

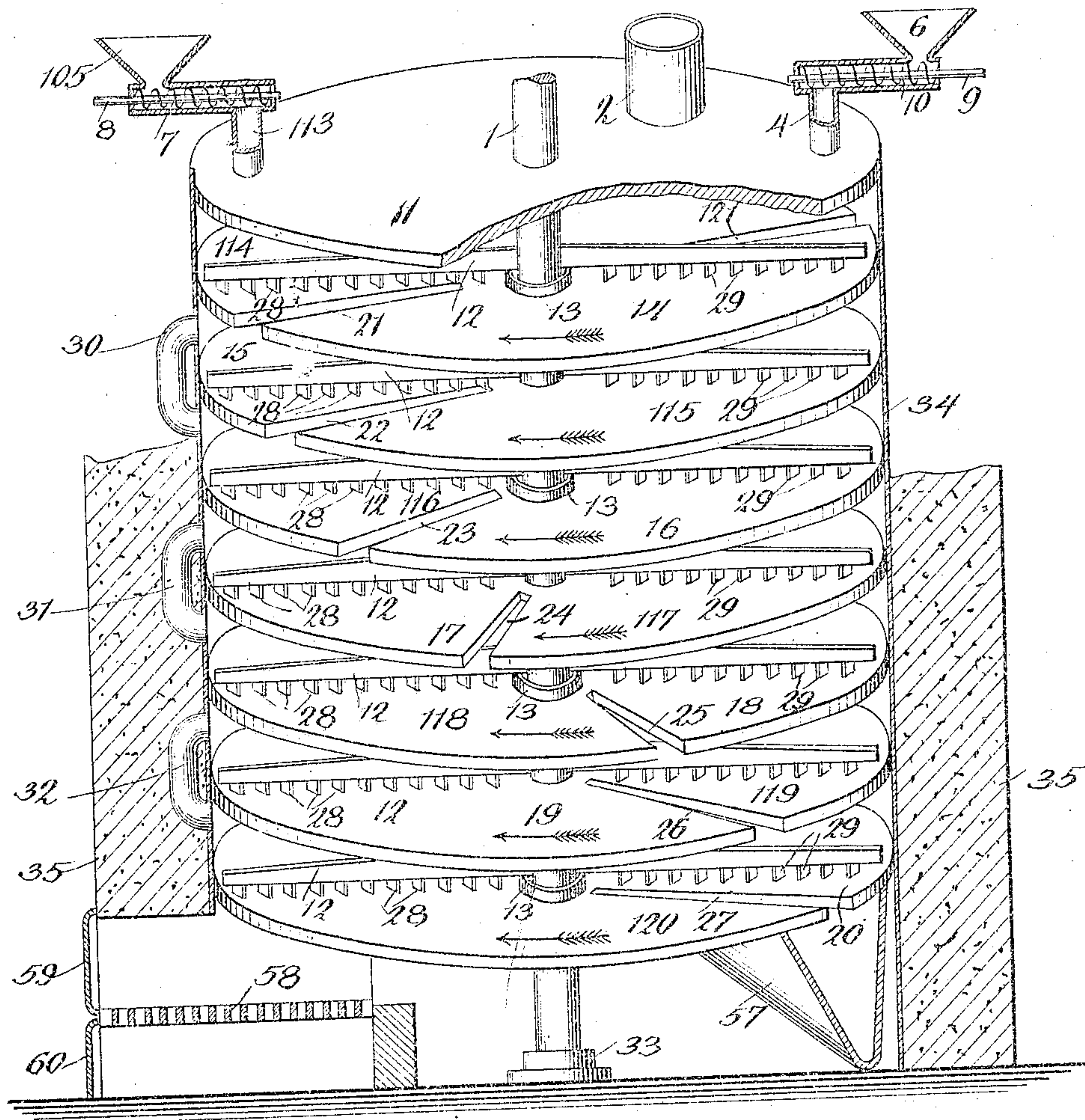
No. 879,842.

PATENTED FEB. 18, 1908.

W. G. SWART.

ROASTER.

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WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## ROASTER.

No. 879,842.

Specification of Letters Patent.

Patented Feb. 18, 1908.

Original application filed February 25, 1905, Serial No. 247,211. Divided and this application filed March 31, 1906, Serial No. 309,067.  
Renewed June 11, 1907. Serial No. 378,419.

*To all whom it may concern:*

Be it known that I, WALTER G. SWART, a citizen of the United States, and resident of Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Roasters, of which the following is a specification, taken in consideration with the accompanying drawings, which form a part of the same.

10 This invention relates to roasters adapted for universal application but particularly adapted for roasting zinc ore, galena or other difficultly roasting sulfid ores in a continuous manner.

15 In my construction of roasters I can continuously roast one grade of ore or if desired, two grades of ore at the same time and at the same time keep them separated as they pass through the roasters.

20 This application is a division of my application No. 247,211, filed February 25, 1905, for ore treating processes.

25 In the accompanying drawing showing an illustrated embodiment of this invention, partly in perspective and partly in vertical section, the same reference numerals refer to the same parts.

