

No. 825,058.

PATENTED JULY 3, 1906.

W. McA. JOHNSON.
ROTARY ELECTRIC FURNACE.
APPLICATION FILED OCT. 13, 1903.

Fig. 1.

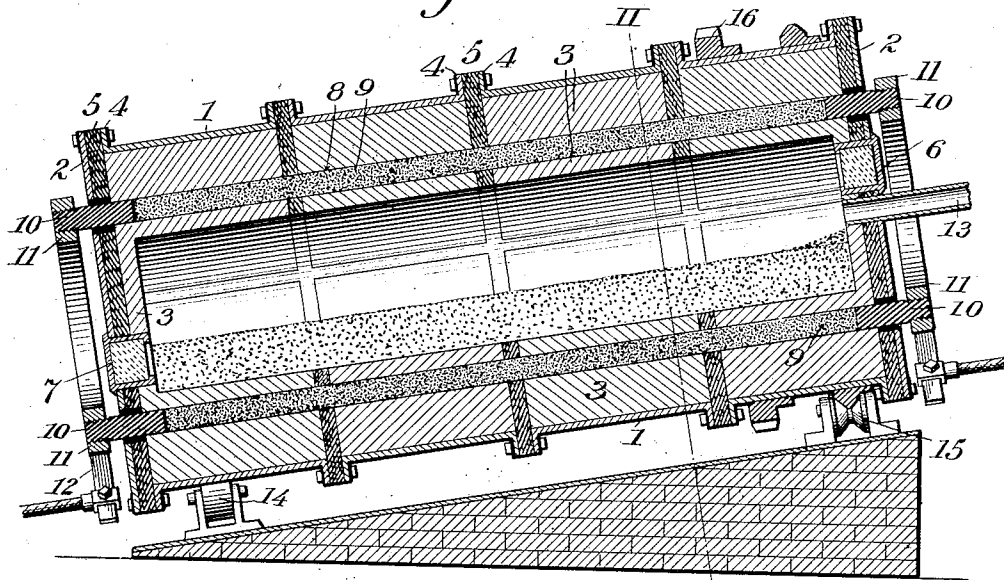
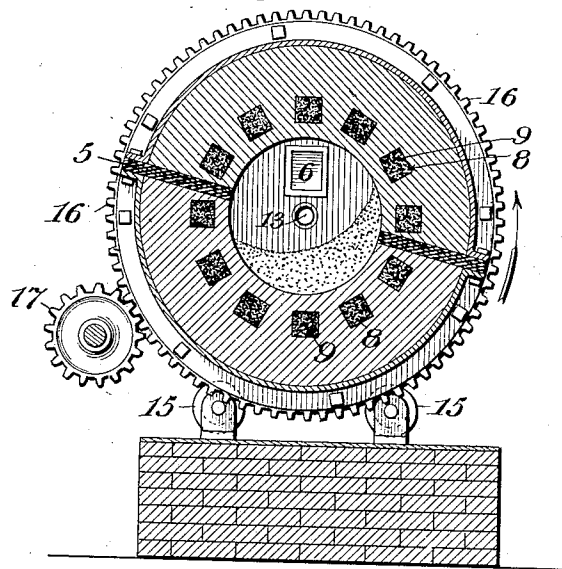


Fig. 2.



Witnesses:
R. H. Baldwin,
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UNITED STATES PATENT OFFICE.

WOOLSEY McA. JOHNSON, OF IOLA, KANSAS.

ROTARY ELECTRIC FURNACE.

No. 825,058.

Specification of Letters Patent.

Patented July 3, 1906.

Application filed October 13, 1903. Serial No. 176,854.

To all whom it may concern:

Be it known that I, WOOLSEY McA. JOHNSON, a citizen of the United States, residing at Iola, in the county of Allen and State of Kansas, have invented certain new and useful Improvements in Rotary Electric Furnaces, of which the following is a specification.

This invention is a rotary electric furnace or retort designed particularly for the reduction of zinc ores and the distillation of the metal.

The furnace comprises, essentially, a rotatable cylindrical body provided with a refractory lining, suitable end plates or closures, and means within the walls for developing the necessary temperature.

For a clear understanding of my invention reference is made to the accompanying drawings, wherein—

Figure 1 is a central longitudinal section of one form of my furnace mounted in an inclined position, and Fig. 2 is a transverse section thereof on line II II of Fig. 1.

