AUSTRALIA

FORM 1

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25 JUN 1987

Adelaide

604133

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952-1966

APPLICATION FOR A PATENT

~~I~~/We JOHN LESLIE GRAHAM McNAB and KEITH EDWARD OPIE

both of 23 Commercial Street, Marleston, State of South Australia, Commonwealth of Australia

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

"TANK CONSTRUCTION"

which is described in the accompanying provisional/~~complete~~ specification.

~~My~~/Our address for service is care of R. K. MADDERN & ASSOCIATES, Patent Attorneys, ~~97~~ 345 King William Street, Adelaide, South Australia.

Dated this 25th day of June, 1987.

JOHN LESLIE GRAHAM McNAB and
KEITH EDWARD OPIE
By their Patent Attorneys
R.K. MADDERN & ASSOCIATES

R.K. MADDERN

TO:

THE COMMISSIONER OF PATENTS,
CANBERRA, A.C.T.

ACCEPTED AND AMENDMENTS ALLOWED 7.9.90

FD 4026 1M 9/77 JS

AUSTRALIA FORM 6

(Note: To be signed by the applicant(s), or if a Company, to be signed by a person on its behalf. Parts inappropriate to a particular application should be cancelled).

COMMONWEALTH OF AUSTRALIA
Patents Act 1952-1982

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DECLARATION IN SUPPORT OF AN APPLICATION FOR A PATENT ~~OR PATENT OF ADDITION~~

•

INSTRUCTIONS

Insert if available.
Full name(s) of applicant(s).

In support of the Application made by JOHN LESLIE McNAB and KEITH EDWARD OPIE

Title of invention.

for a patent/~~patent of addition~~ for an invention entitled

"TANK CONSTRUCTION"

Full name(s) of declarant(s).
Address(es) of declarant(s).

~~I/~~We JOHN LESLIE McNAB and KEITH EDWARD OPIE of both of 23 Commercial Street, Marleston, State of South Australia, Commonwealth of Australia

do solemnly and sincerely declare as follows:—

1. ~~I am/~~We are the applicant(s) for the patent/~~patent of addition~~
~~(or, in the case of an application by a body corporate)~~

~~1. I am/We are authorized by the abovementioned applicant(s) for the patent/patent of addition to make this declaration on its/their behalf.~~

2. ~~I am~~/We are the actual inventor(s) of the invention
~~(or, where a person other than the inventor is the applicant)~~

Full name(s) of actual inventor(s).

~~2.~~

Address(es) of actual inventor(s).

~~of~~

Recite manner in which applicant(s) derive(s) title from actual inventor(s).

~~is/are the actual inventor(s) of the invention and the facts upon which the applicant(s) is/are entitled to make the application are as follows:—~~

Declared at Marleston, South Australia this 25th day of June 1987

Signature(s) of declarant(s).

(Note: No attestation or other signature is required).

To: The Commissioner of Patents,
Commonwealth of Australia.

(12) PATENT ABRIDGMENT (11) Document No. AU-B-18375/88
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 604133

(54) Title
SEPTIC TANK

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(71) Applicant(s)
JOHN LESLIE GRAHAM MCNAB; KEITH EDWARD OPIE

(72) Inventor(s)
JOHN LESLIE MCNAB; KEITH EDWARD OPIE

(74) Attorney or Agent
R K MADDERN & ASSOCIATES, 345 King William Street, ADELAIDE SA 5000

(56) Prior Art Documents
AU 517190 29779/77 E03F 5/18
US 3662918

(57) Claim

1. A septic tank having upwardly-extending side walls, and horizontally-extending base wall and lid, characterised in that the side walls comprise two parts which, in plan, are substantially C-shaped, and which intersect face-to-face, to thus form two upwardly-extending inwardly-directed ribs,

a transverse rib extending across the base of the tank between lower ends of the upwardly-extending ribs,

and a load member extending across the tank and effectively joining the upwardly-extending ribs at their upper ends.

