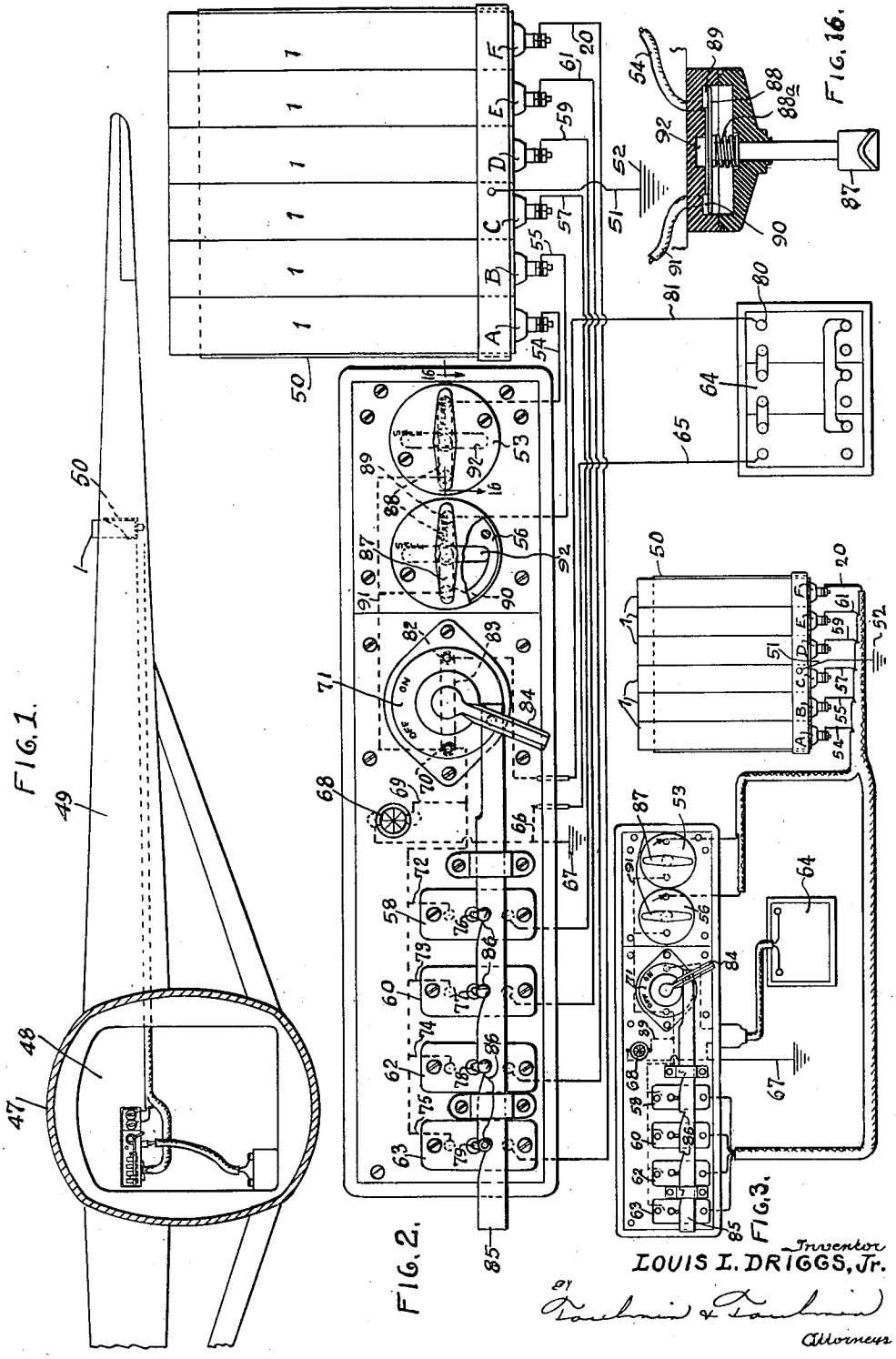
Nov. 28, 1933. L. L. DRIGGS, JR 1,937,191

