March 19, 1935. F. F. BURTON ET AL 1,994,564

FIREARM

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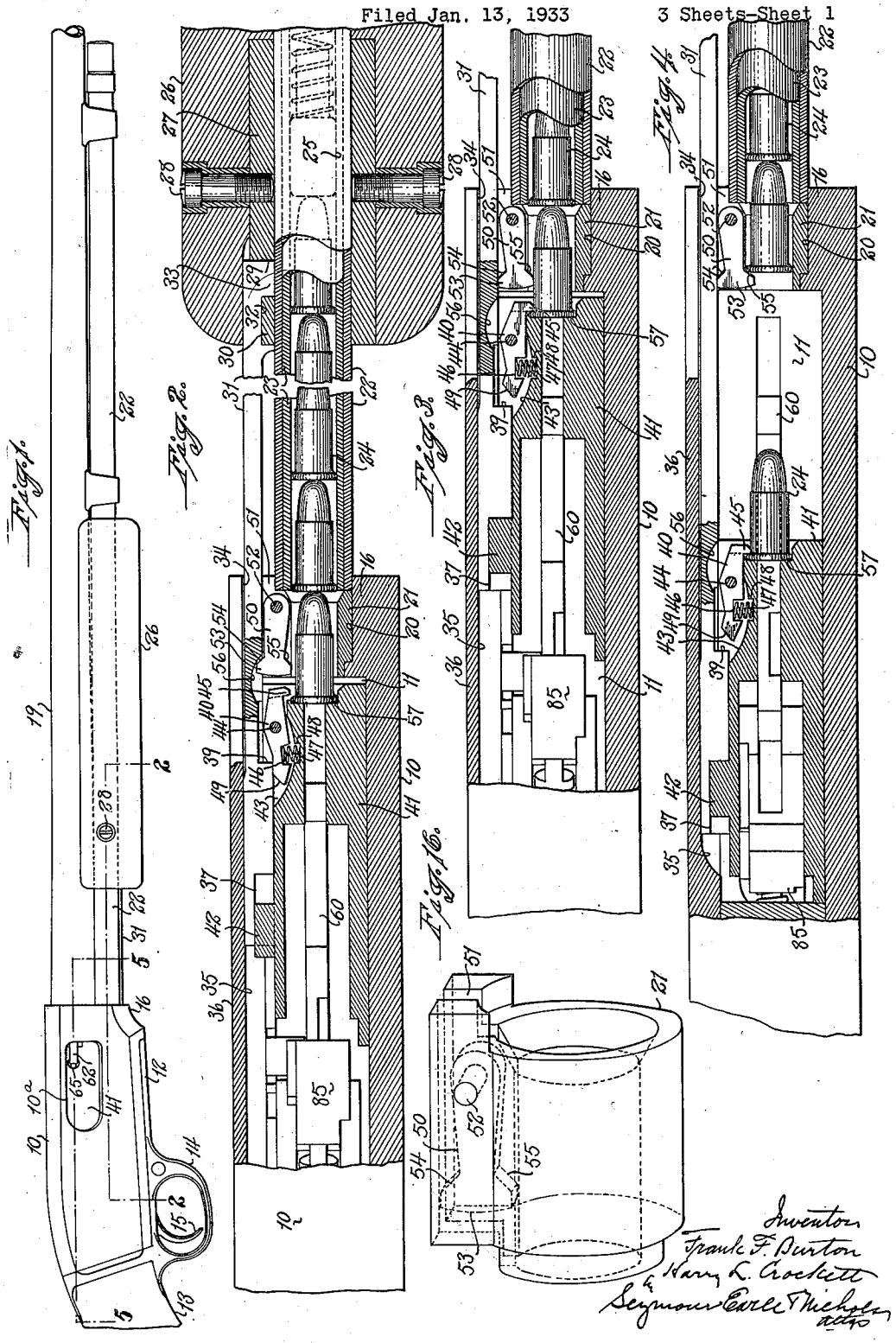


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 16.

