Sept. 1, 1964 E. T. SUYDAM 3,146,670

MISSILE LAUNCHER ASSEMBLY

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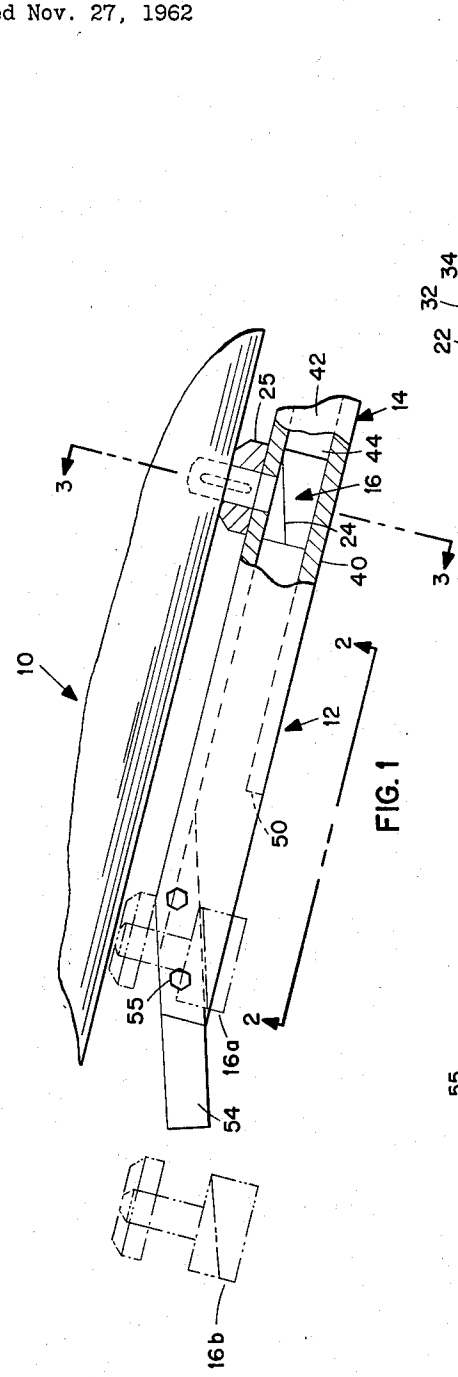


