

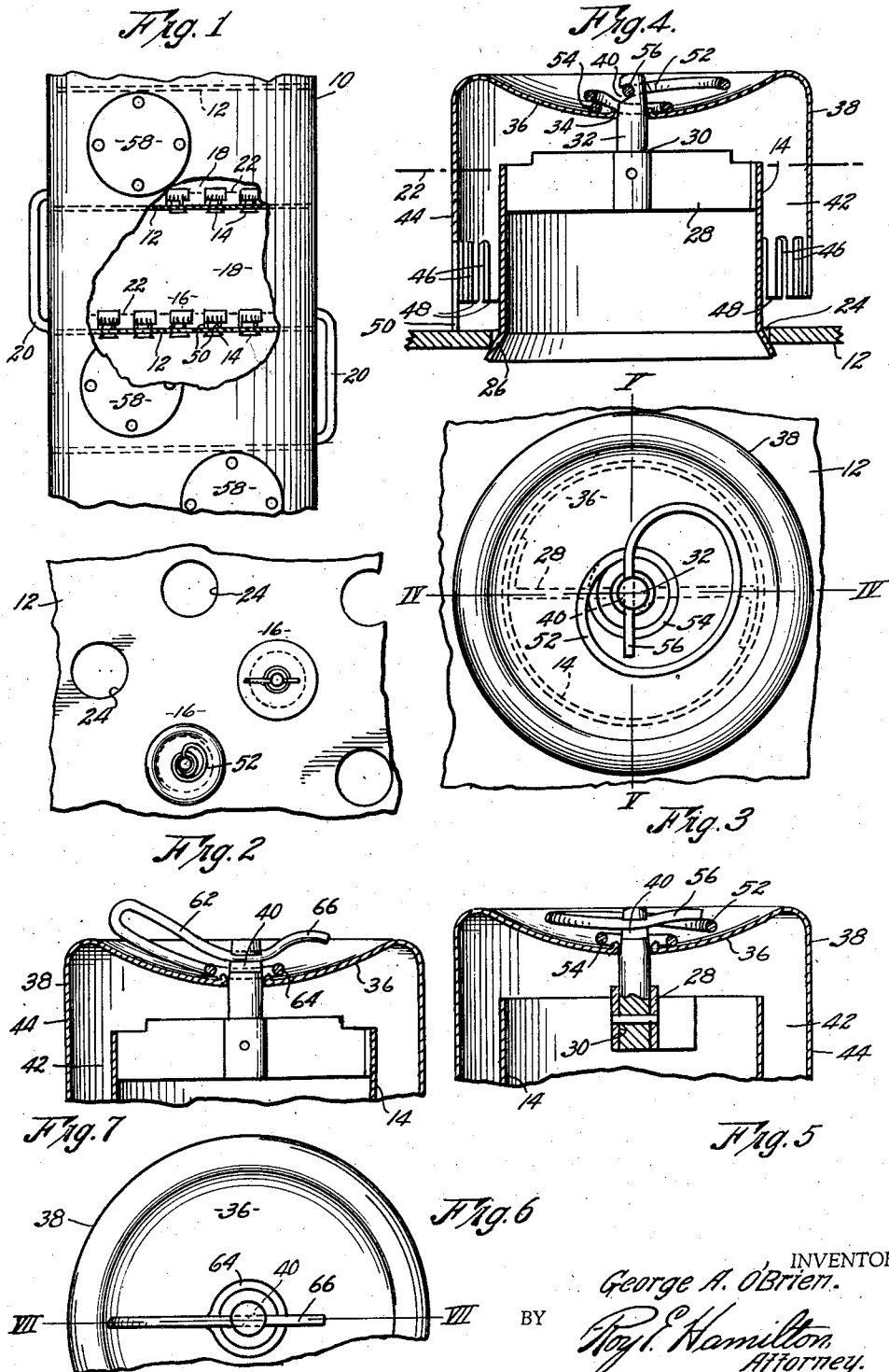
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BUBBLE CAP

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BUBBLE CAP

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1 Claim. (Cl. 261—114)

This invention relates to improvements in bubble caps for effecting contact and heat transfer between vapors and liquids. In the art of distillation and rectification, it is important to provide means and apparatus for intimately mixing and contacting vapors of liquids being distilled with a wash liquid.

It is the principal object of the present invention to provide an improved form of bubble cap including a chimney or vapor riser pipe and a bubble cap which are secured to the tray and fixed in relative relation by means of a resilient member.

Another object is to provide a bubble cap, so constructed, that it is easily installed and removed for cleaning.

A further object of the invention is the provision of a bubble cap so constructed and mounted that the parts may be easily released and separated by the operator stationed outside the bubble tower, by using an elongated hook member.

Other objects are simplicity and economy of construction, ease and speed of installation and removal, and adaptability for use with the present standard bubble tower, bubble plate or tray.

With these objects in view as well as other objects which will appear during the course of the specification, reference will now be had to the drawing wherein—

Figure 1 is a fragmentary elevation of a bubble or fractionating tower partly broken away to show the relative relation of the bubble trays carrying the bubble caps embodying this invention.

Fig. 2 is an enlarged, fragmentary plan view of one of the bubble trays indicating the relative position of the bubble caps.

Fig. 3 is an enlarged plan view of one of the bubble caps shown positioned on the bubble tray.

Fig. 4 is a vertical sectional view taken on line IV—IV of Fig. 3.

Fig. 5 is a fragmentary vertical section taken on line V—V of Fig. 3.

Fig. 6 is a fragmentary plan view of the bubble cap provided with modified form of the resilient fastening means.

