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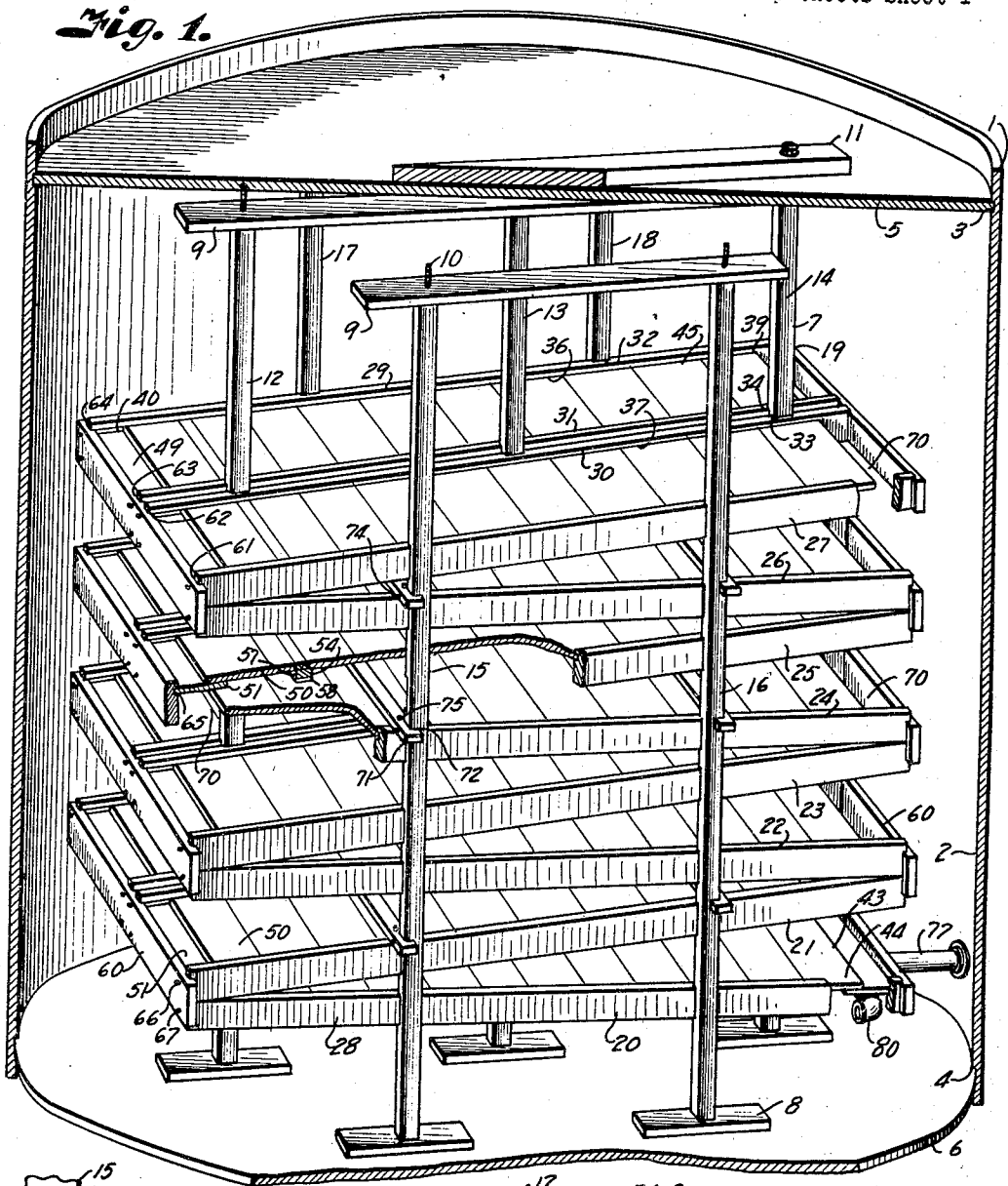
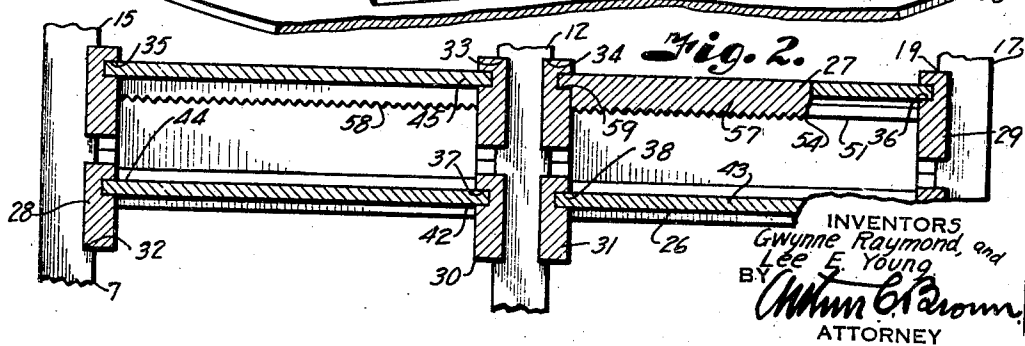
G. RAYMOND ET AL
BAFFLE CONSTRUCTION

