

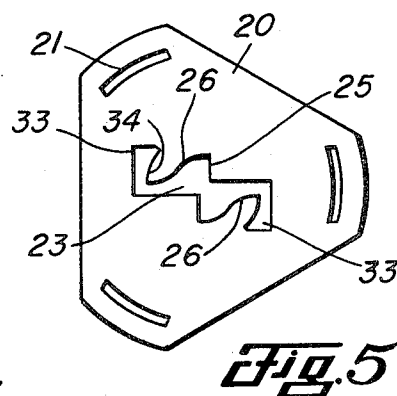
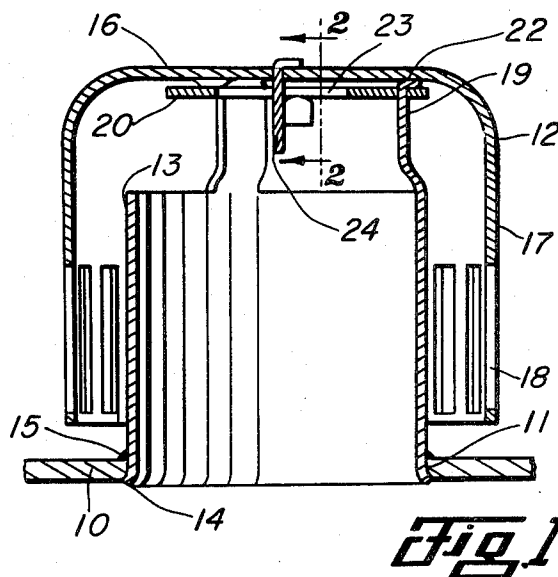
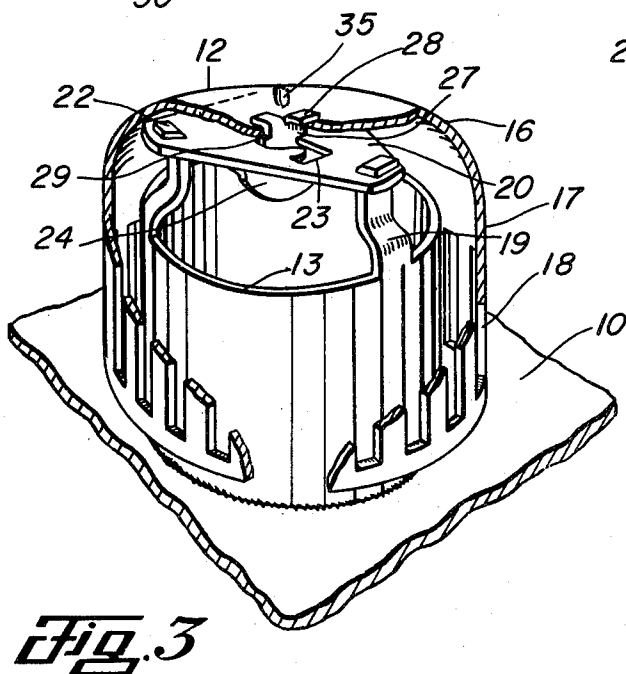
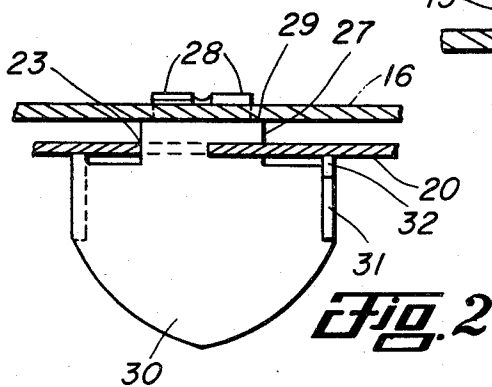
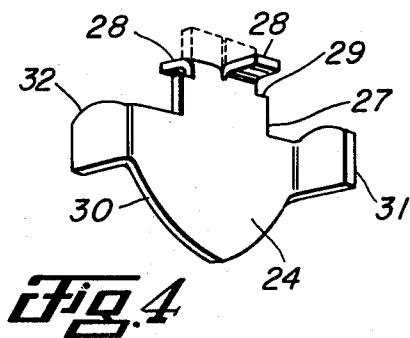
Oct. 10, 1950

