Oct. 14, 1930. R. E. WILSON ET AL 1,778,475

FRACTIONATING COLUMN

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Fig. 1

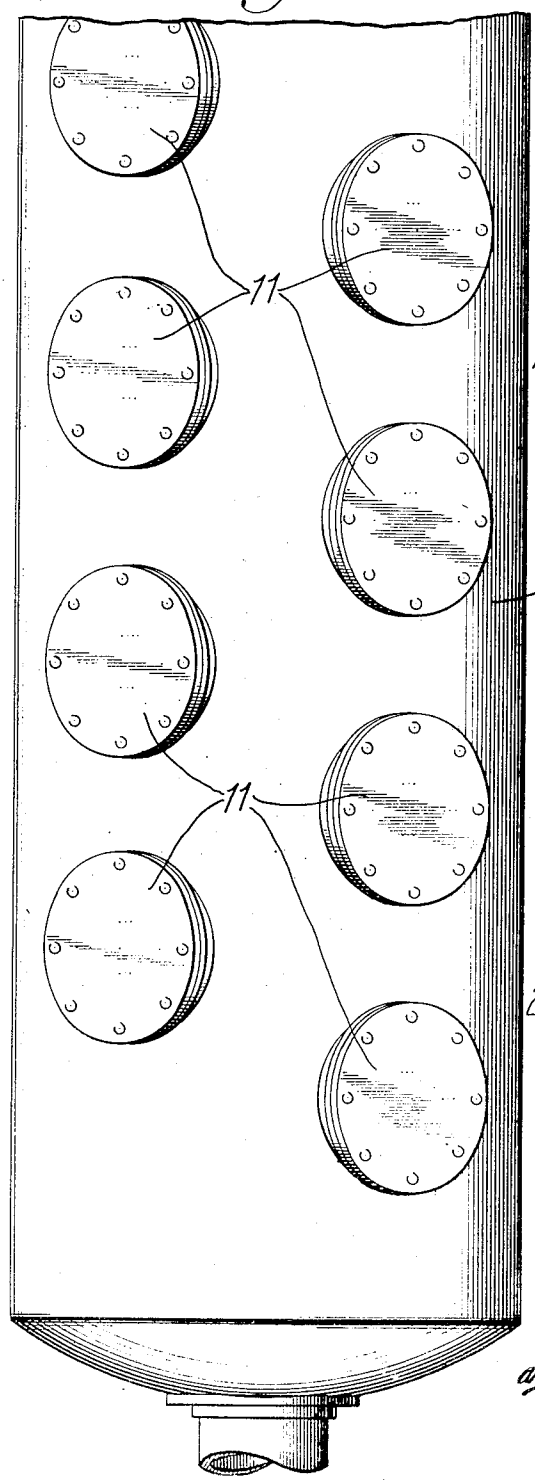


Fig. 2

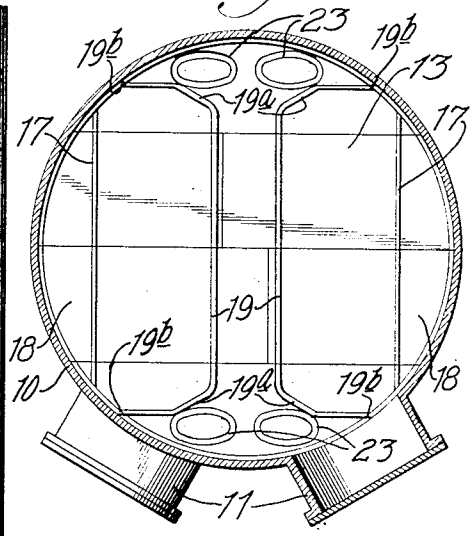
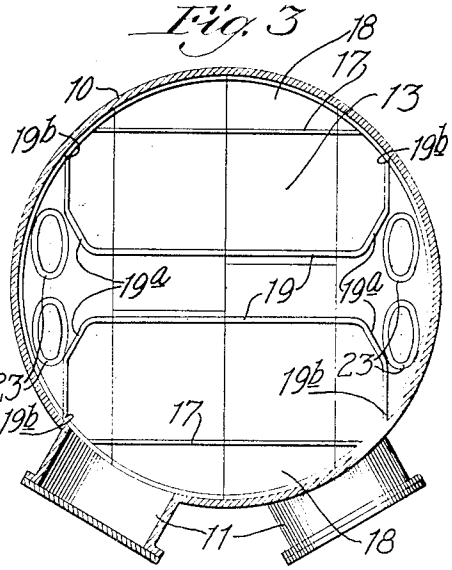


