Dec. 21, 1937. C. G. ANDERSON 2,102,873

AUTOMATIC DRAFT CONTROL

Filed Jan. 2, 1936

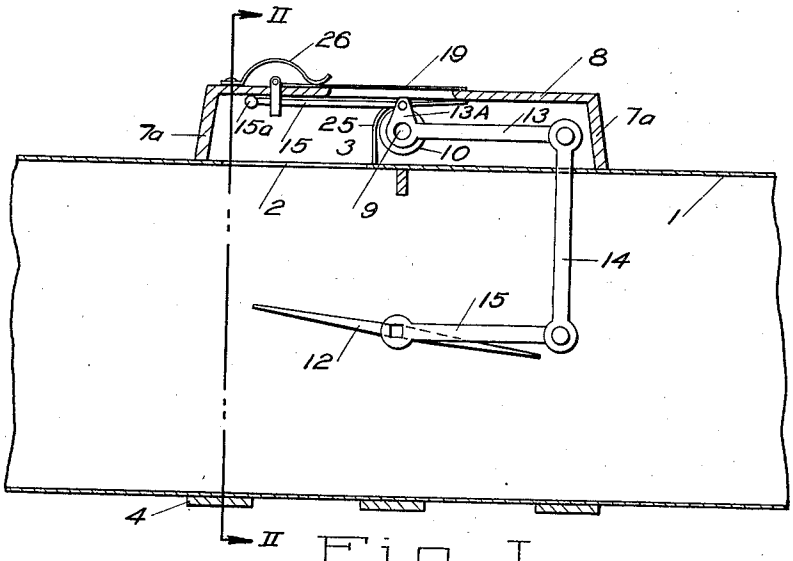


Fig. I

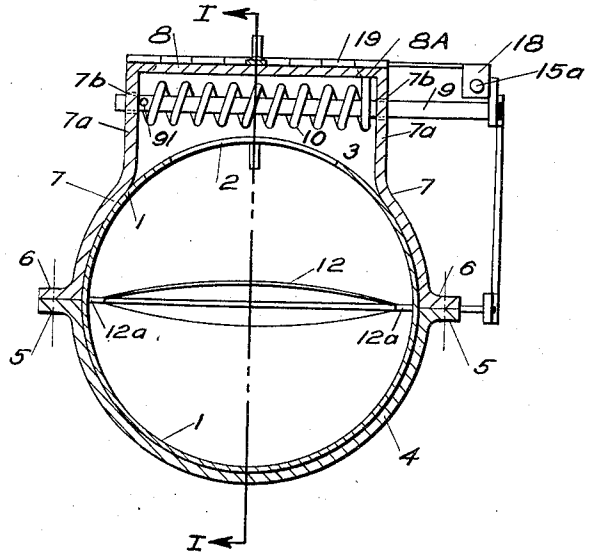


Fig. II

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Patented Dec. 21, 1937 2,102,873

UNITED STATES PATENT OFFICE

2,102,873

AUTOMATIC DRAFT CONTROL

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Application January 2, 1936. Serial No. 57,090

5 Claims. (Cl. 236—16)

This invention relates to thermostatic draft control for furnaces and particularly for oil burning furnaces of the intermittent type, such as are used in residences, though it is generally useful.

In furnaces of the type mentioned, conditions prevail that are different from furnaces in continuous use. They do not run steadily since no structure has yet been developed that will vary the heat production to a point that will exactly meet requirements, hence they are made as an on and off control device, requiring a fall of temperature of a few degrees in space to be heated to start the oil burner, which then heats to a few degrees above the median temperature, when a thermostat acts to interrupt its action. This is repeated from time to time and during the off period the combustion chamber cools to a point well below the ignition point of the fuel used, resulting in poor combustion of the atomized fuel air mixture when it is injected into the comparatively cool furnace, during the first short interval after the burner ignites for a fire period.

To avoid disagreeable odors during that period it is necessary that an adequate draft be provided with connections to a chimney, to carry off the odors of incompletely burned oil vapor or spray that has been cooled below burning temperature by contact with the comparatively cool walls of the furnace interior.

Immediately the furnace temperature rises to a point where no odors will develop it is economical to immediately check the draft automatically, so that an excessive amount of heat will not be carried up the chimney.

The object of my invention is to meet the conditions named with a structure that is at once effective, of low cost and not liable to get out of order. These and other objects that will be at once apparent constitute the purpose of the present invention, the base purpose being satisfactory operation with economy.

Drawing accompanies and forms a part of this specification illustrating a form thereof that has proved highly satisfactory from every viewpoint of the conditions named and will be herein explained as the preferred form of the invention though I do not wish to limit myself except by the appended claims.

