

(12) PATENT
(19) AUSTRALIAN PATENT OFFICE

(11) Application No. AU 199921544 B2
(10) Patent No. 745454

(54) Title
Stackable re-usable container

(51)⁷ International Patent Classification(s)
B65D 021/02 B65D 071/00
B65D 001/12

(21) Application No: **199921544**

(22) Application Date: **1998.11.23**

(87) WIPO No: **WO99/26852**

(30) Priority Data

(31) Number	(32) Date	(33) Country
29720725	1997.11.25	DE
29809094	1998.05.22	DE

(43) Publication Date : **1999.06.15**

(43) Publication Journal Date : **1999.08.12**

(44) Accepted Journal Date : **2002.03.21**

(71) Applicant(s)
Mauser-Werke GmbH and Co. KG

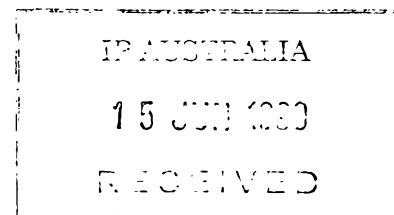
(72) Inventor(s)
Dietmar Przytulla; Khaled Atta

(74) Agent/Attorney
F B RICE and CO,605 Darling Street,BALMAIN NSW 2041

(56) Related Art
GB 2137158
EP 504718
EP 745538

PCT
WELTORGANISATION FÜR GEISTIGES EIGENTUM
Internationales Büro
**INTERNATIONALE ANMELDUNG VERÖFFENTLICHT NACH DEM VERTRAG ÜBER DIE
INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT)**

(51) Internationale Patentklassifikation ⁶ : B65D 21/02, 1/12, 71/00		A1	(11) Internationale Veröffentlichungsnummer: WO 99/26852
		(43) Internationales Veröffentlichungsdatum:	3. Juni 1999 (03.06.99)
(21) Internationales Aktenzeichen: PCT/EP98/07554		(81) Bestimmungsstaaten: AU, BG, BR, CA, CN, CZ, DE, HU, IL, IS, JP, KE, KR, KZ, LK, MX, NO, NZ, PL, RO, RU, SG, SI, SK, TR, US, europäisches Patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).	
(22) Internationales Anmeldedatum: 23. November 1998 (23.11.98)			
(30) Prioritätsdaten: 297 20 725.3 25. November 1997 (25.11.97) DE 298 09 094.5 22. Mai 1998 (22.05.98) DE		Veröffentlicht Mit internationalem Recherchenbericht. Vor Ablauf der für Änderungen der Ansprüche zugelassenen Frist; Veröffentlichung wird wiederholt falls Änderungen eintreffen.	
(71) Anmelder (für alle Bestimmungsstaaten ausser US): MAUSER-WERKE GMBH [DE/DE]; Schildgesstrasse 71-163, D-50321 Brühl (DE).			
(72) Erfinder; und (75) Erfinder/Anmelder (nur für US): PRZYTULLA, Dietmar [DE/DE]; Gustav-Heinemann-Strasse 64, D-50171 Kerpen (DE). ATTA, Khaled [EG/DE]; Eifelstrasse 100, D-50374 Erftstadt (DE).			
(74) Gemeinsamer Vertreter: MAUSER-WERKE GMBH; Herforth, Klaus, E., Schildgesstrasse 71-163, D-50321 Brühl (DE).			



(54) Title: STACKABLE RE-USABLE CONTAINER

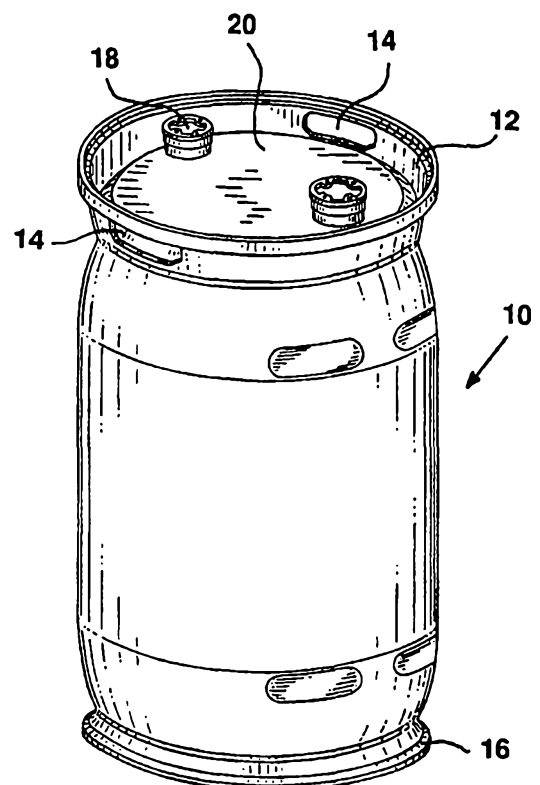
(54) Bezeichnung: STAPELBARER MEHRWEGE-BEHÄLTER

(57) Abstract

A re-usable container made of thermoplastic synthetic material has at least one filling and emptying hole (18) in its upper bottom (20), a continuous upper stacking ring (12) and a continuous lower stacking ring (16). In order to enable this container to be reused, to be directly stacked, to be emptied practically without residues and to be easily handled, the upper stacking ring (12) has a slightly larger diameter than the lower stacking ring (16). A recess shaped on the inside of the upper front edge of the upper stacking ring matches the diameter of the lower stacking ring (16), and an upwardly projecting ring flange is arranged on the outer side of the upper stacking ring, so that when the containers are stacked upon each other the lower stacking ring of the upper container fits into the recess of the upper stacking ring and is form-fittingly centred from the outside by the upwardly projecting ring flange. This makes it possible to stack several containers in a direct and reliable manner.

(57) Zusammenfassung

Die Erfindung betrifft einen Mehrwege-Behälter aus thermoplastischem Kunststoff, mit wenigstens einer Einfüll- und Entnahmeöffnung (18) im Oberboden (20) und mit einem oberen und einem unteren umlaufenden Stapelring (12). Um eine Mehrfachverwendung, eine direkte Übereinanderstapelbarkeit, eine gute Restentleerbarkeit und eine gute Handhabbarkeit zu gewährleisten, ist erfindungsgemäß vorgesehen, daß der obere Stapelring (12) einen etwas größeren Durchmesser als der untere Stapelring (16) aufweist, wobei der obere Stapelring auf seiner oberen Stirnkante innenseitig eine dem Durchmesser des unteren Stapelringes (16) angepaßte Einförmung und außenseitig einen nach oben stehenden Flanschring derart aufweist, daß bei Übereinanderstapelung der untere Stapelring des oberen Behälters in die Einförmung des oberen Stapelringes eingestellt und von außen formschlüssig von dem nach oben stehenden Flanschring zentriert wird. Hierdurch wird eine direkte und sichere Mehrfachstapelung von erfindungsgemäßen Behältern ermöglicht.



Hierdurch wird eine direkte und sichere Mehrfachstapelung von erfindungsgemäßen Behältern ermöglicht.

Abstract (Fig. 1)

The invention concerns a reusable container made of thermoplastic material, with at least one filling and removal opening in the top and with upper and lower peripheral stacking rings.

In order to ensure repeated use, a capacity for stacking directly one on top of the other, easy emptying of residues and easy handling, according to the invention it is provided that the upper stacking ring has a slightly larger diameter than the lower stacking ring, wherein the upper stacking ring comprises on its upper end edge on the inside a recess adapted to the diameter of the lower stacking ring and on the outside an upwardly projecting flange ring, in such a way that, when stacked one on top of the other, the lower stacking ring of the upper container is inserted in the recess of the upper stacking ring and centred from the outside in form-locking relationship by the upwardly projecting flange ring. As a result, direct and reliable multiple stacking of containers according to the invention is made possible.



Technical Field

The invention concerns a reusable container made of thermoplastic material, with at least one filling and removal opening in the top or container cap and with upper and lower peripheral stacking rings.

5

Background Art

A similar container is known for example from DE-A 2 629 630. This known container with extruded thin side wall has a comparatively poor stack loading capacity, can be emptied of residues only inadequately and is not
10 suitable for repeated use.

A further similar plastic container is known from GB-A 2,137,158.

Disclosure of Invention

In a first aspect, the invention is a reusable container of thermoplastic
15 material, with at least one filling and removal opening in the top or container lid and with one upper and lower peripheral stacking rings, characterised in that the upper stacking ring has a slightly larger diameter than the lower stacking ring, and the upper stacking ring comprises on its upper end edge on the inside a recess adapted to the diameter of the lower stacking ring and on
20 the outside an upwardly projecting flange ring, in such a way that, when stacked one on top of the other, the lower stacking ring of the upper container is inserted in the recess of the upper stacking ring and centred from the outside in a positive locking manner by the upwardly projecting flange ring, wherein the upwardly directed connecting web between the container body
25 and the upper stacking ring is widened outwards in a slightly obliquely conical manner, and wherein the upper edge at the upper end of the connecting web of the upper stacking ring is designed in the form of a solid angled portion from which the flange ring projects axially upwards on the outside and the underside of which has a substantially horizontal or slightly
30 inclined contact surface for the lower claw of a barrel-gripper.

An advantage of the first aspect of the invention is that reliable multiple stacking of containers is made possible, avoiding stacking pallets. A further advantage is that the larger diameter of the upper stacking ring allows better handling and manipulation of full containers of this kind. The
35 subsidiary claims contain further advantageous developments of the present invention.



Due to the structural design of the container and the advantages gained with it, it is made possible for the container according to the invention to be particularly well suited to comparatively hazardous liquids such as e.g. plant protection agents (herbicides, pesticides) as well and to be repeatedly useable.

