

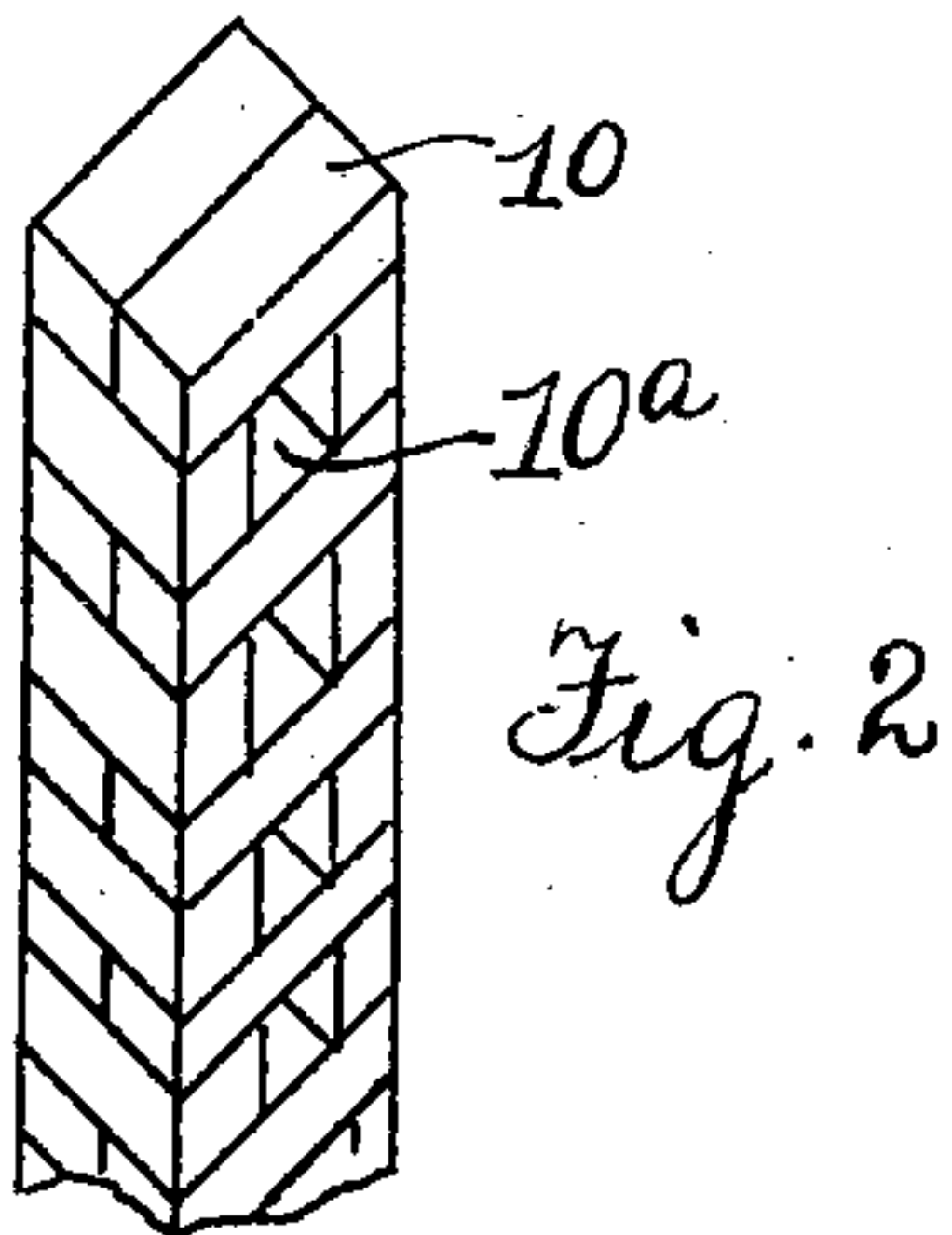
