Jan. 12, 1932. W. L. SPIKER 1,840,474

DRAFT CONTROL FOR HEATERS

Filed Oct. 7, 1929

Fig. 2.

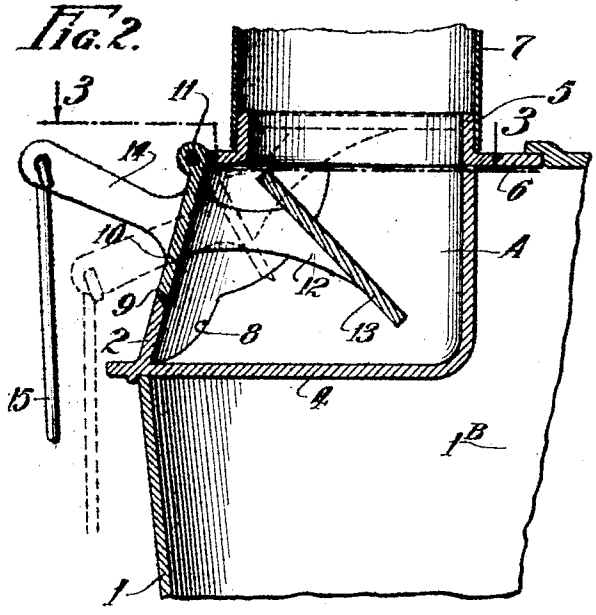


Fig. 1.

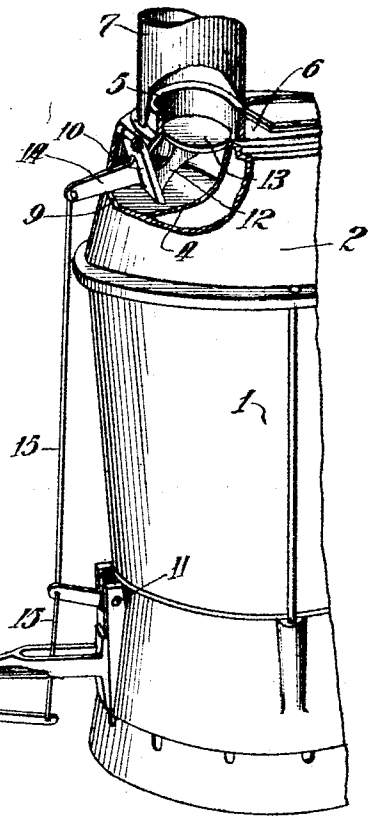
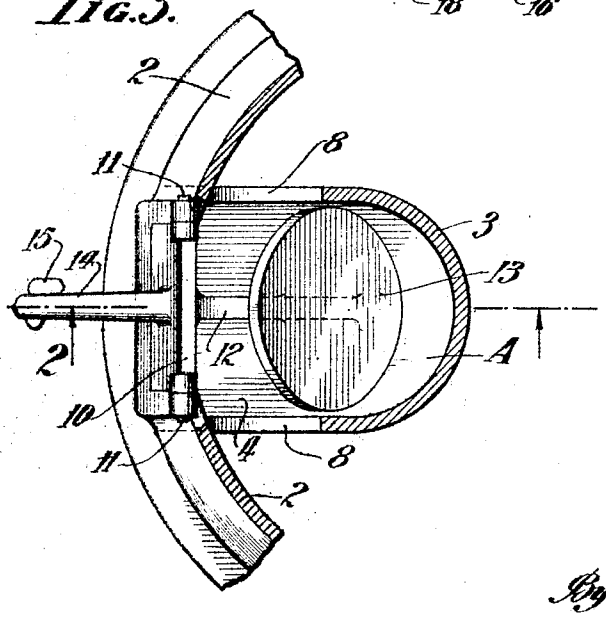


Fig. 3.



Inventor:

Wilber L. Spiker

By: Albert Scibilia

Attorney

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UNITED STATES PATENT OFFICE

WILBER L. SPIKER, OF MACOMB, ILLINOIS, ASSIGNOR TO AMERICAN STEEL PRODUCTS CO., OF MACOMB, ILLINOIS, A CORPORATION OF ILLINOIS

DRAFT CONTROL FOR HEATERS

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My invenion relates to the class of heaters in which the combustion gases pass to the flue through a check-draft chamber, which chamber has an air inlet controlled by a damper.

With such a draft control arrangement, an opening of the damper permits cold air to enter the check-draft chamber, thereby checking the draft up the flue and hence retarding the combustion of fuel within the heater. At the same time, some of the entering air is also apt to pass down into the combustion chamber, and if the barometer is low, the resulting down draft may draw some of the smoky and sooty contents of the flue down into the check draft chamber. In practice, this may cause obnoxious gases from the flue to pass through the said air inlet into the room in which the heater is disposed, and the resulting vitiating of the surrounding air may have serious effects—as for example on young and delicate chicks, when such a heater is used as part of a brooder.

