

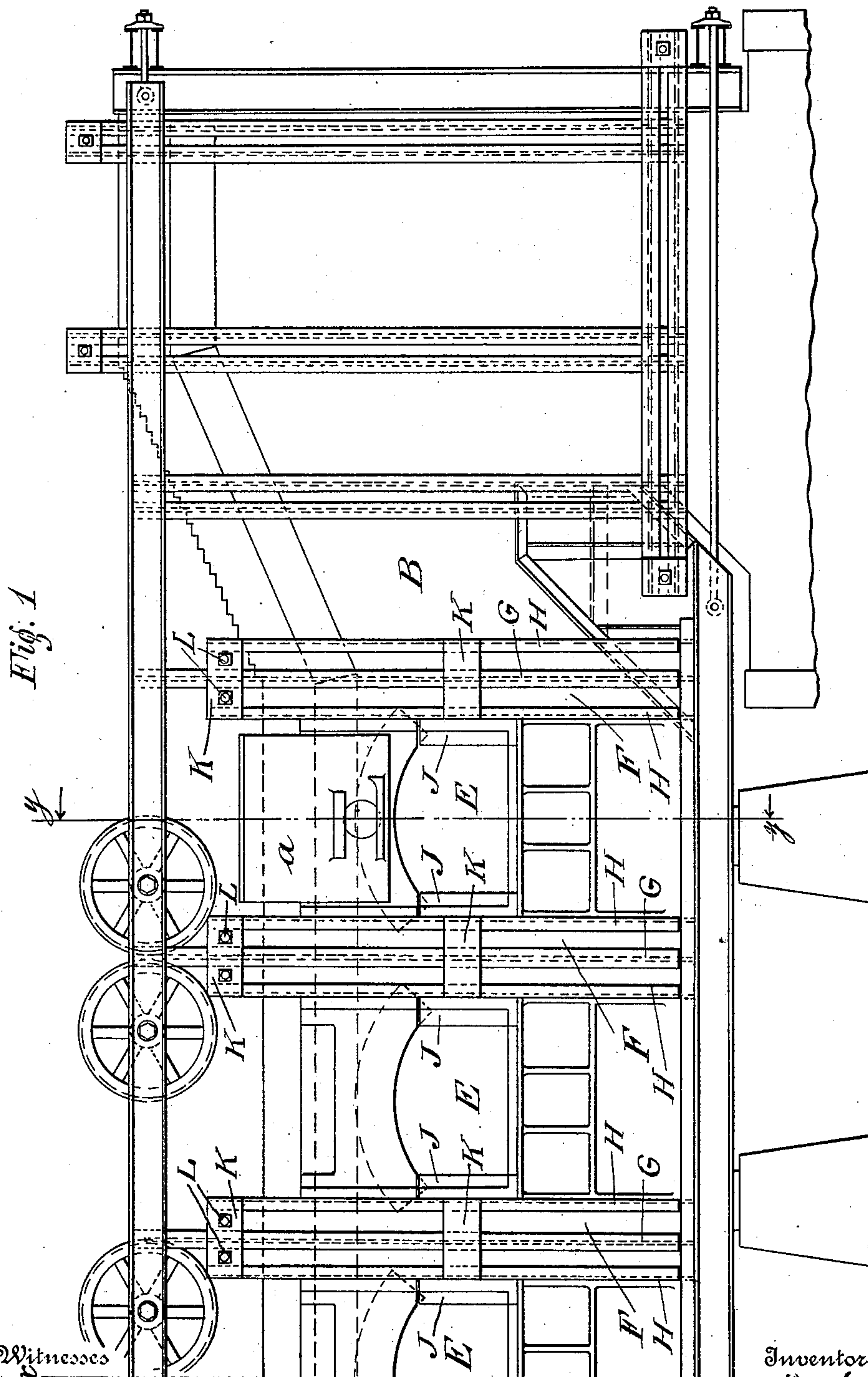
No. 886,370.

PATENTED MAY 5, 1908.

K. C. HOXIE.
FURNACE WALL.

APPLICATION FILED JAN. 10, 1908.

