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PLATING RACK WITH PLURAL LAYER PLASTISOL COATING

Filed June 12, 1967

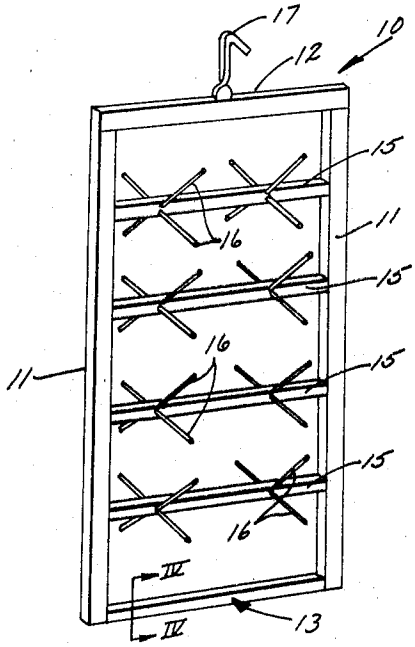


FIG. 1

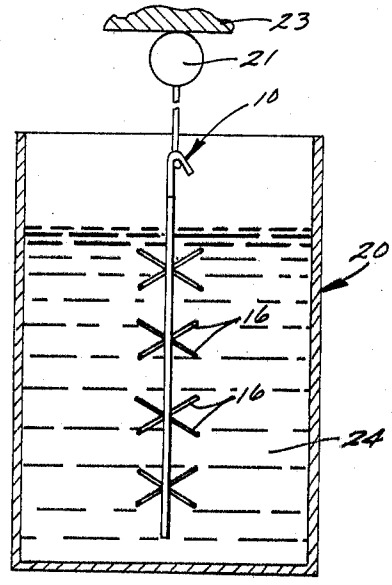


FIG. 2.

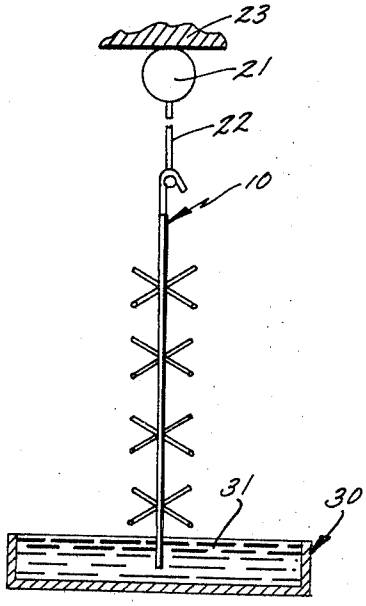


FIG. 3.

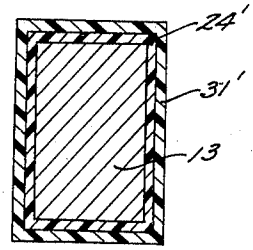


FIG. 4.

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PLATING RACK WITH PLURAL LAYER PLASTISOL COATING

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ABSTRACT OF THE DISCLOSURE

A rack having a cured plastisol insulating coating. The rack is initially dipped into a relatively flexible plastic forming plastisol and, after partial curing, those portions of the rack ordinarily subjected to brading forces during use are re-dipped into a relatively hard plastic forming plastisol. The layers are fully cured simultaneously in the preferred embodiment of the invention. The flexible plastisol covering usually the upper portions of the rack permits flexing of the article retaining members without fear of cracking the insulating coating. The hard plastic insulating layer covering usually the lower portion of the rack prevents abrading of the insulation when the rack is slid across or bumped against the floor.

BACKGROUND

This invention relates to plating racks and, more particularly, to racks covered with an insulating or otherwise inert medium to prevent depositing of metal or the like there onto during use.

In the fabrication and utilization of article retaining racks such as are utilized to retain and suspend articles within plating baths, anodizing baths and the like for electro-chemical or other types of surface treatment, it is usually desirable that the rack be covered with some type of inert insulating material. In the case of electro-chemical processes, of course, those points where the rack electrically connects to the individual articles and the power supply are not covered. The inert insulation serves a number of purposes, depending upon the particular type of environment. For example, it prevents the plating of material onto the rack as well as onto the articles during an electroplating operation and, thus, results in a marked savings insofar as material costs are concerned.

In the past, racks of the type described have been insulated by preheating them and dipping them into plastisol (polyvinyl chloride) one or more times to build a coating of desired thickness. The rack is then subjected to heat to cure the plastic coating so formed and, after removing the coating from the contact points, put into use.

