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ELECTRODE CLAMP

Filed March 12, 1938

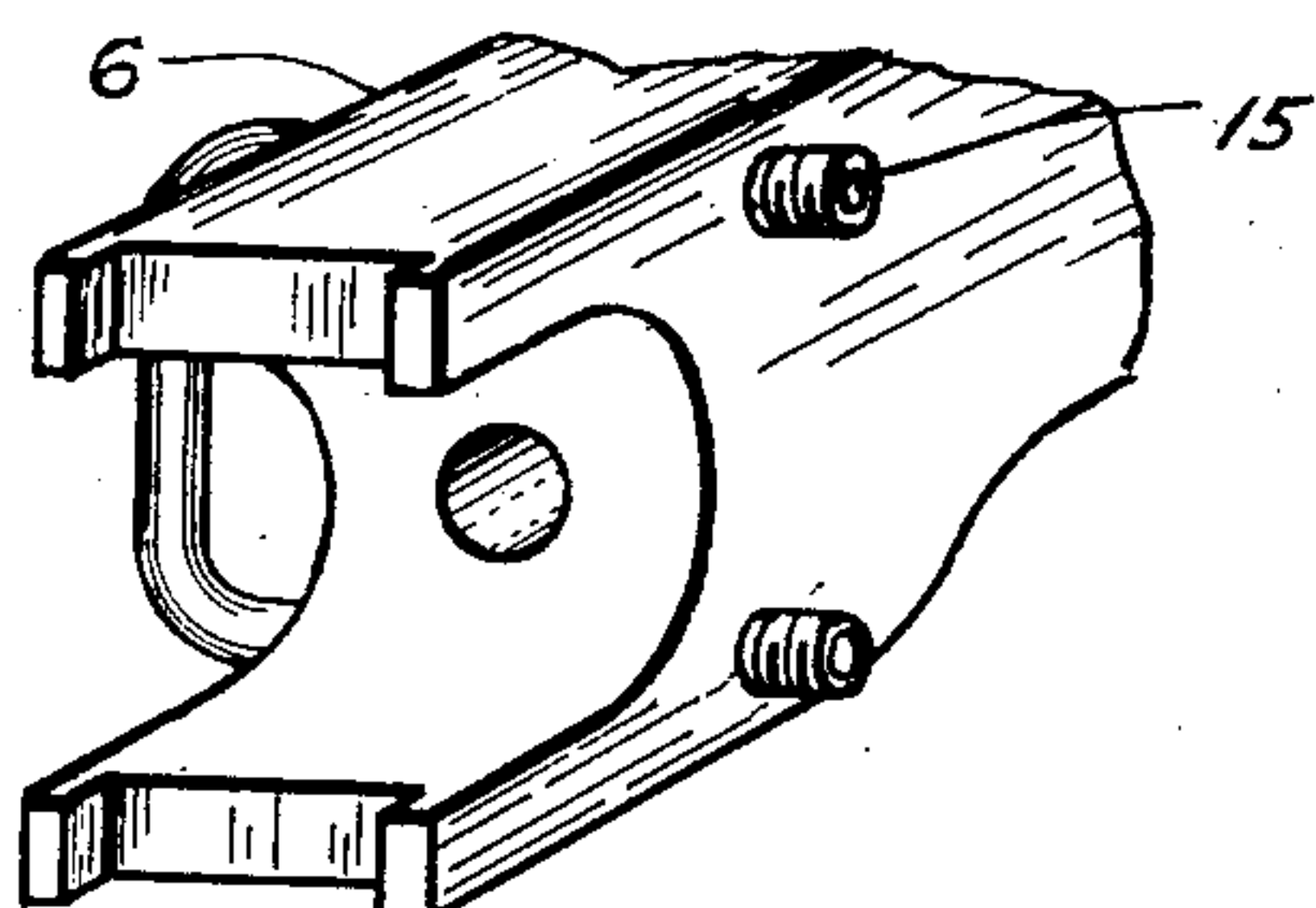


Fig 2.

