March 14, 1944. A. M. SHORESMAN 2,344,329

FRACTIONATING EQUIPMENT

Original Filed Dec. 28, 1939

Fig. 1.

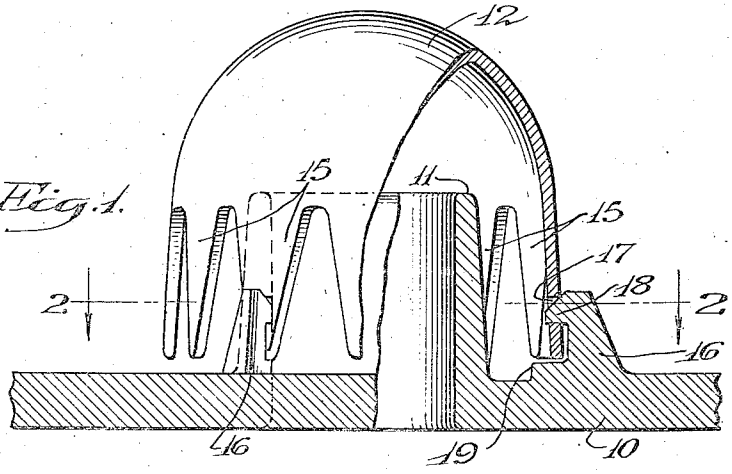
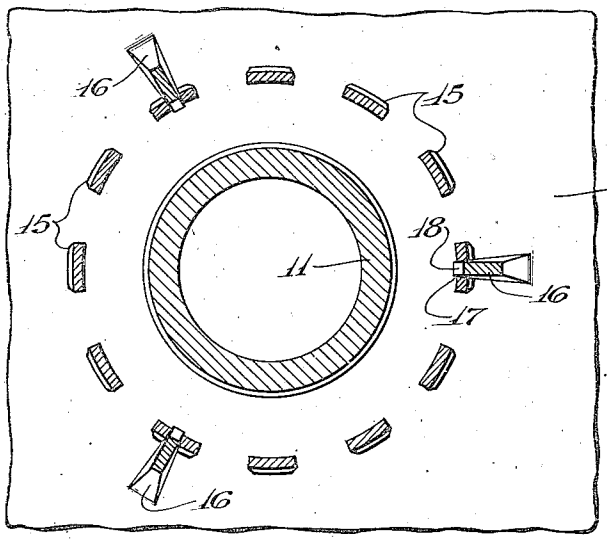


Fig. 2.



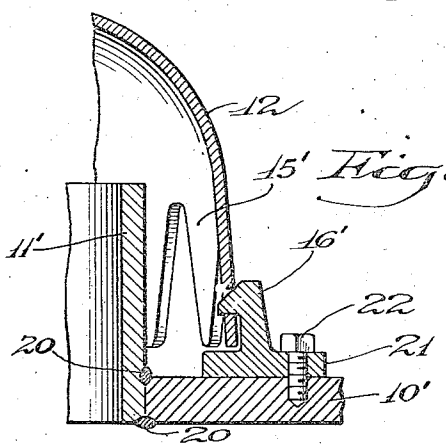


Fig. 3.

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FRACTIONATING EQUIPMENT

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Substituted for application Serial No. 311,310, December 28, 1939. This application February 28, 1942, Serial No. 432,747

3 Claims. (Cl. 261—114)

This application is a substitute for my copending application Serial No. 311,310, filed December 28, 1939.

The invention relates to an improvement in fractionating columns of the bubble type and particularly to improved means for securing the bubble caps of such fractionating columns in place.

Bubble type fractionating columns are now commonly employed in the distilling art and their various conventional forms are familiar to those conversant with the art.

This invention provides means of attaching bubble caps to the deck or tray of a fractionating column which obviates restriction of the flow of vapors through the vapor riser and cap and thus permits higher capacity or higher fractionating efficiency, as compared with fractionating columns of the same size designed in a conventional manner. The attaching means provided also permits ready removal of the bubble caps from the tray or deck.

The means which I employ to secure the caps in place over the vapor risers comprises a plurality of spaced lugs which are integral with or secured to the deck outside the area occupied by the bubble caps and which engage the lower portion of the caps to secure them in place.

The accompanying drawing diagrammatically illustrates several forms of the means provided by the invention for detachably securing a bubble cap to the tray or deck of a fractionating column.

Figure 1 of the drawing is an elevational view, shown partially in section, of a bubble cap and vapor riser and an adjacent portion of the deck, wherein the cap is secured to the deck in the manner provided by the invention.