5 The novel reusable container may be further distinguished by the following characteristics and advantages:

- two mutually opposed gripping openings are formed in the upwardly facing connecting web of the upper stacking ring,
- the container body is of full cylindrical construction over a certain
10 distance in the middle and slightly curved or conically reduced at the top and bottom towards the connecting point of the upper stacking ring and towards the connecting point of the lower stacking ring,
- the height (=axial length) of the curved reduced region of the container wall from the connecting point of the upper or lower stacking ring
15 or of the respective connecting web to the beginning of the full cylindrical region of the container wall is about 110 mm,
- the largest diameter of a container which can be manipulated or carried by hand with a limited capacity of not more than 70 litres in the region of the full cylindrical container wall or of the outer edge of the upper
20 stacking ring is about 380 mm,
- the top is essentially flat or slightly curved and in its flat edge region comprises two opposed upright bung openings closeable in a gas-tight manner,
- the essentially flat or slightly outwardly curved (=cambered) top is
25 connected by an obliquely conical or curved ring piece at the point of connection of the upper stacking ring to the conically reduced region of the lower container wall,
- the bottom slopes down slightly obliquely or flatly to one side in such a way that below a bung socket is formed a depression (=hollow) as a
30 pump sump,
- at least three recesses projecting upwards slightly towards the inside are formed in the bottom in the region of the pump sump as a means of centring the lower end of a pump tube (e.g. a Micromatic filling and emptying suction tube),
- 35 - the central region of the bottom is cambered slightly inwards or curved upwards for the purpose of better emptying of residues,



- the central region of the top is cambered slightly inwards or curved downwards for the purpose of better emptying of residues overhead,

- the container wall is multi-layered and consists of at least two or more different plastic materials (coextrusion),

5 - the container has a limited capacity of not more than about 70 litres and is equipped with at least two handles in the upper stacking ring, so that the container can still be manipulated or carried by hand,

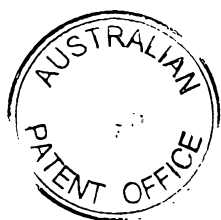
10 - containers of different height (with the same diameter, top and bottom) with capacities of e.g. 25, 30, 50, 60 or 70 litres can be made in a single interchangeable blow mould according to the invention by insertion of a ring pieces of different height in the full cylindrical region of the container body,

15 - by providing corresponding apertures (e.g. holes) in the connecting web of the lower stabilising ring above the angled base ring there is the possibility of mutually fixing the lower base ring of a container stacked on top to the upper stacking ring of a container stacked underneath, wherein corresponding fastening means (such as e.g. wire clips or plastic cable ties) can be passed through an aperture and a gripping opening,

20 - for mutual fixing at least two adjacent containers are oriented in such a way that their gripping openings are aligned, so that an elongate fastening means (such as e.g. a tightening strap or a wooden batten or a board) can be inserted through the gripping openings, and the containers can be fixed together,

25 - to increase the stacking reliability during storage and transport several containers stacked on top of a pallet can be fixed together and/or to the pallet by fastening means passed through the gripping openings in the upper stacking ring and/or through the apertures in the lower base ring.

30 In a second aspect, the invention is a blow mould for the manufacture of a reusable container from thermoplastic material by the blow moulding method, characterised by a specially shaped cavity for the reusable container comprising at least one filling and removal opening in the top or in the container cap and one upper and one lower peripheral stacking ring, wherein the upper stacking ring has a slightly larger diameter than the lower stacking ring, and the upper stacking ring comprises on its upper end edge on the
35 inside a recess adapted to the diameter of the lower stacking ring and on the outside an upwardly projecting flange ring, in such a way that, when stacked

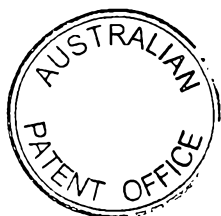


one on top of the other, the lower stacking ring of the upper container is inserted in the recess of the upper stacking ring and centred from the outside in a positive-locking manner by the upwardly projecting flange ring, wherein the upwardly directed connecting web between the container body and the upper stacking ring is widened outwards in a slightly obliquely conical manner, and wherein the upper edge at the upper end of the connecting web of the upper stacking ring is designed in the form of a solid angled portion from which the flange ring projects axially upwards on the outside and the underside of which has a substantially horizontal or slightly inclined contact surface for the lower claw of a barrel-gripper.

It is an advantage of at least one aspect of the invention to provide a reusable container which is of stable construction, which even without intermediate elements (such as e.g. stacking pallets) can be repeatedly stacked directly one on top of the other, which is easy to empty of residues, and which in particular can be used repeatedly and is easy to handle.

The new blow mould for the manufacture of a reusable container according to the invention may be distinguished in particular by the fact that in each of the two blow mould halves an insert may be provided by means of which the gripping openings arranged in the upper stacking ring are punched out.

The blow mould may be further constructed as an interchangeable blow mould, wherein the blow mould halves are split horizontally in the full cylindrical portion for the central region of the container, so that, by corresponding exchange and insertion of a respective ring



piece, different container sizes with the same diameter but with different heights can be manufactured easily. Thus by insertion of a respective central ring piece in a single blow mould, different container sizes with a filling volume from 25 to 70 litres can be made.

The present invention is illustrated and described in more detail below with the aid of practical examples shown in the drawings. They show:

Figure 1 a 50-litre tight-head container according to the invention in a perspective view,

Figure 2 the reusable container according to Fig. 1 in a partial-section side view with the Micromatic pump tube inserted,

Figure 3 a bottom view of the reusable container according to Fig. 1,

Figure 4 a screw-cap container according to the invention in a perspective view,

Figure 5 a 60-litre screw-cap container in a partial-section side view,

Figure 6 a 25-litre reusable container in a side view,

Figure 7 a top view of the screw-cap container according to Fig. 4,

Figure 8 a top view of a rectangular reusable container,

Figure 9 in a partial-section side view, the top and bottom regions of two reusable containers stacked one on top of the other,

Figure 10 a detail of the upper stacking ring with gripping opening,

Figure 11 in a partial-section side view, the top and bottom regions of two reusable containers stacked one on top of the other with mutual stack fixing,

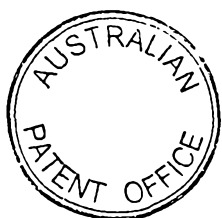


Figure 12 in a partial-section side view, the top and bottom regions of reusable containers stacked one on top of the other with other stack fixing,

Figure 13 a top view of a pallet with nine reusable containers,

Figure 14 a side view of palletted reusable containers,

Figure 15 a top view of a container with a square basic shape,

Figure 16 a top view of a container with a hexagonal basic shape,

Figure 17 in a side view, a 70-litre screw-cap container and

Figure 18 in a partial-section side view, the top region of a container with cap.

In Figure 1 is shown a preferred embodiment according to the invention of a reusable container 10 made of thermoplastic material, here with a filling volume of 50 litres with a height-to-diameter ratio of $H/D = 1.60$. At the upper edge of the barrel is mounted an integral peripheral stacking ring 12 (carrying and transport ring) connected in one piece with the container body, with two diametrically opposed gripping openings 14 therein. At the lower edge of the container body is formed a corresponding stand ring 16. In the top 20 are formed two mutually opposed, internally threaded two-inch bung sockets closed with bungs 18. In the partial-section side view in Figure 2 can be seen an inserted pump tube 62 (Micromatic tube) which at the bottom below the bung stands on the bottom 64 in the pump sump 66 which is formed there. It becomes clear from the top view of the bottom 64 in Figure 3 that in the region of the pump sump 66 are formed four inwardly and upwardly projecting centring projections 68 which centre the lower end of the pump tube 62 or position it in the pump sump.

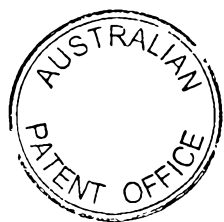
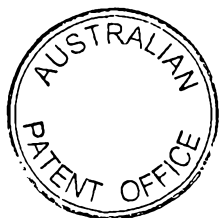


Figure 4 shows a modification of the reusable container in an advantageous embodiment as a screw-cap barrel 22 with a capacity of 50 litres ($H/D = 1.60$), wherein in the top 20 is provided only one large central filling and emptying opening which is closed with a screw cap 24. The upright threaded socket can be constructed optionally as an internally threaded two-inch or three-inch bung socket and closed with a corresponding externally threaded bung, or the threaded socket is provided with an external thread and closed with an internally threaded screw cap. The diameter can in this case be about 80 mm (for screw cap K 80) to about 400 mm for large screw caps. Particularly preferred are current diameter sizes of 150 mm, 220 mm or 250 mm.

In Figure 5 is shown a 60-litre screw-cap container (diameter about 380 mm, height about 665 mm, H/D ratio = 1.75) with inserted intermediate ring piece 70. The reusable container can be made of transparent plastic material (without addition of dye) or, in case of dyed plastic material, with a viewing strip 72; then appropriately a level scale is provided on the outer wall of the container. If necessary two outwardly projecting peripheral double-fold rings can be provided in the transition region between the cylindrical wall and the curved reduced wall regions.

In Figure 6 is shown a small 25-litre reusable container with a H/D ratio of 0.97. Figure 7 shows in a top view a screw-cap barrel 22 with central filling and emptying opening for the large screw cap 24, wherein the upper stacking ring 12 is shown broken off in the region of the right gripping opening 14 in a partial sectional view.

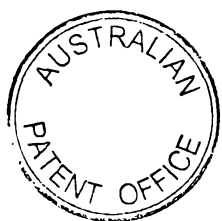
In Figure 8 is shown a corresponding top view of a particular embodiment of the reusable container according to the invention as a canister version 26 with upper L-ring-



shaped stacking ring 12. This canister version 26 (L-ring jerrican) has a basic essentially rectangular shape, wherein the gripping openings 14 in the upper stacking ring 12 are arranged on the two opposed longer side walls, and the filling and emptying opening closed with a screw cap 28 at the outer edge of the top 20 is arranged on one of the two shorter side walls in between. In this case, by contrast with the lower stacking ring, the upper stacking ring 12 does not extend around the whole circumference, but in front of the filling and emptying opening comprises an interruption or recess 30 for pouring out the liquid contents unhindered. With a central arrangement of a large filling and emptying opening, the upper stacking ring continues around the whole circumference as well.

