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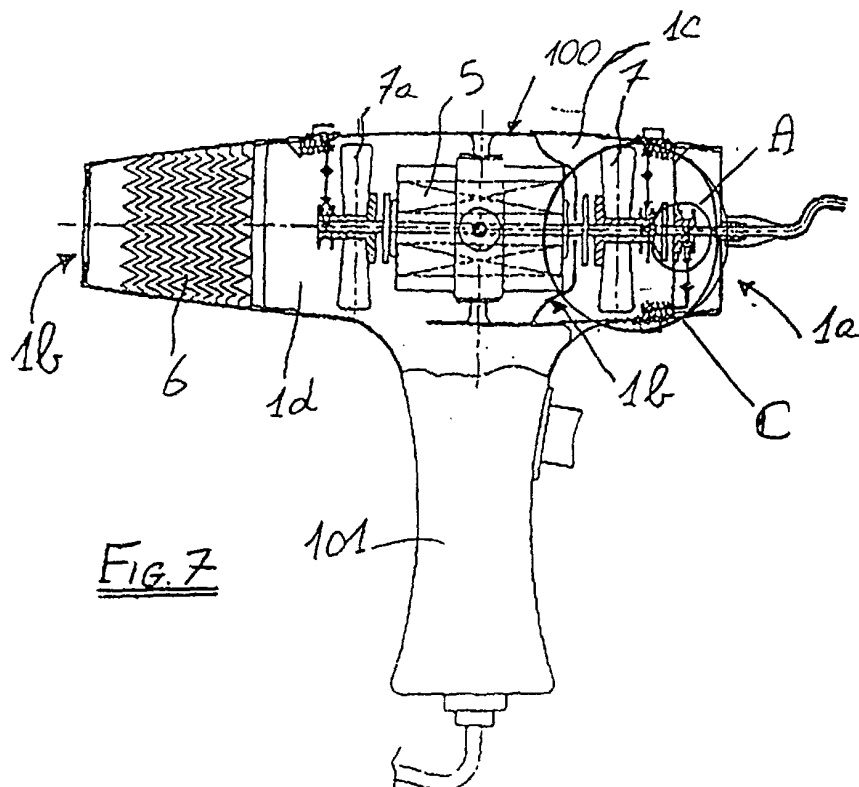
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(54) **Multifunctional hair-dryer, in particular for eliminating dandruff**

(57) A multifunctional hair-dryer device includes: a containing case (1); an air inlet aperture (1a), an air outlet aperture, a motor (5) situated inside said case (1); at least one fan (7) fastened to the output shaft (5a) of the motor (5) to generate a flow of air between the inlet aperture (1a) and the outlet aperture (1b); a heating element (6) for heating the flow of air; means (2) for operating the motor (5). The shape of the rear end of the case in the region of the air inlet aperture (1a) is such that a series of additional fittings can be coupled thereto to be operated by supplying them with driving force or by aspiration.

ment (6) for heating the flow of air; means (2) for operating the motor (5). The shape of the rear end of the case in the region of the air inlet aperture (1a) is such that a series of additional fittings can be coupled thereto to be operated by supplying them with driving force or by aspiration.



Description

[0001] The present invention relates to the technical field concerning hair-dryers, commonly called "phon".

[0002] In this case, the present invention relates to a multifunctional hair drying device, i.e. a device which is capable of performing additional operations, besides the traditional hair drying, e.g. eliminating of dandruff from the scalp.

[0003] Traditional hair dryers generally include a hollow, basically "T"-like plastic body, which forms a handle and a head, orthogonal to the handle.

[0004] The head longitudinal ends feature a rear and a front aperture, for respectively aspirating air from the environment, and for blowing suitably heated air at the other side.

[0005] An electric motor, supported inside the head, features a fan integrally keyed onto the output shaft.

[0006] A group of electric resistances, situated near the head front aperture, heats the flow of air coming from the rear aperture due to Joule effect.

[0007] The hair-dryer power cord is connected to the handle, which houses circuitry and buttons operating the electric motor, which usually works with different speeds.

[0008] The power cord supplies power to the electric motor and to the group of resistances.

[0009] The air, aspirated through the head rear aperture due to the rotation effect of the fan keyed onto the shaft of the electric motor, is pushed through the group of resistances and heated.

[0010] The heated air leaves the head through the opposite part, i.e. the front aperture.

[0011] Thus, the user's wet hair is gradually dried by the hot air directed towards it.

[0012] The object of the present invention is to propose a multifunctional hair-dryer device, which can perform, simultaneously or alternatively, additional operations, different from the traditional hair drying.

[0013] Another object of the present invention is to propose a hair-dryer device, which is capable of filtering the air before it is sent to the hair.

[0014] A further object of the present invention is to propose a hair-dryer device which is capable of removing and collecting the dandruff from the scalp and the surrounding clothes.

[0015] A still further object of the present invention is to propose a hair-dryer device which is capable of operating, according to particularly simple and rapid techniques, fittings for personal and domestic animals care and hygiene.

[0016] A yet further object of the present invention is to propose a hair-dryer device obtained by a simple, extremely functional and flexible technical solution, which ensures particularly high reliability.

[0017] The above mentioned objects are obtained in accordance with the content of the claims.