2,134,203

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3 Sheets-Sheet 1

Fig. 1.



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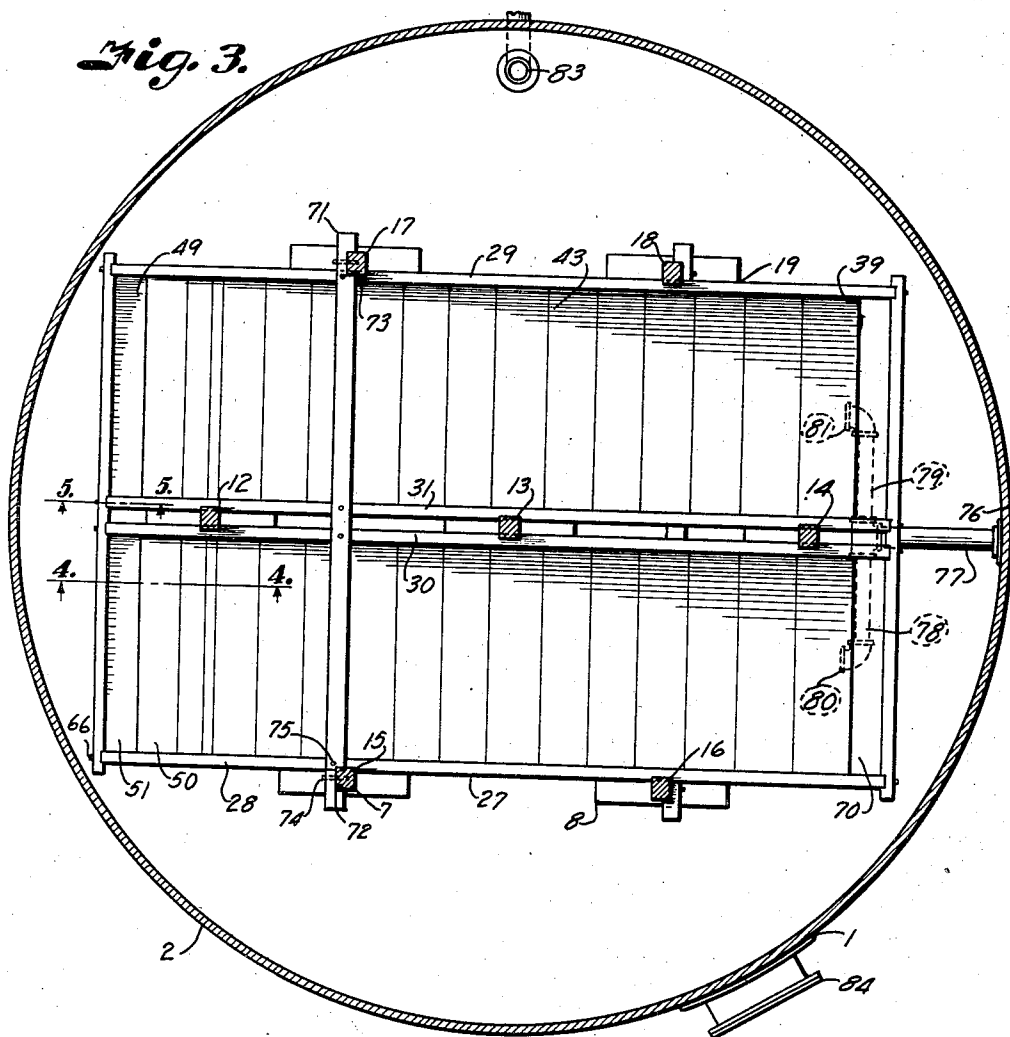
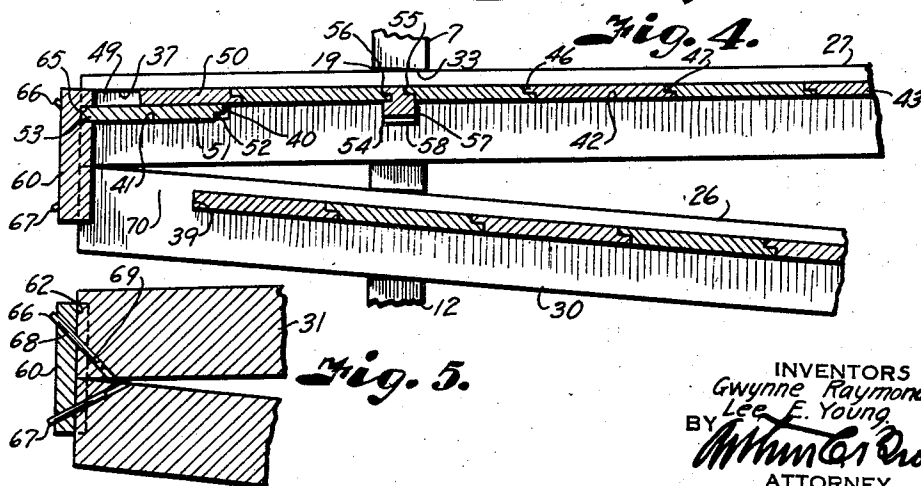
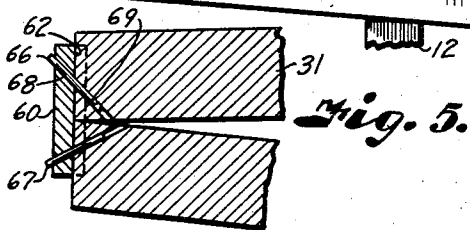
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Fig. 6.

