

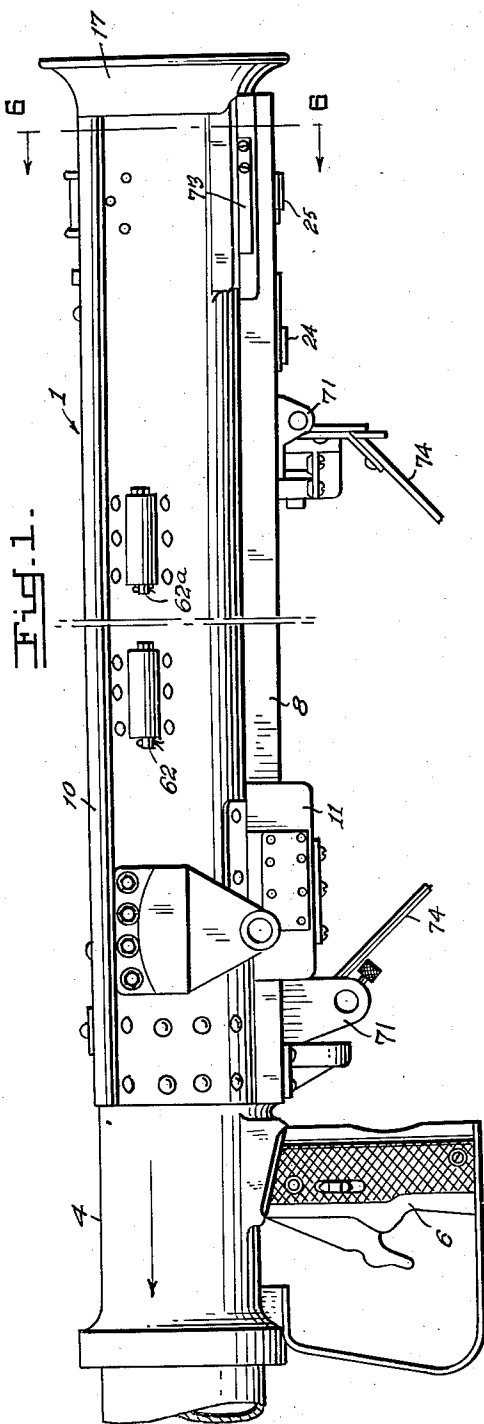
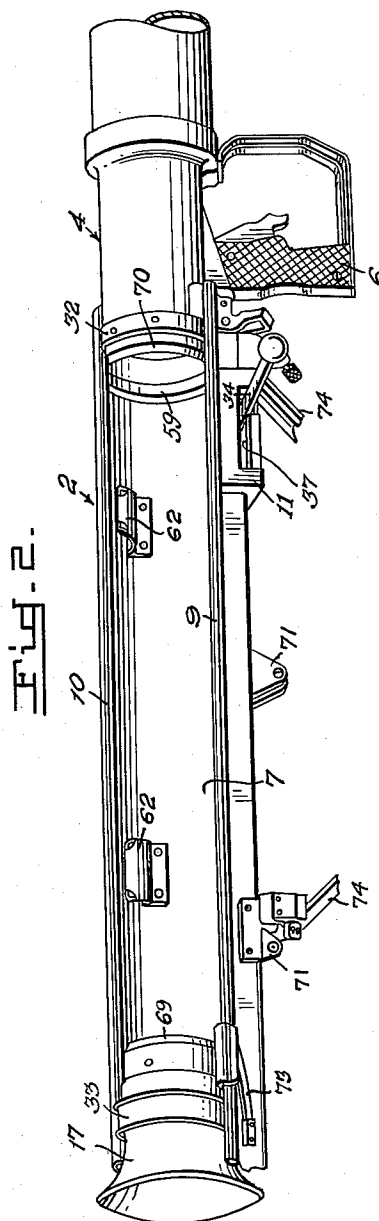
Jan. 3, 1961

