May 10, 1927. 1,628,428

C. PRICHARD

DRAFT REGULATOR

Filed Sept. 2, 1926

Fig. 1

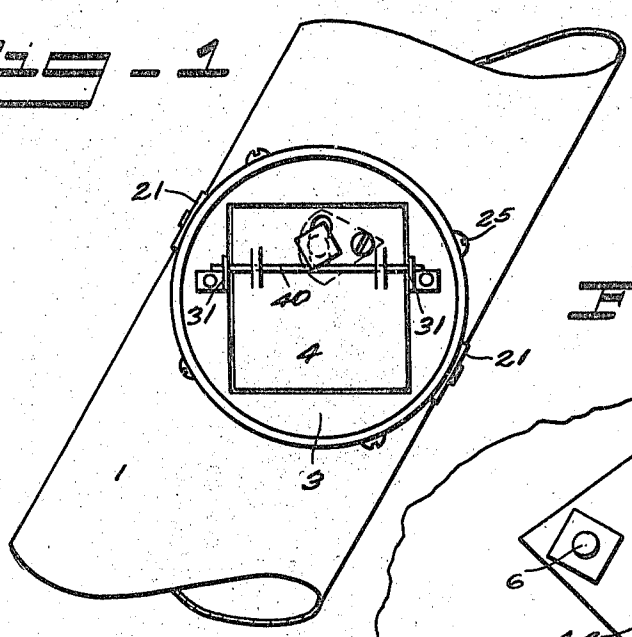
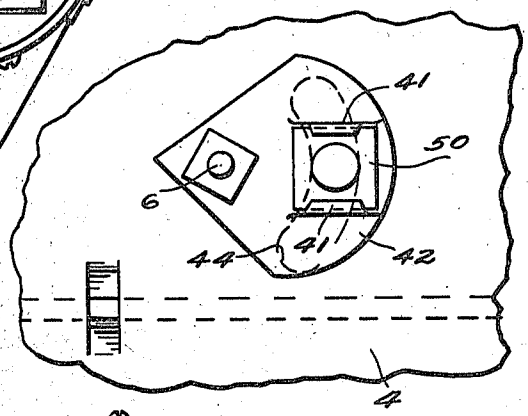


Fig. 3



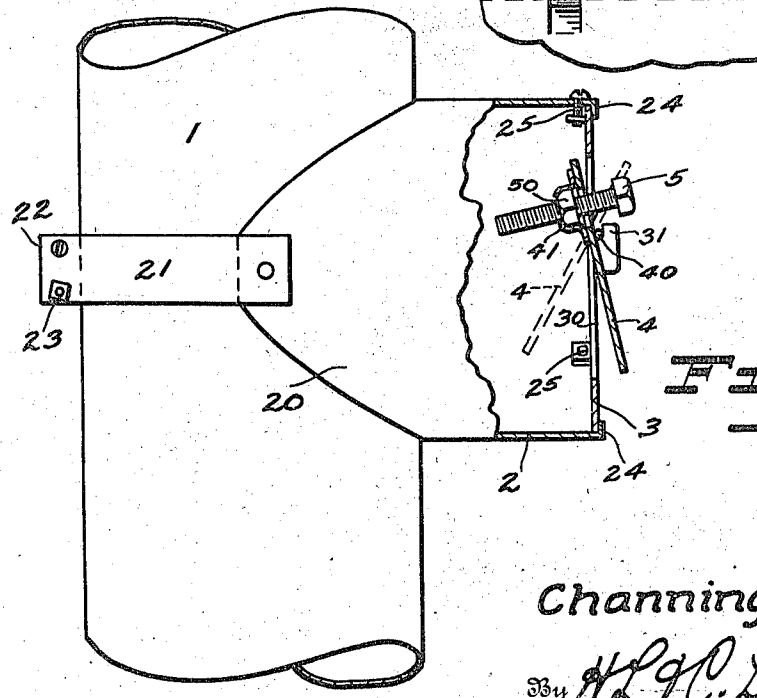


Fig. 2

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UNITED STATES PATENT OFFICE.

CHANNING PRICHARD, OF SEATTLE, WASHINGTON, ASSIGNOR OF ONE-HALF TO JOHN T. BEAMISH, OF BAKER, OREGON.

DRAFT REGULATOR.

Application filed September 2, 1926. Serial No. 133,159.

My invention relates to draft regulators or devices designed for attachment to furnaces, stoves and the like, to secure an even regular draft pressure in the gas discharge system, thereby maintaining an even rate of combustion in the fire and because of this, contributing to efficiency and economy in the use of the fuel.

The object of my invention is to produce a device of such character that it will be simple and cheap in construction and effective in use, and in one form of the device, one which may be readily applied to the gas discharge system of furnaces already constructed.