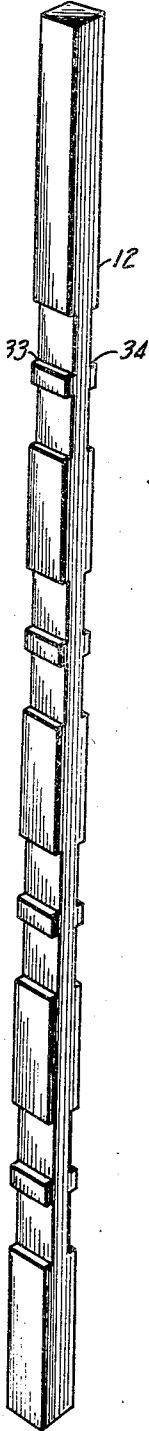


Fig. 7.

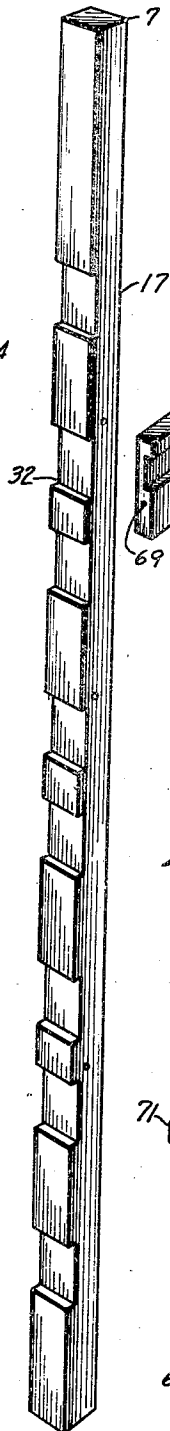


Fig. 8.