L. M. HARVEY  
ROCKET LAUNCHER

2,966,827

Filed Jan. 27, 1959

5 Sheets-Sheet 1



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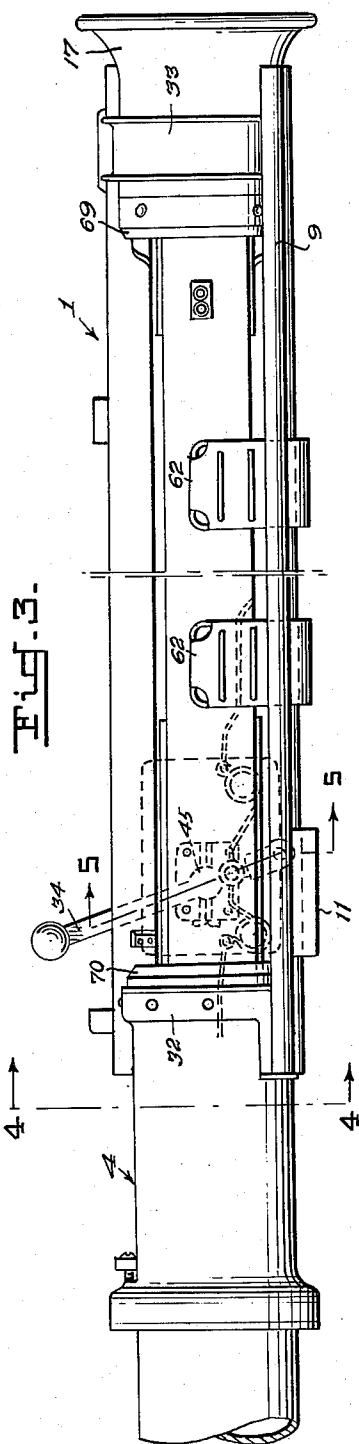
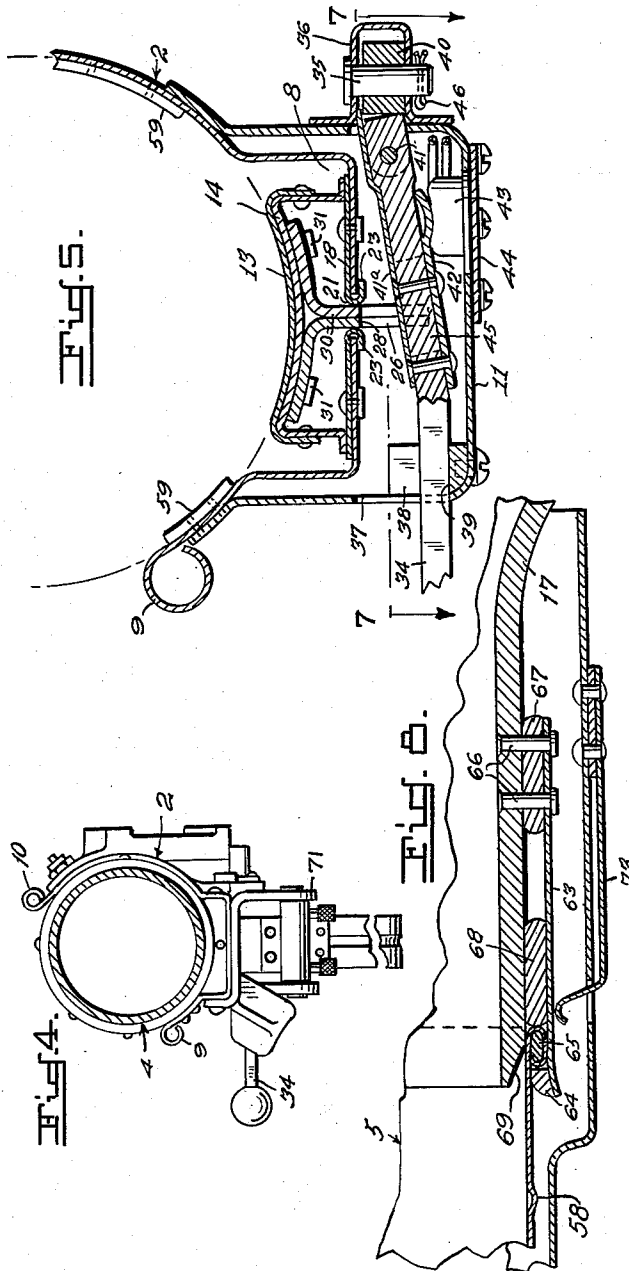
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5 Sheets-Sheet 2



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Fig. 11.

