

March 24, 1936.

H. H. LORENZ
REGISTER AND CONTROL

2,034,700

Filed Aug. 17, 1933

Fig. 1.

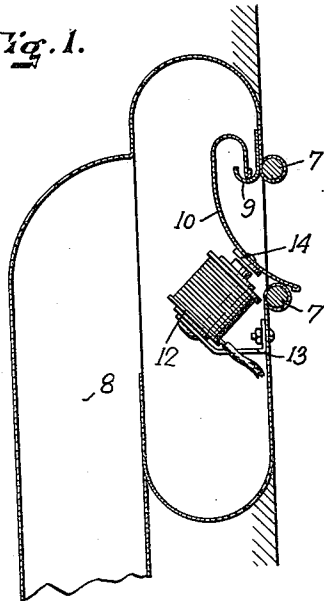


Fig. 2.

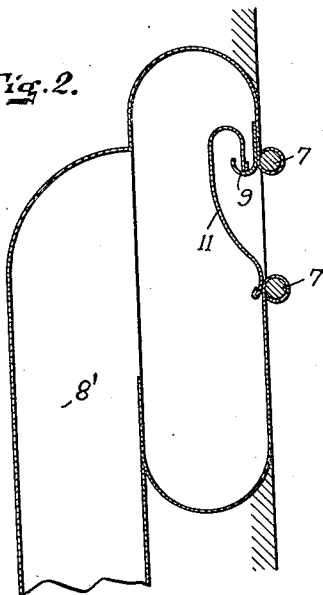


Fig. 3.

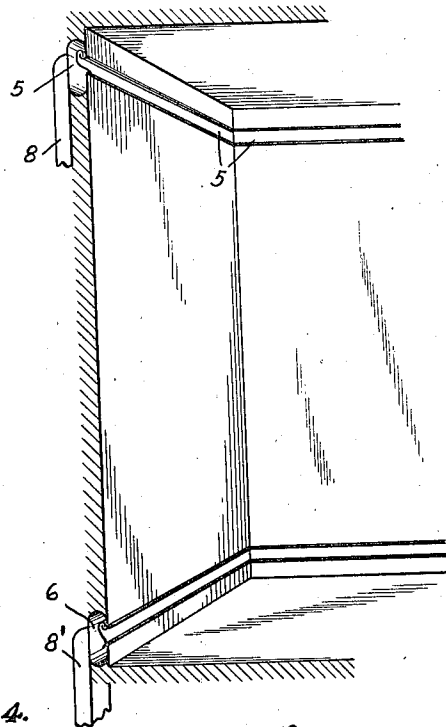


Fig. 4.

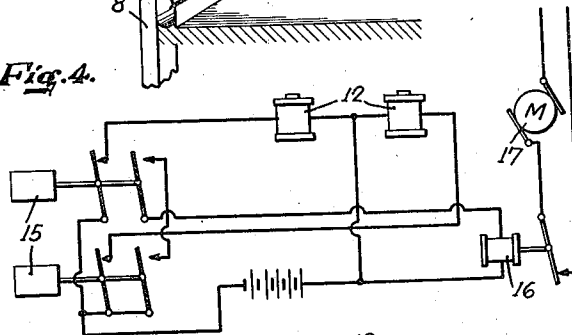
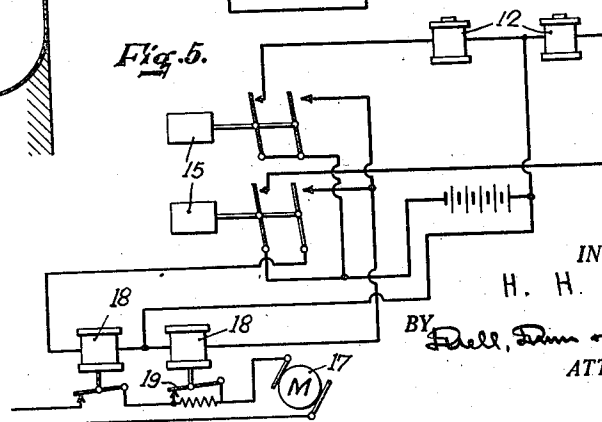


Fig. 5.



