Aug. 21, 1923.

1,465,417

B. G. CALL ET AL

RABBLE FURNACE CONSTRUCTION

Filed Dec. 19, 1921

2 Sheets-Sheet 1

Fig. 1.

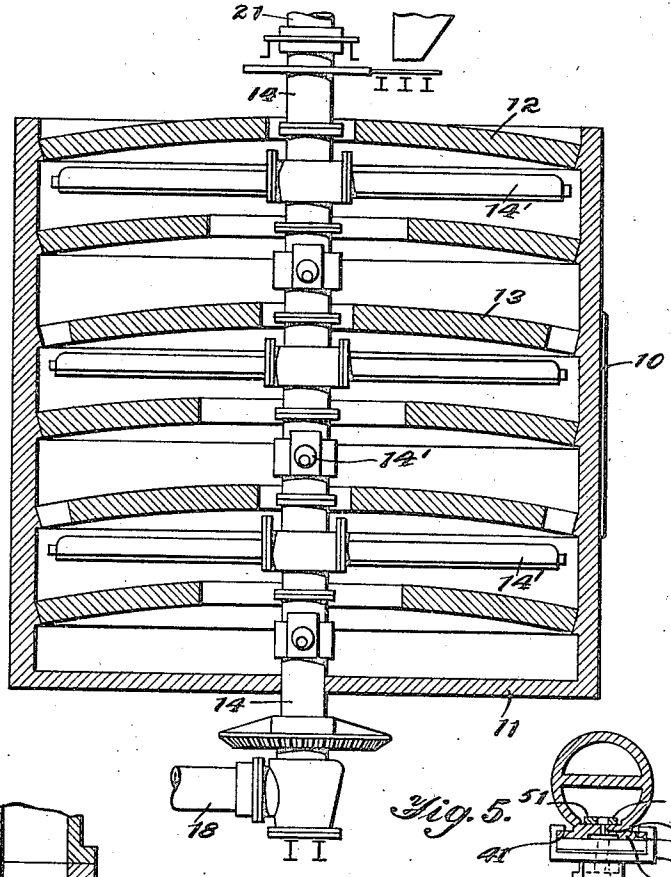


Fig. 5.

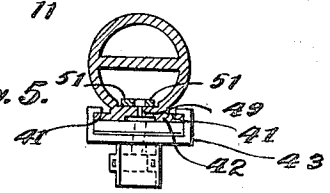


Fig. 4.

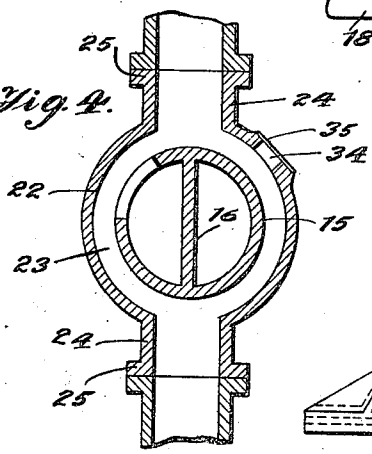


Fig. 6.

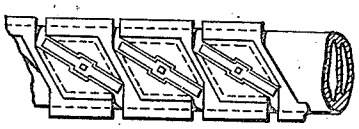


Fig. 8.

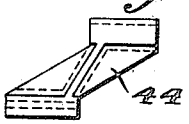


Fig. 7.

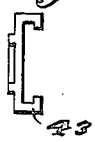


Fig. 9.



Fig. 10.

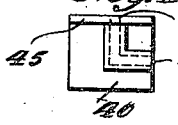


Fig. 11.



