(No Model.)

W. F. C. McCARTY.

PROCESS OF AND APPARATUS FOR TREATING FATS AND OILS FOR OBTAINING FATTY ACIDS.

No. 283,266. Patented Aug. 14, 1883.

Fig. 1.

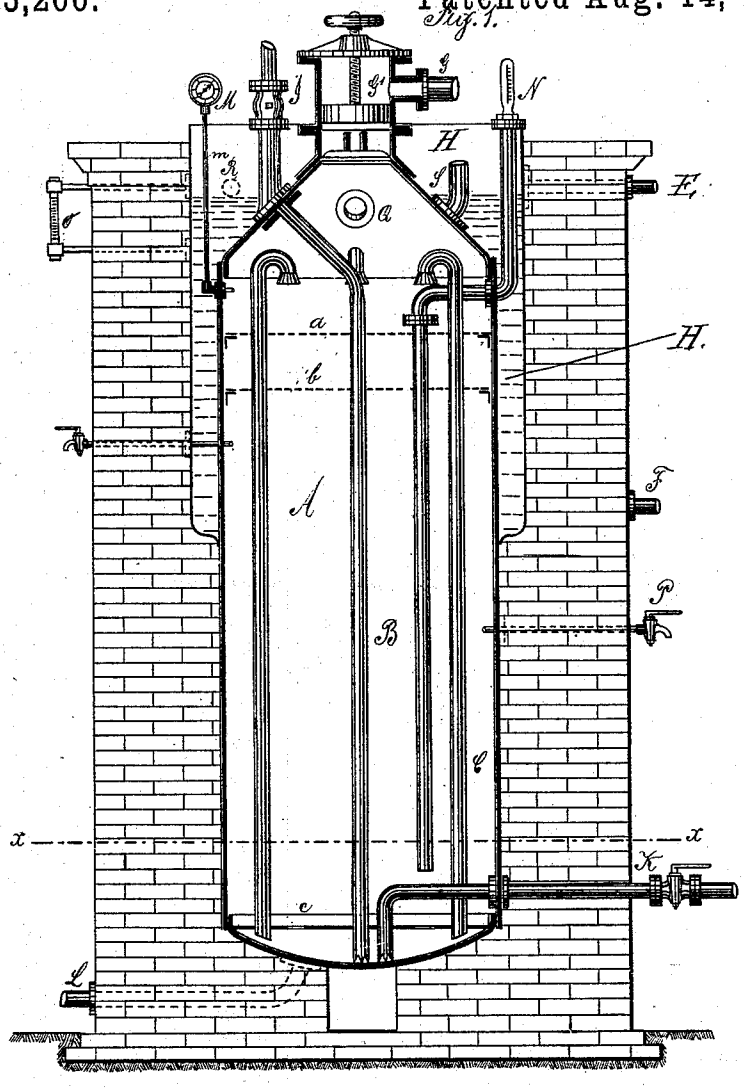
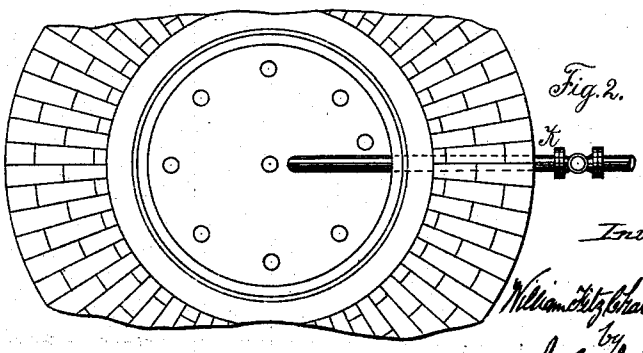


Fig. 2.



Witnesses.
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UNITED STATES PATENT OFFICE.

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PROCESS OF AND APPARATUS FOR TREATING FATS AND OILS FOR OBTAINING FATTY ACIDS.

SPECIFICATION forming part of Letters Patent No. 283,266, dated August 14, 1883.

Application filed July 27, 1882. (No model.) Patented in England May 31, 1882, No. 2,559; in Belgium June 15, 1882, No. 58,053; in Italy June 21, 1882, No. 14,315—343; in France August 12, 1882, No. 149,118; in Canada October 14, 1882, No. 15,628; in Spain November 10, 1882. No. 2,514; in Portugal November 19, 1882, No. 772, and in Germany June 3, 1883, No. 23,465.

To all whom it may concern:

Be it known that I, WILLIAM FITZ-CHARLES McCARTY, of Paris, in the French Republic, and at present of Berlin, in the German Empire, have invented certain new and useful Improvements in Processes of and Apparatus for Treating Fats and Oils for Obtaining Fatty Acids, known as the "Vacuum Emulsion Process," of which the following is a full and clear specification.

