

Feb. 21, 1933.

H. W. DOUGHTY

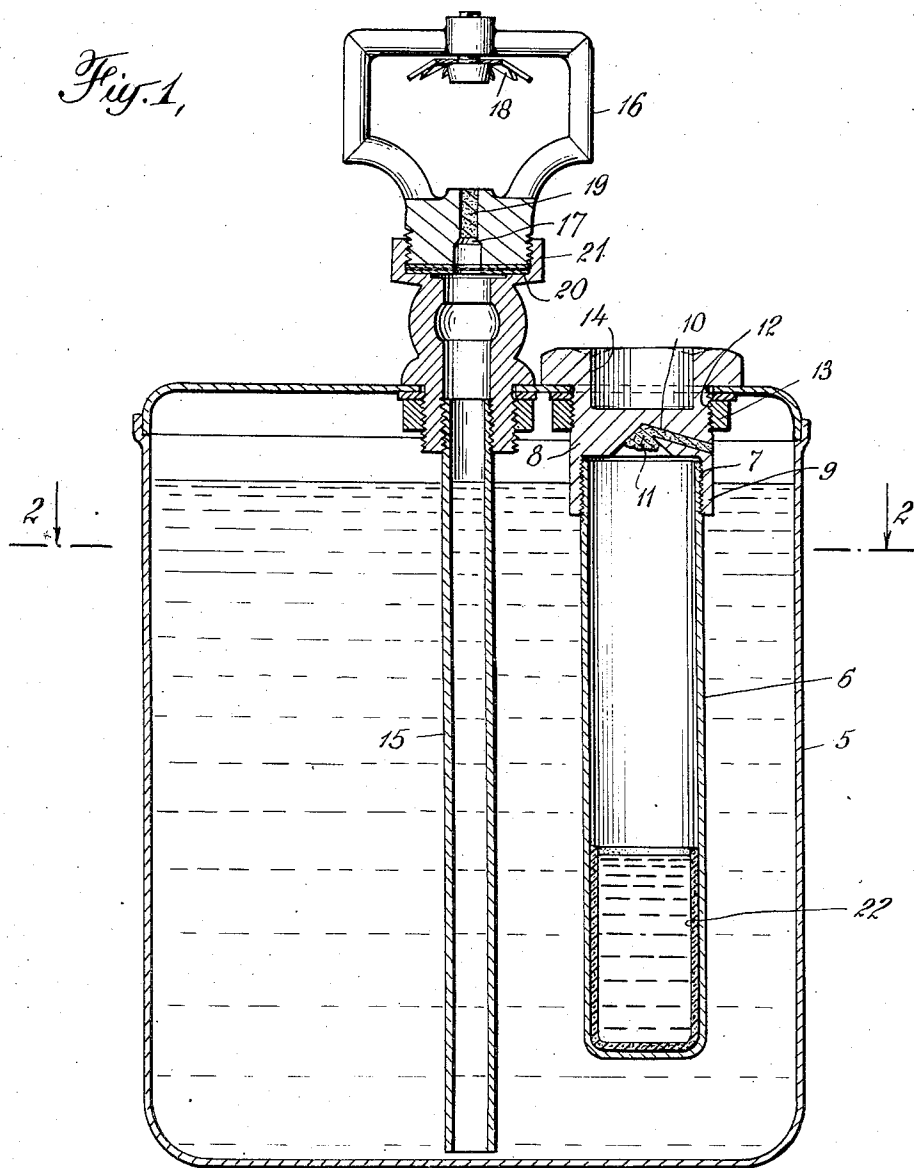
1,898,482

FIRE EXTINGUISHER

Filed March 14, 1932

2 Sheets-Sheet 1

Fig. 1,



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Fig. 2,

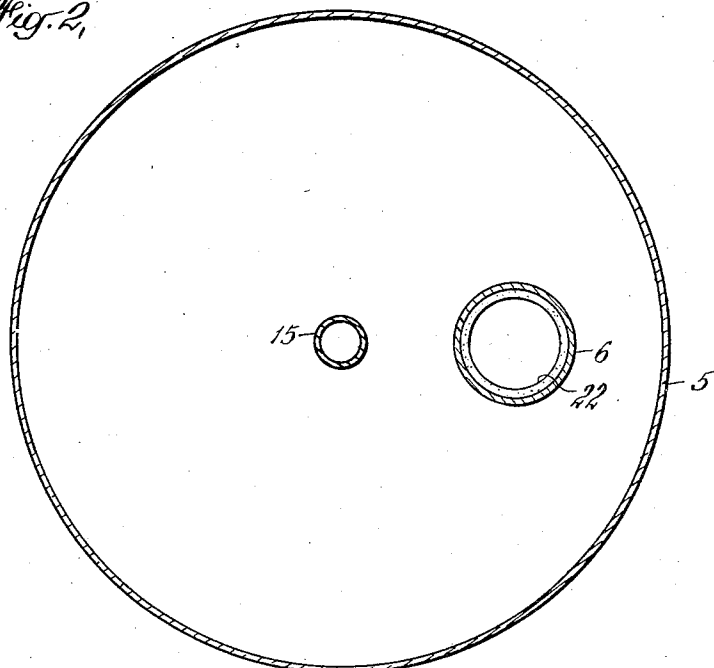
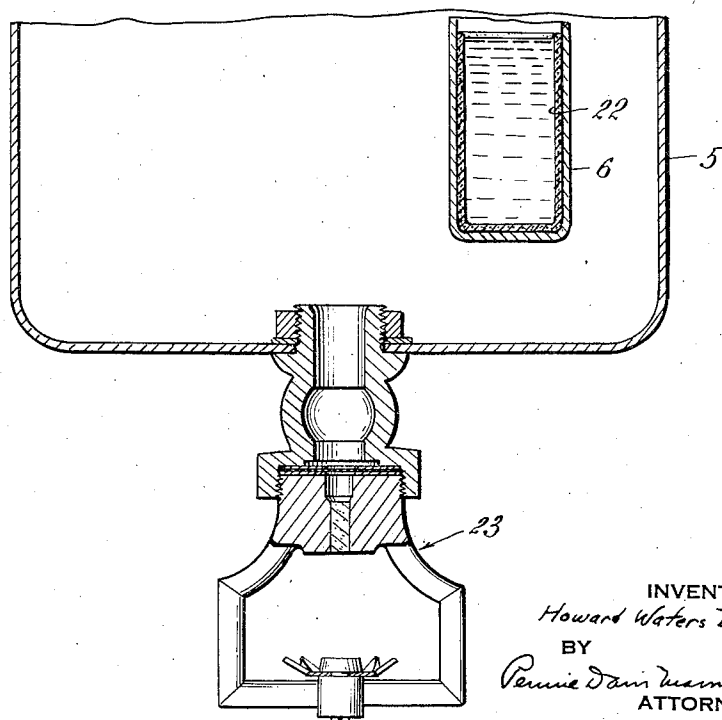


Fig. 3,



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FIRE EXTINGUISHER

Application filed March 14, 1932. Serial No. 598,731.

This invention relates to fire extinguishers and particularly to that type of extinguishers from which a fire extinguishing fluid is adapted to be discharged automatically when the temperature in the vicinity of the extinguisher rises to a predetermined point.

It is the object of the present invention to provide a simple and effective extinguisher containing a fire extinguishing fluid and a fluid which is maintained under pressure at normal atmospheric temperatures and is adapted to be released under suitable conditions, as for example when a fire occurs in the vicinity, so that the fire extinguishing fluid is discharged onto the burning area adjacent the extinguisher.

Another object of the invention is to avoid premature release of the fire extinguishing liquid in the event of leakage of the fluid under pressure.

In carrying out the invention, I provide a receptacle of any suitable material and form for the fire extinguishing fluid, such as carbon tetrachloride, and also provide an outlet for the latter preferably with a sprinkler head of approved design. If the outlet is at the top of the receptacle, a tube should extend therefrom to the bottom of the receptacle to permit ejection of the contents. The outlet may, however, be placed at the bottom of the receptacle.

Within the receptacle and immersed in the fire extinguishing fluid, a suitable container for a fluid under pressure is disposed, so that it may be withdrawn for refilling when required. The container is closed by a removable cap having an outlet passage therein which communicates with the interior of the receptacle for the fire extinguishing fluid. The passage may be sealed normally by a plug of fusible alloy such as Woods metal having a fusing point equal to the temperature at which the contents of the extinguisher are to be discharged. Such alloys are well-known in the art and are commonly used in automatic sprinkler systems.

