No. 821,416. PATENTED MAY 22, 1906.

J. H. HUMMEL.

AUTOMATIC VENTILATING APPARATUS.

APPLICATION FILED APR. 6, 1905.

Fig. 1

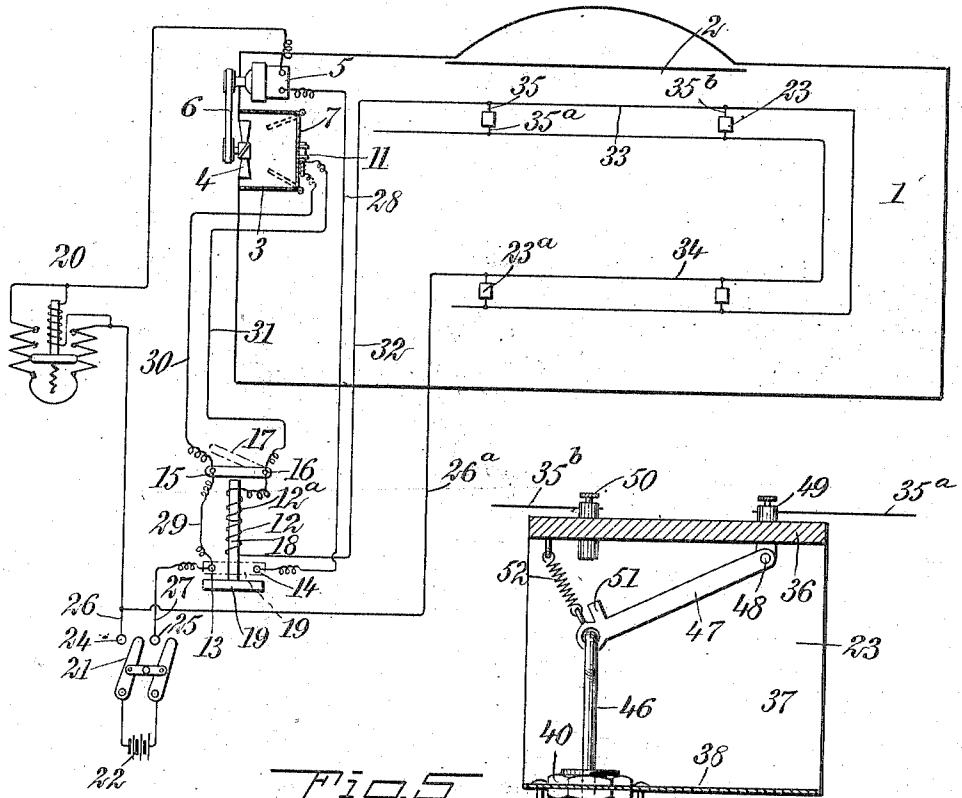
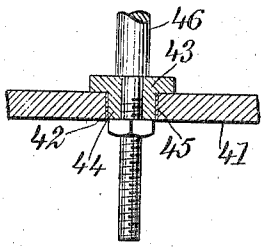


Fig. 5

Fig. 3

Fig. 4



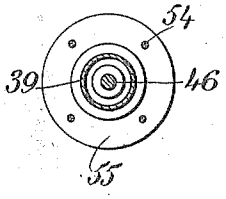
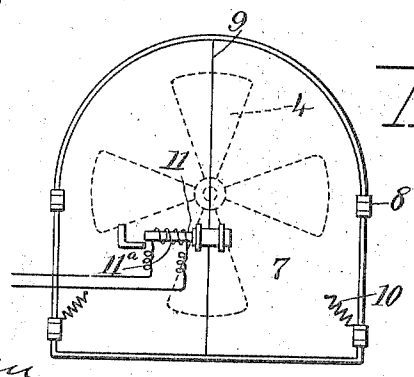


Fig. 2



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AUTOMATIC VENTILATING APPARATUS.

No. 821,416. Specification of Letters Patent. Patented May 22, 1906.

Application filed April 6, 1905. Serial No. 254,116.

To all whom it may concern:

Be it known that I, JAMES H. HUMMEL, a citizen of the United States, and a resident of Mount Vernon, in the county of Westchester and State of New York, have invented a new and Improved Automatic Ventilating Apparatus, of which the following is a full, clear, and exact description.

This invention relates to ventilation, and concerns itself especially with apparatus intended to be used in theaters and similar places.