My invention relates to an improved process for treating fats and oils for obtaining fatty acids, known as the "vacuum emulsion process." By means of my process, which is essentially a mechanical, not a chemical process, I open up the molecules and destroy or break through the fine film of albumine or the cellular membrane surrounding each molecule. My process is economical, a great saving of time is attained, and a better product extracted than is possible with any of the processes for extracting stearine and glycerine from fatty substances, known up to the present day as the "grease," is not subjected to any saponification whatsoever, and has not been adulterated by any admixture of chemicals, so that I am enabled to produce pure stearine or stearic acid with a high melting-point and glycerine of absolute purity, while the oleine is better suited for making soap than that attained by any other process. By employing neutral carbonate of magnesia or other finely-subdivided neutral substance I achieve a purely mechanical action, so that the said finely-divided substance acts by abrasion on the cellular membrane or fine albumine film surrounding the molecules forming the grease, in such manner that the molecules are opened up, the glyceral oxide is freed, unites with the water employed in the process, and forms glyceral hydrate or glycerated water, leaving the grease remaining as fatty acids. By employing the vacuum the greases or fatty acids and the glycerated water are separated according to their specific gravity, and by the continued application of the said vacuum by means of a suitable vacuum apparatus or air-pump the greases are exhausted into a suitable receiver or condenser, when the same are cooled or condensed in a purer and whiter condition than by any other known process, for the reason that less heat is employed and no chemicals applied to decompose or change the nature of the greases.

Figure 1 is the vertical section of an apparatus employed in carrying out my said invention; Fig. 2, a section on the line *x x* in Fig. 1.

A is the boiler; B, the tube or pipe for supplying the apparatus with molten grease or fatty matter, and is also employed as steam-pipe for admitting steam into the vessel or digester A.

C C are four or more pipes or tubes, which at the lower end reach below the perforated false bottom *c* and within a short distance of the bottom of the boiler, digester, or vessel proper, A. These pipes serve as circulating-tubes, and are provided at the upper part with a suitable bend, whereas their upper extremities are provided with a suitable rose, in order to attain a better separation of the molecules and to create a greater degree of friction, abrasion, or attrition between the said molecules and the finely-divided neutral carbonate of magnesia or other suitable neutral substance.

D is the brick-work surrounding the boiler, vessel, or digester A, in order to prevent radiation; or, instead of the brick-work, the boiler can be mounted on a suitable frame and well coated or covered with a suitable non-conducting material.

E is a suitable pipe or tube for supplying the jacket H with water for cooling the vessel or boiler A and its contents.

F is a pipe or tube for letting off the water out of the jacket or water-space H.

G is a tube or pipe communicating with the interior of the valve-box I, which said pipe is connected with a suitable vacuum apparatus or air-pump, and serves not only for drawing off the stearic acid or stearine and the oleine, but also for allowing the carbonic-acid gas given off during the first part of the process to escape either into the open air or into a suitable condenser.

G′ is a screw-valve for cutting off the connection between the pipe G and the boiler or vessel A.

K is a pipe or tube provided with a suitable valve or cock, and is employed for drawing off the glyceral hydrate or glycerated water, which is effected by means of the vacuum apparatus or air-pump, or by means of a suitable siphon.

L is a pipe connected to the bottom of the boiler or vessel A, which can be employed for a like purpose as the tube or pipe K, or for letting off any part of the contents of the boiler or vessel A, as may be desired.

M is a manometer, which is connected with the upper part of the boiler or vessel A, in order to be able to control the pressure in the same by means of a pipe, *m*.

N is a thermometer attached to the upper end of the pipe or tube *n*, in order to be able to control the temperature in the said boiler or vessel.

S is a suitable pipe or tube leading to the safety-valve.

O is a water-gage for controlling the height of the contents of the boiler.

P is a pipe or tube for testing or examining the progress of the process.

Q is a pipe or tube for supplying the vessel, receptacle, or boiler A with water.

R is a pipe or tube for allowing any superfluous water to escape from the water-jacket or space H.

a b are two perforated plates or sieves, which are inserted in the upper part of the boiler or vessel A in order to promote the separation of the molecules and increase the attrition or abrasion on the albumine film or membrane surrounding the molecules.

c is a perforated false bottom to the vessel or boiler A, for the purpose mentioned above.

It will be evident to any person skilled in the art that other means can be employed for increasing the abrasion or attrition between the molecules without departing from the tenor of my said invention; and I desire it to be specially understood that my said invention is not founded on any chemical process or reaction, but that the same consists exclusively of a mechanical action on the albumine film or membrane surrounding the molecules, in order to open up the same and set free the glycerine and fatty acids.

In order that my said invention and the apparatus employed in carrying out the same may be more fully understood, I will now proceed to describe the operation of the said apparatus and the method of carrying out my process aforenamed.

