Dec. 26, 1922. 1,439,685.

J. W. BODMAN.

PRODUCTION OF LIGHT COLORED FATTY ACIDS.

FILED SEPT. 21, 1920. 2 SHEETS—SHEET 1.

Fig. 1.

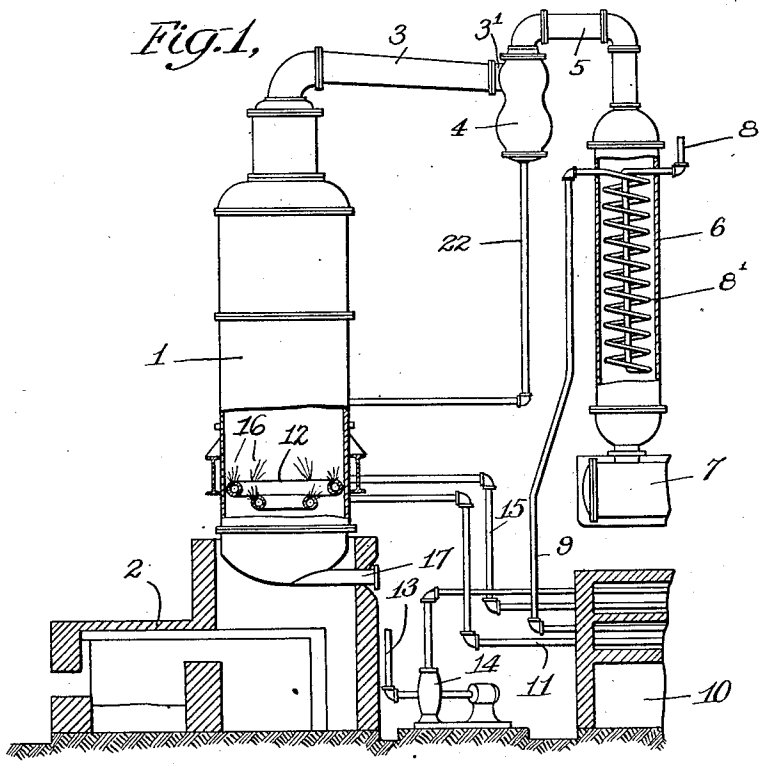
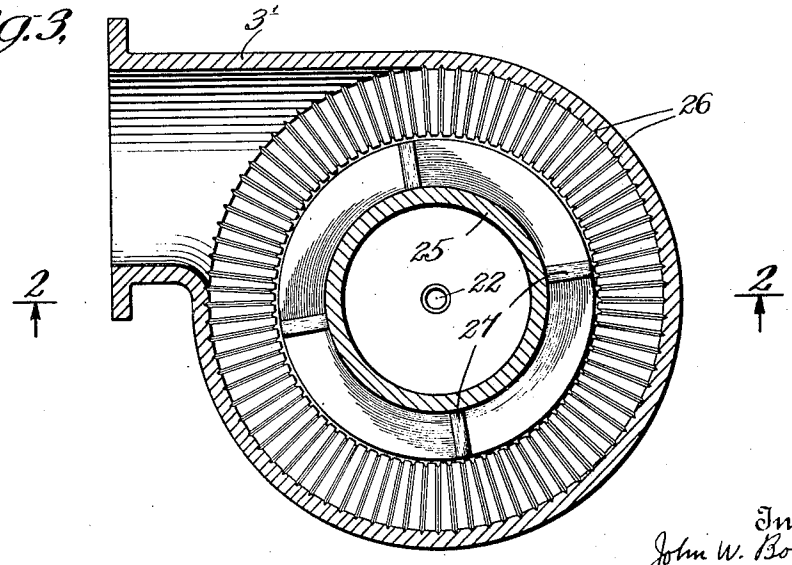


Fig. 3.



