

March 18, 1947.

J. M. KING ET AL

2,417,418

ARMING VANE FOR AERIAL BOMB FUSES

Filed March 10, 1943

Fig. 1.

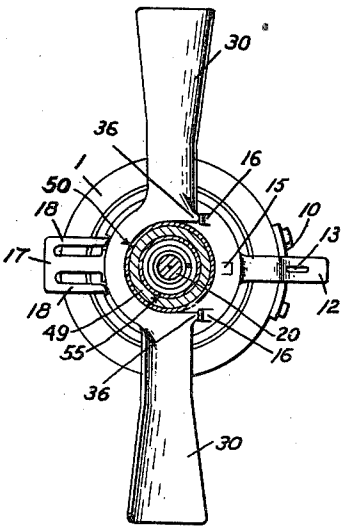


Fig. 2.

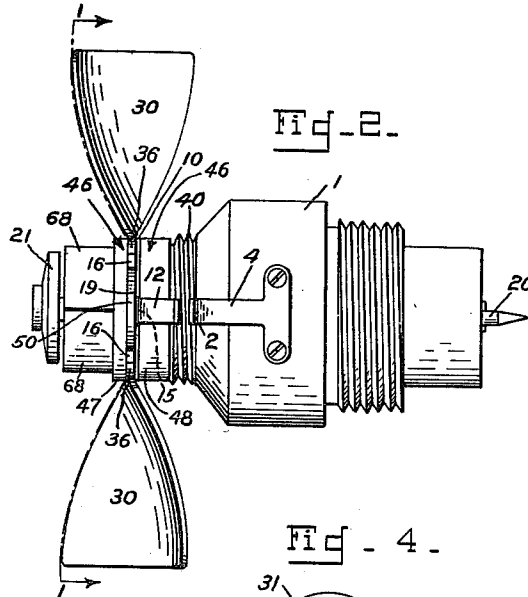


Fig. 4.

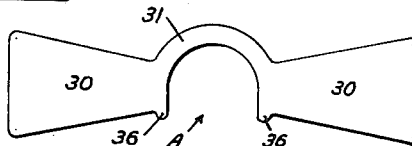


Fig. 3.

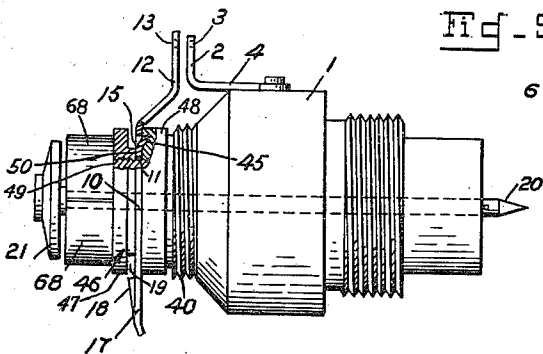


Fig. 5.

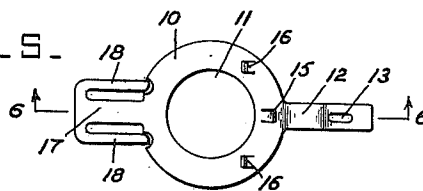
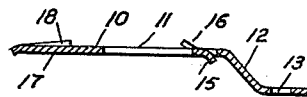


Fig. 6.



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2,417,418

ARMING VANE FOR AERIAL BOMB FUSES

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Application March 10, 1943, Serial No. 478,656

11 Claims. (Cl. 102—81.2)

(Granted under the act of March 3, 1883, as
amended April 30, 1928; 370 O. G. 757)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment to us of any royalty thereon.

This invention relates to aerial bomb fuses, and more particularly, to the arming vane for such fuses. The type of fuse to which the improved arming vane of this invention is applicable is fully described in the Bold Patent #2,190,374. As more fully described in the said patent, the purpose of the arming vane is to operate the fuse mechanism after the bomb had dropped a sufficient distance from the aircraft. In the said patent and as heretofore used the arming vane is permanently secured in operative position on the fuse. The object of this invention is to provide a fuse of the character described in which the arming vane is detached for shipment but readily inserted in place on the fuse when ready for use. In preparing the fuse for shipment (separate from the aerial bomb) it has been necessary heretofore to use a relatively large size carton because of the large diameter of the secured-in-place arming vane compared to the fuse itself. This, in addition, required the use of bracing or filling material to occupy the space in the container about the fuse proper. By shipping the arming vane detached from the fuse, the size of the container is reduced to the outside diameter of the fuse and the need of bracing or filling material is obviated; the detached vane may be inserted in the reduced container alongside the fuse.

