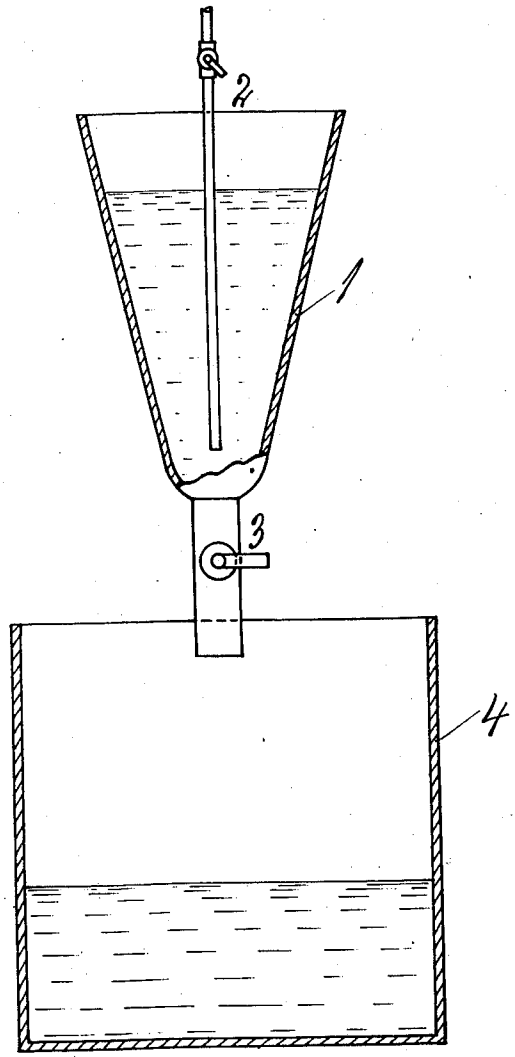
Jan. 7, 1930. A. W. OWE 1,742,666

PROCESS OF RECOVERING OIL FROM FISH LIVERS AND OTHER SIMILAR MATERIALS

Filed Feb. 25, 1926



F. W. Owe
INVENTOR

By: Marks & Clark
Attys.

Patented Jan. 7, 1930

1,742,666

UNITED STATES PATENT OFFICE

AAGE W. OWE, OF LYSAKER, NORWAY

PROCESS OF RECOVERING OIL FROM FISH LIVERS AND OTHER SIMILAR MATERIALS

Application filed February 25, 1926, Serial No. 90,662, and in Norway March 5, 1925.

The usual process in the production of oils from fish liver or other similar materials consists therein that the liver is heated by direct or indirect steam or hot water to a temperature generally ranging from 70–80° C. or more. During this heating the liver gives off the oil when the cell walls burst presumably because the albumens coagulate by heating. The oil collects on the top of the residuum and is separated therefrom by decanting or ladling. The last portions of the oil are frequently recovered by a filtering operation sometimes in combination with pressing. In any case the hot oil is either introduced into larger clearing tanks or directly into barrels.

In the said prior method of operation the liver as well as the oil is maintained at elevated temperatures for a relatively long period of time generally several hours at about 60° C. Such long heat treatment is however according to applicant's experience, injurious to the quality of the resulting product, because the reactions which produce the unpleasant prominent "steam train flavour" take place more rapidly the higher the temperature is. This is a fact which has not hitherto been known.

The present invention has for its object a process which is based upon this novel recognition and by means of which an improved product is obtained in such manner that the liver pulp and the oil are both maintained at high temperature for a shorter period of time than otherwise is usual. It is suitable to maintain the liver pulp at high temperature only for such length of time as is necessary to cause the livers to give off the oil, that is to say, to coagulate to a sufficient degree to allow the oil to be separated off by mechanical means, whereupon the pulp is immediately cooled down to a lower temperature, for example ordinary room temperature. The shortest suitable duration of the heating will depend upon the temperature to which the pulp is heated. At 60° C., 10 minutes will usually be sufficient, and at 100° C. two or three minutes will suffice. The end point of the heating is reached when the walls of the cells burst. Centrifugal treatment of a sample of the pulp will then give two clearly separated layers, one consisting of an oil and the other of a cell tissue. When too short time or too low temperatures are employed the output of oil will be diminished. The more rapidly the liver pulp is brought to the desired temperature and the more rapidly it is afterwards cooled, the better the products obtained will be.

