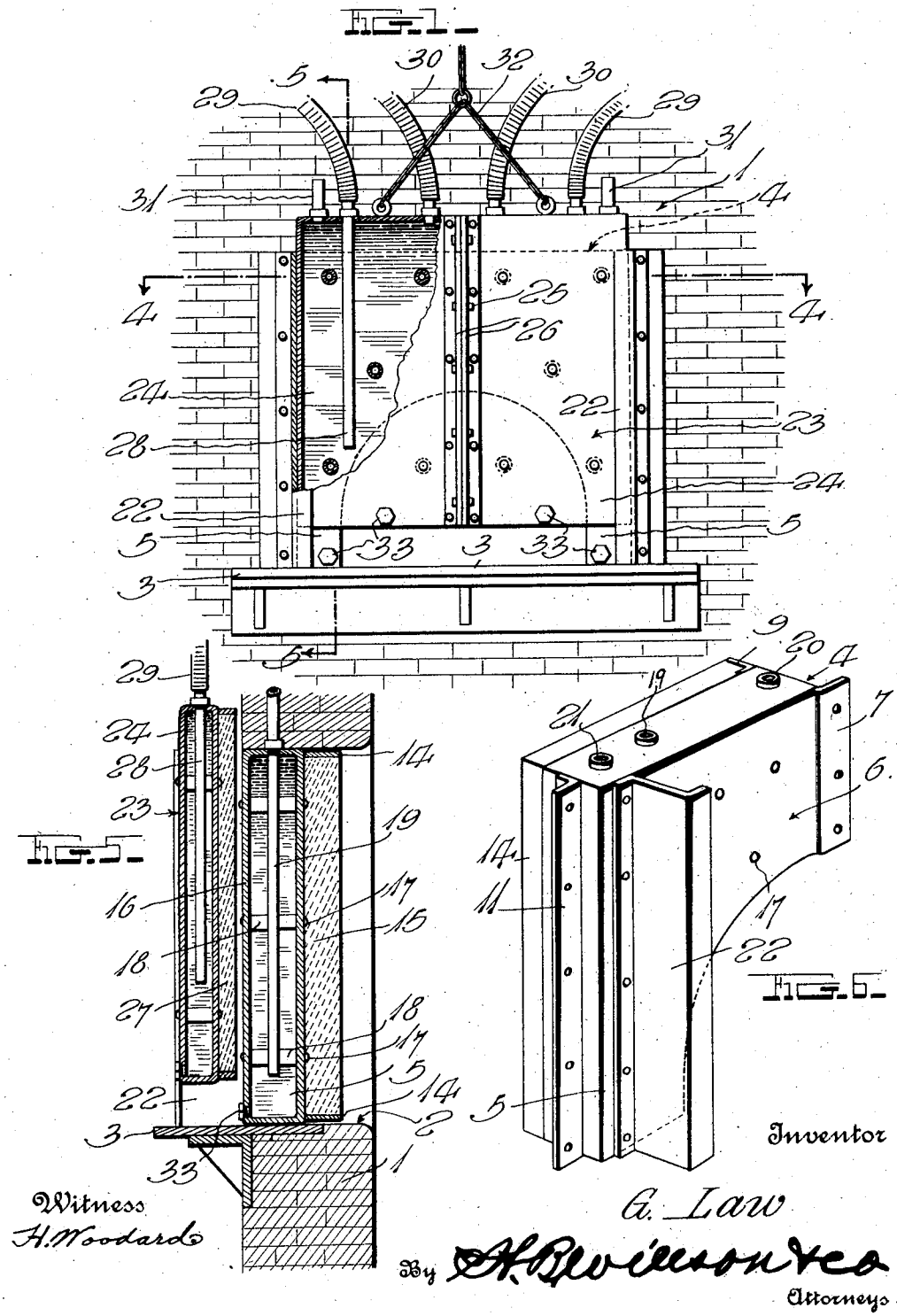
G. LAW.