For the attainment of this and such other objects of invention as may herein appear or be pointed out there is shown one embodiment of the invention in the accompanying drawing, wherein:

Fig. 1 is a sectional view of fuse with the arming vane in place taken along the line 1—1 of Fig. 2;

Fig. 2 is a side elevational view thereof;

Fig. 3 is likewise a side elevational view, but with the fuse turned 90° from its position in Fig. 2 and with a portion in section the arming vane not shown;

Fig. 4 shows the arming vane in front elevation;

Fig. 5 shows a lock member, likewise in front elevation; and

Fig. 6 is a section on the line 6—6 of Fig. 5.

In the following description of the improved arming vane, the identical references used in the

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said Bold patent will be employed to refer to the same parts of the fuse insofar as such parts are substantially duplicated in this description. The fuse comprises a casing 1, threaded at one end for screwing in place in the head of the aerial bomb. The other end of the fuse casing is tapped to receive a hollow cup-shaped member 40 containing the mushroom head 21 at its nose, between which and a rotatable ring 46, are the segmentary locking blocks 68. The firing pin is designated 20. The rotatable ring 46, upon rotation, actuates mechanism releasing the segmentary blocks 68, as in the said Bold patent, 2,190,374, permitting functioning of the fuse upon impact. The rotatable ring 46 is formed of annular members 47 and 48 threaded onto cylindrical member 49. As seen in Figure 3, annular member 47 has an annular shoulder 50 of smaller outside diameter than the rest of member 47, whereby, as members 47 and 48 are brought close together, an annular groove 19 remains between abutting faces of members 47 and 48 and the outside surface of shoulder 50.

The improved propeller of this invention, designated 30, is slipped in place sidewise in annular groove 19 in the periphery of the rotatable ring, for which reason the propeller has an open mouth A, the two wings of the propeller being integral with an arcuate neck 31. For the purpose of holding the propeller securely in place, a locking member 10, fabricated of spring plate or thin sheet of a suitable springy material, is provided in said annular groove, the locking member having a central aperture 11 through which the cylindrical member 49 is receivable. To assemble the locking member 10 to the fuse, the members 21, 68 and 47 are removed and the locking member 10 placed on member 49 in encircling relation thereto. The members 21, 68 and 47 are then reassembled to the fuse, and, as shown in Figure 3, the member 47 is turned tightly so that its reduced shoulder 50 bears against locking member 10 which is thus secured firmly between shoulder 50 and member 48. The propeller vane 30 is then receivable in the remaining groove 19 which is shown in Figure 3 without the propeller 30, and Figure 2 shows the propeller 30 in place in groove 19. As best seen in Figure 1, the arcuate inner surface portion of the propeller 30 is thus in embracing contact with the peripheral surface of shoulder 50. The members 10, 30, 47, 48 and 49 when thus locked together, form a rotatable member or unit. Locking member 10 has

an arm 12 bent out of the plane of the center ring portion, see Figs. 5 and 6, which bent arm has an aperture 13 at its distal end, preferably elongated as shown. An L-shaped stationary member 4 is secured to the fuse casing 1 with its upright leg 2 in parallelism with the distal portion of bent arm 12. The distal end of leg 2 of stationary member 4 is provided with an aperture 3 which, when the locking member is turned (with the propeller secured thereto) into angular coincidence with the said stationary leg 2, will align with the aperture 13 of the locking member 10. The arming wire (not shown) is passed through the two apertures 13-3 (for a purpose fully explained in the said Bold patent).

