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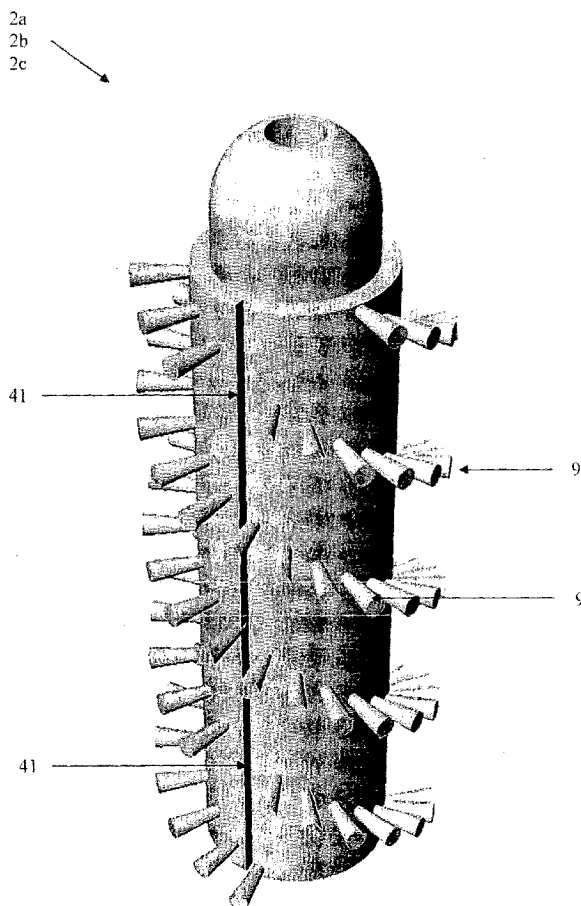
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(54) Title: A DEVICE FOR CLEANING BRUSHES



(57) Abstract: A device (1) for cleaning brushes, in par-
ticular brushes for hair or animal fur, comprising a container
(12), at least a rotary counter-brush (2a, 2b, 2c), inserted in-
side the container (12) and able to act on at least a brush to
be cleaned (4). The counter-brush includes bristles which are
arranged along preferential lines along an external surface of
a body of the counter-brush, the lines being distanced from
one another by spaces which are sufficient to enable a wind-
ing of the hairs or fur along the body of the counter-brush.

A DEVICE FOR CLEANING BRUSHES**Technical Field**

The invention relates to a device for cleaning brushes of various types, such as those habitually used by hairdressers or for brushing animals' coats.

Background Art

The removal of hair and/or animal fur from brushes is a long job, requiring
5 patience.

To resolve this problem, in the past some devices which seek to automate the brush-cleaning operation have been provided.

US patent US 5,701,626 (Zara) teaches a device for cleaning hairdressers' brushes.

10 The device comprises three cleaning elements, rotating at a same speed and in a same direction, and distributed circumferentially about a space for receiving a brush to be cleaned.

Both the rotating cleaning elements and the brush being cleaned are immersed in a sterilising liquid contained in a recipient which is part of the
15 device.

Application WO2005/046325, by the present applicant, teaches a device for cleaning and automatically sterilising hairdressers' cylindrical brushes.

In this device too there are three rotating cleaning elements, or counter-brushes, rotating at a same speed and in a same direction, and being
20 arranged about a space for receiving the brush to be cleaned.

However, differently to the prior patent US 5,701,626, in the device described in WO2005/046325 the counter-brushes and the brush are not immersed in a disinfecting liquid.

Further, in the device of WO2005/046325 the brush to be cleaned is set in
25 rotation, in an opposite direction to the rotation direction of the counter-brushes.

The devices illustrated above exhibit some drawbacks, however.

Both the prior-art devices are not very effective.

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The device of US 5,701,626 (Zara) exhibits a further drawback of requiring a periodical replacement of the sterilising solution, as well as its disposal.

Further, in US 5,701,626 (Zara) the counter-brushes exhibit an arrangement in which the bristles are arranged in tight bundles all of a same height, the
5 arrangement of the bristles being such as to define an external cylindrical surface which is almost totally filled with bristles.

This arrangement of the bristles does not enable good hair removal from the brush to be cleaned.