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FIREARM

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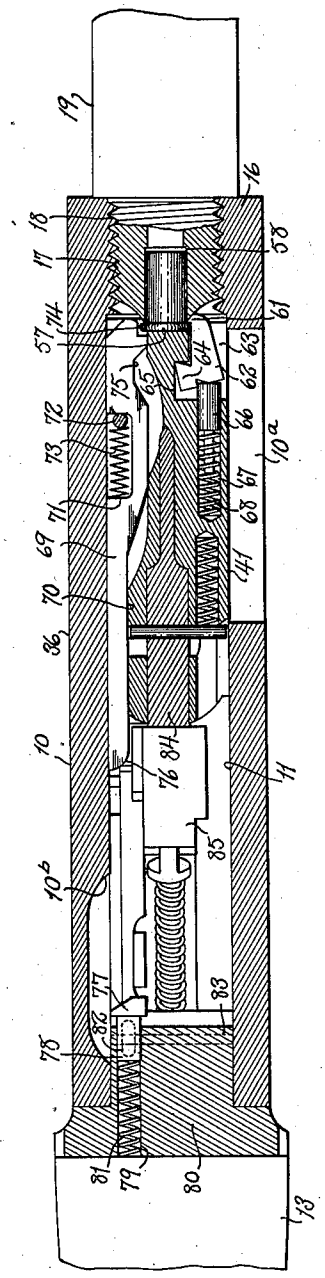


Fig. 5.

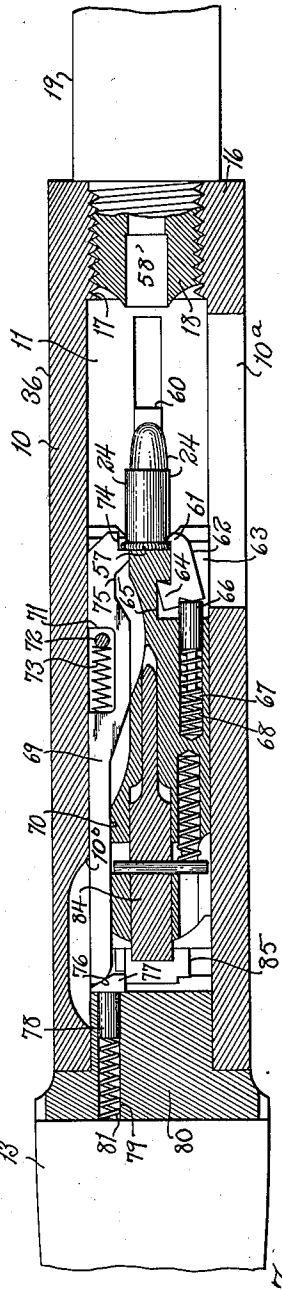


Fig. 6.

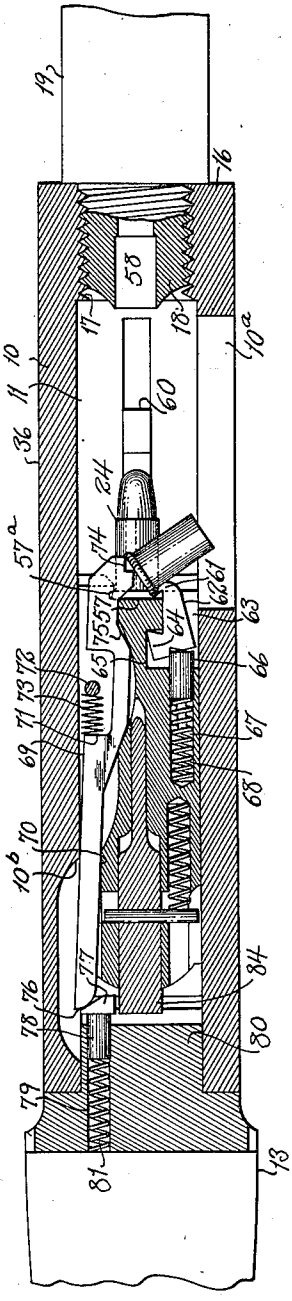


Fig. 4.

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FIREARM

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Fig. 8.

