

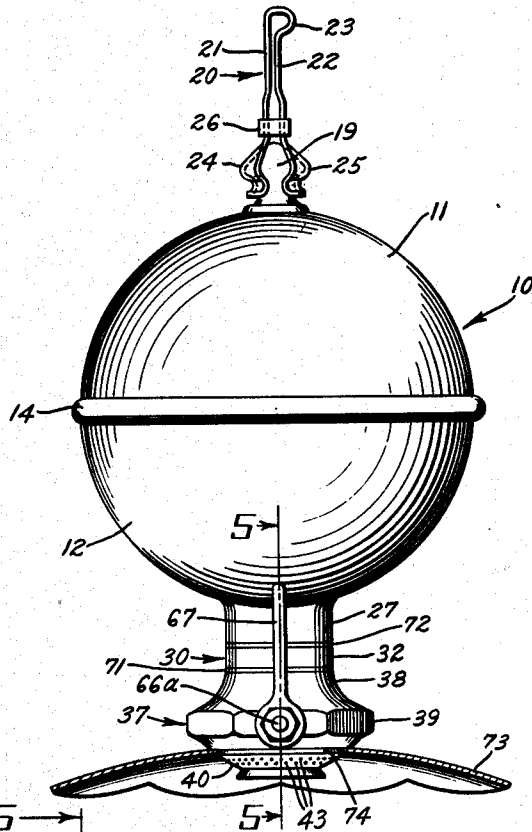
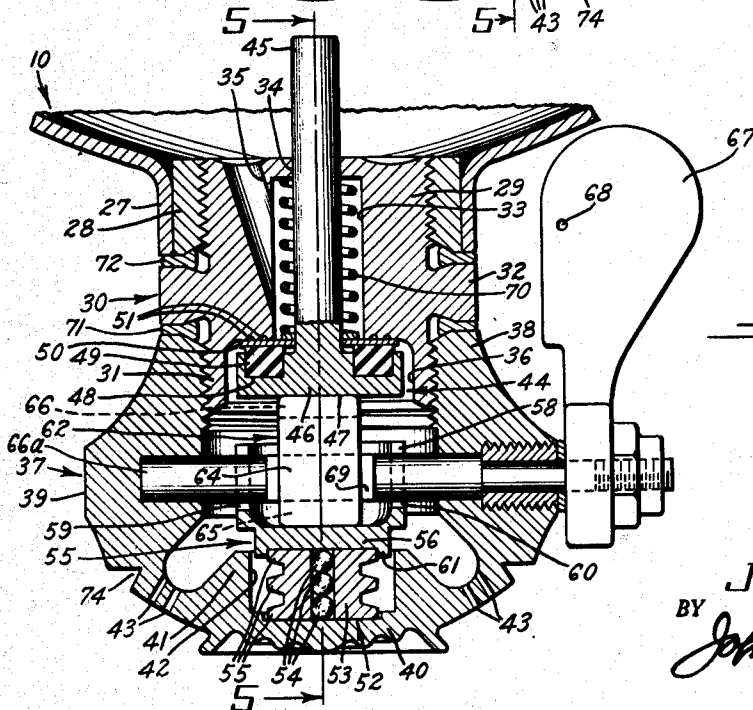
Sept. 19, 1950

