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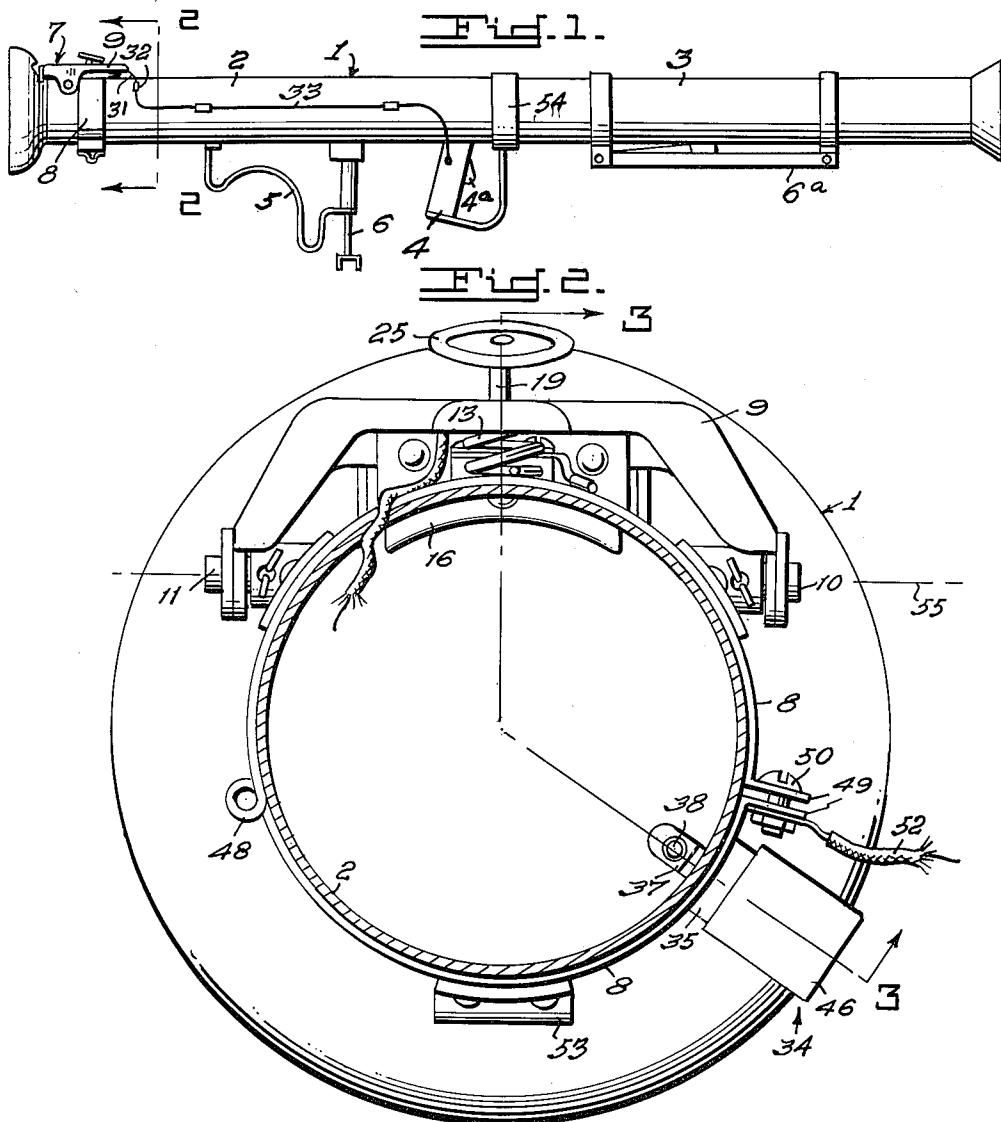
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CONTACT AND STOP MECHANISM FOR LAUNCHERS

