March 1, 1960 M. J. NEDER 2,926,568

FEEDING SYSTEM, CONTINUOUS CLIP TYPE

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Fig. 1

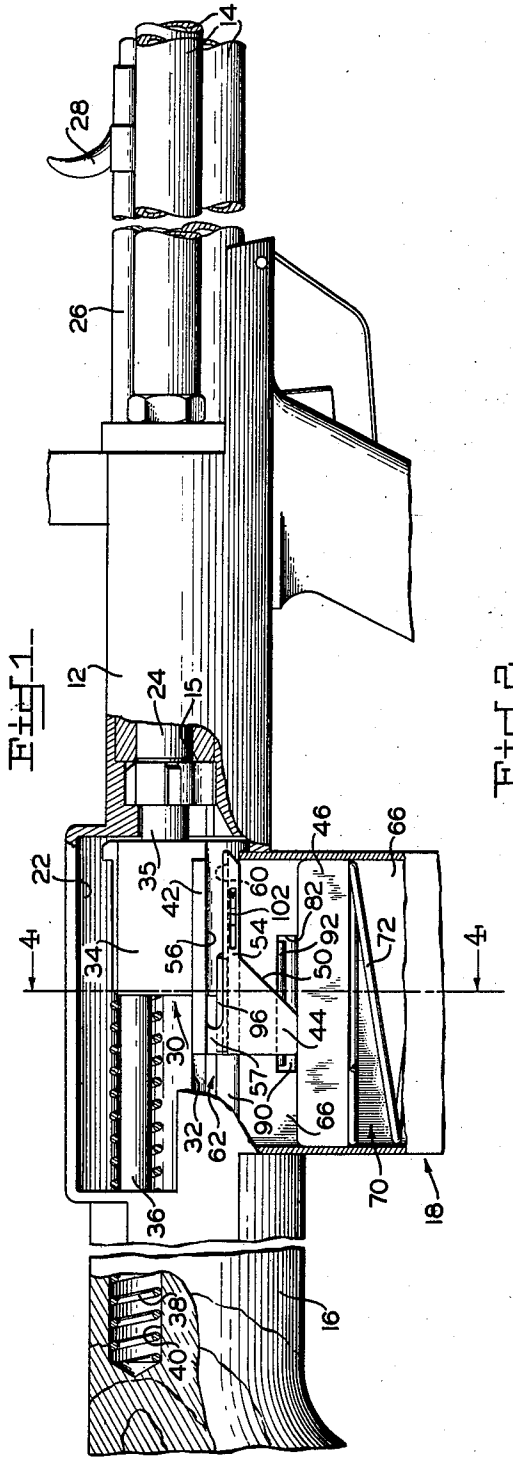
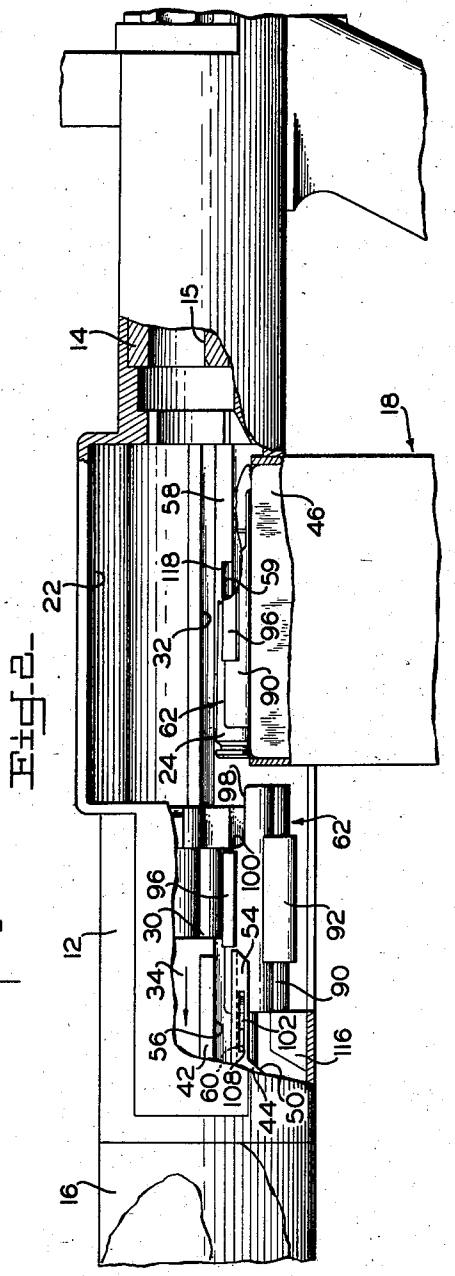


Fig. 2



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FEEDING SYSTEM, CONTINUOUS CLIP TYPE

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Fig. 3.

