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SURFACE TREATMENT OF MATERIALS

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The present invention relates to the surface treatment of materials. It has for an object, and is more particularly concerned with, the treatment of metallic and non-metallic surfaces so that a film or films may be produced thereon which will prevent the spreading or creeping of oil on the surface treated.

Another and more specific object of the present invention is the treatment of metallic surfaces for the purpose of rendering such surfaces non-wettable by oil.

A further object of the invention is to provide a simple means whereby surfaces can be treated to ensure the exclusion of oil therefrom where oil would tend to cause damage to such surfaces or to surrounding parts.

In certain cases it is desirable to prevent the creepage of oil over metallic surfaces. For example, in watch bearings it is desirable to have the oil which lubricates the bearing confined to the actual area of lubrication and to prevent the creepage of oil into the adjoining and surrounding parts within the watch casing. It is also desirable to prevent creepage of oil over contact points in electrical apparatus. It is, furthermore, desirable to prevent oil from creeping off oil rings onto shafts. In such cases, and in others which will readily suggest themselves, the present invention is designed to provide a means whereby a dam or barrier is presented to the creepage or spreading of oil.

It has been found that if the surfaces to be treated for the prevention of such oil creepage or oil spreading as has been referred to, are first carefully cleaned and then provided with a layer or layers of an organic material having a long chain length and so positioned on the surface to be treated that the exposed portion of the molecules on the outside layer presents a grouping which is non-wettable by oil that the objects of the present invention may be accomplished. Specifically such long chain compounds as the long chain metallic soaps, for example, ferric stearate when applied on the surfaces to be treated produce films thereon which are non-wettable by oil.

In order to apply such non-wettable films, the surface is first thoroughly cleaned in any suitable manner. In the case of metallic surfaces electrolytic treatment, immersion in a caustic soda bath or a bath of carbon tetrachloride or benzene, or similar cleansing agent is used. The cleaned surface is thoroughly dried after which the non-wettable film is applied.

The method of application of the non-wettable film may be as follows:

Taking as an example a ferrous article such as steel, as a surface to be rendered non-wettable by oil, the cleaned metal is provided with a non-

wettable film by applying directly to the metallic surface a film of molten metallic soap, such as ferric stearate. Or a solution in which the non-wettable film material is carried and from which the film is deposited on the surface to be treated may preferably be employed. For example, a cleaned metallic surface is dipped into a solution consisting of 10% by weight of ferric stearate and 90% by weight of a refined hydrocarbon of a kerosene nature, for example the material known as Bayol obtained from The Standard Oil Development Co. of N. J. The bath is maintained at a temperature of 120° C. The metal part to be treated is allowed to remain in the heated bath for a period of about three minutes, or, if the metal part or surface is large, the time of immersion is long enough for the metal to assume a uniform temperature. The parts so treated are removed from the bath at a definite speed to obtain an even thickness of non-wettable film which is allowed to dry at room temperature. In this way the carrier is evaporated and a continuous film is laid down evenly. Successful applications by this method have been made to the following metals: steel, cast iron, platinum, brass, bronze, babbitt, cadmium, chromium plate and nickel plate.

In order to observe the ability of the film produced to withstand the effect of oils, six different kinds of oil were placed on the protective surfaces mentioned. Before placing the oil on the protective surfaces the film was broken at the point where the drops were to be placed in order to encourage destruction of the film. The films on all of the metals so treated have withstood breakdown for a period of four and a half months.

It is believed that the molecules are oriented so that only the CH₃ groups are exposed at the upper surface, thus forming a surface which oil, tetradecane, benzene and the like will not wet and on which such material will simply roll about leaving no trace of its path.

If the non-wettable film is contaminated, that is, by handling or physical injury such as scratches or the like it can be restored by re-baking at a temperature of 120° C.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In combination, a metallic article having a surface area provided with a continuous film of even thickness consisting of ferric stearate, said film being non-wettable by oil.

2. In combination, a ferrous article having a surface area provided with a continuous film of even thickness consisting of ferric stearate, said film being non-wettable by oil.

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