J. F. KENDALL.

DRAFT REGULATING APPARATUS.

APPLICATION FILED OCT. 10, 1918.

1,358,854. Patented Nov. 16, 1920.

Fig. 1.

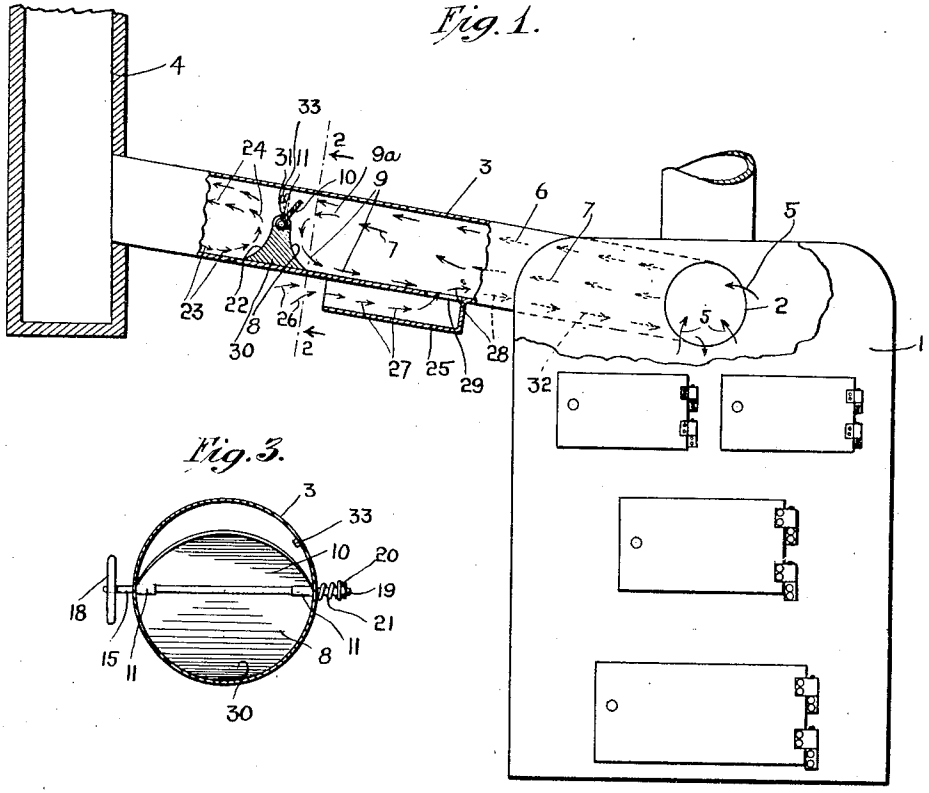
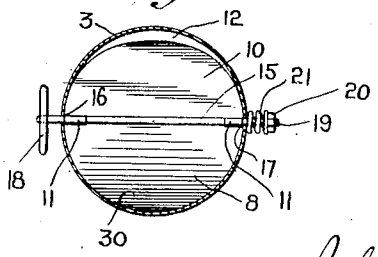


Fig. 3.

Fig. 2.



WITNESS

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DRAFT-REGULATING APPARATUS.

1,358,854. Specification of Letters Patent. Patented Nov. 16, 1920.

Application filed October 10, 1918. Serial No. 257,629.

To all whom it may concern:

Be it known that I, JOHN F. KENDALL, a citizen of the United States of America, residing at Flatbush, county of Kings, Brooklyn, State of New York, have invented certain new and useful Improvement in Draft-Regulating Apparatus, of which the following is a specification.

This invention relates to draft regulating apparatus.

More particularly, the invention relates to draft regulating apparatus for minimizing the loss or wastage of combustible gases or partially oxygenated products of combustion of furnaces, heaters and other types of fuel ignition and combustion apparatus.

The invention is applicable for use with a furnace or the like provided with flue passage for the discharge of the evolved carbonaceous gases and products of combustion by the provision of means for reflecting back and returning the ignitible gases to the region of ignition. In the preferred forms of the invention, the flue passage is substantially closed by such reflecting means at a cooler region or portion thereof, and the flow of gases through the hotter region controlled by a damper or equivalent regulating means. For a flue of cylindrical cross section, the damper is of more or less semi-elliptical contour, whereby passage is afforded at all times for the flow of the gases of highest temperature and the flow of the cooler and ignitible or partially oxygenated gases reflected back to the region of ignition of the furnace or the like.

Other features and objects of the invention will be more fully understood from the following description and the accompanying drawings, in which—

Figure 1 shows diagrammatically a vertical elevation of a furnace with my draft regulating apparatus, the latter being shown in vertical section;

Fig. 2 is a section on line 2—2 of Fig. 1 as viewed in the direction of the indicated arrows; and

Fig. 3 is a vertical section similar to Fig. 2 showing the damper in an increased discharging position.

Referring to the drawings, the furnace proper is indicated at 1 shown provided with the discharge opening 2 communicating through the flue pipe 3 with the chimney or stack 4. The products of combustion evolved upon ignition are indicated generally by the arrows 5 and the passage of the same through the anterior portion of the flue pipe 3 designated by the arrows 6, 7, indicating generally two strata of gases. The stratum 6 comprises gases of relatively higher temperature formed substantially entirely of nitrogen and carbon dioxid, the latter being the chemical combination of carbon with a maximum quantity of oxygen. The stratum 7 comprises relatively cooler gases formed more or less of carbon monoxid, a chemical combination containing a lesser proportional quantity of oxygen, and other partially oxygenated carbonaceous gases and other ignitible and heat evolving products evolved upon ignition.

