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(54) Suction cleaning device

(57) Suction cleaning device (10) comprising at least a suction assembly (11) which can be associated with an accumulation tank (12), having at least a chamber able to contain the dirt sucked in, inside the volume of said accumulation tank (12) there being a housing seating (15) in which said suction assembly (11) is able to be at least partly inserted, said housing seating (15) being autonomous with respect to said chamber of said accumulation tank (12).

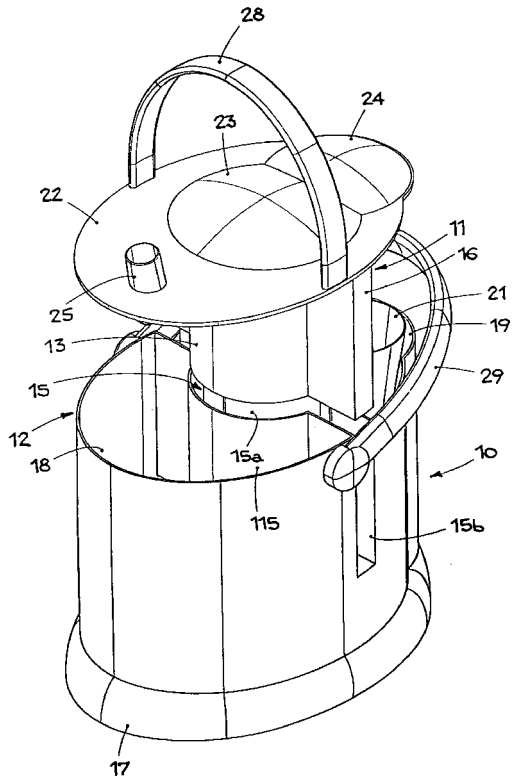

Fig.1

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Description

FIELD OF THE INVENTION

[0001] This invention concerns a suction cleaning device as set forth in the main claim.

[0002] The invention refers particularly to cleaning devices comprising a suction assembly associated with an accumulation tank, inside which the dirt sucked in is deposited, able to be connected to pick-up accessories of various types, such as tubes, lances, brushes, or similar.

[0003] The cleaning device according to the invention is advantageously, but not exclusively, of the liquid bath type, that is, provided with an accumulation tank containing a liquid, generally water, able to retain the dirt sucked in.

BACKGROUND OF THE INVENTION

[0004] The state of the art includes cleaning devices comprising a suction assembly associated with an accumulation tank inside which the dirt picked up is deposited.

[0005] The suction assembly, which may be associated with pick-up accessories of various types, normally comprises an electric motor able to make a fan rotate, the fan being able to generate the suction depression of the cleaning device.

[0006] One of the main disadvantages of such devices is that it is necessary to periodically remove the dirt from the accumulation tank, since to carry out this operation it is necessary to dis-associate the latter from the suction assembly.

[0007] This normally involves manipulating and removing various pieces and/or attachment or clamping elements of the cleaning device, which is a long and complex procedure which may lead to the user getting dirty.

[0008] This disadvantage is even more considerable in the case of cleaning devices of the liquid bath type in which the accumulation tank contains a liquid substance able to retain the dirt sucked in.

[0009] In this type of cleaning device, in fact, the accumulation tank has to be manipulated extremely carefully and cannot be inclined too much, so that the liquid inside, and therefore the dirt, is prevented from leaking.

[0010] It is therefore even more complex and laborious to disassociate the accumulation tank from the suction assembly, and creates considerable inconvenience for the person who has to do it.

[0011] EP-A-0 119 423 discloses a vacuum cleaner wherein a cylindrical suction assembly is arranged in fixed manner on a base support provided with rollers, and wherein a container for the dirt is able to be mounted on the base support in a removable manner. The dirt container is provided with a cylindrical cavity, opening towards the bottom, inside which the suction assembly is housed, with accuracy and in an air-tight manner, when the dirt container is mounted on the base support. This cleaner has the disadvantage that in order to access the suction assembly the dirt container has to be removed first.

[0012] The present Applicant has devised and embodied this invention to overcome these shortcomings and to obtain other advantages.

SUMMARY OF THE INVENTION

[0013] The invention is set forth and characterised in the main claim, while the dependent claims describe other characteristics of the invention.

[0014] The purpose of the invention is to achieve a suction cleaning device wherein the accumulation tank and the suction assembly can be reciprocally dis-associated quickly and easily, without needing to remove attachment and/or clamping elements and without using any tool or instrument.

[0015] Another purpose of the invention is to achieve a suction cleaning device which is efficient, simple and compact which is suitable for liquid bath functioning.

[0016] The cleaning device according to the invention comprises a suction assembly and an accumulation tank for the dirt sucked in, wherein the accumulation tank in turn comprises a lower compartment where the dirt is accumulated and at least a lateral chamber to convey the air sucked in which communicates with said lower compartment, and wherein the tank is shaped so as to define a housing seating opening upwards and/or laterally, into which the suction assembly is able to be inserted in a removable fashion, keeping the accumulation tank fixed.

[0017] In a preferential embodiment, the accumulation tank is provided with two lateral chambers, substantially vertical, between which the housing seating for the suction assembly is made.

[0018] According to one characteristic of the invention, the housing seating, in turn, comprises a substantially cylindrical central compartment, opening upwards and two lateral compartments which put the central compartment into communication with the outside from opposite sides.

[0019] The suction assembly is made in a single piece and can be removed from its housing seating simply by being extracted from above.

[0020] In a preferential embodiment, the suction assembly is able to be constrained inside the relative housing seating due to having the same shape.

[0021] In this way, it is easy and quick to dis-associate the suction assembly and the accumulation tank, and then to empty the latter.

[0022] In a preferential embodiment, the suction assembly is solidly associated with a closing cover of the accumulation tank; when the cover is removed the

suction assembly is removed from the relative housing seating.

[0023] According to a variant, the cover is provided with gripping means able to allow the cover to be removed more easily.

[0024] According to another variant, the accumulation tank is also provided with relative gripping means, by means of which it can be lifted and manipulated so as to be emptied.

[0025] In a preferential form of embodiment, the suction cleaning device according to the invention is of the liquid bath type.

[0026] In this embodiment, the accumulation tank is able to contain liquids in its lower compartment and the housing seating of the suction assembly is of the air-tight sealed type, so as to prevent any contact between the motor and the liquid contained in the accumulation tank.

[0027] In this case the suction assembly is very easy to extract, which is extremely advantageous because it does not require any movement of the accumulation tank, thus preventing the risk of any leakage of the liquid and of the dirt contained therein.

