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AUTOMATIC SPRINKLER

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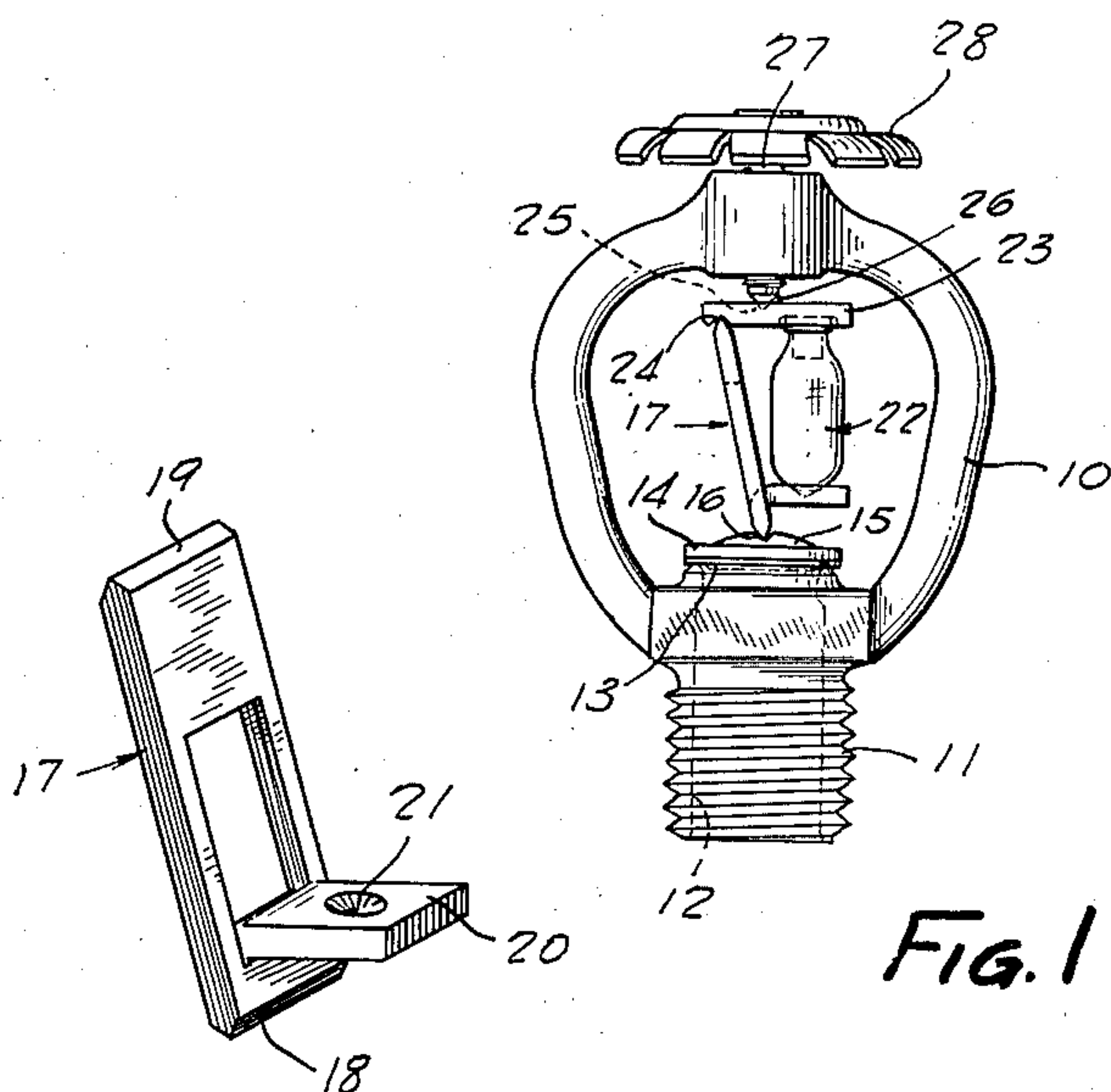


