Dec. 24, 1957 D. F. GUNDER 2,817,272

ROCKET LAUNCHER

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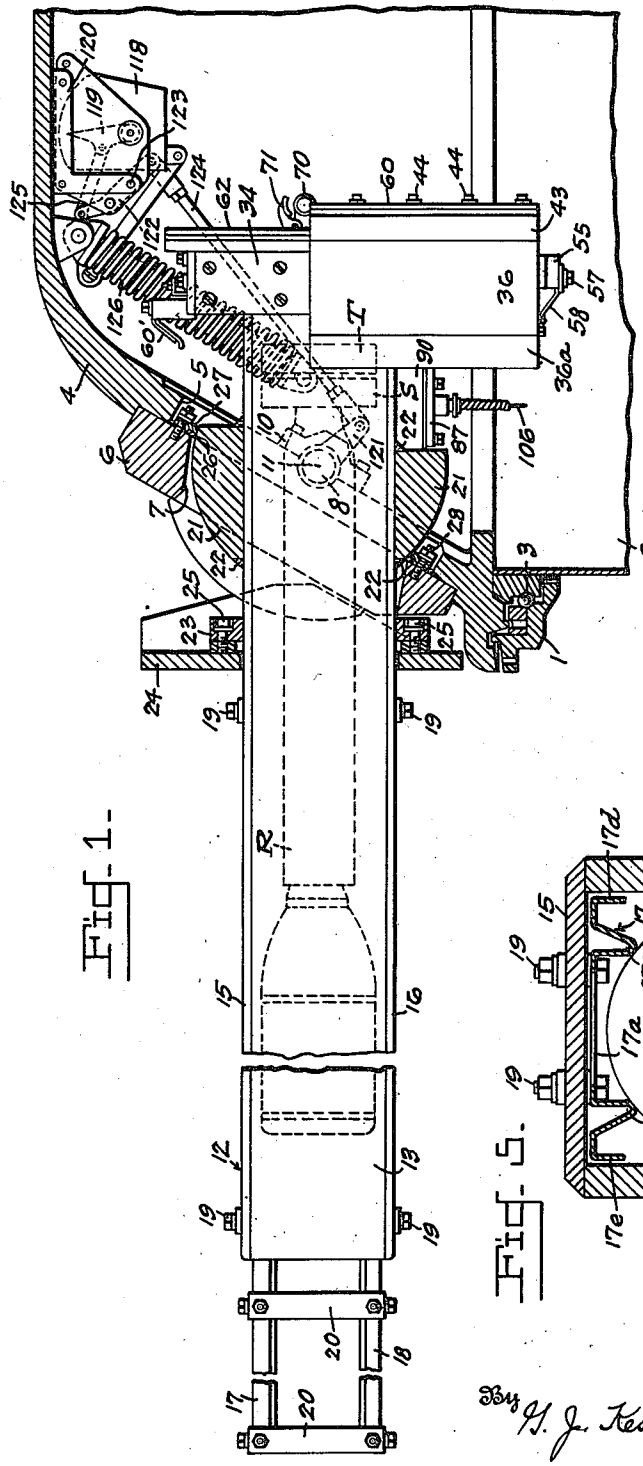


Fig. 1.

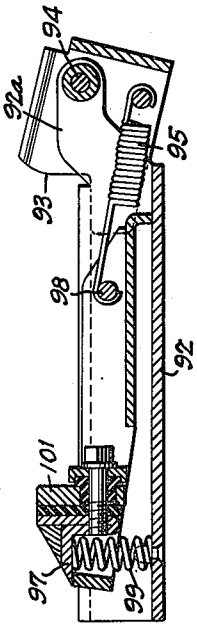


Fig. 3.

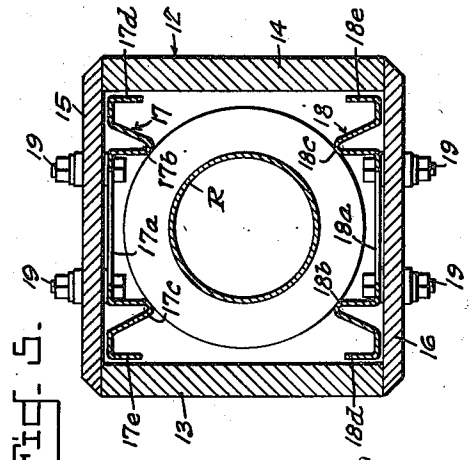


Fig. 5.

