

No. 673,414.

Patented May 7, 1901.

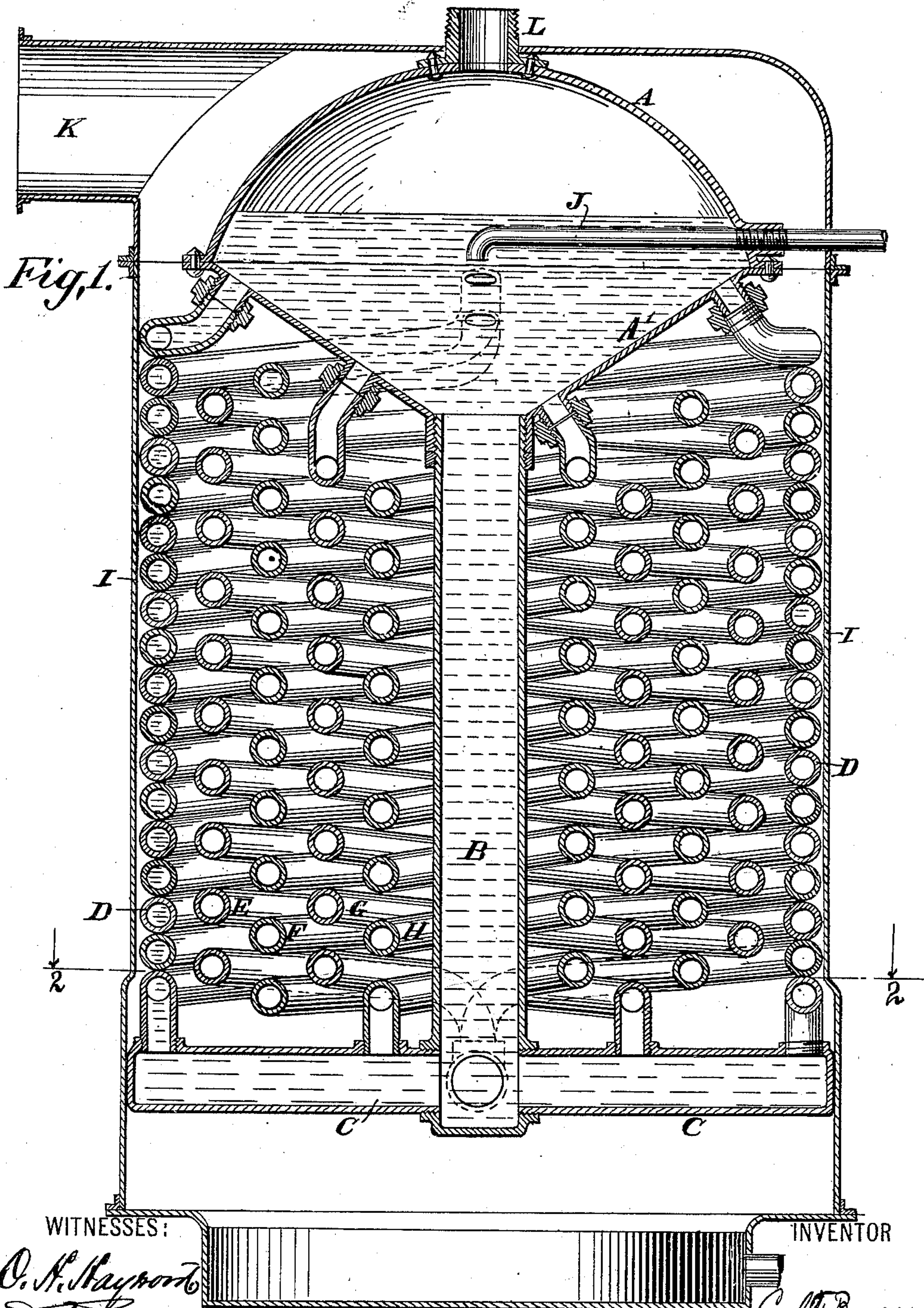
C. F. BERGMANN.

STEAM BOILER.

(Application filed Aug. 28, 1900.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

