Feb. 15, 1949. H. C. GLITSCH 2,461,729

BUBBLE CAP MOUNTING

Filed Dec. 15, 1945

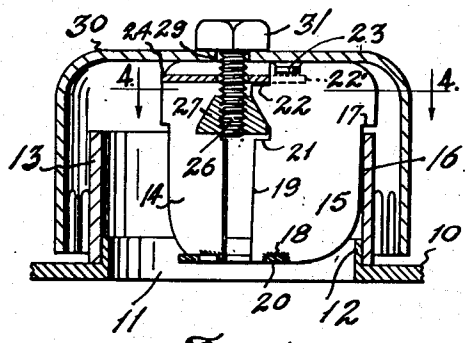


Fig. 1.

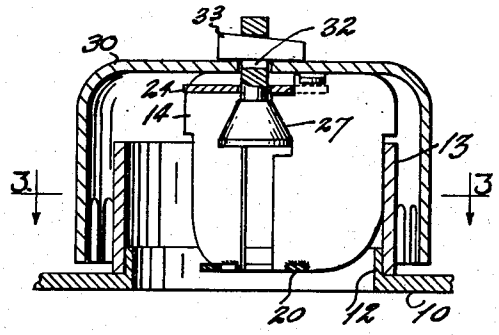


Fig. 6.

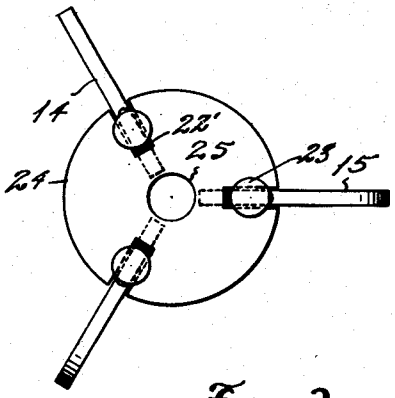


Fig. 2.

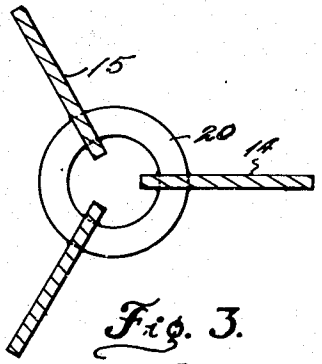


Fig. 3.

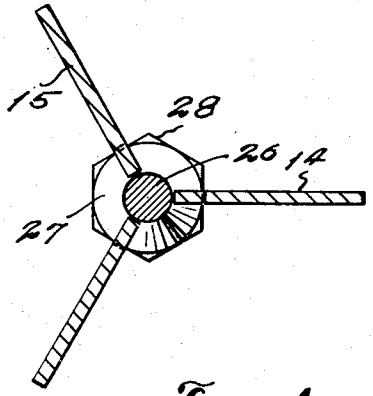


Fig. 4.

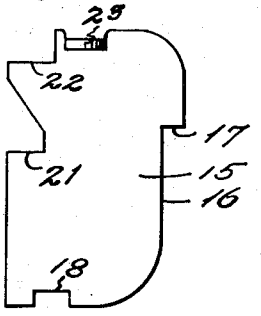


Fig. 5.

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BUBBLE CAP MOUNTING

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6 Claims. (Cl. 261—114)

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This invention relates to new and useful improvements in bubble cap mountings.

The invention has to do with bubble caps for the trays of refining towers and one object of the invention is to provide improved means for mounting and securing the bubble cap in place.

A further object of the invention is to provide an improved bubble cap mounting having a spider adapted to fit in the riser and support the cap and means for securing the cap on the spider in a new and novel manner, whereby the cap may be readily applied and secured or removed.

Another object of the invention is to provide an improved bubble cap mounting wherein the spider is frictionally held in the riser and the cap is removably fastened on the spider.

Still another object of the invention is to provide a spider and fastening wherein the spider may be formed of sheet or thin plate metal and the fastening stud secured therein, thus producing a unitary structure which may be economically manufactured.

A construction designed to carry out the invention will be hereinafter described together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawing, wherein an example of the invention is shown, and wherein:

Fig. 1 is a vertical sectional view of a bubble cap constructed in accordance with the invention,

Fig. 2 is a plan view of the spider,

Fig. 3 is a horizontal cross-sectional view of the spider taken on the line 3—3 of Fig. 1,

Fig. 4 is a plan view of the spider, the spacer disk being omitted;

Fig. 5 is an elevation of one of the spider wings, and

Fig. 6 is a view similar to Fig. 1 showing a modified form of fastening.

In the drawings, the numeral 10 designates the floor or deck of a refining tower which is provided with an opening 11, surrounded by an upstanding collar 12. An annular riser 13 fits snugly around the collar and engages the upper surfaces of the deck. These elements may be of any desired construction.

A spider 14 is adapted to frictionally engage in the riser and to extend thereabove. The spider includes a plurality of equi-spaced radial wings 15. Each wing is cut back along its outer vertical edge 16 to provide an overhanging shoulder 17, whereby the edges 16 may be slid down into

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the riser in frictional engagement therewith. The shoulders come to rest upon the upper edge of the riser and support the spider.