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2 Sheets-Sheet 1



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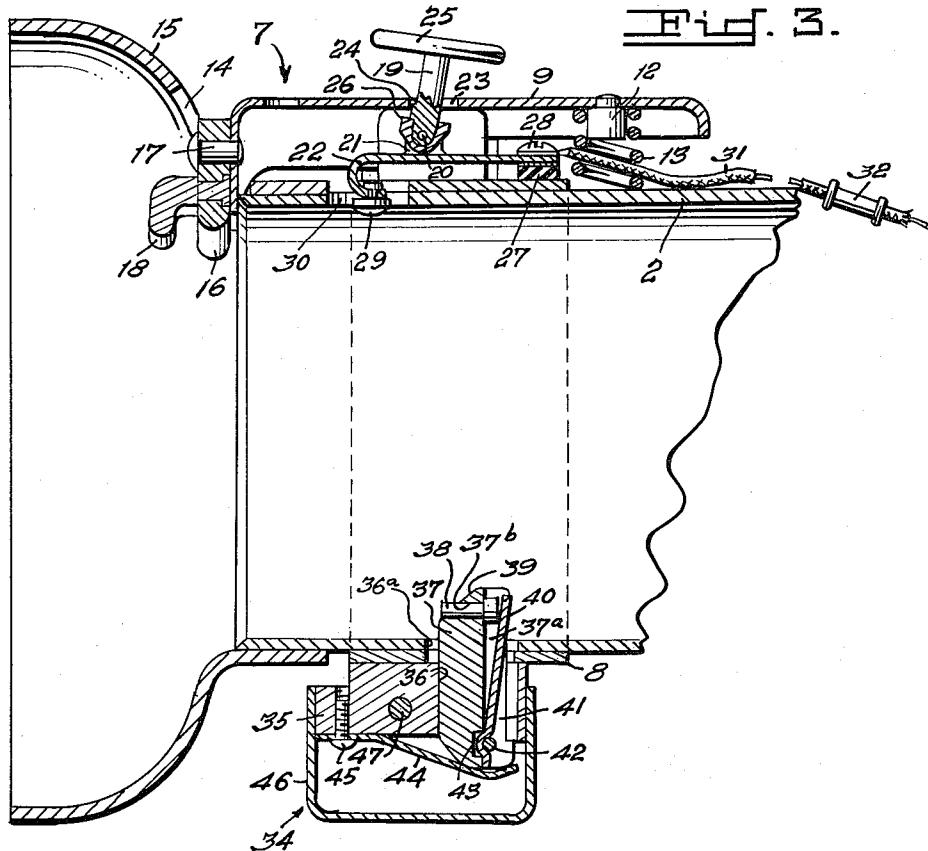
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CONTACT AND STOP MECHANISM FOR LAUNCHERS

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11 Claims. (Cl. 89—1.7)

This invention relates to a contact and stop mechanism for launchers for electrically fired rockets and more particularly to mechanism for increasing the speed of operation of loading rockets into the launcher and completing the electrical firing circuit thereto. It is also an object to provide means for making or opening the electrical firing circuit to lessen the hazard of loading and unloading a rocket launcher.

This device is adapted to be installed on a rocket launcher of the shoulder-fired or "bazooka" type. In order to arm a rocket in a launcher of this type it was previously necessary to pull the blue wire (positive contact wire) out of the expansion cone at the rear of the rocket and backward to uncoil it, then straighten out one end thereof, pull off the insulating tube, and finally engage the uninsulated end portion between the coils of the contact springs. This was a slow and tedious maneuver and in cold climates required the loader to remove his gloves. Such an operation also required a series of arm and hand movements which were time-consuming and prevented rapid fire, particularly under battle conditions.

With the present invention, the loading schedule can be performed by a loader on the right side of the launcher, who must remove both hands from the rear of the tube when engaging the positive contact.

It is a primary object of this invention to provide a mechanism to close the firing circuit of an electrically-fired rocket in a launcher without interference from any source and arm the rocket by deliberate action.

It is a further object of the invention to provide contact mechanism operable from either side of the launcher.

It is another object to provide a mechanism capable of being easily and quickly operated by a heavily gloved hand such as are necessary in cold climates.

A still further object of the invention is to provide a rocket contact and stop mechanism adapted to be installed on a launcher of the "bazooka" type with a minimum of machine work and mechanical changes.

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:

Figure 1 is a side elevation of a rocket launcher provided with a mechanism in accordance with the invention.

Figure 2 is an enlarged section taken along lines 2—2 of Figure 1, and

Figure 3 is an enlarged section taken along lines 3—3 of Figure 2.

