Nov. 27, 1945. S. JACKSON, JR 2,389,782

FLARE OR FUSEE

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FIG. 2.

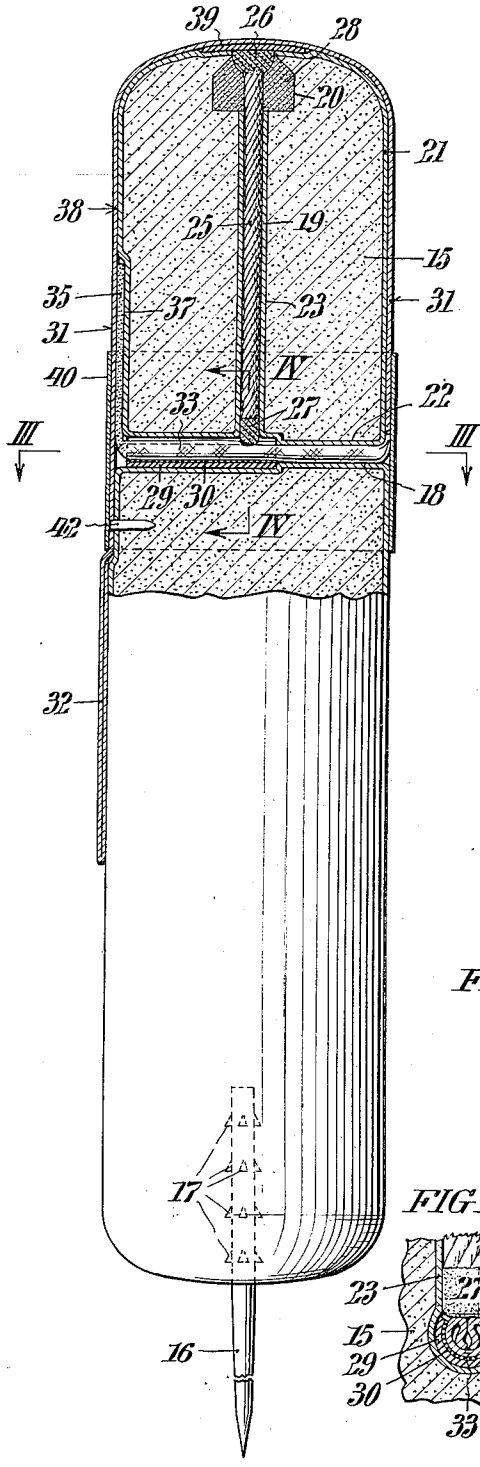


FIG. 1.

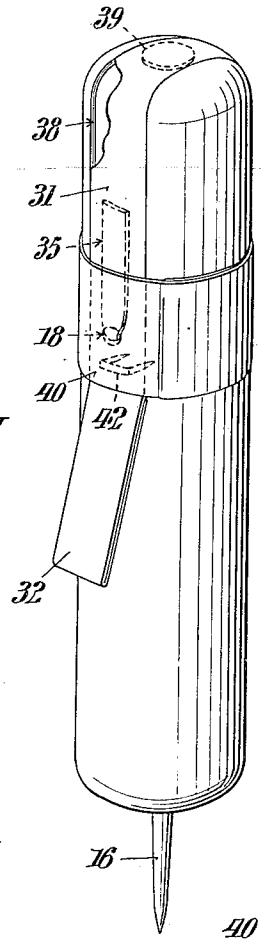


FIG. 5.

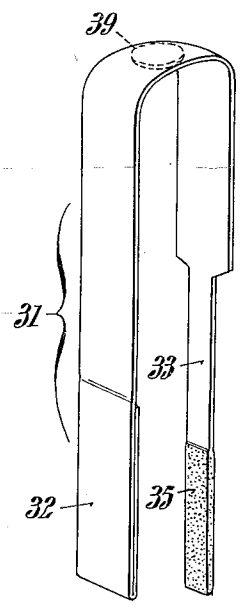


FIG. 6.

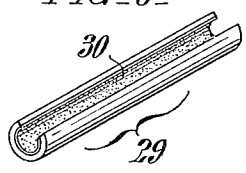


FIG. 3.

