Jan. 8, 1935. G. B. COUBROUGH 1,987,097

COLUMN

Filed July 13, 1932

Fig. 1

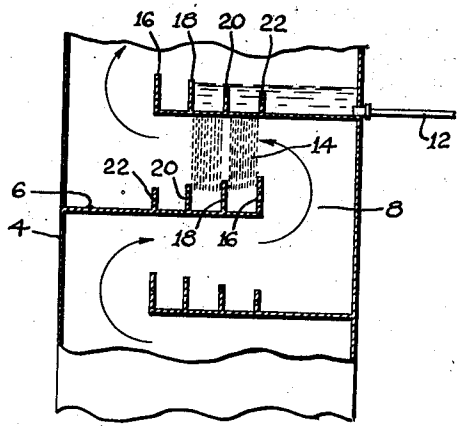
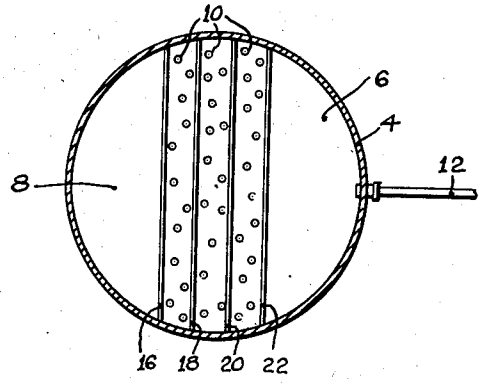


Fig. 2



Witness
H. E. Van Dine

Inventor
George B. Coubrough
by his Attorneys
Van Antwerp Fitch Hildreth & Cary

Patented Jan. 8, 1935 1,987,097

UNITED STATES PATENT OFFICE

1,987,097

COLUMN

George B. Coubrough, Long Beach, Calif., assignor to The Lummus Company, New York, N. Y., a corporation of Delaware

Application July 13, 1932, Serial No. 622,210

1 Claim. (Cl. 261—113)

The present invention relates to columns and more particularly to columns of the type described in my co-pending application Serial No. 407,670 since matured into Patent 1,945,600 dated Feb. 6, 1934.

The column described in my prior application involves the use of shower decks consisting of perforated plates through which the liquid passes in a shower of fine streams. The vapors which are to contact with the liquid pass horizontally through the showers under the deck. In a construction of this type, it is essential that the shower extend completely across the column, otherwise a part of the vapor would be by-passed without contact with the liquid.

It is the object of the present invention to provide a shower deck which will maintain a discharge of liquid entirely across the path of the vapors, regardless of the total quantity of liquid supplied to the deck. To this end, the present invention consists of the deck hereinafter described and particularly defined in the claim.

In the accompanying drawing, Fig. 1 is a fragmentary elevation partly in section of a column embodying the preferred form of duct, and Fig. 2 is a horizontal sectional view of the column.

The illustrated embodiment of the invention comprises a column indicated generally at 4, in which are mounted a plurality of overlapping segmental decks or plates 6 shaped to provide vapor riser passages 8 alternately at opposite sides of the column. The vapors pass in the general direction indicated by the arrows, namely, horizontally under the decks, and thence upwardly through the passages 8. As shown in Fig. 2, the overlapping portions of the several decks are provided with a series of small perforations 10. Reflux liquid is fed to the unperforated back portion of the uppermost deck by any suitable means, illustrated as a supply pipe 12. The liquid discharges in a fine rain or shower 14 across the path of the vapors. The liquid is retained on each deck by an end dam 16.

The decks are all of substantially identical form, except that alternate decks are reversed in position, as shown in Fig. 1. The width of the perforated portion of each deck is about one-third of the diameter, and the width of each vapor passage is likewise about one-third the diameter, so that the vapor passage of one deck lies immediately above the unperforated back portion of the deck below.

If the reflux liquid supplied were always adequate to maintain the deck completely covered, the spray would always maintain itself completely across the path of the vapors. In many instances, however, it is necessary to supply an amount of reflux insufficient to cover all of the perforations, and under such circumstances it is equally necessary that a complete shower extend across the column. Accordingly, there is provided a series of graduated weirs or dams, indicated in Fig. 1 as three dams 18, 20 and 22 which are arranged parallel to the end dam 16 and serve to form narrow channels.

The dams 18, 20 and 22 are of graduated heights and act as weirs to permit overflow from one channel to another as the liquid supply is increased. The space between the shell and the lowest weir 22 is always filled when the column is operating. When only a small quantity of reflux is being supplied, only the first channel between the dams 22 and 20 is filled but the liquid being confined in this channel is able to form a complete shower across the column. If the supply of reflux liquid is increased to such an extent that liquid cannot be accommodated in the first channel, it overflows the dam 20 into the second channel. As shown in Fig. 1, a sufficient amount of liquid is being supplied to maintain the first two channels completely filled. If the reflux supply were further increased, the liquid would overflow the weir 18 into the next channel.

The liquid descending in a shower from the uppermost plate descends into corresponding channels of the deck immediately below, thereby filling or partly filling the channels thereof in exactly similar fashion so that the maintenance of a complete shower across the path of vapors is assured. It will be noted that the direction of the vapor flow is such as to sweep the shower in each deck slightly toward the back portion of the deck, but this action does not interfere with the maintenance of a complete shower across the entire path of the vapors. If a considerable quantity of reflux is being handled, above the capacity of any deck, an overflow will occur over the dam 16 to the unperforated back portion of the deck next below, from which it can distribute into the channels in the manner above described.

It will be seen, therefore, that a complete shower across the path of the vapors is provided, whatever quantity of reflux liquid is being passed through the column. Thus, complete contact of all particles of the vapor with the liquid shower is assured.

Having thus described the invention, what is claimed is:

A column comprising a shell, a shower deck

extending partially across the shell and having an unperforated portion adjacent to the shell and a perforated portion near the middle of the shell, means for feeding liquid to the unperforated portion, a weir separating the perforated and unperforated portions, a second weir of greater height extending across the perforated portion to divide said portion into channels, and an end dam of greater height than said weirs, the space between the end dam and the shell forming a vapor space for ascending vapors.

GEORGE B. COUBROUGH.