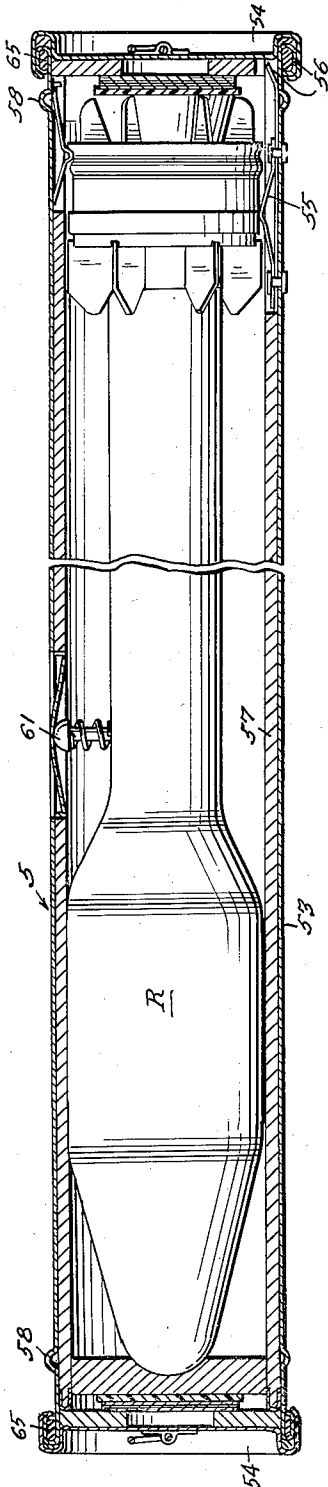


Fig. 7.

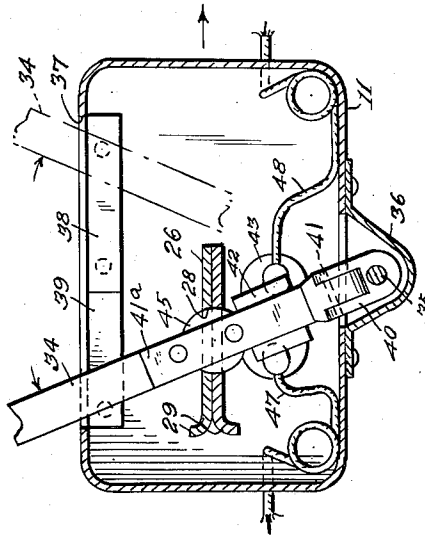
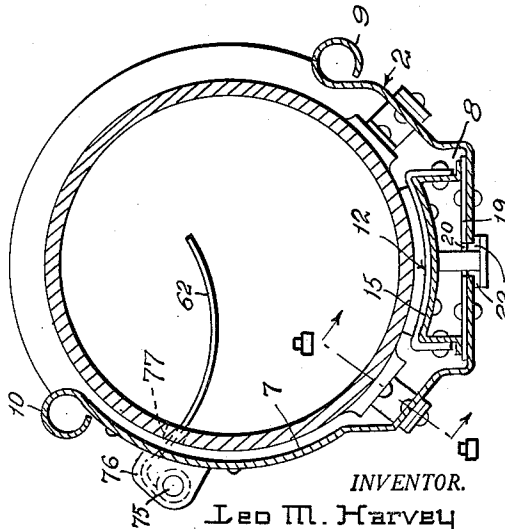


Fig. 6.