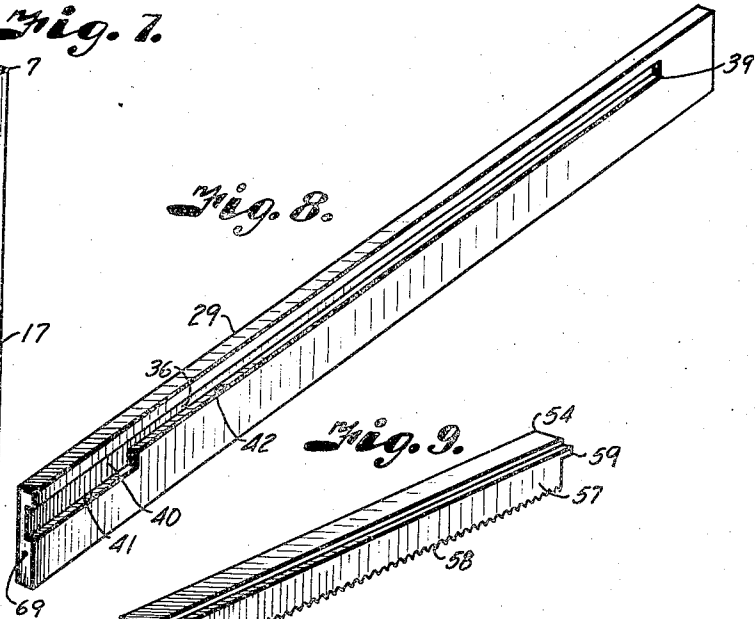


Fig. 9.

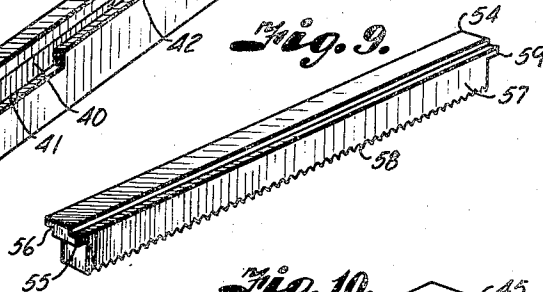


Fig. 10.

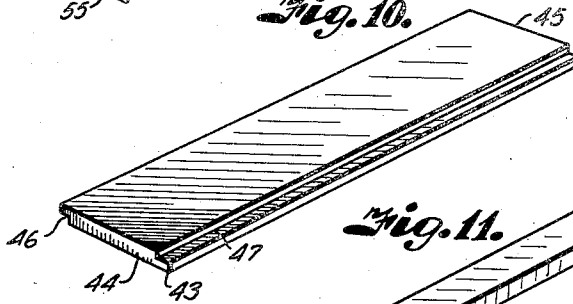


Fig. 11.

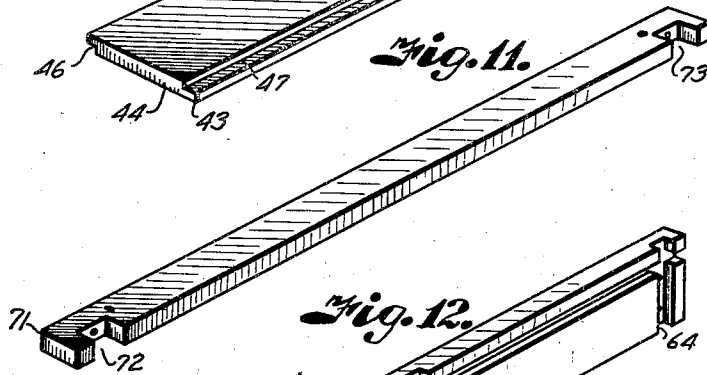
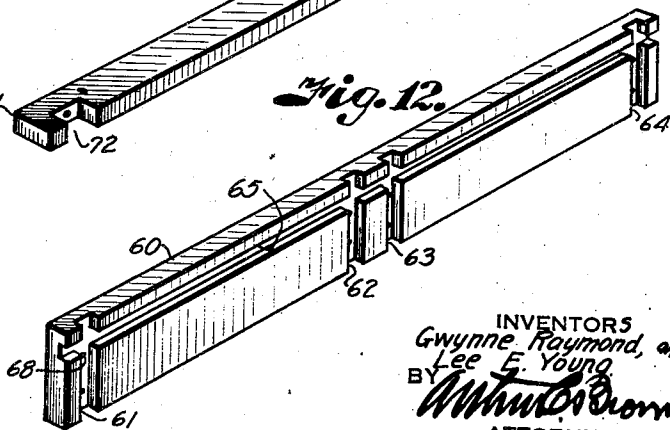


Fig. 12.



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2,134,203

BAFFLE CONSTRUCTION

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Application April 25, 1936, Serial No. 76,484

11 Claims. (Cl. 210—47)

This invention relates to treating tanks and particularly a baffle construction therefor. Many fluids requiring treatment, for example certain oil emulsions, have disintegrating effects on metal and cannot be treated in metallic vessels or vessels containing metallic parts. Such fluids may be successfully treated in wooden tanks but when baffles are necessary for retarding flow of fluid under treatment, they offer many constructional difficulties.

