Nov. 10, 1970 H. H. FRIEND 3,538,635

COMBINED EXTRACTOR AND EJECTOR MECHANISM FOR AUTOMATIC GRENADE LAUNCHER

Filed Dec. 26, 1968 4 Sheets-Sheet 1

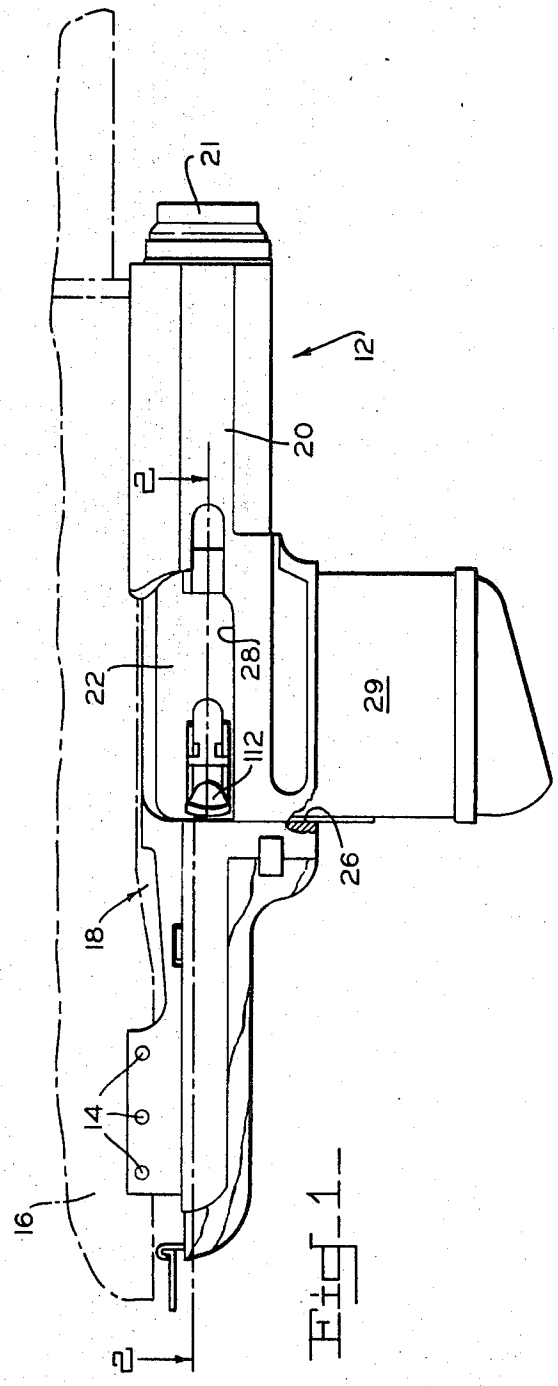

Fig. 1

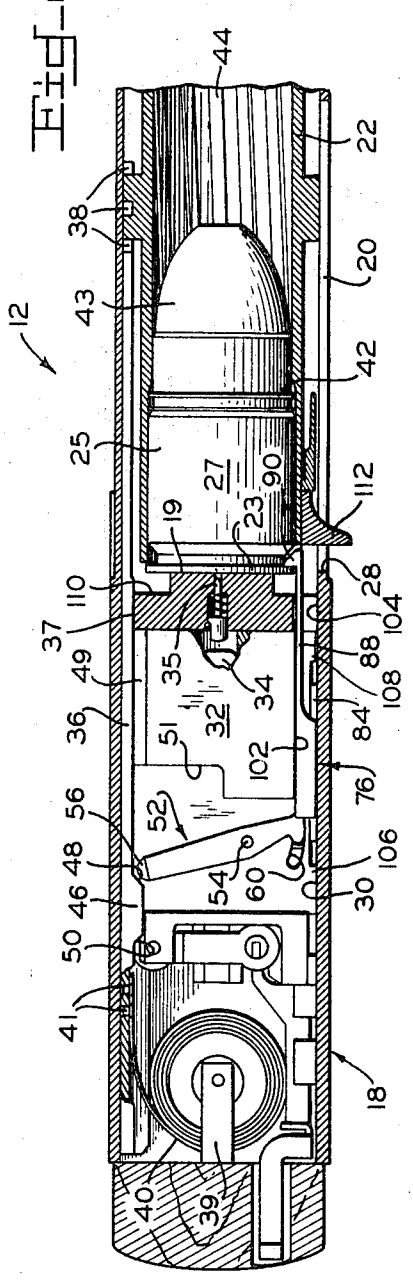

Fig. 2

INVENTOR
Harvey H. Friend

BY
Harry M. Saragovitz, Edward J. Kelly, Herbert Berl & Albert E. Arnold Jr.
ATTORNEYS

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Filed Dec. 26, 1968 4 Sheets-Sheet 2

