Jan. 18, 1938. P. L. FAUTH 2,105,782

APPARATUS FOR DEHYDRATING OIL CONTAINING MATERIALS, HAVING A HIGH WATER CONTENT, PARTICULARLY WHALE FLESH

Filed May 16, 1935

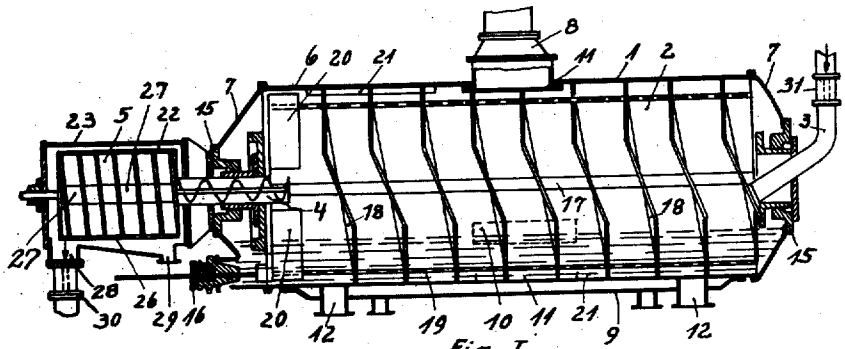


Fig. I

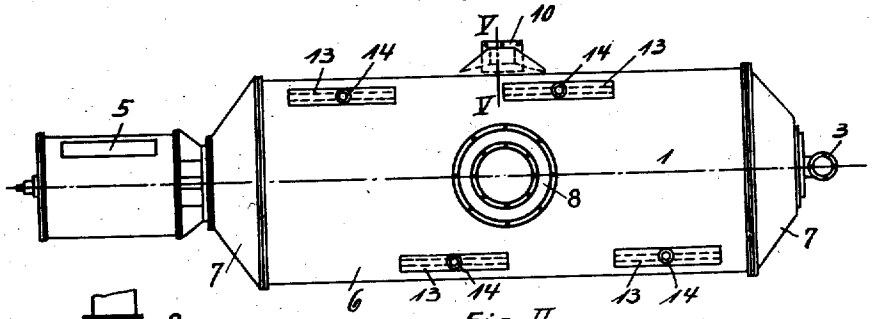


Fig. II

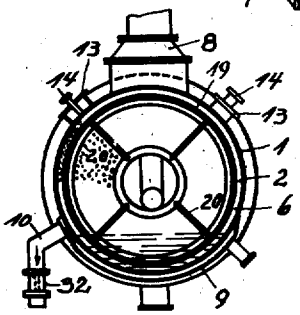


Fig. III

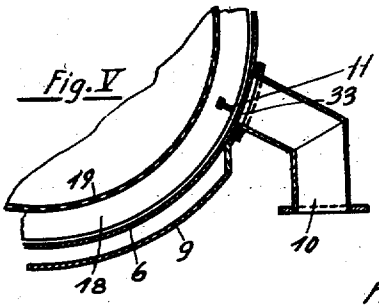


Fig. V

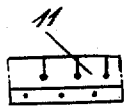


Fig. Va



Fig. Vb

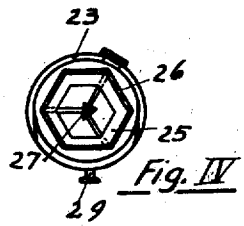


Fig. IV

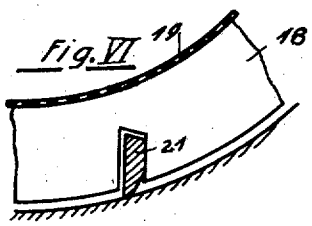


Fig. VI

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UNITED STATES PATENT OFFICE

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APPARATUS FOR DEHYDRATING OIL-CONTAINING MATERIAL HAVING A HIGH WATER CONTENT, PARTICULARLY WHALE FLESH

Philipp Lorenz Fauth, Wiesbaden-Dotzheim, Germany, assignor to Gesellschaft zur Verwertung Fauth'scher Patente m. b. H., Wiesbaden, Germany

Application May 16, 1935, Serial No. 21,788
In Germany May 14, 1934

7 Claims. (Cl. 37—13)

The present invention relates to apparatus for dehydrating oil-containing materials, having a high water content, particularly whale flesh.

