United States Patent

[11] 3,545,641

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[45] Patented **Dec. 8, 1970**

[54] **FIBERGLASS BIN**
5 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **220/97,** 220/1.5, 220/72, 222/143
[51] **Int. Cl.** **B65d 21/02,** B65d 87/02
[50] **Field of Search** ..... 220/1.5, 5, 71—74, 97; 222/143, 547

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Attorney—Harris, Kiech, Russell and Kern

ABSTRACT: A fiberglass bin including a continuous solid fiberglass and resin enclosure having four slightly bowed sides of uniform thickness and a supported bottom, with the sides including a layer of stretched fiberglass cloth. A fiberglass and resin top may be formed integrally with said enclosure or may be preformed and joined thereto, said top including an opening with a removable cover. The bottom support may consist of a wooden skid coated with fiberglass and resin integrally adhered to the bottom and with four legs adapted to be received by the top of another bin permitting stacking of a number of the bins.

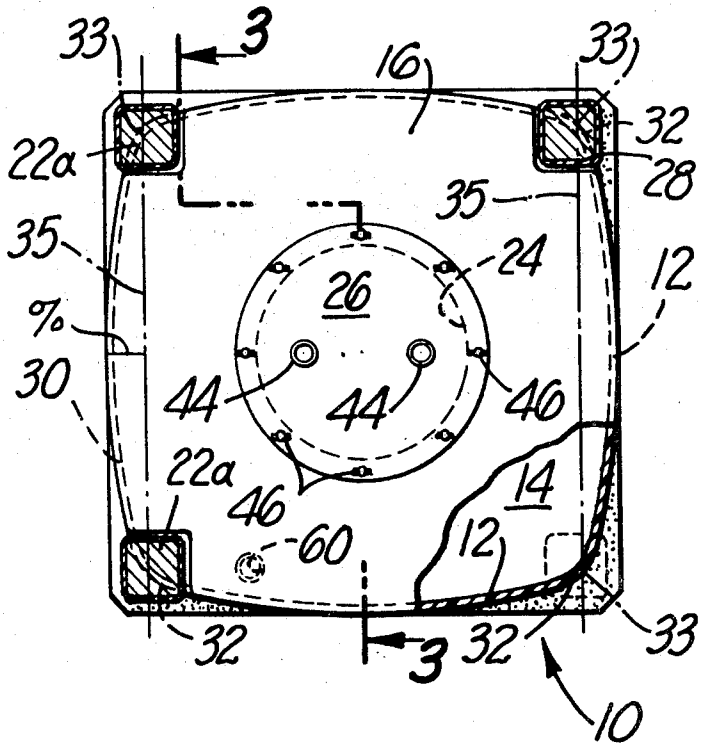


FIG. 1.

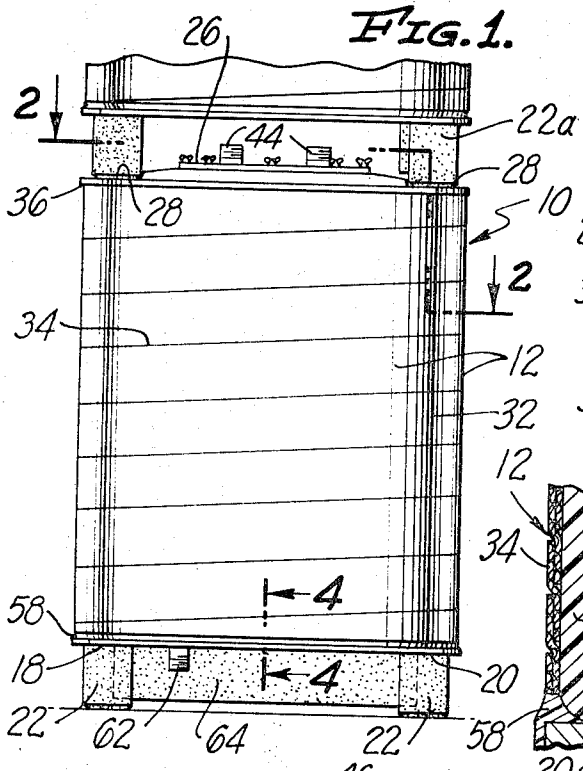


FIG. 2.

