Nov. 28, 1933. L. L. DRIGGS, JR 1,937,220

FLARE SIGNAL

Filed May 25, 1932 2 Sheets-Sheet 1

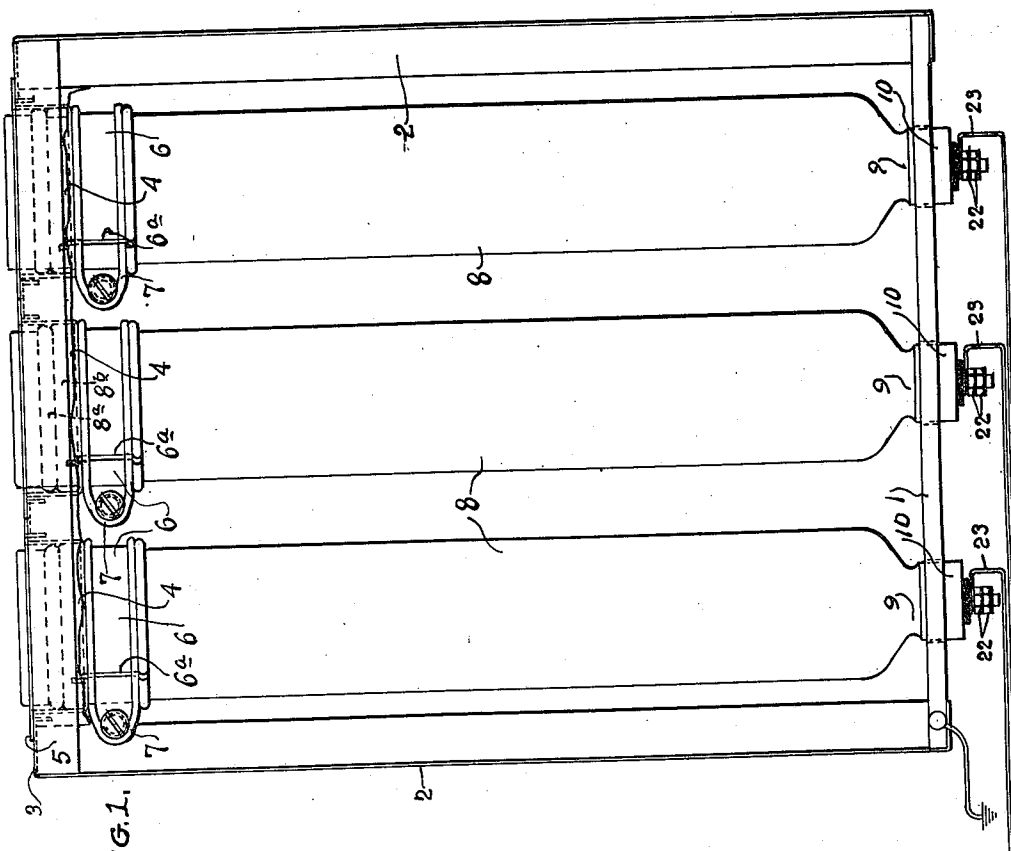


FIG. 1.

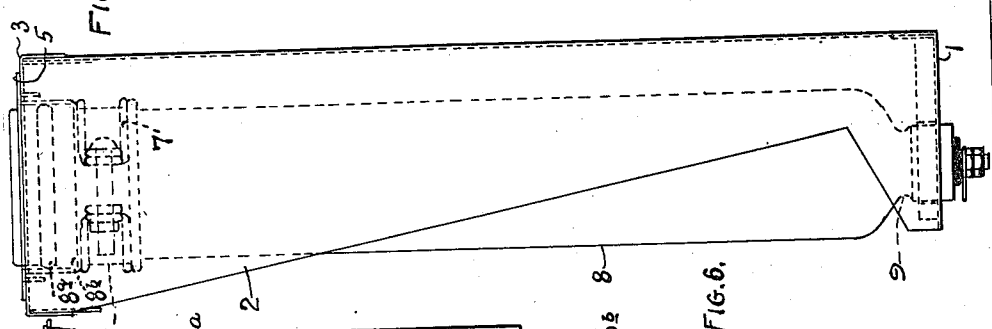


FIG. 6.