H. C. GLITSCH
BUBBLE CAP ASSEMBLY

2,525,218

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2 Sheets-Sheet 1



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2 Sheets-Sheet 2

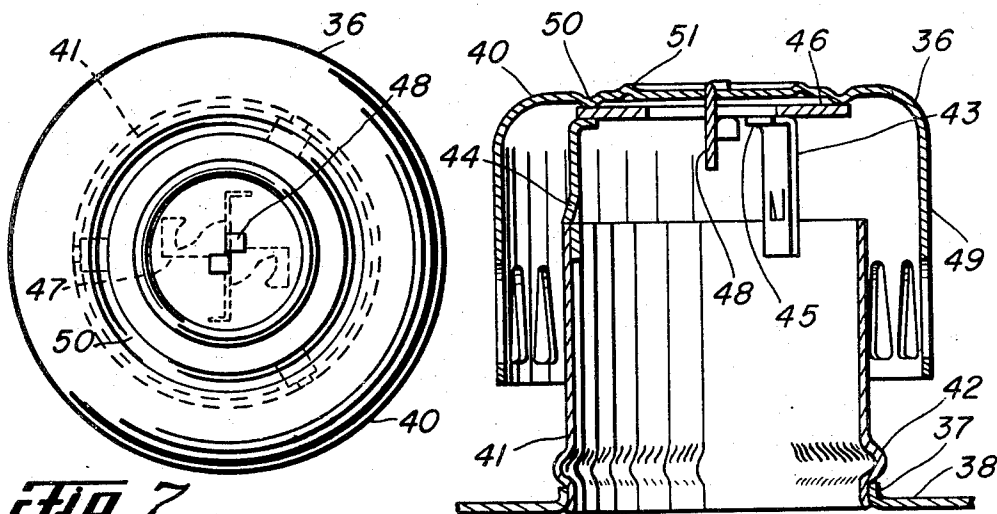


Fig. 7

Fig. 6

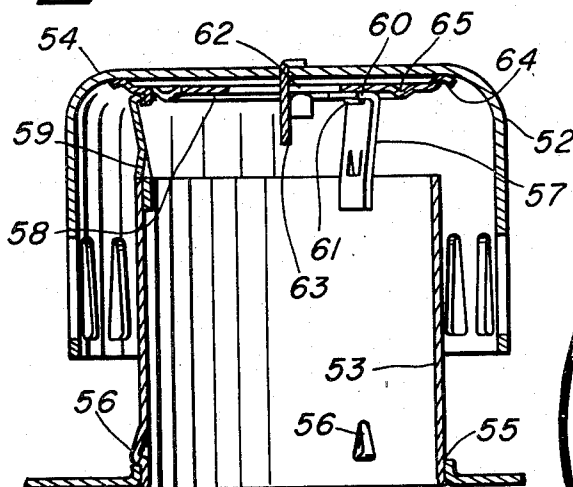


Fig. 9

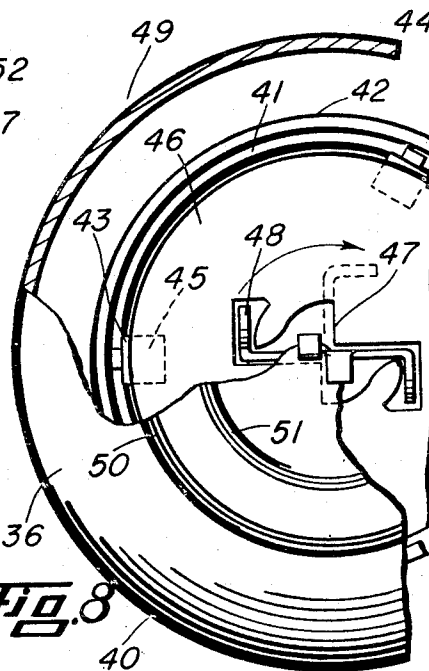


Fig. 8

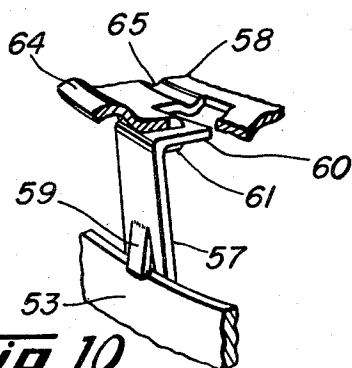


Fig. 10

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UNITED STATES PATENT OFFICE

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BUBBLE CAP ASSEMBLY

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8 Claims. (Cl. 261-114)

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This invention relates to new and useful improvements in bubble cap assemblies and is a continuation-in-part of my copending application, Serial No. 777,144, filed October 1, 1947.

