Feb. 3, 1959 L. E. DOAK 2,871,952

FIRE EXTINGUISHER

Filed May 20, 1957

FIG. 1

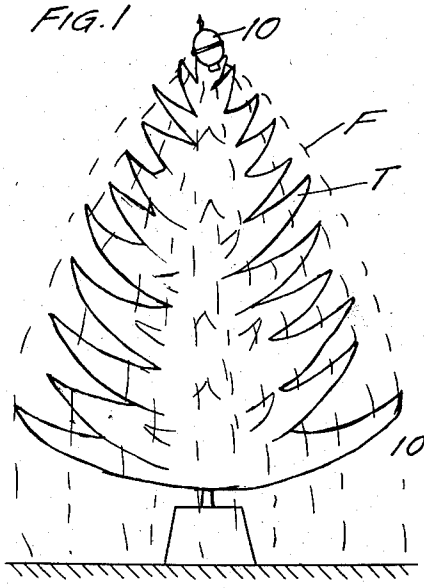


FIG. 2

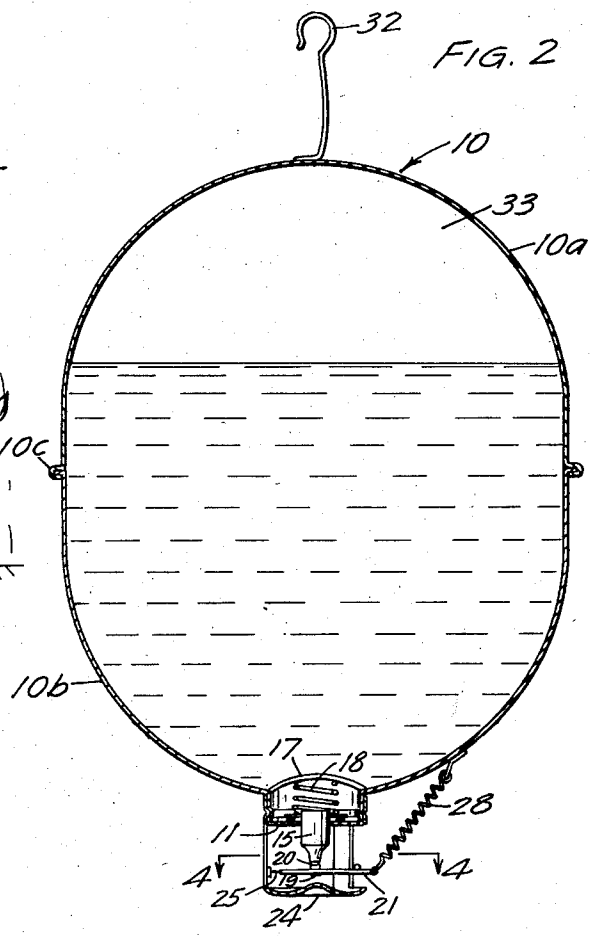


FIG. 3

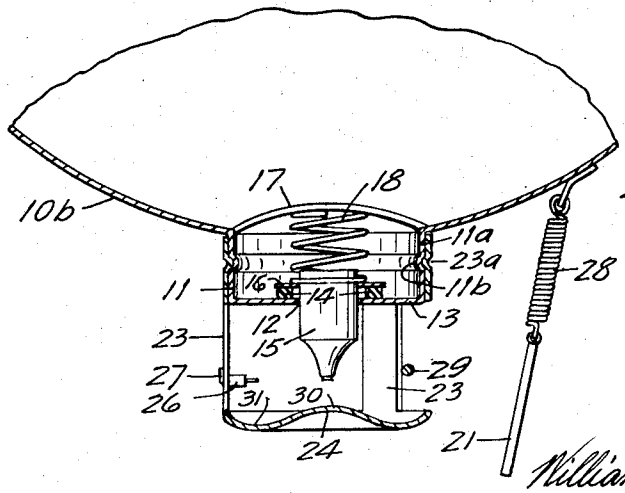
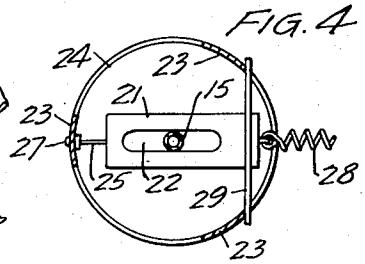


FIG. 4



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United States Patent Office

2,871,952

Patented Feb. 3, 1959

2,871,952

FIRE EXTINGUISHER

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Application May 20, 1957, Serial No. 660,109

3 Claims. (Cl. 169—26)

This invention relates to fire extinguishers and more particularly relates to fire extinguishers containing a quantity of non-conducting fire extinguishing liquid under pressure to be released upon the occurrence of a fire.

