United States Patent [19]

Evans

[11] **3,906,652**

[45] **Sept. 23, 1975**

[54] **CARTRIDGE FEED MAGAZINE ASSEMBLY WITH SELF-CONTAINED FOLLOWER SPRING**

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[21] Appl. No.: **443,068**

[52] **U.S. Cl.** **42/50**
[51] **Int. Cl.²** **F41C 25/02**
[58] **Field of Search** 42/50

[56] **References Cited**

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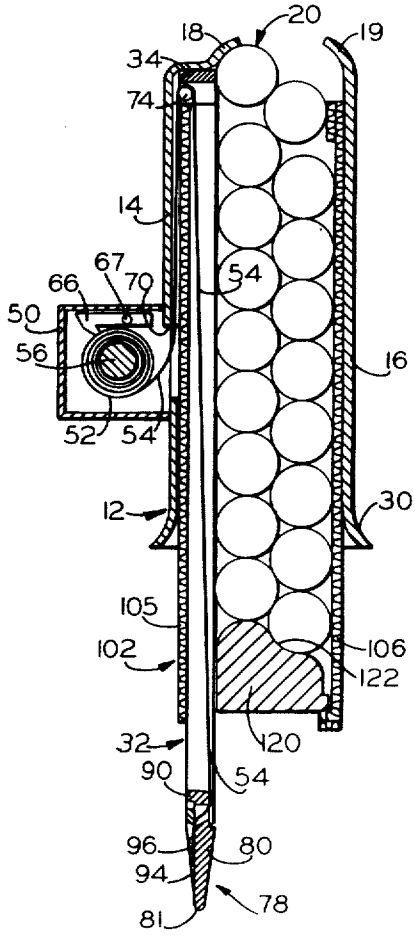
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Primary Examiner—Samuel Feinberg
Assistant Examiner—C. T. Jordan
Attorney, Agent, or Firm—Robert P. Gibson

[57] **ABSTRACT**

The rapid reloading of a semi-automatic or automatic firearm of the type wherein the cartridges are fed thereto from a box-type magazine is accomplished by providing the firearm with an adapter similar at the upper end thereof to a conventional magazine but terminating in an open bottom adapted for the upward insertion of the customary sealed container in which the cartridges are initially packaged for shipment to the user. A guide plate fixed within the adapter depends therefrom to terminate in a pivotal lifter which is releasably retained in vertical alignment with the guide plate by a coiled negator type spring housed in a compartment projecting from the exterior sidewall of the adapter. However, when the lifter is manually pivoted out of such alignment, the spring then acts thereon to urge the lifter upwardly within a suitable track in the guide plate and into contact with the underside of a follower in the cartridge container for successively feeding the double column of cartridges therein into the firearm. A pawl and ratchet arrangement is associated with the coiling movement of the spring to permit the tension thereon to be released and to thereafter be restored to the desired operating level immediately prior to operation of the firearm.

