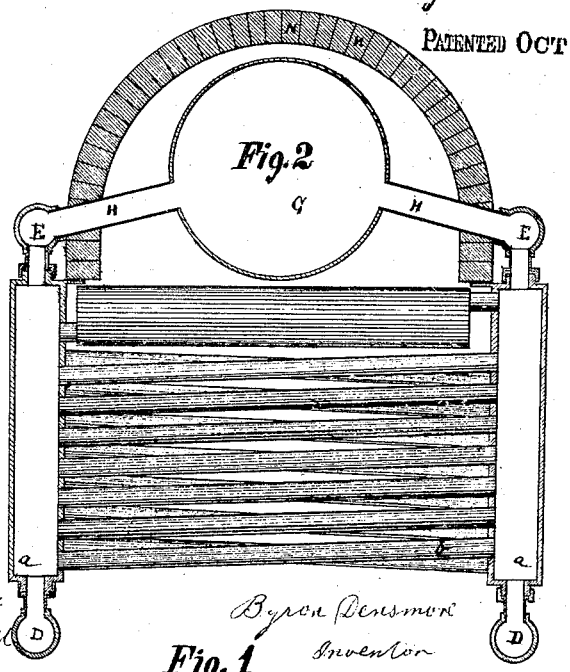
BYRON DENSMORE'S.
SECTIONAL STEAM BOILER.
New York City.