[0028] In accordance with another variant, the cleaning device according to the invention also has the following characteristics:

- in the lateral chamber of the accumulation tank a conduit to feed the air sucked in is able to be inserted, which is provided with assembly means which allow it to be easily inserted and removed;
- once inserted into the tank, the feed conduit has its lower end arranged below the minimum level of the liquid contained in the tank;
- in the lower compartment of the accumulation tank are provided vertical bulkheads able to prevent a wave effect of the liquid contained therein, even when the cleaning device is moved;
- in a second lateral chamber of the accumulation tank there is a tubular element which is provided with a filter panel and inside which a floating element can slide, able to automatically close the outlet aperture of the air from the tank should the liquid contained inside exceed a set safety level;
- the tubular element is also provided with assembly means which allow it to be easily inserted and removed;
- the accumulation tank is provided with a grip or handle which is arranged inside the housing seating able to house the suction assembly and is connected with elastic means which take it to the operating position when said suction assembly is removed, while it stays pressed towards the bottom of the housing seating by the suction assembly itself, when the latter is inserted into the seating;
- the suction assembly comprises, in a lateral appendix, at least an aperture for the outlet of the filtered air, in correspondence with which attachment means are provided to cooperate with a corresponding tubular blower element, by means of which the filtered air can be conveyed far from the cleaning device;
- the suction assembly can comprise two lateral apertures for the outlet of the filtered air, made on opposite lateral appendixes and housed, during use, in the two corresponding lateral compartments of said housing seating;
- the accumulation tank is provided at the lower part with at least a pair of wheels which facilitate movement with respect to the floor.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] These and other characteristics of the invention will be clear from the following description of two preferential forms of embodiment, given as a non-restrictive example, with reference to the attached drawings wherein:

Fig. 1	is a three-dimensional, schematic view of a suction cleaning device according to the invention, in a first form of embodiment, with the suction assembly removed;
Fig. 2	is a side view of the cleaning device as in Fig. 1;
Fig. 3	shows the cleaning device as in Fig. 2 in the assembled version;
Fig. 4	shows the accumulation tank of the cleaning device as in Fig. 1;
Fig. 5	is a side view of a second form of embodiment of the cleaning device according to the invention;
Fig. 6	is an enlarged and sectioned side view of the cleaning device as in Fig. 5;
Fig. 7	is an enlarged and sectioned side view of the dirt-accumulation tank of the cleaning device as in Fig. 5;
Fig. 8	is a front view of the cleaning device as in Fig. 5;
Fig. 9	is a section from A to A of Fig. 7; and
Fig. 10	is an enlarged and sectioned detail of the suction assembly of the device shown in Fig. 5.

DETAILED DESCRIPTION OF TWO PREFERRED FORMS OF EMBODIMENT

[0030] With reference to Figs. 1-4, a suction cleaning device according to the invention 10 comprises a suction assembly 11 associated with an accumulation tank 12, open at the upper part and able to contain the dirt collected.

[0031] The suction assembly 11 is made in a single piece and comprises an outer containing structure, inside which an electric motor 13 is mounted able to make a fan 14 rotate; the fan 14 in this case is mounted

coaxial and suitable to generate the suction depression of the cleaning device 10.

[0032] The suction assembly 11 has a substantially cylindrical shape, and is provided with two lateral extensions 16, diametrically opposite each other and provided with apertures 32, by means of which the air taken in is expelled and filtered.

[0033] The suction assembly 11 can be extracted from the accumulation tank 12 from above, to be selectively dis-associated.

[0034] According to one characteristic of the invention, in fact, inside the volume of the accumulation tank 12, and in a substantially central position, there is a housing seating 15 inside which the suction assembly 11 is able to be inserted in a removable manner.

[0035] The housing seating 15 is open at the upper part and is defined by a shell 115 which separates it from the accumulation tank 12.

[0036] In the embodiments shown here, the housing seating 15 comprises a central zone 15a inside which the motor 13 and the fan 14 are arranged, and two slits 15b, open towards the outside, inside which the two lateral extensions 16 are inserted.

[0037] The accumulation tank 12 is associated at the lower part with a base plate 17, by means of which it rests on the floor, and is provided with a handle or grip 29, pinned at the sides, which allows it to be lifted.

[0038] The accumulation tank 12 comprises a first and a second chamber, respectively 18 and 19, open at the upper part and substantially opposite the housing seating 15.

[0039] The chambers 18 and 19 are connected together, in correspondence with the bottom of the accumulation tank 12, by a connection compartment 20 which develops below the housing seating 15.

[0040] The second chamber 19 is in communication with the suction assembly 11 and contains a filter 21 inside which is able to prevent the dirt collected inside the accumulation tank 12 from passing towards the fan 14 and the motor 13.

[0041] According to a variant which is not shown here, the communication zone, or connection compartment 20, can be made on one side of the accumulation tank 12.

[0042] The accumulation tank 12 is able to be closed at the upper part by means of a cover 22 which is solid with the suction assembly 11 and which can be clamped in the closed position.

[0043] In a first embodiment, the cover 22 and the accumulation tank 12 are constrained together in a snug-fit connection.

[0044] According to a variant, they are constrained together by rapid attachment/detachment means.

[0045] Two caps 23 and 24 are made on the cover 22; they communicate with each other and are raised with respect to the cover 22 itself, able to couple respectively with the suction assembly 11 and the filter 21.

[0046] The cover 22 is also provided with a handle or grip 28 and an attachment socket 25, which communicates with the first chamber 18; the accessories 30 for picking up dirt are able to be connected to the attachment socket 25.

[0047] In the case shown in Fig. 3, the accessories 30 consist of a flexible tube 26, able to be attached to the attachment socket 25, and a lance 27 connected thereto.

[0048] When the cleaning device 10 is functioning, the fan 14 is made to rotate by the motor 13 and creates a depression inside the accumulation tank 12, with the air circulating from the first chamber 18 towards the second chamber 19 through the connection compartment 20 (Fig. 3).

[0049] Due to this circulation of air, the dirt is then sucked in through the accessories 30 and deposited inside the accumulation tank 12, while the air sucked in by the suction assembly 11, after being filtered by the filter 21, is made to flow outside through the apertures made on the lateral extensions 16.

