

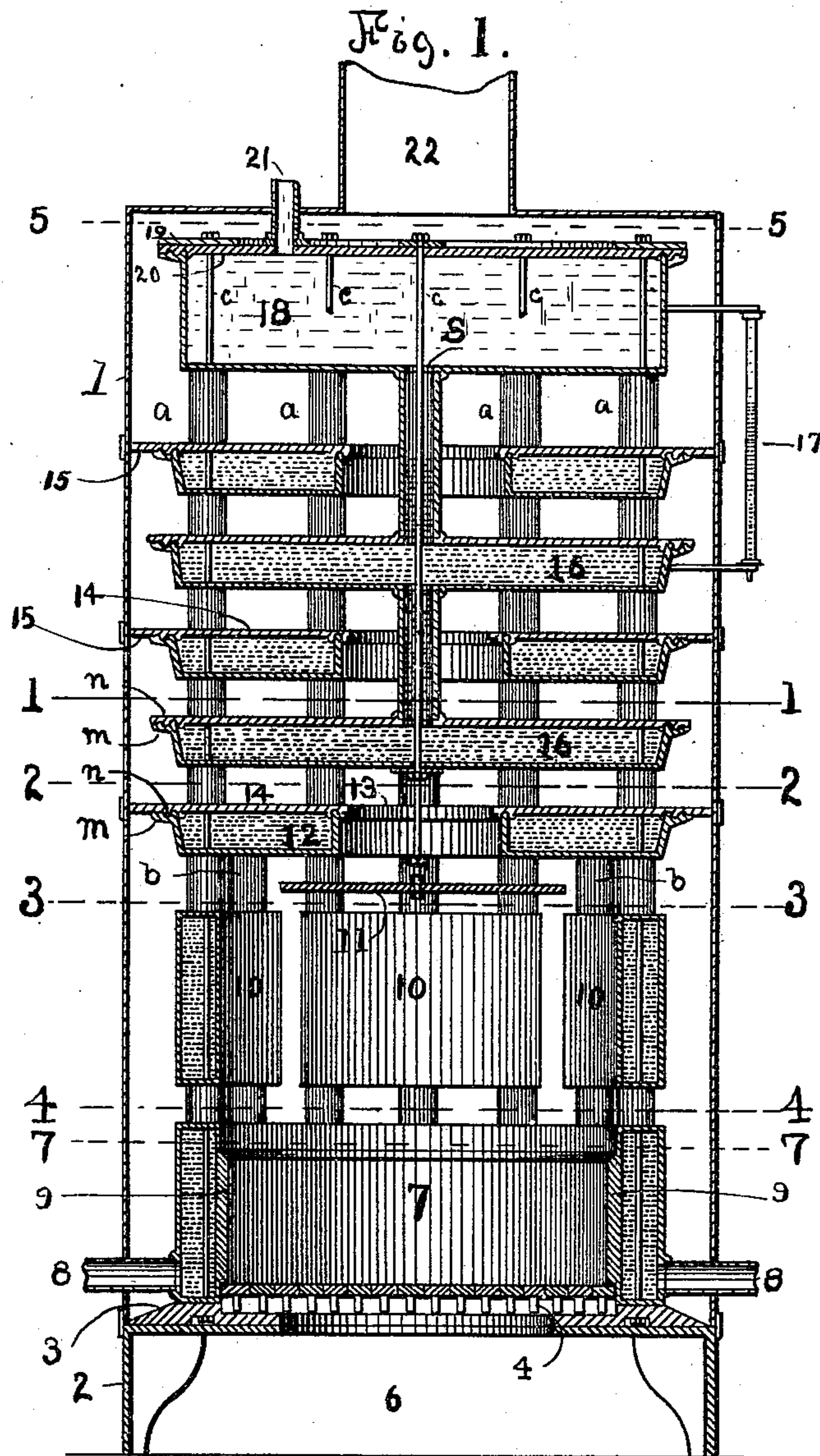
(No Model.)

3 Sheets—Sheet 1.

J. MICHAELSON & W. REID.  
HEATER.

No. 543,039.

Patented July 23, 1895.



Witnesses:

*Geo. H. Harvey*  
*J. H. Beal*

Inventors

*Joseph Michaelson*  
*and William Reid,*  
*by their Attorney,*  
*Wm. L. Pierce.*

(No Model.)