[0018] The characteristic features of the present in-

vention will be pointed out in the following description of a preferred, but not only embodiment, with reference to the enclosed drawings, in which:

- 5 - Figure 1 is a schematic, lateral partially section view of the proposed hair-dryer device according to a first portable-type embodiment;
- Figure 2 is a schematic general lateral view of the device of Figure 1;
- 10 - Figures 3 and 4 are schematic lateral views of two fittings of the device;
- Figure 5 is a schematic, lateral fragmentary section view of the proposed hair-dryer device according to another portable-type embodiment;
- 15 - Figures 5a and 5b are schematic lateral views of two fittings of the device;
- Figure 6 is a schematic general lateral view of the device of Figure 5;
- Figure 7 is a schematic, lateral fragmentary section view of the proposed hair-dryer device according to a particular embodiment, which drives mechanically operated fittings;
- 20 - Figure 7a is a schematic, enlarged view of the particular A of Figure 7;
- 25 - Figure 8 is a schematic general lateral view of the device of Figure 7;
- Figure 9 is a schematic, very enlarged view of the particular C of Figure 7;
- 30 - Figures 10 and 10a are schematic front and lateral views of the particular D of Figure 9;
- Figures 11, 12 are schematic lateral and plan section view of the proposed hair-dryer device according to a third, stationary embodiment;
- 35 - Figures 13, 14 are schematic front and lateral views of mechanical speed reducing means.

[0019] With reference to the above described Figures, the reference numeral 1 indicates a hollow case formed by a head 100 and a handle 101, which constitute the proposed multifunctional hair-dryer device.

[0020] The head 100 features a rear aperture 1a, through which aspirated air enters, and a front aperture 1b, through which the air leaves. The two openings are substantially aligned with each other.

45 **[0021]** The central part of the head 100 houses an electric motor 5, suitably supported thereby.

[0022] A fan 7 is keyed onto the shaft 5a of the electric motor 5, so that, when the motor is operated, it generates a flow of air between the inlet opening 1a and the outlet opening 1b.

50 **[0023]** A group of resistances 6 are situated inside the head 100, near the front aperture 1b, to heat, due to Joule effect and according to known techniques, the flow of air passing through the head (Figure 1).

55 **[0024]** A set of buttons 2 and the supply circuitry of both the electric motor and the group of resistances 6, are situated inside the handle 101.

[0025] In the region of the air inlet opening 1a, the

head 100 is shaped in such a way that it can be removably coupled with a container 4, which is equipped with a filter 4a and with a non-return valve 4b (Figure 1).

[0026] The container 4 collects the dandruff and the impurities contained in the aspirated air due to the combined action of the filter 4a and the non-return valve 4b.

[0027] The bottom of the container 4 is advantageously open or closed with a grating or net.

[0028] If the bottom of the container 4 is open, it couples removably with a first hub 10, whose aperture section is limited and/or shaped, (Figure 3), or with a second hub 11, equipped with a shank 11a, which fits inside a flexible duct 12 (Figure 4), which can end with another hub.

[0029] The proposed hair-dryer device includes also friction clutch means 9, which are operated by operating means 8 to engage with the output shaft 5a and which extend outside the rear end of the head 100.

[0030] A suitable hug-like support 13, fastened to the head rear end, carries a flexible cable 15, which is driven into rotation by the friction clutch means 9. The flexible cable 15, contained in a co-axial sheath 14, is connected to an additional, mechanically operated, fitting, e.g. razor, hair-removers, hair-cutters, nail clippers, shoes shining brushes, clothes vacuum cleaners, etc. (Figure 7a).

[0031] The co-axial sheath 14 is fastened to the hug-like support 13 by a piece of pipe 13a, which extends outside the hug-like support 13.

[0032] The operating means 8 include a button, situated outside the case, e.g. on the head 100, and connected with the friction clutch means 9 by a lever 8c.

[0033] Due to a suitable friction system 5c, the fan 7 can be fixed to the shaft 5a of the electric motor 5, on which it is mounted idle.

[0034] Slots 3, letting additional air into the head 100, are situated in the portion of the head 100 between the fan 7 and the rear end of the case 1, to which the above mentioned additional fittings are coupled.

[0035] A moving ring nut 3a allows to choke the slots 3 opening; the ring nut 3a can be operated either manually or by electric and/or electronic means.

[0036] The electric motor 5 is operated by acting on the hair-dryer operating button 2 and drives the fan 7 into rotation, which makes the rear aperture 1a intake air, thus setting the surrounding area in depression.

[0037] This allows, according to known techniques, to eject the flow of air thus created and heated by the group of resistances 6 through the front aperture 1b.

[0038] According to a second embodiment, the output shaft 5a of the motor 5 extends from both extremities thereof and carries a second fan 7a, in a position opposite to the first fan 7.

[0039] In this case, a separating wall 1b advantageously defines two hermetic chambers, first 1c and second 1d, in which the first fan 7 and the second fan 7a work, respectively.

[0040] The flow of air, entering the first hermetic

chamber 1c through the rear aperture 1a and leaving it through the slots 3, allows to suck dandruff and/or impurities.

[0041] The second hermetic chamber 1d features, made near the second fan 7a, slots 3a letting air in from outside.

[0042] Another moving ring nut adjusts the opening section of the slots 3a.

[0043] The flow of hot air present in the second hermetic chamber 1d allows to dry wet and/or humid hair.

[0044] The above flow of air enters the second hermetic chamber 1d through the above mentioned slots 3a and leaves it, after having been heated, through the front aperture 1b.

[0045] The second fan 7a can be also mounted idle on the output shaft 5a of the motor 5 and driven thereby by means of a friction system 5b, which is operated by a button 8a acting via a corresponding lever.

[0046] The above mentioned friction clutch means 9 include a sleeve 18, mounted idle on the output shaft 5a and carrying, keyed thereon, the first fan 7, whose head section is widened and turned toward a disc fastened co-axially on the output shaft 5a.