It is, therefore, the principal object of the present invention to provide a tank of this character with a simple and rigidly constructed baffle unit not affected by the disintegrating action of the fluid under treatment.

Other important objects of the invention are to provide a baffle unit that is readily assembled and retained in assembled condition without the use of nails, bolts or other metal parts; to provide for expansion of parts of the respective baffle elements composing the unit; and to provide each baffle element with a distributor whereby fluid under treatment is distributed uniformly across the width thereof.

In accomplishing these and other objects of the invention, as hereinafter pointed out, we have provided improved details of structure, the preferred form of which is illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective sectional view through a fluid treating tank equipped with a baffle unit embodying the features of our invention, portions of selected baffling elements being broken away to better illustrate the construction.

Fig. 2 is a cross-section through a pair of adjacent baffle elements particularly illustrating support thereof by the shoring posts and mounting of the top boards within the side boards of the respective baffle elements.

Fig. 3 is a horizontal section through the tank and baffle unit.

Fig. 4 is a detail section through a portion of the baffle unit on the line 4—4 of Fig. 3, particularly illustrating the expansion joint to permit expansion of the top or cross boards of the respective baffles.

Fig. 5 is a fragmentary section on the line 5—5 of Fig. 3 illustrating connection of the end boards with the side boards of adjacent baffle elements.

Fig. 6 is a perspective view of one of the center posts.

Fig. 7 is a similar view of one of the side posts.

Fig. 8 is a detail perspective view of one of the side boards of a baffle element.

Fig. 9 is a perspective view of one of the distributor bars.

Fig. 10 is a perspective view of one of the top boards of a baffle element.

Fig. 11 is a perspective view of one of the cross tie bars.

Fig. 12 is a perspective view of one of the end boards of a baffle element.

Referring more in detail to the drawings:

1 designates a vessel, such as a tank, having a cylindrical side wall 2 preferably formed of wooden staves and having their upper and lower ends rabbeted as at 3 and 4, to accommodate the peripheral edges of upper and lower heads or decks 5 and 6, the upper head being supported by suitable shoring posts 7 having their lower ends supported upon footing boards 8 and their upper ends carrying stringers 9 that engage under and support the upper head 5. The posts 7 are tied at their upper and lower ends to the heads of fastening devices, such as bolts 10, that are shielded within the members connected by them from contact with fluids contained in the tank. Cooperating with the stringers 9 are outer stringers 11 to clamp the boards composing the upper head 5 therebetween.

Except for the arrangement of the posts to accommodate the baffle unit, as hereinafter described, the specific construction of the tank forms no part of the present invention and may be of any approved construction wherein metal parts are shielded from the corrosive action of the fluid contained in the tank.

In order to accommodate the baffle unit, the posts 7 are preferably arranged in parallel rows, which, in the illustrated instance, are three in number with the center row arranged diametrically of the tank and comprising three posts 12, 13 and 14. The outer rows are spaced therefrom and each consists of two posts 15—16 and 17—18 respectively, arranged in staggered relation with the posts 12, 13 and 14 of the center row.

Supported by the posts is a baffle unit 19 comprising two parallel series of superimposed baffle elements, the respective baffle elements in each series being arranged side by side at the respective sides of the center row of posts and designated 20 to 27 respectively. Each baffle element comprises an inverted pan or tray-like member preferably formed of wood, such as cypress, cedar, white pine, redwood, or other material not subject to disintegrating influence of fluids to be treated in the tank. The pairs of baffle elements are therefore constructed of dimension lumber and

comprise outer side boards 28 and 29 and inner side boards 30 and 31 extending transversely of the respective rows of posts, the outer side boards 28 and 29 being mounted in notches 32 formed in the inner faces of the outer rows of posts and inner boards 30 and 31 in notches 33 and 34 that are formed in the side faces of the center row of posts.

The notches conform in width to the side boards and are spaced along the height of the posts to conform to the positions to be occupied by the respective baffle elements. The notches in the posts in the respective rows are arranged at different elevations and angles so that the side boards of alternate baffles slope upwardly in one direction and the side boards of the intermediate baffles slope upwardly in the opposite direction, at such angles that alternate ends of the side boards of one element contact the corresponding ends of side boards of adjacent baffle elements in edge to edge relation, as clearly illustrated in Fig. 1.

