Jan. 30, 1923. 1,443,816.

F. A. J. FITZ GERALD.

ELECTRIC FURNACE.

FILED JAN. 13, 1921. 2 SHEETS—SHEET 1.

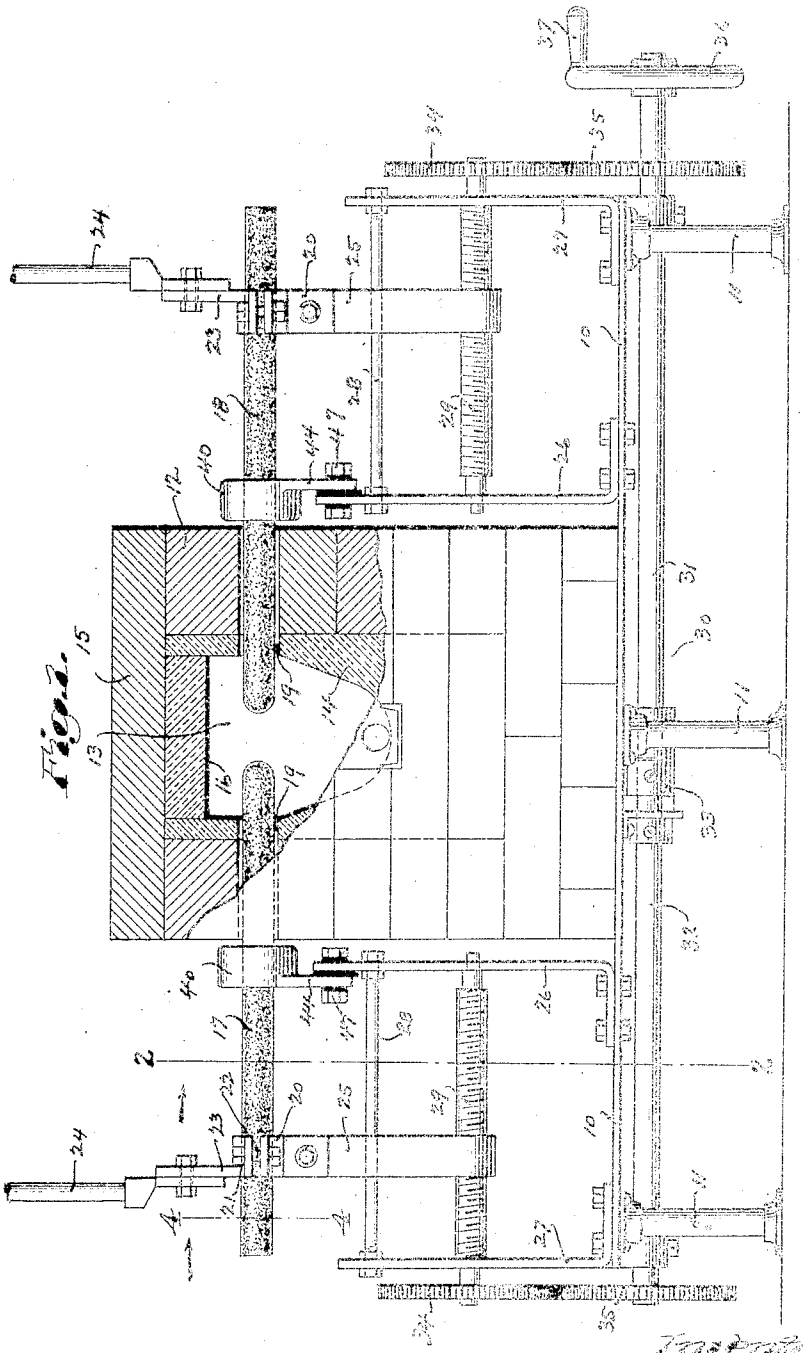


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

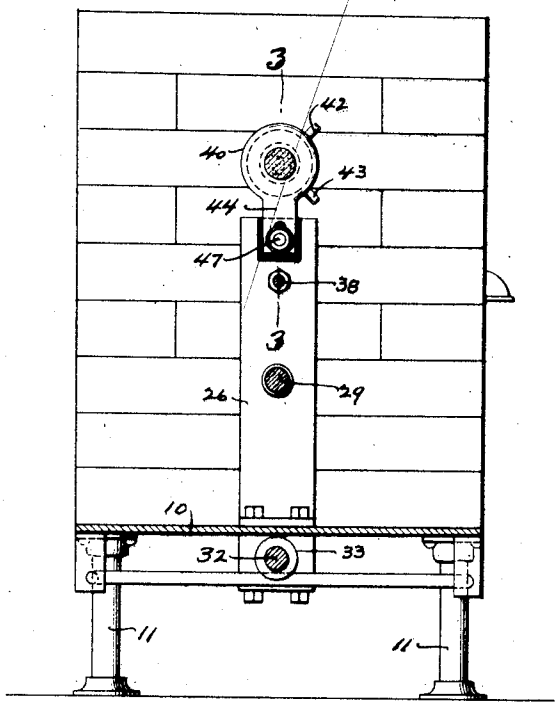


Fig. 3.