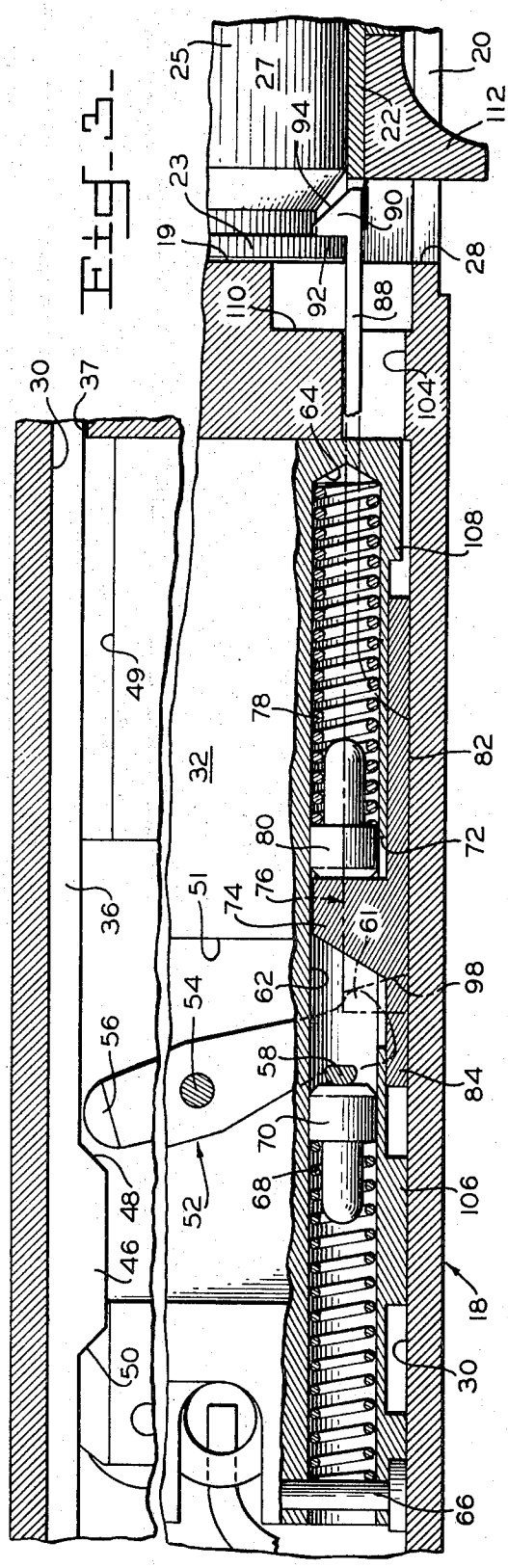

Fig. 3

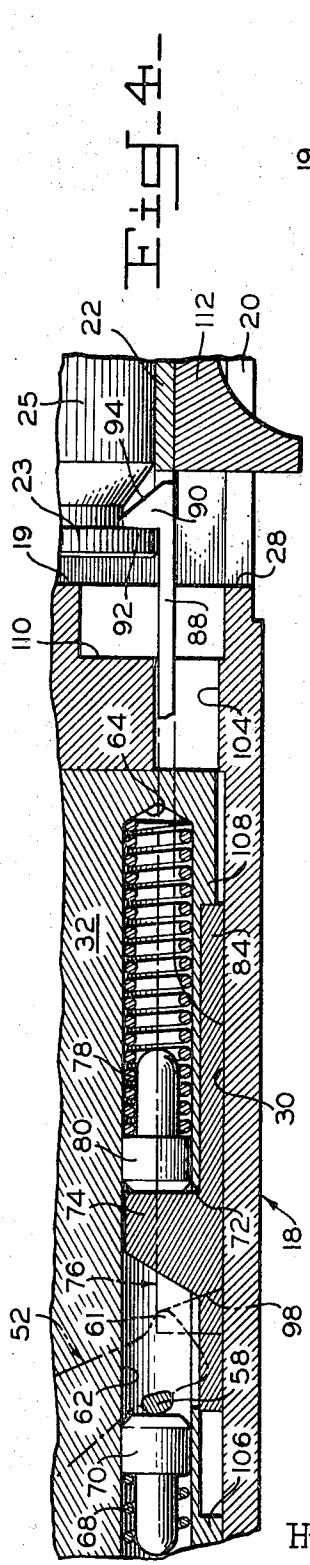

Fig. 4

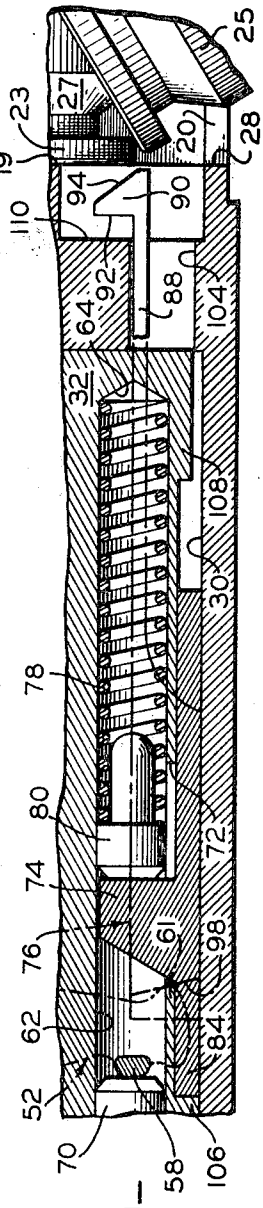

Fig. 5

INVENTOR
Harvey H. Friend

BY
Harry M. Saragovitz, Edward J. Kelly
Herbert Berl & Gilbert E. Alcorn Jr.
ATTORNEYS