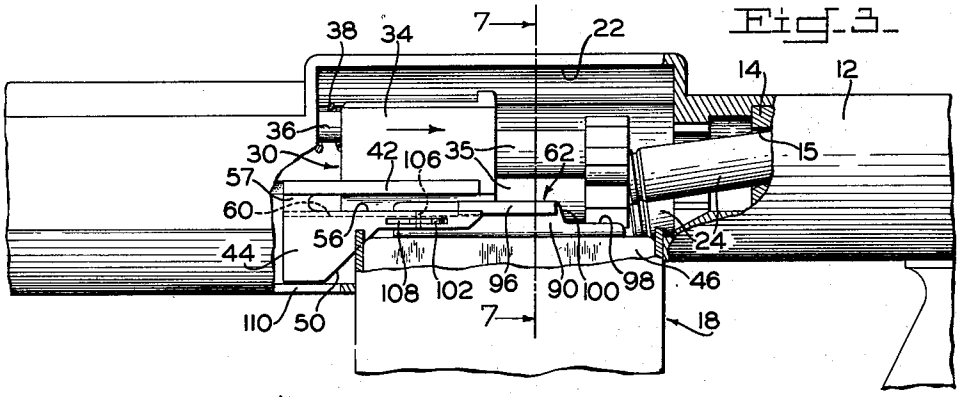


Fig. 4.

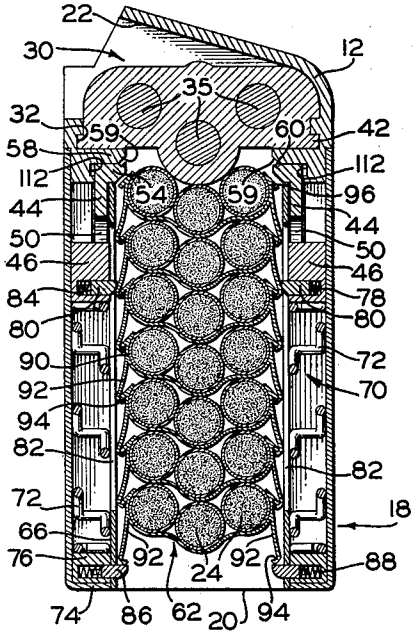
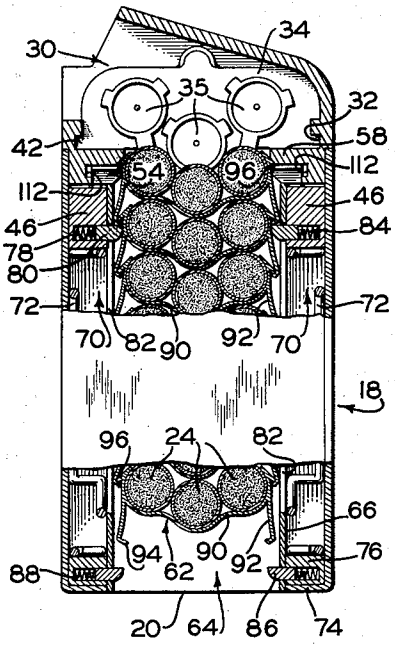


Fig. 5.



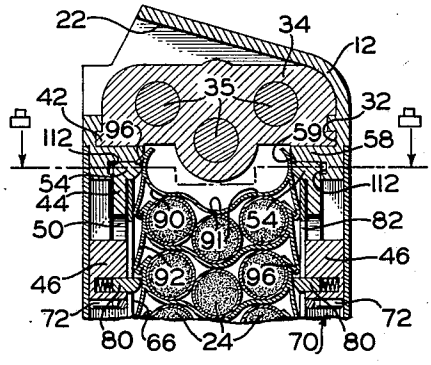


Fig. 6.