In one of its main objects, my invention aims to overcome such an exit of flue gases through the check-draft damper inlet when the check-draft damper is open, by effectively closing (or at least throttling) the flue. Furthermore, my invenion aims to provide unitary means for simultaneously controlling the inlet to the check-draft chamber and the inlet from the heater to the flue, so as to effect a dampening of the flue which will cooperate with the admission of air to the check-draft chamber for affording a more speedy, sensitive and positive control of the combustion of the fuel in the heater.

Still further and also more detailed objects will appear from the following specification and from the accompanying drawings, in which drawings

Fig. 1 is a fragmentary perspective view of a thermostatically regulated brooder heater equipped with my invention, with portions broken away to show my duplex draft control in its extreme draft-checking position.

Fig. 2 is a fragmentary and enlarged vertical section taken along the line 2—2 of Fig. 3 with my draft control in its opposite extreme position, and with dotted lines showing certain parts in positions corresponding to those in Fig. 1.

Fig. 3 is a fragmentary horizontal section taken along zigzagged line 3—3 of Fig. 2.

In one of its immediate commercial applications, my invention is particularly suited for use in connection with the automatic controlling of heaters for brooders, hence I am illustrating it in such an embodiment, although I do not wish to be limited to the particular type of heater to which it is applied, nor to the use of my invention in connection with a thermostatically actuated regulating mechanism.

In the illustrated embodiment, the heater body includes a main side wall portion 1 surmounted by an upper body portion 2, and this upper portion includes a U-shaped inner wall 3 and a check-draft chamber bottom 4 extending across this inner wall and reaching to the outer wall 2 of the said upper body portion. The chamber A as thus formed within the heater body underhangs the flue collar 5 on the heater top 6, to which collar the flue pipe 7 is attached, and this chamber has recesses 8 in the upper portion of its inner wall, through which recesses the combustion gases can pass from the combustion chamber B of the heater into the check-draft chamber A.

The outer wall of the upper body portion 2 has an aperture 9 for admitting air to the said chamber to check the draft up the flue, and this air inlet is controlled by a check-draft damper 10 which desirably is pivoted at its upper end (as by pivot pins 11) to the upper body portion of the heater. This check-draft damper is connected by a rigid arm or web 12 to a flue damper 13 of somewhat smaller diameter than the bore of the flue collar 5, and the said flue damper desirably extends at an acute and downwardly open angle to the check-draft damper 10.

An operating arm 14 extends outwardly from the check-draft damper and is connected by a link 15 to the inner end of a lever 16 which is pivotally suspended at its outer end from a bracket 17 rigidly fastened to the heater body, and a thermally expansible wafer 18 is interposed between the bracket

17 and the lever 16 near the outer end of the lever.

When the heater is relatively cool, so that the air around the wafer 18 is also at a moderate temperature, the combined weight of the two dampers 10 and 13 and the interposed arm 12 overbalances the combined weight of the outer damper arm 14, the link 15, and the lever 16. Consequently, the damper unit (consisting of the two dampers 10 and 13 and the interposed arm 12) depends by gravity in a position to which it is limited by a suitable stop arrangement, as for example by having the beveled lower edge of the damper 10 engage the correspondingly beveled lower edge of the air inlet aperture 9.

In this position (shown in full lines in Fig. 2), the check-draft damper closes the air inlet, while the flue damper 13 is disposed lower than the bottom of the flue collar and partially below the recesses 8 in the walls of the check-draft chamber. Consequently, the combustion gases which enter this chamber can readily pass to the flue both above and around the flue damper, which damper is considerably smaller in area than the horizontal section of the check-draft chamber, as shown in Fig. 3.

When the heater warms the surrounding air to the minimum temperature for which the thermostatic wafer 18 is constructed, this wafer expands and swings the lever 16 downward (or clockwise in Fig. 1) about the suspending bolt 19, thus pulling the link 15 downward and rocking the damper unit in a counter-clockwise direction. This movement of the damper unit simultaneously opens the check-draft damper 10, so as to admit air from outside the heater to the chamber A, and moves the flue damper 13 towards the flue so as to contract the passages through which gases can pass from the said chamber to the flue.

The proportioning of parts is desirably such that the maximum movement of the damper unit afforded in the said direction by the thermostatic wafer will swing the flue damper 13 into the bore of the flue collar, thereby disposing this flue damper above the recesses 8 and leaving only a sufficiently wide annular passage between the rim of the flue damper and the bore of the flue collar to clear soot or other deposits in this collar. In this position, as shown in dotted lines in Fig. 2, the flue is effectively throttled, while the air inlet 9 is open to admit air to the check-draft chamber and from the latter (through the recesses 8) to the combustion chamber B of the heater.