J. H. REGER
FIRE EXTINGUISHER

2,522,962

Filed March 18, 1948

3 Sheets-Sheet 1



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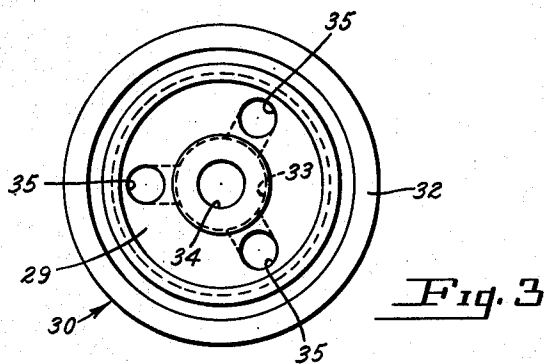
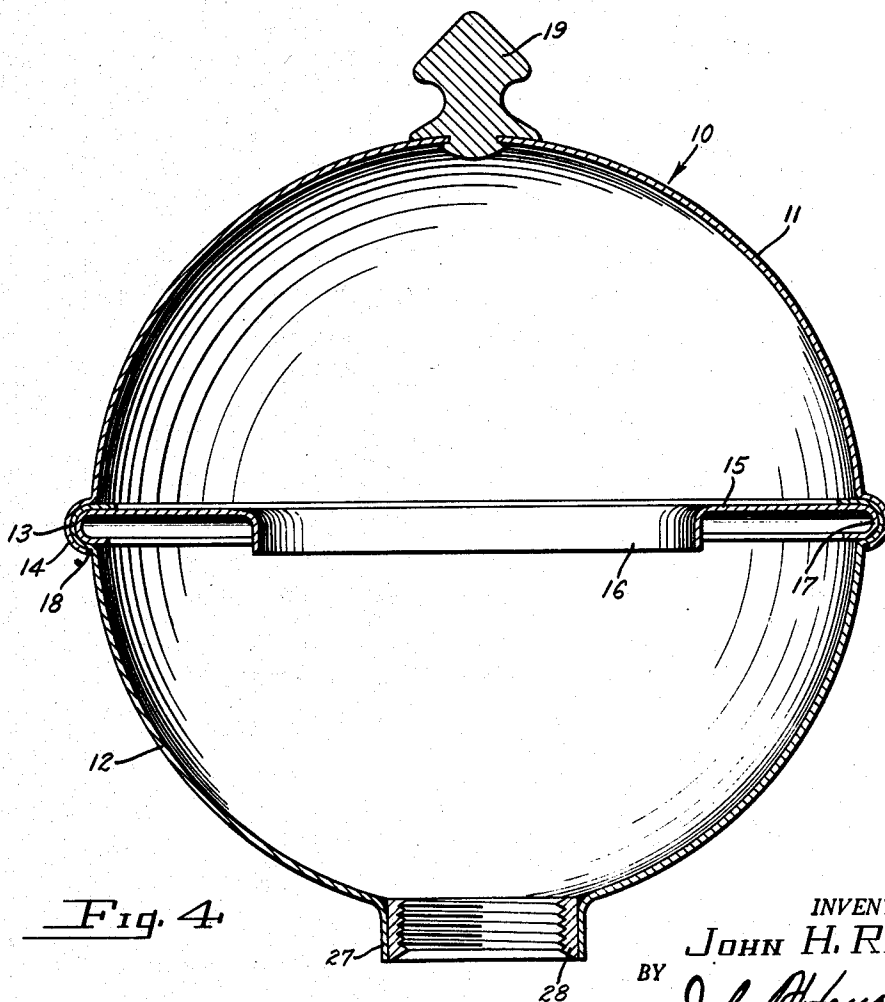
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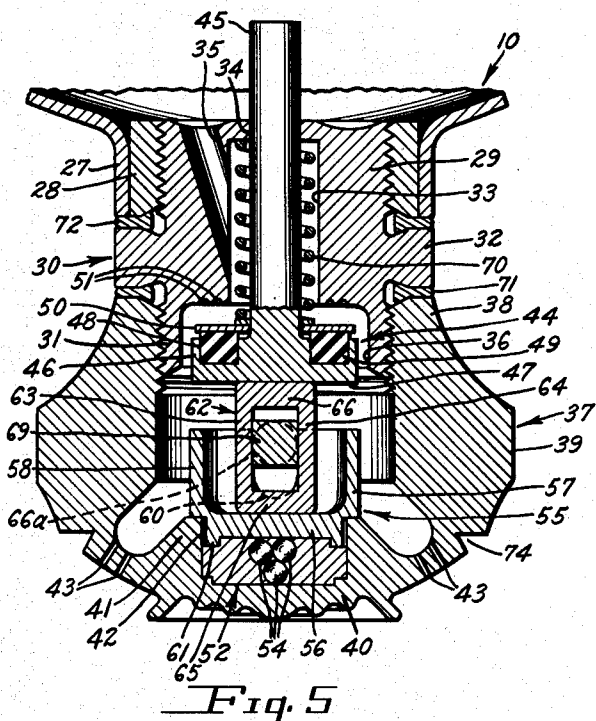
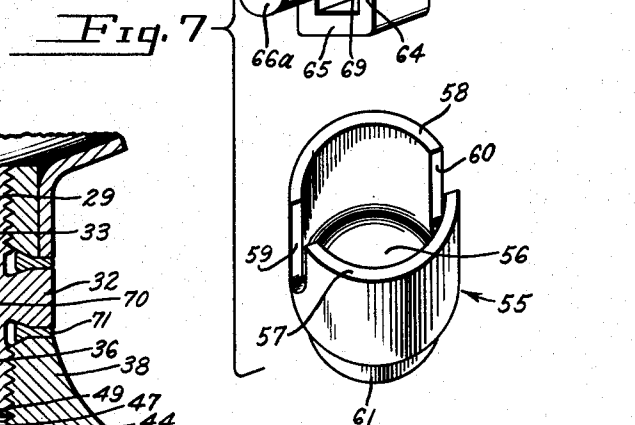
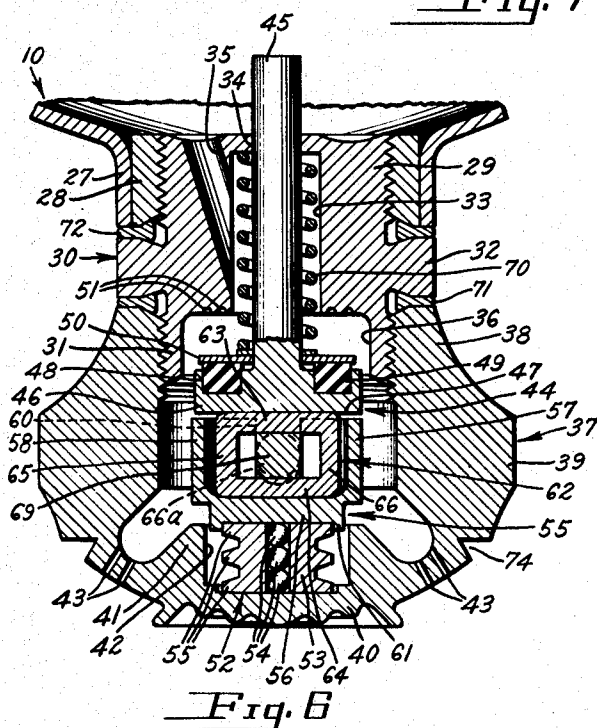
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UNITED STATES PATENT OFFICE