Form 10

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952-62

COMPLETE SPECIFICATION

(ORIGINAL)

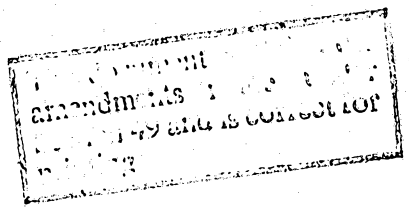
604133

FOR OFFICE USE:

Application Number: Class Int. Class
Lodged:

Complete Specification Lodged:
Accepted:
Published:

Priority:



Related Art:

TO BE COMPLETED BY APPLICANT

Name of Applicant: JOHN LESLIE GRAHAM McNAB and KEITH EDWARD OPIE

Address of Applicant: both of 23 Commercial Street, Marleston, State of South Australia, Commonwealth of Australia

Actual Inventor: JOHN LESLIE GRAHAM McNAB and KEITH EDWARD OPIE

Address for Service: Care of R.K. MADDERN & ASSOCIATES, 345 King William Street, Adelaide, State of South Australia, Commonwealth of Australia.

Complete Specification for the invention entitled:

"TANK CONSTRUCTION"

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

This invention relates to an improved construction for a tank, for example, for a septic tank.

It has been found that space limitations frequently require that tanks have a generally rectangular shape in plan, and a cylindrical tank having its cylinder axis vertical is likely to be too wide for many sites.

Large diameter vertical cylindrical tanks are cost effective with respect to materials used for the volume contained with respect to tensile stresses, providing what is often called hoop strength, but are liable to local buckling under compression forces which can be applied externally, if made of thin wall semi-flexible material such as fibreglass reinforced plastics.

Rectangular tanks with generally flat sides can meet many space limitations, however forces on the sides of such tanks require the sides to have enough material of sufficient strength to provide the required stiffness to prevent distortion, this being much greater than needed for cylindrical tanks.

The effects of stresses in flat sided tanks can only be withstood by flexible materials such as plastics if large amounts of plastics material, or ribbed walls, are used for construction. Rigid materials such as steel, cement and masonary have considerable mass, but for that reason handling and installing are more difficult than tanks made of lightweight flexible plastic materials such as glass reinforced polyester resins.

Thin wall fibreglass reinforced plastics material must be made sufficiently rugged to withstand the hydraulic pressures imparted, and if that occurs with the previously used configuration or tank-shape, the material costs become excessively high. An object of this invention is to provide an improvement in the design of the shape of a tank such that it need not necessarily be wholly cylindrical, or have excessively thick walls.

Another object of this invention is to provide a tank which has a generally rectangular shape and which uses the advantages of circular form and thus can be manufactured from flexible materials without elaborate stiffening. It follows that there would also be cost savings in using rigid materials although there would be extra mass compared to most plastic materials.

Since appropriately selected plastic material can also provide resistance to corrosion and chemical attack, it is more suited to many tank applications.

As said above, a circular tank has much greater strength because of its "hoop strength" than say a vessel having flat sides, and in an embodiment of this invention advantage is taken of this phenomenon, in that a fibreglass tank comprises upwardly-extending side walls, and horizontally-extending base wall and lid, characterised in that the side walls comprise two parts which, in plan, are substantially C-shaped, and which intersect face-to-face, to thus form two upwardly-extending inwardly-directed ribs.

The inwardly directed ribs, in being flanked by the side walls curving outwardly therefrom, constitute shallow beams which resist deflection, and this can be enhanced by a load member (which can be the lid itself) joining the ribs at their upper ends. The load member must be able to function either as a tension, or as a compression member.

Since the side wall upper portion of the container portion is constrained by the load member against inward or outward deflection due to hydraulic pressures, and the lower portion also constrained by the base of the container, the hoop strength will be effective over most if not all of the depth of the container portion, even though some of the depth may not benefit as much as the base or mouth.