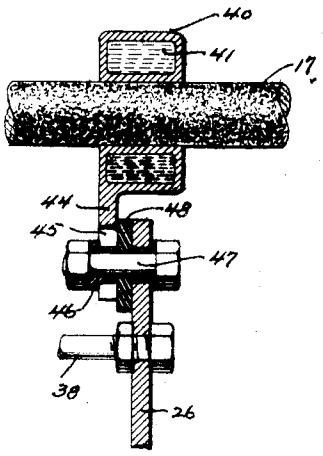
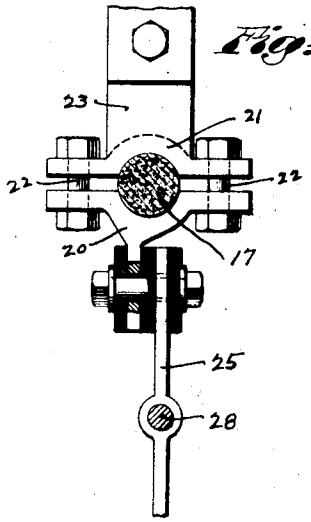


Fig. 4.



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Patented Jan. 30, 1923. 1,443,816

BEST AVAILABLE COPY

UNITED STATES PATENT OFFICE.

FRANCIS A. J. FITZ GERALD, OF NIAGARA FALLS, NEW YORK, ASSIGNOR TO BUFFALO APPARATUS CORPORATION, OF BUFFALO, NEW YORK, A CORPORATION OF NEW YORK.

ELECTRIC FURNACE.

Application filed January 12, 1921. Serial No. 436,917.

To all whom it may concern:

Be it known that I, FRANCIS A. J. FITZ GERALD, a citizen of the United States of America, and a resident of the city of Niagara Falls, county of Niagara, and State of New York, have invented certain new and useful Improvements in Electric Furnaces, of which the following is a full, clear, and exact description.

My invention relates generally to electric furnaces and more particularly to a furnace of the arc type which is heated by radiation from a single phase arc. It is well known that in furnaces of this type the arc is formed between two opposing carbon electrodes. I have found that it is very important that the electrodes be kept in exact alinement with each other if the furnace is to work in a satisfactory and efficient manner. If the electrodes are not in alinement, the arc drawn between them will wear away the ends unevenly, with the result that the surfaces at the end of the electrodes will eventually lie in planes at angles to the vertical center line of the furnace. This will result in deflecting the radiation of heat produced by the arc; and, as this deflection is many times in an upward direction, much loss results in current consumption.

In providing my invention, I have sought to overcome the disadvantages above enumerated and to provide a furnace in which means are provided for maintaining the electrodes in perfect alinement.

Another object has been to provide a furnace in which both electrodes may be operated simultaneously, so that the furnace may be easily controlled by one workman.

Another object has been to provide means whereby one electrode may be moved independently of the other.

The above objects and advantages have been accomplished by the device shown in the accompanying drawings, of which:

Fig. 1 is a side elevation of my furnace, partly in section.

Fig. 2 is a sectional, end view of the same and is taken on line 2—2 of Fig. 1.

Fig. 3 is an enlarged, sectional view taken on line 3—3 of Fig. 2.

Fig. 4 is an enlarged, sectional view taken on line 4—4 of Fig. 1.

My furnace comprises a base 10 which is suitably supported by standards 11. As my furnace is particularly adapted for experimental work, these standards may be of any suitable height and they may be mounted on a truck (not shown) if desired. The walls 12 provide for enclosing the furnace chamber 13, and these walls are made of suitable refractory material, having preferably a suitable chamber lining 14. 15 is the cover for the furnace chamber which is also preferably lined at 16. 17 and 18 are the electrodes, which are preferably of carbon, and are passed through apertures 19 formed through two opposite walls 12 of the furnace chamber. Each of the carbons is suitably mounted and clamped in an electrode holder 20. Each electrode holder is provided with a clamp member 21 which is fastened to the electrode holder 20 by means of bolts 22. The clamp member 21 is provided with an upwardly extending contact arm 23, whereby the cable 24 carrying current to the electrode may be suitably connected to the electrode holder. Each of the electrode holders is carried at the upper end of an operating arm 25, and is suitably insulated therefrom as clearly shown in Fig. 4.

