

No. 755,077.

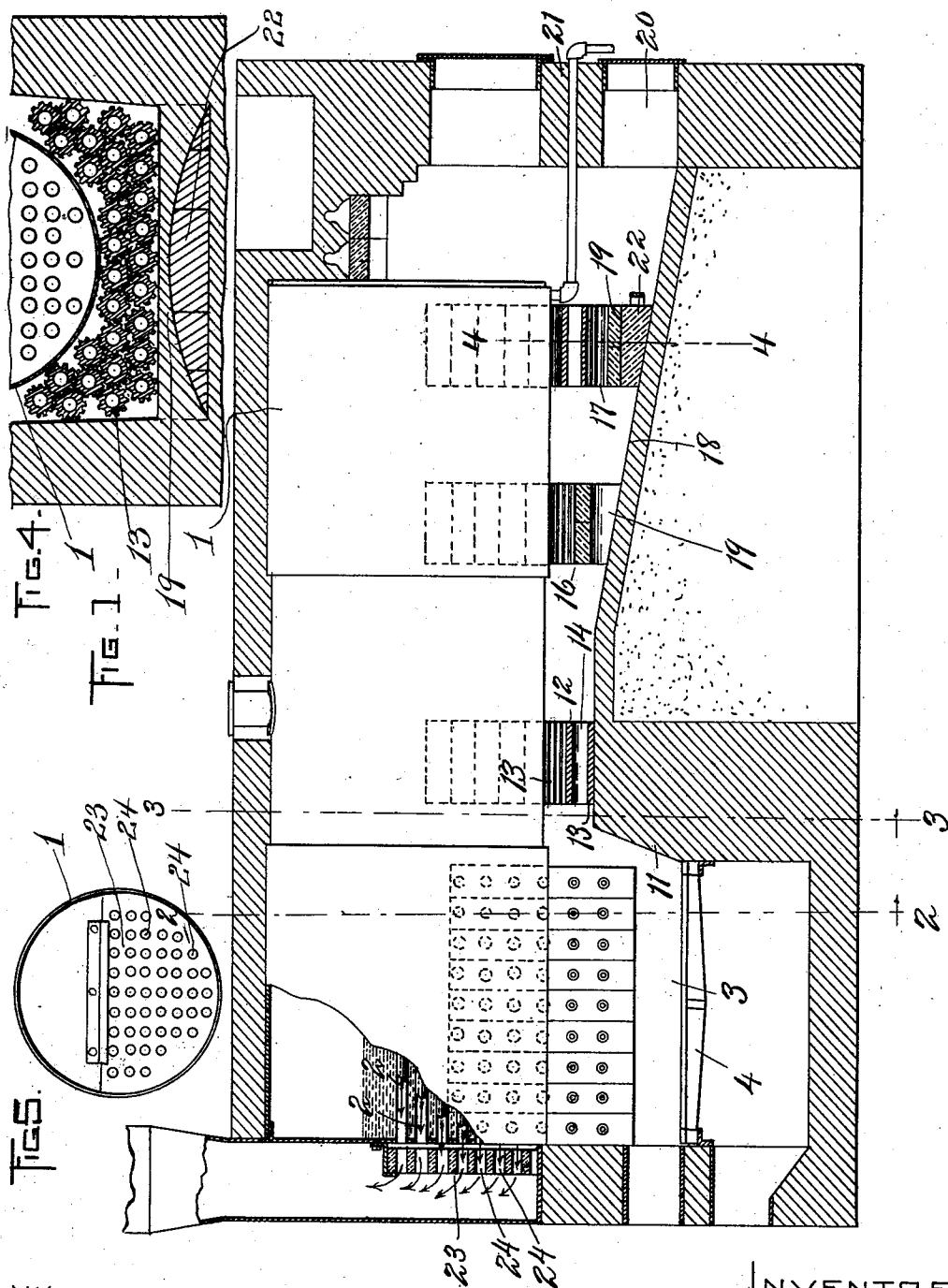
PATENTED MAR. 22, 1904.

S. R. THOMPSON.
BOILER FURNACE.

APPLICATION FILED JUNE 22, 1901. RENEWED AUG. 1, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:
P. H. Pezzetti
George Pezzetti

INVENTOR:
S. R. Thompson
by Knight, Bonnell & Company
Atty.

No. 755,077.

PATENTED MAR. 22, 1904.

S. R. THOMPSON.
BOILER FURNACE.

APPLICATION FILED JUNE 22, 1901. RENEWED AUG. 1, 1903.

NO MODEL.