Figure 9 shows as a detail in a part-sectional view the corner regions of two containers stacked one on top of the other. Here the upper container stands with its stand ring 16 with the downwardly facing horizontal bearing surface 50 of its base ring 48 on the horizontal upwardly facing bearing surface 36 of the angled portion 32 of the upper stacking ring 12 of the lower container. The flange edge 38 (=centring ring) which projects upwards on the outside on the angled portion 32 centres the base ring 48 of the barrel stacked on top and prevents the barrels from slipping sideways e.g. due to vibrations during transport. In case of direct stacking of the containers, the upright flange edge 38 is not loaded in the axial direction (no lever action).

The container wall 40 is slightly oblique or curved below the connecting point 42 of the connecting web 44 of the upper stacking ring as well as above the connecting point of the connecting web 46 of the lower stand ring 16, over a height of about 100 mm as far as the cylindrical

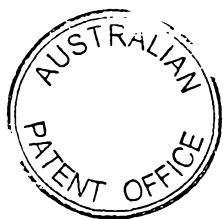


barrel body region. The maximum angle of inclination here is about 15° to 20° . Also the connecting web 44 of the upper stacking ring 12 (angle of inclination about 5° - 8°) and the connecting web 46 of the lower stabilising ring 16 slope outwards slightly. The upper edge or the angled portion 32 of the upper stacking ring is comparatively thick, i.e. solidly constructed, to increase the radial rigidity.

On the lower side of the angled portion 32 of the upper stacking ring 12 is formed a wide, essentially horizontal or slightly inclined contact face 34 for the lower claw of a barrel gripper. The upper claw of the barrel gripper comes into contact on the inside of the angled portion 32 as a counter support in extension of the connecting web 44.

The partial view in Figure 10 shows a gripping opening 14 in the stacking ring 12. According to the invention the containers are preferably made in one piece by blow moulding in a single operation in a blow mould with two mould slides for upsetting the two peripheral stacking rings, wherein at the same time the gripping openings in the upper stacking ring are punched out in the blow mould by means of two peripheral punching rings.

In Figure 11 is shown one possible way of securing transport of the containers according to the invention. In the connecting web of the lower stabilising ring or above the base ring 48 are made several evenly spaced-apart apertures 52. These can be e.g. ordinary holes. But they can also be transverse slots which are already made during the blow moulding operation when upsetting the base ring 48. Thus through the aperture 52 and the gripping opening 14 can be pulled a fastening means, e.g. a binding wire or, as shown here, a cable tie 54 by means of which the two containers stacked one on top of the other can be rigidly



fixed together. To eliminate the fixing, the cable tie is simply squeezed through.

In Figure 12 is shown another possible way of securing transport by means of a wooden batten 56 passed through the aligned gripping openings, as a means of fastening containers according to the invention. The top view in Figure 13 illustrates this type of fastening of adjacent containers on a bottom pallet 58.

In Figure 14 are shown, in triple direct stacking (without further intermediate pallets), $3 \times 3 \times 3 = 27$ containers 10 which are stacked on a bottom pallet 58 and which, to increase stacking reliability particularly against vibrations during transport, are fixed relative to each other and on the pallet 58 itself e.g. by means of clamping straps 60 which extend vertically through the gripping openings in the upper stacking ring and below the pallet deck as well as by means of horizontally extending clamping straps 60 encompassing the containers.

When loading 60-litre containers according to the invention (diameter about 380 mm, height about 665 mm) in a 20-foot ISO container (DIN 668) with a free area for 10 ISO pallets (1140 x 1140 mm) adjacent to each other, nine containers in one plane or 27 containers in a triple stack can be shipped on one ISO pallet, and with ten pallets 270 containers with a total contents of 16,200 litres can be shipped.

The reusable containers according to the invention can also have a basic approximately rectangular or square or hexagonal shape with round stacking and stand rings in the container body. In Figure 15 is shown a rectangular container 74 and in Figure 16 a hexagonal container 76. The



rounded corner regions can in this case also have a larger radius or a larger curvature.

A particularly tall-format container 78 with a capacity of about 70 litres is shown in Figure 17. The tall-format container 78 is provided with an externally threaded filling and emptying socket 80 (diameter 80 mm) arranged laterally in the top for a screw cap K80. But the opening socket 80 could be arranged centrally in the top.

A special design of a container according to the invention is shown in a detail in Figure 18 in the form of a barrel 82 with cap. Here the removable cap 84 is provided with a stacking ring 12 (and gripping opening 14) and at least one lateral bung socket 86. Below the stacking ring 12, the cap 84 has a downwardly opening U-shaped cap flange edge 88 in which a gasket 90 is inserted by placement or foaming. The cap flange edge 88 lies on a shell flange 92 at the upper opening edge of the barrel body. Cap flange edge 88 and shell flange 92 are held together gas-tightly and liquid-tightly by a clamping ring 94 in the closed state. This barrel 82 with cap is particularly suitable for repeated use of viscous or granular contents.

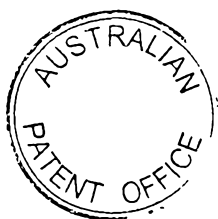
Larger containers can also have a larger capacity of e.g. 100, 120, 150, 200 or 220 litres for reuse in a stable construction depending on requirements. When full, however, these containers can no longer be manipulated by hand, but are preferably to be handled with an elevating truck or fork lift truck with suitable barrel gripper tools (parrot beak).

The characteristics described can readily be exchanged and/or combined with each other.



THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A reusable container of thermoplastic material, with at least one filling and removal opening in the top or container lid and with one upper and lower peripheral stacking rings, characterised in that the upper stacking ring
5 has a slightly larger diameter than the lower stacking ring, and the upper stacking ring comprises on its upper end edge on the inside a recess adapted to the diameter of the lower stacking ring and on the outside an upwardly projecting flange ring, in such a way that, when stacked one on top of the other, the lower stacking ring of the upper container is inserted in the recess
10 of the upper stacking ring and centred from the outside in a positive locking manner by the upwardly projecting flange ring, wherein the upwardly directed connecting web between the container body and the upper stacking ring is widened outwards in a slightly obliquely conical manner, and wherein the upper edge at the upper end of the connecting web of the upper stacking
15 ring is designed in the form of a solid angled portion from which the flange ring projects axially upwards on the outside and the underside of which has a substantially horizontal or slightly inclined contact surface for the lower claw of a barrel-gripper.
2. A container according to claim 1, characterised in that two mutually
20 opposed gripping openings are formed in the upwardly facing connecting web of the upper stacking ring.
3. A container according to claim 1 or claim 2, characterised in that the container body is of full cylindrical construction over a certain distance in the middle and slightly curved or conically reduced at the top and bottom
25 towards the connecting point of the upper stacking ring and towards the connecting point of the lower stacking ring.
4. A container according to claim 3, characterised in that the height of the curved reduced region of the container wall from the connecting point of the upper or lower stacking ring or of the respective connecting web to the
30 beginning of the full cylindrical region of the container wall is about 110mm.
5. A container according to any one of the preceding claims 1 to 4, characterised in that for a container with a limited capacity of a maximum of 70 litres the largest diameter in the region of the full cylindrical container wall or of the outer edge of the upper stacking ring is about 380mm.
- 35 6. A container according to any one of the preceding claims 1 to 5, characterised in that the top is essentially flat or curved slightly outwards and



in its flat edge region it comprises two opposed upright bung openings closable in a gas-tight manner.

7. A container according to claim 3, characterised in that the essentially flat top is connected by a obliquely conical or curved ring piece at the point of connection of the upper stacking ring to the conically reduced region of the lower container wall.
8. A container according to any one of the preceding claims 1 to 7, characterised in that the bottom slopes down slightly obliquely to one side in such a way that below a bung socket is formed a depression as a pump sump.
9. A container according to any one of the preceding claims 1 to 8, characterised in that at least three recesses projecting upwards slightly towards the inside are formed in the bottom in the region of the pump sump as a means of centring the lower end of a pump tube.
10. A container according to any one of the preceding claims 1 to 9, characterised in that the central region of the bottom is cambered slightly inwards or curved upwards for the purpose of better emptying of residues.
11. A container according to claim 6, characterised in that the central region of the top between the two bung sockets is cambered slightly inwards or curved downwards for the purpose of better emptying of residues overhead.
12. A container according to any one of the preceding claims 1 to 11, characterised in that the container wall is multi-layered and consists of at least two different plastic materials.
13. A container according to claim 12, wherein the at least two different plastic materials are coextruded.
14. A container according to any one of the preceding claims 1 to 13, characterised in that an upright internally threaded bung socket with a two-inch or three-inch bung opening, which can be closed in a gas-tight and liquid-tight manner with an externally threaded bung, is provided centrally in the top.
15. A container according to any one of the preceding claims 1 to 14, characterised in that an upright externally threaded bung socket with an opening diameter larger than or equal to 80mm, which can be closed in a gas-tight and liquid-tight manner with an internally threaded screw cap, centrally in the top.
16. A container according to any one of the preceding claims 1 to 15, characterised in that the plastic material is transparent or, if the plastic



material is dyed, a viewing strip is provided, and the container wall is provided with a prestamped level scale.

17. A container according to any one of the preceding claims 1 to 16, characterised in that in the lower stabilising ring or in the connecting web
5 above the angled base ring is provided at least one aperture, preferably several apertures designed as holes, through which a fastening means can be passed for mutually fixing the lower stabilising ring of a container stacked on top to the upper handling ring of a container stacked underneath.

18. A container according to claim 2, characterised in that at least two
10 adjacent containers are oriented in such a way that their gripping openings are aligned, so that an elongate fastening means can be passed through the gripping openings, and the containers can be fixed with respect to one another.

19. A container according to claim 2 or claim 17, characterised in that to
15 increase the stacking reliability during storage and transport a plurality of containers stacked on top of a pallet can be fixed together and/or to the pallet by fastening means passed through the gripping openings in the upper handling ring and/or through the apertures in the lower stabilising ring.

20. A container according to any one of the preceding claims 1 to 19, characterised in that the top together with the upper stacking ring is designed in the form of a removable barrel lid and is detachably fastened to the container body by means of a clamping ring.

