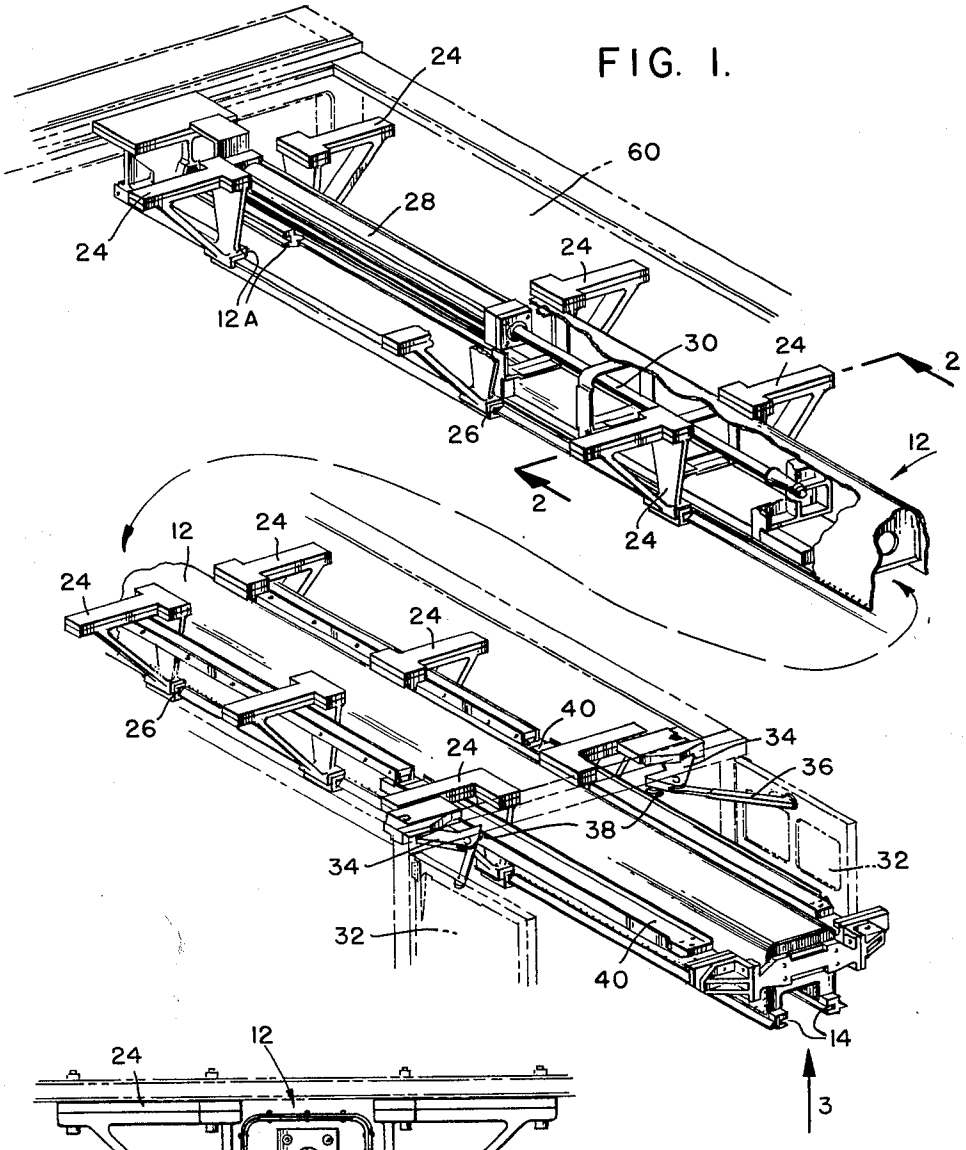
April 20, 1965 J. T. BRATTON 3,179,010

EXTENSIBLE LAUNCHING RAIL

Filed June 17, 1963 2 Sheets-Sheet 1

FIG. 1.



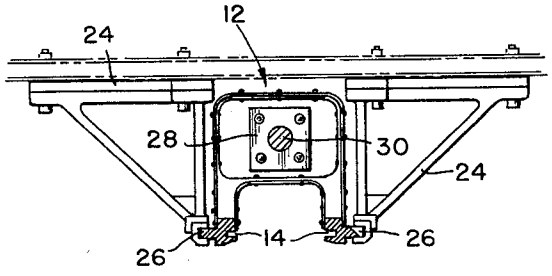


FIG. 2.

