

J. HARRISON, Jr.
Sectional Steam-Boilers.

No. 147,391.

Patented Feb. 10, 1874.

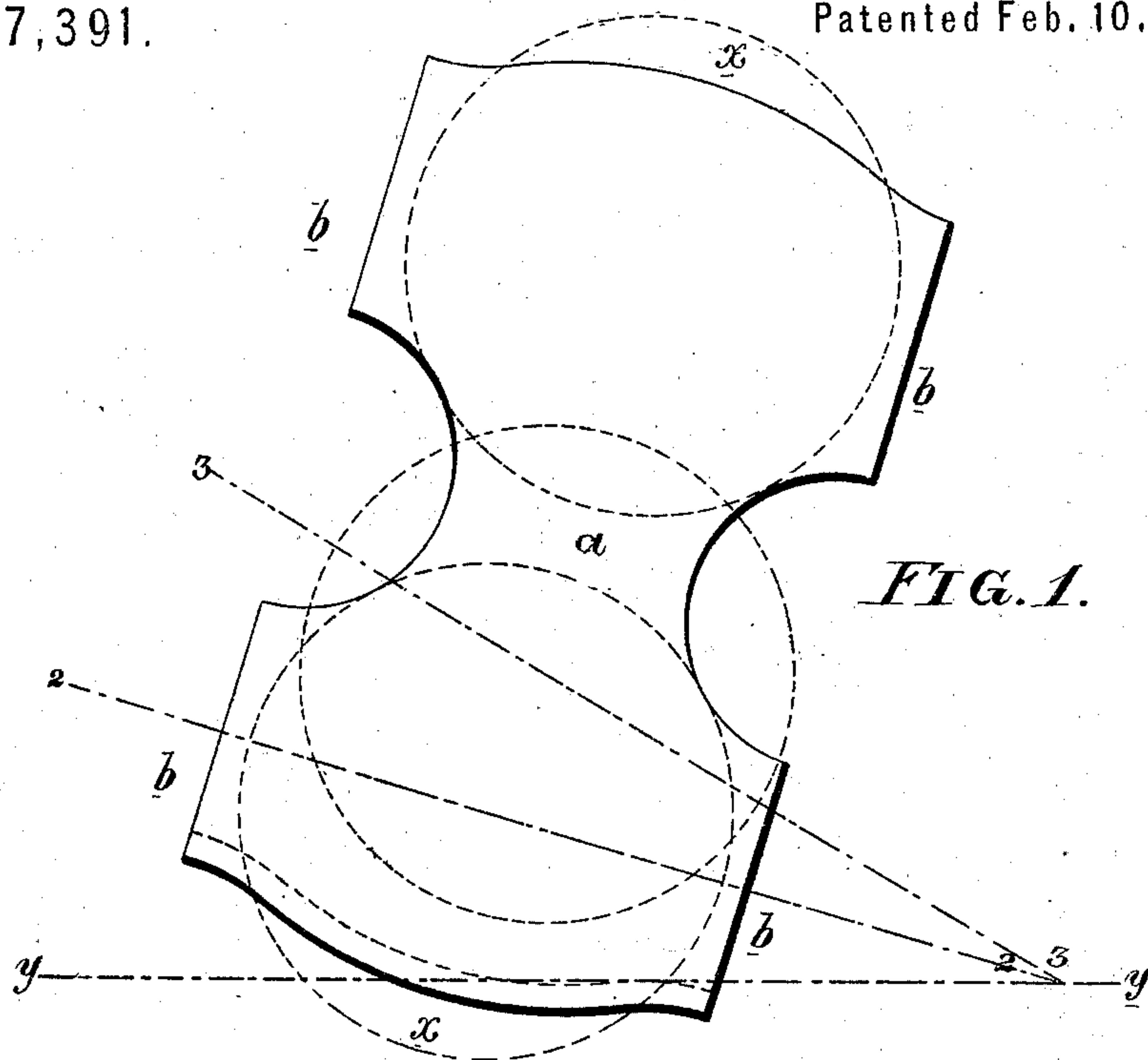


FIG. 1.

