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# UTILITY PATENT APPLICATION TRANSMITTAL

*(ONLY FOR NEW NONPROVISIONAL APPLICATIONS UNDER 37 CFR 1.53(B))*

| | |
|---|---|
| *Attorney Docket No.* | 424662077100 |
| *First Named Inventor* | Patrick Joseph William MOLONEY |
| *Title* | HAND HELD APPLIANCE |
| *Express Mail Label No.* | |

## APPLICATION ELEMENTS

*See MPEP chapter 600 concerning utility patent application contents.*

1. [X] **Fee Transmittal Form** (PTO/SB/17 or equivalent)
2. [ ] **Applicant asserts small entity status.** See 37 CFR 1.27
3. [ ] **Applicant certifies micro entity status.** See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.
4. [X] **Specification** [*Total Pages* 40 ]
   Both the claims and abstract must start on a new page.
   *(See MPEP § 608.01(a) for information on the preferred arrangement)*
5. [X] **Drawing(s)** *(35 U.S.C. 113)* [*Total Sheets* 18 ]
6. **Inventor's Oath or Declaration** [*Total Pages* ]
   *(including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e))*
   a. [ ] Newly executed (original or copy)
   b. [ ] A copy from a prior application (37 CFR 1.63(d))
7. [X] **Application Data Sheet** **See note below.*
   See 37 CFR 1.76 (PTO/AIA/14 or equivalent)
8. [ ] **CD-ROM or CD-R** In duplicate, large table, or Computer Program *(Appendix)*
   [ ] Landscape Table on CD
9. **Nucleotide and/or Amino Acid Sequence Submission** *(if applicable, items a. – c. are required)*
   a. [ ] Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. [ ] CD-ROM or CD-R (2 copies); or ii. [ ] Paper
   c. [ ] Statements verifying identity of above copies

*ADDRESS TO:* **Commissioner for Patents**
**P.O. Box 1450**
**Alexandria, VA 22313-1450**

## ACCOMPANYING APPLICATION PARTS

10. [ ] **Assignment Papers**
    (cover sheet & document(s))
    Name of Assignee: Dyson Technology Limited
11. [ ] **37 CFR 3.73(c) Statement** *(when there is an assignee)* [X] **Power of Attorney**
12. [ ] **English Translation Document** *(if applicable)*
13. [ ] **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    [ ] Copies of citations attached
14. [ ] **Preliminary Amendment**
15. [ ] **Return Receipt Postcard** *(MPEP § 503) (Should be specifically itemized)*
16. [ ] **Certified Copy of Priority Document(s)** *(if foreign priority is claimed)*
17. [ ] **Nonpublication Request** Under 35 U.S.C.122 (b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
18. [ ] Other:

***Note:** (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 **must** be included in an Application Data Sheet (ADS).
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

## 18. CORRESPONDENCE ADDRESS

[X] The address associated with Customer Number: 25227 ***OR*** [ ] Correspondence address below

| | | | | | |
|---|---|---|---|---|---|
| Name | | | | | |
| Address | | | | | |
| City | | State | | Zip Code | |
| Country | | Telephone | | Email | |

| | | | |
|---|---|---|---|
| Signature | /Bradley J. Meier/ | Date | July 3, 2014 |
| Name (Print/Type) | Bradley J. Meier | Registration No. (Attorney/Agent) | 44,236 |

I hereby certify that this paper is being transmitted via the Office electronic filing system in accordance with § 1.6(a)(4).

Dated: July 3, 2014 Electronic Signature for Ghita Haronni: /Ghita Haronni/

va-427927

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# POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

| Application Number | Filing Date |
|---|---|
| | |

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

[X] I hereby appoint Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 25227

**OR**

[ ] I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

**Please recognize or change the correspondence address for the application identified in the attached transmittal letter to:**

[X] The address associated with the above-mentioned Customer Number

**OR**

[ ] The address associated with Customer Number:

**OR**

| | | | | | |
|---|---|---|---|---|---|
| Firm or Individual Name | | | | | |
| Address | | | | | |
| City | | State | | Zip | |
| Country | | | | | |
| Telephone | | Email | | | |

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

Dyson Technology Limited

[ ] Inventor or Joint Inventor (title not required below)

[ ] Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

[X] Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

[ ] Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

**SIGNATURE of Applicant for Patent**

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

| | | | |
|---|---|---|---|
| Signature | G.R. Smith | Date (Optional) | 14. May. 2014 |
| Name | Gillian R. Smith | | |
| Title | Group IP Director, Dyson Technology Limited | | |

**NOTE:** Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

[ ] Total of 1 forms are submitted.

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| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | 424662077100 |
|---|---|---|
| | Application Number | |
| Title of Invention | HAND HELD APPLIANCE | |

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

## Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

## Inventor Information:

**Inventor 1** Remove

**Legal Name**

| Prefix | Given Name | Middle Name | Family Name | Suffix |
|---|---|---|---|---|
| Mr. | Patrick | Joseph William | MOLONEY | |

**Residence Information (Select One)** ○ US Residency ◉ Non US Residency ○ Active US Military Service

| City | Swindon | Country of Residence i | GB |
|---|---|---|---|

**Mailing Address of Inventor:**

| | | | |
|---|---|---|---|
| **Address 1** | c/o Dyson Technology Limited | | |
| **Address 2** | Tetbury Hill, Malmesbury | | |
| **City** | Wiltshire | **State/Province** | |
| **Postal Code** | SN16 0RP | **Country** i | GB |

**Inventor 2** Remove

**Legal Name**

| Prefix | Given Name | Middle Name | Family Name | Suffix |
|---|---|---|---|---|
| Mr. | Edward | Sebert Maurice | SHELTON | |

**Residence Information (Select One)** ○ US Residency ◉ Non US Residency ○ Active US Military Service

| City | Swindon | Country of Residence i | GB |
|---|---|---|---|

**Mailing Address of Inventor:**

| | | | |
|---|---|---|---|
| **Address 1** | c/o Dyson Technology Limited | | |
| **Address 2** | Tetbury Hill, Malmesbury | | |
| **City** | Wiltshire | **State/Province** | |
| **Postal Code** | SN16 0RP | **Country** i | GB |

**Inventor 3** Remove

**Legal Name**


SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324

| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | 424662077100 |
|---|---|---|
| | Application Number | |
| Title of Invention | HAND HELD APPLIANCE | |

| Prefix | Given Name | Middle Name | Family Name | Suffix |
|---|---|---|---|---|
| Mr. | Stephen | Benjamin | COURTNEY | |

**Residence Information (Select One)** ○ US Residency ◉ Non US Residency ○ Active US Military Service

| City | Bath | Country of Residence i | GB |
|---|---|---|---|

**Mailing Address of Inventor:**

| | |
|---|---|
| **Address 1** | c/o Dyson Technology Limited |
| **Address 2** | Tetbury Hill, Malmesbury |

| City | Wiltshire | State/Province | |
|---|---|---|---|
| **Postal Code** | SN16 0RP | **Country** i | GB |

**Inventor 4** Remove

**Legal Name**

| Prefix | Given Name | Middle Name | Family Name | Suffix |
|---|---|---|---|---|
| Mr. | Daniel | Martin | TAYLOR | |

**Residence Information (Select One)** ○ US Residency ◉ Non US Residency ○ Active US Military Service

| City | Bristol | Country of Residence i | GB |
|---|---|---|---|

**Mailing Address of Inventor:**

| | |
|---|---|
| **Address 1** | c/o Dyson Technology Limited |
| **Address 2** | Tetbury Hill, Malmesbury |

| City | Wiltshire | State/Province | |
|---|---|---|---|
| **Postal Code** | SN16 0RP | **Country** i | GB |

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

## Correspondence Information:

**Enter either Customer Number or complete the Correspondence Information section below.**
**For further information see 37 CFR 1.33(a).**

☐ **An Address is being provided for the correspondence Information of this application.**

| | | | |
|---|---|---|---|
| **Customer Number** | 25227 | | |
| **Email Address** | Patentdocket@mofo.com | Add Email | Remove Email |



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| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | 424662077100 |
|---|---|---|
| | Application Number | |
| Title of Invention | HAND HELD APPLIANCE | |

## Application Information:

| | | | |
|---|---|---|---|
| **Title of the Invention** | HAND HELD APPLIANCE | | |
| **Attorney Docket Number** | 424662077100 | **Small Entity Status Claimed** | ☐ |
| **Application Type** | Nonprovisional | | |
| **Subject Matter** | Utility | | |
| **Total Number of Drawing Sheets (if any)** | 18 | **Suggested Figure for Publication (if any)** | |

## Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

## Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

| | | | |
|---|---|---|---|
| Please Select One: | ◉ Customer Number | ○ US Patent Practitioner | ○ Limited Recognition (37 CFR 11.9) |
| Customer Number | 25227 | | |

## Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

| Prior Application Status | | | Remove |
|---|---|---|---|
| Application Number | Continuity Type | Prior Application Number | Filing Date (YYYY-MM-DD) |
| | | | |

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

## Foreign Priority Information:

| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | 424662077100 |
|---|---|---|
| | Application Number | |
| Title of Invention | HAND HELD APPLIANCE | |

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) [i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

| Application Number | Country [i] | Filing Date (YYYY-MM-DD) | Access Code [j] (if applicable) |
|---|---|---|---|
| 1312068.8 | GB | 2013-07-05 | |

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

## Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

## Authorization to Permit Access:

☐ Authorization to Permit Access to the Instant Application by the Participating Offices

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

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| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | 424662077100 |
|---|---|---|
| | Application Number | |
| Title of Invention | HAND HELD APPLIANCE | |

## Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

**Applicant 1** Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

| | | |
|---|---|---|
| ◉ Assignee | ○ Legal Representative under 35 U.S.C. 117 | ○ Joint Inventor |
| ○ Person to whom the inventor is obligated to assign. | ○ Person who shows sufficient proprietary interest | |

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor :

If the Applicant is an Organization check here. ☒

| Organization Name | Dyson Technology Limited | | |
|---|---|---|---|
| **Mailing Address Information:** | | | |
| **Address 1** | Tetbury Hill, Malmesbury | | |
| Address 2 | | | |
| **City** | Wiltshire | **State/Province** | |
| **Country** [i] | GB | Postal Code | SN16 0RP |
| Phone Number | | Fax Number | |
| Email Address | | | |

Additional Applicant Data may be generated within this form by selecting the Add button. Add

## Non-Applicant Assignee Information:

Providing assignment information in this section does not subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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| **Application Data Sheet 37 CFR 1.76** | Attorney Docket Number | 424662077100 |
|---|---|---|
| | Application Number | |
| Title of Invention | HAND HELD APPLIANCE | |

**Assignee 1**

Complete this section only if non-applicant assignee information is desired to be included on the patent application publication in accordance with 37 CFR 1.215(b). Do not include in this section an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest), as the patent application publication will include the name of the applicant(s).

Remove

If the Assignee is an Organization check here. ☐

| Prefix | **Given Name** | Middle Name | **Family Name** | Suffix |
|---|---|---|---|---|
| | | | | |

**Mailing Address Information:**

| | |
|---|---|
| **Address 1** | |
| Address 2 | |

| | | | |
|---|---|---|---|
| **City** | | **State/Province** | |
| **Country** i | | Postal Code | |
| Phone Number | | Fax Number | |
| Email Address | | | |

Additional Assignee Data may be generated within this form by selecting the Add button. Add

## Signature:

Remove

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications

| **Signature** | /Bradley J. Meier/ | | | Date (YYYY-MM-DD) | 2014-07-03 |
|---|---|---|---|---|---|
| First Name | Bradley | Last Name | Meier | Registration Number | 44236 |

Additional Signature may be generated within this form by selecting the Add button. Add

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**



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SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324

# Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

# HAND HELD APPLIANCE

## REFERENCE TO RELATED APPLICATIONS

This application claims the priority of United Kingdom Application No. 1312068.8, filed July 05, 2013, the entire contents of which are incorporated herein by reference.

## FIELD OF THE INVENTION

This invention relates to a hand held appliance, in particular a hair care appliance such as a hairdryer or hot styling brush.

## BACKGROUND OF THE INVENTION

Blowers and in particular hot air blowers are used for a variety of applications such as drying substances such as paint or hair and cleaning or stripping surface layers. In addition, hot air blowers such as hot styling brushes are used to style hair from a wet or dry condition.

Generally, a motor and fan are provided which draw fluid into a body; the fluid may be heated prior to exiting the body. The motor is susceptible to damage from foreign objects such as dirt or hair so conventionally a filter is provided at the fluid intake end of the blower. Conventionally such appliances are provided with a nozzle which can be attached and detached from the appliance and changes the shape and velocity of fluid flow that exits the appliance. Such nozzles can be used to focus the outflow of the appliance or to diffuse the outflow depending on the requirements of the user at that time.

## SUMMARY OF THE INVENTION

According to a first aspect, the invention provides a hair care appliance comprising a handle, the handle comprising a wall and an outer wall wherein the wall defines a primary fluid flow path that extends from a primary fluid inlet into the appliance and the outer wall is an external surface of the appliance.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 10 of 2286

The provision of a double layered wall reduces the transmission of vibration and noise from within the handle. It isolates internal components of the handle from the outer wall.

Preferably, the outer wall extends substantially continuously around the wall. It is preferred that the outer wall extends substantially along the wall.

It is preferred that the handle comprises a layer of insulating material between the outer wall and the wall.

Preferably, the insulating layer mitigates one or more of noise, vibration and heat produced by the appliance. It is preferred that the insulating material is a foam or a felt.

It is preferred that the handle comprises a first end and a second end wherein the primary fluid inlet is at or near the second end.

Preferably, the handle includes a heater for heating fluid drawn into the primary fluid inlet. Preferably, the heater is downstream of the fan unit. The heater is preferably, disposed adjacent the first end of the handle.

Preferably, the primary fluid inlet comprises a first aperture extending at least partially around the handle and a second aperture extending through the second end of the handle.

Another aspect of the invention provides a hair care appliance comprising a handle, the handle comprising a wall and an outer wall wherein the wall defines a primary fluid flow path that extends from a primary fluid inlet into the appliance and the outer wall is an external surface of the appliance wherein the handle comprises a first end and a second end wherein the primary fluid inlet is at or near the second end and wherein the primary fluid inlet comprises a first aperture extending at least partially around the handle and a second aperture extending through the second end of the handle.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 11 of 2286

According to another aspect, the invention provides a hair care appliance comprising a body comprising an outer wall and a handle comprising an outer wall and a wall disposed within the outer wall wherein, the outer wall of the body and the wall of the handle are formed as a single unit.

Forming the body and the wall of the handle as a single unit has a number of advantages. Firstly the access to at least some of the components of the appliance is made more difficult. In convention hairdryers, a clam shell construction is used and the two parts are usually screwed together. A user can relatively easily remove the screws and access the heater and fan unit. In the present invention, as there are no joins or screws that can be removed, it is made more difficult for a user to take the product apart. Secondly, the product is visually cleaner. There are no join lines running along the length of the body and no recesses or extensions in the body that would be required in order to connect the two parts.

Preferably, the wall comprises an access aperture extending at least partially along and around the wall.

It is preferred that the wall comprises a hatch for closing the access aperture.

Preferably, the handle comprises a primary fluid inlet disposed at and/or near the distal end of the handle from the body. Preferably, the primary fluid inlet extends at least partially around and along the handle. Preferably, the primary fluid inlet comprises at least one aperture extending around the outer wall. It is preferred that the primary fluid inlet comprises at least one aperture extending along the outer wall. Preferably, the primary fluid inlet comprises at least one aperture extending across the outer wall.

Preferably, the handle comprises a primary fluid flow path flowing from the primary fluid inlet along the handle and into the body. It is preferred that the primary fluid flow path flows from the primary fluid inlet within the wall to the body.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 12 of 2286

Preferably, the handle comprises a fan unit wherein the fan unit draws fluid into the primary fluid flow path.

It is preferred that the body comprises a primary fluid outlet for the primary fluid flow path. Preferably, the primary fluid outlet is in fluid communication with the primary fluid inlet and the primary fluid flow path.

Preferably, the body comprises a first end and a second end and the primary fluid outlet is at the second end.

Preferably, the body comprises a fluid flow path. Preferably, the fluid flow path extends from a fluid inlet in the body to a fluid outlet.

It is preferred that the body comprises a duct extending within the outer wall of the body and the duct extends from the first end.

Preferably, the primary fluid flow path extends between the outer wall of the body and the duct. Preferably, the primary fluid flow path extends to a primary fluid outlet. Preferably, the primary fluid flow path extends about the duct. Preferably, the primary fluid flow path extends at least partially along the duct. Preferably, the duct extends at least partially along the body.

It is preferred that the duct defines a fluid flow path extending through the body. Preferably, the fluid flow path extends from a fluid inlet to a fluid outlet. Preferably, the fluid flow path extends within the duct. Preferably, the fluid flow path extends from a fluid inlet in the body through the duct to a fluid outlet from the body.

Preferably, the duct extends about the fluid flow path. Preferably, the fluid flow path extends through the duct. Preferably, the fluid flow path is defined by a duct extending



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 13 of 2286

through the body. Preferably, the fluid flow path exits the body by the fluid outlet. Preferably, the fluid flow path is provided through the duct.

It is preferred that the fluid inlet is at the first end of the body.

Preferably, the fluid flow path merges with the primary fluid flow path within the body.

Alternatively, the primary fluid flow path surrounds the fluid flow path at the second end of the body. Fluid in the primary fluid flow path exits the body by the primary fluid outlet.

Preferably, the duct is connected to the outer wall of the body by a side wall extending between the duct and the outer wall. It is preferred that the side wall is angled to both the outer wall of the body and the duct. Preferably, the side wall is disposed at the first end of the body. It is preferred that the duct and side wall are formed as a single unit. Preferably, the duct and side wall are formed from a plastic material. It is preferred that the side wall at least partially defines the fluid inlet into the fluid flow path

Preferably, the outer wall of the handle extends about the wall and partially along the wall. It is preferred that the outer wall of the handle extends over an access hatch into the wall.

Preferably, the outer wall of the handle extends about the wall for substantially the whole length of the wall. It is preferred that the wall of the handle comprises a primary fluid inlet. Preferably, the primary fluid inlet of the outer wall of the handle is in fluid communication with the primary fluid inlet of the wall of the handle.

It is preferred that the outer wall of the body and wall of the handle are made from a plastic material.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 14 of 2286

Preferably, the outer wall of the handle is made from a different material to the wall of the handle and the outer wall of the body. Preferably, the outer wall is formed from a metal. Preferably, the outer wall of the handle is made from aluminium or an aluminium alloy.

It is preferred that the body comprises a heater. The heater is for heating fluid in the primary fluid flow path. Preferably, the heater is provided between the outer wall and the duct. It is preferred that the primary fluid flow path extends through the heater. Preferably, the heater extends along the body. It is preferred that the heater extends at least partially around the body. Alternatively, the heater extends around the body. It is preferred that the heater extends at least partially around and about the duct. Alternatively, the heater extends around about the duct. Preferably, the heater extends at least partially along the duct. Preferably, the heater is annular.

Also provided is a hand held appliance comprising a body comprising an outer wall and a handle comprising an outer wall and a wall disposed within the outer wall wherein, the outer wall of the body and the wall of the handle are formed as a single unit.

Preferably, the body has an inlet end and an outlet end and the side wall is at the inlet end.

It is preferred that the duct at least partially defines a fluid flow path through the body. Preferably, the duct is recessed within the outer wall at the inlet end.

It is preferred that the handle is connected to the body at a first end. Preferably, a second control switch is provided on the handle. It is preferred that the second control switch is located on the handle adjacent to the inlet end of the body.

Preferably, both the first control switch and the second control switch are accessible by a single digit.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 15 of 2286

It is preferred that the second control switch comprises two buttons.

Preferably, the handle is generally tubular and at a distal end to the body the handle comprises a primary fluid inlet. It is preferred that the handle comprises a wall and at the distal end, the handle comprises an end wall extending across the wall. Preferably, the primary fluid inlet extends at least partially across the end wall.

It is preferred that the appliance comprises a power cable connectable to a power source at one end and extending into substantially the centre of the end wall of the handle at the other end.

Preferably, the handle comprises an outer wall and the outer wall extends at least partially along and around the wall.

Preferably, a lining material is provided between the outer wall and the wall. Preferably, the lining material is an insulating layer. Preferably, the lining material or insulating layer extends substantially continuously along and/or around the wall.

Preferably, the primary fluid outlet is at least partially defined by the duct. It is preferred that the primary fluid outlet is defined by the body and the duct.

Preferably, within the body, the primary fluid flow path and fluid flow path merge.

Preferably, the primary fluid outlet extends about the fluid flow path. Preferably, the body comprises a fluid outlet for the fluid flow path and the primary fluid outlet extends about the fluid outlet.

Preferably, the primary fluid outlet is at the outlet end of the body.

Preferably, the body decreases in diameter towards the outlet end.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 16 of 2286

Preferably, the first control switch comprises two buttons.

According to a third aspect, the invention provides a hair care appliance comprising a body, and a handle having a first end in fluid communication with the body and a second end comprising a primary fluid inlet into the appliance wherein the primary fluid inlet comprises a first aperture extending at least partially around the handle and a second aperture extending through the second end of the handle.

Having the primary fluid inlet disposed on more than one surface of the appliance is advantageous. In conventional hairdryers, the primary fluid inlet is generally located on the back end of the hairdryer and in an attempt to prevent blockage, the end is often convex. If the back end of the hairdryer is placed down on a hard surface, it will roll onto a side.

However, on a soft surface such as bedding or a long pile carpet, the inlet can still be at least partially covered or blocked. This can lead to overheating of the motor. By having the inlet on more than one surface, there is less chance of any blockage being sufficient to cause damage to the motor.

Preferably, the handle comprises an end wall at the second end and the second aperture extends through the end wall.

It is preferred that the end wall is substantially orthogonal to the handle.

Preferably, the first aperture is adjacent the second end of the handle.

It is preferred that the fan unit is upstream of the primary fluid inlet.

Preferably, the first aperture comprises a plurality of apertures extending at least partially around the handle.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 17 of 2286

It is preferred that the first aperture comprises a plurality of apertures extending at least partially along the handle.

Preferably, the second aperture comprises a plurality of apertures extending through the end of the handle.

Preferably, a power cable for supplying power to the fan unit is provided, the power cable extending through the end of the handle. It is preferred that the power cable extends substantially centrally through the handle at the primary fluid inlet. It is preferred that the second aperture extends at least partially around the power cable.

Preferably, a primary fluid flow path is provided from the primary fluid inlet through the handle and into the body to a primary fluid outlet.

It is preferred that the handle comprises a wall and the primary fluid flow path extends within the wall. It is preferred that the handle comprises an outer wall wherein said outer wall extends around the wall and at least partially along the wall. It is preferred that the handle comprises a layer of insulating material between the outer wall and the wall.

Preferably, the primary fluid outlet comprises a plurality of apertures extending at least partially along and around the body.

It is preferred that the primary fluid flow path is substantially linear through the handle and into the body.

Alternatively, the handle is substantially orthogonal to the body.

It is preferred that the within the body the primary fluid flow path surrounds the fluid flow path.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 18 of 2286

It is preferred that the primary fluid outlet extends about the fluid flow path.

Preferably, the appliance comprises a head attachable to the handle, the head comprising a primary fluid outlet for the appliance. Preferably, the primary fluid outlet comprises a plurality of apertures extending at least partially along and around the head. Preferably, the primary fluid flow path is substantially linear through the handle and into the head.

Alternatively, the primary fluid flow path from the primary fluid inlet to the primary fluid outlet is non linear. It is preferred that the primary fluid flows within the handle in a first direction and within the body in a second direction. Preferably, the primary fluid flow in the body is substantially orthogonal to the primary fluid flow in the handle.

Another aspect of the invention provides a hair care appliance comprising a handle, the handle comprising a wall and an outer wall wherein the wall defines a primary fluid flow path that extends from a primary fluid inlet into the appliance and the outer wall is an external surface of the appliance wherein the primary fluid flow path from the primary fluid inlet to the primary fluid outlet is non linear.

It is preferred that fluid in the fluid flow path is entrained into the body by the action of a fan unit in the primary fluid flow path.

Also provided is a hand held appliance comprising a handle, the handle comprising a wall and an outer wall wherein the wall defines a primary fluid flow path that extends from a primary fluid inlet into the hand held appliance and the outer wall is an external surface of the hand held appliance.

According to a fifth aspect, the invention provides a hair care appliance comprising a body, a fluid flow path extending through the body from a fluid inlet to a fluid outlet and a PCB extending about the fluid flow path.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 19 of 2286

Preferably, the PCB is annular. It is preferred that the PCB is isolated from the fluid flow path.

Preferably, the PCB comprises a first layer and a second layer. It is preferred that the first layer extends substantially continuously about the fluid flow path. Preferably, the second layer extends partially about the fluid flow path.

It is preferred that the second layer is adjacent the first layer. Preferably, the second layer is downstream of the first layer.

It is preferred that the PCB extends at least partially around extends about the duct.

Preferably, the primary fluid flow path is in fluid communication with the PCB.

It is preferred that the heater is downstream of the PCB.

Preferably, a thermal barrier is provided between the PCB and the heater. The thermal barrier is located fluidly between the PCB and the heater.

Preferably, comprising a handle wherein the handle attached to and extending from the body and the primary fluid inlet is in the handle is connected to the body at a first end.

It is preferred that the handle comprises a fan unit for drawing fluid into the primary fluid flow path.

Preferably, the handle comprises a second end distal to the first end, the second end comprising a primary fluid inlet.

It is preferred that the primary fluid flow path extends along the handle and into the body to a primary fluid outlet.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 20 of 2286

Preferably, the primary fluid flow path is non-linear.

It is preferred that within the handle the primary fluid flow path is generally circular.

Preferably, within the body the primary fluid flow path is generally annular.

It is preferred that where the primary fluid flow path enters the body a flow plate is provided. Preferably, the body comprises a flow plate for directing flow from the handle into the body.

Preferably, the flow plate deflects the primary flow around the duct from a circular to an annular flow.

It is preferred that the primary fluid flows through the handle in a first direction and in the body in a second direction. Preferably, the flow plate directs primary flow from the first direction to the second direction.

Preferably, the flow plate is provided in the primary fluid flow path to direct flow from a circular flow in the handle to an annular flow in the body18. Preferably, the flow plate is adjacent to the PCB.

Preferably, the flow plate is shaped around components on the PCB.

Preferably, the flow plate deflects the primary flow from a first direction of flow within the handle to a second direction of flow within the body.

Preferably, the fan unit is upstream of the PCB.

According to a sixth aspect, the invention provides a hair care appliance comprising a body, a heater, a PCB and a primary fluid flow path extending from a primary fluid inlet into the appliance to a primary fluid outlet out of the body wherein the PCB and heater



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 21 of 2286

are in fluid communication with the primary fluid flow path and the PCB is upstream of the heater.

Preferably, a fan unit is provided and the fan unit is upstream of the heater.

Alternatively, a fan unit is provided and the fan unit is downstream of the PCB.

It is preferred that the thermal barrier is in thermal communication with the PCB and functions as a heat sink for the PCB. Preferably, the thermal barrier is aluminium or an alloy of aluminium.

It is preferred that the body includes a handle portion upstream of the heater. Preferably, the primary fluid inlet is in the handle portion. It is preferred that the primary fluid flow path extends linearly through the body.

Preferably, the flow plate comprises at least one aperture. It is preferred that the at least one aperture enables fluid to flow through the flow plate to the PCB.

Preferably, the flow plate is connected to the PCB. The flow plate acts as a heat sink for the PCB. It is preferred that the flow plate additionally directs primary fluid flow around the PCB.

Preferably, the flow plate is additionally one or more of a thermal barrier, heat sink and deflector plate for the PCB.

It is preferred that where the primary flow enters the body there is a region of relatively high velocity flow.

Preferably, the PCB comprises components extending outwards from a board by different amounts and the components are arranged such that components that extend further out from the board are positioned radially away from the region of relatively



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 22 of 2286

high velocity flow. It is preferred that at least some of the components that extend further out from the board are capacitors.

Preferably, components that extend less distance from the board are positioned in the region of relatively high velocity flow.

It is preferred that the thermal barrier is additionally a deflector plate for deflecting debris from the PCB away from the primary fluid flow path and the primary fluid outlet.

According to a seventh aspect, the invention provides a hair care appliance comprising a body, a PCB having electrical components mounted thereon and a primary fluid flow path extending at least partially through the body and passed the PCB, wherein the primary fluid flow path has a region of relatively high velocity and a region of relatively low velocity and components mounted on the PCB are arranged so that larger components are in the region of relatively low velocity.

Preferably, the appliance comprises a handle connected to the body at a first end wherein the primary fluid flow path flows through the handle into the body.

It is preferred that the primary fluid flow path extends in a first direction within the handle and a second direction within the body.

Preferably, the body is generally tubular and has an upper half and a lower half and the handle is connected to the lower half. It is preferred that the region of relatively high velocity is in the lower half of the body. Preferably, the region of relatively low velocity is in the upper half of the body.

It is preferred that larger components of the PCB are located in the upper half of the body. Preferably, smaller components of the PCB are located in the lower half of the body. It is preferred that larger components of the PCB are components which extend the furthest from a circuit board on which they are mounted.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 23 of 2286

According to an eighth aspect, the invention provides, a hair care appliance comprising a body, a fluid flow path extending through the body from a fluid inlet through which a fluid flow enters the appliance to a fluid outlet for emitting the fluid flow from a front end of the body and an attachment for adjusting at least one parameter of fluid emitted from the appliance, the attachment comprising an upstream end for attaching to the appliance, wherein one or both of the front end of the body and the upstream end of the attachment comprises at least one magnet.

Preferably, the front end of the body comprises an end wall extending radially inwards of the body and the end wall comprises at least one magnet.

It is preferred that end wall comprises a plurality of magnets radially spaced about the end wall.

Preferably, the end wall comprises a ring of magnetic material extending around the end wall.

Preferably, the end wall comprises an outer face and an inner face, the outer face being an external surface of the appliance, wherein the at least one magnet is adjacent the inner face.
It is preferred that the at least one magnet is embedded in the end face.

Preferably, the upstream end of the attachment comprises an end face and a plurality of magnets radially spaced about the end face.

It is preferred that the upstream end of the attachment comprises a ring of magnetic material extending around the end face.

Preferably, the magnet or magnetic material is made from a polymer containing magnetic flakes.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 24 of 2286

It is preferred that an external surface of the magnet or magnetic material is coated with an anti scratch coating.

Preferably, the appliance comprises a primary fluid flow path extending at least partially through the body from a primary fluid inlet through which a primary fluid flow enters the appliance to a primary fluid outlet.

It is preferred that the appliance comprises a handle wherein the primary fluid inlet is in the handle.

Preferably, fluid flow is drawn through the fluid flow path by fluid emitted from the primary fluid outlet.

It is preferred that the primary fluid flow extends about the duct.

Preferably, the attachment is configured to inhibit emission of the fluid flow from the appliance. It is preferred that the attachment includes means to inhibit generation of a fluid flow along the fluid flow path to the fluid outlet. Preferably, the means to inhibit the generation of a fluid flow comprises a barrier which blocks the duct when the attachment is attached to the appliance.

It is preferred that the attachment is in the form of a nozzle defining a nozzle fluid flow path extending from a nozzle fluid inlet through which the primary fluid flow enters the nozzle to a nozzle fluid outlet for emitting the primary fluid flow.

Preferably, the attachment has an outer wall that substantially continues the profile of the body at the front end of the body.

It is preferred that the body reduces in diameter towards the front end of the body. Preferably, the reduction in diameter has a constant gradient.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 25 of 2286

It is preferred that the appliance comprises a body and a fluid flow path extending through the body from a fluid inlet through which a fluid flow enters the appliance to a fluid outlet for emitting the fluid flow from a front end of the body, wherein the front end of the body comprises at least one magnet.

Preferably, the front end of the body comprises an end wall extending radially inwards of the body and the end wall comprises at least one magnet.

It is preferred that the end wall comprises a plurality of magnets radially spaced about the end wall.

Preferably, the end wall comprises a ring of magnetic material extending around the end wall.

The invention also provides an attachment for adjusting at least one parameter of fluid emitted from the appliance comprising an upstream end for attaching to the appliance, wherein the upstream end of the attachment comprises at least one magnet.

According to a ninth aspect, the invention provides a hair care appliance having a handle, and a body, the body having an outer wall and a duct wherein the outer wall extends about the duct and the outer wall converges towards the duct.

Preferably, the outer wall has a first part and a second part and the first part is tubular.

It is preferred that the first part is of substantially uniform diameter.

Preferably, the second part is cone shaped.

It is preferred that the second part of the outer wall converges towards the duct at an angle of between 1 and 89°.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 26 of 2286

Preferably, the second part of the outer wall converges towards the duct at an angle of between 30 and 60°.

Preferably, the appliance comprises a fan unit for drawing fluid into the primary fluid flow path from a primary fluid inlet to a primary fluid outlet.

It is preferred that the body comprises the primary fluid outlet at one end and wherein the outer wall converges towards the duct towards the primary fluid outlet.

Preferably, the body has a first end and a second end and the outer wall converges towards the duct at the second end of the body.

Preferably, the appliance comprises a handle having a primary fluid inlet in fluid communication with the primary fluid flow path.

It is preferred that fluid is entrained into the fluid flow path by the action of a fan unit drawing fluid into the primary fluid flow path.

Preferably, the primary fluid flow path extends about the fluid flow path.

## BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described by way of example with reference to the accompanying drawings, of which:

Figures 1 and 2 show different aspects of a hairdryer according to the invention;

Figure 3 shows a cross section though a hairdryer according to the invention;

Figures 4a and 4b show enlarged views of portions of the cross section of Figure 3;



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 27 of 2286

Figures 5, 6 and 7 show different views of parts of a hairdryer according to the invention;

Figures 8a and 8b show respectively a cross section through and a perspective of alternate hair care appliance;

Figures 9 and 10 show different views of a hairdryer according to the invention;

Figure 11a shows a top sectional view along line M-M of Figure 1;

Figure 11b shows a top sectional view along line L-L of Figure 1;

Figures 12a, 12b and 12c show views of various internal components of the body of a hairdryer according to an invention;

Figures 13 to 16 show various views of a hairdryer 10 having an attachment 600 for changing a parameter of fluid output from the hairdryer; and

Figures 17a and 17b show different constructions of a magnetic connection between a hairdryer and an attachment.

## DETAILED DESCRIPTION OF THE INVENTION

Figures 1 and 2 show a hairdryer 10 with a handle 20 and a body 30. The handle has a first end 22 which is connected to the body 30 and a second end 24 distal from the body 30 and which includes a primary inlet 40. Power is supplied to the hairdryer 10 via a cable 50.

The body 30 has a first end 32 and a second end 34 and can be considered to have two parts. A first part 36 which extends from the first end 32 which is tubular and of a generally consistent diameter and a second part 38 which extends from the second end 34 to join the first part 36. The second part 38 is cone shaped and varies in diameter along its length from the diameter of the first part 36 of the body 30 to a smaller



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 28 of 2286

diameter at the second end 34 of the body. In this example, the second part 38 has a constant gradient and the angle $\alpha$ subtended from the outer wall 360 of the first part 36 of the body 30 is around 40°.

Referring now to Figures 2, 3, 4a and 4b in particular the handle 20 has an outer wall 200 which extends from the body 30 to a distal end 24 of the handle. At the distal end 24 of the handle an end wall 210 extends across the outer wall 200. The cable 50 enters the hairdryer through this end wall 210. The primary inlet 40 in the handle 20 includes first apertures that extend around and along 42 the outer wall 200 of the handle and second apertures that extend across 46 and through the end wall 210 of the handle 20. The cable 50 is located approximately in the middle of the end wall 210 so extends from the centre of the handle 20. The end wall 210 is orthogonal to the outer wall 200 and inner wall 220 of the handle.

It is preferred that the cable 50 extends centrally from the handle 20 as this means the hairdryer is balanced regardless of the orientation of the handle 20 in a users' hand. Also, if the user moves the position of their hand on the handle 20 there will be no tugging from the cable 50 as it does not change position with respect to the hand when the hand is moved. If the cable were offset and nearer one side of the handle then the weight distribution of the hairdryer would change with orientation which is distracting for the user.

Upstream of the primary inlet 40, a fan unit 70 is provided. The fan unit 70 includes a fan and a motor. The fan unit 70 draws fluid through the primary inlet 40 towards the body 30 through a fluid flow path 400 that extends from the primary inlet 40 and into the body 30 where the handle 20 and the body 30 are joined 90. The fluid flow path 400 continues through the body 30 towards the second end 34 of the body, around a heater 80 and to a primary fluid outlet 440 where fluid that is drawn in by the fan unit exits the primary fluid flow path 400. The primary fluid flow path 400 is non linear and flows through the handle 20 in a first direction and through the body 30 in a second direction which is orthogonal to the first direction.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 29 of 2286

The body 30 includes an outer wall 360 and an inner duct 310. The primary fluid flow path 400 extends along the body from the junction 90 of the handle 20 and the body 30 between the outer wall 360 and the duct 310 towards the primary fluid outlet 440 at the second end of the body 30.

Another fluid flow path is provided within the body; this flow is not directly processed by the fan unit or the heater but is drawn into the hairdryer by the action of the fan unit producing the primary flow through the hairdryer. This fluid flow is entrained into the hairdryer by the fluid flowing through the primary fluid flow path 400.

The first end 32 of the body includes a fluid inlet 320 and the second end 34 of the body includes a fluid outlet 340. Both the fluid inlet 320 and the fluid outlet 340 are at least partially defined by the duct 310 which is an inner wall of the body 30 and extends within and along the body. A fluid flow path 300 extends within the duct from the fluid inlet 320 to the fluid outlet 340. At the first end 32 of the body 30, a side wall 350 extends between the outer wall 360 and the duct 310. This side wall 350 at least partially defines the fluid inlet 320. At the second end 34 of the body a gap 370 is provided between the outer wall 360 and the duct, this gap 370 defines the primary fluid outlet 440. The primary fluid outlet 440 is annular and surrounds the fluid flow path. The primary fluid outlet 440 may be internal so the primary fluid flow path 400 merges with the fluid flow path 300 within the body 30. Alternatively, the primary fluid outlet 440 is external and exits from the body 30 separately to the fluid from the fluid flow path 300 at the fluid outlet 340.

The outer wall 360 of the body converges towards the duct 310 and a centre line A-A of the body 30. Having an outer wall 360 that converges towards the duct 310 has the advantage that the primary flow exiting the primary fluid outlet 440 is directed towards the centre line A-A of the body 30. The fluid exiting the primary fluid outlet 440 will cause some external entrainment of fluid 490 from outside the hairdryer due to the movement of the fluid from the primary outlet 440. This effect is increased by the outer



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 30 of 2286

wall 360 converging towards the duct 310. Partly this is because the primary flow is focused rather than divergent and partly this is because of the slope of the outer wall 360 of the body 30 towards the second end 34 of the hairdryer.

The duct 310 is an internal wall of the hairdryer that can be accessed from outside the hairdryer. Thus, the duct 310 is an external wall of the hairdryer. The duct 310 is recessed within the body 30 so the side wall 350 that connects between the outer wall 360 and the duct 310 is angled with respect to the outer wall 360. The angle β is around 115° from a line subtended by the outer wall 360 of the body 30 (Figure 4b).

A PCB 75 including the control electronics for the hairdryer is located in the body 30 near the side wall 350 and fluid inlet 320. The PCB 75 is ring shaped and extends round the duct 310 between the duct 310 and the outer wall 360. The PCB 75 is in fluid communication with the primary fluid flow path 400. The PCB 75 extends about the fluid flow path 300 and is isolated from the fluid flow path 300 by the duct 310.

The PCB 75 controls such parameters as the temperature of the heater 80 and the speed of rotation of the fan unit 70. Internal wiring (not shown) electrically connects the PCB 75 to the heater 80 and the fan unit 70 and the cable 50. Control buttons 62, 64 are provided and connected to the PCB 75 to enable a user to select from a range of temperature settings and flow rates for example.

In use, fluid is drawn into the primary fluid flow path 400 by the action of the fan unit 70, is optionally heated by the heater 80 and exits from the primary fluid outlet 440. This processed flow causes fluid to be entrained into the fluid flow path 300 at the fluid inlet 320. The fluid combines with the processed flow at the second end 34 of the body. In the example shown in Figure 3, the processed flow exits the primary fluid outlet 440 and the hairdryer as an annular flow which surrounds the entrained flow that exits from the hairdryer via the fluid outlet 340. Thus fluid that is processed by the fan unit and heater is augmented by the entrained flow.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 31 of 2286

Figures 5 to 7 all show exploded views of the different parts that the hairdryer 10 is formed from. Instead of a conventional clamshell hairdryer having two outer parts which require external fixings such as screws this hairdryer is made without such external fixings.

A first piece is the outer wall 200 of the handle 20 including the primary inlet 40 and cable 50. A second piece comprises the duct 310 and side wall 350 of the body 30. A third piece is the outer wall 360 of the body 30 and an inner wall 220 of the handle 20. The second and third pieces are manufactured as single units. This has two advantages; a first is that it enables tight tolerances to be reproduced between the duct 310 and the outer wall 360 of the body 30 and the second is that there are no unseemly joins in the body 30. By manufacturing the hairdryer out of these three main components, both the function and the form of the hairdryer are easily maintained. In addition, there is a safety aspect as an end user would find is difficult to dissemble the hairdryer using normal household tools.

The third piece comprising outer wall 360 of the body 30 and inner wall 220 of the handle 20 are moulded as a one piece unit from a plastic material. The second piece comprising the duct 310 and the side wall 350 is also moulded from a plastic material. Suitable plastic materials include polycarbonate, glass-filled PPA (Polyphthalamide), PPS (Polyphenylene Sulphide), LCAP (Liquid Crystal Aromatic Polymer) or PEEK (Polyether ether ketone) and the skilled person will appreciate that this list is not exhaustive. The outer wall 200 of the handle 20 can be made from any of a number of suitable materials but is preferably made from aluminium, an alloy of aluminium a steel or a stainless steel.

In order to assemble internal components of the hairdryer an access hatch 222 is provided in the inner wall 220 of the handle 20. This enables the fan unit 70 to be positioned and wiring that connects the fan unit 70, the heater 80, control buttons 62, 64 and PCB 75 to the cable 50 to be connected simply and with relative speed. The heater 80 and PCB 75 are located around the duct 310 which is inserted into the body 30, the



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 32 of 2286

wiring is connected and the access hatch 222 is placed over the corresponding hole 224 in the inner wall 220 of the handle 20. The side wall 350 seals the first end 32 of the body 30. This stops both two things, fluid being entrained into the primary fluid flow path 400 at the first end 32 of the body and fluid that has been processed by the fan unit 70 from exiting the body 30 at the first end 32.

In the example shown with respect to Figures 5, 6 and 7 the control buttons 62 on the handle are on the side of the handle that faces the fluid outlet 340.

The hatch 222 needs to be of a size large enough to enable wiring connections to be made to the electrical components and can be at any location around the handle. The hatch may extend for the whole length of the inner wall 220 and is locatable at any orientation around the inner wall 220.

Referring now particular for Figures 3, 4a and 5 to 7, the construction of the handle will be discussed. The handle 20 has an outer wall 200 and an inner wall 220. The inner wall 220 is a duct which surrounds and defines a primary fluid flow path 400 through the hairdryer. The outer wall 200 includes a grippable portion and in this example, includes the primary inlet 40 into the primary fluid flow path 400. Within the inner 220 wall, an insulating layer of material 212 is provided. The insulating layer is a foam or a felt and insulates the handle from noise produced by the fan unit 70, heat produced by the operation of the hairdryer, vibrations caused by the fan unit and noise produced within the hairdryer by the flow of fluid through the primary fluid flow path 400.

Alternatively or additionally, insulating layer of material 212 is provided between the outer wall 210 and inner wall 220. This is described in relation to Figure 8a.

As a minimum, the insulating material 212 is positioned around the fan unit 70 and preferably around the access hatch 222. However, it is preferred that the insulating material 212 is substantially continuous around the inner 220 wall and extends for the length of the inner wall 220 of the handle as this has the most impact on insulating the



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 33 of 2286

handle. The insulating material 212 may also extend around the primary inlet 40 to reduce any noise produced directly by fluid being drawn into the primary fluid flow path 400.

In this example, the outer wall 200 includes the primary fluid inlet 40; however it is not essential that the outer wall extends over the entire length of the inner wall 20. The outer wall 200 should extend over the access hatch 222 and the region of the handle 20 that contains the fan unit 70 for insulation purposes and for aesthetic and safety reasons to both hide and prevent access to the access hatch 222 by a user. In the event that the outer wall 200 does not extend the entire length of the inner wall 220, then either the inner wall 220 would comprise the inlet 40 at its distal end from the junction 90 with the body 30 or a separate inlet body attachable to the outer wall 200 and/or inner wall 220 could be provided.

The outer wall 200 is positioned with respect to the inner wall 220 and then secured in place. The outer wall 200 is for example, secured by plasma welding as this prevents user removal and thus access to sensitive components and also provides a clean join.

Figures 8a and 8b show an alternate hair care appliance having a similar primary inlet 540. In this example, the hair care appliance is a hot styling brush 500 and it has a handle 520 and a detachable head 530 which is attachable at the distal end 522 of the handle 520 to the primary inlet 540.

The handle 520 has an outer wall 526 which is generally tubular and includes the primary inlet 540 at and adjacent one end 524. The primary inlet 540 comprises a first set of apertures 544 which extend radially around the handle 520 and along the outer wall 526 of the handle from the handle end 524. The handle end 524 is covered by an end wall 510 which is also perforated with a second set of apertures 546 that extend through the end wall 510 of the handle. Thus, the primary inlet 540 extends around, along and across the handle 520. The end wall 510 is orthogonal to the outer wall 526 and inner wall 560 of the handle.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 34 of 2286

The handle 520 also includes a fan unit 570 which comprises a fan and a motor which drives the fan and in use, draws fluid in through the primary inlet 540, along a fluid flow path 550 which extends through the length of the handle 520. The fluid is optionally heater by a heater 580 before entering an inner cavity 538 of the head 530.

The head 530 includes a fluid outlet which in this example comprises two sets of parallel slots 534 each extending towards an end 536 of the head and radially around the head 530 with one set of slots 534a being upstream of a second set of slots 534b. This arrangement enables fluid to exit the head all the way around the head and for the majority of the length of the head 530 maximising a hair styling region of the product.

The head 530 also includes bristles 532 which extend radially away from the head 530. The bristles 532 are formed as parallel lines which extend radially around the head. Each set of bristles is located between two adjacent slots 534 but bristles need not be provided between every pair of slots.

In use, hair is wrapped around the head 530. The bristles 534 retain the hair whilst hot air or fluid exits through the slots drying the hair and styling the hair into curls or waves.

Power is provided to the appliance via a power cable 548 which preferably extends from a plug or other power source through the end wall 510 of the handle 520. The handle 520 also houses a PCB 575 which is electrically connected to the cable 548, the fan unit 570 and the heater 580 by internal wiring (not shown). Control buttons 555 are provided and connected to the PCB 575 to allow the user to select one of a range of temperature and flow settings. The control buttons 555 are push buttons or slide buttons, for example.

The handle 520 has an outer wall 526 and an inner wall 560. The inner wall 560 is a duct which surrounds and defines a fluid flow path 550 through the appliance. The



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 35 of 2286

outer wall 526 includes a grippable portion and in these examples, includes the primary inlet 540 into the fluid flow path 550. In between the outer 526 and inner 560 walls, an insulating layer of material 528 is provided. The insulating layer is a foam or a felt and insulates the handle from noise produced by the fan unit 570, heat produced by the operation of the appliance, vibrations caused by the fan unit and noise produced within the appliance by the flow of fluid through the fluid flow path 550.

As a minimum, insulating material is positioned around the fan unit 570. However, it is preferred that the insulating material 528 is substantially continuous between the outer 526 and inner 560 handles and extends for the length of the inner wall 560 of the handle as this has the most impact on insulating the handle. The insulating material 528 may also extend around the primary inlet 540 to reduce any noise produced directly by fluid being drawn into the fluid flow path 550.

The primary inlet 40, 540 comprises a plurality of apertures extending around, along and across the handle 20, 520. Having an inlet that extends in three dimensions has advantages particularly when used with hair grooming appliances. Firstly, if the appliance is placed on a surface whilst switched on only a small part of the inlet surface area will be blocked or have restricted flow of fluid into the appliance. This protects the fan unit and particularly the motor of the fan unit from running with too low a flow rate as this can cause overheating of the motor and cause damage to the motor.

Secondly, often hair care appliances are used with a styling product such as a mousse, gel or spray. These products are typically either applied by a hand or directly to the hair as a mist. After application by a hand, some of the product will be retained on the skin which is then transferred to the appliance when held. This can block at least some of the apertures 42, 544 that extend around and along the handle 20, 520. However, the apertures 46, 546 that extend under the handle and across the end wall 210, 510 of the handle will be unaffected. When a product is applied as a mist, it can settle on the appliance and again block or restrict at least some of the apertures of the primary inlet



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 36 of 2286

40, 540. However, by having apertures that extend around, along and across the handle 20, 520 the risk of blocking the primary inlet 40, 540 is reduced.

The apertures are preferably circular with a diameter of 0.2 to 1.6 mm. The diameter of the apertures can vary along, around and across the handle 20, 520. It is advantageous to space the apertures regularly around, along and across the primary inlet 40, 540. Not only is this visually pleasing but it also has the technical advantage that there is no weak region of the primary inlet 40, 540 where blockage of a portion is more likely or would have more impact on the flow into the primary inlet 40, 540. The inlet is designed so that the flow into the inlet is even at least around the circumference of the handle 20, 520.

It is preferred that the handle is made from a metallic material so any styling product that sticks to the handle and does block the primary inlet 40, 540 is easily removed and only temporarily blocks any apertures.

Referring now to Figures 9 and 10, the hairdryer 10 includes two sets of control buttons 62, 64. A first set 62 is provided on the handle 20 and a second set 64 on the body 30. Conveniently, the two sets of buttons 62, 64 are located so they can all be accessed by one digit. In normal use this digit is the thumb, but if the hairdryer is held differently it may be a finger. The first set 62 are provided on the handle 20 on the same side of the handle 20 as the body inlet 320. The second set 64 are provided on the side wall 350 of the body 30. An as example, the first set 62 can include an on button 62a and a cold shot button 62b and the second set 64 can include a heater control button 64a and a flow control button 64b.

One advantage of having the buttons located on one side or end of the hairdryer is that all the control buttons 62, 64 can be seen by a user at the same time making use of the hairdryer and changes to parameters such as flow rate and temperature simplified.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 37 of 2286

Another advantage is that the control electronics are in one region of the handle 20. This is particularly advantageous when the primary flow path 400 is through the handle as there is no wiring to be routed around the handle to the front face, i.e., that side of the handle 20 that faces the outlets 340, 440 of the hairdryer.

A third advantage is that the second set of control buttons 64 is mounted directly onto the PCB 75. This not only simplifies the production of the hairdryer but also improves reliability as there are fewer electrical connections within the hairdryer.

The control buttons 62, 64 can be depressible buttons or slidable controls or a mixture of differently actuated controls. It is preferred that the control buttons 62, 64 stand proud of the surface in which they are located as this enables a user to find the required button by feel alone.

The PCB 75 will now be discussed in particular with reference to Figures 3, 4b, 11a, 11b, 12a 12b, and 12c. The PCB 75 is annular or ring shaped and extends around the duct 310 and between the duct 310 and the outer wall 360. In this example, the PCB has two boards, a first board 75a which extends all the way round the duct 310 and a second board 75b adjacent of and downstream of the first board 75a. The second board 75b extends only partially around the duct 310 and about the fluid flow path 300.

The PCB 75 houses a number of different components each of which extend away from the board on which it is mounted by a different amount. Referring in particular to Figures 3, 4b, 12a 12b, and 12c, large components 77 such as capacitors, are positioned on the first board 75a radially away from the second board 75b. This has a number of advantages such as the PCB 75 is made as compact as possible as the smaller components or those which extend least away from the board on which they are mounted are double stacked whereas the larger components or those that extend the furthest from the board on which they are mounted are single stacked.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 38 of 2286

Another advantage to this arrangement on the PCB 75 in is flow management of fluid in the primary fluid flow path 400 as the primary fluid flow path moves from the handle 20 into the body 30. Referring to Figures 3, 4b, 12b, and 12c, the handle 20 is generally tubular and the primary fluid flow path 400 is generally circular as it enters the junction 90 between the handle 20 and the body 30. At this point the primary fluid flow path 400 changes direction by 90° and from a circular flow to an annular flow around the duct 310 between the duct 310 and the outer wall 360 of the body 30. These changes affect the velocity of flow in the primary fluid flow path 400.

If we consider that the body 30 is generally symmetrical about a centre line A-A which extends along the length of the body 30, the duct 310 and outer wall 360 are concentric as is the heater 80 located between the duct 310 and the outer wall 360. When the fluid in the primary fluid flow path 400 reaches the junction 90 between the body 30 and the handle 20, the fluid must change both direction and shape. This creates a region of high velocity flow in the body 30 by the junction 90 and a region of lower velocity flow radially spaced within the body 30 from the junction 90. If we consider the body 30 to have an upper half 380 and a lower half 390 where the upper half 380 is radially spaced away from the handle 20 and the lower half 390 includes the junction 90 between the body 30 and the handle 20 then the lower half 390 has flow at a relatively higher velocity than the upper half 380.

The PCB 75 is orientated so that larger components 77 are located in the upper half 380 in the relative lower velocity flow radially away from the region of relatively high velocity so that their impact on the velocity of flow within the hairdryer is reduced. The double layer 75a, 75b PCB is located in the lower half 390 as this part of the PCB 75 extends less into the primary fluid flow path 400.

In addition, a flow plate 700 is provided to curve or direct the flow within the primary fluid flow path 400 over and around the PCB 75 to further minimise any pressure losses due to the location of the PCB and due to the change of direction of the primary fluid flow path 400 as it enters the body 30. The flow plate 700 is annular with a curved



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 39 of 2286

section 710 (Figures 3, 4b, 11a, 11b, 12a, 12b, and 12c) that provides a smooth change in orientation or direction for the primary fluid flow path 400. By providing a curved surface 710 flow is directed around the corner reducing noise produced by the orthogonal change in direction and reducing any pressure loss or loss of velocity of the fluid. The entire flow plate 700 could be curved however, the benefits are seen by merely having the part of the flow plate 700 that is located in the lower half 390 of the body 30 having a curved surface 710.

The flow plate 700 is adjacent the PCB 75 and advantageously, the flow plate 700 is connected to the PCB 75 via a connecting bridge 720. The flow plate 700 is made from a conducting material preferably a metallic material such as aluminium or an alloy thereof so this bridge 720 provides a heat sink for the PCB 75 drawing heat from the components of the PCB and conducting that heat into the fluid flowing through the fluid flow path as it passes the flow plate 700.

In addition, the flow plate 700 serves as a thermal barrier for the PCB 75 and temperature sensitive components mounted thereon. A heater 80 is located within the body 30 downstream of the junction 90 between the body 30 and the handle 20 and the PCB 75 and when fluid is flowing through the primary fluid flow path 400, i.e., when the hairdryer is switched on the majority if not all of the heat produced by the heater 80 will be taken to the primary fluid outlet 440. However, when the hairdryer is turned off or onto stand-by, the heater will emit residual heat which will radiate both upstream and downstream so the flow plate ideally also acts as a thermal barrier for the PCB 75.

The flow plate 700 does not seal the PCB 75 against fluid in the fluid flow path 400 rather it enables fluid to flow around the PCB 75 either through openings 730 (Figure 4b in particular) between the flow plate 700 and the body 30 or slots 740 within the flow plate (Figure 12a).

The flow plate 700 has another function. In the event of a failure of one or more components such as a capacitor on the PCB 75, the flow plate 700 acts as a deflector



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 40 of 2286

plate which deflects any debris and/or electrolyte from a component failure back towards the side wall 350 and protects against the debris and/or electrolyte from entering the primary fluid flow path 400 where it would encounter the heater 80 and the primary fluid outlet 440.

Figures 13 to 16 show various views of a hairdryer 10 having an attachment 600 for changing a parameter of fluid output from the hairdryer. The attachment 600 comprises a bung 610 and an outer wall 660. Between the bung 610 and outer wall 660 an attachment fluid flow path 620 extends from an attachment fluid inlet 630 to an attachment fluid outlet 640. At the upstream end 660a of the outer wall 660 a ring of magnetic material 662 is provided. The ring of magnetic material 662 is recessed into or embedded in an upstream face 664 of the upstream end 660a of the outer wall 660.

The hairdryer 10 includes a number of magnets 364 radially spaced around an end wall 362 at the second end 34 of the hairdryer 10 (Figures 3 and 4a). The end wall 362 extends radially inwards of the outer wall 360 of the body 30. These magnets 364 couple with the ring of magnetic material 662 when the attachment 600 is attached to the hairdryer 10.

Alternatively, the end wall 362 of the hairdryer 10 can include a ring of magnetic material and the attachment can include point magnets radially spaced around or another ring of magnetic material. Only one part of the magnetic connection needs to be magnetised, the other merely needs to be magnetically attracted to the magnetised part.

The use of a magnetic connection between the hairdryer and an attachment has a number of advantages, particularly when used with this type of hairdryer 10, i.e., one having an inner bore 300 defined by a duct 310 and components 77, 80 which extend around the bore. The spacing and maintaining the spacing between the duct 310 and the outer wall 360 of the hairdryer 10 along the length of the body 30 is important. If the duct 310 were pushed to one side within the body 30, the heater 80 could become damaged, fluid flow compromised and hot spots could appear on the outer wall 360.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 41 of 2286

Thus, when an attachment is attached and removed, it is important not to introduce extra stress or strain on the hairdryer 10. Traditional push and snap fit and friction fit methods of attachment could do this. However, magnetic attachment provides consistent positioning at a known force. In addition if the product is dropped or knocked the magnetic force attracting the two parts can be set at a level which allows the attachment to snap off.

The force between the magnets can be manipulated in a number of ways. The use of discrete or point magnets is one way. A ring of magnetic material is an alternative. This could be a solid ring of a magnetic material such as iron or could comprise flakes of magnetic material moulded within a suitable substrate such as an epoxy resin. The ring of material can be fully exposed, partially exposed or concealed behind the end wall of the hairdryer. Referring now to Figures 17a and 17b two alternative constructions are discussed. Both options have the end wall 362 extending radially inwards of the outer wall 360 of the body. Figure 17a shows an L-shaped ring of magnetic material 700 having a first leg 710 which engages the inner surface 362a of the front face 362 of the outer wall and a second leg 720 which extends from the first leg 710 towards the outer surface of the end wall 362. The second leg 720 may be flush with the outer surface. Figure 17b shows an alternate construction where the ring of magnetic material 730 is positioned against the inner surface 362a of the end wall 362 and is completely concealed behind the end wall 362.

The ring of magnetic material 662 on the attachment 600 may also be fully exposed, partially concealed or fully concealed at the upstream face 664. When partially or fully exposed magnetic parts are used, both parts of the magnetic attachment 700, 662 are preferably flush with the respective end wall 362 and upstream face 664. Alternatively the two parts of the magnet are shaped to engage mechanically as well as magnetically. For example by the provision of one recessed magnet and one proud of the respective end wall and upstream face or a stepped surface to the magnets.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 42 of 2286

For the embodiments where the magnet is exposed, it is preferably covered in an anti scratch coating 722 (Figure 17a) such as PTFE. This is advantageous as it allows for the attachment to be rotated with respect to the body of the appliance without damage to mating surfaces.

In the embodiments shown and referring to Figures 13, 14a and 14b in particular, the attachment 600 is a concentrator nozzle, i.e., it concentrates the flow into a smaller area. The primary fluid flow path 400 of the hairdryer has an annular primary fluid outlet 440 and this provides a relatively large cross sectional area of heated fluid. The attachment 600 has an attachment fluid outlet 640 which is generally rectangular with its long side 670 being similar to the diameter of the primary fluid outlet 440 (it may be bigger or smaller) and the short side 680 being significantly smaller than the diameter of the primary fluid outlet 440 and the long side 670. A concentrator nozzle 600 concentrates the flow over a smaller area providing a user with a directed flow. As the attachment 600 is rotatable with respect to the body 30 and can be positioned in any orientation with respect to the body 30, the flow from the attachment can be orientated horizontally or vertically or at any angle inbetween enabling the user to have fine control over drying.

Referring to Figures 13 to 16, when the attachment 600 is attached to a hairdryer 10, the outer wall 660 forms a continuation of the hairdryer outer wall 360. The bung 610 has two parts a cone 612 and a base 614. The cone 612 extends within the attachment 600 forming a point 616 towards the attachment fluid outlet 640 and directs flow from the primary fluid outlet 440 of the hairdryer towards the attachment fluid outlet 640. The cone 612 defines with the outer wall 660 the limits of the attachment fluid flow path 620. The base 614 is upstream of the cone 612 and limits flow from the fluid flow path 300 by extending into the end of the duct 310 forming a loose bung. The attachment fluid flow path 620 is in fluid communication with the primary fluid flow path 400 of the hairdryer 10 so fluid from the primary fluid flow path 400 is emitted from the attachment fluid outlet 640.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 43 of 2286

The invention has been described in detail with respect to a hairdryer and a hot styling brush however, it is applicable to any appliance that draws in a fluid and directs the outflow of that fluid from the appliance.

The appliance can be used with or without a heater; the action of the outflow of fluid at high velocity has a drying effect.

The attachment described has been a concentrating attachment however, magnetic attachment of any nozzle shape, size or with any function is possible.

The fluid that flows through the appliance is generally air, but may be a different combination of gases or gas and can include additives to improve performance of the appliance or the impact the appliance has on an object the output is directed at for example, hair and the styling of that hair.

The invention is not limited to the detailed description given above. Variations will be apparent to the person skilled in the art.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 44 of 2286

## CLAIMS

1. A hand held appliance comprising a handle, the handle comprising a wall and an outer wall wherein the wall defines a primary fluid flow path that extends from a primary fluid inlet into the appliance and the outer wall is an external surface of the appliance wherein an insulating layer is provided between the wall and the outer wall.

2. The appliance of claim 1, wherein the outer wall extends substantially continuously around the wall.

3. The appliance of claim 1, wherein the outer wall extends substantially along the wall.

4. The appliance of claim 1, wherein the insulating layer is substantially continuous around the wall.

5. The appliance of claim 1, wherein the insulating layer is substantially continuous along the wall.

6. The appliance of claim 1, wherein the insulating layer mitigates one or more of noise, vibration and heat produced by the appliance.

7. The appliance of claim 1, wherein the insulating material is a foam or a felt.

8. The appliance of claim 1 , wherein the wall is formed from a plastic material.

9. The appliance of claim 8, wherein the plastic material is one of polycarbonate, glass filled PPA, PPS, LCAP or PEEK.

10. The appliance of claim 1, wherein the handle includes a fan unit for drawing fluid into the primary fluid inlet and along the primary fluid flow path.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 45 of 2286

11. The appliance of claim 1, wherein the handle comprises a first end and a second end wherein the primary fluid inlet is at or near the second end.

12. The appliance of claim 11, wherein the primary fluid inlet comprises a first aperture extending at least partially around the handle and a second aperture extending through the second end of the handle.

13. A hand held appliance comprising a handle, the handle comprising a wall and an outer wall wherein the wall defines a primary fluid flow path that extends from a primary fluid inlet into the appliance and the outer wall is an external surface of the appliance wherein the handle comprises a first end and a second end wherein the primary fluid inlet is at or near the second end and wherein the primary fluid inlet comprises a first aperture extending at least partially around the handle and a second aperture extending through the second end of the handle.

14. The appliance of claim 13, wherein the handle comprises an end wall at the second end and the second aperture extends through the end wall.

15. The appliance of claim 14, wherein the end wall is substantially orthogonal to the handle.

16. The appliance of claim 13, wherein the first aperture is adjacent the second end of the handle.

17. The appliance of claim 13, wherein a power cable for supplying power to the fan unit is provided, the power cable extending through the second end of the handle.

18. The appliance of claim 17, wherein the power cable extends substantially centrally through the second end of the handle.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 46 of 2286

19. The appliance of claim 10, wherein the handle includes a heater for heating fluid drawn into the primary fluid inlet.

20. The appliance of claim 19, wherein the heater is downstream of the fan unit.

21. The appliance of claim 1, comprising a head attachable to the handle, the head comprising a primary fluid outlet for the appliance.

22. The appliance of claim 21, wherein the primary fluid outlet comprises a plurality of apertures extending at least partially along and around the head.

23. The appliance of claim 21, wherein the primary fluid flow path is substantially linear through the handle and into the head.

24. The appliance of claim 1, comprising a body having a primary fluid outlet, wherein the primary fluid outlet is in fluid communication with the primary fluid inlet and the primary fluid flow path.

25. The appliance of claim 24, wherein the primary fluid flow path from the primary fluid inlet to the primary fluid outlet is non linear.

26. A hair care appliance comprising a handle, the handle comprising a wall and an outer wall wherein the wall defines a primary fluid flow path that extends from a primary fluid inlet into the appliance and the outer wall is an external surface of the appliance wherein the primary fluid flow path from the primary fluid inlet to a primary fluid outlet is non linear.

27. The appliance of claim 26, wherein the primary fluid flows within the handle in a first direction and within the body in a second direction.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 47 of 2286

28. The appliance of claim 26, wherein the primary fluid flow in the body is substantially orthogonal to the primary fluid flow in the handle.

29. The appliance of claim 24, wherein the body comprises a fluid flow path extending from a fluid inlet in the body to a fluid outlet.

30. The appliance of claim 29, wherein the fluid flow path merges with the primary fluid flow path within the body.

31. The appliance of claim 30, wherein fluid in the primary fluid flow path exits the body by the primary fluid outlet.

32. The appliance of claim 29, wherein fluid in the fluid flow is entrained into the body by the action of a fan unit in the primary fluid flow path.

