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PROCESS FOR APPLYING A PROTECTIVE COATING TO METALLIC ARTICLES

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4 Claims. (Cl. 91—70)

This invention relates to a process for applying a protective coating to metallic articles.

It is known to dissolve induratable artificial resins in solvents and apply them to articles of various kinds by brushing, spraying or dipping, and that a suitable filler, such as aluminium powder, finely pulverized heavy spar or the like, may also be incorporated with the solution. The hardening of the dissolved resin after the application of the coating, is effected by first raising, or maintaining, the temperature so as to cause the complete evaporation of the solvent, and then increasing the temperature so as to effect the partial or complete hardening of the artificial resin.

This current process is attended with considerable difficulties, due, in part, to the nature of the solvent itself, and partly to the method of producing such an induratable coating. The evaporation of the solvent (usually alcohol) requires a certain time, and it is not until evaporation is complete that an elevated hardening temperature can be employed. Consequently, the complete application process takes some considerable time. A further difficulty consists in that, in the first place, a temperature suitable for evaporating the solution must be maintained for a certain period, of at least half an hour, after which the still higher optimum hardening temperature must be maintained for a certain minimum period. This process is cumbrous and requires extensive appliances and control apparatus, together with first-class skilled operatives. A further difficulty resides in the inflammability of the usual solvents, which must only be used with special precautions which increase the expense of the operation. Extensive experiments with a view to improving the various artificial-resin coatings and simplifying the process of applying same, have also shown that, when applied by the known process, the elasticity of the artificial resins, under mechanical stresses, such as shock and impact, leaves much to be desired.

It has now been ascertained that the process of applying a coating of induratable artificial resin to metallic articles is substantially improved by dissolving induratable artificial resins in tar oil, with or without finely powdered fillers. The employment of tar oil possesses the particular advantage—in addition to those hereinafter set forth—that its viscosity renders it highly suitable as a suspension vehicle.

Since it is of advantage to employ inorganic fillers which resist chemical action, on the one hand, and possess sufficient physical hardness on the other—such as heavy spar, quartzite or other minerals—suspensions should always be employed when such fillers are used, since the latter are insoluble in the tar oil. The compositions prepared by dissolving induratable artificial resins in tar oil, with or without additions, are applied by brushing, spraying, or by dipping the heated article in the composition.

Additional fillers may consist of organic substances of high boiling point, such as anthracene oils, since, owing to their high boiling point—above 300° C.—they do not vaporize completely during the application process, but are still present in the hardened final coating, and act favorably by increasing its elasticity.

Another advantage of employing tar oils consists in that the flash point is so high as to preclude risk in the performance of the process. Since the boiling points of tar oil range between about 180° and 360° C., whilst the hardening temperatures of the artificial resins lie between about 80° and 300° C., it is possible to select tar oils which boil within a range approximating to the temperature limits within which the hardening of the artificial resins proceeds with the requisite velocity. In this manner it is possible not only to prevent the formation of bubbles, which is a source of considerable difficulties in other methods of application, but also to avoid treatment at different temperatures, such as inevitable in the case of other solvents. In the case of these latter, it is first necessary to employ a low temperature in order to evaporate the solvent, and only thereafter to proceed to the higher, actual hardening temperature. Operating in this manner necessitates either employing two stoves, together with the devices for transferring the articles from the one to the other, or else the gradual heating of the coated articles up to the hardening temperature. The consumption of material, heat and time thereby entailed is obviated by the hereindescribed process. In this case, the temperature of the tube may be approximately the same, during the application of the artificial resin and tar oil compositions, as that required for the hardening stage, provided merely that the optimum hardening temperature be borne in mind when selecting the tar oil to be employed, or conversely that, in the case of tar oils with a given range of boiling points, the hardening temperatures of the resins employed approximately coincide with said range of boiling points.

The previously mentioned beneficial action of a content of organic substances of high boiling

point, such as anthracene oil (b. p. above 300° C.) in the finished, hardened coating, can be easily obtained in accordance with the invention, by adding a certain amount of anthracene oil, boiling above 300° C., to the tar oil employed as the solvent. The coatings obtained in accordance with the above described principles are distinguished by extreme compactness and adhesion, and thus are unusually resistant to chemical and mechanical influences.

Example

A tube of any convenient metal or metallic alloy, which has either been previously heated in a suitable and known manner, or is heated to about 260–280° C. during the operation, is brushed or, preferably, sprayed with a mixture prepared, in known manner, by triturating tar oil (b. p. 210–240° C.) with a mixture of finely powdered artificial resin and finely powdered quartzite in equal proportions. If necessary, a short supplementary hardening of the coating may be performed at a suitable temperature. The coating may be applied both outside and inside.

I claim:—

1. A process for applying a protective coating to metallic articles, which comprises applying a composition containing a solution of induratable artificial resins in tar oil and an organic substance such as anthracene boiling above 300° C., to a metallic article whilst heating.

2. A process for applying a protective coating to metallic articles, which comprises heating the metallic article and then applying a composition containing a solution of induratable artificial resins in tar oil and an organic substance such as anthracene boiling above 300° C. to said metallic article.

3. A process for applying a protective coating to metallic articles, which comprises applying a composition containing a solution of induratable artificial resins in tar oils having a range of boiling points approximately corresponding to the temperature at which the transformation of the artificial resin into the insoluble and infusible form proceeds at suitable velocity and an organic substance such as anthracene boiling above 300° C., to a metallic article whilst heating.

4. A process for applying a protective coating to metallic articles, which comprises heating the metallic article and then applying a composition containing a solution of induratable artificial resins in tar oils having a range of boiling points approximately corresponding to the temperature at which the transformation of the artificial resin into the insoluble and infusible form proceeds at suitable velocity and an organic substance such as anthracene boiling above 300° C. to said metallic article.

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