[0050] To dis-associate the accumulation tank 12 from the suction assembly 11 and allow it to be emptied, or to carry out maintenance operations on the cleaning device 10, it is sufficient to release the cover 22 from the accumulation tank 12 and lift it using the handle 28, so as to remove the suction assembly 11 from the relative housing seating 15 from above (Figs. 1 and 2).

[0051] When these operations are finished, it is easy to re-assemble the cleaning device 10 thanks to the fact that the suction assembly 11 and the relative housing seating 15 are associated by having the same form and also to the fact that the cover 22 and the accumulation tank 12 are constrained together either by rapid attachment means or by a snug-fit connection.

[0052] The cleaning device 10 according to the invention, due to its structure and conformation, is advantageously used with a liquid bath.

[0053] The accumulation tank 12, in fact, can be filled with water 31 up to a level below the housing seating 15 (Fig. 3), so that the dirt sucked in, substantially forced to pass through the connection compartment 20, is deposited on the water and remains held therein.

[0054] In this embodiment, the housing seating 15 of the suction assembly 11 is of the air-tight seal type, to prevent the motor 13 from being exposed to humidity or splashes of water.

[0055] Moreover, in combination with the filter 21, or to substitute it, separation means of a conventional type are provided, able to separate the air sucked in from the particles of dirt agglomerated with the drops of water.

[0056] In accordance with a second form of embodiment (Figs. 5-10), a conduit 40 is removably inserted into the first lateral chamber 18 of the tank 12; the conduit 40 can be connected to the flexible tube 26 which feeds the air sucked in. The upper part 41 of the conduit 40 is provided with an assembly flange 42 which cooperates with a corresponding seating 43 made on the upper part of the tank 12. In this way, the conduit 40 can

easily be inserted and removed by the user.

[0057] The inner terminal part 44 of the conduit 40 is arranged below the minimum level l_1 of the liquid contained in the tank 12, so that the dirty air sucked in from outside is always in contact with the liquid.

[0058] In the lower part of the connection compartment 20 of the tank 12 there are vertical curved bulkheads 45 (Figs. 7 and 9), able to prevent a wave effect of the liquid contained therein, even when the cleaning device 10 is moved.

[0059] In the second lateral chamber 19 of the tank 12 (Figs. 5 and 6), a vertical tubular element 46 is inserted, provided with a filter panel 47 on the periphery. Inside the tubular element 46 a float 48 is able to slide, automatically closing the outlet aperture 49 of the air from the tank 12, whenever the liquid contained inside the latter exceeds a set safety level.

[0060] The tubular element 46 is also provided with an upper flange 50 able to be mounted on a corresponding seating 51 of the tank 12, to allow it to be easily inserted and removed by the user.

[0061] In this second embodiment the handle 29 of the tank 12 is arranged inside the housing seating 15 able to house the suction assembly 11. To be more exact, two helical springs 52, arranged on opposite sides, constantly thrust the handle 29 upwards against two fixed stops 53.

[0062] When the device is operative (Fig. 6), with the suction assembly 11 inserted into the housing seating 15, the handle 29 is thrust towards the bottom of the housing seating 15 by the suction assembly 11 itself. When, on the contrary, the suction assembly 11 is removed by the user, the handle 29 automatically returns upwards, against the fixed stops 53 (Fig. 7), ready to be gripped.

[0063] At least one of the two lateral apertures 32 through which the filtered air exits is provided with attachment teeth 54 (Fig. 10) able to cooperate with a corresponding groove 55 of a tubular blower element 56, by means of which the filtered air can be conveyed far from the cleaning device 10.

[0064] In correspondence with each of the lateral apertures 32 a container of perfumed substances is able to be inserted, of a conventional type and not shown in the drawings, which is able to perfume the air exiting from the device 10 through the apertures 32.

[0065] The base plate 17 is provided at the bottom with a pair of wheels 57 which facilitate the movement of the entire device 10 with respect to the floor.

[0066] It is obvious, however, that modifications and/or additions may be made to the suction cleaning device 10 as described heretofore, but these shall remain within the field and scope of the invention.

[0067] For example, the attachment socket 25 for the accessories 30 may be provided on the accumulation tank 12 or on the conduit 40 instead of on the cover 22, and the filter 21 may be associated directly with the relative cap 24.

[0068] It is also obvious that, although the invention has been described with reference to two specific examples, a person of skill shall certainly be able to achieve many other equivalent forms, all of which shall come within the field and scope of the invention.

Claims

1. Suction cleaning device comprising a suction assembly (11) and an accumulation tank (12) to accumulate the dirt sucked in, the device being characterised in that said accumulation tank (12) comprises a lower compartment (20) to accumulate the dirt and at least a first lateral chamber (18) to convey the air sucked in communicating with said lower compartment (20), said tank (12) being shaped so as to define a housing seating (15), open at the top and laterally, into which said suction assembly (11) is able to be removably inserted, keeping said accumulation tank (12) fixed.

2. Cleaning device as in Claim 1, characterised in that said suction assembly (11) can be inserted substantially vertically and is able to be constrained to said housing seating (15) due to having the same shape.

3. Cleaning device as in Claim 1, characterised in that said suction assembly (11) is made in a single piece and can be removed from said housing seating (15) by extraction upwards.

4. Cleaning device as in Claim 1, characterised in that said housing seating (15) is open both upwards and also towards two lateral opposite walls of said container, so that said suction assembly (11) can easily be removed from said housing seating (15) from above.

5. Cleaning device as in Claim 1, characterised in that said tank (12) also comprises a second lateral chamber (19), said two lateral chambers (18, 19) being substantially vertical and defining between them said housing seating (15).

6. Cleaning device as in Claim 1, characterised in that said housing seating (15) comprises a substantially cylindrical central compartment (15a), open towards the top, and two lateral compartments (15b) which put said central compartment (15a) in communication with the outside from opposite sides.

7. Cleaning device as in Claim 5, characterised in that said first chamber (18) is connected with coupling means (25) for accessories (30) to pick up dirt and said second chamber (19) communicates with said suction assembly (11).

8. Cleaning device as in Claim 5, characterised in that filtering means (21), able to prevent the contamination of the suction assembly (11) by the dirt in the accumulation tank (12), are provided in at least one of said chambers (18, 19) and said connection compartment (20).

9. Cleaning device as in Claim 1, characterised in that said suction assembly (11) integrally includes means (16) to discharge the air sucked in.

10. Cleaning device as in Claim 9, characterised in that said housing seating (15) is provided with lateral apertures (15b) in correspondence with which said discharge means (16) are able to be arranged.

