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AUTOMATIC DRAFT CONTROL FOR FURNACES

Filed May 14, 1929

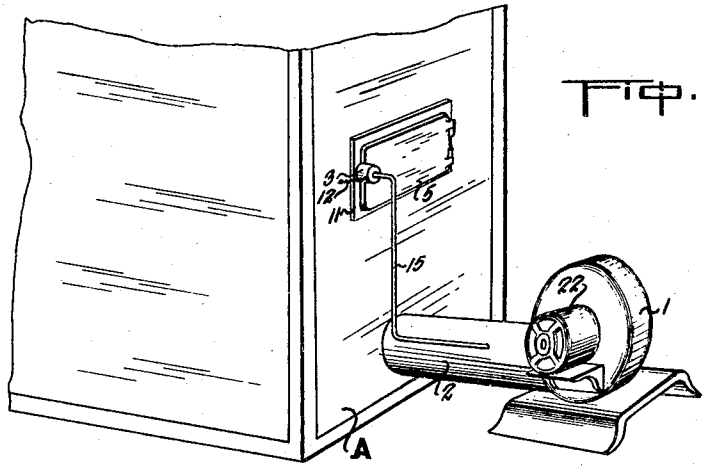


Fig. 1.

Fig. 2.

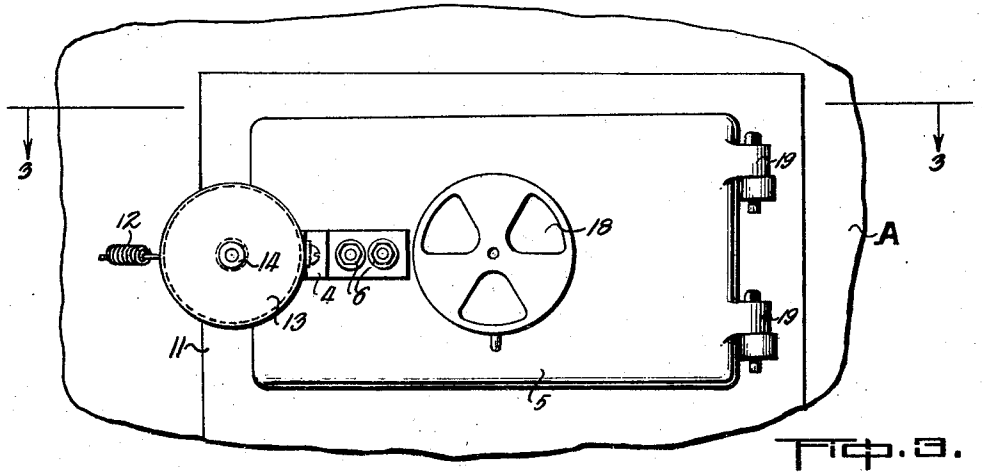


Fig. 3.

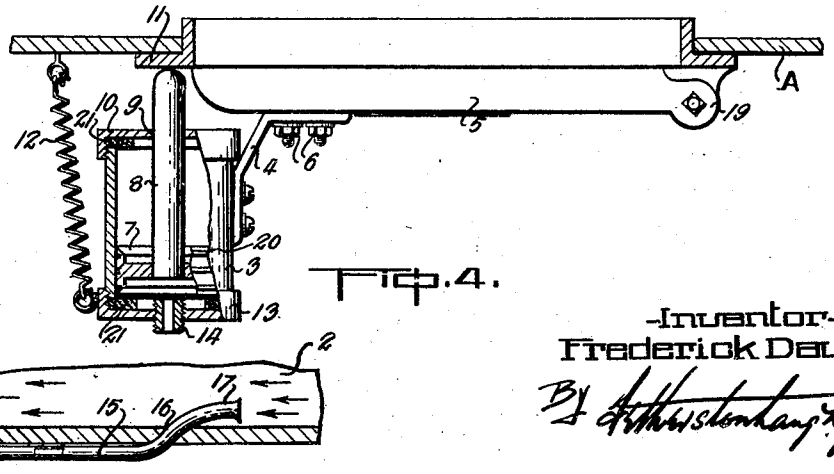


Fig. 4.

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UNITED STATES PATENT OFFICE

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AUTOMATIC DRAFT CONTROL FOR FURNACES

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My invention relates to improvements in draft controls for furnaces, and the object of my invention is to construct a natural draft control device particularly adapted for furnaces in which an artificial air draft is incorporated, so that passage of natural draft through the fire box may be controlled in accordance with the artificial draft pressures.

A further object of my invention is to so construct my device that its attachment and application will in no way interfere with standard furnace construction or necessitate any extensive alterations when being attached.

My invention consists of a draft control constructed and arranged all as hereinafter more particularly described and illustrated in the accompanying drawings, in which:—

Fig. 1 is a perspective view of a fragmentary portion of a furnace casing, showing a blower fan positioned exteriorly thereof, and my device positioned in proximity to the fire box door.

