Jan. 1, 1952 D. W. HARTZELL 2,581,324

AUTOMATIC FIRE EXTINGUISHER

Filed Sept. 20, 1950 2 SHEETS—SHEET 1

Fig. 1

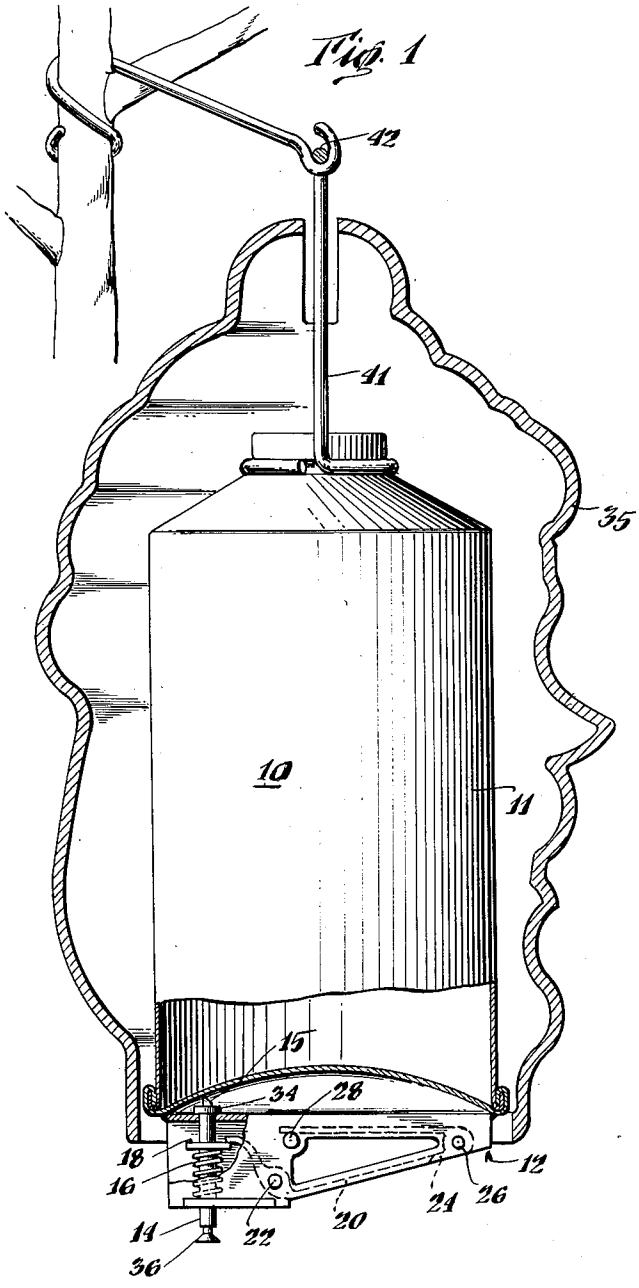


Fig. 4

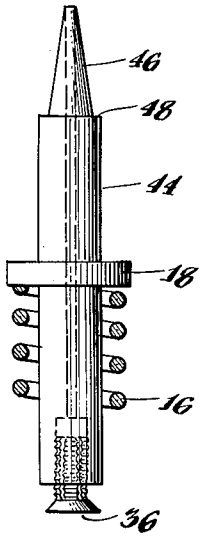
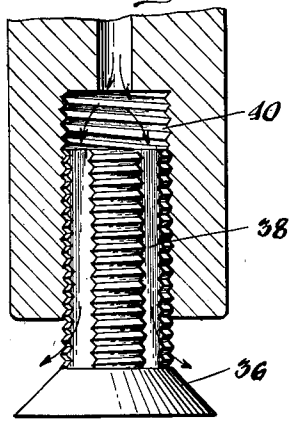