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FEEDING SYSTEM, CONTINUOUS CLIP TYPE

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Fig. 7

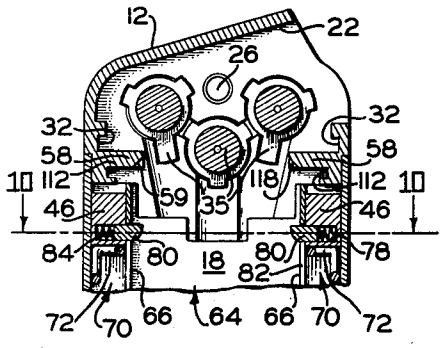


Fig. 8

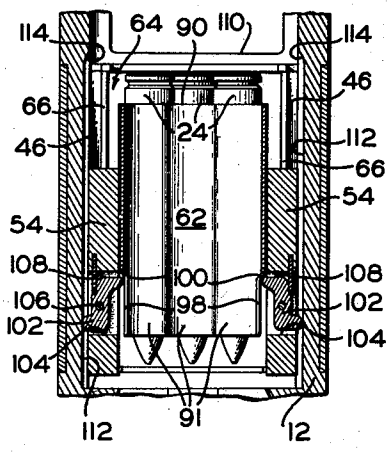


Fig. 9

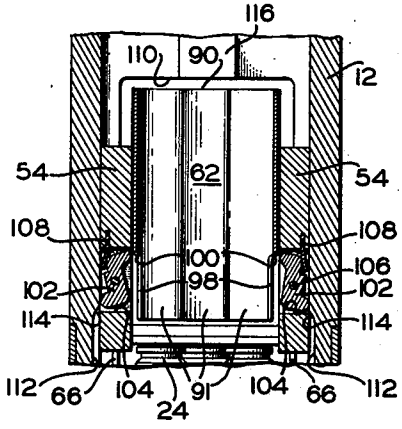


Fig. 10

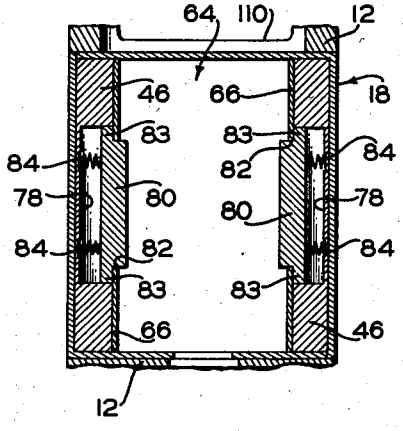


Fig. 11

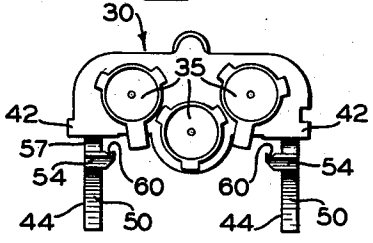
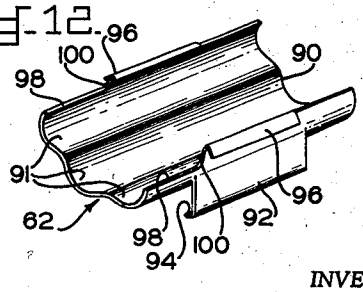


Fig. 12



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United States Patent Office 2,926,568 Patented Mar. 1, 1960

2,926,568

FEEDING SYSTEM, CONTINUOUS CLIP TYPE

Maxwell J. Neder, Pomona, Calif., assignor to the United States of America as represented by the Secretary of the Army

Application March 16, 1959, Serial No. 799,825

6 Claims. (Cl. 89—126)

(Granted under Title 35, U.S. Code (1952), sec. 266)

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

This invention relates to multi-barrel firearms of the type generally fired from the shoulder of the user and more particularly to means for continuously feeding ammunition thereto.

In modern-day firearms the demand for firepower and accuracy are the dominating factors to be considered in the final design thereof. Present automatic rifles or light machine guns fulfill the firepower requirements but fall short when it comes to accuracy. This is due to the forces encountered when firing such a gun; namely, the recoil force caused by the explosion of the cartridge in the firing chamber and the muzzle climb caused by the torque imparted to the projectile by the rifling in the firearm barrel. It is, therefore, apparent that during full automatic operation of shoulder-operated firearms only the first shot can be accurately aimed while the remaining shots will usually be high due to the existing forces mentioned above.

Accordingly, the development of a semiautomatic, multi-barrel shoulder weapon would seem to provide the required firepower and accuracy in that a plurality of projectiles may be discharged with each pull of the trigger, thereby allowing each successive shot to be aimed by the operator insuring greater accuracy while the firepower is governed only by the rapidity with which the firearm can be aimed and the trigger pulled.

However, extensive use of the shoulder type of multi-barrel firearms has heretofore been limited by the difficulties involved in continuously feeding ammunition thereto. Many systems exist for feeding these firearms but they all require special means for handling the cartridges in the gun prior to being chambered in the barrels, or special chambering is required as the cartridges are generally inclosed in clips and are chambered and fired while still retained in such clips. Also, special means must be provided for ejecting the empty clips from the gun.

