M. R. CONLEY.

ELECTRIC FURNACE.

APPLICATION FILED FEB. 15, 1911.

1,023,996.

Patented Apr. 23, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

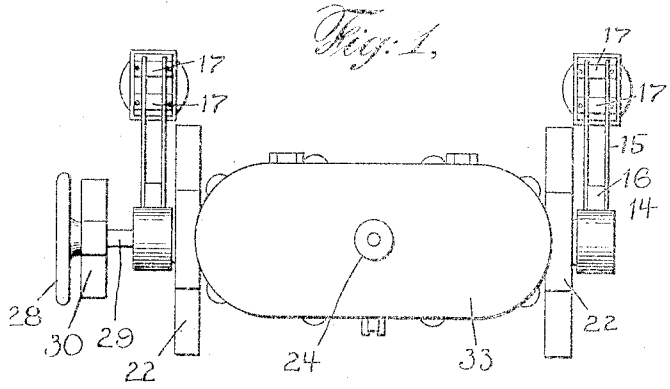


Fig. 2.

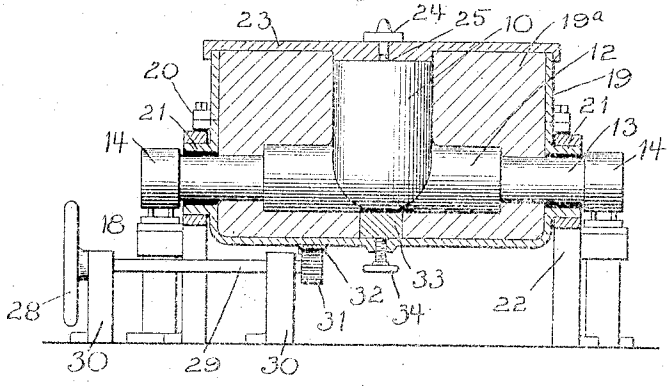
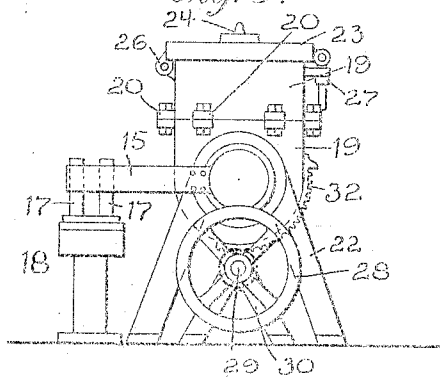


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

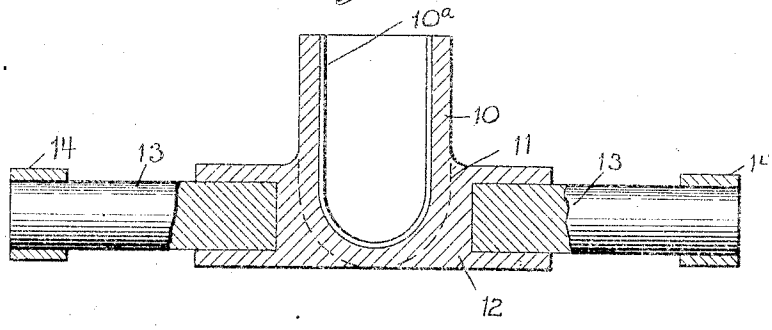
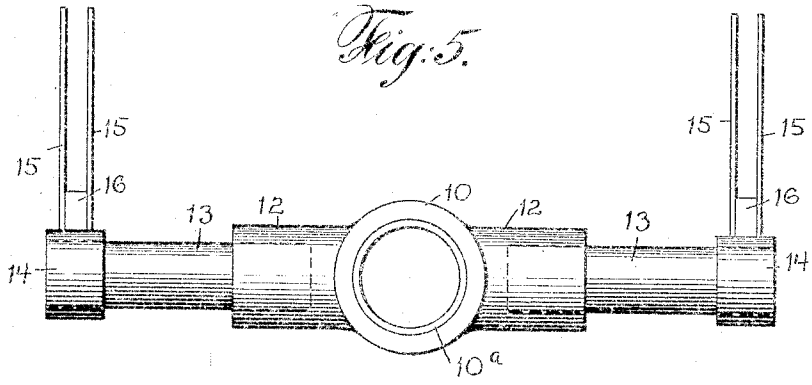


Fig. 5.



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UNITED STATES PATENT OFFICE.

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ELECTRIC FURNACE.

1,023,996. Specification of Letters Patent. Patented Apr. 23, 1912.

Application filed February 15, 1911. Serial No. 603,718.

To all whom it may concern:

Be it known that I, MICHAEL R. CONLEY, of the city of New York, county of Kings, and State of New York, have invented a new and useful Improvement in Electric Furnaces, of which the following is a full, clear, and exact description.

My invention relates to improvements in electric furnaces and especially to electric furnaces of the resistance type such as shown in my application for Letters Patent of the United States No. 564,741.

My present invention relates to improvements in certain details of the furnace set out in the application referred to. First, I find that in actual practice after the charge is melted, the voltage of the current has a tendency to run down, while the amperage mounts up quickly. To assist in obviating this slight difficulty, I provide the furnace or melting pot or chamber, with an inner wall of material which is a non-conductor until highly heated, such for instance as fire clay, so that after the furnace is highly heated the lining will take the current, but will be of such resistance as to afford a sort of balance, and have a tendency to prevent the rapid fall of voltage and the rapid rise of the amperage.