Fig. 5



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AUTOMATIC FIRE EXTINGUISHER

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Fig. 2

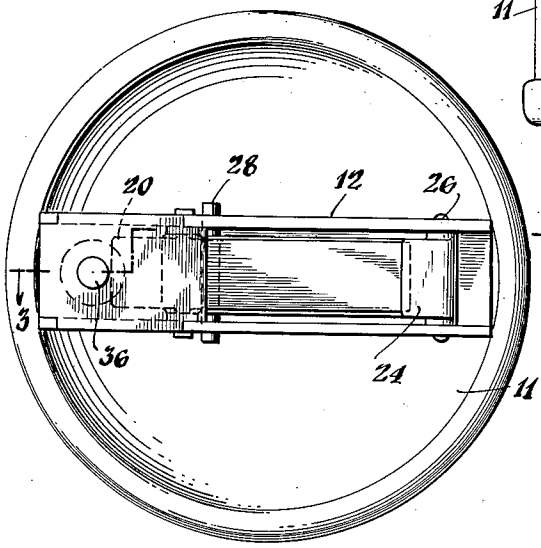


Fig. 6

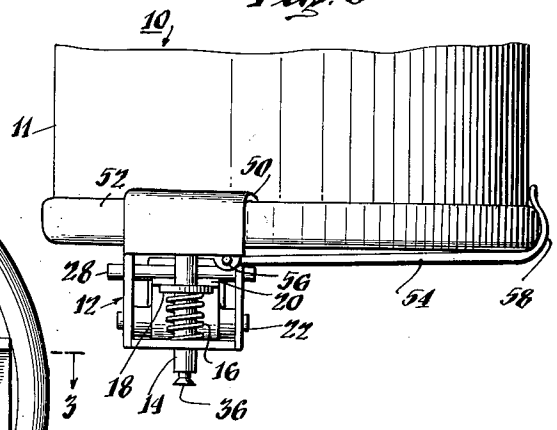


Fig. 7

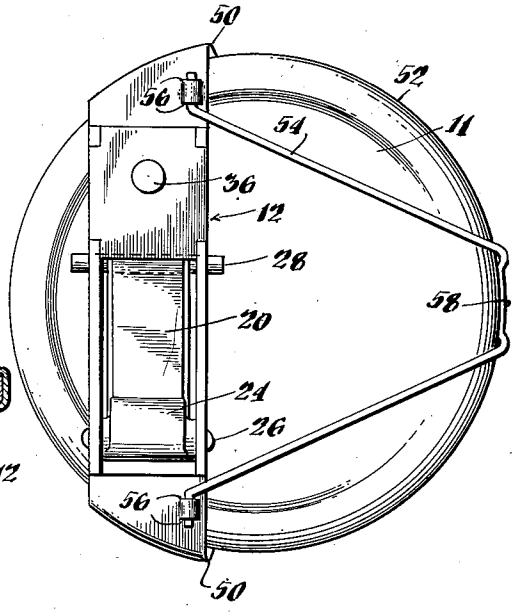
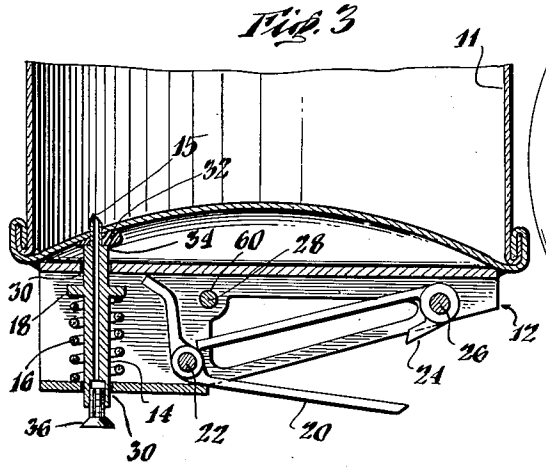


Fig. 3



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AUTOMATIC FIRE EXTINGUISHER

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3 Claims. (Cl. 169—26)

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This invention relates to an infrangible automatic fire extinguishing apparatus and in particular to a device adapted to disperse fire extinguishing fluid as a finely divided spray or mist.