PARACHUTE FLARE

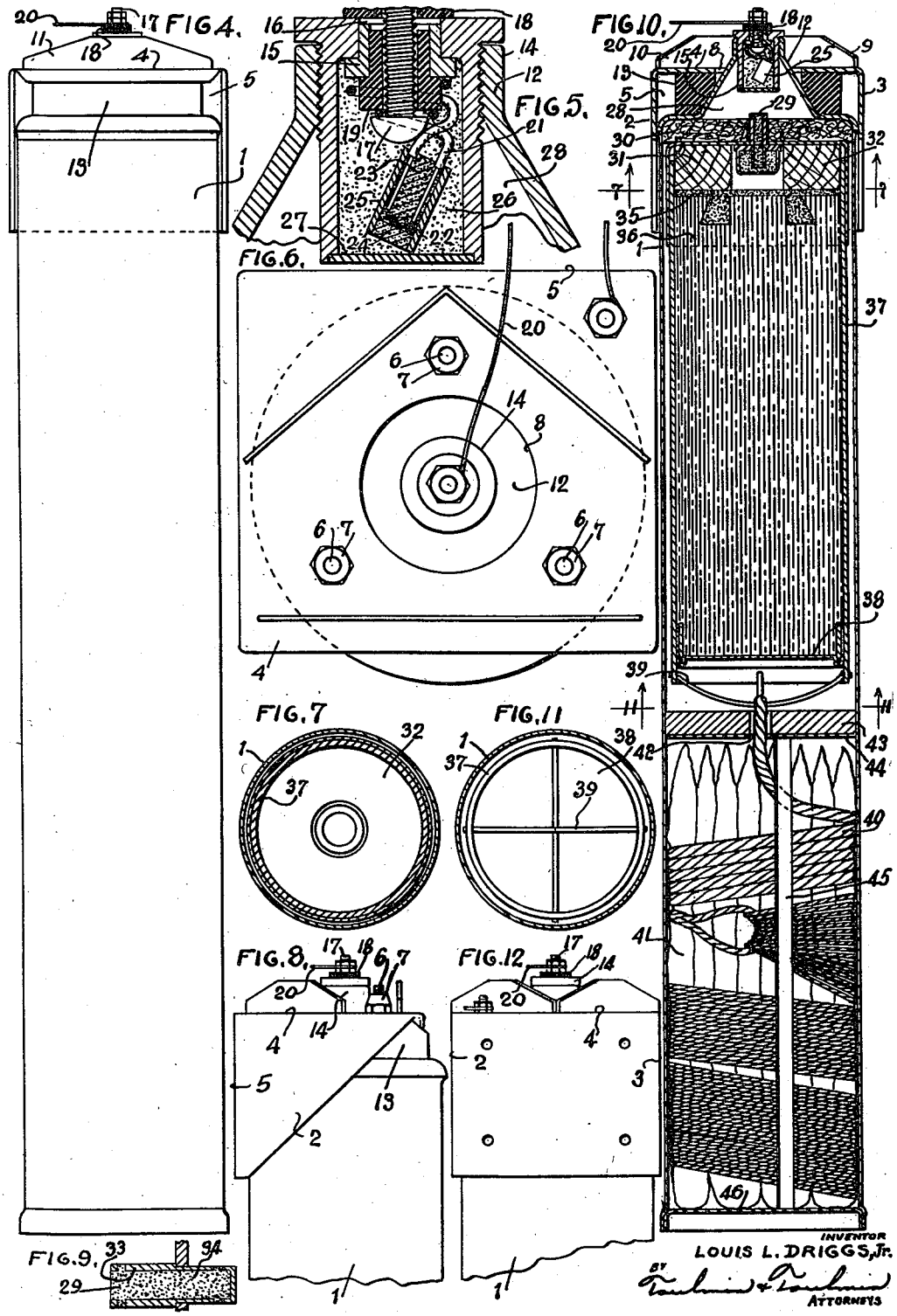
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PARACHUTE FLARE

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PARACHUTE FLARE

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FIG. 13.