Figure 2 is a sectional plan view of the apparatus illustrated in Figure 1 taken along line 2—2 in Figure 1.

Figure 3 is a fragmentary elevational view, shown in section, illustrating apparatus similar to that shown in Figure 1, but with a modified form of attaching lug for the bubble cap.

Referring now to Figures 1 and 2, the bubble deck or tray 10 is provided with a plurality of spaced vapor risers, one of which is indicated at 11. A bubble cap, such as indicated at 12, is provided over each of the risers 11.

The lower portion or skirt of the bubble cap comprises teeth 15 and vapors rising through the fractionating column pass from the vapor riser through the interior of the cap and through the slots or serrations provided between teeth 15 to bubble through a pool of liquid maintained on the tray. Thus, intimate contact is obtained between the ascending vapors and the descending refluxing liquid and condensate on the bubble trays.

A plurality of attaching lugs 16 is provided about the vapor riser 11, three such lugs spaced 120 degrees apart being employed in the case illustrated for each riser. Three teeth spaced 120 degrees apart about the periphery of the bubble cap are each provided with slots or openings 17 into which the protruding upper shoulders 18 of the lugs 16 project when the bubble cap is forced down between the lugs, thus locking the cap in place. A shoulder or stop 19 is provided at the base of each of the lugs against which the bottom of the corresponding tooth of the bubble cap rests to space the teeth from the upper surface of the deck.

With anchoring lugs of the type illustrated in Figures 1 and 2, the bubble cap 12 is preferably pressed or stamped from a sheet of steel, ingot iron or the like, having sufficient resilience or spring in the teeth 15 so that a downward pressure exerted on the bubble cap will force the bottom of those teeth provided with the slots 17 past the projecting shoulder 18 of the lugs until the latter register with the slots 17. The teeth then spring back into place to firmly lock the bubble cap in position.

As shown in Figures 1 and 2, lugs 16 and risers 11 are cast or otherwise formed integral with deck 10 but, when desired, instead of employing this type of deck, the lugs and risers may be welded or bolted to a deck formed from a steel plate or sheet of ingot iron or other suitable metal. This latter construction is illustrated in Figure 3 wherein deck 10' replaces deck 10, riser 11' replaces riser 11 and lugs 16' replaces lug 16, the bubble cap 12 being the same as in Figure 1. Riser 11' is welded to deck 10', as indicated at 20, and lug 16', which is otherwise similar to lug 16, is provided with a projecting base 21 having a bolt hole through which bolt 22 extends to register with a tapped hole provided in the deck.

It will, of course, be understood that the invention is not limited to a bubble cap of any specific design or shape. It is applicable to rectangular and oval bubble caps, as well as those of square, hexagonal or circular shape and caps having either perforate or slotted skirts may be employed, as well as the type illustrated which has a toothed or serrated skirt. Many specific forms of attaching members which do not interfere with the flow of vapors through the riser or

through the bubble cap and which permit ready detachment of the cap, other than the specific forms here used as illustrations, will be apparent to a skilled mechanic in view of the teachings of the invention and it is, therefore, not intended to limit the invention in its broader aspects to the specific form of attaching means illustrated.

Although I have mentioned only metallic bubble caps and decks in the foregoing specification, the features of the invention may be advantageously applied to non-metallic caps and/or decks composed, for example, of ceramic material, such as tile, porcelain, pottery or other materials of lower structural strength than metal. Due to their comparative fragility, bubble caps and decks of such material cannot be secured together in the conventional manner without the danger of breakage but, by employing anchoring means such as provided by the invention, can be safely employed where their use is otherwise desirable.

I claim as my invention:

1. In combination with a deck or tray of a fractionator having a plurality of spaced vapor risers, a removable bubble cap disposed over each of said risers, said bubble caps each having a skirt portion provided with spaced openings, and spaced lugs on said deck having projecting portions constructed and arranged to be inserted in said openings for retaining the caps in place on the deck.

2. In combination with a deck or tray of a fractionator having a plurality of spaced vapor risers, a removable bubble cap disposed over each of said risers, said bubble caps each having a skirt portion comprising spaced downwardly extending resilient prongs or teeth some of which are provided with openings therein, and spaced lugs on said deck having projecting portions so constructed and arranged that when the cap is forced downward between the lugs, said resilient prongs or teeth having said openings will spring into engagement with the lugs to retain the cap in place on the deck.

3. In combination with a bubble deck having a vapor riser, a bubble cap disposed over said riser and lugs on the deck at spaced points about the riser, the cap being provided at spaced points about its periphery with resilient prongs having openings into which projecting portions of said lugs extend.

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