

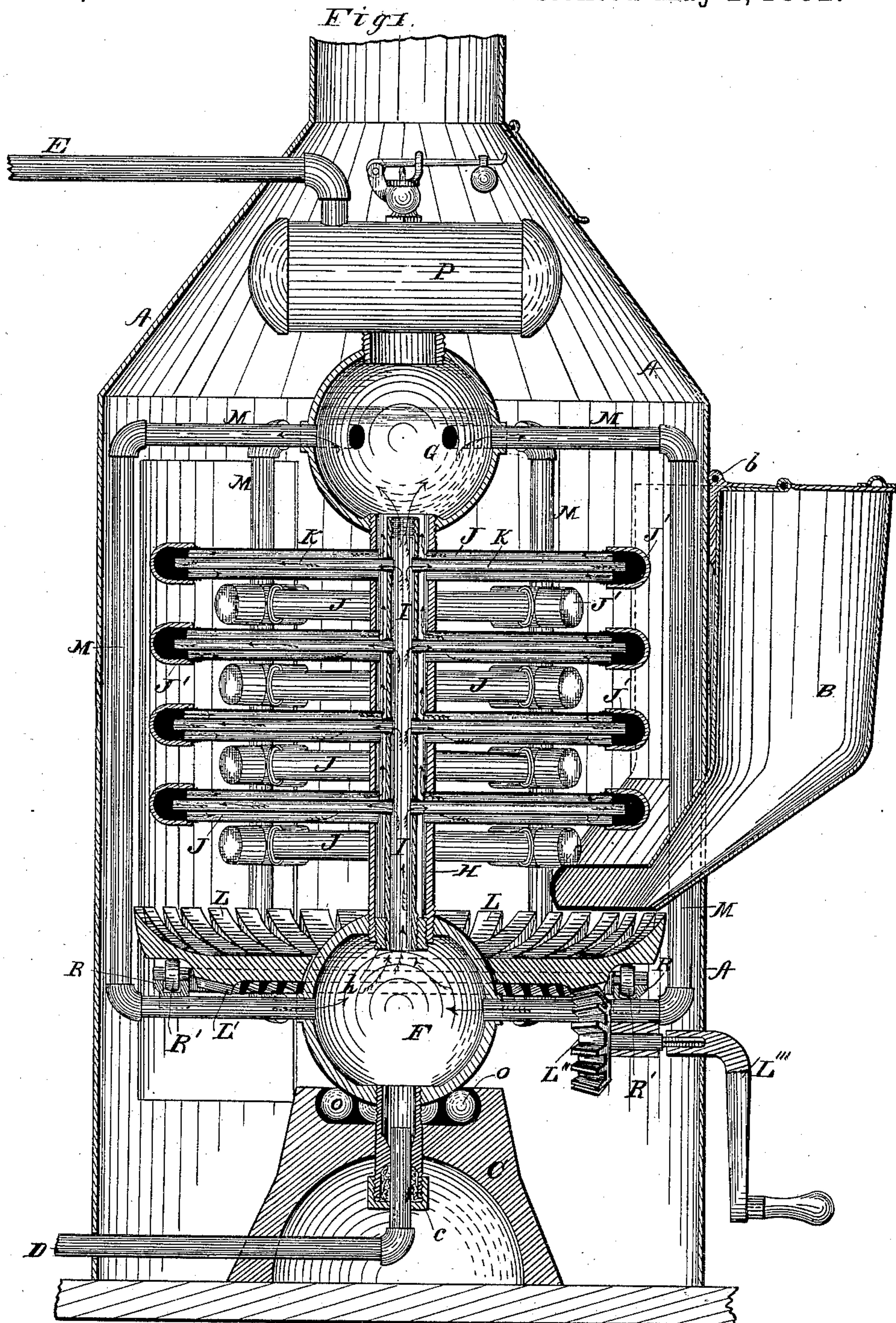
(No Model.)

2 Sheets—Sheet 1.

T. G. MORSE.
STEAM GENERATOR.

No. 257,236.

Patented May 2, 1882.



