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WIRE ROPE LUBRICANT COMPRISING A BLOWN PETROLEUM EXTRACT AND A PARAFFINIC RESIDUUM

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This invention relates to an asphaltic lubricating and coating composition suitable for application to wire ropes.

Wire ropes are lubricated during manufacture and use in order to protect them from deterioration resulting from exposure to the atmosphere and other detrimental elements and to reduce frictional wear. According to a conventional practice, the wire rope is made by twisting a number of wires together and drawing the resulting twisted strands through a die, with a steady stream of the lubricant being applied to the twisted strands just before they pass through the die.

Normally solid asphaltic compositions of various types, which require heating for their application, are commonly employed as wire rope lubricants. Such compositions are applied at moderately elevated temperatures, ordinarily in the range from about 225° F. to about 300° F., since it is not practical in operations of this type to maintain the material at higher temperatures, of the order of 500° F. or more, such as are employed with asphaltic compositions in paving, roofing etc. A really satisfactory wire rope lubricant of this type is therefore required to have a very difficultly obtainable combination of viscosity characteristics, since it must have a softening point of at least about 125° F., and preferably of at least about 130° F., in order to prevent melting and running off the wires at elevated atmospheric temperatures of the order to which wire ropes are frequently subjected in storage and in use, and at the same time, for ease of application, it must have a low viscosity at temperatures in about the 225–300° F. range, such that it will flow and spread readily at these temperatures.

In accordance with this invention, an improved wire rope lubricant is obtained by air blowing a non-paraffinic extract from a paraffin base distillate oil and blending the resulting asphaltic product with a paraffinic residual oil in sufficient amount to give a composition having the desired penetration and softening point. I have found that compositions thus obtained have very much lower viscosities in the 225–300° F. range for a given softening point and penetration at 77° F. than do the asphaltic compositions of the prior art which have been employed as wire rope lubricants.

Non-paraffinic extracts which may be employed in the production of the blown asphaltic material are obtained by extracting a paraffinic distillate oil fraction having a viscosity within the lubricating oil range, and preferably having a Saybolt Universal viscosity at 210° F. of from about 50 to about 100 seconds, with a selective solvent for aromatic and naphthenic hydrocarbons, such as, for example, sulfur dioxide, nitrobenzene, phenol, furfural, chlorophenols, aniline, cresylic acid, quinoline, dichloroethyl ether, etc., or with mixtures of such solvents with each other.

The more aromatic and naphthenic extract obtained as described above is blown with air according to conventional procedure, for example at a temperature in the range of about 450° F. to about 525° F., either in the presence or absence of a catalyst, until a product of the

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desired softening point is obtained. The blowing is suitably carried out until an asphaltic product having a softening point by the A. S. T. M. ring and ball method in the range from about 140° F. to about 250° F., and preferably from about 150° F. to about 200° F., is obtained.

The paraffinic residual oil which is blended with the blown asphaltic material to form the compositions of this invention is a residual fraction from a paraffin base crude, preferably having a viscosity within the lubricating oil range. Most advantageously, it is a fraction having a Saybolt Universal viscosity at 210° F. in the range from about 100 to 300 seconds. Both this residuum and the distillate oil from which the extract is obtained may be crude petroleum fractions, obtained directly from the distillation of petroleum, or they may be refined oils obtained by various conventional refining processes.

The proportions in which the blown asphaltic material and the paraffinic residual oil are blended may vary widely, depending upon the characteristics of the materials employed and upon the properties of the final product desired. In general, the proportions of these materials employed may be such that the final product contains from about 30 to about 80 percent by volume of the blown asphaltic product and about 70 to about 20 percent by volume of the paraffinic residual oil, and preferably from about 45 to about 75 percent of the asphaltic material and about 55 to about 25 percent by volume of the residual oil. In accordance with the preferred embodiment of my invention, the asphaltic product and the residual oil are blended in suitable proportions to give a final product having a penetration at 77° F. in the range from about 90 to about 120 and a softening point by the ring and ball method in the range from about 130° F. to about 145° F.