An object of my invention is to provide a new and improved fire extinguisher of simple and inexpensive construction and operation.

Another object of my invention is the provision of a novel fire extinguisher of the cartridge type, substantially filled with a fire-extinguishing liquid under pressure and which is provided with a novel valve mechanism facilitating ready and easy charging of the cartridge and expelling of the liquid for extinguishing a fire.

A further object of my invention is the provision in a cartridge-type fire extinguisher of a frangible, fluid-discharging stem which is normally closed and which is easily broken by mechanism operating in response to the occurrence of a fire in the immediate area, and which also has the function of operating as a valve facilitating ready and easy charging of the cartridge.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompany drawings wherein like reference characters refer to the same or similar parts throughout the several views and in which:

Fig. 1 is an elevation view of the extinguisher applied to a Christmas tree and showing the manner in which the fire extinguishing fluid is discharged therefrom so as to envelop the entire tree;

Fig. 2 is a section view taken on a vertical plane longitudinally through the extinguisher;

Fig. 3 is an enlarged detail section view of the valve mechanism and frangible stem in ruptured condition and wherein the fire extinguishing fluid is being discharged; and

Fig. 4 is a detail section of the fluid diffuser and taken on a substantially horizontal plane at 4—4 in Fig. 2.

One form of the present invention is shown in the drawings and is described herein. The cartridge-type fire extinguisher includes a closed container indicated in general by the numeral **10** and being constructed of two shell halves **10***a* and **10***b* which are interconnected in sealed relation to each other by a crimped connection **10***c*. The lower shell **10***b* has a downwardly extending, cup-shaped receptacle **11** formed integrally thereof and provided with an aperture **12** in the bottom wall thereof. The opening-defining portions **13** disposed peripherally around the aperture **12** define a valve-sealing portion, and an annular gasket **14** is applied onto the valve-seating portion **13**.

A hollow frangible stem **15** has an open upper end **15***a* which projects through the aperture **12** and into the interior of the container, slightly above the valve-seating portion **13**. The stem **15** has a transversely outwardly projecting annular flange **16** at the upper end thereof and formed integrally thereof and defining a

valve element seatable against the valve-seating portion **13** and gasket **14**.

Means are provided for urging and holding the stem **15** downwardly so as to urge and hold the flange or valve element **16** against the seating portion of the container. In the form shown, a rigid bar **17** extends across the inner end of the receptacle **11** and is affixed at its opposite ends by any suitable means such as spot welds to diametrically opposite portions of the lower container shell **10***b*. The central portion of the bar **17** is disposed directly above the stem **15**. A spring **18** is disposed between the bar **17** and the stem **15**, the lower end of the spring **18** surrounding the upper end **15***a* of the stem and bearing against the flange **16**.

Stem **15**, which is constructed of a frangible material such as glass or plastic, has a diminished lower end portion **18** which is closed, and which is provided with an annular stem-weakening groove **20** disposed slightly above the bottom end. Discharge of the fire-extinguishing liquid from the cartridge **10** is accomplished by breaking or rupturing the stem **15** at the weakened portion thereof.

Means are provided for rupturing the stem **15** adjacent the lower end thereof and in response to the presence of a fire in proximity with the extinguisher. In the form shown, such means include an impact element or hammer **21** which, in the form shown, comprises an elongated bar having an elongated slot **22** therethrough and extending lengthwise thereof for receiving the lower end **19** of the stem **15** therethrough. The impact element **21** is supported from a plurality of depending frame elements **23** which are interconnected at their lower ends by means of a diffuser **24** hereinafter more fully described, and are interconnected at their upper ends by a ring which encircles the receptacle **11**. The peripheral wall **11***a* of the receptacle has a number of recesses **11***b* and the interconnecting ring on frame elements **23** has corresponding detents **23***a* therein which fit into the recesses **11***b* for holding the frame elements in position. The impact element has a fusible link **25** at the inner end thereof which may be formed integrally of the element **21** and which is in turn connected with a mounting element **26** which is fixed by any suitable means, such as a tab **28** projecting through a suitable aperture in the frame element **23** and bent flat against the outer side of the frame element.

Means are provided for actuating the impact element **21**, causing the same to engage and break the stem **15** when the fusible link **25** ruptures. In the form shown, a tension spring **28** is connected to the outer end of the impact element **21** and is connected to the outer side of the container **10** in spaced relation with the receptacle **11**. A spring-guiding bar **29** extends transversely of the impact element **21** above the spring **23** and is affixed at its opposite ends to adjacent frame elements **23** for guiding the spring and causing the impact element **21** to be urged in a direction transversely of the stem **15**.

The diffuser **24**, which may be formed integrally of the frame elements **23** has a central convex top surface portion **30** disposed below the lower end of the stem **15**, and the diffuser **24** also has an annular concave top surface portion **31** surrounding the central portion and disposed transversely outwardly from the end of the stem **15**.

