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FURNACE DRAFT CONTROL

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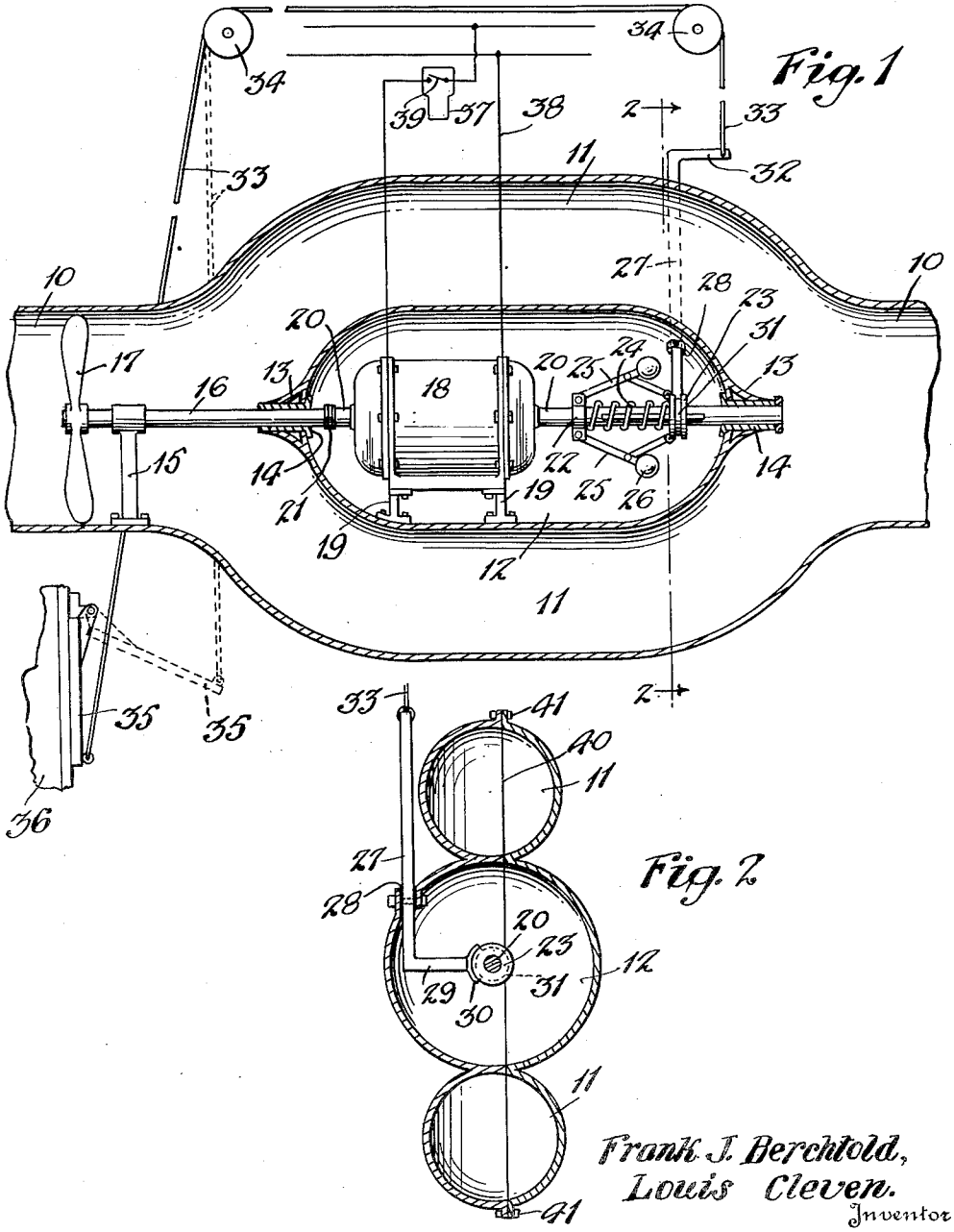


Fig. 1

Fig. 2

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FURNACE DRAFT CONTROL

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Our invention relates to improvements in furnace attachments and more particularly to improvements in furnace draft controlling devices.

An important object of our invention is the provision of a device of this character which is automatic in operation, which is easily and cheaply installed and which is of simple construction and efficient in operation.

Other objects and advantages of our invention will be apparent during the course of the following description.

