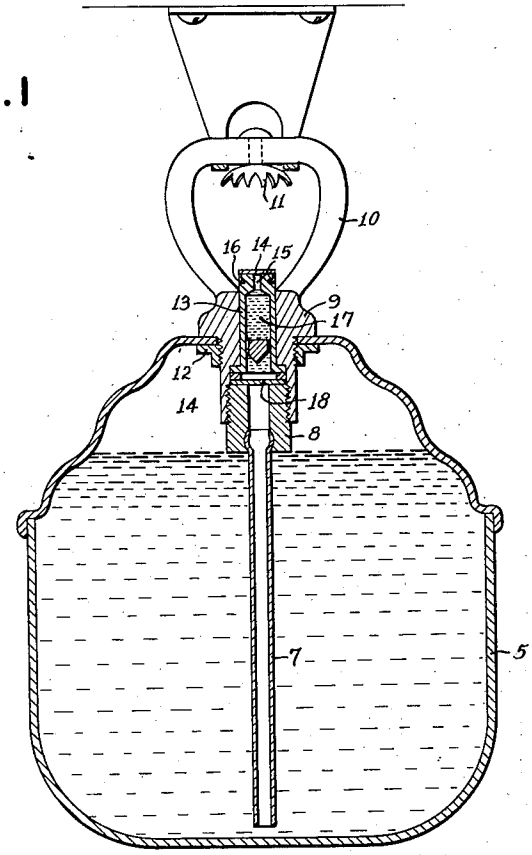
June 21, 1949. H. W. DOUGHTY 2,474,099

FIRE EXTINGUISHER

Filed Sept. 9, 1947

FIG. 1



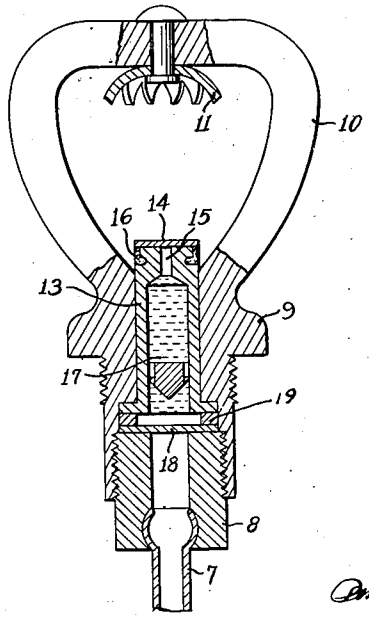


FIG. 2

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FIRE EXTINGUISHER

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2 Claims. (Cl. 169—26)

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This invention relates to fire extinguishers, and particularly to improvements in extinguishers which are adapted to release a fire extinguishing agent automatically when the temperature in the vicinity of the apparatus rises to a predetermined point.

In apparatus of this type, a receptacle is provided for a fire extinguishing liquid, usually a chlorinated hydrocarbon, such as carbon tetrachloride, and a gas generating agent such as an aqueous solution of ammonia. The apparatus is provided with a sprinkler head or similar distributor and an outlet leading thereto which is normally sealed and adapted to be released when a fire occurs. The pressure is developed by the generating agent when the temperature rises, and the fire extinguishing agent is forced through the outlet when the latter is released. The fire extinguishing agent is distributed over the surrounding area.

The receptacle in such extinguishers is customarily made of aluminum to avoid corrosion by the liquid contents, as described in Patent No. 1,698,840. Usually such extinguishers are provided with the "dual control" features of Patent No. 1,736,255. In recent forms of such extinguishers, parts of the release mechanism have been constructed of stainless steel, as shown for example in Patent No. 2,020,427. The extinguishers may be constructed so that the fire extinguishing liquid is delivered upwardly through an outlet tube as shown, for example, in the last mentioned patent.

The frangible diaphragm which is characteristic of the "dual control" feature of Patent No. 1,736,255 may be made of any suitable metallic foil of requisite strength, but usually gold foil or aluminum foil is employed. The diaphragm may be secured between two washers of suitable material, stainless steel being commonly used. The diaphragm prevents the escape of any liquid from the extinguisher until the pressure therein has risen to a point sufficient to rupture the diaphragm. The latter is ordinarily protected by means which prevent rupture until a link or cap has likewise been released by an increase of temperature sufficient to melt a low melting point alloy, whereby the link or cap is held in place. Consequently, the liquid is not released until the temperature is sufficiently high to melt the alloy and likewise to generate gaseous pressure within the container.