OPEN HEARTH FURNACE DOOR AND FRAME.

APPLICATION FILED MAY 6, 1920.

1,391,196. **Patented Sept. 20, 1921.**

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

FIG. 2.

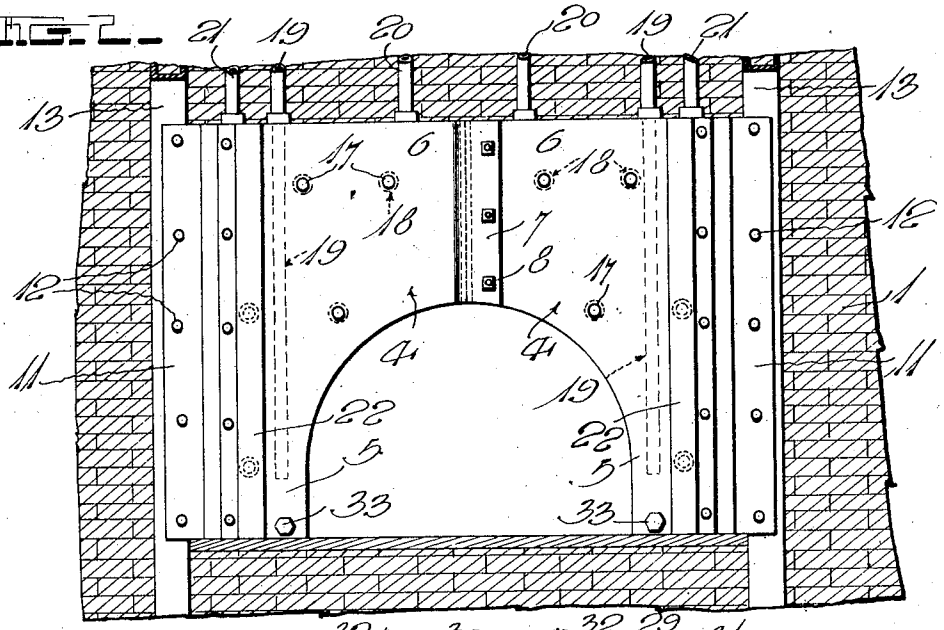


FIG. 3.

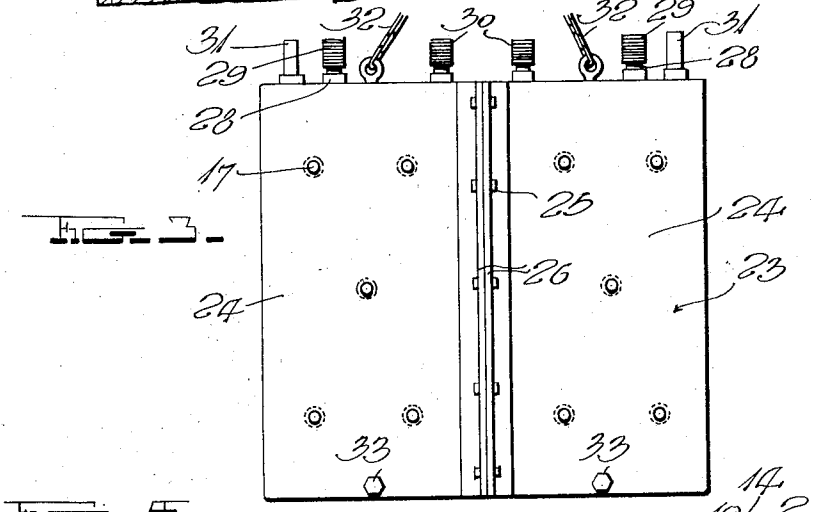
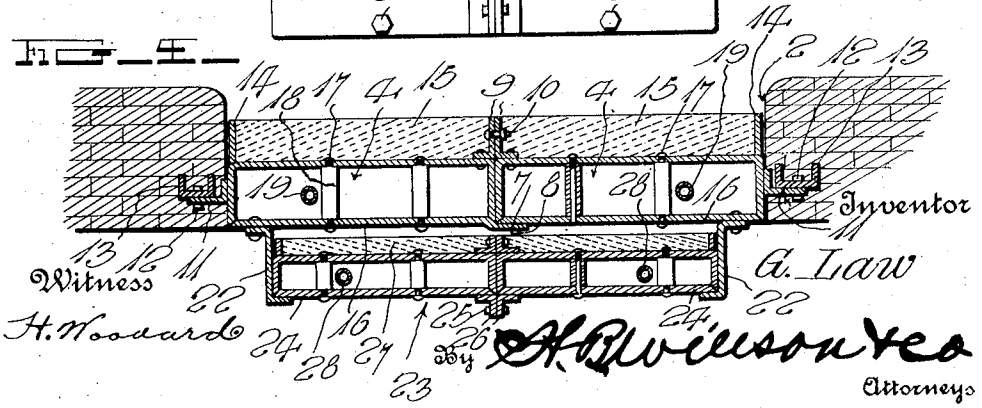


