Feb. 2, 1926. 1,571,617

P. R. BASSETT

AERIAL FLARE BOMB

Filed Sept. 22, 1917 3 Sheets-Sheet 1

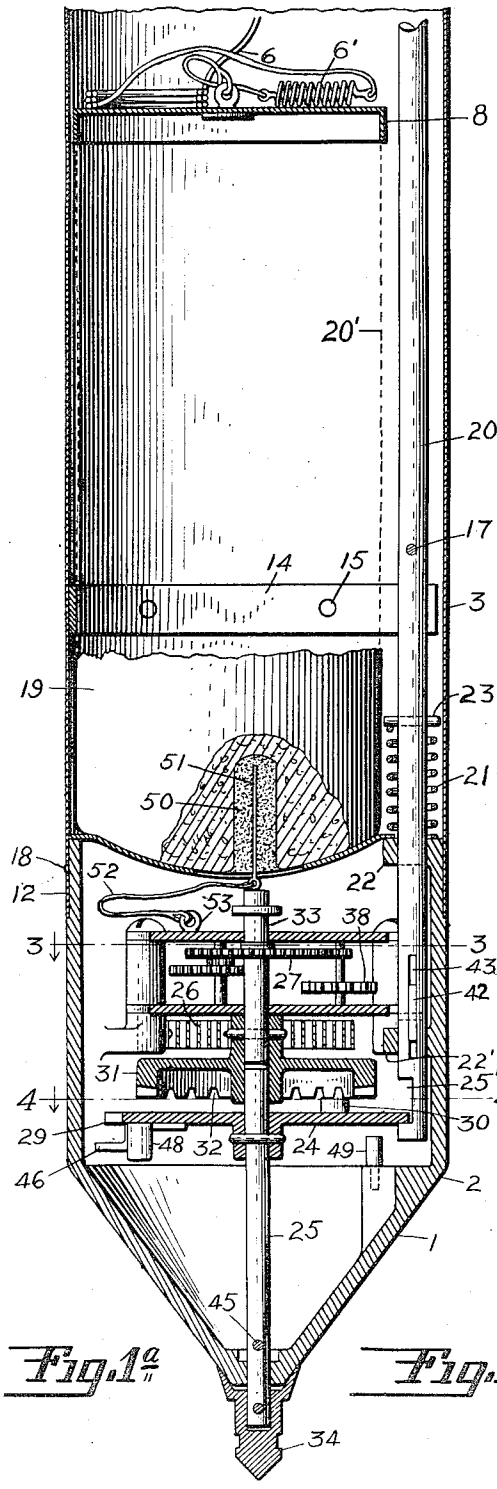


Fig. 1a

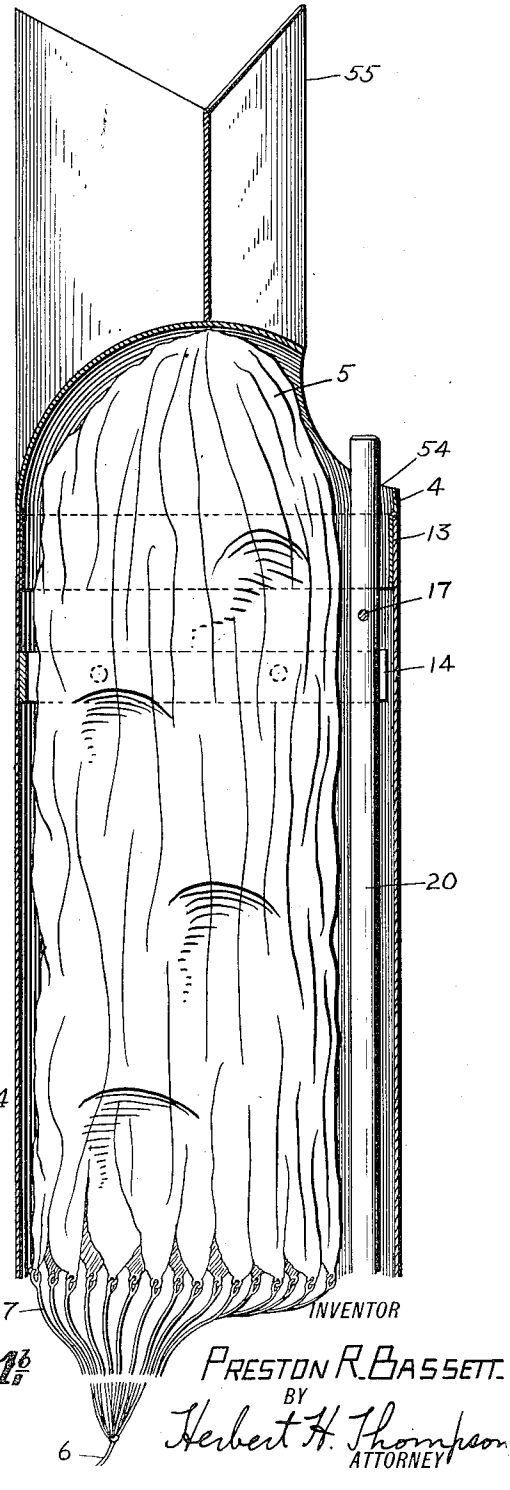


Fig. 1b

INVENTOR

PRESTON R. BASSETT.

BY

Herbert H. Thompson

ATTORNEY

Feb. 2, 1926. 1,571,617

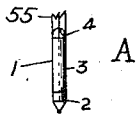
P. R. BASSETT

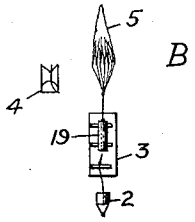