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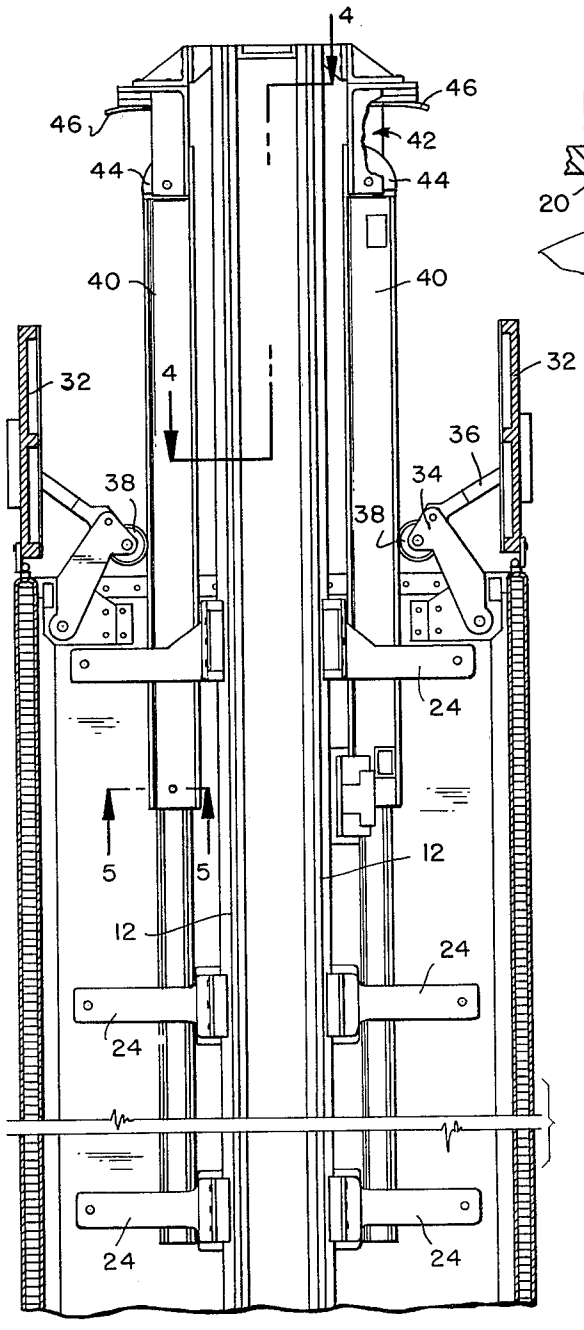


FIG. 3.

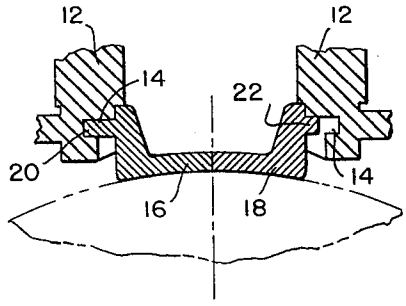


FIG. 4.

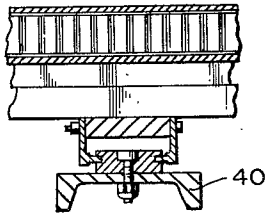


FIG. 5.

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EXTENSIBLE LAUNCHING RAIL

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Filed June 17, 1963, Ser. No. 288,569
1 Claim. (Cl. 89—1.7)

This invention relates to missile launcher components and more particularly to an extensible launcher rail apparatus as disclosed in patent application of Earl E. Biermann and Melvin Appelman, Serial No. 93,820, filed March 6, 1961, for "Launcher," now Patent 3,106,132.

In the application referred to there is disclosed a complete shipboard launcher assembly which includes four adjacent housings, each divided into upper and lower cells which contain rocket propelled missiles, the housings being supported for conjoint rotation about a vertical axis and each being selectively rotatable about a common horizontal axis. The principal purpose of the housings is to protect the missiles from deleterious weather conditions, such as sea spray, and to maintain them in a closure under controlled temperature conditions. A closure for such purpose need be no longer than the missile it contains and would thus be of minimum weight and bulk, both desirable on a ship, however, by so minimizing the length the launching rail became of insufficient length to launch the missile.

The principal object of the invention is to provide a missile launching rail, associated with a missile housing, which may be retracted into the missile housing until missile launching is desired, at which time it may be extended to provide a length adequate for launching the missile.

Another object is to utilize the motion of the launching rail during its extension and retraction to open and close closure doors disposed at the launching end of a launching cell.

Further objects, advantages and salient features will become more apparent from a consideration of the description to follow, the appended claim and the accompanying drawing, in which:

FIG. 1 is a two part isometric view, the parts being actually in axial alignment as indicated by the joining broken line, a central portion between the parts being omitted,

FIG. 2 is a section taken on line 2—2, FIG. 1,

FIG. 3 is a lower plan of the forward portion of FIG. 1 as viewed in the direction of arrow 3.

FIG. 4 is a section taken on line 4—4, FIG. 3, and

FIG. 5 is a section taken on line 5—5, FIG. 3.