Fig. 3



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Fig. 4

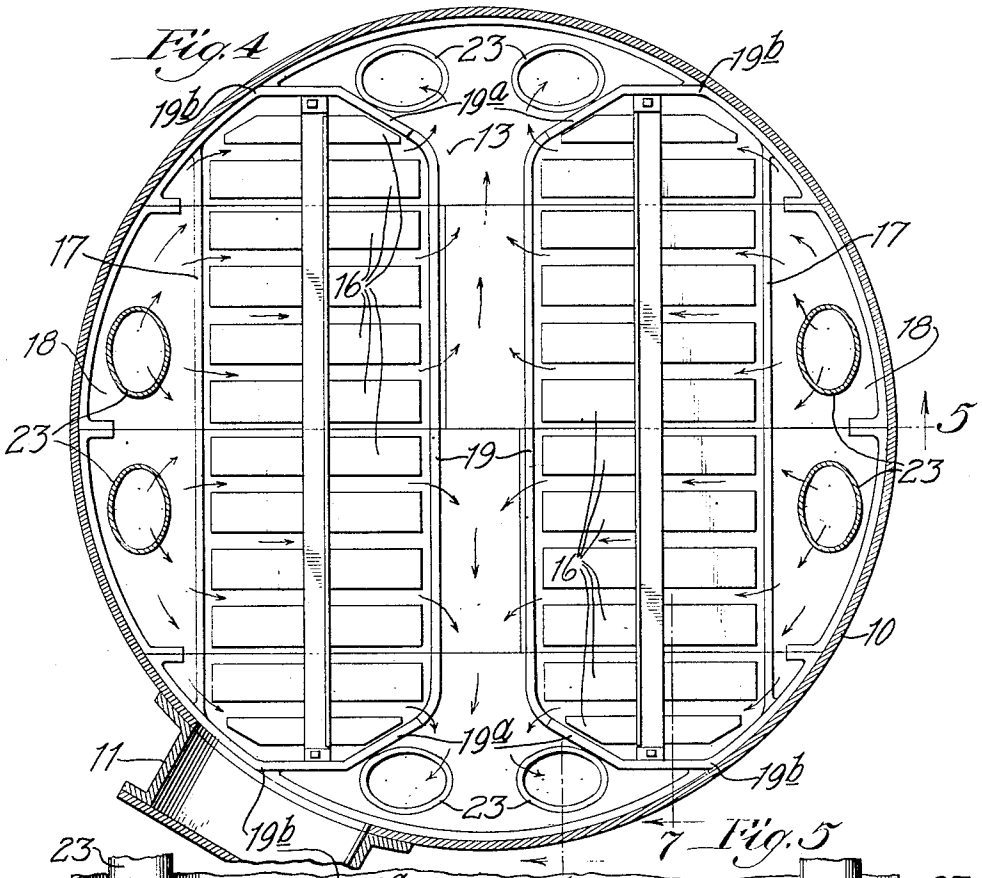
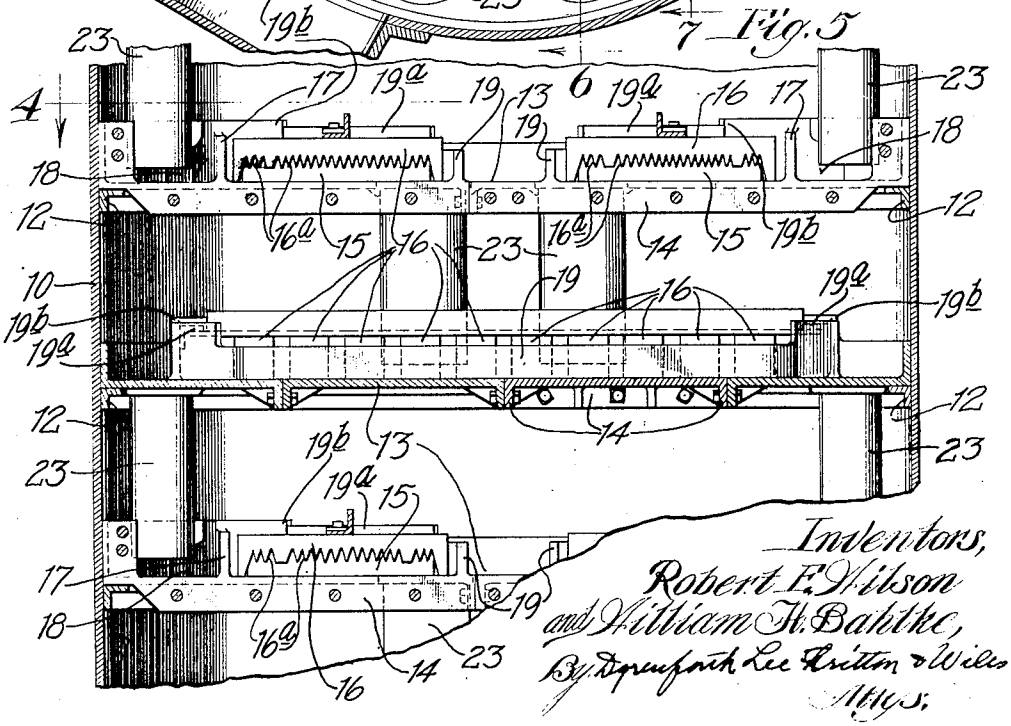