2,522,962

FIRE EXTINGUISHER

John H. Reger, Devon, Conn.

Application March 18, 1948, Serial No. 15,551

6 Claims. (Cl. 169—26)

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This invention relates to new and useful improvements in fire extinguishers and has particular relation to an ornamental fire extinguisher.

An object of the invention is to provide a fire extinguisher adapted to be hung on a Christmas tree to serve as an ornament and also to serve as automatic means for extinguishing a fire starting in such tree.

Another object is to provide a fire extinguisher including means whereby its discharge is automatically started when the extinguisher is subjected to a predetermined degree of heat.

A further object is to provide a fire extinguisher having the characteristics stated and which also includes means whereby the extinguisher may be manually started.

Other objects and advantages of the invention will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawings wherein a satisfactory embodiment of the invention is shown. However, it is to be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

In the drawings:

Fig. 1 is a side elevational view of the complete fire extinguisher of the invention;

Fig. 2 is an enlarged central vertical sectional view through the extinguisher head and the lower portion of the extinguisher body or receptacle;

Fig. 3 is an enlarged elevational view of one end portion of a nipple employed;

Fig. 4 is an enlarged vertical central sectional view through the body or receptacle of the extinguisher;

Fig. 5 is a sectional view taken as along the line 5—5 of Fig. 2 but with the fusible element collapsed and the valve open;

Fig. 6 is a view similar to Fig. 5 but showing the parts when the valve is manually opened, the fusible element being normal or uncollapsed; and

Fig. 7 is an exploded isometric view showing the means for manually opening the valve.