Referring to said figures, the body of the furnace is shown as consisting of a plurality of transverse sections 1 1, of cast-iron, and cast-iron end plates 2 2. Each of said sections 1 is provided with a lining 3 of refractory brick or fireproof composition, which may be acid, neutral, or basic, in accordance with the character of the ore to be treated. Said sections are provided with flanges 4 at their abutting ends, and in assembling the furnace gaskets or plates 5, of asbestos or other refractory insulating material, are clamped between the several sections and between said sections and the end plates 2 by means of insulated bolts, as clearly indicated in Fig. 1. In this manner a substantially air-tight structure is provided composed of several independent and electrically-insulated parts, whereby loss of current by leakage through the furnace-walls between the terminals is reduced to a minimum or entirely obviated. While I consider such sectional construction to be preferable, I do not limit myself thereto. The furnace is preferably mounted, as shown, in an inclined position, and suitable doors 6 7 for the introduction of the charge and the withdrawal of the residuum are provided at the ends.

8 8 represent a plurality of longitudinal passages extending through the refractory lining of the retort and opening at the ends thereof through registering apertures in the

end plates. In operation said passages are filled with powdered coke or graphite or with a divided carbonaceous mixture which will offer sufficient resistance to the current to develop the desired temperature. When the furnace is mounted in an inclined position, the lower ends of said passages are closed by closely-fitting blocks or plugs 10, preferably of graphite, to which electrical connection is made in any approved manner. A similar closure and contact may be applied to the upper end of the furnace.

As one means for making electrical contact with the resistance-bodies 9 I have indicated the plugs or blocks 10 as secured in screw-threaded apertures in annular copper plates 11, to the peripheries of which brushes 12 are applied. In this case said blocks 10 may be insulated from the end plates of the furnace. I do not, however, limit myself to any particular form of contact device, but may, if desired, use the end plates of the furnace for making contact with the several blocks 10, applying the brush to an axial projection from said plates. One of said projections may, if desired, be tubular and serve as the eduction-pipe for the volatile reaction products.

I have illustrated the passages 8 as rectangular in section, substantially uniform in cross-sectional area, and as lying parallel to the inner wall of the furnace. It will be understood, however, that in one or all of these respects I may introduce such modifications as will serve to secure a proper distribution of heat within the furnace-chamber. For instance, it is often desirable to produce a graduated temperature within the muffle, the temperature being highest near the lower or discharge end and decreasing toward the eduction-pipe for the metallic vapors. In such case I may either construct the passages 10 of gradually-decreasing cross-sectional area toward the discharge end of the furnace or I may vary the composition and conductivity of the filling material 9, a certain proportion of refractory, non-conducting, and substantially irreducible material, such as carbide of silicon or siloxicon, being incorporated with the portions thereof in which it is desired to develop the highest temperature. Thus a graduated temperature development may be secured from end to end of the furnace by a graded admixture of non-conductive material with the divided conductor.

The retort is provided with a suitable education-pipe 13 for the metallic vapors, said pipe communicating with suitable condensers and with an exhaust or pressure pump in case it be desired to work under diminished or increased pressure. The retort is mounted upon suitable roller-bearings 14 15, one or both sets of which may be coned, as indicated at 15, or otherwise formed to prevent longitudinal displacement of the furnace. Any suitable means for imparting a rotary movement may be provided. As one such means I have indicated the use of a rack 16 and pinion 17.

15 I claim—

1. A rotatable electric furnace comprising a chamber composed of separable sections provided with refractory linings, a resistance-conductor for heating said chamber, and means for rotating said furnace substantially as described.

2. A rotatable electric furnace comprising a chamber composed of separable sections

provided with refractory linings, insulating material between said sections, a resistance-conductor for heating said chamber, and means for rotating said furnace substantially as described. 25

3. A rotatable electric furnace comprising a chamber composed of separable sections provided with refractory linings, resistance-conductors within said linings, and means for rotating said furnace substantially as described. 30

4. A rotatable electric furnace comprising a chamber composed of separable sections provided with refractory linings, a resistance-body of divided conductive material within said linings, and means for rotating said furnace substantially as described. 35 40

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

WOOLSEY McA. JOHNSON.

Witnesses:

CHARLES M. STARKWEATHER,
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