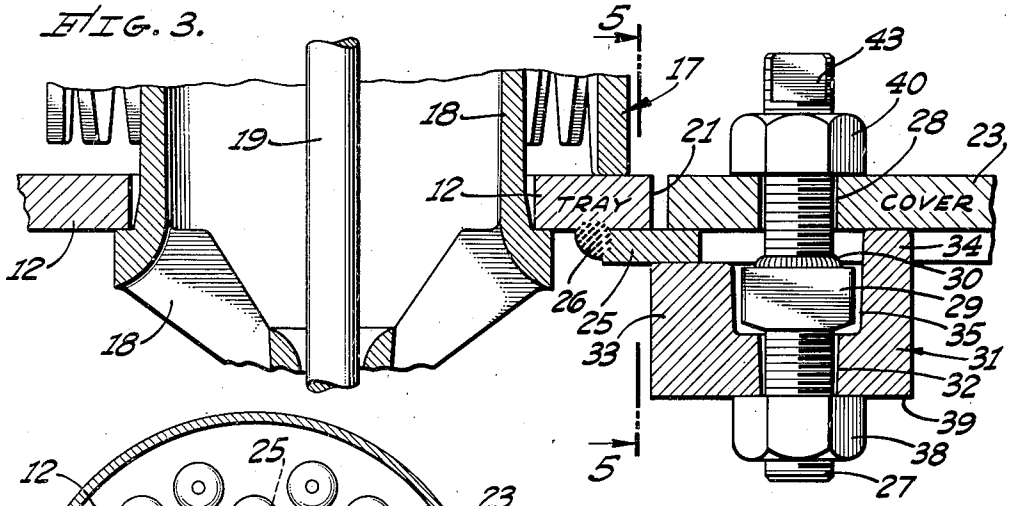
July 12, 1949. A. WESSMAN 2,476,009

DEVICE FOR SECURING MANWAY COVERS

Filed Aug. 12, 1946

FIG. 3.



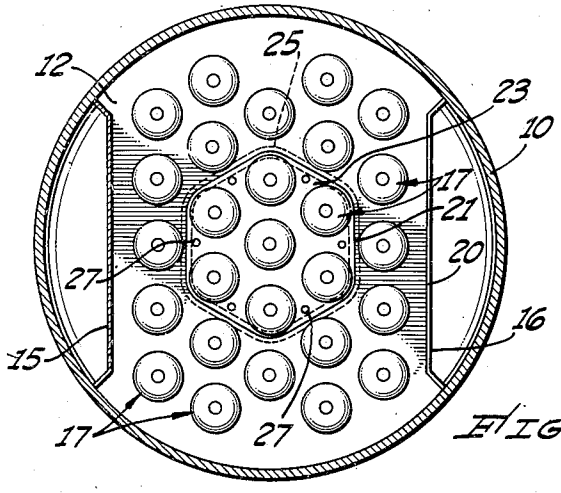
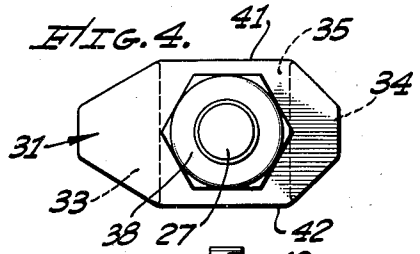


FIG. 2.

FIG. 4.



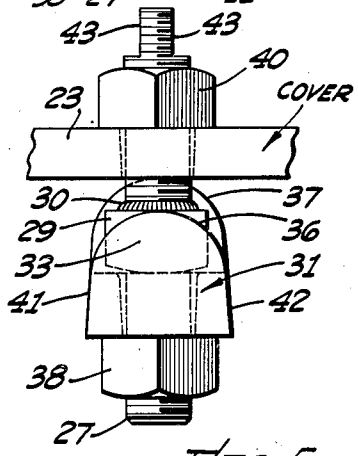


FIG. 5.

