

No. 672,279.

Patented Apr. 16, 1901.

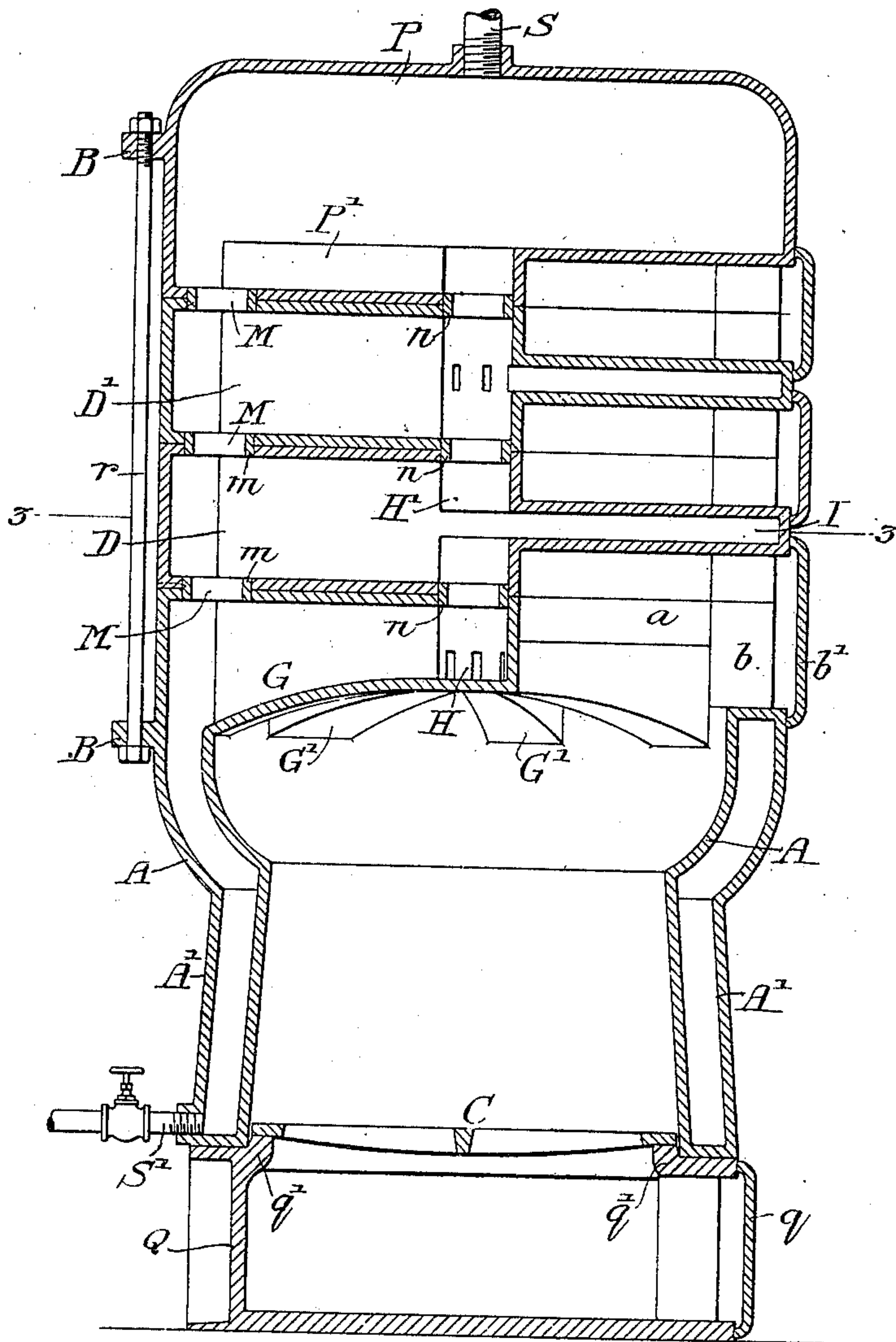
M. B. MOORE.
HORIZONTAL SECTIONAL BOILER.

(Application filed Nov. 14, 1900.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



Witnesses:-

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Wm. H. & Wm. H.

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Fig. 2.

