F. C. GRAF AND M. J. ZWOSTA.

DEVICE FOR DROPPING BOMBS OR OTHER DEVICES.

APPLICATION FILED OCT. 29, 1918.

1,335,283. **Patented Mar. 30, 1920.**

Fig:1.

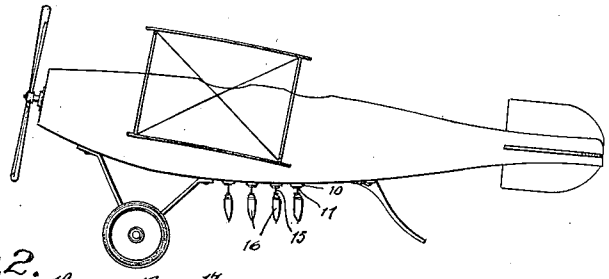


Fig:2.

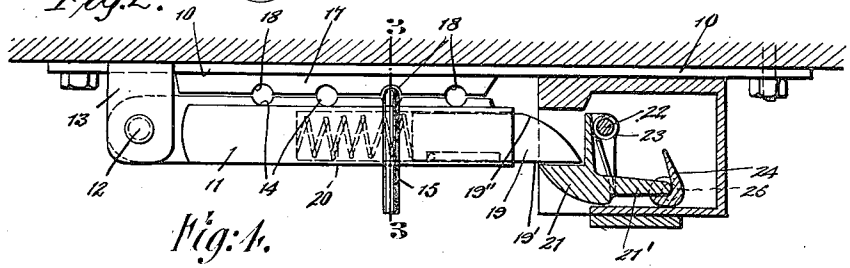
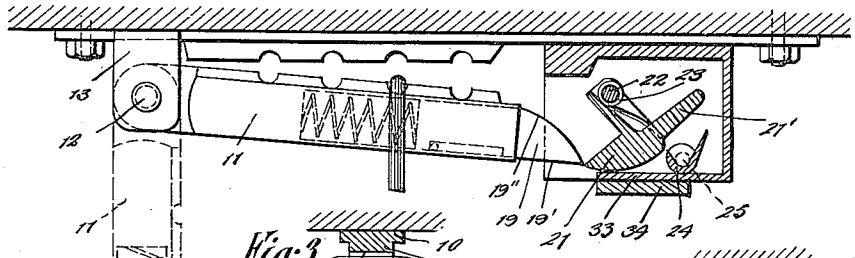


Fig:4.



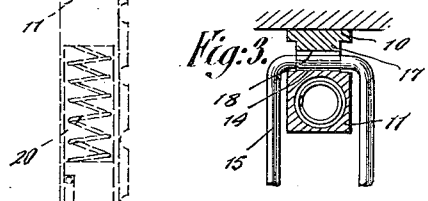


Fig:3.

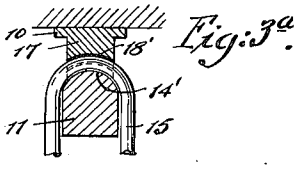


Fig:3a.

Fig:5.

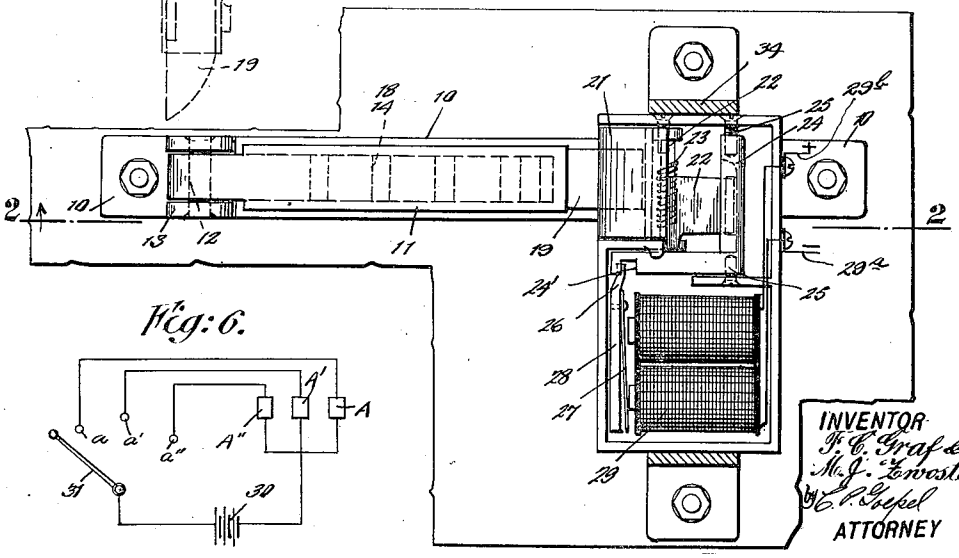


Fig:6.