The present application is a continuation in part of my application Serial Number 682,798, filed July 11, 1946.

The fire extinguisher of the present invention is intended to be highly ornamental whereby it may be hung on a Christmas tree or in any other conspicuous location. Further, owing to its neat and attractive appearance, it may be used at all seasons and will not be out of place even though disposed in a prominent location, either on a

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Christmas tree or some other place in a home or other type of building. Rapid discharge at a relatively low temperature whereby to extinguish a fire before it has gained considerable headway is a feature of the present device.

Referring in detail to the drawings, the present extinguisher comprises a container or receptacle generally designated 10 and here shown as in the form of a sphere including an upper semi-spherical section 11 and a lower semi-spherical section 12. Container section 12, adjacent its open side, includes an annular bead-like portion 13 disposed within a somewhat similar portion 14 of the section 11. Within the container is a bulkhead 15 in the form of an annulus having the relatively large opening placing the two container sections in communication.

Such opening is defined by an annular flange 16 serving somewhat to stiffen the bulkhead. The outer edge of the bulkhead is defined by a bead-like portion 17 received in the portion 13 of section 12. The two sections 11 and 12 and the bulkhead 15 are spun together in a single joint and the joint is preferably soft soldered as at 18. Container 10 will withstand a considerable pressure and the bulkhead 15 serves to increase the structural strength of the container and to considerably prolong its life against accidental abuses resulting from dropping it or the like.

An ornamental button-like device 19 is riveted or otherwise secured to the upper side of the container 10 and is designed for use in suspending the container from any suitable support. As a suspension means and for cooperation with the button 19, a clip generally designated 20 is provided. Said clip is preferably formed of a piece of spring metal bent to provide substantially parallel arms 21 and 22 and a loop portion 23 which may be passed over a branch of the tree or which may have a nail pass therethrough or a thread or the like, whereby the extinguisher will be supported.

At their lower ends, arms 21 and 22 are expanded and bent to provide portions 24 and 25 to engage opposite sides of the button-like device 19 and to enter under the head of the same. To prevent casual opening of the arms 21 and 22 and thus casual release of the fire extinguishing unit, a lock slide 26 is disposed about the arms and when in the position of Fig. 1, securely fastens the clip in place. On upward movement of the slide 26, the arms are released and may be sprung apart to remove the clip from the container 10.

In its lower side the container is provided with

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an opening defined by an annular flange 27 and within such flange is soldered or otherwise fixed an internally threaded nut or nut-like piece 28. Nut 28 is designed to have the upper end 29 of a nipple 30 threaded therein as in Figs. 2, 5 and 6. In addition to the threaded end portion 29, nipple 30 includes an outer threaded end portion 31 and an intermediate enlarged diameter portion 32 between said threaded portions.

Further, there is an opening through the longitudinal center of the nipple and which opening comprises a relatively large diameter pocket-like portion 33 and a smaller diameter portion 34 aligned with and forming a continuation of said pocket portion. A series of inclined discharge openings or passageways 35 communicate the upper end of the nipple, and thus the interior of the container 10, with the pocket-like portion 33 which at its lower end opens into a recess or chamber 36 formed in the lower or outer end portion of the nipple.

Threaded on the lower or outer end portion 31 of the nipple is a head or spray housing generally designated 37. Such housing 37 includes a skirt portion 38 threaded onto the end portion 31 of the nipple, a flat sided flange portion 39, for example a hexagonal portion, and a lower or outer wall portion 40. A relatively heavy inner flange 41 defines an open sided chamber 42 at the inner side of wall 40 and separates said chamber or spaces said chamber from spray jets 43 in said wall 40.