33. The appliance of claim 29, wherein the fluid flow path is defined by a duct extending through the body.

34. The appliance of claim 29, wherein the fluid flow path extends from a fluid inlet to a fluid outlet.

35. The appliance of claim 24, wherein the body comprises a heater for heating fluid in the primary fluid flow path.

36. The appliance of claim 35, wherein the heater extends around the duct.

37. The appliance of claim 35, wherein the heater extends along the body.

38. The appliance of claim 35, wherein the heater is annular.

39. The appliance of claim 1, wherein the appliance is a hair care appliance.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 48 of 2286

## ABSTRACT OF THE DISCLOSURE

Disclosed is a hair care appliance comprising a handle, the handle comprising a wall and an outer wall wherein the wall defines a primary fluid flow path that extends from a primary fluid inlet into the appliance and the outer wall is an external surface of the appliance. The outer wall may extend substantially continuously around and along the wall. An insulating layer may be provided between the wall and the outer wall, the insulating layer is may be substantially continuous around and along the wall and may mitigate one or more of noise, vibration and heat produced by the appliance. The handle may include a fan unit for drawing fluid into the primary fluid inlet and along the primary fluid flow path.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 49 of 2286

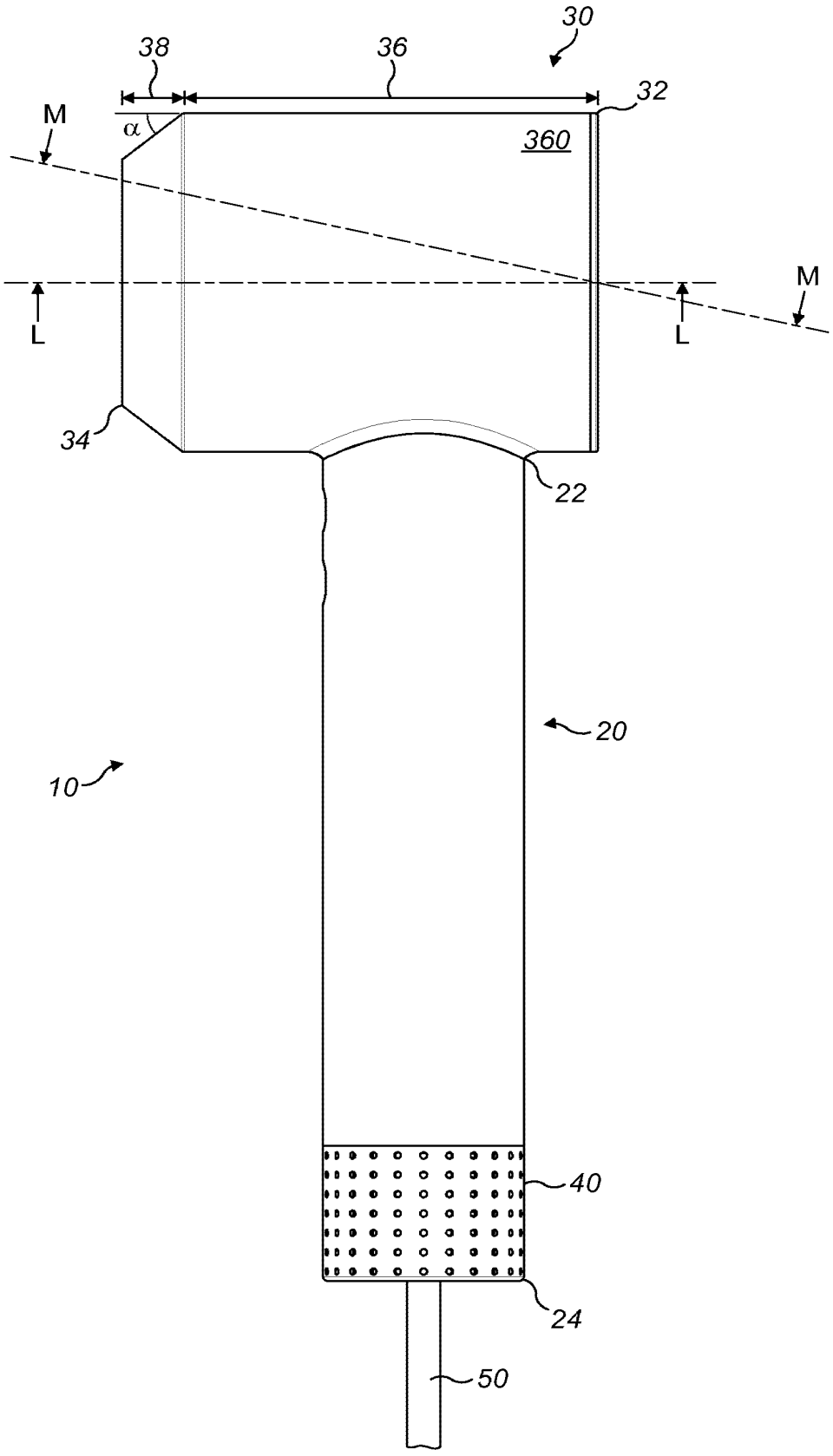



FIG. 1

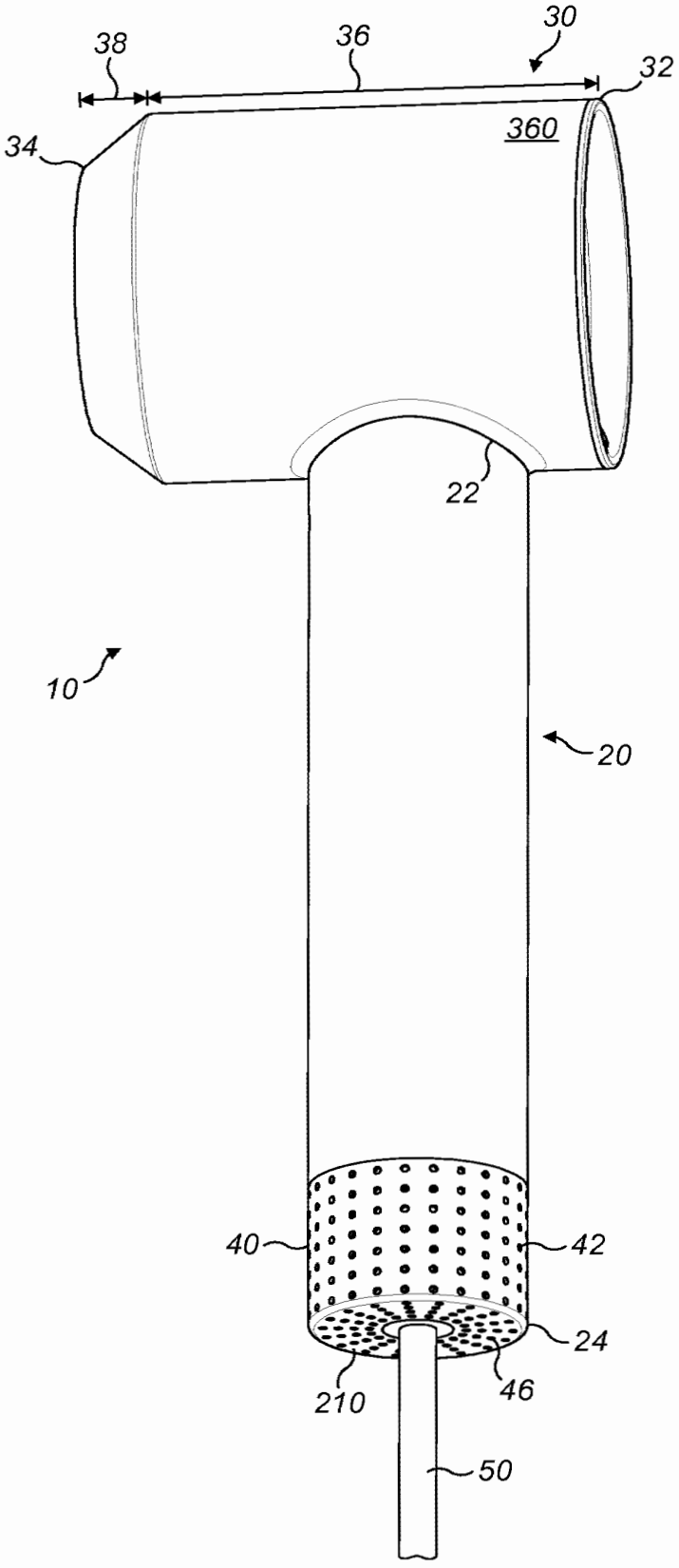



FIG. 2

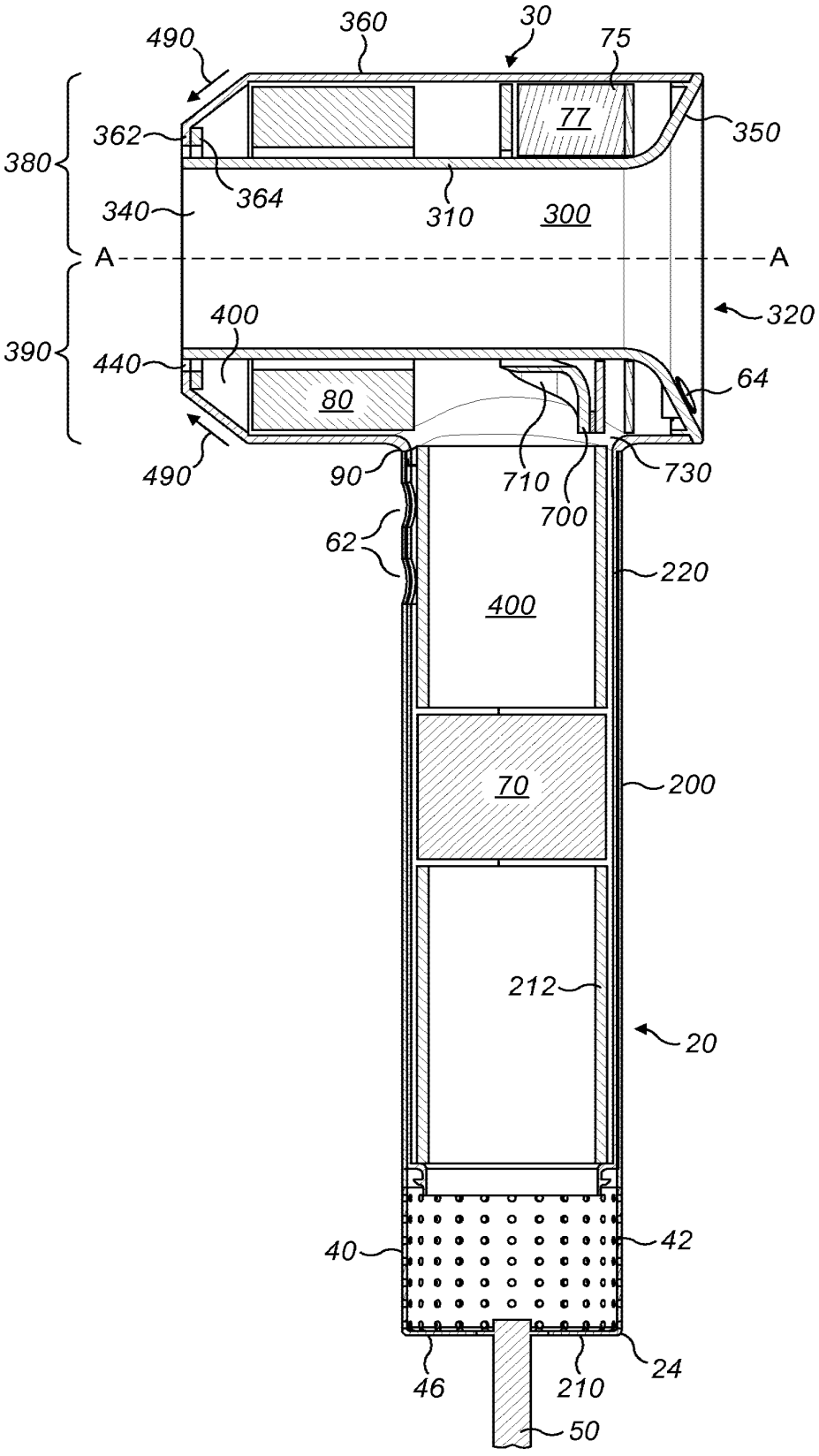

490
360
30
75
77
350
362
364
380
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FIG. 3

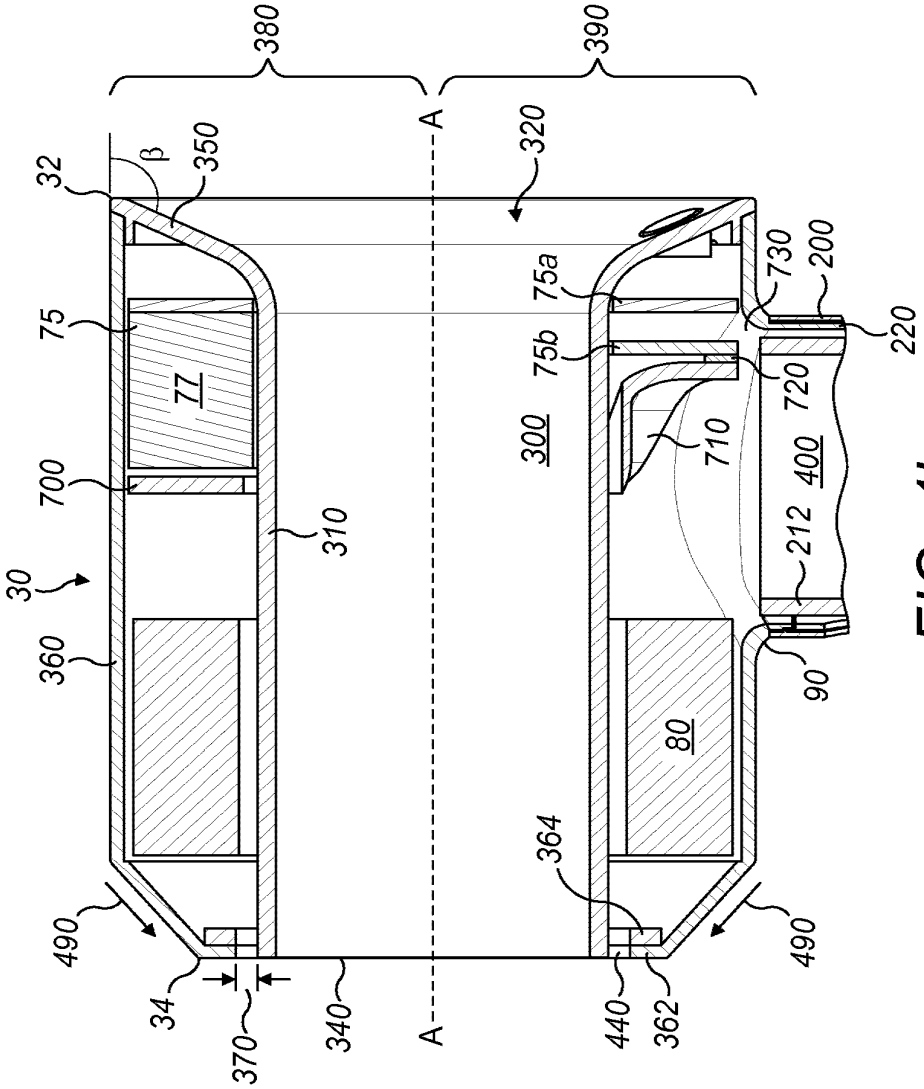

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FIG. 4b

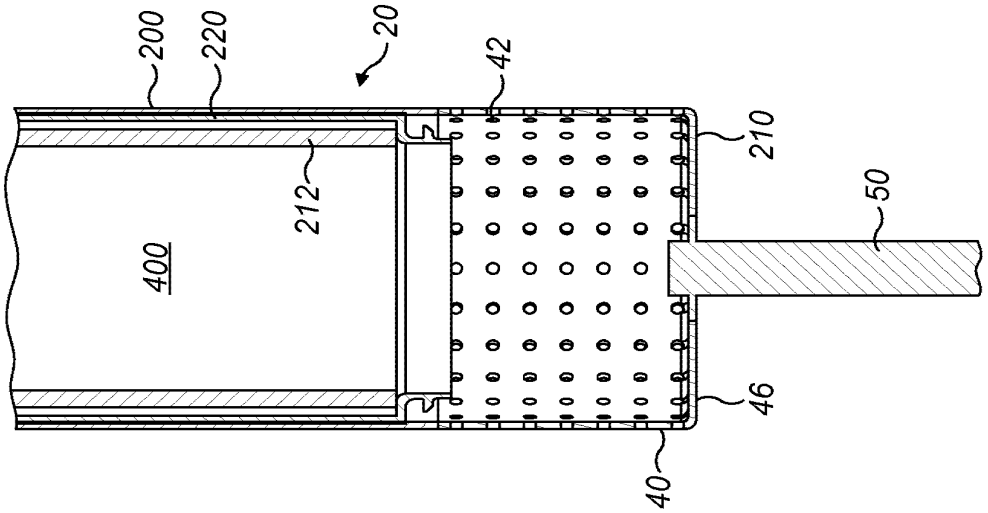

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FIG. 4a

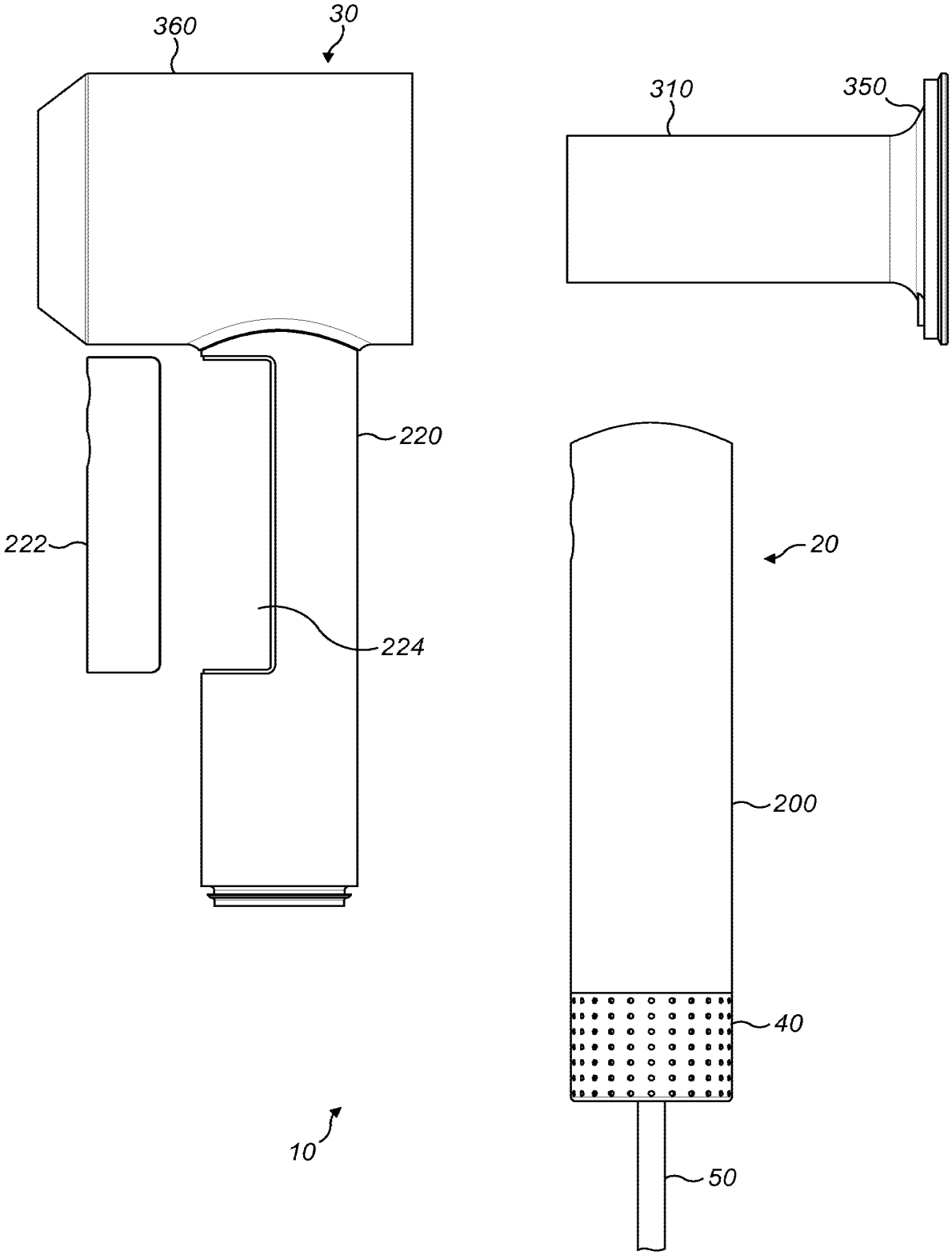



FIG. 5

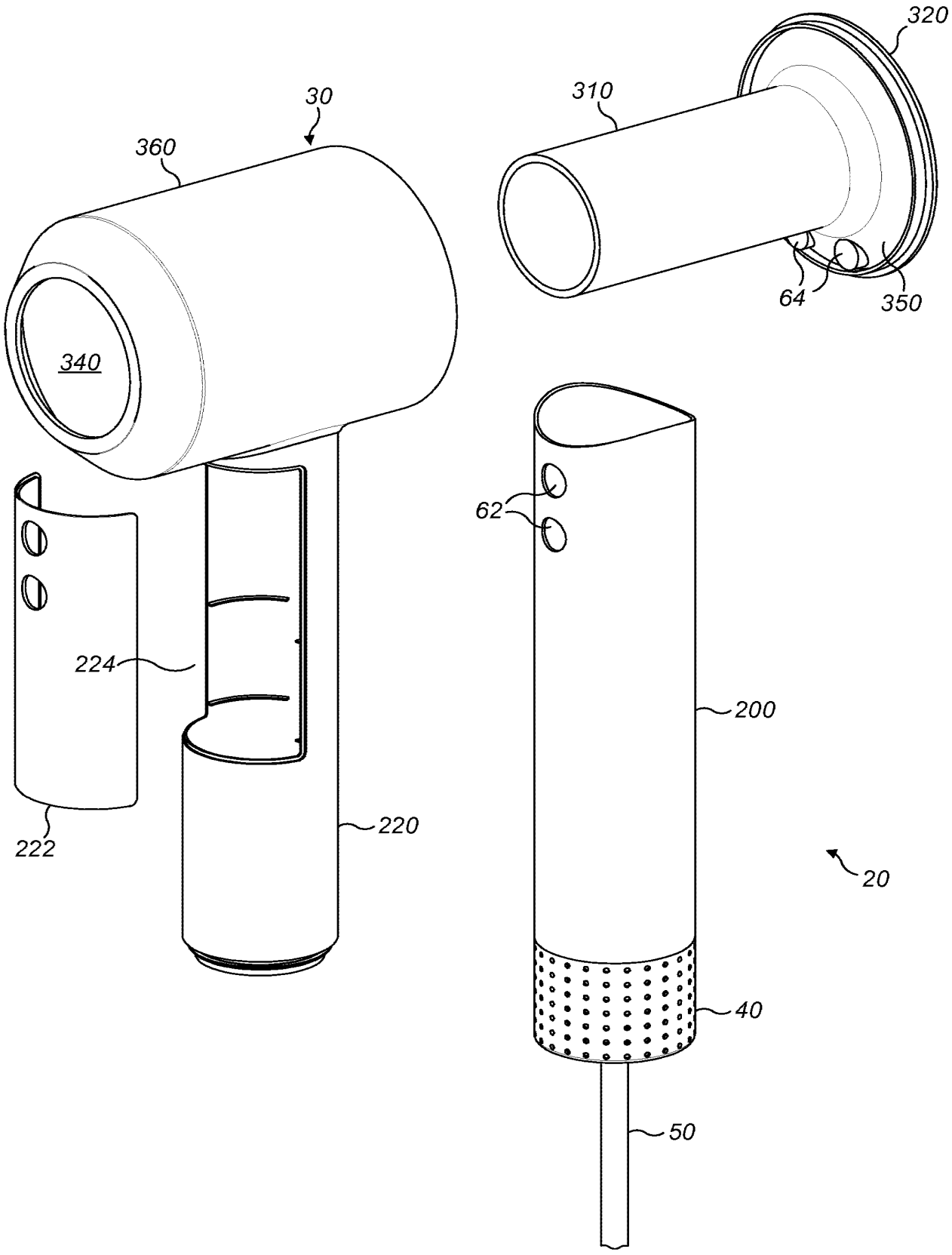



FIG. 6

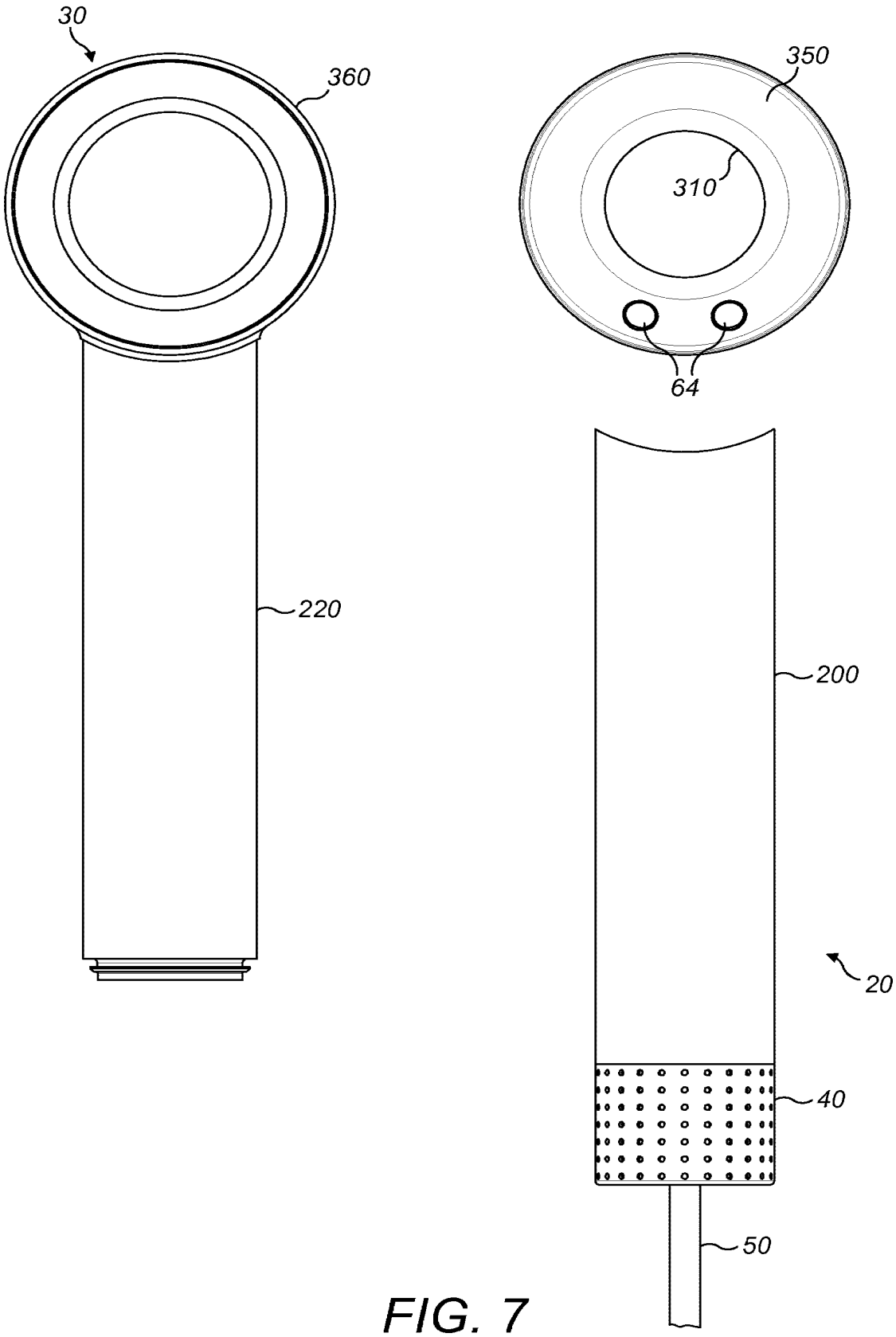



FIG. 7

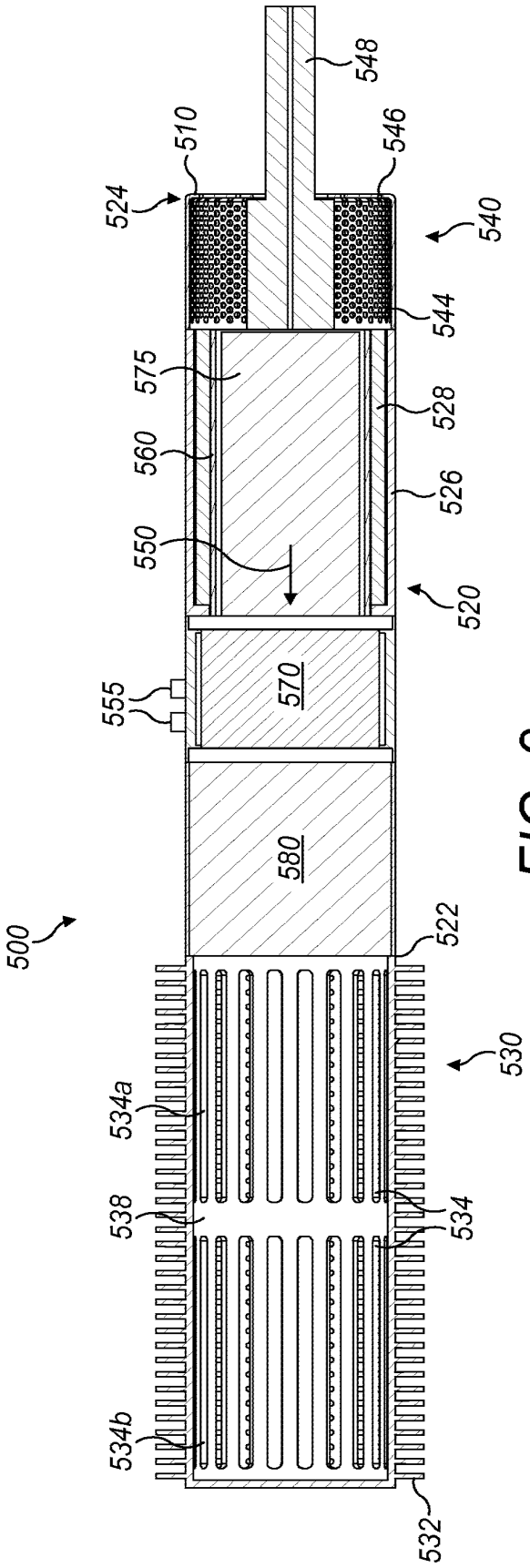

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FIG. 8a

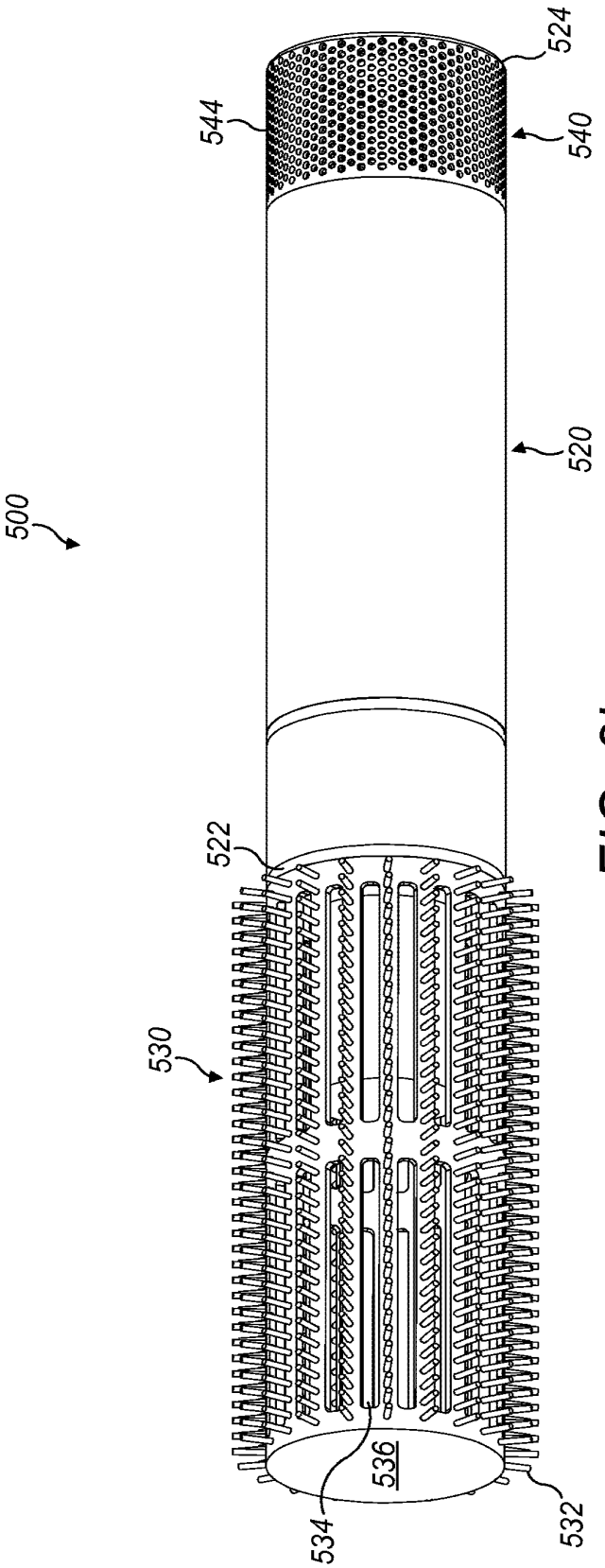



FIG. 8b

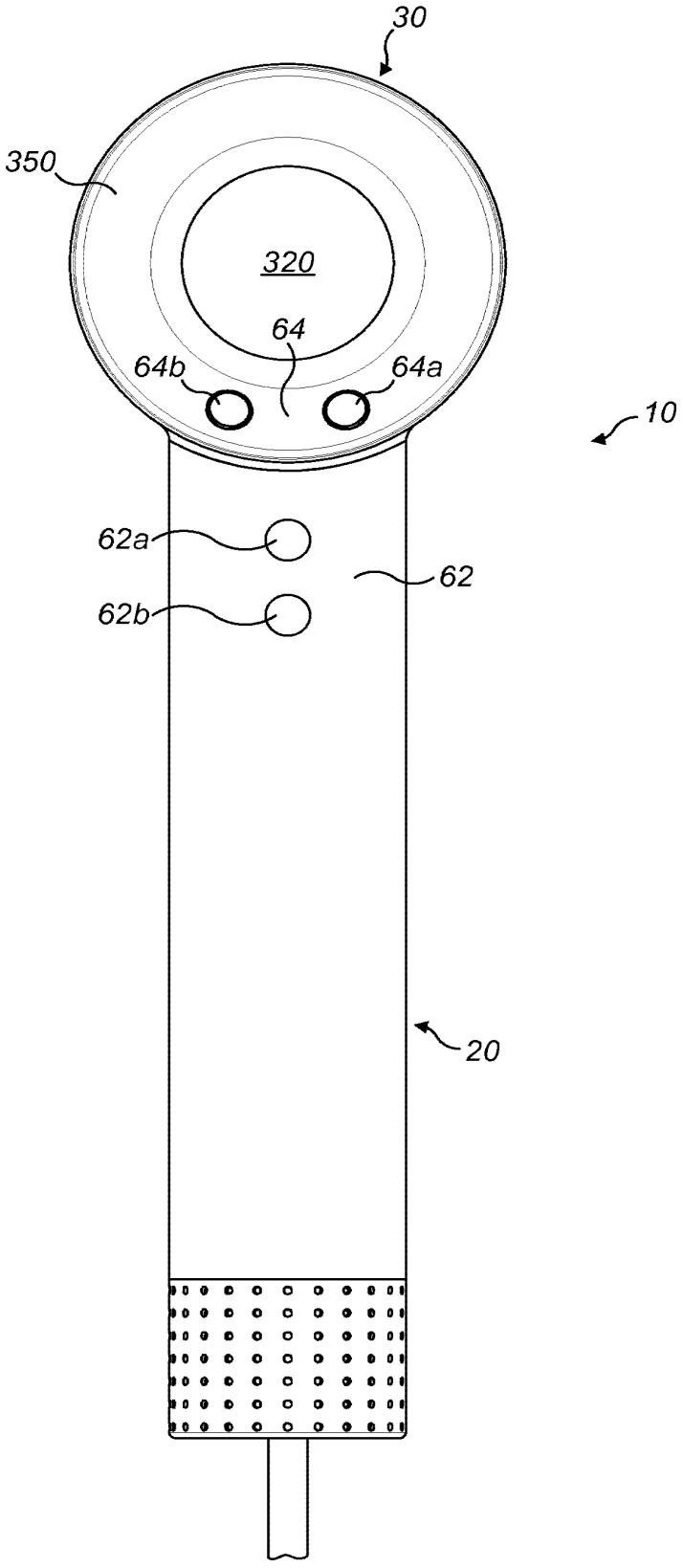



FIG. 9

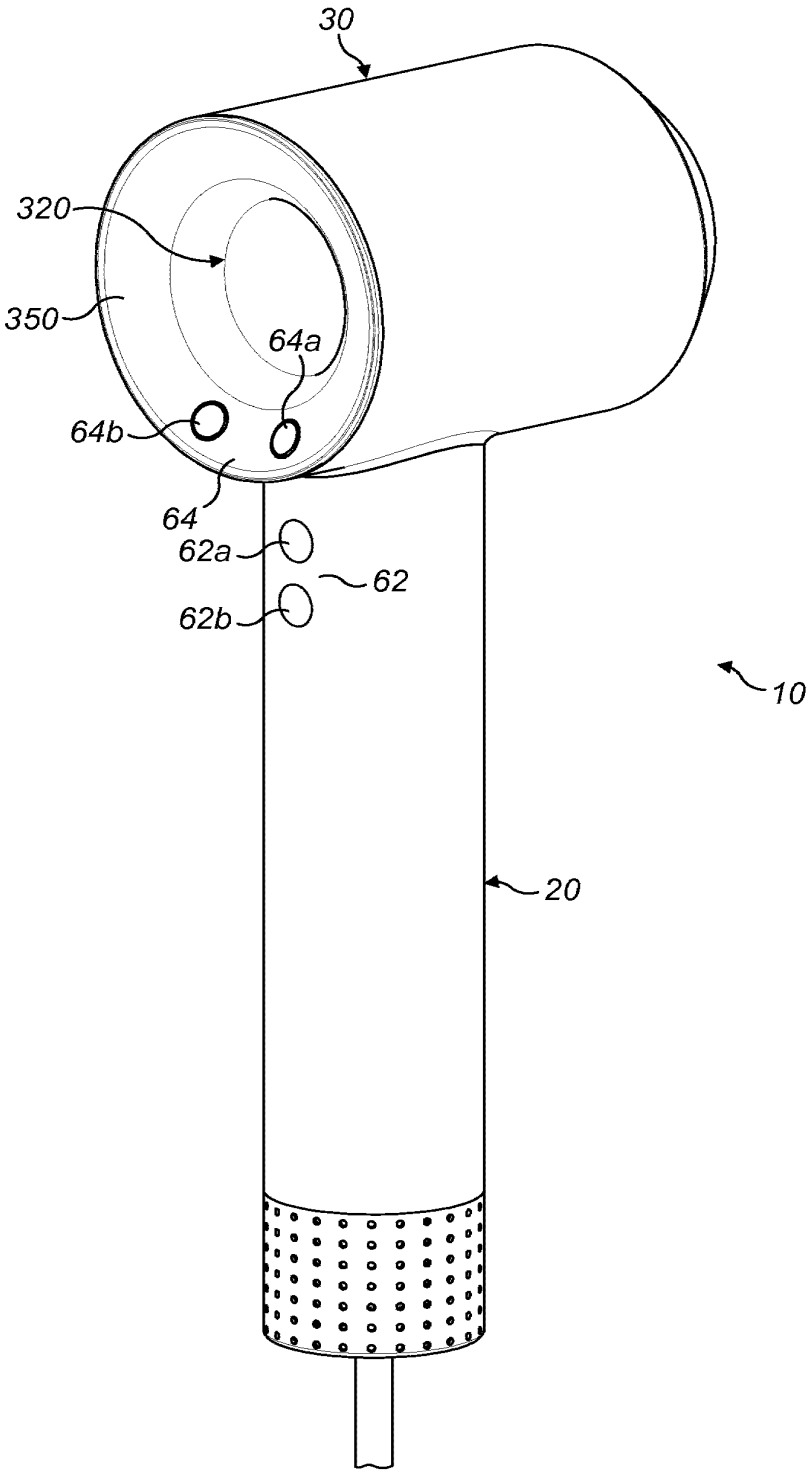



FIG. 10

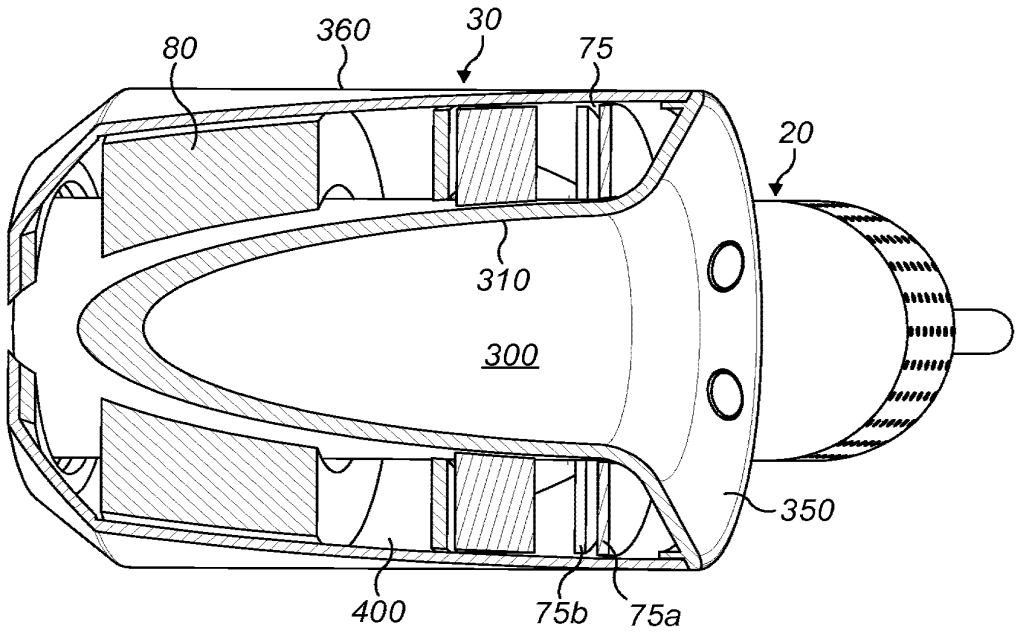



FIG. 11a

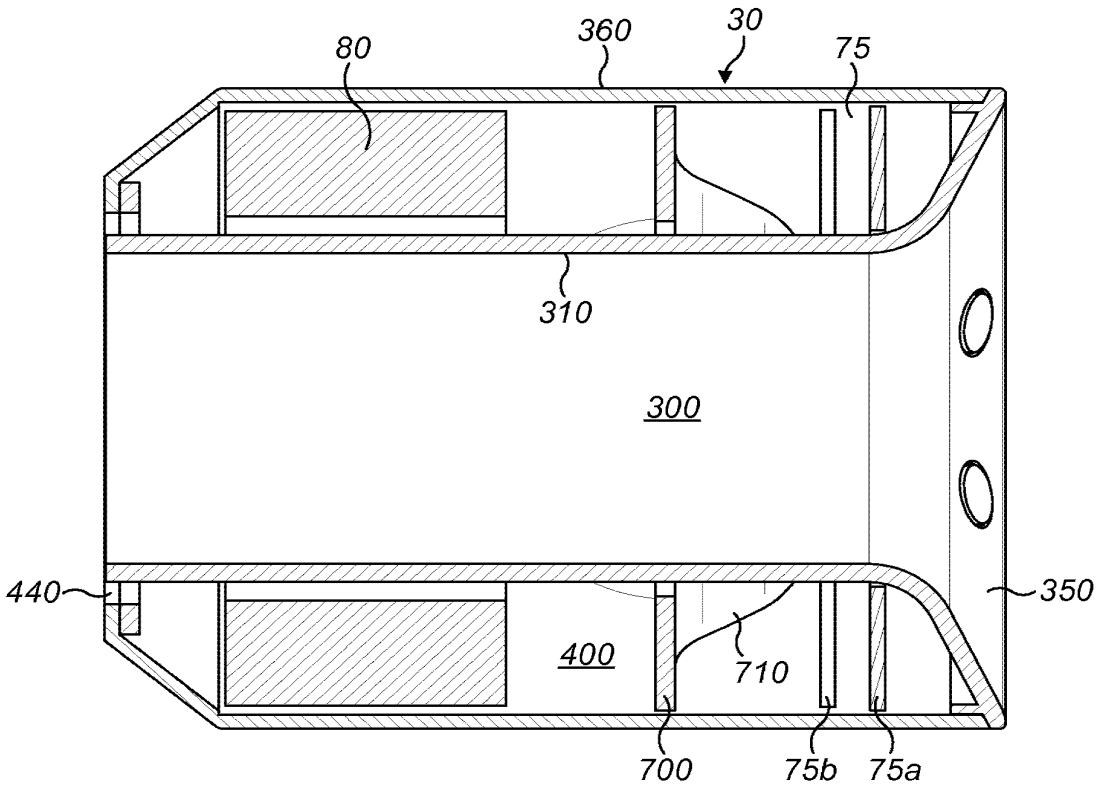



FIG. 11b

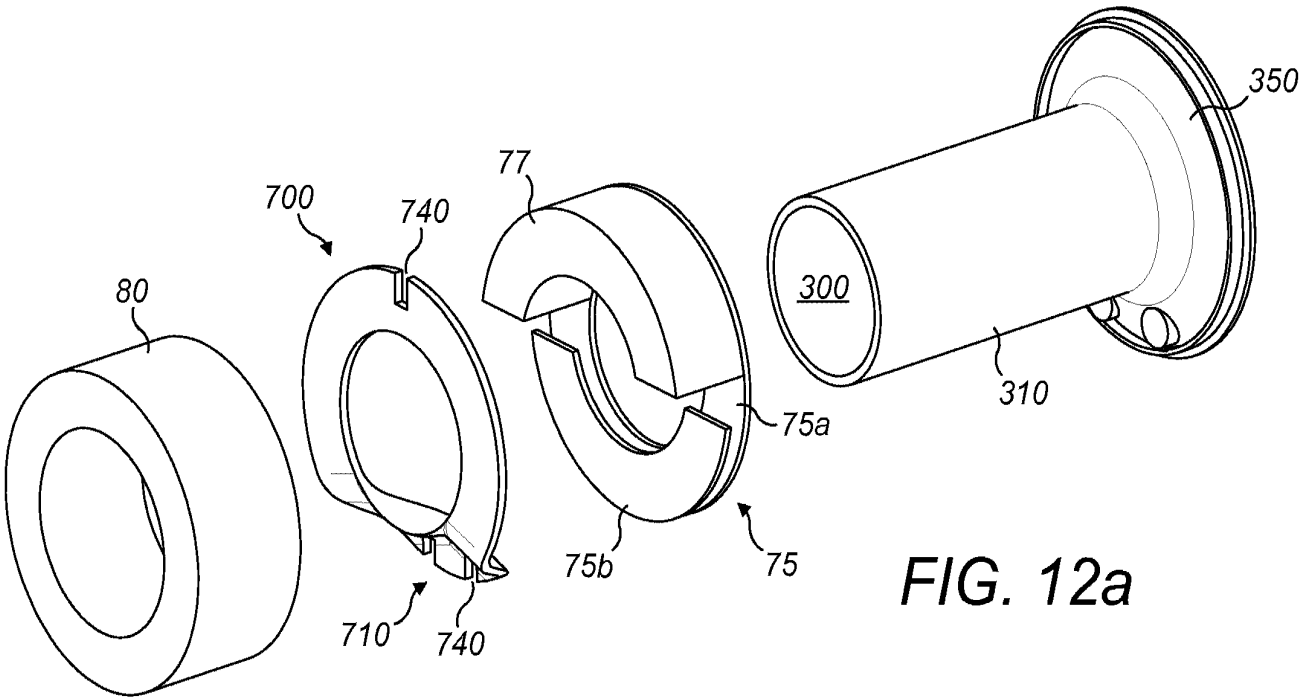



FIG. 12a

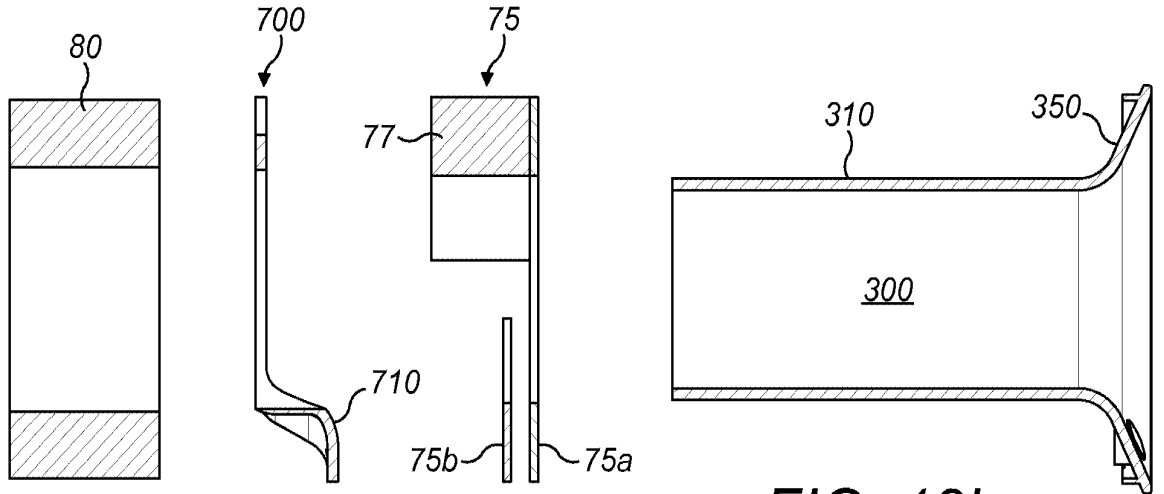



FIG. 12b

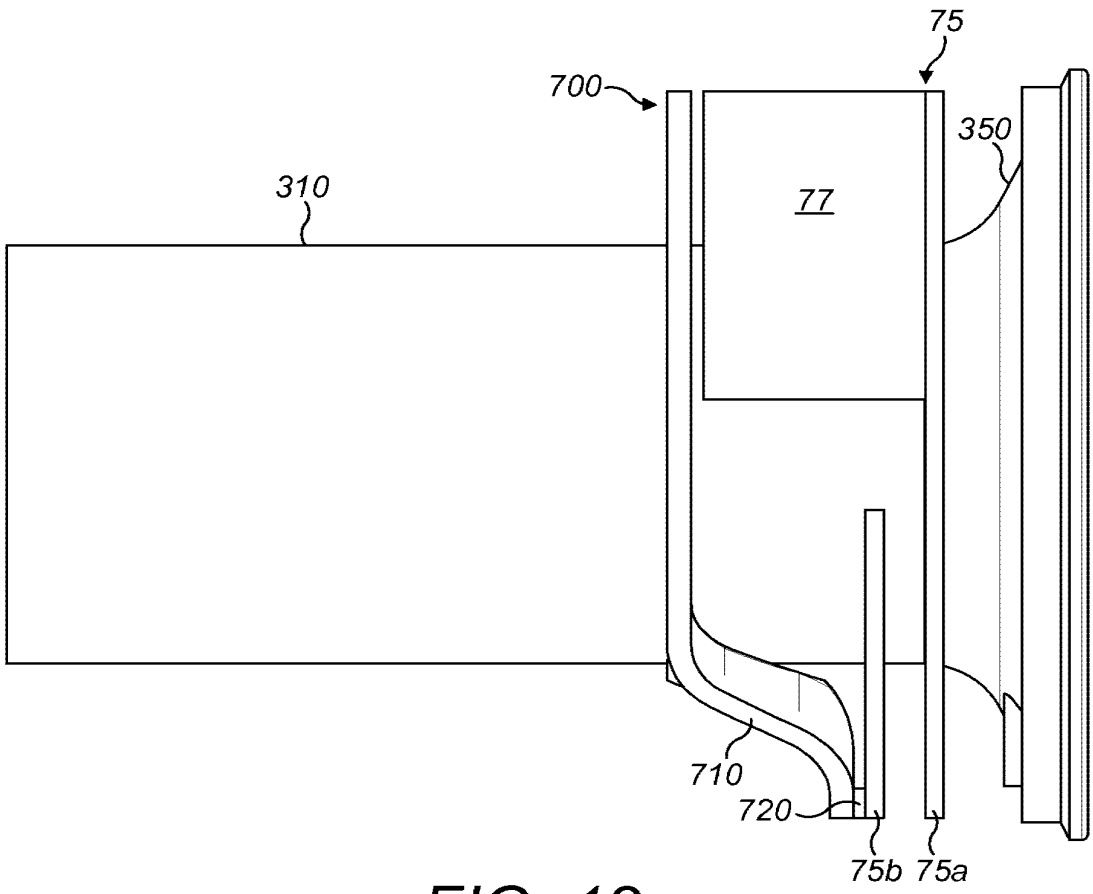



FIG. 12c

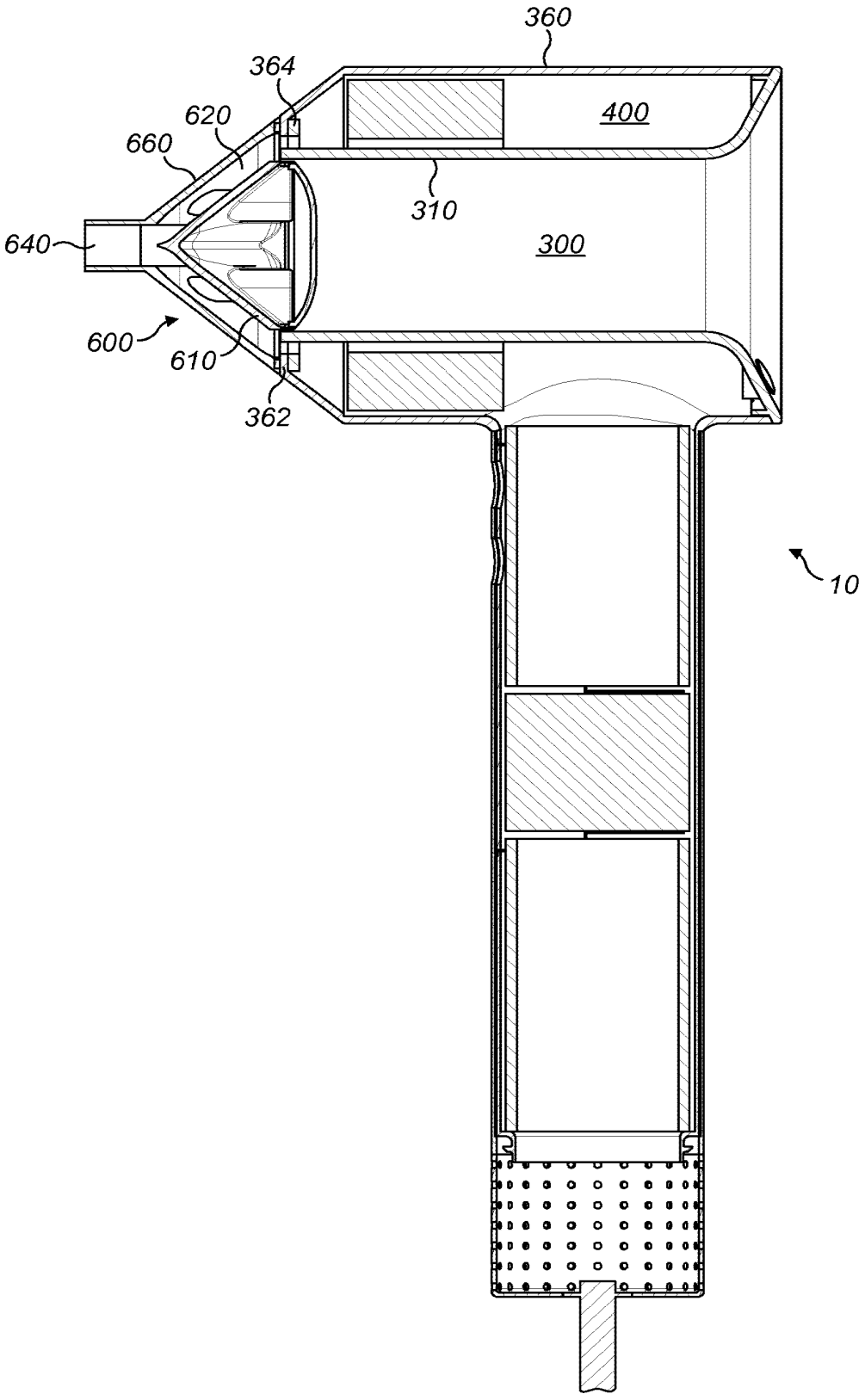



FIG. 13

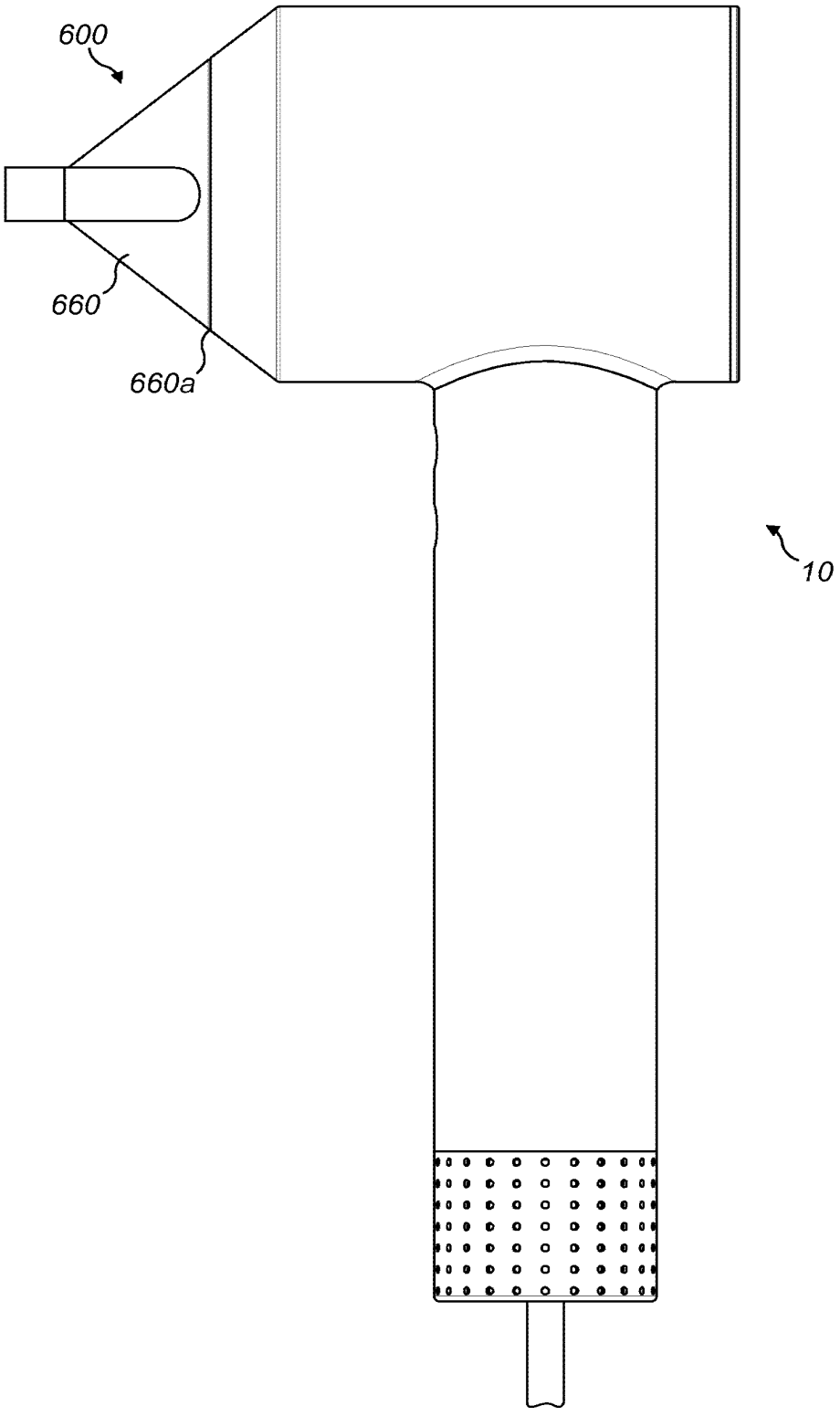



FIG. 14a

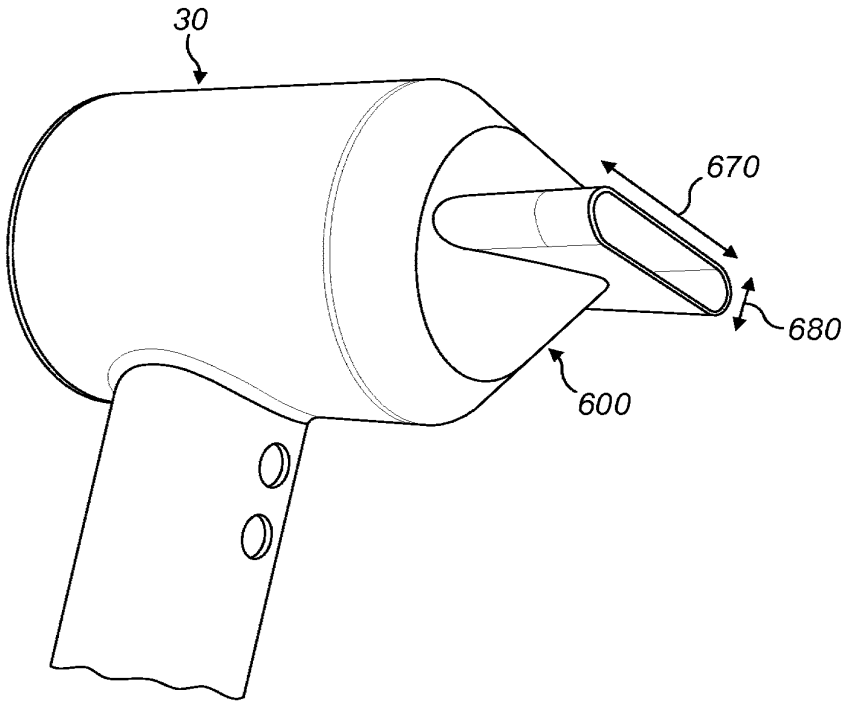



FIG. 14b

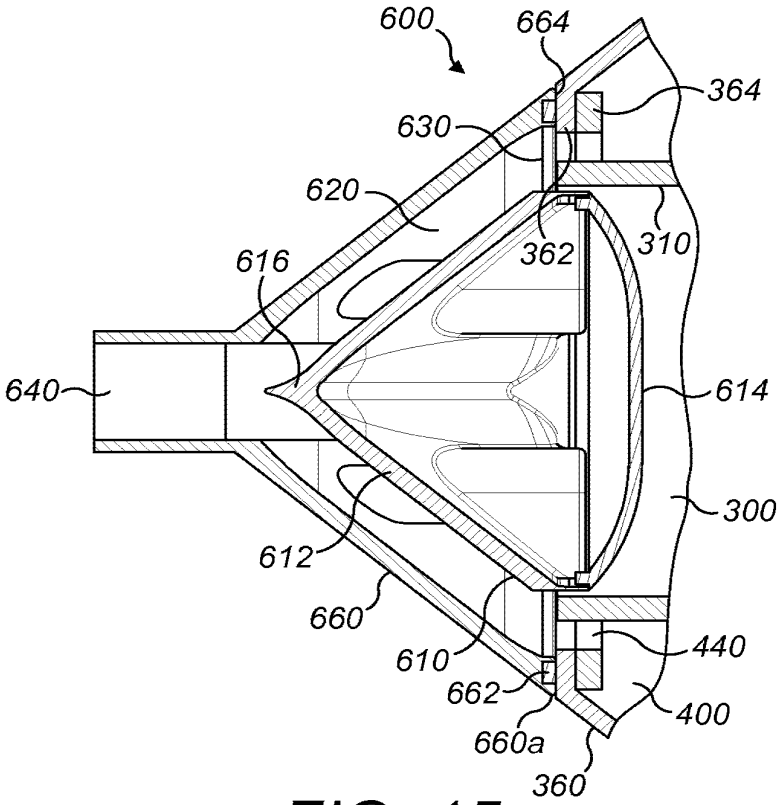



FIG. 15

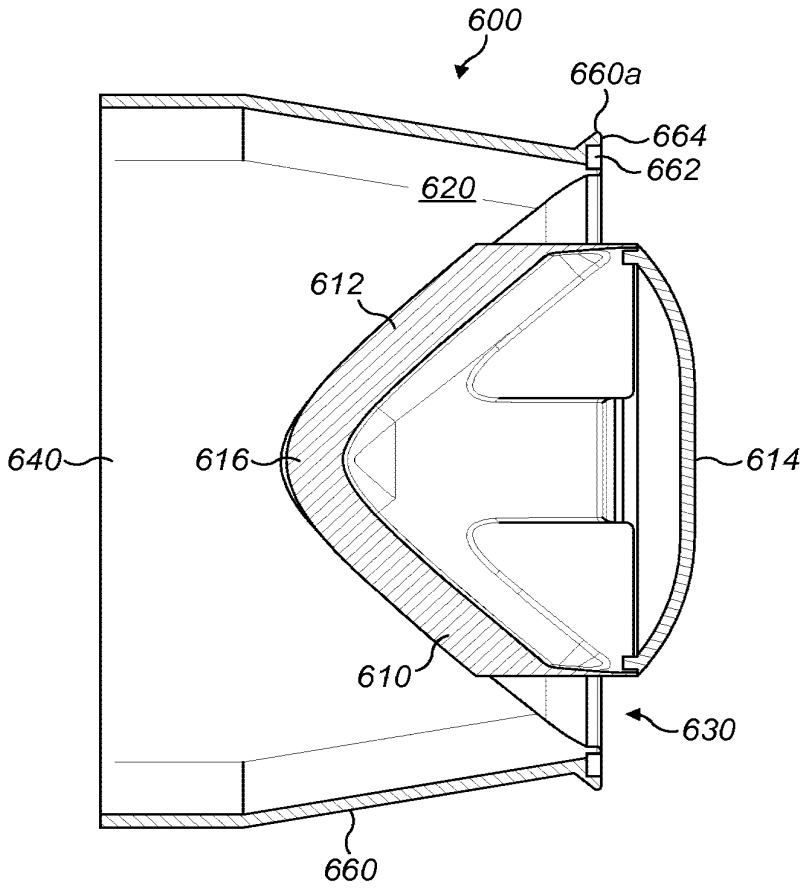



FIG. 16

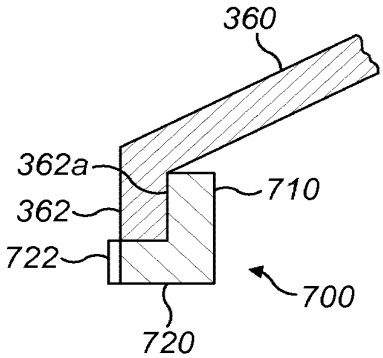



FIG. 17a

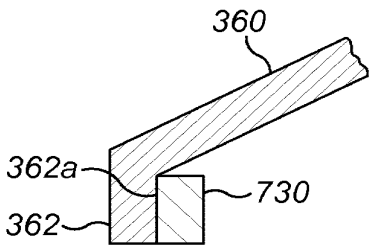



FIG. 17b

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | |
| **Filing Date:** | |
| **Title of Invention:** | HAND HELD APPLIANCE |
| **First Named Inventor/Applicant Name:** | Patrick Joseph William MOLONEY |
| **Filer:** | Bradley J. Meier/Ghita Haronni |
| **Attorney Docket Number:** | 424662077100 |

Filed as Large Entity

## Utility under 35 USC 111(a) Filing Fees

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| Utility application filing | 1011 | 1 | 280 | 280 |
| Utility Search Fee | 1111 | 1 | 600 | 600 |
| Utility Examination Fee | 1311 | 1 | 720 | 720 |
| **Pages:** | | | | |
| **Claims:** | | | | |
| Claims in Excess of 20 | 1202 | 19 | 80 | 1520 |
| **Miscellaneous-Filing:** | | | | |
| Late Filing Fee for Oath or Declaration | 1051 | 1 | 140 | 140 |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |
| **Post-Allowance-and-Post-Issuance:** | | | | |
| **Extension-of-Time:** | | | | |
| **Miscellaneous:** | | | | |
| | | **Total in USD ($)** | | **3260** |

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 19492649 |
| **Application Number:** | 14323937 |
| **International Application Number:** | |
| **Confirmation Number:** | 2130 |
| **Title of Invention:** | HAND HELD APPLIANCE |
| **First Named Inventor/Applicant Name:** | Patrick Joseph William MOLONEY |
| **Customer Number:** | 25227 |
| **Filer:** | Bradley J. Meier/Ghita Haronni |
| **Filer Authorized By:** | Bradley J. Meier |
| **Attorney Docket Number:** | 424662077100 |
| **Receipt Date:** | 03-JUL-2014 |
| **Filing Date:** | |
| **Time Stamp:** | 19:13:09 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | Deposit Account |
| Payment was successfully received in RAM | $3260 |
| RAM confirmation Number | 5136 |
| Deposit Account | 031952 |
| Authorized User | |

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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IPR2023-01324

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Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | | ApplicationPapers_424662077100.pdf | 2561839<br>b4baf18be9e56ebcf3647848707c239f7603c998 | yes | 2 |

| | Multipart Description/PDF files in .zip description | | |
|---|---|---|---|
| | Document Description | Start | End |
| | Transmittal of New Application | 1 | 1 |
| | Power of Attorney | 2 | 2 |

**Warnings:**

**Information:**

| | | | | | |
|---|---|---|---|---|---|
| 2 | Application Data Sheet | ADS_424662077100.PDF | 1503230<br>c1396e5433b88fa6da184161cf3b48c006bb4ccf | no | 7 |

**Warnings:**

**Information:**

| | | | | | |
|---|---|---|---|---|---|
| 3 | | Specification_424662077100.pdf | 162891<br>f7daef5bd69571c5eb1f451a8a8dd994fe23e7ae | yes | 40 |

| | Multipart Description/PDF files in .zip description | | |
|---|---|---|---|
| | Document Description | Start | End |
| | Specification | 1 | 35 |
| | Claims | 36 | 39 |
| | Abstract | 40 | 40 |

**Warnings:**

**Information:**

| | | | | | |
|---|---|---|---|---|---|
| 4 | Drawings-only black and white line drawings | Drawings_1248A_424662077100.pdf | 1220780<br>ac142ab5850f441d67e622582eb7692d9f9e1916 | no | 18 |

**Warnings:**

**Information:**

| | | | | | |
|---|---|---|---|---|---|
| 5 | Fee Worksheet (SB06) | fee-info.pdf | 38175<br>[illegible]15a85 | no | 2 |

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IPR2023-01324

| Warnings: | |
|---|---|
| Information: | |
| Total Files Size (in bytes): | 5486915 |

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**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

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United States Patent and Trademark Office
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www.uspto.gov

| APPLICATION NUMBER | FILING or 371(c) DATE | GRP ART UNIT | FIL FEE REC'D | ATTY.DOCKET.NO | TOT CLAIMS | IND CLAIMS |
|---|---|---|---|---|---|---|
| 14/323,937 | 07/03/2014 | 1615 | 3260 | 424662077100 | 39 | 3 |

**CONFIRMATION NO. 2130**

25227
MORRISON & FOERSTER LLP
1650 TYSONS BOULEVARD
SUITE 400
MCLEAN, VA 22102

**FILING RECEIPT**




Date Mailed: 07/21/2014

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

**Inventor(s)**

Patrick Joseph William MOLONEY, Swindon, UNITED KINGDOM;
Edward Sebert Maurice SHELTON, Swindon, UNITED KINGDOM;
Stephen Benjamin COURTNEY, Bath, UNITED KINGDOM;
Daniel Martin TAYLOR, Bristol, UNITED KINGDOM;

**Applicant(s)**

Dyson Technology Limited, Wiltshire, UNITED KINGDOM

**Power of Attorney:** None

**Domestic Applications for which benefit is claimed - None.**
*A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.*

**Foreign Applications** (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
UNITED KINGDOM 1312068.8 07/05/2013 No Access Code Provided

**If Required, Foreign Filing License Granted:** 07/17/2014

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/323,937**

**Projected Publication Date:** 01/08/2015

**Non-Publication Request:** No

**Early Publication Request:** No



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 73 of 2286

**Title**

HAND HELD APPLIANCE

**Preliminary Class**

424

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

## PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

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SharkNinja Ex. 1002
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Page 74 of 2286

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## Title 37, Code of Federal Regulations, 5.11 & 5.15

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SharkNinja Ex. 1002
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IPR2023-01324
Page 75 of 2286

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United States Patent and Trademark Office
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www.uspto.gov

| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|---|---|---|---|
| 14/323,937 | 07/03/2014 | Patrick Joseph William MOLONEY | 424662077100 |

**CONFIRMATION NO. 2130**

25227
MORRISON & FOERSTER LLP
1650 TYSONS BOULEVARD
SUITE 400
MCLEAN, VA 22102

**NOTICE**

*OC000000069661904*

Date Mailed: 07/21/2014

## INFORMATIONAL NOTICE TO APPLICANT

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

The item(s) indicated below are also required and should be submitted with any reply to this notice to avoid further processing delays.

- A properly executed inventor's oath or declaration has not been received for the following inventor(s):
  Patrick Joseph William MOLONEY
  Edward Sebert Maurice SHELTON
  Stephen Benjamin COURTNEY
  Daniel Martin TAYLOR



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 76 of 2286

## PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 14/323,937

### APPLICATION AS FILED - PART I

| FOR | (Column 1) NUMBER FILED | (Column 2) NUMBER EXTRA | SMALL ENTITY RATE($) | SMALL ENTITY FEE($) | OR | OTHER THAN SMALL ENTITY RATE($) | OTHER THAN SMALL ENTITY FEE($) |
|---|---|---|---|---|---|---|---|
| BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | | | N/A | 280 |
| SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | | | N/A | 600 |
| EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | | | N/A | 720 |
| TOTAL CLAIMS (37 CFR 1.16(i)) | 39 minus 20 = | * 19 | | | OR | x 80 = | 1520 |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | 3 minus 3 = | * | | | | x 420 = | 0.00 |
| APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | | | | 0.00 |
| MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | | | | 0.00 |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | | | TOTAL | 3120 |

### APPLICATION AS AMENDED - PART II

| | | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | SMALL ENTITY RATE($) | SMALL ENTITY ADDITIONAL FEE($) | OR | OTHER THAN SMALL ENTITY RATE($) | OTHER THAN SMALL ENTITY ADDITIONAL FEE($) |
|---|---|---|---|---|---|---|---|---|---|---|
| AMENDMENT A | Total (37 CFR 1.16(i)) | * | Minus | ** | = | x = | | OR | x = | |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | x = | | OR | x = | |
| | Application Size Fee (37 CFR 1.16(s)) | | | | | | | | | |
| | FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | OR | | |
| | | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE | |

| | | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE($) | ADDITIONAL FEE($) | OR | RATE($) | ADDITIONAL FEE($) |
|---|---|---|---|---|---|---|---|---|---|---|
| AMENDMENT B | Total (37 CFR 1.16(i)) | * | Minus | ** | = | x = | | OR | x = | |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | x = | | OR | x = | |
| | Application Size Fee (37 CFR 1.16(s)) | | | | | | | | | |
| | FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | OR | | |
| | | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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# Certified Office Copy

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with patent application GB1312068.8 filed on 5 July 2013, and as stored electronically on the Patents Electronic Case file System.

The Patents Electronic Case-file System is compliant with British Standard BS10008 - Evidential weight and legal admissibility of information stored electronically and ISO15801 - Electronic imaging – information stored electronically, recommendations for trustworthiness and reliability.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1985 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

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Signed

Dated 12 June 2014



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 78 of 2286

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**Patents Form 1**
Patents Act 1977 *(Rule 12)*

Request for grant of a patent

Concept House
Cardiff Road
Newport
South Wales
NP10 8QQ

*Application number* GB 1312068.8

| | | |
|---|---|---|
| 1. | Your reference | **MJF_GBP1248A** |
| 2. | Full name, address and postcode of the applicant or of each applicant | **DYSON TECHNOLOGY LIMITED**<br>**Tetbury Hill**<br>**Malmesbury SN16 0RP**<br>**Wiltshire**<br>**United Kingdom**<br>08940744001 |
| | Patents ADP number *(if you know it)* | |
| 3. | Title of the invention | **A HANDHELD APPLIANCE** |
| 4. | Name of your agent *(if you have one)* | **FOWLER, Maria** |
| | "Address for service" to which all correspondence should be sent. This may be in the European Economic area or Channel Islands (see warning note below) *(including the postcode)* | **FOWLER, Maria**<br>**PO Box Dyson Technology Limited**<br>**Intellectual Property Department**<br>**Tetbury Hill**<br>**Malmesbury SN16 0RP**<br>**Wiltshire**<br>**United Kingdom**<br>08940744002 |
| | Patents ADP number *(if you know it)* | |

5. Priority declaration: Are you claiming priority from one or more earlier-filed patent applications? If so, please give details of the application(s)

| Country | Application number | Date of filing | PDAS Access Code |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 6. | Divisionals etc: Is this application a divisional application, or being made following resolution of an entitlement dispute about an earlier application. If so, please give the application number and filing date of the earlier application | Number of earlier UK application | Date of filing *(day / month / year)* |

| | | |
|---|---|---|
| 7. | Inventorship: (Inventors must be individuals not companies) | |
| | Are all the applicants named above also inventors? | **No** |
| 8. | Are you paying the application fee with this form? | **Yes** |
| 9. | Accompanying documents: please enter the number of pages of each item accompanying this form. | |
| | Continuation sheets of this form | |
| | Description: | **35** |
| | Claim*(s)*: | **8** |
| | Abstract: | **1** |
| | Drawing*(s)*: | **14** |

If you are <u>not</u> filing a description, please give details of the previous application you are going to rely upon

| Country | Application number | Date of filing | PDAS Access Code |
|---|---|---|---|



SharkNinja Ex. 1002
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IPR2023-01324

10. If you are also filing any of the following, state how many against each item.

| | |
|---|---|
| Priority documents: | **0** |
| Statement of inventorship and right to grant of a patent (Patents Form 7): | **0** |
| Request for search (Patents Form 9A): | **1** |
| Request for a substantive examination (Patents Form 10): | **1** |
| Any other documents (please specify): | |

11. I/We request the grant of a patent on the basis of this application.

Signature: **Subject: GB, Dyson Technology Limited, M. Fowler 28586; Issuer: European Patent Office, European Patent Office CA** Date: **05 Jul 2013**

12. Name, e-mail address, telephone, fax and/or mobile number, if any, of a contact point for the applicant

**Webb, Miss Hannah**
**Email: Hannah.Webb@dyson.com**
**Telephone: 01666 834258**
**Fax: 01666 828164**

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After an application for a patent has been filed, the Comptroller will consider whether publication or communication of the invention should be prohibited or restricted under section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you are resident in the United Kingdom and your application contains information which relates to military technology, or would be prejudicial to national security or the safety of the public, section 23 of the Patents Act 1977 prohibits you from applying for a patent abroad without first getting written permission from the Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked. Until such time or until the revocation of any direction, for any such application the address for service referred to at part 4 above must be in the United Kingdom.

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324

# A Handheld Appliance

This invention relates to a hand held appliance, in particular a hair care appliance such as a hairdryer or hot styling brush.

Blowers and in particular hot air blowers are used for a variety of applications such as drying substances such as paint or hair and cleaning or stripping surface layers. In addition, hot air blowers such as hot styling brushes are used to style hair from a wet or dry condition.

Generally, a motor and fan are provided which draw fluid into a body; the fluid may be heated prior to exiting the body. The motor is susceptible to damage from foreign objects such as dirt or hair so conventionally a filter is provided at the fluid intake end of the blower. Conventionally such appliances are provided with a nozzle which can be attached and detached from the appliance and changes the shape and velocity of fluid flow that exits the appliance. Such nozzles can be used to focus the outflow of the appliance or to diffuse the outflow depending on the requirements of the user at that time.

According to a first aspect, the invention provides a hair care appliance comprising: a body comprising an outer wall; and a handle comprising an outer wall and a wall disposed within the outer wall wherein, the outer wall of the body and the wall of the handle are formed as a single unit.

Forming the body and the wall of the handle as a single unit has a number of advantages. Firstly the access to at least some of the components of the appliance is made more difficult. In convention hairdryers, a clam shell construction is used and the two parts are usually screwed together. A user can relatively easily remove the screws

and access the heater and fan unit. In the present invention, as there are no joins or screws that can be removed, it is made more difficult for a user to take the product apart. Secondly, the product is visually cleaner. There are no join lines running along the length of the body and no recesses or extensions in the body that would be required in order to connect the two parts.

Preferably, the wall comprises an access aperture extending at least partially along and around the wall.

It is preferred that the wall comprises a hatch for closing the access aperture.

Preferably, the handle comprises a primary fluid inlet disposed at and/or near the distal end of the handle from the body. Preferably, the primary fluid inlet extends at least partially around and along the handle. Preferably, the primary fluid inlet comprises at least one aperture extending around the outer wall. It is preferred that the primary fluid inlet comprises at least one aperture extending along the outer wall. Preferably, the primary fluid inlet comprises at least one aperture extending across the outer wall.

Preferably, the handle comprises a primary fluid flow path flowing from the primary fluid inlet along the handle and into the body. It is preferred that the primary fluid flow path flows from the primary fluid inlet within the wall to the body.

Preferably, the handle comprises a fan unit wherein the fan unit draws fluid into the primary fluid flow path.

It is preferred that the body comprises a primary fluid outlet for the primary fluid flow path. Preferably, the primary fluid outlet is in fluid communication with the primary fluid inlet and the primary fluid flow path.

Preferably, the body comprises a first end and a second end and the primary fluid outlet is at the second end.

Preferably, the body comprises a fluid flow path. Preferably, the fluid flow path extends from a fluid inlet in the body to a fluid outlet.

It is preferred that the body comprises a duct extending within the outer wall of the body and the duct extends from the first end.

Preferably, the primary fluid flow path extends between the outer wall of the body and the duct. Preferably, the primary fluid flow path extends to a primary fluid outlet. Preferably, the primary fluid flow path extends about the duct. Preferably, the primary fluid flow path extends at least partially along the duct. Preferably, the duct extends at least partially along the body.

It is preferred that the duct defines a fluid flow path extending through the body. Preferably, the fluid flow path extends from a fluid inlet to a fluid outlet. Preferably, the fluid flow path extends within the duct. Preferably, the fluid flow path extends from a fluid inlet in the body through the duct to a fluid outlet from the body.

Preferably, the duct extends about the fluid flow path. Preferably, the fluid flow path extends through the duct. Preferably, the fluid flow path is defined by a duct extending through the body. Preferably, the fluid flow path exits the body by the fluid outlet. Preferably, the fluid flow path is provided through the duct.

It is preferred that the fluid inlet is at the first end of the body.

Preferably, the fluid flow path merges with the primary fluid flow path within the body.

Alternatively, the primary fluid flow path surrounds the fluid flow path at the second end of the body. Fluid in the primary fluid flow path exits the body by the primary fluid outlet.

Preferably, the duct is connected to the outer wall of the body by a side wall extending between the duct and the outer wall. It is preferred that the side wall is angled to both the outer wall of the body and the duct. Preferably, the side wall is disposed at the first end of the body. It is preferred that the duct and side wall are formed as a single unit. Preferably, the duct and side wall are formed from a plastic material. It is preferred that the side wall at least partially defines the fluid inlet into the fluid flow path

Preferably, the outer wall of the handle extends about the wall and partially along the wall.

It is preferred that the outer wall of the handle extends over an access hatch into the wall.

Preferably, the outer wall of the handle extends about the wall for substantially the whole length of the wall. It is preferred that the wall of the handle comprises a primary fluid inlet. Preferably, the primary fluid inlet of the outer wall of the handle is in fluid communication with the primary fluid inlet of the wall of the handle.

It is preferred that the outer wall of the body and wall of the handle are made from a plastic material.

Preferably, the outer wall of the handle is made from a different material to the wall of the handle and the outer wall of the body. Preferably, the outer wall is formed from a metal. Preferably, the outer wall of the handle is made from aluminium or an aluminium alloy.

It is preferred that the body comprises a heater. The heater is for heating fluid in the primary fluid flow path. Preferably, the heater is provided between the outer wall and the duct. It is preferred that the primary fluid flow path extends through the heater. Preferably, the heater extends along the body. It is preferred that the heater extends at least partially around the body. Alternatively, the heater extends around the body. It is preferred that the heater extends at least partially around and about the duct.

Alternatively, the heater extends around about the duct. Preferably, the heater extends at least partially along the duct. Preferably, the heater is annular.

Also provided is a hand held appliance comprising: a body comprising an outer wall; and a handle comprising an outer wall and a wall disposed within the outer wall wherein, the outer wall of the body and the wall of the handle are formed as a single unit.

According to a second aspect, the invention provides a hair care appliance comprising: a body having a duct, an outer wall extending about the duct and a side wall extending between the duct and the outer wall, wherein a control switch is provided on the side wall and wherein the outer wall, side wall and the duct are all external walls of the appliance.

Preferably, the body has an inlet end and an outlet end and the side wall is at the inlet end.

It is preferred that the duct at least partially defines a fluid flow path through the body. Preferably, duct is recessed within the outer wall at the inlet end.

It is preferred that the handle is connected to the body at a first end. Preferably, a second control switch is provided on the handle. It is preferred that the second control switch is located on the handle adjacent to the inlet end of the body.

Preferably, both the first control switch and the second control switch are accessible by a single digit.

It is preferred that the second control switch comprises two buttons.

Preferably, the handle is generally tubular and at a distal end to the body the handle comprises a primary fluid inlet. It is preferred that the handle comprises a wall and at

the distal end, the handle comprises an end wall extending across the wall. Preferably, the primary fluid inlet extends at least partially across the end wall.

It is preferred that the appliance comprises a power cable connectable to a power source at one end and extending into substantially the centre of the end wall of the handle at the other end.

Preferably, the handle comprises an outer wall and the outer wall extends at least partially along and around the wall.

Preferably, a lining material is provided between the outer wall and the wall. Preferably, the lining material is an insulating layer. Preferably, the lining material or insulating layer extends substantially continuously along and/or around the wall.

Preferably, the primary fluid outlet is at least partially defined by the duct. It is preferred that the primary fluid outlet is defined by the body and the duct.

Preferably, within the body, the primary fluid flow path and fluid flow path merge.

Preferably, the primary fluid outlet extends about the fluid flow path. Preferably, the body comprises a fluid outlet for the fluid flow path and the primary fluid outlet extends about the fluid outlet.

Preferably, the primary fluid outlet is at the outlet end of the body.

Preferably, the body decreases in diameter towards the outlet end.

Preferably, the first control switch comprises two buttons.

Also provided is a hand held appliance comprising: a body having a duct, an outer wall extending about the duct and a side wall extending between the duct and the outer wall,

wherein a control switch is provided on the side wall and wherein the outer wall, side wall and the duct are all external walls of the hand held appliance.

According to a third aspect, the invention provides a hair care appliance comprising a body, and a handle having a first end in fluid communication with the body and a second end comprising a primary fluid inlet into the appliance wherein the primary fluid inlet comprises a first aperture extending at least partially around the handle and a second aperture extending through the second end of the handle.

