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DELAY FUSE FOR DROP BOMBS

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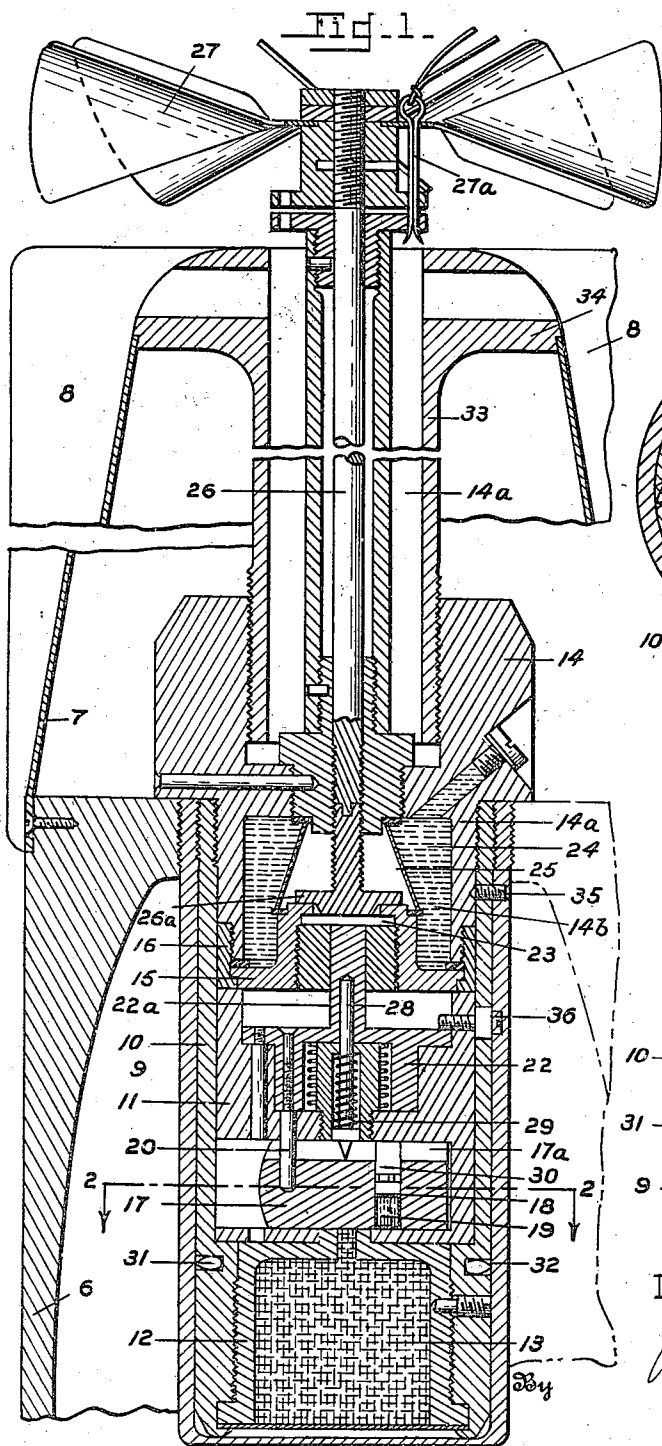


Fig. 2.

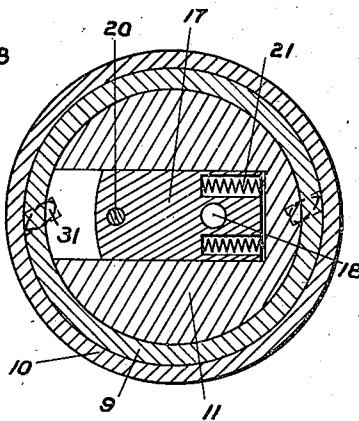


Fig. 3.

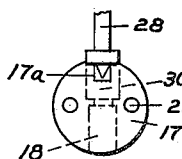
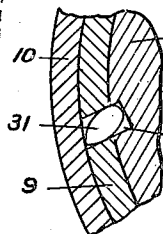


Fig. 4.



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DELAY FUSE FOR DROP BOMBS

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(GRANTED UNDER THE ACT OF MARCH 3, 1883, AS AMENDED APRIL 30, 1928; 370 O. G. 757)

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

5 The subject of this invention is a delay fuse for drop bombs.

The object of the present invention is the provision of a fuse for drop bombs which may be set to explode the bomb at a predetermined interval after it has been launched. 10 When a bombing plane or squadron passes over a favorable target the hostile troops in the vicinity will seek shelter thereby limiting the destructive force of the bomb to the demolition of property and equipment. 15

The fuse forming the subject of this invention may be set to function hours or days after impact, the exact time for the explosion of the apparently harmless bomb to occur for instance at some period of the day when it is known that troops will be in the locality. The timing mechanism for securing this result contemplates the novel incorporation of a frangible container, rupturable during 20 flight to allow a solvent of predetermined strength to be liberated and have access to a soluble member which holds the firing mechanism inoperative.

