Dec. 21, 1943. R. G. LE TOURNEAU 2,337,333

ELECTRODE HOLDER

Filed Sept. 19, 1942

Fig. 1

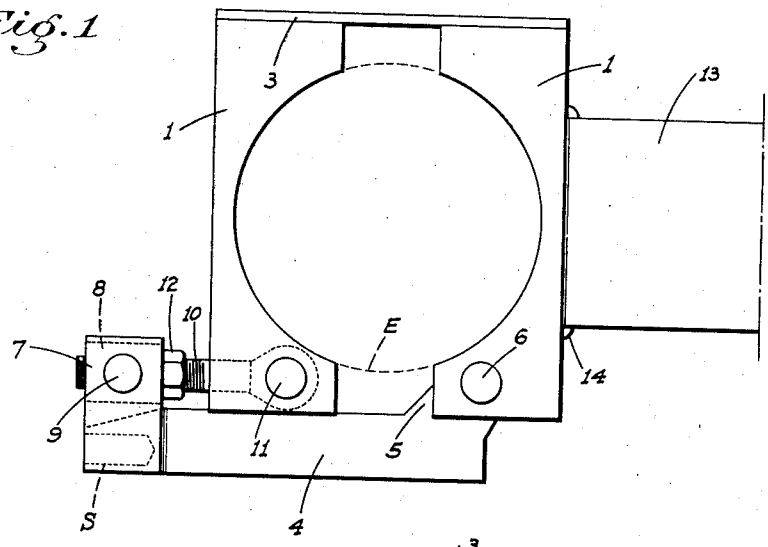
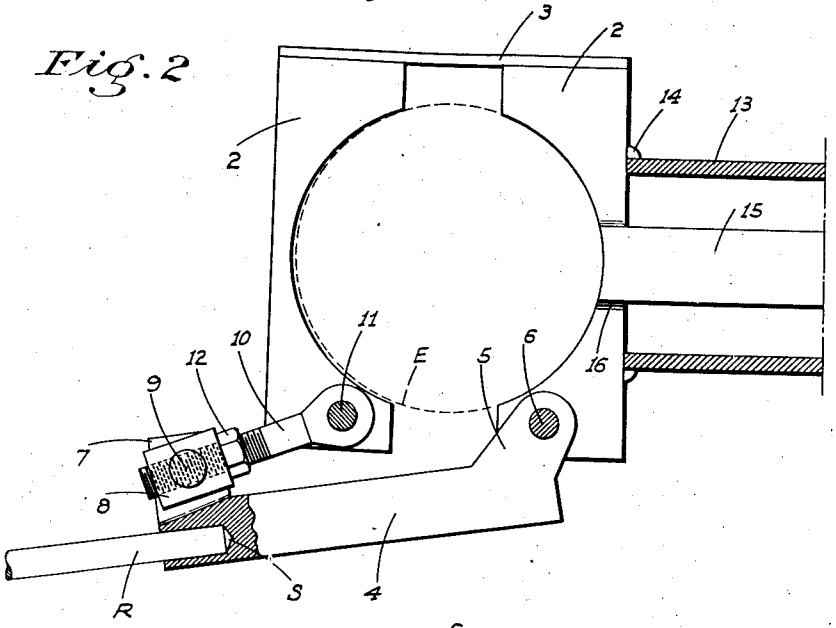


Fig. 2



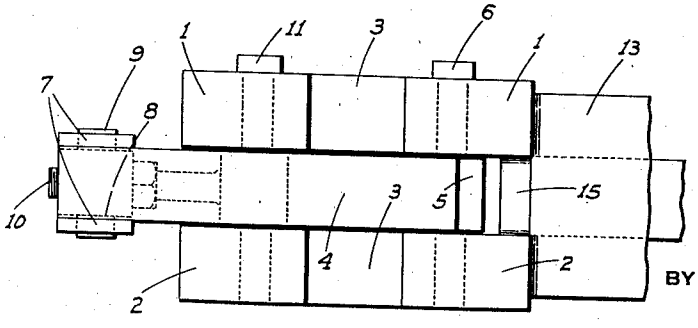


Fig. 3

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ELECTRODE HOLDER

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Application September 19, 1942, Serial No. 458,966

