June 21, 1927. 1,633,498

K. L. SEELBACH

TEMPERATURE CONTROLLING APPLIANCE

Filed April 21, 1921

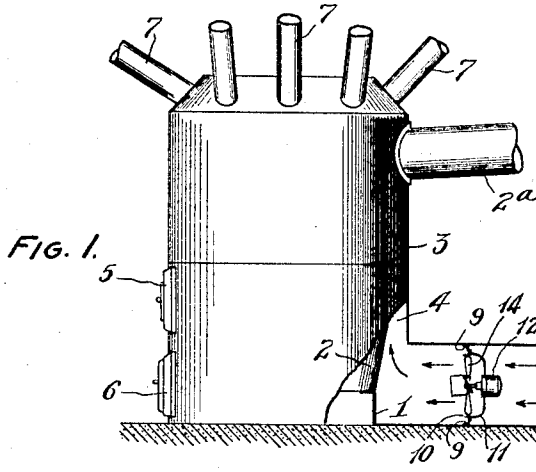


FIG. I.

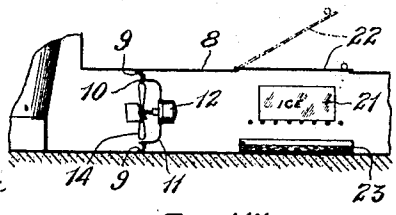


FIG. VII.

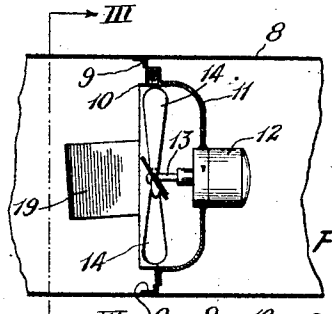


FIG. II.

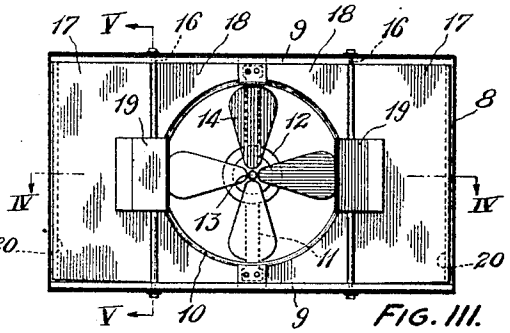


FIG. III.

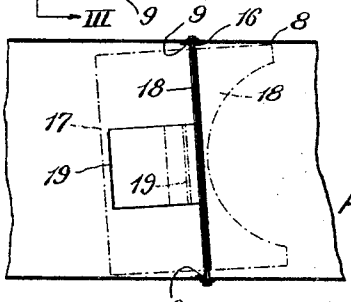


FIG. V.

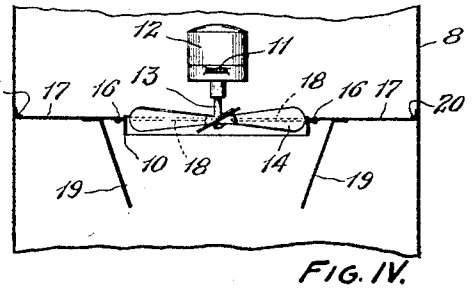


FIG. IV.

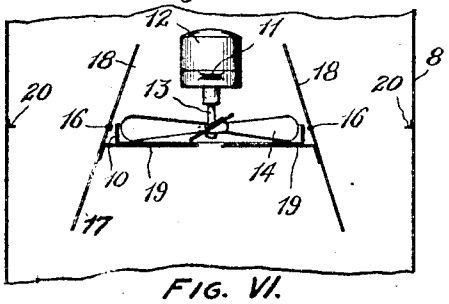


FIG. VI.

INVENTOR:
KURT L. SEELBACH

BY HIS ATTY

Patented June 21, 1927. 1,633,498

UNITED STATES PATENT OFFICE.

