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[54] **PENETRATING OIL COMPOSITIONS**

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[58] **Field of Search** ..... 252/11, 52 R, 52 A; 44/58, 44/53

[56] **References Cited**

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Bennett "The Chemical Formulary" Vol. IX (1951) pp. 284 and 285.

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[57] **ABSTRACT**

A penetrating oil composition comprising (a) lubricating oil, (b) gasoline, (c) a monohydric alcohol, and (d) polyglycols, glycerols, their ethers or mixtures thereof.

5 Claims, No Drawings

PENETRATING OIL COMPOSITIONS

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

This invention relates to lubricating oil compositions and more particularly to penetrating oil compositions based on a combination of novel components.

2. DESCRIPTION OF THE PRIOR ART

A demand continues in the art for liquid compositions which have the property of penetrating rapidly between metallic surfaces which are in close contact such as the leaves of springs, hinges, bolts, car door locks, house locks, padlocks, pipe fittings, and the like, and the difficulties in loosening adjacent metallic surfaces which have rusted, "frozen" or otherwise become bound together are well known. In the usual situation, a layer or film of rust between the surfaces is so tenacious that it often binds the adjacent metal surfaces so tightly that it is difficult if not impossible to loosen the surfaces by the use of mechanical loosening devices such as wrenches. "Frozen" bolts are especially a common problem. Other problem areas include door hinges which develop tightness due in part to the formation of rust between the moving parts of the hinge.

A number of oil compositions are offered commercially which have been used for the purpose of lubricating such difficult-to-loosen surfaces and such compositions are generally known as penetrating oils. These oils are generally characterized by having a high degree of penetration, which means that the surface tension and viscosity of the oil is somewhat lower than that of an ordinary lubricant used on rotating parts. Also, a penetrating oil is one which has the ability to form a lubricating film between closely contacted metal parts, a feature which is to be distinguished from the ability of lubricating oils to adhere to metal once the film is formed. The latter property is commonly called "oiliness". Ordinarily lubricating oils do not possess a desired penetration to any decided degree and to improve this characteristic various materials have been added to lubricating oils in order to effect a desired penetrating action.

In the various penetrating oil compositions known to the art, use has been made of a variety of materials which are stated as having the desired penetrating action. Thus, carbon tetrachloride in combination with acetic acid is disclosed for this purpose in U.S. Pat. No. 2,429,735 whereas U.S. Pat. No. 1,822,886 suggests the use of Eocene, trichlorethylene and acetone. U.S. Pat. No. 2,053,046 suggests the use of aliphatic nitriles to effect penetrating action; U.S. Pat. No. 2,041,076 suggests the use of organic fatty acids and their halogenated esters to effect penetrating action; and U.S. Pat. No. 2,389,608 suggests the use of up to 25% cyclohexanone to effect penetrating action. However, none of these prior patents suggest the novel components and total composition of the present invention.

SUMMARY OF THE INVENTION

It is accordingly one object of this invention to provide a penetrating oil composition which overcomes or otherwise mitigates the problems of the prior art in this area.

A further object of this invention is to provide a penetrating oil composition which is characterized by its excellent penetrating action while still providing the necessary lubricating characteristics to achieve all the advantages required by a penetrating oil composition.

A still further object of the invention is to provide a penetrating oil composition characterized in that a major portion of the penetrating oil composition comprises a polyalkylene glycol or ether derivative thereof.

Further objects and advantages of the present invention will become apparent as the description thereof proceeds.

In satisfaction of the foregoing objects and advantages there is provided by this invention a penetrating oil composition comprising: (a) a lubricating oil, (b) gasoline, (c) a monohydric alcohol, and (d) a polyalkylene glycol, glycerol, ether derivatives thereof or mixtures.

DESCRIPTION OF PREFERRED EMBODIMENTS

As indicated, this invention is concerned with a novel penetrating oil composition which contains four primary and necessary components. Other materials may of course be added to the composition in minor amounts so long as they are compatible with the mixture and not detrimental to the ability of the inventive mixture to function as a penetrating oil.

In its broadest aspect, the invention comprises the following penetrating oil composition:

Component	Parts by Volume
Lubricating Oil	1.5 to 2.5
Polyglycol or Ether or Mixture	1.5 to 2.5
Gasoline	0.5 to 1.5
Monohydric Alcohol	0.5 to 1.5

A highly preferred composition for use as a penetrating oil comprises 2 parts by volume lubricating oil, 2 parts by volume polyglycol, ether thereof or mixture, 1 part gasoline, and 1 part monohydric alcohol.

The lubricating oil component of the composition may be described as any lubricating oil which provides the necessary lubrication normally used in penetrating oils. The preferred lubricants can be described as ranging in viscosity from 10 SAE to 30 or 40 SAE as oils of this viscosity have been found most satisfactory. Ordinary motor oils having the indicated SAE ratings are very satisfactory.

A second major component of the composition comprises about 1.5 to 2.5 parts by volume of the class of compounds which may be generally described as polyglycols, or more accurately as polyalkylene glycols or glycerols, their ether derivatives or mixtures thereof.

