

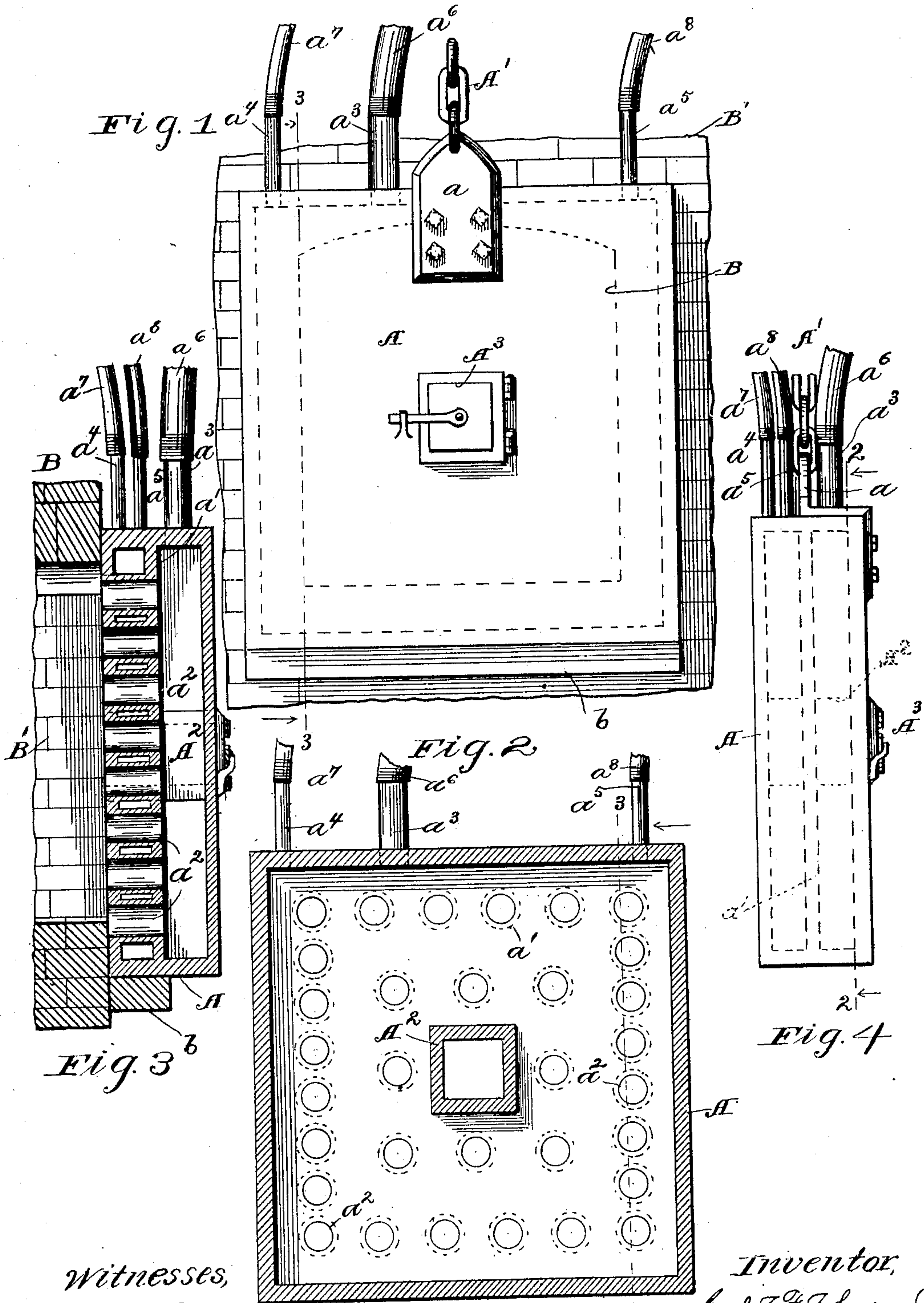
No. 869,575.

PATENTED OCT. 29, 1907.

C. J. F. JOHNSON.

FURNACE DOOR.