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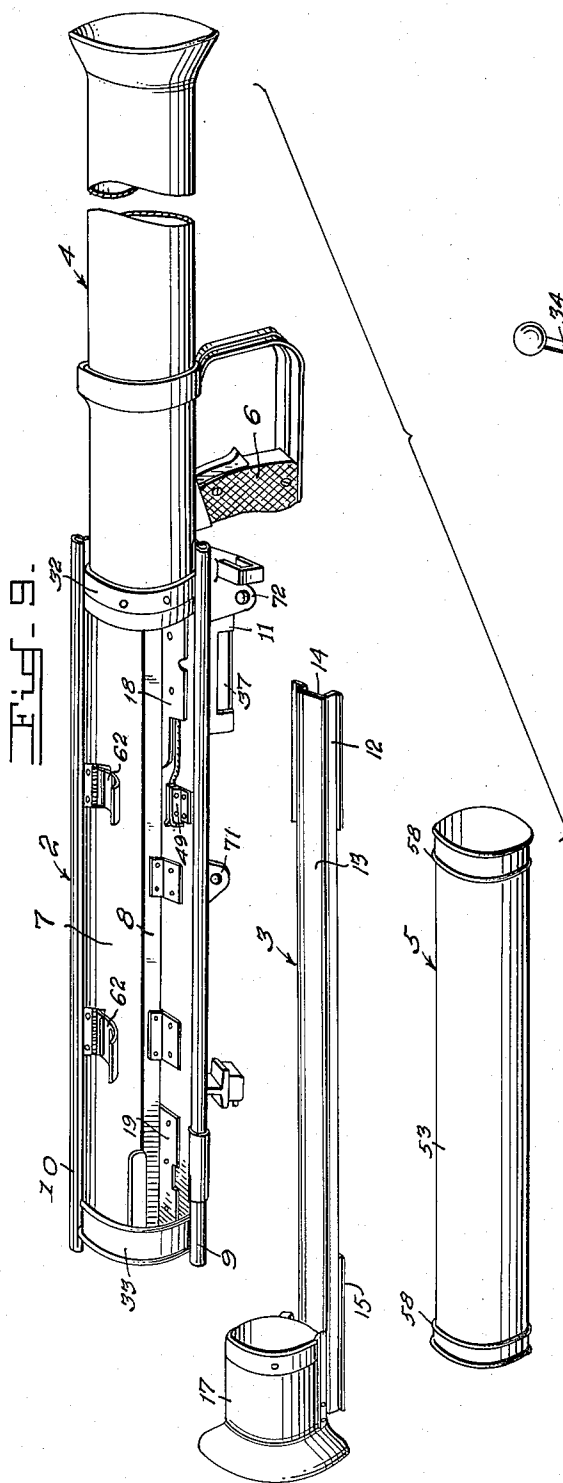
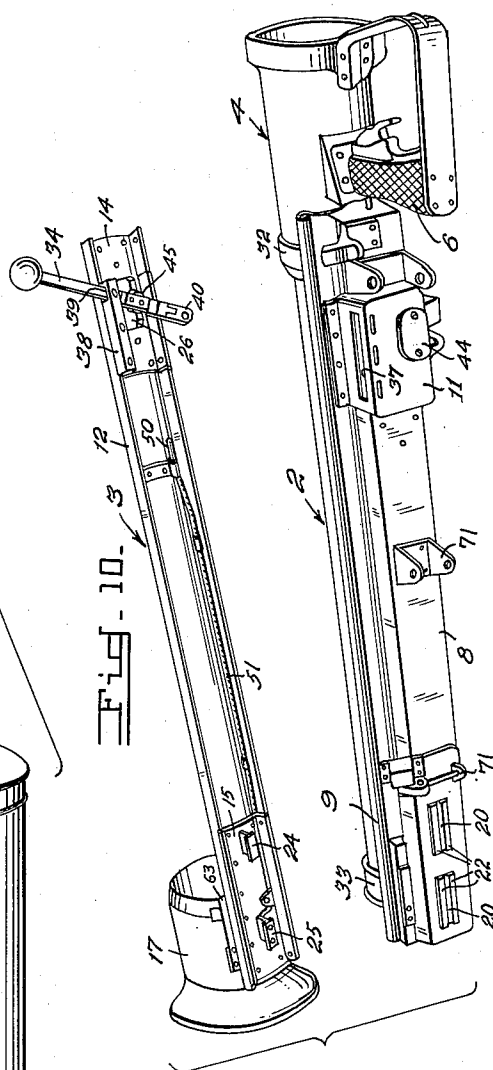
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2,966,827

Filed Jan. 27, 1959

5 Sheets-Sheet 4



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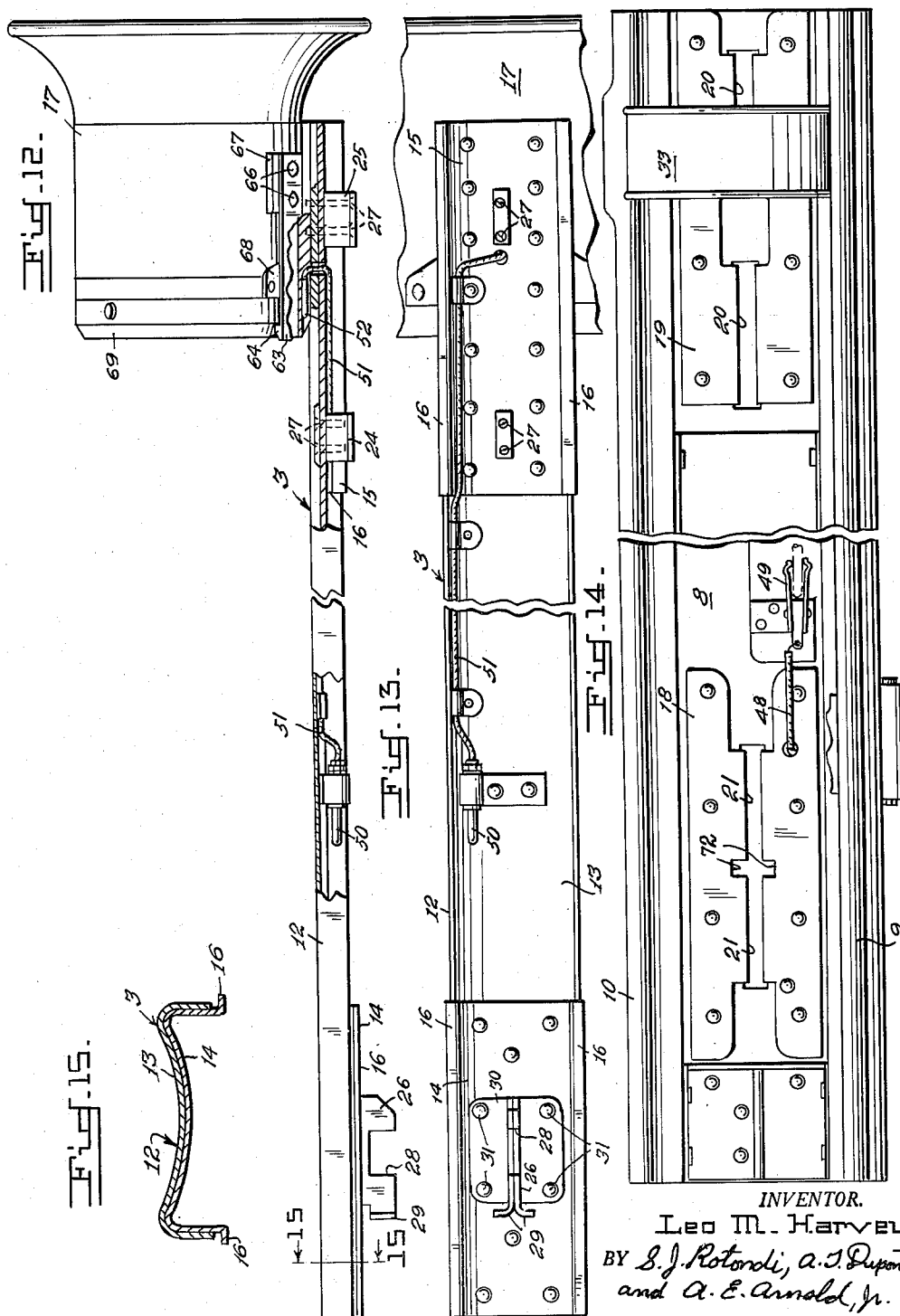
L. M. HARVEY