Fig. 5



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Fig. 6

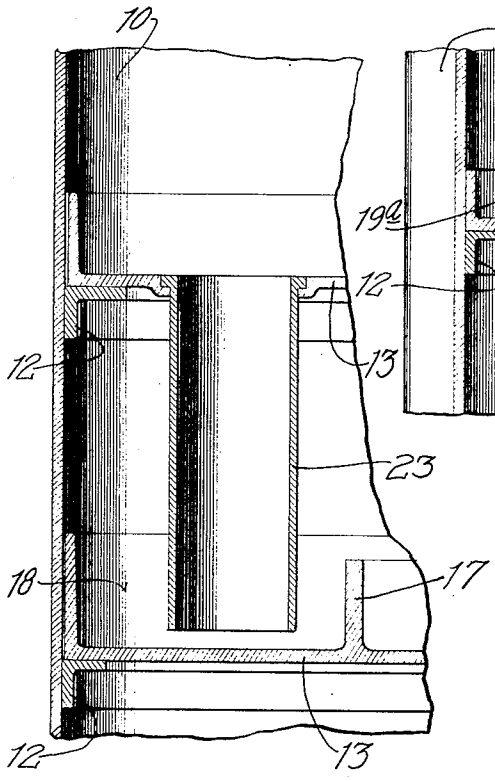
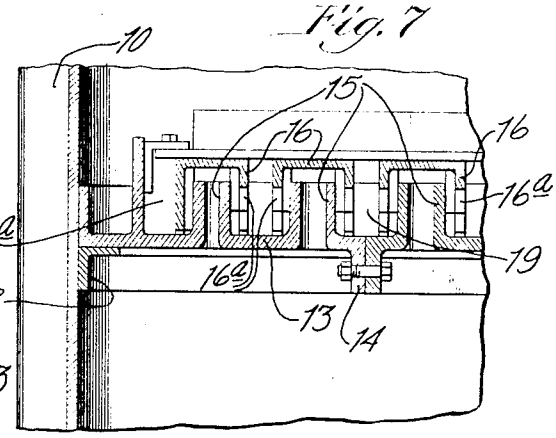


Fig. 7



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Patented Oct. 14, 1930 1,778,475

UNITED STATES PATENT OFFICE

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FRACTIONATING COLUMN

Application filed August 6, 1927. Serial No. 211,158.

The present invention relates to improvements in fractionating columns, and will be fully understood from the following description thereof, illustrated by the accompanying drawings, in which—

Figure 1 is a view in side elevation of a portion of a column or tower embodying the present invention; Figs. 2 and 3 are diagrammatic sectional views showing the relative placing of the parts of successive plates within the tower; Fig. 4 is a sectional view on the line 4 of Fig. 5; Fig. 5 is a vertical sectional view on the line 5 of Fig. 4; Fig. 6 is a view taken as indicated by the line 6 of Fig 4; and Fig. 7 is a view taken as indicated by the line 7 of Fig. 4.

