Dec. 19, 1939. E. H. JOHNSON 2,183,648

GRATE FOR SAWDUST BURNERS

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Fig. 1.

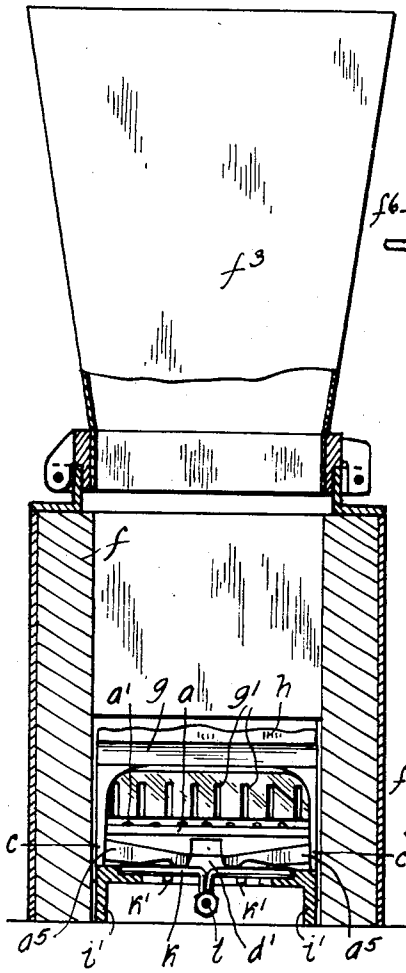


Fig. 3.

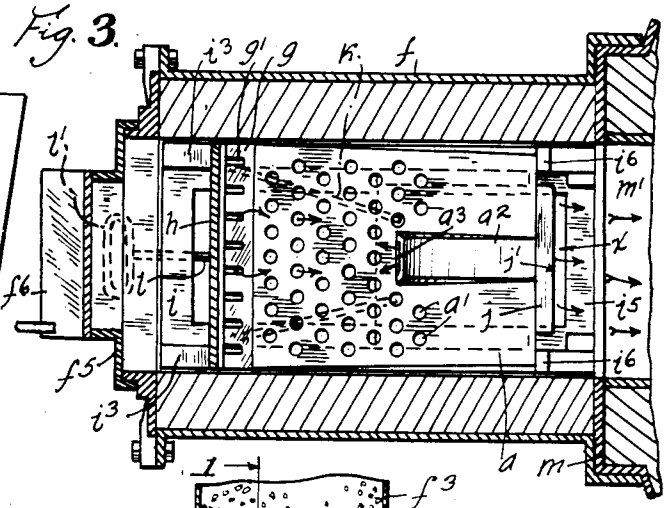


Fig. 2.

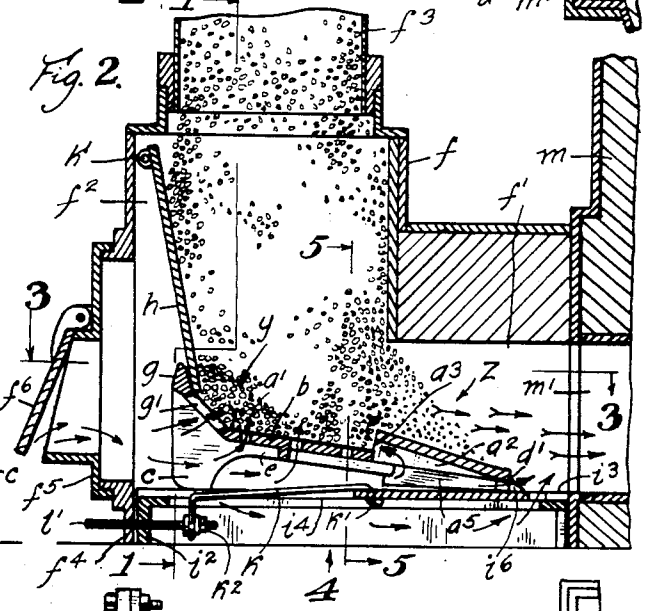
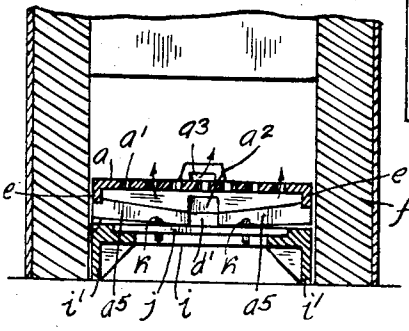


Fig. 5.