The mechanical means or apparatus employed to attain this result can be of different types. In any case the liver pulp is first heated by contact with heating surfaces or by the introduction of hot water or steam to bring it to the desired maximum temperature and thereupon by contact with cooling surfaces or by the introduction of cold water, cold oil or cold liver pulp the temperature is brought down again to effect separation of oil and tissue residuum.

To effect the heating as well as the cooling one can for example make use of hollow cylinders on the surfaces of which the liver pulp is spread in thin layer. The cylinders employed to effect the heating may be filled with water and by supply of steam or by other means the cylinders are maintained at the desired maximum temperature, for example 60° C. The dimensions of the cylinders are so proportioned in relation to the quantity of liver to be treated that the pulp leaves the cylinders in suitably coagulated condition. From these cylinders the pulp is transferred to the cooling cylinders through the interior of which cold water or other cooling liquid is circulated in such a quantity that the pulp leaves the cylinders at a temperature of about 25° C. The oil is thereupon separated from the tissue residuum by mechanical means as

by ladling, centrifugal treatment and filtering.

In an analogous manner the pulp can be passed through pipes which are surrounded by heating or cooling fluids.

In the accompanying drawing I have shown an apparatus for carrying out my process, the sole figure being a cross-sectional elevation of apparatus which I have found suitable. I shall describe the drawing in connection with the following examples.

Example 1

5 hectolitres of cod livers are ground in a sausage mill and are poured into a conical wooden container 1 having steam supply pipe 2 and draw off valve 3 at the bottom. Superheated steam as a powerful jet is introduced into the container so that the liver pulp in the course of about 10 minutes attains a temperature of about 90° C.

As soon as the temperature of 90° C. has been reached the steam is shut off and the entire mass is caused to pass through the bottom valve 3 into the vessel 4 containing about 600 litres of cold water (of 5–10° C.). The contents of the vessel 4 is then at once subjected to agitation for example by mechanical stirrers or by handspikes, whereby the temperature in the course of two or three minutes adjusts itself to 40° C. At this temperature the reactions producing undesirable flavour in the oil proceed very slowly. Even several hours standing at this temperature will not appreciably lower the high quality of the product. The liver mass can therefore be left standing until the oil has separated out. Three layers will then be formed, on the top oil and at the bottom water. The middle layer contains the liver tissue suspended in water. The oil is removed by ladling, by means of siphons, by filtration or centrifugal treatment and is finally purified in the usual manner by cooling to about 0° C. and filtering.

Special measures to prevent formation of emulsions are not necessary because there are not formed emulsions of such a stable character as not to separate by standing or at least by centrifugal treatment.

Example 2

5 hectolitres of livers are subjected to the same treatment as explained in Example 1 but for the difference that the vessel 4 contains 600 litres of cold liver oil instead of cold water.

A superior product can be obtained by the use of the hitherto employed rendering methods provided steps are taken to rapidly cool the oil to ordinary temperature immediately after it has been separated from the tissue residuum.

The advantageous result of this treatment is due to the fact that the oil separated from the tissue residuum will always contain a substantial proportion of small suspended particles of tissue which if the oil is not rapidly cooled will impart to the oil an unpleasant liver flavor.

Claim:

Process of recovering oil from fish livers comprising in combination the steps of heating the liver in a finely subdivided condition to 60° C. or above, maintaining the liver at this temperature only for such time as is necessary to cause the livers to give off oil, and subjecting the heated liver to a sudden cooling in contact with non-gaseous cooling means to lower the mass to 50° C. or below.

In testimony whereof I have signed my name to this specification.

AAGE W. OWE.