APPLICATION FOR A PATENT

WE

A.F. & B.J. MACFARLANE

(Use BLOCK letters)

of

MAIL SERVICE 1103

MARYBOURNE, QLD. 4650

hereby apply for the grant of a Patent for an invention entitled THE RIM

METHOD OF FIBRE GLASS TANK REINFORCING

which is described in the accompanying provisional specification.

My address for service is RURAL INDUSTRIES

26 CAYNDH RD., MARYBOURNE, QLD. 4650

Dated this 16th day of MAY 1977

To:

THE COMMISSIONER OF PATENTS

This form must be accompanied by either a provisional specification (Form 9 and true copy) or by a complete specification (Form 10 and true copy).
DECLARATION IN SUPPORT OF AN APPLICATION FOR A PATENT OR PATENT OF ADDITION

In support of the Application made by A. F. R. J. MACFARLANE

for a patent

or

for an invention entitled THE RIM METHOD OF

FIBRE GLASS TANK REINFORCING

I, A. F. MACFARLANE

of MARYBOURGH, Qld., declare solemnly and sincerely declare as follows—

1. I am the applicant for the patent

- or, in the case of an application by a body corporate

1. I am authorized by

the applicant for the patent

- or, where a person other than the inventor is the applicant

- to make this declaration on

- its behalf;

2. I am the actual inventor of the invention.

- or, where a person other than the inventor is the applicant

of

is the actual inventor of the invention

and the facts upon which I am entitled

I am entitled to make the

- application are as follows:

Declared at MARYBOURGH this 16 day of MAY 1972.

To:

THE COMMISSIONER OF PATENTS.

(Authorized by Declarant)

(IMPORTANT—Cross out inapplicable words in the above Form.)
1. A method of fabricating a holding tank comprising the steps of: forming flat sheet panels predominantly of plastic material and comprising substantially circular top and bottom panels and a substantially rectangular side panel adapted to be bent to a substantially cylindrical shape with substantially vertical mating edges for connection between said top and bottom panels to form said tank; arranging a plurality of tensile members in spaced apart relationship along said rectangular side panel and substantially parallel to the operative lower edge thereof; bending said side panel to its operative cylindrical shape; connecting the respective opposite ends of each said tensile member together, and operatively sealing the joints between the said mating edges of said side panel and between said side panel and said bottom panel.
6. A side wall structure for a substantially cylindrical holding tank comprising a substantially cylindrical shell formed predominantly of plastic material and having a plurality of spaced reinforcing hoops encased therein, each hoop being adapted to form a tensile loop extending continuously around said tank.
APPLICANTS: ALEXANDER FRANK MACFARLANE and BETTY JOAN MACFARLANE

NUMBERS: PD 0165 and PD Y


FORM 10

Regulation 13(2)

COMMONWEALTH OF AUSTRALIA

Patents Act 1952-1973

COMPLETE SPECIFICATION FOR THE INVENTION ENTITLED:-

"IMPROVEMENTS TO TANK CONSTRUCTION"

The following statement is a full description of this invention, including the best method of performing it known to me:-

- 1 -
THIS INVENTION relates to improvements to storage tanks and other holding vessels, and to a method of constructing such vessels formed predominantly of plastic materials.

Domestic type water tanks are customarily fabricated in a factory from roll-formed corrugated galvanised iron sheet and each tank is transported in its completed form for placement on site. As such tanks are relatively large, road and rail transportation is difficult and the cost of transportation is increased due to the bulk of the tank even though the tank may be relatively light. Such tanks are also subject to deterioration caused by rust, and plastic tanks have been used to overcome this problem. However, such earlier constructions have proved to be either extremely expensive to manufacture and install or unreliable in use.

This invention aims to overcome the above and other disadvantages, and according to one aspect this invention provides a tank which may be prefabricated in a factory and assembled on site. Preferably, the prefabricated tanks are formed predominantly of plastic material and this invention also aims to provide a plastic tank construction which will not suffer from the disadvantages which have been apparent in many earlier attempts to provide plastic tank constructions. Other objects and advantages of the invention will become apparent from the following description.

