J. W. BALLARD.

REPEATING RIFLE.

APPLICATION FILED JULY 14, 1917.

1,328,356.

Patented Jan. 20, 1920.

4 SHEETS—SHEET 1.

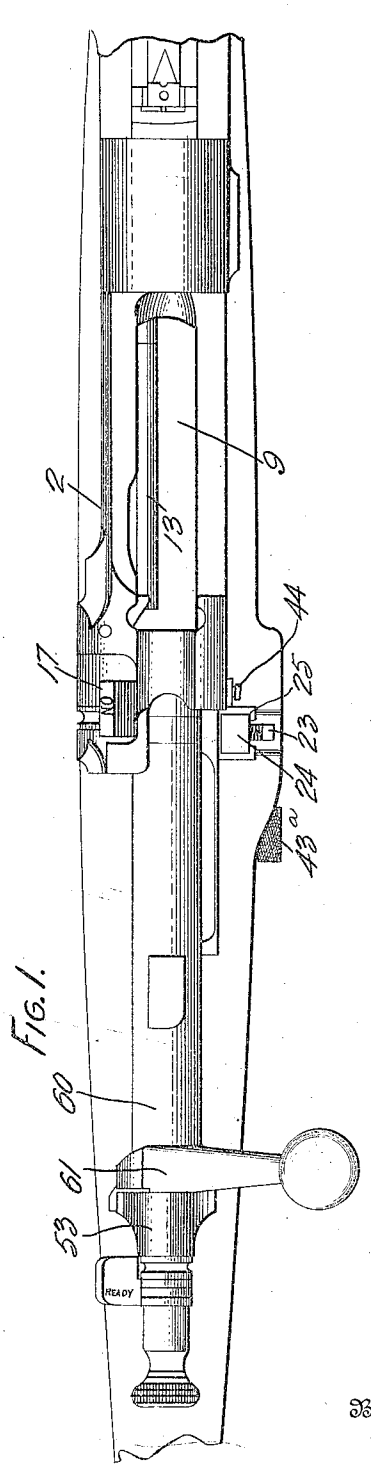


FIG. 1.

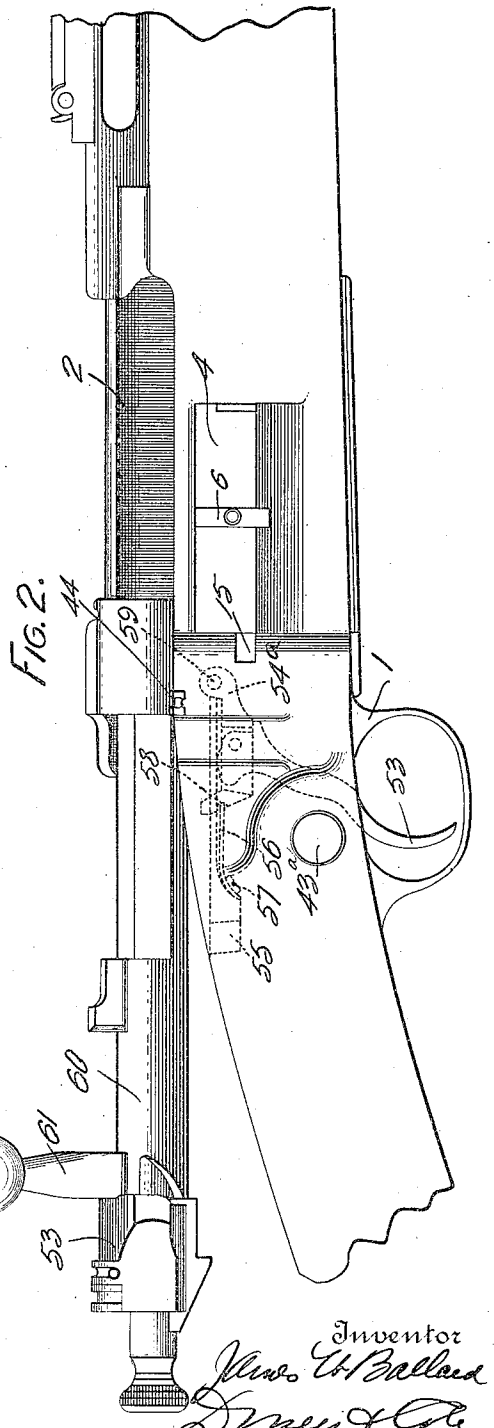


FIG. 2.

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4 SHEETS—SHEET 2.

FIG. 3.

