J. R. FORTUNE.

FURNACE FIRE DOOR.

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939,996.

Patented Nov. 16, 1909.

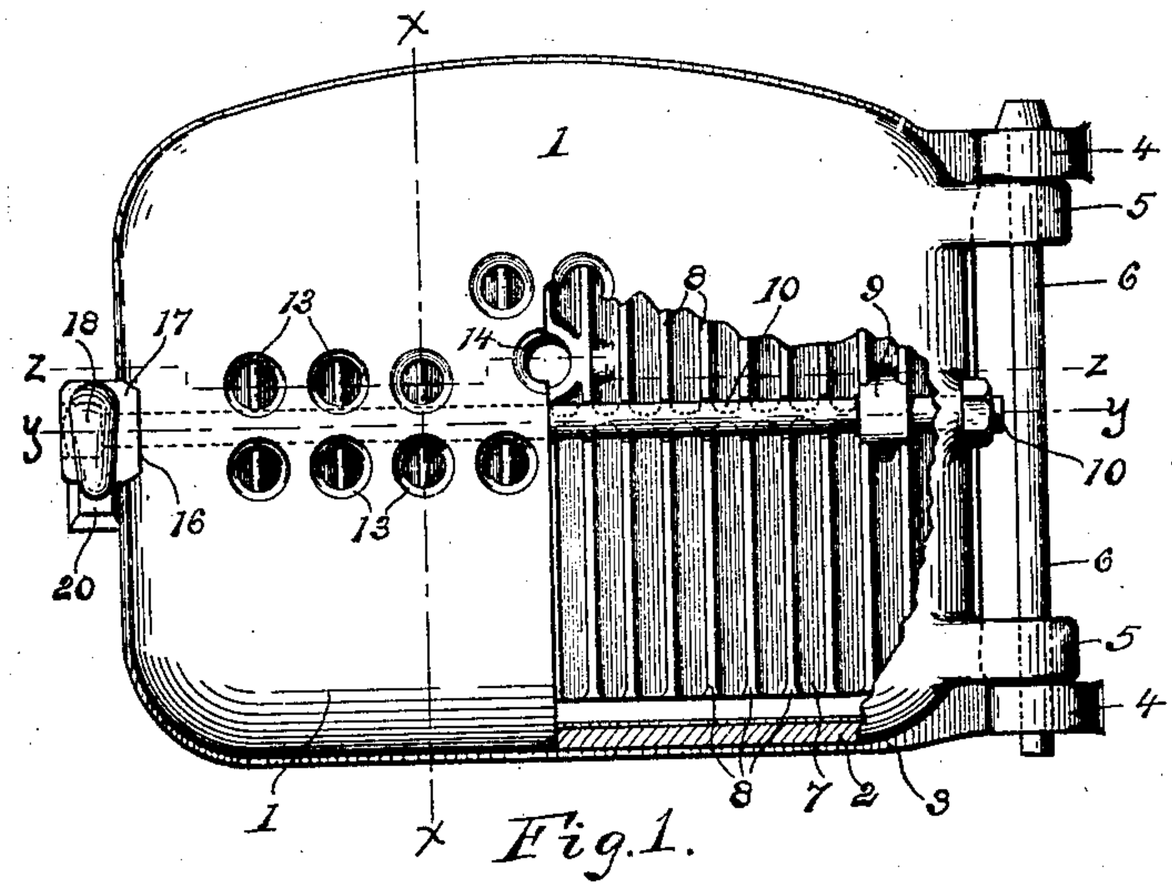

Fig. 1.

