Feb. 18, 1947. D. I. SLOAN 2,416,028

RELEASE ASSEMBLY FOR BOMB SHACKLES

Filed Aug. 18, 1944 2 Sheets-Sheet 1

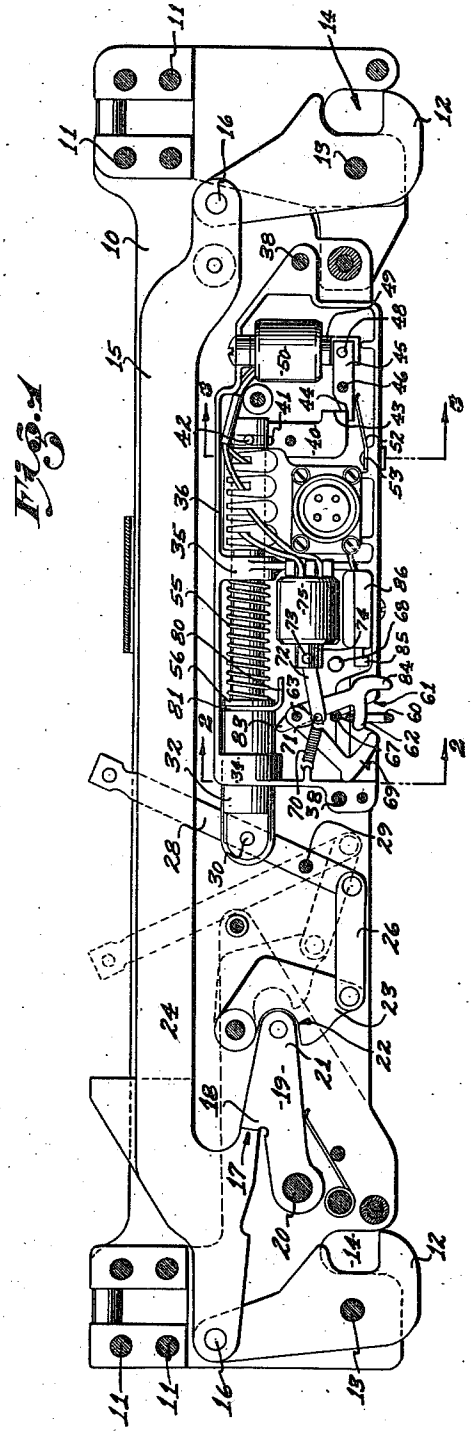


Fig. 1

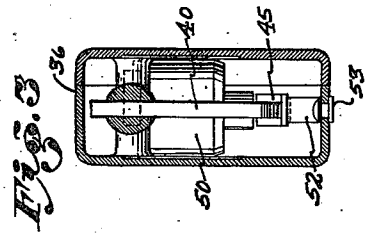


Fig. 3

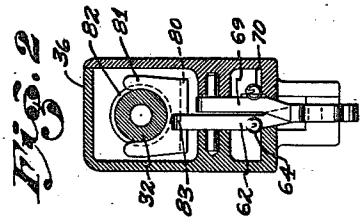


Fig. 2

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Feb. 18, 1947. D. I. SLOAN 2,416,028

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Filed Aug. 18, 1944 2 Sheets-Sheet 2

Fig. 4

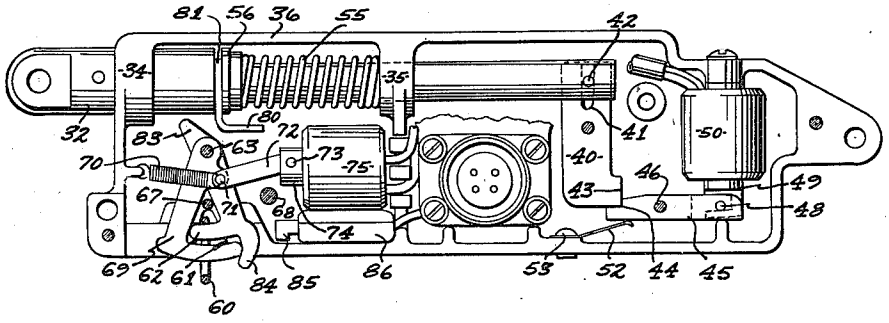


Fig. 5

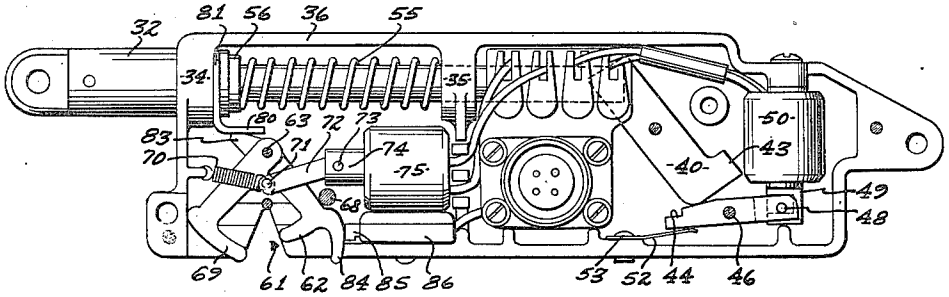


Fig. 7

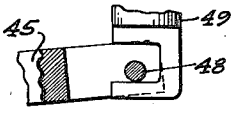
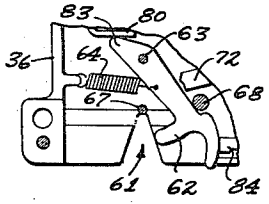


