

WILLIAM BYERS.

Improvement in Steam Generators.

No. 120,937.

Patented Nov. 14, 1871.

Fig. 1.

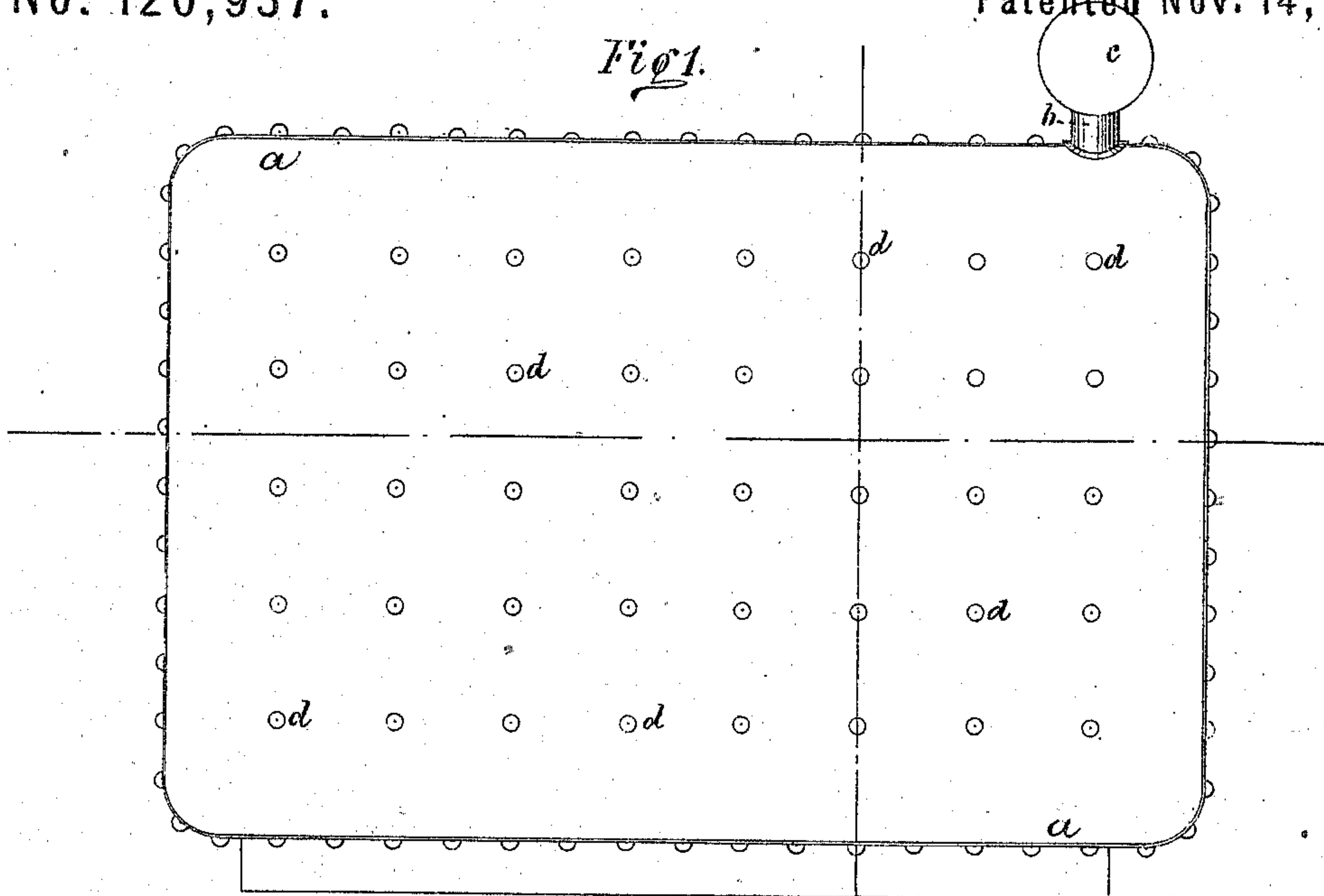
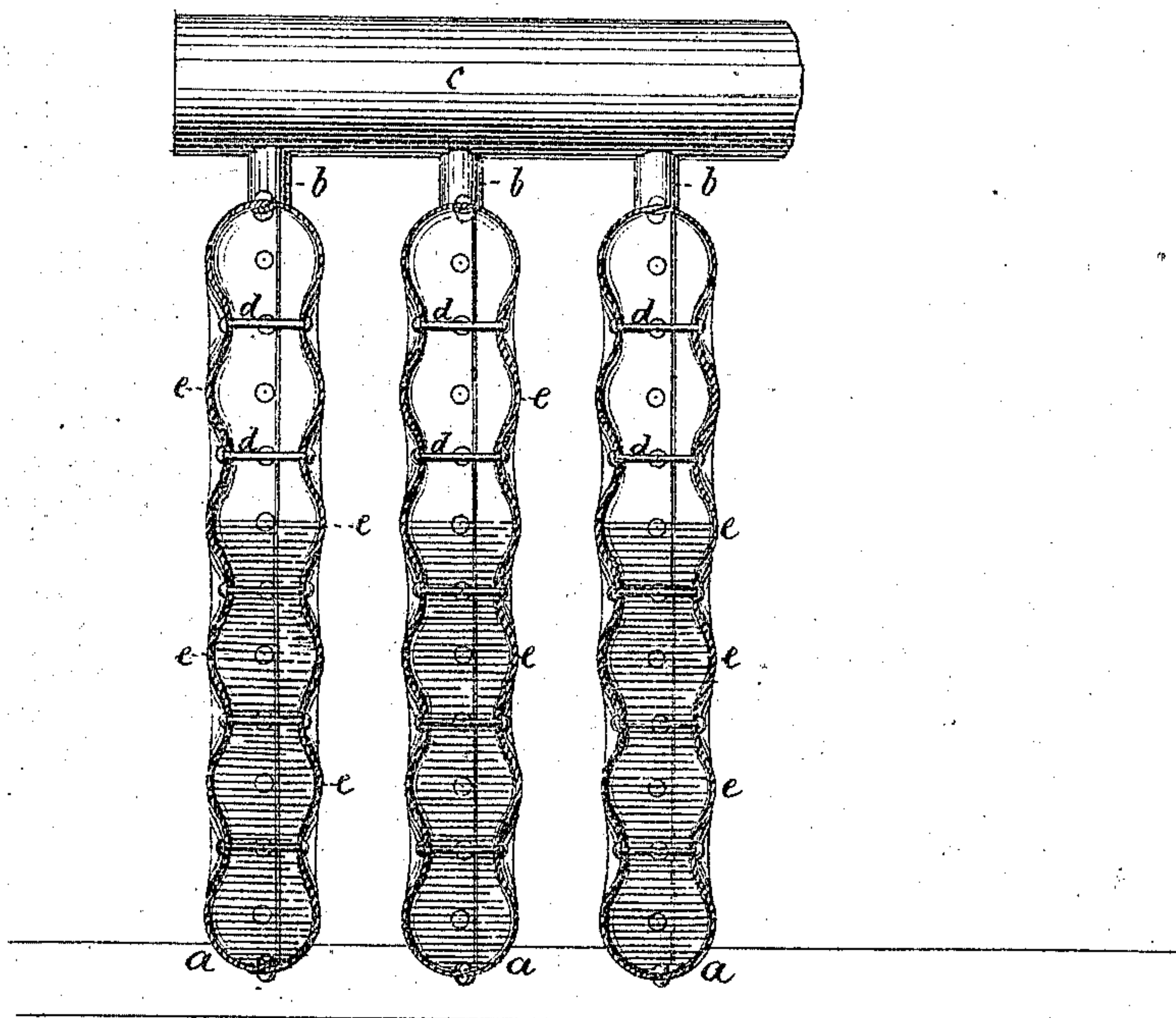