Fig. 1

Fig. 2

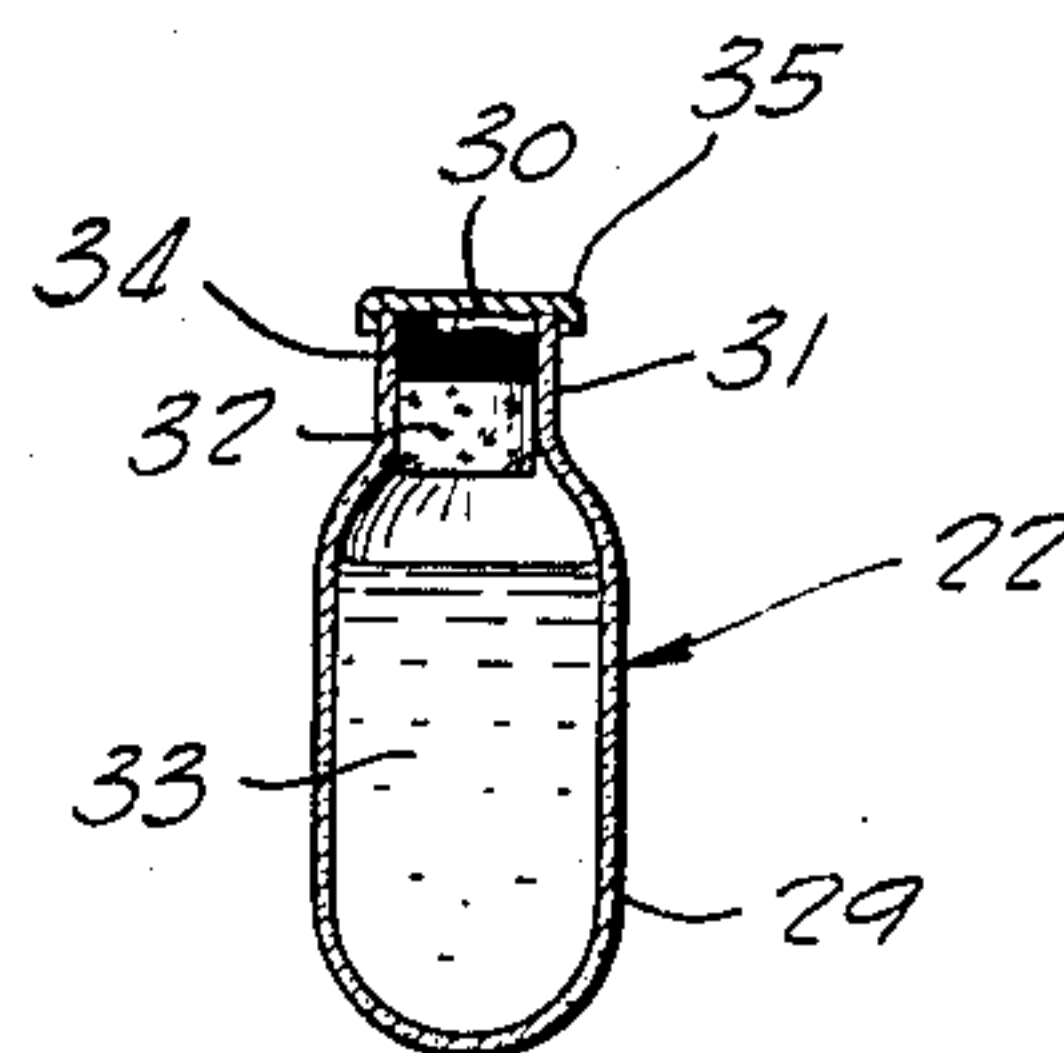


Fig. 3

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AUTOMATIC SPRINKLER

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2 Claims. (Cl. 169—38)

This invention has to do with automatic sprinklers such as are commonly employed for the purpose of automatically releasing a stream of water when a certain predetermined temperature has been reached.

At the present time, the fairly well crystallized practice in this field is to provide a fitting which constitutes the automatic sprinkler, and which fitting closes the end of a pipe which receives water under pressure. The fitting includes a closure which normally seals the end of the pipe against escape of the water, and this closure is usually held in position by an assembly of parts which ordinarily includes a glass or quartz tube or bulb that is filled with a liquid that is susceptible to the influence of heat, so as to fracture the bulb when a predetermined temperature has been reached.

This bulb and associated parts are held under pressure against the closure element, so that upon rupture of the bulb the pressure is relieved from the closure element and the water pressure in the pipe is effective to blow the same off and provide the stream of water for fire fighting purposes.

An important phase of the present invention deals with the manner of assembling the frangible bulb in position holding the closure in place. This invention has in view as an important object the provision of a novel type of strut assembly which is readily collapsible upon rupture of the bulb, to release the closure element.