Of course the cartridge **10** may be provided with any suitable means for securing the extinguisher onto a Christmas tree and the like and in the form shown, a hanger or hook **32** is affixed to the top of the container **10** as by spot welding.

One of the important features of the present invention is the construction thereof which facilitates ready and

easy charging of the container with compressed air or other gas and fluid after the parts have been assembled in manufacture. The material with which the cartridge is to be charged is supplied under pressure around the stem 15 and receptacle 11, and this application of material under pressure may be accomplished by any suitable means such as a rubber supply nozzle which may be applied around the periphery of receptacle 11 before the frame elements 23 and diffuser 24 are secured thereon. By application of pressure onto the outside of stem 15, the stem will move inwardly, lifting the flange 16 off the gasket 14 and causing material to be injected into the interior of the container. The aperture 12 in the bottom of the receptacle 11 is slightly larger than the external diameter of the stem and the material passes easily thereby. It is preferred that compressed air at approximately five to seven p. s. i. be injected into the container along with a quantity of the non-conducting fire extinguisher liquid.

In operation, the fire extinguisher may be hung adjacent the top of a Christmas tree as shown in Fig. 1 or in any other hazardous location wherein a fire would spread and go out of control rapidly, if not immediately extinguished. If a fire were to occur in the Christmas tree, the temperature in the area of the fusible link 25 would immediately cause the link to fuse. In this form of the invention the fusible link has a rated rupture temperature of approximately 140 degrees F. When the link 25 ruptures, the spring 28 causes the impact element to strike and rupture the lower end of the stem 15. The stem 15 will break at the weakened groove 20 and compressed air at 33 in the container and above the liquid will cause the liquid to be expelled through the ruptured stem 15. The expelling liquid will engage the central convex portion 30 of the diffuser and will flow transversely outwardly in multidirections and be diffused upwardly by the convex peripheral portion 21, whereupon the fire extinguishing fluid, which will substantially vaporize and envelop the entire Christmas tree T in the manner shown by the dotted lines F in Fig. 1.

It will be seen that I have provided a new and improved extinguisher which has an improved frangible stem for ejecting the fire-extinguishing fluid in response to presence of heat and which is arranged to provide a simple valve mechanism to facilitate ready and easy charging of the extinguisher with fire-extinguishing liquid and compressed air.

It will, of course, be understood that various changes may be made in the form, detail, arrangement and proportion of the parts without departing from the scope of my invention which consists of the matter described herein and set forth in the appended claims.

What I claim is:

1. A cartridge-type fire extinguisher, comprising a closed container adapted to contain a quantity of fire-extinguishing liquid under gas pressure, said container having an aperture in the bottom thereof defining valve-seating portions therearound, a hollow frangible stem having a closed lower end disposed outwardly of the container and adapted to be ruptured, said stem also having an open upper end projecting through the aperture in the container and an enlarged external periphery on the upper end thereof engaging and seating against said seating portion at the inner side of the aperture in the container, and spring means urging the stem outwardly, the stem being smaller in external configuration than the configuration of the aperture in the container, whereby to facilitate charging of the container with fluid and gas by application of the gas and fluid under pressure to the external side of the container and stem.

2. A cartridge-type fire extinguisher comprising a closed container adapted to contain a quantity of fire extinguishing liquid and gas under pressure and having an aperture in the bottom thereof, the container defining a valve-seating portion peripherally around the aperture and on the inner side of the container, a hollow stem having an externally flanged open upper end projecting through the aperture and also having a frangible closed outer end projecting outwardly from the aperture in the container, the flange defining a valve element and bearing against the valve-seating portion around the aperture in sealing relation, a compression spring bearing against the flanged upper end of the stem and urging the same toward the seating portion, anchoring means in the container restricting upward movement of the spring, and said aperture being larger than the external periphery of the stem whereby to permit inflow of liquid applied under pressure to the outer side of the container around the stem.

3. A cartridge-type fire extinguisher comprising a container adapted to contain a quantity of fire extinguishing fluid and gas under pressure, and having an opening in the bottom thereof, a hollow stem in the opening and immovable in an outward direction, said stem having an open inner end communicating with the interior of the container and having a diminished and weakened frangible lower end projecting outwardly from the container, an elongated and generally horizontal impact element having an elongated slot therein receiving the diminished lower end of the stem therethrough, a fusible link connected to one end of the impact element, anchoring means connecting the fusible link with the container for holding the impact element in stationary position, and spring means urging the impact element to move the end of the slot toward the frangible lower end of the stem whereby the weakened lower end of the stem is broken by the impact element in response to heat which releases the fusible link and causes expelling of the fire-extinguishing liquid through the broken stem.

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