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F. MOSSBERG

2,115,371

FIRE EXTINGUISHER

Original Filed Feb. 11, 1936

Fig. 1,

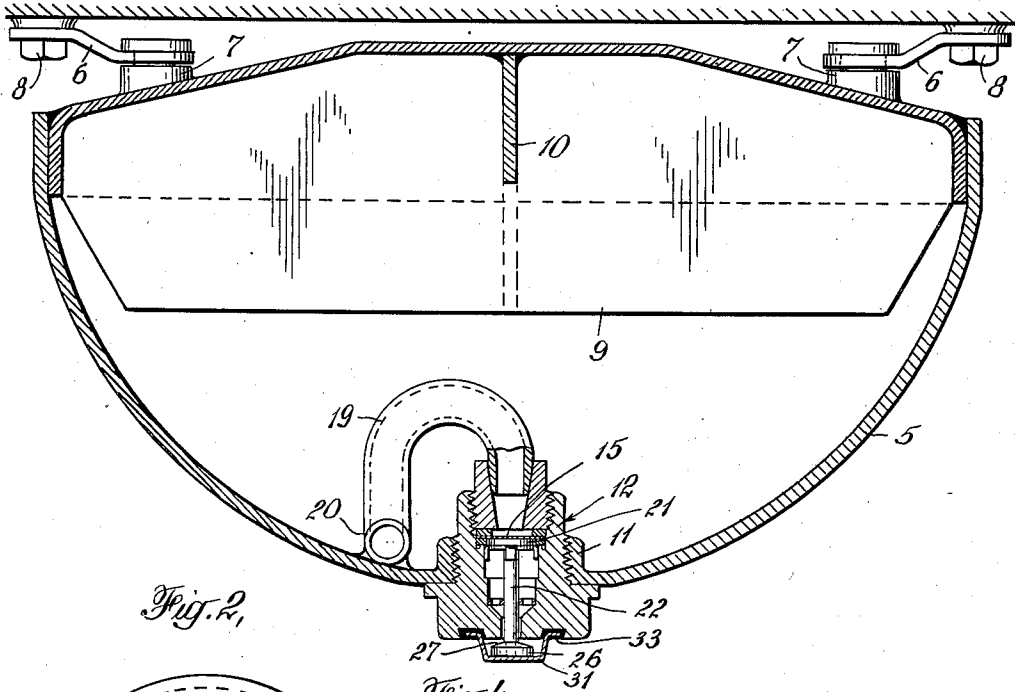


Fig. 2,

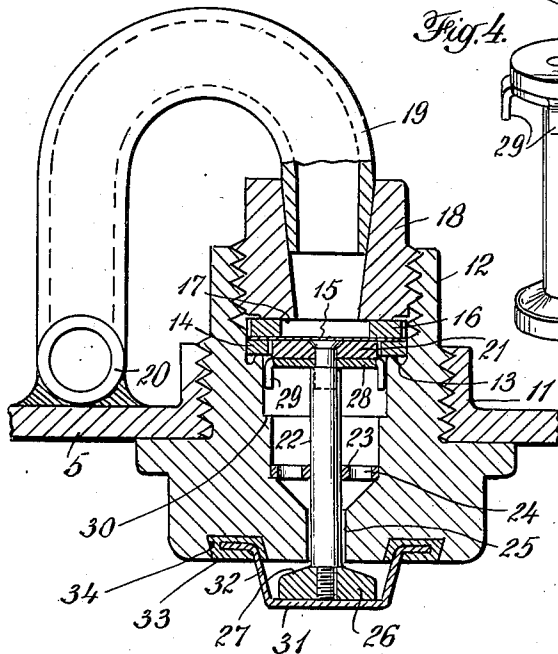


Fig. 4,

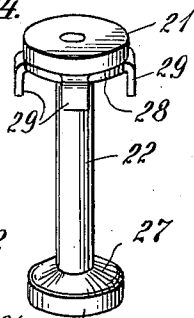
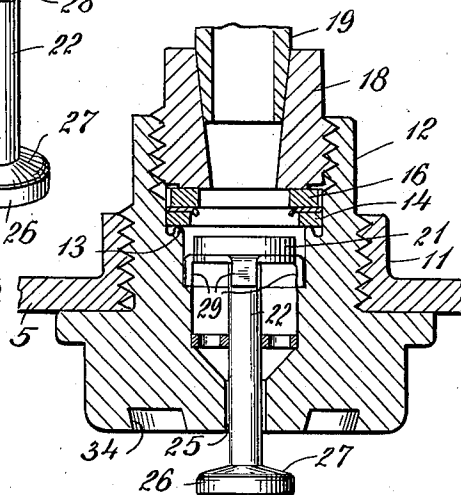