13 Claims, 16 Drawing Figures



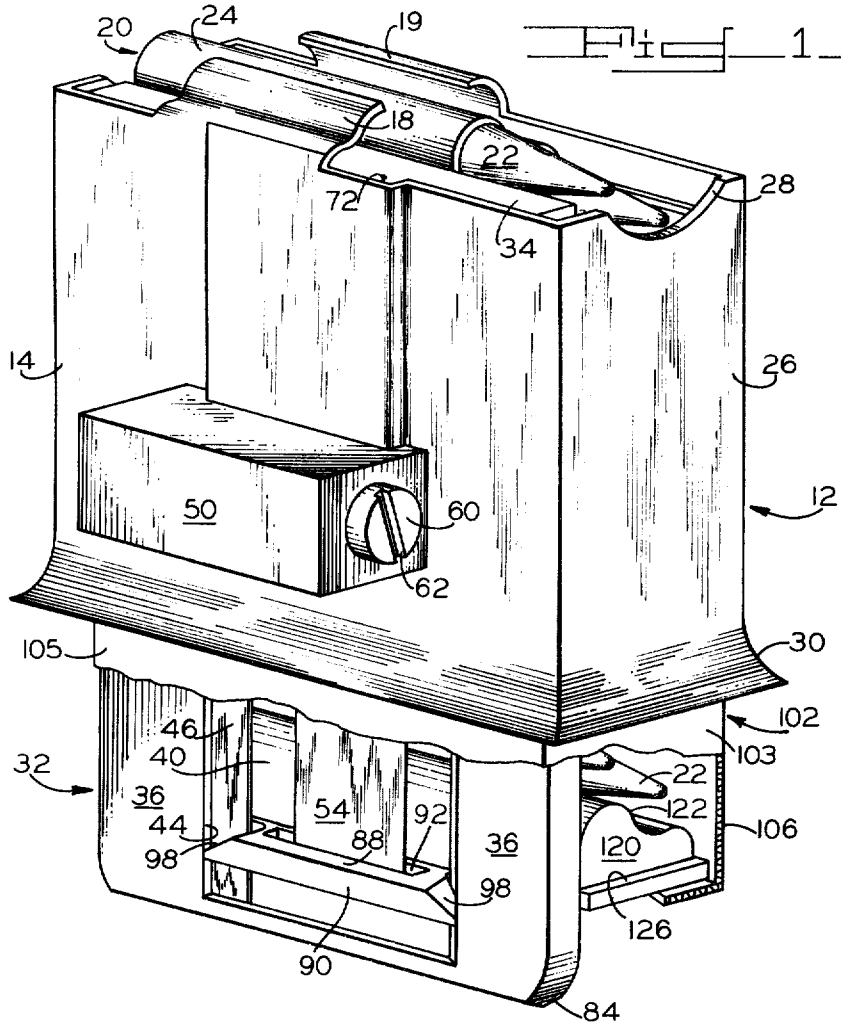


Fig. 1

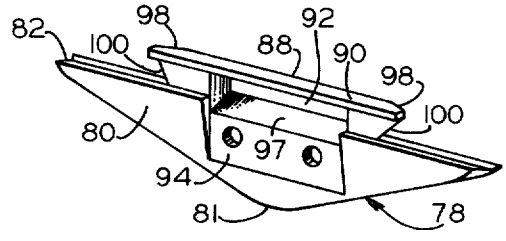


Fig. 2

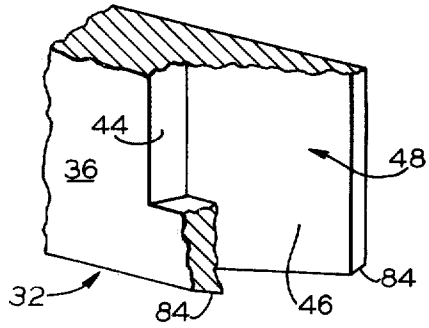


Fig. 3

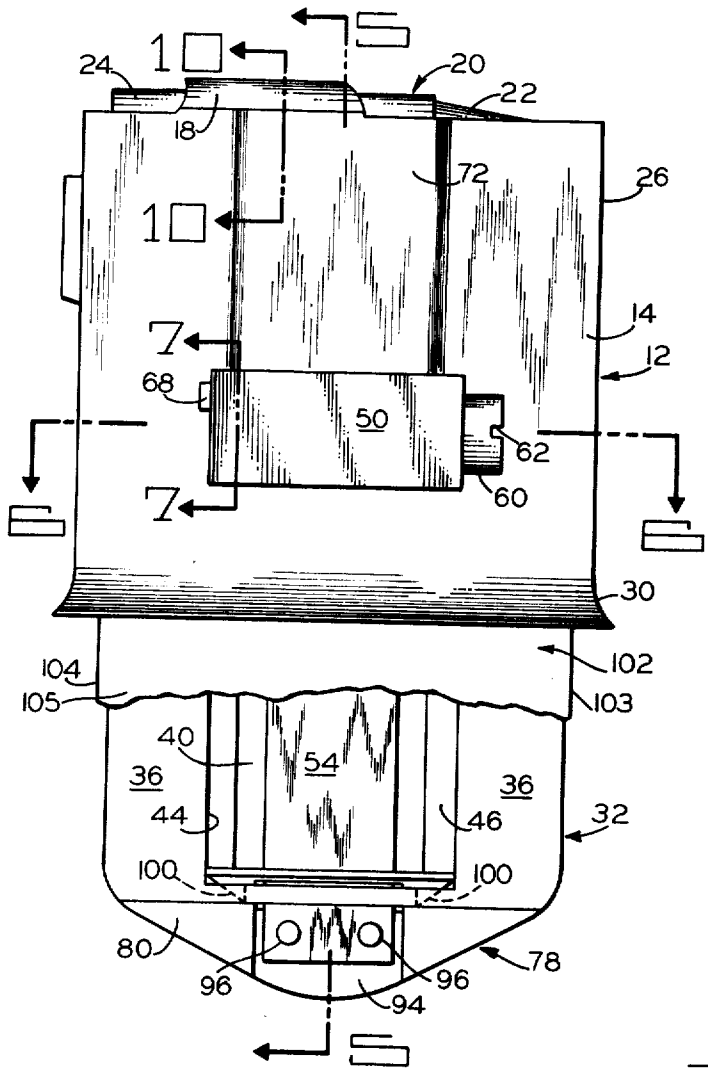


Fig 4

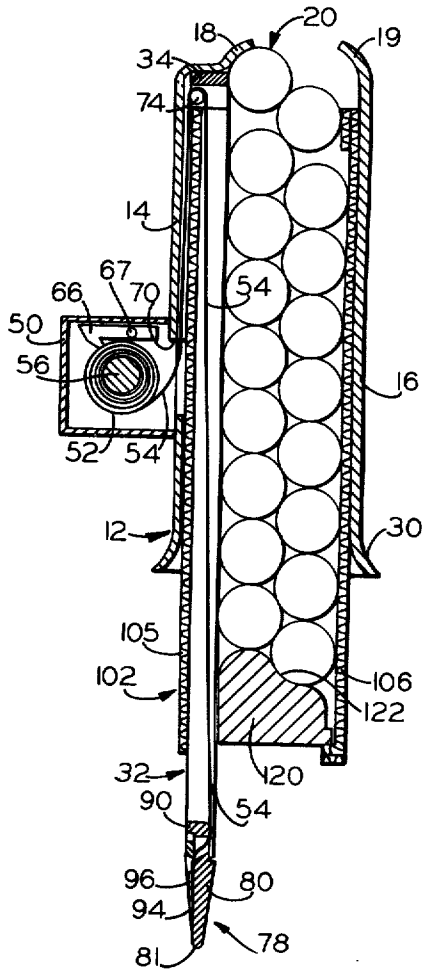


Fig 5

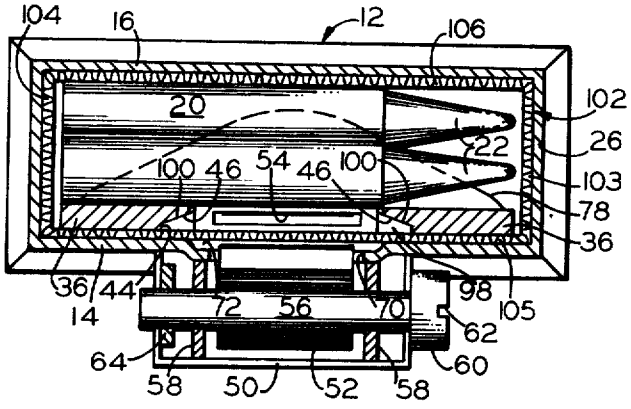


Fig 6

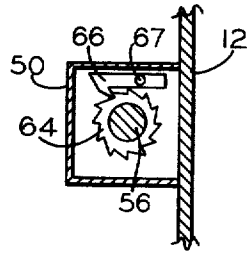


Fig 7

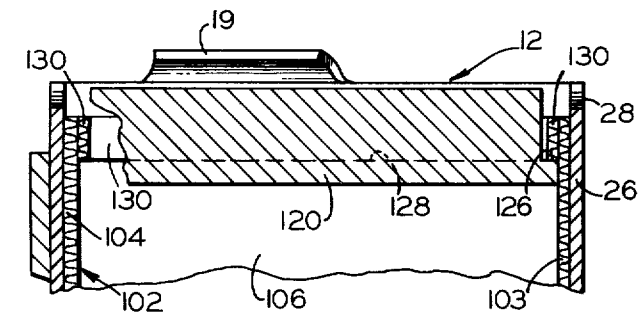


Fig. 9

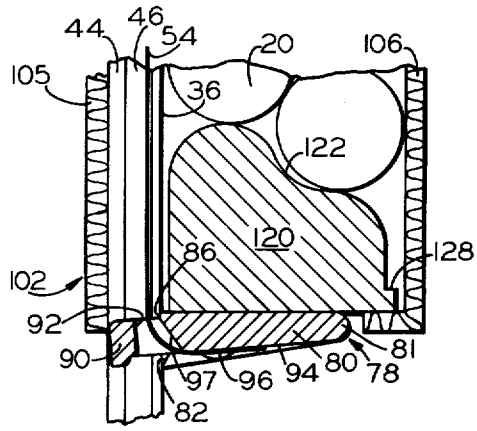


Fig. 8

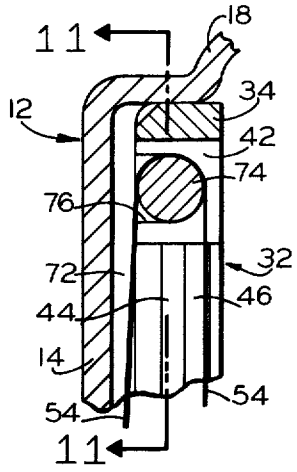


Fig. 10

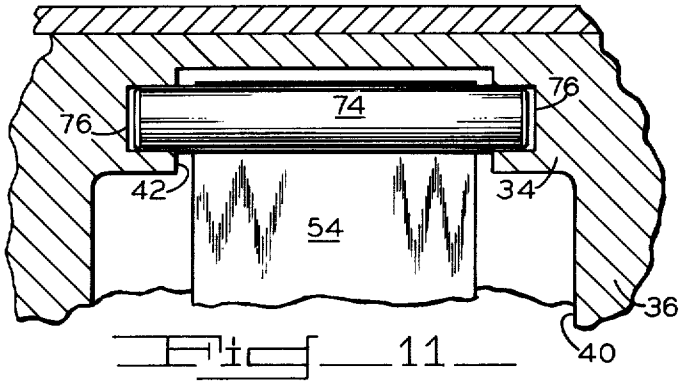


Fig. 11

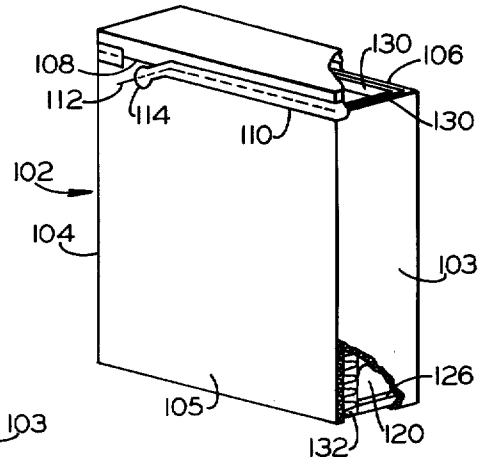


Fig. 12

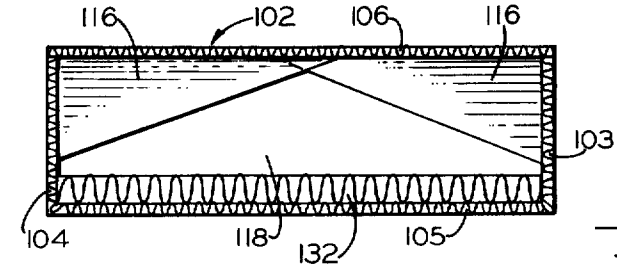


Fig. 13

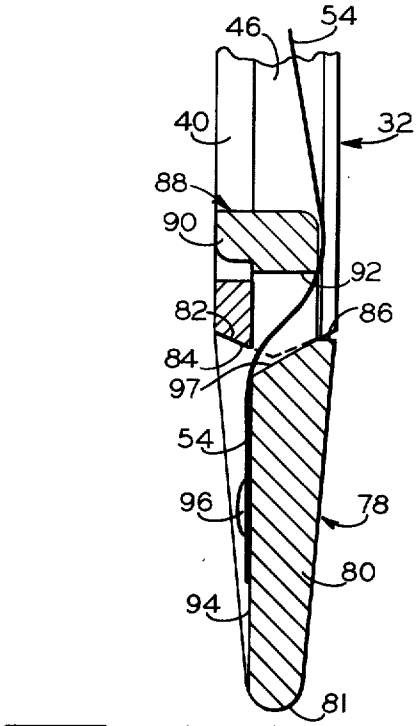


Fig 14

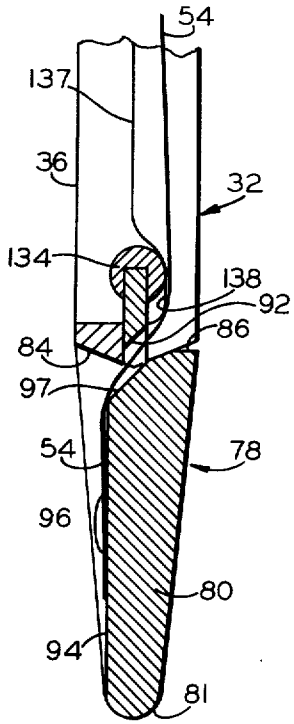


Fig 15

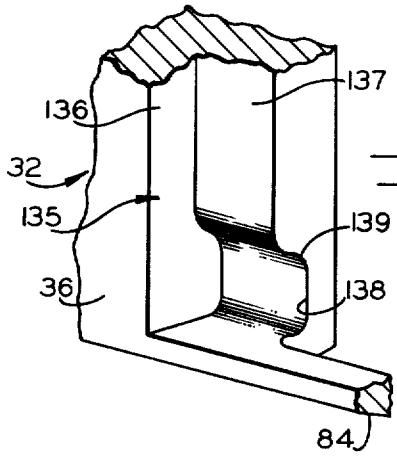


Fig 16

CARTRIDGE FEED MAGAZINE ASSEMBLY WITH SELF-CONTAINED FOLLOWER SPRING

The invention described herein may be manufactured, used and licensed by or for the Government for governmental purposes without the payment to me of any royalty thereon.

BACKGROUND OF THE INVENTION

This invention relates to the loading of ammunition into small arms sporting or military weapons and is more particularly directed to means for reloading the weapon directly from the sealed containers in which the individual rounds are originally packaged for shipment to the user.

In small arms weapons adapted for repetitive fire, the cartridges therefor are generally contained in a box-type magazine which is releasably retained in the underside of the weapon and is provided with a spring-biased follower for successively feeding each cartridge into firing position. When the magazine is emptied, it is removed from the weapon and preferably replaced by one with a full complement of cartridges. However, inasmuch as the quantity of fully loaded magazines which can be conveniently