No. 616,078. Patented Dec. 20, 1898.

H. COCHRAN.

APPARATUS FOR PROTECTING BUILDINGS FROM FIRE.

(Application filed Sept. 7, 1897.)

(No Model.) 2 Sheets—Sheet 1.

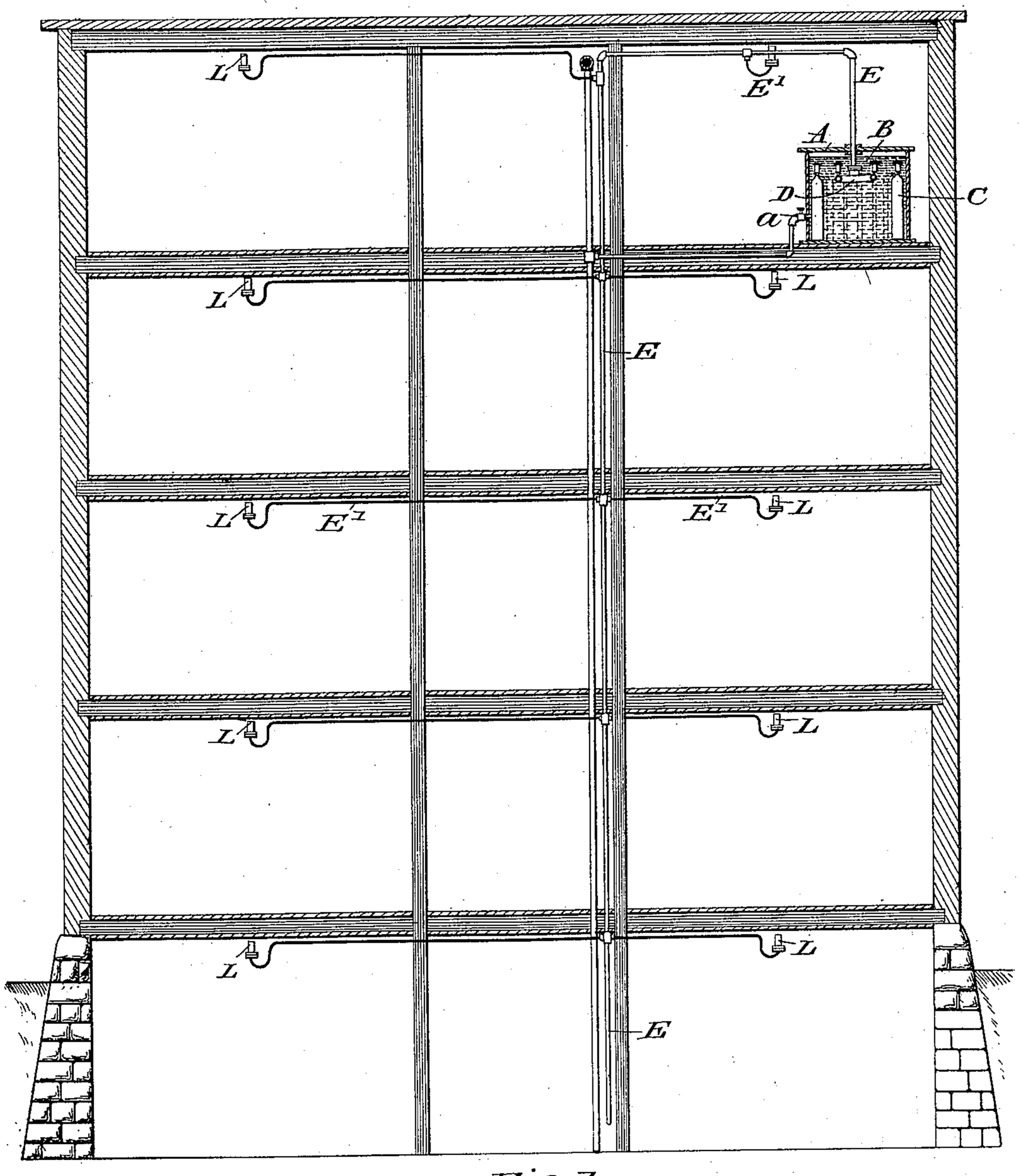

Fig. 1.

