May 13, 1952 R. G. DAVIDSON 2,596,841

RIFLE WITH INTEGRAL BREECH BOLT AND MAGAZINE

Filed Dec. 20, 1949 3 Sheets-Sheet 1

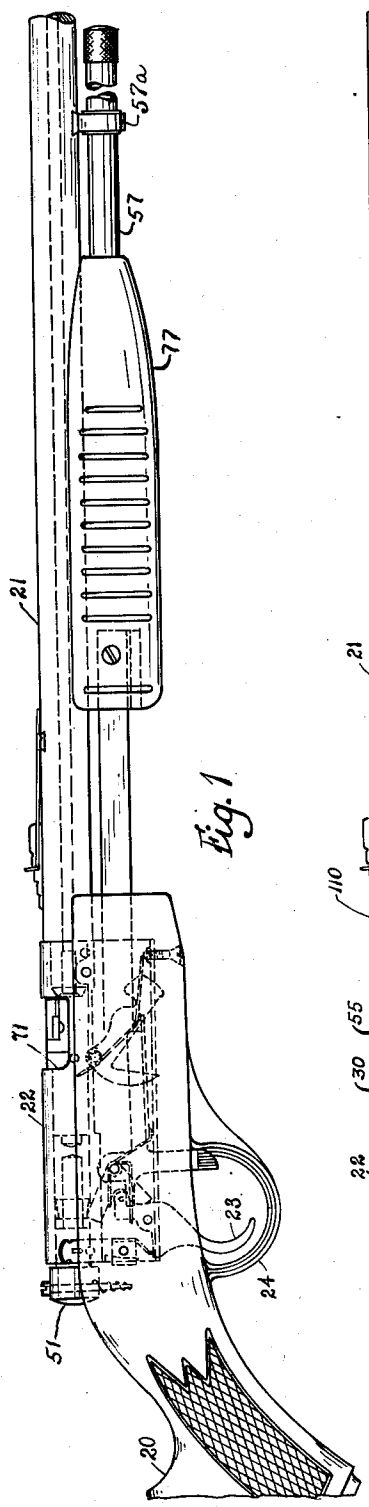


Fig. 1

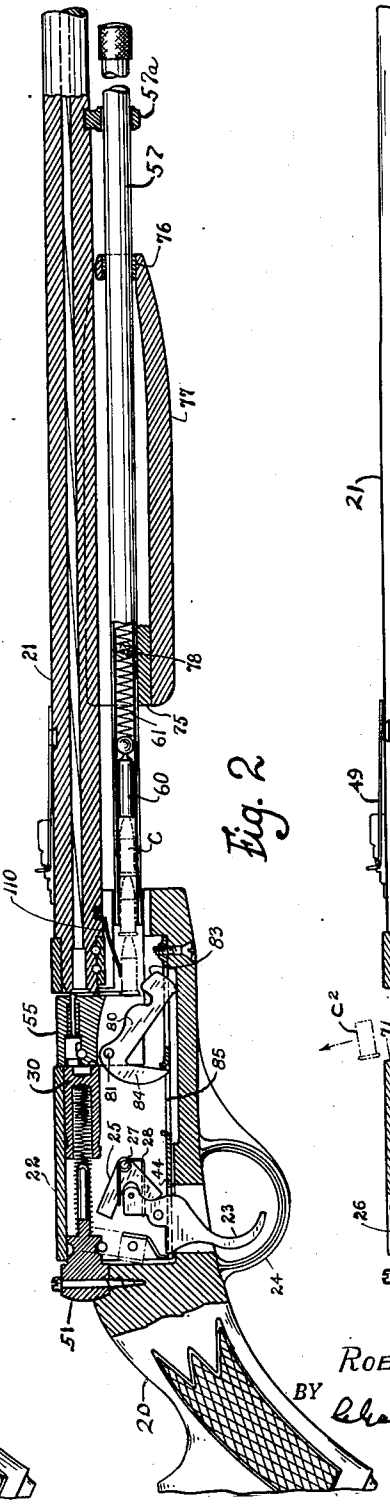


Fig. 2

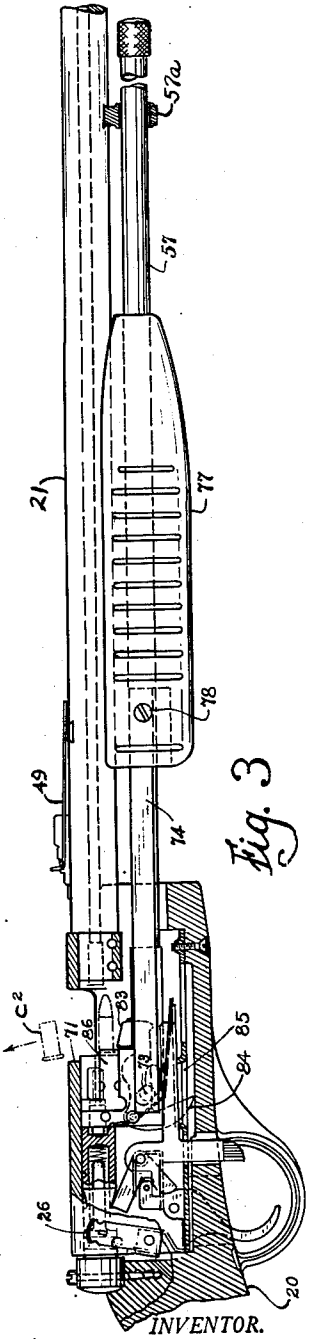


