

May 6, 1941.

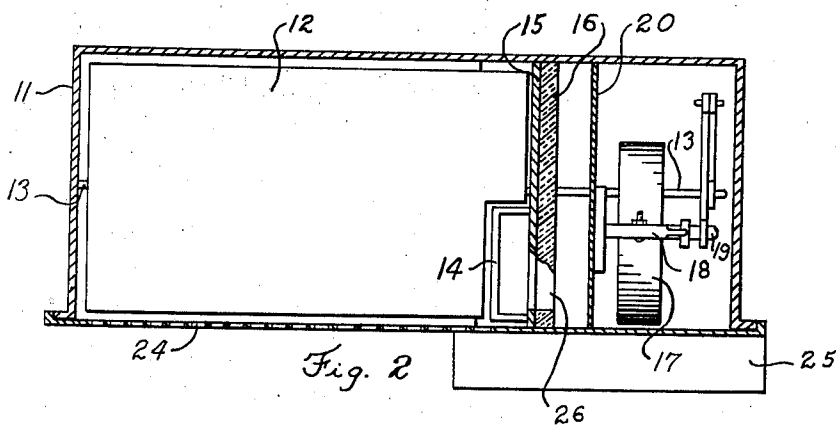
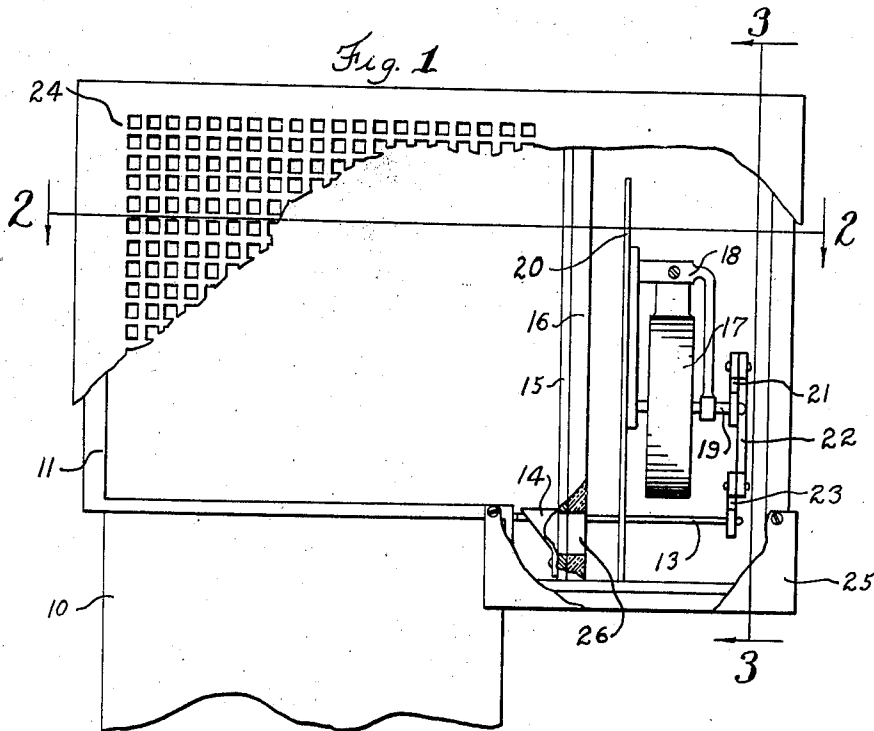
C. L. AKERS

2,241,108

AIR FLOW CONTROL

Filed March 22, 1940

2 Sheets-Sheet 1



INVENTOR
CECIL LYNN AKERS,
By *Minturn Minturn*,
ATTORNEYS

May 6, 1941.