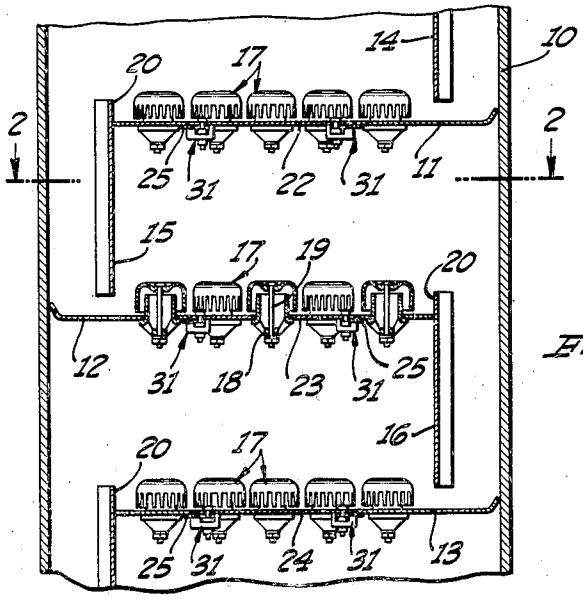


FIG. 1.

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DEVICE FOR SECURING MANWAY COVERS

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Application August 12, 1946, Serial No. 689,967

6 Claims. (Cl. 292—212)

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This invention relates to bubble columns of the type employed in oil refineries and oil cracking plants for fractionation, distillation, absorption and the like, and is particularly directed to improvements for securing manway covers in a position on the various trays within the bubble columns.

In conventional bubble column construction it has been customary to provide each of the trays in the bubble column with an opening or manway to enable a workman to travel from one end of the column to the other for cleaning, maintenance, inspection, etc. These manways are normally closed by a cover plate which is secured in position on its respective tray by means of attachment fittings. It is desirable that the manway covers be releasable from either top or bottom so that a workman may move through the bubble column in either direction.

It is the principal object of this invention to provide a novel form of such an attachment device or fitting which may be releasable from either side of the bubble tray.

Another object is to provide securing means for a manway cover which is rugged in construction, inexpensive to manufacture, and easy to secure and release with ordinary tools.

A further object is to provide a releasable securing device of this type incorporating a wrench engageable lug adapted to contact a supporting ledge which is utilized for supporting the cover on the bubble tray.

Other objects and advantages will appear hereinafter.

In the drawings:

Figure 1 is a diagrammatic sectional elevation of a portion of a bubble column having manway covers secured to bubble trays by a preferred form of attachment device embodying my invention.

Figure 2 is a sectional plan view taken substantially on the line 2—2 as shown in Figure 1.

Figure 3 is a fragmental sectional elevation shown on an enlarged scale and demonstrating details of construction of the attachment device embodying my invention.

Figure 4 is a bottom view of the attachment fitting shown in Figure 3.

Figure 5 is an elevation view taken substantially on the line 5—5 as shown in Figure 3, the tray being omitted for clarity of illustration.

Referring to the drawings, bubble column generally designated 10 is provided with a series of bubble trays, including trays 11, 12 and 13. Down-pipes 14, 15 and 16 are associated with each of the trays respectively to direct downwardly flowing fluid across each of the trays in turn. Each of the trays is provided with a plurality of bubble-caps 17 and corresponding chimneys or vapor necks 18. Each bubble-cap 17 and its corresponding vapor neck 18 are maintained in proper relationship by means of a central bolt 19. The details of construction of the individual bubble-caps and vapor necks may be of any preferred form, the chief requirement being that an efficient commingling be produced between gases rising through the vapor necks and the fluid flowing across the individual trays. The upper portion 20 of each down pipe serves as a weir to maintain proper depth of fluid on the individual tray.