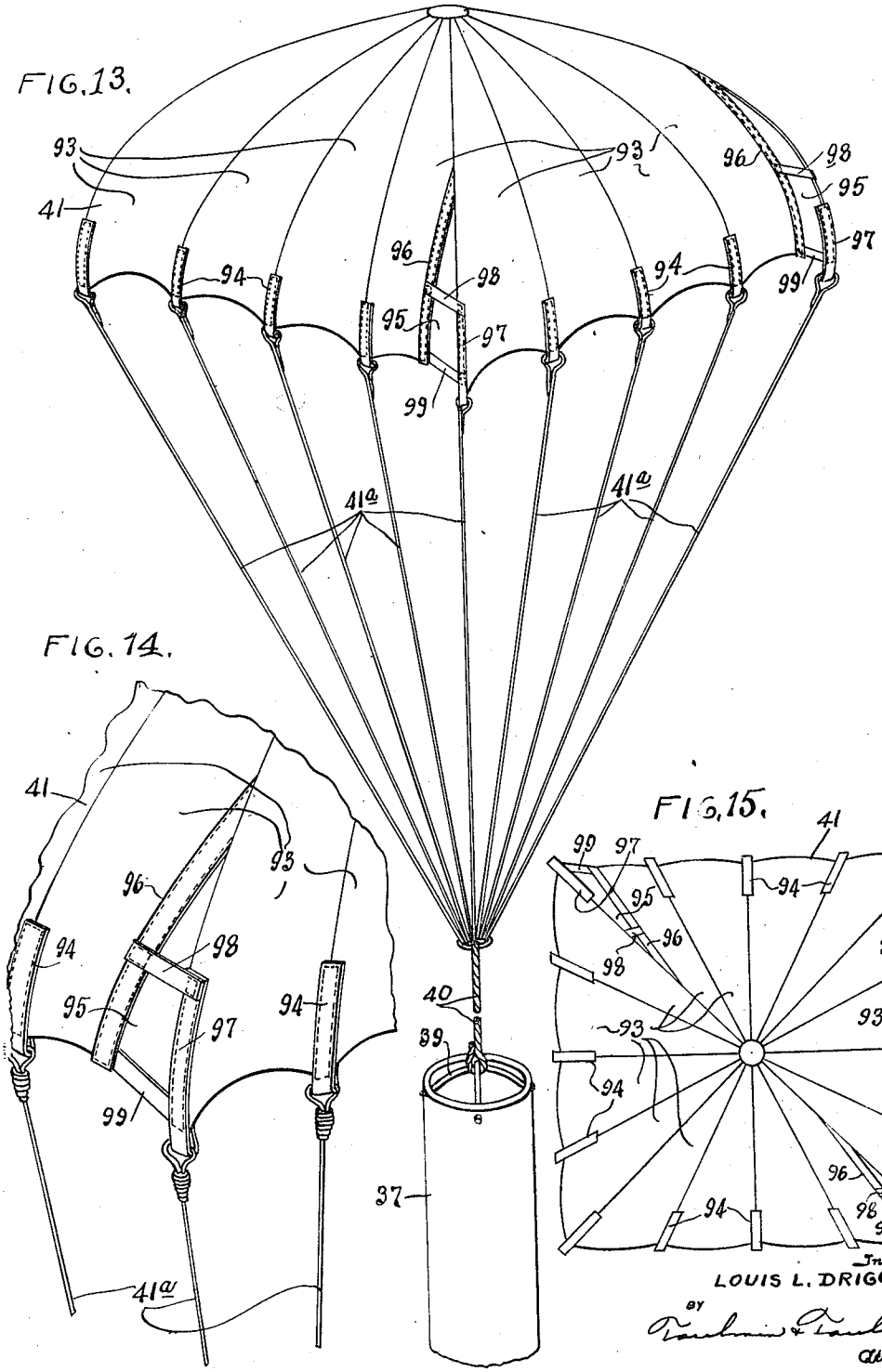


FIG. 14.

FIG. 15.

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1,937,191

PARACHUTE FLARE

Louis L. Driggs, Jr., Tippecanoe City, Ohio

Application November 23, 1931
Serial No. 576,667

18 Claims. (Cl. 102—24)

My invention relates to flares.

In particular, it is the object of my invention to provide a flare which may be electrically controlled as to its expulsion from its case permitting of remote control of the discharge of the flare.

