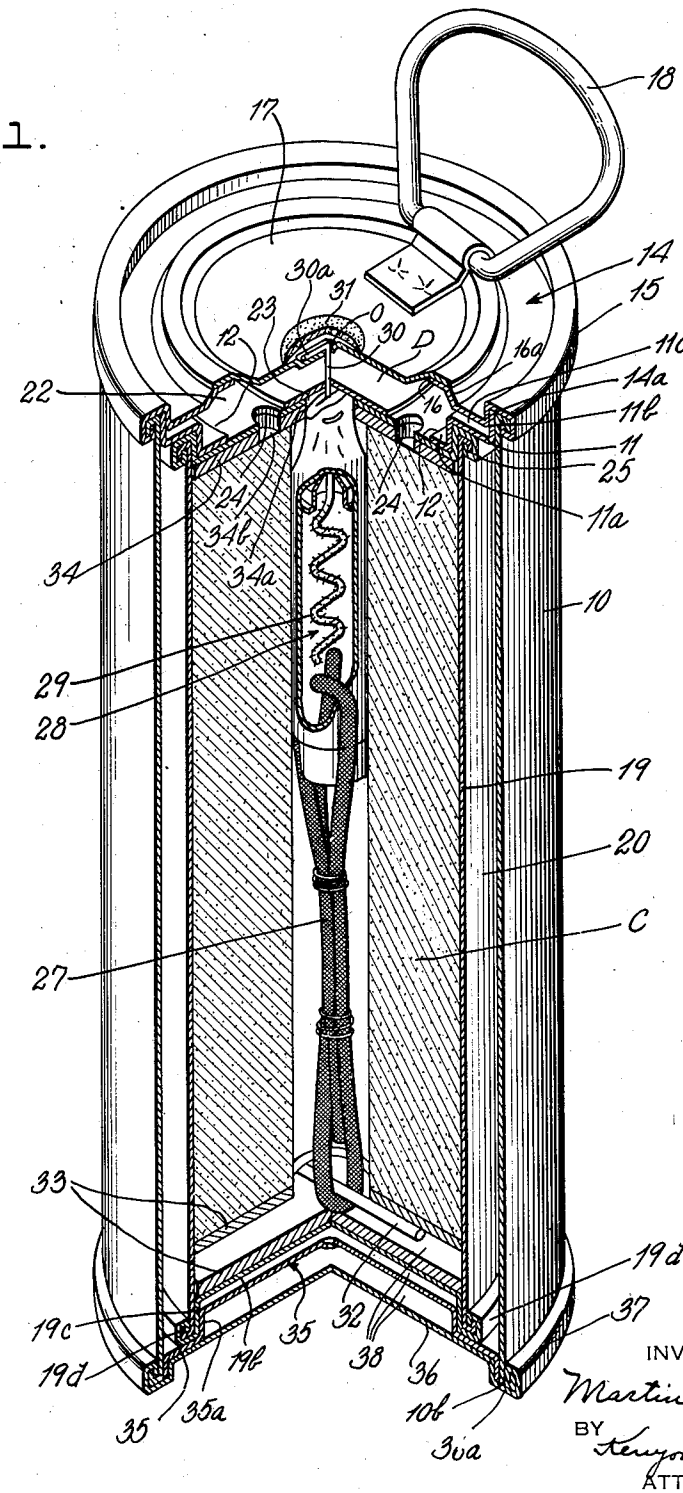
Sept. 13, 1949. M. DWYER 2,481,987

EMERGENCY SIGNALING DEVICE

Filed Nov. 29. 1944 3 Sheets-Sheet 1

Fig. 1.