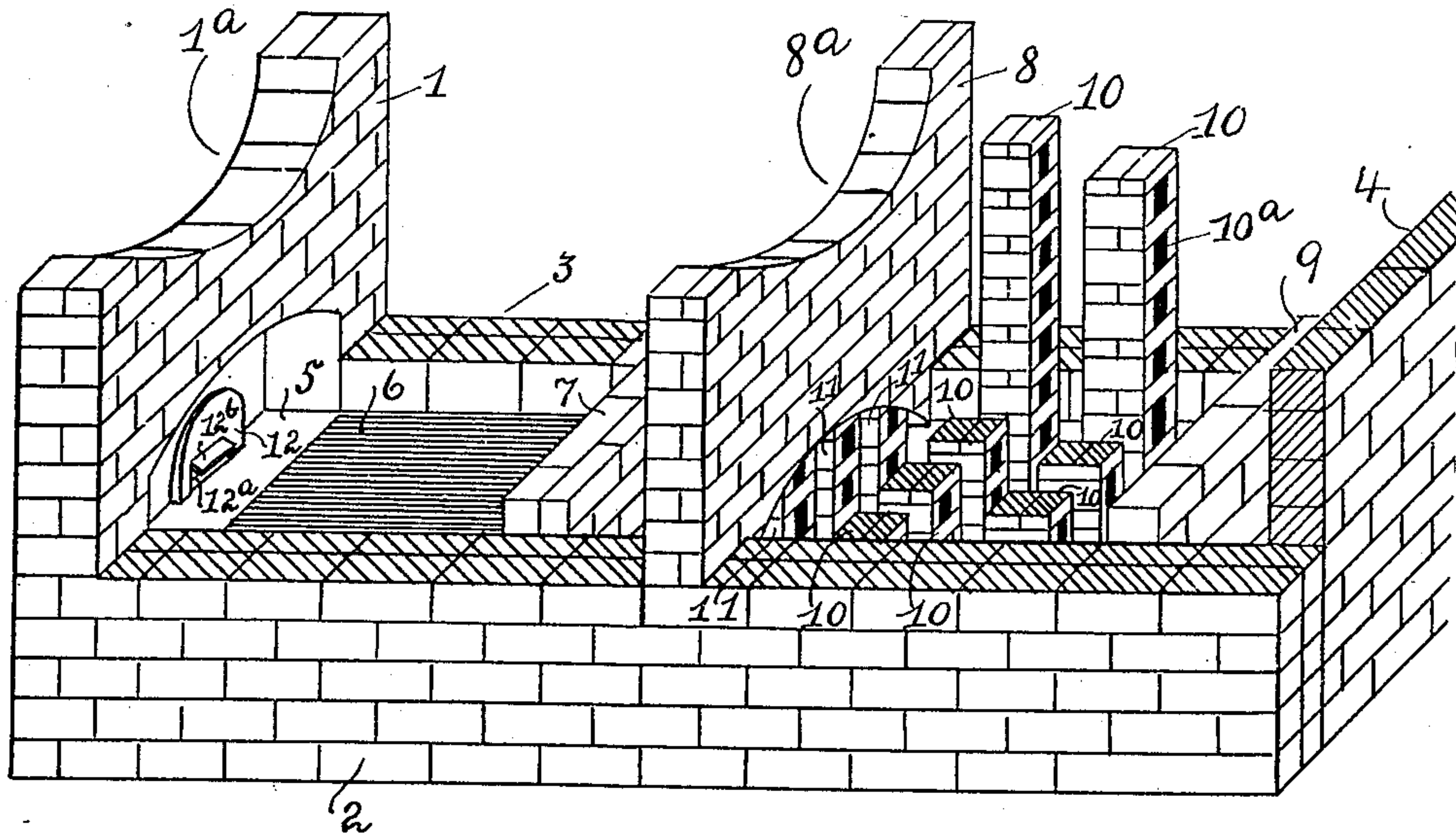
J. D. REEKIE.
FURNACE.