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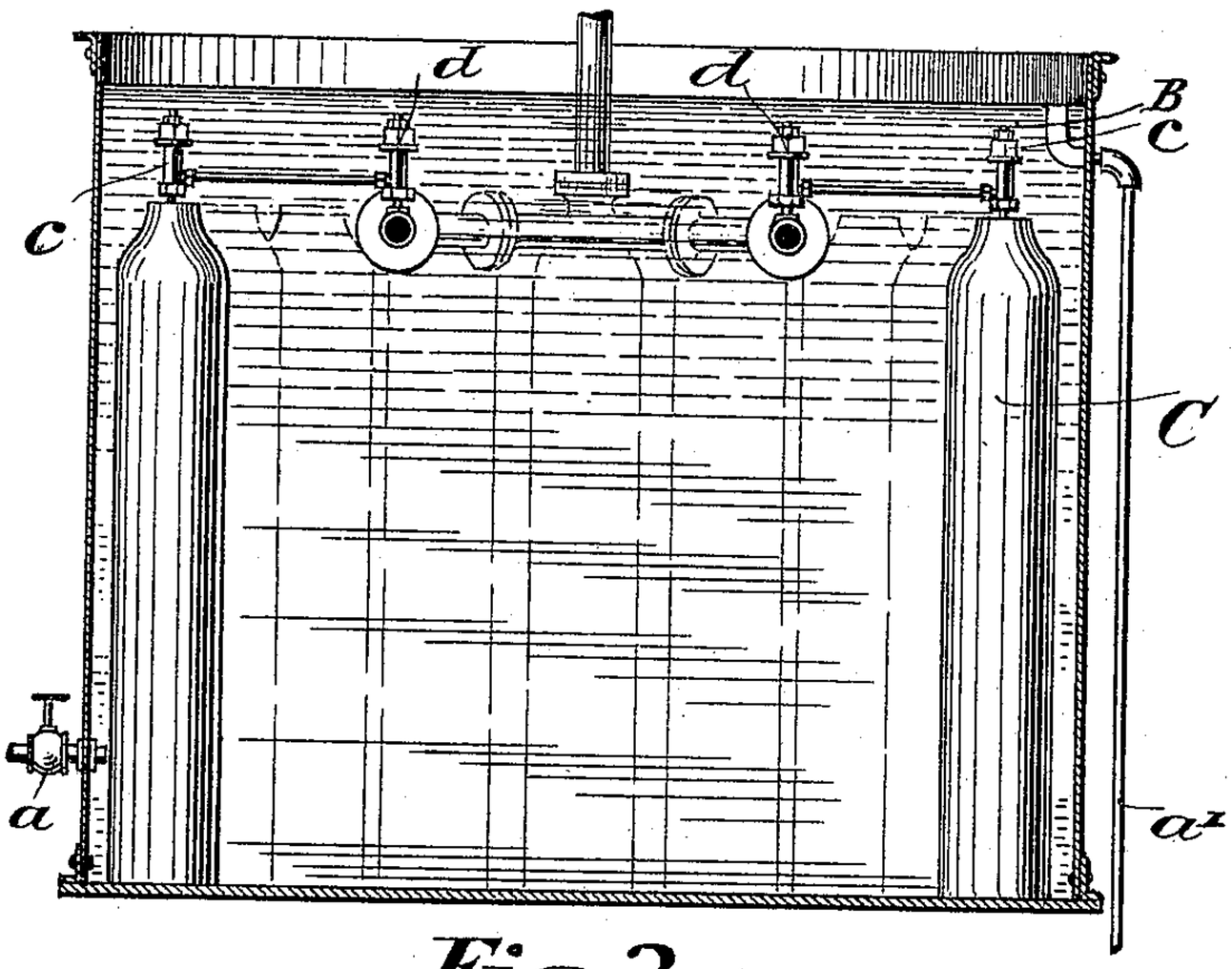

Fig. 2.