11. Cleaning device as in Claim 1, characterised in that a single upper cover (22) is able to close both said tank (12) and said suction assembly (11) inside said housing seating (15).

12. Cleaning device as in Claim 11, characterised in that said cover (22) is solidly associated with said suction assembly (11), so that lifting said cover (22) causes the suction assembly (11) to be removed from said housing seating (15).

13. Cleaning device as in Claim 11, characterised in that said cover (22) is able to be constrained to said accumulation tank (12) by a snug-fit connection.

14. Cleaning device as in Claim 11, characterised in that said cover (22) is able to be clamped to said accumulation tank (12) by means of rapid attachment/detachment means.

15. Cleaning device as in Claim 11, characterised in that said cover (22) is provided with specific gripping and lifting means (28).

16. Cleaning device as in Claim 1, characterised in that said accumulation tank (12) is suitable to contain a liquid (31) able to retain the dirt sucked in.

17. Cleaning device as in Claim 16, characterised in that said accumulation tank (12) is associated with means to separate the air sucked in from the dirt agglomerated with the drops of said liquid (31).

18. Cleaning device as in Claim 1, characterised in that said housing seating (15) is of the air-tight seal type.

19. Cleaning device as in Claim 1, characterised in that said accumulation tank (12) is provided with specific gripping and lifting means (29).

20. Cleaning device as in Claim 1, characterised in that in said lateral chamber (18) a conduit to feed the air sucked in is able to be inserted, which is provided with assembly means (42, 43) which allow it to be easily inserted into and removed from said tank (12).

21. Cleaning device as in Claims 16 and 20, characterised in that said conduit (40), once inserted into said tank (12), has its inner end part (44) arranged at least in proximity with the minimum level (l_1) of said liquid.

22. Cleaning device as in Claims 1 and 16, characterised in that in said lower compartment (20) there are vertical bulkheads (45) able to prevent a wave effect of said liquid even when the cleaning device is moved.

23. Cleaning device as in Claims 5 and 16, characterised in that in said second lateral chamber (19) there is a tubular element (46) to expel the filtered air which, on at least one part of its peripheral surface, is provided with a filter panel (47), and in that inside said tubular element (46) a floating element (48) is able to slide, able to automatically close the air outlet aperture (49) from said tank (12) whenever the liquid contained therein exceeds a set safety level.

24. Cleaning device as in Claim 23, characterised in that said tubular element (46) is provided with assembly means (50, 51) which allow it to be easily inserted into and removed from said tank (12).

25. Cleaning device as in Claim 1, characterised in that said tank (12) is provided with a handle (29) housed inside said housing seating (15), that elastic means (52) are provided to automatically take said handle (29) upwards when said suction assembly (11) is removed from said housing seating (15), and that said handle (29) is able to remain pressed towards the bottom of said housing seating (15) by said suction assembly (11) when the latter is inserted in said housing seating (15).

26. Cleaning device as in Claim 1, characterised in that said suction assembly (11) comprises at least a lateral appendix (32) provided with an aperture for the outlet of the filtered air, in correspondence with which attachment means (54) are provided to cooperate with a corresponding tubular blower element (56), by means of which the filtered air can be conveyed far from the cleaning device (10).

27. Cleaning device as in Claim 1, characterised in that said suction assembly (11) comprises two lateral apertures (32) for the outlet of the filtered air, made on opposite lateral appendixes and housed, during

use, in the two corresponding lateral compartments (15b) of said housing seating (15).

28. Cleaning device as in Claim 26 or 27, characterised in that in correspondence with each of said lateral apertures (32) a container of perfumed substances is able to be inserted, able to perfume the air emitted from the device (10) through said lateral apertures (32).

29. Cleaning device as in Claim 1, characterised in that said accumulation tank (12) is provided at the lower part with at least a pair of wheels (57) which facilitate movement with respect to the floor.

