July 20, 1948. F. C. EASTMAN 2,445,423

SAFETY CONTAINER FOR ROCKETS

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Fig. 1

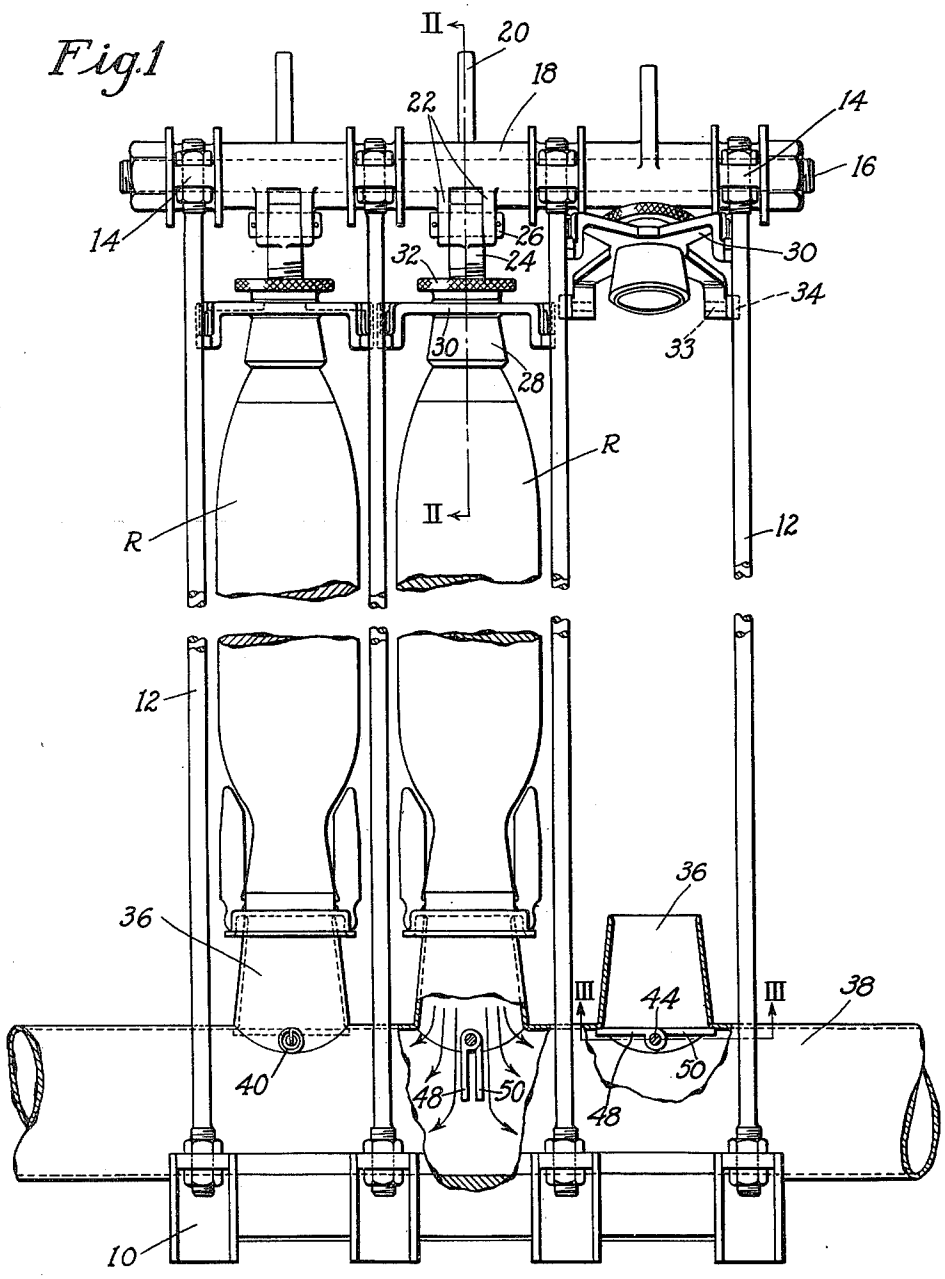

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Fig. 2

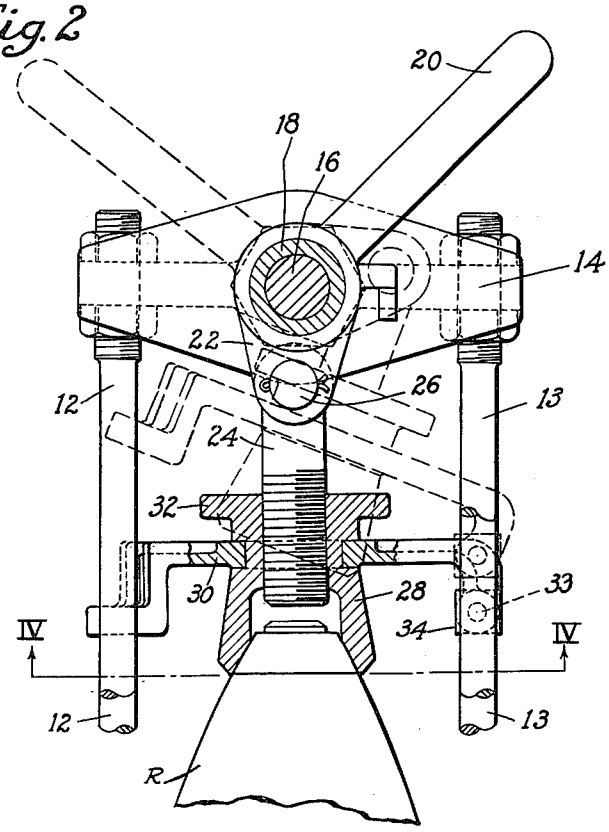


Fig. 3

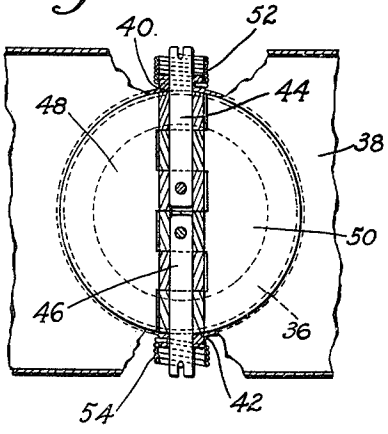
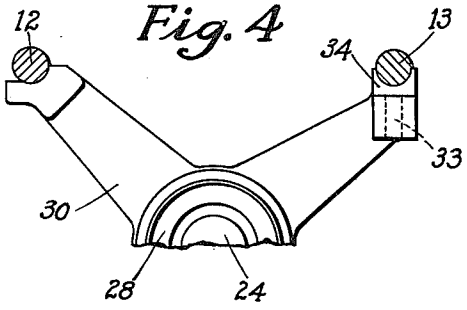


Fig. 4



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SAFETY CONTAINER FOR ROCKETS

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6 Claims. (Cl. 102—49)

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This invention relates to a safety container for rocket projectiles, such a container being adapted to be installed in aircraft, naval craft, vehicles, or any location where it is desirable to guard against the hazard created by unexpected ignition of the propelling charge of a rocket, by enemy bullets or otherwise.

Experience in combat has taught that when the motor section of a rocket being carried otherwise than in a launching tube is penetrated by a bullet the propelling charge in the rocket is often ignited and the rocket "takes off," with disastrous result to the craft in which it is being carried and/or to persons in the vicinity.

The object of the present invention is to remove the danger to persons and equipment resulting from unexpected or accidental ignition of the propelling charges of rockets stored in an airplane, boat, vehicle or the like. This is accomplished, according to the invention, by providing a storage structure comprising means for positively holding the rockets from movement and at the same time conducting away the blast of burning gases from ignited propelling charges to a place where it will do no damage.

One embodiment of the invention, selected for purposes of illustration, is fully described in connection with the accompanying drawings, in which

Fig. 1 is a view in front elevation of a three-section holder or container in which two sections are occupied by rockets and one section is empty;

Fig. 2 is an enlarged view, partly in elevation and partly in section upon the line II—II of Fig. 1;

Fig. 3 is an inverted plan view; partly in section upon the line III—III of Fig. 1; and

