

(No Model.)

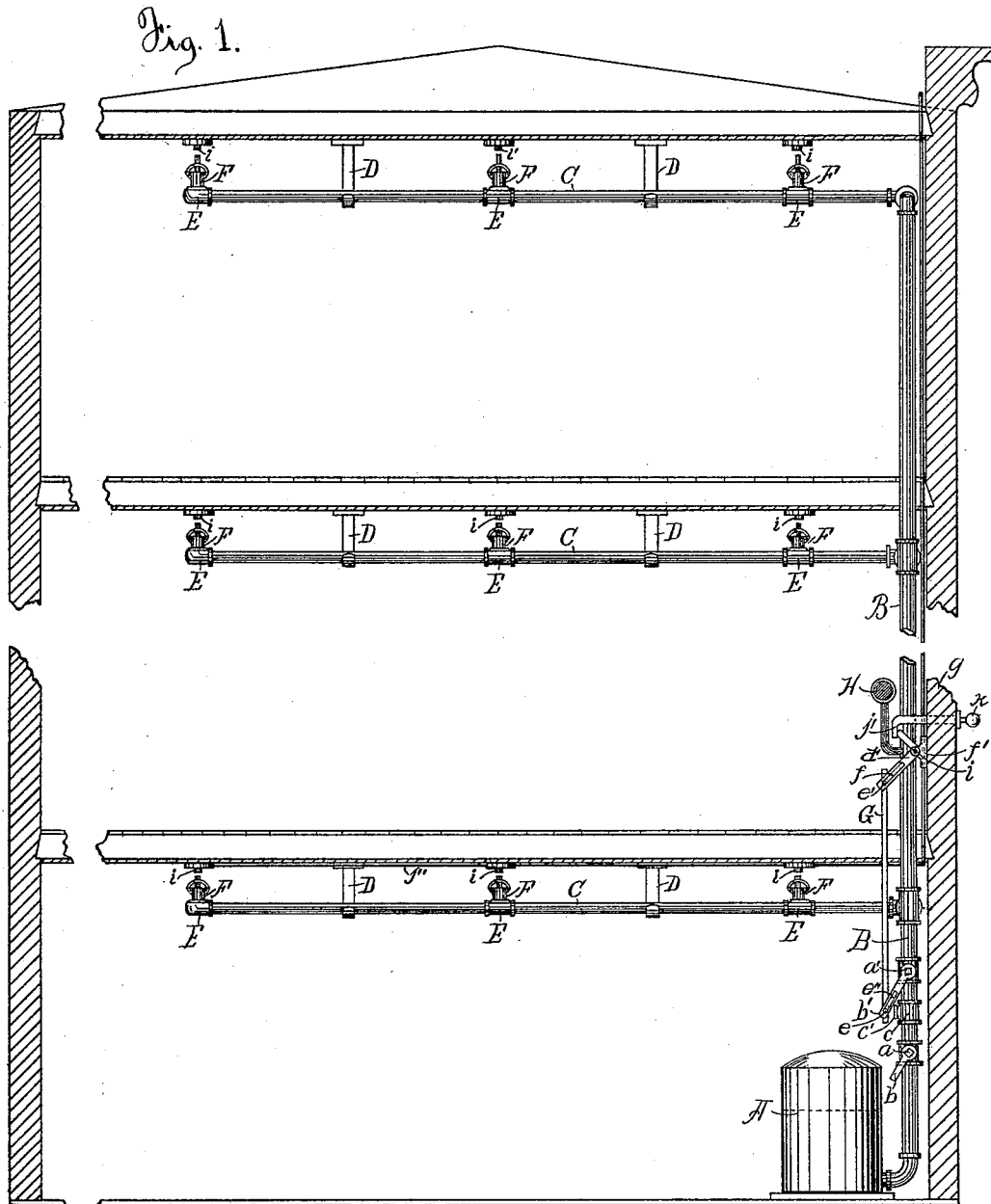
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H. B. DUNHAM.

AUTOMATIC FIRE EXTINGUISHING AND ALARM APPARATUS.

