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LUBRICATING COMPOSITION

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3 Claims. (Cl. 252—34.7)

The present invention relates generally to the lubricating art and is more particularly concerned with a novel synthetic lubricant having special utility and value as applied to knives for cutting and trimming steel sheets and plates.

It is customary in the production of tin-plated steel sheets to trim the steel stock prior to the application of the tin plate thereto. This trimming operation is generally accomplished by side-trimming knives and while the overall operation is generally satisfactory, there has always been associated with it a lubricating problem. It is essential to lubricate the knives in some way to reduce their wear, but ordinary lubricants cannot readily and economically be removed from the steel after the cutting operation and if not removed, these lubricants produce a grayish color apparent in the edges of the final tin-coated article. To the best of my knowledge, no lubricant has been discovered or developed prior to the present invention, which meets and solves this problem.

The lubricating composition of this invention has proven to be a complete solution to the aforementioned problem inasmuch as it meets not only the requirement that it be readily removable from the steel stock, but also because it is chemically and physically stable under the conditions of use, has a relatively high viscosity and good film strength and lubricity and is composed of ingredients which are commercially available at a cost making the use of the lubricant distinctly advantageous economically.

Generally, the lubricant of this invention consists essentially of the novel mixture resulting from bringing together triethanolamine and oleic acid in certain critical ratios to each other. The triethanolamine component may be in amount between about 70 parts and about 98 parts while the oleic acid component may vary between about 2 parts and 30 parts in accordance with this invention. So long as these limits are observed in the synthesis of this lubricant, the foregoing advantages are to be obtained without offsetting disadvantages making the lubricant either undesirable to use or useless as a steel strip-slitting knife lubricant.

Also, it is important in the preparation of the lubricant of this invention that substances which may be deleterious to the composition itself, or to the knives or the steel stock on which it is used should be excluded. Those skilled in the art, however, will understand that substances which are inocuous in their effects on the physical and chemical stability of this lubricant composition and are not corrosive to the knives and strip stock on which the lubricant is used may be incorporated in the said invention composition in such amounts as they are so ineffective without departing from the spirit of the invention or the scope of the claims. Insofar as the foregoing ranges are concerned, I have discovered that where the amount of oleic acid exceeds about 30% of the lubricant composition, or in other words, where the amount of oleic acid is in excess of approximately ⅓ the amount of triethanolamine, the composition possesses

such a high viscosity at operating temperatures of the strip-slitting knives as to be incapable of constantly providing the lubricity required to prevent excessive wear of the knives. On the other hand, where the amount of oleic acid is less than about 2 parts, compared to about 98 parts of triethanolamine, the film strength-producing characteristic of the lubricant will be so reduced as to make the lubricant entirely unsuited for use as a lubricant on strip-slitting knives.

As mentioned above, as a practical matter, lubricant compositions of this invention are virtually instantaneously and infinitely soluble in knife-cleaning mixtures of the type in commercial use. A typical cleaning mixture of this kind is known as Penn-Salt #32, proprietary cleaner manufactured by the Penn Salt Company and containing basically 70% sodium orthosilicate and 13% trisodium phosphate, the remaining 17% being tetrasodium pyrophosphate and sodium carbonate. The composition of the cleaner is, however, not critical insofar as the present lubricant is concerned since this lubricant is readily removed by any aqueous alkaline mixture and, in fact is quickly and completely removed from metal surfaces by means only of boiling water.

In accordance with my preferred practice of this invention, triethanolamine and oleic acid are brought together in the ratios stated at about room temperature. A slight heating of the reaction mixture occurs due apparently to an exothermic saponification reaction. The oleic acid appears to be substantially entirely consumed in this reaction so that the resulting mixture consists essentially of a soap and triethanolamine in an amount corresponding to the initial excess of this substance over the stoichiometric quantity for oleic acid saponification. In the absence of this substantial amount of free triethanolamine in the reaction product, the special advantages and utility of this invention are not realized and it is because of this fact that the aforesaid ratios are of critical importance.

By way of illustrating this invention and without limiting the appended claims, I have obtained good results by stirring about 30 parts of oleic acid into about 70 parts of triethanolamine, these two substances being in the liquid phase and at a temperature of about 70° F. The amine may require slight warming to melt before mixing in this manner because of the proximity of its melting point temperature to normal room temperature. The mixture is stirred until the evolution of heat therein is no longer detectable and then is ready for storage or use.

Following the same procedure, good results are also obtained where the oleic acid is used in the amount of 2 parts, and the triethanolamine is used in the amount of 98 parts.

In this specification and in the appended claims wherever proportions are stated, it is with reference to the weigh rather than the volume basis.

This is a continuation-in-part of my application Serial No. 274,503, filed March 1, 1952, and entitled "Lubricating Composition," now abandoned.

Having thus described the present invention so that others skilled in the art may be able to practice the same, I state that what I desire to secure by Letters Patent is defined in what is claimed.

What is claimed is:

1. A synthetic lubricant, for use in lubricating metal cutting knives, said lubricant having good cold metal lubricity and film strength characteristics and chemical and physical stability, said lubricant consisting essentially of an oleic soap of triethanolamine and free triethanolamine and having properties resulting from its preparation by mixing triethanolamine and oleic acid together in the ratio of about 2 parts and about 30 parts of oleic

acid to between about 98 parts and about 70 parts of triethanolamine.

2. A synthetic lubricant, for use in lubricating metal cutting knives, having good metal cutting lubricity and film strength characteristics and chemical and physical stability, said lubricant consisting essentially of an oleic soap of triethanolamine and free triethanolamine and having properties resulting from its preparation by mixing triethanolamine and oleic acid together in the ratio of about 2 parts of oleic acid and about 98 parts of triethanolamine.

3. A synthetic lubricant, for use in lubricating metal cutting knives, having good metal cutting lubricity and film strength characteristics and chemical and physical stability, said lubricant consisting essentially of an oleic soap of triethanolamine and free triethanolamine and having properties resulting from its preparation by mixing triethanolamine and oleic acid together in the ratio of about 30 parts of oleic acid and about 70 parts of triethanolamine.

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