L. L. KNOX.

HOLLOW SHEET METAL FURNACE DOOR STRUCTURE.

APPLICATION FILED DEC. 1, 1915.

1,191,518.

Patented July 18, 1916.

2 SHEETS—SHEET 1.

Fig. 2.

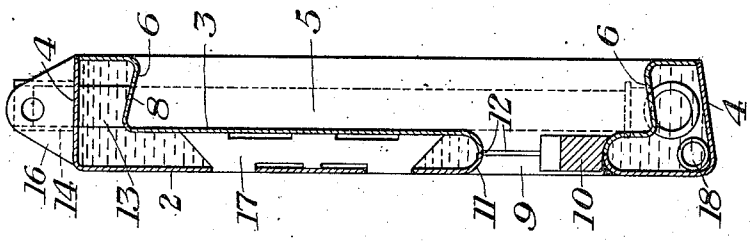
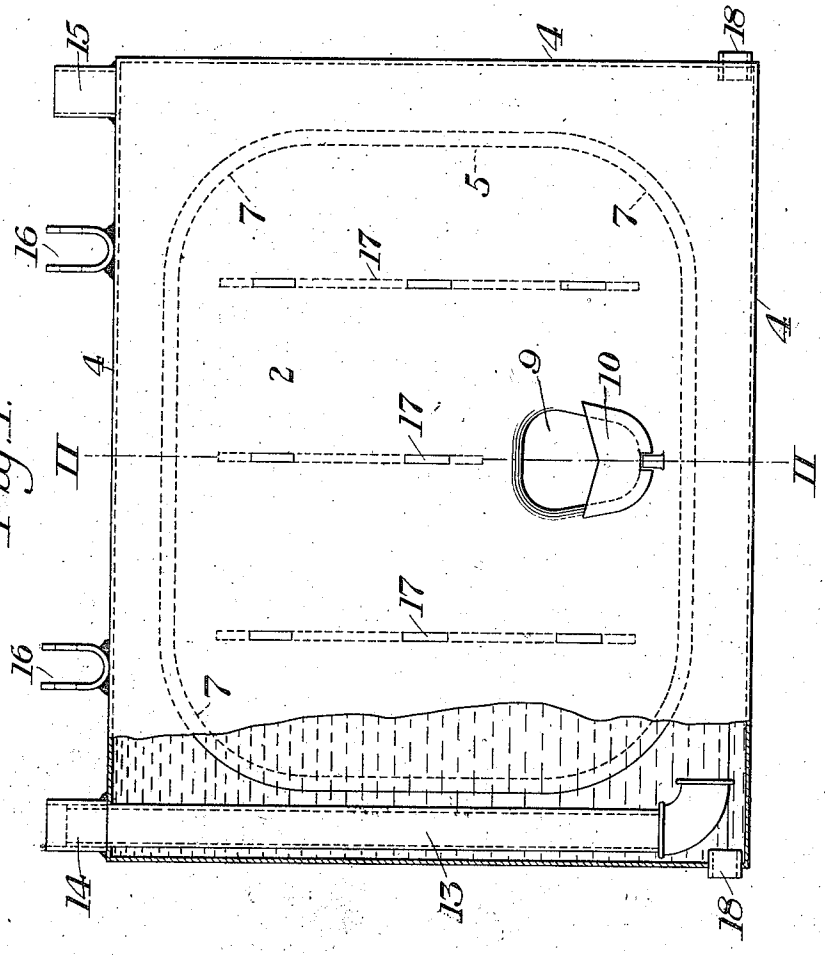


Fig. 1.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 5.

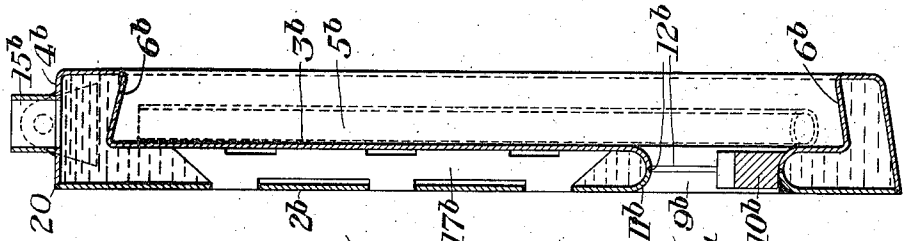


Fig. 4.