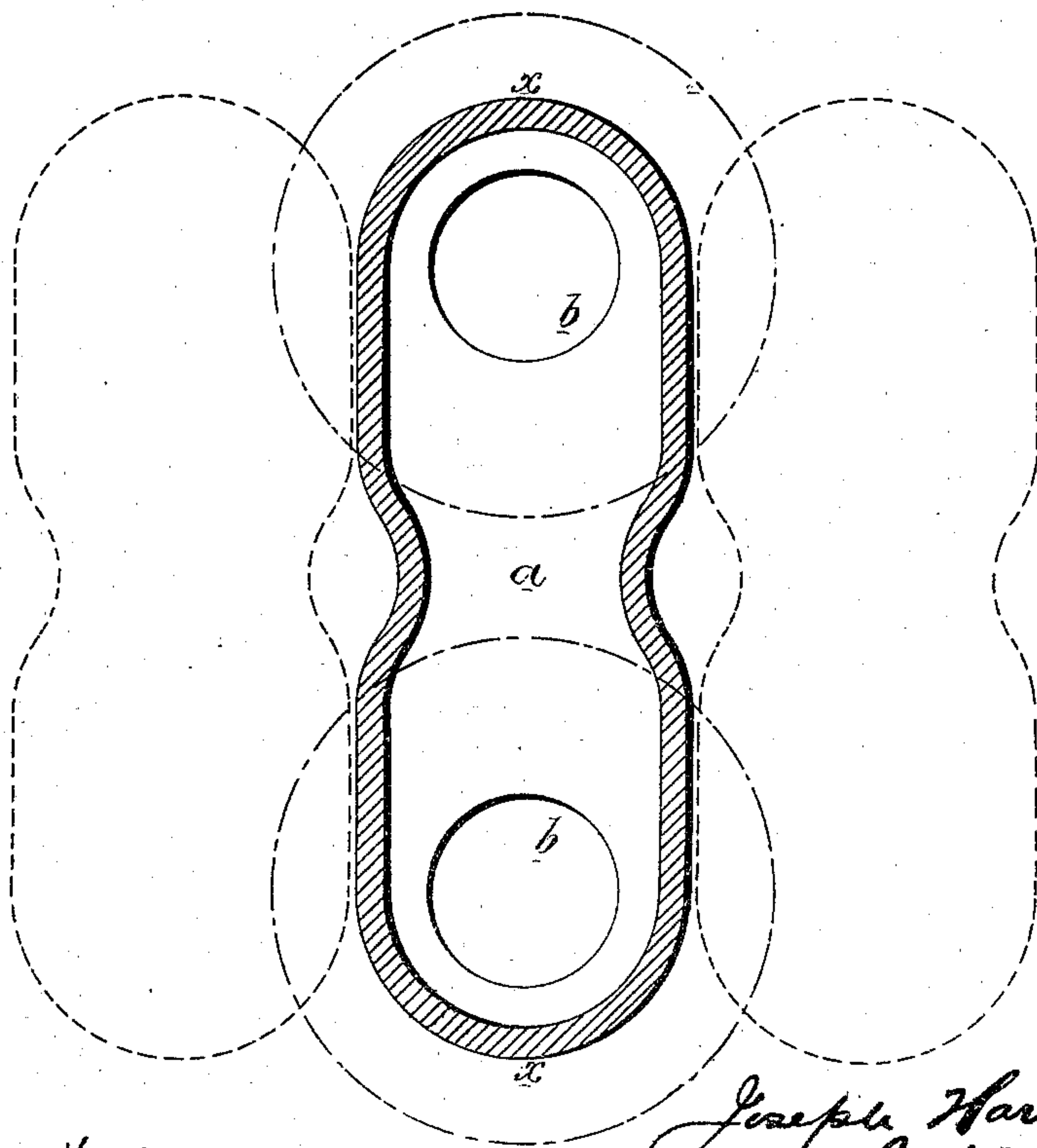


FIG. 2.

Witnesses, Hubert Howson,
Harry Smith

Joseph Harrison, Jr.
by his attys.
Howson and Son.

UNITED STATES PATENT OFFICE.