Locking member 10 is provided with an inwardly-turned tab 15 tongued out of the plate constituting the locking member (to the right in Fig. 3), which tab is receivable in a depression 45, to hold the locking member against turning. For the purpose of securely holding the propeller, locking member 10 is also provided with a pair of tongued tabs 16, shown in Fig. 5, on each side of the tab 15. As shown in Figs. 6 and 3, the tabs 16 are turned in a direction opposite to that of single tab 15. For the said purpose of propeller securement the locking member 10 is further provided with a fork-like extension 17, diametrically opposed to its bent arm 12. Fork extension 17 is provided, as best shown in Fig. 5 with a finger 18, one on each side, which fingers are turned up, Fig. 6, in the same direction as the said pair of tabs 16. Lastly, the propeller is provided on both sides of its mouthed slot A, see Fig. 4, with a pair of projections 36, which cooperate with the pair of tabs 16, as shown in Fig. 1.

The propeller is slipped into place in the annular groove from the side of the locking member 10 provided with the forked member 17, see Fig. 3. In entering in this manner, see Fig. 3, the propeller, more particularly, its sides defining the mouth A, Fig. 4, presses the two fingers 18 of the forked member 17 (back into the plane of 17 and the locking member in general) out of the way, the fingers snapping back into position projecting out of the said plane (as shown in Fig. 3); in this position the spring fingers 18 are effective to prevent backing-off of the propeller, i. e., to the left as shown in Fig. 1. The said two projections 36 of the propeller hub abut against the two tabs 16, see Fig. 1, to stop movement of the propeller in the other direction (to the right) and also serve to center the propeller in position angularly. The tabs 16 and the tab 15 also serve to create axial pressure as the propeller is pushed home into position (as just described) which spring pressure causes a firm securement of the propeller 30 and its locking member 10, in the recess or annular groove provided in rotatable ring 46.

We claim:

1. In an aerial bomb fuse of the type in which segmentary blocks are releasably retained in a ring formation, said fuse having a rotating member for actuating mechanism releasing said blocks, said rotating member providing an annular recess, the said parts being held in a fuse casing provided with a projecting lug apertured at its distal end for the arming wire, the combination of a two-wing propeller, the opposed wings being connected by a semi-circular arcuate neck presenting an open mouth, the said connecting neck terminating in rounded points on both sides of the said mouth opening, and a locking member in the form of a center ring provided

with three tongued out tabs, the said connecting neck of the propeller being removably, and the said center ring of the locking member being permanently, received in the said annular recess, one of the facing walls of the recess being provided with a depression for receiving one of the said tongued out tabs, the other pair of the said tabs disposed on either side of the said tab being tongued out in the direction opposite to the said single tab, the said locking member being further provided with a fork-like member projecting from its said center ring provided at its distal end with a pair of tines pressed out of the plane of the said fork member and said center ring in the direction of tonguing of the said pair of ring tabs, the said propeller being adapted to be slipped over the said pair of pressed-out tines and to depress them into the said plane of the fork-like member and the center ring, the said depressed tines snapping behind the said arcuate neck of the propeller to hold the same against withdrawal in the opposite direction, the said pair of rounded points on opposite sides of the open mouth of the propeller being adapted to abut the respective ones of the said pair of tongued tabs of the center ring, whereby the propeller is centered in place relative to the center ring and the said recess, the said center ring of the locking member being further provided with an arm bent to present its distal portion parallel to the said lug of the fuse casing and provided with a distal aperture aligned with the aperture of the said lug, whereby the arming wire may be received through the said pair of aligned apertures.

2. In an aerial bomb fuse of the type in which segmentary blocks are releasably retained in a ring formation, said fuse having a rotating member for actuating mechanism releasing said blocks, said rotating member providing an annular recess, the said parts being held in a fuse casing provided with a projecting lug apertured at its distal end for the arming wire, the combination of a two-wing propeller, the opposed wings being connected by a semi-circular arcuate neck presenting an open mouth, and a locking member in the form of a center ring provided with three tongued out tabs, the said connecting neck of the propeller being removably, and the said center ring of the locking member being permanently, received in the said annular recess, one of the facing walls of the recess being provided with a depression for receiving one of the said tongued out tabs, the other pair of the said tabs disposed on either side of the said tab being tongued out in the direction opposite to the said single tab, the said locking member being further provided with a fork-like member projecting from its said center ring and provided at its distal end with a pair of tines pressed out of the planes of the said fork member and said center ring in the direction of tonguing of the said pair of ring tabs, the said propeller being adapted to be slipped over the said pair of pressed-out tines and to depress them into the said plane of the fork-like member and the center ring, the said depressed tines snapping behind the said arcuate neck of the propeller to hold the same against withdrawal in the opposite direction, the said center ring of the locking member being further provided with an arm bent to present its distal portion parallel to the said lug of the fuse casing and provided with a distal aperture aligned with the aperture of the said lug, whereby the arming

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wire may be received through the said pair of aligned apertures.

