W. H. BRISTOL AND M. J. JOHNSON.

ELECTRIC FURNACE.

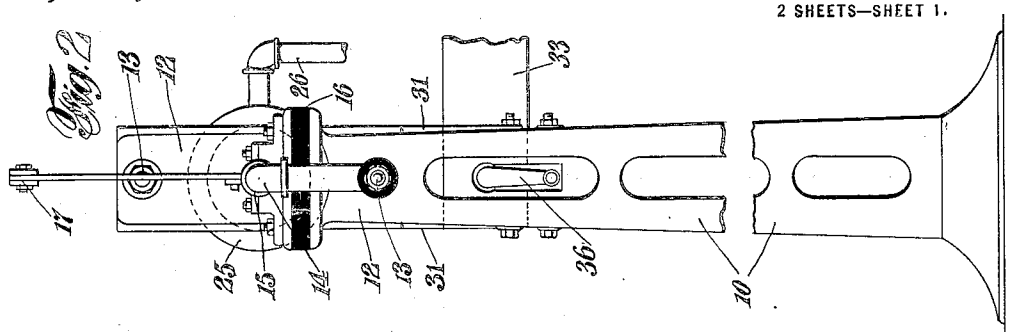
APPLICATION FILED JAN. 14, 1919.

1,323,576.

Patented Dec. 2, 1919.

2 SHEETS—SHEET 1.

Fig. 2.