AERIAL FLARE BOMB

Filed Sept. 22, 1917 3 Sheets-Sheet 2

COURSE OF AEROPLANE

Fig. 2.





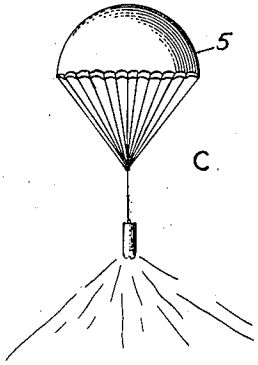


Fig. 3.

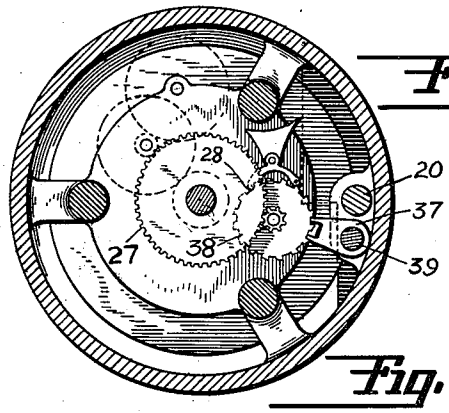


Fig. 4.

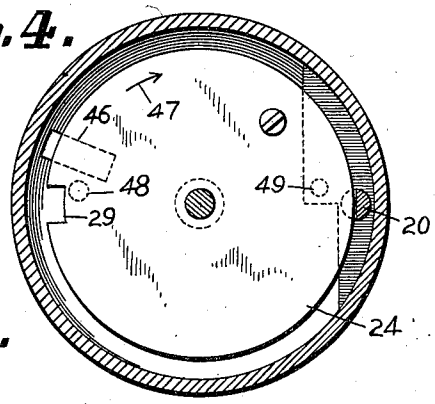


Fig. 6.

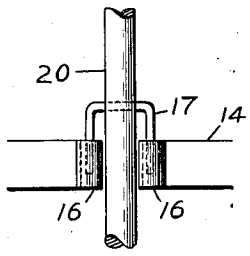


Fig. 5.

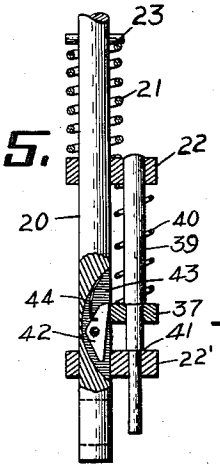


Fig. 7.

