

July 28, 1942.

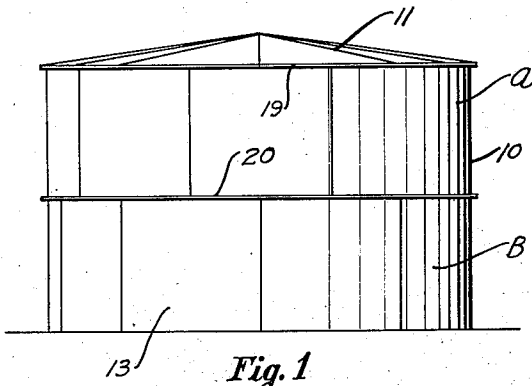
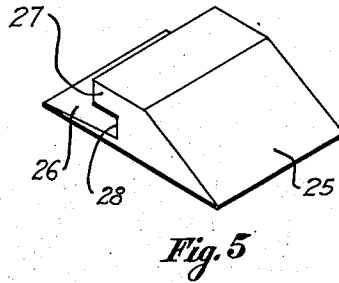
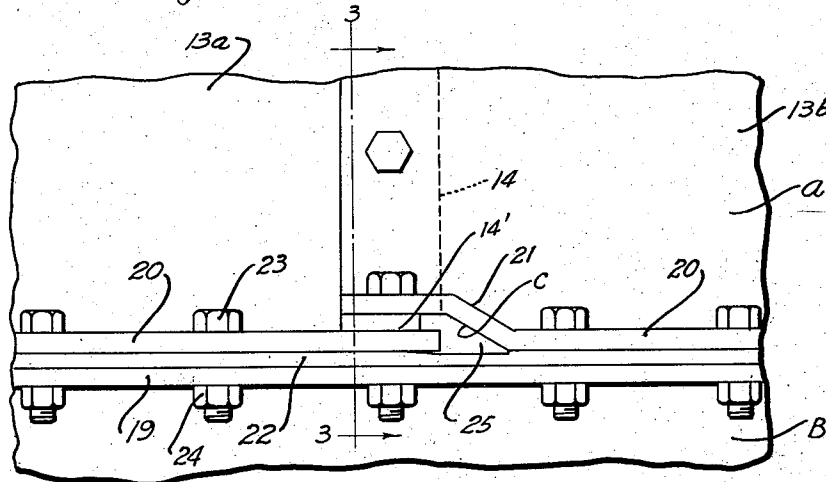
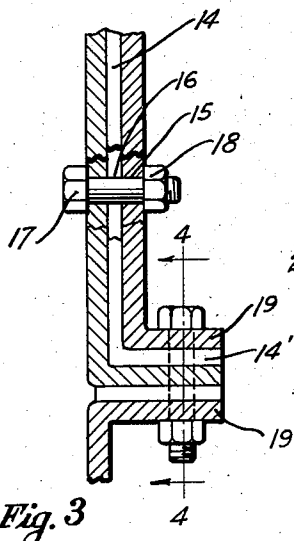
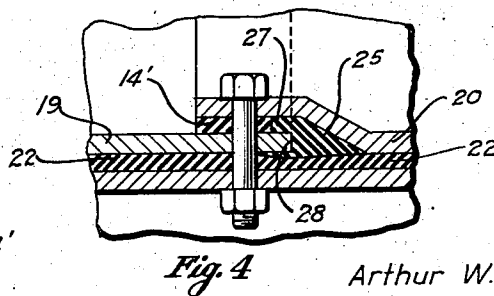
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2,291,132

PACKING MEMBER FOR BOLTED TANKS

Filed March 28, 1938

2 Sheets-Sheet 1



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PACKING MEMBER FOR BOLTED TANKS

