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C. W. JENKS

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PLATING AND GENERAL UTILITY TANK OF THE KNOCKDOWN TYPE

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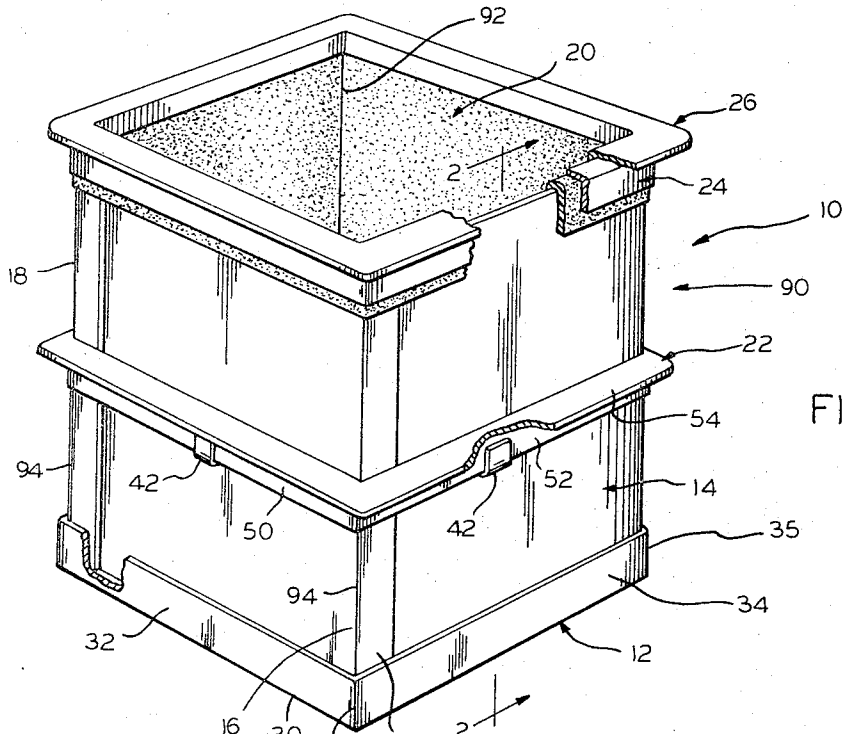