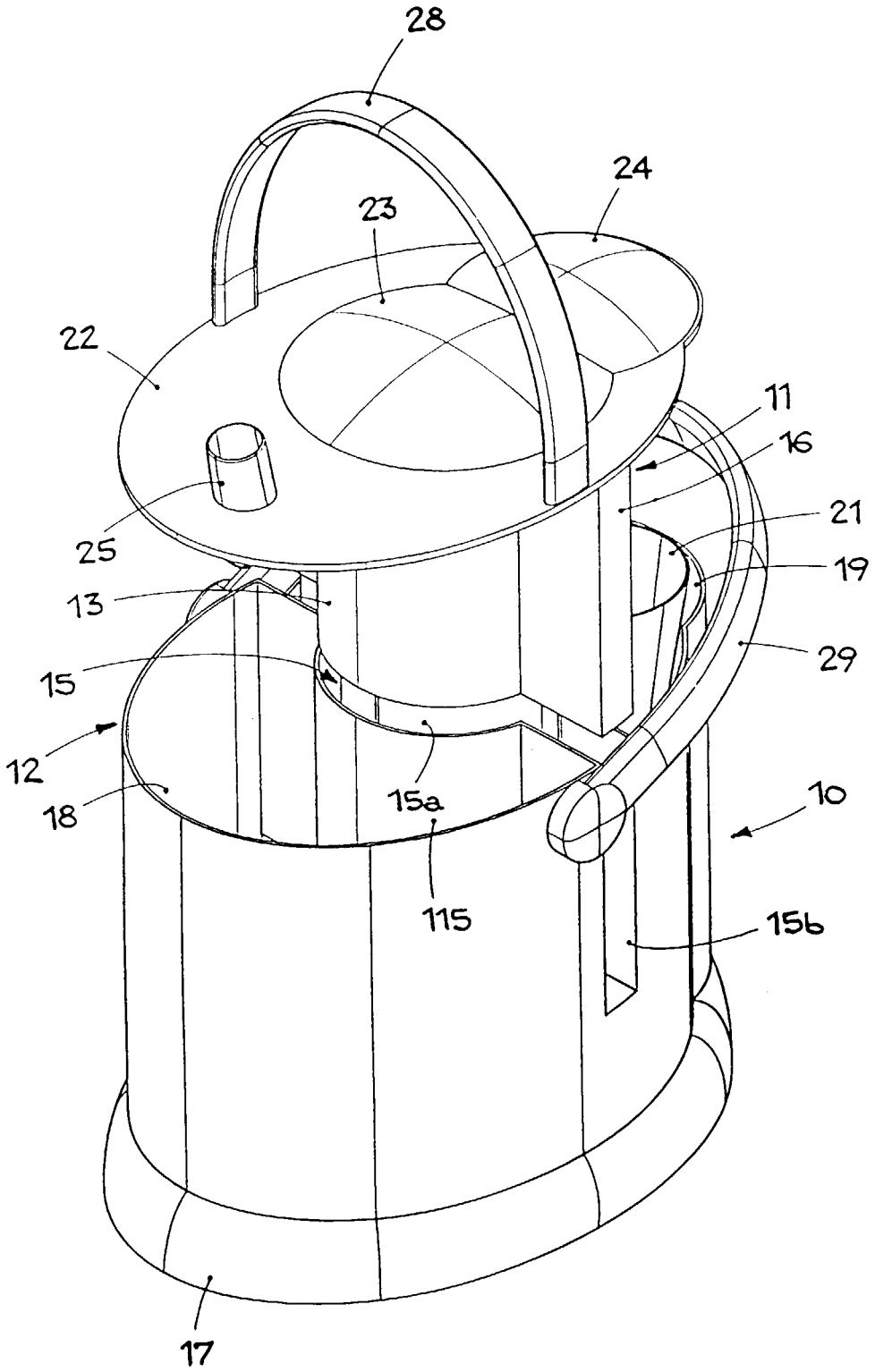

Fig.1

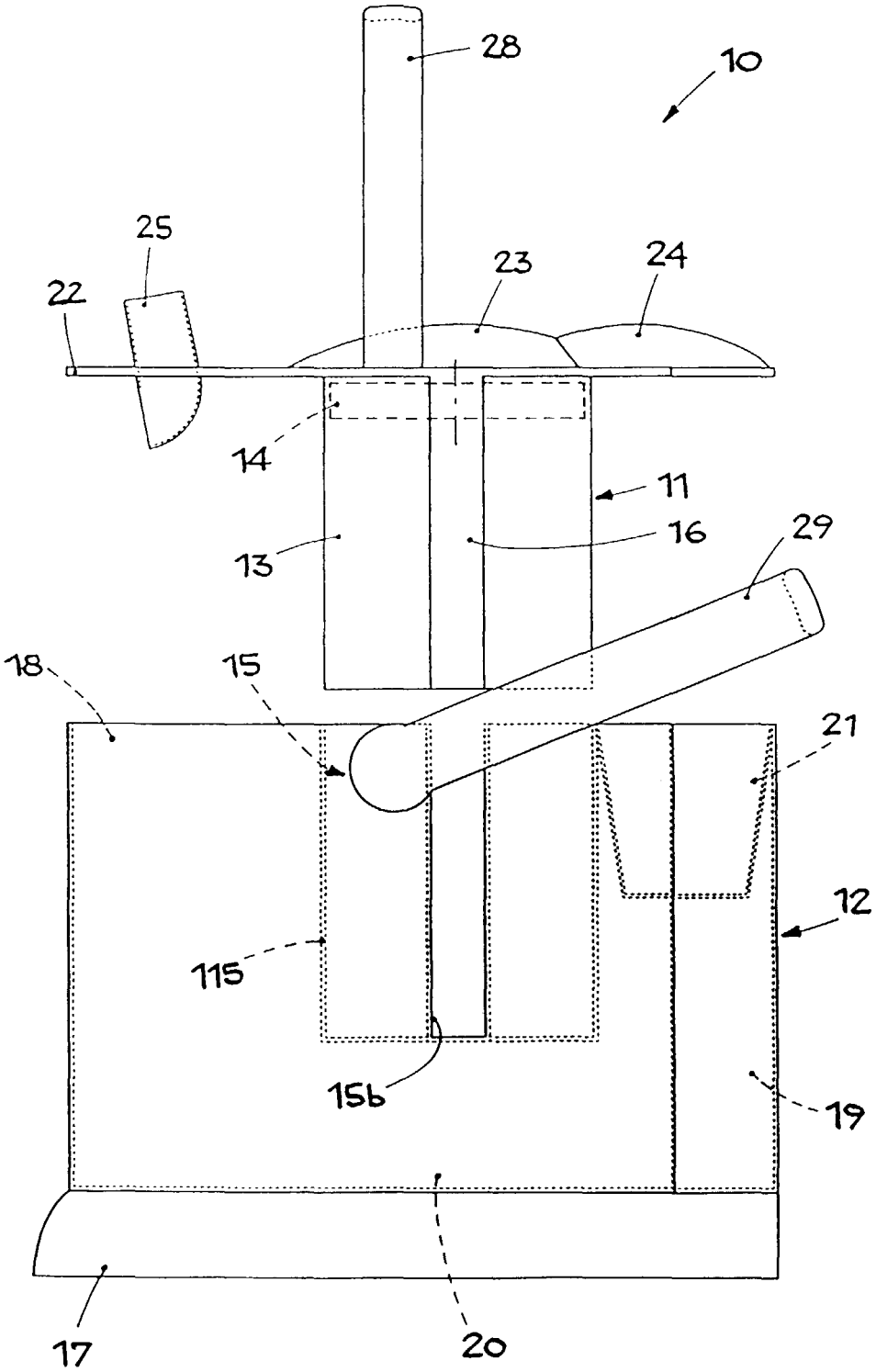

Fig. 2

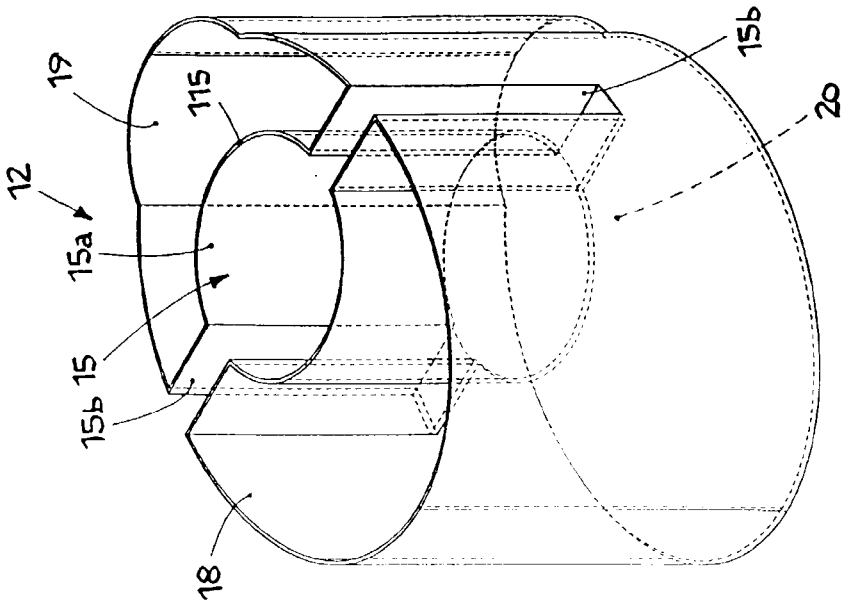
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Fig.4