Inventor

Dwight F. Gunder

By H. J. Kessenich & A. W. Dew

Attorneys

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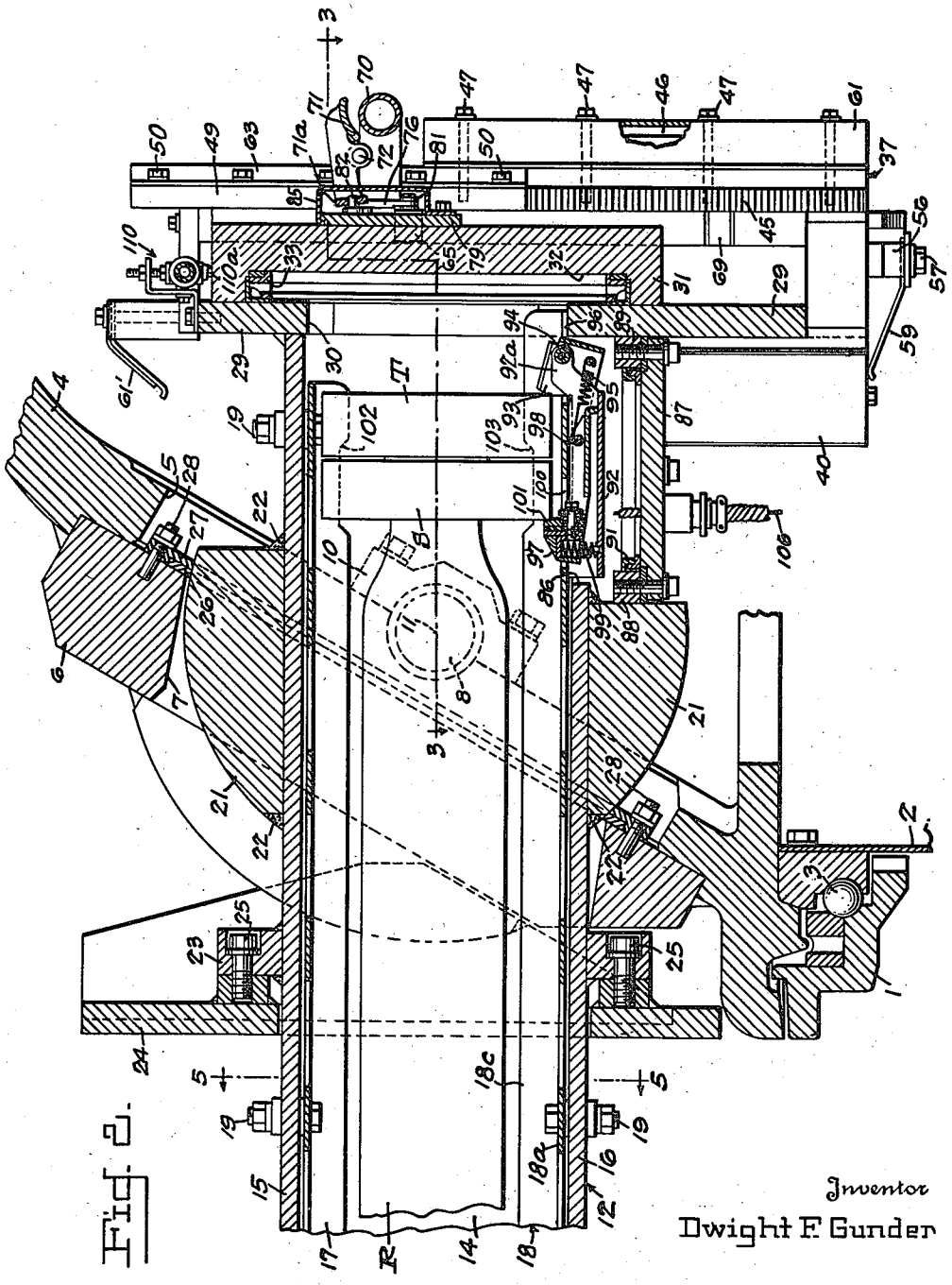


Fig. 2.

Inventor
Dwight F. Gunder

By G. J. Kessenich & A. W. Dew
Attorneys

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ROCKET LAUNCHER

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Fig. 4.

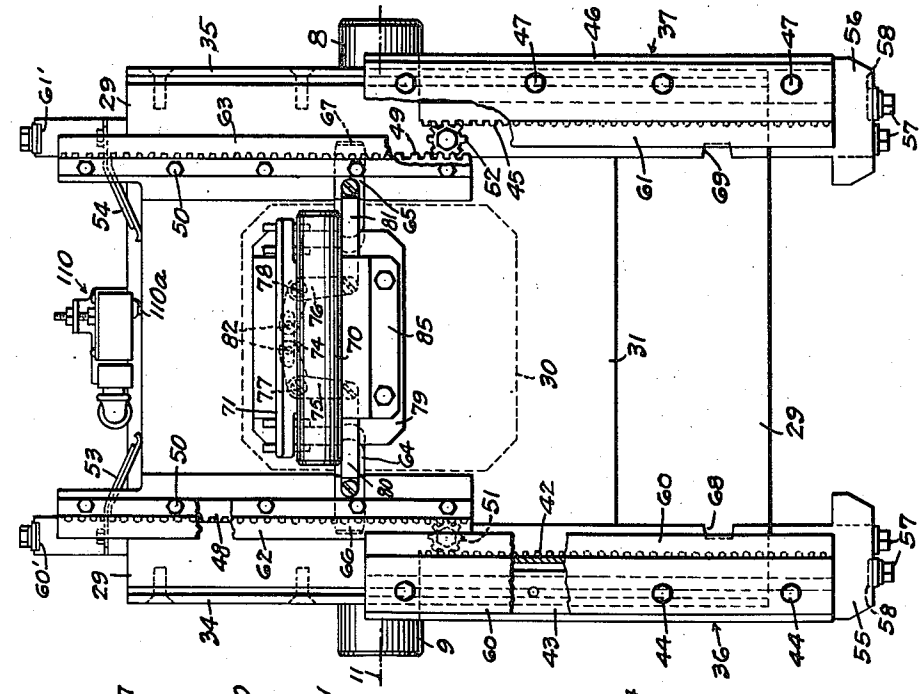


Fig. 5.

