

Sept. 11, 1928.

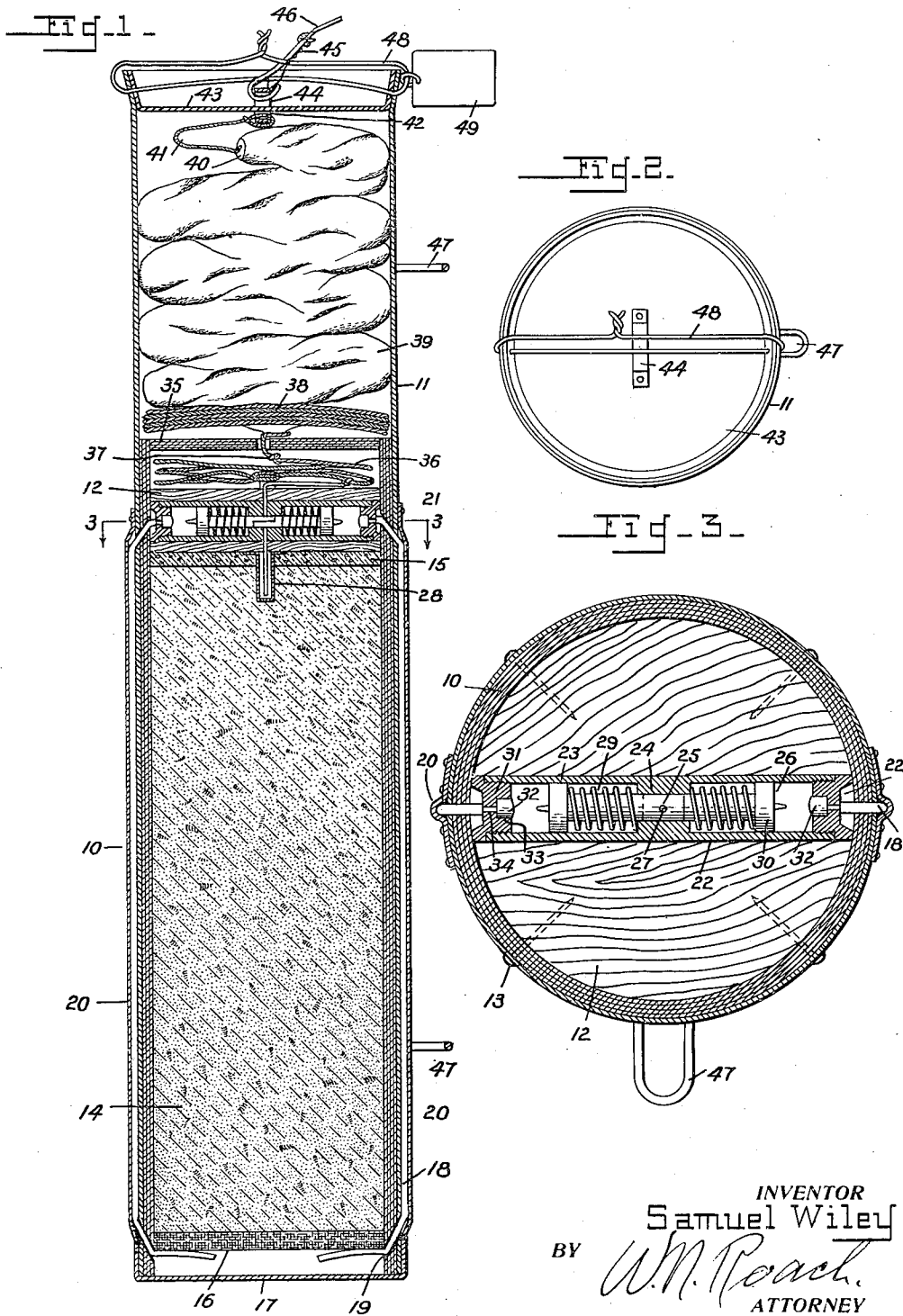
S. WILEY

1,683,940

ILLUMINATING AERO BOMB OR FLARE

Filed July 17, 1924

2 Sheets-Sheet 1



INVENTOR
Samuel Wiley
BY *W. M. Roach*
ATTORNEY

Sept. 11, 1928.