Fig. 3,



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FIRE EXTINGUISHER

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11 Claims. (Cl. 169—26)

This invention relates to fire extinguishers and particularly to improvements in extinguishers of the type in which a liquid fire extinguishing agent is released automatically when the temperature in the vicinity of the apparatus rises to a predetermined point.

Fire extinguishers of the type referred to are adapted to be filled with a fire extinguishing liquid, for example, carbon tetrachloride and a gas generating agent such as an aqueous solution of ammonia. The receptacle for the fire extinguishing liquid is provided with a suitable distributor such as a sprinkler head and with an outlet leading thereto which is normally sealed and adapted to be opened when a fire occurs. Pressure developed by the gas-generating agent when the temperature rises forces the fire extinguishing liquid through the outlet, and the liquid is distributed over the surrounding surface.

It is the object of the present invention to provide an improved fire extinguishing apparatus wherein the release of the liquid is more positive and dependable and the efficiency of the apparatus is increased.

Another object of the invention is the provision of an improved outlet and distributor whereby the liquid is delivered more uniformly to the surrounding surface which is to be protected.

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

Fig. 1 is a vertical section through a fire extinguisher embodying the invention;

Fig. 2 is an enlarged vertical section through the distributor head;

Fig. 3 is a similar view illustrating the structure when the liquid has been released; and

Fig. 4 is a detail in perspective of the diaphragm supporting member in the distributor head.

Referring to the drawing, 5 indicates a receptacle which is made preferably of aluminum, particularly if the liquids used therein consist of carbon tetrachloride and aqueous ammonia. Aluminum best resists the corrosive effect of these liquids in combination. The receptacle 5 may be of any shape or size depending upon the requirements. It may be constructed of other materials than aluminum, although aluminum is preferred for the reasons noted. In the form of the invention illustrated, the receptacle 5 is adapted to be supported with the distributor head inverted. Brackets 6 secured to bosses 7 on the receptacle

may be fastened by bolts 8, for example, to the ceiling of a room or to any other support. The upper part of the receptacle is preferably divided by internal transversely disposed partitions 9 and 10 which may be secured by solder or otherwise to the wall of the receptacle.

The receptacle is provided preferably with a threaded internal flange 11 to receive an outlet 12 which is secured in liquid and gas-tight relation to the flange to avoid leakage. The outlet 12 is preferably made of a material such as stainless steel to avoid corrosion and also to permit adherence of the solder of low melting point as hereinafter described.

The outlet embodies the "dual control" features of U. S. Patent No. 1,736,255, to which my improvements more particularly relate. It is provided with a shoulder 13 supporting a washer 14 upon which is mounted a thin diaphragm 15 preferably of gold foil. The diaphragm may be made of other metals such as platinum, silver, or aluminum. It normally closes the outlet and is securely held between the washer 14 and a washer 16 which bears against a shoulder 17 and is held in position by a threaded plug 18. The plug 18 has an opening therethrough communicating with a pipe 19 curved as indicated with its inlet end 20 disposed adjacent the bottom of the receptacle 5, so that substantially all of the liquid in the receptacle will be drained therefrom when the outlet is released.

As a safeguard against premature release of the liquid, the diaphragm 15 is supported by a head 21 mounted on a stem 22 which extends through an opening in a strainer 23 having perforations 24 therein. The stem 22 extends through an opening 25 which is substantially larger than the stem and terminates in a head 26 having sloping surfaces 27, the purpose of which will hereinafter more fully appear. A washer 28 with depending legs 29 is adapted to center the head 21 and ensure longitudinal movement when the head is released. A shoulder 30 is provided against which the legs 29 come to rest, thereby limiting the movement of the head when it is released.