No. 538,016.

Patented Apr. 23, 1895.



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(No Model.)

2 Sheets—Sheet 2.

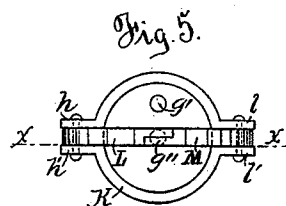
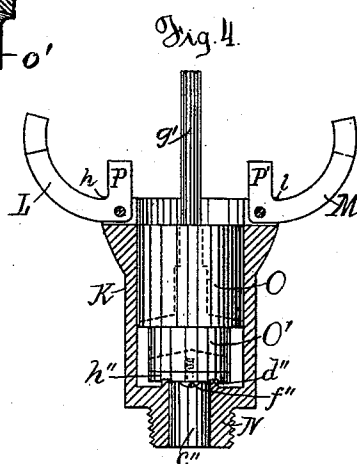
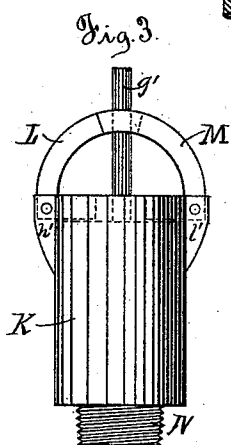
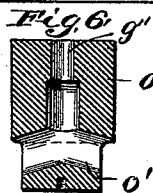
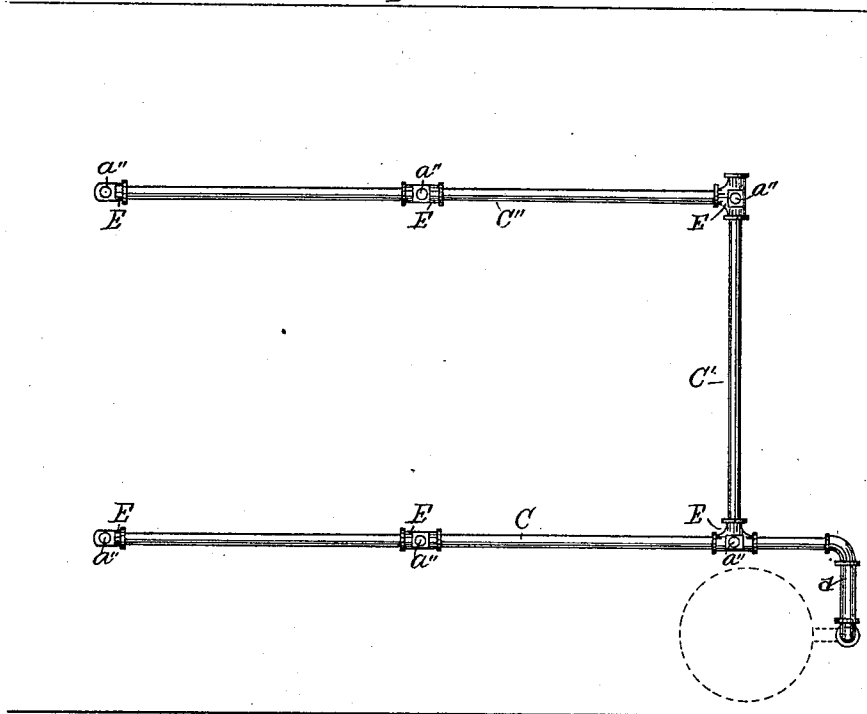
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Fig. 2.



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UNITED STATES PATENT OFFICE.

HUMPHREY BLODGET DUNHAM, OF NEWARK, NEW JERSEY.

AUTOMATIC FIRE EXTINGUISHING AND ALARM APPARATUS.

SPECIFICATION forming part of Letters Patent No. 538,016, dated April 23, 1895.

Application filed January 13, 1894. Serial No. 496,788. (No model.)

To all whom it may concern:

Be it known that I, HUMPHREY BLODGET DUNHAM, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Automatic Fire Extinguishing and Alarm Apparatus, which improvements are fully set forth in the following specification and accompanying drawings.