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2 Sheets-Sheet 2

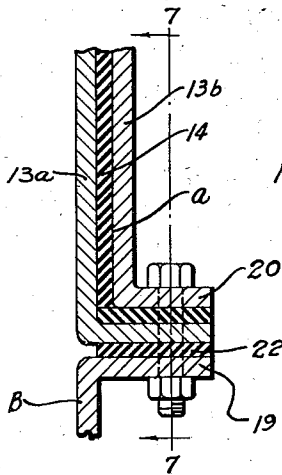


Fig. 6

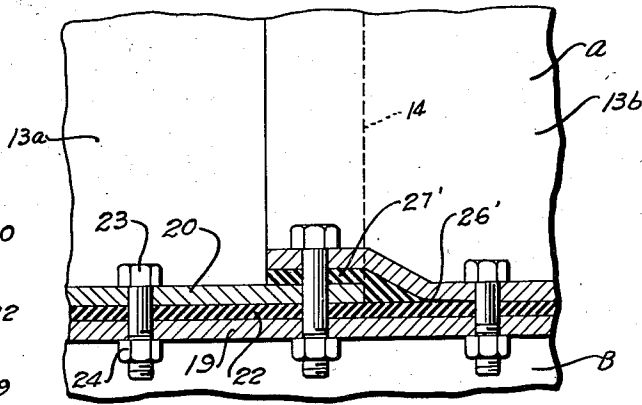


Fig. 7

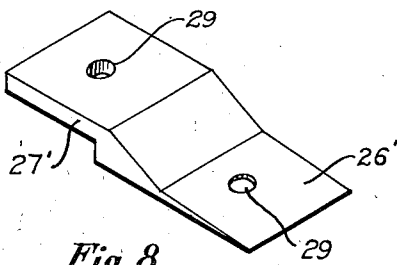


Fig. 8

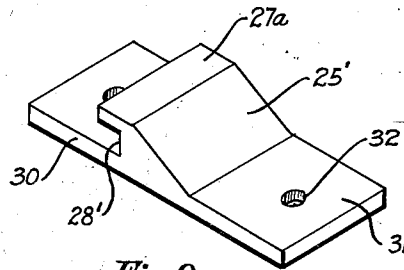


Fig. 9

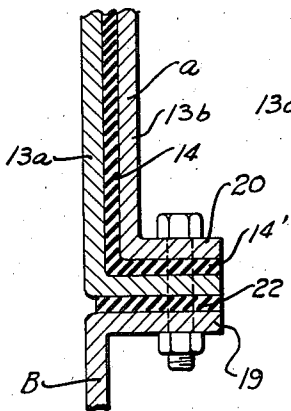


Fig. 11

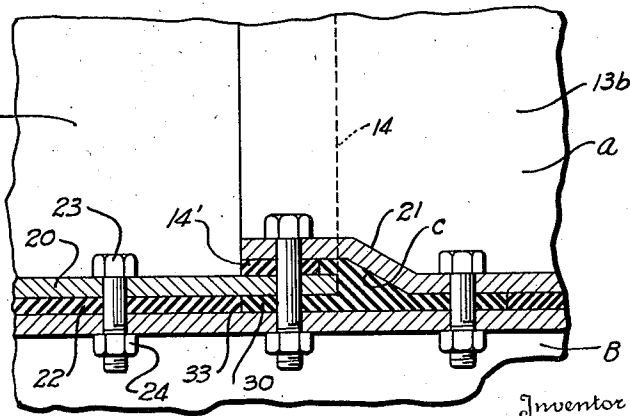


Fig. 10

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UNITED STATES PATENT OFFICE

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PACKING MEMBER FOR BOLTED TANKS

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1 Claim. (Cl. 220—81)

This invention relates to new and useful improvements in packing members for bolted tanks.

It is the general practice in constructing metallic tanks to form the tank of a plurality of plates or sheets. Each tank sheet has its vertical edge overlapping the vertical sheet adjacent thereto and these overlapping edge portions are secured together by bolts, rivets, or other fastening means. Each sheet is formed with an outwardly directed flange at its upper and lower ends and in order to permit the ends of the flanges to overlap each other when two sheets are fastened together, one of the sheets has its flange offset so as to overlie the flange of the adjacent sheet. The sheets which have their vertical edges overlapping in this manner form one section or course of the tank and each tank is made up of a plurality of such sections or courses, superposed one upon the other. The sheets of one section are staggered with relation to the sheets of the section immediately therebelow, and the outwardly directed flanges of the sheets are utilized to secure the sections together.

Since the sheets of each section are staggered with relation to the sheets of the section therebelow, the overlapping vertical joints of the sheets in the upper section are located substantially at the central portion of the sheets in the lower section. Because the flange of one sheet must be offset to overlie the flange of the adjacent sheet in its section, the offset portion of the flange does not lie flush against the flange of the section therebelow, whereby a fluid-tight joint at the intersection of the three tank sheets is not produced.

While only the intersections of the tank sheets have been discussed, it is pointed out that this same problem is present at the intersections of all of the sheets, including the floor structure, and the deck or roof of these are constructed on the same principle as the walls or sections of the tanks. This joint has been filled with various materials which have not proven satisfactory because the liquid within the tank eventually seeps through.

It is one of the objects of the invention to provide an improved packing member for packing off the joint at the intersection of the metallic sheets in a tank, said member being substantially permanent.

An important object of the invention is to provide an improved flexible packing member which is adapted to be confined between the flanges of adjacent sections of a metallic tank, whereby when said sections are assembled and secured

together, the packing member is deformed into packing position to provide a fluid-tight seal between the sections.