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Fig. 6

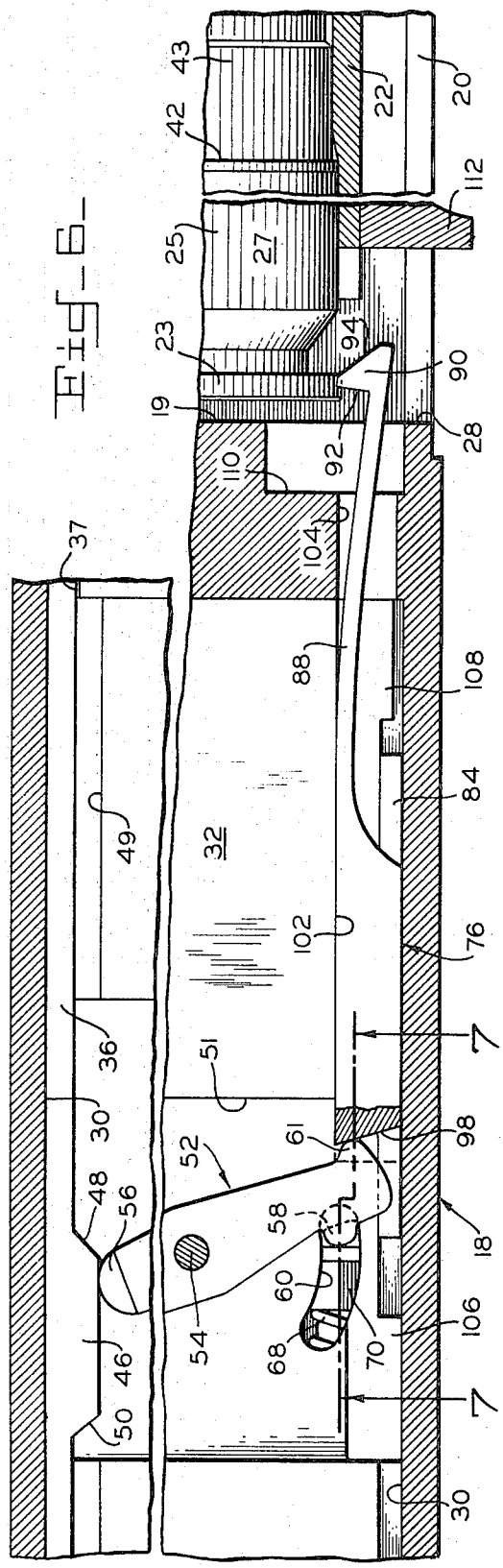


Fig. 8

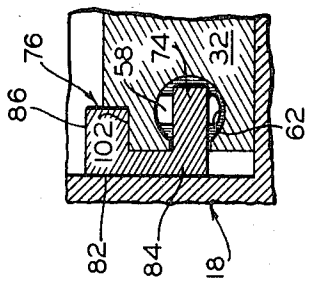
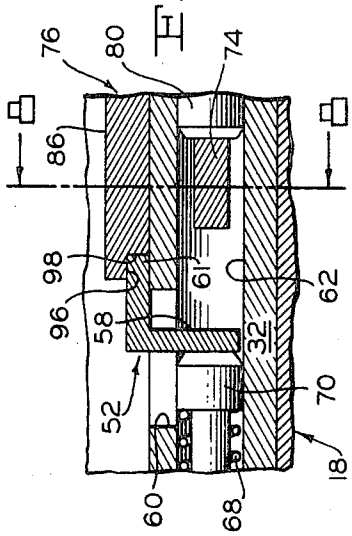


Fig. 7



INVENTOR
Harvey H. Friend
BY
Harry M. Saragovitz, Edward J. Kelly
Herbert Berl, Herbert E. Dunseath Jr.
ATTORNEYS

Nov. 10, 1970 H. H. FRIEND 3,538,635

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Filed Dec. 26, 1968 4 Sheets-Sheet 4