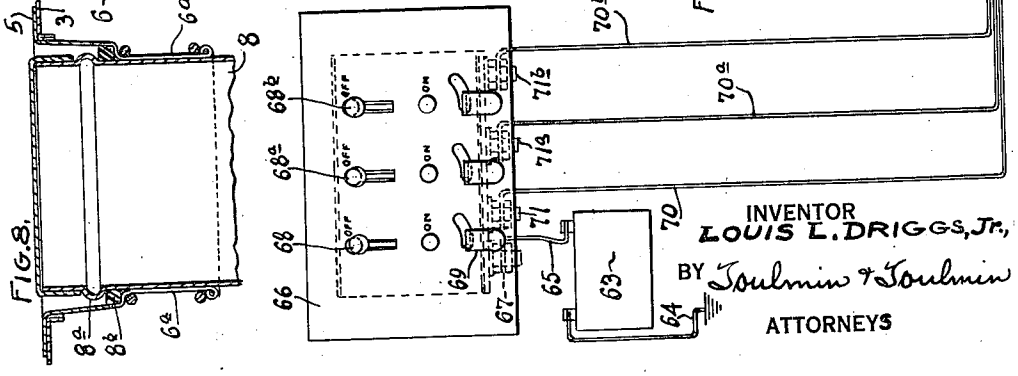


FIG. 8.

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FLARE SIGNAL

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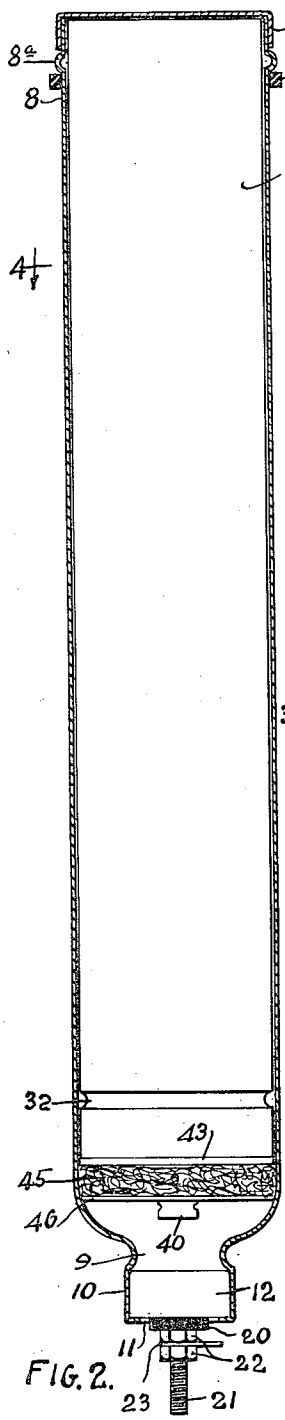


FIG. 2.

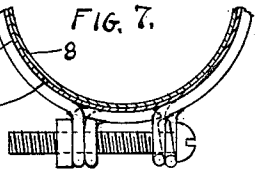


FIG. 7.

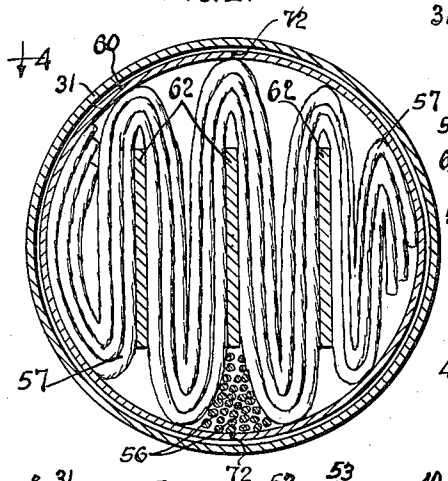


FIG. 4.