Fig. 2 is an enlarged front elevational view of a portion of the furnace casing surrounding the fire box door showing my device positioned upon the door.

Fig. 3 is a horizontal cross sectional view taken through the line 3—3, Fig. 2, and

Fig. 4 is an enlarged view of a fragmentary portion of the air blast conduit showing the pipe connection which extends therefrom to my device.

Like characters of reference indicate corresponding parts in the different views.

As hereinbefore explained my device is particularly constructed for use upon furnaces of the type illustrated in Fig. 1 in which an artificial air draft is created by means of a blower fan 1 and conduit 2, extending therefrom to the furnace "A". An artificial air draft is generally used in conjunction with either an oil burning furnace, an automatic feed coal burning furnace, or a furnace particularly adapted for burning the cheaper and smaller grades of coal. All these types of furnace permit the entry of a natural draft during the period that the artificial draft is passing through the furnace, but it has been found, particularly in the case of oil furnaces automatically controlled by a thermostat, that when a sufficient degree of heat has been obtained whereby the actuation of the oil burning mechanism and blower fan is cut off that the natural draft continues to pass through the heated furnace and much more rapidly cools it down to the burner actuating temperature than would be the case if this natural draft were cut off during the periods of inaction.

In order to accomplish this I have constructed the device illustrated in the drawings, and which consists of a cylinder 3 mounted upon a right angle bracket 4 which is secured to the furnace door 5 by means of bolts 6. Interiorly of this cylinder 3 I position a piston and piston rod 7 and 8, the piston rod projecting through an orifice 9 in the rear end 10 of the cylinder, and having its outer end in contact with the casing 11 of the furnace door. 12 is a helical spring extending between the cylinder and the furnace casing. Centrally of the outer end 13 of the cylinder I furnish a nipple 14 connected to a flexible pipe 15 which extends therefrom through an orifice 16 into the interior of the air conduit 2. The end 17 of the pipe 15 faces the direction of flow of the artificial draft indicated by arrows in Fig. 4, the end of the pipe being slightly bell mouthed.

The furnace door 5 illustrated in the drawings is of course of the standard type generally provided with an artificial air draft damper 18, and mounted upon the door frame 11 by means of a pair of hinges 19. When my device is used in combination with a furnace door of the type illustrated in the drawings wherein the damper 18 is incorporated, such damper is kept closed and the passage of natural draft is controlled by opening and

closing of the furnace door. It is of course to be understood that in the piston and cylinder assembly the piston is provided with piston rings 20 and the cylinder with packings 21 between the cylinder proper and its ends 10 and 13 which are threaded thereunto.

My device operates as follows:—

When the blower fan 1 is inactive there is no air pressure in the conduit 2, and the furnace door 5 is kept closed through the medium of the spring 12 connected to the cylinder 3 which is mounted upon the door, the furnace door being in the position illustrated in Fig. 3 and the piston 7 at the outer end of the cylinder.

When the blower fan 1 is actuated by means of the electrical motor 22 an air pressure is created in the conduit 2, such air pressure in turn passing along the pipe 15 through the nipple 14 into the outer end of the cylinder. This air pressure tends to move the piston rearwardly towards the furnace, but as the piston rod 8 is in contact with the door frame the piston 1 in itself cannot move and the cylinder 3 further moves outwardly and opens the furnace door 5 against the resiliency of the spring 12. The degree of the door opening being of course dependent upon the air pressure in the conduit 2. When the fan becomes inactive the air pressure in conduit 2 and pipe 15 returns to normal and the furnace door 5 will close under the tension of the spring 12.

From the foregoing description it will be apparent that I have devised a particularly simple and efficient device for controlling the passage of natural draft through a furnace, so that the passage of such natural draft can be regulated in accordance with the artificial draft, but although I have shown and described my device as used in conjunction with a furnace door it will be readily seen that with very little alteration or adjustment it can be adapted for use upon any type of damper controlling the passage of natural draft to a furnace, it being only necessary to move the damper in one direction under the influence of the piston 7 and move it in the other direction by resilient means or a second piston or the like.

It is to be also understood that although I have shown and described a piston and cylinder as the controlling means actuated by the air pressure of the artificial draft that I can use any other similar means actuated by variations in pressure without departing from the spirit of my invention as set forth in the appended claim.

What I claim as my invention is:—

A device for controlling the natural draft through swingable furnace doors in furnaces incorporating an artificial air draft providing means, comprising a cylinder rigidly mounted upon the furnace door, a piston in the cylinder, a piston rod extending through one end of the cylinder and engaging the furnace casing, the cylinder and piston rod being substantially at right angles to the furnace casing when the door is closed, a pipe line extending from the artificial air draft producing means to the other end of the cylinder whereby the cylinder is moved in one direction to open the door under the artificial air draft pressure, and resilient means acting against the artificial air draft pressure for closing the door.

FREDERICK DAVISON.