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DRAWING COMPOSITION AND METHOD OF MAKING THE SAME

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This invention relates to metal drawing and to drawing compositions. It relates particularly to a base suitable for preparing the various desirable drawing compositions by relatively simple compounding.

The properties of compositions used for facilitating the flow of metal during the forming thereof must be varied substantially for the different drawing pressures encountered in the manufacture of various types of articles if the percentage of failures is to be kept at a minimum. Heretofore the manufacturer of drawing compositions compounded almost every composition from a different base material, and as a result he was required to have a multitude of independent expensive processes and a tremendous inventory of ingredients.

It is a principal object of the present invention to provide a base material from which substantially all of the required drawing compositions may be prepared by the addition of relatively few compounding ingredients thereto.

It is another object of the invention to provide a method of preparing drawing compositions having improved drawing properties.

It is a further object of this invention to provide an improved method of drawing metal.

It is a still further object of this invention to provide drawing compositions which, when properly used, will eliminate a large proportion of the failures usually accompanying the difficult drawing operations.

It has now been found that these and other objects which will be apparent from the following description of the invention may be readily accomplished with drawing compositions having a base comprising the sulfonated mixture of one or more long chain fatty acids, one or more resinous acids such as the acids in rosin, and one or more solid higher alcohols.

The sulfonated higher alcohols appear to function as extreme pressure lubricants as well as wetting agents which aid in maintaining the stability of the compositions. These solid higher alcohols should be present in the amount of about 5% to about 10 or 15% of the mixture, more than 5% being preferable.

The relative proportions of fatty acids and rosin acids, which together may make up from about 50 to about 95% of the base material, may be varied widely while still retaining the benefits of the invention. Thus the mixture may contain two or more parts of fatty acids such as stearic, palmitic, lauric oleic, etc., and one part of a rosin acid such as abietic, or one part fatty acid and two parts rosin acid. The rosin acids do not sulfonate as readily as the fatty acids, and it is therefore preferable to have a larger proportion of fatty acids than rosin acids present in the mix. The alkali rosinates formed upon neutralization of the sulfated mix are, however, valuable as solubilizers for oil, which is usually added in making the final composition. The fatty acids may constitute from about 35% to as much as 65 or 75% of the drawing composition base.

The base material may be readily prepared by sulfonating a mixture comprising about 5 to about 10% higher alcohol, about 20% to about 60 or 65% rosin acids, and about 35% to about 65 or 75% of one or more fatty acids. The materials may, however, be sulfonated separately if desired.

Talloil, either crude or refined, is a desirable source for the raw materials of the invention. Talloil is a by-product oil obtained from the wood of coniferous trees during the process of conversion of the wood fiber into cellulose by the sulfate or Swedish process for pulp making. It is a mixture of 35–50% rosin acids, 40–60% fatty acids, and 5–10% higher alcohols (sterols) such as lauryl, stearyl, oleyl alcohols, etc., and when sulfonated it forms soluble product which dries to a varnish-like film and which has been found to be a desirable base for a large number of drawing compositions.

An even more satisfactory raw material for the preparation of a base for drawing compositions is a sulfonated mixture of talloil and sperm oil, or a mixture of sulfonated sperm oil and talloil. The mixture should preferably have about 10 to 30% (based on the talloil) of sperm oil. The sulfonated sperm oil plasticizes the sulfonated talloil so that a product which dries to a softer film is obtained.

The sulfonation may be accomplished in accordance with the procedures apparent to those skilled in the art. Thus, the mixture of alcohols, fatty and rosin acids—such, for example as talloil or a mixture of talloil and sperm oil—may be mixed with strong sulfuric acid, such as 66° Bé. sulfuric acid, whereupon a reaction occurs. After the reaction the mixture is neutralized with alkali, such as potassium hydroxide. The neutralized mixture separates into two layers, the lower layer, which constitutes the waste product, being discarded. The top layer, which constitutes the base material, is preferably evaporated until it contains no more than about 10 or 15% of water.

It has been found that a large number of draw-

ing compositions having improved properties may be obtained simply by mixing suitable quantities of the above sulfonated base with one or more compounding agents, such, for example, as oils, pigments, free fatty acid and wetting agents or polyhydric alcohols. It is usually desirable that the compositions thus prepared be mixed with a suitable quantity of water prior to use. A heavily pigmented drawing composition which, when suitably diluted with water, is especially suitable for drawing operations involving very high localized pressure, may, for example, be made by incorporating 25 to 40% of relatively high viscosity lubricating oil and 25 to 35% of a suitable pigment, such as lithopone, etc., into the above base.

Furthermore, it is to be understood that the particular form of product shown and described, and the particular procedure set forth, are presented for purposes of explanation and illustration and that various modifications of said product and procedure can be made without departing from my invention as defined in the appended claims.

What I claim is:

1. A drawing composition base comprising sulfonated talloil in major proportion and plasticizing amounts of sulfonated sperm oil.

2. A drawing composition comprising a sulfonated mixture of talloil and sperm oil, said mixture having 10% to 30% sperm oil based on the quantity of talloil.

3. A drawing composition having a base comprising sulfonated talloil in major proportion and plasticizing amounts of sulfonated sperm oil together with a mineral oil.

4. The composition of claim 3 containing a suitable pigment to facilitate drawing.

5. A drawing composition comprising mineral oil, a suitable pigment, and a base composed of 40% to 60% sulfonated higher fatty acids, 35% to 50% sulfonated rosin acids, 5% to 15% sulfonated higher alcohols, and 10% to 30% sulfonated sperm oil.

6. A drawing composition which may be diluted with water comprising a base of a sulfonated mixture of about 5% to 15% of higher alcohols, about 20% to 65% of rosin acids, and about 35% to 75% of one or more higher fatty acids, together with mineral oil.

7. The composition of claim 6 containing a pigment suitable for drawing and a small quantity of free higher fatty acid.

8. A drawing composition which may be diluted with water comprising a base of sulfonated talloil in major proportions and plasticizing amounts of sulfonated sperm oil, mineral oil in the amount of 25% to 40% by weight of said base, and a pigment suitable for drawing.

9. In a method of drawing metal, the steps which comprise disposing a composition comprising sulfonated talloil between the die and the metal and drawing the metal.

10. In a method of drawing metal, the steps which comprise disposing a composition comprising sulfonated tall oil and sulfonated sperm oil between the die and the metal and drawing the metal.

11. In a method of drawing metal, the steps which comprise disposing a composition comprising sulfonated sterols, a sulfonated higher fatty acid, and a sulfonated rosin acid between the die and the metal and drawing the metal.

12. In a method of drawing metal, the steps which comprise coating the metal to be drawn with a composition comprising sulfonated talloil and sulfonated sperm oil and then passing the coated metal through a die to reduce its cross section.

13. A method of treating metal, which comprises disposing a composition comprising sulfonated sterols, a sulfonated higher fatty acid and a sulfonated rosin acid on the surface of the metal and passing the metal through a plurality of drawing dies to reduce its cross section.

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