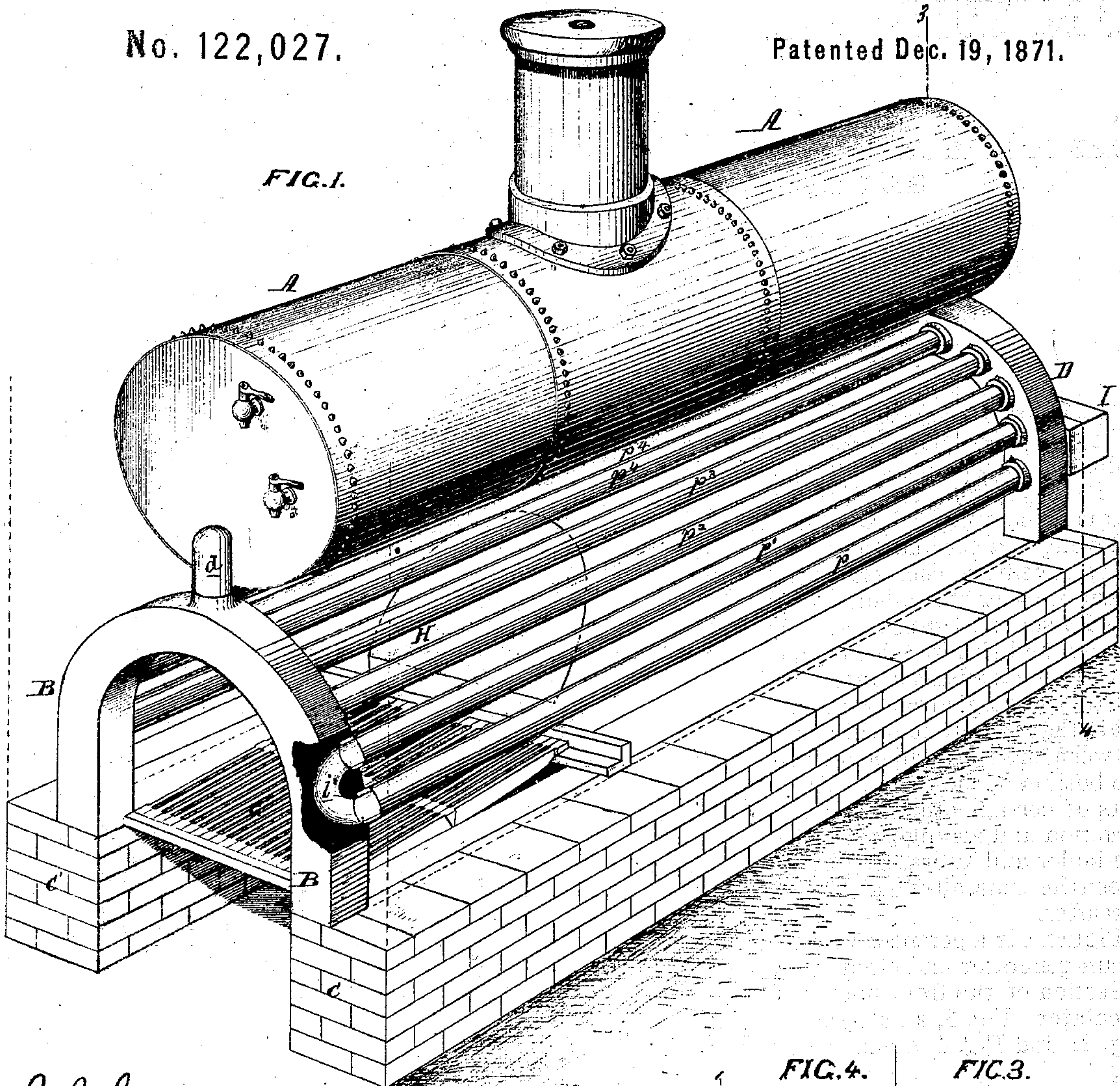


*J.J. Jordan assr etc.,
Combined Steam Generator & Circulator.*

