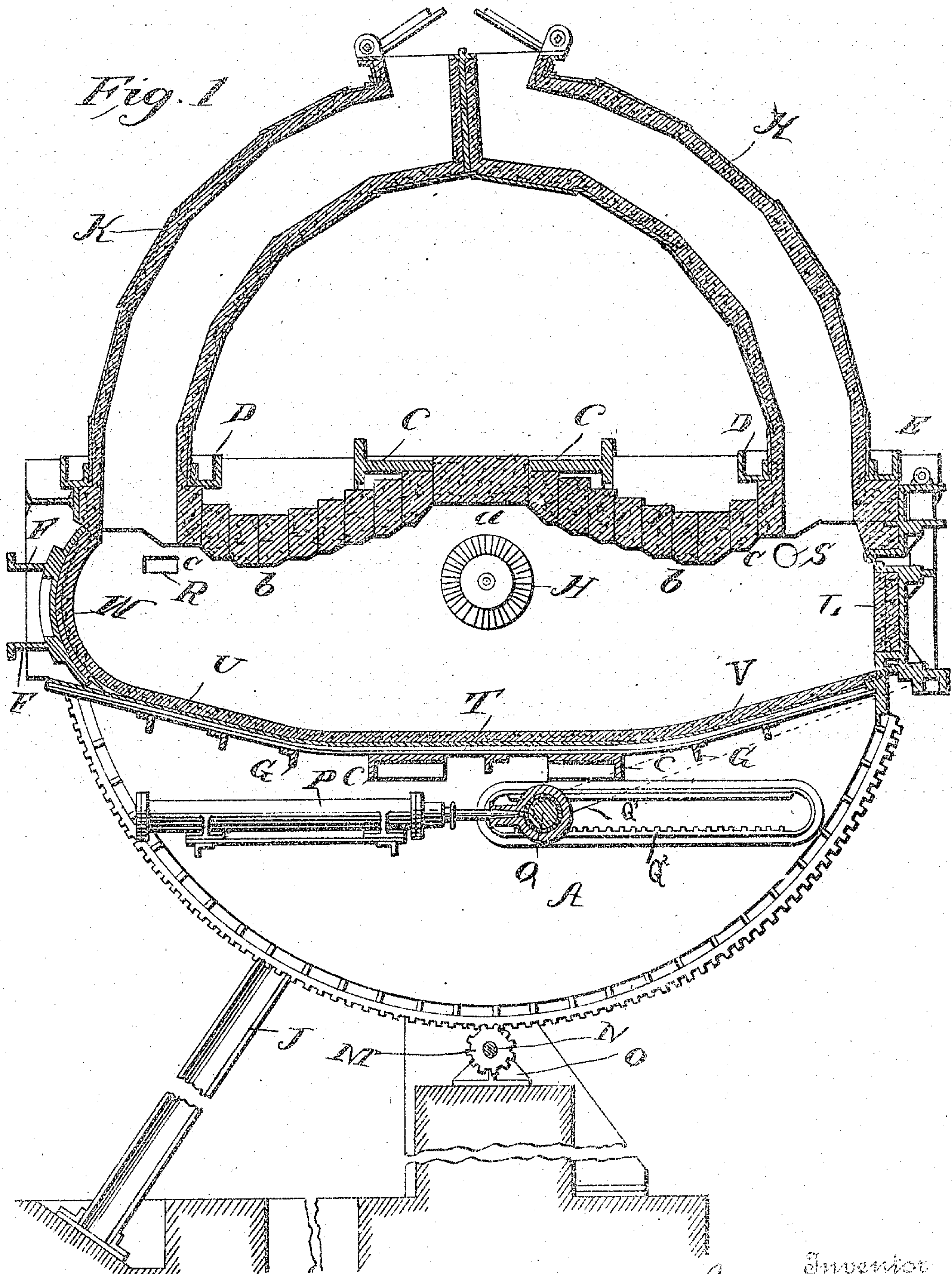


J. P. ROE.

OSCILLATING PUDDLING FURNACE.

