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SUPPORTING MEMBER FOR ENAMELING RACKS

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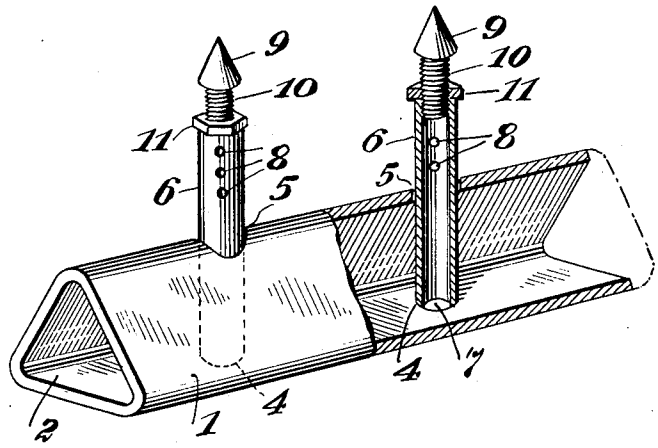


Fig. 1.

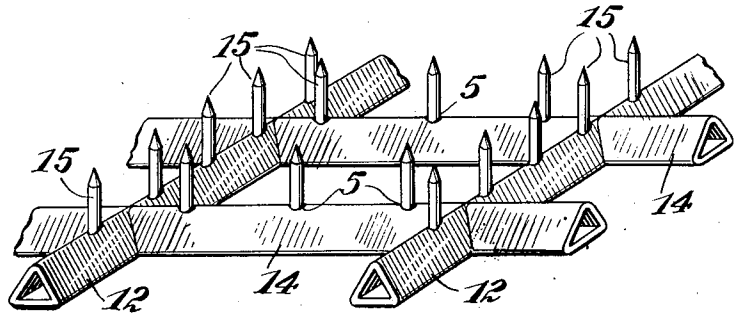


Fig. 2.

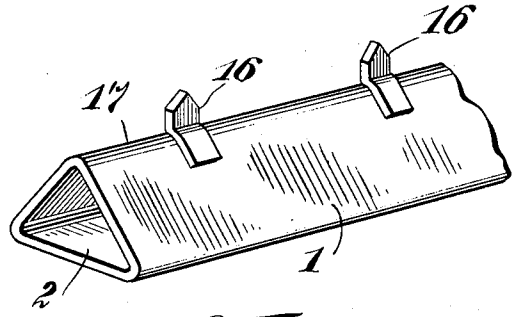


Fig. 3.

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SUPPORTING MEMBER FOR ENAMELING RACKS

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7 Claims. (Cl. 25—153)

The present invention relates broadly to the art of enameling and more especially for a support for use in an enameling furnace.

Enameling operations necessitate supporting in a furnace the article to be enameled with a minimum amount of surface of the article in contact with the support. Where all surfaces are to be covered with enamel, the article is usually supported upon very fine pointed posts or short columns. Heretofore in the art, these posts have comprised an integral part of a casting wherein a cast plate or bar formed the base of the rack. It is particularly desirable in an enameling oven that the supports shall be of heat resisting alloy metal so as to avoid scale because an accumulation of scale and dirt in the furnace is dangerous since it may be carried by convection currents to the surface of molten enamel and thus injure or ruin the coating. Cast racks require individual finishing of the points of the supports while the entire rack must be handled as a unit since the posts and base bars or plates are all cast as a part of the same integral casting.

In using cast supports, it is difficult to obtain good results from non-scaling heat resisting alloy and it is particularly difficult to obtain uniform distribution of alloy materials into the small posts comprising the supporting members.

Another difficulty encountered with the racks of the known art is that when the racks were heated in the furnace, the unequal masses of metal forming the racks heat unequally in rate of time, and, consequently, the racks warp and distort under the severe thermal work. This is a serious matter, particularly where the racks are supporting flat plates to be enameled such as side plates for the refrigerators, etc. These plates must be maintained substantially level on the top surface where the heavy coating of enamel forms the outside finish of the completed plate. If the racks warp and disturb the level of the plates, the enamel will flow from the high to the lower points on the plates and the plates are thereby ruined, or the enameled plate may warp so that it cannot be straightened without cracking the enamel.

Furthermore, cast metal supporting racks require a substantial amount of metal to form a rack that will not quickly deteriorate in use. It is not infrequent that the mass of metal in a cast rack greatly exceeds the mass of metal in the article to be enameled. It, therefore, follows that the heat units of the furnace wasted in heating the rack often exceeds the number of heat units necessary to raise the article being made to vitrifying temperature for the enamel.

Racks may be mounted for movement in any convenient way into the furnace such as upon trackways or conveyors, slides or other convenient ways of transporting the racks into and out of the furnace. These features are common in the art.

The present invention overcomes the difficulties of the known art by providing racks wherein preferably wrought metal is used in the place of cast metal. Preferably, the supporting base bars for the posts or pins are made from sheet material, of substantially uniform thickness, formed into a hollow member. This member may be also formed from tubing or otherwise. Preferably, the supporting base bars are triangular in cross-section. The posts or supporting pins are likewise preferably formed of wrought metal and are riveted or welded into the flat bottom portion of the base bars and the posts extend through the upper wall of these base bars. The posts, however, are not rigidly anchored to the upper wall but are securely anchored in the lower wall. These pins are individually pointed to fine points before being set in the base bars on which the pins are arranged to properly support the article to be enameled. Where the article is a flat plate, the points of these pins lie substantially in a plane, otherwise the points of the pins fit the surface to be supported.