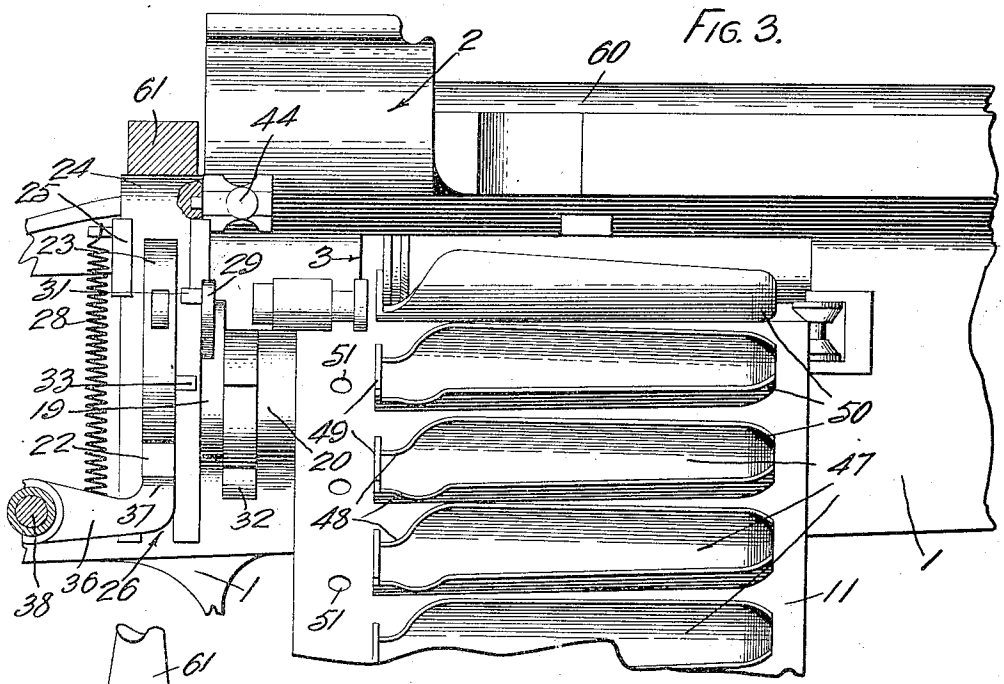
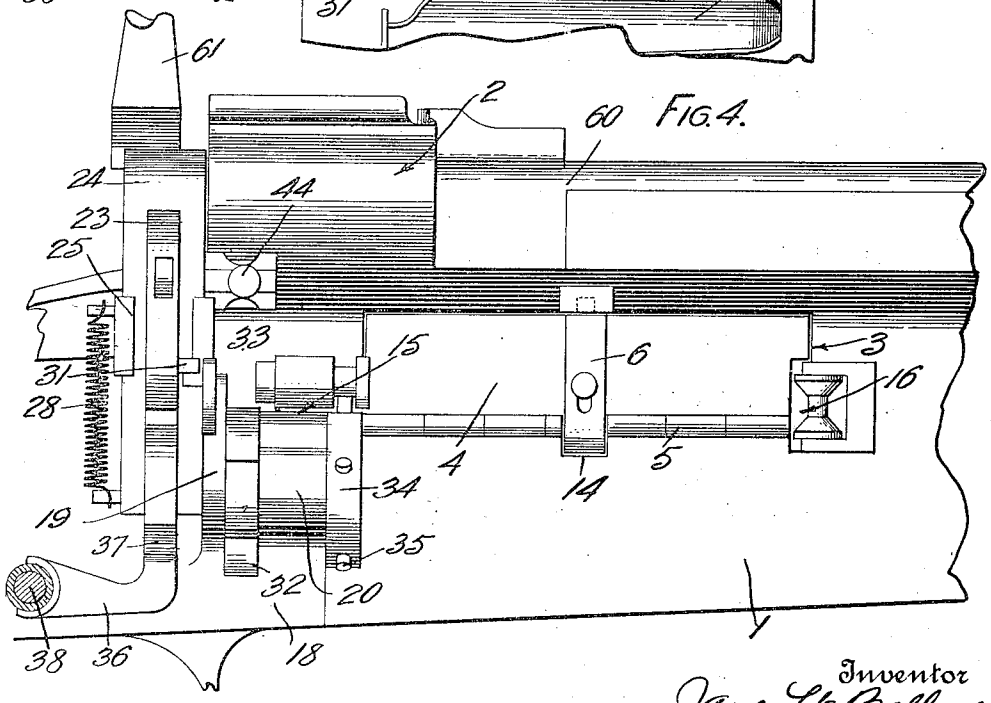


FIG. 4.



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4 SHEETS—SHEET 3.

FIG. 5.