One object of the invention is to provide an improved bubble cap assembly for use in refining vessels having a removable bubble cap and novel means for securing the cap to a riser.

Another object of the invention to provide an improved bubble cap assembly having cap supporting means mounted on its riser together with means carried by the cap for coacting with the supporting means to removably and frictionally latch said cap to the riser.

A particular object of the invention is to provide an improved bubble cap assembly having novel cap mounting means which includes a pair of coacting fastening elements, one of which is carried by the cap and the other by the riser and adapted to frictionally secure said cap to said riser, one of the elements being of sufficient flexibility as to be distortable into locking position upon full engagement of said element.

Still another object of the invention is to provide an improved bubble cap assembly, of the character described, wherein a bayonet element depends from the cap for frictionally engaging a slotted plate element supported by the riser, said cap and plate having coacting means for locking the elements against accidental disconnection.

A further object of the invention is to provide an improved bubble cap assembly, of the character described, wherein the plate element carried by the riser or the cap is sufficiently flexible to permit frictional locking engagement of the bayonet and plate element.

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 drawings, where examples of the invention are shown, and wherein:

Fig. 1 is a transverse, vertical, sectional view of a bubble cap assembly constructed in accordance with the invention and shown mounted in a deck,

Fig. 2 is an enlarged, sectional view, taken on the line 2-2 of Fig. 1,

Fig. 3 is a perspective view of the bubble cap assembly, with a portion of the bubble cap broken away,

Fig. 4 is a perspective view of the bayonet fastening element carried by the bubble cap,

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Fig. 5 is a plan view of the plate element supported by the riser,

Fig. 6 is a transverse, vertical, sectional view of a modified form of bubble cap assembly,

Fig. 7 is a plan view of the modified form of the bubble cap assembly shown in Fig. 6,

Fig. 8 is a plan view, partly in section, of the modified assembly,

Fig. 9 is a view, similar to Fig. 6, of another modification, and

Fig. 10 is an enlarged perspective view showing the connection of one of the supporting arms to the riser and plate element of the modified assembly shown in Fig. 9.

In the drawings, the numeral 10 designates a portion of a tray floor or deck of a refining vessel (not shown) which deck has a plurality of conventional vapor or riser openings 11 formed therein. Each opening 11 is shown as being circular and a bubble cap assembly 12 is provided for the same. The assembly 12 includes an upright, tubular riser 13, in the form of a short sleeve or collar, snugly engaged within the opening 11 and having its lower edge portion flared or swaged outwardly so as to underlie the margin of the deck surrounding said opening. If desired, the riser may be tack welded to the deck as shown by the numeral 15. A bubble cap 16, of a diameter considerably larger than the diameter of the riser and having a depending annular skirt 17, is mounted upon the upper end of the riser with its skirt surrounding said riser in spaced, concentric relation. The lower margin of the skirt 17 is spaced from the deck and has suitable vents or openings 18 formed therein.

A plurality of upright supports or arms 19 project above the upper end of the riser for supporting the cap 16 in spaced relation thereto. The arms 19 are preferably disposed within the inner periphery of the riser, by being offset inwardly, so as to not project therebeyond and have a transverse, flat plate or element 20 mounted upon their upper end portions. As shown in Fig. 5, the plate 20 is substantially triangular in shape and has openings or slots 21 formed in its apex portions for receiving the ends 22 of the arms which are bent outwardly upon themselves so as to overlie and fasten said plate thereto. In order to permit the passage of the riser through the opening 11 upon installation or removal, the plate is preferably of a size less than the external diameter of said riser.