For carrying out the dehydrating process described in co-pending patent application, Serial No. 721,808, filed April 21, 1934, perforated drums rotating inside of a stationary drum were employed.

It has now been found that the screens or sieves of the drums become clogged comparatively easily during operation, so that poor circulation of liquid and unfavorable transfer of heat take place. In the drums hitherto employed, the screen holes or perforations had to be very small, in order as far as possible, to avoid the penetration of flesh, blubber or bone particles therethrough.

Attempts to carry out the process by employing a rotating inner conveyor screw, the blades of which reached as far as the inner surface of the outer drum, failed chiefly owing to the fact that flesh sinews and flesh tendons as well as blubber crusts and relatively large bone splinters became jammed between the blades of the screw and the inner wall of the outer drum and gave rise to continuous disturbances in operation. It has also been found that on dispensing with the perforated jacket a substantially greater amount of power had to be employed.

According to this invention it has been found that the hereinbefore mentioned difficulties may be overcome by combining a rotating perforated drum with a rotating conveyor screw.

According to this invention the rotating conveyor screw is provided with a longitudinally extending perforated cylindrical sieve wall, which however does not outwardly close the conveyor screw, but is disposed about 100 mms. from the outer edge of the screw blades. This sieve wall is provided with large holes or perforations so that the sieve will not become clogged and the circulation will not be disturbed. In this inner drum formed by the sieve wall the main quantity of the flesh, blubber or bones to be boiled remains and only finely comminuted parts, which cannot squeeze under the blades, pass through the sieve wall. The conveyor screw is divided by this sieve wall into inner and outer conveyor screws. The outer conveyor screw approaches fairly closely to the inner surface of the outer drum and conveys the finer particles which have passed through the sieve wall to the discharge end of the dehydrating drum. The sieve wall extends only to about 20 cms. from the discharge end of the inner drum and discharging plates, which extend to the inner surface of the outer drum and removes the material conveyed from the inner and outer conveyor screws into the discharging or delivery screw fixed to the discharge end of the sieve wall.

Automatically falling scrapers displaced relatively to one another are mounted on the outer conveyor screw and always keep the heating surfaces clean, so that scorching of the flesh particles is prevented.

The overflow from the drum is disposed in the middle thereof at the height of the desired liquid level and is provided with screens which are readily exchangeable from outside and are twice scraped on the inner surface by strippers mounted on the conveyor at each rotation of the conveyor. The perforations in the discharge screen are advantageously conical in shape, the base of the cone being on the outside.

It has been further found that it is very advantageous to manufacture the blades of the conveyor from perforated metal sheets having holes about 10 mms. in diameter, since in this way equalization of liquid within the drum can easily take place and the passage to the overflow is as free from hindrances as possible. It has also been found thereby that the conveying efficiency of the blades is not detrimentally influenced by these perforations.

In the arrangement of the inner drum according to co-pending patent application, Serial No. 721,808, the drum was furthermore divided by a constriction provided therein into a boiling drum and a draining drum. The present invention enables this constriction and subdivision of the drum to be dispensed with. In place thereof a hexagonal draining drum is disposed in front of the delivery screw. It has in fact been further found that substantially more efficient draining than hitherto is obtained with the aid of a hexagonal drum as aforesaid, which in combination with the outer screw conveyor may be allowed to revolve at ten times the speed of the inner boiling drum. A triangular prism is further disposed on the axle of the draining drum, with the aid of which a double impact of the conveyed material being drained is effected, which constitutes a further improvement of the draining process.

An embodiment of apparatus according to this invention is illustrated in the accompanying drawing, in which

Fig. 1 is a longitudinal section through the apparatus,

Fig. 2 is a plan view of the apparatus,

Fig. 3 is a cross-section through the outer and inner drums,

Fig. 4 is a cross-section through the draining drum,

Fig. 5 is an enlarged partial transverse sectional view on line V—V of Fig. 2 illustrating the arrangement of the overflow with the stripper;

Fig. 5a is a plan view of part of a stripper;

Fig. 5b is a transverse sectional view of a stripper;

Fig. 6 is an enlarged transverse sectional view illustrating the arrangement of the scrapers.

