Jan. 16, 1934. E. BURG 1,943,286

BURNER FOR FURNACES

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Fig. 1

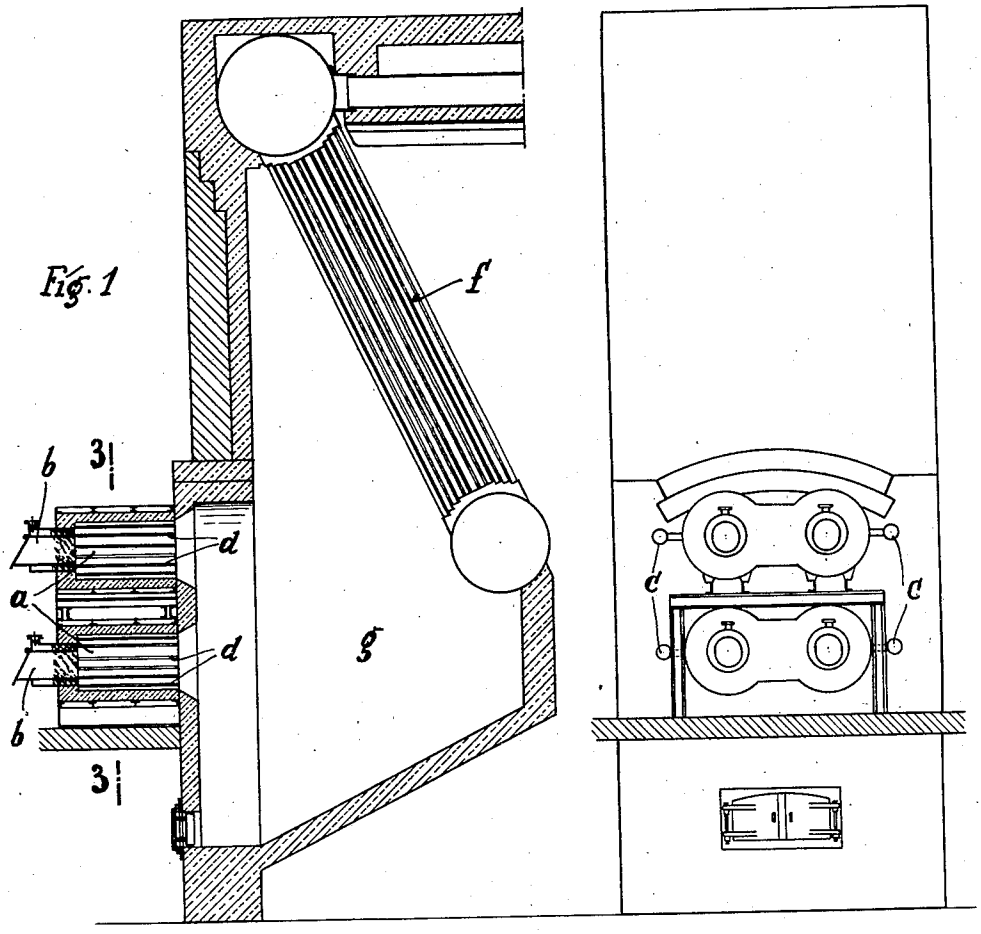

Fig. 2

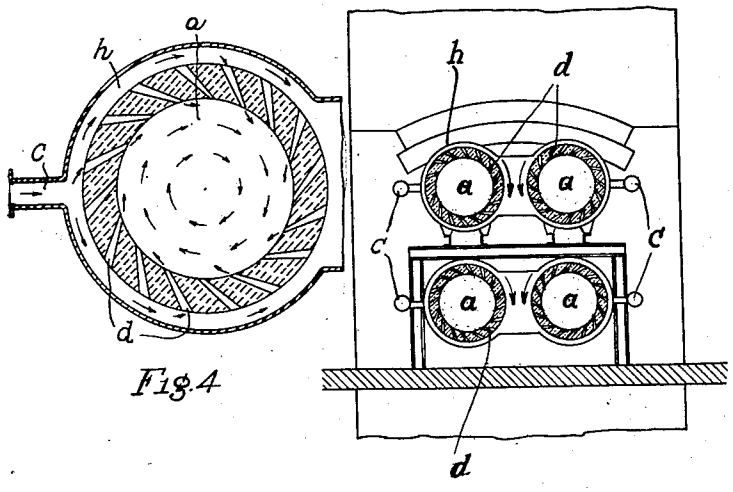

Fig. 4

Fig. 3

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BURNER FOR FURNACES

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2 Claims. (Cl. 110—28)