Figure 1 is a sectional, side view of a building fitted with my improved apparatus. Fig. 2 is a plan view showing disposition of a series of horizontal delivery pipes. Fig. 3 is a view in perspective of an improved form of sprinkler which I employ. Fig. 4 is a longitudinal section of same, the section being taken on the line $x-x$ of Fig. 5. Fig. 5 is a plan view of said sprinkler. Fig. 6 is a central longitudinal section of sprinkler plunger, showing openings therein.

Similar reference-letters denote like parts in the different views.

This invention relates generally to that class of apparatus known as fire extinguishers, and particularly to an extinguisher adapted to contain a supply of fire-extinguishing liquid, under suitable air-pressure, and to duly discharge the same, upon the surrounding atmosphere reaching a high degree of temperature, as in the event of the building in which the apparatus is located taking fire, and at the same instant convey, through the medium of an electric circuit, to a distant station, as, for instance, a station of a local fire department, a suitable notification in the nature of an alarm.

It consists in the novel formation and disposition of certain of the parts, in certain combinations of the various parts and in certain details of construction, all of which will be fully described hereinafter.

The object of my invention is to provide a fire-extinguishing and alarm apparatus which shall contain, under suitable air-pressure, a reasonable supply of fire-extinguishing liquid, of any approved character, and discharge the same automatically, through the influence of the surrounding atmosphere, upon the latter becoming unduly heated; which shall embrace in its construction one or more sprink-

lers adapted to act, upon the apparatus being called into service, in conjunction with an electric circuit, for the purpose of conveying to a distant point a suitable notification to serve as an alarm; which shall be simple and cheap in construction and reliable in operation, and in which the supply-reservoir shall have only one opening with the main delivery-pipe leading therefrom. To the attainment of these ends I make use of the following parts:

Having reference to the accompanying drawings, the letter A denotes a closed tank or supply-reservoir, of sheet-iron or other suitable material, and preferably located in the basement of the building. This reservoir is preferably of one hundred gallons capacity, and is provided with a suitable opening near the bottom thereof, from which leads the main delivery-pipe B, the latter extending vertically upward to the ceiling of the room, where it communicates through a suitable connecting pipe, d , with the horizontal delivery-pipe C, the latter being supported by the hooks D, depending from the ceiling. The vertical delivery-pipe B may, of course, extend upward through any practicable number of rooms, and communicate with a pipe corresponding to C, in each room, as illustrated in the drawings; and a series of horizontal delivery-pipes, as C, C', C'', (Fig. 2,) may be disposed in each room, if deemed advisable,—the number of these pipes which may be advantageously used in any room, depending upon the size of the room. To simplify the description, however, I shall hereinafter refer only to pipe C.

The vertical pipe B, is provided with an ordinary plug-cock, or valve, a , having stem b , and with a like valve a' , having slotted stem b' . At a point intermediate of the valves a , a' , the vertical pipe B is provided with a nozzle c , having a cap c' . There is fixed upon the vertical pipe B, above the valve a' , a common T, from which leads a branch d , (Fig. 2,) connecting at its distant end with the horizontal pipe C. The horizontal pipe C is composed of sections, each of suitable length and united by the couplings E, each of which couplings is provided with a threaded opening a'' , into which takes the threaded tap N, of the sprinkler F, which will be described par-

ticularly hereinafter. A pin *e* passes through the slot *e''*, in the stem *b'*, and takes into the lower end of the rod *G*. The latter extends upward through a suitable opening in the floor above, and is connected to the lower branch of the bell-crank *d'*, by means of a pin *e'*, which passes through the slot *f*, and takes into the said rod at the upper end thereof. The bell-crank *d'* is supported by the bracket *f'*, secured in any convenient manner to the wall *g*, and works upon the pivot *i*. A suitable opening is formed through the wall *g*, immediately above the bracket *f'*, and the hooked rod *j'* extends outward through said opening. A knob-portion *k*, is screwed or otherwise fixed upon the outer end of the rod *j'*, and the hook, at the inner end of said rod, is adapted to engage the upper branch of the bell-crank *d'*. It will therefore, be seen that the withdrawal of the rod *j'*, will cause the bell-crank to work upon its pivot *i*, so as to impart an upward movement to the rod *G*, the effect of which will be to close the valve *a'*. This construction permits the closing of the valve *a'* by an attendant, whether he is in the basement, on the floor above or outside of the building, and forms an important feature of my invention.