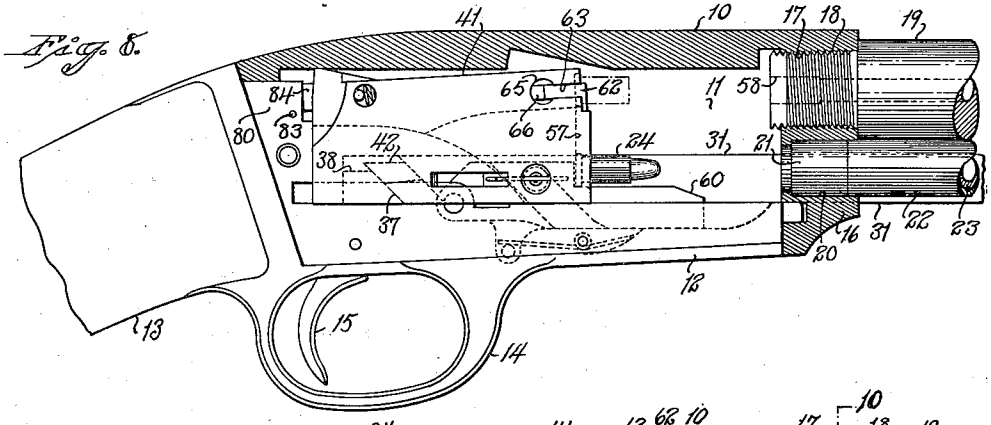


Fig. 9.

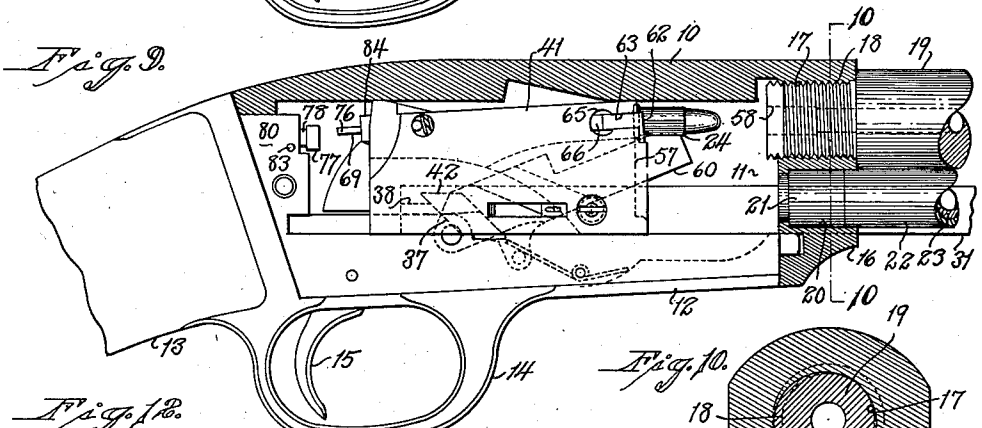


Fig. 10.

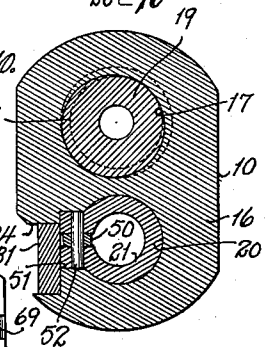


Fig. 12.

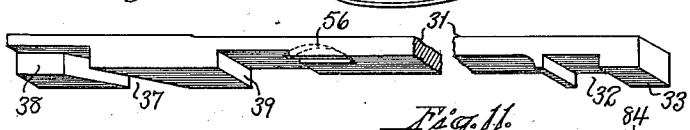


Fig. 11.

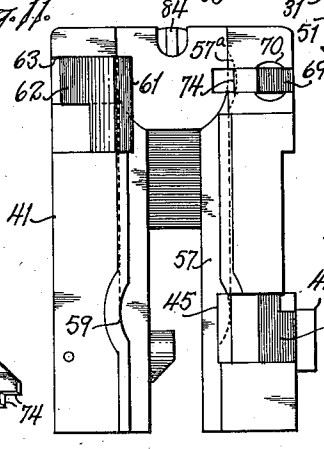


Fig. 13.

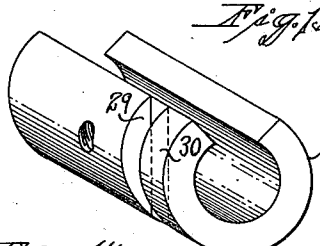


Fig. 15.

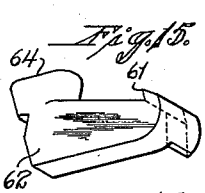


Fig. 14.

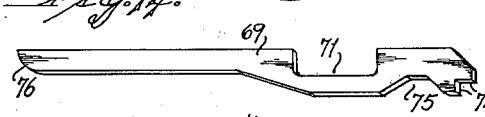


Fig. 16.

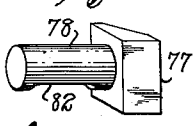
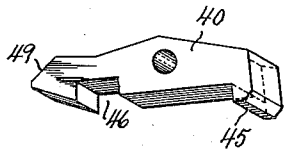


Fig. 17.



