This invention relates to detergent compositions; and it comprises as a pasty detergent composition for removing grease, a mixture of liquid kerosene, or the like oil, somewhat modified to lessen its water repellent (hydrophobe) character made into a paste with a granular, alkaline detergent salt insoluble therein and sufficiently hard grained to serve as a scouring agent, said salt being soluble in water and serving later as a dispersing agent in removing the composition and said composition being free from water; and it further comprises a process of making such a detergent wherein dry kerosene is treated by dissolving an oil soluble emulsifying agent therein, such as a triethanolamine soap, then mixed with a granular detergent salt of alkaline nature of sufficient hardness to serve as a scouring agent, and the mixture is stirred until it acquires a permanent, smooth, pasty consistency, the relative proportion of solids and liquid kerosene being adjusted to permit this result; all as more fully hereinafter set forth and as claimed.

Removing machine grease from the hands is troublesome. Ordinary soap and water are not particularly efficient, the heavy petroleum oils used in lubricating not emulsifying readily in soapy water. Resort is generally made to soap containing gritty mineral powders (sand, pumice stone, emery, kieselguhr, etc.) as scouring agents. These grits, however, scratch and abrade the skin and are, further, apt to create trouble in the plumbing connections of the ordinary stationary wash bowls or sinks. In the factory, a kerosene wash is often used; lubricating oils being soluble in, or miscible with, kerosene. However, while the kerosene readily removes the bulk of the grease, it is generally expedient to follow by rubbing the hands with a dry absorbent meal of some kind, prior to using soap and water; this being to get rid of residual films of a kerosene-grease mixture. These are difficult to remove by washing, kerosene being water repellent in a high degree. This water repellent quality of kerosene militates against its use on the hands, since it does not contact well with damp skin surfaces; it does not go into the irregularities or rugosities of the skin as thoroughly as is desired.

In the present invention, I provide a detergent free of the noted difficulties. In it, I use a kerosene treated to lessen its water repellent qualities, thereby giving a better contact with the skin, in commixture with a dry, granular, alkaline dispersing detergent properties when in water solution; the salt serving as a scouring agent. In this composition kerosene free from water is present as an external liquid adapted readily to contact with and exert a true solvent action on any grease with which the composition comes in contact. None of the salts I ordinarily use in the mixture (the sodium carbonate, either hydrated or anhydrous, borax, trisodium phosphate, sodium meta-phosphate, etc.) has the hardness characteristic of all the mineral grits used in soap and none will scratch or substantially abrade the skin; but they are hard enough to be useful scourers to serve mechanically in aiding the kerosene to remove dirt. They also serve to give the modified kerosene a convenient creamy or pasty consistency. In the composition in use, the function of these salts is mechanical; they are convenient, not-too-hard scouring agents and paste-formers.

In use, the paste is applied to the greasy hands and worked until the grease is cut and taken up. The hands are then washed, with or without previous wiping. The modified kerosene comes into actual contact with the skin, irrespective of its dampness. The admixed salt meal at this time aids mechanically in securing quick and uniform contact and facilitating admixture of kerosene and grease. When the hands are washed, the detergent salt then goes into solution and acts as a dispersing or emulsifying agent. In washing, the solid salts dissolve and rapidly and effectually emulsify and remove all the residual grease and kerosene.

As will be seen, the salt component of this mixture has two consecutive functions, a mechanical function during the use of the composition and an entirely different function in getting rid of it afterwards.

In modifying the kerosene to lessen its hydrophobe properties and make it emulsifiable, I dissolve in it an oil soluble soap of some kind. Triethanolamine soaps made with commercial oleic acid are suitable; but triethanolamine soaps made with any fatty acids may be used. Soda soaps of ordinary fatty acids do not dissolve in oil to a sufficient extent but the modified fatty oils made by treatment of fatty oils with sulfuric acid, and sometimes known as "Turkey red oils", such as sulfated castor oil, and their soaps will do so. It is, of course, possible to make triethanolamine soaps with these modified oils and the products are useful for my purposes, although rather expensive. Instead of using oil-soluble soaps in modifying kerosene, I can use various sulfonated mineral oil preparations now on the market. These materials all serve as emulsifying agents.