FIG. 1

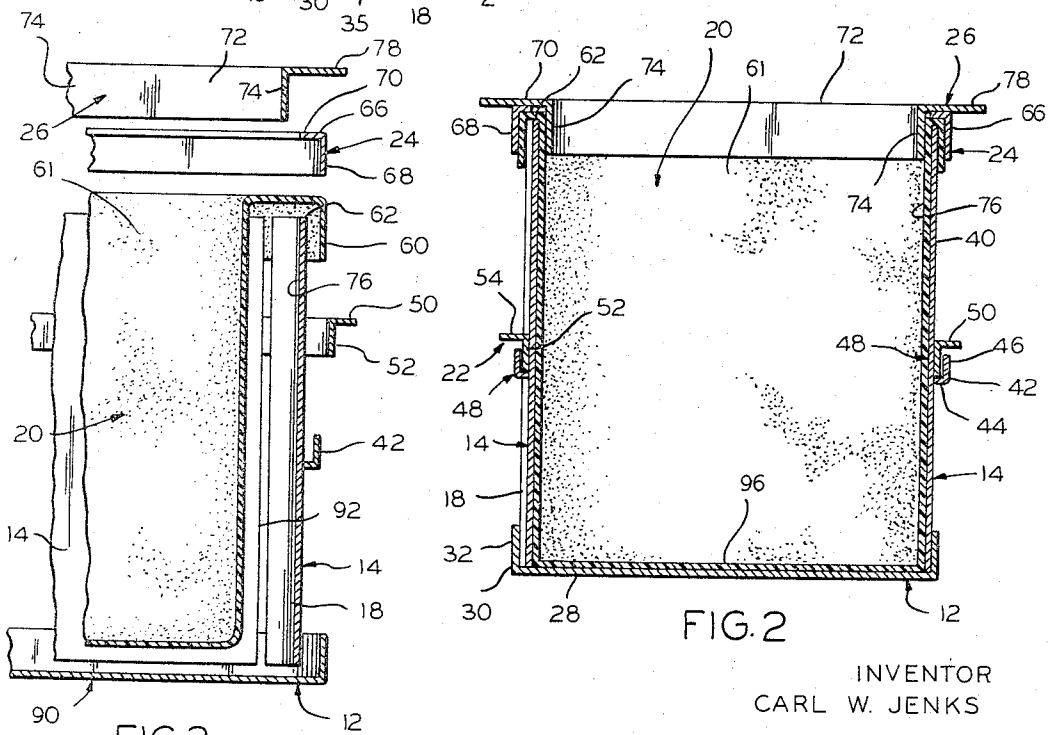


FIG. 2

FIG. 3

INVENTOR
CARL W. JENKS

BY
Mann, Brown & McWilliams
ATTORNEYS

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PLATING AND GENERAL UTILITY TANK OF THE KNOCKDOWN TYPE

Carl W. Jenks, 1131 Ostrander, La Grange, Ill. 60525
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My invention relates to a knockdown tank arrangement for plating and general utility purposes, and more particularly, to a tank arrangement that can be shipped or stored flat, and that is yet readily assembled for use.

Tanks of the type used in the plating field are usually rigidly assembled structures that are put together in tank form at the point of manufacture and thus must be shipped and stored in their assembled condition. As tanks of this type are comparatively large, they make shipment and storage difficult and expensive due to the space they take up and the extra precautions that must be taken to avoid damage. Furthermore, when leakage starts, liquid-proofing is frequently difficult and time consuming, and often the tank is entirely replaced to avoid undue job down time and the labor expense involved in making repairs.

A principal object of my invention is to provide a tank arrangement for plating and general utility purposes which may be shipped and stored in a substantially flat knocked down relation, and yet which may be conveniently assembled at the point of use.

Another principal object of the invention is to provide a knockdown tank arrangement having an inexpensive leak-proof liner arranged for ready replacement when needed thereby avoiding having to replace the whole tank when leakage starts.

Other objects of the invention are to provide a novel tank frame arrangement that is readily assembled and disassembled, to provide a novel arrangement of mounting the liner within the tank frame, and to provide a tank arrangement that is economical of manufacture, convenient in use, and readily adapted for a wide variety of applications.

Other objects, uses, and advantages will be obvious or become apparent from a consideration of the following detailed description and the application drawings.

In the drawings:

FIGURE 1 is a perspective view of a preferred embodiment of the invention, with parts being broken away to expose other parts;

FIGURE 2 is a cross-sectional view taken substantially along line 2—2 of FIGURE 1; and

FIGURE 3 is a fragmental cross-sectional view through one side of the tank, but showing the tank parts in exploded relation.

However, it should be understood that the specific drawing illustrations provided are supplied primarily to comply with the requirements of the patent act, and that the invention may have other embodiments.

Reference numeral 10 of FIGURE 1 generally indicates a preferred embodiment of my tank arrangement, which comprises a base 12 that is generally flat or planar and quadrilateral in configuration, four side plates or panels 14, each of which is generally quadrilateral and planar in configuration except for one side 16 which defines a right angled flange 18, a quadrilateral open centered girth frame 22, a bag-like liner 20, a quadri-

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lateral open centered bag top clamping frame 24, and a quadrilateral open centered brace frame 26.

The base 12 is in the form of a floor or bottom plate 28 formed about its side edge portions 30 with an upstanding circumambient side wall 32. Side wall 32 in turn may be formed by forming the plate or floor 28 with extensions 34 that are turned upwardly with respect to the plate 28 and secured together at the corners 35 of the wall 32, as by welding.

The side plates or panels 14 in the form shown each have secured to their outwardly facing surfaces 40 an angle shaped stop member 42 having its shorter leg 44 affixed as by welding to the respective plate or panels 14 and the longer portion 46 disposed in upstanding relation to define a pocket 48 to receive the girth frame 20 in the manner indicated in FIGURES 1 and 2 when the tank is in assembled relation.