Witnesses
W. R. Edelen.
J. B. Whipple

Inventor.
Thomas G. Morse.
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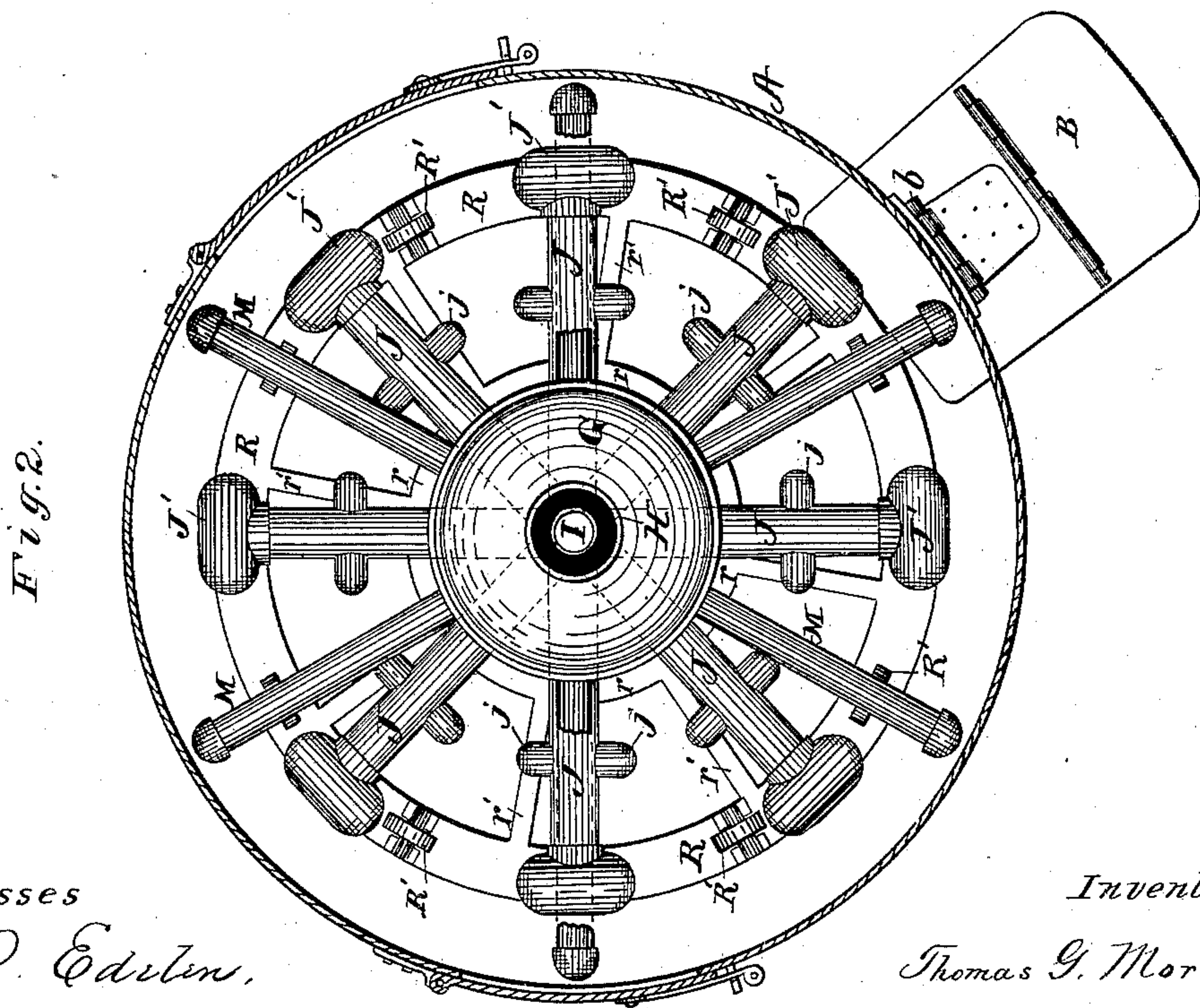
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UNITED STATES PATENT OFFICE.

THOMAS G. MORSE, OF ERIE, PENNSYLVANIA.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 257,236, dated May 2, 1882.

Application filed October 28, 1881. (No model.)

To all whom it may concern:

Be it known that I, THOMAS G. MORSE, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented new and useful Improvements in Steam and Hot-Water Generators; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and the letters or figures of reference marked thereon.

My invention consists in providing new and improved apparatus for the generating of steam for either heating or motor purposes, or the heating of water and the distribution of the same for heating or other purposes.

My invention relates to the construction of the boiler, the furnace, and the means for distributing hot water.

My device is shown in the accompanying drawings, as follows:

Figure 1 is a vertical section of all parts except the steam-dome, which is shown in elevation. Fig. 2 is a top or plan view of the boiler, the surrounding case A being in horizontal section, and the fire-grate being removed to show parts below it.

