2 Sheets. Sheet 1.

C. W. Bentley,

Steam-Boiler Tube.

No. 3,244. Patented Sep. 1, 1843.

Fig 1.

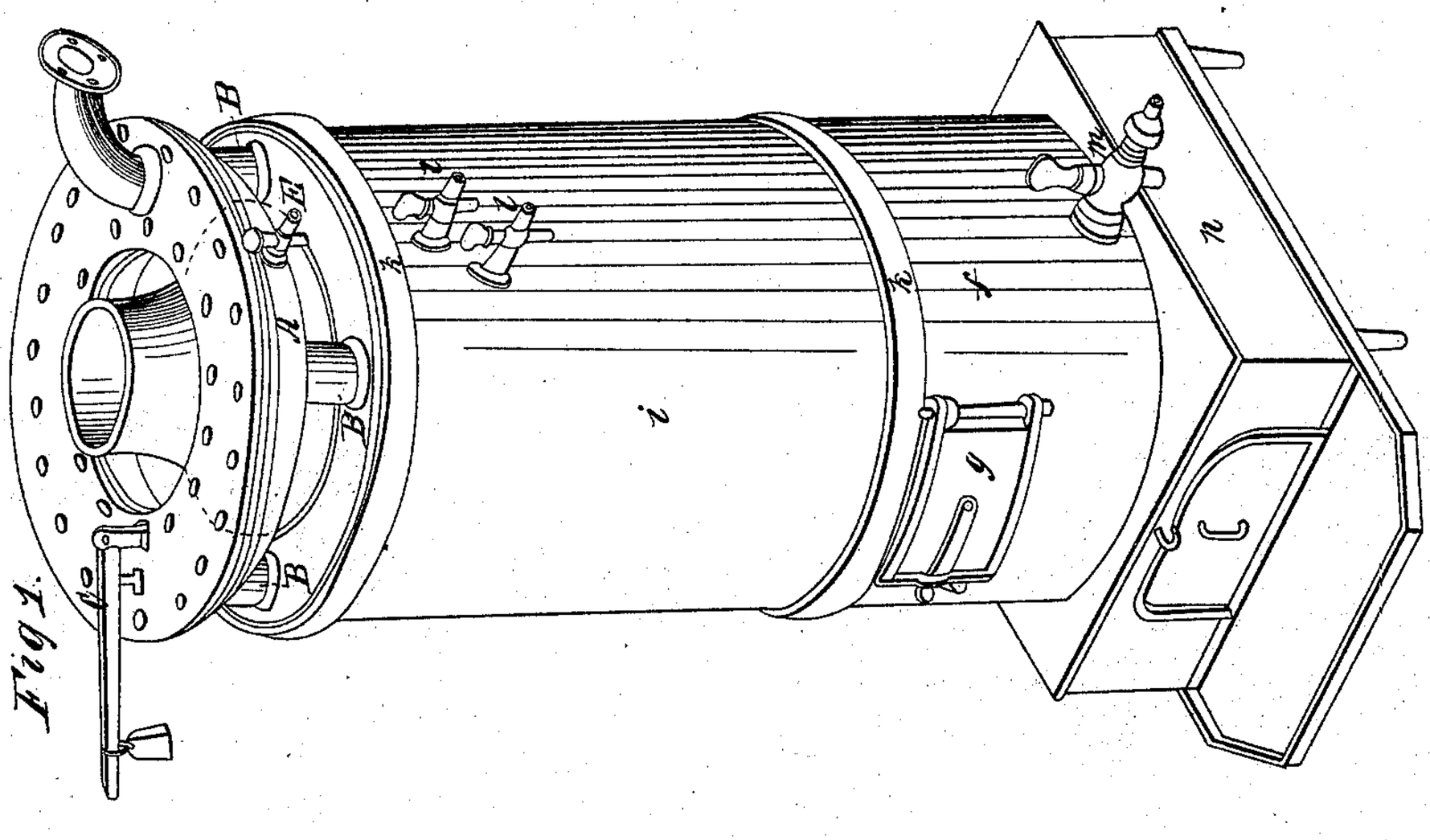
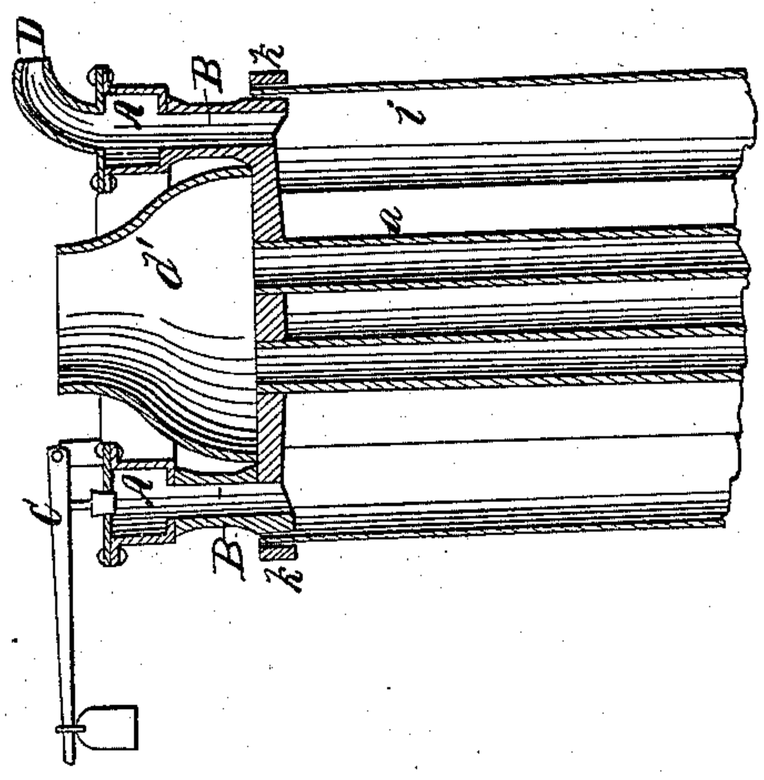