Fig. 4 is an inverted plan view on the line IV—IV of Fig. 2.

Although the invention is illustrated as embodied in a container comprising three sections, adapted to hold three rockets, the apparatus may obviously consist of a holder for a single rocket or any multiple thereof.

Referring to Figs. 1 and 2, a base 10 is connected by upright front bars 12 and rear bars 13 to an upper crosshead 14 in which is secured a stationary, horizontal shaft 16. Journaled upon the shaft 16 is a sleeve 18 having a radially projecting handle 20, and a pair of radial lugs 22 which constitute one member of a toggle. The other member of the toggle is a short rod 24 articulated with the lugs 22 by a pivot pin 26. The lower end of the rod 24 is screw threaded into a cup 28, the open, lower end of which

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is formed to receive and fit the nose of a rocket R.

The cup 28 is mounted rotatably in a guide slide 30 which is vertically movable upon the bars 12 and 13. A flange 32, integral with the cup 28 and having a knurled periphery, provides manually operable means for screwing the cup up or down on the rod 24 to adjust the position of the cup to the length of the rockets to be held.

As shown in Figs. 2 and 4, the front portion of the slide 30 is formed to fit against the front bars 12 when the slide is horizontal, and the rear portion of the slide is journaled on pivot pins 33 carried by slidable blocks 34 formed to fit against the rear bars 13.

The structure described above constitutes a toggle clamp for positively holding down a rocket engaged by the cup 28. In Fig. 1 rockets are shown clamped in the left-hand and center holding units and the right-hand unit is shown empty, with the clamping cup 28 raised. In use, when the handle 20 is swung forward around the shaft 16, to the position shown in broken lines in Fig. 2, the guide slide 30 and clamping cup 28 are raised to inoperative positions, permitting easy removal or insertion of a rocket. When the handle is swung rearward and the parts are in the positions shown in full lines, the toggle 22, 24 is straight and the cup 28 is held down positively in clamping engagement with the nose of the rocket R.