The construction and operation of my device are as follows:

First, of the boiler. Two hollow spheres, F and G, are connected together by a tube, H. The lower end of the tube H is plugged with a bush, h, into which is screwed an internal tube, I. This tube opens freely into the lower sphere, and into the upper sphere also, except when the boiler is used for heating and distributing water, when it is plugged at its upper end, as seen at i in Fig. 3. The tube H always opens freely into the sphere G. Horizontal tubes J radiate from the tube H at numerous points, and have within them tubes K, which radiate at corresponding points from the tube I. This arrangement is clearly shown in Fig. 1. At the outer extremity of the radial tubes J there is free access to the tubes K. Now we will suppose the device to be filled with water up to the water-lines shown in Fig. 1 in the sphere G, and that the outer surface of the spheres and the pipes H and J are exposed to heat. A movement of water will take place as follows: upward in the tubes H

and I, outward in the tubes K, and inward in the tubes J. By adding to the device tubes M, which connect the spheres F and G, an outlet is made for the water flowing to the sphere G back into the sphere F. It will thus be seen that I have provided for a perfect circulation of water through the boiler. It will also be seen that in proportion to the capacity of the boiler a very large area of heating-surface is obtained. The caps J' on the ends of the arms J may be extended laterally, as shown in Figs. 1 and 2, forming T's, and short branch pipe j, as shown in Fig. 2, may extend from the tubes J, and in this manner considerable more heating-surface may be obtained. In the construction of this boiler the spheres should be made of cast-metal and the tubes of lap-welded wrought-iron tubing of proper size. The caps J' will be made of cast metal. The parts will all be connected together by screw-threads. When so constructed the boiler will be very strong and capable of resisting a very great pressure. D is the supply-pipe, and enters the boiler at the bottom. When this boiler is used for generating steam, either at high or low pressure, it will be provided with a steam-dome, P, and safety-valve. E is the steam-pipe leading from the steam-dome.

This boiler may be mounted in various ways. In the drawings I have shown it mounted as follows: A surrounding case of metal or brick, A, has a centrally-located pedestal, C, within it. In the top of this pedestal is a recess containing a series of round balls, O. The lower sphere sets upon these balls, and the supply-pipe D connects with it centrally with a swivel-joint and stuffing-box c. When thus mounted the boiler can be revolved on its axis, the balls O acting as friction-rollers, and any one of the radial arms can be brought to the door in the case A. Such a movement will only be necessary when it is desirable to remove any of the tubes for repair. When this is done the fuel-magazine must be withdrawn from the case, and certain connections may have to be loosened—as, for example, the steam-pipe E, if attached, as shown in Fig. 1; but it is obvious that attachments may be made so as not to be disturbed.

Second, of the furnace. The case A, above referred to, constitutes the walls of the fur-

nace. It may be made of masonry or of sheet metal. As shown it is circular. A circular grate, L, is mounted so as to surround the lower sphere, F. It rests upon rollers R', which
 5 are mounted on an annular frame, R, which is supported by the sphere F and pipes M. The lower side of the grate is provided with cog-gearing L', which gears with a pinion, L'', which is rotated by a detachable crank, L''', on the
 10 outside of the case. By this arrangement the grate can be rotated, and the fuel put in at the door or other opening at one side can be carried around to the opposite side, and thus the fire can be kept even and uniform all around.
 15 A fuel-magazine, B, may be placed at one side with a spout entering the furnace, and when the grate is revolved the fuel will feed down therefrom automatically and uniformly over the surface of the grate. This will be very
 20 convenient when fine coal or sawdust is used as a fuel. The magazine B is shown hinged at b, so it can be drawn back out of the furnace when it is desired to rotate the boiler, as above described.
 25 The plug i may be used when the boiler is generating steam; but it is better not to do so, as the circulation of the water is sufficient without it, and would probably be too violent with it. The spheres F and G, as such, are
 30 not essential elements; but by their use chambers are obtained which are advantageous, the lower one serving as a mud-drum, and the upper one affording a steam-space. When the boiler is used for heating water only the up-
 35 per sphere is wholly unnecessary; but the lower one is always desirable as a mud-drum.
 To the means of circulating the water or steam in heating apparatus I make no claim in this application, but reserve my right to
 40 make a separate application therefor.
 I am aware that it is not new to arrange one pipe within another, substantially as shown, for the purpose of obtaining a free circulation of steam or water.
 45 I am aware that it is old to revolve a boiler upon a supply-pipe by means of a swivel-joint; am also aware that it is old to provide a boiler with a vertical tube having another tube contained therein, said inner tube being closed at
 50 the bottom and provided with a series of tubes radiating from near its bottom and surrounded by a similar series radiating from the outer vertical tube; also, that it is old to provide the
 55 ends of the outer radial tubes with globular projections, which furnishes a greater area for the heat to act upon; and these parts I do not claim, as they all differ from mine in that, first, the grate is not inclosed and supported by an
 60 outer series of tubes, nor are the grate and tubes revolved together; second, that the radial tubes are not arranged in series along the whole length of the vertical tubes, thus affording a greater area for the heat to act upon; third, that the inner vertical tube, which is
 65 liable to clog, does not open into a mud-drum; fourth, that the globular ends to the outer ra-