The invention consists, in the form illustrated, of a device designed for attachment to the gas discharge pipe of a furnace, said attachment containing a draft regulating or controlling opening and a controlling damper acting as a valve in said opening, this being constructed in such a way as to automatically swing in either direction, through the opening, thereby to permit inlet of air or discharge of gas, and provided with means whereby a constant difference in pressure between the gases in said pipe and outside thereof may be maintained.

The specific features of which my invention consists will be hereinafter set forth in the specification and then particularly defined in the claims.

The drawings accompanying herewith illustrate my invention as embodying a device intended for attachment to a pipe.

Figure 1 shows a side view of a pipe having my attachment secured thereto, this view showing a full front view of the draft regulating damper and opening.

Figure 2 is a side view of the device shown in Figure 1 with the portion thereof containing the regulating damper in section.

Figure 3 is a detailed view on a larger scale of a portion of the inner face of the draft regulating damper, illustrating the means employed for regulating the action thereof.

The ultimate purpose of my present invention is to provide means which will operate to maintain an even draft upon the fire and prevent a gusty action therein. In the operation of furnaces such as are more particularly used for heating houses, the draft upon the furnace at any instant depends to a certain extent, and sometimes to a very considerable extent, upon the atmospheric conditions existing at the upper or discharge end of the chimney. This results in an uneven fire and in some cases to a downward draft caused by wind blowing into the chimney discharge, such as to force gases backwardly through the furnace.

In my present invention I establish a uniform draft condition in the furnace by providing, in the gas discharge system, a regulating opening and hinging therein a valve or damper, which is so weighted and balanced that it will swing inward to admit additional air when the draft on the furnace is increased and may also swing outward when the draft pressure is reversed.

The most convenient manner of applying this device is to attach it to a gas discharge pipe and this is the plan herein illustrated in the drawings, which represent a section of such a pipe. This is provided with a hole in one side at the point where it is desired to attach my regulating device. The regulating device itself has a casing which consists of a cylindrical section 2 and two ears 20, these ears being of the shape that would be made by so cutting one end of a cylindrical casing as to enable it to fit over or against the gas discharge pipe 1.

Two strap or clamping members 21 are secured to the points of the sections 20 and extend the rest of the way about the pipe. The ends of these straps approach close to each other at the back side of the pipe 1 and have the sections 22 thereof bent outwardly at right angles. The whole device is then fixed to the pipe by the use of clamping screws or bolts 23.

The outwardly projecting end of the casing 2 is provided with a head 3 which closes the same. For purposes of adjustment in angular position, I prefer that the head 3 be angularly adjustable with reference to the casing 2. This I have shown as being secured by providing the casing with a slight inwardly extending flange 24 and using a certain number of holding or securing bolts 25, which extend through the sides of the casing and have their nuts on the inner side of the casing, bearing against the inner surface of the head 3. Three such bolts would answer satisfactorily. With such construction, the head 3 may be turned in the casing so as to insure that the draft opening therein and the controlling plate or

damper 4, which is pivoted in said opening, may be adjusted to a vertcal position, whatever the angular position of the pipe 1.

The disc 3, which forms the head of the casing, is provided with a regulating or draft controlling opening 30. This, as illustrated, is of a square outline. Pivotally mounted in this opening so that in one position it will effectively close the same, is the controlling plate 4 which constitutes the damper. This damper plate has a pivot pin 40 secured thereto at a point above the center of its vertical side. The head 3 has two ears 31, secured thereto and provided with notches extending downward from their upper edge to receive the projecting ends of the pivot pin or axis 40. As the damper plate 4 has a larger area at one side of its pivot than at the other, it will easily swing under the influence of any variations in pressure at opposite sides thereof.

As it is necessary to maintain a less pressure on the inside of this damper than on the outside, in order to secure any draft in the chimney, means are provided whereby the tendency of the damper would be to slightly swing outward if the pressure upon the two sides were equal. To secure this result I provide a weight for the upper half of the plate, so positioned as to tend to swing the damper plate 4 outwardly under conditions of equilibrium of pressure at opposite sides thereof. This is designed to be so adjusted that the plate 4 will hang vertically, that is, in the same plane as the head 3, under normal conditions of draft in the furnace.

The means preferably employed by me are such as will permit adjustment of this weight for varying conditions. Such means preferably consist of a bolt 5, which has its nut 50 secured in fixed relation with the regulating plate or damper 4. This nut is shown as being held in place by slight ears or lugs 41, cut from the adjustable plate 42. These lugs bear against side faces of the nut and have their outer ends slightly turned over the upper face of the nut. By adjusting the bolt 5 so that its center of gravity is somewhat inwardly of the damper 4, the desired result will be secured. The difference in pressure at the two sides of the damper 4, which will be required to cause said damper to hang in the plane of the head 3, will vary with the position of this bolt, that is, with the amount of its inward projection. The greater the inward projection of the bolt, the greater will be the difference of pressure at the two sides of the controlling damper 4.