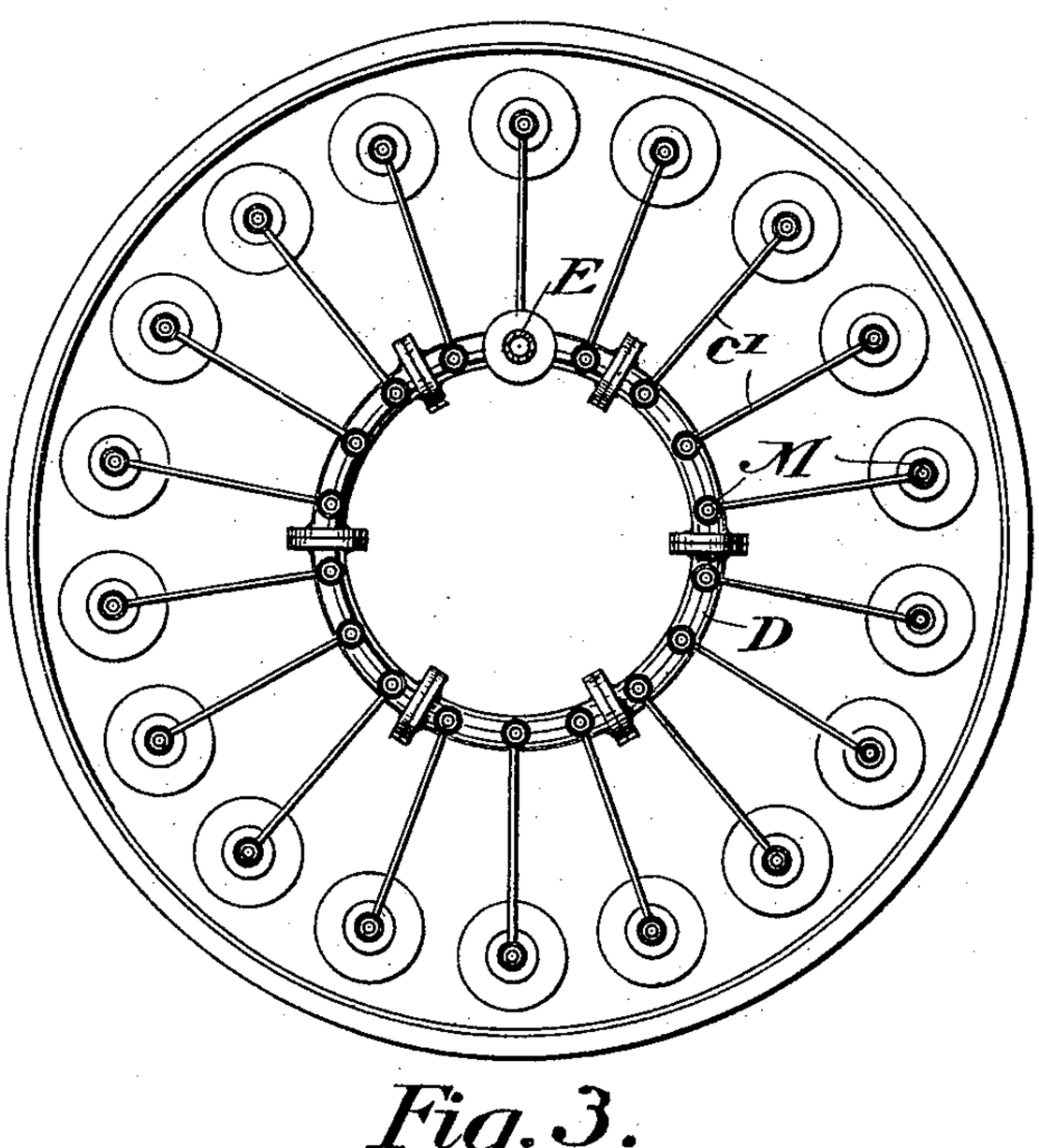

Fig. 3.

