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M. QUERCIA

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RECHARGE VESSELS FOR A LIQUIFIED GAS UNDER PRESSURE

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Fig. 1.

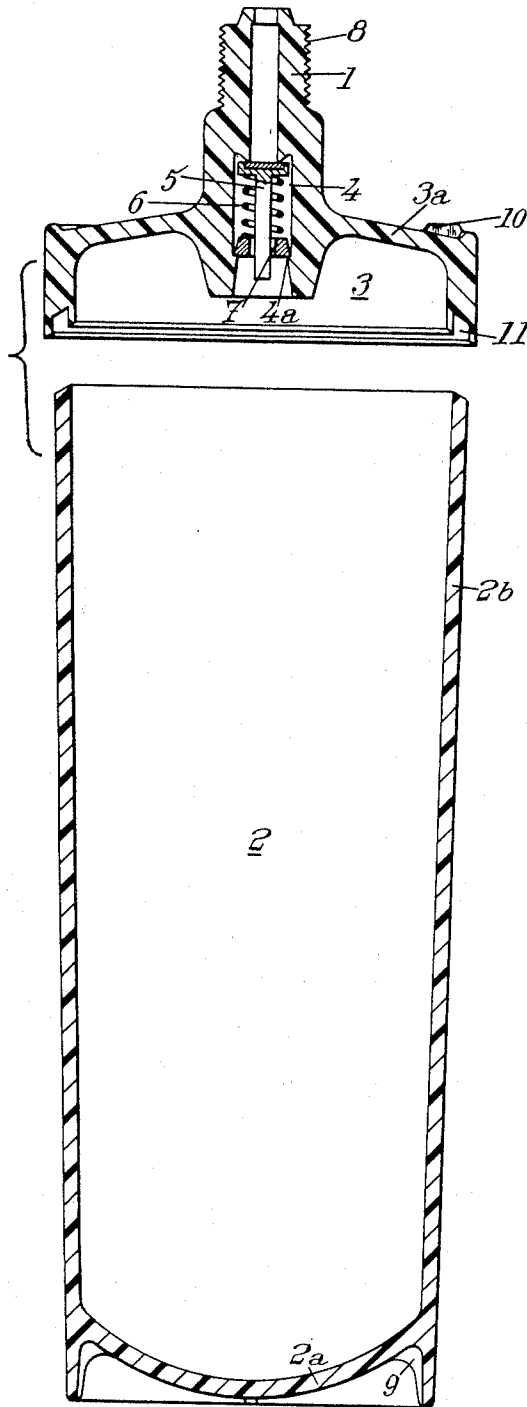


Fig. 2.

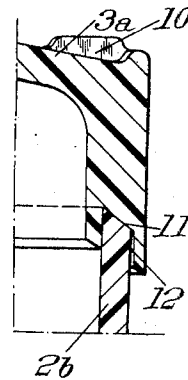
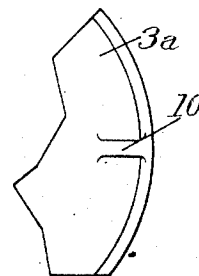


Fig. 3.



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7 Claims

ABSTRACT OF THE DISCLOSURE

A recharge vessel containing a liquified gas is made of two portions of plastic material, a top one and a bottom one. The bottom portion is cup-shaped and includes a bottom and a cylindrical side wall, whereas the top portion is in the form of a relatively flat inverted funnel the edge of which is secured by welding or glueing to the top edge of the bottom portion. The top portion is made of a very hard material, possibly opaque, and in particular a polyamide loaded with glass fibres, whereas the bottom portion is made by molding of a transparent or at least translucent material such as a polyamide without charge of glass fibres.

The present invention relates to a recharge vessel for a liquefied gas under pressure, such a vessel being made of two portions assembled together in fluidtight fashion and being adapted to have its neck connected with the tank of a utilization device intended to be filled with said gas, for instance a lighter, a liquid atomizer or the like.

The chief object of the present invention is to provide a vessel of this kind which is better adapted to meet the requirements of practice than those known at the present time.