Kerosene modified to make it emulsifiable, but 55...
still substantially dry, is not impaired as regards miscibility with machine grease or lubricating oil; and it enters the rugosities of the skin better than the original kerosene; it makes a better wetting out of the material in its surface. In the actual composition, contact is of course facilitated by the presence of the solid filler or abrading.

Instead of kerosene, I can use any other thin and mobile petroleum or coal tar oil, since all these hydrocarbons mix well with machine grease and commercial kerosene has about the right properties for my purposes. The relation of the solid granular material to the modified kerosene is not that of a simple physical mixture; other things apparently happen. In using the ordinary proportions of solid and liquid, with the solid being an anhydrous detergent salt, such as soda ash, the mixture is at first thin; requiring stirring to keep the ingredients in commixture.

With the usual proportions, the volume of the liquid is greater than that of the solid. But in a short time, thickening occurs, rapidly at first and then more slowly over a long period of time. This thickening is at first due to the absorption or adsorption (either or both) of the kerosene by the soda ash. The particles of some commercial grades of soda ash are minutely pervious. On this account, a mixture containing a hydrate, crystalline salt, such as commercial sal soda, Na₂CO₃·10H₂O, the mixture though at first thick, tends to soften on standing, indicating the development of some new type of relationship at the interface between solid and liquid. By using mixtures of the two types of salts, these opposing tendencies balance out and a paste can be made retaining its original consistency over a period of time. Good and satisfactory compositions can be made with either soda ash or sal soda, but a mixture of the two works better. In the detergent, either salt forms a satisfactory scouring agent and the two salts function subsequently in the same way as dispersing agents. There is, however, a difference in the quickness with which the two dissolve in water.

In a typical embodiment of the present invention, I used 270 pounds of a good grade of water white, commercial kerosene; the grade ordinarily used in lamps. In this kerosene I dissolved a soap composition made from 12 pounds of commercial triethanolamine and 32 pounds of commercial oleic acid. Instead of combining them previously, these two components can be dissolved in the oil, probably forming a soap in situ. The modified kerosene produced was somewhat changed in color but did not otherwise differ in appearance from the original kerosene. However, it contacted with the skin surface of the hands much more readily. I then mixed the modified kerosene with a fine ground mixture of equal parts by weight of sal soda and soda ash. A composition containing about 70 parts of mixed salts and 30 parts of kerosene, both by weight, is desirable. The salts should be ground to pass a 30 to 50 mesh screen. Material passing through a 40 mesh screen is generally satisfactory. A batch of the particular composition just described was made by mixing 260 pounds of the mixed salts with 50 pounds of modified kerosene.

In a general way, in using soda ash as the scourer, the useful proportions are somewhere between 48 per cent and 62 per cent of soda ash by weight. Beyond 62 per cent of soda ash by weight, the composition is too thick and crumbly; it has too much of a putty consistency. Less than the lower limit, the mixture is too soft, it is soft enough to pour. On the other hand, in using hydrated sodium carbonate, that is sal soda, in lieu of soda ash, greater quantities of salt are indicated. With a sal soda filler, the upper limit is about 80 per cent, but the lower limit is about 70 per cent. Mixtures of dry sodium carbonate and sal soda give intermediate results.

A mixture of equal parts of soda ash and sal soda gives a particularly desirable cleanser with an amount corresponding to 32 per cent of the final mix. A mixture of the two carbonates, as a matter of fact, has certain other advantages. In washing the hands, the sal soda goes into solution rapidly; its emulsifying effect on the grease-kerosene film may not be sufficient. On the other hand, the anhydrous carbonate goes into solution rather slowly. With a mixture of the two forms of sodium carbonate, better results are obtained than with either alone.

The paste made as described is permanent and can be stored in cans and the like indefinitely, without change. It extrudes readily from the usual collapsible tube type of container.

While I regard sodium carbonate in its various forms as the best scouring agent in my composition, other solid alkaline detergent salts freely soluble in water and capable of emulsifying oils may be used. Borax, trisodium phosphate and commercial crystallized forms of sodium silicate are all suitable. One good scouring composition under the present invention was prepared by mixing together modified kerosene and fine ground commercial sodium silicate in a proportion of about 75 pounds of modified kerosene and 100 pounds of the ground silicate. The scouring composition was of a good creamy consistency, removed grease well and washed off readily. This particular grade of sodium silicate contains 27.5 per cent Na₂O and 55 per cent SiO₂; the residue being H₂O. Some of the grades of crystallized sodium silicate on the market are not as well adapted for my purposes, although they can be used.

