

No. 855,495.

PATENTED JUNE 4, 1907.

M. E. BALDWIN.
ARCH FOR FURNACES AND FIRE BOXES.

APPLICATION FILED NOV. 25, 1905.

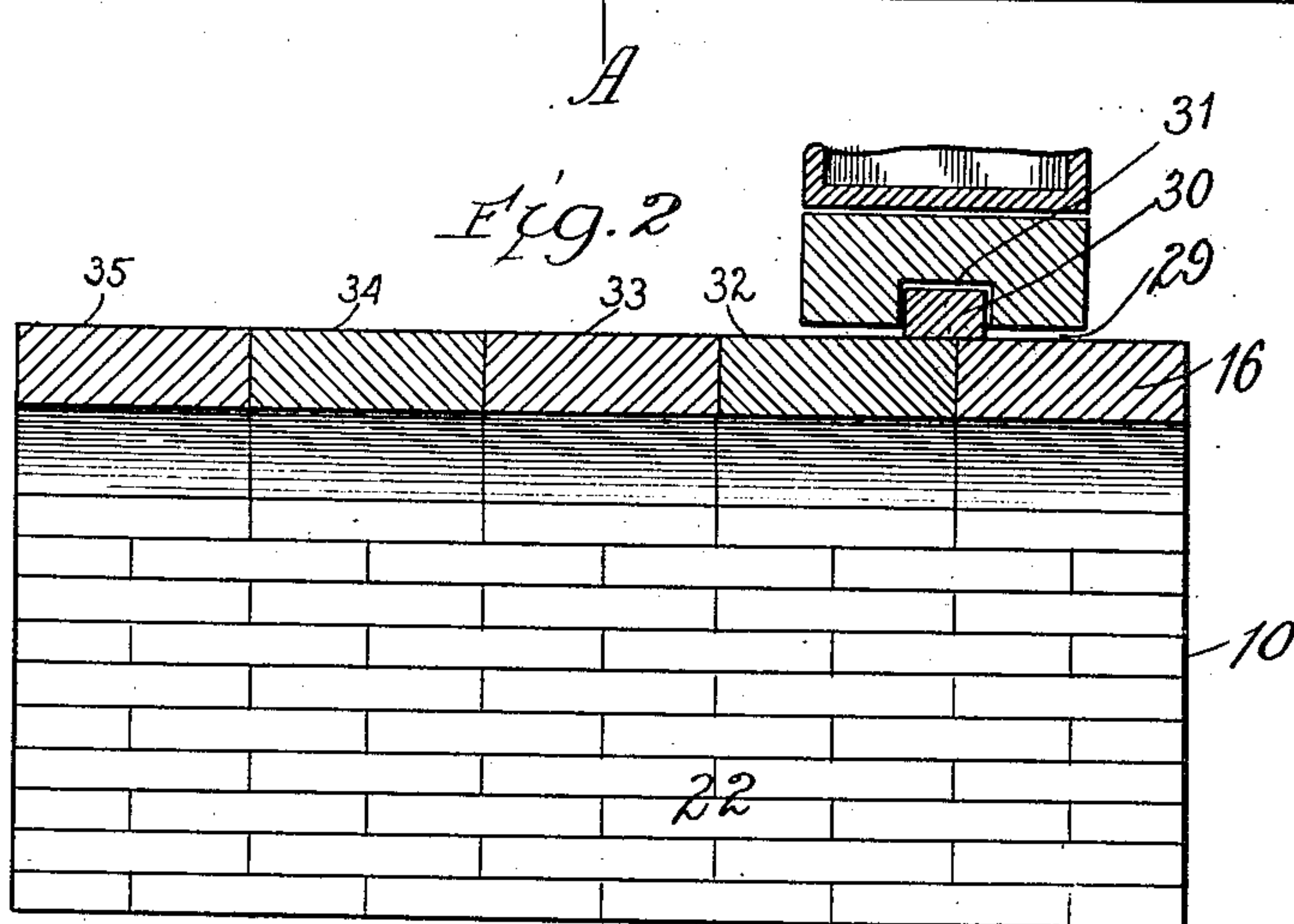
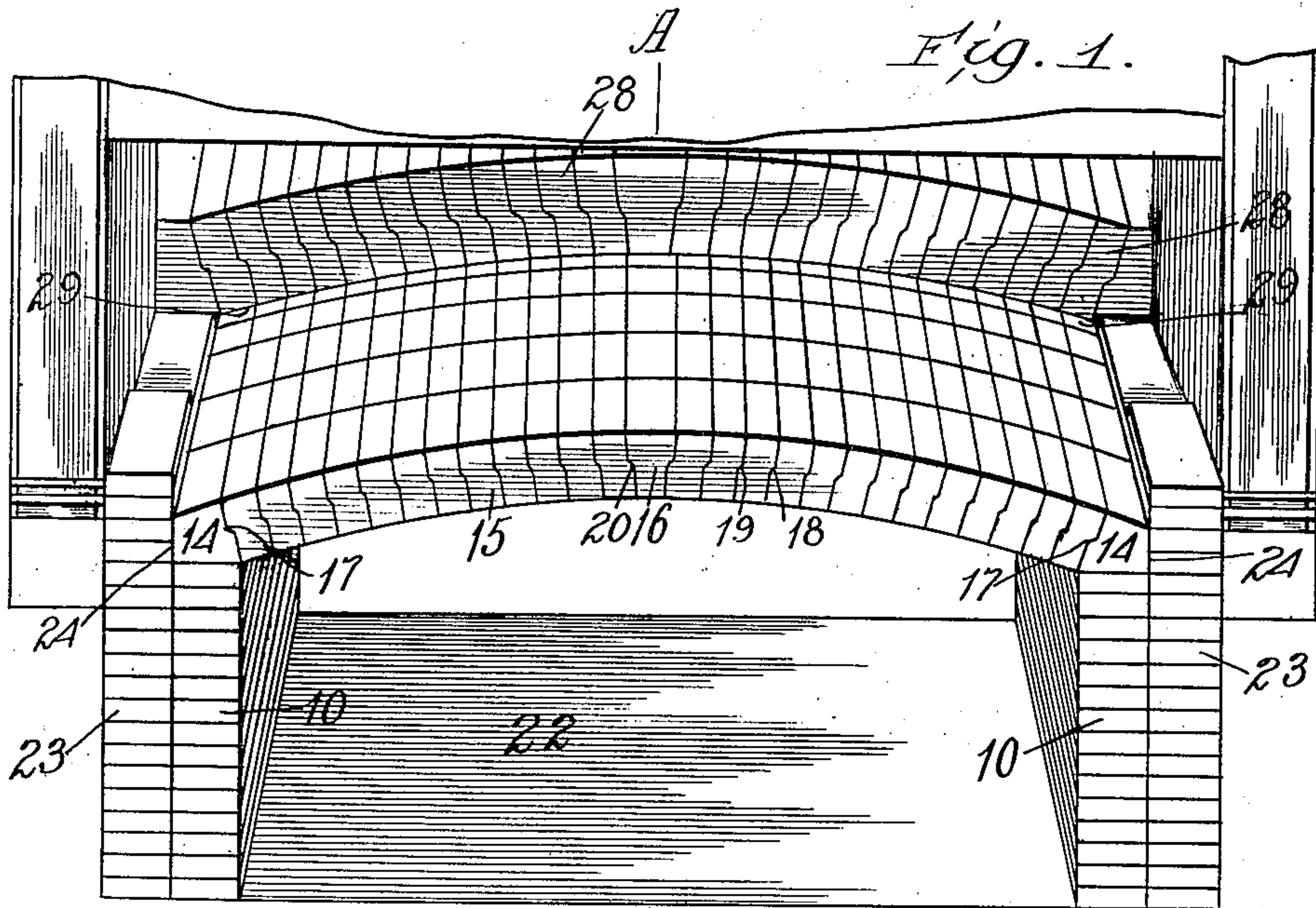