C. L. AKERS

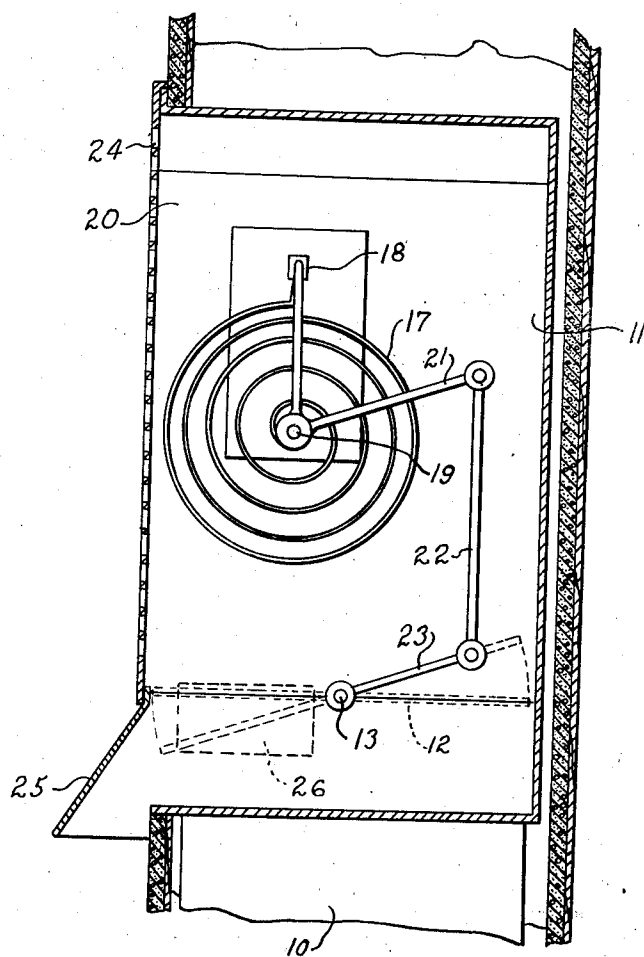
2,241,108

AIR FLOW CONTROL

Filed March 22, 1940

2 Sheets-Sheet 2

Fig. 3



INVENTOR
CECIL LYNN AKERS,
BY *Winters Winters*,
ATTORNEYS

UNITED STATES PATENT OFFICE

2,241,108

AIR FLOW CONTROL

Cecil Lynn Akers, Anderson, Ind., assignor of one-half to Floyd C. Akers, Anderson, Ind.

Application March 22, 1940, Serial No. 325,301

4 Claims. (Cl. 236—101)

This invention relates to means for controlling the flow of air in response to temperature changes such as in a duct leading from some heat source such as a radiator or a hot air furnace and the like or from a cooling element. A primary purpose of the invention is to provide a control sensitive to and operated by differences in room temperatures to control the flow of air into that room in accordance with those temperature changes. A further important object of the invention is to provide a structure that will cause the control to respond to very small variations in the room temperatures, all without requiring elaborate or extremely delicate mechanisms.

These and other objects and advantages of the invention will become apparent to those versed in the art in the following description of one particular form of the invention as illustrated more or less diagrammatically in the accompanying drawings, in which

Fig. 1 is a front elevation of a structure embodying the invention;

Fig. 2, a transverse section on the line 2—2 in Fig. 1; and

Fig. 3, a vertical section on the line 3—3 in Fig. 1.

Like characters of reference indicate like parts throughout the several views in the drawings.

The usual air conductor or pipe 10 is herein shown as leading up to a header or outlet box 11, herein shown as mounted within a partition wall to open through one side of the wall. A cut-off damper 12 in the nature of a butterfly valve is mounted to be rocked by a shaft 13 extending across the end of the pipe 10. It is to be noted that the damper 12 is notched out to clear an upturned hood 14, Fig. 2, so that at the end of the box 11 there is always at least a slight passageway for admittance of air therepast regardless of whether or not the damper 12 is in the open or closed or any of the intermediate positions. The box 11 is made to be somewhat longer than it would be without my control and in the present form is made to extend to one side beyond the pipe 10 to have a vertical partition 15 extending transverse thereacross, preferably well insulated by any suitable means such as by the additional insulating wall 16.

In the chamber thus provided in the box 11 beyond the partition 15, I provide a second partition 20 spaced from the first partition 15 but terminating by its top end below the top of the box 11 to leave an air passageway thereover. On the partition 20, I mount a thermostatic

control member that is sensitive to temperature changes in that it will change form substantially with but slight changes in temperature. Any suitable type of thermostatic control may be employed, the herein shown helically coiled bimetal strip 17 being one form that may be employed. In this form, the outer end of the bimetal 17 is anchored to a post 18 fixed to the partition 20 and has its inner end connected to a rockable shaft 19.

On the end of the shaft 19 is fixed a lever 21. A connecting rod 22 is rockably secured to the outer end of the lever 21 and drops down to rockably engage a lever 23 which in turn is fixed to the damper shaft 13. The connections are so made and the lever so proportioned as to lengths that the damper 12 will be rocked from open to closed positions as the bimetal member 17 may expand.

Since the heat sensitive member 17 is mounted in the chamber in the end of the box 11 and is thoroughly insulated and removed from influence of the temperature of the air flowing up into and out of the box 11, means must be provided to make this member 17 responsive to the room temperature in general into which the air discharges from the box 11.

In order to accomplish this result, the cover grille 24 is confined to the opening of the box 11, and the end chamber in which the member 17 is mounted is covered over by a solid cover so that this control chamber is closed to the room from the front side. In order to insure circulation of the room air through this control chamber to make the member 17 responsive thereto, a collector hood 25 is provided to extend downwardly and outwardly from the floor of the box 11 to be open from its underside only. Then a window 26 of suitable size is provided through the partition wall 15 and the insulating wall 16, Fig. 1, with the deflector hood 14 thereover open from its top side only. It is to be noted that the collector hood 25 is mounted to one side of the path of the discharge air from the box 11 and to be below that path, the hood 25 extending in some cases under the discharging air, when a greater circulation is required through the thermostat chamber.