Another useful composition made under my invention contained kerosene modified by castile soap and Turkey red oil. I added 12 pounds of castile soap and 18 pounds of Turkey red oil to 70 pounds of kerosene; making a total of 100 pounds. In making a batch of cleanser I mixed the 100 pounds of kerosene modified as above described with 100 pounds of trisodium phosphate and 100 pounds of soda ash; both ground to pass a 40-mesh sieve. This gave a good composition having some special utilities. Another composition contained kerosene modified by the presence of a sodium napthalene sulfonate. The modified kerosene was mixed with trisodium phosphate and soda ash. This gave a good scouring composition.

With all these mixtures some adjustment of conditions is required in producing a good creamy paste. The volume of modified kerosene used should always be sufficient for this purpose; should be sufficient to give a good consistent mass with the kerosene present as an external liquid. The specific gravity of the salts varies and with it the volume of kerosene needed. The weight proportions given in the example using sal soda, however, indicate the range which is generally useful; somewhere between 14 and 30 per cent (on the finished composition) by weight of kerosene. A further variance comes with the
size of grain of the scouring agent. A 50 mesh scouring agent in making a creamy paste requires a greater volume of kerosene, other things being equal, than a 40 mesh.

With most of these mixtures the amount of kerosene initially giving a suitable consistency is not necessarily that required for a final pasty consistency. Some of these materials thicken up somewhat on standing and some thin. However, these adjustments can be readily made with any particular mixture. Mixing can be in any ordinary apparatus; internal type mixing apparatus being best. As a rule the salts are mixed first and then the modified kerosene added, agitation being continued until the proper consistency results.

The particular amount of hydrophil agent used depends on its nature and on its activity, this term being here used to designate oil-soluble material which, when dissolved in oil, somewhat lessens its water-repellent properties. The presence of such a substance in solution in the kerosene enables it to make better contact with moist skin. There is considerable difference in this respect between different preparations of the same material. In each case hydrophil agent is added to the kerosene until a modified kerosene is obtained easily stirred up into water to give a milky liquid. There is no advantage in the presence of any more hydrophil agent than will produce this degree of miscibility. Experience has shown that whatever the dispersibility of the kerosene, the presence of an easily soluble alkaline dispersing agent as the scouring material is practically necessary. A mixture of kerosene and machine grease does not emulsify readily. Removal of the grease by washing is a joint action in which the emulsifiability of the kerosene and the dispersing action of the alkaline detergent both play a part. In using triethanolamine soaps it has been found advantageous to use enough excess triethanolamine to make the kerosene more or less alkaline.

While I have more particularly mentioned the use of the present detergent in removing machine grease from the hands, it can, of course, be used in any other relation where grease is to be removed.

In this specification, and in the amended claims, the term “free from water” is used to define a composition free of moisture; that is, having no water present other than that present as chemically combined water of hydration.

What I claim is:

1. A scouring detergent paste adapted upon rubbing on the hands to quickly loosen and take up grease therefrom with subsequent easy removal by a simple water wash, said paste being composed of 14 to 52 per cent by weight of liquid kerosene containing in solution a minor amount, not greater than 30 per cent by weight on the kerosene of an oil-miscible organic emulsifying agent adapted to render the kerosene emulsifiable and to lessen the water repellent properties of the kerosene, in admixture with 86 to 48 per cent by weight of a solid hard fine-grained scouring abrasive consisting of a water-soluble inorganic alkaline detergent salt in granular form of size 30 to 50 mesh, the paste being free of aqueous moisture whereby the solvent action of the liquid kerosene on grease is unhindered and the hard granular character of the abrasive salt is preserved.

2. The preparation of claim 1 wherein said alkaline detergent salt is soda ash admixed with sal soda.

3. The preparation of claim 1 wherein the kerosene constitutes between 14 and 30 per cent by weight of the mixture.

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