3. In an aerial bomb fuse of the type in which segmentary blocks are releasably retained in a ring formation, said fuse having a rotating member for actuating mechanism releasing said blocks, said rotating member providing an annular recess, the said parts being held in a fuse casing provided with a projecting lug apertured at its distal end for the arming wire, the combination of a two-wing propeller, the opposed wings being connected by a semi-circular arcuate neck presenting an open mouth, and a locking member in the form of a center ring provided with tongued out tabs, the said connecting neck of the propeller being removably, and the said center ring of the locking member being permanently, received in the said annular recess, one of the facing walls of the recess being provided with a depression for receiving one of the said tongued out tabs, other of the said tabs being tongued out in the direction opposite to the first said tab, the said locking member being further provided with a fork-like member projecting from its said center ring and provided at its distal end with a pair of tines pressed out of the plane of the said fork member and said center ring in the direction of tonguing of the second said ring tabs, the said propeller being adapted to be slipped over the said pressed-out tines and to depress them into the said plane of the fork-like member and the center ring, the said depressed tines snapping behind the said arcuate neck of the propeller to hold the same against withdrawal in the opposite direction, the said center ring of the locking member being further provided with an arm bent to present its distal portion parallel to the said lug of the fuse casing and provided with a distal aperture aligned with the aperture of the said lug, whereby the arming wire may be received through the said pair of aligned apertures.

4. In an aerial bomb fuse of the type in which segmentary blocks are releasably retained in a ring formation, said fuse having a rotating member for actuating mechanism releasing said blocks, said rotating member providing an annular recess, the said parts being held in a fuse casing provided with a projecting lug apertured at its distal end for the arming wire, the combination of a two-wing propeller, the opposed wings being connected by a semi-circular arcuate neck presenting an open mouth, the said connecting neck terminating in rounded points on both sides of the said mouth opening, and a locking member in the form of a center ring provided with tongued out tabs, the said connecting neck of the propeller being removably, and the said center ring of the locking member being permanently, received in the said annular recess, one of the facing walls of the recess being provided with a depression for receiving one of the said tongued out tabs, other of the said tabs being tongued out in the direction opposite to the first said tab, the said locking member being further provided with a fork-like member projecting from its said center ring and provided at its distal end with a pair of tines pressed out of the plane of the said fork member and said center ring in the direction of tonguing of the said second ring tabs, the said propeller being adapted to be slipped over the said pressed-out tines and to depress them into the said plane of the fork-like member and the center ring, the said depressed tines snapping behind the said arcuate neck of the propeller to

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hold the same against withdrawal in the opposite direction, the said pair of rounded points on opposite sides of the open mouth of the propeller being adapted to abut the respective ones of the said pair of tongued tabs of the center ring, whereby the propeller is centered in place relative to the center ring and the said recess, the said center ring of the locking member being further provided with an arm bent to present its distal portion parallel to the said lug of the fuse casing and provided with a distal aperture aligned with the aperture of the said lug, whereby the arming wire may be received through the said pair of aligned apertures.

5. In an aerial bomb fuse of the type in which segmentary blocks are releasably retained in a ring formation, said fuse having a rotating member for actuating mechanism releasing said blocks, said rotating member providing an annular recess, the said parts being held in a fuse casing provided with a projecting lug apertured at its distal end for the arming wire, the combination of a two-wing propeller, the opposed wings being connected by a semi-circular arcuate neck presenting an open mouth, the said connecting neck terminating in rounded points on both sides of the said mouth opening, and a locking member in the form of a center ring provided with tongued out tabs, the said connecting neck of the propeller being removably, and the said center ring of the locking member being permanently, received in the said annular recess, the said locking member being further provided with a fork-like member projecting from its said center ring and provided at its distal end with a pair of tines pressed out of the plane of the said fork member and said center ring in the direction of tonguing of the said ring tabs, the said propeller being adapted to be slipped over the said pressed-out tines and to depress them into the said plane of the fork-like member and the center ring, the said depressed tines snapping behind the said arcuate neck of the propeller to hold the same against withdrawal in the opposite direction, the said pair of rounded points on opposite sides of the open mouth of the propeller being adapted to abut the said tongued tabs of the center ring, whereby the propeller is centered in place relative to the center ring and the said recess, the said center ring of the locking member being further provided with an arm bent to present its distal portion parallel to the said lug of the fuse casing and provided with a distal aperture aligned with the aperture of the said lug, whereby the arming wire may be received through the said pair of aligned apertures.