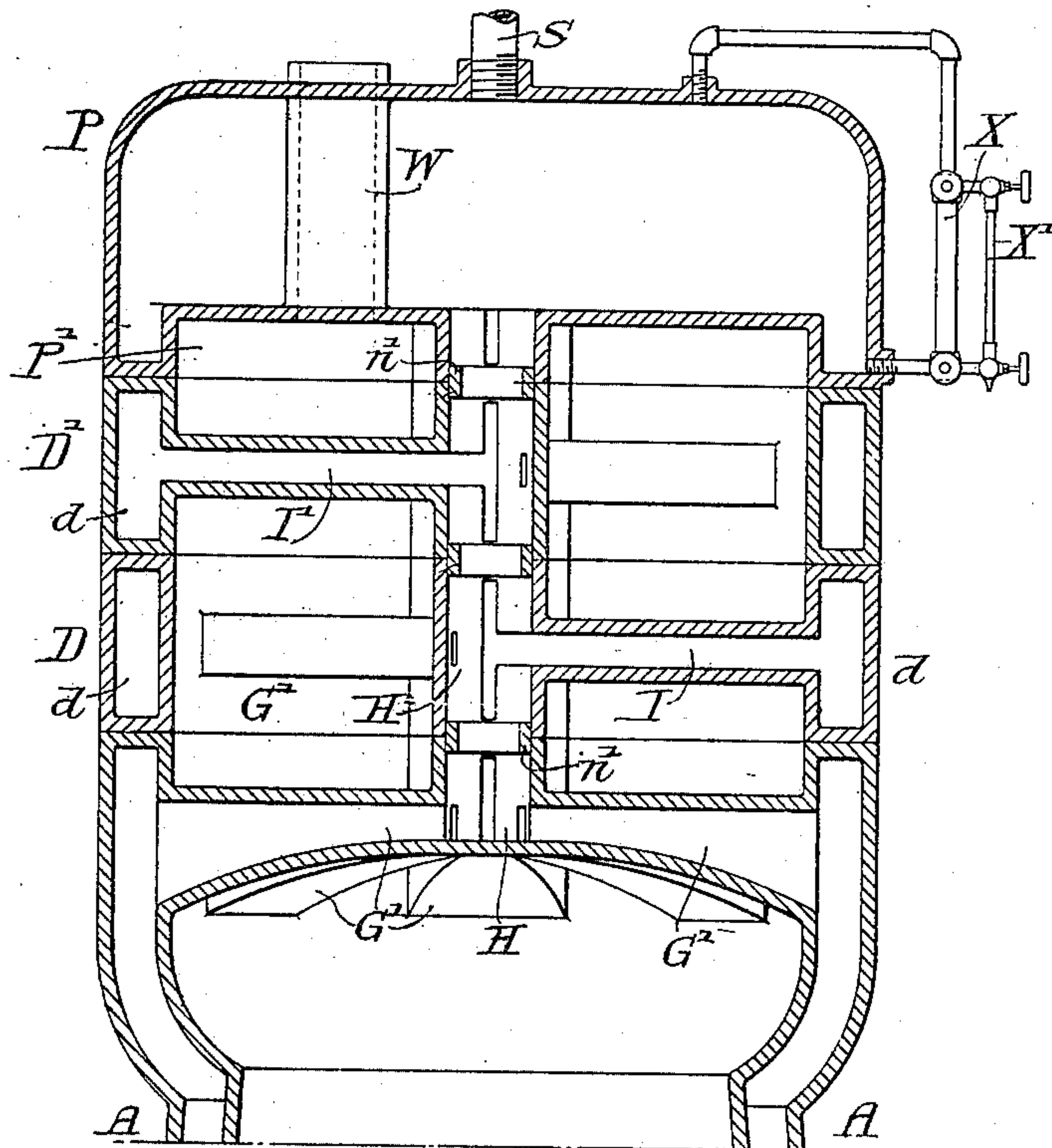
