Nov. 13, 1934. J. J. FORD 1,980,194

THERMOSTATICALLY CONTROLLED SIGNAL

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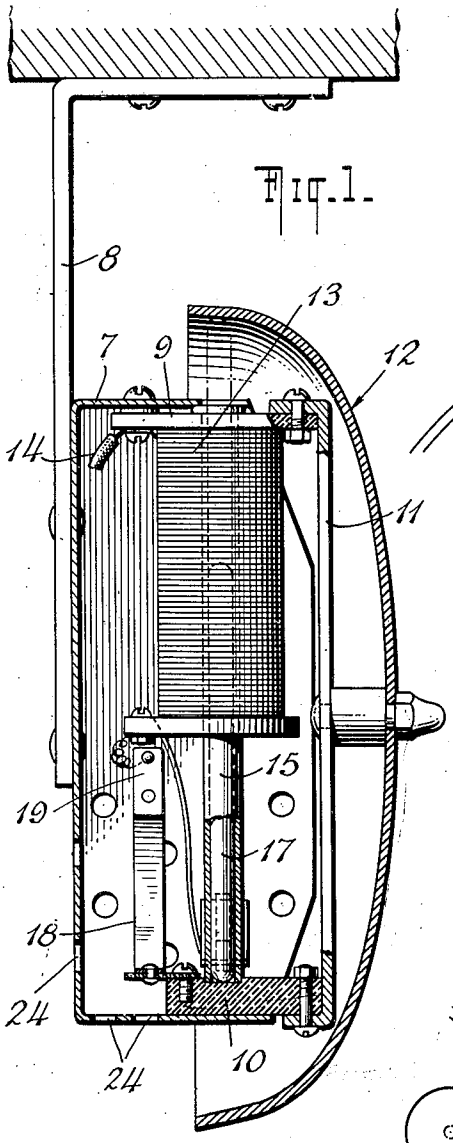

Fig. 1.

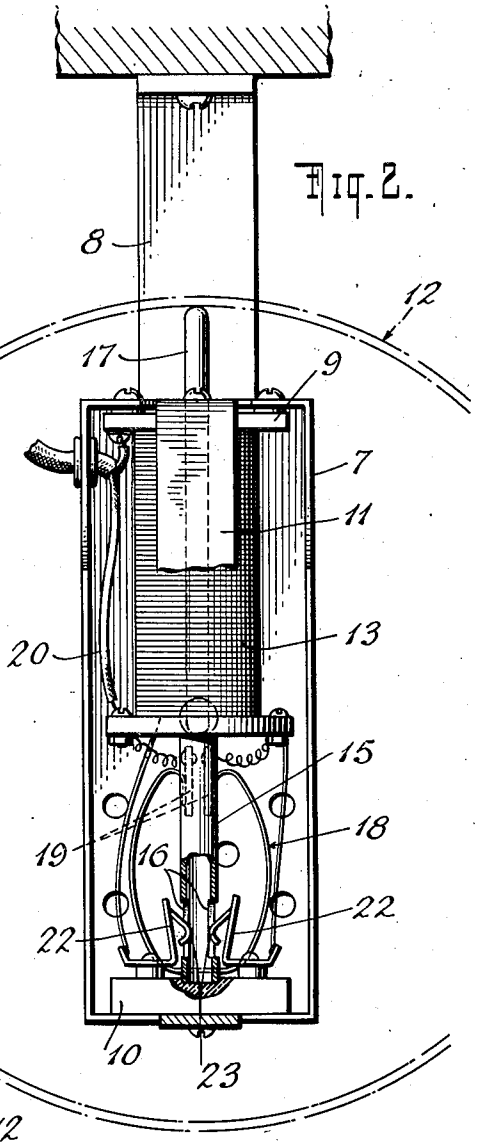

Fig. 2.

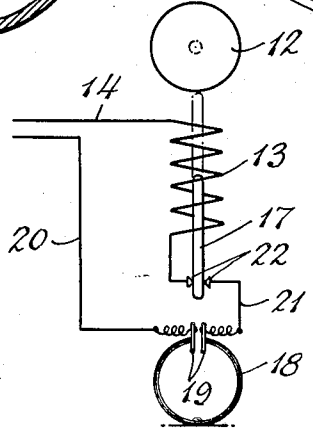

Fig. 3.