Fig. 6



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RELEASE ASSEMBLY FOR BOMB SHACKLES

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1 Claim. (Cl. 89—1.5)

1

This invention relates to the control mechanism for operating the bomb supporting hooks on a bomb shackle. It is designed particularly for the purpose of maintaining the releasing mechanism against accidental release of the bombs until the plane carrying the bombs is over the target. In some common forms of mechanism for this purpose it has happened that the releasing mechanism, by reason of sudden jars or other external causes, operates untimely.

It is an object of this invention to produce a release assembly for bomb shackles of simple form and construction in which the mechanism is so arranged that accidental operation of the releasing mechanism is obviated.

It is another object of this invention to provide a release assembly for bomb shackles of simple form and construction which is positive in operation and which operates in conjunction with and coincident with what is commonly referred to as the bomb arming mechanism.

Other objects and advantages will appear hereinafter from the following description and drawings.

Referring to the drawings, which are for illustrative purposes only:

Fig. 1 is a side elevational view of a bomb shackle, partly in section, showing a release assembly attached thereto;

Fig. 2 is a cross sectional view on line 2—2, Fig. 1;

Fig. 3 is a cross sectional view on line 3—3, Fig. 1;

Fig. 4 is an enlarged elevational view of the release assembly shown in Fig. 1, the parts being shown in locked position assumed before the bomb has been released;

Fig. 5 is a view similar to Fig. 4, showing the parts in position assumed when the bomb has been released;

Fig. 6 is an elevational view of a portion of the release assembly showing the safety lever forming part of the bomb arming mechanism; and

Fig. 7 is an enlarged side view partly in section showing the connection of the sear lever to the plunger of the solenoid.

Referring more particularly to Fig. 1 of the drawings, I have shown a conventional type of bomb shackle. This structure is not in itself new, nor does it form any part of the present invention any more than to illustrate the working of the release assembly.

10 indicates one side plate of a frame to which is attached a similar plate (not shown) by means of bolts or studs 11. 12 indicates the bomb hooks,

2

each of which is pivotally mounted on its respective pin or bolt 13. These hooks, when carrying the bomb as in the position shown, close recesses indicated at 14 formed in the side walls 10 of the bomb shackle. The two jaws 12 are connected by a linkage indicated at 15, such connection being a pivotal connection by reason of pins 16. The linkage 15 is provided with a foot indicated at 17 which engages an abutment 18 formed on a lever 19 pivotally mounted on a bolt or stud 20 supported in the side walls of the bomb shackle.

In the position of the parts shown in Fig. 1, the bomb is being carried and the parts are locked in the bomb carrying position. The free end 21 of the lever 19 extends into a recess 22 formed in a pivoted arm 23, such arm being mounted upon or on a stud or bolt indicated at 24. Pivotally connected to the free end of the arm 23 is a link 26 which is also pivotally connected to a cocking arm 28, such arm being pivotally mounted on a stud or bolt 29. The portion of the mechanism described above constitutes the mechanism of the bomb shackle proper.

The release assembly for the bomb shackle consists of the following interengaging elements. The cocking arm 28 is pivotally connected by means of a pin 30 to the outer end of an actuating rod or plunger indicated at 32. This rod 32 is slidably mounted in guides 34 and 35 formed as parts of a casing 36 which houses the release assembly and which is mounted on the bomb shackle structure by means of bolts and studs indicated at 38. It will be noted that by arranging the shackle release mechanism as a self-contained assembly in a casing detachably secured to the shackle structure, the advantage is secured that if the release mechanism breaks down, the casing and contained mechanism can be readily removed and replaced by another with very little loss of time. The inner end of the actuating rod 32 is slotted to receive the upper end of a rod locking lever indicated at 40. This lever is slotted at its upper end as indicated at 41 to receive a pin 42 secured in the slotted inner end of the actuating rod or plunger. The lower end of the rod locking lever 40 is formed with a toe 43, the corner of which, in the position shown in Fig. 1, engages in a notch 44 formed in one end of a release lever 45 which is pivotally mounted in the casing by means of a pin indicated at 46. The other end of the releasing lever or sear is pivotally connected by means of a pin 48 to the end of a plunger 49 of a solenoid indicated at 50, which solenoid may be termed the bomb shackle release solenoid. The end of the

lever 45 engageable with the toe 43 on the lever 40 is yieldingly held in such engagement by means of a flat spring indicated at 52, one end of which is secured in the casing by means of a stud indicated at 53.