Formed in the facing sides of the side boards 28—30 and 29—31, at points adjacent their upper edges, are rabbet grooves 35—37 and 36—38. The rabbet grooves extend longitudinally in parallel relation with the upper edges of the side boards but terminate short of their upper ends to provide stops 39. The opposite ends of the rabbet grooves terminate in recesses 40 opening from the lower end of the side boards to provide seating faces 41 offset below the seating faces 42 of the rabbet grooves.

43 designates a plurality of top boards arranged in edge to edge engagement and having their ends 44 and 45 mounted in the rabbet grooves of the respective pairs of side boards and having bearing engagement on the seat portions 42 thereof. The engaging edges of the boards 43 are grooved, as at 46, to provide interlapping tongues 47 so that when the boards are placed in juxtaposition the joints therebetween are broken and the faces of the boards lie flush with each other. There is a sufficient number of boards 43 to cover the seating portions 42 of the grooves and to extend into the recesses 40 but they terminate short of the ends of the side boards to form expansion spaces 49, as shown in Fig. 4.

Cooperating with the lowermost board 50, and having their ends supported on the seating portions 41 of the recesses, are sealing boards 51 having their forward edges 52 underlying the boards 50 and the rear portions 53 closing the expansion joints 49. The boards 43 are thus free to expand from the direction of the stops 39 toward the expansion spaces 49.

Inserted between selective bottom boards at the lower ends of the respective baffles are distributors 54 having grooves 55 and rabbets 56 extending along their respective edges to accommodate the tongues on the adjacent boards 43. The distributors are of greater thickness than the bottom boards to provide depending portions 57 having a series of transverse notches 58 in their lower edges, as clearly shown in Figs. 4 and 9. The ends of the distributors are provided with tongues 59 for engaging in the grooves of the side boards to support the distributors in their respective positions.

Extending across the ends of the baffle elements in overlapping relation with the contacting ends of the side boards are end boards 60, which are illustrated in detail in Fig. 12. The boards 60 are of sufficient length to extend across both series 75 of the baffle elements and have transverse grooves

61—62 and 63—64 for accommodating the ends of the side boards, and have longitudinal grooves 65 for accommodating the lower edges 53 of the seal boards as shown in Figs. 4 and 12. The end boards are retained in position by means of dowel pins 66 and 67 which are inserted through aligning bores 68 and 69 extending at angles through the end boards and ends of the side boards, as shown in Fig. 5. The end boards thus cooperate with the boards 43 to form outlet openings 70 for flow of liquid under treatment from one baffle element to the next upper baffle element as shown in Fig. 4.

Extending between selected baffle elements and connecting the pairs of side posts 15—17 and 16—18, are tie bars 71 having notches 72 and 73 in the ends thereof for engaging over the respective posts to prevent spreading of the baffle elements when in assembled condition. The tie bars are connected with the respective posts by dowels 74 extending therethrough and into the posts as shown in Fig. 3. The tie bars are also secured to selected side boards by dowels 75 that extend vertically therethrough and into the edges of the side bars, as shown in Figs. 1 and 3.

Extending through the wall of the tank at a point midway of the width of the lower baffle elements, and at a level below the ends thereof, is an inlet pipe 76 to which is connected a transversely arranged distributor pipe 77 having branched ends 78 and 79 terminating midway between the pairs of side boards of each series and provided with elbows 80 and 81 through which fluid admitted to the tank is discharged under the lower baffle elements. The tank is also provided with an overflow outlet pipe for discharge of oil from the upper part of the tank, and a water outlet 83 communicating with a lower portion of the tank for discharging the surplus water. The tank may also be provided with other fittings as in conventional tank practice, such as clean-out manholes 84, gage-holes, and the like.