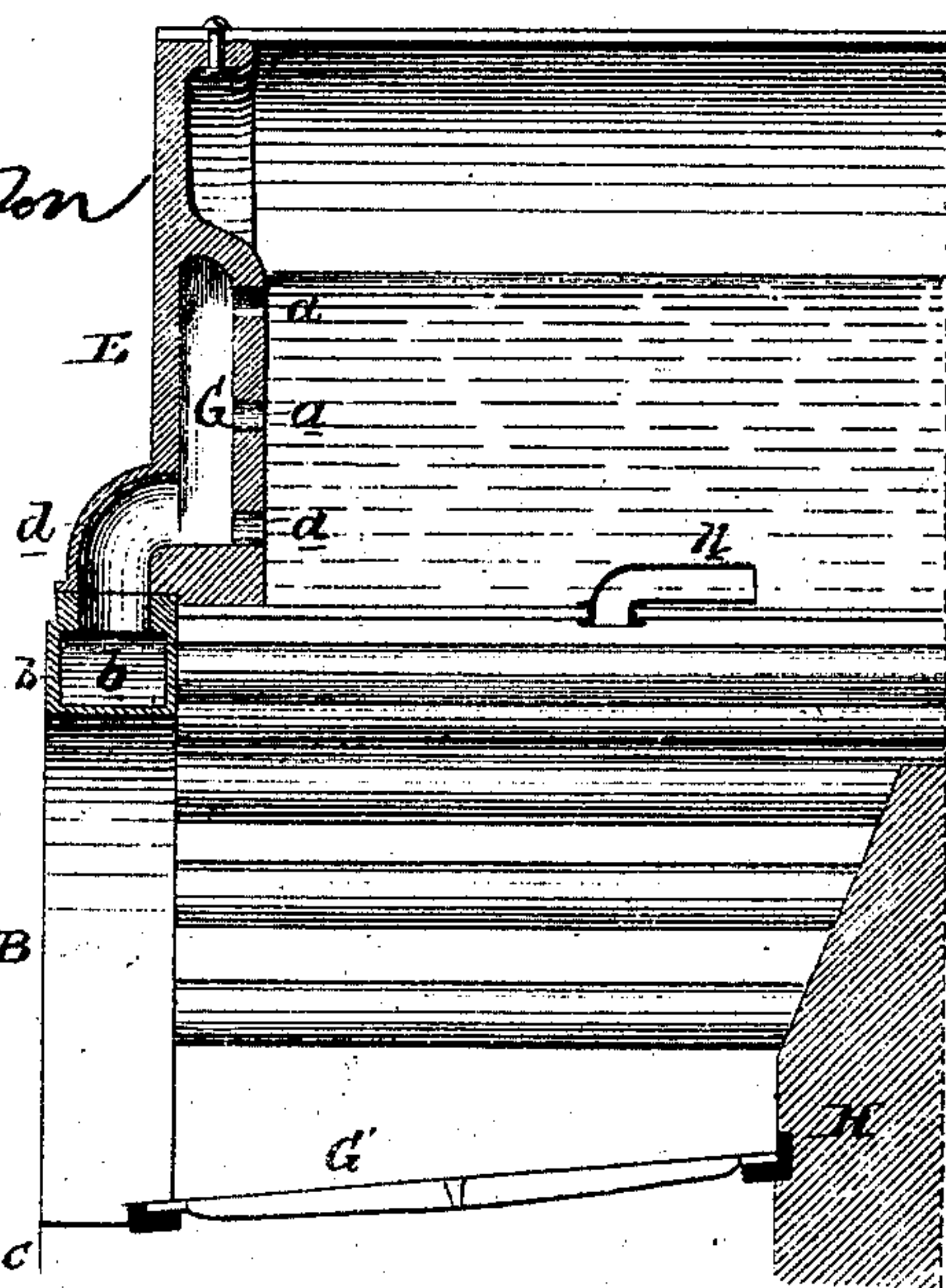
No. 122,027.

Patented Dec. 19, 1871.

FIG. 1.



*J.J. Jordan
by his attor
Hewson and Son*
FIG. 2.