1,683,940

S. WILEY

ILLUMINATING AERO BOMB OR FLARE

Filed July 17, 1924

2 Sheets-Sheet 2

Fig. 4-

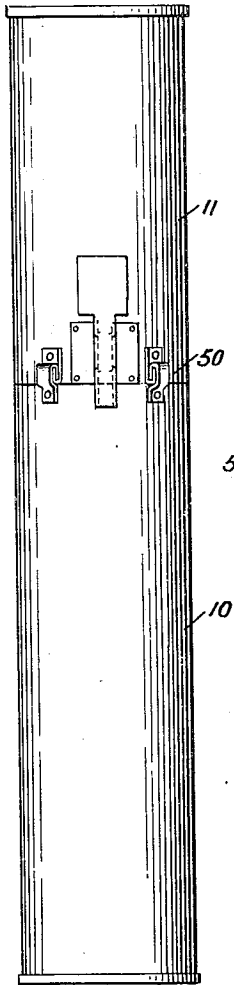


Fig. 5-

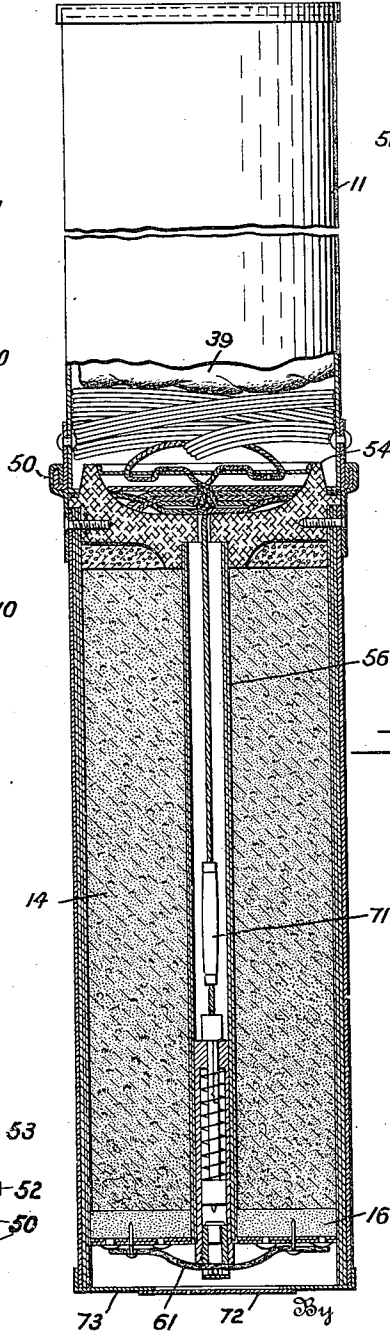


Fig. 6-

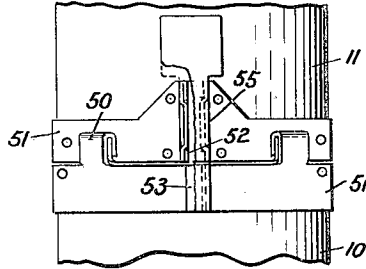


Fig. 7-

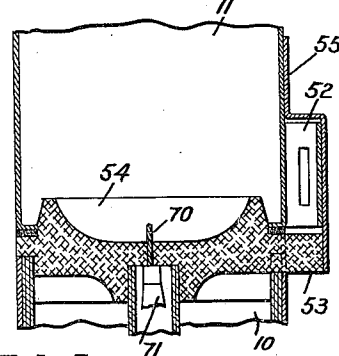


Fig. 8-

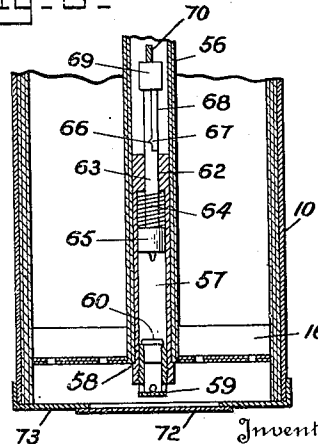
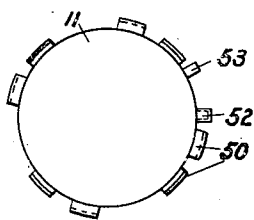


Fig. 9-



Inventor
Samuel Wiley

W. N. Roach.

Attorney

UNITED STATES PATENT OFFICE.

