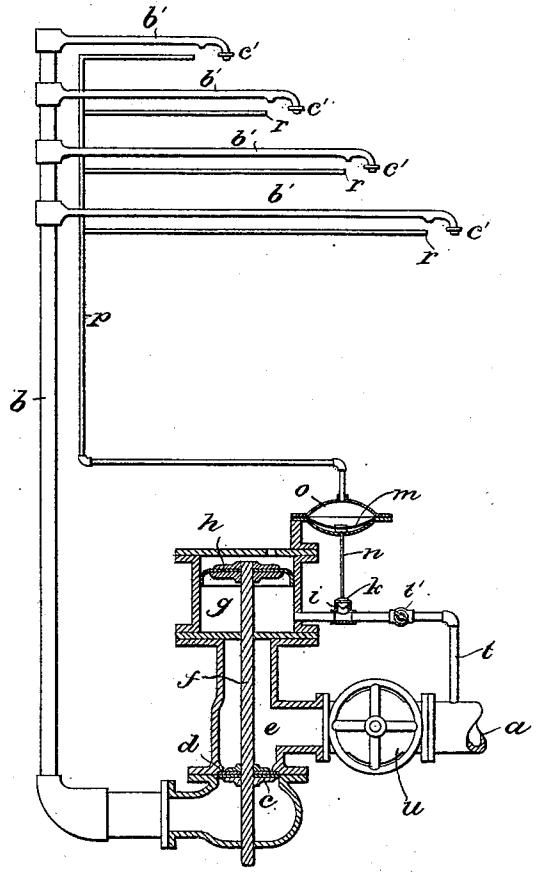
(No Model.)

H. WYMAN.

FIRE EXTINGUISHING APPARATUS.

No. 392,251. Patented Nov. 6, 1888.



Witnesses.
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UNITED STATES PATENT OFFICE.

HORACE WYMAN, OF WORCESTER, MASSACHUSETTS.

FIRE-EXTINGUISHING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 392,251, dated November 6, 1888.

Application filed March 2, 1885. Serial No. 157,472. (No model.)

To all whom it may concern:

Be it known that I, HORACE WYMAN, of Worcester city and county, State of Massachusetts, have invented an Improvement in Fire-Extinguishing Apparatus, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

My invention relates to a fire-extinguishing apparatus of the kind which forms a permanent part of the building or structure to be protected, consisting of pipes for water or other extinguishing material extended through the structure and provided with sprinklers or distributers and means to automatically permit the water to flow therefrom when the temperature is raised above the normal point by the breaking out of a fire.

The present invention is embodied in an apparatus of the class in which the water or fire-extinguishing material is normally excluded from the pipes in the building by a main valve located near the point where it enters the structure, and the said main valve as well as the various sprinklers or distributers are controlled by devices sensitive to a rise in temperature, so that on the breaking out of the fire the main valve is opened, admitting water to the distributing-pipes, from which it is delivered through the sprinklers or distributers that happen to be exposed to the rise in temperature.

In the present invention the main valve is normally held seated by the pressure of a fluid on a piston or equivalent connected with the main valve, and the said valve-holding fluid is controlled by a valve itself governed by a change in pressure in a series of pipes also extending through the building and having sensitive controlling devices located near the sensitive distributers of the water-pipes, so that a rise in temperature which will affect one of the distributers will also affect the sensitive device in the air-pipes. The pressure in the air-pipes may be normally above or below that of the surrounding atmosphere, and upon the operation of one of the sensitive devices the said pipe is placed in direct communication with the atmosphere, so that pressure within the pipe at once becomes substantially the same as that of the surrounding atmosphere, and such change in its pressure causes the pressure of the valve-holding fluid to be reduced and permits the main valve to open.

This invention is distinguishable from that set forth in my application, Serial No. 154,642, filed February 2, 1885, in that it is a pressure apparatus, whereas the earlier case sets forth a vacuum apparatus. With this statement, then, I desire to say I do not broadly claim here the combination, in a vacuum fire-extinguisher system, of a pressure-chamber provided with a movable partition or head and having an internal pressure different from that of the atmosphere, a connected pipe provided with a closed aperture or apertures fitted to open by a rise of temperature of the surrounding atmosphere, and a water-supply pipe provided with a stop-valve held to its seat by the normal pressure in the pressure-chamber acting on the movable partition, so that when the pressure in the pressure-chamber is restored to that of the atmosphere the pressure of the water and the external atmosphere will operate the water-valve and let on a supply of water.

The drawing shows, in diagram and partly in vertical section, a fire-extinguishing apparatus embodying this invention.

The main pipe *a*, connected with a supply of water or other material suitable for extinguishing fire, and a series of pipes, *b*, leading therefrom, and provided with branches *b'*, extending throughout the structure or space to be protected, and provided with the distributers or sprinklers *c'*, may be of any suitable or usual construction, the sprinklers being normally sealed or closed by the action of material sensitive to a rise in temperature—such, for instance, as an easily-fusible solder—such devices being well known.

The "water" (which term is intended to include as an equivalent any fire-extinguishing material) in the pipe *a* is normally excluded from the pipes *b b'* by a main valve, *c*, normally held upon a seat or shoulder, *d*, in a chamber, *e*, communicating with the pipe *a*. The stem *f* of the said valve is extended into a chamber, *g*, and provided with a piston, *h*, or a diaphragm which would be equivalent thereto, in the said chamber, which is normally filled with a fluid, which by its pressure on the said piston prevents the same from be-

ing moved by the pressure of the water in the chamber *e* on the valve *c*, which latter pressure tends to unseat or open the said valve.