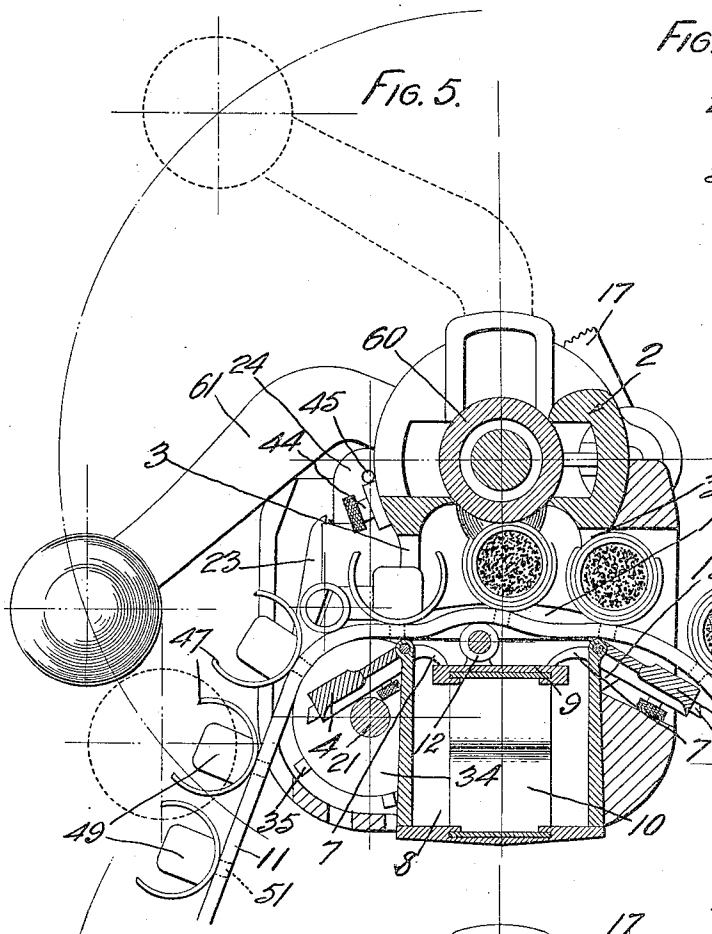


FIG. 13.

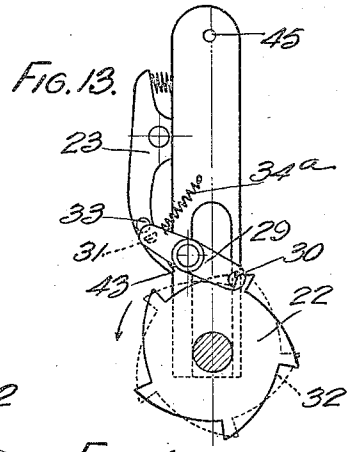


FIG. 14.

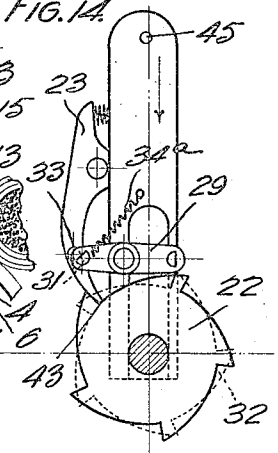


FIG. 15.

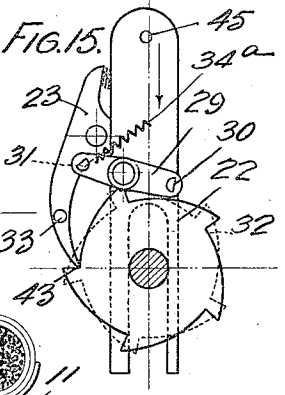
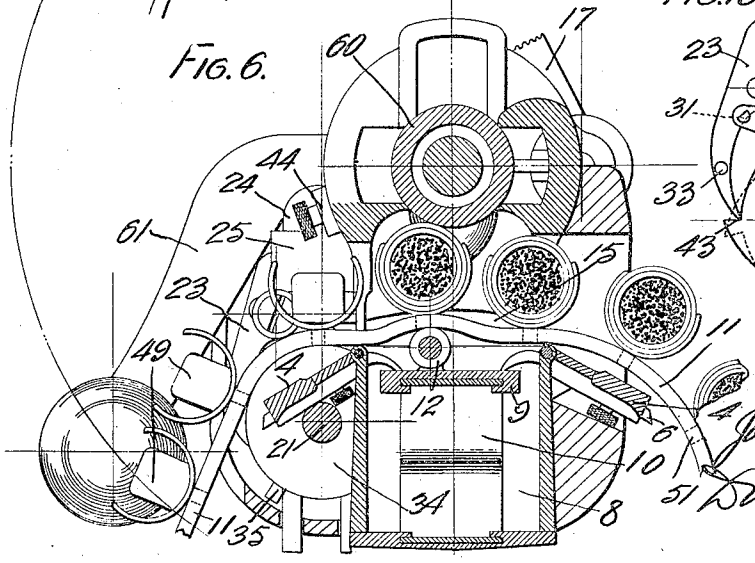


FIG. 6.



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4 SHEETS—SHEET 4.

FIG. 7.

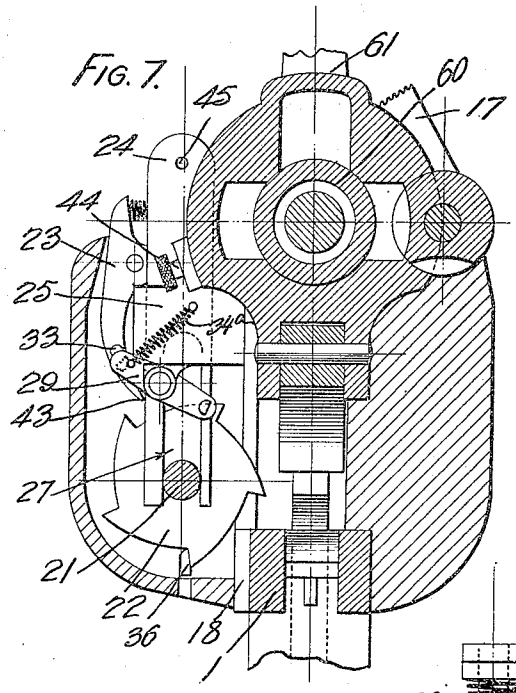


FIG. 9.