3 Sheets—Sheet 2.

J. MICHAELSON & W. REID.  
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Fig. 4.

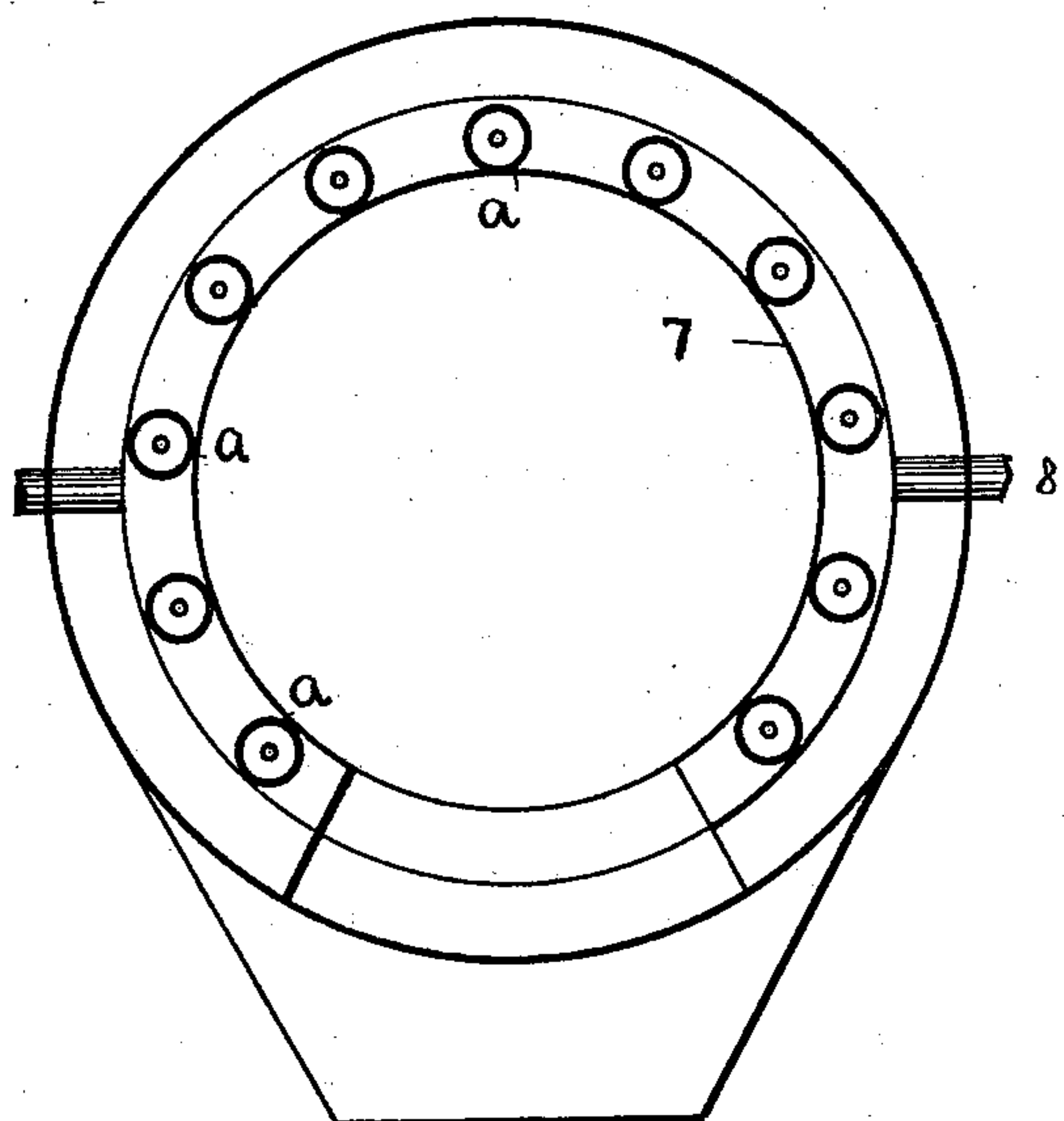


Fig. 3.

