Oct. 20, 1953 C. E. BRUSH 2,655,754

BOX MAGAZINE FOR FIREARMS

Original Filed May 14, 1948 2 Sheets-Sheet 1

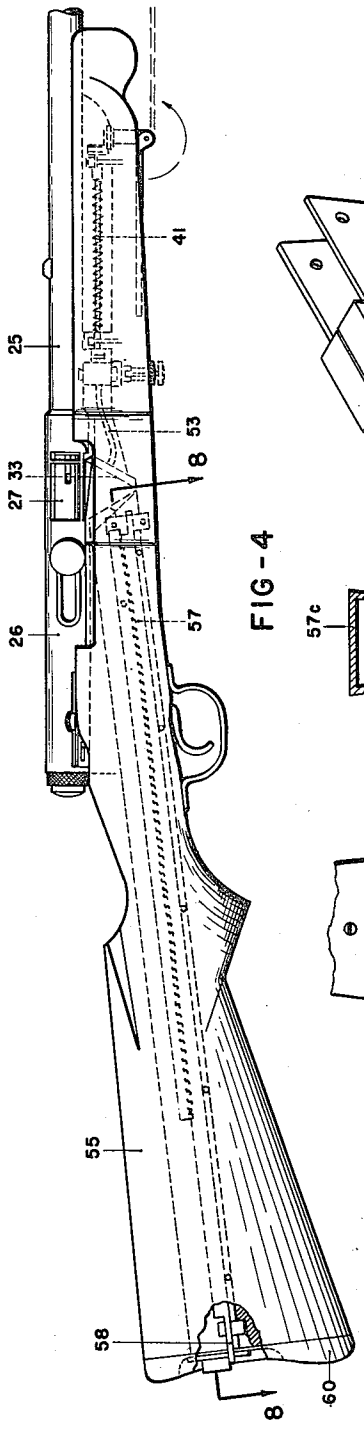


FIG-4

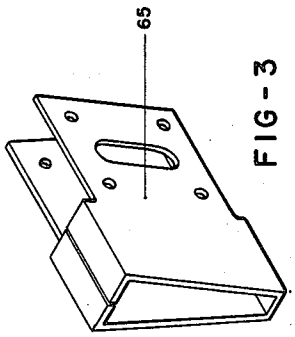


FIG-3

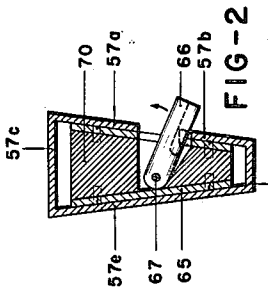


FIG-2

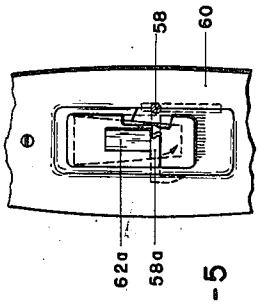


FIG-5

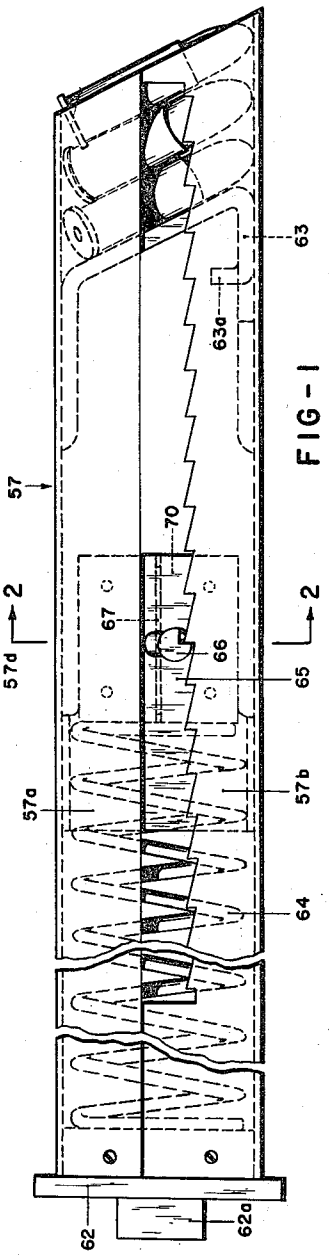


FIG-1

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BOX MAGAZINE FOR FIREARMS

