(No Model.) 3 Sheets—Sheet 1.

J. ROSS.

FURNACE WALL.

No. 457,371. Patented Aug. 11, 1891.

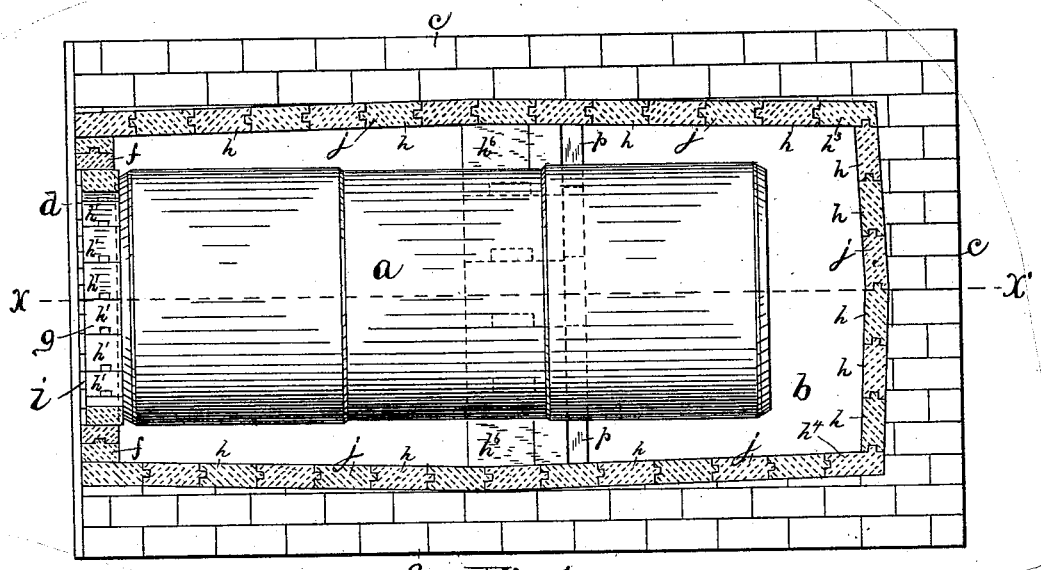

Fig. 1.