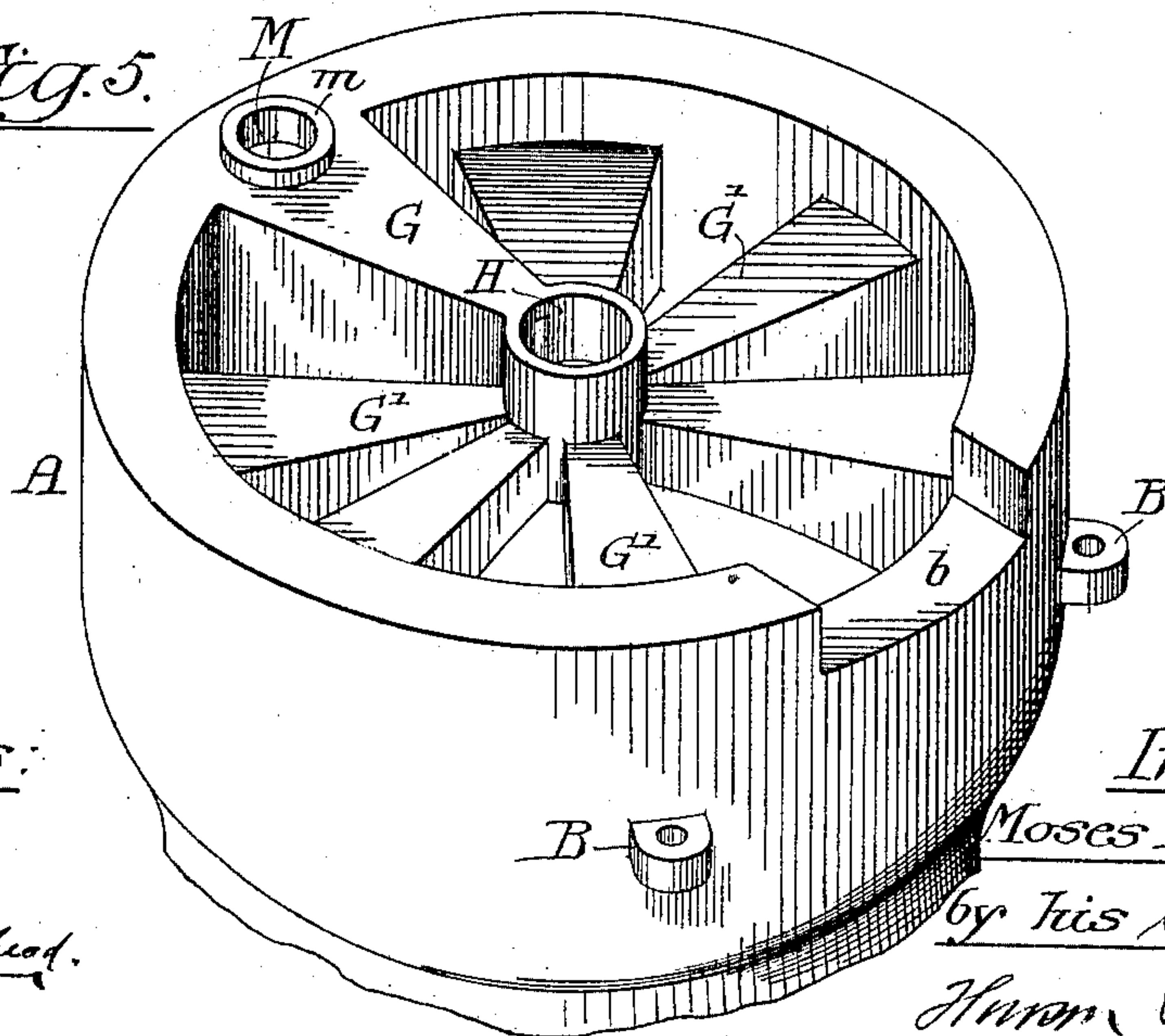


