United States Patent

Barr et al.

[15] **3,680,240**

[45] **Aug. 1, 1972**

[54] **INERTIA ACTUATED CARTRIDGE RETAINING LATCHES**

[72] Inventors: **Irwin R. Barr**, Baltimore; **Jack H. Hayman, Jr.**, Harford; **Harold A. Wilkening**, Baltimore, all of Md.

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

[22] Filed: **Dec. 18, 1970**

[21] Appl. No.: **99,559**

[52] **U.S. Cl.** .....**42/1 Q**, 42/1 F, 42/25

[51] **Int. Cl.**.....**F41c 27/00**, F41c 27/06, F41c 15/00

[58] **Field of Search**.....42/1 F, 1 Q, 25

[56] **References Cited**

UNITED STATES PATENTS

1,702,063	2/1929	Swebilius	42/25
1,796,757	3/1931	Little	42/25
3,245,350	4/1966	Kelly	42/1 F

Primary Examiner—Benjamin A. Borchelt
Assistant Examiner—C. T. Jordan
Attorney—Harry M. Saragovitz, Edward J. Kelly, Herbert Berl and Albert E. Arnold, Jr.

[57] **ABSTRACT**

A firearm includes inertial cartridge retaining latches which are actuated to release the fired cartridge case from the launcher responsive to cartridge discharge forces.

5 Claims, 3 Drawing Figures

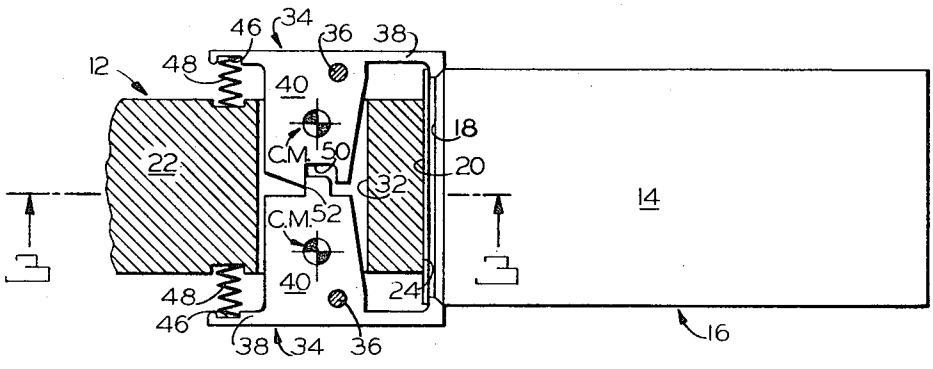


Fig. 1

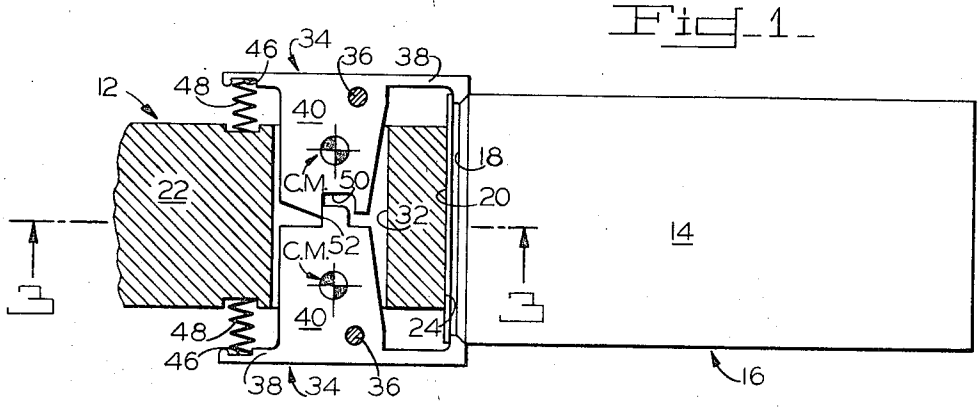
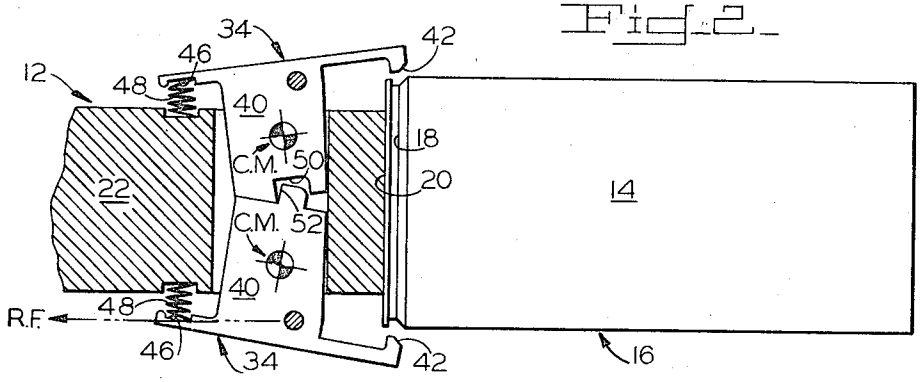


