M. R. CONLEY.

ELECTRIC FURNACE.

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989,568. Patented Apr. 18, 1911.

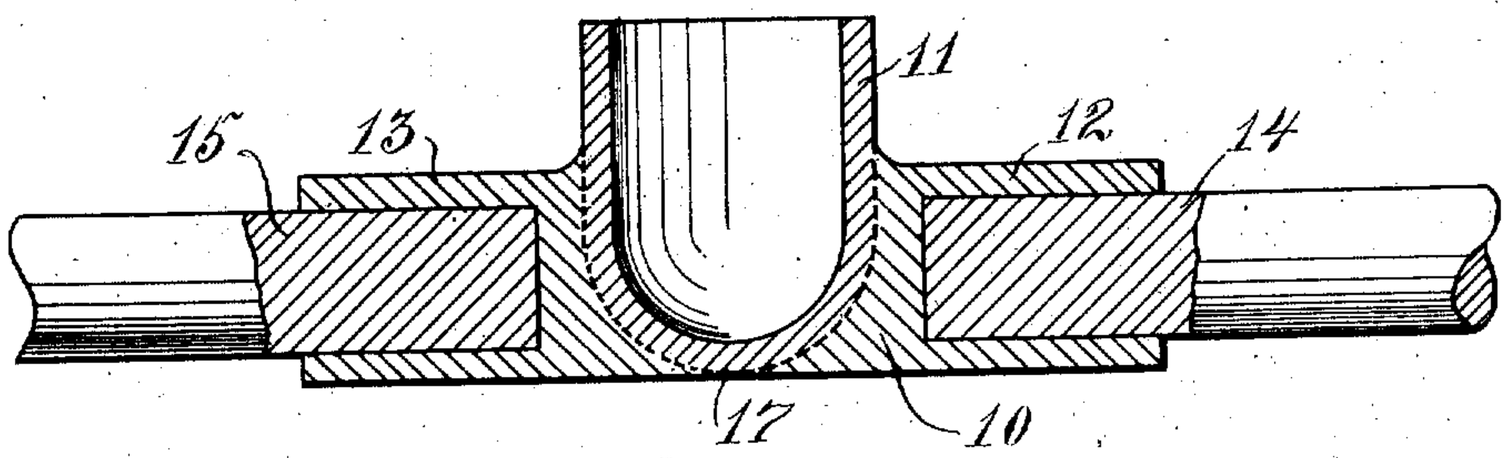

Fig: 1,

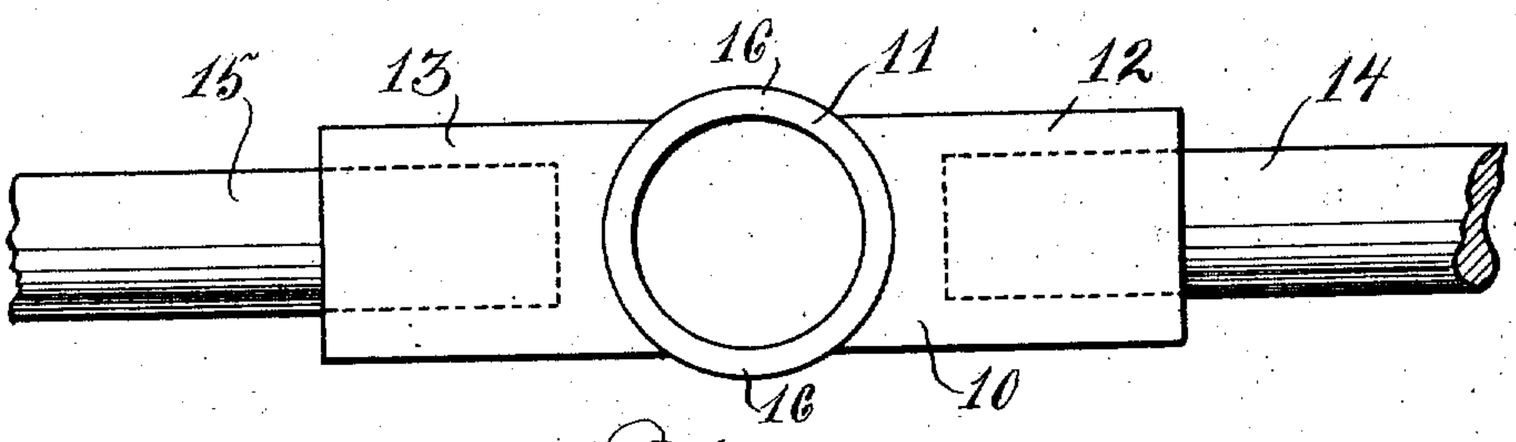

Fig: 2,

Witnesses:
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UNITED STATES PATENT OFFICE.

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ELECTRIC FURNACE.

989,568. Specification of Letters Patent. **Patented Apr. 18, 1911.**

Application filed June 14, 1910. Serial No. 566,741.

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 more especially to electric furnaces of the resistance type in which the heat for melting is generated by the resistance to the electric current as it passes through the wall of the melting chamber.