APPLICATION FILED MAR. 24, 1905.

5 SHEETS—SHEET 1.



Witnesses  
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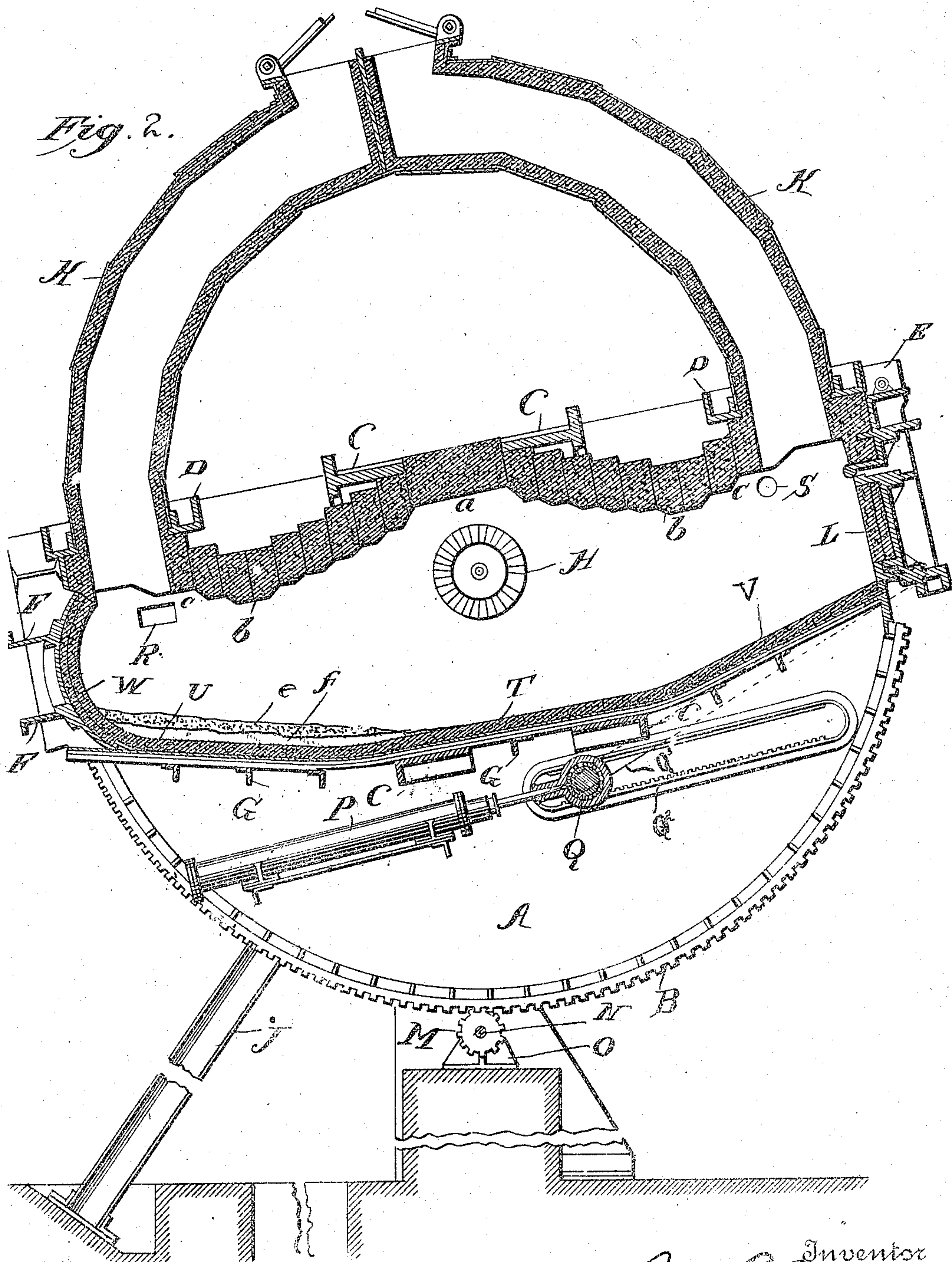


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5 SHEETS—SHEET 2.