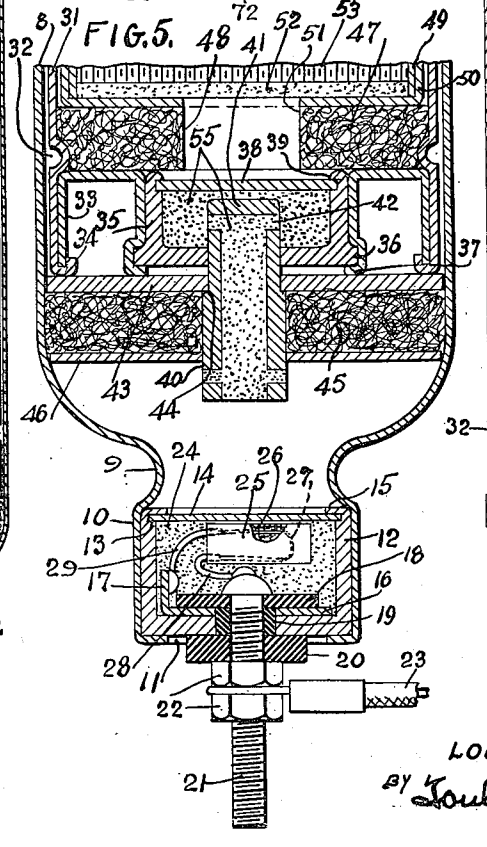


FIG. 5.

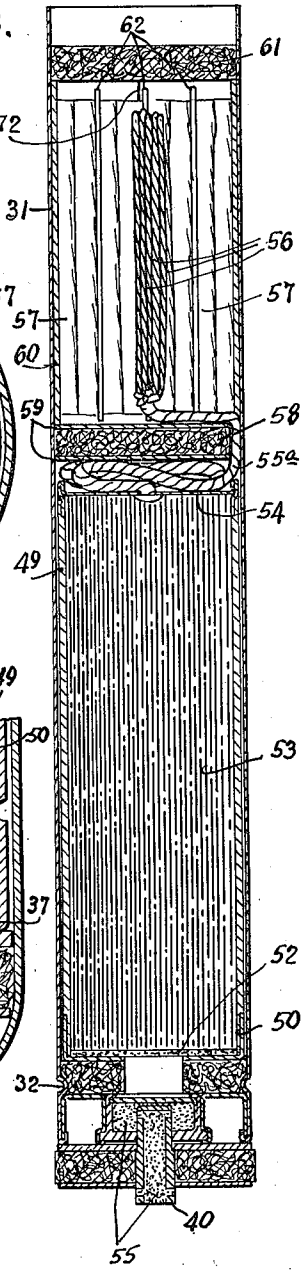


FIG. 3.

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UNITED STATES PATENT OFFICE

1,937,220

FLARE SIGNAL

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

Application May 25, 1932. Serial No. 613,375

16 Claims. (Cl. 102—24)

This invention relates to improvements in flare signals, and particularly to improvements over the flare signal described and claimed in application Ser. No. 576,667, filed November 23, 1931.

This invention has for its object to provide a plurality of flare casings, and means for supporting these casings so they may be fired from a single point remote from the casings, such as by electric firing.

It is an object of this invention to provide means for connecting the flare casings so they may be easily removed and may be securely held when in position. This means consists of a rectangular frame having a part to receive one end of each of a plurality of casings, together with means for receiving the other end of these casings and gripping this end so that the casings are securely held in position against removal and displacement.

It is a further object of this invention to provide a flare casing which has at one end a rolled neck structure providing a mouth, which is easily and readily inserted into a suitable opening in the support, and which also serves as a receptacle or container for the expelling charge.

It is also an object of this invention to provide an especially formed cartridge case for a fuse therein for igniting the charge, and a flare material adapted to be inserted into the casing. There is also provided, in connection with the cartridge case, means for supporting a parachute and means for properly positioning the parachute when supported, and holding the parts thereof in adjusted spaced relationship. For this purpose there is provided a plurality of thrust members which prevent the parachute from becoming compressed to insure its opening, and to facilitate its loading in the case in the container provided therefor.

It is my object to provide a common source of electricity, such as a battery, a plurality of lines to the individual flares to be fired, and independent switches for each line with independent locks therefor.

These and other advantages will appear from the following description taken in connection with the drawings.

Referring to the drawings:

Figure 1 is a view showing the complete layout of the flare structure, together with the wiring and the switchboard used in connection therewith.

Figure 2 is a vertical longitudinal section through the flare casing showing therein the cartridge case in position for firing.

Figure 3 is a vertical longitudinal section through the cartridge case with the charge, the flare material and the parachute inclosed within the cartridge case.

Figure 4 is a section on the line 4—4 of Figure 2.

Figure 5 is an enlarged view of the lower end of the flare casing showing the lower end of the cartridge case in section.

Figure 6 is a side elevation of the frame for supporting the flare, with the flare shown therein.