With the foregoing and other objects in view, this invention resides broadly, according to one aspect,
in a method of fabricating a holding tank comprising the steps of: forming flat sheet panels predominantly of plastic material and comprising substantially circular top and bottom panels and a substantially rectangular side panel adapted to be bent to a substantially cylindrical shape with substantially vertical mating edges for connection between said top and bottom panels to form said tank; arranging a plurality of tensile members in spaced apart relationship along said rectangular side panel and substantially parallel to the operative lower edge thereof; bending said side panel to its operative cylindrical shape; connecting the respective opposite ends of each said tensile member together, and operatively sealing the joints between the said mating edges of said side panel and between said side panel and said bottom panel.

According to another aspect, the invention resides in a side wall structure for a substantially cylindrical holding tank comprising a substantially cylindrical shell formed predominantly of plastic material and having a plurality of spaced reinforcing hoops encased therein, each hoop being adapted to form a tensile loop extending continuously around said tank.

In order that the invention may be more readily understood and put into practical effect, reference will now be made to a preferred construction according to the present invention and illustrated in the accompanying drawings, wherein:-

Fig. 1 is a side elevational view of a
storage tank made in accordance with the present invention; and

Fig. 2 is a typical cross-sectional view of the tank side wall construction and illustrating the side wall to base joint.

The cylindrical holding tank 10 illustrated in the drawings comprises a circular base member 11 and a circular top member 12 joined together by a cylindrical side panel assembly 13 which may be formed as a flat rectangular panel on a flat plate like mould to the desired circumferential length, or on a cylindrical mould as desired. The advantage provided by forming the side panel assembly 13 as a flat rectangular plate is that the tank components may be fabricated in a factory and economically transported as flat plate like members on say a trailer or the like, to the installation site and then set up as will become apparent. Preferably, the tank 10 is fabricated predominantly from fibreglass reinforced plastic with flat steel tensile bands 14 which extend in transversely spaced attitude around the tank 10.

In the embodiment wherein the side panel assembly 13 is formed as a flat rectangular panel, the reinforcing bands 14 extend the full length of the rectangular panel 13 and parallel to the base of the side panel assembly 13. The steel tensile bands 14 project beyond one end of the side panel assembly 13 so that the bands 14 may be overlapped at the junction of the side panel 13 when the latter is wrapped around the circular top and bottom plates 11 and 12 respectively, to enable bolted or rivetted connections or the like,
to be effected between the opposite ends of the steel bands to form continuous steel tensile loops extending in spaced relationship around the tank. The steel tensile bands 14 are spaced close together at the bottom of the tank and the spacing increases towards the top of the tank where the pressure is reduced due to the reduction in the depth of water contained in the tank. The strength of the reinforcing may be accurately calculated to cope with the loads in the side walls of pressure vessels, thus ensuring the safety and effectiveness of the tank.

During manufacture, the flat plate-like mould is prepared with wax or release agent or the like and a first layer of fibreglass reinforced plastic is laid. The reinforcing bands 14 are then placed in position and a second layer of fibreglass reinforced plastic is laid over the original layer and the reinforcing bands. At that stage, additional reinforcing may be placed between the spaces formed between the original reinforcing bands 14 depending upon the strength requirements for the tank. Of course, any additional reinforcement would be covered with a further layer of fibreglass reinforced plastic.

As previously mentioned, the top and base panels and the rectangular side panel may be conveniently transported as a very compact package to the site for erection. At the site, the base panel 11 is supported on a horizontal surface and abutment lugs 15 are positioned spaced around the outer periphery of the base to act as formers about which the side panel may be bent to its operative cylindrical shape. These abutment members 15
may be in the form of steel angle brackets glassed to the base 11 or of course they may be fibreglass brackets similarly fixed in place. When the side member is formed to its cylindrical shape about the abutment members 15 the projecting end portions of the steel bands 14 will overlap the respective opposite ends encased in the adjacent end of the panel. The straps are then through-drilled for bolted connection to form the continuous steel reinforcing hoops encased in the side panel.

