Dec. 7, 1948. J. C. GARAND 2,455,361

GRENADE LAUNCHER

Filed May 12, 1947

Fig. 1.

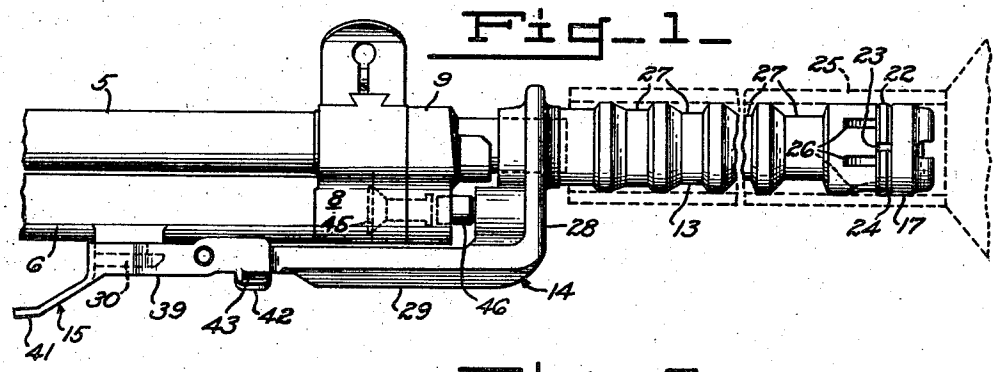


Fig. 2.

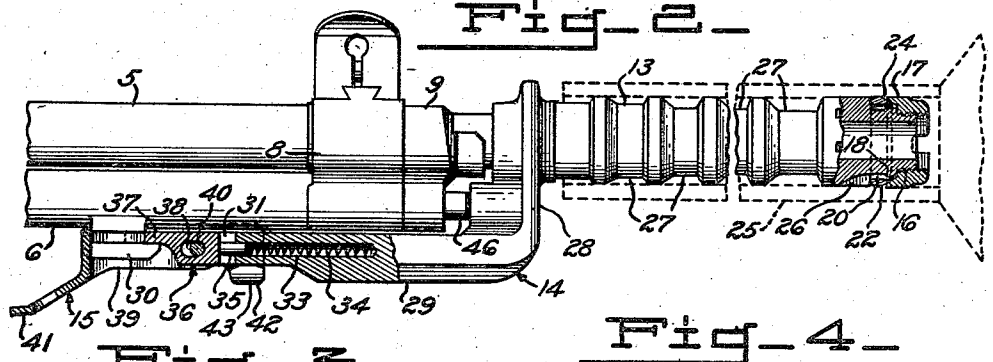


Fig. 3.

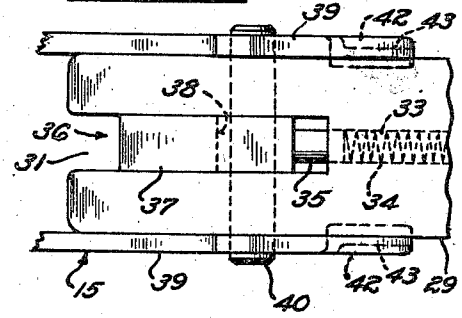


Fig. 4.

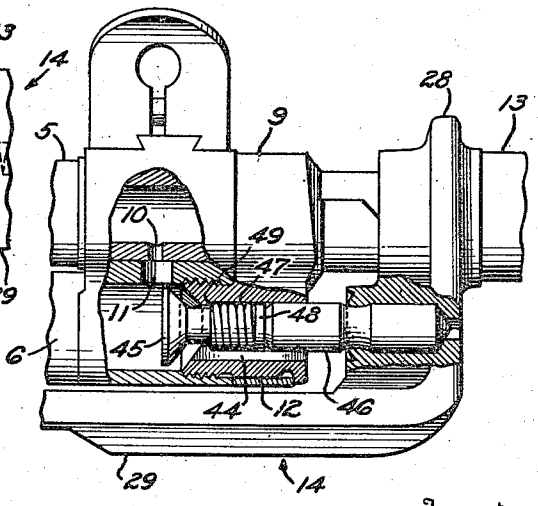
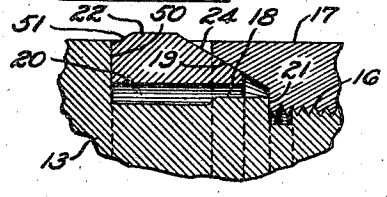


Fig. 5.



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2,455,361

GRENADE LAUNCHER

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Application May 12, 1947, Serial No. 747,579

6 Claims. (Cl. 42—1)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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The invention described in the following specification and claims may be manufactured and used by or for the Government for governmental purposes without the payment to me of any royalty thereon.