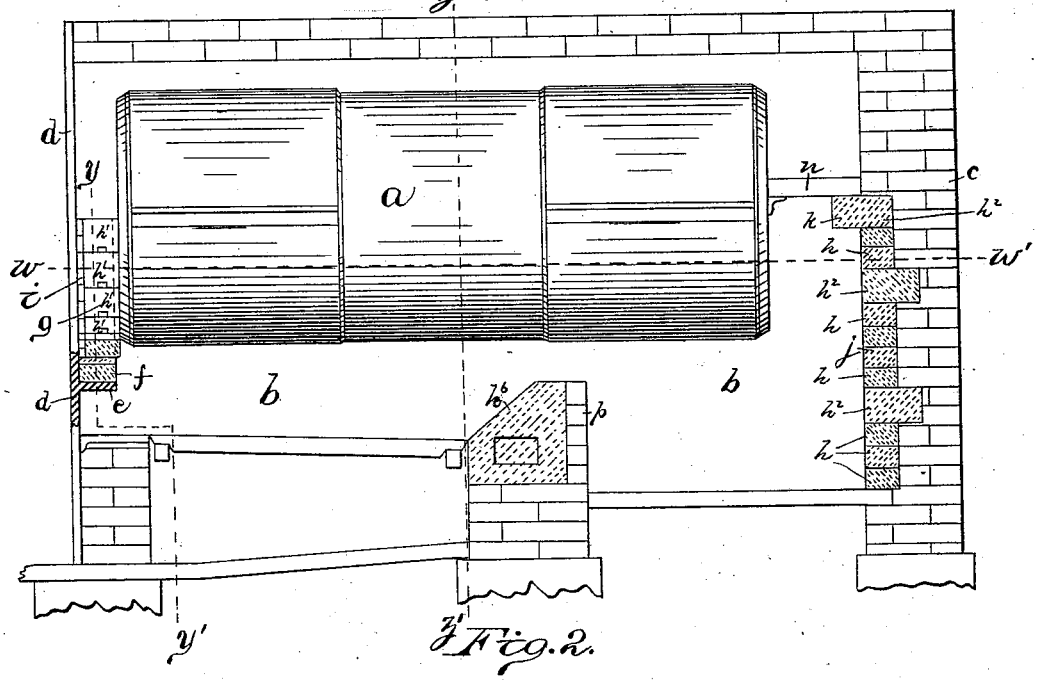

Fig. 2.

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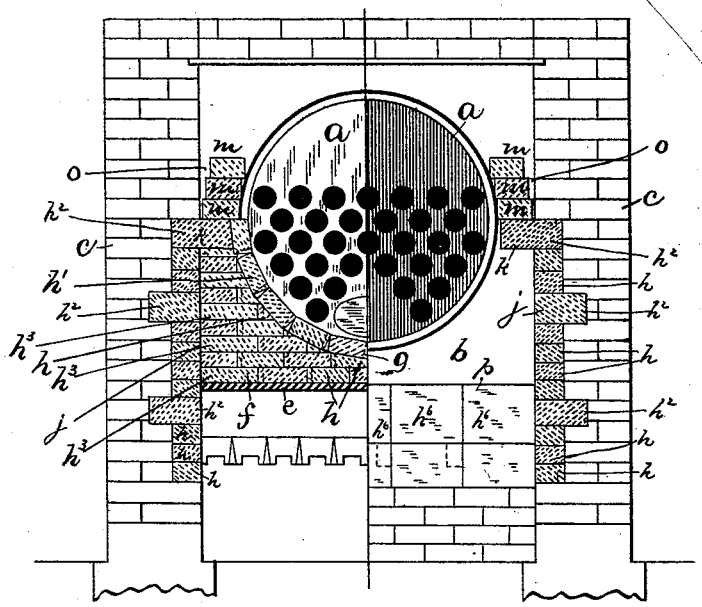

Fig. 3.

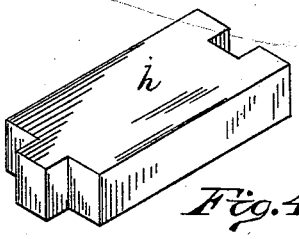

Fig. 4.

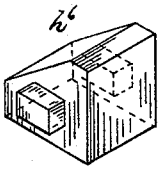

Fig. 10.

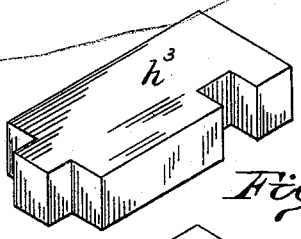

Fig. 7.

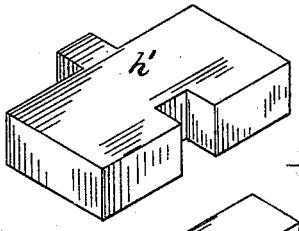

Fig. 5.

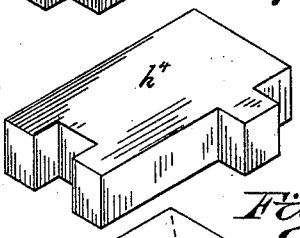

Fig. 8.

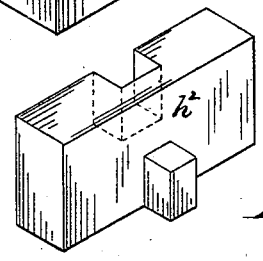

Fig. 6.

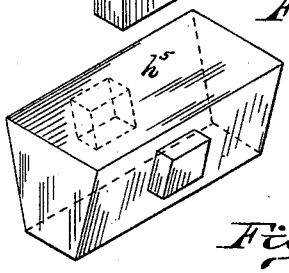

Fig. 9

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FURNACE WALL.

