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3,222,041

SUPPORT PLATE

Filed March 21, 1963

2 Sheets-Sheet 1

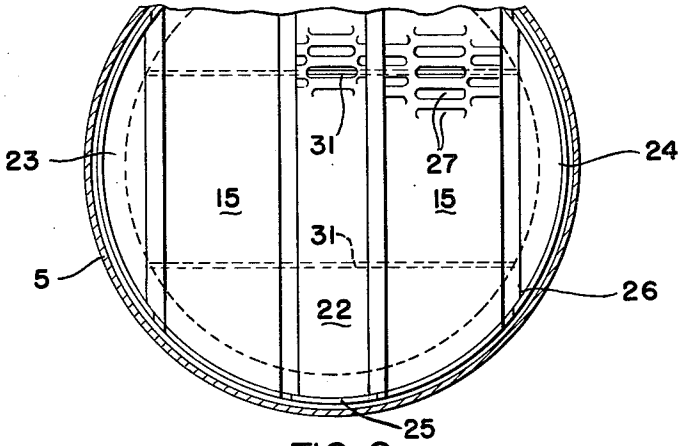


FIG. 2

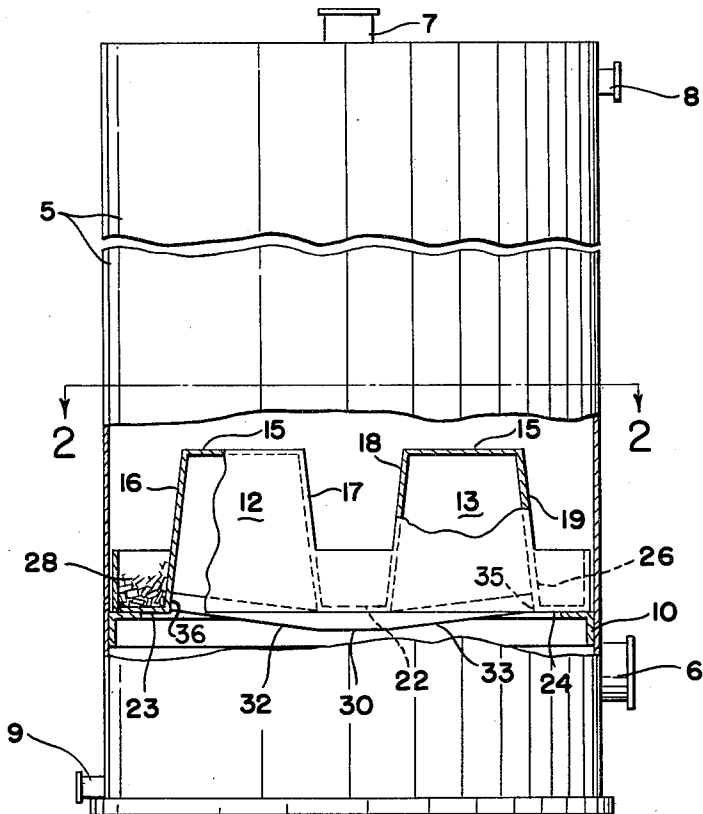


FIG. 1

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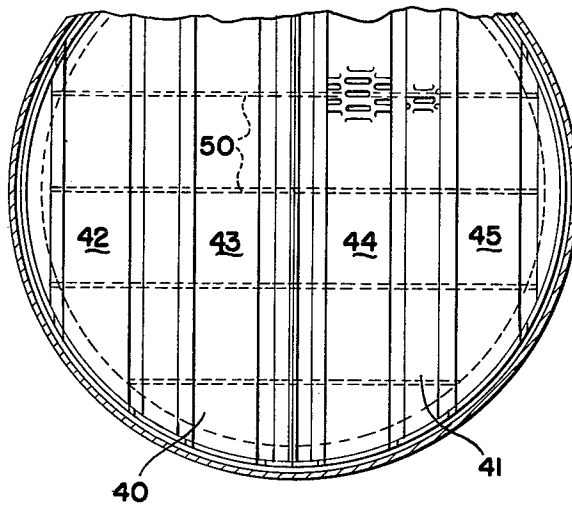


