

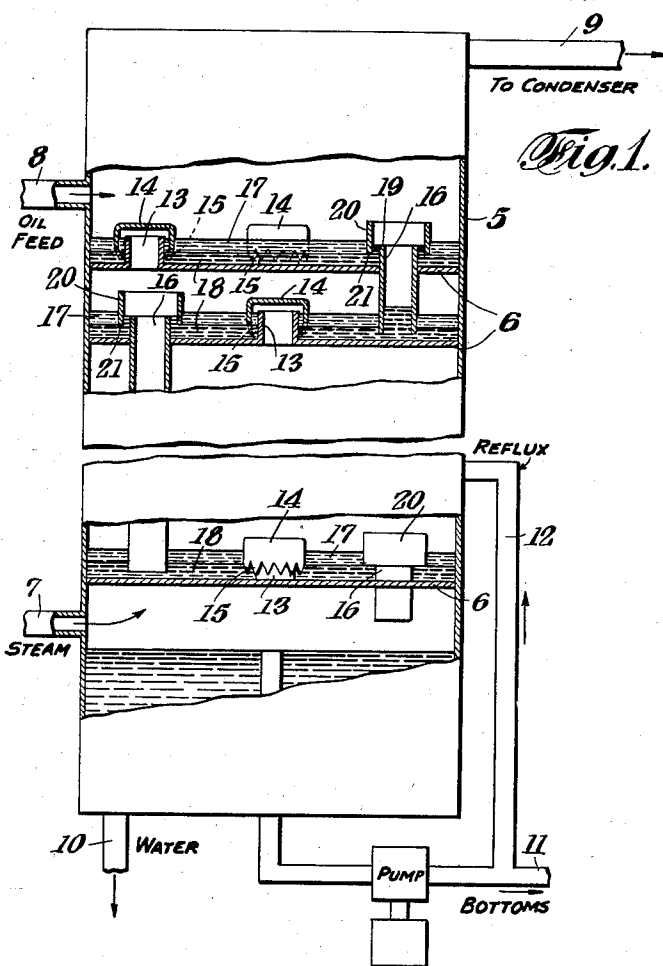
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STEAM COLUMN STILL

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STEAM COLUMN STILL

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2 Claims. (Cl. 202—158)

This invention relates to apparatus in the nature of steam column stills. In distillation apparatus of this character, the fractionation involves the handling of liquids of limited miscibility, such as water and oil. The stratification of these liquids in the pans or trays of a column still seriously affects the operation of such apparatus, materially reducing its efficiency.

The objects of the present invention are to overcome and eliminate the objectionable results of the layer effects mentioned and to accomplish improved and more efficient fractionation.

These and other desirable objects are attained by the novel features of construction, combinations and relations of parts hereinafter described, illustrated and broadly claimed.

The drawing accompanying and forming part of this specification illustrates by way of disclosure a practical commercial embodiment of the invention and it will be appreciated that the structure may be modified and changed all within the true intent and broad scope of the claims.

The single figure in the drawing is a broken and part sectional view of a column steam still having the invention incorporated therein.

In the illustration, a rectifying column is indicated at 5, having bubble trays 6, steam inlet 7, at the bottom, oil feed connection 8, vapor take-off 9, water drain 10 and bottoms discharge and refluxing connections 11, 12.

The bubble trays are shown as having risers 13, with bubble caps 14, standing thereover and having serrated skirts 15, for forcing the rising vapors to bubble through the pools of liquid on the trays. The height of standing liquid on the tray is governed by the downtakes or standpipes 16.

The liquid normally stratifies on the trays forming a distinct upper layer 17, such as gasoline on a lower layer 18, mostly water. In the operation of such apparatus heretofore, the upper lighter liquid passes off through the down spouts from tray-to-tray, leaving the lower water layers in place on the trays and these may increase in depth to an extent where the vapors are bubbling mainly through water or a mixture providing comparatively little rectification.

The present invention involves the provision of means for automatically draining off the lower relatively inefficient layer and holding back the upper layer until the lower layer is mostly removed.

In the illustrated form of the invention, the means for such purpose involves a combination of baffle walls 19, 20, the first being provided by the upper lip of the down spout 16, and the second being provided as an annular dam about the mouth of the down spout and dipping in the liquid to a point 21, approximating the normal

separation level between the upper and lower liquid layers. The baffle 20 being higher than the mouth of the down spout and higher than the top layer of liquid on the tray, holds back the liquid of the top layer, preventing this liquid from overflowing from one tray to the next, until the liquid of the bottom layer is first drained off.

By such means, the liquid of the upper layer, gasoline in the illustration, is held back so that it stands below the serrations in the rims of the bubble caps, requiring gasoline vapors and steam passing up through the column to make intimate contact with the liquid gasoline constituents flowing down the tower.

It will be evident, that with this invention, the operation as well as the actual efficiency will be improved because by the segregation and removal of the heavier liquid the rising vapors are kept in contact at all times with the lighter liquid.

What is claimed is:

1. A still in the nature of a steam column still and having superposed trays, on which the condensing vapors of distillation will collect in overlying liquid layers of limited miscibility, vapor risers from one tray to the next above, bubble caps over said vapor risers and extending downward only far enough to force the rising vapors to bubble upward through only the upper lighter layers of liquids on the trays, down spouts separate from said vapor risers and constituting the only liquid overflow connections between the trays and baffles enclosing the upper ends of said down spouts and extending from above the top level of the upper layers of liquids on the trays downwardly to approximately the top level of the lower, heavier layers of liquids on the trays for forcing all overflow of liquids from tray-to-tray beneath said baffles and for holding back and maintaining an accumulation of the upper lighter liquid layers on the trays for contact by vapors from the risers while permitting the lower heavier layer liquid to drain off beneath the same.

2. The herein disclosed method of operating a still in the nature of a steam column still having superposed trays on which the vapors of distillation condense in supernatant liquid layers of limited miscibility and which comprises, releasing rising vapors at a level to pass upwardly through only the upper lighter layer of liquid on a tray and maintaining this condition by draining off only the heavier lower layer liquid from tray-to-tray and holding the lighter top layer liquid on the trays and preventing runback of the same until the heavier bottom layer lowers below the level at which the rising vapors are released into the lighter top layer liquid.

JAMES W. GRAY. 60