JOSEPH HARRISON, JR., OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN SECTIONAL STEAM-BOILERS.

Specification forming part of Letters Patent No. **147,391**, dated February 10, 1874; application filed December 26, 1873.

To all whom it may concern:

Be it known that I, JOSEPH HARRISON, JR., of Philadelphia, Pennsylvania, have invented certain Improvements in Sectional Steam-Boilers, of which the following is a specification:

My invention relates to improvements in the cast-iron steam-boiler for which Letters Patent were granted to me on the 4th day of October, 1859, the said Letters Patent having been extended on the 30th day of September, 1873, the object of my present improvements being the attainment of increased strength, increased capacity, and economy in the mounting of the boiler.

My cast-iron sectional boiler, prior to the present invention, consisted of a number of sections, each of which was composed of a series of spherical units with contracted circular necks, the units being cast singly, or in pairs, or in groups of three or four, and fitted and bolted together, in a manner too well known to need description. The plans heretofore adopted of grouping the units into sections is preserved in the present instance, the only change being the abandonment of spherical form of unit, and the adoption of the shape illustrated in the side view, Figure 1, and sectional view, Fig. 2, of the accompanying drawing.

The dotted circles in these figures represent the spherical units as heretofore made, two of these units being united by a neck, *a*, and having necks *b b*, to be fitted to those of other units. The shape and character of these necks remain unchanged in my present invention; but I have reduced each unit at and near the point *x* to the extent shown by the difference between the plain and dotted lines in Fig. 1, and have flattened the opposite sides, as shown in the sectional view, Fig. 2. In other words, the body of each unit is made in the form of an ellipsoid or paraboloid, or equivalent figure, with flattened sides, the ellipsoidal body merging into the circular necks *b b* and *a*.

Three important advantages are attained by adopting this form of unit: First, I am enabled to place the boiler at a less angle than heretofore, and to thereby bring it nearer to the

fuel in the furnace, the quantity and cost of brick-work setting being proportionately reduced; secondly, the sections can be brought nearer together than those made of spherical units, thereby economizing space; thirdly, the flattened ellipsoidal sections are better adapted to resist the strain imparted by the connecting-bolts than the spherical units.

As regards the first advantage, it will be seen, on referring to Fig. 1, that the units are placed at such an angle that the water can be entirely drained from the interior, no cavity being presented for the lodgment of sediment. In order to render the spherical units self-draining, it is necessary to arrange them at an angle, represented by the dotted line 3 3, in respect to the horizontal line *y y*, whereas the ellipsoidal units can be arranged at the lesser angle indicated by the lines 2 2.

It will thus be seen that by making the units of the form shown, I am enabled to depress the front portion of the boiler, and to bring it much nearer the fuel than boilers composed of spherical units, the result being economy in mounting the boiler, as well as economy in the consumption of fuel.

As regards the advantages derived from flattening the opposite sides of the units, it will be seen, on reference to Fig. 2, that, although the units are diminished in capacity by this contraction, the sections can be grouped so closely together that a boiler consisting of flattened units will have much more capacity in proportion to the space occupied than a boiler composed of spherical units.

The units are subjected to such compression, on tightening the nuts of the bolts by which they are connected together, that one or more of the spherical units of a section will occasionally yield to this compression—an accident which has never occurred to the flattened units, for the reason that the flattened sides, being parallel with the bolts through which the strain is transmitted, present more available resisting mediums than if they were distended to a globular form; in fact, the ellipsoidal unit will of itself, and without any flattening of the sides, resist the compressing force more effectually than spherical units.

In some cases the spherical form of unit may be retained, but in all such cases each unit should be flattened on opposite sides for the reasons above given.

I claim as my invention—

1. A sectional boiler composed of units of ellipsoidal or paraboloidal form, substantially as described.

2. A sectional boiler composed of units flattened at opposite sides, as specified.

3. A sectional boiler composed of the within-described ellipsoidal or paraboloidal units, having opposite flattened sides, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH HARRISON, JR.

Witnesses:

E. F. PONTFTEUR,
THAD. NORRIS, Jr.