FIG. 4

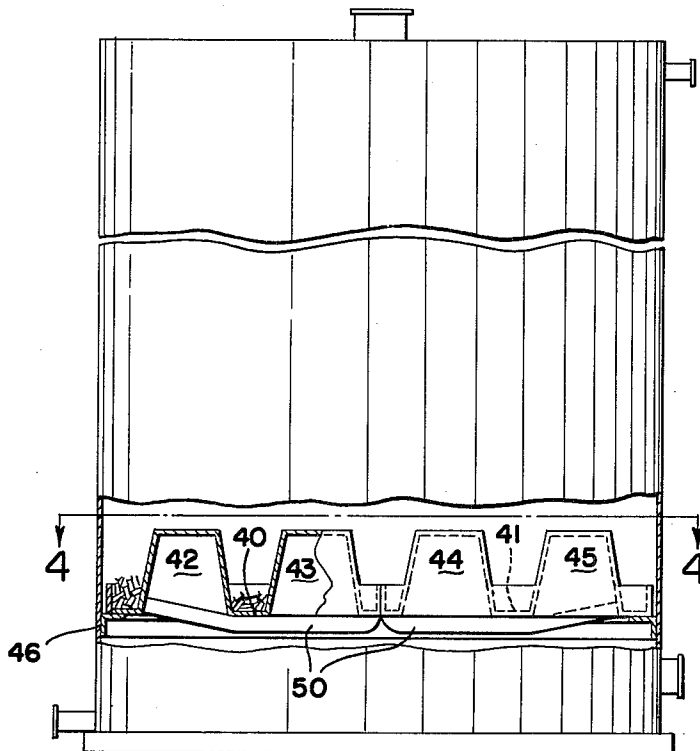


FIG. 3

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3,222,041

SUPPORT PLATE

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7 Claims. (Cl. 261-94)

The invention relates to a reinforced metal support plate for holding a bed of packing elements within a gas-and-liquid treating tower.

The support plate is made of sheet metal. Each sheet of metal is bent to form at least one, and preferably two or more, perforated risers extending from one end of the support plate to the other for the injection of gas into a bed of packing elements. On each side of the riser, and between the risers, if there is more than one, there is a level expanse of perforated metal which assists in holding the packing elements, and collects the downwardly flowing liquid which then flows through the perforations. For towers of large diameter, the support plate is made up of a number of sections each of which is formed with one or more risers, and the section is preferably narrow enough to be passed through a manway in the wall or top of the tower.

A support plate must be strong enough to support a bed of packing elements which are wet with the treating liquid and quite heavy. This weight may be as much as 1000 pounds per square foot or more. Elaborate constructions have been proposed to give strength to the support plate, such as that covered by my U.S. Patent 3,064,954 in which the risers do not extend from one side of the tower to the other. In the support plate of the present invention the risers extend the whole length of the support plate. They are reinforced by one or more metal strips which extend on edge under the one or more risers, and wherever the end of reinforcing strip approaches the perimeter of the support plate its end is welded to the inner surface of the outside wall of the riser located there so that it does not interfere with the support plate resting on the supporting ledge which juts out from the wall of the treating tower.

Both the sides and top of each riser are perforated. Each riser narrows upwardly from its base so that gases passing out of the perforations enter a wider area of the packing elements than if the walls were vertical, and this gives improved capacity. The walls and top of each riser are preferably flat, although the top of the riser may be rounded. The perforations are so small that packing elements do not pass through them.

The support plate may be formed of 12-gauge steel, or any suitable metal which may be somewhat thicker or thinner than this. The width of the base of each riser will measure anywhere from about 3 to 6 inches, more or less, and its top may measure about 1 inch less than this in width. The space between the risers will usually be about 2 inches, and there will be a space of 1 or 2 inches, more or less, between the edge of each section and the riser nearest to it. Each riser will be about 2 to 6 inches high. The edges of each plate will be turned up to strengthen the plate and to retain whatever liquid collects upon the plate, until it drains through the perforations.

Each reinforcing strip will be about 1/2 to 1 inch from top to bottom. It may be 12-gauge steel, or thicker or thinner, or other metal of suitable thickness such as stainless steel, Monel metal, aluminum, etc.

If the support plate is small, a single reinforcement may be all that is required. A larger plate will require more reinforcements, and there may be some half-dozen reinforcements, usually evenly spaced, and the reinforcements may be 4 to 6 inches apart, or thereabout, depending upon the composition and thickness of the support plate.