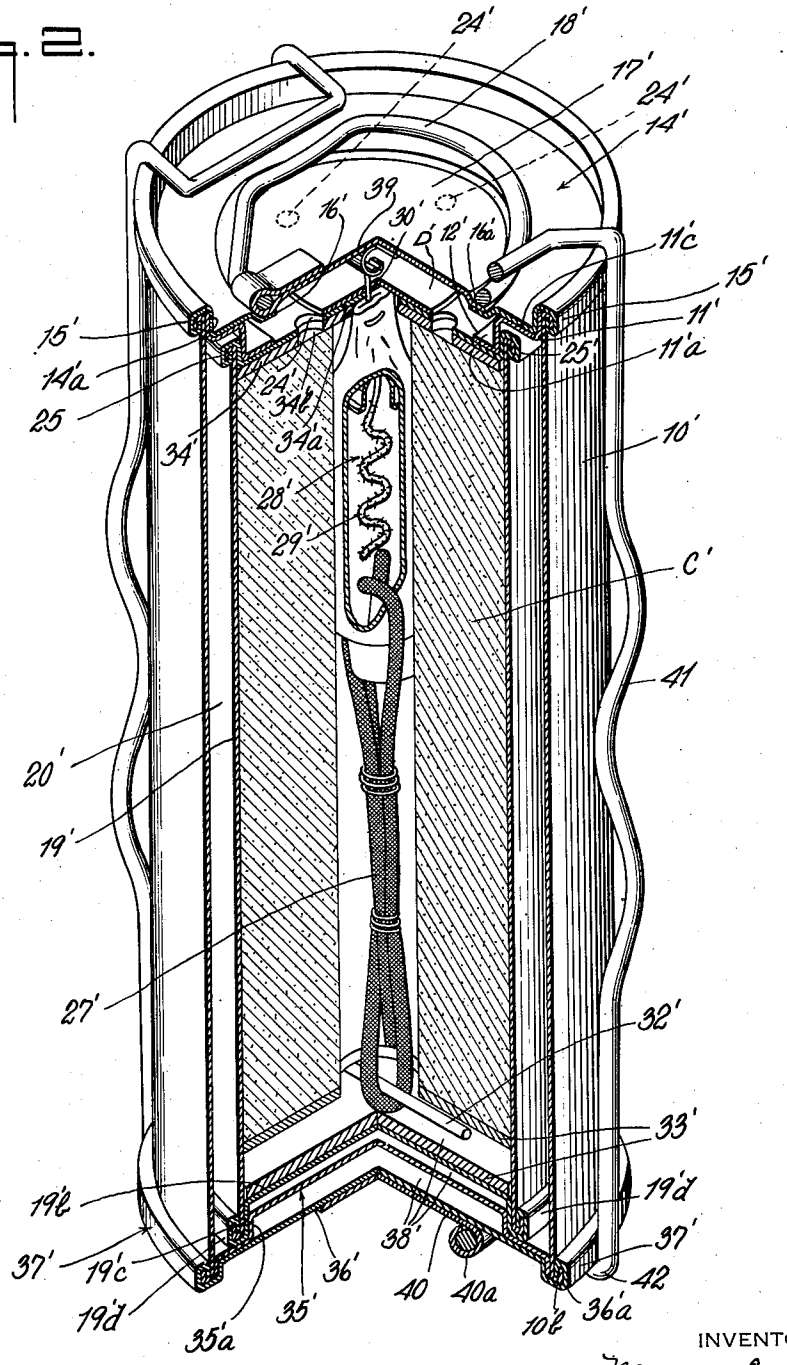
INVENTOR
Martin Dwyer
BY Kenyon & Kenyon
ATTORNEYS

Sept. 13, 1949. M. DWYER 2,481,987

EMERGENCY SIGNALING DEVICE

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Fig. 2.



