X. DE SPIRLET.

FURNACE FOR ROASTING ORES.

APPLICATION FILED APR. 30, 1910.

979,349. Patented Dec. 20, 1910.

Fig. 1

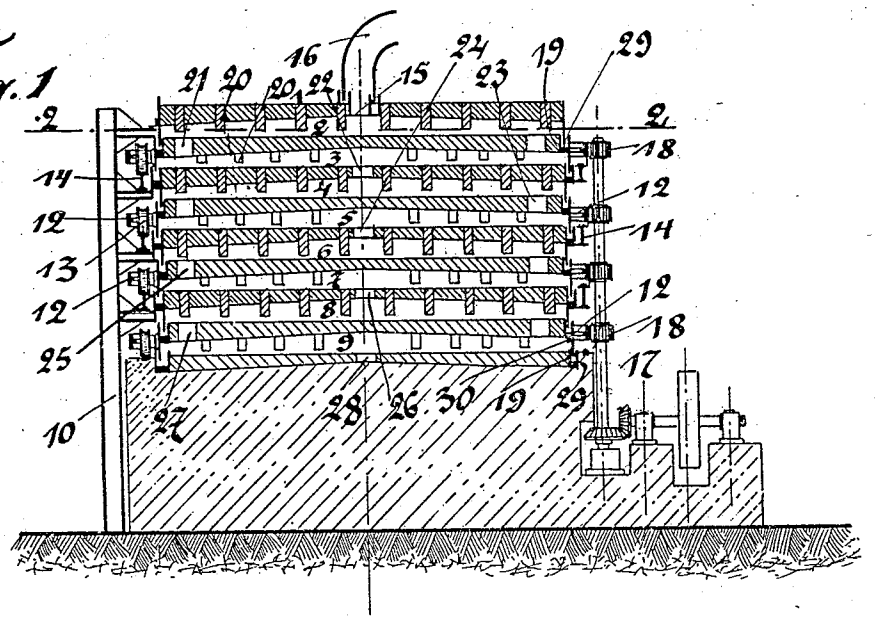
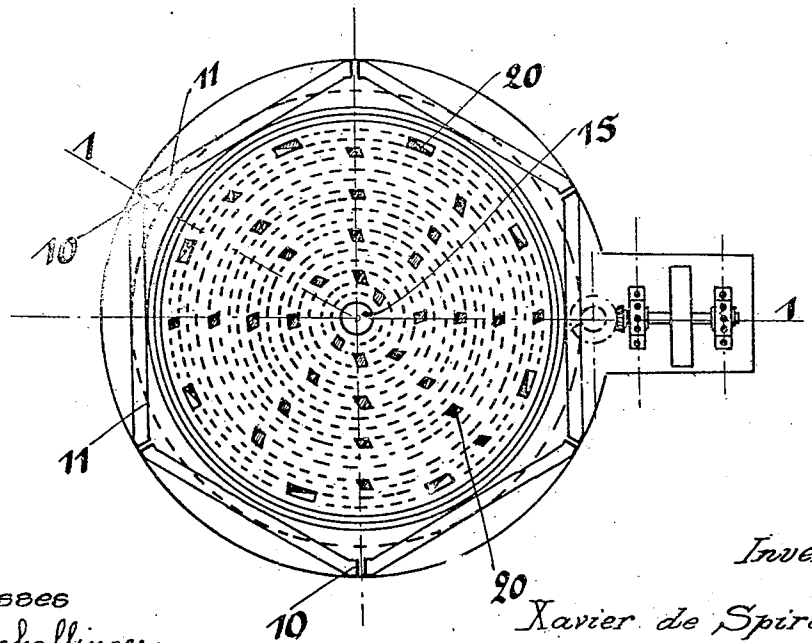


Fig. 2



Witnesses
E. Schallinger
A. Wendt

Inventor
Xavier de Spirlet
by B. Singer

UNITED STATES PATENT OFFICE.

XAVIER DE SPIRLET, OF BRUSSELS, BELGIUM.

FURNACE FOR ROASTING ORES.

979,349. Specification of Letters Patent. Patented Dec. 20, 1910.

Application filed April 30, 1910. Serial No. 558,157.

To all whom it may concern:

Be it known that I, XAVIER DE SPIRLET, engineer, 8 Avenue Rogier, Brussels, in the Kingdom of Belgium, have invented new and useful Improvements in or Relating to Furnaces for Roasting Ores, for which application has been made in Belgium May 5, 1909.

This invention relates to a mechanical furnace for roasting sulfurous ores, more particularly blende (zinc sulfid), a process which has hitherto been carried out practically only by hand labor.

A constructional form of the roasting furnace according to this invention is illustrated, by way of example, in the accompanying drawing in which,

Figure 1 is a vertical section of the furnace on the line 1—1 of Fig. 2 and Fig. 2 is a horizontal cross-section on the line 2—2 of Fig. 1.

The furnace comprises a certain number of superposed horizontal circular plates forming hearths or soles arranged in floors and completely independent of each other. In the example illustrated, the number of plates or hearths is assumed to be nine, but it is obvious that any desired number may be used, such number varying in accordance with the circumstances, such as the kind of the ore to be treated, means for heating, etc. Alternate plates, as 1, 3, 5, 7, 9 are stationary, while the others, as 2, 4, 6, 8 are movable around an imaginary axis coinciding with the vertical axis of the furnace. The fixed plates are carried by columns 10 arranged on the angles of a polygon formed by connecting bars 11 circumscribing the furnace. The columns 10, of which there are six in the example illustrated, support also the movable plates by means of a toothed driving ring 12 provided with rollers 13 traveling on rails 14 secured to the said columns.

