Feb. 21, 1950 C. J. JENDRESEN 2,497,944

COMBINATION NATURAL AND FORCED DRAFT UNIT

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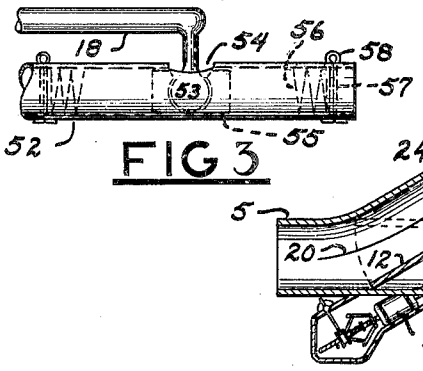


FIG 3

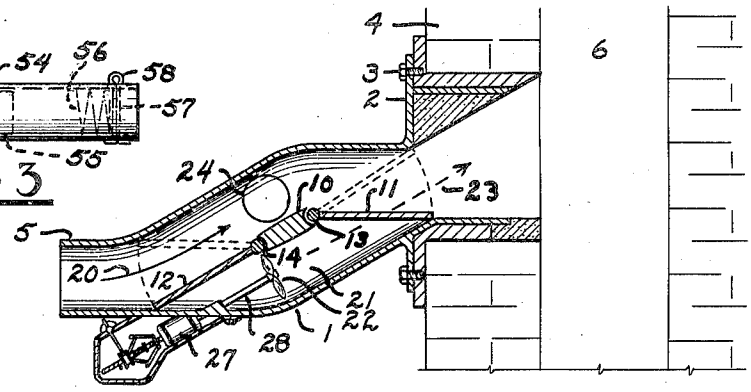


FIG 2

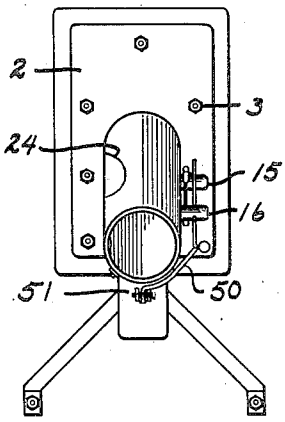


FIG 4

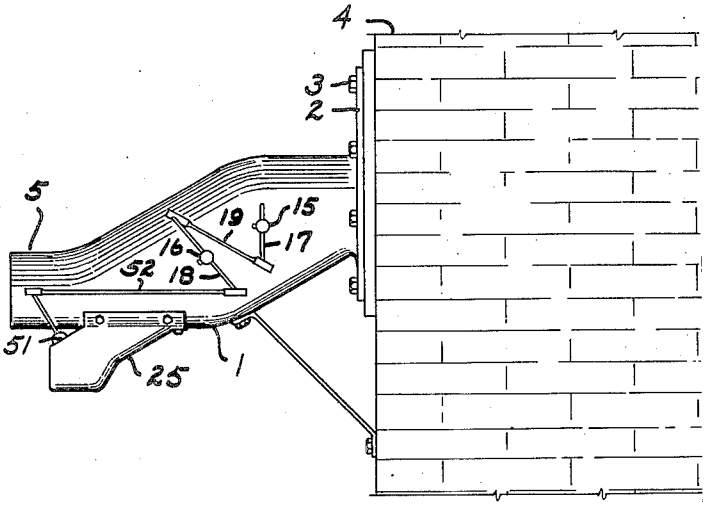


FIG 1

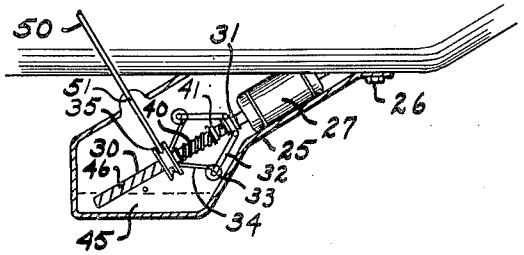


FIG 5

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COMBINATION NATURAL AND FORCED DRAFT UNIT

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3 Claims. (Cl. 110—160)

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This invention relates to draft constructions and is of particular utility with either stoker or hand fed furnaces, whether such furnaces be used for industrial purposes or for residential heating.

The primary object of the invention is to provide a draft construction which includes means for providing normal draft together with means for providing a force draft when a greater draft is desirable or necessary.

