Oct. 7, 1930. J. PETERS 1,777,893

MIXING APPARATUS

Filed April 12, 1929

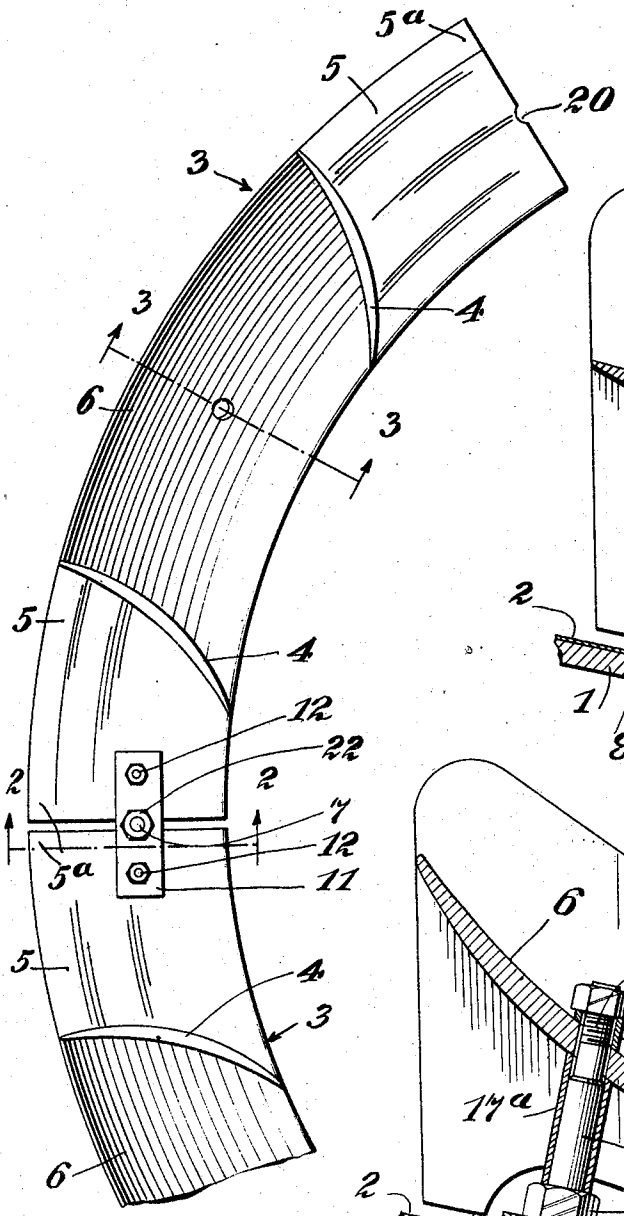

Fig. 1.

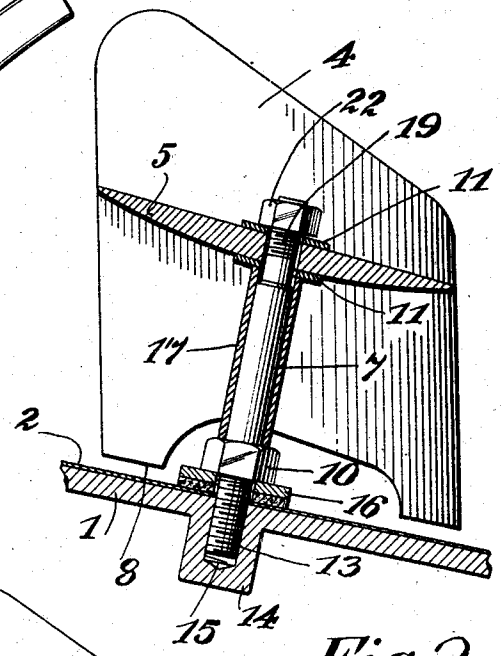

Fig. 2.

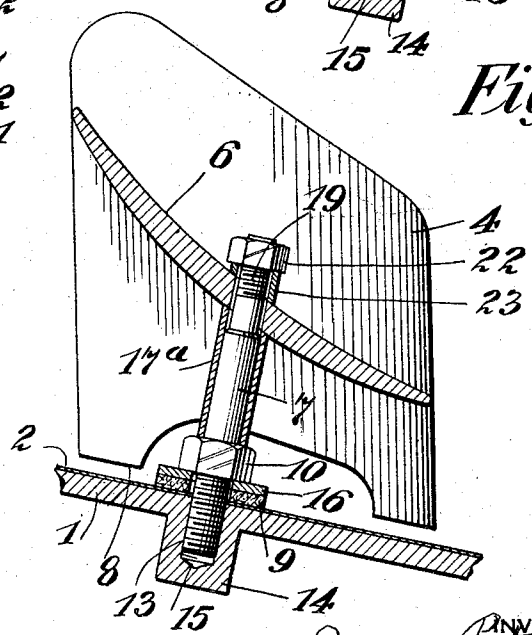

Fig. 3

INVENTOR
James Peters
BY
Frank J. Lewis
ATTORNEY

Patented Oct. 7, 1930

1,777,893

UNITED STATES PATENT OFFICE

JAMES PETERS, OF ROSYLAN HEIGHTS, NEW YORK, ASSIGNOR TO THE TURBO-MIXER CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

MIXING APPARATUS

Application filed April 12, 1929. Serial No. 354,497.