My invention further relates to certain improvements by which the furnace can be conveniently handled and operated in melting metals and pouring the melted materials.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar reference characters indicate corresponding parts in all the views.

Figure 1 is a plan view of the complete furnace embodying my invention. Fig. 2 is a longitudinal section thereof. Fig. 3 is an end view. Fig. 4 is a longitudinal section of the furnace proper with the accessory mechanism removed, and Fig. 5 is a plan view of the structure shown in Fig. 4.

The furnace proper is of the kind set forth in my application above referred to, and comprises a pot or crucible 10 the lower outline of which is shown by the lines 11, and which merges into the body portion 12, this being elongated and slightly narrower than the crucible, while the part 10 is of higher resistance so that the principal heat is applied at the inner furnace wall. The crucible 10 is lined as shown at 10^a, and this lining is of a material which is a non-conductor of current except when highly heated, and this material can preferably be fire clay, magnesite, or other refractory substance. When the furnace is highly heated, however, the lining 10^a will take the current, but being of higher resistance than the other parts of the furnace, will have a tendency to balance the current. The action of this lining 10^a is somewhat analogous to that of the balancing resistance in the well known Nernst lamp; as the conducting crucible itself becomes hotter its resistance also becomes higher, so that a greater E. M. F. will be required to force a given unit of electricity through it. However, when the normally non-conductive lining 10^a has been heated to such a degree that it becomes a conductor, the total resistance of the mass through which the current can pass will be reduced, so that the voltage of the current will tend to fall to normal or initial strength. As the resistance of the conductor, due to the heating effect of the current, increases, so the resistance of the non-conductor decreases, thereby maintaining a balance which tends to maintain constant voltage.

The furnace has terminals 13, preferably of carbon, closely connected with the end portions thereof, and these terminals are provided with metal caps 14 which are cast thereon preferably, and which have switch arms 15 preferably arranged in pairs and spaced apart by a lug 16 on each cap 14. When the furnace is in melting position, the switch arms 15 engage the contacts 17 as shown in Figs. 1 and 3, and the contacts 17 are mounted on a suitable support 18 and connected with a source of electricity.

All the above with the exception of the lining 10^a is not claimed in this application as novel. The general construction of the furnace, however, as described below is believed to possess novel features, and comprises a metallic casing 19 preferably of cast iron, which is in two parts united together as shown at 20 so that the casing can be readily removed. The casing 19 is provided with bearings or trunnions 21 which fit snugly around the terminal carbons 13, and are supported on suitable pedestals or posts 22. The casing is provided with a cover 23 which has a peep hole 25 closed by a plug 24 and arranged directly over the

pot or crucible 10. The cover 23 is hinged at the back edge as shown at 26 and provided with a suitable fastening 27 at the front edge to hold it locked while the charge is being melted. The casing 19 is considerably larger than the furnace proper, and the space between the two is filled as shown at 19ª by suitable insulating material such as fire clay, fire brick, quartz or the like, in order that there may be as little loss as possible by radiation.

It will be seen that the current will be led in through the carbon terminals 13 and that the resistance afforded by the walls of the pot 10 will cause the latter to be highly heated so as to melt the contents.

The furnace is tipped by means of a hand wheel 28 or equivalent lever attached to a horizontal shaft 29, and the latter is mounted in suitable posts 30 and provided with a gear or pinion 31 meshing with a curved rack 32 on the bottom of the casing 19, so that to tilt the furnace and discharge the contents, the cover 23 can be lifted and the furnace tipped over by simply turning the shaft 29, and it will be observed that this action will cause the switch arms 15 to be disengaged from the contacts 17, thus breaking the circuit through the furnace, while the reverse movement of the shaft 29 will tip the furnace back into operative position as shown in Fig. 3 and cause the switch arms to again frictionally engage the contacts 17.

In order that there shall be no unnecessary strain on the furnace by reason of the weight of the charge it is permitted to rest on a block 33 of fire clay or other non-conductor, which is held in the casing 19, and the supporting brick or block can be adjusted by means of the screw 34.

It will be seen that I have provided a very convenient furnace which is automatically cut in and out of circuit by tipping it, that the heat is applied and conserved at the point where the actual melting occurs, and that the furnace can be very easily operated.

I claim:—

1. A resistance electrical furnace having a tilting body, a melting chamber or crucible carried by the body and of higher electric resistance than other parts of the body, and a lining for said crucible which lining is a non-conductor of electricity when cold but a conductor when highly heated.

2. An electric resistance furnace comprising an inclosing oscillating casing, a melting pot contained in the casing and arranged with its open top near the top of the casing, terminals connecting with the lower part of the pot and projecting outward through opposite walls of the casing, an insulating packing or filling between the pot and the casing wall, laterally extending switch arms on the ends of the terminals, and contacts to engage the switch arms.

3. In an electric furnace, the combination with the casing and its contained furnace, the latter having terminals extending through the casing walls, of an adjustable insulating support between the bottom of the furnace and the bottom wall of the casing.

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