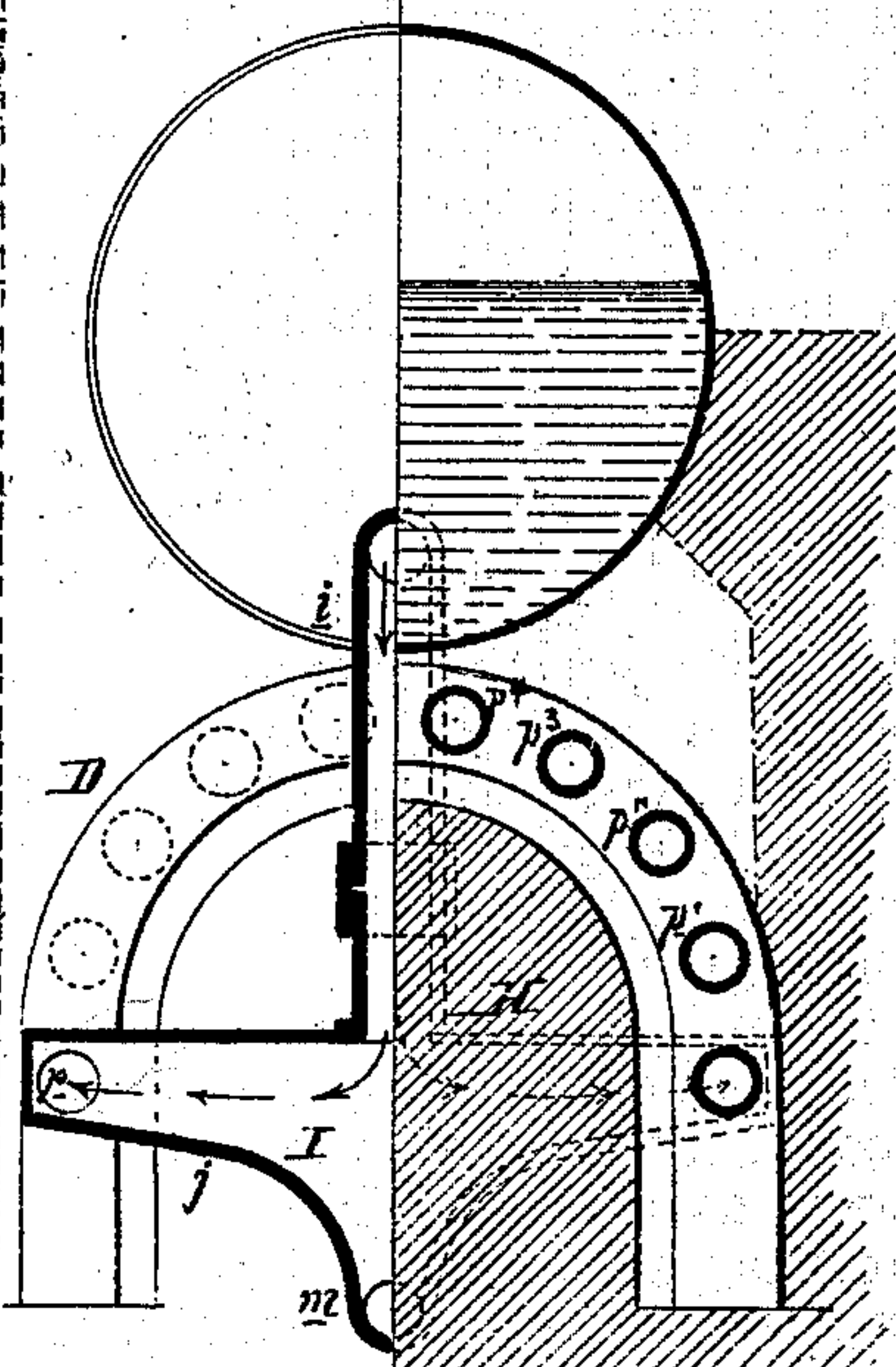


WITNESSES

Wm. A. Steel
Wm. A. Steel

FIG. 4.

FIG. 3.



UNITED STATES PATENT OFFICE.

JOHN JOSEPH JORDAN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND GEORGE T. CARTER, OF SAME PLACE.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. 122,027, dated December 19, 1871.

