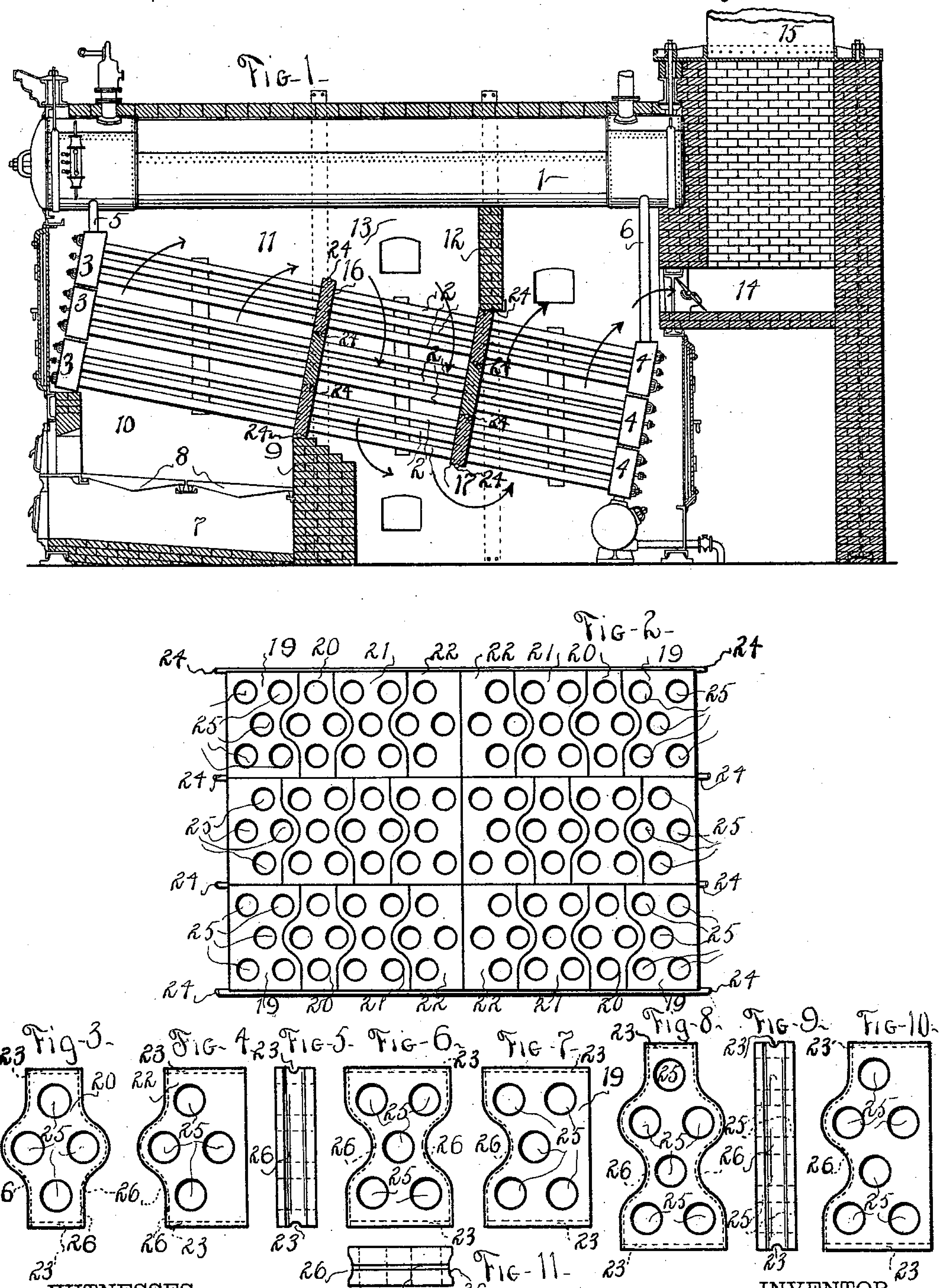
(No Model.)

J. L. GILL, Jr.

STEAM BOILER FURNACE AND TILES THEREFOR.

No. 543,528. Patented July 30, 1895.



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JOHN L. GILL, JR., OF PHILADELPHIA, PENNSYLVANIA.

STEAM-BOILER FURNACE AND TILES THEREFOR.

SPECIFICATION forming part of Letters Patent No. 543,528, dated July 30, 1895.

Application filed October 31, 1894. Serial No. 527,536. (No model.)

To all whom it may concern:

Be it known that I, JOHN L. GILL, Jr., a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Boiler Furnaces and Tiles Therefor; and I do hereby declare the following to be a sufficiently full, clear, and exact description thereof as to enable others skilled in the art to make and use the said invention.