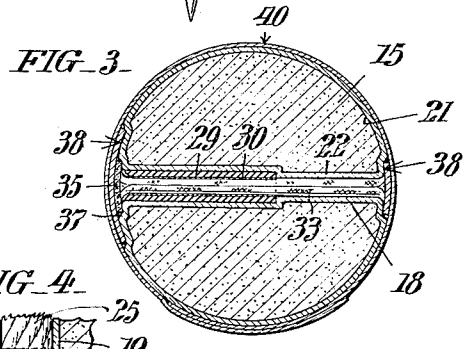


FIG. 4.

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FIG. 9.

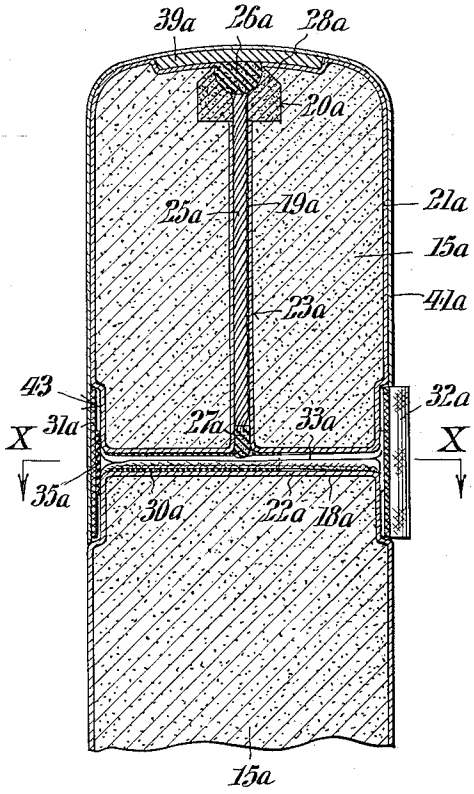


FIG. 8.

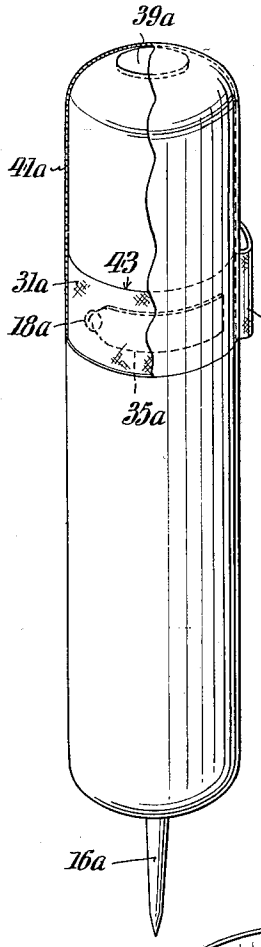


FIG. 7.

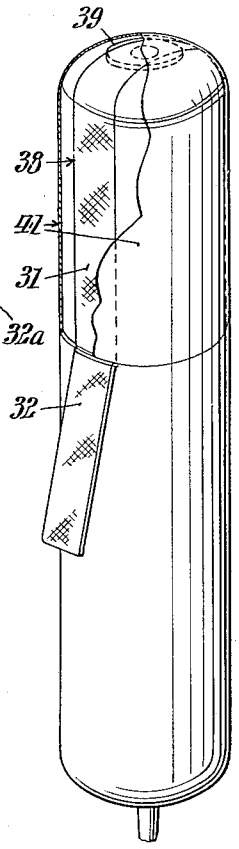


FIG. 10.

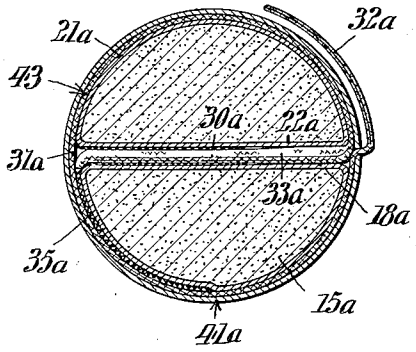
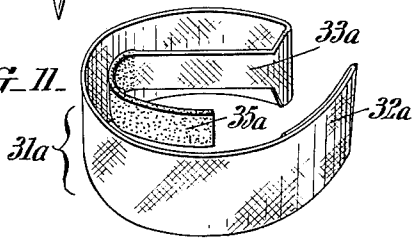


FIG. 11.



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UNITED STATES PATENT OFFICE

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FLARE OR FUSEE

Samuel Jackson, Jr., Haddonfield, N. J.