Means are provided for returning gases of the lower stratum 7, namely the concave means 8 shown as a concave plate of more or less curved cross section; the returned partially oxygenated and other ignitible gases are indicated by the arrows 9. Such reflecting means 8 is shown extending transversely partially across the interior of the pipe 3. Combined with such reflecting means 8, I have arranged the damper 10 shown pivotally mounted at 11, at the upper termination of the reflecting means 8. Such damper 10, as indicated in Fig. 2, is preferably semi-elliptical to provide the clearance 12 between the upper edge of the damper 10 and the flue pipe 3 when the damper 10 is moved to its maximum closing position. In the event that the flue pipe 3 is other than of circular cross section, the damper 10 is constructed correspondingly to provide such clearance 12 for the discharge of the gases through the region of the flue pipe of the highest temperature.

As shown, the damper 10 may be pivotally mounted on the pivot rod 15 extending through suitable openings 16, 17, in the flue pipe 3, one end of the pivot rod 15 being provided with the handle 18 and the opposite end 19 of the rod 15 being threaded to receive the nut 20 for adjustably compressing the spiral or coil spring 21 positioned between the flue pipe 3 and the nut 20, to thereby retain the damper 10 at any desired angular or regulating position.

In certain forms of my invention, provision is made for reflecting back through the chimney or stack the so-called back draft of air from the outside atmosphere into the up draft of combusted gas, to thereby augment

the discharge of the fully oxygenated products of combustion and increase the effective draft of the furnace. As one such means, I have shown the concavely curved means 22, located in the flue 3 between the damper 10 and the chimney or stack 4, the reflected "back" draft being indicated by the arrows 23—24.

Preferably the damper is arranged to oscillate only between its positions of maximum closing and maximum opening on the side toward the opening 2 of the flue pipe, whereby for all positions of the damper the same coacts with the reflecting means 8 to return the ignitible constituents of the gases evolved upon combustion. In Fig. 1, I have shown the damper 10 in an intermediate position, and the course of the reflected gases indicated by the arrows 9^a.

For simplicity of manufacture and assembly, such reflecting means 8 and reflecting means 22 may be combined as a unitary device having a base 30 conforming to the inner face of the flue 3 and extending to the desired extent upwardly or otherwise transversely of the passage of the flue 3, and the damper or other regulating means 10 mounted with suitable eyes or pivot lugs 31 on such upper face of such unitary device.

My draft regulating apparatus is preferably employed in combination with a fuel economizer constructed to receive air from the atmosphere in proper regulated quantity and preheat the same, and to discharge such preheated regulated amount of air into the flue pipe at a point disposed between the reflecting means 8 and the so-called entry opening 2 of the flue passage. Such fuel economizer means is indicated generally at 25 and the air flowing from the atmosphere therein is indicated by the arrows 26: the air flowing through the economizer 25 is indicated by the arrows 27 and the preheated air is indicated by the arrows 28. The preheated air flows through the opening 29 from the fuel economizer 25 into the interior of the flue pipe 3.

Such fuel economizer may embody the construction of my fuel economizer set forth in my Patent No. 1,333,116, Mar. 9, 1920.

In combination with such approved type of fuel economizer, the returned partially combusted and other ignitible gases indicated by the arrows 9, are intimately mixed with the preheated air in the region indicated by the arrows 28, and the resulting mixture, indicated by the arrows 32, is returned through the flue pipe 3 downwardly through the opening 2 into the region of ignition of the furnace 1, or other fuel igniting means.

As one means for limiting the movement of the damper 10, as aforesaid, I have shown the stop 33 positioned to preclude movement of the damper from its position of maximum closure toward the chimney or flue, and thus allow movement of the damper solely from the position of maximum closure toward the furnace, and return.

Whereas I have described my invention by reference to specific forms thereof, it will be understood that many changes and modifications may be made without departing from the spirit of the invention, as defined by the appended claims.

I claim.

1. The combination of a furnace or the like with a flue passage, a damper in said passage comprising a stationary member permanently closing substantially half of said passage and a movable member controlling the opening of the remaining half of said passage.

2. The combination of a furnace or the like with a flue passage, a damper in said passage comprising a stationary member permanently closing substantially half of said passage and a movable member pivotally mounted on said stationary member controlling the opening of the remaining half of said passage.

3. The combination of a furnace or the like with a flue passage, a damper in said passage comprising a stationary member having oppositely disposed concave faces, permanently closing substantially half of said passage and a movable member controlling the opening of the remaining half of the said passage.

4. The combination of a furnace or the like with a flue passage, a damper in said passage comprising a semi-circular reflector having opposite concave faces and a substantially semi-circular member pivotally mounted above said reflector.

5. The combination of a furnace or the like with a flue passage, a substantially circular damper in said passage, comprising a stationary semi-circular lower member and a substantially semi-circular movable upper member, the stationary member having oppositely disposed concave surfaces.

In testimony whereof I have signed this specification this 5th day of October 1918.

JOHN F. KENDALL.