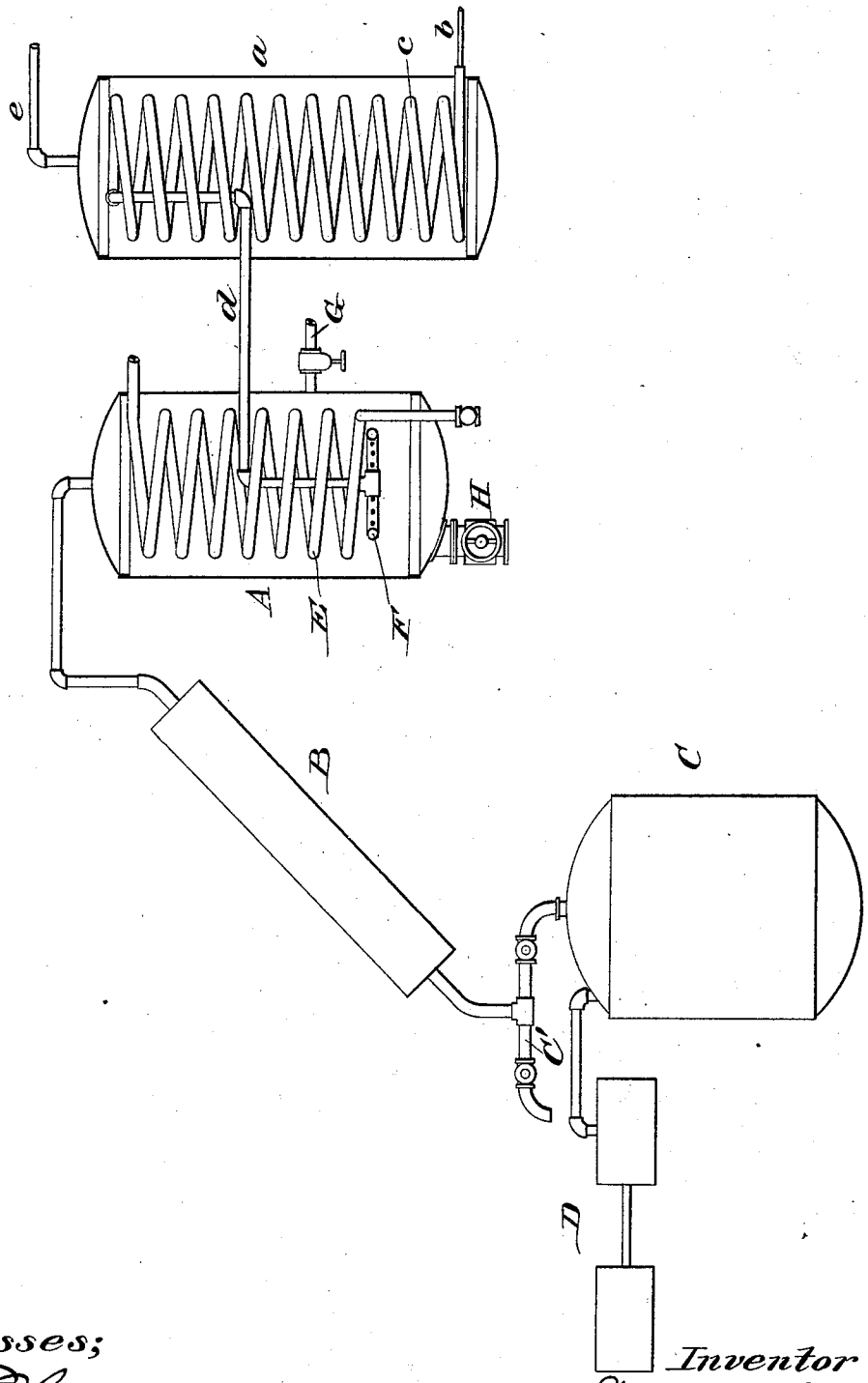
(No Model.)

F. L. DYER.

PROCESS OF PURIFYING FIXED OILS, FATS, AND FATTY ACIDS.

No. 522,156. Patented June 26, 1894.



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PROCESS OF PURIFYING FIXED OILS, FATS, AND FATTY ACIDS.

SPECIFICATION forming part of Letters Patent No. 522,156, dated June 26, 1894.

Application filed March 7, 1894. Serial No. 502,694. (No specimens.)