My invention relates to mixing apparatus and especially to new and improved means for supporting mixing or deflecting structures or elements thereof, in a lined tank and especially a tank having a vitreous lining, in such manner that cracking of the lining is prevented or avoided.

Heretofore it has been a difficult matter to properly mount mixing apparatus and especially the deflector structure thereof in a lined tank of character referred to, without causing cracking, or otherwise injuring the vitreous coating of the tank wall. The common practise has been to bolt the deflector elements directly to the tank wall with metal portions of the deflector in direct contact with the vitreous or analogous lining, with the result that the lining is usually cracked and portions displaced by the mere mechanical pressure or movement of the deflector parts caused by vibration, expansion, etc. Since lined tanks are employed in order to keep certain classes of materials from contact with the metal of the tank, upon which such materials have corrosive or other injurious action, such injury to the protective lining is of course very objectionable.

I avoid these difficulties or disadvantages by providing mounting means, or cooperating arrangements or structures of the deflector and the connecting or supporting means, of such character that cracking or other injury to the vitreous or analogous lining is entirely prevented. As more particularly stated, I support the deflector in such manner that its parts are not in actual contact with the lining, and the supporting devices engage the lining only in small zones or areas and with interposed cushioning means so that cracking or other injury to the lining is entirely obviated.

The characteristics and advantages of the invention are further sufficiently explained in connection with the following detail description of the accompanying drawings, which show representative embodiments. After considering these examples, skilled persons will understand that many variations may be made without departing from the principles disclosed, and I contemplate the employment of any structures that are properly within the scope of the appended claims.

In the drawing:

Fig. 1 is a top plan of one typical deflector, a segment of a tank bottom, and connecting or supporting means embodying the invention in one form.

Fig. 2 is a section at 2—2, Fig. 1.

Fig. 3 is a section at 3—3, Fig. 1.

The deflector structure is here shown as secured to the tank bottom 1, although the structural principles disclosed may be adapted to the support of the deflector from the tank side-wall.

The tank wall 1 has a lining 2, of enamel, usually a vitreous, fused-on enamel, of moderate thickness. The deflector in the form shown is made in arcuate segments 3, each including a plurality of vertical deflecting blades 4, and intermediate, relatively approximately horizontal plates or webs 5 and 6, alternate ones of these being arranged at different angles, or inclinations to the horizontal; thus webs 5 are nearly horizontal or parallel to the tank-bottom, and webs 6 are inclined outwardly-upward. Usually the blades and webs are cast integrally. It has usually been the practice to bolt these deflectors directly to the tank bottom, so that the lower ends of blades 4, were in direct contact with the enamel lining 2. The blade ends, of moderate area, and with sharp edges or corners, will sooner or later, by mere mechanical pressure, or by expansion movements, vibration, etc., crack, chip or flake off the enamel, thus destroying the protective effect thereof.

I provide for the support of the deflector structure entirely free from contact with the tank wall or lining, and especially prevent or avoid any direct contact of the blade bottoms with the lining, and also practically isolate the deflector from the tank bottom, with respect to vibration, etc., as follows:

The deflector is suitably connected to struts, or bolts 7, and the bolts are in turn connected to the tank wall, or bottom, in such manner that the blade ends or bottoms 8 are spaced from the lining 2 in a moderate but substantial distance (say 1/4", more or less) thus af-

fording ample clearance, and preventing contact even under extreme conditions of expansion, warpage, etc. I also preferably provide isolating or cushioning means, such as washers 9, interposed between the lining and bolt fastening means such as nuts 10, so that the bolts may be firmly seated or secured without direct contact of any metal part (such as the nut) with the lining. These isolating washers are of stout, but compressible, and more-or-less resilient material, such as asbestos; they tend to cushion and isolate the entire deflector structure from the tank bottom, and also provide areas of supporting contact which are relatively small, and impose little or no distortion strain upon the tank, lining, or deflector itself.

When the deflector is of segmental form as shown, the nearly horizontal connecting plate or web formations 5 are arranged at ends of the segments; that is, a web portion 5ª is provided at each end of each segment, and the adjacent or abutting ends of these portions provide a complete flow conducting plate or web between two adjacent vertical blades 4. This arrangement provides for easy connection or adjacent segments, as by copper (or other metal) plates or strips 11, bolted to the web sections 5ª at 12. (Fig. 1.)

The bolts 7 are screwed into threaded holes 13 in the tank wall, and preferably lugs or bosses 14 are formed or secured to the outside of the wall (as by welding) to provide bolt-holes of proper length, these holes being closed at the bottom, as at 15. The nut 10 is screwed down on each bolt against the cushioning washer 9, or preferably a metal washer 16 is interposed between the nut and the asbestos washer. A spacing sleeve 17 or 17ª is then placed on each bolt, the sleeve being dimensioned to support the deflector at proper height, with blade ends 8 spaced from the tank bottom as above noted. The upper, threaded ends 19 of the bolts pass through holes in webs 5 or 6, and the spacing sleeves engage directly or indirectly with the undersurfaces of the webs. In the case of the bolts and spacers which cooperate with webs 5 the bolt holes are formed in connecting strips 11, and the ends of web-segments 5ª are notched as at 20 (Fig. 1) to accommodate the bolts. Spacing sleeves 17 engage against the under connecting strips 11, and nuts 22 are screwed down on the upper ends of the bolts against upper strips 11 to clamp the deflector structure in position.

