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(54) **The composite tank and the technology of its manufacturing**

(57) The invention solves the issue of the composite tank and the way of its manufacturing. It is peculiar because it has the liner (1) with the collar consisting of two parts (4).

The internal part (3) has the external surface (8) to connect with the neck (2) of the liner (1) and a fragment of the segment (9) to connect with the external part (7). The neck (2) of the liner is internal. The collar (4) is covered jointly with the liner (1) by layers

(14) of the composite material - glass fiber and carbon fiber.

The way of manufacturing of the composite container, according to the invention involves the fact that after manufacturing of the elements of the neck, molding and joint manufacturing of the liner with the internal part of the collar takes place; then, after the assembly of the external part of the collar, the assembled tank is covered with the layers of the composite material - carbon fiber. The outer layers of the container are made of glass fiber.

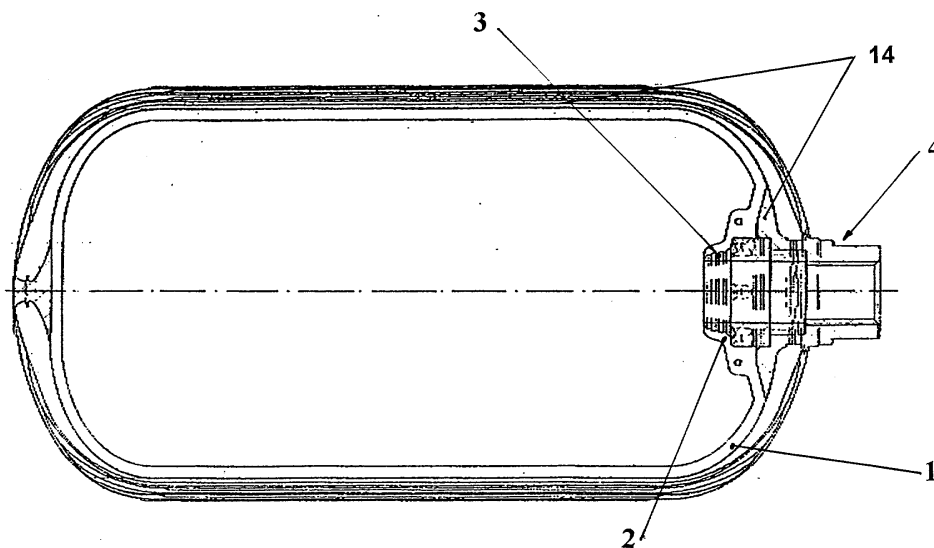


FIG.4

Description

[0001] The object of the invention comprises a composite tank and the technology of its manufacturing.

[0002] The composite tank with a short neck liner made of plastic with a collar embedded in it during manufacturing process is known from the European notification of the invention - EP 0 821 194. The collar rests on the external part of the liner and the neck, whereas from the side of the neck, it has indentions to nest the notches of the neck of the liner.

The valve element is pushed in, and rests on the interior of the ring shaped collar, while the tip is shaped congruently to the tip of the neck of the liner; For convenience both elements are cone-shaped.

The collar and the liner are jointly wrapped with a composite material.

There is a known way of manufacturing the composite tank according to the description: USA No 5,476,189, where a composite fiber is partially wrapped over the liner with the collar and then the pads of the material absorbing the blow are placed in it; and afterwards, the external layer is wrapped over the item, thus covering the pads.

[0003] The nature of the invention comprises a composite tank, which has a liner and a collar connected to it, to be attached to the valve element; and is peculiar, because it consists of two parts and its internal part has the external surface to connect it with the neck of the liner and a fragment of a section to connect it to the external part, which in turn, has the internal surface congruent with a fragment of the internal part, enabling their mutual connection; and also has a resistance collar to rest on the external surface of the liner and the tip to assembly the valve element, while the collar and the liner have layers of the composite material.

The external surface of the internal part of the collar has appendages to connect to the liner neck.

A fragment of the section of the internal part of the collar is threaded.

The neck of the liner is internal.

The internal part between the external surface and external section has a molded collar.

The neck has notches at the closing section of the opening

The neck is shaped as a sleeve at the internal fragment of the opening.