SAMUEL WILEY, OF METUCHEN, NEW JERSEY.

ILLUMINATING AERO BOMB OR FLARE.

Application filed July 17, 1924. Serial No. 726,537.

The subject of this invention is an illuminating aero bomb or flare.

In making night landings in unfamiliar territory and for other purposes, it becomes necessary for the pilot of the aeroplane to drop flares for the purpose of illuminating the surrounding terrain.

The present invention is another expression of the method of igniting the flare through association with a parachute as disclosed in co-pending application, Serial No. 723,371, filed June 30, 1924.

The improvements consist in the provision of a novel form of igniting mechanism and a release mechanism which will permit the flare to be carried on the wings or the fuselage in a manner similar to the wing tip flares now in use. It also contemplates the formation of the parachute container and the light case in separable units, so that upon release of the flare the parachute container will be retained in the launching tube.

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

Several practical embodiments of the invention are illustrated in the accompanying drawings, in which,

Fig. 1 is a longitudinal sectional view of the improved flare;

Fig. 2 is a plan view;

Fig. 3 is a sectional view taken on the line 3-3 of Fig. 1;

Fig. 4 is a view in side elevation of a modified form of flare;

Fig. 5 is a longitudinal sectional view, partly in elevation;

Fig. 6 is a detail view showing an alternate method of forming the cooperating hooks;

Fig. 7 is a fragmentary longitudinal sectional view taken through the partition block;

Fig. 8 is a detail sectional view showing the firing pin in retracted position; and

Fig. 9 is a plan view of Fig. 4.

Referring to the drawings by numerals of reference:

The flare illustrated in Figures 1 to 3 comprises a cylindrical light case 10, partially inserted within a parachute container 11, both of which are held together by means of a partition block 12, disposed within the light case and which receives nails 13 or other suitable securing devices passing through the case and the container.

The light case 10, combustible at a high temperature, encloses an illuminating composition 14, the upper end being spaced from the partition block 12 by a cork disc 15 and the lower end carrying or disposed adjacent a first fire composition 16.

The first fire composition is spaced from a fusible seal 17 to form a chamber for the reception of the free ends of quick-matches 18 introduced into the chamber through inclined apertures 19 in the light case. The quick-matches are disposed along the outer walls of the light case where they are held in place by coverings 20 and re-enter the light case through apertures 21 formed in the upper portion of the case whence they terminate in a passage 22, formed transversely in the partition block 12.

Positioned within the passage 22 is a tubular member 23 formed with a central apertured dividing wall 24 for receiving the overlapping ends 25 of strikers 26, the strikers being normally held together by a wire 27, passing through apertures in the ends of the strikers, the tubular member and the partition block. The lower portion of the wire may be received in a cup 28 depended from the disc 15 while the upper end is secured to a cable 36 adapted to withdraw the wire from the partition block when the parachute is distended. The wire constitutes a safety mechanism for maintaining the strikers in unarm position against the tension of springs 29 confined between the dividing wall and an enlarged head or collar 30 formed on each striker.

Threaded into the opposite ends of the tubular member are plugs 31, each carrying

a primer 32 in an inner recess 33 and provided with ports 34 for communicating the flash from the primers to the quick-matches 18.

5 The upper end of the light case is closed by a disc 35 spaced from the partition block to enclose a coiled or folded cable 36, one end of which is secured to a staple embedded in the block and the other end is knotted as at 37,
10 passed through the disc and fastened to suspension cords 38 of a parachute 39 to suspend the flare from a parachute. The apex 40 of the parachute is attached by means of a cord or thread 41 to a bracket 42 on the under
15 side of a top cap 43 inserted within the flared mouth of the parachute container.

The upper side of the cap is provided with a similar bracket 44 adapted to receive a snap hook 45 on the end of a cable 46 attached
20 to a releasing device, not shown.

The flare is carried by means of loops 47 engageable by a dropping gear which may be located on any convenient portion of the plane.