6. In an aerial bomb fuse of the type in which segmentary blocks are releasably retained in a ring formation, said fuse having a rotating member for actuating mechanism releasing said blocks, said rotating member providing an annular recess, the said parts being held in a fuse casing provided with a projecting lug apertured at its distal end for the arming wire, the combination of a two-wing propeller, the opposed wings being connected by a semi-circular arcuate neck presenting an open mouth, and a locking member in the form of a center ring, the said connecting neck of the propeller being removably, and the said center ring of the locking member being permanently, received in the said annular recess, the said locking member being further provided with a fork-like member projecting from its said center ring and provided at its distal end

with a pair of tines pressed out of the plane of the said fork member and said center ring, the said propeller being adapted to be slipped over the said pressed-out tines and to depress them into the said plane of the fork-like member and the center ring, the said depressed tines snapping behind the said arcuate neck of the propeller to hold the same against the withdrawal in the opposite direction, the said center ring of the locking member being further provided with an arm bent to present its distal portion parallel to the said lug of the fuse casing and provided with a distal aperture aligned with the aperture of the said lug, whereby the arming wire may be received through the said pair of aligned apertures.

7. In combination, a fixed member having a rotating member pivoted thereon and a separable member removably affixed to said rotating member, said rotating member providing an annular recess forming a seat for said separable member, said separable member having a hub including arms received in said recess removably embracing said rotating member and providing a central opening presenting an open face on the side thereof, stop means preventing relative rotation between said rotating member and said separable member and a detent retaining said separable member in seated position upon said rotating member.

8. In combination, a fixed member having a rotating member pivoted thereon and a separable member removably affixed to said rotating member, said rotating member providing an annular recess forming a seat for said separable member, said separable member having a hub including arms received in said recess removably embracing said rotating member and providing a central opening presenting an open face on the side thereof, said rotating member having stop means engaging said separable member preventing relative rotation therebetween, and a retractable detent carried by said rotating member engaging said separable member to retain the latter in seated position upon said rotating member.

9. In an aerial bomb fuse of the type described, in combination, a fuse casing having a rotating member pivoted thereon and a propeller removably affixed to said rotating member, said rotating member having an annular recess forming a seat for said propeller, said propeller having a hub including arms received in said recess removably embracing said rotating member and providing a central opening presenting an open face on the side thereof, said rotating member having stop means engaging said hub preventing relative rotation therebetween, and a retractable detent carried by said rotating member engaging said hub to retain said propeller in seated position upon said rotating member.

10. In combination, a fixed member having a rotating member pivoted thereon and a separable member removably affixed to said rotating member, said rotating member providing an annular recess forming a seat for said separable member, said separable member having a hub including arms received in said recess removably embracing said rotating member and providing a central opening presenting an open face on the side thereof, a locking member in the form of a ring received in said recess between said hub and one wall of said recess, means securing said locking member to said rotating member and means securing said locking member to said separable member preventing relative rotation between said separable member, said locking member and said rotating member, said locking member having a detent engaging the hub of said separable member to retain the latter in seated position on said rotating member.

11. In a fuse of the type described, in combination, a fuse casing having a rotating member pivoted thereon and a propeller removably affixed to said rotating member, said rotating member having an annular recess forming a seat for said propeller, said propeller having a hub including arms received in said recess removably embracing said rotating member and providing a central opening presenting an open face on the side thereof, a locking member in the form of a central ring received in said recess, means providing a depression in the side wall of said recess adjacent said locking member and a projection upon said locking member engaged with the side walls of said depression, a pair of raised fingers carried by said locking member engaged the ends of said arms of said propeller hub, whereby said propeller is prevented from rotating relatively to said rotating member, and a spring detent carried by said locking member engaging the hub of said propeller to retain the latter in seated position upon said rotating member.

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