carried by any one individual is limited, continued operation of the weapon eventually requires reloading of the empty magazines. This has been accomplished, heretofore, by manually removing the required number of cartridges from the disposable container or box in which such cartridges are normally packaged for shipment to the user and then individually transferring each cartridge into the magazine against the bias of the follower spring therein. Obviously, this is a relatively slow and cumbersome procedure which detracts from the rapid and sustained firing so often required in particular military situations.

It is therefore an object of this invention to provide a cartridge feeding arrangement for a small arms weapon capable of sustained fire which can be simply and rapidly reloaded directly from the disposable containers in which the cartridges are originally packaged for shipment from the point of manufacture.

A further object of the present invention lies in the provision of a cartridge feeding arrangement, as aforesaid, which permits a desirable increase in the quantity of the cartridges which can be carried on the person of the user of the weapon.

Another object of this invention is to provide a cartridge feeding arrangement, as aforesaid, wherein prepackaged cartridge containers can be rapidly inserted into an adapter depending from the weapon to permit successive advancement of the cartridges into firing position in substantially the same manner as in a conventional box-type magazine.

Another object of this invention is to provide a cartridge feeding arrangement, as aforesaid, wherein the follower spring which advances each cartridge into the chambering position thereof is adapted to be maintained in a relatively untensioned state during the periods in which the weapon is not in use.

