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J. TAYLOR.
AUTOMATIC SPRINKLER.
APPLICATION FILED MAY 25, 1904.

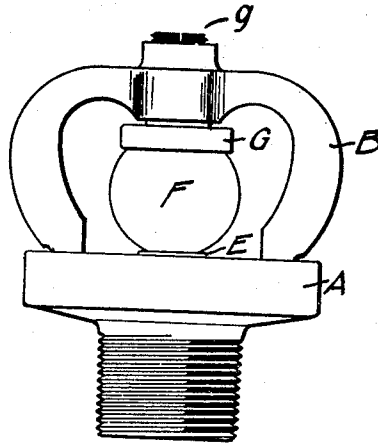


FIG. 1

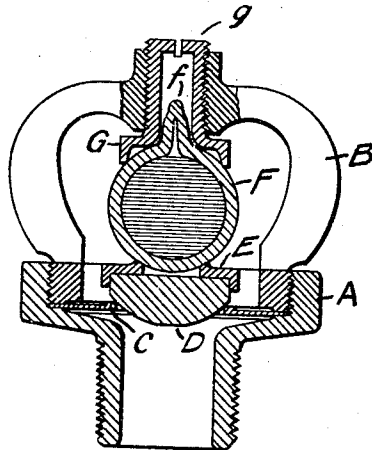


FIG. 2

WITNESSES,

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AUTOMATIC SPRINKLER.

No. 842,725.

Specification of Letters Patent.

Patented Jan. 29, 1907.

Application filed May 25, 1904. Serial No. 209,785.

To all whom it may concern:

Be it known that I, JOHN TAYLOR, of Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Automatic Sprinklers; and I do hereby declare the following specification, taken in connection with the accompanying drawings, forming a part of the same, to be a full, clear, and exact description thereof.

The present invention relates to that type of automatic sprinklers in which the sprinkler is held closed by a flangible vessel or support and is released by the expansive or explosive force of the contents of such flangible vessel induced by the action of heat. An automatic sprinkler of this type has been heretofore suggested, but so far as I am aware all prior attempts to produce a practical commercial sprinkler of this character have been unsuccessful, and no sprinkler of this type has heretofore been introduced into practical use. One serious difficulty with sprinklers of this type when constructed as heretofore proposed has been that frequently the flangible vessel or support would not be destroyed or removed from position by the expansion of its contents when subjected to the degree of heat at which it was desired the sprinkler should open, but would instead be merely fractured so as to permit the escape of the contents without destroying the supporting vessel or removing it from position, and thus without releasing the valve. Another serious difficulty has been that such sprinklers, even when the flangible vessel was destroyed and the valve released, would not operate or become opened with any degree of regularity at the predetermined temperature. Each of these difficulties rendered the sprinkler unreliable and wholly unfit for practical use.

As the result of numerous tests and experiments I have discovered that what is essential for the production of an automatic sprinkler of the type referred to which shall be adapted for practical use is that the material to be employed as the contents of the flangible vessel or support shall be such as will boil or become gaseous at or about the temperature at which it is desired the sprinkler shall open, and so that when the contents of the vessel has by the rise of the temperature to the predetermined point ex-

panded sufficiently to fracture or rupture the vessel, such contents will when thus released from the restraint of the containing vessel and exposed to the atmosphere instantaneously become gaseous, thereby creating a sudden and violent explosion, which will serve to completely shatter the vessel, and thereby insure the complete release of the valve and the opening of the sprinkler. I have further found as the result of such tests that automatic sprinklers constructed upon the principle and having the mode of operation above described will not only be certain to operate successfully and fully release the valve, but that any number of sprinklers so constructed will each operate at substantially the predetermined temperature and with the same regularity and uniformity as the automatic sprinklers now in use provided with solder-jointed holding devices.

The material which I have employed as the contents of the flangible vessel has been an alcoholic liquor or spirit which boils or vaporizes at approximately 165° Fahrenheit and which is adapted for use in the construction of sprinklers designed to open at 165° Fahrenheit, which is the operating temperature of the sprinklers most commonly employed. Other materials or mixtures of materials may be used in place of alcohol or spirit, provided only that the material or mixture be such as will boil or vaporize at approximately the temperature at which it is desired the sprinkler shall open, whether such temperature be 165° Fahrenheit or any other predetermined temperature. Given the temperature at which it is desired the sprinkler shall open, it is simply necessary that a material or mixture shall be selected as the contents of the flangible vessel which will boil or vaporize at approximately that temperature.