Preferably the jets 43 are arranged in a pattern at various angles so that fluid discharged by them will thoroughly cover a considerable area. Clearly, the area covered will depend to some extent to the height of the extinguisher above such area but the arrangement of the spray jets at various angles to one another provides for the spraying of fluid on all portions of the area.

The outer or discharge end of the pocket 33 is normally closed by a valve means generally designated 44. The latter includes a stem 45 passing through the pocket 33 and the opening 34 and an annular head portion 46 having a flat or substantially flat under or outer side 47 and an annular channel 48 opening through its upper side. Partly received in the annular channel or groove 48 is a compressible seal or gasket 49 of a synthetic rubber or the like. On the upper side of said gasket is a thin metal washer or annulus 50. The annulus 50 has a tight fit around the outer or lower portion of the valve stem 45 and is of a very thin stock, as of foil, so that it is readily deformable. For the present purpose, this annulus 50 may be glued or otherwise secured on the upper or inner surface of the compressible annulus 48.

When the valve 44 is closed, the annulus 50 is seated against the outer or lower end of that portion of nipple 30 about the open end of the pocket 33 and preferably such engaged portion is roughened or serrated as at 51 whereby a good seal is established to prevent any leakage of fluid from the container 10, it being understood that the fluid in the container is under pressure. Here it will be understood that when the valve 44 is closed, it is forced against the seat provided by the serrated portions 51 and preferably at this time the annulus 50 is deformed to provide a thorough seal. Also, at this time, since the annulus 50 has a tight fit about the valve stem, the annulus serves to prevent the fluid within the container or receptacle 10 from contacting the compressible gasket 49. Generally, this fire

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extinguishing fluid is of such character as to cause deterioration of the rubber or synthetic rubber comprising such compressible gasket and to prevent any contact, the annular thin metal member 50 is interposed.

A fusible element 52 (see Figs. 2, 5 and 6) comprises a body portion 53 having a recess drilled or otherwise formed therein and extending therethrough or extending substantially therethrough. This recess is in the longitudinal center line of the body and receives a plurality of relatively incompressible balls 54. As shown, the socket or recess is receiving three of the steel or other relatively hard balls 54 and the latter are in alignment disposed one on top of the other and the aggregate of their diameters is the same, or substantially the same, or slightly greater than the thickness of the body 53. The body 53 includes radially thickened portions 55 and such portions are located about the respective balls whereby the body is radially or laterally strengthened in its portions directly opposite or in radial alignment with said balls.

Preferably, the body 53 is of Barnabus-Woods material or Cero Bend and melting of the body then occurs at a temperature of approximately 150° F. As will appear, element 52 is of considerable strength in a direction along its length since any pressure exerted in that direction is against the balls which are incompressible, or relatively so, and while these balls are kept in alignment, the element offers great resistance to compression or distortion. The fusible element 52 is more fully disclosed in the parent application above identified and in my copending application Serial Number 15,552, filed March 18, 1948, now Patent No. 2,510,756, issued June 6, 1950, which copending application is also a division of said parent application.

The element 52 is received or is substantially received within the chamber or recess 42 and disposed on the upper side of said fusible element is a cup-like device (see Fig. 7) generally designated 55 and comprising a bottom wall 56 and vertical side walls or side wall portions 57 and 58, the latter being partly separated by notches or recesses 59 and 60. Below the bottom wall 56, the part 55 includes a short annular skirt-like portion 61 of a diameter to snugly receive or fairly snugly receive the upper end portion of the fusible element 52.

Thus, the cup-like member 55 is disposed on the fusible element 52 and is located between the latter and the valve 44. Within the cup-like member 55 is an elongated substantially rectangular means, or frame or hollow piece or member generally designated 62. The frame 62 includes a pair of opposite side walls 63 and 64 and also a pair of opposite side walls 65 and 66, the latter being somewhat shorter than the side walls 63 and 64 whereby the member 62 has a long and a short axis.