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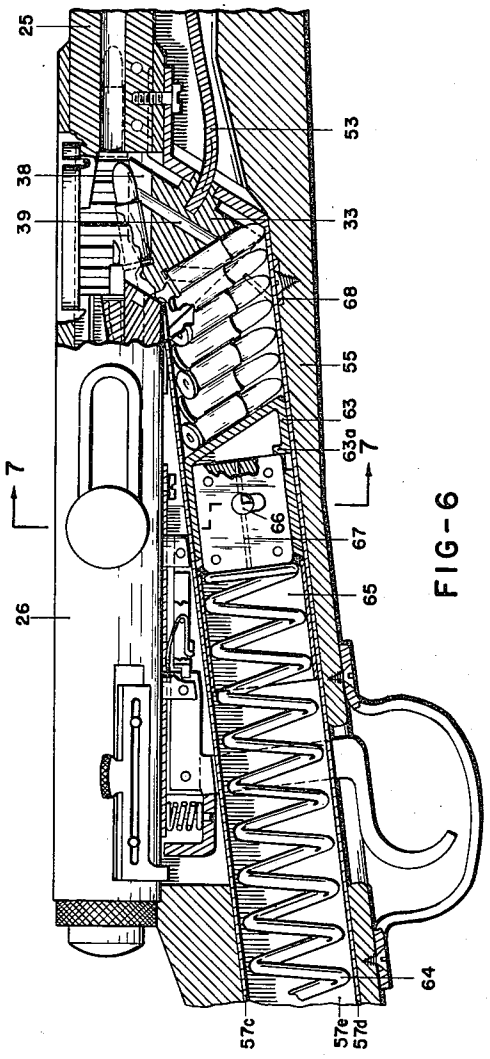


FIG-6

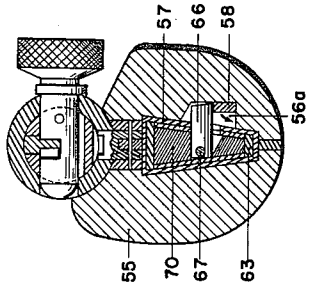


FIG-7

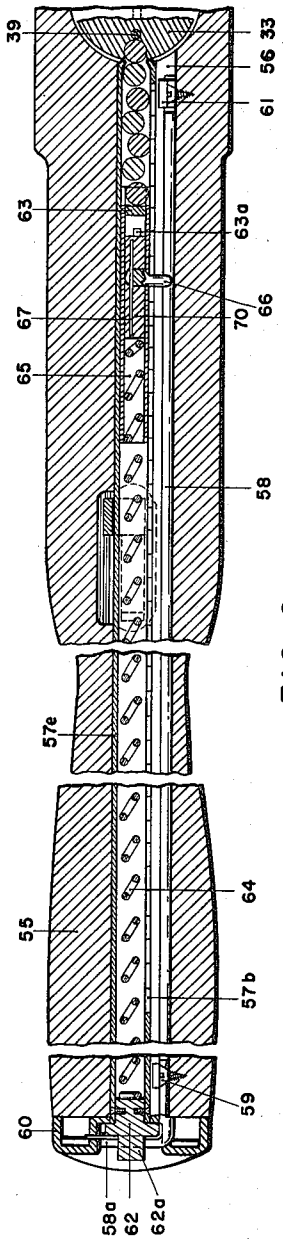


FIG-8

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UNITED STATES PATENT OFFICE

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BOX MAGAZINE FOR FIREARMS

Clyde Edward Brush, Oakland, Calif.

