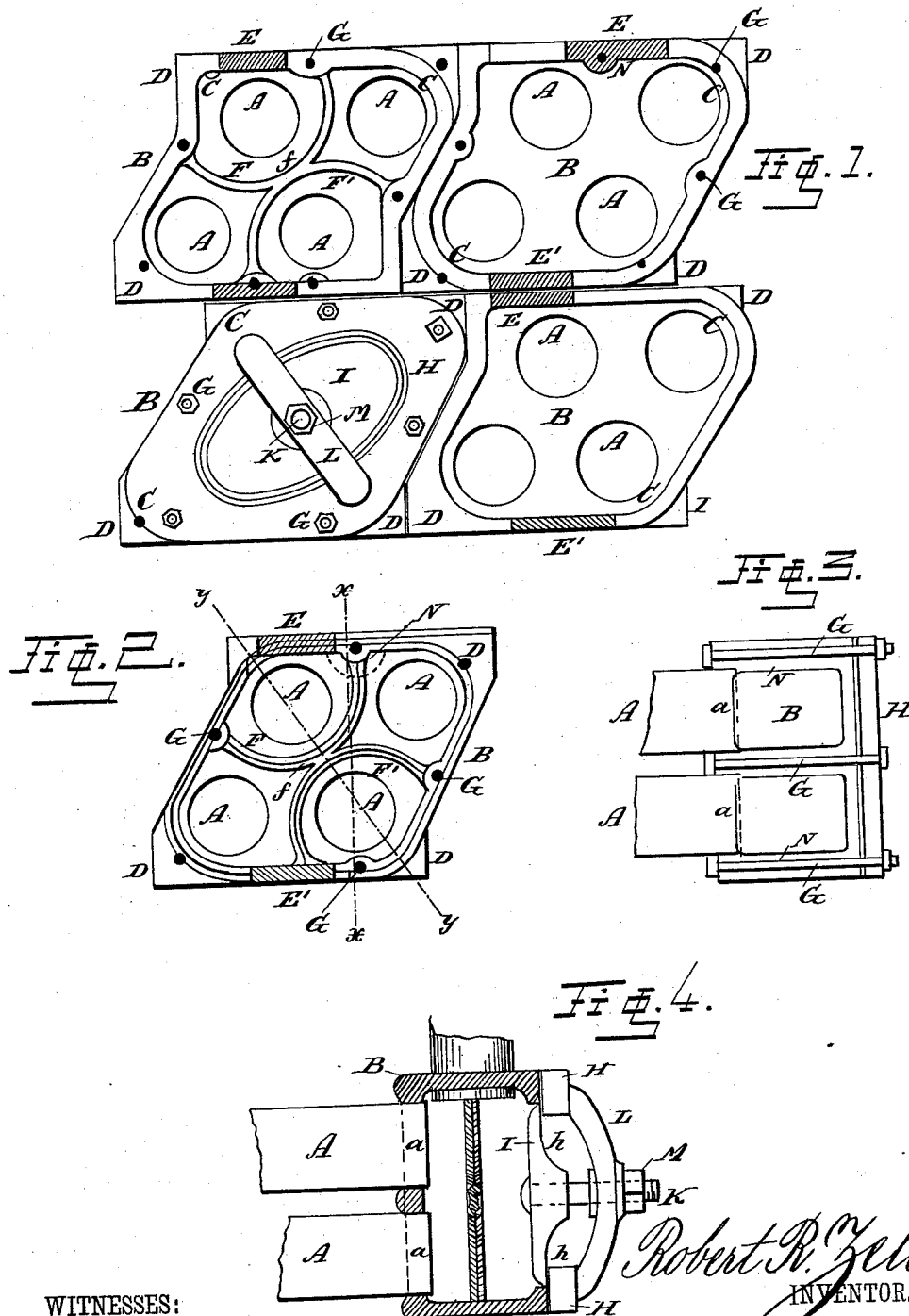


(No Model.)

R. R. ZELL.
SECTIONAL STEAM BOILER.

No. 304,889.

Patented Sept. 9, 1884.



WITNESSES:

Ed. S. Dietrich
Arthur L. Morsell

Robert R. Zell
INVENTOR.
By Louis Baggett & Co.
ATTORNEYS.

UNITED STATES PATENT OFFICE.

ROBERT R. ZELL, OF BALTIMORE, MARYLAND.

SECTIONAL STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 304,889, dated September 9, 1884.

Application filed February 25, 1884. (No model.)