Extending through the member 62 is a shaft 66a on the outer end of which is secured a finger piece 67 which may have an opening 68 therethrough for the passage of the wire of a suitable lead seal or the like (not shown). Shaft 66a not only extends through the member 62 but also extends through the notches 59 and 60 and has bearing in opposite portions of the thickened portion 39 of the spray head 37. That portion of the shaft to which the finger piece 67 is secured extends to the outer side of the spray head as best shown in Figs. 1 and 2. On its portion passing through the frame or means 62, shaft

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66a carries a transversely square enlargement 69 which is of a diameter approximately equal to the lesser diameter of the member 62 or to the distance between its side walls 63 and 64.

With the cup-like member 55 disposed on the fusible element 52, the frame 62 is normally located in the position of Figs. 2 and 5; that is, the greater axis of said member serves to fill the space between the upper surface of the bottom wall 56 of the cup-like member 55 and the under flat surface 47 of the valve head 46. Member 55 and frame 62 are relatively incompressible and thus with the assistance of the fusible element 52 serve to maintain the valve 44 seated in position to prevent any escape of liquid from the container or receptacle 10.

It will be understood that a coil spring 70 located in the pocket 33 and about a portion of the valve stem 45 is constantly tending to unseat the valve 44. This tendency or attempt on the part of the spring is augmented by the pressure of the fluid within the container 10 since such fluid, through the passage 35 and the pocket 33, bears against a portion of the upper side of the valve. However, when the frame 62 is positioned as described and shown in Figs. 2 and 5, it will, so long as the fusible element 52 is normal, serve to maintain the valve 44 seated to prevent the discharge of fluid from the container.

When the container 10 is to be charged, the charge is inserted through the nut 28. At such time, the fusible element 52 has been assembled in the chamber 42 and the member 55 is disposed on the fusible element. Also, the frame 62 is in position in the member 55 with the shaft 66a and its parts positioned and the valve is in position and the heavy coil spring 70 is located in the pocket 33. At this time, the valve is closed and its sealing gasket is held against the end of the nipple 30 about the discharge end of the pocket 33. In other words, at this time the housing 37 has been screwed onto the outer end of the nipple 30 and the complete assembly is made up comprising said nipple and the housing 37, the valve 44, the spring 70, the fusible element 52 and the member 55 and frame 62. Preferably, a gasket 71 provides a seal between the housing 37 and the nipple 30.

The described assembly having been made up, a charge having been placed in the container 10, said assembly is mounted on the container by screwing the threaded end portion 29 of the nipple 30 into the nut 28. Preferably, a compressible gasket 72 is arranged between the flange 27, nut 28 and the upper side of the enlarged diameter portion 32 of the nipple. The spring 70 is under compression and is constantly tending to expand and thus maintains a pressure on the valve head and through the latter and the member 55 and frame 62 on the fusible element 52.

Since as above described this pressure is augmented by the pressure of the fluid within the container, it will be clear that the fusible element 52 is under considerable pressure. However, this pressure is exerted through the incompressible aligned balls and therefore as long as the balls remain in alignment, the pressure is exerted from one to the other thereof and they provide an incompressible column.

Assuming that the container has been loaded and the extinguisher completely assembled, when the lower portion of the latter is subjected to heat to a sufficient degree, the body 53 and particularly the lower portion of such body of the deformable element 52 rapidly softens. As the body softens,

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the balls 54 are permitted to move out of alignment and move laterally or radially. When this occurs, there is a very rapid collapse of the element 52.

This permits movements of the parts to the positions held in Fig. 5. The degree of collapse depends on the rapidity with which the element 52 is cooled but it is possible for it to collapse to between one-third and one-half its height and into a condition where all three of the balls 54 will be radially related rather than arranged in a line, all as shown in Fig. 5. As element 52 collapses or deforms, the pressure on the upper side of the valve, that is, the pressure provided by the spring 70 and the force of the fluid within the container 10, moves the latter to open position and the extinguishing fluid from the container moves downwardly through the passage 35 and pocket 33 about the valve and out through the spray jets 43.