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1,994,564

UNITED STATES PATENT OFFICE

1,994,564

FIREARM

Frank F. Burton, Mount Carmel, and Harry L. Crockett, New Haven, Conn., assignors to Winchester Repeating Arms Company, New Haven, Conn., a corporation of Maryland

Application January 13, 1933, Serial No. 651,506

6 Claims. (Cl. 42—17)

This invention relates to an improvement in firearms and particularly to that class of firearms having breech-bolts or equivalent members which reciprocate longitudinally of the arm. In some of its phases, as will appear from the following, our invention relates more particularly to repeating firearms, though not so limited.

One of the objects of our present invention is to provide a firearm having superior means for ejecting empty shells therefrom, which means will be effective when the breech-mechanism is operated rapidly as well as when the same is operated slowly.

Another object of our invention is to provide a tubular-magazine repeating firearm having means for insuring the transfer of cartridges from the tubular-magazine to the cartridge chamber, which means will be effective when the breech-mechanism is operated with extreme rapidity as well as when the same is operated slowly.

A further object of our invention is to provide a tubular-magazine repeating firearm having automatic means for coupling a cartridge to the bolt or like member of the arm, to insure its positive movement out of the magazine preparatory to its insertion into the cartridge chamber thereof.

A still further object of our invention is to provide a tubular-magazine repeating firearm in which the automatic means for insuring the one-by-one release of cartridges from the tubular magazine thereof, is mounted in a simple, reliable and convenient manner.

Other objects will appear, to those skilled in the art, from the following, taken in conjunction with the appended claims and the accompanying drawings.

In the accompanying drawings:

Fig. 1 is a broken view in side elevation of one form which a firearm embodying our invention may assume;

Fig. 2 is a broken detail view in transverse section, taken on the line 2—2 of Fig. 1, and showing the positions which the parts assume when the breech-bolt is in its closed and locked position;

Fig. 3 is a similar view, but showing the parts in the positions which they assume when the action-slide is partially moved rearwardly for unlocking the bolt, preparatory to retiring the same rearwardly;

Fig. 4 is a similar view, but showing the parts in the positions which they assume when the bolt is in its fully retired position;

Fig. 5 is a broken detail view in transverse section, taken on the line 5—5 of Fig. 1, with the bolt in its closed position;

Fig. 6 is a similar view, but showing the parts in the positions which they assume when the bolt is moved into a position approaching the limit of its rearward movement;

Fig. 7 is a similar view, but showing the parts in the positions which they assume when the ejector-operating plunger has acted to move the ejector longitudinally forward and to rock the forward end thereof inwardly for ejecting an empty cartridge;

Fig. 8 is a broken view of the central portion of the firearm, mainly in side elevation, but with the receiver shown in vertical longitudinal section, the bolt being shown at the limit of its rearward travel;

Fig. 9 is a view corresponding to Fig. 8, but showing the bolt advanced part way of its forward travel;

Fig. 10 is a transverse sectional view taken on the line 10—10 of Fig. 9;

Fig. 11 is a view in front end elevation of the breech-bolt detached, but shown on a larger scale;

Fig. 12 is a broken perspective view of the action-slide detached;

Fig. 13 is a perspective view of the action-slide-sleeve detached;

Fig. 14 is a perspective view of the ejector detached;

Fig. 15 is a perspective view of the cartridge-extractor, detached;

Fig. 16 is a similar view of the unit comprising the cartridge-stop and its mounting-sleeve;

Fig. 17 is a corresponding view of the cartridge-retractor detached; and

Fig. 18 is a corresponding view of the ejector-operating plunger, detached.

The particular tubular-magazine repeating rifle herein chosen for the illustration of our invention includes the usual receiver feature 10, having a chamber 11 formed therein, the bottom of which latter is closed by a guard-plate 12 forming a feature of, and forwardly extending from the butt-stock 13. The said guard-plate is formed with the usual trigger-guard loop 14 formed integral therewith and housing in the usual manner a trigger 15.