This invention relates to a device for facilitating the launching of grenades from firearms and relates more particularly to a grenade launcher for gas-operated semi-automatic firearms of the type illustrated in the Garand Patent No. 2,377,338.

As is well known, a grenade launcher is customarily attached to the muzzle of a firearm and a grenade may be discharged therefrom by firing a blank cartridge in the firearm. In order to reduce the high pressure of the gases evolved in launching grenades, there is customarily provided a valve assembly which upon opening allows a sufficient amount of such gases to escape into the atmosphere and thereby prevents actuation of the recoiling members of the firearm.

In many of the launchers known in the art, the opening of the grenade launching valve is simultaneously accomplished by the act of mounting the launcher on the firearm. When the valve is thus opened, it is obvious that the firearm can not be used for firing regular ball ammunition. Yet in actual warfare it is often of vital importance to fire ball cartridges immediately after a grenade is launched from the firearm. As a result, certain prior art launchers were provided with means whereby proper adjustment of the launcher permitted the valve to close upon the firing of a regular round through the firearm. However, such adjusting means require manual manipulation of the launcher, and consequently valuable time is thus lost in preparing the firearm for ordinary use.

It is therefore an object of this invention to provide automatic means for adjusting a grenade launcher to a position wherein the valve associated therewith will be permitted to close prior to the firing of a round through the firearm.

Another difficulty encountered in prior art grenade launchers has been that of retaining the grenade on the launcher prior to its discharge therefrom. Although accomplished at present by the use of a split ring or coil spring engaged in an annular groove at the front end of the launcher, it has been found that the consequent building up of gas pressures against the front end of the launcher invariably causes such grenade-retaining means to jump out of the annular groove.

Accordingly, it is also an object of this invention to provide an improved means for retaining a grenade on a launcher whereby the high pressure gases existing about the front end of the launcher upon the discharge of a grenade will not interfere with the continued operation of the aforesaid means.

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

Fig. 1 is a side elevational view of the grenade launcher of this invention mounted on the muzzle end of a gas-operated firearm;

Fig. 2 is a view similar to Fig. 1 but showing the front end and the rear end of the grenade launcher in section;

Fig. 3 is an enlarged top view of the rear end of the grenade launcher;

Fig. 4 is an enlarged fragmentary view partially in section showing the cooperation of the grenade launcher valve with the stud on the launcher; and

Fig. 5 is an enlarged fragmentary sectional view of the grenade-retaining means shown in Fig. 2.

Referring to Fig. 1, the grenade launcher of this invention is shown mounted to the barrel 5 of a firearm which, for purposes of illustration, is of the type described in U. S. Patent No. 2,377,338. A gas cylinder 6 is supported beneath barrel 5 by means of an integral rear band (not shown) and a front band 8. A gas cylinder lock 9 is threadably mounted onto the muzzle end of barrel 5 to secure gas cylinder 6 in place. A gas port 10 provided in barrel 5 communicates with a similar gas port 11 in gas cylinder 6 and thereby provides passage for the actuating gases into gas cylinder 6.

Normally, a standard gas cylinder lock screw is threadably secured in the front end of gas cylinder 6. In the present invention, however, the lock screw is not used but instead there is provided a suitable gas cylinder valve screw 12 which serves both as a coupling for gas cylinder 6 and lock 9 and as a means for enabling the escape of gas from barrel 5 in the manner hereinafter described.

The improved grenade launcher is adapted to be readily mounted without the use of tools on the muzzle end of barrel 5 and adapted to be latched, as will be later shown, to the conventional bayonet lug 30 found on military type firearms. The launcher essentially comprises a

heavy-walled cylindrical tube 13, a bracket 14, and a latch 15.

At the front end of tube 13, as shown particularly well in Fig. 5, there is provided a threaded reduced-diameter portion 16 adapted to receive thereon a threaded nut member 17. When assembled to tube 13, nut member 17 is concentric therewith and provides an extension of substantially the same diameter. Nut member 17 is countersunk as shown at 19. Extending from the rear of threaded portion 16 there is provided a raised annular portion 18 defining a shoulder 21 arranged to limit the rearward movement of nut member 17. To the rear of portion 18, tube 13 extends in reduced diameter section as far as a shoulder 50. Thus when nut member 17 is assembled onto threaded portion 16, an annular recess 20 is defined by the rear end of nut member 17 and shoulder 50.

