May 13, 1930. V. C. SNYDER 1,758,478

WATER COOLED COMMINUTED FUEL BURNER

Filed June 30, 1928

Fig. 1.

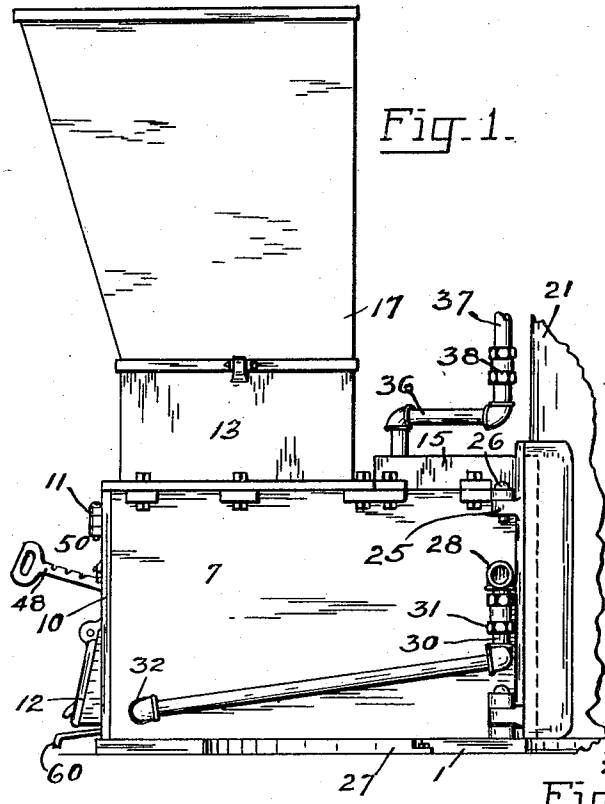


Fig. 3.

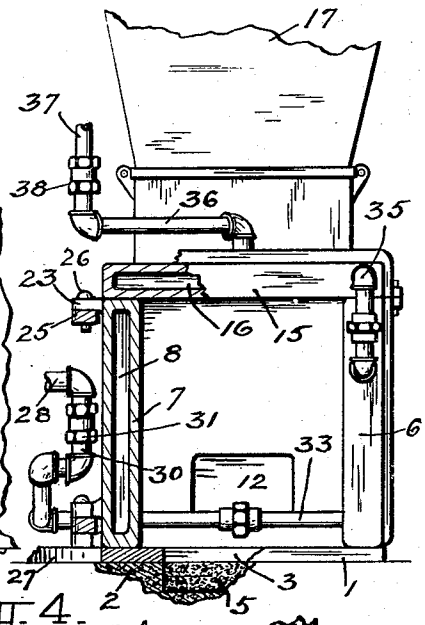


Fig. 4.

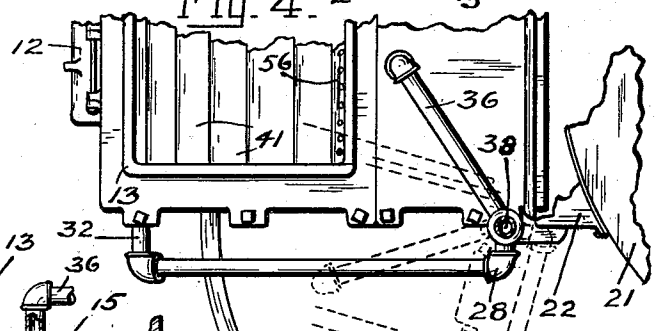
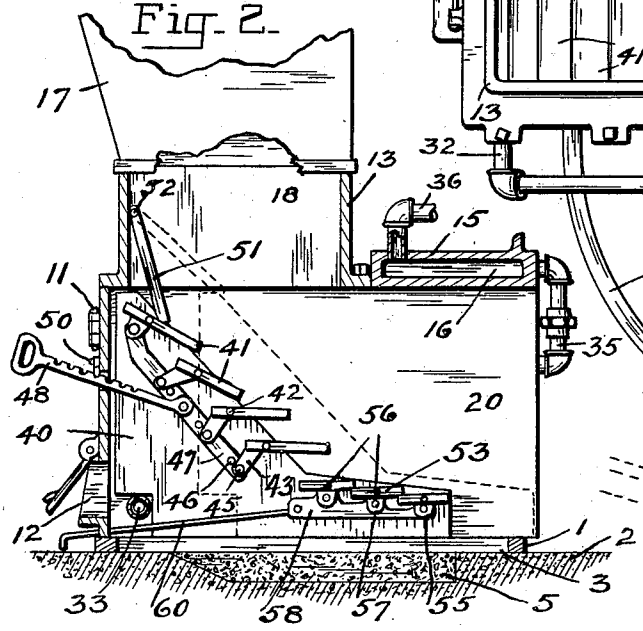


