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B. E. BOYCE
FIRE EXTINGUISHER
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2,876,845

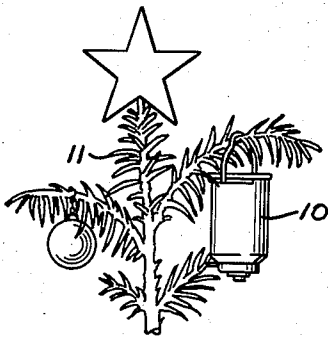


FIG. 1

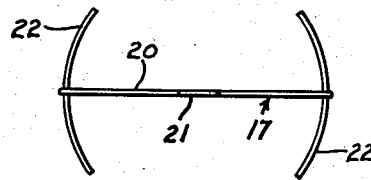


FIG. 3

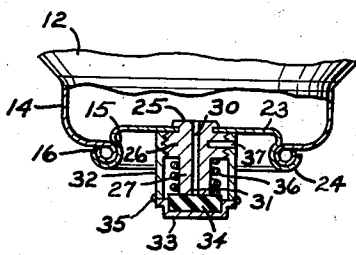


FIG. 4

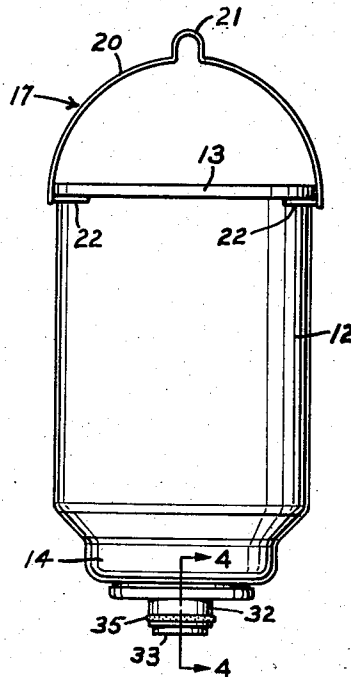


FIG. 2

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FIRE EXTINGUISHER

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3 Claims. (Cl. 169—26)

This invention relates to improvements in a fire extinguisher for Christmas trees that is automatic in operation.

It is an important object of the present invention to provide a fire extinguisher particularly adapted to be attached to a Christmas tree, such device being ornamental in design and being constructed to open automatically in response to a predetermined critical temperature resulting from a flame, so as to spread the fire extinguishing material over the tree.

Another important object is achieved by the provision of a coupling that is attached to the valve member fixed to the closure cap of a pressurized container for the fire extinguishing material, and adapted to hold a valve cover in position normally to close the valve port, the valve cover being attached to the coupling by a material that melts at a predetermined critical heat to provide an automatic separation of the cover from the coupling to open the valve port for effective release of the fire extinguishing material in a spray discharge.

Still another important object is realized by the provision of resilient means about the valve member of the above mentioned assembly that engages the valve cover and tends to urge the cover away from sealing relation with the valve port, and tends to separate the cover from the coupling, the resilient means causing the valve port to open with a quick, positive action.

Yet another important objective is realized in providing a Christmas tree fire extinguisher that is simple and durable in construction, economical to manufacture, and automatic and efficient in operation.

Other important advantages are realized in a provision of safety features in the structural arrangement that prevents unwanted and unintentional opening of the valve member after the device has been completely assembled and charged with fire extinguishing material.

The foregoing and numerous other objects and advantages of the invention will more clearly appear from the following detailed description of a preferred embodiment, particularly when considered in connection with the accompanying drawing in which:

Figure 1 is a perspective view of the fire extinguisher attached to the top of a Christmas tree;

Fig. 2 is a side elevational view of the fire extinguishing device;

Fig. 3 is a top plan view of the hanger for the fire extinguisher shown in Fig. 2, and

Fig. 4 is an enlarged, fragmentary cross sectional view as seen along line 4—4 of Fig. 2.

Referring now by characters of reference to the drawing, and first to Fig. 1, the fire extinguishing device generally indicated at 10 is particularly adapted to be attached to one of the top branches of a Christmas tree generally referred to at 11. The device includes a pressurized container 12 having a reduced lower portion 14. The lower end of reduced container portion 14 is provided with a circular opening 15 defined by a rolled lip margin 16.

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A hanger 17, shown in Figs. 2 and 3, consists of semi-circular portion 20 having an integral, uppermost projection 21 that provides a recess adapted to receive the branch of a Christmas tree. Further, the hanger includes at each end an arcuate arm 22 that is adapted to engage the underside of upper container rim 13. The hanger 17 is usually disassembled from container 12 when packed, and is quickly and easily assembled merely by spreading the resilient portion 20 of hanger 17 and passing the arcuate arms 22 over the upper end of container 12, and then permitting the resiliency of hanger portion 20 to snap the arms 22 under rim 13.

A closure cap 23, the structure of which is best shown in Fig. 4, includes a rolled lip margin 24 that closely fits the lip margin 16 of container opening 15. In assembling closure cap 23 to container 12, the cap 23 is expanded to underlie the peripheral margin of opening 15, which prevents detachment of cap 23 and provides a tight seal between lip portions 16 and 24.

Attached to closure cap 23 is a valve member that includes a portion 25 located internally of cap 23 and of container 12, an enlarged intermediate valve portion 26 that is provided with threads, and a depending reduced valve stem portion 27, the intermediate enlarged portion 26 and reduced stem portion 27 being located externally of cap 23 and of container 12. The valve portion 25 is coined over to attach securely the cap member 23 between such valve portion 25 and the enlarged intermediate valve portion 26. The valve member is provided with a longitudinal passage 30 having a valve outlet port 31 in the end of reduced valve stem portion 27, the passage 30 communicating with the interior of container 12.

