CONTAINER FOR CORROSIVE LIQUIDS AND OTHER SUBSTANCES

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The present invention relates to non-metallic containers for corrosive liquids, such as acids, pickling solutions, plating baths and for other liquids which it may be desired to provide in relatively large quantities.

One object of the invention is to provide improved reinforcing frameworks or containers composed of plates of glass secured together to provide side walls.

A second object is to provide an improved means of sealing the joints between contiguous plates in containers of the foregoing type.

These and other objects of the invention will be apparent from consideration of the following specification and the appended claims.

It has hitherto been proposed to form containers such as tanks and vats for storing acids, holding pickling solutions, or plating solutions, or for containers employed in the storage or treatment of food products, of glass. If these containers are of large size, such as are employed in commercial operations, it is necessary to form them of a plurality of plates which are secured together and sealed at the joints in order to provide a liquid-tight construction. The problem of providing a suitable seal at the joints has hitherto constituted a very serious problem because as the glass plates expanded or contracted, due to thermal changes, or were subjected to mechanical strains and stresses from various causes, cracks permitting the escape of liquids were likely to open. Of course escaping corrosive substances would attack the securing members of the joints and other structures associated with the tanks, thus doing serious damage in a comparatively short time.

In accordance with the provisions of the present invention it is proposed to obviate or at least substantially reduce the foregoing difficulties by the provision of sealing rods in the angles of the tanks designed to yield and move to accommodate the various expansions and contractions or other movements of the glass plates in service.

For a better understanding of the invention reference may now be had to the accompanying drawings in which like numerals refer to like parts throughout and in which

Fig. 1 is a view partially in section and partially in elevation of a tank constructed in accordance with the provisions of the invention;

Fig. 2 is a fragmentary sectional view through a corner of a tank showing on a larger scale the structure for holding the plates and sealing the joints between them;

Fig. 3 is a fragmentary sectional view taken substantially upon the line III—III of Fig. 1 and further illustrating the corner structure of the tank.

In a construction embodying the principles of the invention, as shown in the drawings, a tank 10 comprises side walls 11, end walls 12 and a bottom 13, all comprising glass plates preferably of considerable thickness, e.g., 1/8 inch and also tempered by sudden chilling of the plates while heated approximately to the softening point. The art of tempering such plates is well understood and need not be further described. The plates are secured in a frame of angle irons securing and covering the corners and including bottom members 16 and top members 17, which provide an upper and a lower angular frame. These frames are secured together at the vertical corners by means of vertical angle irons 18, and gusset plates 19 bolted to the frames and the vertical members as indicated at 21 to provide a rigid connection.

It is to be observed that the edges of the plates 11, 12 and 13 are beveled at 22 to provide inwardly flaring crevices or channels in which are wedged securing rods 23. These rods may be formed of steel, brass or other strong metal and preferably are formed with expansion joints 26 including portions 24 and 25 that overlap each other in order to obtain continuity across joints.

The rods are also covered with layers 27 of a corrosion resistant, yieldable material, such as lead or a chemically resistant form of plastic or rubber.

The plates are forced diagonally toward each other at the corners in order to obtain proper spacing by means of a system of wedges 28 and 29, having opposed sloping faces. The backs of these wedges are parallel and one engages the outer face of the associated glass plate while the other engages the inner face of the contiguous angle iron so that by sliding one wedge upon the other any desired spacing of the glass plate with respect to the corresponding flange of the angle is obtained.

It is to be observed that the inner wedge 28 is longer than the outer and that the end thereof is mitered and meets with the corresponding end of the wedge on the other side of the corner. This admits of driving of the outer wedges 29 without slippage of the inner wedges, thus assuring that the thickness of the wedge system will increase as the inner wedge is driven inwardly.

As shown in Fig. 2, the rod 23 is drawn into the tapered slot formed by the bevels 22 by means of screws 31, which are threaded into the
rods and project outwardly at the corners between the plates. The corners of the angle irons 10 are appropriately notched at desired intervals as indicated at 32 to receive the outwardly-projecting extremities of the bolts. Also, cup-like members 33 are disposed in the notches and have flanges 34 setting upon the edges thereof. Compression springs 35 are in the cups of the members and are held under compression by means of nuts 37 threaded upon the bolts.