Fig. 2.



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WATER-COOLED COMMINUTED-FUEL BURNER

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This invention relates to improvements in burners for comminuted fuel, such as sawdust or hogged wood waste.

The principal object of my invention is to provide a burner of the class described, of simple and practical construction, whose walls are chambered and connected with a water circulating system, whereby relatively light and cheap materials, such as cast iron, may be employed in the construction of the burner to resist deterioration through overheating, due to the cooling effect of the circulating water, and through which heat ordinarily lost by radiation will be conserved in the production of a hot water supply.

A further object of the invention is to provide a burner of the class described and having water supply and outlet connections for the circulation of water through its water jacket, and of means for pivotally mounting the same to swing away from the furnace to which it is associated without the disconnection of its pipe fittings.

A still further object of the invention is the provision of novel and adjustable grate devices removably mounted in the burner whereby the combustion of wood waste thereon may be reliably controlled.

Other objects and advantages of my invention, and objects relating to details of construction and arrangement of parts thereof, will be readily apparent in the course of the detailed description to follow.

The accompanying drawings illustrate by way of example an embodiment of my invention, in which:

Figure 1 is a view in side elevation of burner apparatus embodying my invention shown in operative condition as attached to a furnace.

Fig. 2 is a fragmentary view in vertical longitudinal section of the same.

Fig. 3 is a view in rear elevation of Fig. 2 with the grate devices removed and parts of the walls broken away.

Fig. 4 is a fragmentary plan view of my improved burner with the fuel hopper removed.

Referring to said views, the reference numeral 1 indicates a bed plate of cast metal rigidly supported upon a floor 2 having a symmetrically disposed rectangular opening 3 in its middle portion below which a body of fire resisting material 5 is disposed. Upon the side edges of said bed plate my improved burner is supported, consisting in vertical side walls 6 and 7 which are internally chambered, as at 8, for the reception of a cooling body of water. The front wall of the burner consists in a frame 10 including a hinged door 11 of relatively large dimensions having an adjustable draft inlet 12. The top wall of my improved burner is formed by a rectangular throat casting 13 rigidly connected to said side walls at the forward end of the burner and rearwardly thereof a plate 15 rigidly connects said side walls having a water chamber 16 therein.

A hopper 17 is detachably connected to the throat casting 13, and a supply of wood waste or other comminuted fuel is stored for gravitational feed through the throat 18 of the casting 13 and into the combustion chamber 20 of the burner.

21 indicates a furnace of any suitable type, such as is used for domestic heating. 22 indicates a connecting casting fixedly secured to the furnace and extending outwardly to make connection with the rear faces of the side walls 6 and 7 and the upper plate 15. Complementary lugs 23 and 25 are integrally connected at the top and bottom of the side wall 7 and the connecting casting 22, respectively, through apertures in which hinge pins 26 extend, whereby the burner may be pivotally swung to one side to expose the opening through the connecting casting into the furnace.

An arcuate track plate 27 is rigidly connected to the floor upon which the lower sur-

faces of the side walls may bear to maintain the burner in level condition when the same is swung to one side. A pipe connection 28 is provided leading from a source of water supply under pressure which includes a vertical portion 30 having a swivel joint fitting 31 in axial alignment with the hinge pins 26 so that said water connections will not be disturbed when the burner is swung away from the furnace. Said pipe connections enter the water chamber 8 of the side wall 7, as at 32, and said water chamber is connected to the opposite water chamber 8 of the wall 6 through a horizontal pipe connection 33 adjacent the front portion of the walls and near the bottom thereof.