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INVENTOR

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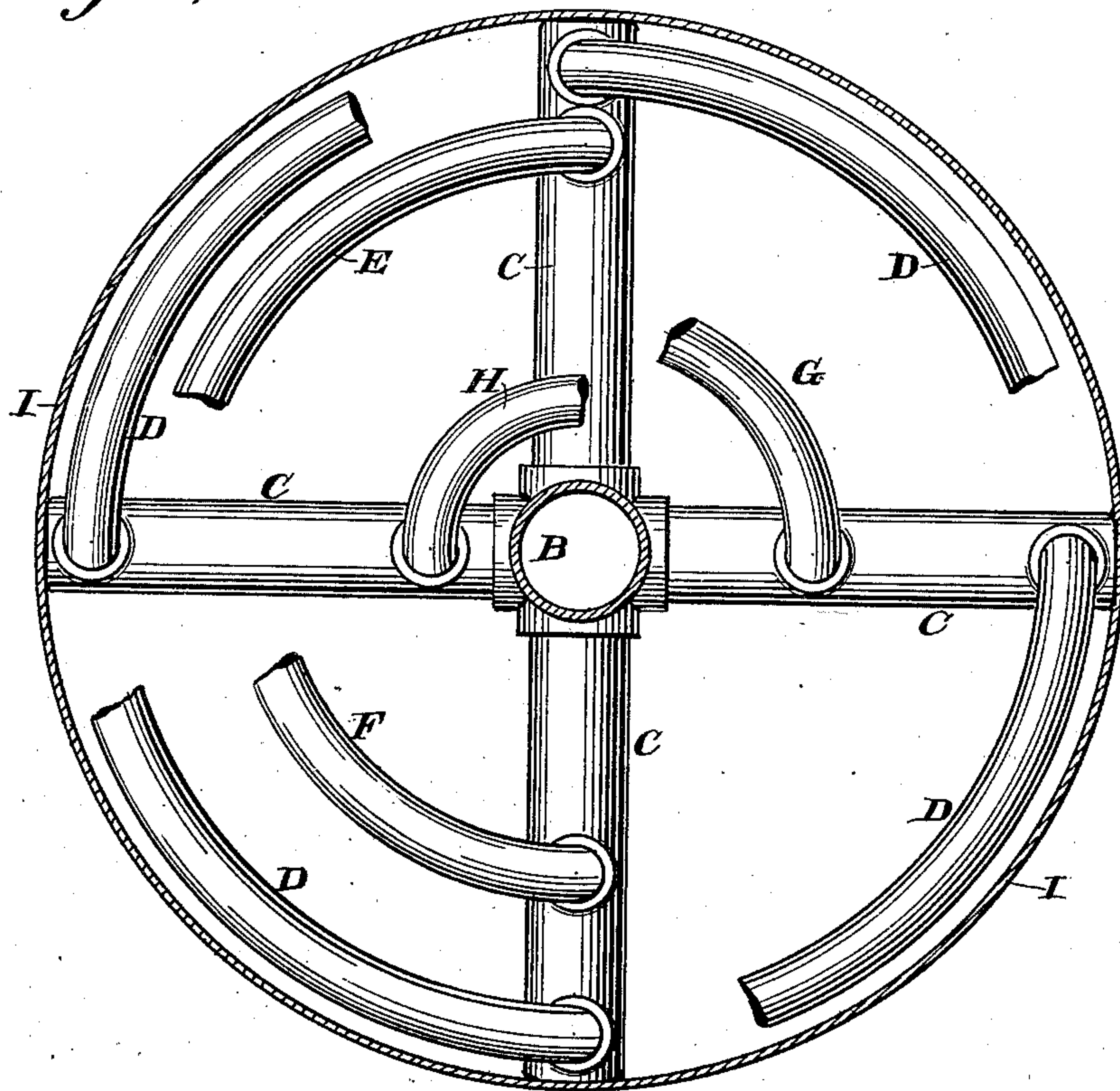
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2 Sheets—Sheet 2.

*Fig. 2,*



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# UNITED STATES PATENT OFFICE.

CARL F. BERGMANN, OF JERSEY CITY, NEW JERSEY.

## STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 673,414, dated May 7, 1901.

Application filed August 28, 1900. Serial No. 28,274. (No model.)

*To all whom it may concern:*

Be it known that I, CARL F. BERGMANN, of Jersey City, Hudson county, and State of New Jersey, have invented a new and useful Improvement in Steam-Boilers, of which the following is a specification.

My invention relates to an improvement in that class of steam-boilers commonly known as "pipe-boilers," and comprises certain novel features, which will be hereinafter described, and particularly pointed out in the claims.

Figure 1 is a sectional elevation of my boiler. Fig. 2 is a plan and partial section taken approximately upon the line 2 2 of Fig. 1.

