(No Model.)

C. C. WALWORTH & O. B. HALL.

AUTOMATIC FIRE EXTINGUISHING APPARATUS.

No. 296,490. Patented Apr. 8, 1884.

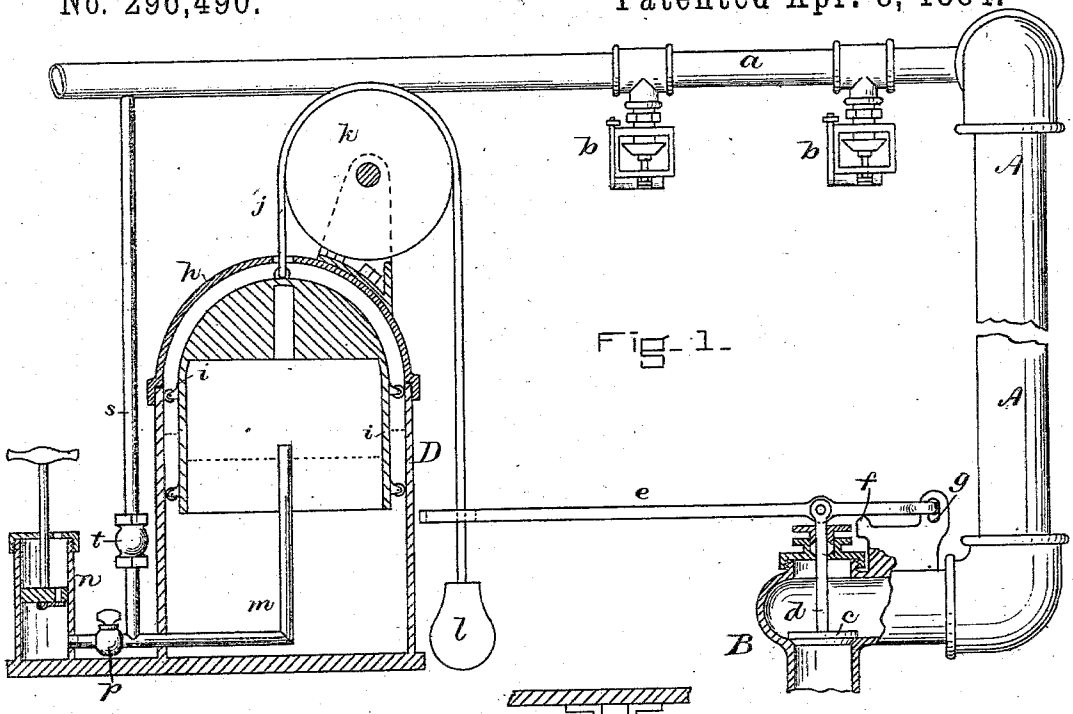


Fig. 1.

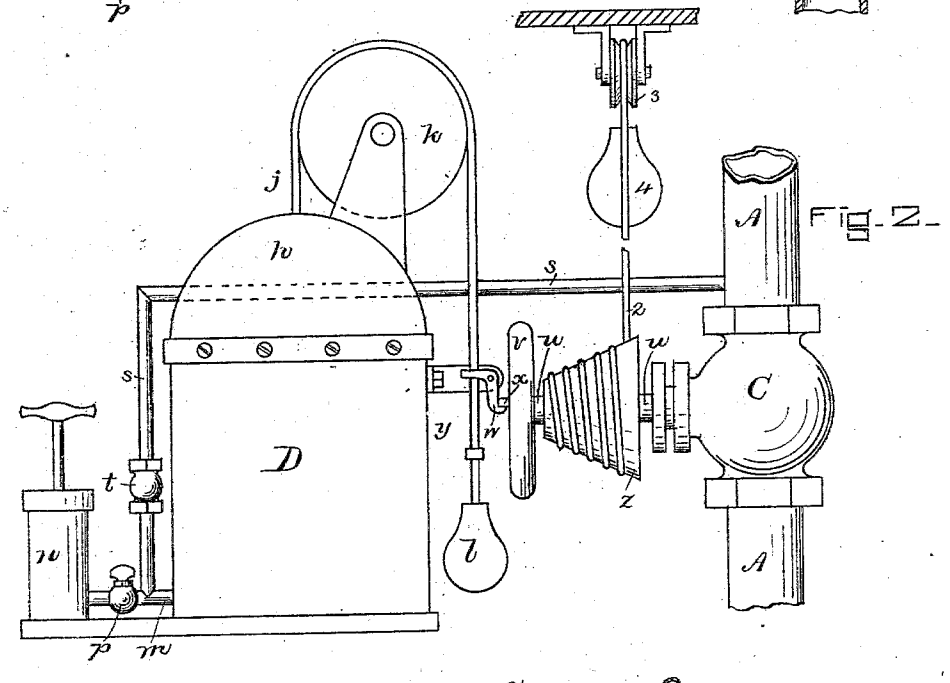


Fig. 2.

