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C. L. PAULUS

BOMB OR FLARE RACK

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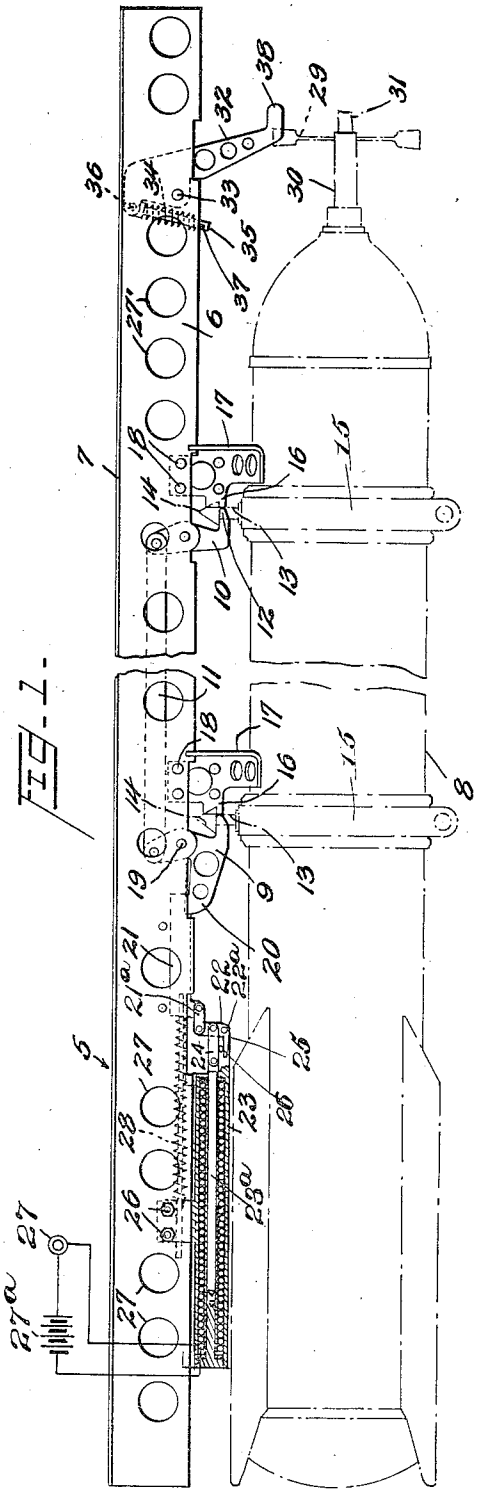

FIG. 1.

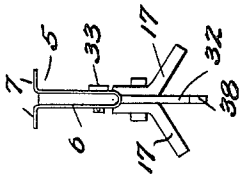

FIG. 2.

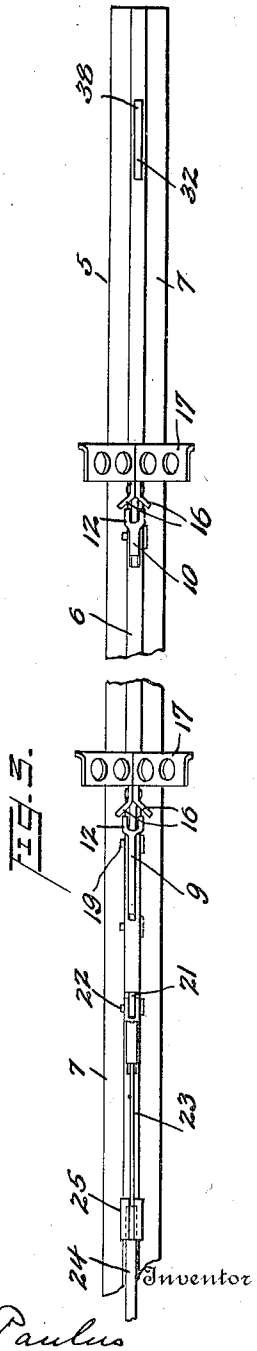

FIG. 3.

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# UNITED STATES PATENT OFFICE.