APPLICATION FILED APR. 4, 1908.

913,236.

Patented Feb. 23, 1909.

Fig. 1.



WITNESSES:

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FURNACE.

No. 913,236.

Specification of Letters Patent.

Patented Feb. 23, 1909.

Application filed April 4, 1908. Serial No. 425,123.

To all whom it may concern:

Be it known that I, JAMES D. REEKIE, a citizen of the United States, residing at Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to furnaces for steam generating plants and has for its object an improved form of such constructions.

It consists of the constructions, combinations and arrangements of parts hereinafter described and claimed.

In the drawings, Figure 1, is a perspective view partly in section of my said invention. Fig. 2, is a fragmentary perspective view of one of the heat-reservoir piers forming part of my said invention.

In the drawings 1, 2, 3, and 4 are respectively the front, right side, left side and rear walls of the furnace, which side and rear walls are not illustrated at their full height.

5, is a dead plate, 6, is a grate, 7 is a forward bridge wall, 8 is an arch in rear of the forward bridge wall and spaced therefrom and extending from one to the other of the side walls and contacting at its upper end with the boiler hereinafter referred to. 9 is a rear bridge wall. 10, 10, are piers of brick erected in a chamber formed by said arch and said rear bridge wall, and said side walls; said piers extending from the floor or bottom of the furnace to within a very short distance of the bottom of the boiler (not shown) and being composed of fire brick arranged in checker form, with the apertures 10^a extending longitudinally of the furnace. Only two of said piers are shown at full height, the others being cross-hatched to indicate that they are not shown at full height. 11, 11, are similar, but shorter, piers erected beneath said arc. Each transverse row of piers is preferably staggered, with relation to the row next to it, the staggered construction being very important in short furnaces in order to increase the distance of travel for the major portion of the gases to be consumed, and to assist in mixing the gases and air. The bottom of the boiler (flue boiler)

will rest in the concavities 1^a and 8^a and will contact with the side and front walls, thereby compelling all gases to pass over the forward bridge wall and beneath said arch, the boiler being preferably suspended so that its weight will not rest on said arch and walls, and the boiler will extend back over the rear bridge wall but not as far as the rear inclosing wall 4. Any suitable form of brick may be used for constructing the walls, arch and piers, and they may be laid up in any suitable manner in the walls and arch but they are laid in the piers preferably as shown, and should be so laid in the piers as to produce the longitudinally directed apertures 10^a. Additional rows of piers may be erected in said chamber, if desired, when said chamber is long enough to contain them; but when the furnace is of great length said piers may be, if desired, positioned in rows extending longitudinally of the furnace,—that is, in such case it may not be essential to stagger them.

12 is a firing door, having a draft port 12^a formed therein, governed by an upwardly, inwardly swinging draft door 12^b, which in operation is adapted to deflect the draft downward upon the dead plate so that said draft will sweep over the front of the fuel bed in close proximity to said fuel and will mix with the gases to be consumed promptly as they are evolved from the coal. By so placing the draft door in the firing door, the most desirable inclination can be given it when open without giving too great a draft as might result from making the fire door swing upwardly and inwardly.

One object of the piers is to absorb heat when the fire is hot and heat can be spared, and to release a portion of said heat into the currents of relatively cool gases evolved from green coal when it is thrown into the furnace, thereby raising the temperature of said gases to the burning point thereof. The value of reserving heat for such purpose by charging inclosed brick reservoirs has long been recognized and I do not seek to claim all such devices broadly. So, too, broadly similar draft deflecting doors are well known and are described in expired patents, and I make no broad claim to a draft deflecting door. But heretofore the heat reservoirs have not been constructed in

the form of isolated piers such as I have shown, and where transverse walls alone are used for such purposes it is evident that swirling and mixing movement of the gases and air is lost or greatly reduced, especially when all the ports in the reservoir walls are directed longitudinally of the furnace. If some of such ports, or gas passages, extend wholly or in part transversely of the furnace, as in some forms of checker work, they soon become more or less choked with soot or ashes, whereby their efficiency is rapidly destroyed. The draft through the longitudinally extending passages is, however, strong enough to keep the ash dust blown out.