[0047] The sleeve 18 is operated by a fork 8c, which engages a circumferential groove made thereon. The sleeve 18 takes, operated by a button 8 accessible from outside of the case, two extreme positions, in one of which the sleeve head is brought in touch with the disc fastened on the output shaft 5a, thus defining a rotational connection between the fan 7 and the output shaft 5a.

[0048] Figures 11, 12 show a third, stationary-type embodiment of the proposed hair-dryer device.

[0049] According to this embodiment, the case 1 defines a second hollow space separated from the first one and equipped with related inlet and outlet air apertures.

[0050] The motor 5 is supported in a wall separating the two hollow spaces and its shaft 5a extends in both hollow spaces and supports both fans 7, 7a.

[0051] Two hoses, a first hose 12a and a second hose 12, connected respectively to the air outlet and inlet apertures, deliver and aspirate air, respectively.

[0052] The fans, first 7 and second 7a, are connected to the output shaft 5a by the friction system 5b, which are connected to operating means 8, 8a accessible from outside of the case 1.

[0053] Each element of the friction system 5b includes a sleeve 18, mounted idle on the output shaft 5a, the latter supporting, keyed thereto, the respective fan 7, 7a, whose head section is widened and turned toward a disc fastened co-axially to the output shaft 5a.

[0054] The sleeve is operated by a fork 8c which engages inside a circumferential groove made in the sleeve. The sleeve 18 is operated by a button 8, 8a accessible from outside of the case and takes two extreme positions: in one position the sleeve head touches the disc fastened to the output shaft 5a, thus rotationally connecting the fan 7, 7a and the output shaft 5a.

[0055] In this wall hair-dryer device, one of the fans

7, 7a is connected with one of coupling elements 21b, whose shape allows it to couple with a series of additional fittings, delivering driving force at a distance, e.g. razor, hair-removers, hair-cutters, nail clippers, shoes shining brushes, clothes vacuum cleaners, etc.

[0056] For this purpose, the coupling element 21b is fastened coaxially to the relative fan 7 and features a seat, inside which a flexible cable contained in a sheath can be introduced to operate mechanically the above mentioned additional fittings.

[0057] Also the coupling element 21b can be connected to the fan 7 or to the output shaft 5a by a friction coupling element.

[0058] The coupling element 21b can include a series of toothed wheels 22 connected one to another in cascade and driven to rotate by a friction coupling element, fan 7 or the output shaft 5a.

[0059] A duct 23a, inside which a non-return valve 4b and a filter 4a are situated, is placed in the area included between the second fan 7 and the corresponding inlet aperture.

[0060] A third fan 21, situated inside the duct 23a, is operated by the air aspirated by the second fan to generate mechanical force, transmitted to the above mentioned additional fittings by the coupling element 21b, which is accessible from outside of the case.

[0061] The coupling element 21b is fastened coaxially to the third fan 21 and features a seat, inside which a flexible cable contained in a sheath can be introduced to operate mechanically the additional fittings.

[0062] The coupling element 21b includes a series of toothed wheels 21a connected one to another in cascade and driven into rotation by the third fan 7.

[0063] Therefore, the described hair-dryer device can perform, simultaneously or alternatively, additional operations, different from the traditional hair drying.

[0064] In case of only one fan keyed onto the motor shaft, it is possible to use the suction effect in correspondence to the rear aperture to collect, by containers and/or hubs, impurities present in the air, in particular dandruff from the scalp and the surrounding clothes.

[0065] In this case it is possible to activate mechanically operated fittings, suitably connected to the flexible cable extending from the support hub and engaging with the rear area of the proposed device case.

[0066] Moreover, a pair of fans can be provided, each of which works in a corresponding hermetic chamber, so as to separate completely the functions of hot air delivery from the air aspiration, thus allowing their simultaneous or single use.

[0067] Suitable friction systems allow to separate the rotation of the motor shaft from the rotation of the fan/s by acting on suitable controls, which can be operated manually or electrically.

[0068] The proposed hair-dryer device uses the effects deriving from the hot air delivery, performing simultaneously either an aspiration function or the supply of rotation driving force.

[0069] The proposed hair-dryer device is particularly useful either for domestic or professional use, and appears to be suitable for aspiration and collecting of the dandruff from the air by drawing it from the scalp.

[0070] The proposed hair-dryer device is also indicated for brushing and aspirating of dust from clothes, for drying and cleaning domestic animals' hair and for operating additional fittings, e.g. razors and hair-removers.

[0071] This relates to portable devices as well as to those stationary, fastened to walls.

[0072] The possibility to use pipes, joints and flexible cables allows to use the fittings even at a big distance from the proposed device.

[0073] The above mentioned objects are obtained by a simple, extremely functional and flexible technical solution, which assures particularly high reliability and which can operate, according to particularly simple and rapid techniques, fittings for personal and domestic animals care and hygiene.

Claims

1. Multifunctional hair-dryer device including:

a containing case (1);

at least one air inlet aperture (1a), situated at the rear end of said case;

at least one air outlet aperture, situated at the front end of said case;

at least one motor (5) situated inside said case (1);

at least one fan (7) fastened to the output shaft (5a) of said motor (5), for generating a flow of air between said inlet aperture (1a) and said outlet aperture (1b);

at least one heating element (6) situated inside said case (1), for heating said flow of air;

operating means (2), for operating said motor (5);

said device being **characterized in that** the shape of the rear end of said case, in the region of said air inlet aperture (1a), is such that a series of additional fittings can be connected therewith to be operated by delivery of driving force or by aspiration.