5 Claims. (Cl. 24—257)

This invention relates generally to an improvement in electric furnaces, and in particular the invention is directed to, and it is the principal object to provide, a unique electrode holder; such holder being characterized by ease of connection with or release of the electrode, and when in use, by the positive grip which it exerts on the electrode to maintain the same against accidental longitudinal displacement, which would result in improper operation of the furnace.

A further object of the invention is to provide an electrode holder which includes spaced clamping blocks secured together at one end by a connection bar having slight resiliency, and connected together at the other end by a releasable and adjustable toggle link unit; adjacent faces of the blocks being oppositely curved to match the curvature of the electrode about which the holder is adapted to clamp.

An additional object of the invention is to provide an electrode holder which includes two vertically spaced clamping block units, each unit including a pair of horizontally spaced clamping blocks whose inner faces are symmetrically curved to matchingly engage the electrode about which the holder is adapted to clamp, the clamping blocks of each unit being secured together at one end by a resilient connection bar, and connected at the other end by means operative to simultaneously draw the clamping blocks of each unit into engagement with a surrounded electrode.

It is also an object of the invention to provide an electrode holder which includes clamping blocks disposed in vertically spaced relation; said clamping blocks being affixed intermediate their ends to a hollow supporting member for the holder, and a bus bar extending in clearance relation through said supporting member and being electrically connected between said spaced clamping blocks.

A further object of the invention is to produce a simple and inexpensive device, and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawing similar characters of reference indicate corresponding parts in the several views:

Figure 1 is a plan view of the device in locked or electrode clamping position.

Figure 2 is a plan view of the device released from electrode clamping position, and with the top clamping blocks removed.

Figure 3 is an end view of the device showing the toggle link unit which controls the clamping action.

Referring now more particularly to the characters of reference on the drawing, the improved electrode holder comprises two vertically spaced symmetrically disposed clamping block units; each of said units including in horizontally spaced relation a pair of opposed clamping blocks, the blocks of the upper and lower units being indicated at 1 and 2 respectively. Adjacent sides of the opposed clamping blocks of each unit are spaced apart a substantial distance, and intermediate their ends these sides are concavely curved to matchingly engage the electrode E about which the device is adapted to clamp.

At one end the clamping blocks of each unit are permanently secured to, and connected by, a bar or strap 3; the blocks 1 and 2, as well as the bars 3, being of copper. The bars 3 have a certain amount of spring or resiliency to permit of some relative approaching or separating movement of the opposed blocks of each unit.

At the end opposite bars 3 the opposed clamping blocks of the units are connected by a toggle link unit which comprises the following:

A rigid horizontal link 4 is disposed in position at said opposite end of the units in a plane therebetween. At one end the link 4 is formed with an integral ear 5 which projects between corresponding upper and lower clamping blocks 1 and 2, and is pivoted therebetween on a vertical pin 6. At the end opposite ear 5, and which end projects somewhat beyond the other corresponding upper and lower clamping blocks 1 and 2, the link 4 is formed with inwardly projecting, vertically spaced ears 7. A head 8 is pivoted between ears 7 by vertical end pins 9, for swinging movement in a horizontal plane. An eye bolt 10, which forms the other and shorter link of the toggle link unit, is disposed with the eye between said other corresponding upper and lower blocks 1 and 2 at the end of said blocks adjacent link 4; said eye being pivoted on a removable and vertical pin 11 which extends between the blocks. At its outer end the eye bolt 10 is adjustably threaded through the head 8, and a lock nut 12 on the eye bolt normally frictionally engages said head.