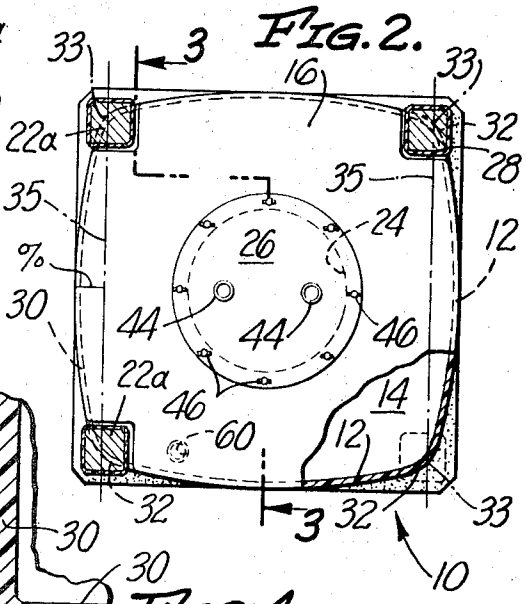


FIG. 4.

FIG. 3.

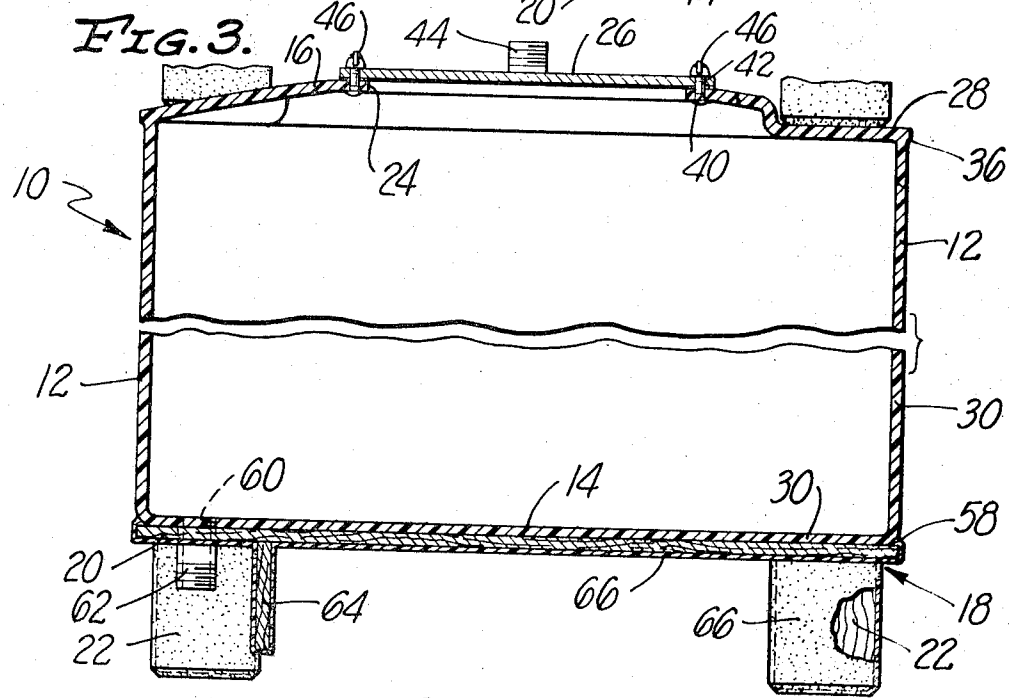
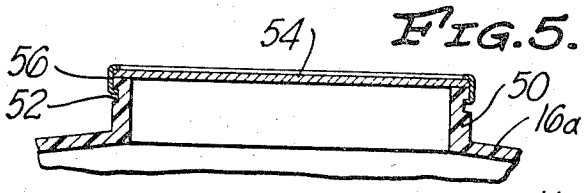


FIG. 5.



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FIBERGLASS BIN

This invention relates to storage bins or containers and more particularly to a fiberglass bin for storing chemicals, plastics, or glue, or the like. Although the bin is principally intended for the storage of these or similar commodities, it may be used with any flowable liquid or solid grannular or powdered substance and all such uses are intended to be within the scope of the invention.