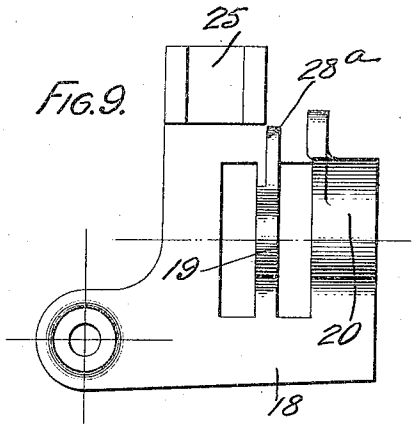


FIG. 10.

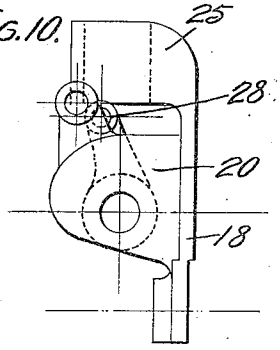


FIG. 11.

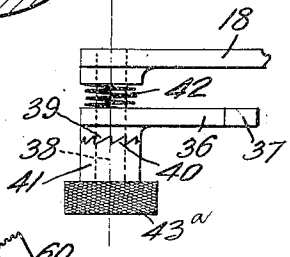


FIG. 8.

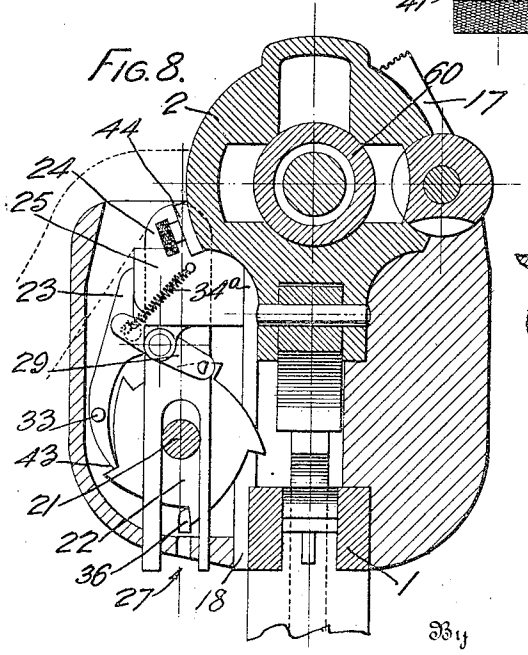
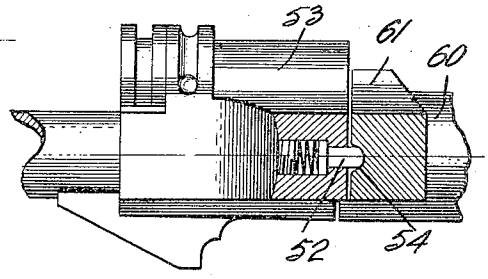


FIG. 12.



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UNITED STATES PATENT OFFICE.

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REPEATING RIFLE.

1,328,356. Specification of Letters Patent. Patented Jan. 20, 1920.

Application filed July 14, 1917. Serial No. 180,614.

To all whom it may concern:

Be it known that I, JAMES W. BALLARD, a citizen of the United States of America, and a resident of Fairfax, Virginia, have invented certain new and useful Improvements in Repeating Rifles, of which the following is a specification.

My invention relates to improvements in repeating rifles, and more particularly to that class of fire-arms in which the cartridges are projected into the chamber and withdrawn therefrom by the manual operation of the breech mechanism by the operator, the end had in view being to provide means whereby a magazine rifle can be so changed, without the alteration of any of its functions, to permit it to be fed from a belt or strip, the construction being such that a rifle embodying this invention, can, at the option of the user be readily and quickly changed from one feed to the other.

Repeating rifles, both military and sporting, in use today, generally embody a magazine, located immediately beneath and to the rear of the chamber of the barrel so that the cartridges need only be raised and projected forwardly into the chamber to load the rifle, and it is particularly to this class of rifles that my invention is applicable, although by slight modifications, within the scope of my invention, the mechanism forming a part thereof can be applied to rifles of the tube feed type, *i. e.*, those rifles in which the cartridges are carried in a tube beneath the barrel and from which they are fed into the chamber.

In the following description my invention is described in connection with the United States Army rifle, Springfield model of 1903, but I do not wish to limit the application of my invention to such rifle as it is equally adaptable to the other types.

The standard military rifles adopted by the various governments, which, so far as their general construction is concerned, are identical, have been designed with the idea of simplicity and reliability, and to withstand hard usage. These rifles are generally adapted to carry in their magazines five or more cartridges and to this extent the firing efficiency of the rifle is limited, in that it is necessary to frequently re-load the rifle at intervals after the cartridges in the magazine have been exhausted. Carrying such a small number of cartridges in the magazine is not desirable, and this has been particularly shown under war conditions such as those existing today.

