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OIL MIST LUBRICATING SYSTEM

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ABSTRACT OF THE DISCLOSURE

An oil mist lubricating system including an oil mist generating head having an air-oil admixing chamber of the venturi-type, and oil reservoir and an oil lift tube connecting the reservoir with the oil mist generating head. A heater maintains the oil in the reservoir at a temperature only slightly above the aerolization point of the oil and below the chemical decomposition point thereof and the oil lift tube and portions of the generating head are constituted of material having low thermal conductivity properties for maintaining the temperature of the oil as it enters the admixing chamber above the aerolization point.

Background of the invention

This invention relates generally to lubricating systems and more particularly to a method of and apparatus for generating an oil mist utilizing highly viscous mistable lubricants.

Centralized lubrication systems employing an oil mist are known in the prior art. In such systems an oil mist or aerosol is generated at a central location and carried through conduits to multiple points of use such as bearings. Fittings are generally employed at the bearings for supplying the bearings with an oil mist or spray or with the lubricant in liquid form.

The oil mist or aerosol is generated in the admixing chamber of an air-operated venturi formed in an oil mist generating head in which minute particles of the oil are admixed with air. Generally the oil is drawn into the admixing chamber by the vacuum condition caused by the air passing through the throat of the venturi.

In general the commercial exploitation of oil mist lubrication systems has been limited to the use of oils in the lower viscosity ranges. Thus there has been little application of oil mist systems utilizing oil or other mistable lubricants having viscosities upwards of about 1000 Saybolt Universal Seconds at 100° F. Although the use of more viscous oils is desirable significant difficulties have been encountered in generating commercially acceptable quantities of mist with the more viscous oils.

The reduction in mist-generating capabilties of oil mist lubricating systems in the higher ranges of oil viscosity results from the necessity of maintaining the temperature of the oil as it enters the admixing chamber at a level at which it is susceptible of dividing into the minute particles required in an oil mist system. The lower the viscosity of the oil the lower its aerolization point, that is, the temperature at which the oil will combine with air in the fine particles necessary to produce an aersol. As the viscosity of the oil increases so does the aerolization point.

In the past attempts have been made to utilize more highly viscous oils, oils having a viscosity as high as or higher than 1000 S.U.S. at 100° F., merely by raising the temperature of the oil in the oil reservoir. This practice has not been completely satisfactory since it has been determined that the oil in the reservoir must be raised to a temperature substantially above the aerolization point in order to produce an oil mist Because of this higher temperature of the oil the oil heaters often times subject

the oil immediately adjacent thereto to temperatures above the chemical decomposition point, rendering the oil unsuitable for lubrication purposes.

In order to overcome the problem of excessive heating in the oil reservoir it has been proposed to reduce the temperature in the reservoir to a level below the aerolization point but to heat the pressurized air, before it enters the admixing chamber, to a level at which the air itself is capable of increasing the temperature of the oil above the aerolization point as the air mixes with the oil in the admixing chamber. This practice, of course, generally requires substantial heating of the air above ambient air temperature.

The present invention is based in part on the discovery that the cooling effect of the oil mist itself on the oil lift tube, which conveys the oil from the reservoir to the oil mist generating head, and the cooling effect of the air as it expands in the throat of the venturi of the mist generating head, significantly reduces the temperature of the oil before the oil enters the admixing chamber. It is this cooling effect which apparently has necessitated either overheating of the oil in the reservoir (raising the temperature of the oil substantially above the aerolization point) or substantial heating of the air before it enters the admixing chamber. Applicants have discovered that by providing materials having suitable insulation properties in the conduit members which convey the oil from the oil reservoir to the admixing chamber, the reservoir temperature can be maintained only slightly above the aerolization point of the oil and the incoming pressurized air temperature can be maintained at ambient levels while maintaining the temperature of the oil as it enters the admixing chamber above the aerolization point.

Summary of the invention

In light of the foregoing the present invention may be summarized as comprising a method of and apparatus for generating an aerosol with lubricating oils having higher viscosities by directing a stream of pressurized air to a venturi-type oil mist generating head, heating a reservoir of lubricating oil to a temperature only slightly above the aerolization point and substantially below chemical decomposition point of the oil, communicating the oil in the reservoir with the throat of the venturi in the generating head to draw the oil in a stream from the reservoir into admixing relation with the air within the venturi, and insulating the stream of oil so that the temperature thereof is maintained above the aerolization point as it admixes with the air to produce an aerosol.

One aspect of the invention resides in the utilization of material having low thermal conductivity as the conduit for conveying the oil from the reservoir to the admixing chamber. The temperature drop of the oil as it is conveyed from the reservoir to the admixing chamber is thereby substantially reduced, and the oil in the reservoir therefore need be raised to a temperature only slightly above the aerolization point. Excessive heating and "hot spots" immediately surrounding the oil reservoir heaters are therefore avoided.

Another aspect of the invention resides in the provision of an air heater to raise the temperature of the pressurized air entering the admixing chamber to a level only slightly above maximum anticipated ambient air temperature. By maintaining the incoming pressurized air temperature at a constant air density can be maintained at the admixing chamber for a given air pressure and the quantity or flow rate of generated oil mist can be carefully controlled.

It is, therefore, an object of the present invention to provide an improved method of and apparatus for generating an oil mist for centralized lubrication system using the more highly viscous oils.