Fig. 5.



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Fig. 6.

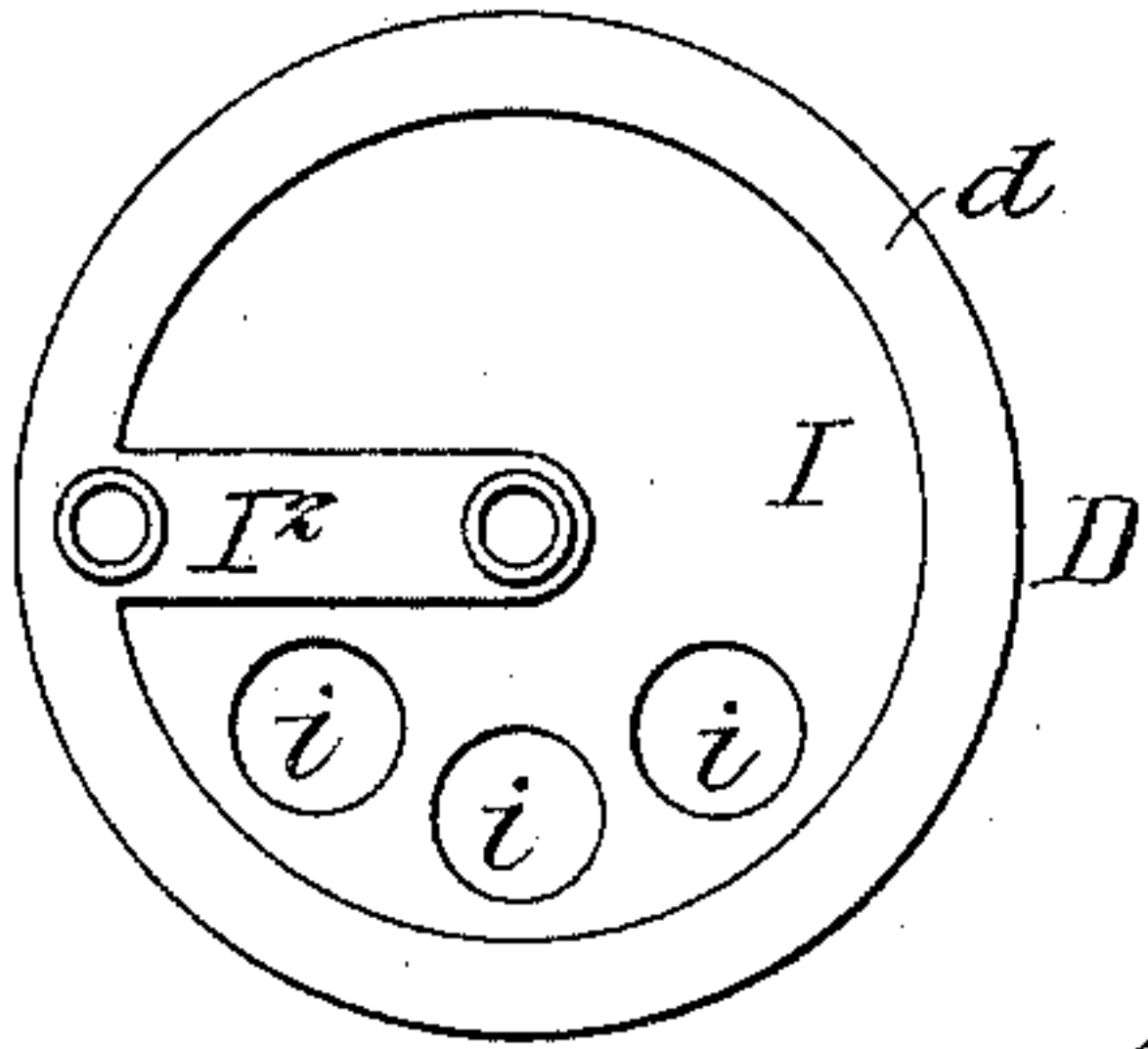


Fig. 7.

