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(54) Title: CLEANING APPARATUS FOR HAIR BRUSHES AND COMBS

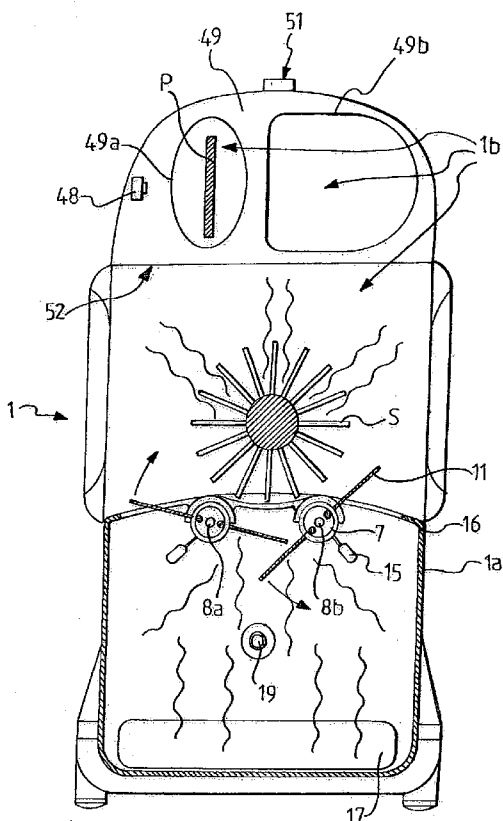


Fig. 2

(57) Abstract: A cleaning apparatus (1) for combs (P) and/or brushes (S) is described, comprising a receiving space for at least one comb (P) and/or at least one brush (S) and means for feeding a flow of steam into the receiving space. Preferably the apparatus also comprises mechanical means for removing the hair trapped between the teeth of the combs or between the bristles of the brushes, after their use.

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Cleaning apparatus for hair brushes and combs**DESCRIPTION****Field of the invention.**

As known, during combing with brushes or combs, it is easy
5 for these tools to no longer be clean at the end of use,
and for some hairs to remain trapped between their teeth or
bristles.

Prior art.

Conventionally, removal of hairs is carried out manually by
10 rubbing two brushes together, a method that does not ensure
the best of hygiene of these tools. There is also a tool in
the form of a small rake, the curved metallic teeth of
which slide, where they can, between the bristles of the
brushes, and there is also an apparatus consisting of two
15 parallel bristled rollers mounted idle, between which it is
possible to manually run a comb, but not a brush, thereby
obtaining a certain degree of cleaning. All of these
solutions do not allow for optimal cleaning and need a long
time. Cleaning brushes with such apparatuses is therefore
20 boring, because it is necessary to work for long periods to
obtain significant results, and above all hygiene is not
guaranteed apart from to a minimal extent. The waste removed
from known apparatuses is often volatile and difficult to
identify.

25 This problem is particularly serious for professional
hairdressers due to the great frequency of use of brushes
and combs and due to the greater hygiene requirements to
which they must comply with, in that their working tools
are intended for use on a large number of people.

30 In order to avoid these drawbacks an apparatus for removing

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the hair trapped between the teeth of combs, or between the bristles of brushes, has been provided that acts through the action of rotary whips, made from silicon, and of an assembly for sucking in and collecting the removed waste.

5 Such an apparatus is described in the European patent EP 1215977 and is effective in removing waste and hair, but it has no effect against the bacteria present on combs and on brushes.

Moreover, hair is often treated with gel, hair spray, 10 cosmetic solutions, etc., which inevitably leave residues on the hair, also not visible. These residues get combs and brushes dirty and can promote the proliferation of bacteria. Therefore, it is advisable to remove them.

The problem at the basis of the present invention is to 15 provide a cleaning apparatus for combs and hair brushes that allows for achieving a greater hygiene compared to known apparatuses, and in particular that allows for clashing bacteria quickly and easily.

Summary of the invention.

20 The invention therefore concerns a cleaning apparatus for combs and/or hair brushes according to claim 1.

In particular, the invention concerns a cleaning apparatus for combs and/or brushes, comprising a receiving space for at least one comb and/or at least one brush, characterised 25 in that it comprises means for feeding a flow of steam into said receiving space.

Advantageously, the steam, the temperature of which is greater than or equal to 60°C, eliminates a great part of the bacteria present on the combs and on the brushes, and 30 clashes the proliferation of new bacteria until the subsequent disinfecting cycle. As the temperature of the steam increases, the disinfecting effectiveness of the

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apparatus also increases.

The apparatus can be provided with means for adjusting the temperature of the steam, to be actuated by the user.

5 Preferably, the receiving space opens towards the outside of the apparatus, i.e. it is not closed by panels or hatches, and it is directly accessible by the user for the insertion of a comb and/or a brush to be cleaned.

10 Preferably, said means for feeding steam comprise a tank for a disinfectant liquid, for example water or an aqueous solution of a disinfectant, an evaporator for the liquid, a hydraulic circuit for feeding the liquid from the tank to the evaporator and a dispenser of the steam inside the receiving space.

15 The hydraulic circuit in turn comprises a pump and a control for its actuation by the user. By intervening on the control, the user actuates the pump, which takes a volume of water from the tank and sends it to the evaporator. The steam produced in the evaporator spreads into the receiving space, where the combs and brushes are
20 positioned, through a dispenser, for example a nozzle or a valve. By releasing the control of the pump, the user interrupts the dispensing of water to the evaporator.

25 Preferably, the pump is of the electrical impulse type, and the evaporator, also electric, is of the uncovered type, i.e. not pressurised.

Preferably, the dispenser is positioned to direct the flow of steam directly onto a comb and/or onto a brush housed in the receiving space of the apparatus.

30 In a particularly advantageous embodiment of the present invention, the apparatus also comprises a sub-apparatus for removing hairs of the type described in European patent EP

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1215977, i.e. a mechanical separator for removing the hairs that inevitably remain trapped between the teeth of the comb or the bristles of brushes during their use. In combination with the elements described above, the apparatus comprises at least one flexible whip for removing hairs from the teeth of a comb or from the bristles of a brush; the flexible whip extends from at least one rotary shaft to cyclically cross the receiving space for the comb or the brush. The apparatus also comprises suction means of the hairs removed by the whip, having the function of generating an air current in the receiving space, at least near to the contact area between the flexible whip and the comb, or the brush.

By the term "whip" it is intended a substantially wire-like elongated element.

The combination between the mechanical separator and the means for cleaning the combs and brushes with steam is synergic: the mechanical separator takes care of removing the hairs and the flow of steam performs a disinfecting action against the bacteria and residues, which may even be invisible, being present on combs and brushes.

The actuation of the separator and of the control of the pump for feeding steam are preferably independent. The best result is obtained by actuating firstly the mechanical separator and subjecting the comb or the brush to the jet of steam thereafter, once the hairs have been removed.

