

(No Model.)

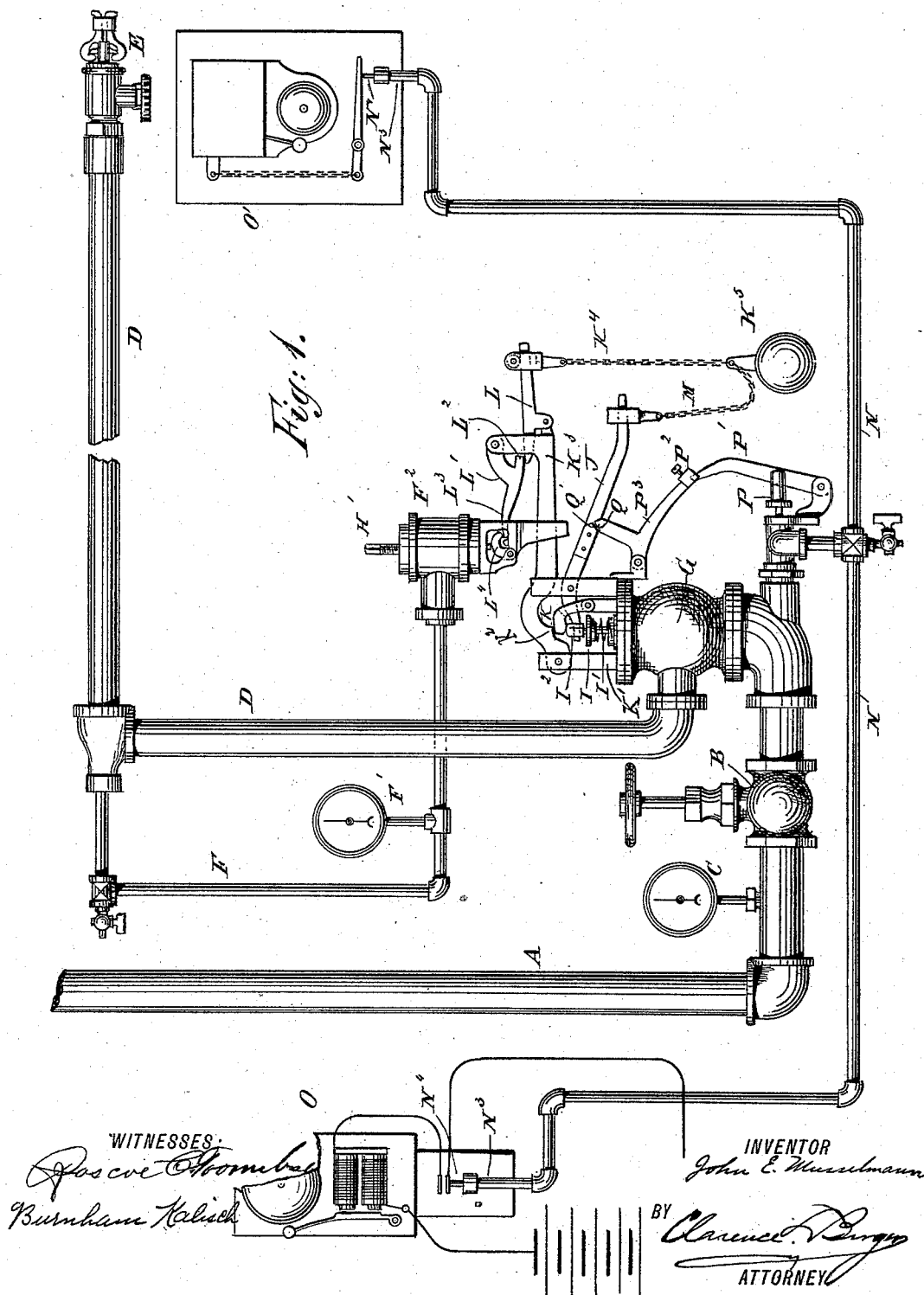
2 Sheets—Sheet 1.

J. E. MUSSELMANN.

AUTOMATIC FIRE EXTINGUISHER AND ALARM.

No. 526,355.

Patented Sept. 18, 1894.



