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SECTIONAL CONTACTING TRAY

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FIGURE 1 is a plan view of a tray made up of deck sections;

FIGURE 2 is an enlarged, fragmentary transverse section taken on the line 2—2 of FIGURE 1;

FIGURE 3 is a further enlarged, fragmentary transverse section taken on the line 3—3 of FIGURE 1, showing a detail;

FIGURE 4 is a fragmentary perspective view of a pair of adjoining tray sections and their connection to a beam;

FIGURE 5 is fragmentary perspective view similar to FIGURE 4 but showing only one of the tray sections;

and

FIGURE 6 is a fragmentary perspective view of a pair of adjoining tray sections and their connections to the supporting ring.

In the drawing, one tray is shown to be mounted in an upright column 5, it being understood that a plurality of such trays may be mounted therein in vertically spaced relation. The column wall carries, for each tray, a supporting ring 5 which supports a plurality of crossbeams 7, which beams may be formed of pairs of structural channels placed back to back with their upper surfaces coplanar with the top of the ring 6.

The tray is composed of a large number of individual tray sections 8a, 8b, 8c, disposed with their longitudinal and/or diagonal edges extending transversely across the beams and mounted side by side. The interior sections 8a and 8c are identical in outline and span the space between the beams; the section 8b adjoining the column wall also spans the beams and has the same length as the sections 8a but is curved at the exterior margin; and the sections 8c extend between one beam and the supporting ring and are curved adjacent the column wall.

These sections are made of sheet material, preferably thin metal plates which include flat, horizontal decks 9 containing openings containing risers 10, which risers are surrounded with bubble caps 11 for the upward passage of gas or vapor. The tray sections have dependent flanges 12 or 13 along their adjoining sides, thereby stiffening the sections against bending and facilitating the use of thin metal plates.

According to the invention the flanges 12 and 13 have lateral sealing rims 14 and 15, respectively, which extend parallel to the deck, so that the flanges have approximately L-shaped cross-sections. Each rim 14 is turned inwardly, under the associated deck 9, and each rim 15 is turned outwardly from its associated deck and is positioned lower than the rims 14. The rims 15 rest on the beams 7 and, in the case of marginal sections provided with these rims (e.g., the section 9 appearing in FIGURES 3 and 6) on the ring 6. These sealing rims further have upward-facing flanges 16 and 17, respectively, at their free edges to add rigidity thereto. A vertical bushing or tubular post 18 is fixed, e.g., by welding, between each sealing rim 14 and its deck 9 at each point where a bolt is to be attached. The bottom of the bushing abuts the top of rim 14 surrounding a bolt hole therein and the top extends upward through a slightly larger hole in the deck to permit a bolt 19 to extend continuously through these parts and through the bushing, a registering bolt hole being formed in the rim 15.

Various arrangements of the flanges 12 and 13 are possible, provided that the sections are constructed so that at each longitudinal joint between sections there is one flange of each type. Thus, as is shown in FIGURE 2, the section 8 has a flange 12 at one side and a flange 13 at the other, while the section 8c has two flanges 13 to facilitate assembly. It is evident that the section 9 of FIGURE 2 is placed on its support prior to emplacing the adjoining sections 8b and 8c.

To seal the deck section against the cross-beams 7 and the supporting ring 5, each marginal portion of a deck section which is to lie above such a supporting element is formed with a similar flange 20, having a horizontal
sealing rim 21 and, preferably, an upward flange 22, as is shown in FIGURES 4–6. These flanges are similarly provided with bushings 18 and bolt holes.

In assembling the tray, the deck sections are positioned side by side with the flange 12 of one section nested within the flange 13 of the adjoining section and a strip of packing or sealing material 23 is placed between each pair of sealing rims 14 and 15. A separate strip of packing material 24 is similarly placed between the end sealing rims 21 and the supporting ring 6 or cross beams 7. The bolts 19 are passed down through the bushings 18 and through the packing strips 23 or 24 and are secured to the cross-beams or supporting ring by threads in the latter or by nuts 25.

When the bolts are tightened the packing material 23 or 24 is compressed to form a gas- and liquid-tight seal against the sealing rims 14, 15 and 21. The bushings 18 are placed in compression by the bolts and transmit the downward thrust of the upper ends of the bolts to the sealing rims 14 and 21. Hence, seals are formed between the rims 14 and 15 and no fluid can by-pass the tray between the sides of the adjacent tray sections; similarly, seals are formed between the rims 21 and the supporting rim or the cross beam and no fluid can pass about the ends of the tray sections.

If desired a tray section may be omitted at one part of the column to provide a large opening 26 at which a liquid downcomer (not shown) may be connected.

The construction according to the invention has the advantage that the tray sections can be mounted in a simple and rapid manner, that they are of light but robust design, can be interconnected in a fluid-tight manner without difficulty, and are easy to disassemble.

I claim:

1. In a contacting column containing a supporting cross beam, a transverse sectional contacting tray comprising a plurality of laterally adjacent tray sections supported on the top of said beam, said sections including decks with openings for the passage of fluid to be contacted, each pair of adjacent tray sections having adjoining flanges which extend downwardly from the adjacent margins of the respective decks and thence laterally to form substantially horizontal sealing rims at levels spaced below the decks, the sealing rim on one of said adjoining flanges extending laterally outward beyond its deck section and the sealing rim on the other flange being superposed on the other sealing rim and extending inwardly under its deck section, a horizontal layer of packing material interposed between said sealing rims, and means for clamping said sealing rims together against the packing material.

2. A contacting tray according to claim 1 wherein said means for clamping the sealing rims includes a bolt extending through the packing material and through three holes situated respectively in the two sealing rims and in the deck the sealing rim of which is higher than the other.

3. A contacting tray according to claim 2 including a compression member extending between the said superposed sealing rim and the said deck adjacent said holes.

4. A contacting tray according to claim 1 wherein said sealing rims have upwardly directed flanges which are spaced laterally from said downwardly extending flanges.

5. A contacting tray according to claim 1 wherein the lower of said sealing rims rests on the cross beam and said means for clamping the sealing rims includes a bolt engaged to the beam and extending upwardly through the packing material and through three holes, respectively in the two sealing rims and in the deck of the sealing rim which is higher than the other.

6. A tray section suitable for assembly with other sections as specified in claim 1, including a deck with openings for the passage of fluid to be contacted, a flange at each side thereof extending downwardly from the deck and thence laterally to form a pair of sealing rims, said rims being substantially parallel to and in spaced relation to the deck and having bolt holes.

7. A tray section according to claim 6 wherein at least one of said sealing rims extends inwardly under the deck, the deck having a bolt hole above each bolt hole in the said sealing rim, in combination with a compression member extending between said one sealing rim and the deck adjacent said bolt holes.

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