Another object is to provide a device of the class described which is self-contained, is compact, and can readily be applied to old or new installations.

A further object is to provide a device of the class described to be installed between the furnace and the chimney and which is operable to provide a reduced pressure within the furnace whereby a draft is induced and the emission of fly ash from the furnace system is avoided.

It is also an object to provide a device in which all moving parts, except the draft inducing impeller, are located exteriorly of the flue.

A still further object is to provide a device in which the draft inducing impeller is surrounded by products of combustion only when the impeller is in actual use.

A further object is to provide a dual duct construction including diverters which are normally in a position to provide a natural draft passage.

A still further object is to provide a mechanism for moving the diverters to close the natural draft passage and provide an alternate passage for a force draft.

Another object is to provide a power driven fan in the alternate passage and means operable to open such passage when operation of the fan is initiated.

The foregoing are primary objects which, together with other and more specific objects, will be more fully apparent from the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a side elevational view of a construction embodying the invention;

Fig. 2 is a sectional view, in elevation, of the device showin in Fig. 1;

Fig. 3 is a detail showing the construction of a resilient linkage connection comprising an element of the invention;

Fig. 4 is an end elevation of the view shown in Fig. 1; and

Fig. 5 is an enlarged sectional detail of the driving motor and diverter control mechanism.

The embodiment of the invention illustrated

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in the drawings comprises a flue section or body 1 which is flanged at 2 for attachment by suitable means such as bolts 3 to the chimney 4, having flue passage 6 therein. The other end 5 of the body 1 is of a size and configuration to receive the end of the flue pipe from the furnace with which the device is to be used. Intermediate the flange 2 and the end 5, the body 1 is enlarged in cross section and has a transverse baffle 10 centrally thereof, the enlargement of the body being sufficient that the cross sectional area both above and below the baffle 10 is substantially equal to the cross sectional area at the end 5 or at the flange end 2. It is intended by this construction that the alternate passages that may be provided through the device shall be substantially uniform in cross section with the flue leading to the device so that efficient passage of the gases of combustion will be provided.

At the opposite edges of the baffle 10 are diverters 11 and 12 mounted upon horizontal pivots 13 and 14, respectively. One end of each of these pivots extends through the side wall of the body 1, thus providing projections 15 and 16 at the exterior of the body. A downwardly extending arm 17 is attached to the projection 15, and another arm 18 is attached to the projection 16 and extends in opposite directions therefrom. The upper end of the latter arm is connected to the lower end of arm 17 by means of connecting rod 19.

It seems apparent that the diverters 11 and 12 will normally assume the positions shown in the drawings due to the force of gravity acting thereon. When in these normal positions, an unobstructed flue passage is provided through the body 1, as indicated by the arrow 20. This is the normal operation of the device when force draft is not required. Attention is directed to the fact that the diverters in normal position form an enclosure 21 below the baffle 10, within which enclosure is located the fan or impeller 22 to be used for creating a force draft when the diverters 11 and 12 are lifted to the positions shown in dotted outline in Fig. 2. When the diverters are lifted to the indicated positions, an alternate force draft passage is provided through the body 1, as indicated by the dotted arrow 23. The mechanism for effecting force draft operation of the device will now be described.

Mounted upon the exterior of the body 1 is a housing 25 attached to the body by means of the cap screws 26. This housing encloses a motor

27, having the upper end of its armature shaft attached to the shaft 28, upon which the fan 22 is mounted. The armature shaft of the motor 27 also extends downwardly at 30 and has a collar 31 fixed thereon. Governor arms 32 are pivoted to this collar and extend downwardly for a pivot connection at 33 with the lower governor arms 34 attached to a collar 35 at their lowermost ends. The collar 35 slidably fits upon the shaft 30 so that axial movement of the collar may be effected through operation of the governor mechanism just described. This collar is normally urged downwardly by means of a compression spring 40, which surrounds the shaft ends and abuts against a tensioning collar 41, adjustably mounted upon the shaft. The lower end 30 of the armature shaft dips within a body of oil 45 in the housing 25 and is provided with a spiral groove 46 so that oil is conducted upwardly to the governor mechanism whenever the motor 27 is in operation.