Broadly speaking, my invention is directed to increase the efficiency of such a rifle by permitting the gun to be fired a greater number of times without the necessity of re-loading at frequent intervals. In applying my invention, however, I have devised mechanism so that the magazine feed may be used that is now present in the rifle, or a belt feed can be used instead, in one and the same rifle, means being provided whereby either the magazine feeding mechanism or the belt feeding mechanism can be thrown out of operative relation at will.

The belt mechanism comprises broadly, a belt or strip adapted to carry a plurality of cartridges along one of its faces, and a belt-feeding mechanism co-acting with the belt in such a manner that the belt or strip will be fed transversely through the rifle to deliver successive cartridges into the chamber of the rifle, upon the actuation of proper mechanism. Means are also provided for withdrawing the belt at any time after its introduction into the rifle.

The invention consists in the construction, arrangement, and combination of the several parts of which it is composed as will be hereafter more fully described and claimed.

Referring to the accompanying drawings in which corresponding parts are designated by corresponding marks of reference,—

Figure 1 is a plan view of the breech mechanism of a rifle (United States rifle, caliber 30, model of 1903) having my invention applied thereto, the bolt of the rifle being retracted to its full limit of movement.

Fig. 2 is a side view thereof.

Fig. 3 is a side elevation of the right side of the rifle shown in Fig. 1, the belt being in operative position and the bolt closed, (the handle of which is broken away).

Fig. 4 is a view similar to Fig. 2, showing the gates in the magazine closed to use the rifle as a magazine feed.

Fig. 5 is a cross sectional view through the receiver and magazine, showing the application of my invention, the bolt of the rifle approaching its locking position.

Fig. 6 is a view similar to Fig. 5, showing the position of the belt to permit the cartridge to be projected into the chamber, the bolt being in closed position.

Fig. 7 is a cross sectional view through the rear end of the receiver and guard show-

ing the position of the belt-actuating mechanism when the bolt handle is fully lifted or withdrawn.

Fig. 8 is a view similar to Fig. 7, showing the position of the belt-actuating mechanism when the bolt handle is in its closed position or in the position shown in Fig. 5.

Fig. 9 is a side elevation of the plate supporting the belt-actuating mechanism.

Fig. 10 is an end view thereof.

Fig. 11 is a detail view of the releasing pawl, upon the actuation of which the belt may be withdrawn from the gun.

Fig. 12 is a detail view partly in section showing the locking plunger for frictionally holding the bolt-handle in its downward position.

Figs. 13, 14 and 15 show diagrammatically various positions assumed by the slide.

For the purpose of clearness in hereinafter referring to parts and mechanism, it will be assumed that the rifle is held in the hands of the operator in firing position, and as a result of such position, the parts necessary to be so described, will be referred to as the right or left side of the gun.

The guard 1 and receiver 2 of the rifle are cut away as at 3, at the right and left sides immediately beneath the opening in the receiver, to permit the passage through the receiver and guard, and from side to side thereof, of the belt carrying the cartridges hereinafter more fully described.

The mechanism of this rifle will not be described in detail, except in part, as the construction and operation thereof is well known to those skilled in the art, and its operation and construction is completely described in the "Description and Rules for the Management of the United States Rifle, Caliber 30, Model of 1903," published by the Government Printing Office, Washington, D. C.

A gate 4 for each of the openings 3 formed in the guard and receiver is hinged to the corresponding sides of the guard 1, and said gates are adapted to be held in their closed positions by the latches 6, as shown in Fig. 4. When the gates are in closed position, the rifle may be used in practically the same manner as the standard gun. Contained within the magazine 8 is the follower 9 normally thrown upwardly by the leaf spring 10, so that when the magazine is loaded the cartridges are thrust upwardly where they are successively projected into the chamber by the movement of the bolt. After the magazine has been emptied, or when the rifle is used as a single shot, the follower 9 by the action of the spring 10 is forced upwardly against the under side of the bolt and forms in this position a floor, as it were, for the receiver. In order that the belt 11 may be introduced into the openings 3 and fed through the gun it is necessary to depress and hold the follower down sufficiently to permit the belt to pass thereover in its travel through the rifle, and to accomplish this tails 7 are formed on the lower part of the latches 6, which tails when the gates 4 are open, serve to hold the follower against complete upward movement in the magazine, as shown in Figs. 5 and 6, the movement of the latches being limited by stops 13 or any suitable means. In place of the rib heretofore formed on the follower, a longitudinal roller 12 may be carried thereby. This roller, when the follower 9 is forced upwardly contacts with the under face of the belt and serves as a bearing therefor, as well as to force the belt upwardly, so that the cartridges carried thereby, when they traverse the rifle beneath the bolt, will contact with the forward end of the bolt and be projected at the proper time into the chamber of the rifle.

The location of the latches on the gates should be such that the tails 7 press downwardly on the follower 9 in such a manner that the follower will throw the front of the cartridge upwardly and assist its projection into the chamber when the cartridge is started forwardly by the inward movement of the bolt. The hinges 5 also provide bearings for supporting the belt. The guard 1 is also cut as at 14 to permit the tails of the latches to lie outside of the guard when the gates are closed, and is further cut at the front and rear edges of the opening as at 15 and 16, and provided with vertical roller guides to contact the edges of the belt, and assist its movement through the rifle.