Original application May 14, 1948, Serial No. 27,063. Divided and this application June 8, 1950, Serial No. 166,930

7 Claims. (Cl. 42—50)

1

This invention relates to improvements in magazines for firearms and relates particularly to magazines of the type sometimes known in the art as "box" magazines, which serve to hold a plurality of cartridges in side-by-side relation. The magazine is especially suitable for storing a large number of rimmed cartridges.

In my parent application, Serial No. 27,063, filed May 14, 1948, now Patent No. 2,601,735, of which this is a division, I have described and claimed a firearm having an improved feed mechanism which uses a conical, rotatable lifter with a plurality of grooves for lifting cartridges from the magazine to the loading position in rear of the barrel. The magazine according to the instant application is suitable for use with the said improved feed mechanism and will be described with reference thereto; this magazine may, however, also be used with other types of firearms and feed mechanisms, including semi-automatic and manually-operated types of mechanisms.

One common type of magazine is the "tubular" type which stores cartridges in end-to-end relation; it has a comparatively high capacity, particularly when short cartridges are used, but is not easy to load and often causes deformation of the points or noses of the bullets. Another type, known as the "box" type, is of box-like form and holds the cartridges in side-by-side relation; this type can be loaded more rapidly and many of them avoid deformation of the noses of the bullets. A further advantage of box magazines is that they may be used with clips for positioning the cartridges. A drawback of the box magazines known heretofore is that they have a limited capacity particularly when rimmed cartridges are used; this limitation derives from the fact that the cartridges have greater diameters at their bases than at the other parts thereof, thereby causing a "bow" effect wherein successive cartridges in side-by-side relation are not parallel but have their axes convergent toward a point or points in the direction of the bullets.

It is an object of this invention to provide an improved magazine for repeating firearms, including semi-automatic and manually-operated types, which incorporates the advantage of high capacity of the tubular type with the advantages of ease in loading and freedom from bullet deformation of the box type. More particularly, it is an object to provide an improved box magazine which will store and supply cartridges to the feed mechanism of firearms which magazine is convenient to load and will advance the cartridges without deforming the latter by spring pressure or by the rubbing of the bullet against the side wall of the magazine or by bumping together and contact of one bullet with the base of the next cartridge, as is common in tubular magazines. Ancillary thereto, it is an object to provide an improved type magazine wherein the contact of the noses of the bullets against the magazine wall is kept to a minimum.

2

An important object of the invention is to provide an improved box-type magazine of the open mouth type, that is, one which does not have converging lips separated by a distance less than the diameter of a live cartridge and does not have other cartridge retaining means at the discharge end, whereby the cartridges are unrestrained and free to be ejected by the sole action of the follower in a direction transverse to the axes of the cartridges, without axial movement of the cartridges. Such a magazine may be used with any loading mechanism of a firearm having means for preventing the discharge of cartridges from the magazine except when required by the operation of the loading mechanism, for example a mechanism such as is described herein.

A further object is to provide an improved magazine having a spring-pressed follower provided with means for preventing the spring from advancing the follower until released, for example after attaching the magazine to a firearm; an ancillary object is to provide a magazine of the character described adapted to cooperate with elements on a firearm for restoring the spring to operative condition for advancing the follower when the magazine is placed in operative position on the firearm.

Another important object of the invention is to provide an improved magazine having a composite spring-pressed follower comprising two separable parts, the forward part being a cartridge-engaging part or follower proper and the rear part forming a movable spring abutment, the magazine being provided with means for securing the rear part in retracted position, preferably at any selected retracted position, against movement by the action of the spring.

Still another object is to provide an improved box-type magazine which is suitable for retention within the stock of a firearm; wherein the cartridges are retained in two alternating rows, the cartridges of one row being skew with respect to those of the other row, whereby the rims of adjacent cartridges are staggered and may be out of contact with each other and the "bow" ef-

fect is avoided. "Alternating rows," as used herein, is intended to denote an arrangement wherein every other cartridge forms one row and the alternating cartridges constitute another row, the cartridges of each row being parallel to one another. Ancillary thereto, it is an object to provide an improved box type magazine wherein the cartridges are arranged in two alternating rows and are urged toward the discharge end of the magazine by a follower plate the face of which has an inclination such as to give the cartridges a tendency to climb away from their nose ends and toward the rimmed ends, whereby the tendency to wear the bullets is avoided or minimized.