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In order to provide access to the various trays of the column for purposes of maintenance and cleaning, openings or manways 21 are provided in each of the trays 11, 12 and 13. Cover plates 22, 23 and 24 are provided in the trays 11, 12 and 13, respectively, for closing the manway provided in each of the trays. A frame or ledge support 25 extending continuously around the opening 21 may be secured to the under side of the tray by means of welding 26. The details of construction of a preferred form of attachment device, as shown in Figure 3, will be described in connection with tray 12 and cover 23, although it will be understood that similar devices are employed for each of the other trays in the bubble column.

Suported on the ledge 25 is the manway 23 which has an exterior shape similar to the shape of the opening 21 within the tray 12. A common method of forming the cover is to cut it from the material of the tray itself by a flame-cutting operation. When this method is employed, the shape of the cover and the shape of the corresponding opening are identical and the width of the flame-cut provides the necessary clearance for installation and removal of the cover. A threaded member 27, which may comprise a stud threaded end to end, extends through an aperture 28 provided in the cover plate 23. A square nut 29 may be threaded to a position intermediate the ends of member 27 and may be locked in place as by welding 30. A lug 31 is provided with the aperture 32 for reception of the threaded member 27 and is further provided with transversely spaced upwardly extended ears 33 and 34. The ears cooperate to define a recess 35 having substantially parallel sides and the square nut 29 is received within the recess 35 in non-rotatable relation. The ear 33 is shorter than the ear 34 in order that contact may be

made with the ledge 25 and cover 23, respectively. Each of the ears 33 and 34 is rounded at its upper end and shown at 36 and 37 in Figure 5. The purpose of this construction is to avoid surface contact with the ledge 25 and cover 23 and thus facilitate removal of the securing device even in the presence of rust or corrosion. A nut 38 is threaded on the lower end of the member 27 and engages the lower flat side of the lug 31. A similar nut 40 is threaded on the upper end of the member 27 and engages the upper surface of the cover plate 23. The cover plate 23 may be provided with vapor necks 18 and bubble-caps 17, if desired, as shown in Figures 1 and 2.

Opposite sides 41 and 42 of the lug 31 are formed parallel to provide wrench engaging surfaces. Furthermore, the upper portion of the threaded member 27 is provided with wrench flats 43. It will be understood from the construction just described that the cover 23 may be secured to or released from the ledge 25, from either above or below the tray 12. Thus, a workman above the tray 12 first lowers the cover 23 into the manway 21 to permit the cover 23 to rest on the flange or ledge 25. Each of the threaded members 27 is then turned by means of applying a wrench to the wrench flats 43 to rotate the ears 33 to a position directly under a portion of the ledge 25. The threaded member 27 is maintained in the selected angular position while a second wrench is utilized to turn the nut 40. This action brings the ears 33 and 34 into engagement with the ledge 25 and cover 23. It will be apparent that the assembly may be removed by workmen above the tray 12 by holding the wrench flats 43 against rotation while unthreading the nut 40.

The device may likewise be secured or removed by a workman below the tray 12. Removal is effected by using one wrench on the surfaces 41 and 42 on the lug 31 to prevent rotation of the lug 31 and hence the member 27, while unthreading the nut 38 with a second wrench. The lug 31 may then be turned 90° so that the ear 33 moves to an inoperative position. Likewise, the cover may be secured in position on the ledge 25 by a workman below the tray 12 by using one wrench on the lug 31 and another on the nut 38.

While the securing device has been shown and described as being mounted on the cover 23, it is recognized that it could be employed advantageously on the tray 12. This alternate construction will be readily understood by referring to Figure 3 and considering the tray to be the cover and vice versa. In such arrangement the ledge 25 would be secured to the cover, while the threaded member 27 passed through an aperture in the tray. In such an inversion of the parts, it might also be desirable to place the ledge 25 on the top surface of the cover and, in such event, the lug 31 would likewise be located above the tray.

These and other variations and modifications may be employed without departing from the spirit of the invention and the device described should therefore be considered illustrative only and not as limiting the scope of the claims.