During the rotation of the rotary shaft, the or each whip strikes the comb or brush arranged at the receiving position, capturing or breaking possible hairs trapped between the teeth or the bristles, and the hairs or their fragments thus freed are removed by the suction air current.

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Preferably, the whips are distributed along an end portion of the rotary shaft, for example they are mounted in an articulated manner on a hub or a spinner that can be dismounted for replacement or cleaning.

- 5 The rotary shaft is preferably positioned horizontally, for which reason the whips rotate in a vertical plane.

More preferably, the separator comprises a first and a second rotary shaft that are parallel, each equipped with at least one whip.

- 10 Preferably the apparatus comprises a body-box inside which the receiving space is defined and the means for feeding steam and the mechanical separator are housed. The controls of the pump and the separator are preferably buttons arranged on the outer surface of the body-box, easy for the
15 user to reach.

Advantageously, the body-box comprises a container for collecting hair of the type with an extractable drawer, equipped with a filter for holding the hair. In this way the cleaning action of the filter is made easier.

- 20 Preferably, there is a motor in common, typically an electric motor, for moving a fan of the suction means, and the rotary shafts. As well as keeping the size and required power of the apparatus low, such a provision ensures that the untangling and sucking actions happen at the same time.

25 **Brief description of the drawings.**

- Further characteristics and advantages shall become clearer from the description of a preferred, but not exclusive, embodiment of a cleaning apparatus for combs and/or brushes, illustrated for indicating and not limiting
30 purposes in the attached schematic drawings, in which:

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- figure 1 is a perspective view of an apparatus according to the present invention;
- figure 2 is a front partial section view of the apparatus shown in figure 1;
- 5 - figure 3 is a side partial section view of the apparatus shown in figure 1;
- figure 4 is a transparent side view of the apparatus shown in figure 1;
- figure 5 is a transparent view from above of the apparatus shown in figure 1;
- 10 - figure 6 is a side section view of an optional component of the apparatus shown in figure 1;
- figure 7 is a plan section view of the component shown in figure 6;
- 15 - figure 8 is a cross section view of a rear portion of the component shown in figure 6;
- figure 9 is a cross section view of a front portion of the component shown in figure 6;
- figures 10 and 11 are front and partial views of the component shown in figure 6.
- 20

Detailed description of the invention.

The cleaning apparatus **1** for combs and/or brushes, shown in figure 1, comprises a body-box **1a** enclosing inside of it all of the elements suitable for the operation of the apparatus **1**, shown in detail in figures 4 and 5.

25

In particular, the apparatus **1** comprises a space **1b** for receiving at least one comb **P** and/or at least one brush **S**. The space **1b** can be closed with hatches hinged to the body-

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box **1a**, but preferably it is directly accessible from the outside of the same body-box **1a** as shown in figure 1, i.e. it opens towards the outside.

Advantageously, the apparatus **1** is provided with means for feeding a steam flow at a high temperature, i.e. at a temperature above 60°C, into the receiving space **1b**. The flow of steam carries out a disinfecting process against organic deposits, bacteria and in general against visible and invisible dirt possibly present on the brush **S** or on the comb **P** inserted into the space **1b**.

Preferably, the receiving space **1b** is divided by a wall into a top area and a bottom area and the flow of steam is fed to the top area. Alternatively, the space **1b** can be configured as a single space.

The means for generating steam comprise an electrically heated boiler, inside of which a liquid for sanification can be poured. The steam produced is channelled and directed to the receiving space **1b**.

Preferably, as shown in figures 4 and 5, the apparatus **1** comprises a tank **40**, provided with a pipe for filling with a sanification liquid, for example water or a solution of another type, and connected to a hydraulic circuit. The hydraulic circuit in turn comprises an evaporator **42** and a pump **41** for feeding the liquid from the tank **40** to the evaporator **42**. The pump **41** can be piezoelectric, with rotary blades, etc., but preferably it is an electrical pulse pump. The evaporator **42** is the component that actually generates steam by heating the volume of liquid provided by the pump **41**. Preferably, the evaporator **42** is not of the pressurised type, for reasons linked to safety, but it is of the uncovered type, i.e. at atmospheric pressure.

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Downstream of the evaporator, with respect to the direction of circulation of the liquid in the hydraulic circuit, there is a duct **47** that feeds the steam produced to a dispenser **48**, arranged to direct the flow of steam inside the receiving space **1b**, preferably into the top area of the space. The dispenser can, for example, be a nozzle that widens the flow of steam to reach all of the points of the space **1b** or of its top portion.

Preferably, the pump **41** is manually controlled by the user by means of a switch **43**. For all of the time in which the user actuates the switch **43**, the pump **41** feeds the liquid to the evaporator **42** and the steam flows into the space **1b**. The evaporator is in turn controlled by an on/off switch **44** that controls when it is switched on and off.

Preferably, the apparatus **1** is provided with means for adjusting the temperature of the steam fed to the combs **P** and to the brushes **S** in the receiving space **1b**. In the embodiment shown in the attached figures, the evaporator **42** is provided with temperature control devices **45** and **46**. The devices **45** and **46** intervene to adjust the flow of current to the electric heater located inside the evaporator **42** to keep the temperature of the steam around the desired value. Such devices **45** and **46** can in turn be controlled by the user, for example by means of an adjustment knob (not shown).

Figures 2 and 3 show the apparatus **1** during its use. The on/off button **44** of the evaporator **42** is down, i.e. the evaporator **42** is operating. A comb **P** is inserted into the top portion of the receiving space **1b**, i.e. the portion that is located above the dividing wall **52**. Insertion is carried out by the user through one of the openings **49a**, **49b** in the front wall **49**, preferably the opening **49a** closest to the dispenser **48**. By pressing the button **43**, the user actuates the pump **41** and the disinfectant liquid is

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taken from the tank **40** and fed to the evaporator **42** to generate the hot steam. The steam generated enters into the receiving space **1b** through the dispenser **48**, engulfing the comb **P** to sanitise the same against residue and bacteria.

- 5 The opening **49b**, intended for the brushes **S**, is larger than the opening **49a** and in relation to the latter it is positioned farther from the dispenser **48** to avoid the jet of steam being able to damage the fine bristles of the brushes **S**.
- 10 When the user releases the button **43**, the pump stops and the flow of steam reduces until there is none. The comb **P** taken out from the space **1b** has undergone an anti-bacterial disinfectant action from the flow of steam, and it is ready to be used.
- 15 Preferably, as shown in figure 3, on the wall **52** there is a spongy mat **50** the function of which is to absorb the possible drops of condensation that forms on the walls that define the receiving space **1b**.

20 On the top part, and/or on the sides of the body-box **1a** grids or openings **51** are formed that allow the steam to be released to the outside after having saturated the receiving space **1b**.

25 Preferably, the apparatus **1** also comprises a mechanical separator for removing hair from the teeth of the comb **P** and from the bristles of the brush **S**. The following description refers exclusively to the separator. This component should still be considered to be optional. In figures 6-11 the receiving space **1b** is only schematised with broken lines.