The grease or fatty substance employed in my said process is first melted in a suitable vessel and introduced into the apparatus, boiler, or vessel A by means of the tube or pipe B, which said pipe or tube is provided with a three-way cock or valve. Water equal to ten per cent. of the weight of the grease is now let into the boiler or vessel by means of the supply-pipe Q, and free steam admitted through the pipe B or the pipe K until an emulsion is formed, after which neutral carbonate of magnesia, equal to about one-tenth per cent., in weight, of the fatty matter to be treated, is admitted or forced into the boiler or vessel by means of the pipe B or the pipe Q, which said neutral carbonate of magnesia, talc, pipe-clay, chalk, or other finely-subdivided neutral substance is previously mixed with a suitable quantity of water in order to thoroughly dissolve the same. I now continue to introduce steam into the boiler or vessel by means of the pipe or tube B until any or all carbonic-acid gas evolved in the apparatus is driven off through the open valve G′ and the pipe or tube G. The valve G′ is now screwed down onto its seat, the steam cut off, and the apparatus heated by means of a suitable firing until the thermometer *n* shows a heat in the boiler or vessel A equal to about 160° centigrade or 320° Fahrenheit. I maintain this last heat for about four to six hours, according to the nature of the grease, after which a vacuum is formed, and in order to facilitate the formation of this said vacuum the fire is put out and cold water introduced into the jacket or water-space H and the grease and the glycerated water allowed to separate, whereupon the glycerated water or glyceral hydrate is drawn off by means of the pipe K and a suitable siphon, or, as aforementioned, by means of an appropriate vacuum apparatus or pump. The valve G′ is now opened, a vacuum created, and the fatty acids drawn off into a suitable condensing apparatus, in which a vacuum has been formed, and which said vacuum is maintained by means of an appropriate vacuum-pump. The greases or fatty acids are now run off into a suitable closed vessel and allowed to crystallize, after which a vacuum is created at the lower part of the said vessel. By opening a stop-cock provided for this purpose air is introduced above the said greases or fatty acids, and by means of the pressure so created the oleine is forced out of the upper part of the said closed vessel through a perforated plate or plates or false bottom covered with hair-cloth or fine wire-gauze, and is allowed to flow off by a cock or valve at the bottom of the said closed vessel into a suitable vat or receptacle arranged for this purpose. The oleine, now separated from the crystallized fatty acids, is absolutely free from all chemical compounds or admixtures, and is admirably adapted for soap-making and lubricating purposes. The fatty acids which have not been subjected to saponification are absolutely free from all impurities and can be applied to greater advantage than heretofore in making candles and such like, as the melting-point has not been decreased, and the glycerine obtained is purer than can be extracted by any other known process.

Having now described my said invention for an improved process for treating fats and oils for obtaining fatty acids, known as the "vacuum emulsion process," I wish it to be understood that what I claim, and desire to secure by Letters Patent, is—

1. The described process of effecting a me-

chanical action on the fine albuminous film surrounding the molecules, to wit: by the agency of neutral carbonate of magnesia, talc, pipe-clay, chalk, or other finely-subdivided substance, and whereby the attrition, abrasion, or friction between the molecules and also between the finely-subdivided neutral matter opens up the molecules and gives the glyceral oxide of fatty acids free without any saponification ensuing and without lowering the melting-point of the stearic acid or stearine, substantially as and for the purpose set forth, and shown in the accompanying drawings.

2. The described emulsion process for extracting glycerine and stearine or stearic acid from fatty substances, consisting in using an emulsion of neutral carbonate of magnesia or other finely-subdivided neutral substance in order to open up the molecules in a purely mechanical manner, and whereby the glyceral oxide is freed, unites with the water employed in the process, and forms glyceral hydrate or glycerated water, leaving the grease remaining as fatty acids, substantially as and for the purpose shown and described.

3. The described process of separating the glycerated water from the fatty acids according to their specific gravity and of exhausting the said fatty acids from the vessel in which they have been treated into a suitable receiver or condenser, the same consisting in the agency of a vacuum created by any suitable vacuum apparatus, and in cooling or condensing said fatty acids in a purer, whiter condition and at higher melting-point than usual and with less heat and without the necessity of chemicals to decompose or change the nature of the greases, substantially as and for the purpose shown and described.

4. The described apparatus for the treatment, by my vacuum emulsion process, of greases or fats for the production of glycerine and stearine or stearic acid, consisting of a digester, A, surrounded with non-conducting material, supply-pipe B, pipes C, water-space H, perforated plates or sieves *a b c*, and suitable inlet and outlet pipes.

In witness whereof I have hereunto set my hand.

WILLIAM FITZ-CHARLES McCARTY.

In presence of—
JAMES T. DU BOIS,
ELISE BRAUN.