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No. 881,342.

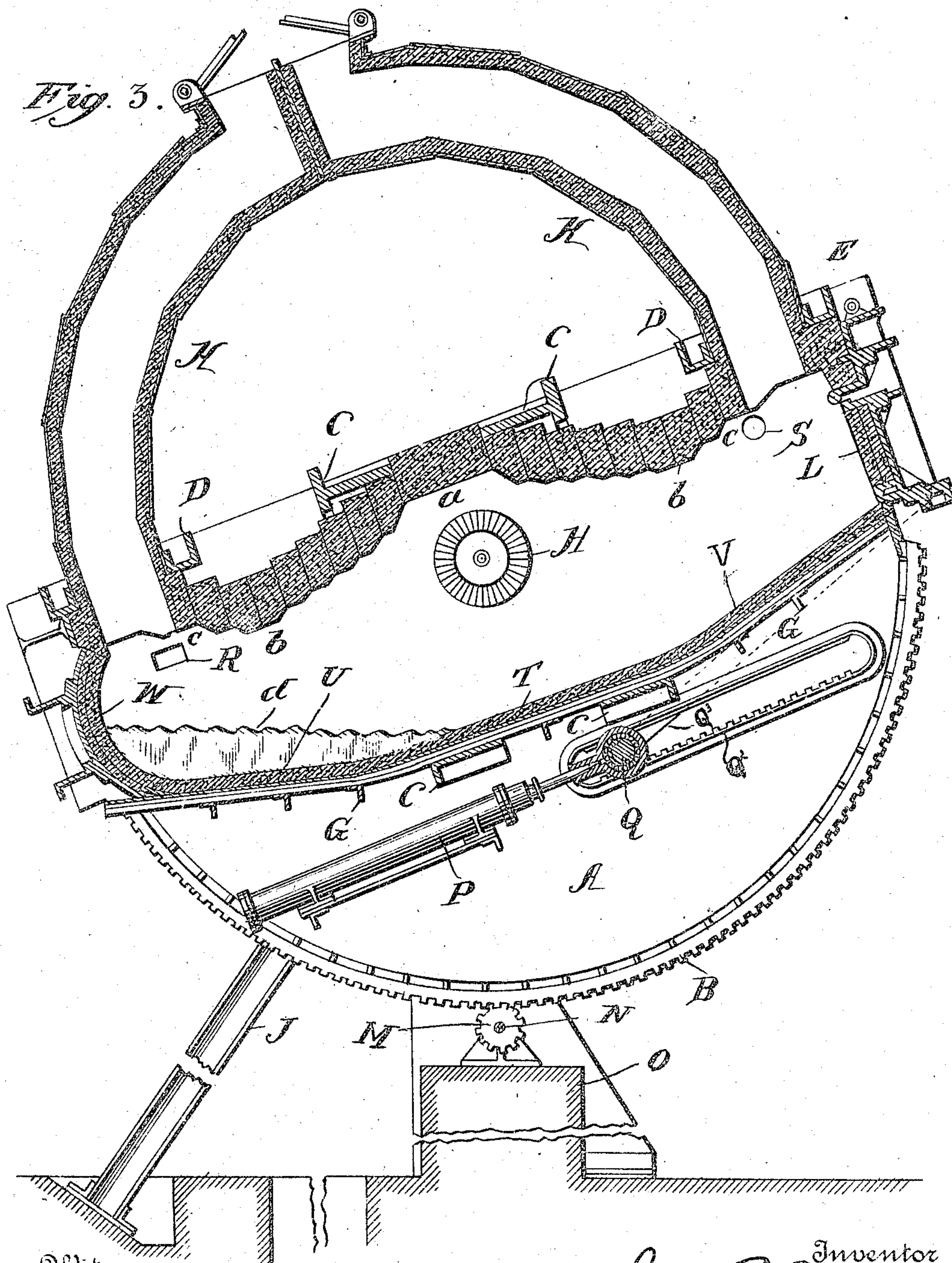
PATENTED MAR. 10, 1908.