A tank equipped with a baffle element constructed as described, is assembled as follows:

When the tank bottom 6 has been laid, the footing boards 8 are placed in the proper position and the shoring posts 7 are set thereon. The stringers 9 are then supported on the ends of the respective posts shown in Fig. 1, after which the head 5 is laid across the stringers and top stringers 11 are put in place, the posts being temporarily supported to retain them in vertical position. The side bars 28—29 and 30—31 of the lower baffle elements of both series are then positioned in the lowermost notches of the posts so that the ends thereof are in alignment. The boards 43, together with the distributor bar 54, are slid into the grooves of the side boards. Since the grooves stop short of the upper ends of the side boards, they may be shoved home against the stop 39 without measuring, the distributing bar being mated between selected boards 43 a short distance from the lower ends of the side boards. The seal board 51 is then mounted in underlying relation with the lowermost board 50 to close the space 49. The side boards of the next upper baffle elements are then mounted in the next upper notches of the shoring posts and the boards 43 thereof are applied in the same manner as described in connection with the lower baffle elements. The remaining baffle elements are assembled in like manner, and when all of them are in place, the cross tie bars 71 are inserted between selected baffle elements to rest upon the upper edges of the side boards, with the notches 75

72 and 73 thereof engaging the outer posts to prevent lateral spreading of the posts. The tie bars are then secured to the posts and to the underlying side boards by the dowels 74 and 75.

The end boards are then placed in position and secured by the dowels 66 and 67 that are driven into the angular bores 68 and 69. The shoring posts are then secured to the upper deck, as in conventional practice, after which the staves forming the side wall may be applied and secured by the usual hoops or bands (not shown). The various fittings, including the inlet pipe 76 and the outlet connection 83 are then applied to the tank, together with the fittings including the manholes 84, to complete the installation.

When the fluid to be treated is admitted to the tank from the pipe 76, it is distributed through the elbows 80 and 81 under the lower baffle elements of both series so that the fluid rises upwardly in two streams and moves under the boards 43 in the channels formed between the respective pairs of side boards toward the outlet openings 70. The fluid streams, upon being engaged by the distributor bar at the lower end of the baffle elements, are distributed by means of the notches uniformly across the widths thereof so that they continue their flow upwardly under the baffles in substantially thin films and through the liquid contained in the tank. Upon flowing through the opening 70, the liquid rises upwardly to engage the seal boards of the next higher baffles and continues upwardly thereunder, passing across the next upper distributing bars 54 and flows toward the opening 79 to the next upper baffle elements, and so on until the sheets of fluid have passed under all the baffle elements of the respective series. The fluid thus moves in zigzag, tortuous paths over an extended area at a relatively slow rate of travel to effect separation of certain components thereof.

For example, in the case of simple oil and water emulsions, the water separates from the oil and remains in the lower portion of the tank as the oil gradually rises under the baffles to collect in the top of the tank from where the oil is drained off through the overflow pipe, as in conventional practice, while the surplus water is drawn off through the pipe 83.

In more complex emulsions, the tank may contain a suitable chemical through which the emulsified liquid is caused to move in tortuous paths incidental to the baffle elements to break the emulsion, and if required the treating liquid may be heated by suitable steam coils or the like, that may be carried in the bottom of the tank as in standard practice.

From the foregoing, it is apparent that we have provided a simple baffle arrangement that is adapted for the treatment of corrosive fluids or fluids having disintegrating effects on metal, and that the baffle elements may be readily constructed and assembled in a rigid unit without use of metal parts. The seal boards also provide suitable expansion joints to allow for expansion of the bottom boards so that they remain in flat condition and do not tend to push the end boards from their connections with the side boards.

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

1. In an apparatus of the character described, an inverted tray-shaped baffle including end and side members, cross members arranged in edge to edge contact and spaced from the end mem-

bers to form a flow outlet at one end and an expansion space at the opposite end of the baffle, means for movably supporting the ends of the cross members on the side members, a sealing member closing the expansion space and having sliding contact with the adjacent cross member, a distributor member supported by the side members nearest the end of the baffle having the sealing member, and means for delivering a fluid for flow under the baffle toward said flow outlet.

2. In an apparatus of the character described, an inverted tray-shaped baffle including end and side members, cross members arranged in edge to edge contact and spaced from the end members to form a flow outlet at one end and an expansion space at the opposite end of the baffle, means movably supporting the ends of the cross members on the side members for expansive movement in the direction of said expansion space, a sealing member closing the expansion space to compensate for expansion and contraction of the cross members, and means for delivering a fluid for flow under the baffle at the end opposite said flow outlet.

3. In an apparatus of the character described, an inverted tray-shaped baffle including side members having facing grooves extending longitudinally of the side members but terminating short of one of their ends and having offset seating portions at their opposite ends, end members connected with ends of the side members, cross members arranged in edge to edge contact and having their ends slidably supported in said grooves and spaced from the end members to form an expansion space over said offset seating portion and an outlet opening at the other end of the baffle, a sealing member having its ends supported on said offset seating portions for closing the expansion space and having sliding contact with a cross member adjacent said expansion space, and means for delivering a fluid for flow under the baffle toward said outlet.