Further, the device requires use of external combs, one for each counter-
10 brush, in order to facilitate the removal of hairs from the counter-brushes.

WO2005/046325 also exhibits this drawback, due to the fact that during the mechanical action of the rotation of the counter-brushes on the brush to be cleaned, the brush to be cleaned tends to rise, as it is pushed upwards.

Disclosure of Invention

15 The invention has the aim of obviating the drawbacks in the prior art and, in particular, the above-indicated drawbacks.

The objectives are attained by a device for cleaning brushes, as specified in claim 1.

Further advantages can also be obtained by the supplementary
20 characteristics specified in the dependent claims.

Brief description of the Drawings

A possible embodiment of the device for cleaning brushes is now described, with reference to the accompanying figures of the drawings, in which:

- figure 1 is a perspective view from above of the device, with the cover
25 thereof removed;
- figure 2 is a perspective view from above of the device, with the cover and the counter-brushes removed;
- figure 3 is a perspective view of a counter-brush;
- figure 4 is a perspective view of the device with the cover present.

Best Mode for Carrying Out the Invention

30

With reference to the numbering used in the figure of the drawings, number 1 denotes, in its entirety, a device for cleaning brushes, such as those

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commonly used by hairdressers, or for brushing animals' coats or for other types of brushes.

The device comprises a container 12 and at least three rotary counter-brushes 2a, 2b, 2c, which are substantially parallel to one another, and which
5 are inserted in the container 12.

The rotary counter-brushes 2a, 2b, 2c are circumferentially distributed such as to define a space 3 for receiving a brush to be cleaned 4, and are removable mounted on rotating shafts 11a, 11b, 11c.

In the illustrated embodiment the counter-brushes are equidistant from one
10 another.

Naturally this is not an obligatory arrangement.

In particular it would be possible to position a second brush to be cleaned externally of the space defined by the counter-brushes, as long as the brush is in contact with at least one of the surfaces provided with bristles of at least
15 one counter-brush.

Preferably at least one of the rotary counter-brushes 2a, 2b, 2c rotates in an opposite direction to the others 2b, 2c.

In this way a more efficient removal of hairs, animal fur and any other residue on the brush to be cleaned is obtained.

20 In an alternative embodiment of the invention, it would also be possible to use only two counter-brushes, possibly rotating in opposite directions.

In a still further embodiment it would be possible to use one counter-brush only.

The movement of the counter-brushes can be commanded by an electric
25 motor and a gear-type transmission, or a cogged belt or another system.

The absolute angular velocities of the counter-brushes are preferably about the same as one another.

A support 55 for supporting the brush to be cleaned can be exhibiting on the bottom of the container 12.

30 Preferably the support 55 is made of a low-friction coefficient material, for example Teflon.

Alternatively it would be possible to provide a support which blocks the rotation of the brushes.

At least one of the counter-brushes 2a is preferably mounted on a tilting shaft 11a.

- 5 In a possible embodiment (not illustrated) the tilting shaft 11a is mounted on an oscillating arm which can distance the shaft 11a from the other two shafts 11b , 11c, contrasting with an elastic recall force.

This movement can also be realised automatically.

- 10 In this way the device can be adapted to the diameter of the brush to be cleaned, as it exerts an almost constant pressure thereon.

It is necessary to take into account the fact that the shapes and sizes of the brushes can be vary varied.

The counter-brushes 2a, 2b, 2c can exhibit, along the whole length of the bodies thereof, an external longitudinal groove 41.

- 15 The groove 41 can be used as a guide for knives or similar tools, for facilitating the periodic operations of maintenance and cleaning of the counter-brushes.

- 20 In the illustrated embodiment each counter-brush 2a, 2b, 2c is provided with bristles 9, arranged in adjacent groups, which develop in lines of bristles which wind spirally about the body of the counter-brush.

It has been noted that this characteristics increases the effectiveness of the mechanical cleaning operation.

The use of counter-brushes having bristle line arranged in three adjacent spiral steps has been shown to be particularly effective.

- 25 At least half of the counter-brushes must be conformed such that the spirals of the bristles 9 push in a downwards direction, so as to push the brush to be cleaned downwards; in other words, to keep it in the seating thereof.