The same result may be secured by a device which permits vertical adjustment of the regulating weight, that is, of the bolt 5. In fact, I prefer to employ both methods in the same construction, as this permits of a greater range of adjustment. The vertical adjustment of the bolt is conveniently secured by mounting the nut 50 upon a plate 42, which plate is made adjustable so as to vary the vertical position of the bolt. This may be conveniently done by pivoting the plate 42 upon a bolt as 6 which functions both as a pivot bolt and a clamping means, so that the end thereof which carries the bolt 5 may swing in a vertical plane. When this is done a slot as 44 should be provided in the regulating damper 4, this being positioned concentric with the pivot bolt 6.

In applying my device to a furnace, a hole is cut in a pipe which forms a part of the gas discharge system. The exact position of cutting this hole is immaterial except that it should be at a point where it is convenient to apply my device and preferably close to the furnace. The device is then placed against the pipe in the position illustrated in Figures 1 and 2, and the straps 21 extending to the opposite side of the pipe 1 and the device then secured in position by the insertion and tightening of the clamping bolts 23. The cutting of the hole in the pipe 1 requires no accuracy of workmanship. This hole would naturally not need to be larger than the hole 30 in the head 3 and this is much smaller than the area of the pipe 1 covered by the casing 2. The regulating means carried by the controlling damper 4 are then adjusted to secure the intensity of draft desired. Such adjustment may also be made at any time while the furnace is in use. At times a very slight draft only is wanted, as for instance in mild weather, whereas in cold weather a stronger draft is desired. The device applied to a furnace will maintain uniform draft conditions therein at all times.

Adjustment of the device may be made which will prevent more than a very slight draft upon the fire, thereby preventing strong burning of the fuel, thus adapting it to mild weather conditions and preventing overheating of the building as well as saving of fuel.

What I claim as my invention is:

1. A draft regulator for furnaces comprising a casing having strap members adapted to pass over the smoke pipe, means for drawing together the ends of said strap members, said casing having a draft opening and a pressure controlled damper in the opening.

2. A draft regulator for furnaces adapted to be secured to the smoke pipe and having a pressure-equalizing damper opening, a damper hinged in said opening to swing in either direction from its closed position, and a regulating weight provided with means for moving it towards and from the hinge axis of said damper.

3. In a draft regulator for furnaces, a pressure operated hinged damper, an arm pivoted on the damper to swing toward and from the hinge axis, means for securing said arm in adjusted position, and a weight carried by the swinging end of said arm and adjustable to shift its center of gravity in a direction normal to the plane of the damper.

4. In a draft regulator for furnaces of the type employing a damper swinging in an opening, a regulating weight on the damper and means for adjusting said weight both in the plane of the damper and normal to said plane.

5. In a draft regulator for furnaces, a casing adapted to be secured to be in communication with the gas discharge from a furnace, said casing having a pressure compensating opening, a damper hinged in said opening to swing both ways from its closing position, the pivot axis of said damper being located above the center of its vertical width, and a weight carried by said damper above its pivot axis and means for adjusting said weight towards and from said pivot axis.

6. In a draft regulator for furnaces, a casing adapted to be secured to be in communication with the gas discharge from a furnace, said casing having a pressure compensating opening, a damper hinged in said opening to swing both ways from its closing position, the pivot axis of said damper being located above the center of its vertical width, an arm pivoted to the damper above its pivot axis to swing vertically and extending in a general horizontal direction, the damper having a slot covered by the swinging end of said arm, means for securing said arm in adjusted positions and a weight threaded in said arm to be adjusted normal to the damper and passing through said slot.

7. In a draft regulator for the gas discharge systems of furnaces, a casing adapted to be secured in communication with the gas discharge system, a plate secured to form a part of the wall of said casing, means for adjusting said plate by turning in its plane, said plate having a draft regulating opening, and a regulating damper comprising a plate hinged in and to swing through said opening, and means for adjusting the center of gravity of said damper plate laterally of its pivot axis.

8. In a draft regulator for the gas discharge systems of furnaces, a casing adapted to be secured in communication with said discharge system and having a flanged circular opening, a circular disc secured for turning adjustment in said opening and having a draft regulating opening and a regulating damper plate pivoted in said opening by an eccentrically placed pivot, and means for adjusting the center of gravity of said damper plate with reference to its pivot axis.

Signed at Seattle, Washington, this 25th day of August, 1926.

CHANNING PRICHARD.