

2 Sheets, Sheet 1.

T. Champion,
Flue and Tubular Boiler.
No. 7,935. *Patented Feb. 18, 1851.*

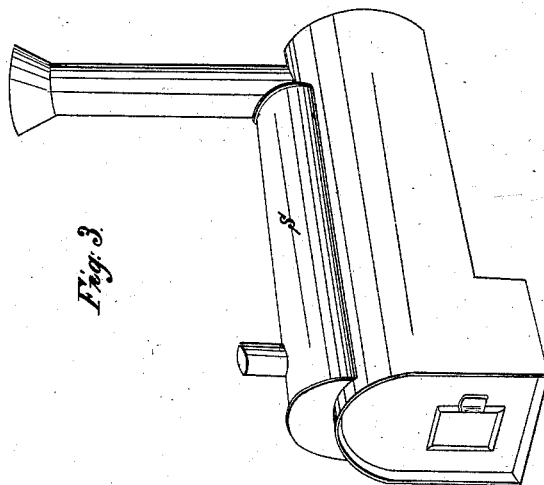


Fig. 3.

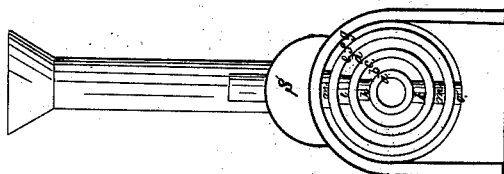


Fig. 2.

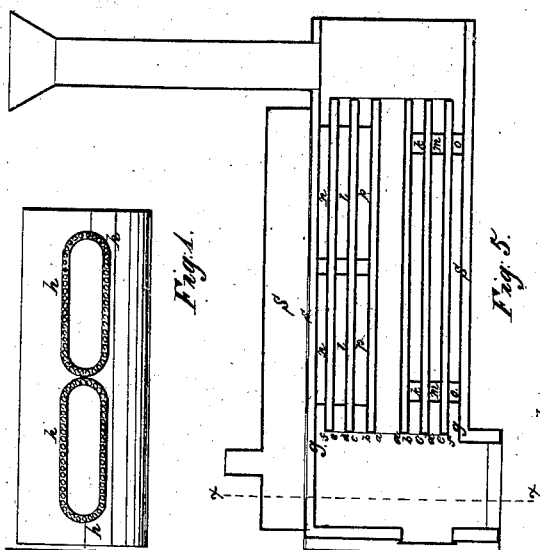


Fig. 4.

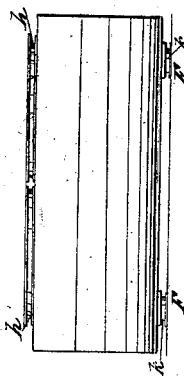


Fig. 5.

Fig. 4.

2 Sheets. Sheet 2.

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Flue and Tubular Boiler.

N^o 7,935.

Patented Feb. 13, 1851.

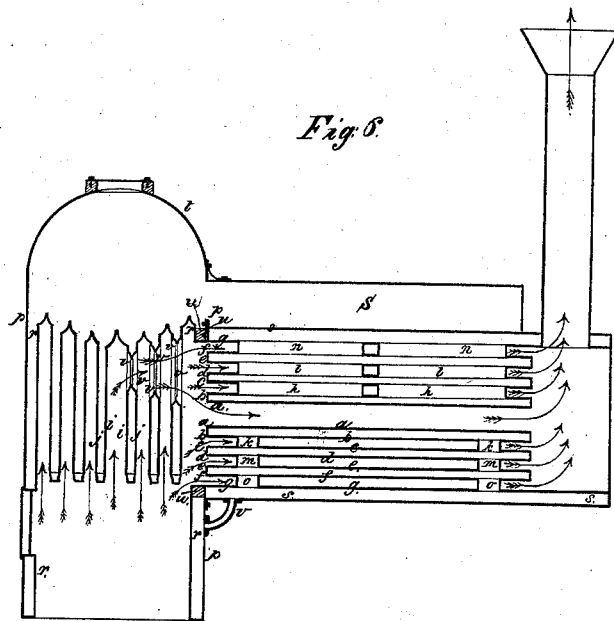


Fig. 8.