30 The separator is preferably positioned below the wall **52**, i.e. the component of the separator are positioned below the means for feeding the steam, therefore also below the

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receiving space **1b**.

As shown in figures 6 and 7, the separator comprises a motor **6**, typically electrical, equipped with a drive shaft **18** that takes care of both moving a fan **13**, and, through a belt transmission **10**, of moving horizontal shafts **8** coupled through gear wheels **9** at a first end, and carrying hubs **7** with relative whips **11** at the opposite end.

A hatch for inspecting the whips **2** is depicted mounted at the front, for example through a screw coupling **19**, **20**. As an alternative to the screw **20** there is a button **54** for switching the separator on.

The body-box **1a** has an opening **16** on top suitable for allowing the whips **11** to come out during the rotation of the shafts **8**. The opening **16**, which opens into the bottom portion of the receiving space **1b**, also allows air to enter that is sucked in by the fan **13** through an air manifold **12** and a passage **17**, connected to a container **3** for collecting hair and other removed waste, preferably in a removable drawer.

Between the opening **16** and the passage **17** a substantially vertical suction duct is therefore defined below the rotary shafts **8**.

The section view of figure 7 allows the section of the air manifold **12** to be seen in plan, connected to a filter **5** housed inside the container **3**, in turn closed by a cover **4**, represented removed from its seat.

It can also be noted that, in order to prevent the whips of the two shafts from interfering with each other during their rotation, the whips **11** of the two shafts **8** are axially shifted.

Preferably, the rotary shafts **8** are a distance apart

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substantially equal to the length of the whips **11**, to keep down the overall size of the apparatus **1**.

Figure 8 represents the extension along the side of the manifold **12**, which, starting from the fan **13**, reaches the
5 filter **5**.

Figure 9 clearly shows the connection between the drive shaft **18**, the fan **13** and the rotary shafts **8** through the transmission **10** and the gear wheels **9**.

It is also possible to see the particular shape of the
10 container **3** for collecting hair, of variable height to insert below the motor **6**. In figures 1-5 the container **3** is in a different position.

Figures 2, 10 and 11 schematically show the action of the untangling whips **11**.

15 In figure 2 it is possible to see, indicated by the arrows, the direction of rotation and the peripheral extension that the whips **11** take up thanks to centrifugal force. In particular, the rotary shafts **8** are counter-rotating in directions such that the respective whips **11** converge from
20 the receiving position of the brush **S**, centrally above the rotary shafts **8**, towards the suction air current, in which the hair removed by the bristles of the brush **S** are conveyed.

Figures 10 and 11 illustrate how the whips **11**, which are
25 flexible, yield when in their path they meet the bristles of a brush **S**, or the teeth of a comb **P**, respectively, arranged in the receiving position.

In greater detail, the operation of the separator of the apparatus **1** is the following.

30 By acting upon the switch **54** the electric motor **6** is fed

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with power, which, in its circular motion, actuates both the fan **13** and the rotary shafts **8** and therefore the whips **11** facing the opening **16** of the body-box **1a**. The movement of the fan **13** in the manifold **12** shaped like a toric chamber causes a continuous air flow in the apparatus **1**, drawing it through the opening **16** where the untangling whips **11** are in action; the air sucked in enters into the drawer-type collection container **3**, goes past the filtering meshes of the filter **5** and is discharged clean to the outside through the slits **14**.

A continuous intake and discharge condition thus is established, suitable for collecting and holding all of the solid residue that is located in the vicinity of the opening **16** where the untangling whips **11** act.

The untangling and cleaning action is carried out by the whips **11**, which during the rotation of the rotary shafts **8** cyclically cross the position for receiving the comb **P** or the brush **S**, near to the opening **16**, and here they hook onto and effectively pull away the hairs and other residue tangled between the bristles of the brush **S** or between the teeth of the comb **P**. The movement of the shafts **8**, and therefore of the whips **11** mounted on hubs **7** fixedly connected to them, is counter-rotating; this allows that which is removed to be conveyed towards the centre, where the flow of intake air has no trouble in capturing the residue and the hair and in conveying it into the collection container **3**.

In the practical embodiment of the apparatus of the invention the most functional whips **11** shall be selected in conformity with the tools that will have to clean. Therefore, they can be rigid or more or less flexible and/or mounted in an articulated manner orbitally on the carrying hubs **7**.

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Alternatively, each whip **11** may consist of the free end of a continuous wire, for example an elastic wire, wound on a reel.

5 The operation of the separator of the apparatus **1** is also shown in figure 2. The front access hatch **28** has a projection **31** that, in the open position illustrated, cooperates with the switch **52**, connected to the motor **6** through electrical connections that are not shown.

10 The apparatus **1** can undergo modifications. For example, separate motors could be provided to move the fan **13** and the rotary shafts **8**, just as the motion transmission systems could be different. For example, two separate transmission chains could be provided for the two rotary shafts **8** and the transmissions chains could be made through
15 gears, belts or rubber-coated pulleys coupled by friction.

As far as the number of whips **11** is concerned, it should be understood that numerous embodiments can be devised. Indeed, whereas on the one hand a single rotary shaft with a single whip **11** could be sufficient, on the other hand the
20 single rotary shaft or each rotary shaft could be equipped with at most two whips distributed along a circumference or axially spaced.

For the means for collecting the hair, as an alternative to the drawer equipped with a filter, it is possible for
25 example to use a collection bag like those used in vacuum cleaners.

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CLAIMS

1. Cleaning apparatus (1) for combs (P) and/or brushes (S), comprising a space (1b) for receiving at least one comb (P) and/or at least one brush (S), characterised in that it comprises means (40, 41, 42, 47, 48) for feeding a flow of steam into said receiving space (1b).
5
2. Apparatus (1) according to claim 1, characterised in that said receiving space (1b) opens towards the outside of the apparatus (1).
- 10 3. Apparatus (1) according to claim 1 or claim 2, characterised in that said means for feeding steam comprise a tank (40) for a disinfectant liquid, an evaporator (42) of said liquid, a hydraulic circuit for feeding the liquid from the tank (40) to said evaporator (42) and a dispenser
15 (47, 48) of the steam into said receiving space (1b).
4. Apparatus (1) according to claim 3, characterised in that said hydraulic circuit comprises a pump (41) and a control (43) for its actuation by the user.
5. Apparatus (1) according to claim 4, characterised
20 in that said pump (41) is of the electrical pulse type and said evaporator (42) is of the uncovered electric type.
6. Apparatus (1) according to one of claims 3-5, characterised in that said dispenser (42) is positioned to direct the flow of steam directly onto a comb (P) and/or
25 onto a brush (S) housed in said receiving space (1b).
7. Apparatus (1) according to one of claims 3-6, characterised in that it also comprises means for adjusting the temperature of the steam fed to the receiving space (1b) above 60 degrees centigrade.
- 30 8. Apparatus (1) according to one of claims 1-7,

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characterised in that it also comprises,

- at least one flexible whip (11) for removing hair from the teeth of said comb (P) or from the bristles of said brush (S), said flexible whip (11) extending from at least one rotary shaft (8) to cyclically cross said receiving space for the comb (P), or for the brush (S), and
- suction means (12, 13) for generating an air current in said receiving space, at least near to the contact area between said flexible whip (11) and the comb (P), or the brush (S).

