No. 858,718. PATENTED JULY 2, 1907.

P. L. T. HÉROULT.

ELECTRIC FURNACE.

APPLICATION FILED APR. 18, 1906.

FIG. 1.

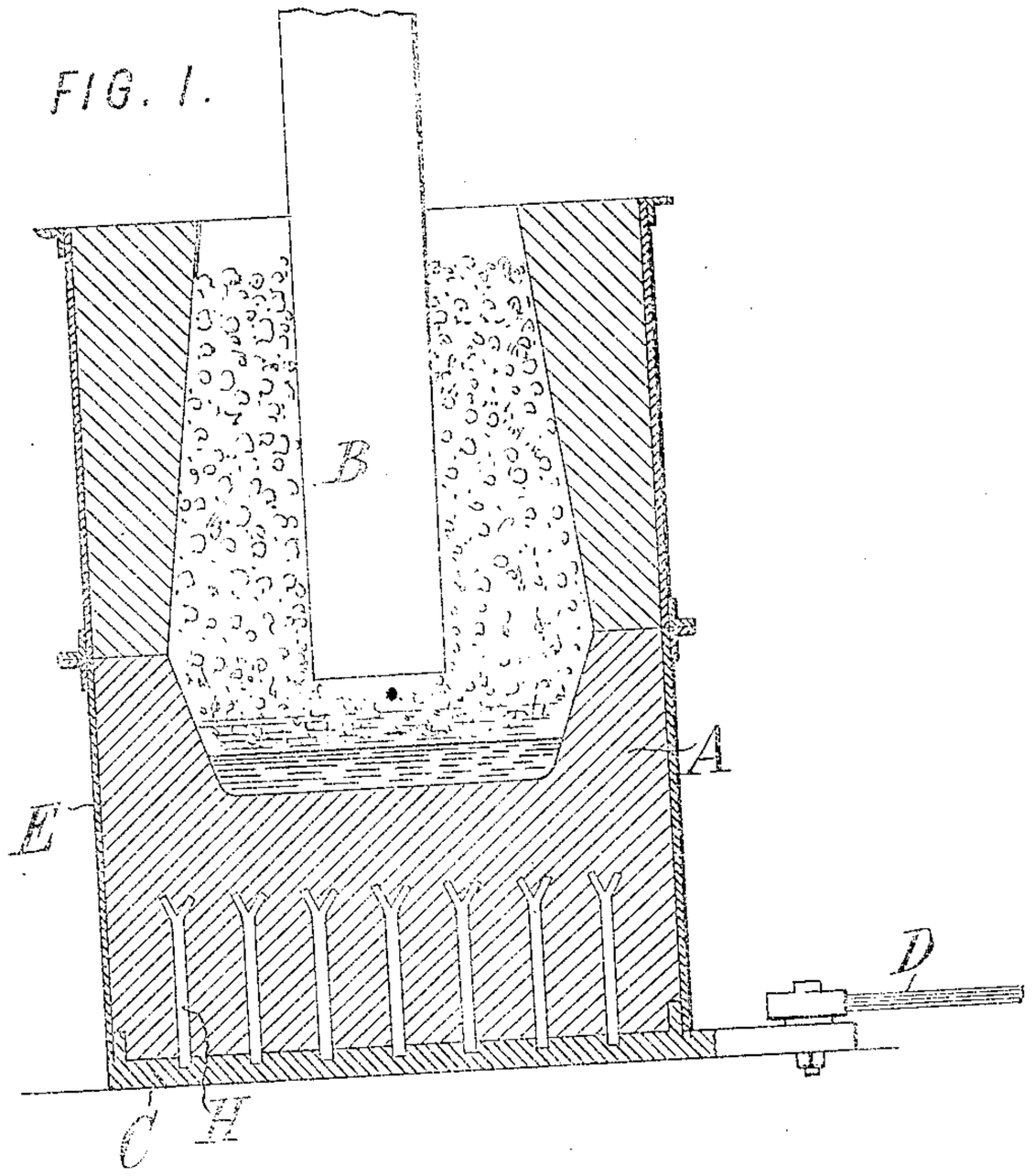


FIG. 2.