The internal flange 41 is preferably made rather heavy so as to contain a substantial amount of metal. This is to prevent the fluid which is moving through the jets from too rapidly cooling the body 53 of the element 52. Should the latter be rapidly cooled, it will become rigid and the valve may only partly open. With the described fuse construction, the valve is held on its seat until there is a lateral movement of one of the balls 54 and then the balls being out of alignment, a sudden collapse of the element takes place.

In this connection it will be understood that but a slight opening of the valve 44 is necessary. The socket formed at the lower side of the member 55 by the annular skirt 61, together with said skirt and the walls of the pocket 42, serve to retain the fusing element. With the described construction, the element is housed as it collapses whereby no part of the collapsible element may escape while soft or molten and thus no portion of the element may pass upwardly and outwardly and later become clogged or lodged in one or more of the jets 43.

A metal deflector 73 may be clamped about the spray housing as in a groove or notch 74 provided for that purpose. This deflector aids in the accumulation of heat for the quicker discharge of the extinguisher and also adds to the ornamental effect of the entire unit. A quicker discharge of the unit is desirable since it is obviously desirable that the unit discharge as soon as possible after a fire starts and before the latter has gained much headway.

The hand piece 67 and its associated parts, particularly the member 62, provide means whereby the valve 44 may be manually released. Thus, if a person is present when a fire starts, he may grip the extinguisher and manually bring about opening of the valve 44 whereby to have the contents of the receptacle 10 immediately discharge and be directed onto the fire.

Normally, the finger piece occupies the position shown in Figs. 1 and 2 and in such instance the means or frame 62 occupies the position of Figs. 2 and 5. That is, normally the frame or means 62 is located with its greatest diameter between the upper surface of the bottom wall 56 of the rigid member 55 and the under flat surface 47 of the valve head 46. Thus, when the fusible element 52 is normal, it serves to maintain the valve 44 closed.

However, when it is desired to manually bring about opening said valve, the finger piece 67 is turned through approximately 90°. This results in turning of the shaft 66a and because the square

portion 69 of the shaft is passing through the frame 62, such frame is keyed to the shaft and to the handle 67 and will also be turned through approximately 90°. That is, to manually bring about opening of the valve, the finger piece 67 is turned to turn the frame 62 from the position of Figs. 1 and 5 to the position of Fig. 6.

In this latter figure, it will be noted that the long diameter of the frame 62 is now crosswise and that its shorter diameter is between the upper surface of the wall 56 and the under flat surface 47 of the valve head. The difference in the two diameters of the frame 62 is sufficient so that when the frame is turned to the position of Fig. 6, the valve 44 may open without any deformation or distortion of the fusible element 52. It will be clear from Fig. 6 that under these conditions, fluid may discharge from the interior of the container 10.

After the valve 44 has been opened, either automatically on collapse of the fusible element 52 or as a result of manual operation of the finger piece 67, it is preferred to remove the entire spray head from the container and to recharge the latter. After the head is removed from a charged container the pressure goes to zero but if the liquid is permitted to remain in the container and the head screwed back on and the device then shaken, the pressure within the container will again rise to about 20 pounds. However, once there has been any discharge, the whole device should be charged anew.

Prior to recharging, the spray head is moved from a charged device and the pressure within container 10 is permitted to go to zero without emptying of the liquid and then a new charge of Dry Ice or carbon dioxide is inserted and the head screwed back on and the device shaken. The pressure will stabilize at about 40-50 pounds as in the initial filling. Further, when this double charged device discharges into a real fire, a white vapor is produced which apparently smothers the fire.

At present it is planned to charge the device as disclosed in my above identified parent application and as at present claimed in my copending divisional application, also above identified. For charging the container is reversed from the position of Fig. 4 and then partly filled with carbon tetrachloride. Assuming the container to be of a capacity of approximately 7 fluid oz. the charge of carbon tetrachloride employed would be about 6½ fluid oz.

