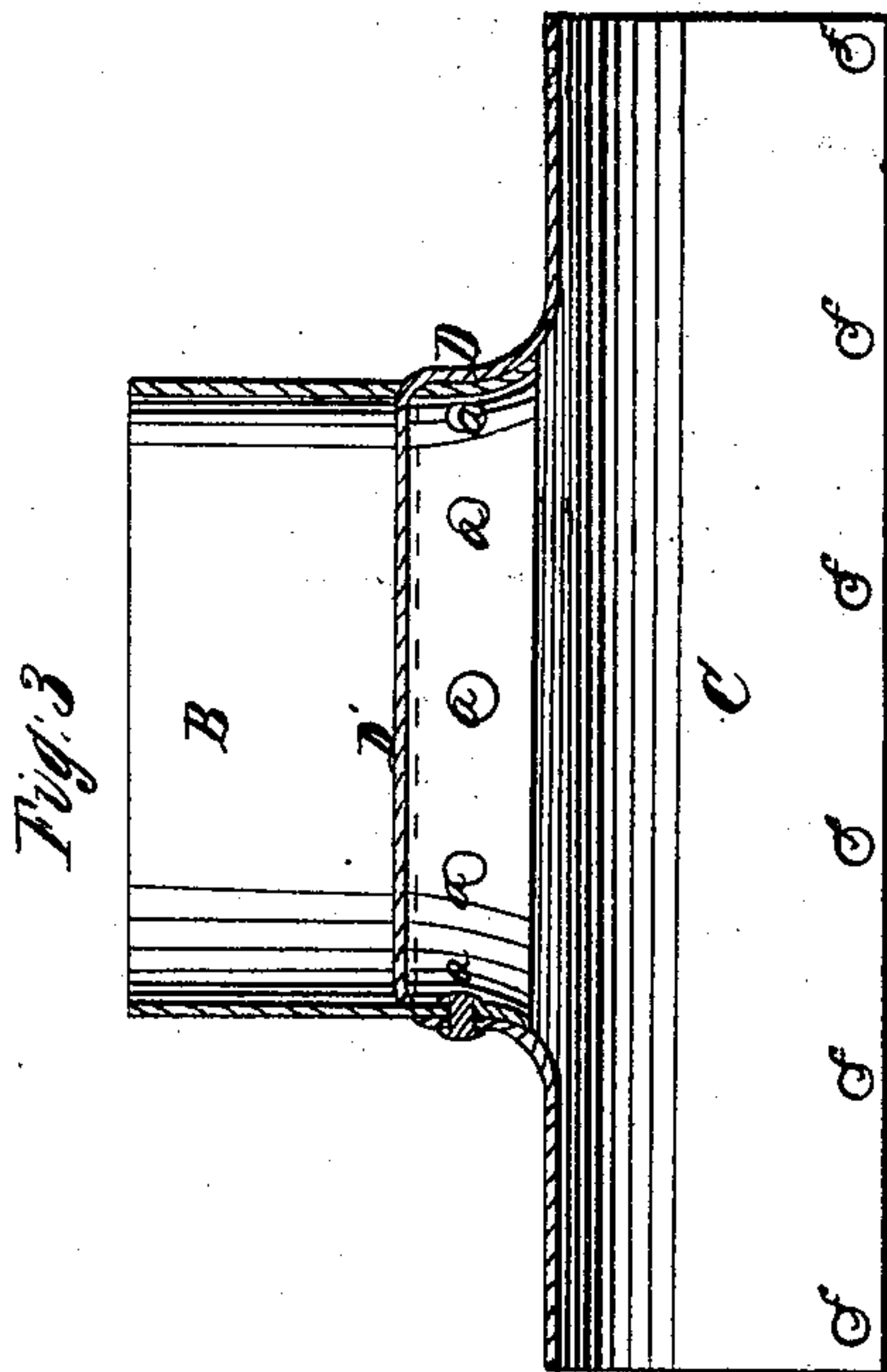