[0004] The nature of the way of manufacturing of the composite container by joint molding of the liner with the collar consists in manufacturing of a two-part collar whose internal part is molded with the liner, leaving the lower, internal surface not connected with the liner; then the manufacturing process of the liner molded in such a way takes place, to which in turn the external part of the collar is attached and the whole item assembled in such a way is covered with the layers of the composite material.

Carbon fiber is the composite material, which his

wrapped over in the wet technology.

After the process of covering of the liner with the layers of the composite material, the drying and hardening takes place.

5 The external layers of the tank are covered with the glass fiber.

There are eight layers of the composite material.

[0005] The construction and the way of manufacturing of the composite tank permits molding with good sealing and adaptation of its construction to the uniform internal tension; and provides resistance to concussions with no need to add diverse pads.

10 **[0006]** The object of invention was presented in the attached drawing where Fig.1 represents the internal part of the collar, Fig. 2 represents the liner with the cross section of the internal part of the collar, Fig. 3 represents the cross section of the composite container with the whole collar.

15 **[0007]** The composite container, according to the invention, consists of a liner 1 made of plastic with the internal neck 2 in which the internal part 3 of the collar 4 is mounted.

[0008] The neck 2 has notches 5 at the closing part of the opening of its internal surface and a sleeve shaped opening 6 behind them. The collar 4 consists of two parts: the internal part 3 and the external part 7.

25 **[0009]** The internal part 3, consisting of a fragment of the sleeve, has appendages 8 on one end of its external surface to connect the closing fragment of the neck 2 of the liner 1, and on the other end, has a fragment of the section 9 to connect the external part 7, which is the external thread 9.

The internal surface consists of a molded collar 10 resting partially on the sleeve wall 6 of the neck 2.

30 The external part 7 of the collar 4 has a form of a sleeve with a resistance collar 11 resting on the external surface of the liner 1 and with the internal thread 12 to connect with the thread 9 of the internal part 3. The tip 13 is adapted to connect the valve element.

35 The internal part 3 of the collar 4 is connected to the liner 1 in one manufacturing process, and afterwards is connected to the external part 7 and the liner constructed in this way is wrapped over with the composite material layer after layer 14.

40 An example of manufacturing:

[0010] The collar is made by means of mechanical methods of two aluminum elements, which constitute its internal and external parts.

50 Then, the internal part is molded together with the liner and the tank molded in this way constitutes one item, where the liner with the internal neck wrapping the fragment of the internal part of the collar is made of polyethylene.

55 **[0011]** The external part of the collar is mounted on the internal part and eight layers of the composite material, carbon fiber are wrapped over it in the wet tech-

nology by earlier saturation.

After the carbon fiber has been wrapped over, the whole tank is dried and hardened and then the external layers of fibers - glass fiber - are wrapped over.

The layers of glass fiber provide resistance of the container to concussion.

Claims

1. The tank with a liner and a collar attached to it to be connected to a valve element is peculiar because the collar (4) consists of two parts, whose internal part (3) has an external surface (8) to connect with the neck (2) of the liner (1) and a fragment of a section (9) to connect with the external part (7), which (7) in turn has the internal surface (9) congruent with a section of the internal part (3) enabling their mutual connection; and which has a resistance collar (11) to rest on the external surface of the liner (1) and the tip (13) to fix the valve element, whereas on the collar (4) and the liner (1) there are layers (14) of the composite material. 50
2. The composite tank, according to claim 1, is peculiar because the external surface (8) of the internal part (3) of the collar (4) has appendages (8) to connect the neck (2) of the liner (1). 25
3. The composite tank, according to claim 1 is peculiar because the fragment of the section (9) of the internal part (3) of the collar (4) is threaded. 30
4. The composite tank, according to claim 1, is peculiar because the neck (2) of the liner (1) is internal. 35
5. The composite tank, according to claim 1, is peculiar because the internal part (3) between external surface (8) and the external section (9) has a molded collar (10). 40
6. The composite tank, according to claim 1, or 4 is peculiar because the neck (2) has notches (5) at the end of the opening. 45
7. The composite tank, according to claim 1 or 4, or 6 is peculiar because the neck (2) has the shape of a sleeve (6) on a fragment of the internal opening.
8. The way of manufacturing of the composite tank by joint molding of the liner with the collar is peculiar because the two part collar (4) is manufactured, whose internal part (3) is molded with the liner (1) leaving the lower internal surface not connected with the liner (1); then the manufacturing process the liner (1) molded in such a way takes place where in turn the external part (7) of the collar (4) is connected and the whole assembled in such a way is 55

covered with layers (14) of the composite material.