INVENTOR
Martin Dwyer
BY Kenyon & Kenyon
ATTORNEYS

Sept. 13, 1949. M. DWYER 2,481,987

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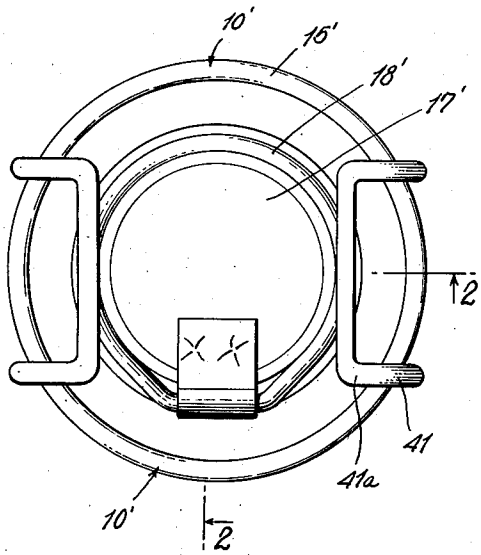


Fig. 3.

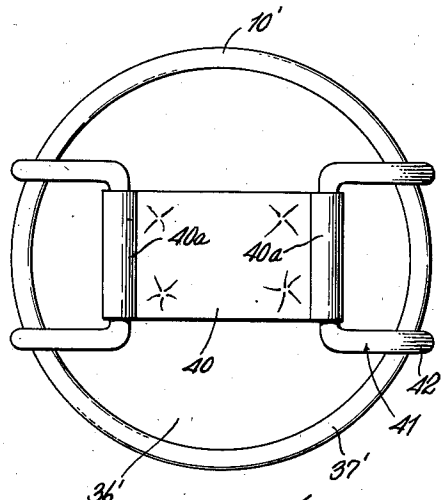
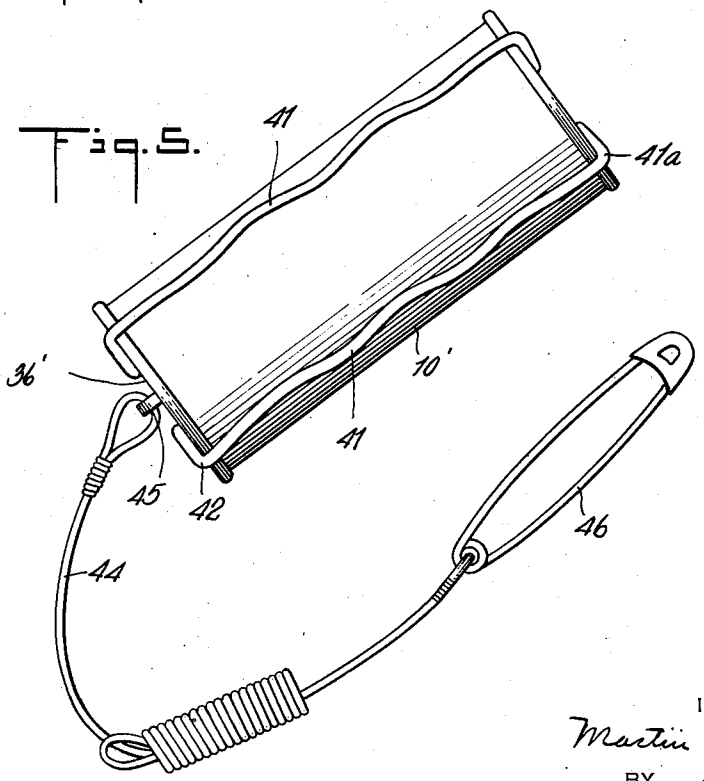


Fig. 4.

Fig. 5.



INVENTOR
Martin Dwyer
BY Kenyon & Kenyon
ATTORNEYS

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UNITED STATES PATENT OFFICE

2,481,987

EMERGENCY SIGNALING DEVICE

Martin Dwyer, Hewlett Harbor, N. Y.

Application November 29, 1944, Serial No. 565,672

4 Claims. (Cl. 102—37.8)

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This invention relates to signalling devices and more particularly to smoke or pyrotechnic signal devices adapted to be carried in emergency life rafts, boats or the like and is a continuation in part of my co-pending application Serial No. 487,261, filed May 17, 1943, now Patent No. 2,448,521.

