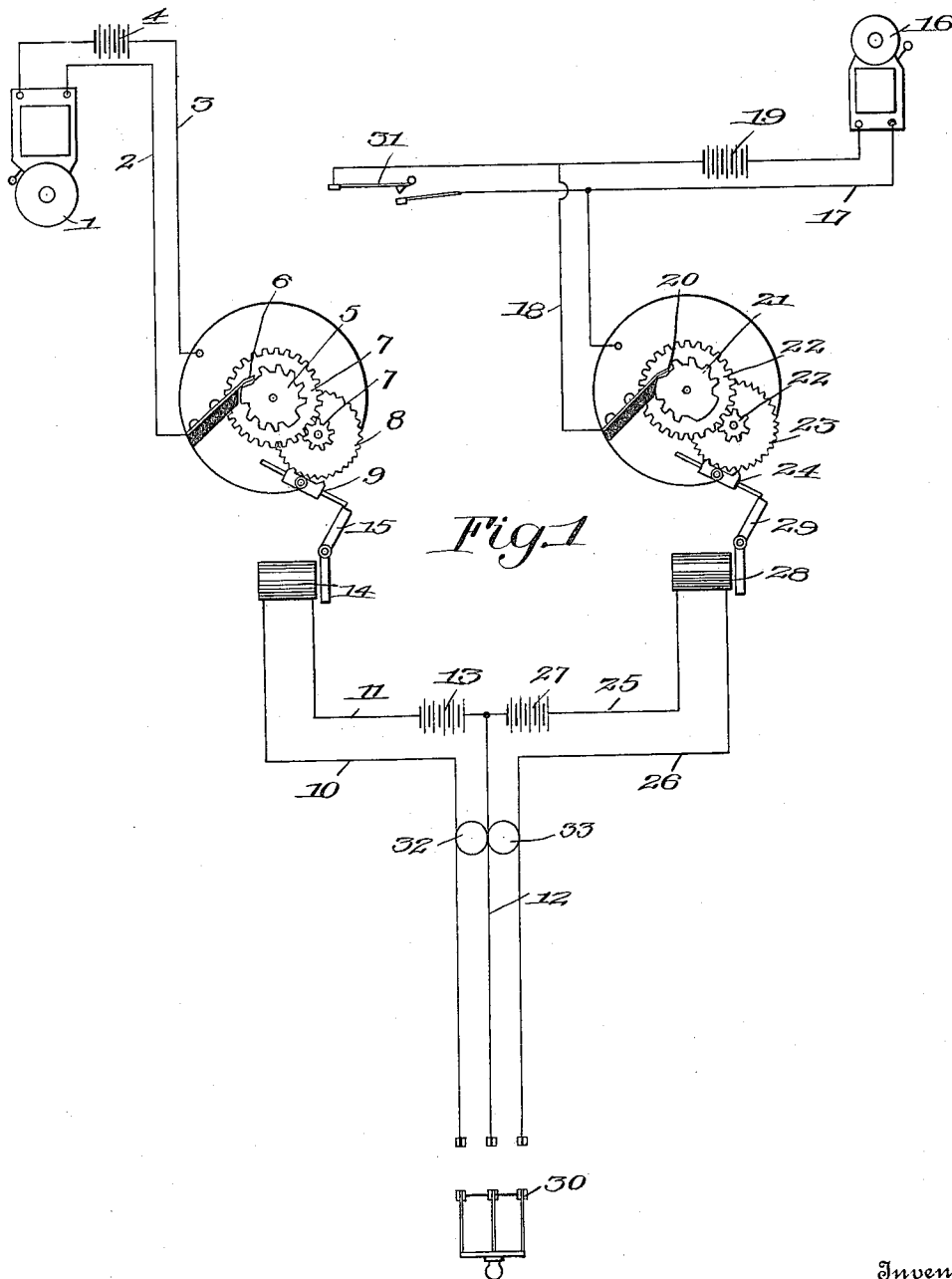


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FIRE ALARM SYSTEM.
APPLICATION FILED JULY 12, 1912.

1,159,905.