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5 SHEETS—SHEET 3.



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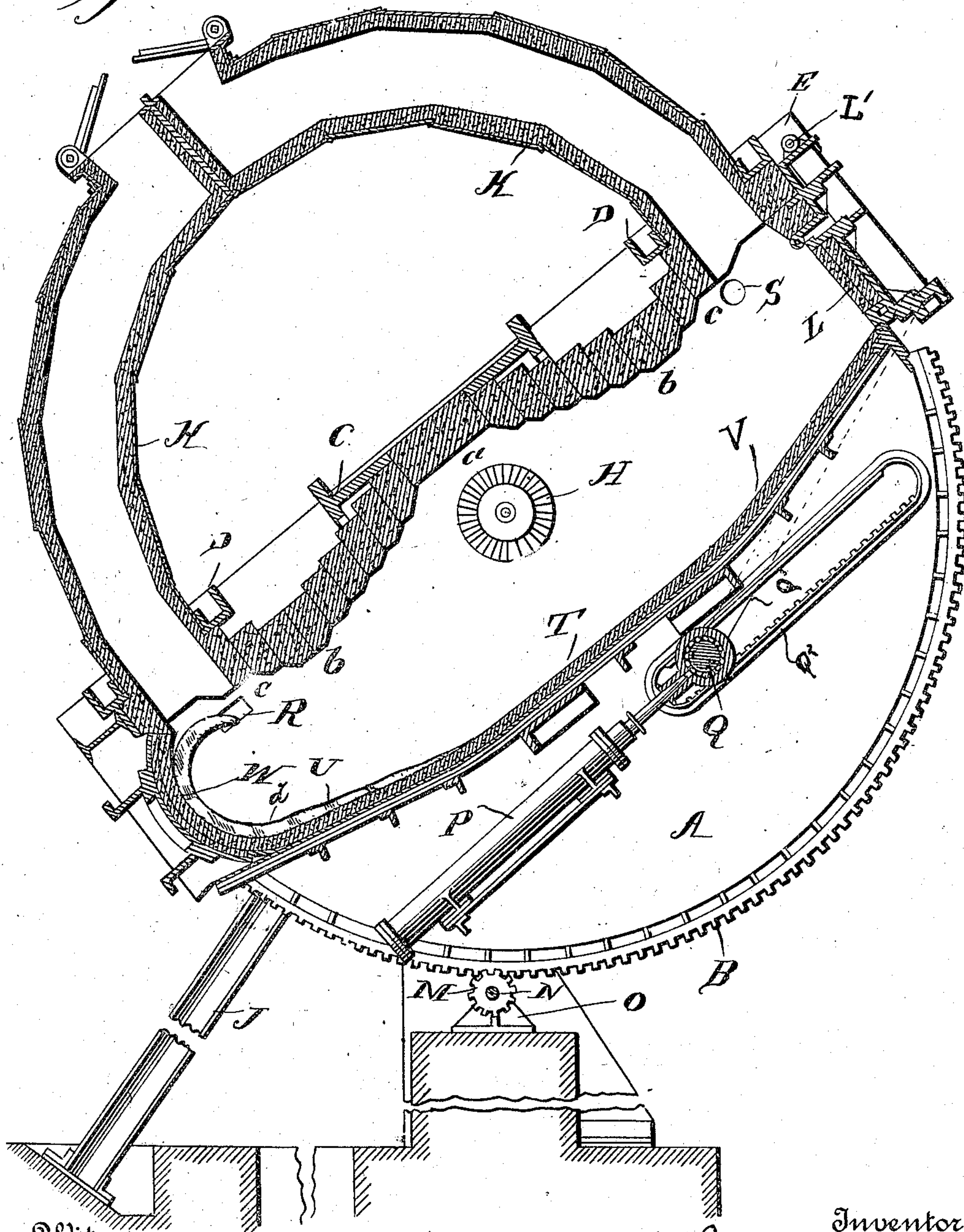
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5 SHEETS—SHEET 4.