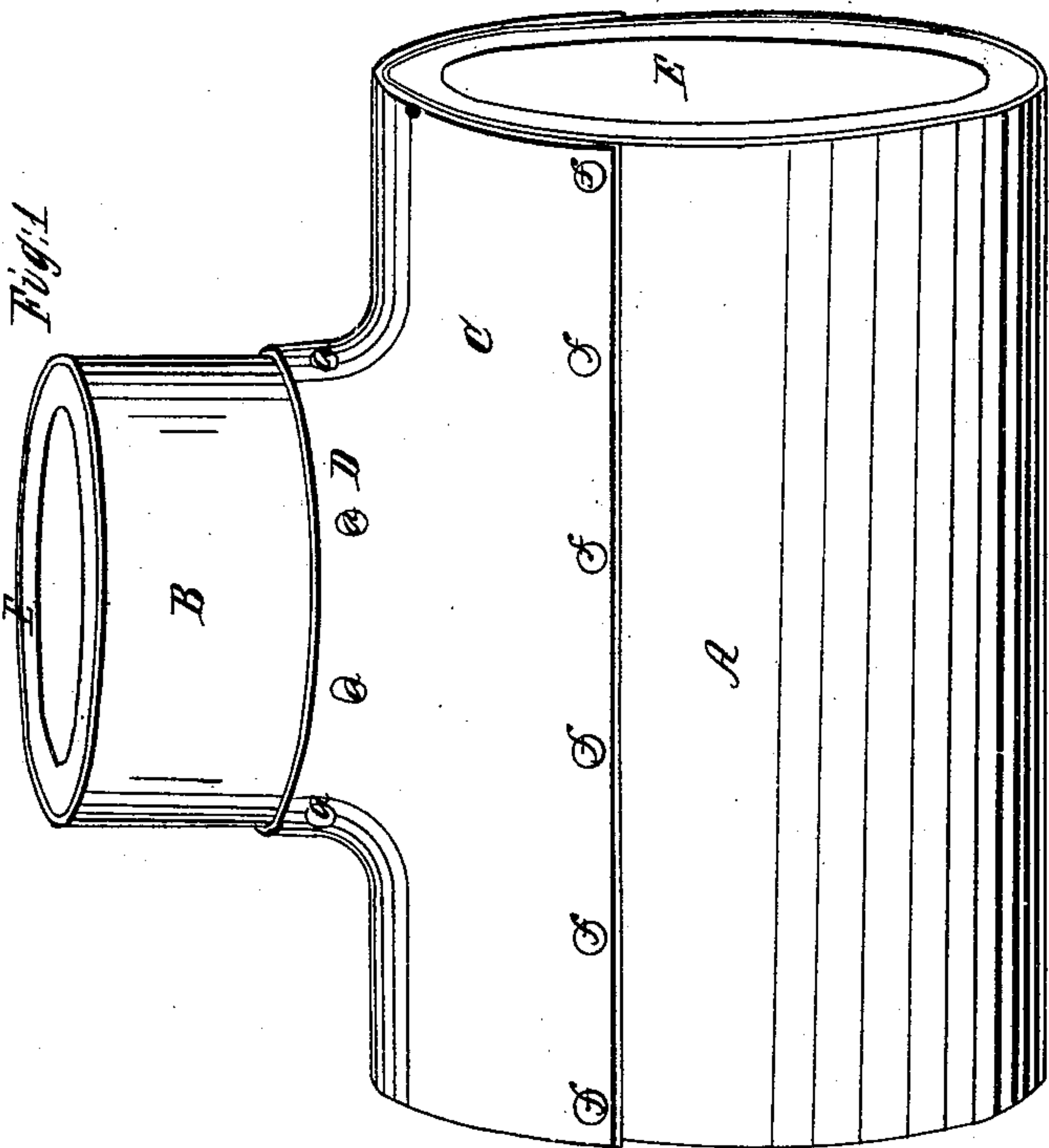