In carrying out my invention I provide an infrangible pressure container which holds a suitable fire extinguishing fluid under pressure exerted by a non-inflammable gas. When a fire occurs, the heat melts a fusible metal link and a spring-driven nozzle is thereby released to penetrate the bottom of the container. This discharges the fire extinguishing fluid to smother the fire.

I have found that for the most efficient fire extinguishing, it is necessary to distribute the fluid as a finely divided spray or mist. When this is done the fluid effectively covers a large area of the floor and it also smothers flames above floor level which tend to travel up draperies or the like. Otherwise the fluid is only effective in the very limited area where it covers the floor.

For this purpose I provide a tubular nozzle with a small diameter so that the gas pressure causes the fire extinguishing fluid to travel through the tube at such a high velocity that it bursts into a finely divided spray at the mouth of the tube. There is one difficulty with the use of such a nozzle. I discovered that the nozzle in striking the concave end surface of the usual pressure container tends to glance off the surface instead of piercing it. I solve this difficulty by a light but rigid frame which holds the nozzle so that it may slide along its longitudinal axis, but which substantially eliminates any sideward movement of the nozzle. The striking force is thus concentrated at one point and the nozzle readily pierces the container.

This invention may readily be understood by reference to the accompanying drawings, in which Fig. 1 is a front elevational view of my device, partially cut away to show the nozzle in its retracted position; Fig. 2 illustrates the bottom of the container; Fig. 3 is an enlarged sectional view taken on line 3—3 of Fig. 2 showing the nozzle after it has penetrated the container; Fig. 4 shows a modified nozzle; Fig. 5 is an enlarged view of the baffle; and Figs. 6 and 7 show a modified form of my invention with a detachable mounting for the nozzle.

In the drawings extinguisher 10 consists of a container 11 which holds a supply of fire extinguishing fluid such as carbon tetrachloride under pressure exerted by a non-inflammable gas such as carbon dioxide. A light but rigid frame 12 is fixed to the bottom of container 11 and it slidably supports a small tubular nozzle 14. This nozzle has one end considerably reduced in diameter and cut on a diagonal as shown at 15 to aid in piercing the container. Nozzle 14 is held in a retracted position against the force of a compressed helical spring 16. This spring, when released, provides the force necessary to drive nozzle 14 through the concave bottom surface of container 11. Spring 16 is held compressed between frame 12 and nozzle flange 18 by lever 20 pivotally mounted on a pin 22. In its compressed state spring 16 exerts a constant force against lever 20 and tends to rotate it in a clockwise direction. Such rotation is prevented by a catch 24 which engages and holds the long arm of lever 20. This catch is also pivotally mounted by a pin 26, and counterclockwise rotation of the catch is prevented by a fusible metal link 28.

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In operation, when a fire occurs, the fusible metal link, which melts at approximately 150° F., releases catch 24, whereby spring 16 is free to drive nozzle 14 into the container (see Fig. 3). Bearing surfaces 30 in frame 12 provide a guide for the nozzle so that it can only travel along its longitudinal axis. It is also to be noted that the nozzle is set at the side of container 11 and the bevel is faced toward the center. Because of these factors, the nozzle cannot hit a glancing blow and the force of spring 16 is concentrated at one point to insure piercing of the container by nozzle 14. This releases the fluid which is forced through the nozzle at a high velocity by the gas pressure, and its turbulent flow causes it to be dispersed from the mouth of the tube as a finely divided spray.

Penetration of the nozzle is limited by a rubber washer 32 mounted on shoulder 34 of nozzle 14. This washer is driven against the concave surface of container 11 with such force that it forms a liquid tight seal with the concave surface to insure passage of the fluid solely through the nozzle. Thus, the fluid is concentrated in a single uniform spray envelope which forms a highly effective blanket to smother the fire.

As is known, there are few things in the home more inflammable than a Christmas tree. I have found that my device is exceptionally well suited to use in extinguishing such Christmas tree fires. The finely divided spray quickly envelops the entire tree to effectively smother the fire and preclude its spreading. When used for this purpose I provide a hollow Christmas tree ornament such as a papier-mâché Santa 35 which fits over extinguisher 10 and presents an attractive ornamental appearance at the tree top.

