June 28, 1932. E. B. McCONNELL 1,865,400

FRACTIONATING COLUMN EQUIPMENT

Filed Feb. 27, 1930

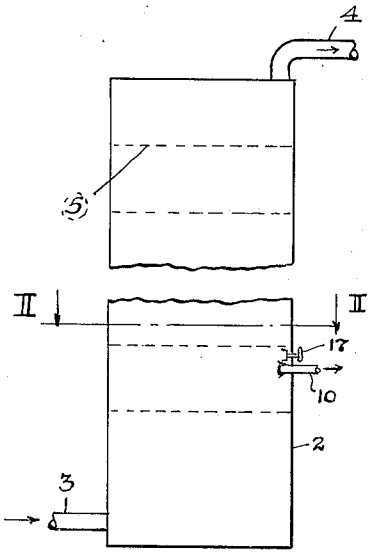


Fig. 1.

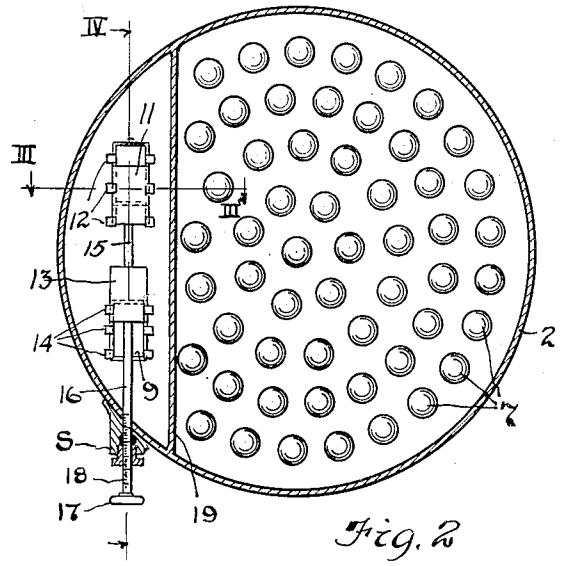


Fig. 2

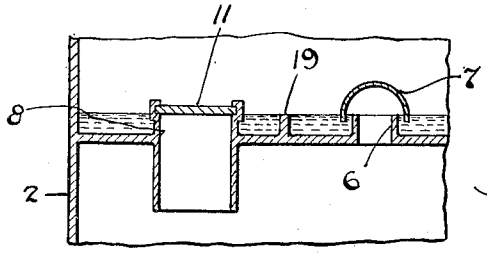


Fig. 3.

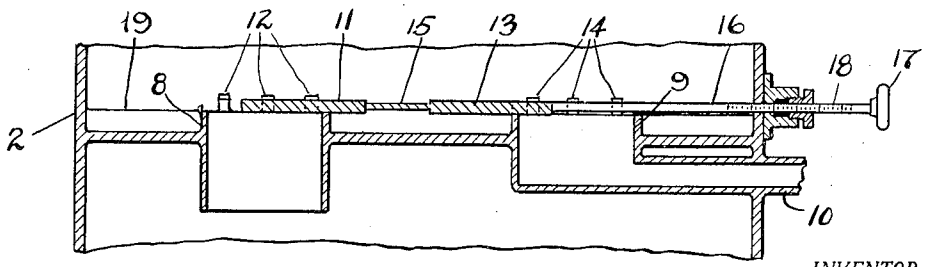


Fig. 4

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UNITED STATES PATENT OFFICE

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FRACTIONATING COLUMN EQUIPMENT

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This invention relates to fractionating columns as employed in distillation, and more particularly columns having plates with definite level overflows; and it is among the objects of the invention to provide a trap-out for any plate as desired, capable of accurately yielding a stream of representative composition from that plate, without disturbing the relative conditions. Another object is the provision of a trap-out for taking a side stream from a fractionating column, regulable with exactness and indicating the position of the control. Other objects and advantages will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, consists of the features hereinafter fully described, and particularly pointed out in the claims, the following description and the annexed drawing setting forth in detail certain structure embodying the invention, such being illustrative however of but one of the various ways in which the principle of the invention may be employed.

