My invention relates to processes of treating mineral oils and products containing hydrocarbons, and to methods for carrying out the processes, as well as to the compounding of the materials used in such processes, and it has particular reference to the treatment of lubricating oil stock.

My present process is particularly designed for the treatment of petroleum products in which are found "carbon clusters", that is to say agglomerations of insoluble hydrocarbon, pitch or waxy substances which have separated from the oil, and by virtue of their presence render the said oil or oil residue very viscous and difficult to pump or otherwise handle.

One object of my present invention is to provide a process particularly applicable to the treatment of what is known as "lub" stock, a material used for making lubricating oil. Lub stock might be more aptly termed lubricating stock, but in the oil fields and refineries the term "lub stock" is well understood, and it is in this sense that I employ this term hereinafter.

The part of the distillate from the crude oil still known as lub stock is treated in various ways for the purpose of securing lubricating oils as a petroleum product. Usually this is discharged into an agitator and treated with sulphuric acid during heating and agitation. From the agitator lubricating oil requiring further treatment and a residuum known as acid sludge are secured, which is at the present time a waste product. The acidulating and agitating process may be repeated at different times and need not be described in detail. In some instances it has been found that the lub stock is not adapted for the manufacture of lubricating oil, or that to treat the same so much sulphuric acid is required that the oil is ruined and without sufficient value for the desired purpose.

By my treatment in connection therewith, it has been possible to obtain lubricating oil from lub stock where before the processes herefore employed were unsatisfactory, as for example, where the base product was from the Lost Soldier field, and in all instances it is now possible with my present invention to secure the lubricating oil with the use of less acid.

This "lub" stock is ordinarily a residuum which consists of a heavy thick mass of hydrocarbons and waxes, depending on the base of the oil or the field from which it is taken, after the light ends, gases, oil and kerosene, etc., are distilled off at temperatures around 500 to 550° F. In order to make lubricating oil from this grade of material it is necessary to remove substantially all of the heavy ends of carbon and also the waxes, to extract the pure oil. When this is treated in the agitator with heat, agitation and by the addition of sulphuric acid, a violent chemical reaction takes place and the heavy carbons and heavy residue of a carbon nature, are dropped to the bottom of the agitator. The thinner mass of fluid is on the top. The amount of acid required depends on the grade of lub stock treated, and this amount varies with whether it is the first or second, etc., treatment; or the particular base which may be used. It is considered dangerous to use an excess acid as it will stay in the thinner oils and the heavy carbons are dropped out, injuring the value of the oil for lubricating purposes.

My treatment is applied to the lub stock preferably at the time of discharge into the agitator or prior thereto, the same reacting as hereinafter set forth. I have found as a result of tests that a less amount of acid is required when my treatment is carried out, and I have found in some instances it is possible to make lubricating oil from some lub stocks where before it was impossible owing to the amount of acid required to get the break. Too much acid will cause so rapid a break as to clog the agitator in some instances. This was found true in the case of oil from Lost Soldier field previously referred to.

In treating or carrying out my process, however, I find that certain additional chemicals are desirable in order to produce a better product, although the product is improved by using either of the combinations previously mentioned. I have further found that the color may be improved by the addition of decolorizers.

In treating the lub stock, a batch of my
composition of materials may be made up as now to be described. The ingredients may be combined, for example, in approximately the following proportions, it being understood that the quantity required depends upon the amount of lubricating oil stock to be treated and that the proportions set forth are substantially approximate and may be varied within limits depending upon the particular base from which the lubricating oil stock was derived. I have secured satisfactory results when employing the materials in the proportion of 120 lbs. naphthalene, 100 lbs. phosphate rock, 95 lbs. caustic soda, 18 lbs. anthracene, 6 lbs. ammonium carbonate, 6 lbs. sodium phosphate, 15 lbs. sugar, 1 lb. arsenious acid, 1 lb. arsenic sulfide, and 1 lb. golden antimony sulfide. This mixture is ground for an hour or more, and then there is added to the same 1 lb. more or less of oil of mirbane liquid, this mainly for the purpose of deodorizing.

In mixing these materials, I may take first the sodium hydroxide, sodium phosphate and ammonium carbonate and mix the same with approximately an equal weight of naphthalene, and grind the same for thirty minutes in a ball mill, and then add the balance of the naphthalene and the proper amount of anthracene, oil of mirbane and phosphate rock, followed, after grinding for a short time, by the granulated sugar, arsenious acids, arsenic sulfide and antimony sulfide. The entire mixture is then ground for several minutes longer, and the material finally packed in air-tight metal drums for use.