KURT L. SEELBACH, OF CLEVELAND, OHIO, ASSIGNOR TO JAMES C. MILES, OF CLEVELAND, OHIO.

TEMPERATURE-CONTROLLING APPLIANCE.

Application filed April 21, 1921. Serial No. 463,298.

My invention relates to an air circulating, ventilating or temperature controlling appliance, which the exemplifying drawing shows adapted to use with a hot air furnace. More particularly, my invention comprehends a forced air circulation by means of an air current induced by an electric fan, together with dampers normally open, but adapted to be closed when the fan is in use.

I am rather well acquainted with the prior art including patents issued to: Woerz, March 21, 1899, No. 621,551; Ilg, May 10, 1910, 957,776; Williams, No. 1,169,448, of January 25, 1916; Edgecombe, No. 1,138,854, of May 11, 1915, and Gaddess, August 7, 1917, No. 1,236,157. These patents show it to be old to provide dampers or ventilators together with means (counterweight or spring) for normally holding the damper in its open or closed position, indeed, show it to be old, to combine such dampers with a blower or fan but not for an inlet of a hot air furnace. The advantages of providing for an air circulation in say, a hot air furnace, which will be more positive than a natural or gravity circulation are promotion of economy, positive ventilation, flexibility, lessening of firing frequency, enabling use of smaller furnace with less space occupied, permitting most convenient location irrespective of prevailing winds avoiding the need of peculiarly located gradually turned or continually inclined pipes allowing smaller pipes to give satisfaction and providing an automatic control.

According to my invention the damper when wide open will afford nearly the maximum supply of air which the maximum-sized opening adapted to be closed by the damper or dampers will allow, and the damper is so constructed as normally to assume its wide open position. I then arrange the fan so that the air current set up thereby will directly impinge against the damper or some extension thereon to cause it to shut and to hold it in its closed position so long as the fan is in operation.

Adverting to the drawings:

Figure I is a side elevation of an air circulation or ventilating apparatus exemplified as a hot air furnace, a portion being shown in section.

Figure II is an enlarged side elevation of the fan shown in Figure I.

Figure III is an inside elevation on line III—III of Figure II.

Figure IV is a plan section of the fan surrounding structure taken on line IV—IV of Figure III with certain parts in the position assumed when the fan is driven, the motor and fan however, appearing as a top plan.

Figure V is a section on line V—V of Figure III.

Figure VI is a partial plan section corresponding to Figure IV showing certain parts in an altered position in consequence of the fan being at rest.

Figure VII is a view corresponding to the sectioned portion of Figure I to illustrate a modified application of my invention.

Supported on a suitable pedestal 1 is a fire pot 2 of a hot air furnace having a flue 2^a and, comprising a casing 3 enveloping the combustion chamber so as to afford an air circulation chamber 4 thereabout. A fuel door 5 and an ash door 6 are also shown. Communicating with the closed top of the circulating chamber 4 are a plurality of heat conducting pipes 7 intended to lead to different rooms.

In order for a hot air furnace properly to operate, it should have a very free gravity circulation, that is to say, an air inlet should be provided corresponding to the aggregate cross-sectional area of a number of pipes provided for distributing the heated air from the furnace. However, conditions of temperature and prevailing winds sometimes make it expedient to provide a regulating device known as a damper at an interiorly communicating air inlet. It has been discovered to be advantageous to provide an induced air current thereby enabling a specific heating efficiency to be realized with a smaller furnace and also insuring a more uniform supply of heat to all portions of a house irrespective of wind direction. Ordinarily the air inlet should be wide open and dampers have long been in use which were adapted normally to assume such a position. It is also old to provide means for automatically closing a damper or dampers. I believe however that I am the first to employ a damper and a fan constructed as a unit so as to enable their being mounted in a laterally adjacent relationship in a compartment of a furnace; as well as the

bare use of a damper normally assuming its open position and so arranged as to be caused to be shut by the air current created when the fan is started. This combination, I am confident should be recognized as patentable notwithstanding such a disclosure as in the Wolfe Patent No. 571,424 of November 17, 1896, where the door 6 is not automatically operated, notwithstanding the disclosure of the Williams Patent No. 1,169,448 of January 25, 1916, for an outlet controlled damper and different or down draft purpose and notwithstanding the reversed action, inapplicable for my purpose, of the Ilg Patent No. 1,189,572 of July 4, 1916.