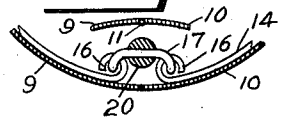
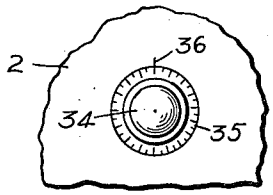


Fig. 8.



INVENTOR

PRESTON R. BASSETT

BY

Herbert H. Thompson

ATTORNEY.

Feb. 2, 1926. 1,571,617

P. R. BASSETT

AERIAL FLARE BOMB

Filed Sept. 22, 1917 3 Sheets-Sheet 3

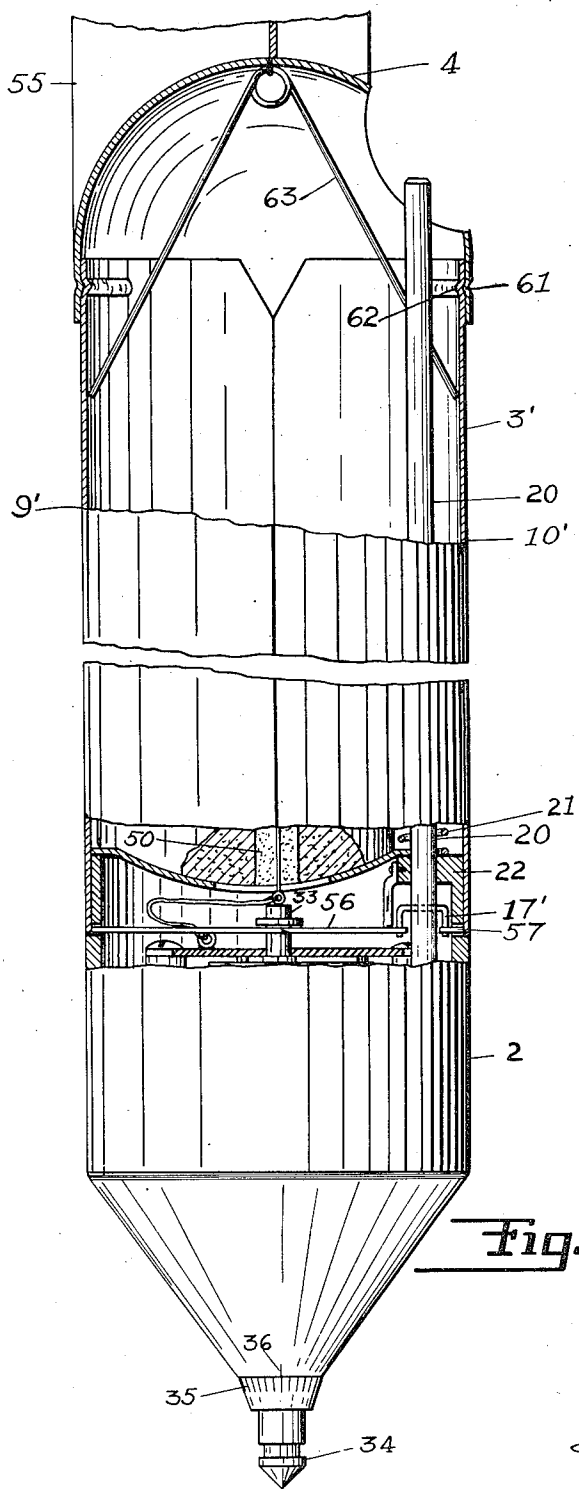


Fig. 9.

INVENTOR
PRESTON R. BASSETT.
BY
Herbert H. Thompson
ATTORNEY

Patented Feb. 2, 1926. 1,571,617

UNITED STATES PATENT OFFICE.

PRESTON R. BASSETT, OF BROOKLYN, NEW YORK, ASSIGNOR TO ELMER A. SPERRY, OF BROOKLYN, NEW YORK.

AERIAL FLARE BOMB.