21. A blow mould for the manufacture of a reusable container from thermoplastic material by the blow moulding method, characterised by a
25 specially shaped cavity for the reusable container comprising at least one filling and removal opening in the top or in the container cap and one upper and one lower peripheral stacking ring, wherein the upper stacking ring has a slightly larger diameter than the lower stacking ring, and the upper stacking ring comprises on its upper end edge on the inside a recess adapted to the
30 diameter of the lower stacking ring and on the outside an upwardly projecting flange ring, in such a way that, when stacked one on top of the other, the lower stacking ring of the upper container is inserted in the recess of the upper stacking ring and centred from the outside in a positive-locking manner by the upwardly projecting flange ring, wherein the upwardly directed connecting web between the container body and the upper stacking ring is widened outwards in a slightly obliquely conical manner, and wherein



the upper edge at the upper end of the connecting web of the upper stacking ring is designed in the form of a solid angled portion from which the flange ring projects axially upwards on the outside and the underside of which has a substantially horizontal or slightly inclined contact surface for the lower claw
5 of a barrel-gripper.

22. A blow mould according to claim 21, characterised in that in the blow mould or in each of the two blow mould halves an insert is provided by means of which the gripping openings arranged in the upper stacking ring are punched out.

10 23. A blow mould according to claim 21 or claim 22, characterised in that the full cylindrical portion of the blow mould - for the central region of the container - is horizontally split and easy to exchange, so that by corresponding exchange and insertion of a respective ring piece, different containers with the same diameter but with different heights can be made,
15 e.g. for preferred filling volumes of 25, 30, 50, 60 or 70 litres.

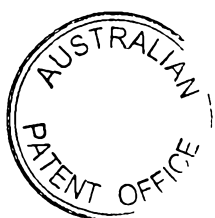
24. A reusable container of thermoplastic material substantially as herein described with reference to the accompanying drawings.

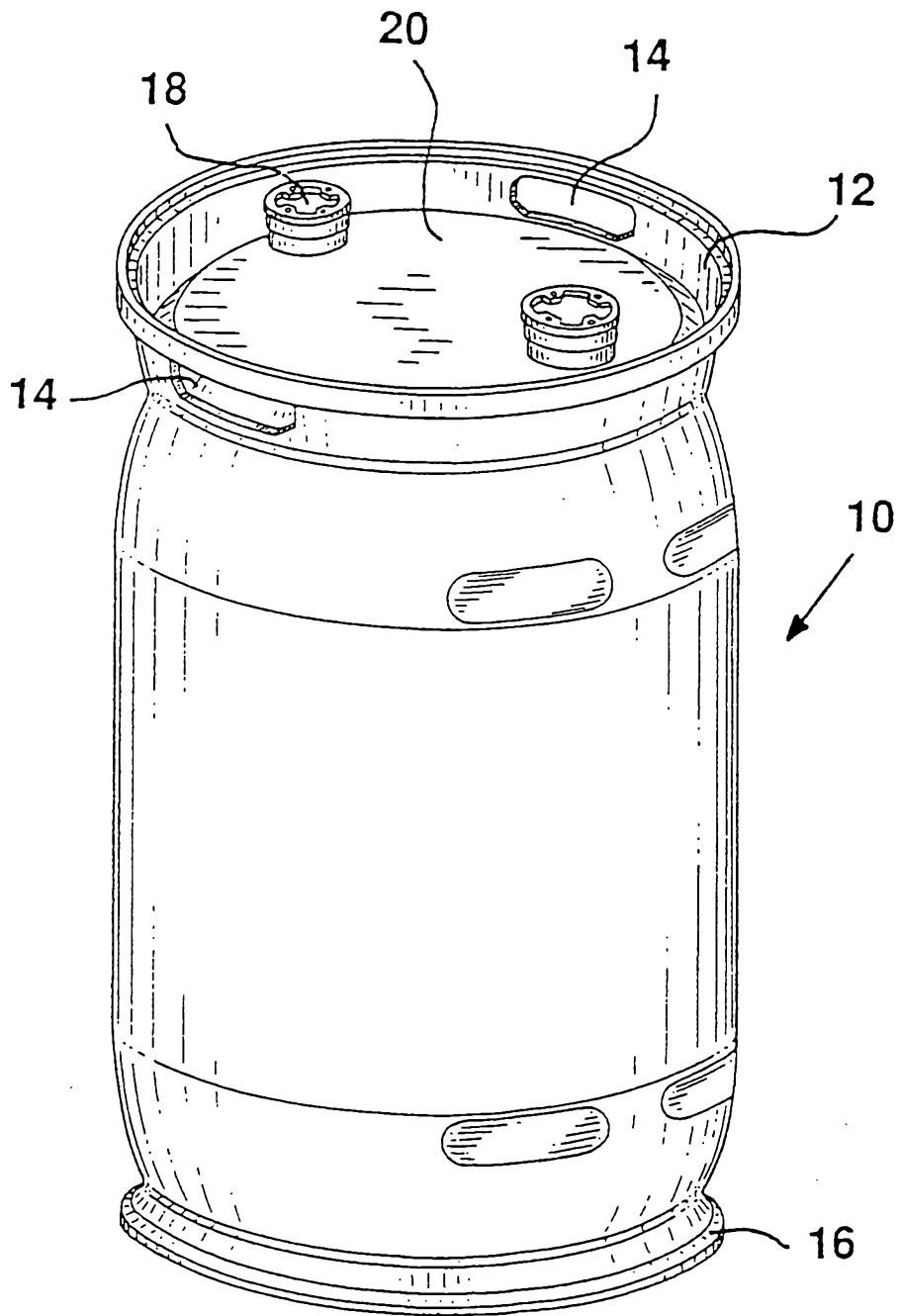
25. A blow mould for the manufacture of a reusable container substantially as herein described with reference to the accompanying drawings.

Dated this nineteenth day of December 2001

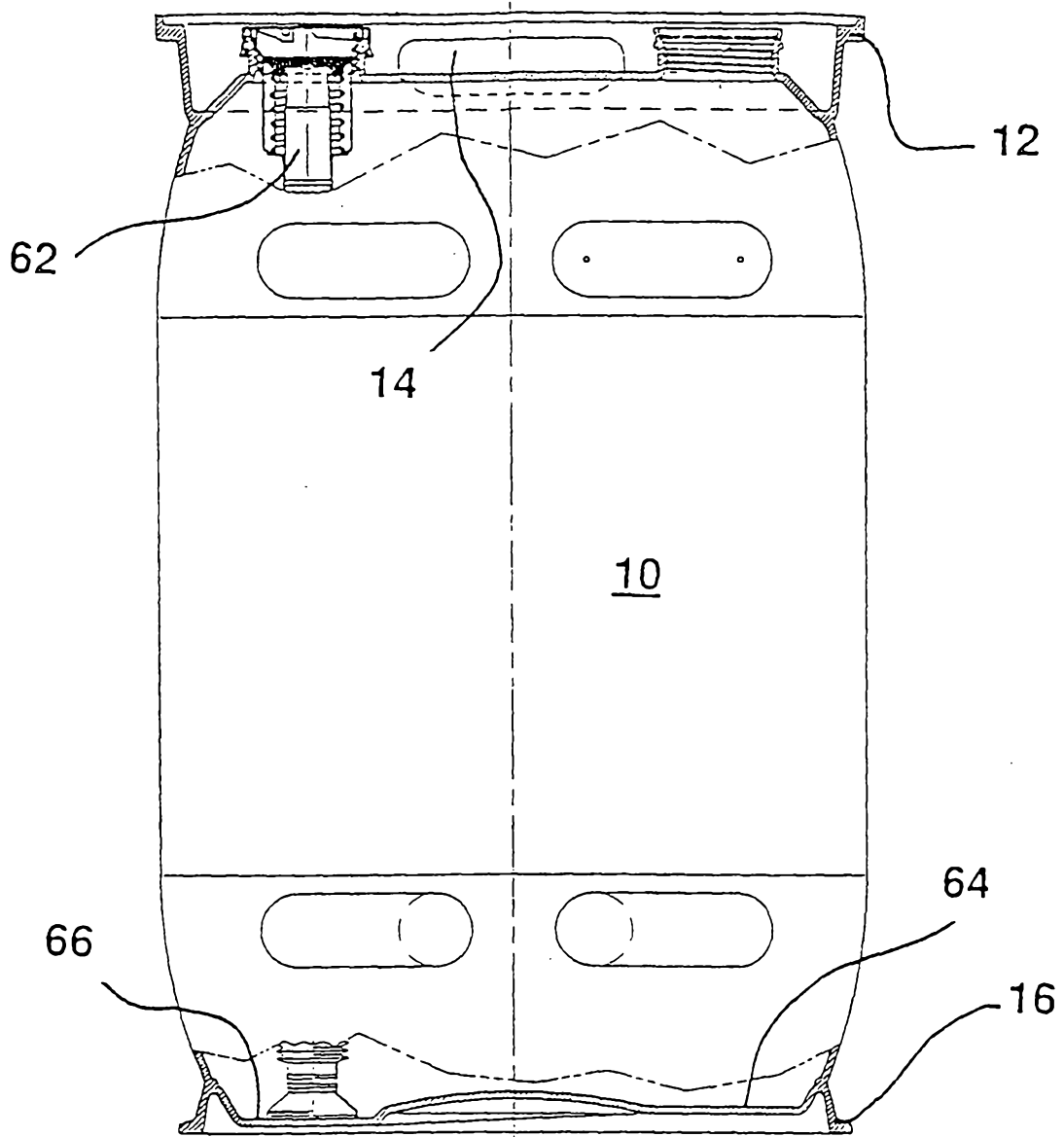
Mauser-Werke GmbH
Patent Attorneys for the Applicant:

F B RICE & CO

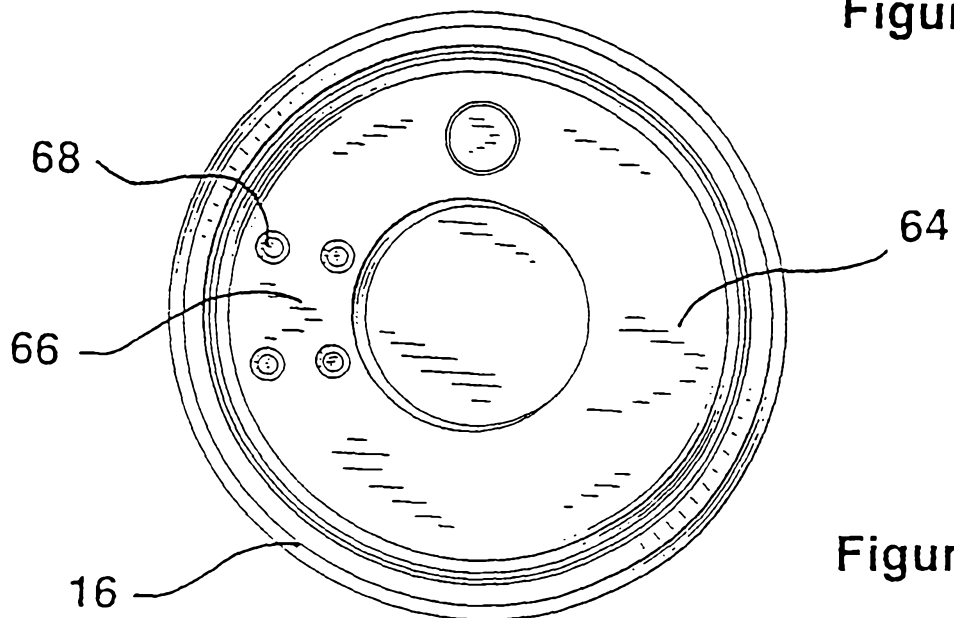




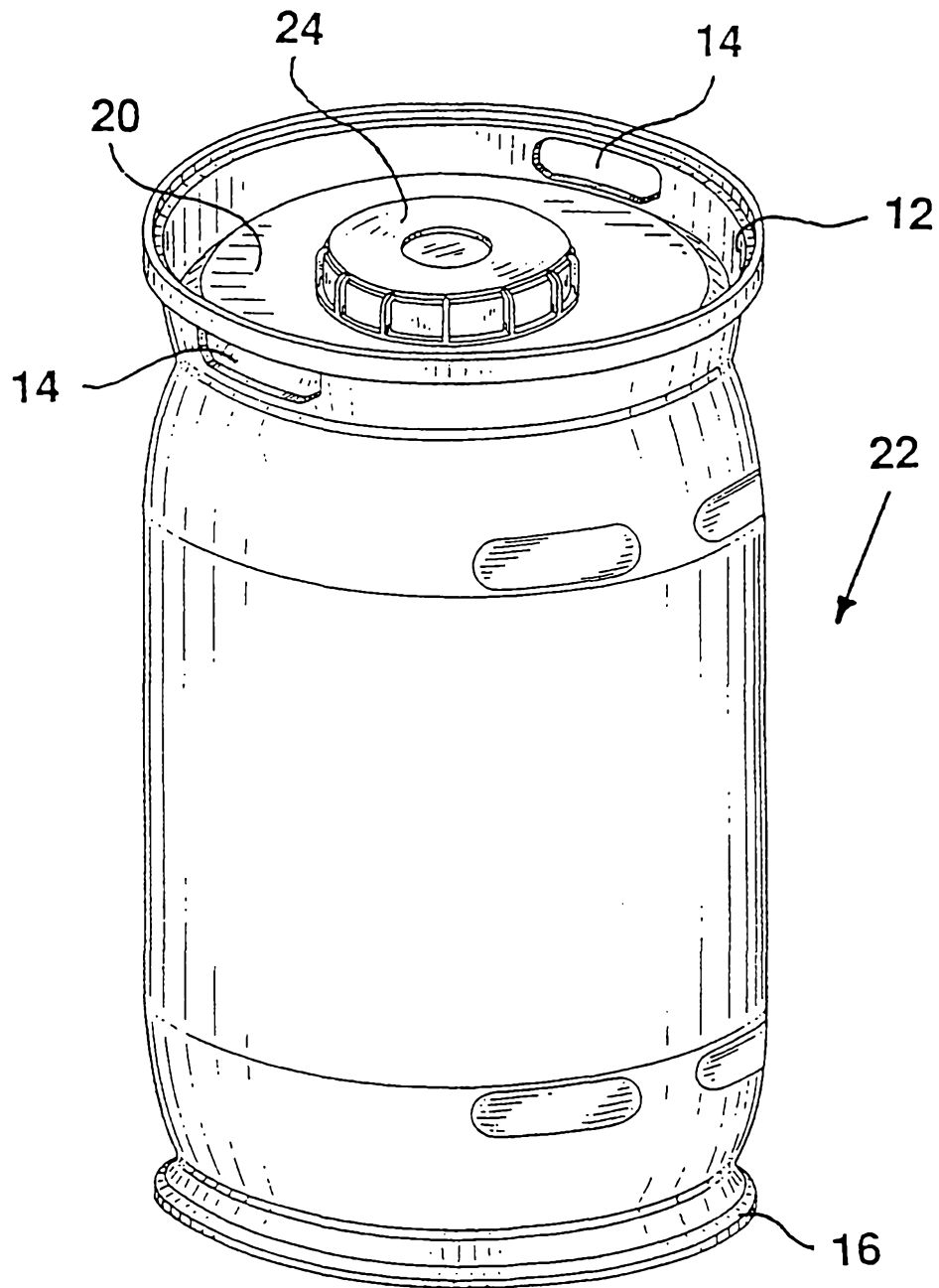
Figur 1



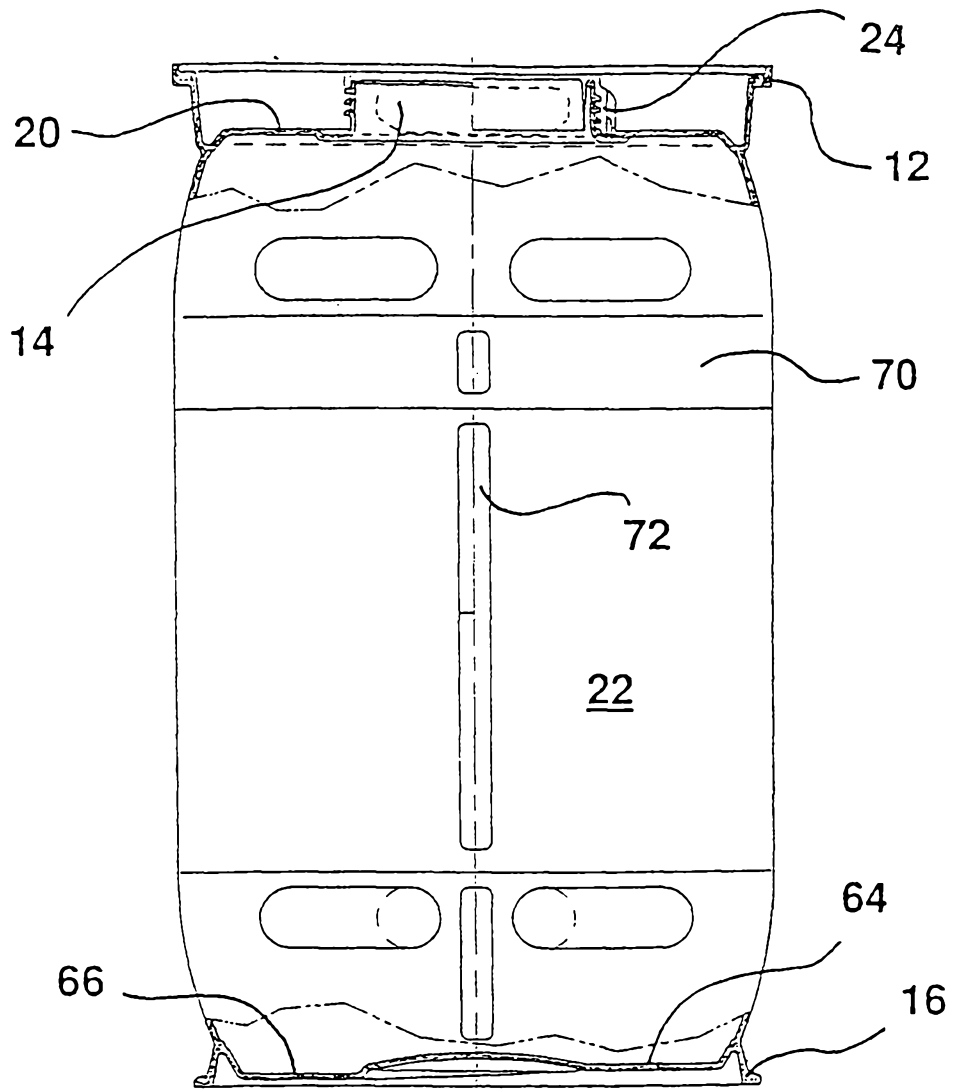
Figur 2



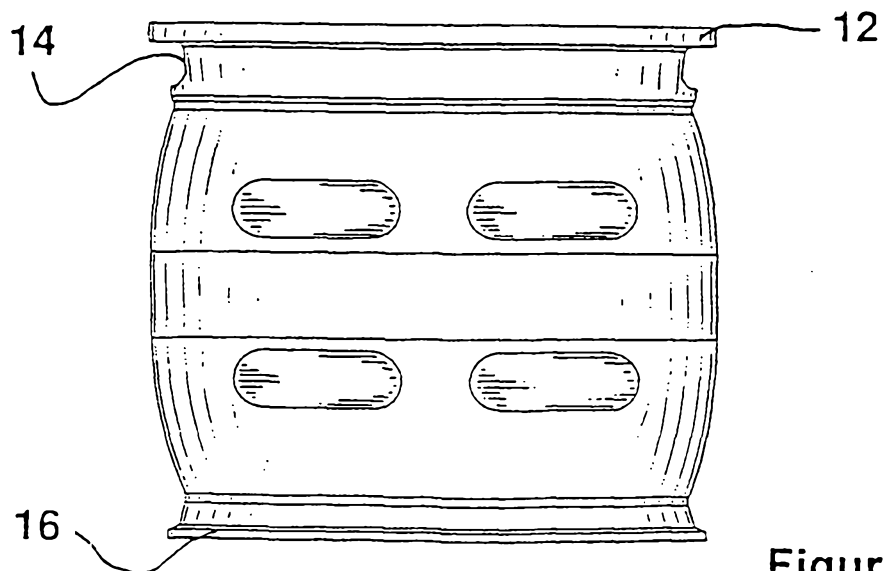
Figur 3