So far as has been described, the mechanism on each side of the guard is identical.

Referring now to the mechanism for feeding the belt, the bolt 60 of the rifle will be presumed to be in normal *i. e.*, closed position as shown in Fig. 3, and the cut-off 17 turned up to read "On" to permit the bolt to be retracted to its full limit of movement to contact with the heads of the successive cartridges as they are presented. Carried preferably on the right side of the rifle, where it will be operated and protected by the handle 61 of the bolt 60, is the belt-actuating mechanism, supported and carried by the guard 1 to the rear of and beneath the opening in the receiver 2. By carrying the belt actuating mechanism on the guard, the dismounting of the rifle is simplified, and may be done in the usual way, in that when the receiver and guard are separated, all of the actuating mechanism is removed with the guard. Supported by the guard 1 is a casting or supporting plate shown in Fig. 9, having formed on its outer face bearings 19 and 20, in which is mounted a longitudinal stub shaft 21, the axis of which is substantially parallel to the longitudinal

axis of the rifle, which shaft carries on its forward end adjacent to and in front of the bearing 20, a wheel 34 having formed on its periphery, a plurality of spaced spurs or teeth 35 which are adapted to enter openings formed in the belt and cause the belt to partake of such movement as will be imparted to the wheel 34 through the shaft 21. Thus it will be seen that by imparting to the wheel 34 desired angular movement, the belt may be caused to travel any desired distance corresponding to such movement. Mechanism to be hereinafter described is correlated to the actuating mechanism of the wheel 34 so that not only is the desired angular rotation given to the wheel 34, but means are provided for locking the wheel, and consequently the belt, against movement at a particular time. Fast on the rear end of the shaft 21 behind the bearing 19 is a ratchet wheel 22, which is adapted to be engaged and moved in a step by step motion by a spring-pressed pawl 23 carried in a slide 24 mounted for vertical movement in a guide 25 formed on the frame, the slide being bifurcated at its lower end as at 26 to straddle the ratchet wheel 22, and each leg thus formed being slotted as at 27 to straddle the stub shaft 21. The slide is normally held to its upper limit of movement by the retractile spring 28, one end of which is pinned to the lower part of the slide and the other end to the guide 25 as shown in Figs. 3 and 4, and the upper end of the slide is in such a position that upon a downward movement of the bolt handle to lock the bolt, the slide will be shoved downwardly to cause a motion of the cartridge belt, and to thereby position a fresh cartridge in the receiver.

The formation of the teeth of the ratchet wheel 22 should be such that upon the complete downward movement of the slide and the pawl carried thereon, the pawl is caused to engage one of the teeth of the ratchet wheel and thereby rotate the shaft through a desired angular movement.

Immediately forward of the ratchet wheel 22 and fixedly carried on the shaft 21, between the bearings 19 and 20, is a second ratchet wheel 32, the teeth of which should preferably be of the same number as, but be reversed in respect to, those of the wheel 22. Thus upon rotation of the shaft 21 each of the wheels 22 and 32 and their corresponding teeth partake of the same angular movement.

Pivotally carried in an ear 28[a] projecting upwardly from the bearing 19 is the locking pawl 29 carrying in its inner end the forwardly projecting pin 30, and in its outer end the rearwardly projecting pin 31. The pawl is held by the retractile spring 34[a], one end of which is pinned to the guide 25, in such a position that when in its normal position the forwardly projecting pin 30 carried by the inner end of the pawl engages one of the teeth of the ratchet wheel 32 and prevents its rotation in the direction of movement imparted to the shaft 21 by the ratchet wheel 22 and pawl 23.

Projecting forwardly from the side of the pawl 23 is the pin 33 so positioned that upon the initial downward movement of the slide and pawl caused by the locking of the bolt as before stated, the pin will be caused to engage and press downwardly the pin 31 carried by the pawl 29, thereby raising the pin 30 out of engagement with the teeth on the ratchet wheel 32, to permit the rotation of the wheel and shaft to the position shown in Fig. 15. The length of the pawl 23 and the positions of the ratchet wheels 22 and 32 on the shaft 21 and their relation to the pawl 29 should be such, that upon the initial downward movement of the slide carrying the pawl 23, the pin 33 will contact with the pin 31 above described to raise the pin 30, and coincident with the movement of such pin at the moment it clears the tooth of the ratchet wheel 32 the nose 43 of the pawl 23 should engage one of the teeth of the wheel 22 and, upon the continued downward movement of the slide 24 the pawl 23 will initiate the rotation of the wheel 22. Immediately after the wheel 22 is set in motion the further downward movement of the slide 24 causes the pin 33 to cam out of contact with the pin 31 on the pawl 29, whereupon the latter will be released and caused, through the action of the spring 34[a], to return the pin 30 into contact with the periphery of the wheel 32, where the pin will at the proper time engage with the oncoming tooth on the wheel 32. The continued downward movement of the slide to its fullest extent causes a continued rotation of the shaft 21 and wheel 34 through the desired angular movement, which should be sufficient to cause the succeeding cartridge to properly aline itself for projection into the chamber. Upon the raising of the bolt handle to unlock and retract the bolt, the spring 28 will cause the slide 24 and pawl 23 thereon to return to its uppermost position, where they will remain until again depressed by the downward movement of the handle 17 to close and lock the bolt, no movement of the belt taking place at this time.