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UNITED STATES PATENT OFFICE

2,034,700

REGISTER AND CONTROL

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Application August 17, 1933, Serial No. 685,534

3 Claims. (Cl. 98—101)

This invention relates to a structurally and functionally improved control capable of use in numerous different associations, but primarily intended to be employed in connection with heating, ventilating, cooling and air-conditioning systems.

It is an object of the invention to furnish an apparatus of this character which will evenly and efficiently distribute into or withdraw air from an enclosure, such as a room, and by means of which the air within the room will be caused to assume the desired condition in a very short interval of time, and without annoyance or discomfort to the occupants of such enclosure during such interval.

A further object is that of furnishing a control for association with systems of the types aforementioned, and by means of which the air conditioned within a number of separate enclosures may be individually controlled so that an extremely simple and economical system is provided.

An additional object is that of furnishing an apparatus of this character which will embrace relatively few parts, each individually simple and rugged in construction and cooperating with great efficiency for indefinite periods of time, without any necessity of repairs or replacements. Consequently, the apparatus contemplated within the scope of the present invention may be economically manufactured and thereafter maintained at minimum expense.

With these and other objects in mind, reference is had to the attached sheet of drawing illustrating practical embodiments of the invention, and in which:

Figure 1 is a transverse sectional view, taken through a discharge duct, and showing the control associated therewith;

Figure 2 is a similar view of an intake duct or register;

Figure 3 is a perspective view showing the application of both of these controls to an enclosure;

Figure 4 is a diagrammatic view of a wiring circuit which may be employed in connection with a control apparatus, and

Figure 5 is a view similar to Figure 4, but showing a second form of wiring diagram.

Referring primarily to Figure 3, the numeral 5 generally indicates a discharge duct, and 6 an exhaust duct. For the sake of illustration, these ducts have been shown as embodied within the walls of an enclosure and as extending throughout the entire area of these walls. While in many

respects, such a layout is preferable, it will be appreciated that the ducts might be confined to one wall of the enclosure, or even extend throughout a portion only of one or more walls. Likewise, while they are preferably embodied within the wall structure, this is not altogether essential, although it is preferred that, as shown, they be disposed adjacent the ceiling and floor surfaces.

Both of these ducts may be formed of sheet metal or similar material to provide channel members, in the outer faces of which a gap is provided, the edges of such gap being in each instance defined by spaced beads 7. Extending to the rear faces and in communication with the interior of the channel members 5 and 6, are ducts 8 and 9, any desirable number of the latter being furnished along the length of the channel members. In case merely one such duct is associated with each member, then it is preferred that the parts be connected substantially intermediate the ends of the channel member.

In both the discharge and intake channel members, it is preferred that there be provided adjacent the upper bead and upon the inner face of each member, a hook shaped extension 9. In the case of the channel member through which air is admitted to the enclosure, there is associated with this ledge or extension a shutter or damper 10, which has a generally curved body with its upper edge bent outwardly and downwardly and resting within the extension or flange 9, the lower edge of the body extending outwardly through the gap between the bead members 7 and normally in contact with the lower bead. In the case of the second member, the damper or shutter 11 is similarly constructed and arranged, except that it does not extend through the gap and in its normal position lies substantially in contact with the inner face of the lower body. It will be appreciated, in connection with both of these members, that the damper or shutter elements are suspended substantially in a condition of balance. In the case of the channel member from which air is discharged into the enclosure, it is found that whether the air be heated or cold, it will flow from the duct 8 into the member 5 and "build up" throughout substantially the entire length of the same, whereupon sufficient pressure will occur to swing the shutter outwardly and shift the inner face from contact with the lower bead. Thereupon, the conditioned air will be discharged in the form of a thin ribbon throughout the entire length of the member and this discharge will continue so long as sufficient fluid flows through the duct 8. If such flow in-

creases in volume, the shutter will automatically accommodate itself to such increase by swinging outwardly to a greater extent. Upon the cessation of flow, the parts will return to the position shown in Figure 1, whereupon the entire cycle may be repeated.