3 SHEETS—SHEET 1.



Witnesses
Sam Hoxieberg
Herbert H. Ogden

Inventor
Kenneth C. Hoxie
By his Attorneys
Burrin, Brockmeyer & Ogden

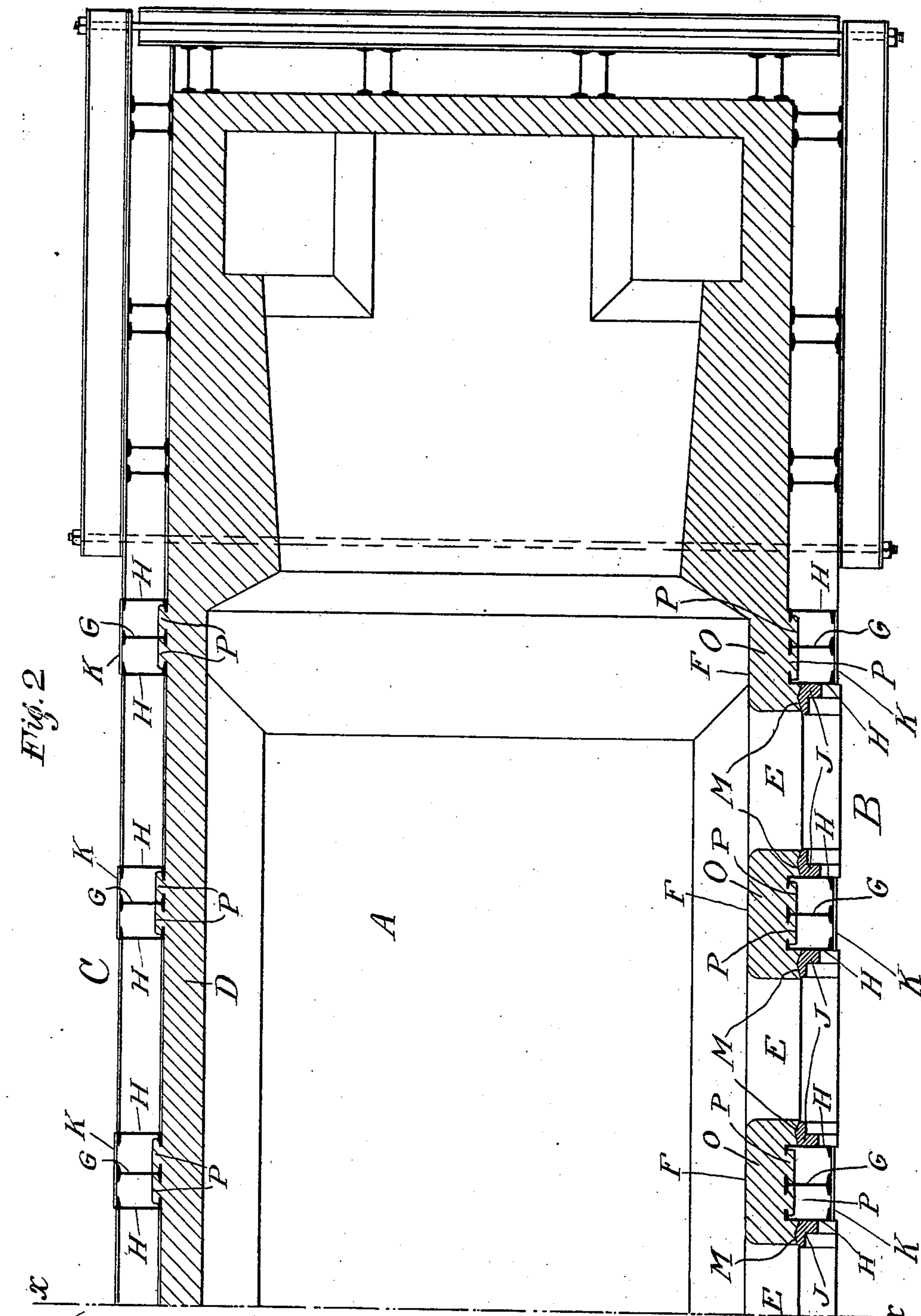
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3 SHEETS—SHEET 2.



Witnesses
 Franz Hengstenberg
 Herbert H. Ogden

By his Attorneys *Inventor*
Henry C. Hovee
Burney, Brickelstein & Ogden

UNITED STATES PATENT OFFICE.

KINNEY C. HOXIE, OF DULUTH, MINNESOTA.

FURNACE-WALL.

No. 886,370.

Specification of Letters Patent.

Patented May 5, 1908.

Application filed January 10, 1908. Serial No. 410,145.

To all whom it may concern:

Be it known that I, KINNEY C. HOXIE, a citizen of the United States, and a resident of Duluth, Minnesota, have invented certain new and useful Improvements in Furnace-Walls, of which the following is a specification, accompanied by drawings.

This invention relates to improvements in furnace walls, more particularly to the construction of walls for open hearth furnaces, although the invention is not limited to this class of furnace and may be used wherever found applicable.

The object of the invention is to enable the walls to be firmly secured to the buck-stays, which are arranged at intervals along the sides of the hearth. In open hearth construction, for instance, the side walls are generally continuous on the tapping side, while on the charging side more than half of the side wall is left out to form the door openings. The piers of brick or masonry work remaining between the door openings are often sources of great trouble on account of their liability to fall away from the uprights or buck-stays and into the furnaces. An occurrence of this kind, of course, means that the furnace must be held off work until repairs are made, which is a very troublesome piece of work to accomplish when the furnace is hot. There are two primary causes for the falling of these piers. First, under certain conditions the brick work is eaten away above the slag line, near the bottom of the piers, for, speaking of basic open hearth furnaces, there is a chemical reaction between the metal in the bath, the basic slag, and the brick which conspires to cut a hole into the wall, so that any disturbing condition causes the wall to fall. This action is further due to the foaming of slag and its rising to a higher level, and also to the violent foaming which throws the slag on the brick work, so that it is eaten away as the slag runs down. Secondly, the striking of the weakened walls, or the jarring of the door frame castings by the charging machine which carries heavy loads of material into the furnace, loosens, weakens and in time may destroy the piers.

