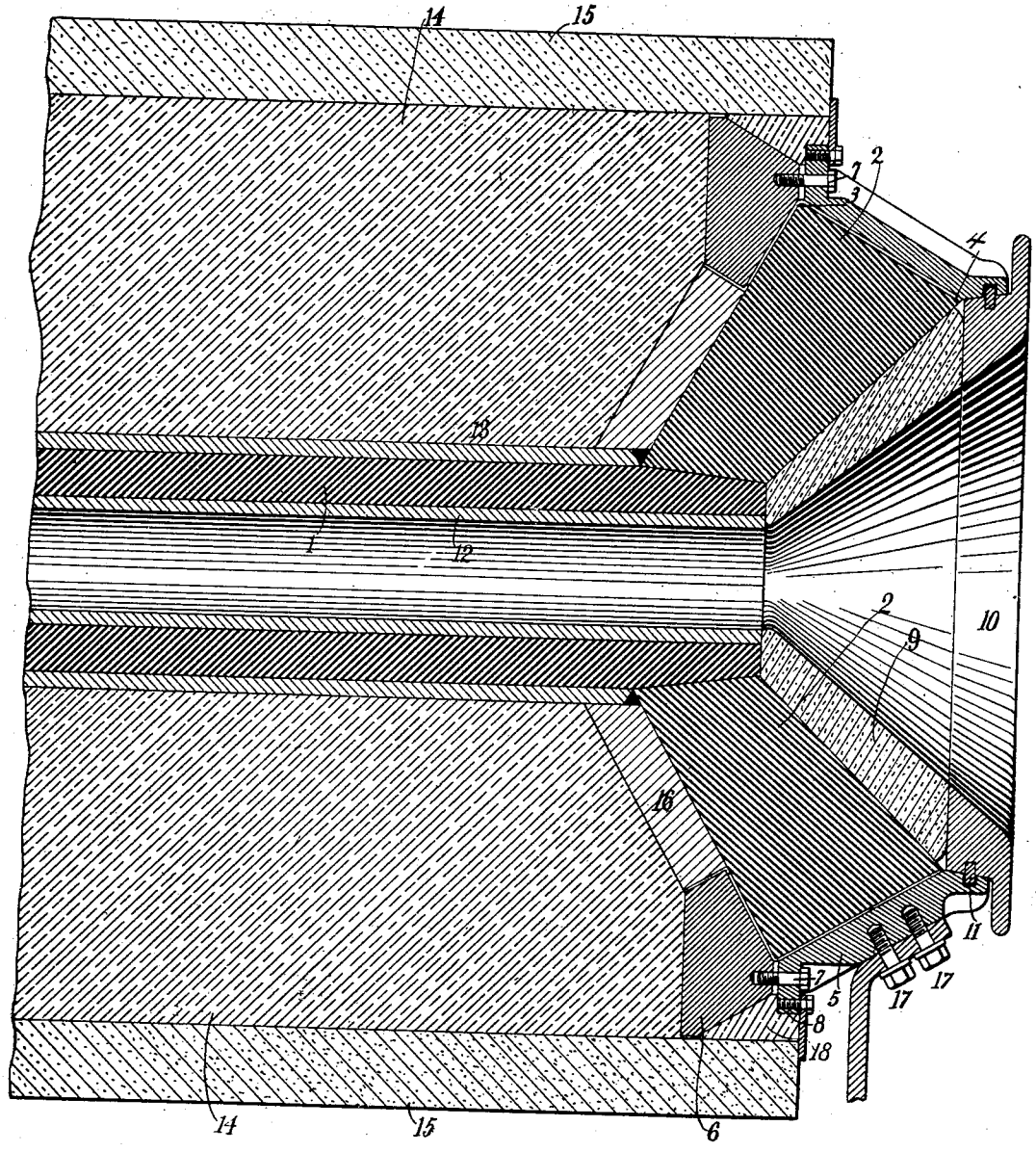
No. 715,506. Patented Dec. 9, 1902.

H. N. POTTER.

ELECTRIC FURNACE.

(Application filed Nov. 21, 1901.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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ELECTRIC FURNACE.

SPECIFICATION forming part of Letters Patent No. 715,506, dated December 9, 1902.

Application filed November 21, 1901. Serial No. 83,076. (No model.)

To all whom it may concern:

Be it known that I, HENRY NOEL POTTER, a citizen of the United States, and a resident of New Rochelle, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Electric Furnaces, of which the following is a specification.

In another application filed by me on the same day herewith and bearing Serial No. 83,078 I describe and illustrate a method of making an electric furnace consisting, essentially, of a carbon tube lined with pure magnesia and preferably coated with the same substance and provided with a suitable jacket of inert heat-resisting material. In the present application I show and describe such a furnace in the form which I consider best suited for practical use.

Owing to the intense heat at which it is proposed to operate my electric furnace provision must be made for allowing for the expansion and contraction of the parts which are alternately heated and cooled. The present invention relates, among other things, to the means for securing this result. Moreover, since the inert heat-resisting material which I propose to use for the jacket is a hydroscopic substance subject to air-slaking it is important that means should be provided for preventing this, and a second part of my invention relates to such means.