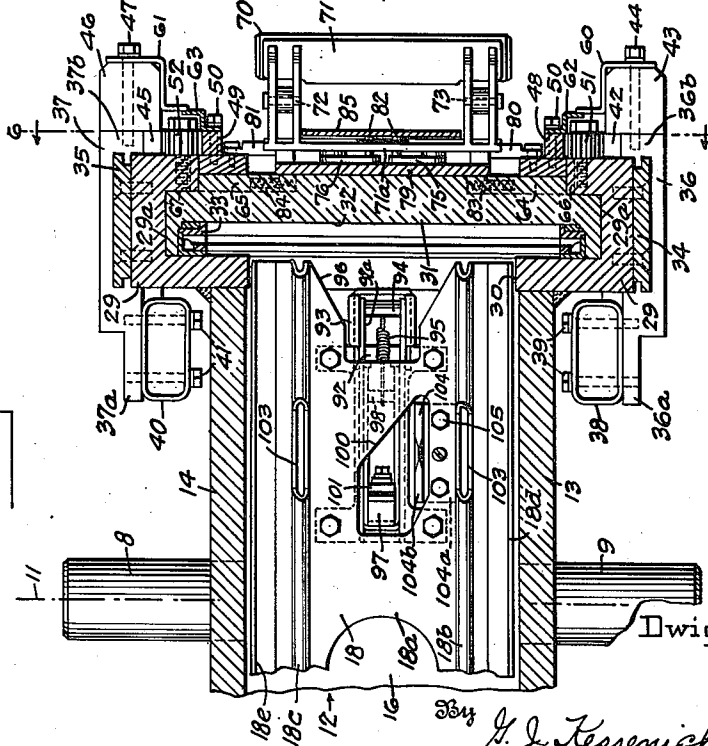
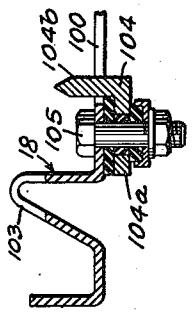


Fig. 10.



Inventor
Dwight F. Gunder

By J. J. Kessenich + A. W. Dow
Attorneys

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Fig. 7.

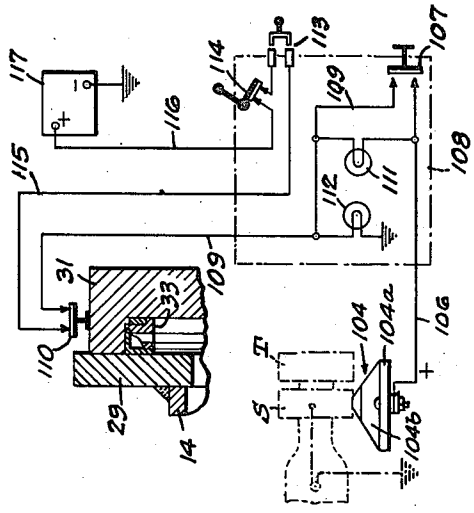


Fig. 8.

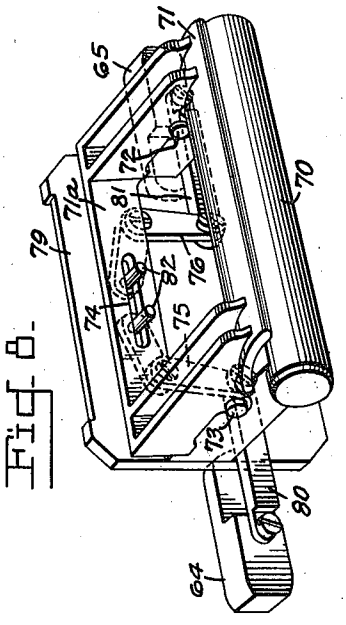
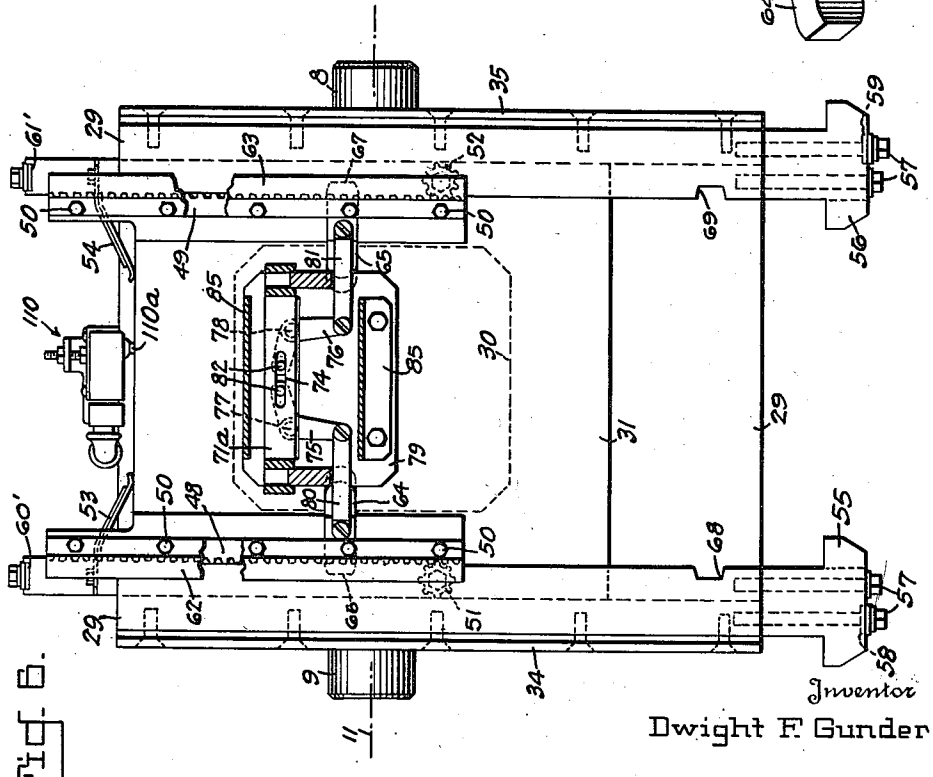


Fig. 6.