The invention consists chiefly in making the two portions of the vessel of plastic materials, one of these portions, the bottom one, being in the form of a cup and including the bottom and the side wall of the vessel, and the other portion, the top one, being in the form of an inverted funnel including a neck for the delivery of the gas and a frusto-conical part fitting on the top of said cup-shaped portion side wall, the corresponding edges of said side wall and of said frusto-cylindrical part being ensured by being glued or welded together.

Advantageously, the top portion, the neck of which is provided on the outer surface thereof with screw threads, is made of a moldable plastic material as hard as possible, which material may be opaque and may in particular consist of a polyamide loaded with glass fibres, the cup-shaped portion being made of a transparent or at least translucent material, not so hard as said top portion and which may consist of a polyamide without glass fibres incorporated therein.

Advantageously, the neck of the top portion constitutes a valve box into which a closing valve and its return spring may be introduced from the inside before this top portion is assembled with the bottom portion.

A preferred embodiment of the present invention will be hereinafter described with reference to the appended drawings, given merely by way of example, and in which:

FIG. 1 is an axial sectional view of the two portions of a recharge vessel according to the invention shown before these two portions are assembled together,

FIG. 2 is a sectional view on an enlarged scale showing the assembly of the two portions together; and

FIG. 3 is a partial plan top view of a recharge vessel.

It will be supposed that the vessel is intended to contain a liquefied gas under pressure, such as butane, intended to be fed to lighters.

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The vessel comprises a neck 1 for the introduction of said gas into the tank of a lighter.

One of the portions 2 of the vessel, molded separately by injection of a plastic material, is cup-shaped and includes a bottom 2a and a side wall 2b. The other portion 3, in the form of an inverted funnel, comprises neck 1 and the frusto-conical portion 3a to be secured in a gastight manner to portion 2. The respective corresponding edges of portions 2 and 3 are sealed together by glueing or by welding.

Recharge vessels intended to contain a liquefied gas under pressure are generally provided in their necks, with a closing valve. When the neck of the vessel is formed by molding of a plastic material, the inside of the neck is advantageously shaped to form a valve case 4 into which there is introduced, from the frusto-conical part 3a of top portion 3, a valve 5 and its return spring 6, this operation being performed before top portion 3 is secured to cup-shaped portion 2. As a matter of fact it suffices to provide by molding, in the cylindrical wall of valve case 4, a shoulder 4a forming a bearing for a ring 7, either slit or not, after the valve has been introduced into valve case 4. When ring 7 which surrounds the rod of valve 5 is inserted in position, return spring 6 is compressed.

If, according to a modification, not shown by the drawings, a ring 7 without slit having a relatively sharp angle at its lower part is used, shoulder 4a may be dispensed with because the ring is fixed by said sharp edge cutting into the wall of recess 5.

It will be understood that portion 3, when it is made according to the present invention, permits a particularly easy mounting of such a valve in view of the fact that valve case 4 is of easy access since, before portion 3 is fitted to portion 2, instead of being located at the end of a rather deep recess in the vessel as it is the case in prior constructions. In such constructions the vessel was made of two portions, one corresponding to the neck and to the side wall of the vessel, whereas the other portion consisted essentially of the vessel bottom.

Recharge vessels for fuel gas and in particular butane gas for gas lighters are generally provided on the external surface of neck 1, with screw threads 8 for connecting the vessel to the tank of the lighter to be recharged.

When portion 3 is made of a molded plastic material, this material must be as hard as possible, in such manner as to prevent neck 1 from being screwed in incorrect manner in the corresponding screw threaded hole of the gas lighter tank. Such a screwing would prevent a correct transfer of the gas and the vessel, having its screw threads injured, could never be correctly mounted later on the tank of another lighter for recharging it.

On the other hand, it is advantageous to be always capable of knowing the amount of liquefied gas that remains on the inside of the vessel.

It is therefore advantageous to make the cylindrical wall 2b of the vessel of a transparent material.

If use were made of a vessel the portion of which carrying the threaded neck is metallic whereas the main body is for instance of glass or a transparent plastic material, a fluidtight assembly of these two portions would be difficult and expensive.