The tower may be square, cylindrical, or any desired shape. The support plate is supported along its edge

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which is adjacent the wall, and the reinforcements do not extend to this edge, but extend only to the wall of the riser nearest the outer edge of the support plate.

The invention is further described in connection with the accompanying drawings, in which:

FIGURE 1 is an elevational view of a tower, partly broken away to show a section through a one-piece support plate;

FIGURE 2 is a plan view on the line 2-2 of FIGURE 1;

FIGURE 3 is an elevational view of a tower, partly broken away to show a sectional support plate; and

FIGURE 4 is a plan view on the line 4-4 of FIGURE 3.

The tower 5 is provided with a gas inlet 6 and outlet 7, and a liquid inlet 8 and outlet 9.

Only one support plate is shown in FIGURES 1 and 3, although there may be several with several beds of packing elements in a single tower. Suitable distributor means will be provided.

The support plate rests on the angle 10, although it may be supported on any other type of ledge. It is formed from a single piece of metal and comprises the two risers 12 and 13 each formed with a flat top 15 and upwardly tapering walls 16, 17, 18 and 19. The base portion 22 separates the two risers, and other base portions 23 and 24 extend outwardly from the two risers. These base portions are all on the same level and rest on the angle 10. Each edge of the base of the support plate is turned up at 25, and the ends of the turned-up portions are welded to the walls of the risers at 26. The perforations 27 in the top and walls of the risers, and in the base portions are so small that the packing elements 28 do not pass through them.

The middle portion 30 of each of the two reinforcing bars 31 (FIGURE 2) is straight and horizontal. The ends 32 and 33 incline upwardly at a slight angle. The ends of these upwardly inclined portions 32 and 33 are welded to the base of the walls 16 and 19, respectively, at 35 and 36. The middle portion 30 is the horizontal portion of the support plate.

The ends of the reinforcing bar abut the outside walls of the two risers, so that the bar prevents these walls from spreading and prevents the center of the support plate from sagging. It is noted that the reinforcing bar does not extend to the outer edge of the support plate but is limited in length to the portion of the support plate that is capable of spreading.

FIGURES 3 and 4 illustrate a similarly constructed tower of larger diameter. The support plate is made of two sections 40 and 41, each of which comprises two risers 42, 43, 44 and 45. The risers rest on angle 46. This gives support to the side and ends of each section. Each reinforcing bar 50 extends from the meeting line of the two sections, and its outer end abuts the outside wall of the riser nearest the wall of the tower.

The invention is covered in the claims which follow. What I claim is:

1. A metal support plate for a gas-and-liquid treating tower with at least one riser which tapers upwardly and extends from one end to the other of the plate, and with a base portion extending horizontally outward from the base of the wall of each riser in the same horizontal plane, there being no base under the riser, said base portions being integral with the bottoms of the riser walls, the risers and base portions being perforated; at least one reinforcing bar on the undersurface of the support plate and extending transversely of said riser with one end welded in abutting relation to the inner surface of the riser wall which is adapted to be adjacent the wall of the tower and the other end welded to the support plate

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against its opposite edge, the edge of each base portion being turned up with each edge of a turned-up portion welded to the adjacent wall of a riser.

2. The support plate of claim 1 in which all of the risers are made from one piece of metal.

3. The support plate of claim 1 which is circular.

4. The support plate of claim 3 which is circular and the ends of the reinforcing bar are welded in abutting relation to the inner surfaces of the riser walls which are nearest the edges of the support plate.

5. The support plate of claim 1 which is in the shape of a segment of a circle.

6. The support plate of claim 5 in which the end of the reinforcing bar which is not welded to said riser wall is welded to the under side of the base.

7. A metal support plate for a gas-and-liquid treating tower with at least one riser which tapers upwardly and extends from one end to the other of the plate, and with a base portion extending horizontally outward from the base of the wall of each riser in the same horizontal plane, there being no base under the riser, said base portions

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being integral with the bottoms of the riser walls, the risers and base portions being perforated; at least one reinforcing bar on the undersurface of the support plate and extending transversely of said risers with its ends welded to the support plate to prevent the risers from spreading, the edge of each base portion being turned up with each edge of a turned-up portion welded to the adjacent wall of a riser.

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