The main parts of the apparatus consist of the outer drum 1, the inner perforated drum 2, the feed pipe 3, the delivery screw 4 and the draining drum 5.

The outer drum 1 consists of a sheet metal cylinder 6, the two covers 7 and the outlet hood 8.

The sheet metal cylinder 6 is provided below with a steam jacket 9 for heating purposes. On one side of the sheet metal cylinder 6 there is disposed an overflow 10, discharging into the sluice 32, which is provided with easily exchangeable perforated sieves 33, which are kept clean by two strippers 11. Two large outlet connections 12 serving for the cleaning of the drum are disposed lower down on the sheet metal jacket 6 and four large inspection covers 13, in which the sprinklers 14 are mounted, are disposed at the top.

The two covers 7 serve for the reception of the bearings 15 and the drive 16 for the inner drum 2.

The outlet hood 8 serves for leading off the vapors.

The inner drum structure consists of the drum framework 17, the screw 18, the perforated drum 19 and the delivery plates 20.

The conveyor screw blades 18 are manufactured from perforated metal sheets, the perforations in which are about 10 mms. in diameter. This conveyor screw is subdivided by the perforated drum 19, which is made of perforated sheet metal having perforations about 5 to 6 mms. in diameter. Four scrapers 21 (Fig. 6) are loosely mounted in slots in the outer screw 18 and are displaced relatively to one another along the outer screw over the entire length of the drum. These scrapers automatically move by gravity to and from the drum walls according to their position in the cycle of rotation of the screw 18. The screw 18 of the inner drum terminates about 200 mms. from the discharge end of the inner drum. At this point delivery plates 20 are disposed, which extend to the bottom of the outer jacket and convey the material delivered thereto by the inner and outer screws into the delivery screw 4.

The material under treatment is fed into the drum 2 through the inlet sluice 31 and the inlet pipe 3 and the delivery screw 4 conveys the treated material from the boiling drum 2 into the draining drum 5. The draining drum 5 consists of the inner drum 22 and the outer drum 23.

The inner drum 22 is hexagonal in construction and consists of the drum framework 24, the conveyor screw 25, the perforated jacket 26 made from perforated sheet metal and the triangular prism 27 which extends along the axle of the drum.

The outer drum 23 is provided with a discharge connection 28 for the treated material, which connection discharges into the sluice 30 and also with a connection 29 for liquid, which discharges into the overflow 10 and is thus closed by the sluice 32.

When operating under vacuum, the vacuum zone is accordingly bounded by the sluices or flow resistances 30, 31 and 32.

The above described apparatus has proved to be very advantageous for the purposes in question and it offers substantial economic advantages over the older apparatus. Since clogging of the screens or sieves can no longer occur, substantially more efficient circulation of liquid and transfer of heat are obtained, whereby the efficiency of the apparatus may be substantially increased. In addition to whale flesh, blubber and the like, less bulky flesh material, particularly flesh containing considerable amounts of sinews, as well as skins and bone flesh may be equally satisfactorily worked up.

The previous division of the inner drum by the constriction into a boiling drum and draining drum had, moreover, the disadvantage that satisfactory draining could not be effected in the slowly rotating round drum, owing to the too sluggish condition of the material, whereas in the present apparatus, satisfactory draining is effected owing to the separation of the draining drum from the boiling drum and the greater number of revolutions of the hexagonal discharge drum, with the co-employment of the triangular prism serving as impact plate.

The apparatus of this invention is not only suitable for boiling flesh, blubber and bones, but may also be extensively employed for other processes, for example, in the extraction of fat-containing materials of every kind with the aid of a solvent.

What I claim is:

1. Apparatus for dehydrating oil-containing materials having a high water content including a sealed boiling drum, a heating jacket for said boiling drum, a conveyor screw rotatably disposed inside said boiling drum, an inner perforated drum disposed inside said boiling drum, which perforated drum divides the said conveyor screw into an inner screw and an outer screw, means for introducing material to be dehydrated to the inner perforated drum at one end thereof, and means for removing material from the drum at a point removed from said one end.