The fuse is further so constructed that 30 upon any attempt to remove it from the bomb for the purpose of rendering the bomb inoperative immediate detonation of the explosive charge will result.

Safety is obtained by arranging the setting mechanism so that the fuse can not be 35 armed until the bomb has been released from the plane. Provision is also made whereby the fuse may be assembled to the bomb with the rear cap and stabilizers in place.

40 To these and other ends, my invention consists in the construction, arrangement and combination of elements, described hereinafter and pointed out in the claims forming a part of this specification.

45 A practical embodiment of the invention is illustrated in the accompanying drawing, in which

Fig. 1 is a longitudinal sectional view of a fuse constructed in accordance with the invention; 50

Fig. 2 is a sectional view on the line 2—2 of Fig. 1;

Fig. 3 is a detail end view of the bolt;

Fig. 4 is a detail view showing the grape-seed lock. 55

Referring to the drawing by numerals of reference:

In carrying out the invention the bomb consists prior to the assembly of the fuse of a shell 6 on which is fixed a rear cap 7 having 60 the usual stabilizing fins 8. The shell and cap are suitably apertured to permit insertion of a fuse, the inner end of which is disposed in a fuse seat liner or thimble 9 which may be assembled to the shell prior to fusing 65 the bomb or it may be assembled with the fuse.

The fuse comprises a body or casing which for convenience is formed in two parts and consists of a sleeve 10 provided for threaded 70 attachment to the liner 9 and a centrally disposed member 11. To the inner end of the casing is secured a block 12 containing a booster charge 13 while on the outer end of the casing is detachably connected, as by 75 threading, a fuse head 14 which is formed with a tubular extension 14a, and the extremity of which head, adjacent the casing member 11, is closed by a plate 15 retained by a threaded ring 16 to form a liquid tight joint. 80

Mounted transversely in the casing is a slidable bolt 17 carrying a primer 18 and a detonator 19. The bolt is normally held in the unarmed position with the primer detonator out of line with the booster 13 and 85 firing pin 28 by means of one or more release rods 20 engageable with the bolt to hold it against the action of the springs 21. The release rods are carried by a plunger 22 mounted between the casing member 11 and 90 fuse head 14 and normally held in the energized position, with the release rods in engagement with the bolt, by means of a disk 23 secured in the plate 15 of the fuse head in any convenient manner and serving as a restraining member against which the stem 22a of the plunger is in contact. The disk 23 is of a material such as celluloid which is soluble, and in the operation of the fuse is to be subjected to a solvent 24, for example, ace- 10

tone, of a predetermined strength to disintegrate the disk in a stated period of time. The solvent is confined in an annular chamber 14b in the fuse head, the inner wall 25 of said chamber being of glass or some other frangible material. Liberation of the solvent is effected by means of a spindle 26 carrying vanes 27 which unthread it during flight in a well known manner, and in order to facilitate and insure breaking of the glass wall during the longitudinal movement of the spindle, the wall is preferably of tapered form. The spindle at its lower end is provided with an enlarged head 26a removably keyed to permit its separation and allow the vane unit to fall clear when its task is accomplished. It will be noted that when the vane assembly is in place in the fuse the head 26a is in position to prevent sufficient movement of the plunger 22 to withdraw the release rod 20 from the bolt so that even should accidental liberation of the solvent result in dissolution of the disk 23 the fuse can not function until after the bomb is launched and the release pin 27a, holding the vanes against rotation, is removed in the accustomed manner.

The firing pin 28 disposed in the casing member 11 rides on the bolt 17 with its point in a groove 17a in the bolt, thereby preventing the bolt from rotating in its movement to armed position. The firing pin spring 29 presses the pin against the bolt so that as soon as the opening 30 in the bolt presents itself, the firing pin enters therein and sets off the primer and this will automatically occur when the release rod has been withdrawn.

The casing 10 is held against removal by a number of grape-seed locking members 31 which are so disposed in recesses 32 to permit threading but to prevent unthreading of the casing with respect to the liner 9. Consequently, when an attempt is made to remove the fuse, only the fuse head 14 will be moved, and since the plunger under the influence of its spring will follow this movement the release rod will be withdrawn and the bolt armed. The firing pin then automatically sets off the primer before the fuse head can be removed.

