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R. VON ZELEWSKI.

ROASTING FURNACE WITH A SWIMMING HEARTH.

APPLICATION FILED JAN. 12, 1903.

NO MODEL.

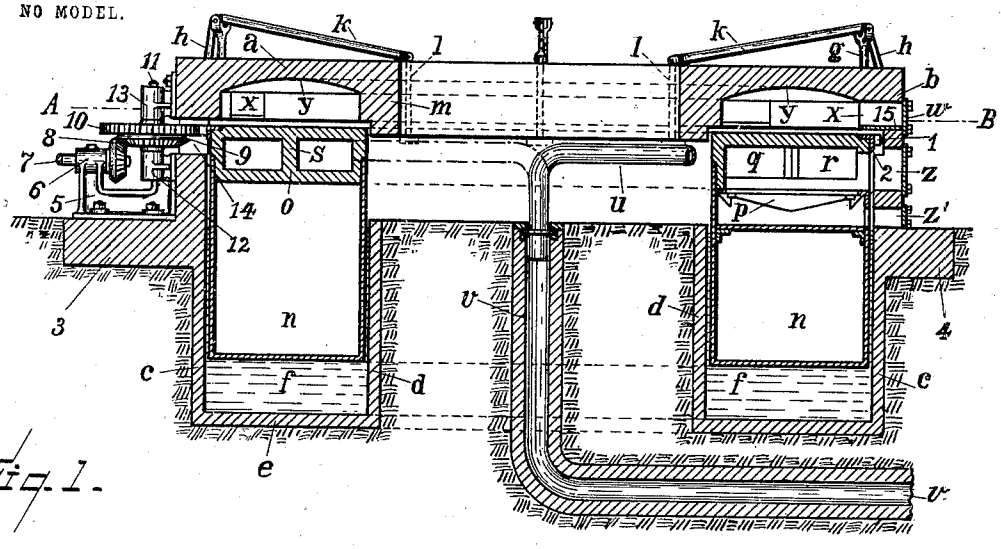


Fig. 1.

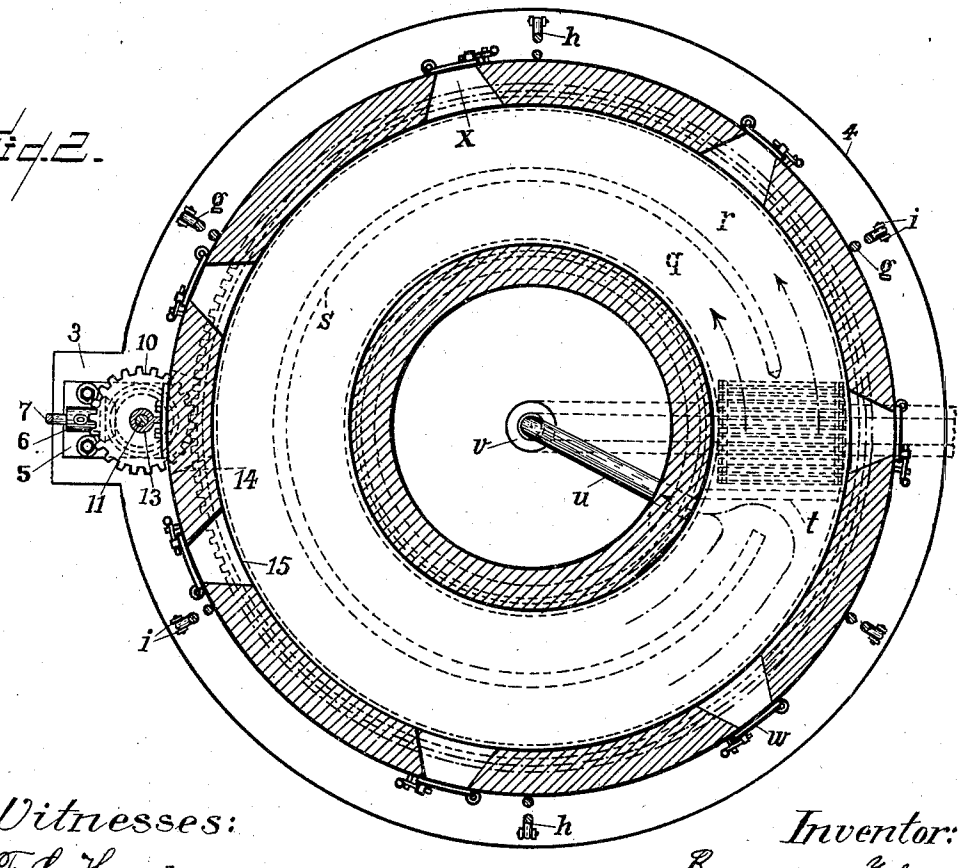


Fig. 2.

