

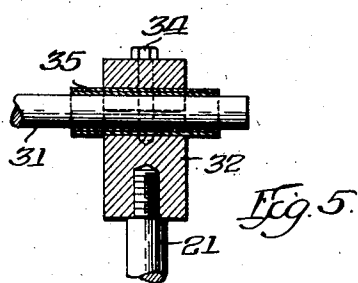
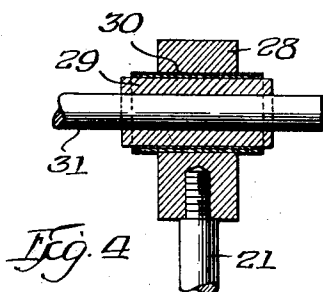
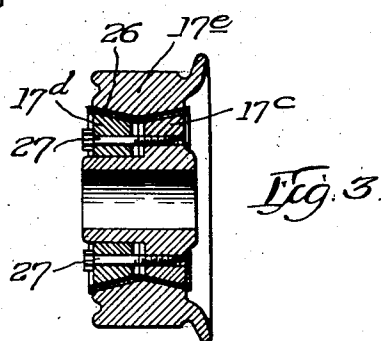
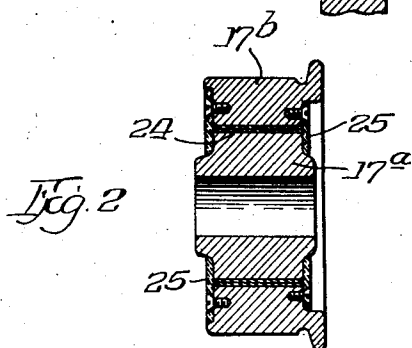
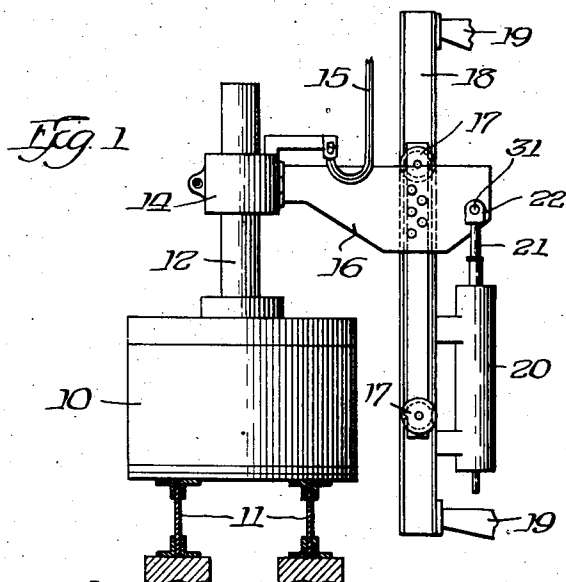
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G. KELLER ET AL

ELECTRIC FURNACE CONSTRUCTION

Filed May 9, 1927



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UNITED STATES PATENT OFFICE.

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ELECTRIC-FURNACE CONSTRUCTION.

Application filed May 9, 1927, Serial No. 189,877, and in Germany June 7, 1926.

This invention relates to electric furnaces of the melting type and has to do particularly with the construction of means for supporting and adjusting the electrodes, whereby their feed is controlled incident to operation of the furnace.

The general object of the invention is the provision of an adjustable electrode supporting apparatus which will afford effective insulation between the electrode carrier, which is electrically charged, and the earthed members whereby the carrier is supported and operated.

Another object is the provision of a construction which will be effective to avoid deterioration of the insulation by heat and wear, and thus afford reliable protection for the portions of the apparatus which are earthed or which are likely to be touched by persons or other objects.

Other and further objects will be pointed out or indicated hereinafter, or will be apparent to one skilled in the art upon an understanding of the invention or its employment in practice.

In the drawing forming a part of this specification, we illustrate certain arrangements of structure embodying the invention, but it is to be understood that these are susceptible of various modifications in arrangement and detail, without departing from the scope of the invention indicated in the appended claims.

In said drawing,

Fig. 1 is a diagrammatic illustration in the nature of a sectional elevation of apparatus in which the invention is embodied;

Fig. 2 is a detail in the nature of a diametrical section of one of the wheels for the carrier frame;

Fig. 3 is a similar section of a modified construction of the frame-carrying wheels;

Fig. 4 is a detail in the nature of a section of a connection between the electrode-carrying frame and its operating means; and

Fig. 5 is a similar detail of another form of such connection.

Considerable difficulty is experienced in preserving proper insulation between the movable electrode holders of electric melting furnaces and the associated portions of the apparatus which are earthed or which are easily accessible and likely to be touched by persons or objects in the vicinity of the fur-