Application filed September 22, 1917. Serial No. 192,776.

To all whom it may concern:

Be it known that PRESTON R. BASSETT, a citizen of the United States of America, residing at 1716 Newkirk Avenue, Brooklyn, in the county of Kings and State of New York, has invented certain new and useful Improvements in Aerial Flare Bombs, of which the following is a specification.

This invention relates to flaming bombs or star shells adapted to be dropped from aeroplanes for illuminating large areas. Bombs of this nature are especially useful in illuminating the object of attack at night.

The advantages of being able to observe the effects upon the target of gun fire, or of being able to see where to drop explosive bombs are obvious. With existing methods, it is often impossible to make such observations. Searchlights are commonly used, but for various reasons searchlights cannot always be employed advantageously under many conditions. Even when searchlights are playing successfully upon a target, they do not show where the shells are falling with respect to the target.

Also when an aeroplane is reconnoitering over enemy territory at night, the advantages of being able to illuminate the ground below in searching for important points or objects, or in observing the activities of the enemy, are very great.

The object of this invention is to produce a bomb which may be carried by an aeroplane and dropped from a position above the earth or target, and which wall fall rapidly toward the earth or target until within a predetermined height thereabove, then emit a brilliant light, illuminating the region and objects below as it slowly descends.

Referring to the drawings wherein I have shown what I now consider to be the preferred form of my invention:

Fig. 1ª is a sectional elevation of the lower half of the bomb.

Fig. 1ᵇ is a sectional elevation of the upper half of the bomb.

Fig. 2 is an illustration of several of the successive stages assumed by the bomb after being dropped from an aeroplane.

Fig. 3 is a section taken on line 3—3, Fig. 1ª, showing a clock works timing device.

Fig. 4 is a section taken on line 4—4, Fig. 1ª, of a releasing device.

Fig. 5 is a detail of means for setting the clock works in motion.

Fig. 6 is an elevation detail of means for normally holding the parts of the bomb together.

Fig. 7 is a sectional plan detail of the same.

Fig. 8 is a view looking up from under the bomb, which is partly cut away, showing a time setting knob.

Fig. 9 is an elevation partly in section of a modified form of bomb.

In Figs. 1ª and 1ᵇ the outer casing of the bomb 1 is shown as comprising three sections; the bottom section 2, the middle section 3 and the top section 4. Confined within the middle and top sections is a parachute 5 to which is attached by means of a cord 6 and the parachute strings 7, a cap 8 which embraces the upper end of a block 19, as indicated by the dotted lines 20′. The block is made up of an illuminating substance, which may be pressed into a solid or semi-solid form, around which may be wrapped a piece of paper, zinc or other suitable material if desired, to prevent the illuminant from crumbling and which will be rapidly consumed when the illuminant is fired. The block is designed upon being ignited to emit a light of great brilliancy.

The several sections are designed to be normally held together, and when dropped from an aeroplane, to fall to within a predetermined distance from the earth and then fall apart. One method of accomplishing this is as follows: The middle section 3 which may be a flat piece of material or two semi-cylindrical pieces 9 and 10 hinged together on one side as at 11 Fig. 7, may be wrapped around the bottom section 2 as at 12 Fig. 1ª and around the top section 4 as at 13 Fig. 1ᵇ. One or more springs 14 are shown attached to the inside of section 3 by any suitable means, such as by rivets or screws 15. The ends of these springs may be bent to form eyelets 16 into which may be inserted a hook 17 to hold the ends of the springs together and thus hold the middle section 3 of the bomb folded firmly over the bottom and top sections 2 and 4. One or more pins 18 protruding from section 2 into holes in section 3 or any other suitable means may be provided to prevent section 2 from slipping out from section 3. Similar

provision may be made to prevent premature disengagement between sections 3 and 4.