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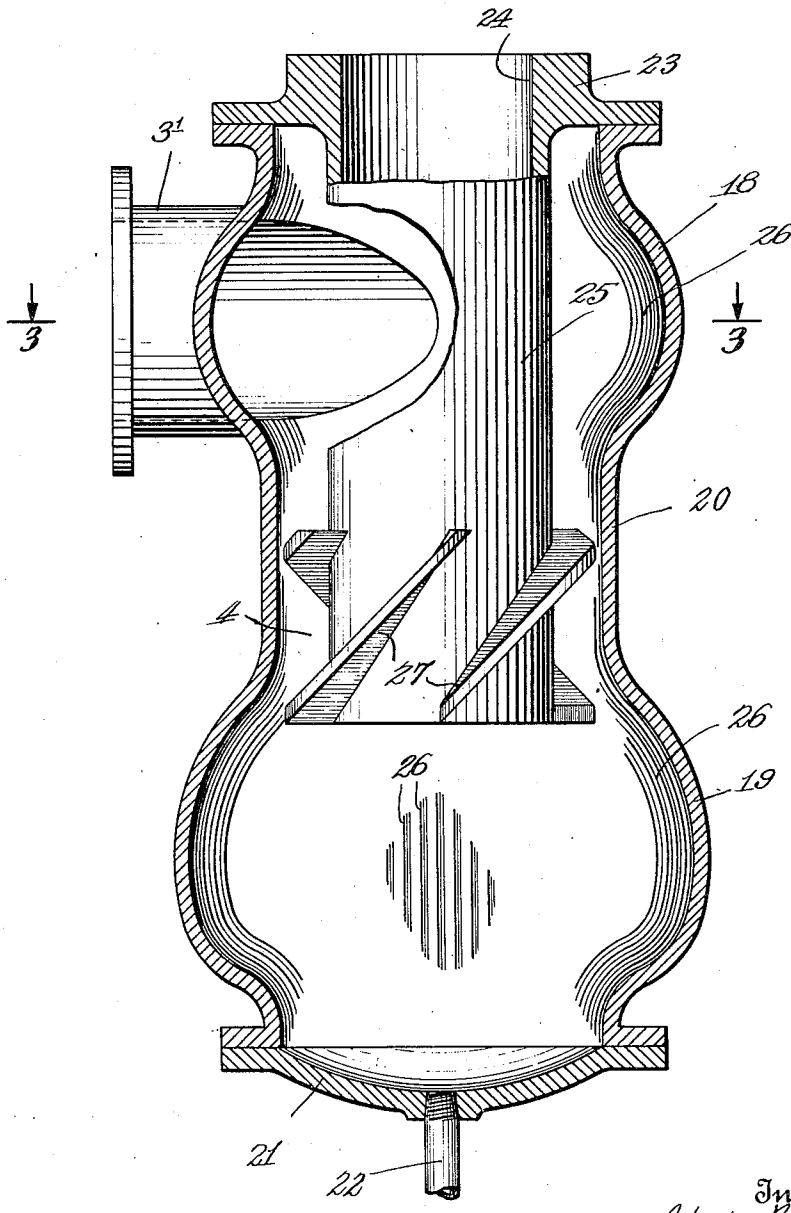
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PRODUCTION OF LIGHT COLORED FATTY ACIDS.

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Fig. 2,



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Patented Dec. 26, 1922. 1,439,685

UNITED STATES PATENT OFFICE.

JOHN W. BODMAN, OF WESTERN SPRINGS, ILLINOIS, ASSIGNOR TO WILLIAM GARRIGUE & COMPANY, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

PRODUCTION OF LIGHT-COLORED FATTY ACIDS.

Application filed September 21, 1920. Serial No. 411,846.

To all whom it may concern:

Be it known that I, JOHN W. BODMAN, a citizen of the United States, residing at Western Springs, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in the Production of Light-Colored Fatty Acids, of which the following is a specification.

My invention relates to a process of purifying fatty acids and suitable apparatus by which the process may be carried out. The process is intended to produce light colored fatty acids, which may be employed directly in soap making, for example, from raw material containing fatty acids, comprising recovered fats and refinery foots, for example, which are too dark in color to be employed directly in soap manufacture. My process involves the distillation of the dark colored fatty acids, followed by the separation from the evaporated products of particles of color bearing material carried thereby, the separation preferably being accomplished by centrifugal action during which the vapors are subjected to a scrubbing action, while the temperature and pressure conditions are suitably controlled. Thereafter, the evaporated fatty acids are condensed.

My present invention may be considered as in some respects an improvement on that disclosed in my application Serial No. 316,301, distillation of fatty acids, filed August 9, 1919 now Patent 1,372,477, issued March 22, 1921. In the process there disclosed the black fatty acid is fed continuously to a vacuum still into which it is preferably sprayed, the still being heated by direct fire and supplied with a highly heated gaseous carrier, preferably superheated steam. The fine subdivision to which the fatty acid is subjected and its thorough commingling with the heated gaseous carrier results in a distillation which eliminates a very considerable part of the color-bearing elements of the material.