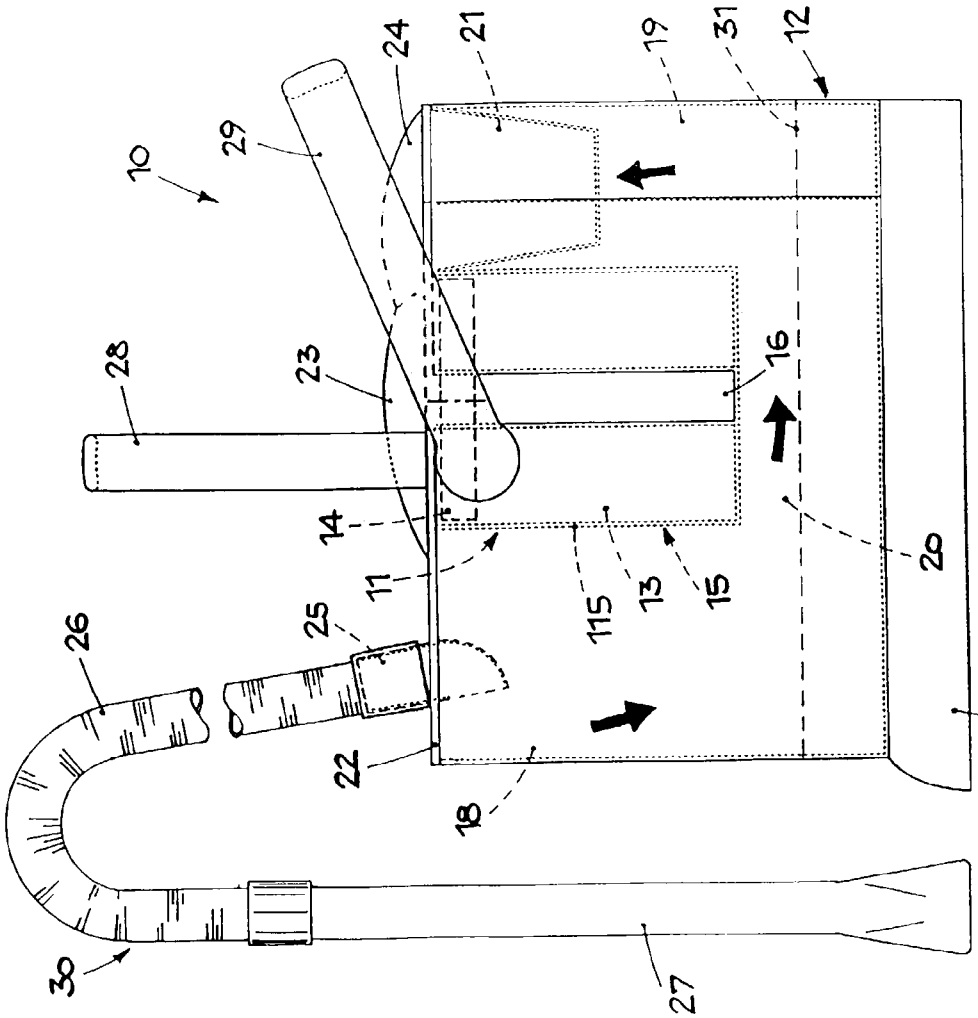
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Fig.3