Still further objects of the invention will become apparent from the following description of one embodiment of the invention, taken in connection with the accompanying drawings forming a part of this specification and showing the said embodiment, wherein:

Fig. 1 is a side elevation of the magazine during the operation of feeding cartridges into the magazine;

Fig. 2 is a transverse section taken on line 2—2 of Fig. 1;

Fig. 3 is an isometric view of a part of the composite magazine follower;

Fig. 4 is a right side elevation of the rear part of a semi-automatic rifle employing the improved magazine;

Fig. 5 is a rear elevation view showing the magazine locked in position, parts being broken away;

Fig. 6 is an enlarged, vertical longitudinal sectional view of the rear portion of the firearm with the magazine in partly exhausted condition and the breech bolt retracted;

Fig. 7 is a transverse sectional view taken on line 7—7 of Fig. 6; and

Fig. 8 is an enlarged, horizontal longitudinal view through the stock and magazine, taken on line 8—8 of Fig. 1 but showing the magazine in partly exhausted condition.

Referring to the drawings, and particularly to Figs. 4–8, there is shown a semi-automatic rifle of the blow-back type, that is, of the type in which the breech bolt is driven back directly by the pressure of the gases resulting from the burning of the propelling charge within the cartridge and within the bore of the barrel, it being understood that the magazine is not limited to use with such a firearm. The rifle has a barrel **25**, in rear of which is a chambered receiver **26** in which are reciprocatingly mounted the breech bolt **27** and other operating elements, not shown.

Located close to the breech of the barrel, and generally below the forward end of the receiver, there is located the rotatable lifter **33**, of generally conical outline and journalled at its ends for rotation about the cone axis. The lifter has smooth surfaces of rotation about the cone axis. The lifter is situated at the rear of the breech of the barrel and immediately below it, with its axis inclined downwardly toward the front at an angle to the barrel axis of about half the apex angle of the cone, so that the upper face of the cone, as viewed from the side, is essentially parallel to the bore line. The lifter has formed therein a plurality, e. g., two cylindrical, round-bottomed recesses **38** spaced equally about the circumference of the cone and parallel to the conical face, and of a size to accommodate a live cartridge of the type to be fired to about three fourths of the diameter of the cartridge snugly but without binding. The recesses extend generally longitudinally of the cone. The lifter is further provided with a bore perpendicular to the cone axis and of a diameter somewhat less than that of the cartridge and extending through the bases of opposite recesses **38** at points forwardly of the midpoints thereof. This bore accommodates a plunger or rod **39** which is of a length somewhat longer than the length of the bore, the exact length being determined by the amount of lift desired for the front end of the cartridge during the loading operation, as will be described hereafter.

The purpose of the plunger **39** is to reflect the pressure of cartridges in the magazine, which are constantly urged forwardly toward the conical lifter by yieldingly tensioned means comprising a follower spring in the magazine, to be described, in a direction substantially against the lower face of the cone. This pressure is reflected by means of the plunger **39** against the lower side of a cartridge which, in the cycle of reloading the bore with a live cartridge, is found to occupy the uppermost recess **38** in the lifter. The latter cartrdige is positioned in its recess parallel to the bore line and just beneath it, its upper surface being at about the level of the lowermost part of the breech chamber. The lower end of the plunger **39** is, in this part of the loading cycle, projecting into the lower recess **38** and is engaged by the forward cartridge in the magazine. This urges the plunger forwardly and upwardly, and lifts the front end of the cartridge in the upper recess **38**.

The lifter is constantly urged to rotate in one direction by any resilient means, such as a helically wound torsion spring **41** (Fig. 4). This spring is connected to a flexible cable **53**, such as a helical wire cable which extends rearwardly through a large recess in the stock and into the bore of the lifter **33** and is suitably anchored thereto.

The construction and operation of the firearm are described more particularly in the aforesaid Patent No. 2,601,735.