25 Upon release of the flare the cable 46 will be drawn taut and pull out the top cap 43 and at the same time withdraw the parachute 39 from its container. The momentum of the falling flare will be sufficient to snap the attaching cord 41, thereby detaching the flare
30 from the releasing mechanism. The parachute will normally be distended shortly after release and through the sudden jerk on the cable 36 the closing disc 35 will be dislodged from the light case to free the cable 36. In straightening out or unfolding the
35 cable will withdraw the wire 27 thus permitting the strikers 26 to be urged outwardly by their springs 29 to prime the primers 32. The flash from the primers passes through the ports 34 in the plugs to ignite the quick-matches which relay the flame to the first fire
40 composition and illuminating composition and consume the fusible seal 17.

45 During storage and transportation, the top cap 43 is held in position within the parachute container by a wire 48 attached to which is an instruction tag 49 informing the operator to remove the wire after the flare has
50 been placed in the dropping gear.

In the modified form shown in Figures 4 to 9, I contemplate releasing the flare from a launching tube and for this purpose a separable joint is provided between the light case
55 10 and the parachute container 11 with a view to retaining the parachute container within the launching tube.

The case and the container are maintained as a unit by means of cooperating hooks 50,
60 either formed separately on the case and the container as shown in Figure 4 or formed on a band 51 as shown in Figure 6.

The parachute container is supported in the launching tube by means of a lug 52
65 formed integrally with the container and

which is normally positioned above but spaced from a corresponding lug 53 either formed on the partition block 54 as shown in Figure 7 or on the light case 10. During transportation and storage the lugs 52 and 53 are secured in alignment and held against
70 rotational movement with respect to each other by a clip 55. This clip is removed prior to placing the flare in the launching tube and a supporting bracket (not shown) may be
75 adapted to be inserted between the lugs to support the flare. The launching tube is provided with suitable mechanism for rotating the light case 10 to disengage the hooks 50, whereby to permit the light case and the
80 parachute to drop from the plane through the force of gravity.

While the structure defined in Figures 1 to 3 in the present disclosure include a plurality firing mechanism to insure ignition of the
85 illuminating composition, I may reduce the firing mechanism to a single unit by enclosing it in a tube 56 disposed axially of the flare and extending from the partition block 54 to the first fire composition 16. This construction obviates the necessity of disposing quick-matches on the outside of the light case and further it constitutes a practically instantaneous as opposed to a delay ignition to permit the pilot of the plane to utilize the flare
90 at low altitudes.

Disposed in the lower end of the tube 56 is a sleeve 57 its lower end formed with an annular flange 58 seated against the end of the tube to prevent the sleeve from being
100 pulled upward when the parachute, during distension, actuates the cable 70. The flanged portion of the sleeve is tapped for the reception of a plug 59 carrying a primer 60 and a quick-match 61. The upper end of the
105 sleeve is formed with a reduced opening 62 to permit retraction of the firing pin 63 against the tension of a spring 64 confined between the enlarged head 65 of the firing pin and the shoulder formed by the reduced
110 opening in the sleeve.

The upper portion of the firing pin is semi-cylindrical and is provided with a notch 66 adapted to receive a complementary projection 67 on a semi-cylindrical dog 68 which
115 is formed with a collar 69 adapted to seat on the upper end of the sleeve to normally hold the firing pin from the primer 60 against the action of gravity and the spring 64.

The dog 68 is secured to one end of a cable 120 70, which is fastened to the suspension cords of the parachute so that when the parachute is distended the cable will serve to retract the firing pin, thereby compressing the spring 64 until the projection 67 clears the upper
125 end of the sleeve (as shown in Figure 8) to be disengaged from the firing pin and release the same to prime the primer.

The cable is provided with a stop 71 adapted to engage the partition block 54 where it
130

serves to suspend the light case from the parachute.

Instead of the fusible seal which is shown in Figure 1, I employ a pressure released disc 72 on a cap 73 for venting the gases until the temperature of the illuminating composition reaches a sufficient degree to consume the lower portion of the light case thereby resulting in the removal of the cap 73.

