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J. C. WOODSON

ELECTRIC MUFFLE FURNACE

Filed Oct. 2, 1922

Fig. 1.

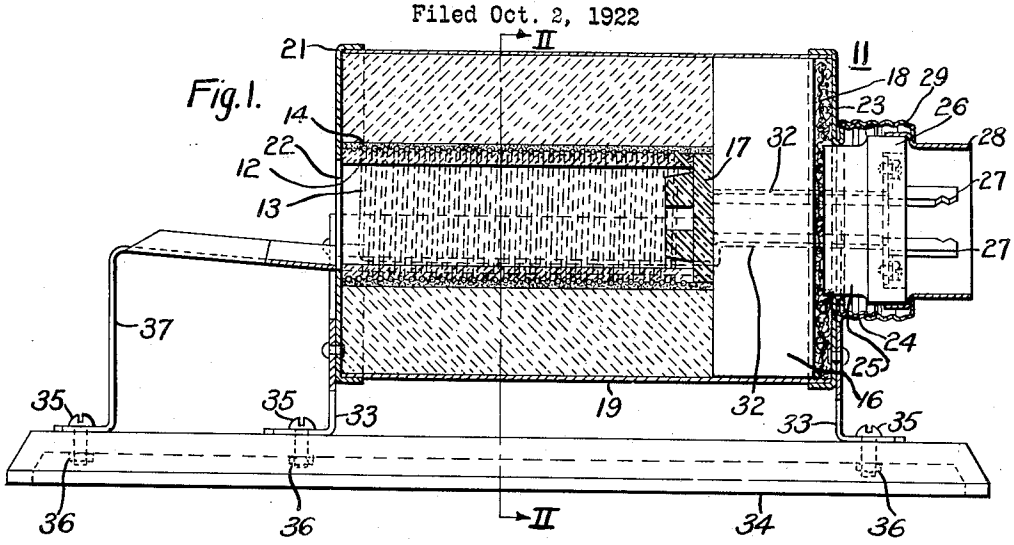
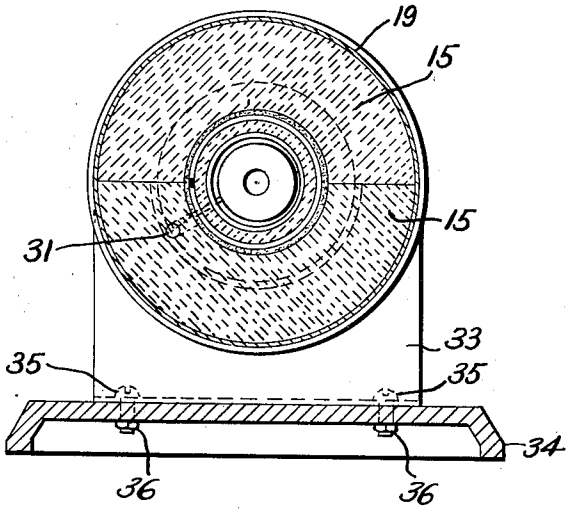


Fig. 2.



WITNESSES:

A. G. Schiefelbein

H. M. Biebel

INVENTOR

James C. Woodson.

BY

Wesley G. Carr

ATTORNEY

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UNITED STATES PATENT OFFICE.

JAMES C. WOODSON, OF MANSFIELD, OHIO, ASSIGNOR TO WESTINGHOUSE ELECTRIC PRODUCTS COMPANY, A CORPORATION OF MICHIGAN.

ELECTRIC MUFFLE FURNACE.

Application filed October 2, 1922. Serial No. 591,781.

To all whom it may concern:

Be it known that I, JAMES C. WOODSON, a citizen of the United States, and a resident of Mansfield, in the county of Richland and State of Ohio, have invented a new and useful Improvement in Electric Muffle Furnaces, of which the following is a specification.

My invention relates to electric furnaces and, particularly, to electric-resistance furnaces of the muffle type.

The object of my invention is to provide a relatively simple, compact, rugged and inexpensive structure for relatively small portable muffle furnaces.

In practicing my invention, I provide a tabular muffle of refractory material, upon which a suitable resistor member is wound and held in place thereon by an initially granular electrical-insulating material. I provide a suitable heat-insulating casing for the heating element and a suitable heat-insulating end disk at one thereof. I provide a suitable terminal member located adjacent that end of the furnace at which the disk of heat-insulating material is located. A suitable metallic casing, having end caps to which suitable supporting members are secured, is provided. A work-supporting member is provided adjacent the open end of the muffle, and the furnace is mounted on a suitable base.

In the single sheet of drawings,

Figure 1 is a view, in vertical longitudinal section, of a muffle furnace embodying my invention; and

Fig. 2 is a view, in vertical lateral section thereof, taken on the line II—II of Fig. 1.