The integral forward wall 16 of the receiver 10 is formed near its upper end with an internally-threaded bore 17 receiving the externally-threaded shank 18 of a barrel 19. Immediately below the threaded bore 17, just referred to, the front wall 16 of the receiver 10 is formed with a

parallel bore 20 into which is snugly fitted a bushing or sleeve 21, as clearly shown in Figs. 2 to 4 inclusive. The said bushing 21 is slightly shorter than the bore 20 in which it is fitted, so as to permit the introduction into the forward end of the said bore of an outer magazine-tube 22 of usual construction and having telescopically fitted within it an inner magazine-tube 23. The inner magazine-tube 23 just referred to is adapted to accommodate within it a series of cartridges 24 arranged end to end, as shown, and normally pressed rearwardly by a spring-actuated plunger 25 in accordance with the usual practice in firearms of the type to which our invention relates.

Slidably mounted upon the outer magazine-tube 22, intermediate the ends thereof, is a reciprocating operating-handle 26 having installed in its rear end a sleeve 27 secured in place therein by complementary screws 28—28.

The sleeve 27, just above referred to, is formed with a transverse coupling-groove 29 resulting in the formation, at the rear end of the said sleeve, of a coupling-rib 30. For interengagement with the groove and rib 29 and 30 respectively of the sleeve 27, the forward end of a bar-like action-slide 31 has its forward end provided with a transverse coupling-groove 32 receiving the coupling-rib 30 of the said sleeve and resulting in the formation of a laterally-offsetting coupling-rib 33 adapted to enter the coupling-groove 29 in the said sleeve.

By entering the rib 33 into the groove 29 and the rib 30 into the groove 32, the sleeve 27, and hence the operating-handle 26, is coupled to the action-slide 31 for concurrent reciprocating movement. When once the sleeve 27 and the forward end of the action-slide 31 have been interengaged, as just described, and fitted within the interior of the operating-handle 26, the said parts are securely interlocked against unintentional displacement by locking the sleeve 27 in place by means of the screws 28—28 before described.

The rear end of the action-slide 31 passes rearwardly through an opening 34 formed in the front wall 16 of the receiver 10 immediately to one side of the bore 20 therein, and is guided thereby as well as by a longitudinal groove 35 formed in the side wall 36 of the said receiver.

The rear portion of the action-slide 31 is formed in its inner face with an upwardly- and rearwardly-inclined bolt-operating groove 37, the rear wall of which groove terminates in a horizontal bolt-locking shoulder 38 formed upon the said action-slide, as clearly shown in Fig. 12. Slightly forward of the bolt-operating groove 37, the inner face of the action-slide is transversely grooved to provide a shoulder 39 adapted, as will hereinafter appear, to control the transverse rocking movement of a cartridge-retractor 40.

Housed within the chamber 11 of the receiver 10 is a longitudinally-slidable and vertically-rocking breech-bolt 41 having a laterally-offsetting lug 42, which has its front and rear walls inclined for entry into the inclined bolt-operating groove 37, in the action-slide 31, and adapted to have its under face engaged by the bolt-locking shoulder 38 of the said slide, as will hereinafter appear.

The cartridge-retractor 40, hereinbefore referred to, is mounted in a longitudinal groove 43 formed in the left side of the bolt 41 adjacent the forward end thereof, in a transverse plane aligned with the axis of the magazine-tubes 22 and 23. The said retractor, as will hereinafter appear, is designed to interlock a cartridge with the bolt and insure its retraction from the tubular-magazine when the bolt is moved rearwardly and, for the purpose described, is mounted in the groove 43 before referred to, upon a pivot-pin 44, and is formed at its forward end with an inwardly-extending cartridge-retracting nose 45, and in its inner face, adjacent its rear end, with a transverse groove 46, forming a seat for the outer end of a helical spring 47, the inner end of which latter is seated in a socket 48 formed in the breech-bolt 41 and leading inwardly from the bottom of the groove 43 therein, in line with the groove 46 in the retractor 40. The said spring 47 exerts a constant effort to swing the cartridge-retractor 40 in a clockwise direction, so as to move its nose 45 inwardly. For the purpose of swinging the retractor 40 in a counterclockwise direction for retiring its nose 45, we form the said retractor at its outer rear corner with a cam-surface 49 engageable with the shoulder 39, before described, on the action-slide 31.