The chamber *g* is provided with an escape-passage, *i*, normally closed by a valve, *k*, which may be of very small area, so that, although it is subjected to the same pressure per inch as the piston *h*, the total pressure on the said valve may be very small and overcome by a very slight force.

The controlling-valve *k*, which governs the escape of fluid from the chamber *g*, and consequently governs the operation of the main valve *c*, is shown as retained on its seat by a diaphragm, *m*, bearing on the stem *n* of the valve *k*, the said diaphragm being itself acted upon by the pressure of a fluid (usually air) in a chamber, *o*, connected with a series of pipes, *p*, preferably of small diameter, and provided with sensitive devices, *r*, adjacent to the sprinklers *c'* of the water-pipes, the said devices being normally sealed and retaining the fluid in the pipes; but when affected by a rise in temperature they operate to unseal the pipes and establish communication between the interior of the said pipes and the external atmosphere.

The diaphragm *m* is of much greater area than the valve *k*, so that a given pressure per square inch on the diaphragm will balance a much greater pressure per square inch on the said valve *k*, and the piston *h* is also shown as of greater area than the main valve *c*, so that the pressure on said piston *h* and the valve *k* will balance a larger pressure per square inch on the valve *c*. For instance, if we suppose that the pressure of the water in the pipe *a* is forty pounds to the square inch and the piston *h* four times the area of the said valve *c*, it would only require a pressure of ten pounds to the square inch in the chamber *g* to retain the valve seated, and if the valve *k* were a square inch in area and the diaphragm *m* twenty square inches it would only require a pressure of half a pound to the square inch on the diaphragm to retain the valve *k* seated, and thus maintain a pressure in the chamber *g* sufficient to restrain the piston *h* and valve *c* from moving. It will therefore be sufficient for perfect security to retain a pressure of only a few pounds above that of the atmosphere in the pipe *p*, which pressure would be so slight that there would be but little danger of leakage from the said pipes. Any suitable fluid may be employed in the chamber *g*, and, as herein shown, means are provided for filling the said chamber with material under a pressure sufficient to retain the main valve seated, the chamber *g* being connected with the pipe *a* by a pipe, *t*, containing a stop-cock, *t'*.

In placing the apparatus in operative condition the stop-cock *t'* is opened, admitting water from the pipe *a* into the chamber *g* until the piston *h* or its equivalent is raised far enough to press the valve *c* to its seat. The stop-cock *t'* is then closed and the pressure maintained in the chamber *g* by the controlling-valve *k*, itself governed by the pressure in the pipe *p* and made operative by the change of pressure in the said pipe in coming to the atmospheric pressure, when the said pipe is opened or unsealed by one of the devices *r*.

If desired, the pressure in the pipe *p* may be below instead of above the atmospheric pressure, in which case the said pipe would enter the lower side of the chamber *o*, and the upper side of the said chamber would be left open to the atmosphere. The main pipe *a* is shown as provided with a stop-valve, *u*, which may be closed in order to empty the pipes *b b'*, or to retain them empty while the valve *c* is being closed and the chamber *g* filled and the pressure adjusted in the pipes *p*, and after the parts are all properly adjusted the stop-valve *u* may be opened, when the water will be excluded from the pipes *b b'* by the valve *c* until one of the sensitive devices in the pipes *r* is operated, causing a change of the pressure in the said pipes.

If desired, the air-pressure by which the valve *k* is governed may be maintained in the pipes *b b'* themselves instead of in a separate series of pipes, in which case the chamber *o* will be connected with the pipe *b* by a suitable branch pipe, and the distributers *c'* or other sensitive devices in the pipes *b'* might be depended on to establish communication between the interior of the said pipes and the surrounding atmosphere.

I claim—

1. The main supply-pipe *a* and distributing-pipes *b*, combined with a main valve, *c*, intercepting the main and distributing pipes and sealed against the pressure of the fluid in the main pipe, a pressure-chamber, *g*, piston *h*, arranged in said chamber and connected with the said valve and normally supported by pressure, so as to seat the said valve, an air-charged pipe connected with said chamber and sealed from the external atmosphere, and a valve normally seated in the outlet of said chamber by the air-pressure in said air-charged pipe and unseated by the escape of air from said pipe by their unsealing, incident to a dangerous rise of temperature, substantially as described.

2. The main supply-pipe and the distributing-pipes connected therewith, the main valve for controlling the flow of fluid from the former to the latter named pipes, and a fluid-pressure chamber, and a piston therein connected to said valve and when under pressure in said chamber normally sustaining the said valve seated against the pressure in the main pipe, combined with an outlet, *i*, for said pressure-chamber, a valve, *k*, in said outlet, a diaphragm, *m*, connected to the stem of said last-named valve, an air-pressure chamber, *o*, in which said diaphragm is arranged, and a pipe communicating with the said air-chamber and containing air under pressure and closed from a normal external atmosphere and opened for

the escape of air by an abnormal atmosphere, substantially as described.

3. In a fire-extinguishing apparatus, in combination with an air-chamber, a pipe normally having an internal air-pressure different from that of the atmosphere and provided with a closed aperture or apertures fitted to open by a rise in temperature of the surrounding atmosphere, a water-supply pipe provided with a stop-valve, a chamber having a piston in operative connection with the stop-valve, and a valve or cock in operative connection with the air-chamber and with the chamber having the piston, as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HORACE WYMAN.

Witnesses:
G. W. GREGORY,
JOS. P. LIVERMORE.