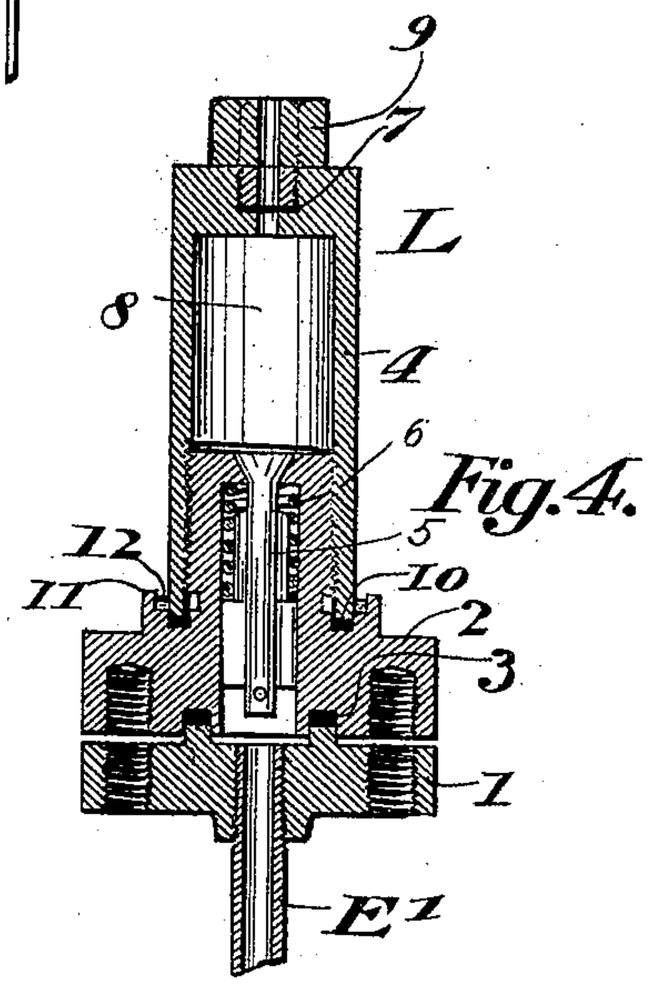

Fig. 4.

Fig. 5.

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APPARATUS FOR PROTECTING BUILDINGS FROM FIRE.

SPECIFICATION forming part of Letters Patent No. 616,078, dated December 20, 1898.

Application filed September 7, 1897. Serial No. 650,714. (No model.)

To all whom it may concern:

Be it known that I, HEYWOOD COCHRAN, of Johnstown, Cambria county, Pennsylvania, have invented certain new and useful Improvements in Methods of and Apparatus for Automatically Extinguishing Fire, of which the following is a specification.

My invention relates to a novel method of and apparatus for automatically extinguishing incipient fires.

The method which I employ may be stated as consisting, broadly, in the conveying of carbonic acid or an equivalent element in a liquefied condition through a covered pipe system which terminates in exposed chambers in which portions of the said liquid are normally isolated from the liquid in the pipe system and in automatically discharging the contents of said chamber into the room to be protected and connecting the chamber with the element in the pipe system when the walls of the chamber become sufficiently heated. To this end I provide a receptacle containing vessels of liquefied carbonic acid, and from these vessels I lead this element to exposed chambers distributed throughout the building at desired points. I provide between the chamber and the pipe system a valve which tends to open under the influence of the pressure exerted by the carbonic acid in the pipe system, but tends to close under the influence of that within the chamber. The outlet from this chamber is closed by a disk which is adapted to burst at a predetermined increase of pressure within the chamber.

My invention therefore consists in the novel method and means above outlined, as well as in the specific devices which I have shown and will hereinafter describe.