30 In the illustrative embodiment of this invention shown in the drawing, the casing 34 which is indicated of metal, is supported in a heavy masonry or similar setting 35 which materially decreases the heat radiation. A series of hearths or shelves of suitable material are mounted within this casing, each hearth 35 being substantially divided by diametrical slots, such as 21 and 121 which form the two hearths 14 and 114 on this same level for the treatment of different material, if desired. The other hearths are divided in a similar 40 manner. The non-aligned slots 21, 22, 23, etc. form a plurality of hearths on each level, each slot being arranged as indicated over the rear of the hearth below. If desired, a suitable grate 58 may be arranged below the series of 45 hearths and may be fired through the doors 59, 60 in the ordinary way. The gases of combustion pass up through the slots to some extent, and also the alternate shelves are provided with collars 13 which form annular openings of any size desired near the 50 center of these shelves. Also suitable circulating pipes 30, 31, 32 are arranged at suitable intervals around the periphery of the other shelves so as to conduct the gases 55 through the apparatus in a zigzag manner

before they pass out through the flue 2 to be utilized in a Glover tower or other acid making apparatus in the case of sulfurous gases.

A vertical shaft 1 supported in the bearing 33 and rotated by any desired means in the 60 direction of the arrows, is indicated as passing axially through the roaster. This shaft is provided with a series of arms 12 on which are arranged suitable rabbles 28, 29 which as indicated are inclined in different directions. 65 In this way when rotated in the direction of the arrows one set of rabbles moves material circumferentially around the hearth to some extent and also displaces it outward. The rabbles on the other arm move the material 70 around the hearth in the same direction and also displace it inward into the path of the rabbles on the other arm. In this way the material is continuously turned over and also slowly fed around the hearths in the direction 75 of the arrows.

Material may be fed into this roaster through one or more conveyers, such as the screw conveyer 10, driven by the rotating shaft 9 at any desired speed and thus feeding 80 material from the hopper 6 into the tube 4 through which it drops onto the hearth 14. It is evident that this material will be fed around the hearth 14, will fall through the slot 21 upon the rear of the hearth 15 below 85 and passing around this hearth in a similar manner will progressively pass over the hearths 16, 17, 18, 19 and 20, finally issuing through the discharge chute 57. If desired, other different material may be fed by the 90 conveyer 7 on the rotating shaft 8 from the hopper 105 through the feed tube 113 upon the hearth 114. This material will be slowly fed through the roaster passing over the hearths 114, 115, 116, 117, 118, 119 and 120, 95 before being discharged. These two materials will be kept separate throughout their passage through the roaster, but, of course, the gases evolved from them will mingle and one material can impart its heat to the other 100 in an obvious manner both by the heat of the gases by radiation and by conduction through the various hearths.

Zinc blende, galena or other difficultly roasting sulfid ores can be conveniently 105 treated in this apparatus by feeding the ore through the conveyer 10 over one series of hearths where it is roasted and the sulfur driven off in the shape of sulfurous gas. The additional heat which is usually neces- 110



sary in order to properly desulfurize such ores can be readily supplied by feeding through the other conveyer 7 and over the other series of hearths some other pyritical or sulfur-bearing heating material, such as iron pyrites, chalcopyrite, pyrrhotite or similar sulfid material, or if desired, sulfur itself may be employed in some cases. After the roaster has been brought up to heat by the furnace indicated or by other heating means the desulfurization of the ore takes place in a well-known manner, the proper amount of additional heat being supplied to the partly desulfurized ore by the feeding of sufficient pyritical or other sulfur bearing heating material so that not only is the ore properly desulfurized without the use of coal or similar heating material, but also the sulfurous gases are richer and better adapted for subsequent treatment in sulfuric acid apparatus and for utilization in other ways.

Having thus described my invention in connection with an illustrative embodiment thereof, to the details of which I do not desire to be limited, what is claimed as new and what is desired to be secured by Letters Patent is set forth in the appended claims.

1. A roaster having a hearth with a plurality of substantially radial slots extending inward from its periphery.

2. In roasters, a series of vertically arrayed hearths each provided with a plurality of substantially radial slots out of vertical alinement.

3. In roasters, a series of vertically arrayed hearths, each provided with a plurality of substantially radial slots out of vertical

alinement, the slots extending inward from the periphery of the hearth, each slot being above the rear portion of the hearth below.

4. In roasters, a series of vertically arrayed hearths, each provided with a plurality of substantially radial slots, out of vertical alinement, and feed devices to feed material to the separate divisions of the hearths.

5. In roasters, a series of vertically arrayed hearths each provided with a plurality of substantially radial slots out of vertical alinement, and feed devices to feed material to the separate divisions of the hearths.

6. In a roaster, a plurality of fixed slotted hearths, each hearth having a plurality of radial slots arranged staggered to the next succeeding hearth, rotating rabbles adapted to coact with each division of the fixed hearths so that the material fed upon different portions of the hearth will be kept separated, as it moves throughout the roaster.

7. In a roaster, a plurality of fixed slotted hearths, each hearth having a plurality of slots, rotating rabbles mounted upon a central shaft, circulating pipes, passages between the vertical shaft and the hearth, substantially as described.

8. In a roaster, a plurality of fixed slotted hearths, each hearth having a plurality of slots, rotating rabbles mounted upon a central vertical shaft, circulating pipes, passages between the vertical shaft and between each alternate hearth.

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Witnesses:

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