The object of the invention is to provide automatically-operated ventilating apparatus which is simple and reliable in operation.

A special purpose has been to provide means for preventing the body of the theater from filling with smoke in case of a fire on the stage or in the wings.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

In the drawings, Figure 1, which is largely diagrammatic, represents a stage in plan provided with my apparatus, a certain part of the apparatus being shown in section. Fig. 2 is a front elevation of a fan-house or box constituting a feature of the apparatus. Fig. 3 is a substantially vertical section through a thermostat which constitutes a feature of the invention. Fig. 4 is a vertical section through a portion of the thermostat and illustrating its mode of operation, and Fig. 5 is a section taken substantially upon the line 5 5 of Fig. 3.

Referring more particularly to the parts, 1 represents in plan a stage of a theater which would be cut off from the body of the theater by means of a movable curtain 2 of the usual form. In applying my invention I provide near one wall of the theater a fan box or case 3, within which there is mounted an exhaust-fan 4, the same being driven by an electric motor 5, as indicated, through the medium of a belt 6. The inner wall of the box 3 would be formed of two swinging doors 7, hinged at 8, as indicated, and meeting on a central vertical line 9, as shown most clearly in Fig. 2. Preferably on their inner side these doors are normally held closed by suitable springs 10, as shown, and the doors are further provided with an electrically-operated latch 11. There is also provided at a suitable point, preferably on the usual switchboard, an electrically-operated switch 12. This switch 12 comprises four contacts 13, 14, 15, and 16, arranged as shown. Between the contacts 15 and 16 a switch member 17 is pivotally mounted at 16, so that the said switch member may constitute a bridge connecting these two contacts in a well-known manner. Between the contacts 13 and 14 a solenoid-core 18 is arranged, and to the lower extremity of this core is attached a transverse member or bar 19, which may operate to bridge the contacts 13 and 14 in a manner which will appear more fully hereinafter. At a suitable point, preferably on the same switchboard, I arrange an electrically-controlled variable resistance 20. There is also provided a main switch 21 and a battery 22.

At suitable points above the stage or in the wings of the same I provide a plurality of thermostats 23. These are preferably four or more in number, as shown, and may be located as indicated.

From the contacts 24 and 25, which may be bridged by the double switch 21, so as to connect the contacts electrically with the battery 22, wires 26 and 27 pass. The wire 26 passes through the electrically-controlled resistance 20, beyond which it passes to the motor 5, as shown. A second wire or conductor 28 leads from the motor 5 to the contact 14 aforesaid. The conductor 27 leads to the contact 13, which contact is connected with the contact 15 through a conductor 29. Beyond the contact 15 a conductor 30 leads to the electrically-operated latch 11, passing through the coil of a solenoid 11^a at this point. Beyond the latch 11 a conductor 31 leads to the contact-point 16, and this contact-point is connected with the coil of a solenoid 12^a, of which solenoid the aforesaid member 18 constitutes the core. Beyond the coil of the solenoid 12^a a conductor 32 leads off to a leg 33 of the circuit, which is disposed in a suitable manner above the stage, preferably near the ceiling, as will be readily understood. From the conductor 26 a branch 26^a leads, which branch terminates in a leg 34 of the circuit, which leg is arranged in substantial parallelism with the leg 33, referred to above. The legs 33 and 34 are connected by thermostat-conductors 35, arranged in parallel, as shown.

The construction of the thermostats 23 is very clearly shown in Figs. 3 to 5. They are of simple construction, comprising a plate 36, of slate or similar material, constituting a base for the body 37, formed, preferably, of a plate of copper depending therebelow, as

shown. The said copper plate presents a horizontal extension 38 at its lower edge, which affords means for supporting a brass tube 39, which projects vertically downward from the wall 38, as indicated, the upper extremity of the said tube being secured in position in any suitable manner, as by the nuts 40. The lower extremity of the tube 39 is closed by a head 41, preferably of brass or copper, and this head, as shown in Fig. 4, is provided with an opening 42. In this opening there is seated a plug 43, having a body 44 of reduced diameter with respect to the opening 42, and this plug is secured in position by a quantity of soft solder or similar material 45, which is placed around the body of the same in the opening 42. The plug 43 is secured upon a stem 46 in any suitable manner, as shown. The said stem projects upwardly, as indicated, and is attached at its upper extremity to a switch member 47. This switch member 47 is pivoted at 48 to a metallic member, such as a binding-post 49, and a similar metallic member 50 is placed opposite the head 51 of the switch member, as shown.