2. Device, according to claim 1, **characterized in that** dandruff or other impurities removed by aspiration through said inlet aperture (1a) are collected in a container (4) connected to said rear end of said

case (1) and equipped with a filter (4a) as well as with a non-return valve (4b), said container having the bottom open or closed with a net.

3. Device, according to claim 2, **characterized in that** a hub (10) is connected to the open bottom of the container (4), the hub having an aperture with limited section and/or shaped. 5
4. Device, according to claim 2, **characterized in that** a hub (11) is connected to the open bottom of the container (4), the hub (11) being equipped with a shank (11a) fitting inside a flexible duct (12), which can end with another hub. 10
5. Device, according to claim 1, **characterized in that** it includes friction clutch means (9), which are operated by operating means (8) for engaging with the output shaft (5a), said friction clutch means (9) being accessible from outside of said rear end, with a hub support (13) being connected to the rear end and supporting a flexible cable (15), which engages with said friction clutch means (9), to be driven into rotation, said flexible cable being contained in a coaxial sheath (14) and connected to a mechanically operated additional fitting. 15 20 25
6. Device, according to claim 5, **characterized in that** said coaxial sheath (14) is fastened to said hub support (13) by a portion of pipe (13a) which extends from the outer part of the hub support (13). 30
7. Device, according to claim 5, **characterized in that** said friction clutch means (9) includes a series of toothed wheels connected one to another in cascade. 35
8. Device, according to claim 5, **characterized in that** said operating means (8) include a button outside said case, which is connected with said friction clutch means (9) by a lever (8c). 40
9. Device, according to claim 1, **characterized in that** said fan (7) is mounted idle on the output shaft (5a) of the motor (5) and can be fixed to the output shaft by a friction system (5c). 45
10. Device, according to claim 1, **characterized in that** slots (3) are situated between said fan (7) and the rear end of said case (1), to which the additional fittings are associated, for letting in additional air, the opening of said slots (3) being adjusted by a moving ring nut (3a). 50
11. Device, according to claim 1, **characterized in that** the output shaft (5a) of said motor (5) extends from both sides thereof and carries a second fan (7a), in a position opposite to the first fan (7), and **in that** it 55

includes a wall (1b) which defines at least two hermetic chambers, a first chamber (1c) and a second chamber (1d), with the first fan (7) and the second fan (7a) working in the first chamber and in the second chamber, respectively.

12. Device, according to claim 11, **characterized in that** slots (3a) are situated in said second hermetic chamber (1d), near said second fan (7a) for letting in additional air, the opening of said slots (3a) being adjusted by a moving ring nut.
13. Device, according to claim 12, **characterized in that** said second fan (7a) is mounted idle on the output shaft (5a) of said motor (5) and is fixed to the output shaft by a friction system (5b) operated by a button (8a) acting via a corresponding lever.
14. Device, according to claim 5, **characterized in that** said friction clutch means (9) include a sleeve (18), mounted idle on the output shaft (5a) and carrying, keyed thereon, said fan (7), whose head section is widened and turned toward a disc fastened co-axially on the output shaft (5a), said sleeve (18) being operated by a fork (8c), which engages with a circumferential groove made thereon and operated by a button (8), accessible from outside of the case, so as to take two extreme positions, in one of which said sleeve head is brought in touch with the disc fastened on the output shaft (5a), thus rotationally fixing said fan (7) and the output shaft (5a).
15. Multifunction wall hair-dryer device includes:
 - a containing case (1) with at least one air inlet aperture (1a) and at least one air outlet aperture,
 - at least one motor (5) situated inside a hollow space defined by said case (1);
 - at least one fan (7) fastened to the output shaft (5a) of said motor (5) for generating a flow of air between said inlet aperture and said outlet aperture;
 - a first hose (12a) connected to said outlet aperture,
 - a heating element (6) situated inside said case (1) between said fan (7) and said outlet aperture;
 - said device being **characterized in that:**
 - said case (1) defines a second hollow space separated from the first one and equipped with related air inlet and outlet

apertures;

said motor (5) is supported in a wall separating the two hollow spaces with the output shaft (5a) extending in both hollow spaces;

at least one second fan (7a) is situated in said second hollow space, each fan being connected to a corresponding portion of said output shaft (5a);

a second flexible hose (12) is connected to the inlet aperture of the second hollow space, acting by aspiration.

16. Device, according to claim 15, **characterized in that** said first fan (7) and second fan (7a) are connected to said output shaft (5a) by a friction clutch system (5b), operated by means (8,8a), which are accessible from outside of the case (1).

17. Device, according to claim 16, **characterized in that** each friction clutch system (5b) includes a sleeve (18), mounted idle on the output shaft (5a) and carrying, keyed thereon, the respective fan (7,7a) whose head section is widened and turned toward a disc fastened coaxially on said output shaft (5a), said sleeve being operated by a fork (8c), which engages inside a circumferential groove made thereon and operated by a button (8,8a), accessible from outside of the case, so as to take two extreme positions, in one of which said sleeve head is in touch with the disc fastened on the output shaft (5a), thus rotationally fixing said fan (7,7a) and the output shaft (5a).

18. Device, according to claim 15, **characterized in that** at least one of the fans (7) is connected with a coupling element (21b), whose shape allows the connection with a series of additional fittings operated by supplying them with driving force.

19. Device, according to claim 18, **characterized in that** said coupling element (21b) is fastened to said fan (7), in coaxial relation therewith, and features a seat, inside which a flexible cable contained in a sheath can be introduced to operate mechanically said additional fittings.