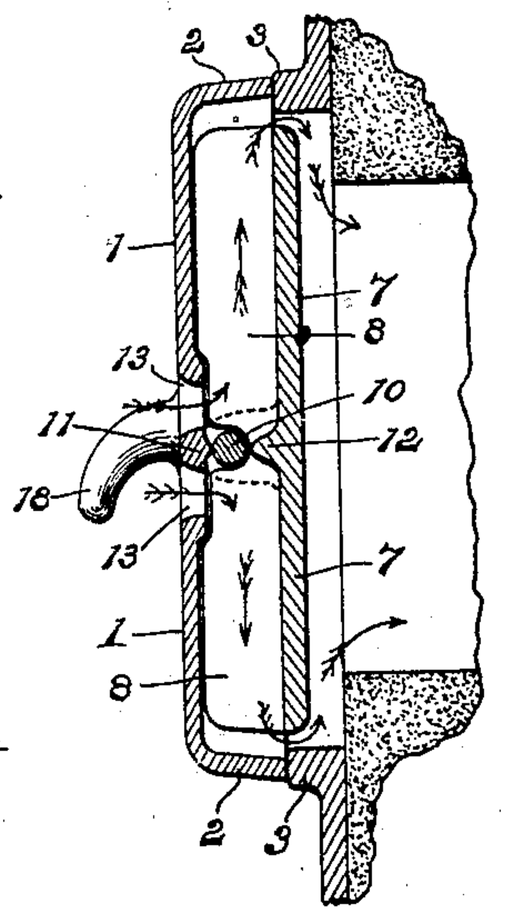

Fig. 2.

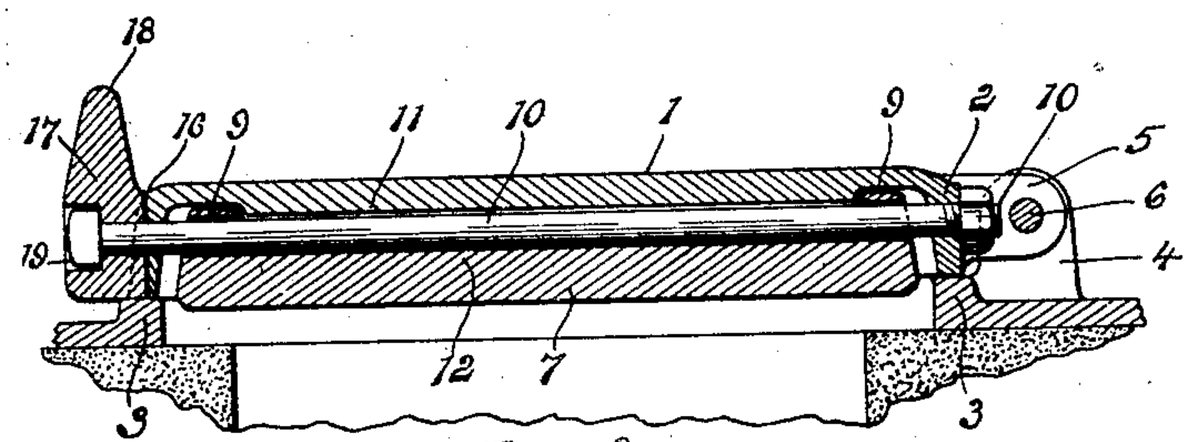

Fig. 3.

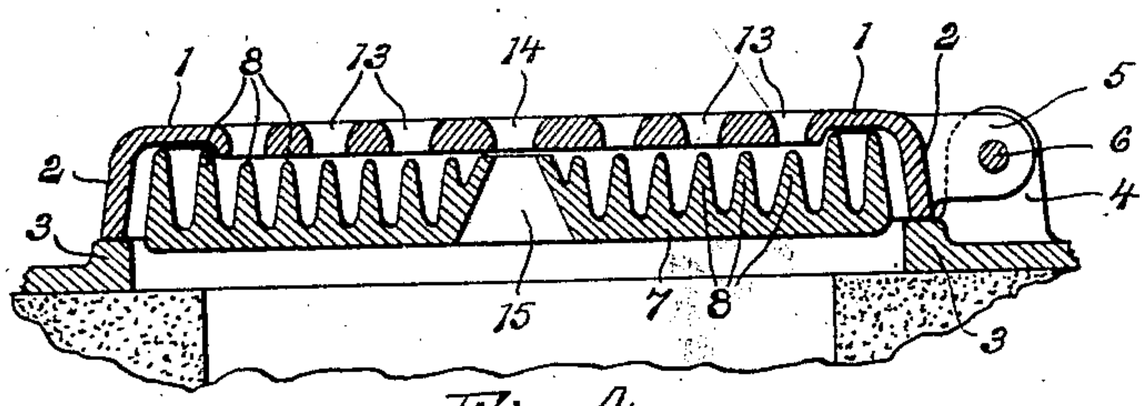

Fig. 4.