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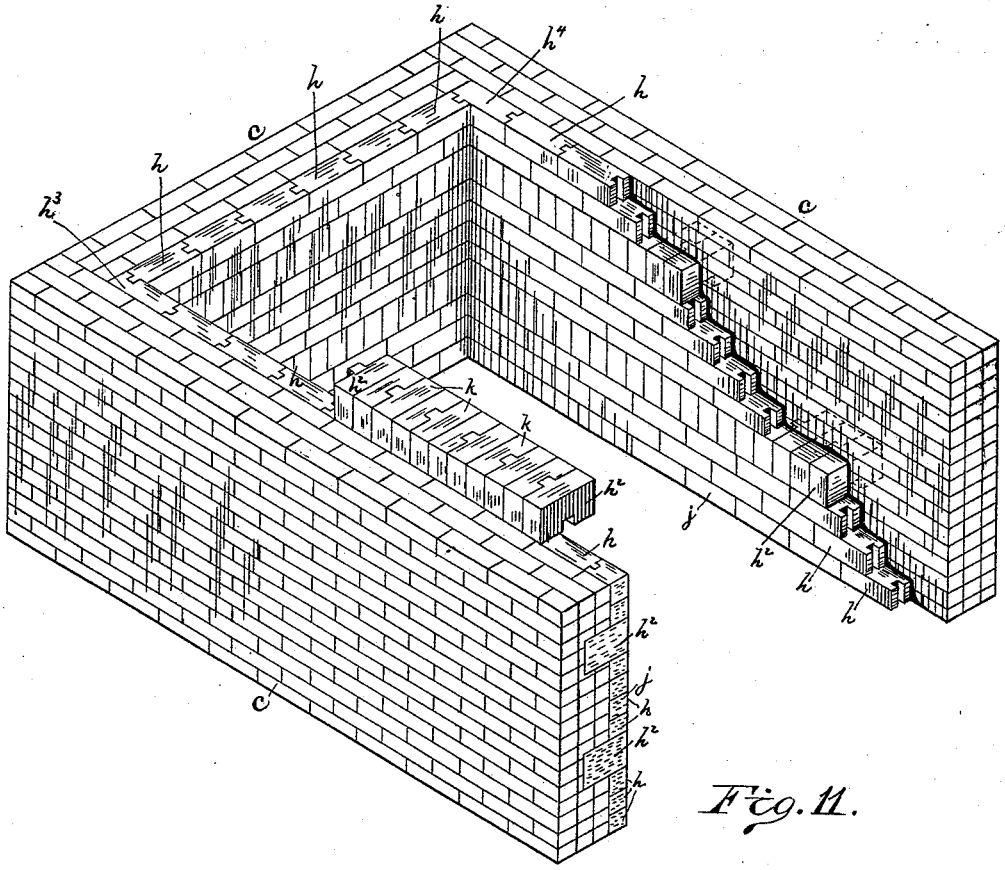

Fig. 11.

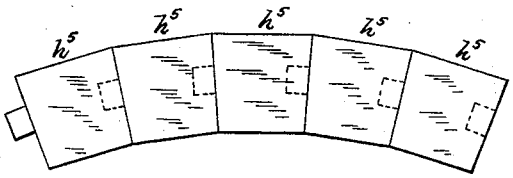

Fig. 12.

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INVENTOR

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UNITED STATES PATENT OFFICE.

JOHN ROSS, OF CHESTER, ASSIGNOR OF ONE-HALF TO CRAWFORD COATES, JR., OF PHILADELPHIA, PENNSYLVANIA.

FURNACE-WALL.

SPECIFICATION forming part of Letters Patent No. 457,371, dated August 11, 1891.

Application filed February 13, 1889. Serial No. 299,737. (No model.)