Increasing air transport over large bodies of water has made it extremely important that all crews operating such transport have in their emergency life rafts day and night-time signalling devices capable of expelling large volumes of colored smoke or light-emitting composition. The same situation exists with respect to ships and lifeboats.

One of the principal requirements of such devices or signals is that they remain absolutely watertight and moistureproof until they are used, irrespective of the weather conditions and other environment to which they are exposed prior to such use, because the ignitible contents of the devices must be dry or else they cannot be used effectively, if at all.

One of the principal features of the invention relates to novel container constructions for such devices that are of extremely rugged construction, that are absolutely water and moistureproof, i. e., hermetically sealed, and that are capable of keeping the ignitible contents dry even under the severest conditions so that the devices may be used whenever required in an emergency.

Another object of the invention is to produce devices of this character that will be comparatively simple in construction, cheap and easy to assemble.

Another object of the invention is to provide devices of the character described that will be self-contained, each including everything necessary for its operation in an emergency and which may be put into use without requiring any tools.

In the past, it has been common practice to design a smoke or pyrotechnic signal to fit on a detachable handle, and to include such a handle in a kit including several signals so that the signals could be affixed individually to the handle and held thereby a safe distance away from the user's hand while being fired, ignited or burned. This made it essential to include an extra piece of equipment, namely, a handle with each kit, and had the great disadvantage that, if the individual handle were lost overboard or elsewhere, it would become impossible to fire, ignite or burn the signals of the kit. In other words, the dependency of these kits upon a detachable handle was one of their principal weaknesses.

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Another principal object of the present invention is to provide signalling devices that may be safely fired, ignited, burned or otherwise used and which are independent entirely of each other and of any requirement for a detachable handle.

Another principal object is to provide devices which may be safely held in hand by the user during use without requiring any handle whatsoever.

Another object is the provision on signalling devices, each of which is a completely independent entity, so that the loss of one or more will have no effect whatsoever on the ability to use those remaining.

To the accomplishment of the foregoing and such other objects as may hereafter appear, this invention consists in the novel construction and arrangement of parts hereinafter to be described and then sought to be defined in the appended claims, reference being had to the accompanying drawing forming a part hereof and which shows, merely for the purposes of illustrative disclosure, preferred embodiments of the invention, it being expressly understood, however, that various changes may be made in practice within the scope of the appended claims without digressing from the inventive idea.

In a drawing, in which similar reference characters denote corresponding parts,

Fig. 1 is a perspective view partially in section of one form of my device;

Fig. 2 is a similar, view of a modified form of the device the section being taken along lines 2—2 of Fig. 3,

Fig. 3 is a top plan view of the device of Fig. 2,

Fig. 4 is a bottom plan view thereof, and

Fig. 5 is a diagrammatic view of the device of Fig. 2 embodying other features of the invention.

Referring to the drawing and first to Fig. 1, 10 denotes an external casing or container of metal or other suitable material. In the embodiment shown, this casing is of cylindrical form but it may be of any desired form. Its walls may be smooth as shown or have the configuration of my aforementioned application. A member or spacer 11 of substantially cup-like form and preferably of metal is admeasured to fit within the upper end of the container 10. The bottom portion 11a of this member has reduced diameter and is provided with a central opening 12 to permit rapid escape of products of combustion from the device as will be presently described. This member or spacer 11 forms a positioning guide for other parts of the device as will be presently described.

A cover member 14 preferably of metal is provided for the member 11. This cover member is admeasured to fit within the upper portion 11b of said member 11 resting on the shoulder 11c of the member 11 so that the wall of portion 11b lies between the side walls 14a of the member 14 and the rim portion of container 10. The upper edges of the member 14 and of the container 10 are beaded over together very securely to provide an annular sealing bead or rib 15. This bead is very secure and is made moisture and leak proof in any well known manner, as by the use of solder or the like.