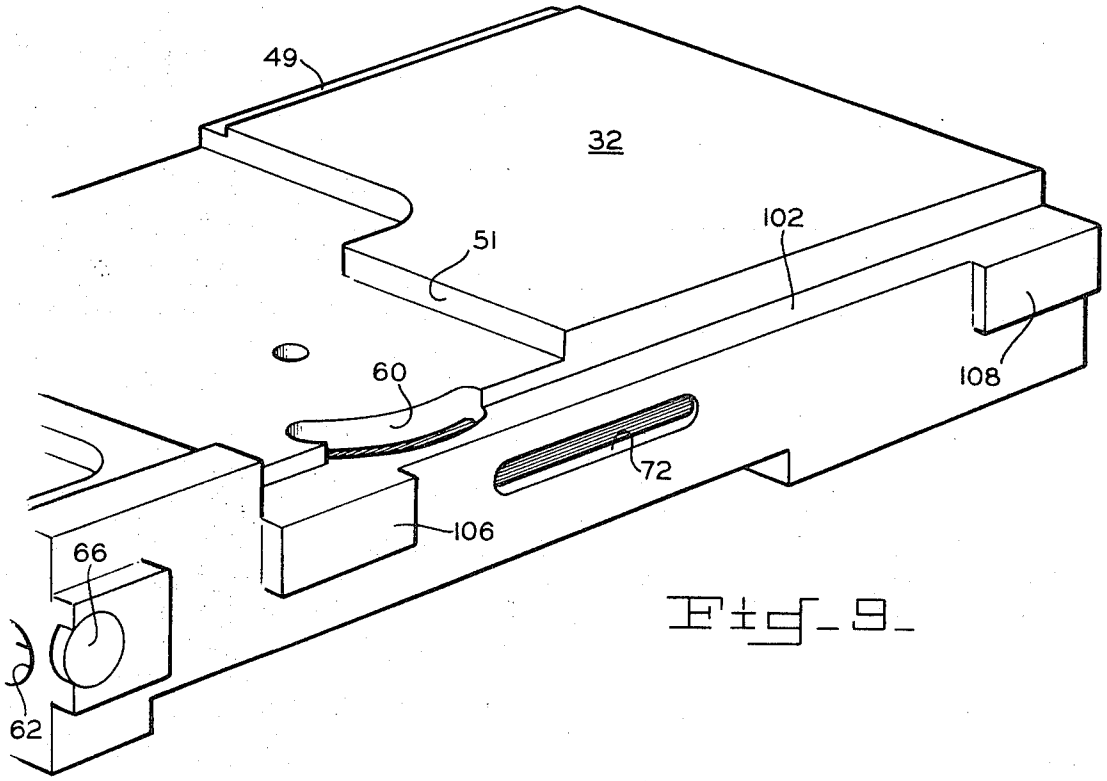

Fig. 9

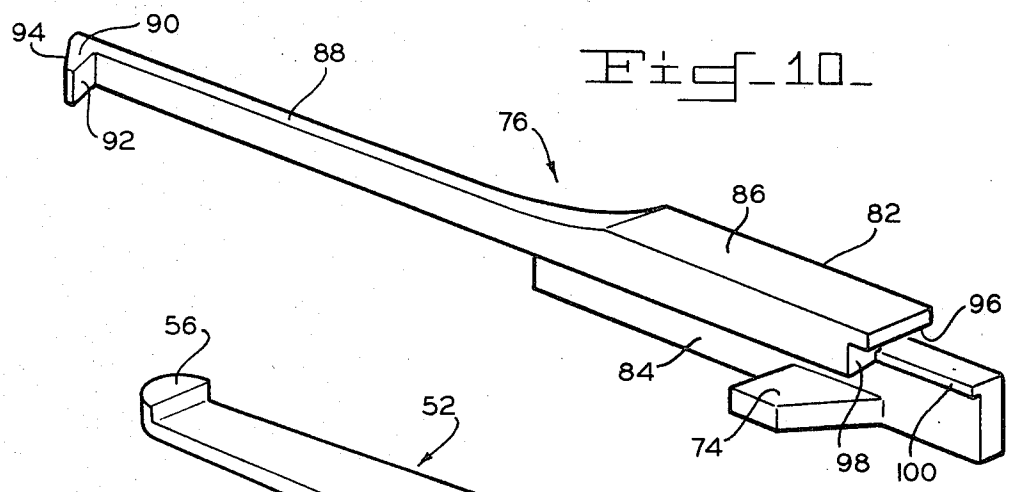

Fig. 10

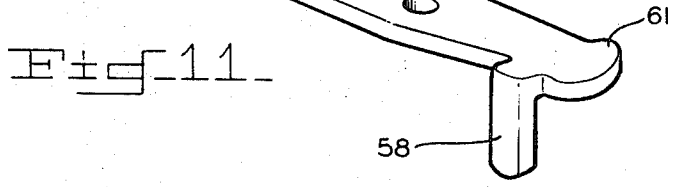

Fig. 11

INVENTOR
Harvey H. Friend

BY
Harry M. Saragovitz, Edward J. Kelly, Herbert Berl, & Albert E. Arnold Jr.
ATTORNEYS.

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3,538,635

COMBINED EXTRACTOR AND EJECTOR MECHANISM FOR AUTOMATIC GRENADE LAUNCHER

Harvey H. Friend, Hamden, Conn., assignor, by mesne assignments, to the United States of America as represented by the Secretary of the Army

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Int. Cl. F41c *11/00, 15/00*
U.S. Cl. 42—10 14 Claims

ABSTRACT OF THE DISCLOSURE

In a grenade launcher attachment of the type wherein the cartridges are fed from a depending box-type magazine and the functional engagement between the fired projectile and the rifling in the barrel actuates the latter forwardly to open the breech for the insertion of the next cartridge fed from the magazine, an extractor is resiliently mounted in the receiver for longitudinal movement forwardly and rearwardly of a fixed breech face therein. A pivotal lever is transversely mounted in the receiver rearwardly of the extractor and is arranged to be pivoted in opposite directions by spaced cam surfaces on an operating rod connected to the barrel. Movement of this lever in the counterclockwise direction during the return of the barrel to battery position actuates the extractor forwardly into gripping engagement with the chambered grenade cartridge while movement of the lever into the clockwise direction permits the extractor to be biased to the rear so that the fired cartridge case will be pivoted about a fixed fulcrum point in the receiver and out through an ejection port in the side thereof. This rearward movement of the extractor is continued until the cartride gripping end thereof is fully retracted into the receiver out of the feeding path of the next grenade cartridge being advanced from the box magazine.

This invention relates to a magazine-fed grenade launching attachment for inclusion in a small arms weapon system and is mare particularly directed to a combined extractor and ejector mechanism for automatically removing each fired grenade cartridge case from the attachment.

Efforts are currently under way to provide certain military rifles with an attachment which will permit the user to instantly switch between the normal operation of the rifle and the launching of special grenade cartridges, either singly or in semiautomatic bursts. While such capability has recently been achieved in several instances, the problems involved in rapidly feeding relatively large grenade cartridges into firing position with the attachment have greatly reduced the ease with which the rifle was originally designed to be handled.

For one thing, the retention of a plurality of grenade cartridges in a grouping which will permit successive feeding thereof into firing position has, up to now, required the permanent addition to the launcher attachment of some outwardly projecting structure which has detracted from or interfered with the proper handling of the rifle especially when being operated in a prone position. Furthermore, the added weight of the permanently affixed cartridge feeding structure as well as that of the unfired grenade cartridges themselves, when circumstances do not permit the unloading thereof, seriously detract from the maneuverability expected of a light-weight, shoulder-operated firearm.

Accordingly, it has been proposed that the grenade ammunition be housed in a conventional box-type magazine which can be readily inserted into the underside of the launcher attachment and easily removed therefrom

at the option of the user regardless of any unexpended cartridges therein. However, considerable difficulty has been encountered in reducing such proposal to practice primarily because of the problems involved in effecting the automatic extraction and ejection of each fired case prior to the chambering of the next successive cartridge.

This is particularly true in a grenade launcher structure wherein the barrel is arranged to reciprocate fowadly of the stationay portion of the receiver in whcih the striker is mounted and the required opening of the breech during each firing cycle is provided by the forward actuation imparted to the barrel by the frictional engagement of the fired projectile passing therethrough. In an arrangement of this kind, it is essential that each cartridge in the magazine be fed directly into firing alignment with the barrel and be specifically oriented prior to firing, to bring the base of the cartridge into relatively firm contact with the fixed vertical breech closure surface in the receiver. However, it has been found that such requirement cannot be readily accomplished in the presence of those conventional extractor and ejector mechanisms which normally project forwardly of the breech closure surface into the feed path of the grenade cartridge. While the required noninterference with the upward feeding movement of each grenade cartridge can be obtained by resiliently mounting the extractor and ejector in the stationary breech closure portion of the receiver, the desired firm contact between the base of the grenade cartridge and the fixed breech closure surface in the receiver cannot be properly maintained due to the forward thrust exerted against the base of the cartridge by the compressed extractor and ejector components. In addition, where an extractor is resiliently mounted against a spring, it does not provide the rigidity required to provide a fulcrum point around which a fired cartridge case is arranged to be pivoted by a conventional forwardly biased ejector.

It is therefore a basic object of this invention to provide a cartridge case extractor for a semiautomatic grenade launcher attached to a rifle or an equivalent small arms weapon system wherein the extractor will also function to automatically eject the fired cases from the launcher.

A further object of this invention is to provide a combined extractor and ejector mechanism, as aforesaid, which does not extend into the feeding path of each grenade cartridge while such cartridge is being fed to the firing position thereof.