Application September 26, 1944, Serial No. 555,791

16 Claims. (Cl. 102—70)

This invention relates to flares or fusees useful in emergencies for service as visible warning or danger signals in the event of accidents incident to operation of railway trains, buses, trucks, etc.

Devices of this sort as heretofore ordinarily constructed were easily damaged or broken notwithstanding the exercise of reasonable care in ordinary handling, and in being cast away or set up after ignition; ofttimes difficult to ignite; subject to deterioration from moisture; and liable moreover to cause injuries unless extreme caution was observed on the part of the users in setting them off.

The chief aim of my invention is to provide a flare or fusee which is simple in construction, yet free of the various drawbacks mentioned above, and which lends itself to very economic production in quantity from relatively inexpensive materials.

Other objects and attendant advantages will appear from the following detailed description of the attached drawings, wherein

Fig. 1 is a perspective view of a fusee conveniently embodying my invention in one form.

Fig. 2 is a view of the fusee partly in side elevation and partly in longitudinal section.

Fig. 3 is a cross section of the fusee taken as indicated by the angled arrows III—III in Fig. 2.

Fig. 4 is a fragmentary detail view on a larger scale taken as indicated by the angled arrows IV—IV in Fig. 2.

Figs. 5 and 6 are perspective views of certain component parts of the fusee which will be later on particularly referred to.

Fig. 7 is a perspective view of a fusee like that of Fig. 1 slightly modified.

Fig. 8 is a view like Fig. 1 showing an alternative form of my invention.

Fig. 9 is a fragmentary longitudinal sectional view of the fusee shown in Fig. 8.

Fig. 10 is a cross sectional view taken as indicated by the angled arrows X—X in Fig. 9; and

Fig. 11 is a perspective view of one of the component parts of the fusee shown in Figs. 8–10.

Referring first more particularly to Figs. 1–6 of these illustrations, the fusee there shown has a body 15 which is pres-molded or otherwise fashioned to elongate cylindric configuration from a slow combustible composition capable of emitting colored-light in burning, and which has its upper and lower ends well rounded to avoid sharp corner edges likely to be broken incident to handling of the fusee. As shown the fusee may be provided with a pendent spike point 16 part of which is imbedded in the material of the body 15 and provided with anchorage spurs 17 for greater security against subsequent dislodgment. Somewhat below its upper end the body 15 of the fusee has a transverse or diametral opening 18 of relatively small diameter in communication with a longitudinal or axial opening 19 which extends to said top end where it terminates in a diametrically enlarged recess 20. Incident to manufacture, the fusee is dipped into or coated with a molten solution of a suitable plastic such for example as cellulose acetate to provide the body with a relatively tough, tenacious, moisture-impervious outer protective skin 21, said plastic having a fusing or burning characteristic corresponding to that of the material of said body. As a result of this dipping, the openings 18 and 19 are lined as at 22 and 23 with the plastic. Disposed within the axial opening 19 is a fuse 25 with match-heads 26 and 27 at its opposite ends, the latter head being exposed within the transverse opening 18; and surrounding the upper end of said fuse is a collar of rapid-burning composition 28 which is firmly packed into the enlargement or recess 20 so as to be in direct contact with the material of the fusee body. From Figs. 2 and 3 it will be observed that a longitudinally-slotted bushing 29 (illustrated in perspective in Fig. 6) is inserted into the transverse opening 18 from one side of the body, said bushing being positioned with its slot uppermost and with the match-head 27 of the fuse 25 projecting thereinto. The starter element for the fusee is generally designated by the numeral 31 and as shown in Fig. 5 is formed from fabric tape, one end thereof being retroverted as at 32 to serve as a grasp tab, and the other end reduced in width as at 33, the tip portion of the latter end being impregnated or coated as at 35 with a material which by friction with a composition 30 at the inside of the bushing 29 and with the match-head 27 will cause ignition of the fuse 25 in a manner later on explained. As shown in Figs. 1 and 2 the narrow portion 33 of the starter tape 31 is passed through the transverse opening 18 from the right of the fusee body as considered in Fig. 2, and its impregnated end 35 laid upwardly into a recess 37 formed centrally of a groove 38 which extends continuously across the top end and down along the opposite sides of the body 15 to meet with the opposite ends of said opening. The remaining or wide portion of the starter tape 31 is passed upward in the groove 38 from the right-hand end of the opening 18 in Fig. 1, then across the top of the body 15 and down the opposite side of the latter to overlap the narrow portion 33 of