The head 21 is normally held in position to support the diaphragm 15 by a cap 31 having legs 32 which are embedded in solder 33 of suitable composition, so that it will melt at a predetermined temperature at which the extinguishing liquid is to be released. The solder is disposed in a recess 34 provided for that purpose.

As indicated in Fig. 2, the outlet from the extinguisher is normally closed by the diaphragm 15

supported by the head 21. When the temperature in the vicinity of the extinguisher rises to the point where the solder 33 is melted, the cap 31 is released, thereby permitting the head 21 to drop. At the same time, the increase in temperature generates gas, for example, ammonia, thereby creating pressure within the extinguisher sufficient to force the liquid against the diaphragm 15 which is thereby ruptured, as indicated in Fig. 3. The liquid passes around the head 15 through the perforations 24 in the strainer 23 through the opening 25, and is ejected with considerable force against the sloping surface 27 of the head 26. The head 26 is held in predetermined position by engagement of the legs 29 with the shoulder 30 and the sloping surface 27 deflects the liquid, causing it to be distributed uniformly over the surface in the vicinity of the extinguisher, which thus acts efficiently to ensure that fire will be extinguished by the action of the liquid. When the extinguisher has been discharged in the manner described and the fire has been extinguished, the apparatus may be refilled. A new diaphragm 15 may be inserted and the valve may be again locked in the position indicated in Fig. 2 by the application of a cap held by solder as before.

As previously indicated, stainless steel is used preferably for the parts comprising the outlet 30 from the extinguisher including particularly the head 21 and the outlet 12. Stainless steel has relatively slight electrolytic effect in contact with the gold diaphragm 15 and it is likewise adapted to hold the solder 33 which does not readily adhere to metals such as steel and aluminum. The stainless steel may be of any suitable composition, a steel alloy containing chromium in the proportion of for example about 18-8% being suitable for the purpose.

As hereinbefore indicated, the structure as described has the advantages of "dual control" and is particularly adapted for applications where it is desirable to have the outlet directed downwardly. The mechanism of the diaphragm support is practical and certain in operation. It assures successful operation of the extinguisher when the emergency arises.

The structure as described has been subjected to many practical tests for fire extinguishing characteristics and is effective in operation. It also ensures the protection and preservation of the contents of the receptacle indefinitely so that the fire extinguishing liquid is available when a fire occurs. None of the contents can escape previous to the emergency which the device is intended to meet.

The various advantages of the invention are set forth herein, and these and other advantages may be attained with numerous modifications of the structure without departing from the invention or sacrificing the advantages thereof.

I claim:

1. In a fire extinguisher, a receptacle adapted to contain fire extinguishing and gas generating agents, a discharge nozzle having a passage therethrough and means normally closing the passage and adapted to be released under predetermined conditions of external temperature and internal pressure of the receptacle comprising a frangible diaphragm across the passage, a member supporting the diaphragm having a stem and a distributor head on the stem, and temperature sensitive means normally holding said member in diaphragm supporting position.

2. In a fire extinguisher, a receptacle adapted

to contain fire extinguishing and gas generating agents, a discharge nozzle having a passage therethrough and means normally closing the passage and adapted to be released under predetermined conditions of external temperature and internal pressure of the receptacle comprising a frangible diaphragm across the passage, a member supporting the diaphragm having a stem and a distributor head on the stem, temperature sensitive means normally holding said member in diaphragm supporting position, and means for limiting the movement of said member when it is released.

3. In a fire extinguisher, a receptacle adapted to contain fire extinguishing and gas generating agents, a discharge nozzle having a passage therethrough and means normally closing the passage and adapted to be released under predetermined conditions of external temperature and internal pressure of the receptacle comprising a frangible diaphragm across the passage, a member supporting the diaphragm having a stem and a distributor head on the stem, temperature sensitive means normally holding said member in diaphragm supporting position, and means for limiting the movement of said member when it is released, comprising legs on the valve and a ledge adapted to be engaged by the legs.

