

J. A. REED.

Sectional Steam-Generators.

No. 148,757.

Patented March 17, 1874.

Fig. 1.

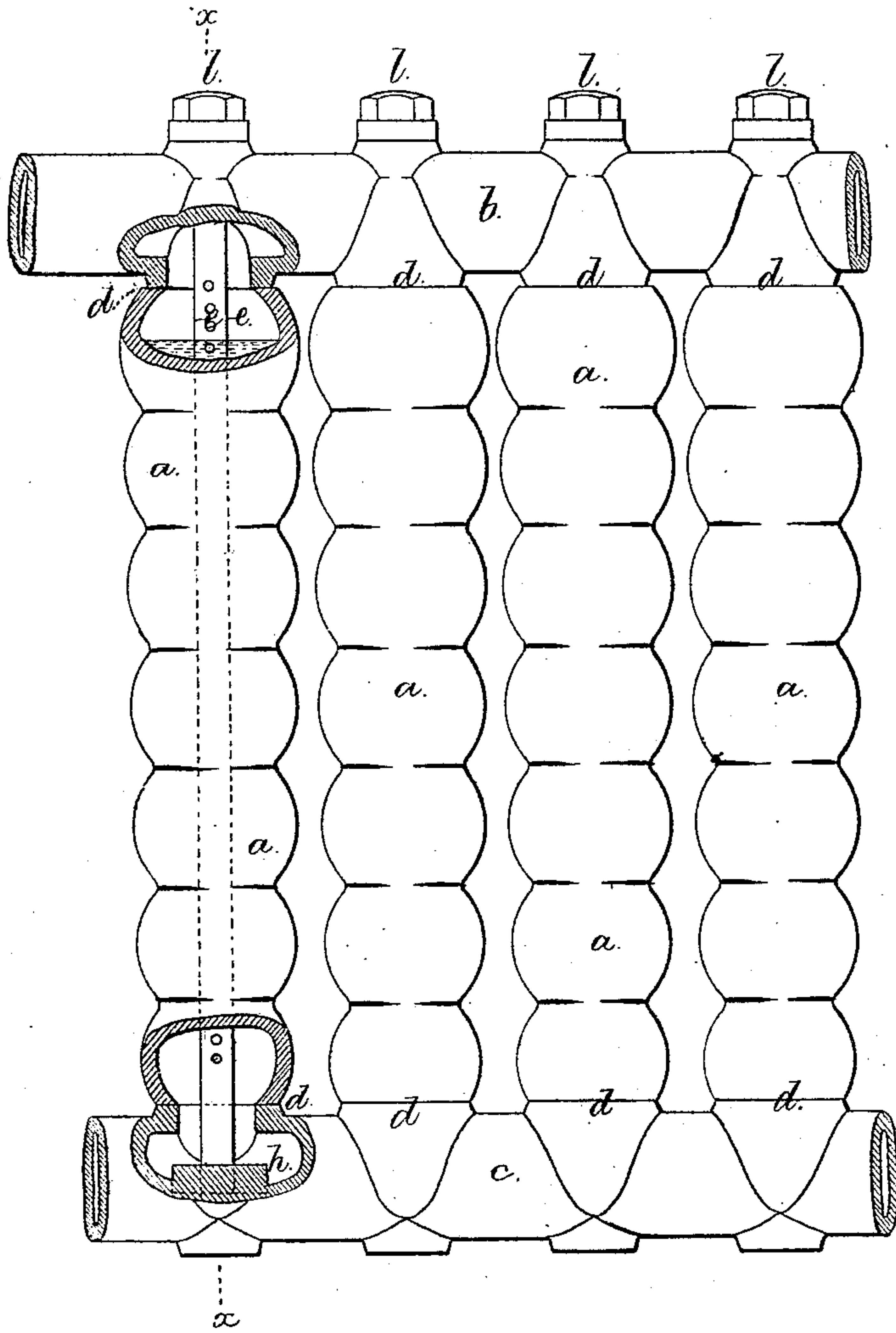
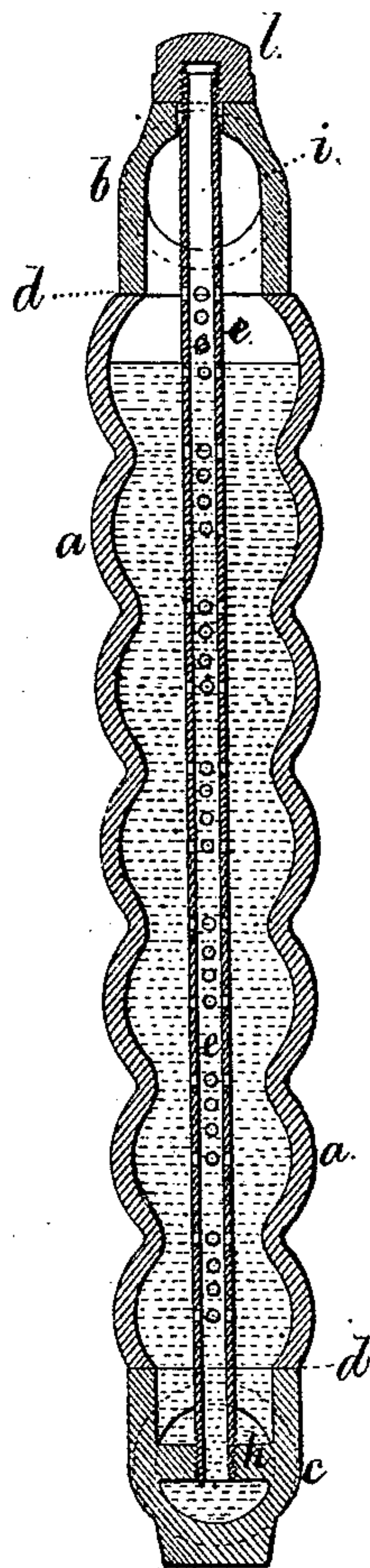