The fractionating column shown in the present application is similar to and an improvement upon the fractionating column shown in copending patent application, Serial No. 6152, filed January 31, 1925, by ourselves and others as co-inventors, which has matured into Patent No. 1,716,939 on June 11, 1929. Since the two fractionating columns are similar in general construction and operation, we shall not describe the present one in as much detail as the other. We shall attempt more particularly to point out the differences beween the present device and the one shown in the other patent application referred to.

Referring more particularly to the drawings, in Fig. 1 is shown a portion of the vertical cylindrical shell 10 of a fractionating column or tower embodying the present invention. This shell is provided with manholes 11 arranged in vertical rows, alternate manholes being set at an angle to one another. These manholes are preferably of a size such that the sections forming the plates of the column may be inserted therethrough.

As will be seen from Figs. 5 and 7, at suitable vertical intervals within the tower, the circular flanges 12 are secured to its inner wall, and on these are mounted the plates 13.

The plates are preferably formed of sections with downwardly projecting flanges 14 at their sides for joining them together; and alternate plates are preferably arranged at an angle to each other, for example, at substantially right angles.

Each of the plates is provided with a number of upwardly projecting nipples 15 preferably of substanatially rectangular shape. These projecting nipples provide for the passage of gas from the vapor space below the plate to that above it, and each of the nipples is provided with a substantially rectangular bubble cap 16, the lower edge of which is suitably serrated as at 16^a. The nipples 15 and caps 16 may be so arranged as to provide a plurality of rows of bubble caps substantially equally spaced from one another, the rows extending substantially transversely across the plates.

At diametrically opposite sides the plates are provided with upwardly projecting dams 17, 17, so arranged that when the sections are properly placed, a pool 18 is formed, the wall thereof formed by dams 17, 17, substantially paralleling the rows of the bubble cap 16. One such pool 18 is formed at diametrically opposed points on said plate, and these pools receive the liquid reflux discharge from the next plate above through the drain or discharge pipes 23 in the usual manner. The pools 18 preferably include an area extending substantially the width of the row of bubble caps and the overflow from the next plate above is distributed from such pools over the dams 17, 17 between the bubble caps. While such a distributing pool 18 is desirable, the overflows may deliver directly into the pool created by the lower dams, which will in general give adequate distribution.

Adjacent the inner ends of each row of bubble caps there is provided another somewhat lower dam, such dams being indicated by 19, 19 respectively. The ends of these dams are preferably curved backwardly around the ends of each row of bubble caps and raised somewhat as indicated by 19^a, the extreme ends of such dams being carried entirely back to the wall of the shell as indicated by 19^b. It will be seen, therefore, that each row of bubble caps 16 is enclosed between the two dams 17, and 19, the dam 17 being somewhat higher than the dam 19.

Alternate plates are set substantially at

right angles to each other, and in the operation of the device, liquid flows through the discharge pipes 23 from one plate into the pools 18 in the next adjacent plate below. From the pools 18 the liquid streams over the dam 17 and travels in approximately uniform streams around and between the bubble caps and then flows over the dams 19 to the central portion of the plate where it moves to the overflow pipes. This course is indicated by the arrows in Fig. 4.

One of the particular features of the present invention is the provision of the dams 19 adjacent the ends of the bubble caps, such dams serving to retard the escape of liquid from the spaces between the bubble caps and help maintain a more or less substantially uniform depth of liquid around all parts of the bubble caps. When the dams are dispensed with, the depth of liquid around the outer bubble caps is liable to be less than that around the central bubble caps, thus causing uneven operation of the apparatus.

While we have shown and described certain embodiments of our invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention disclosed in the appended claims, in which it is our intention to claim all novelty in our invention as broadly as possible in view of the prior art.

What we claim as new, and desire to secure by Letters Patent, is:

1. In a fractionating plate of the bubble type; oppositely disposed dams on said plate forming pools for the reception of overflow liquid from higher plates; two rows of vapor uptakes and bubble caps between said dams, said bubble caps being substantially evenly spaced; two relatively lower dams between the rows of bubble caps, said lower dams being substantially parallel with the first mentioned dams; and discharge means oppositely disposed on said plate between said lower dams.