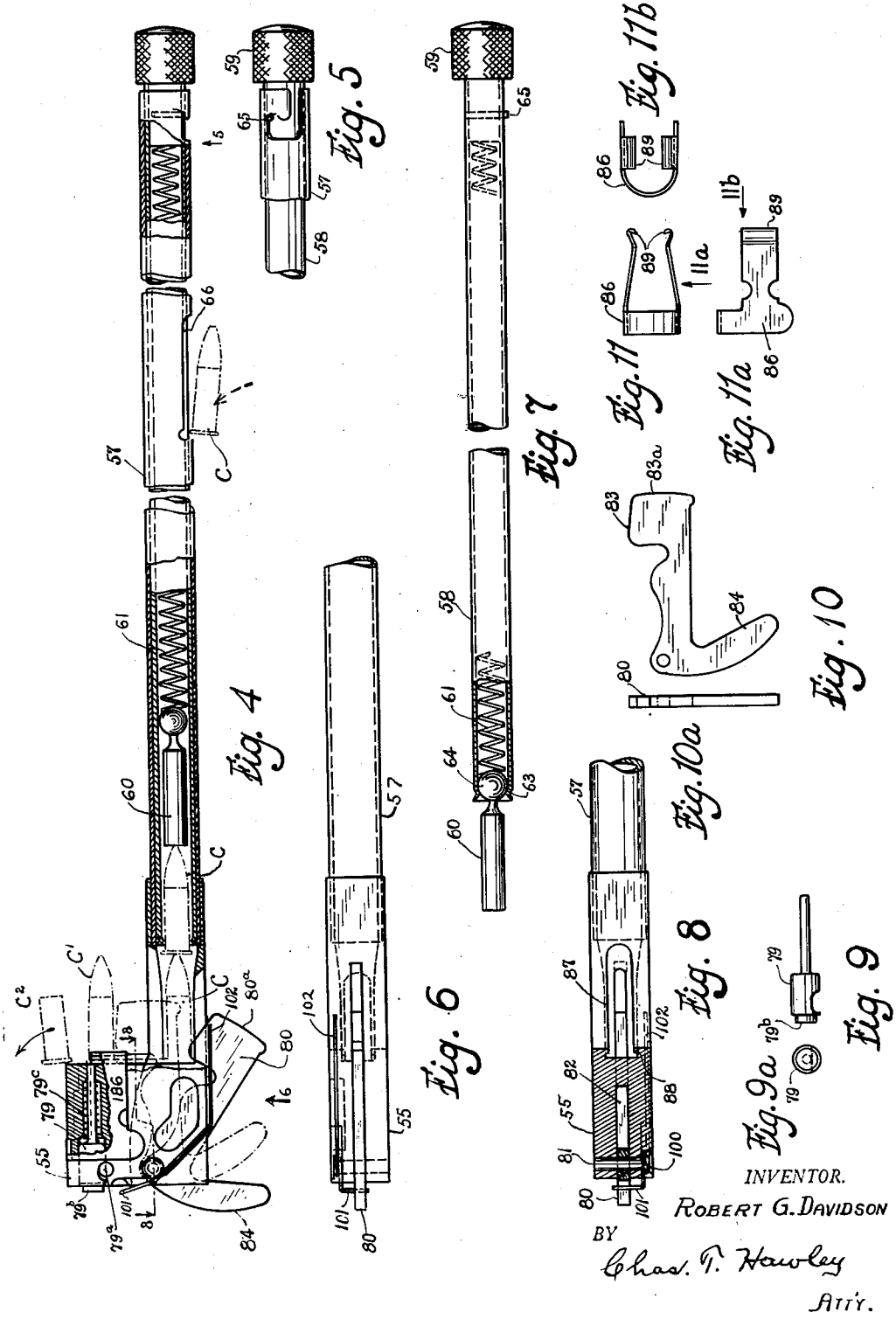
Fig. 3

INVENTOR.
ROBERT G. DAVIDSON
BY Chas. T. Hawley
ATT'Y.

May 13, 1952 R. G. DAVIDSON 2,596,841

RIFLE WITH INTEGRAL BREECH BOLT AND MAGAZINE

Filed Dec. 20, 1949 3 Sheets-Sheet 2



INVENTOR.
ROBERT G. DAVIDSON
BY
Chas. T. Hawley
ATT'Y.