Springs 14 are designed with a tendency to straighten out, so that if hooks 17 are removed, section 3 will be thrown open and the several sections fall apart. In order to accomplish this, I have shown a rod 20 extending downwardly through the bomb. Hooks 17 are shown attached to rod 20 by passing through it, so that if the rod is raised, the hooks will be removed. A spring 21 pressing at one end against a projection 22 on section 2, and at the other end against a pin 23 in rod 20, tends to raise the rod, but is prevented from so doing by a disk 24 which engages rod 20 in a notch 25′ in the rod. Disk 24 is pinned to a shaft 25 and through a lug 30 fixed on the disk, engages a cog wheel 31 in any of a plurality of notches 32. Cog wheel 31 is pinned to a shaft 33, and is designed to be rotated by a spring 26. It will be seen that the rotation of cog wheel 31 will be imparted through lug 30 to disk 24. A system of gears or clock work 27 having a pawl and ratchet escapement 28 may be provided to retard the rotation of the disk.

A notch 29 is cut in the periphery of the disk, to allow rod 20 to slip through when the disk has turned around so that the notch reaches the rod. Obviously the greater the distance through which notch 29 has to turn before reaching rod 20, the longer it will take to release said rod. Shaft 25 may be allowed to protrude through the bottom of the bomb, and has attached to its end a knob 34 on which is provided a graduated scale 35 Fig. 8 for reading in connection with a line 36 on the casing of the bomb. By pulling down on knob 34, lug 30 disengages cog wheel 31. Knob 34 may then be turned until the proper reading of the scale 35 in conjunction with line 36 is effected. The knob is then released, whereupon, rod 20 which will have been drawn down against the pressure of spring 21, will raise disk 24 again, and cause lug 30 to re-enter one of notches 32. Notch 29 in disk 24 will now have been placed the desired distance from rod 20, so that the said rod will become released after the clock work is set in motion.

The clock work or timing mechanism 27 is normally locked against operation by a detent 37 which engages ratchet wheel 38 (Fig. 3). Detent 37 is fixed on a rod 39 which is mounted slidably up and down (Fig. 5) in the same guides 22 and 22′ with rod 20. A spring 40 pressing at one end against guide 22 and at the other end against detent 37 holds rod 39 normally down with shoulder 41 resting on guide 22′. In this position the detent 37 locks the timing mechanism against operation. The mechanism may be released by raising the detent. To accomplish this, I have shown a pawl embedded in a slot 43 in rod 20. A spring 44 presses the pawl against detent 37, so that when rod 20 is pressed down far enough, the pawl slips under the detent. Upon releasing rod 20 it returns again to its normal position, lifting detent 37 against the pressure of the light spring 40, out of engagement with ratchet 38 thereby permitting the timing mechanism to begin to operate.

In order to prevent rod 20 from being moved down far enough to allow pawl 42 to slip under detent 37 when knob 34 is pulled down, I have shown a pin 45 in shaft 25, which is designed to limit the distance through which shaft 25, disk 24 and arm 20 may be drawn.

In order to prevent accidental releasing of the timing mechanism, I have shown a stop 46 on disk 24. The disk may be turned in the direction of arrow 47 (Fig. 4) until stop 46 comes under rod 20. Stop 46 will then prevent the downward movement of the said rod. Disk 24 with the stop 46 may be kept normally in this position. A lug 48 on the disk may by striking a pin 49 in the casing of the bomb, serve to indicate when stop 46 is in the proper position. The said lug and pin may also serve to prevent the turning of disk 24 far enough in the wrong direction to allow rod 20 to slip through notch 29, either when positioning stop 46 below rod 20 or when shifting lug 30 in notches 32.

Embedded in the bottom of the illuminant block 19, I have shown a small quantity of igniting substance 50. A pin 51 attached by means of a cord 52 to the lower part of the bomb at 53 is shown embedded in the substance 50. The said pin may be made rough, and is designed upon being withdrawn, to ignite substance 50 which will in turn ignite the illuminant 19. Shaft 33 of the timing mechanism may be made long enough to engage pin 51 to prevent its withdrawal under normal conditions.

