

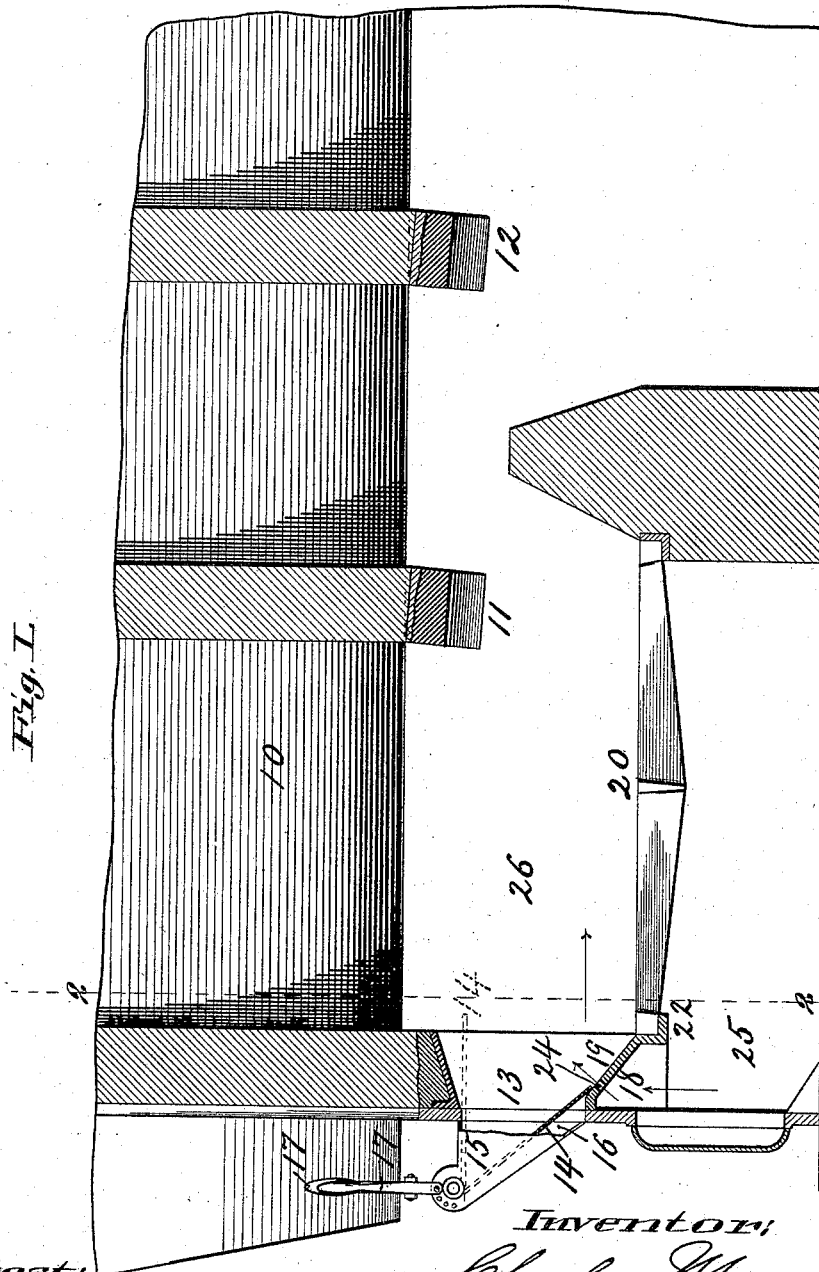
(No Model.)

2 Sheets—Sheet 1.

C. MURRAY.
SMOKELESS FURNACE.

No. 526,193.

Patented Sept. 18, 1894.



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(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

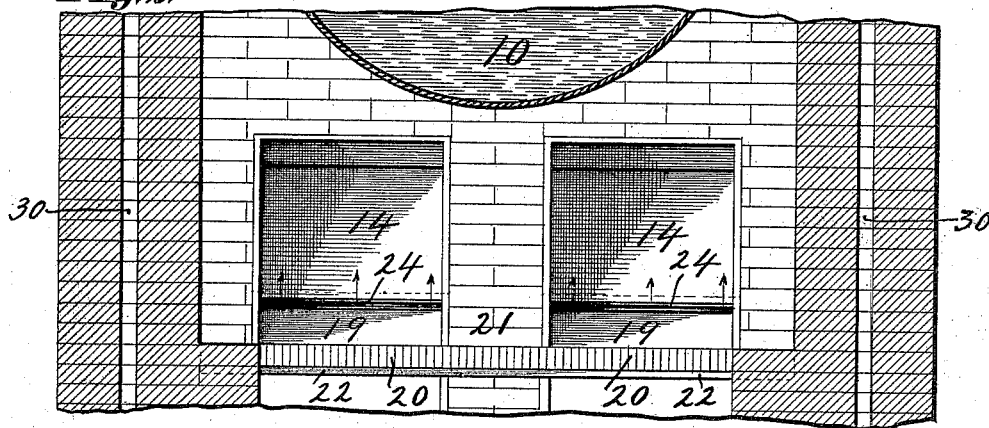


Fig. 3.