It is a further object of my invention to provide means of controlling the electric circuit to prevent accidental discharge of the flare; and means cooperating therewith for discharging a plurality of flares as a unit or successively.

It is a further object to provide means of supporting and of discharging and of controlling the discharge of pyrotechnic flares from airplanes.

It is a further object to provide a novel form of parachute for supporting flares after the discharge.

It is the object of my invention to provide a parachute which will have the minimum of swinging and rocking and the minimum of rotation and of means of absorbing the shock of applying the load to the parachute.

It is a further object of my invention to provide a novel form of holder and of mounting so that they may be mounted for either an up or down discharge and may be located either on the wing, within the wing or on the fuselage.

Referring to the drawings:

Figure 1 is a section through the fuselage of an airplane showing one of the wings in elevation and the location of the control mechanism, battery, flares and flare holder;

Figure 2 is a diagrammatic view of the control system for firing six flares, six flares and their holder and the connected battery with the parts in firing position;

Figure 3 is a similar view with the parts in non-firing or inoperative position;

Figure 4 is a side elevation of one of the flares;

Figure 5 is a section on the line 5—5 of Figure 6;

Figure 6 is a top plan view;

Figure 7 is a section on the line 7—7 of Figure 10;

Figure 8 is a side elevation of the top of the flare and its holder;

Figure 9 is a section through the flare fuse;

Figure 10 is a vertical section through the flare;

Figure 11 is a section on the line 11—11 of Figure 10;

Figure 12 is a rear elevation of the top of the flare showing the back of the holder;

Figure 13 is a perspective of the parachute opened carrying its load;

Figure 14 is a detail view of one of the corners of the parachute showing the air releasing opening;

Figure 15 is a top plan view;

Figure 16 is a section on the line 16—16 of Figure 2.

Referring to the drawings in detail, it will be understood that the flare may fire in any direction, that is, vertically, up or down, or laterally, and to illustrate the flare positions I have shown it in a vertical discharge, and also for a vertical discharge up and a vertical discharge down.

The flare consists of a cylindrical metal container 1, which is permanently supported within a supporting bracket comprising a side plate 2 and a side plate 3, a top plate 4 and a back plate 5. The metal casing 1 is attached by the bolts 6 and nuts 7 to the supporting bracket through the top plate 4 thereof which has an aperture 8 in the center. Reinforcing flanges 9, 10 and 11 are mounted on the top of this bracket. Projecting up through the aperture 8 is a crown piece in the shape of an inverted funnel, designated 12. Interposed between the crown 12 and the bottom of the plate 4 is a rubber ring 13 which acts as a shock absorber when the flare is fired. The upper end of the crown piece 12 is formed into a collar 14 internally threaded for receiving the firing plug 15 which is a cylinder having an opening 16 at the top for receiving the binding post 17 to which it is connected by the washers 18 and 19 of insulation material. To one end of this binding post is connected the wire 20 and on the other end of the binding post is the wire 21 which has a loop at one end of fine wire 22 that becomes incandescent when the current is placed on the line in order to ignite the powder 24 which is packed within the cylinder 25 mounted on the loop of wire 22.

This in turn fires the black powder 26 in the firing plug 15. This black powder is held in at one end by a cardboard disk 27. The firing plug discharges into the firing chamber 28 within the crown piece 12 and thereby serves to fire the fuse 29 which projects up above the felt disk 30 located between the top of the projectile casing 31 and the under side of the top of the flare casing 1. The felt disk prevents flames reaching the parachute.

The projectile casing is provided on its inner side with an annular wooden block 32 into which is projected the firing end of the fuse 29 comprising a cup 33 having powder contents 34 which ignites the layer of powder 35 formed on the end of the flare material 36.

This flare material is contained within a paste

board cylinder or carton 37. The bottom of this flare carton or casing 37 is sealed with a metallic disk 38 while the carton itself is provided with a saddle 39 to which is attached the parachute cable 40, the other end of which is connected to the parachute 41.