The lower, or tail, end of each rocket rests upon and is supported by the upper end of a short, downwardly flaring exhaust tube 36, the lower end of which opens into a relatively large, horizontal, open ended, exhaust manifold 38 disposed at right angles to the axis of the tube and having a cross-sectional area larger than that of the tube. The gases in the blast from an ignited rocket expand, with a reduction of pressure, while passing through the flaring exhaust tube 36 and then expand greatly in the large manifold 38, with the result that by the time they escape their pressure is much lowered.

The exhaust manifold 38 may be of any length necessary to conduct the blast of burning gases away to a place where it will do no damage. For example, when the rocket container or holder is installed in an aircraft, which is one of the locations where it is most valuable, the exhaust manifold may extend to, and through, both sides of the fuselage and discharge the rocket blast into the outside air at both sides of the craft, without damage to equipment or personnel. Release of the gases simultaneously in opposite directions produces such a balance of forces that

there is no noticeable effect upon the flight or maneuverability of the craft.

In order to divide the stream of gases as they emerge from the exhaust tube **36** and to facilitate their flow in opposite directions in the manifold **38**, as well as to afford safety from accidental ignition of one rocket in a multi-unit holder by a blast of flame from another rocket which has been ignited, a one-way, two-flap, check valve or folding gate, which opens only downward, is provided at the lower end of each exhaust tube **36**. As shown in Figs. 1 and 3, the manifold **38** has, at the lower end of each tube **36**, a front bearing **40** and a rear bearing **42**. Journaled in the bearing **40** is a short shaft **44** which extends inward half way across the open lower end of the tube **36**. Journaled in the bearing **42** is a similar short shaft **46**, in alinement with the shaft **44**. A semicircular flap **48** is pinned to the shaft **44** and a similar semicircular flap **50** is pinned to the shaft **46**. Light torsion springs **52** and **54** surrounding the shafts **44** and **46**, respectively, tend continually to rotate said shafts oppositely in such directions as to maintain the flaps **48** and **50** in the positions shown in Fig. 3 and in the right-hand and left-hand units in Fig. 1, with the lower ends of the exhaust tubes **36** closed against the entrance of burning blast gases from the manifold **38**.

When the propelling charge of a rocket in a holder is ignited the springs **52** and **54** yield readily to the downward pressure of the blast upon the flaps **48** and **50**, and permit the flaps to swing down to the positions shown in the center holder in Fig. 1, dividing the blast of burning gases and allowing them to flow in opposite directions in the manifold **38**, as indicated by the arrows on the drawing.

Tests have demonstrated that it is entirely practicable to hold a rocket while its propelling charge is burning out, if a free exit is provided for the burning gases and the rocket is not allowed to start to move, whereas if any initial movement is permitted it is difficult or impossible to stop the flight of the rocket. The present invention provides simple, practical means for positively holding one or more rockets, and conducting away to a safe place the blast of burning gases resulting from accidental ignition of their propelling charges.

Having described the invention, what is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A safety container for rockets comprising a rocket holder provided with means for positively holding a rocket against movement, an open exhaust manifold disposed transversely of the axis of a rocket in the holder and spaced from the tail end of the rocket, and an exhaust tube opening into said manifold, said tube being coaxial with the rocket and having one of its ends in contact with the tail end of the rocket.

2. A safety container for rockets comprising a plurality of rocket holders arranged side by side and each provided with means for positively holding a rocket against movement, an open exhaust manifold disposed transversely of the axes of rockets in said holders and spaced from the tail ends of the rockets, and a plurality of exhaust tubes opening into said manifold, said tubes being coaxial with said rockets, respectively, and each tube having one of its ends in contact with one of the rockets.

3. A safety container for rockets comprising a storage structure provided with holders for retaining rockets, exhaust tubes, in contact with the tail ends of rockets in said holders, for conducting away gases from the rockets in the event of accidental ignition of the propelling charges thereof, and an open ended exhaust manifold into which said tubes lead and which extends from said tubes in opposite directions at right angles to their axes.

4. A safety holder for rockets comprising an exhaust tube, clamping means for holding a rocket with its tail end against one end of said tube, an exhaust manifold into which the other end of said tube leads, said manifold being disposed at right angles to the axis of said tube, and means associated with the tube for dividing gases emerging from the tube to cause them to flow in opposite directions in the manifold.

5. A safety holder for rockets comprising an exhaust tube, clamping means for holding a rocket with its tail end against one end of said tube, and a yieldable, one-way gate associated with the tube and opening only outwardly thereof to permit emergence of burning gases from the tube while preventing entrance of flame into the tube in the opposite direction.

6. A safety holder for rockets comprising means for positively holding a rocket from movement, a flaring exhaust tube disposed with its small end in register with the tail end of a rocket in the holder, and an open exhaust manifold having a cross-sectional area larger than that of the tube, into which the large end of the tube opens.

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REFERENCES CITED

The following references are of record in the file of this patent:

FOREIGN PATENTS

Number	Country	Date
2,330	Great Britain	Feb. 13, 1915
298,525	Germany	Nov. 22, 1920
507,684	France	July 1, 1920