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FURNACE FIRE-DOOR.

939,996. Specification of Letters Patent. Patented Nov. 16, 1909.

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To all whom it may concern:

Be it known that I, JOHN R. FORTUNE, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Furnace Fire-Doors, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in furnace fire-doors and its object is to provide a door front with a suitable cast metal protecting lining, said lining and door front being so constructed as to prevent the lining from becoming burned out, and further to so attach the lining to the door front that the lining will be prevented from warping, and so that it may be quickly and easily detached.

A further object is to provide a door front with a detachable lug or handle so that if the handle becomes broken it may be quickly replaced.

To this end the invention consists in so constructing the door front and lining that currents of cold air will be directed over the whole inner surface of the lining, and in attaching the lining to the door front by a single longitudinal bolt which permits free expansion and contraction of the lining in all directions.

The invention also consists in making the handle a separate piece which is attached to the door front by the same bolt which holds the lining in place, and in the several advantages of the particular construction, arrangement and combination of parts all as hereinafter more fully described, reference being had to the accompanying drawings in which—

Figure 1 is a front elevation of a furnace fire-door embodying the invention, with parts broken away to show the construction; Fig. 2 is a vertical section of the same on the line *x—x* of Fig. 1; Fig. 3, a horizontal section on the line *y—y;* and Fig. 4, a similar section on the line *z—z*.

As shown in the drawings 1 is a fire-door front of the usual concavo-convex form having an inwardly extending edge flange 2 seating upon the door frame 3 or raised rib around the door opening in the furnace front. Lugs 4 on the furnace front, and ears 5 formed integral with the door front, form hinge members to receive a rod or pintle 6 passing through openings in said ears and lugs to hinge the door to the front.

7 is a protecting lining, preferably of cast metal, formed with a series of vertical ribs 8 on its inner face engaging the inner surface of the door front and forming between them a series of separate air passages between the door front and lining. The lining is also provided with a central lug 9 at each end having an opening to receive a bolt 10 which passes through openings in the end flanges 2 and detachably holds the lining in place. The lining is of less width and height than the internal dimensions of the door front so that there is a space between the lining and door all around its edges to permit its free expansion and a longitudinal rib or thickened portion 11 on the door front between the lugs 9 centers the lining on the bolt 10.

A rib 12 on the lining extends longitudinally of the bolt and outward into engagement with its inner side, and the rib 11 on the door front extends inward into engagement with the outer side of the bolt, thus separating the air ducts or passages formed by the vertical ribs on the upper half of the lining from those on the lower half of the same. Two longitudinal rows of openings 13 are provided in the door front, one just above and the other just below the bolt 10, and so arranged that each opening admits air to the inner ends of two of the passages. The air is drawn in through the openings and passing along the passages, enters the furnace around the upper and lower edges of the lining, as shown by the arrows in Fig. 2, cooling the whole surface of the door and lining. The ribs 8 not only space the lining from the door front and form air passages between, but they also tend to prevent the lining from warping and increase the radiating surface of said lining. A central opening 14 in the door front coincides with the inner end of a flaring opening 15 in the lining so that the operator may view the interior of the furnace without opening the door.

A notch 16 is provided in the front edge of the door front and into this notch fits a casting 17 provided with a curved lug 18 forming the door handle. The casting is securely held in place by the bolt 10 which

passes therethrough, a recess 19 being provided in its outer side to receive the head of the bolt, and said casting forms a projection on the door front to engage a lug 20 on the casing to hold the door closed.

