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RALPH J. WIRSHING AND HENRY R. FAAS, OF DETROIT, MICHIGAN, ASSIGNORS TO GENERAL MOTORS RESEARCH CORPORATION, OF DETROIT, MICHIGAN, A CORPORATION OF DELAWARE

COATING FOR FERROUS METALS

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The invention relates to the coating of metal surfaces, especially of iron or steel or alloys thereof herein referred to as ferrous metals. The type of coating with which the invention is particularly concerned is that in which one layer of a composite coating consists of a metal, preferably electrolytically deposited, and another layer consists of a lacquer or enamel.

In the finishing of metal parts, for example, the sheet metal body or chassis parts of automobiles, it is customary to apply to ferrous metal surfaces a lacquer or enamel coating. Lacquers usually employed for this purpose are of the pyroxylin type, these being applied over one or more preliminary or priming coats in the nature of oil paints. These priming coatings are usually dried at elevated temperatures. The enamels commonly used, especially for the coating of parts such as hoods and fenders, are of the "baked enamel" or "baked japan" type, containing asphalt and linseed oil. A typical composition of this type may contain approximately 100 lbs. asphalt, 20 gallons linseed oil and ¼ lb. lead oxide, which ingredients are mixed with about an equal volume of some thinner such as petroleum naphtha. These baking enamels are usually applied in several coats each of which is baked on at a temperature in the neighborhood of 450° F. for a half hour or more. Finishes of these types, however, have not been found capable of satisfactorily withstanding atmospheric and other corrosive agencies under some of the severe conditions to which articles such as automobiles are subjected. Exposure to salt water or sea air, for example, cause rusting of the metal under the lacquer or enamel with the result that the coating is lifted from the surface and falls away in flakes.

In an effort to overcome this difficulty we have experimented with numerous combinations of sub-coatings designed to afford increased protection to the metal surfaces. Many of these sub-coatings which would be desirable from the standpoint of their protective effect are unsuitable for the reason that the lacquer or enamel does not adhere satisfactorily to the surface of the coating material. We have found, however, that tin and chromium possess to a high degree the properties desirable for this use. Both of these metals are extremely efficient in preventing corrosion of ferrous metals by atmospheric or other common corrosive agencies and the lacquer with its priming coatings as well as baked japan or enamel coatings adhere to them very satisfactorily, the combination affording a highly efficient and permanent finish for withstanding severe service conditions. It is preferred to apply the metal coatings by electroplating and any usual method of depositing these metals is applicable. Chromium suffers the disadvantages that its plating baths do not possess as high throwing power as tin plating baths, hence tin is somewhat more suitable for application to surfaces of irregular contour. Tin or high tin alloy might, of course, be applied by dipping the article in a fused bath of the metal, but we prefer electrolytic deposition by reason of the facility with which the coating may be applied, the superior adhesion of the lacquer or enamel to the electrodeposited coating, and the uniform distribution and the ease of control of thickness of the deposit. The electrolytic deposit has a slightly roughened surface or "tooth" which contributes to the adhesion of the subsequently applied liquid coating composition.

The temperature at which the baking enamels are baked is usually above the melting point of tin, but we have found that a thin electrolytic deposit of tin will remain in position under the enamel during the baking process. Chromium, of course, is capable of withstanding without change any temperature required for baking.

We claim:

The process of producing a protective coating upon articles having a ferrous metal surface comprising applying by electro-deposition to the surface a thin coating of tin, applying to the tin coated surface a covering of asphaltic baking enamel and then subjecting the article to a baking temperature of approximate 450° F.

In testimony whereof we affix our signatures.

RALPH J. WIRSHING.
HENRY R. FAAS.