

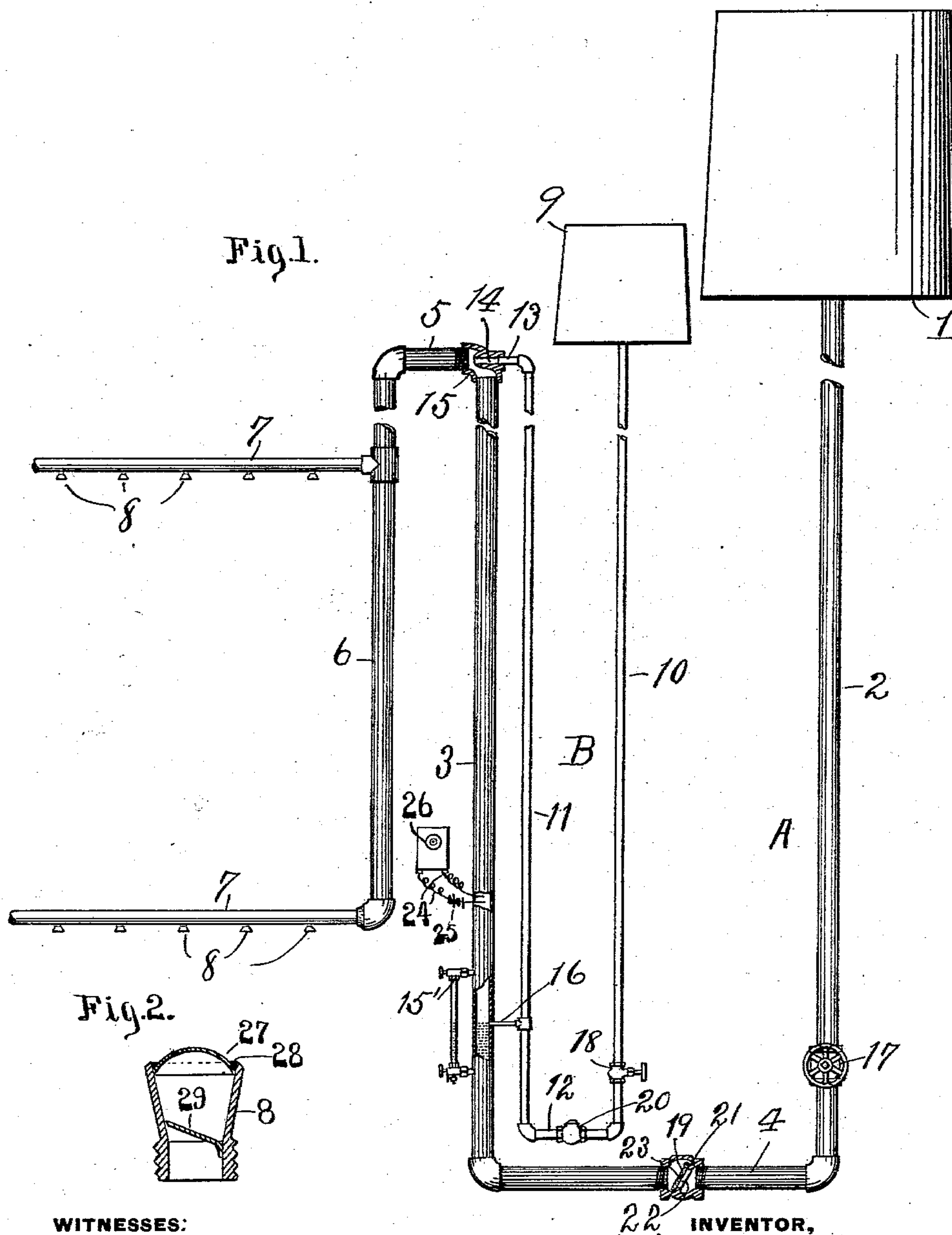
No. 753,007.

PATENTED FEB. 23, 1904.

H. C. SHAW.
FIRE EXTINGUISHER.
APPLICATION FILED APR. 27, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:

Geo. H. Harvey.
F. M. Barber.

by his Attorney

INVENTOR,

Henry C. Shaw,
Wm. L. Pierce,

No. 753,007.