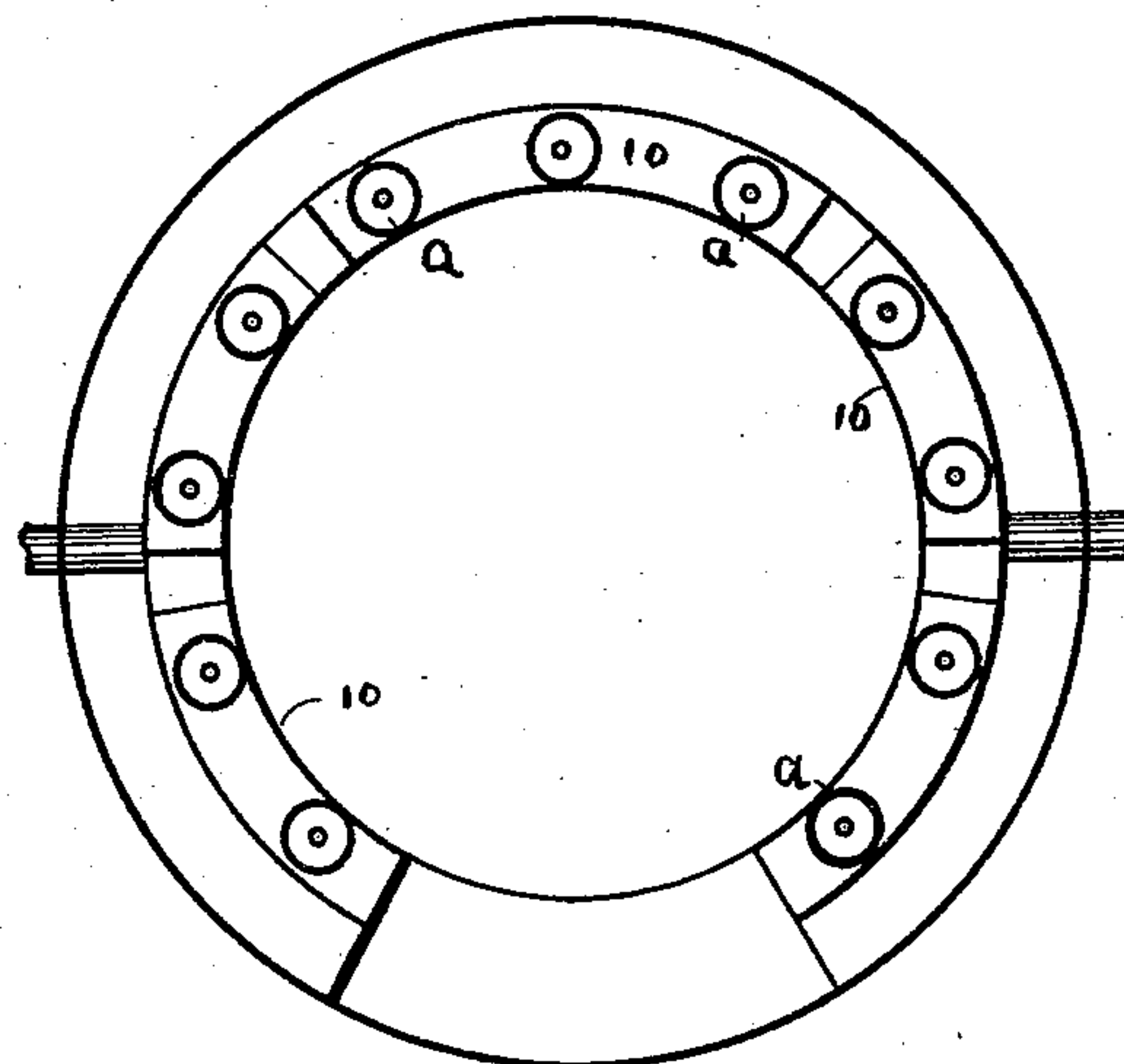


Fig. 2.