Another object of the invention is to provide an improved packing member of the character described which is so constructed that it not only packs off between the tank sections, but may also be utilized to pack off between the overlapping portions of adjacent sheets of each section.

A further object of the invention is to provide a packing member constructed of rubber, or other resilient material and shaped to generally conform to one of the spaces left between the sections of a tank when said sections of the tank are assembled, each packing member having means for retaining the member in proper position while the sections are being assembled, which facilitates the assembling of the tank.

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, in which an example of the invention is shown, and wherein:

Figure 1 is an elevation of a tank, employing packing members, constructed in accordance with the invention,

Figure 2 is an enlarged elevation of one of the tank joints, having the packing member therein,

Figure 3 is a transverse, vertical, sectional view, taken on the line 3—3 of Figure 2,

Figure 4 is a transverse, vertical, sectional view, taken on the line 4—4 of Figure 3,

Figure 5 is an isometric view of the packing member,

Figure 6 is an enlarged transverse, vertical, sectional view of a modified form of the packing member,

Figure 7 is a vertical, sectional view, taken on the line 7—7 of Figure 6,

Figure 8 is an isometric view of the packing member,

Figure 9 is an isometric view of still another form of the invention,

Figure 10 is a view, similar to Figure 4, of the form shown in Figure 9 placed within the joint, and

Figure 11 is a transverse, vertical, sectional view, taken on the line 11—11 of Figure 10.

In the drawings, the numeral 10 designates a metal tank having a top or deck 11. The tank is constructed of superposed sections or courses A and B which sections are fastened together by

bolts 12, the top 11 being secured to the uppermost section. It is pointed out that the tank is shown as constructed of two sections but manifestly, any desired number of sections may be employed.

Each section is formed by a plurality of sheets or plates 13 and each sheet is arcuate or curved in cross-section. Each sheet has one vertical edge portion overlapping the edge portion of the adjacent sheet and a suitable flexible packing strip 14 (Figure 4) is interposed between said overlapping edge portions. The sheets are provided with registering bolt holes or openings 15, while the strip has similar openings 16 and bolts 17 extend through said openings. Nuts 18 are threaded onto the outer ends of said bolts, whereby the sheets are securely fastened to each other along their vertical edges.

The two adjacent sheets shown in Figure 2 have been numbered 13a and 13b for the sake of clarity, and each sheet has an outwardly directed flange 19 at its upper end and a similar flange 20 at its lower end and these flanges extend substantially throughout the width of the sheet. To permit the adjacent sheets 13a and 13b in the upper section A to overlap and be secured together, as described, the end of the flange 20 of the sheet 13b is offset upwardly as shown at 21 in Figure 2. Therefore, when the sheets are fastened together the offset portion 21 of the flange 20 of the sheet 13b overlies the end of the flange 20 of the adjacent sheet 13a. The packing strip 14 which is disposed between the overlapping edge portions of the sheets may be extended (Figure 4) so that its end 14' is located between the flanges 20. The upper flanges 19 of the sheets 13a and 13b of the upper section A are constructed in the same manner as are the lower flanges 20, whereby when the sheets are secured together, the end of the flange on each sheet overlies the end of the flange on the adjacent sheet.

The lower section B of the tank is constructed in the same manner as the upper section A and when said sections are placed together, the sheets of the same are placed in staggered relation, as is clearly shown in Figure 1. Thus, the vertical joints between the sheets of one section are disposed at substantially the central portion of the sheets of the other section. The lower flanges 20 of the upper section A rest upon and are supported on the upper flanges 19 of the lower section B. A packing gasket or strip 22 is interposed between these flanges 19 and the flanges 20 and registering openings are provided in said flanges and gasket, whereby bolts 23 may pass therethrough. Nuts 24 are threaded onto the outer ends of the bolts to fasten the sections A and B together.

Due to the offset 21 in the flanges of the sheets which permits said flanges to overlie each other at their ends, it is manifest that a space or opening C is present at every joint between adjacent sheets. This space has a general triangular shape and establishes a communication between the interior and exterior of the tank. Manifestly, unless these spaces are sealed, a leakage of the liquid from the interior of the tank will occur.

For sealing or packing off each space C to prevent leakage at this point, a packing member 25 (Figures 2 and 5) is provided. Each packing member is formed of rubber, rubber compound, or other elastic material and comprises a body portion having a general triangular shape which conforms to the general shape of the space C. 75

The base of the body portion is extended to provide a relatively thin lip or extension 26 which tapers to a knife-edge at its outer end. The lip or extension is, preferably made integral with the body 25. The top of the member is extended to form a flange 27 which extends throughout the width of the body. The flange 27 is shorter than the lip or extension 26 and overhangs the inner portion of the same in spaced relation thereto, whereby a groove 28 is provided between the flange and lip. The width of the packing member is substantially equal to the width of the flanges 19 and 20 plus the thickness of the sheet 13.