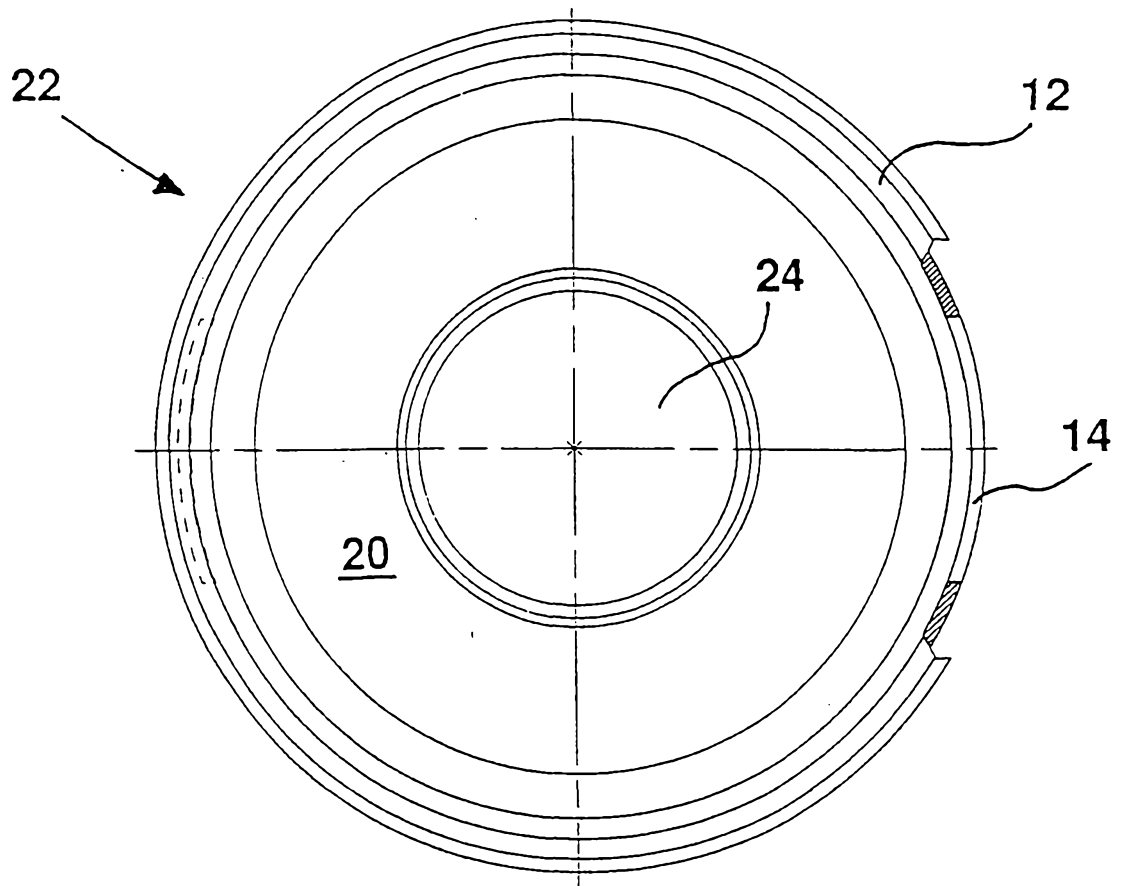
Figur 4



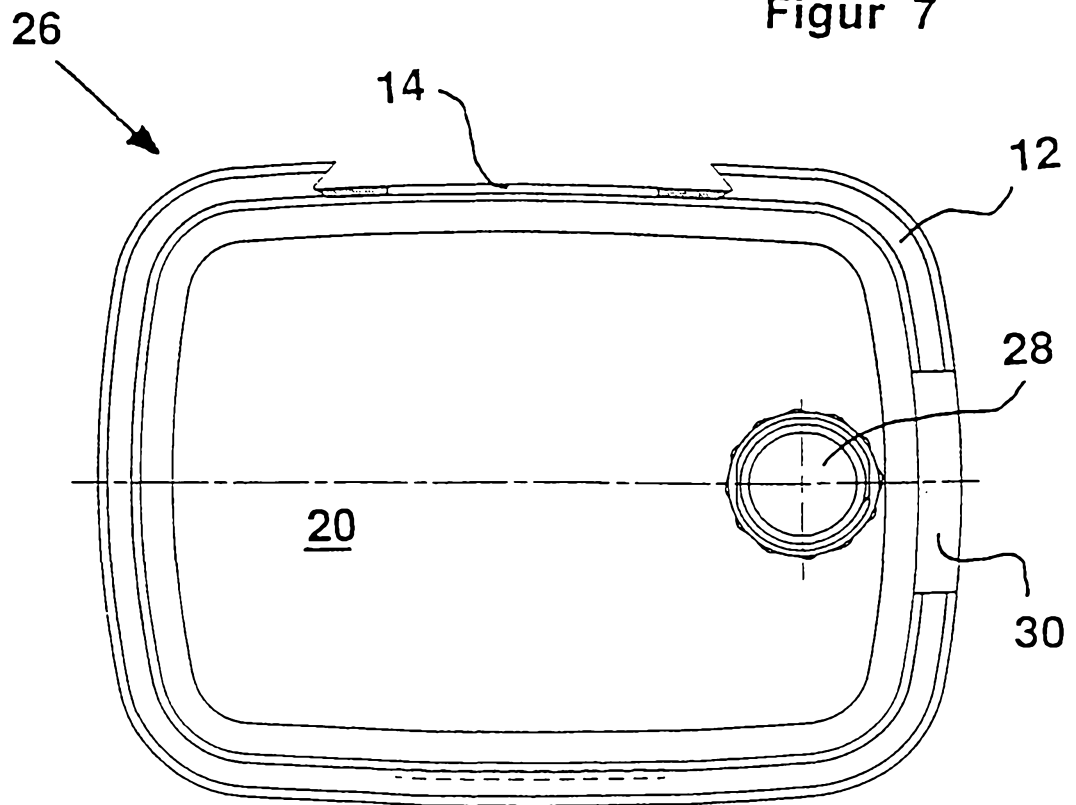
Figur 5



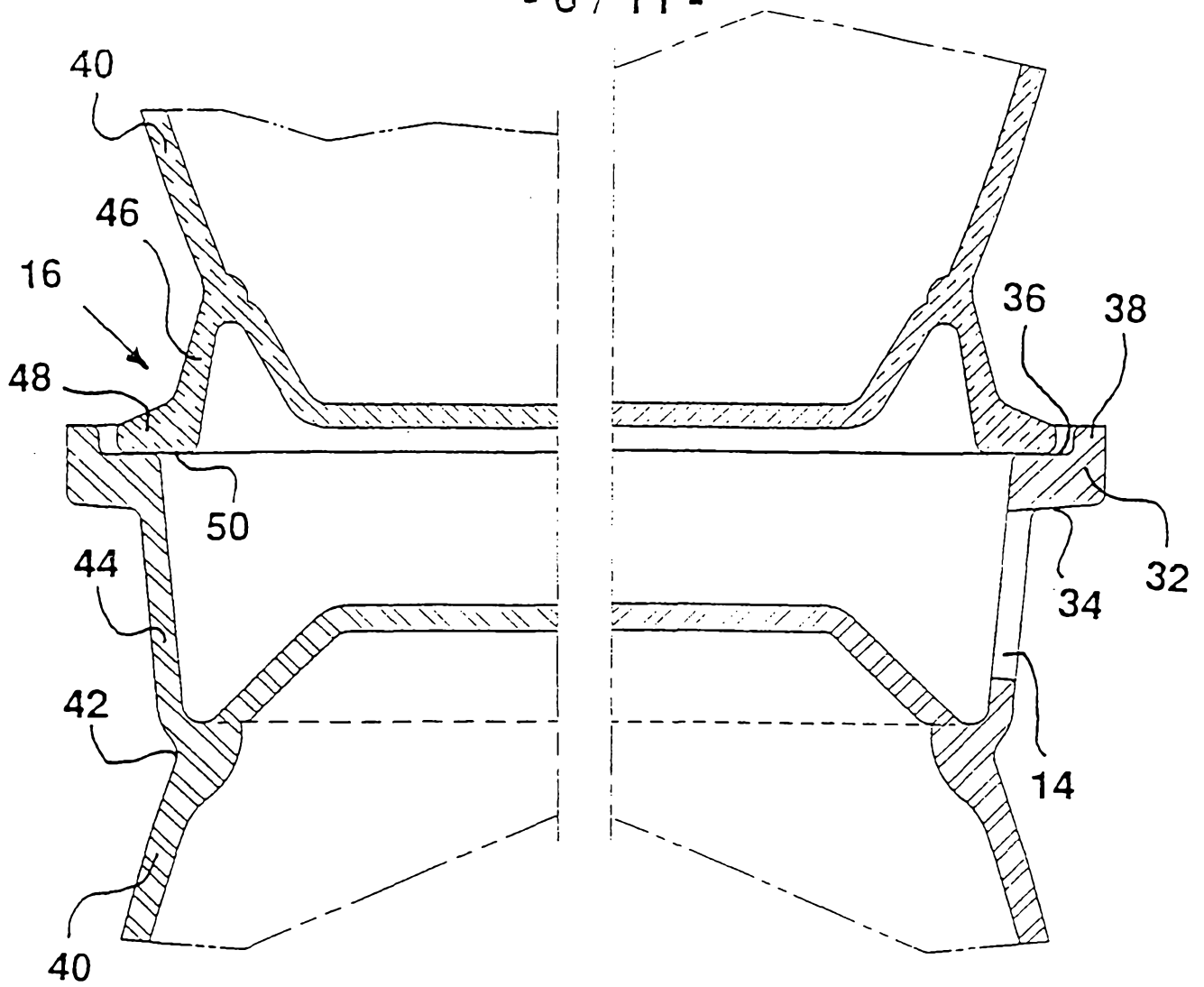
Figur 6



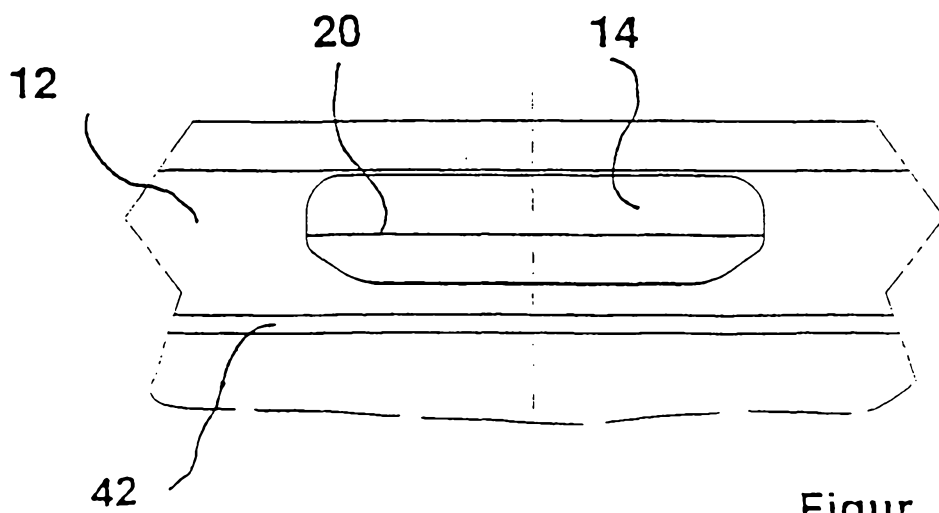
Figur 7