In the container, I may place a suitable liquefied gas or solidified gas which will become liquid at the normal temperature of

the apparatus and under the pressure developed. Liquid or solid carbon dioxide are suitable pressure developing agents. The former will remain a liquid at normal atmospheric temperature under a pressure of 5 atmospheres, and the latter will be converted into liquid at such temperatures and at the pressure of 5 atmospheres developed by the vaporization of a part of the carbon dioxide. When the pressure is released, however, by the opening of the passage in the cap, the liquid carbon dioxide will vaporize rapidly even at normal atmospheric temperatures and under higher temperatures such as are developed in the vicinity of a fire, the vaporization will be more rapid.

Consequently when the fusible plug melts as the result of heat transmitted through the cap, the gaseous pressure in the receptacle above the fire extinguishing fluid will increase rapidly and the fluid will be ejected through the outlet if the latter is open.

To avoid premature discharge, I preferably provide an outlet or sprinkler head with a fusible plug of an alloy such as Woods metal or other suitable metal having a melting point such as to fuse when the temperature rises to a predetermined point. Should any leak occur in the inner container in the absence of a temperature sufficient to melt the latter plug, the fire extinguishing fluid will be retained, but if both plugs are melted by an increase in temperature due to a fire, the fluid will be ejected immediately upon the surrounding surface.

The invention will be better understood by reference to the following description and the accompanying drawings, in which

Fig. 1 is a vertical section through an apparatus embodying the invention;

Fig. 2 is a transverse section on the line 2-2 of Fig. 1; and

Fig. 3 is a fragmentary view illustrating the application of the sprinkler head at the bottom of the receptacle.

Referring to the drawings, 5 indicates the receptacle for the fire extinguishing fluid. The receptacle, made preferably of a suitable metal, may be of any suitable form. It is filled preferably with a fire extinguishing

fluid such as carbon tetrachloride to approximately the level indicated by the line X in the drawings.

To facilitate the removal or refilling of the container 6, the latter is made preferably in the form of an elongated tube of suitable metal and is threadedly secured at 7 to a cap 8 also of metal. It will be noted that the cap 8 has a downwardly extending flange 9 which is threaded to receive the upper end of the tubular container 6. The latter, being quite cold when it is connected to the cap, will be contracted somewhat, and upon the natural rise in temperature after the parts are assembled the tubular container will expand, thus ensuring a gas-tight joint at the threaded connection.

The cap 8 is provided with a passage 10 which is normally closed by a plug 11 of fusible metal adapted to become liquid at a predetermined temperature at which the apparatus is designed to operate. The passage 10 extends into the space within the receptacle 5 above the level of the fire extinguishing fluid therein. Thus when the plug 11 fuses the gaseous contents of the tubular container 6 are released to the space within the receptacle 5 and afford the necessary pressure to force the fire extinguishing fluid therefrom.

The cap 8 is threadedly secured at 12 to a ring 13 which may be welded or otherwise fastened to the upper wall of the receptacle 5. Thus the cap and the tubular container 6 may be removed bodily from the device when desired. Preferably the cap 8 is countersunk at 14 to facilitate transfer of heat to the fusible plug 11.

In the preferred form of the invention, a tube 15 extends through the top of the receptacle 5 to a point adjacent the bottom thereof and carries on its upper end a sprinkler head 16 having a passage 17 therein and a deflector 18 above the end of the passage to distribute the liquid over the surrounding surface. The passage 17 may be filled with a fusible metal 19 or other fusible material adapted to melt at the temperature at which the device is designed to operate. Conveniently a frangible diaphragm may be disposed between a shoulder 20 and the threaded top 21 of the sprinkler head, thus introducing another element of resistance in the passage of the fire extinguishing fluid from the receptacle 5 through the sprinkler head.

In preparing the device, the receptacle 5 may be filled to the level indicated with a fire extinguishing fluid such as carbon tetrachloride. The tubular container 6 is detached from the cap 8 and is partially filled with a liquefied gas such as liquid carbon dioxide or with a solidified gas such as solid carbon dioxide. Other materials may be employed, but those described are best adapted for use in the apparatus. Conveniently an insulating layer 22 of paper or other suitable mate-

rial may be placed in the tubular container 6 to prevent premature vaporization while the parts are being assembled. The tubular container 6 is threadedly connected to the cap 8, the passage 10 being previously sealed with the fusible plug, and the cap is then introduced and threadedly secured in the ring 13 as indicated in the drawings. The apparatus may be disposed then in position for use should necessity arise. It will be understood that a portion of the liquefied gas will vaporize until an equilibrium is established. If a solidified gas is used, a portion will likewise vaporize until an equilibrium is established. Thereafter the liquid will remain in the tubular container 6 with a small amount of vapor under pressure until it is released by the fusing of the plug 11. When the plug 11 is fused, pressure will be released to the receptacle 5 and the contents of the receptacle will be ejected unless the passage in the sprinkler head is closed. Upon the occasion of a fire, the passage 10 and the corresponding passage 17 in the sprinkler head will be opened substantially simultaneously, and if a diaphragm is employed it will be ruptured by the pressure of the liquid under the action of the gas expanding in the interior of the receptacle 5.

