

[54] **GRENADE LAUNCHER WITH PIVOTALLY MOUNTED BARREL**

3,408,761 11/1968 Silsby42/1 F
3,507,067 4/1970 Into42/1 F

[72] Inventors: Paul H. Ellis, Aberdeen; Ralph J. Kibler, Phoenix; Richard R. Kramer, Charlestown, all of Md.

Primary Examiner—Benjamin A. Borchelt
Assistant Examiner—C. T. Jordan
Attorney—Harry M. Saragovitz, Edward J. Kelly, Herbert Berl and Robert P. Gibson

[73] Assignee: The United States of America as represented by the Secretary of the Army

[22] Filed: May 21, 1969

[57] **ABSTRACT**

[21] Appl. No.: 826,315

A single-shot grenade launcher which can be conveniently attached to a rifle by substitution of relatively few original parts and is a self-contained unit consisting of a launcher barrel pivotally mounted to the underside of the rifle. The unit has its own receiver and firing mechanism, a spring loaded ejector rod and a launcher barrel lock. When the launcher barrel is pivoted downwardly to a 15° angle the ejector rod ejects the cartridge. When the launcher barrel is closed it is automatically locked in the firing position. Locking and release of the launcher barrel and cocking of the firing mechanism is accomplished by a manually operated, spring-loaded slide.

[52] U.S. Cl.42/1 F
[51] Int. Cl.F41c 27/06
[58] Field of Search.....42/1 F

[56] **References Cited**

UNITED STATES PATENTS

3,279,114 10/1966 Lewis et al.....42/1 F
3,332,162 7/1967 Martwick et al.....42/1 F

7 Claims, 6 Drawing Figures

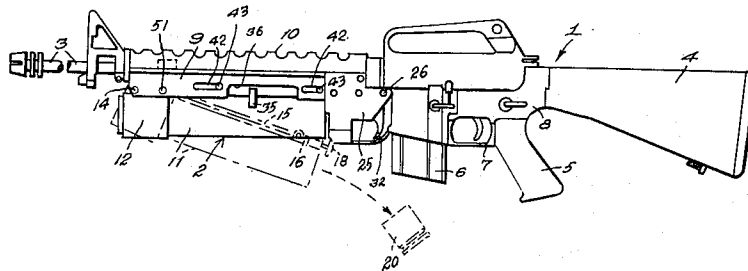


Fig. 1.

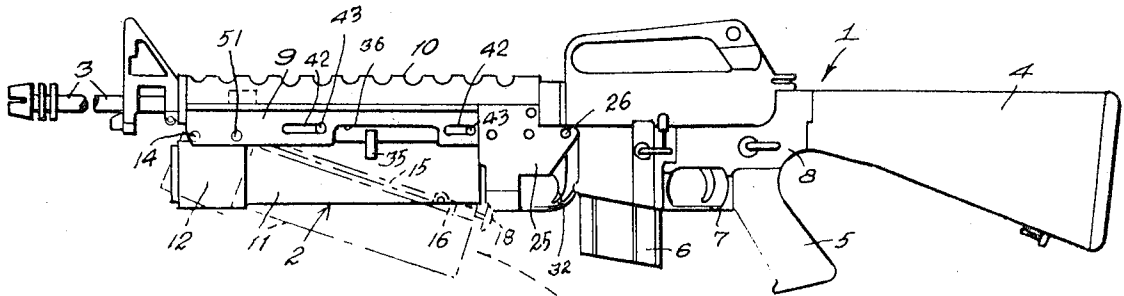


Fig. 4.

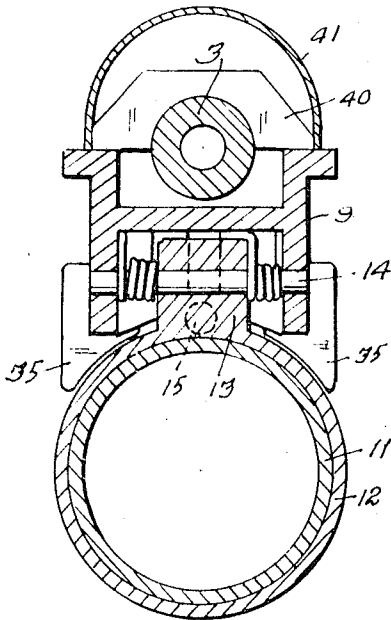


Fig. 5.