**2,966,827**

ROCKET LAUNCHER

Filed Jan. 27, 1959

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2,966,827

## ROCKET LAUNCHER

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Filed Jan. 27, 1959, Ser. No. 789,456

6 Claims. (Cl. 89—1.7)

This invention relates to a rocket launcher (and more particularly to a rocket launcher in which, the rocket per se, is prepackaged in a container, such container forming the breech chamber of a rocket launcher when inserted in longitudinal alignment between the barrel and the rearwardly disposed blast tube. The container is then securely engaged by movement of a shuttle bar mechanism and the firing connections are automatically made by the same action.

Heretofore, rockets have had to be removed from their containers before loading into a launcher with the attendant possibility of damaging the same either by accident or through mishandling. With the present invention, much of this hazard has been removed by having the rocket supplied to the launcher already packaged and loaded by removing a pair of covers and inserting the open ended container into a receiving body mechanism and securing it in the rocket launcher by a shuttle bar arrangement.

It is, therefore, an object of this invention to provide a rocket launcher having its ammunition encased in a moisture and shock-proof tubular container with removable end covers, the container to form a breech chamber with the barrel and blast tube of the launcher when the end covers are removed and the container is placed in longitudinal alignment between the barrel and blast tube of a launcher.

It is another object of the invention to provide a rocket launcher capable of being easily assembled or dismantled.

It is a still further object of the invention to provide a launcher wherein a rocket can be quickly loaded for firing and the firing circuit can be automatically connected to the trigger mechanism by a minimum of manual operations.

The specific nature of the invention as well as the 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 the breech end of a rocket launcher constructed in accordance with the invention, illustrating the receiver body, the blast tube, the barrel and the trigger mechanism;

Figure 2 is a perspective view of the launcher illustrated in Figure 1, taken from the reverse side thereof;

Figure 3 is a top view of the launcher;

Figure 4 is a cross section taken along line 4—4 of Figure 3;

Figure 5 is a cross sectional view of an enlarged scale, taken along line 5—5 of Figure 3, illustrating the operating lever mechanism;

Figure 6 is a cross section, taken along line 6—6 of Figure 1, certain parts being omitted for the sake of clarity;

Figure 7 is a sectional view, taken along line 7—7 of Figure 5, illustrating the operating lever in plan;

Figure 8 is a sectional view, taken along line 8—8 of Figure 6, illustrating one of the extractors;

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Figure 9 is an exploded perspective view of the component members of the rocket launcher, the operating lever mechanism having been removed;

Figure 10 is an exploded perspective view of the receiving body and the shuttle bar, looking from the bottom;

Figure 11 is a longitudinal section through a rocket container as used in the launcher;

Figure 12 is a somewhat enlarged side elevation of a shuttle bar and blast tube, certain parts being shown cut away;

Figure 13 is a bottom plan view of the parts shown in Figure 12;

Figure 14 is a top plan view of the receiver body with the barrel being removed; and

Figure 15 is an enlarged cross section, taken along line 15—15 of Figure 12.