- 30 The spiral shape of the bristles also means that the hairs or animal fur can be optimally retained; the hairs or fur are arranged along the body of the counter-brushes because between the various spiral lines of bristles free spaces are afforded.

In a case of counter-brushes with spiral bristle development, in a variant of the invention it is possible to have at least two closely situated lines of bristles which follow a same spiral development, the lines of bristles possibly being of different heights, with free spaces left between the groups or pairs of lines.

5 An alternative embodiment of the counter-brushes (not illustrated in the figures of the drawings) includes a plurality of bundles of bristles which develop such as to define lines of bristles which are vertically arranged on the body of the counter-brush, leaving between a vertical line of bristles and
10 another sufficient spaces to enable hair or fur to be wound up thereon along the body of the counter-brush.

A further variant includes diagonal lines of bristles, or even horizontal lines of bristles.

Also in the case of vertical, diagonal or horizontal lines it is possible to have
15 two close lines of bristles which follow a same direction, with the close-by lines possibly having different heights, with free spaces left between the groups or pairs of lines.

Bristles having a minimal length can be inserted in the spaces on the body of the counter-brushes comprised between the lines of bristles.

20 The bristles 9 can be made of polyamide, can be metallic filaments, or synthetic or natural filaments of animal or vegetable or other origin.

The free spaces between the lines formed by the bundles of bristles are such as to enable hairs or fur to be wound along the body of the counter-brush.

In a possible embodiment the bristles are about 2 mm long and have a
25 diameter of about 0.2 mm.

The interaxis step between the bristles can be of between 5 and 200 mm, preferably about 23-24 mm.

In a case in which the lines of bristle bundles are spirally-arranged, or in a case in which they are vertically-arranged or in any case in which they have
30 an orientation with respect to the vertical, in order to facilitate cleaning of the device the lines of bristles can be extractable from the body of the counter-

brush, for example mounted on strips insertable in appropriately-conformed seatings afforded on the body of the counter-brush.

The bristlecleaning device can comprise means for aspirating the deposits removed from the counter-brushes, and accumulating the deposits in the
5 container 12, thus reducing the cleaning operations of the machine itself.

For example, an aspiration hole 14 can be afforded on the bottom of the container 12, the hole 14 being connected by an aspirating tube to a collection tank 16 positioned below the container 12.

The illustrated device further comprises means 13 for creating a jet of water
10 steam which exits from a nozzle 33 and strikes the brush 4 to be cleaned and means 114 for generating a jet of hot air which exits from at least a hole 44 and strikes the brush 4 to be cleaned and the counter-brushes (2a, 2b, 2c) in order to dry the steam.

It is important for the bristles to be dry before beginning the subsequent
15 action of cleaning on a further brush to be cleaned.

The steam can also exit from several nozzles arranged in different positions internally of the container.

The means for generating steam 13 and hot air 14 can also be positioned below the container 12.

20 The special arrangement of the bristles of the counter-brush facilitates the winding of the hair and fur along the body of the counter-brushes.

The means for aspirating, for generating the steam and the hot air can be of conventional type.

The regulation of the means for aspirating, the means for generating steam
25 and the means for generating hot air can be effected by known device.

Thanks to the use of steam a high level of hygiene can be guaranteed without immersing the brush in a disinfectant liquid (as required in the above-described prior art).

With respect to the prior art the device described herein obviates the problem
30 of disposal of the disinfectant liquid, with evident benefits from the ecological point of view.

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The container 12 is preferably closed by a cover 21 mounted on fastening pins 51, 52, 53, which exhibits a hole 27 for insertion of the part to be cleaned of a brush 4, while the handle of the brush can remain outside.

In a possible embodiment the device further comprises an annular chamber
5 60 provided with a plurality of openings 61 for inserting already-cleaned brushes.

Ultraviolet lamps can be inserted in the annular chamber to keep the brushes in optimal hygienic conditions.

The device 1 as it is described herein can be mounted on wheels 26 to
10 facilitate movement thereof.

Obviously an expert in the sector might make numerous modifications of a technical and applicational nature to the device as described above, without forsaking the ambit of the inventive idea as claimed herein.