In the operation of my invention, the draft through the port 12^a meets and to some extent mixes with the cool gases evolved from the fresh coal thrown on the fire. Thence said gases and air leap the forward bridge wall and are sucked down under said arch, passing between the piers 11 and through the ports 10^a in said piers, and gaining considerable heat through the radiation from the surcharged piers. The current of gases is then baffled to some extent by the forward row of piers 10, and said current is sub-divided, part of the gases swirling around the outer faces of said piers and passing between them, and part of said gases passing through said piers, such swirling movement assisting in the further mixing of the air and gases, and the piers releasing heat into such mixture to raise it to or near to the degree of heat necessary to combustion. The same process is further continued by the passage of the unconsumed air and gases through and between the next row of piers, and so on until the gases reach the rear bridge wall, by which time the combustible elements of them are consumed and the hot products of combustion pass over the rear bridge wall and rise to the flues of the boiler and pass forward through said flues and thence to the smoke stack (not shown) in the usual manner.

What I claim is:

1. In a furnace, the combination of vertical inclosing walls, a forward bridge wall, an arch in rear of said bridge wall, a series of piers beneath said arch and approximately contacting therewith at their upper ends, a series of piers in rear of said arch, some of said piers being staggered with relation to others of said piers, and a rear bridge wall in rear of said piers, the top of said rear bridge wall being on a lower plane than the tops of said arch and rear piers.

2. In a furnace, the combination of vertical inclosing walls, a forward bridge wall, a grate positioned between the forward bridge wall and the front inclosing wall, a plural number of transversely directed rows

of piers in rear of said arch, the piers of each of said rows being staggered with relation to the piers of the respectively adjoining rows, each of said piers having flues formed therein directed longitudinally of the furnace, a rear bridge wall in rear of the rearward said piers.

3. In a furnace, the combination of vertical inclosing walls, a forward bridge wall, an arch in rear of said forward bridge wall, a series of piers beneath said arch, a series of piers in rear of said arch, some of said piers being staggered with respect to others of said piers, and a rear bridge wall in rear of said piers.

4. In a furnace the combination of side and end inclosing walls, a forward bridge wall extending from one side wall to the opposite side wall, said inclosing walls being higher than said bridge wall, a grate between said bridge wall and the front and side inclosing walls, an arch in rear of said bridge wall and spaced therefrom the top of said arch being higher than said bridge wall, a series of piers beneath said arch, said piers having ports extending therethrough longitudinally of the furnace, a series of piers in rear of said arch and spaced therefrom, said piers having ports formed therein extending longitudinally of the furnace, said piers having solid side faces, a rear bridge wall in rear of said piers, the top of said rear bridge wall being on a lower plane than the top of said arch, said front wall and arch being adapted to receive thereon a horizontal cylindrical boiler and to conform to the bottom of the same.

5. In a furnace, the combination of inclosing front, side and rear walls, a forward bridge wall extending from one side wall to the opposite side wall, said inclosing walls being higher than said bridge wall, a grate between said bridge wall and the front and side inclosing walls, an arch in rear of said bridge wall and spaced therefrom, the top of said arch being higher than said bridge wall, a series of piers in rear of said arch, said piers having ports formed therein extending longitudinally of said furnace, said piers having solid side faces, a rear bridge wall in rear of said piers the top of said rear bridge wall being on a lower plane than the top of said arch, said front wall and arch being adapted to receive thereon a horizontal cylindrical boiler and to conform to the bottom of such boiler.

6. In a furnace, the combination of side and end inclosing walls, a forward bridge wall extending transversely of the furnace, said inclosing walls being higher than said bridge wall, a grate between said bridge wall and the front and side inclosing walls, an arch in rear of said bridge wall and spaced therefrom, the top of said arch being higher than said bridge wall, a series of piers in rear of said arch said piers having ports formed

therein extending longitudinally of the furnace, said piers having solid side walls, some of said piers being staggered with relation to others of said piers, a rear bridge wall in rear
5 of said piers extending transversely of the furnace, the top of said rear bridge wall being lower than the top of said arch, said front wall and arch being adapted to receive there-

on a horizontal cylindrical boiler and to conform to the bottom of said boiler.

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

JAMES D. REEKIE.

Witnesses:

JAMES T. WATSON,
C. T. CRANDALL.