INVENTOR
JOHN J. FORD
BY Fritz Ziegler Jr.
ATTORNEY

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Fig. 4.

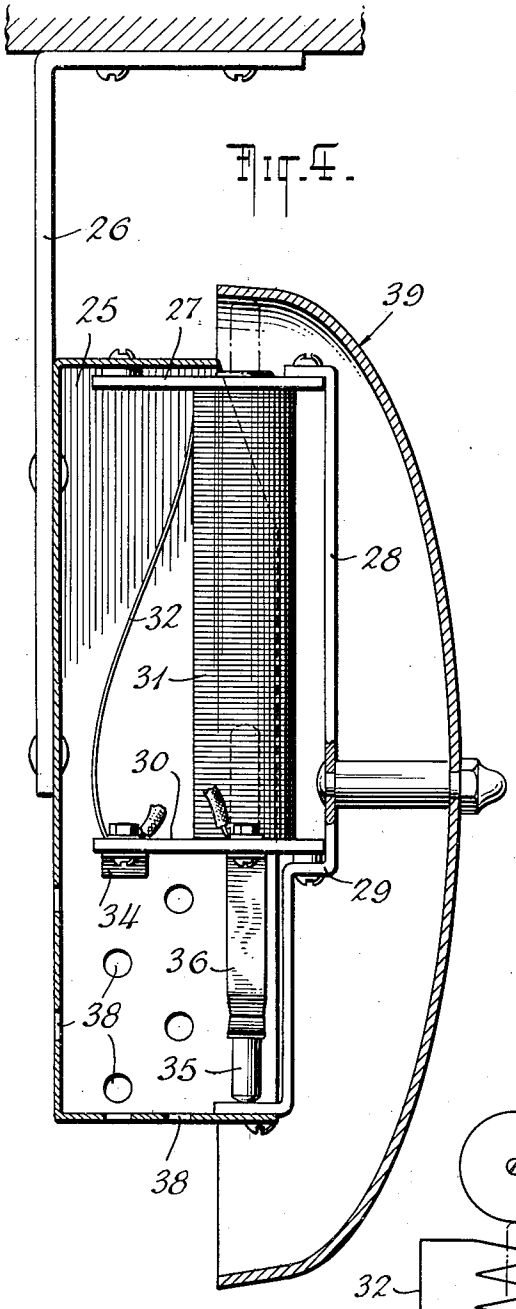
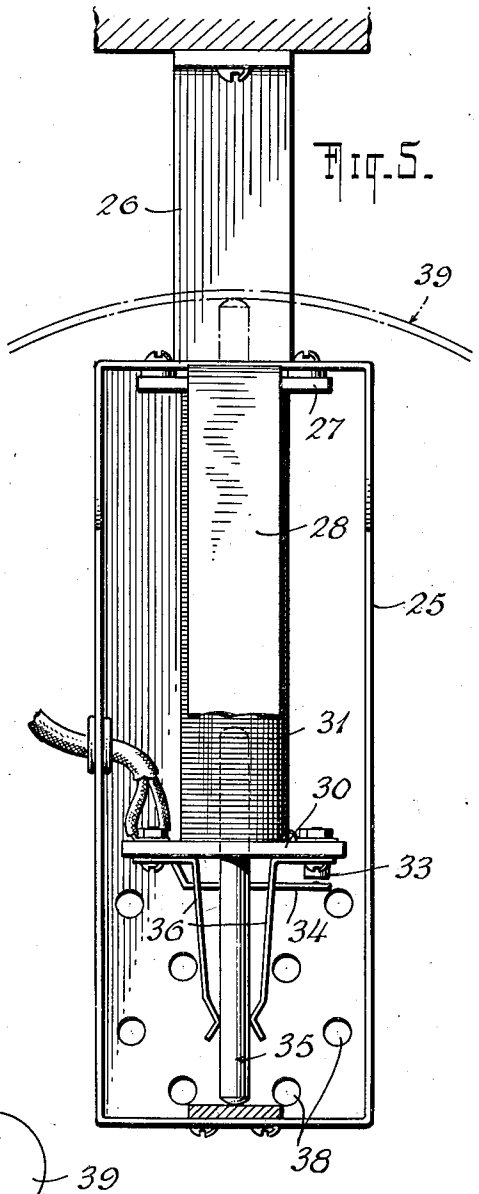


Fig. 5.