Claims

- 1). A device (1) for cleaning brushes, in particular brushes for hair or animal fur, comprising a container (12), at least a rotary counter-brush (2a, 2b, 2c), inserted inside the container (12) and able to act on at least a brush to be cleaned (4), characterised in that the counter-brush includes bristles which
5 are arranged along preferential lines along an external surface of a body of the counter-brush, the lines being distanced from one another by spaces which are sufficient to enable a winding of the hairs or fur along the body of the counter-brush.
- 2). The device (1) for cleaning brushes of claim 1, wherein the bristles of the
10 counter-brushes (2a, 2b, 2c) develop along preferential lines which are spiral-shaped.
- 3). The device (1) for cleaning brushes of claim 2, wherein at least a half of the counter-brushes (2a, 2b) must be shaped such that the spirals of the bristles effect a descending motion during rotation of the counter-brushes,
15 such as to push the brush to be cleaned in a downwards direction in order to keep the brush in a seating.
- 4). The device (1) for cleaning brushes of claim 2, wherein the bristles (3) of the spiral of the counter-brushes (2a, 2b, 2c) exhibit three different steps.
- 5). The device (1) for cleaning brushes of claim 1, wherein the counter-
20 brushes (2a, 2b, 2c) are provided with bristles (9) arranged in vertical groups, diagonal groups or horizontal groups, and wherein sufficient space between groups are allowed in order to enable a winding of the hairs or fur.
- 6). The device (1) for cleaning brushes of claim 2 or 5, characterised in that it has at least two close-lying lines of bristles which follow a same development
25 along the body of the counter-brush.
- 7). The device (1) for cleaning brushes of claim 6, characterised in that the close lines of bristles are of different heights.

- 8). The device (1) for cleaning brushes of claim 1, characterised in that bristles having a minimal length are located in the spaces on the body of the counter-brushes comprised between the bristle lines.
- 9). The device (1) for cleaning brushes of claim 1, characterised in that the
5 lines of bristles are arranged in adjacent bundles.
- 10). The device (1) for cleaning brushes of the preceding claims, wherein the bristles (9) are preferably made of polyamide, metal filaments, synthetic or natural filaments of animal or vegetal origin or of various types.
- 11). The device (1) for cleaning brushes of the preceding claims, wherein the
10 bristles exhibit a length of about 2 mm and a diameter section of 0.2 mm.
- 12). The device (1) for cleaning brushes of the preceding claims, wherein the bristles exhibit an interaxial step between the bristles of from 5 to 200 mm.
- 13). The device (1) for cleaning brushes of the preceding claims, wherein the lines of bristles are extractable from the body of the counter-brush.
- 14). The device (1) for cleaning brushes of the preceding claims, comprising
15 at least two counter-brushes between which the brush to be cleaned is arranged.
- 15). The device (1) for cleaning brushes of claim 14, wherein the two counter-brushes rotate in opposite directions.
- 16). The device (1) for cleaning brushes of claim 14, comprising at least three
20 rotary counter-brushes (2a, 2b, 2c), of which at least one counter-brush (2a) rotates in an opposite direction to the other counter-brushes.
- 17). The device (1) for cleaning brushes of claim 14, comprising at least two rotary counter-brushes (2a, 2b, 2c) which act either simultaneously or
25 separately on different brushes to be cleaned.
- 18). The device (1) for cleaning brushes of claim 1, wherein the rotary counter-brushes (2a, 2b, 2c) are removably mounted on rotating shafts (11a, 11b, 11c).
- 19). The device (1) for cleaning brushes of claim 18, wherein each rotary
30 counter-brush (2a, 2b, 2c) exhibits at an end thereof a transversal groove (14) which is engaged by a transversal element (15a, 15b, 15c) which is solidly constrained to the rotating shaft (11a, 11b, 11c).

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20). The device (1) for cleaning brushes of claim 18, characterised in that at least one of the counter-brushes (2a) is mounted on a tilting shaft (11a).

21). The device (1) for cleaning brushes of one of the preceding claims, characterised in that each of the counter-brushes (2a, 2b, 2c) exhibits at least
5 an external longitudinal groove (41) along a whole length of the body of the counter-brush (2a, 2b, 2c).

