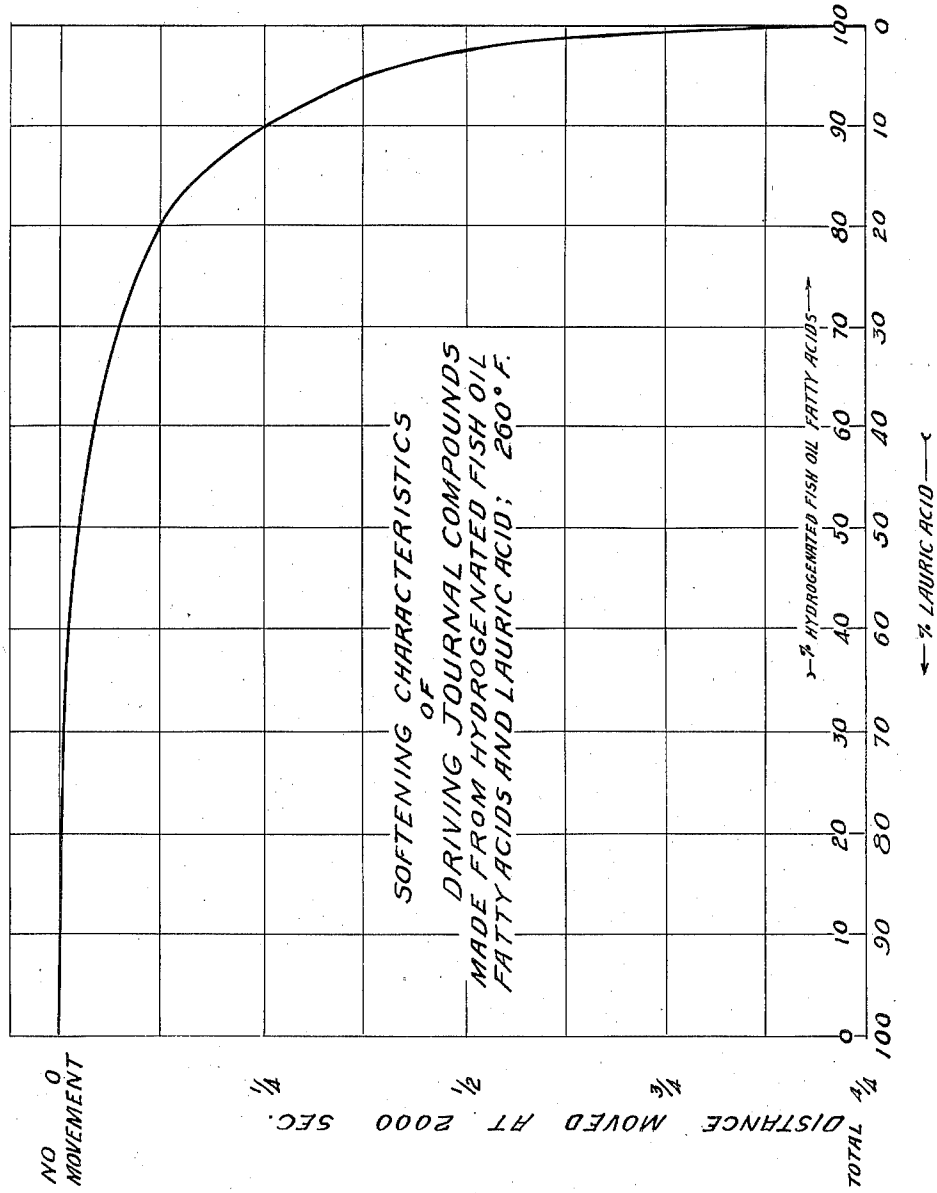
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DRIVING JOURNAL COMPOUND

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DRIVING JOURNAL COMPOUND

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This invention relates to lubricants of the driving journal compound type and particularly to such lubricants in which part of the soap content is sodium laurate.