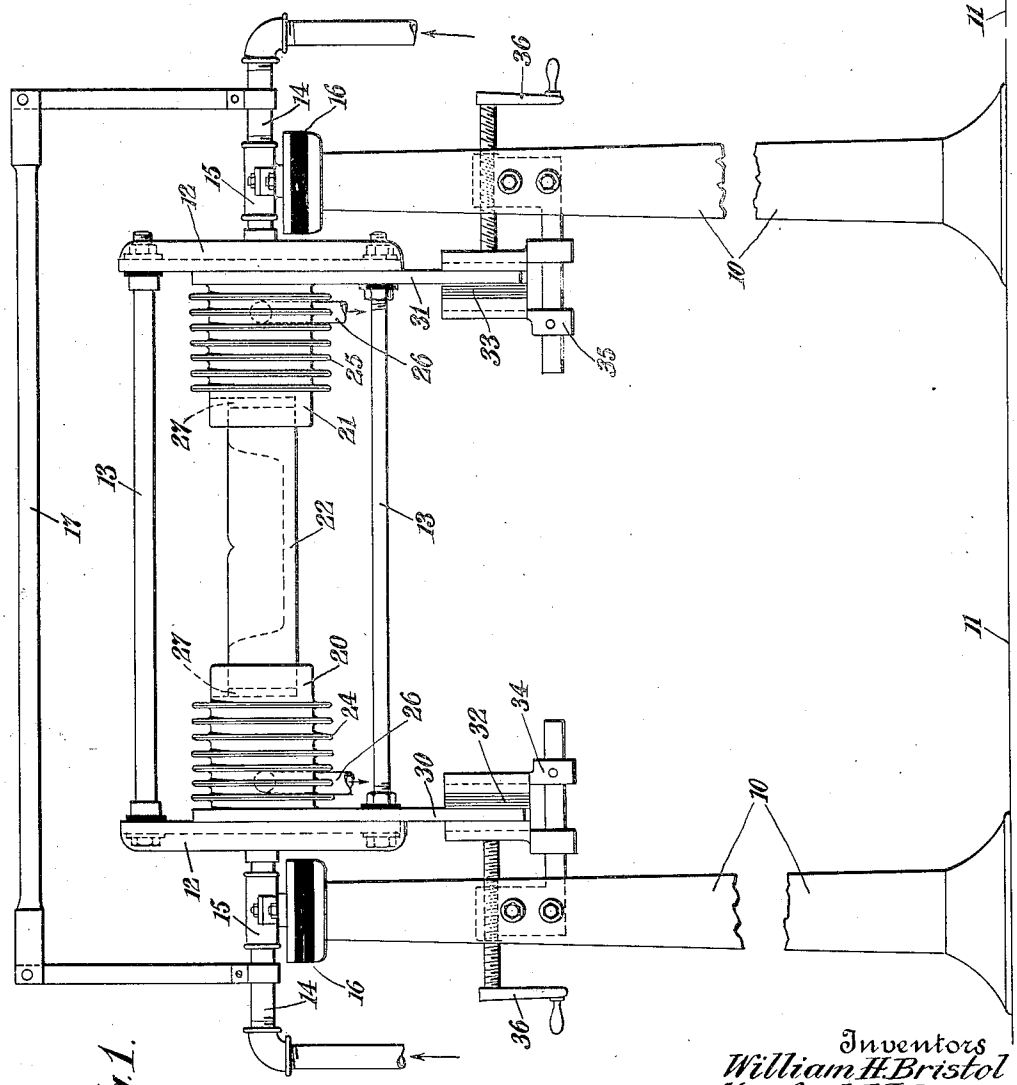


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 3.

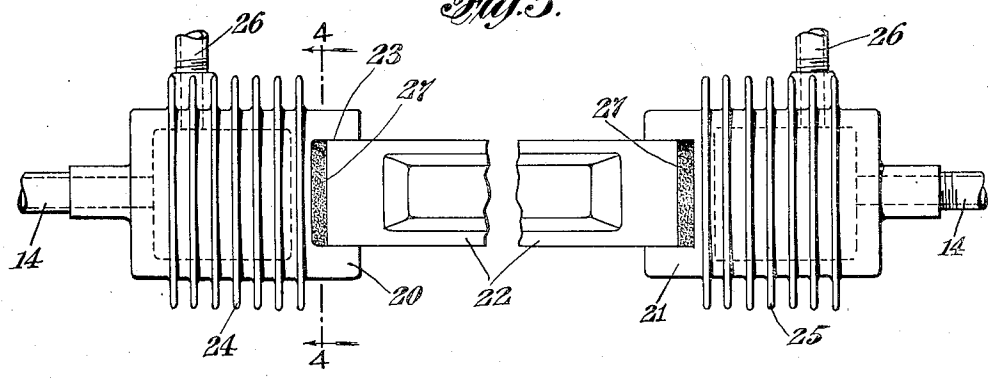


Fig. 5

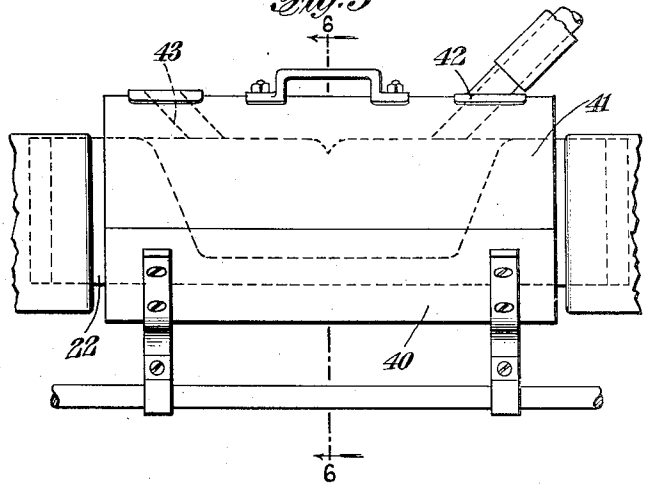


Fig. 6.