Figure 7 is a fragmentary view showing one side of the container and the container support taken on the line 7—7 of Figure 8.

Figure 8 is a vertical section through the upper end of the container and the adjacent part of the frame for supporting the container.

In Figure 1 the various flares, three in number, are shown to be supported by means of a casing, rectangular in shape, having a base member 1, side members 2 and a top 3. The base member has a plurality of holes, not shown, for receiving the neck or mouth end of the flare casing. The top has an equal number of larger holes to receive the other ends of the flare casings. These ends of the casings project into sleeves 4 located in the holes in the top.

Each sleeve has a flange 5, which serves to engage the top and support the sleeve from downward movement therein. The lower reduced end 6 of each sleeve has a plurality of slits 6*a*, which make it possible for this end to be brought into clamping engagement with the flare casing by means of a clamp 7, which fits around this slit end of the sleeve. The reduced end of the sleeve contacts directly with the outer wall or periphery of the flare casing or container 8, while the enlarged upper part of the sleeve provides space for the seating of a cap located on the upper end of the flare casing. For properly supporting the container within the sleeve there is provided on the upper end of the container a bead 8*a*, which engages a rubber ring 8*b* resting on the reduced end 6 of the sleeve for supporting, in a resilient manner, the container in the sleeve.

One end of the container or flare casing is reduced in size, and has a neck 9 between the body of the casing or container and a mouth 10 located beyond the neck from the body. The mouth part is cylindrical in shape, and provides a housing for containing the expelling charge. The end of the mouth is turned in and forms a somewhat reduced hole 11. Located on the inside of the mouth is a cup 12, which rests upon the turned-in

end of the mouth. Around the upper edge of this cup there is formed a shoulder 13, upon which a hard paper sealing disc 14 rests, and is held in position thereon by means of a turned-over upper edge 15.

In the bottom of the cup is a plate 16, which has at one end an up-turned part 17, to which an electric conductor is attached for grounding purposes. The bottom of the cup and the plate 16 have holes therein in which there is an insulating ring 19. Resting upon the plate 16 and the insulating ring 19 is an insulating disc 18, while below the bottom of the cup there is a second insulating disc 20. These discs and ring are held together by means of a copper bolt 21, which has its head resting upon the insulating disc 18. Cooperating with the head for clamping the insulating discs and the insulating ring are two nuts 22. These nuts not only serve to hold the bolt in position on the mouth of the container, but they serve as a clamp for clamping the end of a wire conductor 23.

Within the inclosure formed by the cup 12 and the hard paper disc 14 is powder 24 adapted to be ignited for expelling purposes. Embedded in this powder is a cylinder 25, which also has powder 26 therein. In the powder 26 within the cylinder 25 is a fine wire 27, which is caused to glow by the passing of an electric current therethrough. To one end of this fine wire is attached one end of a conducting wire 29, which leads to the upturned end of the plate 16 for grounding purposes. The other end of this fine wire is connected by means of a wire 28 to the head of the bolt 21.

The other end of the cartridge case or container is closed by means of a cap 30, which is adapted to rest in the enlarged part of the sleeve in the top of the supporting frame. Within each container or flare casing is a cartridge case 31, shown in section in Figure 3. Adjacent one end of this cartridge case is an inwardly directed bead 32, which serves as a shoulder for limiting the inward movement of an annular cup member 33. The end of the cartridge case adjacent the bead is spun over, as at 34, to engage the periphery of the outer wall of the annular cup, as clearly shown in Figure 5. Within the annular cup there is a cup 35, which has around its periphery at the closed end thereof, a flange 36 engaged and supported by means of the turned-over or spun end 37 of the inside wall of the annular cup.

This cup has a seat thereon similar to the cup 12, which supports a disc 38 held in position on the seat or shoulder by a turned-over edge 39. Extending into the bottom of the cup 35 is a fuse tube 40, closed at one end 41, with laterally extending holes 42 therein adjacent the closed end. The end of the cartridge case just described rests upon a thick, heavy circular metal disc 43, which has a hole in the center thereof to receive the fuse tube 40. On this fuse tube is a shoulder 44, which prevents the disc from leaving the adjacent part of the cartridge case.