Still another object of the present invention is the provision of a combined cartridge extractor and ejector mechanism which is not conventionally fixed to any stationary or recoiling part of the launcher but is instead resiliently mounted for longitudinal actuation in both forward and rearward directions.

An additional object of this invention is to provide an extractor and ejector mechanism, as aforesaid, which will positively engage with the rim of the grenade cartridge despite the lack of any control over the cartridge upon exit from the box-type magazine.

A final object of this invention is to provide a cartridge extractor which will retain each cartridge in the correct firing position regardless of tolerance variations therein or in the firing chamber in the barrel.

It has been found that these objects can best be attained in the type of grenade launcher concerned herewith if an elongated cartridge case extractor is slidably mounted in the interior of the receiver and is arranged to be linearly actuated in both a forward and rearward direction in timed correspondence with the reciprocation of the barrel to and from the battery position thereof. This is accomplished by seating a first spring-biased plunger in the receiver in position to normally urge the extractor to the rear into contact with one end of a pivotally mounted

actuating lever extending transversely across the width of the receiver. A second spring-biased plunger is slidably seated in the receiver in position to urge one end of the actuating lever into contact with the rear end of the extractor. The end of the actuating lever opposite the end in contact with the extractor is arranged to lie in the path of spaced camming surfaces on a longitudinal operating rod fixed to the reciprocating barrel.

Thus, as the barrel is moved forwardly away from battery position upon the firing of a grenade cartridge, the forward cam surface on the operating rod will pivot the actuating lever in a clockwise direction thereby permitting the first spring-biased plunger to actuate the extractor to the rear and thereby pull the cartridge-engaging hook on the front end thereof into a suitable opening in the receiver which penetrates the breech closure surface therein. This rearward movement of the extractor produces a couple which pivots the fired cartridge case about the edge formed by the opening in the breech closure member and out through the ejector port in the side of the receiver. Once the fired case has been ejected, the extractor continues to move to the rear until it is completely withdrawn into the breech closure member.

The next grenade cartridge in the magazine is thereupon fed upwardly into the receiver and as the barrel is returned to battery to chamber such cartridge, the rearward cam surface on the operating rod pivots the actuating lever in a counterclockwise direction to thereby urge the extractor forwardly so that the hook on the front end thereof will ride over the rim of the chambered cartridge to engage in the annular groove therein. As the forward cam surface on the operating rod passes beyond the end of the extractor actuating lever, the compression imparted to the first spring-biased plunger during the forward travel of the extractor is utilized to urge the extractor rearwardly and thereby bring the base of the cartridge engaged thereby into firm contact with the breech closure surface in the receiver.

The exact nature of the invention as well as other objects and advantages thereof will be readily apparent from consideration of the following specification relating to the annexed drawings wherein:

FIG. 1 is a right side view of a grenade launching attachment mounted to the underside of a conventional rifle shown in phantom;

FIG. 2 is an enlarged sectional view taken along line 2—2 in FIG. 1 showing the extractor holding a grenade cartridge in the firing position with the barrel in full battery position;

FIG. 3 is an enlarged view of the structure shown in FIG. 2 but taken with the right hand portion thereof longitudinally sectioned in a lower plane to show the internal details of the extractor and ejector mechanism and the actuating means therefor, the width of the view being substantially reduced by breaking away the central portion thereof in a vertical plane;

FIG. 4 is a fragmentary view of FIG. 3 showing the extractor in the forwardmost position in engagement with the rim of a fired cartridge case;

FIG. 5 is a view similar to that of FIG. 4 but showing the extractor pulled to the rear during the ejection of the fired cartridge case;

FIG. 6 is a view similar to that of FIG. 3 but showing the manner in which the rearward travel of the operating rod pivots the actuating lever to advance the extractor hook into engagement with the rim of the chambered grenade cartridge;

FIG. 7 is a fragmentary section taken along line 7—7 in FIG. 6 to show the relationship between the extractor, the actuating lever therefor, and the spring-biased plungers associated therewith;

FIG. 8 is a cross-sectional view taken along line 8—8 in FIG. 7 to show the manner in which the extractor is mounted in the firing mechanism housing;

FIG. 9 is a perspective view of the housing in which the extractor and the actuating lever therefor are mounted;

FIG. 10 is a perspective view of the extractor; and

FIG. 11 is a perspective view of the extractor actuating lever.

As best shown in FIG. 1, a grenade launcher attachment **12** for use with a standard military rifle is fixedly secured as indicated at **14**, to the underside of the rifle receiver **16** in position to be selectively fired intermittantly therewith without any necessity for the user to change his grip on the rifle or the position in which it is being fired. Attachment **12** includes a receiver **18** provided with a substantially centrally located vertical cartridge seating surface **19** therein and a generally cylindrical portion **20** extending forwardly of surface **19** for slidably receiving a barrel **22** which reciprocates between a closed battery and an open cartridge feeding position. In the battery position, an annular flange **21** at the muzzle end of barrel **22** contacts the front end of cylindrical portion **20** of receiver **18** to halt the breech end of barrel **22** at a predetermined distance from cartridge seating surface **19** thereby providing space for the diametrically enlarged rim **23** at the rear end of the case portion **25** of the grenade cartridge **27** being fired. In the fully open position of barrel **22**, the breech end thereof is disposed forwardly of cartridge seating surface **19** at a distance slightly greater than the length of cartridge **27**.

Immediately forward of cartridge seating surface **19**, receiver **18** is provided with a magazine opening **26** in the underside thereof which communicates with a laterally opening cartridge ejection port **28** in the side of receiver **18**. A box-type magazine **29** is arranged to be releasably latched in opening **26**. Rearwardly of magazine opening **26** and ejection port **28**, receiver **18** is provided with a forwardly extending cavity **30** of generally rectangular configuration for enclosing a correspondingly shaped housing **32** containing a striker **34** arranged to actuate a resiliently biased firing pin **35** through cartridge seating surface **19** for firing the grenade cartridge **27** upon the return of barrel **22** to the closed position thereof. A longitudinal operating rod **36** is slidably mounted within receiver **18** adjacent the left side of housing **32**. The forward end of operating rod **36** passes through a vertical slot **37** in receiver **18** and is suitably shaped to interlock with mating structure on the exterior of barrel **22**, as best shown at **38** in FIG. 2, for providing joint movement therewith. Rotatably mounted on a bracket **39** fixed in the rear end of receiver **18** is a coiled negator spring **40** with the outer terminal end thereof being suitably pinned to operating rod **36** as indicated at **41**. When a grenade cartridge **27** is fired, the frictional engagement between the rotating band **42** on the projectile portion **43** thereof and the rifling **44** in barrel **22** pulls the latter forwardly together with operating rod **36**. Thus, negator spring **40** is energized to provide the force necessary to return barrel **22** to the battery position thereof.