The cover member 14 has a comparatively large opening 16 defined by an upstanding shoulder 16a that is normally sealed by a removable tear strip or member 17 also preferably of metal which is secured over said opening in well-known manner as by soldering or the like. This tear strip 17, while removable, effectively and completely seals the opening 16 against moisture, water and gas until it is removed. A ring 18 or other equivalent means is attached to the tear strip 17 to facilitate removal of the latter by the user without tools. It is merely necessary for the user to grasp the ring 18 and pull off the tear strip 17 to expose the opening 16.

The entire inner wall of the container or casing 10 may be coated with an insulating lining of lacquer or the like that may be applied either by spraying, dipping or in any other suitable manner. This lining preferably has heat insulating properties.

An inner container 19 of metal or other suitable material for holding the burning compound C to be presently described is provided. This container 19 has smaller diameter than that of the external casing 10 so that a substantial air space 20 may be provided between the walls of the two containers 10 and 19. The wall of container 19 is completely imperforate as is that of container 19 so that the air in space 20 serves as an effective heat insulator. Thus the container 10 may be safely and comfortably held without danger by the user while the compound C in container 19 is burning.

A cover 22 preferably of metal is provided for the upper end of the container 19. This cover has a central opening 23 and a plurality of additional openings 24 arranged about the opening 23 to provide for the escape of the smoke and gases of combustion of the compound C within the container 19 upwardly through said cover. The cover 22 is fitted reentrantly within the top of container 19 and its edge beaded over with the upper edge of said container at 25. The reduced portion 11a of the cup-like member or spacer 11 is admeasured to fit within this cover 22 and thereby serves to center the upper end of inner container 19 with respect to outer container 10.

The inner container 19 is provided with an insulating lining similar to that of container or casing 10 and is filled with the suitable smoke compound C which is capable of producing large volumes of smoke when burned that will be visible as a cloud even in a high wind. The constituents of this smoke compound include a dye for coloring the smoke as desired, a burning agent to produce the smoke and fuel so that a sustained volume of smoke will be produced when the compound is ignited. Any of the commercially known satisfactory smoke-producing compounds may be utilized.

The smoke compound may, for example, consist of a mixture of:

	Per cent
Dye	69.2
Sucrose	14.2
Potassium chlorate	16.2
Halowax oil #1000	0.4

The sucrose may be a good commercial grade of confectioners' XXXX sugar, the polarization of which is not less than 99.9% sucrose. It shall be of such fineness that 100% shall pass a 100 mesh sieve and not more than 20% shall be retained on a 200 mesh sieve.

The potassium chlorate used in the device is preferably at least 99% pure with not more than .5% moisture. It should pass 100% through a 100 mesh screen.

A dye is H. V. Orange B which is a naphthalene-azo - dimethylaniline,paranitrobenzene azo - B - naphthol coupling.

The Halowax oil #1000 is a commercial product sold under the name and number given. Halowax oil #1000 is described in Handbook of Material Trade Names—Zimmerman & Levine—Industrial Research Service, 1946, as "A water-white hydrocarbon liquid. Boiling range 480–540° F.; sp. gr., 1.19–1.25; flash point, 203° F.; fire point, 338° F.; readily soluble in common hydrocarbon solvents." The materials in the above proportions are intimately mixed in a suitable tumbling machine for the blending of the smoke producing chemicals until a smooth even texture of compound is obtained. Deviation from the formula because of variation in chemicals especially dyes may be necessary to obtain the desired result as to color of smoke and burning time.

A fuse 27 extends through the compound C and terminates in a pull wire lighter 28 that will serve to light the fuse 27. This igniter 28 has a striking member 29 which in turn has a pull-cord or wire 30 attached thereto which extends through the tear strip 17, a bent-over portion 30a thereof being soldered at 31 to said tear strip in such a way as to seal the opening in the tear strip 17 through which the bent-over portion has been passed in the assembling of the device. Since portion 30a of wire 30 is attached directly to the tear strip 17 removal of the tear strip 17 will automatically cause the striker 29 to fire the igniter 28. The lower end of the fuse 27 is secured against withdrawal by the cross pin 32 around which the fuse is looped. This pin is preferably of combustible material such as zinc or the like.

