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METHOD OF LUBRICATION AND LUBRICANT THEREFOR

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5 Claims. (Cl. 87—9)

This invention relates to a method of lubrication, particularly for roll necks in rolling mills, and lubricants therefor.

Heretofore, lubricants for such machinery as roll necks in rolling mills, for high temperature bearings, and the like, have been unsatisfactory because greases of proper consistency when at the bearing temperature are extremely hard when cold. As a result, it was necessary to melt them to get them to the bearings, or wait until the bearings got hot enough to melt the greases, using in some cases a hand applied "starting-up" grease in the meantime. As a result, the lubrication of such machinery has been extremely inefficient, and any attempt at efficiency has resulted in the wastage of enormous quantities of lubricant.

It has been heretofore considered impossible to make the greases softer, since for a particular lubrication, a grease of definite hardness is required to stand the particular load and conditions. Non-lubricating material such as a high melt point asphalt is required on account of the high temperature conditions. The greases used for this type of work have been soda or soda lime soap base greases, but it has heretofore not been possible to use large amounts of grease material.

In accordance with this invention, such greases are rendered more fluid by the incorporation of certain organic solvents, to such a point that they may be applied readily to the spot to be lubricated, for example, through an automatic or pressure lubrication system. The solvent is preferably so chosen that when the grease reaches the point of lubrication, the temperature present will cause the solvent to evaporate, and the grease will then regain its former characteristics. The solvent chosen must be one which does not cause a breakdown of the grease initially, or materially affect its lubricating properties, and should have a boiling point above normal atmospheric conditions.

Clearly the solvent should not evaporate under the pressure and temperature conditions in the lubricant-feeding mechanism, but should have a sufficiently high boiling point as to maintain the necessary fluidity until the point of lubrication has been reached.

For example, a sodium base grease may be prepared in the ordinary manner containing 10 to 50% of a soda soap, such as oleate, stearate or the like (preferably tallow fat acids), and the balance mineral oil of the desired viscosity. A typical grease will contain 30% sodium soap and 70% of a heavy steam refined cylinder stock min-

eral oil having a viscosity of 200° Sayboldt at 210° F. Such a grease will be extremely hard. The proportion of tallow or soap is far higher in these greases than was possible under prior practice, and the greases therefore have a considerably higher melting point initially than formerly was the case for similar operating conditions.

The fluidity of such hard grease may then be modified by incorporating a solvent which will not destroy the grease structure. For example, butyl carbitol, (monobutyl ether of diethylene glycol), carbitol, (monoethyl ether of diethylene glycol), ethylene dichloride, or dichlorethyl ether may be used, preferably in proportions of from 1% upwards. Normally not more than 5% need be used. With the particular sodium soap described, 2½% of butyl carbitol is preferred. The addition of this amount of solvent renders the grease soft enough to be applied by ordinary mechanical lubrication methods, but does not affect its lubricating properties.

By proper choice of solvents, one may be selected which will evaporate under the particular bearing temperature encountered, and will thus produce a grease having the original consistency and other characteristics of the initial product. For high temperature lubrication, butyl carbitol, having a boiling point of 431° F. is preferable. The carbitol boils at 388° F., the dichlorethyl ether at 350° F., and the ethylene dichloride at 188° F. and these solvents may be used for conditions suitable to their particular boiling points.

Upon reaching the point of lubrication, the solvent evaporates and produces a grease of the original consistency. However, even if the solvent does not evaporate, the effectiveness of the grease is not substantially impaired.

In the case of a lime soap grease, either an anhydrous or a hydrated grease may be used. In the case of the anhydrous grease, a coupler should be used such as described in my co-pending application Serial No. 412,930. The grease in general will contain 5 to 50% of a lime soap such as lime tallow soap, and the remainder consists of a mineral oil. For example, a hard grease may be prepared from 20% lime tallow soap and 80% of a heavy mineral oil such as was described in connection with the soda soap grease. With this grease may be incorporated a small amount of a coupler to prevent segregation, and the fluidity of the grease may then be modified as desired by incorporation of a minor percentage of a solvent such as a phenyl chloride, including monochlor benzene, ortho dichlor benzene, and

trichlor benzene, or solvents such as ethylene dichloride, dichlorethyl ether, trichlor ethylene or the like. 1 to 5% is normally sufficient, and 2½% of monochlor benzene is preferred in the
5 specific grease described.

As with the soda soap, the particular solvent may be chosen in accordance with the temperature to be encountered. Ethylene dichloride has a boiling point of 188° F; dichlorethyl ether of
10 350° F; ortho dichlor benzene of 354° F., monochlor benzene of 270° F., and trichlor benzene of 419° F. and trichlor ethylene of 188° F.

The foregoing detailed description has been given for clearness of understanding only, and
15 no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible, in view of the prior art.

I claim:

20 1. The method of lubricating a hot roll neck bearing normally requiring lubricating greases which are hard at atmospheric temperatures, which comprises adding to such a hard grease a small proportion of a grease compatible solvent
25 volatile at the operating temperature of the bearing, said solvent being a hydrocarbon or derivative thereof and having a boiling point high enough that it does not evaporate under the

temperature and pressure conditions of the lubricant feeding mechanism, the proportion of the solvent being large enough to soften the grease sufficiently to be applied by mechanical lubrication systems and being small enough that the
5 grease structure is retained in the softened grease, and mechanically applying the grease to the bearing, where the heat of operation of the bearing evaporates the solvent and produces a grease inherently of the original consistency. 10

2. The method as set forth in claim 1, in which the solvent has a boiling point of at least 180° F.

3. The method as set forth in claim 1, in which the solvent is of the order of 1-5% of the
15 lubricant.

4. The method as set forth in claim 1, in which the grease is a soda soap grease and the solvent is selected from the class consisting of monobutyl ethyl of diethylene glycol, monoethyl ether of diethylene glycol, ethylene dichloride and di-
20 chlorethyl ether.

5. The method as set forth in claim 1, in which the grease is a lime soap grease and the solvent is selected from the class consisting of phenyl chlorides, ethylene dichloride, trichlor ethylene, 25 and dichlorethyl ether.

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