An additional object of the present invention lies in the provision of a cartridge feeding arrangement, as aforesaid, wherein the withdrawal of the empty cartridge container from the adapter serves to return the follower spring to the compressed state required to lift a full load of cartridges.

It has been found that the foregoing objects can be readily and economically accomplished by a cartridge feeding arrangement wherein the disposable container in which the cartridges are originally loaded at the point of manufacture is inserted upwardly into an adapter open at both ends thereof and provided with substantially the same configuration at the upper end thereof as a conventional box magazine of the type wherein a double column of staggered cartridges is serially advanced to permit a reciprocal bolt to successively chamber each cartridge into the firearm barrel. A substantially rectangular guide plate is secured within the interior of the adapter in spaced relation to the sidewall thereof to form a passage for a negator type of follower spring terminating in a coiled end which is housed in a separate compartment projecting outwardly from the exterior surface of the same sidewall at a convenient location above the lower end thereof. The guide plate extends downwardly below the open bottom of the adapter for pivotal engagement by a separate cartridge lifter to which the opposite end of the negator spring is fastened. When the lifter is in vertical alignment with the guide plate, the follower spring provides a releasable locking engagement therebetween. The guide plate is vertically channeled for slidably engaging the lifter following the termination of the locking engagement therebetween. Also included in the compartment which houses the coiled end of the follower spring is a suitable pawl and ratchet arrangement which permits restoration of the follower spring to a desired operating tension level whenever active use of the weapon is contemplated.