Inventor
Dwight F. Gunder

By G. J. Kessnick & A. W. Dew
Attorneys

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2,817,272

# ROCKET LAUNCHER

Dwight F. Gunder, Ithaca, N. Y., assignor to the United States of America as represented by the Secretary of the Army

Application May 10, 1951, Serial No. 225,657

6 Claims. (Cl. 89—1.7)

(Granted under Title 35, U. S. Code (1952), sec. 266)

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

This invention relates to rocket launchers particularly for use upon tanks and other confined enclosures where a discharge of propellent gases rearwardly into an occupied enclosed space is not permissible.

It is the principal object of the invention to provide a rocket launcher which is easily and quickly loaded, positive and safe in operation both as regards enemy fire and improper operation or loading.

Another object is to provide a launcher having an easily operated breechblock which, when closed, effectively seals the launcher tube against the rearward discharge of propellent gases and directs such gases forwardly out of the muzzle portion of the tube.

Still another object is to provide a rocket launcher which is readily adaptable to a conventional gun mount and its elevating and aiming means.

A further object is to provide a launcher tube which is relatively simple to construct, easy to aim and which positively guides the rocket in a desired initial trajectory during launching.

Yet another object is to provide latch mechanism which cooperates with a rocket to releasably secure the same in proper firing position longitudinally within the tube and at the same time, enables the rocket to travel forwardly after initiation.

Other objects and advantages will be apparent after a study of the following detailed description in connection with the drawings.

In the drawings:

Figure 1 is a side elevation of the launcher mounted in the turret at zero or point blank elevation, the turret and shield being shown in section.

Figure 2 is a longitudinal vertical axial section to an enlarged scale through the breech portion of the launcher and showing the breechblock in closed position and a rocket ready for launching.

Figure 3 is a longitudinal horizontal section to a scale reduced from Figure 2, and taken in offset planes identified by the line 3—3 of Figure 2.

Figure 4 is a rear elevation of the launcher to the same scale as Figure 3, the breechblock being shown closed and rack and pinion covers removed.

Figure 5 is a transverse section through the launcher tube in a plane identified by the line 5—5 of Figure 2.

Figure 6 is a transverse section taken in a plane identified by the line 6—6 of Figure 3.

Figure 7 is a wiring diagram of the firing and safety circuits.

Figure 8 is a perspective detail view to an enlarged scale of the breechblock latch.

Figure 9 is an enlarged detail view of that portion of Figure 2 showing the rocket latching mechanism, and

Figure 10 is a transverse sectional view of the rocket contacting plate of the firing circuit.



Referring in detail to the drawings, 1 identifies a ring supported by the tank frame or body in any suitable manner, not shown, and supporting the tank turret, generally identified at 2, by antifriction bearing means 3. The armored top or cap 4 of the turret has an opening 5 within which the plate 6 is welded. The rocket launcher extends through the opening 7 in plate or cap 6 and is pivotally mounted for elevation about a normally horizontal axis by a pair of aligned trunnions appearing upon Figures. 3, 4 and 6. Trunnion 8 and 9 is also identified upon Figures 1 and 2 from which figures it will be noted that this trunnion is journaled in bearing block 10 bolted to the inner wall of top 4 adjacent opening 5. The other trunnion 9 is journaled in an identical manner on top 4 at the other side of opening 5, whereby the launcher may be elevated and depressed about the normally horizontal axis 11 defined by the trunnions. Standard or conventional elevating mechanism, not shown, such as is used to elevate the 75 mm. gun on the Army's medium tanks, may be used to elevate the launcher about axis 11. Training of the launcher is effected by its pivotal movement as a unit with the turret about the normally vertical axis thereof.

The launching tube or crate, per se, is generally identified by the numeral 12 and, referring to Figures 1, 2, 3 and 5, comprises a pair of armor side plates 13 and 14 connected at top and bottom by armor plates 15 and 16. The plates are rigidly connected, as by welding, to form a unitary frame or crate substantially square in interior cross-sectional dimensions, and extending from the interior of the turret to a point six inches or more ahead of the longest rocket to be fired. By this construction a rigid support is provided for the launcher tracks and the rockets are protected from the sides against premature detonation by enemy fire.

The top and bottom launching tracks 17 and 18 are duplicates in cross-sectional form and are secured to the top and bottom plates 15 and 16, respectively, as by bolts 19. From Figure 5 it will be noted that track 18 for example, comprises a central base portion 18*a*, having its side edges bent to form two spaced ribs or rails 18*b* and 18*c*, and outer upturned flanges or terminal edge portions 18*d* and 18*e*. Corresponding portions of rail 17 are identified by like letters and it will be noted that the guide or rail portions of the two tracks define a circle of a diameter about equal to that of the head and tail portions of a rocket R to be launched. As shown upon Figure 1, the tracks 17 and 18 extend forwardly a substantial distance ahead of the armor plates 13, 14, 15 and 16 and are there rigidly united in fixed parallel relation, by vertical straps or braces 20 bolted to the flanges. By this construction, the rocket on ignition is positively guided along a straight launching path determined by the rotational position of the turret and the elevation of the launcher about trunnion axis 11.

