June 25, 1935. R. D. ANDERSON 2,006,191

ADJUSTABLE OVERFLOW DEVICE

Filed July 14, 1930 2 Sheets-Sheet 1

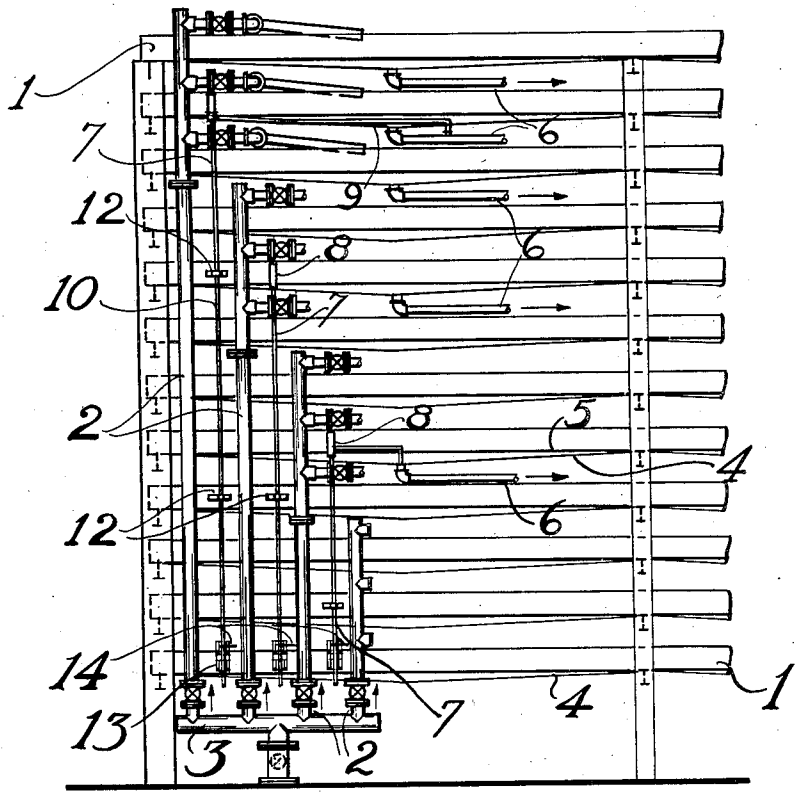


Fig.-1

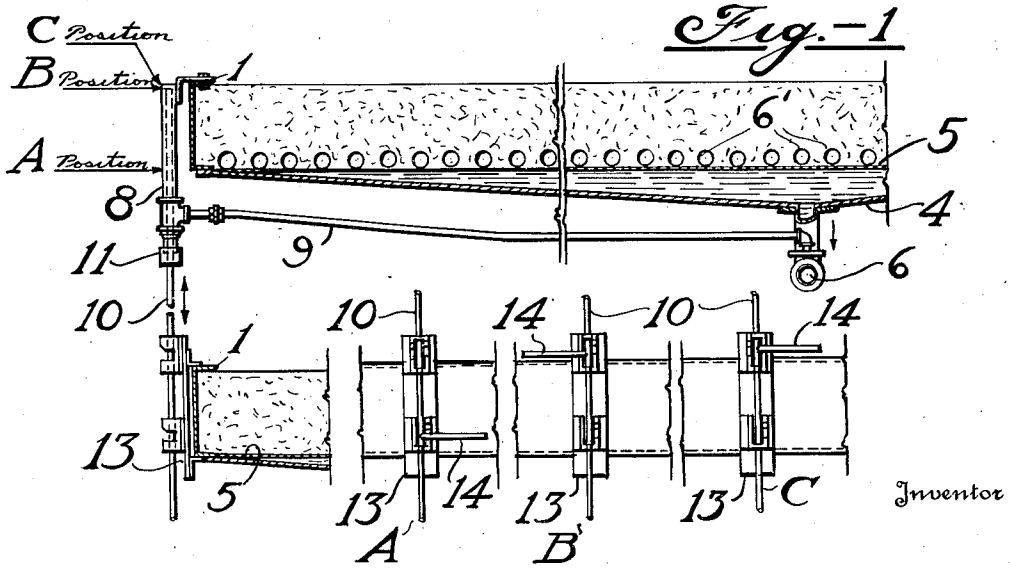


Fig.-2

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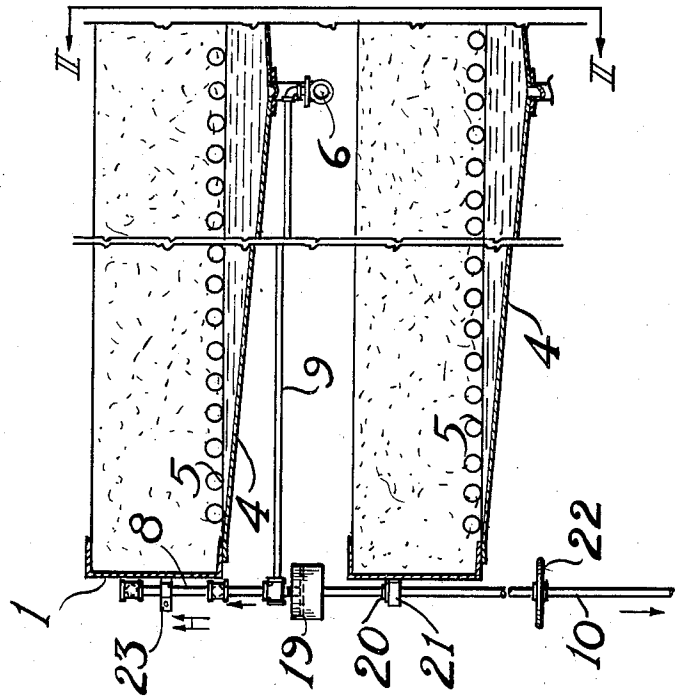


Fig. 4

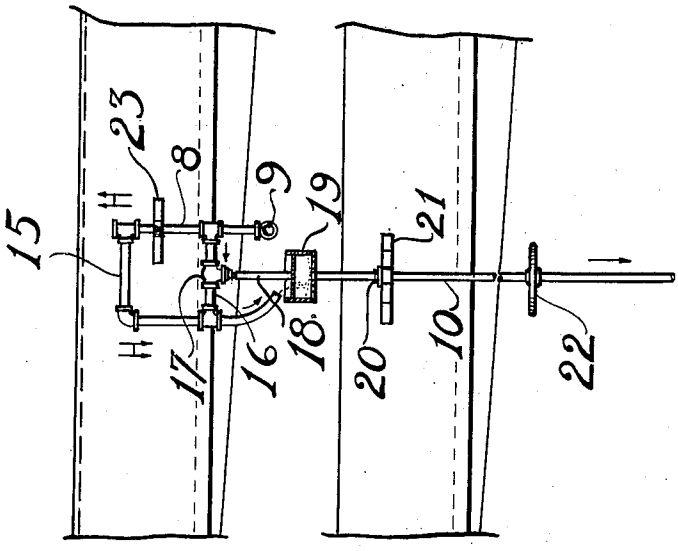


Fig. 3

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UNITED STATES PATENT OFFICE

2,006,191

ADJUSTABLE OVERFLOW DEVICE

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Application July 14, 1930, Serial No. 467,677

1 Claim. (Cl. 137—21)

This invention relates to a level indicating device for containers which are to be charged with at least two liquids of different gravity, and will be fully understood from the following description read in connection with the drawings in which:

Fig. 1 is a side elevation of a stack or bank of wax sweaters provided with the device of the invention:

Fig. 2 is a vertical section through a portion of the stack of wax sweaters showing the details of the level indicating device:

Fig. 3 is a side elevation of a portion of two sweaters showing a modified level indicating device; and

Fig. 4 is a section on line IV—IV of Fig. 3.

The invention will be described in the following in conjunction with its application to wax sweater pans; it will, however, be understood that the same device can be used with other containers for similar purposes.

It is old in the art of petroleum refining to free the slack wax obtained in the filter presses from the large amount of oil which it contains by chilling it to a solid mass and then gradually raising the temperature. This operation may be carried out in pan sweaters arranged in a room of good insulating properties.

In Fig. 1 there are shown 12 pans designated by numeral 1 and arranged on top of each other. Each pan has a wax and water charging line 2 connected to a common header 3. The pans have sloping bottoms 4 and are provided with a wire gauze screen or perforated metal plate 5. Draw-off lines 6 are connected to the lowest part of the bottom of each pan. The pans are also provided with water coils 6' (see Fig. 2) above the screen through which cold water for chilling or hot water for melting may be circulated. When starting the operation the pans are first charged with water to a depth sufficient to cover the screen, for the purpose of preventing wax from getting into the discharge line, then melted paraffin wax is charged to a depth of 5 or 6 inches. Cold water is now sent through the coil 6' until the wax has become solid, the water in the pan is then withdrawn and the temperature of the water in the coils is gradually raised whereby the oil sweats out of the wax, drains through the screens and discharges through lines at the bottoms of the pans.