An embodiment of the invention is described hereunder in some detail with reference to, and is illustrated in, the accompanying drawings, in which:

Fig. 1 is a plan view of the container portion of a tank,

Fig. 2 is an "exploded" sectional view showing a central section through the container walls and also through the tank lid, taken on line 2-2 of Fig. 1, and

Fig. 3 is a perspective view of the container portion.

In this embodiment, a septic tank comprises a container portion 10 and a lid 11. The container portion

10 and lid 11 both locate over an inlet tube 12 at one end, and an outlet baffle 13 exists at the other.

Both the container portion 10 and lid 11 are provided with outstanding flanges respectively designated 14 and 15 at the mouth of the container portion 10, and these flanges become contiguous when bolted together by fasteners, or cemented together.

The shape of the container portion 10 and lid 11 both include part circular portions designated 18, and these intersect in upwardly extending inwardly directed ribs 19, on a plane P-P which is a chordal plane to both the part round portions. The base 20 at the location of the chordal plane also has an upwardly projecting rib 21, while the lid 11 has a tension member 22 extending transversely across it, which effectively joins the upper ends of the ribs 19.

The hoop strength of the part round portions would be lost if it were not for the base 20 and its rib 21 at the lower portions of the container walls, and for the tension member 22 extending across the upper portion, but the existence of these two very inexpensive moulded portions preserve most although not all of the hoop strength of the part circular container portions 18 which make up the tank. A baffle plate 24 extends between opposite side walls of the tank.

Since these mechanical properties are preserved, for design purposes the tank will approximate two separate and independent circular tanks and therefore

the need for excessive thickness of the walls of the tanks is averted.

One of the problems which has been encountered heretofore has been the cost of transport, but this can be reduced if the side walls of the container portion 10 are upwardly divergent as shown. The inlet tube 12 and baffle 13 can be separate and can be positioned on site.

The claims defining the invention are as follows:

1. A septic tank having upwardly-extending side walls, and horizontally-extending base wall and lid, characterised in that the side walls comprise two parts which, in plan, are substantially C-shaped, and which intersect face-to-face, to thus form two upwardly-extending inwardly-directed ribs,

a transverse rib extending across the base of the tank between lower ends of the upwardly-extending ribs,

and a load member extending across the tank and effectively joining the upwardly-extending ribs at their upper ends.

2. A septic tank according to claim 1 further comprising outstanding flanges on both the tank and the lid, and fasteners for securing the flanges together face to face, said load member extending between flanges of the lid.

3. A septic tank according to claim 1 or claim 2 wherein the side walls diverge in an upward direction.

4. A septic tank according to any preceding claim further comprising an inlet tube, being partly engaged by a tank wall and partly engaged by the lid, and an outlet baffle extending into the tank from a tank wall, said inlet tube and said outlet baffle being positioned at opposite ends of the tank, distal from the open faces of the substantially C-shaped parts.

5 A septic tank substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

DATED this 24th day of June, 1988.