9. Apparatus (1) according to claim 8, characterised in that it comprises means (3, 5) for collecting the hair sucked up by the suction means (12, 13).
10. Apparatus (1) according to claim 8 or claim 9, characterised in that it comprises a first (8a) and a second (8b) rotary shaft that are parallel, equipped with at least one respective whip (11).
11. Apparatus (1) according to claim 10, characterised in that the first (8a) and the second rotary shaft (8b) are counter-rotating in directions such that the respective whips (11) converge from the receiving position towards the suction air current.
12. Apparatus (1) according to claim 10 or claim 11, characterised in that the rotary shafts (8) are a distance apart substantially equal to the length of the whips (11).
13. Apparatus (1) according to any one of the previous claims 10-12, characterised in that the whips (11) are mounted in an articulated manner.
14. Apparatus (1) according to any one of the previous claims 10-13, characterised in that the whips (11) are mounted on removable hubs (7).

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15. Apparatus (1) according to one of claims 1 to 14, characterised in that it is housed in a body-box (1a) inside which said receiving space is defined, in turn provided with a container (3) for collecting hair in a
5 removable drawer equipped with a filter (5) for holding the hair.

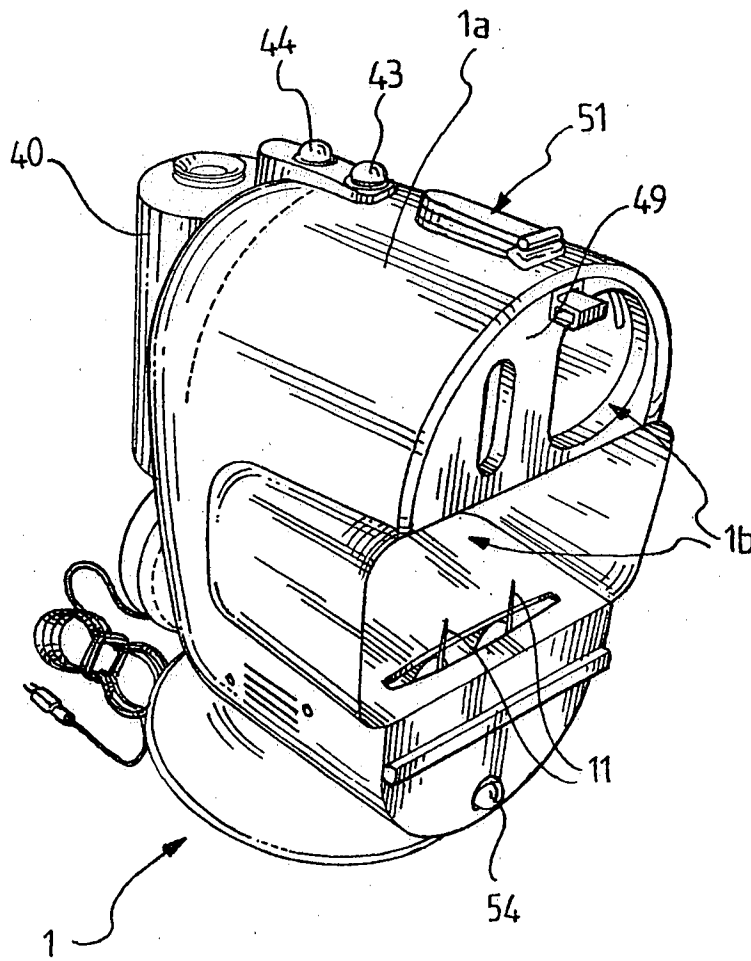


Fig. 1

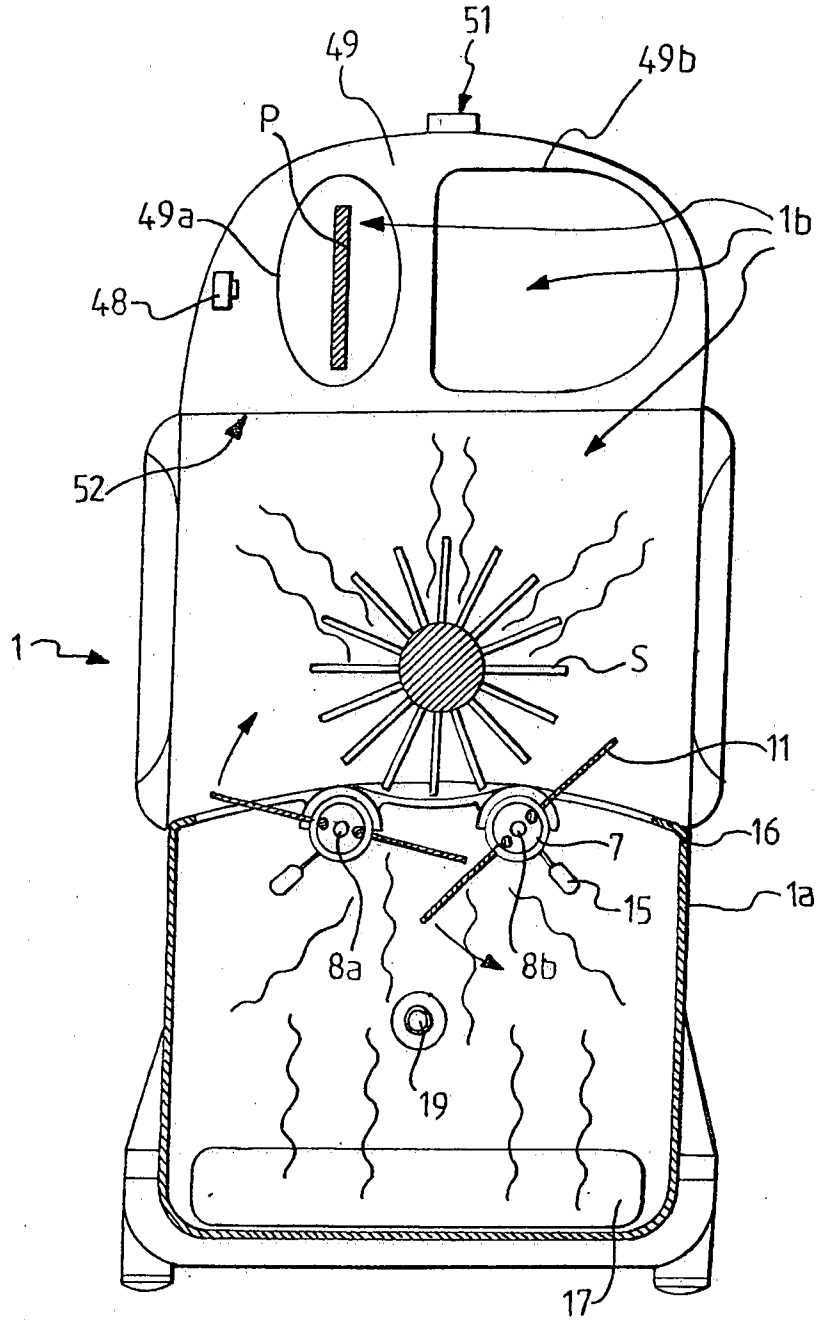


Fig. 2

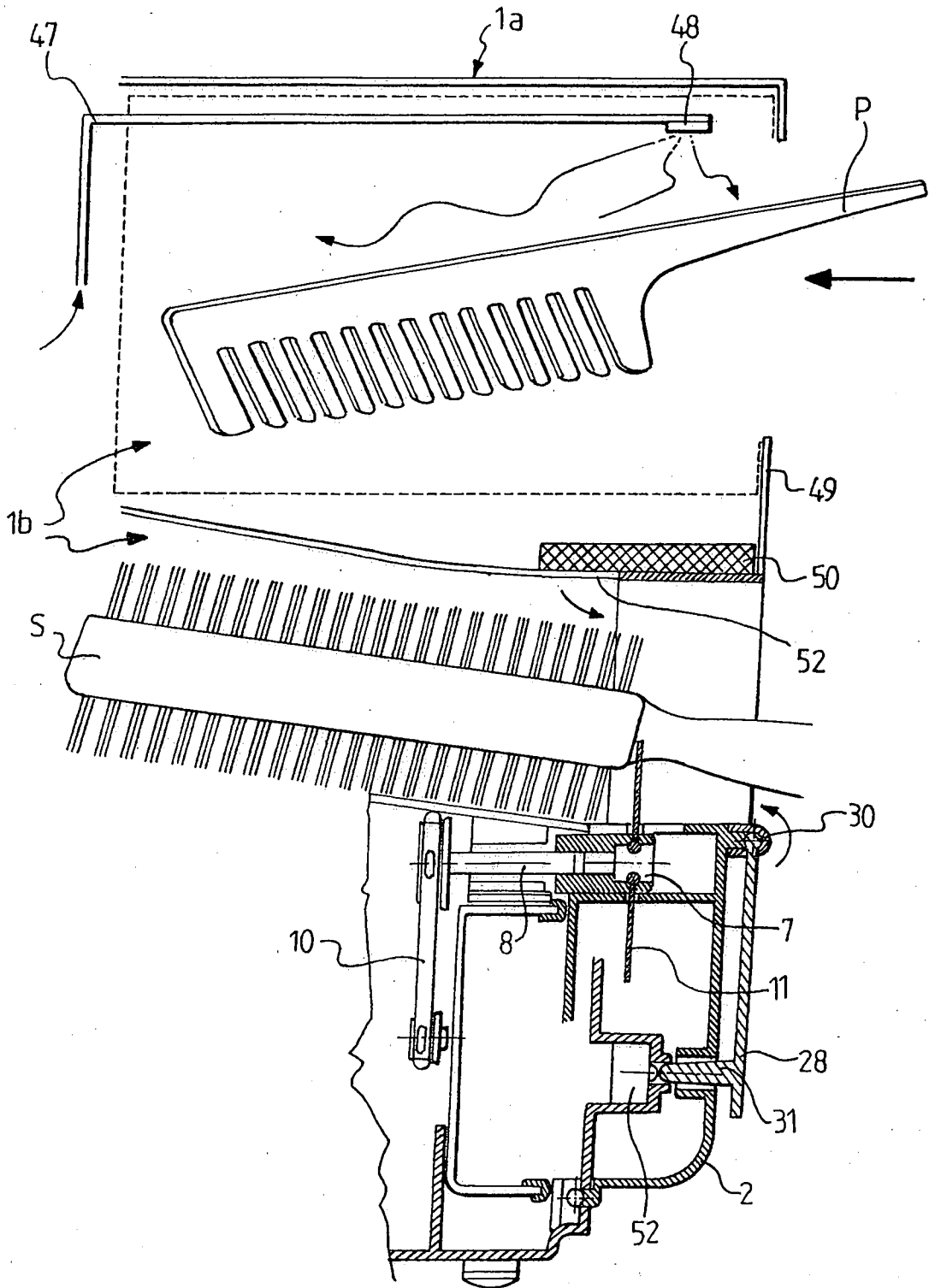


Fig. 3

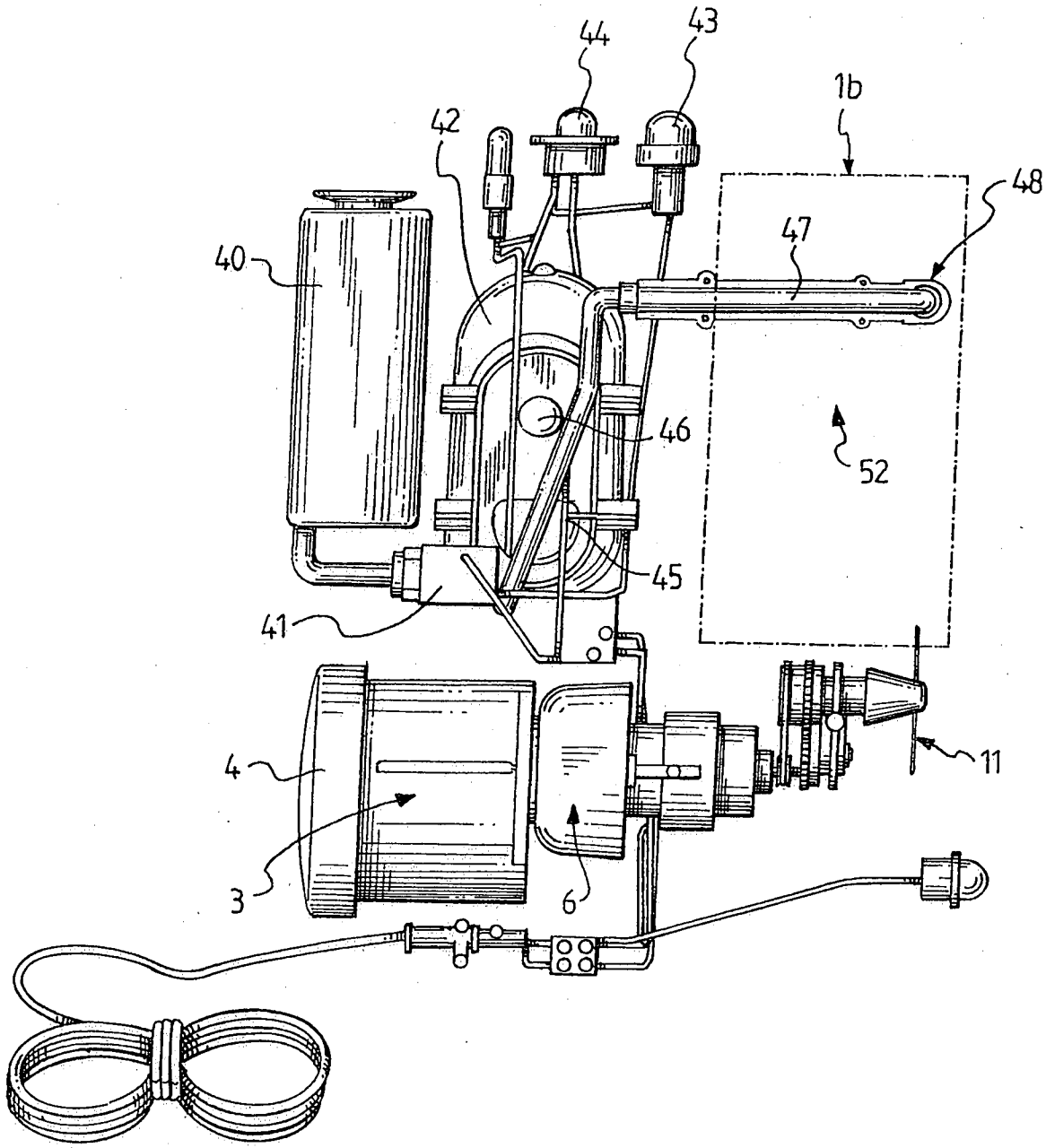


Fig. 4

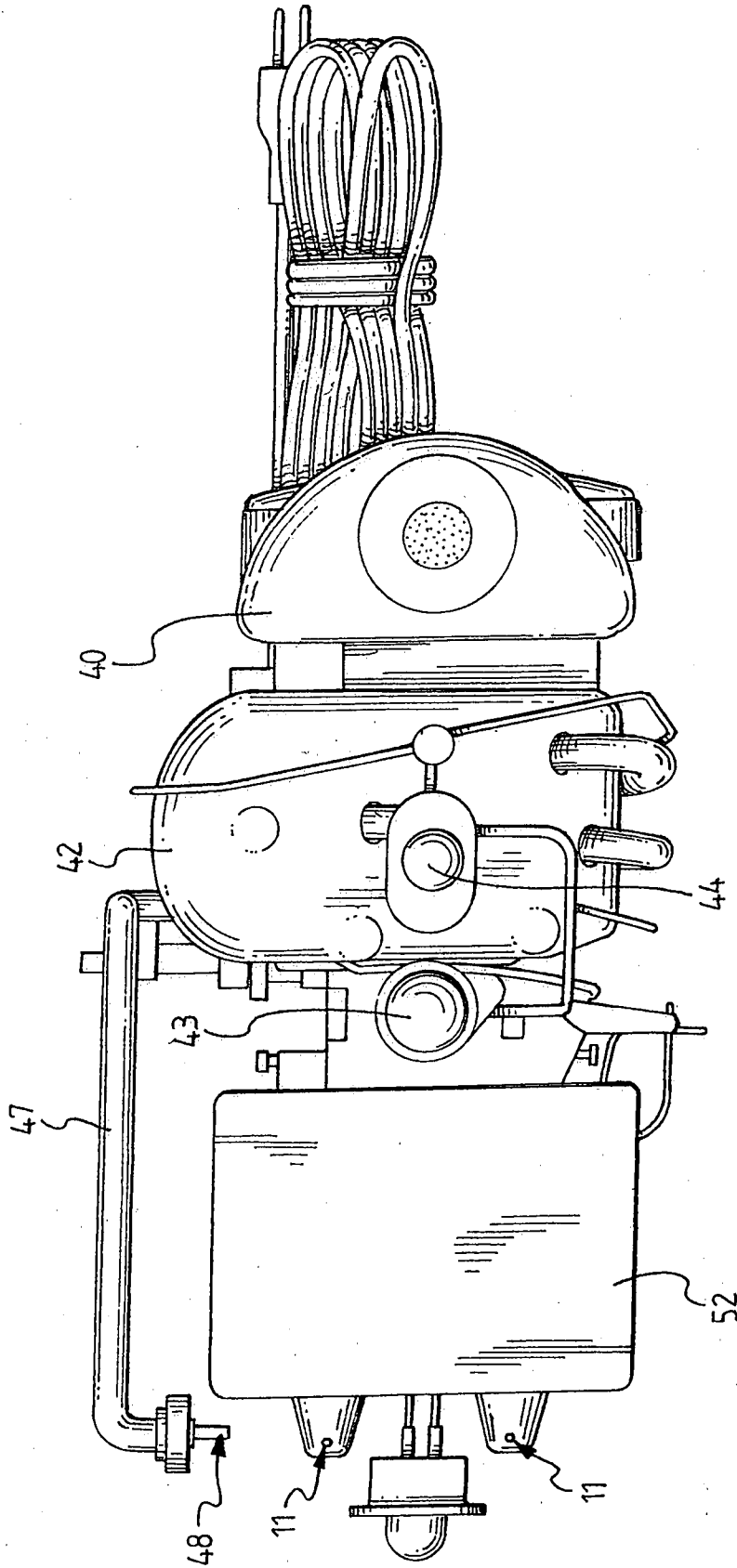


Fig. 5

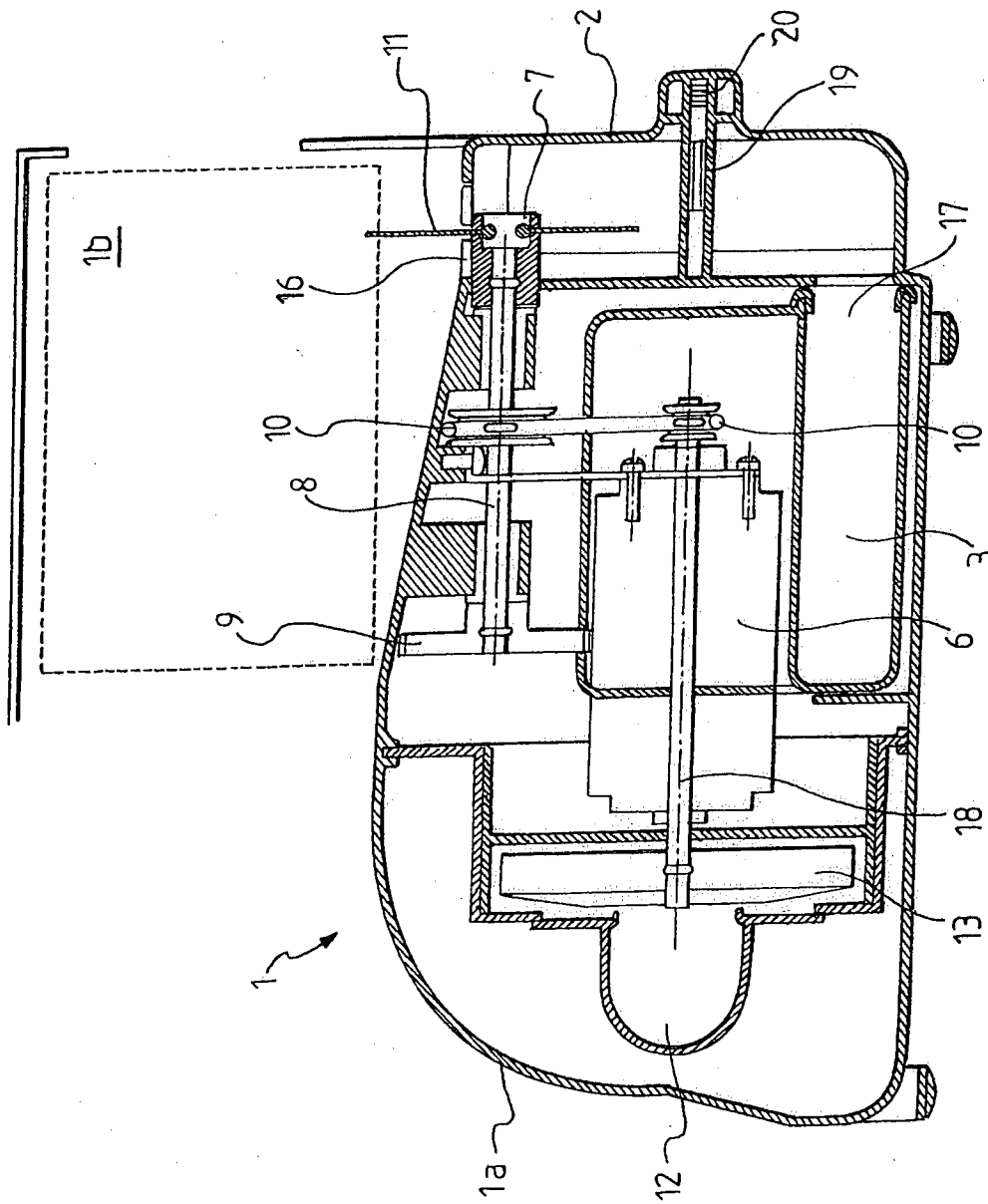
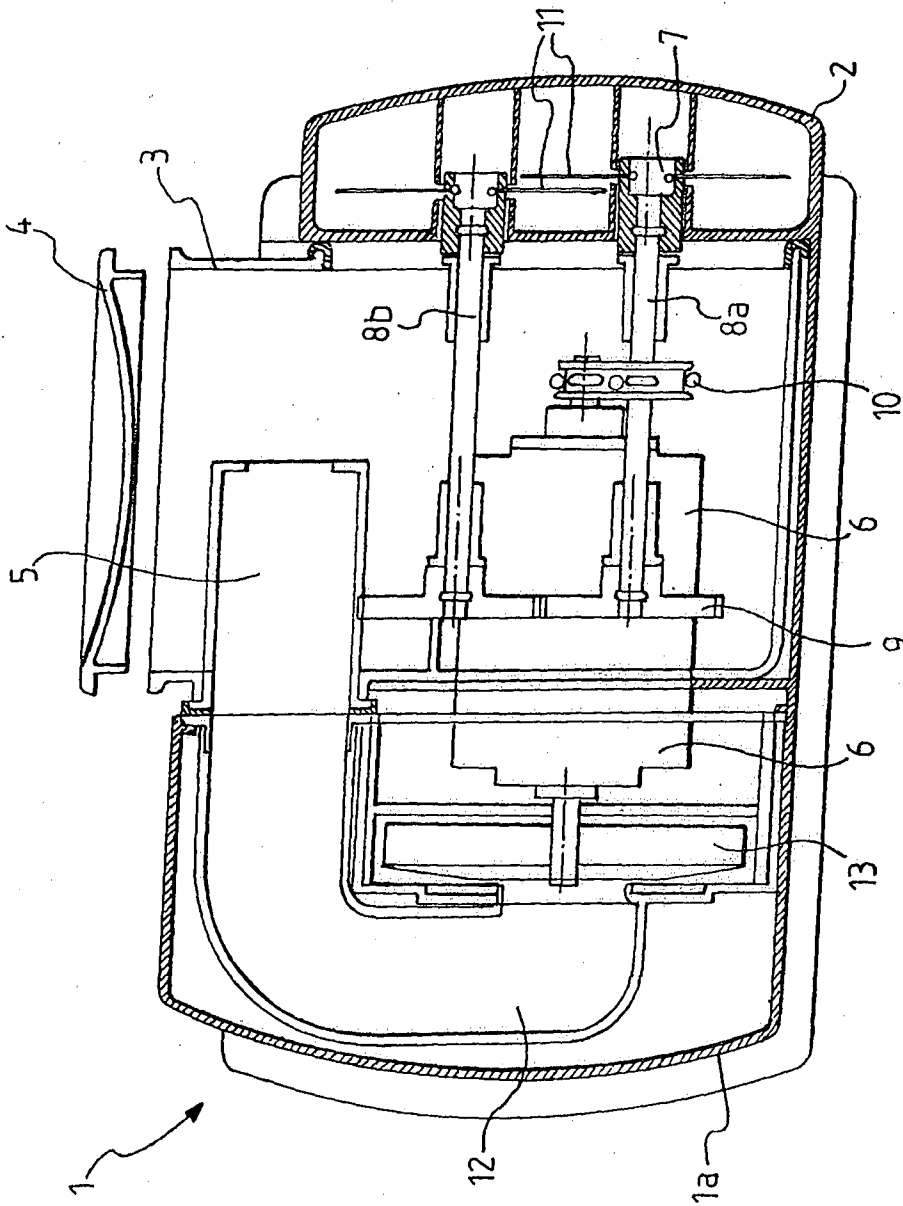