The following examples are illustrative of the preferred embodiment of this invention.

EXAMPLE I

A lubricant composition was prepared comprising a blend of 50 parts by volume of a blown furfural extract having a softening point of 186° F. and a penetration at 77° F. of 8, with 50 parts per volume of a residual oil from a paraffin base crude, having an A. P. I. gravity of 21.1°, a Saybolt Universal viscosity at 210° F. of 210 seconds and a flash point, COC, of 570° F. The blown furfural extract was obtained by air blowing a furfural extract from a wax distillate 40 cut from a paraffin base crude, the extract having an A. P. I. gravity of 11.4°, a Saybolt Universal viscosity at 210° F. of 301 seconds and a flash point, COC, of 525° F. The air blowing was carried out at a temperature of 450–525° F. for about 30 hours in the absence of a catalyst. The blend of the blown asphaltic material and the residual oil was prepared by mixing the two materials together in the above proportions and heating the mixture with stirring at 350° F. for about thirty minutes, until a smooth, homogeneous product was obtained.

EXAMPLE II

A second lubricant composition was prepared as described in Example I, employing 51 parts per volume of blown furfural extract and 49 parts per volume of paraffin base residuum. The blown furfural extract was a mixture of 21 parts of a blown furfural extract having a softening point of 183° F. and 30 parts of a blown furfural extract having a softening point of 165° F., both obtained by blowing an extract from a wax distillate 40 similar to that employed in Example I. The paraffin base residuum was a 20.4° A. P. I. gravity oil having a Saybolt Universal viscosity at 210° F. of 218 seconds and a flash point, COC, of 565° F.

EXAMPLE III

Another lubricant composition was prepared as described in Example I, employing 60 parts per volume of blown furfural extract and 40 parts per volume of paraffin base residuum. The blown furfural extract was a mixture of 22 parts of a blown furfural extract having a softening point of 143° F. and 38 parts of a blown furfural extract having a softening point of 161° F., obtained by blowing an extract from a wax distillate 40 similar to that employed in Example I. The paraffinic residuum was the same as that employed in Example I.

Table I below shows the viscosity characteristics in the 225–300° F. range of the lubricants of the above examples (Nos. 5, 6 and 7, respectively, in the table) as compared with compositions representative of asphaltic lubricating and coating compositions of the prior art, made up to approximately the same softening point and penetration at 77° F.

The naphthenic residuum employed in lubricant No. 2 of the table was a 9.9 A. P. I. gravity residuum obtained from a naphthenic type crude by ordinary distillation, having a flash point of 510° F. and a Saybolt Universal viscosity at 210° F. of 1170 seconds. The naphthenic residuum employed in lubricant No. 4 was a 14.7 A. P. I. gravity vacuum residuum from a naphthenic type crude, having a flash point of 525° F. and a Saybolt Universal viscosity at 210° F. of 518 seconds. The air blown naphthenic residua employed in lubricants Nos. 1 and 3 were asphalts having softening points of about 115° F. and about 200° F., respectively, obtained by blowing a naphthenic residuum of the same type as that employed as the fluxing oil in lubricant No. 2. The air blown paraffinic residua employed in lubricants Nos. 1 and 2 were asphalts having softening points of about 160° F. and 228° F., respectively, obtained by blowing a paraffinic residuum of the same type as that employed as fluxing oil in the examples of the invention.