On the other hand, there does not exist at the present time a plastic material which is transparent, very hard, cheap and chemically inert with respect to the liquefied gas, in particular butane gas, so that it would not be possible to manufacture at a reasonable cost a recharge vessel in which portions 2 and 3 would be made of the same plastic material.

For these reasons, according to the present invention, top portion 3 is made of a plastic material as hard as possible. Since it is not necessary to have it transparent,

it may advantageously be made of a polyamide loaded with glass fibres.

As for bottom portion 2, it is made of a transparent or at least translucent plastic material. The material of which portion 2 is made may be of a hardness lower than that of portion 3. Advantageously it consists of a polyamide without glass fibres incorporated therein.

When using the materials above stated, which are of the same kind, it is possible to assemble portions 2 and 3 by welding and in particular by spin welding.

For this purpose, there is provided on each of the portions 2 and 3 (the whole of which constitutes a body of revolution about the axis of the vessel) on the external surfaces of bottom 2a, and frusto-conical portion 3a, respectively, preferably near their periphery, at least one projection, designated by 9 and 10, respectively, by means of which it is possible to rotate said portions 2 and 3 with respect to each other about their common axis.

Preferably projections 9 and 10 constitute a set of radial fins.

Of course, instead of projections it would be possible to make use of recesses.

Concerning the sealing joint is advantageously constituted, on the side of the lower edge of the frusto-conical part 3a of portion 3, by a circular groove 11 adapted to accommodate the top edge of the wall 2b of portion 2.

According to the present invention, there is left in groove 11, opposite one side of the edge of wall 2b, a slot 12 adapted to receive the burrs resulting from the welding or glueing of portions 2 and 3 together (FIG. 2).

As a matter of fact, the invention includes the assembly of portions 2 and 3 by glueing when the respective plastic materials thereof are very different.

In this case slot 12 absorbs the excess of glue so as to prevent the latter from projecting outwardly on transparent or translucent wall 2b.

What I claim is:

- 1. A recharge vessel which comprises, in combination, a cup-shaped portion made of a molded plastic material and comprising a bottom and a side wall, a cover portion made of a molded plastic material and comprising a neck at the top and a frusto-conical part fitting with the top of said cup-shaped portion side wall, the top edge of said cup-shaped portion side wall and the bottom edge of said frusto-conical part being sealed together, wherein said two portions are made of different plastic materials, respectively, said cover portion being provided, on a wall of said neck, with screw threads, the material of said cover portion being harder than the material of said cup-shaped portion, the material of said cup-shaped portion being at least translucent.
- 2. A recharge vessel according to claim 1 wherein the lower edge of the frusto-conical part of said cover portion is provided with an annular groove, the top edge of

the cup-shaped portion fitting in said groove with a continuous peripheral space between the outer peripheral surface of said side wall and the corresponding face of said groove, said top edge of said cup-shaped portion and said bottom edge of said frusto-conical part being glued together, and said slot being adapted to receive any burrs formed during their glueing together.

3. A recharge vessel according to claim 1 wherein the lower edge of the frusto-conical part of said cover portion is provided with an annular groove, the top edge of the cup-shaped portion fitting in said groove with a continuous peripheral space between the outer peripheral surface of said side wall and the corresponding face of said groove, said top edge of said cup-shaped portion and said bottom edge of said frusto-conical part being welded together, and said space being adapted to receive any burrs formed during their welding together.

4. A recharge vessel according to claim 1, wherein said screw threads are provided on the external peripheral surface of said neck.

5. A recharge vessel according to claim 4, wherein the internal wall of said neck forms a valve case which, in the absence of said cup-shaped portion, is accessible, through an opening, from the bottom, for the introduction of the elements of a valve.

6. A recharge vessel according to claim 4 wherein said cover portion is made of a material consisting of a polyamide loaded with glass fibres, said cup-shaped portion being made of a polyamide without glass fibres.

7. A recharge vessel according to claim 6, wherein said material of said cover portion is opaque.

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