It is, therefore, an object of this invention to provide a multi-barrel shoulder firearm with a simple, durable, yet inexpensive feeding system whereby the simultaneous chambering of a plurality of cartridges may be accomplished with a minimum of handling.

Another object of my invention is to provide such firearm with an integral open end magazine such that cartridges can be readily loaded therein from the bottom without requiring manual operation of the charging mechanism.

A further object of my invention is to provide suitable follower means for successively moving the cartridge-containing clips upwardly in the magazine well in synchronism with the firing operation of the firearm.

Still another object of my invention is to provide a multi-barrel shoulder firearm with a feeding system wherein the magazine followers are operated by direct

contact with the bolt assembly to lift the cartridges from the magazine into the firearm.

It is a further object of my invention to utilize the recoil energy of the bolt assembly not only to extract and eject the fire cartridge cases but also, simultaneously therewith, to strip the empty cartridge clip from the top of the magazine and eject it from the firearm.

In some multi-barrel firearms of the shoulder type wherein the cartridges are retained and fired in clips or holders, these clips are usually made in two sections and, therefore, are very complicated in design. Furthermore, such two-piece clips usually require a special tool to enable disassembly thereof in order to permit removal of the fired cartridge case therefrom. Thus, these clips cannot be reused without a prior assembly operation.

It is, therefore, a further object of this invention to provide a unitary cartridge holding clip which eliminates the necessity of assembling or disassembling the clip, thus, facilitating its reuse.

It is a still further object of my invention to provide a lightweight cartridge clip for use in the multi-barrel firearms of the shoulder type, the clip being constructed to include means for connecting adjacent clips together to form a vertical stack, thus, facilitating the ease with which the magazine can be loaded.

Still another and further object of my invention is to provide an improved means for connecting successive cartridge clips into a single stack wherein the connecting structure also serves as the means by which the stack is incrementally lifted from the magazine well into the firearm receiver during firing.

The specific nature of the invention as well as other objects and advantages thereof will clearly appear from a description of a preferred embodiment shown in the accompanying drawings in which:

Fig. 1 is a longitudinal elevational view of a firearm incorporating an embodiment of my invention and conveniently broken away to show the bolt assembly in the battery position immediately before firing with the bolt holding the followers in the magazine in the depressed position;

Fig. 2 is a view similar to Fig. 1 but showing the bolt assembly in the recoil position with a loaded clip of cartridges in position to be chambered by the counter-recoil of the bolt assembly while the empty clip from the previous firing cycle is shown about to be ejected from the gun;

Fig. 3 is a view similar to Figs. 1 and 2 but showing the arrangement of the elements as the cartridges are being chambered by the bolt assembly;

Fig. 4 is a cross-section taken along line 4—4 of Fig. 1 showing the clips interconnected to form the vertical stack and being retained in the magazine by the latches at the bottom thereof as they appear after the initial loading of the magazine;

Fig. 5 is a view similar to Fig. 4 but with the bolt assembly drawn to the rear to allow the stack of clips to be lifted by the ratchet members in the followers into the position wherein the cartridges will be chambered by the counterrecoil movement of the bolt assembly;

Fig. 6 is a fragmentary cross-sectional view similar to Fig. 5 but with the bolt assembly in the battery position to show the stack of clips being supported by the bolt assembly as the followers are depressed by the depressors;

Fig. 7 is a fragmentary cross-section taken along line 7—7 of Fig. 3 but with the clips removed to more clearly show the positioning stops in the receiver and the shoulders on said stops which prevent the forward movement of the clips as the cartridges are stripped therefrom by the bolt assembly;

Fig. 8 is a view taken along line 8—8 of Fig. 6 to show the arrangement of the ejection latches prior to

engagement with the clip when the bolt assembly begins its recoil stroke;

Fig. 9 is a view similar to Fig. 8 but showing the latches in the inoperative position just prior to ejecting the clip from the firearm;

Fig. 10 is a cross-section taken along line 10—10 of Fig. 7 to show the arrangement of the ratchet members in the magazine followers;

Fig. 11 is a front view of the bolt assembly to more clearly show the configuration of the depressors; and

Fig. 12 is a perspective view of one of the cartridge clips.

Referring now to the drawings and in particular to Figs. 1 and 2, there is shown a firearm having a receiver 12 in the forward end of which is securely mounted a plurality of barrels 14 having firing chambers 15. It will be noted that while three barrels are shown in the present embodiment, the number is not limited thereto since more or less could be fed in the same manner as that described hereafter. The rear end of receiver 12 terminates in a cylindrical stock 16.