Fig. 2



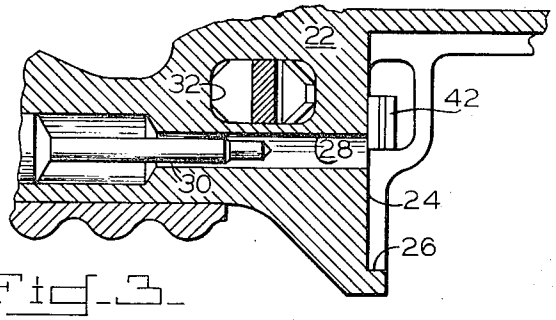


Fig. 3

INVENTOR
Irwin R. Barr
John H. Hayman, Jr.
Harold A. Wilkening
BY
Harry M. Saragovitz, Edward J. Kelly
Herbert Berl, & Albert P. Arnold
ATTORNEYS

INERTIA ACTUATED CARTRIDGE RETAINING LATCHES

BACKGROUND OF THE INVENTION

This invention relates to grenade launchers for firing grenade rounds comprising a case from which the grenade is propelled and pertains more particularly to latches for releasably retaining the case to the launcher during discharge of the round.

One particular firearm being developed for military use comprises a rifle with a grenade launcher mounted to the barrel thereof, thereby providing for the troops a firearm having both area and point capabilities. Because it is mounted to the rifle barrel, it is important that the launcher be as light as possible. Also, such a firearm requires a firing mechanism whereby the shooter may fire the rifle at selected rates and types of fire and also by the same trigger fire the launcher. This necessarily requires a complicated firing mechanism.

SUMMARY OF THE INVENTION

The present invention serves to lighten the weight of the launcher and simplify the firing mechanism thereof by providing latches, for releasably retaining the grenade round to the launcher during discharge thereof, which are completely self-contained except for springs that bias them to their engaging positions and which are automatically actuated by recoil forces.

This is achieved by providing on each of the latches an inertial mass which opposes the recoil displacement of the launcher by the forces generated by discharge of the round, thereby actuating the latch to its disengaged position for release of the fired case.

Other objects and advantages of the invention will be apparent from the following specification and the accompanying drawing which are for the purpose of illustration only.

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is a fragmentary top view of the grenade launcher showing in cross-section the latches of this invention mounted therein and disposed in their engaging positions;

FIG. **2** is a view similar to FIG. **1** but showing the latches actuated to their disengaged positions; and

FIG. **3** is a cross-sectioned view taken along line **3—3** of FIG. **1**.

DESCRIPTION OF A PREFERRED EMBODIMENT

Shown in the drawing is a launcher **12** for firing a grenade round **14** such as is disclosed in the co-pending patent application by N. J. La Costa for "Grenade Round with Means Giving Forward Momentum to the Fired Case" Ser. No. 99,698, filed Jan. 12, 1970 and which includes a case **16** provided with an annular groove **18** therearound adjacent base **20** thereof. Launcher **12** includes a breechblock **22** provided with a front face **24** which is contacted by base **20** when round **14** is loaded to the launcher. A lip **26** extends forwardly from the bottom section of face **24** for engagement by the rim of base **20** to correctly locate round **14** relative to breechblock **22** when loaded to launcher **12**. Extending longitudinally through breechblock **22** is a longitudinal bore **28** for slidingly receiving a firing pin **30** and extending laterally through

the breechblock **22** above bore **28** is a chamber **32** which is rectangular in vertical cross-section. Chamber **32** accommodates a pair of latches **34** which are pivotally mounted to breechblock **22** on opposite sides thereof by means of pins **36** for displacement between engaging and disengaged positions relative to groove **18**. Pins **36** are vertically disposed so as to be normal to the longitudinal direction of the recoil forces RF generated when round **14** is fired.