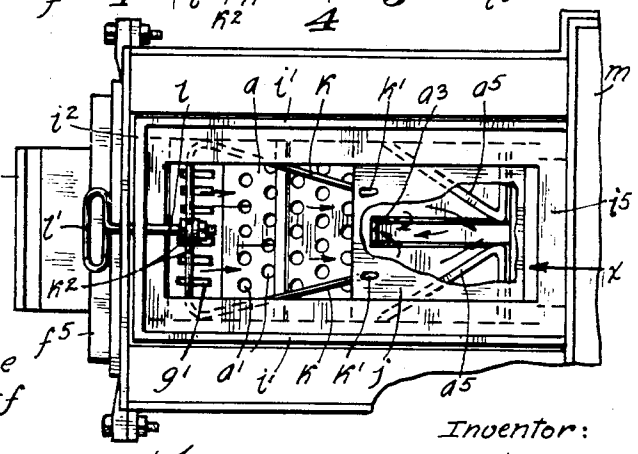


Fig. 4

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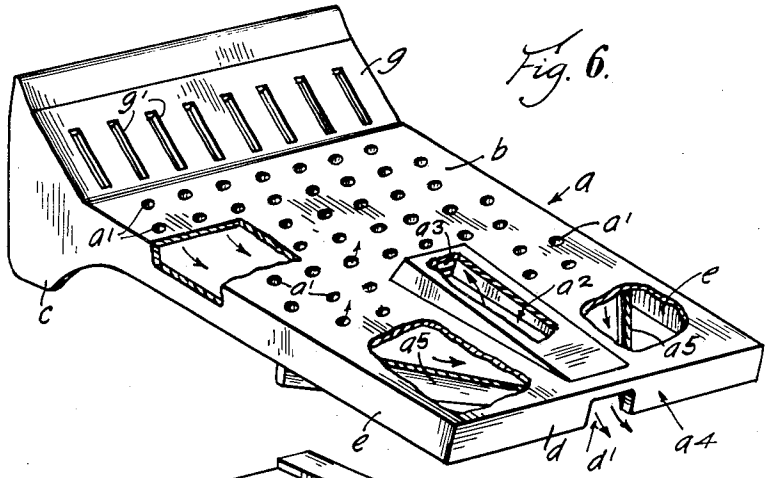
Fig. 6.



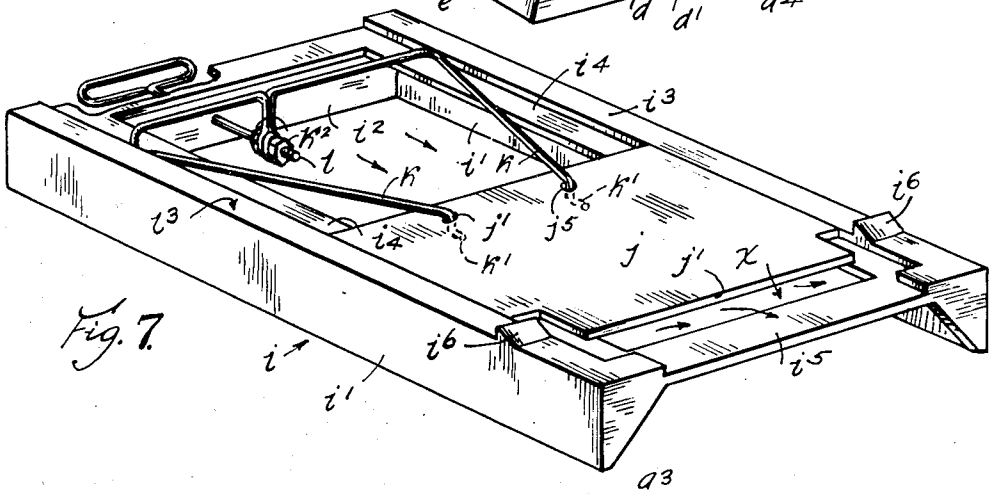


Fig. 7.

