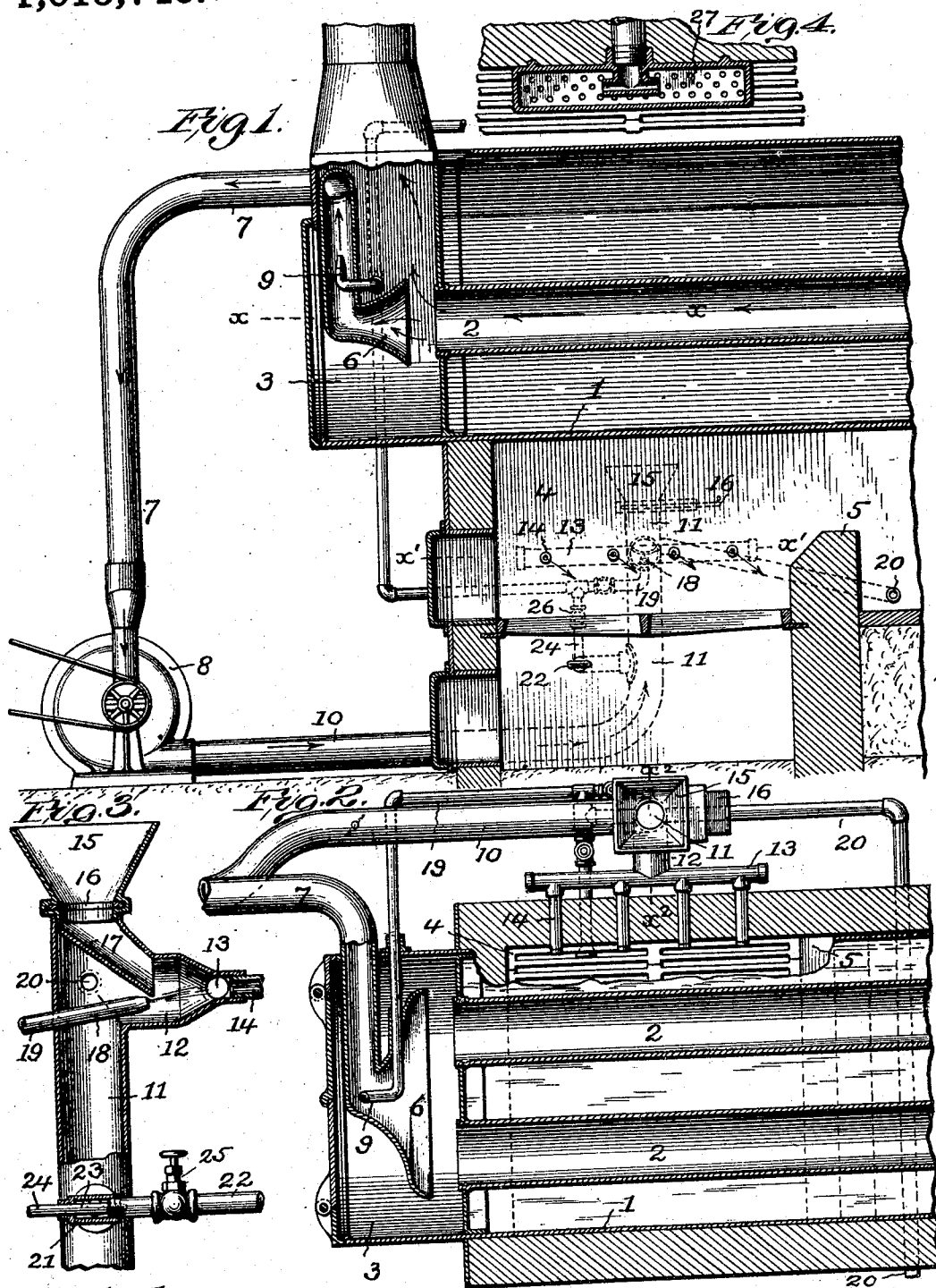


R. G. SPEER.
SMOKE CONSUMING FURNACE.
APPLICATION FILED MAR. 13, 1911.

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UNITED STATES PATENT OFFICE.

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SMOKE-CONSUMING FURNACE.

1,015,746.

Specification of Letters Patent.

Patented Jan. 23, 1912.

Application filed March 13, 1911. Serial No. 614,221.

To all whom it may concern:

Be it known that I, ROBERT G. SPEER, a citizen of the United States of America, and a resident of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Smoke-Consuming Furnaces, of which the following is a specification.

This invention relates to that class of smoke consuming furnaces in which the unconsumed gases and carbon are taken from the exit end of the flues, and after being mixed with steam or air are passed into the fire chamber to be consumed. And the present improvement has for its object to provide a simple and efficient structural arrangement and combination of parts whereby the unconsumed gases and carbon are withdrawn from the exit end of the flues of a steam boiler and after being mixed with air, steam and pulverized fuel are discharged in an even and uniform manner into the fire chamber of the furnace to be consumed, all as will hereinafter more fully appear.

