

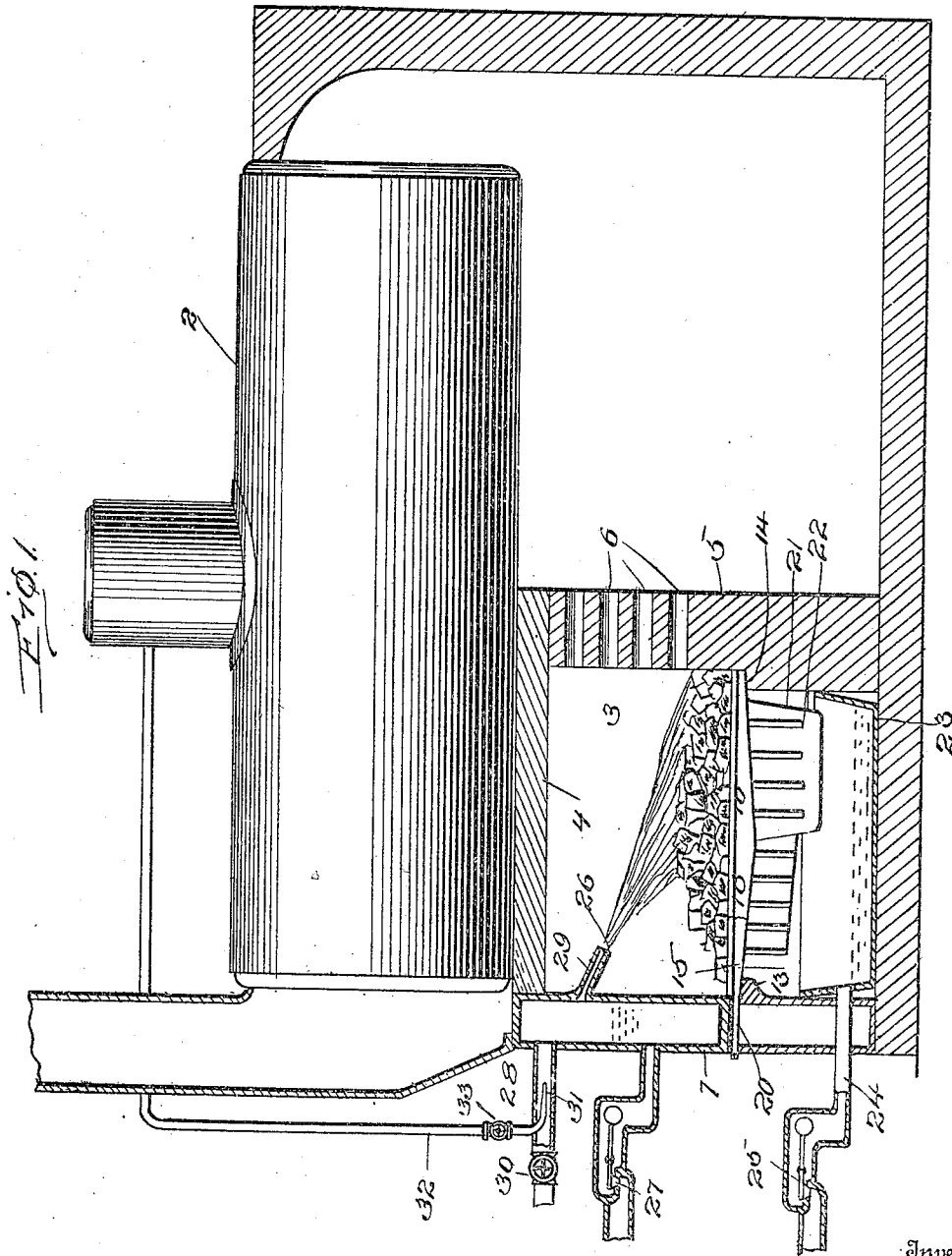
V. H. HOBSON.
FURNACE.

APPLICATION FILED FEB. 27, 1909.

952,431.

Patented Mar. 15, 1910.