The stock **55** has an elongated hole **56** of generally trapezoidal cross section for receiving the magazine, with the wider of the two unequal faces at the top and with a smaller, rectangular recess **56***a* in the right face (Fig. 7). The main, trapezoidal part of the hole or well **56** is for receiving the magazine **57** and the recess at the side is provided to accommodate a longitudinal, rectangular magazine release rod **58** which is supported and positioned near the rear thereof by screws **59**. The rod **58** has small recesses on one side to accommodate the heads of the screws **59** when the rod is rotated counterclockwise 90° from the position shown in Fig. 7. The stock **55** is fitted with a butt plate **60** having an opening providing access to the hole **56** (Figs. 4, 5 and 8). The rod **58** extends through another hole in the side of the plate **60** and has a portion **58***a* extending at right angles to the main, forwardly extending part and forming a rear bar or closure for retaining the magazine within the hole **56**. The free end of the part **58***a* is notched to provide a forward tip adapted to enter a recess at the left side of the butt plate, as shown in Fig. 8. The rod **58** has its forward, rounded end located eccentrically and retained by a staple **61** which is fixed to and within the stock. The rear end of the rod at the plate **60** also has an eccentric, pivotal support as shown in Fig. 4. Thus the rod **58** is given a pivotal mounting by the

staple 61 and the hole in the butt plate about an eccentric axis, whereby it may be swung through 90° counterclockwise from the position shown in Figs. 5 and 7. This turning movement is effected by swinging the rear bar 58*a* downwardly about the pivotal mounting; this is, at the same time, effective to open the rear of the hole to permit a magazine to be inserted or withdrawn. The rod 58 is retained against rearward movement by engagement of the notch at the free end of the part 58*a* with the recess in the butt plate.

The magazine 57 may be formed of a single piece of sheet metal, bent to provide parallel top and bottom portions 57*c* and 57*d*, an inclined left sidewall 57*e*, and two inclined, coplanar fractional side walls 57*a* and 57*b*, leaving a slot between them which extends longitudinally with respect to the magazine (Figs. 1 and 2). The upper edge of the lower fractional side wall 57*a* is serrated to provide saw teeth or notches with rearwardly facing vertical or slightly undercut portions, spaced apart at intervals corresponding to the distance occupied by one cartridge. At the front the fractional sidewalls 57*a* and 57*b* are extended vertically to abut each other, and these right side walls, as well as the left sidewall 57*e*, are converged at the extreme forward end of the magazine to provide lips tapered toward a forward opening just wide enough to permit the passage of a single cartridge in alignment with the feed mechanism. Thus, in the embodiment illustrated, the lips are shaped to provide a vertical opening to discharge a cartridge in alignment with the recess 38 at the bottom of the lifter 33 (Fig. 8). To conform to the inclination of the recess 38, the magazine extends forwardly farther at the bottom than at the top. The rear of the magazine is closed by a back plate 62 which is secured to the other parts of the magazine by cone head screws with flat tops. The plate 62 has a projection 62*a* serving as a grip by which the magazine may be retracted. The portion 58*a* of the rod 58 is in engagement with the projection 62*a* when in its horizontal, locked position. It will be noted that the magazine back plate 62 extends laterally beyond the other parts of the magazine, so that the front face of the lateral projection abuts a portion of the butt plate 60 (Fig. 8). This insures a snug fit for the portion 58*a*.

A composite follower having separable, mutually abutting parts 63 and 65 is reciprocably positioned within the magazine. The forward part 63 forms a cartridge-engaging part; it is the follower proper and is herein referred to as the follower. It is formed of a sheet of metal bent to engage the top and bottom of the magazine and having an inclined front section sloped to conform to the slope of the front end of the magazine and, hence, to the inclination of the recess 38 at the bottom of the lifter. The sides of the follower are open. A follower or magazine spring 64 abuts the back plate 62 and the part 65 which is formed as a follower insert and fits slidably within the magazine and is shaped to engage the four sides thereof. Insert 65 has its top and bottom notched at their forward portions to extend into the follower without friction (Figs. 1 and 6). This insert forms a movable abutment for the spring 64. The insert may be made hollow as shown in Fig. 3 and a block 70 may be fixed within it to form the actual abutment for the front end of the spring; the rear face of this block is forward from the rear end of the hollow part 65, whereby the spring enters the