Witnesses:
F. G. Harder.
Jos. Schnitzler

Inventor:
Roman von Zelewski
per Martin Schmetz.
Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 741,430. Patented October 13, 1903.

UNITED STATES PATENT OFFICE.

ROMAN VON ZELEWSKI, OF BIRKENGANG, GERMANY.

ROASTING-FURNACE WITH A SWIMMING HEARTH.

SPECIFICATION forming part of Letters Patent No. 741,430, dated October 13, 1903.

Application filed January 12, 1903. Serial No. 138,733. (No model.)

To all whom it may concern:

Be it known that I, ROMAN VON ZELEWSKI, manager of the Zinc Works Birkengang, a subject of the King of Prussia, Emperor of Germany, residing at Birkengang, near Stolberg, Rhineland, in the Kingdom of Prussia, Empire of Germany, have invented certain new and useful Improvements in Roasting-Furnaces with Swimming Hearths; and I do hereby 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 to roasting-furnaces, and particularly to that class of furnaces with a swimming hearth, differing in its construction from similar hearths in being placed upon an annular swimmer instead of being carried by wheels upon an annular track, as is usually the case with flame-furnaces or muffle-furnaces, such as roasting or calcining furnaces, ovens, kilns, &c. By the arrangement and construction of this swimming hearth an undue friction is avoided, so that for its rotation only a small fraction of the power now necessary to revolve a hearth of the old construction will be required. The saving of power and the reduction of the wear and tear of the machinery for revolving the hearth will be all the more apparent where the hearth is heavily charged and the friction augmented accordingly.

In the accompanying drawings, Figure 1 is a vertical sectional view of the improved roasting-furnace especially constructed for roasting of zinc-blende or sulfuret of zinc. Fig. 2 is sectional view taken on line A B of Fig. 1.

The stationary cap *a*, the outer wall *b*, as well as the walls *c d* and the bottom *e*, forming the annular water-basin *f*, may be of any suitable construction. The cap *a* is supported by means of a number of posts *g*, of which each is connected on the one hand by a brace *h* to a grappling-iron *i*, firmly secured in the extended foundation of the wall *b*, and on the other hand by a brace *k* to a rod *l*, embedded in the inner edge *m* of the cap *a*. Within the water-basin *f* is placed the annular swimmer *n*, which may be of any suitable construction, as the latter naturally must vary to suit the conditions under which the hearth is intended to work—*i. e.*, it must be constructed to support the weight of the greatest amount of material with which the hearth may be charged. The simplest form of construction is to build the swimmer *n* with an open face, in which the hearth *o* is placed and supported, as shown in Fig. 1. Instead of leaving the swimmer open at the top it may just as well be provided with a closed top, or the swimmer may be built in sections instead of a single structure; but all of these different ways of construction would in no way alter the working of said hearth. The securing of the hearth *o* to the swimmer *n* may be executed in any desirable manner and is therefore not shown in detail.

The hearth *o* itself consists of a ring-shaped structure, being provided at one place with a grate *p* for the reception and combustion of the fuel to obtain the necessary heat. The products of combustion are led off through the two flues *q* and *r*, formed by the division-wall *s*. To prevent the products of combustion from returning to the fireplace, a cross-wall *t* is placed between the fireplace and the end of the division-wall *s*, which ends short of said cross-wall *t* to let the products of combustion flowing through the flue *r* enter the pipe *u*, communicating directly with the flue *q* and with the stationary flue *v*, leading to a chimney. As the pipe *u* is securely fastened to the hearth *o* on the one hand and movably but air-tight with the vertical branch of the flue *v*, there must be an open space provided allowing a free rotation of said pipe, which space is obtained by leaving the cap *a* and the wall *d* disconnected, as clearly shown in Fig. 1.