4. In an apparatus of the character described, spaced rows of vertical posts having vertically spaced notches in their facing sides, superimposed baffle members including spaced pairs of alternately inclined side members mounted in the respective notches of the posts and arranged with their opposite ends in edge to edge contact with the ends of the next upper and lower side members respectively, end members connecting the contacting ends of the side members, cross members arranged in edge to edge contact and having their ends slidably supported by the side members and spaced from the end members, sealing members closing the spaces at the lower ends of the side members, tie bars extending between selective side members and engaging the posts to retain said members in assembled position and means for delivering a liquid under the lowermost baffle member for upward flow under the respective baffle members.

5. In combination with a tank having floor and roof decks, spaced rows of vertical posts carried upon the floor deck and supporting the roof deck, said posts having vertically spaced notches in their facing sides, superimposed baffle members including spaced pairs of alternately inclined side members mounted in the respective notches of the posts and arranged with their opposite ends in edge to edge contact with the ends of the next upper and lower side members respectively, end members connecting the contacting ends of the side members, cross members ar-

ranged in edge to edge contact and having their ends slidably supported by the side members and spaced from the end members, sealing members closing the spaces at the lower ends of the side members, tie bars extending between selective side members and having notches engaging the posts to retain said members in assembled position and for enhancing rigidity of the posts, and means for admitting a liquid to the tank under the lowermost baffle member for upward flow under the respective baffle members toward the top of the tank.

6. In an apparatus of the character described, spaced rows of vertical posts having vertically spaced notches in their facing sides, superimposed baffles including pairs of alternately inclined side members mounted in the respective notches of the posts, end members connecting the upper and lower ends of adjacent side members, cross members arranged in edge to edge contact and having their ends slidably supported by the side members and spaced from the end members, sealing members closing the spaces at the lower ends of the side members, tie bars extending between selective side members and engaging the posts to retain said members in assembled position, distributor bars retained between selected cross members nearest the lower ends of the side members, and means for delivering a fluid under the lowermost baffle for flow under the respective baffles.

7. In an apparatus of the character described, spaced rows of vertical posts having vertically spaced notches in their facing sides, alternately inclined side members mounted in the respective notches of the posts and arranged with their upper ends in edge to edge contact with the lower end of the next upper side members, end members connecting the contacting ends of the side members, cross members arranged in edge to edge contact and having their ends supported by the side members and spaced from the end members at the upper ends of the side members to form outlet openings, tie bars extending between selective side members and engaging the posts to retain said members in assembled position, and means for delivering a fluid under the lowermost cross members for upward flow under said other cross members.

8. In an apparatus of the character described,

an inverted tray-shaped baffle including side and end members, cross members arranged in edge to edge contact and spaced from one of the end members to form a flow outlet at that end of the baffle, means movably supporting the ends of the cross members to accommodate shrinking and swelling thereof incidental to contact of fluid with the baffle, means for delivering a fluid for flow under the baffle toward said outlet, and an expansion joint member cooperating with the cross members to completely close the baffle with the exception of said flow outlet whereby the fluid is caused to flow the entire length of said baffle.

9. In an apparatus of the character described, spaced rows of posts, alternately inclined tray-like baffles invertedly supported between the rows of posts, tie bars extending between selected baffles and having notches to form hook-like ends engaged over the sides of the posts to retain the baffles in supported engagement with the posts, and means for delivering a fluid for flow under said baffles.

10. In combination with a tank, spaced rows of posts having vertically spaced ledge-like seating portions in the facing sides of said posts, a plurality of alternately inclined baffles having sides supported in said seating portions and having flow outlets at their upper ends, tie bars extending between selected baffles and having hook-like ends engaging over outer faces of the posts to retain the sides of the baffles in said seating portions of the posts, and means for delivering fluid for progressive flow under the respective baffles.

11. In combination with a tank having a roof and floor decks, spaced rows of posts carried upon the floor deck for supporting the roof deck and having vertically spaced notches in their facing sides, a plurality of alternately inclined baffles having sides supported in said notches and having flow outlets at their upper ends, tie bars extending between selected baffles and having notches forming hook-like ends for engagement with the posts to support said posts and to retain the baffles in the notches, and means for delivering a fluid for progressive flow under the respective baffles.

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