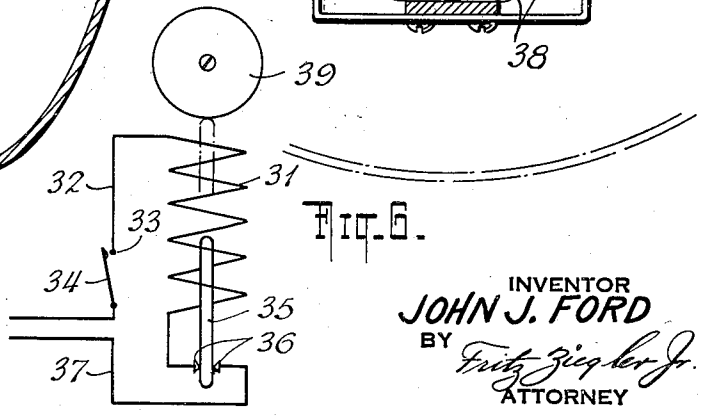


Fig. 6.

INVENTOR
JOHN J. FORD
BY Fritz Ziegler Jr.
ATTORNEY

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UNITED STATES PATENT OFFICE

1,980,194

THERMOSTATICALLY CONTROLLED SIGNAL

John J. Ford, Jackson Heights, N. Y., assignor to Fire Detector Co., Inc., New York, N. Y., a corporation of New York

Application April 27, 1931, Serial No. 533,071

2 Claims. (Cl. 177—311)

This invention relates to improvements in signalling devices and has particular reference to a thermostatically controlled fire alarm.

An object of the invention is to provide an improved signal of simple, practical and compact construction wherein a thermostatic switch is utilized to control the energization of an electromagnetic device for the purpose of operating an audible signal.

The above and other objects will appear more clearly from the following detailed description when taken in connection with the accompanying drawings which illustrate preferred embodiments of the inventive idea.

In the drawings:—

Fig. 1 is a vertical longitudinal section through a signalling device embodying one form of the invention;

Fig. 2 is a front elevation partly broken away and shown in section, and with the audible signal indicated by dot and dash lines;

Fig. 3 is a diagrammatic view of the signalling circuit;

Figs. 4 and 5 are views similar to Figs. 1 and 2 respectively illustrating a slightly different form of the invention; and

Fig. 6 is a diagrammatic view of a circuit employed in the embodiment of Figs. 4 and 5.

Referring more particularly to Figs. 1 to 3, the device is shown as comprising a casing 7 of rectangular formation, open at its front and adapted to be attached to a suitable support by means of a bracket 8. In the upper and lower ends of the casing 7 there are suitably secured plates 9 and 10 of insulated material, said plates projecting beyond the open end of the casing and being connected by a supporting member or strip 11. At approximately the center of said member 11 the same has mounted thereon an audible signal 12 in the form of a gong which is substantially centered with respect to the casing 7 so that the latter will project into the open side of the gong, as shown in Fig. 1.

Mounted within the casing 7 and depending from the plate 9 in a vertical position is an electromagnetic device 13 in the form of a solenoid one terminal of the winding of which is permanently connected to a source of current supply through the conductor 14. The core of said solenoid is extended beyond the lower end of the winding in the form of a sleeve 15 the lower end of which rests upon the insulated plate 10 and adjacent said lower end the sleeve is provided with opposed openings 16 therein, the purpose of which will presently appear. The plunger 17 of the solenoid is movable axially through the core and in the sleeve 15 and upon energization of the solenoid is adapted to be projected beyond the upper end thereof and struck against the gong 12 the rim portion of which is in alignment with the direction of movement of the plunger.