A coupling nut 32 is provided with internal threads over approximately one-half of its length, and is attached by such threads to the threaded, enlarged valve portion 26. The lower end of coupling nut 32 is located in approximately the same plane as the lower end of reduced valve stem portion 27. Secured to the lower end of coupling nut 32 is a valve cover that consists of a cup element 33 attached to the periphery of coupling nut 32, and a synthetic rubber gasket 34 retained by the cup structure 33 and adapted to seat against the lower end of valve stem portion 27 to close valve outlet port 31.

It will be particularly noted that the valve cover is attached to coupling nut 32 by a metal indicated by bead 35 that melts at a predetermined critical heat such as 150 degrees F. to separate the valve cover from coupling nut 32.

A resilient means consisting of a compression spring 36 is located about the reduced valve stem portion 27, one end of spring 36 engaging the enlarged valve portion 26 and the opposite end engaging the gasket 34 of the valve cover. The spring 36 tends to urge the gasket 34 away from the valve outlet port and tends to urge the valve cover generally away from the coupling nut 32.

In assembling the valve member to closure cap 23, the portion 25 is inserted through the center opening of cap 23 and coined over to attach the valve member securely. Before attachment of coupling nut 32, the valve cover represented by cup structure 33 and gasket 34 is attached by the metal bead 35 to the lower end of nut 32. Then, the spring 36 is located about the lower end of reduced valve portion 27 of the valve member and the coupling nut 32 is threadedly attached to the enlarged valve portion 26. Upon tightening of coupling nut 32, the gasket 34 is urged into sealing relation with the valve outlet port 31 under loading of spring 36. Then, a lock pin 37 is forced between coupling nut 32 and enlarged valve portion 26 to prevent unwanted and unintentional detachment of coupling nut 32, and hence assures under normal usage complete closure of the valve member. Of

course, other suitable means may be conveniently employed to fix nut 30 to the valve member.

The container 12 is then filled with a fire extinguishing material such as carbon tetrachloride, chlorobromomethane, or perchloroethylene and with a propellant such as Freon. Of course, other fire extinguishing materials can be conveniently used such as liquid carbon dioxide or powdered bicarbonate of soda with propellants such as nitrogen gas, Freon or carbon dioxide gas.

After charging the container 12 with the fire extinguishing material, the closure cap 23 with the valve member completely assembled is located in opening 15, and is attached to container 12 in the manner previously described by an expanding tool to provide an effective seal.

In use, the fire extinguishing device 10 is attached to the top of the Christmas tree 11 as shown in Fig. 1. If, for example a fire occurs, the flame will heat the metal 35. When the predetermined critical heat of metal 35 is reached, the metal 35 will melt and the valve cover will separate from coupling nut 32. The spring 36 under its compressive loading quickly separates the valve cover 33—34 away from coupling nut 32 and urges the gasket 34 away from the valve outlet port 31. The valve cover and spring will then fall free to permit the fire extinguishing material to be discharged in a spray through valve passage 30 and through valve outlet port 31 over the tree to extinguish the fire.

Although the invention has been described by making detailed reference to a preferred embodiment, such details are to be understood in an instructive, rather than in any restricted sense, many variants being possible within the scope of the claims hereunto appended.

I claim as my invention:

1. In a fire extinguisher, a container for holding fire extinguishing material under pressure, a cap attached to said container, a valve member attached to said cap, said valve member being provided with a valve port communicating with the interior of said container, a coupling member threadedly attached to said valve member, a cover element arranged over one end of the coupling below the valve member to close the valve port, means attaching the cover element to said coupling which melts at a predetermined critical heat to separate said cover element from said coupling, whereby to open said valve port, and a compression spring disposed in said coupling between said valve member and said cover element, the spring being loaded upon threaded attachment of said coupling and said valve member.

2. In a fire extinguisher, a pressurized container for holding fire extinguishing material, a closure cap at-

tached to the bottom of said container, a hanger attached to the upper end of said container adapted for attachment to a support, a valve member attached to said cap including a portion extending into said container, an enlarged intermediate portion located externally of said container and provided with threads, and a reduced depending stem portion provided with a valve outlet port communicating with the interior of said container, a coupling nut threadedly attached to the intermediate valve portion, a valve cover closing one end of said coupling nut, means attaching the valve cover to said coupling nut which consists of a material that melts at a predetermined critical heat to detach said cover from said nut, said coupling nut being threadedly attached to the intermediate valve portion to seat the valve cover against the end of the reduced valve stem portion to close said valve outlet port, and a compression spring located around said reduced valve stem portion, said spring having one end abutting the said intermediate portion and the opposite end abutting the said valve cover tending to urge the valve cover away from said valve port and away from said coupling nut, the spring separating the valve cover from the coupling nut with a quick-snapping action upon melting of said attaching means to open said port.

3. In a fire extinguisher, a container for holding fire extinguishing material, a closure cap attached to the bottom of said container, a discharge unit attached externally to said cap including a coupling nut provided with internal threads, a valve cover closing one end of the coupling nut, means attaching the valve cover to said coupling nut which consists of a material that melts at a predetermined critical heat to detach the cover from the nut, a valve member threadedly fastened in said coupling nut, the valve member being provided with a valve port communicating with the interior of said container, the valve cover operatively closing said port when attached, a compression spring in said coupling nut between said valve member and said cover, the spring being compressed and loaded by threaded attachment of said valve member in said coupling nut, the spring separating the cover from the coupling nut with a quick snapping action upon melting of the attaching means so as to open said port.

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