To all whom it may concern:

Be it known that I, JOHN ROSS, a citizen of the United States, residing in the city of Chester, State of Pennsylvania, have invented a new and useful Improvement in Steam-Boiler and other Furnace Walls, of which invention the following is a specification.

When the outside walls and the linings of steam-boiler furnaces are built of bricks of the usual form laid in the ordinary way, they are, after a comparatively short period of use, cracked and burst out by the expansion and contraction of the boiler and bricks. Furthermore, the bricks of the lining and bridge walls are, by their expanding and contracting action, forced from their places and caused to fall into the fire before they have been burned out.

The object of my invention is to provide a remedy for these evils.

It consists, chiefly, in constructing such lining-walls of meshing bricks—*i. e.*, bricks provided with tongues and grooves—the tongue of one brick meshing with the groove in the contiguous brick in the same course without interlocking when they are laid in juxtaposition.

It also consists in giving a dishing form to the lining, while the body of the wall is built with an outside rectangular face.

It also consists in minor details of construction, all as below specified.

In the annexed drawings, Figure 1 is a sectional plan on the line *w w'* in Fig. 2 of steam-boiler-furnace walls constructed in accordance with my invention; Fig. 2, a sectional side elevation of the same on the line *x x'* of Fig. 1; Fig. 3, a sectional front elevation of the same, the left-hand part on line *y y'* and the right-hand part on line *z z'* of Fig. 2; Figs. 4, 5, 6, 7, and 8, perspective views of the different meshing bricks used in the construction of furnace-walls; Fig. 9, a perspective view of the wedge-shaped meshing bricks or blocks used in building the arched roofs of puddling, heating, smelting, and other furnaces; Fig. 10, a perspective view of the meshing bricks or blocks used for facing furnace bridge-walls; Fig. 11, a perspective view of the lower part of boiler-furnace walls, (front omitted,) showing the meshing bricks in position in the lining; Fig. 12, a side elevations of part of an arched furnace-roof composed of meshing bricks.

a represents a steam-boiler intended to be supported in any of the usual ways in the furnace *b*.

c represents the side and rear walls of the furnace; *d*, its usual iron front, which is intended to be provided with the usual iron doors and also with the usual ledge *e* for supporting the brick-work *f*, which in turn supports the inverted arch *g*, employed to shut in the furnace in front. The brick-work *f* is formed of the meshing fire-bricks *h* and h^3, (see Figs. 4 and 7,) and the arch *g*, resting on said brick-work, is formed of the meshing fire-bricks *h'*. (See Fig. 5.)

The differences between the arch *g* and the arch usually employed in such cases consist in the facts that the bricks composing arch *g* are of the meshing form, laid so as to abut directly against the head of the boiler and so as to leave an inch (more or less) of clear space *i* between their front ends and the iron front *d*, as shown in Figs. 1 and 2. The object of this construction is to allow the arch *g* to be moved on its foundation brick-work *f* by the longitudinal expansion of the boiler without injury to the rear and front portions of the furnace-walls. The bricks in arch *g* are forced out by the expansion of the boiler and left out on the subsequent contraction; but the open space left is filled again by the subsequent expansion of the boiler, and this occurs at each subsequent expansion.

j represents the lining of the furnace-walls *c*. This lining is constructed of meshing fire-bricks *h*, h^2, h^3, and h^4. (See Figs. 1, 4, 6, 7, and 8.) The tongues of the individual bricks mesh in the respective grooves of the bricks laid adjacently to them in the respective courses, bricks *h*, h^3, and h^4 being laid as stretchers and bricks h^2 as headers, as shown in Figs. 1 and 11. It will be seen that the forms of the tongues and grooves are such that the bricks mesh without being locked together, thus allowing the bricks to be moved considerably in line with the meshing tongues and grooves without being able to get out of

line. The lining-walls *j* are built in the concave or dishing form shown in Fig. 1, and the exterior walls *c* are built of ordinary bricks laid as usual, the outside faces of these walls being rectangular, as shown in Fig. 1. I have found that these features of my invention—viz., the meshing of the fire-bricks in the lining without interlocking and the dish in the lining, the supporting masonry being constructed with the outside rectangular faces, as above described—together operate to keep the lining-walls whole and the bricks thereof in line in their respective courses until the bricks of the lining are completely burned out.