9. The way of manufacturing, according to claim 8 is peculiar because the carbon fiber is s the composite material wrapped over in the wet technology.
10. The way of manufacturing, according to claim 8 or 9, is peculiar because the process of drying and hardening takes place after the process of covering of the liner (1) with the layers of the composite material.
11. The way of manufacturing, according to claim 8 or 9 is peculiar because the external surfaces of the tank covered with glass fiber.
12. The way of manufacturing, according to claim 9 is peculiar for the eight layers of the composite material.

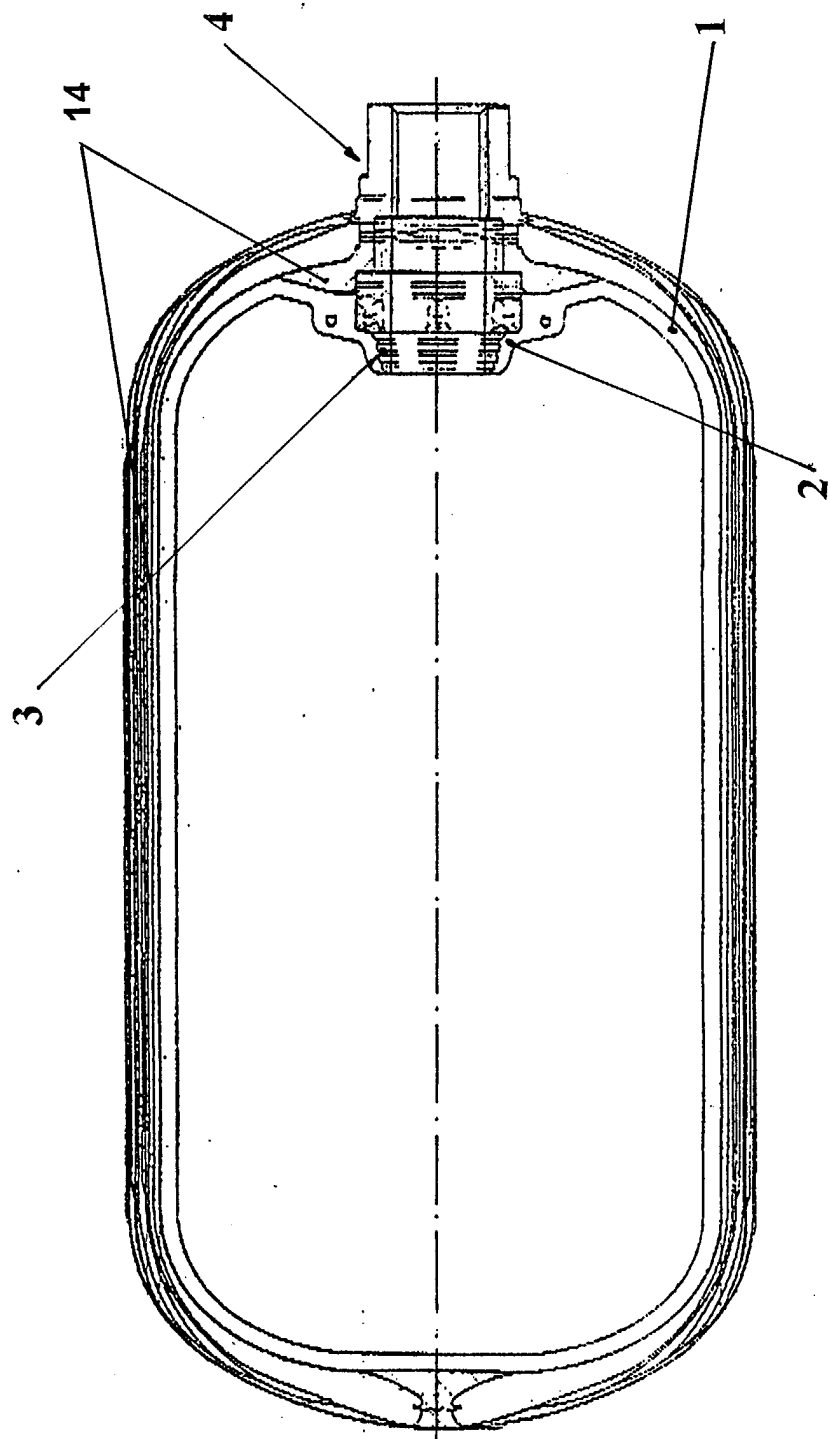


FIG. 4

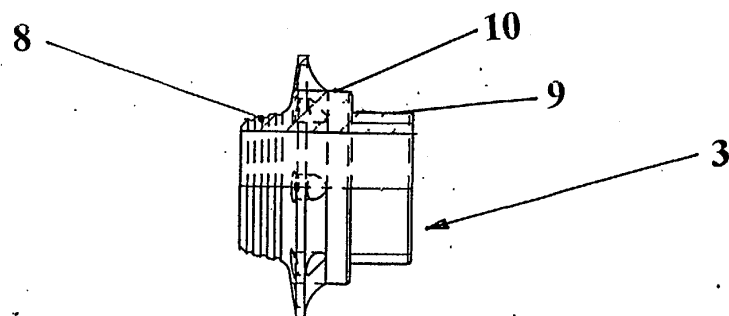


FIG.1

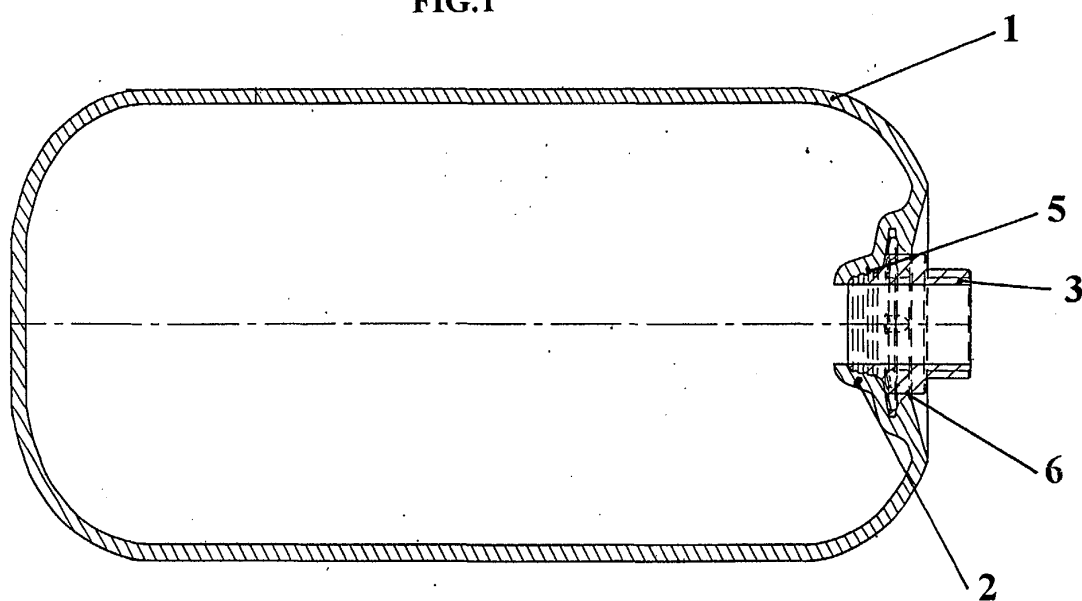


FIG.2

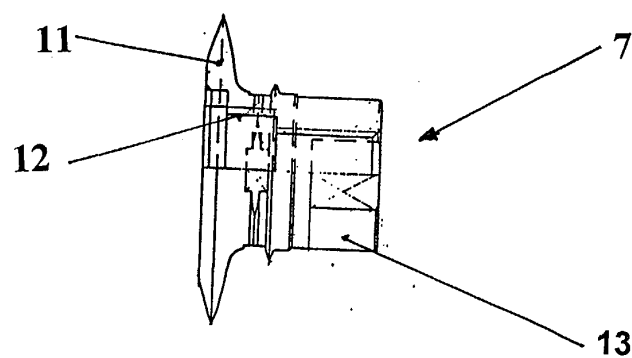


FIG.3