In the preferred form of my invention shown, to further disperse the fire extinguishing fluid I provide a baffle 36 provided with a series of grooves 38, held in threaded engagement with the interiorly threaded end section 40 of nozzle 14. The fluid impinges on this conical surface and it is dispersed over an exceptionally wide area. With this construction, the area covered by the spray may be changed by adjusting the position of the baffle relative to the mouth of the tube, and, by correlating its position in the tube with the height at which the extinguisher is hung, the area of coverage may be predetermined. Extinguisher 10 may be supported by any convenient means for example, as shown in Fig. 1, a wire 41 is wrapped around the top of container 12 and the opposite end of the wire is bent back upon itself at 42 to provide a hook for hanging the extinguisher above floor level.

A modified form of tubular nozzle 44 is shown in Fig. 4. In this embodiment of my invention conical head 46 provides the liquid tight seal with the container. The head is tightly wedged into container 11 by the driving force of spring 16 to form a liquid tight seal, but the magnitude of this force is such that penetration ceases short of shoulder 48. Otherwise the mounting and functioning of this nozzle is the same as nozzle 14 shown in Fig. 3.

In Figs. 6 and 7 frame 12 is modified with detachable means for holding the frame so that it may be readily removed and reused after the container has been emptied. In this embodiment of my invention, I extend both sides of the upper portion of frame 12 and curve the edges of these extensions to correspond with the curvature of container 11. These curved extensions are bent back upon themselves to form hooked edges 50 adapted to fit over seam 52 around the base of the container. Wire 54 is attached to frame 12 by holes 56 and its central portion is also bent back upon itself to form a spring-like clip 58.

To attach the frame, seam 52 of the container is slipped under hooked edges 50 and the spring clip 58 is forced over seam 52. This holds the frame against the base of container 11. To remove the frame, after the container has been emptied, clip 52 is rotated in a counter clockwise direction and frame 12 is then free to slide clear of the container. To reset nozzle 14 in its retracted position for a new container, spring 16 is compressed by bearing down on nozzle flange 18 with a screwdriver or the like. While held in this position, lever 20 and catch 24 are reset to hold the spring and a new fusible link 28 is inserted through holes 60 in frame 12. The nozzle is now ready for operation and frame 12 may be placed on a new container.

The size of container 11 is optional, but the important thing is to provide gas pressure sufficient to force all of the fluid through the nozzle at a relatively high velocity. I find that a sixteen ounce can filled with approximately twelve ounces of fluid under a pressure of thirty to forty pounds per square inch gives exceptionally good results.

The materials used in the construction of my device are those conventionally used in this type of structure.

It will be understood that it is intended to cover all changes and modifications of the preferred embodiment of this invention herein chosen for the purpose of illustration which do not constitute departures from the spirit and scope of the invention.

What I claim is:

1. In combination with an infrangible pressure can having a dished concave bottom for holding fire extinguisher fluid under pressure, a framework rigidly attached to the bottom of the can, a puncturing nozzle mounted in said framework with one end adjacent the bottom of the can and held against any substantial movement relative to the can except endwise movement, spring means adapted to drive said nozzle endwise into the can and heat-sensitive means for controlling the action of such spring, said puncturing nozzle comprising a hollow tube open at the end toward the can adapted to have such end driven into the can and having a substantially straight line passage through such tube adapted to permit the release of fire extinguisher fluid from within the can, and a baffle member connected with the other end of said tube so that liquid forced out of the can will flow through said tube with sufficient velocity to be dispersed by the baffle member into a fine spray.

2. A structure as specified in claim 1 in which the end of the puncturing nozzle toward the can is cut diagonally to form a point and the long pointed side of the nozzle is positioned toward the nearest outer edge of the can.

3. A structure as specified in claim 1 in which the puncturing nozzle has a shoulder to limit its entrance into the can end and carries a gasket adapted to be compressed between such shoulder and the can end to limit leakage of fire extinguisher fluid around the outside of the nozzle.

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