Leading into the air chamber 4 is a passage 8 carrying interiorly near the casing 3 brackets 9 to which are secured in any approved manner an annulus 10 and a frame 11 suitable for the support of an electric motor 12 including a shaft 13 on which is mounted a fan 14 having blades rotatable within the confines of the annulus 10. Outwardly beyond the fan or on the side remote from the casing 3 I install a series of pans 15 to be filled with water and intended to humidify the inflowing air.

It is to be understood that the motor and fan together with the parts to be next described constitute a mechanical unit adapted for ready insertion in the passage which constitutes a part of the entire circulating conduit 8.

I prefer to utilize a pair of dampers one on each side of the fan, but since the construction of both is precisely alike only one need be described and accordingly the singular number will be employed. Extending across the conduit 8 in a direction from top to bottom but slanted from a vertical position is a rod 16 to which is pivoted a damper including a rectangular shaped portion 17 extending in one direction and a portion 18 extending in the opposite direction and shaped as shown to extend around the top and bottom of the adjacent half of the annulus 10. The tilted mounting of the damper causes it gravitationally to assume a certain position which I choose to have be its opening position, that is to say, the position it is shown to occupy in Figures V and VI in which it scarcely restricts the current of air on one side of and around the fan. Projecting from the damper is an extension or vane 19. When the fan 14 is stationary the direction of projection of the vane 19 will be forwardly, that is to say, the same as the direction of flow of the air current. As illustrated, the vane 19 extends from the portion 17 of the damper at an obtuse angle which should however be as little as possible in excess of 90 degrees to yet be capable of exercising the function to be now explained. When the damper is in the normally opened position shown in Figure VI, the vane 19 will be projecting in a direction straight across the front of the fan, whereas the portions 17 will be in a position of slight convergence toward the near wall of the passage 8. It is manifestly preferable to have the portions 17, when in the position shown in Figure VI, obstruct as little as possible the free flow of air. On the other hand, the angular position of the vane 19 as it appears in Figure IV must be such that the air current from the fan will continue effectively to impinge against it after the portion 17 has been moved to its closing position determined by engagement of its extremity with a stop 20 carried by the wall of the passage 8. So long as the fan is being driven the air pressure against the vane 19 will hold the portion 17 against the stop 20 and simultaneously the portion 18 in its closing position. With the cessation of fan action the portions 17 and 18 of the duplex damper will gravitationally swing to their open position and leave open substantially all the space around the fan.

The modification shown in Figure VII consists in the adaptation of my invention to the distribution of cooled as distinguished from heated air. Located in the passage 8 ahead of the fan is a grille for the support of a cake of ice 21 which may be inserted by opening a door 22 in the top of the conduit. Below the grille 21 is a drip pan 23. As will be readily apparent the arrangement just described will enable a supply of cooled air to be distributed about a residence during the summer months.

I claim:—

1. The combination of a temperature controlling compartment provided with a pair of air inlets and an air outlet, a door for one inlet and adapted by the action of gravity to assume an open position, said door carrying a vane, and means for propelling an air current through the other inlet and against said vane whereby to close said door.

2. In an air circulating system comprising a chamber provided with apertures for the direct flow of air and for an induced air current respectively, the combination with air propelling means at one aperture, and a damper adapted to close the other aperture and having means so positioned when in its open position as to intersect the zone of said induced air current whereby to be moved to its closing position when said air current is created, said damper adapted normally to assume its opening position.