In the accompanying drawing, which forms a part of this specification, and wherein like characters of reference denote like parts throughout the same,

Figure 1 is a longitudinal sectional view through a furnace attachment embodying our invention, and,

Figure 2 is a vertical sectional view on the line 2—2 of Figure 1.

In the drawing, wherein for the purpose of illustration is shown a preferred embodiment of our invention, the numeral 10 designates a pipe or flue adapted to be inserted between a furnace and its chimney. Any suitable means (not shown) may be provided for securing the flue 10 to the furnace and chimney or in the usual furnace flue, such means forming no part of the present invention.

The pipe 10 is separated through a portion of its length into spaced branches 11 having a combined capacity substantially equal to the capacity of the pipe 10. The branches 11 return to the pipe 10 into which they gradually emerge. A chamber 12 is arranged between the spaced branches 11 of the flue and is of generally cylindrical form with substantially semi-spherical ends forming the junctures of the branches 11 with each other and with the flue pipe 10. The central portions of the ends of the chamber 12 are provided with supports 13 which merge into the walls of the chamber and support suitable shaft bearings 14. The supports 13 are arranged to give a streamline effect and consequently do not interfere with the passage of gases through the flue. The flue pipe 10, on the furnace side of the branches 11, is provided with a shaft hanger 15 which together with the adjacent bearing 14 supports a fan shaft 16 which is provided with a suitable fan 17 on the furnace side of the hanger. If desired, the fan shaft 16 may be shortened and the hanger bearing 15 dispensed with.

A suitable motor, such as an electric motor 18, is arranged on supports 19 within the chamber, and has a shaft 20 which has a suitable flexible connection 21 with the fan shaft 16. The motor shaft extends through the center of the chamber 12 on the opposite side of the motor from the fan and is journaled at its end in the other bearing 14.

This extension of the motor shaft is provided with a suitable centrifugal governor which consists of a collar 22 rigidly secured to the motor shaft and a movable collar 23 slidably mounted on the shaft and urged away from the rigid collar 22 by a coil spring 24. The collars are connected together by means of pivoted links 25, one set of which is provided with weights 26.

A lever 27 is pivoted in a slot 28 in the side of the chamber 12 and has an angular extension 29 provided with a shoe or the like 30 which rests in an annular groove 31 in the movable collar 23. The long end of the lever is shown extending above the flue and provided with a lateral extension 32 which is connected to a flexible cable 33. The cable passes over suitable pulleys or the like 34 and is secured to the door 35 of the furnace 36.

A thermostat, as shown diagrammatically at 37, is arranged in the motor circuit 38 and opens and closes a switch 39 to stop and start the motor 18.

In operation, when heat is required, the thermostat 37 closes the switch 39 and starts the motor 18 which rotates the fan 17 to cause a draft and suck the gases and fumes of combustion from the furnace through the flue 10 and branches 11. As the motor shaft gains speed, the weights 26 fly outwardly and draw the movable collar 23 towards the rigid collar 22 against the tension of the spring 24. This movement of the collar 23 causes the lever 27 to swing about its pivot in the slot 28, thereby exerting a pull on the cable

33 and opening the furnace door. When the thermostat opens the switch, the motor and fan stop, the spring moves the collar 23 into its normal position and the furnace door 35 is allowed to close by its own weight. It will be seen, therefore, that the operation of the fan and furnace door is entirely automatic and that the furnace door will be open whenever the fan is in operation to allow for a proper draft in the furnace.

The portion of the flue and its branches shown in Figure 1 are preferably formed in a compact unit which may be conveniently attached to any furnace. This unit is preferably split along the line of division shown in Figure 2 at 40 and the two sections thus formed are secured together, as by bolts 41. This line of division 40 preferably is arranged at one side of the center of the unit, as shown, to allow the bearings 14 to be arranged completely within one section. This unit may be split along its center however, and any suitable means for holding the bearings in place may be employed.

As the lever 27 is pivoted adjacent its lower end, the movement of the lever by the collar 23 will be multiplied to assure sufficient pull on the cable to open the door of the furnace. The illustration of the cable, pulleys and lever is merely diagrammatic as it is obvious that any suitable mechanism may be employed to open the door of the furnace when the collar 23 is moved by the centrifugal action of the weights 26. If the furnace door is hinged at its side, a suitable spring may be used to return it to closed position, or any suitable door closing mechanism may be employed.