Adjacent the disc 43 and around the fuse tube is a relatively thick felt disc 45, held in position by means of a second thinner metal disc 46, also having a hole through which the fuse tube passes. The lower end of the fuse tube is open, and has lateral holes therein. Located above the annular cup is a second felt disc 47, which has in the center thereof a hole 48 directly above the cardboard disc 38.

Fitting within the cartridge case is a cylindrical carton 49, made of paste-board or other suitable material. This carton is cylindrical in shape, and has its lower end closed by means of a metallic cap 50, with a hole 51 in the center in line with the hole 48. This carton rests on top of the felt disc 47, and has in its bottom a layer of powder 52.

Above the layer of powder 52 and filling the carton, is flare material 53. The upper end of this carton is closed by means of a disc 54. The cup 35 and the fuse tube 40 have therein powder 55. Attached to the disc 54 is one end of a wire 55*a*. To the other end of this wire is attached one end of each of a plurality of strings 56, which have their other ends attached to a parachute 57. This parachute and the strings are properly folded and placed within the cartridge case above the carton containing the flare material. The wire is coiled above the disc 54 and passes between the side of the cartridge case and a felt packing 58 located immediately above the carton containing the flare material.

Immediately above and below the packing 58 is a thin disc 59 of some suitable material. The upper disc supports within the cartridge a tube 60, which forms a casing for the folded parachute. In the upper end of the cartridge case and resting on the upper end of the tube 60 is a packing 61. This tube 60 with the packing 61 and one of the discs 59 form a casing or housing in which the folded parachute is contained before it is discharged, and when in position to be discharged. Within the tube 60 and between the packing 61 and the upper disc 59 is a plurality of flat spacers or thrust members 62, about which the parachute is coiled for support within the tube. These strips of suitable material prevent the parachute from becoming compressed and hold the parts in proper position so that when the flare is discharged the parachute will properly open without interference.

The numeral 63 indicates a battery for supplying an electric current for discharging the charge of powder within the mouth of each container. From one end of this battery a ground wire 64 extends. From the other end a lead 65 extends to a binding post 67 of a switch case 66. From this post 67 wires lead to a plurality of contacts, one for each of a plurality of switches. Each switch is opened or closed by means of a lever 68, 68*a* or 68*b*. By operating the lever 68 contact is so made that a current will flow from the battery, through a wire 70 attached at one end to a binding post 71. This wire is connected at its other end to one of the wires 23, attached to the copper bolt of one of the flare casings.

For locking the lever 68 in position so that it cannot be operated for making contact and closing the circuit, there is provided a lock member 69. When the switch lever is in off position, as shown in Figure 1 and the lock is in the vertical position, the switch cannot be moved for making contact, and cannot be moved until the lock is moved from the vertical position, or from one end of a slot 69*a* to the other end.

The switch lever 68*a* is operated to make contact so that the current will flow from the battery, through a wire 70*a* attached at one end to a binding post 71*a*. The other end of this wire unites with one of the wires 23.

The switch lever 68*b* is operated to form an electrical connection between the battery 63 and the wire 70*b* connected at one end to a binding post 71*b*. The other end of this wire 70*b* is connected to one of the wires 23.

Each one of these switch levers has a lock 69, similarly operated and movable to and fro in a slot 69*a*. When these locks are in a vertical position, as shown in Figure 1, the switch levers cannot be moved. When they are moved to the right-hand end of the slot 69*a* the switch levers may be moved for contacting purposes so that each of the flares may be discharged. The current passing through the wires 70, 70*a* and 70*b* causes the small wire to glow and discharge the powder around it.

It will be further understood that the tube 60 may be split at 72 so that it will readily fall apart and free the parachute when the appropriate time comes for the parachute to open.

It will be further understood that I desire to comprehend within my invention such modifications as come within the scope of my claims and my invention.

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

1. In a flare support, a frame having a lower member having holes therein to receive the firing ends of flares and an upper member having holes therein to receive the discharge ends of flares, and means in the holes of one member to grip and support the flares.

2. In a flare support, a frame having a lower member having holes therein to receive the firing ends of flares and an upper member having holes therein to receive the discharge ends of flares, and means on one member to grip and support the flares, said means consisting of sleeves supported by the frame and engaging the flares.

3. In a flare support, a sleeve having a large end and a smaller slitted end adapted to receive one end of a flare and support the flare, a flange on the large end of the sleeve, and means to engage the flange and support the sleeve and engage the other end of the flare to prevent its swinging in the sleeve.