latter. I prefer to construct the follower 63 to fit snugly within the magazine so as to slide freely when urged by the follower spring and the follower insert, but to remain at any previously assumed position along the length of the magazine when the force of the spring against it is removed, by means to be described. By this snugness the feeding of live cartridges into the magazine is facilitated in that the user can insert the cartridges from the front end while having either the follower or the previously introduced cartridge close enough to the front to facilitate positioning the cartridge as required to form alternating rows. As each added cartridge is inserted and pushed toward the rear, the follower will yield only as far as it is pushed manually through the cartridge.

The follower 63 has a portion of its bottom cut out and bent to provide a tongue 63*a* affording an abutment for the follower insert and insuring forward pressure at the bottom. At the top forward pressure is assured by engagement of the top, forward part of the follower insert with the inclined, front face of the follower. The follower insert 65 carries a transverse pawl 66 which is pivotally mounted therein for movement in a transverse, vertical plane on a longitudinal pin 67 fitted in the block 70. It extends laterally through the slot between the fractional right side walls 57*a* and 57*b* and normally rests by gravity on the serrated edge. It is notched at the end by cutting away the front, lower quadrant (Figs. 1 and 6) so that it may catch on the saw teeth and prevent the forward movement of the follower insert when resting on the serrated edge. The pawl 66 extends far enough laterally to serve as an operating handle and to rest on the rod 58, as shown in Fig. 7. As is evident from the foregoing, when the closure 58*a* is lowered, the rectangular rod 58 is lying on its side, the pawl 66 is in engagement with the saw teeth on the serrated edge of the magazine, preventing the forward movement of the follower insert, and the follower spring is rendered inactive. When the rod 58 is turned clockwise to the position shown in Figs. 5 and 7, the pawl 66 is engaged by the edge of rod 58, being thereby lifted above the saw teeth and permitting the follower spring to force it against the follower 63.

Because of this arrangement, it is unnecessary to provide positive means for retaining the cartridges within the magazine, and the converging lips at the front thereof may be spaced apart sufficiently to permit the follower spring to eject a live cartridge between them without opposition. Thus, in loading cartridges into the magazine, the operator lifts the pawl 66 to free it from the serrated edge of the side wall and permits the follower spring to advance both parts of the composite follower to the front of the magazine; he then pulls back the follower insert, using the pawl 66 as a handle, and engages it with the rearmost notch, thereby compressing the follower spring and securing the follower insert in retracted position. Live cartridges may then be inserted and positioned from the front, each cartridge being inserted with the rim toward the wider, upper part of the magazine. The follower is pushed back each time a cartridge is inserted until the follower engages the follower insert. This operation is illustrated in Fig. 1, wherein the follower 63 is shown separated from the follower 65, the latter being shown, however, with the pawl 66 engaged with a notch forward of the rearmost notch. The successive cartridges are

positioned so that every other one has its rim toward the right, the alternating cartridges having their rims toward the left. As a result, adjacent cartridges are in engagement only forwardly from their rim portions, i. e., near to or at the projecting bullets, and the arcing or bow effect is avoided, because the rims are not positioned to transmit thrust. It is possible, for example, to load as many as 50 or more caliber .22 rimmed cartridges into a magazine of a length to fit into the ordinary rifle stock in a straight line without any arcing.