Fig. 4.



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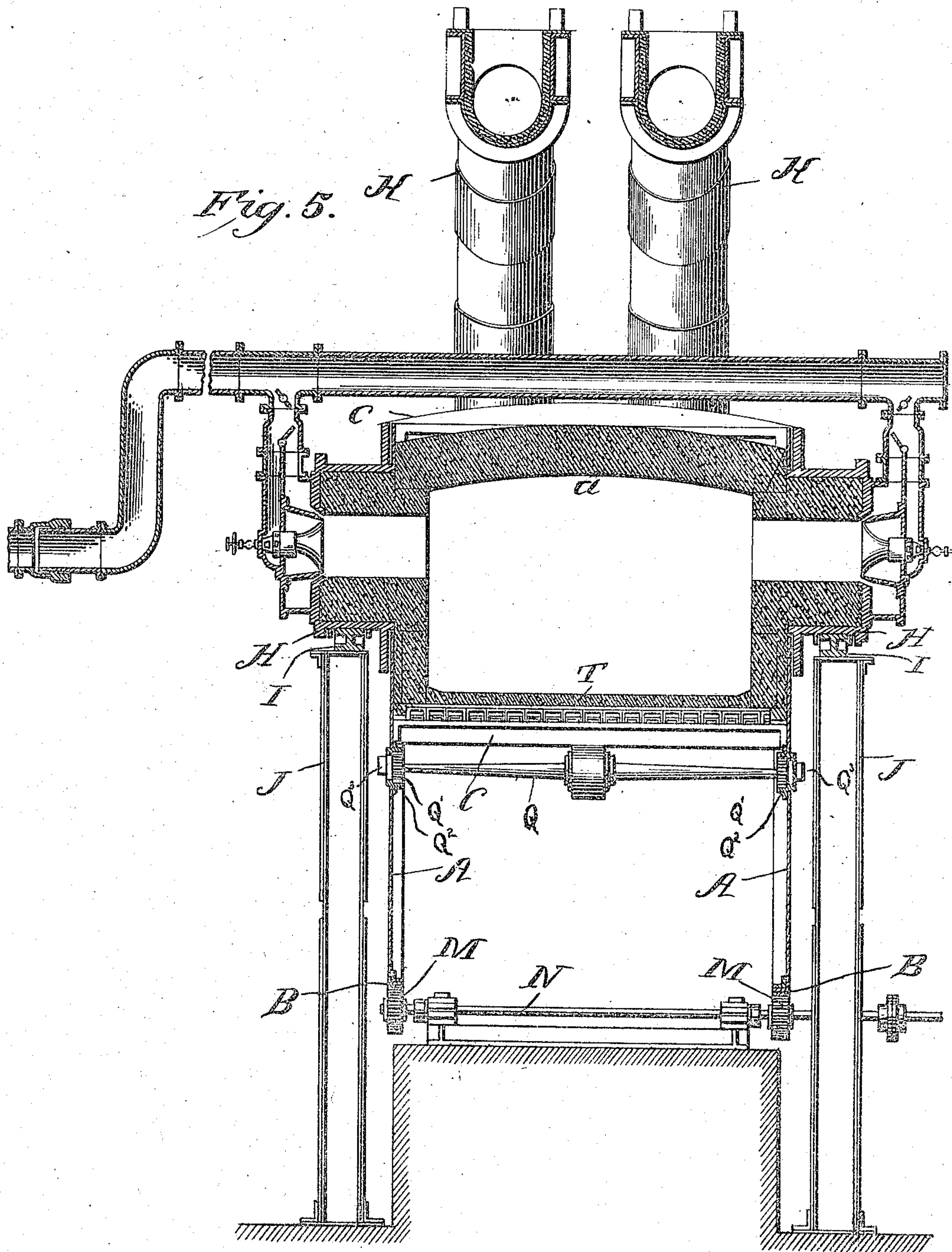
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APPLICATION FILED MAR. 24, 1906.

