July 15, 1930.

E. E. BARTELS

1,770,725

BUBBLE TOWER

Filed Sept. 28, 1927

Fig. 1

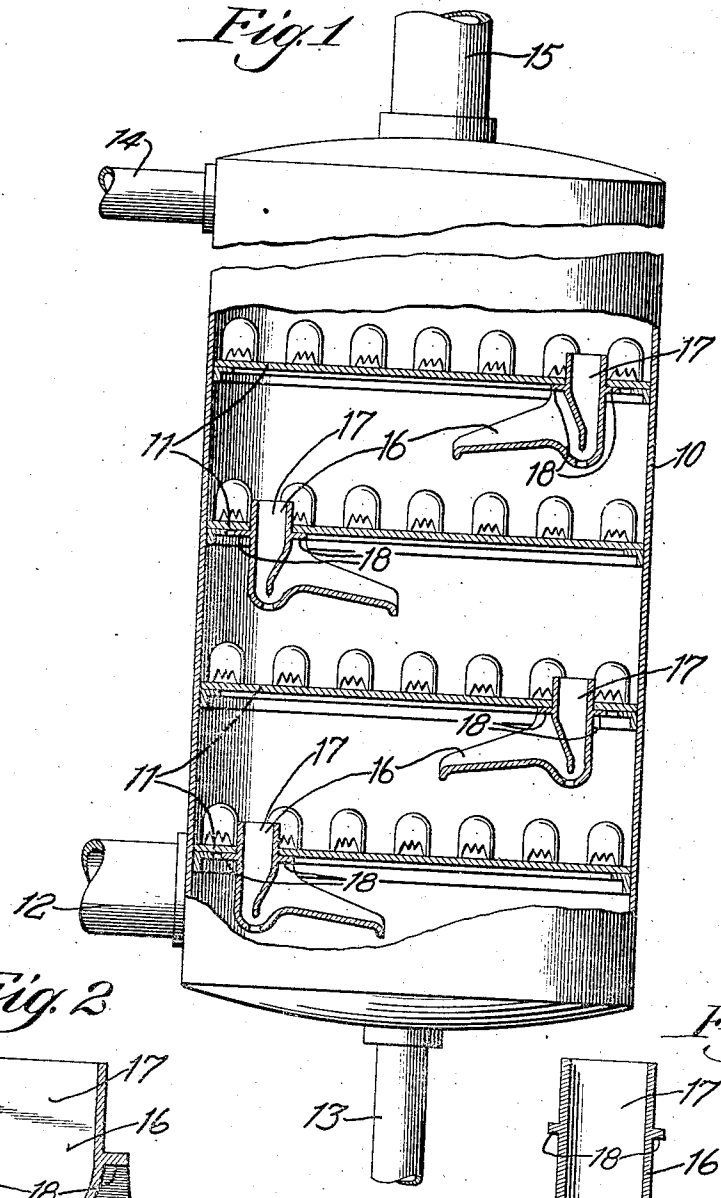


Fig. 2

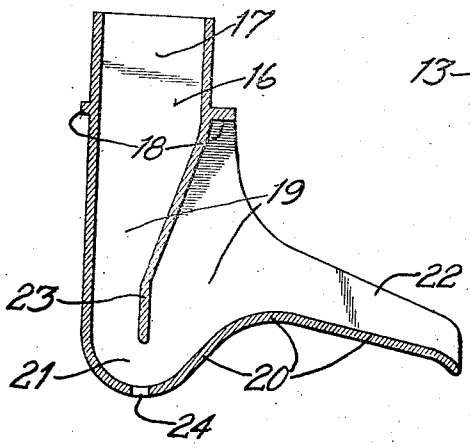
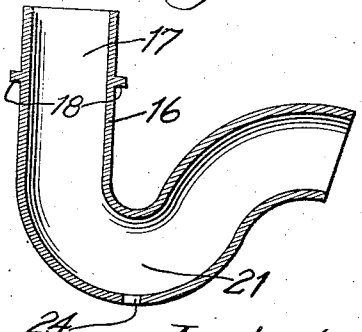


Fig. 3



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UNITED STATES PATENT OFFICE

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BUBBLE TOWER

Application filed September 28, 1927. Serial No. 222,620.

This invention relates to improvements in fractionating columns, and particularly to columns of the bubble cap type.

