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ART OF PREVENTING SEIZURE OF CONTACTING SURFACES OF SOFT ALLOYS AND LIKE MATERIALS

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5 Claims. (Cl. 91—68)

My copending application Serial No. 740,029, filed August 15, 1934, describes certain manners of preventing contact seizure of metal parts, and the present invention likewise relates to the art of preventing such seizure.

In making close fitting contacts between metal parts, especially those of soft metals such as aluminum and aluminum alloy (including duralumin), the parts sometimes seize and become "welded" so that it is impossible to move the parts one with respect to the other. This is particularly the case when threads in such parts are caused to engage, and occurs both in tightening the threads together for establishing a coupling and in attempting to release them. Many such alloys have the property of yielding plastically rather than resiliently, and hence imperfections in one surface result in a corresponding and mating imperfection in the other surface.

According to the present invention, the contacting surfaces are treated with an anti-seizing material of a character which adheres to the surfaces, so that the articles to be engaged may be previously prepared with the material in position, and then the articles are brought together and the material operates to permit the articles to be tightly engaged by sliding movement without danger of seizing either during the engagement or disengagement thereof.

When such articles are employed for making couplings in pipe lines which are to convey gasoline and like fuels, it is especially necessary that the material should not be soluble in the gasoline, for example, and should not be present in such quantity and at such points that it may become disengaged in the course of service and either operate to obstruct the conduit locally or be carried along with the flow of gasoline and operate to obstruct the conduit at some other and restricted point.

It has heretofore been proposed to coat the articles as a whole by dipping them in hot liquid substances which form a deposit thereon and which become solid upon cooling. Such a procedure does not permit obtaining a thin film as the necessary high temperature for proper liquidity is difficult to obtain by reason of the possibility of decomposing the material employed. Hence it is customary to subject the dipped articles to a centrifugal operation to discharge excess material, but this operation is usually incomplete as the material tends to collect at various points of the system and is not properly discharged to form the thin even coating which is so desirable. Similarly, such hot materials could not be adequately applied by brushing or spraying operations of a local nature, as the high temperature required gives difficulty in the proper application of the substance.

According to the present invention, such a deposit is made locally by the use of a composition which at a normal temperature for employment without difficulty gives a thin uniform film by reason of the employment of a solvent in the composition used. This solvent is volatile and evaporates to deposit a film which is thinner than the applied coating and is of substantially uniform nature throughout the surface to which the application is made.

A preferred manner of operating is to employ a lacquer base dissolved in a normal lacquer solvent as a protective coating material and as the base for holding the anti-seize material. Such a lacquer base should be insoluble in the gasoline when the composition is to be employed for a gasoline fuel line, and it has been found that a nitrocellulose of the normal character employed for making lacquer solutions provides an excellent base material. The anti-seize material itself operates as an extending or plasticizing agent for the lacquer base of the lacquer solution. It is customary also to include a dye stuff so that the proper application of the coating may be revealed in the finished article.

It has been found that an excellent composition of this nature may be made by employing a normal lacquer solution comprising the lacquer base in a solvent therefor, in conjunction with a substance containing the stearic acid radicle. Such a substance may be a metal stearate, such as aluminum, zinc or lead stearate, or stearic acid. It has been found that excellent results are attained when a mixture is employed such, for example, as from 50 to 95 percent of aluminum, zinc or lead stearate or mixtures thereof, along with 5 to 50 percent of stearic acid. These stearate compounds and stearic acid are soluble in the normal lacquer solvents and also in turpentine, carbon tetrachloride, other carbon-chlorine solvents, in alcohol, etc., and such solvents may be employed for thinning the lacquer solution and/or for producing a solvent for the lacquer base.

The viscosity of the composition is adjusted by the employment of solvent until it can be easily applied locally to the desired points of the articles, as, for example, the screw threads. This composition can be painted at the desired points, that is, applied by a brush, swab, or by like

means customarily employed for distributing paint onto surfaces to be coated.