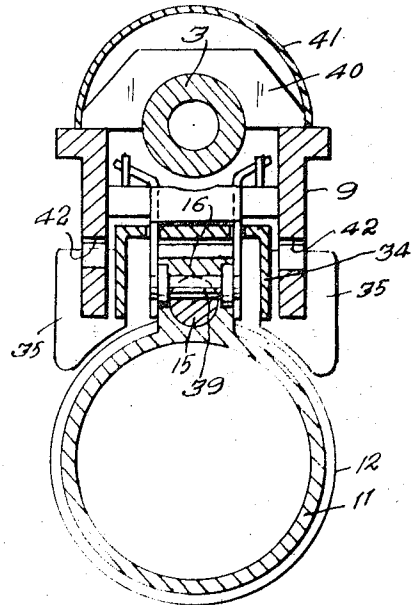
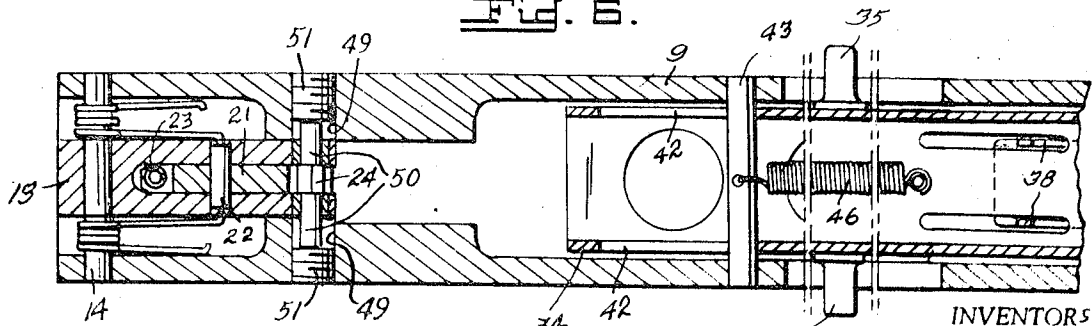


Fig. 6.



INVENTORS.

Paul H. Ellis
Ralph J. Kibler
Richard R. Kramer

BY: Harry M. Saragovitz,
Edward J. Kelly, Herbert Beil &
Robert R. Gibson ATTORNEYS.

Fig. 2.

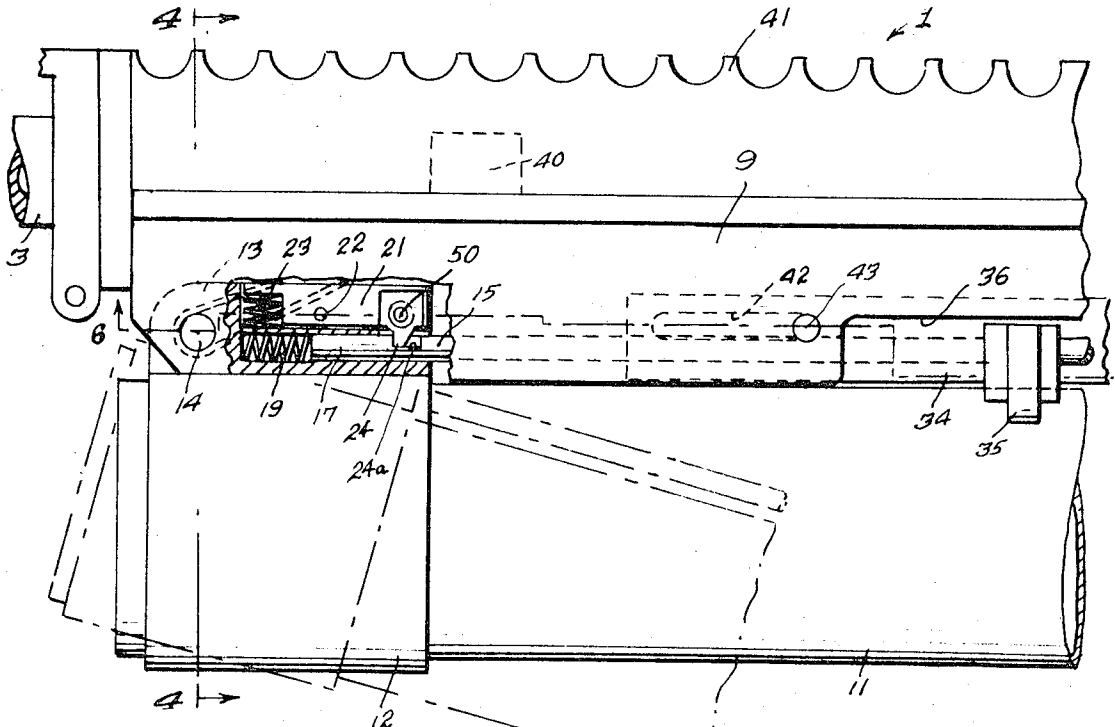
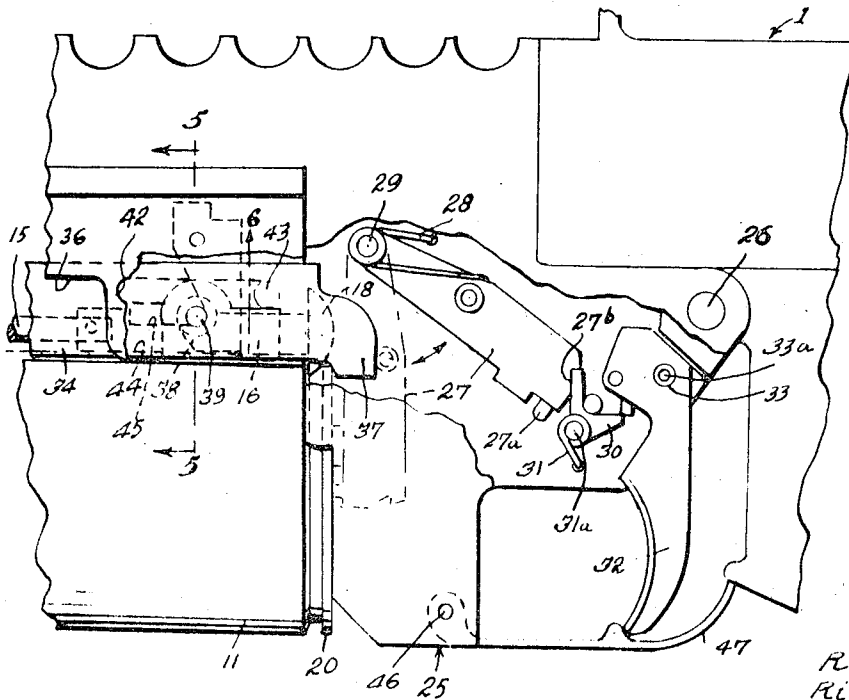