The above described electrode holder is supported by a hollow box beam 13 which overhangs

the crucible of the furnace and is mounted for vertical adjustment and in insulated relation thereto, as for example is shown in my co-pending application for United States Letters Patent, Serial No. 458,968 filed September 19, 1942.

The hollow box beam 13 is rigidly secured, as by welding 14, to one side of corresponding upper and lower blocks 1 and 2 of the units; the space between said blocks being centrally disposed relative to the top and bottom of box beam 13. A bus bar 15 extends in clearance relation through the box beam 13 from an electric supply cable (not shown) to a rigid and electrical connection between the adjacent blocks 1 and 2, as at 16.

The parts of the clamp are initially in the position shown in Fig. 2, the toggle link assembly being released and the clamping blocks of each unit sprung apart somewhat.

After insertion of the electrode E into the released holder a rod R is inserted in a socket S in the outer end of link 4, and the link swung inward about pin 6 as an axis to a point at or slightly beyond dead center relative to eye bolt 10. Consequently the clamping blocks of each unit are forced in a direction to cause a certain amount of relative approaching movement thereof, whereby the blocks of each unit positively and simultaneously grip the electrode.

Should adjustment of the toggle link unit be necessary, the pin 11 is removed and the nut 12 backed away from head 8. Thereafter the eye bolt 10 is rotated to the extent necessary to effect the adjustment, and the parts are again assembled with the nut 12 locked against head 3.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

1. An electrode holder comprising a pair of rigid electrode clamping blocks disposed in spaced parallel relation, said blocks being concavely curved on adjacent sides to matchingly engage the electrode about which the holder is adapted to clamp, an initially separate heavy duty flat spring bar fixed in connection with adjacent ends of said blocks and extending therebetween, and a tensioning unit connected between the opposite ends of said blocks operative to draw said opposite ends toward each other.

2. An electrode holder as in claim 1 in which said blocks are of substantial size and flat at said adjacent ends, the spring bar being fixedly secured in face to face engagement with said ends.

3. An electrode holder comprising a pair of rigid, electrode clamping blocks disposed in spaced parallel relation, said blocks being rectangular in cross section and concavely curved on adjacent sides to matchingly engage the electrode about which the holder is adapted to clamp, an initially separate heavy-duty flat spring, the blocks at one end being square-cut transversely and said spring being fixedly secured at its ends in face to face engagement with said square block ends, and a tensioning unit connected between the opposite ends of said blocks operative to draw said opposite ends toward each other.

4. An electrode holder comprising vertically spaced, symmetrically disposed electrode clamping units, each unit including a pair of rigid clamping blocks disposed in spaced parallel relation, adjacent sides of each pair of blocks being concavely curved to matchingly engage the electrode about which the holder is adapted to clamp, an initially separate heavy-duty flat spring bar fixed in connection with adjacent ends of each pair of blocks and extending therebetween, a tensioning unit connected between the other ends of both pairs of blocks operative to simultaneously draw said other ends in an electrode clamping direction, and a support on one side of the holder to which corresponding blocks of the pairs are fixed.

5. An electrode holder comprising vertically spaced, symmetrically disposed electrode clamping units, each unit including a pair of rigid clamping blocks disposed in spaced parallel relation, adjacent sides of each pair of blocks being concavely curved to matchingly engage the electrode about which the holder is adapted to clamp, an initially separate heavy-duty flat spring bar fixed in connection with adjacent ends of each pair of blocks and extending therebetween, a tensioning unit connected between the other ends of both pairs of blocks operative to simultaneously draw said other ends in an electrode clamping direction, and a support on one side of the holder to which corresponding blocks of the pairs are fixed; said tensioning unit comprising a toggle link assembly having a pair of links included therein, said links projecting at one end between and being pivotally connected to adjacent and corresponding ones of the pairs of blocks.

ROBERT G. LE TOURNEAU.