Nov. 6, 1928. 1,690,619

B. H. CHRISTY

DOOR FOR FURNACES

Filed Sept. 2, 1927

FIG. I.

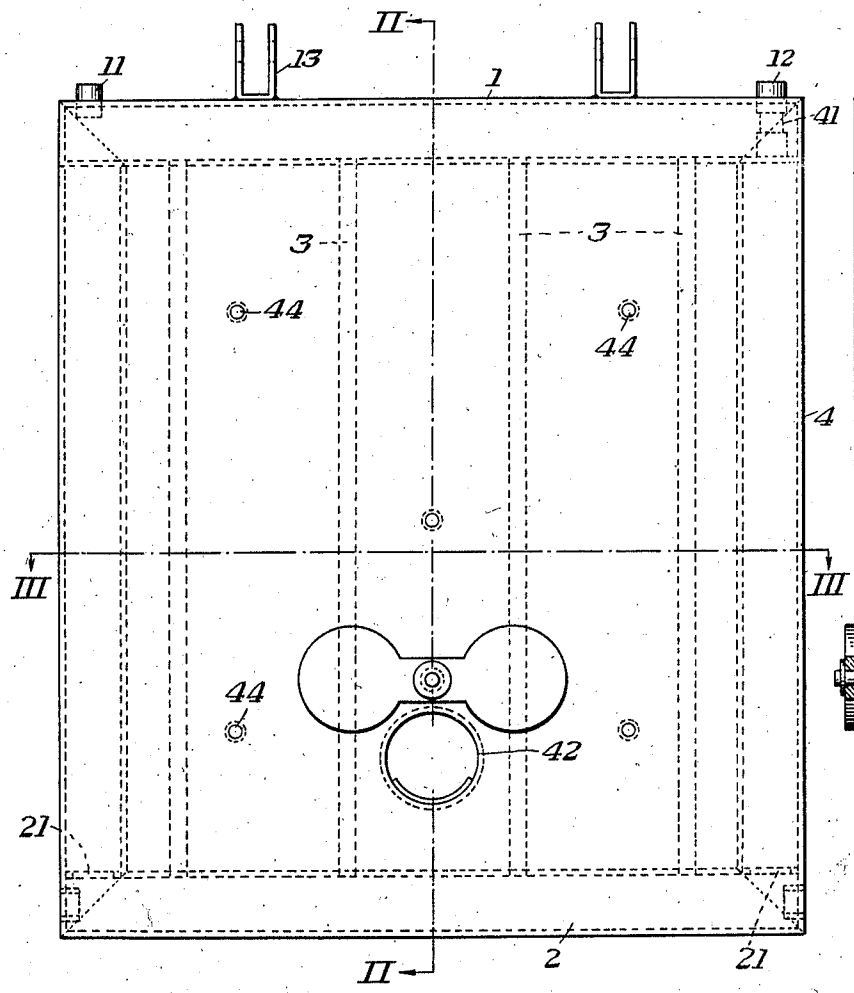


FIG. II.

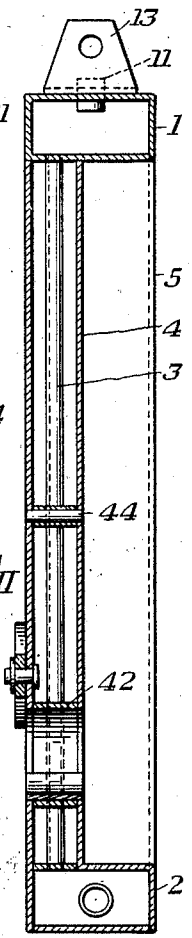
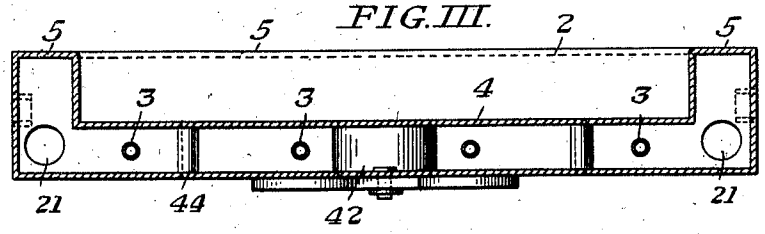


FIG. III.