JOHN LESLIE GRAHAM McNAB and
KEITH EDWARD OPIE

By their Patent Attorneys,
R.K. MADDERN & ASSOCIATES

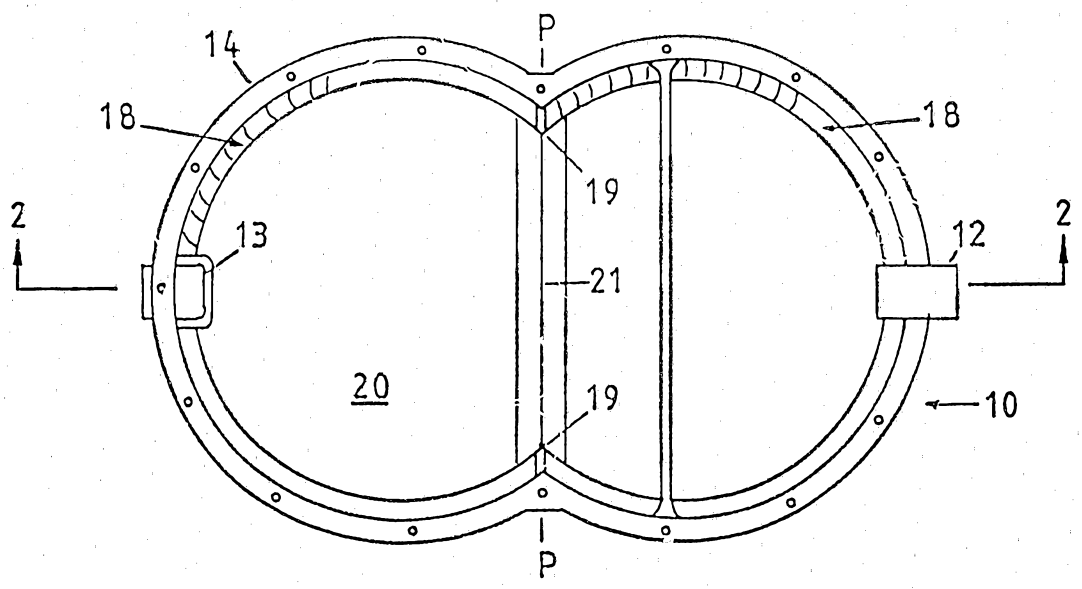

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FIG 1

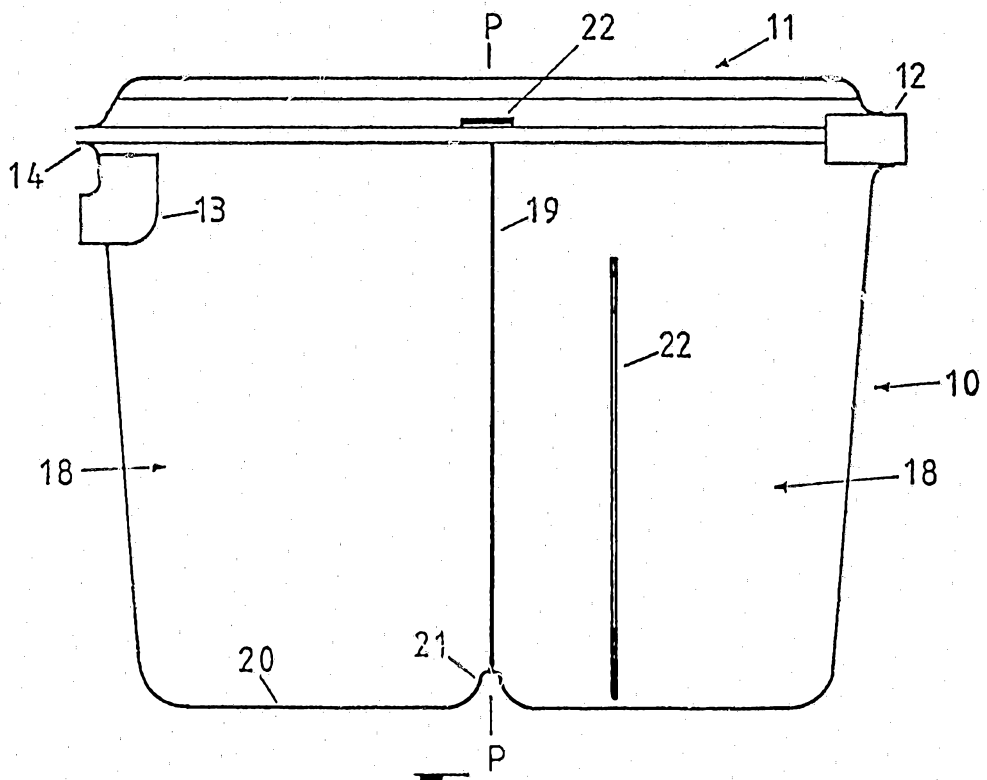
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FIG 2