In intermediate positions, flue throttling action of the flue damper is less, the check-draft damper 10 admits air to a lesser extent, and the inclined position of the flue damper will cause the lower face of the latter to deflect the admitted air downwardly through the lower portions of the recesses 8 into the combustion chamber of the heater. Owing to this combined control of the admitted air and of the passage area to the flue, and also to the downward deflecting of even small quantities of admitted air, my control arrangement causes the heater to respond quickly to the movements of the damper unit, so that it affords an unusually sensitive regulation, although quite simple and inexpensive in construction.

In practice, I desirably make the damper-connecting part 12 in the form of a flat arm or web having its major faces vertically disposed, so as to minimize its impeding of the currents of gases and air. However, I do not wish to be limited either to this or to other details of the construction and arrangement above disclosed, since changes may obviously be made without departing either from the spirit of my invention or from the appended claims.

I claim as my invention:

1. In a heater, a body having a check-draft chamber in its upper porton, the body being provided with an upper flue opening and a lateral air inlet connecting with the said chamber; a check-draft damper pivoted to the heater body and disposed for controlling the air inlet, and a flue damper fast with respect to the check-draft damper and extending at a downwardly open angle from the flue damper; the heater body having a combustion chamber connected to the check-draft chamber by a lateral opening in the latter chamber, and the flue damper being movable to and from a position in which it is disposed entirely above the said lateral opening.

2. In a heater, a body having a check-draft chamber in its upper portion, the body being provided with an upper flue opening and a lateral air inlet both connecting with the said chamber; a check-draft damper pivoted to the heater body on a horizontal axis adjacent to one edge of the air inlet and disposed for controlling the air inlet, a rigid arm extending inwardly of the heater from the check-draft damper, and a flue damper fast on the inner end of the said arm and adapted to be brought into and out of throttling relation to the flue opening by movement of the check-draft damper about the said pivoting the check-draft damper having adjacent to the said air inlet a gas inlet connecting the chamber with the adjacent interior portion of the body, and the check-draft damper being disposed for intercepting the direct flow of air from the said air inlet to the flue opening when the check-draft damper is in its open position.

3. In a heater, a heater body, a check-draft chamber disposed in the upper portion of the heater body, the said chamber having a lateral opening leading to the outer air

and having adjacent to the said opening an aperture connecting the interior of the chamber with the interior of the heater body, the said chamber also having a flue opening in its top, and a unitary control member comprising in rigid formation a check-draft damper movable into and out of closure relation to the said inlet, a flue damper somewhat smaller in area than the bore of the flue outlet and movable into and out of that outlet, and an arm connecting and spacing the two dampers, the said arm being formed for holding the two dampers in downwardly diverging planes.

4. In a heater having in its upper portion a check-draft chamber, and having an air inlet and a flue opening both connected to the said chamber, a unitary control member comprising in rigid formation a check-draft damper movable into and out of closure relation to the said inlet, a flue damper somewhat smaller in area than the bore of the flue outlet and movable into and out of that outlet, and an arm connecting and spacing the two dampers; the said arm being relatively flat and disposed with its major faces upright, and being of such length as to hold the flue damper freely spaced downwardly from the flue opening when the air inlet is closed by the check-draft chamber.

5. In a heater, a heater body having a check-draft chamber and having an upward flue opening and a lateral air inlet both directly connected to the said chamber; and a damper unit pivoted upon the heater body on a horizontal axis and simultaneously controlling both the air inlet and the flue opening in effectively opposite directions; the damper unit including in rigid assembly a check-draft damper controlling the lateral air inlet, and a flue damper underhanging the flue opening and movable within the said chamber towards and away from the flue opening, the flue damper being sufficiently smaller than the flue opening so that it can be disposed within the said opening when the damper unit is in one position.

6. In a heater, a body having a check-draft chamber adjacent both to the top and to one side of the body, and having a flue opening and an air inlet connected to the said chamber, the body having in its said side an air inlet opening leading to the said chamber, the said chamber having in a wall thereof adjacent to the said body side an opening communicating with the interior of the heater; and a damper unit movably mounted on the heater body for simultaneously controlling both the air inlet and the flue opening in effectively opposite directions; the damper unit including in rigid assembly a check-draft damper controlling the air inlet, and a flue damper disposed in the said chamber and arranged for throttling the flue when the check draft damper is in its open position; said check draft damper arranged for downwardly deflecting air admitted through the said inlet when the flue damper is in closed position.

7. A heater construction as per claim 6, in which the opening in the check draft chamber wall widens upwardly.

Signed at Macomb, Illinois, October 2nd, 1929.

WILBER L. SPIKER.