UNITED STATES PATENT OFFICE.

ERNST TWITCHELL, OF WYOMING, OHIO.

PROCESS OF EFFECTING A COMBINATION BETWEEN SELECTED MEMBERS OF THE ALCOHOLS AND FATTY ACID.

No. 844,426. Specification of Letters Patent. Patented Feb. 19, 1907.

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To all whom it may concern:

Be it known that I, ERNST TWITCHELL, a citizen of the United States, residing at Wyoming, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Process of Effecting a Combination Between Selected Members of the Alcohols and Fatty Acid, of which the following is a specification.

My invention relates to a process for manufacturing certain organic products, such as neutral oils or fats and other compounds, of which there may be a wide range, resulting inherently from my process and depending specifically upon the characteristics of the particular compounds selected for the reaction.

The object of the invention is, broadly speaking, to effect a combination between those non-readily-volatile compounds containing alcoholic hydroxyl, of which glycerin and castor-oil may be cited as examples, and a fatty acid, of which stearic and oleic acid may be cited as familiar examples.

The distinction which I have just drawn excludes from my process the common ethyl or methyl alcohols, which are highly volatile at ordinary temperatures. These readily-volatile alcohols being mutually soluble in water and in fatty acids may be readily combined with the fatty acids by other processes.

So far as I am aware it has heretofore been found impossible to effect a complete combination between the compounds above named. For instance, when glycerin and a fatty acid are heated together under a very high temperature they may combine to a limited extent with great difficulty and incompletely; but the requisite conditions are such as to render this process substantially prohibitive on an industrial basis, even where the resultant is the perfect and complete combination which I believe to be effected for the first time by my process.

I have discovered that a combination may be easily and completely effected between selected members of the compounds above named by subjecting them under relatively low temperatures to the influence of a sulfo fatty acid or a combination thereof. In other words, I have found that the alcoholic compounds above named will chemically combine with the fatty acids when brought together and heated with a relatively small quantity of one of the sulfo fatty acids, the reagent having a catalytic function, and hence undergoing no decomposition in the reaction induced by its presence. The quantity of the reagent used is so small and its physical characteristics are such that it need not be recovered from the resultant products, and its presence in them is not appreciable. The particular member of this sulfo-fatty acid group which gives the best result is a sulfo fatty aromatic acid patented by me July 11, 1899, No. 628,503. It is possible to use a simple sulfo fatty acid; but this reagent is open to the objections pointed out in my prior patent—that is, it is difficult to obtain in a pure state, and it is of such unstable character as to be undesirable where my preferred reagent is obtainable.

I will now describe some specific selected examples of my process and the resultant products.

Bring together into an open vessel adapted to be heated in any convenient manner say ten parts of glycerin and one hundred parts of stearic acid. Add to this mixture from one to five parts of sulfo fatty aromatic acid. Heat to approximately 100° centigrade, and agitate the contents of the vessel sufficiently to insure an intimate intermixture. The combination of the glycerin with the stearic acid commences immediately with a separation of water, which is evaporated as soon as formed. In a short time, varying slightly according to the quantity involved, the reaction will be completed. The product of this reaction is a glycerid, either a mono-glycerid or a di or a tri-glycerid, or possibly a mixture. If the fatty acid was in excess—for instance, if five parts of glycerin were used to one hundred parts of stearic acid—the resultant product will consist entirely of a tri-glycerid. If the glycerin was in excess—as, for instance, if thirty parts of glycerin were used to one hundred parts of stearic acid—the resultant product would consist mostly of mono and di glycerids. If the glycerin was in excess, the unacted-on or uncombined portion thereof may be removed by washing the product with water. If the fatty acid is in excess, the unacted-on or uncombined portion thereof may be removed by washing the product with alcohol or by some other well-known process in the art of refining fats. In either event, however, the original compound which was not in excess will be wholly combined in the reaction, and

the uncombined portion of product can be removed by a washing process familiar to the arts. The products of this specific example of my process are well known and have various uses in the arts, although they are not, as in this instance, the results of an industrial generative process.

Instead of a pure glycerin a mixture thereof, such as a well-known organic refuse or fat, may be employed, in which event the glycerin-bearing substance may be simply regarded as a carrier, and the uncombined residue thereof may be separated from the resultant product by any suitable solvent in which the resultant product is insoluble.

As an example of my process employing an alcohol other than glycerin, take one hundred parts of castor-oil (which contains an alcoholic hydroxyl group and is therefore, broadly speaking, an alcohol) and seventy-five parts of stearic acid and from one to five parts of the sulfo fatty aromatic acid and subject them to the heating and mixing process above described. The resultant product of this reaction is a neutral oil the character of which depends upon the fatty acid used.

From the foregoing general statements of the purposes and operation of my process, as illustrated by selected specific examples, those skilled in the art will readily derive such an understanding of the invention as will enable them to make practical application thereof without further instruction. It will therefore be unnecessary to recite further specific examples of the process, which in its nature admits of almost infinite variety, but all dependent upon the principles involved in my process and subordinate thereto.

It is desirable that the alcoholic hydroxyl be substantially anhydrous. There is usually a slight amount of water present, particularly where glycerin and similar hygroscopic compounds are employed; but it is the intention to carry on the reaction in the absence of water, and sufficient heat must therefore be employed to substantially evaporate any water accidentally present, as well as the water formed by the reaction.

Having described my invention, I claim—

The herein-described process of combining a non-readily-volatile compound containing alcoholic hydroxyl and a fatty acid, which consists in bringing them together in the presence of a relatively small percentage of a sulfo fatty acid and applying sufficient heat to the mixture to evaporate any water present as well as the water formed by the reaction.

In testimony whereof I have hereunto set my hand.

ERNST TWITCHELL.

Witnesses:

OLIVER B. KAISER,

LEO O'DONNELL.