The girth frame 22 is in the form of a continuous open centered member 50 that is angled in transverse section to define a depending portion 52 which fits in the respective pockets 48 and a laterally extending portion 54 which serves as a handle for raising and lowering the girth frame 20 into position.

The liner 20 is bag-shaped in configuration and is proportioned to substantially complement the inside surfaces of the tank base 12 and side panels 14 when the tank is in assembled relation. As indicated in the drawing figures, the open end portion 60 of the liner that defines its mouth 61 is turned over the top edges 62 of the panels 14 in being applied to the tank.

The clamping frame 24 is a continuous member 66 that is angled in transverse section to define a depending portion 68 that clamps the bag end 60 against the outer surfaces of the panel walls 14 and a laterally extending portion 70 which is disposed in overlying relation with respect to the top edges 62 of the side panels.

The brace frame 26 comprises an open centered member 72 that is angled in transverse section, and comprises a depending portion 74 which clamps the liner against the inner surfaces 76 of the panels 14 and a laterally extending portion 78 that serves as a handle for maneuvering the frame 26.

The frames 22, 24 and 26 may be formed of any suitable substance though steel is preferred for plating tank use. The liner 20 may be formed from any suitable substance, an example of which is polyvinyl chloride, though where the tank is intended to serve plating purposes, the liner must be formed of some substance that will be inert and impervious to the liquid it is to contain.

The base 12 and frames 22, 24 and 26 may be fabricated as subassemblies in any suitable manner, and in the case of frames 22, 24 and 26, suitable lengths of angled material having the relative configurations indicated may be secured together at the corners of the frames to complete the respective frames.

The tank base 12, the side panels or plates 14, and the frames 22, 24 and 26 comprise a tank framework 90 that may be shipped in a flat knocked down relation, or stored in such relation, thereby effecting substantial economies in the space occupied and shipping or storage expense.

When it is desired to assemble the tank 10, the base 12 is placed on the floor in the location where the tank is to be used with its side wall 34 disposed in the illustrated upright position.

The four side panels or walls 14 are then stood upright inside of the side wall or flange 34, with the angle flanges 18 of each panel 14 overlapping the adjacent side edge 92 of the adjacent panel 14. Thus, the panels 14 consecutively overlap each other about the outside of the tank, with the upright edges 92 of the respective panels 14 being disposed inside the flanges 18 at the corners 94 of the panels.

The girth frame 22 is then slid downwardly over the outside surfaces 40 of the side panels 14 and its depending portion 52 is inserted in the pockets 48 defined by the respective stop members 42, thereby holding the side panels 14 in upright relation for the rest of the tank assembly operation.

The liner 20 is then placed inside the tank with its bottom portion 96 in engagement with the floor 28 of the tank and the assembler at this point presses the liner into all of the tank corners and also turns the top of the liner over the top edges 62 of the side panels in the manner indicated in FIGURE 3.

It is then helpful to start filling the tank, and as the tank fills up, the assembler adjusts the liner by pulling on the now downwardly turned bag end 60 to eliminate possible wrinkles. When the tank is about two-thirds full, the liner downturned end 60 should be pulled downwardly to fully tension the liner and flatten it out against the side panels, after which the clamping frame 26 is pressed into place in the position indicated in FIGURE 2 to clamp the liner end 60 in place against the outer surfaces 40 of the tank panels.

The tank may then be filled to the desired depth and the liner end 60 again pulled where needed to take up whatever slack might be left in the liner.

The bracing frame 26 is then pressed into the top of the tank with its flange portions 74 disposed inside of clamping frame 66 and against the liner in the manner indicated in FIGURE 2.

This completes assembly of the tank and the tank is now ready for use.

When it is necessary to replace the liner 20, the frame 26 is removed by lifting upwardly on its flange portion 78, and then the clamping frame 26 is lifted off the turned over end portion of the liner. Assuming that the tank has been emptied, the liner may then be readily removed and a new liner inserted, following the liner installation steps already described.

Where the tank is to be knocked down for storage purposes, disassembly is effected by substantially reversing the assembly steps described.