Provided in the underside of receiver 12 and integral therewith, is a cartridge magazine 18 having its free end open, as shown at 20, for a purpose to be described later. A substantially rectangular port 22 is formed in the side of receiver 12 and is located above the upper end of magazine 18 in position to direct the fired cartridge cases out of receiver 12.

Reciprocably mounted between barrels 14 for longitudinal movement in response to the discharge gases generated by the firing of cartridges 24 is a conventional operating rod 26 having a charging lever 28 for permitting manual operation thereof.

A bolt assembly 30 is slidably mounted in opposing grooves 32 in the sides of receiver 12 for reciprocation between battery and recoil positions. Bolt assembly 30 includes a carrier 34 and a plurality of cylindrical bolts 35 slidably disposed therein corresponding to the number of barrels 14 and in respective axial alignment therewith. Extending rearwardly from carrier 34 is a cylindrical guide rod 36 which supports the forward portion of a surrounding recoil spring 38 seated against the rear of carrier 34 to normally bias bolt assembly 30 to the battery position. The opposite end of recoil spring 38 extends beyond guide rod 36 into a bore 40 formed into stock 16. A longitudinal rib 42 is formed on either side of the carrier 34 for sliding engagement with grooves 32 of receiver 12. Ribs 42 project rearwardly of carrier 34 and are each provided with a depressor 44 depending from the rear end thereof.

As best shown in Fig. 1, depressors 44 are of sufficient length to effect respective slidable contact of the bottom surfaces thereof with the upper surfaces of a spaced-apart pair of followers 46 slidably disposed in magazine 18. The forward edges of depressors 44 are angularly formed, as at 50, for a purpose to be subsequently shown and extend upwardly and forwardly to terminate slightly forwardly of the rear end of bolt carrier 34.

Each depressor 44 is also provided with an integral, forwardly extending arm portion 54 disposed on either side of carrier 34. Arm portion 54 of each depressor 44 is spaced below the underside of rib 42 to form a longitudinal opening 56 therebetween and, consequently, depressors 44 are connected to ribs 42 only by a web portion 57.

The interior side wall surfaces of receiver 12 immediately above magazine 18 are provided with opposing inwardly directed rectangular ledges 58 provided with an angular stop surface 59 along the underside of the rear ends thereof. Ledges 58 are disposed so as to lie between the underside of carrier 34 and the top of depressor arms 54 when bolt assembly 30 is in the battery position as shown in Figs. 4 and 6. A V-slot 60 extends longitudinally along the upper surface of each of depressor arms 54 and is arranged to engage the top one of a stack of clips 62 in a manner to be described hereinafter.

Magazine 18 is rectangular in shape and the interior thereof is provided with an open central well 64 of sufficient width to slidingly receive a plurality of cartridge clips 62 either singly or in a vertical stack. Well 64 is formed by a pair of partitions 66 spaced apart from the outer longitudinal walls of magazine 18 to form rectangular compartments 70. Slidably disposed in each compartment 70 is a follower 46 which is normally biased upwardly by a rectangular spring 72. The sidewalls of magazine 18 are turned inwardly at the lower end thereof, as shown at 74, to respectively retain supports 76 similar in configuration to followers 46 which serve to seat the lower ends of springs 72 as shown in Figs. 4 and 5. A longitudinal recess 78 extends centrally and transversely into the inner side of each of followers 46 for slidingly receiving a substantially rectangular lifter member 80 which extends through an elongated slot 82 in each of partitions 66 to project slightly into magazine well 64. Located behind each lifter member 80 in recess 78 is a pair of springs 84 which serve to bias lifter member 80 into well 64 for engagement with clips 62 in a manner to be hereinafter shown. Follower spring supports 76 are similarly provided with latches 86 which are biased into magazine well 64, immediately adjacent open end 20, by springs 88 to retain the cartridge clips 62 in magazine 18 during the initial loading thereof.

Lifter members 80 are provided with forwardly and rearwardly projecting ears 83 which are arranged to bear against partitions 66 adjacent slot 82 to retain members 80 in recesses 78 as best shown in Fig. 10. A similar construction is provided on latches 86.