In the case of the channel member through which air is withdrawn from the enclosure, a reverse of the foregoing action occurs. Either due to the building up of pressure within the enclosure, or due to suction communicated through the duct 8' to the channel member 6, the shutter 11 will swing inwardly to an extent proportional to the volume of air being discharged or withdrawn. By the provision of such a shutter the entrance of dust into the channel member is normally prevented. When the shutter finally does open, any dust particles in suspension will move with relatively great speed incident to the rapidity of flow of the air through the channel member, and will consequently not be deposited within the same.

Now with a view to controlling the air conditioned within the individual enclosures, it is preferred that an electromagnet be associated with the channel 5. This element, which has been indicated at 12, may be mounted upon a bracket 13 secured to the inner face of such member and a cooperating armature 14 may be secured to the shutter 10. It is obvious that when the electromagnet is energized, the shutter will be drawn firmly into contact with the lower bead, thus preventing the further discharge of air from the member 5. Energization of the electromagnet may be accomplished by, for example, arranging the same in circuit with a thermostat individual to the enclosure with which such channel is associated.

Referring to Figure 4, a pair of double contact thermostats have been shown at 15. As afore brought out, the electromagnets 12 are arranged in series with such thermostats so that when the dry bulb temperature of the air reaches a predetermined point, the electromagnets are energized to close the shutters. The second contacts of these thermostats may be arranged in series, one with the other, so that when the last thermostat closes, a relay 16 will be energized to interrupt the circuit by a motor 17, which latter controls a blower communicating with the duct 8 and/or an oil burner or stoker coupled to the furnace. Obviously in lieu of, or supplemental to the thermostats, further controls might be provided, particularly if the invention were employed in connection with an air-conditioning and cooling system where wet bulb temperature, dew point and similar factors are essential features in the condition to be maintained. This illustration has not been resorted to in that the 'hook-up' necessary in this connection will be well understood by anyone skilled in the art, and to include such illustration would accordingly needlessly complicate the present views.

In Figure 5 a further form of wiring diagram has been shown. Here again, double point thermostats have been indicated at 15 and which are arranged in series with the electromagnets 12. However, in this view, at least one thermostat is arranged in series with a relay 18, which controls a switch 19 capable of being thrown to positions at which the motor 17 operates at greater or lesser speeds. In such a case it will be appreciated that as individual enclosures reach a condition desired, the speed of operation of the blower will be decreased so as to supply sufficient air in proper condition to the other enclosures, and when the latter reach such condition, cessation of operation will result.

Thus, among others, the several objects of the invention are achieved. It will be understood that the structure hereinbefore illustrated and described, might be modified in numerous particulars, and that the wiring diagrams as afore brought out, could be rearranged or added to, as desired. In fact, under certain conditions, electromagnetic controls might be dispensed with.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A control including, in combination, a member providing a passage way formed with an opening for the flow of fluid, a shutter element balanced to extend adjacent said opening and unrestrained to swing with respect to said member, a bracket extending from said member and within the same, an electromagnet mounted by said bracket and an armature secured to said shutter whereby said magnet when energized will bring said shutter to a position obstructing the flow of fluid through said opening.

2. A control including, in combination, a member providing a passage way formed with an opening for the flow of fluid, a support, hook shaped in cross section and secured to the inner face of said member adjacent the upper edge of its opening, a shutter having a hook-shaped upper end disposed within said support, and the body of said shutter being free to swing and extending downwardly and through said opening, the under surface of said shutter being disposed adjacent the edge of said member.

3. A control including, in combination, a member providing a passage way formed with an opening for the flow of fluid, a support, hook shaped in cross section and secured to the inner face of said member adjacent the upper edge of its opening, a shutter having a hook shaped upper end disposed within said support, the body of said shutter being free to swing and extending downwardly through said opening, the under surface of said shutter being disposed adjacent an edge defining the opening of said member, and means for forcing such under surface of said shutter and edge of said member into intimate contact with each other.

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