In placing the packing member in position, the lip or extension 26 is interposed between the end of the flange 20 of one of the sheets 13a of the section A (Figure 2) and the packing strip 22 which rests upon the flange 19 of the sheet therebelow of the section B. The end of the flange 20 is engaged within the groove 28 of the packing member, whereby the flange 27 of said member overlies the end of the sheet flange 20. The base of the body portion of the packing member rests upon the packing strip 22 beyond the end of the flange 20 of the sheet 13a.

The packing member 25 is positioned in this manner prior to the placement of the next adjacent sheet 13b of the section A. When this latter sheet is placed in position with its vertical edge portion overlapping the vertical edge portion of the sheet 13a, and its lower flange 20 resting on the packing strip 22 and flange 19 of the sheet of the lower section B, the offset portion 21 of the flange on the sheet 13b engages or rests upon the inclined upper surface of the body of the packing member. The packing strip 14 is, of course, interposed between the sheets 13a and 13b, as has been described, and the extended end 14' of said strip is disposed between the overlapping flanges 20 of said sheets. As is clearly shown in Figure 2, this extended end of the strip abuts the outer edge of the flange 27 of the packing member and in effect forms a continuation thereof.

The packing member is slightly larger than the space C so that when the nuts 24 are tightened on the bolts 23 to draw the sections together, the packing member is deformed into a tight sealing engagement with the contiguous flanges and sheets which it contacts. With such arrangement, the space C is closed and leakage therethrough is prevented. It is pointed out that the provision of the lip or extension 26 makes it possible to hold the packing member in position on the lower section B and on the flange of the sheet 13a, while the sheet 13b of the upper section is being positioned and secured in place.

In Figures 6 to 8, a modified form of the invention is shown. In this form, a lip or extension 26' similar to the lip 26 is formed at the opposite end of the body portion of the packing member and when in place this lip overlies the packing strip 22 beneath the sheet 13b (Figure 7). A flange 27', similar to the flange 27 but having a greater length, is formed on the body portion of the member. This flange is of sufficient length to extend to the extremity or vertical edge of the sheet 13b (Figure 7) whereby said flange takes the place of the extended end 14' of the strip 14, which extended end is eliminated. The flange 27' and extension 26' are formed with openings 29, so that one of the bolts 23 may extend through each opening. Manifestly, the flange 27' could be formed on the packing mem-

ber shown in Figure 5, and similarly, the extension 26 on the member in Figure 5 could be substituted for the extension 26' shown in Figure 8.

Still another form of the invention is shown in Figures 9 to 11. In this form, a packing member having a body portion 25', of a general triangular shape, is provided with a flange 27a, which is of substantially the same size as the flange 27 of the member, shown in Figure 5. Instead of the lip 26, as in the first form, the body 25' has a thickened extension 30, whereby a groove 28' is present between the extension and flange 27a. A second extension 31, of the same size as the extension 30, extends from the opposite side of the body 25' and the thickness of both extensions is substantially equal to the thickness of the packing strip 22, which is interposed between the flanges 19 and 20 of the sections or courses A and B of the tank.

In applying this form of the invention, the packing strip 22 is cut out, as shown at 33 in Figure 10, and the size of this cut out portion is sufficient to accommodate the packing member 25'. The ends of the extensions 30 and 31 abut the ends of the cut out portion in the strip 22, whereby said extension, in effect, forms a part of the strip. The end of the flange 20 of the sheet 13a engages within the groove 28' and the

offset 21 in the flange 20 overlies the body portion 25' of the member, as in the first form shown in Figure 2. The extensions 30 and 31 are provided with openings 32 to permit the bolts 23 to pass therethrough. When this form of the invention is employed, the packing strip 22 may be made in short lengths instead of continuous, as in the other forms.

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

The combination with a metallic tank having superimposed sections, the vertical seams of adjacent superimposed sections being staggered with respect to one another, said sections being formed of sheets having flanges about their horizontal edges one end of said flanges being offset about the straight end of another flange so as to form a substantially triangular opening at the juncture of three of the flanged sheets, of a packing member, an elastic body having substantially the same shape as the opening and being arranged to be inserted in said opening and deformed into packing position when the sheets are fastened together, and means on the body comprising a slot therein receiving said straight end of the flange of one of said sheets for preventing displacement of the member during the fastening operation.

ARTHUR W. ASHLEY.