Having the primary fluid inlet disposed one more than one surface of the appliance is advantageous. In conventional hairdryers, the primary fluid inlet is generally located on the back end of the hairdryer and in an attempt to prevent blockage, the end is often convex. If the back end of the hairdryer is placed down on a hard surface, it will roll onto a side.

However, on a soft surface such as bedding or a long pile carpet, the inlet can still be at least partially covered or blocked. This can lead to overheating of the motor. By having the inlet on more than one surface, there is less chance of any blockage being sufficient to cause damage to the motor.

Preferably, the handle comprises an end wall at the second end and the second aperture extends through the end wall.

It is preferred that the end wall is substantially orthogonal to the handle.

Preferably, the first aperture is adjacent the second end of the handle.

It is preferred that the fan unit is upstream of the primary fluid inlet.

Preferably, the first aperture comprises a plurality of apertures extending at least partially around the handle.

It is preferred that the first aperture comprises a plurality of apertures extending at least partially along the handle.

Preferably, the second aperture comprises a plurality of apertures extending through the end of the handle.

Preferably, a power cable for supplying power to the fan unit is provided, the power cable extending through the end of the handle. It is preferred that the power cable extends substantially centrally thorough the handle at the primary fluid inlet. It is preferred that the second aperture extends at least partially around the power cable.

Preferably, a primary fluid flow path is provided from the primary fluid inlet through the handle and into the body to a primary fluid outlet.

It is preferred that the handle comprises a wall and the primary fluid flow path extends within the wall. It is preferred that the handle comprises an outer wall wherein said outer wall extends around the wall and at least partially along the wall. It is preferred that the handle comprises a layer of insulating material between the outer wall and the wall.

Preferably, the primary fluid outlet comprises a plurality of apertures extending at least partially along and around the body.

It is preferred that the primary fluid flow path is substantially linear through the handle and into the body

Alternatively, the handle is substantially orthogonal to the body.

It is preferred that the within the body the primary fluid flow path surrounds the fluid flow path.

It is preferred that the primary fluid outlet extends about the fluid flow path.

Also provided is a hand held hand held appliance comprising a body, and a handle having a first end in fluid communication with the body and a second end comprising a primary fluid inlet into the hand held appliance wherein the primary fluid inlet comprises a first aperture extending at least partially around the handle and a second aperture extending through the second end of the handle.

According to a fourth aspect, the invention provides hair care appliance comprising a handle, the handle comprising a wall and an outer wall wherein the wall defines a primary fluid flow path that extends from a primary fluid inlet into the appliance and the outer wall is an external surface of the appliance.

The provision of a double layered wall reduces the transmission of vibration and noise from within the handle. It isolates internal components of the handle from the outer wall.

Preferably, the outer wall extends substantially continuously around the wall. It is preferred that the outer wall extends substantially along the wall.

Preferably, the insulating layer mitigates one or more of noise, vibration and heat produced by the appliance. It is preferred that the insulating material is a foam or a felt.

It is preferred that the handle comprises a first end and a second end wherein the primary fluid inlet is at or near the second end.

Preferably, the handle includes a heater for heating fluid drawn into the primary fluid inlet.

Preferably, the heater is downstream of the fan unit. The heater is preferably, disposed adjacent the first end of the handle.

Preferably, the appliance comprises a head attachable to the handle, the head comprising a primary fluid outlet for the appliance. Preferably, the primary fluid outlet comprises a plurality of apertures extending at least partially along and around the head. Preferably, the primary fluid flow path is substantially linear through the handle and into the head.

Alternatively, the primary fluid flow path from the primary fluid inlet to the primary fluid outlet is non linear. It is preferred that the primary fluid flows within the handle in a first direction and within the body in a second direction. Preferably, the primary fluid flow in the body is substantially orthogonal to the primary fluid flow in the handle.

It is preferred that fluid in the fluid flow path is entrained into the body by the action of a fan unit in the primary fluid flow path.

Also provided is a hand held appliance comprising a handle, the handle comprising a wall and an outer wall wherein the wall defines a primary fluid flow path that extends from a primary fluid inlet into the hand held appliance and the outer wall is an external surface of the hand held appliance.

According to a fifth aspect, the invention provides a hair care appliance comprising a body, a fluid flow path extending through the body from a fluid inlet to a fluid outlet and a PCB extending about the fluid flow path.

Preferably, the PCB is annular. It is preferred that the PCB is isolated from the fluid flow path.

Preferably, the PCB comprises a first layer and a second layer. It is preferred that the first layer extends substantially continuously about the fluid flow path. Preferably, the second layer extends partially about the fluid flow path.

It is preferred that the second layer is adjacent the first layer. Preferably, the second layer is downstream of the first layer.

It is preferred that the PCB extends at least partially around extends about the duct.

Preferably, the primary fluid flow path is in fluid communication with the PCB.

It is preferred that the heater is downstream of the PCB.

Preferably, a thermal barrier is provided between the PCB and the heater. The thermal barrier is located fluidly between the PCB and the heater.

Preferably, comprising a handle wherein the handle attached to and extending from the body and the primary fluid inlet is in the handle is connected to the body at a first end.

It is preferred that the handle comprises a fan unit for drawing fluid into the primary fluid flow path.

Preferably, the handle comprises a second end distal to the first end, the second end comprising a primary fluid inlet,

It is preferred that the primary fluid flow path extends along the handle and into the body to a primary fluid outlet.

Preferably, the primary fluid flow path is non-linear.

It is preferred that within the handle the primary fluid flow path is generally circular.

Preferably, within the body the primary fluid flow path is generally annular.

It is preferred that where the primary fluid flow path enters the body a flow plate is provided. Preferably, the body comprises a flow plate for directing flow from the handle into the body.

Preferably, the flow plate deflects the primary flow around the duct from a circular to an annular flow.

It is preferred that the primary fluid flows through the handle in a first direction and in the body in a second direction. Preferably, the flow plate directs primary flow from the first direction to the second direction.

Preferably, the flow plate is provided in the primary fluid flow path to direct flow from a circular flow in the handle to an annular flow in the body18. Preferably, the flow plate is adjacent to the PCB.

Preferably, the flow plate is shaped around components on the PCB.

Preferably, the flow plate deflects the primary flow from a first direction of flow within the handle to a second direction of flow within the body.

Preferably, the fan unit is upstream of the PCB.

According to a sixth aspect, the invention provides a hair care appliance comprising: a body, a heater, a PCB and a primary fluid flow path extending from a primary fluid inlet into the appliance to a primary fluid outlet out of the body wherein the PCB and heater are in fluid communication with the primary fluid flow path and the PCB is upstream of the heater.

Preferably, a fan unit is provided and the fan unit is upstream of the heater.

Alternatively, a fan unit is provided and the fan unit is downstream of the PCB.

It is preferred that the thermal barrier is in thermal communication with the PCB and functions as a heat sink for the PCB. Preferably, the thermal barrier is aluminium or an alloy of aluminium.

It is preferred that the body includes a handle portion upstream of the heater. Preferably, the primary fluid inlet is in the handle portion. It is preferred that the primary fluid flow path extends linearly through the body.

Preferably, the flow plate comprises at least one aperture. It is preferred that the at least one aperture enables fluid to flow through the flow plate to the PCB.

Preferably, the flow plate is connected to the PCB. The flow plate acts as a heat sink for the PCB. It is preferred that the flow plate additionally directs primary fluid flow around the PCB.

Preferably, the flow plate is additionally one or more of a thermal barrier, heat sink and deflector plate for the PCB.

It is preferred that where the primary flow enters the body there is a region of relatively high velocity flow.

Preferably, the PCB comprises components extending outwards from a board by different amounts and the components are arranged such that components that extend further out from the board are positioned radially away from the region of relatively high velocity flow. It is preferred that at least some of the components that extend further out from the board are capacitors.

Preferably, components that extend less distance from the board are positioned in the region of relatively high velocity flow.

It is preferred that the thermal barrier is additionally a deflector plate for deflecting debris from the PCB away from the primary fluid flow path and the primary fluid outlet.

According to a seventh aspect, the invention provides a hair care appliance comprising: a body, a PCB having electrical components mounted thereon and a primary fluid flow path extending at least partially through the body and passed the PCB, wherein the primary fluid flow path has a region of relatively high velocity and a region of relatively low velocity and components mounted on the PCB are arranged so that larger components are in the region of relatively low velocity.

Preferably, the appliance comprises a handle connected to the body at a first end wherein the primary fluid flow path flows through the handle into the body.

It is preferred that the primary fluid flow path extends in a first direction within the handle and a second direction within the body..

Preferably, the body is generally tubular and has an upper half and a lower half and the handle is connected to the lower half. It is preferred that the region of relatively high velocity is in the lower half of the body. Preferably, the region of relatively low velocity is in the upper half of the body.

It is preferred that larger components of the PCB are located in the upper half of the body. Preferably, smaller components of the PCB are located in the lower half of the body. It is preferred that larger components of the PCB are components which extend the furthest from a circuit board on which they are mounted.

According to an eighth aspect, the invention provides, a hair care appliance comprising a body; a fluid flow path extending through the body from a fluid inlet through which a fluid flow enters the appliance to a fluid outlet for emitting the fluid flow from a front end of the body; ; and an attachment for adjusting at least one parameter of fluid emitted from the appliance, the attachment comprising an upstream end for attaching to the

appliance, wherein one or both of the front end of the body and the upstream end of the attachment comprises at least one magnet.

Preferably, the front end of the body comprises an end wall extending radially inwards of the body and the end wall comprises at least one magnet.

It is preferred that end wall comprises a plurality of magnets radially spaced about the end wall.

Preferably, the end wall comprises a ring of magnetic material extending around the end wall.

Preferably, the end wall comprises an outer face and an inner face, the outer face being an external surface of the appliance, wherein the at least one magnet is adjacent the inner face.
It is preferred that the at least one magnet is embedded in the end face.

Preferably, the upstream end of the attachment comprises an end face and a plurality of magnets radially spaced about the end face.

It is preferred that the upstream end of the attachment comprises a ring of magnetic material extending around the end face.

Preferably, the magnet or magnetic material is made from a polymer containing magnetic flakes.

It is preferred that an external surface of the magnet or magnetic material is coated with an anti scratch coating.

Preferably, the appliance comprises a primary fluid flow path extending at least partially through the body from a primary fluid inlet through which a primary fluid flow enters the appliance to a primary fluid outlet.

It is preferred that the appliance comprises a handle wherein the primary fluid inlet is in the handle.

Preferably, fluid flow is drawn through the fluid flow path by fluid emitted from the primary fluid outlet.

It is preferred that the primary fluid flow extends about the duct.

Preferably, the attachment is configured to inhibit emission of the fluid flow from the appliance. It is preferred that the attachment includes means to inhibit generation of a fluid flow along the fluid flow path to the fluid outlet. Preferably, the means to inhibit the generation of a fluid flow comprises a barrier which blocks the duct when the attachment is attached to the appliance.

It is preferred that the attachment is in the form of a nozzle defining a nozzle fluid flow path extending from a nozzle fluid inlet through which the primary fluid flow enters the nozzle to a nozzle fluid outlet for emitting the primary fluid flow.

Preferably, the attachment has an outer wall that substantially continues the profile of the body at the front end of the body.

It is preferred that the body reduces in diameter towards the front end of the body. Preferably, the reduction in diameter has a constant gradient.

It is preferred that the appliance comprises a body; a fluid flow path extending through the body from a fluid inlet through which a fluid flow enters the appliance to a fluid

outlet for emitting the fluid flow from a front end of the body wherein the front end of the body comprises at least one magnet.

Preferably, the front end of the body comprises an end wall extending radially inwards of the body and the end wall comprises at least one magnet.

It is preferred that the end wall comprises a plurality of magnets radially spaced about the end wall.

Preferably, the end wall comprises a ring of magnetic material extending around the end wall.

The invention also provides an attachment for adjusting at least one parameter of fluid emitted from the appliance comprising an upstream end for attaching to the appliance, wherein the upstream end of the attachment comprises at least one magnet.

According to a ninth aspect, the invention provides a hair care appliance having a handle, and a body, the body having an outer wall and a duct wherein the outer wall extends about the duct and the outer wall converges towards the duct.

Preferably, the outer wall has a first part and a second part and the first part is tubular.

It is preferred that the first part is of substantially uniform diameter.

Preferably, the second part is cone shaped.

It is preferred that the second part of the outer wall converges towards the duct at an angle of between 1 and 89°.

Preferably, the second part of the outer wall converges towards the duct at an angle of between 30 and 60°.

Preferably, the appliance comprises a fan unit for drawing fluid into the primary fluid flow path from a primary fluid inlet to a primary fluid outlet.

It is preferred that the body comprises the primary fluid outlet at one end and wherein the outer wall converges towards the duct towards the primary fluid outlet.

Preferably, the body has a first end and a second end and the outer wall converges towards the duct at the second end of the body.

Preferably, the appliance comprises a handle having a primary fluid inlet in fluid communication with the primary fluid flow path.

It is preferred that fluid is entrained into the fluid flow path by the action of a fan unit drawing fluid into the primary fluid flow path.

Preferably, the primary fluid flow path extends about the fluid flow path.

The invention will now be described by way of example with reference to the accompanying drawings, of which:

Figures 1 and 2 show different aspects of a hairdryer according to the invention;

Figure 3 shows a cross section though a hairdryer according to the invention;

Figures 4a and 4b show enlarged views of portions of the cross section of Figure 3;

Figures 5, 6 and 7 show different views of parts of a hairdryer according to the invention;

Figures 8a and 8b show respectively a cross section through and a perspective of alternate hair care appliance;

Figures 9 and 10 show different views of a hairdryer according to the invention;

Figure 11a shows a top sectional view along line M-M of Figure 1;

Figure 11b shows a top sectional view along line L-L of Figure 1;

Figures 12a, 12b and 12c show views of various internal components of the body of a hairdryer according to an invention; and

Figures 13 to 16 show various views of a hairdryer 10 having an attachment 600 for changing a parameter of fluid output from the hairdryer.

Figures 1 and 2 show a hairdryer 10 with a handle 20 and a body 30. The handle has a first end 22 which is connected to the body 30 and a second end 24 distal from the body 30 and which includes a primary inlet 40. Power is supplied to the hairdryer 10 via a cable 50.

The body 30 has a first end 32 and a second end 34 and can be considered to have two parts. A first part 36 which extends from the first end 32 which is tubular and of a generally consistent diameter and a second part 38 which extends from the second end 34 to join the first part 36. The second part 38 is cone shaped and varies in diameter along its length from the diameter of the first part 36 of the body 30 to a smaller diameter at the second end 34 of the body. In this example, the second part 38 has a constant gradient and the angle $\alpha$ subtended from the outer wall 360 of the first part 36 of the body 30 is around 40°.

Referring now to Figures 2, 3, 4An and 4b in particular the handle 20 has an outer wall 200 which extends from the body 30 to a distal end 24 of the handle. At the distal end 24 of the handle an end wall 210 extends across the outer wall 200. The cable 50 enters the hairdryer through this end wall 210. The primary inlet 40 in the handle 20 includes

first apertures that extend around and along 42 the outer wall 200 of the handle and second apertures that extend across 46 and through the end wall 210 of the handle 20. The cable 50 is located approximately in the middle of the end wall 210 so extends from the centre of the handle 20. The end wall 210 is orthogonal to the outer wall 200 and inner wall 220 of the handle.

It is preferred that the cable 50 extends centrally from the handle 20 as this means the hairdryer is balanced regardless of the orientation of the handle 20 in a users' hand. Also, if the user moves the position of their hand on the handle 20 there will be no tugging from the cable 50 as it does not change position with respect to the hand when the hand is moved. If the cable were offset and nearer one side of the handle then the weight distribution of the hairdryer would change with orientation which is distracting for the user.

Upstream of the primary inlet 40, a fan unit 70 is provided. The fan unit 70 includes a fan and a motor. The fan unit 70 draws fluid through the primary inlet 40 towards the body 30 through a fluid flow path 400 that extends from the primary inlet 40 and into the body 30 where the handle 20 and the body 30 are joined 90. The fluid flow path 400 continues through the body 30 towards the second end 34 of the body, around a heater 80 and to a primary fluid outlet 440 where fluid that is drawn in by the fan unit exits the primary fluid flow path 400. The primary fluid flow path 400 is non linear and flows through the handle 20 in a first direction and through the body 30 in a second direction which is orthogonal to the first direction.

The body 30 includes an outer wall 360 and an inner duct 310. The primary fluid flow path 400 extends along the body from the junction 90 of the handle 20 and the body 30 between the outer wall 360 and the duct 310 towards the primary fluid outlet 440 at the second end of the body 30.

Another fluid flow path is provided within the body; this flow is not directly processed by the fan unit or the heater but is drawn into the hairdryer by the action of the fan unit

producing the primary flow through the hairdryer. This fluid flow is entrained into the hairdryer by the fluid flowing through the primary fluid flow path 400.

The first end 32 of the body includes a fluid inlet 320 and the second end 34 of the body includes a fluid outlet 340. Both the fluid inlet 320 and the fluid outlet 340 are at least partially defined by the duct 310 which is an inner wall of the body 30 and extends within and along the body. A fluid flow path 300 extends within the duct from the fluid inlet 320 to the fluid outlet 340. At the first end 32 of the body 30, a side wall 350 extends between the outer wall 360 and the duct 310. This side wall 350 at least partially defines the fluid inlet 320. At the second end 34 of the body a gap 370 is provided between the outer wall 360 and the duct, this gap 370 defines the primary fluid outlet 440. The primary fluid outlet 440 is annular and surrounds the fluid flow path. The primary fluid outlet 440 may be internal so the primary fluid flow path 400 merges with the fluid flow path 300 within the body 30. Alternatively, the primary fluid outlet 440 is external and exits from the body 30 separately to the fluid from the fluid flow path 300 at the fluid outlet 340.

The outer wall 360 of the body converges towards the duct 310 and a centre line A-A of the body 30. Having an outer wall 360 that converges towards the duct 310 has the advantage that the primary flow exiting the primary fluid outlet 440 is directed towards the centre line A-A of the body 30. The fluid exiting the primary fluid outlet 440 will cause some external entrainment of fluid 490 from outside the hairdryer due to the movement of the fluid from the primary outlet 440. This effect is increased by the outer wall 360 converging towards the duct 310. Partly this is because the primary flow is focused rather than divergent and partly this is because of the slope of the outer wall 360 of the body 30 towards the second end 34 of the hairdryer.

The duct 310 is an internal wall of the hairdryer that can be accessed from outside the hairdryer. Thus, the duct 310 is an external wall of the hairdryer. The duct 310 is recessed within the body 30 so the side wall 350 that connects between the outer wall

360 and the duct 310 is angled with respect to the outer wall 360. The angle β is around 115° from a line subtended by the outer wall 360 of the body 30 (Figure 4b).

A PCB 75 including the control electronics for the hairdryer is located in the body 30 near the side wall 350 and fluid inlet 320. The PCB 75 is ring shaped and extends round the duct 310 between the duct 310 and the outer wall 360. The PCB 75 is in fluid communication with the primary fluid flow path 400. The PCB 75 extends about the fluid flow path 300 and is isolated from the fluid flow path 300 by the duct 310.

The PCB 75 controls such parameters as the temperature of the heater 80 and the speed of rotation of the fan unit 70. Internal wiring (not shown) electrically connects the PCB 75 to the heater 80 and the fan unit 70 and the cable 50. Control buttons 62, 64 are provided and connected to the PCB 75 to enable a user to select from a range of temperature settings and flow rates for example.

In use, fluid is drawn into the primary fluid flow path 400 by the action of the fan unit 70, is optionally heated by the heater 80 and exits from the primary fluid outlet 440. This processed flow causes fluid to be entrained into the fluid flow path 300 at the fluid inlet 320. The fluid combines with the processed flow at the second end 34 of the body. In the example shown in Figure 3, the processed flow exits the primary fluid outlet 440 and the hairdryer as an annular flow which surrounds the entrained flow that exits from the hairdryer via the fluid outlet 340. Thus fluid that is processed by the fan unit and heater is augmented by the entrained flow.

Figures 5 to 7 all show exploded views of the different parts that the hairdryer 10 is formed from. Instead of a conventional clamshell hairdryer having two outer parts which require external fixings such as screws this hairdryer is made without such external fixings.

A first piece is the outer wall 200 of the handle 20 including the primary inlet 40 and cable 50. A second piece comprises the duct 310 and side wall 350 of the body 30. A

third piece is the outer wall 360 of the body 30 and an inner wall 220 of the handle 20. The second and third pieces are manufactured as single units. This has two advantages; a first is that it enables tight tolerances to be reproduced between the duct 310 and the outer wall 360 of the body 30 and the second is that there are no unseemly joins in the body 30. By manufacturing the hairdryer out of these three main components, both the function and the form of the hairdryer are easily maintained. In addition, there is a safety aspect as an end user would find is difficult to dissemble the hairdryer using normal household tools.

The third piece comprising outer wall 360 of the body 30 and inner wall 220 of the handle 20 are moulded as a one piece unit from a plastic material. The second piece comprising the duct 310 and the side wall 350 is also moulded from a plastic material. Suitable plastic materials include polycarbonate, glass-filled PPA (Polyphthalamide), PPS (Polyphenylene Sulphide), LCAP (Liquid Crystal Aromatic Polymer) or PEEK (Polyether ether ketone) and the skilled person will appreciate that this list is not exhaustive. The outer wall 200 of the handle 20 can be made from any of a number of suitable materials but is preferably made from aluminium, an alloy of aluminium a steel or a stainless steel.

In order to assembly internal components of the hairdryer an access hatch 222 is provided in the inner wall 220 of the handle 20. This enables the fan unit 70 to be positioned and wiring that connects the fan unit 70, the heater 80, control buttons 62, 64 and PCB 75 to the cable 50 to be connected simply and with relative speed. The heater 80 and PCB 75 are located around the duct 310 which is inserted into the body 30, the wiring is connected and the access hatch 222 is placed over the corresponding hole 224 in the inner wall 220 of the handle 20. The side wall 350 seals the first end 32 of the body 30. This stops both two things, fluid being entrained into the primary fluid flow path 400 at the first end 32 of the body and fluid that has been processed by the fan unit 70 from exiting the body 30 at the first end 32.

In the example shown with respect to Figures 5, 6 and 7 the control buttons 62 on the handle are on the side of the handle that faces the fluid outlet 340.

The hatch 222 needs to be of a size large enough to enable wiring connections to be made to the electrical components and can be at any location around the handle. The hatch may extend for the whole length of the inner wall 220 and is locatable at any orientation around the inner wall 220.

Referring now particular for Figures 3, 4An and 5 to 7, the construction of the handle will be discussed. The handle 20 has an outer wall 200 and an inner wall 220. The inner wall 220 is a duct which surrounds and defines a primary fluid flow path 400 through the hairdryer. The outer wall 200 includes a grippable portion and in this example, includes the primary inlet 40 into the primary fluid flow path 400. Within the inner 220 wall, an insulting layer of material 212 is provided. The insulating layer is a foam or a felt and insulates the handle from noise produced by the fan unit 70, heat produced by the operation of the hairdryer, vibrations caused by the fan unit and noise produced within the hairdryer by the flow of fluid through the primary fluid flow path 400.

Alternatively or additionally, insulating layer of material 212 is provided between the outer wall 210 and inner wall 220. This is described in relation to Figure 8a.

As a minimum, the insulating material 212 is positioned around the fan unit 70 and preferably around the access hatch 222. However, it is preferred that the insulating material 212 is substantially continuous around the inner 220 wall and extends for the length of the inner wall 220 of the handle as this has the most impact on insulating the handle. The insulating material 212 may also extend around the primary inlet 40 to reduce any noise produced directly by fluid being drawn into the primary fluid flow path 400.

In this example, the outer wall 200 includes the primary fluid inlet 40; however it is not essential that the outer wall extends over the entire length of the inner wall 20. The outer wall 200 should extend over the access hatch 222 and the region of the handle 20 that contains the fan unit 70 for insulation purposes and for aesthetic and safety reasons to both hide and prevent access to the access hatch 222 by a user. In the event that the outer wall 200 does not extend the entire length of the inner wall 220, then either the inner wall 220 would comprise the inlet 40 at its' distal end from the junction 90 with the body 30 or a separate inlet body attachable to the outer wall 200 and/or inner wall 220 could be provided.

The outer wall 200 is positioned with respect to the inner wall 220 and then secured in place. The outer wall 200 is for example, secured by plasma welding as this prevents user removal and thus access to sensitive components and also provides a clean join.

Figures 8An and 8b show an alternate hair care appliance having a similar primary inlet 540. In this example, the hair care appliance is a hot styling brush 500 and it has a handle 520 and a detachable head 530 which is attachable at the distal end 522 of the handle 520 to the primary inlet 540.

The handle 520 has an outer wall 526 which is generally tubular and includes the primary inlet 540 at and adjacent one end 524. The primary inlet 540 comprises a first set of apertures 544 which extend radially around the handle 520 and along the outer wall 526 of the handle from the handle end 524. The handle end 524 is covered by an end wall 510 which is also perforated with a second set of apertures 546 that extend through the end wall 510 of the handle. Thus, the primary inlet 540 extends around, along and across the handle 520. The end wall 510 is orthogonal to the outer wall 526 and inner wall 560 of the handle.

The handle 520 also includes a fan unit 570 which comprises a fan and a motor which drives the fan and in use, draws fluid in through the primary inlet 540, along a fluid

flow path 550 which extends through the length of the handle 520. The fluid is optionally heater by a heater 580 before entering an inner cavity 538 of the head 530.

The head 530 includes a fluid outlet which in this example comprises two sets of parallel slots 534 each extending towards an end 536 of the head and radially around the head 530 with one set of slots 534a being upstream of a second set of slots 534b. This arrangement enables fluid to exit the head all the way around the head and for the majority of the length of the head 530 maximising a hair styling region of the product.

The head 530 also includes bristles 532 which extend radially away from the head 530. The bristles 532 are formed as parallel lines which extend radially around the head. Each set of bristles is located between two adjacent slots 534 but bristles need not be provided between every pair of slots.

In use, hair is wrapped around the head 530. The bristles 534 retain the hair whilst hot air or fluid exits through the slots drying the hair and styling the hair into curls or waves.

Power is provided to the appliance via a power cable 548 which preferably extends from a plug or other power source through the end wall 510 of the handle 520. The handle 520 also houses a PCB 575 which is electrically connected to the cable 548, the fan unit 570 and the heater 580 by internal wiring (not shown). Control buttons 555 are provided and connected to the PCB 575 to allow the user to select one of a range of temperature and flow settings. The control buttons 555 are push buttons or slide buttons, for example.

The handle 520 has an outer wall 526 and an inner wall 560. The inner wall 560 is a duct which surrounds and defines a fluid flow path 550 through the appliance. The outer wall 526 includes a grippable portion and in these examples, includes the primary inlet 540 into the fluid flow path 550. Inbetween the outer 526 and inner 560 walls, an insulting layer of material 528 is provided. The insulating layer is a foam or a felt and

insulates the handle from noise produced by the fan unit 570, heat produced by the operation of the appliance, vibrations caused by the fan unit and noise produced within the appliance by the flow of fluid through the fluid flow path 550.

As a minimum, insulating material is positioned around the fan unit 570. However, it is preferred that the insulating material 528 is substantially continuous between the outer 526 and inner 560 handles and extends for the length of the inner wall 560 of the handle as this has the most impact on insulating the handle. The insulating material 528 may also extend around the primary inlet 540 to reduce any noise produced directly by fluid being drawn into the fluid flow path 550.

The primary inlet 40, 540 comprises a plurality of apertures extending around, along and across the handle 20, 520. Having an inlet that extends in three dimensions has advantages particularly when used with hair grooming appliances. Firstly, if the appliance is placed on a surface whilst switched on only a small part of the inlet surface area will be blocked or have restricted flow of fluid into the appliance. This protects the fan unit and particularly the motor of the fan unit from running with too low a flow rate as this can cause overheating of the motor and cause damage to the motor.

Secondly, often hair care appliances are used with a styling product such as a mousse, gel or spray. These products are typically either applied by a hand or directly to the hair as a mist. After application by a hand, some of the product will be retained on the skin which is then transferred to the appliance when held. This can block at least some of the apertures 42, 544 that extend around and along the handle 20, 520. However, the apertures 44. 546 that extend under the handle and across the end wall 210, 510 of the handle will be unaffected. When a product is applied as a mist, it can settle on the appliance and again block or restrict at least some of the apertures of the primary inlet 40, 540. However, by having apertures that extend around along and across the handle 20, 520 the risk of blocking the primary inlet 40, 540 is reduced.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 107 of 2286

The apertures are preferably circular with a diameter of 0.2 to 1.6 mm. The diameter of the apertures can vary along, around and across the handle 20, 520. It is advantageous to space the apertures regularly around, along and across the primary inlet 40, 540. Not only is this visually pleasing but it also has the technical advantage that there is no weak region of the primary inlet 40, 540 where blockage of a portion is more likely or would have more impact on the flow into the primary inlet 40, 540. The inlet is designed so that the flow into the inlet is even at least around the circumference of the handle 20, 520.

It is preferred that the handle is made from a metallic material so any styling product that sticks to the handle and does block the primary inlet 40, 540 is easily removed and only temporarily blocks any apertures.

Referring now to Figures 9 and 10, the hairdryer 10 includes two sets of control buttons 62, 64. A first set 62 is provided on the handle 20 and a second set 64 on the body 30. Conveniently, the two sets of buttons 62, 64 are located so they can all be accessed by one digit. In normal use this digit is the thumb, but if the hairdryer is held differently it may be a finger. The first set 62 are provided on the handle 20 on the same side of the handle 20 as the body inlet 320. The second set 64 are provided on the side wall 350 of the body 30. An as example, the first set 62 can include an on button 62An and a cold shot button 62b and the second set 64 can include a heater control button 64An and a flow control button 64b.

One advantage of having the buttons located on one side or end of the hairdryer is that all the control buttons 62, 64 can be seen by a user at the same time making use of the hairdryer and changes to parameters such as flow rate and temperature simplified.

Another advantage is that the control electronics are in one region of the handle 20. This is particularly advantageous when the primary flow path 400 is through the handle as there are is no wiring to be routed around the handle to the front face i.e. that side of the handle 20 that faces the outlets 340, 440 of the hairdryer.

A third advantage is that the second set of control buttons 64 is mounted directly onto the PCB 75. This not only simplifies the production of the hairdryer but also improves reliability as there are fewer electrical connections within the hairdryer.

The control buttons 62, 64 can be depressible buttons or slidable controls or a mixture of differently actuated controls. It is preferred that the control buttons 62, 64 stand proud of the surface in which they are located as this enables a user to find the required button by feel alone.

The PCB 75 will now be discussed in particular with reference to Figures 3, 4b, 11a, 11b, 12a 12b, and 12c. The PCB 75 is annular or ring shaped and extends around the duct 310 and between the duct 310 and the outer wall 360. In this example, the PCB has two boards, a first board 75a which extends all the way round the duct 310 and a second board 75b adjacent of and downstream of the first board 75a. The second board 75b extends only partially around the duct 310 and about the fluid flow path 300.

The PCB 75 houses a number of different components each of which extend away from the board on which it is mounted by a different amount. Referring in particular to Figures 3, 4b, 12a 12b, and 12c, large components 77 such as capacitors, are positioned on the first board 75a radially away from the second board 75b. This has a number of advantages such as the PCB 75 is made as compact as possible as the smaller components or those which extend least away from the board on which they are mounted are double stacked whereas the larger components or those that extend the furthest from the board on which they are mounted are single stacked.

Another advantage to this arrangement on the PCB 75 in is flow management of fluid in the primary fluid flow path 400 as the primary fluid flow path moves from the handle 20 into the body 30. Referring to Figures 3, 4b 12b, and 12c, the handle 20 is generally tubular and the primary fluid flow path 400 is generally circular as it enters the junction 90 between the handle 20 and the body 30. At this point the primary fluid flow path

400 changes direction by 90° and from a circular flow to an annular flow around the duct 310 between the duct 310 and the outer wall 360 of the body 30. These changes affect the velocity of flow in the primary fluid flow path 400.

If we consider that the body 30 is generally symmetrical about a centre line A-A which extends along the length of the body 30, the duct 310 and outer wall 360 are concentric as is the heater 80 located between the duct 310 and the outer wall 360. When the fluid in the primary fluid flow path 400 reaches the junction 90 between the body 30 and the handle 20, the fluid must change both direction and shape. This creates a region of high velocity flow in the body 30 by the junction 90 and a region of lower velocity flow radially spaced within the body 30 from the junction 90. If we consider the body 30 to have an upper half 380 and a lower half 390 where the upper half 380 is radially spaced away from the handle 20 and the lower half 390 includes the junction 90 between the body 30 and the handle 20 then the lower half 390 has flow at a relatively higher velocity than the upper half 380.

The PCB 75 is orientated so that larger components 77 are located in the upper half 380 in the relative lower velocity flow radially away from the region of relatively high velocity so that their impact on the velocity of flow within the hairdryer is reduced. The double layer 75a, 75b PCB is located in the lower half 390 as this part of the PCB 75 extends less into the primary fluid flow path 400.

In addition, a flow plate 700 is provided to curve or direct the flow within the primary fluid flow path 400 over and around the PCB 75 to further minimise any pressure losses due to the location of the PCB and due to the change of direction of the primary fluid flow path 400 as it enters the body 30. The flow plate 700 is annular with a curved section 710 (Figures 3, 4b, 11a, 11b, 12a 12b, and 12c) that provides a smooth change in orientation or direction for the primary fluid flow path 400. By providing a curved surface 710 flow is directed around the corner reducing noise produced by the orthogonal change in direction and reducing any pressure loss or loss of velocity of the fluid. The entire flow plate 700 could be curved however, the benefits are seen by

merely having the part of the flow plate 700 that is located in the lower half 390 of the body 30 having a curved surface 710.

The flow plate 700 is adjacent the PCB 75 and advantageously, the flow plate 700 is connected to the PCB 75 via a connecting bridge 720. The flow plate 700 is made from a conducting material preferably a metallic material such as aluminium or an alloy thereof so this bridge 720 provides a heat sink for the PCB 75 drawing heat from the components of the PCB and conducting that heat into the fluid flowing through the fluid flow path as it passes the flow plate 700.

In addition, the flow plate 700 serves as a thermal barrier for the PCB 75 and temperature sensitive components mounted thereon. A heater 80 is located within the body 30 downstream of the junction 90 between the body 30 and the handle 20 and the PCB 75 and when fluid is flowing through the primary fluid flow path 400 i.e. when the hairdryer is switched on the majority if not all of the heat produced by the heater 80 will be taken to the primary fluid outlet 440. However, when the hairdryer is turned off or onto stand-by, the heater will emit residual heat which will radiate both upstream and downstream so the flow plate ideally also acts as a thermal barrier for the PCB 75.

The flow plate 700 does not seal the PCB 75 against fluid in the fluid flow path 400 rather it enables fluid to flow around the PCB 75 either through openings 730 (Figure 4b in particular) between the flow plate 700 and the body 30 or slots 740 within the flow plate (Figure 12a).

The flow plate 700 has another function. In the event of a failure of one or more components such as a capacitor on the PCB 75, the flow plate 700 acts as a deflector plate which deflects any debris and/or electrolyte from a component failure back towards the side wall 350 and protects against the debris and/or electrolyte from entering the primary fluid flow path 400 where it would encounter the heater 80 and the primary fluid outlet 440.

Figures 13 to 16 show various views of a hairdryer 10 having an attachment 600 for changing a parameter of fluid output from the hairdryer. The attachment 600 comprises a bung 610 and an outer wall 660. Between the bung 610 and outer wall 660 an attachment fluid flow path 620 extends from an attachment fluid inlet 630 to an attachment fluid outlet 640. At the upstream end 660a of the outer wall 660 a ring of magnetic material 662 is provided. The ring of magnetic material 662 is recessed into or embedded in an upstream face 664 of the upstream end 660a of the outer wall 660.

The hairdryer 10 includes a number of magnets 364 radially spaced around an end wall 362 at the second end 34 of the hairdryer 10 (Figures 3 and 4a). The end wall 362 extends radially inwards of the outer wall 360 of the body 30. These magnets 364 couple with the ring of magnetic material 662 when the attachment 600 is attached to the hairdryer 10.

Alternatively, the end wall 362 of the hairdryer 10 can include a ring of magnetic material and the attachment can include point magnets radially spaced around or another ring of magnetic material. Only one part of the magnetic connection needs to be magnetised, the other merely needs to be magnetically attracted to the magnetised part.

The use of a magnetic connection between the hairdryer and an attachment has a number of advantages, particularly when used with this type of hairdryer 10 i.e. one having an inner bore 300 defined by a duct 310 and components 77, 80 which extend around the bore. The spacing and maintaining the spacing between the duct 310 and the outer wall 360 of the hairdryer 10 along the length of the body 30 is important. If the duct 310 were pushed to one side within the body 30, the heater 80 could become damaged, fluid flow compromised and hot spots could appear on the outer wall 360. Thus, when an attachment is attached and removed, it is important not to introduce extra stress or strain on the hairdryer 10. Traditional push and snap fit and friction fit methods of attachment could do this. However, magnetic attachment provides consistent positioning at a known force. In addition if the product is dropped or

knocked the magnetic force attracting the two parts can be set at a level which allows the attachment to snap off.

The force between the magnets can be manipulated in a number of ways. The use of discrete or point magnets is one way. A ring of magnetic material is an alternative. This could be a solid ring of a magnetic material such as iron or could comprise flakes of magnetic material moulded within a suitable substrate such as an epoxy resin. The ring of material can be fully exposed, partially exposed or concealed behind the end wall of the hairdryer. Referring now to Figures 17An and 17b two alternative constructions are discussed. Both options have the end wall 362 extending radially inwards of the outer wall 360 of the body. Figure 17a shows an L-shaped ring of magnetic material 700 having a first leg 710 which engages the inner surface 362a of the front face 362of the outer wall and a second leg 720 which extends from the first leg 710 towards the outer surface of the end wall 362. The second leg 720 may be flush with the outer surface. Figure 17b shows an alternate construction where the ring of magnetic material 730 is positioned against the inner surface 362a of the end wall 362 and is completely concealed behind the end wall 362.

The ring of magnetic material 662 on the attachment 600 may also be fully exposed, partially concealed or fully concealed at the upstream face 664. When partially or fully exposed magnetic parts are used, both parts of the magnetic attachment 700, 662 are preferably flush with the respective end wall 362 and upstream face 664. Alternatively the two parts of the magnet are shaped to engage mechanically as well as magnetically. For example by the provision of one recessed magnet and one proud of the respective end wall and upstream face or a stepped surface to the magnets.

For the embodiments where the magnet is exposed, it is preferably covered in an anti scratch coating 722 (Figure 17a) such as PTFE. This is advantageous as it allows for the attachment to be rotated with respect to the body of the appliance without damage to mating surfaces.

In the embodiments shown and referring to Figures 13, 14a and 14b in particular, the attachment 600 is a concentrator nozzle i.e. it concentrates the flow into a smaller area. The primary fluid flow path 400 of the hairdryer has an annular primary fluid outlet 440 and this provides a relatively large cross sectional area of heated fluid. The attachment 600 has an attachment fluid outlet 640 which is generally rectangular with its' long side 670 being similar to the diameter of the primary fluid outlet 440 (it may be bigger or smaller) and the short side 680 being significantly smaller than the diameter of the primary fluid outlet 440 and the long side 670 . A concentrator nozzle 600 concentrates the flow over a smaller area providing a user with a directed flow. As the attachment 600 is rotatable with respect to the body 30 and can be positioned in any orientation with respect to the body 30, the flow from the attachment can be orientated horizontally or vertically or at any angle inbetween enabling the user to have fine control over drying.

Referring to Figures 13 to 16, when the attachment 600 is attached to a hairdryer 10, the outer wall 660 forms a continuation of the hairdryer outer wall 360. The bung 610 has two parts a cone 612 and a base 614. The cone 612 extends within the attachment 600 forming a point 616 towards the attachment fluid outlet 640 and directs flow from the primary fluid outlet 440 of the hairdryer towards the attachment fluid outlet 640. The cone 612 defines with the outer wall 660 the limits of the attachment fluid flow path 620. The base 614 is upstream of the cone 612 and limits flow from the fluid flow path 300 by extending into the end of the duct 310 forming a loose bung. The attachment fluid flow path 620 is in fluid communication with the primary fluid flow path 400 of the hairdryer 10 so fluid from the primary fluid flow path 400 is emitted from the attachment fluid outlet 640.

The invention has been described in detail with respect to a hairdryer and a hot styling brush however, it is applicable to any appliance that draws in a fluid and directs the outflow of that fluid from the appliance.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 114 of 2286

The appliance can be used with or without a heater; the action of the outflow of fluid at high velocity has a drying effect.

The attachment described has been a concentrating attachment however, magnetic attachment of any nozzle shape, size or with any function is possible.

The fluid that flows through the appliance is generally air, but may be a different combination of gases or gas and can include additives to improve performance of the appliance or the impact the appliance has on an object the output is directed at for example, hair and the styling of that hair.

The invention is not limited to the detailed description given above. Variations will be apparent to the person skilled in the art.

**CLAIMS**

1. A hair care appliance comprising a handle, the handle comprising a wall and an outer wall wherein the wall defines a primary fluid flow path that extends from a primary fluid inlet into the appliance and the outer wall is an external surface of the appliance.

2. An appliance according to claim 1, wherein the outer wall extends substantially continuously around the wall.

3. An appliance according to claim 1 or claim2, wherein the outer wall extends substantially along the wall.

4. An appliance according to any preceding claim, wherein an insulating layer is provided between the wall and the outer wall.

5. An appliance according to claim 4, wherein the insulating layer is substantially continuous around the wall.

6. An appliance according to claim 4 or claim 5, wherein the insulating layer is substantially continuous along the wall.

7. An appliance according to any of claims 4 to 6, wherein the insulating layer mitigates one or more of noise, vibration and heat produced by the appliance.

8. An appliance according to any of claims 4 to 7, wherein the insulating material is a foam or a felt.

9. An appliance according to any preceding claim, wherein the outer wall is formed from a metal.

10. An appliance according to claim 9, wherein the metal is aluminium or an aluminium alloy.

11. An appliance according to any preceding claim, wherein the wall is formed from a plastic material.

12. An appliance according to claim 11, wherein the plastic material is one of polycarbonate, glass filled PPA, PPS, LCAP or PEEK.

13. An appliance according to any preceding claim, wherein the handle includes a fan unit for drawing fluid into the primary fluid inlet and along the primary fluid flow path.

14. An appliance according to any preceding claim, wherein the handle comprises a first end and a second end wherein the primary fluid inlet is at or near the second end.

15. An appliance according to claim 14, wherein the primary fluid inlet comprises a first aperture extending at least partially around the handle and a second aperture extending through the second end of the handle.

16. An appliance according to claim 14 or claim 15, wherein the handle comprises an end wall at the second end and the second aperture extends through the end wall.

17. An appliance according to claim 16, wherein the end wall is substantially orthogonal to the handle.

18. An appliance according to any of claims 14 to 17, wherein the first aperture is adjacent the second end of the handle.

19. An appliance according to any of claims 14 to 18, wherein a power cable for supplying power to the fan unit is provided, the power cable extending through the second end of the handle.

20. An appliance according to claim 19, wherein the power cable extends substantially centrally thorough the second end of the handle.

21. An appliance according to any of claims 13 to 20, wherein the handle includes a heater for heating fluid drawn into the primary fluid inlet.

22. An appliance according to claim 21, wherein the heater is downstream of the fan unit

23. An appliance according to any preceding claim comprising a head attachable to the handle, the head comprising a primary fluid outlet for the appliance.

24. An appliance according to claim 23, wherein the primary fluid outlet comprises a plurality of apertures extending at least partially along and around the head.

25. An appliance according to claim 23 and 24, wherein the primary fluid flow path is substantially linear through the handle and into the head.

26. An appliance according to any of claims 1 to 22, comprising a body having a primary fluid outlet, wherein the primary fluid outlet is in fluid communication with the primary fluid inlet and the primary fluid flow path.

27. An appliance according to claim 26, wherein the primary fluid flow path from the primary fluid inlet to the primary fluid outlet is non linear.

28. An appliance according to claim 27, wherein the primary fluid flows within the handle in a first direction and within the body in a second direction.

29. An appliance according to claim 27 or claim 28, wherein the primary fluid flow in the body is substantially orthogonal to the primary fluid flow in the handle.

30. An appliance according to any of claims 26 to 29, wherein the body comprises a fluid flow path extending from a fluid inlet in the body to a fluid outlet.

31. An appliance according to claim 30, wherein the fluid flow path merges with the primary fluid flow path within the body.

32. An appliance according to claim 31, wherein fluid in the primary fluid flow path exits the body by the primary fluid outlet.

33. An appliance according to any of claims 30 to 32, wherein fluid in the fluid flow is entrained into the body by the action of a fan unit in the primary fluid flow path.

34. An appliance according to any of claims 30 to 33, wherein the fluid flow path is defined by a duct extending through the body.

35. An appliance according to any of claims 30 to 34, wherein the fluid flow path extends from a fluid inlet to a fluid outlet.

36. An appliance according to any of claims 26 to 35, wherein the body comprises a heater for heating fluid in the primary fluid flow path.

37. An appliance according to claim 36, wherein the heater extends around the duct.

38. An appliance according to claim 36 or claim 37, wherein the heater extends along the body.

39. An appliance according to any of claims 36 to 38, wherein the heater is annular.

40. A handheld appliance comprising a handle, the handle comprising a wall and an outer wall wherein the wall defines a primary fluid flow path that extends from a primary fluid inlet into the appliance and the outer wall is an external surface of the appliance.

41. An appliance according to claim 40, wherein the outer wall extends substantially continuously around the wall.

42. An appliance according to claim 40 or claim 41, wherein the outer wall extends substantially along the wall.

43. An appliance according to any of claims 40 to 42, wherein an insulating layer is provided between the wall and the outer wall.

44. An appliance according to claim 43, wherein the insulating layer is substantially continuous around the wall.

45. An appliance according to claim 43 or claim 44, wherein the insulating layer is substantially continuous along the wall.

46. An appliance according to any of claims 43 to 45, wherein the insulating layer mitigates one or more of noise, vibration and heat produced by the appliance.

47. An appliance according to any of claims 43 to 46, wherein the insulating material is a foam or a felt.

48. An appliance according to any of claims 40 to 47, wherein the outer wall is formed from a metal.

49. An appliance according to claim 48, wherein the metal is aluminium or an aluminium alloy.

50. An appliance according to any of claims 40 to 49, wherein the wall is formed from a plastic material.

51. An appliance according to claim 50, wherein the plastic material is one of polycarbonate, glass filled PPA, PPS, LCAP or PEEK.

52. An appliance according to any of claims 40 to 51, wherein the handle includes a fan unit for drawing fluid into the primary fluid inlet and along the primary fluid flow path.

53. An appliance according to any of claims 40 to 52, wherein the handle comprises a first end and a second end wherein the primary fluid inlet is at or near the second end.

54. An appliance according to claim 53, wherein the primary fluid inlet comprises a first aperture extending at least partially around the handle and a second aperture extending through the second end of the handle.

55. An appliance according to claim 53 or claim 54, wherein the handle comprises an end wall at the second end and the second aperture extends through the end wall.

56. An appliance according to claim 55, wherein the end wall is substantially orthogonal to the handle.

57. An appliance according to any of claims 54 to 56, wherein the first aperture is adjacent the second end of the handle.

58. An appliance according to any of claims 54 to 57, wherein a power cable for supplying power to the fan unit is provided, the power cable extending through the second end of the handle.

59. An appliance according to claim 58, wherein the power cable extends substantially centrally thorough the second end of the handle.

60. An appliance according to any of claims 52 to 59, wherein the handle includes a heater for heating fluid drawn into the primary fluid inlet.

61. An appliance according to claim 60, wherein the heater is downstream of the fan unit

62. An appliance according to any of claims 40 to 61 comprising a head attachable to the handle, the head comprising a primary fluid outlet for the appliance.

63. An appliance according to claim 62, wherein the primary fluid outlet comprises a plurality of apertures extending at least partially along and around the head.

64. An appliance according to claim 62 and 63, wherein the primary fluid flow path is substantially linear through the handle and into the head.

64. An appliance according to any of claims 40 to 61, comprising a body having a primary fluid outlet, wherein the primary fluid outlet is in fluid communication with the primary fluid inlet and the primary fluid flow path.

65. An appliance according to claim 64, wherein the primary fluid flow path from the primary fluid inlet to the primary fluid outlet is non linear.

66. An appliance according to claim 65, wherein the primary fluid flows within the handle in a first direction and within the body in a second direction.

67. An appliance according to claim 65 or claim 66, wherein the primary fluid flow in the body is substantially orthogonal to the primary fluid flow in the handle.

68. An appliance according to any of claims 64 to 67, wherein the body comprises a fluid flow path extending from a fluid inlet in the body to a fluid outlet.

69. An appliance according to claim 68, wherein the fluid flow path merges with the primary fluid flow path within the body.

70. An appliance according to claim 69, wherein fluid in the primary fluid flow path exits the body by the primary fluid outlet.

71. An appliance according to any of claims 68 to 70, wherein fluid in the fluid flow is entrained into the body by the action of a fan unit in the primary fluid flow path.

72. An appliance according to any of claims 68 to 71, wherein the fluid flow path is defined by a duct extending through the body.

73. An appliance according to any of claims 68 to 72, wherein the fluid flow path extends from a fluid inlet to a fluid outlet.

74. An appliance according to any of claims 68 to 73, wherein the body comprises a heater for heating fluid in the primary fluid flow path.

75. An appliance according to claim 74, wherein the heater extends around the duct.

76. An appliance according to claim 74 or claim 75, wherein the heater extends along the body.

77. An appliance according to any of claims 74 to 76, wherein the heater is annular.

# ABSTRACT

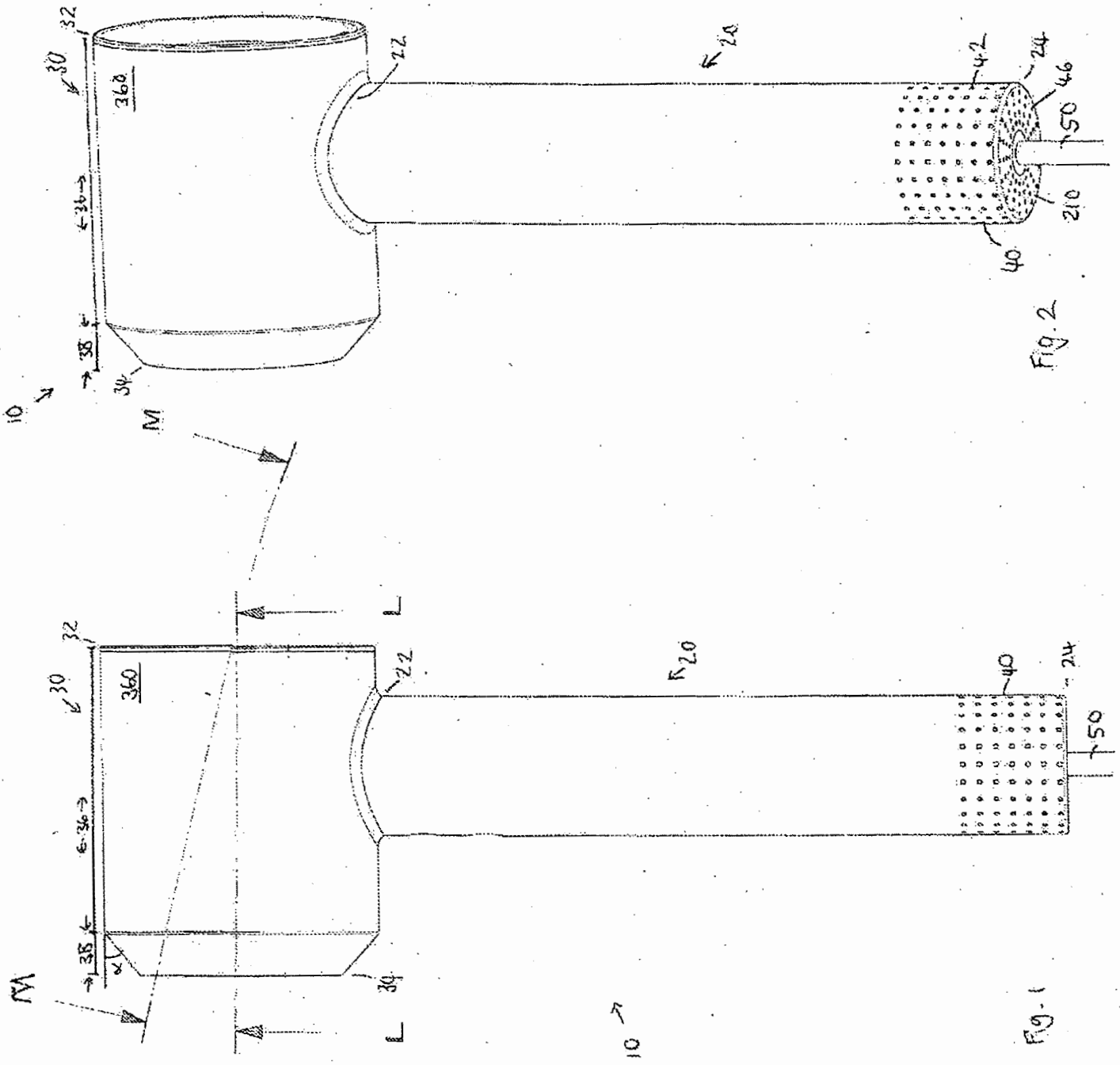
## A Handheld Appliance

Disclosed is a hair care appliance comprising a handle, the handle comprising a wall and an outer wall wherein the wall defines a primary fluid flow path that extends from a primary fluid inlet into the appliance and the outer wall is an external surface of the appliance. The outer wall may extend substantially continuously around and along the wall. An insulating layer may be provided between the wall and the outer wall, the insulating layer is may be substantially continuous around and along the wall and may mitigate one or more of noise, vibration and heat produced by the appliance. The handle may include a fan unit for drawing fluid into the primary fluid inlet and along the primary fluid flow path.

(Figure 4a)

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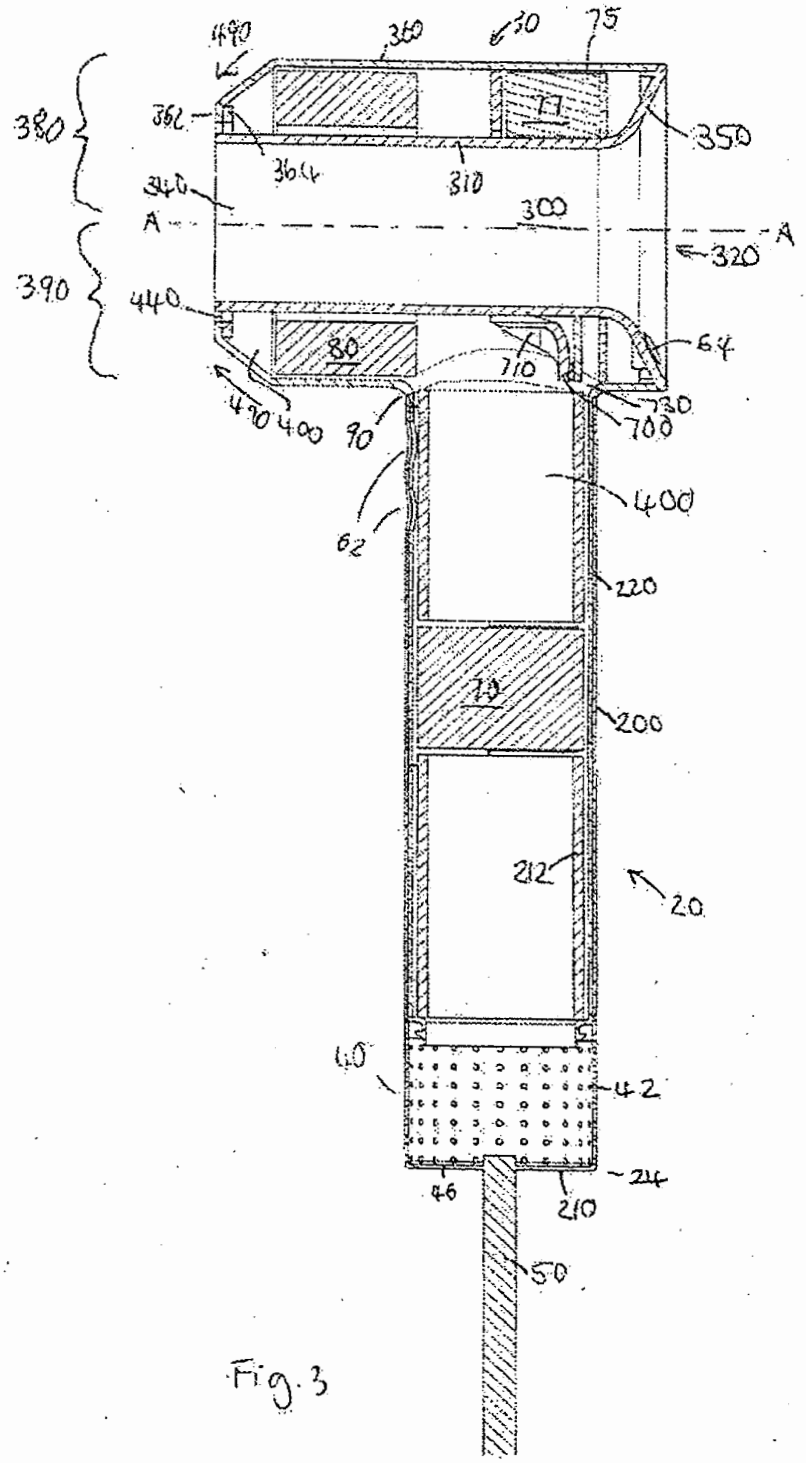



Fig. 3

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 126 of 2286

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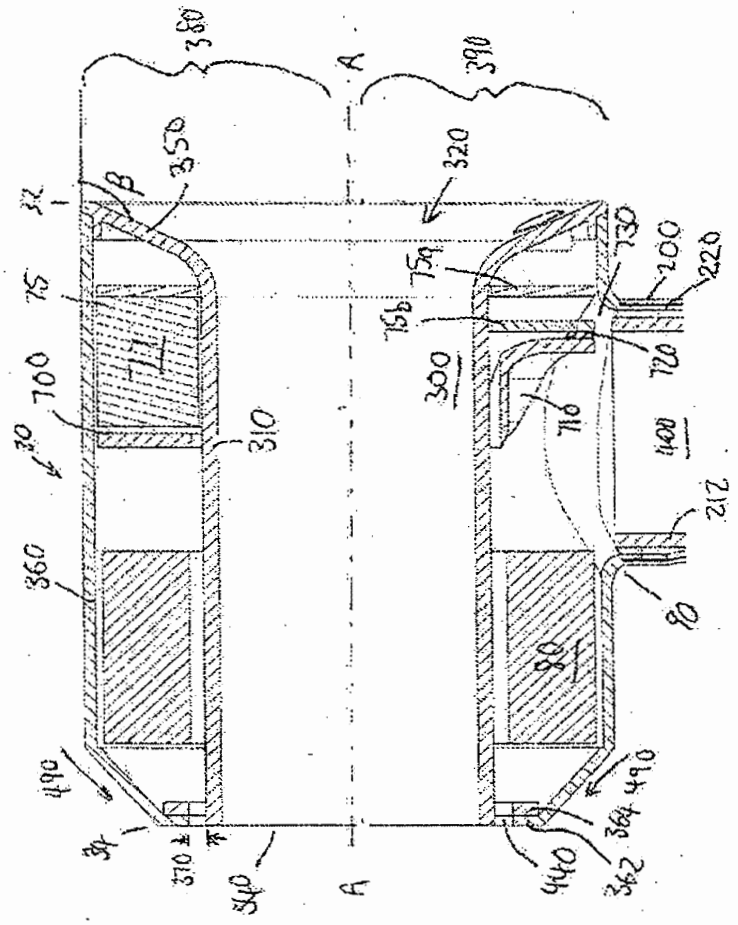



Fig 4b

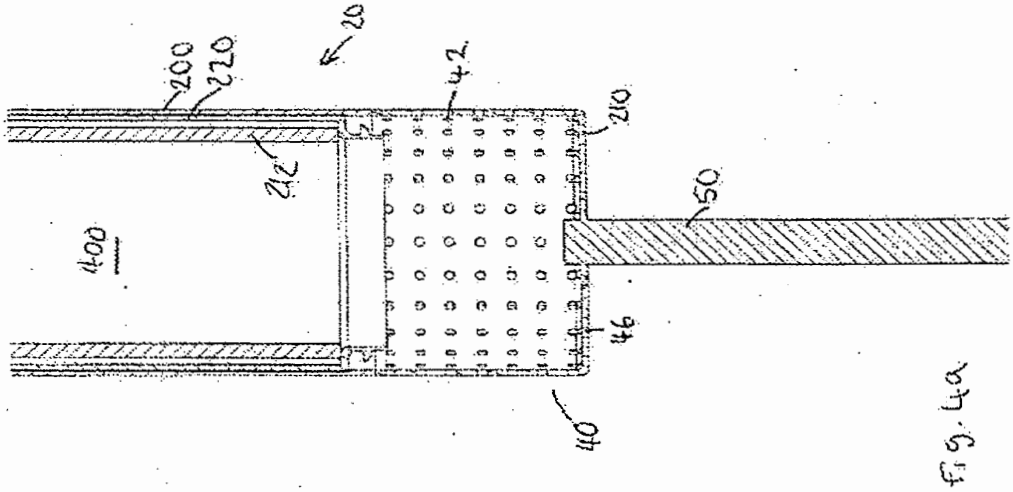



Fig. 4a

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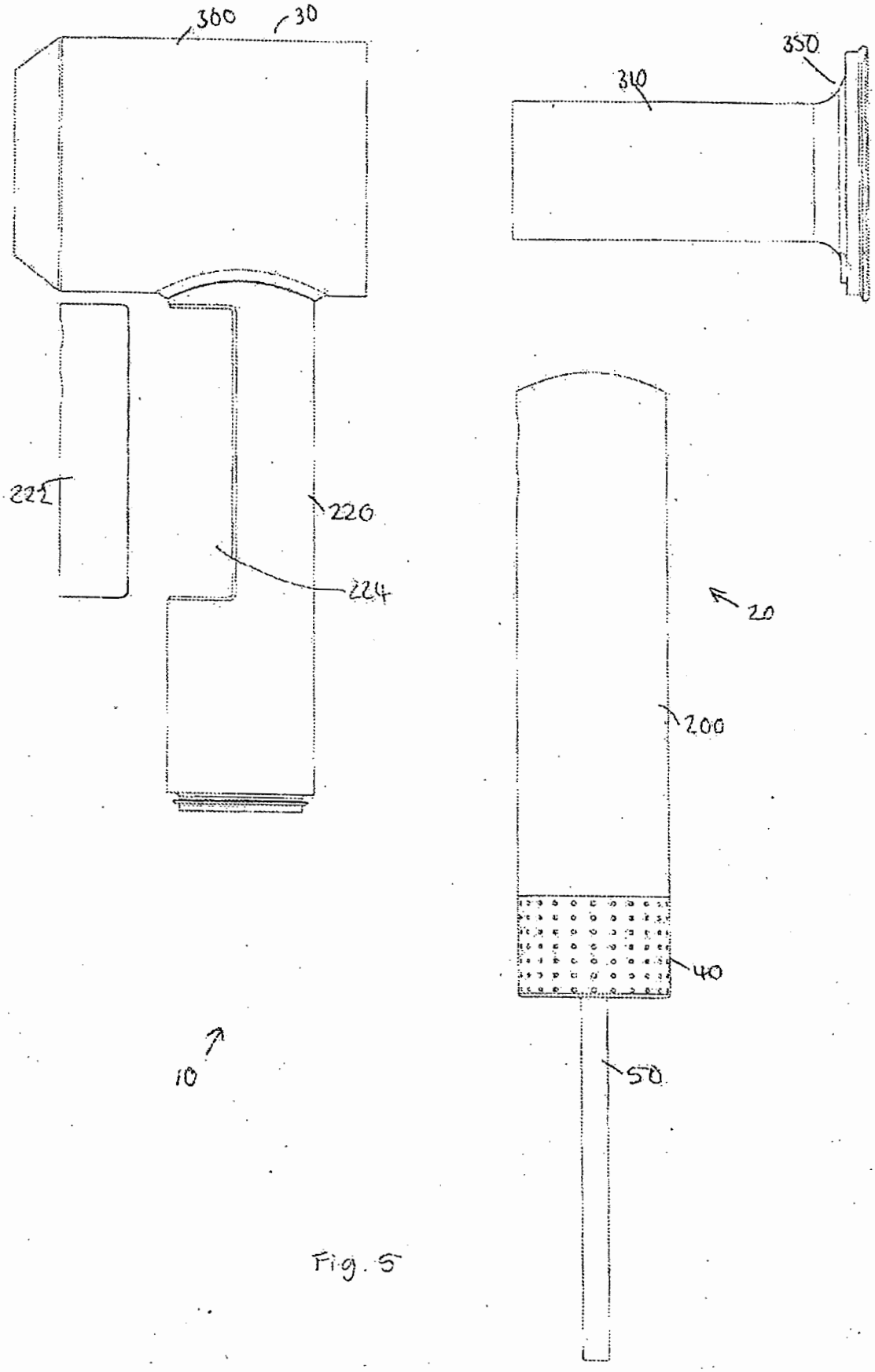



Fig. 5

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 128 of 2286

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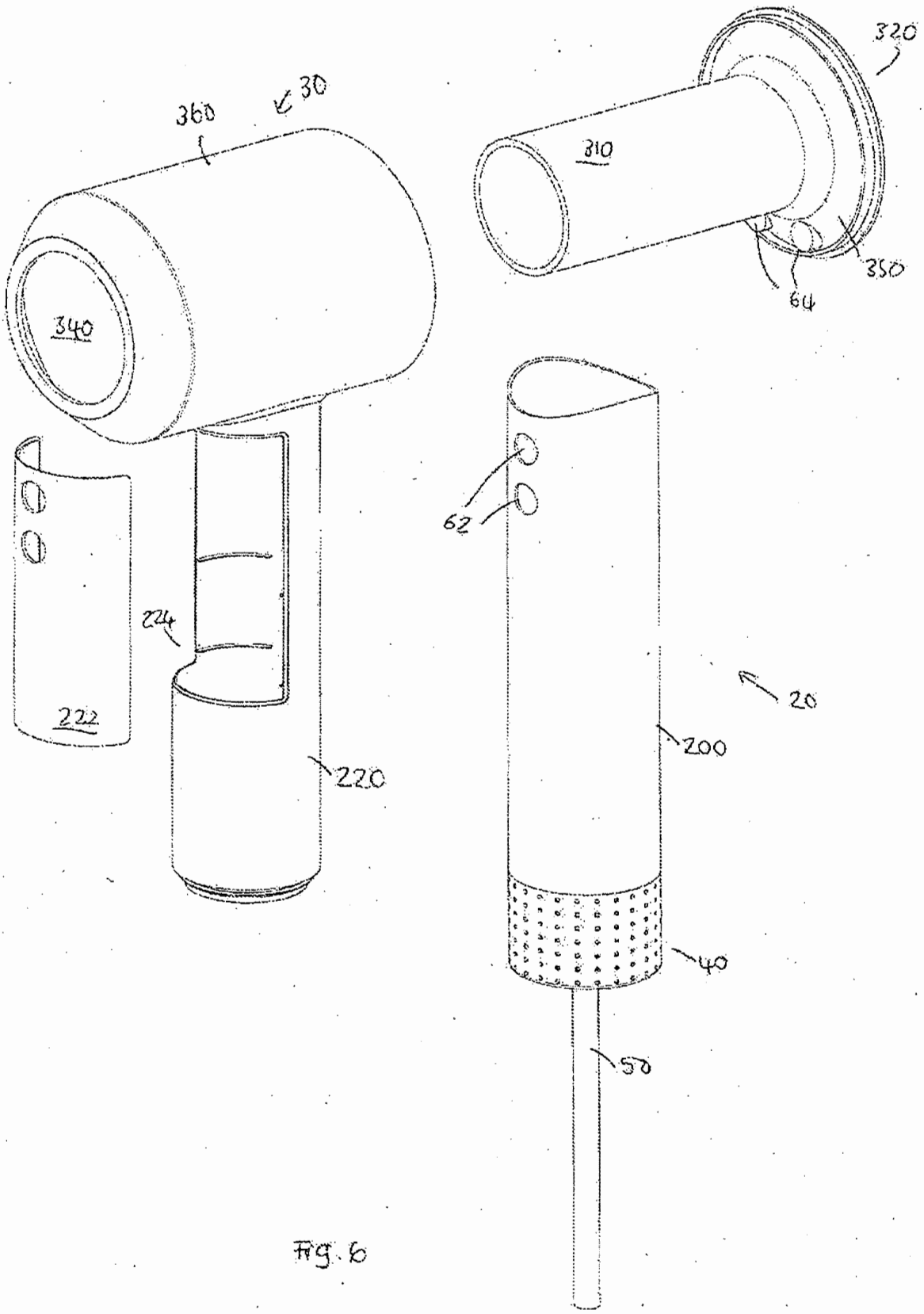



Fig. 6

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 129 of 2286

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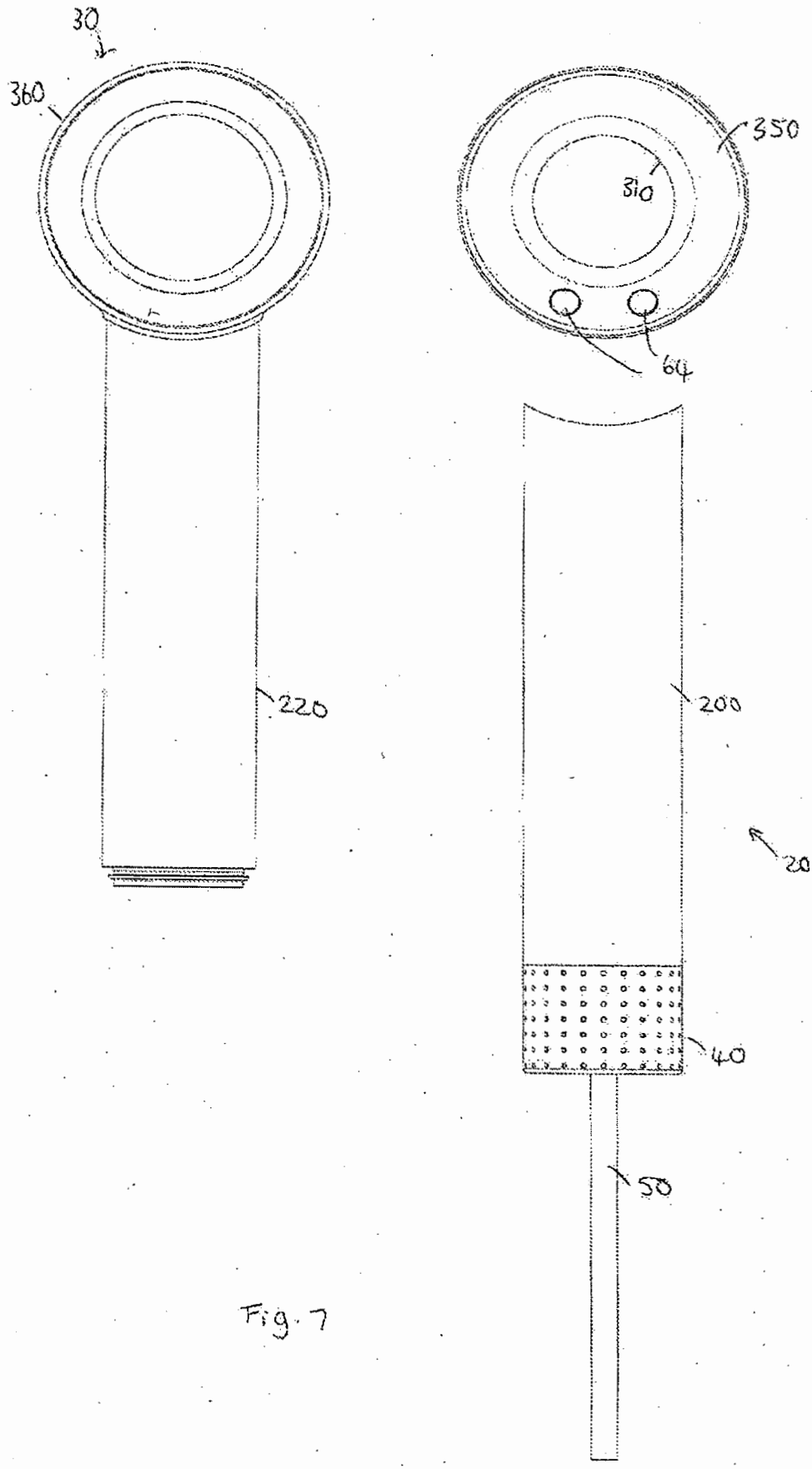



Fig. 7

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 130 of 2286

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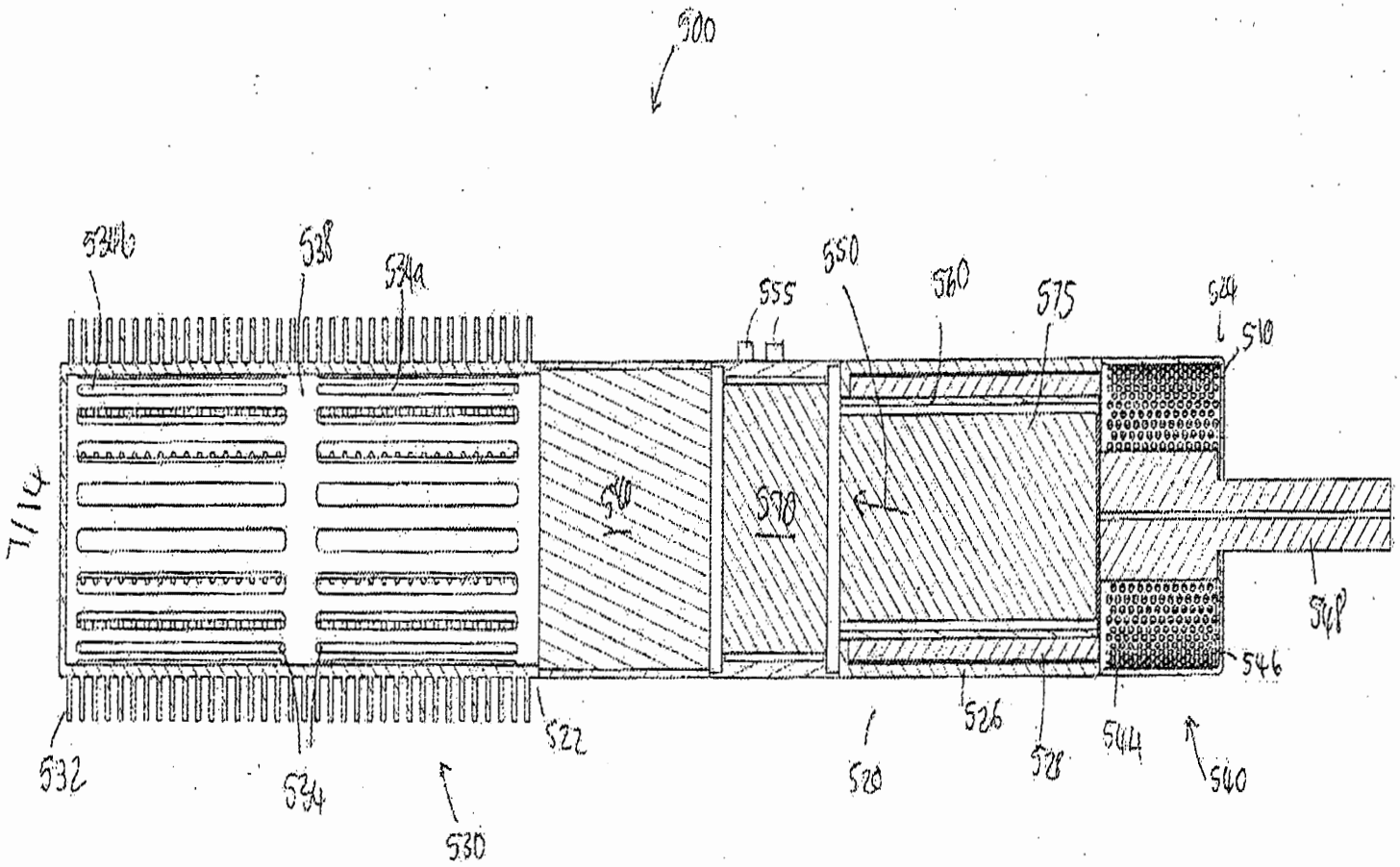