I have now found, however, that a further elimination of color-bearing material may be effected by subjecting the commingled mass of evaporated fatty acids and carrier to a separating process, such as that briefly described above. It would appear from my research that color-bearing material, of a pitch-like nature, is carried by the highly heated gaseous stream in the form of small particles which can be separated from the gaseous stream by a suitable separating process conducted at a temperature above the distilling point of the fatty acids. The particles of pitch-like material are heavier than the remainder of the gaseous stream, and may, therefore, be thrown to the outer edge of the stream by centrifugal action, so that they may be caused to impinge against suitable surfaces and condensed thereon while the evaporated fatty acids continue uncondensed, the acids being condensed at a subsequent point. The pitch or color bearing material which has been separated out of the gaseous stream may be returned to the still and again distilled, or may be led to a suitable settling tank.

In order that a clearer understanding of my invention may be had, attention is hereby directed to the accompanying drawings forming part of this application, illustrating one manner in which my improved process may be carried out and one form of apparatus, comprised in my invention. In the drawings Fig. 1 represents a diagrammatic side elevation of a portion of an installation for producing light colored fatty acids, certain parts being shown in cross section; Fig. 2 is an enlarged vertical section through the separating apparatus shown in Fig. 1, this section being taken on line 2—2 of Fig. 3; and Fig. 3 is a horizontal section taken on line 3—3 of Fig. 2.

Referring to the drawings, the still 1 is preferably mounted over and heated from a furnace 2. A connection 3 extends from the top of the still to the separator 4 from the top of which a connection 5 extends to the top of what I term a superheater condenser 6 which is connected at its bottom to a receiver 7. The latter may be connected to the top of another condenser, which is connected to a barometric condenser and vacuum pump. I have not deemed it necessary to illustrate these parts last referred to, as the same are shown and described in my copending application referred to.

In the form of my invention illustrated, the steam or other gaseous carrier to be used enters the system through a pipe 8 which extends through the superheater condenser 6 in a suitable coil indicated at 8′. The steam or other gaseous carrier passes from coil 8′ by a pipe 9 which extends

through the furnace 10. The gaseous carrier is superheated by its passage through coil 8′ because of the passage of the hot vapors from the still over this coil. The gaseous carrier is still further heated by furnace 10, from which the gaseous carrier passes by pipe 11 into the lower part of the still, where it escapes through suitable nozzles or vents 12.

The material to be distilled comprising dark colored fatty acids enters through a pipe 13 and is forced by pump 14 through a coil of pipe mounted in furnace 10 from which point the heated fatty acids pass through pipe connection 15 into the still. Here they preferably pass through nozzles 16 in the form of spray. The heat conditions are so arranged as to cause the evaporation of the sprayed fatty acids. An outlet 17 is provided at the bottom of the still for pitch or tar.

Pipe connection 3 extending from the top of the still is coupled to the intake pipe 3′ extending horizontally into the upper portion of the separator 4. The latter preferably is formed of a metal casting having an upper chamber 18 into which the intake pipe 3′ leads and a chamber 19 adjacent the lower portion of the separator. Chambers 18 and 19 are connected by a neck portion 20.

The bottom of the separator is closed by a closure member 21 having a draw-off connection 22 therein. The separator is closed at the top by a member 23 having an opening 24 therein and a downwardly extending tube 25, this tube being open at the bottom. The pipe connection 5 is suitably connected with the top closure member 23, so that gaseous matter in the lower portion of the separator may escape through tube 25 and connection 5 to the condenser 6.

The upper chamber 18 in the separator is preferably outwardly curved as shown, and is of an enlarged diameter in comparison with that of the pipe connections 3 and 3′ by which the gaseous stream enters the separator. Preferably, the diameter of chamber 18 is about twice that of the pipe connection 3′ and, the tube 25 being of about the same diameter as pipe connection 3′, the annular space surrounding tube 25 into which the gaseous stream passes from pipe 3′ is large enough to permit a considerable expansion of the gases passing therein.

The bottom chamber 19 is preferably outwardly curved as shown and of a diameter somewhat larger than that of the upper chamber 18. The neck portion 20 connecting the two chambers is of a less diameter than that of chamber 18, so that the passage for the gaseous stream between this neck portion 20 and the tube 25 is considerably restricted. The lower end of tube 25 is preferably positioned at a point adjacent the upper end of chamber 19.

The inner surface of the outer casing of the separator is provided with vertical channels 26 which preferably extend throughout the length of chambers 18 and 19 and neck portion 20. These channels constitute scouring surfaces for the gaseous stream contacting against the same. The channels may be formed by grooving the inner surfaces of the casing as shown or otherwise, the effect being in any case to present inwardly directed ribs closely spaced together with channels extending downwardly between the same.