A semi-cylindrical rotor 21 has an opening to receive the rear end of the launcher crate and is welded thereto as indicated at 22, Figure 2. The rotor has an axis coincident with trunnion axis 11 and a diameter slightly less than the distance from said axis to opening 7, whereby the opening is substantially closed for all angles of elevation of the launcher. A flange 23 is welded to and about the launcher tube just forwardly of rotor 21. A shield 24 of appropriate shape and size to obstruct and cover the small opening between the opening 7 in plate 6 and rotor 21, is bolted to flange 23 as by socket head screws 25. The aforesaid opening is closed by an obturating strip 26 of flexible material held in position by a ring 27 held to cap 7 by stud bolts 28.

As best shown in Figure 3, a breechblock housing 29 is welded over and across the rear end of the plates 13 to 16. This housing consists essentially of a flat plate hav-

ing its vertical side edges shaped rearwardly and then inwardly, to form vertically-disposed confronting guides or channels, as indicated at **29***a*. The housing has a generally square opening **30** symmetrically positioned with respect to the rear end of the launcher tube and has transverse dimensions a little less than those of the tube, whereby a rocket may freely pass through the opening in loading. See also Figure 2.

A breechblock **31**, rectangular in outline, slidably fits the vertical guide channels and is movable vertically therebetween from a closed or upper position wherein it closes the aforesaid loading opening, to a second or open position wherein the loading opening is fully exposed for loading a rocket therethrough. The forward face of the breechblock **31** is formed with a circular recess **32** having a diameter materially larger than the maximum transverse dimension of opening **30** and so related with the breechblock as to be in symmetrical position over the rear of the launcher tube when the breechblock is in upper or closed position. Obturating rings, generally identified by the numeral **33**, Figures 2, 3 and 7, are mounted with very small tolerances within recess **32** and are so constructed in response to pressure within the launcher engendered by the firing of a rocket, to prevent the blow-back of gases between the housing **29** and the breechblock **31**.

The breechblock is fully counterweighted for ease of vertical movement. This construction includes a pair of undercut guide or track members **34** and **35** bolted to the respective left and right vertical sides of housing **29**. These members are slidably engaged by left and right counterweight elements generally identified by the numerals **36** and **37**. Left counterweight element **36** then, is shaped in transverse horizontal cross-section as clearly shown upon Figure 3 to fit about guide rail **34** and be thereby limited to vertical translation. A forward projection or flange **36***a* forms a support for a box **38** positioned between the flange and the launcher tube. This box is adapted to contain lead shot and is substantially coextensive in vertical dimensions, with slide **36**, and is bolted thereto by bolts **39**.

The rear flange portion **36***b* of counterweight **36** extends inwardly about housing **29** and has a vertical rack **42** secured to it and forming, in effect, an inward continuation of the flange. A lead counterweight bar **43** is secured to flange **36***b* by bolts **44** to give added weight sufficient to counterbalance the weight of breechblock **31**. As the right counterweight **37** is an allochiral or mirror duplicate of counterweight **36**, it is sufficient, referring particularly to Figure 3, to identify forward flange **37***a*, rear flange **37***b*, lead shot box **40**, bolts **41**, right rack **45**, lead bar **46** and attaching bolts **47**. The total weight of the counterweight parts just described is substantially equal to that of breechblock **31** and the parts affixed thereto.

A pair of vertically-disposed racks **48** and **49**, Figures 3, 4 and 6, of the same length and tooth pitch as racks **42** and **45** are secured to breechblock **31** adjacent and parallel with racks **42** and **45**, respectively, as by cap screws **50**. A first pinion **51** is journaled on the rear face of breech housing **29** and meshes with both of racks **42** and **48**. Likewise, a second pinion **52** is journaled at the right on housing **29** and meshes with both of racks **45** and **49**. By this construction the breechblock and counterweights are constrained to move equally and oppositely and the breechblock may be opened and closed with minimum effort.

A pair of leaf-type buffer springs **53** and **54** are secured to the top of the breechblock housing **29** with their free ends extending downwardly to contact and engage the top of the breechblock as it rises into closed position. Stop blocks **55** and **56**, Figure 4, are fixed to the lower ends of the housing **29** by stud bolts **57**. Buffer springs **58** and **59**, Figures 1 and 2 are also secured by one of the bolts **57** to the housing in forwardly-extending position so that their free ends engage the lower surface of the respective shot-box counterweights **38** and **40** when the breechblock is raised to closed position. For a like purpose, springs **60'** and **61'**, Figures 1 and 2, are fixed in forwardly-extending position to the top of housing **29** so that their free ends engage the top of boxes **38** and **40** as the counterweight assembly rises in response to lowering of the breechblock. The springs just described serve to slow down the final or limiting movements of the breechblock and its counterweights, and prevent excessive shock and jar otherwise caused by the rapid movement of the breechblock into open and closed position. The springs also assist in initial or starting movement of the breechblock to open and close positions. Protective shields **60** and **61** generally Z-shaped in cross-section are coextensive with the respective racks **42** and **45**. As shown in Figures 3 and 4, for example, shield **60** is secured to bar **43** by screws **44**, and extends forwardly thereabout and then laterally inwardly over its rack with its vertical inward edge extending over a little more than half of pinion **51**. Shield **61** is correspondingly positioned at the right side in fixed relation with bar **46**. A cooperating pair of shields **62** and **63** are secured to the respective racks **48** and **49** in coextensive relation therewith. These shields are also generally Z-shaped in cross-section and each has its outermost flange extending beneath and slightly underlapping the contiguous edges of the shields **60** and **61**, respectively. These shields thus act to conceal the racks and pinions at all positions and thus prevent injury to operating personnel during opening and closing of the breechblock.