Fig. 8a



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 131 of 2286

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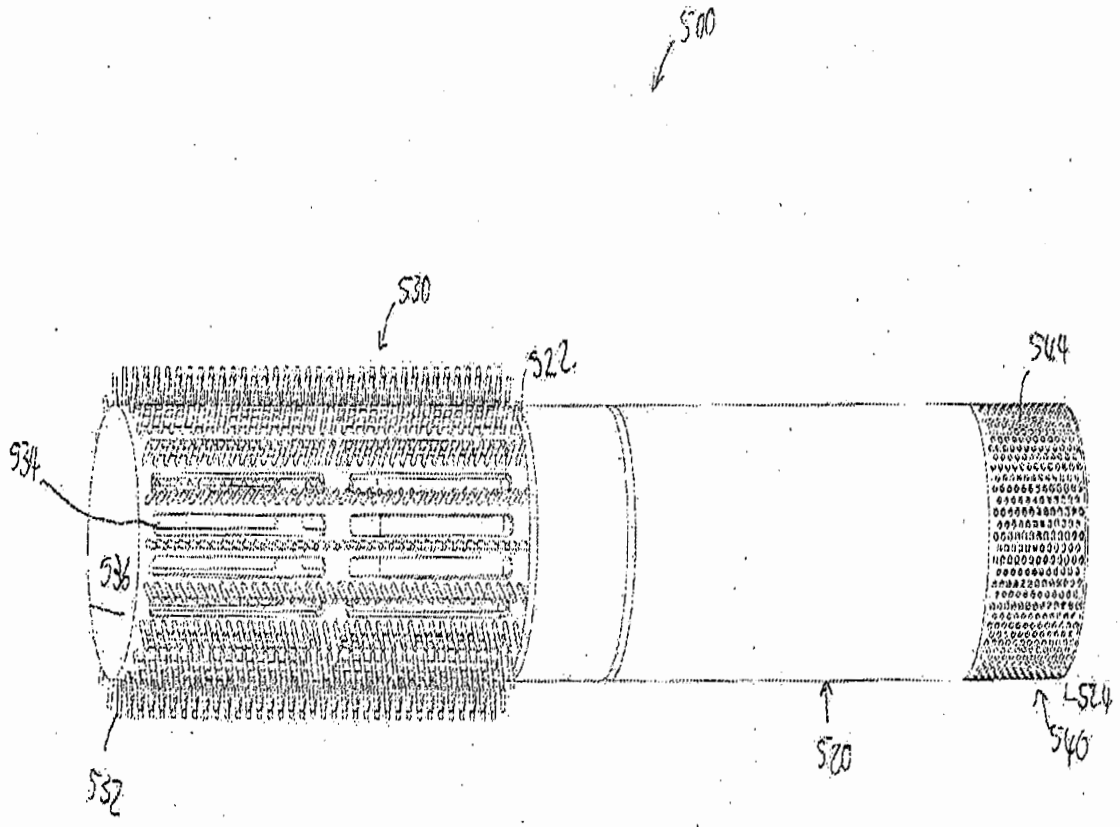



Fig 8b

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 132 of 2286

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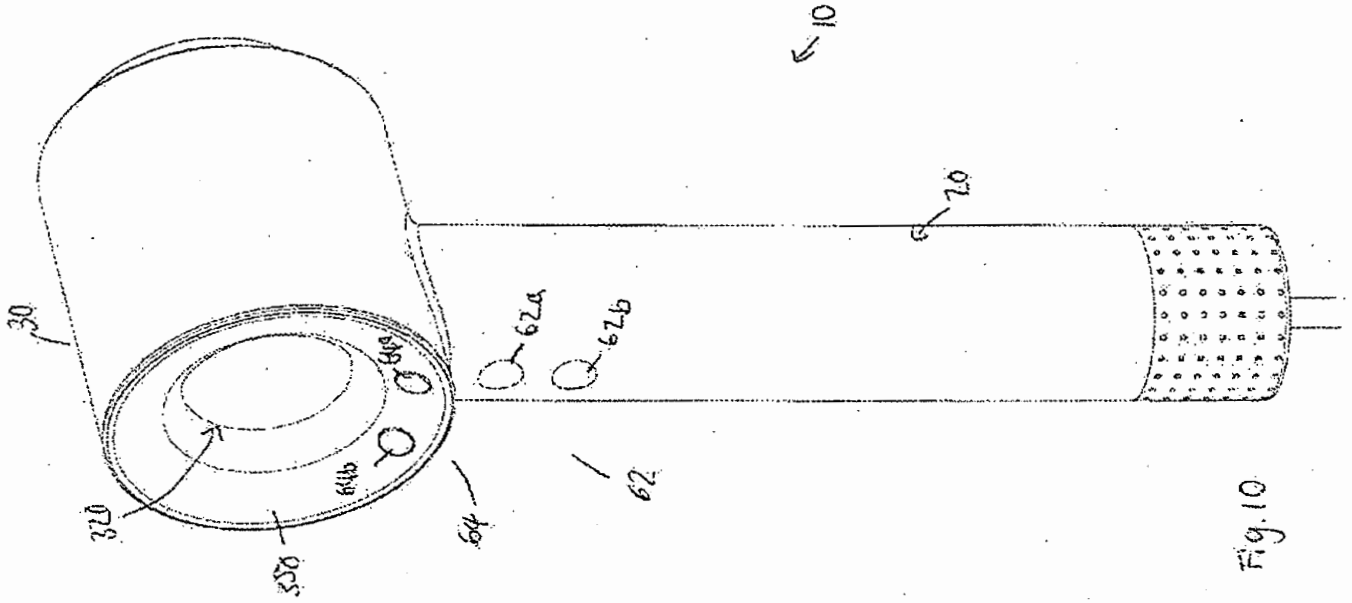



Fig.10

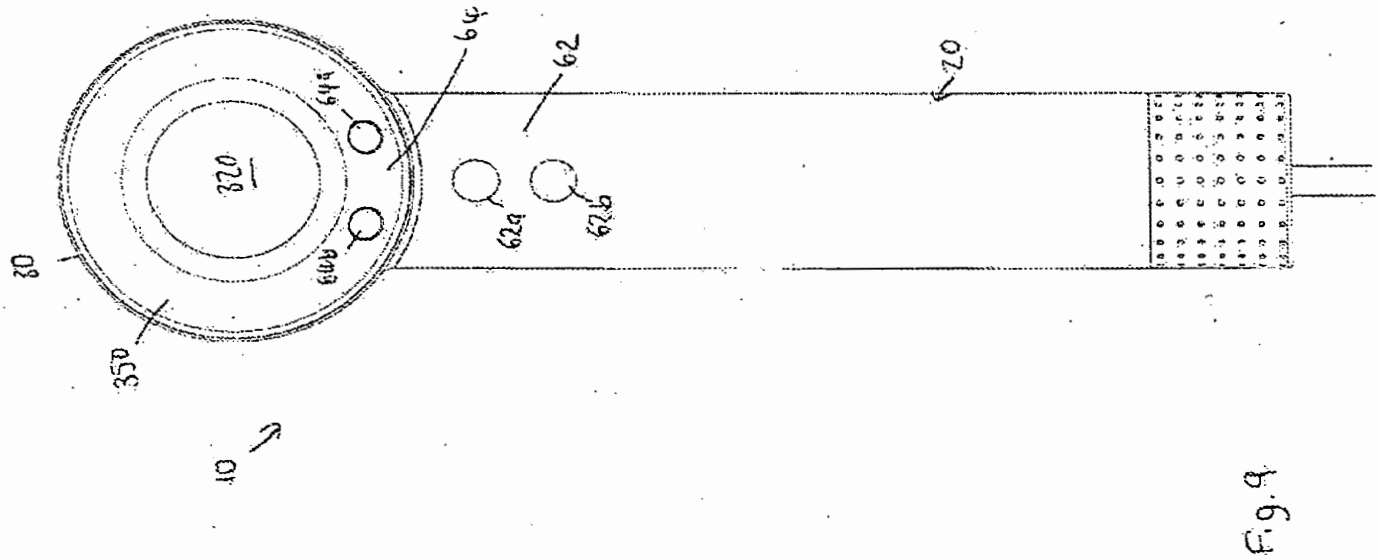



Fig.9

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 133 of 2286

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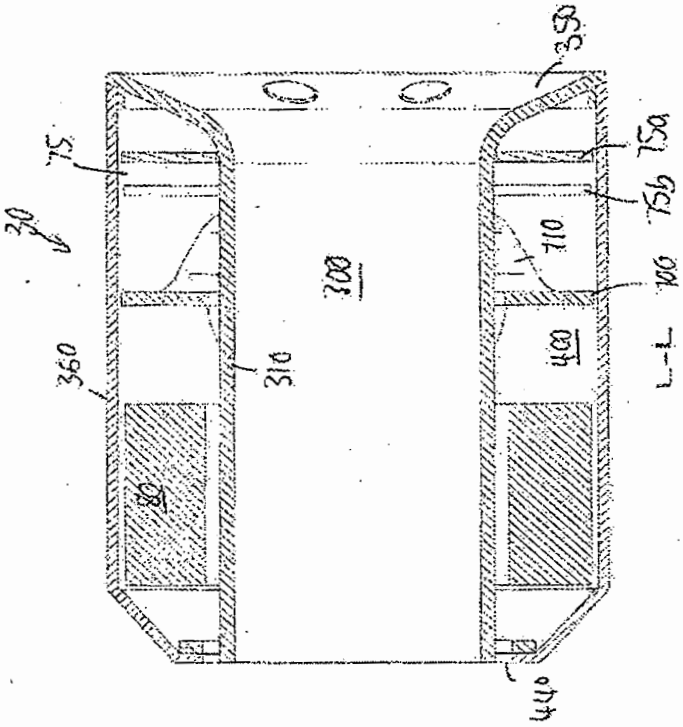



Fig. 11b

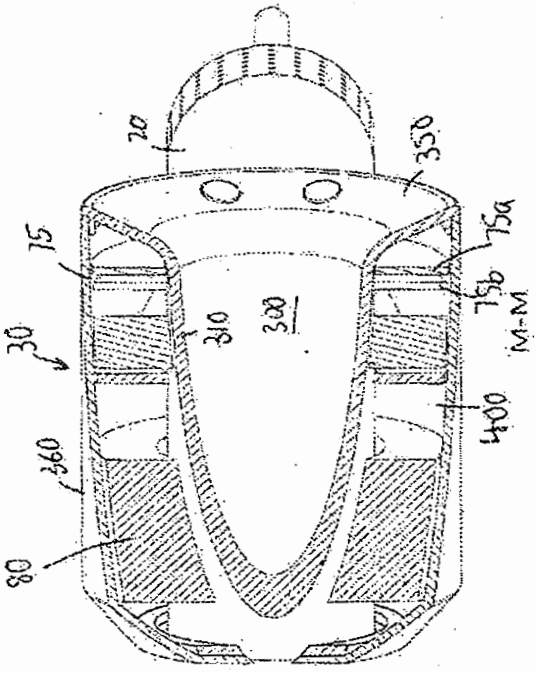



Fig. 11a

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SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 134 of 2286

Best Available Copy



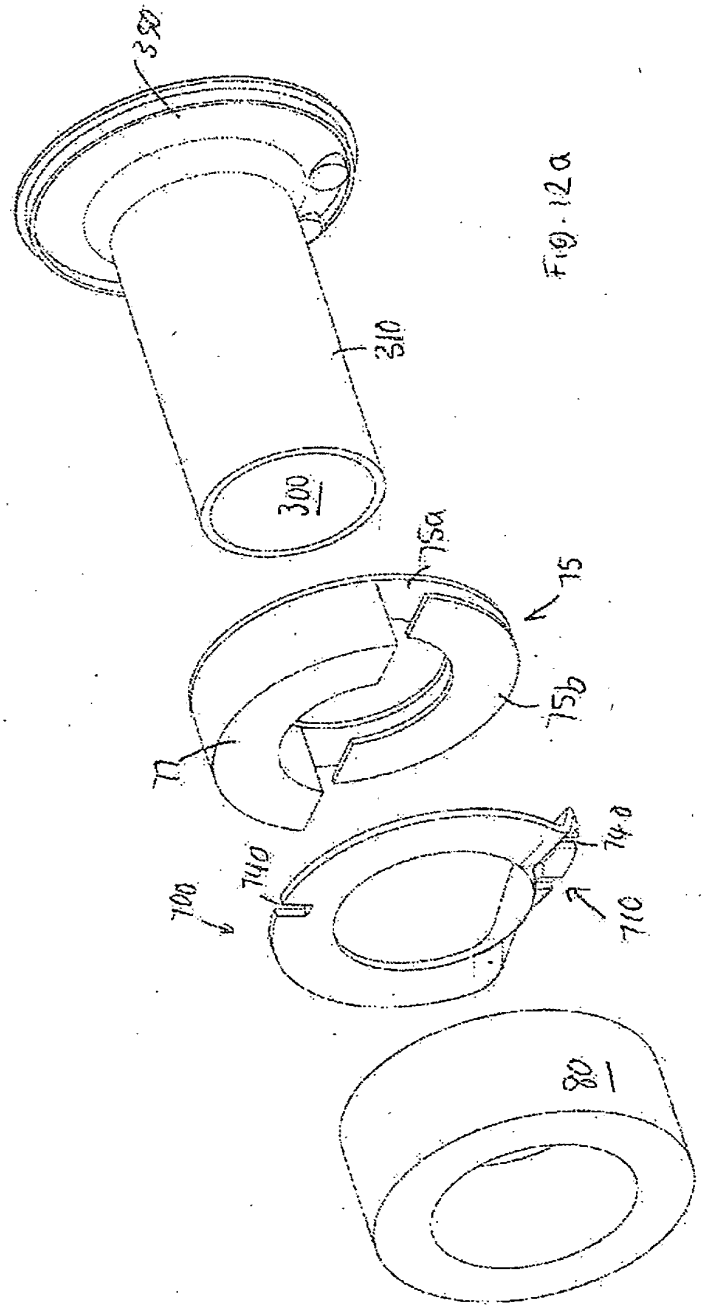



Fig. 12a

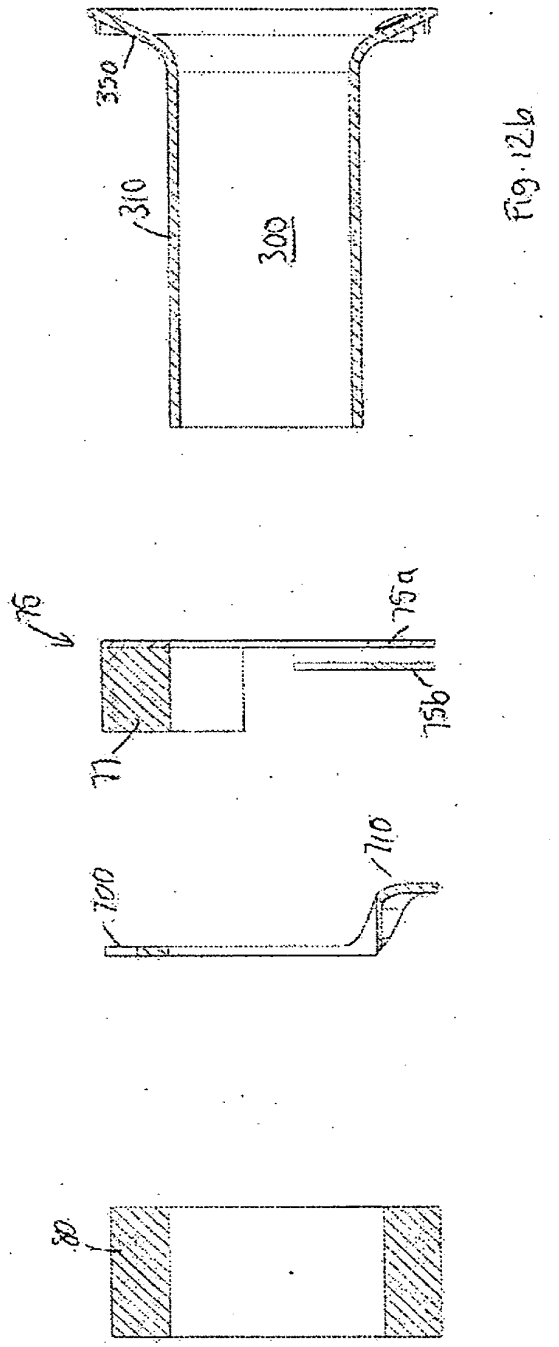



Fig. 12b

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 135 of 2286

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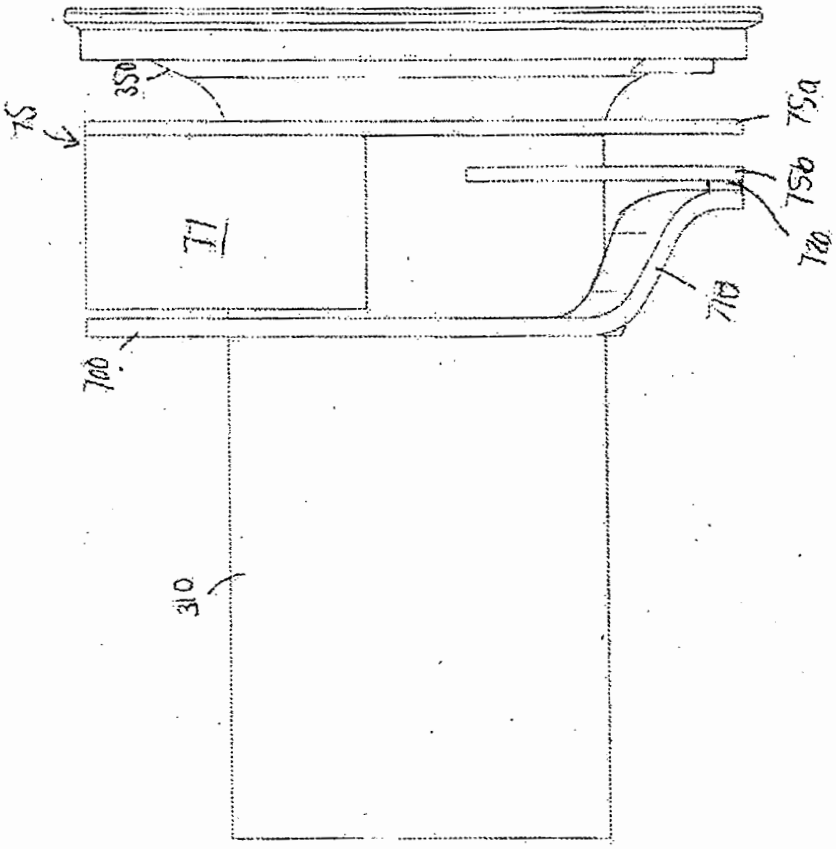



Fig. 12c.

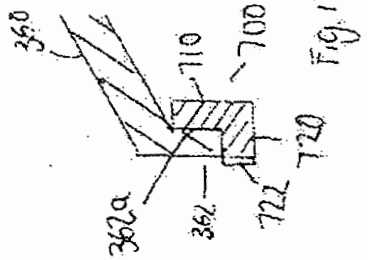



Fig. 17a

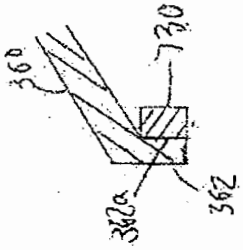



Fig. 17b

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 136 of 2286

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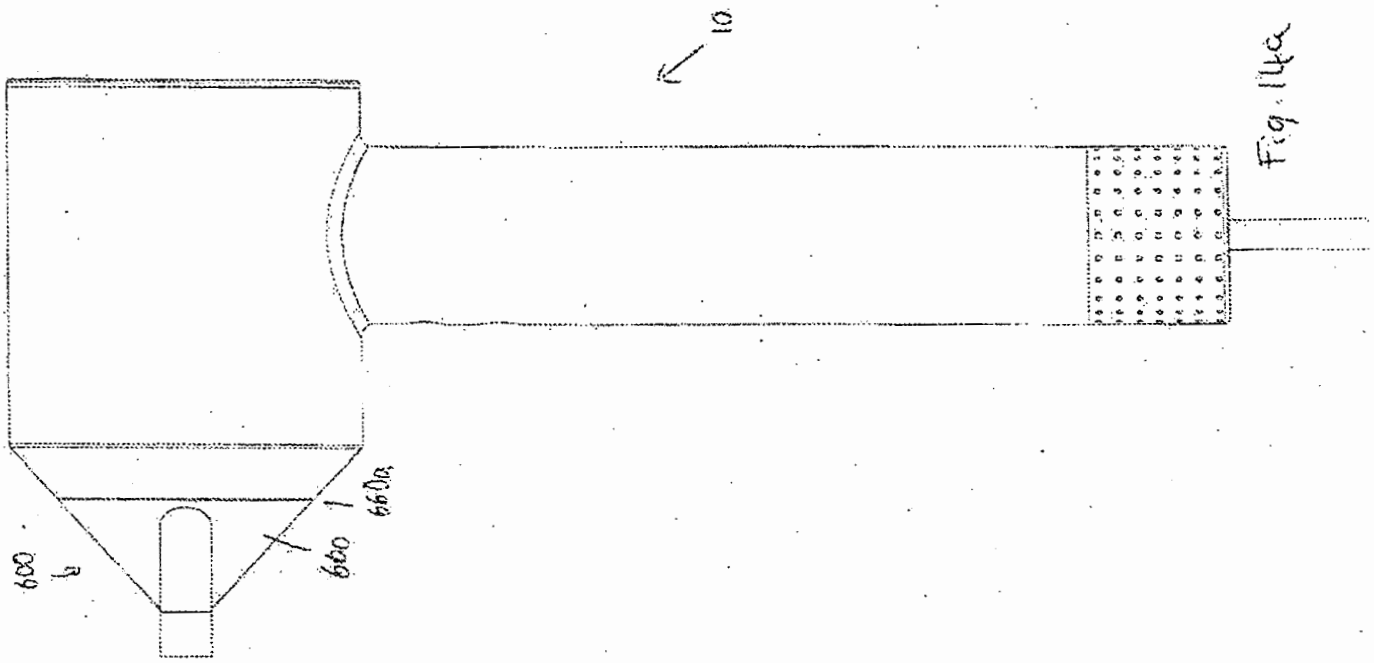



Fig. 14a

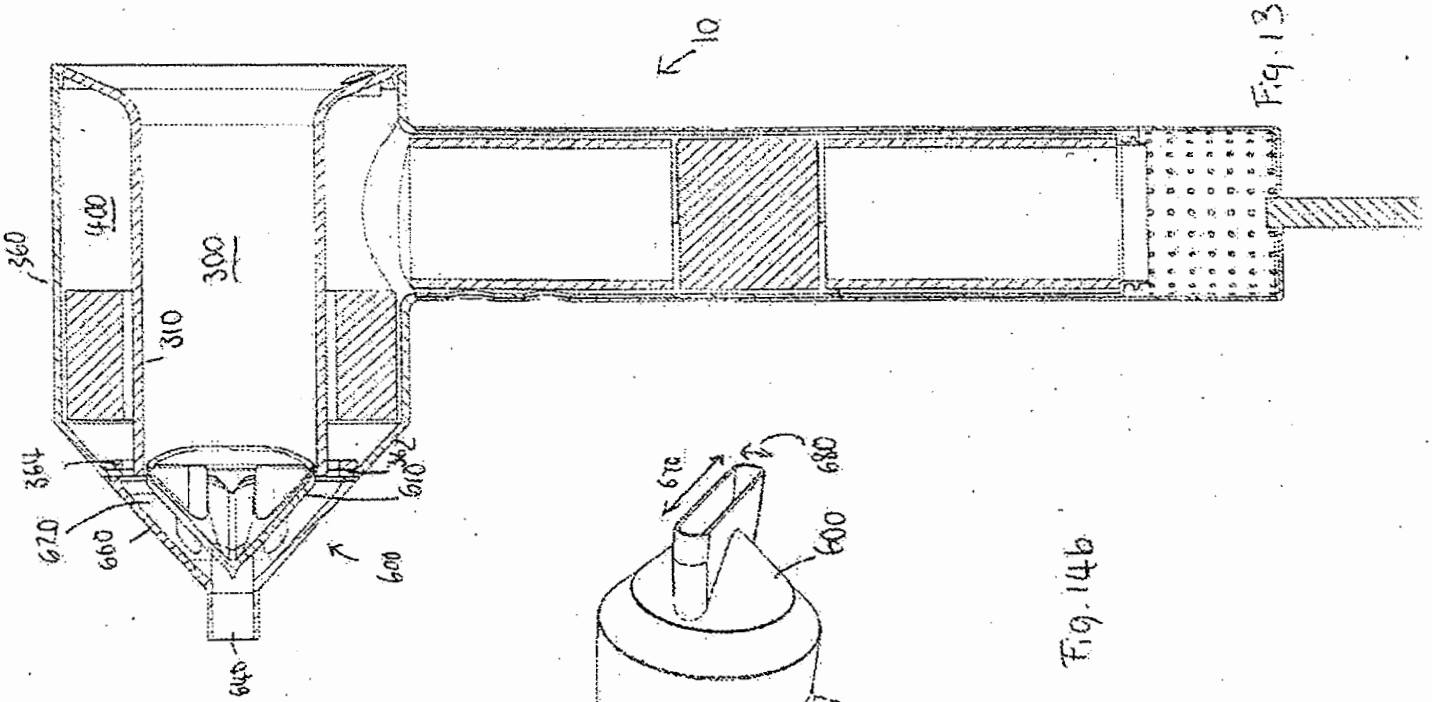



Fig. 13

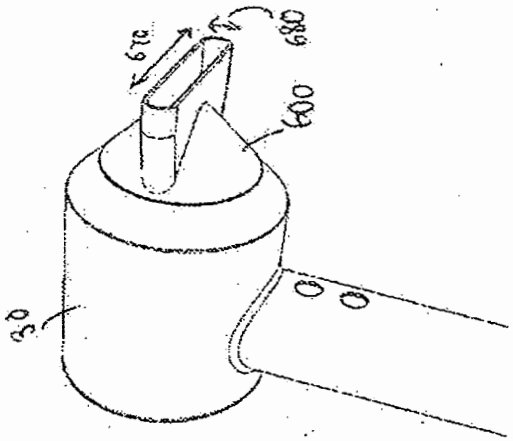



Fig. 14b

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 137 of 2286

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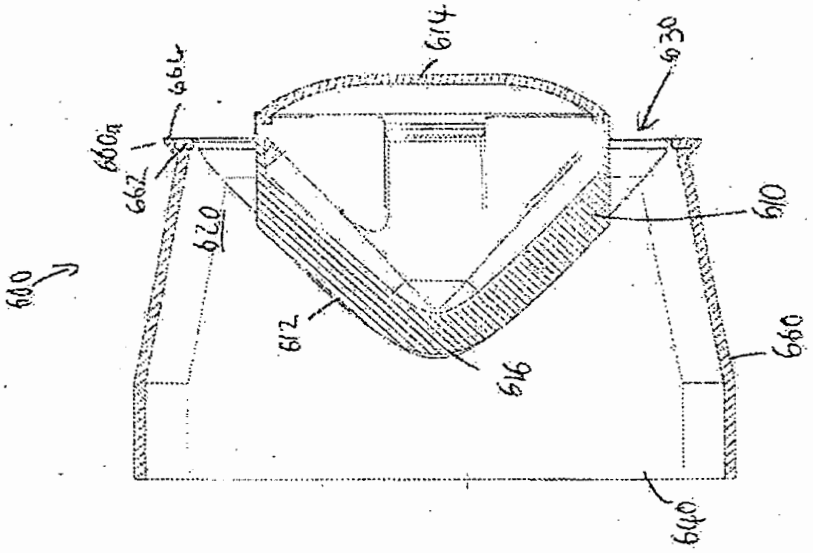



Fig. 16

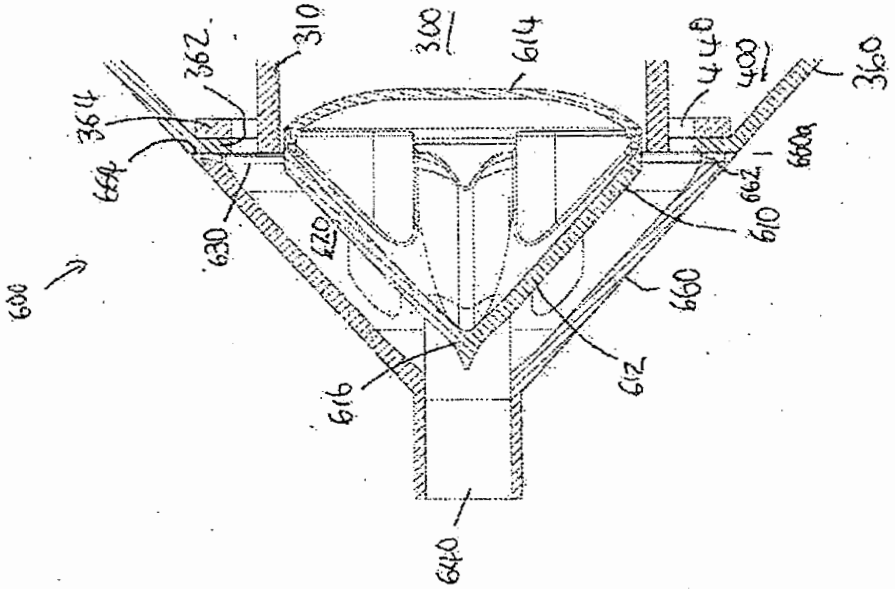



Fig. 15

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Page 138 of 2286

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| Application Number | 14/323,937 |
| Filing Date | July 3, 2014 |
| First Named Inventor | Patrick Joseph William MOLONEY |
| Art Unit | 1615 |
| Examiner Name | Not Yet Assigned |
| Attorney Docket Number | 424662077100 |

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| Firm Name | MORRISON & FOERSTER LLP | | |
| Signature | | | |
| Printed name | Boyoung (Ashley) Yeum | | |
| Date | July 28, 2014 | Reg. No. | L0727 |



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 140 of 2286

OPAP
JUL 28 2014
PATENT & TRADEMARK OFFICE

Docket No.: 424662077100
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:
Patrick Joseph William MOLONEY et al.

Application No.: 14/323,937 Confirmation No.: 2130

Filed: July 3, 2014 Art Unit: 1615

For: HAND HELD APPLIANCE Examiner: Not Yet Assigned

**CLAIM FOR PRIORITY AND SUBMISSION OF DOCUMENTS**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Madam:

Applicant hereby claims priority under 35 U.S.C. 119 based on the following prior foreign application filed in the following foreign country on the date indicated:

| Country | Application No. | Date |
|---|---|---|
| United Kingdom | 1312068.8 | July 5, 2013 |

In support of this claim, a certified copy of the said original foreign application is filed herewith.

Dated: July 28, 2014

Respectfully submitted,

By _____
Boyoung (Ashley) Yeum
Registration No.: L0727
MORRISON & FOERSTER LLP
1650 Tysons Blvd, Suite 400
McLean, Virginia 22102
(703) 760-7380

va-429593

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| Application Number | 14/323,937 |
| Filing Date | July 3, 2014 |
| First Named Inventor | Patrick Joseph William MOLONEY |
| Art Unit | 1615 |
| Examiner Name | Not Yet Assigned |
| Attorney Docket Number | 424662077100 |

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| Signature | /Boyoung (Ashley) Yeum/ | | |
| Printed name | Boyoung (Ashley) Yeum | | |
| Date | August 25, 2014 | Reg. No. | L0727 |

I hereby certify that this paper is being transmitted via the Office electronic filing system in accordance with § 1.6(a)(4).

Dated: August 25, 2014 Electronic Signature for Sarah Noel: /Sarah Noel/



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 142 of 2286

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# DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

| **Title of Invention** | HAND HELD APPLIANCE |
|---|---|

As the below named inventor, I hereby declare that:

This declaration is directed to:
- ☐ The attached application, or
- ☒ United States application or PCT international application number 14/323,937 filed on July 3, 2014 .

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

**WARNING:**

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Patrick Joseph William MOLONEY Date (Optional): 17/7/14

Signature: 

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.



va-428144

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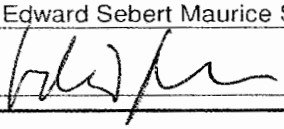
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LEGAL NAME OF INVENTOR

Inventor: Edward Sebert Maurice SHELTON Date (Optional): 23/07/14

Signature: 

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 144 of 2286

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|---|---|
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LEGAL NAME OF INVENTOR

Inventor: Stephen Benjamin COURTNEY Date (Optional): 23/07/2014

Signature:

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 145 of 2286

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LEGAL NAME OF INVENTOR

Inventor: Daniel Martin TAYLOR Date (Optional): 10/07/14

Signature: D. Taylor

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.



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SharkNinja Ex. 1002
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IPR2023-01324
Page 146 of 2286

# Electronic Acknowledgement Receipt

| | |
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| **EFS ID:** | 19952294 |
| **Application Number:** | 14323937 |
| **International Application Number:** | |
| **Confirmation Number:** | 2130 |
| **Title of Invention:** | HAND HELD APPLIANCE |
| **First Named Inventor/Applicant Name:** | Patrick Joseph William MOLONEY |
| **Customer Number:** | 25227 |
| **Filer:** | Boyoung Yeum |
| **Filer Authorized By:** | |
| **Attorney Docket Number:** | 424662077100 |
| **Receipt Date:** | 25-AUG-2014 |
| **Filing Date:** | 03-JUL-2014 |
| **Time Stamp:** | 16:40:27 |
| **Application Type:** | Utility under 35 USC 111(a) |

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| 1 | | 424662077100_DeclarationTransmittal.pdf | 7736282<br>6250d0c7b1a7be9dcca00d24e40ed083e00c76ab | yes | 5 |

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**National Stage of an International Application under 35 U.S.C. 371**
**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

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**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

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| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|---|---|---|---|
| 14/323,937 | 07/03/2014 | Patrick Joseph William MOLONEY | 424662077100 |

**CONFIRMATION NO. 2130**

**PUBLICATION NOTICE**

25227
MORRISON & FOERSTER LLP
1650 TYSONS BOULEVARD
SUITE 400
MCLEAN, VA 22102

*OC000000072737120*

**Title:**HAND HELD APPLIANCE

**Publication No.**US-2015-0007444-A1
**Publication Date:**01/08/2015

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The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 149 of 2286

# PATENT SPECIFICATION 647,291

*Date of filing Complete Specification : Dec. 9, 1948.*

*Application Date : Jan. 14, 1948. No. 1125/48.*

*Complete Specification Published : Dec. 13, 1950.*

Index at Acceptance :—Class 81(ii), B15b.


## PROVISIONAL SPECIFICATION.

## Improvements relating to Electric Hair Driers.

I, FREDERICK GEORGE COOKE, a British Subject, of 22, Pine Walk, Berrylands, Surbiton, Surrey, do hereby declare the nature of this invention to be as follows :—

This invention concerns improvements relating to electric hair driers, particularly portable driers which are held in the hand during use. A particular object of the invention is to provide an efficient drier which is of very simple and practical construction.

In a drier in accordance with the invention, the handle and the casing are made in one piece, preferably as a light-alloy die casting. The handle may have a pistol-grip shape and the casing substantially a barrel shape, the discharge being from a wider end.

The fan and its motor together with the heater are made up as an assembly which is mounted in the casing as a whole, preferably by two securing screws only. Switches for the motor and heater are mounted in the casing immediately behind the handle where they can be manipulated by the thumb of the hand gripping the handle. By this means comfortable one-hand manipulation is achieved in very simple fashion.

Advantageously, the fan is disposed in the wide discharge end of the casing in front of the co-axially disposed heater element and motor, the said fan being arranged to rotate within a shrouding which closely embraces it and extends from the discharge opening to the heater element.

Inlet openings may be provided in the rear part of the barrel of the casing as well as an opening at the truncated rear end, the arrangement being such that the cold air drawn in flows axially through the casing, sweeping over the motor before passing through the heating element.

A preferred embodiment of the invention will now be described by way of example :

In this embodiment, the integral pistol-grip handle extends downwardly, with a slight rearward rake from about the middle of the nacelle casing. The handle is hollow and serves for the passage of the flexible lead which may enter it by way of means designed to prevent sharp kinking of the lead and also to grip the same. For instance, the handle may be wholly encased in an insulating sheath, for example of a plastic or rubber material, which is extended by a short flexible tubular portion closely embracing the lead where it enters the handle and thus affording the aforesaid protection. Longitudinally sliding switches are arranged side by side in an opening in the casing immediately behind the handle. Alternatively masked legends, "on," "off," and "hot," "cold" indicate the positions of the switches.

The wide discharge end and the truncated other end of the casing are occupied by protective screens of wire gauze, that at the former end being secured in place by means of a flanged metal ring. The fan is located immediately behind the discharge-end gauze and rotates inside a flanged cylindrical skirting part secured behind the flanged ring and extended by a cylindrical part of heat-resisting material, for example an asbestos material, which embraces the heating element, the two cylindrical parts together forming a shrouding or tunnel without internally projecting obstructions to the air flow. The heating element may comprise a circularly or spirally disposed coiled element mounted upon a spider of heat-resisting material which is carried in turn upon the front of a forwardly extended portion of a supporting bracket.

The motor, for example a synchronous motor, is attached to the rear side of the same bracket which has wing portions whereby it is secured inside the casing by means of two screws engaging in internal shoulders formed in the casing. The motor, fan, heater and switches are pre-assembled on the bracket and then mounted in the casing as a whole.

In addition to the inlet opening at the narrow end of the casing, there are two rows of narrow louvre-like curved slits in the

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 150 of 2286

rear half of the upper part of the casing. The casing is also formed with an external stiffening rib extending along its top. The slits extend downwardly and forwardly from near this rib and have the rear lip depressed to facilitate free entry of the air.

Three small feet of non-metallic material may be arranged on the outer face of the flanged ring, so that the drier can be safely put down with its discharge opening downwardly.

Dated the 14th day of January, 1948.
JENSON & SON,
77, Chancery Lane, London, W.C.2.
Chartered Patent Agents.

COMPLETE SPECIFICATION.

## Improvements relating to Electric Hair Driers.

I, FREDERICK GEORGE COOKE, a British Subject, of 22, Pine Walk, Berrylands, Surbiton, Surrey, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement :—

This invention concerns improvements relating to electric hair driers of the type comprising a fan, motor and heater which are arranged in the body of a casing provided with a handle by which the user holds the drier. A particular object of the invention is to provide an efficient drier which is easy to use and of simple and practical construction.

It has previously been proposed to mount a switch for controlling the motor and heater of a hair drier of the type set forth in the casing close to the handle.

According to the present invention, in a drier of the type set forth, the fan, motor and heater, together with switches for the motor and heater, are made up as an assembly which is mounted as a whole in the casing, the switches being arranged in the body of the casing, immediately behind the handle of the drier, where they are accessible for manipulation by the thumb of the hand gripping the handle. Comfortable one-hand manipulation is thus achieved in a very simple fashion and by an arrangement which lends itself to design for easy assembly.

The handle and the casing may be made in one piece, preferably as a light-alloy die casting. The handle may have a pistol-grip shape and the casing substantially a barrel shape, flaring towards the discharge end.

Advantageously, the fan is disposed in the wide discharge end of the casing in front of the co-axially disposed heater element and motor, the said fan being arranged to rotate within a shrouding which closely embraces it and extends from the discharge opening to the heater element.

A preferred embodiment of the invention will now be described by way of example and with reference to the accompanying drawings, in which :—

Figure 1 is a longitudinal vertical section through the drier,

Figure 2 a front elevation thereof,

Figure 3 a part plan view and part horizontal section, and

Figure 4 a rear perspective view.

A pistol-grip handle 1 extends downwardly with a slight rearward rake from about the middle of the body of a substantially barrel-shaped casing 2 with which the said handle is integral. The handle is hollow and serves for the passage of the flexible lead 3 which enters it by way of means designed to prevent sharp kinking of the lead and also to grip the same. For instance and as shown, the handle may be wholly encased in an electrically insulating sheath 4, for example of a corrugated plastic or rubber material, which is extended by a short flexible tubular portion 5 closely embracing the lead where it enters the handle and thus affording the aforesaid protection. Longitudinally sliding switch-operating knobs 6 are arranged side by side in an opening 7 in the casing immediately behind the handle 1. Legends alternatively masked by the respective knobs, "on," "off" and "hot," "cold," indicate the positions of the switches.

The wide discharge end and the truncated other end of the casing are occupied by protective screens 8, 9 of wire gauze, that at the former end being secured in place by means of a flanged metal ring 10. A fan 11 is located immediately behind the screen 8 and rotates inside a flanged cylindrical skirting part 12 secured behind the flanged ring 10 and extended by a cylindrical liner 13 of heat-resisting material, for example an asbestos material. The liner 13 embraces a heating element 14, the two parts 12, 13, together forming a shrouding or tunnel without internally projecting obstructions to the air flow. The heating element 14 is a coiled element circularly or spirally disposed upon a spider 15 of heat-resisting material which is carried in turn upon the front of a forward portion 16 (Fig. 3) of a supporting bracket 17.

The fan motor 18, for example a so-called "universal" motor or a synchronous motor,

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 151 of 2286

is attached to the rear side of the same bracket 17 which has wing portions 19 (Fig. 3) whereby it is secured inside the casing 2 by means of two screws 20 engaging in internal shoulders 21 formed in the said casing. The motor 18, fan 11 and heater 14 are pre-assembled on the bracket 17. The switches 22, actuated by the knobs 6, are assembled on the motor by brackets 23 and the whole assembly is then tested and mounted in the casing as a unit.

In addition to the inlet opening at the narrow end of the casing 2, there are two rows of narrow louvre-like curved slits 24 (Figs. 3 and 4) in the rear half of the upper part of the casing. The casing is also formed with an external stiffening rib 25 running along its top. The slits 24 extend downwardly and forwardly from near the rib 25 and have the rear lip depressed to facilitate free entry of the air.

Three small feet 26 of non-metallic material are arranged on the outer face of the flanged ring 10, so that the device can be safely put down with its wide discharge end downwardly.

It will be noted that the arrangement of the motor, heater and fan in relation to the openings is such that the cold air drawn in flows axially through the casing, sweeping over the motor before passing through the heating element.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is :—

1. A hair drier of the type set forth, wherein the fan, motor and heater, together with switches for the motor and heater, are made up as an assembly which is mounted as a whole in the casing, the switches being arranged in the body of the casing, immediately behind the handle of the drier, where they are accessible for manipulation by the thumb of the hand gripping the handle.

2. A hair drier according to Claim 1, wherein the assembly is secured in the casing by means of two screws engaging a shoulder therein.

3. A hair drier according to Claim 1 or 2 and comprising a handle in one piece with the casing.

4. A hair drier according to any one of Claims 1—3, wherein the casing is of substantially a barrel shape, wider towards the discharge end, and has a pistol-grip handle.

5. A hair drier according to any one of Claims 1—4, wherein each of the switches has a longitudinally slidable knob for its operation.

6. A hair drier according to any one of Claims 1—5, wherein the fan is disposed in the wide discharge end of the casing in front of the co-axially disposed heater element and motor, the fan being arranged to rotate within a shrouding which closely embraces it and extends from the discharge opening to the heater element.

7. A hair drier according to any one of Claims 1—6, wherein inlet openings are provided in the rear part of the barrel of the casing as well as an opening at the truncated rear end, the arrangement being such that the cold air drawn in flows axially through the casing, sweeping over the motor before passing through the heating element.

8. A hair drier constructed and arranged substantially as herein described and as shown in the accompanying drawing.

Dated the 9th day of December, 1948.

JENSON & SON,
77, Chancery Lane, London, W.C.2.
Chartered Patent Agents.

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SharkNinja Ex. 1002
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IPR2023-01324
Page 152 of 2286

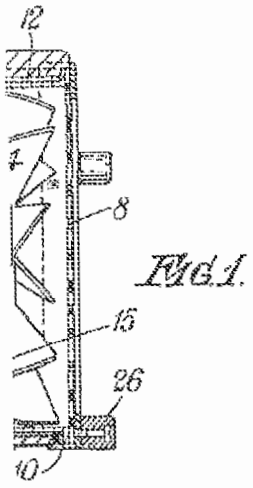
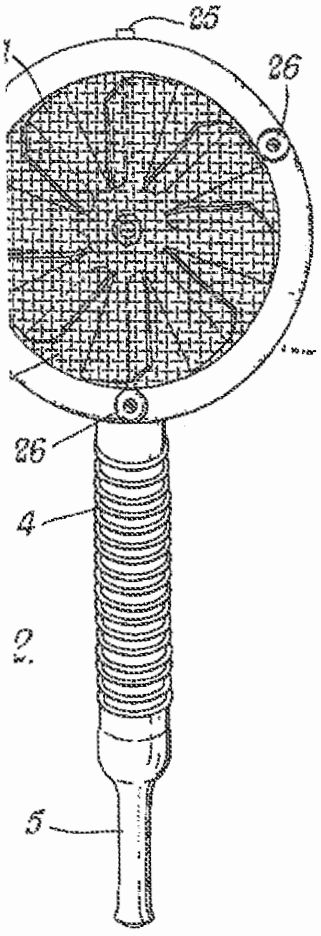



Fig 1.



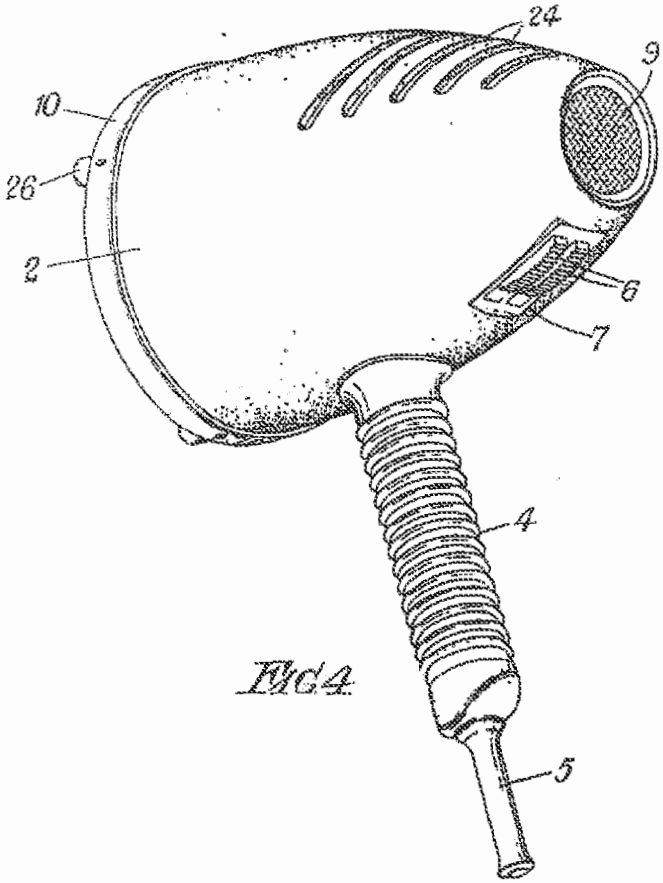




Fig 4.

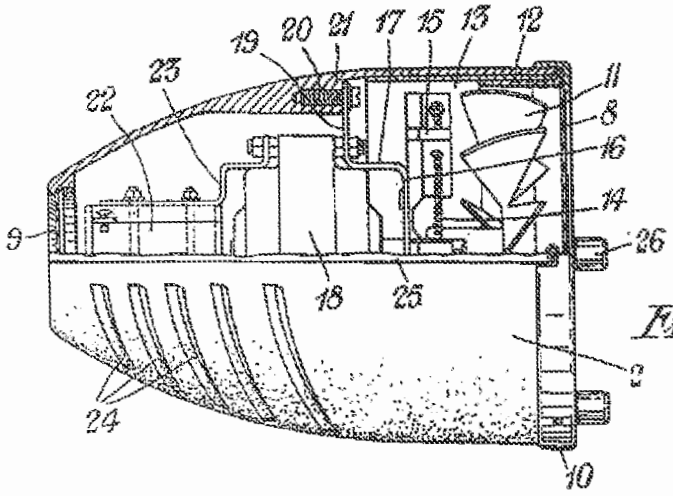



Fig 3.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 153 of 2286

SHEET 1

[This Drawing is a reproduction of the Original on a reduced scale]

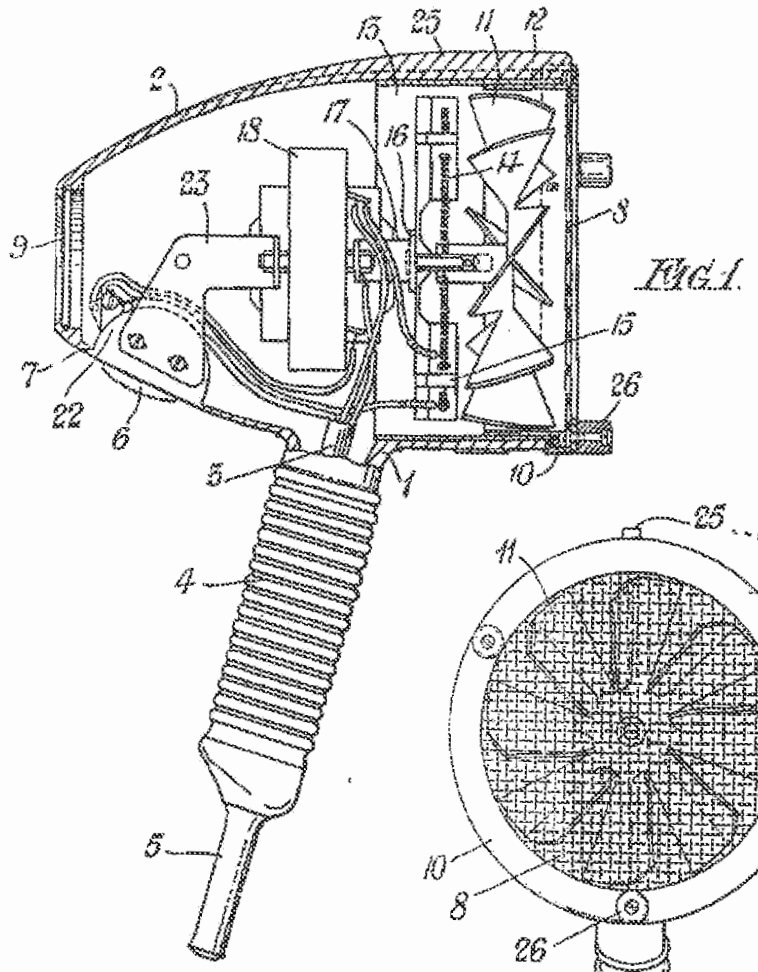



Fig. 1.

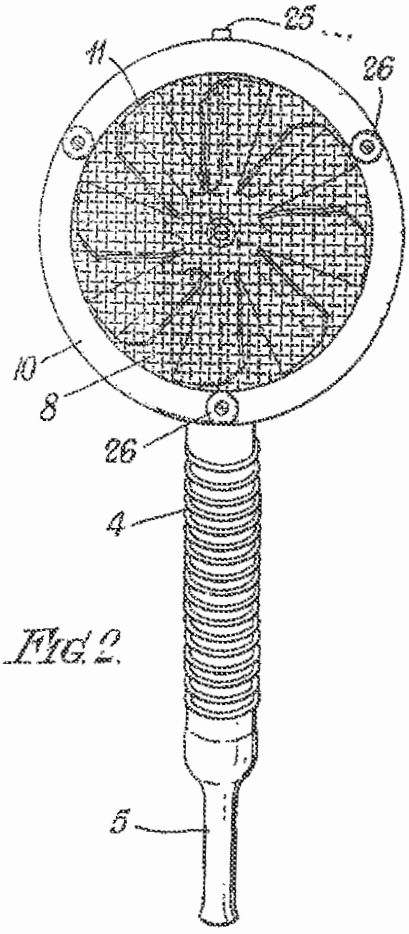
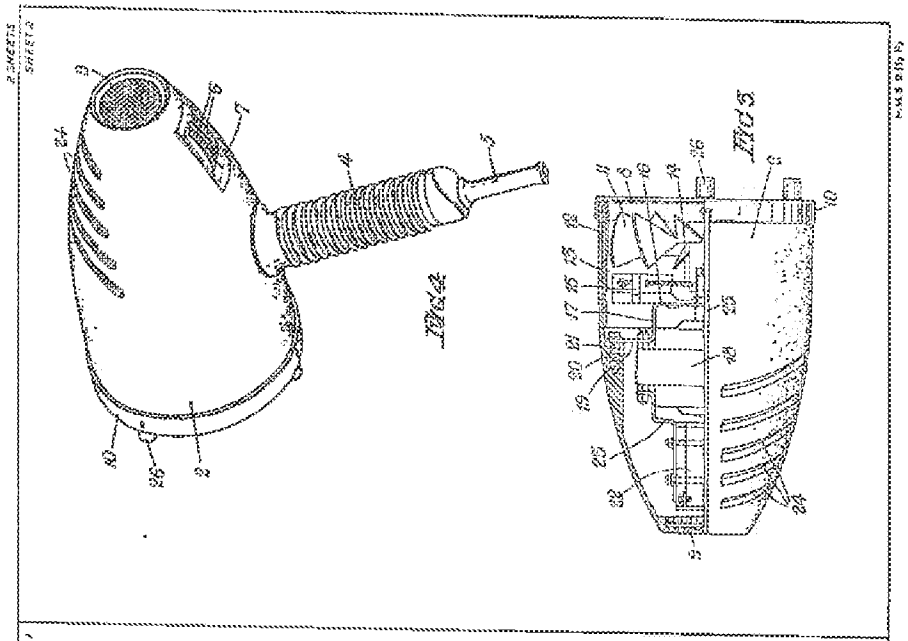
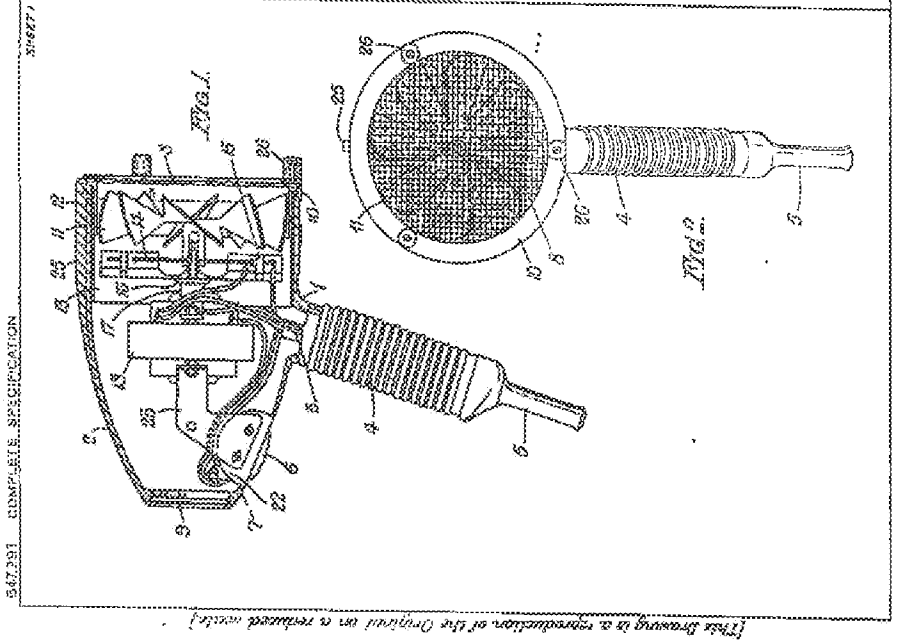



Fig. 2.




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 154 of 2286





[This Drawing is a reproduction of the Original on a reduced scale.]

# PATENT SPECIFICATION

953,057

953,057

Date of Application and filing Complete Specification: April 26, 1960. No. 14558/60

Application made in Sweden (No. 4111) on April 27, 1959.

Complete Specification Published: March 25, 1964.

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Index at Acceptance:—H2 A (2K3, 2K5, 2KX); F2 S(6E2, 6F).

International Classification:—H 02 k (F 06 f).

COMPLETE SPECIFICATION

DRAWINGS ATTACHED

## Suspension Device for a Rotary Device

We, AKTIEBOLAGET ELECTROLUX, a Swedish Company, of Birger Jarlsgatan 6B, Stockholm, Sweden, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement :—

This invention concerns a suspension device for the motor and fan assembly of apparatus in which quiet operation is of great importance, for example a vacuum cleaner or a kitchen fan. The invention concerns more particularly a suspension device for a motor-fan assembly which permits relatively large tangential movements thereof in the surrounding casing but small movements in the axial direction. This function is particularly important with kitchen fans, where the size of the fan wheel must be such that there is the smallest possible clearance between the periphery of the wheel and the surrounding evacuation channel.

According to the invention there is provided a suspension device for supporting a rotary device, for example an electric motor, in a cylindrical casing, the suspension device having one or more than one concentric, elastic ring with radial projections, wherein each ring has at least eight radially extending projections, each projection at one end being connected to the or a ring, each projection at its other end being formed with an abutment face for engaging either the rotary device or the cylindrical casing, and the radial dimension of each projection is greater than its greatest dimension in the circumferential direction to an extent such that each projection is flexed when loaded substantially tangential to the cylindrical surface of the rotary device.

[Price

The invention will now be described in more detail by way of example, with reference to the accompanying drawings, in which :—

Figure 1 is a vertical central section through a kitchen fan embodying the invention ;

Figure 2 is a section on the plane II-II of Figure 1 ;

Figure 3 is a vertical central section through part of a vacuum cleaner embodying the invention ;

Figure 4 is a section in the plane IV-IV of Figure 3 ; and

Figures 5 to 9 are fragmentary detail views of various other arrangements in accordance with the invention.

Figure 1 shows a kitchen fan of known type with a suspension device disposed between an electric motor 11 and a cylindrical casing 12 surrounding it. Casing 12 is carried by webs 13 in a drum 14 in the exhaust channel. A fan wheel 15 is surrounded by a guide ring 16. For proper operation the clearance between the fan wheel and the guide ring in both radial and axial directions must be as small as possible, and the dimensions A and B must not be greater than 2 mm. The suspension between casing 12 and motor 11 is a single rubber ring 17, with an annular internal projection 18, held in a groove 19 in the motor body. The rubber ring has two rows of radial projections 20, which engage casing 12.

Referring now to Figures 3 and 4, which show part of a vacuum cleaner, the motor-fan unit is denoted 21, the casing 22, an internal partition in the casing 23, and a dust bag 24. Between casing 22 and motor-fan unit 21 is disposed a suspension 25. This comprises two rubber rings 26 and 27 having eight projections 29. The rings

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 156 of 2286

engage casing 22 and the projections engage motor-fan unit 21.

Figure 5 shows an embodiment where ring 30 has inwardly directed projections 36 of approximately the same form as those of Figures 1 to 4, and they engage unit 21.

In Figure 6 ring 30 engages casing 22 and has centrally thinned reduced projections, as shown, whose end surfaces engage unit 21.

Figure 7 shows a different kind of projection 36, which engage casing 22 with their end surfaces: the projections may be parallel sided or have a cross section decreasing toward the end surfaces, and the end surfaces may be convex, concave or pointed.

Figure 8 is a perspective view of part of a ring 17 similar to that of Figures 1 and 2, having two rows of projections 20 and an internal annular projection 18 which engages in a groove 19 in the motor casing. Figure 9 is an enlargement of part of Figure 23.

As will be seen from the drawings, in each embodiment there are never less than eight radial projections for each ring. The greatest dimension of each projection is that in the axial direction, whilst the radial dimension of each projection is greater than its greatest dimension in the circumferential direction to an extent that it is more resilient to stresses substantially tangential to the cylindrical surface of the rotary device being suspended than to stresses axial of the rotary device.

WHAT WE CLAIM IS:—

1. Suspension device for supporting a rotary device, for example an electric motor, in a cylindrical casing, the suspension device having one or more than one concentric, elastic ring with radial projections, wherein each ring has at least radially extending projections, each projection at one end being connected to the or a ring, each projection at its other end being formed with an abutment face for engaging either the rotary device or the cylindrical casing, and the radial dimension of each projection is greater than its greatest dimension in the circumferential direction to an extent such that each projection is flexed when loaded substantially tangential to the cylindrical surface of the rotary device.

2. A device according to claim 1 wherein the projections extend radially outwardly.

3. A device according to claim 1 wherein the projections extend radially inwardly.

4. A device according to claim 1 wherein each abutment face is substantially flat.

5. A device according to claim wherein each abutment face is concave.

6. A device according to claim 1 wherein each abutment face is pointed.

7. A device according to claim 1 wherein each projection has a pair of opposed parallel sides.

8. A device according to claim 1 wherein each projection has a pair of opposed concave sides.

9. A device according to claim 2 having two parallel rows of projections.

10. Suspension devices for supporting rotary devices, substantially as herein described, with reference to the accompanying drawings.

WITHERS & SPOONER,
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148-150 Holborn,
London, E.C.1.,
Agents for the Applicants.

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Published at The Patent Office, 25 Southampton Buildings, London, W.C.2, from which copies may be obtained.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 157 of 2286

953,057 COMPLETE · SPECIFICATION
1 SHEET

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FIG.1.

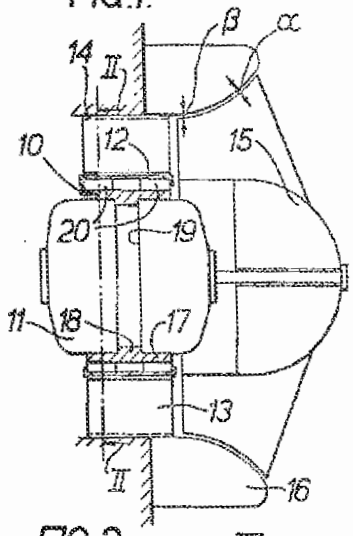



FIG.2.

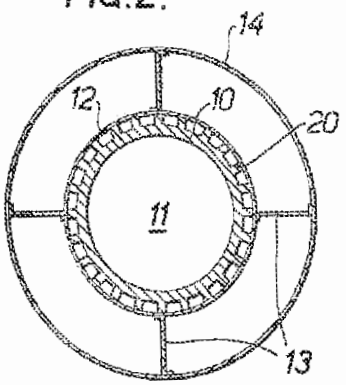



FIG.4.

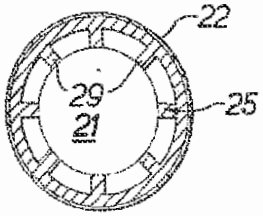



FIG.3.

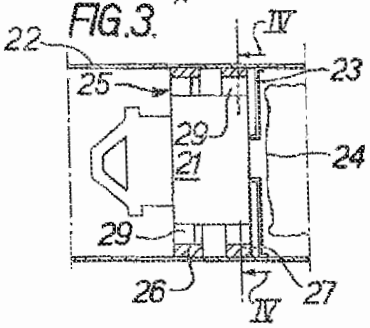



FIG.5.

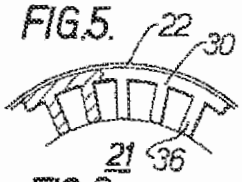



FIG.6.

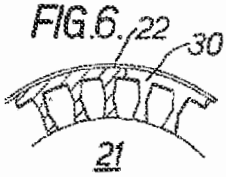



FIG.7.

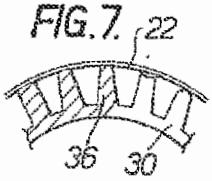



FIG.8.

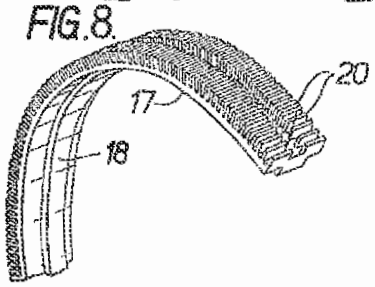
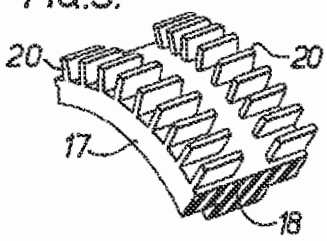



FIG.9.




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 158 of 2286

Description FR1387334

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Hairdryer separately capable of blowing hot air and cold air.

The present invention relates to a hair dryer of the type used by hairdressers: simultaneously and which can blow hot air and cold air separation res, in which the cold air tube is disposed around the hot air blower so that warm air can get out of the blower-containing core, the heating element at the front, and so the cold air around. the hot air blower, since the mutant corner-dry hair and moving from front to the rear blower this heating, the hot air alone, or hot air and cold air can be sent simultaneously from the opening at the front to effect drying.

The drawing. Annexed shows schematically, for example, an embodiment of the invention. : In this drawing Figure 1 is a side elevation in partial section of the hair dryer according to the invention; Figure 2 is a front view of the hair dryer according to Figure 1, the handle being omitted.

In these figures, 1 designates the body-APPA be operated, the fan motor 2, 3 (child heating element housed in the front part, inside the body, -1 the inner tube-hot air, 5 the outer tube cold; 6 is. a leaf spring, the stop 7 of the inner tube Lante sail, the shutter 8 of cold air, the suction tube 9. provided at the rear. APPA Reil.

The reference 10 designates a switch on the handle.

Inside the body of the apparent @ be operated, the arrows 11 indicate the direction of flowing air, 12 designates a cap and a 13. res articulating out the engine and heater in the body 1.

Unlike conventional dryers that are only hot air from the heating tube, in the present invention, the hot air exits through the inner tube 4 hot air surrounding the heating element 3. In the anterior of the body and driven by the 'cap 12 and the spring 13 to the motor 2 within the body 1, while the air entering through the suction tube 9 in the rear part of the body @ 1 is sent into the direction indicated by (11 arrows, alternatively, by pressing the button switches-tor 10 and pushing the hot air tube ar career, the projecting stop 7 provided on the outside of said inner tube-is-released of the leaf spring provided inside the outer tube 5 and cold air moved rearwardly as indicated by the dotted line, while, simultaneously, is formed between the inner tube to 4 and hot air the outer tube to the cold air 5. an opening at the back of the shutter 8, which

allows the air from the suction tube 9 located in the rear part by the body to move in the direction of arrows 11, so the hot air passing through the heating element 3, and the cold air passing between the inner tube Interior for hot air and the tube 4. cold air outside to 5. may be issued simultaneously but separately .

Moreover, by operating the community feeler exterior and pulling the inner tube hot air, that is to say up front in its position tial training, we can only deliver cold air.

Thus, the present invention allows a hair dryer can provide both hot air than cold air, along with separately but, thanks to a simple operation. A switch and a offset of the inner tube hot air 4.

It increases the effectiveness of a hair dryer by blowing warm air through the, inner tube Interior hot air, and, moreover, by sending cold air cold out of the gap formed between the tube within -1. and the outer tube 5.

Therefore, a hairdryer of the invention can improve the efficiency blement noticed a coif fure work by issuing simultaneous, but separate, hot air and cold air, without any risk or. inconveniences that characterize hairdryer conventional type which only send hot air.

RÉPUBLIQUE FRANÇAISE

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# BREVET D'INVENTION

P.V. n° 958.071 N° 1.387.334

Classification internationale A 45 *d*

## Sèche-cheveux capable de souffler séparément de l'air chaud et de l'air froid.

M. AKIHIKO TERANISHI résidant au Japon.

**Demandé le 21 décembre 1963, à 9h 15m, à Paris.**
Délivré par arrêté du 21 décembre 1964.
(*Bulletin officiel de la Propriété industrielle*, n° 5 de 1965.)
(*Demande de brevet déposée au Japon le 22 décembre 1962, sous le n° 58.401, au nom du demandeur.*)

La présente invention concerne un sèche-cheveux du type utilisé par les coiffeurs et qui peut souffler simultanément de l'air chaud et de l'air froid séparés, dans lequel le tube à air froid est disposé autour du souffleur d'air chaud de manière que l'air chaud puisse sortir du souffleur central contenant l'élément de chauffage, à l'avant, et que l'air froid sorte autour du souffleur d'air chaud, puisque, en commutant le sèche-cheveux et déplaçant de l'avant vers l'arrière ce souffleur à chauffage, l'air chaud seul, ou l'air chaud et l'air froid puissent être envoyés simultanément par l'ouverture située à l'avant pour effectuer un séchage.

Le dessin annexé représente schématiquement, à titre d'exemple, un mode de réalisation de l'invention. Dans ce dessin :

La figure 1 est une élévation latérale avec coupe partielle du sèche-cheveux selon l'invention ;

La figure 2 est une vue de face du sèche-cheveux selon la figure 1, la poignée étant omise.

Dans ces figures, 1 désigne le corps de l'appareil, 2 le moteur du ventilateur, 3 l'élément chauffant logé dans la partie avant, à l'intérieur du corps, 4 le tube intérieur à air chaud, 5 le tube extérieur à froid; 6 est un ressort à lame, 7 la butée saillante du tube intérieur, 8 l'obturateur de l'air froid, 9 le tube d'aspiration prévu à l'arrière de l'appareil. La référence 10 désigne un commutateur placé sur la poignée. A l'intérieur du corps de l'appareil, les flèches 11 indiquent le sens de circulation de l'air, 12 désigne un chapeau et 13 un ressort articulant le moteur et l'élément chauffant dans le corps 1.

Contrairement aux séchoirs classiques qui envoient de l'air chaud uniquement en provenance du tube de chauffage, dans la présente invention, l'air chaud sort par le tube intérieur à air chaud 4 qui entoure l'élément chauffant 3 dans la partie antérieure du corps et qui conduit par le chapeau 12 et le ressort 13 au moteur 2 à l'intérieur du corps 1, tandis que l'air pénétrant par le tube d'aspiration 9 dans la partie arrière du corps 1 est envoyé dans le sens indiqué par les flèches 11; alternativement, en actionnant le bouton d'interrupteur 10 et en repoussant le tube d'air chaud en arrière, la butée saillante 7 prévue sur l'extérieur dudit tube intérieur est dégagée du ressort à lame prévu à l'intérieur du tube extérieur à air froid 5 et déplacé vers l'arrière comme l'indique le tracé en pointillé, alors que, simultanément, il se forme entre le tube intérieur pour l'air chaud 4 et le tube extérieur pour l'air froid 5, une ouverture située à l'arrière de l'obturateur 8, ce qui permet à l'air provenant du tube d'aspiration 9 situé dans la partie arrière du corps de circuler dans le sens des flèches 11; ainsi, l'air chaud traversant l'élément chauffant 3, et l'air froid passant entre le tube intérieur pour air chaud 4 et le tube extérieur pour air froid 5 peuvent être délivrés simultanément mais séparément. En outre, en actionnant le commutateur et en tirant vers l'extérieur le tube intérieur à air chaud, c'est-à-dire en avant jusqu'à sa position initiale, on peut ne délivrer que de l'air froid.

Ainsi, la présente invention permet de réaliser un sèche-cheveux pouvant fournir aussi bien de l'air chaud que de l'air froid, en même temps mais séparément, et cela grâce à la simple manipulation d'un commutateur et à un décalage du tube intérieur à air chaud 4. Elle augmente l'efficacité d'un sèche-cheveux en envoyant de l'air chaud par le tube intérieur à air chaud et, de plus, en envoyant de l'air froid froid hors de l'intervalle formé entre ce tube intérieur 4 et le tube extérieur 5. Par conséquent, un sèche-cheveux selon l'invention peut remarquablement améliorer l'efficacité d'un travail de coiffure grâce à la délivrance simultanée, mais séparée, d'air chaud et d'air froid, sans aucun des risques ni des désagréments qui caractérisent les sèche-cheveux de type classique qui n'envoient que de l'air chaud.

65 2191 0 73 091 3 ◆ **Prix du fascicule : 2 francs**

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 161 of 2286

RÉSUMÉ

L'invention a pour objet un sèche-cheveux capable de débiter de l'air chaud et de l'air froid, dans lequel le tube à air froid est disposé autour de l'élément chauffant et du tube à air chaud, de telle sorte que l'on peut faire passer de l'air sur l'élément chauffant et sortir chaud par le tube intérieur dans l'axe et à l'avant de l'appareil, et que l'on peut faire sortir de l'air froid qui passe autour dudit tube intérieur, tandis que, en actionnant un commutateur et en formant une ouverture d'entrée entre ledit tube intérieur et le tube extérieur en repoussant en arrière l'obturateur d'air, grâce à des saillies formant butées prévues à la périphérie du tube intérieur et un ressort à lame prévu sur la paroi interne dudit tube extérieur, on peut délivrer, simultanément mais séparément, de l'air chaud et de l'air froid.

AKIMIKO TERANISHI

Par procuration :

Cabinet TONY-DURAND

Pour la vente des fascicules, s'adresser à l'IMPRIMERIE NATIONALE, 27, rue de la Convention, Paris (15e).

SharkNinja Ex. 1002
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IPR2023-01324
Page 162 of 2286

FIG. 1

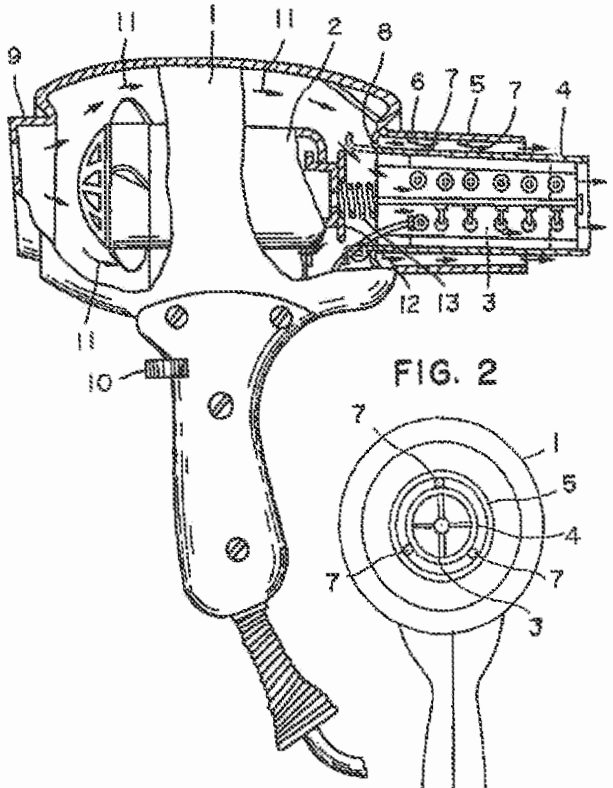
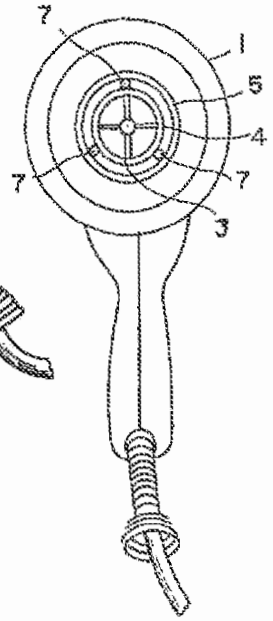



FIG. 2



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# Notice

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## DESCRIPTION FR1408096

Improvements to equipment to dry and curl the hair Disclosed -of perfected ments devices to dry and curl the hair and, in particular, .a .dispositif perfected to curl and dry hair quickly.

In recent years, have become extremely popular as electrical appliances domesti c, hairdryers - from type having an air portable gen erator forced hot and flexible large cap connected by a flexible light pipe.

For normal use of such a battery-operated appa, the user washes his hair, form multiple loops on curlers or rollers and then puts the cap on his head to dry all .cheveux same time.

While such use is quite convenient, sometimes the user wants .pas wash your hair and form a series of loops but wants to train a few loops and simply wet with water or other pro. product to fix them properly.

.de In such cases, the large soft cap covering the entire hair provides a very efficient way to dry a couple of loops and, consequently, the drying time is excessively long.

Meanwhile, the-remains of hair was not wet from just too dry.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 164 of 2286

In addition, it is always .craindre as hair, .Already blowdry, are Deran GHGs or disheveled during operations that few understand modes include putting the cap on his head and remove it.

This shows that arises the need for a device for sea .de a loop quickly and easily.

It is also desirable that this device can be used as accessory -de individual portable hair dryer well known.

Under a -de its forms, the apparatus includes a hairdryer with a hose, a curler provided with openings, and a device to connect to the curler Extremists ance .from -from pipe hairdryer.

With such an amount toga, the user wraps a strand of damp hair around the curler, -lays the curler in any suitable manner, and then plug the pipe: the hair dryer to an opening -from bi Goudi.

After few .de time loop -de hair is dry enough for us to unplug the hose from the expensive hair dryer and remove the curler the 'loop created.

It should be noted that with such use, the connection between the curler and hose hair dryer is normally done before forming each loop and removed .Then; as a result, it is understood that it is highly desirable that the coupling is simple and safe to operate.

This is especially important when the person who uses the fact appareüiage curl itself, which is commonly the case.

This person obviously has to raise both arms above his head and .de make this connection without direct vision.

Although a mirror is useful for this purpose, it is desirable that the apparatus is easy .to fri ser to


SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 165 of 2286

manaeuvrer with: or without using a mirror.