May 13, 1952 R. G. DAVIDSON 2,596,841

RIFLE WITH INTEGRAL BREECH BOLT AND MAGAZINE

Filed Dec. 20, 1949 3 Sheets-Sheet 3

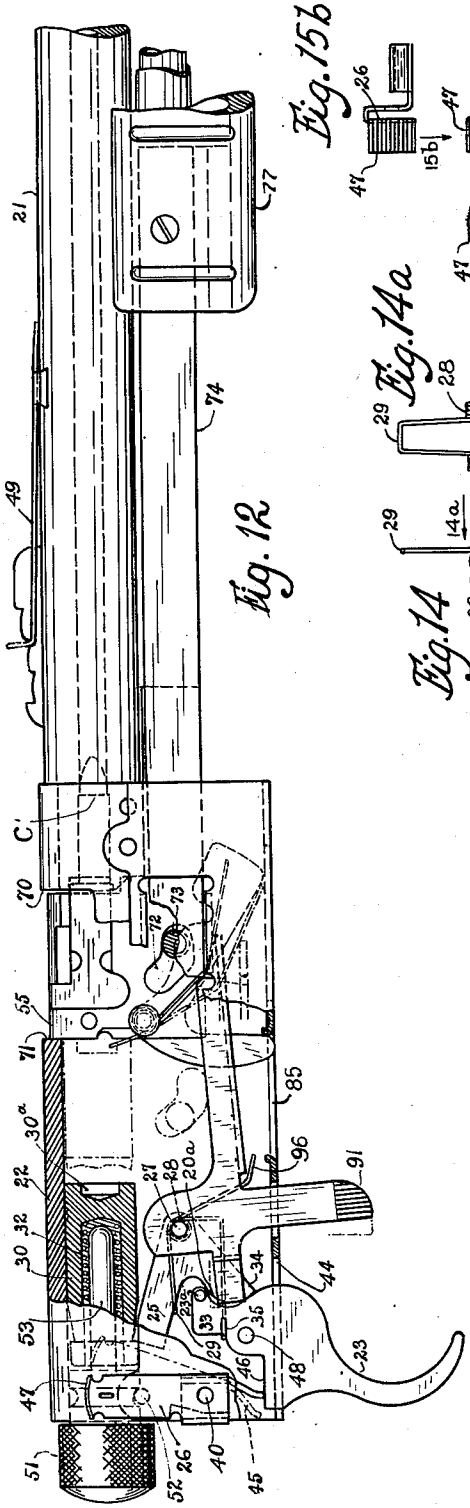


Fig. 12

Fig. 15b

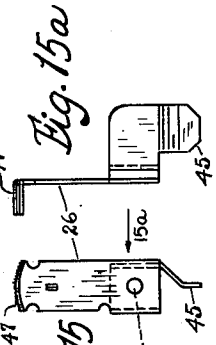


Fig. 15a

Fig. 15

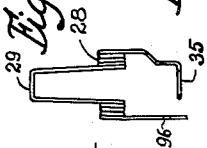


Fig. 14a

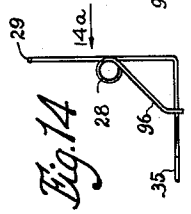


Fig. 14

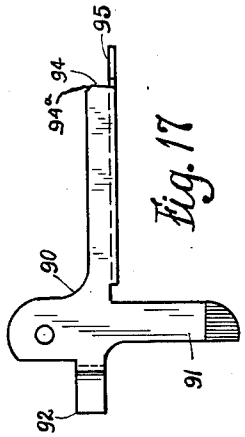


Fig. 17

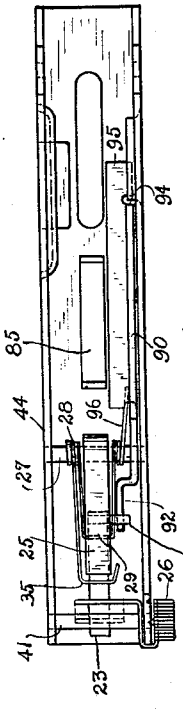


Fig 13

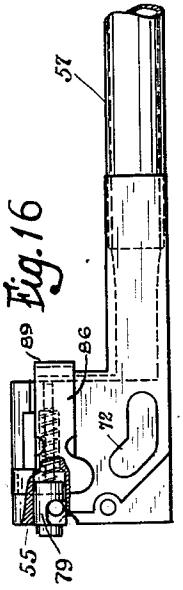


Fig. 16

INVENTOR.
ROBERT G. DAVIDSON

BY
Chas. P. Hawley
ATTY.

Patented May 13, 1952 2,596,841

UNITED STATES PATENT OFFICE

2,596,841

RIFLE WITH INTEGRAL BREECH BOLT AND MAGAZINE

Robert G. Davidson, Chicopee Falls, Mass., assignor to Noble Manufacturing Co. Inc., Haydenville, Mass., a corporation of Massachusetts

Application December 20, 1949, Serial No. 134,015

10 Claims. (Cl. 42—17)

1

This invention relates to a magazine rifle of the more common type in which the reloading mechanism is manually operated.

It is the general object of the present invention to improve and simplify the reloading mechanism, to reduce the cost of manufacture thereof, and to provide for safe and reliable reloading operation.

To the attainment of this general object, an important feature of the invention relates to the provision of a unitary breech-bolt and magazine tube, together with manually-operated cam mechanism for moving these parts to firing and to reloading positions.

Other features of my invention relate to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings, in which