The water chamber 8 of the wall 6 is communicatively connected with the water chamber 16 of the top plate 15 by means of pipe connections 35. Extending out of said water chamber 16 is a pipe 36 directed horizontally and thence upwardly, as at 37, and including a swivel joint fitting 38 in axial alignment with the hinge pins 26 and the swivel fitting 31.

Thus a water circulation is established through the water chambers 8 and 16 which may be utilized for the provision of a hot water supply for domestic purposes and at the same time affording a cooling system to maintain the temperature of the walls surrounding the combustion chamber at a degree which will prevent their rapid deterioration. The pivotal joints afforded by the hinge pins 26 and the swivel fittings 31 and 38 insure that the water connections will not be disrupted upon the swinging movement of the burner.

The grate structure of my invention consists in a removable frame comprising side plates 40 adjacent the opposite walls 6 and 7 of the burner. Grate bars 41 are pivotally connected at 42 in said plates and are each provided with a lug 43 having pivot pins 45 entered selectively in either of a pair of holes 46 in a tie bar 47 to give said grate bars either of two selected inclinations, respectively. Said tie bar is controlled by means of a rack bar 48 extending through the door 11 and maintained in adjusted position by means of a pivoted dog 50.

51 indicates a swinging plate pivoted at 52 in the front wall of the throat casting 13 and adapted to rest at its lower end upon the uppermost of the grate bars 41. Substantially horizontal grate bars 53 are mounted in extensions 55 of the side plates 40 and are pivoted at 56 therein. The grate bars 53 are further provided with lugs 57 pivotally connected to a bar 58 which is controlled by a rod 50 extending to the door 11.

It will thus be seen that sawdust stored in the hopper 17 will descend by gravity through the throat opening 18 and rest upon the grate bars 41 and 53 while air to support combustion enters through interstices between the grate bars and combustion is effected in the chamber 20 whence the products of combustion are drawn through the furnace in the usual manner. The grate bars may be adjusted at suitable angles to support the fuel while burning in the desired manner and to admit the desired quantity of air.

The combustion may be further controlled by moving the entire grate frame within the combustion chamber forwardly or rearwardly to more or less close the throat opening 18. When thrust forwardly, as indicated in broken lines in Fig. 2, the plate 51 will swing forwardly therewith and partially block said throat opening, whereupon the sawdust or other fuel will be partially blocked in its descent and the supply of fuel will be retarded.

The provision of a sawdust burner constructed and organized in the manner described, having water cooled chambers in its side walls and top, where the effect of intense heat will be most apparent, is extremely desirable in the maintenance of a burner of this type. Also, the corollary effect of furnishing a supply of hot water for domestic purposes or which may be in a steam or hot water boiler connected with the hot water of the furnace gives a valuable adjunct to the invention. The provision of means for swinging the entire structure to admit of access to the furnace for cleaning or repairs is a still further advantage in my new construction.

From the foregoing construction, taken in connection with the accompanying drawings, the advantages of the construction and application of my improved water cooled comminuted fuel burners will be readily apparent; but, while I have described the principle of operation of the invention, together with the structures which I now consider the best embodiment thereof, it will be readily understood that the devices shown are merely illustrative and that such changes may be made therein as will lie within the scope of the following claims.

Having described my invention, what I claim, is:

1. A burner for furnaces, consisting in a base, walls movably supported on said base, a throat element superimposed on said side walls connecting them together, a hopper mounted on said throat element, a plate rigidly connected to said side walls rearwardly of said throat element, said side walls and said plate being chambered to provide water passages, water communicating connections between said water passages, means to hingedly connect said burner to a furnace, pipe connections to supply water and withdraw the same from said passages, and swivel devices in said pipe connections in axial alignment with the hinge connections of the burner.

2. A burner for furnaces, consisting in a fire-box pivotally mounted to swing in hori-

zontal directions, the side walls and top of said firebox being separably connected together and each formed with a water-chamber, water supply and discharge pipes communicating with said chambers respectively provided with swivel-joints in the axis of pivotal movement of the fire-box, and pipe connections between the side wall chambers and between one of said side wall chambers and the chamber of the top wall.

VERN C. SNYDER.