing and explosion of said one cartridge, away from said rest position toward a momentary extreme rearward position, followed by an immediate secondary forward motion toward said chamber portion, said hammer means being tensioned by said breech bolt during said primary rearward motion and manually releasable by the operator of the pistol.

2. A pistol according to claim 1, further including an ejector on said frame, means for urging said ejector against said breech bolt, said frame having a lateral opening adjacent said ejector, whereby said primary rearward motion of said breech bolt is effective to dislodge the case portion of said one cartridge through said opening, said slide assembly being formed with an ejection port which during said primary rearward motion of said breech bolt becomes aligned with said lateral opening, so that the case portion of said one cartridge will pass first through said opening and then through said port.

3. A pistol according to claim 1, further including an extractor hook for engaging the case portion of said one cartridge in said rest position of the breech bolt.

4. A pistol according to claim 1, further including a cartridge magazine in said frame below said breech bolt and means for urging at least two cartridges toward said breech bolt and for maintaining said two cartridges in a substantially aligned position with said breech bolt, whereby said primary rearward motion of the breech bolt beyond the rear end of said magazine permits said cartridge urging means to directly position said one cartridge in alignment with said chamber portion, and whereby said secondary forward motion of the breech bolt causes the latter to force said one cartridge into said chamber portion.

5. A pistol according to claim 4, wherein said frame includes a hollow pistol grip handle forming said magazine, a cartridge plate in said magazine for supporting said cartridges, means for urging said cartridge plate toward said breech bolt to align said two cartridges with respect thereto, said handle having an elongated slot extending along its side with an upper enlarged section larger than said cartridges for manually loading the latter into said magazine, said cartridge plate including a portion extending outwardly through said slot to permit manually to depress said cartridge plate for insertion of said cartridges.

6. A pistol according to claim 4, wherein a slide stop means is operatively connected to one of said cross pins for movement to a position engaging and arresting said slide assembly substantially at the end of its primary rearward motion away from said rest position to prevent return of said slide assembly to said rest position thereof, said cartridge urging means engaging said slide stop means to move the latter to said position arresting said slide assembly and breech bolt therewith when the last cartridge has been displaced from said magazine, so that the operator knows, when the slide assembly is arrested rearwardly from said rest position, that the magazine is empty.

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