Fig. 1 is a partial side elevation of a rifle embodying my invention and cocked for firing;

Fig. 2 is a view similar to Fig. 1 but partly in section and showing the parts after firing;

Fig. 3 is a view similar to Fig. 2 but with certain parts in reloading position;

Fig. 4 is an enlarged side elevation, partly in section and showing the unitary breech-bolt and magazine tube and certain associated parts;

Figs. 5 and 6 are partial bottom views, looking in the direction of the arrows 5 and 6 in Fig. 4;

Fig. 7 is a side elevation of the inner magazine tube, partly in section and showing the spring-operated feeding plunger;

Fig. 8 is a partial plan view, partly in section, on the line 8—8 in Fig. 4;

Fig. 9 is a side elevation of a firing pin;

Fig. 9a is an end view thereof;

Fig. 10 is a side elevation of a lifter lever to be described;

Fig. 10a is an end view thereof;

Fig. 11 is a plan view of a cartridge-retainer;

Fig. 11a is a side view thereof;

Fig. 11b is an end view thereof;

Fig. 12 is an enlarged partial side elevation, similar to Fig. 1 but showing certain parts in section and other parts in different positions;

Fig. 13 is a plan view of an action housing and certain associated parts;

Fig. 14 is a side elevation of a spring to be described;

Fig. 14a is an end view thereof;

Fig. 15 is a side view of a safety lever;

Fig. 15a is an end view thereof;

Fig. 15b is a plan view thereof;

2

Fig. 16 is a partial side elevation of the unitary breech-bolt and magazine tube; and

Fig. 17 is a side view of a release lever.