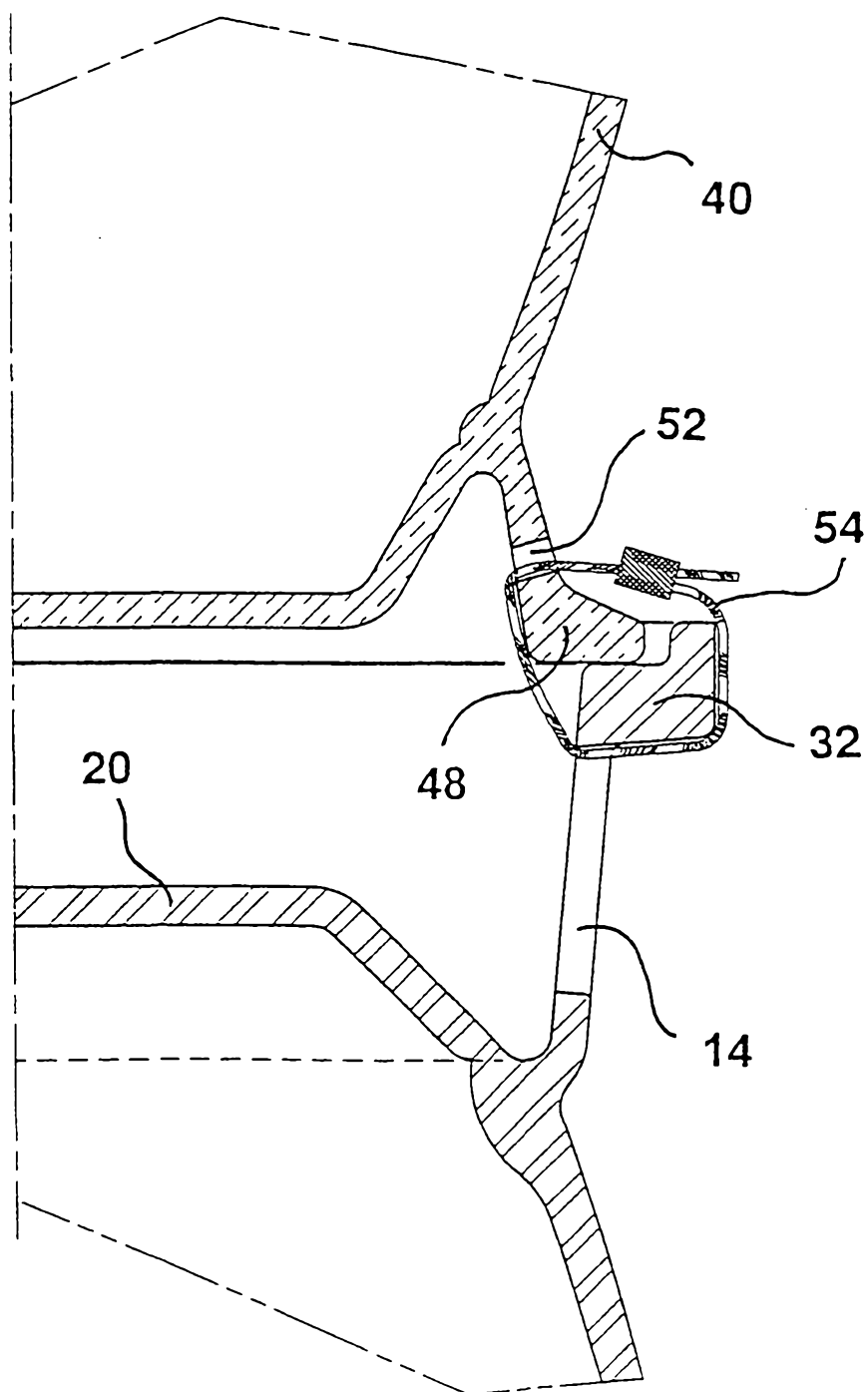
Figur 8



Figur 9

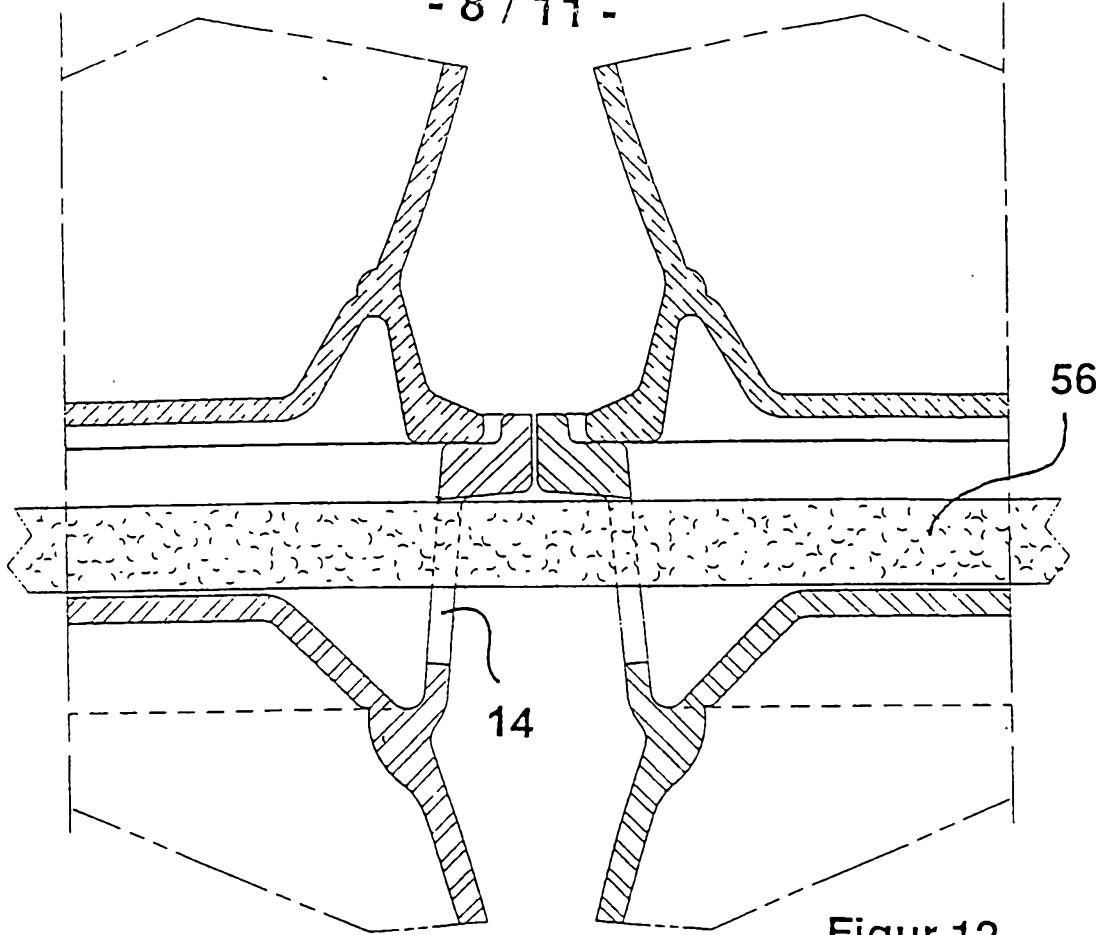


Figur 10

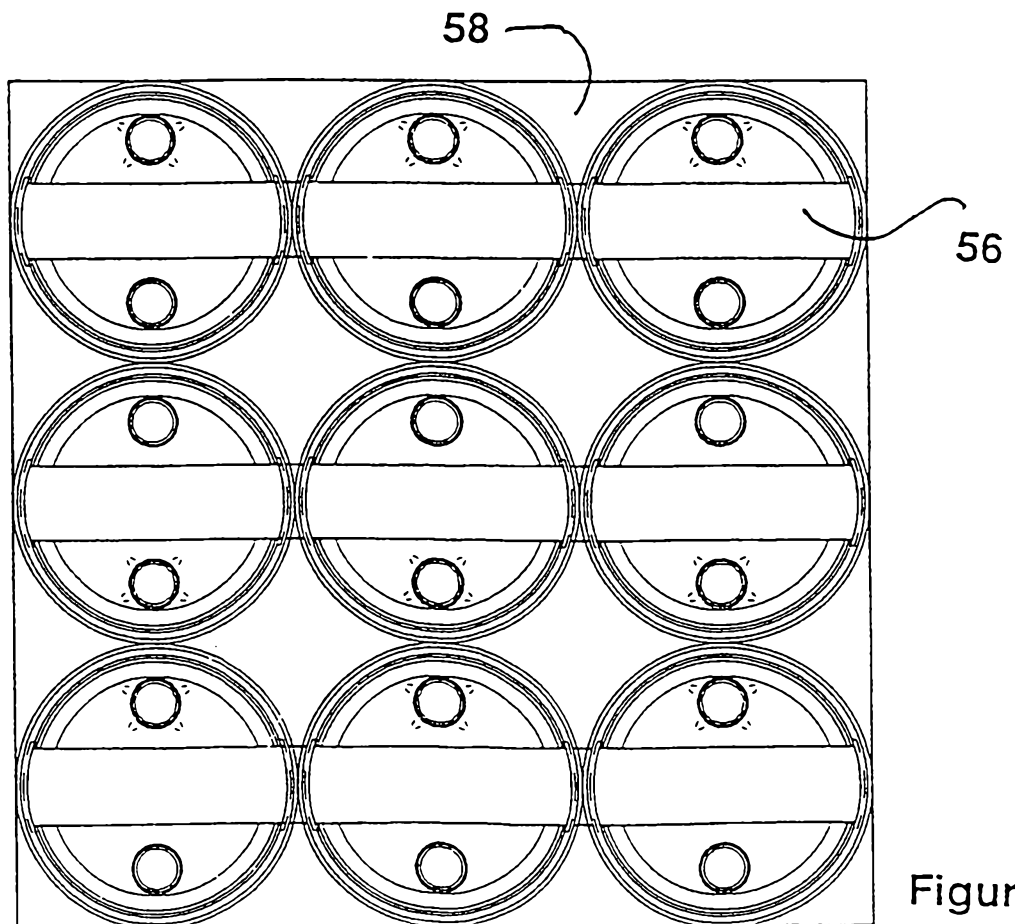


Figur 11

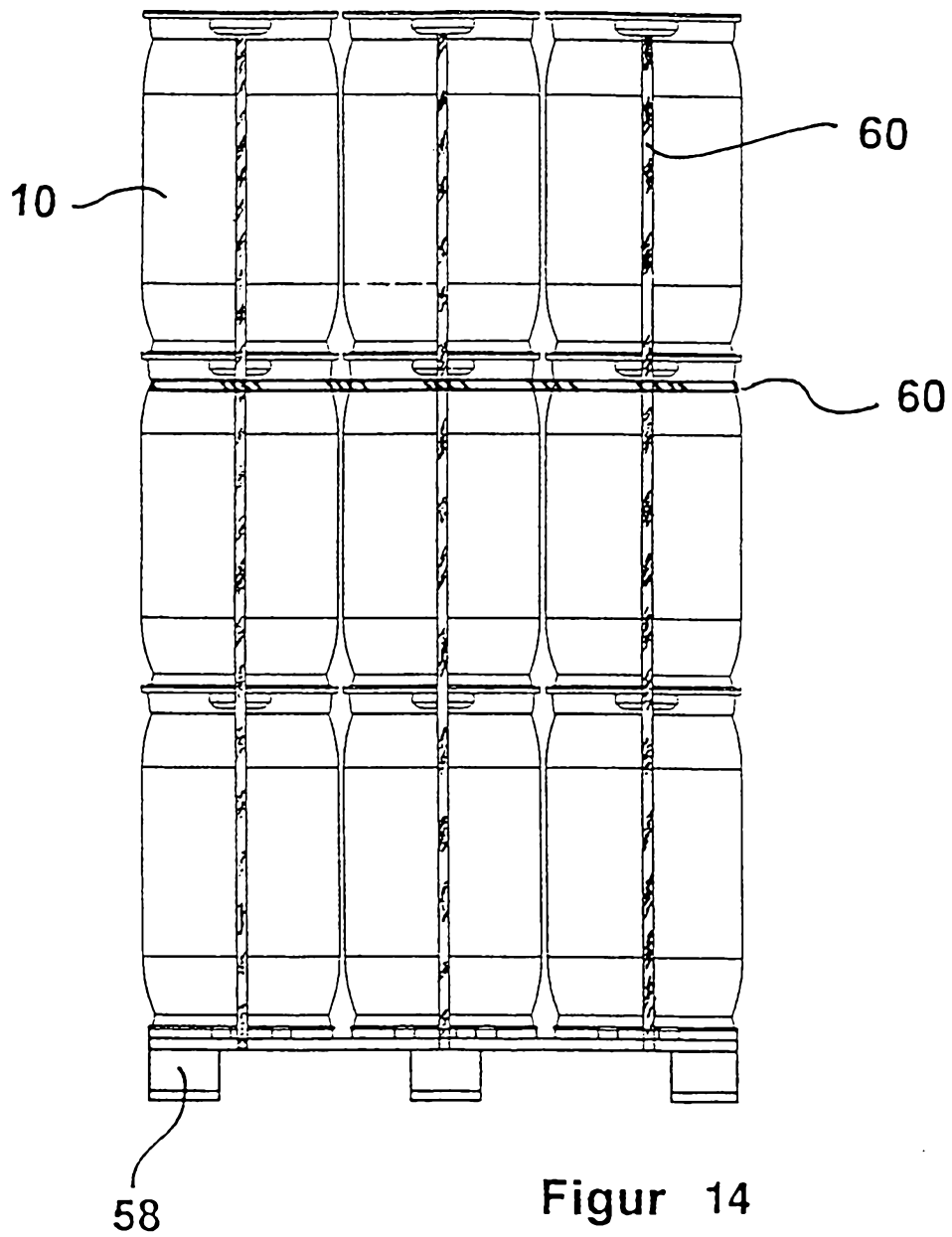
- 8 / 11 -