Although we prefer to use the branched pipe arrangement shown, it is thought obvious that other arrangements of the motor and fan may be used, or one of the branches 11 could be dispensed with.

While we have shown and described the preferred embodiment of our invention, it is to be understood that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of our invention or the scope of the subjoined claims.

Having thus described our invention, what we claim and desire to protect by Letters Patent is:

1. The combination with a furnace having a door therein and a flue leading from said furnace, of a fan arranged to draw gases through said flue, means to operate said fan, and automatic means operated by said fan operating means to open the door of the furnace during the operation of said fan.

2. The combination with a furnace having a door therein, of a flue leading from said furnace, a fan arranged to draw gases through said flue, a motor to operate said fan, and means operated by said motor to open the furnace door.

3. The combination with a furnace having a door therein, of a flue leading from said furnace, a fan arranged to draw gases through said flue, a motor to operate said fan, a centrifugal member operatively connected to said motor, and means operatively connecting said centrifugal member with the door of the furnace to open the furnace door when the fan is in operation.

4. The combination with a furnace having a door therein, of a flue leading from said furnace, a fan arranged in said flue, a motor to operate said fan, said motor having a shaft extension, a collar slidably arranged on said shaft extension, a governor to operate said collar, and means operatively connecting said collar with the furnace door whereby operation of said fan by its motor actuates the collar to open the furnace door and maintain it in open position during the operation of the fan.

5. The combination with a furnace having a door therein, of a flue pipe connected to said furnace and having an offset portion, a motor arranged adjacent said offset portion and having a shaft extending into the flue pipe, a fan arranged on the inner end of the motor shaft, and means operated by said motor to open the furnace door and maintain it in open position during the operation of said motor.

6. The combination with a furnace having a door therein, of a flue pipe leading from said furnace and having spaced branches opening at each of their ends into the flue pipe, a chamber arranged between the branches of the flue pipe, shaft bearings arranged in the end walls of said chamber, a motor mounted within said chamber, a fan shaft extending through one of said bearings into said flue and being operatively connected to said motor, a fan on the flue end of said shaft, the motor having a shaft journaled in the bearing in the other end of said chamber, a governor on said motor shaft, a collar slidably mounted on said motor shaft, and connected to said governor, a lever pivotally secured to the wall of said chamber and having one end operatively engaging said collar, and means operatively connecting the other end of the lever with the furnace door to open the same during operation of said motor.

7. A furnace attachment comprising a flue pipe having spaced branches opening into the flue pipe at each of their ends, a chamber arranged between the branches, shaft bearings arranged in the end walls of said chamber, a motor mounted in said chamber, a shaft journaled in said bearings and connected to said motor to be rotated thereby, said shaft extending into said pipe, and a fan mounted on said shaft within the flue, said flue pipe, branches and chamber being formed in two sections, the dividing line of said sections being spaced from the center of said chamber

whereby the shaft bearings are arranged in the larger section.

8. The combination with a furnace having a door therein, of a flue pipe leading from said furnace, a fan arranged in said flue pipe, a motor to operate said fan, means operated by said motor to open the furnace door during the operation of the fan, and automatic means to start and stop said motor.

9. The combination with a furnace having a door therein and a flue leading from said furnace, of means to induce a draft in said flue, means to operate said draft inducing means, and automatic means to open the door of the furnace during the operation of the draft inducing means.

10. The combination with a furnace having a door therein, of a flue leading from said furnace, means to induce a draft in said flue, motive means to operate said draft inducing means, and means operated by said motive means to open the door of the furnace during the operation of the draft inducing means.

11. The combination with a furnace having a door therein, of a flue leading from said furnace, a fan arranged to draw gases through said flue, a motor to operate said fan, means to start and stop said motor, means operated by said motor to positively open the furnace door and maintain it in open position during the operation of the motor, and means to release the furnace door and allow it to close when the fan motor is stopped.

12. The combination with a furnace having a door therein, of a flue leading from said furnace at a point spaced from said door, a fan arranged to draw gases through said flue, a motor to operate said fan, and means operated by said motor to open the furnace door and maintain it in open position during the operation of the motor.

In testimony whereof we affix our signatures.

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