Referring to the drawings, my improved rifle comprises the usual stock 20 (Fig. 1), barrel 21, breech-bolt receiver 22 assembled with said barrel, trigger 23, trigger-guard 24, sear 25 (Figs. 12 and 13) and safety lever 26.

The sear 25 is mounted on a fixed pivot 27 and is swung upward to engaging position by a spring 28 (Figs. 13 and 14) which has a loop 29 underlying the sear. The sear engages an annular shoulder at the rear end of a hammer 30 (Fig. 12) which is slidable in the receiver 22. The sear holds the hammer in normally rearward position, with the helical hammer spring 32 (Fig. 12) in compression.

As the trigger 23 is pulled and moves clockwise, the upward extension 33 of the trigger engages a depending portion 34 of the sear and swings the sear downward, thus releasing the hammer.

An offset portion 35 of the spring 28 engages a rear face of the trigger, thus tensioning the sear-engaging loop 29 and keeping the trigger in contact with the sear.

The safety lever 26 (Figs. 12, 13 and 15) is pivoted at 40 in an action housing 44 and has a depending arm 45 adapted to overlie the shoulder 46 (Fig. 12) on the trigger 23 when the safety lever 26 is in rear position, as shown in full lines in Fig. 12. The safety lever 26 has an offset knurled portion 27 for convenient manual operation. The trigger 23 is pivoted at 48 in the action housing 44.

An adjustable rear sight 49 (Fig. 12) is mounted on the barrel 21 in any usual manner. A spring-retaining knob 51 (Fig. 12) is secured in the rear end of the receiver 22 by a cross pin 52 and has a forwardly extending pin 53 which centers the hammer spring 32.

The parts thus far described are of more or less usual construction and in general do not embody the present invention.

I will now describe my improved magazine and reloading mechanism. A breech-bolt 55 (Figs. 12 and 16) is permanently assembled with a magazine tube 57 which extends loosely through an annular support 57a (Fig. 1) secured to the under side of the barrel 21 and toward the front end thereof. The parts 55 and 57 form a unitary structure which is both swingable and slidable relative to the support 57a.

The magazine tube 57 is preferably a force fit in the front end of the breech-bolt 55 (Figs. 8 and 16) and houses an inner magazine tube 58

(Fig. 7) having a knob 59 at one end. The inner tube 58 and knob 59 are removably retained in the tube 57 by a bayonet lock connection as shown in Fig. 5.

A cartridge follower 60 and spring 61 are housed in the inner tube 58, and the rear end of the tube is slightly contracted as indicated at 63 (Fig. 7) to prevent escape of the slightly enlarged and ball-shaped end 64 of the cartridge follower 60.

A crosspin 65 (Fig. 7) retains the knob 59 in the end of the inner tube 58, thus confining the spring 61. The crosspin 65 also functions as part of the bayonet lock. The outer magazine tube 57 (Fig. 4) has an opening 66 in its lower side, through which cartridges C may be inserted when the inner tube 58 is released and drawn forward beyond the slot 66.

The receiver 22 (Fig. 12) has an opening 70 in its upper face, which opening provides a rear shoulder 71 which abuts the rear end of the breech-bolt 55. The breech-bolt 55 is provided with a cam slot 72 (Figs. 12 and 16) into which projects a pin 73 fixed in the rear end of a slide bar 74 (Fig. 12).