Referring now to the drawings, 1 indicates generally the rocket launcher in its entirety, and comprises, as best seen in Figure 9 (which shows the main elements of the launcher with some mechanisms omitted for the sake of clarity), a receiver body, indicated generally by 2, a shuttle bar indicated generally by 3, a barrel portion 4, and a rocket container indicated generally by 5. A trigger mechanism 6 is provided on the barrel 4.

The receiver body 2 is secured at one of its ends to the barrel 4 and comprises a cylindrical open-end trough 7 which is canted to a position convenient for the operator in loading the launcher. As is best seen in Figure 6, the open-end trough 7 is depressed longitudinally along the bottom thereof to form a channel 8 for a purpose to be later described. The longitudinal edges 9 and 10 of the channel 8 are rolled outwardly to enhance loading therein and eliminate sharp edges. A housing 11 is attached to the under side of the receiver body 2 at its forward end for supporting operating mechanisms to be later described.

The shuttle bar 3 is comprised of an elongated channel bar 12 having a concave upper surface 13 to fit the contour of rocket container 5. As best viewed from Figures 10, 12, and 13, it will be seen that channel plates 14 and 15 are secured to the under surface of bar 12 at either end thereof. The plates are flanged outwardly as at 16 for a bearing surface to be described hereinafter. A blast tube 17 is affixed at one end of the bar 12.

In assembled relation, the shuttle bar 3 is slidably mounted in the receiving body 2 and on the upper surface of channel 8. As best seen in Figure 14, the channel 8 is provided with a pair of bearing plates 18 and 19, secured to its upper surface at either end thereof. As seen in Figures 5 and 6, the plates 18 and 19 are cut and turned down through longitudinal slots 20 and 21 cut through the bottom of channel 8 and then turned back under as at 22 and 23, thus forming a bearing surface for a pair of downwardly extending lugs 24 and 25 affixed to the rearward portion of the bar 12 and a downwardly extending lug 26 affixed to the lower surface of the bar 12 at the front end thereof. The lugs 24 and 25 are of inverted T-shape and are secured to the bar by screws 27, whereas the lug 26 is notched as at 28 and is provided with a pair of outwardly turned ears 29 as best seen in Figure 13. The lug 26 is formed of two pieces of stock and its upper ends 30 are flanged outwardly to form a pair of plates which are secured to the under side of the bar 12 by fastening elements 31. As best viewed from Figures 2, 3, and 9, it will be seen that the barrel 4 is secured to the receiver body 2 by a band 32 and that a band 33 is mounted at the rearward end of receiving body 2 to encircle the blast tube 17 when in assembled relation therewith.

Operating means for moving the shuttle bar in a reciprocating motion within receiver body 2 is provided

and consists of a combination hand lever 34 and contact switch mechanism mounted within the housing 11 which is secured to the under side of the receiver body 2. From Figures 2, 5, 7, and 10, it will be seen that the lever 34 of the operating means is pivoted about a pin 35 carried by the support 36 attached at one side of housing 11. The lever 34 is disposed transversely of the launcher and extends through an elongated opening 37 in the other side of housing 11. Lying within opening 37 and disposed under lever 34 is an elongated block 38 notched at one end thereof as at 39. This block does not close opening 37 but leaves space for the lever 34 to swing through when moved by the operator. Near its pivoted end, lever 34 has an extension 40 hinged thereto as at 41 and both parts are held in biased relation by a leaf spring 41a.

Fastened below the lever 34 is an electrical contact leaf spring 42, so that when the lever is in notch 39, the spring will make contact with a contact member 43 mounted on the floor of housing 11 by a mounting plate 44. Lever 34 is further provided with a disc-like intermediate portion 45, best seen in Figure 7, and when the lever is in assembled relation within housing 11, the portion 45 normally lies within notch 28 on lug 26 of the shuttle bar 3. A cotter pin 46 secures pivot 35 against accidental removal, and also to allow quick dismantling of the parts of the lever mechanism. Electrical leads 47 and 48, which connect the contact member 43 with the trigger mechanism 6 and the rocket firing contact means respectively, are mounted on the member 43. Lead 48 is secured in channel 8 to a jack 49 adapted to receive a contact finger 50 connected at one end of a lead 51 secured to the under surface of bar 12 and is snaked into a passage in the blast tube 17 and terminates in a contact finger 52.