k, Figs. 2, 3, and 11, represents a course of the meshing fire-bricks h^2 set on edge projecting inwardly to form a ledge to support the ordinary bricks *m*, Fig. 3, along the sides and to support one end of the tiles *n*, Fig. 2, along the rear end of the furnace, together forming the partition between the lower or fire space and the upper or flue space of the furnace. The bricks *m* are laid in contact with the boiler, leaving clear spaces *o* between them and the bodies of the side walls, as shown in Fig. 3, to permit the boiler to expand laterally without occasioning pressure against the side walls of the furnace. It results from this construction that, while bricks *m* are not forced against the side walls by the boiler's expansion, they are not left behind when the boiler contracts, but, on the contrary, through their gravity continue to hold their places in contact with the boiler. The tiles *n* are of the usual form and are laid as usual in such cases.

p, Figs. 1 and 2, represents the bridge-wall, which is of the usual construction, except that it is faced with the meshing fire bricks or blocks h^6, Fig. 10.

The above-described method of building, lining, and outside abutting walls is further applicable in the construction of puddling, heating, smelting, and other furnaces.

The body of the meshing brick or block h^5 is wedge-shaped, it being intended for use in the arched roofs of smelting-furnaces and other furnaces requiring such roofs, as well as for arching over the "cleaning-out" holes which are usually provided in furnace-walls, and then bricked up with a view to their being temporarily opened when occasions arise.

Referring to Figs. 9 and 12, it will be seen that the tongues and grooves of the bricks h^5 occupy only the middle portions of the respective bricks.

I am aware that wedge-shaped bricks or blocks provided with tongues and grooves and intended for use in the construction of arches are described in a British patent to W. H. Mortimer; but Mortimer's bricks would not answer my purpose, for the reason that their tongues and grooves extend the whole length of the bricks. If such bricks were used where mine are intended to be used in the construction of furnace-walls, they would be drawn out of place by the action of the heat.

The tongues and grooves of the meshing bricks or blocks require to be rectangular, all corners being full and square, as shown.

I claim—

1. For steam-boiler and other furnaces, a dry wall-lining composed of fire-bricks which are provided with rectangular tongues and corresponding grooves, the tongues of the bricks in a course being adapted to mesh with the grooves of the adjacent bricks in the same course, respectively, without interlocking, thereby permitting movement of the bricks in line with said tongues and grooves without breaking the alignment of the bricks, substantially as set forth.

2. These parts in combination, viz: the abutting walls *c*, having outside rectangular faces, the dished lining *j*, built of fire-bricks which mesh without interlocking, the partition-tiles *n*, the bricks *m*, laid with a clear space between them and the adjacent portions of the furnace-walls to obviate cracking of these walls by the lateral expansion of the boiler, and of the bricks in the wall, substantially as set forth.

3. These parts in combination, viz: the iron front *d*, provided with a ledge *e*, the brick-work *f*, composed of meshing fire-bricks, and the inverted arch *g*, of meshing fire-bricks, laid with their inner ends in contact with the boiler-head, leaving a clear space between the outer ends of these bricks and the said iron front to prevent the rear and front walls of a steam-boiler furnace from being cracked and disintegrated by the longitudinal expansion of the boiler and action of the heat, substantially as set forth.

4. In furnace-walls, an arch composed of the meshing bricks or blocks h^5, substantially as set forth.

5. A furnace bridge-wall faced with the meshing bricks or blocks h^6, substantially as set forth.

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Witnesses:
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CLIFFORD E. LARZELERE.