These polyglycols or polyglycerol materials are well known in the art and the polyglycols may be described as reaction products of alkylene glycols and glycerols such as ethylene glycol, propylene glycol, etc., with successive molecules of an alkylene oxide such as ethylene oxide, propylene oxide, etc., which provide the high molecular weight polyalkylene glycols. The reaction of monoalkyl ethers of alkylene glycols or glycerols with alkylene oxides provides the corresponding monoalkyl ethers. As indicated all of these materials and their methods of preparation are well known in the art.

An alternative polyglycol component which may be used are polyoxyalkylene ethers of glycerol which are prepared by condensation of a mixture of alkylene oxides with glycerol. The resultant product is a complex mixture of glyceryl ethers having polyoxyalkylene

chains of different lengths. These compositions may be mixed with glycol or glycerol and if desired a solvent such as an alcohol. Products of this type are also known to the art.

As is well known, these polyglycols, polyglycerols and glycol ethers have varying molecular weights and viscosities which usually depend on the length of the polymer chain and the number of moles of alkylene oxide reacted. For purposes of this invention, the polyglycols, polyglycerols and ethers which may be used are those which have Saybolt viscosities on the order of about 60 to 600 seconds at 100°F. A highly preferred component of this group is a mixture comprising about 66.5 weight percent polyethylene glycols and about 33.5 weight percent ethyl polyglycol ethers. This component, alone, or in concert with the alcohol and gasoline, is believed to provide the excellent penetrating characteristics of the composition of this invention.

A further important component of the penetrating oil composition may be described generally as gasoline of the type used in automobiles, preferably regular grade gasoline. Gasoline may be defined as a complex mixture of hydrocarbons boiling between about 0° and 200°C. having an octane rating in the range of about 85 to 95 and may be used with or without additives such as tetraethyl lead. Regular grade gasoline, because of its cost and availability, is preferable.

The final main component of the composition is a monohydric alcohol of the formula ROH in which R is preferably an alkyl group of 1 to about 7 carbon atoms. Ethyl alcohol, usually referred to as denatured alcohol is especially a preferred component although methyl alcohol and other alcohols of this series may also be used. However, because of the ready availability and compatibility of denatured alcohol, it represents a preferred component.

As indicated above, the penetrating oil composition of this invention has been found to be excellent in penetrating into interstices of metallic surfaces and working to lubricate and loosen the surfaces so that bolts and the like can be loosened from "frozen" positions.

EXAMPLE

A penetrating oil composition was prepared by mixing the following components in the amounts indicated.

Component	Parts by Volume
Lubricating Oil (SAE 10W-30)	2.0
Polyglycol (66.51% Polyethylene glycol 33.49% Polyethyl glycol ether)	2.0
Regular Gasoline	1.0
Denatured Ethyl Alcohol	1.0

After the components were mixed thoroughly, a portion of the resulting composition was applied to a series of "frozen" and rusted bolts in the usual manner. After a 15 minute period, each of the bolts could be loosened manually with a wrench.

The novel composition of the present invention provides unique action as a penetrating oil composition in providing the necessary penetrating effect in loosening automobile and house locks, padlocks, pipe fittings and the like. After the penetrating action has been effected however, the composition will also act to keep locks and fittings lubricated over a substantial period of time, i.e., for several months. Thus, the combination of lubricating and penetrating components in the composition provide a cooperating or synergistic effect which would not be realized if the components were used individually.

The invention has been described herein with reference to certain preferred embodiments. However, as obvious variations thereon will appear to those skilled in the art the invention is not to be considered as limited thereto.

What is claimed is:

1. As a new penetrating oil composition of matter, a mixture consisting essentially of, (a) about 1.5 to 2.5 parts by volume of a mineral lubricating oil, (b) about 1.5 to 2.5 parts be volume of a polyalkylene glycol or ether component selected from the group consisting of polyalkylene glycol, polyalkylene glycerol, monoether derivatives of said glycols or glycerols, and mixtures thereof, the alkyl groups therein containing 1 to about 7 carbon atoms, said polyalkylene glycol or ether component having a Saybolt viscosity at 100°F. of about 60–600 seconds; (c) about 0.5 to 1.5 parts by volume of gasoline and, (d) about 0.5 to 1.5 parts by volume of a monohydric alcohol of the formula ROH, wherein R is 1 to 7 carbon atoms.

2. A composition according to claim **1** wherein the gasoline component is a mixture of hydrocarbons having a boiling point of about 0 to 200°C.

3. A composition according to claim **2** wherein the monohydric alcohol is ethyl alcohol.

4. A composition according to claim **1** which comprises 2 parts by volume of mineral lubricating oil, 2 parts by volume of polyalkylene glycols or ethers, 1 part by volume of regular grade gasoline and 1 part by volume of denatured ethyl alcohol.

5. A composition according to claim **4** wherein the polyalkylene glycol component contains about 66.5 weight percent polyethylene glycols and 33.5 weight percent polyethylene glycol ethers.

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