108333

PATENTED OCT 18 1870

Fig. 2



Witnesses { Mary E Densmore
Abraham Odell

Byron Densmore
Inventor

Fig. 1

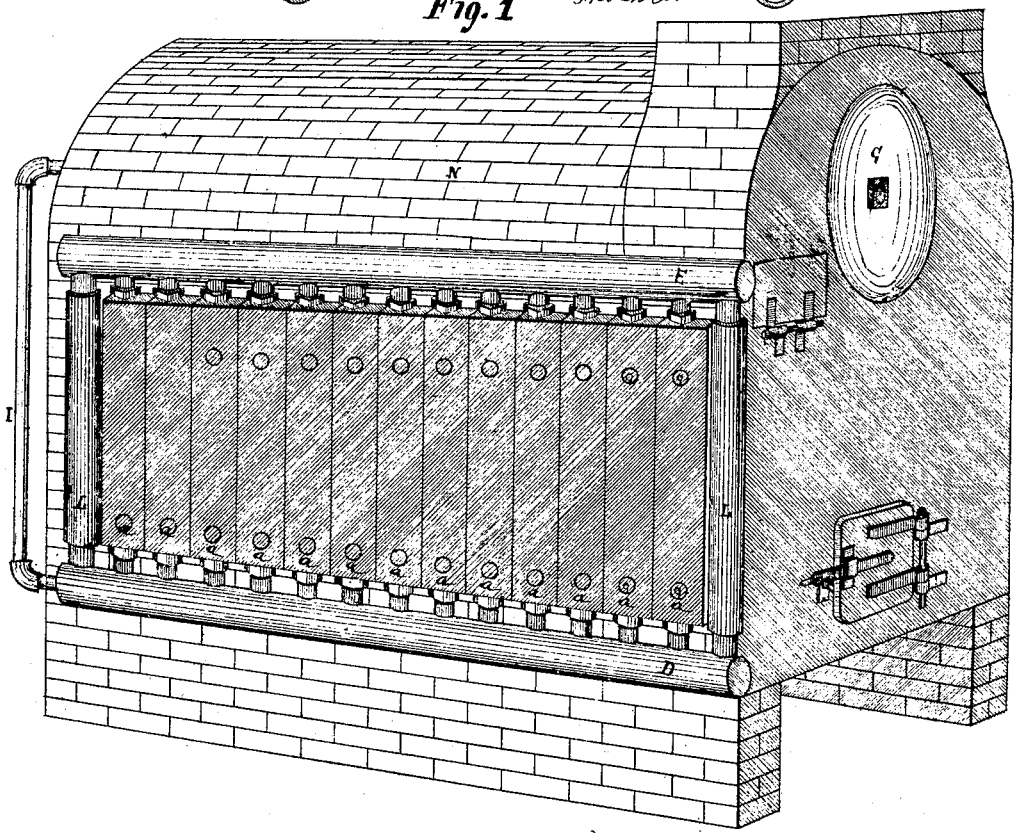


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Fig. 4

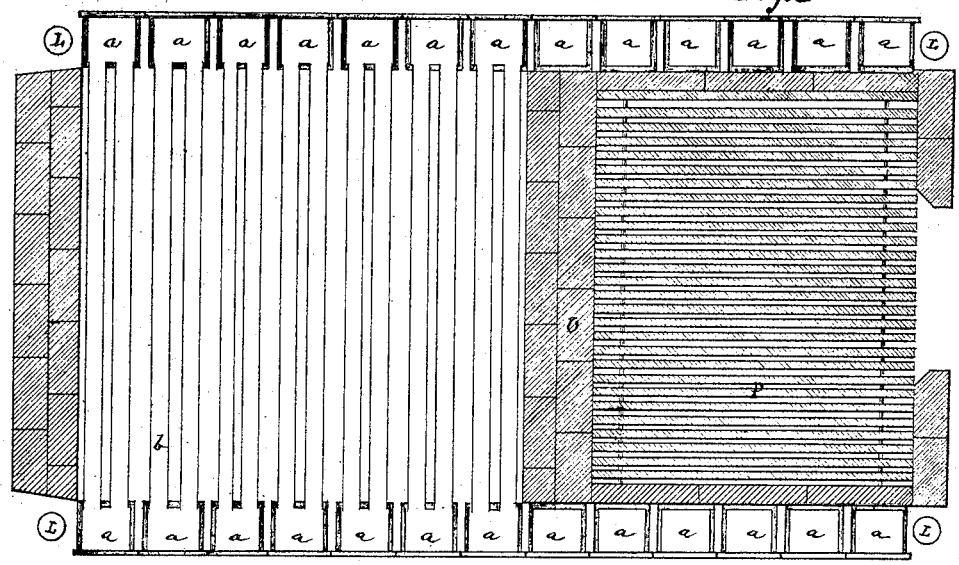
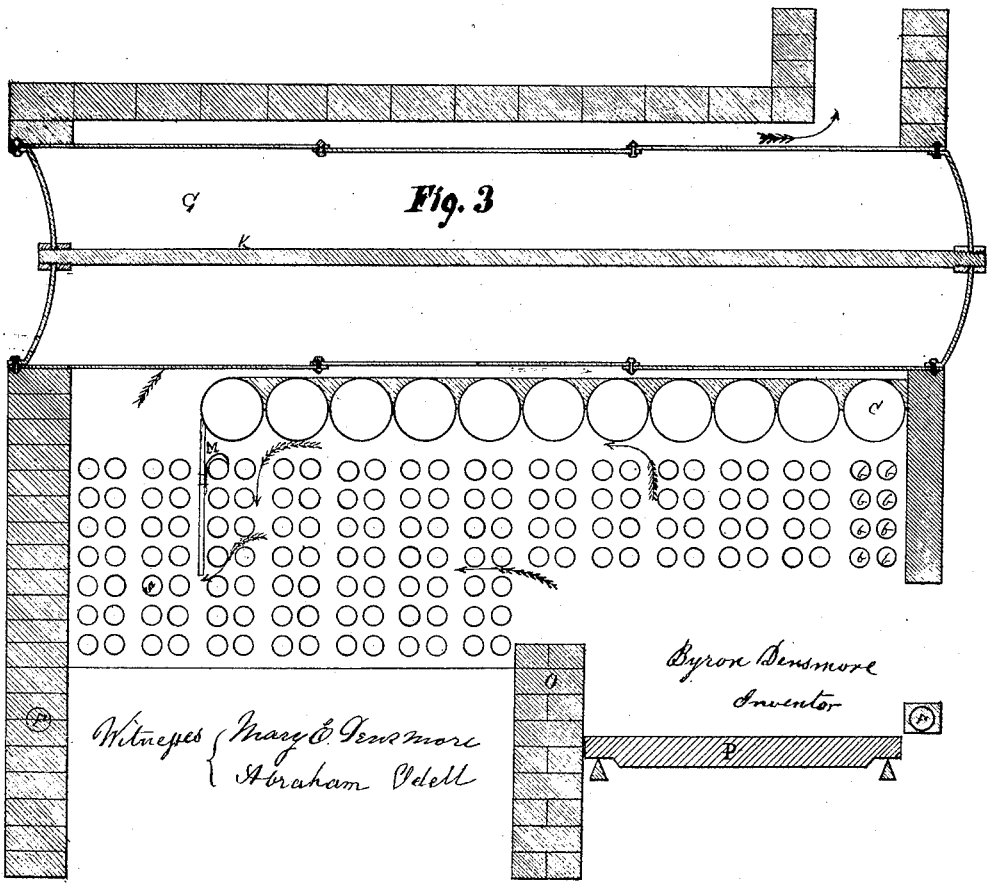


Fig. 3



Witnesses { Mary C. Densmore
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Byron Densmore
Inventor

United States Patent Office.

BYRON DENSMORE, OF NEW YORK, N. Y.

Letters Patent No. 108,333, dated October 18, 1870: antedated October 4, 1870.

IMPROVEMENT IN SECTIONAL STEAM-GENERATORS.

The Schedule referred to in these Letters Patent and making part of the same.

I, BYRON DENSMORE, of the city of New York, in the State of New York, have invented certain Improvements in Sectional Steam-Boilers, of which the following is a specification.

My improvements consist in so arranging a sectional steam-boiler as to prevent priming; also, to absorb the heat into the water more perfectly; also, in so connecting the parts as to prevent leakage, and to require less space and less brick-work, thus removing defects hitherto existing in sectional boilers.

