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PROTECTIVE COATING

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1 Claim. (Cl. 117—134)

The present invention relates to surface treating compounds for metals and metallic alloys and particularly to processes of application therefor.

The principal object of this invention is to develop a process of treating metal surfaces to prevent corrosion by the application of thin coatings of lanolin or similar slushing material under conditions of utmost safety from fire and explosion hazards.

Lanolin, a wax-like fat or grease which is obtained principally from sheep's or lamb's wool, possesses the characteristics of tenacious adherence to metallic surfaces to such a degree that it has become recognized as an excellent corrosion inhibitor. In addition, it, almost exclusively among slushing compounds, is substantially free from any tendencies to form corrosive residue. In its natural state, however, this product is too thick, even when heated, to be applied satisfactorily and efficiently to the surfaces of close-tolerance machine parts. As a result, the protective film when of excess thickness may interfere with and even prevent close fitting piece parts from being assembled. Under such circumstances, it was found necessary to remove the film before assembly. Through experimentation with various thinning agents, an ideal consistency was obtained which, when applied at certain temperatures, formed a coating that afforded proper characteristics for protecting the surfaces of fine machine parts adequately to resist corrosion under all ordinary environments with minimum discoloration and odor.

Lanolin is soluble in trichloroethylene and in carbon tetrachloride, two noninflammable solvents having generally similar properties. Of these two solvents, trichloroethylene is somewhat preferable because it is least corrosive and remains more nearly neutral following application upon ferrous alloys. A range of tests was conducted to determine the temperature at which a proper quantity of lanolin may be held in solution for the purpose of dip or immersion coating of machined parts.

The use of trichloroethylene as a degreasing agent, both in vaporous as well as in liquid form, had been known before, and while it appears that its use as an applicator solvent, in view of this practice, might be paradoxical, it was found, nevertheless, that by obtaining concentrated solutions of lanolin in trichloroethylene at temperatures ranging from 150 degrees F. to 190 degrees F., a suitable film thickness could be deposited both on ferrous as well as nonferrous

metallic alloys to enable them to withstand the ravages of ordinary corrosive atmospheres. Heavier coating films produced in this manner were found to possess sufficient qualities of adherence to withstand more extreme climatic conditions and exposures to humid atmospheres during all seasons of the year. The film deposits thus applied though adhesive and elastic so as to remain stable under temperature changes are, nevertheless, not greasy or oily to the touch even under extraordinary room temperature conditions.

For ordinary dipping operations, the concentration of lanolin is preferably maintained at about 12% to 20% by weight and for producing heavy films, the concentration may be raised to about 40% to 50%.

Surface deposits thus applied may be regulated as to thickness by varying the concentration of the solution, and, by reducing the proportions of lanolin to about 5% by weight, the films may be produced so nearly transparent as not to require removal for the sake of appearance. The removal of the film, if desired, however, may be effected in the conventional manner; that is, by suspending in heated solvents or in the vapors thereof.

It is to be noted that rapid vaporization of trichloroethylene begins at 190 degrees F. so that when dipping in the higher temperature solutions for the purpose of obtaining relatively thinner film deposits, care should be exercised to avoid the formation of excessive vapor zones above the dipping solution. Otherwise upon the removal of piece parts slowly, the degreasing action will be encountered by the wet piece parts upon passing through the vapor zone. Where the higher temperature of dipping solutions is so much preferred as to warrant the risk of generating rapid vaporization, a simple and for most purposes adequate precaution against degreasing may be had by a quick withdrawal of the piece parts from the solution or by a rapid passing through the vaporization zone. Another expedient which has proved more effective, however, under these conditions of dipping consists in the provision of a condensation coil disposed above and near the surface of the dipping solution and located perimetrically around the walls of the solution container.

While lanolin may be applied by the use of other volatile solvents, none has been found so well suited, noninflammable, and at the same time possessing a vaporization point so much higher than the boiling point of lanolin. Since

trichloroethylene has no flash point, its use in buildings is safe and always permissible even where an industrial plant may be governed by insurance underwriters' restrictions. Under various ranges of the described formula, lanolin has been applied thoroughly to metal surfaces and even the thinnest application film following the volatilization of the solvent was found to be entirely impervious to moisture and other corrosive atmospheres.

What is claimed is:

A process of coating metallic piece parts to prevent tarnish or oxidation which consists in

dissolving lamb's wool fat in trichloroethylene in the proportion of from 12 to 20 per cent by weight, heating the solution in an open top vessel to a temperature of from 150 to 190° F., cooling the vapors overlying the solution to subdue evaporation, immersing piece parts in said solution for a period of exposure of from 15 to 30 seconds according to the mass of the piece parts, and withdrawing the piece parts by moving them upwardly rapidly through the subdued evaporation zone overlying the solution.

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