2. Apparatus for dehydrating oil-containing materials having a high water content including a sealed boiling drum, a heating jacket for said boiling drum, a conveyor screw rotatably disposed inside said boiling drum, a perforated drum disposed inside said boiling drum, which perforated drum divides the said conveyor screw into an inner screw and an outer screw, a plurality of radially disposed plates at the exit end of the boiling drum, and a delivery screw extending forwardly from said plates and having its rear end portion disposed centrally of said plates, the arrangement being such that the material transported to said plates by the inner and outer screw is conveyed to the delivery screw by said plates.

3. Apparatus as claimed in claim 1 wherein the conveyor screw is made of perforated metal sheets.

4. Apparatus for dehydrating oil-containing materials having a high water content including a sealed boiling drum, a heating jacket for said boiling drum, a conveyor screw rotatably disposed inside said boiling drum, an inner perforated drum disposed inside said boiling drum, which perforated drum divides the said conveyor screw into an inner screw and an outer screw and a plurality of automatically falling scrapers on the outer screw disposed displaced relatively to each other for the purpose of cleaning the inner surface of the boiling drum, means for feeding material to be dehydrated to one end of the inner

drum, and means for discharging treated material from the inner drum at a point remote from the feed end.

5. Apparatus for dehydrating oil-containing materials having a high water content including a sealed boiling drum, a heating jacket, said drum having an inspection opening, a cover for said opening and a sprinkler opening into the upper part of the boiling drum, a conveyor screw rotatably disposed inside said boiling drum, an inner perforated drum disposed inside said boiling drum, which perforated drum divides the said conveyor screw into an inner screw and an outer screw, means for feeding material into the boiling drum to the inner conveyor at one end of said boiling drum, and means for discharging treated material from the boiling drum at a position remote from the feed end.

6. Apparatus for dehydrating oil-containing materials having a high water content including a sealed boiling drum, a heating jacket for said boiling drum, a conveyor screw rotatably disposed inside said boiling drum, a perforated drum disposed inside said boiling drum, which perforated drum divides the said conveyor screw into an inner screw and an outer screw, a draining drum connected to said boiling drum, said draining drum comprising an outer drum, a conduit for removing the treated material from said draining drum, a conduit for removing the liquid which collects from said draining drum, an axle in said draining drum, a perforated hexagonal drum rotatable on said axle and disposed inside said outer drum, and screw blades disposed inside said hexagonal drum.

7. Apparatus for dehydrating oil-containing materials having a high water content including a sealed boiling drum, a heating jacket for said boiling drum, a conveyor screw rotatably disposed inside said boiling drum, a perforated drum disposed inside said boiling drum, which perforated drum divides the said conveyor screw into an inner screw and an outer screw and a draining drum connected to said boiling drum, said draining drum comprising an outer drum, a conduit for removing the treated material from said draining drum, a conduit for removing the liquid which collects from said draining drum, an axle in said draining drum, a perforated hexagonal drum rotatable on said axle and disposed inside said outer drum, screw blades disposed inside said hexagonal drum and a triangular prism on said axle, said prism serving as an impact plate for breaking the material under treatment.

PHILIPP LORENZ FAUTH.

CERTIFICATE OF CORRECTION.

Patent No. 2,105,782. January 18, 1938.

PHILIPP LORENZ FAUTH.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 55, for the word "removes" read remove; and second column, line 3, after "screw" insert are; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 26th day of July, A. D. 1938.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.

drum, and means for discharging treated material from the inner drum at a point remote from the feed end.

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6. Apparatus for dehydrating oil-containing materials having a high water content including a sealed boiling drum, a heating jacket for said boiling drum, a conveyor screw rotatably disposed inside said boiling drum, a perforated drum disposed inside said boiling drum, which perforated drum divides the said conveyor screw into an inner screw and an outer screw, a draining drum connected to said boiling drum, said draining drum comprising an outer drum, a conduit for removing the treated material from said draining drum, a conduit for removing the liquid which collects from said draining drum, an axle in said draining drum, a perforated hexagonal drum rotatable on said axle and disposed inside said outer drum, and screw blades disposed inside said hexagonal drum.

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