The upper fixed plate 1 which closes the furnace, is lined with a suitable non-conducting material in order to prevent loss of heat and provided with a suitable distributing apparatus for the ore. An opening 15 made in the center, is used for carrying away the sulfurous gases through a suitable conduit 16.

The movable plates 2, 4, 6, 8 are rotated by means of a vertical spindle 17 carrying toothed pinions 18 engaging with the rings 12, the said spindle being driven from the top or the bottom by means of suitable transmission gear. The speed of rotation is preferably the same for all the movable plates, but it might be varied from one plate to another, for instance, it might decrease from the top downward. It would be sufficient for the purpose to vary suitably the proportion between the pinions 18 and the toothed ring 12.

Both the fixed and the movable plates consist of ring-like plates 19 of special cross-section, forming the beginnings of very low arches and are formed of refractory material of suitable composition and quality. Each plate is provided with a series of teeth 20, also of suitable refractory material, secured in the arch, the said teeth being shaped and arranged so as to move the ore spread on the plate or hearth immediately below in the desired direction, either from the center toward the circumference or from the circumference toward the center. Thus in the example illustrated, the cover plate 1 is provided with teeth designed and arranged so as to move the ore supplied by the distributer at the center of the plate 2, from the center toward the circumference merely by the rotation of the said plate. The said ore arriving at the circumference of plate 2, falls through openings 21 on the fixed plate 3. The teeth provided on the arch 2, bring the ore back from the circumference of the plate 3 toward a central hole 22 whence it falls on to the plate 4, and so on from one plate to another, through the holes 23, 24, 25, 26, 27 and 28. The gases follow a reverse path through the same holes 28, 27, 26, etc., until they are carried away.

The joints between the different plates, which are completely independent of each other, are obtained by means of annular troughs or channels 29 constituted by a ring or hoop with which engages the edge of a cylindrical projection 30 of the ring of the plate immediately higher. The channels are filled with fine ore, sand or any other suitable material in powdered form, or even with liquid, for obtaining the best possible joint preventing the escape of gases or entrance of air.

The working of the furnace can be at will either absolutely continuous or intermittent according to circumstances, the speed or the speeds of rotation being naturally adjustable in every particular case.

Each apparatus can be heated independ-

ently or a battery or series of apparatus can be heated from one and the same source. Only one plate is heated, but air for oxidation purposes is introduced into the furnace at an adjustable high temperature.

Mechanical furnaces constructed as hereinbefore described have the following important advantages. Owing to the use of rotary rolling plates, the furnace can be given a sufficient diameter for keeping within advantageous limits the losses by radiation per unit of a useful surface. Owing to this construction, it is, moreover, possible to avoid altogether the use in the interior of the furnace of metal parts which, in a sulfurous atmosphere are unable to stand the high temperature required for roasting blende, and become completely corroded in spite of the cooling devices designed for preventing it, when a lower temperature may be maintained, as for instance in roasting pyrites. Moreover this construction renders any cooling superfluous and thus economizes the fuel. The construction of the furnace makes repairs easy, as taking to pieces and reërecting can be effected quickly. Finally, the arrangement enables the cost of a roasting installation to be reduced owing to the large diameters which may be given to the roasting plates and the greater output resulting therefrom.

I declare that what I claim is:

1. An ore roaster comprising in combination, a series of superposed plates of refractory material spaced apart from each other to form intervening chambers, said plates having openings for successive delivery of one plate to the next lowermost plate, said plates having means for moving the material toward said openings, means for moving certain of said plates with respect to the remaining plates, and means forming closed joints at the outer margins of said plates.

2. An ore roaster comprising in combination, a series of superposed plates of refractory material spaced apart from each other to form intervening chambers, said plates having openings for successive delivery of one plate to the next lowermost plate with the openings of adjacent plates out of alinement, teeth for said plates for moving the material toward said openings, means for rotating certain of said plates with respect to the remaining plates, and annular interfitting joint members closing the openings between said plates at the outer margins thereof.

3. An ore roaster comprising in combination, a housing, a series of superposed plates therein spaced apart from each other to form intervening chambers, means for moving certain of said plates with respect to other plates, and means carried by the plates and disposed wholly within said housing for moving the material on said plates toward a discharging position.

4. An ore roaster comprising in combination, a series of superposed plates spaced apart from each other to form intervening chambers, certain of said plates being stationary, means for moving some of said plates, and means carried by said stationary plates for causing the material to move toward a discharging position upon movement of the movable plates.

5. An ore roaster comprising in combination, a series of superposed plates spaced apart from each other to form intervening chambers, certain of said plates being stationary, means for moving other of said plates with respect to the stationary plates, and means carried by the stationary and movable plates for causing the material to advance toward a discharge position upon actuation of the movable plates.

6. An ore roaster comprising in combination, a series of superposed plates spaced apart from each other to form intervening chambers, said plates having openings for successive delivery of the material of one plate to the next lowermost plate, means for moving certain of said plates with respect to the remaining plates, certain of said plates carrying means for advancing the material to a discharging position upon operation of the movable plate.

7. An ore roaster comprising in combination, a series of superposed plates spaced apart from each other to form intervening chambers, means for moving certain of said plates with respect to the remaining plates, said plates carrying means for moving or advancing the material in different directions to a discharging position.

8. An ore roaster comprising in combination, a series of superposed plates spaced apart from each other to form intervening chambers, means for moving certain of said plates with respect to the remaining plates, certain of said plates carrying means for moving the material toward the center thereof and other of said plates carrying means for moving the material toward the periphery thereof upon movement of certain of said plates.

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

XAVIER DE SPIRLET.

Witnesses:
L. PARETTE,
GREGORY PHELAN.