May 24, 1960 W. T. JOHNSTON 2,937,697

FURNACE DRAFT CONTROL

Filed Oct. 7, 1957

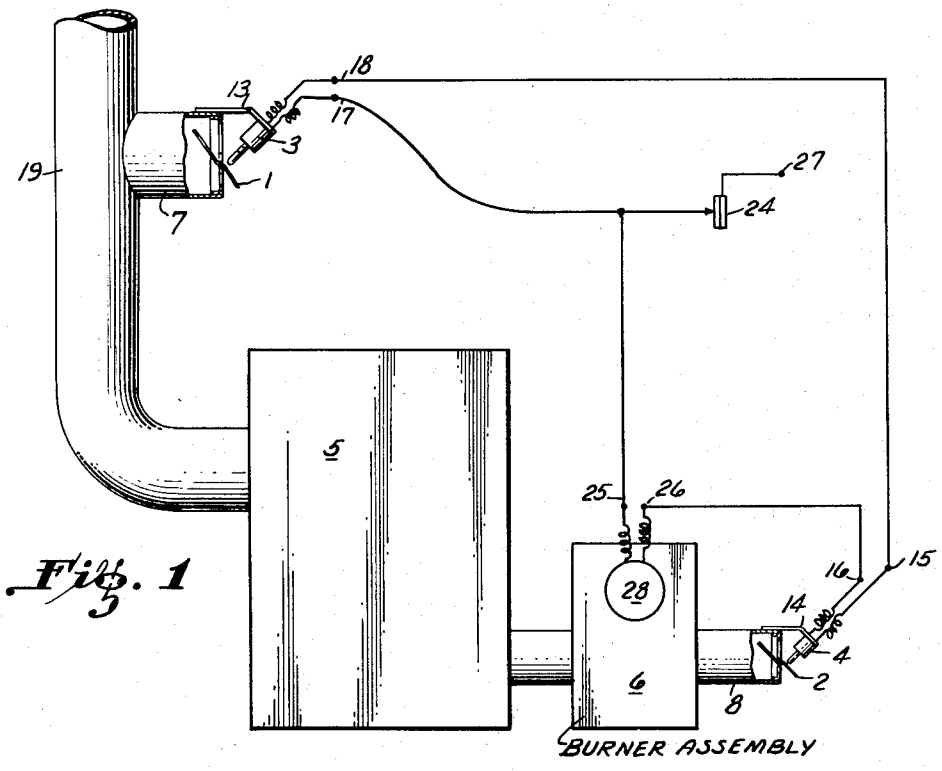


Fig. 1

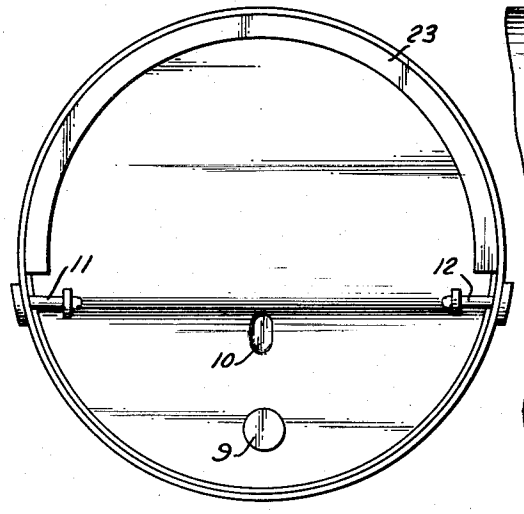


Fig. 2

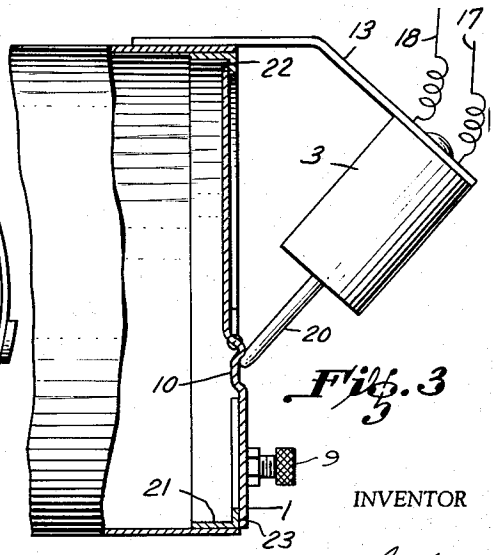


Fig. 3

INVENTOR

Willis T. Johnston

United States Patent Office 2,937,697 Patented May 24, 1960

2,937,697

FURNACE DRAFT CONTROL

Willis T. Johnston, Dawson, Iowa, assignor of one-half to Evelyn Dew, Flint, Mich.