Inasmuch as the slide 24 is always under the action of the spring 28, tending to pull the slide upwardly, it is necessary to provide a lock for the bolt handle when in its closed position, to prevent the slide from throwing the bolt handle upwardly, thereby unlocking the bolt, and to accomplish this, a spring-pressed ball plunger 52 is carried by the right wing of the sleeve 53 and seats itself in the recess 54 formed in the rear face of the bolt handle 61, see Fig. 12, and the pressure of the ball plunger in the recess

should be sufficient to overcome the action of the spring 28 on the slide 24. The pawl 29 and ratchet wheel 32, above described, serve as means for locking the belt against forward movement unless the feed mechanism has been actuated, and they also prevent an overthrow of the belt.

For the purpose of locking the belt against retrograde movement and to position the belt properly, a dog 36 is provided, the beveled nose 37 of which under the action of a suitable spring, such for instance as the spring 42, engages the teeth of the wheel 22 and arrests its rotation in a direction opposite to that imparted by the pawl 23.

After the belt carrying a number of cartridges is inserted in the rifle and before any or all of them have been fired, it may be desirable to withdraw the belt from the rifle, and to this end the pawl 36 is pivotally supported by a pin 38 projecting outwardly from the plate 18 (see Fig. 11), the pawl having formed on the outer face of its hub a series of ratchet teeth 39, which are adapted to be held in contact with similar teeth 40, formed on a sleeve 41, through the medium of an expansion spring 42 carried by the pin 38 between the plate 18 and the pawl 36. The teeth 39 and 40 are so formed that the pawl is permitted to move about its axis without rotating the sleeve 41 when the beveled nose 37 is depressed by the cam action of the teeth on the ratchet wheel 22 when the latter is moved in a direction to feed the belt, but the pawl may be depressed at will through the teeth 39 and 40 at any time by rotating the milled head 43^a of the sleeve 41, whereby the release of the ratchet wheel will be effected to permit the withdrawal of the belt through the side of the rifle through which it was inserted. The sleeve 41 should project outwardly far enough to permit the milled head 43^a to be outside of the stock of the rifle where it may be actuated, as shown in Figs. 1 and 2. To permit this function, however, the position and shape of the pawl 23 carried by the slide 24 should be such that when the slide assumes its uppermost position the nose 43 of the pawl should be a sufficient distance beyond the path of rotation of the wheel 22 so that its nose will not contact with the teeth of the said wheel (see Figs. 7 and 13), thereby permitting the retrograde rotation, when the dog 36 is depressed, of the wheel 22, shaft 21 and toothed wheel 34 to allow the belt to be withdrawn.

As hereinbefore stated, it is possible to use my invention without affecting in any way, the magazine feed mechanism of this type of rifle, and to this end I have provided means for throwing out of operative relation the belt-actuating mechanism, in order that the magazine feed may be used, which means embody a latch 44 preferably mounted on one side and at the rear end of the receiver, the pin of such latch being adapted to be thrust into an opening 45 formed in the upper end of the front face of the slide 24 when the slide is at its limit of downward movement, (see Fig. 3). By so locking the slide all of the belt-actuating mechanism is thrown out of operative relation with the bolt and is not actuated on movement of the bolt, the bolt being free to be rotated and moved forwardly and rearwardly to load the rifle from the magazine.

The cartridge belt 11 is formed from leather or any suitable material, or may be a flat metal strip, and carries along its upper or outer face at predetermined intervals substantially throughout its length, a series of clips 47 formed of spring metal, semi-cylindrical in shape, each of the clips being adapted to hold by spring pressure a single cartridge. The clips are cut away as at 48 to provide finger room, and have their rear ends upturned as at 49, and their forward ends turned in as at 50, so that when the cartridges are inserted therein the heads thereof will contact with the upturned part 49 and the shoulders of the cartridge at the base of the bullet will be grasped by the inturned ends 50, thereby firmly clamping the cartridge against displacement or loss, but permitting its projection by the bolt into the chamber. Formed in the rear of the belt behind the clips 47, throughout its length, are a plurality of perforations or openings 51, adapted to be engaged by the teeth or spurs 35 on the wheel 34. The position of the clips on the belt and the perforations therein should be such that upon the actuation of the wheel 22 by the complete downward movement of the slide 24, the belt and cartridges thereon will be caused to travel a sufficient distance to remove the empty clip, from which a cartridge has been projected into the chamber, from the receiver and permit the succeeding clip containing a cartridge to assume its proper position in the receiver where the cartridge may be by the closing movement of the bolt removed from its clip and projected into the chamber. It should be understood, however, that the number of perforations in the belt and their distance from each other depends only upon the number of spurs on the wheel 22 and their distance from each other.

Inasmuch as the guard is cut away to permit the passage of the belt through the rifle, the trigger mechanism should be modified slightly. Instead of using the coil sear spring in the forward end of the sear, the forward end of the sear containing the spring seat is cut away, leaving only the pivotal portion 54^a of the sear as shown in dotted lines in Fig. 2, leaving the sear pivoted as at 59. The rear end of the sear is

notched on its rear beveled face as at 58 to receive the end of a leaf spring 56 fastened to a part 55 of the receiver by a screw 57. By this construction, the spring action upon the sear is the same as that caused by the coiled spring, and except for the removal of the forward end of the sear, the trigger mechanism and its operation is the same.