Thus, as the container, from which the top has been removed to expose the uppermost cartridges therein, is inserted upwardly into the open bottom of the adapter, the depending guide plate will eject and replace the separator originally disposed between the cartridges and the adjacent sidewall of the cartridge container. The lifter can then be manually pivoted to a horizontal position out of locking engagement with the guide plate for upward bias by the follower spring into lifting engagement with the follower in the bottom of the cartridge container whereby the cartridges are successively fed into the weapon in the manner well known in the art. Once all the cartridges have been fired, the empty container can be readily withdrawn from the adapter by a simple downward pull thereon which will not only restore the original tension to the follower spring but also pivot the lifter back into releasable locking engagement with the guide plate ready for the insertion of another cartridge container into the adapter.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the cartridge feeding arrangement partially broken away to show the lower end of the guide-plate and the cartridge lifter holding a fully loaded cartridge container in feeding position;

FIG. 2 is a perspective view of the cartridge lifter shown separately of the guide plate;

FIG. 3 is an enlarged perspective view of a fragmentary portion of the lower end of the guide plate showing the configuration of one of the dovetail channels therein;

FIG. 4 is an elevational view of the adapter with a fully loaded cartridge container inserted therein and partially broken away to show the guide plate with the cartridge lifter releasably locked thereto immediately

prior to lifting engagement with the cartridge follower;

FIG. 5 is a sectional view taken along line 5—5 of FIG. 4 showing the path taken by the negator type follower spring from the coiled end thereof to the end in engagement with the cartridge lifter;

FIG. 6 is a sectional view taken along line 6—6 in FIG. 4 but with the cartridge lifter (indicated by the dotted line) pivoted into lifting contact with the cartridge follower;

FIG. 7 is a sectional view taken along line 7—7 in FIG. 4 showing the pawl and ratchet arrangement for maintaining the follower spring at a desired tension;

FIG. 8 is an enlarged fragmentary sectional view taken through the guide plate to show the cartridge lifter in position to impart upward feeding movement to the cartridge follower;

FIG. 9 is a fragmentary sectional view taken through the upper end of the adapter to show the means for halting the upward travel of the cartridge follower;

FIG. 10 is an enlarged view taken along line 10—10 in FIG. 4 showing the manner in which the follower spring is supported in the upper end of the guide plate;

FIG. 11 is a sectional view taken along line 11—11 in FIG. 10;

FIG. 12 is a perspective view of the cartridge container with a portion of the upper forward corner broken away to show the follower stops and a portion of the lower forward corner similarly broken to show the removable spacer therein;

FIG. 13 is an enlarged transverse section through the cartridge container showing the configuration of the bottom end thereof with the follower removed;

FIG. 14 is an enlarged fragmentary sectional view of the cartridge lifter disposed in vertical engagement with the bottom edge of the guide plate;

FIG. 15 is a view similar to that of FIG. 14 but showing an alternate configuration for the mating portions of the guide plate and cartridge lifter; and

FIG. 16 is an enlarged perspective view of a fragmentary portion of the guide plate utilized with the alternate cartridge lifter construction of FIG. 15.

DESCRIPTION OF A PREFERRED EMBODIMENT

As shown in the drawings, the cartridge feeding arrangement of the present invention utilizes a hollow substantially rectangular adapter 12 structurally equivalent to the upper end of the conventional box magazine of the type which is releasably latched in a suitable opening in the bottom of a firearm receiver to depend downwardly therefrom. Although the right and left sidewalls 14 and 16 of adapter 12 (as viewed from the rear of the weapon) are provided with the customary feed lips which serve to halt the upward feeding movement of a double column of cartridges 20, the right feed lip 18 originates at a point inwardly of sidewall 14, as best shown in FIG. 5, and cooperates with the left feed lip 19 to position the feed opening therebetween in offset relation to the central location customarily found in conventional box-type magazines. However, such offset location of the feed opening, for a purpose to be hereinafter shown, does not interfere with the normal vertical feeding movement of cartridges 20 or the subsequent horizontal guidance imparted thereto during the insertion thereof in the firing chamber of the weapon. Although cartridges 20 are here shown with the projectiles 22 retained in cylindrical cases 24 of consumable material, it should be understood that the cartridge feeding arrangement described herein is equally applicable to cartridges with forwardly tapered metallic cases. The front end wall 26 of adapter 12 is arcuately recessed as indicated at 28 to permit each cartridge 20 to be forced out from beneath feed lips 18 and 19 by a conventional firearm bolt (not shown). The bottom of adapter 12 is fully open and is preferably flared outwardly on all four sides as best shown at 30 in FIG. 1.

A substantially rectangular guide plate 32 terminating at the upper end thereof in a right angle portion 34 is suitably fixed to the interior surface of adapter sidewall 14, as by welding or the like, to extend downwardly below the flared end 30 of adapter 12 in parallel spaced relation thereto, as best shown in FIGS. 5 and 10. Plate 32 is divided into a pair of identical panels 36 by a central rectangular slot 40 disposed slightly above the bottom edge of plate 32 and extending upwardly into right angle portion 34 to terminate in a vertical extension of lesser width, as indicated at 42 in FIG. 11. As best shown in FIG. 3, the cross-section of the oppositely facing edges of panels 36 includes an outer rectangular surface 44 and an adjacent inwardly sloped surface 46 which combine to provide a vertical dove-tailed channel 48 for a purpose to be shown.

Projecting outwardly from the exterior of sidewall 14 is a rectangular compartment 50 for housing the coiled end 52 of a negator spring 54 in the form of a resilient steel tape. The coiled end of spring 54 is suitably fastened to a shaft 56 rotatably supported by a pair of spaced retainers 58 (FIG. 6) fixedly mounted within opposite ends of compartment 50. Shaft 56 extends completely through compartment 50 to terminate at the forward end thereof in an enlarged head 60 which is slotted, as indicated at 62, to receive the tip of a screwdriver or other mating implement capable of imparting rotation to shaft 56. The opposite end of shaft 56 carries a ratchet wheel 64 located within compartment 50 adjacent the end wall thereof for engagement by a pawl 66 pivoted on a pin 67 fixed in the compartment end wall and provided with a release finger 68 projecting outwardly of compartment 50. The sidewall of compartment 50 and the adjacent sidewall 14 of adapter 12 are both suitably apertured, as shown at 70 in FIG. 5, for the passage therethrough of spring 54. In addition, while sidewall 14 of adapter 12 may be recessed along the interior surface thereof, it is preferably bulged outwardly, as indicated at 72, to provide suitable clearance for the upward passage of spring 54 into supporting contact with a rod 74 fixedly mounted in the right-angle portion 34 of guide plate 32. The ends of rod 74 are preferably press-fitted into corresponding U-shaped openings 76 formed into the outer face of portion 34 on each side of slot extension 42 slightly below the upper terminus thereof, as best shown in FIG. 11. Thus, spring 54 is free to pass upwardly and over rod 74 so as to continue downwardly between panels 36 for exit from the bottom of rectangular slot 40 into fixed engagement with a cartridge lifter 78 disposed in pivotal engagement with the bottom edge of guide plate 32.