Filed Oct. 7, 1957, Ser. No. 688,655

6 Claims. (Cl. 158—28)

This invention relates to heating systems generally, and more particularly to the furnace draft control used in conjunction with them.

In a well designed heating system, especially those using oil or gas, it is important to have the proper amount of air supplied to the fuel combustion chamber via an inlet into the burner assembly when fuel is being consumed. It is also economical to have a freely swinging damper in a lateral inlet into the smokepipe after the combustion chamber so that a correct draft will be created, regardless of wind and other atmospheric conditions. These requirements need to prevail when fuel is being consumed. However, if these two inlets remain open after the fuel supply is shut off, a considerable volume of inside air will enter the two inlets, absorb heat, and be carried to the outside. The air lost in this manner is replaced by cold air coming from otuside to inside which further acts to lower inside temperature.

It is a primary object of this invention to prevent the loss of heat through convection by closing the two said air inlets when fuel is not being consumed.

It is a further object of this invention to provide a means of releasing the inlets so that their normal operation will not be impaired when fuel is being consumed.

These and other objects of the invention will become apparent in light of the accompanying drawing and subsequent description.

Figure 1 shows a view of the furnace and burner assembly which is operatively associated with the furnace to deliver heat thereto, and the two air inlets that are affected.

Figure 2 shows a view looking into the top air inlet with the damper partially open, and a solenoid removed.

Figure 3 shows a side view of the top air inlet with the damper and solenoid.

Referring now to Figure 1, the furnace is shown at **5** and the burner assembly at **6**. The damper mechanism of the burner inlet pipe at **9** is of the same general construction as the damper mechanism of the smokepipe inlet pipe at **7**, except that it should be noted that the damper mechanism at **8** need not control the correct air to fuel ratio, only that in the open position it allows an abundance of air to reach a separate burner air adjustment. The mounting bracket **13** is shown for rigidly supporting the solenoid **3**, and a mounting bracket **14** for rigidly supporting the solenoid **4**. Wires **15**, **16** and **17**, **18** are connected to the solenoid coils. These solenoid coils are connected in series with each other in the thermostat circuit. The smokepipe, which is operatively associated with the furnace to remove gases therefrom, is shown at **19**.

The usual burner motor is shown at **28**, with motor leads **25** and **26**. The thermostat is shown at **24**. The leads **26** and **27** are connected to an electric power supply.

Figure 2 shows the damper supported by stub shafts **11** and **12**, about which the damper pivots. The usual damper counterbalance which allows the damper to swing freely in response to draft is shown at **9**.

Referring now to Figure 3, it becomes apparent that when the solenoid **3** is energized, the plunger **20** will be retracted, allowing the damper to swing freely between the vertical and a horizontal position. The semi-ellipsoidal depression **10** is slightly displaced from the damper center. The long axis of the depression is oriented to rotate in a plane normal to the pivotal axis of the damper. The plunger **20** has the form of a rod whose axis is also in a plane normal to the pivotal axis of the damper. When the solenoid **3**, Figure 3, is de-energized, the plunger **20** will extend, the lower end making contact with the semi-ellipsoidal depression **10** in the damper, causing the damper **1** to rotate to the closed position. In the closed position the damper **1** is held against surface **22** of collar **21** and surface **23** of collar **21**. A comparable action occurs simultaneously as solenoid **4**, Figure 1, is deenergized to move the damper **2** into the closed position.