An arm 50 extends outwardly from within the housing 25 and is pivoted at 51, where it emerges from the housing. The inner end of this housing engages within a peripheral groove in the collar 35 so that the arm moves upon its pivot in accordance with movements of the collar axially of the shaft 30. The opposite end of the arm 50 is attached through connecting rod 52 to the lower end of the arm 18, whereby an operable connection is provided between the governor mechanism and the linkage control for the diverters 11 and 12.

To assure smooth and efficient operation of the mechanism, the connections at the ends of the rods 19 and 52 are made resilient in the manner indicated in Fig. 3, of which the detail will be assumed as showing the connection at the lower end of the arm 18. A ball 53 extends sidewardly from the arm and is adapted to pass through an opening 54 in the hollow, enlarged end of the connecting rod 52. This ball is grasped by socket members 55, which provide a complementary spherical surface to engage the ball 53 under pressure exerted by springs 56, which are retained in place by means of suitable stops 57 held in place by cotter keys 58. It seems apparent that this construction permits resilient movement between the respective arms and connecting rods, which are interconnected to provide desired movement of the diverters 11 and 12 as a result of the operation of the governor mechanism on the armature shaft 30.

By way of further description and a summary of the operation of the device, it is pointed out that the motor 27 may be energized from any suitable source. If the device is used for residential heating, where hand stoking is relied upon, the motor may be thermostatically controlled so that induced draft will be effected whenever the temperature of the heated space falls below a predetermined point. If, on the other hand, a mechanical stoker is used, electrical circuits may be such that the motor 27 will be controlled through the stoker mechanism. For example, the induced draft feature may be used whenever the stoker is placed in operation either manually or by means of automatic control mechanisms, as well known in the art.

In any event, flue gases pass through the device as indicated by the arrow 20 when natural draft is relied upon. This draft may be controlled by suitable mechanisms including, if desired, the conventional check door or wind vane fitted on the opening 24 in the body 1. When, however,

the motor 27 is energized, the governor mechanism is immediately actuated to impart movement to the lever 50 and in turn to the linkage mechanism including the arms 17 and 18 attached to the diverter pivots 13 and 14. Such action lifts these diverters against the force of gravity and provides a passage as indicated by the arrow 23 whereby force draft is induced by the fan 22 for that period of time during which force draft is required. When the motor 27 is de-energized, the diverters move under gravity to the position as indicated in Fig. 2 and the arm 50 moves to exert some tension upon the spring 40 so that the centrifugal force exerted by the governor is supplemented by the spring tension subsequently to aid in lifting the diverters when force draft is to be used.

Broadly, the invention comprehends a device of the class described which is inexpensive and efficient and which may be effectively utilized in either existing or new installations.

The invention claimed is:

1. In a device of the class described, a body having a passage therethrough, pivot means extending transversely and horizontally within said body, a pair of oppositely directed diverters mounted on said means and biased to normally define a flue passage on one side in the body and simultaneously form an enclosure on the opposite side within the body, a fan within said enclosure, a motor operatively connected to said fan, a linkage operatively interconnecting said pivot means, and means connected to said linkage and operable by said motor for moving said diverters to close said passage and form a draft passage past the fan whereby a forced draft is induced through the body.

2. In a device of the class described, a body having a substantially horizontal passage therethrough, a pair of parallel pivots extending transversely and horizontally within said body, a baffle extending transversely of the body between said pivots, oppositely directed diverters mounted on said pivots and movable downwardly under gravity to normally define with said baffle an upper flue passage and to form an enclosure therebeneath, a fan within said enclosure, a motor operatively connected to said fan, and means comprising a linkage operatively interconnecting said pivots and operable by said motor for lifting said diverters to close said upper passage and form a draft passage below the diverters and baffle past the fan whereby a force draft is induced through the body.

3. In a device of the class described, a body having a substantially horizontal passage therethrough, a pair of parallel pivots extending transversely and horizontally within said body, said pivots lying in an inclined plane extending longitudinally of the body, a baffle extending transversely of the body between said pivots, diverters mounted on said pivots and movable downwardly under gravity to normally define with said baffle an upper flue passage and to form an enclosure therebeneath, a fan within said enclosure, a motor operatively connected to said fan, and means comprising a linkage operatively interconnecting said pivots and operable by said motor for lifting said diverters to close said upper passage and form a draft passage below the diverters and baffle past the fan whereby a force draft is induced through the body.

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