UNITED STATES PATENT OFFICE.

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PROCESS OF PURIFYING OILS.

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To all whom it may concern:

Be it known that I, DAVID T. DAY, a citizen of the United States, residing at Washington, District of Columbia, have invented new and useful Improvements in Processes of Purifying Oils, of which the following is a specification.

This invention relates to the refining of oils and has to do particularly with the purification and deodorizing of oils especially hydrocarbon oils.

Petroleum oils and especially oils obtained therefrom by distillation and still more especially obtained by cracking processes, are always more or less characterized by unpleasant odors, and these are also indicative of impurities in these oils which render them likely to polymerize or resinify, forming gums which are highly undesirable. Motor spirits containing these gums quickly foul and clog up engines in which they are used. It has been found that in the case of hydrocarbon oil, these bad odors are chiefly due to the presence of a small proportion of the acetylene series, and the di-ethylene series of hydrocarbons, and even when the odors are very pronounced they may be caused by less than half of one per cent. of the objectionable hydrocarbon. These hydrocarbons form one series among many which are unsaturated hydrocarbons. It has been found that besides the unsaturated hydrocarbons known as the acetylene series, other unsaturated hydrocarbons occur generally in much larger proportion. For example, a crude petroleum of Pennsylvania may contain five to ten per cent. of unsaturated hydrocarbon of which less than a tenth of one per cent. will consist of the acetylene series, or of the di-ethylene series. Again, a gasolene may contain more than ten per cent. of unsaturated hydrocarbons of which less than one-half of one per cent. may be of the bad smelling acetylene or di-ethylene, the remainder consisting chiefly of the ethylene series with no objectionable odor.

In refining hydrocarbon oils it is the well known practice to remove the odors by agitating the oil with strong sulfuric acid, and in some cases even with fuming sulfuric acid. It is well known that if such treatment is sufficiently continued the sulfuric acid will attack all of the unsaturated hydrocarbons. It follows that during the agitation of oil with sulfuric acid the acid attacks not only the acetylene hydrocarbons, but also more or less of the ethylene hydrocarbons, with consequent waste of both oil and acid. In the case of cracked motor spirits this loss is frequently excessive and very expensive.

I have found reagents which may be used in the place of sulfuric acid which attack practically only the objectionable hydrocarbons and thus make it possible to deodorize an oil with the loss of a fraction of one per cent. and with a minimum consumption of the reagent. The reagents may be used and mixed with the oil either by air agitation, mechanical agitation, or treated in one of the more modern continuous systems. The reagents used are salts of mercury, copper, iron, and of similar metals in the lowest state of oxidation, that is cuprous and mercurous salts, etc. The salts of any metal in the lower state of oxidation may be used provided that such metal has two stages of oxidation. Chlorids and similar salts are especially efficient. The addition of ammonia to an extent sufficient to effect the solution of the salts has proved of advantage. The reagents may be used in said solutions. Cuprous chlorid in ammoniacal solution or in aqueous solution may be added to the oil and intimately mixed therewith in any suitable way and allowed to settle, after which it will be found that the reagent has taken with it the objectionable substances.

In carrying out the process any desired type of apparatus for mixing and subsequently separating off the reagent may be used. Such apparatus should have means for adding the reagent as a spray to the oil and means for agitating the mixture. Agitation by releasing air under pressure within the oil is advantageous. Also means should be provided for introducing necessary wash solution such as alkali water, when needed to finish the removal of the reagent. No claim is made to any apparatus since the process may be carried out in any convenient construction.

It is obvious from the nature of the reagents that they are also effective in removing odors due to sulfur compounds.

What I claim is:—

1. The process of purifying oils which consists of bringing the oil to be treated into contact with cuprous chlorid.

2. The process of purifying oils which consists of bringing the oil to be treated into

contact with cuprous chlorid in an ammoniacal solution.

3. The process of purifying oils containing undesirable acetylenes to remove the acetylene which consists of mixing the oil to be treated with cuprous chlorid to take up the acetylene.

4. The process of purifying gasolene which consists of bringing the gasolene to be treated into contact with cuprous chlorid.

5. The process of purifying gasolene which consists of bringing the gasolene to be treated into contact with cuprous chlorid in an ammoniacal solution.

6. The process of purifying gasolene which consists of bringing the gasolene to be treated into contact with cuprous chlorid under substantially atmospheric temperature conditions.

In testimony whereof I have hereunto set my hand.

DAVID T. DAY.