

March 8, 1932.

C. M. CORBETT

1,848,462

FRACTIONATING TOWER

Filed Feb. 26, 1930

2 Sheets-Sheet 1

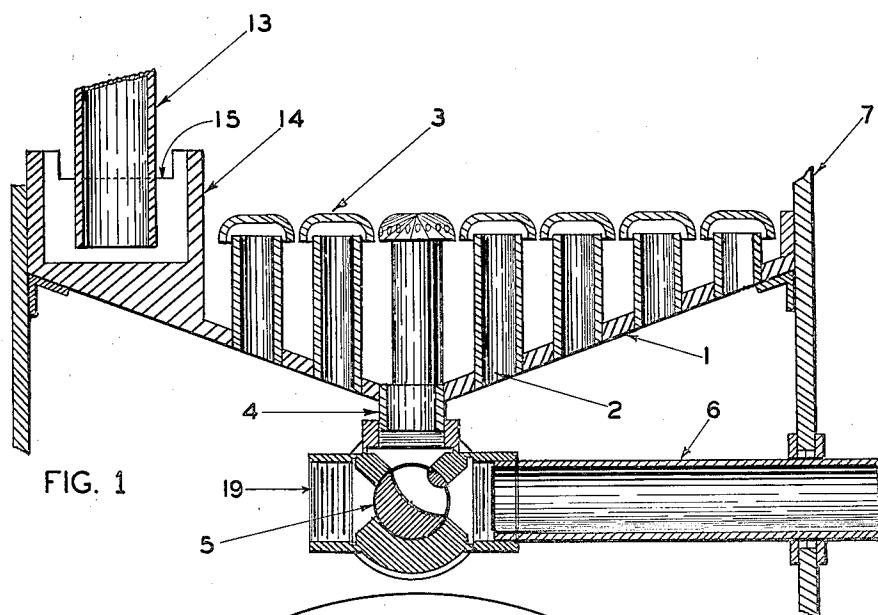


FIG. 1

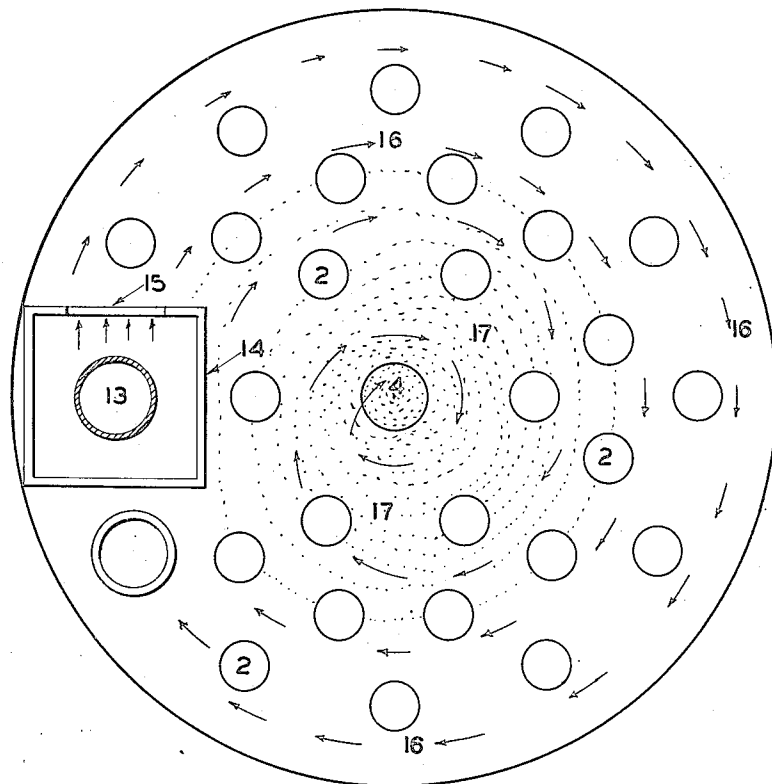


FIG. 2

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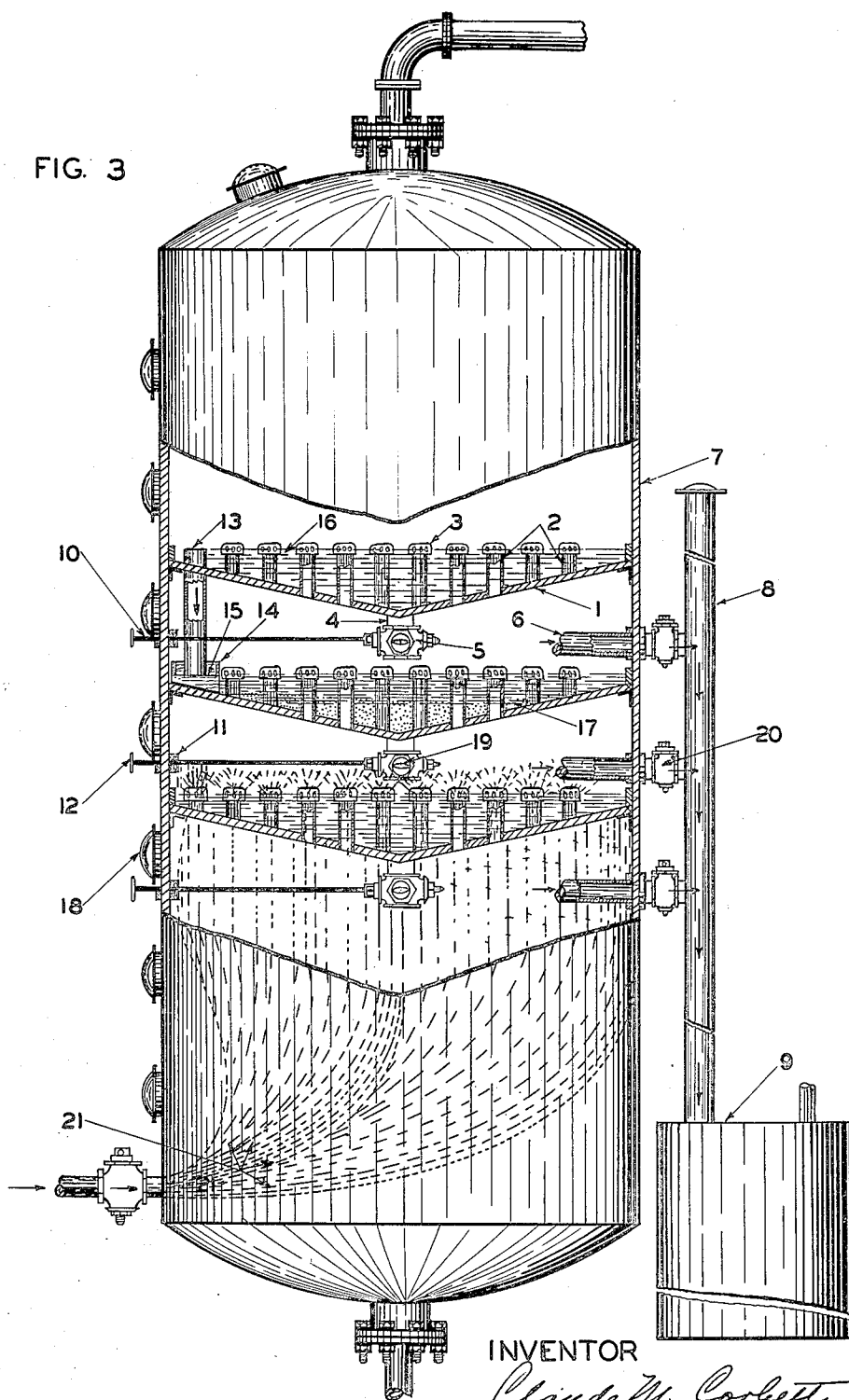
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FIG. 3



UNITED STATES PATENT OFFICE

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FRACTIONATING TOWER

Application filed February 26, 1930. Serial No. 431,574.

My invention relates to fractionating towers and contemplates a mechanism with means for collecting, controlling and disposing of any carbonaceous sediment, precipitate, dirt and the like, that collects on the trays; and the objects of my invention are, first, to provide a fractionating tower in which the carbonaceous sediment, precipitate, dirt and fluid may be drained from the trays while the tower is in operation; second, to provide a fractionating tower that may be cleaned at a minimum cost; third, to provide a fractionating tower in which its fractionating capacity may be adjusted in accordance with the vaporizing capacity of the stills in order to obtain better results in a more flexible method of operation; and fourth, to provide a fractionating tower with bubble trays each having a sloping base adapted to accumulate a liquid thereon; said liquid moving in a circular current assisting to gravitate the heavier sediments to the lowest point on the sloping base of said tray, below and apart from the stratum thru which the rising vapors bubble, thus localizing the sediment to be withdrawn to prevent its being carried upward with the rising vapors.

With these and other objects in view, my invention consists in the novel construction and arrangement of parts, as will be explained more fully hereinafter.

In the drawings, illustrating my invention, similar characters of reference designate corresponding parts in which:

Figure 1 is a vertical sectional view through a bubble tray constructed in accordance with the invention and constituting an embodiment thereof.

Figure 2 is a plan view of Figure 1 showing the position of parts thereon.

Figure 3 is a partial sectional view of a fractionating tower in which bubble trays constructed in accordance with my invention are installed.

Referring now to the drawings illustrating my invention I have shown a bubble tray, having raised vertical edges and sloping base 1. Extending through base 1 upward to a point where all tops are in the same level plane, are a plurality of vertical nipples 2,

adapted to receive bubble caps 3. At the lowest point of the base 1 is a hole and therein rigidly attached is a nipple 4 extending downward and attached to a three-way valve 5, controlled by shaft 10 passing through stuffing box 11 and receiving a wheel or lever 12 adapted to be operated manually or mechanically. Opening 19 of three-way valve 5 is left unattached and to the other opening, and suitably attached therein is a drain pipe 6 passing through wall of tower 7 into valve 20 which is attached to manifold 8 leading to separator 9.