For the purpose of preventing more than one cartridge from rearwardly escaping from the tubular-magazine, under the urge of the spring-pressed plunger 25 therein, at each full operation of the bolt-mechanism, we employ a cartridge-stop 50 located in a radial slot 51 in the mounting-bushing or -sleeve 21 located in longitudinal alignment with the cartridge-retractor 40, before referred to. The said cartridge-stop is pivotally mounted at its forward end in the said sleeve 21 by means of a pivot-pin 52, and is formed at its rear end with a head-portion 53, which latter is formed at its outer forward corner and its inner forward corner respectively with inclined cam-surfaces 54 and 55. The cam-surface 54, just referred to, is adapted to be engaged by an inclined cam-surface 56 formed on the inner face of the action-slide 31 for being positively swung inwardly into its cartridge-stopping position, as will hereinafter appear. The cam-surface 55 of the stop 50 is adapted to be engaged by the head of a cartridge for checking the rearward movement thereof on certain occasions, and for being cammed laterally outward thereby on other occasions, into a clearance or cartridge-releasing position as will hereinafter appear.

The forward face of the bolt 41 is formed with a vertically-extending undercut cartridge-guideway 57 adapted to successively receive the heads of cartridges as the same are rearwardly fed from the tubular-magazine, and to guide each cartridge successively upward during the forward movement of the bolt 41, into alignment with the cartridge-chamber 58 in the barrel 19, before referred to. To permit the initial axial entry of the head of a cartridge into the guide-way 57, the lower end thereof is cut away as at 59, as clearly shown in Fig. 11.

For the purpose of lifting each cartridge successively upward into line with the cartridge-chamber 58 as just described, we may employ any suitable mechanism for that purpose, herein requiring no detailed description other than to say that in the instance shown, we employ a cartridge-lifter 60, pivotally mounted in the guard-plate 12 and adapted to be controlled in its vertical movement by the movement of the breech-bolt 41 in accordance with usual practice.

As each successive cartridge is lifted upwardly by the member 60 into alignment with the cartridge-chamber 58, its head is positioned beneath, so to speak, the extracting-nose 61 of a pivotal extractor 62 mounted with capacity for rocking

movement in a longitudinal groove 63 formed in the forward end of the breech-bolt 41 in a plane laterally in line with the axis of the cartridge-chamber 58. The said extractor is provided with an inwardly-projecting lug 64 entering a socket 65 opening rearwardly from the groove 63, before referred to. For the purpose of swinging the extractor 62 in a counterclockwise direction and hence move its extractor-nose 61 inwardly for engagement with the cartridge, we employ a plunger 66 engaging the rear face of the said extractor and reciprocating in a longitudinal bore 67 leading rearwardly out of the rear end of the groove 63 and housing a helical spring 68 which exerts a constant effort to move the said plunger forwardly.

For the purpose of laterally ejecting an empty cartridge, after the same has been extracted from the cartridge-chamber 58 by the extractor 62, we employ a bar-like ejector 69 mounted in a longitudinal groove 70 formed in the left-side wall of the breech-bolt 41 and having capacity for both longitudinal bodily movement and lateral rocking movement in the said groove. In its outer edge, the ejector 69 is formed with a notch 71 receiving a retaining-pin 72 and a helical spring 73. The said helical spring 73 is seated at its forward end against the pin 72 and at its rear end against the rear wall of the notch 71, and exerts a constant effort to move the ejector 69 bodily rearward.

The forward inner corner of the ejector 69 is notched to provide an L-shaped cartridge-engaging and cartridge-ejecting shoulder 74, and is further formed rearwardly of the said shoulder with a transverse clearance-notch 75. The rear end of the ejector 69 is rounded to form an inwardly- and forwardly-sloping cam-surface 76 for engagement with the inclined forward face of the head 77 of an ejector-operating plunger 78 located axially in line with the said ejector and reciprocating in a longitudinal bore 79 formed in the upstanding portion 80 of the guard-plate 12. A helical spring 81, located in the bore 79 rearwardly of the plunger 78, exerts a constant effort to move the latter forwardly for the purpose as will hereinafter appear, and it will be noted that the said spring 81 is of greater strength than the spring 73, before referred to, so as to have capacity for overcoming the same, as will hereinafter appear. To limit the forward movement of the ejector-operating plunger 78, the under face of the same is formed with a groove 82 receiving a transverse stop-pin 83.

The breech-bolt 41 carries the usual longitudinally-arranged firing-pin 84 adapted to be struck for firing a cartridge by a pivotal hammer 85 controlled by the trigger 15, before referred to.

Before describing the detail operation of the rifle herein chosen for the illustration of our invention, attention may be called to the fact that the lug 42, offsetting from the breech-bolt 41 and interengaging with the inclined bolt-operating groove 37 in the action-slide 31, serves to provide what might be termed a "lost-motion" connection between the said action-slide and the said bolt, inasmuch as the initial rearward movement of the action-slide does not immediately effect the unlocking-movement of the bolt, as will be seen from the following.