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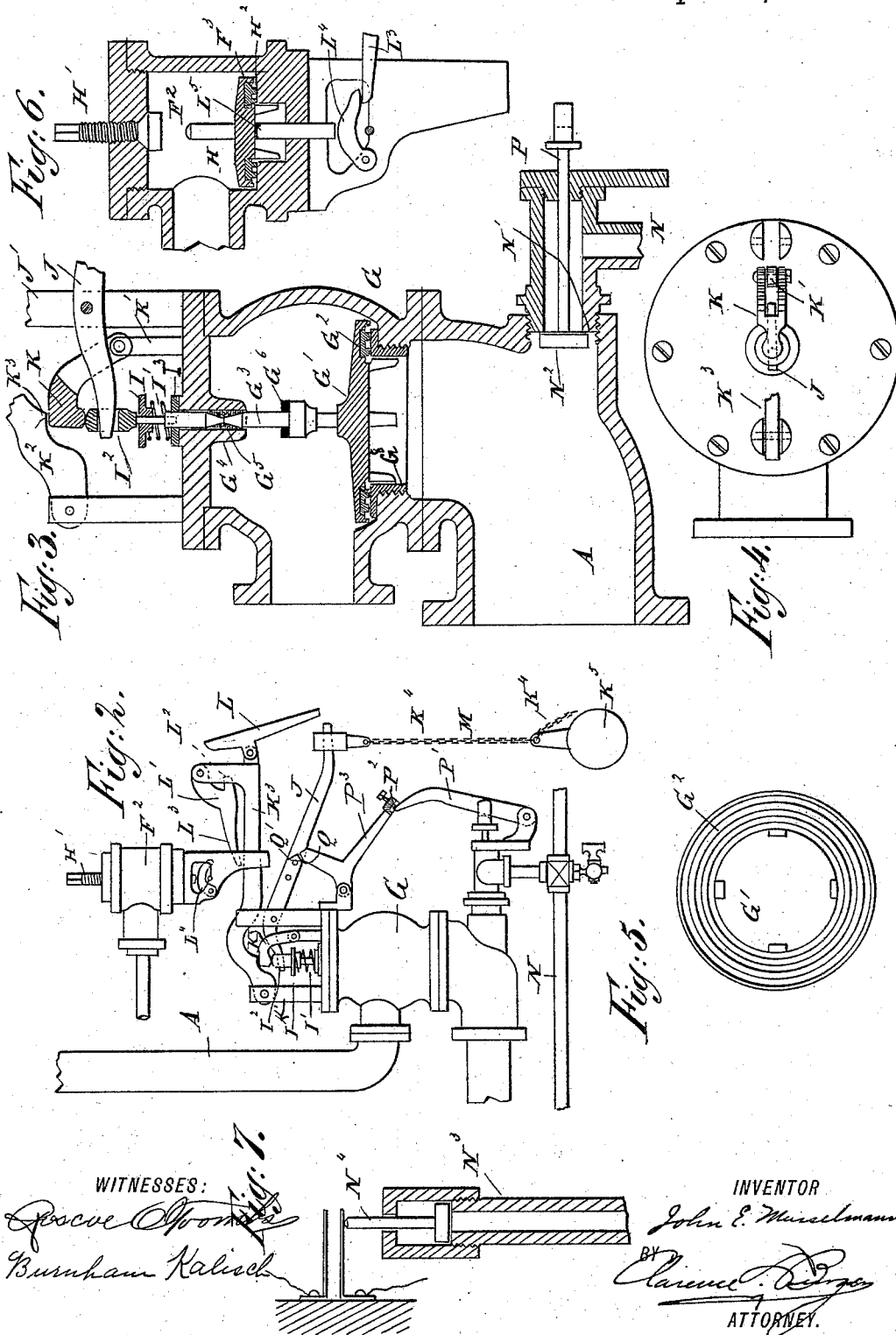
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Patented Sept. 18, 1894.



WITNESSES:

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AUTOMATIC FIRE EXTINGUISHER AND ALARM.

SPECIFICATION forming part of Letters Patent No. 526,355, dated September 18, 1894.

Application filed December 9, 1891. Serial No. 414,530. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. MUSSELMANN, a citizen of the United States, residing at Hasbrouck Heights, Lodi, in the county of Bergen and State of New Jersey, have invented a certain new and useful Improvement in Automatic Fire Extinguishers and Alarms, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

This invention relates particularly to that class of automatic fire-extinguishers which operate on what is known as the "dry pipe" system, in which the water supply is normally excluded from the distributing pipes and sensitive distributors by a main supply valve, and air maintained therein at a pressure different from, preferably higher than, that of the atmosphere, so that the opening of any of the distributors by the heat of a fire will cause a variation of pressure in the distributing system, which variation is arranged by means of a pressure-controlled head to automatically open the main supply valve and admit the water into the distributing system, whence it is thrown from the open distributors only upon the fire.

Among the objects of my invention are to absolutely insure the full opening of the main supply valve at the proper time, to prevent leakage, and to provide simple and effective means of automatically sounding an alarm when the main valve is opened.