Patented Nov. 9, 1915.
2 SHEETS—SHEET 1.



Witnesses

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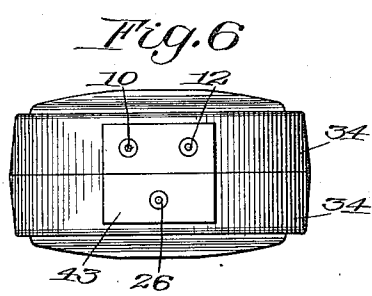
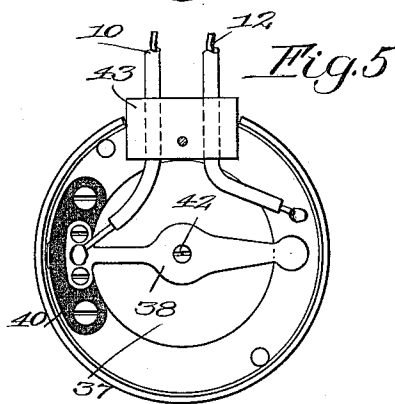
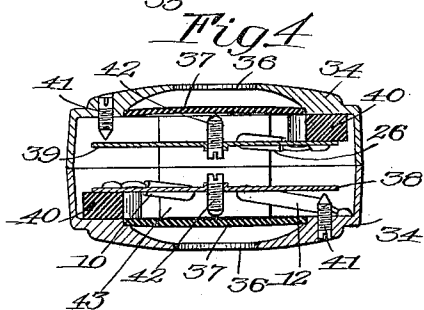
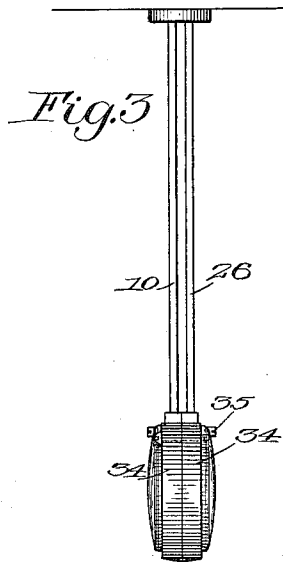
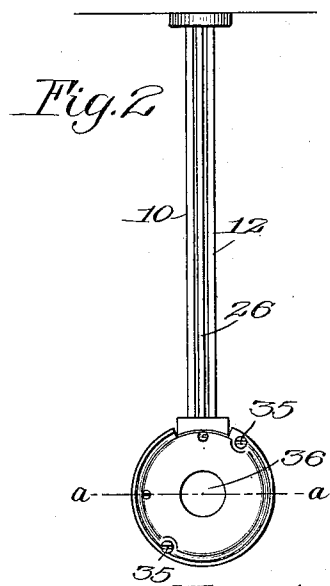
By

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Witnesses
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UNITED STATES PATENT OFFICE.

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FIRE-ALARM SYSTEM.

1,159,905.

Specification of Letters Patent.

Patented Nov. 9, 1915.

Application filed July 12, 1912. Serial No. 708,979.

To all whom it may concern:

Be it known that I, WILLIAM L. DENIO, of Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Fire-Alarm Systems, which improvement is fully set forth in the following specification and shown in the accompanying drawings.

The present invention relates to fire alarm systems and an object of the same is to provide a construction designed for school houses, factories, and other buildings, in which there is provided a local alarm within the building and a main alarm at a fire house or other station, each of said alarms being distinctive as, for instance, the local alarm being the usual four-two signal indicating Fire—Go, whereas the main alarm rings a number to indicate the location of the fire.

Another object of the invention is to provide for ringing the local alarm independently of the main alarm, in order that the system may be used for fire drills, thus making it impossible to distinguish, in the local alarm, between the fire drill and an actual fire alarm.

Still another object of the invention is to provide a construction in which a local alarm will ring automatically at a temperature lower than that which will automatically effect the operation of the main alarm, so that the occupants of the building will be notified prior to the operation of the main alarm.

A still further object of the invention is to provide a thermostat which is so mounted and constructed that it will not be affected by moisture.