Lubricants of the driving journal compound type consist wholly or largely of soda soap and lubricating oil, the soda soap comprising from about 35% to about 55% and preferably from about 40% to about 50% of the product. The soap content of such products should be made from fatty acids rather than fats, i. e. should be substantially glycerine free, and should also be substantially anhydrous although a trace of water is usually present.

In the past, lubricants of the driving journal compound type have been made using soda soaps of fatty acid materials consisting almost wholly of fatty acids having at least 16 carbon atoms per molecule, for instance palmitic acid ($C_{15}H_{31}COOH$), stearic acid ($C_{17}H_{35}COOH$) or behenic acid ($C_{21}H_{43}COOH$). One type of fatty acid which has been found highly desirable in the manufacture of lubricants of the driving journal compound type is that made up of fatty acids split from hydrogenated fats. These fatty acids as well as those which are hydrogenated after being split from the natural fats are referred to as hydrogenated fatty acids. Hydrogenated fish oil fatty acids are particularly suitable.

We find, however, that for the most part the use of these hydrogenated fatty acids or the use of other fatty acids made up predominantly of compounds having at least 16 carbon atoms per molecule are deficient in one very important property known as softening time. We have found that small amounts of lauric acid ($C_{11}H_{23}COOH$) added to the conventional fatty acids result in the production of a driving journal compound of greatly increased softening time and also improved structure and pressability.

It is an object of our invention to provide new and improved lubricants of the driving journal compound type and methods of manufacture therefor. Another object of our invention is to provide lubricants of the driving journal compound type having good body and high plasticity at room temperature coupled with very high softening times at elevated temperatures. It is also an object of our invention to make possible the manufacture of high quality lubricants of the driving journal compound type from fatty acid materials which could not heretofore be used in the manufacture of such quality lubricants. A further object of our invention is to provide lubricants of the driving journal compound type having improved pressing characteristics. Another object of our invention is to provide a method of making lubricants of the driving journal compound type under steam kettle conditions which have properties even more advantageous than those of products which could be made heretofore only under the more drastic conditions of the fire kettle technique. Other and more detailed objects, advantages and uses of our invention will become apparent as the description thereof proceeds.

It is highly desirable that a lubricant of the driving journal compound type be plastic at ordinary temperatures so that it can be pressed into sticks or blocks and so that the formed lubricant will not break under conditions of use. At the same time it is very desirable that such lubricants retain their body at elevated temperatures so that they will continue to resist flow under low pressures. Otherwise these lubricants do not retain their form during use and are consumed too rapidly.

We find that these properties can be combined to a most unusual degree by the use of a relatively small amount of lauric acid along with a major amount of conventional fatty acids, preferably hydrogenated fatty acids.

Softening time is an index of quality from the service standpoint and is measured by a test in which a cylinder of driving journal compound ½ inch in diameter and about ⅝ inch long is heated on an oil or mercury bath to the desired test temperature while subjected to the weight of an 85 gram cylinder which provides a pressure on the driving journal compound comparable to the pressure to which the compound is subjected in actual operation when it is forced by a spring against a hot bearing. Softening time is defined as the time required to flatten the test cylinder ¼ inch under these conditions.

As illustrating the effect of a small amount of lauric acid on softening time, a driving journal compound containing 45% sodium hydrogenated fish oil soap, 45% of steam refined oil having a 530° F. flash point and 10% of heavy black oil has a softening time of about 1500 seconds, while if only 10% of the hydrogenated fish oil fatty acids is replaced with lauric acid (90% pure), the softening time increases to 8000 seconds while with 20% lauric acid in the total fatty acids the softening time becomes 16,000 seconds.

It is thus apparent that an extremely small amount of lauric acid gives an exceptionally fine product and permits the use of other fatty acid materials which are completely unsuitable with-

out the added lauric acid. At the same time the lauric acid improves the structure of the driving journal compound at ordinary temperatures and also improves the pressability of the product.