Mounted on the actuating rod 32 is a compression spring indicated at 55, one end of which engages the guide 35 and the other end of which engages a shoulder 56 formed on the actuating rod 32. This spring 55 tends to move the actuating rod in a left-hand direction and thereby through the connection of the slotted end of the rod 32 and the pin 42 to the lever 40 to firmly hold the toe 43 on the lever 40 in the notch 44 of the lever 45. The spring 55, as stated above, tends to move the actuating rod to the left and thereby operates the arm 28 to release the bomb shackle.

In devices of the kind herein referred to it is desirable to provide for the arming of the bomb as it is released from the bomb shackle. This is usually done by providing mechanism which coacts with the bomb shackle which engages a ring attached to a cable, which cable is attached to the fuse of the bomb. This construction of the ring and cable being common, merely the ring is indicated in the drawings. The ring just referred to is indicated at 60, and while the bomb is being carried it normally assumes the position indicated in Fig. 1 within a throat or notch indicated at 61 formed in the walls of the casing 36. It is retained in this position during normal operations by means of a safety hook indicated at 62 which is pivotally mounted upon a stud or bolt indicated at 63 mounted in the casing. This safety arm is yieldingly held in the position shown in Fig. 1 by means of a coiled spring indicated at 64 which is attached to and extends from the arm 62 to a portion of the casing as shown in Fig. 6, the arm being limited in its movement by means of pins or bolts indicated at 67 and 68. Also pivotally mounted on the stud or bolt 63 is a fuse release or arming hook indicated at 69. This hook is yieldingly held clear of the throat 61 by means of a coiled spring indicated at 70, which spring also is attached to the casing 36. Attached also to the hook 69 by means of a pin 71 is a link 72 pivotally connected at 73 to the plunger 74 of what I have termed a bomb arming solenoid 75.

As stated heretofore, the position of parts indicated in Fig. 1 are in the relation assumed when the bomb shackle is carrying the bomb and when in this position the safety hook 62 is in engagement with the ring 60 of the bomb arming mechanism. When the aviator wishes to drop the bomb armed, he, through suitable electrical connections, energizes the bomb arming solenoid 75. This causes the plunger of the solenoid to be retracted and through the connecting mechanism described pull the fuse release hook 69 across the throat below the safety hook 62 into the position shown in Fig. 4. The bomb release solenoid 50 is then energized through suitable electrical connections and the core retracted, thereby pulling the release lever 45 into the position shown in Fig. 5 of the drawings. When in this position the actuating rod locking lever 40 is free to move into the position shown in Fig. 5 and is caused to move into such position by reason of the movement of the actuating rod 32 by reason of the spring 55. This outward movement of the actuating rod 32 rocks the rocking arm 28 and through its link connection with the arm 23 releases the lever 19 and permits the weight of the bombs to open the hooks 12, thereby releasing the bombs.

During the outward movement of the actuating rod or plunger 32 just described, the safety lever 62 is moved clear of the throat 61 and as the bomb drops away the ring 64 of the fuse connection is caught by the fuse release hook 69 and the fuse is set. The safety hook 62 is moved clear of the throat or notch 61 just referred to by means of a foot 80 formed on a yoke 81 which engages in an annular groove 82 in the actuating rod 32 as shown in Fig. 2. This foot 80 engages the upper end 83 of the safety hook 62 and swings the hook free of the throat. This movement of the safety hook also performs another function, as follows, the curved end 84 of the hook engages the end of a slide indicated at 85 of a slide switch indicated at 86 which switch is electrically connected to the bomb shackle release solenoid 50 and by such movement the bomb shackle release solenoid and bomb arming solenoid 75 are de-energized, arming hook 69 thereby freeing ring 60.

Although one form of the invention has been particularly shown and described, it is contemplated that various changes and modifications can be made without departing from the scope of the invention and it is intended to cover such changes and modifications as come within the scope of the appended claim.

I claim as my invention:

A release assembly for bomb shackles comprising: a casing; an actuating rod slidably mounted in the casing; spring means on said rod for yieldably moving said rod outwardly; a rod locking lever pivotally mounted in said casing; means on said actuating rod engaging one end of said rod locking lever; a release lever pivotally mounted in said casing; said release lever having a notch in one end engaged by the adjacent end of the rod locking lever; spring means mounted in said casing for yieldably holding the release lever in engagement with the rod locking lever; a solenoid in said casing, a movable plunger in the solenoid, means for pivotally connecting the plunger to the other end of the release lever; said casing having an open throat in the lower portion of the casing; a safety hook pivotally mounted in the casing extending across said throat; spring means for yieldingly holding said safety hook across the said throat; a fuse release hook pivotally mounted in said casing; spring means for yieldingly holding said fuse release hook free of the said throat; a bomb arming solenoid in said casing, a movable plunger in said solenoid pivotally connected to said fuse release hook; and a foot on said actuating rod engageable with said safety hook to move said safety hook clear of the said throat.

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