June 13, 1933. J. FRITCSON ET AL 1,913,708

DEVICE FOR CARRYING BOMBS AND OTHER HEAVY BODIES ON AND RELEASING THEM FROM AIRCRAFT

Filed June 15, 1931

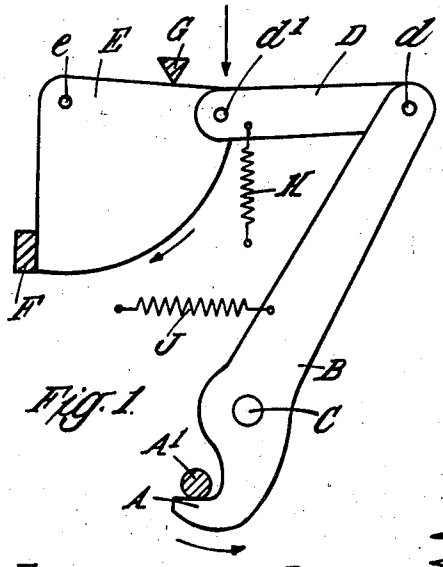


Fig. 1.

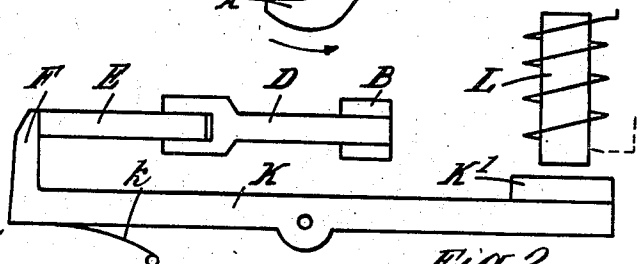


Fig. 2.

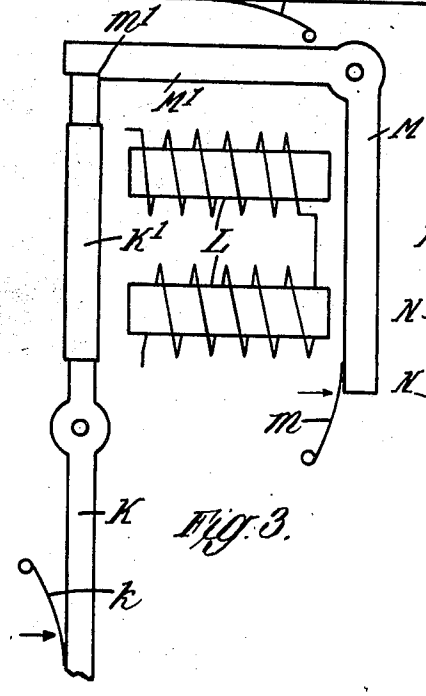
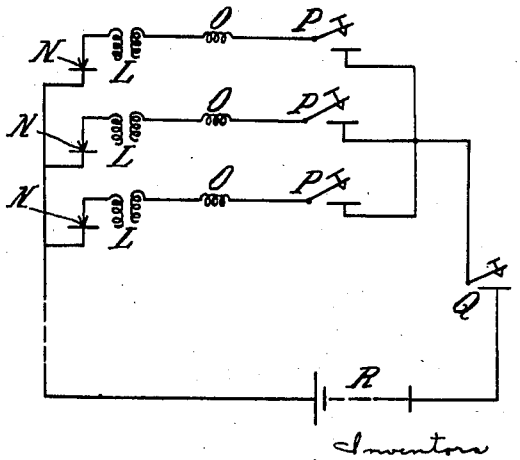


Fig. 3.

Fig. 4.



Inventors
Jules Fritcson
and
Arnold Vikane
By Pennie, Davis, Marvin & Edmonds
Attorneys

Patented June 13, 1933 1,913,708

UNITED STATES PATENT OFFICE

JURIS FRITCSON AND ARNOLD VIKSNE, OF RIGA, LATVIA

DEVICE FOR CARRYING BOMBS AND OTHER HEAVY BODIES ON AND RELEASING THEM FROM AIRCRAFT

Application filed June 15, 1931. Serial No. 544,430.

