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ANTIFREEZE LUBRICATING GREASE

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The present invention relates to lubricating greases and more particularly to greases of the type suitable for lubrication of exposed metal parts such as railroad switches and the like to prevent freezing in winter and to afford adequate lubrication. The invention will be fully described in the following specification:

There is considerable difficulty encountered by railroads in keeping switches, signals and other exposed equipment lubricated and in operating condition during the winter months and particularly in the presence of snow and ice. The ordinary railroad greases will not prevent the formation of ice which interrupts the normal operation of the switch or signal and when applied to the cold or wet metal does not properly adhere. In the present invention, a grease composition containing anti-freeze compounds incorporated therein has been found entirely satisfactory even under the most trying conditions.

The principal ingredients of the present composition include the sett portion which comprises a lubricating mineral oil, lime soap of rosin acids, particularly those acids formed on the first run in the distillation of rosin and known to the trade as kidney rosin oil or similar materials, a small amount of water for emulsifying purposes, a wetting agent and anti-freeze compounds which may consist of highly soluble mineral salts such as anhydrous calcium chloride, magnesium chloride, sodium chloride and the like.

The so-called sett portion of the grease mentioned above comprises lubricating oil so thickened by the saponification of the rosin acids with hydrated lime as to prevent settling out of the anti-freeze salts. For the particular purpose in hand, the grease must be made as inexpensively as possible and a relatively light unrefined distillate with a viscosity above 100 seconds Saybolt at 100° F. has been found sufficient to supply the lubricating qualities. To this is also preferably added a substantial proportion of an asphaltic petroleum residue either of the cracked or of the uncracked type or a coal tar pitch. These oils together make up 40 to 60% of the composition and may be advantageously in proportion of about one-third of the lubricating oil to two-thirds of the asphaltic compounds. The lime added in a hydrated form may consist of 5 to 10% of the final mixture and the rosin oil from say 3 to 6% so that the soap would be roughly from 8 to 15% of the composition, and the lime soaps of the rosin acids are formed by saponifying the kidney rosin oil with hydrated lime directly in the oil.

The wetting agent is used to give the grease the power of adhering or sticking to the cold metal surfaces. While greases will ordinarily adhere fairly well to warm or heated metal surfaces, it has been found that unless some wetting agent is added, the grease tends to ball up instead of spreading out when applied to a wet or cold metallic surface. Furthermore, it has been found that the wetting agents greatly decrease the tendency of the grease to be washed off by the melting ice and snow. Any suitable wetting agent may be used for this purpose, such as fatty acid pitch, coal tar, coal tar pitch, distillation residues of hydrocarbon oxidation products, but wax tailings are perhaps the cheapest and are quite satisfactory when present in proportion of about 10 to 20% of the composition.

A small amount of water is added to the compound so as to obtain the ingredients in a smooth emulsified form. 1% is usually sufficient, although it may vary up to about 5%.

The anti-freeze salts have been mentioned above. They should be used in an anhydrous condition and ground to say 20 to 100 mesh, so that they may be stirred into the sett compound in a uniform manner. The amount used should be 20% or more. Usually 25 to 35% gives the best balance of anti-freeze and lubricant, although other proportions may be used.

The finished grease should be of a semi-solid consistency so it may be easily applied to the rails, switches or signals with a swabbing stick or brush.

In the following tests, a grease was made up according to the following formula:

	Per cent
Hydrated lime	10
Kidney rosin oil	6
Light hydrocarbon distillate (150 seconds Saybolt at 100° F.)	17
Cracking coil tar	25
Water	1
Wax tailings	15
Anhydrous granulated calcium chloride	26
	100

The hydrated lime, water, wax tailings were agitated together with about two-thirds of the mixed hydrocarbon oils. The rosin oil was added to the remaining one-third of the hydrocarbon oil and the two fluids were thoroughly mixed at a temperature around 120° F. Calcium chloride was then added before the grease had set and was stirred in for 15 or 20 minutes. The com-

pound was semi-fluid. This grease was used in all of the following tests:

1. The above compound was applied to a railroad switch before snowfall and a total fall of 3½" did not in any way impede the operation of the switch. Nearby switches to which none of the compound had been applied froze up and could not be thrown until the snow was shoveled off and salt had been spread about to melt the adhering ice.

2. The compound was carefully applied to a switch and was observed carefully over four days of alternate thawing and freezing. Some water collected in the switch, but there was at no time any difficulty in its operation.

3. A $\frac{3}{16}$" layer of the grease was applied to a steel tank which was exposed to winter weather. After a fall of 2½" of snow, it was observed that none had accumulated on the outside of the tank, having melted and drained off soon after falling. The grease coating was intact.

4. As a laboratory test, two flat steel blocks were coated with the compound and pressed forcibly together and then placed in a bucket of water. The water froze, but the two steel blocks could easily be picked out and had not frozen together. Uncoated specimens froze tightly together and were deeply imbedded in the ice.

The present invention is not to be limited to any theory of the operation of the anti-freeze grease or to the particular ingredients of the preferred compositions or to the particular proportions thereof, but only to the following claims in which it is desired to claim all novelty inherent in the composition:

We claim:

1. An anti-freeze lubricating grease comprising a sett grease, a wetting agent and from 20 to 35% of an anti-freeze salt.

2. An anti-freeze lubricating compound comprising about 8 to 15% of a lime rosin soap, about 35 to 60% of a heavy hydrocarbon oil, 10 to 20% of wax tailings, 20 to 35% of an anti-freeze salt and 1 to 5% of water, in an emulsified form.

3. Composition according to claim 2 in which the oil comprises a blend of a light lubricating oil and an asphaltic oil.

4. Composition according to claim 2 in which the oil comprises a blend of a light lubricating oil and cracking coil tar.

5. A composition according to claim 2 in which the anti-freeze salt is selected from the group consisting of calcium chloride, magnesium chloride and sodium chloride.

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