Patented Mar. 1, 1927. 1,619,486

UNITED STATES PATENT OFFICE.

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PROCESS OF REFINING OILS.

No Drawing. Application filed September 28, 1923. Serial No. 665,467.

This invention relates to processes of refining oil; and it comprises a process of refining fatty oils of the nature of cottonseed oil wherein a body of such oil is treated with a caustic alkali solution, usually caustic soda, in two successive portions, one such portion being for the purpose of neutralization and the other portion being for the purpose of decolorization; an immediate centrifugal separation of admixed oil and solution following immediately upon admixture in each case; all as more fully hereinafter set forth and as claimed.

In the refining of fatty oils of the nature of cottonseed oil, it is the usual practice to admix a certain amount of caustic soda solution, agitate and allow the mixture to settle. The amount of soda solution used is often in excess, and it may be in large excess, of the amount required to neutralize the free fatty acids present. This is for the reason that the caustic soda has another function besides neutralizing: that of decolorizing and clarifying. In the usual practice the oil is warmed sufficiently to make it fluid and is then admixed with the required amount of soda lye as determined by laboratory procedures. The mixture is agitated and is then allowed to settle for a time. This time is never less than several hours and may go as high as several days. During this period various other actions apparently take place; one being a development of a structure or state of aggregation by the soaps present; a formation of some sort of a gel. The matter settled out, or "soap stock" contains soaps formed from the free fatty acids present (as well as a certain amount of soaps formed by the saponification of neutral oils) coloring matter, resins, etc. and also a large amount of neutral oil entangled by the other substances present. This included neutral oil represents a substantial loss to the oil refiner since it is not easy to recover it in a high grade condition. Usually the soap stock is sold for soap making as it is, and the contained oil brings but a low price for this purpose.

In another and copending application, Serial No. 586,523, filed September 6, 1922, I have described and claimed an improvement on this usual method wherein the body of oil and alkali after agitation is not allowed to become quiescent and given time to settle and separate naturally but is immediately separated in a centrifugal. By so doing, the amount of neutral oil entangled in the soap stock is materially reduced; being usually reduced to a negligible amount. This I have found is because the soaps formed by the interaction of the alkali and the free fatty acids of the oil are at first in a structureless condition while after a time in a quiescent body of material the soaps develop a structure capable of entangling and holding oil.

In the present invention which is an improvement on that of the acknowledged application, I have gone a step further by separating the neutralization function of the caustic soda from its decolorization function with the result of not only accomplishing a saving in neutral oil, as in my prior process, but of markedly improving the color of the resultant oil. By separately neutralizing and decolorizing the latter operation is more efficient than where the two are simultaneous. I have found that in using an excess of caustic soda added at once to a vegetable oil with the object of simultaneously effecting neutralizing and decolorizing, the improvement in color and grade of the oil is not as great as where the neutralization is first effected, the resulting soaps separated and then further soda added for the purpose of decolorizing with another separation immediately thereafter. In practice, I first agitate a batch or body of oil in the usual way with a caustic soda solution of any of the usual strengths, say 10° Baumé to 20° Baumé; but I use not much more soda than the amount required to exactly neutralize the free fatty acids present, say not more than 10 or 20 per cent in excess of the neutralization amount. Commonly this slight excess is much less than the amount required for a substantial decolorization and clarification. Admixture of oil and soda liquor is accomplished as quickly as possible, consistent with thorough incorporation of the two liquids. Usually not more than 15 minutes or so of agitation are required to effect an intimate incorporation although with viscid oil the time may rise to 30 minutes or so. The mixture is immediately sent to a centrifugal machine and separated at once into neutral oil and soap stock. No opportunity is given for the development of structure in the soaps formed

by any quiescence or period of rest following the incorporation agitation. The neutral oil separated is then agitated with a further quantity of caustic soda; this time to accomplish decolorization. Where a given amount of oil requires, say, 100 parts NaOH for neutralization of the free fatty acids present and where it is usual to employ another 100 parts for decolorizing, I may use, say 120 parts of the total caustic soda in the first or neutralizing stage and the remaining 80 parts in the second or decolorizing stage. The proportions given are merely exemplificatory, since the amount of soda required varies with every lot of oil. But in all cases I use in the first stage the amount required to neutralize or perhaps a slight excess and use a further quantity of caustic soda in the second stage. The total amount of caustic soda I at present use in treating cottonseed oil is usually that indicated by the regulations of the Cottonseed Crushers Association. In so doing I am enabled to produce an oil with much less than the usual "refining loss" and of better color.

In one particular case where the refining loss with the oil under treatment by the usual method which involves using the full quantity of caustic soda at once, settling, etc., was 6.4 per cent, I found that on treatment of the same oil with the same quantity of soda in two stages, with an immediate centrifugal separation at the end of each stage, the refining loss was but 3.13 per cent and the color of the oil was much better than that given by the usual process.

In practical embodiments of the present invention I may use any of the usual apparatus for effecting the admixture of the soda solution and oil though, of course, I do not require the usual settling facilities. In effecting immediate separation of the oil from the other bodies while I find it much better to use a centrifugal, the point is more in a quick separation than in the use of any particular machine. A centrifugal gives extremely rapid separation and this is what I want. The point is to effect a separation as soon as heating and agitation are discontinued; to afford no opportunity for development of structure in the soaps—of any colloid or gel condition. Any usual alkali or alkali solution may be employed. Ordinarily I employ caustic soda solution between 10° and 20° Baumé as is usual; but I may use caustic potash or even lime or salts of alkaline reaction. The oil treated may be any of the usual vegetable oils.

What I claim is:—

The process of refining and decolorizing vegetable oils which comprises quickly admixing with agitation such an oil with the amount of caustic alkali solution required for neutralization, separating the neutral oil from the other matters present by centrifugal action immediately upon completion of incorporation of the alkali solution, once more quickly admixing with agitation the oil with a further quantity of alkali solution sufficient to decolorize the oil and once more separating by centrifugal action immediately thereafter.

In testimony whereof, I have hereunto affixed my signature.

FRANCIS JAVIER RESINES.