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DEVICE FOR DROPPING BOMBS OR OTHER DEVICES.

1,335,283. Specification of Letters Patent. Patented Mar. 30, 1920.

Application filed October 29, 1918. Serial No. 260,092.

To all whom it may concern:

Be it known that we, FREDERICK CHARLES GRAF, a citizen of the United States, and a resident of Brooklyn, in the city and State of New York, and MICHAEL J. ZWOSTA, a citizen of the United States, and a resident of Evergreen, county of Queens, Long Island, in the State of New York, have invented certain new and useful Improvements in Devices for Dropping Bombs or other Devices, of which the following is a specification.

The present invention relates to improvements in devices for dropping bombs or other articles and is applicable generally in cases where an article is to be held upon, or connected with, a carrier, and released therefrom at certain times, generally at the operator's choice.

It is an object of the present invention to provide an improved device of this character particularly for use upon airplanes or other aircraft and which may be operated with certainty and in no way hamper or inconvenience the pilot or the operator in his control of the airplane. To this end we propose to provide in the present embodiment of our invention an electric releasing means which, when operated, will enable the weight of the bomb to immediately disengage the holding means so that the bomb may be dropped practically instantaneously at the moment desired by the operator. A further object is to provide such means which will enable the bombs to be easily connected to the airplane and which will positively retain the same until it is desired to release them.

With these and other objects in view an embodiment of our invention is shown in the accompanying drawings and this embodiment will be hereinafter more fully described with reference thereto and the invention will be finally pointed out in the claims.

In the accompanying drawings:

Figure 1 shows an airplane equipped with an embodiment of our invention;

Fig. 2 is a view partly in side elevation and partly in section of one of the devices in the normal or locked position, this view being taken along the line 2—2 of Fig. 5;

Fig. 3 is a vertical transverse sectional view taken along the line 3—3 of Fig. 2;

Fig. 3ª is a view similar to Fig. 3, but showing a slightly modified form of construction;

Fig. 4 is a view partly in side elevation and partly in section and showing the manner of releasing the device and also showing in dotted lines its released position;

Fig. 5 is an inverted plan view with the cover of a portion of the same removed; and

Fig. 6 is a diagram showing the switch and electric circuits.

Similar reference characters indicate corresponding parts throughout the several figures of the drawings.

Referring to the drawings a suitable board or frame 10, which may form part of the airplane structure, or be attached thereto, is provided at the under side of the airplane, and the carrier is secured thereto, and comprises an arm or bar 11 pivoted at 12 to swing about a horizontal axis, say upon a bracket 13 projected downwardly from said frame 10. This carrier bar 11 is provided with one or more seats or sockets 14 at its upper edge, and if a plurality of sockets are used, they are preferably located at different distances from the pivot 12. Any one of these sockets is adapted to receive, and hold in position temporarily, a hanger or support 15, made to embrace or straddle the arm 11 and provided at its lower end with a hook or loop for suspending the bomb or other article 16, or the hanger 15 may be attached permanently to the bomb or other article. For the sake of holding the hanger 15 more securely, the frame 10 may be provided with a rib 17 having downwardly-open recesses 18 in registry with the sockets 14 and adapted to fit over the top bar of the hanger 15 so as to afford a further safeguard against accidental displacement of the hanger. Lateral movement of the hanger is prevented, but it is permitted to swing freely with the movement of the airplane. Thus the bombs always hang vertically irrespective of the position of the airplane, and they may therefore be dropped with great accuracy.

In order to normally hold the carrier bar 11 in its horizontal or raised supporting position (Fig. 2), the following arrangement may be adopted. At the free end of the bar 11 an extension or bolt 19 is normally caused to project by a spring 20, said bolt being slidable lengthwise of the carrier bar, and having a lower face 19′ parallel to the direction in which the bolt slides, and an upper face 19″ inclined or oblique to said direction. In the supporting position, the lower

face 19′ of the bolt 19 is in engagement with a retaining member 21 pivoted on the frame 10 at 22 and pressed in the direction indicated, by a spring 23 coiled around the pivot. This retaining member has a heel 21′ pressing on a dog 24 pivoted at 25 about the axis parallel to that of the pivot 22. The dog 24 has an opening or notch 24′ into which projects a latch 26, and normally said latch holds the parts in the position illustrated by Fig. 7, but when the latch is moved to release the dog 24, the weight of the bar 11 upon the bolt, will cause the latter to be rocked on its pivot and the member 21 will swing until its forward or retaining portion moves from under the bolt 19 and thus allows the carrier bar 11 to drop, releasing the hanger 15, which slides off said bar dropping with the bomb or other articles. The sliding bolt 19 enables the carrier bar to be swung to its closed position in engagement with the bolt 19 without retracting the bolt so that the bombs may be conveniently and quickly attached by one man. The locking member is preferably provided with a watertight cover 33, shown removed in Fig. 5 and is secured to the frame 10 by a strap 34.