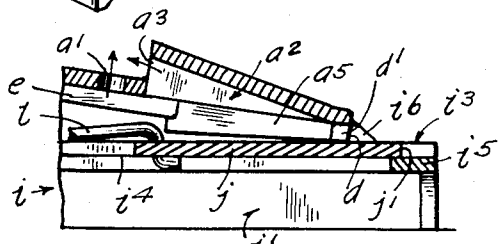


Fig. 9.

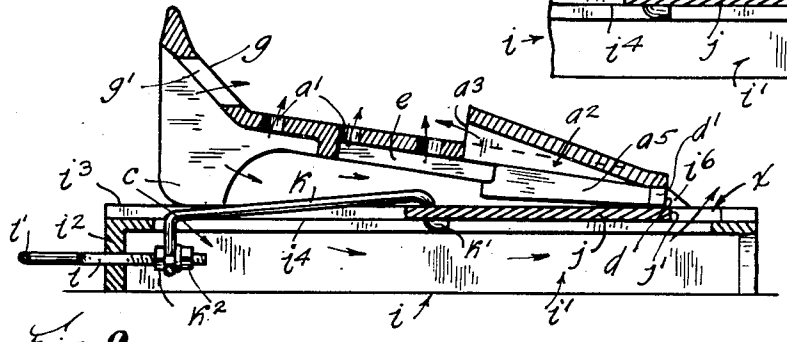


Fig. 8.

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UNITED STATES PATENT OFFICE

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GRATE FOR SAWDUST BURNERS

Erik H. Johnson, Portland, Oreg.

Application June 20, 1938, Serial No. 214,675

2 Claims. (Cl. 110—7)

My invention relates to sawdust burners that are attached to the outside of a furnace and which inject a flame therein thru the fire door thereof.

The main object of my invention is in providing for a proper amount of air to be proportionally distributed to the fuel in such a manner that a complete combustion thereof is attained.

Another object is to prevent the formation of gas within the burner as the fire becomes extinguished, which, when the fire is again lighted, results in a back fire, and also to eliminate the forming of creosote around the edges of the draft door of said burner.

Another object is to allow for the admittance of a blast of air directly into the furnace and means for controlling the same.

A still further object is to provide a grate that is of such length as to fully carry the fuel thereupon, whereby unburned fuel cannot fall over the inner end thereof and into the ash pit.

My invention consists of a combination grate and elevating frame therefor, which allows for a desired amount of air to be passed under said grate and to the fuel stacked thereupon in such a manner as to create a proper combustion of said fuel and in addition a blast of air directed into the furnace and a damper outwardly manipulated for controlling said blast of air.

In the accompanying drawings:

Fig. 1 is a fragmentary front elevation of the burner as attached to a furnace and is a section taken on line 1—1 of Fig. 2 to show my improved grate positioned in said burner;

Fig. 2 is a longitudinal vertical section of the burner and my grate therein and their relation to the furnace.

Fig. 3 is a plan section taken on line 3—3 of Fig. 2;

Fig. 4 is a bottom view of the burner and my grate to show details thereof;

Fig. 5 is a front vertical section taken on the line 5—5 of Fig. 2.

Fig. 6 is a perspective of my grate with parts broken away to show means of directing air to various auxiliary openings of said grate;

Fig. 7 is a perspective of the supporting frame upon which my grate is mounted and shows a plate damper slidably mounted on said frame to control a blast of air that may be directed into the furnace.

Fig. 8 is a longitudinal section of my grate combination to more clearly show details of construction and also the damper plate in open position in relation to the inner end of the supporting frame for directing a blast of air to the furnace;

Fig. 9 is a similar but fragmentary section showing the damper plate in its inner or closed position whereby no air can be directed into the furnace.

As illustrated, my grate as a consists of a bed plate b supported at its outer end on legs c and at the inner end on the flange d while flanges e are provided at each side to stiffen said plate. The bed plate b which is downwardly inclined toward the throat f' of the burner housing f has an extension g setting at a greater incline to coact with the apron h, pivotally mounted on pins h' to the side walls f^2 of the burner housing f, for guiding the fuel from the hopper f^3 to the grate.