In carrying out this idea in a practical embodiment, a strut member is formed with an edge which engages in a notch in the closure element. This strut member is also formed with a projection against which the frangible bulb is designed to bear. At the top a bridge engages the extremity of the strut element and the bulb, and pressure is placed on this bridge in the usual manner by a yoke and associated screw stem.

So long as the bulb remains intact, pressure is equally distributed through the said bulbs and strut member to effectively maintain the closure in sealing position. However, when a temperature has been reached which causes the bulb to fracture under influence of the material herein, the entire strut assembly collapses, releasing the closure.

Another important phase of the present invention is concerned with the tube or bulb, which constitutes the critical element in the operation of the sprinkler. Heretofore it has been the practice to finally shape these bulbs after the liquid has been introduced thereinto; such final shaping usually involving the fusing of a cap or

end portion to one end of a bulb. There are certain disadvantages attending this practice which are proposed to be obviated by the present invention.

In the first place, there is no method available for accurately testing the finally shaped container before the liquid is inserted. Hence, there is no assurance that the container will have the ability to withstand the stresses caused by the expansion of the material in the bulb until the temperature which has been predetermined for rupture has been reached.

Another notable disadvantageous feature is that the fusing of a cap or end portion on the bulb is usually accompanied by the formation of a wall structure at this point, which very often has the property of porosity to an undesirable degree. When this condition exists, the expansion of the liquid causes the escape of air through the porous structure, with the result that when the temperature at which the bulb is supposed to fracture has been reached, there is not a sufficient amount of the material remaining in the bulb to cause the rupture.

Another important disadvantage which is inherent to the now known practice of finally shaping the bulb after filling is that it is practically impossible to secure any uniformity in the wall thickness. Under such conditions, any thinned or weakened portions of the wall are likely to cause a rupturing before the predetermined temperature has been reached, or a somewhat opposite condition may occur in that a small break or rupture will cause a leakage which will so reduce the amount of material in the bulb as to prevent final complete rupture and subsequent flow of water.

Bearing in mind the above noted disadvantages, this invention proposes to obviate the same by providing a novel container or bulb element.

The invention has in view as an object, the provision of an automatic sprinkler which includes a frangible element, of the character above noted, which is made in substantially conventional bottle shape or form, and which bottle is completely formed and shaped prior to the filling thereof by the liquid.

Another object of the invention is the provision of a frangible container or bulb, of the character above noted, which is readily adapted to receiving air under pressure, in addition to the liquid material. This objective is readily obtained by availing of the bottle structure above noted, together with a closure element, such as a cork,

which may be forced downwardly into the bottle to build up pressure in the air therein.

Another more particular object in view is the provision of a bottle or container of the character
5 above noted, together with appropriate means for hermetically sealing the opening through which the material is admitted. In carrying out this idea, wax or other sealing material may be applied to the stopper or cork after the latter has
10 been properly positioned, and in addition a cap, preferably of soft metal, may be added to complete the seal.

By availing of the preformed bottle, in accordance with the above noted thoughts, it is
15 possible to test the bottle, and be sure the same has a properly uniform wall structure of a desired strength sufficient to withstand the stresses until the predetermined pressure has been reached. Accuracy in the quantity of liquid
20 which is admitted to the bottle is also provided for, as well as the building up of pressure in the air therein.

Another important advantage attending this practice is that the bottles or containers may be
25 manufactured much more cheaply than may the bulbs which have heretofore been used.

This invention also contemplates an arrangement in which differently shaped bottles or containers are employed to indicate different temperatures at which the same will fracture.

Various other more detailed objects and advantages will in part become apparent, and in part be hereinafter stated, as the description of the invention proceeds.

35 The invention, therefore, comprises an automatic sprinkler consisting of a fitting formed with a socket which carries at one end a closure for the end of a pipe line. This closure is held in sealing position by a novel type of strut assembly in which pressure on the closure is applied to a strut element on one side, and a frangible bottle or bulb on the other.
40

When this frangible member is destroyed under the influence of temperature changes, the
45 strut assembly collapses to release the closure member.

An important phase of the present invention is the novel type of bottle member which is included in the strut assembly as the frangible part. A bridge engages one end of the strut and frangible bottle, and pressure is applied on this bridge from the screw member which is carried by the yoke.
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For a full and more complete understanding of the present invention, reference may be had to the following description and accompanying drawing wherein
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Figure 1 is a view in side elevation of an automatic sprinkler, made in accordance with the precepts of this invention,
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Figure 2 is an enlarged detailed view in perspective of a strut element, and

Figure 3 is a transverse section taken through the frangible bottle.