I will now describe my improved sprinkler: The casing *K* may be readily formed by casting from any suitable material, as iron. There are formed integral with the casing *K*, at the upper end of one side thereof, two lateral lugs or ears, *h, h'*, between which is pivotally disposed the curved arm *L*; and there are also formed integral with the casing *K*, diametrically opposite the ears *h, h'*, two corresponding lugs or ears, *l, l'*, between which is pivotally disposed the curved arm *M*, corresponding to *L*. The casing *K* terminates at its lower end in a threaded, slightly-tapering tap *N*, adapted to enter and fit snugly within the opening *a''*, in the coupling *E*. A longitudinal bore *c''* leads centrally from the lower end of the tap *N* to the interior of the casing *K*, where it is surrounded by the annular rib or seat *d''*. There is introduced within the casing *K* a plunger *O*, the lower portion of which is cut away to form an extension *O'* and leave an annular space between said extension and the casing *K*; and I secure to the lower end of the extension *O'*, as by means of the screw *f''*, a disk of suitable packing material, *h''*, which, upon the plunger *O* being urged well to place in the casing *K*, is firmly seated upon the annular rib *d''*, and serves to effectually prevent the passage of air or liquid through the bore *c''*.

Each of the arms *L, M*, is provided with an offset *P, P'*, which offsets are adapted to come in contact with the top of the plunger *O*, upon the arms *L, M*, being swung inward upon their respective pivots, and urge said plunger firmly to place within the casing *K*. This result is accomplished when the arms *L, M*, are brought to the position shown in Fig. 3. Each of the arms *L, M*, is cut away at the

outer end thereof, as shown in Fig. 5, so that the end of one will lap upon the other; and, upon the sprinkler being required for service, the arms *L, M*, are brought together, as stated, and sealed by applying thereto at the junction-point a small quantity of sensitive solder, or other sealing agent fusible ordinarily at about 100° temperature.

The plunger *O* is provided with a vertical spindle *g'*, which is inserted in any convenient manner in the top of said plunger, so as to extend upward on one side of the arms *L, M*, when the latter have been closed as herein stated. The location of the spindle *g'*, with respect to the plunger *O*, is clearly shown in Fig. 5. The plunger *O* is also provided with a transverse opening, communicating with a central, longitudinal opening, which openings are indicated in dotted lines in Fig. 4, and the upper terminus of the central opening is indicated by *g''* in Fig. 5.

The sprinkler herein described is applied to the pipe *C*, by seating the tap *N* in the threaded opening *a''*, and in doing this it is advisable to use a cementing agent, of some suitable character, to make sure that the junction is air and liquid tight. All other junctions are preferably effected in like manner.

In using my apparatus I first close the valve *a*, leaving unsealed the most distant sprinkler on the pipe *C*. I then remove the cap *c'*, from nozzle *c*, and apply to the latter the delivery-hose of a suitable force-pump, by means of which I fill the upper portion of the vertical pipe *B*, and the horizontal pipe *C*, with a suitable fire extinguishing liquid till the same appears at the sprinkler left unsealed. In practice I purpose to make use of some approved chemical liquid which will not freeze, and which will insure, when brought in contact with fire, the generation of gases adapted to instantly destroy combustion, as by so doing the quantity of liquid delivered need not be large. I then close the valve *a'* and seal the sprinkler last referred to. I then open the valve *a*, and force sufficient liquid into the reservoir to fill the same about two-thirds full. I then disconnect the force-pump hose, and connect with the nozzle *c* an air-pump, of any approved construction, by means of which I introduce to the reservoir *A* about seventy pounds of air-pressure, this being deemed sufficient under ordinary conditions. I now close the valve *a*, disconnect the air-pump, and replace the cap *c'*; whereupon I open both valves *a, a'*, and permit the air-pressure to act on the entire quantity of liquid contained in the apparatus. Now, should the sprinkler *F* become unsealed, as by reason of the surrounding atmosphere becoming unduly heated, the plunger *O* will be forced from its seat, thus allowing the contained liquid in the apparatus to escape through the bore *c''*, through the space intervening between the extension *O'* and the casing *K*, and through the transverse and central openings hereinbefore referred to, and be distributed over a