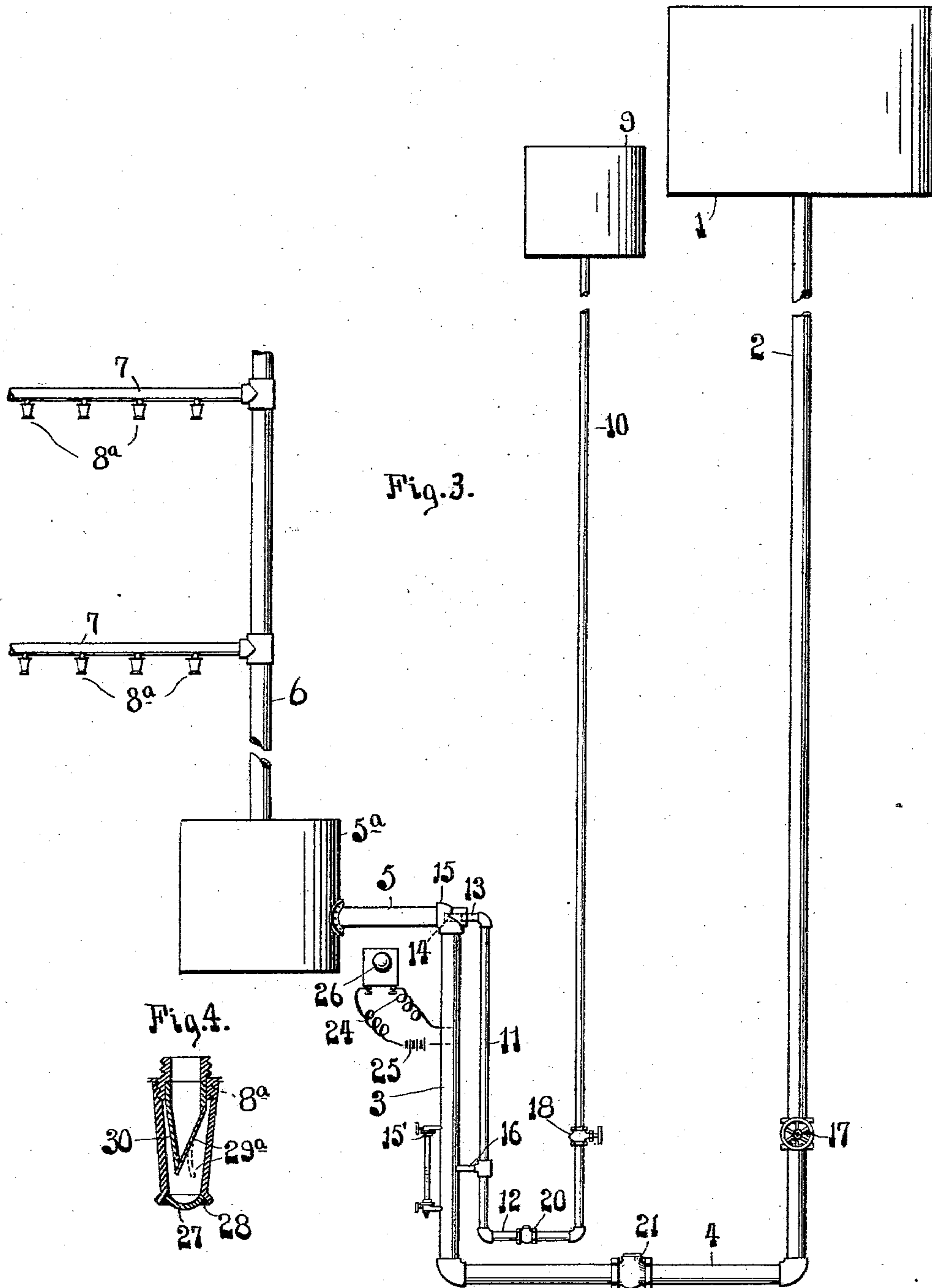
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UNITED STATES PATENT OFFICE.

HENRY C. SHAW, OF GLENSHAW, PENNSYLVANIA.

FIRE-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 753,007, dated February 23, 1904.

Application filed April 27, 1903. Serial No. 154,566. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. SHAW, a citizen of the United States, residing at Glenshaw, in the county of Allegheny and State of Pennsylvania, have invented or discovered new and useful Improvements in Fire-Extinguishers, of which the following is a specification.

My invention relates to fire-extinguishers provided with parts which become softened or melted by fire, and so automatically permit the discharge of a fire-destroying fluid upon the fire.

It is the object of my invention to provide a simple and cheap automatic sprinkling apparatus which when certain fusible parts become melted by the fire will automatically and immediately discharge a fire-destroying gas and liquid upon the fire.

In the drawings, Figure 1 shows in elevation, partly in section, one form which my invention may assume. Fig. 2 shows the details of one of the sprinklers. Fig. 3 shows a view, similar to Fig. 1, of a modification of my invention adapted to discharge gas only. Fig. 4 is a view of a differently-constructed sprinkler from that shown on Fig. 2.

Referring to the drawings, 1 designates a tank containing some kind of fluid, as bicarbonate of soda, which when mixed with some acid, as sulfuric acid, will form carbonic-acid gas or other fire-smothering gas.

