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W. A. GOLDTHWAIT.

ALARM FOR AUTOMATIC FIRE EXTINGUISHERS.

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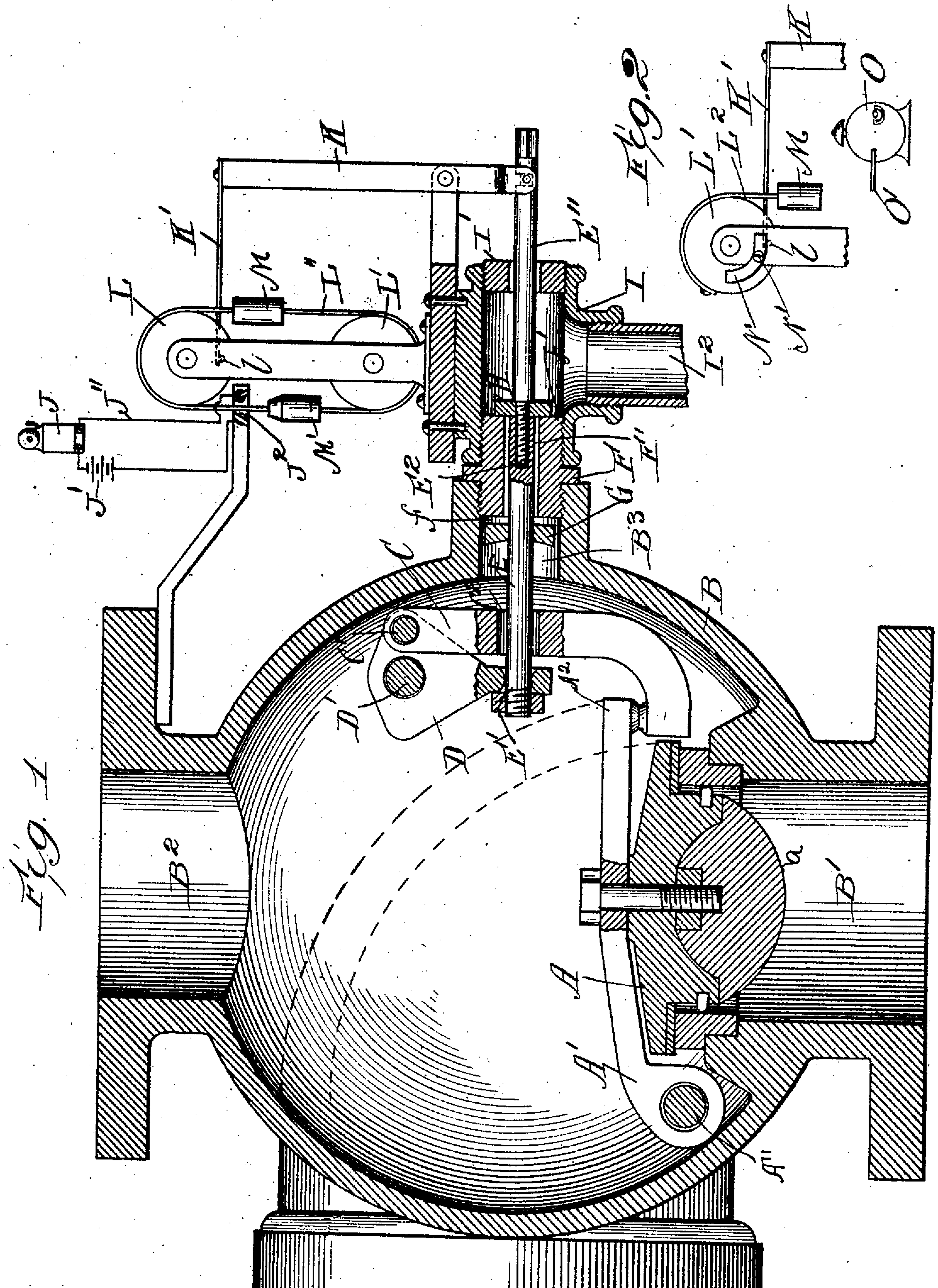

Witnesses:
Ray White
Harry R. White

Inventor:
William A. Goldthwait
By L. H. Hopkins Atty.

UNITED STATES PATENT OFFICE.

WILLIAM A. GOLDTHWAIT, OF MELROSE PARK, ILLINOIS, ASSIGNOR TO AUTOMATIC FIRE PROTECTION COMPANY, A CORPORATION OF MAINE.

ALARM FOR AUTOMATIC FIRE-EXTINGUISHERS.

No. 840,311. Specification of Letters Patent. Patented Jan. 1, 1907.

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To all whom it may concern:

Be it known that I, WILLIAM A. GOLDTHWAIT, a citizen of the United States, residing at Melrose Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Alarms for Automatic Fire-Extinguishers, of which the following is a specification.