Various types and forms of receptacles have been provided for containing flowable substances or commodities and have been constructed of many different materials. Usually the bin or receptacle is circular, but many have been rectangular. Where the substance to be contained is a liquid, usually the receptacle includes some type of added support about the vertical sides due to the outward pressure exerted on these sides by the liquid. This support may take the form of additional bracing added to the sides, or may be accomplished by increasing the thicknesses of the sides at the critical pressure areas. The cost of construction is accordingly increased as is the weight of the structure, which adds to its relative immobility, whether empty or filled. Oftentimes it is desirable, from a space economy standpoint, to stack the bins, which results in the additional structural problem of providing the required support strength for the weight of the additional bins stacked above. Additional bracing or sidewall thickness must usually be provided to achieve this added required strength. Moreover, because of the excessive weight and the inherent cumbersomeness of many of the receptacles, storage, transportation, and relocation of the receptacles is difficult and impractical.

Accordingly, I have developed a novel lightweight fiberglass bin which may be easily and inexpensively manufactured and which may be used to store liquid materials without requiring additional bracing or support for the sidewalls. The bin is provided with a bottom support integrally adhered to the bottom and including leg supports which permit the bins to be stacked one upon the other.

More particularly, my invention includes a continuous solid fiberglass and resin wall forming an enclosure comprising preferably four equal sides and a bottom with the sides formed into rounded corners with the adjacent sides and being bowed slightly outwardly from the corners. The sides and corners include a layer of stretched fiberglass cloth and preferably are relatively thin and have the same uniform thickness. The stretched cloth on the bowed sides provides peripheral strength for the bin. A fiberglass and resin top may be formed integrally with the continuous wall forming the enclosure or may be preformed and adhered thereto and includes a suitable removably sealed opening therethrough. The bottom is preferably supported by a wooden skid with a support face beneath the bottom and integrally adhered thereto and with preferably four legs extending below the support face. Surface areas substantially above the corners of the bin are provided for receiving the legs of another such bin for stacking the bins where the corners act as a column and provide the required stacking support without additional bracing or support devices.

It is an object of my invention, therefore, to provide a bin for the storage of flowable commodities which is both easily and inexpensively manufactured and is relatively lightweight. Another object of my invention is to provide such a bin constructed of a fiberglass and resin material.

A further object of my invention is to provide such a bin wherein a continuous wall forms an enclosure comprising the sides and bottom of the bin, and where the sides are bowed slightly outwardly and include a layer of fiberglass cloth, and are relatively thin with a uniform thickness. Another object of my invention is to provide such a bin wherein a fiberglass and resin top may be formed integrally with the side and bottom enclosure or may be preformed and adhered thereto.

Still another object of my invention is to provide such a fiberglass bin including a bottom support member with a support face extending beneath and adhered to the bottom and

including support legs extending below the support face. A further object is to provide a means for stacking a number of the bins one upon the other without adding additional support or bracing to the enclosure.

The invention, both as to its organization and method of operation, together with further objects and advantages thereof, may best be understood by reference to the following description taken in connection with the accompanying drawing.

In the drawing:

FIG. 1 is a side elevational view of my invention showing one fiberglass bin with another stacked thereupon;

FIG. 2 is a horizontal sectional view of my invention along the line 2–2 in FIG. 1;

FIG. 3 is an enlarged sectional view of my invention along the line 3–3 in FIG. 2;

FIG. 4 is an enlarged fragmentary sectional view of my invention taken along the line 4–4 in FIG. 1; and

FIG. 5 is an enlarged sectional view showing another embodiment of the covered opening in the top of my bin.

Referring now to the drawing, my fiberglass bin, as indicated by the reference numeral **10**, includes sidewalls **12**, a bottom **14**, and a top **16**. A support member **18** is preferably provided for the bottom **14** and includes a support face **20** beneath the bottom **14** and legs **22** which extend below the support face **20**. The sides **12** are bowed slightly outwardly (FIG. 2) and are relatively thin and of substantially the same thickness. The top **16** includes an opening **24** therethrough and a cover member **26** is releasably secured about the opening **24**. The legs **22** are adapted to be received by surface areas **28** in the top of another such bin for stacking the bins.