Table I

No.	1	2	3	4	5	6	7
Composition, percent by volume:							
Paraffinic residuum 120			52		50	49	40
Naphthenic residuum		20		34			
Air blown paraffinic residuum 120	66	80					
Air blown naphthenic residuum	34		48				
Air blown extract from wax distillate 40				66	50	51	60
Tests:							
Softening Point, R. & B., ° F.	133	154	135	139	137	138	143
Penetration at 77° F.	102	96	103	93	109	100	95
Viscosity SF/225° F.	670		555	935	303	250	275
Viscosity SF/300° F.	63	126	49	55	34	36	32

As shown by the above table, all of the lubricants representative of this invention (Nos. 5, 6 and 7) had very low viscosities in the 225–300° F. temperature range, not obtainable with other asphaltic compositions comprising either an asphalt of different type, i. e., obtained by blowing a petroleum fraction of different type, or a fluxing oil of different type. The lubricants of this invention were outstandingly superior in the desired viscosity characteristics to a composition comprising both an asphalt of different type and a fluxing oil of different type (No. 2), and also to a composition comprising an asphalt of the same type blended with a naphthenic rather than a paraffinic residual oil (No. 4). They were also markedly superior to a composition comprising a fluxing oil of the same type with an asphalt obtained by blowing a non-

paraffinic oil of different type, i. e., a naphthenic residuum (No. 3).

As can be readily seen from the foregoing, asphaltic compositions vary widely and unpredictably in their viscosity characteristics according to the type of asphaltic material and also according to the type of fluxing oil employed, and the unusual viscosity characteristics of the compositions of this invention are, therefore, critically dependent upon the special combination of an asphalt of the type described with a paraffinic residual oil.

In addition to their special viscosity characteristics in the 225–300° F. temperature range, the lubricants of this invention have also been found to have all of the other properties required of a very superior wire rope lubricant, including a suitably small change in penetration in the 32–115° F. range, good pliability at low temperatures and excellent rust protectiveness. In comparative tests with a commercial wire rope lubricant of the best grade available, lubricants of this invention were found to have both superior viscosity characteristics at 225–300° F. and superior rust protectiveness, as shown by both the Salt Spray Test (Federal Specification VV-L-791, Method 400.1.1) and the Humidity Cabinet Test (JAN-H-792), being substantially equivalent in all other respects.

Obviously many modifications and variations of the invention, as hereinbefore set forth, may be made without departing from the spirit and scope thereof and, therefore, only such limitations should be imposed as are indicated in the appended claims.

I claim:

1. A wire rope lubricant consisting essentially of a blend of about 30 to 80 percent by volume of an asphaltic product having a softening point in about the range 140–250° F. with about 70–20 percent by volume of a paraffin base residuum having a viscosity in the lubricating oil range, said asphaltic product being obtained by air blowing a petroleum extract obtained by extracting a paraffin base distillate oil having a viscosity in the lubricating oil range with a selective solvent for non-paraffinic hydrocarbons, said blend having a penetration at 77° F. in about the range 90–120 and a softening point in about the range 130–145° F.

2. A wire rope lubricant as defined in claim 1 wherein the said paraffin base residuum has a Saybolt Universal viscosity at 210° F. in about the range 100–300 seconds.

3. A wire rope lubricant as defined in claim 1 wherein the said lubricant consists of a blend of about 45–75 percent by volume of the said asphaltic product having a softening point in about the range 150–200° F. with about 55–25 percent by volume of the said paraffin base residuum having a Saybolt Universal viscosity at 210° F. in about the range 190–240 seconds.

4. A wire rope lubricant as defined in claim 1 wherein the said lubricant consists essentially of a blend of about 50 percent by volume of the said asphaltic product having a softening point in about the range 160–190° F. with about 50 percent by volume of the said paraffin base residuum having a Saybolt Universal viscosity at about 210° F. in about the range 190–240 seconds.

References Cited in the file of this patent

UNITED STATES PATENTS

2,144,694	Smith et al.	Jan. 24, 1939
2,201,396	Fryar	May 21, 1940
2,237,682	McLennan	Apr. 8, 1941
2,450,756	Hoiberg	Oct. 5, 1948
2,488,293	Hoiberg	Nov. 15, 1949
2,625,510	Moore	Jan. 13, 1953