In said annexed drawing:—

Fig. 1 is a schematic side elevation, partly broken, of a fractionating column in accordance with the invention; Fig. 2 is a sectional view, on enlarged scale, taken on a plane indicated by the line II—II, Fig. 1; Fig. 3 is a detail sectional view taken on a plane indicated by the line III—III, Fig. 2, and Fig. 4 is a section taken on a plane indicated by the line IV—IV, Fig. 2.

Referring more particularly to the drawing, there is shown a fractionating or rectifying column 2 which may have an inlet 3 and an upper outlet 4, and plates 5, which may be of number as desired. Such plates are provided with constant-level overflows 6, and means for diverting the rising vapor under the liquid, such means being of any convenient form, for example bell-caps 7, the detail of which may be in accordance with any usual or preferred form. Located also on the plate is an overflow 8 leading to the plate below, at any convenient point, for instance at one side, and matching such overflow is another overflow 9 connecting to a point without the column, as for instance by a pipe 10. Controllable to open or close the overflow 8 is a member 11, which may be conveniently in the form of a slide, and guided against displacement by some suitable guideways, as guides 12. Similarly, an openable and closable control 13 is provided for the overflow 9, and maintained against displacement by suitable guideways, such as guides 14. The slides 11 and 13 are connected together as by bar 15 for simultaneous movement, and proportionally so set that as one slide is open, the other is correspondingly closed, or vice versa. A control rod 16, with any convenient operating means, such as a handle 17, connects with the slides, and allows of manipulation thereof for setting to the desired point. A stuffing box *s* of suitable form may be arranged to prevent leakage about the rod. Means for indicating externally the position of the slide 13, and correspondingly that of the compensating slide, may be provided, for instance graduations 18 on the rod 16, such being on a scale of percentage, or of dimension, or as desired. A weir or level 19 may be located between the trap-out and the bells if desired.

Such a trap-out may be installed on any of the plates as preferred, and as applied for instance to the fractionating column working on distillate vapors of mixed character such as petroleum, it may be employed to give a side stream at any of the plate points desired. Regulation of the closure 13 may be had by means of the hand control 17, the closure being set for such flow as may be required, the gauge 18 serving to indicate the position.

In this manner, side streams may be taken from selected plates of the column, and products of corresponding character may be selectively had in a manner to avoid interfering with the relative conditions in operation.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the means stated in any of the following claims, or the equivalent of such, be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In a device of the character described, a closed shell, a substantially horizontal plate therein having an opening at overflow level, another opening at overflow level, a conduit leading from said last-named opening to a point outside the shell, a regulable closure for each of said openings, and means for proportionally regulating the extent of opening of one of said openings and closing the other and vice versa.

2. In a device of the character described, a closed shell, a substantially horizontal plate therein having a plurality of bell-cap overflow openings, a pair of openings at overflow level, one leading to the under-side of the plate and the other leading to a point outside a slide controlling each of said last-named openings, said slide being connected such that one opening is proportionally closed as the other is opened and vice versa, means for setting said slides, and means for indicating the position thereof.

3. In a device of the character described, a closed shell, a substantially horizontal plate having an opening at overflow level, another opening at overflow level discharging to a point outside the shell, joined closure means controlling said openings to proportionally close one as the other is opened and vice versa, a rod for operating said closure means, a stuffing box thereon, and means for regulably setting said rod.

4. In a device of the character described, a closed shell, a substantially horizontal plate having an opening at overflow level, another opening at overflow level discharging to a point outside the shell, joined slide cover means controlling said openings to proportionally close one as the other is opened and vice versa, a rod for operating said slide means, a stuffing box thereon, means for regulably setting said rod and means for externally indicating the position of said slide means.

Signed by me this 13th day of February, 1930.

ELLIOTT B. McCONNELL.