The operation of the bomb is as follows: The operator in an aeroplane, being above a position or object which he wishes to illuminate, knowing the altitude at which he is flying, sets the mechanism by means of knob 34, to uncouple the several sections 2, 3 and 4 of the bomb a predetermined length of time after the clock work is set in motion. He then presses down on the top of rod 20 which protrudes through the bomb near its top at 54. The bomb is then dropped at which time rod 20 is released, and the timing mechanism begins to move. The bomb falls wholly intact as in position A, Fig. 2, vane 55 serving to keep it upright as it falls. A predetermined length of time after the bomb is released, at which time it is designed to have fallen to within

an advantageous distance above the ground or the target, rod 20 will be released, permitting spring 21 to move it upward, withdrawing hooks 17 and allowing section 3 of the casing to spring open, position B, Fig. 2. The top section 4 will then fall off, as the parachute lags and retards the falling of the illuminent 19, while section 2 continuing to fall rapidly, withdraws pin 51, igniting the illuminant, while the parachute opens up and suspends the flaring illuminant in the air, Fig. 2, position C.

In order to prevent injury to the parachute by a sudden jerk by the illuminant, a shock absorbing member 6' may be placed in the cord 6. Member 6' may comprise a spring, or a soft wire coil which will absorb the shock by opening out slowly and remaining open.

As the illuminant block 19 is designed to burn away, the cap 8 will of course be made with sufficient weight to support the parachute against collapsing before the illuminant has been entirely consumed.

By keeping the bomb wholly intact through the greater part of its fall, position A, Fig. 2, a minimum amount of resisting surface is offered to the wind, thereby minimizing the drift of the bomb.

In Fig. 9. I have shown a modification of the method of effecting the opening of the shell. In this form, the middle section 3' is shown in two parts 9' and 10' wrapped around the bottom section 2 as in the other form, and held normally in this position by straps 56 and 57 attached to the said parts and passing through openings in section 1 and locked together by a pin 17' inserted in holes in said straps. Pin 17' is attached to rod 20, so that when the rod is raised the pin will be lifted out of holes 60, thereby releasing the straps.

The top section 4' is shown as placed over the top of the middle section 3' thus holding the parts 9' and 10' thereof together at the top. A small ridge 61 extending part way around the inside of section 4' on opposite sides, may engage depressions 62 in section 3', to prevent section 4' from slipping off. A spring 63 pressing out on parts 9' and 10' may be provided to spread parts 9' and 10' when straps 56 and 57 are released.

The opening of these parts while the bomb is falling will cause a sudden retardation of the upper parts of the shell, thus throwing them off, and allowing the parachute (not shown in this figure) to open, while the ignition of the illuminant may be effected in the same manner as shown in the other form.

In accordance with the provisions of the patent statutes, I have herein described the principle of operation of my invention, together with the apparatus, which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means. Also, while it is designed to use the various features and elements in the combination and relations described, some of these may be altered and others omitted without interfering with the more general results outlined, and the invention extends to such use. For instance it is obvious that the illuminant need not be placed within the covering or casing 3 of the bomb, as the bomb casing may be made in numerous other forms, wherein the illuminant may be attached in any suitable manner to the outside.

Having described my invention what I claim and desire to secure by Letters Patent is:

1. In an illuminating bomb, a shell, an illuminant and a suspending means therefor within said shell, adjustable time releasing means for releasing said illuminant and said suspending means, means for normally holding said releasing means inoperative, means for rendering said releasing means operative, and means for preventing the accidental operation of said time releasing means.

2. In an illuminating bomb, a shell, an illuminant and a suspending means therefor within said shell, adjustable time releasing means for releasing said illuminant and said suspending means, means for normally holding said releasing means inoperative means for rendering said releasing means operative, and means for preventing the accidental operation of said time releasing means.

3. An illuminating device adapted to be dropped from an aeroplane comprising a parachute, an illuminant, means for connecting said illuminant and said parachute, means for holding said parachute closed for a predetermined length of time after said dropping, shock absorbing means in said connecting means, means for releasing said parachute, and means for igniting said illuminant.

