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LUBRICATING COMPOUND

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The present invention relates to improvements in oil compounds, and more particularly to heavy oil compounds or greases suitable for use as gear greases and in other situations, such as the lubrication of thrust bearings, wherein metal to metal contact of the parts to be lubricated is likely to occur under heavy load.

In accordance with the present invention, a suitable lubricating compound is prepared by incorporating with a desired lubricating oil of high viscosity a heavy metal compound of a sulfonic acid derived from the treatment of a petroleum oil with strong sulfuric acid, preferably fuming sulfuric acid. The sulfonic acid may be of the preferentially oil-soluble type, such as is described, for example, in the patent of Humphreys, et al., No. 1,286,179, granted November 26, 1918, or may be of the preferentially water-soluble type, such as is described in the patent to Humphreys et al., No. 1,474,933, granted November 20, 1923. In general the use of the compounds of the preferentially oil soluble type is preferred. The salts of the sulfonic compounds with lead, copper, zinc, iron or other heavy metals may be used. Such salts may be produced by direct reaction of the corresponding sulfonic acids with the bases of the heavy metal, or by double decomposition between a water soluble salt of the desired petroleum sulfonic compound, for example, the sodium salts, and a salt of the heavy metal. For example, the lead sulfonic acid compounds may be produced by direct reaction between the sulfonic acids and litharge, or by reaction between equivalent proportions of the sodium salt of the petroleum sulfonic acid and lead acetate.

In preparing the lubricating compound in accordance with the present invention, a heavy lubricating oil of the desired viscosity, preferably 80 sec. Saybolt or higher at 210° F., is thoroughly intermixed with from 5 to 30% of the selected heavy metal salt of petroleum sulfonic acids, for example, the lead salt. Thus, a compound suitable for use on the worm gears of automotive trucks and the like may be prepared by incorporating into a heavy lubricating oil having a viscosity of 105 to 115 sec. Saybolt at 210° F. from 15 to 25% of a stock consisting of a mixture of lead compounds of preferentially oil-soluble petroleum sulfonic acids, said mixture containing 45 to 50% of the lead compound and the remainder of viscous petroleum oil. In place of the lead compound, compounds of other heavy metals or of the preferentially water-soluble type of sulfonic acid may be employed. It is readily understood that the above example is intended to be illustrative, and that compositions may be prepared in which oils of varying viscosities and varying proportions of the heavy metal compound of the petroleum sulfonic acid are employed, in accordance with the characteristics desired in the final product. Thus for very severe work I have employed as high as 27 to 30% of the lead compound in a 90 viscosity oil (210).

The compounds prepared in accordance with the present invention are particularly advantageous in preventing seizure of bearings under severe loads, where the lubricating oil film may break and metal to metal contact occur, and are remarkably effective in preventing uneven wear, scoring and pitting. The compound of the present invention is likewise advantageous in that it does not tend to foam and therefore to work out of bearings. In these and other respects the compound of the present invention is greatly superior to the types of greases prepared hitherto for similar use, including compounds containing sodium soaps and heavy metal soaps of fatty oils such as fish oil.

I claim:

1. A lubricating compound comprising a viscous lubricating oil and a heavy metal compound of a petroleum sulfonic acid.

2. A lubricating compound comprising a viscous lubricant hydrocarbon oil having a viscosity of at least 80 sec. Saybolt at 210° F. and a heavy metal compound of a petroleum sulfonic acid.

3. A lubricating compound comprising a viscous hydrocarbon oil and 5 to 15% of a heavy metal compound of a petroleum sulfonic acid.

4. A lubricating compound comprising a lubricant hydrocarbon oil having a viscosity

of 105 to 115 sec. Saybolt at 210° F., and 10% of a lead compound of a petroleum sulfonic acid.

5. A lubricating compound comprising a viscous lubricating oil, and a copper compound of a petroleum sulfonic acid.

6. A lubricating compound comprising a viscous lubricant hydrocarbon oil having a viscosity of at least 80 sec. Saybolt at 210° F., and a copper compound of a petroleum sulfonic acid.

7. A lubricating compound comprising a viscous lubricating oil, and an iron compound of a petroleum sulfonic acid.

8. A lubricating compound comprising a viscous lubricant hydrocarbon oil having a viscosity of at least 80 sec. Saybolt at 210° F., and an iron compound of a petroleum sulfonic acid.

9. A lubricating compound comprising a viscous lubricating oil, and a lead compound of a petroleum sulfonic acid.

10. A lubricating compound comprising a viscous lubricant hydrocarbon oil having a viscosity of at least 80 sec. Saybolt at 210° F., and a lead compound of a petroleum sulfonic acid.

Witness my hand this sixth day of July, 1929.

MAURICE H. ARVESON.