This invention relates to a device for carrying bombs and other heavy bodies on and releasing them from aircraft, the said device comprising a member which has a hook for supporting the bomb and which is held in its retaining position by a projection which, when moved into its releasing position, allows the hook member to move so as to release the bomb.

According to the present invention the aforesaid hook member is connected by a link to a pivoted member with which the aforesaid projection co-operates and the parts are so constructed and arranged that normally (i. e. when the hook member is supporting the bomb) the link and the pivoted member are nearly on the dead centre position so that little or none of the weight of the bomb is exerted on the said projection. This projection can be moved mechanically to its releasing position but it is preferably moved by means of an electro-magnetic device having two armatures one of which normally locks the other (which moves the said projection) against the releasing movement.

In order that the said invention may be clearly understood and readily carried into effect, the same will now be described more fully with reference to the accompanying drawing, in which:—

Figure 1 is a side elevation showing more or less diagrammatically a form of device according to this invention,

Figure 2 is a plan view of Figure 1 showing also one way of releasing the projection,

Figure 3 is a view showing the preferred way of moving the projection by means of an electro-magnetic device, and

Figure 4 is a diagram of the preferred electrical circuits relating to several bomb releasing devices.

Referring to Figures 1 and 2, A is the hook of the hook member B which is pivoted at C to a suitable frame, the said hook supporting the sling or loop A′ of the bomb. The upper end of this member has one end of a link D pivoted thereto at *d*, the other end of this link being pivoted at *d′* to a sector-shaped lever E (or a lever of other suitable form) pivoted at *e* to the frame. F is the projection which normally engages with one face of the lever E as shown. If the parts described are arranged in such relative positions that a horizontal plane containing the axes of the pivots *e* and *d* also contains the axis of the pivot *e′* (i. e. the parts D and E are on the dead centre position), it will be clear that the weight of the bomb on the hook A cannot turn the hook member B. However by displacing the pivot *d′* in the direction of the arrow drawn above this pivot it is possible to find the point beyond which the turning force (due to the weight of the bomb) acting upon the lever E is no longer balanced by the friction at the pivots of the various parts. It is at approximately this point that the parts are set by means of the projection F and another projection G engaging with the upper surface of the lever E. The parts D and E are then somewhat out of the dead centre position. If now the projection F is moved into its releasing position, the weight of the bomb on the hook A will effect a displacement of the parts and the release of the bomb. If desired a spring H may be provided acting to move the pivot *d′* downwards; in this case the parts D and E can be arranged closer to the dead centre position and the force exerted by the lever E on the projection F will be a constant quantity not dependent on the weight of the bomb. If a bomb of such light weight is to be used that it cannot overcome the friction of the parts by its weight, a spring J acting on the member B may be provided. If desired the springs H and J may be replaced by a single spring acting between the parts B and D. If the hook A is intended to carry very heavy bombs it may be given a suitable shape with a view to reducing the stresses in the parts of the device. This is attained by constructing the hook so that the centre of the bomb sling or loop A′ can be placed at a small distance horizontally from a vertical plane containing the axis of the pivot C. The vertical distance from the sustaining portion of the hook A to a horizontal plane containing the axis of the pivot C is made sufficient to enable the hook member B when slightly turned on its pivot C to

move away sufficiently to release the sling or loop A'.

The aforesaid projection F may be carried on a pivoted lever K (Figure 2) controlled by a spring *k*. This lever may be moved mechanically by the operator when the bomb is required to be dropped or it may be moved by means of an electro-magnet L the energizing current of which is under the control of the operator; in the latter case the end of the lever K remote from the projection F is formed at K' to constitute the armature of the electro-magnet.