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DOOR FOR FURNACES.

Application filed September 2, 1927. Serial No. 217,027.

My invention relates to improvements in the structure of doors for furnaces, particularly doors which include water-cooled supporting structures of metal with facings of such refractory material as fire brick. Doors so constructed are provided for open-hearth steel furnaces, for example, and for furnaces of other sorts in which very high temperatures are maintained.

The supporting structure of a door of my invention is illustrated in the accompanying drawings. Fig. I is a view of the structure in rear elevation, as seen from outside the furnace; Fig. II is a view in vertical section, on the plane indicated at II—II, Fig. I; and Fig. III is a view in horizontal section, on the plane indicated at III—III, Fig. I.

The structure includes an upper header 1, a lower header 2, with circulation pipes 3 extending between, and an intermediate body 4. The two headers are duplicates; rectangular in cross section, and closed at the ends. Their length is equal to the width of the door, their width to the thickness of the door, and their height is sufficient to afford a structure of proper strength to carry the introduced body of refractory, and to give circulation within to a sufficient volume of water. The headers of the door structure which the drawings show and which I am describing, are formed of rolled steel, 3/8" in thickness. They are 47" long, and 4 3/8" x 8" in cross section. These are external measurements. The intermediate body 4 is of the cross-sectional shape shown in Fig. III, it extends vertically between the headers and forms with the headers the complete structure. Its length over all is 47 inches; its height, 46 1/4"; its thickness at the sides 8", and intermediately, 3 1/2". Like the headers, the intermediate body is formed of rolled steel 3/8" thick. Indeed, the outer rear face of the structure may be formed as a plate of steel continuous to the very edges. Upon this plate the parts described may be built by welding, rolled angles being employed, so far as is found convenient.

The space between the outer and inner plates in the intermediate body of the structure, is 2 3/4" across (inside measurement), and within this space and with sufficient clearance, as shown in Fig. II, extend the circulation pipes 3. These are ordinary lengths of one-inch pipe, welded at their ends in orifices cut for them in the walls of the headers.

The body of refractory which constitutes the flame-enduring and effective face of the door is carried in and fills the reentrant space on the front of the supporting structure, clearly shown in Figs. II and III, and the position of the outer face of this body of refractory material, when applied, is defined by lines 5, Figs. II and III. The upper header is near its ends provided with 2" line sockets 11 and 12. Through socket 11 inlet for water is afforded to the chamber within the header. An outlet pipe 41 extends upwardly from the chamber within the body 4 and makes connection through socket 12 with a delivery pipe. The lower header near its ends is provided with two orifices 21 (each conveniently 3" in diameter), opening to the chamber within body 4.

The upper header is equipped externally with door-elevating lugs 13. The usual peep-hole is formed by a length of pipe 42, welded to place in orifices formed for it in the opposite walls of the body 4. The opposite walls of the body 4 may be additionally spaced and secured by means of the usual stay bolts and separators, whose positions are indicated at 44.

Water entering at 11 fills all the chambers of the structure. It circulates from header 1 through pipes 3 to header 2. Passing from header 2 through orifices 21, it enters the chamber within body 4, and from this chamber it passes out through pipe 41 to exit 12. The relatively cool water descending through pipes 3 takes up heat rapidly; there is excellent distribution of the heat as it is absorbed by the supporting structure; strains due to inequalities in thermal expansion are largely eliminated; the circulation pipes are strengthening members; and the door structure is at once durable and strong.

I claim as my invention.

1. A supporting structure for a furnace door including upper and lower headers with interconnecting circulation pipes, and an intermediate hollow body within which said circulation pipes extend, the whole constituting a structure with a reentrant space on one side for the reception of a body of

refractory material, the upper header being provided with an inlet orifice, the lower header with an orifice opening to the space within the intermediate hollow body, and an outlet pipe leading from the space last named through the upper header.

2. A supporting structure for a furnace door including upper and lower headers, and walls extending between said upper and lower headers and with the headers forming an intermediate hollow body, circulation pipes extending between the headers and through the space within the hollow body, one of the headers being provided with an inlet opening, the other header being provided with an orifice in its wall opening to the space within the intermediate hollow body, and an outlet, leading from the space last named.

In testimony whereof I have hereunto set my hand.

BAYARD H. CHRISTY.