In using the materials, I use ordinarily one-sixth pound per barrel of lubricating oil stock, but this may vary from a sixth or more down to a twelfth of a pound per barrel of lubricating oil stock, depending upon the particular kind of stock treated. After treatment thereafter in the usual manner, it is found that the heat and sulfurous acid treatment in the agitator is greatly improved. The chemicals cause a breaking up of the carbon clusters, and there is a better break between the sulfurous acid and the oil. There is a chemical reaction raising the temperature and breaking up the smaller hydrocarbon clusters that the acid would ordinarily not attack sufficiently to cause them to separate by gravity from the oil. The phosphate rock seems to greatly improve the action, causing the acid to break quicker and cut sharper with smaller quantities of acid and to bring a better color to the oil. Ordinarily the chemicals are put in about three to five minutes before the sulfurous acid is added, and it was found that the temperature immediately went up several degrees, and after the sulfurous acid was added there was a violent boiling created and the heavy sludge or heavy carbons formed immediately and dropped to the bottom of the agitator, leaving the light oil and waxes at the top. As a result of this treatment, a very high grade of lubricating oil can be made from the Lost Soldier crude oil stock where heretofore it was not possible to procure the same, owing to the amount of acid required. The sulfurous acid subsequent to the addition of my materials appears to make the attack or create the chemical action in a most satisfactory manner, presumably due to the fact that I have separated the hydrocarbon clusters before adding the acid, creating a more fluid substance and making it easier for the acid to attack the heavy carbons. In practice I have found that the result is apparent for when excess quantities of my materials are used, the sulfurous acid will work so fast the sludge will drop so quickly that it will clog the agitator and it is difficult to handle the same and transport it away from the agitator.

Having now described my said invention, what I claim is:

1. A method of treating lubricating oil stock which comprises breaking up agglomerations of heavy hydrocarbons therein by the addition of a composition resulting from the admixture of materials comprising naphthalene, anthracene and alkaline substances to effect the disintegration of agglomerations of heavy insoluble waxy deposits therein and agitating the lubricating oil stock with sulfurous acid.

2. A method of treating lubricating oil stock which comprises treating the same with a composition resulting from the admixture of materials comprising naphthalene, anthracene and alkaline substances to effect the disintegration of agglomerations of heavy insoluble waxy deposits therein and agitating the lubricating oil stock with sulfurous acid.

3. A method of treating lubricating oil stock which comprises treating the same with a composition resulting from the admixture of materials comprising naphthalene, anthracene, alkaline substances and phosphate rock, and treating said lubricating oil stock with an acid.

4. A method of treating lubricating oil stock which comprises treating the same with a composition resulting from the admixture of materials comprising naphthalene, anthracene, alkalies, phosphate rock and sugar, and treating with an acid.

5. A method of treating lubricating oil stock which comprises treating the same with a composition resulting from the admixture of materials comprising naphthalene, anthracene, alkalies, calcium phosphate and sugar, and treating with an acid.

6. A method of treating lubricating oil stock which comprises treating the same with a composition resulting from the admixture of materials comprising naphthalene, anthracene, alkalies, sugar and a phosphate rock prior to the process of agitation and treatment with sulfurous acid.

7. The process of treating lubricating oil stock which comprises treating the same with
a composition resulting from the admixture of materials comprising naphthalene, anthracene, sodium hydroxide, ammonium carbonate, sodium phosphate, phosphate rock, sugar, arsenious acid, arsenic sulfide and golden antimony sulfide prior to agitation and treatment of said lubricating oil stock with sulfuric acid.

8. A process of treating lubricating oil stock which comprises treating the same with a composition resulting from the admixture of materials comprising naphthalene anthracene, sodium hydroxide, phosphate rock and sugar.

9. The process of treating lubricating oil stock which comprises adding to the same prior to agitation with sulfuric acid a composition resulting from the admixture of materials comprising substantially 120 parts naphthalene, 100 parts calcium phosphate (phosphate rock), 35 parts sodium hydroxide, 18 parts anthracene, 6½ parts ammonium carbonate, 6½ parts sodium phosphate, 18 parts sugar, 1 part arsenious acid, 1 part arsenic sulfide, and 1 part golden antimony sulfide.

In witness whereof I have hereunto subscribed my name.

ALBERT H. ACKERMAN.