To all whom it may concern:

Be it known that I, Heinrich Specketer, of Griesheim-on-the-Main, Germany, residing at Griesheim-on-the-Main, Germany, have invented certain new and useful Improvements in Apparatus for Producing Zinc and other Similar Metals, of which the following is a specification.

The present invention relates to rotary electric furnaces and has for its object to provide a furnace of this type constituting an improvement over that shown in my prior Patent No. 1,069,211, of June 9, 1914, in that a plurality of reduction chambers are employed in the present instance instead of the single reduction chamber shown in said prior patent. It has been demonstrated in practice that the use of a plurality of reduction chambers in a single rotary furnace has numerous advantages which cannot be predicted upon furnaces having a single reduction chamber only. Chief among these advantages may be mentioned a great reduction in the formation of dust, a more uniform heating of the charge, and an increase in the work done by the same amount of electrical energy. Furthermore, when using polyphase currents, one of the phases may be utilized in each of the chambers, it being understood that electrodes in the several chambers must be well insulated from each other. In addition to the above advantages of a multiple chamber furnace, there are others of probably equal importance.

For instance, the use of a plurality of reduction chambers renders it possible to effect a thorough mixing of the charge during the rotation of the furnace, as will hereinafter appear. In my prior patent above referred to, only a slight mixing action will take place because the furnace must be rotated so slowly in order to prevent undue formation of dust. In the present instance, however, the charge may be mixed in spite of the slow rotation.

The invention is illustrated in the accompanying drawings in which,

Figure 1 is a vertical transverse section of a cylindrical furnace constructed in accordance with the invention.

Fig. 2 is a similar view of a furnace constructed in accordance with the invention, but having a rectangular cross section.

Fig. 3 is a vertical longitudinal section of a modified form of the improved furnace.

Figs. 4 to 7 are vertical transverse sections illustrating different ways in which the dividing partitions in the furnace may be arranged.

Referring first to Figs. 1 and 2, the lining of the furnace is denoted by the reference character A. It is provided with a plurality of feed openings C, each of which communicates with a corresponding compartment or reduction chamber formed by the provision of a plurality of partitions, F in Fig. 1, F² in Fig. 2 running the entire length of the furnace. Each of the chambers is provided with a suitable discharge opening. The outlet conduits for discharging the reduction gases from each chamber do not show in the sectional views of Figs. 1 and 2, but in Fig. 3, where the partitions are shown at E a conduit for this purpose is shown at E. The electrodes are also not shown in Figs. 1 and 2, but are clearly shown at B in Fig. 3. The electrodes are incorporated in the different modifications of the furnace shown in Figs. 1, 2, 4, 5, 6, and 7, in the same manner as the electrodes B in the modification of Fig. 3. The partitions reach to the electrodes, and are separated from the outer wall by the electrodes, as shown clearly in Fig. 3. When polyphase current is used, each chamber is provided with a special electrode, to which the current is supplied through the outer wall of the furnace. The furnace may be mounted for rotation about a horizontal axis by any suitable means such as that shown in my aforesaid prior patent. In the case of this patent, for example, the current is supplied to the electrodes by means of trolleys. The specific manner in which the furnace is mounted and rotated, however, has nothing to do with the present invention, and therefore no mounting for the furnace or actuating means have been shown. The furnace may either be cylindrical in shape and have a circular cross-section, as in Fig. 1, or have a rectangular cross-section as in Fig. 2.

Figs. 4 to 7 inclusive illustrate furnaces constructed along the lines of that shown in Fig. 1, but in which the several reduction chambers are placed in communication by openings in the partitions, these partitions being marked F⁴, F⁵, F⁶ and F⁷ respectively in Figs. 4, 5, 6 and 7. In Fig. 4 a single partition provided with openings J divides the furnace into two communicating reduction chambers. In Fig. 5, the partitions are arranged in the same manner as in Fig. 1.

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Heinrich Specketer, of Griesheim-on-the-Main, Germany.
but are provided with openings \( J \) which place the chambers in communication. Fig. 6 shows a furnace divided into three chambers by means of parallel partitions. In both Figs. 6 and 7 the partitions are provided with openings \( J \).

In Fig. 3 the communication between the chambers is established in a different manner by so constructing the partitions that they do not divide the interior of the furnace into distinctly separate chambers. The partitions \( J^2 \), do not extend the full length of the furnace but start at each end thereof and terminate near the center of the furnace to leave a central compartment or space \( G \) which communicates with all of the spaces \( H \) between the partitions. Viewing the disposition and construction of the partitions \( F^2 \) in Fig. 3 in a different way, it will be noted that the aligned portions of the partitions may be considered single partitions provided with openings which form the central space \( G \).

In the type of furnace shown in Figs. 1 and 2, the total charge in the furnace is sub-divided into relatively small lots which may obviously be more uniformly heated than if the charge were not so divided.

Furthermore, the partitions in Figs. 1 and 2 maintain the contents in the proper state of mixture owing to the slighter falling motion of the charge.

In Figs. 4 to 7 the partitions in lifting the material cause some of the same to pass from each chamber through the openings \( J \) into the adjacent chamber. This results in an efficient mixing action without the formation of an objectional amount of dust.

The same result is also obtained by the types of furnace shown in Fig. 3, where the charge passes from one chamber into the central communicating space \( G \) and from there into other chambers. The continuance of this action serves to intimately mix the charge.

Obviously, many changes may be made in the details of construction without departing from the scope of the invention as defined in the accompanying claims.

What I claim is:

1. A rotary electric furnace provided with at least one partition disposed longitudinally in the furnace to divide the same into two partitions disposed longitudinally in the furnace to divide the same into three reduction chambers.

2. A rotary electric furnace provided with three partitions extending from the center of the furnace and disposed longitudinally in the furnace to divide the same into three equally large reduction chambers arranged around the central axis of the furnace.

3. A rotary electric furnace having a reduction chamber, and a partition adjacent to the chamber and disposed longitudinally in the furnace dividing the same into a plurality of reduction chambers each opening directly into the first mentioned reduction chamber.

4. A rotary electric furnace having a reduction chamber, and a partition adjacent to the chamber and disposed longitudinally in the furnace dividing the same into a plurality of reduction chambers each opening directly into the first mentioned reduction chamber.

5. A rotary electric furnace provided with at least one partition disposed longitudinally in the furnace to divide the same into at least two reduction chambers, said partition being provided with openings connecting said chambers for the purpose described.

6. A rotary electric furnace provided with two partitions disposed longitudinally in the furnace to divide the same into at least two reduction chambers all communicating at the central portion of the furnace.

7. A rotary electric furnace provided with three partitions extending from the center of the furnace and disposed longitudinally in the furnace to divide the same into three equally large reduction chambers arranged around the central axis of the furnace and all communicating at the central portion of the furnace.

8. A rotary electric furnace having a reduction chamber and partitions disposed longitudinally in the furnace dividing the same into a plurality of reduction chambers, all communicating at the central portion of the furnace.

9. A rotary polyphase electric furnace provided with at least one partition disposed longitudinally in the furnace and dividing the interior of the furnace into a plurality of separated reduction chambers each adapted to utilize a different phase of the electric current.

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

HEINRICH SPECKETER.

 Witnesses:  
JEAN GRUND,  
CARL GRUND.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."