The lower edges of the wings are provided with notches 18, adjacent their inner vertical edges 19 for receiving a spacer ring 20 which may be welded or otherwise secured thereto. The vertical edges 19 of the wings are formed with angular notches or seats 21 and thereabove each wing is cut back to form a shoulder 22. A spacer disk 24 resting upon the shoulders 22 is formed with radial slots 22' for receiving the upper ends of the wings. Upsets 23 formed in the upper edges of the wings overhang the disk 24 and prevent upward displacement of said disk, whereby the upper ends of the wings are loosely confined in the slots and are capable of limited radial displacement; however such radial displacement is confined to the upper portions of said wings, since the spacer ring 20 is welded to the wings.

The disk 24 has a central aperture 25 which receives a screw-threaded stud 26 engaging in a conical head 27 loosely confined in the notches 21 and provided with an angular or hexagonal rim 28. The angular rim prevents the head from rotating in the spider. The stud extends up through an aperture 29 in the bubble cap 30 and thereabove, for receiving a nut 31, whereby the cap is fastened upon the spider. When the nut 31 is tightened the conical head 27 is pulled upward, whereby its conical surface engages the inclined edges of the wing notches 21 and displaces the upper portions of the wings so that their outer vertical edges 16 frictionally engage the inner surface of the riser 13, thereby fastening the spider in place.

By removing the nut 31 the cap may be removed without withdrawing the spider from the riser; however, it is not necessary to remove the nut since the spider and cap as a unit may be withdrawn from the riser and the same procedure may be followed in installing the spider and cap. The arrangement is simple and inexpensive. The wings 15, ring 20 and disk 24 may be stamped from sheet or thin plate metal and scrap from larger stampings may be used.

It is pointed out that since the liquid on the tray covers the lower ends or shirts of the caps 30, the gas passes upwardly through the riser 13, then downwardly between said riser and the cap and upwardly through the liquid. The object is to bubble this gas through the liquid and thus if the pressure differential between the gas pressures below and above the tray is too great, the gas would channel through the liquid and bub-

bling would be defeated. The only impedance to the flow of the gas is the layer of liquid which is only a few inches deep, therefore a pressure differential of less than ½ a pound per sq. in. between the gas pressures below and above the tray is all that is required, under ordinary conditions, to produce efficient bubbling. The frictional engagement between the vertical edges **16** and the inner surface of the riser **13**, is depended upon to hold the spider in said riser against upward displacement by the force of the pressure differential. Actual use shows that the spider will resist many pounds of pressure before being displaced. It is obvious that either the nut **31** or wedge **33** may be employed to draw the head upwardly and radially displace the upper portions of the wings to such an extent as to provide a frictional engagement of wings with the spider which would resist an upward force of many pounds.

It is obvious that fastenings other than a nut and screw-threads may be used. In Fig. 6 I have shown the stud formed with a vertical slot **32** extending above and below the top surface of the cap **30** for receiving a wedge key **33**, whereby the cap may be fastened on the spider. In this form the head **27** is made integral with the stud and the screw-threads are omitted from said stud.

The foregoing description of the invention is explanatory thereof and various changes in the size, shape and materials, as well as in the details of the illustrated construction may be made, within the scope of the appended claims, without departing from the spirit of the invention.

What I claim and desire to secure by Letters Patent is:

1. A bubble cap mounting for insertion downwardly in a bubble tray riser including, a spider having outwardly movable divergent upright wings, an element attached to the wings for confining them in divergent relation, a head confined between the inner edge portions of the spider wings and movable upwardly to displace said wings outwardly, a stud extending upwardly from said head and above the spider and cap means for moving said stud and head upwardly, the wings having upright outer edges for frictional engagement in a riser.

2. A bubble cap mounting as set forth in claim 1, and a spacer ring secured to the lower ends of the spider wings.

3. A bubble cap mounting as set forth in claim 1, wherein the wings have overhanging shoulders at their outer edges.

4. A bubble cap spider for downward insertion in a bubble tray riser including, a plurality of radial upright wings, each wing having an overhanging shoulder at its outer edge and a notch in its inner edge, a head confined in the notches between the inner edges of the wings, a stud extending upwardly from the head, and spacer elements engaging and holding the wings in divergent relation.

5. A bubble cap spider for downward insertion in a bubble tray riser including, a plurality of radially movable upright wings, each wing having an overhanging shoulder at its outer edge, spacer means for the wings, and means in the spider engaging the wings for displacing them radially.

6. A bubble cap spider for downward insertion in a bubble tray riser including, a plurality of radially movable upright wings, each wing having an overhanging shoulder at its outer edge and a notch at its inner edge having an inclined surface, a spacer member loosely attached to the upper portions of the wings, a conical head loosely confined in the notches of the wings, a stud engaging the head, and a spacer member secured to the lower ends of the wings.

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