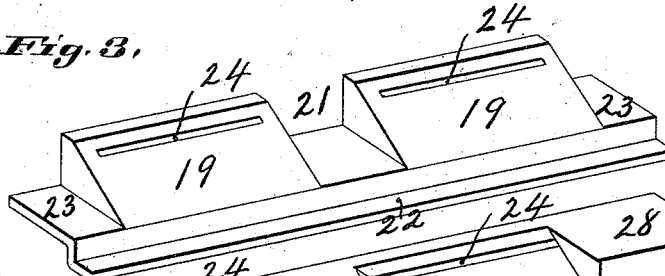


Fig. 4.

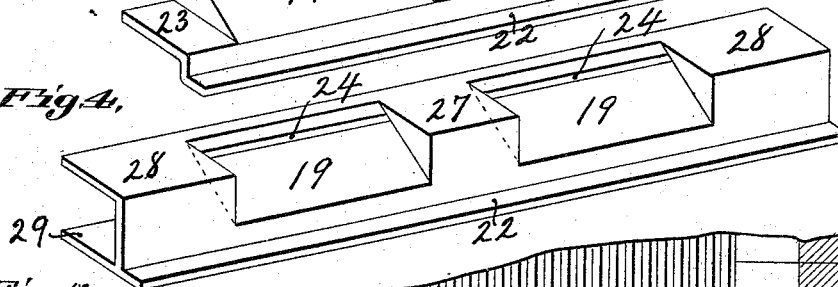
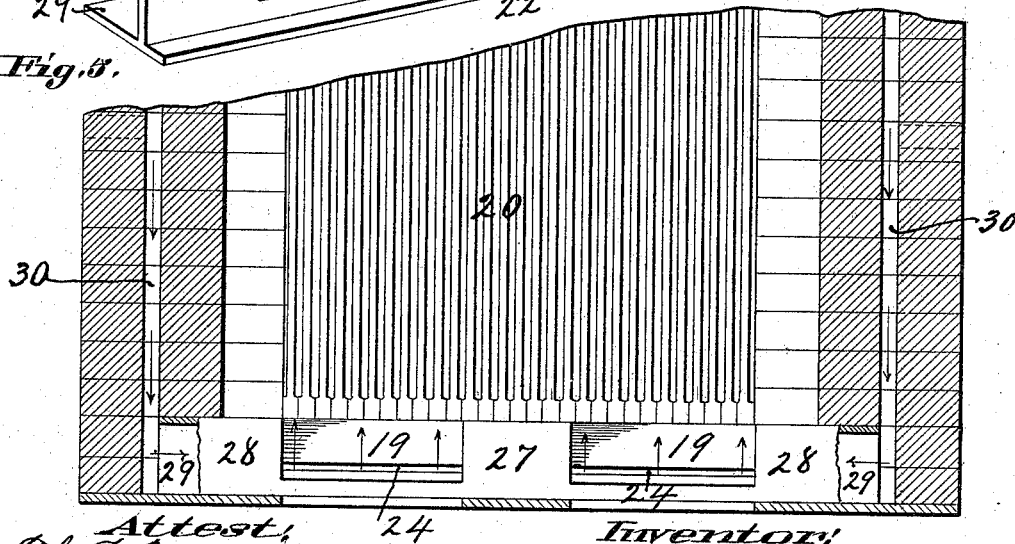


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES MURRAY, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THOMAS LAWSON,
OF SAME PLACE.

SMOKELESS FURNACE.

SPECIFICATION forming part of Letters Patent No. 526,193, dated September 18, 1894.

Application filed July 27, 1893. Serial No. 481,601. (No model.)

To all whom it may concern:

Be it known that I, CHARLES MURRAY, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented a new and useful Smokeless Furnace, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to that class of smokeless furnaces in which one or more fire brick arches are disposed above the grate bars to deflect the products of combustion down upon the fire to burn the smoke or to burn the smoke by the incandescence of said fire brick arches.

It is necessary in converting ordinary furnaces into this class of smokeless furnaces to lower the grate bars considerably, so that the grate bars are below the bottom of the doors of the ordinary furnace. This leaves a right-angular space between the front of the furnace and the grate bars and below the fire doors, which makes it difficult to clean out the grate of such a furnace. In such furnaces before conversion the air is preferably led in at the lower part of the fire door, so that it will be admitted to the furnace at or near the burning coal, and for this purpose an inclined pivoted door has been employed, which leaves a slight space below said inclined door for the admission of air.

The object of my invention is to obviate the right-angular space, above referred to in such smokeless furnaces, and to make it easy to clean out such a furnace.

The invention for accomplishing these results has further for its object to admit air to the furnace below and independently of the inclined door and at or about the level of incandescent fuel upon the grate bars.

The invention consists in a new and useful drop-bearing-bar for supporting the front of the grate bars and in a new and useful means for admitting air through said drop-bearing-bar to the furnace.