As best shown in Fig. 12, clips 62 include an arcuate cartridge retaining portion 90 formed by adjacent cartridge seating depressions 91 to resiliently hold a plurality of cartridges 24 corresponding to the number of barrels 14. Centrally provided on both sides of cartridge retaining portion 90 are substantially resilient rectangular leg portions 92 which extend downwardly and outwardly relative to portion 90 and terminate in upwardly curved hooks 94. Leg portions 92 are equal in length to the spring-biased ratchet members 80 of followers 46 to insure positive contact therewith. Located at the top of cartridge retaining portion 90 immediately above leg portions 92 are a pair of integral downwardly angled tabs 96 arranged to be releasably engaged by hooks 94 of the next successive clip thereabove. The distance between the free ends of leg portions 92 is slightly less than the interior transverse dimension of magazine well 64 to allow hooks 94 to snap over tabs 96 as the clips are fed into magazine 18 from the bottom thereof to form a vertical stack. As the stack of clips 62 is lifted by followers 46 into receiver 12, the tabs 96 of the uppermost clip engage the corresponding angular stop portions 59 on the underside of ledges 58. As bolt assembly 30 starts its counterrecoil stroke and depressor arms 54 pass over the top clip 62, tabs 96 slidably engage in the V-slot 60 in arms 54, thereby supporting the stack of clips 62 as followers 46 are cammed downwardly by angular surface 50 on depressors 44 as best shown in Fig. 3.

As best shown in Figs. 2, 3 and 12, the forward end of cartridge retaining portion 90 of each clip 62 is cut away as indicated at 98 to form a vertical shoulder 100. A pair of substantially S-shaped catches 102 are pivotally mounted by a pin 106 in a rectangular recess 104 extending transversely through depressor arms 54. A flat spring 108 is fixedly mounted in each arm 54 by suitable means and normally biases catch 102 into the position shown in Fig. 8 for releasable engagement with shoulder 100 of clip 62 for stripping the empty clip from the top of the stack in magazine 18 and ejecting

it through a port **110** provided in the bottom of receiver **12** rearwardly of magazine **18**.

Immediately beneath receiver ledges **58** and adjacent depressor arms **54**, when bolt assembly **30** is in the battery position, is a longitudinal undercut **112** in receiver **12** to allow catches **102** to be pivoted into engagement with shoulders **100** as mentioned above. The rear end of each undercut **112** forms a cam surface **114** to pivot catch **102** out of engagement with shoulder **100**, as shown in Fig. 9, so that bolt carrier **34** can continue to the rear to disengage V-slot **60** from beneath tabs **96** of the empty clip **62**.

An upwardly projecting lug **116** is provided in the center of receiver **12** rearwardly of port **110**, the purpose of which will be made clear in describing the operation of the gun.

During the counterrecoil movement of bolt assembly **30**, bolts feed the cartridges **24** in the top clip **62** forwardly into the respective chambers **15** of barrels **14**. Since the force of this stripping action has a tendency to simultaneously move top clip **62** forward, a shoulder **118** is provided on each of the ledges **58** immediately forward of angular stop portions **59** thereon to contact the forward edge of tabs **96** and thereby prevent any forward movement of clip **62**. The arrangement of stop portions **59** and shoulders **118** is clearly shown in Fig. 7.

Operation

In preparing the gun for the field, clips **62** loaded with cartridges **24** are inserted into the bottom of magazine well **64** one or more at a time. It will be noted that while inserting clips **62** into magazine well **64**, latches **86** are cammed out of the way by clips **62**. Likewise, lifter members **80** in followers **46** are also cammed out of the way by the upwardly moving clips **62**, but in both instances members **86** and **80** are returned to their projecting positions shown in Figs. 4 and5 by springs **88** and **84**, respectively. When bolt assembly **30** is in the closed or battery position, depressors **44** force followers **46** downwardly. As the last clip **62** is inserted into magazine **18**, the cartridges **24** in the uppermost clip will contact the underside of carrier **34**. At such time, pressure applied to the bottom clip of the stack will cause the hooks **94** of leg portions **92** to snap over tabs **96** on the adjacent clips, thereby connecting all of the clips into a vertical stack. At least two of the clips **62** will lie above lifter members **80** in followers **46** although not in position to be supported thereby as shown in Fig. 4. Once the stack of clips **62** is formed, it is retained in magazine **18** by latches **86**.

To charge the firearm, the bolt assembly **30** is drawn rearwardly by means of charging lever **28**. As depressors **44** are withdrawn from contact with the top of followers **46**, follower springs **74** urge such followers upwardly toward receiver **12**. As the followers move upwardly, lifter members **80** engage leg portions **92** of the uppermost loaded clip **62** and thereby lift the entire stack into contact with the stop portions **59** on ledges **58**, thus, positioning the cartridges **24** of the uppermost clip in front of the bolts **35**. The charging lever **28** is then released and bolt assembly **30** moves forwardly under the bias of recoil spring **38**.