APPLICATION FILED MAR. 21, 1907.



Witnesses,
E. L. Buck.
Jno. F. Oberlin

Inventor,
Carl J. F. Johnson
by J. B. Fay
his attorney.

UNITED STATES PATENT OFFICE.

CARL J. F. JOHNSON, OF CLEVELAND, OHIO, ASSIGNOR OF ONE-HALF TO CARL W. CARLSON,
OF CLEVELAND, OHIO.

FURNACE-DOOR.

No. 869,575.

Specification of Letters Patent.

Patented Oct. 29, 1907.

Application filed March 21, 1907. Serial No. 363,544.

To all whom it may concern:

Be it known that I, CARL J. F. JOHNSON, a citizen of the United States, resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and
5 useful Improvement in Furnace-Doors, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

10 My invention relates to doors for use in connection with furnaces or the like.

While I recognize that my improved door construction will prove available for use in connection with various types of furnaces, it has been designed with particular regard to the needs of reheating furnaces and the like where a gaseous blast is utilized in bringing the objects or material to be heated, up to the desired temperature. In all such furnaces, such for example as billet heating furnaces, it is necessary to provide a
15 number of openings in the side walls through which access may be had to the interior from time to time as occasion arises. In view of the intense heat maintained within the furnace chamber, the effective closure of these openings where the furnace is running full
20 blast becomes quite a problem. It is obviously impracticable to utilize fittings such as guide ways in which to slidably mount the doors; and where, as is the prevailing construction, the doors are simply hung or suspended in front of the openings the escape of the
25 heated gases around its edges even though slight at first has the effect of very quickly eating away the brick work forming the jambs of the doorway. Indeed in the case of a mill of any considerable size, a force of masons is required to be kept in constant attendance upon the
35 furnaces to repair the damage thus wrought.

The object of my invention is the provision of means whereby these several difficulties may be to a large degree overcome.

40 To this end said invention consists of means herein after fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail certain means embodying the invention, such disclosed means constituting but one of various
45 mechanical forms in which the principle of the invention may be used.

In said annexed drawing: Figure 1 is a front elevation of a door embodying my invention as disposed in front of an opening such as has been described; Fig. 2
50 is a vertical longitudinal cross section of such door, taken on the line 2—2, Fig. 4; Fig. 3 is a vertical transverse cross-section of the same, taken on the line 3—3, Figs. 1 and 2; while Fig. 4 is an end elevation of the door

As will be obvious from an inspection of the several 55 figures of the drawings just described, such door in the approved form there described consists essentially of a flat, hollow structure A in form similar to that of the opening B in the furnace wall B', which it is designed to close. In size it should be somewhat larger 60 so as to be able to overlap the edges of the latter on all four sides. Such structure A is preferably of cast metal construction and may be made in one integral piece. However, this detail is immaterial, for it may be just as well be of built up construction so far as the principle 65 of its operation is concerned. When in proper position to close the furnace opening, the door is designed to rest upon a sill b of the character usually provided in this connection; while to raise the door from before the opening, a chain A' or the like attached to a hanger a 70 at the top of the door, together with suitable hoisting mechanism are provided. The hollow structure thus constituting the door, is longitudinally divided by a partition a' into two chambers that respectively extend the entire length and height of the same. The disposition of partition a' may be varied to change the dimensions of these chambers in the matter of width as 75 may be desired. In the preferred construction, as shown, they are of substantially equal width. Extending transversely across the inner of these chambers, 80 viewing the same as operatively positioned with respect to the side of the furnace, are a plurality of ducts a² that afford communication between the outer of such chambers and the inner face of the door structure regarded as an entirety. The number of these ducts or 85 passages is immaterial and will obviously depend, among other things on the size of the door. The majority are, however, desirably arranged to form a series with their external openings so arranged as to lie contiguously to the edges of the door opening B'. Those 90 remaining are scattered intermediately of such outer series and a larger duct or passage A² centrally disposed in the door structure and extending through both chambers. This latter duct is designed to be normally closed by means of a small door A³ hinged on the outer face 95 of the door structure A. Extending upwardly from the top of the door structure are three short pipe sections a³ a⁴ and a⁵. Of these, section a³ communicates with the outer chamber and is connected by means of a hose coupling a⁶ with a suitable source of air under pressure 100 as with a pipe leading from a blower or the like; while sections a⁴ a⁵ are communicated with the inner of the two chambers and are connected by means of hose couplings a⁷ a⁸ with any suitable water supply, whereby a circulation of water may be maintained through the 105 chamber in question.