Fig 2.



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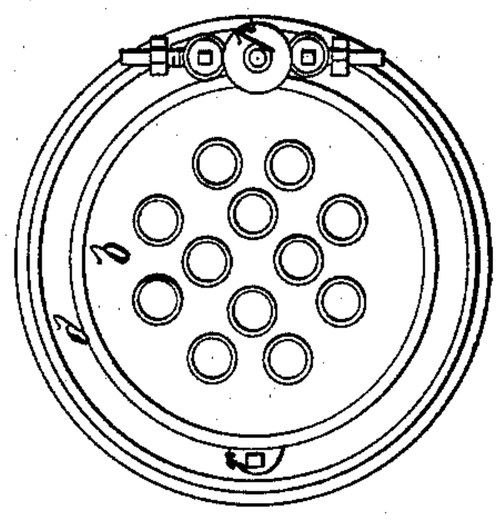


Fig 5.

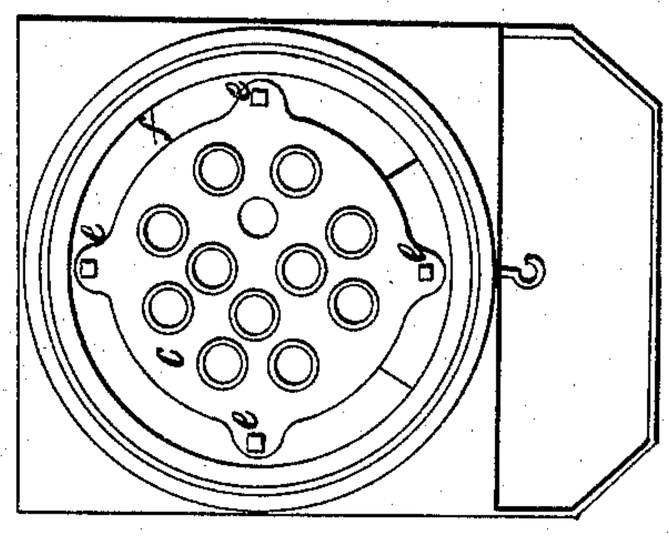


Fig 4.