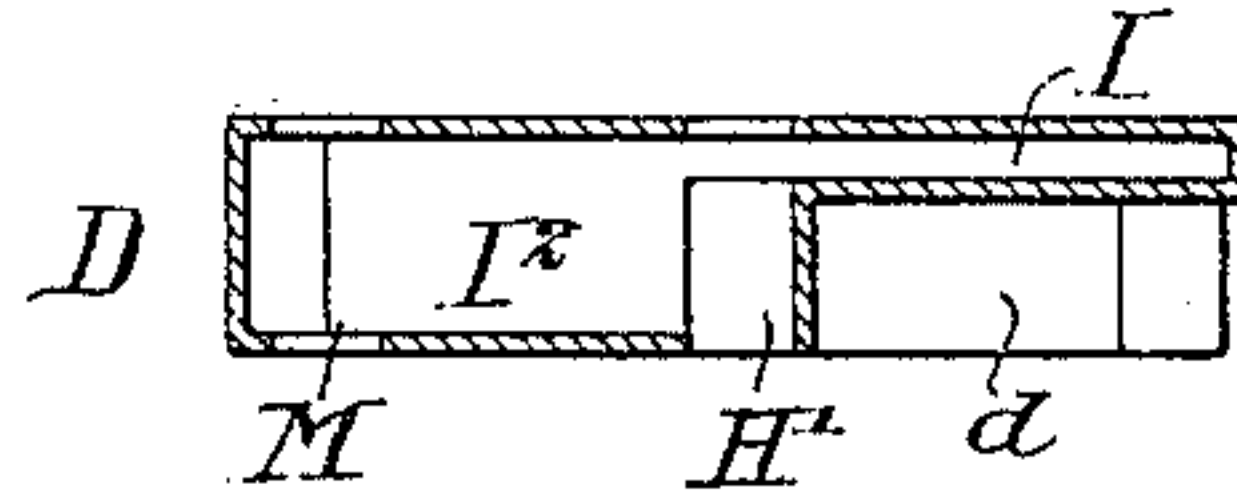


Fig. 5.