20. Device, according to claim 19, **characterized in that** said coupling element (21b) is fastened to said fan (7) or to said output shaft (5a) by a friction clutch system.

21. Device, according to claim 19, **characterized in that** said coupling element (21b) includes a group of toothed wheels (22), connected one to another

in cascade and driven into rotation by said fan (7) or by said output shaft (5a), possibly through a friction clutch system.

22. Device, according to claim 15, **characterized in that** a duct (23a), inside which a non-return valve (4b) and a filter (4a) are situated in the area included between the second fan (7) and the corresponding inlet aperture.

23. Device, according to claim 15, **characterized in that** a third fan (21) is situated inside the duct (23a) and is operated by the air aspirated by the second fan to generate mechanical force, which is transmitted to said additional fittings by a coupling element (21b), which is accessible from outside of the case.

24. Device, according to claim 23, **characterized in that** said coupling element (21b) is fastened to said third fan (21), in coaxial relation therewith, and features a seat, inside which a flexible cable contained in a sheath can be introduced to operate mechanically said additional fittings.

25. Device, according to claim 24, **characterized in that** said coupling element (21b) includes a group of toothed wheels (21a), connected one to another in cascade and driven into rotation by said third fan (21).

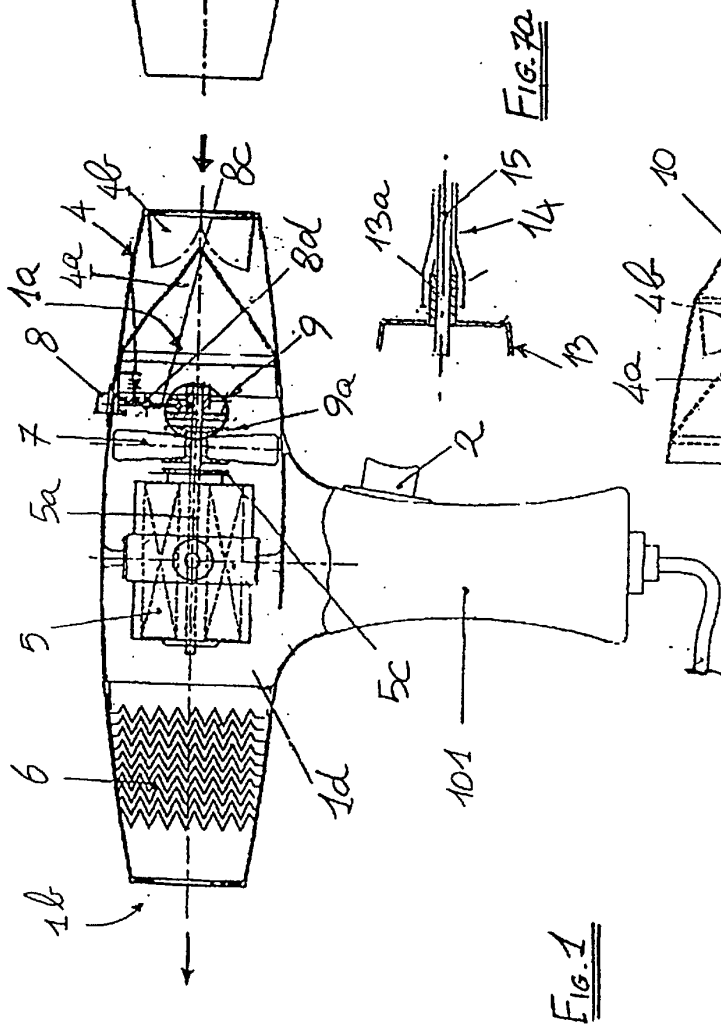
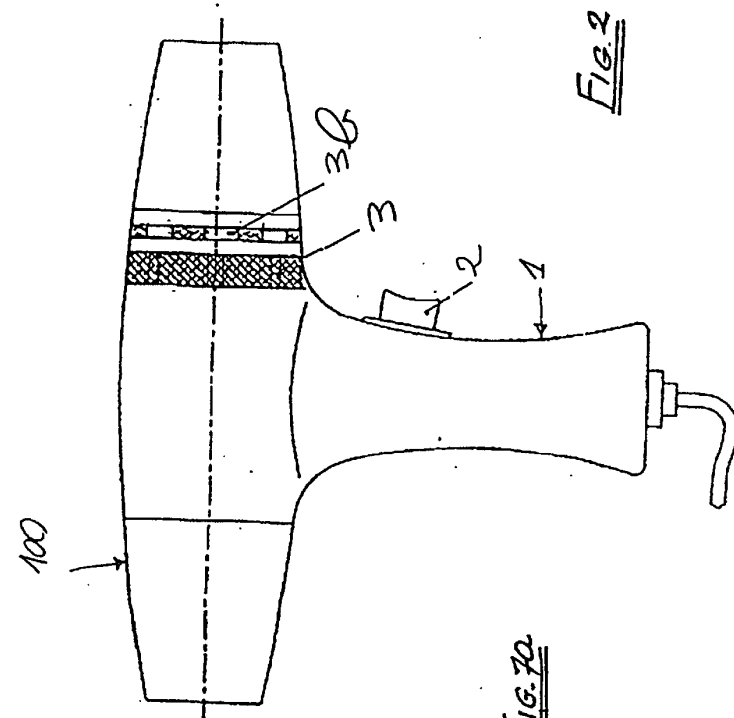