When a sweater is charged at night it is almost impossible for the operator to gage correctly the height of the oil in the pan; therefore considerable capacity is lost due to not filling the pans to their maximum capacity. The level indicating device of the present invention allows to charge each pan to the maximum capacity by eliminating or greatly lessening the hazard of overcharging the pan. This device therefore greatly improves the operating conditions, especially the capacity of the sweating unit. It also permits control of the operation from the ground floor which greatly increases safety, since the operator is not obliged to climb a ladder in order to ascertain the height of the charge in the pan.

Each group of pans in the bank includes a pan provided with a level indicating device with the exception of the 3 lowest ones. An equal relative quantity of liquid is introduced into the pans of each group. The further details of this device may be seen on Fig. 2. The level indicator essentially consists of a substantially vertical conduit 8 which is in communication by means of line 9 with the liquid at the bottom of the pan. A convenient arrangement is shown in Fig. 2 where line 9 is connected by means of a downwardly bent section with the bottom draw-off line 6 of the pan. The pan and the conduit 8 connected therewith form a U in both legs of which the hydrostatic pressure of the fluids tends to be equalized. The discharge conduit 10 is connected by means of stuffing box 11 with the conduit 8 in which 10 can slide up or down. Notched angle clips 12 are provided to hold each pipe conduit 10 in its vertical position. The position of conduit 10 can be adjusted by means of guide 13 and stop 14 so that its top will be in the A, B or C position required for charging water, charging wax out or after charging.

In Figs. 3 and 4 the discharge conduit is again connected by line 9 to the bottom draw-off line 6. Conduit 8 has an inverted U shaped portion 15 and a by-pass line 16 connecting the two legs of the U shaped portion. A valve 17 is provided in a by-pass line which may be operated by any means, for example, such as a long rod from the ground level. In the drawings the stem 18 of this valve is shown keyed to a bowl 19 into which the U shaped portion discharges: This bowl is again rigidly connected with the discharge conduit 10 which extends down to the ground floor and is open at the bottom. Conduit 10 has a thrust-collar 20 resting in a bracket 21 which may be spot-welded to the side wall of a lower pan. Conduit 10 is also provided with a hand wheel 22 by means of which it may be turned whereby valve 17 may be closed or opened by the operator on the ground floor. The U shaped por-

tion 15 is held by means of an adjustment clamp 23 which is spot-welded to the side wall of the pan.

The operation of the device shown in Figs. 1 and 2 is as follows:

Discharge conduit 10 is first set so that its top will be in the A position and the pan is charged with water until the latter overflows through the discharge conduit. The operator then knows that the water has reached the proper level in the pan, shuts off the water, sets the discharge conduit in the second position in which its top will be at the level B and begins the charging of the melted wax. When the wax level in the pan has reached such a height that it causes the water in conduit 8 to overflow through the discharge conduit 10, i. e., when the hydrostatic pressure of the combined water and wax columns in the pan is equal to the hydrostatic pressure of the water in conduit 8, the operator stops charging wax to that pan and sets the discharge conduit in the third position in which its top will be at the level C.

The operation of the device shown in Figs. 3 and 4 is identical in principle. Valve 17 is first opened and the pan is charged with water until the latter reaches the by-pass line 16 and overflows, following the path marked by single arrows, into the bowl 19 and hence through discharge conduit 10. The operator then shuts off the water supply, closes valve 17 and begins charging of the melted wax. When the latter has reached the proper level the water overflows following the path marked by double arrows (⇉). The wax supplied into the pan is then shut off.

It will be understood that both devices can be modified so that they will indicate the level when charging a greater number of liquids of different specific gravity. It will be sufficient for that purpose to provide a correspondingly greater number of positions for the discharge conduit 10 of Figs. 1 and 2 or to provide two or more valved by-pass lines 16 in the inverted U shaped portion 15 of Figs. 3 and 4.

Having thus described my invention and the method of carrying it out, what I claim is:

In combination with a receptacle having a charging line connected with a plurality of lines and adapted to convey a plurality of immiscible liquids, a device for determining at least two liquid levels in succession, comprising a substantially vertical conduit connected to the lower part of the receptacle so as to form a U therewith, a discharge conduit substantially parallel with the first mentioned conduit, said conduits being connected by at least two horizontal tubes, at least one of the tubes being provided with a valve, the discharge conduit comprising at least two separate sections, an upper one and a lower one, the lower one having a receptacle to receive the liquid from the upper section and being connected with said valve by means of a stem whereby said valve can be operated by turning the lower section of the discharge conduit.

RICHARD D. ANDERSON.