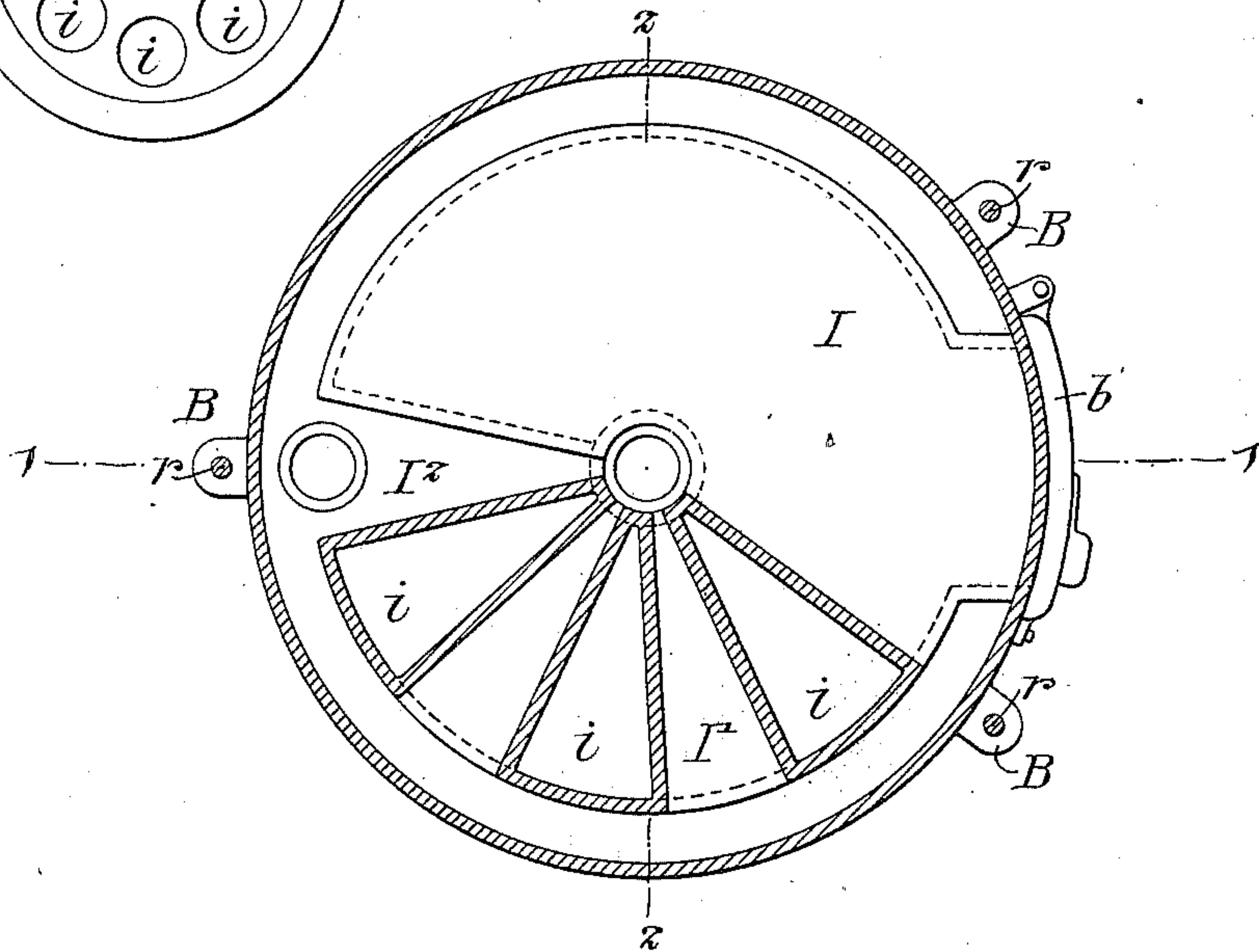
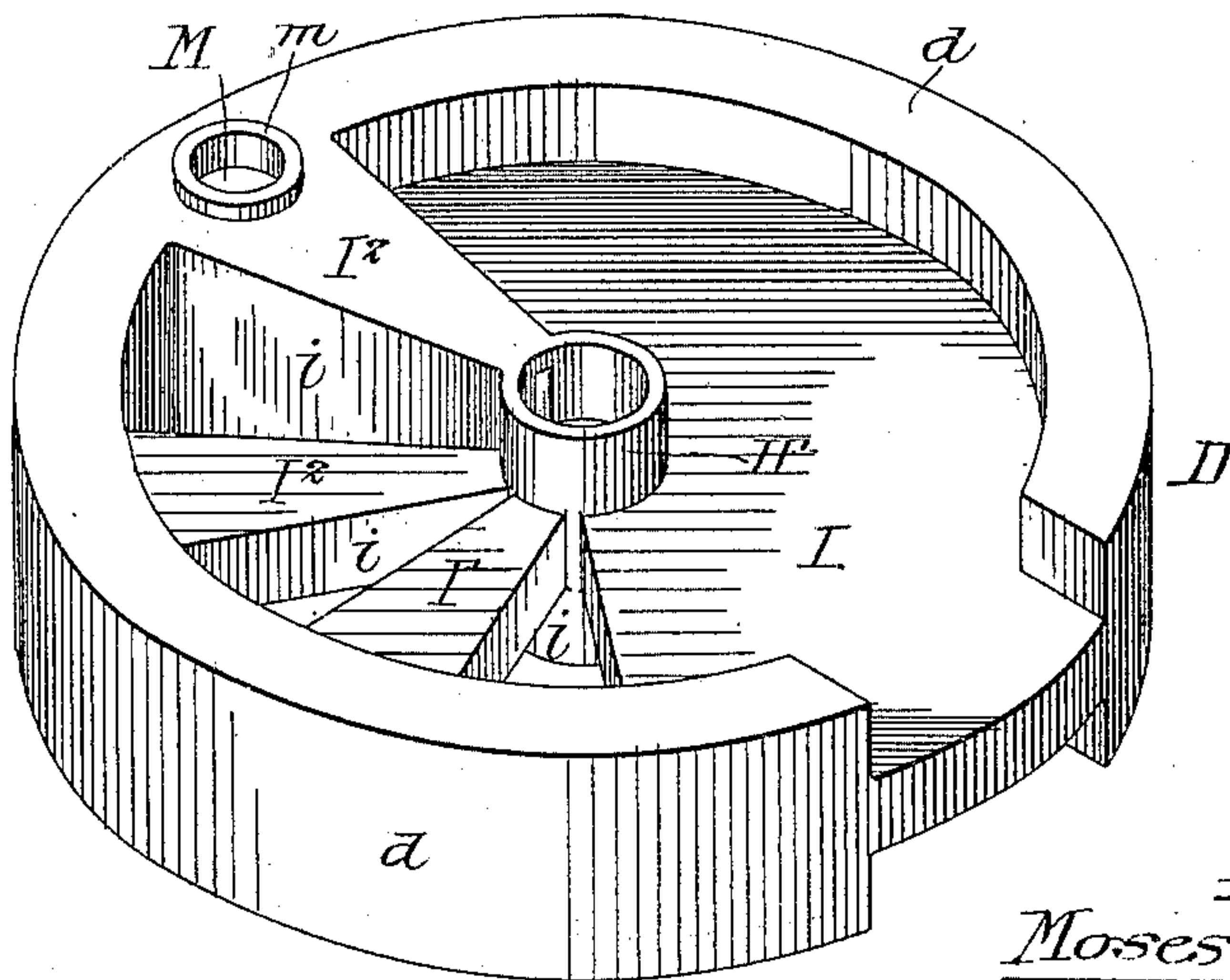


Fig. 4.



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by his Attorneys:

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UNITED STATES PATENT OFFICE.