More particularly, and in the illustrated form of **175** invention, the sides **12** and **32 14** preferably are formed from a continuous wall of solid fiberglass and resin **30**. **162 158** sheet metal mold (not shown) is constructed, and chopped fiberglass and resin are sprayed thereon to form the sides **12** and bottom **14** producing the continuous solid fiberglass and resin enclosure **30**. The mold is shaped to provide preferably four equal sides **12** which are formed into rounded corners **32** with the adjacent sides. Preferably each side **12** is bowed slightly outwardly from the corners as shown in FIG. 2. This slight outward bow increases the capacity from a circular bin with the same diameter and provides more peripheral strength to the sides over a square or rectangular bin. For example, in FIG. 2 the sides **12** are shown as being bowed outwardly from phantom lines **35** through the apexes or midpoints **33** of the corners **32** to increase the width of the container **10** by about 10 percent over the width between the phantom lines **35**. Each bowed side would then increase the width by one half of of this amount or by about 5 percent as shown in FIG. 2. It is felt that this provides the optimum condition as to capacity and strength. If the sides are bowed to increase the width more than about 20 percent, substantial capacity will be lost, whereas any increase of less than about 8 percent will not sufficiently increase the peripheral strength resistance to bulging. In one commercial model, the bin is generally square and is 39 inches wide at the corners, i.e., between the lines **35**, and is 43 inches wide at the maximum bow.

When the continuous solid wall enclosure **30** has partially cured, the mold with the enclosure is mounted to a rotatable mandrel (not shown) and the outer surface of the sides **12** of the enclosure **30** are coated by resin. The mandrel is rotated and a fiberglass cloth strip **34** is wound about the sides **12** to form an outer layer for the sides **12** as shown in FIG. 4. The fiberglass cloth strip **34** is pulled from a reel (not shown) and is stretched as it is wound about the sides **12** and is allowed to set or cure in this stretched condition. It is to be understood, however, that the cloth layer may be positioned at the inside surface of the sides **12**, if desired. Alternatively, the cloth may be added, externally or internally, to the enclosure **30** while the resin is fluid, so that the sprayed fiberglass and resin flow into and through the cloth to form one resulting composite layer for the sides **12** and corners **32**. The stretched cloth pro-

vides additional peripheral strength to the bowed sides 12 to resist bulging of the sides when a liquid commodity is stored in the bin 10. No additional braces or supports for the sides 12 or corners 32 are required and the sidewalls 12 and corners 32, including their cloth layer, are relatively thin and may be substantially equal in thickness. The corners 32 provide sufficient support for the stacking of the bins as will be more fully discussed later.

When the sides 12, and bottom 14, have fully cured, the metal mold is removed and the fiberglass and resin top 16, which may be preformed, is attached at the exposed edges of the sides 12 and corners 32. The top 16 is mounted on the sides 12 and corners 32 and an annular edge 36 formed by the top 16 and sides 12 is ground smooth. The edge 36 is coated with resin and a strip of fiberglass is adhered thereto or fiberglass is sprayed thereon to form a smooth, bonded joint between the top 16 and the upper edges of the sides 12 and corners 32.

The top 16 may slope gently upwardly toward its center from the outer edge 36 (FIG. 3). The opening 24 is then cut in the top 16 and holes 40 are punched in the top 16 for bolts 42 to mount the cover 26 about the opening 24. The cover 26 may be formed from any suitable material such as metal and may include grooved fittings 44 for setting it in place and for its removal. Wing nuts 46 are provided for the bolts 42 to securely mount the cover 26 about the opening 24.

In an alternate method of construction, an inflatable and collapsible bladder (not shown) is used in place of the sheet metal mold. The bladder may include bracing members (not shown) for the sides to provide the correct configuration for the sides of the bin 10 and to support the bladder in its proper position for the mold. Again the continuous wall of chopped fiberglass and resin is sprayed on to form the sides 12 and bottom 14 producing the enclosure 30. In this situation, however, if the bladder is suitably braced, a top 16*a* (FIG. 5) may be formed integrally with the enclosure 30. The neck of the bladder will form the opening 24, and the wall 30 may be continued upwardly about the neck of the bladder to form a circular neck 50 on the top 16*a*. When the enclosure 30 has partially cured, the mold and enclosure 30 are again mounted on the rotatable mandrel to wind the fiberglass strip 34 about the sides 12 coated with resin. Again, the cloth may be added while the resin is fluid in order that the cloth and sprayed fiberglass and resin will be bonded and will flow together to form one resulting composite layer for the sides 12 and corners 32. When the structure has fully cured, the bladder is collapsed and removed from the structure. An annular groove 52 may be provided about the neck 50 of the top 16*a* and a standard drum top 54 may be placed on the neck 50 and secured thereto by means of an annular snap ring 56.