A single coupling device is particularly important when the loops on the back of the head is carried out, in which case by means of a mirror is limited and very inconvenient position.

A general object of the present invention is to provide an apparatus. improved drying and curling .cheveux,: able to quickly and conveniently form loops -of .de hair.

A further object of the invention to provide an accessory to curl hair that can be used with a portable hair dryer domestic type.

Another object .de this invention is to provide a unique curler including an improved and simplified operative part available for connecting and die easily connect said curler and a source of heated hose as a hair dryer air.

Another object of this invention is -de procu rer .dispositif a sophisticated coupling while being convenient to connect and disconnect, can not be easily detached accidentally.

Another object of the invention is to provide a device for rough .coupler a curler and a hairdryer block, which is a safe and convenient use even when the user's hands are in a difficult position.

Briefly, hair curling appliance of the invention comprises, in one form thereof, a curler substantially tubular shape, provided with an opening at one end thereof and .d'une series of holes on its side wall.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 166 of 2286

'We have also provided a device for a lock of hair -maintain on the curler, after it has been wrapped around the side wall thereof -de.

A pipe, flexible and lightweight, air supply, from a portable hair dryer constituting a forced hot air source is connected to the opening of the curler, so the air is channeled through - the curler and escapes through the holes -de its sidewall to .passer .within hair forming the loop and thus dry quickly.

A magnetic device used to associate the ele ment connection curler.

The magnetic my device provides sufficiently energetic although easy to remove when desired coupling; moreover, it makes the connection operation, then it is sufficient to move the connecting element in close proxi mity to the opening so that the hair curler is brought into position for coupling.

To better understand the technical features of the invention and its advantages are described in an exemplary embodiment illustrated in the drawings attached .ci below, with the understanding that they are in no way limited as to the mode of implementation of the invention or its applications.

1 shows a perspective view of the hair curling -the unit, in accordance with the invention in operation.

2 shows an elevational view lat eral; partially in section of the curler of Fig 1.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 167 of 2286

Figure 3 shows a cross section of the handle shown in Figure 1.

4 shows an end view in ele vation of the curler of figure 2.

The Figure 5 shows a perspective view of a clamp to maintain -servant hair on the curler, and Figure 6 shows a cross sectional view .coupe, along the axis 6 of the curler of figure 2.

In Figure 1 in particular, the curling device of the invention is shown in operation on a human head marked with the number 10.

The appa chine comprises a tubular curler 12 about what du- a strand of hair is wound to sea for a loop 14.

To facilitate winding hair onto the curler 12, there is provided a cylinder-shaped brush 16, housed inside the curler.

It can be seen in Figure 6, the brush 16 has a central axis 18 comprises two supporting twisted son and eight radial rows .de bristles 20.

Each row of bristles through one of the elongated slots 22 to facilitate the winding of hair around the hair curler.

The curler 12 can be provided with any side wall surface, provided with the desired openings, it should be noted however that the configuration described, with elongated slots, is particularly suitable for operation with the used brush 16, since the slots are designed .for receive the bristles and keep them in place.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 168 of 2286

To make it even easier implementation .Des bristle brush, a single frame can be used for the assembly to separate the bristles in rows and guide them into the slots.

The curler, as shown in Figures 2 and 6, comprises an elongate tubular body having eight ribs 24 that delimit the eight slots 22 allon cool.

The ribs 24 have radial parts 26 which extend inwardly and render the curler resistant and rigid.

As shown in FIG 2, the ribs 24 converge toward a closed end, thus giving the curler conical.

The ribs themselves also have a variable section, which increases as we approach the closed end, while .Des erage or slots 22 in the EES believes oppo direction.

Such an arrangement facilitates the manufacture of the curler, made by molding.

Returning to Figure 1, we see that the curler 12 is shown with its open end connec ted to a tubular member or handle 28 whose other end is: connected to the hose 30 with a hair dryer.

The pipe itself is equipped with a suitable device for the connec ter the power supply 32 of a hair dryer, which is a forced hot air source.

Although air can be distributed by any source provided that -to .effet, individual portable hair dryer standard type is particularly suitable for this purpose.

A .ce subject, it may be pointed out that although the curler be described here draws uti Lisé to make as many loops as you like, we consider that it will be primarily used as a curler camera



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 169 of 2286

retouching to form or reform a or two loops each use sation, and it will be sold as access curler evening current handset consists of a hair dryer and a soft cap.

Interconnection or handle 28 rec element titue a convenient device for holding the curler 12 and the pipe 30 during operation.

As shown in Figure 1, the size of the poi handlebar 28 is such that the user can easily hold it in his hand.

For example, the handle is shown in a slightly greater length 7.6 cm and an outer diameter which decreases from the curler tube, the mean diameter being in approximately 3.8 cm.

According to the invention, the downstream end or exit .de the handle 28 is designed to be asso ciated with the upstream end of the curler, surprisingly, as will be discussed later .par.

To curl, user rolls a wick of hair around the curler 12 which is separated from the handle 28.

When the loop is complete wound ment, it may be held in place by any suitable means, for example, with the flexible clamp 34 which is shown with more details on the die of Figure 5.

We must understand that we can open the clamp enough to fit on the loop, and when we do the longer, she tends to return to its original form and as a result, to maintain the loop on the curler.

While holding the curler 12 .d'une hand, the Utili sateur then causes the handle 28 to the pipe 30 connected to the open end of the curler, and connects the handle to the curler.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 170 of 2286

It is understood that the heated air from the hair dryer 32 is thus channeled to the curler and: through openings or slots 22, happening in and around the curl 14 and it dries quickly.

When the loop is sufficiently dried, detached from the bi Goudi da loop handle 28 and can then be separated -from curler when desired.

Because assembly and .démontage handle 28 and 12 are often curler rp tees, it is even now evident that appears to the table that the devices are used -de coupling of employment and convenient sure.

This is particu larly true if the user operates on its pro pres hair, because of the awkward and painful position must be adopted for the con nection.

According to the invention, there is provided an improved appa reillage coupling comprising a magnetic device to facilitate such my floors and disassembly, and -of mechanical means to prevent accidental deletion of the connection.

In Figures 2 and 4, there is shown a washer 36; made of a magnetic material such as iron or steel, connected to the upstream end 12 of the hair curler.

In the circuit shown, the washer is equipped .de four radial spikes are also pacées 38.

When the washer is placed on the curler mity Extremists open, each of the nails 38 is received in a cavity 40 formed in the end .from curler.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 171 of 2286

The curler further comprises four equally spaced internal ribs (.two of them are shown at 42) extending radially inwardly.

The ribs 42, who face 38 points, helping to keep the puck on the end of the curler.

A series of projecting parts 44 is situated at the end of the bi Goudi, two of which are adjacent each -de cavity 40 and tip 38.

The washer 36 may be held in position by deforming parts lantes sail 49 above the tips 38.

The curler is preferably molded from plastic material and in this case, the projections 44: may be distorted by heating to maintain the .de washer.

The washer can be attached to the course curler by other means appro asked if they wish to.

During the operation: from defor mation by heating, care should be taken not to deform the outer diameter of the curler and not drop the plastic material on the surface of the washer.

In addition, it is worth re mark set before the puck curler, it is preferable to insert the brush 16 into the slot inside the curler, since .more small internal diameter of the washer makes this operation more difficult when the washer is in place.

In Figure 3, one can see the second half of the magnetic coupling, a magnet shaped .rondelle 46, housed in the inner wall of the handlebar 28 poi slightly away from its downstream end.

The annular section 48 of the inner wall of the handle 28 is adapted to receive the magnet; the end wall 50 limits the axial movement .de magnet in the downstream direction.

To accurately place the magnet 46 to the interior of the handle 28 is provided with four grooves is



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 172 of 2286

also espa Cees, parallel to its axis; one of them is very apparent in 52.

The annular section com -48 carries four splines 54 parallel to the axis, cha CUNE them being adapted to fit to a counterpart laughing Internal groove 52.

During assembly, the magnet 46 may be introduced through the upstream end of the handle 28, its grooves 52 being ali nated with the splines 54 so that it can adapt to the annular section 48.

The magnet is maintained in this position by means of a series of projections 56 obtained by deforming by heating the upstream ends .Des splines 54.

From the foregoing, shall immediately be deduced that, to make the connection between the handle and the curler, it is sufficient to appro.cherl'extré- ance down the handle of the upstream end of the curler until description that the annu lar end surface of the washer 36 is magnetically attracted by the annular end surface of the magnet 46.

To minimize the risk of accidentally deleting the connection, you can use a magnet that requires considerable effort to sepa rer components.

The attractive forces acting between the magnet 46 and the washer 36 are substantially parallel to the longitudinal axis of the curler.

To help separate the handle of the curler, it was fitted in the vicinity -In conical portion 58, From A flare device 60 is eten ing outwards.

During use, i'évasë- ment is placed against the end: the handle 28, as shown in Figure 1.

To separate elements, the user can push the flare with the thumb while pulling the curler and .poignée.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 173 of 2286

As noted, the magnetic attraction between my -the washer 36 and the magnet 46 pro duct primarily axial force; as a result, such a magnetic coupling can be destroyed by a force -de tilting or tilting, that is to say a force in-a common axis in the plane 36 and therondelle magnet 46.

With the lever arm could .dont acquirable beneficial, such force could very easily be obtained by taking the hand -handle 28 while pushing or bumping against one side of the curler an object in the vicinity of the downstream end.

To avoid such losses -de coupling the upstream Extremists -from ance curler fits into the handle - l'extrémité downstream; thus ensuring mé mechanical connection.

Specifically, the upper end of the bi Goudi fits leaving the end of the game in -de handle, so that these elements .two not rub on each other when the surface of the washer 36 remains completely stuck to the face of the magnet 46 -de, but when the force -de tipping or tilting, as mentioned above; is applied, the downstream edge of the handle 28 retains -the -bigoudi inner sidewall and the outer sidewall of the handle retains the inner rim upstream .from curler.

What is more impor tant, this intervention takes place when the magnetic attrac tion between -the washer 36 and the magnet 46 is still relatively high; .par suite, complete contact between the washer 36 and 46 will be restored instantly -'aimant .DES the tilting force will cease (unless, of course, an axial force -de separation is applied).

We can see that the removal of the magnetic coupling is only possible if the force applied is substantially parallel to the lines -de magnetic attraction force but opposite.

As ii is not necessary that the two components fit together closely com, little wind tolerances be very large, thereby minimizing manufacturing costs.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 174 of 2286

The original coupling device of the invention is also very satisfactory for the user since. avoids problems pe- ble that may arise with .Des lages apparatus comprising, fixtures friction.

Another advantage is that the telescopic assembly limit the transverse sliding of the washer 36 and magnet 46, and facilitates the insertion of the end in the handle of the curler.

In .don ing conical ends ele ments, it further simplifies the operation, while allowing more tolerance margins.

As can be seen in Figure 3, the downstream end of the handle has an inner section slightly gente- diver to the outlet, the diameter having a marked discontinuity in passing from the portion 62 to the portion 64.

In order to adapt to the conical Internal laughing .parties 62 and 64, the outer surface of the end 12 of the hair curler also comprises two portions 66 and 58 and different diameters -de .dont sections converge slightly towards Extremists ance adjacent curler.

The diameters of sec tion 62, -64, 66 and 58 are such that when the washer 36 is attracted by the magnet 46, the external .paroi curler does not affect practically the inner wall of the handle.

Ii is noted that the axial length of the .Part 64 is smaller than the part 66 -de while that of the portion 62 is greater than 58 -de.

Thus, when a transverse force is applied to one of the two components, the contact surface between the compo nents is minimized.

Another advantage of having the coupling device of the invention is that it aligns the point -de view aspect, with the other elements.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 175 of 2286

Ii is desirable to use -from plastic or similar material, .to both manufacturing, bigoudi- and that of the handle because it is lightweight, easy to clean, rough, tough and good thermal insulation .

In addition, this material is trans formable, just -de fresh, finished with a molding operation occurs if the model of the component is done well.

In this case, the curler and the handle are slightly tapered and com bear no special grooves, or other oddities as they can be easily molded in a single operation.

The forms have .doivent parts of those components that play a role in neck range of the invention, this would not bother Ope ra tion -de single molding.

We can consider the block .d'alimentation hairdryer 32 as an element of these dryers equipped with the flexible, lightweight hose 30, made of reinforced plastic rings and .de relatively large diameter.

Ii will not make detailed description of a particu lar hairdryer; should, however, very well for this purpose, -the portable hairdryer well known, the household type, low pressure, with engine, fan and heating; the reason is that the air flow such hairdryer is more than enough to quickly dry a bit isolated; and that the pipe is very light -so what minimizes the risk of the user arm fatigue during the drying process.

With this combination, ii has been found that standard loop can be dried in a minute or two, this time Depen ing course -de the exact state of the loop, and moisture.

Accordingly, such as dry-che want if -largement employees, and the curler and fa loop is relatively low COST expensive items, one can realize that the curling device of the invention provides a very com medium mode and inexpensive form -of loops.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 176 of 2286

Although all curler and handle, described here, can be used to achieve so .for bou keys as desired, it is considered that it will be used most advantageously as retu che device to form or reform a or two loops every time.

We also consider that the curler and handle -may be sold as accessories a hairdryer domestic classic portable, with a hair dryer and soft cap.

While there has been shown and described an exemplary embodiment .entendu ii is that it is not desired to limit the specific forms given simply as examples and not restrictive and the cun by Thus all variants using the same means and performing the same techniques as described above would fall within the scope of his invention functions.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 177 of 2286

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## CLAIMS FR1408096

R @ Sumi; Improvements in drying apparatus and fri ser hair. relating more particularly to a hair curling device, provided with a positive connection .DIS curler to a hot air source, said improvements including the following features, taken sé rately or in combinations.

Curler one substantially tubular, bearing an opening com @ at one end thereof and a series of holes on its wall -latérale a wick -de hair being wound on said wall and then be held in place through an appropriate device.

The connecting device 2 of the hair curler is a lightweight and flexible hose, air distribution, upstream rextré- mity said pipe being connected to the source.

3 tubular handle, rigid, to be held by the user during commissioning .plis the Extremists ance upstream of said handle being connected to the downstream end of the hot air pipe, the other Extremists mittee being designed to be connected!

the -bigoudi.

4 A -dispositif many a magnetic coupling ing downstream of the handle attached to the open end of the curler ex end, said Compre ing a magnet and a washer sav attracted the magnet, their separation can not be effected through a telescopic mounting that .par forces opposed to the direc



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 178 of 2286

ment of magnetic attraction forces.

A brush 5 housed inside said curler, and in which the bristles penetrate into the slots of the sidewall to facilitate winding hair onto the curler -of.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 179 of 2286

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# DESCRIPTION FR1408096

Improvements to equipment to dry and curl the hair Disclosed-ments of perfect devices to dry and curl the hair and, in particular,. An improved device. Curling hair and dry quickly.

In recent years, have become extremely popular as electrical appliances domesticated question, the hair dryer of the type having an air gen erator portable forced hot and flexible large cap connected by a flexible and lightweight hose.

For normal use of such apparent operated screw, the user washes hair, form several loops on curlers or rollers and then puts the cap on his head to dry all the hair. Simultaneously.

Although such use is quite convenient, sometimes the user desires. Not wash your hair and form a series of loops but wants to train some buckles and simply wet with water or other pro. product to fix properly.

In. These cases, the large flexible cap covering the entire hair provides a very efficient way to dry one or two loops and, consequently, the drying time is excessively long.

Meanwhile, the rest of the hair, which was not wet from just too dry.

In addition, it is always. Feared that hair. Already set folds are distur GHG or disheveled in the little com-mode operations are to put the cap on his head and remove.

This shows that arises the need for a device. Of sea for a loop quickly and easily.

It is also desirable that this device can be used as an accessory-individual portable hairdryer well known.

Under-its forms, the apparatus includes a hair dryer with a hose, a curler provided with openings, and a device to connect to the extremity curler mittee. Pipe-hair dryer.

With such a my-toge, the user wraps a strand of wet hair around, fixed curler curler in any suitable way, then the branch pipe: the hair dryer to an opening-bi Goudi.

After few. Time-loop hair is dry enough for us to disconnect the hose from the expensive hair dryer and remove the curler 'loop made.

It should be noted that with such a use, the connection between the hose and curler hair dryer is normally done before forming each loop and then deleted;. Therefore, be understood that it is highly desirable that the device coupling is simple and secure employment.

This is especially important when the person who uses the fact appareüiage to curl itself, which is commonly the case.

This person must obviously raise both arms above. His head and make this connection without direct vision.

Although a mirror is useful for this purpose, it is desirable that the apparatus is easy to service fri manaeuvrer with:. Or without using a mirror.

A single coupling device is particularly important when the loops on the back of the head is carried out, in which case by means of a mirror is limited and very inconvenient position.

A-General object of the present invention is to provide an apparatus. improved drying and curling hair. capable of forming quickly and conveniently-locks of hair..

A further object of the invention to provide an accessory to curl hair that can be used with a portable hairdryer domestic type.

Another object. Of the present invention is to provide a single curler including an improved and simplified operative part available for connecting and die easily connect said curler and a source of heated hose as a hair dryer air.

Another object of this invention to provide a device rer. Sophisticated coupling, while being convenient to connect and disconnect, can not be easily detached by mistake.

Another object of the invention is to provide a rough device. Coupling a curler and a hairdryer block, which is a safe and convenient use even when the user's hands are in a difficult position.

Briefly, the hair curling appliance of the invention comprises, in one form thereof, a curler substantially tubular shape, having an opening at one end thereof and. Of a series of holes on its

side wall.

'We have also provided a device for maintaining a loop-hair on the curler, after it has been rolled around the side-wall thereof.

A pipe, flexible and lightweight, air supply, from a portable hair dryer constituting a forced hot air source is connected to the opening of the curler, so that the air is channeled through - curler and escapes through the holes of the side-wall to. pass. component in the hair loop and thus dry quickly.

A magnetic device used to associate the element ment connection curler.

The magnetic my device ensures a sufficiently energetic although easy to remove when desired coupling, in addition, it facilitates the connection operation then it is sufficient to bring the connecting element immediately next opening Curler for position until it is driven coupling.

To better understand the technical features of the invention and its advantages are described in an exemplary embodiment illustrated in the drawings. Attached below, it being understood that they have no limitation as to the mode of implementation of the invention or its applications.

1 shows a perspective view of the-hair curling device, in accordance with the invention in operation.

2 shows a view in lateral elevation eral, partially in section, of the curler of Fig 1.

Figure 3 shows a cross section of the handle shown in Figure 1.

4 shows an end view in ele vation of the curler of figure 2.

Figure 5. represents a perspective view of a clip for holding the hair on the curler, and Figure 6 shows a perspective. cross sectional cut along the axis 6 of the curler of figure 2.

In Figure 1 in particular, the curling device of the invention is shown in operation on a human head marked with the number 10.

The apparent Reil comprises a tubular curler 12, around-what a hair strand is wound to sea for a loop 14.

To facilitate winding hair onto the curler 12, there is provided a cylinder-shaped brush 16, housed inside the curler.

It can be seen in Figure 6, the brush 16 has a central axis 18 comprises two supporting twisted son and eight radial rows. Bristle 20.

Each row of bristles through one of the elongated slots 22 to facilitate the winding of hair around the hair curler.

The curler 12 can be provided with any side wall surface, provided with the desired openings, it should be noted however that the configuration described, with elongated slots, is particularly suitable for use with the brush 16 tion, because the slots are designed. receive the bristles and keep them in place.

To make it even easier to set up. Bristle brush, a single frame can be used for the assembly to separate the bristles in rows and guide them into the slots.

The curler, as shown in Figures 2 and 6, comprises an elongate tubular body having eight ribs 24 which define eight OLDER elongated slots 22.

The ribs 24 have radial parts 26 which extend inwardly and render rigid and resistant curler.

As shown in FIG 2, the ribs 24 converge toward a closed end, thereby giving a conical curler.

The ribs themselves also have a variable section, which increases as one approaches the closed end, or while opening. Slots 22 in the EES believes opposition direction.

Such an arrangement facilitates the manufacture of the curler, made by molding.

Returning to Figure 1, we see that the curler 12 is shown with its open end connector Tee has a tubular member or handle 28 whose other end is: connected to the hose 30 a hairdryer.

The pipe itself is equipped with a suitable device for the ter connected to the power supply 32 of a hair dryer, which is a forced hot air source.

Although air can be distributed by any source provided to this. Purpose, a portable hair dryer standard type is particularly suitable for this purpose.

A. This subject, it may be noted that, although the curler be described here draws uti Lisé to achieve many loops as desired, considering it is mainly used as curler camera retouching to form or reform a or two loops each use sation, and it will be sold as an accessory curler evening current handset consists of a hairdryer and a soft cap.

Interconnection or handle element 28 con titue a convenient device for holding the curler 12 and

the pipe 30 during operation.

As shown in Figure 1, the size of the poi nated 28 is such that the user can easily hold it in his hand.

For example, the handle is shown in a slightly greater length 7.6 cm and an outer diameter which decreases from the curler tube, the mean diameter being in approximately 3.8 cm.

According to the invention, the downstream end or outlet. Of the handle 28 is designed to be asso ciated with the upstream end of the curler, an original manner, as will be explained. Thereafter.

To curl, user wraps a strand of hair around the curler 12 is separated from the handle 28.

When the loop is complete wound ment, it may be held in place by any suitable means, for example, with the flexible clamp 34 which is shown with more details on the die 5.

We must understand that we can open the clamp enough to fit on the loop, and when you do the longer, she tends to return to its original shape and, consequently, to maintain the loop on the curler.

While holding. Hand a curler 12, the use sateur then causes the handle 28 to the pipe 30 connected to the open end of the curler, and connects the handle to the curler.

It is understood that the heated air from the hair dryer 32 is thus channeled to the curler and: through openings or slots 22, happening in and around the curl 14 and it dries quickly.

When the loop is sufficiently dried, detached from the handle 28 the bi Goudi da loop and can be then separated from the curler, when desired.

That the assembly and disassembly of the handle 28 and the curler 12. Ties are often repeated, it is, now, it is obvious that the desired table-coupling devices used are a convenient and employment course.

This is particu larly true when the user operates on its pro pres hair, because of the awkward and painful position that should be adopted for the con nection.

According to the invention, there is provided an improved apparent reillage comprising a magnetic coupling device in order to facilitate such advantages my and disassembly, and mechanical means for preventing accidental removal of the connection.

In Figures 2 and 4, there is shown a washer 36, made of a magnetic material such as iron or steel,

connected to the upstream end of the curler 12.

In the assembly shown, the washer is equipped. Four radial spikes are also pacées 38.

When the washer is placed over the open extremity of the moth-eaten curler, each of the tips 38 is received in a cavity 40 formed in the end. Curler.

The curler further comprises four equally spaced internal ribs (. Two of them are shown at 42), extending radially inwardly.

The ribs 42 facing the spikes 38, helping to keep the puck on the end of the curler.

A series of projecting parts 44 is situated at the end of the bi Goudi, two of which are adjacent to each cavity 40, and tip 38.

The washer 36 may be held in position by deforming the portions 49 lantes sail. over 38 peaks.

The curler is preferably molded from plastic material and, in this case, the protrusions 44 can be deformed by heating to maintain the washer..

The washer can be attached to the course curler by other appropriate means asked if we wish to.

During operation: formation of deformed by heating, care should be taken not to deform the outer diameter of the curler and not drop the plastic material on the surface of the washer.

In addition, it is worth re mark set before the puck curler, it is preferable to introduce the brush 16 into the slot inside the curler, since the inner diameter. Smaller washer makes this operation more difficult when the washer is in place.

In Figure 3, one can see the second half of the magnetic coupling, a magnet shaped. Washer 46 housed in the inner wall of the poi nated 28 slightly away from its downstream end.

The annular section 48 of the inner wall of the handle 28 is adapted to receive the magnet, the end wall 50 limits the axial movement of the magnet in the downstream direction..

To accurately place the magnet 46 to the interior of the handle 28 is provided with four grooves is also Spanish Cees, parallel to its axis, one of which appears markedly at 52.

The annular section com -48 carries four grooves 54, parallel to the axis, each of them being CUNE designed to adapt to the integral laughing homologous groove 52.

During assembly, the magnet 46 may be introduced through the upstream end of the handle 28, its grooves being ali gnées 52 with the splines 54 so that it can adapt to the annular section 48.

The magnet is maintained in this position by means of a series of projections 56 obtained by deforming the ends upstream heating. Splines 54.

From the foregoing, immediately immediately downstream of the handle of the upstream end of the curler is deduced that, to make the connection between the handle and the curler, it is sufficient to supply. Cherl'extré-mittee until description that the annu lar end surface of the washer 36 is magnetically attracted by the annular end surface of the magnet 46.

To minimize the risk of accidentally deleting the connection, you can use a magnet which requires a considerable effort to separate the components rer.

The attraction forces acting between the magnet 46 and the washer 36 are substantially parallel to the longitudinal axis of the curler.

To help separate the handle of the curler, it has been provided, in the vicinity of-the conical part 58. Of a flaring device 60 is extended outwardly ing.

During use, i'évasë-ment is placed against the end: the handle 28, as shown in Figure 1.

To separate elements, the user can push the flare with the thumb while pulling the curler and handle..

As noted, the magnetic attraction between my-washer 36 and the magnet 46 pro duct mainly an axial force, as a result, such a magnetic coupling could be destroyed by a force-failover or inclination, that is to say a force along an axis, located in the common plane in the washer 36 @ and the magnet 46.

Thanks to the lever arm. Whose could bene acquirable, such force could very easily be obtained by taking the hand-grip 28 while pushing or bumping against one side of the curler an object in the vicinity of the downstream end.

To avoid such losses, the coupling, the upstream extremity mittee-of-curler fits into the downstream end of the handle, thus providing a mechanical connection EM.

Specifically, the upper end of the bi Goudi fits leaving the game in the end-of the grip, so that these. Two elements do not rub on each other when the surface of the washer 36 remains completely stuck to the face on the magnet 46, when the force-but not tip or tilt, above; applied, the downstream edge of the handle 28 holds the inner side-wall -curler and the outer side wall of

the handle holds internal upstream edge. curler.

What is most important as this intervention while the magnetic attrac-tion between the washer 36 and the magnet 46 is still relatively high place, as a result, the complete contact between the washer 36 and - magnet 46 will be. restored instantly. soon as the tilting force ceases (unless, of course, an axial force-separation is applied).

It can therefore be seen that the elimination of the magnetic coupling is only possible if the force applied is substantially-parallel to the lines of force of magnetic attraction, but in opposite directions.

As ii is not necessary that the two components fit together closely com, tolerances can be very little larger, thereby minimizing manufacturing costs.

The original coupling device of the invention is also very satisfying to the user since. avoid pe-able problems that may arise with. lages of apparatus comprising, fixtures friction.

Another advantage is that the telescopic assembly limit the transverse sliding of the washer 36 and magnet 46, and facilitates the insertion of the end in the handle of the curler.

In. Ing gift conical ends ele ments, it further simplifies this operation, while allowing more tolerance margins.

As can be seen in Figure 3, the downstream end of the handle has an internal section slightly diver-gent to the exit diameter with a marked discontinuity when going from Part 62 to Part 64.

In order to adapt to the integral of laughing. Tapered portions 62 and 64, the outer surface of the end of the hair roller 12 also comprises two portions 66 and 58 of different diameters, and. Whose sections converge slightly towards the extremity mittee adjacent curler.

Diameters sec tions 62, -64, 66 and 58 are such that when the washer 36 is attracted by the magnet 46, the outer wall of the curler. Almost does not touch the inner wall of the handle.

Ii is noted that the axial length of the portion 64. Is less than that of the portion 66, while that of the portion 62 is greater than that of 58.

Thus when a transverse force is applied to one of the two components, the contact surface between the components nents is minimized.

Another advantage of having the coupling device of the invention is that it is compatible, from a side-view, with the other elements.

Ii is desirable to use, plastic, or similar material. Both for manufacturing, curler and for the effect of the handle because it is lightweight, easy to clean, rough, tough and good thermal insulation .

In addition, this material is trans formable, just-fresh, finite by a molding operation occurs if the component model is well done.

In this case, the curler and the handle are slightly conical and are not com or special grooves or other singularities as they can be easily molded in a single operation.

The forms. Should have parts of these components play a role in neck range of the invention, not to impede this operation rational unique molding.

We can consider the block. Supply hairdryer 32 as a component of these dryers equipped with the flexible, lightweight hose 30, is enhanced by plastic rings and. Relatively large diameter.

Ii will not make a particular type of detailed binding hairdryer description; should, however, very well for this purpose, the portable hair dryer well known, the household type, low pressure, with engine, fan and heating, and the reason is that the air flow as a hair dryer is widely enough to quickly dry a bit isolated, and that the pipe is very light, so what minimizes the risk view of the arm of the user getting tired during the drying operation.

With this combination, ii proved a standard loop can be dried in a minute or two, this time depending of course the exact state of the loop, and moisture.

Accordingly, such che dryer want being so widely used, and the curler and fa loop being relatively costly expensive items, we can realize that curling device of the invention provides a very com medium mode and cheap, form-loops.

Although all curler and handle, described here, can be used. Bou to achieve so cles as desired, considering it will be used most advantageously as retu che apparatus for forming or reforming, a or two loops each use.

It also considers that the curler and the grip can be sold as accessories hairdryer domestic classic portable, with a hair dryer and soft cap.

While there has been shown and described an exemplary embodiment is ii. Understood that it is not desired to limit the specific forms merely given as examples and without any restrictive character the cun and by Thus all variants using the same means and performing the same procedures as those described above would fall within the scope of his invention functions.

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## CLAIMS FR1408096

R @ Sumi; Improvements to drying apparatus and fri ser hair. relating more particularly to a device for hair curling, with a positive saying. connecting a curler to a source of hot air, said improvements including in particular the following characteristics, taken se rately or in combinations.

Curler one substantially tubular com @ bearing opening at one end thereof and a series of orifices on its side-wall, a wick-hair can be wound on said wall and then be held in place through an appropriate device.

2 The connection device of the curler is a flexible and lightweight hose, air distribution, upstream of said pipe being connected to the source rextré-mittee.

Tubular handle 3, rigid, to be held by the user during installation. Folds, the upstream extremity of said handle being connected to the downstream end of the hot air pipe, the other extremity mittee mittee being adapted to be connected!

to-curler.

A 4-magnetic coupling device mainte ing downstream of the handle attached to the open end of the curler ex end, said device comprising ing a magnet and a washer sav attracted the magnet, their separation can not be effected through a telescopic mounting that. ment direction by forces opposed to the magnetic attraction forces.

A brush 5 housed inside said curler, and in which the bristles penetrate into the slots of the sidewall to facilitate winding the hair-curler.

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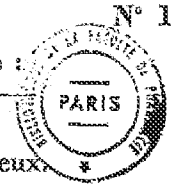
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# BREVET D'INVENTION

P.V. n° 988.522 N° 1.408.096

Classification internationale : A 45 *d*




## Perfectionnements aux appareils à sécher et à friser les cheveux

COMPAGNIE FRANÇAISE THOMSON-HOUSTON résidant en France (Seine).

Demandé le 18 septembre 1964, à 13h 23m, à Paris.

Délivré par arrêté du 28 juin 1965.

(*Bulletin officiel de la Propriété industrielle*, n° 32 de 1965.)

(*2 demandes de brevets déposées aux États-Unis d'Amérique le 19 septembre 1963 : la 1re, sous le n° 310.034, au nom de* M. Edgar, Alfred PHANEUF; *la 2e, sous le n° 310.035, aux noms de* MM. Carl, Albert EDMAN *et* Peter KRANZ.)

La présente invention concerne des perfectionnements aux appareils à sécher et friser les cheveux et, plus particulièrement, un dispositif perfectionné pour friser et sécher rapidement les cheveux.

Ces dernières années, sont devenus extrêmement populaires comme appareils électriques domestiques, les sèche-cheveux du type comportant un générateur portatif d'air chaud forcé et un grand bonnet souple connecté par un tuyau souple et léger. Pour une utilisation normale d'un tel appareil électrique, l'utilisateur se lave les cheveux, forme plusieurs boucles sur des bigoudis ou des rouleaux et se place ensuite le bonnet sur la tête pour sécher tous les cheveux en même temps. Bien qu'une telle utilisation soit tout à fait commode, il arrive parfois que l'utilisateur ne désire pas se laver les cheveux et former une série de boucles mais souhaite plutôt former quelques boucles et les mouille simplement avec de l'eau ou autre produit pour les fixer convenablement. Dans de tels cas, le grand bonnet souple recouvrant la totalité des cheveux offre une méthode peu efficace pour sécher une ou deux boucles et, par suite, la durée de séchage est excessivement longue. Entre temps, le reste des cheveux qui n'a pas été mouillé devient trop sec. De plus, il est toujours à craindre que les cheveux, déjà mis en plis, ne soient dérangés ou ébouriffés au cours des opérations peu commodes qui consistent à mettre le bonnet sur la tête et à l'en retirer. On voit donc que se fait sentir le besoin d'un dispositif permettant de former une boucle rapidement et facilement. Il est, de plus, souhaitable que ce dispositif puisse être utilisé comme accessoire de sèche-cheveux portatifs individuels bien connus. Sous une de ses formes, l'appareil comprend un sèche-cheveux comportant un tuyau souple, un bigoudi muni d'ouvertures, et un dispositif pour connecter le bigoudi à l'extrémité du tuyau du sèche-cheveux. Avec un tel montage, l'utilisateur enroule une mèche de cheveux humide autour du bigoudi, fixe le bigoudi d'une façon appropriée quelconque, et branche ensuite le tuyau du sèche-cheveux à une ouverture du bigoudi. Après peu de temps, la boucle de cheveux est suffisamment sèche pour qu'on puisse débrancher le tuyau du sèche-cheveux et retirer le bigoudi de la boucle réalisée.

Il faut remarquer qu'avec une telle utilisation, la connexion entre le bigoudi et le tuyau du sèche-cheveux est normalement faite avant de former chaque boucle et supprimée ensuite; par suite, on comprendra qu'il est hautement souhaitable que le dispositif de couplage soit simple et d'un emploi sûr. Ceci est particulièrement important quand la personne qui utilise l'appareillage le fait pour se friser elle-même, ce qui est couramment le cas. Cette personne doit évidemment lever les deux bras au-dessus de sa tête et réaliser cette connexion sans vision directe. Bien qu'un miroir soit utile à cet effet, il est souhaitable que l'appareil à friser soit facile à manœuvrer avec ou sans l'aide d'un miroir. Un dispositif de couplage simple est particulièrement important quand on réalise des boucles à l'arrière de la tête, en quel cas l'aide d'un miroir est limité et la position très incommode.

Un objet général de la présente invention est de procurer un appareil perfectionné à sécher et friser les cheveux, capable de former rapidement et commodément des boucles de cheveux.

Un objet supplémentaire de l'invention est de procurer un accessoire pour friser les cheveux qui puisse être utilisé avec un sèche-cheveux portatif de type domestique.

Un autre objet de la présente invention est de procurer un bigoudi unique comprenant un dispositif perfectionné et simplifié pour connecter et déconnecter facilement ledit bigoudi et une source d'air chauffé telle que le tuyau d'un sèche-cheveux.

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 190 of 2286

Un autre objet de cette invention est de procurer un dispositif de couplage perfectionné qui, tout en étant commode à connecter et déconnecter, ne puisse pas être détaché facilement par mégarde.

Un autre objet de l'invention est de procurer un dispositif rugueux pour coupler un bigoudi et un bloc sèche-cheveux, qui soit d'un emploi sûr et commode même quand les mains de l'utilisateur sont dans une position pénible.

Brièvement, l'appareil à friser les cheveux de l'invention comporte, sous l'une de ses formes, un bigoudi de forme sensiblement tubulaire, muni d'une ouverture à l'une de ses extrémités et d'une série d'orifices sur sa paroi latérale. On a aussi prévu un dispositif pour maintenir une boucle de cheveux sur le bigoudi, après qu'elle ait été enroulée autour de la paroi latérale de celui-ci. Un tuyau, souple et léger, d'alimentation en air, issu d'un sèche-cheveux portatif constituant une source d'air chaud forcé, est connecté à l'ouverture du bigoudi, de sorte que l'air est canalisé à travers le bigoudi et s'échappe par les orifices de sa paroi latérale, pour passer dans les cheveux constituant la boucle et la sécher ainsi rapidement.

Un dispositif magnétique sert à associer l'élément de connexion au bigoudi. Le dispositif magnétique assure un couplage suffisamment énergique bien que facile à supprimer quand on le désire; de plus, il facilite l'opération de connexion puisqu'il suffit d'amener l'élément de connexion à proximité immédiate de l'ouverture du bigoudi pour qu'il soit entraîné jusqu'en position de couplage.

Pour mieux faire comprendre les caractéristiques techniques de l'invention et ses avantages, on en décrit un exemple de réalisation, illustré par les dessins ci-dessous annexés, étant bien entendu que ceux-ci n'ont aucun caractère limitatif quant au mode de mise en œuvre de l'invention ou à ses applications.

La figure 1 représente une vue en perspective de l'appareil à friser les cheveux, conforme à l'invention en fonctionnement.

La figure 2 représente une vue en élévation latérale; partiellement en coupe, du bigoudi de la figure 1.

La figure 3 représente une coupe transversale de la poignée représentée sur la figure 1.

La figure 4 représente une vue terminale en élévation du bigoudi de la figure 2.

La figure 5 représente une vue en perspective d'une pince servant à maintenir les cheveux sur le bigoudi, et

La figure 6 représente une vue en coupe transversale, selon l'axe 6, du bigoudi de la figure 2.

Sur la figure 1 en particulier, l'appareil à friser de l'invention est représenté en fonctionnement sur une tête humaine repérée par le nombre 10. L'appareil comprend un bigoudi tubulaire 12, autour duquel une mèche de cheveux est enroulée pour former une boucle 14. Pour faciliter l'enroulement des cheveux sur le bigoudi 12, on a prévu une brosse en forme de cylindre 16, logée à l'intérieur du bigoudi.

On peut voir, sur la figure 6, que la brosse 16 comporte un axe central 18 constitué par deux fils torsadés et supportant huit rangées radiales de soies 20. Chaque rangée de soies traverse une des fentes allongées 22, afin de faciliter l'enroulement des cheveux autour du bigoudi. Le bigoudi 12 peut être pourvu de toute surface de paroi latérale, munie des ouvertures désirées, il faut cependant remarquer que la configuration décrite, avec fentes allongées, est particulièrement adaptée à l'utilisation avec la brosse 16, du fait que les fentes sont conçues pour recevoir les soies et les maintenir en place. Pour rendre encore plus facile la mise en place des soies de la brosse, une monture simple peut être utilisée à l'assemblage pour séparer les soies en rangées et les guider dans les fentes.

Le bigoudi, comme le montrent les figures 2 et 6, comprend un corps tubulaire allongé comportant huit nervures 24 qui délimitent les huit fentes allongées 22. Les nervures 24 comportent des régions radiales 26 qui s'étendent vers l'intérieur et rendent le bigoudi résistant et rigide. Comme le montre la figure 2, les nervures 24 convergent vers une extrémité fermée, donnant ainsi au bigoudi une forme conique. Les nervures elles-mêmes ont aussi une section variable, qui augmente à mesure qu'on approche de l'extrémité fermée, tandis que l'ouverture des fentes 22 croît dans la direction opposée. Une telle disposition facilite la fabrication du bigoudi, effectuée par moulage.

En revenant à la figure 1, on voit que le bigoudi 12 est représenté avec son extrémité ouverte connectée à un élément tubulaire ou poignée 28 dont l'autre extrémité est connectée au tuyau souple 30 d'un sèche-cheveux. Le tuyau est lui-même muni d'un dispositif convenable permettant de le connecter au bloc d'alimentation 32 d'un sèche-cheveux, qui constitue une source d'air chaud forcé. Bien que l'air puisse être distribué par n'importe quelle source prévue à cet effet, un sèche-cheveux portatif individuel de type courant convient particulièrement à cet usage. A ce sujet, on peut faire remarquer que, bien que le bigoudi décrit ici puisse être utilisé pour réaliser autant de boucles qu'on le désire, on considère que ce bigoudi sera principalement utilisé comme appareil de retouche, pour former ou reformer une ou deux boucles à chaque utilisation, et que ce bigoudi sera vendu comme accessoire du combiné courant constitué par un sèche-cheveux et un bonnet souple.

L'élément d'interconnexion ou poignée 28 constitue un dispositif commode pour tenir le bigoudi 12 et le tuyau 30 pendant le fonctionnement.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 191 of 2286

Comme le montre la figure 1, la taille de la poignée 28 est telle que l'utilisateur puisse facilement la tenir dans sa main. Par exemple, la poignée représentée a une longueur légèrement supérieure à 7,6 cm et un diamètre externe qui décroît du tuyau au bigoudi, le diamètre moyen étant d'environ 3,8 cm.

Conformément à l'invention, l'extrémité aval ou sortie de la poignée 28 est conçue pour être associée à l'extrémité amont du bigoudi, de manière originale, comme il sera exposé par la suite.

Pour se friser, l'utilisateur enroule une mèche de cheveux autour du bigoudi 12 qui est séparé de la poignée 28. Quand la boucle est complètement enroulée, elle peut être maintenue en place par tout moyen approprié, par exemple, avec la pince souple 34 qui est montrée avec plus de détails sur la figure 5. On doit comprendre qu'on peut ouvrir suffisamment la pince pour l'adapter sur la boucle et que, quand on ne la tient plus, elle tend à reprendre sa forme primitive et, par suite, à maintenir la boucle sur le bigoudi.

Tout en tenant d'une main le bigoudi 12, l'utilisateur amène alors la poignée 28 connectée au tuyau 30 jusqu'à l'extrémité ouverte du bigoudi, et connecte la poignée au bigoudi. On comprend que l'air chauffé issu du sèche-cheveux 32 est ainsi canalisé jusqu'au bigoudi et, par les ouvertures ou fentes 22, passe dans et autour de la boucle de cheveux 14 qu'il sèche ainsi rapidement. Quand la boucle est suffisamment sèche, on détache du bigoudi la poignée 28 et la boucle peut être ensuite séparée du bigoudi quand on le désire.

Du fait que le montage et le démontage de la poignée 28 et du bigoudi 12 sont souvent répétés, il est, dès maintenant, évident qu'il est souhaitable que les dispositifs de couplage utilisés soient d'un emploi commode et sûr. Cela est particulièrement vrai quand l'utilisateur opère sur ses propres cheveux, en raison de la position incommode et pénible qu'il faut adopter pour faire la connexion.

Conformément à l'invention, il est fourni un appareillage perfectionné de couplage comprenant un dispositif magnétique, afin de faciliter de tels montages et démontages, et des moyens mécaniques destinés à empêcher toute suppression accidentelle de la connexion.

Sur les figures 2 et 4, on peut voir une rondelle 36, faite d'un matériau magnétique tel que du fer ou de l'acier, connectée à l'extrémité amont du bigoudi 12. Dans le montage indiqué, la rondelle est munie de quatre pointes radiales également espacées 38. Quand la rondelle est placée sur l'extrémité ouverte du bigoudi, chacune des pointes 38 vient se loger dans une cavité 40 pratiquée dans l'extrémité du bigoudi. Le bigoudi comporte en plus quatre nervures internes également espacées (deux d'entre elles sont représentées en 42), s'étendant radialement vers l'intérieur. Les nervures 42, qui font face aux pointes 38, aident à maintenir la rondelle sur l'extrémité du bigoudi. Une série de pièces en saillie 44 est située à l'extrémité du bigoudi, deux d'entre elles étant voisines de chaque cavité 40 et pointe 38. La rondelle 36 peut être maintenue en position en déformant les parties saillantes 44 au-dessus des pointes 38. Le bigoudi est de préférence moulé dans un matériau plastique et, dans ce cas, les parties saillantes 44 peuvent être déformées par chauffage, afin de maintenir la rondelle en place. La rondelle peut évidemment être fixée au bigoudi par d'autres moyens appropriés si on le désire. Pendant l'opération de déformation par chauffage, il faudra prendre garde à ne pas déformer le diamètre externe du bigoudi et à ne pas déposer du matériau plastique sur la surface de la rondelle. De plus, il est bon de remarquer qu'avant de fixer la rondelle au bigoudi, il est préférable d'introduire la brosse 16 dans son logement à l'intérieur du bigoudi, puisque le diamètre interne plus petit de la rondelle rend cette opération plus difficile quand la rondelle est en place.

Sur la figure 3, on peut voir la seconde moitié du coupleur magnétique, un aimant en forme de rondelle 46, logé dans la paroi interne de la poignée 28 légèrement à l'écart de son extrémité aval. La section annulaire 48 de la paroi interne de la poignée 28 est conçue pour recevoir l'aimant; la paroi terminale 50 limite le déplacement axial de l'aimant dans la direction aval. Pour placer avec précision l'aimant 46 à l'intérieur de la poignée 28 on l'a muni de quatre gorges également espacées, parallèles à son axe; l'une d'elles apparaît très nettement en 52. La section annulaire 48 comporte quatre cannelures 54, parallèles à l'axe, chacune d'elles étant conçue pour s'adapter à l'intérieur d'une gorge homologue 52. A l'assemblage, l'aimant 46 peut être introduit par l'extrémité amont de la poignée 28, ses gorges 52 étant alignées avec les cannelures 54 afin qu'on puisse l'adapter à la section annulaire 48. L'aimant est maintenu en cette position au moyen d'une série de saillies 56 obtenues en déformant par chauffage les extrémités amont des cannelures 54.

De la description qui précède, on déduit immédiatement que, pour effectuer la connexion entre la poignée et le bigoudi, il suffit d'approcher l'extrémité aval de la poignée de l'extrémité amont du bigoudi, jusqu'à ce que la surface extrême annulaire de la rondelle 36 soit attirée magnétiquement par la surface extrême annulaire de l'aimant 46. Pour réduire au minimum le risque de suppression accidentelle de la connexion, on peut utiliser un aimant qui exige un effort considérable pour séparer les composants. Les forces d'attraction qui

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 192 of 2286

s'exercent entre l'aimant 46 et la rondelle 36 sont essentiellement parallèles à l'axe longitudinal du bigoudi. Pour aider à séparer la poignée du bigoudi, ce dernier a été muni, au voisinage de la partie conique 58, d'un évasement périphérique 60 s'étendant vers l'extérieur. Pendant l'utilisation, l'évasement est placé contre l'extrémité de la poignée 28, comme indiqué sur la figure 1. Pour séparer les éléments, l'utilisateur peut pousser l'évasement avec le pouce tout en tirant sur le bigoudi et la poignée.

Comme on l'a fait remarquer, l'attraction magnétique entre la rondelle 36 et l'aimant 46 produit principalement une force axiale; par suite, un tel couplage magnétique pourrait être détruit par une force de basculement ou d'inclinaison, c'est-à-dire une force selon un axe situé dans le plan commun à la rondelle 36 et à l'aimant 46. Grâce au bras de levier dont elle pourrait bénéficier, une telle force pourrait très facilement être obtenue en tenant en main la poignée 28 tout en poussant ou cognant un côté du bigoudi contre un objet, au voisinage de l'extrémité aval. Pour éviter de telles suppressions du couplage, l'extrémité amont du bigoudi s'emboîte dans l'extrémité aval de la poignée, assurant ainsi une liaison mécanique.

Plus précisément, l'extrémité supérieure du bigoudi s'ajuste en laissant du jeu dans l'extrémité de la poignée, de façon que ces deux éléments ne frottent pas l'un sur l'autre quand la surface de la rondelle 36 reste entièrement collée sur la surface de l'aimant 46, mais quand la force de basculement ou d'inclinaison, mentionnée ci-dessus, est appliquée, le rebord aval de la poignée 28 retient la paroi latérale interne du bigoudi et la paroi latérale externe de la poignée retient le rebord interne amont du bigoudi. Ce qui est plus important, cette intervention a lieu alors que l'attraction magnétique entre la rondelle 36 et l'aimant 46 est encore relativement grande; par suite, le contact complet entre la rondelle 36 et l'aimant 46 sera rétabli instantanément dès que la force de basculement aura cessé (à moins, bien entendu, qu'une force axiale de séparation ne soit appliquée). On peut donc voir que la suppression du couplage magnétique n'est possible que si l'effort appliqué est sensiblement parallèle aux lignes de force d'attraction magnétique mais de sens contraire.

Comme il n'est pas nécessaire que les deux composants s'emboîtent étroitement, les tolérances peuvent être très larges, réduisant ainsi au minimum les coûts de fabrication. Le dispositif original de couplage de l'invention est aussi très satisfaisant pour l'utilisateur puisqu'il évite les problèmes pénibles qui pourraient se poser avec des appareillages comprenant des montages à friction.

Un autre avantage du montage télescopique est qu'il limite le glissement transversal de la rondelle 36 et de l'aimant 46, et qu'il facilite l'insertion de l'extrémité du bigoudi dans la poignée. En donnant une forme conique aux extrémités des éléments, on simplifie encore cette opération, tout en autorisant des tolérances plus larges. Comme on peut le voir sur la figure 3, l'extrémité aval de la poignée a une section interne légèrement divergente vers la sortie, le diamètre présentant une discontinuité marquée quand on passe de la partie 62 à la partie 64. Pour pouvoir s'adapter à l'intérieur des parties coniques 62 et 64, la surface externe de l'extrémité du bigoudi 12 comporte aussi deux parties 66 et 58 de diamètres différents et dont les sections convergent légèrement vers l'extrémité adjacente du bigoudi. Les diamètres des sections 62, 64, 66 et 58 sont tels que, quand la rondelle 36 est attirée par l'aimant 46, la paroi externe du bigoudi ne touche pratiquement pas la paroi interne de la poignée. Il faut remarquer que la longueur axiale de la partie 64 est inférieure à celle de la partie 66 tandis que celle de la partie 62 est supérieure à celle de 58. Ainsi quand une force transversale est appliquée à l'un des deux composants, la surface de contact entre les composants est réduite au minimum.

Un autre avantage que présente le dispositif de couplage de l'invention est qu'il s'harmonise, du point de vue aspect, avec les autres éléments. Il est en effet souhaitable d'utiliser du plastique, ou un matériau similaire, à la fois pour la fabrication du bigoudi et pour celle de la poignée, car il est léger, facilement lavable, rugueux, résistant et bon isolant thermique. De plus, ce matériau est transformable, à peu de frais, en produit fini par une opération de moulage si le modèle du composant est bien fait. Dans le cas présent, le bigoudi ainsi que la poignée sont légèrement coniques et ne comportent ni gorges spéciales ni autres singularités aussi peuvent-ils être facilement moulés en une seule opération. Les formes que doivent avoir les parties de ces composants qui jouent un rôle dans le couplage de l'invention, ne contrarient pas cette opération de moulage unique.

On peut considérer le bloc d'alimentation de sèche-cheveux 32 comme étant un élément de ces séchoirs munis du tuyau souple et léger 30, fait de matière plastique renforcée par des anneaux, et de diamètre relativement important. Il ne sera pas fait de description détaillée d'un type particulier de sèche-cheveux; convient, toutefois, très bien à cet usage, le sèche-cheveux portatif bien connu, du type ménager, à basse pression, comportant moteur, ventilateur et chauffage; la raison en est que le débit d'air d'un tel sèche-cheveux est très largement suffisant pour sécher rapidement une mèche isolée, et que le tuyau en est très léger de sorte qu'est réduit au minimum le risque de voir le bras de l'utilisateur se fatiguer au cours

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 193 of 2286

de l'opération de séchage. Avec cette combinaison, il s'est avéré qu'une boucle standard pouvait être séchée en une ou deux minutes, ce temps dépendant bien sûr de l'état exact de la boucle, et de son humidité. En conséquence, de tels sèche-cheveux étant si largement employés, et le bigoudi et la boucle étant des articles relativement peu coûteux, on peut se rendre compte que l'appareil à friser de l'invention procure un moyen très commode et bon marché de former des boucles.

Bien que l'ensemble bigoudi et poignée, décrit ici, puisse être utilisé pour réaliser autant de boucles qu'on le désire, on considère qu'il sera utilisé le plus avantageusement comme appareil de retouche pour former, ou reformer, une ou deux boucles à chaque utilisation. On considère aussi que le bigoudi et la poignée peuvent être vendus comme accessoires d'un sèche-cheveux domestique portatif classique, avec un ensemble sèche-cheveux et bonnet souple.

Bien que l'on n'ait représenté et décrit qu'un exemple de réalisation il est bien entendu que l'on ne désire pas limiter à ces formes particulières données simplement à titre d'exemples et sans aucun caractère restrictif et que par conséquent toutes les variantes utilisant les mêmes moyens et réalisant les mêmes fonctions techniques que celles décrites ci-dessus rentreraient dans le cadre de la présente invention.

## RÉSUMÉ

Perfectionnements aux appareils à sécher et friser les cheveux, ayant trait plus particulièrement, à un appareil à friser les cheveux, muni d'un dispositif de connexion d'un bigoudi à une source d'air chaud, lesdits perfectionnements comportant notamment les caractéristiques suivantes, prises séparément ou en combinaisons.

1° Bigoudi de forme sensiblement tubulaire, comportant une ouverture à l'une de ses extrémités et une série d'orifices sur sa paroi latérale, une mèche de cheveux pouvant être enroulée sur ladite paroi et être ensuite maintenue en place grâce à un dispositif approprié.

2° Le dispositif de connexion du bigoudi est un tuyau souple et léger de distribution d'air, l'extrémité amont dudit tuyau étant connectée à la source.

3° Poignée tubulaire rigide, destinée à être tenue par l'utilisateur pendant la mise en plis, l'extrémité amont de ladite poignée étant connectée à l'extrémité aval du tuyau d'air chaud, l'autre extrémité étant conçue pour être connectée au bigoudi.

4° Un dispositif de couplage magnétique maintenant l'extrémité aval de la poignée attachée à l'extrémité ouverte du bigoudi, ledit dispositif comprenant un aimant et une rondelle attirée par l'aimant, leur séparation ne pouvant être effectuée, grâce à un montage télescopique, que par des forces directement opposées aux forces d'attraction magnétique.

5° Une brosse logée à l'intérieur dudit bigoudi et dont les soies pénètrent dans les fentes de la paroi latérale afin de faciliter l'enroulement des cheveux sur le bigoudi.

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 194 of 2286

FIG. I

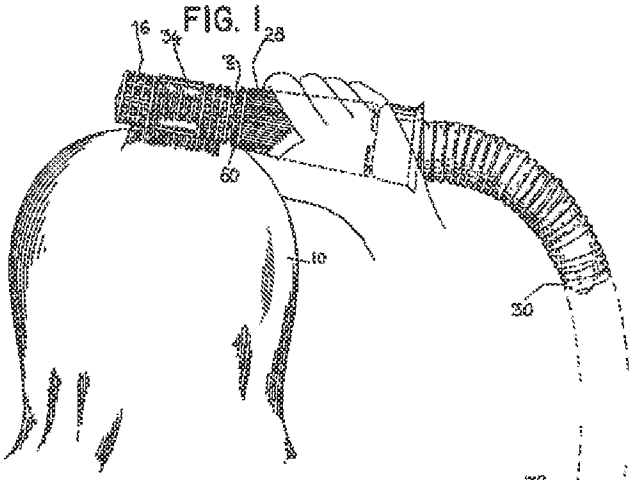
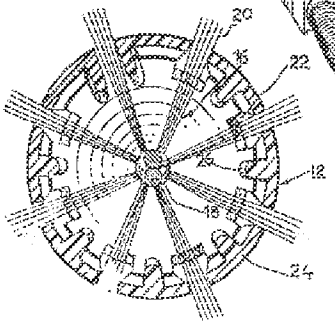



FIG. 6



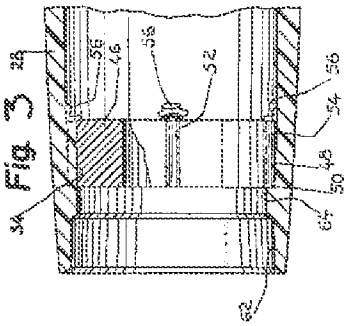


Fig. 3

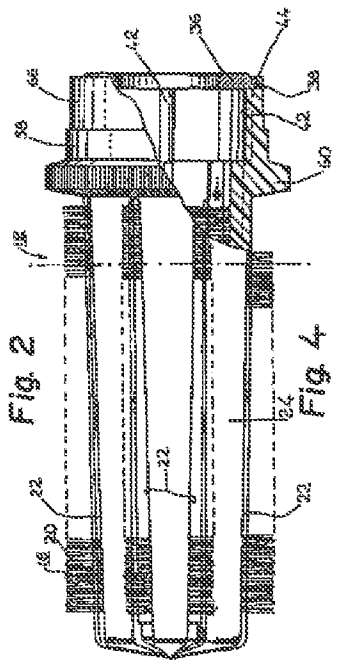


Fig. 2

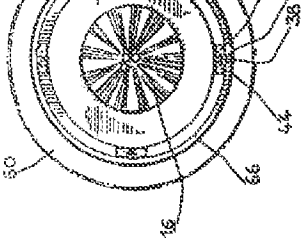


Fig. 4

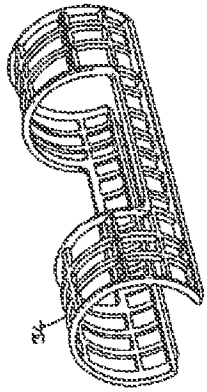


Fig. 5

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 196 of 2286

PATENT SPECIFICATION (11) 1 446 385

1 446 385

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(44) Complete Specification published 18 Aug. 1976
(51) INT. CL.* A45D 20/10
(52) Index at acceptance
A5R 32




# (54) HAND-HELD HAIR-DRYER

(71) We, N.V. PHILIPS' GLOEILAMPENFABRIEKEN, a limited liability Company, organized and established under the laws of the Kingdom of the Netherlands, of Emmasingel 29, Eindhoven, Holland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a hand-held hair-dryer having a casing part of which contains a blower coupled to an electric motor, an outlet duct containing a heating element being connected to this part of the casing.

German utility model 70 370 61 describes such a hand-held hair-dryer in which the electric connections and small electric components are accommodated on a printed circuit board in a separate space in the casing of the hair-dryer. However, in many cases such a separate space will increase the bulk, or adversely affect the shape, of the appliance. In particular in a hand-held hair-dryer having a motor with fan wheels mounted one on each end of the shaft whilst the width of the outlet duct is substantially equal to the length of the shaft, permitting a very compact construction, the accommodation of a printed circuit board can provide difficulty.

According to the invention, there is provided a hand-held hair-dryer having a casing part of which contains a blower coupled to an electric motor, whilst an outlet duct in which a heating element is accommodated is connected to the said part of the casing, in which the outlet duct also contains a printed circuit board for the electric connections.

The size of the printed circuit board can be adapted to the dimensions of the outlet duct which are determined by, amongst other things, the power which the heating element accommodated in it is required to deliver in the form of heat. When the printed circuit board is arranged parallel to one of the wall parts of the duct the size of the casing of the hair-dryer will substantially not be influenced. The printed circuit board may also serve as a heat shield between the heating element and the wall of the outlet duct.

Also a plurality of printed circuit boards may be used to form a housing in which the heating element is accommodated. In an embodiment in which the outlet duct comprises two parallel cover plates between which the heating element is arranged the space between the plates may be bounded on either side by a printed circuit board. A preferred embodiment is characterized in that at least one of the cover plates carries a printed circuit board which immediately adjoins the two boards located one on either side.

An embodiment of the invention will now be described, by way of example, with reference to the accompanying diagrammatic drawing, in which:

Figure 1 is a sectional plan view of a hand-held hair-dryer, and

Figure 2 is a sectional view thereof taken on the line I—I of Figure 1.

Referring now to Figure 1, a hair-dryer casing 1 comprises a part 2 and an adjoining outlet duct 3. The part 2 accommodates a motor 4 having fanwheels 6 mounted one at each end of a motor shaft 5.

The outlet duct 3 accommodates a heating element 7 which comprises two formers 8 on which a heating wire is wound. As is better seen from Figure 2, cover plates 10 and 11 are located above and beneath the element respectively. The motor 4, the heating element 7 and the cover plates 10 and 11 are supported by a frame 12. A space 13 between the cover plates 10 and 11 is bounded on either side by a printed circuit board 14 and 15 respectively to which boards are secured electric components such as terminals 16 and 17 for a flexible electric cord, capacitors 18 and 19, a rectifier 20 and a switch 21. The cover plate 10 carries a printed circuit board 22 which may contain a safety cut-out for preventing overheating and contact members 23 for tapping the voltage at various points of the heating element.

The construction described permits rapid and reliable assembly of the electric components of the hair-dryer. The printed circuit boards 14, 15 and 22 may immediately adjoin one another so as to form a housing for the heating element. The cover plate 10 may be dispensed with, the printed circuit boards serving as a support for the element

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 197 of 2286

and as a heat shield between it and the wall of the outlet duct. The air-stream produced by the fanwheels 6 when the hair-dryer is in operation ensures cooling of the printed circuit boards.

WHAT WE CLAIM IS:—

1. A hand-held hair-dryer having a casing part of which contains a blower coupled to an electric motor, whilst an outlet duct in which a heating element is accommodated is connected to the said part of the casing, in which the outlet duct also contains a printed circuit board for the electric connections.

2. A hair-dryer as claimed in Claim 1, in which the blower comprises two fan wheels mounted on opposite ends of a shaft of said motor.

3. A hair-dryer as claimed in Claim 1 or 2, in which the printed circuit board also serves as a heat shield between the heating element and the wall of the outlet duct.

4. A hair-dryer as claimed in Claim 1, 2 or 3, in which a plurality of printed circuit boards constitute a housing which accommodates the heating element.

5. A hair-dryer as claimed in Claim 1, 2 or 3 having two parallel cover plates which are arranged on two opposite sides in the outlet duct, the heating element being located in the space between the cover plates, in which the said space is bounded on each of the other two sides by a printed circuit board.

6. A hair-dryer as claimed in Claim 5, in which at least one of the cover plates carries a printed circuit board which immediately adjoins the two printed circuit boards arranged on said two other sides.

7. A hand-held hair-dryer substantially as herein described with reference to the drawing.

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 198 of 2286

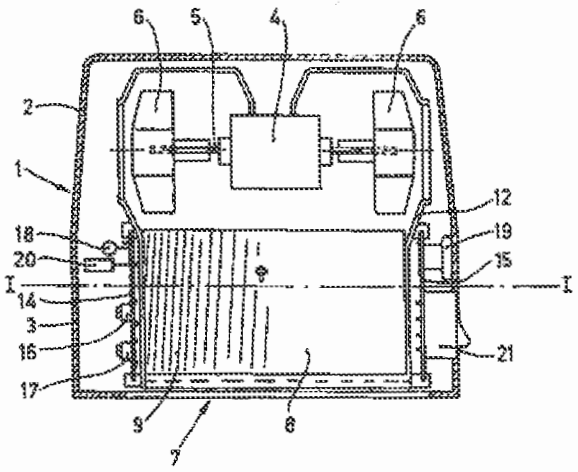



Fig. 1

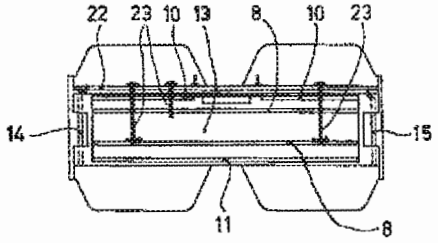



Fig. 2

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 199 of 2286

# PATENT SPECIFICATION (11) 1 456 000

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A5R 32 79D
A4V 11 13A



(72) Inventors WILLIAM R. HEMRICH and GEORGE P. GALLANIS


## (54) IMPROVEMENTS IN OR RELATING TO HAIRDRESSING APPLIANCES


(71) We SUNBEAM CORPORATION, a corporation organized and existing under the laws of the State of Delaware, United States of America, of 5400 West Roosevelt Road, Chicago, Illinois 60650, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—


This invention relates to hairdressing appliances, and is more particularly concerned with a heated comb, for hair styling, having means for producing a spray mist for convenient spot wet styling. As used herein the term "heated comb" is meant to embrace a heated brush as well as a heated comb.

According to this invention there is provided a hairdressing appliance for use as a heated comb comprising an elongate housing having an air inlet at one end and an air outlet in fluid connection therewith on the underside thereof toward the other end and including a handgrip body portion containing an electric motor, a heater and a fan, which serve in operation to take in air through said inlet and to discharge heated air through said outlet; and a comb holder portion having means for releasably attaching a comb or brush adjacent the outlet so as to depend from the housing, said comb holder portion being releasably connected to said handgrip body portion, and a further housing portion releasably connected to said comb holder portion and having therein a pump, a reservoir for the pump, and a spray nozzle adjacent said other end for spraying in the same direction as the comb or brush depends from the housing, the spray nozzle being in communication with an outlet of the pump, and a lever pivotably mounted on the housing for actuating the pump.

In a preferred embodiment of the invention the heated comb has an elongate three-part housing which is extremely attractive and is well adapted for its purpose. As will be described in greater detail herein, this hair styling appliance comprises a power handle having an air inlet at a rear end and a heated air outlet at a forward end thereof. Mounted within the handle are an electric motor powered fan adjacent the air inlet and a heater assembly between the fan and the air outlet. A power cord is provided for energizing the motor and the heater assembly and on-off and/or high-low speed switches may be provided. The power handle by itself may be used for spot drying hair or fingernail polish. A comb holder body portion which blends into the outer configuration of the power handle is releasably attachable to the forward end thereof. The underside of this body portion is provided with a heated air discharge recess which is in communication with the heated air outlet of the power handle, and is provided with a spring clip for releasably mounting a fine or coarse tooth comb or a brush in this recess depending on the needs of the particular hairstyle desired. Releasably mounted on the comb holder body portion is a pump-reservoir unit which completes the overall pleasing design of this hair styler and which includes a mist spray nozzle adjacent the forward end of the heated air discharge recess. A pump actuating lever is pivotably mounted on the comb holder with a finger-engageable portion thereof extending along a portion of the underside of the power handle in spaced relation thereto to facilitate convenient actuation of the spray mist pump by a person holding the power handle during a hair styling operation.

The invention will best be understood from the following description of a preferred embodiment thereof with reference


SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 200 of 2286

to the accompanying drawings, in which:

Fig. 1 is a perspective view of a heated comb;

Fig. 2 is an enlarged partially broken front elevational view of the heated comb of Fig. 1 with the power handle and a major portion of the comb holder shown in vertical section;

Fig. 3 is a perspective view of the pump-reservoir unit of the heated comb of Figs. 1 and 2;

Fig. 4 is an enlarged vertical sectional view of the interconnected comb holder and pump-reservoir unit; and

Fig. 5 is a bottom view of the pump-reservoir unit of Fig. 4 with a portion of the bottom wall thereof broken away for clarity.

Referring now to the drawings, in which like parts are designated by like numerals in the various views, there is shown in Fig. 1 a heated comb designated generally by the reference numeral 10. As is best shown in Figs. 1 and 2, the heated comb 10 has three releasably interconnected portions including a power handle 12, a comb holder 14 and a pump-reservoir unit 16.

Referring particularly to Fig. 2. the power handle 12 has a generally tubular hand grip body portion 17 having formed at a rear end thereof, (shown to the left in Fig. 2) an air inlet grill 18 with a screen 19 provided inwardly of the grill 18. Also provided in the body portion 17 is a motor mounting frame 20 which is suitably attached to the interior of the body portion 17 and in which is mounted an electric motor 21 having a drive shaft 22. A conventional fan 23 is mounted on the rear end of the drive shaft 22 adjacent the air inlet grill 18. A heater assembly 24 of conventional type is mounted with the body portion 17 forwardly of the motor 21.

The underside of the body portion 17 is provided with a depending housing portion 26 in which is mounted an on-off switch 27 having a protruding actuating button 28. It is to be understood that a switch could also be provided in this portion for controlling fan speed and heater output. The switch 27 is connected to a power cord 29 and to the heater assembly 24 and the motor 21 through suitable electrical leads.

The forward end of the body portion 17 has a recess 32 with a screen 33 being provided at the inner end of the recess to prevent anyone from inserting a finger into the recess 32 and coming into contact with the heater assembly 24. An inner upper surface of the recess 32 is provided with a notch 34 which is located approximately midway between the forward and rear ends of the recess 32. This notch 34 is for a purpose which will be described hereinafter. It is to be noted that the power handle 12 described thus far herein may be used by itself as a spot hair dryer or for drying wet nail polish.

The comb holder 14, as is best illustrated in Fig. 4, comprises a body portion 36 which consists of a generally tubular portion 38 having a rearwardly projecting reduced diameter portion 39 which is adapted to be received within the recess 32 formed in the forward end of the power handle 12. The comb holder body portion 36 also has a base portion 40 which extends forwardly from a lower portion only of the tubular portion 38 and has side walls 41, a front end wall 42 and a bottom wall 43. The bottom wall 43 has a downwardly-opening heated air discharge recess 44 formed therein with an upper wall 46 of the base portion 40 defining an upper surface of this recess 44. A downwardly and forwardly inclined wall 47 extends between the forward edge of the upper wall 46 and the bottom wall 43 at the forward end of the recess 44.

The upper wall 46 is laterally slotted, as at 48, to accommodate mounting end portions 50 of a resilient clip 49 which projects downwardly into the recess 44 and is adapted for releasably gripping a fine or coarse tooth comb or a brush. The bottom wall 43 is provided at the forward and rear ends of the recess 44 with aligned slots 51 which serve to accommodate the aforementioned comb or brush.

As illustrated in Fig. 1, a comb 70 having a series of teeth 71 is shown mounted in the comb holder 14, a base portion 72 of the comb 70 being resiliently gripped by the comb clip 49.

A circular opening 52 is provided in the bottom wall 43 forwardly of the recess 44 for a purpose which will be described hereinafter. The rear end of the upper wall 46 of the base portion 40 has an upwardly and rearwardly inclined wall portion 53 having a central opening 54 formed therein, the purpose of which will also be described hereinafter. It is noted that the inclined wall portion 53, the upper wall 46 and the downwardly inclined wall portion 47 together with the side walls 41 of the base portion 40 define a passageway which serves to direct heated air from the forward end of the power handle 12 downwardly to the heated air discharge recess 44.

The lower rear portion of the comb holder body portion 36 is provided with an opening 56 in which is received a bell-crank type lever 57 which is pivotally mounted therein on a pivot pin 58. The lever 57 has a finger-engageable portion 59 which, when the comb holder 14 is connected to the power handle 12, is adapted to extend along a portion of the underside of the power handle 12 in spaced relation thereto whereby the portion 59 may be conveniently actuated by anyone gripping the power handle

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 201 of 2286

12. The lever 57 also has an actuating portion 60 which is disposed within the body portion 36 and which is provided with an enlargement 61 for actuating a mist spray pump to be described hereinafter.

A flexible latch member 62 has its forward end connected to the underside of a top wall of the tubular portion 38 of the comb holder body portion 36, as at 63 in Fig. 4. Intermediate its ends, the latch member 62 is provided with an actuating button 64 which extends upwardly through an opening 65 formed in the upper wall of the tubular body portion 38. The rear end of the latch member 62 is provided with an upwardly extending latch finger 66 (Fig. 2) which, when the comb holder 14 is inserted into the forward end of the power handle 12, is engageable in the notch 34 formed in the upper surface of the recess 32 of the power handle 12. The latch finger 66 is provided with a downwardly and rearwardly inclined upper surface 67 whereby the latch member 62 is automatically depressed by a cam action upon insertion of the comb holder 14 into the recessed forward end of the power handle 12 until the latch finger 66 springs upwardly into engagement in the notch 34. To disassemble the comb holder 14 from the power handle 12, the actuating button 64 is manually depressed to disengage the latch finger 66 from the notch 34, in a manner well known in the art.

To facilitate mounting of the pump-reservoir 16 on the comb holder 14, the forward edge of the tubular portion 38 of the comb holder body portion 36 is provided with a reduced thickness portion as illustrated at 68. Also, a detent 69 is provided on the upper surface of the bottom wall 43 of the base portion 40 intermediate the forward end of the recess 44 and the circular opening 52.

As is best illustrated in Figs. 3, 4 and 5, the pump-reservoir 16 comprises a body portion 74 including a top wall 75, side walls 76, a bottom wall 77, a front end wall 78 and a cover 79 which serves as a rear end wall. The rear edges of the body portion 74 have reduced thickness portions, as is best shown at 80 in Fig. 4, to facilitate interengagement between the rear end of the pump-reservoir portion 74 and the forward end of the tubular body portion 38 of the comb holder 14. The forward end of the body portion 74 is releasably engaged with the forward end of the base portion 40 of the comb holder 14 by means of a retainer clip 81 which is fastened to the bottom wall 77 of the body portion 74 and is resiliently engageable with the detent 69 provided on the base portion 40 of the comb holder 14, as illustrated in Fig. 4.

The forward end of the pump-reservoir has a vertical wall 82 which is spaced somewhat rearwardly of the front end wall 78 of the body portion 74. The vertical wall 82 has a boss portion having a vertically extending bore 83 which is adapted to receive a spray nozzle 115 to be more fully described hereinafter. The wall 82 is further provided with a horizontal bore 84 which intersects the vertical bore 83.

The bottom wall 77 of the pump-reservoir portion 74 is provided with a filler opening 85 having a cap 86. The cap 86 is attached to the pump-reservoir 16 by attachment of a portion thereof to a depending boss 87 formed on the underside of the bottom wall 77. The cap 86 is further provided with a tab 88 to facilitate removal of the cap 86 from the filler opening 85 when it is necessary to refill the reservoir.

The pump-reservoir cover 79 is provided on its inner surface with an integral inwardly extending tubular gland 89 having a reduced diameter portion 90 upon which is mounted the open end of a pump housing 92 to define a pumping chamber 93 therein. The pump housing 92 is provided with an axial bore 94 with a pump outlet tube 95 extending between the axial bore 94 and the bore 84 formed in the wall 82. The pump housing 92 is also provided with an inlet bore 97 which intersects the axial bore 94 and is connected to one end of a pump inlet tube 96, the other end of which tube 96 is provided with an eyelet having a check valve 99 provided therein and a screen 100 at its outer end, whereby an inlet to the pump from the reservoir is provided.

The opposite or outer face of the reservoir cover 79 is provided with an outwardly projecting recessed gland 102 which is adapted to receive a center web gasket 103, and a piston rod bearing 104. A piston assembly 106 includes a piston 108 movable within the chamber 93 and which is connected to one end of a piston rod 107 which extends through an opening 105 formed in the cover 79 in centered relation relative to the glands 89 and 102. A return spring 109 is provided about the outer portion of the piston rod 107 and is seated between the piston rod bearing 104 and a washer 110 which is retained adjacent the outer end of the piston rod 107 by a spring retainer 111. As best seen in Fig. 4, the outer end 112 of the piston rod 107 is biased against the enlargement 61 provided on the actuating portion 60 of the pivotally mounted pump-actuating lever 57. The pump-reservoir 16 is also provided with a relief check valve 113 which is mounted in the bottom wall 77 thereof.

The spray nozzle 115 previously mentioned has a body 116 having a reduced end 117 which is fitted into the bore 83 adjacent the wall 82. The body 116 is also provided with an externally threaded portion 118 upon which is threadedly mounted a nozzle

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 202 of 2286

head 119 having a central orifice 120 provided therein. Although not shown in the drawings, the nozzle head 119 includes a conventional ball valve, spring and spray plug. As illustrated in Fig. 4, it is noted that the nozzle orifice 120 is vertically aligned with the circular opening 52 provided in the bottom wall 43 of the comb holder 14 whereby, upon actuation of the pump through the lever 57, a spray mist is provided adjacent the specific portion of a person's hair being combed or brushed.

As is clearly illustrated in the drawings, the outer configurations of the interconnected power handle 12, comb holder 14 and pump-reservoir 16 are such that the meeting outer surfaces blend one into the other to provide an overall appearance of a single elongate housing. For instance, as best shown in Fig. 2, the upper surface of the fully assembled heated comb, while being defined by respective contiguous upper surfaces of the handgrip body portion 17, the comb holder body portion 36 and the pump reservoir body portion 74, provides a smooth generally planar upper surface.

In use, the heated comb 10 is readily grasped by gripping the power handle 12 and, if it should be desired to spot wet style, it is merely necessary to squeeze the lever 57 with a finger to actuate the pump thereby to produce a spray mist. It is evident that with this heated comb wet styling may be accomplished without the necessity of putting down the heated comb, turning on a tap and applying water directly to the hair.

While there has been shown and described above a single embodiment of the present invention, it will be apparent to those skilled in the art that various changes and modifications may be made without departing from the scope of the invention as defined in the appended claims.