Fig. 7 is a vertical section taken on line VII—VII of Fig. 6.

In the drawing similar parts are designated by like reference characters and the numeral 10 designates a bubble tower having horizontally disposed, spaced apart bubble trays or plates 12 having circular openings 24 for the reception of the chimneys 14 of the bubble caps 16. These vertically spaced compartments 18 which may be interconnected by down pipes 20 in the usual

manner to establish fixed liquid levels 22 in the various compartments.

The chimney 14 is tubular in form and provided at its lower end with an outwardly flared flange 26 of greater diameter than the diameter of the circular tray openings 24 so that when the body of the chimney is fitted upwardly through hole 24 the flange 26 will contact the tray 12 about said opening to seal the opening therebetween. The flange 26 may be curved vertically or it may be of frusto-conical form so that as it is forced upwardly it will fit tighter into opening 24 to effect proper sealing. The outer diameter of chimney 14 is sufficiently less than the diameter of opening 24 to permit the free movement of the chimney downwardly from the operative position when its securing means is released as hereinafter described. Chimney 14 is provided at its upper extremity with a diametrically disposed cross bar 28 which is rigidly fixed by welding, riveting or any other of the well known means, and has an axially disposed opening 30 adapted to receive an axially disposed stem 32 which extends thereabove to pass through the central hole 34 formed through the dished top 36 of cap 38. The portion of stem 32 extended upwardly from hole 34 is preferably disposed within the confines of the dished top of the cap and is provided with a side notch 40 which is shown slightly undercut to prevent accidental displacement of resilient securing means as hereinafter described.

The cap 38 is of inverted cylinder dish-shape of greater diameter than chimney 14 so as to present an annular passageway or recess 42 therebetween, whereby the vapors passing from chimney 14 outwardly between the top of the chimney and the dished top 36 of the cap which is spaced thereabove will pass downwardly into the annular passageway 42. The lower edge of side wall 44 of the cap is positioned above the bubble tray 12 and the edge portion of said wall is provided with a series of spaced apart notches 46 to form depending teeth 48.

Legs 50 extend downwardly from the body of cap 38 to rest on the bubble tray 12 to support the cap in proper relation to the tray. Three legs are best suited for leveling the cap so that the feeding of the vapors will be evenly distributed by passage through the upper extremity of notches 48.

The spring or resilient securing means 52 shown in the preferred form comprises a spring wire of any suitable cross section and made of a material that will retain its resiliency at a temperature above that of the bubble tower in which it is used.

This spring 52 is of a general spiral and conical form as shown with a ring member 54 at the lower portion thereof and terminating at its upper extremity in a transverse arm 56 which serves to engage the stem notch 40 as clearly shown. As the ring portion 54 rests on dished top 36 about hole 34, the metal of the top 36 may be flanged upwardly about hole 34 to prevent slippage of the ring portion of the spring against the stem, also that portion of the stem 32 disposed above the top plate 36 is shown as cone-shaped so as to insure free passage of the stem through said hole.

When the spring 52 is in the position shown in the drawing it is under sufficient tension to pull the chimney tightly against the under edge of bubble tray 12 as the cap legs 50 rest on top of said tray.

The springs 52 are so arranged relative to the operating man holes 58 of the tower that the operator may by means of hooked tool reach through the adjacent man hole and engage the free end of the transverse arm 56 to remove it from said notch 40 thus permitting the chimney 14 to drop and the cap to be removed through the man hole.

When the bubble cap is to be positioned the chimney is held in position through tray opening 24 by an operator therebelow, while an operator thereabove positions the cap on stem 32 and forces the spring to position with the spring arm 56 engaging side notch 40. This method of mounting the caps saves much time over the old method and is a much easier operation. Furthermore, this resilient securing means always exerts a force tending to move the chimney to a position against the bubble plate.

It will be noted that this resilient securing means when in the operative position is disposed below the top horizontal plane of the cap so as to not interfere with the spaces thereabove.

In the operation of the bubble tower the liquid level 22 of the oil will be considered at the point indicated. The vapors from the compartment 18 therebelow will pass upwardly through chimneys

14 downward through annular passageway 42 thence out through side notches 40.

Since the bubble tray shown is the one now in general use it is apparent that the present bubble cap may be generally used for old installations and also for new work.

Reference will now be had to the modified form of resilient securing means or spring for securing the chimney and cap in position which is shown in Figs. 6 and 7. In these views the chimney and cap are identical with those shown in the preferred form and the only modification is in the spring 62. This spring or resilient securing means is substantially U-shaped with a ring shaped bearing portion 64 adapted to rest on top plate 36 with its other end portion 66 anchored under tension in side notch 40 formed in stem 32. In this form of spring securing means it may be necessary to extend a portion of the spring above the upper plane of cap 38, however in general it functions and is operated in a manner substantially as set out in regard to spring 52.

It is quite apparent that the particular form of the spring is not so material in so long as it may be easily positioned and removed and exerts a sufficient tension between the cap and chimney to properly seat and hold the chimney in the bubble tray.

What I claim as new and desire to protect by Letters Patent is:

A bubble cap assembly adapted to cover an opening in a bubble tray comprising a chimney fitted in the opening of the tray, said chimney having a sealing flange to engage the underside of the tray, a stem having a side notch and extending axially and upwardly from said chimney, a cap carried by said tray in spaced relation about said chimney with said stem extending there-through, and a spring member disposed under tension with its one end engaging said notched stem and its other end resting on said cap whereby said chimney and cap are secured in operative relation on said tray.

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