Each of the latches **34** comprises an arm **38**, which extends along the outside of breechblock **22**, and an inertial block **40** which extends from the arm into chamber **32**. Arm **38** is provided at the end thereof which is forwardly of pin **36** with a hook **42** which is insertable into groove **18** of round **14** when loaded to launcher **12** thereby releasably holding base **20** of such round against front face **24** to assure impact of firing pin **30**, when released, against primer **44** in such base. Provided on the inside of the end of arm **38** which is rearwardly of pin **36** is a recessed seat **46** for a spring **48** which acts to resiliently hold the latch in the engaging position thereof.

As shown in FIGS. **1** and **2**, one of the inertial blocks **40** is provided with a vertical slot **50** while the other one is provided with a tongue **52** which is received by such slot and which cooperates therewith to assure that both latches **34** pivot in unison between their engaging and disengaged positions. As shown also in FIGS. **1** and **2**, each of the inertial blocks **40** has a center of mass which is indicated at CM, and it is noted that the centers of mass CM are located inside and to the rear of pins **36**. Thus, when round **14** is fired, the discharge forces are applied to breechblock **22**, to cause accelerated recoil displacement thereof, and this recoil displacement is transmitted to latches **34** through pins **36**. The accelerated recoil displacement transmitted to latches **34** is opposed by the inertia of inertial blocks **40**, and with CM thereof being located inside and to the rear of the pivotal point of the latches at pins **36** the latches are pivoted against the bias of the respective springs **48** to their disengaged positions. Obviously, inertial blocks **40** must have sufficient mass so that their resistance to the accelerated recoil displacement of breechblock **22** will overcome the bias of springs **48** and the resistance of latches **34** to displacement to their disengaged positions.

OPERATION

Round **14** is loaded to laucher **12** by resting base **20** of the round on lip **26** and then pressing rearwardly on the round, thereby causing latches **34** to be biased outwardly until hooks **42** thereon snap into groove **18**. When round **14** is fired, the recoil displacement of breechblock **22** is opposed by the mass of inertial blocks **40** causing latches **34** to be pivoted to their disengaged positions, freeing fired case **16** for ejection by the forward momentum imparted thereto, as described in the aforementioned co-pending patent application by N. J. La Costa.

We wish it to be understood that we do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

We claim:

1. In a firearm for firing an ammunition round comprising a case with an annular extractor groove, the improvement wherein said firearm includes at least one latch releasably engageable with said extractor groove for securing said round to said firearm for discharge, said latch including an inertial block disposed to oppose the recoil forces generated by discharge of said round and thereby actuate said latch from engagement with said extractor groove.

2. The invention as defined in claim 1 wherein said latch is disposed for pivotal displacement between an engaging and a disengaged position relative to said extractor groove by means of a pin disposed normal to the direction of the recoil forces and through said latch intermediate the front and rear ends thereof.

3. The invention as defined in claim 2 wherein said latch includes a hook located on the front end thereof

for engagement with said extractor groove when said latch is in the engaging position, and wherein the center of mass of said inertial block is located inwardly and to the rear of said pin.

4. The invention as defined in claim 3 wherein said firearm includes a pair of said latches pivotally mounted diametrically apart thereto, and including means interlocking said pair of latches to assure simultaneous displacement between the engaging and the disengaged positions thereof.

5. The invention as defined in claim 4 wherein said interlocking means comprise a tongue extending from said inertial block of one of said pair of latches, and a slot disposed in said inertial block of the other one of said pair of latches for receiving said tongue.

* * * * *