

Sept. 27, 1932.

G. H. COOKE

1,880,122

FUSE SETTING DEVICE FOR AIRCRAFT BOMBS

Filed March 31, 1932

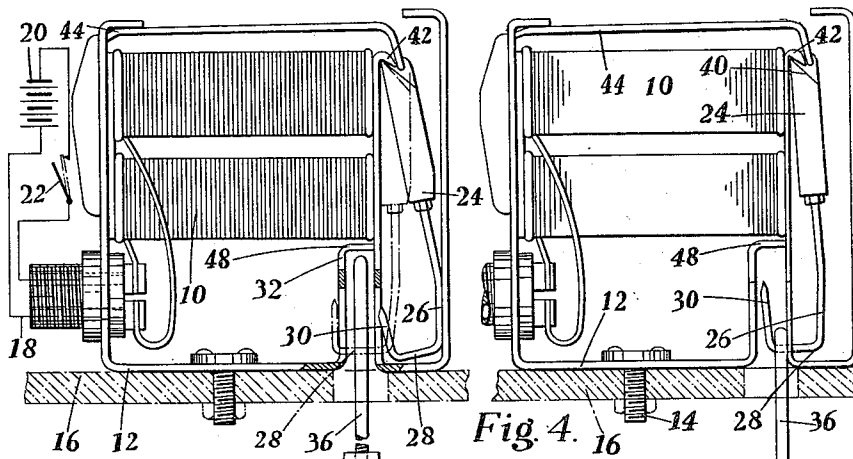


Fig. 3.

Fig. 1.

Fig. 4.

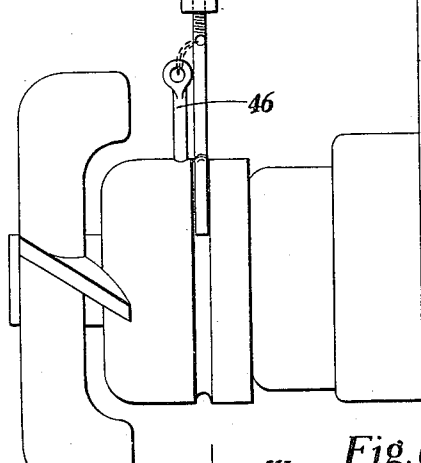
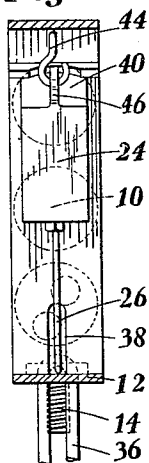


Fig. 5.

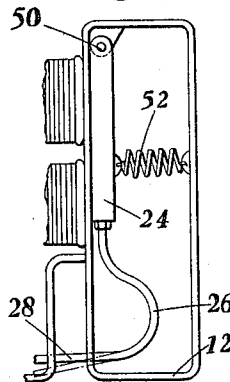
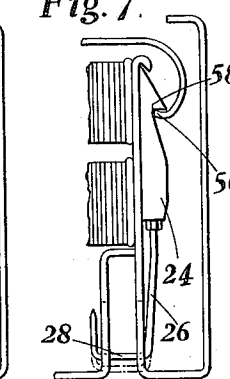
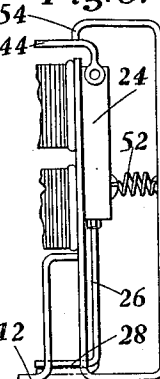
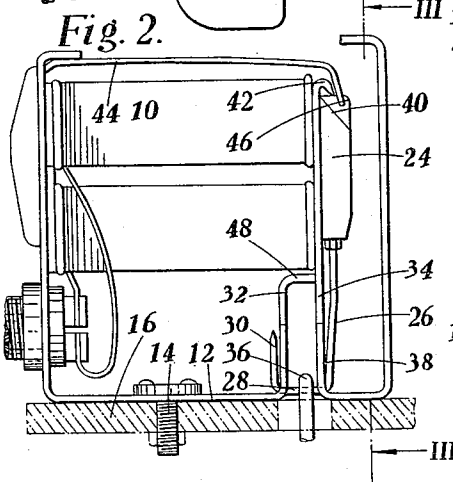


Fig. 2.

Fig. 6.

Fig. 7.



INVENTOR
G. H. COOKE
BY
Gill & Jennings
ATTORNEYS

UNITED STATES PATENT OFFICE

GEOFFREY HASLEWOOD COOKE, OF LONDON, ENGLAND, ASSIGNOR TO HANDLEY PAGE LIMITED, OF CRICKLEWOOD, ENGLAND, A BRITISH COMPANY

FUSE-SETTING DEVICE FOR AIRCRAFT BOMBS

Application filed March 31, 1932, Serial No. 602,353, and in Great Britain April 9, 1931.