The present invention relates to a device for use in connection with wet-pipe systems for giving an alarm upon the opening of the system by the firing of one or more sprinkler-heads; and its object is to prevent the giving of false alarms upon the momentary unseating of the main valve under the influence of water-hammer. An alarm device which responds instantly to these momentary impulses is for obvious reasons objectionable, and in order to overcome this objection I interpose between the valve and the alarm mechanism additional mechanism which may be appropriately called "time mechanism." It may be adjusted or regulated to run any desired length of time before conditioning the alarm mechanism to operate, so that if the main valve remains open for that length of time the alarm mechanism will be conditioned to operate, while, on the other hand if the main valve reseats before the expiration of that time the alarm mechanism will not be conditioned to operate. Furthermore, the time mechanism is so connected with the main valve that it will be reset or turned back to the starting-point by the reseating of the main valve.

In its broadest aspect the invention is not limited to either time mechanism or alarm mechanism of any particular construction. I prefer, however, to use time mechanism which derives its motive power from a weight and an electrical alarm mechanism.

The invention consists in the features of novelty that are hereinafter described.

In the accompanying drawings, which are made a part of this specification, Figure 1 is a sectional elevation of the main valve of an automatic fire-extinguisher and an alarm device embodying the invention. Fig. 2 is an elevation showing a modification.

The main valve A is contained within a casing B, having an inlet B′, surrounded by a valve-seat, and an outlet B^2, opening into the riser. The valve is carried by an arm A′, fulcrumed at A″, so that it may swing in the direction indicated by dotted lines. The arm A has an extension A^2, which when the valve is seated engages the lower end of a link C with a tendency to draw and hold the latter down. The link depends from a pivot C′, carried by the horizontal arm of a bell-crank lever D, which is fulcrumed to the casing at D′. The other arm of the lever depends and has a flared opening through which passes a rod or stem E, a nut E′ being turned onto the inner end of the stem so as to engage the inner side of the lever, whereby movement is transmitted from one to the other. The link C has a slot C^2, through which the stem passes freely. The stem passes out through an opening B^3 in the side of the casing and through a hollow plug F, which is screwed into a spud surrounding the opening B^3 of the casing. The opening through the plug is made somewhat larger in diameter than the stem, so as to provide an annular chamber F′. The stem is made in two parts, the outer one E″ of which screws into a threaded socket E^2 in the outer end of the inner one for the purpose of adjustment, as hereinafter described.

Valve-seats *f f′* are formed on the ends of the plug F, and valves G and H are secured to stem E, so as to operate reciprocally in connection with said seats, respectively, for controlling the inner and outer ends of the chamber F′, sufficient space being left between the margin of the valve G and the inner surface of the spud to permit water to pass it and enter the chamber F′ and permit the necessary endwise movement of the stem E. The valve H is turned onto the threaded portion of the section E″ and abuts against a shoulder thereon and in order to insure an absolutely water-tight joint may be there soldered or brazed. The stem E passes also through the straightaway branch of a T-fitting I, one end of which branch is screwed onto the projecting end of the plug F, while the other end is closed by a plug I′, having an opening through which the stem passes. The lateral branch of the fitting communicates with a drain-pipe I^2. The extremity of the stem is squared for the reception of a wrench for turning it, whereby the stem may be adjusted in length in order to bring the valve H to its seat when the main valve is seated. The pivot A is so located that the valve will normally seek its seat by gravity, and in order to accentuate

this tendency and also to give it greater effect in controlling the time mechanism hereinafter described it is weighted with lead or other heavy material, as shown at *a*. In addition to this the water above the valve will assist in holding it seated excepting when the pressure above and below are in equilibrium.

The alarm mechanism (shown in Fig. 1) consists of a magneto-electric bell J, a battery J′, and an open circuit J″, having terminals J^2. Between the alarm mechanism and the stem E is arranged the time mechanism, which is connected with the stem through the medium of a lever K and a cord, chain, wire, or similar device K′, one end of which is attached to the pulley L at the point *l*. The time mechanism here shown consists of a pair of pulleys L and L′, an endless band or belt L″ surrounding them and having sufficient frictional contact therewith to prevent slipping under ordinary conditions, and two weights M and M′, secured to the opposite sides of the band, respectively. The weights are preferably metallic, and the weight M is a trifle heavier than the weight M′, so that when the pulleys are unrestrained it will fall slowly and gradually and in like manner lift the weight M′ until (unless sooner arrested) the tapering top of the weight M′ contacts with the terminals and closes the circuit, thereby conditioning the alarm mechanism to operate.

In Fig. 1 the parts are shown in the positions which they normally occupy when the main valve is seated and the system filled with water. The pressure of the water confined above the main valve or the weight of the valve and its accessories, or both, will hold it seated, and acting through the intermediate devices also holds the valve H seated and restrains the time mechanism, the tension on the cord K′ operating in opposition to the weight M. When the main valve unseats, it releases the link C and leaves the stem E free to be moved outward by the pressure of the water upon the valve G. This seats the valve G and unseats the valve H and allows the water to escape from the chamber F′ into the drain-pipe. The outward movement of the stem also rocks the lever K, and this in turn slackens the cord K′. The pulley L being then unrestrained the weight M will fall, causing the weight M′ to rise.