I claim:

1. In a device for securing a manway cover to a tray in a bubble column, the combination of a threaded member extending through an aperture in the cover, a lug encircling a portion of said threaded member and having a non-circular recess, the lug having substantially parallel sides to facilitate engagement by a wrench, a non-circular element fixed on said threaded member intermediate its ends and adapted to be non-rotatably received in said lug recess, a short ear on said lug at one side of said recess adapted to engage a ledge support for the cover, a long ear on said lug at the other side of said recess adapted to engage the cover, a nut threaded on said member adapted to engage said lug, a nut threaded on said member adapted to engage said cover, and wrench flats on the threaded member adjacent the last mentioned nut.

2. In a device for securing a manway cover to a tray in a bubble column, the combination of a threaded member extending through an aperture in the cover, a lug encircling a portion of said threaded member and having a non-circular recess, the lug having substantially parallel sides to facilitate engagement by a wrench, a non-circular element fixed on said threaded member intermediate its ends and adapted to be non-rotatably received in said lug recess, a short ear on said lug at one side of said recess adapted to engage a ledge support for the cover, a long ear on said lug at the other side of said recess adapted to engage the cover, the engaging portions of said lug ears being curved to avoid surface contact, a nut threaded on said member adapted to engage said lug, a nut threaded on said member adapted to engage said cover, and wrench flats on the threaded member adjacent the last mentioned nut.

3. In a device for securing a cover plate within an opening in a bubble column tray plate, the combination of a ledge element secured to one of the plates and adapted to extend continuously about said opening, a threaded member extending through an aperture in the other plate, means on the threaded member releasable from either side of the tray plate adapted to maintain the ledge element and apertured plate in engagement, said means including a wrench engageable lug encircling a portion of said threaded member and having a non-circular recess, a non-circular element fixed on said threaded member intermediate its ends and adapted to be non-rotatably received in said lug recess, said lug having a short ear at one side of said recess adapted to engage the ledge element and a long ear on the other side of said recess adapted to engage the apertured plate, a nut threaded on said member adapted to engage the lug, a nut threaded on said member and adapted to engage the apertured plate, and means on the member adjacent the last mentioned nut for preventing rotation of said member.

4. In a device for securing a cover plate within an opening in a bubble column tray plate, the combination of a ledge element secured to one of the plates and adapted to extend continuously about said opening, a threaded member extending through an aperture in the other plate, means on the threaded member releasable from either side of the tray plate adapted to maintain the ledge element and apertured plate in engagement, said means including a wrench engageable lug encircling a portion of said threaded member and having a non-circular recess, a non-circular element fixed on said threaded member intermediate its ends and adapted to be non-rotatably received in said lug recess, said lug having a short ear at one side of said recess adapted to engage the ledge element and a long ear on the other side of said recess adapted to engage the apertured plate, the engaging portions of said lug ears being curved to avoid surface contact, a nut threaded on said member adapted to engage the lug, a nut

threaded on said member and adapted to engage the apertured plate, and means on the member adjacent the last mentioned nut for preventing rotation of said member.

5. In a device for securing a cover plate within an opening in a bubble column tray plate, the combination of a ledge element secured to one of the plates and adapted to extend continuously about said opening, a lug having a short rounded ear adapted to engage the ledge element and a long rounded ear adapted to engage the other plate, and means releasable from either side of the tray plate for maintaining the lug ears in engagement, said means including a threaded member extending through the lug and through one of said plates, said member being non-rotatably secured relative to said lug.

6. In a device for securing a cover plate within an opening in a bubble column tray plate, the cover plate having a ledge element secured there-

to and extending continuously therearound, the improvement comprising a lug having a short rounded ear adapted to engage the ledge element and a long rounded ear adapted to engage the tray plate; means releasable from either side of the tray plate for maintaining the lug ears in engagement, said means including a threaded member adapted to extend through the lug and through the tray plate, said member being non-rotatably secured relative to said lug.

ARNOLD WESSMAN.

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

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