The front end of the bar 74 is welded or otherwise secured to a segmental block 75 (Fig. 2), which in turn is seated in a segmental axial recess in a manually-movable operating member or fore end 77 and which may be secured therein by screws 78. The sides of the operating member 77 may be grooved to provide a satisfactory grip. A bushing 76 (Fig. 2) guides the front end of the operating member.

As the operating member 77 and slide bar 74 are moved forward after a fresh cartridge is presented, the pin 73 in the bar 74 presses against the front inclined wall of the cam slot 72 (Fig. 16) and tends to lift the breech-bolt. As soon as the breech-bolt clears the receiver shoulder 71, the breech-bolt is lifted by the pin 73 and the pin enters the horizontal arm of the slot, thus locking the breech-bolt in raised and firing position. This combined forward and upward movement of the breech-bolt also inserts the fresh cartridge C' into the rifle barrel 21 and presents the firing-pin 79 in operative position.

The trigger 23 may then be pulled if the safety lever 26 has been released. The trigger will then depress the sear 25 and thus release the hammer 30. The hammer 30 then moves forward and strikes the firing-pin 79 (Fig. 9) loosely held in a recess in the breech-bolt 55 by a crosspin 79a (Fig. 4), and positioned rearward by a light coil spring 79c.

The firing-pin has a reduced end portion 79b (Fig. 9) which is aligned with a recess 30a (Fig. 12) in the front end of the hammer 30 so long as the breech-bolt is in lowered or rearwardly withdrawn position. In such position, therefore, the firing-pin cannot be moved by the hammer.

When the breech-bolt 55 is in raised and firing position, however, the firing-pin is out of alignment with the recess 30a, and a rim portion of the hammer 30 will be aligned with the pin 79. Thus a cartridge can be fired only when the breech-bolt is fully in firing position.

As the operating member 77 is moved rearward to reloading position, the pin 73 (Fig. 12) will enter the upwardly inclined rear end of the cam slot 72 and will cause the breech-bolt 55 to move downward to clear the receiver shoulder 71 (Fig. 3). The breech-bolt 55 will thereafter be moved rearward to the loading position shown in Fig. 3. The pin 73 has substantial lost motion in the slot 72.

A lifter lever 80 (Figs. 4, 8 and 10) is pivoted at 81 (Fig. 8) in an upright slot 82 in the breech-bolt 55. The lever 80 has an end portion 83 (Fig. 10) which underlies the cartridge C' (Fig. 4) which is in loading position, and the end portion 83 has a segmental end face 83a which limits rearward movement of the next cartridge until the lifter lever 80 is returned to lowered position. This is effected by engagement of a depending arm 84 with the front end of a slot 85 (Fig. 13) in the lower face of the action housing 44 as the breech-bolt 55 is moved forward to the firing position shown in Fig. 12.

As the breech-bolt is shifted downward and rearward from the position shown in Fig. 2 to the position shown in Fig. 3, the arm 84 is engaged by the rear edge of the slot 85 and the end portion 83 of the lever is pushed abruptly upward to raise the new cartridge C' as indicated in broken lines in Fig. 4 and to simultaneously eject the empty cartridge C2.

During this movement, the end flange of the cartridge C' is held by a retainer 86 (Fig. 11) which is mounted on the breech-bolt 55 (Fig. 16). In its lower part, the breech-bolt 55 (Fig. 8) has a recess 87 to receive a cartridge from the magazine inner tube 58, and has lugs 88 overlying said recess and aligned with the inturned ends 89 of the retainer 86. The lugs 88 and the retainer ends 89 successively engage the end flange or rim of the new cartridge and guide the cartridge in its upward movement. The retainer is preferably of spring steel and the resiliently mounted inturned ends 89 retain the raised cartridge in loading position until it is advanced and enters the rear end of the barrel 21.

As the breech-bolt is thereafter moved forward to the position shown in Fig. 1, the lifter lever 80 is moved downward as above described to the position shown in Fig. 2, so that the next cartridge C may be pushed into loading position by the cartridge follower 60 and spring 61.