MOSES B. MOORE, OF READING, PENNSYLVANIA, ASSIGNOR TO PENNINGTON
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HORIZONTAL SECTIONAL BOILER.

SPECIFICATION forming part of Letters Patent No. 672,279, dated April 16, 1901.

Application filed November 14, 1900. Serial No. 36,448. (No model.)

To all whom it may concern:

Be it known that I, MOSES B. MOORE, a citizen of the United States, residing in Reading, Pennsylvania, have invented certain Improvements in Horizontal Sectional Boilers, of which the following is a specification.

My invention relates to certain improvements in sectional steam-heating boilers, having for one object the provision of a boiler of simple construction and economical in action, a further object being to provide improved means for varying the capacity of the boiler. These objects I attain as hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical sectional view on the line 1 1, Fig. 3, of my improved boiler, showing the construction of the intermediate sections and indicating the method of connecting together the sections of the boiler. Fig. 2 is a vertical sectional view on the line 2 2, Fig. 3, indicating the path of the products of combustion. Fig. 3 is a sectional plan view on the line 3 3, Fig. 1, showing the construction of the intermediate sections. Fig. 4 is a perspective view of one of the intermediate sections. Fig. 5 is a perspective view of the upper part of the furnace-section, and Figs. 6 and 7 are modifications of the intermediate sections.

Referring to the drawings, Q is the base of the structure, and in this base is the ash-pit, having a door *q* and with a flange *q'* supporting the grate C.

Mounted on the base is the furnace-section A, having a double wall forming a water-chamber A'. This section A is, preferably, a casting, and radiating from a central tubular hub or riser H to the outer portion of the casing are tubular arms G G', forming the dome of the combustion-chamber. The arm G is higher than the other arms, extending to a level with the ring *a* and the upper end of the riser H.

In the upper portion of the section A is a fire-door opening *b*, having a door *b'*. The opening in the present instance is partly in the section A and partly in the section above it.

P is the dome of the boiler, having a large steam-space and a hollow ring or flange around

its lower edge, alining with a ring of an adjoining section.

W is a flue extending through the dome-section, as shown, and connected to the stack in any suitable manner.

Between the dome P and the furnace-section A are mounted as many intermediate sections as desired. I have shown two, D and D', in the present instance. These sections are identical in form; but the upper section is reversed, so as to form an indirect passage for the products of combustion. The section D has a hollow ring *d* and a central riser or hub H' in line and communicating with the riser H of the section A. Extending from the riser H' to the ring *d* is a partition I, and in this partition are flue-openings *i*, forming tubular arms I' I². The arm I² is of the full height of the section D, while the partition is less than said height, forming with the arm G of the section A and the partition of the adjoining section D' horizontal passages for the products of combustion, the arm I² acting as a deflector.

It will be noted that the solid portion of the partition I extends over about one-half of the surface of the section D, and the flue-openings are all on one side of the arm I². As the section D' is identical with the section D, all that is necessary in assembling the boiler is to reverse the section D'. Its arm I² will be in line with the arm I² of the section D. The arms I' will be directly over the solid portion of the partition I, and its solid portion will be directly over the flue-openings in the section D.

The lower portion of the dome-section P has a depression P', in line with the arm I² and with the riser H'. The several risers are connected by nipples *n*, and the arms I² and G, as well as the portion P' of the dome, have openings M, in line with suitable nipples *m*, in them, thus forming circulating-passages between the several sections of the boiler.

S is the steam-pipe secured to the dome-section, and S' is the return-pipe connected to the lower portion of the section A.

Lugs B B are preferably cast on the furnace-section A and the dome-section P, and

the bolts *r* pass through these lugs, serving to hold the several sections of the boiler together.

A water-column X, with a gage-glass X' of any of the well-known forms, is attached to the dome-section P, and in operation the water-level is always kept above the bottom of said dome-section.