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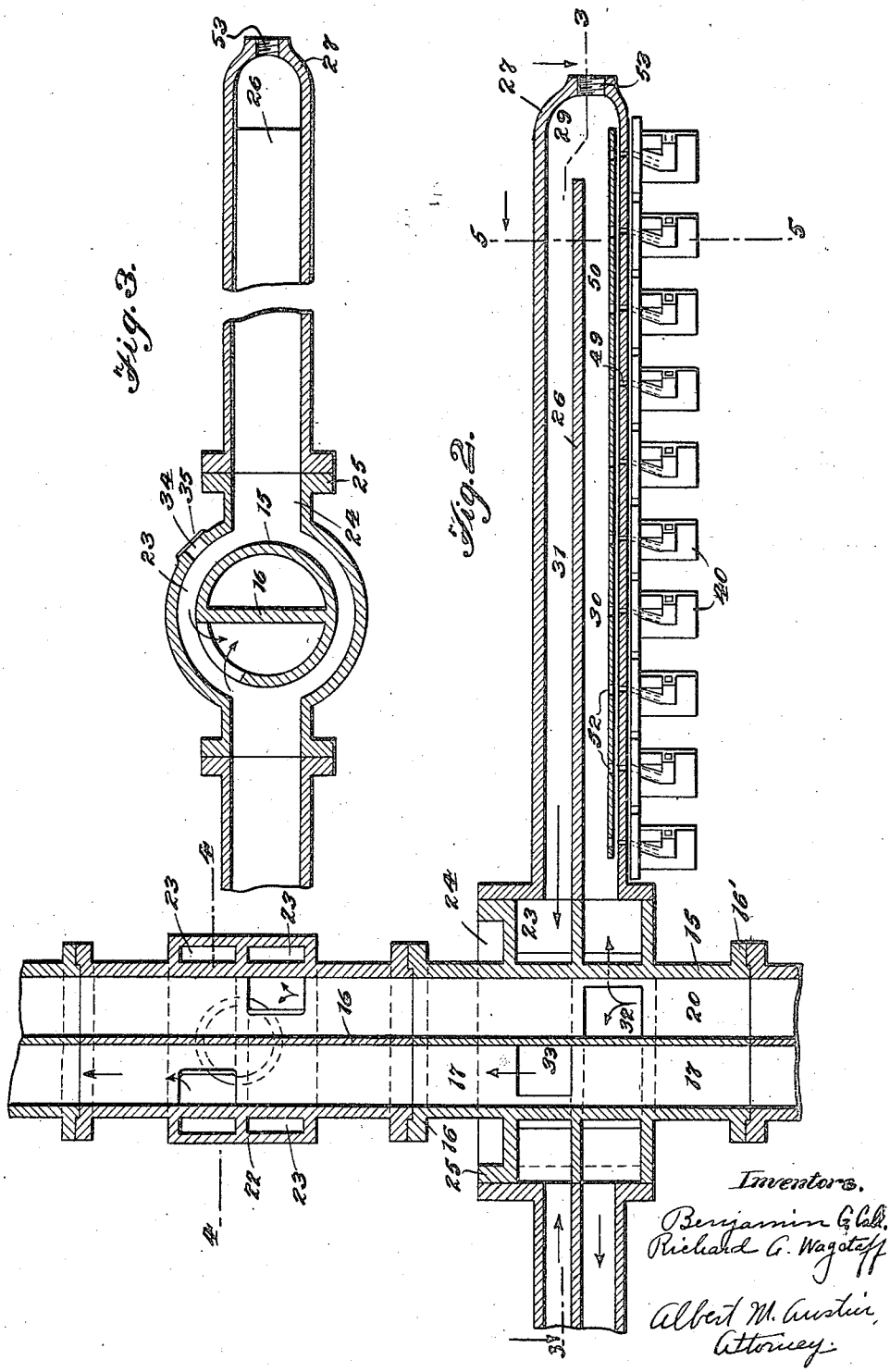
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RABBLE FURNACE CONSTRUCTION

Filed Dec. 19, 1921 2 Sheets-Sheet 2



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Patented Aug. 21, 1923. 1,465,417

UNITED STATES PATENT OFFICE.

BENJAMIN G. CALL, OF TACOMA, WASHINGTON, AND RICHARD A. WAGSTAFF, OF GARFIELD, UTAH, ASSIGNORS TO AMERICAN SMELTING AND REFINING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

RABBLE-FURNACE CONSTRUCTION.

Original application filed October 9, 1917, Serial No. 195,509. Divided and this application filed December 19, 1921. Serial No. 523,283.

To all whom it may concern:

Be it known that we, BENJAMIN G. CALL, a citizen of the United States, and resident of Tacoma, county of Pierce, State of Washington, formerly a resident of Garfield, county of Salt Lake, State of Utah, and RICHARD A. WAGSTAFF, a citizen of the United States, and resident of Garfield, county of Salt Lake, State of Utah, have invented certain new and useful Improvements in Rabble-Furnace Constructions, of which the following is a specification.

The invention relates in general to an ore roasting furnace and particularly relates to improvements in the shaft in the rabble arms and in the rabbles used in radial multiple deck ore roasting furnaces.

One of the objects of the invention is to provide an improved construction of rabbles and their correlated parts so designed that burnt out or damaged parts may be readily replaced without the necessity of demounting the entire organization and without materially affecting the position of the undamaged rabbles on any one rabble arm.

Another object of the invention is to provide an improved and simply constructed means for supplying air to the hearth of the furnace to heat the parts thereof.

Various other objects and advantages of the invention will be in part obvious from an inspection of the accompanying drawings and in part will be more fully set forth in the following particular description of one form of mechanism embodying our invention, and the invention also consists in certain new and novel features of construction and combination of parts hereinafter set forth and claimed.