To the tank or reservoir 1 is connected a U-shaped pipe A, having the vertical legs 2 and 3 and the horizontal part 4, connecting the bottoms of the legs. The upper end of the leg 3 of the U-pipe A is connected to a horizontal pipe or mixing-chamber 5, which is connected to the main distributing-pipe 6, from which extend the branch pipes 7, provided with sprinkler-nozzles 8, of any approved type, having therein any form of easily-fusible material, which will be melted by a fire, and so provide outlet-openings for the branch pipes.

I may use a sprinkler like that shown in Fig. 2, which has the cap 27 sealed to the body thereof by the fusible material 28. In the sprinkler is a reed or tongue 29, which will produce a tone upon the discharge of the

gas to give a warning of the existence of a fire. The kind of tone or noise producing device is immaterial, the one shown being merely an illustration of one form.

In Fig. 4 I have shown a second form of sprinkler, (marked 8^a), having the beveled projection 30, provided with the tongue 29^a. This sprinkler shows the ordinary peddler's horn, with the cap 27 and seal 28.

The arrangement of the pipes 5, 6, and 7 may be varied to suit the rooms or buildings where they are placed. There may be several of the pipes 6, and these pipes may be included in other planes than those in which they lie.

9 is a lead or lead-lined tank or reservoir, preferably at a lower level than the tank 1, both of these tanks being preferably located on or above the roof of the building protected by the extinguisher. To the tank 9 is connected the lead U-pipe B, having the vertical legs 10 and 11 and the horizontal part 12, connecting the bottoms of the legs. The upper end of the leg 12 has connected thereto a horizontal part 13, fitting a hole 14 in the elbow 15, which connects the leg 3 and the pipe 5. The hole 14 is concentric with the axis of the tube 5. The leg 3 of the U-pipe A has at its lower portion a gage 15, such as is common on steam-boilers to show the level of the water therein. Opposite about the middle of the gage 15 is a small pipe 16, which connects the leg 3 of U-pipe A to the leg 11 of U-pipe B. The lower portions of the legs 2 and 10 have stop-valves 17 and 18, respectively, of common construction.

The horizontal parts 4 and 12 of the U-pipes A and B have, respectively, the check-valves 19 and 20, permitting a free flow of fluid toward the sprinklers, but only a limited flow toward the tanks 1 and 9. The valves 18 and 20 are nickel-plated or of some material not easily corroded by the gas and the liquid. It is clear that the valves 18 and 20 may be located elsewhere than shown and that a single valve in the pipe 5 would take the place of the valves in the pipes 4 and 12. The check-valves (one only, 19, being shown in full) are gates pivoted at their upper side at 21 and having their seats 22 in the rear thereof toward the tanks.

They are provided with a small hole 23, which allows a small proportion of the fluid to pass toward the tanks for a reason to be hereinafter stated.

5 Extending through the wall of the tube 3 are two spaced wires 24, which are terminals of the battery 25. In the circuit of the battery is an alarm 26.

10 In Fig. 3 I have shown a view similar to that of Fig. 1. In Fig. 3 the mixing-chamber 5^a is large enough to hold the contents of both tanks 1 and 9 and additional gas-forming chemicals, if required, and has the pipe 6 extending up vertically therefrom in order that the
15 liquid in the chamber 5^a cannot be discharged. This form of the invention is for use where the discharge of liquid would do great damage.

I prefer to include in the pipes a pungent, disagreeable, or other characteristic material,
20 as iodoform or peppermint, which serves to warn persons inhaling or smelling the same that some of the gas in the pipes is escaping.

The operation of the apparatus shown in Fig. 1 is as follows: The nozzles being all
25 sealed with fusible material and the tanks supplied with their respective fluids, the valves 17 and 18 are opened and the flow in the tubes is so regulated that the soda solution reaches the cross-pipe 16 first and passes
30 into the pipe 11, where it meets the acid. Thereupon carbonic-acid gas is evolved and passes up the pipe 11 into the pipes 5, 6, and 7. Gas is evolved in this manner until the gas has developed a back pressure sufficient
35 to keep the two liquids below the cross-pipe 16. In case any gas afterward escapes the soda solution will, owing to the level of the tank 1 being higher than that of the tank 9, again automatically pass over into pipe 11.
40 Again more gas will be evolved until the two liquids are again pushed below the pipe 16. In case a fire melts out the fusible material in some of the nozzles the back pressure on the liquid in the pipes 1 and 9 is relieved and the
45 soda solution and the acid pass up the legs 3 and 11, respectively, and mix in the tube-section or mixer 5, where a large quantity of carbonic-acid gas is formed. As soon as the back pressure of the gas is sufficient to crowd
50 the liquids below the mixing-chamber 5 the formation of gas automatically ceases; but as soon as the escaping gas relieves this back pressure sufficiently the liquids again rise and mix again automatically in tube or mixing-
55 chamber 5. Thus the formation of gas is automatically regulated so as to correspond in general with the number of nozzles which are in action, and they roughly correspond to the area of the fire. The material discharged
60 from the nozzles consists of both gas and water, since the water in the soda and acid solutions is merely a carrier for the latter. In case the back pressure should become very great the check-valves 19 and 20 will relieve
65 this pressure by permitting portions of the