It will therefore be seen that I have provided a knockdown tank arrangement that is especially adapted for use in the electroplating field. The tank components may be shipped and stored flat, which so far as I am aware, is a first in the electroplating field. Furthermore, when leakage starts, replacement of the liner is readily effected which permits continued use of the more expensive tank frame 22.

The foregoing description and the drawings are given merely to explain and illustrate my invention and the invention is not to be limited thereto, except insofar as the appended claims are so limited, since those skilled in the art who have my disclosure before them will be able to make modifications and variations therein without departing from the scope of the invention.

I claim:

1. A knockdown tank comprising:
 - a base having an upstanding circumambient side wall,
 - a plurality of side plates adapted to be positioned in upstanding consecutive assembled relation about the inside of said base side wall with adjacent edges of said side plates overlapping,
 - an open centered girth frame received about said side plates when the latter are in their assembled relation,

a liquid impermeable bag positioned within said side plates and having open end turned downwardly over the top edges of said side walls, means for clamping said bag end against the outside surfaces of said side plates, and means for bracing said side plates about their top edges against movement inwardly of their assembled relation.

2. A knockdown tank comprising:
 - a planar base having an upstanding sidewall thereabout,
 - a plurality of side plates positioned in upstanding relation about and adjacent the inside of said base side wall with adjacent upright edges of side plates overlapping,
 - said plates defining an open tank top about an open centered girth frame received about said side plates in bracing relation with the outside surfaces thereof,
 - a liquid tight bag positioned within said side plates, means for clamping the open end of said bag to the top edges of said side plates,
 - and an open centered brace frame inserted within the open top of said tank and proportioned to prop said plates against said girth frame.
3. The tank set forth in claim 2 wherein:
 - said tank is quadrilateral in horizontal cross section, and wherein each of said plates are formed on like upstanding side edges with right angled flanges, said flange overlapping the other upstanding side edges of adjacent sheets.
4. The tank set forth in claim 2 wherein:
 - at least one of said side plates carries a stop member on the outside surface thereof on which said girth frame rests.
5. The tank set forth in claim 2 wherein:
 - said clamping means comprises an open centered clamping frame proportioned to be press fitted over the top edges of said plates with the bag end clamped therebetween.
6. A knockdown tank comprising:
 - a flat quadrilaterally shaped base having an upstanding side wall thereabout and comprising a side portion along each side edge of said base,
 - a plurality of side panels positioned in upstanding relation to said base and adjacent the inside of the respective side portions to define an open tank mouth, said side panels being equal in number to the sides of said base and having a right angled flange along like upstanding side edges thereof with the other side edges of the panels being disposed behind the respective flanges consecutively about said tank,
 - an open centered girth frame received about said side panels in bracing relation with the outside surfaces thereof,
 - a liquid tight bag positioned within said side panels and proportioned to overlie the inside surfaces of same with the bag bottom engaging said base, said bag having the open end thereof turned over the top edges of said panels,
 - an open centered clamping frame press fitted over the top edges of said panels with said bag open end clamped therebetween,
 - and an open centered brace frame press fitted within said tank mouth and proportioned to prop said panels against said girth frame,
 - said brace frame defining an outwardly extending flange thereabout that overlies said clamping frame.
7. The tank set forth in claim 6 wherein:
 - said brace frame flange extends outwardly of said clamping flange and forms a handle for lifting said brace frame from said tank mouth.
8. The tank set forth in claim 6 wherein:
 - at least two diametrically opposite of said panels carry stops for positioning said girth frame adjacent the median portion of said tank.

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9. The tank set forth in claim 8 wherein:
said girth frame is angle shaped in transverse section
with one portion thereof abutting the outside sur-
faces of said panels,
said stops each comprising an upstanding member 5
spaced from the outside surfaces of said diametrically
opposed panels for receiving said one portion of said
girth frame.

10. The tank set forth in claim 6 wherein:
said clamping frame is angle shaped in transverse sec- 10

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tion with one portion thereof overlying the top edges
of said panels.

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THERON E. CONDON, *Primary Examiner.*

G. T. HALL, *Assistant Examiner.*