A section 35^a of the thermostat-wire is attached to the binding-post 49 and the section 35^b opposite attached to the opposite binding-post 50. The extremity of the switch member 47 is normally impelled to move upwardly by a spring 52, attached as shown. From this arrangement it should be readily understood that if the plug 43 should become disconnected the spring 52 will operate to draw the switch member 47 upwardly and bring its head 51 in contact with the extension of the binding-post 50 in such a manner asto close the circuit through the thermostat-wires 35.

In order to prevent the stem 46 or the tube 39 from being struck, I provide a guard-frame 53, which is formed of vertically-disposed rods 54, disposed as shown in Fig. 5, and these support at their lower extremities a circular guard-plate 55.

The mode of operation of the apparatus will now be described.

When the switch 21 is closed, no effects are produced in the circuit, as it will be observed that the circuit remains open at the thermostats 23. In case of a fire a rise of temperature above the stage to a predetermined degree would result in releasing one or more of the stems 46, whereupon the corresponding spring 52 would operate, as described above, to close connection between the legs 33 and 34. Suppose, for instance, that the thermostat 23^a should fuse, as suggested, the switch 21 being in closed position so as to put the poles of the battery 22 in connection with the contacts 24 and 25. Immediately when the thermostat 23^a fuses an electrical circuit would be established, as follows: from the contact 24 and conductor 26 through the branch conductor 26^a, the leg 34, the fused thermostat 23^a, and the leg 33. From the leg 33 the circuit would pass through the conductor 32, energizing the coil of the solenoid 12^a of the electric switch 12. From the coil the circuit would pass through the bridge member 17, connection 29, and conductor 27 back to the battery. When the coil of the solenoid 12^a is energized, it will be drawn upwardly, and an extension from the upper extremity of the core 18 thereof will strike against the bridge member 17, so as to force the same upwardly into substantially the position in which it is shown in dotted outline in Fig. 1. Displacing the bridge member 17 in this manner operates to throw the electrically-operated latch 11 into the circuit, the circuit now being established as follows: through the conductor 31, through the latch 11, through the conductor 30, the contact 15, connection 29, conductor 27. As the movement of the core 18 continues the bridge-bar 19 short-circuits the contacts 13 and 14. In doing so a circuit is established through the conductor 26, the electrically-controlled rheostat 20, and the motor 5, the circuit passing from the motor through the conductor 28 to the contact 14, bridge-bar 19, and conductor 27. In this way a circuit is first established through the latch 11, which releases the swinging door 7, and a circuit is also established through the motor. Closing the circuit through the latch operates, of course, to release it so as to permit the doors to swing open. The motor 5 and the fan 4 being now set in motion, the fan operates to produce a partial vacuum in the interior of the box 3, and the air-pressure on the faces of the doors 7 operates to swing the same inwardly into some such position as that in which they are shown in dotted lines in Fig. 1. The smoke which accumulates above the stage from the fire would be drawn out by the fan and discharged into the outer air directly or else through a suitable flue, if found desirable.

The apparatus described constitutes a simple automatic means for removing the smoke from a burning building and is thought to be especially beneficial when used in the connection suggested. As is well known, much of the confusion and panic that often results in theater fires is occasioned by the passing of the smoke into the body of the theater, which, even in small quantities, tends to alarm the audience and in great quantities may produce suffocation. With this apparatus in operation if the curtain is run down, the body of the theater can be kept free from smoke while the audience finds exit.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In an apparatus of the class described in combination, an exhaust-fan, an electric mo-

tor therefor, automatically-operated circuit-closers for the motor-circuit, and a box for said fan having outwardly-swinging doors normally closed and arranged to be opened automatically by the air movement created by said fan.

2. In apparatus of the class described in combination, an exhaust-fan having an electric motor, a box for the same having doors adapted to swing in the direction of the air-current created by said fan, means normally tending to hold said doors in a closed position, an electrically-controlled latch normally locking said doors in said closed position, a plurality of thermostats and a circuit including said thermostats, said motor and said latch.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES H. HUMMEL.

Witnesses:
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JNO. M. RITTER.