The invention will be best understood by referring to the accompanying drawings forming part of this specification, in which—

Figure 1 is a longitudinal, sectional elevation of a steam boiler furnace provided with my invention. Fig. 2 is a vertical cross sectional view on the line 2, 2 of Fig. 1. Fig. 3 is an isometric view of my novel drop-bearing bar. Fig. 4 is an isometric view of a modification of my novel drop-bearing-bar. Fig. 5 is a sectional plan of a steam-boiler furnace provided with my invention, showing more particularly the drop-bearing-bar illustrated in Fig. 4 applied to such a furnace.

The same marks of reference indicate the same parts throughout the several views of the drawings.

10 is a steam-boiler furnace suitably supported in place, and 11 and 12 are fire brick arches employed to obviate smoke.

13 are the doors through which the coal is fed into the furnace and 14 are the inclined doors journaled in brackets 15 and 16 projecting from the front of the furnace. These doors are each operated by a suitably pivoted handle 17.

It is generally required to apply such a smokeless furnace to a boiler having the usual or ordinary setting, and this is done by lowering the grate bars and applying the fire brick arches as above described. In such cases it is inexpedient to change the location or size of the openings leading to the fire grate, but it is desirable to leave the said openings of their usual or ordinary size and location. This will leave a right-angular space between the fire grate and the front of the furnace below the said openings, which renders the grate bars of such a furnace hard to clean. In place of the ordinary doors covering such openings, an inclined door is provided for each opening which admits the air to the furnace below the door and near the fire grate. These features are of the usual form and arrangement and are not claimed herein.

To obviate the right-angular space above referred to, between fire grate and the front of the furnace, I provide a drop-bearing-bar 18 of the form substantially as shown in Figs. 1 and 3. This drop-bearing-bar consists of two inclined parts 19, which rise from the level of the top of the grate bars 20 to the lower part of the ordinary furnace doors.

Two of such inclined portions 19 are desirable where two doors are employed, and a space 21 (Fig. 3) at the ordinary level of the grate bars may be left between said inclined portions. The said drop-bearing-bar is provided with a ledge 22 for supporting the grate bars and also has side projections 23 by which said bearing-bar rests upon the side wall of the furnace. The inclined portions 19 slightly below the inclined doors 14, are provided with slots 24, which communicate (Figs. 1, 2 and 3) with the ash pit 25 at one side and with the furnace proper or combustion chamber 26 at the other side, admitting air to the furnace from the ash pit by way of said slots to near the level of the fuel upon the fire grate. By this construction it will be seen that a gradual slope is provided from the lower part of the ordinary furnace door to the fire-grate, and the right-angular space between fire-grate and the front of the furnace, in smokeless furnaces of the character described, is obviated. It will be further noted that a novel means is also afforded for admitting air to the furnace at or near the level of the incandescent fuel.

In Figs. 4 and 5, I have illustrated a modification of the foregoing drop-bearing-bar and a novel means of taking air from the space in the side walls of the furnace through the drop-bearing-bar and admitting it at the level of the fuel upon the fire-grate. In the present instance, the drop-bearing-bar is provided with the inclined portions 19, the slots 24 and the ledge 22 for supporting the grate bars, but instead of the space 21, between the inclined portions 19 at the level of the fire-grate, the drop-bearing-bar in Figs. 4 and 5 is provided with a filled-out part 27 and instead of the extensions 23, as previously described, is provided with filled-out parts 28, and a bottom plate 29 at the level of the ledge 22 making a channel-bar, which, when set in position, communicates with air spaces 30 in the side walls of the furnace, (Fig. 5.) The drop-bearing-bar in this modification, provides a passage-way for feeding air to the furnace from the side walls. The advantage of

this construction is that it feeds heated air to the fire, as the air drawn from the side walls will be considerably raised in temperature by the heat generated in the furnace. The drop-bearing-bar, described as a modification herein, possesses besides all the advantages of the previously described drop-bearing-bar.

Having fully set forth my invention, what I desire to claim and secure by Letters Patent of the United States is—

1. In combination with a steam boiler furnace having fire arches disposed above the fire and a fire grate arranged at a distance below the furnace doors, a drop-bearing-bar for supporting the front end of said fire-grate, forming a slope from the grate bars to the level of the bottom of such furnace doors.

2. In combination with a steam boiler furnace having fire arches disposed above the fire and a fire grate arranged at a distance below the furnace doors, a slotted drop-bearing-bar for supporting the front end of said fire-grate, forming a slope from the grate bars to the level of the bottom of such furnace doors, and admitting air to the furnace at or near the level of the fuel thereon through the slots in said bearing-bar.

3. In combination with a steam boiler furnace having fire arches disposed above the fire and a fire grate arranged at a distance below the furnace doors, a slotted drop-bearing-bar for supporting the front end of said fire-grate, forming a slope from the grate-bars to the level of the bottom of such doors, and a channel leading through said bearing-bar and communicating with air spaces in the side walls of the furnace, whereby a means is also afforded for feeding heated air to the furnace at or near the level of the fuel upon the fire-grate.

In testimony whereof I have hereunto set my hand and affixed my seal, this 25th day of July, 1893, in the presence of two subscribing witnesses.

CHARLES MURRAY. [L. s.]

Witnesses:

A. C. FOWLER,
JOHN F. GREEN.