To these and other ends the invention consists in certain parts and combinations of parts all of which will be hereinafter described, the novel features being pointed out in the appended claims.

In the drawings: Figure 1 illustrates diagrammatically a fire alarm system constructed in accordance with the present invention; Figs. 2 and 3 are respectively side and edge views of a thermostat used in the system; Fig. 4 is a section on the line *a—*a** Fig. 3; Fig. 5 is an inside view of one of the members of the thermostat; and Fig. 6 is a top view of the thermostat.

According to this invention, there may be provided at a central station a main alarm of any suitable construction having a circuit leading from the central station to a

local station and formed by conductors 2 and 3, the battery 4 or other source of energy being located therein. This main circuit may be controlled by a distinctive plural impulse signaling mechanism situated at the local station and consisting, in this instance, of a toothed or number wheel 5 electrically connected to the conductor 3 and adapted to cooperate with the contact 6 which is electrically connected to the conductor 2. The toothed member 5 is adapted to be driven through the medium of gears 7 by a clock spring or other motor device (not shown.) The action of the spring is controlled by the escapement wheel 8 and a pallet 9 cooperating with said escapement wheel.

The distinctive plural impulse signaling mechanism is controlled in any suitable manner, preferably, by means of the controlling circuit consisting of conductors 10, 11 and 12, the battery or other source of energy 13 being located in said circuit together with an electro-magnet 14 whose armature 15 lies, when the magnet is deenergized, in the path of the pallet 9, holding the latter against movement. When the magnet 14 is energized the armature 15 is moved out of the path of the pallet 9 permitting the latter to vibrate and the escapement wheel 8 to rotate under the action of the spring, thus driving the toothed or number wheel 5. The system also employs a local alarm 16 which, by conductors 17 and 18, connect with the distinctive plural impulse signaling mechanism and with the batteries 19 or other source of energy of the local alarm circuit.

The signaling mechanism of the local alarm circuit may comprise a spring contact 20 connected to the conductor 18 and a toothed or number wheel 21 connected to the conductor 17 and adapted to cooperate with the contact 20. The toothed wheel is driven through pinions 22 by a spring or other motor device (not shown.) The action of this spring is controlled by an escapement 23.

The distinctive mechanism of the local alarm is controlled in any suitable manner but preferably through the medium of a circuit comprising the conductors 12, 25 and 26 and having located therein a battery 27 or other suitable source of energy and an electro-magnet 28. The armature 29, in this instance, lies, when the magnet is deenergized, in the path of the pallet 24 holding the latter against vibration and the escapement wheel 23 against turning under the action of the

spring (not shown) to drive the toothed wheel 21. In this connection, attention is called to the fact that the toothed wheel has six teeth arranged to form a set of four and a set of two which will actuate the local alarm to give the signal four-two or Fire—Go.

It will be noted that the conductor 12 is common to the controlling circuit of the main alarm and also to the controlling circuit of the local alarm and that both of these circuits may be controlled by a single or common controller preferably in the form of a three blade switch. Through this switch the signaling mechanism of both the local and the main alarm will be simultaneously actuated.

Some means may be provided through which the local alarm may be actuated independently of the main alarm and preferably without disturbing the distinctive signaling mechanism, for, by the independent use of the local alarm, the signaling mechanism might run down and thus not be in condition to be actuated on by an actual fire. To this end, a manually operable switch or make and break device 31 is arranged to short circuit the distinctive signaling mechanism of the local alarm circuit so that the local alarm 16 may be actuated. This arrangement is particularly advantageous in the fire alarm systems of public schools and other places where there is provided a fire drill. There may also be provided an automatic means for actuating either or both the local and the main alarm. Preferably this automatic means consists of two thermostats 32 and 33 one bridged across the controlling circuit of the distinctive signaling mechanism for operating the main alarm and the other bridged across the controlling circuit of the distinctive signaling mechanism for operating the local alarm. The thermostat 33 which controls the local alarm is set to operate at a lower temperature than the thermostat 32 which controls the main alarm. This arrangement is provided to indicate or signal the building whenever the temperature thereof increases to a dangerous degree so that the fire or other cause may be eliminated, if possible, before sending in the regular alarm. Of course, these thermostats 32 and 33 are arranged in pairs throughout the building installed with this system.