In Fig. 3 of the drawings, I have illustrated a modification of the device in which the same parts are employed except that the tube 15 is omitted and the sprinkler head 23 is secured to the bottom of the receptacle 5. The sprinkler head includes the same elements as in the previously described embodiment of the invention. The only difference is that the fire extinguishing fluid is delivered from the bottom of the receptacle 5 rather than from the top. The operation in both cases is the same.

The invention affords a simple and effective fire extinguishing structure with certainty of operation and assurance against premature discharge by reason of inadvertent leakage of gas from the tubular container 6. Various changes may be made in the form and arrangement of the device and the several parts thereof without departing from the invention or sacrificing any of the advantages thereof.

I claim:

1. A fire extinguisher comprising a closed receptacle for fire-extinguishing liquid, outlet means constructed and positioned to normally prevent discharge of the liquid there-through, said outlet means being open at predetermined fire temperature, a container within the receptacle adapted to hold a fluid under pressure and having a passage communicating with the interior of the receptacle, and means fusible at said predetermined fire temperature to normally close the passage, said fusible means being positioned

to be affected by a rise of temperature adjacent the receptacle.

2. A fire extinguisher comprising a closed receptacle for fire-extinguishing liquid, outlet means constructed and positioned to normally prevent discharge of the liquid there-through, said outlet means being open at predetermined fire temperature, a container within the receptacle adapted to hold a fluid under pressure, including a removable cap having a passage communicating with the interior of the receptacle, and means fusible at said predetermined fire temperature to normally close the passage, said fusible means being positioned to be affected by a rise of temperature adjacent the receptacle.

3. A fire extinguisher comprising a closed receptacle for fire-extinguishing liquid, outlet means constructed and positioned to normally prevent discharge of the liquid there-through, said outlet means being open at predetermined fire temperature, a container within the receptacle adapted to hold a fluid under pressure, including a removable cap threadedly secured to the receptacle and to the container and having a passage communicating with the interior of the receptacle, and means fusible at predetermined temperature to normally close the passage, said fusible means being positioned to be affected by a rise of temperature adjacent the receptacle.

4. A fire extinguisher comprising a closed receptacle for fire-extinguishing liquid, outlet means including a distributor head constructed and positioned to normally prevent discharge of the liquid therethrough, said outlet means being open at predetermined fire temperature, a container within the receptacle adapted to hold a fluid under pressure and having a passage communicating with the interior of the receptacle, means fusible at predetermined temperature to normally close the passage, said fusible means being positioned to be affected by a rise of temperature adjacent the receptacle.

5. A fire extinguisher comprising a receptacle for fire extinguishing liquid, an outlet therefrom including a distributor head with a passage therein and means fusible at predetermined temperature normally closing the passage, a container within the receptacle adapted to hold a fluid under pressure and having a passage communicating with the interior of the receptacle and means fusible at predetermined fire temperature to normally close the passage, said fusible means being positioned to be affected by a rise of temperature adjacent the receptacle.

6. A fire extinguisher comprising a receptacle for fire extinguishing liquid, an outlet therefrom including a distributor head with a passage therein and means fusible at predetermined temperature normally closing the passage, a container within the re-

ceptacle adapted to hold a fluid under pressure including a removable cap having a passage communicating with the interior of the receptacle and means fusible at predetermined fire temperature to normally close the passage, said fusible means being positioned to be affected by a rise of temperature adjacent the receptacle.

7. A fire extinguisher comprising a receptacle for fire extinguishing liquid, an outlet therefrom including a distributor head with a passage therein and means fusible at predetermined temperature normally closing the passage, a container within the receptacle adapted to hold a fluid under pressure, including a removable cap threadedly secured to the receptacle and to the container and having a passage communicating with the interior of the receptacle, and means fusible at predetermined fire temperature to normally close the passage, said fusible means being positioned to be affected by a rise of temperature adjacent the receptacle.

In testimony whereof I affix my signature.

HOWARD WATERS DOUGHTY.