Fig. 3

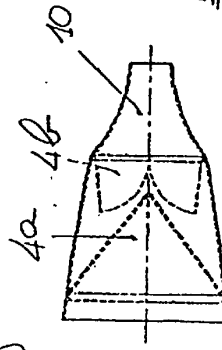
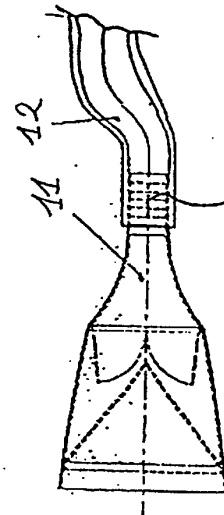
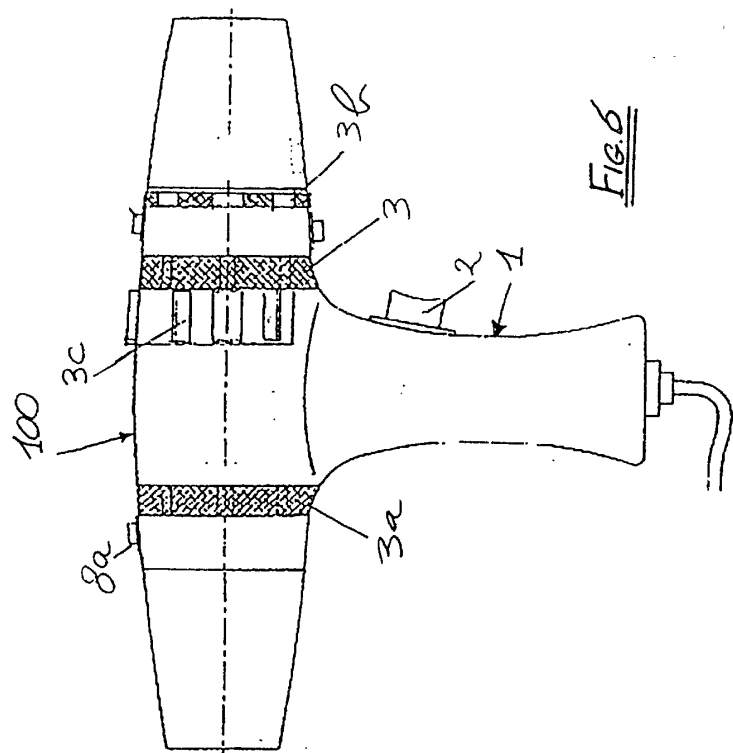
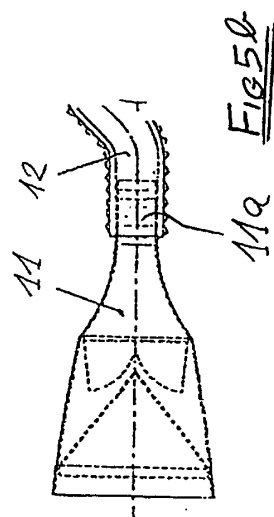
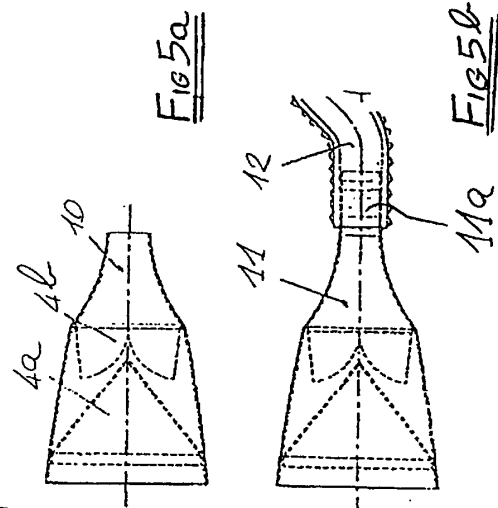
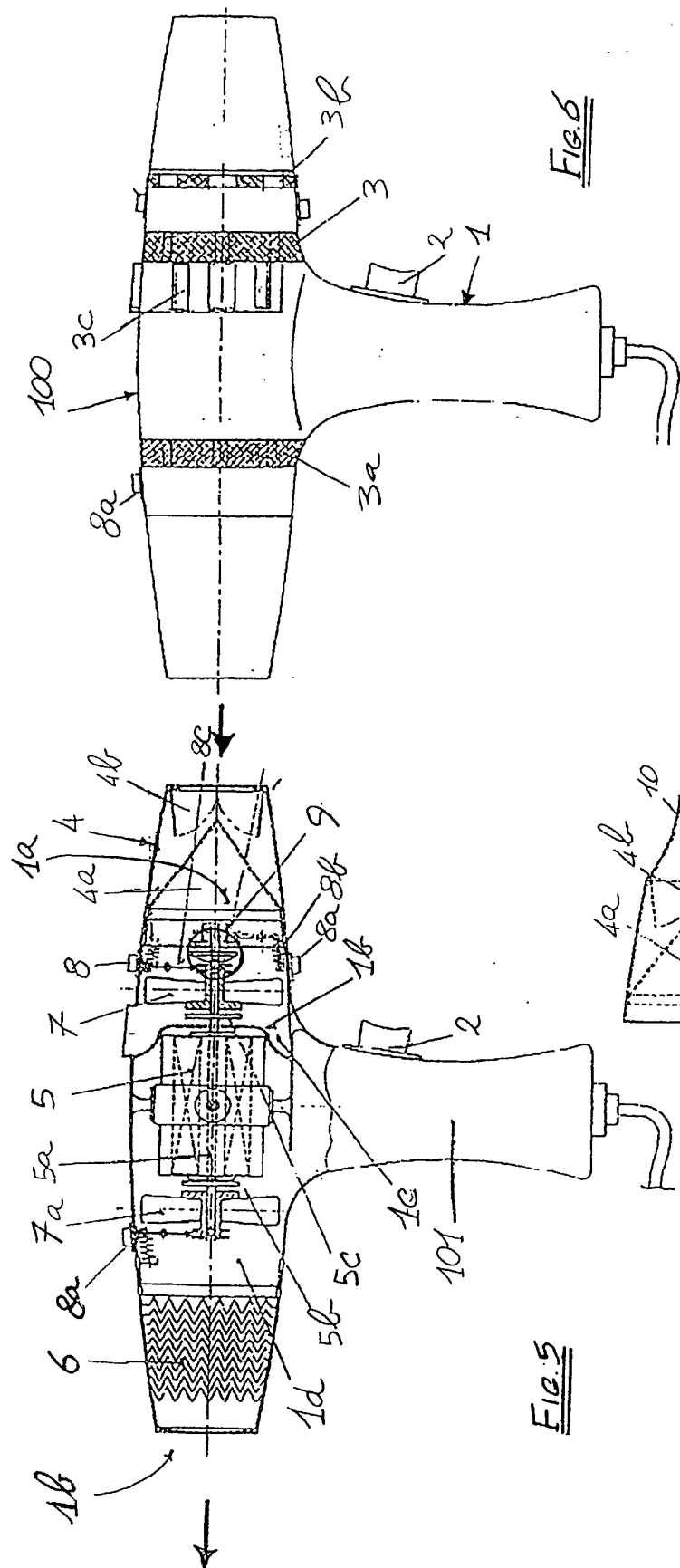