The construction of the pair of thermostats is shown in Figs. 2 to 6, conductors 10, 12 and 26 acting as suspenders of the thermostats which are connected together in a single casing. In this instance, the double thermostat comprises two cup-shaped members 34 connected together by screws 35. Each cup-shaped member is provided with a central opening which is closed by a member 37 preferably in the form of a rubber disk which expands and contracts under the

action of changes in temperature, being set slightly concavo-convex, the convex side being disposed toward the opening 36 so that this condition is increased by the increase in temperature. The joint between the two casing members 34 is so tight that it perfectly excludes moisture from the interior of the casing. The conductor or wire 12 is connected to the casing so that the latter will serve as a part of the circuit while conductors 10 and 26 are connected with two contacts 38 and 39 within the casing. These contacts are insulated from the casing by insulating pieces 40 and are made of spring material so as to move toward stops 41 which are electrically connected to the casing members 34 and are preferably in the form of screws extending through the casing and operable from the exterior thereof to provide for the adjustment of said stops so as to vary the temperature at which the thermostats shall operate. The contacts 38 and 39 are normally held away from the stops 41 by means of spacing members 42 which are preferably in the form of screws adjustable on the contacts 38 and 39 and bearing upon the disks or members 37 which are affected by the changes in temperature. It is apparent that, when the member 37 bulges outwardly on an increase in temperature, the contact 38 or 39 will cooperate with its stop 41 and close the circuit controlled by the thermostat. The conductors 10, 12 and 26 preferably pass through insulating blocks 43 which fit tightly in the walls of the casing to exclude moisture therefrom.

Assume that the system is installed in a school or other building and it is desired to give the ordinary fire drill signal. The make and break device 31 is closed and opened to simulate the action of the distinctive signaling mechanism controlling the local alarm. The pupils or other occupants of the building go through the drill not knowing whether there is an actual fire or not. Assume that a fire is discovered within the building and it is desired to send in both the local and the main alarm, the controller or switch 30 is closed, thus causing the actuation of both distinctive signaling mechanisms. Assume again, that a fire, or conditions which might lead to a fire, arise in some portion of the building unknown to anyone therein, then the thermostats will close, the one actuating the local alarm operating first and permitting the occupants of the building to remedy the trouble without sending in the main alarm.

A fire alarm system constructed in accordance with this invention permits the sending of a distinctive plural impulse local and a distinctive plural impulse main alarm. The local alarm may be actuated to give the fire drill, and without interfering with the distinctive signaling mechanism of said alarm.

The system may be actuated manually or automatically and the automatic control is such that the local alarm operates first.

What I claim as my invention and desire to secure by Letters Patent is:

1. A fire alarm system comprising a central station, a main alarm located at the central station, a local station, a local alarm arranged at the local station, a circuit leading from the central station to the local station and including said main alarm, a local alarm, a local circuit at the local station including the local alarm, and a distinctive-plural impulse mechanism at the local station for controlling said main circuit, a distinctive-plural impulse signaling mechanism at the local station for controlling said local circuit, said last named signaling mechanism being operable independently of the signaling mechanism of the main circuit, and common means for actuating both mechanisms.
2. A fire alarm system comprising a central station, a main alarm located at the central station, a local station, a local alarm arranged at the local station, a circuit leading from the central station to the local station and including said main alarm, a local alarm, a local circuit at the local station including the local alarm, a distinctive-plural impulse mechanism at the local station for controlling said main circuit, a distinctive-plural impulse signaling mechanism at the local station for controlling said local circuit, said last named signaling mechanism being operable independently of the signaling mechanism of the main circuit, common means for actuating both mechanisms, and means at the local station for operating the local alarm independently of the main alarm.
3. A fire alarm system comprising a central station, a main alarm located at the central station, a local station, a local alarm arranged at the local station, a circuit leading from the central station to the local station, a local alarm circuit at the local station including the local alarm, two distinctive plural-impulse signaling mechanisms, one for each circuit and both located at the local station, the signaling mechanism of the local alarm being operable independently of the signaling mechanism of the main alarm, and electro-magnetic means having a single controlling switch for simultaneously effecting the operation of both signaling mechanisms.
4. A fire alarm system comprising a main alarm located at a central office, a local alarm arranged in a building to notify the occupants thereof, a circuit leading from the main alarm to the building and including said main alarm, a local circuit in the building including the local alarm, two distinctive plural-impulse signaling mechanisms,