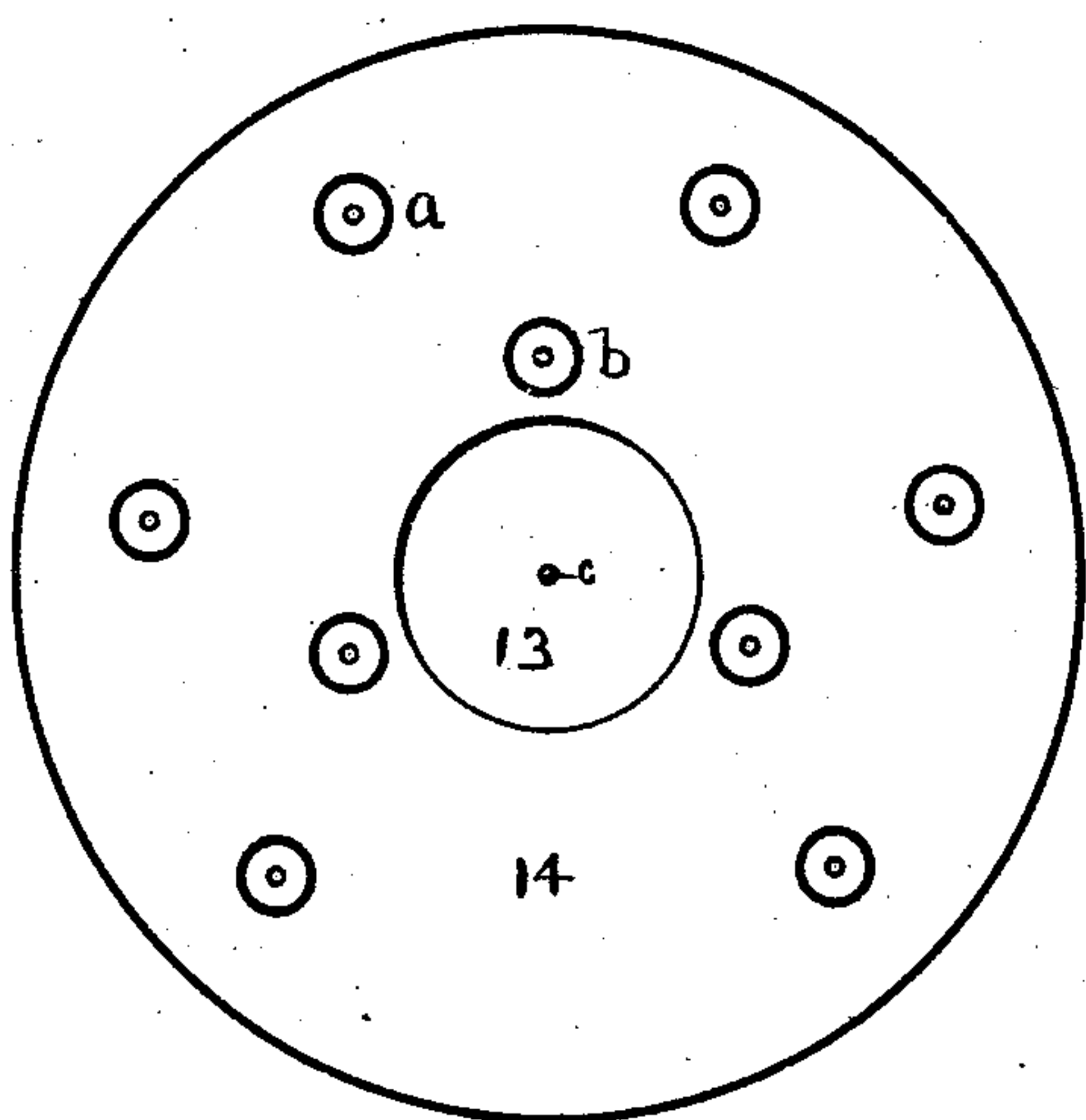
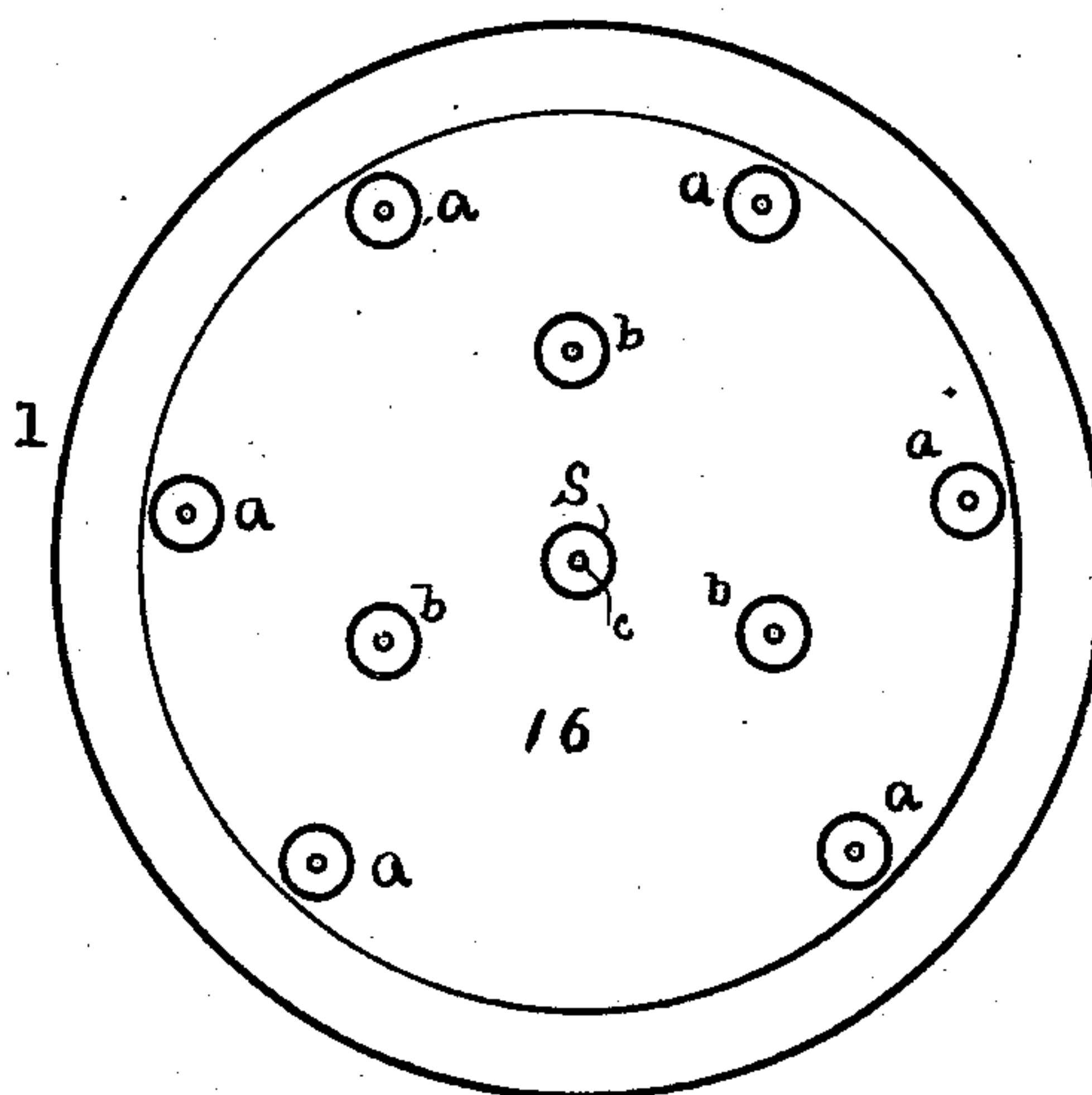