This invention relates to steam-boiler furnaces and to that particular class of boilers in which the heat-absorbing surface consists of inclined tubes containing water and exposed to heated products of combustion and requiring the guiding or direction of such products of combustion upon and between the tubes by partitions of refractory material to more effectively impart heat to them, and has for its object the better facility of making and applying such partitions and the better durability thereof when in use.

To this end this invention consists in a series of blocks or tiles of fire-brick or like refractory material having perforations adapted to fit the tubes and edges or margins of such forms as to fit the contiguous tiles, such edges having grooves formed therein to receive fire-clay or mortar, which, hardening upon application of heat, forms a tongue holding the parts in position and closing the joints between the tiles. Transverse grooves adapted to fit rods or braces are formed on the straight edges of the tiles, into which rods extending into the walls of the furnace are placed, which hold the tiles against the tendency to slide downward upon the tubes of the boiler. When assembled, the tiles form partitions which direct the course of products of combustion crosswise of the tubes in passing from the fuel to the chimney. As heretofore made, such partitions have been formed of tiles having tongues or projections formed integrally upon the edge of one tile to engage in grooves or cavities in the contiguous tiles, and such tiles have been made divided in planes coincident with the axes of the tubes to which they were applied. Such constructions are attended with a practical difficulty of production, owing to the shrinkage and warping of such forms in drying and in burning or baking, demanding such a looseness of fitting of the tiles to each other as make insecure holding of one on the other and leaving gaps in the joints which impair their efficiency as partitions. An avoidance of these objections is accomplished by this invention, the construction and application of which is hereinafter fully described and shown in the accompanying drawings.

Referring to the drawings, Figure 1 shows a vertical lengthwise section of an inclined tubulous boiler with this invention applied; Fig. 2, an elevation of one of the partitions embodying this invention. Figs. 3, 4, 6, 7, 8, and 10 are front views of tiles for making such partitions; Figs. 5 and 9, side edge views thereof, and Fig. 11 a top edge view thereof.

Referring to Fig. 1, 1 represents the steam and water cylinder of a boiler; 2, the inclined tubes connected therewith by headers 3 and 4 and pipes 5 and 6.

7 represents the ash-pit; 8, the grate-bars; 9, the bridge-wall; 10, the fire-chamber; 11, the flue-chamber; 12, a deflecting cross-wall; 13, the side wall; 14, the flue to the chimney 15.

16 and 17 represent the partitions which are the special subject-matter of this invention. The partitions 17 and 16 are formed of tiles 19, 20, and 21 molded of refractory fire-clay and baked. The upper and lower edges of the tiles 19, 20, 21, and 22 have semicircular grooves 23 formed in them, as shown in full line in Fig. 5 and in dotted lines in Figs. 3, 4, 6, and 7, of such size as to fit rods 24, which enter the side walls 13 and resist the tendency of the tiles to slide downwardly on the tubes 2. Perforations 25, of such size as to fit easily around the tubes 2, are formed in the tiles 19, 20, 21, and 22. The side or upright edges of the tiles 19, 20, 21, and 22 are formed in curves, so as to avoid intersecting any of the perforations 25, and have grooves 26 in them, as shown in full lines in Fig. 11 and by dotted lines in Figs. 3, 4, 6, and 7.

The tiles shown in Figs. 8, 9, and 10 differ only from those shown in the other figures in the number and arrangement of apertures and form of the curved sides.

The tiles 19, 20, 21, and 22 are applied to the tube 2 by sliding them upon them before the headers 3 and 4 are attached. The grooves 26 are filled with plastic fire cement or mortar. The rods 24 are inserted in the grooves 23 and in the walls 13. The mortar or cement in the grooves 23 dries and hardens, is afterward baked by the heat of the furnace, and forms an effectual key or tongue between the tiles, so that the tiles thus assembled form substantial partitions and direct the products of combustion in the direction indicated by arrows in Fig. 1.

The tiles are in merchantable form when baked and ready for shipment, although they require to be assembled and combined with the fire-clay cement or mortar, as described, when used.

Having described my invention and the application and operation thereof, what I claim is—

1. As an article of manufacture refractory tiles having perforations adapted to receive the water tubes of steam generators, two opposite parallel straight edges grooved lengthwise to fit upon rods, and curved grooved edges adapted to fit similar curved edged tiles and receive a plastic cement when assembled in partition walls of steam generator furnaces substantially as set forth.

2. In a partition for directing products of combustion among the tubes of steam generators of the class described, a series of perforated tiles fitted upon boiler tubes, and having grooved parallel edges fitted upon bracing rods, and curved grooved edges, fitted to like edges of contiguous tiles combined with a refractory cement in said grooves substantially as set forth.

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Witnesses:
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