WHAT WE CLAIM IS:—

1. A hairdressing appliance for use as a heated comb comprising an elongate housing having an air inlet at one end and an air outlet in fluid connection therewith on the underside thereof toward the other end and including a handgrip body portion containing an electric motor, a heater and a fan which serve in operation to take in air through said inlet and to discharge heated air through said outlet; and a comb holder portion having means for releasably attaching a comb or brush adjacent the outlet so as to depend from the housing said comb holder portion being releasably connected to said handgrip body portion, and a further housing portion releasably connected to said comb holder portion and having therein a pump, a reservoir for the pump, and a spray nozzle adjacent said other end for spraying in the same direction as the comb or brush depends from the housing, the spray nozzle being in communication with an outlet of the pump, and a lever pivotably mounted on the housing for actuating the pump.

2. The hairdressing appliance of claim 1 wherein the comb holder portion includes the air outlet and has the pump actuating lever pivotably mounted thereon.

3. The hairdressing appliance of claim 2 wherein the handgrip body portion has an air outlet opening at its forward end, wherein the comb holder portion is connected to the forward end of the handgrip body portion and has formed on the underside thereof an open bottom recess which constitutes said air outlet, a passage being provided in the comb holder portion for directing heated air from the air outlet opening of the handgrip body portion to the recess, and wherein the means for releasably attaching a comb or brush comprises a clip member mounted in the recess for resiliently gripping the upper edge of a comb or brush inserted into the recess.

4. The hairdressing appliance of claim 3 wherein the comb holder portion includes a downwardly and forwardly inclined wall portion.

5. The hairdressing appliance of claim 3 or claim 4 including a manually operable latch provided in the comb holder portion releasably engaging the handgrip body portion.

6. The hairdressing appliance of any of claims 2 to 5 wherein a finger-engageable portion of the pump actuating lever, extends along a portion of the underside of the handgrip body portion in spaced relation thereto for convenient actuation by a person holding the hairdressing appliance by the handgrip body portion thereof.

7. The hairdressing appliance of any preceding claim wherein the further housing portion is resiliently mounted on the comb holder portion, wherein the pump is mounted in the further housing portion with a piston rod projecting rearwardly thereof and into the comb holder portion and wherein the pump actuating lever has an actuating portion engageable with the rearwardly projecting portion of the piston rod, the further housing portion further including a capped filler port for the reservoir and an inlet from the reservoir to the pump.

8. The hairdressing appliance of any preceding claim wherein the upper surface thereof is generally planar and is defined by respectively contiguous upper surfaces of the handgrip, comb holder, and further interconnected body portions.

9. A hairdressing appliance for use as a heated comb substantially as herein described with reference to the accompanying drawings.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 203 of 2286

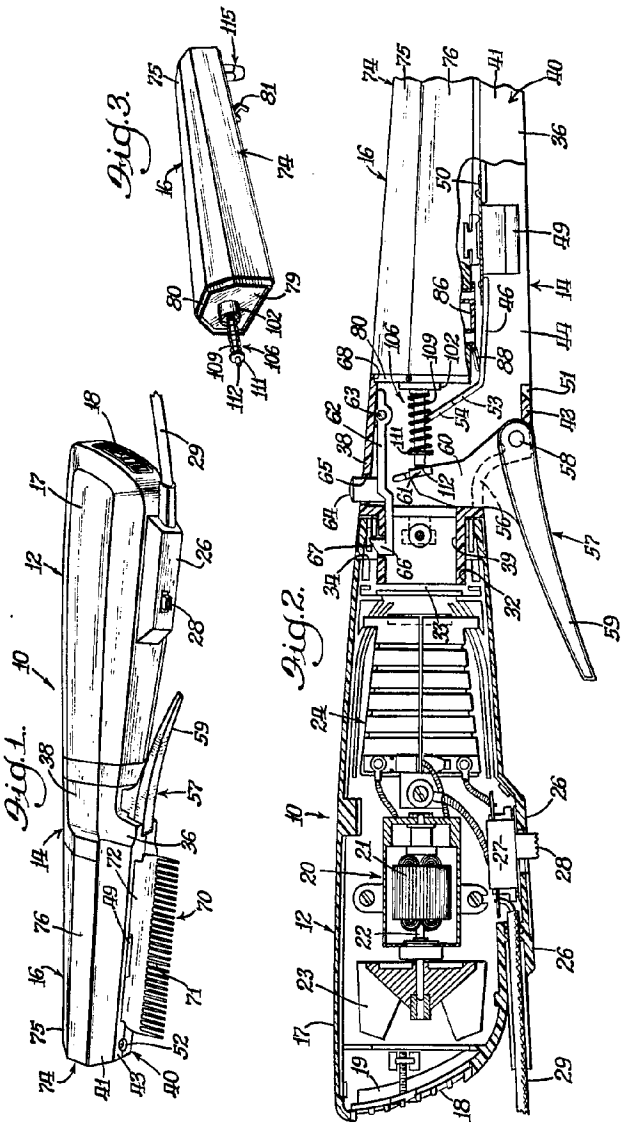
For the Applicants,
FRANK B. DEHN & CO.,
Imperial House,
15—19 Kingsway,
London WC2B 6UZ.

Reference has been directed in pursuance of section 9, subsection (1) of the Patents Act 1949, to patent No. 1,362,758.

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 204 of 2286

1456000 COMPLETE SPECIFICATION
2 SHEETS This drawing is a reproduction of the Original on a reduced scale
Sheet 1




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 205 of 2286

1456000 COMPLETE SPECIFICATION
2 SHEETS This drawing is a reproduction of the Original on a reduced scale
Sheet 2

Fig.4.

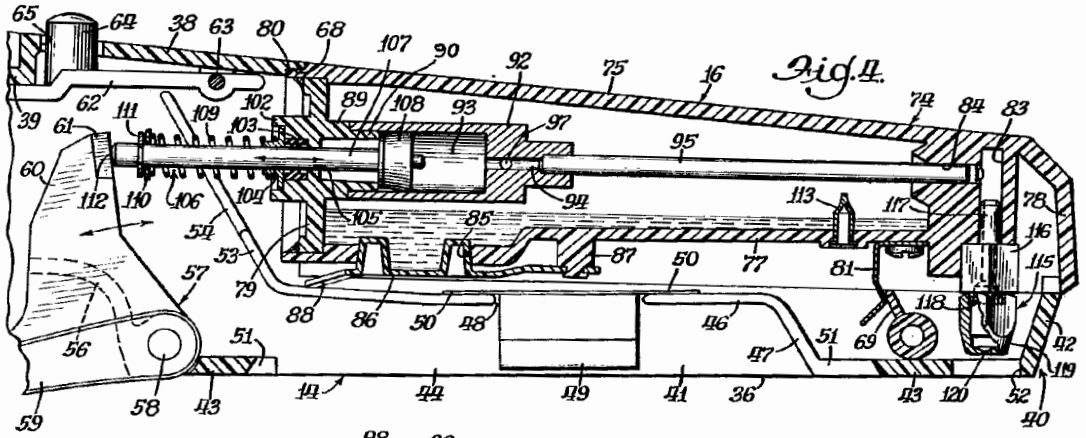
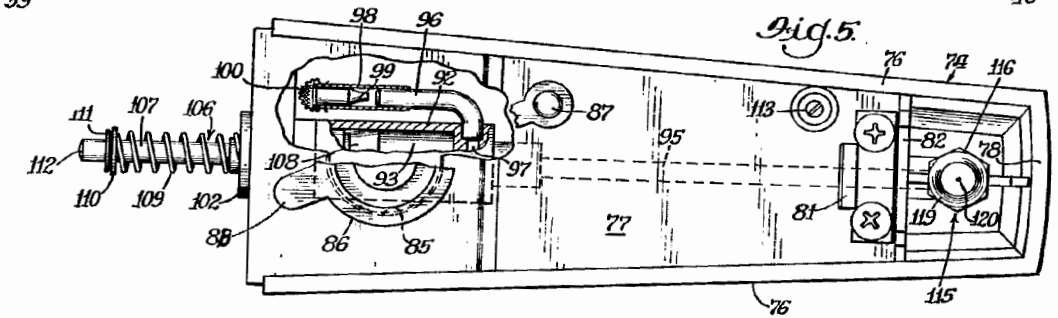


Fig.5.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 206 of 2286

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PN - CH588835 A5 19770615
PA - GIMELLI & CO AG

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AN - 1977-F9379Y
TI - Hot air hair dryer - has two stage control by grip switch and rod acting on pressure switches in lengthways movements from handle
AB - Hot air hair blower/dryer handle tube encloses a small d.c. motor, fan, heater coils, rectifier, smoothing chokes and condenser plugged into a printed circuit board joined to the motor connections. A two position grip switch protrudes from and adjusts lengthways in the housing. The switch is positively coupled to two pressure switches (18,19). The heater is joined to the motor casing by strips.
The grip switch should be pinned to a bar which is designed as a triangle (21) at its switching end in such a way that the two triangle surfaces pointing into the housing connect positively to the two switches (18,19) respectively, thus facilitating two stage heat control.
PN - CH588835 A 19770615 DW197729
PA - (GIME-N) GIMELLI & CO AG





SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 207 of 2286

CH 588 835

SCHWEIZERISCHE EIDGENOSSENSCHAFT
EIDGENÖSSISCHES AMT FÜR GEISTIGES EIGENTUM

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(62) Teilgesuch von:

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(33)(32)(31) Priorität:

Patent erteilt: 30.4.1977

(45) Patentschrift veröffentlicht: 15.6.1977

(54) Titel: **Heissluftgerät für Haarbehandlung**

(73) Inhaber: Gimelli & Co. AG, Zollikofen

(74) Vertreter: «PERUHAG», Patent-Erwirkungs- und Handels-Gesellschaft mbH, Bern

(72) Erfinder: Samuel Gimelli, Zollikofen

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 208 of 2286

Die Erfindung betrifft ein Heissluftgerät für Haarbehandlung, mit einem in einem als Handgriff ausgebildeten rohrförmigen Gehäuse gehaltenen Gleichstromkleinmotor mit Ventilatorflügel, einem am Motor befestigten, gegen diesen Flügel sich erweiternden Kreiskegelstumpfmantel und einem mit schraubenförmigen Heizwindungen versehenen zapfenartigen Heizkörper sowie mit Diodengleichrichter, Glättedrosseln und Glättekondensator, wobei der Gleichstrommotor zwei in axialer Richtung vorstehende, leitende Anschlüsse aufweist und in eine mantelförmige Fassung gebettet ist, und wobei eine zwei Anschlüsse aufweisende Platine vorgesehen ist, die mit gedruckter Schaltung versehen ist, auf welcher Platine die Drahtenden des Diodengleichrichters, der Glättedrosseln und des Glättekondensators gesteckt sind.

Die Erfindung betrifft eine Weiterentwicklung des Heissluftgerätes obgenannter Art. Durch eine handliche Schaltgriffanordnung kann die Heizung während des Gebrauchs in zwei Stufen ein- und ausgeschaltet werden. Zudem wird der Heizkörper auch inwendig von der Luft bestrichen. Dieses Heissluftgerät ist dadurch gekennzeichnet, dass ein aus dem Gehäuse ragender, in Längsrichtung derselben verschiebbarer Schaltmarken anzeigender Schaltgriff vorgesehen ist, der in Wirkverbindung mit zwei Druckschaltern steht, und dass der Heizkörper durch Lamellen mit der mantelförmigen Fassung des Motors verbunden ist.

In der Zeichnung ist ein Ausführungsbeispiel des Erfindungsgegenstandes dargestellt. Es zeigen:

Fig. 1 einen Längsschnitt durch das Heissluftgerät,

Fig. 2 einen Schnitt nach Linie II–II der Fig. 1,

Fig. 3 die Schaltorgane nach Fig. 1 von innen gesehen.

Das Heissluftgerät für Haarbehandlung weist ein als Handgriff ausgebildetes rohrförmiges Gehäuse 1 auf. In dieses ist eine Fassung 2 mit ihren Rippen 3 eingesetzt (Fig. 1). Die Fassung 2 umschliesst einen Gleichstromkleinmotor 4. Auf der Lufteintrittseite weist der Motor 4 eine vorstehende Welle auf, die einen Ventilatorflügel 5 trägt. Am Motor 4 ist ein gegen den Flügel 5 sich erweiternder Kegelstumpfmantel 6 befestigt. Der Flügel 5 übergreift den äusseren Rand des Kegelstumpfmantels 6, so dass sich keine Haare um die Motorwelle wickeln können.

DerMotor 4 weist auf seiner dem Luftaustritt zugewandten Seite zwei in Achsrichtung vorstehende, leitende Anschlüsse 7 auf. An diesen sind die entsprechenden Anschlüsse einer Platine 8 angelötet. Die Platine 8 weist auf der Motorseite eine gedruckte Schaltung auf. Auf der dem Luftaustritt zugewandten Seite sind elektrische Bauelemente: ein Dioden-Gleichrichter, zwei Drosselspulen und ein Glättekondensator kompakt angeordnet. Die Fassung 2 steht gegenüber dem Motor 4 vor und ist über vier Lamellen 9 mit einem rohrartigen, eine schraubenförmige Heizdrahtwindung aufweisenden Heizkörper 10 fest verbunden. Die vom Flügel 5 kommende Luft kann zwischen den Lamellen 9 hindurch ins Innere des Heizkörpers 10 gelangen. Dadurch wird der Heizkörper 10 aussen und innen von der Frischluft bestrichen und die Platine 8 mit den elektrischen Bauelementen abgekühlt.

An der Luftaustrittsseite weist das Gehäuse 1 ein abgesetztes Ende 11 auf, das zum Anschluss eines Haartrocknungskammes oder eines Lockenwicklers benutzt werden kann. In dieses Ende 11 ist ein mit konzentrischen Luftaustrittsöffnungen versehenes Einsatzstück 12 gesteckt, an welchem der Heizkörper 10 anstösst. Am Lufteintrittsende des Gehäuses 1 ist ein mit konzentrischen Öffnungen versehenes Abschlussstück 13 angeschraubt. Durch eine zwischen Motor 4 und Anschlussstück 13 eingesetzte Distanzhülse 14 sind der Motor 4 und der Heizkörper 10 in axialer Richtung gehalten. Auf der Lufteintrittseite ist die Distanzhülse 14 mit einer Traverse 15 zur Aufnahme der Kabelanschlüsse 16 versehen.

Die Stromzuführung erfolgt von den Kabelanschlüssen 16 über Leiter, die in Längsrillen der Distanzhülse 14 geführt sind, zu zwei kleinen Druckschaltern 18, 19 (Fig. 2, 3). Diese sind durch Zapfen an der Fassung 2 gehalten. Die Fassung 2 weist auf der dem Luftaustritt zugewandten Seite der beiden Schalter 18, 19, in der Längsmittelebene zwischen denselben eine aus der Zeichnung nicht ersichtliche V-förmige Führung auf, in welcher das mit einem Dreikantquerschnitt versehene Ende 21 eines Schaltstabes 20 (Fig. 2, 3) seitlich gehalten ist. Der Schaltstab 20 weist eine in eine Führungsnut 22 des Gehäuses 1 greifende Führungspartie 23 auf (Fig. 1, 3). Diese ist mit seitlichen Verankerungsnasen 24 versehen und durch zwei parallele Längsschlitze 25 seitlich federelastisch gemacht, so dass die Führungspartie 23 des Schaltstabes 20 bei der Montage von der Innenseite des Gehäuses 1 durch die Führungsnut 22 desselben gedrückt werden kann, wobei die Verankerungsnasen 24 an der Gehäuseaussenseite der Führungsnut 22 einrasten. An der Aussenseite des Gehäuses 1 ist ein mit kammartigen Rillen versehener Schaltgriff 26 vorgesehen, der mit zwei Verbindungszapfen 27 versehen ist (Fig. 1), die in Löchern 28 des Schaltstabes 20 stecken. Durch Verschieben des Schaltgriffes 26 gegen die Schalter 18, 19 wird zunächst der Schaltknopf 29 des Schalters 18 und bei weiterem Verschieben der Schaltknopf 30 des Schalters 19 durch eine der beiden nach dem Gehäuseinnern gerichteten Flächen des dreikantigen Endes 21 des Schaltstabes 20 gedrückt. Die beiden Schaltknöpfe 29, 30 dienen zur stufenweisen Ein- und Ausschaltung der Heizung. Durch das Vorschieben des Schaltgriffes 26 werden Marken 31 der Schaltstufen sichtbar (Fig. 3).

Der relativ grosse Heizwiderstand des Heizkörpers 10 ist in zwei Stufen unterteilt und wird vom Netzstrom durchflossen, der dann in Serienschaltung an den Diodengleichrichter gelangt, an dem nur noch eine Klemmenspannung von 12 Volt vorhanden ist, so dass der Gleichstrommotor 4 an eine niedrige Klemmenspannung angeschlossen ist.

## PATENTANSPRUCH

Heissluftgerät für Haarbehandlung, mit einem in einem als Handgriff ausgebildeten rohrförmigen Gehäuse gehaltenen Gleichstromkleinmotor mit Ventilatorflügel, einem am Motor befestigten, gegen diesen Flügel sich erweiternden Kreiskegelstumpfmantel und einem mit schraubenförmigen Heizwindungen versehenen rohrartigen Heizkörper sowie mit Diodengleichrichter, Glättedrosseln und Glättekondensator, wobei der Gleichstrommotor zwei in axialer Richtung vorstehende leitende Anschlüsse aufweist und in eine mantelförmige Fassung gebettet ist, und wobei eine zwei Anschlüsse aufweisende Platine vorgesehen ist, die mit gedruckter Schaltung versehen ist, auf welcher Platine die Drahtenden des Diodengleichrichters, der Glättedrosseln und des Glättekondensators gesteckt sind, dadurch gekennzeichnet, dass ein aus dem Gehäuse (1) ragender, in Längsrichtung desselben verschiebbarer Schaltmarken (31) anzeigender Schaltgriff (26) vorgesehen ist, der in Wirkverbindung mit zwei Druckschaltern (18, 19) steht, und dass der Heizkörper (10) durch Lamellen (9) mit der mantelförmigen Fassung (2) des Motors (4) verbunden ist.

## UNTERANSPRÜCHE

1. Heissluftgerät nach Patentanspruch, dadurch gekennzeichnet, dass der Schaltgriff (26) durch Zapfen (27) an einem Schaltstab (20) befestigt ist, der zu seiner Längsführung am schaltenden Ende (21) einen Dreikantquerschnitt aufweist, und dass die zwei nach dem Gehäuseinnern gerichteten Flächen des Stabendes (21) in Wirkverbindung mit je einem der beiden Druckschalter (18, 19) stehen.

2. Heissluftgerät nach Patentanspruch, dadurch gekennzeichnet, dass am Luftaustrittsende des Gehäuses (1) ein mit konzentrischen Luftaustrittsöffnungen versehenes Einsatzstück (12) vorgesehen ist.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 209 of 2286

3. Heissluftgerät nach Patentanspruch, dadurch gekennzeichnet, dass am Lufteintrittsende des Gehäuses (1) ein mit konzentrischen Öffnungen versehenes Abschlussstück (13) vorgesehen ist, und dass eine Distanzhülse (14) zwischen dem Motor (4) und dem Abschlussstück (13) eingebaut ist.

4. Heissluftgerät nach Patentanspruch, dadurch gekennzeichnet, dass die Anschlüsse (7) des Motors (4) mit den entsprechenden Anschlüssen der Platine (8) durch Lötstellen verbunden sind.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 210 of 2286

Fig.1

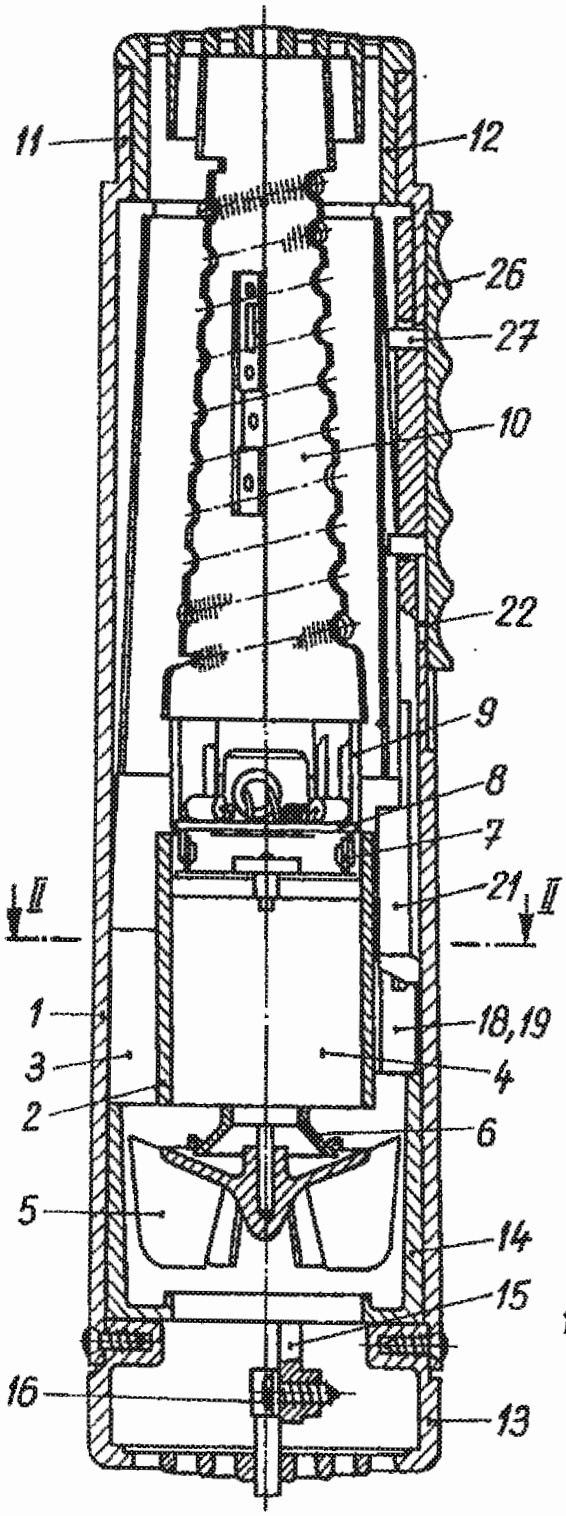



Fig.3

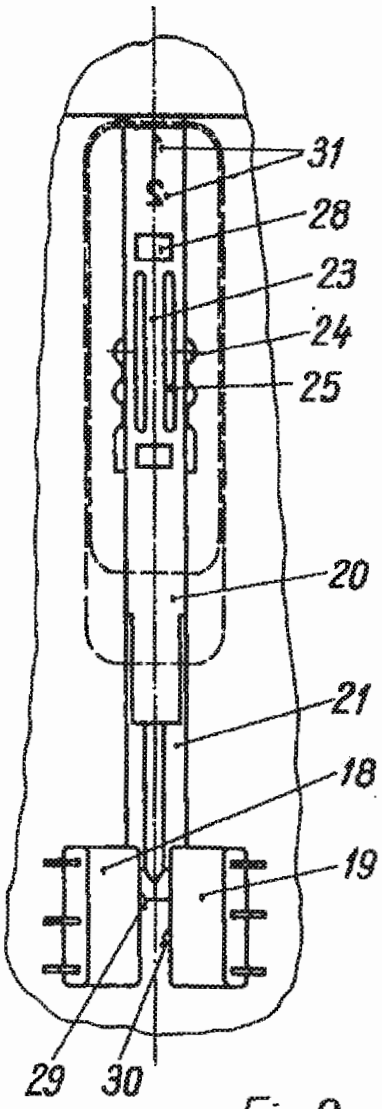
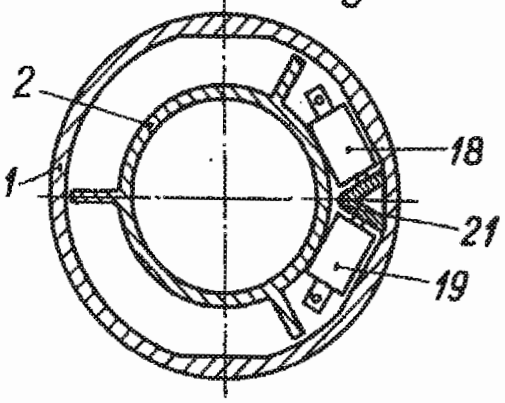



Fig.2




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 211 of 2286

(51) Int. Cl. 2: A 45 D 20/52

(19) BUNDESREPUBLIK DEUTSCHLAND

DEUTSCHES PATENTAMT

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(43) Offenlegungstag: 28. 7. 77

(30) Unionspriorität:

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(54) Bezeichnung: Lockenwickelvorrichtung

(62) Ausscheidung aus: P 25 35 421.6

(71) Anmelder: Matsushita Electric Works, Ltd., Kadoma, Osaka (Japan)

(74) Vertreter: Hermelink, H. I., Dipl.-Phys. Dr., Pat.-Anw., 8000 München

(72) Erfinder: Ihara, Sinji, Hikone, Shiga (Japan)

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Prüfungsantrag gem. § 28 b PatG ist gestellt

DT 25 59 697 A 1

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 212 of 2286

PATENTANWALT
DR. HEINRICH HERMELINK
8 München 60, Apolloweg 9, Tel. 8114378

2559697

München, den 21. 2. 1977
27/042

MATSUSHITA ELECTRIC WORKS, LTD., Osaka/Japan

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Patentansprüche

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1. Lockenwicklervorrichtung für einen Heißluft-Frisierstab mit einem auf das Gebläse des Frisierstabes aufsetzbaren Bürstenkörper, der auf seinem Umfang mit Borsten besetzt ist, gekennzeichnet durch einen auf dem Bürstenkörper (18) sitzenden, zwischen den Wurzeln und den Spitzen der Borsten (22) angeordneten Mäntel (31) aus wärmeleitendem Werkstoff.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der Mantel mit Luftaustrittsöffnungen (33, 35) versehen ist.

3. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß die Borsten (22) die Luftaustrittsöffnungen teilweise durchsetzen.

4. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß der Mantel (31) Längsschlitze (33), durch welche die Borsten (22) nach außen ragen, und Löcher (35) aufweist.

5. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der Mantel (31) abnehmbar am Bürstenkörper (18) befestigt ist.

Dr.Hk/Du.



BNSDOCID: <DE_____2559697A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 213 of 2286

6. Lockenwicklervorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der Mantel (31) eine Mehrzahl von Abschnitten (32) aus wärmeleitendem Werkstoff, die so angeordnet sind, daß die Wurzeln der Borsten (22) sich innerhalb der Mantelabschnitte (32) befinden, und einen am Stirnende des Mantels befindlichen Sockel (34), an dem die Abschnitte (32) einseitig befestigt sind, aufweist.

7. Lockenwicklervorrichtung nach Anspruch 6, dadurch gekennzeichnet, daß die Abschnitte (32) des Mantels gekrümmten Querschnitt haben und in Umfangsrichtung derart voneinander getrennt sind, daß zwischen ihnen axiale Längsschlitze (33) frei bleiben, durch welche die in axialen Reihen angeordneten Borsten (22) nach außen ragen können, sowie daß der Sockel (34) des Mantels scheibenförmig ausgebildet ist, so daß der Mantel insgesamt zylindrischen Umriß aufweist.

8. Lockenwicklervorrichtung nach Anspruch 6, dadurch gekennzeichnet, daß die Abschnitte (32) des Mantels mit in Längsrichtung der Abschnitte voneinander getrennten Löchern (35) versehen sind.

9. Lockenwicklervorrichtung nach Anspruch 6, dadurch gekennzeichnet, daß die Abschnitte (32) des Mantels aus einem Metall hoher Wärmeleitfähigkeit bestehen.

10. Lockenwicklervorrichtung nach Anspruch 7, dadurch gekennzeichnet, daß die Anzahl der Mantelabschnitte (32) ebenso wie diejenige der Längsschlitze (33) der Anzahl der auf dem Bürstenkörper (18) vorgesehenen axialen Borstenreihen (22) entspricht.



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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 214 of 2286

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München, den 21. 2. 1977
3 27/042

MATSUSHITA ELECTRIC WORKS, LTD., Osaka/Japan

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Lockenwicklervorrichtung

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Die Erfindung bezieht sich auf eine Lockenwicklervorrichtung für einen Heißluft-Frisierstab nach dem Gattungsbegriff des Hauptanspruchs.

Die bekannten Frisierstäbe (z. B. DT-GmS 6 600 558) sind mit einer Rundbürste ausgestattet, deren Bürstenkörper auf seinem Umfang mit Borsten besetzt ist, so daß die auf die Bürste aufgewickelten Haare durch Heißluftbehandlung in Locken gelegt werden können.

Wenn die Haare jedoch sehr dünn und weich sind, verfangen sie sich leicht zwischen den unteren Teilen der Borsten und bilden eine so dichte Schicht, daß die von innen durchgeblasene Luft nicht genügend nach außen durchdringen kann, wodurch die Temperaturverteilung stark ungleichmäßig wird. Außerdem ist das Abwickeln der Haare nach dem Ende der Behandlung dann mit Schwierigkeiten und Schmerzen verbunden.

Die in Anspruch 1 gekennzeichnete Vorrichtung hat die Aufgabe, eine solche Verstopfung der Luftauslaßöffnungen der Bürste zu verhindern, den Wärmeübergang an die aufgewickelten Haare zu verbessern und einen hohen Luftdurchsatz zu erzielen, so daß die Behandlung wesentlich abgekürzt werden kann.

Dr.Hk/Du.



BNSDOCID: <DE_____2559697A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 215 of 2286

Dies wird erfindungsgemäß durch einen auf den Bürstenkörper aufschiebbaren Mantel aus wärmeleitendem Werkstoff erzielt, der zwischen den Wurzeln und den Spitzen der Borsten angeordnet ist und so verhindert, daß die Haare sich in den Wurzeln der Borsten verfangen. Der Mantel ist mit Luftaustrittsöffnungen versehen, durch die auch die Borsten nach außen ragen. Die auf den Mantel aufgewickelten Haare liegen also auf einer Fläche, die so gut wärmeleitend ist, daß die Lockenbildung erheblich begünstigt wird.

Ein Ausführungsbeispiel der Erfindung wird nachstehend an Hand der Zeichnung beschrieben. Hierin sind

Fig. 1 die perspektivische Ansicht eines Frisierstabs mit aufgesteckter Lockenwicklerbürste,

Fig. 2 A und 2B eine perspektivische Darstellung und eine Stirnansicht der Bürste,

Fig. 2 C ein Längsschnitt des wärmeleitenden Zusatzteils
und
Fig. 3 ein Querschnitt des auf die Bürste nach Fig. 1 und 2 aufgesteckten Zusatzteils.

In Fig. 1 ist ein Heißluftgebläse 11 dargestellt, das eine Luftansaugöffnung 13 und ein Netzkabel 14 an einem Ende und einen Schalter 15 in der Mitte aufweist. Ein Druckknopf 16 dient zur Abschaltung der Heizvorrichtung, so daß auf Wunsch kalte Luft abgegeben wird. An der Stirnseite des Gebläses 11 ist eine Rundbürste 12 abnehmbar derart angesetzt, daß die vom Gebläse geförderte heiße oder kalte Luft durch längsverlaufende Führungskanäle 2o geleitet wird.



BNSDOCID: <DE 2559697A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 216 of 2286

Wie Fig. 2A und 2B zeigen, besitzt die Bürste 12 einen Sockel 17 und einen dazu koaxialen Bürstenkörper 18, die vorzugsweise aus Kunststoff bestehen. Der Bürstenkörper 18 ist mit radialen, längsverlaufenden Rippen 19 versehen, zwischen denen ungefähr V-förmige Luftführungskanäle 20 ausgespart sind. Diese Kanäle 20 stehen über Durchgangsöffnungen 21 im Sockel 17 mit der Mündung des Gebläses 11 in Verbindung. Auf den äußeren Mantelflächen der Rippen 19 sind in regelmäßigen Abständen Borsten 22 bündelweise angeordnet.

Fig. 2C zeigt im Schnitt einen wärmeleitenden Mantel 31, der auf die Bürste 12 nach Fig. 2A und 2B aufgeschoben werden kann. Der Mantel 31 besteht z. B. aus Metall wie Aluminium, Eisen, Messing od. dgl. und ist in eine Mehrzahl axial verlaufender Abschnitte 32 mit bogenförmigem Querschnitt unterteilt, die gemäß einem zylindrischen (vorzugsweise kreiszylindrischen) Umriß angeordnet sind. Die Abschnitte 32 sind an einem Ende in einem scheibenförmigen Sockel 34 derart verankert, daß zwischen ihnen jeweils ein Längsschlitz 33 frei bleibt. Die Anzahl der Längsschlitze 33, sowie diejenige der Abschnitte 32 entspricht der Anzahl der Rippen 19 der zugeordneten Rundbürste. Der Mantel 31 wird so auf die Bürste 12 aufgeschoben, daß die Borsten 22 durch die Längsschlitze 33 des Mantels teilweise nach außen ragen.

Wie aus Fig. 3 hervorgeht, ist der wärmeleitende Mantel 31 so ausgebildet, daß sein äußerer Umriß sich zwischen den Wurzeln und den Spitzen der Borsten 22 befindet, d. h. die Wurzeln der Borsten 22 sind von dem Mantel 31 um einen merklichen Abstand nach innen verlegt.



BNSDOCID: <DE 2559697A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 217 of 2286

Die Bürste zusammen mit dem aufgeschobenen Mantel erhöht den Wärmeübergang von der durch die Luftführungskanäle 20 strömenden heißen oder kalten Luft zu den auf die Bürste 12 aufgewickelten Haaren. Da nämlich die gekrümmten Abschnitte 32 des Mantels 31 aus einem wärmeleitenden Material bestehen, werden sie von der auf die Innenflächen der Abschnitte 32 auftreffenden Heißluft gut erwärmt und geben diese Wärme rasch an die auf sie aufgewickelten Haare weiter. Die gekrümmten Innenflächen der Abschnitte 32 unterstützen den Wärmeübergang von dem durch das Gebläse 11 geförderten Luftstrom.

In den Abschnitten 32 sind vorzugsweise viele nebeneinander liegende Löcher 35 vorgesehen, durch welche die durch die Führungskanäle 20 zugeführte Heißluft nach außen strömen kann. Dadurch, daß die Luft sowohl durch die Löcher 35, als auch durch die Längsschlitze 33 austreten kann, wird eine hervorragende Ventilation der aufgewickelten Haare und damit eine rasche Trocknungswirkung erzielt.

Die freien Ende der Abschnitte 32 an der dem Sockel 34 abgewandten Seite des wärmeleitenden Mantels 31 können federnd über den Umfang des Sockels 17 der Bürste 12 geschoben und dort eingerastet werden. In dieser Stellung trifft der durch die Durchlaßöffnungen 21 des Sockels 17 austretende Luftstrom über die Kanäle 20 auf die Innenfläche des im wesentlichen zylindrischen Mantels 31, heizt die verschiedenen Abschnitte 32 auf und gelangt durch die Schlitze 33 und die Löcher 35 zu den auf den Mantel 31 aufgewickelten und von den Borsten 21 gehaltenen Haaren, um diese zu erwärmen und zu trocknen.

Durch den aufgeschobenen Mantel sind die Wurzeln der Bürsten 22 geschützt, so daß die Haare sich nicht in diesen



ENSDOCID: <DE 2559697A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 218 of 2286

Wurzeln verfangen können. Auch stehen die Abschnitte 32 des Mantels 31 in einem größeren Bereich in Berührung mit den Haaren als bei normalen Frisierstäben, so daß die Wärme nicht nur unmittelbar von dem Heißluftstrom, sondern auch von dem Mantel 31 auf die Haare übergeht. Dieser doppelte Wärmeübergang gewährleistet, daß eine gute Lockenbildung auch dann eintritt, wenn die Haare dicht auf den Mantel gewickelt sind, zumal der Luftstrom einen hohen Austrittsquerschnitt vorfindet und so von den dicht gewickelten Haaren nicht im Übermaß behindert werden kann.



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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 219 of 2286

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2559697

Nummer: 25 59 697
Int. Cl.²: A 45 D 20/52
Anmeldetag: 8. August 1975
Offenlegungstag: 28. Juli 1977

Fig. 1

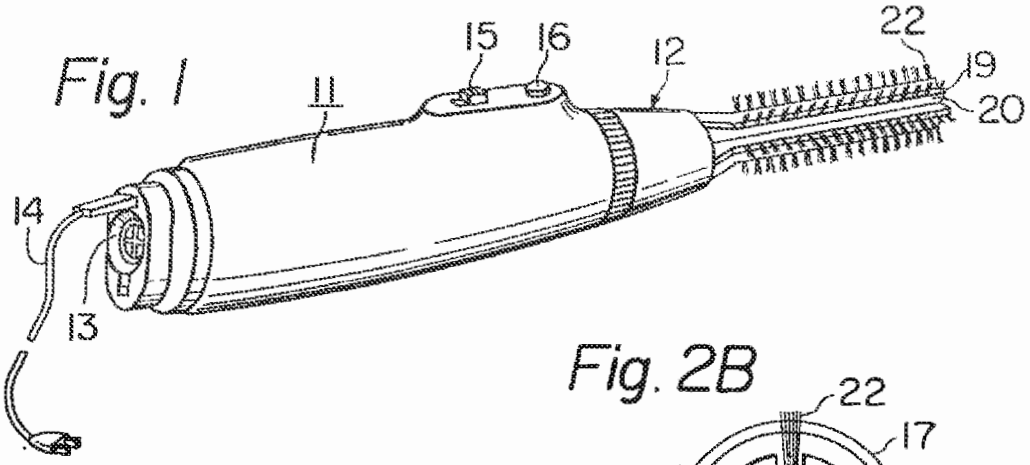



Fig. 2B

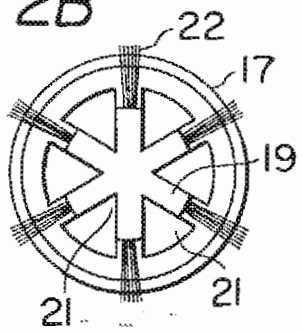



Fig. 2A

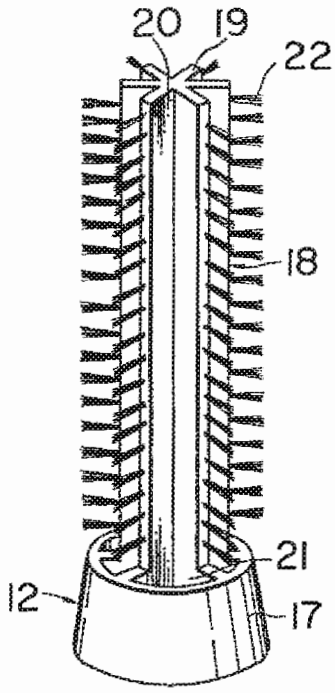



Fig. 2C

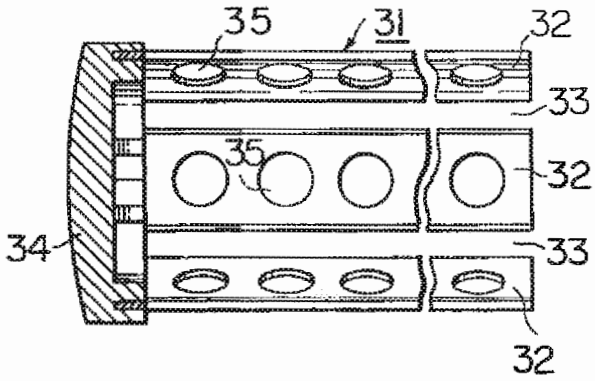
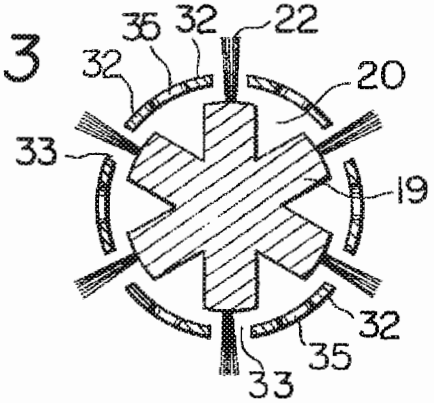



Fig. 3






BNSDOCID: <DE 2559697A1_1_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 221 of 2286

# PATENT SPECIFICATION (11) 1 489 723

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(72) Inventors HOWARD RICHARD SHAFFER
JOHN AARON ZIMMERMAN Jr.
ROBERT HOUSTON FRANTZ


## (54) IMPROVEMENTS IN AND RELATING TO ELECTRICAL CONNECTOR ASSEMBLIES


(71) We, AMP INCORPORATED, a corporation organised and existing under the laws of the State of New Jersey, United States of America, of Eisenhower Boulevard, Harrisburg, Pennsylvania, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:


The present invention relates to electrical connector assemblies.

According to one aspect of the present invention, an electrical connector assembly comprises a socket and a bipartite plug, a forward and rear a part of the plug being joined together but capable of relative rotational movement, the socket having a cavity at its forward end adapted to receive a forward portion of the bipartite plug when the plug and socket are mated and the forward and rear parts of the plug are in a first relative position with an external lug on each part in axial alignment, so that during mating, the lugs move along a groove formed in a surface of the cavity, and that after mating the rear part of the plug is rotatable relative to the forward part to cause the lug on the rear part to move along a slot formed in the surface of the cavity and communicating with the groove to latch the plug to the socket.

According to a further aspect of the present invention, an electrical connector assembly comprises a socket and a plug, the socket including a housing of insulating material and at least one electrical contact received within a passageway extending from a rear surface of the housing towards the opposite front surface of the housing, a portion of the contact extending from the passageway into a cavity in the housing which cavity is open to the front surface, a groove formed in a surface of the cavity and extending from the front surface inwardly towards the rear surface, a slot in the surface of the cavity communicating with the groove and extending normally from the groove, the plug including a plug housing having a through passageway receiving an electrical contact and a plug cover extending rearwardly of the plug housing both the plug housing and the plug cover being of insulating material and joined together but capable of relative rotational movement between a first position at which an external lug on the plug housing is in axial alignment with an external lug on the plug cover and a second position at which the lugs are out of alignment, on mating engagement of the plug and the socket, the plug enters the cavity in the socket when the plug housing and the plug cover are in the first position, the lugs moving along the groove in the cavity until the electric contact in the plug housing engages the electrical contact portion in the cavity, the plug cover then being rotated relative to the plug housing to the second position so that the lug on the plug cover moves along the slot to latch the plug to the socket.

Embodiments of the invention will now be described, by way of example, reference being made to the Figures of the accompanying diagrammatic drawings in which:—

Figure 1 is a perspective view of an electrical connector assembly;

Figure 2 is an exploded perspective view of the assembly of Figure 1 with a plug disconnected from a socket;

Figure 3 is an exploded perspective view of the plug of Figure 2;

Figure 4 is a side elevation, partly in section of the plug and a power cable partially in assembled condition;

Figure 5 is a view similar to Figure 4 of the plug and power cable in the assembled condition;

Figure 6 is a cross section on the line 6-6 in Figure 1 showing the electrical connector


SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 222 of 2286

assembly in the assembled but unlatched condition;

Figure 7 is a view similar to Figure 6 showing the assembly in the assembled and latched condition;

Figure 8 is an exploded perspective view of a housing forming part of an electrically powered device and a modified socket;

Figure 9 is an exploded perspective view of a modified socket and an apertured panel; and

Figure 10 is a cross-section of the modified socket of Figure 9 assembled in the apertured panel and having a sealing member mounted therearound.

As shown in Figures 1 and 2, an electrical connector assembly comprises a socket 14 and a bipartite plug 12.

The socket 14 includes a housing of insulating material formed from two shell parts 18, 20. When the shell parts 18, 20 are operatively jointed together they define three passageways 16 extending from a rear surface 21 of the housing towards the opposite front surface 23 of the housing. Slots 50, 52 are formed in the shell parts 18, 20 transversely of the passageways 16 and receive a retaining plate 48. Three electrical contacts 42 each terminating a wire 40 are held in a predetermined spaced, parallel array by the retaining plate 48 so that each contact 42 is received within an individual passageway 16. The front pin portion of each contact 42 extends from its passageway 16 into a cylindrical cavity 22 in the housing which cavity 22 extends rearwardlyfrom the front surface 23.

A pair of diametrically opposed grooves 24, 26 of different sizes is formed in the surface of the cavity 22 and extends the length of the cavity 22 inwardly from the front surface 23. Slots 28 in the surface of the cavity 22 each communicate with a groove 24, 26 and extend normally to the groove peripherally of the cavity 22. Across the width of each slot 28 is a detent 32.

Referring also to Figures 3 to 5, the plug 12 includes a plug housing 68 and a plug cover 66 extending rearwardly of the plug housing. The plug housing 68 and plug cover 66 are both made from electrically insulating material.

The plug housing 68 is generally cylindrical with through passageways 104 extending from a front to an opposite rear surface. On the outer cylindrical surface are a pair of diametrically opposed lugs 110, 112 adjacent the front surface and a pair of diametrically opposed projections 116 spaced rearwardly from the lugs 110. The lugs 110, 112 are of different size and correspond to the grooves 26, 24. Each projection 116 has a rearwardly facing sloping surface 132. A pair of diametrically opposed flexible straps 122 extend rearwardly from the rear surface of the plug housing 68 and each terminates in a member 118 having a surface 128 formed with serrations.

The plug cover 66 has a central through passage having a first forward cylindrical portion 72, a second rear cylindrical portion 76 and an intermediate tapered portion 74. Immediately adjacent the forward end of the plug cover 66 on the outside surface are a pair of diametrically opposed lugs 78, 80 of different sizes corresponding to the grooves 26, 24. Spaced rearwardly from the lugs 78, 80 are a pair of diametrically opposed peripheral elongate through slots 82. An annular flange 86 extends around the cover 66 rearwardly of the slots 82. Immediately behind the flange 86, serrations 88 are formed in the outer surface of the cover 66.

The rear of the plug cover 66 is formed as a flexible guard 77.

A power cable 90 is passed through the passage in the cover 66 (see Figure 3) so that contact sockets 98 each terminating a wire 92 extend forwardly from the cover and are within the passageways 104 of the plug housing 68. The housing 68 is then pushed into the forward cylindrical portion 72 until the projections 116 each latch in a respective slot 82. The surfaces 132 in effect, open the cover 66 during the insertion operation. The members 118 are forced by the walls of the tapered portion 74 into engagement with the sheath of the cable 90 the seration in the surfaces 128 biting into the cable sheath to provide a strain relief effect.

A sealing washer 126 can be threaded over the cable 90 and positioned in the tapered portion 74 adjacent the cylindrical portion 76 to enhance the sealing of the cable in the plug.

By gripping the plug cover 66 about the serrations 88 and twisting, the cover 66 can be rotated relative to the plug housing 68, the projections 116 moving relatively along the elongate slots 82 between a first position at which the lugs 110, 78; 112, 80 are in alignment and a second position at which the lugs 110, 78; 112, 80 are out of alignment.

Referring also to Figures 6 and 7, with the plug housing and plug cover in the first position the plug 12 is inserted into the cavity 22 with the lugs 110, 78; 112, 80 sliding along the grooves 26, 24. When the plug 12 is fully inserted into the cavity 22 and the pin portions of the contacts 42 are received in the contact sockets 90, the plug cover 66 is rotated relative to the plug housing 68 so that the lugs 78, 80 pass along respective slots 28 and over the detents 32 to lach the plug 12 to the socket 14.

The socket 14 can be enclosed in the

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 223 of 2286

housing of any suitable electrical appliance such as a drill, sander, saw, hairdryer, vacuum cleaner or kitchen appliance.

Figure 8 shows a modified socket 133, namely a drop-in socket which has an outer configuration adapted to be received in a profiled cavity 134 defined by housing portions 136, 138 of an electrically powered hand drill. The drop-in socket 133 has an outer profile which is received in the profiled cavity 134 with integral projections 140 mating in respective recesses 142 of the housing to secure the socket 133 against both rotational and axial movement within the housing. The interior of the socket 133 is substantially identical to that of the previously described socket 14 and includes a cavity 144, diametrically opposed grooves 146, 148 and slots 150. While the drop-in socket 133 has been shown as a unitary molded member, clearly this could be a two-piece molded member.

An advantage of the electrical connector assemblies described with reference to Figures 1 to 7 and 8 is that one power cable fitted with a plug 12 can be used with any number of electrical appliances fitted with a socket 14 or 133. Until recently, most electrical appliances have been provided with permanently attached power cables and since many of these power cables are heavy duty cables, they are expensive and also difficult to fold away into storage.

A further socket 152 is shown in Figures 9 and 10. The socket 152 has an interior adapted to receive the plug 12 and includes a cavity 154 having a pair diametrically opposed grooves 156, 158, slots 160 and detents 162. The exterior of the front portion 164 of the socket 152 is subsantially cylindrical while the rear portion 166 is profiled to include a keying projection 168 and locking lances 170. A panel 172 includes a profiled aperture 174 including a keying recess 176.

The socket 152 is mounted in the panel 172 as shown in Figure 10. The keying projection 168 is aligned with the keying recess 176 and the rear portion 166 of the socket 152 is pushed through aperture 174 until the locking lances 170 engage the rear surface of the panel.

A resilient sealing member 178 shown in Figures 10 is generally cylindrical having inwardly directed, annular flanges 182, 184 at the opposite ends thereof. Each of the flanges 182, 184 is provided with a plurality of annular, outwardly directed ridges 186, 188 respectively. The sealing member 178 is slipped over the front portion 164 of the socket 152 with the ridges 186, 188 outwardly orientated. The socket 152 is mounted in panel 172, as previously described. The ridges 186 engage the panel face to provide an environmental tight seal therebetween. Likewise, when a plug 12 is assembled in the socket 152, the ridges 188 will form an environmental tight seal between the plug and socket 152.

WHAT WE CLAIM IS:—

1. An electrical connector assembly comprising a socket and a bipartite plug, a forward and a rear part of the plug being joined together but capable of relative rotational movement, the socket having a cavity at its forward end adapted to receive a forward portion of the bipartite plug when the plug and socket are mated and the forward and rear parts of the plug are in a first relative position with an external lug on each part in axial alignment so that during mating, the lugs move along a groove formed in a surface of the cavity, and that after mating the rear part of the plug is rotatable relative to the forward part to cause the lug on the rear part to move along a slot formed in the surface of the cavity and communicating with the groove to latch the plug to the socket.

2. An electrical connector assembly comprising a socket and a plug, the socket including a housing of insulating material and an electrical contact received within a passageway extending from a rear surface of the housing towards the opposite front surface of the housing, a portion of the contact extending from the passageway into a cavity in the housing which cavity is open to the front surface, a groove formed in a surface of the cavity and extending from the front surface inwardly towards the rear surface, a slot in the surface of the cavity communicating with the groove and extending normally from the groove, the plug including a plug housing having a through passageway receiving an electrical contact and a plug cover extending rearwardly of the plug housing both the plug housing and plug cover being of insulating material, and joined together but capable of relative rotational movement between a first position at which an external lug on the plug housing is in axial alignment with an external lug on the plug cover and a second position at which the lugs are out of alignment, on mating engagement of the plug and the socket, the plug enters the cavity in the socket when the plug housing and plug cover are in the first position, the lugs moving along the groove in the cavity until the electrical contact in the plug housing engages the electrical contact portion in the cavity, the plug cover then being rotated relative to the plug housing to the second position so that the lug on the plug cover moves along the slot to latch the plug to the socket.

3. An electrical assembly as claimed in Claim 1 or 2, in which a detent is formed in the slot, the lug riding over the detent during its movement along the slot.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 224 of 2286

4. An electrical connector as claimed in Claim 2 or 3, in which the plug cover has a through passageway having a first forward relatively large cylindrical portion, a second rear relatively small cylindrical portion and an intermediate tapered portion joining said first and second portions, the first portion receiving a rear portion of the plug housing, the plug housing having a latching projection which engages in a peripheral elongate slot in the plug cover to join the plug cover to the plug housing.

5. An electrical connector as claimed in Claim 4, in which a pair of members are provided each attached to the plug housing and extending rearwardly therefrom within the plug cover into the intermediate portion of the passtageway where they engage a cable when the cable is operatively inserted through the passage in the plug cover.

6. An electrical connector assembly as claimed in Claim 4 or 5, in which a seal is provided in the passageway at the intermediate portion for extending around a cable when operatively inserted through the passageway into the plug cover.

7. An electrical connector assembly as claimed in anyone of Claims 4, 5 or 6, in which a rear portion of the plug cover is formed as a resilient guard for protecting a cable when operatively inserted through the passageway in the plug cover.

8. An electrical connector assembly as claimed in anyone of Claims 1 to 7, in which the socket is housed within an electrical appliance, the appliance having an aperture to permit the plug to be mated with the socket.

9. An electrical connector assembly as claimed in any one of Claims 1 to 7, in which the socket is mountable in an aperture of an apertured panel.

10. An electrical connector assembly constructed and arranged substantially as hereinbefore described with reference to and illustrated in Figures 1 to 7 or Figure 8 or Figures 9 and 10 of the accompanying drawings.

For the Applicants:
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Chartered Patent Agent.

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 225 of 2286

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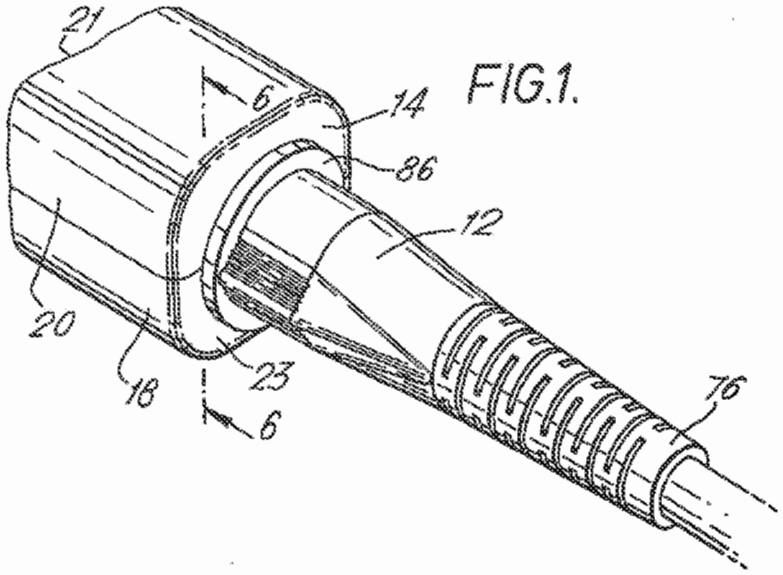
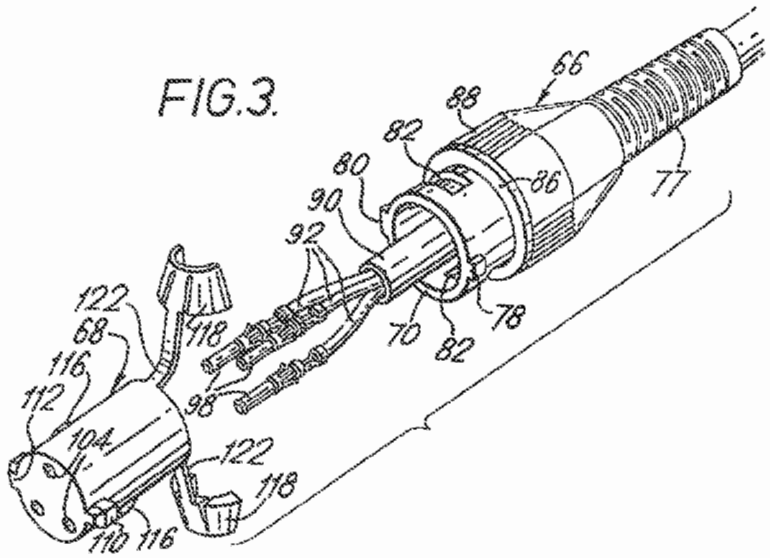



FIG.1.

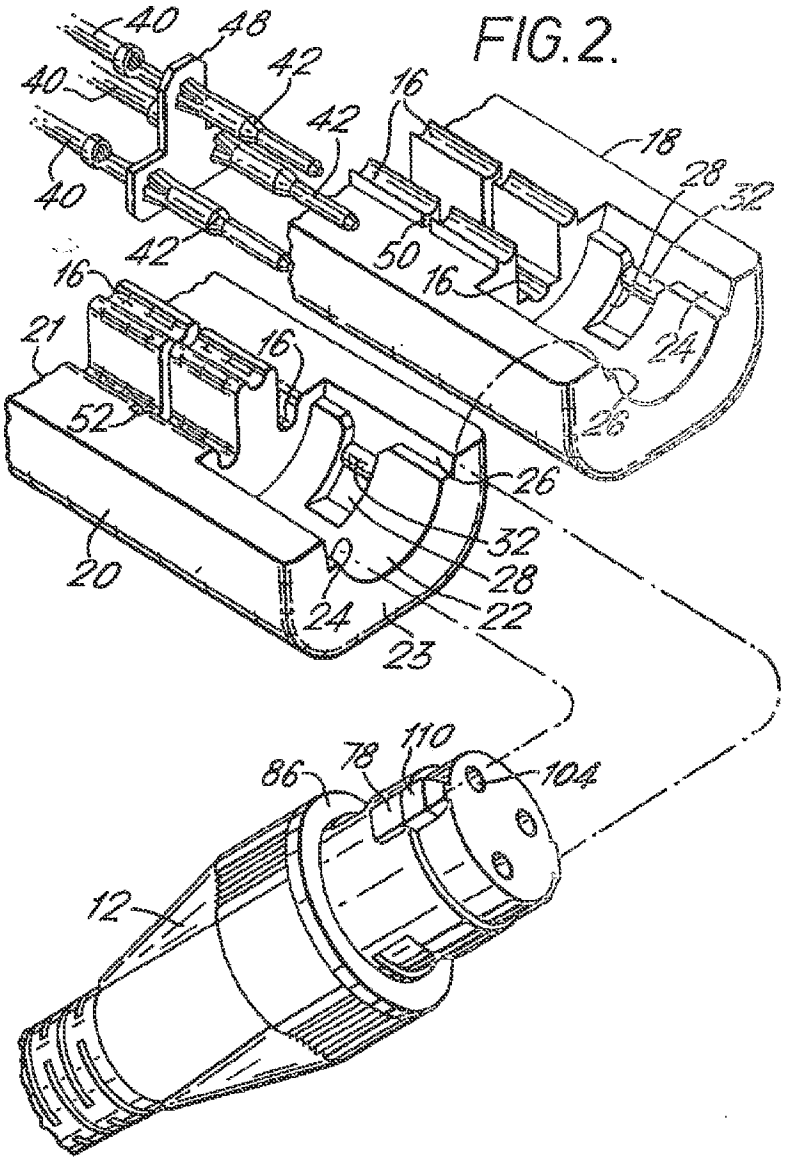
FIG.3.




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 226 of 2286

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SHEET 2

FIG. 2.




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 227 of 2286

FIG.4.

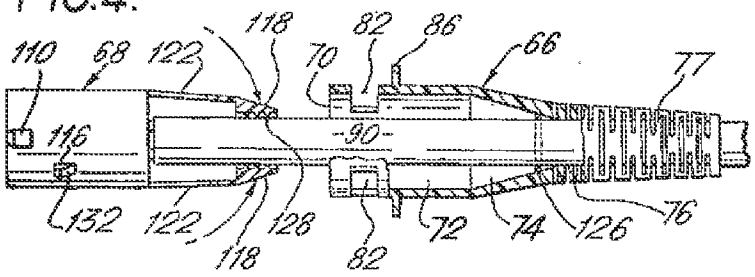



FIG.5.

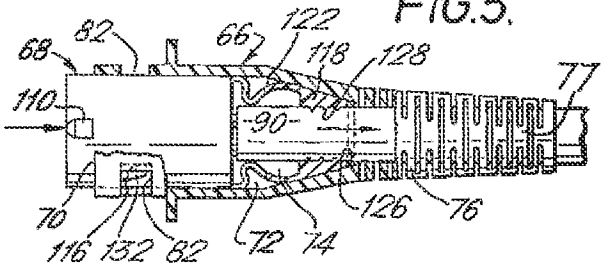
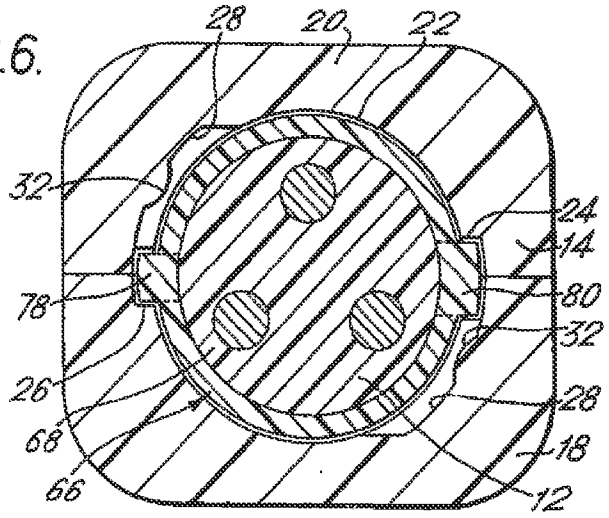


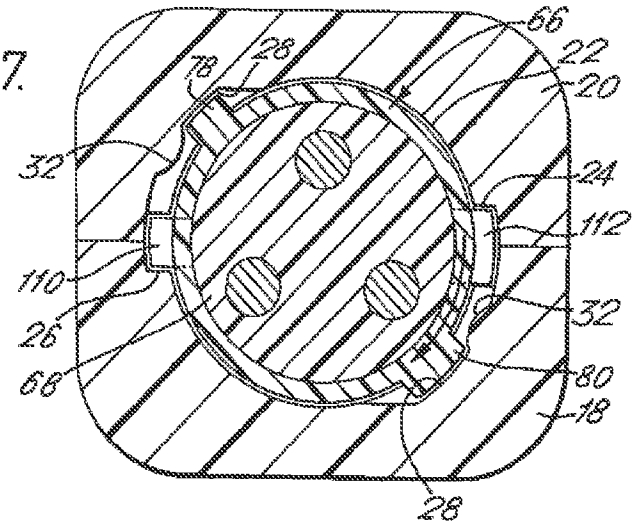

FIG.6.




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 228 of 2286

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SHEET 4

FIG.7.



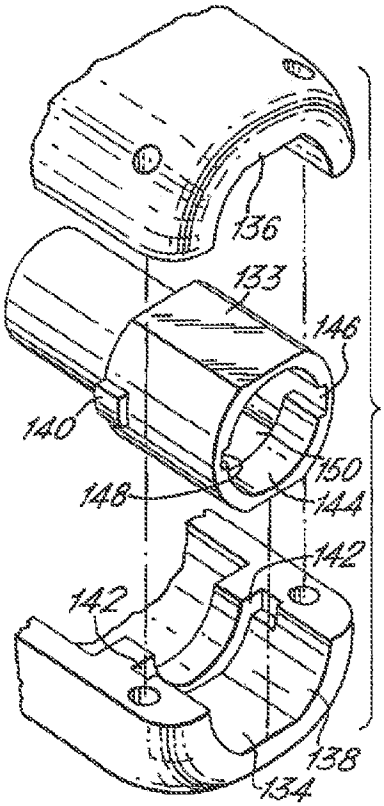




FIG.8.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 229 of 2286

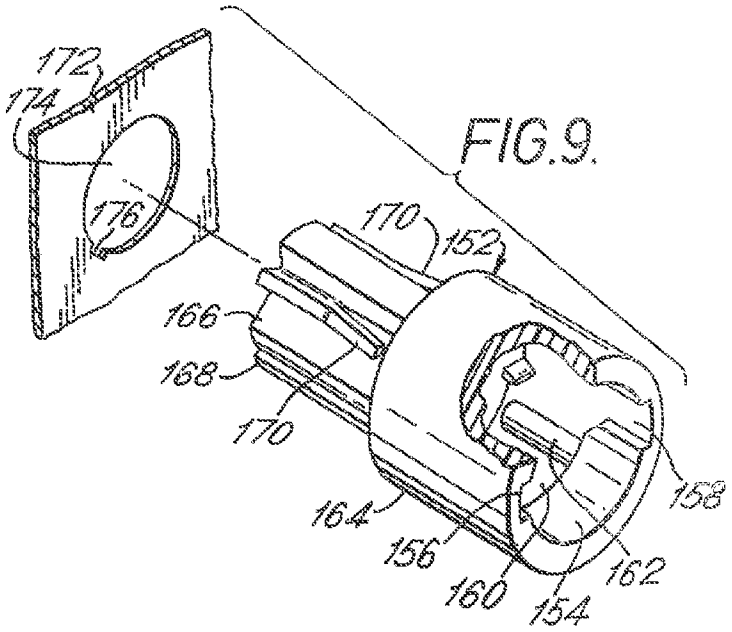
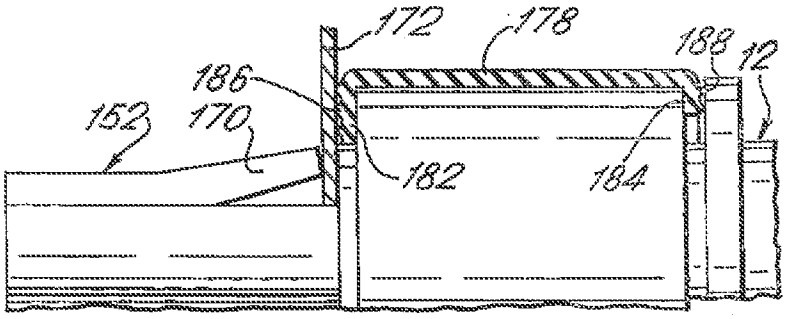



FIG.9.

FIG.10.




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 230 of 2286

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# DESCRIPTION DE2618819

Electrical Haartrockengerät1?

Has hair drying device according to the invention is essentially an electrical device for generating a hot-air stream, said apparatus comprising an axial fan motor, which is housed in the end part of a substantially cylindrical housing.

This motor is held in the fan housing by means of curved guide vanes which are located between the outer surface of the motor and the inner surface of the housing and connecting the two surfaces.

Further, the electric hair drier or an electric heating element, which is located in the cylindrical or tapered front part of the housing.

Said electrical heating element consists of a winding of a wound on a support tape-shaped l.fiderstandes, wherein the flat side of all coils forming the outer surface of a cylinder, a prism or a cone or truncated pyramid, which extends parallel to the air flow, in turn, the housing inner wall follows.

Each turn is separated from the next one by a gap.

Furthermore, additional devices can be attached to the electric hair dryer, and although at the exit end of the air flow yet, zzie example, a brush with a star-shaped cross-section of a Föhnkamm, a round or slit and the like.

Many electric hairdryer, particularly for domestic use, have a pistol-shaped housing, from whose mouth the warm air is blown out.

The back of the grip of the pistol-shaped housing generally is an air blower, while the electric heating element is housed in the pipe of the pistol-shaped housing.

The electric power is supplied to these devices through an electric cable and a switch, which are also arranged in the handle of the gun-shaped housing.

It is also known that the hot air outlet of such hair dryers to fit a cylindrical or cone-shaped brush, which can be inserted between the strands of hair to be treated.

These brushes offer the possibility to accelerate the drying of the hair and at the same time to brush the hair to smooth or curl.

To this end, brush and hair drier are undulating moves.

In this type of hair drying apparatus, the brush is usually removable so that the device can be used depending on the needs and desires, with or without brush.

Haartrocknernv to have been developed a non-disabled ursprünglichfllr air flow from the mouth, wherein the flow resistance is increased, and reduces the amount of air supplied by the drying apparatus.

The initial amount of air can be reached in such cases, only again when larger fans and electric motors are used in the Hair Dryers, requiring in turn larger U44 heavier casing, thus making the dryer clumsy and unwieldy.

Other devices that are equipped with combs or sausages and have a substantially oblong-round shape, can be equipped due to their shape only with hot air blower units of low efficiency and performance.

This results in an object to an electric hair drier having a device for fixing accessories, such as brushes, combs, and to develop the like, wherein the air stream, only a small resistance is opposed to and the hair dryer in a convenient-to-handle housing, a small fan and a small engine, capable of promoting a greater quantity of air.

It has been found, an electric hair drier, which consists of: a housing in the form of a hollow cylinder or cone, or a combination of both the molding at the rear end of the air inlet openings and, at its other end, a circular

Has air outlet, a fan device> consisting of a

Electric motor having a diameter which is smaller than the inner diameter of the housing and a motor shaft fixed to the axial

Impeller coaxial with the housing in the

Vicinity of the air inlet openings is arranged, a cylindrical or cone-shaped electrical heating element, which in the front part of the co-axial with the housing in the space between

Blower means and the discharge opening is arranged is and radially to a line extending from a fixed winding support, made of a nonconductive and heat-resistant material in the form of at least four longitudinal ribs extending from a joint line along the housing axis, the substantially parallel and in particular a distance from the housing wall and extending a strip-shaped resistor, which is wound into spirals on said winding support on the outer edges of the radial ribs, whereby the strip surface is directed substantially parallel to the housing wall and the air flow.

The fan means comprises an electric motor which is provided on its outer side with fixed, curved air guide surfaces, which are attached either directly or indirectly on the motor housing, and stop the motor in the housing of the electric hair dryer.

On the axis of the motor axial fan is mounted, which is located in the immediate vicinity of the air inlet openings.

Particularly advantageous is an embodiment of the inventive hair dryer appliance, the outer housing is in the form of a long-coated truncated cone which is closed at its end by a rounded cap stronger.

This cap has an air inlet opening to a plurality of slots, which may be disposed concentrically or radially.

In this cap, particularly in the non-permeated part of slots or openings for the medium current supply cables .. be provided and a switch.

Furthermore, the cap, in particular if it is provided with concentrically arranged slits have also radially extending reinforcing ribs.

The cap is removably connected to the truncated cone-shaped housing, for example by means of screws or threaded.

The free end of the housing is provided with a Hinterschneiduagversehen to which a short conically verjUngendes anschliet part whose outer surface advantageously forms an angle of about 210 with the center axis of the housing.

This conically tapered part takes on an appropriately getormtes, Mountable, hollow connector, the inner opening flush adjoins the inner opening of the housing.

This hollow Anschlubteil can be configured as slot die or as Rundddse, which opens in the latter case the connector out like a trumpet after its free end.

In addition, the hollow connector member may be provided in its inner opening with several spoke-like and equi-spaced radial ribs, with the core of a cylindrical Bdrste resources, or as a Föhnkamms or Ondulierstabes are firmly connected, or form a unit with these.

The cylindrical brush advantageously consists of a rigid central core from which several, preferably out eight radial ribs star-shaped.

These ribs are to include the same angle with each other whose vertex is on the central axis of the brush.

In the outer edges of said ribs bristles are embedded such that their free ends are located in the lateral surface of an imaginary cylinder whose central axis coincides with the central axis of the fixed central core of the brush.

The free end of the brush is covered with a flat plate which is attached to the central core, or forming one piece with this.

The diameter of this disc should be larger than that of the central core of the brush, but smaller than that of the imaginary cylinder in the lateral surface of the free ends of the bristles lie.

The radial ribs of the hollow connection piece, bearing the brush, are advantageously arranged such that they each connect the inner surface of the hollow connecting portion fixedly connected to the outer edge of one of the ribs of the brush.

In this way it is ensured that the conveyed out of the housing the air flow is blown into the intermediate spaces, which are enclosed by the star-shaped except after emerging bristle rows.

Normally four radial ribs are sufficient to give the brush a safe hit.

Also for the brush, it has proven when the hollow connector opens out like a trumpet after his, the brush end facing.

Designed as a connecting part Föhnkamm, or curler may be mounted in the hollow connector section in the same manner as the brush.

However, it is also possible to provide a covering of the hollow connector section in such a manner that a part or the entire air flow of the inventive hair dryer unit in the hollow upper part of the comb

or the curler hollow to be blown.

Both the comb and the curler must then be provided with openings which allow the flow of air can escape so that it is directed at the hair to be treated.

The housing and the other parts of the hair drying device of the invention will be beneficial made of a material with low weight, such as plastic or light metal.

In the housing, a blower means is arranged and fixed, comprising an electric motor and an impeller.

For fixing the electric motor on its outer side with fixed and for the purpose of guiding air optionally curved wings may be provided, which are fixed to the inner wall of the housing and hold the motor in the housing.

The impeller is mounted on the axis of the motor, it is in the immediate vicinity of the air inlet openings.

After the free end of the housing is the HeizOfltnt - seen in the direction of air flow - is arranged behind the engine and is fastened by means of webs on the housing inner wall.

The heating element consists of a winding support, which is formed by two trapez5xörmigen plates of non-conductive and heat-resistant material, which are joined together in their midst so that they have seen in cross-section form a cross of radial ribs, the arms of which enclose a right angle.

Of course, several of such panels can be provided instead of the two trapezium-shaped plates, which are also joined together at their center, wherein the angle between the radial ribs to be the same.

The outer edges of the radial ribs are formed such that they extend in parallel in the distance of the inner wall of the housing gleichmXtgen.

Furthermore, these outer edges of the bobbin advantageously have at equal intervals flat, preferably rectangular recesses that are shaped so that they can take a turn of a ribbon-shaped resistor, respectively.

The width of this ribbon-shaped resistor to be a multiple of its thickness.

With this structure, the heating element to reach a minimum of flow resistance, since the end face of which the air flow opposes the strip-shaped resistance, in comparison to the total heat exchange area is very small IST7 there are between the adjacent turns of the coil air gaps, and

thus a high heat exchange coefficient is achieved.

These gaps disrupt the interface that would otherwise form a smooth surface and to create turbulence of the air flow, resulting in a good heat transfer.

This fact allows the use of a smaller heat-exchanging surface, with a given, but the air-bearing wattage and hence lesser dimensions for all of the hair drier.

In the accompanying drawings an embodiment of the inventive hair dryer apparatus is illustrated schematically.

In the drawings:

Figure 1 is a longitudinal sectional view of a hair drier with a conical body and cylindrical brush attached thereto, wherein the inner part and

Brush are shown in side view

Figure 2 is a plan view of the cover of the housing

Figure 3 is a plan view of the free end of the brush,

Figure 4 is an isometric view of a partially coiled heating element,

Figure 5 shows a portion of the rib edge of the bobbin,

Figure o the isometric view of a partially wound conical heater.

With reference to the Figures 1, 2 and 3, the hair dryer unit has a cone-shaped hollow body 1, which is preferably injection molded from plastic.

On its front side the housing 1 has an exit opening 10 and at its rear end with a removable lid 11.

This cover 11 is pierced by the air inlet openings 12 which are disposed around a solid central portion 13 which carries a cable 14 and a switch 15.

A blower unit 2 is mounted inside the rear housing end.

It consists of a cone-shaped fan housing 20 whose rear end is open, so that the air has access, which is mounted in the rear end of the housing 1.

An electric motor 21 is housed in the front portion of the blower housing 20 and connected in this position by a plurality of ribs 23 in the form of aerodynamic profiled curved Luftleitflügeln fixed to the blower housing 20.

25 is seated on the motor shaft, an axial fan 26 which is capable of in the fan housing 20 with a narrow air gap between the ends of the fan blades and the inside of the fan housing 20 to rotate.

An electrical line leads from the switch 15 for connection to the electric motor 21,

Before the blower, an electric heating element is 3

It is mounted in the front space of the housing 1 and consists of a winding carrier 3 in the form of two trapezoidal plates 31 intersect at right angles and are put together in their middle, thereby four radial fins 32, 32 ', 32 '', 32ltt ( see Figure 6) form.

In the outer edges of the ribs a plurality of shallow recesses 33 are provided, each of which contains a winding of a thin band-shaped resistor 34.

The front end and the rear end of the plates 31 are extended and project beyond the edges of the ribs to the inner wall of the housing has corresponding recesses for receiving the said lugs.

An electric line 37 connects the front end of the resistance winding the cable 14, while the rear end of the winding is connected via the line 38 to the second terminal of the electric motor.

A cylindrical brush 4 is attached to the outlet end 10 of the housing 1 by means of a hollow flared trumpet-like molded article 41, which is pushed abruptly via an external annular undercut 18 of the housing end.

The brush 4 consists of a solid center core 42, a star shape out of the eight radial ribs 43.

The front end of the brush 4 is covered by a flat plate 44 which is fixed to the central core 42.

In the radial outer edges of the ribs 43 the bristles 45 are inserted, which form a brush of cylindrical shape.

The shaped part 41 is fixedly connected to the brush 4 through four radial fins 46 which extend between the outer edge at the rear end of four bristle-carrying ribs 43 to the inside of the trumpet-shaped molding 41 and are thus connected test.

Ertindungsgemässe the hair drying apparatus operates as follows: The axial fan 24 draws air through the inlet openings 12, and conveys it to the exit end 10 of the housing 1

The curved around the motor 21 guide vanes 23 are configured such that they direct the flow of air from a circular direction in an axial direction through the cone-shaped heating element 3.

The conical design of the housing 1 serves to accelerate the air so that it enters through the outlet opening into the spaces 47 formed between the ribs 43 of the brush 4, and from there through the bristles 45 into the material to be dried hair.

The respective shapes of the brush and the heating element are the factors that determine the reduction of the flow resistance in the hair drier.