Fig. 1<sup>a</sup>.



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Fig. 6.

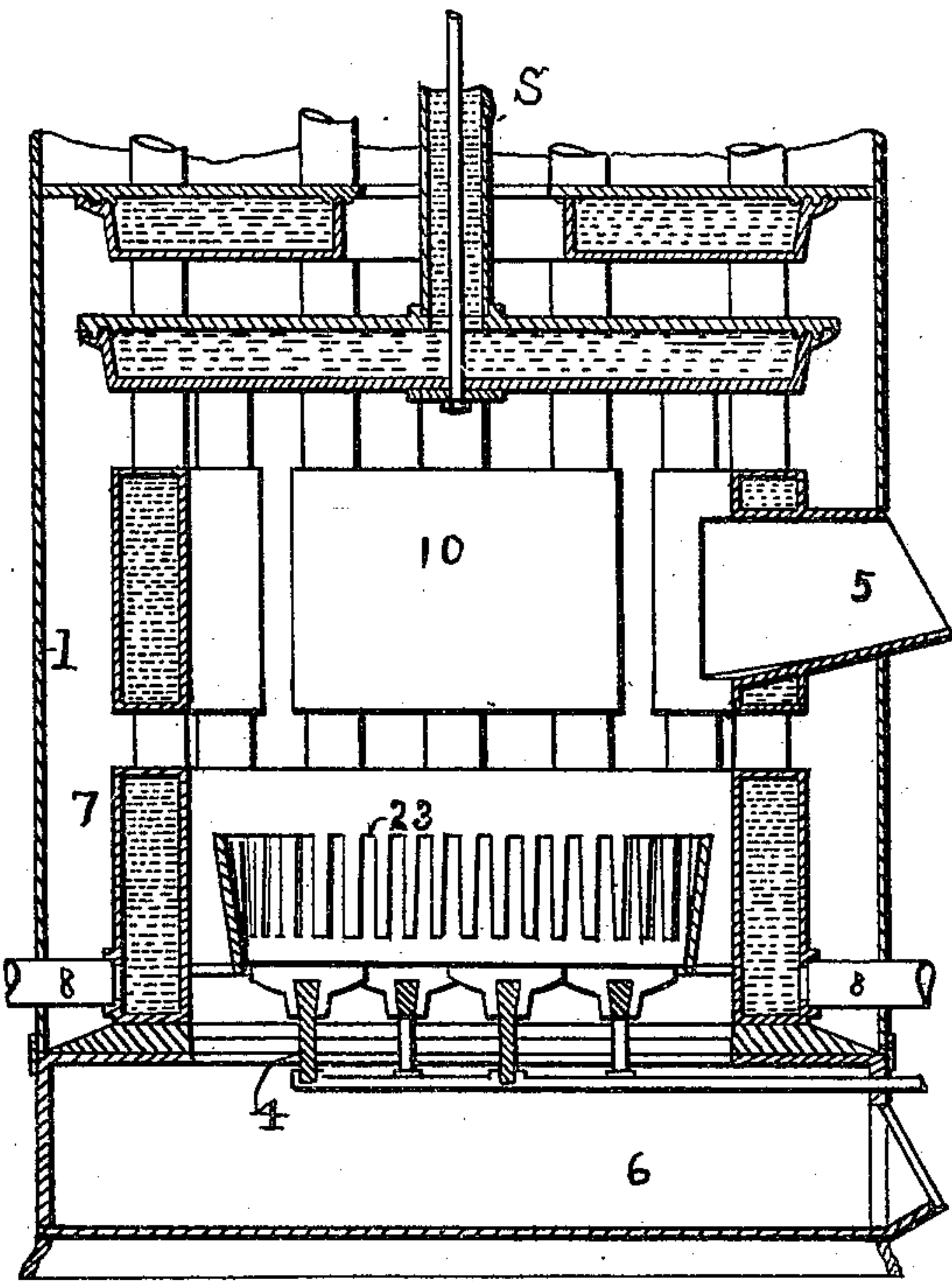


Fig. 7.

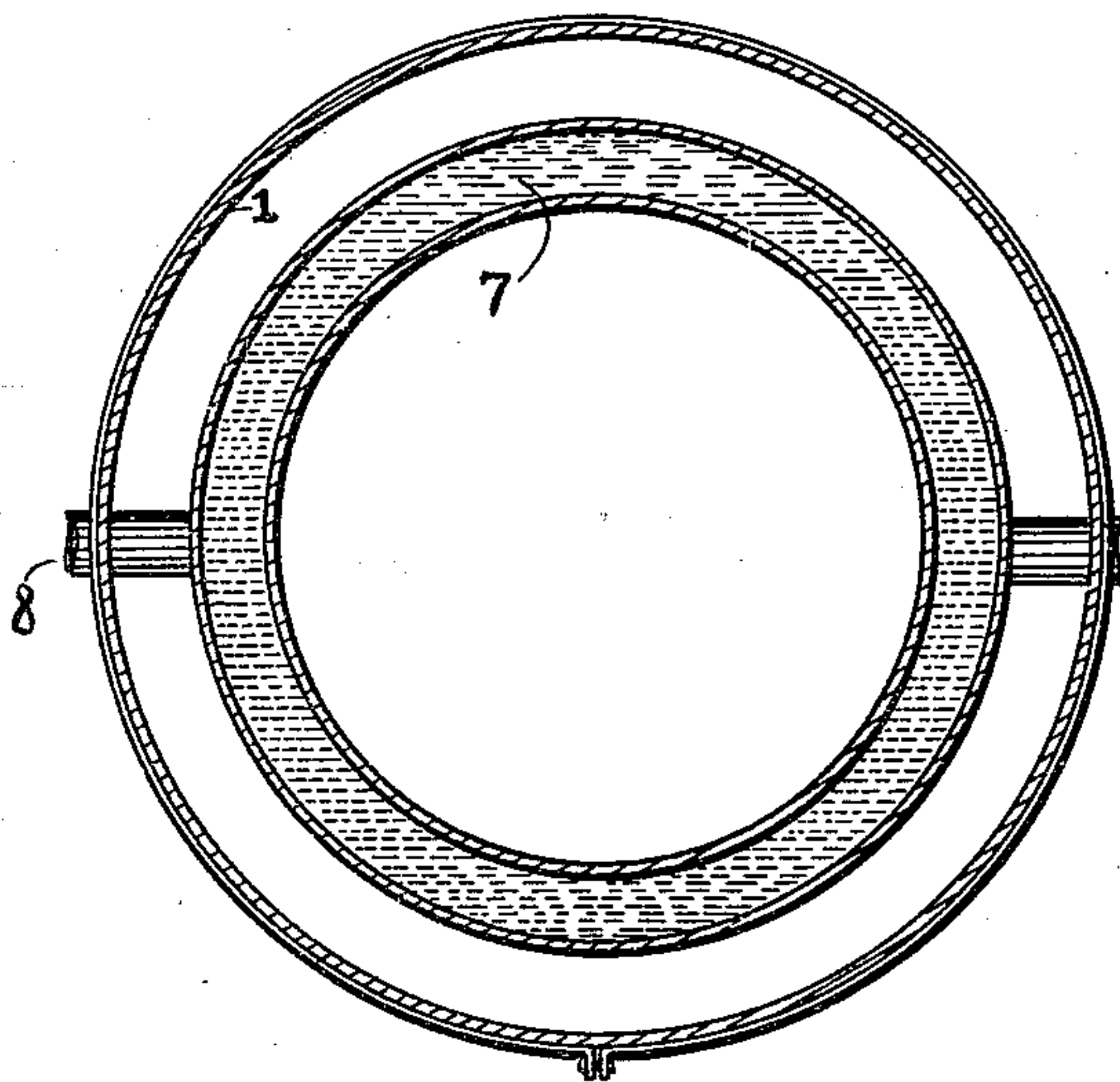


Fig. 9.