Fig. 4





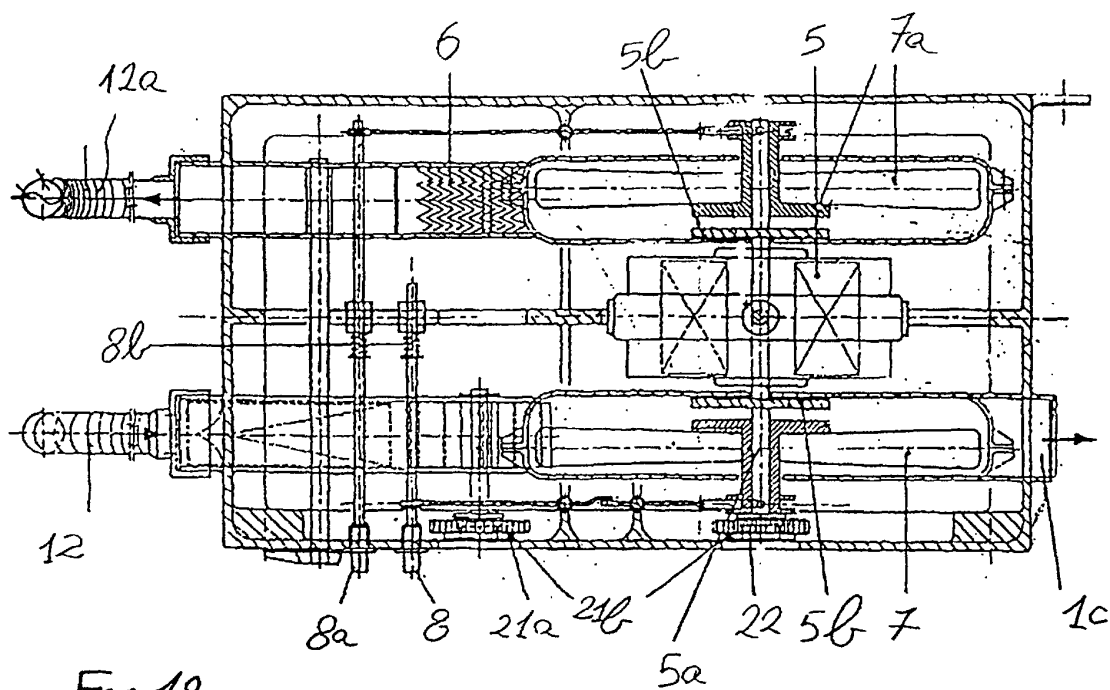


Fig. 12

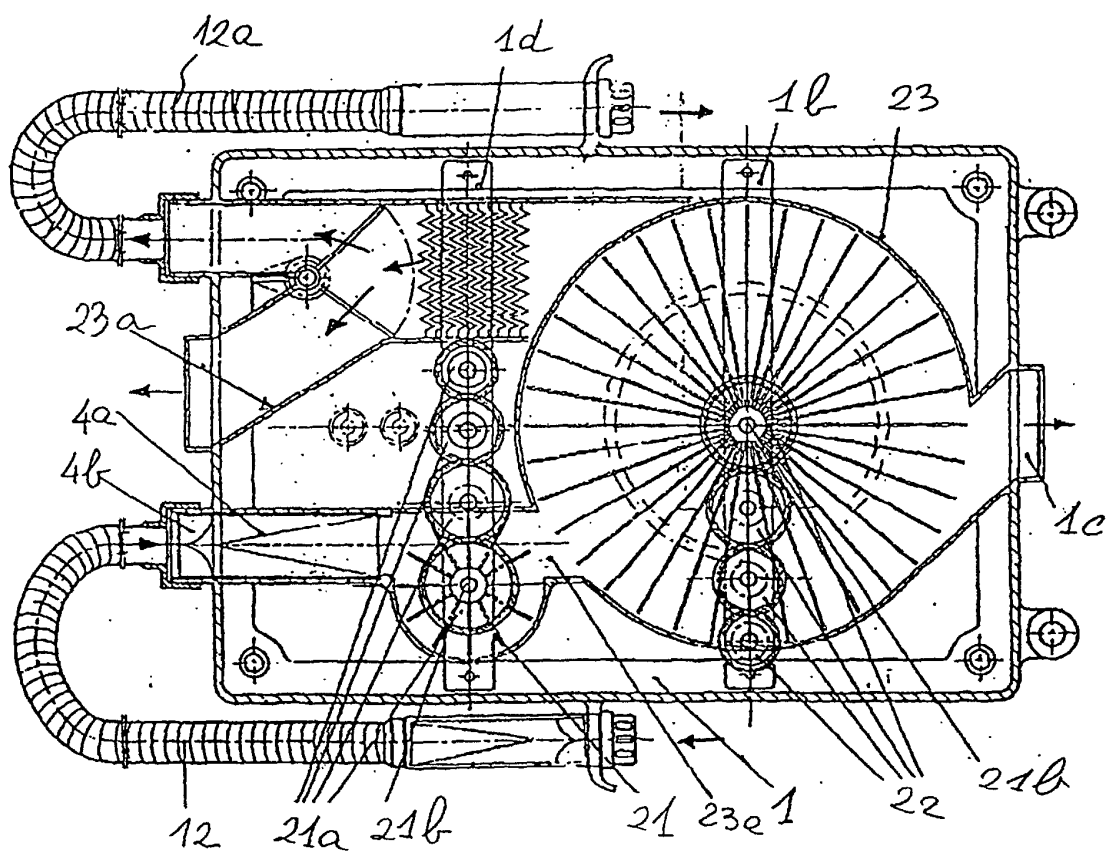
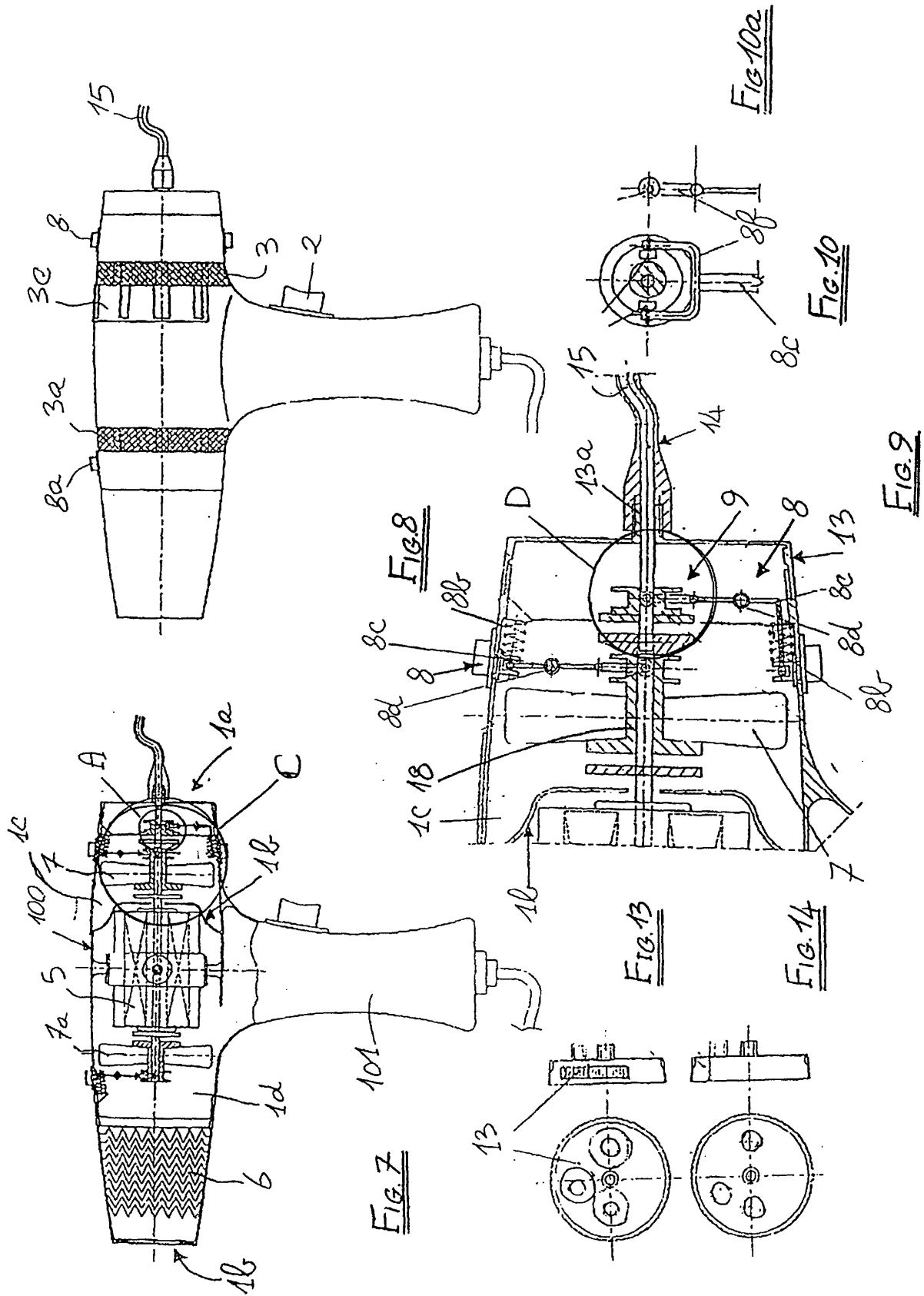


Fig. 11





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 12 3699

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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