said tape. Secured to the inner face of the starter element 31 midway between its ends is a guard cap 39 which may be of metal and which, with the starter positioned as shown in Figs. 1 and 2, overlies the match-head 26 of the fuse 25 so as to normally protect it against injury. In this instance, the starter 31 is held in assembly by an adhesive band 40 which may be of paper or the like with the retroverted end portion 32 projecting below said band so that the latter may be readily grasped. In order to assist in retainment of the starter tape 31 normally and to protect the exposed portion thereof, the upper end of the fusee may, after complete assembling, be coated with additional plastic, or as an alternative, the band 40 may be dispensed with entirely and the additional plastic coating alone relied upon, as shown in Fig. 7 at 41 to retain and protect the starter tape. If desired or found convenient in practice a staple or the like such as indicated at 42 in Figs. 1 and 2 may be used as a securing means either by itself or in addition to the tape 40.

The method of using the fusee is as follows: the tab 32 of the starter 31 is grasped and the latter unwrapped from over the top end of the fusee by an upward and downward swing of the hand, the band 40 and/or the additional protective coating 41, as the case may be, incidentally yielding to being ruptured or torn away, and the protective disk at the same time removed from over the upper match-head 26 of the fuse 25. By a final pull on the tape, the narrow portion 33 thereof is withdrawn from the transverse opening 18, with the result that the material 35 at its end by abrasion with the material 30 on the bushing 29 and the match-head 27, causes ignition of the time fuse 25. The fusee is then placed where it is to serve as a visible danger signal, as by thrusting its spike end 16 into any suitable supporting means or material. Sufficient time is allowed for this by reason of the length of the fuse 25 before the rapid-burning material at 28 is set off to ignite the material of the body at the upper end of the latter. As the material of the body burns down, the coating 21, by reason of having the characteristics above pointed out, is either consumed or melts away at a corresponding rate.

In the modified embodiment of my invention shown in Figs. 8, 9 and 10, the projecting portions of the starter tape 31*a* are wrapped about the body 15*a* of the fusee, it being laid in a shallow, circumferential groove 43 in said body. After assembling of the modified fusee, the upper end thereof is dipped into molten plastic and given a second coat 41*a* by which the starter tape is held in place in the groove 43, with its projecting grasp tab 32*a* free. The additional coating 41*a* in Figs. 8 and 9 also serves in this case as the means for retaining the protective disk 39*a* over the upper match-head 26*a* of the fuse 25*a*. In all other respects the fusee of Figs. 8–10 is exactly like that illustrated in Figs. 1–6, and 7 and for this reason all other component elements thereof not specifically referred to but having their counterparts in the previously described embodiment are identified with the same numerals except for addition in each instance of the letter *a* for convenience of ready distinction.

In each of the illustrated embodiments, the plastic coating constitutes a tough tenacious moisture-impervious outer protective skin which not only prevents disintegration of the material of the fusee body upon impact with other objects incident to handling of the fusee, but also excludes moisture thereby precluding deterioration of said material as well as of the other internal parts. A further advantage resides in the provision of the guard cap over the upper match-head of the fuse which latter is thus protected against injury by end contact of the fusee with other fusees, or the spike points of such other fusees in case they are shifted or tumbled about in kits of the type ordinarily employed for carriage purposes.

Ignition is made positive by reason of the novel construction of the starter element and the way in which the match material thereon coacts with the coating on the inner surface of the bushing in the transverse opening and with the lower match-head of the fuse as said element is withdrawn. In the event that the starter tape 31 should tear off before its end portion 35 is removed and thus fail to start the fusee, the then exposed upper match-head 26 may be ignited by friction with a suitable extraneous surface or object in the manner of ordinary fusees.

From the foregoing it will therefore be apparent that my improved fusee is not only simple in construction and reliable in operation but capable of economic production in quantity at relatively small cost.

Having thus described my invention, I claim:

1. A flare or fusee having an elongate body formed from compacted combustible slow-burning colored-flame producing material with a transverse opening near one end thereof and a longitudinal opening extending from said end and meeting the transverse opening; a fuse within the longitudinal opening having a match-head exposed in the transverse opening; a starter element within the transverse opening carrying material adapted to cause ignition of the match-head on the fuse by abrasion therewith, said element having a projecting grasp by which it can be withdrawn to set off said fuse.