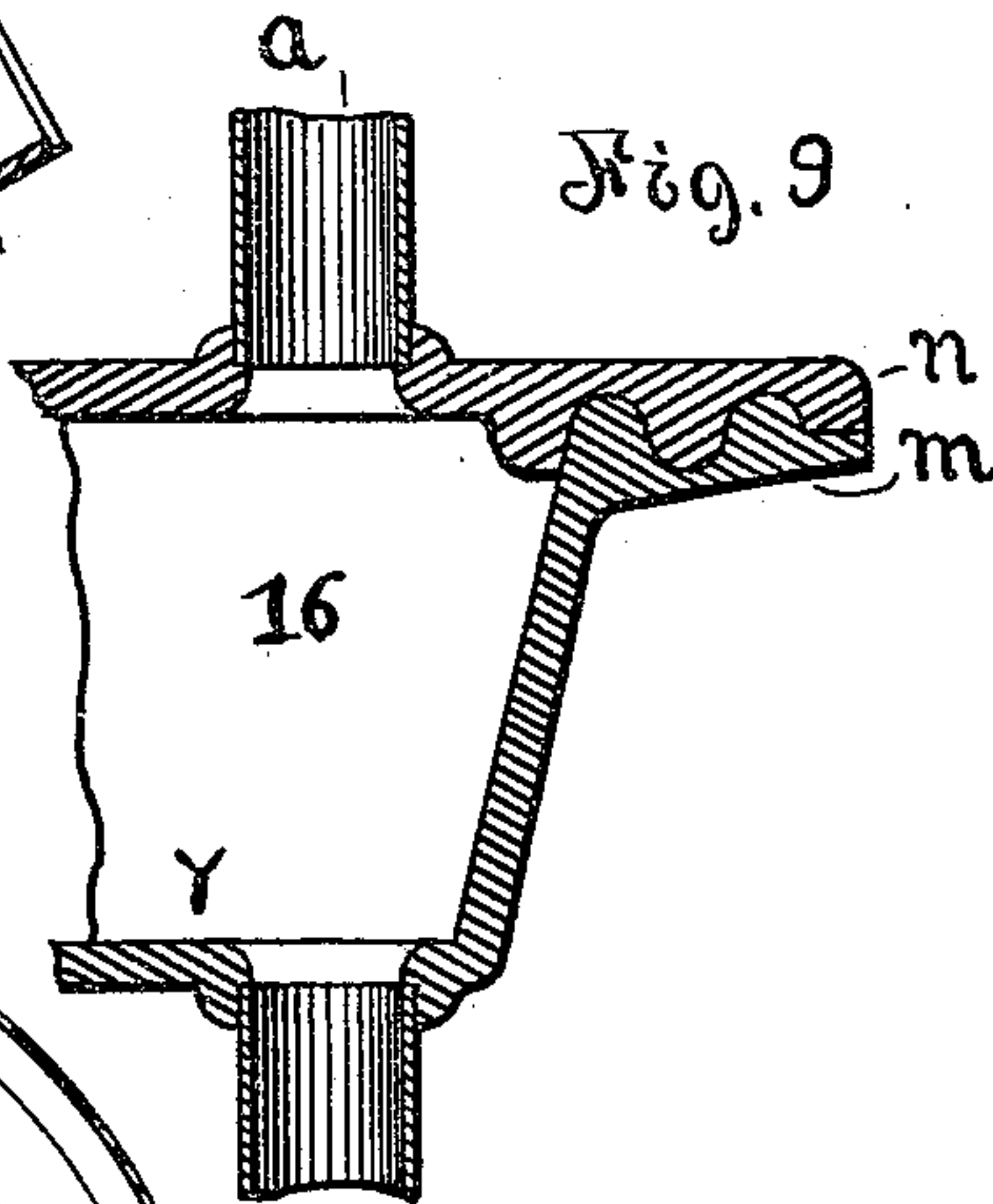


Fig. 8.