The accompanying drawing, which is a graph of a function of softening time against the composition of the fatty acids used in a driving journal compound illustrates the effect of using various proportions of 90% pure lauric acid and a commercial hydrogenated fish oil fatty acid material known as Hardesty fatty acids. In this graph the ordinate measures the distance which the test cylinder of driving journal compound moves in 2000 seconds at the test temperature of 260° F., while the abscissa measures the composition of the fatty acid component of the driving journal compound. Thus with pure lauric acid there is substantially no flattening of the test cylinder of driving journal compound under these time and temperature conditions and very little flattening when 25% of lauric acid is used along with 75% of the hydrogenated fish oil fatty acids. On the other hand, when less than this amount of lauric acid is used, the amount of flattening increases very rapidly. When no lauric acid is used the flattening occurs long before the expiration of 2000 seconds at 260° F., i. e. the softening time is less than 2000 seconds, in fact about 1500 seconds.

The preferred source of lauric acid for use in accordance with our invention is the relatively pure material obtained by the fractional distillation of various types of fatty acids from natural sources. We prefer to add the lauric acid in the form of a highly concentrated material, say 75% pure or better, but fatty acid material containing as little as 40% lauric acid can be used, in quantities sufficient to give amounts of added lauric acid within the range from about 3% to about 25% of the total fatty acids used.

Lubricants in accordance with my invention can be made using any of the procedures known in the art by merely substituting the fatty acid mixtures above described for those heretofore used. However, these fatty acid mixtures can be used particularly advantageously in a steam kettle type of operation as contrasted with fire kettle technique and while fatty acids heretofore used give low softening time products when steam kettles are used this is not true when low molecular weight fatty acids are used. The data above given are for driving journal compounds made in a steam kettle type of operation.

In the steam kettle technique the soap is formed in at least a portion, preferably all, of the oil at a temperature of from about 260° F. to about 300° F. In no case should the grease be heated above 330° F.

While we have described our invention in connection with certain preferred embodiments thereof, it is to be understood that these are by way of illustration and not by way of limitation and we do not mean to be bound thereby but only to the scope of the appended claims.

We claim:

1. A lubricant of the driving journal compound type comprising soda soap made from a major quantity of hydrogenated fatty acids to which from about 3% to about 25% of lauric acid has been added.

2. In a substantially anhydrous lubricant containing from about 35% to about 55% soda soap, at least the bulk of the remainder being lubricating oil, the improvement which consists in using soda soap made from a major quantity of hydrogenated fatty acids of predominantly at least 16 carbon atoms per molecule together with from about 3% to about 25% of added lauric acid.

3. In the manufacture of a lubricant of the driving journal compound type the step which comprises saponifying a major amount of a fatty acid material made up largely of compounds having at least 16 carbon atoms per molecule and a minor proportion of a fatty acid material containing at least about 40% lauric acid, said last-mentioned fatty acid material being used in quantities sufficient to bring the amount of added lauric acid within the range from about 3% to about 25% of the total fatty acids used.

4. In the manufacture of a lubricant of the driving journal compound type the step which comprises saponifying a major amount of a hydrogenated fatty acid material made up largely of compounds having at least 16 carbon atoms per molecule and a minor proportion of a fatty acid material containing at least about 75% lauric acid, said last-mentioned fatty acid material being used in quantities sufficient to bring the amount of added lauric acid within the range from about 3% to about 25% of the total fatty acids used.

5. A step according to claim 4 in which said hydrogenated fatty acid material is hydrogenated fish oil fatty acids normally yielding a driving journal compound of poor softening time.

6. In the manufacture of a lubricant of the driving journal compound type the step which comprises saponifying fatty acids in at least a portion of the lubricating oil at a temperature from about 260° F. to about 300° F., said fatty acids containing from about 3% to about 25% of added lauric acid, the remainder being made up of fatty acids containing predominantly at least 16 carbon atoms per molecule.

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