Operating rod **36** is formed with a laterally extending projection **46** on which the front and rear faces thereof are angularly inclined in opposite directions to provide cam surfaces **48** and **50**. In order to accommodate projection **46**, housing **32** is longitudinally recessed along the left side thereof as shown at **49** in FIG. 9. The top of housing **32** is rectangularly recessed as indicated at **51** to accommodate a lever **52** which is pivotally mounted on a vertical pin **54** fixed in recessed portion **51** of housing **32**. One end of lever **52** is arcuately contoured and provided with a raised step **56** which extends into the path of longitudinal movement of projection **46** on operating rod **36**. On the opposite end of lever **52**, the rearward edge thereof is formed with a depending offset arm **58** extending into an arcuate slot **60** vertically cut into housing **32** from the top thereof. The forward edge of this end of lever **52** ter-

minates in a forwardly extending eccentrically arcuate projection 61 for a purpose to be shown.

Originating at the rear end of housing 32 is a longitudinal hole 62 which extends forwardly therein to intersect slot 60 and is continued therebeyond to terminate in a closed front end 64 adjacent the forward wall of housing 32. A pin 66 is transversely mounted in the rear end of housing 32 across hole 62 therein to serve as a stop for the rear end of coil spring 68. The front end of spring 68 bears against a plunger 70 slidably mounted in longitudinal hole 62 in position to be biased into contact with offset arm 58 on lever 52 for normally imparting counterclockwise pivotal movement thereto into contact with the rear end of extractor 76.

The right side of housing 32 is provided with a substantially centrally disposed longitudinal slot 72 communicating with hole 62 and arranged to slidably receive a generally triangular lug 74 projecting outwardly from the side of an elongated extractor 76. A second spring 78 with thicker and stronger coils than spring 68 is seated in the forward portion of hole 62 and a plunger 80 is slidably interposed between the rear end of spring 78 and the front face of lug 74 on extractor 76 to normally urge the latter to the rear.

As best shown in FIG. 10, extractor 76 is provided with a body portion 82 consisting of a lower rectangular section 84 and an upper rectangular section 86 of greater lateral extent but so positioned relative to section 84 that both sections form a common wall surface which serves as the outer side of extractor 76. Upper section 86 extends forwardly in a reduced cross-sectional configuration to form a relatively flexible arm 88 which terminates at the front end thereof in a laterally projecting hook 90 with a perpendicular rear face 92 and an inclined front face 94. The rear end of upper section 86 is vertically undercut as indicated at 96 with the surface adjacent lower section 84 being laterally angled as at 98 for a purpose to be shown. Lower section 84 extends rearwardly beyond upper section 86 and is provided with an overhanging rib 100 along the inner edge of the top surface thereof. Triangular lug 74 projects from the inner wall of lower section 84 below the junction thereof with upper section 86 and is so positioned that the underside of such lug is flush with the bottom surface of lower section 84.

When extractor 76 is slidably mounted against the right side of housing 32 with triangular lug 74 extending into longitudinal slot 72, the exposed underside of upper section 86 as well as rib 100 on lower section 84 will be slidably disposed on a mating ledge 102 formed in the top of housing 32. As best shown in FIG. 6, extractor arm 88 is arranged to extend through a passage 104 connecting cavity 30 with recess 110 of receiver 18 in order to engage with rim 23 on cartridge 27. Since spring 78 urges plunger 80 rearwardly against lug 74 on extractor 76, engagement of hook 90 with rim 23 will pull cartridge 27 rearwarddly until the base thereof is in positive contact with surface 19 in receiver 18. A rectangular projection 106 is provided on the right side of housing 32 to extend forwardly of the rear end wall of rectangular recess 51. A second rectangular projection 108 is located at the forward end of housing 32 on the same side as projection 106.

When barrel 22 and operating rod 36 associated therewith are in the battery position best shown in FIG. 2, the grenate cartridge 27 then being held against surface 19 in receiver 18 by extractor 76 is ready to be fired by the release of striker 34. As projectile 43 is forced forwardly out of cartridge case 25 by the expanding discharge gases, the frictional force between rotating band 42 and rifling 44 in barrel 22 pulls the latter forwardly away from the battery position thereof against the resistance of negator spring 40.

During the initial forward travel of projectile 43, the expanded condition of the fired cartridge case tends to produce some sticking thereof in barrel 22. Thus, as barrel 22 is actuated forwardly, cartridge case 25 is pulled away from contact with surface 19 in receiver 18. Since extractor hook 90 is still engaged with cartridge case rim 23, extractor 76 will be pulled forwardly against the rearward bias of spring 78. However, this forward movement of extractor 76 is quickly halted as the front end of section 84 thereon strikes rectangular projection 108 of the side of housing 32. Projection 108 is specifically located to halt the forward movement of extractor 76 before extractor lug 74 can strike the front end of longitudinal slot 72 in housing 32. Such arrangement eliminates the possibility of cracking or other damage to the relatively thin wall section of housing 32 in which slot 72 is located. Once this forward movement of extractor 76 is halted, the continuing forward travel of barrel 22 will free the fired cartridge case 25 and thereby permit spring 78 to restore extractor 76 to the position in which the base of cartridge case 25 is held in positive contact with surface 19 in receiver 18.