Having thus fully described my invention what I claim is:—

1. The combination of a door front having a series of openings, a lining secured to the door front and formed with a series of independent vertical passages each having an end wall adjacent to one of the openings in the door front and each passage adapted to receive air through said opening and discharge it at its opposite end.

2. The combination of a door front having a series of openings, a lining spaced from the door front and secured thereto, a series of ribs on the lining forming air passages between the door front and lining, and a rib extending transversely to said ribs and forming end walls for the passages, said passages each communicating with the atmosphere through one of the openings in the door adjacent to said transverse rib and adapted to communicate with the interior of a furnace at its opposite end.

3. The combination of a door front having one or more holes along its longitudinal center line, a lining secured to the door front and formed with air passages in its surface adjacent to the door front, said passages extending in opposite directions from said center line of the door front and each communicating with the atmosphere at its inner end through said holes in the door front and open at its opposite end.

4. The combination of a door front having a series of openings adjacent to its longitudinal center line, a lining, parallel ribs on the lining forming air passages between the lining and door front, and a rib adjacent to said openings extending transversely to the parallel ribs and dividing the air passages formed by said ribs into air passages extending in opposite directions from said transverse rib, said passages communicating with the atmosphere through said openings in the door front and open at their ends at the edges of said lining.

5. The combination of a door front having inwardly extending flanged edges and provided with a row of openings at each side of its longitudinal center line, a lining attached to the door front with a space between it and the door front and between its upper and lower edges and the flanged edges of the door front, a longitudinal rib on the lining extending toward the inner surface of the door front between its rows of openings, a series of vertical ribs on the lining extending upwardly and downwardly from the longitudinal rib and forming air passages, and means for securing the lining to the door front.

6. The combination of a door front, a lining spaced from said door front, a bolt extending parallel with the inner surface of the door front across and between said surface and the adjacent side of the lining, means on the lining engaged by said bolt, and means on the door front engaging said bolt to detachably secure the lining to the front.

7. The combination of a door front having inwardly extending flanged edges provided with openings, a lining spaced from the inner surface of the door front, a bolt extending through said openings in said flanged edges and across the inner surface of the door front parallel therewith and between said surface and the adjacent side of the lining, and lugs on the lining engaged by said bolt to detachably secure the lining to the front.

8. The combination of a door front having inwardly extending flanged edges, a lining spaced from said flanged edges, lugs on the lining, a bolt extending through the flanged edges and through the lugs to secure the lining to the front, and a projection on the door front to center the lining on the bolt relative to said front.

9. The combination of a door front having a series of openings and provided with inwardly extending flanged edges, a lining spaced from the door front and from its flanged edges, parallel ribs on the lining extending across the space between the front and lining, lugs on the lining, a bolt extending through the flanged edges and through openings in the lugs to secure the lining to the front, a projecting rib on the door front extending inward between said lugs, and a rib on the lining extending across the same between said lugs and outward toward the rib on the front.

10. A furnace fire door comprising a front having inwardly extending flanged edges having an opening, a lining inclosed within said flanged edges, a casting formed with an opening and a projecting portion forming a handle, and a bolt extending through the openings in the casting and flange and engaging the lining to secure the lining and handle to the front.

11. A furnace fire door comprising a door front having inwardly extending flanged edges, a casting formed with a projection forming a handle, a lining spaced from the inner surface of the door front, a bolt extending through said casting and flanges and across the inner surface of the front parallel therewith between said surface and the lining, lugs on the lining engaged by said bolt, a head on one end of the bolt to engage the casting and a nut on the opposite end of said bolt to engage the flange.

12. The combination of a door front having inwardly extending flanges and pro-

vided with a notch in one flange, a casting engaging said notch and provided with a projection forming a handle and with a recess in the outer side, a lining upon the door front, lugs on said lining, a bolt provided with a head engaging the recess in the casting and extending through said casting, flanges, and lugs, and a nut on the opposite end of the bolt engaging the outer side of the flange.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN R. FORTUNE.

Witnesses:

OTTO F. BARTHEL,

A. M. DORR.