This cable 40 passes through an aperture 42 in a disk 43 which is supported by a metal disk 44. This disk in turn rests upon a thrust member 45, the other end of which rests upon the hermetically-sealed metallic enclosure plate 46 that is carried on the bottom of the flare casing 1.

Referring to the firing mechanism, 47 represents the fuselage of an airplane, while 48 indicates the instrument board thereof or any other convenient location for mounting the switch. 49 represents a wing structure of an airplane in which is mounted within the supporting bracket generally designated 50 a plurality of flare casings 1. The construction of this supporting casing 50 is generally similar to the individual supporting casing heretofore described.

As shown in Figures 1, 2 and 3, the flares are arranged to be shot upwardly. The flare casing 50 is connected by the wire 51 to some part of the machine as a ground as at 52.

The flares may be either independently operated or may be operated as a unit for discharge. That is, the firing circuit may be independently closed for each flare or may be closed for all of the flares at one time. For instance, flare A is connected to its switch designated 53 by the wire 54. Flare B is connected by the wire 55 to its switch 56. Flare C is connected by the wire 57 to its switch 58. Flare D is connected by the wire 59 to the switch 60. Flare E is connected by the wire 61 to the switch 62. Flare F is connected by the wire 20 to the switch 63. 64 designates a source of current, such as a battery, connected by the wire 65 and the wire 66 which is grounded at one end at 67 and the other end is connected to a dash lamp 68 which is in turn connected by the wire 69 to the terminal 70 of the master switch 71. On the other side it is connected by the wires 72—73—74 and 75 to the switches 58, 60, 62 and 63 which have the switch arms 76, 77, 78 and 79. The other side of the battery is connected through its terminal 80 and wire 81 to the terminal 82 of the master switch 71. The terminals 70 and 82 in this switch are connected by the switch plate 83 when the switch lever 84 is in "on" position. This is the master current controlling switch. To it is connected a locking bar 85 having notches 86 for receiving the switch arms 76, 77, 78 and 79. In the position shown in Figure 2 the independent switches 58, 60, 62 and 63 are closed by such arms and the locking bar 85 is in the unlocked position while in Figure 3 it is in the locked position. To close any one of the switches 58, 60, 62 and 63 it is necessary to move the current controlling switch arm 84 to "on" position and to then independently move each one of the switch arms 76, 77, 78 and 79 into closed position. When the master switch 84 with the locking bar 85 is in "off" position the switches 58, 60, 62 and 63 are locked against accidental closing. It requires two operations to close any one of those switches, namely, the closing of the current switch by moving the arm 84 to "on" position and then move one of the switch arms 76, 77, 78 and 79.

The switches 53 and 56 are of a different type. Before they can function it is first necessary to throw the current controlling switch arm 84 to "on" position and then to pull out the handle 87 and rotate it so that the switch plate 88 will engage the terminals 89 and 90. The terminals 90 are connected by the wires 91 to the terminals 70 of the master switch 71. The other terminals 89 are connected by their respective wires 54 and 55 to the flare terminals on flares A and B. By having a switch of this type it is necessary for the operator to do three things:

(1) To close the current switch.

(2) To pull out the individual switch.

(3) To rotate the individual switch into contact making position.

This prevents accidents.

The switch plate 88*a* is rotated by the handle 88*b*. The helical spring 88*c* presses the switch plate into the groove 92. It must be lifted out of this groove and rotated a quarter turn in order to be brought in engagement with the terminal points 89 and 90.

Turning to the parachute, one of the essential problems with a parachute, particularly a parachute supporting a flare, is to prevent the parachute from rocking and thereby bringing the flare within a smoke cloud so as to cast a shadow on the ground and still fully illuminating the ground.

According, I have provided a parachute which, when open, is substantially square in outline made up of a plurality of sections 93 to which the parachute ropes 41*a* are connected by straps 94 which may be resilient. But the special feature of my invention is the provision of air releasing slots 95 at the corners of the parachute. The margin of this slot through which air escapes is bound with a strap 96 on one side and a resilient strap 97 on the other joint by a strap 98 and a strap 99. The strap 96 may be resilient.