As a means of permitting the fuse to be placed in the bomb without removal of the rear cap, there is provided an elongated tubular member 33 fixed to the fuse head and formed with a collar 34 which when the fuse is in place will rest against the cap closing it and securely holding it in place.

Solvents of various strengths corresponding to the delay periods may be conveniently kept in vials and the fuse is preferably charged just prior to assembling it to the bomb.

Safety screws 35 and 36 are provided for an obvious purpose and are removable before fusing the bomb.

I claim:

1. A time fuse for bombs, including a casing, a booster in one end thereof, a fuse head threadable in the other end and including an annular chamber having a tapered frangible wall, a solvent of predetermined strength in the chamber, a plunger mounted between the casing and the fuse head, a slidable bolt mounted transversely in the casing, a primer detonator in the bolt, a release rod carried by the plunger for normally holding the bolt in unarmed position, a soluble disk carried by the fuse head and restraining the plunger against movement, a firing pin for automatically setting off the primer as the bolt arms, means removable during flight for breaking the frangible wall to liberate the solvent, said means also serving when in place to assure retention of the plunger and means for retaining the casing whereby on removal of the head the plunger may withdraw the release rod and permit the fuse to function.
2. A time fuse for bombs including a casing, a slidable bolt mounted transversely in the casing, a primer in said bolt, a plunger carrying means for normally holding the bolt in unarmed position, a soluble member for restraining the plunger against movement, a container adjacent the plunger and having a frangible wall, a solvent of predetermined strength in the container and means operable during flight for rupturing the wall and liberating the solvent, said means also serving when in place to assure retention of the plunger.
3. A time fuse for bombs, including a casing, a slidable bolt mounted transversely in the casing, a primer in said bolt, a plunger carrying means for normally holding the bolt in unarmed position, a soluble member for restraining the plunger against movement, a container adjacent the plunger, a solvent of predetermined strength in the container and means operable during flight for liberating the solvent, said means also serving when in place to assure retention of the plunger.
4. A time fuse for bombs including a casing, a slidable bolt mounted transversely in the casing, a primer in said bolt, a plunger carrying means for normally holding the bolt in unarmed position, a soluble member for restraining the plunger against movement, a container adjacent the plunger, a solvent of predetermined strength in the container and a non-soluble member normally supporting the soluble member and movable during flight for liberating the solvent.
5. A time fuse for bombs, including a casing, a slidable bolt mounted transversely in the casing, a primer in said bolt, a plunger carrying means for normally holding the bolt in unarmed position, a member for restraining the plunger against movement, a confined chemical of predetermined strength

and means operable during the chemical to disintegrate the restraining member.

6. A time fuse for projectiles including a casing, a slidable bolt mounted transversely of the casing, a primer in said bolt, a plunger carrying means for normally holding the bolt in unarmed position, a member for restraining the plunger against movement, a chamber in the casing for holding a chemical of predetermined strength and means for liberating the chemical to disintegrate the restraining member.

7. A time fuse including a casing, a slidable bolt mounted transversely in the casing, a primer in said bolt, a plunger in the casing carrying means for normally holding the bolt in unarmed position, a member for restraining the plunger against movement, a firing pin mounted in the casing to automatically set off the primer as the bolt moves to armed position, a timing element controlling the restraining member and means supporting a restraining member and movable to bring the timing element into operation.

8. A time fuse including a casing, a slidable bolt mounted transversely in the casing, a primer in said bolt, a plunger in the casing carrying means for normally holding the bolt in unarmed position, a firing pin mounted in the casing to automatically set off the primer as the bolt moves to armed position, a timing element controlling the movement of the plunger to functioning position and positively movable means for bringing the timing element into operation.

9. A time fuse for projectiles including a member securable to the projectile against removal, a fuse head unscrewable from said member and means operable on unscrewing of the head for inoperating a delay time mechanism to provide for immediate detonation.

10. A time fuse embodying a firing mechanism, a timing element associated therewith and operable during removal of the fuse from a projectile to permit functioning of the firing mechanism.

11. A fuse embodying a firing mechanism and means associated therewith and actuated during removal of the fuse from a projectile to permit functioning of the firing mechanism.

12. In a fuse, a casing, a firing mechanism in the casing, a soluble member restraining the firing mechanism, an annular chamber having a frangible wall, a solvent in the chamber, and means operable to break the frangible wall.

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