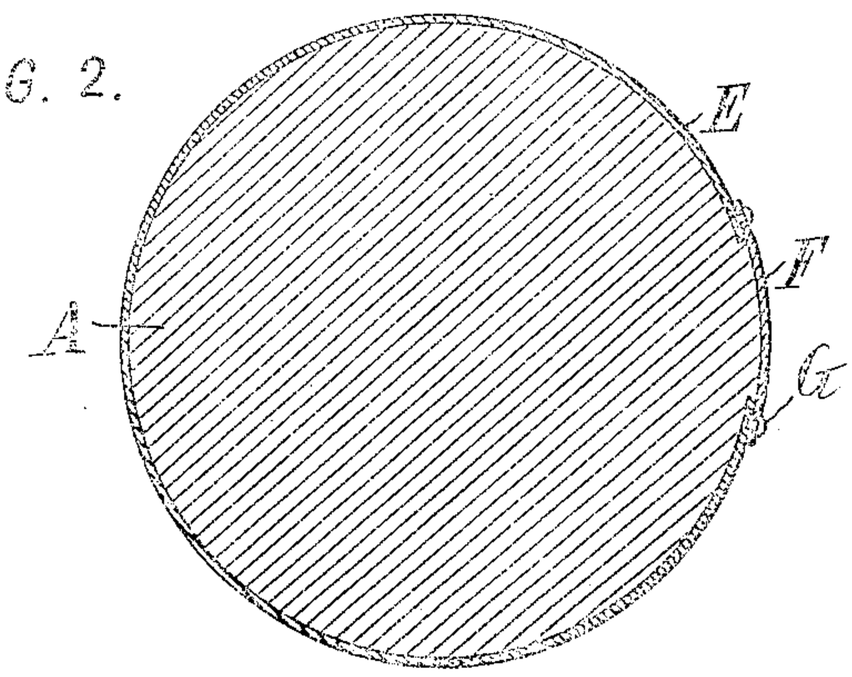
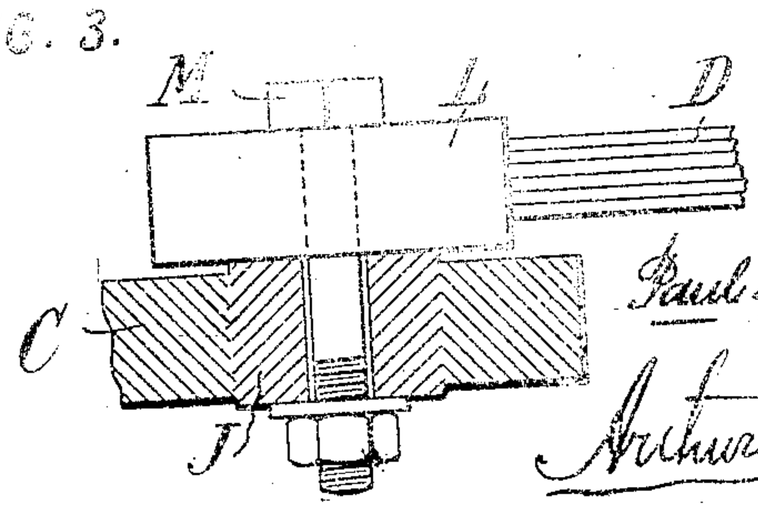


FIG. 3.



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ELECTRIC FURNACE.

No. 858,718. Specification of Letters Patent. Patented July 2, 1907.

Application filed April 18, 1906. Serial No. 312,318.

To all whom it may concern:

Be it known that I, PAUL LOUIS TOUSSAINT HÉROULT, a citizen of the Republic of France, residing at La Praz, Savoie, France, have invented certain new and useful Improvements in Electric Furnaces, of which the following is a specification.

This invention aims to provide certain improvements in electric furnaces, whereby the power factor (when an alternating current is used) is increased, and whereby the resistance to the passage of the current is lessened, and also whereby certain other advantages are obtained hereinafter referred to in detail.

The accompanying drawings illustrate an embodiment of the invention.

Figure 1 is a vertical section of a furnace; Fig. 2 is a horizontal section thereof; Fig. 3 is a sectional view of a detail on an enlarged scale.

Referring to the embodiment illustrated, the body A of the furnace may be of carbon as usual, bound by a surrounding jacket or rings of iron, steel or the like. The current passes from the electrode B through the charge, and thence through the cast iron base C to cables D. Ordinarily the jacket is made of iron or steel forming a continuous ring of magnetic material, forming an uninterrupted medium for the lines of force around the direct line of the current, and introducing a considerable impedance into the circuit. I propose to eliminate this impedance by breaking the circuit. For this purpose the iron portion E of the jacket is not continuous around the carbon body of the furnace, but is broken at one or more points, the edges being connected by a strip F of copper or other non-magnetic material connected to the iron in any suitable way, as by means of rivets G. The jacket may be arranged as shown to run continuously from the top to the bottom, in which case the copper will be similarly arranged, or the iron and also the copper may be arranged in a variety of other ways to bind the body of the furnace together, and at the same time to avoid the provision of a complete circuit of magnetic material. The impedance may be so reduced by this construction as to increase the power factor from 60 as in the ordinary alternating current furnaces to 92 or 93.

A more perfect contact than usual between the body of the furnace and the cast iron base is secured by providing long and preferably forked pins H, which extend from the base upward into the carbon block, and the lower ends of which are cast into the base plate C so as to make perfect contact therewith. This construction increases by about two per cent. or more the conductivity as compared with previous constructions, and is at the same time very cheap and very readily applied to the furnace.

For making a good connection between the cable or cables D and the plate C, I provide a special contact block J of copper about which the plate C is cast so as to effect an intimate, welded, union. Practically an alloy is formed tapering off to copper on one side and iron on the other. To secure this union the parts may be specially heated as by means of thermit or the electric arc. The block J is preferably plated at least on the faces which come into contact with the cast iron, with tin or other metal which keeps the copper perfectly clean and unoxidized and which melts at the casting temperature, and thus insures a clean contact between the cast iron and the copper. A cable block L which may be of the usual type, of aluminium cast upon the ends of the cables, is clamped strongly upon the contact block J, as for example by means of a bolt M, the contact faces of the blocks J and L being planed to insure a good contact. This method of connecting the cable to the base plate effects a material increase in conductivity, as compared with the connecting of the cable block directly to the cast iron plate. The complete furnace, therefore, has a very limited loss of current through resistance and a very high power factor, whereby considerable economies in cost of operation and also in the cost of installation are effected.

Though I have described with great particularity of detail a certain specific embodiment of the invention, yet it is not to be understood therefrom that the invention is limited to the exact embodiment described. Various modifications thereof in detail and in the arrangement and combination of the parts, may be made by those skilled in the art, without departure from the invention.

What I claim is:—

1. An electric furnace having a body A of carbon, and a jacket surrounding the same comprising a portion E of iron, said portion being divided and its ends connected by a portion F of copper to break the lines of force around the furnace.

2. An electric furnace having a base plate serving as a current terminal and made of cast iron with rods of wrought iron projecting into the body of the furnace and having their lower ends cast into the base plate.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

PAUL LOUIS TOUSSAINT HÉROULT.

Witnesses:

D. ANTHONY USINA,

FRED WHITE.