Thus, the full strength is secured while, at the same time, allowing the air to escape and thereby preventing excessive rotation and rocking of the parachute. When the rocking of the parachute is prevented the parachute does not spill air and, therefore, descends more slowly making up for the loss of air through the slot 95 so that the net speed of descent is about the same as that of parachutes now made in the art without the disadvantage of excessive rotation and rocking. Of course, my parachute is adaptable to support other objects than flares.

It will be understood that I desire to comprehend within my invention such modifications as may be necessary to adapt it to varying conditions and uses.

It will be understood that the purpose of the slots in the parachute is to provide a slow rotation due to tangential discharge of the air during descent. The parachute slowly rotates and in this way disturbs the plane of oscillation in which the weight (such a weight may be a flare or a man, or any other similar body) starts to swing. This attempt to change the plane of oscillation results in dampening out the oscillation. By making the straps adjacent the vent openings resilient, the further advantage is gained of controlling the rotation of the parachute. Thus, the vents can open quite wide at the instant of high load and close up later to provide the normal opening which is desired during descent.

It will be understood that my invention will apply to a parachute of any shape with means to cause slow rotation as it is the slow rotation brought about in this case by the use of slots that damps out the oscillation. It is new in the art to use rotation as a means of dampening oscillation. I also desire to comprehend within

my invention means, such as a parachute, of unsymmetrical form that would thereby be caused to slowly rotate or the use of shroud lines of unequal length to cause the chute to rotate.

I comprehend within my invention any means of causing rotation to thereby dampen oscillation, but I have shown one of the preferred forms in my drawings which are described in my specification.

By " weight " I refer to any body of any character attached to the parachute.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a flare, a casing, a parachute, a flare connected thereto, an expelling charge in the casing for expelling the flare and its parachute, and means for resiliently supporting said flare and its casing.

2. In a flare, a bracket, a casing releasably supported by the bracket, a parachute, a flare connected thereto, an expelling charge in the casing for expelling the flare and its parachute, and means for electrically firing the explosive charge for expelling the flare and its parachute from the casing.

3. In a flare, a casing, means for yieldingly and releasably supporting the casing, a parachute, a flare connected thereto, an expelling charge in the casing for expelling the flare and its parachute, means for electrically firing the explosive charge for expelling the flare and its parachute from the casing, a time fuse between the expelling charge and the flare adapted to be ignited by the expelling charge and upon burning to a predetermined point after the expulsion of the flare to ignite the flare.

4. In a flare, a casing, a parachute, a flare connected thereto, an expelling charge in the casing for expelling the flare and its parachute, means for electrically firing the explosive charge for expelling the flare and its parachute from the casing, a time fuse between the expelling charge and the flare adapted to be ignited by the expelling charge and upon burning to a predetermined point after the expulsion of the flare to ignite the flare, and explosive means associated therewith for blowing the time fuse away from the end of the flare upon ignition.

5. In a flare construction, the combination of a hermetically-sealed casing, an explosive expelling charge in one end thereof, a seal at the other end thereof, a parachute and flare therebetween, and means for electrically igniting the expelling charge.

6. In a flare construction, the combination of a hermetically-sealed casing, an explosive expelling charge in one end thereof, a seal at the other end thereof, a parachute and flare therebetween, a time fuse between said explosive and said flare, and means for electrically igniting the expelling charge.

7. In a flare construction, the combination of a hermetically-sealed casing, an explosive expelling charge in one end thereof, a seal at the other end thereof, a parachute and flare therebetween, a time fuse between said explosive and said flare, a support on said flare for supporting the time fuse, and means for electrically igniting the expelling charge.

8. In a flare construction, the combination of a hermetically-sealed casing, a firing plug having therein an explosive expelling charge in one end of the casing, means to yieldingly support the casing, a seal at the other end thereof, a parachute and flare therebetween, a time fuse between said firing plug and said flare, a support on said flare for supporting the time fuse, and a second explosive charge ignitible by the time fuse for blowing off said time fuse support and igniting the flare at a predetermined point in the air.