Fig. 4

Witnesses
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Ray White.

Fig. 5

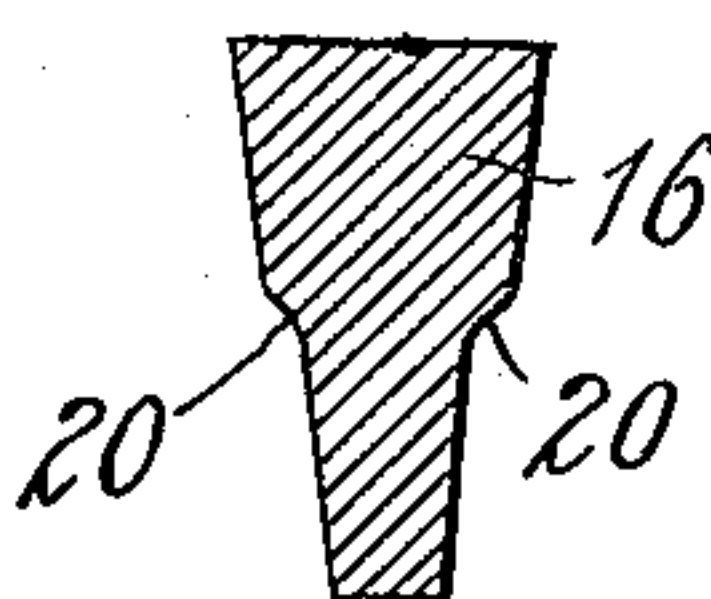
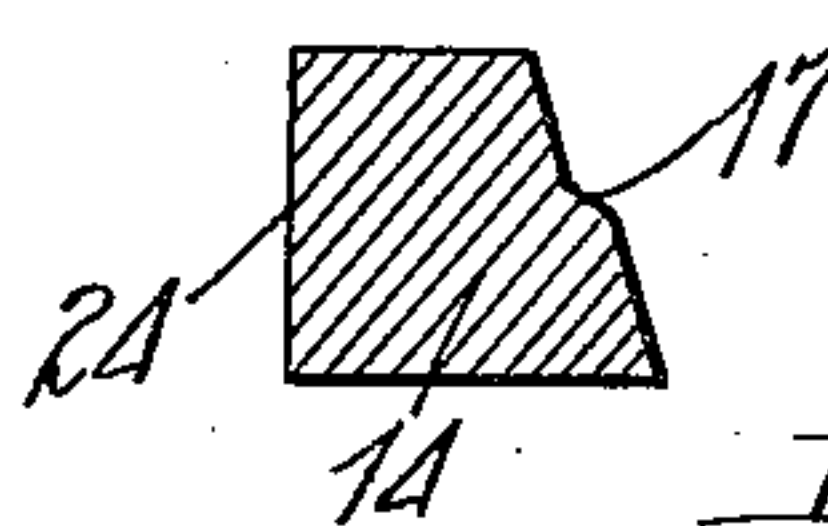


Fig. 3.



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ARCH FOR FURNACES AND FIRE-BOXES.

No. 855,495.

Specification of Letters Patent.

Patented June 4, 1907.

Application filed November 25, 1905. Serial No. 289,112.

To all whom it may concern:

Be it known that I, MAJOR E. BALDWIN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Arches for Furnaces and Fire-Boxes, of which the following is a specification.

My invention relates to arches particularly for furnaces and fire boxes.

The object of my invention is to provide such a device which can be very easily and economically made and which when in place, is not apt to be destroyed by a brick or block in the arch, dropping down partially or wholly through the arch, in a hole formed about the brick or block by uneven expansion while the arch is heated. The result in the case of a partial dropping down being that the lower end of the block is gradually burned away until finally the whole block is consumed and the arch destroyed.

My invention more in detail consists in a novel form of block for the arch, so made that it has a bearing upon the block adjacent to it on one side and forms a support for the block adjacent to it on the other side with the result that when an arch is formed of these blocks all of the blocks of the arch must rise and fall together under heating and cooling action whereby all of the blocks of the arch are burned substantially alike with the result that the life of an arch made in accordance with my invention is greatly prolonged over that of other arches heretofore in use.

My invention also consists in a novel means for combining the fire box arch with a supplemental arch supporting the brick work above this supplemental arch under a boiler heated by the fire box, in a novel construction of arched fire box roof whereby one part may be replaced without replacing the entire roof, and in details of construction which will be more fully described and claimed as the specification proceeds.

Referring to the drawings, Figure 1 is a front elevation of the device of my invention in its preferred form. Fig. 2 is a central sectional side view through the device on the line A—A of Fig. 1. Fig. 3 is a detail view of the skew block at each side of the arch. Fig. 4 is a detail view of one of the blocks used in the formation of my arch. Fig. 5 is a detail view of the key to the arch.