FIG. 1

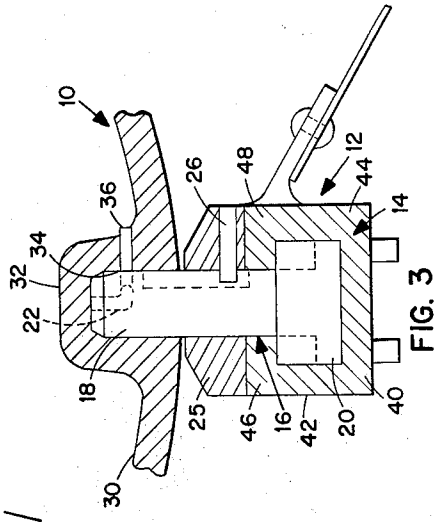


FIG. 3

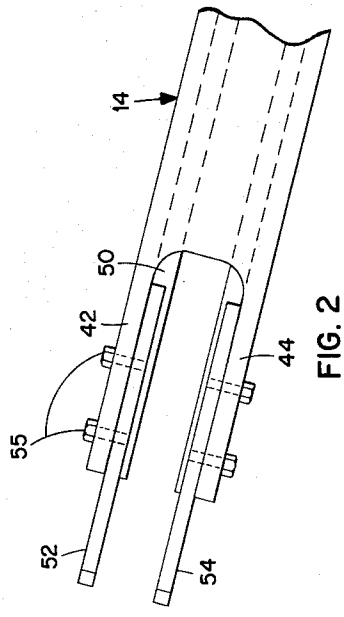


FIG. 2

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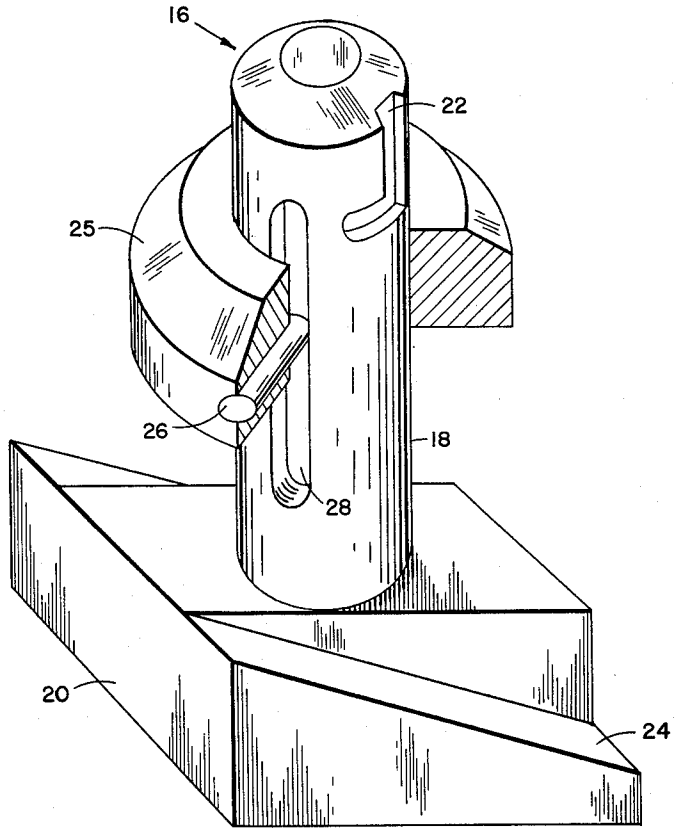


FIG. 4

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MISSILE LAUNCHER ASSEMBLY

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7 Claims. (Cl. 89—1.7)

The present invention pertains to launchers for rockets and more particularly relates to a jettisonable launcher assembly fitting for engaging the guide rail of the launcher.

In the use of prior launch fittings, the fitting was not jettisonable and therefor added additional weight to the missile cutting down the range for the same. Further the aerodynamic drag of the launch fitting not only decreased the range but it caused an unbalanced torque on the missile which affected the trajectory of the missile. In some cases an additional launch fitting was placed in the opposite side of the missile to balance the aerodynamic drag. This practice further added to the weight and drag affecting the missile flight.

An object of the present invention is to provide a missile launcher assembly which employs a jettisonable launch fitting to reduce the missile weight during flight.

Another object of the invention is to provide a missile launcher assembly wherein the launch fitting is jettisonable from the missile during the launching to reduce aerodynamic drag and unbalanced torque on the missile during flight.

One of the important features of the invention is to provide a launcher assembly which employs a launch fitting to accurately guide the missile on the launcher rails and which is subsequently positively and mechanically separated from the missile at the terminal end of the launcher rail.

These and other objects and advantages of the present invention will become apparent from the following detailed description taken with the accompanying drawings, wherein:

FIGURE 1 is a fragmentary side elevation view partially broken away illustrating the missile launcher assembly of the present invention.

FIGURE 2 is a fragmentary bottom view of the launcher along line 2—2 of FIGURE 1;

FIGURE 3 is a sectional view taken on line 3—3 of FIGURE 1; and

FIGURE 4 is a perspective view of the launch fitting.

Referring now to the drawings and particularly to FIGURE 1 thereof, **10** indicates a missile on a launcher **12** adjacent the end of its travel on the launcher. Launcher rail **14** is broken away to illustrate a jettisonable fitting **16** which forms an important part of the launcher assembly of the present invention. Fitting **16** is illustrated in phantom at two further positions **16***a* and **16***b* representing the positions of the fitting at later periods during the launching process, and illustrating the manner of separation of the fitting from the missile.

Fitting **16** is in the form of a pin or shank portion **18** (FIGURE 4) having a rectangular head **20**, the sides of which define guide faces. A J-slot **22** is formed in pin **18** at the distal end thereof. Head **20** is provided with a cam surface **24** which is inclined with respect to the axis of the pin for purposes explained hereinbelow.

A spacer ring **25** is mounted on pin **18**, for purposes described hereinbelow, by a retaining pin **26** which is fixed in a radial bore in ring **25** and projects inwardly therefrom into a vertical slot **28** formed in pin **18**. Thus ring **25** is capable of limited movement longitudinally of pin **18** but is precluded from removal from the pin.