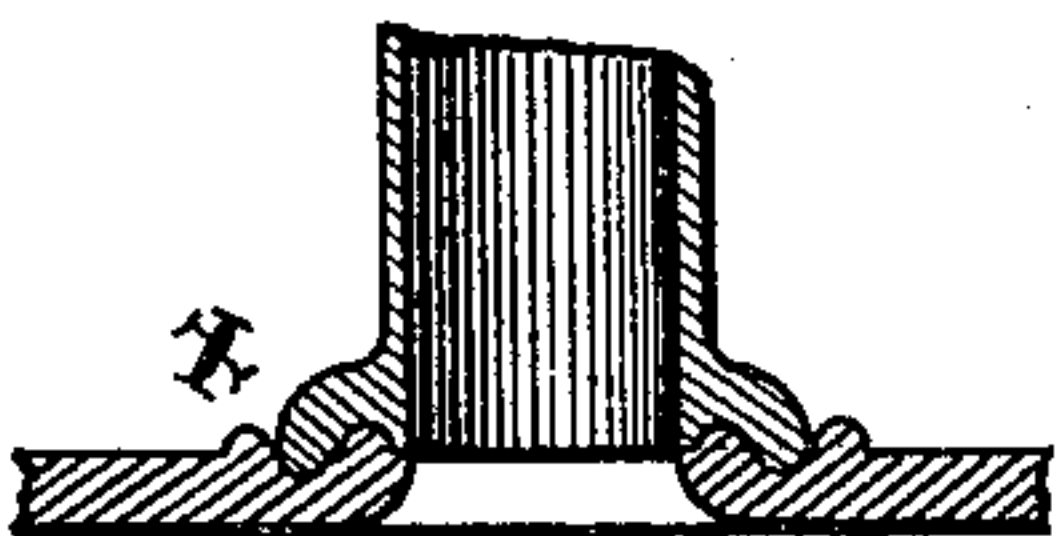
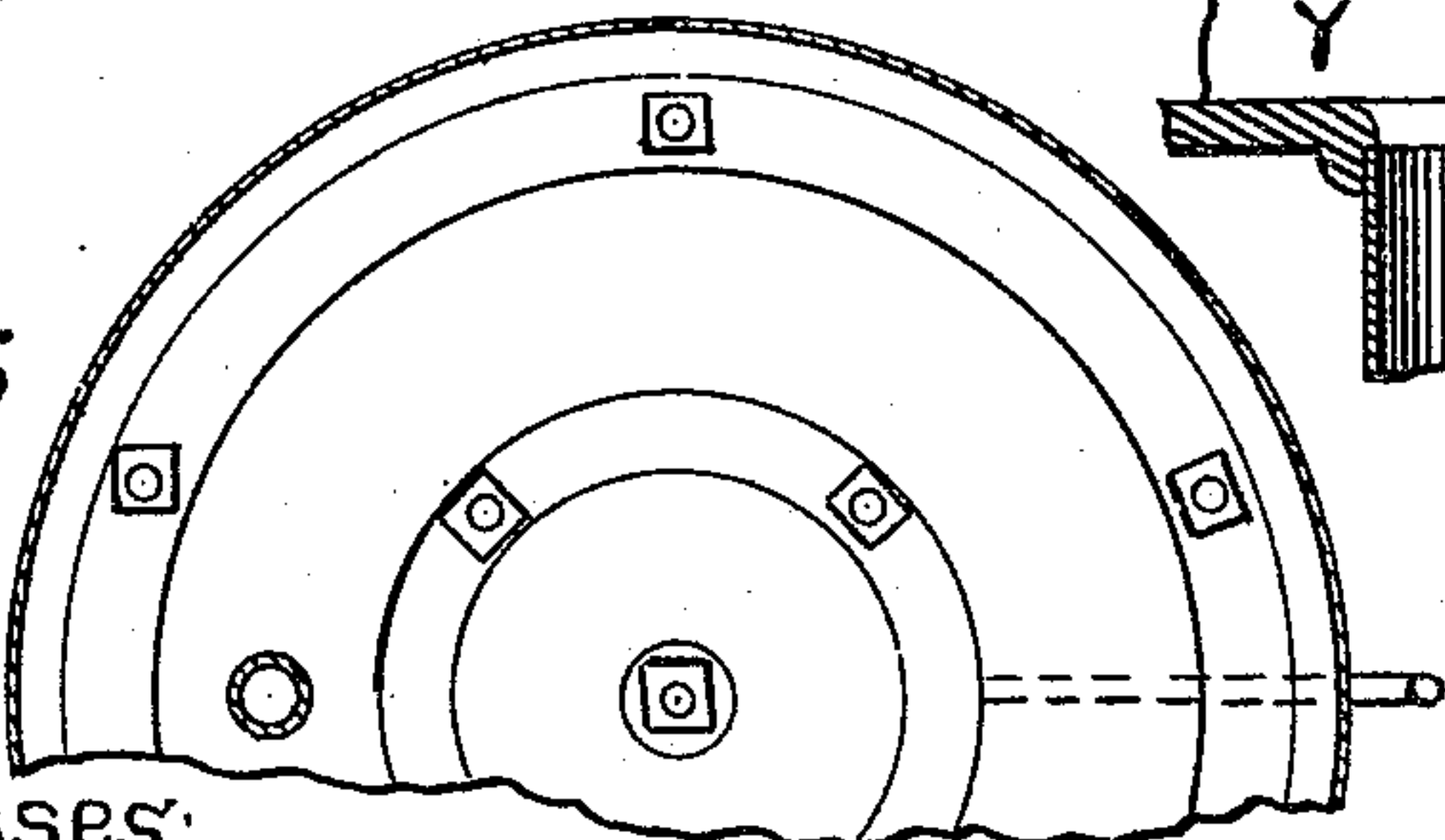


Fig. 5.



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# UNITED STATES PATENT OFFICE.

JOSEPH MICHAELSON, OF NEW BRIGHTON, PENNSYLVANIA, AND WILLIAM REID, OF GENEVA, NEW YORK.

## HEATER.

SPECIFICATION forming part of Letters Patent No. 543,039, dated July 23, 1895.

Application filed June 23, 1894. Serial No. 616,537. (No model.)

*To all whom it may concern:*

Be it known that we, JOSEPH MICHAELSON, residing at New Brighton, Beaver county, Pennsylvania, and WILLIAM REID, residing at Geneva, Ontario county, New York, citizens of the United States, have invented or discovered new and useful Improvements in Heaters, of which the following is a specification.

In the accompanying drawings, which make part of this specification, Figure 1 is a vertical section of heater; Fig. 1<sup>a</sup>, a section on line 1 1 of Fig. 1; Fig. 2, a section on line 2 2 of same; Fig. 3, a section on line 3 3 of same; Fig. 4, a section on line 4 4 of same; Fig. 5, a broken-away section on line 5 5 of same. Fig. 6 is a vertical section of a modification. Fig. 7 is a horizontal section on line 7 7 of Fig. 1 showing a circular water-section. Fig. 8 is a detail showing joint between tube and section of heater, and Fig. 9 a detail showing modified joint between tube and section of heater and between top and bottom castings of a section.

Our invention relates to an improvement in steam or hot-water heaters, and the general purposes thereof are to construct a heater from few patterns, easily molded, and therefore inexpensive; also to obtain a vertical circulation of the water; also to secure all horizontal joints; also to arrange the parts of the heaters so that all portions of each section shall be exposed to the action of the heat; also to make a sectional heater which can be readily set up, taken down, repaired, or receive a substituted part.

In the accompanying drawings, which make part of this specification, 1 is the casing of the heater.

2 is the cast-iron base.

3 is a ring resting upon base and acting to distribute the weight equally. Said ring has on the under side square recesses to receive the nuts which are at the lower ends of vertical binding-rods.

4 is the grate, of any approved construction. It may be circular or of any desired shape.