fluids to flow back through the holes 23. The valves are useful to prevent the back pressure of the gas from throwing or pushing the liquids forcibly into the tanks. When the liquid in pipe 3 rises so as to cover both terminals of the wires 24, the bell 26 will give
70 the alarm in the office or other place where it may be located. As soon as any of the caps 27 are unsealed the escaping gas will at once cause the unsealed sprinklers to give an
75 audible signal indicating the presence and location of the fire and the number of sprinklers unsealed—that is, the area of the fire will be indicated by the character of the tone due
80 to the number of reeds actuated.

The operation of the form of extinguisher shown in Fig. 3 is the same as that shown in Fig. 1, except that a larger quantity of liquid can be mixed and that only gas is expelled.

Having described my invention, I claim— 85

1. In a fire-extinguisher, a set of automatic sprinklers, reservoirs containing fluids capable when mixed of forming a fire-extinguishing gas, a mixing-chamber for said liquids, and pipes connecting said chamber and reservoirs and the chamber and the sprinklers. 90

2. In a fire-extinguisher, a set of automatic sprinklers, reservoirs containing fluids capable when mixed of forming a fire-extinguishing gas, a mixing-chamber for said liquids, 95 U-pipes for conveying the liquids to said chamber, a pipe connecting the chamber and the sprinklers.

3. In a fire-extinguisher, a set of automatic sprinklers, reservoirs containing liquids capable when mixed of forming a fire-extinguishing gas, a mixing-chamber for said liquids, 100 U-pipes for conveying the liquids to said chamber, a cross-connecting pipe between the U-pipes and a pipe connecting the chamber and the sprinklers. 105

4. In a fire-extinguisher, a set of automatic sprinklers, reservoirs containing liquids capable when mixed of forming a fire-extinguishing gas, a mixing-chamber for said liquids, 110 U-pipes for conveying the liquids to said chamber, and a cross-connecting pipe between the U-pipes, pipes connecting said chamber and the sprinkler, and a liquid-gage on one of the U-tubes. 115

5. In a fire-extinguisher, having automatic sprinklers, reservoirs for fluids, a mixing-chamber, pipes for connecting the reservoirs with the mixer and the mixer with the sprinklers, a cross-pipe connecting between the 120 pipes, intermediate the tanks and the mixer.

6. In a fire-extinguisher having automatic sprinklers, a set of pipes provided with automatic sprinklers, reservoirs for liquids capable when mixed of forming a fire-extinguishing gas, a mixing-chamber for the liquids, and 125 fluid-checking means located between the sprinklers and the tank and opening toward the mixing-chamber, the said checking means checking the flow of fluid into the said tanks. 130

7. In a fire-extinguisher, a set of pipes provided with automatic sprinklers, reservoirs for liquids capable when mixed of forming a fire-extinguishing gas, a mixing-chamber for the fluids, pipes connecting the tanks and the mixing-chamber, and check-valves in the last-named pipes opening toward the mixing-chamber.

8. In a fire-extinguisher, a set of pipes provided with automatic sprinklers, reservoirs for liquids capable when mixed of forming a fire-extinguishing gas, a mixing-chamber for the fluids, pipes connecting the tanks and the mixing-chamber, and check-valves in the last-named pipes opening toward the mixing-chamber, said check-valves being provided with small holes to permit the flow of the fluids toward the reservoirs.

9. In a fire-extinguisher, a set of automatic sprinklers, reservoirs for liquids capable when

mixed of forming a fire-extinguishing gas, one reservoir having greater elevation than the other, a mixing-chamber for the fluids, and pipes connecting the reservoirs and the mixing-chamber, and the mixing-chamber and the sprinklers.

10. In a fire-extinguisher, automatic sprinklers, reservoirs containing liquids a mixing-chamber for the fluids, pipes connecting the reservoirs and the chamber, and the chamber and the sprinklers, a pair of electric terminals in one of the tubes above the normal liquid-line, and an alarm and a source of electricity connected to the said terminals.

Signed at Pittsburg, Pennsylvania, this 15th day of April, 1903.

HENRY C. SHAW.

Witnesses:

F. N. BARBER,
A. M. STEEN.