Spaced apart washers 33 of paper or other desirable material lie at the bottom of the compound C and serve to retain it in container 19 and to protect the fuse 27. A similar washer 34 of paper or the like having perforations 34a and 34b corresponding to the perforating 23 and 24 in the top 22 of the inner container and underlying the latter is provided.

A bottom or end wall 19b preferably of metal is provided for the container 19, being reentrant at 19c and attached at 19d to said container as by beading or the like to insure a leak proof-seal.

A cup-shaped member or spacer 35 similar to the member 11 is admeasured to fit within the lower end of outer container 10. This spacer is of the same material as spacer 11. The upper portion 35a of this member 35 has reduced diameter and is admeasured to fit within the reentrant portion 19c of the bottom 19b of the inner container 19. It serves as a positioning guide for

the lower end of container 19 so that the latter's lower end is centered with respect to the outer container 10.

The bottom member 36 of the outer container 10 completely closes the lower end of the latter and is secured to the container 10 together with the cup-like member 35 as by beading over the rim 36a with the lower edge 10b of said container 10 to form a water-tight and moisture-proof hermetic sealing bead 37. Solder or other similar material may be used about the bead 37 to obtain a very strong water-tight, moisture-proof seal. The bottom member 36 preferably is of the same material as container 10.

The entire construction described is very conveniently and simply assembled. The component parts or ingredients of the inner container 19 are loaded therein from the bottom end thereof. Then the bottom end is closed off by the bottom 19b. The pull wire 30 then protrudes from the upper cover 22 of container 19, being held in place by a suitable disc D of adhesive material such as Scotch cellulose tape or the like. The inner assembly is inserted into the outer container 10 through its top and so that the bottom 19b is centered on the lower spacer or cup member 35. The bottom 36 of the outer container 10 has been previously attached to the latter. Then the cup member 11, assembled cover 14 and tear strip 17 are placed over the top end of outer container 10. The portion 30a of pull wire 30 projects through the opening O in the tear strip 17. The cup member or spacer 11 serves to center the upper end of the inner container 19. The bead 15 is formed, and the bent-over portion 30a of the pull wire soldered at 31 to the tear strip 17 closing opening O. This completely seals the contents of the inner container from atmosphere and in leak proof manner. In use, the tear strip 17 is pulled off by grasping the ring 18. As the tear strip is pulled off the pull wire 30 is pulled with it so that the striker 29 automatically fires the igniter 28 and starts burning of the fuse 27 and combustion of the smoke producing compound C. The voluminous smoke produced by the burning smoke compound C then escapes to atmosphere through the perforations 24 in inner lid 22 and the opening 16 in the outer cover 14 of container 10 left by removal of the tear strip 17.

It will be noted that air spaces 38 are provided between the bottom 36 and the bottom 19b of the inner container and between the washers 33. This provides heat insulation at the bottom of the unit.

The heat insulation provided by the air spaces 20 and 38 and the imperforate walls of containers 19 and 10 provide safe heat insulation and make it possible to hold the device comfortably during use.

The modified form of device of Fig. 2 has substantially similar construction with a few differences in detail to be presently described.

In this construction the outer cover 14' of the outer container 10' differs from that of cover 14 of Fig. 1 in that the shoulder 16a' adjacent opening 16' extends downwardly rather than upwardly. The tear strip 17' is secured to the downwardly extending shoulder 16a' in the same manner as tear strip 17 is attached to shoulder 16a of Fig. 1. The pull cord or wire 30' of the pull wire lighter or igniter 28' is attached to a dependent member 39 carried by the tear strip 17'. The various other parts having identical but primed reference characters as those of Fig. 1 denote corresponding identical parts.