To charge the upper face of the hearth *o* with material, the grate *p* with fuel, and to withdraw the ashes from the ash-pit, the outer wall *b* is provided with a number of openings provided with hinged or sliding doors or shutters *w*. For charging the hearth *o* with the raw material and for the withdrawal of the finished product a number of charging-openings X are arranged at suitable intervals around the circumference of the furnace in such a manner that their lower face corresponds with the upper face of the hearth *o*, and to facilitate the operations necessary for the charging and withdrawal of the material

the charging-openings X are made wider at their inner end than at their outer end to give free access to the space formed between the upper face of the hearth and the arched lower face *y* of the cap *a*.

The openings *z* for throwing the fuel upon the grate *p* and the opening *z'* for removing the ashes from the ash-pit may be shaped in a similar manner, but are only arranged at one point of the circumference of the outer furnace-wall.

The rotation of the hearth *o* is effected by means of the circular rack 1, secured to the outer wall of the hearth *o* by its angular flange 2. Upon the outer wall *b* and upon the extension 3 of the ring-shaped foundation 4 is secured a frame 5, carrying in its journal-box 6 the driving-shaft 7, whose bevel-pinion 8 is meshing with the bevel-wheel 9, forming in this case an integral part of the wheel 10, seated upon the shaft 11, partly held in the journal-box 12 of the frame 5 and partly in the upper journal-box 13, secured to the outer wall *b*. To let the wheel 10 mesh with the rack 1, the outer wall *b* is cut away at 14. If now the wheel 10 is rotated in the one or in the other direction by means of the bevel-pinion 8 and the bevel-wheel 9, the hearth will be rotated accordingly. In order to prevent any particles of the ore to get between the teeth of the rack 1 and the wheel 10, the bottom of each charging-opening *x* has been provided with a bottom plate 15.

It will thus be seen that this furnace possesses a great advantage over older constructions of this kind, as the rotation of the hearth supported in the manner shown and described here saves a great amount of power, and this means a saving of fuel, and consequently a saving of money.

This new furnace may be employed with the same advantages for baking bricks, pottery, and other articles as well as for roasting ores, thus affording a means for reducing the cost of production in many industrial branches where now furnaces are employed requiring an undue amount of power for their rotation.

What I claim is—

1. A roasting-furnace of the class described, comprising an annular water-basin, an annular swimmer movably arranged therein, an annular hearth placed upon said swimmer, a fireplace in said hearth, a cross-wall at one side of said fireplace, a centrally-arranged wall within said hearth extending from the opposite side of said fireplace and ending short of said cross-wall, flues within said hearth to lead off the products of combustion, a flue connected with a chimney and provided with a vertical branch placed in the center of the furnace, a pipe secured to the inner wall of said hearth and rotatorily connected with said vertical flue branch to lead the products of combustion from the hearth-flues to said vertical flue branch, an outer wall provided with charging-openings to give access to the upper face of said hearth, and other openings to give access to the upper and lower division of said fireplace, means for opening and closing said openings, an overhanging cap partly supported by said outer wall, braced posts to support the overhanging part of said cap, a circular rack secured to the outer wall of the annular hearth, a driving mechanism upon the outside of the furnace to mesh with said rack to rotate said hearth, and a protection-plate at the bottom of the charging-doors to prevent particles of ore from getting into the driving mechanism, substantially as shown and described.

2. In a roasting-furnace the combination of an outer wall and a cap partly supported by said outer wall and partly by braced posts with an annular water-basin, an annular swimmer arranged in said water-basin, an annular hearth carried by said swimmer, a fireplace within said hearth, a cross-wall in said hearth, a longitudinal division-wall in said hearth extending from said fireplace to within a short distance of said cross-wall, flues in said hearth to lead off the products of combustion, a chimney-flue, a pipe to connect the hearth-flues to said chimney-flue, and charging-openings in the outer wall to give access to the upper face of said rotatory hearth and to said fireplace, bottom plates upon the bottom of said charging-openings, and means for rotating the hearth from the outside of the furnace, substantially as shown and described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

ROMAN VON ZELEWSKI.

Witnesses:

JOHN B. ADAMS,

E. M. BROMDAYE.