Cartridge lifter 78 is formed with a generally triangular body 80 of isosceles configuration with the base side thereof substantially equivalent in length to the bottom edge of guide plate 32. The sidewalls of lifter 78 are convergingly tapered to terminate in a rounded end as best indicated at 81 in FIG. 14. A substantially V-

shaped groove **82** is provided along the base edge of cartridge lifter body **80** for mating engagement with a correspondingly shaped rib **84** extending along the bottom edge of plate **32**. As shown at **86**, groove **82** is reduced in height along the edge thereof coextensive with the inwardly facing side of guide plate **32** to form a locating surface for a purpose to be hereinafter shown. A guide portion **88** of lesser length and cross-sectional thickness than the grooved end of body **80** extends centrally outwardly therefrom to terminate in a right-angle projection **90** of rectangular cross-section as best shown in FIG. **2**. Guide portion **88** is also provided with a rectangular access slot **92** therethrough parallel to groove **82** for passage of spring **54**. The outwardly facing tapered sidewall of cartridge lifter body **80** is centrally slabbed to form a rectangular surface **94** to which the end of spring **54** is fastened by suitable screws or rivets **96**. The bottom of access slot **92** is preferably sloped, as indicated at **97** in FIG. **2**, to minimize the extent to which spring **54** must be bent to provide substantially flush contact with surface **94**. On the side of guide portion **88** opposite surface **94**, the opposed corners thereof are convergingly beveled, as best shown at **98**, to mate with surfaces **46** of dovetail channels **48** in plate **32** when cartridge lifter **78** is in vertical alignment therewith. The vertical sides of guide portion **88** are also beveled, as indicated at **100**, to mate with surfaces **46** of dovetail channels **48** when cartridge lifter **78** has been pivoted to a position at right angles to the vertical axis of plate **32**.

The container in which cartridges **20** are packaged at the point of manufacture is a generally rectangular box **102**, with front and rear end walls, identified as **103** and **104**, respectively, and right and left sidewalls identified as **105** and **106**, respectively, and is preferably fabricated of suitably weatherproofed corrugated cardboard. A perforated tear line **108** extends around all four walls of box **102** and is covered by an adherent sealing tape **110** to which is fastened one end of a tear string **112**, the other end of which is, in turn, suitably fastened within the interior of box **102**. One end of tape **110** is provided with a tab **114** which, when pulled, will cause string **112** to cut through tear lines **108** thereby permitting the top of box **102** to be readily removed for exposing the uppermost cartridges **20** therein. As an alternative, box **102** can be fabricated from a molded plastic and provided with a snap-on plastic top. The bottom of box **102** is formed by overlapping triangular sections **116** which, as best shown in FIG. **13**, provide an open area **118** of isosceles triangular configuration with the base side thereof coextensive with right side wall **105** of box **102**. A cartridge follower **120** with a substantially rectangular bottom end is slidably disposed for vertical movement in box **102** and is provided with an arcuate double-sloped upper surface **122** arranged to support two juxtaposed columns of cartridges **20** in vertically staggered relationship. Follower **120** is normally supported by overlapping sections **116** to serve as a closure for the open triangular area **118** at the bottom of box **102**. Ledges **126** are provided on the front and rear of follower **120** and a similar ledge **128** is formed on the left side thereof as shown in FIG. **8**. A reinforcing strip **130** is suitably fixed to the interior surface of box **102** along the upper portion of end walls **103** and **104** and along left side wall **106** to provide stop surfaces respectively engageable with ledges **126** and **128** of follower **120** for halting the upward travel thereof in cartridge box **102** following the feeding of the last cartridge **20** therefrom. A removable spacer **132** of hard corrugated cardboard or any suitable plastic material similar in size to the interior surface of sidewall **105** of cartridge box **102** is disposed between such wall and cartridges **20**.