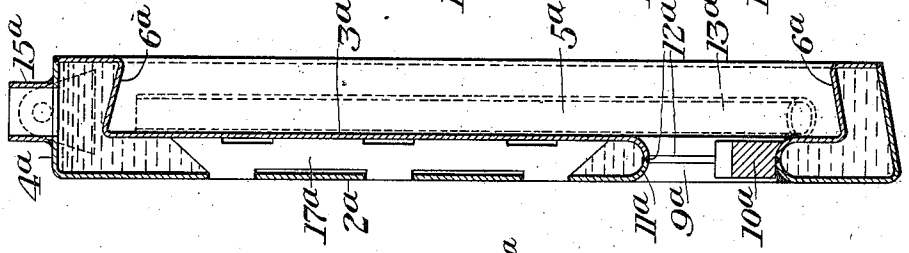
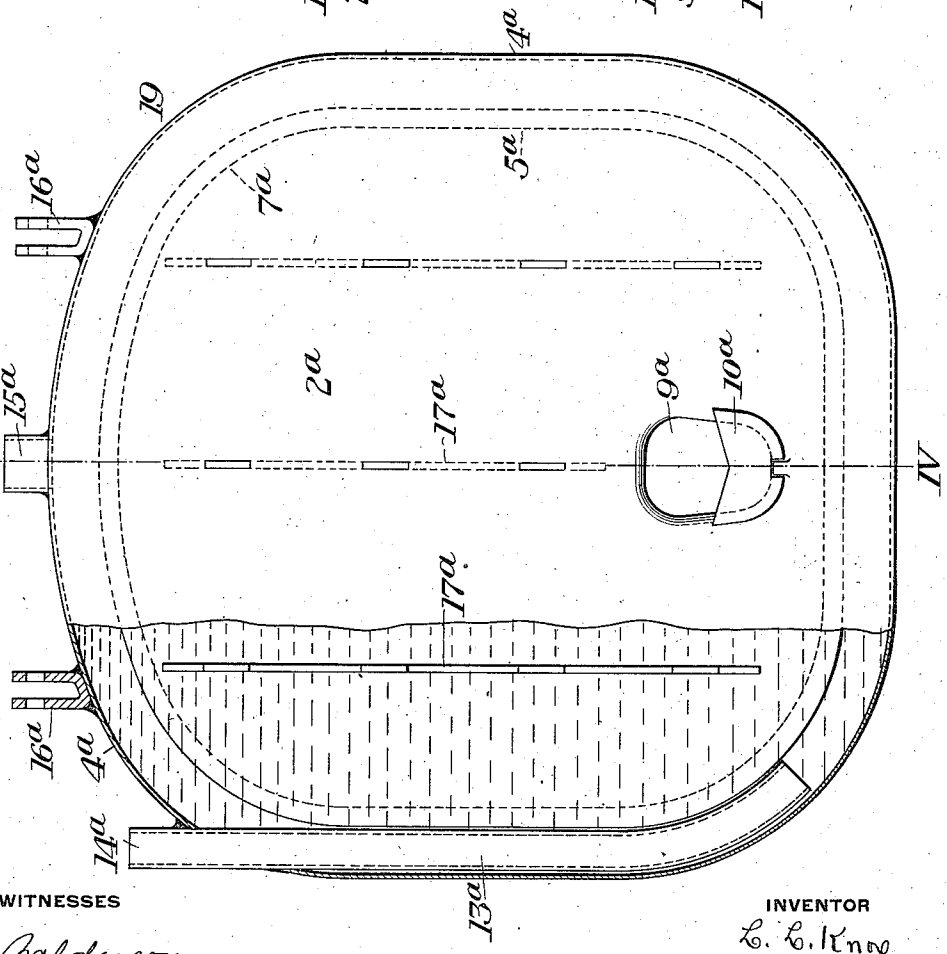


Fig. 3.



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UNITED STATES PATENT OFFICE.

LUTHER L. KNOX, OF AVALON, PENNSYLVANIA, ASSIGNOR TO KNOX PRESSED & WELDED STEEL COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

HOLLOW SHEET-METAL FURNACE-DOOR STRUCTURE.

1,191,518. Specification of Letters Patent. Patented July 18, 1916.

Application filed December 1, 1915. Serial No. 64,452.

To all whom it may concern:

Be it known that I, LUTHER L. KNOX, a citizen of the United States, residing at Avalon, Allegheny county, Pennsylvania, have invented a new and useful Hollow Sheet-Metal Furnace-Door Structure, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front elevation, partially in section, of a door structure embodying my invention. Fig. 2 is a section on the line II—II of Fig. 1. Fig. 3 is a view similar to Fig. 1, but showing a modification. Fig. 4 is a section on the line IV—IV of Fig. 3, and Fig. 5 is a view similar to Fig. 4, but showing a further modification.

My invention has relation to furnace doors, and more particularly to hollow water cooled doors formed of sheet metal.

My invention is designed to provide a door of this character in which the welds between the plates or sheets forming the structure are so located as to be protected from the action of heat when in service. Also to provide a structure of this character in which corners or angles of a character likely to crack and give way in service are largely obviated. Also to provide a structure of this character which can be readily manufactured at a relatively low cost, and which will be strong and durable in service.