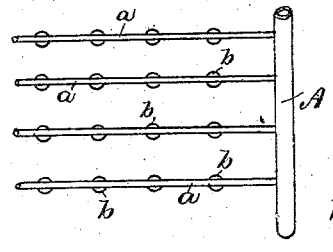


Fig. 3.

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CALEB C. WALWORTH, OF BOSTON, AND OSBORN B. HALL, OF MALDEN, MASSACHUSETTS.

AUTOMATIC FIRE-EXTINGUISHING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 296,490, dated April 8, 1884.

Application filed November 17, 1883. (No model.)

To all whom it may concern:

Be it known that we, CALEB C. WALWORTH, of Boston, in the county of Suffolk, and OSBORN B. HALL, of Malden, in the county of Middlesex, both in the State of Massachusetts, have invented a new and useful Improvement in Automatic Fire-Extinguishing Apparatus, which will, in connection with the accompanying drawings, be hereinafter fully described, and specifically defined in the appended claims.

This invention relates to that class of automatic fire-extinguishers which are arranged upon a system of water-distributing pipes, and which are held inoperative by fusible metal when the temperature is normal, but which are liberated and rendered operative by the fusing of such confining metal when the temperature is raised to a predetermined point in the incipient stage of a fire; and the invention consists in the combination, with such system of water-distributing pipes and automatic extinguishers, and a valve or stop-cock by which the water is shut off therefrom, of a device which, when liberated, will open such valve or stop-cock and allow the water to fill the distributing-pipes and extinguishers, which valve-opening device is normally held inoperative by compressed air, which will be liberated by the fusing of the confining metal of any one or more of said automatic extinguishers when the heat reaches the danger-point, as stated, thereby allowing the valve-opening device to perform its office and admit the water to the distributing-pipes and extinguishers.

In the accompanying drawings, Figure 1 is a sectional elevation, showing a fire-extinguishing apparatus embodying our invention. Fig. 2 is an elevation similar to Fig. 1, but omitting the distributing-pipes, and showing a modification of the valve and of the devices which actuate it. Fig. 3 is a detached plan view, showing the system of distributing-pipes, and the extinguishers thereon mounted.

In these views, A represents the main water-supply pipe, and *a* the branch pipes connecting therewith, and upon which are arranged the automatic extinguishers *b*, all of which parts may be of any known kind or arrangement.

A stop-valve body, B, is inserted in pipe A at a convenient point therein, beyond which it is not desired to have the water pass, when the apparatus is inoperative, such valve being usually arranged in the "engine-room" or other position below frost and remote from causes of accidental injury thereto or to the pipe. The valve *c*, seated in body B, has its stem *d* pivoted to lever *e*, which latter rests upon the fulcrum *f* when the valve is seated; but when it has, by the rising of the long arm of the lever, been slightly raised, then the lever is fulcrumed at *g*, and by thus providing a fulcrum near the junction of the valve-stem and lever the same force, when applied to the outer end of the lever, will overcome a much greater resistance of the valve, in case it should adhere to its seat, or from other causes, and when once the valve is liberated and the fulcrum of the lever changed, the deflection of the valve-stem from a vertical line by the rising of the lever is materially lessened. Said lever may be of such weight as to resist the water-pressure upon valve *c*, or it may be weighted in any of the well-known methods, so that it will resist such pressure.

For the purpose of opening valve *c* by means of lever *e*, when by the rising of the temperature by fire one or more of the extinguishers *b* are liberated, we employ the following devices: A water-tank, D, is located in a suitable frost-proof position. This tank is preferably provided with an arched removable top, *h*, having an opening at its apex for the cord *j*, which is attached to interior tank, *i*, and sustains the weight *l*. Said interior inverted tank, *i*, is provided with the usual guiding-rolls, which bear against the interior of the outer tank, as shown, in the well-known manner of "dip-seal" gasometers. It is also formed with a suitably-weighted top, as shown. An air-pipe, *m*, connected with air-pump *n*, rises in tanks D *i* above the water-line in the latter, as shown, and serves as the conduit by which air may be forced into said tank *i* with the requisite density, it being secured therein by stop-cock *p*, arranged between the air-pump and tank. A pipe, *s*, connects with pipe *m*, and also with one of the water-distributing pipes *a*. Line *j* passes loosely through lever *e*, and its weight *l* is arranged at such distance below the lever, when the apparatus is in nor-

mal position, that tank *i* may make a considerable part of its descent before the weight encounters the lever.