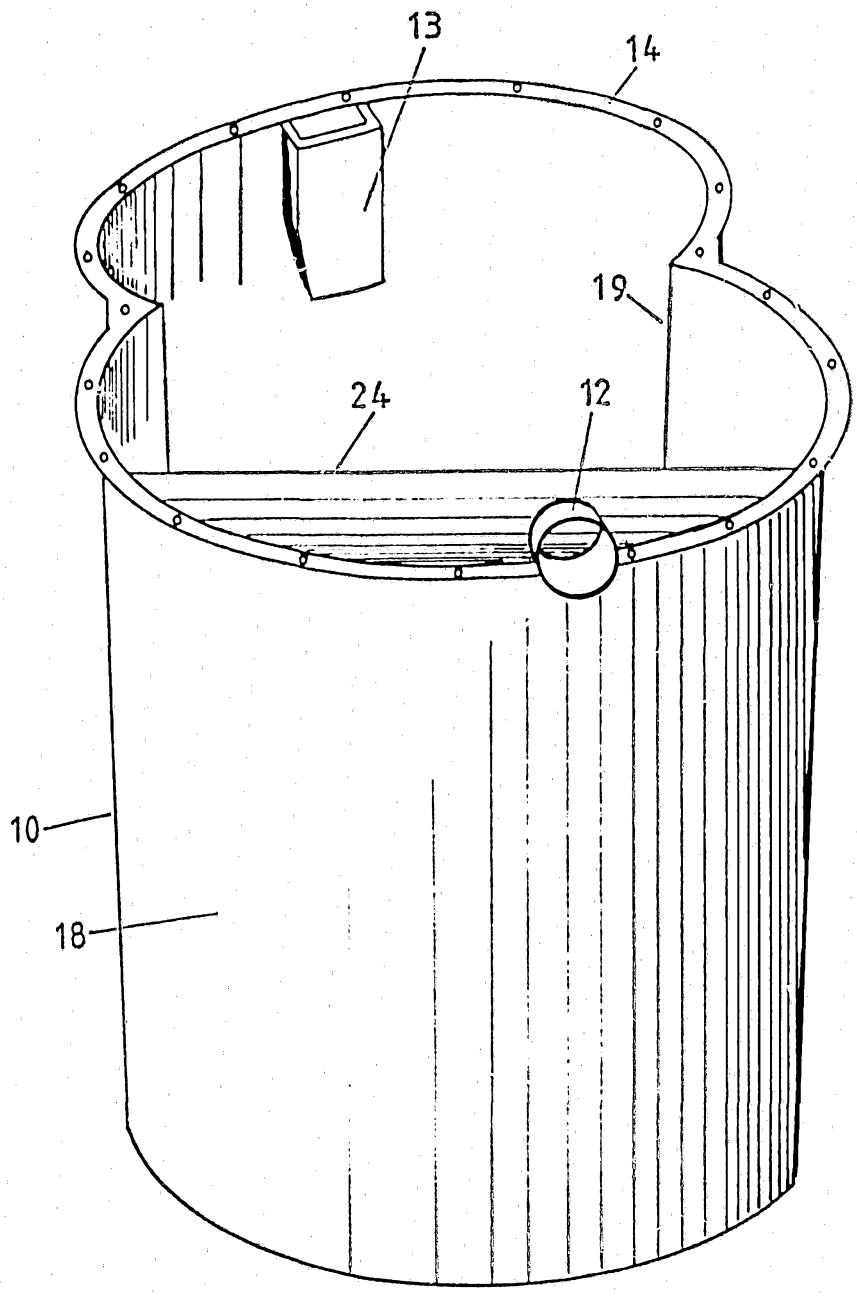

FIG 3