In co-pending application Serial No. 191,250, filed May 13, 1927, Perry J. Sweeney has described a bubble tower provided with overflow pipes having liquid seals therein, and adapted to discharge liquid at a point above the level of the liquid on the plate therebeneath.

The present invention relates particularly to an improvement in overflow pipes of this kind.

The invention will be readily understood from the following description taken in conjunction with the drawings, in which:

Figure 1 is an elevational view of a column, partly broken away to show plates and associated parts.

Fig. 2 is a sectional view of the overflow pipe on an enlarged scale; and

Fig. 3 is a similar view of a modified form of overflow pipe.

Referring to the drawings, 10 is a fractionating column provided with bubble plates 11 of the ordinary type. The column is provided at its lower end with a vapor supply pipe 12 and a liquid draw-off pipe 13, and at its upper end with a liquid supply pipe 14 and a vapor-outlet 15. The overflow pipes 16 are provided with a liquid seal or trap, and with an outlet located above the liquid level of the plate next below.

As shown in Figs. 1 and 2, each of the overflow pipes 16 preferably comprises an upstanding nipple 17, a flange 18 therebeneath for attachment to a bubble cap plate, and a lower body portion constituted by sides 19, and a wall portion 20 which extends downwardly from said flange, closes the bottom of the nipple 17 and then proceeds upwardly forming with the sides 19 a well 21. The wall 20 then bends downwardly again and, together with extensions of the sides 19, forms a spout 22 which terminates somewhat above the level of the liquid maintained in the next inferior plate. A septum 23 extends between the sides 19 and from the flange 18 into the well 21 so as to establish a liquid seal therein.

The liquid seal or well portion 21 of the overflow pipe 16 is provided with a hole or orifice 24, at a low portion thereof and preferably at its lowest point. The orifice 24 is of such a size that it permits only a part of the down-coming liquid to pass therethrough so that sealing liquid is maintained in the well 21 and a substantial part of the flow passes over the spout 22. Since the size of the orifice depends upon the volume of the flow, it is impossible to state definitely what size it should be in any particular case. By way of illustration, however, it may be stated that in bubble towers used for fractionating petroleum distillates an orifice of about one inch diameter has been found suitable for overflow pipes in which the nipple 17 is about six inches in diameter.

As shown in Fig. 3, the overflow pipe 16 may be in the form of a pipe of uniform diameter having a bend which constitutes a liquid seal therein. The orifice 24 is provided in the lowest point of this bend.

In operation, the down-flowing liquid passes into the overflow pipe through the nipple 17 and fills the liquid seal or well 21, so as to prevent upward passage of the vapors therethrough. A stream of the liquid issues from the orifice 24, carrying with it solid matter which might otherwise collect in the well 21. As previously indicated, this stream ordinarily constitutes only a part of the down-flowing liquid, the remainder passing out over the spout 22.

Although the present invention has been described in connection with the details of a specific embodiment thereof, it is not intended that such details shall be regarded as limitations upon the scope of the invention except in so far as included in the accompanying claims.

I claim:

1. A bubble tower provided with bubble cap plates and overflow pipes, said overflow pipes being provided with a liquid seal having a well for sealing liquid, and with means adapted to discharge liquid at a point above the level of the liquid on the plate therebeneath, said pipes being provided with a normally unclosed perforation at a low point of

said well and adapted to discharge liquid continuously therefrom.

2. An overflow pipe for bubble cap towers comprising a nipple adapted to project above a bubble plate to which it is to be attached, a well portion, a spout extending therefrom, and a wall extending into said well portion to constitute a liquid seal therein, said pipe being provided with a relatively small normally unclosed orifice at a low point of said well.

3. A bubble tower, comprising a plurality of superimposed plates, a bubble plate, an overflow pipe therefor, said overflow pipe being provided with a liquid seal portion, a discharge above the liquid level of the next inferior plate, and a normally unclosed perforation at a low point of said seal portion and adapted to discharge liquid continuously.

4. A bubble tower comprising a plurality of superimposed plates, a bubble plate, an overflow pipe, therefore said overflow pipe being provided with means constituting a receptacle for sealing liquid therein and provided with a normally unclosed orifice at the lowest point of said receptacle and adapted to discharge liquid continuously upon the plate therebeneath.

In witness whereof, I have hereunto set my hand, this 8th day of September, 1927.

EDWARD E. BARTELS.