A Z-shaped opening or slot 23 is formed in the central portion of the plate for receiving a bayonet element or key 24 which is secured to

and depends from the cap. Opposed notches or recesses 25 are formed at the medial portion of the slot 23 to permit limited turning of the key 24 and the cap relative to the plate and riser. The clockwise margin or wall of each notch or recess 25 extends at a right angle to the slot so as to function as a stop for limiting rotation of the key, while the opposite wall or counter-clockwise margin of each notch is curved as shown by the numeral 26 to relieve said slot and accommodate relative turning of said key.

An upstanding tongue or lug 27 of reduced width is formed on the key 24 for projecting through a complementary opening in the top of the cap. The projecting extremity of the lug is bifurcated or split, with the split portions 28 being bent upon themselves in opposite directions so as to overlie the top of the cap. As is clearly shown in Fig. 2, the lower portion of the lug 27 is of increased width to provide opposed, upwardly-directed shoulders 29 for engaging the underside of the cap top. The key has a substantially flat body of greater width than height including wing portions or sections extending laterally of the central axis of the key and with a tapered or beveled, pointed lower edge portion 30 for facilitating its insertion in the Z-slot 23 of the plate 20. An ear or lug 31, having a rounded or beveled upper edge portion 32, extends at a right angle from each end of the key at its upper edge portion for frictionally engaging the underside of the plate.

Since the ears 31 extend in opposite directions, the same are insertable through the oppositely-disposed legs or lateral portions 33 of the Z-slot. Due to the curved edge portions of the ears, which project above the body of the key, the plate is distorted or flexed upwardly by the engagement therewith of said key and the cap is frictionally locked or fastened to the riser upon insertion of said key in the Z-slot and relative turning thereof. The notches 25 of the slot coact with the lateral sides of the lug 27 to limit relative rotation of the key. If desired, the inner margins or walls of the slot portions 33 may be curved inwardly from their inner to their outer ends so as to facilitate turning movement of the ears of the key. Also, projections in the form of dimples 35 may depend from the top of the cap in the path of the ends 22 of the riser arms 19 to prevent accidental rotation and disconnection of said cap. A dimple 35 is provided for each arm and is positioned so as to be disposed contiguous to and counter-clockwise of its arm when the key is engaged with the slot.

In Figs. 6, 7 and 8, a modified bubble cap assembly 36 is shown mounted in the upwardly flanged riser opening 37 of a tray floor or deck 38. The assembly 36 includes a bubble cap 40 and a riser 41 the lower end of which may be swaged or belled outwardly so as to snugly engage the flanged opening 37 forming a fluid-tight seal therewith. For supporting the riser 41, an external, annular projection or rib 42 is formed in the lower portion of the riser by bellling or rolling the same outwardly. Upright supports or arms 43 are welded or otherwise secured to the upper end of the riser for supporting the cap in spaced relation. It is preferable to cut an ear or lug 44 in the lower portion of each arm 43 and bend the same outwardly for engagement with the upper edge portion of the riser so as to properly space the arm thereabove. As shown by the numeral 45, the upper ends of the arm

fastening element or plate 46, similar to the plate 20, welded or otherwise secured thereto in overlying relation. The plate 46 is preferably circular and has a similar Z-shaped slot or opening 47 formed in its medial portion for receiving a similar bayonet element or key 48 depending from the cap and fastened thereto in a similar manner. It is noted that the plate 46 is preferably circular and may be relatively thick or of heavy gauge. If desired, the blank cut from the deck 38 in forming the opening 37 may be used as the plate 46.

The bubble cap has been shown as being circular, but could be of any desired shape, and includes the usual slotted skirt 49 spaced above the deck. The frictional connection and disconnection of this form of the invention is the same as that of the first form. When the plate 46 is relatively thick or of heavy gauge, the cap is formed of relatively thin or light gauge metal so as to be distorted or flexed downwardly upon locking engagement of the key with the plate. In order to increase the frictional engagement of the cap and the plate, annular ribs 50 and 51 may be formed in the flat top of said cap and said ribs are preferably oppositely-directed. The outer rib 50 is of a diameter slightly less than the diameter of the plate 46 and is preferably directed downwardly so as to bear against said plate.