To all whom it may concern:

Be it known that I, JOHN JOSEPH JORDAN, of Philadelphia, county of Philadelphia and State of Pennsylvania, have invented a Combined Steam-Generator and Circulator, of which the following is a specification:

My invention consists of an ordinary cylindrical or other steam-boiler, with which is combined a series of tubes arranged in the form of an arch and situated below and communicating at two points with the interior of the said boiler, the tubes being also arranged at such distance apart that the products of combustion shall pass between the same and be brought in contact with the bottom of the boiler. My invention also consists of certain other improvements in the construction and arrangement of the parts of both the boiler and tubes, and of the connection between the same, all of which will be fully described hereafter.

Figure 1 is a perspective view of my combined steam-generator and circulator; Fig. 2, a vertical section of the front portion of the boiler and circulator; Fig. 3, a half section on the line 1 2, Fig. 2; and Fig. 4, a half section on the line 3 4, Fig. 1.

A is the body of the boiler or generator, and is of the usual cylindrical form, with cast-iron ends. In the front end E, Fig. 2, of the body is formed a chamber, G, communicating in one direction, through a series of holes, *a a*, with the interior of the body, and in the opposite direction, through a branch, *d*, with a chamber, *b*, formed in the upper portion of an arched casting, B, supported on the brick-work foundation C C' on each side of the fire-place. At the rear of the body of the generator, and situated below the same, is a similar arched casting, D, and between these two castings extends a series of tubes arranged in the form of an arch corresponding to that of the castings, as shown in Figs. 3 and 4. G' is the grate, extending from the arched casting B to the brick-work H, which is arched at the top to conform with the arrangement of the tubes, between which and the brick-work, which extends to the rear casting D, there is a space for the circulation of the products of combustion, as shown in Fig. 3. The body A of the boiler may also, if desired, be formed with a return-flue or flues for the passage of the products of combustion. At the rear of the casting D is

a casing, I, communicating, through a pipe, *i*, with the body of the boiler, near the bottom of the same, the casing having a branch, *j*, communicating with the lowest tube of the series on one side, as shown in Fig. 4, and a similar branch communicating with the lowest tube of the series on the other side, and part of the casing is depressed at *m*, so as to form a mud-receptacle. The water is fed into the body of the boiler, immediately above the fire-place, through a bent tube, *n*, and, with the water already in the boiler, has a tendency to circulate toward the rear and pass down the pipe *i* to the casing I at the back of the casting D, where it passes in contrary directions into the two lowest tubes of the series—for instance, one current of water passes into the tube *p*, to the front casting B, where it turns and flows along the next tube *p*¹ to the casting D, returning thence along the tube *p*² and back through the tube *p*³, and returning through the tube *p*⁴ into the chamber *b*, thence through the branch *d* into the chamber G in the head E of the body A, and thence into the latter through the holes *a a*. The other current of water takes a like circuitous course through the other half of the tubes until it enters the front of the body A. Thus a constant circulation of water is maintained through the tubes which are exposed to the heated products of combustion, and a rapid generation of steam and prevention of deposit of scale is the result.

It will be observed that the tubes are arranged sufficiently apart from each other to permit the products of combustion to impinge against the body of the boiler, so that the body is of itself a steam-generator, and the presence of the brick-work H from the back of the fire-place to the rear end of the generator causes the products of combustion to be brought into intimate contact both with the tubes and the body, thereby producing the best steam-generating effects.

The ends B and D may be simple hollow casings of wrought or cast iron, with partitions to direct the flow of water from the end of one tube to the end of the next; but I prefer to form these end pieces of cast-iron and to cast into the same bends *i'* for receiving the ends of the pipes, as shown in Fig. 1.

I claim—

1. A circulator, consisting of a series of parallel tubes communicating with each other and

with the boiler, and arranged in the form of an arch between the boiler and fire-place, substantially as set forth.

2. The cast-iron head E of the body, chambered as described, and having apertures communicating with the interior of the body, as set forth.

3. The casing I at the rear of the boiler communicating with the body and with the two lowermost tubes *p* of the circulator, as set forth.

4. The depression *m* of the said casing I, for the purpose specified.

5. The arched brick-work H, arranged within the arched tubular circulator, between the fire-

place and the rear of the boiler, so as to cause the products of combustion to impinge upon both the tubes and body of the boiler.

6. The arched pieces B and D, with and within which are cast bends *i'*, adapted to tubes, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN JOS. JORDAN.

Witnesses:

F. B. RICHARDS,

J. RUPERTUS.

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