Let it be supposed that the time mechanism is so adjusted or regulated that it requires thirty seconds to condition the alarm mechanism to operate, or, in other words, referring to the form of the invention shown in Fig. 1, let it be supposed that when the time mechanism is set in operation it requires thirty seconds for the weight M′ to move from its normal position to a position in contact with the terminals J^2. When so adjusted, if the valve remains unseated thirty seconds the circuit will be closed, and the alarm will operate and continue to operate until the circuit is again broken by the falling of the weight M′, which is effective by a pull upon the cord K′. The power for producing this pull is derived from the valve A and is transmitted through the connections already described—that is to say, the downward pressure of the arm A^2 upon the link C draws said link down, rocks the lever D, draws the stem E inward and the lower arm of the lever K inward and the upper end outward, and the resulting pull upon the cord will turn the pulley L in opposition to the weight M and reset the time mechanism. On the other hand, if the valve remains unseated for less than thirty seconds the time mechanism will not have time to condition the alarm mechanism to operate. This brief unseating of the valve may be caused by a sudden impulse produced, say, by water-hammer, and as soon as this impulse is over the valve will return to its seat and in like manner reset the time mechanism. Thus it will be seen the device is entirely automatic in its operation.

In some localities there is no water-hammer, or practically none, while in others it varies in frequency, duration, and pressure. It is of course desirable that the alarm be given as soon as possible after the firing of a head, and hence to meet these varying conditions, so as to have a sufficient margin of safety against false alarms and at the same time cause an alarm as soon as possible after said margin is passed, the time mechanism is provided with means for adjusting it, or, in other words, for regulating the length of time it must run before conditioning the alarm mechanism. This may be done in a number of ways. One way is to vary the speed of the time mechanism so as to vary the time required for the weights to move a given distance. This may be done by varying the differential of the weights without making any other changes, or it may be done by applying an adjustable friction-brake to a part of the mechanism, as shown in Fig. 2. In this figure, N represents a plate-spring bearing against the pulley L, and N′ is a set-screw for adjusting the tension of the spring. Another way is to vary the distance the weight or equivalent part has to travel at a given speed. This may be done by shifting the band on the pulley L so as to vary the distance between the weight M′ and the terminals J^2.

As before stated, the invention is not limited to an alarm mechanism of any particular construction, and in Fig. 2 I have shown a mechanical alarm mechanism O, having a trip or trigger O′ arranged in the path of the weight M and adapted to be tripped by the weight as it descends, the weight M′ and the pulley L′ are dispensed with, and a cord, chain, or similar device L^2, attached to and

depending from the pulley L, is substituted for the endless band L''.

I do not claim the broad idea of combining with the valve and its alarm mechanism a shifting body for conditioning the alarm mechanism to operate, means through which the valve in opening conditions the body to shift, and means for retarding the movement of said body, nor do I broadly claim the combination with such valve, alarm mechanism, shiftable body, and retarding means, of means through which the valve in opening conditions the body to move in one direction, and thereby conditions the alarm mechanism to operate, and means whereby the return movement of the valve conditions said body to move in the opposite direction.

What I claim as new is—

1. In a device of the class described, the combination with a valve exposed to the pressure of the water flowing past it, and an alarm mechanism, of time mechanism for conditioning the alarm mechanism to operate, and connections between the valve and time mechanism through which power is transmitted from the valve to the time mechanism for controlling the latter, substantially as described.

2. In a device of the class described, the combination with a valve exposed to the pressure of the water flowing past it and an alarm mechanism, of time mechanism for conditioning the alarm mechanism to operate, said time mechanism having a suspended weight, and connections between the valve and time mechanism for holding the weight suspended while the valve is seated and permitting it to fall when the valve is unseated, substantially as described.

3. In a device of the class described, the combination with a valve exposed to the pressure of the water flowing past it, and an alarm mechanism, of time mechanism for conditioning the alarm mechanism to operate, said time mechanism having differential weights acting against each other and connections between the valve and time mechanism for restraining said weights while the valve is seated and permitting them to move when the valve is unseated, substantially as described.

4. In a device of the class described, the combination with a valve exposed to the pressure of the water flowing past it and an alarm mechanism, of time mechanism for conditioning the alarm mechanism to operate, said time mechanism having a pair of pulleys, a band surrounding them, and differential weights attached to opposite sides of said band, and connections between the valve and time mechanism for controlling it, substantially as described.

5. In a device of the class described, the combination with a casing having an opening, a valve exposed to the pressure of the water flowing past it and an alarm mechanism, of time mechanism for conditioning the alarm mechanism to operate, connections between the valve and time mechanism for controlling it, said connections including a stem passing through said opening in the casing, and inward and outward seating valves carried by the stem and adapted to control said opening, substantially as described.

6. In a device of the class described, the combination with a valve and an alarm mechanism, of time mechanism having a shifting body, and means through which the valve lifts said body to a position from which it may fall by gravity and condition the alarm mechanism to operate, substantially as described.

7. In a device of the class described, the combination with a valve and an alarm mechanism of time mechanism having a shifting body which, upon falling, conditions the alarm mechanism to operate, and having also means for retarding the falling of said body, and means through which the valve lifts said body, substantially as described.

WILLIAM A. GOLDTHWAIT.

Witnesses:

L. M. HOPKINS,

H. M. MCDONELL.