Referring first to that form of my invention shown in Figs. 1 and 2, the door structure is formed of an outer plate member 2 and an inner plate member 3. The outer plate member has its top, bottom and lateral edge portions bent inwardly to form substantially right angle flanges 4, which form the top, bottom and lateral edge walls of the structure. The inner plate member has its central portion inset outwardly to form a seat 5 for the usual refractory lining, not shown, the walls of this inset preferably being undercut or dovetailed, as indicated at 6. The free edge portions of the member 3 around the lining seat are welded to the free edges of the flanges 4 of the member 2. The lining seat 5 is formed with the rounded corner portions 7. This makes it possible to form the outer wall 8 of this seat in continuous form without joints, welds or seams; and, furthermore, obviates any sharp angles or corners. These are particularly objectionable in structures of this kind, since, owing to the severe expansion and contraction strains to which the structures are subject in service, such corners are usually the weakest points in the structure and are apt to crack and give way. I have shown the door as provided with a poke opening 9 in which is seated a separate rest 10 for the poker. The walls of this opening may be formed by bending toward each other the edge portions of the members 2 and 3 around said opening, as indicated at 11, and welding their free edges at 12. 13 designates a water inlet pipe extending downwardly within one side portion of the structure and terminating near the bottom thereof. This pipe is provided with an inlet connection 14 which may be welded to the top wall of the structure. 15 designates an outlet connection at the opposite upper portion of the structure. 16 designate lifting lugs, which are also welded to said top wall. 17 designate suitable internal spacing or reinforcing members which are preferably welded to the members 2 and 3. 18 designate cleaning-out sleeves or thimbles, which may be welded in openings provided therefor in the lower portion of the structure, and which sleeves or thimbles are normally closed by suitable plugs.

The form of my invention shown in Figs. 3 and 4, is similar to that just described, except that I not only round the corner portions 7 of the lining seat, but also round the outer corners 19 of the structure. This not only does away with the outer corners, but it also enables the flanges 4^a to be made continuous entirely around the structure; whereas in the structure shown in Figs. 1 and 2, the corresponding flanges 4 must be cut and welded at the corners. In this form of structure the outlet connection 15^a is at the highest central portion of the structure. Other parts of the structure which are generally similar to that first described are given the same reference characters, with the letter "a" added thereto.

The form of my invention shown in Fig. 5 differs from those previously described, in that the inner plate member 3^b has its free edge portion bent outwardly to form the closing flanges 4^b, and these are welded at their free edges to the straight free edges

of the outer plate member 2^b at 20. This construction has the advantage of bringing this welded joint at the outer side of the structure instead of at its inner side.

My invention provides a door structure which is strong and durable in service, owing largely to the location and arrangement of the welded joints; and also by reason of the elimination of the corners or angles which have heretofore constituted the weak parts of such structures.

I do not wish to limit myself to the particular forms of my invention which I have herein shown and described, as it will be obvious that these can be modified in various ways without departing from the spirit and scope of my invention as defined in the appended claims.

I claim:

1. A hollow sheet metal door structure having an inner plate member provided with a depression forming an inset lining seating portion, the surrounding wall of said seating portion having portions thereof curved to form rounded or arched corners, substantially as described.

2. A hollow sheet metal door structure, formed of an inner plate member and an outer plate member, one of said members having approximately right angled flanges which constitute the edge wall of the structure, and the free edges of which are welded to the free edges of the other plate member, the inner member having a depression forming an integral inset lining seating portion whose surrounding wall is continuous and is rounded at the corners of the lining seating, substantially as described.

3. A hollow sheet metal door structure formed of an inner plate member and an outer plate member, the inner plate member having a depression forming an integral inset lining seating portion whose surrounding wall is continuous and is rounded at its corner portions, substantially as described.

4. A hollow sheet metal door structure formed of an inner plate member and an outer plate member, the inner plate member having a depression forming an integral inset lining seating portion whose surrounding wall is continuous and is rounded at its corner portions, the edge portions of the inner member around the lining seat being bent outwardly to form the edge walls of the structure, and being welded at their free edges to the free edges of the outer plate member, substantially as described.

5. A hollow sheet metal door structure formed of inner and outer plate members, the inner plate member having an integral inset lining seating portion formed with rounded corners, and the structure also having a depression with rounded top and bottom corners, substantially as described.

6. A hollow sheet metal door structure, formed of inner and outer plate members, one of said members having continuous approximately right angled flanges which form the edge walls of the structure and are welded at their free edges to the free edges of the other plate member, the outer corner portions of the structure being rounded, substantially as described.

7. A hollow sheet metal door structure having an inner plate member provided with a depression forming an inset lining seating portion, the surrounding wall of said seating portion having portions thereof curved to form rounded or arched corners, and the outer edge of the structure being substantially parallel with the wall of said lining seating portion, and having its corners also rounded, substantially as described.

8. A hollow sheet metal door structure formed of an outer plate member and an inner plate member having its edges extending in the form of outwardly bent edge flanges which constitute the edge walls of the structure, the free edge portions of said flanges being welded to the outer plate member at the outer corner portion of the structure and the inner member having a depression forming an inset lining-seating portion, substantially as described.

In testimony whereof I have hereunto set my hand.

LUTHER L. KNOX.

Witnesses:
W. C. Lyon,
H. M. Corwin.