In extinguishers such as I have described, the tube through which the fire extinguishing liquid is discharged is customarily made of aluminum,

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which is relatively high in the electropotential series, whereas both gold and stainless steel (iron 74%, chromium 18%, nickel 8%, or similar composition) are relatively low in the same series. The liquid contents of the extinguisher afford an excellent electrolyte. Examination of certain extinguishers which have been in use for a number of years has disclosed the fact that a plug of aluminum hydroxide may accumulate in the tube below the diaphragm as the result of electrolytic action. Such a plug renders the apparatus inoperative, and fails, therefore, to afford the protection for which the device is intended.

It is the object of the present invention to provide a structure which obviates the difficulty mentioned by eliminating the possibility of electrolysis resulting from contact of the fluid contents of the extinguisher with the inner walls of the tube and with the diaphragm, thus affording an apparatus which is reliable and will serve its intended function even after standing for many years.

Other objects and advantages of the invention will be apparent as it is better understood by reference to the following specification and accompanying drawing, in which

Fig. 1 is a sectional view through an extinguisher embodying the invention; and

Fig. 2 is an enlarged sectional view of the sprinkler head in such an extinguisher.

As an example of the invention and referring to the drawing, a receptacle 5 is made preferably of aluminum to avoid the chemically corrosive effect of the mixture of carbon tetrachloride and aqueous ammonia which is stored in the receptacle. In the form of the invention illustrated, the liquid is discharged upwardly through a tube having an enlarged plug-like end 8 threadedly secured in a head 9 having a yoke 10 and a distributor 11 mounted thereon. The head 9 may be made of aluminum and is secured in an opening in the casing 5 by a collar 12 also of aluminum.

Supported within the head 9 is a thimble 13 of stainless steel which is flanged at its bottom and is adapted to receive a cap 14 covering an outlet 15 and held in place by low melting point solder 16 around the edge of the cap. The thimble 13 is filled preferably with a material 17 which is liquid or semi-liquid at the temperature at which the apparatus is designed to operate. Vaseline and glycerine are suitable filling materials. Low melting point waxes and like materials can be used. This material is designed to be ejected when the diaphragm is released to permit expulsion of the liquid contents of the receptacle.

It serves meanwhile to protect the diaphragm hereinafter described and to prevent rupture thereof until the cap 14 is released by the melting of the solder.

Between the flange at the lower end of the thimble 13 and a shoulder formed by the inner end of the plug-like end 8 of the tube, a diaphragm assembly is mounted. As indicated in Fig. 2, the assembly consists of a diaphragm 18 of suitable metal foil, preferably gold. It is mounted between the shoulder formed by the inner end of the tube and a washer 19, preferably of stainless steel, engaging the thimble 13. Thus the diaphragm is held firmly, and leakage of liquid around it is prevented so that no liquid can escape until the diaphragm is ruptured.

In accordance with the present invention, the tube 7 including its plug-like end 8 is made of a non-conducting material which is not affected chemically by the liquid contents of the receptacle 5. Any material which has such properties, together with sufficient strength, may be utilized for the purpose. I prefer to employ artificial resins such as phenol formaldehyde resins, formaldehyde urea resins, and similar products which are readily available and adapted to serve the purpose. Owing to the non-conducting properties of the material, the path for current generated by reason of the difference of potential between the diaphragm 18 and the wall of the receptacle 5 is relatively long. It has been demonstrated that with such a structure the only effect of the difference in potential is the deposition of a slight film of aluminum hydroxide on the inner surface of the container 5. There is no appreciable electro-potential between gold and stainless steel when immersed in the mixture of carbon tetrachloride and aqueous ammonia. The potential found is ± 0.005 volt, while between aluminum and gold or stainless steel it is about 0.8 volt. It is not possible for any aluminum hydroxide to accumulate within the tube 7 or its plug-like end 8. Consequently the difficulty heretofore experienced, resulting from

electrolysis within the tube 7 or its plug-like end 8, is entirely eliminated. Thus, the extinguisher may remain in a static condition for many years without danger of becoming inoperative.

Various changes may be made in the details of construction and in the materials employed therein without departing from the invention or sacrificing the advantages thereof.

I claim:

1. In an automatic fire extinguisher adapted to release a fire extinguishing liquid under pressure generated by increase in temperature in the vicinity of the extinguisher to a predetermined point, a metallic receptacle for the fire extinguishing liquid and a pressure generating agent, a distributor head having a discharge passage extending therethrough, a thin metallic diaphragm sealing said passage and adapted to be ruptured by increase in the surrounding temperature and the resulting pressure developed in the container, a tube extending into and affording an outlet for the fire extinguishing liquid, one end of the tube bearing against the diaphragm and holding it in position to seal the passage through the distributor head, the tube being of electrically non-conducting material whereby electrolysis between the diaphragm and the tube is substantially inhibited.

2. An automatic fire extinguisher as set forth in claim 1 in which the tube is of an artificial resin.

HOWARD WATERS DOUGHTY.

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