No. 850,155. PATENTED APR. 16, 1907.

A. L. HAMMERBERG.

WATER COOLED FURNACE FRONT.

APPLICATION FILED NOV. 10, 1905.

2 SHEETS—SHEET 1.

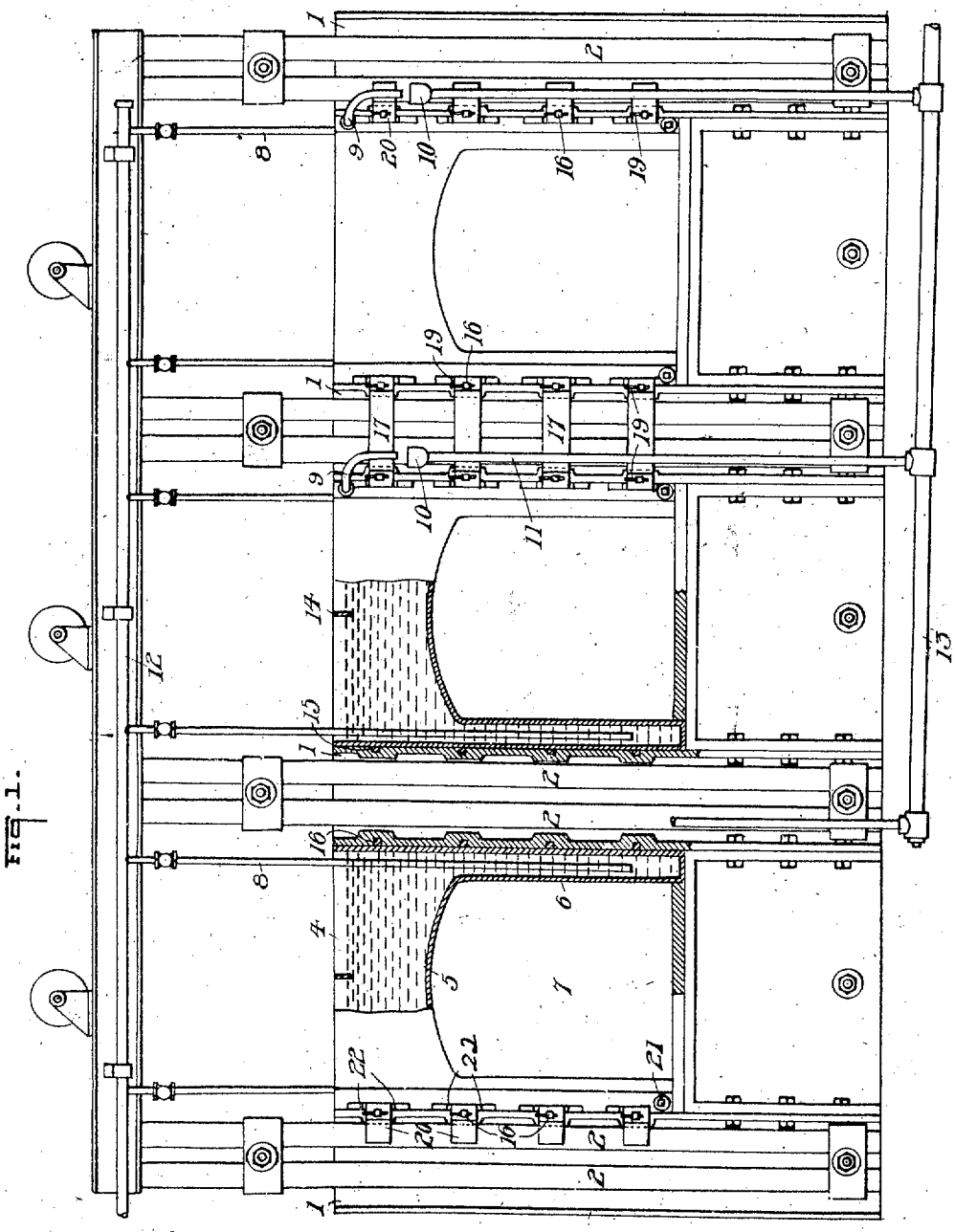


FIG. 1.