In view of the connection between operating rod 36 and barrel 22, the former is likewise pulled forwardly to bring cam surface 48 into contact with the stepped end 56 of lever 52 to impart pivotal movement thereto in a clockwise direction until projection 46 has moved completely therebeyond. During this pivotal movement of lever 52, projection 61 thereon is moved rearwardly thereby permitting the bias of compressed spring 78 to impart corresponding rearward movement to extractor 76. Since the portion of receiver 18 containing cartridge seating surface 19 is circumferentially recessed, as indicated at 110, to a lesser diameter than that of cartridge rim 23, the rearward movement of extractor hook 90 produces a couple which pivots the fired case 25 about the peripheral edge of surface 19 as soon as barrel 22 has moved beyond the front end of such fired case. By the time the rearward travel of extractor 76 is halted by contact with projection 106 on housing 32 as shown in FIG. 5, the fired case 25 has been pivoted completely through ejection port 28 in the side of receiver 18 and extractor hook 90 has been withdrawn into the circumferential recess 110 disposed rearwardly of cartridge seating surface 19. Thus, the next cartridge 27 in magazine 29 is free to be moved upwardly into firing position when the continued forward movement of barrel 22 releases a suitable cartridge holding member (not shown).

During the clockwise pivotal movement of lever 52, arm 58 thereon acts on plunger 70 to compress spring 68. Thus, once cam 46 on operating rod 36 moves forwardly out of contact with lever 52, spring 68 serves to return eccentric projection 61 into contact with angular surface 98 on extractor 76 in order to insure the immediate response thereof to the counterclockwise pivoting of lever 52. Barrel 22 is arranged to be latched in the open position at the conclusion of the forward movement thereof and such latch (not shown) is released by the upward feeding movement of cartridge 27. As barrel 22 is being returned to battery position in response to the action of negator spring 40, cam surface 50 on operating rod 36 contacts stepped end 56 of lever 52 and imparts counterclockwise movement thereto. As a result, projection 61 on lever 52 is forced forwardly against angled surface 98 at the rear end of extractor 76 to impart forward movement thereto. The eccentric configuration of projection 61 is specifically designed to insure the clearance necessary to prevent the remainder of lever 52 from contacting the rear end of extractor 76. As extractor hook 90 moves into contact with the base of the newly fed cartridge 27, the latter is moved forwardly away from cartridge seating surface 19 until picked up by the simultaneous rearward movement of barrel 22 into battery position. The direction of movement of cartridge 27 is thereupon reversed so that the rim portion 23 thereon is brought into contact with the inclined front face 94 of extractor hook 90. In view of the flexibility of extractor arm 88, hook 90 is moved outwardly, as best shown in FIG. 6, to snap over cartridge case rim 23 and engage with the front face thereof. Thus,

as cam 46 moves rearwardly out of contact with lever 52, the bias of compressed spring 78 urges extractor hook 90 rearwardly to pull the base of cartridge 27 into positive contact with cartridge seating surface 19 in receiver 18. Cartridge 27 is now ready to be fired whereupon the foregoing cycle of operation is repeated.

In order to initiate the required semiautomatic operation of the grenade launcher attachment, the first cartridge 27 must be properly engaged by extractor hook 90. This is accomplished by the provision of a fixed handle 112 projecting outwardly from barrel 22 through cartridge ejection port 28 in receiver 18 which will permit manual reciprocation of barrel 22 for one cycle of operation.

As a result of the "floating action" provided by the unique extractor-ejector combination of this invention, each cartridge is automatically directed into the correct firing position regardless of the particular longitudinal location thereof or of the dimensional tolerances of either cartridge 27 or the firing chamber in the breech end of barrel 22. Inasmuch as each cartridge is not subjected to any positive control during the upward feeding movement thereof from magazine 29, the longitudinal location thereof relative to cartridge seating surface 19 is subject to considerable variation. In firearms with conventional extractors, this lack of control over the cartridge during the feeding movement thereof would certainly interfere with the required positive engagement between the extractor hook and the rim of the cartridge case. However, such is not the case here since extractor 76 is specifically arranged to push cartridge 27 forwardly into final chambering engagement with the rearwardly moving barrel 22. Consequently, the required engagement between extractor hook 90 and rim 23 on cartridge 27 is effected during the final movement of barrel 22 into battery position. Thus, any variation in the location of cartridge 27 relative to the cartridge seating surface 19 or in the size of cartridge 27 relative to the firing chamber in barrel 22 is completely nullified by the rearward bias imparted to extractor 76 once barrel 22 has been halted in battery position. As a result, each chambered cartridge 27 is retained in exactly the same position at the instant of firing regardless of dimensional variations or initial positioning thereof. Obviously, this is a considerable improvement over those firearms wherein the extractor plays no part in providing the proper headspacing for the cartridges.

I claim:

1. A combined extractor and ejector mechanism for a semiautomatic grenade launcher having a fixed vertical surface therein for seating a rimmed grenade cartridge in firing position, a barrel slidably disposed for reciprocal movement forwardly of the cartridge seating surface between an open position permitting the cartridge to be fed into chambering alignment with the barrel and a closed battery position in which the cartridge is chambered, and an operating rod secured at the front end thereof to the barrel and of sufficient length to extend rearwardly beyond the cartridge seating surface, said mechanism comprising,

a slidably mounted elongated extractor having a cartridge gripping portion at the front end thereof disposed for longitudinal movement forwardly and rearwardly of said cartridge seating surface,

a pivotal lever having one end thereof in contact with the rear of said extractor, and

cam means on the operating rod for pivoting said lever in one direction to actuate said extractor forwardly into gripping engagement with the chambered cartridge and for pivoting said lever in the opposite direction to withdraw said cartridge gripping portion on said extractor out of the path of the next grenade cartridge to be fed into chambering alignment with the barrel.

2. The combination defined in claim 1 including an ejection port in the side of the launcher extending forwardly of the fixed cartridge seating surface therein, and a reduced diameter portion forming the cartridge seating surface to provide a fulcrum edge about which the fired cartridge case is pivoted to pass out through said ejection port as said cartridge gripping portion on said extractor is retracted rearwardly of the cartridge seating surface.