It is preferred, in order to secure the best results, that when the flangible vessel or support is in place in the sprinkler and subjected to normal temperatures the contents should not entirely fill the vessel, in order that as the temperature rises beyond the normal there may be room within the vessel for the initial expansion of its contents to take place without fracturing or rupturing the vessel and so that fracture or rupture of the vessel will not occur until the contents has reached approximately its boiling or vaporizing point. A

convenient way to prepare the frangible vessel and its contents to secure this result is to subject the vessel with the material or mixture up to approximately its boiling or vaporizing point, taking care that the vessel shall be completely filled with the material or mixture at this temperature and then tightly close the vessel, preferably by hermetically sealing the same. When, now, the vessel and its contents are subjected to normal temperatures, the contents will contract and so as not to entirely fill the vessel. This method of preparing the vessel and its contents insures that when the same are again subjected to approximately the predetermined temperature the contents will expand, so as to again completely fill the vessel, and so that any further expansion will produce the desired fracture or rupture of the vessel, and further insures that when such fracture or rupture takes place the contents of the vessel will be at its boiling or vaporizing point, and so that upon its release and exposure to the atmosphere it will instantaneously assume a gaseous form and produce the desired explosion. I prefer to make the frangible vessel of glass, as glass has been found to be especially adapted to meet the requirements of the case, and, furthermore, a glass vessel may be conveniently hermetically sealed by fusing.

Referring to the drawings, Figure 1 represents an automatic sprinkler embodying my invention, and Fig. 2 is a central longitudinal section thereof.

The sprinkler shown embodies a body portion A, having a frame B, preferably screwed into the body portion. A flexible diaphragm C, having a central opening therein and properly secured in place, preferably by clamping the outer edge thereof between the body portion A and the frame B, constitutes the seat for the valve D. This valve is preferably made of glass, and a metal cap E rests thereon. F is the frangible vessel or support, preferably made of glass. As shown, the frangible vessel F is substantially spherical in shape or in the form of a bulb with a projecting neck *f*. This projecting neck *f* forms a convenient means for introducing the alcoholic liquor or other material or mixture into the vessel and also enables the vessel to be readily hermetically sealed by fusing together the end of said projecting neck, as shown. In the construction shown the frangible vessel F is employed as a means to hold the valve D to its seat, and said vessel is itself held in place by means of a metal cap G, secured to the frame B. This metal cap G is preferably provided with a projecting stem *g*, which is screw-threaded exteriorly, so that it may be screwed into the frame B and the cap G be thus adjusted in position with relation to the frame. The projecting stem *g* is also preferably made hollow, so as to receive and protect the projecting neck *f* of the frangible

vessel, the cap G being centrally perforated to receive said projecting neck. The cap G also serves as a distributor for the water.

While I have shown and described a convenient form of sprinkler embodying my invention, it is to be understood that the construction of the sprinkler may be widely varied and is in no way material so far as the present invention is concerned, the essential and characteristic feature of said invention consisting, broadly, in the employment of a material or mixture as the contents of the frangible vessel which boils or becomes gaseous at approximately the temperature at which it is desired the sprinkler shall open.

While I prefer to employ the frangible vessel as a means for holding an independent valve to its seat, because in such a construction the frangible vessel is out of contact with the water in the sprinkler, and is consequently more sensitive and reliable, such frangible vessel might, if desired, be employed to directly close the waterway of the sprinkler, and thus itself constitute the valve, and it is to be understood that such latter construction would be equally within my invention.

As will be understood, the present invention not only makes practical the construction of automatic sprinklers of the character referred to which will operate with regularity and uniformity at substantially the predetermined temperature, but also enables the production of such automatic sprinklers which will be operative at any desired temperature within a practical range, it being simply necessary to select as the contents of the frangible vessel a material or mixture which will vaporize or become gaseous at the desired operative temperature.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. An automatic sprinkler embodying in its construction as a means for holding said sprinkler closed a frangible vessel containing a material or mixture the boiling-point of which is at approximately the temperature at which it is desired the sprinkler shall open, substantially as described.

2. An automatic sprinkler embodying in its construction as a means for holding said sprinkler closed a frangible vessel containing a non-gaseous material or mixture which as it expands will serve to fracture the vessel, and which when released by such fracture will become gaseous, thereby producing an explosion and shattering the vessel, substantially as described.

3. An automatic sprinkler embodying in its construction as a means for holding said sprinkler closed a frangible vessel partially filled at normal temperatures with a mixture or material which, when subjected to a temperature approximating its boiling or vaporizing point will expand so as to completely fill said vessel, and which will then by its fur-

ther expansion serve to fracture the vessel and upon its release assume a gaseous form, substantially as described.

4. In an automatic sprinkler, the combination, with the valve, of a frangible vessel for holding said valve to its seat, said frangible vessel containing a material or mixture the boiling-point of which is at approximately the temperature at which it is desired the sprinkler shall open, substantially as described.

5. In an automatic sprinkler, the combination, with the valve, of a frangible vessel for holding said valve to its seat, said frangible vessel containing a non-gaseous material or mixture which as it expands will serve to fracture the vessel, and which when released by such fracture will become gaseous, thereby producing an explosion and shattering the vessel, substantially as described.

6. In an automatic sprinkler, the combination, with the valve, of a frangible vessel

for holding said valve to its seat, said frangible vessel being partially filled at normal temperatures with a mixture or material which, when subjected to a temperature approximating its boiling or vaporizing point, will expand so as to completely fill said vessel, and which will then by its further expansion serve to fracture the vessel and upon its release assume a gaseous form, substantially as described.

7. An automatic sprinkler embodying in its construction as a means for holding said sprinkler closed a frangible vessel containing a non-gaseous material or mixture adapted by expansion to fracture the vessel and adapted to become gaseous upon the reduction of pressure produced by such fracture.

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Witnesses:

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