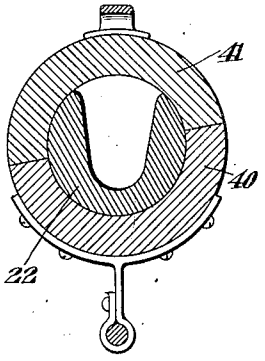
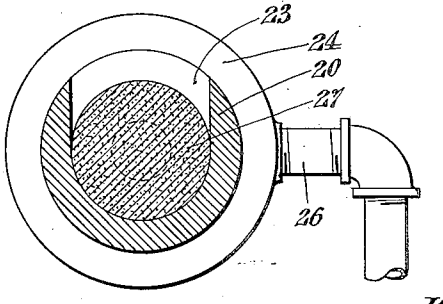


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM H. BRISTOL, OF WATERBURY, AND MANFRED J. JOHNSON, OF NAUGATUCK, CONNECTICUT, ASSIGNORS TO THE BRISTOL COMPANY, OF WATERBURY, CONNECTICUT, A CORPORATION OF CONNECTICUT.

ELECTRIC FURNACE.

1,323,576. Specification of Letters Patent. Patented Dec. 2, 1919.

Application filed January 14, 1919. Serial No. 271,071.

To all whom it may concern:

Be it known that we, WILLIAM H. BRISTOL and MANFRED J. JOHNSON, citizens of the United States, and residents of Waterbury and Naugatuck, respectively, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Electric Furnaces, of which the following is a specification.

The invention relates to electric furnaces, and more particularly to a furnace of the resistance type which may be made rocking or tilting, if desired, to facilitate the discharge of the molten metal. It has for its object to provide a simple, compact and readily operated furnace of this character, and in which the melt is accomplished in a particularly effective manner. A further object of the invention consists in a construction whereby the insertion of the heating element or resistance member will be facilitated; and, furthermore, in means which will greatly decrease the consumption of said resistance member due to arcing, as well as, also, the burning and melting of the electrodes by which said resistance member is retained. Another object of the invention consists in means for conveniently introducing the current to the resistance member where the furnace is designed to be tilted as a whole.

The nature of the invention will be best understood when described in connection with the accompanying drawings, in which—

Figure 1 is a front elevation of the improved electric furnace.

Fig. 2 is an end view thereof.

Fig. 3 is a fragmentary plan.

Fig. 4 is a section taken on the line 4—4, Fig. 3.

Fig. 5 is a detail view of the resistance element suitably incased in refractory material.

Fig. 6 is a section taken on the line 6—6, Fig. 5.

Similar characters of reference designate corresponding parts throughout the several views.

Referring to the drawings, 10 designates a pair of uprights or pedestals supported on a suitable base or support 11, said pedestals being designed to carry the entire furnace, and in manner to permit of rotation or tilting relative thereto. To this end, the furnace is retained between suitable heads or plates 12, united by adjustable and insulated rods 13, and to which heads there are rigidly secured, at opposite ends of the furnace, inlet pipes 14 for the cooling water of a suitable water jacket hereinafter described. These pipes 14 pass through corresponding sleeves or bearings 15 secured to the top of the pedestals 10 and insulated therefrom by suitable blocks of insulation 16, said pipes 14 thereby affording trunnions for the tilting or rocking movement of the furnace. The entire furnace may be thus rocked or tilted by means of a handle or rod 17 extending over the top of the furnace and secured to the pipes 14.

The heads 12 carry, also, suitable retainers or electrodes 20 and 21 for a resistance medium or heating element such as a carbon rod 22, which may be of the reflector type or, for example, of the crucible type shown. The member 22 is designed to be retained and supported by the oppositely disposed electrodes and is conveniently inserted from the top of the said electrodes which, for this purpose, are provided with an upper opening 23. This greatly facilitates the insertion and removal of the resistance member in that it is unnecessary to dismantle the furnace. A suitable water jacket 24 and a jacket 25 are provided about the respective electrodes, said jackets receiving water from the inlet pipes 14, and discharging same through outlet pipes 26.