Since most racks of the type described depend upon the flexibility of the article-engaging members to retain the articles thereon, the plastisols which have been utilized for insulating purposes should retain their flexibility so that they will not crack. The harder plastisol coatings crack much sooner in service than do the softer coatings. While such soft insulating coatings have proved satisfactory insofar ast he article-retaining members and other interior portions of the rack have been concerned, a marked tendency has existed for the insulating coating to be scraped

from portions of the racks such as the bottom when, for example, it is slid across the floor, bumped against the floor or otherwise subjected to abrading forces. When such scraping occurs, the rack should be repaired or recoated immediately in order to prevent the electro-deposition of plating or other treatment material thereon. Such repair or replacement, of course, results in substantially increased overhead to plating concerns electro-deposititon of plating or other treatment material thereon. Such repair or replacement, of course, results in substantially increased overhead to plating concerns as well as necessitating the obtaining and storage of extra racks which may be brought into use immediately upon the removal of a scraped rack from the plating apparatus.

In addition to the problems incurred in electrolytic-type treatment, insulative coatings of the type described also perform a desirable function in surface treatment methods which do not depend upon electrolytic techniques for achieving the desired surface condition. Thus, for example, where the particular process involves the mere subjection of the parts to be treated to chemical reagents, the presence of the plastic insulating coating on the racks ordinarily will prevent inter-action of the reagent and the rack-forming metal and, in a matter similar to that discussed in connection with electro-plating, provide a more uniform product at a more economical price. Thus, regardless of the particular type of surface treatment under consideration, if an insulating coating on the rack is necessary for an economical and satisfactory treatment of the parts, and if the rack depends upon the flexibility of certain portions thereof to retain the articles thereon, the prior art has used either a flexible or "soft" type of plastisol which is easily scraped from the rack surfaces when they are subjected to abrading forces, or a "hard" type of plastisol which is subject to early cracking at points which require flexing.

Objects and specification

It is an object of this invention, therefore, to provide a rack of the type described which is not subject to the disadvantages outlined above.

More particularly, it is an object of this invention to provide a rack and coating therefor which, while permitting flexing of the article-retaining members without cracking, is not subject to being easily scraped from the rack when it is bumped against or slid across the floor or walls of the particular enclosure in which the plating or other type of treatment process is being executed.

Thus, it is an object of this invention to provide a rack of the type described having a markedly increased life expectancy and, which may be fabricated at a cost only slightly greater than that incurred in the fabrication of insulated racks in accordance with the teachings of present technology.

These as well as other objects of this invention will be readily understood with reference to the following specification and accompanying figures in which:

FIG. 1 is a perspective vew of a typical plating rack;

FIG. 2 is a schematic illustration of the initial dipping process;

FIG. 3 is a schematic illustration of the final dipping process; and

FIG. 4 is a cross-sectional view taken along plane IV—IV of FIG. 1 illustrating the double-coated, abrasion-resistant section of the novel rack.

Briefly, this invention relates to an article-retaining rack having a metallic framework adapted to be suspended within a solution tank or the like, the framework having a plurality of flexible article retaining members affixed thereto and a plastic insulating material covering substantially all surfaces thereof. The improvement comprises the utilization of a first insulating material to cover those portions of the rack including the flexible members not ordinarily subjected to abrading forces during use. This first material is sufficiently flexible so as not to crack under the influence of the flexing of the retaining members. A second insulating material is utilized to cover those portions of the rack, such as the base thereof, which are ordinarily subjected to abrading forces during use. The second material is harder than the first material whereby it cannot be scraped easily from the rack by the abrading forces.

Referring now to the figures, a preferred embodiment of this invention will be described in detail. FIG. 1 illustrates a typical plating rack to which the teachings of this invention are applicable. The rack, indicated generally by the reference numeral **10**, comprises a pair of vertical splines **11**, an upper frame member **12**, and a lower frame member **13**. Depending upon the particular environment in which the rack is to be utilized, the base thereof may be provided with guard stubs or the like as is well-known in the art. As will be readily appreciated, the teachings of this invention are equally applicable despite such variations in the specific rack construction.

Suspended between the frame members **11** are a series of spaced horizontal cross bars **15**. Affixed to the cross bars **15** are a plurality of flexible article retaining clips **16** upon which the articles are adapted to be suspended during the treatment of their surfaces. As is well-known in the art, the clips **16** may take any of a wide variety of forms and are usually designed with the retention of a particular part in mind. This, of course, is true as regards the remainder of the rack structure and, for example, in many situations no horizontal crossbars **15** are necessary, the articles to be treated being of sufficient size to be otherwise suspended from the rack. As will be apparent, the teachings of this invention will find applicability regardless of the physical configuration of the particular rack. The rack illustrated in FIG. 1 is merely a typical representation and its structural characteristics are not meant to limit the scope of this invention.