In the construction of my furnace I provide side walls 10 of ordinary construction

and upon it mount my improved arch which clearly appears in Fig. 1 the same consisting of right end left skew blocks 14 resting on each side wall, a plurality of blocks 15 extending from each skew block toward the center of the device, and a central key stone 16. The blocks are as shown, arranged in the ordinary arch curve of any desired radius the top and bottom surfaces of the blocks being in substantially parallel curved surfaces or planes. Each skew block has upon its skew face, a projecting ledge 17 upon which a downwardly projecting edge 18 upon the adjacent block is adapted to engage and rest, and each block has on its face toward the center of the arch an upwardly turned face or ledge 19 corresponding to the face 17 on the skew block, on which the downwardly turned face 18 upon the adjacent block is adapted to rest. The key stone or block 16 has upon its opposite sides, two downwardly turned faces 20 adapted to rest upon the upwardly turned faces 19 of the arch blocks which are adjacent to it. The result of this construction is that the downwardly turned face 18 of each block resting upon the upwardly turned face or ledge 19 of the adjacent block—(or skew block) it is impossible for any one block when the arch is expanded by heat, to slip downwardly through the arch body to a greater depth than the adjoining block can slip with the result that all the blocks of the arch are maintained in uniform position relative to each other so that no one block is more liable to be burned off at its bottom, which is in contact with the flames in the furnace proper 22 than is the adjacent block.

In order to give the device stability I build up outside the supporting wall 10 supplemental walls 23 to a sufficient height so that the vertical faces 24 of the skew blocks 14 rest against them and are thereby held against lateral movement which would, if permitted, cause the spreading and breaking of the arch.

I find the special form of block here illustrated, of advantage. As illustrated, it is in effect approximately an ordinary brick with an offset in substantially its middle as shown, that is to say, the entire body of the block is warped, skewed or bent to one side of the normal central plane of the block so that a ledge is formed upon one side to support the adjacent block while a corresponding downwardly faced edge is formed upon the other side so that the block may rest upon an adja-

cent block as described. I find that by far the best results are obtained by making the faces 18 and 19 in approximately the middle of a side face of an arch brick and at an oblique angle thereto. This so as to avoid the formation of sharp corners which are easily broken during the expansion and contraction of the arch under the action of heat when in use. Portions of the same side of each block other than in this offset portion, are as shown in parallel planes. These blocks may be made of any size suitable to the curvature of the arch in which they are to be used and the strength requirements of such proposed arch.

In addition to the features herein described, I provide a novel form of construction for a fire box when used in connection with a steam boiler by means of which the fire arch heretofore described may be removed and replaced without disturbing the arch supporting the boiler proper, this device is illustrated in Figs. 1 and 2 which show a supplemental arch 28 built preferably in exactly the same form as the regular arch heretofore described above the regular arch of the fire box at a convenient point so that the boiler (not shown) may be supported upon it in any suitable manner. This supplemental arch is spaced above the regular arch by an air space 29 as shown. Resting upon the regular arch as shown in Fig. 2, is a packing member 30 of brick or other fire proof material running across the top of the fire box arch and fitting into and adapted to move up and down in a notch or recess 31 in the under side of the supplemental arch 28. The result of this construction is that as the regular fire box arch expands and contracts with heat, from fire in the fire space 22, this packing member 30 moves up and down in the recess 31

just described so that the expansion of the regular arch does not in any way affect the supplemental arch. When it is desired to replace the portions of the regular fire box arch under the supplemental arch, the play of this packing member 30 in the space 31 allows the workman to remove and replace the portions of the fire box arch without in any way disturbing or weakening the supplemental arch 28 which is as shown carried by the side walls 23 of the fire box without in any way receiving its support from the fire box arch.

Another feature of my invention consists in making the fire box roof in a plurality of parallel independent arches 32, 33, 34, 35, etc. as indicated on Figs. 1 and 2 so that if one section or arch is more affected by heat than another section it may be removed and replaced without disturbing the adjacent arch or arches.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is;

In a furnace, the combination of a fire-box arch, a supplemental arch above the fire-box arch, one of said arches being provided with a groove, and a rigid packing member engaging the other of said arches and fitting loosely in said groove, permitting relative movement between said arches and sealing the space between said arches.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

MAJOR E. BALDWIN.

Witnesses:

CAROLYN RAFTERY,
DWIGHT B. CHEEVER.