It will be apparent that by screwing the nuts 37 in or out the compression upon the springs 30 is regulated. The compression of the springs causes the rod 23 to be drawn outwardly and wedged yieldably between the beveled surfaces 22. The springs will yield under expansion or other changes in glass plates to maintain uniform line contact between the covering element 21 and the surfaces 22. The spring connection or seat for the nuts 37 will also permit slight tilting movement of the bolts to accommodate for thermal expansion or contraction of the rods under service conditions. The beveling of the edges of the plates assures that even with comparatively slight pressure exerted by the springs 30 strong compressional forces between glass and the coverings 27 will be exerted, thus assuring that a perfect seal will be maintained at all times.

It will be apparent that the junctions of the rods 23 at the corners between the glass plates can be sealed with a yieldable material, such as lead burned into the junction or in any other way in which it may be desired. The constructions herein shown and described are to be considered merely as exemplary. It will be apparent to those skilled in the art that numerous modifications may be made therein without departure from the spirit of the invention or the scope of the appended claims.

What I claim is:

1. A glass container for corrosive liquids and the like comprising plates of glass set up in angular relation with respect to each other to form the side walls of the container, said plates having contiguous edges beveled to provide inwardly flared crevices, the outsides of the plates being covered with angle irons and the insides of the crevices being sealed by means of rods engaging the contiguous edges of the plates of glass and being drawn outwardly by means of screws threaded into the rods, said rods being covered with a yieldable material maintaining secure contact with the contiguous glass surface, said screws being provided with nuts and springs under compression between the nuts and the angle irons in order yieldably to maintain the rods in position.

2. A container for corrosive liquids and the like comprising glass plates set up in angular relation to provide side walls for the container, a reinforcing framework of angle irons disposed to engage the exterior faces of the angles between the plates and wedges between the plates and the angle irons, which wedges comprise pairs of elements having sloping faces sliding upon each other and parallel backs, one of which engages the contiguous face of the glass and the other of which engages the inner face of the contiguous angle iron.

3. A container for corrosive liquids and the like comprising glass plates set up in angular relation to provide side walls for the container, a reinforcing framework of angle irons disposed to engage the exterior faces of the angles between the plates and wedges between the plates and the angle irons, which wedges comprise pairs of elements having sloping faces sliding upon each other and parallel backs, one of which engages the contiguous face of the glass and the other of which engages the inner face of the contiguous angle iron.

4. A container structure for corrosive liquids and the like comprising plates of glass set up in angular relation with respect to each other to provide the side walls of the container, a joint structure between the plates, angle elements engaging the exterior faces of the plates at the angles, sealing rods wedged between the plates at the angles, said rods having expansion joints therein and being covered by continuous yieldable sheathing adapted to contact with the surfaces of the glass plate to provide a seal, bolts threaded into the rods and projecting outwardly through openings in the angle irons, nuts upon the bolts and springs in compression between the nuts and the irons.

5. A container for corrosive liquids and the like comprising plates of glass set up in angular relation with respect to each other to constitute the sides and bottom of the container, a framework comprising angle irons covering the angles formed by the plates, said plates having beveled edges providing inwardly flaring crevices, the sides of which have comparatively slight angularity with respect to each other, sealing rods disposed in the crevices and being wedged outwardly by means of screws threaded into the rods and extending outwardly through openings in the angle irons.

6. A construction as defined in claim 5 in which helical springs under compression are disposed about the screws and exert pressure at one extremity against the corresponding angle iron and at the other extremity exert pressure against a nut upon the screw.

7. A container for corrosive liquids and the like comprising plates of glass set up in angular relation with respect to each other to constitute the side and bottom of the container, a framework comprising angle irons covering the angles formed by the plates, said plates having beveled edges providing inwardly flaring crevices, the sides of which have slight angularity with respect to each other, sealing rods disposed in the crevices, screws threaded into the rods and extending outwardly through openings formed in the angle irons and constituting means for wedging the rods into the crevices, and wedges disposed between the edges of the plates and angle irons for adjustment of the plates to obtain proper spacing of the contiguous beveled edges.