2. In a fractionating plate of the bubble type; oppositely disposed dams on said plate forming pools for the reception of overflow liquid from higher plates; discharge means disposed between said dams; a row of vapor uptakes and bubble caps on said plate on each side of said median line, said bubble caps being disposed to divide into substantially equal streams the overflow liquid issuing from the pools formed by said dams; and another lower dam on said plate on each side of said median line, said two lower dams lying between the two rows of vapor uptakes and bubble caps.

3. A fractionating plate as claimed in claim 2, the ends of the lower dams being curved outwardly around the ends of each row of vapor uptakes and bubble caps.

4. A fractionating plate of the bubble type having oppositely disposed dams to form pools; two groups of vapor uptakes with bubble caps between said dams; two lower dams between the two groups of vapor uptakes with bubble caps; and an outlet between the two lower dams.

5. A fractionating plate of the bubble type having oppositely disposed dams to form pools; two groups of vapor uptakes with bubble caps between said dams; two lower dams between the two groups of vapor uptakes with bubble caps, and two outlets between the lower dams at the ends of the space between such lower dams.

6. A fractionating plate of the bubble type having two oppositely disposed dams forming pools; two groups of vapor uptakes with bubble caps between said dams; two lower dams between the two groups of vapor uptakes with bubble caps, the ends of each lower dam being curved backwardly around one group of vapor uptakes with bubble caps to join the ends of the adjacent higher dam; and an outlet between the two lower dams.

7. A fractionating plate of the bubble type having two oppositely disposed dams forming pools; two groups of vapor uptakes with bubble caps between said dams; two lower dams between the two groups of vapor uptakes with bubble caps, the ends of each lower dam being curved backwardly around one group of vapor uptakes with bubble caps to join the ends of the adjacent higher dam; and two outlets between the two lower dams arranged at the ends of the space between such higher dams.

8. In a fractionating column of the bubble type; a plate with a discharge opening; a dam on said plate adapted to maintain an inlet pool of liquid on one side thereof, said liquid adapted to escape from said pool by flowing over said dam; and a second lower dam on said plate adapted to retard the liquid flowing over said first mentioned dam and maintain a second pool between said dams, said liquid adapted to escape from said second mentioned pool to the discharge opening in the plate by flowing over said lower dam; and vapor uptakes covered with bubble caps located between said dams.

9. In a fractionating column of the bubble type; a plate with a discharge opening; a pair of dams on said plate adapted to maintain inlet pools of liquid on the outer sides thereof, said liquid adapted to escape from said pools by flowing over said dams; and a second pair of lower dams on said plate between said first mentioned dams and adapted to retard the liquid flowing over said first mentioned dams and maintain two additional pools, said liquid adapted to escape from said additional pools to the discharge opening in the plate by flowing over said lower dams;

and vapor uptakes covered with bubble caps located in said additional pools.

10. In a fractionating column of the bubble type; a plate with a discharge opening; a dam on said plate adapted to maintain a pool of liquid thereon, said liquid adapted to escape from said pool to the discharge opening in the plate by flowing over said dam; and vapor uptakes covered with bubble caps located in said pool.

11. A fractionating plate of the bubble type having discharge outlets; two dams maintaining two pools of liquid, the outflow from each pool being regulated by one of said dams and delivering into a channel leading to the discharge outlets; and vapor uptakes covered with bubble caps in said pools.

12. A fractionating plate of the bubble type having discharge outlets; two dams maintaining two pools of liquid, the outflow from each pool being regulated by one of said dams and delivering into a common channel leading to the discharge outlets; and vapor uptakes covered with bubble caps in said pools.

13. A fractionating plate of the bubble type having discharge outlets; two dams maintaining two pools of liquid, the outflow from each pool being regulated by one of said dams and delivering into a common channel parallel with the dams leading to the discharge outlets; and vapor uptakes covered with bubble caps in said pools.

14. A fractionating plate of the bubble type having discharge outlets; two dams maintaining two pools of liquid, the outflow from each pool being regulated by one of said dams and delivering into a channel leading to the discharge outlets; two higher dams regulating the inflow to said pools and maintaining two higher inlet pools; and vapor uptakes covered with bubble caps in said pools.

In witness whereof, we have hereunto set our hands this 28th day of July, 1927.

ROBERT E. WILSON.
WILLIAM H. BAHLKE.