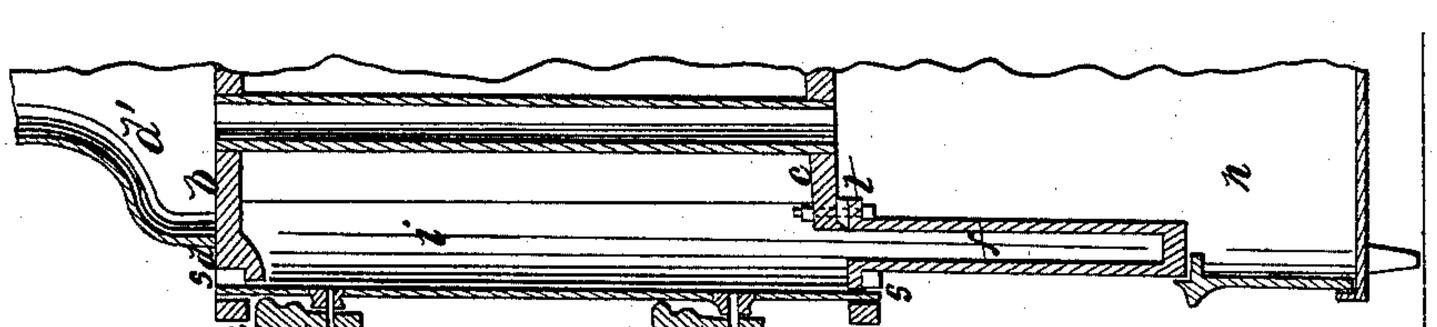
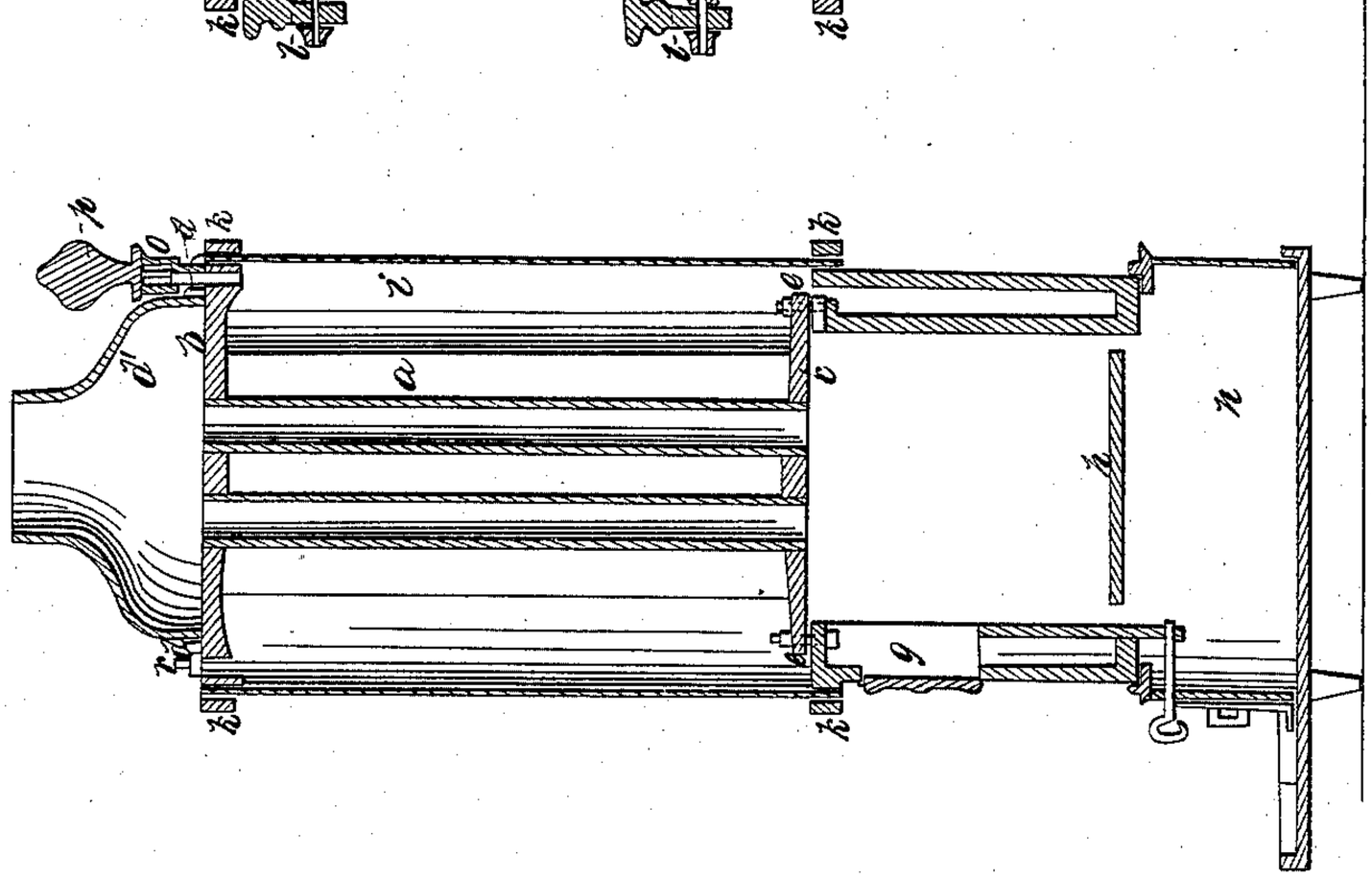


Fig 3.