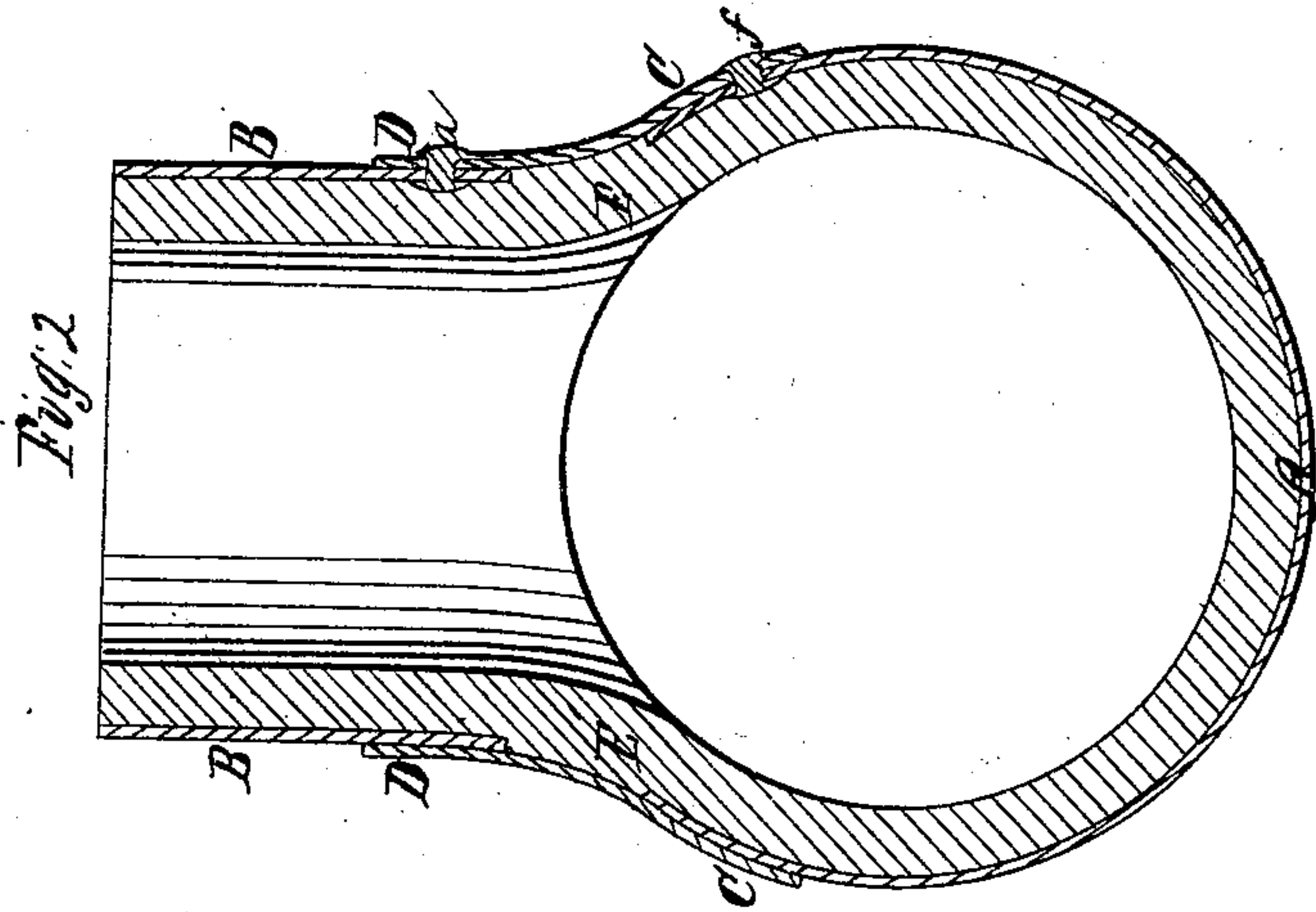