In order to protect the actuating mechanism from injury, it may be desirable to modify the stock of the rifle slightly, in that an enlargement is formed thereon in order to cover and protect the actuating mechanism as shown in Figs. 1, 2, 7 and 8.

Operation: Assuming the magazine of the rifle to be empty, the gates in the sides of the guard being closed, and the bolt being retracted to its farthermost position, and the cut-off 17 turned to read "On" as shown in Fig. 1, to operate the rifle as a belt feed, the follower 9 within the magazine is pressed downwardly, and the gates 4 on each side of the guard opened to their fullest extent, whereby the tails 7 formed on the latches will contact with, and hold the follower in a depressed position as shown in Figs. 5 and 6. The belt 11 is then inserted from the left side of the rifle between the guide rollers, its end being pulled through until the first perforation in the belt engages with one of the teeth 35 on the wheel 34. The bolt is then moved inwardly, carrying with it during such movement, a cartridge from out of a clip up and into the chamber. The bolt handle is then turned downwardly to lock the bolt in the receiver, and during the initiation of the downward movement of the handle, the driving portion thereof engages and forces downwardly, the slide 24 which carries with it, the pawl 23. Upon the initial actuation of the slide 24 carrying the pawl 23, the forwardly projecting pin 33 engages and moves downwardly the rearwardly projecting pin 31 carried on the dog 29, thereby lifting out of engagement with the tooth on the wheel 32, the pin 30, whereupon the shaft 21 may be rotated to move the belt. As soon as the pin 30 is lifted far enough to pass beyond the path of the teeth on the wheel 32, the nose of the pawl 23 engages with a tooth on the wheel 22. Continued downward movement of the slide carrying the pawl starts a rotation of the wheel 22 and at the same time causes the pin 33 to cam off of the pin 31, thereby permitting the dog 29 to assume its normal position, and to lock the wheel 32 against rotation when one of the teeth thereon again contacts with the pin 30. Continued downward movement of the slide carrying the pawl 23 to its fullest extent, results in a rotation of the shaft 21, thereby causing a rotation of the wheel 34, which, during its rotation, moves the belt forwardly a sufficient distance to remove the empty clip from the receiver and position the succeeding clip with the cartridge therein in such a position that upon the retraction of the bolt and its subsequent return, the cartridge will be raised from the last mentioned clip and projected in the chamber. When the handle of the bolt is lifted to withdraw the exploded cartridge from the chamber and to reload the rifle, the slide 24, owing to the tension of the spring 28 follows the bolt handle upwardly, and assumes the position shown in Figs. 4 and 7. Retraction of the bolt, and a closing of the bolt and downward movement of the handle to lock the same, will again cause the slide to move downwardly and perform the function before stated.

Assuming that part of the cartridges contained in the belt have been fired, and it is desirable to withdraw the belt from the rifle without firing the remaining number of cartridges, the milled head 43^a formed on the sleeve 41 is rotated slightly in a forward direction to cause the beveled nose 37 of the dog 36 to disengage itself from the wheel 22, thereby permitting the shaft 21 to rotate in a reverse direction to that through which it rotates to feed the belt. The belt may be then withdrawn from the rifle by pulling the same out of the guard from the left side of the rifle.

Assuming now that it is desired to use the rifle as a magazine feed after the belt is withdrawn therefrom, it is only necessary to close the gates in the guard, thereby completing the magazine and to press downwardly, either by the hand or by the handle of the bolt, the slide 24 to its fullest limit, whereupon the latch 44 is shoved rearwardly into the recess 45 at the forward face of the slide, whereupon the slide will be held in downward position where it will not be affected by the movement of the bolt handle. The magazine may then be loaded in the usual manner, and the rifle operated to load therefrom the chamber as may be desired.

Having thus described my invention, what I claim and desire to secure by Letters Patent is,—

1. In a rifle, the combination of magazine-feeding mechanism; and belt-feeding mechanism adapted to be operated when said magazine-feeding mechanism is in inoperative position, of means for locking the magazine-feeding mechanism in inoperative position to permit the operation of said belt-feeding mechanism.

2. In a rifle, the combination of magazine-feeding mechanism, and belt-feeding mechanism adapted to be operated when said magazine-feeding mechanism is in inoperative position, of means for locking the belt-feeding mechanism in inoperative position to permit the operation of said magazine-feeding mechanism.

3. In a rifle, the combination of magazine-feeding mechanism, and belt-feeding mechanism adapted to be operated when said magazine-feeding mechanism is in inoperative position, of means for locking either of said mechanisms in inoperative position.

4. In a rifle, the combination of magazine-feeding mechanism, and belt-feeding mechanism adapted to be operated when said magazine-feeding mechanism is in inoperative position, of means for throwing the belt-feeding mechanism out of operative position.

In testimony whereof I have hereunto set my hand this 13th day of July, 1917.

JAMES W. BALLARD.