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C. F. TEARS

OIL APPARATUS

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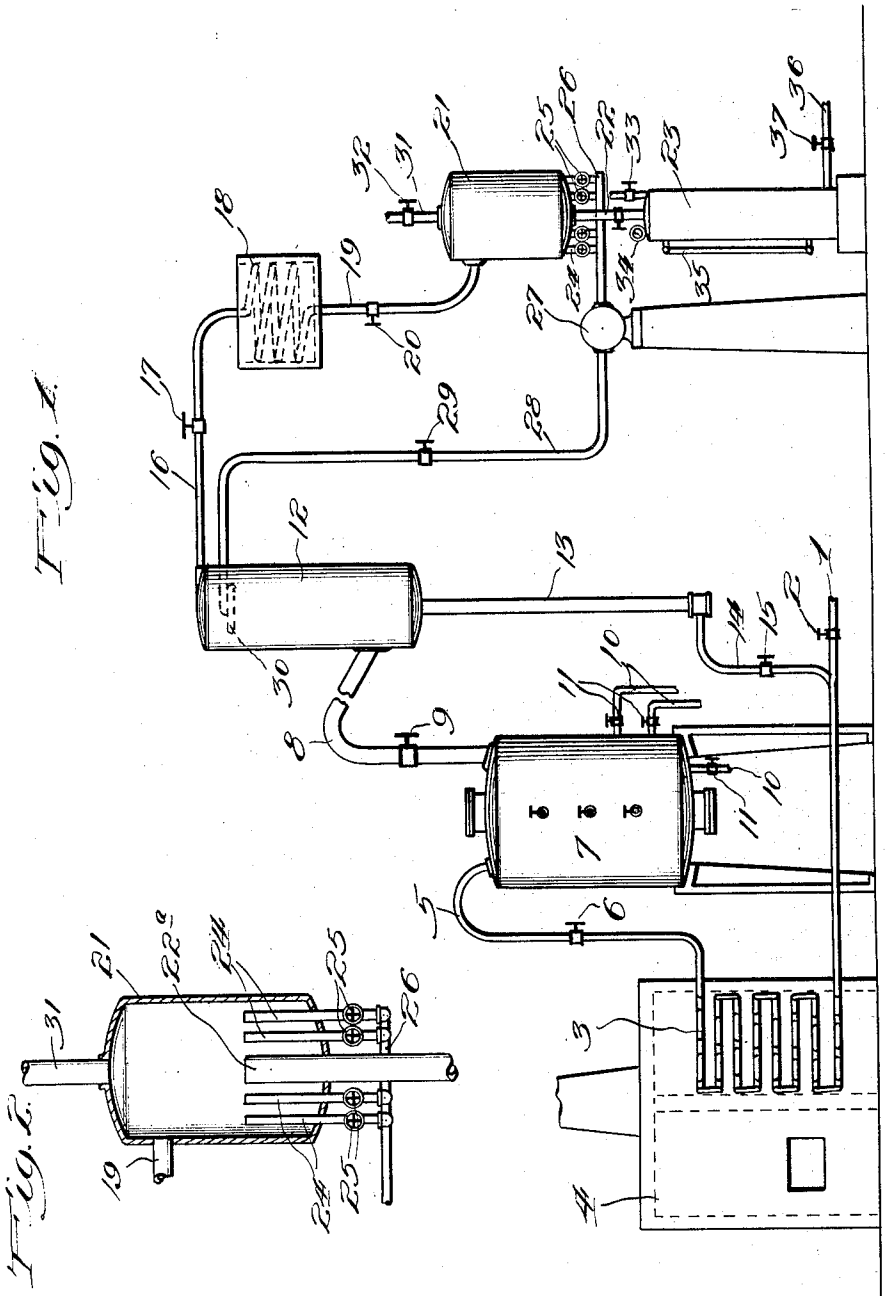


Fig. 1.

Fig. 2.

Witness:
Stephen V. Rebora

Inventor:
Claude F. Tears,
by Frank L. Belknap Atty.

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CLAUDE F. TEARS, OF CHICAGO, ILLINOIS, ASSIGNOR TO UNIVERSAL OIL PRODUCTS COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF SOUTH DAKOTA.

OIL APPARATUS.

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This invention relates to improvements in oil apparatus, and refers more particularly to a stream divider to be used in connection with distillation processes or cracking processes in the treatment of hydrocarbon oil.