It is evident that the forward end is advantageously raised during loading of the magazine and during insertion into the rifle so as to avoid spilling cartridges. When the magazine is being inserted into the stock the rod 58 is necessarily on its side (to lower the transverse portion 58*a*) and the pawl 66 does not come into contact therewith; hence the follower spring remains blocked. After the magazine has been pushed home to bring the front end up to the lifter 33, the end portion 58*a* is swung up to lock its end in the butt plate and lock the magazine in place; this tilts the rod 58 up on edge to the position shown in Fig. 7, thereby engaging the lower face of the pawl 66 and raising it to above the level of the serrations on the fractional side 57*a*. The follower insert is thereby freed for movement forwardly into and against the follower, and so moves under the force of the magazine spring. This causes the follower to advance the cartridges and press the foremost cartridge against the lifter. Unless the lifter is oriented to have one of its recesses 38 in lowermost position the foremost cartridge will be pressed against the smooth, conical portion of the lifter; when the lifter is turned by the spring 41 to align one of the recesses 38 with the front of the magazine the foremost cartridge moves forwardly into the recess. A resilient guide 68, secured to the stock by screws, centers the magazine laterally within the stock and further urges the front end of the magazine upwardly against the receiver 26.

As a result of the alternating row arrangement of the cartridges, whereby the cartridges of each row are parallel to each other and skew with respect to the cartridges of the other row, and further as a result of the inclination of the cartridges causing their noses to be farther advanced than their bases or rimmed ends, a very important improvement is achieved: As the follower advances the cartridges, the latter are not merely slid forwardly but are given a turning motion tending to make the cartridges roll forwardly and upwardly within the magazine, thereby relieving pressure from their noses and obviating or greatly reducing wear. This feature facilitates the use of a long box type magazine without deformation of the bullets. While the magazine is being loaded the follower spring is ineffective and only slight pressure is applied to the cartridges.

According to a variant, I may provide only one notch for the pawl 66 instead of serrations along the full length of the slot between the fractional right sides. I prefer, however, to use the arrangement shown because it permits the magazine to be loaded with less cartridges than required to fill the magazine to capacity and still have the follower insert within close proximity to the follower, as indicated in Fig. 1, thereby avoiding extended forward movement of the follower insert and consequent pounding when the pawl is released. For this reason it is advisable, after any desired number of cartridges have been inserted, to raise the pawl 66, move the follower insert gently forward against the follower, and again engage the pawl in the proper notch. Moreover, by providing serrations along the length of the magazine it is possible to remove the magazine from the gun without spilling cartridges from the front. Thus, when the rod 58 is turned to lower the portion 58*a* the pawl is free to engage the next forward notch, regardless of its position; when the magazine is withdrawn, relieving the pressure of the lifter 33 against the foremost cartridge, the follower advances within the magazine only the distance required for the pawl to engage the next notch, and the magazine may then be withdrawn completely without discharge of cartridges.

The coaction between the lifter and the bolt is described in the aforesaid, Patent No. 2,601,735. In summary, the lifter is urged continuously to rotate in a counterclockwise direction (as viewed from the rear) by the spring 41, but when the bolt is forward this rotatiton is checked before the recess 38 carrying a live cartridge has reached its uppermost position by engagement of the cartridge with a part on the under side of the bolt and disposed to the right of the center thereof. When the bolt is retracted (and retracts a cartridge from the chamber in the event that the gun was loaded) the bolt moves to the rear of the cartridge in the recess 38, freeing the lifter to complete its movement by turning through a small angle of approximately 20°; rotation of the lifter is stopped by engaging of the said cartridge with a projection on the receiver.

When the live cartridge in recess 38 has thus been moved to its loading position directly beneath the line of travel of the bolt, the other recess 38, heretofore empty, is moved into alignment with the front of the magazine, and a live cartridge is pushed into the latter recess by the action of the follower spring 64. The latter cartridge bears against the plunger 39, causing it to raise the front end of the cartridge which is in loading position at the top of the lifter. In this way the force of the follower spring 64 is reflected against the uppermost cartridge beneath the barrel bore only when the rotation of the lifter has been completed and the bolt is retracted.