When the fiberglass bin has been constructed by either of the preferred or similar methods, the bin is set on the support 18 which preferably is in the form of a wooden skid. The skid or support 18 includes the support face 20 beneath the bottom 14 and in the preferred embodiment includes four legs 22 extending below the face 20. A wooden skid of this type has been found superior both as a support and because of its durability. The support face 20 is sprayed with resin before the bin is placed thereon and adheres to the bottom 14. Additionally, the outer edges of the support face 20 are bonded to the bottom 14 and the sides 12. For example, the edges of the support face 20 and the base of the sides 12 are coated with resin and a fiberglass cloth strip or sprayed fiberglass is added about these edges to form a bonded joint 58 about the base of the sides 12. The wooden skid 18 may then be sprayed with fiberglass and resin as a thin protective coating 66 for the wood.

Preferably, the top 16, or 16*a*, includes surface areas 28 above the corners 32 as shown in FIG. 2. The surface areas 28 are rendered substantially level and smooth to receive legs 22*a* from another similar bin to permit stacking of the bins. The legs 22*a* as shown in FIG. 2 are centered about each corner 32 and extend partially outwardly therefrom. By centering the leg 22*a* over the corner 32, the corner acts as a vertical column and receives directly the proportionate weight of the bin stacked above and provides the required support for the stacked bins without increasing the thickness of the corner 32 or by providing additional bracing support. The corners 32 and sidewalls 12 with their layer of fiberglass cloth may therefore be relatively thin and are of substantially the same thickness.

An inexpensively and easily manufactured sturdy fiberglass bin has been provided which with its uniformly thin walls provides the peripheral support required to store a liquid commodity. A drain hole 60 may be provided in the bottom 14 and through the support face 20 and may receive a screwed fitting 62 for a drainpipe (not shown). A wooden drain guard 64, preferably sprayed with a thin coating of fiberglass and resin, may be secured beneath the support face 20. The support or skid 18 provides support for the bottom 14 and with the surface areas 28 of the top 16 provides a means of stacking the bins one upon the other. Additionally, when a bin 10 is required to be transported or relocated, a fork lift (not shown) may be used where the lifting members fit between the legs 22 of the support 18. The bins, therefore, may be easily transported and relocated and may be stored or stacked when in use in a minimum of space.

Although I have described in some detail exemplary embodiments of my invention, changes, modifications, and substitutions may be made therein without departing from the spirit of the invention. I therefore intend that my invention be limited in scope only by the terms of the following claims.

I claim:

1. A fiberglass bin for containing a flowable commodity, comprising:

a continuous solid fiberglass and resin wall forming an enclosure comprising a plurality of sides and a bottom, each of said sides formed into rounded corners with the adjacent sides and being bowed slightly outwardly from the corners in the horizontal plane and being straight in the vertical plane, said sides and corners including a layer of stretched fiberglass cloth, the thickness of said sides and corners being substantially uniform; and

a fiberglass and resin top joined at its outer edges to said sides and corners.

2. A bin as defined in claim 1 wherein said top is formed integrally with said continuous wall.

3. A bin as defined in claim 1 including a support member for said bottom and comprising a support face extending beneath said bottom and a plurality of legs extending below said face, and wherein said top includes a plurality of surface areas each substantially above one of said corners, said surface areas adapted to receive the legs of another bin to permit stacking of said bins with said rounded corners providing vertically straight load bearing columns between said top surface areas and said legs.

4. A bin as defined in claim 3 wherein said enclosure includes four substantially equal sides, and said support member includes four legs.

5. A bin as defined in claim 1 wherein said enclosure includes four substantially equal sides and each of said sides is bowed outwardly from a line through the approximate apexes of the respective rounded corners with the maximum width of the bin about 8 percent to about 20 percent greater than the width between such lines.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,545,641 Dated December 8, 1970

Inventor(s) Rodney I. Olson

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2: Line 33, "175" after "of" should read --my--;
Line 34, "32" should read --bottom--;
Lines 35, 36, "162 158 sheet" should read --Preferably, a--.

SIGNED AND
SEALED
MAR 2 1971

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents