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LUBRICANT

Paul H. Carnell, Bartlesville, Okla., assignor to Phillips Petroleum Company, a corporation of Delaware

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6 Claims. (Cl. 252—28)

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This invention relates to lubricants. In one of its more specific aspects it relates to lubricants for use in lubricating valves in certain corrosive acid service.

One object of my invention is to provide a lubricant for use in the lubrication of valves in corrosive acid service.

Another object of my invention is to provide a lubricant for use in the lubrication of valves in hydrofluoric acid and hydrochloric acid services.

Still other objects and advantages of my invention will be apparent to those skilled in the art from a careful study of the following detailed disclosure.

In carrying out the above objects I have found that a chlorinated paraffin wax containing an inert, solid lubricant can be manufactured in such a manner and possesses chemical and physical properties which permit its successful use for the lubrication of valves in systems employing acids and acidic material, such as hydrofluoric acid and hydrochloric acid.

I have found that upon chlorinating a paraffin wax until it contains over 40 per cent by weight of chlorine, for example about 42 per cent, and incorporating in this chlorinated material graphite or asbestos that an excellent valve lubricant results. Most valve lubricants, and in fact substantially all valve lubricants now commercially available, fail in such service as hereinbefore mentioned. In testing out many commercially available so called acid resistant lubricants it is only a matter of time until these lubricants fail. By failure of a valve lubricant is meant that the lubricant may fail to seal the valve against leakage, may freeze the valve in either an open or closed position, or may be reacted upon and destroyed by the corrosive action of the material in process.

My chlorinated wax composition I have found overcomes all these difficulties.

A satisfactory valve lubricant may be prepared as follows:

290 grams of a paraffin wax having a melting point between 125° and 130° F. was chlorinated until the chlorinated material weighed about 500 grams. This chlorinated material possessed a viscosity of approximately 25 poises at 25° C., a specific gravity of 1.17 and had an empirical formula of $C_{25}H_{45}Cl_7$. To this chlorinated product was added 480 grams of powdered graphite and the ingredients were well mixed with vigorous stirring until the composition was uniform throughout.

This composition was found to be highly resistant to acids, especially aqueous and anhydrous hydrofluoric acid and aqueous and anhydrous hydrochloric acid. The lubricant does not disintegrate nor form an undesirable hard or gummy material when contacted with any of these normally corrosive materials.

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The lubricant composition prepared as above described was tested as follows:

Testing Agent (Excess)	Contact Time, Hours	Appearance of Grease At End of Contact
50 per cent Aqueous HF	15	Unchanged.
Commercial Anhydrous HF	15	Do.
38 per cent Aqueous HCl	15	Do.

Four commercial greases recommended for lubrication of valves used in hydrofluoric acid-hydrocarbon service were tested for comparison purposes with an excess of commercial anhydrous hydrofluoric acid. The results are as follows:

Grease	Appearance After 5 Minutes in Excess Commercial Anhydrous HF
No. 1	Reacts and a portion dissolves leaving a residue.
No. 2	Same solution; acid colored yellow; grease became somewhat hardened.
No. 3	Same solution; acid colored brown; grease slowly dissolved, residue becomes solidified, brittle and crumbly.
No. 4	Grease dispersed and became more fluid; rubber-like material was formed.

These data indicate that the grease made by the method of my process is superior to those commercially available for hydrofluoric acid and hydrochloric acid services. My lubricant does not dissolve in these acids and does not react with them in any manner as to form undesirable hard or gummy products.

Such a lubricant as I herein disclose serves exceptionally well to lubricate stopcock type or plug valves in hydrofluoric acid alkylation service that are exposed to highly acidic mixtures.

Under certain conditions the graphite or asbestos impregnating agent may be omitted from the chlorinated wax. The chlorinated wax by itself is a relatively thick and viscous composition, and for many uses, I prefer to increase the body thereof or to improve its lubrication properties by the addition of graphite or asbestos.

The impregnation of graphite or asbestos into the chlorinated wax does not alter the chemical properties of the base material; hence the chlorinated wax alone will possess the same proper-

ties as disclosed above for the chlorinated wax-graphite composition.

In my example I have used about 480 grams of graphite per 500 grams of the chlorinated wax to produce a certain composition. This ratio of ingredients is not critical since the amount of graphite or of asbestos or other impregnating agent added to a given amount of chlorinated wax may be varied within wide limits. The desired consistency, lubricating value or workability, may well be considered as the determining factor for the ratio of impregnating agent to chlorinated wax.

It will be obvious to those skilled in the art that my lubricant may be used in services not herein specifically mentioned, but which depend upon the properties of the composition as herein disclosed.

Having disclosed by invention, I claim:

1. A valve lubricant composition comprising the following ingredients in approximately the proportions stated, 51% of a chlorinated paraffin wax prepared from paraffin wax having a melting point between approximately 125° and 130° F. and containing about 42% chlorine by weight, and 49% graphite.

2. A valve lubricant composition comprising the following ingredients, in approximately the proportions stated, 51% of a chlorinated paraffin wax prepared from paraffin wax having a melting point between approximately 125° and 130° F. and containing about 42% by weight of chlorine, and 49% of a solid thickening agent possessing lubricating properties selected from the group consisting of graphite and asbestos.

3. The valve lubricant composition of claim 2 wherein the solid thickening agent is asbestos.

4. A composition for the lubrication of valves used in service where an acid selected from the group consisting of HCl and HF is in process consisting of a chlorinated paraffin wax prepared from a paraffin wax having a melting point between approximately 125° and 130° F. and containing about 42% by weight of chlorine, and sufficient solid thickening agent selected from the group consisting of graphite and asbestos to impart a desired consistency to the lubricant composition to effectively seal valves lubricated with said composition against leakage when used in said service.

5. The composition of claim 4 wherein the solid thickening agent is graphite.

6. The composition of claim 4 wherein the solid thickening agent is asbestos.

PAUL H. CARNELL.

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