There is provided in recess 20 a resilient washer-like ring 22 which is split as shown at 23 in Fig. 1. The outer periphery of ring 22 normally extends slightly above the outer periphery of tube 13 and is beveled at the front as shown at 24 to mate with countersink 19 of nut member 17. Thus, there is here provided a means for retaining a conventional grenade 25 (shown in dotted lines) in position to be launched when a blank cartridge is discharged in the firearm. The act of mounting grenade 25 onto tube 13 over the bevel portion 24 of ring 22, compresses such ring to resiliently engage the inner periphery of grenade 25. Such construction thereby prevents accidental displacement of grenade 25 from the launcher. Ring 22 is also beveled at the rear as shown at 51 thereby eliminating a sharp corner which might tend to create undue friction against the interior periphery of grenade 25.

A plurality of spaced slots 26 are provided circumferentially about tube 13 so as to intersect groove 20. Slots 26 extend substantially parallel with the longitudinal axis of tube 13 and decrease in depth rearwardly as shown in Fig. 2. When a grenade is mounted on tube 13, the compression of ring 22 opens a passageway between countersink 19 and beveled surface 24 for the flow of the gases emitted from tube 13 upon the discharge of a blank cartridge in the firearm. As a result, the gases enter recess 20 and are dissipated into the atmosphere through slots 26. In the event the bore diameter of grenade 25 is a maximum, the gases will enter recess 20 and consequently slots 26 by the way of split 23 since ring 22 will not be appreciably compressed. The width of split 23 is such that closing thereof will take place before ring 22 will bottom on raised annular portion 18. Thus even in the event of a minimum bore diameter in grenade 25, a passageway for the flow of the gases is still assured. If the gases are not dissipated in the manner described above, gas pressures would be built up in the vicinity of ring 22 of sufficient strength to force ring 22 out of recess 20.

Tube 13 is also provided with a series of annular grooves 27 about the outer periphery thereof which serve both to reduce the weight of the launcher and to minimize the friction on grenade 25 as it leaves the launcher.

Bracket 14 may be integral with tube 13 as shown or may be a separate member suitably secured thereto. Bracket 14 is an L-shaped member having its shorter arm 28 extending downwardly from tube 13 and its longer arm 29 extending rearwardly in a plane substantially parallel to the longitudinal axis of tube 13. At the rear end of arm 29 there is provided a longitudinally extending slot 31. A hole 33 extends forwardly along arm 29 from the front end of slot 31 and is adapted to receive therein a coil spring 34 and the pin-like end 35 of a plunger 36. Plunger 36 is provided with a body portion 37 substantially rectangular in shape and is provided with a transversely disposed elongated hole 38.

Latch 15 is provided with a pair of arms 39 pivotally secured at the rear of bracket 14, as shown in Fig. 3, by means of a pin 40 which also passes through elongated hole 38 and thereby retains plunger 36 in place and also limits the longitudinal movement thereof. Latch arms 39 are connected by a downwardly and rearwardly extending finger portion 41. The front end of each arm 39 is provided with a depending lug 42, the outer face of which is indented to form a detent portion 43. When the grenade launcher is mounted to the firearm, latch 15 is pivoted so as to engage the rear of bayonet lug 30. Thereupon detents 43 prevent accidental displacement of latch 15 from its bayonet-lug-engaging position until pressure is applied downwardly upon finger portion 41. When the launcher is to be removed from the firearm, latch 15 is pivoted so as to disengage from bayonet lug 30 during which movement detents 43 are resiliently forced apart by the sides of bracket arm 29.

Valve screw 12 is provided with a gas passage 44 and a slidable valve member 45 therein arranged to reciprocate longitudinally so as to open or close passage 44. A spring 47 surrounds valve 45 and is seated between an enlarged rear end 48 thereof and a shoulder 49 in gas passage 44. A longitudinal stud 46 extends rearwardly from bracket arm 28 and provides means for opening valve member 45. As valve member 45 is moved to open gas passage 44, spring 47 is compressed. When the launcher counter-recoils forwardly in a manner to be described, valve 45 closes under the urging of spring 47 thereby permitting the normal usage of ball ammunition in the firearm.

When the grenade launcher is mounted on the firearm as shown in Fig. 1, there is a slight clearance between the end of stud 46 and valve member 45. However, when a grenade is launched, considerable gas pressure acts upon the front end of launcher tube 13 causing it to recoil rearwardly. As a result, stud 46 moves valve 45 rearwardly thereby allowing some of the gases evolved upon the discharge of the blank cartridge to escape through gas passage 44 in valve screw 12. The rearward recoil movement of the launcher is cushioned and stopped by spring 34 which has been compressed by plunger 36 upon contact with the front of bayonet lug 30. When the recoil pressure has subsided, the launcher is automatically returned to the position shown in Fig. 1, by the urging of spring 34. Detents 43 prevent any downward pivoting of latch 15 during the recoil movement of the launcher, thereby assuring positive latching in cooperation with bayonet lug 30 upon the return to its pre-launching position.