2 SHEETS—SHEET 2.

FIG. 3

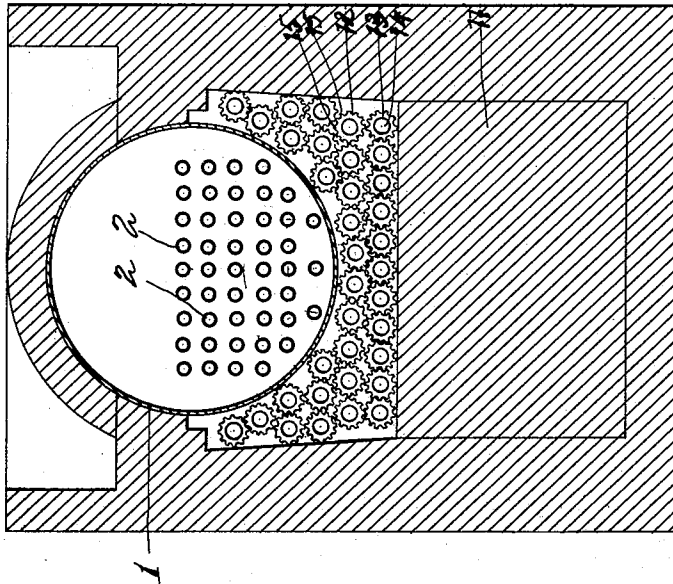
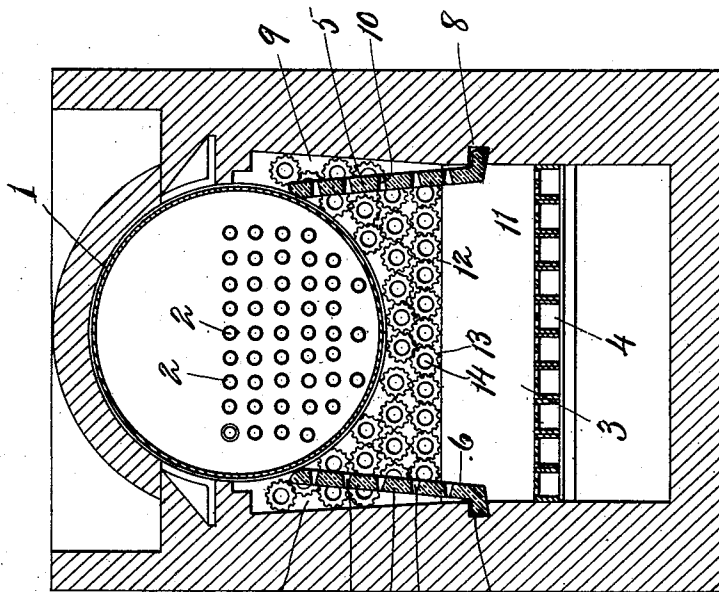


FIG. 2



WITNESSES:

P. W. Pezzetti
George Pezzetti

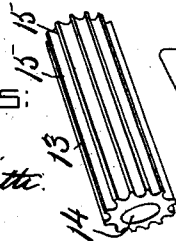


FIG. 6

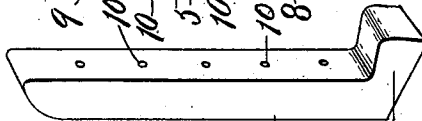


FIG. 7

INVENTOR:

S. R. Thompson
by Wright & Burdick
attys.

UNITED STATES PATENT OFFICE.

SAMUEL R. THOMPSON, OF EAST LEXINGTON, MASSACHUSETTS, AS-
SIGNOR OF ONE-HALF TO FRANK H. THOMPSON, OF ARLINGTON,
MASSACHUSETTS.

BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 755,077, dated March 22, 1904.

Application filed June 22, 1901. Renewed August 1, 1903. Serial No. 167,949. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL R. THOMPSON, of East Lexington, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Boiler-Furnaces, of which the following is a specification.

This invention relates to boiler-furnaces, and in most of its features is designed to be particularly applied to boilers of the horizontal return tubular type. Its object is to improve and regulate the combustion of the furnace-gases by the location at suitable points of partitions composed of refractory material, such as fire-clay, which absorb the heat from the flame and hot gases and give it back to the smoke and unconsumed gases which from time to time emanate from the furnace. In a patent, No. 520,067, granted to me I describe a furnace construction for boilers of this character in which the furnace-chamber above the grate is roofed with a shed-like structure composed of refractory blocks. The objection to this construction was that the blocks, being confined at both ends, were liable to somewhat rapid deterioration on account of their expansion and contraction, which would tend, owing to the disposition of the blocks, to disintegrate the structure. In place of this shed-like structure I now provide at the sides of the furnace-chamber upright plates or partitions composed of refractory material and having their lower edges supported by the side walls of the furnace, their upper edges resting against the boiler and being free to expand and contract in a vertical direction. In the said prior patent I also describe a partition above the bridge-wall composed of trough-shaped elongated blocks, through the channels of which the furnace-gases were compelled to pass. In place of these trough-shaped blocks I now employ tubular tiles or blocks corrugated or ribbed on their outer sides and loosely aggregated to form the partition, the tiles in this form being more durable and less easily broken and presenting a greater surface to the action of the flame and gases. I also provide a series of these parti-

tions, located at intervals, between which the furnace-gases have access to the boiler, and below the rearmost partition or partitions I provide openings normally closed by refractory blocks which can be withdrawn, so as to afford access for cleaning out soot, &c., through an opening in the rear of the furnace-casing. I further provide at the front of the boiler a refractory partition having openings alined with the fire-tubes of the boiler, which partition becomes heated and serves to prevent the cooling of the front ends of the tubes.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a longitudinal vertical section of a boiler and furnace constructed in accordance with my invention. Figs. 2, 3, and 4 represent sections on the correspondingly-numbered lines of Fig. 1. Fig. 5 represents a front end view of the boiler, showing the partition covering the tube-space. Figs. 6 and 7 represent detail perspective views of the tiles making up the furnace and bridge-wall partition.