To all whom it may concern:

Be it known that I, ROBERT R. ZELL, a citizen of the United States, and a resident of Baltimore, in the county of Baltimore and State of Maryland, have invented certain new and useful Improvements in Sectional Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention has relation to that class of steam-boilers known as "sectional boilers," "safety-boilers," or "water-tube boilers," in which the water from which the steam is generated is contained in a series of tubes or pipes, which are subjected to the direct action of heat, the steam as it is generated in the pipes ascending up into a steam-drum or steam-reservoir located above the water-tubes; and my invention consists in an improved construction of the block-like heads or boxes, or so-called "headers," of the series of water-tubes, which form the end walls of the boiler, in such a manner as to prevent leakage, increase the strength and durability of the headers, fixing the water-tubes firmly therein, by expanding the same on the inside, and so arranging the man-hole, which gives access to the interior of the box or header, that it may be screwed up firmly in its place without packing, and in a simple and expeditious manner.

In the accompanying drawings, Figure 1 is an end view showing four of my improved end boxes or headers arranged in their proper juxtaposition. Fig. 2 is a sectional view through one of the boxes. Fig. 3 is a sectional view through line *xx* in Fig. 2, and Fig. 4 is a sectional view through line *yy* in the same figure.

Similar letters of reference indicate corresponding parts in all the figures.

In the annexed drawings, A denotes the water-tubes, which are staggered, as shown in Fig. 1, and arranged in fours, there being one end box or header for each section of four pipes. The size of the boiler or steam-generator depends upon the number of sections used, each section consisting, preferably, of four pipes or

water-tubes, with their appropriate end boxes or headers—one at each end.

My improved header consists of a box, B, of rhomboidal shape, as shown in the drawings, having rounded corners C, and constructed with triangular projections D—one in each corner—so that in building up a boiler by nesting the end boxes or headers the walls at both ends of the boiler will be formed by the boxes and their projecting corners D, as shown in Fig. 1. Each box has two openings, E and E', arranged in a vertical line with each other, by means of which each vertical row or series of boxes may be connected to one another—that is to say, the several boxes constituting one vertical row are connected to one another by means of their registering-openings E and E'. The boxes B are cast with inside curved braces, F and F', the size and position of which will be more readily understood by reference to Fig. 4 of the drawings, between which the inner ends of the pipes project, the pipes being fastened water and steam tight in the boxes or headers B by expanding their inserted ends *a* on the inside. The braces F and F' come together and are united at the point *f* at the crown of their respective arches, thus forming one solid brace inside of the box, which adds greatly to the strength of the same, without in the least interfering with its operation. The box is further strengthened by stay-bolts G, which also serve to fasten the cover H of the box upon the same. This cover is constructed with an oval aperture, *h*, which forms the man-hole, and is closed by the man-hole plate I, the rim of which is turned true, so as to fit the inside of the box. Plate I is secured in its place by means of the bolt K, inserted through the yoke or brace L on the outside of the box, and the nut M; and as plate I is placed inside of the box, bearing with its edge against the inside of the cover H, it will be seen that it will be seated firmly on the cover, with a pressure commensurate with the steam-pressure inside of the box. Box B is cast with inwardly-projecting lugs N, which are bored through for the insertion of the stay-bolts G, there being six of these bolts for each box.

While in the foregoing description and illustration of my invention I have shown the

end boxes or headers constructed for the insertion of four pipes only, it is obvious that they may be constructed to receive a larger number of pipes—such as six, eight, or even more, if desired—without deviating from the spirit of my improvement.

In order to fix the water-tubes in the headers, the outside plate, H, is removed by unscrewing the nuts on the stay-bolts G, when access may be had to the inside of the box with the proper tools, so as to expand the inner ends of the tubes in the flue-holes. After this has been done, plate H is again fastened in its position, after which the man-hole plate I is inserted and fastened in the manner described.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. As an improvement in sectional boilers, the rhomboidal end boxes or headers having inside braces, and provided with a removable end plate or cover of corresponding shape, having an oval man-hole and a man-hole plate of corresponding shape adapted to close the man-hole from the inside, substantially as set forth.

2. An end box or header for the water-tubes of sectional steam-boilers, of the shape of a rhomb or rhomboid having rounded corners, substantially as set forth.

3. An end box or header for the water-tubes of sectional steam-boilers, of the shape of a rhomb or rhomboid having rounded corners,

provided with projecting webs D, substantially as set forth.

4. In a sectional steam-boiler, the combination of the water-tubes A, boxes B, having inside braces, F F', and lugs N, removable plate H, having man-hole h, stay-bolts G, and man-hole plate I, substantially as set forth.

5. As an improvement in sectional boilers, the rhomboidal end boxes or headers having an oval man-hole pointing with its ends in the direction of the acute angles of the rhomb or rhomboid, and provided with an oval man-hole plate bearing against the inside of the man-hole, substantially as and for the purpose set forth.

6. The combination, in a sectional steam-boiler, of the water-tubes A, end boxes or headers, B, having apertures E E', and oval man-holes h, and provided with the corner webs, D, removable plate H, inside braces, F F', lugs N, stay-bolts G, oval man-hole plate I, fitting the man-hole on the inside, and means for fixing said plate in position to close the box, substantially as and for the purposes shown and set forth.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

ROBERT R. ZELL.

Witnesses:

WM. H. DANEKER,

H. E. FRANZ.