Let it be presumed that the gun has been fired and that the bolt is still in its closed and locked position, as shown, for instance, in Figs. 2 and 5 of the drawings.

Now, when a rearward draft is exerted upon the operating-handle 26 to move the same rearwardly, the said motion will correspondingly affect the action-slide 31 and cause the bolt-locking shoulder 38 thereon to ride rearwardly from under the lug 42 of the breech-bolt 41 without effecting the movement of the said bolt until the inclined forward wall of the bolt-operating groove 37 engages with the similarly-inclined forward wall of the said lug 42. During this motion just described, in which the bolt remains stationary, the cam-surface 56 in the action-slide will act against the inclined cam-surface 54 of the cartridge-stop 50 and swing the same inwardly, so as to interpose its cam-surface 55 in the path of the second cartridge of the column thereof in the tubular-magazine to thus guard against the escape of any cartridge save the rearmost one thereof during the rearward excursion of the breech-bolt 41 presently to take place.

The initial movement of the action-slide now being described will also permit the cartridge-retractor 40 to swing in a clockwise direction under the urge of the spring 47 to hook its retracting-nose 45 over the forward side of the head of the rearmost cartridge of the column thereof already referred to, so as to couple the cartridge in question to the breech-bolt 41 to insure its rearward travel therewith. This clockwise swinging of the cartridge-retractor is permitted by the rearward movement of the shoulder 39 on the action-slide 31 which permits the inclined cam-surface 49 of the retractor to slide thereover. The parts will now have assumed the positions in which they are shown in Fig. 3 in which it will be noted that the nose 45 of the retractor now forms in effect a continuation of the front face of one of the complementary channels which together constitute the vertically-extending undercut cartridge-guide-way 57 in the forward face of the breech-bolt 41.

Now the further rearward movement of the action-slide 31 will cause the inclined forward wall of the bolt-operating groove 37 therein to cam the lug 42 of the bolt 41 downwardly and hence unlock the bolt and immediately thereafter slide the same rearwardly with the effect of carrying along with it the particular cartridge with which the retractor 45 is at the time engaged and also the empty cartridge from the cartridge-chamber 58 with which the extractor 62 is at the time engaged.

As soon as the empty cartridge has been sufficiently withdrawn from the cartridge-chamber 58 as above described, it will be shifted slightly laterally by the urge of the extractor 62, with the effect of seating the periphery of its head in an arcuate undercut 57[a] leading laterally out of the vertical guide-way 57 in the bolt, adjacent the forward end of the ejector 69.

Now as the breech-bolt 41 approaches the limit of its rearward travel, the cam-surface 76 at the rear end of the ejector 69 will engage with the sloping forward face of the head 77 of the ejector-operating plunger 78, with the effect, first, due to the resistance of the spring 81, of bodily shifting the said ejector relatively forwardly to engage the rear wall of its L-shaped cartridge-ejecting shoulder 74 with the rear face of the head of the empty cartridge. This movement of the ejector serves to slightly compress the spring 73. As soon as the ejector is moved into engagement with the empty cartridge as just described, the relative forward movement of the ejector will be halted and the same will continue to travel rear-

wardly with the breech-bolt 41, with the effect of moving the ejector-operating plunger 78 rearwardly against the counterurge of the spring 81, which will be thus compressed. As soon as the resistance offered by the plunger 78 to the rearward travel of the ejector is sufficient to overcome the resistance to displacement which is offered by the engagement of the head of the empty cartridge with the undercut 57ª, the said ejector 69 will be simultaneously snapped forward bodily and at the same time have its rear end outwardly urged and its forward end inwardly urged due to its pivotal contact with the corner 10ᵇ in the receiver 10, so as to yieldingly maintain both walls of the L-shaped cartridge-ejecting shoulder 74 of the ejector in engagement with the adjacent portions of the head of the empty cartridge as the same pivots around the hook of the extractor 62, as clearly shown in Fig. 7.

By the combined forward bodily movement and rocking movement of the ejector 69 as just above described, a uniform and reliable ejection of empty cartridges is effected, since the forward end of the ejector exerts both forward and lateral pressure on the empty cartridge until the instant the same is flipped outwardly through an ejection-opening 10ª in the side wall of the receiver 10.