Manually releasable means are provided to lock the breechblock in either of its two extreme positions of fully open and fully closed. Such means comprises a pair of slides or locking bolts **64** and **65** carried by the breechblock and transversely slidable in aligned channels or grooves therein. These bolts are so positioned that when the breechblock is closed as shown at Figure 6, the slides may be moved outwardly in opposite directions, to cause their ends to engage in notches **66** and **67** in the inwardly-directed flange portion of breechblock housing **29**. A second pair of notches **68** and **69**, Figures 4 and 6, are provided at the lower ends of the aforesaid flange portions of the breechblock housing and are so located that slides **64** and **65** may engage therein when the breechblock is fully open.

Simultaneous operation of the locking bolts is effected by mechanism including a handle or rod **70** fixed to the breechblock and projecting rearwardly therefrom. A rocker arm or control lever **71** is substantially coextensive with handle **70** in transverse dimension and has arms pivoted at **72** and **73**, Figure 3, to the handle. The rocker arm as a bar **71***a* integral with and connecting the forward ends of its arms. This bar has a longitudinal slot **74**, Figures 6 and 8, in its central portion.

A pair of bellcranks **75** and **76** are pivoted at **77** and **78**, respectively, to a base plate **79** secured to the breechblock **31**. A link **80** connects bolt **64** with one arm of bellcrank **75**. Likewise a link **81** connects bolt **65** with one arm of bellcrank **76**. The remaining arms of the bellcrank have pins **82** which project rearwardly into slot **74** with a sliding fit therein. Thus, when handle **70** and rocker arm **71** are simultaneously grasped and pressed together, the resulting pivotal movement of the rocker arm pivots bellcranks **75** and **76** and withdraws bolts **64** and **65** from the notches **66**, **67** or **68**, **69**, as the case may be, whereby the breechblock may then be moved vertically. Coil springs **83** and **84**, Figure 3, are positioned within axial bores in the respective bolts and react against contiguous portions of the breechblock, to urge the bolts outwardly into locking positions. As best shown upon Figure 2, a cover plate **85** is secured to plate **79** and extends over the breechblock to protect the parts just described.

Means are provided to releasably engage the tail fin shroud rings of the rocket as it is loaded into the launcher to thereby locate it within the launcher tube in the proper

longitudinal position so that it may be electrically fired and automatically released for forward propulsion by its motor. These means are best shown upon Figures 2, 3 and 9. In Figure 2 it will be noted that lower or bottom plate **16** is centrally cut away just rearwardly of the flat rear face of rotor **21**, to provide an opening **86** in the bottom of the breech portion of the tube. A plate **87** has a fore and aft dimension equal to the distance between the aforesaid face of rotor **21** and breechblock housing **29**. This plate is bolted to a square frame comprising front and rear strips **88** and **89** welded, respectively, to the rear face of rotor **21** and the forward face of housing **29**, and side pieces, one of which is identified at **90**, Figure 1, welded across the ends of the strips **88** and **89**. The side pieces are of greater vertical dimension than the strips **88** and **89** and are welded at their forward and rear ends to the rotor **21** and housing **29**, respectively. The side pieces are also welded along their top edges, to the side portions of plate **16** bounding the opening **86**. Sealing or obturating strips **91** are secured to plate **87** and the frame comprising parts **88**, **89**, **90**, etc., and interfit when the plate **87** is bolted in place, to prevent the escape of propelling gases into the turret when a rocket is fired. The construction just described thus forms a sealed chamber within which the latching mechanism, to be described, is mounted.

A support **92**, Figures 2, 3 and 9 is generally U-shaped in cross-section and has horizontally and outwardly-extending flanges bolted to and supported from, the rear horizontal portions of lower launching rail **18**. The support has transversely spaced upstanding lugs at its rearward end, one of which is identified at **92***a*, and which have aligned bearing openings to support a rear stop **93** for pivotal movement on pin **94**. The stop is generally of inverted U shape in transverse section, with vertical sides embracing the support **92** and provides a forwardly and upwardly inclined top surface which projects upwardly through a cut-out **96**, Figure 3, in bottom rail **18** and which is cammed downwardly by the shroud rings of a rocket as the latter is slid into loaded position. A spring **95**, Figures 2 and 3, acts to urge the stop into the limiting position shown, a position determined by the engagement of lugs upon the stop with the bottom of the support.

A forward elongated stop **97** is generally U-shaped in transverse section to fit between the sides of support **92**. This stop is pivoted on a pin **98** fixed in the sides of the support. A coil spring **99** urges the stop into the maximum clockwise position shown upon Figure 2 wherein a portion of the stop or latch projects upwardly through an opening **100** in bottom rail **18** into position to engage the forward shroud ring S when the rocket is properly loaded. Due to the fact that the pivot axis of the forward stop is below the ring-engaging face thereof, a sufficient forward thrust on the rocket as when its propelling charge is ignited, will cam the stop downwardly and release the rocket for flight. For the purpose of providing a firing circuit through ring S to the ignition squib of the rocket motor, the rear face of the stop, that is, the metal plate **101** (see also Figure 7) which actually engages the forward shroud ring, is electrically insulated from the remainder of the stop. For a like reason, the portions of the rails **17** and **18** which otherwise would engage the forward shroud ring when the rocket is in firing position, are cut away as indicated at **102** and **103**, Figures 2 and 3. From Figure 2 it will be noted that the confronting faces of the two stops **93** and **97** are spaced so that as a rocket is slid into the launcher, stop **93** is cammed downwardly by the shroud rings and then snaps into place behind the rear ring as the front face of the forward ring engages the insulated face of stop **97**. The rocket is thus releasably held in firing position and instantly released when its propellant is ignited.

