July 7, 1931. S. LÖFFLER 1,812,966

COAL DUST FURNACE FOR HIGH PRESSURE BOILERS

Filed Sept. 20, 1928

Fig. 1.

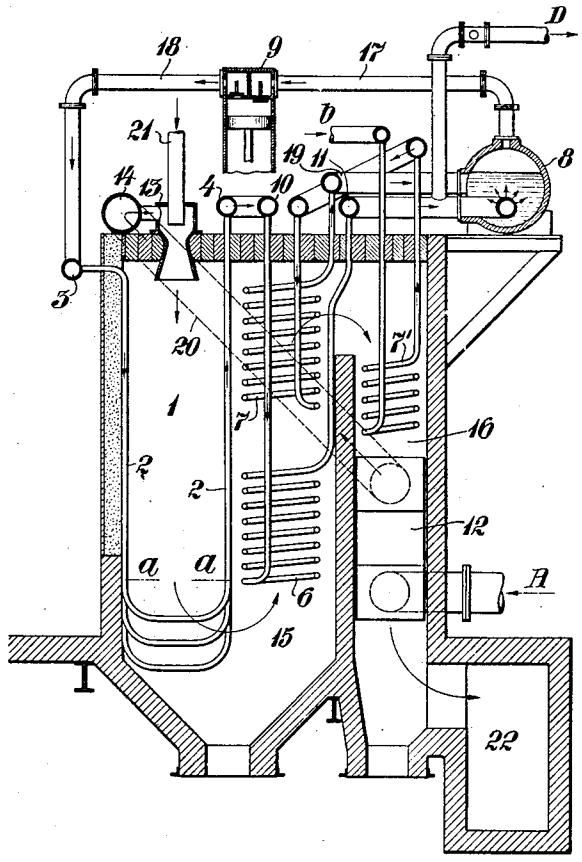
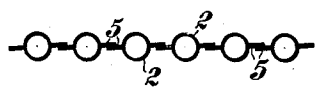


Fig. 2.



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UNITED STATES PATENT OFFICE

STEPHAN LÖFFLER, OF CHARLOTTENBURG, NEAR BERLIN, GERMANY; JENNY ELFRIEDE LÖFFLER SOLE HEIR AND WIDOW OF SAID STEPHAN LÖFFLER, DECEASED

COAL DUST FURNACE FOR HIGH PRESSURE BOILERS

Application filed September 20, 1928, Serial No. 307,289, and in Germany September 26, 1927.

This invention relates to a coal dust furnace intended for use in connection with high-pressure boilers, especially such as shown and described in my U. S. A. application Serial Number 701,855, filed March 25, 1924. The chief characteristic feature of the present improved furnace resides therein that there are arranged in the furnace U-shaped superheating tubes branching off from upper collecting tubes and forming with their vertical legs bounding walls for and in the furnace space, the horizontal or transverse legs extending in several heights and affording free passages for the furnace gases on their way to flue or flues provided in the boiler.

The invention is illustrated diagrammatically and by way of example on the accompanying drawings on which Figure 1 is a vertical section through a coal dust furnace designed according to this invention, and Figure 2 shows a detail, all as fully described hereinafter.

On the drawings, 1 (Fig. 1) denotes the furnace space, and 2 are U-shaped superheating tubes arranged therein. The tubes 2 are branching off from upper collecting tubes 3 and 4, and their vertical legs are so arranged with respect to one another that they form a bounding wall or parts of such wall. That is to say: either said vertical tube legs themselves, i. e. solely these tube legs, form said wall, in that they are arranged sufficiently closely to one another, or the said legs are provided with lateral ledges 5 (Fig. 2), or instead of these ledges bricks of refractory clay are arranged between the said legs. These latter extend in any case down to about the depth *a—a*, below which the horizontal or transverse connecting parts of the superheating legs 2 are located in several heights or depths, for instance in three, as in Fig. 1. The furnace gases can, therefore, pass through the spaces or gaps between these horizontal or transverse tube portions to the flues which form parts of the furnace, as shown.

There are two furnace-forming flues 15 and 16 in the example shown, and coiled pipes 6 and 7 are arranged in these flues, of which the flue 15 contains an aftersuperheater 6 and a feed-water heater 7, and the flue 16 contains a feed-water heater 7′ which is connected up in series with the feed-water heater 7, as shown; the flue 16 contains, besides, an air preheater 12. The steam to be superheated is produced in the drum-shaped boiler 8 and conveyed to the superheating tubes 2 by means of pipes 17 and 18, and by a pump 9 inserted between these pipes, as shown. There may be individual tubes 2 connected up in parallel, as in the drawing, but the tubes may be combined to a plurality of nests which in turn may be connected up also in parallel or in series or partly in parallel and partly in series, as most suited in the given case. The superheated steam flows through the pipes 4 and 10 to the after-superheater 6 and finally through the pipe 11 to and into the boiler 8, as well as to a pipe D through which a part of the superheated steam is conducted to an engine, whereas the other part is used for the generation of live steam in the boiler 8.

The feed water is supplied at *b* and passes through the feed-water heaters 7′ and 7 in the direction indicated by the arrows. The heated water then flows through the pipe 19 to and into the boiler 8, in which it is converted into steam by a part of the superheated steam arriving through the pipe 11, as already mentioned.

I wish it to be understood that the feed-water heating coil 7′ may be dispensed with, in which case the feed-water heating coil 7 is, however, correspondingly longer or larger. In either case an air-heater 12 is preferably arranged in the flue 16, and the air which is supplied to this heater at A is used for operating the dust coal burner 13 which is connected at 14 by means of a pipe 20 (indicated only by dotted lines) with the air-heater 12, and receives the dust coal through the pipe 21. 22 denotes the waste gas flue.

I claim:

1. A dust coal furnace of the Löffler type, comprising, in combination with the furnace parts forming the combustion space, and with the means for introducing the dust coal into said space, downwardly extending U-

shaped superheating pipes arranged in said space and forming with one half of their legs a bounding wall between the said space and a neighboring space in said furnace, the transverse pipe parts connecting said wall-forming legs with the opposite other legs being arranged in different heights so as to form passages between them, substantially and for the purpose set forth.

2. A dust-coal furnace, comprising, in combination, with the means for introducing the dust-coal into the combustion space, downwardly extending U-shaped super-heating pipes forming said space, the transverse pipe parts connecting one set of the legs of said pipes with the opposite set thereof being arranged in different heights so as to form passages between them, said transverse pipe parts being freely arranged in the combustion chamber to accommodate free expansion and contraction of the legs of the pipes.

3. A dust-coal furnace, comprising, in combination, with means for introducing the coal-dust into the combustion chamber, downwardly extending U-shaped super-heating pipes forming said space, each U-shaped pipe including opposed leg parts and a connecting part forming the sole connection between the leg parts, said connecting parts being arranged at different heights to form passages therebetween and being freely arranged in the combustion chamber to accommodate free expansion and contraction of the leg parts of the pipes.

In testimony whereof I affix my signature.

STEPHAN LÖFFLER.