FIG. 4.



Witness

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UNITED STATES PATENT OFFICE.

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OPEN-HEARTH-FURNACE DOOR AND FRAME.

1,391,196. Specification of Letters Patent. Patented Sept. 20, 1921.

Application filed May 6, 1920. Serial No. 379,393.

To all whom it may concern:

Be it known that I, GEORGE LAW, a citizen of the United States, residing at York, in the county of York and State of Pennsylvania, have invented certain new and useful Improvements in Open-Hearth-Furnace Doors and Frames; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to furnace doors and frames therefor and more particularly to those used in connection with open hearth metal furnaces.

The principal object of the invention is to provide simple, inexpensive, easily installed and efficient frame and door structures, which are water-cooled to resist the terrific heat to which they are subjected. I am aware that water-cooled doors and frames have been heretofore devised, but my invention resides in the novel features of construction herein described and claimed and illustrated in the accompanying drawings.

Figure 1 is a front elevation partly in section showing a furnace door frame constructed in accordance with my invention.

Fig. 2 is a front elevation of the door frame with the door removed and illustrating the surrounding furnace structure in vertical section.

Fig. 3 is a front elevation of the door detached from the frame.

Fig. 4 is a horizontal section as indicated by line 4—4 of Fig. 1.

Fig. 5 is a vertical section as indicated by the line 5—5 of Fig. 1.

Fig. 6 is a perspective view of one of the right angular casings of which the door frame is constructed.

In the drawings above briefly described, I have shown a portion of an open hearth metal furnace 1, said furnace having a rectangular opening 2 whose lower side is provided with the usual or any preferred form of dead plate 3. Received snugly in the opening 2, is an arched frame formed of two right angular, inverted L-shaped, substantially flat casings 4. The vertical arms 5 of the casings 4 rest on the dead plate 3 while the horizontal arms 6 of said casings extend into abutting contact with each other. These abutting ends of the arms 6 are detachably secured together, preferably by means of a flange 7 formed on one arm and screws or like fasteners 8, the flange of the one arm overlapping the front side of the other arm and being secured to the latter by means of the fasteners 8, as shown clearly in Figs. 2 and 4. In addition to this securing means, angle-irons or other appropriate flanges 9 may be formed on the rear sides of the arms 6 and secured together by bolts or other adequate fasteners 10. The outer opposed edges of the two casings 4 are provided with vertical flanges 11 which are secured thereto by welding or otherwise, said flanges being secured by bolts 12 to vertical bars 13 embedded in the furnace wall. These flanges may be formed by angle-irons as shown in Fig. 4 or in any other preferred manner and it will be observed that they form stiffening means for the outer edge walls of the casing.