Description of the Accompanying Drawing.

Figure 1 is a perspective of my invention.
Figure 2 is a transverse elevation.
Figure 3 is a longitudinal elevation.
Figure 4 is a plan of the same.

The sections *a* are made of cast-iron, and when two-inch tubes are used, are about six and one-half inches square, and from three to three and one-half feet long, the water-space being five and one-quarter inches square.

The front sides are widened on both edges, so that each section fills a space of seven and one-eighth inches in width.

The sections form the sides of the boiler, touching each other only at the outer edges, leaving a space of five-eighths of an inch between the sections, so that the heat acts on three sides of them.

The tubes *b* are placed transversely, slightly inclined from the horizontal. There are two rows up and down in each section, inclining in opposite directions, which gives an active circulation to the water in the tubes, and causes the water to keep at the same level in the sections at each end of the tubes.

The tubes are screwed into the sections with right and left-hand screws, of fine lead and very little taper.

Over the two-inch tubes in each section is placed a seven-inch tube, *c*, horizontally, having heads welded into the ends, and being connected to the sections by two-inch nipples, one of the nipples being right and left. One of these nipples is placed as low down on the tube for the admission of water, and the other as high up for the exit of steam, as is practicable.

The sections *a* have a round projection or boss on each end, one and one-quarter inch long, and of sufficient diameter to screw for a two-inch union-nut. There is a two-inch hole in these bosses into the water-space. The ends of the bosses are faced off in the lathe when they are screwed.

The pipes D D and E E may be of either wrought-iron or cast. Cast is thought preferable, should be four inches inside diameter, and, if cast, five and one-quarter outside.

The sections are connected to these pipes by means of two-inch unions, one part of the union screwing into the pipes, and the union-nuts screwing onto the bosses on the ends of the sections. These unions are packed with the metallic spring gasket patented by me December, 1868.

The pipes D D are connected together at each end by the transverse pipes F F, fig. 3, and the pipes are connected at each end to the steam-cylinder G, by the inclined pipes H H, which are three inches diameter. The steam-cylinder G is twenty-four inches diameter.

K is a stay-rod from head to head, two inches in diameter.

The corner pipes L L L L are three inches diameter, and may be of wrought-iron, with a right and left-hand screw, or may be of cast-iron, and connected to the pipes D D and F E by two right and left nipples, or by one right nipple and one right and left.

M is a plate of iron that is hung in the upper edge, touching the rear large tube, and extending down four tubes between the small tubes, to force the draught downward, and to equalize the heat among the tubes.

I is a pipe connecting the steam-cylinder G and one of the pipes D D. It enters the steam-cylinder two or three inches from the bottom of it, so that, when the water rises that high in the cylinder, it will flow to the bottom of the boiler.

The spaces between the large tubes are stopped with fire-mortar.

N is a brick arch, resting on flanges projecting out at the top of the sections *a* for that purpose. The front is of light cast or wrought-iron, lined with fire-brick. The foundation-wall should be eight inches thick from the front to the bridge-wall O, and twelve inches thick from there to the rear end of the boiler, the outsides being flush with the boiler, and a wall four inches thick carried up along the inside of the pipes D D, and lap onto the sections *a*, to stop the opening between the sections and pipes back of the bridge-wall.

The top edges of the grates P should be placed about as high as the center of the pipes D D, and fire-bricks set on end between the grates and sections, the lower ends resting on the foundation-wall, and the upper end lapping up onto the lower ends of the sections, thus stopping the opening between the sections, and pipes D D being held in their position by the grates.

The seven-inch tubes are omitted in one, two, or three of the rear sections, according to the size of the boiler, for a flue-way to the upper chamber of the boiler. The rear end of the boiler is stopped with brick-work. The arrows indicate the direction of the draught.

q q q q are plugs. The upper ones are placed on a level with the nipples that connect the large tubes to the sections, for convenience of cleaning out the large

tubes, and the lower ones are for the convenience of cleaning out the lower ends of the sections.

There should be two blow-off cocks, on opposite corners of the boiler. Then the pipes D D will blow out clear.

The circulation of the water in the small tubes is so rapid that they do not scale.

The water-line is through the center of the large tubes, which gives a large surface to evaporate from, which leaves about seven inches in height from the water-line to the tops of the sections, which gives good room for the steam to separate from the water before it passes through the small openings into the pipes E E. In these pipes the steam flows from the center toward the ends. Here again the water and steam have a good opportunity to separate. At the ends the steam passes up the pipes H into the steam-cylinder, and the water falls down the pipes L L L L. Hence, in no case does much water get into the steam-cylinder.

I claim as my invention—

1. The combination of the sections *a* and tubes *b*, substantially as set forth.

2. The combination of the sections *a* and the pipes D D and E E, substantially as specified.

3. The combination of the pipes D D and E E and L L L L, substantially as set forth.

BYRON DENSMORE.

Witnesses:

MARY E. DENSMORE,
ABRAHAM ODELL.