My invention relates to improvements in burners for steam boilers, metallurgical furnaces, and the like, and more particularly in burners for powdered fuel, in which the fuel is delivered from the burners with whirling motion. The object of the improvements is to construct the burners so that the slag is separated from the flame before being deposited on the walls of the flue or on the boiler tubes. With this object in view my invention consists in disposing a plurality of burners one beside the other and disposing the means for imparting whirling movement to the fuel so that the whirling movement of adjacent burners has the same direction at adjacent sides of the flames, the said movement being preferably directed downwardly, I have found that thereby the slag is thrown downwardly and out of the flame, so that it is deposited on the bottom of the fire box. For example, where two burners are provided, the said burners are placed one beside the other, and the fuel is whirled around in both burners so that the adjacent parts of the flames are directed downwardly. Where a plurality of corresponding pairs of burners are provided, the members of the corresponding pairs are arranged so that the tangential deliveries of the members of one pair will join with the similar deliveries from the members of another pair to produce thereby a downwardly directed common stream path of slag and flame.

For the purpose of explaining the invention an example embodying the same has been shown in the accompanying drawing in which the same reference characters have been used in all the views to indicate corresponding parts. In said drawing,

Fig. 1 is a sectional elevation showing a part of a steam boiler provided with four burners for powdered fuel,

Fig. 2 is an end view looking from the left in Fig. 1, and

Fig. 3 is a sectional elevation taken on the line 3—3 of Fig. 1,

Fig. 4 is an enlarged sectional view of a single combustion chamber showing in detail its connection with an inlet conduit.

In the example shown in the figures the burners are provided in a steam boiler having water tubes *f*. But I wish it to be understood that my invention is not limited to the use of the burners in steam boilers. As shown, the steam boiler is provided with a burner having four combustion chambers *a* and intakes *b* for the powdered fuel, and the air for supporting combustion is supplied to the combustion chambers *a* through pipes *c* opening in annular chambers *h* surrounding the combustion chambers *a*. The chambers *h* are connected with the combustion chambers by tangential slots *d*, so that a whirling movement is imparted to the flames emitted from the combustion chambers *a*, as is known in the art. The tangential passages *d* are disposed so that the flames are whirled around in the direction of the arrows shown in Fig. 3. As appears from the said figures the whirling movement is directed downwardly at the adjacent sides of the flames emanating from the combustion chambers *a*. Therefore, the flames emanating from the burners meet at their adjacent sides, and they are whirled downwardly, so that the slag is separated therefrom and deposited on the bottom of the fire box *g*. Thus as best shown in Fig. 3, where the burners are arranged in upper and lower pairs, each pair being in a horizontal plane and parallel to each other, the right hand burners of each pair, which of themselves are parallel and in a vertical plane, carry through the fuel whirling operation in a counter-clockwise direction, while the left hand burners of each pair, also of themselves parallel to each other and in a vertical plane, carry through the whirling in a clockwise direction. By thus grouping and operatively arranging the burners as a unit, the slag and flame from all of the burners are tangentially delivered so as to proceed downwardly along a common stream path along which the slag is separated from the flame for deposit on the bottom of the fire box.

While in describing the invention reference has been made to a particular example embodying the same I wish it to be understood that my invention is not limited to the construction shown in the drawing, and that various changes may be made in the general arrangement of the apparatus and the construction of its parts without departing from the invention.

I claim:

1. In a furnace, a unit for the combustion of pulverized fuel comprising a group of four coacting burners arranged in relatively superimposed pairs, having their longitudinal axes substantially horizontal and parallel and having their outlets in the same vertical plane, a pair of said burners being in the same upper level and in spaced apart relation and the other pair in the same lower level also in spaced apart relation, the burners being arranged so that a vertical plane passing between the members of one pair passes between the members of the other pair, nozzles in connection with the burners for supplying fuel to said burners, a

casing for each pair of burners on the same level, and oppositely disposed inlet conduits arranged in the same horizontal plane communicating with each casing for feeding a supply of air therein, said burners having passages in their walls inclined respectively to the radii of the nozzles at the outlets of the passages, whereby air forced into each burner from the opposite conduits is whirled through the passages in a relatively counter-whirling direction within the burners.

2. In a furnace for the combustion of pulverized fuel, a plurality of cylindrical burners arranged on the same level and having their longitudinal axes parallel to each other in the same horizontal plane, a casing for said burners, oppositely disposed air supply conduits lying in the same horizontal plane in communication with the casing at opposite sides thereof, and a pair of nozzles each extending longitudinally from one of said burners in the casing and in spaced apart relation, and adapted to supply fuel thereto, each of said burners having slotted passages through its walls inclined respectively to the radii of the nozzles at the outlets of the passages whereby air forced through the oppositely disposed conduits into the casing is passed in counter-whirling directions through the walls of the burners and into the interior of the furnace in combination with the combustible fuel introduced through the nozzles.

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