The rocket container 5, best illustrated in Figure 11, is comprised of a substantially tubular body 53, closed at its ends by covers 54. The container is provided with a contact leaf spring 55, normally contacting the contact ring of a rocket when in the container, and a turned-up portion 56 to provide a spring-like contact member to contact finger 52 when the rocket and container are assembled in the launcher. The container tube is lined with suitable insulating and shock-absorbing material 57. Annular beads 58 are provided adjacent to both ends of the container 5 and are for the purpose of positioning the container when in assembly with the receiving body of the launcher. Stops 59 are provided within the inner walls of the receiver body 2 at the junction of the barrel and the receiver and abut with the annular beads 58 at the front end of the container. A ground contact is provided by the usual "throw-out" pin 61 of the rocket R which normally maintains the rocket unarmed until after the same has left the launcher. Spring-loaded ejecting means are provided within the receiver body 2 for aiding in ejecting the empty rocket container and consists of a plurality of spring-loaded concave flaps 62 lying in the path of a rocket and its container when loaded into the receiver. These flaps are mounted at their outer ends to shafts 75 carried by brackets 76 and extending through slots 77 in the side wall of the receiver.

Means for extracting the empty containers are provided and consist of a pair of elongated leaf springs 63 (see Figures 8, 10, and 12) attached to the blast tube 17. Heads 64 are attached to the free ends of the leaf springs 63 and normally snap over a bead 65 provided adjacent each end of the container 5, as best seen in Figure 8. The extractor leaf springs 63 are fastened at one end to the blast tube 17 by rivets 66 and are held in spaced relation to the blast tube by spacing elements 67 and 68. Spacer 68 acts also as a stop to limit the travel of the container. Extractor 63 is normally biased against the outer surface of the blast tube 17 by a spring 73. It will be seen also from Figure 8, that the inner edge of the blast tube is beveled as at 69. The purpose of this beveled edge is explained as follows: In its assembled

relation in the launcher container 5 fits snugly around both the blast tube and the barrel to form a continuous tube therewith, hence, the container will readily slide onto the blast tube when urged into position. A similar beveled edge 70 is provided on the barrel portion 4 and the effect of which is similar to the aforesaid.

The launcher may be equipped with lugs 71 for mounting on a standard rocket launcher tripod or for use with shoulder straps.

#### Operation

The operation of the launcher is as follows: Assuming that the launcher is empty, i.e., without a container in place and lever 34 is at its extreme rearward position in opening 37, the container 5, containing a rocket, is opened by taking off covers 54 at each end thereof and the container tube 53 is inserted in the receiver 2 and nested with its beads 58 abutting stops 59. The beads 58 are not positioned symmetrically with respect to the beads 65 on opposite ends of the tube 53. Hence the container tube 53 cannot be placed in the receiver body 2 in the wrong position, i.e., with the nose of the rocket pointing towards the rear of the launcher. The weight of the rocket in the container is sufficient to overcome the spring members 62 and hold them down.

The container is now ready to be secured in the launcher. Lever 34 is pushed all the way forward in opening 37 in housing 11 and simultaneously therewith the shuttle bar assembly 3 is moved forward, the flanges 16 riding on the plates 18 and 19 guided by lugs 24, 25, and 26 sliding in slots 20 and 21 and carrying with it the blast tube 17. The beveled edges 69 and 70 will slide into snug fit with the container tube 53 at each end thereof and a bead 65 will slide under the extractor heads 64 and be held securely therein. See Figure 8.

The jack 49 and the contact finger 50 are automatically engaged by movement of the shuttle bar forward and also the finger 52 contacts the turned up portion 56 of the leaf spring contact 55 on the container 5 thus completing the firing circuit to the contact member 43. The final operation consists in moving the lever 34 downwardly in its notch 39 to bring the contact spring 42 against the member 43 to complete the circuit to the trigger mechanism 6. By virtue of the "throw-out" pin 61 acting as a "ground," the circuit is now complete and is ready for the firing of a rocket.

To unload the launcher, the procedure is merely reversed. The extractor fingers or heads 64 will withdraw the container tube 53 from the blast tube and the ejector members 62 will fly upwards due to the reduction in weight by the launching of the rocket and the container tube will be ejected. The electric connections will be broken and the launcher made ready for further loading.

It is apparent from the foregoing that a highly efficient, yet greatly simplified, rocket launcher has been devised. The launcher possesses mobility and quick assembly or dismantling. By merely pulling out the cotter pin 46 and removing pivot 35 the lever may be withdrawn through opening 37. The lugs 24 and 25 may be loosened by unscrewing screws 27 and removed. The shuttle bar is moved until the turned-out ears 29 on lug 26 register with a notch 72 provided on bearing plates 18 and located medially in slot 21. The shuttle bar is then lifted upward and out. The barrel 4 is then disengaged from the receiving body and the rocket launcher can be stowed in a relatively small space or carried by a shoulder strap 74, etc. A screw driver can perform about all the operations needed to mount and dismantle the launcher. Suitable insulation (not shown) may be applied at critical points throughout the launcher to prevent shorting of the circuit due to dampness or wear.