Where desired, the pins may be formed of hollow tubing, preferably having the same wall thickness as the base supports and with one end of the tube collapsed and welded into a solid point. This form of pin presents a structure wherein all of the metal thicknesses throughout the structure may be uniform. It is to be understood that the racks in accordance with the present invention are constructed from non-scaling heat resisting metallic alloys, such as for example, chrome steel.

The present invention possesses many advantages over the prior art. Some of these advantages are that the pins do not tend to warp or bend since they are made of worked metal, the grain and density of the metal is much more uniformly distributed than in cast metal. Furthermore, there is little tendency for temperature reactions to tend to cause the pins to break away from the base bars. The pins being riveted or welded or otherwise secured to the lower member of the base bar, have a movement relative to the place where these pins pass through the upper member of the base bars, and thus while the pins

are rigidly guided and supported, the internal thermal action on the parts is minimized. The parts being of uniform metallic thickness tend to heat uniformly and do not bend or warp. The metal utilized being relatively small as compared to the strength obtained obviates the necessity of useless heating a large amount of metal in the supporting rack.

It is realized that the present invention may be carried out in structures other than those disclosed herewith, which is a disclosure of the preferred form, therefore, it is to be understood that the present invention may be embodied in structures other than those specifically shown herewith, and the disclosure herewith is to be understood as illustrative and not in the limiting sense.

Fig. 1 illustrates a detail view of a part of a rack in accordance with the present invention showing a part broken away.

Fig. 2 illustrates a section built up to support flat plates on the tips of the posts.

Fig. 3 is a modification of the invention.

Referring to the drawing and more especially to Fig. 1, which illustrates a preferred form of the present invention, the bar or main support preferably comprises a tubular member 1 formed of sheet metal or seamless tubing, the cross section of which is unimportant except that it is desirable this member shall be provided with a substantially flat base 2. Supporting pins are mounted in the base 2 preferably by welding at the point 4. These pins extend through the upper portion of the bar but are not anchored at this portion and are freely movable as at the point 5, so that during heating and cooling, a movement may occur between the body of the pin and the base bar at the point 5. These pins may be solid but in the preferred form comprise tubular members, 6 which are open at the bottom as at 7 so as to provide an open recess into which the heating gases may freely enter. In order to prevent pocketing of these heating gases, the tubular members are preferably provided with openings 8 so that the hot gases may circulate through the tube. In view of the fact that it may be desirable to adjust the height of the tubes, particularly as the points may tend to burn off or wear down, in the preferred form, the point comprises a conical head 9 provided with a screw threaded body 10 adapted to be screw threaded into the tubular member 6 and where desired, lock nuts 11 cooperate with a screw threaded portion 10 and the ends of the tube 6 to lock the conical points 9 in adjusted vertical position. These supporting members are usually used as individual bars although in certain cases, it may be desirable to make up a grid.

Fig. 2 illustrates a made-up grid having connected bars 12 and 14 and with solid pins 15 extending through the bars with the bases of the pins welded or otherwise securely attached to the base portions 2 of the grid bars and with these pins extending freely through the upper portion of the grid bars in such manner as to provide movement between the pins and the bars as explained with reference to Fig. 1.

Fig. 3 illustrates a further modification of the invention in which points 16 are mounted on top of the ridge 17 of a triangular shaped bar. Preferably, though not necessarily, these points 16 are securely attached by welding or otherwise to the bars 1.

It is to be understood that the preferred material used for making the parts is non-rusting heat-resisting metallic alloys. It is also understood that the present invention is not limited to any particular geometric form of rack or to a specific geometric form of supporting bar.

Having described my invention, I claim:

1. A device of the class described comprising a hollow tubular member having a flat side adapted to operate as a base, and an upstanding member having the lower end thereof anchored to the flat side of the supporting member, said supporting member being provided with an opening in the upper side thereof opposite said flat side and said upstanding member passing freely through said opening.

2. A device of the class described comprising a hollow supporting bar having one side thereof flat, upstanding supports anchored to said flattened side of said bar and extending through openings in the opposite side of said hollow bar, said upstanding supports terminating in points adapted to sustain articles in an enameling furnace.

3. An article of the class described comprising longitudinally extending base bars formed of hollow tubing having a flattened side, tubular posts anchored to the flattened side of said hollow tubing with the bottom portion of said posts being open to atmosphere to facilitate passage of hot gases in the said posts.

4. A device of the class described comprising an enameling oven rack having longitudinally extending hollow supporting bars, upstanding hollow posts anchored at their lower ends to said supporting bars and extending through openings on the opposite side of said supporting bars, with the base of said posts in open communication with atmosphere, said posts having openings in the side thereof to facilitate passage of hot gases through said posts.

5. As an article of manufacture, a supporting bar for an enameling oven comprising a longitudinally extending hollow member having one side thereof flattened, and upstanding supports secured to said bar and terminating above said bar to support articles to be enameled in an enameling oven.

6. As an article of manufacture, a rack for enameling ovens comprising a hollow supporting bar, a plurality of spaced apart posts secured to a side wall of said supporting bar and extending through openings in the opposite side of said supporting bar whereby said supporting bar and said posts are free to expand and contract independently of each other.

7. As an article of manufacture, a supporting rack for enameling ovens comprising a supporting member, upstanding posts secured to said supporting member, adjustable points mounted in the upper ends of said posts and being adapted to be raised or lowered to conform with the shape of the article being supported upon said posts.

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