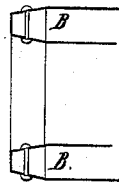


Fig. 7.

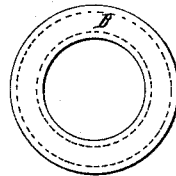


Fig. 9.

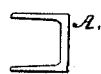


Fig. 10.



UNITED STATES PATENT OFFICE.

THOS. CHAMPION, OF PHILADELPHIA, PENNSYLVANIA.

ANNULAR STEAM-BOILER.

Specification of Letters Patent No. 7,935, dated February 18, 1851.

To all whom it may concern:

Be it known that I, THOMAS CHAMPION, of the city and county of Philadelphia and State of Pennsylvania, have invented a new and Improved Mode of Constructing Steam-Boilers; and I do hereby declare the following to be a full and clear description thereof, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 represents a vertical longitudinal section of the boiler. Fig. 2 is a vertical transverse section on the line *x, x*, of Fig. 1. Fig. 3 is an elevation or perspective view. Fig. 4 is a top view of one of the horizontal cylinders showing the openings and flange or collar connection. Fig. 5 is a vertical elevation of the same. Fig. 6 is a vertical longitudinal section through the center, showing the arrangement and connection of vertical and horizontal concentric cylinders, the vertical cylinders being at the furnace end of the boiler. Fig. 7 is a view of a metallic ring for closing the extremities of the water spaces. Fig. 8 is a section of ditto, showing the connection of two of the cylinders therewith.

The same letters marked on the above figures indicate the same parts.

The nature of one of my inventions and improvements consists in closing the annular water spaces of my concentric boiler by means of metallic tapered rings, by which the ends of the cylinders, of uniform length, can be closed even and fair at both ends so as to stand the fire and leave only the required space for fire and so that the constructor can get the rivets in on one side and at the same time have room for riveting them on the other side.

Another of my inventions and improvements consists in connecting the lower parts of the annular water spaces each to each firmly, the upper and inner, to the lower and outer one answering the fourfold purpose of bracing the boiler below, or, if needed, at the sides, giving free ebullition, further assisting evaporation, and giving an opportunity for the dirt to settle in the blow pipe where it may be blown out.

To enable others skilled in the art to make and use my invention, I will proceed to describe the manner of arranging the several parts, and of connecting them together.

I construct my boilers of the ordinary

materials, and commence by forming a number of cylinders of boiler iron, or copper, open at both ends, and of the several diameters proportioned to the relative size of the several fire and water spaces determined upon. On the upper side of each cylinder, elongated or elliptical openings (as shown in Fig. 4) are made and collars (solid, or sheets flanged) are adapted to said openings of the proper form and size for connecting two successive cylinders together. The flanges or collars are made in the ordinary manner described below. On the underside of each cylinder smaller openings *F*, are made to which the flanges of connecting tubes or collars (*k m o*) are fitted and riveted.

In putting together the several parts I commence with the cylinder (*b b*) Figs. 1, and 2, and place around it the cylinder *c, c*; then between the openings and upper side of these cylinders I place the flanges or collars (*h h*); and in like manner on the lower side of the cylinder (*b*) the flanges (*k k*); then insert the cylinder (*a a*) and inclose the water space at both ends between (*a a*) and (*b b*) by tapered rings *B*. The cylinder (*e e*) is then placed around the cylinder (*d d*) and the two are connected together as above mentioned by flanged collars;—then inclose the water space at both ends between (*e e*) and (*d d*) by means of rings *B*, and so in like manner the cylinder (*f f*) and the cylinder (*g g*). When all the pairs of cylinders have been thus connected, completing the inclosure of these spaces, the alternate fire or hot air spaces being left open for the access of fire at one end, and for its escape into the flue at the other.