Thereafter, about .01 cubic inch of carbon dioxide (Dry Ice) is placed in the container and the assembly of the valve, spray head, etc. and nipple is screwed into the nut 28. A momentary pressure of from 90-100 pounds is developed and is utilized to inspect for leakage and final assembly proof that the unit is capable of standing at least twice its discharge pressure. Reaction of the carbon tetrachloride will absorb the excess pressure and the reaction may be expedited by a light shaking of the unit. The final pressure within the container will remain at approximately 40 pounds per square inch, varying slightly with atmospheric conditions.

Having thus set forth the nature of my invention, what I claim is:

1. In a fire extinguisher, a hollow body having an opening in a wall thereof, a spray housing having jets adapted to discharge fluid passing through said opening from said body to said housing, a valve adapted to prevent movement of fluid from the body to the housing, a fusible

element normally maintaining the valve in closed position, means forming a socket in said housing, said element in said socket, said element adapted to soften on being heated and to collapse under the compressive force placed on it by the valve and permit the latter to move to open position, and said valve comprising a portion partially entering and receivable in said socket and including a socket partly receiving said element whereby as the latter collapses it is confined within said sockets and may not spread to block said jets.

2. In a fire extinguisher, a hollow body having an opening in a wall thereof, a spray housing having jets adapted to discharge fluid passing through said opening from said body to said housing, a valve adapted to prevent movement of fluid from the body to the housing, a fusible element normally maintaining the valve in closed position, means forming a socket in said housing, said element in said socket, said element adapted to soften on being heated and to collapse under the compressive force placed on it by the valve and permit the latter to move to open position, said valve including a portion partially entering and receivable in said socket and bearing on said element whereby as the latter collapses it is confined in said socket and may not spread to block said jets, and said housing including a substantial body of material about said socket to prevent cooling of said element prior to the desired opening of the valve by fluid moving to and through said jets.

3. In a fire extinguisher, a hollow body having an opening in a wall thereof, a spray housing communicating with the interior of said body through said opening and having spray jets adapted to discharge fluid entering the housing from said body, a valve, means including a two-diameter device at the outer side of said valve and when positioned with its greatest diameter extending from said valve serving to maintain said valve closed, and manual means for turning said device to have its lesser diameter extending from the valve whereby the latter may open.

4. In a fire extinguisher, a hollow body adapted to contain fire extinguishing fluid, said body having an opening through a wall thereof, a spray housing having discharge jets adapted to discharge fluid passing through said opening from said body to said housing, said spray housing comprising an outer end wall and side walls, an inner wall extending inwardly of said housing from the outer end wall thereof and spaced from the side walls thereof and defining an open ended chamber located substantially centrally of said outer end wall of said housing, said jets of said housing opening through said outer end wall thereof and spaced about said inner wall, a valve adapted when closed to prevent movement of fluid from said body to said spray jets of said housing, a fusible element in said chamber, said element normally maintaining said valve closed, a spring constantly tending to move said valve to open position whereby on softening of said element the spring together with the pressure of the contents of the body will bring about deformation of said element in said chamber and move the valve to open position whereby the interior of the body is placed in communication with said spray jets.

5. In a fire extinguisher, a hollow body having an opening in a wall thereof, a spray housing including an outer end wall, said spray housing secured to said body to receive therefrom fluid

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passing through said opening, a valve adapted to prevent movement of fluid from the body to the housing, a spring normally urging said valve toward open position, an upstanding annular wall on the inner surface of said outer end wall of said housing and therewith defining an open ended chamber, a fusible element in said chamber and held therein under compression by said valve and normally maintaining the valve in closed position, said element adapted to soften on being heated and to collapse under the compressive force placed on it by the valve and permit the latter to move to open position, said spray jets located at the outer sides of said annular wall and thus spaced from said chamber, and said valve including a socket partly receiving said element whereby as the latter collapses it is confined by the socket portion of the valve and the walls of said chamber and may not spread to block said jets.

6. In the fire extinguisher as in claim 3, a

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turnable shaft attached to said device and extending to the outer side of said housing, and a handle on said shaft at the outer side of said housing and operable to turn the shaft and thus said device to have the same located with its desired diameter extending from said valve.

JOHN H. REGER.

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