5 is the frame for charging-door.

6 is the ash-pit.

7 is the lower fire-chamber section supplied

by feed-pipes 8 8. It may be horseshoe, circular, or any desired shape. It is here shown as a hollow ring cast with a core and supported upon ring 3. It is preferably provided with inwardly-projecting ribs 9 9, which keep the fuel from immediate contact with the cold feed-water in section 7. Otherwise the combustion would be retarded. Rising from said feed-section 7 are a series of vertical water-tubes, here shown as eleven in number. Six of them, *a a*, are aligned clear through to the steam and water dome, while five of them, *b b*, are aligned only to the first main section of the heater. These tubes are of cast or wrought iron, and are jointed into the sections either as shown by the flanged joint at *x*, Fig. 8, or by the recessed seat and straight tube seen at *y*, Fig. 9.

Through the tubes *a a* and the intermediate sections of the heater extend the binding-rods *c c*, provided with locking-nuts at top and bottom. Like rods, similarly secured, extend through tubes *b b*. These rods give rigidity to the heater, binding the parts firmly together, and take all tension off the joints. It will be observed, however, that they are not in contact with the fire, but carefully protected by being run only in the water-tubes and water-sections. They can never rise above the temperature of the surrounding steam or hot water and oppose all tendency of joints to open.

The next section of the heater we prefer to make in segments 10 10, which constitute the upper fire-chamber section. By making it in segments the fire not only plays around it but through it, insuring a more rapid rise in temperature. The further purpose of this section is to increase the depth of the fire-chamber. These segments are also preferably core-jobs, but both these segments and the lower fire-chamber section may be molded without cores by casting in parts, like the main sections of the heater.

Centrally and immediately above the upper fire-chamber section is a plate 11, to protect the main sections from the immediate action of the flames. This is suspended upon one of the binding-rods.

The remainder of the heater proper is built up of pairs of sections, which we distinguish



as central flue and peripheral flue sections. The central flue-sections consist of a ring-shaped basin 12, with suitable openings to receive the water-tubes and a large central opening 13 for the upward passage of the smoke and gases. Around the upper periphery of said basin are molded one or more flanges *m m* to make the joint with the top plate 14, having corresponding grooves *n n*, as seen more clearly in Fig. 9, which, however, shows a peripheral flue-section. The top plate of the central flue-section projects, forming a horizontal peripheral flange 15, extending out to meet the casing of the heater. The peripheral flue-sections 16 16 are like the central flue-sections, except that they lack flange 15 and central opening 13. These different flue-sections are also connected by any desired number of water-tubes, and the pairs of these sections may be repeated until the desired capacity is secured in the heater. Starting with the lowest central flue-section are additional water-tubes *b b*, arranged around the center, here shown as three, aligned through to the steam and water dome. These are also provided with binding-rods *c c*.

S is a central water-tube, having rod *c*, aligned from lowest peripheral flue-section to steam and water dome. Said tube S connects peripheral flue-sections, takes the bending moment, and braces the large surfaces of said external flue-sections.

17 is the water-gage.

18 is the steam and water drum supported upon the various tubes and bearing peripheral ring 19 and internal ring 20, to receive bolts of binding-rods and distribute strain thereof, as seen clearly in Fig. 10.

21 is the outflow-pipe.

22 is the stack.

Fig. 6 is a vertical section shown as taken at right angles to Fig. 1. It differs from the heater shown in Fig. 1, in the following particulars: Instead of ribs 9 9, to keep fuel from contact with cold-water surfaces, this heater has a regular slotted fire-pot 22 to accomplish the same purpose. Plate 11 is also omitted. The principal change is that the heater above the fire-chamber is built up, commencing with a peripheral flue-section instead of a central flue-section, as in Fig. 1'.

The operation and advantages of the heater are already apparent from the previous description; but the following additional features may be noted: When used as a steam-heater, dome 18 may be employed as a super-heater. The two lower sections may be thrown into one, if found desirable. The feed of water is all vertical to take place of heated water rising in a vertical direction. The foundry-work is much simplified by the small

number of patterns which are easily molded and with simple joints. In some cases sufficient heat capacity may be developed without the use of the upper and lower fire-chamber sections shown in the drawings, and an ordinary fire-pot or equivalent device may take their place. The central flue and peripheral flue-sections may also be made as core-jobs, if desired, instead of being made with a removable cap.

Having described our invention, we claim—

1. In heaters the combination of an inclosing shell; a fire chamber; a horizontal water section with a peripheral flue; a horizontal water section with an internal flue, said latter section having a detachable cover extending to the wall of the casing, and acting as a flue ring.

2. In heaters, the combination of a water section forming the walls of the fire chamber; a horizontal water section with central flue, above said first section; a horizontal section with peripheral flue above said first horizontal section; a flue plate surrounding said first horizontal section, and water tubes connecting the several sections.

3. In heaters, the combination of a water section forming the walls of the fire chamber; a horizontal water section with central flue, above said first section; a horizontal section with peripheral flue above said first horizontal section; a flue plate surrounding said first horizontal section; a projecting plate below said first horizontal section, and water tubes connecting the several sections.

4. In sectional heaters, a horizontal section consisting of a ring-shaped dish with flue opening in the center and suitable opening for vertical water tubes and a detachable cover.

5. In sectional heaters, a horizontal dish-shaped section having a flue opening in the center and suitable openings for vertical water tubes and a cover united to said section by a tongue and groove joint.

6. In heaters, the combination of a steam and water dome; concentric rings resting upon said dome; horizontal water sections beneath said dome; vertical rods connecting said sections and bolted to said rings.

In testimony whereof we have hereunto set our hands this 28th day of May, A. D. 1894.

JOSEPH MICHAELSON.

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