Among the salient objects of the invention are to provide a device interposed between the condenser and receiving tank of a distillation system, whereby controlled quantities of the condensate are directed to the receiver or collecting means, and a portion of the condensate comprising a controlled ratio of the condensate directed to the receiver, returned to the dephlegmating or fractionating column, and there utilized as a refluxing medium.

Fig. 1 is a diagrammatic side elevational view of a cracking process in which the stream divider is positioned.

Fig. 2 is a detail of the internal construction of the device.

In the operation of a fractionating tower or refluxing column, it is desirable to maintain a constant ratio between the amount of final product or final distillate collected, and the quantity of condensate or refluxing medium returned to the tower. An approved method of refluxing is to re-circulate a portion of this final condensate to the top of the tower. It is the purpose of the present invention to maintain a constant ratio between the final product or final distillate collected and the returned refluxing medium by the interposition of a stream divider positioned in the line between the final condenser and receiver.

Referring to the drawings, the oil to be treated is introduced from any convenient source through the line 1 controlled by a valve 2, and is raised to a conversion temperature in the coil 3 positioned in the furnace 4. After passing through the heating coil, the oil is directed through the transfer line 5 regulated by a valve 6, to a conversion or expansion chamber 7 wherein the oil is permitted to collect in a substantial body, the vapors passing off through the line 8 in which is interposed the valve 9, the unvaporized liquids being drawn off either intermittently or continuously through either of the residuum lines 10 regulated by the valves 11. The vapors passing from the expansion chamber are introduced into fractioning column 12 where they are subjected to a refluxing action, the separated condensate flowing back through the dephlegmator leg 13 and connecting line 14 controlled by a valve 15 to the charging line while the uncondensed vapors pass over from the top of the dephlegmator through the pipe 16 regulated by a valve 17 to the water condenser 18. The discharge end of the condenser is connected by means of the line 19 regulated by a valve 20 to the stream divider container or tank 21, in which the fluid condensate is permitted to collect. A drawoff line 22 communicating with the receiving tank 23 terminates in a standpipe 22^a within the container. In addition to the standpipe 22^a, there are a plurality of standpipes 24 controlled by valves 25 which are manifolded outside of the container in a single line 26 which communicates with the suction side of the pump 27 whereby a part of the condensate may be returned through the line 28 regulated by a valve 29 to a spray pipe 30 positioned in the top of the fractionating column 12. By means of this pump, the condensate withdrawn from the container 21 through the standpipes 24 is recycled and utilized as a refluxing medium in the dephlegmating or fractionating column.

As explained, the stream divider consists of a tank or container having one large overflow pipe leading to the receiving tank, and several smaller overflow pipes 24, the upper ends of which are at the same level as the pipe 22^a. The smaller overflow pipes are manifolded outside of the container and by opening and closing the valves 25 the ratio of the product directed to the receiver relative to the refluxing medium returned to the fractionating or dephlegmating column may be controlled.

It will be understood that whatever the rate of flow of the condensate through the line 19 from the condenser, the ratio between the amount of product directed to the receiver and the amount of reflux returned to the dephlegmating column remains constant.

As an example of this control, assume that the capacity of the four smaller pipes 24 manifolded to the suction side of the pump 27 is equal to the capacity of the large overflow pipe to the receiver. With all of the valves open the ratio of the product to the refluxing medium will be as 1 to 1 and this ratio will be maintained no

matter at what rate the total condensate is flowing.

By regulating the valves 25, a desired variance in this ratio may be produced and the amount of condensate returned relative the final product may be accurately controlled. For atmospheric pressure operation, the container is provided with a gas vent line 31 controlled by a valve 32.

Although the stream divider is shown interposed in a cracking system, it is understood that it may be likewise positioned in any type of system in which liquid products are distilled, either under atmospheric or super-atmospheric pressure.

The receiving tank is equipped with a pressure relief valve 33, pressure gauge 34, liquid level gauge 35, and a liquid drawoff line 36 controlled by a valve 37 whereby the conditions of operation may be accurately regulated.

I claim as my invention:

1. A stream divider for distilling systems comprising an enlarged container, an inlet line connected thereto, an outlet line in the form of a vertical standpipe communicating with a flowing reservoir, a plurality of relatively smaller drawoff pipes having their upper extremities equilevel with the outlet line, valves controlling said lines whereby a constant ratio of the flow of liquids in the separate outlet lines is accurately controlled.

2. A stream divider for distilling systems, comprising an enlarged container, a liquid inlet line connected thereto, an outlet line terminating in a standpipe in the container, a plurality of relatively smaller manifolded outlet lines terminating as standpipes in the container and having their upper extremities equilevel with the larger outlet line.

CLAUDE F. TEARS.