5 SHEETS—SHEET 5.



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# UNITED STATES PATENT OFFICE.

JAMES P. ROE, OF POTTSTOWN, PENNSYLVANIA.

## OSCILLATING PUDDLING-FURNACE.

No. 881,342.

Specification of Letters Patent.

Patented March 10, 1908.

Application filed March 24, 1905. Serial No. 251,783.

*To all whom it may concern.*

Be it known that I, JAMES P. ROE, a citizen of the United States, residing at Pottstown, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in Oscillating Puddling-Furnaces; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates, generally, to puddling furnaces and particularly to the bottoms or hearths of oscillating furnaces of the type shown in U. S. Letters Patent granted to me on the 9th day of July 1901, No. 678,281.

I have found that a straight flat bottom in the type of furnace mentioned has many disadvantages of which the following may be named: The center portion is too near the zone of highest temperature, resulting in destruction to the bottom and causing great difficulty in maintaining the same, and injury to any iron that may rest temporarily at or near the center of the furnace; an irregular depth of bath when the furnace is at an angle, part of the bath being very shallow and part being too deep for a free "high boil"; it provides but a small available capacity for the bath, when at an angle, in proportion to the size of the furnace; and, as in any large, flat area of water cooled surface, the danger of the formation of steam pockets and the resulting warping of the water cooled substructure, tending to destroy the whole bottom.

It is the purpose of my invention to obviate the objectionable features named above in oscillating furnaces and I accomplish this by means of the peculiar construction and arrangement of the bottom, sides, and end of such furnaces as hereinafter described and as illustrated in the accompanying drawings forming a part of this specification, and in which

Figure 1, is a longitudinal vertical section through an oscillating furnace constructed according to my invention and in its untitled or horizontal position; Fig. 2, a similar view showing the furnace tilted slightly toward one end; Fig. 3, a similar view showing the furnace tilted to a greater degree; Fig. 4, a similar view showing the furnace tilted to

a still greater angle of oscillation; and Fig. 5, a transverse vertical section through the center or middle of the furnace.

Similar letters refer to similar parts throughout all the views.

In the drawings A represents the side plates of a puddling furnace having their edges in the form of segments to which the toothed racks B are secured and which form the bottom flanges therefor. The side plates are secured together by the transverse braces C, the stack-bases D, formed with collars to receive the ends or bases of the stacks, the end brace E, the end beams F, and the angle bars G, all of which are suitably bolted to the said plates A. The furnace is supported by tubular trunnions H, which rest on rollers I in bearings on pillars or other suitable supports J, so as to provide for the rocking movement or oscillation of the furnace. The heating agent is supplied through the tubular trunnions at each side of the furnace. There are, in this instance, two stacks K, at each end of the furnace which curve over the furnace and meet above its center of length. L is a door secured to a shaft L' which is journaled in the frame through which the ball or mass of metal is discharged from the furnace.

The racks B gear with the toothed wheels M on a shaft N, suitably supported on a sub-frame O, below the body of the furnace, which shaft may derive its power from any prime mover by suitable connection therewith.

The door L is operated by a pressure cylinder P, connected to a cross-head Q, which carries the pinions Q' which mesh with the teeth of racks Q' supported from the side plates A. To the cross-head Q the ends of rods Q'' are connected the other ends of said rods being connected to the door L, whereby the latter is swung open and shut, as fully described in Letters Patent No 678,281, above-mentioned. The furnace is charged through the openings R, and the operation of the same may be observed through openings S in the sides thereof and through which any oxids may be introduced when found necessary.