65 Referring now to the drawing, wherein like reference characters denote corresponding parts, an automatic sprinkler is shown as comprising a fitting which includes a yoke member 10, which carries at one end a threaded plug 11, which is designed to be threaded into the extremity of
70 a pipe; (not illustrated). Such a pipe constitutes a source of water supply and ordinarily receives water under pressure. The plug 11 has a bore, indicated at 12, which is closed by a closure assembly including a thin disc member 13, which
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preferably is of copper, and a backing member 14.

As shown in the drawing, the disc member 13 is formed with a depressed portion which enters into the bore 12, and the backing member 14 has a complementary formation. Throughout the following description the assembly 14 and 13 will be referred to as the closure. Member 14 is shaped to provide a boss 15 that is formed with a transverse notch 16. A strut member 17 has a knife edge at 18 which is received in the notch 16.
10

This strut member 17 is also formed with a knife edge 19 at its upper end, and intermediate the ends thereof is struck therefrom a tab 20. This tab 20 may be formed by well known metal stamping operations. The tab 20 is formed with a depression 21 which receives one end of a frangible bottle element indicated at 22. The particular manner in which the frangible bottle member 22 is manufactured and filled with a liquid will be hereinafter described in detail.
20

At the upper end a bridge member 23 bears against the top of the frangible bottle 22, and this bridge member 23 is formed with a transverse notch 24 which receives the knife edge 19. The bridge member, on its upper surface, is formed with a small recess or depression 25, which receives the pointed end 26 of a threaded stem 27 that is carried by the yoke 10. This stem 27 is provided with an operating member in the form of a hand wheel, indicated at 28.
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Referring now more particularly to Figure 3, it is noted that the frangible bulb 22 is of substantially acorn formation, although, obviously, the invention is not to be limited by the particular shape or size of this member. As briefly pointed out, the bottle 22 may be manufactured by well known glass blowing operations, to provide a wall structure 29 which is substantially uniform throughout.
35

The bottle 22 has an open end at 30 which is defined by a neck 31. A desired quantity of some material which is susceptible to the influence of heat to expand and cause a fracture of the bottle when a predetermined temperature has been reached is placed in the bottle 22. Carbon tetrachlorid is one material which has been found suitable for such use.
45

A stopper or cork is shown at 32 as being pressed downwardly in the neck 31 sufficiently far to build up pressure in the air which may be contained in the bottle, in the space which is not occupied by the carbon tetrachlorid. This latter material is indicated at 33. After the stopper or cork 32 has been properly positioned, sealing wax, as indicated at 34, may be poured into the neck of the bottle to effect a hermetical seal. A cap member is shown at 35 as being positioned over the neck 31, and this cap member is preferably made from some malleable metal such as lead, copper or tin.
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After the frangible bottle 22 has been properly assembled so that the same will fracture at a certain predetermined temperature, the parts are assembled, as shown in Figure 1. When the automatic sprinkler is positioned for service, by threading the plug 11 into the end of a pipe which receives water under pressure, this pipe will be sealed against the escape of water until a certain predetermined temperature has been reached. When this temperature has been reached, the carbon tetrachlorid in the bottle 32 will expand and cause rupture thereof.
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When this rupture occurs, the strut assembly, including the strut member 17 and bridge 23, will collapse, thereby relieving the closure from any
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force or stress which opposes the pressure of the water in the pipe line, and such water pressure will, therefore, blow out the water pressure and provide a stream of water as contemplated.

5 While a preferred specific embodiment of the invention is hereinbefore set forth, it is to be clearly understood that I am not to be limited to the exact constructions illustrated and described, because various modifications of these
10 details may be provided in putting the invention into practice within the purview of the appended claims.

I claim:

1. In the manufacture of automatic sprinklers,
15 the method of forming a frangible vessel having

a predetermined rupturing temperature which consists in placing an expansive material within the bottle, building up a predetermined air pressure in said bottle over said expansive material, and then sealing the bottle.

2. In the manufacture of an automatic sprinkler, the method of forming a frangible vessel having a predetermined rupturing temperature which consists in placing an expansive material in a bottle having an open neck, forcing a stopper
10 downwardly in said open neck to build up a predetermined pressure on air in said bottle over the expansive material, and then sealing said stopper in said neck.

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