2 SHEETS—SHEET 1.



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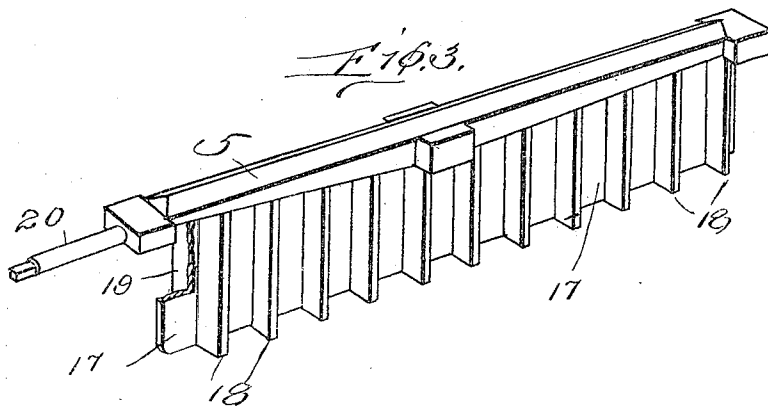
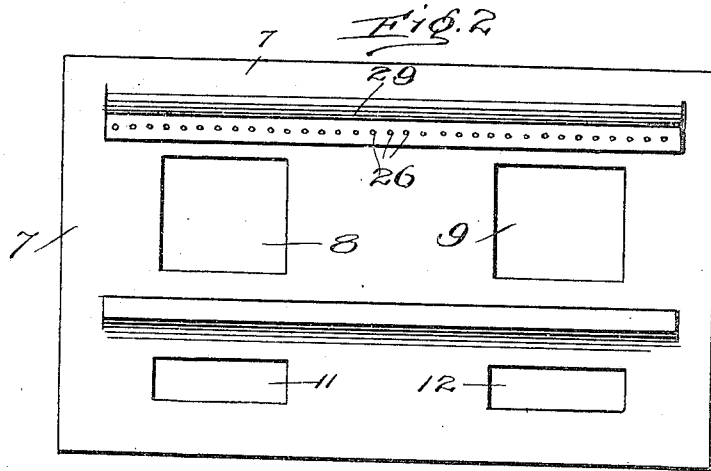
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Witnesses

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UNITED STATES PATENT OFFICE.

VALENTINE H. HOBSON, OF RICHMOND, KENTUCKY.

FURNACE.

952,431.

Specification of Letters Patent.

Patented Mar. 15, 1910.

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To all whom it may concern:

Be it known that I, VALENTINE H. HOBSON, a citizen of the United States, residing at Richmond, in the county of Madison and State of Kentucky, have invented certain new and useful Improvements in Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in furnaces and particularly to furnaces arranged for providing for a substantially complete combustion.

A further object of the invention is the arrangement of the fire box in the furnace and a feeding thereto of steam and air in predetermined quantities both below and on top of the fuel in the heated condition whereby proper chemical union is made, resulting in a complete burning of the fuel.

A further object of the invention is the arrangement of a furnace substantially inclosed and having a water front arranged with a plurality of nozzles for discharging air and steam above the fire.

A still further object of the invention is the arrangement of a grate in a fire box having a plurality of flanges, some of which are longer than others, and means for maintaining water in continuous contact with the longer flanges whereby steam and vapor are evolved below the fire.

With these and other objects in view, the invention comprises certain novel constructions, arrangements and combinations of parts, as will be hereinafter fully described and claimed.

In the drawings:—Figure 1 is a longitudinal, vertical section through an embodiment of the invention. Fig. 2 is an interior view of the water front removed. Fig. 3 is an enlarged perspective view of one of the grate bars.

Referring to the drawings by numerals 1 indicates a housing of any desired kind in which is mounted a boiler 2 of any desired kind. Arranged in the housing 1 is a fire box 3 having an arch 4 and a bridge wall 5 formed with a plurality of apertures 6. Opposite the wall 5 is a water front 7 in which are located door openings 8 and 9 for supplying fuel to grate 10, and door openings 11 and 12 for removing ash below the grate. The grate 10 is supported upon projections

or shoulders 13 and 14 provided on a water front 7 and a bridge wall 5. The grate 10 is composed of a plurality of grate bars 15 and 16 that are preferably formed independently of each other. The grate bar 15 is formed with a depending flange 17 having laterally projecting flanges 18 and 19. The bar 15 is also supplied with a projection 20 to which a shaker or bar may be attached for shaking the bar. Each of the bars 15 may be supplied with a projection 20 or only one and the remaining bars connected thereto as occasion may demand. Bar 16 also may be supplied with a projection 20 for affording means by which the same may be rocked. Bar 16 is formed with a flange 21 similar to flange 17 except that the same extends downward farther than flange 17 and is also provided with flanges 22—22 on each side thereof.