22). The device (1) for cleaning brushes of one of the preceding claims, further comprising means for aspirating deposits removed from the counter-brushes (2a, 2b, 2c) and present in the container (12).

10 23). The device (1) for cleaning brushes of claim 1, wherein an aspiration hole (14) is afforded in a bottom of the container (12), which aspiration hole (14) is connected to a collection tank (16) via an aspirating tube (15).

24). The device (1) for cleaning brushes of claim 1, comprising means (13, 33) for creating a jet of water steam which strikes the brush (4) to be cleaned
15 and means (14, 44) for generating a jet of hot air which strikes the brush to be cleaned (4) and the counter-brushes (2a, 2b, 2c).

25) The device (1) for cleaning brushes of one of the preceding claims, characterised in that the container (12) is closed by a cover (21), the cover (21) exhibiting a hole (27) for inserting a part of a brush (5) to be cleaned.

20 26). The device (1) for cleaning brushes of any one of the preceding claims, further comprising an annular chamber provided with a plurality of openings for insertion of already-cleaned brushes.

27). The device (1) for cleaning brushes of one of the preceding claims, characterised in that it is mounted on wheels (26).

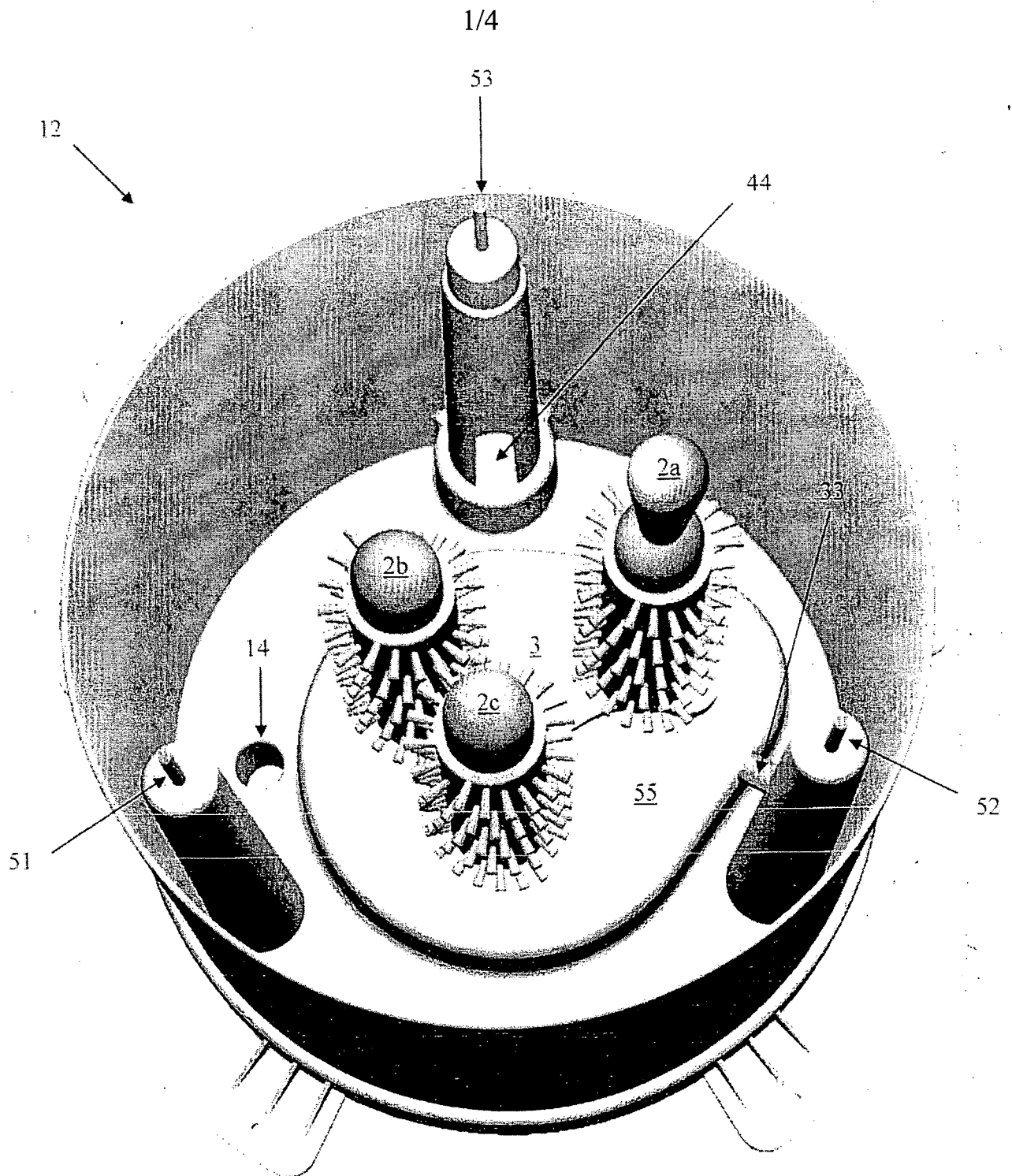


Fig. 1

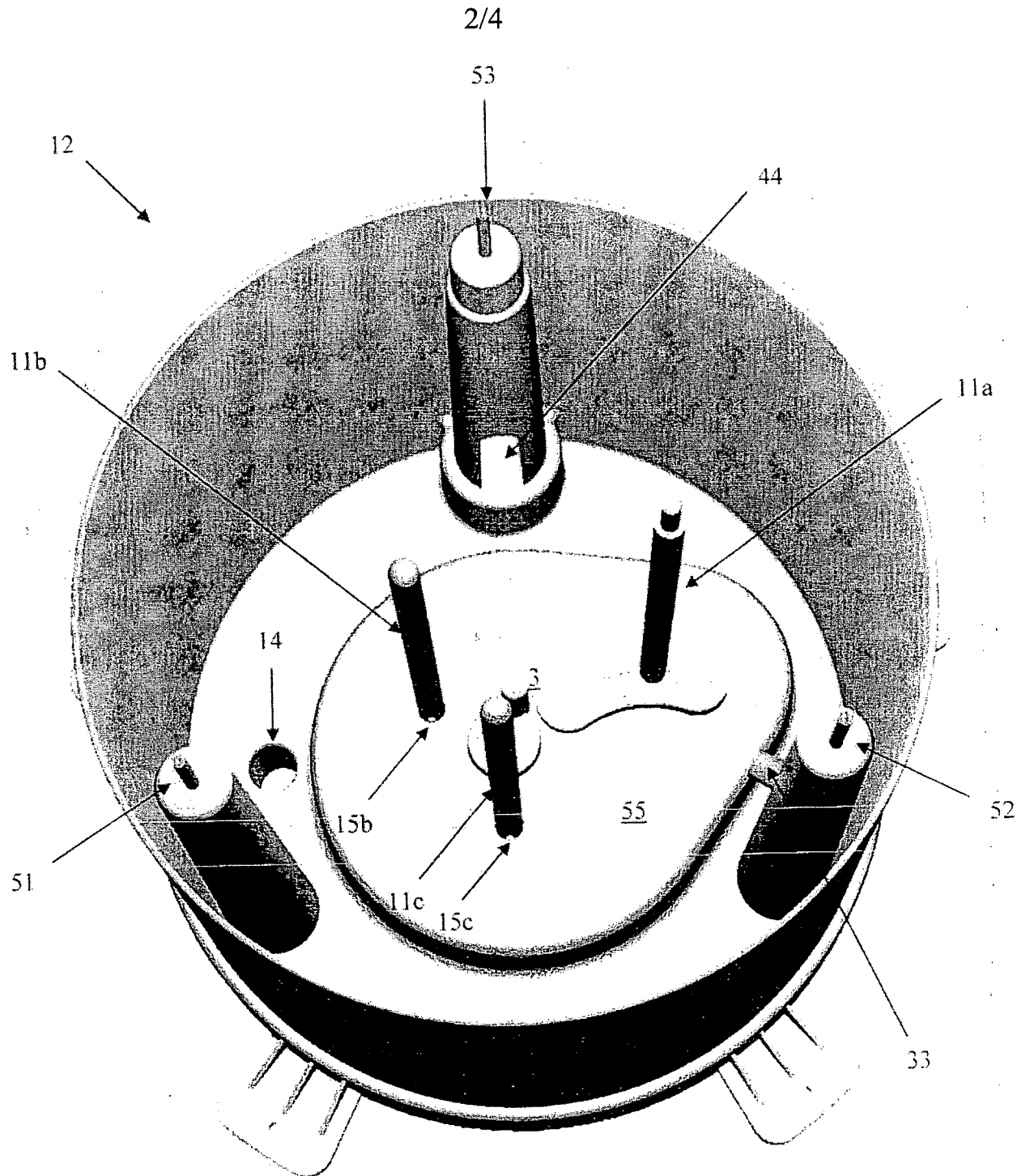


Fig. 2

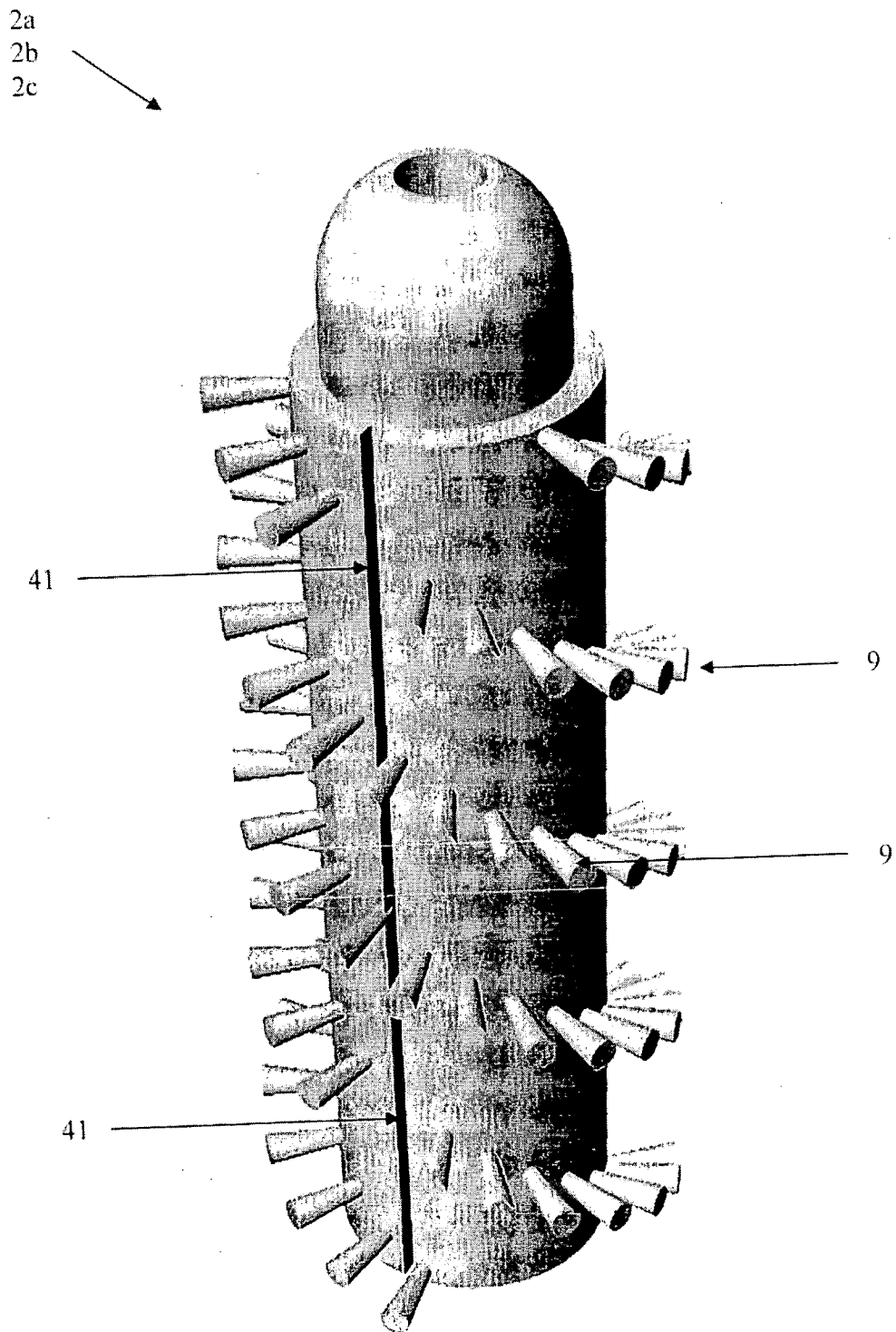


Fig. 3

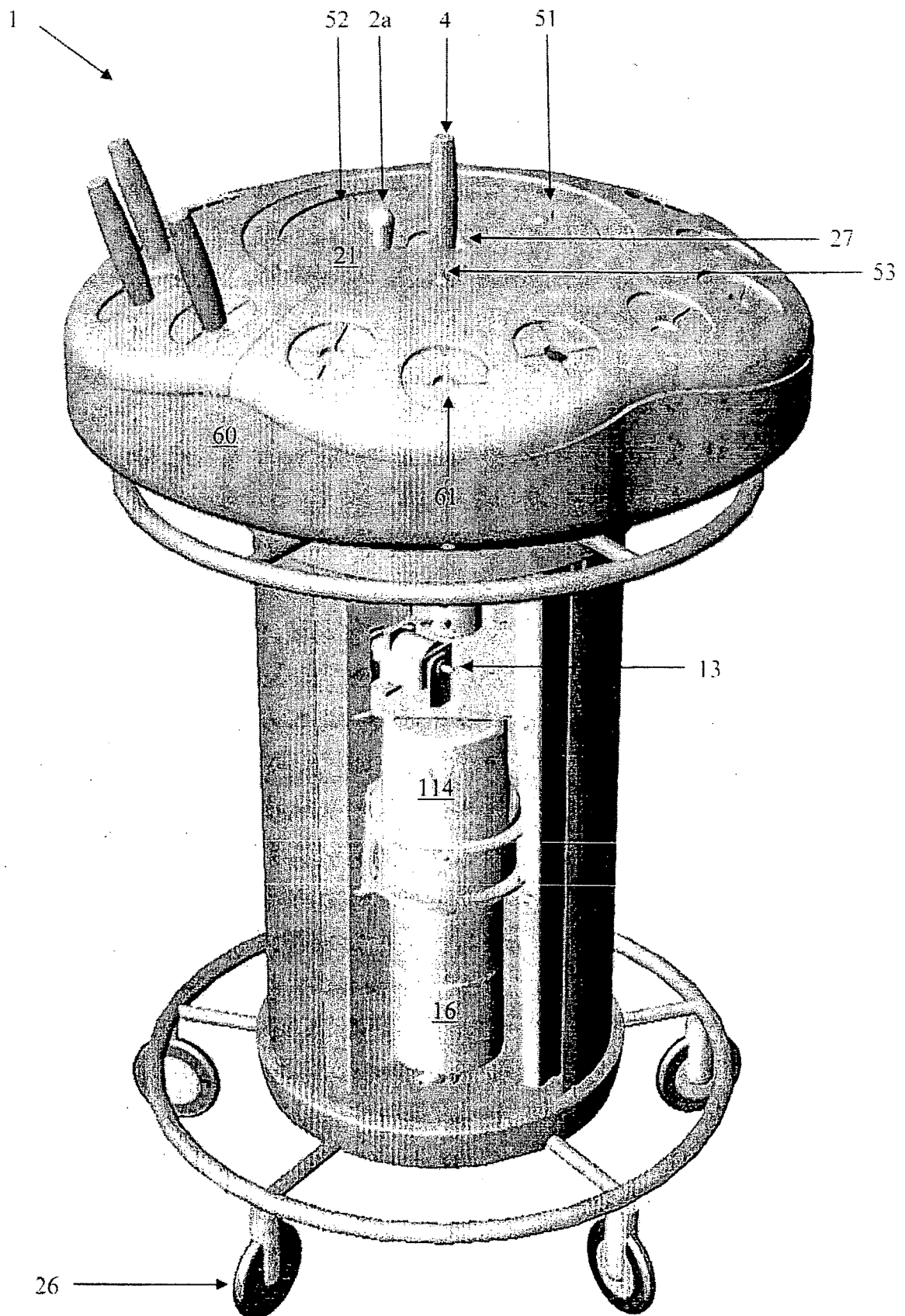


Fig. 4