An electric muffle furnace, designated generally by the numeral 11, comprises a tubular muffle 12 of a suitable electric-insulating and heat-conducting refractory material which is provided, on its outer surface, with a helical groove to receive a suitable resistor member 13, comprising a wire having a resistance to permit of being traversed by an electric current of suitable intensity to produce the desired temperature within the muffle 12. A layer 14 of an electrical-insulating and initially granular material, such as alundum, is provided on the outer surface of the muffle 12 and covers the resistor member 13 in order to prevent movement of the resistor member 13 relatively to the muffle. Upon heating up the furnace for the first time, the layer 14 hardens and serves to hold the resistor firmly in place.

A plurality of substantially semi-tubular heat-insulating members 15 surround the heating element, comprising the muffle 12, the resistor 13 and the layer 14, and are substantially co-extensive with the length of the muffle. An end disk 16, of a refractory heat-insulating material, is located adjacent the one end of the muffle 12, the diameter of the disk 16 being substantially the same as the outer diameter of the two members 15. An end piece or closing member 17, of refractory material, is placed at that end of the muffle 12 which is operatively engaged by the disk 16 in order to provide an abutment for small articles placed within the muffle 12 to be heat-treated therein or for tools which are inserted therein to be heated. A relatively thin disk 18 of heat-insulating material, such as mineral wool, is placed adjacent the outer surface of the disk 16.

A metallic casing and containing structure for the muffle and the surrounding heat-insulating members may comprise an open-end thin metal tubular casing 19 having an end cap 21 secured thereto adjacent to the open end of the muffle 12, which may be provided with a central opening 22, slightly larger than the inner diameter of the muffle. A second end cap 23 is suitably secured to the other end of the open casing 19 and has a substantially central, circular opening 24 therethrough. A screw-threaded tubular collar 25 is secured to the cap 23 concentric with the opening 24.

A terminal block 26, carrying terminal members 27 suitably secured thereto, is located within the collar 25 and is provided with an outwardly-extending tubular metal cover member 28 which is so formed as to have a larger diameter for that portion of its length which is in operative contact with the block 26 and a somewhat smaller diameter for that portion which extends outwardly from the block 26 and covers the terminal bars 27. A shoulder is thus provided which may be clamped by a screw-threaded clamping collar 29 screwed on the collar 25, thus securing the block 26 in substantially concentric and rigid relation to the opening 24.

That end of the resistor member 13 lo-

cated adjacent to the open end of the muffle may be brought through an opening 31 in one of the members 15 toward the hereinbefore-described terminal device and through an opening 32 in the end disk 16 and be suitably secured to one of the terminal members 27. The other end of the resistor member 13 may be brought through a substantially similar opening 32 to the other of the terminal bars 27 and secured thereto in any suitable or desired manner.

Supporting members 33 are secured to each of the end caps 21 and 23 and support the assembled furnace structure on a suitable base 34. Screws 35 and nuts 36 may be employed to hold the securing members against the base 34. A work-supporting member 37 is provided adjacent the open end of the muffle 12 and may comprise a sheet-metal member bent to substantially L-shape and with the portion provided with a small, integral flange to permit of securing one end thereof on the base 34 by screws 35 and nuts 36.

A suitable contact plug may be employed to connect the resistor, through the terminal bars 27, to a suitable source of supply of electric energy and it may be noted that the heat-insulating material interposed between the heating element proper and the terminal device is effective to permit of operating the terminal device at a relatively low temperature which does not injure the metal parts thereof, even though the temperature within the muffle is relatively high.

The device embodying my invention provides a relatively small tubular furnace which may be employed in a variety of work and for a variety of uses, such as the heat treatment of relatively small metallic objects, or it may be employed by operators for heating relatively small soldering irons or for effecting brazing operations on relatively small objects.

Various modifications in the arrangement and location of parts may be made within the spirit and scope of my invention, and such modifications are intended to be covered by the appended claims.

I claim as my invention:—

1. In an electric-resistance furnace, in combination, a base, a tubular casing, end caps for said casing, each having a central circular opening therethrough, means for supporting said casing above said base secured to said end caps, a heat-insulating lining within said casing, a tubular muffle, a stop member projecting into said muffle at one end thereof, a disc of heat-insulating material in said casing adjacent to said stop member and to one of said end caps, a terminal member operatively supported by the end cap located adjacent to said disc of heat-insulating material, and located in axial alinement with said tubular muffle, and a work-supporting member at the other end of said casing.

2. In an electric-resistance furnace, in combination, a base, a tubular casing, end caps for said casing, each having a central circular opening therethrough, means for supporting said casing above said base secured to said end caps, a heat-insulating lining within said casing, a tubular muffle within said lining, a resistor on said muffle, a stop member projecting into said muffle at one end thereof, a disc of heat-insulating material in said casing adjacent to said stop member and to one of said end caps, a terminal member projecting outwardly through the opening in the end cap located adjacent to said disc of heat-insulating material, and means having a screw-threaded engagement with said end cap for holding said terminal member in its proper operative position in said opening.

In testimony whereof, I have hereunto subscribed my name this 15th day of Sept., 1922.

JAMES C. WOODSON.