P. Ball,

Water Pipe.

No. 87,900.

Patented Mar. 16. 1869.



Witnesses
Thos. H. Dodge
L. Miller

Inventor
Phineas Ball



PHINEHAS BALL, OF WORCESTER, MASSACHUSETTS.

Letters Patent No. 87,900, dated March 16, 1869.

IMPROVEMENT IN BRANCH-JOINT FOR WROUGHT-IRON WATER-PIPES.

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

Know all men by these presents:

That I, PHINEHAS BALL, of the city and county of Worcester, and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Branches for Wrought-Iron Cement-Lined Water-Pipes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a perspective view of my improved branch;

Figure 2 represents a transverse section of the same, through the central part; and

Figure 3 represents a longitudinal central section of my improved branch without the cement lining.

To enable those skilled in the art to which my invention belongs, to make and use the same, I will proceed to describe it more in detail.

The nature of my invention consists in forming the branches of cement-lined water-pipes of wrought-iron, in the peculiar manner hereafter explained.

In the drawings, the part marked A is the main pipe, and B, the distributing-pipe, which is joined to the main pipe A, as follows:

A wrought-iron plate, C, is cut to the required size, heated, and placed upon a concaved cylindrical mould, corresponding to the size of the main pipe A. The mould has, at its central part, a circular opening, which corresponds to the size of the distributing-pipe B. At the intersection of the two cylindrical surfaces, the mould is rounded to prevent damaging the plate when struck by the die.

The die conforms to the shape of the mould, and is composed of two parts, the face of one being a half cylinder, having in its centre an opening, through which works the circular part that fits the opening in the centre of the mould. It is so arranged that the half cylinder strikes the plate C first, and forces it into the mould, giving it the cylindrical form to fit the surface of the main pipe A, and holding it in position, while the circular part of the die immediately follows, and, either by steady pressure or by successive blows, as may be preferred, forces out the central part of the plate C into the circular opening in the mould, thereby forming a protuberance, D, somewhat resembling the bottom of a tin dish, as indicated in section by red lines, fig. 3 of the drawings.

The plate is then taken from the mould, and the cir-

cular portion D' is punched out, leaving an opening, the size of the distributing-pipe B, the end of which is inserted in the opening, and slightly swelled at the edge, by hammering, when holes are punched through both, and rivets, *a*, inserted to secure them together.

A hole, somewhat larger than the end of the distributing-pipe, is then cut in the main pipe A, and the plate C and pipe B being placed over it, the edges of the plate C are secured to the pipe A, by rivets *f*. The whole is then lined with cement, *E*, as indicated in the drawings, thus forming a branch of the same substance and quality as the other portions of the pipe.

If preferred in any case, the projections D may be formed in the piece of which the main pipe is made, or it may be in a piece of sufficient size to be riveted entirely around the main pipe A. I prefer, however, to make the branch as shown in the drawings.

It will be seen, by the foregoing description, that the branches thus formed are as strong and durable as the other portions of the pipe, and are not liable to break, or crack, like joints formed by soldering, which is the ordinary and most common mode of forming the branches for wrought-iron cement-lined water-pipes.

They are easily and cheaply constructed, and are superior to any branches in common use for the purpose, and obviate one if not the greatest objection to the general use of wrought-iron cement-lined water-pipes.

Having described my improved branch for wrought-iron cement-lined water-pipe,

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

1. A branch and offset, D, for facilitating the attachment of branch-pipes, when said offset is formed from a solid plate of metal, substantially as shown and described, and for the purposes stated.

2. The combination, with the pipes A and B, of a plate, or cap, C, provided with an offset, or projection, D, substantially as and for the purposes set forth.

3. A branch for wrought-iron cement-lined water-pipes, the parts of which are constructed in the manner and form substantially as shown and described.

PHINEHAS BALL.

Witnesses:

THOS. H. DODGE,
D. L. MILLER.