Accordingly, when a cartridge box **102**, from which the top has been removed to expose the cartridges **20** therein, is inserted into the open bottom of adapter **12** to bring the upper end of spacer **132** in contact with end **81** of cartridge lifter **78** and then forced upwardly, spacer **132** will be pushed out through open area **118** of box **102** and be replaced by guide plate **32**. Once the underside of cartridge box **102** has moved beyond the bottom of central slot **40** in guide plate **32**, cartridge lifter **78** can be manually pushed inwardly beneath cartridge box **102** to bring the end of follower spring **54** out of vertical alignment with guide plate **32**, whereupon the bias of such spring is applied to lifter **78** to continue the pivotal movement imparted thereto until, as best shown in FIG. **8**, the tapered sidewall thereof is horizontally disposed in contact with the underside of the portion of cartridge follower **120** exposed by open area **118** in the bottom of cartridge box **102**. As cartridge lifter **78** is pivoted out of contact with rib **84** on guide plate **32**, the clearance provided by the reduced height of locating surface **86** permits the adjacent higher slope of V-shaped groove **82** to move past the vertex edge of rib **84**. Thereafter, as cartridge lifter **78** continues to pivot in response to the tension of spring **54**, beveled corners **98** move out of contact with the sloped surfaces **46** in dovetail channels **48** thereby bringing the rectangular ends of projection **90** into sliding contact with surfaces **44** while simultaneously bringing beveled surfaces **100** on the opposite sides of guide portion **88** into slidable contact with sloped surfaces **46**. The pivotal movement of lifter **78** is halted as locating surface **86** contacts the inner face of panel **36** and brings the opposite extremity of groove **82** into simultaneous contact with the same face of panel **36**, as best shown in FIG. **8**. Thus, cartridge lifter **78** is oriented so that the tapered sidewall thereof will be in flush contact with the underside of follower **120**. Once the pivotal movement of cartridge lifter **78** is completed, the bias of spring **54** forces such lifter to ride upwardly in dovetail channels **48** until the uppermost cartridge **20** in box **102** contacts feed lip **18** in adapter **12**. Thereafter, as each cartridge **20** is fed into the firing chamber of the weapon, lifter **78** responds to the bias of spring **54** to automatically bring each uppermost cartridge **20** in box **102** into contact with either feed lip **18** or **19**. When the last cartridge **20** has been fed out of cartridge box **102**, further upward movement of follower **120** is prevented as ledges **126** and **128** come into contact with the undersides of reinforcing strip **130**.

Withdrawal of the empty cartridge box **102** from adapter **12** is accomplished simply by a downward pull thereon which causes follower **120** to impart corresponding movement to cartridge lifter **78**. As lifter **78** slides along dovetail channels **48**, the end of spring **54** fastened thereto is pulled downwardly to unwind the portion thereof which had been previously coiled within compartment **50**. When right-angle projection **90** on guide portion **88** of cartridge lifter **78** contacts the bottom wall of rectangular slot **40** in guide plate **32**, the continued downward pull on follower **120** pivots

lifter **78** so that bevel surfaces **100** move out of contact with dovetail channels **48** and bevel surfaces **98** are, in turn, brought into contact therewith. During this pivotal movement of cartridge lifter, V-shaped groove **82** thereon reengages with the correspondingly shaped rib **84** on guide plate **32** to again releasably lock lifter **78** into position to serve as a vertical extension thereof for contact with the spacer **132** in the next cartridge box **102** to be inserted upwardly into adapter **12.**

When the ready-to-fire status of the weapon is no longer required, the tension of the follower spring **54** can be almost completely released by pivoting release finger **68** to disengage pawl **66** from the teeth on ratchet wheel **64.** Such inactivation of the follower spring **54** has an extremely beneficial effect on the endurance life thereof. Restoration of spring **54** to the former tensioned status thereof can be readily accomplished by rotating shaft **56** by a screwdriver or any other implement which can be inserted into slotted end **62** therein.

In the event a more simplified transition between the vertical and horizontal positions of cartridge lifter **78** is desired, this may be accomplished by replacing the right-angle projection **90** at the upper end of the guide portion **88** with a centrally disposed cylindrical configuration as shown at **134** in FIG. **15.** In addition, channels **48** are replaced by guide tracks **135** formed by planar surfaces **136** and **137** intersecting at right angles. The lower end of surface **137** is formed with a vertical pocket **138** to accommodate cylindrical end **134** of cartridge lifter **78** which functions in exactly the same manner as described in connection with the configuration shown in FIG. **14.** The upper end of pocket **138** is arcuately contoured as indicated at **139** to guide the cylindrical configuration into contact with surface **137** of guide track **135.**

Thus, there is here provided a cartridge feeding arrangement which eliminates the need for carrying the relatively heavy box-type magazines customarily utilized in current semi-automatic and automatic small arms weapons. Instead, the weapon can be reloaded directly from the boxes which serve as the shipping container for the cartridges, thereby eliminating the former relatively slow and clumsy process of unloading a cartridge box and individually transferring each cartridge therein to the empty magazine. Furthermore, the worthwhile benefits of the present invention can be obtained without any modification to existing weapons.

The foregoing disclosure and description of the invention is illustrative only. Various changes may be made within the scope of the appended claims without departing from the spirit of the invention.

I claim:

1. A cartridge feed arrangement for successively advancing each of a plurality of cartridges packaged in an original shipping container directly into a small arms weapon into position to be subsequently chambered therein, comprising,

an adapter open at both ends thereof and releasably secured within the weapon to depend therefrom for the upward insertion therein of the shipping container loaded with cartridges,

a guide plate fixed at the upper end thereof to an interior sidewall of said adapter to extend downwardly in spaced parallel relation thereto for vertical passage through the inserted cartridge container,

a follower slidably disposed in the container for supporting the cartridges thereon,

a cartridge lifter releasably secured to the depending end of said guide plate for pivotal movement into and out of lifting engagement with said follower, and

a negator spring extending from said adapter into fixed attachment with said cartridge lifter for normally biasing said lifter into vertical engagement with the depending end of said guide plate until said lifter is manually pivoted inwardly toward the depending open end of said adapter whereupon the bias of said spring is shifted to actuate said lifter upwardly in said guide plate for imparting corresponding feeding movement to said follower and the cartridges supported thereon.

2. The cartridge feed arrangement of claim **1** wherein said negator spring comprises,

a coiled end secured to the exterior of said adapter,

a first portion extending from said coiled end into said adapter and upwardly along the exterior of the container, and

a second portion extending downwardly through the interior of the container and along said guide plate into fixed attachment with said cartridge lifter.

3. The cartridge feed arrangement of claim **1** including,

means for adjusting the tension of said negator spring to a level at least equal to the weight of the container and a full load of cartridges therein, and

means for optionally releasing the tension of said spring during those periods in which the weapon need not be maintained in a ready-to-use status.