Fig. 3.



INVENTORS,

Paul H. Ellis
Ralph J. Kibler
Richard R. Kramer

BY *Harry M. Saragovitz,*
Edward J. Kelly, Herbert Deal &
Robert P. Gibson ATTORNEYS.

GRENAD LAUNCHER WITH PIVOTALLY MOUNTED BARREL

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

The present invention relates to a single-shot grenade launcher which is mounted on the underside of a rifle and which is capable of a rapid firing cycle without interfering with the operation and maintenance of the rifle to which it is attached, and while the grenade launcher of this invention is particularly adaptable to the M-16 rifle, it can be used with rifles of other types with minor modifications.

In the M-16 rifle, the launcher unit is mounted by removal of the rifle pivot pin, the right and left handguard, the front swivel pin and sling. The launcher unit is then mounted under the rifle barrel by substituting for the removed parts a special pivot pin, a clamp over the rifle barrel and a special upper handguard which is snapped in place. No drilling, machining or other modification to the rifle is necessary.

It is therefore a primary object of this invention to provide a single-shot grenade launcher unit which can be conveniently attached to a rifle.

It is another object to provide a grenade launcher to be attached to a rifle that is capable of a rapid-firing cycle and which does not interfere with the operation or maintenance of the rifle to which it is attached.

It is still another object of the invention to provide a grenade launcher for attachment to a rifle that is provided with its own firing and ejecting mechanism.

In the drawings:

FIG. 1 is a side elevation of a rifle with the grenade launcher of this invention attached thereto, the loading and cartridge ejection position being shown in the broken lines;

FIG. 2 is a fragmental side elevation view of the rifle and forward portion of the grenade launcher with parts broken away to expose operational mechanism;

FIG. 3 is a similar view of the rearward portion of the grenade launcher;

FIG. 4 is a partial cross-sectional view taken along lines 4-4 of FIG. 2;

FIG. 5 is a cross-sectional view taken along lines 5-5 of FIG. 3, and,

FIG. 6 is a cross-sectional detail taken along lines 6-6 of FIGS. 2 and 3.

Referring in detail to the drawings, reference character 1 designates generally a rifle while 2 indicates generally the grenade launcher which is shown as attached to the rifle 1 in FIG. 1. Rifle 1 includes a barrel 3, a stock 4, hand grip 5, magazine 6, a firing mechanism 7, a receiver 8, a body portion 9 and a handguard 10.