4. In a flare, a container consisting of a metal cylinder having one end reduced to form a neck and a cylindrical mouth somewhat larger than the neck, and a cap for closing the other end of the container.

5. In a flare, a container consisting of a metal cylinder having one end reduced to form a neck and a cylindrical mouth somewhat larger than the neck, a cup in the mouth for containing an explosive, and electrical means for firing the explosive.

6. In a flare, a container consisting of a metal cylinder having one end reduced to form a neck and a cylindrical mouth somewhat larger than the neck, a cup in the mouth for containing an explosure, a copper insulated binder post bolt acting to hold the cup in the mouth, and a wire in the cup connected at one end to the bolt and at the other end to a ground.

7. In a flare, a container consisting of a metal cylinder having one end reduced to form a neck and a cylindrical mouth somewhat larger than the neck, a cup in the mouth, said cup having a shoulder around its rim, a disc on the shoulder held in place by the turned-over end of the cup, an explosive in the cup, and electric means for firing the explosive.

8. In a flare, a container consisting of a metal cylinder having one end reduced to form a neck and a cylindrical mouth somewhat larger than the neck, a cup in the mouth, a copper insulated binder post bolt serving to hold the cup in the mouth, a glow wire in the cup connected at one end to the bolt and grounded at the other end, an explosive in the cup around the wire, a disc for closing the cup, and a cartridge in the container supported on the reduced end thereof and having a fuse adjacent the cup.

9. In a flare, a container consisting of a metal cylinder having one end reduced to form a neck and a cylindrical mouth somewhat larger than the neck, a cup in the mouth, a copper insulated binder post bolt serving to hold the cup in the mouth, a glow wire in the cup connected at one end to the bolt and grounded at the other end, an explosive in the cup around the wire, a disc for closing the cup, and a cartridge in the container supported on the reduced end thereof and having a fuse adjacent the cup, said cartridge being supported in the container by means of a pair of discs and an intermediate layer of felt through which the fuse extends.

10. In a flare, a cartridge consisting of a case having at one end a carton containing a flare material, at the other end a tube, said tube being closed at one end by a disc adjacent the carton and closed at the other end by a felt pad in the case, a parachute in the tube, and a plurality of small plates between the disc and the pad with the parachute folded about them.

11. In a flare, a container for a parachute consisting of a tube closed at one end by a disc and at the other end by a felt pad, a plurality of spacer plates in the tube between the disc and the pad, and a parachute in the tube folded back and forth about the plates.

12. In combination, a rack comprising a frame having end members with apertures of different sizes in the respective end members, a flare-supporting tube having a restricted head fitted in the smaller of said apertures, the other end of which is fitted in the larger of said apertures, said tube being longer than the distance between the end members having the apertures, and detachable clamping means mounted adjacent the larger aperture for detachably clamping said tube in position to prevent its making its exit from said rack.

13. In combination, a rack comprising a frame having end members with apertures of different sizes in the respective end members, a flare-supporting tube having a restricted head fitted in the smaller of said apertures, the other end of which is fitted in the larger of said apertures, said tube being longer than the distance between the end members having the apertures, detachable clamping means mounted adjacent the larger aperture for detachably clamping said tube in position to prevent its making its exit from said rack, a flare casing mounted in said tube adapted to be expelled therefrom, and means for sealing said flare in said tube.

14. In combination, a rack comprising a frame having end members with apertures of different sizes in the respective end members, a flare-supporting tube having a restricted head fitted in the smaller of said apertures, the other end of which is fitted in the larger of said apertures, said tube being longer than the distance between the end members having the apertures, detachable clamping means mounted adjacent the larger aperture for detachably clamping said tube in position to prevent its making its exit from said rack, a flare casing mounted in said tube adapted to be expelled therefrom, means for sealing said flare in said tube, and firing means mounted in the re-

stricted end of said tube adapted at will to expel said flare.

15. In combination, a plurality of flares, a plurality of tubes, one for each flare, a plurality of electric circuits, one connected to each tube, an expelling charge fired thereby in each tube, a common source of electrical energy, and independent switches controlling the application of said energy to each tube and independent locks therefor.

16. In combination, a flare tube, a split flange collar, and means to clamp said collar thereon to retain said tube in a supporting rack.

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