WITNESSES:

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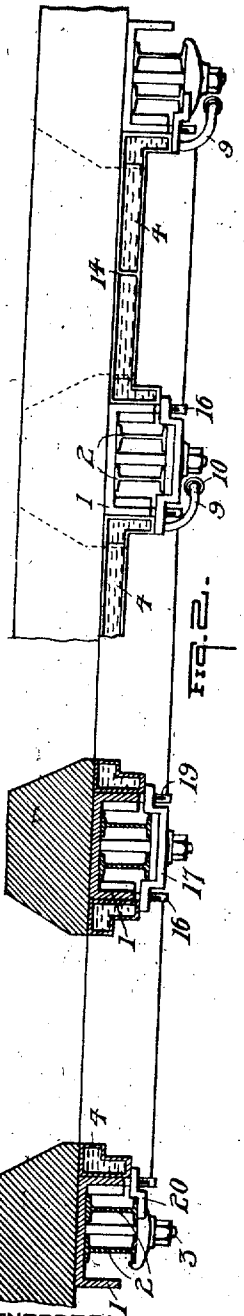


FIG. 2.

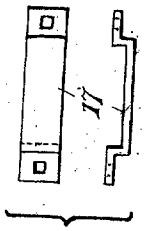


FIG. 6.

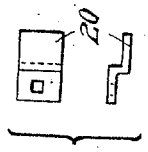


FIG. 7.

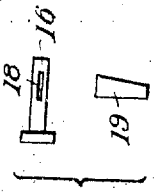


FIG. 8.

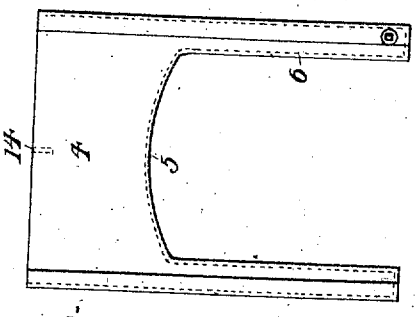


FIG. 4.

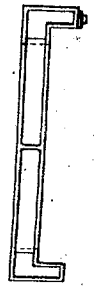


FIG. 5.

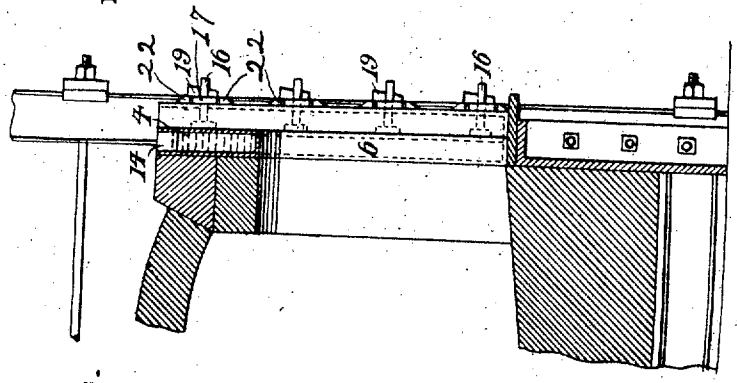


FIG. 3.

WITNESSES:

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ATTORNEYS.

UNITED STATES PATENT OFFICE.

ARNDT L. HAMMERBERG, OF YOUNGSTOWN, OHIO.

WATER-COOLED FURNACE-FRONT.

No. 850,155. Specification of Letters Patent. Patented April 16, 1907.

Application filed November 10, 1905. Serial No. 286,693.

To all whom it may concern:

Be it known that I, ARNDT L. HAMMERBERG, a citizen of the United States, residing at Youngstown, in the county of Mahoning and State of Ohio, have invented or discovered new and useful Improvements in Water-Cooled Furnace-Fronts, of which the following is a specification.

My invention relates to water-cooled furnaces; and its principal object is to construct a durable furnace-door frame attached to the furnace-binding in such a manner that it can be easily and speedily replaced without stopping the operation of the furnace, an object which I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a front view of my invention, partly in section; Fig. 2, a half plan and half horizontal section of a portion of a furnace including my invention; Fig. 3, a vertical section through the center of one of the furnace-doors; Fig. 4, a front elevation of one of the water-boxes which I employ; Fig. 5, a plan of Fig. 4; Fig. 6, a side elevation and plan of one of the clamps used in the central portion of the front of the furnaces to hold the water-boxes in place; Fig. 7, a front elevation and plan of one of the clamps used at the end portions of the front of the furnaces to clamp the water-boxes in place, and Fig. 8 an elevation of one of the binding-bolts and one of the keys for holding the said clamps in place.