Another modification of the bubble cap assembly is shown in Figs. 9 and 10 and is designated by the numeral 52. This modified cap assembly includes a riser 53 and a cap 54 similar to the riser 41 and cap 40. A flanged opening 55 is formed in a deck plate 56 for receiving the lower end of the riser 53 which is swaged or belled outwardly into fluid-tight engagement therewith. Instead of the annular rib 42, a plurality of outwardly-pressed ears or lugs 58 are formed in the lower portion of the riser so as to bear upon the marginal flange of the opening 55 and maintain said riser in position. Secured to the upper end of the riser are a plurality of substantially upright arms 57 for supporting a circular fastening element or plate 58. Each arm 57 has an outwardly-directed ear or lug 59, similar to the ears 44 of the arms 43, for engaging the upper edge portion of the riser. Since the plate 58 is of a diameter greater than the diameter of the riser, the upper portions of the arms are preferably bent or inclined outwardly. An inwardly-directed, slotted ear or eye 60 is formed on the upper end of each arm and is adapted to be engaged by a tongue or lug 61 cut out of the plate and bent downwardly around a portion of the eye so as to fasten said plate to said arm. The plate has a Z-shaped slot or opening 62 formed in its medial portion for receiving a bayonet element or key 63, substantially identical to the key 24 and 48, which depends from and is fastened to the cap 52 in a similar manner. The plate is relatively thin so as to be distorted or flexed upwardly upon locking engagement of the key 63 with the slot 62. In order to enhance this frictional locking engagement, the rigidity of the plate is increased by forming a pair of annular, concentric projections or ribs 64 and 65 in said plate. The ribs are oppositely-directed and the outer rib 64 is preferably directed upwardly so as to bear against the underside of the cap.

From the foregoing, it is readily apparent that bubble cap assemblies of novel construction have been provided. The caps are removably fastened to their risers so as to be capable of being quickly

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installed and removed. Due to the frictional engagement of the keys with their plates and the flexing of said plates or the top of the cap, the latter is securely fastened against displacement. Additional fastening or locking means is provided by the cap projections 35 as well as the ribs 50, 51, 64 and 65. It is noted that the caps 40 and 54 are interchangeable with the cap 16.

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 assembly including, a riser, a cap mounted on the riser in spaced relation, substantially upright supports carried by said riser, a transverse plate secured to the upper ends of the uprights and having an elongate opening therein, and a depending plate-like key secured to the cap and engaging within the opening, said key having laterally extending wing portions being adapted to frictionally engage the underside marginal edge portion of the plate surrounding said opening upon turning of said cap and key relative to said riser and plate.

2. A bubble cap assembly including, a riser member, a cap member mounted upon the riser member, supporting means carried by one of the members for disposing the members in spaced relation, coacting frictional fastening elements carried by the supporting means and the other of said members, the fastening elements including a slotted plate secured to one member and a projecting plate-like key secured to the other member and extending through the plate slot, said key having laterally extending wing portions frictionally engaging the underside marginal edge portion of the plate surrounding the plate slot.

3. A bubble cap assembly including, a riser, a cap mounted on the riser in spaced relation,

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upright arms carried by said riser, a transverse plate secured to the upper ends of the arms and having a Z-slot therein, a key secured to and depending from the cap and engaging within the slot, said key having laterally extending wing portions adapted to frictionally engage the surrounding marginal edge portion of the underside of the plate upon turning of said cap and key relative to said riser and plate.

4. A bubble cap assembly as set forth in claim 3 including, coacting projections on the contiguous surfaces of the cap and plate to prevent accidental turning of said cap.

5. A bubble cap assembly as set forth in claim 3 wherein the medial portion of the plate slot is relieved to permit turning of the key relative thereto.

6. A bubble cap assembly as set forth in claim 3 wherein the plate is relatively thin and has annular ribs for increasing the frictional engagement of the key and plate.

7. A bubble cap assembly as set forth in claim 3 wherein the cap is relatively thin and has annular ribs for increasing the frictional engagement of the cap and plate.

8. A bubble cap assembly as set forth in claim 3, wherein the wing portions of the key include plate-like sections of the key projecting laterally of the central axis of the key and cam-like ears extending substantially at right angles to said sections.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,876,179	Tindall	Sept. 6, 1932
1,965,549	Holmes et al.	July 3, 1934
2,391,502	O'Brien	Dec. 25, 1945
2,406,278	Worth	Aug. 20, 1946
2,457,398	Roberts et al.	Dec. 28, 1948