3. The combination defined in claim 1 wherein said elongated extractor includes a flexible body and an inclined cam surface at the front of said cartridge gripping portion for riding over the cartridge rim to engage therewith during the movement of the cartridge into contact with the fixed cartridge seating surface.

4. The combination defined in claim 1 wherein said cam means on said operating rod projects laterally therefrom and includes oppositely inclined cam surfaces on the front and rear surfaces thereof.

5. The combination defined in claim 1 wherein said pivotal lever extends transversely across the launcher with the end opposite the end in contact with said extractor being disposed in the longitudinal path of said cam means on the operating rod.

6. In a grenade launcher having a fixed vertical surface therein for seating a rimmed grenade cartridge in firing position, a barrel slidably disposed for reciprocal movement forwardly of the cartridge seating surface to and from a closed battery position, an operating rod secured at the front end thereof to the barrel and of sufficient length to extend rearwardly beyond the cartridge seating surface, and a box-type magazine for feeding grenade cartridges in front of the fixed cartridge seating surface in position to be chambered by the barrel during the movement thereof into battery position, a combined extractor and ejector mechanism comprising,

a slidably mounted elongated extractor having a flexible body terminating in a cartridge gripping portion at the front end thereof,

first spring means normally biasing said extractor to the rear,

a pivotal lever having one end thereof in contact with the rear of said extractor,

second spring means normally biasing said lever into contact with said extractor when in the forward position thereof, and

cam means on the operating rod for pivoting said lever in a clockwise direction during the forward movement of the barrel out of chambering engagement with the fired cartridge case whereby said first spring means biases said extractor rearwardly to pivot the fired cartridge case about the edge of the fixed cartridge seating surface for ejection from the launcher,

said cam means being also arranged to pivot said lever in a counterclockwise direction during the return of the barrel to battery position and thereby drive said extractor forwardly to first push the newly fed cartridge into chambering engagement in the barrel and thereafter engage said cartridge gripping portion on said extractor with the rim of the chambered cartridge.

7. The combination defined in claim 6 wherein said extractor includes a laterally projecting lug and said first spring means comprises,

a slidable plunger disposed in contact with the front face of said projecting lug and provided with a forwardly facing annular shoulder thereon, and

a compression spring seated against said forwardly facing annular shoulder for urging said plunger rearwardly to impart corresponding movement to said extractor.

8. The combination defined in claim 6 wherein said pivotal lever includes a depending arm at one end thereof and said second spring means comprises,

a slidable plunger disposed rearwardly of said extractor arm for contact therewith, said plunger having a rearwardly facing shoulder thereon, and

a compression spring seated against said rearwardly facing plunger shoulder for urging said plunger for-

wardly against said lever arm to hold said lever in contact with the rear of said extractor.

9. In a grenade launcher having a receiver with a centrally located vertical surface for seating a rimmed grenade cartridge in firing position, a housing disposed in the receiver rearwardly of the cartridge seating surface, a barrel slidably disposed for reciprocal movement forwardly of the cartridge seating surface to and from a closed battery position, an operating rod secured at the front end thereof to the barrel and of sufficient length to extend rearwardly beyond the cartridge seating surface, and a box-type magazine releasably latched to the underside of the housing for feeding successive grenade cartridges in front of the cartridge seating surface in position to be chambered by the barrel during the movement thereof into battery position, a combined extractor and ejector mechanism comprising,

an elongated extractor slidably mounted to the side of the fixed housing and having a flexible body terminating in a hook at the front end thereof for gripping the rim of the grenade cartridge,

first spring means seated in the forward portion of the fixed housing for normally biasing said extractor to the rear,

a lever pivotally mounted in the fixed housing to extend transversely thereacross with one end in contact with the rear end of said extractor,

second spring means seated in the rearward portion of the fixed housing for normally biasing said pivotal lever into contact with the rear end of said extractor when said hook thereon is in gripping engagement with the rim of the grenade cartridge,

a forwardly facing cam surface on the operating rod for pivoting said lever in a clockwise direction during the forward movement of the barrel out of chambering engagement with the fired cartridge case whereby said first spring means biases said extractor rearwardly to pivot the fired cartridge case about the edge of the fixed cartridge seating surface for ejection from the launcher, and

a rearwardly facing cam surface on the operating rod for pivoting said lever in a counterclockwise direction during the return of the barrel to battery position to drive said extractor forwardly to first push the newly fed cartridge into chambering engagement in the barrel and thereafter position said hook on said extractor for gripping engagement with the chambered cartridge.

10. The combination defined in claim 9 wherein said extractor includes a laterally projecting lug extending into the side of the fixed housing rearwardly of said first spring means and in contact therewith.

11. The combination defined in claim 9 wherein an ejection port is provided in the side of the launcher to extend forwardly of the cartridge seating surface therein, and wherein the forward end of the cartridge seating surface is reduced in diameter to a lesser extent than the rim of the cartridge to form a peripheral edge about which the fired case is pivoted out through said ejection port.

12. The combination defined in claim 9 wherein the housing includes a vertically extending arcuate slot and said pivotal lever is provided with a depending arm at one end thereof slidably disposed in said housing slot, said second spring means being contained in the housing in longitudinal alignment with said first spring means for contacting the lower end of said depending arm.

13. The combination defined in claim 9 wherein the rear end of said extractor includes a forwardly sloped surface and one end of said pivotal lever includes a forwardly extending arcuately eccentric projection for contacting said sloped surface on said extractor to prevent interference with the remainder of said lever during the pivotal movements thereof.

14. The combination defined in claim 9 wherein the fixed housing is provided with a longitudinal hole for slidably receiving said first spring means, said extractor includes an outwardly projecting lug extending into said hole to contact said first spring means, said pivotal lever includes a depending arm passing through said longitudinal hole, and said second spring means exerts a lesser bias than said first spring means whereby said second spring means biases said lever into contact with said extractor immediately following the end of the clockwise pivotal movement imparted thereto by said forwardly facing cam surface on the operating rod.

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BENJAMIN A. BORCHELT, Primary Examiner

C. T. JORDAN, Assistant Examiner

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