The grenade launcher 2 consists of a barrel 11 which is provided with a collar 12 having an upstanding block 13 at its upper end. Block 13 is pivoted to the forward end of body 9 at its forward end by a pivot pin 14. A cartridge ejecting mechanism is provided for automatic ejection of a cartridge case from barrel 11 and consists of a rod 15 which is slidable in a longitudinal bore 44 in a block 16 fixed on top of the rearward portion of barrel 11 and in a bore 17 in the forward block 13, see FIG. 2. Ejector rod 15 is provided with a head 18 on its rearward end. Rod 15 is further biased rearwardly by a spring 19 in bore 17, see FIG. 2.

A means for releasing the ejector rod 15 when the barrel 11 is pivoted downwardly to a 15° angle to permit the head 18 to eject a fired cartridge case 20, see FIG. 1, and consists of a pawl 21 which is pivoted in block 13 as at 22 and biased to pivot downwardly by a spring 23. A detent 24 is carried by the rearward end of pawl 21 and is adapted to engage in a cutout 24a in rod 15, see FIG. 2. As seen in FIG. 6, body 9 is transversely bored as at 49. A pin 50 passing through detent 24 extends from each side thereof and into bore 49 and is of smaller diameter than the bore itself. Each end of bore 49 is closed by plugs 51. Pawl 21, spring 23 and detent 24 may be nested in appropriate recesses in block 13 as shown.

The grenade launcher 2 is provided with a receiver indicated generally by 25 and is independent of receiver 8 of rifle 1 and is connected to the rifle 1 by a pivot pin 26 which is substituted for the original pin of the rifle. The receiver 25 includes a firing mechanism consisting of a hammer 27 which is provided with a firing pin 27a on its forward face and a notch 27b in its lower end. Hammer 27 is biased by a spring 28 and is rotatably mounted on a pivot pin 29 at its other end. A sear 30, biased by a spring 31 is rotatably mounted on a pivot pin 31a. A trigger 32, biased by a spring 33 is rotatably mounted on a pivot pin 33a.

Means are provided for cocking hammer 27 and releasing barrel 11 for reloading and consists of a slide 34 which is provided with a pair of handles 35 fixed, one on each side, thereof. Handles 35 ride in a cutout 36 in body 9, as shown. Slide 34 is an inverted channel-shaped member and is biased forwardly by a spring 46. At the breech end of slide 34 is formed a pair of downwardly curved ears 37 which engage hammer 27. Rearward movement of slide 34 will cock the hammer 27 and at the same time move a pair of spring-loaded latches 38 which engage a pin 39 to lock the launcher barrel 11 when closed.

A clamp 40 over the gun barrel 3 and an upper handguard 41 replacing original hand guard 10 completes the assembly.

OPERATION

Assuming that a grenade has been chambered and fired from launcher barrel 11 and that the operator is right handed and the operator's left hand is gripping the launcher barrel 11 which is now also their rifle's lower handguard, just forward of the two slide handles 35 on either side of the barrel 11. The operator's right hand now grips the magazine 6 which acts as a pistol grip when firing the launcher 2, and the right forefinger is on the trigger 32 of the firing mechanism 25. The trigger 32 is held in a depressed position to allow full grip support of the rifle with the right hand when the left hand is subsequently removed. The operator now slides the left hand loosely along the barrel 11 rearwardly until the thumb and a finger contacts the handles 35 to move slide 34 to its full limit of rearward travel which is determined by slots 42 in slide 34 and pins 43 riding therein, see FIG. 6. Pin 43 is fixed transversely in body 9, as shown. This movement has rotated hammer 27 by the ears 37 to be held in a cocked position by sear 30 which engages in notch 27b, and has moved latches 38 to release launcher barrel 11. Slide 34 will be urged forwardly by spring 46. The left hand now is quickly removed from tube 11 to reach for a new round and the barrel 11 automatically drops down and is stopped in its downward rotation at an approximate 15° angle, whereupon detent 24 is released from cutout 24a to permit spring 19 to urge rod 15 rearwardly and cause head 18 to eject cartridge case 20, which action occurs during the last 2° of rotation of the barrel 11 downwardly. The barrel 11 is limited to a 15° downward rotation and the angle of rotation thereof being illustrated in FIG. 1 by broken lines, will obviously be limited by the relative diameters of pin 50 and bore 49 and the pin's movement from side to side in bore 49. As barrel 11 drops downward towards the aforesaid 15° angle pawl 21 will rotate in a counter clockwise manner about pivot 22 against the bias of spring 23 and the detent 24 is detached from cutout 24a. Plugs 51 serve as closures for bore 49. Barrel 11 is now in position to receive a new round. The new round is inserted in the barrel 11 and held firmly against the ejector head 18 with the heel of the left palm and with the forward part of the palm under the barrel 11. Then, with an upward push, and the urging of spring 46, the barrel 11 is pivoted shut and latches 38 engages pin 39 to lock the barrel 11 in firing position and the left hand moves to a full grip around the barrel 11 and trigger 32 is released and then pulled to fire the round and complete the cycle. As barrel 11 is pivoted shut, the live round is cammed fully into the barrel 11 as its rim bears against the forward face of firing mechanism 25 which, in turn, bears against the ejector rod head 18 which is also