3. The combination with a temperature controlling compartment provided with an air outlet and with an air inlet, a fan and a damper disposed adjacent to each other across said inlet, said damper being arranged normally to assume a postion to leave

open the space not occupied by said fan and a vane extending at an angle from said damper and intersecting the zone of the air current created when said fan is operated whereby to close off said space.

4. The combination of a member provided with an opening, a duplex damper pivoted there-across, a vane projecting at an angle from one section of said damper, a fan for exerting an air current to move said vane to one of its alternative positions, and means for moving said fan.

5. In an air circulating system comprising a compartment including a direct passage for the normal flow of air and a passage for an induced air current, the combination with a fan operatively mounted in said last mentioned passage, of a damper arranged at said first mentioned passage and provided with a vane which when the damper is in its open position will partially obstruct the induced air current passage whereby to be moved to its closing position when said air current is created, and means for driving said fan.

6. An appliance of the character described comprising the combination of an air passage, an annulus mounted therein, a fan in said annulus, a damper mounted to control the space between one side of said annulus and the near wall of said passage, said damper including portions extending around opposite defining edges of said fan and a vane carried by one of said damper portions adapted to intersect the cylindrical plane of said annulus.

7. An appliance of the character described comprising the combination of a compartment, an annulus supported therein and spaced from the walls thereof, a rotary fan operatively mounted for movement in said annulus and a pivoted damper mounted to control the aperture between a portion of said annulus and compartment, said damper including portions extending in opposite directions from said pivot one of said portions havng an edge conforming to an arc of said annulus for the purpose specified.

8. The combination with a rotary fan, of a damper pivotally mounted at one side of said fan and including sections extending in opposite directions from said pivot, and a vane adapted to be exposed to the air current created by said fan and projecting at an angle to one of said sections.

9. The combination with a compartment, a rotary fan therein, and dampers pivotally mounted on opposite sides of said fan and each including sections extending in opposite directions from their pivots, and converging vanes adapted to be exposed to the air current created by said fan and projecting each from one of the sections of said dampers respectively.

10. An appliance of the character described comprising a compartment provided with an inlet and an outlet, a rotary fan for establishing an air current between said inlet and outlet, and a structure movably mounted between said inlet and outlet, said structure including parts adapted to assume alternative positions depending upon whether said fan is functioning or not and so arranged that in one case one part closes the passage adjacent the fan orbit and in the other case another part projects in front of said fan.

11. The combination with an air passage, a rotary fan therein, a damper in said passage and extending between the edge of the fan and the wall of said passage, said damper having a vane to be moved by a current of air established by the operation of said fan, said fan and damper being a structural unit detachably connected in said passage.

12. In a heating apparatus, the combination with a heating chamber having an air inlet, of a frame positioned across the inlet, a fan mounted within the frame, dampers intermediate the fan and sides of the air inlet, said dampers being open when the fan is inoperative, and means carried by said dampers adapted to be impinged by the air current from said fan when set in operation whereby to close said dampers.

13. In a heating apparatus, the combination with a heating chamber, of means operable to force air into said chamber, said chamber having an air inlet adjacent said means, a damper extending across said inlet and arranged to swing normally toward the chamber for allowing access of air into said chamber when the forcing means is not operating, said damper being also arranged to swing away from the chamber and across the inlet when the fan is set in motion whereby the passage through the fan constitutes the only inlet into the chamber, and a vane carried by the damper in position to be impinged by air current from said forcing means whereby to close said damper.

14. An appliance of the character described comprising the combination of an air passage, a circular fan occupying only a part of the cross-sectional area of said passage and a damper mounted to control substantially all the space between a peripheral segment of said fan and a wall of said passage, said damper including a portion extending around a defining edge of said fan.

Signed by me, this 16th day of April, 1921.

KURT L. SEELBACH.