The invention comprises various novel combinations of parts and features of construction and arrangement, which will first be described in detail and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a view in elevation of an automatic fire extinguisher and alarm, embodying my invention, set for action. Fig. 2 is a similar view of the principal parts of the apparatus, showing the main valve restraining devices tripped. Fig. 3 represents in enlarged sectional elevation the construction and arrangement of the main supply valve. Fig. 4 is a plan view of the same. Fig. 5 is a face

view of the valve head. Fig. 6 represents in sectional elevation the arrangement of the pressure-controlled head in its chamber. Fig. 7 represents in sectional elevation the arrangement of the alarm-operating plunger. Like letters of reference designate corresponding parts in the several figures.

A designates the main pipe connected with the supply of water under pressure; B, an ordinary hand valve therein; C, a water-pressure gage; D, the distributing pipes; E, one of the closed sensitive distributors,—which may be of any approved form;—F, the air pipe; F', the air pressure gage connected with the system of distributing pipes, and G the main valve normally cutting off the water supply from the distributing system D, E.

Air is maintained, as by an air forcing apparatus, in the closed distributing system D, E, and air pipe F, at a pressure different from that of the atmosphere, preferably higher than the same, and lower than that of the water supply.

The air pipe F is connected with an air chamber F² formed with an internal seat F³ on which the head of an axially movable plunger H, the stem of which plunger is fitted to slide in a guide formed in the base of the chamber, is normally held by the air pressure, but is free to rise when the pressure is removed.

A driver H' is screwed through the top of the chamber F², in line with the stem of the plunger H, which driver can be screwed down initially so as to set the plunger in operative position against the resistance offered by the devices which it retains, as hereinafter described, until a sufficient air pressure can be obtained to hold it in position, and then said driver retracted to give the plunger the necessary clearance. I prefer to use this plunger, instead of the usual flexible diaphragm, as a pressure head to control the main supply valve, it being made perfectly tight by soft metal packing rings H² seated in its face, and its operation being positive and immediate, instead of gradual as that of the elastic diaphragm. The main valve G, which I prefer to use, is also an axially movable valve, having its head G' made tight by soft metal pack-

ing rings G^2 embedded in an annular groove in the head G' , and narrower than the valve seat, which has a flat face G^8 of hard metal, as shown in Fig. 3, so that when the main valve is initially closed, the soft metal rings G^2 will be spread out by contact with the hard metal seat G^8 , and thus, all inequalities being filled, an absolutely tight closure is effected.

The valve stem G^3 , where it passes through the guide-sleeve G^4 is surrounded by soft packing G^5 , to make the passage through the sleeve G^4 tight and obviate the use of a stuffing box.

A packed collar G^6 on the stem G^3 inside the sleeve G^4 , becomes seated upon and tightly closes the sleeve when the valve is opened.

To further seal the valve-stem passage through the guide-sleeve G^4 , without interfering with the free opening of the valve, said stem G^3 is tightly surrounded by a flexible washer I^3 , which is tightly pressed upon the outer end of the guide-sleeve G^4 by a coil spring I' , surrounding the valve-stem and retained by a collar I secured thereon, which washer, together with the coil spring I' and collar I , will rise with the valve stem G^3 when the main valve opens. The outer end of the valve stem is formed with a slot I^2 which receives one arm of a valve-operating lever J , pivoted to swing vertically on a standard J' , so that the depression of the outer arm of the lever J will open the valve G , if free.

To hold the valve normally against the pressure of the water-supply, an elbow shaped bearer K is pivoted to a standard K' so as to swing over the upper end of the valve-stem G^3 , and the bearer K is borne upon by the shoulder K^2 of a restraining arm K^3 .

The arm K^3 is pivoted to a standard to swing vertically, and normally supports at its extreme end, by a chain K^4 , a weight K^5 , which added to the normal air pressure on the plunger H as hereinafter described, is adjusted to overcome the opposing water pressure on the valve G and keep the same closed.

The weight-supporter of the arm K^3 is preferably made releasable by forming it as a separate lever L , pivoted to tilt on the arm K^3 , and having its outer end connected to the weight chain K^4 by a loop and friction wheel, which will run off the lever L when tilted and free the restraining arm K^3 and valve G . The weight-supporting lever L is normally prevented from tilting by a holder L' pivoted to an extension of the arm K^3 and having an arm L^2 engaging the inner end of the lever L and another arm L^3 pressed downward by a keeper L^4 , which is hinged to an extension of the wall of the chamber F^2 , and borne upon by the stem L^5 of the air-pressed plunger H . It will thus be seen that the opening of the water-pressed main valve G is resisted directly by the lever K^3 , which is here restrained both by the weight K^5 acting through the lever L and by the air pressure on the plunger H acting through the lever L' and the lever