It is to be understood that the form of the invention herein shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to,

without departing from the spirit of the invention, or the scope of the appended claims.

What is claimed is:

1. In a rocket launcher including an open receiving cradle, a barrel member fastened at its rearward end to said cradle, a tubular rocket container open at both end thereof and removeably positioned within said receiving cradle, a shuttle bar assembly including an elongated channel bar, a blast tube secured at the rearward end of said bar, means for guiding said shuttle bar axially in said cradle comprising a series of downwardly extending longitudinally aligned lugs attached to the under surface of said bar and adapted to slide in longitudinally aligned slots formed in the floor of said cradle, an operating lever carried by the forward under surface of said receiving cradle, said lever co-acting with one of said lugs to move said shuttle bar in a reciprocating movement within said cradle and secure said tubular container in snug engagement with said barrel and said blast tube to form a continuous launching tube therewith, and electrical contact means for firing a rocket when in said container including first and second terminals, said first terminal being carried by the under surface of said shuttle bar and said second terminal being carried by the upper surface of said cradle, said first terminal being connected to a contact finger located in said blast tube and said second terminal being connected to a contact member disposed on the floor of said housing on the under surface of said cradle, said contact member being connected in turn to a trigger mechanism located on said barrel member of said launcher, said first and said second electrical terminals being automatically engaged with each other upon full forward movement of said operating lever and establishing electrical contact between said contact member in said blast tube and said trigger mechanism upon pushing said lever in a downward movement.

2. In a rocket launcher as claimed in claim 1, wherein said receiving cradle is depressed along its floor to form a channel for locating the operating parts of said launcher, a pair of flat bearing plates fastened to the fore and aft portions of the floor of said chamber and a pair of channel plates having outwardly flanged edges fastened to the under surface of said shuttle bar adapted to slide upon said bearing plates when said shuttle bar is in its operating position within said receiving cradle.

3. In a rocket launcher as claimed in claim 1, wherein the shuttle bar includes an elongated channel bar having a concave upper surface to fit the contour of said rocket container when said container is in its firing position in said receiving cradle, a pair of spaced longitudinally aligned removable inverted T-shaped lugs extending downwardly from the under surface of the rearward portion of said bar, said T-shaped lugs being slidable in a pair of slots formed in the floor of said receiving cradle, a forwardly disposed notched lug on said bar aligned with said inverted T-shaped lugs, said notched lug being adapted to slide in a third slot formed in the floor of said cradle, said lug notch providing a bearing for a widened portion formed medially of said operating

lever to reciprocate said bar upon reciprocating movement of said lever.

4. In a launcher as claimed in claim 1 in which the rocket container includes a tubular member provided with an insulating liner, a removable cover affixed to each end thereof for inclosing a rocket therein, a leaf spring contact member secured to the inner wall of said container adapted to normally contact the contact-ring of a rocket when housed within said container, said spring being provided with an upturned extension at its rearward portion to provide a contact between said spring and a terminal provided within said blast tube leading to mechanism for firing said rocket, a first pair of annular beads irregularly disposed on the outer periphery of said container to prevent misplacement of said container in said receiving body, said beads being disposed to abut stops provided on the inner walls of said receiving cradle and to prevent axial movement of said container when assembled in said receiving cradle, and a second pair of annular beads located at the ends of said container acting as retaining means for said covers.

5. In a rocket launcher including a receiver body, a barrel portion secured at one end of said body, a shuttle bar assembly including a channel bar, a blast tube secured to the rearward end of said bar, an operating lever mounted within a housing attached to the under surface of the forward portion of said bar, one end of said lever being pivoted to a support carried by one side of said housing, the medial portion of said lever being disc-like and adapted to slide within a notch provided in an elongated downwardly extending lug attached to the under surface of said bar, said lever being disposed to move said bar axially with respect to said receiver body when moved about its pivot, the other end of said lever normally sliding in an elongated opening in the other side of said housing, locking means for said bar comprising an elongated notched flat bar normally disposed below said lever and attached to said housing to act as a lock for said lever when it is pushed downward in said notch and an electrical contact member secured to the floor of said housing, said lever contacting said electrical contact member when in locked position in said notch in said bar to complete a firing circuit between a rocket in said container and said trigger mechanism.

6. An operating lever as claimed in claim 5, wherein said lever comprises a handle portion and having an extension pivoted to said handle portion and pivotally mounted on a support attached to one side of said housing, and a leaf spring secured at one of its ends to the upper surface of said handle portion of said lever and having its free end normally biasing said lever extension in a downward direction.

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