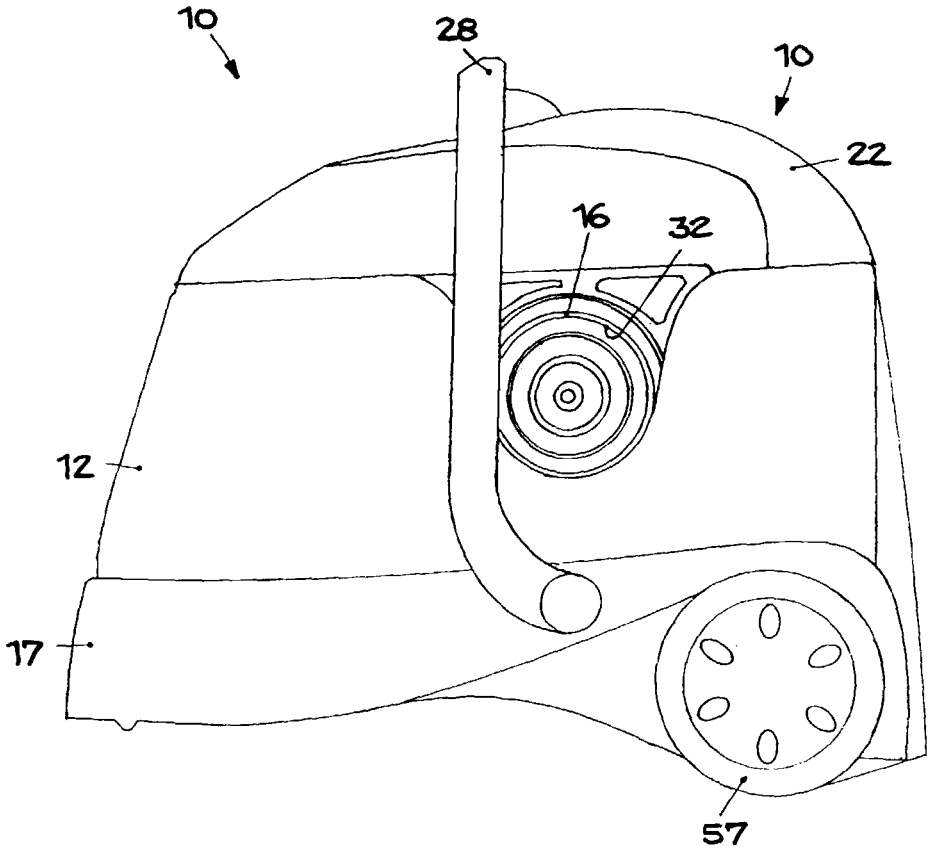

Fig. 5

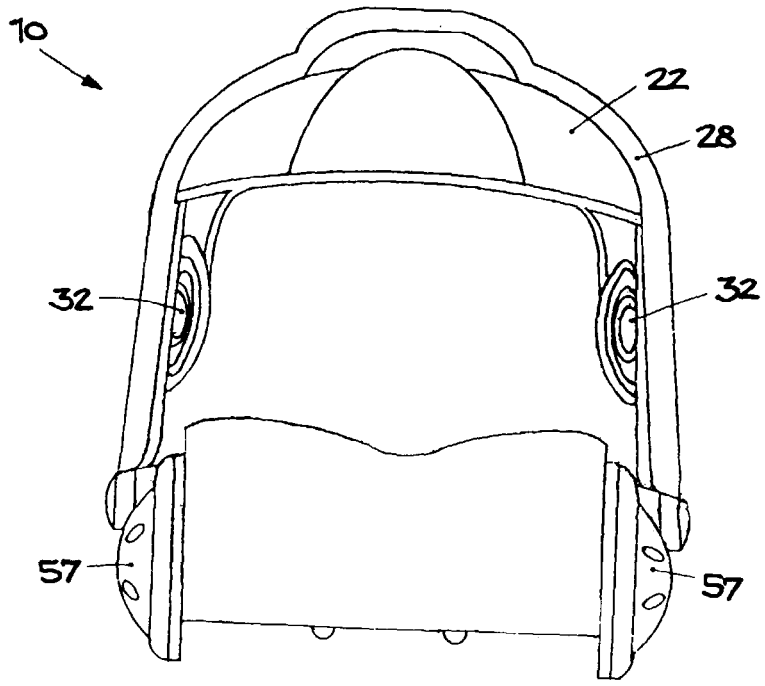

Fig. 8

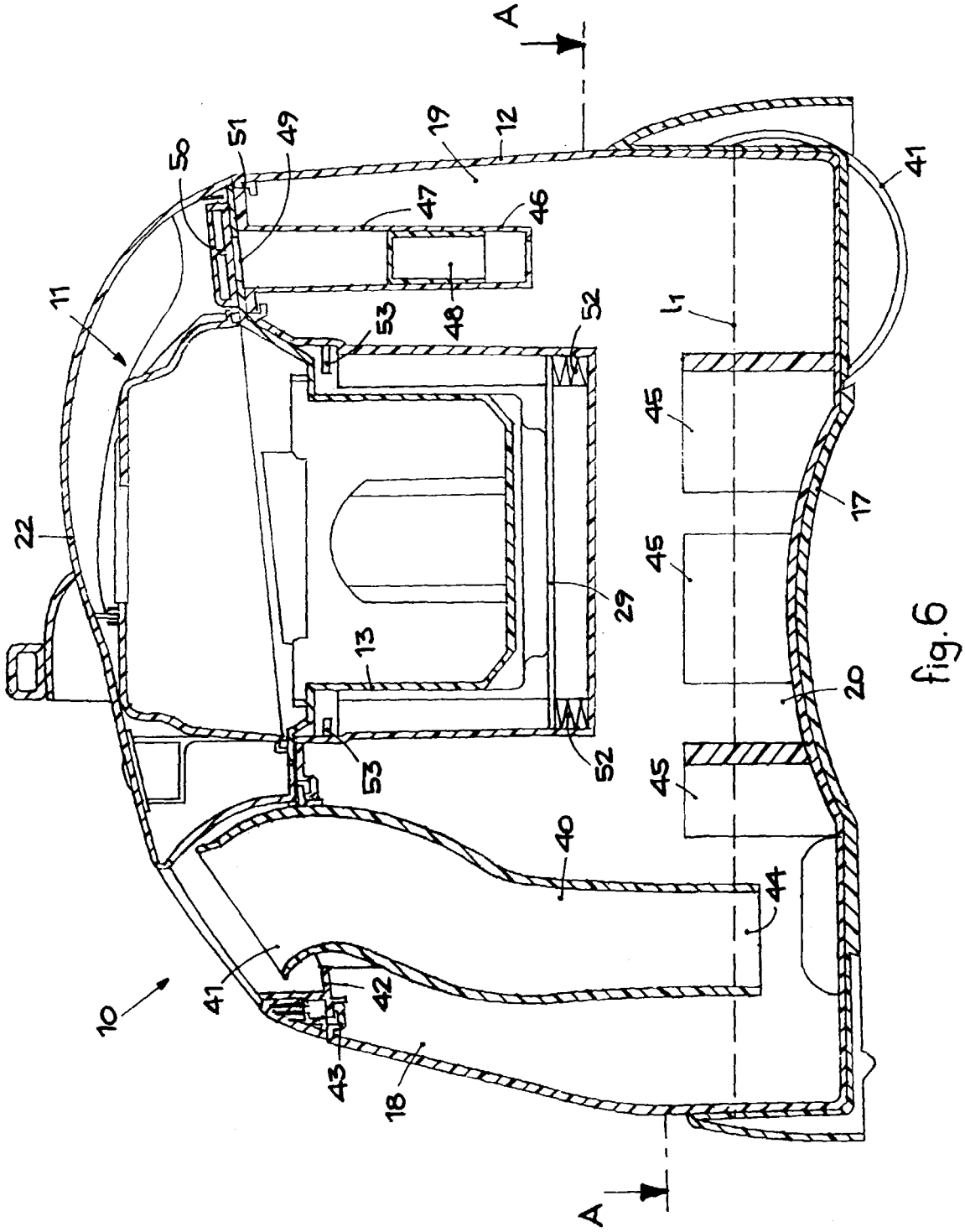
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fig.6