It will be noted that by constructing and assembling the intermediate sections as shown in my improved boiler the hot gases and products of combustion from the furnace first rise vertically between the radiating-tubes G at the top of the furnace-section A. Above these part of the gases strike the bottom of the partition I of the first intermediate section D and are deflected, passing half-way around the boiler and after striking the deflecting-arms flowing with the rest of the gases upwardly through the flues *i* of the other half of the section D. The next higher section, while being of the same form as the first section D, is turned upside down, and this brings its partition over the tubes of the said first section. Striking this the gases are again deflected and forced to pass half-way around the boiler in an opposite direction to that taken in the lower section. This successive rise and horizontal circular motion of the products of combustion, as caused by the partitions I and the tubes or arms I², is repeated a number of times, depending upon the number of intermediate sections, until at last they strike the bottom of the dome-section P. Owing to the tubular portion P' the gases are compelled to pass entirely around the boiler, and they finally escape through the smoke-passage W. By thus causing the heated gases to pass, as described, around the water-tubes and against the water-filled partitions of the boiler-sections the maximum economy of fuel is obtained. The number of intermediate sections used in the boiler can be determined by the steaming capacity required in each case, and the cost of the patterns for any one boiler is reduced to a minimum, owing to the fact that the intermediate section may be duplicated and the size of the boiler varied without any increase in the number of patterns required.

It will be understood that I do not confine myself to the particular form of tubular arms above described, as I may construct the intermediate sections with a partition having any form of flue-openings therethrough—for example, circular holes, as shown in Fig. 6. Furthermore, it is not necessary to always have a rim *d* extending beyond both sides of the partition I, as I may, if desired, only have it on one side of the same, as shown in Fig. 7, and having the position of the flue-openings through the partitions reversed in alternating sections.

I claim as my invention—

1. The combination in a sectional boiler of the character described, of a furnace and a dome section, having mounted between them

intermediate sections, said intermediate sections forming partitions, a deflecting-arm on each of said partitions and flue-openings through them close to the said arms, the openings on alternate sections being on opposite sides of the boiler and forming with the deflecting-arms alternate horizontal and vertical passages for the products of combustion, whereby the latter are compelled to pass at least half-way around the boiler in a horizontal plane at each section thereof before rising, substantially as described.

2. The combination in a sectional boiler of the character described, of furnace and dome sections with intermediate sections, each of said intermediate sections consisting of a hollow ring, a riser and a hollow partition connecting said riser with the ring, there being radiating-tubes forming flue-openings through one side of the partition, substantially as described.

3. As a new article of manufacture, a boiler-section consisting of a ring, a central riser and a hollow partition between the ring and the riser, flue-openings extending through one portion of the partition and an extended portion on the partition forming a deflector for the products of combustion, substantially as described.

4. The combination in a sectional steam-boiler, of a hollow-sided furnace-section having a riser and radiating-tubes connecting the riser with the hollow sides, hollow intermediate sections, also having risers and radiating-tubes and a dome-section on top of the intermediate sections, the risers of each section being vertically over one another and connected to each other and to the dome-section, and a second set of connections near the edge of each section also connecting said sections together and to the dome-section, substantially as described.

5. In a boiler of the character described, the combination with a furnace-section and a dome-section, of intermediate sections, each of said intermediate sections consisting of a ring, a riser in the center of said ring, a hollow partition connecting the riser with the ring, flue-openings through the partition forming tubes, a hollow deflecting-arm on each intermediate section, the ring of said section extending vertically above and below the partition and the tubes, the said intermediate sections of the boiler being alternately reversed thereby forming alternate horizontal and vertical passages for the products of combustion, substantially as described.

6. A boiler consisting of a furnace-section, a number of intermediate sections, and a dome-section, said sections being connected together, the connections being vertically over one another and forming two vertical passages, transverse partitions on the intermediate sections having deflecting-arms an outlet for products of combustion through the dome-section, said partitions on the intermediate sections forming alternate horizontal

and vertical passages whereby said products of combustion are made to pass in reverse directions through the sections of the boiler before escaping therefrom, substantially as described.

7. In a steam-boiler, the combination of a furnace, intermediate and dome sections, water-tubes in the furnace and intermediate sections, said tubes in the intermediate sections forming transverse partitions across the boiler, said intermediate sections being made with two half-doorways, half-doorways also in the furnace and dome sections, means for carrying away steam generated, and passages through the boiler for the products of combustion, substantially as described.

8. The combination in a sectional boiler of

the character described, of a dome-section and intermediate sections with a furnace-section, risers in the center of said sections, said furnace-section having double walls forming water-chambers, radiating-tubes in its upper portion, said tubes connecting the riser to the water-chambers, and a second series of connections at the circumferences of all the sections, substantially as described.

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

MOSES B. MOORE.

Witnesses:

WILLIAM E. BRADLEY,
JOS. H. KLEIN.