The upper section of the rack has one or more supporting hooks **17** affixed thereto. The rack and articles carried thereby are suspended from hooks **17** within the plating or other treatment bath by means of these hooks. Where the particular operation involves electrolysis, the upper extremities of the hook **17** will ordinarily be left bare to provide a conductive path from the support bar through the metallic portions of the rack to the articles. In this regard, the tips of the article-retaining clip **16** will ordinarily also be left bare such that conductive contact is established between the article and the power supply.

After fabrication of the metallic rack components by welding, riveting or the like, the rack is preheated and dipped in a solution of flexible plastic forming plastisol **24** which, as shown in FIG. 2, may be contained within a dipping tank indicated generally by the reference numeral **20**. Merely by way of example, the rack may be supported from an overhead hoist **21** affixed to the ceiling **23** by means of cable **22**. The rack may be dipped into the flexible plastisol **24** a sufficient number of times with intermittent reheating, if necessary, to provide a gelled plastisol layer of desired thickness thereon. At this point, preferably, the rack is moved above a shallow dipping tank, such as that indicated by the reference numeral **30** in FIG. 3, and the lower portion, after suitable preheating, is dipped into a solution of hard or rigid forming plastisol **31**. Dipping may be repeated within tank **30** until a gelled layer of desired thickness has been placed thereon. The rack is then subjected to heat in an oven or the like to cure both the flexible and hard plastisols.

While the preferred embodiment illustrated above, contemplates the curing of the two layers simultaneously, it will be apparent to those skilled in the art that the first flexible layer might be cured prior to formation of the second layer if suitable bonding between layers can be obtained. In either event, the process results in the coating of the interior and upper sections of the rack including the flexible article-retaining members **16** with a plastic which will remain sufficiently flexible to prevent cracking under the influence of the flexing article retaining members **16**. The lower portion of the rack, particularly that portion constantly coming into abutment with the floor or the like, has a harder plastic insulating layer covering it. The abrasion resistance of this layer prevents scraping of the material from the plating rack during ordinary usage and, thus, vastly prolongs its life.

As shown particularly in FIG. 4, the lower sections of the plating rack indicated generally by the reference numeral **13** are covered both by the layer of soft plastisol **24'** and the layer of hard plastisol **31'**. During curing, these layers are curingly bonded together to provide a sturdy and highly functional assembly. That is to say, that the two gelled layers of soft and hard plastisols are polymerized or cured simultaneously in overlaying relationship with the metallic rack structure and each other.

As noted, the plastisol **24** utilized for formation of the initial insulating layer is flexible, preferably having a Shore A durometer hardness of 65 to 80. The hard plastisol **31**, utilized to cover those sections of the rack which are subject to abrading forces during ordinary usage, has a hardness which, ordinarily, exceeds 85.

It will be noted that the plating rack which is the subject of this invention may be fabricated with little added expense and, yet, has a life expectancy greatly exceeding that of plating racks manufactured in accordance with the teachings of the prior art. For example, it is not unusual to have to completely recover or reinsulate a plating rack coated with a flexible plastisol only at intervals of three or four months whereas, the plating rack which is the subject of this invention will, in all probability, never require reinsulating. The savings in time, trouble and money for the rack user are evident. This fact, coupled with the relative ease with which the additional coating step may be executed in the fabrication of the rack, is one of the salient features of this invention.

While a preferred embodiment of this invention has been illustrated in detail, it will be readily apparent to those skilled in the art that other embodiments may be conceived and fabricated without departing from the spirit and scope of this specification and the accompanying drawings. Such other embodiments are to be deemed as included within the scope of the following claims unless these claims, by their language, expressly state otherwise.

I claim:

1. In an article-retaining rack having a metallic framework adapted to be suspended within a treatment material containing enclosure, said framework having a plurality of flexible article retaining members affixed thereto and a plastic insulating material covering substantially all surfaces thereof, the improvement comprising a first layer of insulating material covering those portions of the rack including said members not ordinarily subjected to abrading forces during use, said first layer being sufficiently flexible so as not to crack under the influence of the flexing of said retaining members and a second layer of insulating material covering those portions of the rack ordinarily subjected to abrading forces during use, said second layer being harder than said first layer whereby it cannot be scraped easily from said rack by said abrading forces.

2. The rack as set forth in claim 1 wherein said first and second layers of materials are cured plastisols.

3. The rack as set forth in claim 2 wherein said first layer also covers those portions of said rack ordinarily subjected to abrading forces, said second layer overlying said first layer.

4. The rack as set forth in claim 3 wherein said first and second layers are curingly bonded together.

5. The rack as set forth in claim 2 wherein said first layer has a Shore A durometer hardness in the range of about 65 to 80 and said second layer has a Shore A durometer hardness exceeding about 85.

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