When the bolt moves forward the lower, front edge thereof engages the uppermost cartridge and pushes it forward. The cartridge rim moves upwardly to bring it to a substantially horizontal position in line with the barrel bore, and entirely clear of the lifter before the bolt has completed its forward movement. The lifter 33 is now free to resume its turning movement, which commences while the bolt is completing its forward movement. During the turning movement of the lifter the plunger 39 is projecting into the empty recess 38 which is descending on the left side of the lifter. Rotation is stopped by engagement of the next live cartridge with the part on the bolt as described above; this occurs before the empty recess is in alignment with the magazine, whereby the foremost cartridge in the magazine cannot enter the empty recess and no pressure is brought to bear against the plunger 39 until the bolt is again retracted.

I claim as my invention:

1. A box magazine for repeating firearms comprising a wall structure providing peripheral walls enclosing a storage space of cross sectional shape to contain live cartridges in side-by-side

relation, said wall providing a discharge opening at one end of the magazine and a longitudinal slot; a composite follower having separable, mutually abutting parts, said parts being individually reciprocably movable within said storage space, the part nearer said discharge opening being a cartridge-engaging part for moving cartridges to the discharge opening when moved toward said opening by the other part of the follower; and a projection secured to said other part extending through said slot.

2. A box magazine for repeating firearms comprising a wall structure providing peripheral walls enclosing a storage space of cross sectional shape to contain live cartridges in side-by-side relation, said walls providing a discharge opening at one end of the magazine; a composite follower having separable, mutually abutting parts, said parts being individually reciprocably movable within said storage space, the part nearer said discharge opening being a cartridge-engaging part for moving cartridges to the discharge opening and the other part forming a movable spring abutment; a magazine spring disposed to engage said spring abutment and to move said composite magazine follower toward said discharge opening; and securing means for securing said movable abutment in a retracted position against forward movement.

3. A magazine according to claim 2 wherein the securing means is engageable with the said wall structure at a plurality of longitudinal positions and is carried by the movable abutment.

4. A magazine according to claim 2 wherein the said cartridge-engaging part of the magazine has walls engaging the peripheral walls of the magazine for maintaining the said part oriented within the magazine and the movable spring abutment is shaped as a follower insert having a forward part thereof adapted to enter the rear portion of the cartridge-engaging part.

5. A box magazine for repeating firearms comprising a wall structure providing peripheral walls enclosing a storage space of cross sectional shape to contain live cartridges in side-by-side relation, said walls providing a discharge opening at one end of the magazine and said wall structure providing a longitudinal slot; a magazine follower reciprocably movable within said storage space; a magazine spring disposed to move said magazine follower from a retracted position toward said discharge opening; and a pawl movable along said slot and adapted to be releasably latched to said wall structure at a plurality of positions along the length thereof, for preventing the spring from moving the follower toward the discharge opening from a retracted position

of the follower, said pawl having an engageable part at said slot whereby the pawl can be latched and unlatched at any longitudinal position thereof.

6. A box magazine for repeating firearms comprising a wall structure providing peripheral walls enclosing a storage space of cross sectional shape to contain live cartridges in side-by-side relation, said walls providing a discharge opening at one end of the magazine and said wall structure providing a longitudinal slot having serrations forming notches along an edge thereof; a magazine follower reciprocably movable within said storage space; a magazine spring disposed to move said magazine follower from a retracted position toward said discharge opening; and a pawl movable along said slot together with the forward end of said spring and having a part thereof extending through said slot and shaped for engaging said notches, whereby said spring can be prevented from moving the follower toward the discharge opening from a retracted position of the follower.

7. A box magazine for repeating firearms comprising a wall structure providing peripheral walls enclosing a storage space of cross sectional shape to contain live cartridges in side-by-side relation, said walls providing a discharge opening at one end of the magazine and said wall structure providing a longitudinal slot having serrations forming notches; a composite follower having separable, mutually abutting parts reciprocably movable within said storage space, the part nearer said discharge opening being a cartridge-engaging part for moving cartridges to the discharge opening and the other part forming a movable spring abutment; a magazine spring disposed to engage said spring abutment and to move said composite magazine follower toward said discharge opening; and a pawl carried by said movable spring abutment and shaped to engage said notches for securing said movable abutment in a retracted position against forward movement.

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