It is easy to remove the brush, for example, in the drawing, the produced flowing from the outlet opening 10, air in the gaps 47 in a uniform, axial flow is maintained and then slowly passes through the bristles outwards without undergoing a sudden restriction, or change in direction , as is the case with tubular brushes previously used.

Many modifications and changes in the structure of the present invention Huartrockners can be made by one skilled in the art, without that this concept of the invention and the scope of the claims will be left.

As well as a slit or circular nozzle may be mounted on the outlet end of the housing instead of the brush.

The round brush can also be replaced by a Föhnkamm or a styling brush with clip device, the air in the case of Föhnkamms through his back into the wound directly on the bar on the teeth and in the case of Frisierst abs by the measures provided for in this bar slots Hair is conducted.

Further, for example, also be designed in a cylindrical form the outer casing.

The carrier for the Zeiz development can be more than four ribs, such as six or eight have.

Also the heating element or the resistance may have more than one connector at each end, so that the heating element can be charged in different ways and size.

It is also possible to change the number of the brush rib according to the requirements and in accordance with the diameter and length of the brush.

Instead of the axial fan can also Diagonalgebläserad be employed if a higher pressure of the outflowing air to be achieved.

By the cylindrical-conical shape of the housing and by the guide surfaces to the motor can be

produced with the inventive hair drier, a highly accelerated airflow with minimum expenditure of energy.

Due to the particular type and the special construction of the heater, this flow of air heated to the time inkürzester vorbedtimmte temperature and maintained at this temperature.

Due to the special configuration and arrangement of the heating coil, and the large contact area with the air flow an optimal utilization of the electrical energy supplied to the heater is guaranteed.

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## CLAIMS DE2618819

Patent speech Electric hair drier, consisting of:

A housing in the form of a hollow cylinder or cone, or a combination of these two forms, the other at one end and at the LuEtaustrittsörEnungen

End is provided with a circular air outlet of a blower unit, comprising an electric motor with respect to the one of the lnnendurchmesscr

Housing of smaller diameter, and a total axial impeller, which is fixed on the motor shaft, said fan means is disposed coaxially in the part of the housing and rtickwärtigen near Lufteintrittsötfnungen, a cylindrical or kegei?

örmigen electrical

Heating element, the housing in the front part coaxially in the Ge, and is indeed located in the space between the blowing device and the Austrlttsöfnung, while the heating element is made of a test winding carrier consists of a non-conductive and heat-resistant material in the form of at least four longitudinal ribs on its a connecting line along the housing axis to a radially extending line, the union essentially parallel and at a certain height relative to the housing wall verläuPt, and a strip-shaped resistor into spirals on said winding support the

Outer edges of the radial fins is wound, the

Belt surface is directed substantially parallel to the housing wall and the air flow, the electrical line and switch means for

And power supply circuit of the fan motor and the heating element.

2 Electrical ilaartrockengerät according to claim 1, characterized in that the housing has the shape

of a long coated gelstumptes K which is closed at its higher end with a rounded cap, which as the air inlet openings comprising a plurality of slots, while the free

End of the housing is provided with an undercut, followed by a short, conically tapering AuEstik part adjoins who is able auXzunehmen an attachable and hollow connector part.

3

Electrical llaartrockengerät according to claim 2, characterized in that the hollow connection piece is a wide slot nozzle.

4 Electric hair drying apparatus according to claim 2, characterized geLennzeidrnet that the hollow connector is a after its free end like a trumpet opening molding.

5 Electric hair drier according to claim 2, characterized in that the hollow connecting portion in its inner () with a plurality of spoke-like frnung and in the same

Provided spaced radial ribs which are integral with the core of a cylindrical brush.

6 Electric hair drier according to claim 5, characterized in that the cylindrical brush consists of a solid core means of the plurality of radial

Ribs out in a star shape, in which the outer edges bristles are embedded, the free ends of a cylindrical

Forming shape, the free end of the brush is covered with a flat plate fixed to the central core, having a diameter larger than that of the central core, but smaller than that of the cylinder formed by the bristles.

7 Electric hair drier according to claim 2, characterized in that the hollow Anschlunteil is fixedly connected to the back of a hollow Föhnkamms.

X. El ektrisches hair drying apparatus according to claim 2, characterized in that the hollow Anschlusste1.l list connected to a hollow Ondulierstah, who in his

Has surface air outlet apertures.

9

Electric hair drier according Anspriichen 1 to 8, characterized in that the winding carrier of the

The heating element along the outer edges of the radial

Rib is provided at regular intervals with flat, right angled recesses which are so large that they can take a winding of the strip resistance state, respectively.

10

Electrical Ilaartrockengerät according to claims 1 to 9, characterized in that the electric motor of the blower unit is provided at its outer side with fixed vanes which are fixed on the motor housing and serve to keep the motor in the housing.

11 Electrical hair drier as claimed in claims 1 to 10, characterized in that the fan unit comprises a cylindrical casing provided at its rear

End open Urid: is closely matched in their outer Foom the inner surface of the rear housing part and a fixed wing through the front of this envelope

Having an electric motor, on whose axis an axial fan is arranged, only a narrow gap between the fan blades and the inner surface of the shell is.

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 243 of 2286

## Patentansprüche

1. Elektrisches Haartrockengerät, bestehend aus:

Einem Gehäuse in Form eines Hohlzylinders oder -kegels oder einer Kombination dieser beiden Formen, das an einem Ende mit Luftaustrittsöffnungen und am anderen Ende mit einer kreisförmigen Luftaustrittsöffnung versehen ist,

einer Gebläseeinrichtung, bestehend aus einem Elektromotor mit einem in bezug auf den Innendurchmesser des Gehäuses kleineren Durchmesser und einem axialen Gebläserad, das auf der Motorachse befestigt ist, wobei die Gebläseeinrichtung koaxial im rückwärtigen Teil des Gehäuses und in der Nähe der Lufteintrittsöffnungen angeordnet ist,

einem zylindrischen oder kegelförmigen elektrischen Heizelement, das im vorderen Teil koaxial in dem Gehäuse, und zwar im Raum zwischen der Gebläseeinrichtung und der Austrittsöffnung angeordnet ist, dabei besteht das Heizelement aus einem festen Wicklungsträger aus einem nichtleitenden und wärmefesten Material in Form von wenigstens vier längsgerichteten Rippen, die sich von einer Verbindungslinie entlang der Gehäuseachse radial bis zu einer Linie erstrecken, die im wesentlichen parallel und in bestimmten Abstand zur Gehäusewandung verläuft,und einem bandförmigen Widerstand, der in Spiralen auf den genannten Wicklungsträger über die Außenkanten der radialen Rippen gewickelt ist, wobei die Bandoberfläche im wesentlichen parallel zur Gehäusewand und zur Luftströmung gerichtet ist,

elektrischen Leitungs- und Schalteinrichtungen zur Stromversorgung und Schaltung des Gebläsemotors und des Heizelements.



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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 244 of 2286

2. Elektrisches Haartrockengerät nach Anspruch 1, dadurch gekennzeichnet, daß das Gehäuse die Form eines langezogenen Kugelstumpfes hat, der an seinem stärkeren Ende mit einer gerundeten Kappe verschlossen ist, welche als Lufteinlaß-öffnungen mehrere Schlitze aufweist, während das freie Ende des Gehäuses mit einer Hinterschneidung versehen ist, an die sich ein kurzer, sich konisch verjüngender Aufsteckteil anschließt, der ein aufsteckbares und hohles Anschlußteil aufzunehmen vermag.

3. Elektrisches Haartrockengerät nach Anspruch 2, dadurch gekennzeichnet, daß das hohle Anschlußteil eine Breitschlitzdüse ist.

4. Elektrisches Haartrockengerät nach Anspruch 2, dadurch gekennzeichnet, daß das hohle Anschlußteil ein sich nach seinem freien Ende hin trompetenartig öffnendes Formteil ist.

5. Elektrisches Haartrockengerät nach Anspruch 2, dadurch gekennzeichnet, daß das hohle Anschlußteil in seiner inneren Öffnung mit mehreren speichenartig und im gleichen Abstand zueinander angeordneten radialen Rippen versehen ist, die mit dem Kern einer zylindrischen Bürste fest verbunden sind.

6. Elektrisches Haartrockengerät nach Anspruch 5, dadurch gekennzeichnet, daß die zylindrische Bürste aus einem festen Mittelkern besteht, von dem mehrere radiale Rippen sternförmig ausgehen, in deren Außenkanten Borsten eingelassen sind, deren freie Enden eine zylindrische Form bilden, wobei das freie Ende der Bürste mit einer flachen, am Mittelkern befestigten Scheibe abgedeckt ist, deren Durchmesser größer als der des Mittelkerns, aber kleiner als der des von den Borsten gebildeten Zylinders ist.



709846/0120

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 245 of 2286

7. Elektrisches Haartrockengerät nach Anspruch 2, dadurch gekennzeichnet, daß das hohle Anschlußteil mit dem hohlen Rücken eines Föhnkamms fest verbunden ist.

8. Elektrisches Haartrockengerät nach Anspruch 2, dadurch gekennzeichnet, daß das hohle Anschlußteil mit einem hohlen Ondulierstab verbunden ist, der in seiner Oberfläche Luftauslaßschlitze aufweist.

9. Elektrisches Haartrockengerät nach Ansprüchen 1 bis 8, dadurch gekennzeichnet, daß der Wicklungsträger des Heizelementes entlang der Außenkanten der radialen Rippen in gleichmäßigen Abständen mit flachen, rechtwinkligen Aussparungen versehen ist, die so groß sind, daß sie jeweils eine Wicklung des bandförmigen Widerstandes aufnehmen können.

10. Elektrisches Haartrockengerät nach Ansprüchen 1 bis 9, dadurch gekennzeichnet, daß der Elektromotor der Gebläseeinheit an seiner Außenseite mit festen Flügeln versehen ist, die am Motorgehäuse befestigt sind und dazu dienen, den Motor in dem Gehäuse zu halten.

11. Elektrisches Haartrockengerät nach Ansprüchen 1 bis 10, dadurch gekennzeichnet, daß die Gebläseeinheit eine zylindrische Hülle aufweist, die an ihrem rückwärtigen Ende offen und in ihrer äußeren Form der Innenfläche des rückwärtigen Gehäuseteils eng angepaßt ist und einen im vorderen Teil dieser Hülle durch Flügel befestigten Elektromotor aufweist, auf dessen Achse ein Axialgebläserad angeordnet ist, wobei nur ein enger Zwischenraum zwischen den Gebläseflügeln und der Innenfläche der Hülle besteht.

12.3.1976



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 246 of 2286

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"Elektrisches Haartrockengerät"

Das erfindungsgemäße Haartrockengerät ist im wesentlichen ein elektrisches Gerät zum Erzeugen eines Warmluftstrahls, wobei dieses Gerät einen axialen Gebläsemotor aufweist, der im Endteil eines im wesentlichen zylindrischen Gehäuses untergebracht ist. Dieser Motor mit Gebläserad wird in dem Gehäuse mittels gebogener Leitflächen gehalten, die sich zwischen der äußeren Oberfläche des Motors und der inneren Oberfläche des Gehäuses befinden und diese beiden Flächen verbinden. Weiter weist das elektrische Haartrockengerät noch ein elektrisches Heizelement auf, das sich in dem zylindrischen oder sich verjüngenden Vorderteil des Gehäuses befindet. Dieses elektrische Heizelement besteht aus einer Wicklung eines auf einen Träger gewickelten bandförmigen Widerstandes, wobei die flache Seite aller Windungen die Außenfläche eines Zylinders, eines Prismas oder eines Kegel- oder Pyramidenstumpfes bilden, welche parallel zur Luftströmung verläuft, die ihrerseits der Gehäuseinnenwand folgt. Jede Windung ist von der Nachbarwindung durch einen Zwischenraum getrennt. Außerdem können an dem elektrischen Haartrockner, und zwar am Austrittsende des Luftstromes noch



709846/0120

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 247 of 2286

Zusatzgeräte befestigt werden, wie beispielsweise eine Bürste mit sternförmigem Querschnitt, einen Föhnkamm, eine Rund- oder Schlitzdüse und dergleichen.

Viele elektrische Haartrockner, insbesondere die für den häuslichen Gebrauch, haben ein pistolenförmiges Gehäuse, aus dessen Mündung die Warmluft ausgeblasen wird. Hinten am Griff des pistolenförmigen Gehäuses befindet sich meist ein Luftgebläse, während das elektrische Heizelement in dem Rohr des pistolenförmigen Gehäuses untergebracht ist. Die elektrische Energie wird diesen Geräten über ein Elektrokabel und einen Schalter zugeführt, die ebenfalls im Griff des pistolenförmigen Gehäuses angeordnet sind.

Es ist auch bereits bekannt, am Warmluftaustritt solcher Haartrockengeräte eine zylindrische oder kegelförmige Bürste anzubringen, die zwischen die Strähnen des zu behandelnden Haares gesteckt werden kann. Diese Bürsten eröffnen die Möglichkeit, das Trocknen des Haares zu beschleunigen und gleichzeitig das Haar zu bürsten, zu glätten oder zu kräuseln. Hierzu werden Bürste und das Haartrockengerät wellenförmig bewegt. Bei dieser Art von Haartrockengeräten ist die Bürste gewöhnlich abnehmbar, so daß das Gerät je nach den Erfordernissen und Wünschen mit oder ohne Bürste verwendet werden kann. An Haartrocknern, die ursprünglich für einen nicht behinderten Luftstrom aus der Mündung entwickelt worden sind, wird dadurch der Strömungswiderstand erhöht und die vom Trockengerät gelieferte Luftmenge vermindert. Die ursprüngliche Luftmenge ist in solchen Fällen nur wieder zu erreichen, wenn größere Ventilatoren und Elektromotoren in die Haartrockengeräte eingesetzt werden, die ihrerseits größere und schwerere Gehäuse erfordern und damit die Trockner plump und unhandlich machen.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 248 of 2286

Andere Geräte, die mit Kämmen oder Bürsten ausgerüstet sind und eine im wesentlichen länglich-runde Form haben, können auf Grund ihrer Form nur mit Warmluftgebläseeinheiten von geringer Effektivität und Leistung ausgerüstet werden.

Hieraus ergibt sich als Aufgabe, ein elektrisches Haartrockengerät mit einer Einrichtung zum Befestigen von Zusatzgeräten, wie beispielsweise Bürsten, Kämmen und dergleichen zu entwickeln, wobei dem Luftstrom nur ein geringer Widerstand entgegengesetzt wird und der Haartrockner in einem bequem zu handhabenden Gehäuse, mit einem kleinen Gebläse und einem kleinen Motor, eine größere Luftmenge zu fördern vermag.

Es wurde ein elektrisches Haartrockengerät gefunden, das besteht aus:

einem Gehäuse in Form eines Hohlzylinders oder -Kegels oder einer Kombination beider Formen, das an seinem rückwärtigen Ende Lufteintrittsöffnungen und an seinem anderen Ende eine kreisförmige Luftaustrittsöffnung aufweist,

einer Gebläseeinrichtung, bestehend aus einem Elektromotor mit einem Durchmesser, der kleiner ist als der Innendurchmesser des Gehäuses und einem auf der Motorwelle befestigten axialen Gebläserad, das koaxial mit dem Gehäuse in der Nähe der Lufteintrittsöffnungen angeordnet ist,

einem zylindrischen beziehungsweise kegelförmigen elektrischen Heizelement, das im vorderen Teil koaxial mit dem Gehäuse in dem Raum zwischen der Gebläseeinrichtung und der Austrittsöffnung angeordnet ist und aus einem festen Wicklungsträger,





SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 249 of 2286

aus einem nicht leitenden und wärmefesten Material in Form von wenigstens vier längs gerichteten Rippen, die sich von einer Verbindungslinie entlang der Gehäuseachse radial bis zu einer Linie erstrecken, die im wesentlichen parallel und im bestimmten Abstand zur Gehäusewandung verläuft und einem bandförmigen Widerstand, der in Spiralen auf den genannten Wicklungsträger über die Außenkanten der radialen Rippen gewickelt ist, wobei die Bandoberfläche im wesentlichen parallel zur Gehäusewandung und zur Luftströmung gerichtet ist.

Die Gebläseeinrichtung weist einen Elektromotor auf, der an seiner Außenseite mit festen, gebogenen Luftleitflächen versehen ist, die entweder direkt oder indirekt am Motorgehäuse befestigt sind und den Motor im Gehäuse des elektrischen Haartrockners halten. Auf der Achse des Motors ist ein axiales Gebläserad befestigt, das sich in unmittelbarer Nähe der Lufteintrittsöffnungen befindet.

Besonders vorteilhaft ist eine Ausführungsform des erfindungsgemäßen Haartrockengeräts, dessen Außengehäuse die Form eines langezogenen Kegelstumpfes hat, der an seinem stärkeren Ende durch eine gerundete Kappe verschlossen ist. Diese Kappe weist als Lufteinlaßöffnung mehrere Schlitze auf, die konzentrisch oder radial angeordnet sein können. In dieser Kappe, insbesondere in dem nicht von Schlitzen durchzogenen Mittelteil können noch Öffnungen für das Stromzuführungskabel und einen Schalter vorgesehen sein.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 250 of 2286

Außerdem kann die Kappe, insbesondere wenn sie mit konzentrisch angeordneten Schlitzen versehen ist, auch noch radial verlaufende Verstärkungsrippen aufweisen. Die Kappe ist mit dem kegelstumpfförmigen Gehäuse lösbar, beispielsweise mittels Schrauben oder Gewinde verbunden. Das freie Ende des Gehäuses ist mit einer Hinterschneidung versehen, an die sich ein kurzes, sich konisch verjüngendes Teil anschließt, dessen Außenfläche mit der Mittelachse des Gehäuses vorteilhaft einen Winkel von etwa 21° einschließt.

Dieses konisch sich verjüngende Teil nimmt ein entsprechend geformtes, aufsteckbares, hohles Anschlußteil auf, dessen innere Öffnung bündig an die innere Öffnung des Gehäuses anschließt.

Dieses hohle Anschlußteil kann als Breitschlitzdüse ausgebildet sein oder auch als Runddüse, wobei sich im letzteren Falle das Anschlußteil nach seinem freien Ende hin trompetenartig öffnet. Außerdem kann das hohle Anschlußteil in seiner inneren Öffnung mit mehreren speichenartig und im gleichen Abstand zueinander angeordneten radialen Rippen versehen sein, die mit dem Kern einer zylindrischen Bürste, beziehungsweise eines Föhnkamms oder eines Ondulierstabes fest verbunden sind, beziehungsweise mit diesen eine Einheit bilden.

Die zylindrische Bürste besteht vorteilhaft aus einem festen Mittelkern, von dem mehrere, vorzugsweise acht radiale Rippen sternförmig ausgehen. Diese Rippen sollen untereinander gleiche Winkel einschließen, deren Scheitelpunkt auf der Mittelachse der Bürste liegt.





SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 251 of 2286

In die Außenkanten dieser Rippen sind Borsten so eingelassen, daß deren freie Enden in der Mantelfläche eines gedachten Zylinders liegen, dessen Mittelachse mit der Mittelachse des festen Mittelkerns der Bürste zusammenfällt. Das freie Ende der Bürste ist mit einer flachen Scheibe abgedeckt, die am Mittelkern befestigt ist, beziehungsweise mit diesem ein Stück bildet. Der Durchmesser dieser Scheibe soll größer sein, als der des Mittelkerns der Bürste, aber kleiner als der des gedachten Zylinders, in dessen Mantelfläche die freien Enden der Borsten liegen.

Die radialen Rippen des hohlen Anschlußstückes, die die Bürste tragen, sind vorteilhaft so angeordnet, daß sie jeweils die innere Oberfläche des hohlen Anschlußteils mit der Außenkante einer der Rippen der Bürste fest verbinden. Auf diese Weise ist sichergestellt, daß der aus dem Gehäuse geförderte Luftstrom in die Zwischenräume geblasen wird, die von den sternförmig nach außer strebenden Borstenreihen eingeschlossen werden. Normalerweise sind vier radiale Rippen völlig ausreichend, der Bürste einen sicheren Halt zu geben. Auch für die Bürste hat es sich bewährt, wenn das hohle Anschlußteil sich nach seinem, der Bürste zugekehrten Ende hin trompetenartig öffnet.

Der als Anschlußteil ausgebildete Föhnkamm, beziehungsweise Ondulierstab, kann in dem hohlen Anschlußteil in gleicher Weise befestigt sein wie die Bürste. Es besteht jedoch auch die Möglichkeit, eine Abdeckung des hohlen Anschlußteils in der Weise vorzusehen, daß ein Teil oder der gesamte Luftstrom des erfindungsgemäßen Haartrockengerätes in den hohlen Oberteil des Kamms oder in den hohlen Ondulierstab geblasen werden. Sowohl der Kamm als auch



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 252 of 2286

der Ondulierstab müssen dann mit Öffnungen versehen sein, aus denen der Luftstrom so austreten kann, daß er auf das zu behandelnde Haar gerichtet ist.

Das Gehäuse und die anderen Teile des Haartrockengerätes der Erfindung sollen vorteilhaft aus einem Material mit geringem Eigengewicht, wie beispielsweise Kunststoff oder Leichtmetall gefertigt sein.

In dem Gehäuse ist eine Gebläseeinrichtung angeordnet und befestigt, die aus einem Elektromotor und einem Gebläserad besteht. Zur Befestigung kann der Elektromotor an seiner Außenseite mit festen und zum Zwecke der Luftführung gegebenenfalls gebogenen Flügeln versehen sein, die an der Innenwandung des Gehäuses befestigt sind und den Motor im Gehäuse halten. Das Gebläserad ist auf der Achse des Motors so befestigt, daß es sich in unmittelbarer Nähe der Lufteinlaßöffnungen befindet.

Nach dem freien Ende des Gehäuses hin ist das Heizelement - in Richtung des Luftstromes gesehen - hinter dem Motor angeordnet und mittels Stegen an der Gehäuseinnenwand befestigt. Das Heizelement besteht aus einem Wicklungsträger, der von zwei trapezförmigen Platten aus nicht leitendem und wärmebeständigem Material gebildet wird, die in ihrer Mitte so zusammengefügt sind, daß sie im Querschnitt gesehen ein Kreuz von radialen Rippen bilden, dessen Arme einen rechten Winkel einschließen. Selbstverständlich können anstelle der zwei trapezförmigen Platten auch mehrere solcher Platten vorgesehen werden, die ebenfalls in ihrer Mitte zusammengefügt sind, wobei die Winkel zwischen den radialen Rippen gleich sein sollen. Die Außenkanten dieser radialen Rippen sind so ausgebildet, daß sie im gleichmäßigen Abstand der Innenwandung des Gehäuses parallel verlaufen.





SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 253 of 2286

Außerdem weisen diese Außenkanten des Wicklungsträgers vorteilhaft in gleichen Abständen flache, vorzugsweise rechteckige Aussparungen auf, die so geformt sind, daß sie jeweils eine Windung eines bandförmigen Widerstandes aufnehmen können. Die Breite dieses bandförmigen Widerstandes soll ein Vielfaches seiner Dicke betragen. Durch diesen Aufbau des Heizelementes wird ein Minimum an Strömungswiderstand erreicht, da die Stirnseite, die der bandförmige Widerstand dem Luftstrom entgegenstellt, im Vergleich zu der gesamten Wärmeaustauschfläche sehr klein ist, da sich zwischen den benachbarten Windungen der Wicklung Luftzwischenräume befinden und auf diese Weise ein hoher Wärmeaustauschkoeffizient erreicht wird. Diese Zwischenräume unterbrechen die Grenzfläche, die sonst eine glatte Oberfläche bilden würde und schaffen Turbolenzen des Luftstroms, wodurch sich ein guter Wärmeübergang ergibt. Diese Tatsache erlaubt die Verwendung einer kleineren Wärmeaustauschfläche, bei einer gegebenen, an die Luft zu übertragenden Wattleistung und damit geringerer Abmessungen für das gesamte Haartrockengerät.

In den beiliegenden Zeichnungen ist eine Ausführungsart des erfindungsgemäßen Haartrockengerätes schematisch dargestellt. Es zeigen:

Abbildung 1 einen Längsschnitt durch ein Haartrockengerät mit kegelförmigem Gehäuse und daran befestigter zylindrischer Bürste, wobei die Innenteile und die Bürste in Seitenansicht gezeigt sind,

Abbildung 2 eine Draufsicht auf den Deckel des Gehäuses,



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 254 of 2286

Abbildung 3 eine Draufsicht auf das freie Ende der Bürste,

Abbildung 4 eine isometrische Ansicht eines nur teilweise gewickelten Heizelements,

Abbildung 5 einen Teil der Rippenkante des Wicklungsträgers,

Abbildung 6 die isometrische Ansicht eines nur teilweise gewickelten kegelförmigen Heizelementes.

Unter Hinweis auf die Abbildungen 1, 2 und 3 besitzt das Haartrockengerät ein kegelförmiges, hohles Gehäuse 1, das vorzugsweise aus Kunststoff spritzgegossen ist. An seiner Vorderseite weist das Gehäuse 1 eine Austrittsöffnung 10 und an seinem rückwärtigen Ende einen abnehmbaren Deckel 11 auf. Dieser Deckel 11 ist von Lufteintrittsöffnungen 12 durchbrochen, die rings um ein festes Mittelteil 13 angeordnet sind, das einen Kabelanschluß 14 und einen Schalter 15 trägt.

Eine Gebläseeinrichtung 2 ist im Innenraum des rückwärtigen Gehäuseendes angebracht. Sie besteht aus einem konisch geformten Gebläsegehäuse 2o, dessen hinteres Ende offen ist, damit die Luft Zutritt hat, und das in dem rückwärtigen Ende des Gehäuses 1 befestigt ist. Ein Elektromotor 21 ist im Vorderteil des Gebläsegehäuses 2o untergebracht und in dieser Stellung durch mehrere Rippen 23 in Form von aerodynamisch profilierten, gebogenen Luftleitflügeln fest mit dem Gebläsegehäuse 2o verbunden. Auf der Motorwelle 25 sitzt ein axiales Gebläserad 26, das sich im Gebläsegehäuse 2o mit einem engen Luftzwischenraum zwischen den Enden der Gebläseflügel und der Innenseite des Gebläsegehäuses 2o zu drehen vermag. Eine elektrische Leitung führt vom Schalter 15 zum Anschluß für den Elektromotor 21.

Vor der Gebläseeinrichtung befindet sich ein elektrisches Heizelement 3. Es ist in dem vorderen Raum des Gehäuses 1 befestigt und besteht aus einem Wicklungsträger 3 in Form von zwei trapezförmigen Platten 31, die sich rechtwinklig kreuzen und in ihrer Mittel zusammengefügt sind, wodurch sie vier radiale Rippen 32, 32', 32'', 32''' (siehe Abbildung 6) bilden.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 255 of 2286

In den Außenkanten der Rippen ist eine Anzahl von flachen Vertiefungen 33 vorgesehen, von denen jede eine Windung eines dünnen, bandförmigen Widerstandes 34 aufnimmt. Das Vorderende und das Hinterende der Platten 31 sind vergrößert und ragen über die Kanten der Rippen bis zur Innenwand des Gehäuses, das entsprechende Aussparungen aufweist, um die besagten Ansätze aufzunehmen. Eine elektrische Leitung 37 verbindet das vordere Ende der Widerstandswicklung mit dem Kabelanschluß 14, während das hintere Ende der Wicklung über die Leitung 38 mit dem zweiten Anschluß des Elektromotors verbunden ist.

Eine zylindrische Bürste 4 ist am Austrittsende 10 des Gehäuses 1 mit Hilfe eines hohlen, trompetenartig sich erweiternden Formteils 41 befestigt, das ruckartig über eine äußere ringförmige Hinterschneidung 18 des Gehäuseendes geschoben wird. Die Bürste 4 besteht aus einem festen Mittelkern 42, von dem acht radiale Rippen 43 sternförmig ausgehen. Das Vorderende der Bürste 4 ist durch eine flache Scheibe 44 abgedeckt, die am Mittelkern 42 befestigt ist. In die Außenkanten der radialen Rippen 43 sind Borsten 45 eingelassen, die eine Bürste von zylindrischer Form bilden.

Das Formteil 41 ist mit der Bürste 4 durch vier radiale Rippen 46 fest verbunden, die sich zwischen der Außenkante am hinteren Ende von vier borstentragenden Rippen 43 bis zur Innenseite des trompetenartigen Formteils 41 erstrecken und damit fest verbunden sind.

Das erfindungsgemäße Haartrockengerät arbeitet folgendermaßen:

Das axiale Gebläserad 24 saugt Luft durch die Eintrittsöffnungen 12 und befördert sie zum Austrittsende 10 des Gehäuses 1. Die rund um den Motor 21 gebogenen Leitflügel 23 sind so ausgeführt, daß sie die Luftströmung aus einer kreisförmigen Richtung in eine axiale Richtung durch das kegelförmige Heizelement 3 dirigieren. Die kegelförmige Ausbildung des Gehäuses 1



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 256 of 2286

dient dazu, die Luft zu beschleunigen, so daß diese durch die Austrittsöffnung in die Zwischenräume 47 gelangt, die zwischen den Rippen 43 der Bürste 4 ausgebildet sind und von dort durch die Borsten 45 in das zu trocknende Haar.

Die jeweiligen Formen der Bürste und des Heizelementes sind die Faktoren, die die Verringerung des Strömungswiderstandes im Haartrockengerät bedingen. So ist für die Bürste beispielsweise aus der Zeichnung leicht zu entnehmen, daß die aus der Austrittsöffnung 10 hervorströmende Luft in den Zwischenräumen 47 in gleichmäßiger, axialer Strömung gehalten wird und dann durch die Borsten langsam nach außen strömt, ohne eine plötzliche Drosselung oder Richtungsänderung zu erfahren, wie dies bei den bisher verwendeten röhrenförmigen Bürsten der Fall ist.

Viele Modifizierungen und Änderungen im Aufbau des erfindungsgemäßen Haartrockners können von einem Fachmann vorgenommen werden, ohne daß damit der Erfindungsgedanke und der Schutzbereich der Ansprüche verlassen wird. So können anstelle der Bürste auch eine Breitschlitz- oder Runddüse auf das Austrittsende des Gehäuses aufgesetzt werden. Die Rundbürste kann auch durch einen Föhnkamm oder durch einen Frisierstab mit Clipeinrichtung ersetzt werden, wobei die Luft im Fall des Föhnkamms durch dessen Rücken auf die Zinken und im Fall des Frisierstabs durch die in diesem Stab vorgesehenen Schlitze direkt in das auf den Stab gewickelte Haar geleitet wird. Weiterhin kann beispielsweise das Außengehäuse auch in zylindrischer Form ausgeführt sein. Der Träger für die Heizwicklung kann mehr als vier Rippen, wie beispielsweise sechs oder acht aufweisen. Auch kann das Heizelement beziehungsweise dessen Widerstand mehr als einen Anschluß an jedem Ende haben, so daß der Heizwiderstand in unterschiedlicher Weise und Größe belastet werden kann.

Auch ist es möglich, die Zahl der Bürstenrippen entsprechend den Erfordernissen und in Übereinstimmung mit dem Durchmesser und der Länge der Bürste zu ändern. Anstatt des Axialgebläserades kann auch ein Diagonalgebläserad eingesetzt werden, falls ein höherer Druck der ausströmenden Luft erreicht werden



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 257 of 2286

soll.

Durch die zylindrisch-konische Form des Gehäuses und durch die Leitflächen an dem Motor kann mit dem erfindungsgemäßen Haartrockengerät ein hochbeschleunigter Luftstrom mit geringstem Energieaufwand erzeugt werden. Infolge der speziellen Art und des speziellen Aufbaus des Heizkörpers kann dieser Luftstrom in kürzester Zeit auf die vorbestimmte Temperatur erwärmt und auf dieser Temperatur gehalten werden. Durch die spezielle Ausbildung und Anordnung der Heizwicklung sowie die große Kontaktfläche mit dem Luftstrom ist eine optimale Ausnutzung der dem Heizelement zugeführten elektrischen Energie gewährleistet.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 258 of 2286

Nummer: 26 18 819
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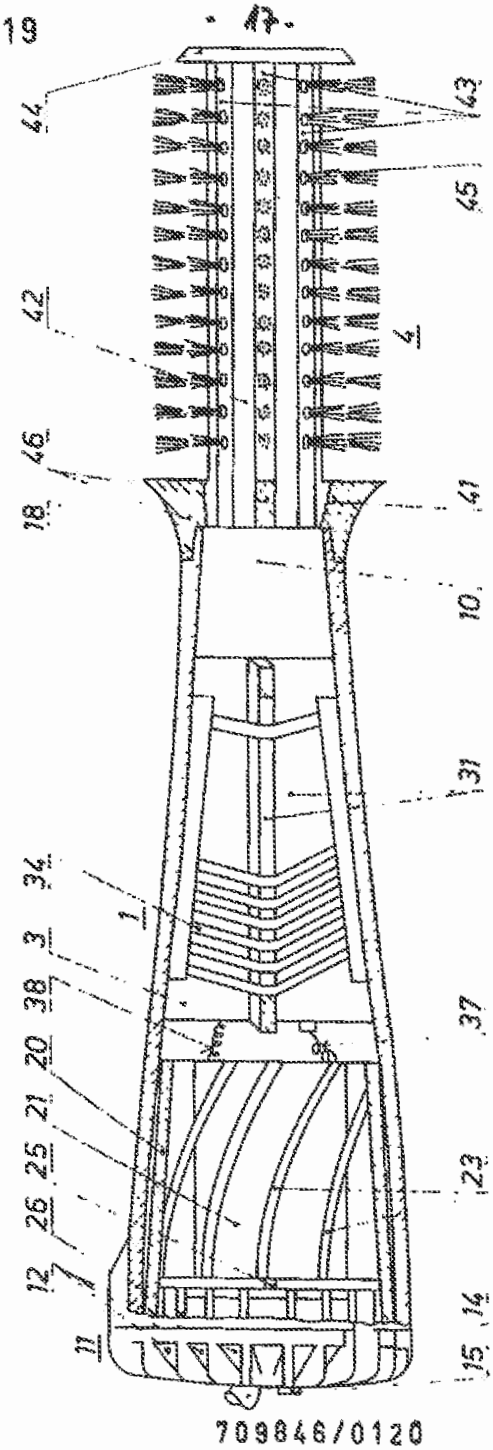



FIG. 1



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 259 of 2286

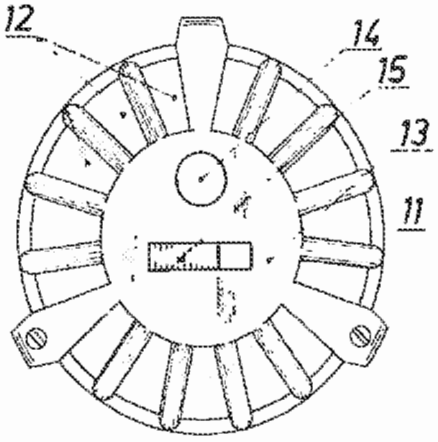



FIG. 2

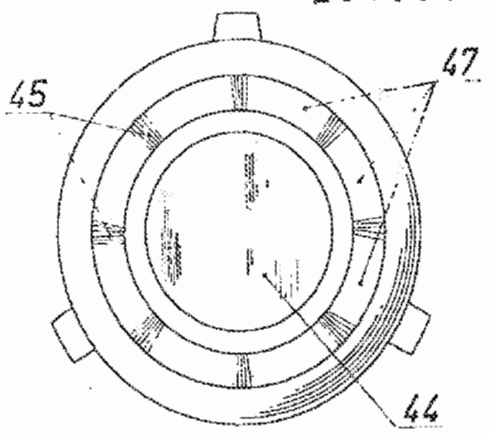



FIG. 3

FIG. 4

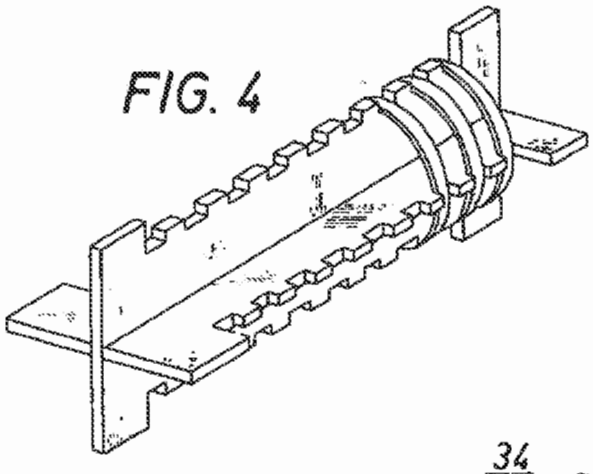
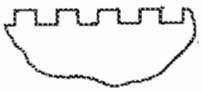


FIG. 5



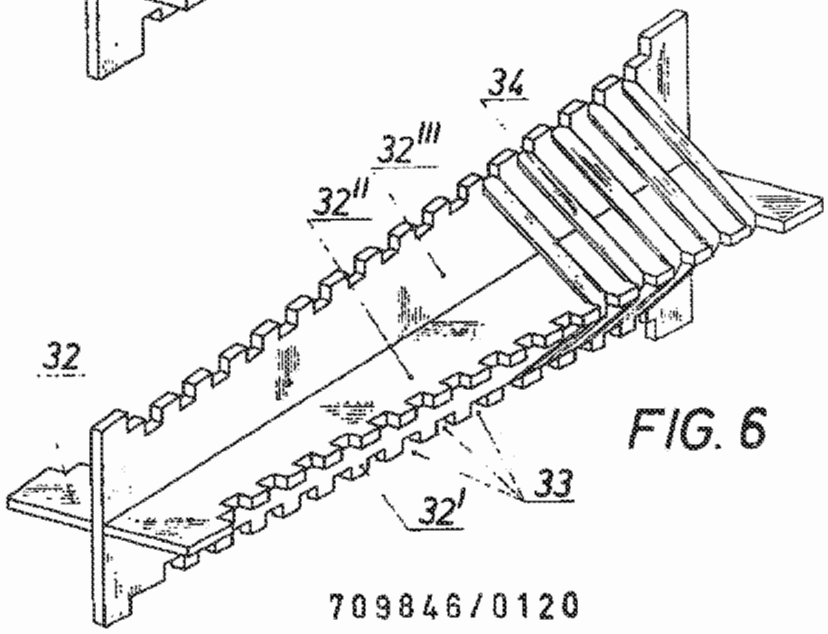



FIG. 6

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 260 of 2286

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## (54) IMPROVEMENTS IN ELECTRIC HAIR DRYERS

(71) We, CONAIR CORPORATION, a corporation organised and existing under the laws of the State of Delaware, United States of America, of 11, Executive Avenue, New Jersey 08817, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

The present invention relates to electric hair dryers.

Hair dryers may be either hand held, or designed to rest on a table top to leave the users hands free. When designed for the latter category, for domestic use, a better appearance is obtained by having a smooth uniform outer surface. This requires having fan, fan motor, heating element, and switch internally mounted.

It is an object of the present invention to provide an electric hair dryer for domestic use which is capable of operation when hand held, and also when resting on a table or other support surface.

According to the present invention, there is provided a hair dryer, including a casing formed by a base and a housing movable mounted on the base, the dryer being capable of normal operation both in a free-standing condition in which the housing is supported by the base and the base rests on a table top or other generally horizontal surface, and when the dryer is hand-held by a user, the casing having an air intake for admitting air to be used for drying hair into the casing, an air outlet for discharging such air from the casing, and an internal air duct interconnecting the air intake and outlet, the housing containing electrical means operable to propel air entering the casing through the air intake, through the duct and out of the air outlet, and to heat such air, the casing also containing a switch arrangement for the air propelling means which is actuable by relative movement between the base and housing.

The invention also consists in a hair dryer, including a hollow generally cylindrical elongate housing, mounted for rotation about its longitudinal axis on a hollow base, the dryer being capable of normal operation both in a freestanding condition in which the housing is generally upright and supported by the base when the base rests on a table top or other generally horizontal surface, and when the dryer is hand-held by a user, the base having an air intake for admitting air to be used for drying hair into an internal air duct defined by the base and housing and the housing having an air outlet for discharging such air from the duct, an electric motor, a fan driven by the motor, and a heating element, located in the duct within the housing, an internal electrical switch connected to the motor to control the operation thereof, the switch being dimensioned and mounted in the duct adjacent the juncture of the base and housing, so as to minimise physical interference with air flowing through the duct during normal operation of the dryer, the switch being actuable by relative rotation between the base and housing.

In one embodiment the dryer includes a generally circular base, and a generally cylindrical housing rotatably mounted on the base.

The base, which is hollow and defines a part of the internal air duct, has an air intake about its periphery and a generally unobstructed air outlet at its top, intermediate the ends of the duct. The housing, which is also hollow and defines a part of the internal air duct, includes an intermediate air inlet at its bottom in alignment with the intermediate air outlet of the base. The outer surface of the base has louvers defining the air intake for receiving air from outside of the base. Once air enters the base, it is sucked


SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 261 of 2286

it cannot slip through its arcuate slot.

The bosses 22 support the housing 2 above the base 4 and the arcuate slots act as guides for the screws 24 when the base is rotated with respect to the housing 2. Figure 5 shows that the curvature of the arcuate slots 26 conforms to the curvature of the top surface of the base, thus assuring that the housing 2 and the base 4 remain in axial alignment during and after any rotation. The extent of possible rotation is determined by the length of the slots 26.

A "slide type" switch 16 including a slidable protruding switch member 18, which can be slid into an "OFF", "LOW SPEED" or "HIGH SPEED" position, is shown generally in Figure 2. This switch 16 is mounted in the internal air duct on the lower surface of the housing with the switch member 18 protruding downwardly towards the base. Wire 6 supplies electrical energy to the switch 16.

Motor 3, which is electrically connected to the switch 16, has two operating positions, "LOW SPEED", and "HIGH SPEED" and an "OFF" position which correspond to the three different positions of the slidable switch member 18.

Figure 8 shows a pair of members 20 protruding upwardly towards the housing 2. These members 20 are carried by the base 4 and are positioned on each side of the slidable switch member 18 and cooperate with it in such a way that any movement of the members 20 moves the slidable switch member. Thus, by rotating the base 4 with respect to the housing 2, which consequently moves the members 20 and the slidable switch member 18, the user of the hair dryer can select or change the position of the slidable switch member 18. Because the slidable switch 16 is electrically connected to the motor 3 and its associated fan, switching of the position of the slidable switch member 18 will either turn the fan off, cause the fan to spin at one specified speed, or cause the fan to spin at a second specific speed. Since the rate at which heated air (to be used for hair grooming) is discharged from the housing 2 is proportional to the speed at which the fan 5 spins, this rate of discharge is controlled by the position of the slidable switch member 18. Thus, the above-described configuration enables the user of the hair dryer to select the speed at which heated air will be discharged from the dryer by merely rotating the base 4 relative to the housing 2.

Figure 7 shows that the slidable switch 16 is affixed to the periphery of the base of the housing 2. By positioning the switch in this location, physical interference with air flowing through the dryer and physical interference with the motor, fan and heating element is minimised or avoided.

Figure 8 shows in detail how the members 20 cooperate with the slidable switch member 18 and that movement of the members 20 moves the switch member 18.

To avoid breaking members 20 or the slidable switch member 18, stop means are provided to limit the extent of rotation of the base 4. By having the length of the arcuate slots 26 approximately equal to the maximum range of distance that the slidable switch member 18 is capable of travelling, the base 4 cannot be rotated to such a degree that would snap the slidable switch member 18.

The internal components of the dryer including the heating element 7 and the air outlet vents 12 are shown more clearly in Figures 2, 4 and 6 and Figures 1 and 3, respectively.

The heating element 7 which is located in the upper portion of the housing 2 comprises a frame 15 and wires 13 which are wrapped around the frame. The wires 13 are heated by electrical energy supplied thereto and this heat is transferred to air passing through or adjacent to the heating element.

Disc 11, as shown in Figures 1 and 3, is seated in a groove 17 in the upper part of housing 22, and retained therein by pins 19. These pins 19 pass through holes 21 and are received by holes 23 in the disc. Removal of the disc 11 only requires the removal of the pins 19.

Disc 11 has slots which define air outlet vents 12. These outlet vents 12 ensure that all of the heated air discharged from the housing 2 is channeled in the same direction of flow.

Although the above-described embodiment of the invention has the internal switch 16 located on the bottom of the housing 2 and the cooperating members 20 protruding upwardly from the top of the base 4, these elements can be reversed. However, by positioning the switch 16 in the base 4, it is necessary to run electrical connecting wires from the base 4 to the housing 2 since the internal components of the dryer are located therein. The rotation of the base 4 will result in excessive wear and tear on the wire and shorten its useful life. This will not happen if the switch is positioned on the housing.

When the hair dryer is operating (i.e. the base has been rotated to move the slide switch 16 into one of its operating positions) the motor 3 rotates fan blades 5, drawing air from outside the base 4 into the base through the air intake louvers 8. Although the initial direction of flow of the air drawn into the supporting piece is radial, this air is subsequently redirected to an axial direction of flow by the action of the spinning fan 5.

The axially flowing air passes from base 4 through the outlet 25 and enters the housing 2. The flowing air passes through the fan

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 262 of 2286

claims 2 to 10, wherein the switch arrangement is a multi-position switch and the motor is of the variable speed type, the speeds of the motor corresponding to the positions of the multi-position switch.

12. A hair dryer as claimed in any of claims 2 to 11, wherein the housing and the part of the duct defined thereby are substantially cylindrical.

13. A hair dryer as claimed in claim 12, wherein the longitudinal axis of the housing and the part of the duct defined thereby are angled in a region between the motor and the air outlet.

14. A hair dryer as claimed in claim 12 or 13, wherein the housing and the part of the duct defined thereby tapers so as to reduce in cross-section in a direction away from the base.

15. A hair dryer as claimed in claim 12, 13 or 14, wherein the base is generally circular in cross-section and coaxial with the housing, and wherein the air intake is defined by a plurality of generally radially directed, circumferentially distributed openings in the base.

16. A hair dryer, including a hollow generally cylindrical elongate housing, mounted for rotation about its longitudinal axis on a hollow base, the dryer being capable of normal operation both in a free-standing condition in which the housing is generally upright and supported by the base when the base rests on a table top or other generally horizontal surface, and when the dryer is hand-held by a user, the base having an air intake for admitting air to be used for drying hair into an internal air duct defined by the base and housing and the housing having an air outlet for discharging such air from the duct, an electric motor, a fan driven by the motor, and a heating element, located in the duct within the housing, an internal electrical switch connected to the motor to control the operation thereof, the switch being dimensioned and mounted in the duct adjacent the juncture of the base and housing, so as to minimise physical interference with air flowing through the duct during normal operation of the dryer, the switch being actuable by relative rotation between the base and housing.

17. A hair dryer as claimed in claim 16, wherein the housing and duct are tapered so as to reduce in cross-section in a direction away from the base of the air outlet, the air outlet being located at the longitudinal end of the housing remote from the duct, and wherein the base is generally circular in cross-section, and is provided with a plurality of generally radially directed, circumferentially distributed louvers adjacent the base which form the air intake.

18. A hair dryer substantially as hereinbefore described with reference to the accompanying drawings.

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 263 of 2286

FIG. 5

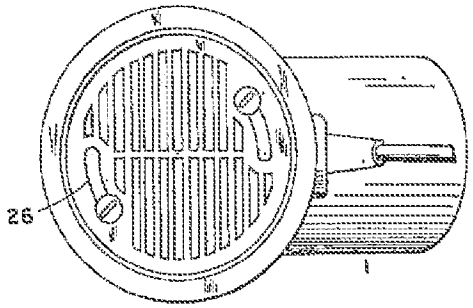



FIG. 6

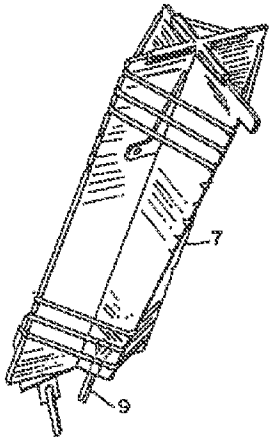



FIG. 7

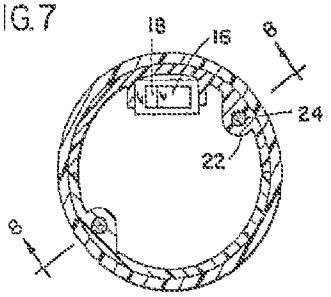
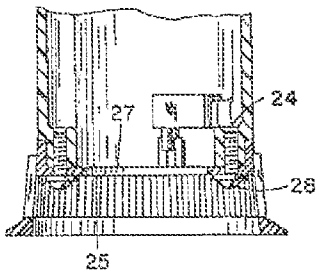



FIG. 8



**Reference D1**

Patent:

Application No: S54-21164

Filing Date: February 23, 1979

Laid-open Disclosure No: S55-113408

Disclosure Date: September 2, 1980

Title of Invention: Hair Dryer

Applicant: Toshiba

Abstract:

In a conventional hair dryer, air taken from outside passes through a heater only once. Therefore, the temperature of hot air is influenced by the temperature of the room. Further, part of heat is radiated to the outside so heat efficiency is not sufficient.

In the present invention since the flowing outlet and the suction inlet are open on the same side, part of heated air can be used by recirculation, and further, the partition wall between a suction path and a blow path is heated, whereby air can be preheated whereby heat efficiency can be increased.

As shown in Fig. 1, in the present hairdryer, a suction path (3) and a heat air path (4) are divided by the tubular wall (2) in the co-axial arrangement in such a manner that the suction inlet (5) and the blow outlet (6) are arranged on the same plain. The heater is indicated at (7).

⑲ 日本国特許庁（JP）　　⑪ 特許出願公開

⑫ 公開特許公報（A）　　昭55—113408

| ⑤1Int. Cl.³ | 識別記号 | 庁内整理番号 | ⑬公開　昭和55年(1980)9月2日 |
|---|---|---|---|
| A 45 D 20/10 | 101 | 6865—3B | |

発明の数　1
審査請求　未請求

（全 3 頁）

# ⑤4ヘアードライヤ

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⑳特　願　昭54—21164
㉒出　願　昭54(1979)2月23日

⑦2発　明　者　長谷川繁
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## 明　細　書

### 1　発明の名称

ヘアードライヤ

### 2　特許請求の範囲

(1)　仕切板を境として吸気通路と熱風通路とを配設し、上記吸気通路の吸気口および上記熱風通路の熱風吹出口をほぼ同一面に形成するとともに、上記熱風通路中に発熱体を配置し、かつ上記吸気通路と熱風通路との間にファンを設けたことを特徴とするヘアードライヤ。

(2)　熱風通路の外周に環状の吸気通路を同心的に配設したことを特徴とする特許請求の範囲第1項記載のヘアードライヤ。

(3)　仕切板を熱良導体で構成したことを特徴とする特許請求の範囲第1項記載のヘアードライヤ。

### 3　発明の詳細な説明

本発明は、整髪用のヘアードライヤに関し、特にその通風路の部分の改良に係る。

従来のヘアードライヤは、背部または側面から外気を取入れ、加熱しながら熱風として前方に一直線状に吐出するようになつている。この場合、室内空気が発熱体の部分を1回しか通過しないため、熱風の温度は、室内空気の温度に左右され、風速や風量を定めたとき、発熱体の熱容量ワツトにより限定されてしまう。また発熱体の一部の熱は、輻射によりヘアードライヤのケースに伝達され、外部に放熱される。このため従来のものは、熱効率の観点から充分でなかつた。



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 266 of 2286

本発明の目的は、熱風通路および吸気通路の中において、熱風を還流させることにより、熱効率の改善を図る点にある。

以下、本発明を図面にもとづいて具体的に説明する。

本発明のヘアードライヤ(1)は、第1図に示すように、例えば円筒状の仕切板(2)を境として吸気通路(3)と熱風通路(4)とを同心的に配設し、上記吸気通路(3)の吸気口(5)および上記熱風通路(4)における格子状の熱風吹出口(6)をほぼ同一面に形成するとともに、上記熱風通路(4)の中に発熱体(7)を配設し、かつ上記吸気通路(3)と熱風通路(4)との間にファン(8)を設けて構成してある。

そして仕切板(2)は、熱良導体例えばアルミニウム製で両端で開口する円筒体で、その内部で



熱風通路(4)を形成し、かつその外周面と筒状の本体ケース(9)との間で吸気通路(3)を形成している。本体ケース(9)は、例えばプラスチック成形によりつくり、下部にハンドル部(10)およびスイッチ(11)の取付部(12)を形成している。スイッチ(11)は、その操作によつて、ファン(8)のモータ(13)および発熱体(7)の通電を制御する。なお、モータ(13)は、取付金具(14)により本体ケース(9)の内部後方に設けられている。

さて、上記構成において、スイッチ(11)の操作によりモータ(13)を回転させると、ファン(8)は、吸気口(5)から空気を取入れ、熱風通路(4)に吹き出す。すなわち空気は、吸気口(5)から入り、吸気通路(3)を通り、流れの方向を変えて熱風通路(4)で発熱体(7)により加熱され、吹出口(6)から吐



出する。この場合、吐出された熱風の一部は、髪に当つて返り、吸気口(5)に入り込んで熱風通路(4)の部分で戻る。このようにして一部の熱風は、還流中に再加熱され、また吸気通路(3)の中で仕切板(2)の熱を受けて予熱される。特に髪にくせづけのときに、吸気口(5)が髪の部分に接近するため、温風の循環作用は、一層助長され、熱効率を高める。

なお、第2図の実施例は、吸気口(5)を中心とし、その外周に熱風通路(4)を形成した例であるそしてフイルタ(15)は、吸気口(5)に取付けられ、ごみなどの流入を阻止する。またカバー(16)は、例えばゴムなどでラツパ状に形成され、本体ケース(9)の開口面に着脱自在に取付けてあり、熱風の回収をよくするため、熱風の外方への飛散



を防止する。

本発明によれば、熱風吹出口と吸気口とがほぼ同一面で開口しているため、熱風の一部が循環して利用でき、しかも熱風通路と吸気通路との間に仕切板が吸気通路中の空気を予熱するから、ヘアードライヤの熱効率が高められ、したがつて熱容量の小ワット化と製品の小形化とが達成できる。

## 4　図面の簡単な説明

第1図は本発明のヘアードライヤの断面図、第2図は他の実施例の要部の断面図である。

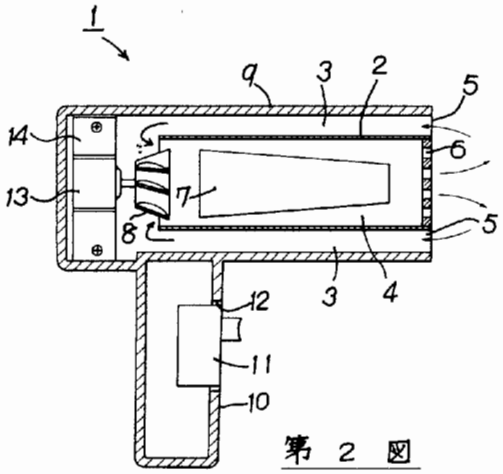
(1)・・ヘアードライヤ、(2)・・仕切板、(3)・・吸気通路、(4)・・熱風通路、(5)・・吸気口、(6)・・熱風吹出口、(7)・・発熱体、(8)・・ファン。



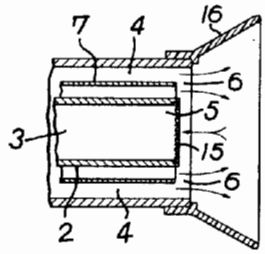


SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 267 of 2286

第 1 図




第 2 図






SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 268 of 2286

昭 56 5.25 発行

第1部門(2)

# 正　　誤　　表

（昭和56年5月25日発行）

| 特許公開番号 | 分類 | 識別記号 | 個所 | 誤 | 正 |
|---|---|---|---|---|---|
| 昭55－110554 | A 61 L 2／10 | | 代理人 | 脱落 | 弁理士 樺沢襄 外2名 |
| 昭55－110580 | B 26 B 19／12 | | 代理人 | 脱落 | 弁理士 樺沢襄 外2名 |
| 昭55－110581 | B 26 B 19／12 | | 代理人 | 脱落 | 弁理士 樺沢襄 外2名 |
| 昭55－113408 | A 45 D 20／10 | 101 | 代理人 | 脱落 | 弁理士 樺沢襄 外2名 |
| 昭55－138482 | B 26 B 19／20 | | 代理人 | 脱落 | 弁理士 樺沢襄 外2名 |
| 昭55－143123 | A 47 L 9／28 | | 代理人 | 脱落 | 弁理士 樺沢襄 外2名 |
| 昭56－ 1188 | B 26 B 19／06 | | 代理人 | 脱落 | 弁理士 樺沢襄 外2名 |

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 269 of 2286

**Reference D3**

Utility Model:

Application No: S56-125919

Filing Date: August 27, 1981

Laid-open Disclosure No: S28-32706

Disclosure Date: March 3, 1983

Title of Invention: Hair Dryer

Applicant: Mr. Yoshitaka Ohara, et al

Abstract:

A conventional hair dryer is of the type which blows hot air against the hair. The type of hair dryer gives unpleasant feeling to a user and it causes to damage hair so it was inconvenient for the user since he/she have to adjust the distance between his/her hair and the hair dryer. The present invention is for solving the problems.

In use, the fan (3) is rotated by the motor (2) whereby air is delivered through the inlet (19 ) via the heater (4). After the air has been heated, the air flows the space between the air outlet section and the air delivery tube, and then, the bent section (18), to the air delivery tube (5), then to the outside through the end of the air delivery tube (5).

On the other hand, the outside air, which has come into the blowing air chamber (1a), upwardly passes through the flow passage (23) and them to the outside through the delivery tube (5).

In use, if it does not have the support member 22, a user press the curved section (18) against the head and rub thereby, whereby water droplets adhered to the head evaporates due to heat.

Reference numerals

1. case body

1a. blowing air chamber

1b. handle

1c. air outlet section
2. motor
3. fan
4. heat source
5. air delivery tube
9. bobbin
10. heater
15. switch
16. electric code
18. curved section
19. inlet
22. support member
23. flow path

(19) JAPANESE PATENT OFFICE (JP)

(11) Published Utility Model No.

**(12) Utility Model Application (U)**

S58-32706

| (51) Int. Cl.[3] | ID Code. | Internal Filing No. |
|---|---|---|
| A 45 D 20/10 | 104 | 7030-3B |
| | 102 | 7030-3B |
| | 103 | 7030-3B |

(43) Publication Date: March 3, 1983

Examination Requested: Not Requested

(Total of 2 pages [in original])

(54) Hair Dryer

(21) Utility Model Application No. S56-125919

(22) Filing Date: August 27, 1981

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(57) Claims of Utility Application Model

(1) A hair dryer comprising: an integrally formed hollow casing including, at a lower portion, a blowing chamber with an air hole, at a central portion, a handle portion and, at an upper portion, a discharge portion having a front end and a rear end, an edge of the front end being formed so as to curve inwards and the rear end being pierced by a hole,

the lower portion blowing chamber containing a motor and a fan driven by the motor

the handle portion containing a heat source,

the upper portion discharge portion containing an air pipe extending in a front-rear direction with a front end positioned within the curved edge and a rear end projecting rearwards through the hole, the air pipe being arranged so that a space is formed between the air pipe and an inner peripheral surface of the upper portion discharge portion; and

attached to the casing, a power cord for the heat source and a switch for switching the power to the heat source on and off according to an external operation.

(2) The hair dryer according to claim 1, wherein

the heat source is formed by winding a heater 10 on a cross-shaped bobbin.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 272 of 2286

(3) The hair dryer according to claim 1 or claim 2, wherein

the fan is constructed from a tubular body provided with a plurality of blades around the periphery thereof,

the tubular body contains a motor and a rotating shaft of the motor is attached to the tubular body.

**Brief Description of the Drawings**

The drawings illustrate an embodiment of the present invention. FIG. 1 is an overall side view. FIG. 2 is a back view. FIG. 3 is a side view of a partial vertical cross-section. FIG. 4 is a plan view showing a horizontal cross-section at a position of the handle portion. FIG. 5 is a plan view showing a transverse section through the air chamber position and a section through the fan.

In the drawings 1 denotes a casing, 1a denotes an air chamber, 1b denotes a handle portion, 1c denotes a discharge portion, 2 denotes a motor, 3 denotes a fan, 4 denotes a heat source, 5 denotes an air pipe, 9 denotes a bobbin, 10 denotes a heater, 15 denotes a switch, 16 denotes a cord, 18 denotes a curved portion, 19 denotes air holes, 22 denotes a reinforcing member, and 23 denotes an airflow path.

FIG. 1

FIG. 2

FIG. 3

FIG. 4

FIG. 5

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 274 of 2286

[500 yen STAMP] [200 yen STAMP]

[4000 yen STAMP]

(4,000 yen)

Utility Model Registration Application (4), no added code

August 27, 1981

Patent Office Commissioner SHIMADA Haruki

1. Title of the Invention Hair Dryer

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5. List of Attached Documents

| | | | | |
|---|---|---|---|---|
| FORMAT | (1) Specification | 1 | (2) Drawings | 1 |
| CHECK | (3) Copy of Application | 1 | (4) Power of Attorney | 1 |

For the Power of Attorney, the item attached to and filed on same dates as the Utility Model Application Code (1) will be used

[DATE STAMPED: Japan Patent Office; August 27, 2013; Applications Second Section]

Comparison with 58-32706 Tatsuzawa 56 125919 52

Specification

1. Title of Invention

Hair Dryer

2. Utility Model Registration Claims

(1) A hair dryer comprising: an integrally formed hollow casing including, at a lower portion, a blowing chamber with an air hole, at a central portion, a handle portion and, at an upper portion, a discharge portion having a front end and a rear end, an edge of the front end being formed so as to curve inwards and the rear end being pierced by a hole,

the lower portion blowing chamber containing a motor and a fan driven by the motor

the handle portion containing a heat source,

the upper portion discharge portion containing an air pipe extending in a front-rear direction with a front end positioned within the curved edge and a rear end projecting rearwards through the hole, the air pipe being arranged so that a space is formed between the air pipe and an inner peripheral surface of the upper portion discharge portion; and

attached to the casing, a power cord for the heat source and a switch for switching the power to the heat source on and off according to an external operation.

(2) The hair dryer according to claim 1, wherein

the heat source is formed by winding a heater 10 on a cross-shaped bobbin.

(3) The hair dryer according to claim 1 or claim 2, wherein

the fan is constructed from a tubular body provided with a plurality of blades around the periphery thereof, and

the tubular body contains a motor and a rotating shaft of the motor is attached to the tubular body.

3. Detailed Description of the Invention

The present invention relates to a hair dryer that dries hair on an intake side without blowing warm air against the hair.

All hair dryers of the prior art are arranged so that warm air is blown against the hair to dry it. This not only causes the user discomfort but, due to the warm air being blown against the head, may also damage the hair itself or the scalp. This tendency is particularly pronounced when the warm air is switched to hot air. Further, such an arrangement is inconvenient because when the dryer is used, a short distance must be maintained between the discharge outlet for the warm air and the head of the user.

The present invention has an object of solving the above-described problems of the prior art. An embodiment of the present invention is described below with reference to the drawings. In the drawings (1) denotes an integrally formed hollow casing having, at a lower portion, a blowing chamber (1a) containing a motor (2) and a fan (3) driven by the motor (2), at a central portion, a handle portion

(1b) containing a heat source (4) and, at an upper portion, a discharge portion (1c) housing an air pipe (5) that discharges warm air rearwards. The fan is formed of a tubular body (3a) that is closed at one end, open at the other, and includes numerous blades (3b), (3b)… formed at an external periphery thereof by slitting and forming or the like. The motor (2) is housed within the tubular body (3a) and a rotating shaft (2') of the motor (2) is engaged at a central portion of the closed end of the tubular body (3a) via an installation fixture (6). When the motor (2) is integrally attached to the fan (3), the resulting arrangement is fitted within the blowing chamber (1a) and the motor (2) is fixedly attached therein via a fixture and/or adhesive agent (7). The heat source (4) is formed by winding a heater (10) onto a cross-shaped bobbin (9) formed by bonding together insulating plates with extending edges (8). The heat source (4) is wrapped in insulating material (11) and installed within the handle portion (1b) of the casing (1). The handle portion (1b) has a rear side that is a double wall formed by an inner wall (12) and an outer wall (13), a space (14) for housing wiring or the like being formed between the inner wall (12) and the outer wall (13). A switch (15) for switching between high-temperature air and low-temperature air is attached at a central portion of the outer wall (13), and a power cord (16) is provided at a lower surface of the outer wall (13). The discharge portion (1c) of the casing (1), extends in a direction perpendicular to the handle portion (1b) and has a cylindrical shape with a closed rear surface and an open front surface, the edge of the opening in the front surface including an inward-orientated U-profile curve. Further, the air pipe (5) is concentrically provided within the discharge portion (1c) in such a way that a rear end is open, the front end being positioned within the curved portion (18) in the discharge portion (1c) and the rear end protruding rearwards through a hole (17) so that a space is formed between the air pipe (5) and the inner peripheral surface of the discharge portion (1c). (19) denotes an air hole formed on a bottom surface of the blowing chamber (1a) of the casing (1), (20) denotes a protective resistor, and (21) denotes a thermostat. The protective resistor (20) and the thermostat (21) are connected to the switch (15) and the power cord (16). (22) denotes a reinforcing member provided so as to surround an outer periphery of the front end of the discharge portion (1c) and cover the front surface of the handle portion (1b) of the casing (1) to more reliably insulate the handle portion (1b) from heat conducted from the heat source (4). A through hole (24) communicating with the airflow path (23) formed by the reinforcing member and the front portion of the casing (1) opens into the lower portion blowing chamber (1a).

Thus, when the motor (2) is caused to turn via the switch (15), the fan (3) rotates and external air is drawn to the heat source (4) via the air hole (19). The air is heated and guided to the front end of the air pipe (5) through the space between the discharge portion (1c) and the air pipe (5) and the curved portion (18) of the discharge portion (1c). Thereafter, the warm air is discharged from the rear end of the air pipe (5).

External air from the blowing chamber (1a) also arrives at the upper portion via the airflow path (23) and is discharged to the opening portion (22'). The air is then guided by the flow of warm air discharged to the outside through the air pipe (5).

Hence, when a hair dryer not including the upper opening portion (22') or the reinforcing member (22) is used, the user moves the curved portion (18) of the upper portion discharge portion (1c) of the casing (1) back and forth, lightly pressing it against the surface of the head. Water droplets adhering to

the hair at the pressed position are evaporated by the warm air, and the resulting water vapor is discharged from the air pipe (5) with the flow of warm air. Here, any loose hair that has fallen from the head or the like is also sucked in and discharged from the air pipe (5). Note that by using the warm air discharged from the air pipe (5), the hair dryer can also be used in the same way as the hair dryers of the prior art.

According to the above-described invention, it is possible to dry hair without blowing warm air as in the prior art, making it possible to avoid damaging the hair or the scalp. Also, since the invention can be used by lightly touching the casing against the head, it is easy to use. A further is advantage is that the discomfort associated with the blowing of warm air is eliminated.

4. Brief Description of the Drawings

The drawings illustrate an embodiment of the present invention. FIG. 1 is an overall side view. FIG. 2 is a back view. FIG. 3 is a side view of a partial vertical cross-section. FIG. 4 is a plan view showing a horizontal cross-section at a position of the handle portion. FIG. 5 is a plan view showing a transverse section through the air chamber position and a section through the fan.

In the drawings 1 denotes a casing, 1a denotes an air chamber, 1b denotes a handle portion, 1c denotes a discharge portion, 2 denotes a motor, 3 denotes a fan, 4 denotes a heat source, 5 denotes an air pipe, 9 denotes a bobbin, 10 denotes a heater, 15 denotes a switch, 16 denotes a cord, 18 denotes a curved portion, 19 denotes air holes, 22 denotes a reinforcing member, and 23 denotes an airflow path.