The latch 26 might be shifted to its releasing position by hand or in any other suitable manner, a spring, such as 27, tending to return said latch to the holding position. We prefer to release the latch by electrical means, for which purpose the latch is connected with the armature 28 of an electromagnet 29, the coils of which are in circuit with a source of electricity (battery) 30 and with a switch 31 by wires 29^a and 29^b, the latter being operated by the pilot or the observer of the airplane.

In Fig. 3^a we have illustrated a slightly modified form of construction in which the recesses 14′ and 18′ are curved, concentrically to each other the hanger 15′ being rounded. This construction permits of free swinging of the bomb.

In some cases, as indicated in the diagram Fig. 4, the airplane may carry a plurality of bomb-dropping devices A, A′, A″, each of the characters described above, and in these cases we prefer to operate all of these devices by means of a single switch 31, so arranged that in the position *a* it will close the circuit to release the bomb held by the device A, while the devices A′, A″ will be operated when the switch is moved to the positions *a′* and *a″* respectively. By throwing the switch quickly, all the bombs may be released in quick succession, practically at the same time. The device may, if desired, be connected to the electric system of the airplane. The pilot of an airplane may conveniently operate the device without the need of an extra man for this purpose.

The provision of a plurality of sockets for holding the hanger 15 at different distances from the pivot of the carrier arm 11, has been made in view of the fact the bombs differ in weight, and light bombs would preferably be secured to the carrier arm at a greater distance from its pivot than heavy bombs, so as to exert about the same leverage on said arm.

As indicated at the beginning of this specification, our invention may be used for a variety of purposes, whenever an article is to be held for a time and then released from a carrier. Thus we might employ devices constructed according to our invention, for delivering mail bags to or from moving trains or airplanes. The device may also be used on other aircraft such as dirigibles, balloons, etc., and on battleships for dropping depth bombs.

We have illustrated and described a preferred and satisfactory embodiment of our invention but it is obvious that changes may be made therein within the spirit and scope thereof as defined in the appended claims.

We claim:

1. A device of the character described for dropping articles from an airship or other moving body adapted to have movement in inclined directions, comprising a horizontally disposed supporting member, a straight supporting bar arranged beneath said supporting member and pivotally supported at one end, a movable dog normally supporting the other end of said supporting bar and normally restraining it, a latch for locking and releasing said dog, the weight of the article to be dropped adapted to move said dog into non-restraining position when said dog is released, said bar being provided along its upper surface with a plurality of spaced notches disposed at different distances from said pivot of said bar, and adapted to position said article upon said bar, the weighting effect of said article being of proportionately increasing effect as said article is placed in the notches greater distances from said pivot, and means opposed to said notches adapted to engage the said article when positioned in said notches in the supporting position of said bar to retain said articles in said notches.

2. A device of the character described for dropping articles, comprising a horizontally disposed supporting member, a straight supporting bar arranged beneath said supporting member substantially parallel thereto and pivotally supported at one end, a movable dog normally supporting the other end of said supporting bar and normally restraining it, a latch for locking and releasing said dog, the weight of the article to be dropped adapted to move said dog into non-restraining position when said dog is released, said bar being provided along its

upper surface with a plurality of spaced notches disposed at different distances from said pivot of said bar, and adapted to position said article upon said bar, the weighting effect of said article being of proportionately increasing effect as said article is placed in the notches greater distances from said pivot, and a rib on said supporting plate contacting with said bar and provided in its under surface with notches corresponding to and registering with said notches of said bar, and constituting with said notches of said bar apertures through said contacting bar and rib.

3. A device of the character described for dropping articles, comprising a horizontally disposed supporting member, a straight supporting bar arranged beneath said supporting member substantially parallel thereto, and pivotally supported at one end, a spring-pressed longitudinally sliding extension or bolt provided in the other end of said bar having at one side a surface parallel to the direction of its sliding movement, and at its other side a surface oblique to said direction, a movable dog normally supporting the free end of said supporting bar and normally restraining it, a latch for locking and releasing said dog, the weight of the article to be dropped adapted to move said dog into non-restraining position when said dog is released, said extension or bolt adapted to enable positioning of said bar in its supporting position in engagement with said dog without releasing the movement of said dog.

In testimony that we claim the foregoing as our invention, we have signed our names hereunder.

FREDERICK CHARLES GRAF.
MICHAEL J. ZWOSTA.