cammed to a fully seated position where detent 24 again engages in cutout 24a and locks the barrel 11 and round in firing position. The detent 24 will not release rod 15 until barrel 11 drops again. The movements described above will be reversed should the operator be left handed. Rod 15 is retained in bores 17 and 44 by pin 39 which rides in a cutout 45 in rod 15, see FIG. 3.

It is apparent that a rapid-firing cycle (fire, cock, eject and reload is accomplished by the grenade launcher of this invention by virtue of the overall and detail design concepts employed and by the method by which these features have been adapted to fit the movements most natural to the operator with elimination of lost motion.

Provisions are included to allow trigger guard 47 to swing down about pivot pin 46 and to allow trigger 32 to swing forward thus permitting the rifle to be opened and disassembled for normal cleaning without removing the grenade launcher from the rifle.

What is claimed is:

1. A grenade launcher for attachment to the underside of a rifle comprising a barrel pivotally connected at its forward end to said rifle, said barrel adapted for rotation between loading and firing positions in said launcher, means for ejecting a cartridge case from said barrel mounted on said barrel and operable when said barrel is in said loading position, means mounted on said barrel for locking said ejecting means when said barrel is in said firing position, means mounted on said grenade launcher for locking said barrel when in said firing position, a receiver connected to said rifle rearwardly of said barrel, a firing mechanism for said launcher mounted in said receiver, and means mounted in said rifle for cocking said rifle firing mechanism and operating means for locking said barrel.

2. A grenade launcher for attachment to the underside of a rifle and operable independently thereof, and comprising, a barrel having an upstanding, longitudinally bored block on top of each end thereof, said forward block being pivoted to said rifle whereby said barrel may be rotated between loading and firing positions in said launcher, a spring-loaded cartridge ejecting rod having a cartridge-engaging head on its rearward end and a notch in its forward and rearward portions, slidable in said longitudinal bores in said blocks, means housed in said forward block cooperating with said forward notch for locking said cartridge-ejecting rod when said barrel is in said firing position, means housed in said launcher for locking said barrel

in said firing position, a receiver attached to said rifle rearwardly of said barrel, a firing mechanism for said launcher in said receiver, and a spring-loaded cocking member slidable in said rifle for cocking said firing mechanism and operating said barrel-locking means.

3. A grenade launcher as claimed in claim 2 wherein said rotation between loading and firing positions is limited to 15°.

4. A grenade launcher as claimed in claim 2 wherein said means for locking said cartridge ejection rod comprises a spring-loaded detent pivotally mounted in said rifle and cooperating with said rod whereby when said barrel is in said firing position and said rod is cammed forwardly by the forward face of said receiver, said detent will engage in said notch in the forward portion of said rod and become disengaged therefrom when said barrel is pivoted downwardly to said loading position to permit said rod to move rearwardly and eject a cartridge case from said barrel by said head.

5. A grenade launcher as claimed in claim 1 wherein said means for locking said barrel in said firing position comprises a pair of spring-biased latches mounted in said rifle and a pin transversely mounted in said block on top of the rearward portion of said barrel, said latches being movable by said cocking member to engage said pin to lock said barrel when said barrel is in said firing position in said launcher.

6. A grenade launcher as claimed in claim 2 wherein said firing mechanism mounted in said receiver comprises a rotatable, spring-loaded hammer having a firing pin fixed to its forward face and a notch in its lower end, a spring-loaded, rotatable trigger and a spring-loaded, rotatable sear disposed between said hammer and said trigger whereby when said hammer is rotated counterclockwise by said rearward movement of said cocking member, said sear will engage in said notch in said hammer to hold it in a cocked position until said trigger is pulled to release said sear from said notch to permit said hammer to rotate clockwise and fire a cartridge in said barrel.

7. A grenade launcher as claimed in claim 2 wherein said cocking member comprises an inverted channel-shaped member slidably mounted in said rifle and a pair of handles attached, one each, on each side thereof, said slide when moved rearwardly acting to cock said firing mechanism and release said barrel from a firing position and upon forward movement to lock said barrel when in said firing position.

* * * * *

45
50
55
60
65
70
75