The outer annular water space communicates above with semi-cylindrical steam chambers, (extending nearly the full length of the boiler as represented in Figs. 1, 3, and 6) by means of openings through the top of the outer cylinder surrounded by flanged collars, secured to the cylinders by rivets, or other means.

Having completed the description of Figs. 1 and 2 and the longitudinal part of Fig. 6, I will now proceed to describe the vertical part of Fig. 6.

Beginning, as in the horizontal longitudinal arrangement, by forming any number of cylinders desired. Commencing with the center one (*i i*) and placing around it a cylinder (*j j*) with the holes cut out of both

sheets (*i* and *j*) forming flues (*v*) for the escape of heat into the horizontal portion of the boiler.

In like manner all the other cylinders are 5 connected, first riveting around the fire escape openings, then the alternate upper fire end, and lower water chamber till all the inner short cylinders are completed. Then place the two outer vertical cylinders *p p* 10 and (*r r*) together without the dome (*t*) being connected. Then rivet the large ring or flange (*u*) in the opening for the escape of fire or heated air into the horizontal longitudinal spaces. Then the vertical and hori- 15 zontal cylinders may be connected; after which the dome (*t*) may be riveted on even with the top of the flange of the cylinder (*r r*).

This construction dispenses with the use 20 of the top furnace sheet and removes the danger of collapse of said top furnace sheet which often happens in the use of the ordinary boiler.

The longitudinal section of the boiler is 25 connected to the vertical section by rivets, or bolts, or both, passed through a flange on the longitudinal section.

V, is a small pipe placed directly beneath 30 the longitudinal section, for uniting the same with the vertical section, and thus connecting the water chambers in the two.

The lower end of the water spaces, of the vertical cylinder are closed by tapered metallic rings, such as are shown at B, in Figs. 35 7 and 8, being bolted or riveted to the same. The top ends of the alternate fire spaces are closed by flanging the sheets together as shown in Fig. 6.

This construction of boiler is well adapted 40 for steam vessels where great quantities of steam are required in circumscribed spaces—exposing at least three times the heating surface in a given size of boiler—and greatly lessening the quantity of fuel required to 45 generate a given amount of steam.

Among the advantages arising from the before described construction are the following: 1st. In the old form of concentric cylinder boilers the cylinders have to be made 50 of different lengths in order to insert the bolts or rivets and consequently are uneven. But by the employment of the beveled rings

for uniting the ends of the cylinders to form the concentric water chambers in the manner that I employ them, the ends of the cylinders may all be in the same horizontal or 55 vertical plane and room given for the introduction of the rivets and for the use of the hammer—button set and battering ram or hold fast used by the workman in securing 60 the rivets, as the applying of these tools at right angles to the sloped sides of the rings enables the workman to apply the necessary blows to the head of the button-set without striking the adjacent cylinders. 2nd. The 65 rings around the openings through which the water and steam circulate add strength to the boiler and the lower openings allow of free ebullition and permit the dirt to settle down into the blow pipe, and the upper or 70 elliptical openings facilitate evaporation. 3rd. The semi-circular steam chamber allows of a free evaporation, and adds strength to the boiler. 4th. The combination of the 75 vertical and horizontal cylinders produces a greater amount of heating surface to the action of the fire.

Having thus described the nature of my invention and improvement in the construction of steam boilers what I claim as new 80 and of my invention and desire to secure by Letters Patent, is—

1. The employment of the tapered rings B, for closing the ends of any of the water spaces of the concentric boilers in the manner set forth. 85

2. I also claim connecting the lower parts of the annular water spaces, each to each from the upper and inner to the lower and outer one substantially as described, by 90 metallic rings or collars—thus giving free ebullition, assistin gevaporation, and allowing the dirt to settle down into the blow pipe, from whence it may be blown out—the aforesaid rings or collars bracing the 95 boiler as well as forming the connection between the cylinders.

In testimony whereof I have hereunto signed my name before two subscribing witnesses.

THOMAS CHAMPION.

Witnesses:

WM. P. ELLIOT,
T. L. SMITH.