This application is a division of our copending application, Serial No. 195,509 filed October 9, 1917, rabble construction.

In the drawings:

Figure 1 is a vertical sectional view taken axially through a multiple hearth roaster showing a preferred embodiment of our invention installed therein and shown in side elevation;

Figure 2 is a vertical sectional view taken axially through the central column and one of the rabble arms;

Figure 3 is a transverse sectional view taken on the line 3—3 of Figure 2;

Figure 4 is a similar view taken on the line 4—4 of Figure 2;

Figure 5 is a transverse sectional view through one of the rabble arms and taken on the line 5—5 of Figure 2;

Figure 6 is a fragmentary view of a portion of a rabble arm and attached rabbles looking upwardly from underneath the arms;

Figures 7 and 8 are respectively a view in side elevation and a view in plan showing details of the clamp for holding the rabble to the rabble arm; and

Figures 9, 10 and 11 are respectively a plan view, a view in side elevation and a view in end elevation of the rabble.

Like reference characters denote like parts in the several figures of the drawings.

In the drawings there is shown a conventional form of multiple hearth furnace 10, including a bottom hearth 11, a top dome drying hearth 12, and certain intermediate hearths 13. Centrally positioned to extend through the several hearths is an upstanding shaft 14 formed of a plurality of sections, one section for each of the intermediate hearths and a section for the bottom hearth. These sections include radial arms 14, a pair of diametrically disposed arms for each of the spaces between adjacent superposed hearths and with the arms in one hearth disposed at 90° from the arms in the hearth spaces just above and below the same.

As these sections are similar in construction it will be understood that the detail description of any one section will be sufficient for any other similar section.

Referring particularly to Figure 2 it will be noted that each section is formed of a tubular member 15 provided at opposite ends with outstanding flanges 16 by means of which it may be attached to the similar section above and below the section described. The member 15 is provided with a central partition 16 designed, when the several sections are assembled, to be positioned in line with and form a continuation of the similar partitions in the next adjacent sections thereby to form a two-compartment air passageway through the column. One of the passageways 17 is opened at the bottom through the air inlet or outlet 18 and

similarly the other passageway 20 is opened at the top through the inlet or outlet 21. Either of these outlets may be suitably connected to an air current producing means or arranged to discharge either the hot or cold air as may be desired. Each of the sections is provided centrally thereof with a circular wind box 22 inclosing the cylindrical member 15 and spaced therefrom to form a double decked wind passageway 23. Diametrically opposite sides of the wind box are formed into outwardly extending bells 24, the outer end of each of which is provided with a flange 25 constituting a means for fastening the rabble arms 14' thereto.

Each of the rabble arms is provided with a horizontally disposed partition 26, which has its inner end affixed to the tubular member 15 and has its outer end spaced a short distance from the outer end 27 of the rabble arm thereby to form a passageway 29 connecting the lower side 30 and the upper side 31 of the rabble arm. This lower side 30 of the rabble is connected to the lower portion of the air chamber 23 which lower side is in fluid communication with the passageway 20 through an opening 32 in the side of the member 15. Similarly the upper side 31 of the rabble arm is connected through the upper side of the compartment 23 and is in fluid communication with the passageway 17 through an opening 33 in the side of the tubular member 15, all as more particularly shown in Figure 2.

By this construction it will be obvious that air may be introduced either at the top or bottom of the shaft and passed successively through each side of the rabble arms, cooling the same during its passage. The finally heated air may be discharged onto the hearth or piped into any of the metallurgical devices which can utilize heated air to advantage.

For the purpose of supplying hot air to the hearths in the device disclosed, the wind boxes are provided with port holes 34 positioned in the side thereof, which holes are normally closed by means of cover plates 35.

The rabble arms carry a plurality of rabbles 40 as is usual in devices of this character. For the purpose of supporting the rabbles demountably in position, the lower side of the arm is flattened to form laterally extending ledges 41 in a bottom plate 42. A plurality of rabble guiding members or clamps 43 are slidably mounted on the ledges 41 so that the clamps can be slid longitudinally back and forth along the length of the rabble arms. Each side of the clamps is provided with a rabble supporting ledge 44, with the ledge on one of the clamps coacting with the corresponding ledge on the adjacent clamp to form a supporting means for engaging under and supporting the T-head 45 of the rabbles 40 as shown in Figure 6.

Each of the rabbles is provided with an air conducting passageway 46 which opens through the head 45, extends within a short distance from the lower end of rabble and is then turned 90° to exit through the port 47 at the rear side and near the edge of the blade portion 48 of the rabble. The plate 42 is provided with a plurality of apertures 49 spaced apart longitudinally thereof and designed to place the hearth spaces in communication with the interior of each of the rabble arms when the rabbles are set in their fixed position.