In the drawing,—

Fig. I is a section of a smoke pipe assumed to be in position between a furnace and a chimney, being taken on the line I—I of Fig. II;

Fig. II is also a sectional view of the same structure shown in Fig. I taken on the line II—II of Fig. I.

For convenience in attaching, the device is shown as a clamp-like structure capable of being attached to an existing pipe without much disturbance of the pipe as originally installed.

1 represents the smoke pipe and an opening 2 is made in the wall thereof, that registers with the chamber 3 of the draft control apparatus now to be described.

The draft control apparatus is shown in the form of a clamp that surrounds the pipe 1 and is made in two halves, a band portion 4, provided with a flange 5 arranged to mate with a corresponding flange 6 of the structure proper indicated in general by the numeral 7.

Walls 7a and a closure 8 define a chamber 3 alongside the pipe 1. Within the chamber 3 is a staff 9 that is rotatively mounted in openings 7b in the walls 7a as shown in Fig. II.

A coil spring 10 which may be of any preferred metal, steel for example, surrounds the staff 9 and serves as a thermostat. One end of the spring is made rigid with the relatively fixed wall of the closure 8 or at 8a or any convenient point and the other end is made rigid with the staff 9 at 91. Both the sensitivity and the overall movement of the spring 10 are a function of its length and the expansion coefficient of the material of construction. If made of brass it need be only about half as long as when made of ferrous metal.

Changes of temperature within the chamber 3 affect the spring 10 and cause it to coil up and uncoil according to temperature change.

Rotative motion of the staff 9 is communicated to a damper 12 placed in the pipe 1 in the well known manner by means of transmission diagrammatically indicated by the levers 13, 14 and 15 which are operatively connected to the staff 9 at one end of the train and to the damper pivot 12a at the other end. Obviously temperature changes of the pipe 1 are immediately communicated to the chamber 3 and the spring 10 to move the damper 12 to control the pipe 1 in the well known manner of dampers so disposed.

Made rigid with the lever 13 is the bellcrank lever 13a to which is pivotally connected the rod 15. The rod 15 is provided with the collar 15a and runs loosely through the lug 18 of the check draft 19, with lost motion of sufficient degree that the check-draft will not open until the damper 12 is nearly in its extreme position tending to obstruct the pipe 1, when it will open very abruptly. A deflector plate 25 is positioned to

protect the spring 10 from the rush of incoming cold air when the check draft 19 is open. This has been omitted from Fig. II for clarity in the drawing. A leaf spring 26 keeps the check draft normally closed.

The check draft, controlled by the lost motion device so that it will open abruptly by the last end movement of the staff 9 and close as abruptly when the shaft 9 reverses, is an important point in the structure.

Having thus fully disclosed the nature of this invention, and a manner of constructing the same, what I desire to secure by Letters Patent, is,—

1. A self-contained draft control apparatus for attachment to a furnace pipe, comprising a frame to surround a pipe, a pipe damper therein, a thermostat chamber within said frame, a thermostat mounted in said chamber, a check draft positioned to admit outside air above the damper and transmission means interconnecting the thermostat, the damper and the check draft for constant cooperative movement of the damper with the thermostat and a lost motion in said transmission to effect intermittent movement of the check draft at a predetermined high temperature.

2. Draft control means for a furnace pipe comprising in combination a clamp for rigidly surrounding a portion of the exterior of a smoke pipe, pipe damper, check draft and thermostat mountings formed within said clamp member, a pipe damper, a check draft and a thermostat in said mountings and transmissions between the damper, the check draft and the thermostat, said transmissions being arranged to abruptly move the check draft when the damper is in nearly closed position.

3. Draft control means for a furnace pipe comprising a clamp adapted for rigid attachment externally of a pipe to comprise a portion of the same, a pipe damper, a check draft and a thermostat contained in said clamp and mounted for movement therein, transmissions between the thermostat and the pipe damper that are arranged to transmit proportionate movement to said damper, a transmission between said thermostat and said check draft and a lost motion device in said last named transmission that is arranged to abruptly operate the check draft when the damper is substantially closed.

4. Draft control apparatus comprising a frame member for rigid insertion in a flue as a portion thereof, an opening in said frame, a check draft positioned to control said opening, a damper positioned in the frame to control the flue, a thermostat that is effective to control the damper according to temperature of gases passing through the flue and transmissions between the thermostat and the check draft that are effective to operate said check draft abruptly at a predetermined high temperature.

5. Flue draft control apparatus comprising a frame member adapted for insertion in a smoke pipe to form a part thereof that is provided with a side opening, a check draft member mounted for movement to control said opening, a damper mounted for movement to control the smoke pipe and a thermostat device that is effective to move the damper to close the smoke pipe as the temperature therein rises and to abruptly open the check draft when the damper has been moved to nearly close the pipe.

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