Fig. 2.



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UNITED STATES PATENT OFFICE.

WILLIAM BYERS, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. 120,937, dated November 14, 1871.

To all whom it may concern:

Be it known that I, WILLIAM BYERS, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Steam-Generators; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

Figure 1 is a side elevation, and Fig. 2 a transverse vertical section.

My invention relates to improvement in the class of steam-generators formed in separate compartments, with alternating convexities and concavities on one or both sides. Heretofore these have been so constructed that the two plates composing them touch or come in contact at every point where a concavity or inward protuberance occurs. My invention has for its object to remedy certain disadvantages arising from this construction; and consists in so forming and connecting the sides of each compartment or generator that while the circulation of the water or steam is left perfectly free there shall be no waste of heating surface; or, in other words, every portion of the surface be freely exposed to water or steam on one side and the action of flame or heat on the other. This produces a manifest advantage in respect to capacity of the boiler for producing a given amount of steam from a given quantity of water in a given time and with a given temperature. It avoids, further, any liability of corrosion or deposit of sediment or any foreign mineral substance around the bolts, &c.

Referring to the drawing, *a* are the compartments aforesaid, any convenient number being employed, say six or more, the same being placed vertically on their edges, side by side, at suitable intervals, and connected by tubes *b* extending

from their upper edges, with a pipe, *c*, for carrying off steam, the generators being also supplied with water-pipes. The sides of the generators are connected by means of transverse stay-rods *d* placed in parallel rows at equal distances apart, the spaces between the rods in each row being also equal. The swellings or bulges above referred to are shown at *e*, there being one bulge between each set of four contiguous stay-rods, so that a section, like those in Fig. 2, cutting any one of the rows of stay-rods, has serpentine sides, the stay-rods connecting the bottoms of the external hollows or, what is the same thing, the apices of the internal bulges.

This construction disposes the sides of the generators in series of arches, those of each series radiating in all directions from a common key-point; hence results immense strength and also increased heating-surface. The thickness of the plates can be much less than that of plane plates of only equal strength. The water-line can be placed at any convenient height, the furnace-fire being prevented from mounting above the water-line by means of strips of iron placed between the compartments. On the same principle may be constructed boilers not in separate compartments, and also fire-boxes in locomotives.

I do not claim a steam-generator whose sides are formed with convexities and concavities; but What I do claim is—

The steam-generator herein described, formed of plates, each provided with equal and alternating convexities and concavities, and united by stay-rods or bolts *d* so as to leave a water and steam-space between them, as and for the purpose specified.

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Witnesses:

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