The air spaces 20', 38' function in identically the same manner as the air spaces 20 and 38 of the device of Fig. 1 to provide adequate heat insulation so that the device may be safely held in hand during combustion of the compound C' which is fired when the tear strip 17' is removed.

It is important to note that the walls of the containers 19' and 10' are imperforate in the same way as that of containers 19 and 10 and for the same purpose namely to augment the heat insulation provided by the air spaces so that the device may be safely held in hand during combustion. The imperforate nature of the walls of the outer containers 10 or 10' also is important for effective protection of their contents.

An auxiliary handle construction may be provided in order that either the container 10 or 10' may be held further away from the user during burning of the smoke compound C or C' or any other type of compound, for example a pyrotechnic compound producing brilliant light that may be substituted for the smoke compounds C or C'. In the drawings it is shown as applied to container 10'. It should be understood that it may be applied in the same way to container 10. Referring to Figs. 2–4 inclusive, a member 40 may be secured to the bottom 36' as by spot welding or in any other suitable way. Eyelets or hinges 40a are provided on the member 40 at suitably spaced-apart points. Rods or handle members 41 of bendable metal such as iron wire or any other suitable material are pivotally secured to the hinges or eyelets 40a. These rods 41 are bent at 42 around the bead 37' so that in position of non-use they extend substantially parallel with and lie against the side wall or walls of the container 10'. The rods or members 41 may be extended and bent over at 41a to hook over the upper annular bead 15' of container 10', and will thus be retained to their non-use position until released by the user. A frangible annular band (not shown) of "cellophane" tape, "Scotch" cellulose tape, or any other suitable binding tape could serve, as an alternative or an adjunct, to secure the rods against the container 10' in their non-use position. When the device is to be used, the band or tape if used is destroyed. The rod members 41 then can be rotated about eyelets 40a to extend below the bottom 36' and serve as a convenient handle for the container that may be grasped by the user. One or more of such rods 41 can be used. The rods 41 may be applied in identical manner to container 10 of Fig. 1 for the same purposes.

In addition to the features described, either the device of Fig. 1 or Fig. 2 may be equipped with anchoring means. As shown in Fig. 5, a suitable cord or chain 44 is secured to the bottom 36' of container 10'. A safety pin 46 or other similar fastening element is secured to the cord so that the signal device may be securely fastened either to a part in a life raft or to part of the users' clothing to prevent loss in the water or elsewhere. This same anchoring means may be provided for the container 10 of Fig. 1 in the same way.

To use the device if it is equipped with the handle members or rods 41, the hooked-over portions 41a are released from the bead 15' or 15 and the rods are rotated to open position. Thereafter, the ring 18' or 18 is grasped and the tear or pull strip 17' or 17 is removed. This

ignites the igniter 28' or 28 and lights the fuse 27' or 27. The burning of fuse 27' or 27 ignites the compound C' or C and such ignition produces voluminous smoke which then escapes to atmosphere through the openings left in the tops 14' or 14 by removal of tear strips 17' or 17.

The outer surfaces of containers 10 or 10' and other exposed parts are preferably coated with a protective coating after the device has been completely assembled. Such coating for example may be a corrosion preventative coating. Other protective coatings also may be used.

The pull wire igniters 28 or 28' in the embodiment shown are of a type that ignite when the pull wires 30 or 30' are pulled out. The fuses 27 or 27' which are inserted into the bodies of these igniters as shown in the drawings are fired by the igniters. The igniters 28, 28' can be of other types.

The construction of the inner containers 19 or 19' may be applied to any of the modifications of my aforementioned co-pending application. Other modifications in construction are possible too without departing from the spirit of the invention and are contemplated. There is no intention of limitation to the exact details shown and described.