The operation of the door should be quite obvious from the foregoing description of its construction. As-

suming the furnace to be in operation, the door A will of course be positioned as indicated in Figs. 2 and 3 so as to close opening B'. The current of water flowing through the inner chamber and about ducts a^2 serves to maintain the inner face of the door cool in spite of the intense heat to which it is exposed. At the same time the air blast admitted through conduit a^6 into the outer of the chambers escapes by way of ducts a^2 as a plurality of streams or jets into the door opening. These playing upon the jambs of the door not only intensify the cooling effect of the water current but positively drive back the ignited gases that otherwise would seek egress through between the door and furnace wall. The latter is thus preserved against the disintegrating influence of these belching flames indefinitely and the life of the structure much prolonged. When it is desired to inspect the interior of the furnace, instead of having to raise the whole door structure A, the small door A^3 may be swung and through the passage A^2 a clear view had of the progress of the heating. This view can be had, too, without danger of a sudden burst of flame striking the observer in the face, for the inner series of jets will prove as effective in averting this discharge as the outer series in protecting the edges of the doorway. The flexible hose connections, it will of course be understood, are to enable the door structure to be raised from before the opening when occasion arises to have access to the furnace interior.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any one of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. A door for furnaces and the like comprising a hollow structure, a vertical partition dividing the same into two longitudinally extending chambers, passages connecting one of said chambers with the opposite outer face of the structure, air supply connections for said last named chamber, and water supply connections for the remaining chamber.
2. A door for furnaces and the like comprising a hollow

structure, a vertical partition dividing the same into two longitudinally extending chambers, a plurality of ducts passing transversely through one of said chambers and connecting the other thereof with the opposite outer face of the structure, air supply connections for such other chamber, and water supply connections for said first named chamber.

3. A door for furnaces and the like comprising a flat hollow structure of substantially the size and form of the opening to be closed, a vertical partition dividing the same into two longitudinally extending chambers, a plurality of ducts passing transversely through the inner of said chambers and connecting the outer thereof with the inner face of the door, said ducts being disposed to open contiguously to the edges of the door opening when said door is in its closed position, air connections for the outer of said chambers, and water connections for the inner thereof.

4. A door for furnaces and the like comprising a hollow structure, a vertical partition dividing the same into two longitudinally extending chambers, passages connecting one of said chambers with the opposite outer face of the structure, air supply connections for said last named chamber, water connections for the remaining chamber, and a transverse duct extending through both chambers.

5. A door for furnaces and the like comprising a flat hollow structure of substantially the size and form of the opening to be closed, a vertical partition dividing the same into two longitudinally extending chambers, a plurality of ducts passing transversely through the inner of said chambers and connecting the outer thereof with the inner face of the door, said ducts being disposed to open contiguously to the edges of the door opening when said door is in its closed position, air connections for the outer of said chambers, water connections for the inner thereof, and a centrally disposed transverse duct extending through both chambers.

6. A door for furnaces and the like comprising a hollow structure, a plurality of ducts connecting the interior of such structure with one outer face thereof, and air supply connections to the interior of said structure.

7. A door for furnaces and the like comprising a flat hollow structure of substantially the size and form of the opening to be closed, a plurality of ducts connecting the interior of said structure with the face thereof turned towards such opening, said ducts being disposed to open contiguously to the edges of the door opening when said door is in its closed position, and air supply connections for said structure.

Signed by me, this 18th day of March, 1907.

CARL J. F. JOHNSON.

Attested by:

D. T. DAVIES,
JOHN F. OBERLIN.