4. The cartridge feed arrangement of claim **1** wherein the lower end of said guide plate is provided with a V-shaped rib and wherein said cartridge lifter is provided with a corresponding V-shaped groove for mating engagement with said guide plate rib in response to the vertical bias of said negator spring.

5. The cartridge feed arrangement of claim **1** wherein said guide plate includes a central opening therethrough defining a pair of vertical dove-tailed channels spaced to slidably receive the opposite ends of said cartridge lifter during the upward movement imparted thereto by said negator spring.

6. The cartridge feed arrangement of claim **1** including,

a pair of spaced feed lips at the upper end of said adapter for halting the upward movement imparted to the cartridges, and

stop surfaces at the upper end of the container for halting the upward movement of said cartridge follower in the absence of any cartridges thereon.

7. In an arrangement for serially feeding a staggered double column of cartridges into a small arms weapon directly from a rectangular container in which the cartriges are originally packaged for shipment, the combination of,

an adapter open at both ends thereof and releasably secured within the weapon to depend therefrom for the upward insertion of a preloaded cartridge container,

a guide plate having an outwardly turned upper end fixed to the interior sidewall of said adapter and a rectangular body extending downwardly from said outwardly turned upper end in spaced parallel relation to the interior sidewall of said adapter to ter-

minate therebelow in a V-shaped rib, said plate also having a rectangular slot centrally therethrough defining a pair of oppositely spaced vertical channels,

a follower slidably disposed in the container for supporting the cartridges thereon,

a cartridge lifter having a V-shaped groove along one edge thereof for releasable mating engagement with said rib on said guide plate when said cartridge lifter is in vertical alignment therewith, and

a negator spring having one end thereof secured to the exterior of said adapter for passage into the interior thereof upwardly over the top of one sidewall of the cartridge container and downwardly along said central slot in said guide plate into fixed attachment with said cartridge lifter whereby the bias of said spring normally retains said lifter in releasable vertical engagement with said guide plate until said lifter is manually pivoted inwardly toward the depending open end of said adapter whereupon the bias of said spring is shifted to continue the pivotal movement of said lifter out of engagement with said guide plate rib and into sliding engagement with said vertical channels in said guide plate to impart upward feeding movement to said follower and the cartridges thereon.

8. The cartridge feeding arrangement of claim **7** wherein said vertical channels in said guide plate are formed with an outer rectangular surface and an adjacent inwardly sloped surface cooperating to provide a dovetail configuration, and wherein said cartridge lifter comprises,

a triangular body of isosceles configuration,

a guide portion extending centrally and outwardly from the base side of said body to terminate in a right-angle projection of rectangular cross-section,

a first pair of bevel surfaces on said guide portion at the opposite upper corners thereof remote from said right-angle projection, said bevel surfaces oriented for slidable mating contact with said inwardly sloped surfaces of said dovetail channels in said guide plate when said cartridge lifter is in vertical engagement therewith, and

a second pair of bevel surfaces on the opposite vertical sides of said guide portion oriented for respective slidable mating contact with said inwardly sloped surfaces of said dovetail channels in said guide plate when said cartridge lifter is provided at right angles thereto into lifting engagement with said follower.

9. The cartridge feeding arrangement of claim **8** wherein one sidewall of said adapter is centrally bulged outwardly from the point of entry of said spring to provide clearance for the portion thereof extending upwardly adjacent the exterior sidewall of the cartridge container, said guide plate includes a fixed rod above said rectangular slot therein for supporting said spring to permit the downward passage thereof along said slot, and said cartridge lifter is provided with a transverse opening through said guide portion thereof for passage of the downwardly extending portion of said spring into fixed engagement with the outwardly facing sidewall of said triangular body.

10. The cartridge feeding arrangement of claim **7** wherein the end of said negator spring secured to the exterior of said adapter is arranged to wind into a plurality of nested coils as the cartridge lifter rides upwardly in said vertical channels in said guide plate, and wherein said adapter is provided with an outwardly extending compartment for housing said coiled end of said spring, said compartment including a pawl and ratchet combination for retaining said spring at a predetermined tension.

11. The cartridge feeding arrangement of claim **7** wherein the opposite sidewalls of said cartridge lifter are convergingly tapered and wherein one of the sloped wall surfaces of said V-shaped groove is horizontally slabbed to form a locating surface for contacting the inwardly facing side of said guide plate during the pivotal movement imparted to said cartridge lifter to thereby position the upper tapered sidewall thereof in flush contact with the underside of said follower.

12. The cartridge feeding arrangement of claim **7** wherein said vertical channels in said guide plate are formed by rectangular surfaces intersecting at right angles, said surface parallel to the sidewalls of said guide plate terminating in a rectangular pocket at the lower end thereof, and wherein said cartridge lifter comprises a triangular body of isosceles configuration having a guide portion projecting outwardly and centrally from the base side thereof to terminate in a cylindrical configuration adapted to be partially received in said pockets when said cartridge lifter is in vertical engagement with said V-shaped rib on said guide plate, each of said pockets having an arcuate upper wall for guiding said cylindrical configuration into said vertical channels in said guide plate during the pivotal movement imparted to said cartridge lifter.

13. The cartridge feeding arrangement of claim **7** wherein the cartridge container comprises,

a rectangular box having a removable cover,

a slidable insert disposed between one interior sidewall of said box and the cartridges adjacent thereto in position to be replaced by said guide plate in said adapter during the upward insertion of said box therein, and

a pair of overlapping triangular sections disposed at the bottom of said box to define an open passage for said cartridge lifter during the upward movement imparted thereto by said negator spring.

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