or keeper L^4 , while the said weight is counter-balanced by the air-pressed plunger acting through said intervening levers L , L' , L^4 . Then when the variation in the air pressure occurs through the opening of any of the distributors, the pressure head of the plunger H being freed yields, allowing the keeper L^4 to release the holder L' and the latter in turn to release the lever L , which is tilted by the weight K^5 , and permits the same to become detached from the restraining arm K^3 , thus leaving the main valve G free to be opened by the water pressure. To insure the positive opening of the main valve when thus freed, the weight G^5 is connected also to the valve-operating lever J by a normally slack-chain M , so that when the weight is detached from the valve restraining arm K^3 as described, it comes with sudden force upon the valve-operating lever J , compelling the same to open the valve G , the restraining arm K^3 yielding until the bearer K swings past the shoulder K^2 , so that the valve stem G^3 is then free to rise to its fullest extent, and the valve G fully opened to admit the water to the distributing system automatically.

To sound an alarm when the main valve is opened, a branch pipe N is connected with the main pipe A in advance of the main valve G , and is formed with a valve seat N' , to which is fitted a secondary valve N^2 , which is normally closed by the water pressure so as to cut off the water-supply from the branch pipe. The branch pipe N terminates in a chamber N^3 containing a plunger N^4 , which is arranged to operate an alarm, when the secondary valve N^2 is opened and the plunger N^4 is forced outward by the water-pressure, either by closing the circuit of an electric alarm O , as illustrated at the left of Fig. 1, or by tripping an ordinary automatic mechanical alarm O' as illustrated at the right of said figure.

To open the secondary valve N^2 simultaneously with the opening of the supply-valve G , the axially working stem P of the same is pivoted to a pivotal arm P' , the free end of which is engaged by an adjustable bearer P^2 , screwing in a pivotal elbow lever P^3 , the other arm of which has a beveled end Q normally engaged by a beveled shoulder Q' on the main valve operating lever J .

When the lever J is operated as before described in opening the valve G , its shoulder Q' throws downward the lever P^3 forcing inward the arm P' and valve-stem P and opening the alarm-controlling valve N^2 . The alarm will thus be sounded simultaneously with the operation of the distributing system.

I claim as my invention—

1. The combination, with the main supply pipe, the supply valve tending to open under pressure of supply, the distributing system containing air under pressure different from the atmosphere and a movable pressure head in connection therewith having a stem, of a

valve-restraining arm, a weight resisting through said valve-restraining arm the supply pressure on the valve, and a compound lever carried by said valve-restraining arm, detachably supporting said weight and retained by said pressure-head stem, so that the pressure on said head normally counterbalances said weight, while acting with said weight to jointly counterbalance the pressure on the supply valve, but on yielding of said pressure head, the weight is cast-off and the valve-restraining arm relieved, substantially as described.

2. The combination, with the main supply pipe, the supply valve tending to open under pressure of supply, the distributing system, containing air under pressure different from the atmosphere, and a movable pressure head having a stem, of a valve-restraining arm, a valve-opening arm, a detachable weight acting jointly with the pressure head to counterbalance through said valve-restraining arm the supply pressure on the valve, and connections between the pressure head stem and the weight, whereby the pressure head in yielding throws said weight off the valve-restraining arm upon the valve-opening arm, substantially as described.

3. The combination, with the main water supply pipe, the supply valve, the distributing system substantially as described, and the pressure head, of a main valve-restraining arm, a main valve-opening arm, a pendant, as a chain, hung detachably on the valve-restraining arm, a valve-restraining weight on said pendant, a slack pendant, as a chain, connecting said weight and the valve-opening arm, and devices operated from the pressure head to detach the pendant from the restraining arm, so that the weight will exert a sud-

den vertical pull on the pendant of the valve-opening arm, substantially as described.

4. The combination, with the distributing system containing air under pressure different from the atmosphere, the closed chamber connected therewith having a seat, the non-diaphragmic pressure head to be held on said seat, and the main valve and its operating devices restrained by said pressure head, of an adjustable driver H' in said chamber to initially bind said pressure head upon its seat and then be retracted therefrom, substantially as described.

5. The combination, with the main water supply pipe and the distributing system substantially as described, of a branch pipe, a secondary valve therein, a secondary valve-arm and means substantially as described whereby the same is operated by the opening of the distributing system, a motor, as a plunger, in a chamber of the branch pipe beyond the valve therein, and an alarm in operative connection with said motor, substantially as set forth.

6. The combination, with the main supply valve, the main valve-operating arm, the distributing system, substantially as described, and the pressure head controlling the main valve, of a branch-pipe, an alarm-operating motor therein, a secondary valve in advance of the said motor, an operating arm for said secondary valve, and a bearer for said secondary valve arm which is worked by the operation of the main valve-operating arm, substantially as described.

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Witnesses:

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