While in the foregoing there has been illustrated and described such combination and arrangement of elements as constitute the preferred embodiment of my invention, it is nevertheless desired to emphasize the fact that interpretation of the invention should only be conclusive when made in the light of the subjoined claims.

I claim:

1. A flare embodying a light case, a parachute container, a partition block, means for securing the case and the container to the partition block, an illuminating composition carried in the light case, a parachute carried in the container, a folded cable for attaching the parachute to the block, a tubular member mounted transversely in the block, said tubular member formed with a centrally disposed apertured dividing wall, strikers having collars and overlapping ends reciprocally mounted in the tubular member, springs confined between the collars and dividing wall, plugs closing the ends of the tubular member, primers disposed in the plugs, quick-matches positioned on the outside of the light case and introduced into the case above and below the illuminating composition, a wire insertable through the overlapping ends of the strikers to hold the strikers against the tension of their springs, said wire being secured to the folded cable and adapted to be withdrawn from the strikers when the cable is drawn taut, a closure for the container, a frangible cord connecting the closure and the parachute and adapted to withdraw the parachute when the closure is removed, and a fusible seal for closing the light case.

2. A flare embodying a light case, a parachute container, a partition block, means for securing the case and the container to the block, an illuminating composition carried in the light case, a parachute carried in the container and attachable to the block, a tubular member mounted in the block, said member formed with a centrally disposed apertured dividing wall, strikers having collars and overlapping ends reciprocally mounted in the tubular member, tension elements confined between the collars and the dividing wall, plugs closing the end of the tubular member, primers disposed in the plugs, means positioned on the outside of the light case and introduced into opposite ends for relaying ignition, means for retaining the strikers in unarmed position, and extractable through

the agency of the parachute to release the strikers to armed position, a closure for the container, and means for withdrawing the parachute from the container when the closure is removed.

3. A flare embodying a light case, an illuminant carried in one portion of the case, a transversely apertured block disposed in the case above the illuminant, a tubular member carried in the block, said member formed with a centrally disposed apertured dividing wall, plugs for closing the ends of the tubular member, primers carried by the plugs, strikers having collars and overlapping ends reciprocally mounted in the tubular member, tension elements confined between the collars and the dividing wall, means for retaining the strikers in unarmed position, means for releasing the strikers to armed position, and means for relaying ignition to the illuminant.

4. A flare embodying a light case, an illuminant and an igniting mechanism carried by the case, a container secured to the case, a closure for the container, a parachute disposed within the container and associated with the igniting mechanism, and a frangible connection between the parachute and the closure whereby to withdraw the parachute from the container when the closure is removed.

5. A flare embodying a light case, an illuminant carried in one portion of the case, a transversely apertured block disposed in the case adjacent the illuminant, a tubular member carried in the block, said member formed with a centrally disposed apertured dividing wall, plugs for closing the ends of the tubular member, primers carried by the plugs, members reciprocally mounted in the tubular member for priming the primers, means for retaining said members under tension, and means for releasing said retaining means.

6. A flare embodying a light case, an illuminant carried in one portion of the case, a block disposed in the case adjacent the illuminant, a tubular member carried in the block, plugs for closing the ends of the member, primers carried by the plugs, members reciprocally mounted in the tubular member for priming the primers, means for retaining said member under tension, and means for releasing said retaining means.

7. A flare embodying a light case, an illuminant carried by the case, a block disposed adjacent the illuminant, priming elements carried by the block, strikers reciprocally mounted within the block, said strikers formed with overlapping ends, means for retaining the strikers in inoperative position, and means for releasing the strikers to prime the primers.

8. A flare embodying a light case, an illuminant carried by the case, a block disposed adjacent the illuminant, priming elements positioned in opposite sides of the block, and

strikers normally under tension and releasable to prime the primers.

5 9. A flare embodying a light case, an illuminant carried by the case, a block disposed adjacent the illuminant, priming elements positioned in the block, and strikers releasable in divergent directions for priming the primers.

10. A flare embodying a light case, an illuminant carried by the case, a block disposed adjacent the illuminant, priming elements positioned in the block, strikers reciprocally mounted within the block, and means passing through overlapping ends of the strikers to retain the strikers in unarmed position.

SAMUEL WILEY.