4. In a fire extinguisher, a receptacle adapted to contain fire extinguishing and gas generating agents, a discharge nozzle having a passage therethrough and means normally closing the passage and adapted to be released under predetermined conditions of external temperature and internal pressure of the receptacle comprising a frangible diaphragm across the passage, a member supporting the diaphragm having a stem and a distributor head on the stem having a sloping surface to spread the fire extinguishing agent, and temperature sensitive means normally holding said valve in diaphragm supporting position.

5. In a fire extinguisher, a receptacle adapted to contain fire extinguishing and gas generating agents, a discharge nozzle having a passage therethrough and means normally closing the passage and adapted to be released under predetermined conditions of external temperature and internal pressure of the receptacle comprising a frangible diaphragm across the passage, a member supporting the diaphragm having a stem and a distributor head on the stem, temperature sensitive means normally holding said member in diaphragm supporting position, and a pipe connected to the passage with an inlet adjacent the bottom of the receptacle.

6. In a fire extinguisher, a receptacle adapted to contain fire extinguishing and gas generating agents, a discharge nozzle having a passage therethrough and means normally closing the passage and adapted to be released under predetermined conditions of external temperature and internal pressure of the receptacle comprising a frangible diaphragm across the passage, a member supporting the diaphragm having a stem and a distributor head on the stem, temperature sensitive means normally holding said member in diaphragm supporting position, and a strainer in the passage having an opening for the stem and serving as a guide therefor.

7. In a fire extinguisher, a receptacle adapted to contain fire extinguishing and gas generating agents, a discharge nozzle having a passage therethrough and means normally closing the passage and adapted to be released under predetermined conditions of external temperature and internal

pressure of the receptacle comprising a frangible diaphragm across the passage, a member supporting the diaphragm having a stem and a distributor head on the stem having a sloping surface to spread the fire extinguishing agent, temperature sensitive means normally holding said member in diaphragm supporting position, and a pipe connected to the passage with an inlet adjacent the bottom of the receptacle.

8. In a fire extinguisher, a receptacle adapted to contain fire extinguishing and gas generating agents, a discharge nozzle having a passage there-through and means normally closing the passage and adapted to be released under predetermined conditions of external temperature and internal pressure of the receptacle comprising a frangible diaphragm across the passage, a member supporting the diaphragm having a stem and a distributor head on the stem having a sloping surface to spread the fire extinguishing agent, temperature sensitive means normally holding said member in diaphragm supporting position, and a strainer in the passage having an opening for the stem and serving as a guide therefor.
9. In a fire extinguisher, a receptacle adapted to contain fire extinguishing and gas generating agents, a discharge nozzle having a passage there-through and means normally closing the passage and adapted to be released under predetermined conditions of external temperature and internal pressure of the receptacle comprising a frangible diaphragm across the passage, a member supporting the diaphragm having a stem and a distributor head on the stem, temperature sensitive means normally holding said member in diaphragm supporting position, a pipe connected to

the passage with an inlet adjacent the bottom of the receptacle, and means for limiting the movement of said member when it is released.

10. In a fire extinguisher, a receptacle adapted to contain fire extinguishing and gas generating agents, a discharge nozzle having a passage there-through and means normally closing the passage and adapted to be released under predetermined conditions of external temperature and internal pressure of the receptacle comprising a frangible diaphragm across the passage, a member supporting the diaphragm having a stem and a distributor head on the stem, temperature sensitive means normally holding said member in diaphragm supporting position, a strainer in the passage having an opening for the stem and serving as a guide therefor, and means for limiting the movement of said member when it is released.

11. In a fire extinguisher, a receptacle adapted to contain fire-extinguishing and gas-generating agents, a discharge nozzle having a passage there-through and means normally closing the passage and adapted to be released under predetermined conditions of external temperature and internal pressure of the receptacle, comprising a frangible diaphragm across the passage, a member including a diaphragm-supporting head substantially as large as the portion of the diaphragm to be exposed to the fire extinguishing agent, a stem connected at one end to said supporting head and a distributor head connected to the other end of said stem, and temperature-sensitive means normally holding said member in position so that said head bears against and supports the diaphragm.

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