Referring more particularly to the drawings wherein like reference characters designate like or corresponding parts throughout the different views, a demountable rocket launcher of the "bazooka" type is designated generally by reference numeral 1 and consists of a tubular rear barrel or breech portion 2 which contains the operating mechanism and a forward barrel portion 3. These portions are separably connected by a bayonet-type connection 54 of conventional construction and hence not shown in detail. Attached to the breech portion is a grip 4 incorporating a

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trigger 4a. Also attached to the lower part of the rear barrel is a shoulder guard 5 to support the launcher on the shoulder of the gunner. If the weapon is to be supported upon the ground, there is provided a monopod 6 attached to the rear breech portion and a bipod 6a attached to the front barrel or portion. Both the monopod and the bipod are adjustable to provide changes in elevation and are adapted to be folded or collapsed when not in use. The rocket stop and contact mechanisms which constitute the invention are designated generally at 7 and 34 respectively. They are designed as a unit and are both assembled upon a spring band 8 detachably secured to breech portion 1. As best illustrated in Figures 2 and 3, a contactor latch housing 9 is pivotally mounted upon the rear barrel on the top side by a pair of trunnions 10 and 11 defining a transverse axis 55, Fig. 2. A stud 12 is secured to the forward lower surface of housing 9 and receives one end of a coil spring 13, the other end of which bears against the tube 9. This spring serves to bias the latch to its normal position shown upon Fig. 3. The rear portion of the latch 9 extends through an opening 14 in the breech guard or shroud 15 of the rear barrel 2, and has a blade 16 fixed thereto by rivets 17. From Fig. 2 it will be noted that the protruding edge of blade 16 is arcuate in a transverse plane to conform to the curvature of the barrel and a rocket when loaded therein. This blade provides the ground contact for the electrical firing circuit. To prevent rearward movement of the rocket in the tube, a rear rocket stop or blade 18 is carried by the blade 16 as seen in Figure 3.

A flat spring 22 is secured at its forward end to band 8, as by screw 28 and insulated from a band by a dielectric block 27. The rearward end of this spring is bowed downwardly and forwardly and carries a contact button 29 projecting through aligned openings 30 in the band 8 and barrel portion 2. The spring is provided at its top intermediate part with lugs between which a latch 19 is pivoted by pin 20, and is insulated from the latch by a dielectric block 26. The latch projects upwardly through a hole 23 in housing 9 and has a manipulating button 25 secured to its upper free end. This latch has an upwardly facing shoulder 24, Fig. 3, so positioned that when the latch is pressed downwardly and rearwardly by pressure upon button 25, the contact button 29 is moved downwardly and held in position engaging the conventional insulated metallic band about the rocket's tail assembly. A lead 31 with connector 32, is secured at one end by screw 28 to make electrical contact with spring 22, and as indicated at 33, Fig. 1, extends to a source of voltage in grip 4 such as a small generator manually operated by pressure on trigger 4a.

A rocket stop mechanism, also secured to band 8, contacts with the contact mechanism just described, to make certain that the rocket as it is loaded into the launcher, is stopped at a position such that its contact band is opposite button 29 and the flanged or rolled end of its shroud ring is positioned between blade 16 and stop 18, whereby the rocket is yieldingly held in firing position. This mechanism is best shown upon Fig. 3 and consists of a body portion 35 rigidly attached to band 8 and having a bore 36 extending radially of the tube portion 2 and aligned with corresponding holes in the band and tube. A plunger 37 slidably fits this bore and has its radially inward end normally projecting into the tube. This end is formed with a 45° forwardly and inwardly extending bevel as indicated at 39, and a channeled forward surface 37a and a bore 37b parallel with the axis of the tube 2. This bore, as shown, opens rearwardly through the face of bevel 39, and forwardly through the base of channel 37a.

A rocket stop pin 38 slidably fits bore 37b and is so dimensioned that on its rearward limiting position, deter-

mined by the seating of its enlarged head against the bottom of channel 37a, its rearward squared end projects slightly from the beveled face 39, as shown upon Fig. 3. A relatively stiff wire spring 40 is secured at its lower end, as by pin 42, to plunger or slide 37, and at its other end engages the enlarged head of pin 38 to urge it forwardly into the position shown.