Referring in detail to the drawing, cell 60 corresponds to one of the eight cells disclosed in the patent application referred to, which is closed at its rear end by a rupturable diaphragm (not shown) and its front end by a pair of doors. Each cell contains a launching rail 12 having parallel facing grooves 14 adjacent its lower edge which form guideways for slideably receiving a pair of longitudinally spaced launching lugs 16, 18, FIG. 4, which project upwardly from the missile. The lugs are substantially identical except that the laterally and oppositely projecting flanges 20 on front lug 16 are longer than the flanges 22 on rear lug 18. The lower inwardly projecting flanges, forming grooves 14, are cut away rearwardly from the front end of the rail for a distance equal to the spacing of the lugs so that when the front lug reaches the front end of the rail the rear lug simultaneously reaches the rear end of this cut away portion to permit the lugs to be simultaneously freed from guidance by the rail thus preventing tipping of the missile about the rear lug due to force of gravity which would

occur if the rear lug remained in the guide after the front lug had left same.

Rail 12 is supported for rectilinear movement by suitable brackets 24 supported from the roof of the cell which brackets may employ suitable gibs 26 for adjustment. A short rail portion 12A, having the same groove shape as rail 12 is fixed to the cell at the rear end of rail 12 and serves as a guide for loading a missile through the rear end of the cell onto rail 12. A double acting air operated pneumatic actuator 28 is fixed to the cell, its piston rod 30 being connected to an intermediate portion of the rail. As will be apparent, when the piston rod moves forwardly, the rail 12 slides forward away from fixed rail 12A projecting forwardly from the front end of the cell and when moved rearwardly returns the rail to its normal position within the cell.

A pair of hinged doors 32, 32 are provided for closing the front end of each cell, these being actuated by movement of the rail. As best shown in FIG. 3, each door is provided with a pivoted arm 34 connected by a pivoted link 36 to the door, the arm having a roller 38 which may ride along a guideway 40 having a depression 42 at its front end and a camming surface 44 joining the recess and guideway. When the rail is in retracted position with the doors closed the roller is disposed within the recess and when the rail moves forwardly, surface 44 cams the roller 38 and arm 34 outwardly thus opening the door to the position shown. When the rail is retracted the door remains open until finger 46 engages around the roller and forces it back into the depression thus positively closing the door. It will be apparent that a spring could be employed in lieu of such fingers to close the door.

When it is desired to load a missile into the launcher cell rail 12 is in retracted position with its rear end abuting the forward end of rail portion 12A. The front doors 32, 32 will be closed at this time and the rupture diaphragm (not shown) which closes the rear end will be removed. Suitable handling apparatus (not shown) aligns a missile with the launching rail and rams it forward to its launching position within the cell. During the final portion of the ramming operation a downwardly projecting lug (not shown) on the missile engages a resiliently urged detent and locks the missile against longitudinal movement. The diaphragm is then applied which completely closes the cell against entrance of water and the like. Suitable buffers (not shown) are then moved into engagement with the missile which prevent any movement of the missile in the cell and prevent undesired forces, resulting from ship roll and pitch, from being transmitted to the missile launcher lugs 16, 18. When it is desired to launch a missile, the buffers are moved out of engagement with the missile and air under pressure is applied to cylinder 28 which moves rail 12 to a position, as shown in FIG. 1, with its forward portion projecting beyond the forward end of the cell, the forward motion opening the doors. The missile remains in its original position engaged by the detent. The length of travel of the missile along the rail, before being freed from same, has now been increased by the distance the rear end of rail 12 has moved forwardly from fixed portion 12A. The missile is now ready to be launched and, assuming its thrust motor produces thrust in excess of the restraint of the detent, moves forwardly along and off of rail 12.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claim the invention may be practiced otherwise than as specifically described.

What is claimed is:

In a shipboard missile launcher of the type having an

elongated closed housing with operable closures at forward and rearward ends of same and mounted for rotation about horizontal and vertical axes, whereby the longitudinal axis of the housing may be oriented to desired positions in azimuth and elevation, said housing being of a length only slightly in excess of a rocket propelled missile to be contained in same, said missile having a pair of longitudinally spaced launching rail engaging lugs projecting upwardly therefrom,

(*a*) a missile launching rail extending between opposite ends of said housing for slideably receiving said lugs and suspending the missile therebelow,

(*b*) said launching rail comprising a relatively short loading portion immovably affixed to the housing adjacent the rear end of same, and

(*c*) an aligned launching portion slideably mounted by the housing having a missile stowage position in which its rear end abuts the forward end of the fixed loading portion with its forward end disposed within and adjacent the forward end of the housing, whereby the forward end of the housing may be closed by the forward closure, the spacing of said lugs being such that both lugs engage said launching portion with the rear lug spaced forward from the rear end of same,

(*d*) said launching portion adapted to move to a launching position in which its forward end is disposed outwardly beyond the forward end of the housing when the forward closure is opened, the rear lug then engaging said launching portion near its rear end, releasable means for maintaining the missile immovable relative to the housing when the launching portion is moved from its stowage position to its launching position,

(*e*) and power operated means for moving said launching portion between its stowage position and launching position.

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