The firing circuit is shown at Figure 7 and incorporates safety and signal features which make it impossible to fire a rocket unless and until the breechblock is fully closed. As a preliminary it should be explained that the two shroud rings S and T which surround and are connected with the stabilizing fins of the rocket are separate and distinct and that the forward ring S is electrically insulated from the other parts of the rocket. A lead then extends from this forward ring to the interior of the rocket motor where it connects with the electric squib of the igniter for the propellant.

For the purpose of making electrical contact with shroud ring S, I provide the launcher with an electrical contact for engaging the ring when the rocket is properly loaded. This contact is generally identified by the numeral **104**, Figures 3 and 10. This consists of a member L-shaped in cross-section having its horizontal and rigidly secured by screws **105**, Figure 3, to the bottom of rail **18** so that its vertical or upstanding part projects through opening **100**. This upstanding part **104***b* is tapered, as clearly shown upon Figure 7, and its upper sharpened edge is so positioned as to engage shroud ring S and make a good electrical contact therewith when the rocket is in proper launching position. A lead **106** in the form of an armored cable is connected at one end with contact **104** and extends to a firing switch **107** forming a component part of a switch box **108** located at a convenient position within the turret. A second lead **109** extends from the switch **107** to a second or breech-operated microswitch **110**. A signal lamp **111** is connected in shunt across switch **107** to be lighted when the breechblock is closed and a rocket is loaded into the launcher. The shunt circuit including the lamp **111** does not convey sufficient current to initiate the squib of the igniter for the propellent charge. As shown upon Figures 4 and 6, switch **110** is fixed to the top of breech housing **29**. This switch is normally open and is so positioned on the top of the housing **29** that its contact plunger **110***a* is engaged by the top of the breechblock only on the final increment of movement of the block into closed position, to thereby close the switch. Lead **109** is grounded through a signal lamp **112** and, accordingly is lighted when the breechblock and safety switch **114** are closed. A lead **115** extends from switch **110** to one terminal of a removable safety plug **113** having its other terminal connected with safety switch **114**. A lead **116** connects switch **114** with one terminal of battery **117** having its other terminal grounded. Thus, in an obvious manner, the firing circuit is completed in response to the closure of firing switch **107** when, and only when, (1) a rocket is properly loaded, (2) the breechblock is fully closed, (3) safety plug **113** is in position and (4) safety switch **114** is closed.

Any suitable mechanism may be provided to indicate the angle of elevation or depression of the launcher tube axis. One suitable form is shown in Figure 1, and comprises a dial plate **118** having a scale graduated in degrees and concentric of the axis of a pointer **119** pivoted upon the plate. The plate is fixed to a bracket **120** carried by the top of the turret.

An operating connection between the launcher and indicator consists of lever **121** fixed to the right trunnion of the launcher, and a second lever **122** pivoted at **123** on the bracket **120**. An adjustable link **124** interconnects levers **121** and **122** in a parallelogram arrangement which causes the two levers to pivot equally and in the same direction of rotation when the launcher is elevated or depressed. A short link **125** connects lever **122** with pointer **119** in a second parallelogram arrangement such that the angular movement of the pointer is substantially the same as that of the launcher over the range of movement of the latter.

The operation of the launcher will be clear from the foregoing description and may be summarized as follows, it being assumed that the breechblock is closed. The gunner grasps handle **70** and lever **71**, presses them

together to withdraw breechblock locking bolts **64** and **65**, and then exerts a downward thrust upon the handle. Due to the counterweight arrangement previously described the breechblock can be moved downwardly with a minimum of effort. When the breechblock is fully lowered or opened, release of lever **71** enables springs **83** and **84** to move bolts **64** and **65** into notches **68** and **69**, to thereby lock the breechblock in open position. As the breechblock moves downwardly switch **110** is opened.

A rocket is slid through the opening **30** into the launcher tube. As the forward ring S engages rear latch **93**, the latter is cammed downwardly. When said ring contacts forward stop or face **101**, latch **93** snaps into position behind the rear ring thus releasably locking the rocket in proper firing position and causing **104** to make electrical contact with ring S. The handle **70** and lever **71** are again grasped, pressed together to unlock the breechblock, and raised to thereby close the breechblock. As the latter moves into closed position, switch **110** is closed.

The elevating mechanism of the launcher and the traversing mechanism of the turret may now be operated to elevate and train the tube to the desired target after which, plug **113** being in place, switch **107** is closed to complete the firing circuit and ignite the propellent charge of the rocket. The forward thrust engendered by the burning propellant forces forward stop downwardly and thus releases the rocket for flight. Due to the fact that the breechblock, when closed, forms a hermetical seal of the rear end of the launcher, the propellant gases are deflected forwardly along the spaces between the rocket and plates **13—16**. The open construction of tracks **17** and **18** increases the area for escape of the gases about the rocket during initial movement thereof along the launcher.

Suitable elevating means, not shown, are provided by which the launcher may be elevated and depressed about its trunnion axis **11**. It is contemplated to utilize the standard elevating mechanism of the 75 mm. tank gun which the launcher replaces. An equilibrator spring **126** is provided to assist in balancing the excess weight of the breechblock, housing and counterweights, over that portion of the launcher forwardly of the trunnions.