A locking lever 90 (Fig. 17) is pivoted on the stud 27 (Fig. 12) in the action casing 44, which also provides a pivot for the sear 25. The lever 90 has a depending arm 91 which extends downward through a slot in the action casing 44 and stock 20, and also has a rearwardly extending offset arm 92 which underlies a pin 23a in the trigger 23. At its forward end, the lever 90 has a shoulder 94 and a side flange 95.

The sear spring 28 previously described has an arm 96 (Figs. 12 to 14) which engages the rear end of the side flange 95 and tends to move the lever 90 anti-clockwise to locking position, with the shoulder 94 of the lever raised into the path of the slide bar 74 as shown in Fig. 12. The upper front corner of the shoulder 94 is beveled as shown at 94a and exerts a cam action on the rear end of the slide bar 74, thus insuring that the bar 74 and breech-bolt 55 are moved to their extreme forward positions before the trigger can be operated.

The locking lever 90 may be released by manual rearward movement of the lever arm 91 to allow rearward manual movement of the slide bar 74 and breech-bolt 55 when the hammer 30 is in cocked or rear position. The trigger 23 is then held from movement by the pin 23a until the lever 90 is returned to locked position.

A spring 100 (Figs. 4 and 6) is pivoted on the lifter lever pivot 81 (Fig. 8). The spring 100 has an arm 102 resting on the side flange 95 of the locking lever 90 and has another arm 101 extending upward and rearward from the breech-

bolt **55**. When the hammer **30** is released and moves forward to strike the firing-pin, the end of the hammer presses against the arm **101** of the spring **100** and places the spring under tension to depress the locking lever **90** as shown in Fig. 3. This spring action is strong enough to overcome the sear spring **28** and thus allows the slide bar **74** to be moved backward manually by the operating member **77** to eject the empty cartridge C2 and to present a fresh cartridge C' in loading position.

When the locking lever **90** is thus moved downward to free the slide bar **74** and breech-bolt **55**, the back projection **92** of the locking lever **90** moves up under the trigger pin **23***a*, so that the sear cannot be depressed and the hammer released while the breech-bolt is out of firing position. The trigger is moved anti-clockwise by the spring **28** acting through the cam surface **20***a* of the sear.

The small loop spring **110** (Fig. 2) under the rifle barrel engages the top of the fresh cartridge and holds it down in horizontal position when first pushed into the breech-bolt. This prevents the following cartridge from wedging under the point of the fresh cartridge and lifting it out of alignment.

Operation

The specification operation of the several separate features of the invention has been set forth in connection with the descriptions thereof, but the general operation of the invention may be briefly described as follows:

Assuming that the inner magazine tube **58** contains cartridges and that the gun is not loaded, the operator grasps the operating member **77** and slides said member, together with the magazine tube and other attached parts, rearward or toward the butt. This depresses and withdraws the breech-bolt **55** from the barrel **21** and allows a new cartridge to be moved upward into alignment with the barrel **21**, at the same time ejecting the empty cartridge shell, if any.

The operating member **77** is then returned to its forward position and by such movement returns the breech-bolt also to its original position. During this latter movement, the breech-bolt slides the new cartridge forward into firing position in the barrel **21**, and the breech-bolt is then locked in cartridge firing position.

The trigger **23** may then be pulled and will depress the sear and thus release the hammer **30**. The hammer **30** then moves forward and strikes the firing pin **79** (Fig. 9).

When the breech-bolt **55** is raised and in firing position, the firing pin is out of alignment with the recess **30***a* in the hammer **30**, and the rim portion of the hammer **30** will be aligned with the pin **79**. Thus the inserted cartridge may be fired by a blow on the firing pin **79**.

Giving consideration to the detailed construction and operation of my improved magazine rifle, it will be evident that the construction involves relatively few and simple parts and that the reloading operation may be easily learned and quickly performed. I also provide improved safety features which make premature or accidental discharge of the rifle substantially impossible.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. In a magazine rifle, a breech-bolt receiver, a rifle barrel fixed thereto, said receiver having a longitudinal passage with a front top opening and having an abrupt rear shoulder for said opening, a breech-bolt slidable longitudinally and swingable vertically in said passage and opening, a magazine tube fixed to said breech-bolt and swingable therewith, and a manual operating member effective to give said breech-bolt and tube assembly successive forward and upward movements to firing position.