This invention relates to fuse-setting devices for bombs of the kind in which the fuse is set by the withdrawal of a pin or other safety member consequent on the releasing of the bomb from the aircraft. In such devices the fuse pin usually has attached to it a loop of wire which is engaged by a hook or the like when it is desired to set the fuse on release, and this hook has hitherto been movable by mechanical means into or out of the loop. According to the present invention the hook is moved electrically into the loop and is free to be moved downwards by the pull of the loop into engagement with a fixed detent which is not in the path of the loop but which supports the hook. Conveniently the fixed detent has a gap therein through which the loop would normally pass but which is bridged by the hook when moved downwards by the loop.

It will be appreciated that in such a construction the hook may be very small and light, and therefore capable of being actuated with a minimum of energy, since the shock of detaining the loop is not borne by the pivot or other support of the hook but by a fixed detent.

Several modified forms of the device are illustrated by way of example in the accompanying drawing, in which

Figure 1 is a side elevation showing the loop and fuse-pin in position,

Figure 2 is a similar view showing the position of the parts immediately after the bomb has been released with the fuse set,

Figure 3 is an end elevation in cross-section along the line III—III in Figure 2,

Figure 4 shows the position of the parts at a later stage when the electromagnet has been de-energized, and

Figures 5, 6 and 7 are fragmentary side elevations showing three modified forms of the device.

The preferred form of the invention is illustrated in Figures 1-4. In these figures the electro-magnet 10 is supported in a frame 12 of sheet metal which is secured in an upright position in a suitable casing (not shown), the bottom of which is indicated at 16. The windings of the electromagnet are

connected through wires 18, Figure 1, to a source of current 20, and a switch 22 is provided whereby the electromagnet may be energized at will. An iron armature 24 has secured to it a wire hook 26 which is bent to provide a horizontal portion 28 and an upturned tip 30. The sheet metal of the frame is bent to provide two partitions 32, 34 between which there is a pocket open at the bottom for the reception of the fusing loop 36. When the armature is retracted the hook lies wholly outside this pocket as shown in Figure 1 and narrow slots 38 are made in the partitions 32, 34 to enable the hook to pass into the pocket when the armature is attracted towards the left by the energization of the electromagnet as shown in Figure 2. When in this position the upturned tip 30 is within or slightly to the left of the slot in the partition 32, and the horizontal portion 28 of the hook extends across the pocket near its open lower end, but clear of the lower ends of the slots.

The upper end of the armature is bevelled as at 40 on the side remote from the electromagnet so as to form a knife edge, and the part of the frame 12 which supports the pole-pieces of the electromagnet is bent over at an acute angle as shown at 42 to provide a V block in which the knife edge engages. It is held in engagement by a steel wire spring 44 which is fixed rigidly at its right-hand end to the frame 12 and is hooked at its free end into a hole in a lug 46 projecting from the bevelled surface 40 of the frame. As will be seen, the tendency of the spring is to move the armature upwards, thus keeping the knife edge in engagement with the V block and also turning it anti-clockwise into the position shown in Figure 1. When the magnet is energized the armature and the hook are moved into the position shown in dotted lines in Figure 1 against the stress of the spring. If now the bomb is released the loop 36 will move downwards into engagement with the horizontal part 28 of the hook which will therefore be itself moved down a short distance until it engages the lower ends of the slots 38, the spring 44 enabling the armature to slide downwards

across the faces of the pole-piece as shown clearly in Figure 2. It will be appreciated that the shock of withdrawing the fuse-pin 46 from the bomb will be taken by the frame 12 through the short horizontal portion 28 of the hook, this frame being solidly supported by the casing 16, and therefore this shock will not be transmitted to the armature or its supports. Consequently, the whole device may be made small and light because it is not necessary to take into consideration the shock consequent upon the withdrawal of the fuse-pin.

As shown in Figure 4, the loop 26 is retained within the pocket after the electromagnet has been deenergized, being nipped between the tip 30 of the hook and the partition 34. Thus proof is provided that the bomb was released with the fuse set. The partition 32 is bent at right-angles at its upper end to provide a guard 48 for the purpose of preventing damage to the electromagnet or other parts of the device by a too forcible thrusting of the loop upwards into the pocket.

In the modified construction shown in Figure 5 the armature is pivoted at 50 to a fixed part of the frame, and the hook 26 is bent into the shape of a sickle so that its horizontal tip 28 can readily yield downwards into engagement with the lower ends of the slots 38. The armature is retracted by a coil spring 52.

In Figure 6 the armature is merely pivoted to the free end of the spring 44 the upward movement of which is limited by a stop 54 and a coil spring 52 is provided for retracting the armature as in Figure 5.

In Figures 5 and 6 the hook is not provided with the upturned tip 30 and the slots 38 are replaced by holes only large enough to allow the horizontal portion 28 of the hook to move freely into and out of the gap between the partitions.

Owing to the extremes of temperature to which aircraft are subjected and the consequent risk of freezing of oil or condensed moisture it is desirable to avoid pivot pins for supporting members which are to be moved by non-positive means such as electromagnets, and for the same reason coiled springs are undesirable. For this reason the form of the device shown in Figures 1-4 is preferred to those shown in Figures 5 and 6. The pivotal connection between the free end of the spring 44 and the lug 46 is not such as to be objectionable, but if desired this may be replaced by a knife edge connection as shown in Figure 7 where the end of the spring is shown bent round so as to present a sharpened extremity 56 upwardly to an undercut notch 58 in the armature.