Referring to the drawings, Figure 1 is a sectional diagrammatic view of a building containing my improved apparatus. Figs. 2 and 3 are sectional and plan views of the reservoir containing the carbonic-acid drums. Fig. 4 is a sectional view of one of the exposed check-valves. Fig. 5 is a cross-section of the valve-stem of the same.

On the top floor of the building I place the water-reservoir A, in which are a plurality of drums C, containing liquid carbonic acid at preferably about nine hundred pounds pressure. I place the reservoir higher than the bulk of the pipe system, so that the carbonic acid throughout the pipe system will remain liquefied. This would obviously not be the case if the reservoir is placed in the lower part of the building. The water B in the reservoir should be kept in constant circulation, so that the drums may be kept at a substantially constant temperature, thus insuring a constant pressure of the carbonic acid at all times. I also prefer that the water in the reservoir should always be above the level of the top of the drums and of all valves and joints contiguous thereto. In this way a leak through any of the joints or valves will be readily noticed when the janitor of the building inspects the reservoir, as he of course should do at stated intervals.

I have represented the inlet for the water into the reservoir A by *a* and the outlet for the same by *a'*.

On each side of the drums C there is a stop-valve *c*, and from this valve there is a section of pipe *c'*, leading to another stop-valve *d*, connected to a central header D. From this central header leads the main pipe E for the system of pipes which distribute the carbonic acid throughout the building. This main pipe connects with the branch pipes E', which terminate in the chambers L. The pipes should be thoroughly protected from the heat of the room by magnesia or other suitable covering; but the metallic casing of the chambers are purposely left exposed.

Referring now to Figs. 4 and 5, I show a preferred form of check-valve, in which 1 is a flange secured about the end of the branch pipe E'. 1 is secured to the base 2, a suitable gasket 3 being compressed between the two. To the base is secured the body 4, in which is a chamber 8. 5 is the valve-stem, which is seated in a tapered orifice at the top of the base member 2, and this orifice communicates with the chamber 8. 6 is a light spring engaging the wings of the valve-stem and acting to normally keep the valve closed. This spring may be dispensed with, if desired, although I prefer to provide it. 7 is a small disk, preferably of copper, held in place above the chamber by means of the nut 9, which has a central passage in communication, except for the disk, with the chamber. This disk is arranged to safely withstand a pressure con-

siderably above that normally carried in the system, but is not strong enough to retain a pressure greater than that which may be fixed upon as the one which represents a dangerous outside temperature—say 140° Fahrenheit. 10 is a suitable gasket between the base member and the body of the valve. 11 is an annular projection on the base member, which forms a receptacle for water 12. By an inspection of this water at stated intervals leakage at any of the check-valves will be readily detected. The valve-stem 5 is normally in its closed position, (that shown in Fig. 4,) because the pressure in the carbonic-acid chamber would be normally higher than that in the pipe E′, for the temperature of the carbonic acid in 8 is substantially that of the outside air, while that in the insulated pipes is much nearer to the temperature of the water in the reservoir A. When, however, the temperature abnormally rises, and with it the pressure in the chamber, as a result bursting the disk 1, the immediate lowering of the pressure above the valve-stem causes the carbonic acid in the pipe E′ to raise the valve-stem, so that a constant flow of carbonic acid will shoot upward against the ceiling of the room and from there scatter in all directions, quickly extinguishing any incipient fire.

It will thus be seen that I have devised a system which requires very little attention, in which no damage to property will be occasioned by the discharge of the extinguishing element, which discharges such a highly-compressed element that its extinguishing effects will be rapid and widespread, and which is composed of parts that are staunch and simple and so simple in their mode of operation that the utmost reliability is attained.

It is of course clear that I am not limited to the specific construction and arrangement which I have shown, for it must be obvious that my invention is much broader than the mere embodiment thereof by means of which its scope and nature have been set forth.