2. The combination in a magazine rifle as set forth in claim 1, in which the breech-bolt and magazine tube assembly is swingable relative to the rifle barrel near the front end of said magazine tube and is also slidable relative to said barrel.

3. The combination in a magazine rifle as set forth in claim 1, in which the operating member is effective to give the breech-bolt and magazine tube assembly a forward movement and a succeeding upward swinging movement and to thereafter lock said breech-bolt in raised and firing position, all by a single continued forward movement of said operating member.

4. The combination in a magazine rifle as set forth in claim 1, in which the operating member is effective to give the breech-bolt and magazine tube assembly a forward movement and a succeeding upward swinging movement and to thereafter lock said breech-bolt in raised firing position, all by operation of a single cam connection between said operating member and said bolt and tube assembly.

5. The combination in a magazine rifle as set forth in claim 1, in which the operating member is effective to give the breech-bolt and magazine tube assembly a forward movement and a succeeding upward swinging movement and to thereafter lock said breech-bolt in raised firing position, all by operation of a single cam connection between said operating member and said bolt and tube assembly, and in which said cam connection includes coacting parts on said member and assembly which have substantial lost motion relative to each other.

6. The combination in a magazine rifle as set forth in claim 1, in which the breech-bolt has a retainer of resilient sheet metal mounted thereon and having inwardly projecting jaws to engage the rim of a cartridge.

7. The combination in a magazine rifle as set forth in claim 1, in which a lifter lever in said breech-bolt is engaged by fixed surfaces as said breech-bolt is moved longitudinally and is swung abruptly upward at the end of the rear movement of the breech-bolt to eject an empty cartridge and to raise a fresh cartridge to firing position, and in which said lever has a segmental end surface to engage and hold the succeeding cartridge until the raised cartridge has been loaded and fired.

8. In a magazine rifle, a breech-bolt receiver, a rifle barrel fixed thereto, said receiver having a longitudinal passage with a front top opening and having an abrupt rear shoulder for said opening, a breech-bolt slidable longitudinally and swingable vertically in said passage and opening, a magazine tube fixed to said breech-bolt and swingable therewith, a manual operating member effective to give said breech-bolt and tube successive forward and upward movements to firing position, a firing-pin in said breech-bolt having a reduced rear end portion, a hammer slidable in said receiver but out of direct alignment with said firing-pin when the pin is in firing position,

said hammer having an annular portion engaging said pin, and said hammer having an axial end recess to receive the reduced end of said pin when the breech-bolt is in cartridge-receiving position.

9. In a magazine rifle, a breech-bolt receiver, a rifle barrel fixed thereto, said receiver having a longitudinal passage with a front top opening and having an abrupt rear shoulder for said opening, a breech-bolt slidable longitudinally and swingable vertically in said passage and opening, a magazine tube fixed to said breech-bolt and swingable therewith, a hammer, a manual operating member effective to give said breech-bolt successive forward and upward movements to firing position, a locking lever for said breech-bolt, a spring to move said locking lever to locking position, and a stronger spring engaged by said hammer and effective to unlock said breech-bolt as the rifle is fired and as the trigger is released and returns to normal position.

10. In a magazine rifle, a breech-bolt receiver, a rifle barrel fixed thereto, said receiver having a longitudinal passage with a front top opening and having an abrupt rear shoulder for said opening, a breech-bolt slidable longitudinally and swingable vertically in said passage and opening, a magazine tube fixed to said breech-bolt and swingable therewith, a hammer, a manual operating member effective to give said breech-bolt successive forward and upward movements to firing position, a locking lever for said breech-bolt, a spring to move said locking lever to locking position, a stronger spring engaged by said hammer and effective to unlock said breech-bolt as the rifle is fired, and said trigger having a portion which engages and holds said locking lever in locking position when said trigger is out of normal position.

ROBERT G. DAVIDSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,155,512	Swebilius	Apr. 25, 1939
2,317,641	Reising	Apr. 27, 1943
2,369,244	Lowe	Feb. 13, 1945
2,422,301	Horan	June 17, 1947