In order to prevent premature dropping of the bomb as a result of mechanical shocks the arrangement shown in Figure 3 is employed. In this figure the armature K' of the lever K which carries the projection F is associated with two electro-magnets L, L which also have another armature M controlled by a spring *m* which is weaker than the spring *k* controlling the lever K so that the armature M is attracted before the armature K'. The armature M has a transverse arm M' formed with a notch or recess *m'* to form a shoulder against which the upper end of the armature K' normally bears so that in the normal condition of the parts (i. e. before the energizing current of the electro-magnets L, L is switched on) the lever K is prevented from moving in a direction to release the bomb. This electro-magnetic device forms the subject of a concurrent patent application in the name of Juris Fritcson and the operation is fully described in the specification accompanying that application.

We may introduce into the electrical circuit containing the energizing coils of the electro-magnetic device a contact operated by any of the moving parts of the bomb release device so as to cut off the energizing current when the bomb is being released, as well as an indicator which indicates that the bomb has been dropped. The electric circuits for several bomb releasing devices are shown in Figure 4 in which L, L, L represent the electro-magnets, N, N, N represent the aforesaid contacts which cut off the current on release of the bombs, O, O, O represent the indicators of any suitable character and P, P, P represent hand-operated switches for completing the separate circuits through the various coils of the electro-magnets so that the bombs can be dropped individually. Q represents a hand-operated switch which has to be brought into operation before the circuits through the individual coils of the electro-magnets can be completed and R represents the source of current. The switch Q not only serves as a safety device which prevents any of the bombs from being dropped by accidental movement of any of the switches P into the bomb releasing position, but also serves as a master switch so that after any one or more of the switches P have been brought into operation the switch Q can be operated to release all the selected bombs.

What we claim and desire to secure by Letters Patent of the United States is:—

1. In a device for carrying bombs and other heavy bodies on and releasing them from aircraft, the combination with a hook support for the body, a pivoted member, a link connecting the first two members together, and a retaining member for co-operating with said pivoted member and releasable to allow said hook member to move and drop the body, of an electro-magnet the energizing current of which is under the control of the operator, an armature appertaining to said electro-magnet a lever carrying said armature and the retaining member, a second armature appertaining to said electro-magnet, said second armature moving towards the magnet before the first armature when the energizing current is switched on, and means whereby said second armature normally prevents movement of the first armature under the influence of shocks to release the hook member.

2. For use with a device for carrying bombs and other heavy bodies on and releasing them from aircraft, the combination with the elements claimed in claim 1, of a hand-operated switch, an indicator and a contact in the circuit containing the coil of the electro-magnet, said contact breaking said circuit when the bomb or other heavy body is released.

3. For use with the device for carrying bombs and other heavy bodies on and releasing them from aircraft, the combination with the elements claimed in claim 1, of a hand-operated switch, an indicator and a contact in the circuit containing the coil of the electro-magnet, said contact breaking said circuit when the bomb or other heavy body is released.

4. For use with a device for carrying bombs and other heavy bodies on and releasing them from aircraft, the combination with a plurality of the elements claimed in claim 1, of a switch which controls the supply of the electric current to the various circuits.

5. For use with a device for carrying bombs and other heavy bodies on and releasing them from aircraft, the combination with a plurality of the elements claimed in claim 1, of a switch which controls the supply of the electric current to the various circuits.

6. In a device for carrying and releasing bombs from aircraft and including a hook member, a pivoted member, a link connecting same, said link normally extending substantially horizontally between the end of the pivoted member and the end of the hook member, said link and pivoted member being normally arranged near dead center position, and a retaining member for co-operating with said pivoted member and movable into releasing position to allow said hook member to move to drop the body, interlocking arma-

tures operatively connected with the release hook-member and its associated toggle links, and a single electro-magnetic device, and including two electro-magnets connected in series, for operating said armatures to release said hook-member.

JURIS FRITCSON.
ARNOLD VIKSNE.