Standards 26 and 27 are provided beneath each of the electrodes 17 and 18. These standards are preferably secured to the base 10 and their upper ends are connected together by means of a guide rod 28. An operating screw 29 is rotatably supported by the standards at some distance below the guide rod 28. Each of the operating arms 25 is provided with a screw-threaded aperture near its lower end for engagement with the operating screw 29 and also with an aperture for registration and sliding engagement with the guide rod 28. This arrangement keeps the operating arm in perfect alinement, and at the same time permits its movement backwardly and forwardly.

An operating shaft 30 is suitably mounted and preferably attached to the lower side of the base 10. This shaft comprises preferably two parts 31 and 32 which are connect-

ed together by means of a suitable clutch coupling 33. This coupling is of such a nature that the parts 31 and 32 of the shaft may be disconnected at will. Each of the operating screws 29 has a spur gear 34 attached to its outwardly projecting end. Meshing with this spur gear is another spur gear 35 which is rigidly carried by the operating shaft. An operating wheel 36, having a handle 37 is mounted at one end of the operating shaft, whereby the same may be rotated by the workman. One of the operating screws 29 is provided with a right-hand thread and the other one is provided with a left-hand thread, so that, as the operating shaft 30 is rotated, the electrodes will be moved in opposite directions through the medium of the spur gears and screw-threads

An electrode guide 40 (see Fig. 3) is provided for each of the electrodes 17 and 18. These guides are preferably of metal and have a hollow center, thus providing a water space 41. Suitable connections 42 and 43 are provided, whereby water may be circulated through the guide. The guide is provided with a laterally-extending, bifurcated arm 44 which is carried by the upwardly-projecting end of the standard 26. The arm 44 is suitably insulated, as shown in Fig. 3, from the standard 26. The slot 45 in the arm is slightly wider than the insulated bushing 46 over which it is disposed, so that the guide may be swung sidewise, as well as being elevated or lowered, whereby the electrodes may be accurately alined. A bolt 47, also insulated from the standard 26, is provided for clamping each of the electrode guides in its adjusted position. An insulating washer 48 is disposed between the arm 44 of the guide and the standard 26.

When a crucible is to be used in my furnace, the electrodes may be removed and granular carbon packed about the crucible and in the apertures 19. The electrodes may be then placed in the electrode holders 20 and brought against the granular carbon, whereby the granular carbon will act as a resistor for heating the crucible. These and other modifications of the details herein shown and described may be made without departing from the spirit of my invention or the scope of the appended claims; and, I do not, therefore, wish to be limited to the exact embodiment herein shown and described, the form described being merely a preferred embodiment thereof.

Having thus described my invention, what I claim is:

1. An electric furnace comprising a furnace chamber, oppositely arranged electrodes passing through the walls of the chamber, a holder for each electrode, means for simultaneously moving the electrodes toward and away from each other, and a guide for each electrode spaced apart from the holder for keeping the electrodes in alinement.

2. An electric furnace comprising a furnace chamber, oppositely arranged electrodes passing through the walls of the chamber, a holder for each electrode, a right-hand operating screw rotatably mounted below one electrode, a left-hand operating screw rotatably mounted below the other electrode, an operating arm for connecting each of the screws with one of the electrodes, an operating shaft, and means for connecting the shaft with the operating screws.

3. An electric furnace comprising a furnace chamber, oppositely arranged electrodes passing through the walls of the chamber, a holder for each electrode, a right-hand operating screw rotatably mounted below one electrode, a left-hand operating screw rotatably mounted below the other electrode, an operating arm for connecting each of the screws with one of the electrodes, an operating shaft, means for connecting the shaft with the operating screws, and a guide for each electrode spaced apart from the holder for keeping the electrodes in alinement.

4. An electric furnace comprising a furnace chamber, oppositely arranged electrodes passing through the walls of the chamber, a holder for each electrode, a right-hand operating screw rotatably mounted below one electrode, a left-hand operating screw rotatably mounted below the other electrode, an operating arm for connecting each of the screws with one of the electrodes, a guide for each holder, an operating shaft, and means for connecting the shaft with the operating screws.

In testimony whereof, I have hereunto signed my name.

FRANCIS A. J. FITZ GERALD.