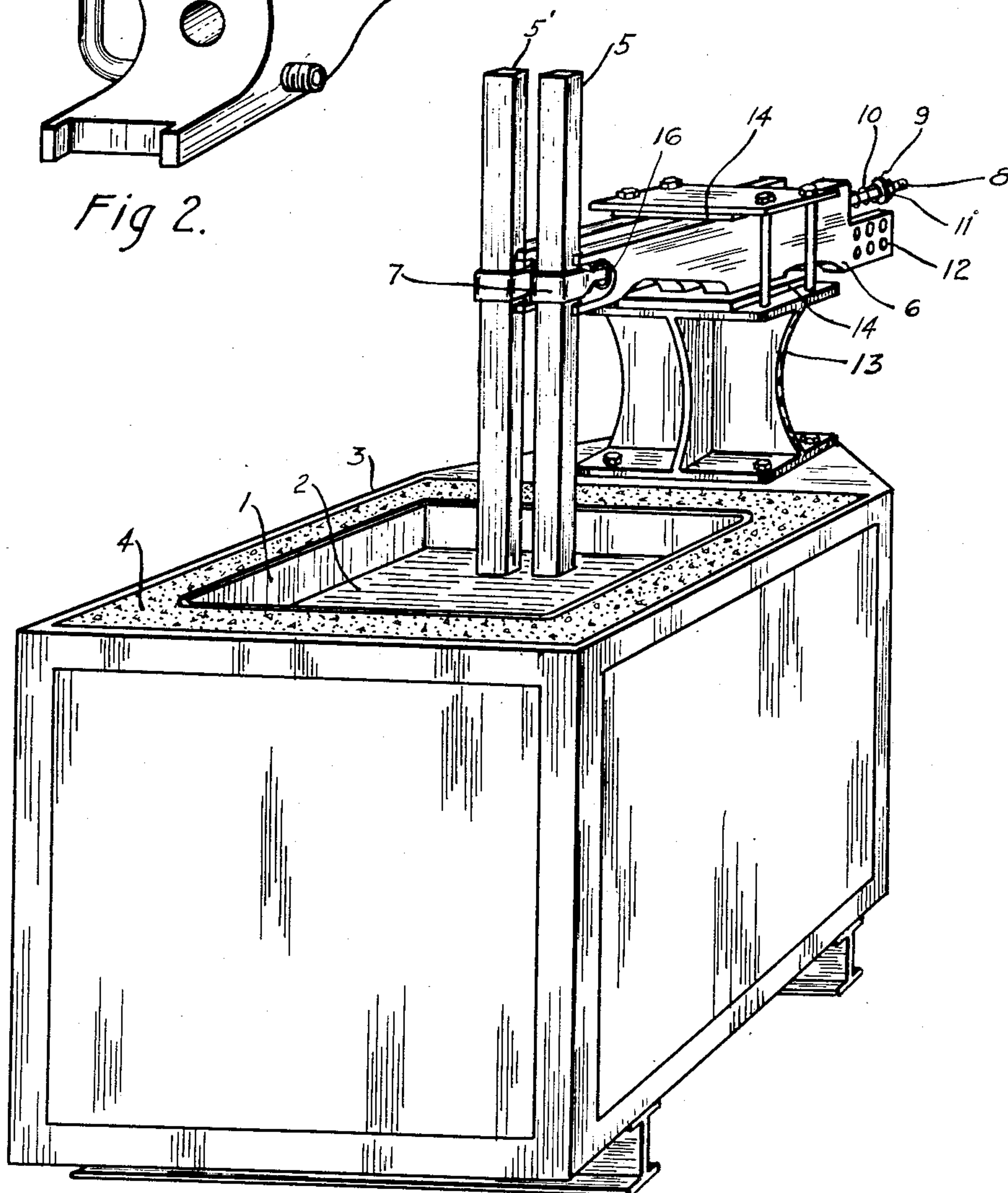


Fig 1.

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UNITED STATES PATENT OFFICE

2,149,003

ELECTRODE CLAMP

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Application March 12, 1938, Serial No. 195,478

1 Claim. (Cl. 13—16)

This invention deals with electric salt bath furnaces and relates in particular to an improved electrode clamping device for use in such furnaces.

5 An object of the invention is to provide a clamp which at one time holds the electrode firmly in place yet which is so adapted that the electrode may be released for adjustment or renewal with a minimum of time and effort.

10 A further object is to provide an electrode assembly for a salt bath furnace which will permit the use of simple and cheap electrodes and at the same time afford an easy means for changing or adjusting said electrodes.