The bolt may now be moved forwardly by means of the operating-handle 26 and action-slide 31, during which forward movement the cartridge-lifter 60 will serve to lift the cartridge now being held by the cartridge-retractor 40 and elevate the said cartridge by sliding its head-portion through the cartridge-guide-way 57 in the forward face of the bolt and into alignment with the cartridge-chamber 58 and into engagement with the extractor 62. The continued forward movement of the action-slide and bolt will cause the introduction of the now-elevated cartridge into the cartridge-chamber 58 and effect the upward tilting and locking of the bolt, in the usual manner of slide-action firearms.

After the bolt has been moved to the limit of its forward movement, the action-slide 31 will lock the same by causing its bolt-locking shoulder 38 to ride under the lug 42 and will also effect the counterclockwise swinging movement of the retractor 40 to retire the nose 45 thereof out of the path of the head of the rearmost cartridge in the tubular-magazine. This counterclockwise movement of the retractor just described is effected by the engagement of the shoulder 39 of the action-slide with the cam-surface 49 of the retractor and takes place substantially concurrently with the movement of the cam-surface 56 into alignment with the head of the cartridge-stop 50 to permit the same to be forcibly swung outwardly by the head of the now-rearmost cartridge in the tubular-magazine so that the said cartridge is free to move rearwardly under the urge of the spring-pressed plunger 25 and seat its head against the rear wall of the cartridge-guide-way 57 of the breech-bolt, preparatory to being grasped by the retractor 40 for being fed into the cartridge-chamber during a subsequent operation of the rifle.

No claim is made herein to the novel ejector-means 69, 77, etc., herein shown and described, since the same is the sole invention of Frank F. Burton.

It will be understood by those skilled in the art that our invention may assume varied physical forms without departing from our inventive concept, and we, therefore, do not limit our invention to the specific embodiment herein chosen for illustration.

We claim:

1. In a firearm, the combination with a reciprocating breech-bolt; a cartridge-magazine; a cartridge-retractor carried by the said breech-bolt to successively couple cartridges thereto; and manual operating-means for the said breech-bolt having limited movement relative thereto, and carrying controlling-means positioned to control the movement of the said cartridge-retractor during the relative movement of the said operating-means with respect to the said breech-bolt.

2. In a firearm, the combination with a reciprocating breech-bolt; a cartridge-magazine; a cartridge-retractor carried by the said breech-bolt to successively couple cartridges thereto; spring-means urging the said cartridge-retractor into engagement with a cartridge; and manual operating-means for the said breech-bolt having limited movement relative thereto and carrying controlling-means positioned to retire the said cartridge-retractor during the relative movement of the said manual operating-means with respect to the said breech-bolt.

3. In a firearm, the combination with a reciprocating breech-bolt; a cartridge-magazine; a cartridge-retractor carried by the said breech-bolt to successively couple cartridges thereto; and a reciprocating action-slide for the said breech-bolt, having limited movement relative thereto, and carrying controlling-means positioned to control the movement of the said cartridge-retractor during the relative movement of the said action-slide with respect to the said breech-bolt.

4. In a firearm, the combination with a reciprocating breech-bolt; a cartridge-magazine; a cartridge-retractor carried by the said bolt to successively couple cartridges thereto; spring-means urging the said cartridge-retractor into engagement with a cartridge; and a manually-operable reciprocating action-slide for the said breech-bolt having limited movement relative thereto and carrying controlling-means positioned to retire the said cartridge-retractor during the relative movement of the said action-slide with respect to the said breech-bolt.

5. In a firearm, the combination with a reciprocating breech-bolt; a cartridge-magazine; a pivotal cartridge-retractor carried by the said breech-bolt to successively couple cartridges thereto; and manual operating-means for the said breech-bolt having limited movement relative thereto, and carrying controlling-means positioned to control the movement of the said pivotal cartridge-retractor during the relative movement of the said operating-means with respect to the said breech-bolt.

6. In a firearm, the combination with a reciprocating breech-bolt; a cartridge-magazine; a pivotal cartridge-retractor carried by the said bolt to successively couple cartridges thereto; spring-means urging the said pivotal cartridge-retractor into engagement with a cartridge; and manual operating-means for the said breech-bolt having limited movement relative thereto and carrying controlling-means positioned to retire the said pivotal cartridge-retractor during the relative movement of the said manual operating-means with respect to the said breech-bolt.

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