Under some conditions of roasting it is found desirable to provide a means for controlling the flow through the passageways 46 and for this purpose each of the rabble arms is provided with a damper plate 50 slidably mounted on the top of the plate 42. The damper plate is guided between guiding walls 51 formed in the interior of the rabble arms and is provided with a plurality of openings 52 extending therethrough and spaced apart to correspond to and be placed in alignment with the opening 49 at the bottom of the rabble arm. For the purpose of providing access to the damper plate, the outer lower end of the rabble arm is provided with an opening 53 through which an instrument may be inserted to engage and shift the damper plate and thus regulate the extent of opening through the apertures 49.

In operation it will be understood that the central column is revolved, carrying with it the rabble arms and that the material to be roasted is fed into the furnace and is moved from one hearth to another by means forming no particular part of this invention.

Air is passed by its natural draft or by providing artificial draft creating means at either or both ends of the column. This cooling air is passed up one of the passageways 17 or 20, the other passageway constituting the discharge for the air heated in its passage through the rabble arms. While a large proportion of the air will pass from one to the other side of the partition 26 through the passageway 29, it is obvious that some air will be discharged through the rabbles onto the hearths, and the amount of this air is regulated at each arm simply by shifting the damper plate contained in the arm.

If at any time one of the rabbles should become burned, or otherwise damaged, the rabbles and corresponding guide plates to the outside of the damaged rabble are shifted outwardly on the rabble arms and the damaged part permitted to drop out of position onto the hearth. The other rabbles may be shoved back into position or a new rabble may be inserted in place of the damaged rabble.

While we have shown and described, and

have pointed out in the annexed claims, certain novel features of my invention, it will be understood that various omissions, substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention.

Having thus described our invention, we claim:

1. In a device of the class described, the combination of a rabble arm provided with a guide supporting member extending lengthwise thereof, a plurality of rabble guides slidably mounted on said member, adjacent sides of contiguous guides being provided with rabble supporting means, and a plurality of rabbles, each supported by said means between the contiguous guides whereby any pair of adjacent guides may be separated to permit the removal of the rabble carried thereby without affecting the mounting of the other rabbles.

2. In a device of the class described, the combination of a rabble arm provided with a guide supporting member extending lengthwise thereof, a plurality of rabble guides slidably mounted on said member, adjacent sides of contiguous guides being provided with rabble supporting means, and a plurality of rabbles, each provided with an air passageway for conducting air to cool the corresponding rabble and supported by said means between the contiguous guides whereby any pair of adjacent guides may be separated to permit the removal of the rabble carried thereby without affecting the mounting of the other rabbles.

3. As an article of manufacture, a rabble guide provided with means for supporting the same on a rabble arm and also provided with means for engaging a rabble, each pair of adjacent guides forming sides of a parallelogram, the sides being at angle to the respective rabble arm.

4. In a device of the class described, a set constituting an attachment to a rabble arm and including a pair of rabble guides provided with means for mounting the same side by side on a rabble arm, and each guide provided with supporting means coactively adapted to support a rabble therebetween, and a rabble supported in position by said supporting means.

5. In a device of the class described, a set constituting an attachment to a rabble arm and including a pair of rabble guides provided with means for mounting the same side by side on a rabble arm, and each guide provided with supporting means coactively adapted to support a rabble therebetween, a rabble supported in position by said supporting means, and means for cooling the rabble.

6. In a device of the class described, a set constituting an attachment to a rabble arm and including a pair of rabble guides provided with means for mounting the same side by side on a rabble arm, and each guide provided with supporting means coactively adapted to support a rabble therebetween, a rabble supported in position by said supporting means, and air operated means for cooling the rabble.

7. In a device of the class described, a set constituting an attachment to a rabble arm and including a pair of rabble guides provided with means for mounting the same side by side on a rabble arm, and each guide provided with supporting means coactively adapted to support a rabble therebetween, a rabble supported in position by said supporting means, and means for directing a current of air towards the rabble for cooling it.

8. In a device of the class described, a set constituting an attachment to a rabble arm and including a pair or rabble guides provided with means for mounting the same side by side on a rabble arm, and each guide provided with supporting means coactively adapted to support a rabble therebetween, a rabble supported in position by said supporting means, and a passage way for directing air to said rabble for cooling it.

Signed at Tacoma, in the county of Pierce and State of Washington this 28 day of November, A. D. 1921.

BENJAMIN G. CALL.

Signed at Garfield, in the county of Salt Lake, and State of Utah this 23 day of November, A. D. 1921.

RICHARD A. WAGSTAFF.