Referring to the drawings, 1 designates the U-shaped vertically-arranged channel-irons resting against the ends of the furnace and those portions of the front thereof between the furnace-doors. Resting against these channel-irons are the I-beams 2, arranged in pairs, the usual bolts 3 extending between these pairs of I-beams to clamp the sides of the furnace together in a manner well known.

Seated between consecutive pairs of U-shaped irons 1 are the water-boxes 4, which consist of an upper hollow box-like portion 5, extending from one iron 1 to the adjacent one and having vertical legs 6 extending down at each side of the furnace-door opening 7 to the bottom of said opening. These water-boxes are provided with inlet-pipes 8, which extend nearly to the bottom of the legs 6, and also with outlet-pipes 9, which are situated near the top of the water-boxes and convey the water escaping from the boxes into the hopper or funnel 10 at the top of the drain-pipe 11. The various pipes 8 are connected to the common feed-pipe 12, and the several drain-pipes 11 are connected to the common waste-pipe 13. The front and back walls of the water-boxes are connected together and supported by the cross-pieces 14.

The outer lateral faces of the U-shaped channel-irons 1 are provided with horizontal openings 15, which are enlarged at a short distance from their front edges so as to receive the heads of the bolts 16, whose bodies lie in the openings 15. The adjacent edges of the consecutive water-boxes in the central portion of the furnace-front support end portions of the clamp-bars 17, these bars being bent outwardly to accommodate the outer edges of the I-beams 2. The bolts 16 are provided just in front of the clam-bars 17 with openings or keyways 18, in which are driven the wedges 19, which force the water-boxes tightly against the masonry of the furnace and securely hold them in place. The outer edges of the end water-boxes are held in place by the short clamping-bars 20, whose outer ends rest upon one of the I-beams 2 and inner ends upon the edges of the water-boxes, these clamping-bars being held in place by the wedges 19. The usual furnace-doors are fitted to the fronts of these water-boxes in the usual manner, which it is unnecessary to illustrate. It is clear that these water-boxes can be very quickly taken from the furnace-front by removing the keys and the clamping-bars, and this without stopping the operation of the furnace. It will be seen that these water-boxes clear the masonry near the front of the furnace and at the same time provide door-frames which will not readily burn, out as happens with the usual furnace-front made of brick.

I prefer to place at the bottom of the water-legs 6 the plugs 21, which may be removed to drain or clean the water-boxes. In Fig. 1 I have shown the water-boxes provided with lugs 22, between which the ends of the clamps rest in order to prevent any up or down movement of the water-boxes.

Having described my invention, I claim—

1. In a furnace-front having therein a plurality of openings, U-shaped buckstays between consecutive openings, removable door-frames for each opening, clamping-bars having their ends respectively on adjacent door-frames, bolts anchored in the buckstays and

passing through the clamping-bars, and means for securing the bolts and clamping-bars together.

2. In a furnace having therein a plurality of openings, U-shaped buckstays located between consecutive openings and having therein lateral grooves with enlarged inner ends, removable door-frames for each opening, clamping-bars having their ends respectively on adjacent door-frames, bolts in said grooves, the heads of the bolts being in the enlarged portions of said grooves, and means for securing the bolts and bars together.

3. In a furnace-front having therein a plurality of openings, U-shaped buckstays between consecutive openings, removable hollow door-frames for each opening, clamping-bars having their ends respectively on adjacent door-frames, bolts anchored in the buckstays and passing through the clamping-bars, means for securing the bolts and clamping-bars together, and means for leading a cooling fluid into and from said door-frames.

4. In a furnace-front having therein a plurality of openings, a door-frame for each opening, bars having their opposite ends on the edges of adjacent door-frames, and means for causing the bars to hold the frames against the furnace-front.

Signed at Pittsburg, Pennsylvania, this 8th day of November, 1905.

ARNDT L. HAMMERBERG.

Witnesses:

ALICE E. DUFF,

F. N. BARBER.