9. In a flare construction, the combination of a hermetically-sealed casing, a firing plug having therein an explosive expelling charge in one end of the casing, means to yieldingly support the casing, a seal at the other end thereof, a parachute and flare therebetween, a time fuse between said firing plug and said flare, a support on said flare for supporting the time fuse, a second explosive charge ignitible by the time fuse for blowing off said time fuse support and igniting the flare at a predetermined point in the air, and means to separate the flare and parachute into separate compartments.

10. In a flare construction, the combination of a hermetically-sealed casing, a firing plug having therein an explosive expelling charge in one end of the casing, means to yieldingly support the casing, a seal at the other end thereof, a parachute and flare therebetween, a time fuse and support therefor between said firing plug and said flare, a support on said flare for supporting the time fuse, a second explosive charge ignitible by the time fuse for blowing off said time fuse support and igniting the flare at a predetermined point in the air, and means to separate the flare and parachute into separate compartments, and a thrust means between said separating means and the seal on the end of the flare casing in the parachute compartment whereby the force of the expelling charge will force the flare against the partition between it and the parachute and the thrust member engaging the partition will force out the sealing member so that both flare and parachute may be ejected from the casing.

11. In combination, a one-piece tubular casing having at one end a cone-shaped crown with a firing plug therein, a detachable seal at the other end, a propelling charge in the firing plug, a time fuse adjacent the firing plug, a second explosive connected therewith, means of supporting the time fuse and explosive on the end of a flare, a flare, and a flare case, a parachute and means connecting said flare case and said parachute.

12. In combination, a one-piece tubular casing having at one end a firing plug, threaded therein, a detachable seal at the other end, a propelling charge in the firing plug, a time fuse adjacent the firing plug, a second explosive connected therewith, means of supporting the time fuse and explosive on the end of a flare, a flare, and a flare case, a parachute, means connecting said flare case and said parachute, a partition between said flare and parachute.

13. In combination, a one-piece tubular casing having at one end a cone-shaped crown, a detachable seal at the other end, a propelling charge in the crown, a time fuse adjacent the crown, a second explosive connected therewith, means of supporting the time fuse and explosive on the end of a flare, a flare, and a flare case, a parachute, means connecting said flare case and said parachute, a partition between said flare and parachute, a thrust member between said partition, and a detachable seal at the end of the casing.

14. In combination, a casing having a chamber in its closed end, a hermetic seal at the other

end, a detachable firing plug mounted in its closed end, an electric wire in said firing plug, a readily ignitible substance surrounding said wire, a charge of powder surrounding said substance, a time fuse adjacent said powder ignitible thereby, a flare cover carrying said fuse, a propelling charge ignitible by said fuse located between said cover and a flare, a flare mounted in said cover ignitible thereby, and a parachute connected to said flare.

15. In combination, a casing having a chamber in its closed end, a hermetic seal at the other end, a detachable firing plug mounted in its closed end, an electric wire in said firing plug, a readily ignitible substance surrounding said wire, a charge of powder surrounding said substance, a time fuse adjacent said powder ignitible thereby, a flare cover carrying said fuse, a propelling charge ignitible by said fuse located between said cover and a flare, a flare mounted in said cover ignitible thereby, a parachute connected to said flare, said connection comprising a casing for the flare and a cable connection between the casing and the parachute.

16. In combination, a casing having a firing chamber at one end and a hermetic seal at the other, a propelling charge, means of electrically firing said propelling charge, a felt cushion adjacent thereto, a flare cover supporting said cushion, a time fuse in said flare cover, a propelling charge ignitible thereby carried by said cover, means to form a chamber in said cover between it and the flare, a flare casing and flare mounted within said cover, said flare being exposed to the propelling charge, and a parachute connected to the other end of the cover.

17. In combination, a casing having a firing chamber at one end and a hermetic seal at the other, a propelling charge, means of electrically firing said propelling charge, a felt cushion adjacent thereto, a flare cover supporting said cushion, a time fuse in said flare cover, a propelling charge ignitible thereby carried by said cover, means to form a chamber in said cover between it and the flare, a flare casing and flare mounted within said cover, said flare being exposed to the propelling charge, a parachute connected to the other end of the cover, and resilient supporting means for said casing.

18. In a flare, a casing having at one end a cone-shaped crown, and a detachable firing plug in the crown.

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