Thus there is here provided a positive means for automatically returning a grenade launcher to a pre-launching position. As a result, conventional ammunition can be fired in the weapon without any of the delay or loss in time encountered in previous launchers wherein manual adjustment of the launcher is required to change from grenade launching to the firing of ball ammunition.

I claim:

1. In a grenade launcher for a gas-operated firearm having a gas cylinder and resilient valve

means included therein, the combination of, a tubular member adapted to slidably fit over the muzzle end of the firearm, a bracket secured at the rear end of said tubular member in laterally offset and longitudinally extending relation therewith, a stud on said bracket in alignment with and operable to open the valve means in the gas cylinder upon recoil of the launcher, latching means on said bracket constructed and arranged to engage a projecting part of the firearm, and a spring-pressed plunger at the rear end of said bracket adapted to contact the projecting part of the firearm when the launcher is mounted thereon, all adapted and arranged whereby said spring-pressed plunger is effective to cushion the recoil of the launcher and return the same to a pre-launching position.

2. In a device for launching projectiles from a firearm, a tubular member slidably mounted on the muzzle end of the firearm and adapted to receive a projectile thereon, said tubular member having an annular recess formed adjacent the front end thereof and a plurality of spaced slots circumferentially intersecting said recess, and a resilient split ring disposed within said recess and arranged to releasably engage the projectile, all adapted and arranged whereby said slots provide a passage for the flow of the gases resulting from the launching of the projectile.

3. In a device for launching projectiles from a firearm, a tubular member slidably mounted on the muzzle end of the firearm and arranged to receive a projectile thereon, said tubular member having a front end portion of reduced diameter extending rearwardly to terminate in a shoulder, said reduced-diameter portion being threaded at the forward end thereof, a nut member assembled to said threaded front end thereby defining an annular recess in cooperation with said shoulder, said nut member having a countersunk portion at the rear end thereof, said tubular member having a plurality of spaced slots circumferentially intersecting said recess, and a resilient split ring disposed within said recess and extending into said countersunk portion, said ring arranged to releasably retain the projectile on said tubular member.

4. In a device for launching projectiles from a gas operated firearm, a tubular member slidably mounted on the muzzle end of the firearm, said tubular member having a front end portion of reduced diameter extending rearwardly to terminate in a shoulder, said reduced diameter portion being threaded at the forward end thereof, a nut member assembled to said threaded front end thereby defining an annular recess in cooperation with said shoulder, said tubular member having a plurality of spaced slots circumferentially intersecting said recess, said nut member having a countersunk portion at the rear end thereof, a resilient split ring disposed within said recess, and a front bevel surface on said ring arranged to provide a passage into said annular recess when said ring is compressed by the mounting of a projectile on said tubular member, said passage being arranged to divert the firearm discharge gases into said slots thereby reducing the pressure against the front face of said ring.

5. In a device for launching projectiles from military type firearms having a bayonet lug thereon, the combination of, a tubular member slidably mounted on the muzzle end of the firearm, means on said tubular member for releasably retaining a projectile thereon, a bracket having a first arm secured to said tubular member and a second arm extending longitudinally and rearwardly thereof at substantially right angles to said first arm, said second arm having a longitudinal slot of sufficient width to surround the front edge of the bayonet lug, and a forwardly extending recess communicating with said slot, a spring seated in said recess, a plunger having a stem portion extending into said recess against said spring and a body portion extending along said slot, said body portion having a transverse elongated hole therethrough, and a pin extending transversely through said second arm and through said elongated hole for limiting the longitudinal movement of said plunger, all adapted and arranged whereby the recoil movement imparted to the device by the launching of the projectile from said tubular member is effective to compress said spring thereby urging automatic return of the device to a pre-launching position upon the cessation of the recoil movement.

6. The structure of claim 5 wherein said pin pivotally mounts a latch engageable with the rear of the bayonet lug, said latch comprising a yoke-shaped portion having inwardly facing detents for cooperation with the sides of said second arm to prevent pivoting of said latch during the recoil movement of the device, and a downwardly and rearwardly extending finger portion for manually pivoting said latch.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,390,738	Rutherford et al.	Dec. 11, 1945
2,416,287	Coates et al.	Feb. 25, 1947
2,432,539	Olsen	Dec. 16, 1947