As bolt assembly **30** moves forwardly and the cartridges are stripped from the uppermost clip **62**, V-slot **60** in depressor arms **54** slidingly engages tabs **96** on the uppermost clip **62**, thereby supporting the stack of interconnected clips as the angular surface **50** of depressors **44** cams the followers **46** downwardly against the bias of the follower springs **72**. At the same time, the forward edge of tabs **96** contact shoulders **118**, thereby holding the clip **62** against forward movement. When bolt assembly **30** has reached the battery position, depressors **44** have positioned followers **46** so that lifter members **80** will this time engage the leg portions **92** of the second loaded clip of cartridges in the magazine **18** as best shown in Fig. 5. The gun is now ready to fire which is accomplished by a conventional firing mechanism not a part of this invention.

As the bolt assembly **30** starts to recoil in response to the discharge of the cartridges **24** in barrels **14**, springs **108** bias catches **102** on depressor arms **54** to contact shoulder **100** of the uppermost clip **62** thereby pushing the clip to the rear, whereby hooks **94** are slidably released from tabs **96** of the next clip **62** therebeneath. During the recoil travel of clip **62**, catches **102** engage cams **114** of undercut portions **112** and are forced out of contact with shoulders **100**. However, clip **62** continues to recoil together with carrier **34** since tabs **96** are positioned in V-slots **60** on depressor arms **54**. When bolt assembly **30** recoils to a point where the empty clip **62** is directly over port **110** in receiver **12**, the rear edge of the cartridge retaining portion **90** engages lug **116**, thus, halting the rearward travel of the clip **62**. Bolt assembly **30** continues its recoil movement whereby V-slot **60** of projection **54** is slidingly disengaged from beneath tab **96** of clip **62**, thus, allowing the clip to drop through port **110** and out of the gun. Bolt assembly **30**, reaching the end of its recoil stroke, again starts forward under the bias of recoil spring **38** and returns to battery position whereupon the firing cycle is then repeated.

As mentioned heretofore, the magazine is open at its free end thereby permitting the rapid loading of clips of cartridges into the magazine at any convenient time during the operation of the firearm without having to stop and hand operate the mechanism as is necessary with many of the firearms currently in use.

Although a particular embodiment of the invention has been described in detail herein, it is evident that many variations may be devised within the spirit and scope thereof and the following claims are intended to include such variations.

I claim:

1. In a firearm having a receiver, a plurality of barrels, a carrier longitudinally reciprocal to and from a battery position, and a plurality of bolts slidably disposed in the forward end of the carrier for stripping a plurality of cartridges from a unitary clip to simultaneously chamber a cartridge in each of the barrels, means for feeding the cartridges into position to be stripped by the bolts, comprising a magazine secured to the underside of the receiver and open at the lower end thereof for receiving a plurality of the unitary clips loaded with cartridges and adapted to interconnect and form a vertical stack, a rectangular compartment within said magazine extending vertically along each side thereof, a follower slidably disposed in the upper portion of each of said compartments for simultaneously engaging one of the unitary clips, spring means disposed in each of said compartments for normally urging said followers upwardly to lift the vertical stack for positioning the cartridges in the uppermost clip in stripping position, a latch disposed in the bottom of each of said compartments for retaining the vertical stack of clips in said magazine prior to any depletion thereof through the firing operation of the firearm, and support means on said carrier engageable with the uppermost clip for holding the vertical stack in said magazine during the movement of said followers into lifting engagement with the next successive clip.

2. In a firearm having a receiver, a plurality of barrels, an equivalent number of bolts in respective axial alignment with the barrels, and a carrier slidably disposed in the receiver for longitudinally reciprocating the bolts to and from battery position to strip an equivalent number of cartridges from a unitary clip for simultaneous chambering thereof in each of the barrels, means for successively feeding the clips into the receiver for the stripping of cartridges therefrom, comprising a magazine secured to the underside of the receiver and open at the lower end thereof for successively receiving a plurality of the unitary clips loaded with cartridges and adapted

to interconnect and form a vertical stack, a pair of spaced-apart followers disposed in the upper portion of said magazine for simultaneously engaging beneath one of the clips therein, spring means normally urging said followers upwardly to lift the interconnected vertical stack for positioning the uppermost clip therein into stripping position, a pair of depressors depending from opposite sides of the carrier for camming said followers downwardly into engagement with the next successive clip in the vertical stack, and a pair of support arms extending forwardly from said depressors for engaging the uppermost clip during the downward camming of said followers to hold the vertical stack in said magazine until said followers engage the next successive clip.