In the accompanying drawings:—Figure 1, is a vertical longitudinal section of a steam boiler furnace having the present improvement applied. Fig. 2, is an irregular horizontal section on line $x-x$, and $x'-x'$, Fig. 3, is a detail transverse section on line x^2-x^2 , Fig. 2. Fig. 4, is a detail horizontal section of the discharge means to the fire chamber.

Similar numerals of reference indicate like parts in the several views.

Referring to the drawings, 1 represents an ordinary horizontal steam boiler having return flues 2 which discharge into a forwardly arranged uptake or breeching 3, as usual. Said boiler is arranged above a furnace or fire chamber 4 having a bridge wall 5, as usual.

6 is a collecting funnel arranged within the breeching 3 and a short distance in front of the exit ends of the flues 2, and adapted to collect the combustible gases and particles of carbon passing through said flues for delivery into the return pipe or trunk hereinafter described.

7 is the return trunk or pipe above referred to, connected at one end to the aforesaid funnel 6, and at the other end with the inlet of a combined exhaust and pres-

sure blower 8, by which said gases and carbon are forcibly drawn through the funnel 6 and trunk 7 aforesaid.

9 is a steam jet or nozzle arranged in the trunk or pipe 7 and adapted to provide means for moving the aforesaid gases and carbon through the pipe 7, supplementary to the blower 8 above described.

10, is a conducting trunk or pipe extending from the outlet end of the blower 8, to the furnace, and having a vertical portion or branch 11 located adjacent to a side wall of the fire chamber 4, and adapted for connection in manner hereinafter described with said fire chamber.

12 is a lateral tubular extension or trunk of the branch trunk 11, arranged near the upper end thereof, and connecting in turn with a horizontal manifold 13 at the side of the furnace as shown. The manifold 13 is provided with a series of discharge tubes 14 that extend laterally through the wall of the fire chamber to discharge transversely into the same in a plane above the mass of fuel carried on the grate bars of the same.

15 is a funnel or hopper arranged at the upper end of the aforesaid vertical trunk 11, and adapted to contain a supply of pulverized coal, the passage of which into the trunk 11 is controlled by a slide valve 16.

17 is an inclined partition arranged in the vertical trunk 11, beneath the slide valve 16, and adapted to direct the flow of pulverized fuel in front of the nozzle or jet pipe now to be described.

18 is a nozzle or jet pipe passing horizontally into the vertical trunk 11 at a point immediately below the inclined partition 17, and adapted to force the pulverized coal passing down from said partition into the aforesaid manifold 13, along with the gases and carbon flowing toward the same through the conducting trunks 10 and 11. The nozzle or jet pipe 18 receives its supply of steam from a supply pipe 19 extending to a suitable source of steam pressure supply.

20 is an air supply pipe, which preferably extends transversely through the fire bed of the furnace with a view to attain an efficient heating of the air passing through said pipe. Said air supply pipe 20 connects in turn with the aforesaid vertical trunk 11 at a point immediately below the inclined parti-

tion 17, and with a view to introduce a supply of heated air to mix with the gases, carbon and pulverized coal, to aid in the combustion of the same as they are discharged into the fire chamber through the manifold 13 and its accessories before described.

21 is a jet having a lateral inlet communicating with the side of the vertical trunk 11 aforesaid, and an outlet communicating with a discharge tube or nozzle 22 which extends through a side wall of the furnace and discharges beneath the grate bars of the fire chamber 4. 23 is a jet nozzle arranged axially in said casing 21 and connected by a steam pipe 24 with a suitable source of steam pressure supply. The above described construction is adapted to take a portion of gases and carbon passing through the trunk 11 and discharge the same under the grate bars, and with a view to regulate the action of the described parts, valves 25 and 26 are arranged in the tubes 22 and 24, for the regulation and entire stoppage of the flow therethrough.

In Fig. 4, a modification of the manifold 13, and plurality of discharge tubes 14, before described, is shown, and comprises a hollow elongated casing 27 arranged within the fire chamber 4, and connected to the vertical trunk 11, in the same manner as the manifold 13 heretofore described. The lower wall or bottom of said casing is formed with a series of orifices for the passage of

the gases, etc., down against the mass of fuel within the fire chamber.

Having thus fully described my said invention what I claim as new and desire to secure by Letters Patent, is:—

In a steam boiler furnace, the combination of a collecting funnel arranged adjacent to the exit end of the smoke flues and adapted to collect the combustible gases therefrom, a trunk extending therefrom, means for effecting a draft through said trunk, a trunk extending from said means and provided with a vertical branch or trunk located adjacent to a side wall of the furnace, a hopper arranged at the upper end of said vertical trunk and adapted to contain a supply of pulverized coal, a jet nozzle arranged beneath said hopper, an inclined partition arranged intermediate of the hopper and jet nozzle, a discharge means connected at one end to the vertical trunk in line with the aforesaid jet nozzle and at the other end with the interior of the fire chamber, and means for introducing a supply of air into the vertical trunk adjacent to the jet nozzle aforesaid, substantially as set forth.

Signed at St. Louis, Mo., this 4th day of March, 1911.

ROBERT G. SPEER.

Witnesses:

WILLIAM S. SPEER,
RUTH PETERSON.