At this stage of construction, the joint between the base of the now cylindrical side panel 13 and the base panel 11 is fibreglassed inside and out as necessary and the joint between the adjacent ends of the side panel is similarly sealed by fibreglassing inside and out and across the bolted connection between the respective opposite ends of the steel reinforcing bands 14. The tank top is then positioned and fibreglassed in place and of course the top panel 12 may include an inlet 16 with strainer and overflow pipe 17 as desired. Thus the completed tank is a unitary construction having no exposed metal components.

It will be seen that the above described invention provides an economical tank construction using fibreglass reinforced plastic with additional metal reinforcing straps which may be galvanised or untreated as desired. Furthermore, other reinforcing tensile material may be used in lieu of the steel and any material having a high tensile strength would be suitable, such as pre-stretched terylene or steel wire or continuous strands of fibreglass.
or webbing or the like. If desired, reinforcing may be applied to the tank after the side wall has been formed to a cylindrical shape, say about a mould, and of course the reinforcing could then be placed in continuous spiral form around the cylindrical side wall.

Furthermore, when the components of the tank are prefabricated in a factory as flat panel like components, the components for a plurality of tanks may be stacked on one truck for transportation to the desired destination at which the tanks may be assembled from the plate like parts. Thus, the cost of transporting each tank to its site is greatly reduced.

It will of course be realised that while the above has been given by way of illustrative example, the modifications and variations as would be apparent to persons skilled in the art are deemed to lie within the broad scope and ambit of the invention as is defined in the appended claims.
THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A method of fabricating a holding tank comprising the steps of: forming flat sheet panels predominantly of plastic material and comprising substantially circular top and bottom panels and a substantially rectangular side panel adapted to be bent to a substantially cylindrical shape with substantially vertical mating edges for connection between said top and bottom panels to form said tank; arranging a plurality of tensile members in spaced apart relationship along said rectangular side panel and substantially parallel to the operative lower edge thereof; bending said side panel to its operative cylindrical shape; connecting the respective opposite ends of each said tensile member together, and operatively sealing the joints between the said mating edges of said side panel and between said side panel and said bottom panel.

2. A method of forming a holding tank according to Claim 1, wherein said tensile members are metal straps extending the full length of said rectangular side panel and projecting from one end thereof, whereby the respective opposite ends of each said tensile member will overlap when said side panel is operatively disposed in cylindrical form to enable said opposite ends to be operatively connected together such as by through-bolting or riveting or the like.

3. A method of forming a holding tank according to Claim 1 or Claim 2, wherein the spacing between adjacent tensile members increases towards the operative upper end of said side panel.
4. A method of forming a holding tank according to any one of the preceding claims, wherein spaced abutment members are affixed to said base panel around its periphery as guides to enable said rectangular side panel to be bent to its operative cylindrical shape about said abutment members.

5. A method of forming a holding tank according to any one of the preceding claims, wherein fibreglass reinforced plastic is laid about the joints between said side panel and said base and top panels and between the abutting ends of said side panels to form a sealed connection therebetween.

6. A side wall structure for a substantially cylindrical holding tank comprising a substantially cylindrical shell formed predominantly of plastic material and having a plurality of spaced reinforcing hoops encased therein, each hoop being adapted to form a tensile loop extending continuously around said tank.

7. A side wall structure for a substantially cylindrical holding tank according to Claim 6, wherein each said tensile loop is formed as a metal hoop.

8. A side wall structure for a substantially cylindrical holding tank according to either Claim 6 or Claim 7, wherein each said tensile loop comprises one turn of a continuous spiral of reinforcing material wound around cylindrical side wall.

9. A structure as defined in any one of the preceding claims, wherein said plastic material is fibreglass reinforced plastic and said tensile members
are encased between inner and outer layers of fibreglass reinforced plastic.

10. A tank structure substantially as hereinbefore described with reference to the accompanying drawings.

DATED this 17th day of May, 1978.

ALEXANDER FRANK MACFARLANE and
BETTY JOAN MACFARLANE
By their Patent Attorneys
T.G. AHEARN & CO.

(T.G.Ahearn)
Fellow Institute of Patent Attorneys of Australia