To all whom it may concern:

Be it known that I, FRANK L. DYER, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Processes of Purification of Fixed Oils, Fats, and Fatty Acids; and I do hereby declare the following to be a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a process of purification of fixed oils, fats and fatty acids by the injection of steam into the liquid. The steam used, before its introduction into the liquid, is allowed to expand and is then heated to compensate for the diminution of temperature caused by the expansion. The advantage of such steam is that it carries a large amount of latent heat without being of excessive temperature and therefore does not suffer so much condensation, whereby it is very effective in carrying off the volatile impurities of the material treated. I will now illustrate this process as applied to the purification of black or recovered grease, reference being had to the apparatus shown in the drawing, in which—

a, is a cylindrical drum of sheet metal; *b*, is a steam pipe from the boiler; *c*, an expansion coil within the drum *a*, and connected with the steam pipe *b*, but of a greater diameter than the same; *d*, a steam pipe from the expansion coil; *e*, a steam pipe for conveying live steam into the drum *a*, for heating the expansion coil therein; A, is a still; B, a condenser; C, a valved receiver of impurities; C′, a valved pipe leading to a separate receiver (not shown) of the distillate; D, a vacuum pump; E, a heating coil in the still; F, a perforated delivery pipe for the injection of the expanded and reheated steam; G, a valved inlet pipe for the introduction of material into the still; and, H, a valved outlet pipe for the purified material. I show this apparatus simply in order that my process may be understood and therefore do not wish to be limited or restricted to the same.

In carrying out my process with an apparatus such as that illustrated, the still is filled to about one-third of its capacity with the material to be treated. The vacuum pump is then operated until a vacuum of about twenty eight inches is obtained; but this is not absolutely necessary, since in the purification of the liquid a vacuum is not necessary. Heat is then applied to the contents of the still, such as by steam in the coil E, until the liquid is heated to a temperature approximating the boiling point of water at the pressure obtained. Steam from the boiler and under pressure is now passed through the steam pipe *b* into the expansion coil *c*, and by reason of the large size of the latter rapidly expands, its temperature being thereby diminished. By keeping the drum *a*, filled with live steam at the proper temperature, the steam which is thus expanded in the expansion coil *c* is reheated until it is of the desired temperature. This expanded and reheated steam is then injected into the liquid and the odoriferous and some other impurities therein are thus distilled off, having a lower boiling point than the fixed oils, fats, and fatty acids in which they are contained, the necessary vacuum, if used, being maintained as uniform as possible. To avoid a nuisance the impurities passing off with the steam may be condensed in the condenser B, and collected in a receiver C, in the usual manner. This operation is continued until practically all the volatile impurities in the liquid have been removed and collected. In the practice of this process the expanded steam may be passed through the material without any additional heating, if in its expanded form it is sufficiently heated to effect the proper purification of the materials. It is also possible to effect the proper purification without heating the liquid by independent means. The advantage of making use of expanded and reheated steam in the purification of fixed oils, fats and fatty acids, is that the steam can condense but slightly in the still, and therefore the purification is made much quicker and more complete, especially in the treatment of very impure material, such as recovered grease, black grease and cocoa-nut oil. The same advantages are also found in the treatment of the more expensive oils,

from which a thorough removal of all the volatile impurities, such as the lower fatty acids and glycerids which impart a disagreeable taste or odor to the same, is of importance. Where the fats, oils or fatty acids treated are very impure and of a dark or black color, a further purification may be effected after the elimination of the volatile impurities as above described, by raising the temperature of the material without removal from the still, to the point of distillation, and distilling as long as any oil, fat or fatty acid remains in the still, the distillate being collected in a separate receiver.

What I claim, and desire to secure by Letters Patent, is—

1. In the art of purifying fixed oils, fats and fatty acids, the improvement which consists in injecting expanded and reheated steam into the liquid maintained at a temperature below its boiling point, as and for the purpose described.

2. In the art of purifying fixed oils, fats and fatty acids, the improvement which consists in independently heating the liquid and injecting expanded and reheated steam into the independently heated liquid maintained at a temperature below its boiling point, as and for the purpose described.

3. In the art of purifying fixed oils, fats and fatty acids, the improvement which consists in injecting expanded and reheated steam into the liquid maintained *in vacuo* at a temperature below its boiling point, as and for the purpose described.

4. In the art of purifying fixed oils, fats and fatty acids, the improvement which consists in injecting expanded and reheated steam into the independently heated liquid, maintained *in vacuo* at a temperature below its boiling point, as and for the purpose described.

5. In the art of purifying fixed oils, fats and fatty acids, the improvement which consists in injecting expanded and reheated steam into the independently heated liquid, maintained *in vacuo* at a temperature below its boiling point and subsequently subjecting the material freed from its volatile impurities to distillation by means of injection of expanded and reheated steam into the material kept *in vacuo* at the distilling temperature, as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK L. DYER.

Witnesses:
A. L. SOHON,
A. G. REESE.