The composition may be employed at normal room temperature or a slightly elevated temperature may be used, as in the case of applying lacquers. The article is allowed to stand for the evaporation of the volatile solvent, which occurs rapidly, and may be accelerated by heating. The operation is preferably completed by a baking operation at a temperature of, say, 200 to 300 degrees F. This produces a very firm coating in the form of a thin and continuous film which will stand handling without marring or chipping, and which will not be attacked by solvents such as gasolines and motor oils.

It is also possible to carry out the procedure by employing beeswax in lieu of the compound containing the stearic acid radicle, as set out above, as a substitution in whole or in part therefor.

It is also possible to prepare a composition of this nature by dissolving the single or mixed stearic acid compound in a volatile solvent, and applying this as a paint to the article to be safeguarded, and then effecting the evaporation and deposit of the thin film therefrom, this film then being protected by a further application of a thin lacquer solution which likewise is permitted to dry out. In this case, the solvent for the lacquer usually operates to cause a fusion or blending of the films, at least at their meeting surfaces, so that the lacquer film is definitely held in position and operates as a protection against bruising or decomposition of the stearic acid compound or beeswax. In this connection, it may also be pointed out that the application of the mixed lacquer solution and anti-seizing agent appears to result in the deposit of a definite "solid" colloidal film in which the lacquer provides a surface coating of sufficient continuity to protect the stearic acid compound or beeswax which is incorporated within the film.

It is obvious that the invention is not limited to the specific embodiment set out but that it may be modified in many ways without departing from the scope of the appended claims.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is:

1. An article of manufacture comprising a soft metal part such as aluminum and aluminum alloy, having threaded portions which are coated with a thin adherent film of an anti-seizing material composed of stearic acid and a compound selected from the group consisting of zinc, aluminum and lead stearates, combined with a modifying ingredient comprising a lacquer base in such amount as to form a coating which will stand handling without marring or chipping.

2. The method of preventing contact seizure of soft metal parts such as aluminum and aluminum alloy having threaded portions, which consists in coating the threaded portions with a solution including an anti-seizing material composed of stearic acid and a compound selected from the group consisting of zinc, aluminum and lead stearates combined with a lacquer base in the presence of a volatile solvent for said material and said ingredient, and vaporizing the solvent for forming on the threaded portions a thin hard adherent coating of substantially uniform thickness.

3. The method of preventing contact seizure of threaded aluminum and like soft metal parts employed for conducting gasoline and motor oils, consisting in coating the threaded portions of the parts with a solution including an anti-seizing material composed of stearic acid and a compound selected from the group consisting of zinc, aluminum and lead stearates, and also including a lacquer base and a volatile solvent for the said material and said lacquer base, said lacquer base being insoluble in gasoline or motor oil and being present in such an amount as to provide with said material a coating which will stand handling without marring or chipping, vaporizing the solvent for forming a substantially uniform film of said material and said ingredient on the threaded portion, and baking at a temperature of substantially 200 to 300° F. for producing a hard thin adherent localized coating on said threaded portion.

4. An article of manufacture comprising a soft metal part such as aluminum and aluminum alloy, having threaded portions which are coated with a thin adherent film of an anti-seizing material composed of 5 to 50% of stearic acid and from 50 to 95% of a compound selected from the group consisting of aluminum, zinc and lead stearates, combined with a lacquer base in such an amount as to form a coating which will stand handling without marring or chipping, said lacquer base being insoluble in gasoline or motor oil.

5. A coating composition for application to soft metal parts such as aluminum and aluminum alloy, for preventing contact seizure thereof, comprising 5 to 50% of stearic acid, 50 to 95% of a compound selected from the group consisting of aluminum, zinc and lead stearates, a lacquer base in such amount as to form with said stearic acid and stearates a coating which will stand handling without marring or chipping, said lacquer base being insoluble in gasoline or motor oil, and a volatile solvent for said stearic acid, stearates and lacquer base.

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