The mechanism may be varied in many ways within the scope of the invention; for example the electromagnet itself may be the

moving part, or in other words the movable armature may be provided with energizing coils and the pole-pieces of the electro-magnet replaced by a fixed soft iron member.

I claim:—

1. In a bomb fuse setting device of the kind referred to, in combination, a member movable into and out of the path of a fusing loop, and a fixed detent not in the path of the loop, said member being capable of moving downwards into supported engagement with said detent by the downward pull of the loop consequent on the release of the bomb.

2. In a bomb fuse setting device of the kind referred to, in combination, a member movable into and out of the path of a fusing loop, and a fixed detent below said member having an aperture for the passage of the fusing loop, said member being capable of moving downwards by the pull of the loop consequent on the release of the bomb, into supported engagement with said detent across the aperture therein.

3. In a bomb fuse setting device of the kind referred to, in combination, an electromagnet, an armature therefor, a member carried by said armature, normally out of the path of a fusing loop but movable thereinto by energization of the electromagnet, and a fixed detent not in the path of the loop, said member being capable of moving downwards into supported engagement with said detent by the downward pull of the loop consequent on the release of the bomb.

4. In a bomb fuse setting device of the kind referred to, in combination, an electromagnet, an armature therefor, a member carried by said armature normally out of the path of a fusing loop but movable thereinto by energization of the electromagnet, and a fixed detent below said member having an aperture for the passage of the fusing loop, said member being capable of moving downwards by the pull of the loop, consequent on the release of the bomb, into supported engagement with said detent across the aperture therein.

5. In a bomb fuse setting device of the kind referred to, in combination, an electromagnet, a vertically disposed armature therefor, a vertically movable member carried by said armature, normally out of the path of a fusing loop but movable thereinto by energization of the electromagnet, a fixed detent not in the path of the loop, and a spring adapted to retract the armature from the electromagnet and to support said member yieldingly against downward movement, said member being arranged to engage and be supported by said detent when moved downwards by the pull of the fusing loop.

6. In a bomb fuse setting device of the kind referred to, an electromagnet, an armature therefor, a spring yieldingly supporting said armature against downward movement, a fusing-loop retaining member rigidly fixed to

said armature and movable into the path of the fusing-loop by the energization of the electromagnet, and a fixed detent below said member adapted to be engaged by and support said member when the latter is moved downwards by the pull of the fusing loop.

7. In a bomb fuse setting device of the kind referred to, a yielding fusing-loop-detaining member movable into loop-detaining position by electromagnetic means and a fixed detent co-operating with said member to sustain the shock consequent on the release of the bomb.

8. The invention of claim 5 wherein the upper end of the armature is provided with a knife edge which is normally held pivotally seated in a fixed V block by the action of the spring but can be moved out of engagement with the V block by the pull of the loop.

9. The invention of claim 5 wherein the upper end of the armature is provided with a knife edge, and a fixed V block is provided of which the surface facing away from the electromagnet is flat and vertical, the knife edge being held in pivotal engagement with the V block by the spring and sliding down the surface aforesaid when it is moved downwards by the pull of the loop.

10. The invention of claim 6 wherein the connection between the spring and the armature is constituted by a knife edge on the spring and a notch in the armature.

11. The invention of claim 3 wherein the member is of resilient material and is of such form as to be capable of yielding into engagement with the detent.

12. In a bomb fuse setting device of the kind referred to, in combination, a fusing-loop-detaining member movable into loop-detaining position by electromagnetic means, and resilient means for returning said member to normal position upon de-energization of the electromagnetic means, said member being provided with an upwardly-directed element adapted to retain the loop after such de-energization.

13. In a bomb fuse setting device of the kind referred to, in combination, a downwardly-yielding fusing-loop-detaining member movable into loop-detaining position by electromagnetic means, resilient means for returning said member to normal position upon de-energization of said electromagnetic means, and a fixed detent co-operating with said member to sustain the shock consequent on the release of the bomb, said member being provided with an upwardly-directed element adapted to retain the loop after such de-energization.

14. In a bomb fuse setting device of the kind referred to, in combination, a pocket for the reception of a fusing loop said pocket comprising vertical side walls and a floor having an aperture therein, a hook movable into and across said pocket from the side, openings being formed in the side walls to

admit the hook, electromagnetic means for actuating said hook, and yielding means normally maintaining the hook above the floor of the pocket but permitting it to move downwards, under the pull exerted by the fusing loop as a consequence of the release of the bomb, into contact with the floor in a position bridging the aperture in said floor.

In witness whereof I hereunto subscribe my name this twenty-ninth day of February, 1932.

GEOFFREY HASLEWOOD COOKE.

80

85

90

95

100

105

110

115

120

125

130