The same reference characters indicate the same parts in all of the figures.

In the drawings, 1 represents a horizontal return tubular boiler having the usual fire-tubes 2 2, and 3 represents the fire-chamber or furnace, having a grate 4. Above the grate at the sides of the furnace-chamber I locate upright plates or partitions 5 5, each composed of a series of elongated blocks or tiles 6 6, composed of refractory material, such as fire-clay, and having lateral projections or feet 7 at their lower ends, residing in grooves 8 8 in the side walls of the furnace, whereby the tiles 6 are wholly supported. The tiles 6 are slightly inclined inwardly, and their upper ends rest loosely against the shell of the boiler 1. Therefore the tiles are free to expand and contract in a vertical direction and are preserved from breaking by such expansion and contraction. Outside of the partitions 5 5, between the same and the side walls of the furnace, are located chambers 9 9, which communicate with the main body or interior of the fire-chamber through transverse holes or perforations 10 10, formed in the tiles 6.

The flame and furnace-gases are thus allowed to pass across and through the partitions 6 and to heat the same to incandescence, with the result that any smoke or unconsumed gases coming in contact with the heated partitions will have their combustion greatly promoted. The chambers 9 are open at their inner ends, so that gases which pass into them may escape freely over the bridge-wall.

11 represents the bridge-wall, above which, substantially filling the space between said wall and the boiler 1, I locate a partition 12, composed of a series of loosely-aggregated tiles or blocks 13 13, made of refractory material, such as fire-clay, each tile being of tubular form, with a central open aperture 14 and ribs or longitudinal corrugations 15 15 on its outer side distributed around its circumference. The gases have free passage through the apertures 14 and the spaces between the tiles. The great surface exposed by the tiles promotes intimate contact of the gases therewith. Other partitions 16 17 of a similar character are shown in the rear of the partition 12, located between the boiler and the floor 18, which extends rearwardly from the crest of the bridge-wall. These rear partitions are shown as formed close to the floor 18 with openings 19, and in alinement with said openings, so as to give direct access thereto with a hoe or cleaning-tool, is an aperture 20 in the rear wall 21 of the boiler-setting or furnace-casing. The aperture 19 of the rearmost wall 17 is shown as closed with removable blocks or plugs 22 of fire-clay, so as to normally prevent the passage of gases through said openings. The opening of the middle partition 16 may be closed in a similar manner. Between the partitions 12 16 17 the flame and furnace-gases have free access to the shell of the boiler 1, so as to impart their heat thereto.

At the front end of the boiler 1, covering the tube-space, is a refractory partition 23, having apertures 24 24, alined with the delivering ends of the boiler-tubes 2 2. This partition becomes heated by the furnace-gases and prevents the access of any cooled draft to the ends of the boiler-tubes, which would otherwise tend to cool them down.

I claim—

1. The combination of a boiler, a fire-box or furnace, and an upright refractory heat-radiating plate at the side of the fire-box, having its lower edge supported by the side wall

thereof and its upper edge resting loosely against the boiler and adapted to move vertically with respect thereto.

2. The combination of a boiler, a fire-box or furnace, and an upright refractory heat-radiating plate at the side of the fire-box, having its lower edge supported by the side wall thereof and its upper edge resting loosely against the boiler and adapted to move vertically with respect thereto, said plate being separated from the side wall of the fire-box by a chamber open at its rear end and communicating with the main fire-chamber by numerous perforations which traverse the plate.

3. A section or block for heat-radiating furnace-plates, comprising an elongated tile of refractory material, having transverse perforations and a lateral projection or foot at one end extending in the same direction as the perforations.

4. The combination of a furnace and a partition located across the path of the furnace-gases and comprising an aggregated series or group of parallel open tubes composed of refractory material and provided circumferentially with longitudinal ribs or corrugations, the openings in and the spaces between said tubes constituting passages through the partition for the furnace-gases.

5. The combination of a boiler, its casing or setting having a rear wall provided with an opening, a floor under the boiler back of the furnace, a refractory partition located above said floor transversely of the path of the furnace-gases and having an opening next to the floor and directly accessible through the said rear-wall opening, and a refractory filling or closure for said partition-opening.

6. The combination of a furnace, a boiler provided with fire-tubes and having an uptake at one end, and a refractory cover for said end of the boiler provided with openings registering with the apertures of the fire-tubes, said cover being interposed between the delivering ends of the tubes and the uptake and preventing access of relatively cold air from the uptake to said tubes.

In testimony whereof I have affixed my signature in presence of two witnesses.

S. R. THOMPSON.

Witnesses:

A. D. HARRISON,
C. F. BROWN.