nace. These difficulties arise from the necessity of affording secure support and accurate guidance for the electrodes, which are themselves heavy, and the destructive effects of high temperatures upon the insulating material. The present invention solves the difficulty by a new arrangement of the electrode supporting and operating apparatus, whereby the necessary strength is afforded in the supporting structure, accuracy in the guidance of the electrode is maintained, and the insulating material is safeguarded against the destructive effects of the furnace temperatures. The nature of the invention will be ascertained most quickly by reference to the illustrative embodiment shown in the drawing. In this, the reference numeral 10 designates the furnace which is carried on suitable supports 11 and into which the electrode 12 is inserted through an aperture in the top. The electrode is mounted in a carrier 14 to which current is supplied through a conductor 15. The carrier 14 is supported on a carrier arm 16 which constitutes a portion of a carriage having flanged wheels 17 which run on and are guided in guide channels 18 supported in an upright position adjacent the furnace by brackets 19. Hydraulic power cylinder 20 constitutes part of the operating means for effecting and controlling the vertical position of the carriage on the guides 18, and hence the position of the electrode and its feed toward or from the furnace. The piston of the hydraulic cylinder 20 is connected to the carriage by a rod 21 and a connection 22. The cylinder, of course, has pipe connections to other apparatus, such as the means for furnishing and regulating the supply of pressure fluid, so it is highly important that the cylinder, as well as the guides 18, be fully insulated from the heavy current supplied to the carrier 14. Heretofore, it has been customary to provide an insulated connection between the carrier 14 and the arm 16, or in the latter, for this purpose. When so arranged, however, the insulating material is then exposed to high temperatures, and also to mechanical pressures, which has frequently resulted in the deterioration or breaking down of the insulation and loosening of the mechanical mounting of the carrier. By the present invention the insulating material is removed from the zone of

high temperature, and is so arranged that it is not so subject to destruction from mechanical pressures. This is accomplished by placing the insulation and the operative connections between the carriage on the one hand and the guides and operating mechanism on the other hand. For insulating the carriage from the guides, we place the insulating material in the wheels 17. As thus arranged, in the construction illustrated in Fig. 2, the wheel is comprised of a hub portion 17^a and the flanged rim portion 17^b, which is shrunk on to the hub portion over an interposed layer of suitable insulating material 24, such as mica. Thus a strong mechanical structure is provided, which is well qualified to support the carriage, with effective insulation between the carriage and the guides. The edges of the mica insert are protected by rings 25 of a suitable insulating material, such as bakelite, suitably molded or otherwise secured against the faces of the wheel members. In the construction as illustrated in Fig. 3, there are provided cooperating hub portions 17^c and 17^d having synclinal peripheral faces for clamping cooperation with synclinal inner faces of the rim portion 17^e. The insulating material 26 is inserted between these cooperating faces of the hub and rim members and the hub member 17^d drawn up toward the member 17^c by bolts 27, so as to securely clamp the insulating material between the rim and hub members.

Connections for the operating rod and the carriage are illustrated in Figs. 4 and 5. In the construction illustrated in Fig. 4, the operating rod 21 carries a yoke member 28 which is shrunk onto a bushing 29 with an interposed sleeve 30 of strong insulating material, such as mica. The bushing is connected to the carriage by a stud 31. In this fashion, the operating mechanism is effectively insulated from the carriage. In the construction illustrated in Fig. 5, the rod 21 carries a split clamping member 32, which is clamped down on the stud 31 by bolts 34, with a sleeve 35 of insulating material interposed between the clamp and the stud.

With the apparatus constructed in conformity with this invention, therefore, the insulating material is safeguarded against high temperatures and mechanical wear, and its security and durability thereby materially enhanced, with the result that the grounded portions of the mechanism are afforded better protection against voltage and the electrode is afforded more accurate guidance and stable support.

What we claim is:

1. In electric furnace apparatus, in combination, an electrode holder, a carriage for same, a guide on which the carriage travels, and insulating material between the carriage

and guide for preventing transmission of current from the holder to the guide.

2. In electric furnace apparatus, in combination, an electrode holder, a carriage for same, a guide on which the carriage travels, operating means for moving the carriage on the guide, and dielectric material between the carriage and the guide and operating means insulating same from the carriage.

3. In electric furnace apparatus, in combination, an electrode holder, a carriage having an arm supporting the holder, a guide on which the carriage travels, insulating material between the carriage and guide, operating mechanism for shifting the carriage on the guide, and insulating material between the operating mechanism and carriage.

4. In electric furnace apparatus, in combination, an electrode holder, a carriage supporting the holder, a guide for the carriage, and wheels on which the carriage travels on the guide, said wheels having incorporated therein dielectric material insulating the guide from the carriage.

5. In electric furnace apparatus, in combination, an electrode holder, a carriage supporting same, operating mechanism for shifting the carriage, and a connection between the operating mechanism and carriage whereby movement is transmitted to the latter from the former, said connection having incorporated therein dielectric material insulating the operating mechanism from the carriage.

6. In electric furnace apparatus, in combination, a carriage for supporting an electrode, a guide for the carriage, and a wheel having a hub portion connected to the carriage and a rim portion running on the guide and dielectric material insulating the rim portion from the hub portion.

7. In electric furnace apparatus, in combination, a carriage for supporting an electrode, and a guide and operating mechanism having insulated operative connection with the carriage.

8. In electric furnace apparatus, in combination, a vertically extending guide disposed to one side of the furnace, a carriage having an electrode-supporting arm extending from the guide to a position over the furnace, and insulating means between the carriage and guide and operating to guide said carriage for traveling movement on said guide and to insulate said carriage from said guide.

In testimony whereof we have hereunto subscribed our names this 21 day of April, A. D. 1927, at Zurich, Switzerland.

GOTTLIEB KELLER.
ERNST WIRZ.