The invention also contemplates other details of improvement, which will be fully set forth in the following specification.

The drawing illustrates a longitudinal section through one end of my improved electric furnace.

In the drawing, 1 represents the carbon tube, the same being made conical at its end, as shown, to receive the carbon terminal 2 and make good connection therewith. By reason of the conical shape of the end of the tube 1 the terminal 2 can be ground thereon for the purpose indicated. The terminal 2 itself is conical in shape and has flaring ends, the outer edge of which projects, as shown at 3, in such a manner that the slope of the outer surface of the terminal rises from the outer to the inner edge thereof, as from 4 to 3. In this way a conical bearing is made for the ring-shaped metal terminal 5, which is applied to the outer surface of the carbon terminal. The terminal 5 is firmly secured to the carbon terminal by means of a metal ring 6 and a number of screws or bolts 7, which pass through a flange 8 upon the metallic terminal and into the metallic ring 6. By tightening the screws or bolts 7 the fit of the metallic ring upon the carbon terminal can be tightened, so as to make a firm contact between the ring and the carbon terminal. The end face of the carbon terminal is covered with a ring 9, of glazed stoneware, the same being held in place by a ring 10—say of iron—which fastens into the metal ring 5 by means of a bayonet-joint, as shown at 11. Inside the carbon tube 1 is a tube 12, of pure magnesia, and another tube 13, of the same material, surrounds the tube 1. The structure made up of the carbon tube and its lining and covering of pure magnesia is then surrounded by a jacket 14, of calcium oxid, this being in turn held within a larger tube 15, of glazed stoneware. A ring 16, of pure magnesia, is preferably placed between the carbon terminal 2 and the calcia jacket, as clearly shown in the drawing. The terminal ring 5 is ribbed on its outer surface to facilitate cooling and to add rigidity. Connection is made with the external circuit by means of binding-screws 17 17.

To prevent the slaking of the inner calcia jacket when the air is drawn into the pores and spaces between its particles during the cooling process, I provide a stuffing-ring 18, of calcia, at or near the air-inlet in such a position that it will absorb moisture from the in-drawn air and can be itself readily removed and renewed as occasion demands. The outer glazed tube 15 can also be readily removed for repairs and at the same time it permits the axial expansion of the parts within.

Other materials of a heat-insulating and refractory nature—such as chalk, asbestos, &c.—can be substituted for calcia in the jacket.

I claim as my invention—

1. In an electric furnace, a carbon tube constituting the main body thereof and having conical ends, of flaring carbon terminals

adapted to fit the said ends, and ring terminals of metal surrounding the said carbon terminals.

2. In an electric furnace, a tube of carbon having a conical end, a flaring carbon terminal adapted to fit the said end, a ring-shaped metallic terminal coöperating with the carbon terminal, the contact-surfaces between the elements mentioned being conical.

3. In an electric furnace, the combination with a flaring carbon terminal having a sloping outer surface, and a carbon tube constituting the main body of the furnace, of a ring-shaped terminal adapted to fit the slope of the carbon terminal, and means for tightening the fit between the metallic and carbon terminals.

4. In an electric furnace, the combination with a flaring carbon terminal having a sloping outer surface, and a carbon tube constituting the main body of the furnace, of a ring-shaped terminal adapted to fit the slope of the carbon terminal, and means for tightening the fit between the metallic and the carbon terminals, such means consisting of a metallic ring on the opposite side of the slope from the metallic terminal and two or more screws or bolts passing through the metal terminal into the ring.

5. In an electric furnace, a carbon tube constituting the main body thereof, a jacket for the said tube, consisting of a hydroscopic material surrounded by a non-porous tube, in combination with a removable hydroscopic stuffing-ring adapted to take up atmospheric moisture before it reaches the jacket.

6. In an electric furnace, a carbon tube constituting the main body thereof, the said tube being lined and coated with magnesia, a calcia jacket outside the magnesia coating, and a tube of glazed stoneware surrounding the jacket.

7. In an electric furnace, an open-ended carbon tube constituting the main body thereof, a metallic terminal for the said tube, and an intermediate connecting-body so shaped as to place the metallic terminal remote from the carbon tube and out of the line of direct lateral heat radiation therefrom.

8. In an electric furnace, a carbon tube constituting the main body thereof, a metallic terminal for the said tube located beyond the end thereof, a connecting-body between the said terminal and the said tube, and a heat-insulating body such as stoneware interposed between the end of the tube and the exposed portion of the terminal.

9. In an electric furnace, the combination with a flaring carbon terminal having a sloping outward surface, and a carbon tube constituting the main body of the furnace, of a ring-shaped metallic terminal, and means for pressing the metallic against the carbon terminal in a direction parallel to the axial line of the furnace.

Signed at New York, in the county of New York and State of New York, this 19th day of November, A. D. 1901.

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Witnesses:

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