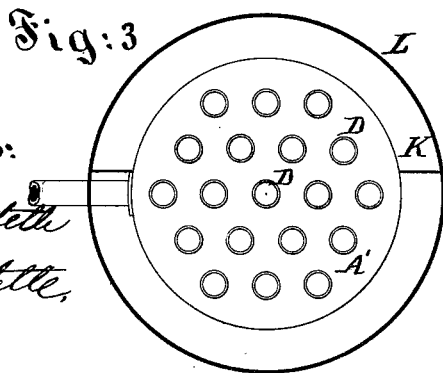
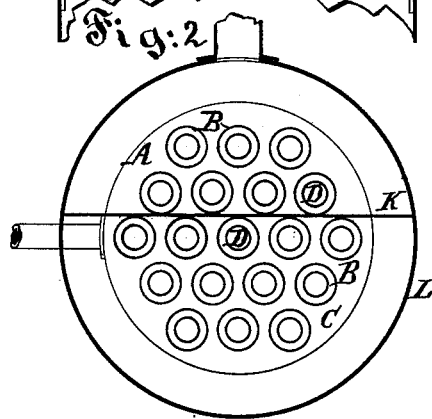
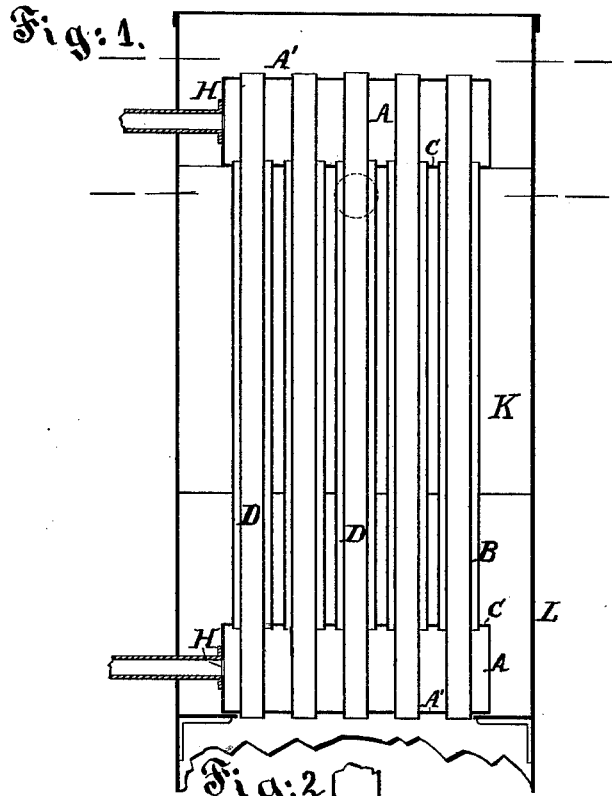


G. H. POND.
Tubular Boiler.

No. 200,873.

Patented March 5, 1878.



Witnesses:

Henry C. Swistell
J. P. Sawtelle

Inventor:

G. H. Pond

UNITED STATES PATENT OFFICE.

GOLDSBURY H. POND, OF NEW YORK, N. Y.

IMPROVEMENT IN TUBULAR BOILERS.

Specification forming part of Letters Patent No. **200,873**, dated March 5, 1878; application filed June 12, 1877.

To all whom it may concern:

Be it known that I, GOLDSBURY HARDEN POND, of the city, county, and State of New York, have invented a new and useful Improvement in Tubular Boilers, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical sectional view. Fig. 2 is a transverse sectional view, and Fig. 3 is an end view.

The object of my invention is to produce a cheap but strong and durable tubular boiler, light in weight, simple in construction, without seams that have to be riveted, as in the ordinary boiler, or heads that have to be turned, making a tubular boiler with four circular heads, two at each end of the boiler, with a space between them. The two double heads are fastened together with tubes instead of bolts, screws, or rivets, and are of immense strength and great efficiency.

I make my tubular boiler by first casting, of malleable cast-steel or other metal, two perforated disks of the size required to hold the tubes. A surrounding rim of the same metal is cast on two of the disks, to inclose a space as large as deemed requisite for the size of the boiler, for steam and water space between the perforated disks and rim, as shown at A A', Fig. 1, thereby making the double heads without seams, rivets, or screws, and also without drilling the holes for the tubes. I then take two of these cast double heads, A A', Fig. 1, for each end of the boiler, and place them opposite each other, as far apart as I design the length of the boiler to be, and put the first or short set of tubes, B, Fig. 1, into

the heads nearest each other on the inner sides C C. Then, with a tube-setting tool, I expand them in the usual manner, forming a shoulder in the tube on each side of the head, thereby fastening the double heads together.

The next set, or long tubes D, which are smaller than the short tubes, are put into the holes in the outside heads, and through the inside heads and the short tubes, to the opposite end of the boiler. The ends of the tubes are expanded and made tight with the tube-setting tool, forming a shoulder in each tube on each side of the head, making strong braces lengthwise of the boiler, and with the short tubes they fasten the double heads firmly together, thereby making a tubular boiler with four circular heads of immense strength, without either rivets, bolts, or screws.

When the boiler is used vertically, or as a portable boiler, the baffle-plate K, Fig. 2, is necessary to direct the flame, heat, and smoke round and between the tubes, and round the upper heads.

L, Fig. 1, is the sheet-iron casing for the boiler, which may be lined with brick or clay, the lower end of the casing forming the fire-box immediately under the lower heads. The upper double head is used for a steam-drum.

I claim as my invention—

The combination of the double heads connected together by two sets of tubes, the fire-tubes passing through the water-tubes, and the diaphragm K, substantially as and for the purpose set forth.

GOLDSBURY HARDEN POND.

Witnesses:

MARY C. SAWTELLE,
J. P. SAWTELLE.