What is claimed is:

1. In a device of the character described, an outer container, an inner container for combustible signalling compound, said inner container having imperforate sides and one imperforate reentrant end and one perforated reentrant end, an apertured cup-like member adjacent one end of said outer container, said member having a portion adapted to fit into the said perforated reentrant end of said inner container and center the latter, said perforated reentrant end of said inner container serving to permit free and voluminous escape therethrough of products of combustion developed by said combustible compound upon its being burned within said inner container, a covering member closing said one end of said outer container, means providing a hermetic seal between said covering member and said outer container, said covering member having an opening, a removable member normally hermetically closing said last-named opening, means secured to said outer container and extending into said imperforate reentrant end of said inner container for centering this latter end of said inner container, a second covering member closing the opposite end of said outer container and means forming a hermetic seal between said sconed covering member and said outer container whereby the contents of said outer container are hermetically sealed therein.

2. In a device of the character described, an outer container, an inner container for combustible signalling compound, said inner container having imperforate sides and one imperforate reentrant end and one perforated reentrant end, a cup-like member secured to one end of said outer container and extending inwardly thereof, said member having a reduced portion adapted to fit into the perforated reentrant end of said inner container and center the latter, said reduced portion having an opening, and said perforated reentrant end and said opening serving to permit free and voluminous escape therethrough and through said opening in said reduced portion of products of combustion developed by said combustible compound upon its being burned within said inner container, a covering member

closing said one end of said outer container, means providing a hermetic seal between said covering member, said outer container and said cup-like member, said covering member having an opening, a removable member normally hermetically closing said last-named opening, means extending into said imperforate reentrant end of said inner container for centering this latter end of said inner container, a second covering member closing the opposite end of said outer container and means forming a hermetic seal between said second covering member and said outer container whereby the contents of said outer container are hermetically sealed therein, and said cup-like member and said means extending into the reentrant imperforate end of said inner container serving to maintain said two containers spaced apart to provide an air space therebetween for effectively heat insulating the outer container from the inner container and its burning contents when the device is in use.

3. In a device of the character described, an outer container, an inner container for combustible signalling compound, a cup-like member adjacent one end of said outer container, said member having a portion adapted to fit into an end of said inner container and center the latter, said inner container being provided with openings at one end to permit free and voluminous escape therethrough of smoke developed by said smoke producing compound upon its being burned within said inner container, and said inner container being imperforate in its sides and at its other end, a covering member closing said first-named end of said outer container, means providing a hermetic seal between said covering member, said container and said cup-like member, said covering member having an opening, a removable member normally hermetically closing said last-named opening, a second cup-like member adjacent the opposite end of said outer container having a portion adapted to fit into the other end of said inner container to center the latter, a second covering member closing the opposite end of said outer container and means forming a hermetic seal between said second covering member and said outer container whereby the contents of said outer container are hermetically sealed therein.

4. In a device of the character described, an outer container, an inner container for combustible signalling compound, said inner container having imperforate sides, an imperforate cover secured to one end of said inner container with an hermetic seal, said cover having a reentrant portion, a cup-like member secured to said outer container adjacent one end thereof and having a portion admeasured to fit into said reentrant portion of said imperforate cover to center the latter, a perforated cover secured to the other end of said inner container, said perforated cover having a reentrant portion, a second cup-like member secured to said outer container adjacent its opposite end and having a portion provided with an opening, said last-named portion being admeasured to fit into the reentrant portion of said perforated cover to center the latter, a covering member for said first-named end of said outer container, means providing an hermetic seal between said covering member and said first-named end of said outer container, a covering member for the said opposite end of said outer container, and means providing an hermetic seal between said second-named covering member and said opposite end of said outer container, whereby the contents of said outer container are hermetically sealed therein,

and said inner container being of smaller dimensions than said outer container and being maintained in spaced relationship from the end and side walls of said outer container by the engagement of said reentrant portions of said two cup-like members in the respective reentrant portions of said two end covers of said inner container, and being thereby heat insulated from said outer container so that said outer container may be held in hand during combustion of said compound, and removable means secured over an opening in said second-named covering member of said outer container for exposing the contents of said outer container for use.

MARTIN DWYER.

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