The plunger 37 is urged radially inwardly to its position shown, by a leaf spring 44 secured at its rearward end by screw 45, to the underside of body 35. The forward end of the spring extends beneath and engages plunger 37, to urge the plunger and parts carried thereby upwardly. Spring 44 is weak relatively to spring 40. A cover 46 is secured to body 35 to protect the exposed parts. A ground lead 52 has one end secured in electrical contact with the tube by the same screw 50 which clamps the two halves of band 8 about the launcher tube. As seen in Fig. 2, these halves are hinged together at 48.

In operation, with the parts shown as in Fig. 3, a rocket is inserted into the tube and is stopped in proper position by engagement of the forward edge of its shroud ring with the end of pin 38. Due to the fact that the end of this pin is square-cut, that is, in a plane normal to the axis of the tube, and the relatively great strength of spring 40, there is no component force tending to depress plunger 37 and the rocket is stopped in proper firing position. Also the spring 40 acts as a buffer or shock absorber to absorb the impact of rough or rapid loading. The force of the spring is sufficient to maintain the rocket in proper firing position within the tube. In this position, the rocket contact ring or band is beneath, but spaced from, contact button or point 29, and the rearward flange on the shroud ring about the tail assembly is positioned between blade 16 and rear stop 18. The rocket is thus yieldingly but firmly held in firing position.

The gunner then presses downwardly and rearwardly on button 25 until shoulder 24 snaps under the edge of hole 23 in latch housing 9. This operation forces button 29 downwardly into engagement with the contact ring of the rocket and completes the firing circuit by way of the generator in grip 4, leads 33, 31, spring 22, button 29, the rocket contact ring (not shown), the firing squib within the rocket, the rocket shroud ring, which, being in contact with pin 38, completes the circuit by way of this pin, plunger 37, band 8, and return lead 52.

A pull on trigger 4a will then generate a voltage which ignites the rocket's propelling charge. The propulsive force, being much greater than any force engendered in loading, forces pin 38, inwardly until the forward edge of the shroud ring contacts bevel 39. Whereupon a vertical component force is produced which easily urges plunger 37 downwardly against the action of spring 44. At the same time, the initial forward motion of the rocket, pivots housing 9 upwardly as the flanged rear edge of its shroud ring moves under and across blade 16 against the force of spring 13. This movement releases the latch 19 which, under the urge of spring 22, returns the contact 29 to open-circuit position.

We have therefore provided a contact and stop mechanism which facilitates the loading of a "bazooka" type launcher and answers a two-fold purpose in that the rocket can be easily and safely loaded, positively held in proper firing position longitudinally within the launcher until fired. The firing circuit is, moreover, automatically opened by the firing of the previous missile. The open position can be readily determined by inspection of button 25, or by feel in case of night firing. The firing circuit is positively closed by downward and rearward pressure on button 25. Where the weapon is being used in cold weather, firing can be carried out by personnel while wearing gloves or mittens. The rate of fire from each launcher can be materially increased when desired or necessary.

While we have shown the preferred form of the invention as known to us, various modifications and substitutions of equivalents will occur to those skilled in the art after a study of the foregoing disclosure. Hence, the disclosure should be taken in an illustrative rather than a limiting sense; and it is our desire and intention to reserve all modifications within the scope of the subjoined claims.

Having now fully disclosed the invention, what we claim and desire to secure by Letters Patent is:

1. In a rocket launcher, a launcher tube, a plunger having a rearwardly-disposed inwardly and forwardly-beveled face and yieldably mounted on said tube for outward movement radially of said tube in response to forward motion of a rocket in said tube from a predetermined firing position to release the rocket for launching, and a stop pin yieldingly carried by said plunger yieldingly urged rearwardly through an opening in said face for forward movement parallel with said tube to engage and stop a rocket in firing position short of said plunger face.

2. A rocket launcher as in claim 1, a relatively weak spring urging said plunger radially inwardly and a relatively stronger spring urging said pin rearwardly with respect to said plunger.

3. In a rocket launcher, a launcher tube, a plunger, means mounting said plunger for reciprocation radially of said tube from a first radially inward position wherein one end of said plunger is in the path of a rocket within said tube, to a second radially outward position clear of said path, said one end having an inwardly and forwardly beveled rear face, a stop having a square-cut rear end and mounted in said plunger for sliding from a first position with said square-cut end projecting rearwardly from said beveled face to a second forward position clear of said beveled face in response to the thrust of a rocket initiated therein, first spring means urging said plunger into its said first position and second spring means urging said stop into its said first position.