The bottom, or hearth proper, is so shaped that its middle or central part T is deeper or lower when the furnace is in a horizontal position than the end parts U and V. See Fig. 1, in which view the central or middle part



T of the bottom is shown flat or horizontal and the ends, or the remaining parts of the bottom, U and V, between the ends of the flat part and the ends of the furnace, being inclined downwardly toward the middle part T. The objects of this construction are, first, to obtain a more uniform temperature throughout the length of the hearth, by increasing the depth below the zone of high temperature; second, to provide greater capacity of furnace for a given area of hearth; third, to obtain a uniform depth of bath when the furnace is at an angle, as shown in Fig. 3, in which the bath is indicated by the letter *d*; fourth, the capability of keeping the iron as it "comes to nature" spread out thinly and evenly over one-half of the hearth, as shown in Fig. 2, in which the iron is lettered *e* and the cinder *f*; and, fifth, when the iron is "ready" to collect it into a mass, to increase the angle of the hearth at the starting or upper end without unduly increasing the angle of the furnace with the horizontal, as shown in Fig. 4.

The end W of the hearth is curved so as to roll up the iron, as a means of massing it; and turning it over after it is massed, both actions being accomplished in a similar manner. The former by the relatively thin apron of iron sliding down the bottom to the curved end, where it follows the curve, see Fig. 4; and the leading end of the apron rolling over onto the portion still on the bottom, while the latter action is accomplished by the whole mass sliding down the inclined bottom with sufficient momentum to follow the curve of the end and then drop on the bottom with the lower side up.

The hearth is formed of oxid of iron on a water-cooled structure or trough which may be formed of a series of pipes arranged so as to form a hearth of the shape described, said pipes extending lengthwise the hearth and up above the bottom at each side for a limited distance, as described in my above-mentioned patent.

The roof is composed of refractory brick and is somewhat bow-shaped in longitudinal section that is to say it is made high in the central part, as at *a*, to give space for flame development, low at the points *b*, near each end, to throw the flame downward to heat the bottom at the ends, and high at the

points *c*, to prevent the cinder of the bath washing and thereby destroying it.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In an oscillating puddling furnace having a transverse axis of oscillation a hearth having its bottom inclining downwardly from each end to a central or middle part on an obtuse angle to said ends.

2. In an oscillating puddling furnace having a transverse axis of oscillation a hearth having a bottom formed with its central part on a lower plane than its ends.

3. In an oscillating puddling furnace having a transverse axis of oscillation, a hearth having a bottom and side walls extending from end to end, one end wall curved upwardly and inwardly, and another end wall provided with means for permitting removal of the charge.

4. In an oscillating puddling furnace having a transverse axis of oscillation a hearth having its bottom formed with a central horizontal part, and its end parts inclining thereto, and a curved end.

5. In an oscillating puddling furnace a hearth having a bottom formed of a central horizontal part and two inclined parts, and an arched bow-shaped roof.

6. In an oscillating puddling furnace a hearth having a bottom inclining downwardly from each end and a central horizontal part, and a roof high at the center and ends and low at the intervening parts thereof.

7. In an oscillating puddling furnace a hearth having a bottom the central part of which is on a horizontal plane and the adjacent parts at each side inclining from each end to said central part, and a curved end, and a roof having a high central part and ends, and a low intervening part.

8. An oscillating puddling furnace having a hearth, an arched bow-shaped roof, a stack at each end of the roof, and means for delivering a heating agent centrally between the ends and between the hearth and roof.

In testimony whereof, I affix my signature, in presence of two witnesses.

JAMES P. ROE.

Witnesses:

JNO. R. BRIGGS,  
H. S. CAMPBELL.