The thermostatic switch is, in the present instance, in the form of a bowed bi-metallic element 18 which is mounted upon the plate 10 rearwardly of the sleeve 15 and which under normal temperature has its ends in spaced relation. Said ends carry contacts 19 one of which is joined to the source of current supply through the conductor 20 while the other is connected to conductor 21.

Also mounted upon the plate 10 on opposite sides of the sleeve 15 are a pair of terminals 22 having spring contacts 23 which project into the opening 16 in said sleeve so as to be engaged by the plunger 17 when the solenoid is de-energized. One of said terminals 22 is connected to the conductor 21 while the other is connected to the lower end of the winding of the solenoid. The casing 7 is preferably provided with a plurality of apertures 24 therein for the free admission of heat into the casing so that when the temperature therein increases and finally reaches a predetermined point the thermostatic element 18, affected by said increase of temperature, will contract and close the contacts 19. The circuit is thereby closed for the energization of the solenoid 13 which causes the plunger 17 thereof to rise through the bore of the solenoid and strike the gong 12 and sound an audible signal. As the plunger 17 rises the lower end thereof passes between the contacts 23 thereby breaking the energizing circuit for the solenoid at this point. The plunger now returns toward its normal position by gravity and upon again engaging the spring contacts 23 the energizing circuit for the solenoid is again closed and the same operation of sounding the signal is repeated. This operation continues until the surrounding temperature is reduced to the point where the contacts 19 are separated to permanently open the circuit for the solenoid. Then, upon deenergization of said solenoid, the plunger returns to its lower position by gravity.

In Figs. 4 to 6 the casing 25 is of substantially the same construction as the casing 7 and is supported by a bracket 26. An upper plate 27 is secured to the casing and projects therefrom, having fastened to its outer end a supporting member or strip 28 the lower end of which is fixed to the bottom of the casing. Intermediate its ends

the member 28 is offset as indicated at 29 to provide a means for attaching the lower plate 30 thereto. Mounted between the plates 27 and 30 is the solenoid 31 one end of the winding of which is connected to a conductor 32 which leads to the contact 33 of a normally open thermostatic switch the bi-metallic contact 34 of which is carried by the plate 30.

The solenoid 31 has a plunger 35 which normally extends below the plate 38 and engages a pair of spring contacts 36 one of which is connected to the winding of the solenoid and the other to the conductor 37 leading to the source of current supply. Upon closure of the thermostatic switch, due to heat entering the casing 25 through the apertures 38 therein, the circuit for energizing the solenoid 31 is closed through said switch, contacts 36 and plunger 35, whereupon the latter is projected upwardly and beyond the casing 25 until it strikes the gong 39 supported by the member 28. As soon as the plunger 35 is disengaged from the contacts 36 the energizing circuit for the solenoid 31 is opened and the plunger drops, by gravity, until it again engages said contacts, thereby again closing the circuit for the solenoid. This operation is repeated as long as the thermostatic switch remains closed, thus intermittently operating the audible alarm.

What is claimed is:

1. In a fire detecting and alarming device, a U-shaped bracket having attached thereto shelves of insulating material, a solenoid mounted on the upper shelf, a metallic tube of non-magnetic material passing through the center of the solenoid, a plunger of magnetic and conducting material slidable in said tube, said plunger having a tapered nose, a pair of spaced flat spring contact members mounted on the lower shelf between which said plunger is adapted to be forced by gravity, a casing to which said bracket is attached, and a bell attached to said bracket, said solenoid being in series circuit with the spring contact members, said plunger when in contact with the spring contact members closing a circuit through the solenoid.

2. In a fire detecting and alarm device a U-shaped bracket having attached thereto shelves of insulating material, a solenoid mounted on the upper shelf, a tube of non-magnetic material passing through the center of the solenoid, a plunger of magnetic and conducting material slidable in said tube, said plunger having a cam surfaced nose, a pair of spaced spring contact members mounted on the lower shelf between which said plunger is adapted to be forced by gravity, a casing attached to the bracket, a bell attached to the bracket, said solenoid being connected in series circuit with the spring contact members and a source of current, a thermostatic switch in series with the circuit through the solenoid, said thermostatic switch being mounted on the lower shelf adjacent the spring contacts.

JOHN J. FORD.