The operation of the draft control takes place in the following sequence. Starting from a static condition when no fuel is being consumed, both the damper **1** and the damper **2** are closed. It should be noted that the combustion chamber is open to the outside via the smokepipe **19**. When the thermostat signals for heat, the solenoids **3** and **4** will retract, allowing both the damper **1** and the damper **2** to swing freely open. The damper **1** and the damper **2** remain open while fuel is being consumed. When the thermostat shuts off the heat, the plungers of solenoids **3** and **4** will extend, closing the damper **1** and damper **2**.

From the foregoing drawing and description it is believed that a clear understanding of the construction and operation of the furnace draft control can be gained.

It is to be understood, however, that various changes may be made by those skilled in the art without departing from the spirit and full intendment of the invention.

What is claimed is:

1. A furnace and draft control, comprising; a furnace, a solenoid, a burner assembly operatively associated with the furnace to deliver heat thereto, electrical circuits for controlling the solenoid and the burner assembly, a smokepipe operatively associated with the furnace to remove gases therefrom, said smokepipe having a lateral inlet pipe, a counterbalanced damper, means mounting said damper on an axis to swing freely in said inlet pipe in response to draft, means mounting the solenoid on said pipe, a plunger means operatively associated with the solenoid and adapted to allow the damper to swing freely when the solenoid is energized at the start of fuel consumption, said plunger means being supported to fall against and close the damper when the solenoid is de-energized at the end of fuel consumption.

2. A furnace and draft control as claimed in claim 1, in which the damper has a semi-ellipsoidal depression slightly displaced from the damper center, the long axis of the depression being oriented to rotate in a plane normal to the pivotal axis of the damper and the plunger means having the form of a rod whose axis is in said plane and whose lower end is received in said depression.

3. A furnace and draft control, comprising; a furnace, a smokepipe operatively associated with the furnace to remove gases therefrom, a solenoid, a burner assembly operatively associated with the furnace to deliver heat thereto, electrical circuits for controlling the solenoid and the burner assembly, said burner assembly having a lateral inlet pipe, a counterbalanced damper, means mounting said damper on an axis to swing freely in said inlet pipe in response to draft, means mounting the solenoid on said pipe, a plunger means operatively associated with the solenoid and adapted to allow the damper to swing freely when the solenoid is energized at the start of fuel consumption, said plunger means being supported to fall

against and close the damper when the solenoid is de-energized at the end of fuel consumption.

4. A furnace and draft control as claimed in claim 3, in which the damper has a semi-ellipsoidal depression slightly displaced from the damper center, the long axis of the depression being oriented to rotate in a plane normal to the pivotal axis of the damper and the plunger means having the form of a rod whose axis is in said plane and whose lower end is received in said depression.

5. A furnace and draft control, comprising; a furnace, a burner assembly operatively associated with the furnace to deliver heat thereto, two solenoids, electrical circuits for controlling the burner assembly and the two-solenoids, a smokepipe operatively associated with the furnace to remove gases therefrom, said smokepipe having a lateral inlet pipe, said burner assembly having a lateral inlet pipe, each inlet pipe having a counter-balanced damper, means mounting each damper on an axis to swing freely in each inlet pipe in response to draft, means mounting one of said solenoids on each inlet pipe, each solenoid having a plunger means operatively associated with the solenoid and adapted to allow the respective

damper to swing freely when the solenoids are simultaneously energized, and each plunger means being supported to fall against and close the respective damper when the solenoids are simultaneously deenergized.

6. A furnace and draft control as claimed in claim 5, each damper having a semi-ellipsoidal depression slightly displaced from the damper center, the long axis of the depression being oriented to rotate in a plane normal to the pivotal axis of the damper and the plunger means having the form of a rod whose axis is in said plane and whose lower end is received in said depression.

References Cited in the file of this patent

UNITED STATES PATENTS

838,338	Johnson	Dec. 11, 1906
1,809,575	Sturgis	June 9, 1931
1,833,888	Barker	Dec. 1, 1931
1,921,667	Gaston	Aug. 8, 1933
1,955,797	Engstrom	Apr. 24, 1934
2,179,120	Firehammer	Nov. 7, 1939
2,508,885	Mackay	May 23, 1950