The flanges 9 above described, in addition to assisting in holding the two casings 4 together, coöperate with other flanges 14 which extend rearwardly from said casings, for the purpose of holding fire clay or brick 15 in place. The flanges 14 may be welded or otherwise joined to the casings as occasion may dictate.

The two casings 4 may of course be constructed in any adequate manner, but for illustrative purposes I have shown the rear sides and the edge walls of each casing all stamped from a single metal plate, while separate front walls 16 are welded or otherwise secured to said edge walls as indicated in Fig. 4. When this construction is followed, I prefer to form the flange 7 by extending the front plate 16 of one of the casings beyond the end of the arm 4, this detail being also shown clearly in Fig. 4. When a stamped metal construction is used, I prefer that the front and back plates of the casings shall be connected by tie bolts 17 and that spacing sleeves 18 be mounted on said bolts. This construction may be followed when the casings are otherwise formed, but if castings are used, the tie bolts may well be dispensed with since castings are not as prone to warp and bend as metal stampings.

Both of the casings 4 are closed on all sides and are water tight, and for the purpose of supplying water to said casings for cooling them, I prefer to pass water feed pipes 19 downwardly through the tops of said casings to points adjacent the lower ends thereof, while water outlet pipes 20 lead from the upper portions of the casings,

which portions may also be equipped with steam outlets 21. By constantly feeding water to the lower ends of the casings 4 and drawing it off from the upper ends of said casings, a steady circulation is produced which maintains a comparatively low temperature within the door frame, so that it is not affected by the heat within the furnace.

The front sides of the casings 4 are provided with combined vertical tracks and casing stiffeners 22 and a door 23 is slidable along said combined tracks and stiffeners, said door being constructed of two rectangular sections 24 secured together by bolts 25 passing through appropriate flanges 26 on the meeting edges of said sections 24. The sections or casings 24 may well be formed in approximately the same manner as the casings 4 and lined in about the same way by fire brick or clay as indicated at 27. Water is supplied to the lower ends of the casings 24 by means of vertical pipes 28 which communicate with flexible feed pipes 29, and the discharge of water from the casings takes place through flexible pipes 30. The casings may also be provided with suitable steam outlets 31 if found necessary. The pipes 29 and 30 are of flexible form, in order that the door 23 may be raised and lowered, and for the purpose of effecting the movement of this door, I have illustrated a suitable suspending chain 32 which may be actuated by any preferred means. Suitable drain plugs 33 may well be provided from the lower ends of the casings 24 as well as from low points of the casings 4, and whenever necessary the entire contents of these casings may be drained.

By constructing the door and frame in the novel manner above described, they may be manufactured and installed easily and with little expense, yet in operation they will be highly efficient and durable. By forming the arch or door frame of the two casings 4, and the door of the two sections 24, all of these parts may be more advantageously manufactured and handled easily, both when installing or removing for repairs. Furthermore, if one part burns out, it is only necessary to replace this part, which insures a great saving in time and expense. Since probably the best results may be obtained from the details disclosed, such details may well be followed, but within the scope of the invention as claimed, numerous changes in form, proportion and minor details may well be made.

I claim:

The combination with an open hearth metal furnace having a rectangular door opening and vertical bars at the sides of said opening; of two substantially flat, inverted L-shaped, right angular, water casings disposed in a common vertical plane and snugly received in said door opening with the free ends of their horizontal arms abutting each other and detachably bolted together, vertical flanges on the outer edges of said vertical arms of said casings and extending throughout the length thereof, said flanges being detachably bolted to said vertical bars and serving both as attaching means and stiffening means for the vertical edge walls of the casings, a pair of parallel vertical tracks secured to the outer side walls of said vertical arms of the casings and extending throughout the length thereof to additionally stiffen said casings, said tracks having inturned flanges parallel with and spaced outwardly from the casings, and a door slidable between said tracks.

In testimony whereof I have hereunto set my hand.

GEORGE LAW.