According to my invention the brick work of the piers is securely bonded to the buck-stays, substantially as shown in the accompanying drawings, and hereinafter fully described and claimed in this specification.

In the drawings, Figure 1 is a side eleva-

tion of one-half of the charging side of an open hearth furnace embodying the invention, the furnace being symmetrical about the center line $x x$; Fig. 2 is a sectional plan view of the hearth; Fig. 3 is a transverse sectional view of the charging side of the furnace on the line $y y$ of Fig. 1, looking in the direction of the arrows, the line $z z$ in this figure representing the longitudinal center line of the furnace; Fig. 4 is an enlarged horizontal sectional detail plan view taken through one of the piers at the charging side of the furnace; and Fig. 5 is an enlarged detail plan view of an alternate course of brick for the buck-stays.

Referring to the drawings, A represents the hearth of an open hearth furnace, of which B is the charging side and C the tapping side. As shown, the side wall D on the tapping side is continuous, while the charging side is provided with door openings E between the piers F. Two and one-half door openings E are illustrated, which indicates that five door openings are provided in all, but a furnace may have any number of doors from one to five or more. At each side of and between the door openings E are built the structural bindings, composed in this instance of structural elements in the form of one I-beam G and two channels H, fastened together with battens K and held against the furnace brick work by the cross rods L at the top, and by suitable connections at the bottom. These structural parts taken as a unit comprise the buck-stays.

According to my invention I bond the brick work O of the piers F to the buck-stays, by means of T-shaped bricks P (Fig. 4) extending through spaces between the beams G and H and fitting against the faces of the beam flanges. These T-shaped bonding members may be of fire brick or other suitable refractory material used in the art.

Bricks of standard thickness and of the shapes shown in Fig. 4 at P, Q, R and S form the locking courses which may be bonded in place by the bonding courses comprising the bricks shown in Fig. 5 at U, V and W. The piers may, if desired, be built up of alternate courses, with every other course provided with the locking T-shaped bricks P, the T-shaped heads of which engage the buck-stays and hold the brick work against the buck-stays under all conditions, or else the T-shaped bricks may be used at either the third, fourth, fifth or even the

sixth course, so as to avoid the fault of inclosing the inner flanges of the buck-stays so closely that they would not be properly air cooled.

5 The door frame castings J are suitably secured to the channels H and are provided with beveled faces M extending into the grooved faces N of the adjacent bricks Q and W, as shown in Figs. 4 and 5. By the use of
10 door frames of the character described, less metal is exposed to the action of the flames, and the shape of the adjacent bricks Q and W serves to anchor the bricks firmly against the buck-stays.

15 The door openings E are adapted to be provided, as shown, with vertically sliding doors a, one of which is shown, but further description of these parts and description of the mechanical construction of the furnace
20 is unnecessary because such portions form no part of the present invention.

At the tapping side of the furnace, buck-stays are shown comprising the channels H and I-beams G, while the brick work D is
25 constructed as described for the charging side with alternate courses of brick as illustrated in Figs. 4 and 5, every other course embodying the T-shaped bricks P for locking the wall to the buck-stays.

30 I claim and desire to obtain by Letters Patent the following:

1. A furnace wall comprising vertically extending structural elements, and brick or masonry work having bricks or individual
35 bonding members locked to said structural elements.

2. A furnace wall comprising vertically extending flanged structural elements, and masonry or brick work having bricks or individual bonding members engaging the flanges
40 of said structural elements.

3. A furnace wall comprising vertically extending flanged structural elements, and brick or masonry work laid in courses and provided with individual bricks or bonding
45 members having T-shaped heads engaging said flanges of the structural elements.

4. A pier for a furnace wall, comprising buck-stays composed of flanged structural elements, and brick or masonry work laid in
50 courses, alternate courses being provided with individual bricks or bonding members engaging the flanges of said structural elements.

5. A pier for a furnace wall, comprising
55 buck-stays composed of flanged structural elements, and brick or masonry work laid in courses, alternate courses being provided with T-shaped bricks or bonding members having their T-shaped heads in engagement
60 with the flanges of said structural elements.

6. A furnace wall comprising buck-stays and brick or masonry work having bricks or individual bonding members locked to said
65 buck-stays.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

KINNEY C. HOXIE.

Witnesses:

OTTO S. MANTHEY,
AMBROSE FOGARTY.