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

1. A rocket-launching tube comprising first and second elongated metallic rectangular plates, said plates being of a length slightly greater than a rocket to be fired from said tube, means connecting said plates in opposed spaced parallel fixed relation, and first and second tracks secured to the confronting surfaces of said plates, respectively, said tracks extending the entire length of and beyond said plates and rigidly braced at their forward portions thereof, each said track comprising an elongated flat base of sheet metal lying in a first plane parallel with its plate, each edge of said sheet being bent inwardly toward the other plate and then reversely outwardly into said plane, then again inwardly in a second plane normal to said first plane, each said reversely-bent portion forming a rail, whereby a total of four rails are formed, and means securing the base portion only of each track to its plate in longitudinally-extending position therealong, the radially innermost portions of said rails collectively defining in transverse section, a circle of the same diameter as a rocket to be fired from said tube.

2. A rocket-launching tube comprising four metallic plates having their contiguous edges rigidly united to form a tube of uniform rectangular cross-section, said tube being of a length slightly greater than a rocket to be fired therefrom, first and second sheet metal rail members secured to respective opposite ones of two of said plates, each said rail member comprising an elongated flat central base portion in a first plane parallel with its plate and having its side edges bent inwardly, then reversely outwardly into said plane, then again inwardly into a terminal edge portion in a second plane normal to said first plane, each said reversely bent portion forming a rail, means securing the base portion only of each track to its plate whereby said rails are parallel and collectively define in transverse section, a circle of the same diameter as that of a rocket to be launched, said rails being longer than and extending the entire length of and forwardly from said tube, and strap means rigidly connecting corresponding terminal portions of the respective tracks externally of said tube.

3. In a rocket launcher, four elongated imperforate plates united along contiguous side edges to form a launcher tube generally square in cross section, track means within said tube to guide a rocket therealong in axial translation, a breechblock housing secured to and across the rear end of said tube in gas-tight relation with said plates and having an opening through which a rocket may be loaded into said tube, said housing providing confronting vertical guide channels at opposite sides of said tube, a generally rectangular breechblock slidable in and along said channels, a pair of counterweights, means fixed to said housing and guiding each counterweight for translation parallel with said breechblock at respectively opposite side edges thereof, first and second racks secured in confronting relation to said breechblock and one counterweight, respectively, third and fourth racks secured in confronting relation to said breechblock and the other counterweight, respectively, a first pinion journaled on said housing and meshing with said first and second racks, and a second pinion journaled on said housing and meshing with said third and fourth racks.

4. In a rocket launcher, four elongated imperforate plates united along contiguous side edges to form a launcher tube, a pair of tracks within said tube, each said track comprising a central base portion lying in a plane and secured to and extending along a respective one of oppositely-disposed plates, each said track having each longitudinal edge turned inwardly toward the other track, then reversely outwardly into said plane, then laterally in said plane and again inwardly to terminate in a flange in a second plane normal to said first plane, each said track forming a pair of parallel rails, said rails collectively defining a circle of substantially the same diameter as that of a rocket to be launched from said tube, said tracks being longer than and extending forwardly from said tube, spaced links rigidly connecting corresponding flanges of opposite tracks externally and forwardly of said tube, a breech housing secured to the breech end of said tube in gas-tight relation therewith and having an opening through which a rocket may be axially loaded into said tube, said housing providing vertical confronting channels at respectively opposite sides of said tube, a breechblock slidably guided for translation in and along said channels from a first position over and closing said opening to a second position clear of said opening, manually releasable means carried by said breechblock for locking the same in either of said positions, first and second vertical guides fixed to opposite sides of said housing, respectively, a counterweight mounted for translation only on and along each respective guide, first and second confronting parallel racks secured to said breechblock and one said counterweight respectively, third and fourth confronting parallel racks secured to said breechblock and the other of said counterweights respectively, a first pinion journaled on said housing and meshing with said third and fourth racks, and means effecting a gas-tight seal between said housing and said breechblock about the rear end of said tube when the breechblock is in first position.

5. In a device for launching a rocket from within an enclosed protective cover, a plurality of elongated flat plates continuously connected along continuous longitu-

dinal edges to form a launcher tube rectangular in transverse section, said tube being of a length slightly greater than the overall length of a rocket to be fired therefrom, and a pair of duplicate tracks secured within and extending along said tube, each said track comprising a central base portion secured centrally to and along opposite ones of said plates, respectively, each said plate having inwardly-directed reversely-bent side edges forming inwardly-extending linear guide rails, said rails being rigidly braces at their forward portions thereof for receiving a rocket loaded into said tube with a smooth sliding fit and guiding the same therealong in longitudinal translation.

6. In a launcher for a rocket, four elongated metallic plates rigidly united along contiguous side edges to form a tube substantially rectangular in cross-section, said tube being of a length equal to, at least, the overall length of a rocket to be fired therefrom, and first and second tracks each secured to and along the confronting inner surfaces of respective ones of oppositely-disposed plates, each said track comprising a flat base of sheet metal secured to and extending centrally and longitudinally along its plate and having its longitudinal side edges turned inwardly and thence outwardly in a reverse bend to form a pair of laterally spaced parallel rails extending longitudinally



along said tube, the radially innermost portions of said rails lying on the circumference of a circle of substantially the same diameter as a rocket to be fired from said launcher.


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