To obviate the serious arcing, usually present in furnaces of this character, between the ends of the resistance member and the walls of the electrode cavities sustaining the resistance member, there is inserted between each end of the said resistance member and the corresponding electrode, a disk 27 of conducting material which is of lesser conductivity than the metal of the electrode, but of greater conductivity than the material constituting the resistance member. For this purpose, a pure graphite disk has been found to be particularly suitable to prevent arcing between the resistance member and electrodes; and the consumption of the former is thereby greatly reduced and the period of activity of the said electrodes is greatly prolonged.

Furthermore, in order to dispense with the necessity of moving bulky cables, generally employed to supply the desired current, and to conveniently effect the tilting of the furnace as a whole, the current is led to the electrodes through conducting plates 30 and 31 which, in turn, are adapted to contact at their lower ends with laminated and conducting bars 32 and 33 respectively, the latter being preferably slightly flexible. The said bars and lower ends of the respective conducting members are detached from each other but are caused to be drawn together by means of suitable clamps 34 and 35 to insure a positive contact when the furnace is in operation. Should it be desired to tilt or move the furnace, the connection is slightly loosened to break the contact by revolving the handles 36 of the clamps and manually grasping the rod 17 to effect the desired motion of the furnace as a whole.

When it is desired to conserve the heat of the furnace, the resistance member 22 may be incased in a suitable shell of refractory material; and, to this end, reference being had more particularly to Figs. 5 and 6 of the drawings, the lower half is surrounded by a semi-cylindrical member 40 of suitable refractory material, while the upper portion is surrounded by a similarly shaped member in the nature of a removable cover 41. This cover also may be provided with a suitable inlet 42, through which a non-oxidizing gas or other medium may be introduced if desired, the cover then being provided, also, with a vent 43.

We claim:

1. An electric furnace of the resistance type, having in combination, a resistance member, and electrodes, provided with an opening at the top, to receive and retain said resistance member.

2. An electric furnace of the resistance type, having in combination, a resistance member, electrodes to retain said member, and conducting end thrust members inserted between the respective ends of the resistance member and the corresponding electrodes.

3. An electric furnace of the resistance type, having in combination, a resistance member, electrodes to retain said member, and conducting end thrust members inserted between the respective ends of the resistance member and the corresponding electrodes, said conducting members having a conductivity intermediate that of the resistance member and electrodes.

4. An electric furnace of the resistance type, having in combination, a resistance member, electrodes to retain said member, and a graphite disk included between the respective ends of the resistance member and the corresponding electrodes.

5. An electric furnace of the resistance type, having in combination, a carbon resistance member, metallic electrodes to retain same, and a graphite disk included between the respective ends of the carbon resistance member and the corresponding metallic electrodes.

6. A tilting electric furnace of the resistance type, having in combination, a suitable support, a heating element rotatably carried by said support, members to conduct current to said heating element and movable therewith, and current supplying bars adapted to contact with said conducting members but detachable therefrom, one member of a set of coöperating conducting members and bars being flexible and yieldable in the direction of the axis of said heating element.

7. A tilting electric furnace of the resistance type, having in combination, a suitable support, a heating element rotatably carried by said support, members to conduct current to said heating element and movable therewith, flexible current supplying bars yieldable in the direction of said heating element and adapted to contact with said conducting members but detachable therefrom, and means to clamp the said conducting members to the respective bars.

8. An electric furnace of the resistance type, having in combination, a heating element, electrodes to retain said heating element, a refractory covering about the lower half of said heating element, and a removable cover of refractory material coöperating therewith and surrounding the upper portion of said heating element.

9. An electric furnace of the resistance type, having in combination, a heating element, electrodes to retain said heating element, a refractory covering about the lower half of said heating element, and a removable cover of refractory material coöperating therewith and surrounding the upper portion of said heating element, said cover being provided with an inlet and a vent.

Signed at Waterbury, in the county of New Haven and State of Connecticut this 9th day of January, A. D. 1919.

WILLIAM H. BRISTOL.
MANFRED J. JOHNSON.