In forming the grate 10 any desired number of grate bars 16 may be used having the extended flange 21. The flange 21 is designed to extend downwardly into the water contained in the receptacle 23 which is continually supplied from pipe 24. The water is controlled in pipe 24 by a valve 25 which will automatically keep the water level in pan or receptacle 23 at a certain place so as to continually provide water for flange or fin 21. When providing water for flange or fin 21 steam and vapor are evolved and pass upwardly into the coal mounted upon grate 10 together with the air passing through the lower drafts which may be provided in doors 11 and 12 or in any other desired manner. In this way air and steam are provided for assisting the combustion of the coal or other fuel upon grate 10. The heat absorbed by the grate 10 will also be radiated by the flanges or fins 17 and 21, and also by flanges 18 and 19 and 22, so that as the air and steam pass upward the same are heated to a greater or less degree according to the temperature of the grate. By thus supplying steam and air in a hot condition to the coal means are provided for the combustion thereof, but in the consuming of the coal and gas a certain amount of unburned products of combustion rise therefrom and would pass out of openings 6 and from thence up the chimney if other means were not provided.

In order to prevent any loss of heat by the non-combustion of gas and unburned products of combustion air and steam are

forced out of openings 26 in a highly heated condition so as to form a proper chemical union with the gases rising from the fuel. In order to provide the desired heated air and steam from opening 26 water front 7 is provided, and has water maintained therein at a predetermined level by means of valve 27. By the proximity of the water front to the fire the water therein will be kept continuously hot for evolving steam and vapor which mix with air and steam from pipe 28 and finally pass out opening 26 through flange or extension 29. The pipe 28 is opened to the atmosphere but regulated by a valve 30 so as to control the amount of air admitted. Within the pipe 28 is positioned a nozzle 31 which is connected to a steam supply 32 controlled by a valve 33. By this construction and arrangement any amount of steam may be discharged through nozzle 31 into pipe 28 and draw air through valve 30 into the upper part of the water front 7. From the upper part of water front 7 the steam and air escape through openings 26 formed in the flange or extension 29. The flange 29 preferably runs the full length of the water front 7 and extends a considerable distance into fire chamber 3 so as to be heated to a high degree. This will cause the heated steam and air passing therethrough to be superheated and thus be prevented from chilling the hot gases in the fire box but will be in condition for a proper chemical union therewith. The water front 7 is preferably made from cast material and may be made of any desired thickness for accomplishing the purposes set forth. The arch 4 and bridge wall 5 may be of any desired thickness and are preferably made from fire brick or clay so as to withstand the heat. In the bridge wall 5 the apertures 6 may be of any desired number and are arranged to have passed therethrough the heat which may be applied to boiler 2 generating steam or may be applied for any other purpose desired as occasion may require.

What I claim is:—

1. In a furnace, a housing formed with a

water front and defining a fire chamber, a grate mounted in said housing, means for maintaining water in said water front at a predetermined level, means for discharging air and steam in said water front above said water level, and means for directing the steam and air from said water front above said grate.

2. In a furnace, a housing formed with a water front and defining a fire chamber, a grate mounted therein, means for maintaining water therein at a predetermined level, an apertured flange projecting therefrom into the fire chamber above said grate whereby steam generated in said water front will be discharged above said grate.

3. In a furnace, a housing formed with a water front and defining a fire chamber, a grate mounted in said housing, an apertured flange connected with said housing and projecting into said fire chamber above said grate, means for maintaining water in said water front at a predetermined level, and means for injecting air and steam into said water front above the water level, said apertured flange discharging the air and steam in said water front into said fire box above said grate.

4. In a furnace, a housing formed with a water front and defining a fire chamber, a grate, means for maintaining water in said water front at a predetermined level, a pipe for supplying air to said water front, means for regulating the amount of air supplied to said pipe, a steam nozzle mounted in said air pipe for supplying steam and drawing air through said pipe into said water front, and an apertured projection extending from said water front above the water level therein into said fire box above said grate whereby the same is heated for directing the air and steam in said water front above said water level into the fire box and superheating the same at the same time.

In testimony whereof I affix my signature in presence of two witnesses.

VALENTINE H. HOBSON.

Witnesses:

JOHN L. FLETCHER,
EDWARD T. FENWICK.