The tube 25 is preferably provided with outwardly directed slanting surfaces 27, which preferably extend about the lower portion of tube 25, within the neck 20, in helical form.

The gaseous stream comprising the evaporated fatty acids, together with the superheated steam or other gaseous carrier with which the acids are commingled, passes into the separator at high velocity, because of the high vacuum under which the system is operated and the force of the highly heated gaseous carrier. Centrifugal action ensues in chamber 18, resulting in the passage of the stream across the roughened surfaces produced by the channels 26. A certain expansion of the gaseous matter also takes place in this chamber, resulting in some fall of temperature. Minute particles of pitch or other color-bearing material entrained in the gaseous stream will be thrown violently against the serrated surfaces of chamber 18 and will to a considerable extent condense against the same, flowing down the channels onto the bottom plate 21.

The stream of gaseous material passes downwardly through the neck 20 where it is again compressed and given velocity, the stream being directed by the spiral ribs 27 against the outer surfaces of chamber 19, with considerable force. The result of this action is that a further centrifugal action takes place in chamber 19 at a somewhat lower temperature, the size of chamber 19 permitting considerable expansion of the gases. A further separation of the color-bearing material accordingly takes place in this chamber. The temperature of the gaseous stream entering the separator and the proportions of the latter should be so chosen that the temperature of the gaseous stream within the separator will be at all times maintained above the distillation point of the fatty acids, which is about 425° F.

The evaporated fatty acids as stated pass upwardly through tube 25 and into condenser 6 and any subsequent condenser or condensers which may be used in the system from which the condensed and purified acids are recovered. The pitch like material which settles on plate 21 may be returned through pipe connection 22 to the

still, so that any fatty acids contained therein may be recovered, or the pitch like material may be conducted to a suitable settling tank.

It should be understood that my invention is not strictly limited to the details of process and apparatus described, but is as broad as is indicated by the accompanying claims.

What I claim is:—

1. A process of producing light colored fatty acids, which comprises evaporating dark colored fatty acids, causing a stream of the evaporated acids to progress at high speed into contact with a plurality of obstructions, to subject the same to a scrubbing action, while maintaining the temperature above the distilling point of the fatty acids, and at the same time continuously changing the direction of movement of the stream, removing color-bearing material which is separated from the stream by contact with such obstructions, and thereafter condensing the evaporated fatty acids.

2. A process of producing light colored fatty acids, which comprises evaporating dark colored fatty acids and thoroughly commingling the vapors with a heated gaseous carrier, subjecting the commingled gaseous mass, while moving at high speed, to a centrifugal action, and the outermost portion of the same to a scrubbing action, while maintaining the temperature above the distilling point of the fatty acids, and thereafter condensing the fatty acids at a point removed from that at which the centrifugal and scrubbing actions took place.

3. A process of producing light colored fatty acids, which comprises evaporating dark colored fatty acids and thoroughly commingling the vapors with a heated gaseous carrier, causing a stream of the commingled gaseous mass to progress at high speed, subjecting the stream to centrifugal action while expanding the volume of the same, but maintaining the temperature above the distilling point of the fatty acids, and subjecting the stream to a scrubbing action during such treatment, and thereafter condensing the fatty acids at a point removed from that at which the centrifugal and scrubbing actions took place.

4. In apparatus for producing light colored fatty acids, the combination of a still, means for introducing the material to be distilled, and means for introducing a gaseous carrier, therein, a separator comprising a closed vertical outer casing having vertical inwardly extending ribs thereon, and a tube extending upwardly therein, with its open lower end spaced above the bottom thereof, a horizontal connection between the top of said still and the space between said tube and said casing, a condenser and a connection between the upper end of said tube and said condenser.

5. In apparatus for producing light colored fatty acids, the combination of a vacuum still, means for introducing the material to be distilled and means for introducing a gaseous carrier therein, a separator connected with the upper portion of said still, comprising means for subjecting the stream of evaporated fatty acids and carrier to centrifugal action, said separator having ribs transverse to the path of the stream therethrough adapted to separate particles of color-bearing material from the stream, a connection extending from said separator, adapted to carry off the purified stream, and a condenser connected to said connection.

This specification signed and witnessed this 11 day of Sept., 1920.

JOHN W. BODMAN.

Witnesses:

G. S. BURTIS,

CARL TRUAX.