The grate a is mounted upon the box-like frame i consisting of sides i', and the end i^2 and shoulders i^3 at each side upon which the legs c and the flange d of the grate are mounted.

A rectangular plate j which is slidably mounted upon the recessed portions i^4 at each side of the frame functions as a damper in conjunction with the cross bar i^5 at the inner end of the frame to form an opening as x for the passage of a blast of air past the inner end a^4 of the grate and directly into the furnace.

Said plate is controlled by means of a U-shaped rod k whose free ends k' hook thru holes j' in said plate. A rod l, adjustably secured to the rod k by nuts k^2, passes thru the end i^2 of the frame and the lower front portion f^4 of the housing f and is provided with a hand loop l'.

The bed plate a is provided with holes a' and the extension g with slots g' for the passage of air from the draft door f^5 to the fuel as y upon said plate and outwardly of the area of combustion as z.

One of the objects of my invention is to provide means for supplying a desired amount of air to the fuel at the area of combustion within the throat f' of the burner. This area is at the inner end of the grate and to inject a flow of air to the fuel at this place, I provide an inclined centrally positioned tunnel having an opening a^3 thru which such air enters said fuel.

In the center of the flange d at the forward end of the grate, I provide a central opening d'. By means of angular baffles a^5 air from under the grate is led to said opening to provide a blast of air which is diverted into the door of this furnace to aid in forming a draft whereby air is drawn thru the slots g', the perforations a'

and the opening a^3 and thus thru the fuel to the area of combustion.

As mentioned, my grate is of greater length than the grates in present use and as will be noted, it extends almost to the door m' of the furnace m to which the burner housing f is secured. Said grate may be adjustably positioned on the frame i as desired according to the kind of fuel used but wherein the innermost position is regulated by stops i^6 on each side of the frame i.

Such length of grate insures that none of the unburned fuel may fall over the inner end a^4 of the grate and be wasted or impede the flow of air but that all fuel will be consumed.

When a fire is to be started, the damper plate j is moved inwardly to allow but a small opening as x between the end j' and the cross bar i^5 and the damper f^6 on the door f^5 is partially opened. When the fire is burning satisfactorily, this damper plate j is then to be closed as seen in Fig. 8.

When it is desired to quench the fire, the damper plate j is pulled to its outward position as seen in Fig. 7 which thereby provides an enlarged opening as x and a blast of air is then directed past the end of the grate and the area of combustion and directly thru the furnace door m' and into the furnace. Thus the air is diverted from the fire and the same soon goes out.

This improved construction of the grate and the control of the air thereto makes it possible to hold, for any length of time, a small fire when so desired. In the present types of grates, when the damper f^6 is almost closed purposely for creating a small fire, the fire invariably becomes extinguished. The hot embers soon form a gas which, when the fire is again ignited, invariably results in a back fire which is always obnoxious and often times disastrous.

Thus, by eliminating the hazard of a back fire and the forming of cresote upon the edges of the door of the burner, I have provided a grate that I have proven to be both practical and safe. Also my grate is so designed as to provide for a more efficient control of the air within the burner to create better combustion and to regulate the fire as desired.

I claim:

1. In a burner of the character described comprising a housing, a fuel feed chute therefor, a damper door, a grate positioned within said housing consisting of an inclined perforated bed plate provided at its outer end with a greater inclined slotted portion against the top of which rests the lower end of a fuel guiding plate which in turn is hingedly mounted within said housing, a base for said grate, a cross bar at the inner end thereof, a plate slidably mounted on said base and controlled from without said housing, whereby a flow of air may be directed and controlled between the inner end of said plate and said cross bar and into the furnace.

2. In a burner of the character described comprising a housing, a fuel feed chute therefor, a damper door, a grate positioned within said housing and consisting of an inclined perforated bed plate provided at its outer end with a greater inclined slotted portion and against the top of which bears the lower end of a fuel guiding plate which in turn is hingedly mounted within said housing, an inclined tunnel central of said grate having an opening for directing air to the central portion of said grate and an opening at the inner end of said grate, means for diverting air from under said grate thru said opening, a base for said grate, a cross bar at the inner end thereof, a plate slidably mounted on said base and controlled from without said housing whereby passage of air may be admitted and controlled between the inner end of said plate and cross bar of said base.

ERIK H. JOHNSON.