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## BOMB OR FLARE RACK.

Application filed May 11, 1923. Serial No. 638,248.

This invention relates to racks especially designed for use on airplanes for the purpose of accurately dropping bombs or flares, the same being generally used in conjunction with a bomb sight.

The object of the present invention is to simplify, improve and render more reliable what is known as the Michelin Mark I flare rack type B and particularly to eliminate the danger attending the mounting and carrying of high explosive bombs.

With the above and other objects in view, the invention consists in the novel construction, combination and arrangement herein fully described, shown and claimed.

In the accompanying drawings,

Figure 1 is a side elevation partly in section of the improved rack.

Figure 2 is an end elevation of the same looking toward the front end thereof.

Figure 3 is a bottom plan view thereof.

The improved rack comprises what I term a T-rail designated generally at 5, the same comprising a hollow-U-shaped body portion 6 and outturned upper edge portions forming oppositely extending flanges 7, by means of which the T rail is secured by suitable fastening means, usually to the bottom of the lower supporting surface or aerofoil of an airplane. The U-shaped body portion is adapted to contain most of the working mechanism of the bomb holding and releasing means.

The bomb or flare represented by the outline 8 is supported underneath the T-rail 5, as indicated in Figure 1, by means of two or more hooks 9 and 10 which hooks are interconnected by a coupling bar or rod 11 to cause both hooks to move in unison. The hooks 10 have the forked ends 12, as shown in the bottom plan view, said ends being adapted to embrace shanks 13 connecting acorn-shaped heads 14 to bands 15 which encircle the bomb or flare, as shown. The forked ends 12 of the hooks engage under the acorn heads 14 and press the latter tightly against forked extensions 16 extending horizontally from bomb steadying or holding brackets 17. The brackets 17 are secured to the body of the T-rail 5 by fastening means, such as bolts or rivets 18 and the downwardly extending forked arms thereof bear against and practically straddle the upper portion of the bomb or flare 8, as clearly indicated in the drawings. The bomb is thus held in a steady manner and a firm engagement between the hooks 9 and 10 and the heads 14, is insured.

The hook 9 is termed a locking hook, the same being connected by a pivot to the T-rail and having an extension or locking arm 20 which extends in a horizontal direction, the extremity thereof underlying a locking bar 21 movable longitudinally within the hollow portion of the body 6 of the T-rail. Connected pivotally to the locking bar 21 is a link $21^a$ in turn pivotally connected to the upstanding arm of a lever 22 mounted on a pivot $22^a$ on the frame or housing of a solenoid magnet 23. The armature $23^a$ of the solenoid is connected by link 24 to the lever 22. A short stop arm 25 on the lever 22 strikes against a stop 26 to maintain the locking bar 21 in proper engagement with the hook 9. A push button switch 27 controls the solenoid magnet circuit containing a battery $27^a$ or other source of electrical energy. The T-rail is formed with lightening holes 27′.

In operation a push on the circuit closing switch button effects a sliding movement of the locking bar 21 against the tension of a spring 28, withdrawing the bar 21 from engagement with the locking hook 9. This allows the arm 20 of the locking hook to spring upwardly under the weight of the bomb or flare and causes the hook 9 to swing laterally from under the head 14. Simultaneously the other hook 10 is swung out of engagement with the respective head 14 and the bomb or flare is dropped.

At the forward end of the bomb or flare there is arranged a rotary arming vane 29 which has primarily attached thereto a cylindrical casing or shell 30 of small diameter including a fuse and booster charge, said shell or casing being adapted to be screwed into the forward end of the shell of the bomb flare in the position indicated in the drawings. The shell indicated at 30 containing the fuse and booster charge also contains a plunger or firing pin 31 to cause detonation of the bomb upon striking the ground or other object. When the bomb or flare is in its supported position beneath the T-rail 5, the arming vane is engaged by a pendant retaining arm 32 supported on a pivot 33 carried by the T-rail 5. The arm 32 is held in locking position by means of a coil spring 34 which surrounds a stem 35 pivotally connected at one end as at 36 to the arm 32 and extending downwardly

through an opening in the base of the hollow portion of the bottom 6 of the T-rail where it is provided with a stud pin 37 to limit the upward movement of the stem 35 and properly position the retaining arm 32. The retaining arm 32 is provided with a finger hold or grip extension 38 to enable said arm to be lifted by the operator when assembling the arming vane, fuse and booster charge with the bomb or flare.