The practical operation of our invention, when embodied as above described, is as follows: The valve *c*, being seated and weighted by lever *e*, excludes the water from the upper part of pipe A, and from all the branches *a*, on which are arranged the extinguishers *b*, which are closed air-tight and secured by fusible metal, as stated. At the same time, by means of air-pump *n*, tank *i* is forced upward to its highest limit by compressing air therein to the requisite density to sustain it, the entire system of water-distributing pipes above valve *c* being by pipe *s* filled with air of equal density as in tank *i;* and when thus prepared the apparatus requires no other care than the occasional use of pump *n* to supply the limited but always inevitable leakage of air from the tank and pipes; but when, from the effect of an incipient fire, one or more of the extinguishers *b* are liberated by the consequent weakening or fusion of the confining metal, they will be forced open by the pressure of the confined air therein, when the air in the pipes and tank will escape, thereby allowing tank *i* to fall, which, by drawing cord *j* over sheave *k*, raises weight *l* into contact with lever *e*, thus raising valve *c*, as described, and admitting the water, which had been held back by the valve, into the distributing-pipes and extinguishers, and permitting those of the latter which had been released by heat to deliver the water upon the fire, a check-valve, *t*, in pipe *s*, which opens upward, preventing the water from escaping through pipe *m*.

If desired, a whistle or other alarm may be connected with our apparatus in such manner that the decrease of atmospheric pressure therein shall cause the alarm to sound; but as such devices are old, well known, and of great variety, they can readily be applied by any one skilled in the art without illustration or explanation herein, and in such manner that either the slight leakage of air which takes place when the apparatus is not used, or the sudden release thereof when an extinguisher is liberated by heat, shall render such whistle or other alarm operative.

In Fig. 2 the air-pipe *s* is carried into main pipe A, instead of into a branch pipe *a*, and instead of a vertical acting sliding stem-valve in the main pipe, a valve-body, C, adapted to a screw-actuated valve, is inserted therein. In this body is arranged a threaded stem, *u*, which, by being rotated, will open or close the valve, and as a means of effecting such rotation a fusee or drum, *z*, is secured on said stem, and a cord wound thereon is carried over sheave 3 and weighted by body 4, so that when the stem is released it will be actuated by said weight 4 to open the valve; and for the purpose of locking and releasing said stem, a hand wheel or crank, *v*, may be secured thereon, and a projecting stud, *x*, thereof is arranged to be engaged by the pivoted angle-lever *w*, through one arm of which the cord *j* passes, while a collar, *y*, is secured on said cord at such point as to engage and actuate lever *w* and disengage it from stud *x*, thereby allowing the weight 4 to open the valve through the agency of cord 2, fusee *z*, and stem *u*.

We are aware that it is old, common, and well known in automatic fire-extinguishing apparatus to exclude the water from the distributing-pipes and the extinguishers by a direct controlling air or gas pressure, which excludes the water by itself occupying the pipes through or into which the water, but for such occupancy, would flow, and we make no claim to any such system or device, as our invention is entirely dissimilar thereto, in that the air-pressure in the pipes must in such case be greater than would be that of the water itself if freely admitted therein, and the water is excluded, as above stated, by the direct resistance thereto of the compressed air or gas, while in our invention the water is excluded from the system of pipes by a valve or other strictly mechanical device, which is inserted in the supply-pipe, while the compressed air or an equivalent gas merely sustains a device which will, when the compressed air is liberated by the action of heat upon the extinguishers, be thereby set free, and open the water-confining device or valve, and allow the flow of the water to the pipes and extinguishers, and by our system we substitute for the pressure, which in the disclaimed devices must be equal to or exceed that of the water, a low pressure, which is merely required to sustain the devices that liberate the water-confining valve, and by increasing the area of the cross-section of the tank the requisite air-pressure per square inch therein and in the pipes may be in the same ratio diminished.

We claim as our invention—

1. In an automatic fire-extinguishing apparatus, the combination of a water-supply pipe, with distributing branches connected therewith, and provided with extinguishers adapted to be opened and rendered operative by heat at the danger-point thereof, a water-excluding valve arranged in said supply-pipe, a tank supported by compressed air, with connections by which the air also communicates with and fills the water-distributing pipes, so as to be liberated by the opening of an extinguisher; and devices connecting said tank and water-excluding valve, and adapted to open the valve and admit the water by the falling of the tank at the liberation and escape of the air therein by the opening of an extinguisher, substantially as specified.

2. In an automatic fire-extinguishing apparatus, the combination of supply-pipe A, its branches *a*, and automatic extinguishers *b* thereon arranged, a water-excluding valve, *c*, arranged in said supply-pipe, an air-tank, *i*, arranged to be supported by compressed air, and with devices for compressing and confin-

ing the air therein, a pipe, *s*, communicating with said air-supply devices and with the water-distributing pipes, a cord, *j*, supported by sheave *k* and attached to said tank, a weight, *l*, suspended by said cord, and a valve-weighting lever, *e*, arranged to be actuated by said cord and its weight, and to thereby open the valve and liberate the water, when the tank falls, by reason of the escape of the air therein, at the liberation of an extinguisher by heat, substantially as specified.

3. In combination with valve *c* and lever *e*, the latter pivotally connected with the valve-stem, and means to actuate said lever, the fulcra *f g*, arranged at different distances from the valve-stem, to vary the relative lengths of the arms of the lever at and after the commencement of the rising movement of the valve, substantially as specified.

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