Fig. 6

Fig. 7



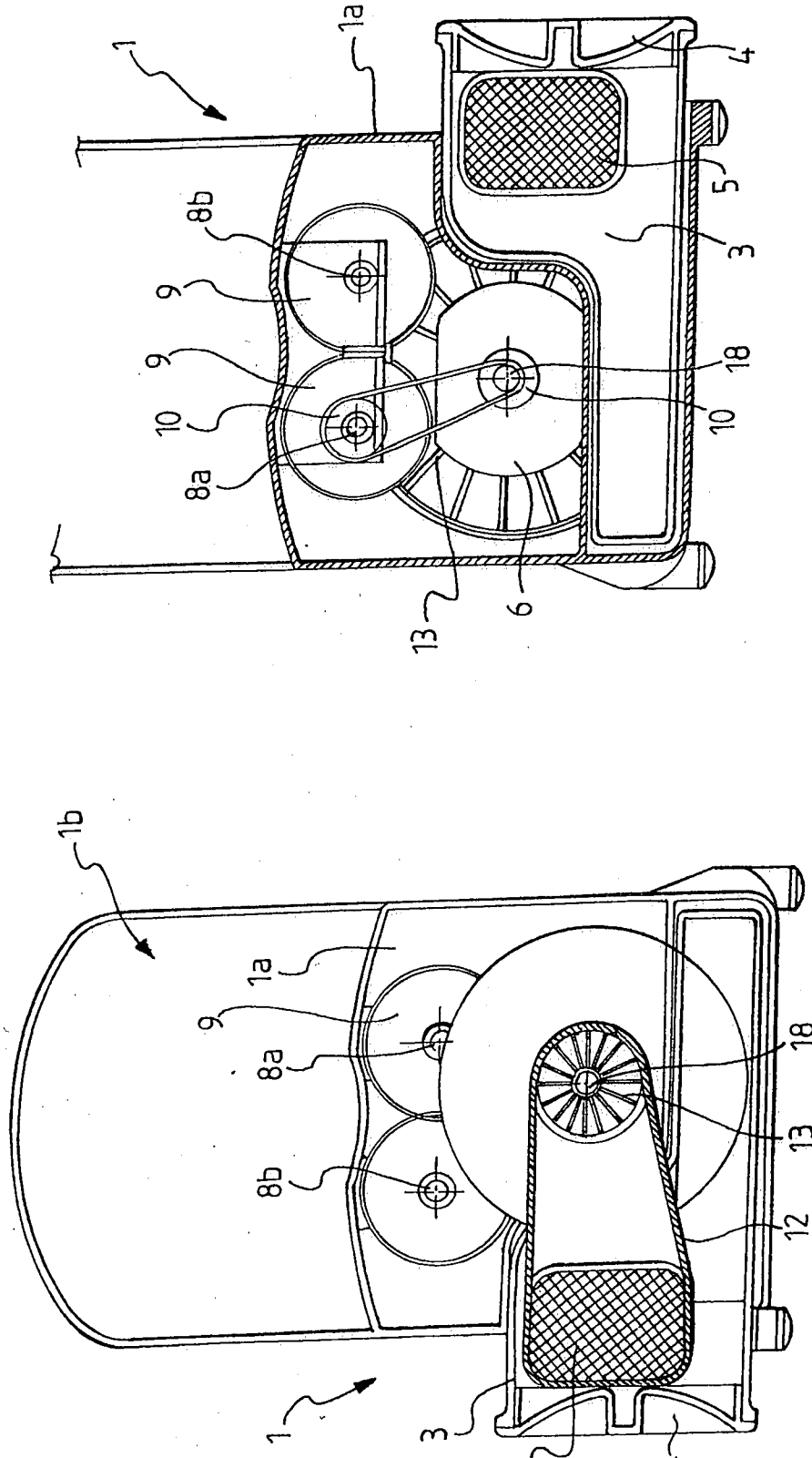


Fig. 9

Fig. 8

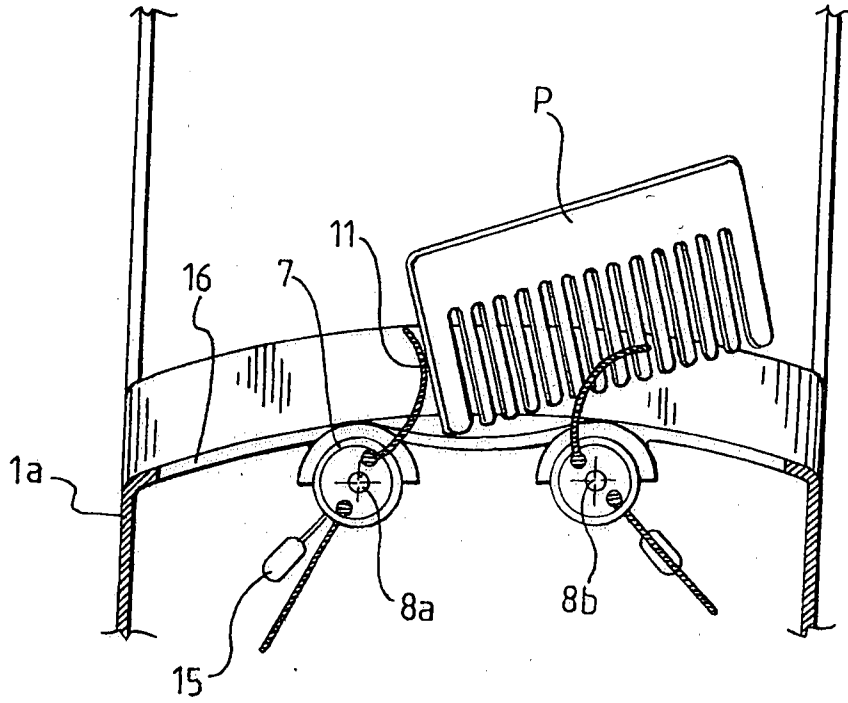


Fig. 10

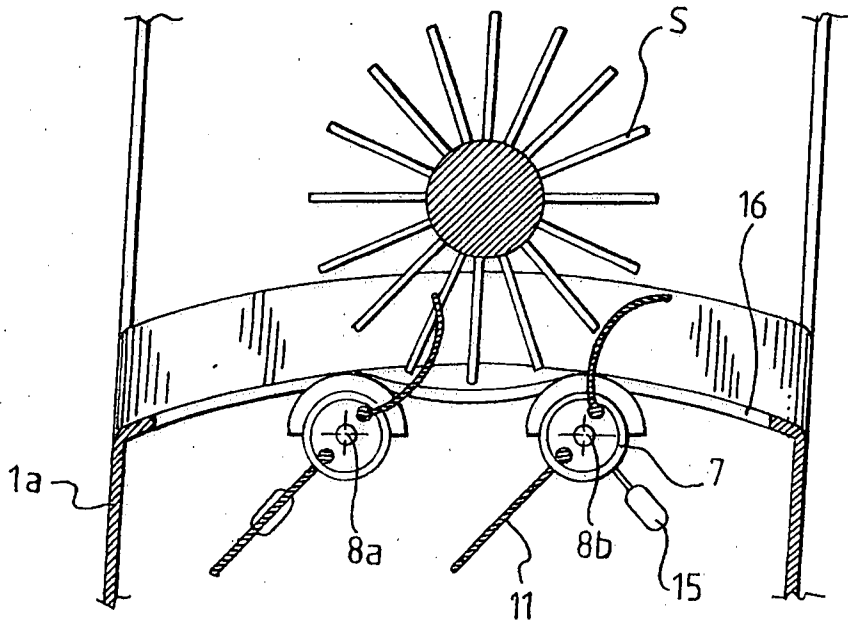


Fig. 11

INTERNATIONAL SEARCH REPORT

International application No
PCT/IT2008/000607A. CLASSIFICATION OF SUBJECT MATTER
INV. A46B17/06 A61L2/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A46B A61L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 230 870 A2 (DOUSS LINE S R L [IT]) 14 August 2002 (2002-08-14) the whole document	1-7
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Information on patent family members

International application No PCT/IT2008/000607

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