Now since there is always an upward passage of air to some degree past the end of the damper 12 across the hood 14 and out through the front grille 24, a flow of air will be induced into the collector hood 25, through the control chamber, up across the thermostat 17, over the top of the partition 20, down to and through the window 26

and upwardly from the hood 14 to join with the column of air flowing past that window. Thus it is to be seen that the air within the control chamber does not become entrapped but is moving so as to make the air adjacent the control member 17 correspond in temperature to the air of the room being heated. The member 17 is thoroughly removed from influence of the temperature of the air in the box 11 by the down flowing column of room air between the partitions 15 and 20 in addition to the heat insulation afforded by the wall 16 and the partition 20. It is to be kept in mind that in general, there is always a circulation of air within the room when air is discharging from the box 11 and that this circulation takes a general upward travel and thence down around and back in a circulation manner across the lower part of the room back to the underside of the incoming air so that there is in general a circulation of the room air toward the collector hood 25.

The heat sensitive member 17 is so designed as to be sensitive as desired within the range of temperatures desired in the room to be heated so that this member 17 will open and close the damper 12 accordingly for admission and closing off of the hot air flow.

While I have herein shown and described my invention in the best form as now known to me, it is obvious that structural variations may be employed without departing from the spirit of the invention and I, therefore, do not desire to be limited to that precise form beyond the limitations as may be imposed by the following claims. I claim:

1. For an air conductor, an outlet box having an intake opening, a damper mounted to swing to control flow of air through said opening into the box, said damper being notched out to allow a limited flow of air past a portion thereof regardless of position of the damper, a control chamber at a side of said box adjacent said damper portion, a damper operating thermostat in said chamber, means operatively connecting said damper and said thermostat for damper operation thereby responsive to temperature changes at the thermostat, means for conducting air into said chamber from a zone to one side of said box, an upturned hood at the notch, and a passageway from said chamber discharging through the hood into said box through the notch at said damper portion, whereby flow of air through and from said box particularly past said damper portion induces a flow of air through said chamber.

2. For an air conductor, an outlet box having an intake opening, a damper mounted to swing to control flow of air through said opening into the box, said damper being notched out to allow a limited flow of air past a portion thereof regardless of position of the damper, a control chamber at a side of said box adjacent said damper portion, a damper operating thermostat in said chamber, means operatively connecting said damper and said thermostat for damper operation thereby responsive to temperature

changes at the thermostat, means for conducting air into said chamber from a zone to one side of said box, an upturned hood at the notch, and a passageway from said chamber discharging through the hood into said box through the notch at said damper portion, whereby flow of air through and from said box particularly past said damper portion induces a flow of air through said chamber, said chamber being located in a continuation of said box and produced by a partition across the box spaced from an end thereof, said chamber discharging passageway being through said partition and hood.

3. For an air conductor, an outlet box having an intake opening, a damper mounted to swing to control flow of air through said opening into the box, said damper being notched out to allow a limited flow of air past a portion thereof regardless of position of the damper, a control chamber at a side of said box adjacent said damper portion, a damper operating thermostat in said chamber, means operatively connecting said damper and said thermostat for damper operation thereby responsive to temperature changes at the thermostat, means for conducting air into said chamber from a zone to one side of said box, an upturned hood at the notch, and a passageway from said chamber discharging through the hood into said box through the notch at said damper portion, whereby flow of air through and from said box particularly past said damper portion induces a flow of air through said chamber, said chamber being located in a continuation of said box and produced by a partition across the box spaced from an end thereof, said chamber discharging passageway being through said partition and hood, the heat sensitive element of the thermostat being located in a direct path between the chamber discharge passageway and the chamber inlet conduit.

4. For an air conductor, an outlet box having an air intake opening and a room air discharge opening, a damper mounted to swing to control air flow through said intake opening into the box, said damper being notched at one end to permit a limited air flow therepast regardless of damper rocking, a damper operation control chamber insulated from but adjacent said box and having an opening into the box through the notch in the damper where the air flow from said intake opening may pass into the box, a thermostat element mounted in the control chamber, said chamber having an air intake opening, and means in the chamber for directing air flow therethrough across said element to said chamber box opening, and a wall in the chamber spaced between its intake and box openings, dividing the chamber into two compartments, said wall having an opening at the opposite end from the two chamber openings, whereby air flow through the chamber is in a tortuous path, said element being mounted in that compartment having the chamber intake opening, the wall being arranged to have incoming air flow first across the element and then between the wall and said box to the chamber box opening.

CECIL LYNN AKERS.