one for controlling said main circuit and the other for controlling the local circuit, separate electromagnets for controlling said signaling mechanisms, separate thermostats for controlling the electro-magnets, and a common manually operable controller for both electro-magnets.

5. A fire alarm system comprising a central station, a main alarm located at the central station, a local station, a local alarm arranged at the local station, a circuit leading from the central station to the local station and including said main alarm, a local alarm circuit at the local station including the local alarm, two distinctive plural impulse signaling mechanisms, one for the main alarm and one for the local alarm, both located at the local station, the signaling mechanism of the local alarm being operable independently of the signaling mechanism of the main alarm, a common manually operable means for simultaneously controlling both signaling mechanisms, and a manually operable device for operating the local alarm independently of the main alarm.

6. A fire alarm system comprising a central station, a local station, a main alarm at the central station, a local alarm, a main circuit connecting the local station with the central station and including the main alarm, a circuit including the local alarm and located at the local station, a distinctive plural-impulse signaling mechanism located at the local station and controlling the main circuit, a distinctive plural-impulse signaling mechanism located at the local station and controlling the local circuit, said last named signaling mechanism being operable independently of the signaling mechanism of the main circuit, and means for effecting the operation of the distinctive plural impulse signaling mechanism of the main circuit at the local station upon the operation of the distinctive plural impulse signaling mechanism of the local circuit.

7. A fire alarm system comprising a central station, a local station, a main alarm at the central station, a local alarm, a main circuit connecting the local station with the central station and including the main alarm, a circuit including the local alarm and located at the local station, a distinctive plural impulse signaling mechanism located at the local station and controlling the main circuit, a distinctive plural-impulse signaling mechanism located at the local station and controlling the local circuit, said last named signaling mechanism being operable independently of the signaling mechanism of the main circuit, and means for effecting the operation of the said distinctive plural-impulse signaling mechanism of the main circuit at the local station upon the operation of the distinctive plural-impulse signaling mechanism of the local circuit.

pulse signaling mechanism of the local circuit; said means embodying an electro-magnet and a circuit including the same closed when the distinctive plural-impulse signaling mechanism of the local circuit is operated.

8. A fire alarm system comprising a central station, a local station, a main alarm at the central station, a local alarm at the local station; a main circuit connecting the local station with the central station and including the main alarm, a circuit including the local alarm and located at the local station, a distinctive plural-impulse signaling mechanism located at the local station and controlling the main circuit, a distinctive plural-impulse signaling mechanism located at the local station and controlling the local circuit, said last named signaling mechanism being operable independently of the signaling mechanism of the main circuit; means for effecting the operation of the distinctive plural impulse signaling mechanism of the main circuit at the local station upon the operation of the distinctive plural-impulse signaling mechanism of the local circuit, said means embodying an electro-magnet and a circuit including the same closed when the signaling mechanism of the local circuit is operated, and

means permitting the local alarm to be operated without energizing the magnet of the distinctive plural impulse signaling mechanism of the main circuit.

9. A fire alarm system comprising a central station, a local station, a main alarm at the central station, a local alarm at the local station, a main circuit connecting the local station with the central station and including the main alarm, a circuit including the local alarm and situated at the local station, a distinctive plural impulse signaling mechanism located at the local station and controlling the main alarm, a distinctive plural impulse signaling mechanism located at the local station and controlling the local circuit, said last named signaling mechanism being operable independently of the signaling mechanism of the main circuit, separate electro-magnets for the two signaling mechanisms, a common means for controlling both magnets, and means for energizing the magnet of the signaling mechanism of the local circuit independently of the electro-magnet controlling the other signaling mechanism.

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Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."