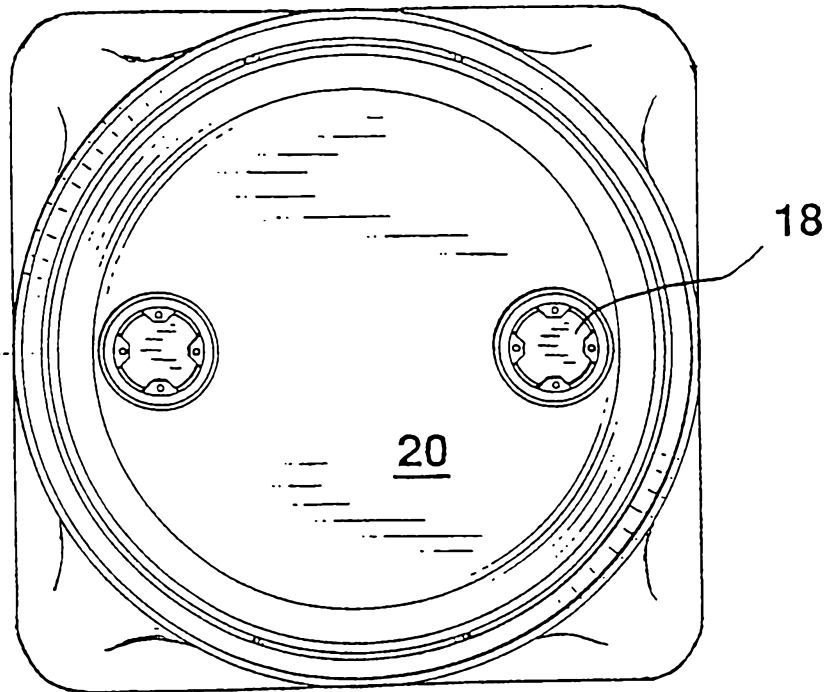
Figur 12



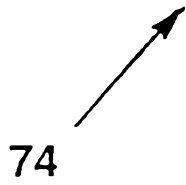
Figur 13



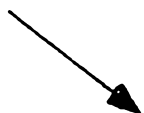
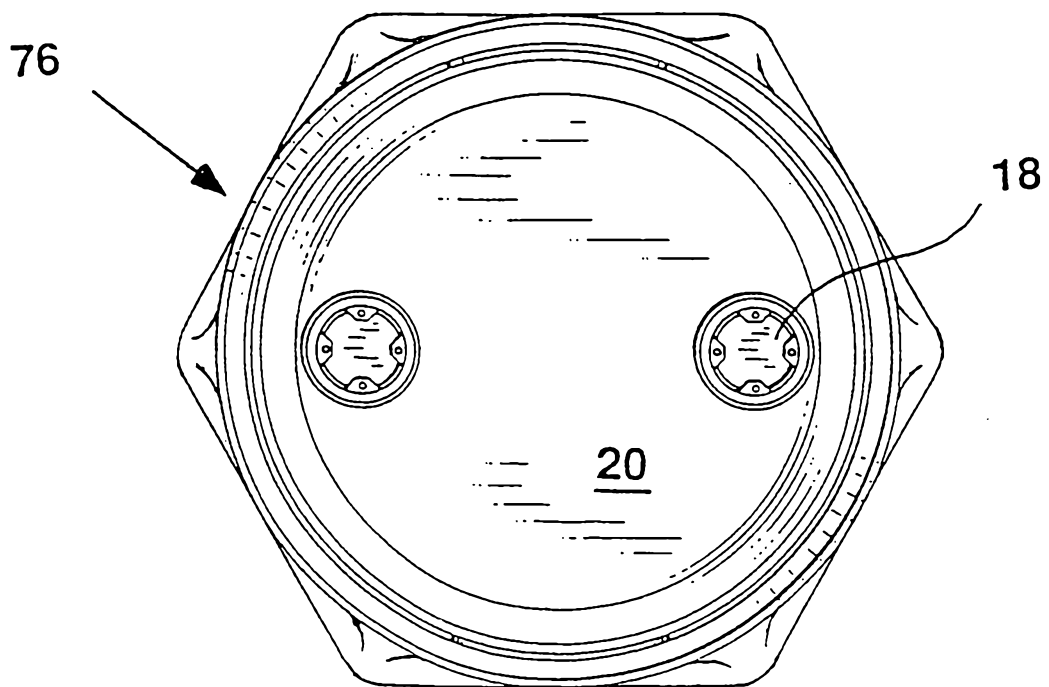
Figur 14



Figur 15



74



76

Figur 16