The construction of device shown in the accompanying drawings is the one which is now preferred by me, although this might be varied in some of its details without altering the scope of the invention. This boiler has four principal divisions—the dome, a water-column depending from said dome, legs extending transversely from the lower end of said water-column, and the coiled pipes extending from said legs upwardly toward the dome. The dome is formed by two plates, the upper plate A being preferably bent in the form of a section of a sphere, while the lower plate A' is preferably bent into the form of a cone. It is evident, however, that either of these might be spherical or conical in shape. The water-column B connects with the lower side of the dome and is the central portion of the boiler. The steam-discharge pipe L is connected centrally with the upper half of the dome. To the lower end of the water-column B are connected the transversely-extending water-legs C. I have herein shown four such legs, although the number thereof might be varied according to the size and the requirements of the boiler. To these legs are connected a series of helically-coiled pipes, which extend upward and at their upper ends connect with the lower half of the dome. A series of pipes D are coiled of the same diameter and quite open—that is, of a pitch which will cause consecutive coils to be at some distance from each other, so that several of these coils may be combined with each other, so as to form a substantially solid wall, as shown in Fig. 1. In the construction herein

shown four of these coils are used, one of the coils being connected with the outer ends of each of the water-legs C. By using a number of coils to form this outer wall the inclination of the coils is maintained, so as to secure a sufficiently rapid circulation of the water therein. If this outer wall were formed of a single coil, the inclination of this coil would be so slight that it would be practically impossible to secure an adequate circulation by relying solely upon the heat to create this circulation. A series of other coils E, F, G, and H are provided and located intermediate said outer wall and the central column B. These coils are of different diameters and are coiled open, so as to allow considerable space between consecutive coils of the same pipe, and are preferably coiled alternately in opposite directions, as clearly indicated in Fig. 1. This method of coiling the pipes causes the columns of heated gas which pass up through the pipes to be thoroughly mixed and broken up, so as to impinge upon all portions of the coils.

Feed-water is introduced to the boiler through a pipe J, which enters the dome and has its inner end turned downwardly over the water-column B, so as to discharge the jet of water into said column in the direction in which the water is desired to flow. This in itself acts as an aid to the circulation, which in some cases is considerable. The entire boiler is surrounded with a casing I of sheet metal or any other desired material to prevent the escape of gases. The outer wall formed by the coils D will largely prevent the escape of heat, but will not prevent the escape of gases. The upper end of the casing I connects with a discharge-pipe K, which leads to a stack or funnel of any convenient design. The lower end of the casing connects with the boiler-furnace, which may be of any convenient design and intended for the use of either coal, oil, or gas.

I claim—

1. A boiler having a combined water and steam dome, a water-column depending centrally from said dome, transverse legs extending from the lower end of the water-column, and helically-coiled pipes extending upwardly from the ends of the transverse legs



to a direct connection with the dome, said pipes combining to form an inclosing water-wall.

2. A boiler having a dome, a central water-column depending therefrom, transverse legs extending from the lower end of the water-column, helically-coiled pipes connecting the ends of said legs with the dome; said pipes having coils of the same diameter and of a pitch enabling them to intermesh to form a substantially solid wall and openly-spaced pipes connecting said legs with the dome at points intermediate the center and their ends.

3. A boiler having a dome formed of top and bottom coned plates united at their edges, a central depending water-column connected with the dome, transverse legs extending from the bottom of the water-column and helically-coiled pipes extending from the ends of the transverse legs to the dome and combining to form an exterior water-wall.

4. A boiler having a dome, a central water-column depending therefrom, transverse legs extending from the lower end of said column, helically-coiled pipes connecting the ends of said legs with the dome; said pipes having coils of the same diameter and of a pitch enabling them to intermesh to form a substantially solid wall, openly-coiled pipes connecting said legs with the dome at points intermediate the center and their ends and a water-feed discharging downward of the central column.

5. A boiler comprising a combined water and steam dome, a water-column of relatively small size depending therefrom, transverse legs extending from the lower end of said column, and pipes connecting the outer ends of said legs with the dome and lying alongside each other to form a substantially solid inclosing wall.

6. A boiler comprising a combined water

and steam dome, a water-column of relatively small size depending therefrom, transverse legs extending from the lower end of said column, pipes connecting the outer ends of said legs with the dome and lying alongside each other to form a substantially solid inclosing wall, and pipes connecting said legs with the dome intermediate said wall and column.

7. A boiler having a series of helically-coiled pipes; said pipes being coiled open and in helices of different diameters, the coils being alternately right and left handed, and circulating connections between opposite ends of said coils.

8. A boiler having a series of helically-coiled pipes, said pipes being coiled open and in helices of different diameters; the coils being alternately right and left handed, a drum connected with the upper ends of said pipes, a central column depending from the drum and transverse legs connecting said columns with the lower ends of the coils.

9. A boiler having a series of helically-coiled pipes, said pipes being coiled open and in helices of different diameters; the coils being alternately right and left handed, a drum connected with the upper ends of said pipes, a central column depending from the drum and transverse legs connecting said columns with the lower ends of the coils and a series of pipes coiled in equal helices of a greater diameter combined to form a substantially solid inclosing water-wall and connected with said legs and drum.

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

CARL F. BERGMANN.

Witnesses:

H. L. REYNOLDS,  
CHAS. J. RATHJEN.