Through base 1 from a point slightly lower than the height of the vertical nipples 2, an overflow pipe 13, is extended downward into the liquid seal box 14, having a low side 15 to allow liquid from the tray above to flow in one direction coming in contact with the contour of the tray's edge, thus creating an eddy in fluid thereon.

In operation the rising vapors 21 passing through vertical nipples 2 and under the caps 3, of a series of trays 1, will condense and form a condensate 16. In this condensate there is a carbonaceous sediment, precipitate, or dirt 17 that prevents efficient continuous operation. By opening valve 20 on pipe 6 and rotating valve 5 by means of shaft 10 and wheel 12 to a point where its opening coincides with openings in tray 1 and pipe 6 allowing fluid 16 and sediment 17 to flush out and into manifold 8 thence to separator 9 thus cleaning the tray while in operation. After sufficient time is allowed for the tray to drain, valve 5 may be closed and the tray will refill with fresh condensate.

If at any time the condensing capacity of the tower is greater than needed, for the vaporizing capacity of the stills, the valve 5 may be reversely rotated to a point where its opening coincides with opening of the tray and opening 19 of the valve, thus allowing the fluid to drain on the next lower tray, rendering the drained tray inoperative, thereby decreasing the fractionating capacity of the tower.

To one familiar with the present type of fractionating towers and the cleaning and operating process thereof, it will be readily

noted that a tower of the type of my invention, can be cleaned and operated at a minimum cost.

While the drawings show my invention constructed in the form of a hollow inverted cone and a three-way valve as means to drain fluid and sediment from the tray, it is to be understood that I do not intend to limit my invention to this particular design since I claim a tray with a sloping base and means to drain fluid and sediment to outside or inside of tower, from the lowest point of said base of tray.

What I claim is:

1. In a fractionating tower, a bubble tray of the character described, having a sloping base with raised vertical edges, a hole at the lowest point of said base, a valve attached under the base at said hole, a pipe extending from said valve through the wall of the tower, a shaft attached to the stem of said valve and passing through a stuffing box attached to the wall of the tower; a wheel or lever fixed on said shaft for operating said valve, said valve and pipe affording a means to drain a liquid and sediments from the tray and the tower while in operation.

2. In a fractionating tower, a bubble tray of the character described, having a sloping base with a plurality of vertical nipples extending upward through said base to a desired point where their tops will be in the same level plane, said nipples adapted to receive bubble caps suitable to permit the passage of gases there-through; and an overflow pipe extending from a point slightly below the tops of said vertical nipples, downward through the base of said tray into a liquid seal box, attached on the highest point of the sloping base of the bubble tray below; said liquid seal-box having one low side, to allow excess fluid from the bubble tray above to flow in one direction, affording means to assist in gravitating the sediment down the sloping base to the lowest point thereon, below and apart from the liquid stratum through which the rising vapors pass upward.

3. In a fractionating tower, a bubble tray of the character described having a sloping base with a plurality of vertical nipples extending through said tray upward to a point where their extreme heights are in the same level plane, said nipples adapted to receive bubble caps; a drainage system connected under the lowest point of said base, with means to drain fluid from said tray to the inside of said tower, while in operation.

4. In a fractionating tower having a plurality of trays, a bubble tray of the character described having a sloping base, with a liquid overflow seal box, having one or more sides lower than the other sides, and suitably attached to top side of said base, near the edge, said seal-box adapted to receive an over-flow

pipe from a higher tray and affording means to circulate the fluid on the tray.

5. A fractionating tower constructed with a plurality of bubble trays of the character described, each tray having a sloping base, a hole at the lowest point of said base, a drainage system and remote controlled valve connected under said hole; a plurality of vertical nipples extending upward through the tray, having their tops in the same level plane; a liquid over-flow seal box with a lowered side suitably attached on the top and near the edge of said tray, affording means to cause the fluid to assume a circular current on said tray; means to introduce washing fluid into the tower; also man holes affording means to enter the tower; said drainage system and valve being adapted to drain sediment from said tray.

6. A fractionating tower of the character described having a plurality of bubble trays, each having a sloping base, on which liquids and sediments collect from the condensing vapors passing upward through said bubble trays, a hole at the lowest point of the base of said bubble tray, a valve attached at said hole and remotely controlled affording means to drain the liquid from one or more bubble trays, during operation, to decrease condensation.

7. A fractionating tower constructed with a plurality of bubble trays, each having a sloping base, a plurality of vertical nipples extending upward through said base to a point where their tops are in the same level plane, an overflow pipe extending from slightly below the height of said vertical nipples downward through the base of said tray into a liquid seal box fixed on the tray below, a hole at the lowest point of the base of said tray, a drainage system and remote controlled valve connected under the base at said hole; a vapor inlet opening near the bottom of the tower, a vapor outlet opening at the top of the tower, a liquid outlet opening at the bottom of the tower; a plurality of sediment drain openings on the side of the tower, arranged between the trays and an equal number of man holes similarly arranged on the opposite side, a plurality of stuffing boxes, fixed over openings on side of the tower, a shaft extending through each stuffing box and attached to the stem of the valve all substantially as and for the purpose set forth.

In witness whereof I have hereunto set my hand on this the 20th day of February, 1930.

CLAUDE M. CORBETT.