4. An illuminating device adapted to be dropped from an aeroplane, comprising a parachute, an illuminant attached thereto, means for holding said parachute inoperative, means for rendering said parachute operative a predetermined length of time after said dropping, means for preventing said illuminant from exerting a sudden jerk on said parachute, and means for igniting said illuminant.

5. In an illuminating bomb, a casing, a parachute and an illuminant attached thereto within said casing, time controlled means for removing said casing from said parachute and said illuminant, an igniting substance adjacent said illuminant, adapted

when subjected to friction to ignite, for igniting said illuminant, and means actuated by the removal of said casing for subjecting said substance to friction.

6. In an illuminating bomb, a casing comprising separable sections, an illuminant within said casing, means attached to said illuminant adapted upon being released to support said illuminant in the air, time controlled means for causing separation of said sections to release said supporting means and said illuminant, and means actuated by the separation of said sections for igniting said illuminant.

7. A bomb comprising normally inoperative means for retarding the descent thereof, means including a manually operable member for rendering said retarding means operative and releasable means for preventing operation of said member.

8. A bomb comprising normally inoperative means for retarding the descent thereof, means for rendering said retarding means operative upon the lapse of a predetermined time, a manually operable member for starting the operation of said second named means and releasable means for preventing operation of said member.

9. The combination of an illuminant, means for supporting said illuminant in the air, a casing for containing said illuminant and said supporting means, means normally tending to release said illuminant and said supporting means from said casing, means for maintaining said releasing means in inoperative condition, clockwork mechanism for rendering said releasing means operative after a predetermined interval of time, and means for igniting said illuminant.

10. The combination of an illuminant, a device for supporting said illuminant in the air, means for holding said device in an inoperative condition, means normally tending to release said device from said first named means, means for maintaining said releasing means inoperative, clockwork mechanism for rendering said releasing means operative, and igniting means for said illuminant.

11. The combination of an illuminant, a normally inoperative device for supporting said illuminant in the air, means normally tending to render said device operative, means for maintaining said first named means in inoperative condition, clockwork mechanism for rendering said first named means operative, and igniting means for said illuminant.

12. The combination of an illuminant, means for supporting said illuminant in the air, a casing for said illuminant and said supporting means, said casing comprising a plurality of sections, a member uniting all of said sections, means normally tending to operate said member to release said sections, and means for preventing operation of said first means until after a predetermined interval of time.

13. The combination of an illuminant, means for supporting said illuminant in the air, a casing for said illuminant and said supporting means, said casing comprising a plurality of sections, a member uniting all of said sections and operable to release said sections, means normally tending to operate said member to release said sections, means for preventing operation of said first means until after a predetermined interval of time, and means whereby operation of said member renders said last-named means operative.

14. The combination of an illuminant, means for supporting said illuminant in the air, a casing for said illuminant and said supporting means, said casing comprising a plurality of sections, a member uniting all of said sections and operable to release said sections, means for operating said member after a predetermined interval to release said sections, and means whereby said releasing operates to ignite said illuminant.

15. The combination of an illuminant, means for supporting said illuminant in the air, a casing for said illuminant and said supporting means, said casing comprising a plurality of sections, means connecting said sections and operable to release said sections, time-controlled mechanism in one of said sections for operating said connecting means to release said sections, said illuminant being positioned in another of said sections.

16. The combination of an illuminant, means for supporting said illuminant in the air, a casing for said illuminant and said supporting means, said casing comprising a plurality of sections, means connecting said sections and operable to release said sections, time-controlled means in one of said sections for operating said connecting means to release said sections, said illuminant being positioned in another of said sections and said supporting means being positioned in a third section.

17. The combination of an illuminant, means for supporting said illuminant in the air, a casing for said illuminant and said supporting means, said casing comprising a plurality of sections, means connecting said sections operable to release said sections, time-controlled mechanism in one of said sections for operating said connecting means to release said sections, said illuminant being positioned in another of said sections, and a connection between said time mechanism and said illuminant whereby separation of the respective sections ignites said illuminant.

In testimony whereof I have affixed my signature.

PRESTON R. BASSETT.