2. A flare or fusee according to claim 1, wherein the fuse also has a match-head at its outer end which can be ignited by abrasion with an extraneous object in the event of failure of the starter element.

3. A flare or fusee according to claim 1, in which the transverse and longitudinal openings have a protective lining of slow-burning material; and in which the fuse is surrounded adjacent its outer end by a collar of rapid-burning composition in intimate contact with the combustible material of the body.

4. A flare or fusee according to claim 1, wherein the longitudinal opening is circumferentially enlarged at its outer end, and wherein the enlargement is packed with a rapid-burning composition which surrounds the corresponding end of the fuse and which is in intimate contact with the material of the fusee body.

5. A flare or fusee according to claim 1, wherein the surface of the transverse opening is lined with igniting material which, by friction with that on the starter, aids in the firing of the fuse.

6. A flare or fusee according to claim 1, wherein the starter comprises a length of flexible strip material whereof one end is lodged in the transverse opening and carries the igniting material, the remainder of the starter strip being wrapped about the fusee body and releasably secured thereto.

7. A flare or fusee according to claim 1, wherein the starter comprises a length of flexible strip material whereof one end is lodged in the trans-

verse opening and carries the igniting material; and wherein the remainder of the starter strip is wrapped over the end of the fusee body to overlie and cover the outer end of the fuse.

8. A flare or fusee according to claim 1, wherein the starter comprises a length of flexible strip material whereof one end is lodged in the transverse opening and carries the igniting material; wherein the remainder of the starter strip is wrapped over the end of the fusee body to overlie and cover the outer end of the fuse; and wherein the fusee body has a groove which extends along opposite sides of the body and across the end thereof for reception of the starter tape.

9. A flare or fusee according to claim 1, wherein the starter comprises a length of flexible strip material whereof one end is lodged in the transverse opening and carries the igniting material; wherein the remainder of the starter strip is wrapped over the end of the fusee body to overlie and cover the outer end of the fuse; and wherein the starter tape is removably retained by a skin of tough tenacious moisture-impervious protective material applied thereover.

10. A flare or fusee according to claim 1, wherein the starter comprises a length of flexible strip material whereof one end is lodged in the transverse opening and carries the igniting material; and wherein the remainder of the strip is wrapped around the body of the fusee.

11. A flare or fusee according to claim 1, wherein the starter comprises a length of flexible strip material whereof one end is lodged in the transverse opening and carries the igniting material; wherein the remainder of the strip is wrapped around the body of the fusee; and wherein the fusee body has a circumferential groove for reception of the starter tape.

12. A flare or fusee according to claim 1, wherein the starter comprises a length of flexible strip material whereof one end is lodged in the transverse opening and carries the igniting material; wherein the remainder of the strip is wrapped around the body of the fusee; and wherein the starter tape is removably retained by a skin of tough tenacious moisture-impervious material applied thereover.

13. A flare or fusee according to claim 1, wherein the starter comprises a length of flexible strip material whereof one end is lodged in the transverse opening and carries the igniting material; wherein the remainder of the starter strip is wrapped over the end of the fusee body to overlie and cover the outer end of the fuse; and wherein a detachable guard cap of rigid material is interposed between the starter tape and the outer end of the fuse.

14. A flare or fusee according to claim 1, wherein the starter comprises a length of flexible strip material whereof one end is lodged in the transverse opening and carries the igniting material; wherein the remainder of the strip is wrapped around the body of the fusee; wherein the starter tape is removably retained by a skin of tough tenacious moisture-impervious material applied thereover; and wherein a detachable guard cap of rigid material is held in place over the outer end of the fuse by said protective skin.

15. A flare or fusee according to claim 1, wherein the body is provided with an adherent protective skin of tough tenacious moisture-impervious material which fuses or burns substantially at the rate of combustion of the material of said body.

16. A flare or fusee according to claim 1, wherein the starter comprises a length of flexible strip material whereof one end is lodged in the transverse opening and carires the igniting material, the remainder of the starter strip being wrapped about the fusee body and releasably secured thereto; wherein the body is provided with an adherent protective skin of tough tenacious moisture-impervious material which fuses or burns substantially at the rate of combustion of the material of said body; and wherein an additional skin of like material covers the exposed portion of the starter tape.

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