The skin **30** of missile **10** (FIGURE 3) is provided with internal bosses **32** at points adapted to be adjacent rails **14** of the launcher. Each boss **32** is provided with

a blind bore **34** which is radial of the missile and leads to the exterior thereof. A shear pin **36** extends radially through the wall of boss **32** and projects into blind bore **34** for engagement with J-slot **22** on fitting **16**. When the missile is to be launched, launch fitting **16** is inserted into blind bore **34** so that shear pin **36** engages J-slot **22**. A 90 degree turn of the fitting then seats shear pin **36** in the bottom of J-slot **22** and locks the fitting in place.

The guide rail **14** is generally U-shaped in cross section, as best seen in FIGURE 3, and comprises a bottom **40**, two sides **42** and **44**, and two inwardly projecting top plates **46** and **48** at the upper edges of side plates **42** and **44**, respectively. When the rectangular head **20** of launch fitting **16** is inserted within side rail **14** it cannot turn and thus the fitting cannot disengage itself from the missile.

The previously mentioned ring **25** is interposed between missile **10** and the upper surfaces of top plates **46** and **48** to prevent damage to the missile skin by rubbing on the rail surface, and to provide clearance between the missile and the rail to prevent tilting of the missile when the center of gravity thereof passes the end of the launcher rail and before the rear end of the missile leaves the rail. The clearance also permits movement of the missile due to crosswind without causing tilting of the missile.

As best seen in FIGURES 1 and 2, bottom plate **40** of guide rail **14** is cut away at **50** adjacent the terminal end of the guide rail. Two fitting retracting plates **52** and **54** are fastened to the inner surfaces of side plates **42** and **44**, respectively, of guide rail **14** by capscrews **55**. The lower edges of retraction plates **52** and **54** are inclined downwardly and forwardly from guide rail **14** at substantially the same angle as cam surface **24** on head **20** of launch fitting **16**.

When the missile approaches the terminal ends of rails **14**, the cam surfaces **24** on head **20** of launch fitting **18** contact the under side of retraction plates **52** and **54**. Further forward movement of the missile causes the launch fitting to be withdrawn from the missile, as illustrated in phantom at **16***a* (FIGURE 1) shearing pin **36**. When the launch fitting reaches the ends of plates **52** and **54** it drops to the ground, as illustrated at **16***b*, and can then be reused to launch another missile.

While a preferred embodiment of the invention has been described herein it should be noted that various changes may be made therein without departing from the spirit of the invention as defined in the appended claims.

I claim:

1. In a missile launcher assembly the combination which comprises, a missile, a U-shaped guide rail, a launch fitting releasably mounted in a lateral bore in said missile, said fitting having a rectangular head for engagement within said guide rail, a pair of retraction plates fixed to the side sections of said U-shaped guide rail adjacent the forward end thereof, said retraction plates projecting forwardly and downwardly from said guide rail, and inclined cam surfaces formed on the head of said launch fitting for engagement with said retraction plates, whereby as the missile moves forward on said guide rail the retraction plates will engage said launch fitting and withdraw said fitting from said missile.

2. A missile launcher assembly as set forth in claim 1 wherein a shear pin is mounted in said missile and projects into said lateral bore, and a J-slot is formed in said fitting for engagement with said shear pin.

3. A missile launcher assembly as set forth in claim 1, wherein a spacer ring is mounted on said fitting between said missile and said launcher rail.

4. A missile launcher assembly as set forth in claim 3 wherein said spacer ring is mounted for limited movement with respect to said fitting by a pin radially affixed

to said ring and projecting inwardly into a longitudinal groove formed in said fitting.

5. For use in a missile launcher assembly the combination which comprises, a missile having a lateral bore formed therein, a shear pin projecting into said bore, a launch fitting having a shank portion and a head, said shank portion being received in said bore, a J-slot formed in said shank portion of said fitting, said shear pin being received in said J-slot so as to latch said shank portion in said bore, and said head having cam surface means and flat guide faces for coaction with means on a guide rail to adapt said fitting for removal from said bore by sufficient force being applied to said cam surface means so as to cause shearing of said shear pin.

6. For use in a missile launcher assembly, the combination which comprises, a missile having a lateral bore formed therein, a shear pin projecting into said bore, a launch fitting having a shank portion and a rectangular head portion, said shank portion being received in said

bore, a J-slot formed in said shank portion of said fitting and engaging said shear pin, a spacer ring mounted on the shank portion of said fitting, and retaining means provided to permit only limited movement of said ring relative to said pin.

7. The combination as set forth in claim 6 wherein said retaining means comprises a longitudinal groove in the shank portion of said fitting, and a pin projecting radially inward from said ring into said longitudinal groove.

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