certain area within the room; and the spindle *g'* will be projected against the electric button *i''*, thereby closing the electric circuit *j''*, and sounding an alarm at a distant station.

The quantity of liquid and amount of air-pressure herein named, are deemed sufficient for an apparatus having a vertical delivery-pipe extending through five or six floors; but in exceptionally high buildings it is my purpose to make use of an apparatus substantially identical with the one herein described, for the protection of the upper floors; and where two apparatus are used in a single building, it will be understood that the rod *G* may be extended upward through the several floors, and connected at its upper end, as at its lower end, to one of the cut-off valves of the upper apparatus. It will also be understood that a cable or rope may be substituted for the rod *G*, without departing from the spirit of my invention.

The pressure-gage *H*, of any approved construction and applied in any ordinary way to the delivery-pipe *B*, as shown, serves as a detector in the event of diminution of the air-pressure through leakage, or otherwise.

Having fully described my invention and stated in what manner the same is to be used, what I claim, and desire to secure by Letters Patent, is—

1. In an apparatus of the class described, the combination with a supply-reservoir, having a single opening, of a main delivery-pipe, leading from said opening, two plug-cocks, adjacently disposed in said main delivery-pipe, a nozzle, on said main delivery-pipe, between said plug-cocks, extinguishing liquid within said delivery-pipe and partially filling said reservoir, and air, under suitable pressure, within the remaining portion of said reservoir, the said air and liquid being each introduced to said reservoir and delivery-pipe, respectively, by way of said nozzle, all substantially as described and for the purposes set forth.

2. In a fire-extinguishing apparatus, comprising a supply-reservoir, having a single opening, and a main delivery-pipe leading from said opening, the said main delivery-pipe being provided with two plug-cocks and a nozzle intermediate of said cocks, in combi-

nation, a secondary delivery-pipe, leading from said main delivery-pipe, a sprinkler, constructed as herein described, on said secondary delivery-pipe, extinguishing liquid, within said main and secondary delivery-pipes, and partially filling said reservoir, and air, under suitable pressure, within the remaining portion of said reservoir, the said air and liquid being each introduced to said reservoir and said delivery-pipes, respectively, by way of said nozzle, all substantially as described and for the purposes set forth.

3. In a fire-extinguishing and alarm apparatus, comprising a supply-reservoir, having a single opening, and a main delivery-pipe leading from said opening, the said main delivery-pipe being provided with two plug-cocks and a nozzle intermediate of said cocks, in combination, a secondary delivery-pipe, leading from said main delivery-pipe, a sprinkler, constructed as herein described, and adapted to be unsealed upon the surrounding atmosphere becoming unduly heated, on said secondary delivery-pipe, an electric circuit, adapted to be closed through the action of said sprinkler, upon the latter being unsealed, as stated, extinguishing liquid, within said main and secondary delivery-pipes, and partially filling said reservoir, and air, under suitable pressure, within the remaining portion of said reservoir, the said air and liquid being each introduced to said reservoir and said delivery-pipes, respectively, by way of said nozzle, all substantially as described and for the purposes set forth.

4. A sprinkler, consisting of a casing provided at its bottom with a threaded tap having a central bore leading to the interior of said casing, a plunger within the casing, means, as the arms *L*, *M*, whereby the plunger may be snugly seated within the casing, and suitable packing service secured to the inner end of said plunger, the latter being provided with an opening or openings adapted to form with the bore named a continuous passage through the sprinkler, substantially as herein described.

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