4. In a rocket launcher, a launcher tube, a body portion secured to the breech end of said tube, a plunger slidably in said portion from a first position with one end projecting into the path of a rocket in said tube to a second position clear of said path, said one end having a forwardly and inwardly beveled rear face, there being a bore in said plunger parallel with said tube and opening through said face, a stop pin having a rear face transversely of said tube and slidable in said bore from a rearward position with its said transverse end projecting from said beveled face to a forward position clear of said face, a relatively light spring urging said plunger into its said first position, and a relatively stronger spring urging said pin into its said rearward position.

5. In a rocket launcher, a launcher tube, a mounting band fixed about the breech end of said tube, a block fixed to said band, a plunger carried by said block for sliding from a first radially inward position with one end in obstructing relation with a rocket in said tube, to a second position clear of the rocket, said one end of the plunger having a rearwardly-facing, forwardly and inwardly extending bevel, there being a bore in said plunger parallel with said tube and opening rearwardly through said bevel, a pin having a square-cut rear end and slidable in said bore from a rearward position with said square-cut rear end protruding from said bevel, to a forward position clear of said bevel, a first spring yieldingly urging said plunger into its said first position and a second spring yieldingly urging said pin into its rearward position, a portion of a rocket engaging said pin when in firing position within said tube.

6. A rocket launcher as in claim 5 said pin when in rearward position engaging and stopping a rocket in firing position in said tube, said pin being forced to its forward position and, thereafter said plunger being

cammed to second position in response to the launching of a rocket.

7. A rocket launcher as in claim 5, said second spring exerting a greater force upon said pin than said first spring upon said plunger.

8. In a rocket launcher for electrically-fired rockets, a launcher tube, a mounting band removably secured about the breech end of said tube, a plunger carried by said band for sliding through an aperture in said tube from a first position with one end projecting into said tube in position to engage and stop a rocket in firing position when loaded into said tube, to a second position clearing a rocket for launching from said tube, said one end having a rearwardly-facing-inwardly-and forwardly-beveled stop surface, a pin having a rear end lying in a plane transversely of said tube and mounted on said plunger for movement from a first position with said plane rear end projecting rearwardly from said beveled stop surface, to a second position within said plunger free of said beveled stop surface, and spring means normally yieldingly holding said plunger and pin in their said first positions.

9. A rocket launcher as in claim 8, a leaf spring having one end fixed to and electrically insulated from said band, the other end of said spring being adapted for movement through an opening in said tube and against its own resilience, into contact with the contact ring of a rocket when the latter engages and is stopped by said pin in firing position, means manually operable externally of said tube to so move and releasably hold said other end of said leaf spring in position engaging said contact ring on said rocket to establish electrical contact between said rocket and said leaf spring, and an electrical circuit for firing said rocket including a lead from an electrical source to said leaf spring, said circuit being completed through said leaf spring, said contact band on said rocket, and grounded by said pin in said plunger.

10. In a rocket launcher for electrically fired rockets,

a launcher tube, a band secured about the breech end of said tube, a block fixed to said band and having a guideway radially of said tube, a plunger slidable in said guideway and having a forwardly and inwardly beveled 5 rear face, relatively weak spring means yieldingly urging said plunger radially inwardly into position with its beveled face in the path of a rocket loaded into said tube, a pin mounted on said plunger for axial movement parallel with said tube in a line intersecting said beveled 10 face, relatively strong spring means carried by said plunger and urging said pin rearwardly to engage and stop a rocket in firing position short of said face.

11. A launcher as recited in claim 10, a leaf spring having one end secured to and insulated from said band, a latch housing pivoted on said tube and having latch means on its rearward end, means yieldingly urging said latch housing into position to engage and hold a rocket against axial motion when in contact with said pin, means manually operable externally of said tube to depress the free end of said spring, against its resilience, into position to engage the firing contact of a rocket positioned against said pin, cooperating means between said a manually operable means and said latch housing releasably holding said spring depressed, an electrical circuit to fire said rocket including a source of voltage, and a lead connecting said source and leaf spring said circuit being completed to ground through said leaf spring, said firing contact of said rocket and said pin in said plunger.

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