3. In a firearm having a receiver, a plurality of barrels, a carrier longitudinally reciprocal to and from a battery position, and a plurality of bolts slidably disposed in the forward end of the carrier for stripping a plurality of cartridges from a unitary clip having adjacent depressions for seating each cartridge therein, each of the clips being formed to resiliently interconnect with the adjacent clip thereabove and therebelow to form a vertical stack, the combination of a magazine secured to the underside of the receiver and open at the lower end thereof for successively receiving a plurality of the unitary clips loaded with cartridges, a pair of spaced-apart followers slidably disposed for vertical movement in the upper portion of said magazine, a spring-biased lifter member transversely mounted in each of said followers for simultaneous engagement beneath the interconnected portions of one of the unitary clips, spring means normally urging said followers upwardly to lift the vertical stack of clips for positioning the cartridges therein into stripping position, a pair of depressors depending from opposite sides of the carrier adjacent the rear end thereof, an inclined cam surface on the front face of each of said depressors for moving said followers downwardly for a distance substantially equivalent to the height of a unitary clip during movement of the carrier to battery position, and a pair of support arms extending forwardly from said depressors and above said cam surfaces thereon for slidably engaging the uppermost clip during the downward travel of said followers to hold the vertical stack in said magazine until said followers engage beneath the interconnecting portions of the next successive clip.

4. In a firearm, a receiver having a cartridge feed opening extending transversely therethrough and an ejection port in the underside thereof, a carrier slidably mounted in said receiver for reciprocal movement to and from a battery position, a plurality of barrels, an equivalent number of bolts slidably disposed in the forward end of said carrier for stripping an equivalent number of cartridges from a unitary clip for subsequent simultaneous chambering in said barrels, stop means in the receiver for preventing forward movement of the clip during the stripping of the cartridges therefrom, a magazine secured to the underside of said receiver forwardly of said ejection port therein and open at the lower end thereof for successively receiving a plurality of unitary clips loaded with cartridges, each of the clips having outwardly projecting upper and lower portions for interconnecting adjacent clips into a single vertical stack when fully loaded into said magazine, a pair of spaced-apart followers slidably disposed for vertical movement in the upper portion of said magazine for simultaneous engagement beneath the interconnected portions of adjacent clips, spring means normally urging each of said followers upwardly to lift the vertical stack of clips for positioning the cartridges in the uppermost clip for respective stripping engagement with said bolts in said carrier, a pair of depressors depending from opposite sides of said carrier for camming said followers downwardly into lifting engagement with the next successive clip in the vertical stack, a support arm projecting forwardly from each of said depressors for engaging the uppermost clip until said followers are returned into position to engage the next successive uppermost clip, and means for imparting the recoil movement of said carier to the empty uppermost clip until alignment thereof with said ejection port in said receiver.

5. The combination defined in claim 4 wherein said last-mentioned means comprises a pair of oppositely disposed catches respectively mounted in said support arms for transverse pivotal movement into and out of engagement with the empty uppermost clip, cam means in said receiver for pivoting said catches out of engagement with the clip immediately prior to alignment with said ejection port in said receiver, lug means in said receiver for haltng the rearward movement of the empty clip in position to drop through said ejection port upon the subsequent withdrawal of said support arms therefrom as said carrier continues to move rearwardly out of battery position, and spring means for returning said catches to the unpivoted positions thereof during forward movement of said carrier into battery position.

6. In a firearm having a plurality of barrels, an equivalent number of bolts in respective axial alignment with the barrels, means for reciprocating the bolts to simultaneously chamber a cartridge in each of the barrels during forward movement, a depending magazine open at both ends thereof for guiding cartridges in front of the bolts for the subsequent chambering thereof in the barrels, and means for retaining the cartridges in the magazine in groups equivalent to the number of bolts and barrels, said cartridge retaining means including a plurality of unitary clips for holding individual groups of cartridges in a vertical stack, each of said clips comprising a body open at the upper end thereof and having a plurality of adjacent longitudinal cartridge seating depressions, a downwardly angled tab portion projecting from opposite sides of said body, and a resilient leg portion depending from opposite sides of said body from a point slightly below said tab portion, each of said leg portions terminating in an inwardly turned hook portion adapted to engage with said corresponding tab portion on said adjacent clip therebelow whereby all of said clips in the magazine are interconnected to form a single vertical stack.

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