Fig. 2.



Witnesses

Chas. H. Smith

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN SECTIONAL STEAM-GENERATORS.

Specification forming part of Letters Patent No. 148,757, dated March 17, 1874; application filed August 5, 1873.

*To all whom it may concern:*

Be it known that I, JOHN A. REED, of Dun Ellen, in the county of Middlesex and State of New Jersey, have invented an Improvement in Sectional Steam-Generators, &c., of which the following is a specification:

Cast-iron has been employed for steam-boilers on account of its durability and freedom from rust and scale; and such cast-iron boilers have been made in sections, connected together by bolts.

My invention is for simplifying the construction, insuring circulation through the pipes, equalizing expansion and contraction, increasing the area of the fire-surface, and of the water-surface, and for facilitating repairs.

In the drawing, Figure 1 is an elevation, partially in section, of a portion of a boiler; and Fig. 2 is a vertical section at the line *x x*.

The tubes *a a* are vertical, or nearly so, and are connected, at their upper and lower ends, with the tubes *b* and *c*. The ends of the tubes *a* are made true by turning them off, or otherwise, and the T's or couplings *d* are made true, so that the surface in contact may form a water-tight joint when the parts are bolted together by the central bolts *e*.

The connecting-tubes *b* and *c* may be arranged in the boiler in parallel rows, connecting with suitable water-supply pipes at the bottom, and steam-pipes at the top; but for smaller and portable boilers, these connecting-tubes *b c* will be polygonal or ring shaped, of different dimensions, and arranged one within another, and connected to the vertical range of tubes *a*.

One of the special peculiarities of this invention relates to the character of each tube *a*, the same being made tapering, with contractions or necks to form spheroids; one above the other, increasing in size toward the top; the object being, first, to increase the surface for the fire to act upon; second, to allow for expansion and contraction, as the cast metal will spring or yield while in this form, because the section of each tube lengthwise corresponds with a number of arches, and they will yield, should there be any tendency to compress the pipe endwise; third, to obtain the greatest strength, because each spheroidal will withstand the largest pressure in proportion to the weight of metal employed; and, fourth, to give free opportunity for the escape of steam, by the increase in size of the

spheroidals toward the top of the tube. This construction gives greater space for the products of combustion near the fire, and lessens that space farther from the fire, thereby promoting equality in the action of the heat.

The next feature of my improvement relates to the tie-rods, which are tubular, and perforated with numerous holes; the object being, first, to connect the parts; second, to insure circulation in the water of each pipe, regardless of the level at which the water in the boiler may stand. The water will circulate down through these tubular tie-rods, entering the highest perforations, and passing out at the bottom and lower perforations, and rise at the outer portion of the tube, so as to produce a constant circulation or change of position in the water of the tube.

The tubular tie-rods *e* are screwed into the cross-bridges *h* in the tubes *c*, and at their upper ends they pass into and are drawn tight by the nuts *l*, that screw upon the tubes, and bear against the outside of the pipe *b*.

When the parts in contact are faced true and smooth, and the tubular ties screwed up tightly, the joints will not leak; or if they do, slightly, at first, it will soon stop, by the slight rusting action of the water, and the tubes *a*, in consequence of their form, can be sufficiently compressed endwise to allow for inequalities of expansion and contraction, so as to remain tight under all circumstances.

The tubes *a* may be used in steam-generators, or in any heating or boiling apparatus in which the water circulates through the tubes.

I claim as my invention—

1. The tubes *a*, placed vertically, or nearly so, and made larger at the upper ends than at the lower ends, and as a series of hollow spheroids increasing in diameter, in combination with the connecting-tubes *b* and *c*, substantially as set forth.

2. The vertical tubes *a* and connecting-tubes *b* and *c*, in combination with the perforated tubular tie-rods *e*, that open at their lower ends within the water-space, and are screwed into the cross-bridges *h*, and tightened by the nuts *l* at the upper ends, substantially as set forth.

Witnesses:

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GEO. D. WALKER,

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