UNITED STATES PATENT OFFICE.

C. W. BENTLEY, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN THE METHOD OF CONSTRUCTING TUBULAR BOILERS FOR GENERATING STEAM.

Specification forming part of Letters Patent No. **3,244**, dated September 1, 1843.

To all whom it may concern:

Be it known that I, CHARLES W. BENTLEY, of Baltimore, in the county of Baltimore and State of Maryland, have invented a new and useful Improvement in the Method of Constructing Boilers for Steaming, &c.; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification, in which—

Figure 1 is an isometrical view; Fig. 2, section of upper part of boiler with a steam-chamber attached; Fig. 3, section of elevation of the boiler. Fig. 4 shows a different method of packing the joints; Fig. 5, horizontal sections of boiler.

The nature of my invention consists in combining wrought-iron tubes and case with a furnace and cast-iron heads, so as to make a cheap and efficient tubular boiler.

The ends of a series of tubes, *a*, are placed in the position they are to stand in in the boiler, and the space between them filled with sand up to the point where the head is to join them. The bore is also stopped, and the outside prepared for the head to be cast onto the ends being upset a little. The mold for the head is then formed around these tubes, and the casting made, joining them firmly at that end, as shown at *b*, Figs. 3 and 5. The opposite end of the tubes are also joined by a similar head, *c*, a little smaller than the upper one. The head *b* has a projecting flange, *d*, on its upper side around outside the tubes for the smoke-pipe *d'* to fit onto. The lower head has ears *e* cast onto its periphery, by which it is bolted onto the furnace or lower chamber, *f*, below. This chamber is formed of two concentric hollow cylinders, which are joined at the bottom. The inner one has ears on its upper edge similar in shape and position to those above named on the head, through which the bolts pass. This joint can be calked or ground, but I prefer the latter. The outer cylinder has a slightly-projecting flange around its upper edge, over which the outer case of the boiler fits. An opening for a door, *g*, is made through one side of these cylinders, their edges being joined all around, so that coal can be supplied to the fire, which is placed on a grate, *h*, inside this chamber.

The outer case, *i*, is made a little smaller than the flange around the fire-chamber, and also than the upper head. It is then heated and put on over them and shrunk on tight. Over this a band of iron, *k*, is heated and shrunk at top and bottom, thus binding the whole firmly and cheaply together, and by calking the joint is rendered extremely tight. In this case there are two gage-cocks, *l*, of the ordinary construction, and near the bottom of the lower chamber the supply-pipe *m* is attached. This boiler is mounted on a square base, *n*, which forms the ash-pit, and has a projecting hearth in front similar to the base of the common cylinder-stove.

In the upper head outside the smoke-pipe a tube, *o*, is inserted, on the top of which a safety-valve, *p*, is placed. From this pipe two lateral ones can be made to project, in which there are stop-cocks *q*. These pipes can be led in any direction the steam is wanted. In front there is also an aperture that can be stopped by a screw, *r*.

When the boiler is to be applied to a steam-engine, a separate steam-chamber, A, is to be attached, constructed as follows: Four (more or less) pillars, B, are fastened onto the top plate. These are hollow and communicate with the boiler below, and also support an annular chamber, A, with which and the boiler they form a connection. This last-named chamber surrounds the smoke-pipe *d'*, and is supplied with a safety-valve, C, of common construction. To it is also affixed a steam-pipe, D, which connects with the engine. On one side a steam gage-cock, E, is placed, and those below in the boiler are quite near the top at *k*. In every other particular the construction is like the first described. Another method of connecting the outside case, *i*, with the heads is to have a space left in the latter, as shown at *s*, Fig. 4, which is filled with cement, as is also the joint between the lower and tubular chambers at *t*, same figure.

What I claim as my invention, and desire to secure by Letters Patent, is—

Casting the heads onto the wrought-iron tubes, in combination with the method of attaching the external casing or boiler to the heads by shrinking the same thereon, in the manner and for the purpose described.

C. W. BENTLEY.

Witnesses:
J. J. GREENOUGH,
JOHN HITZ.