dial tubes are hard to remove when it is desired to clean the flues, while my T ends can be readily removed, owing to the fact that a hand could easily grasp and obtain a hold upon
 70 the parts.

I claim—

1. In a steam-generator, the combination of a certain vertical tube containing a second central vertical tube, with tubes radiating from
 75 the outer vertical tube in series, arranged at stated intervals, and having tubes contained therein, substantially as shown, and radiating from the inner central vertical tube, substantially as set forth.

2. In a steam-generator, the combination of a central vertical tube containing a second vertical tube having its lower end opening into a mud-drum, with tubes radiating from
 85 the outer vertical tube in series, arranged at stated intervals, and having tubes contained therein, substantially as shown, and radiating from the inner central vertical tube, substantially as described, and for the purpose set forth.

3. In a steam-generator, the combination of a central vertical tube containing a second vertical tube, and having a mud-drum attached to the bottom and a steam-chamber at
 95 the top, with tubes radiating from the outer vertical tube in series, arranged at stated intervals, and having contained therein tubes radiating from the inner vertical tube, substantially as described.

4. In a steam-generator, the combination of
 100 a central vertical tube containing a second vertical tube, and having a mud-drum attached to the bottom and a steam-chamber at the top, with tubes radiating from the outer vertical tubes in series, arranged at stated inter-
 105 vals, and having contained therein tubes radiating from the inner vertical tube, and a series of communicating tubes connecting the steam-chamber and the mud-drum, substantially as described.

5. In a steam or hot-water generating boiler which has two concentric vertical tubes and tubes radiating from each of said tubes con-
 110 centrically, the combination, with the outer radial tubes, of T-shaped caps J' at their outer
 115 extremities, substantially as and for the purposes mentioned.

6. In a steam-generator, a system of tubes for the circulation of water, having a grate ar-
 120 ranged within and partly supported upon the outer series of tubes, substantially in the manner described, and for the purpose set forth.

7. In a steam-generator, a system of tubes for the circulation of water, having a grate ar-
 125 ranged within and partly upon the outer series of tubes, and the whole mounted upon and in combination with a swivel-joint on the supply-pipe, in the manner substantially as described, and for the purpose set forth.

8. In a steam or hot-water generating boiler
 130 having the tubes H and I and J and K, and the sphere or chamber F, the combination

therewith of the pedestal C, friction-rollers O, and swivel-joint c, substantially as and for the purposes set forth.

9. In a steam or hot-water generating boiler the combination, substantially as and for the purposes set forth, of the following elements: the upright pipes H and I, the radial pipes J and K, the chambers F and G, the connecting-pipes M, the pedestal C, friction-rollers O, supply-pipe D, and swivel-joint c.

10. A steam or hot-water generator consisting of the combination, substantially as described, of the following elements: a boiler consisting of the tubes H I J K M and spheres F and G, arranged together substantially in the manner specified, a furnace consisting of

the case A, magazine B, grate L, grate-mountings R R', and grate-actuating mechanism L' L'' L'''.

11. In a steam or hot-water generating apparatus, the combination, substantially as described, of the following elements: the case A, grate L, grate-mountings R R', grate-actuating devices L' L'' L''', boiler-mountings C and O, and boiler F G H I J K M.

In testimony that I claim the foregoing I have hereunto set my hand this 17th day of October, 1881.

THOMAS G. MORSE.

Witnesses:

JNO. K. HALLOCK,
C. SMALLEY.