Spacer-sleeves 17ª for the intermediate webs 6 are beveled at the top to engage the angular web face, and short spacers 23 are placed about the upper ends of the bolts, their lower ends being beveled to conform to the upper web surface; and nuts 22 are applied to complete the connection.

In some cases the intermediate connections may be omitted; also the number of blades in each deflector section may vary, and other changes made, as will be evident to skilled persons, and as comprehended in the claims.

I claim:

1. In combination with a tank wall and a mixer structure, bolts secured in the wall and supporting the mixer structure free from the direct contact with the wall, and cushioning washers operatively interposed between the bolts and the wall.

2. In combination with an enamel-lined tank wall, a mixer structure, and bolts secured in the wall and supporting the mixer structure free from the direct contact with the wall, nuts on the bolts, and resilient washers under the nuts and engaging the enamel lining of the wall surface.

3. In combination with a tank wall, a mixer structure, and bolts secured in the wall and supporting the mixer structure free from the direct contact with the wall, nuts on the bolts, resilient washers under the nuts and engaging the enamel lining wall surface and spacer sleeves about the bolts and engaging parts of the mixer structure.

4. In combination with a tank wall, a mixer structure, and bolts secured in the wall and supporting the mixer structure free from the direct contact with the wall, nuts on the bolts, resilient washers under the nuts and engaging the enamel lining wall surface, spacer sleeves about the bolts and engaging parts of the mixer structure, and nuts on upper parts of the bolts clamping the mixer structure in position.

5. In combination with a tank wall having an enamel lining, a mixer structure, bolts secured in the wall and supporting the mixer structure free from direct contact with the wall lining.

6. In combination with a tank bottom wall having an enamel lining, a mixer structure, bolts secured in the wall and supporting the mixer structure free from direct contact with the wall lining.

7. In combination with a tank wall having an enamel lining, a mixer structure, bolts secured in the wall and supporting the mixer structure free from direct contact with the wall lining, nuts on the bolts, and resilient cushioning washers under the nuts and engaging the enamel lining.

8. In combination with a tank wall having an enamel lining, a mixer structure, bolts secured in the wall and supporting the mixer structure free from direct contact with the wall lining, nuts on the bolts, resilient cushioning washers under the nuts and engaging the enamel lining, spacer sleeves about the bolts and engaging parts of the mixer structure.

9. In combination with a tank bottom wall, a deflector structure including vertical blades and connecting webs, and bolts inserted in the wall, and cooperating with the webs to sup-

port the deflector with the lower blade ends spaced from the tank wall surface, nuts on the bolts, and cushioning washers clamped between the nuts and the wall surface.

10. In combination with a tank wall, a deflector structure including vertical blades and connecting webs, and bolts inserted in the wall and cooperating with the webs to support the deflector with the lower blade ends spaced from the tank wall surface, nuts on the bolts, and cushioning washers clamped between the nuts and the wall surface, spacer sleeves on the bolts engaging the webs, and nuts on the upper ends of the bolts clamping the webs against the spacers.

11. In combination with a tank wall, a deflector structure including vertical blades and connecting webs, and bolts inserted in the wall, and cooperating with the webs to support the deflector with the lower blade ends spaced from the tank wall surface, nuts on the bolts, and cushioning washers clamped between the nuts and the wall surface, spacer sleeves on the bolts engaging the webs, and nuts on the upper ends of the bolts clamping the webs against the spacers, and other spacers between the upper nuts and webs.

12. In combination with a tank wall, a segmental deflector structure including vertical blades and connecting webs, and bolts inserted in the wall, and cooperating with the webs to support the deflector with the lower blade ends spaced from the tank wall surface, nuts on the bolts, and cushioning washers clamped between the nuts and the wall surface.

13. In combination with a tank wall, a segmental deflector structure including vertical blades and connecting webs, and bolts inserted in the wall, and cooperating with the webs to support the deflector with the lower blade ends spaced from the tank wall surface, nuts on the bolts, and cushioning washers clamped between the nuts and the wall surface, spacer sleeves on the bolts engaging the webs, and nuts on the upper ends of the bolts clamping the webs against the spacers.

14. In combination with a tank wall, a segmental deflector structure including vertical blades and connecting webs, and bolts inserted in the wall and cooperating with the webs to support the deflector with the lower blade ends spaced from the tank wall surface, nuts on the bolts, cushioning washers clamped between the nuts and the wall surface, spacer sleeves on the bolts engaging the webs, nuts on the upper ends of the bolts clamping the webs against the spacers, and strips connecting the deflector segments together, certain of the supporting bolts passing through said strips.

In testimony whereof I affix my signature.

JAMES PETERS.