15 Further purposes will appear in or be evident from the specification and claim.

Applicant has used two figures by way of illustration of his invention. Figure 1 is an isometric view of a salt bath furnace having an electrode assembly embodying the elements claimed. Figure 2 is a detail view of a portion of the clamp member of Figure 1 showing how cooling may be applied to the piece.

20 In certain salt bath furnaces, and more especially in those operated at high temperature, there is considerable wear and erosion of that part of the electrode which extends down into the bath. The life of the electrodes and the time necessary to replace them are features which must be taken into consideration when figuring production schedules. Ordinarily the electrodes used for these furnaces are made of expensive corrosion resisting alloys and are cast to irregular shape to fit particular furnace requirements. If the pieces are short and are bolted to the connecting studs, it is difficult to change them unless the furnace is shut down and the parts have opportunity to cool. If the pieces are long then their shape usually calls for a more expensive casting and more wastage of electrode material. Applicant has devised an assembly permitting the use of cheap electrodes and electrode material; and permitting the adjusting or changing of electrodes without shutting down the furnace, and with almost negligible time delay in the production schedule.

Referring to Figure 1, applicant has shown a salt bath furnace of the type generally used for treating high speed steel. While the invention is not limited to a special type of furnace, this figure shows a salt bath furnace of the closely spaced electrode type. A pot 1, containing a liquid salt bath 2, is contained in an outer supporting structure 3, and heat insulated therefrom by refractory material 4. The furnace is of

the deep pool type and is designed to operate at a high temperature. A hood, shielding arrangements, racks and similar appurtenances, not shown, may be used as desired.

The electrode assembly, comprising electrode 5, 5 main support arm 6, holding band 7, tie rod 8, washers 9, spring 10, and lock nut 11, is the essential part of the apparatus claimed by applicant as his invention. The assembly above described is rigidly bolted to a supporting member 10 13, but insulated therefrom by insulation 14. Applicant contemplates the use of straight electrodes, as shown, using cast or wrought alloy pieces for some of the high temperature work, but allowably using plain carbon steel bar stock 15 for lower temperature work, thus reducing material and fabricating costs to a minimum.

On installation, the electrode 5 is dropped through the guides in the main support arm 6, and through the band 7. When it has been adjusted 20 to the proper length, the adjusting nut 11 is taken up, the band 7 forcing the electrode against the butting end portions of the block 6 to make a good mechanical joint and an electrical contact for the passage of the heating current. The 25 spring 10 holds the electrode resiliently clamped to the block 6, eliminating the possibility of loosening the clamping means. If the wear of the portions of the electrodes in the bath is irregular, they may be entirely removed and cut off, or they 30 may be turned to present new faces on the sides on which wear occurs.

Applicant has found it desirable, though not essential, to insulate the tie rod 8 from the support arm 6 by an insulating sleeve 16 and suitable 35 spacing insulation between the spring 10 and support arm. This insulation prevents the exciting current from flowing in the tie rod in preference to the regular channel.

According to the present invention there is no 40 need to shut down the furnace and wait for it to cool before making electrode adjustments. The electrode proper may be gripped by a pair of tongs while still hot and released by the nut assembly well removed from the hot zone. The 45 distance from the clamp 7 to the bath 2 may be made as great as desired to keep the temperature of the assembly cool, or the clamp and/or support arm 6 may be artificially cooled. In Figure 2 applicant has shown one method for thus cooling 50 the support arm, a water cooling line 15 being passed through the block close to the point of contact with the electrode.

In the actual operation of furnaces using electrode assemblies as described the electrodes have 55

been removed and replaced with less than one minute's lost time in the production schedule; and in furnaces having more than one set of electrodes one set has been changed without disrupting the
5 production schedule.

Applicant believes that he is the first to use an electrode assembly for a salt bath as described and that the idea represents a new and useful advance in the art of salt bath heat treating
10 furnaces. He requests that United States Letters Patent be granted to him for all that is claimed.

I claim:

An electrode assembly for a salt bath furnace

comprising an electrode having a straight uniform sectioned shank of substantial length, a support member having one end recessed to receive and guide said shank, said end making contact
5 with said shank at spaced points but free from contact at intervening points, a clamping band around a portion of said shank between the position of said contacts, a tie rod extending from said band through said support arm, and clamp
10 actuating means at the other end of said support arm for drawing said band and electrode shank against said support.

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