The object of my invention is to produce a furnace having the highest resistance to the current in that part of the furnace which forms the inner wall of the melting chamber and is next to the charge to be melted. I can do this very nicely by making the furnace of a composition which is a mixture of carbon and a resisting material such as fire-clay. By molding the material so that the ingredients in that portion which constitutes the melting chamber are composed of a relatively high percentage of clay, say sixty per cent., and forty per cent. of carbon, and having the remainder of the furnace high in carbon, say eightly per cent. of carbon and twenty per cent. of fire-clay, it will be seen that the body portion will be of low resistance while the part where the melting takes place will be of high resistance, and this latter part will consequently become much hotter under the influence of a suitable current.

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 transverse vertical section of the furnace embodying my invention, and Fig. 2 is a top view of the furnace.

The furnace can be made of any desired size or shape. In the drawings I have illustrated one having a body portion 10 and a melting chamber 11, the melting chamber 11 being shown in the form of a crucible which can be covered if desired. The body portion 10 of the furnace is made of material of low resistance to an electric current, and I have found that a mixture of sixty per cent. of carbon and forty per cent. of fire-clay makes a mixture which is durable and which does not offer much resistance to the passage of an electric current. The melting chamber 11, however, is of a material which offers high resistance to an electric current, and I use in the composition of this approximately forty per cent. of carbon and sixty per cent. of fire-clay. These percentages, however, both in the body portion and in the heating chamber, may vary considerably without departing from the principle of my invention, which is a furnace of the resistance type, and that part which is next to the material to be melted being of a material offering a higher resistance to an electric current than the rest of the furnace. As a result it will be evident that the heat is very much higher at the point where the melting takes place than in other parts of the furnace, and in this way the furnace is not only rendered more efficient but far more durable.

The body portion 10 has arms 12 and 13 on opposite sides, but of course the body of the furnace may be thick enough to dispense with the arms if desired, but the arms are preferred as they simplify the construction and save material. These arms 12 and 13 are bored out, and the carbon terminals 14 and 15 of relatively large size so as to be of low resistance, are fitted snugly into the bores. When this is done some good conducting cement should be used, and I have found ordinary molasses mixed with carbon, very suitable for the purpose. Proper electric connections are provided for the carbon terminals 14 and 15, but these are not shown in the drawings as they form no part of my present invention.

In making the furnace, the heating chamber 11 and the body portion 10 are formed under pressure in a mold at one and the same time. In this way when the furnace is dried, the heating chamber 11 and the body portion 10 form one continuous body, and in this way all difficulty of forming a good electrical connection between the body portion and the heating chamber is avoided, and all possibility of arcing in the passage of an electric current from the body portion to the melting chamber is eliminated.

In practice the current is turned on through the terminal 14 and passes through the arm 12, and because of its low resistance, the body portion of the furnace will remain comparatively cool while the melting chamber through which the current

passes being of material offering high resistance to the current, will become white hot and will melt materials readily. As the body portion 10 does not entirely surround the sides of the melting chamber 11 at 16, and as it does not extend across the bottom of it at 17, the electric current in passing from the terminals 14 out through the terminals 15, must pass at first through the bottom of the heating chamber, as it is apparent that that path will offer less resistance than through the sides. As a result the melting chamber will first become heated in the bottom part, then as the sides are warmed the resistance therein will be decreased so that part of the current will pass through the sides, and the entire heating chamber in a short time will be uniformly heated to such a degree that a charge of metal or other material will be quickly melted.

It will be seen that I provide an electric furnace which is very simple in construction and is cheap to make, and owing to the close union between the melting chamber 11 and the body portion 10, the melting chamber being in fact integral with the latter, a perfect electric connection between the two is formed so that arcing of the current is impossible, and the connection is so durable that it is impossible to disturb it in the operation of the furnace.

I claim:—

1. An electric resistance furnace comprising a melting chamber the walls of which are of high resistance, and a body portion formed on opposite sides of the melting chamber near the bottom, the melting chamber being wider and deeper than the said body portion and being also smaller at its bottom, whereby the current first traverses the bottom of said melting chamber.

2. An electric resistance furnace having a melting chamber which is composed of material of relatively high resistance, and a body portion formed integral with the walls of the melting chamber but projecting from the sides thereof, said body portion being composed of material of better conductivity than that of the melting chamber.

3. An electric resistance furnace comprising a melting chamber having a closed bottom portion and an integral body portion of less width than the melting chamber formed on opposite sides thereof and connecting with the walls of the melting chamber near the bottom thereof, the body portion being of better conductivity than the walls of the melting chamber.

4. A one-piece electric resistance furnace having a melting chamber composed of material of relatively high resistance, and a body portion formed in the shape of integral arms extending from the sides of the melting chamber, the said body portion being composed of material of better conductivity than that of the melting chamber.

5. An electric furnace having a melting chamber of relatively high resistance and a body portion of relatively low resistance integral therewith, the lower portion of the melting chamber intersecting the body portion and being of greater height than the body portion, whereby a current first traverses the lower walls of the melting chamber.

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Witnesses:

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