Having thus described my invention, what I claim, and desire to protect by Letters Patent, is—

1. The method of automatically extinguishing fires which consists in providing a suitable quantity of the fire-extinguishing element, isolating small portions thereof in exposed chambers, utilizing the increase of pressure within the chamber due to a predetermined rise in the temperature of the chamber to open the outlet of said chamber, and utilizing the subsequent decrease within the chamber to put the main body of the said element in direct communication therewith.

2. A fire-extinguishing apparatus comprising receptacles containing compressed gas in combination with inclosed or insulated pipes leading therefrom, and exposed chambers distributed at different points in the building to be protected, each of said chambers having a weak portion adapted to burst when the pressure of the gas rises abnormally, and a pressure-controlled valve seated in the entrance to the chamber.

3. The combination with a pipe system, of chambers distributed at different points in the building to be protected, each of said chambers having normally-closed means of communication with said pipe system and a weak portion adapted to burst at a predetermined pressure within the chamber.

4. A fire-extinguishing apparatus comprising the combination of receptacles containing the fire-extinguishing element, inclosed pipes leading therefrom, exposed chambers connected to said pipes, and having normally-closed means of communication therewith, and a normally-closed outlet from each of said chambers, said outlet opening automatically by an abnormal increase of pressure within the chamber.

5. In a fire-extinguishing system an exposed metallic chamber having a weak spot adapted to burst at an abnormal increase of pressure within said chamber, in combination with insulated pipes conveying a compressed fire-extinguishing gas from suitable reservoirs to said exposed chamber, and means for normally isolating the contents of said chamber.

6. In a fire-extinguishing system, the combination with suitable carbonic-acid reservoirs of insulated pipes leading therefrom, exposed chambers at the terminals of said pipe system, automatic valves at the entrance to each chamber normally closing the entrance thereto, and means for discharging the contents of any of the said chambers at a predetermined increase of pressure within the same.

7. An exposed chamber for a fire-extinguishing system having an inlet for admitting the fire-extinguishing element from the source of supply and an outlet for discharging the said element, the opening and closing of said inlet being controlled by the comparitive pressure within the chamber and within the system leading thereto, while the opening of said outlet is controlled by a predetermined increase of pressure within the same.

8. The combination with a tank containing water-surrounded carbonic-acid receptacles, a pipe system protected by a covering of non-conducting material and leading downward therefrom, a plurality of exposed metallic chambers connected with said pipe system, automatic valves between each of the said chambers and the continuous pipe system, and a member closing the outlet from said chamber arranged to open said outlet at a predetermined increase of pressure within the chamber.

9. The combination of a body of the fire-extinguishing element, a pipe system leading therefrom, a member connected to the said pipe system, and comprising a base member having a passage, a body member having a chamber, an orifice connecting said chamber and said passage, a pressure-controlled valve

seated in said orifice, and a normally-closed outlet from said chamber arranged to open at a predetermined rise in the pressure within the chamber.

10. The combination, of the body member having a chamber, the base member having a passage thereto, the valve seated in an orifice leading into the chamber, and the disk normally closing an outlet from said chamber and adapted to burst at a pedetermined pressure within the chamber.

11. The combination of the flange secured to the end of the pipe, the base member secured thereto and having a passage, the body member having the chamber, the valve between the passage and the chamber, a normally-closed outlet from said chamber and means for opening said outlet when the pressure of the contents of the chamber rises abnormally.

12. The combination of a pipe system, a chamber, a valve between the system and the chamber arranged to open when the pressure in the pipes is greater than that in the chamber and arranged to close under opposite conditions, and a member normally closing an outlet from said chamber, but opened by an abnormal increase of the pressure therein.

13. The combination of the base member and the body member, having communicating passages, the valve for closing communication therebetween, the nut engaging the walls of the chamber, and having a passage communicating therewith, and the disk secured in place by said nut and closing the passage thereof.

In testimony whereof I have affixed my signature in presence of two witnesses.

HEYWOOD COCHRAN.

Witnesses:

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RICHARD EYRE.