From the foregoing description, taken in connection with the accompanying drawings, it will now be seen that the bomb or flare, while unarmed, may be placed upon the supporting rack and thereafter, by lifting the retaining arm 32 or arming vane, together with the fuse, booster charge and firing pin assembly may be attached to the bomb. The retaining arm 32 is itself allowed to move by action of the spring 34 into engagement with the arm vane which is thus locked against rotation. When the bomb or flare is dropped or released from the rack the arming vane passes out of engagement with the retaining arm 32 and by action of the air current the arming vane 29 is thus spun off, the bomb thereby unlocking the firing pin or plunger 31 which is then free to move lengthwise and effect detonation of the bomb or flare.

I claim:—

1. In combination, a rack for an aerial bomb having a rotary bombing vane adapted to be spun therefrom to render the bomb effective, safety means on said rack directly engaging said vane to hold the vane from spinning while supported by the rack, said safety means being yieldingly held in engagement with the vane and being manually movable to permit assembly of the arming vane and bomb.

2. In a bomb dropping rack, a T-rail having a U-shaped upright body portion and horizontally extending flanges adapted to be directly connected to the airplane, a bomb-supporting hook mounted for pivotal movement in said body portion and means for locking said hook against pivotal movement.

3. In a bomb dropping rack, a T-rail having a U-shaped upright body portion, bomb supporting hooks mounted for pivotal movement in said body portion, means within said U-shaped body for inter-connecting the same, means for locking one of said hooks and means for releasing said locking means.

4. In a bomb-dropping rack, a T-rail having a U-shaped upright body portion, bomb supporting and releasing means carried by said rail within said U-shaped body portion and forked brackets against which the bomb may abut in carrying position, said forked brackets having portions adapted to prevent the bomb from slipping from its supporting means.

5. In combination with an aerial bomb having a headed projection by which it is supported, a supporting rail, a supporting hook supported on said rail and provided with a bifurcated lip, the legs of said bifurcation adapted to pass said projection and support the head of the same from beneath, means on the rail to engage the head of said projection to limit the movement of the bomb in one direction and means for releasing said hook.

6. In a bomb dropping rack, a T-rail having a U-shaped upright body portion, bomb supporting hooks mounted for pivotal movement in said body portion, means within said U-shaped body portion for inter-connecting the same, means within said body portion for unlocking one of said hooks, and means for releasing said locking means.

7. In a bomb dropping rack, a T-rail having a U-shaped upright body portion, bomb supporting hooks mounted for pivotal movement in said body portion, means for inter-connecting the same, means for locking one of said hooks, and brace means connected to said rack and adapted to abut said supporting hooks when they are in operative position to prevent the bomb from slipping therefrom.

8. In a bomb dropping rack, a T-rail having a U-shaped upright body portion, bomb supporting hooks mounted for pivotal movement in said body portion, means within said U-shaped body portion for inter-connecting the same, means for locking one of said hooks, and brace means connected to said rack and adapted to abut said supporting hooks when they are in operative position to prevent the bomb from slipping therefrom.

9. In a bomb dropping rack, a T-rail having a U-shaped upright body portion, bomb supporting pronged hooks mounted for pivotal movement in said body portion, means within said U-shaped body portion for inter-connecting the same, means for locking one of said hooks, and brace means connected to said rack and adapted to abut said supporting hooks when they are in operative position to prevent the bomb from slipping therefrom.

10. In a bomb dropping rack, a T-rail having a U-shaped upright body portion, bomb supporting hooks mounted for pivotal movement in said body portion, means for inter-connecting the same, means slidable to engage one of said hooks to lock the same, and means for releasing said locking means.

In testimony whereof I affix my signature.

CHARLES L. PAULUS.