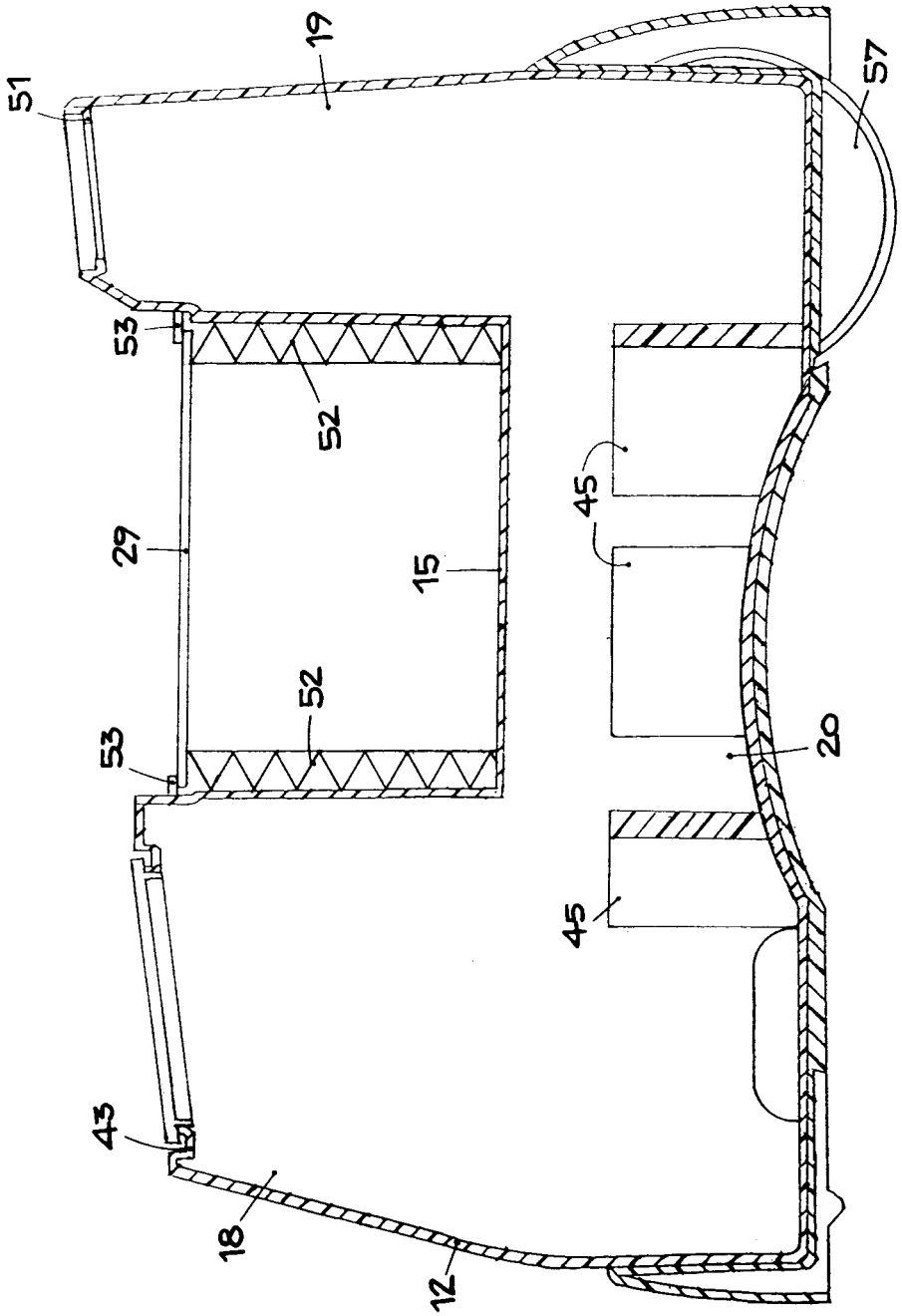

fig.7

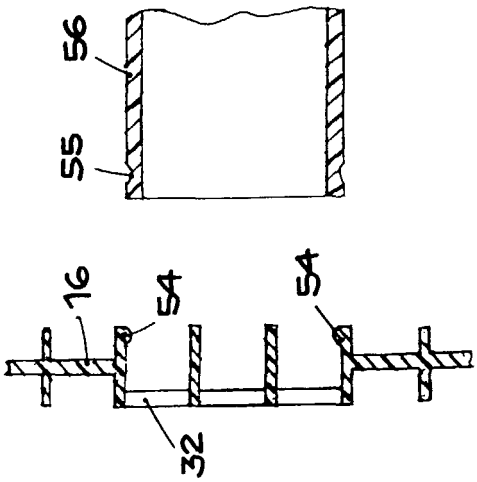

fig.10

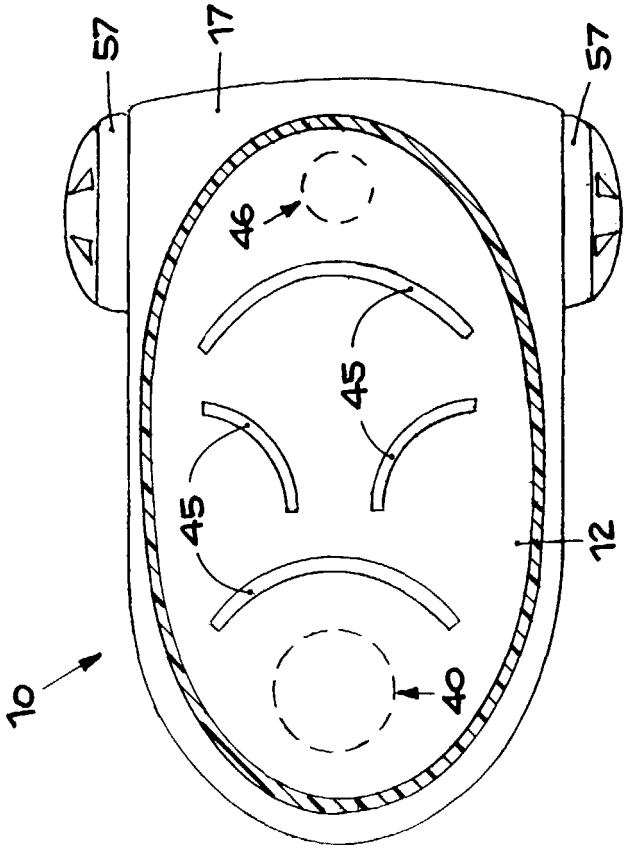

fig.9

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 11 2870

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A,D	EP 0 119 423 A (SIEMENS AG) 26 September 1984 (1984-09-26) * abstract * * page 3, line 7 - page 4, line 36 * * page 5, line 27 - line 31 * * page 6, line 1 - line 5 * * figures * ---	1-29	A47L5/36 A47L9/18
A	WO 85 00117 A (ROYAL APPLIANCE MFG) 17 January 1985 (1985-01-17) * abstract * * page 5, line 11 - page 6, line 12 * * page 8, line 8 - line 28 * * figure 1 * ---	1	
A	WO 95 02986 A (WOOL SANITY SAS DI PIETROBON SILVANO & C. ET AL) 2 February 1995 (1995-02-02) * abstract * * page 7, line 13 - line 27 * * page 12, line 23 - line 28 * * figures 1,3,4A * -----	1	TECHNICAL FIELDS SEARCHED (Int.Cl.7) A47L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	25 September 2000	Cabral Matos, A

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
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