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Utility Model Registration Applicant: TAKEMORI Kunio
Utility Model Registration Applicant: OE Junji
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FIG. 1

FIG. 2

FIG. 3

FIG. 4

FIG. 5

⑲ 日本国特許庁（JP）　　⑪実用新案出願公開

⑫ 公開実用新案公報（U）　　昭58—32706

| ⑤1Int. Cl.³ | 識別記号 | 庁内整理番号 | ⑬公開　昭和58年(1983)3月3日 |
|---|---|---|---|
| A 45 D 20/10 | 104 | 7030—3B | |
| | 102 | 7030—3B | |
| | 103 | 7030—3B | 審査請求　未請求 |

（全 2 頁）

# ⑤4頭髪用ドライヤー

⑵1実　　願　昭56—125919
⑵2出　　願　昭56(1981)8月27日
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⑦2考　案　者　建守邦雄
東京都世田谷区上馬1の31の18
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⑦4代　理　人　弁理士　大内俊治

## ⑤7実用新案登録請求の範囲

(1) 下部に入気孔を形成した送風室を、中間部に手持部を、上部に前端面が開口しその開口縁を内方に鬻曲状に屈曲成形すると共に、後端面に孔を開設した流出部を一体に形成した中空状のケース本体の前記下部送風室内に、モータ及びこのモータにより回転されるフアンを、また前記手持部内に熱源を、また前記上部流出部内に、前端が前記鬻曲状内に位置し後端が前記孔を介して後方に突出して前後方向に延びる送気管を、前記上部流出部の内周面との間に空隙が生じるように夫々装備し、かつ前記ケース本体に、前記熱源用の電源コードと、熱源に対する通電を外部操作により切換える切換スイツチとを取付けて成る頭髪用ドライヤー。

(2) 熱源が、十字状のボビンにヒータ10を巻回して成る実用新案登録請求の範囲第1項記載の頭髪用ドライヤー。

(3) フアンを、外周囲に多数の羽根を設けた円筒体から構成し、この円筒体内に、モータを内装してその回転軸に前記円筒体を取付けて成る実用新案登録請求の範囲第1項または第2項記載の頭髪用ドライヤー。

## 図面の簡単な説明

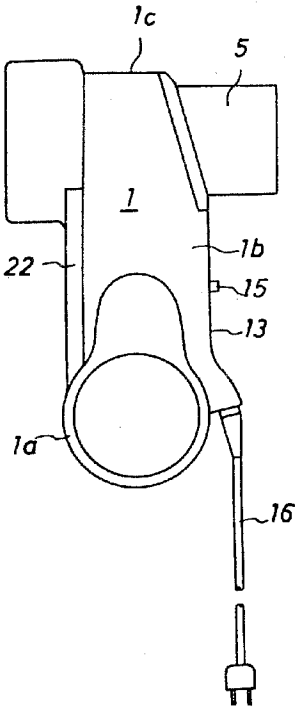
図面は本願の実施例を示すもので、第1図は総体側面図、第2図は同後面図、第3図は一部縦断側面図、第4図は手持部位置を横断した平面図、第5図は送風室位置を横動しかつフアンを半裁した状態の平面図である。

図中1はケース本体、1aは組送風室、1bは手持部、1cは流出部、2はモータ、3はフアン、4は熱源、5は送気管、9はボビン、10はヒータ、15は切換スイツチ、16はコード、18は鬻曲状部、19は入気孔、22は補助部材、23は流通路である。

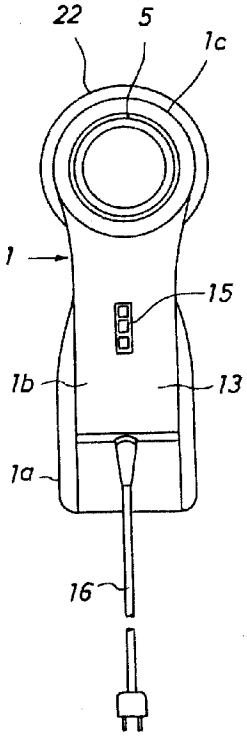


SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 279 of 2286

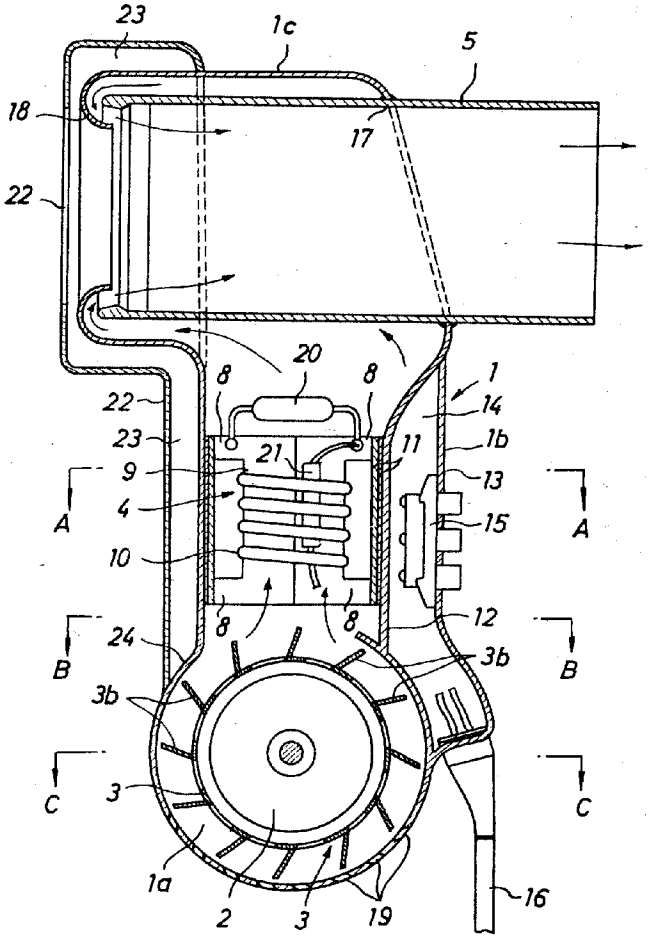
第１図



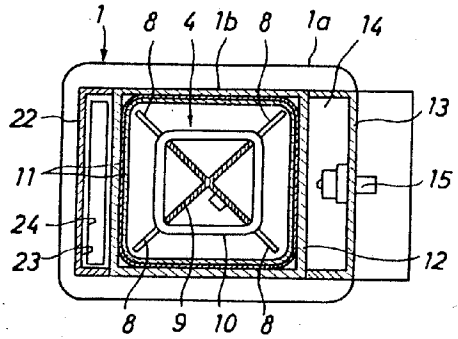

第２図



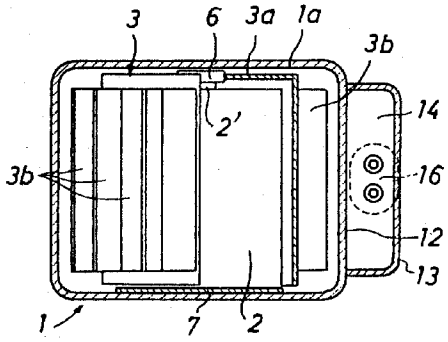

第３図




第４図




第５図






SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 280 of 2286



(4,000円)

# 実用新案登録願(4) 後号なし

昭和 56 年 8 月 27 日

特許庁長官 島田春樹 殿

1. 考案の名称 頭髪用ドライヤー

2. 考案者
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5. 添付書類の目録
方式 (1) 明細書 1通 (2) 図面 1通
審査 (3) 願書副本 1通 (4) 委任状 1通

委任状は同日付出願の実用新案登録願符号( )に添附したものを援用する

特許庁 56.8.27 出願第二課



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 281 of 2286

# 明　　細　　書

1.　考案の名称

頭髪用ドライヤー

2.　実用新案登録請求の範囲

(1)　下部に入気孔を形成した送風室を、中間部に手持部を、上部に前端面が開口しその開口縁を内方に彎曲状に屈曲成形すると共に、後端面に孔を開設した流出部を一体に形成した中空状のケース本体の前記下部送風室内に、モータ及びこのモータにより回転されるファンを、また前記手持部内に熱源を、また前記上部流出部内に、前端が前記彎曲状内に位置し後端が前記孔を介して後方に突出して前後方向に延びる送気管を、前記上部流出部の内周面との間に空隙が生じるように夫々装備し、かつ前記ケース本体に、前記熱源用の電源コードと、熱源に対する通電を外部操作により切換える切換スイッチとを取付けて成る頭髪用ドライヤー。

(2)　熱源が、十字状のボビンにヒータ(10)を巻回して成る実用新案登録請求の範囲第1項記載の頭髪



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 282 of 2286

用ドライヤー。

(3) ファンを、外周囲に多数の羽根を設けた円筒体から構成し、この円筒体内に、モータを内装してその回転軸に前記円筒体を取付けて成る実用新案登録請求の範囲才1項または才2項記載の頭髪用ドライヤー。

3. 考案の詳細な説明

本願は、温風を吹き付けることなくその流入側において頭髪を乾燥するようにした頭髪用ドライヤーに関するものである。

従来公知の頭髪用ドライヤーの全ては、温風を吹き付けることによつて頭髪を乾燥させる形式のものであるので、使用者に不快感を与えるばかりでなく、温風を温度に吹き付ける傾向を有するために頭髪を傷めたり或いは頭部の皮膚に障害を与えたりする惧れがあり、特にこの惧れは、温風を高温に切換えたときに大きく影響し、また使用に際しては、温風の流出口と頭部との近接距離を加減しなければならないという使用上の不便も有していた。



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 283 of 2286

そこで本願は、このような従来の不都合を解消することを目的としたもので、その実施例を以下図面について詳述すると、(1)は下部に、モータ(2)及び該モータ(2)により回転されるファン(3)を収納する送風室(1)aを、中間に、熱源(4)を内装する手持部(1)bを、上部に、温風を後面方向に送出する送気管(5)を内装する流出部(1)cを夫々一体に有した中空状のケース本体で、前記ファン(3)は、一端が閉じられ他端が開放された円筒体(3)aから成り、その外周囲に、切起しなどにより多数の羽根(3)b，(3)b，・・・・・が設けられている。そしてこの円筒体(3)a内にモータ(2)を内装すると共に、その回転軸(2)'を前記円筒体(3)aの閉端面の中心部に取付具(6)を介して軸止し、このようにしてファン(3)にモータ(2)を一体的に取付けた状態で、ケース本体(1)の送風室(1)a内に収納されたのち、例えば止具乃至接着剤(7)を介してモータ(2)が固着される。熱源(4)は、上下端に鍔(8)を有した絶縁板を十字状に結着して成るボビン(9)に、ヒータ(10)を巻回して成り、これが断熱材(11)により包囲された状態で前記ケース本体(1)



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 284 of 2286

の手持部(1)b内に装着されている。手持部(1)bは、後面側が内壁(12)と外壁(13)との二重壁から成り、この内外壁(12)と(13)との間に配線などを納めるための空間部(14)が形成され、外壁(13)の中間部には低温風，高温風及び冷風などの切換用スイッチ(15)が、また外壁(3)の下面には、電源コード(16)が取付けられている。前記ケース本体(1)の流出部(1)cは、手持部(1)bと直交する方向に延びると共に、後面が閉じられ前面が開口する円筒形状を呈しており、その前面開口縁は内方にU字状に彎曲するように屈曲成形されている。また後面には孔(17)が開設されていて、この流出部(1)c内に、前端が彎曲状部(18)内に位置し、かつ後端が前記孔(17)を貫通して後方に突出するように、しかも流出部(1)cの内周面との間に空隙が生じるように前記送気管(5)が同心円状に取付けられている。(19)は前記ケース本体(1)の送風室(1)aの下面に形成した入気孔、(20)は保護抵抗器、(21)はサーモスタットで、保護抵抗器(20)及びサーモスタット(21)は切換スイッチ(15)と共に電源コード(16)に接続されている。(22)は手持部(1)bに対する熱源(4)からの熱伝



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 285 of 2286

導をより確実に遮断するために、ケース本体(1)に手持部(1)bの前面を覆い、かつ前記流出部(1)cの前端部外周を包囲するように設けた補助部材で、これとケース本体(1)の前面部とに形成された流通路(23)に連通する通孔(24)が、ケース本体(1)の下部送風室(1)aの一部に開設されている。

しかして切換スイッチ(15)を介してモータ(2)を回転すると、ファン(3)も一体に回転して外気は入気孔(19)を介して熱源(4)に送られ、こゝで加温されたのち、流出部(1)cと送気管(5)との空隙及び流出部(1)cの彎曲状部(18)を経て送気管(5)の前端面に指向されたのち、温風は送気管(5)の後端より放出される。

一方送風室(1)aからの外気は、流通路(23)を通つて上部に至り、その開口部(22)'に流出する空気は、前記温風の流れに誘導されて送気管(5)を経て外気に放出される。

しかして使用に際し、前記補助部材(22)の上方開口部(22)'を或いは該補助部材(22)を有しないときは、ケース本体(1)の上部流出部(1)cの彎曲状部(18)を頭部に軽く押し当てながら頭部表面を振動する。する



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 286 of 2286

と押し当てられた部分の頭髪に付着している水滴は温風により蒸発すると共に、その蒸発水分は温風の流れに伴つて送気管(5)から放出され、この場合抜毛なども吸引されて送気管(5)から排出される。なお送気管(5)より放出される温風を利用することにより、従来のドライヤーと同様の使用方法も可能であることは勿論である。

以上のように本願によれば、従来のように温風を吹き付けることなく頭髪を乾燥させることができるので、頭髪を傷めたり或いは皮膚に障害を与える惧れはなく、而もケース本体を頭部に軽く押し当てながら使用できるので使用にも便利であり、かつ温風の吹き付けによる不快感も解消し得るなどの利点を有する。

4　図面の簡単な説明

図面は本願の実施例を示すもので、第1図は総体側面図、第2図は同後面図、第3図は一部縦断側面図、第4図は把持部位置を横断した平面図、第5図は送風室位置を横断しかつファンを半截した状態の平面図である。



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 287 of 2286

図中(1)はケース本体、(1)aは送風室、(1)bは手持部、(1)cは流出部、(2)はモータ、(3)はファン、(4)は熱源、(5)は送気管、(9)はボビン、(10)はヒータ、(15)は切換スイッチ、(16)はコード、(18)は湾曲状部、(19)は入気孔、(22)は補助部材、(23)は流通路である。

実用新案登録出願人　小　原　良　隆

同　建　守　邦　雄

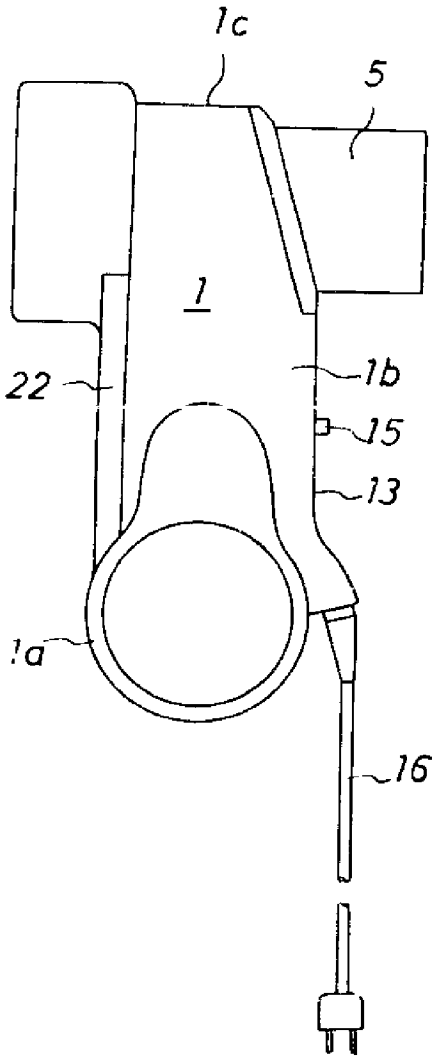
同　大　江　順　次

代理人弁理士　大　内　俊　治

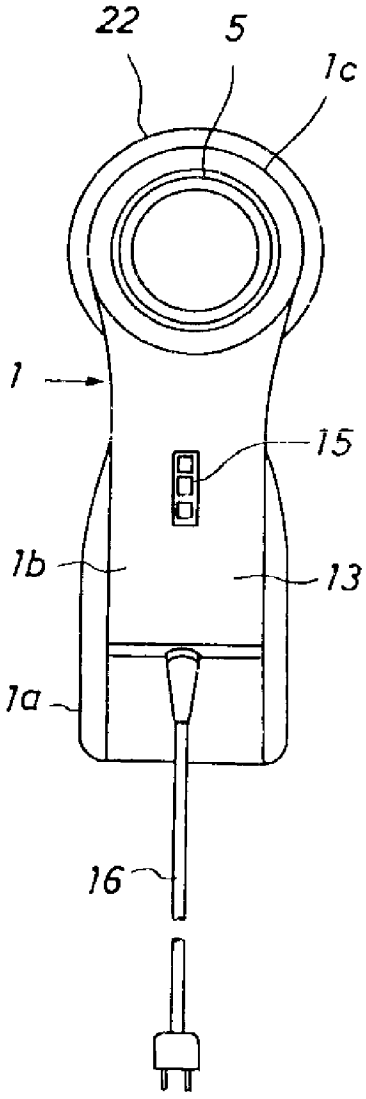


SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 288 of 2286

第 1 図



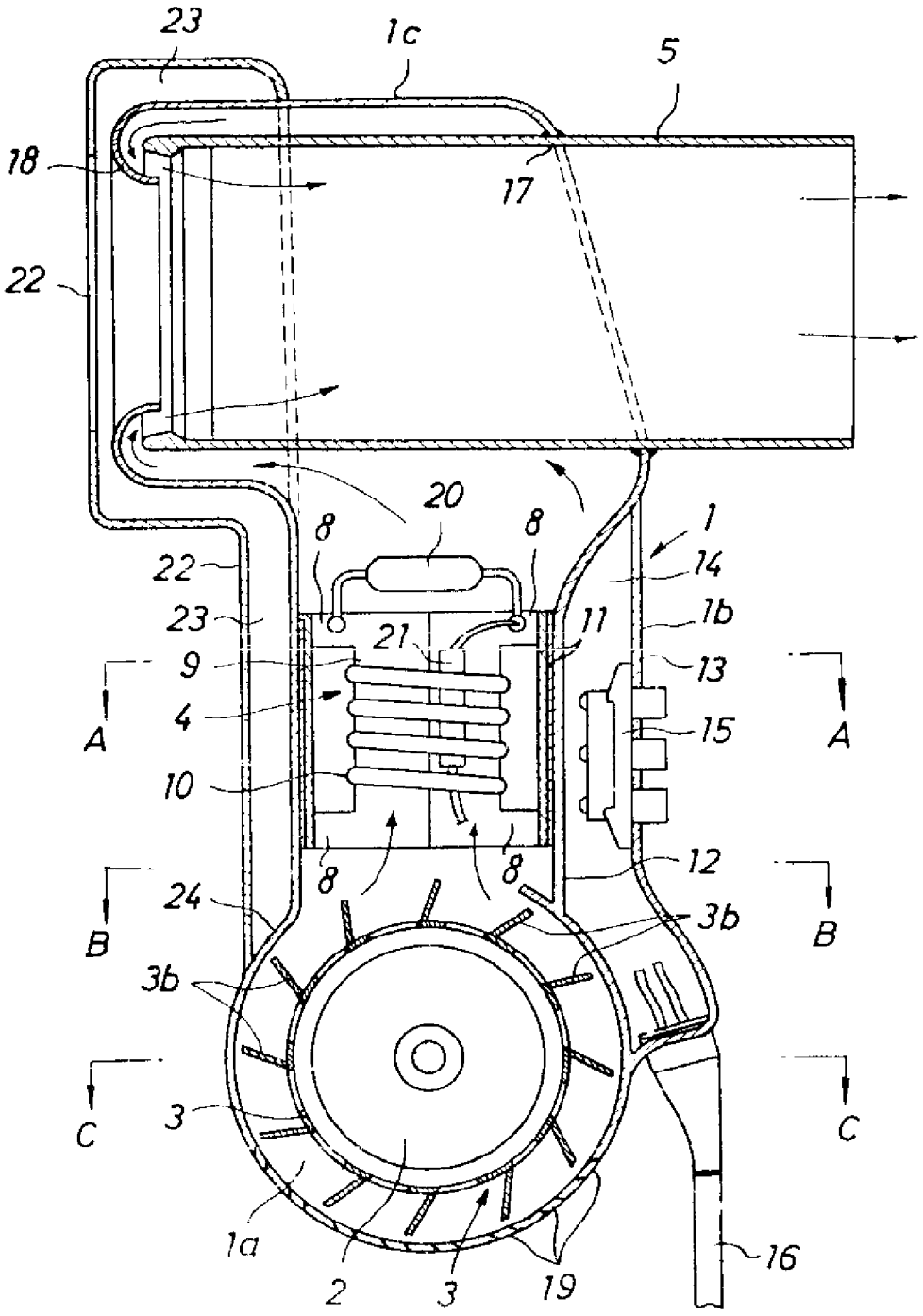

第 2 図




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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 289 of 2286

# 第 3 図

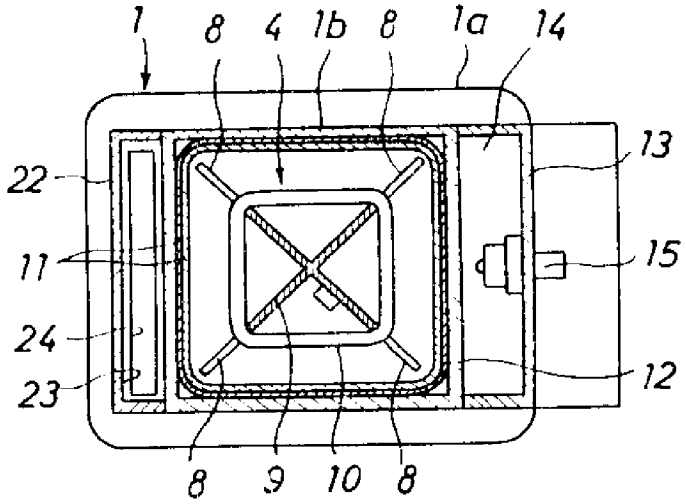



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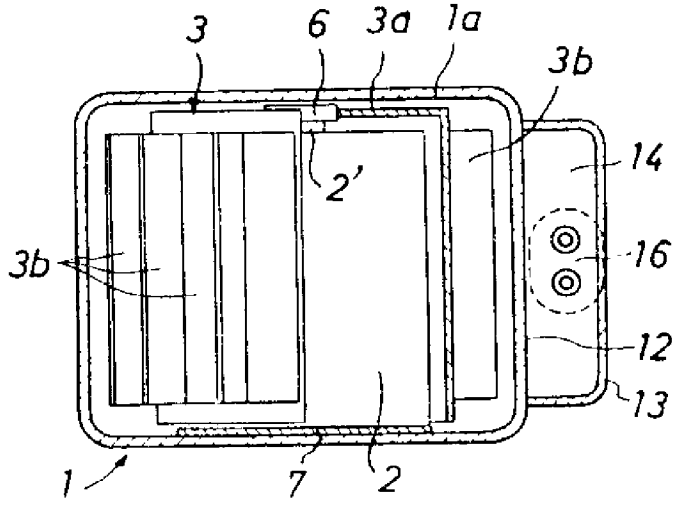


SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 290 of 2286

第 4 図




第 5 図




代理人 弁理士 大 内 俊 治

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 291 of 2286

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 292 of 2286

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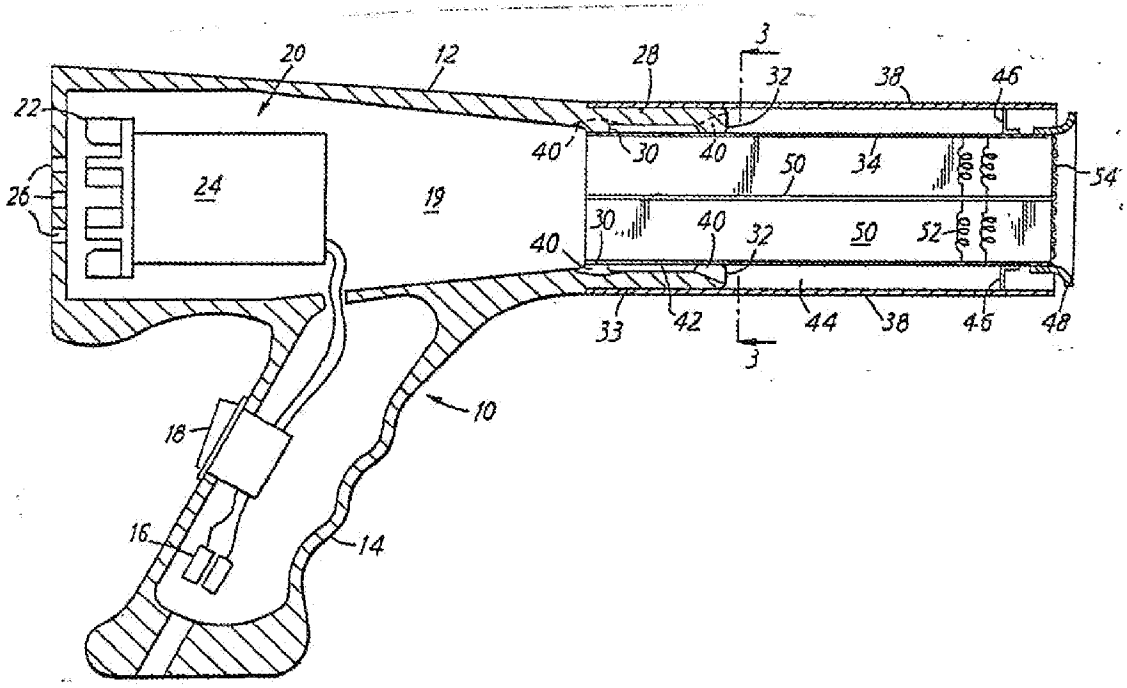
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(54) Title: HEATED GAS BLOWER DEVICE




(57) Abstract

A hot air blower has a relatively thin heat insulating nozzle (34) mounted coaxially within a metallic shield (38). A blower (20) directs a flow of air to the nozzle where it is heated by an electrical heater (52). A portion of the flow from the blower is directed through channels (42) to pass between the nozzle and the shield to keep the shield relatively cool. The blower is suitable in one example for paint stripping.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324

HEATED GAS BLOWER DEVICE

This invention relates to heated gas blower devices and in one example to hand-held devices suitable for tasks such as paint stripping.

Hot air guns have been produced with an electrically powered blower and an electrical heating element. Such guns have been suggested for use in paint stripping and are indeed effective. A problem that is encountered, however, is that because of the high air temperatures that need to be achieved for correct functioning of the gun, the nozzle - usually of metal to give the required mechanical strength - becomes hot enough to cause serious burns if touched accidently by the operator either during or immediately after use.

It is one object of this invention to provide an improved device in which the risk of injury to the operator is considerably reduced.

Accordingly, the present invention consists in a heated gas blower device comprising a nozzle; blower means for establishing a flow of gas through the nozzle; a heater for heating the flow of gas; a shield at least partially surrounding the nozzle; and means for directing a subsidiary flow of relatively cool gas from the blower means outwardly of the device between the nozzle and the shield to effect cooling of the shield.

Advantageously, said means for directing a subsidiary flow comprises a flow divider disposed between the blower means and the heater.

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324

Each bearing ring is formed with a series of circumferentially spaced notches 40 (seen also in Figure 3) which serve to provide, with the annular gap between the rings, a series of channels 42 extending from the body cavity 19 to the annular gap 44 between the nozzle 34 and shield 38.

Towards its free end, the nozzle 34 has riveted to it a series of flanges 46 formed from light guage metal sheet. Each of these flanges engages the inner cylindrical surface of the shield 38 and thereby serves to support the relatively thin nozzle within the mechanically stronger shield. At the free end the nozzle carries - again suitably by riveting - a baffle ring 48.

Within the nozzle 34 there are located a pair of intersecting baffle plates 50 which lie in orthogonal diametric planes of the nozzle. These plates terminate short of the free end of the nozzle and, near that end, carry electrical heating elements shown schematically at 52. These elements are connected by leads (not shown) to the switch 18. Beyond the plates 50, the end of the nozzle 34 is covered by a protective wire grill 54.

The operation of the described device can now be understood.

The blower 20 will in use serve to establish a flow of air towards the nozzle 34 of, for example, approximately 500 litres/minute. Most of this flow will pass axially through the nozzle to be heated by the element 52 to a temperature of, typically, 600°C. Because of the notches 40, however, a small portion of the flow will be divided from the main flow and directed along the channels 42 and through annular gap 44 between the nozzle and the shield. This air of course by-passes the heating element and will be effective to cool the shield 38. At the free ends of the nozzle and shield, the relatively cool air will pass to the atmosphere, being directed away from the area to which heat is intended to be applied by means of the baffle ring 48.

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 295 of 2286

CLAIMS

1. A heated gas blower device comprising a nozzle; blower means for establishing a flow of gas through the nozzle; a heater for heating the flow of gas; a shield at least partially surrounding the nozzle and means for directing a subsidiary flow of relatively cool gas from the blower means outwardly of the device between the nozzle and the shield to effect cooling of the shield.

2. A device according to Claim 1, wherein said means for directing a subsidiary flow comprises a flow divider disposed between the blower means and the heater.

3. A device according to Claim 1, wherein the shield completely surrounds the nozzle.

4. A device according to Claim 3, wherein the shield and the nozzle comprise respective coaxial cylinders.

5. A device according to Claim 4, further comprising a body with an annular mounting portion, the inward end of the nozzle being received within the mounting portion and the mounting portion being received within the inward end of the shield.

6. A device according to Claim 5, wherein said flow divider comprises aperture means formed in said annular mounting portion.

7. A device according to Claim 6, wherein said aperture means comprises a series of circumferentially spaced channels each extending axially through the mounting portion.

8. A device according to Claim 4, wherein the free ends of the nozzle is supported from the free end of the shield.

9. A device according to Claim 8, wherein the shield is formed of metal and the nozzle of heat insulating material.

10. A device according to Claim 1, further comprising handle means enabling the device to be hand held.

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 296 of 2286

# INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 83/00042

## I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [3]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC[3]: B 44 D 3/16

## II. FIELDS SEARCHED

Minimum Documentation Searched [4]

| Classification System | Classification Symbols |
|---|---|
| IPC[3] | B 44 D |

Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in the Fields Searched [5]

## III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

| Category * | Citation of Document, [16] with indication, where appropriate, of the relevant passages [17] | Relevant to Claim No. [18] |
|---|---|---|
| X | US, A, 3094606 (E.W. FERRIS) 18 June 1963 see column 1, line 56 - column 2, line 10; column 2, lines 37-46; figure 1 | 1-10 |

* Special categories of cited documents: [15]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

## IV. CERTIFICATION

| Date of the Actual Completion of the International Search [2] | Date of Mailing of this International Search Report [2] |
|---|---|
| 24th May 1983 | 21 JUIN 1983 |
| **International Searching Authority [1]** | **Signature of Authorized Officer [20]** |
| EUROPEAN PATENT OFFICE | G.L.M. Kruydenberg |

Form PCT/ISA/210 (second sheet) (October 1981)

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 297 of 2286

(19) Europäisches Patentamt
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A3

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## (54) An electrical connector having an anti-decoupling device.

(57) An electrical connector assembly including a pair of mating shells (100, 200) having end faces (122, 224) on dielectric inserts (110, 210) and a coupling nut (300) rotatably mounted on first shell (100), coupling nut (300) including an elongated a generally U-shaped passageway (142, 146, 144) sized to receive a coupling pin (280) on second shell (200), the passageway forming an integral cantilevered latch spring (160) of the type having adjacent its deflectable end a detent (162) for captivating the pin (280), rotation of coupling nut (300) bringing end faces (122, 224) into abutment to stop axial advance but permit continued rotation to allow coupling pin (280) to advance along the passageway to deflect latch spring (162) downwardly and reach the detent (162) whereupon latch spring (162) springs forwardly to captivate coupling pin (280) therein.

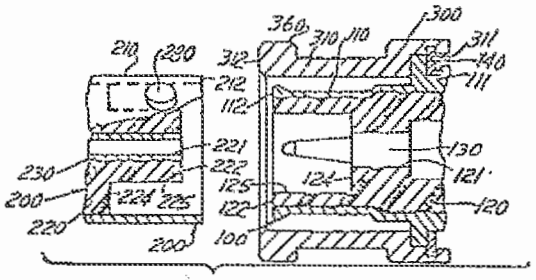



FIG. 1

EP 0 105 810 A3



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 298 of 2286

European Patent Office

# EUROPEAN SEARCH REPORT

0105810

Application number

EP 83 40 1921

## 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. ³) |
|---|---|---|---|
| X | US-A-3 856 375 (SIEMENS) * Column 3, lines 34-43; figures * | 1,5 | H 01 R 13/625 |
| X | US-A-1 514 314 (H.A. DOUGLAS) * Whole document * | 1 | |
| X | FR-A-2 090 787 (COAL INDUSTRY LTD.) * Figures; claim 3 * | 1,5 | |
| A | FR-A-2 498 272 (ITT INDUSTRIES INC.) * Figures * | 1 | |
| D,A | US-A-4 235 498 (BENDIX) * Figures * | 1 | TECHNICAL FIELDS SEARCHED (Int. Cl. ³) H 01 R |

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| THE HAGUE | 24-10-1983 | RAMBOER P. |

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
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited, IPR2023-01324
Page 299 of 2286

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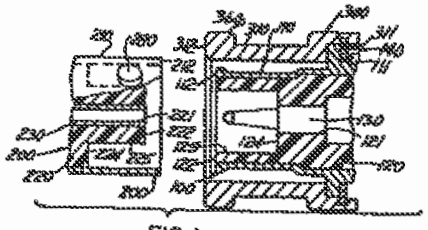


FIG. 1

EP 0 105 810 A2

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 300 of 2286

# AN ELECTRICAL CONNECTOR HAVING AN ANTI-DECOUPLING DEVICE

This invention relates to an electrical connector assembly having an anti-decoupling device and more particularly to a coupling nut including an integral spring element in a bayonet-type coupling arrangement.

An electrical connector assembly generally comprises two separate cylindrical connector housings adapted to be connected together by a coupling member rotatably mounted on one of the connector housings. In a typical bayonet-type coupling arrangement, the coupling member includes a helical slot terminating in a detent sized to receive a pin extending radially from the other connector housing whereby when the coupling member is rotated and the pin advanced relative to the slot, the housing members are axially drawn together and the pin received in the detent. A separate spring element is ordinarily utilized to captivate the pin for preventing unwanted uncoupling of the connector housings. In "Electrical Connector" U.S. Patent 2,984,811 issuing May 16, 1981 to Hennessey, Jr. et al, a sinusoidal wave washer is retained between the coupling member and the one housing so as to provide a constant rearward bias on the coupling member. The washer bias retards uncoupling of the conector housings by increasing frictional forces which the pin must overcome to escape from its detent. Wave washers can fatigue in time since the bias must be maintained continuously. In "Electrical Connector With Locking Means" U.S. Patent 4,235,498 issuing November 25, 1980 to Snyder, the bayonet pin progressively engages a linear succession of detent peaks - and - valleys disposed on a separate plastic spring retained near the end of the slot. While these arrangements are commonly used and

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 301 of 2286

have found acceptable by those in the electrical connector industry, elimination of separate spring parts from the assembly without compromising coupling retention would be desirable.

This invention eliminates need for a separate spring constantly biasing a coupling member relative to an electrical connector assembly having an anti-decoupling device, the assembly comprising: a pair of coaxial shells having interfittable forward portions and dielectric inserts retaining electrical contacts with the forward portion of one shell including a coupling pin; a coupling nut including an end face and a longitudinal guideway therein for receiving the coupling pin, the coupling nut being rotatably disposed about the other shell for connecting the shells with respect to the one another to cause mating engagement of the respective electrical contacts mounted therein; and an anti-decoupling device for preventing unwanted disconnection between the coupling portions. In accord with this invention, the anti-decoupling device comprises respective end faces associated with the dielectric inserts abutting for limiting axial movement of the coupling pin in the guideway and a longitudinally deflectable, cantilever latch spring having a detent thereon for securing the pin, the latch spring being integrally formed in the coupling nut wall and defined by a U-shaped passageway comprising first and second laterally extending slots joined at one of their ends by a bight with the first slot being further rearward of the end face than the second slot and being joined at its other end to the guideway for receiving the pin, advancing and rotating the coupling nut causing the end faces to abut and limit axial movement between the shells but allowing the pin to rotate into engagement with the latch spring to deflect the latch spring until the pin

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 302 of 2286

reaches the detent whereupon the latch springs forward and captivates the pin.

One advantage of this invention is provision of a coupling nut including a resiliently deflectable latch spring within the bayonet-type ramp to secure a pin. Another advantage of this invention is provision of a coupling member including in its wall an integrally formed latch spring. Yet another advantage of this invention is a simple bayonet-type coupling which may be engaged in less than one turn. Finally, an advantage of the invention is provision of a latch spring which eliminates need for a wave washer to provide a constant rearward bias on the coupling member of a coupling assembly.

One way of carrying out the invention is described in detail below with reference to the drawings which illustrate one specific embodiment of this invention, in which:

FIGURE 1 is a partial side view in section of a pair of electrical connectors and a coupling nut utilizing the principles of this invention.

FIGURE 2 is a detailed view of the coupling nut according to this invention.

FIGURE 3 shows assembly of the electrical connectors of FIGURE 1.

FIGURE 4 shows the completed electrical assembly.

Referring now to the drawings, FIGURE 1 shows an electrical connector assembly of the type including a pair of shells 100, 200 and a coupling nut 300 mounted to one shell for connecting to the other shell, the shells and coupling nut being coaxially disposed for mating along a center axis. Each of the shells 100, 200 have, respectively, interfittable forward portions 110, 210 having front end faces 112, 212 with forward portion 210

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 303 of 2286

including a coupling pin 280 extending radially outwardly therefrom and a dielectric insert 120, 220 having a passage 121, 221 retaining an electrical 130, 230 for mating, first shell 100 including a stepped groove 111 therearound for receiving a retaining ring 140. As shown, electrical contact 130 mounted in dielectric insert 110 is a socket-type and electrical contact 230 mounted in dielectric insert 210 is a pin-type. Each of the contacts could be other than shown.

Each of the dielectric inserts 120, 220 include, respectively, longitudinally spaced, forward and rearward end faces 122, 222; 124, 224 with dielectric insert 220 having a cylindrical wall 225 defining a male-type portion between its end faces 222, 224 and dielectric insert 120 having a cylindrical wall 125 defining a receptacle portion (or recess) between its end faces 122, 124, the male-portion being sized to clearance fit the cylindrical recess.

Preferably and in accord with this invention forward end face 222 of insert 220 and rearward end face 124 of insert 120 define limits of axial travel for the respective shells 100, 200. Further and in accord with this invention, forward and rearward end faces 122, 224 of the first and second dielectric inserts 120, 220, respectively, would also abut one another when the connectors are mated and limit forward axial advance of the respective shells.

The coupling nut 300 includes a tubular forward coupling portion 310 having a support rim 360 around an end face 312 thereof, the coupling nut being rotatably disposed about first shell 100 for connecting the shell forward portions 110, 210 together, rotation of the coupling nut axially advancing first shell 100 with respect to second shell 200 to cause rearward end face 124 associated with dielectric insert 120 mounted within

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 304 of 2286

first shell 100 to abut forward end face 222 associated with dielectric insert 220 mounted in second shell 200 and to cause mating engagement of the respective electrical contacts 130, 230. Coupling nut 300 includes an annular groove 311 and is rotably captivated to first shell 100 by a retaining ring 140 being received, respectively, in annular grooves 311, 111.

FIGURE 2 shows coupling nut 300 including an integral spring device for preventing unwanted disconnection between the connector shells. Preferably and in accord with this invention, coupling nut 300 includes in its forward coupling portion 310 a longitudinally deflectable latch spring 160 having a detent 162 disposed at a remote end thereof for securing coupling pin 280 extending radially from forward portion 210 of second shell 200. Latch spring 160 is defined by a continuous U-shaped passageway comprising first and second laterally extending slots 142, 144 being joined at one of their ends by a longitudinal slot 146 with the first slot 142 being joined at its other end to guideway 148 extending longitudinally rearwardly from a key 380 disposed in end face 312 of the coupling nut, the guideway 148 and first slot 142 being adapted to receive coupling pin 280 with the first lateral slot 142 being further rearward from end face 312 than the second lateral slot 144. As such, latch spring 160 defines an integral cantilever-type beam. Preferably, two equiangularily disposed latch springs 160 are provided in the wall of the coupling nut.

FIGURE 3 shows first and second shells 100, 200 aligned for mating into an electrical connector assembly with coupling nut 300 being rotably mounted to first connector shell 100. The coupling pin 280 on second shell 200 is aligned with the longitudinally extending guideway 148 on the coupling nut. Also and shown in

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 305 of 2286

phantom are rearward and forward end faces 124, 122; 224, 222 of the respective dielectric inserts 110, 120 mounted in the respective electrical connector shells 100, 200.

As a result of advancing and rotating coupling nut 300, coupling pin 280 advances longitudinally into guideway 148 and then laterally rearwardly into first lateral slot 142 until such time as rearward end face 124 in first connector shell 100 abuts forward end face 222 in second connector shell 200, the abutting faces prohibiting further axial movement between the shells but not denying rotational movement of the coupling nut. The arrows associated with numbers 280' and 280" (shown in phantom) show successive positions of coupling pin 280. Further rotation of coupling nut 300 causes pin 280 to abut against the latch spring 160 at an intermediate contact point "A" of the latch spring with further rotation camming the coupling pin along the edge of the latch spring to deflect the latch spring longitudinally forwardly towards end face 312 of the coupling nut. Ultimately after this additional rotation, which is much less than one complete rotation, coupling pin 280 reaches detent 162 and the spring latch springs forwardly to captivate the pin in the detent.

FIGURE 4 shows a coupled relation wherein latch spring 160 is longitudinally biasing detent 162 against coupling pin 280.

While a preferred embodiment of the invention has been disclosed, it will be apparent to those skilled in the art that changes may be made to the invention as set forth in the appended claims and, in some instances, certain features of the invention may be used to advantage without corresponding use of other features. For example, a pair of equiangularly disposed coupling pin/spring latches may be provided. Further, although coupling nut 300 is shown as having a support rim 360

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 306 of 2286

around end face 312 thereof providing a polarizing (i.e., orientation) means, support rim itself is not necessary for the principles recited herein of removing a passageway from the wall of the coupling nut to form a cantilever latch spring integrally therewith. Accordingly, it is intended that the illustrative and descriptive materials herein be used to illustrate the principles of the invention and not limit the scope thereof.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 307 of 2286

Claims:

1. An electrical connector assembly having an anti-decoupling device comprising: first and second shells (100, 200) including, respectively, a forward portion (110, 210) and a dielectric insert (120, 220), each said insert retaining an electrical contact (130, 230) therein for mating, said second shell (200) including a radially extending coupling pin (280) on an outside portion thereof; a coupling nut (300) rotatably disposed about first shell (100) and including a coupling portion (310) for connecting the shells together and having an end face (312) and a guideway (148), said guideway (148) extending rearwardly from end face (312) for receiving coupling pin (280) and provided with a detent (162) for receiving said coupling pin; and an anti-decoupling device for preventing unwanted disconnection between the shells, said anti-decoupling device characterized by an end face (124) associated with said first shell (100) being adapted to abut an end face (222) associated with said second shell (200) for limiting axial advance of the shells but allowing continued rotation of the coupling nut; first and second laterally extending slots (142, 144) joined at adjacent ends by a longitudinal slot (146), said first lateral slot (142) being further inward from said end face (312) than said second lateral slot (144) and joined at its other end to guideway (148), said slots (142, 144, 146) forming integrally of coupling nut (300) a deflectable latch spring (160) having the detent

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 308 of 2286

(162) formed thereon for securing said coupling pin (280), advancing and rotating coupling nut (300) causes the end faces to abut and the pin (280) to be rotated in first lateral slot (142) and against the latch spring (160) to first deflect the spring and they advance to the detent (162) whereupon the latch spring deflects and the detent captivates the pin.

2. The electrical connector assembly as recited in Claim 1, wherein said end faces (122, 224) are disposed on dielectric inserts (120, 220).

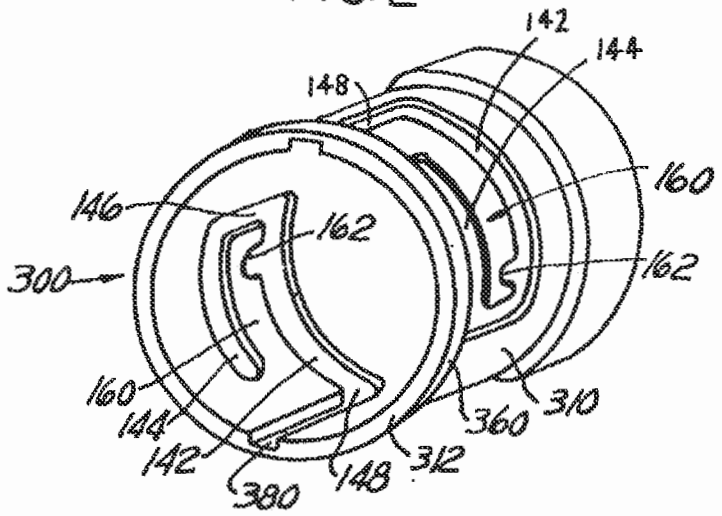
3. The electrical connector assembly as recited in Claim 2, wherein dielectric insert (220) includes a second end face (222) and a generally cylindrical male-portion (225) extending between end faces (222, 224) and dielectric insert (120) includes a second end face (124) and a generally cylindrical receptacle (125) extending between end faces (122, 124), said receptacle (125) being sized to receive said male-portion (225).

4. The electrical connector assembly as recited in Claim 2, wherein forward and rearward end faces (122, 124) of dielectric insert (120) abut, respectively, forward and rearward end faces (222, 224) of dielectric insert (220) for limiting axial entry.

5. The electrical connector assembly as recited in Claim 2, wherein a pair of deflectable latch springs (160) are equiangularly disposed on said coupling portion (310).

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 309 of 2286

FIG. 2



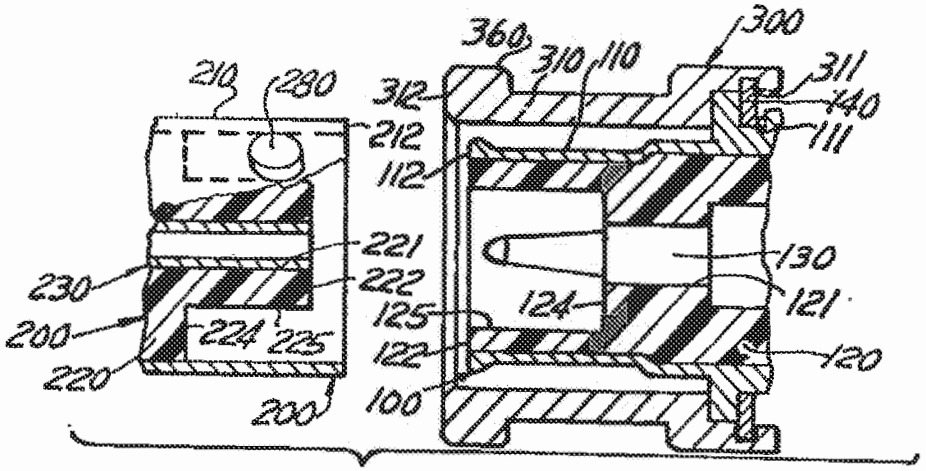




FIG. 1

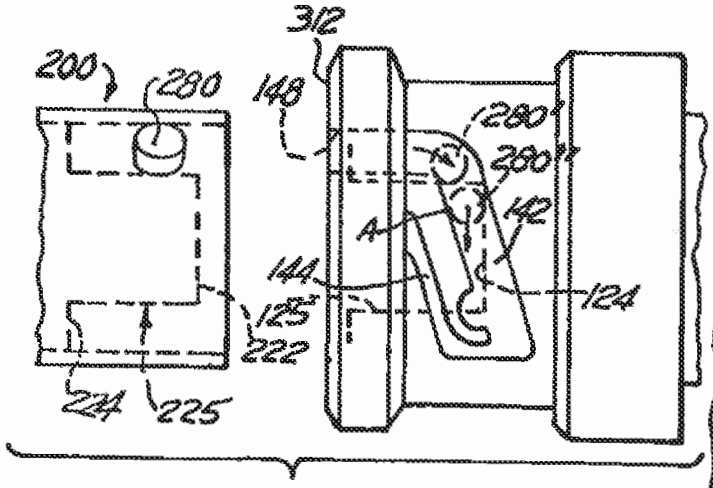
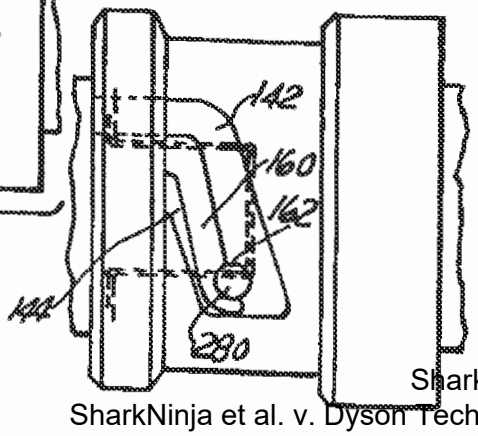



FIG. 3

FIG. 4




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 310 of 2286

(19) JAPANESE PATENT OFFICE (JP) (11) Published Patent Application (Kokai) No.

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S60-135700

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(54) Title of the Invention: Hair Dryer

(21) Patent Application No. S58-242800

(22) Filing Date: December 22, 1983

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(71) Applicant: Matsushita Electrical Industrial Co., Ltd., 1048 Kadoma, Kadoma-shi, Osaka, Japan
(74) Agent: Patent Attorney MIYAI Haruo

Specification

**1. Title of the Invention**

Hair Dryer

**2. Claims**

(1) A hair dryer comprising an annular sound-absorbing member provided peripherally around a fan in an airway.

(2) The hair dryer according to claim (1), wherein the sound-absorbing member is fixed in position by an inlet bell mouth.

(3) The hair dryer according to claim (2), wherein the bell mouth is detachable with respect to members that form the airway and the sound-absorbing member is detachable.

3. Detailed Description of the Invention

(Field of the Invention)

The present invention relates to an air blower for use in a hair dryer or the like.

(Prior Art)

A large proportion of the noise generated in a hair dryer comes from the motor portion, the fan portion, and the inlet portion. In particular, in recent hair dryers, the shift to high wattages has continued and noise during operation has tended to increase accordingly. Hence, such hair dryers had a problem in that the noise of operation was loud, making them unpleasant to use. In particular, the noise from the fan portion was especially loud. The causes of this noise include the sound of turbulence when the air being pulled in passes between the blade of the fan, and noise resulting from the pressure differences and backflow between the inner surface of the casing and the fan. When the generated sound is transmitted to the exterior from the inlet side where the air is pulled in, the user experiences it as unpleasant sound (noise).



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 311 of 2286

To solve this problem, a dryer has been proposed (Published Utility Model Application S53-95281) in which an annular noise-absorbing member 21 is inserted into a suction inlet 23 of a main body 22. In this prior art application, 24 denotes a motor, and 25 denotes a fan. However, in order to enhance the noise reduction effect, it was necessary to increase a width L of the noise-absorbing member 21 to widen the range of the noise reduction. However, increasing the width L in this way causes a problem in that the dryer main body becomes too big, making the dryer as a whole harder to use. If the width L is reduced, the sound absorbing area becomes too small and sufficient sound-absorbing effects cannot be obtained.

(Purpose of the Invention)

The purpose of the present invention is to provide a hair dryer that promotes noise reduction without an accompanying increase in the length of the sound-absorbing means, and is easy to use.

(Disclosure of the Invention)

The hair dryer of the present invention has an annular sound-absorbing member provided peripherally in the airway.

Embodiments

A first embodiment formed by applying the present invention to a hair dryer is illustrated in FIGS. 1 to 4. In the drawings, 1 denotes a hair dryer main body formed from a cylindrical portion that constructs an airway 2 and a grip portion 1a. An airway 2 houses a motor 4 equipped with a fan 3 and a coil-like heater 5, and a switch 6 is provided within the grip portion 1a. 6a denotes a control piece of the switch 6, and 7 denotes a power cord. A discharge outlet mesh 9 is installed in a discharge outlet 8 of the airway 2, and a suction inlet mesh 11 is installed in a suction inlet 10. A cylindrical sound-absorbing member 12 is internally disposed in the airway 2 around an external periphery of the fan 3. The cylindrical sound-absorbing member 12 is located so that the internal edge thereof abuts a motor installation plate 13, and is prevented from dropping out by the suction inlet mesh 11. The suction inlet mesh 11 is formed from a bell mouth 11a and a radial plate-like mesh piece 11b. The mesh piece 11b is set to tilt at an angle *a'* with respect to a vertical cross-section through the airway 2. The angle *a'* is approximately equal to a tilt angle *a* of a blade piece 3a of the fan 3. The suction inlet mesh 11 is housed in a portion of the suction inlet 10 of the dryer main body 1 and a plurality elastic hook pieces 14 provided on the suction inlet mesh 11 engage with a hook indentation portion 15 formed in an inner surface of the dryer main body 1, thereby detachably fixing the suction inlet mesh 11 to the dryer main body 1.

Operation

Due to the provision of the annular sound-absorbing member 12 at the external periphery of the fan 3, the reflection of noise from the inner surface of the airway and transmission to the exterior is reduced in the manner of the prior art, through the absorption of sound energy. As a result, noise reduction in the fan, which is the main region of noise generation, is enhanced. Since the annular sound-absorbing member 12 is provided at the external periphery of the fan 3, unlike the prior art in which the sound-absorbing member is provided at the suction inlet, the dryer main body 1 is not lengthened even when the annular sound-absorbing member 12 is significantly lengthened in the axial direction to increase the absorption range. Thus, the problem of the dryer becoming difficult to use is eliminated.

Moreover, dust or the like drawn in with the air from the exterior is also absorbed by the annular sound-absorbing member 12, and so the buildup of dust in the heater 5 can be reduced and faults in the heater caused by buildups of dust can be



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 312 of 2286

prevented. Although absorption of dust by the annular sound-absorbing member 12 will degrade the sound-absorbing effects it provides, annular sound-absorbing member 12 can be easily removed and reinserted by removing the suction inlet mesh 11, and can therefore be replaced with a new annular sound-absorbing member 12 at regular intervals. Alternatively, the original annular sound-absorbing member 12 may be cleaned.

The suction inlet mesh 11 includes the tilted radial mesh pieces 11b. As result noise generation at the suction inlet 10 is reduced. The reason for this is as follows. In the prior art, the suction inlet mesh was conventionally formed from a radial portion and an annular portion. This meant that the wind noise of air flowing from the suction inlet to the fan blades was very high. By contrast, in the present embodiment, the tilting with respect to the axial direction A of the radial mesh pieces 11b means that air sucked in as indicated by the arrow B in FIG. 4 is introduced between fan blades 3a with its direction already altered by the radial mesh pieces 11b. As a result, the impact of the air with the inlet portions of the fan blades 3a of the fan 3 is small and the amount of noise generated is reduced. In FIG. 4, the arrow Q denotes the direction of rotation. The transmission of generated noise to the suction inlet side 10 is blocked by the mesh pieces 11b, which act as obstructive plates. Instead of being transmitted, the noise is distributed in the directions shown by the arrows D (in FIG. 3). Consequently, this arrangement also serves to reduce noise at the suction inlet 10 side.

(Effects of the Invention)

The hair dryer of the present invention promotes noise reduction without an accompanying increase in the length of the sound absorbing means, and is easy to use.

4. Brief Description of the Drawings

FIG. 1 is a cross-sectional view of a first embodiment of the present invention; FIG. 2 is an exploded perspective view of the same; FIG. 3 is a back view of the same; FIG. 4 is an explanatory view of the same; and FIG. 5 is a cross-sectional view of the prior art.

1…Dryer main body, 2…Airway, 3…Fan, 4…Motor; 5…Heater, 10… Suction inlet, 11…Suction inlet mesh, 11a…Bell mouth, 11b…Mesh piece, 12…Annular sound-absorbing member.

Representative Attorney MIYAI Haruo

**FIG. 1**

**FIG. 2**

**FIG. 3**

**FIG. 4**

**FIG. 5**



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 313 of 2286

⑲日本国特許庁（JP）　⑪特許出願公開

⑫公開特許公報（A）　昭60－135700

| ⑤1Int.Cl.⁴ | 識別記号 | 庁内整理番号 | ④3公開　昭和60年(1985)7月19日 |
|---|---|---|---|
| F 04 D 29/66 | | 7532－3H | |
| // A 45 D 20/10 | | 7715－3B | |

審査請求　未請求　発明の数 1　（全4頁）

⑤4発明の名称　送風機

②1特　願　昭58－242800

②2出　願　昭58(1983)12月22日

⑦2発明者　藤嶋　信一　門真市大字門真1048番地　松下電工株式会社内

⑦1出願人　松下電工株式会社　門真市大字門真1048番地

⑦4代理人　弁理士　宮井　暎夫

明　細　書

1. 発明の名称

送風機

2. 特許請求の範囲

(1) 風路内のファンの外周に環状吸音部材を配設した送風機。

(2) 前記吸音部材を吸込口ベルマウスにより位置決め固定した特許請求の範囲第(1)項記載の送風機。

(3) 前記ベルマウスを前記風路を構成する部材に対して着脱自在とし、前記吸音部材を着脱自在とした特許請求の範囲第(2)項記載の送風機。

3. 発明の詳細な説明

〔技術分野〕

この発明はヘアードライヤ等に適用する送風機に関するものである。

〔背景技術〕

ヘアードライヤの騒音発生は、モータ部と、ファン部と、吸込口部よりの発生が大部分を占めている。特に最近のヘアードライヤは、高ワット化が進み、それに伴なって運転時の騒音も大きくなる傾向となっている。そのため、使用時に運転音がやかましくて使いづらい等の問題点があった。特に、ファンの部分での騒音は著しく大きい。その原因としては、吸い込まれた空気がファンの翼片間を通過するときの乱流音と、ケーシング内面とファンとの間での圧力差および逆流による騒音とがある。そして、この発生音は、空気の取り入れ口である吸込口側から外側へ伝達され、使用者に不快音（騒音）を与えている。

そこで、第5図のように、環状の吸音部材21を本体22の吸込口23に挿入し、発生した騒音を吸収して騒音低減を図るものが提案されている（実開昭53－95281号公報）。24はモータ、25はファンである。しかし、騒音低減の効果を高めるには、吸音部材21の幅Lを大きくして吸音範囲を広げる必要がある。このように、幅Lを大きくとると、ドライヤ本体22の寸法が大きくなり、全体として使い勝手が悪くなるという問題が生じる。幅Lを短くすると、吸音面積が小さく



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 314 of 2286

なり、十分な吸音効果が得られない。

〔発明の目的〕

この発明は、吸音手段によって長尺化を伴うことなく、騒音低減が図れ、使い勝手のよい送風機を提供することを目的とする。

〔発明の開示〕

この発明の送風機は、風路内のファンの外周に環状吸音部材を配設したものである。

実施例

この発明をヘアードライヤに適用した一実施例を第1図ないし第4図に示す。図において、1はドライヤ本体であり、風路2を形成する筒状部分と把手1aとからなる。風路2内にファン3を取付けたモータ4と、コイル状のヒータ5とが収容され、把手1a内にスイッチ6が設けられている。6aはスイッチ6の操作片、7は電源コードである。風路2の吐出口8には吐出口格子9が取付けられ、吸込口10には吸込口格子11が取付けられている。ファン3の外周に位置して、風路2に筒状吸音部材12が内嵌し、筒状吸音部材12はモータ取付板13に内端が位置決めされ、吸込口格子11で抜け止めされている。筒状吸音部材12は、スポンジやウレタン等の多孔質（連続気泡）の部材からなる。吸込口格子11はベルマウス11aと、放射状の板状格子片11bとからなる。格子片11bは風路2の垂直断面に対して角度α'だけ傾けてある。角度α'は、ファン3の翼片3aの傾き角度αと略同じである。吸込口格子11は、ドライヤ本体11の吸込口10に一部を内嵌させてあり、吸込口格子11に設けた複数個の弾性係止片14をドライヤ本体1の内面の係止凹部15に係合させることにより、吸込口格子11はドライヤ本体1に着脱自在に固定される。

動作

ファン3の外周に環状吸音部材12を設けたため、従来のように騒音が風洞内面で反射して外部へ伝達されることが少なくなり、騒音の発生エネルギが吸収される。そのため、騒音発生の主要因部であるファン3の騒音の低減が図れる。環状吸音部材12はファン3の外周に設けるので、従来のように吸込口に設ける場合と異なり、環状吸音部材12の軸方向長さを十分に長くして吸音範囲を広げても、ドライヤ本体1が長くなることがなく、使い勝手が悪くなるという問題が解消される。

また、風とともに外部から吸込んだ塵埃等が環状吸音部材12に吸着され、そのため塵埃がヒータ5に付着堆積することが軽減され、塵埃の堆積によるヒータ5の異常発熱が防止される。環状吸音部材12は塵埃の吸込みによって吸音効果が低下するが、吸込口格子11を取外すことにより容易に着脱できるので、定期的に新たな環状吸音部材と取り換えたり、または洗浄したりすることが可能である。

吸込口格子11は各格子片11bを傾かせた放射状としてあるが、そのため吸込口10での騒音発生が低減される。すなわち、従来一般に吸込口格子は放射状部分と環状部分とで構成しているが、そのため空気が吸込口からファンの翼片へ流入するときの風切音が非常に大きかった。しかし、この実施例では格子片11bを軸方向Aに対して傾けてあるため、第4図の矢印Bのように吸込まれる空気は、矢印Cのように格子片11bで予じめ傾けられてファン3の翼片3a間に導入される。そのため、ファン3の翼片3aの入口部との空気の衝突の度合が小さく、騒音の発生量も小さくなる。第4図において矢印Qは回転方向を示す。また、発生した騒音の吸込口10側への伝達は、格子片11bが遮閉板となって遮閉され、矢印D（第3図）で示すように拡散する。そのため、これによっても吸込口10側での騒音が低下する。

〔発明の効果〕

この発明の送風機は、吸音手段によって長尺化を伴うことなく、騒音低減が図れ、使い勝手が良いという効果がある。

4. 図面の簡単な説明

第1図はこの発明の一実施例の断面図、第2図はその分解斜視図、第3図は同じくその背面図、第4図は同じくその作用説明図、第5図は従来例の断面図である。

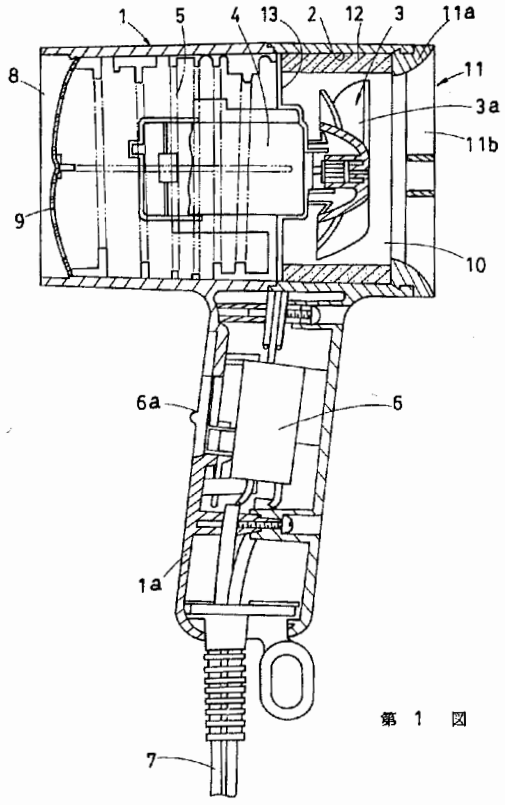
1…ドライヤ本体、2…風路、3…ファン、4



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 315 of 2286

…モータ、5…ヒータ、10…吸込口、11…吸込口格子、11a…ベルマウス、11b…格子片、12…環状吸音部材

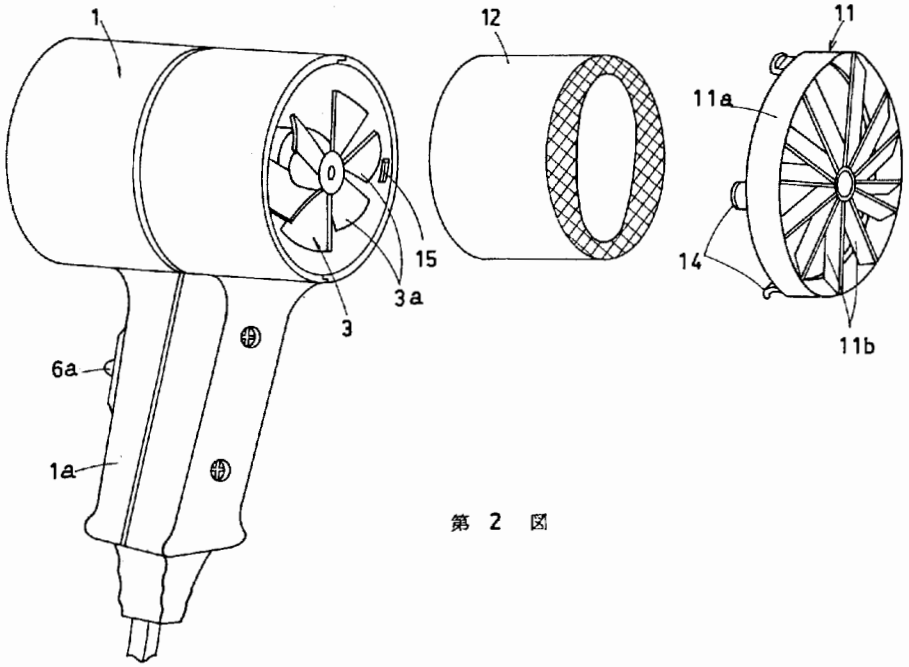
代理人　弁理士　宮井暎夫



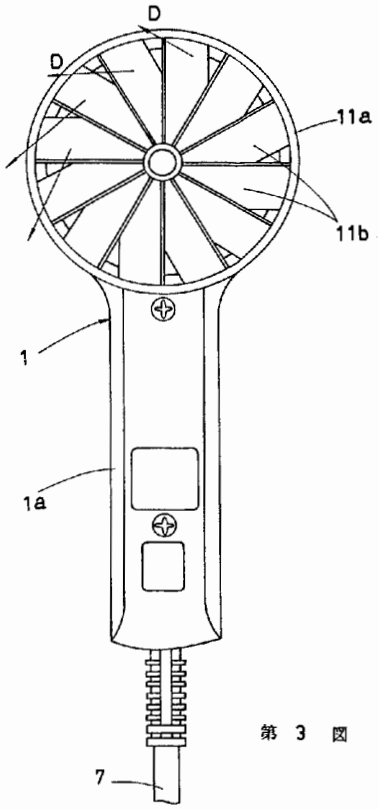

第1図



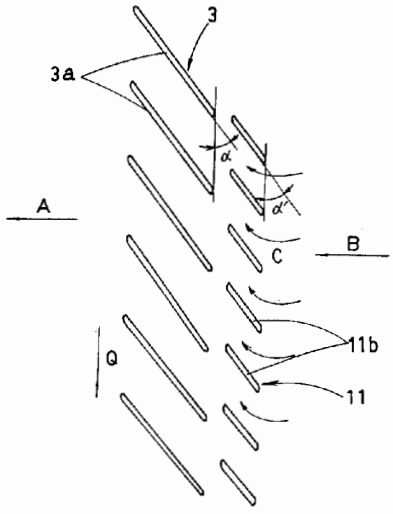
SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 316 of 2286



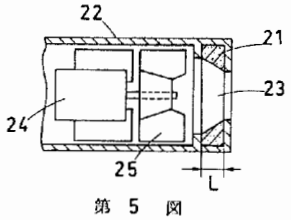

第 2 図




第 3 図




第 4 図




第 5 図



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 317 of 2286

Espacenet

# Bibliographic data: EP0300281 (A1) — 1989-01-25

## Hair drier.

No documents available for this priority number.

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**Applicant(s):** FORFEX POPP A HAARPFLEGEGERAET [DE] ± (FORFEX ALFRED POPP HAARPFLEGEGERATE GMBH, ; FORFEX ALFRED POPP HAARPFLEGEGERAETE GMBH)

**Classification:** **- international:** ***A45D20/50;*** (IPC1-7): A45D20/50
**- cooperative:** **A45D20/50**

**Application number:** EP19880110857 19880707

**Priority number (s):** DE19873723063 19870711

**Also published as:** EP0300281 (B1) DE3723063 (A1)

## Abstract of EP0300281 (A1)

The hairdryer has the shape of a hollow handle (1) with a current supply (1a) and air inlets (2) as well as an installed heater (7) with a fan (8). A tubular brush, which is preferably exchangeable, is connected to the handle (1) at the front end and has alternating rows of holes (4, 24) and rows of brush pins (5, 25) distributed along its circumferential surface. Inserted in the tubular brush (3) is a tube core (12), in particular a metal core, which serves for receiving a heating cartridge (14) in its longitudinal borehole (13) and has along its circumferential surface longitudinal grooves (15) which are located below the rows of holes (4) of the tubular brush (3) and serve for discharging the air flow when the fan (8) is switched on.

Last updated: 11.12.2013 Worldwide Database 5.8.15; 92p

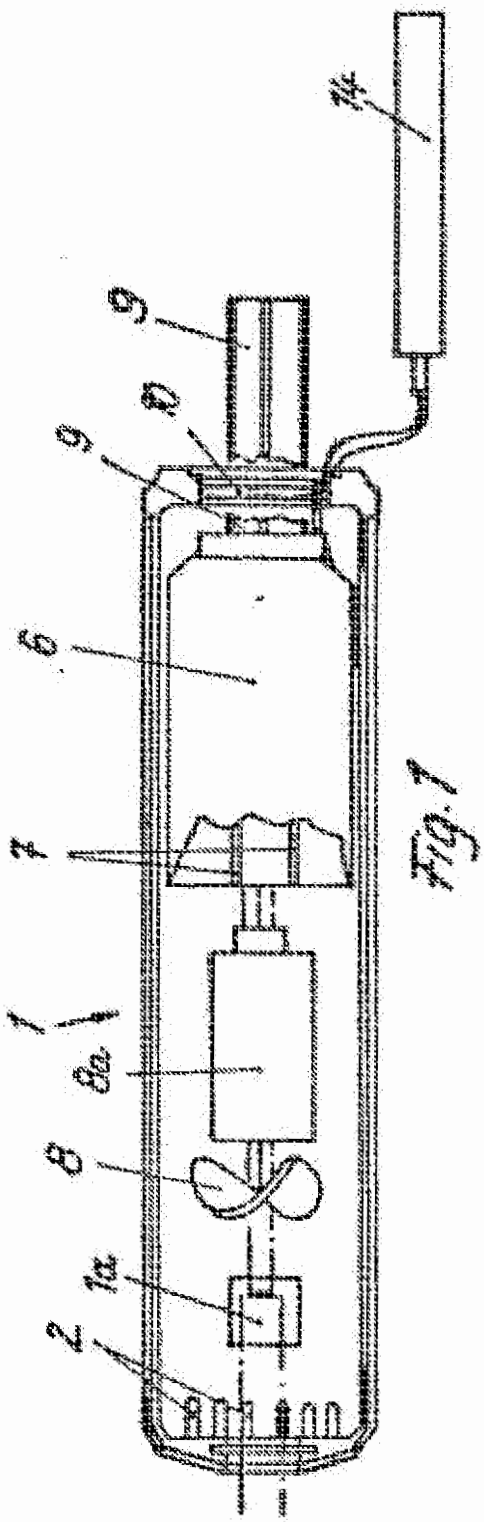



Fig. 1

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 319 of 2286

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(54) Haartrockner.

(57) Es wird ein Haartrockner in Form eines hohlen Handgriffs (1) mit Stromzufuhr (1a) und Lufteinlässen (2), sowie eingebauter Heizung (7) mit Gebläse (8) beschrieben, wobei am Handgriff (1) stirnseitig ein Bürstenrohr vorzugsweise auswechselbar angeschlossen ist, welches abwechselnd Lochreihen (4, 24) und Bürstenstiftreihen (5, 25) längs seiner Umfangsfläche verteilt aufweist. Im Bürstenrohr (3) ist ein Rohrkern (12), insbesondere Metallkern, eingesetzt, welcher in seiner Längsbohrung (13) der Aufnahme einer Heizpatrone (14) dient und entlang seiner Umfangsfläche Längsnuten (15) aufweist, welche unter den Lochreihen (4) des Bürstenrohrs (3) liegen und bei eingeschaltetem Gebläse (8) der Ausleitung des Luftstroms dienen.

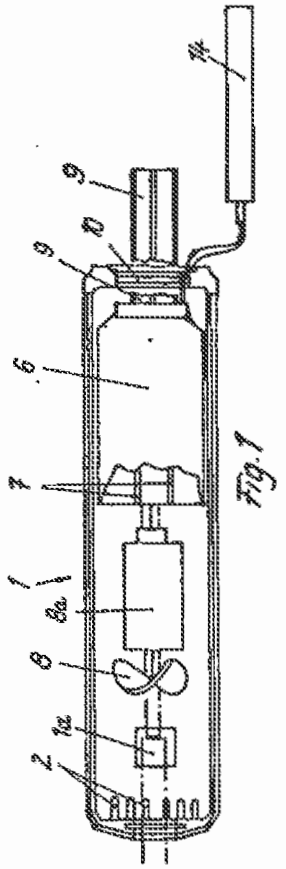



Fig. 1

EP 0 300 281 A1



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 320 of 2286

# Haartrockner

Die Erfindung bezieht sich auf einen Haartrockner in Form eines hohlen Handgriffs mit Lufteinlässen und eingebauter Heizung mit Gebläse.

Es sind solche Hartrockner bekannt, welche am Handgriff einerseits einen drehbaren Stromanschluß aufweisen und andererseits ein Bürstenrohr, vorzugsweise auswechselbar angeschlossen ist, welches abwechselnd Lochreihen und Bürstenstiftreihen längs seiner Umfangsfläche verteilt aufweist und endseitig gegebenenfalls offen ist. Hierbei handelt es sich um Haartrockner "Fön" in Bürstenform, welcher mit Warmluft arbeitet.

Daneben gibt es noch Haarbürsten, welche ebenfalls einen Handgriff mit stirnseitig angeschlossenem Bürstenrohr aus Metall aufweisen, welchem eine Heizpatrone eingeschoben ist und welche Haarbürsten mit Wärmestrahlung ohne Warmluft arbeiten und mehr dem Ausbürsten nach dem Haarfönen dienen.

Es ist nun Aufgabe der Erfindung, hier eine Kombination der vorgenannten Haartrockner und Haarbürsten zu schaffen, welche sowohl eine Warmluftbehandlung als auch eine Wärmestrahlungsbehandlung und Bürsten der Haare jeweils allein als gegebenenfalls auch in Kombination ermöglicht.

Der Haartrockner nach dem Oberbegriff von Anspruch 1 kennzeichnet sich gemäß der Erfindung dadurch, daß im Bürstenrohr ein Rohrkern, insbesondere Metallkern eingesetzt ist, welcher in seiner Längsbohrung der Aufnahme einer Heizpatrone dient und entlang seiner Umfangsfläche Längsnuten aufweist, welche unter den Lochreihen des Bürstenrohrs liegen und bei eingeschaltetem Gebläse der Ausleitung des Luftstroms dienen. Hierdurch wird eine Kombination von Warmluft und Wärmestrahlung als auch in Einzelwirkung auf die zu behandelnden Haare ermöglicht, wobei das Bürstenrohr mit Bürstenstiften, insbesondere aus Kunststoff besteht und endseitig geschlossen ist.

Nach einem weiteren Gedanken der Erfindung kann der Haartrockner nach dem Oberbegriff von Anspruch 2 sich auch dadurch kennzeichnen, daß im Bürstenrohr ein Rohrkern, insbes. Metallkern, eingesetzt ist, welcher in seiner Längsbohrung der Aufnahme einer Heizpatrone dient und entlang seiner Umfangsfläche Längsnuten aufweist, wobei die Lochreihen als Breitschlitze zwischen den Bürstenstiftreihen liegen und die Längsnuten sich unter den letzteren erstrecken, während die Längsstege die Schlitzmitte abdecken, derart, daß bei eingeschaltetem Gebläse der Luftstrom beidseits der Stiftreihen austritt. Hierdruch erfolgt einerseits eine weitere Aufteilung der austretenden Warmluftströme als andererseits auch eine intensivere Wärmeabstrahlung infolge der unter den Schlitzen liegenden Längsstege des Metallkerns mit Heizpatrone.

Bevorzugte Ausführungsformen solcher Haartrockner sind beispielsweise in der Zeichnung dargestellt und nachfolgend im Einzelnen beschrieben und zwar zeigen:

Figur 1 den geöffneten Handgriff einer ersten Ausführungsform,

Figur 2 eine Seitenansicht des mit dem Handgriff zu verbindenden Bürstenrohrs,

Figur 3 eine Seitenansicht des Rohrkerns,

Figur 4 den Querschnitt IV-IV durch den Rohrkern,

Figur 5 den teilw. aufgeschnittenen Handgriff mit Bürstenrohr einer zweiten Ausführungsform,

Figur 6 eine weitere Teilansicht und

Figur 7 den Querschnitt nach Linie VII-VII.

Wie aus der Zeichnung beim ersten Ausführungsbeispiel nach Figur 1 bis 4 ersichtlich wird, besteht der Haartrockner aus dem zweiteiligen Handgriff 1 mit an sich bekannter, drehbarer Stromzuleitung bei 1a und Lufteinlässen 2 einerseits und andererseits auswechselbar anschließbarem Bürstenrohr 3 mit Lochreihen 4 und Bürstenstiftreihen 5. Im Handgriff 1 ist am Anschlußende für das Bürstenrohr 3 eine Aufnahme 6 für das Heizelement 7 (Heizplatten) vorgesehen. Dieser Aufnahme 6 ist einerseits das Gebläse 8 mit Niederspannungsmotor 8a vorgeschaltet, welcher z. B. an einer 12 V Spannung des Heizwiderstandes angeschlossen ist, der mit 220 V gespeist wird und etwa 140 Watt abgibt. Andererseits läuft die Aufnahme 6 einstückig in einer Kreuzführung 9 aus, welcher das Bürstenrohr 3 aufsteckbar ist, das sodann in einer Ringnut 10 an der Stirnseite des Handgriffs 1 mittels Federlappen 11 drehbar einrastet. Das Bürstenrohr (3) kann bei 11a geschlossen oder auch mehr oder weniger geöffnet sein, um Luftstaus zu vermeiden.

Im Bürstenrohr 3 ist ein Metallkern 12 eingeschoben, welcher in seiner Längsbohrung 13 eine Heizpatrone 14 (PTC-Patrone) aufnimmt, welche an 220 V als Widerstand angeschlossen ist und etwa 20 Watt abgibt. Der Metallkern 12 weist an seiner Umfangsfläche Längsnuten 15 auf, welcher unter den Lochreihen 4 des Bürstenrohrs 3 liegen und bei eingeschaltetem Gebläse 8 der Ausleitung des Luftstroms dienen.

Als Schaltstellungen sind beispielsweise vorgesehen: Nullstellung, Gebläse ein, zusätzlich. Heizung ein und Heizpatrone gesondert ein oder als Zuschaltung und wieder Nullstellung am Ende. Somit kann allein mit Kaltluft, Warmluft, Heißluft und Wärmestrahlung gearbeitet werden, was bisher



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 321 of 2286

mit solchen Hand-Haartrocknern nicht möglich war; somit werden diese vielseitiger anwendbar.

Beim zweiten Ausführungsbeispiel nach Figur 5 bis 7 besteht der Haartrockner wiederum aus einem zweiteiligen Handgriff 21 mit drehbarer Stromzuleitung bei 21a und Lufteinlässen 22 einerseits und andererseits, hier fest anschließbarem Bürstenrohr 23 mit Lochreihen 24 als Breitschlitze zwischen den Bürstenstiftreihen 25. Im Handgriff 21 ist wiederum am Anschlußende für das Bürstenrohr 23 eine Aufnahme 26 für das Heizelement 27 (Heizplatten) vorgesehen, welcher (26) einerseits das Gebläse 28 mit Motor 28a vorgeschaltet ist und die (26) andererseits in einem Luftauslaß 29 endet. Das Bürstenrohr 23 ist in einem Ringwulst 30 an der Stirnseite des geteilten Handgriffs 21 mit seiner Ringnut 31 fest eingesetzt.

Im Bürstenrohr 23 ist ein Metallkern 32 eingebracht, welcher in seiner Längsbohrung 33 eine Heizpatrone 34 (PTC-Patrone) aufnimmt. Der Metallkern 32 weist an seiner Umfangsfläche ebenfalls Längsnuten 35 auf, welche (35) sich hier unter der Bürstenstiftreihe 25 erstrecken, während die Längsstege 36 die Schlitzmitte 24 abdecken. Bei eingeschaltetem Luftstrom tritt dieser somit beidseits der Stiftreihen 25 aus. Somit erfolgt eine weitere Aufteilung des Luftstroms beim Austritt jeweils beidseits der Stiftreihen 25 und eine intensivere Wärmeabstrahlung durch die Stege 36 in Schlitzmitte 24.

Die Schaltstellungen können den vorgenannten beim Ausführungsbeispiel entsprechen, wobei bei eingeschaltetem Gebläse 28 dies hörbar ist und bei allein oder zusätzlich eingeschalteter Heizpatrone 34 diese durch eine Punktlichtanzeige 37 angezeigt werden kann. Der Ein-, Um- und Ausstellschieber 38 kann als Halbschale über den Handgriff 21 greifen und ist einerseits durch den Längsschlitz 39 in's Innere desselben (21) zum Geräteschalter geführt, während er (38) andererseits in eine Führungsnut 30 greift.

## Ansprüche

1. Haartrockner in Form eines hohlen Handgriffs mit Stromzufuhr und Lufteinlässen, sowie eingebauter Heizung mit Gebläse, wobei am Handgriff stirnseitig ein Bürstenrohr vorzugsweise auswechselbar angeschlossen ist, welches abwechselnd Lochreihen und Bürstenstiftreihen längs seiner Umfangsfläche verteilt aufweist,
**dadurch gekennzeichnet,** daß im Bürstenrohr (3) ein Rohrkern (12), insbesondere Metallkern, eingesetzt ist, welcher in seiner Längsbohrung (13) der Aufnahme einer Heizpatrone (14) dient und entlang seiner Umfangsfläche Längsnuten (15) aufweist, welche unter den Lochreihen (4) des Bürstenrohrs (3) liegen und bei eingeschaltetem Gebläse (8) der Ausleitung des Luftstrom dienen.

2. Haartrockner in Form eines hohlen Handgriffs mit Stromzufuhr und Lufteinlässen, sowie eingebauter Heizung mit Gebläse, wobei am Handgriff stirnseitig ein Bürstenrohr fest angeschlossen ist, welches abwechselnd Lochreihen und Bürstenstiftreihen längs seiner Umfangsfläche verteilt aufweist,
**dadurch gekennzeichnet,** daß im Bürstenrohr (21) ein Rohrkern (32), insbesondere Metallkern, eingesetzt ist, welcher in seiner Längsbohrung (33) der Aufnahme einer Heizpatrone (26) dient und entlang seiner Umfangsfläche Längsnuten (35) aufweist, wobei die Lochreihe (24) als Breitschlitze zwischen den Bürstenstiftreihen (25) liegen und die Längsnuten (35) sich unter den letzteren (25) erstrecken, während die Längsstege (36) die Schlitzmitten (24) abdecken, derart, daß bei eingeschaltetem Gebläse (28) der Luftstrom beidseits der Bürstenstiftreihen (25) austritt.

3. Haartrockner nach Anspruch 1,
**dadurch gekennzeichnet,** daß im Handgriff (1) beim Anschlußende für das Bürstenrohr (3) eine Aufnahme (6) für das Heizelement (7) vorgesehen ist, welcher einerseits das Gebläse (8) vorgeschaltet ist, während die Aufnahme (6) andererseits in einer Kreuzführung (9) für das aufsteckbare Bürstenrohr (3) endet, welch letzteres in einer Ringnut (10) an der Stirnseite des Handgriffs (1) drehbar eingerastet ist.

Haartrockner nach Anspruch 2,
**dadurch gekennzeichnet,** daß im Handgriff (21) beim Anschlußende für das Bürstenrohr (23) eine Aufnahme (26) für die Heizelemente (27) vorgesehen ist, welcher einerseits das Gebläse (28) vorgeschaltet ist, während die Aufnahme (26) in einem Luftauslaß (29) endet und das Bürstenrohr (23) in einer Ringnut (30) an der Stirnseite des vorzugsweise geteilten Handgriffs (21) fest einsetzbar ist.

5. Haartrockner nach einem der vorhergehenden Ansprüche 1 bis 4,
**dadurch gekennzeichnet,** daß der Ein-, Um- und Ausstellschieber (38) über die Hälfte des Handgriffs (21) als Halbschale greift und einerseits durch eine Schlitzung (39) den Geräteschalter im Inneren des Handgriffs (21) betätigt und andererseits vorzugsweise in eine zusätzliche Führungsnut 40 greift.

6. Haartrockner nach einem der vorhergehenden Ansprüche,
**dadurch gekennzeichnet,** daß bei eingeschalteter Heizpatrone (34) eine Punktlichtanzeige (37) erfolgt.

7. Haartrockner nach einem der vorhergehenden Ansprüche 1 bis 5,
**dadurch gekennzeichnet,** daß derselbe folgende



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 322 of 2286

Schaltstellungen aufweist: Nullstellung, Gebläse ein, zusätzlich Heizung ein und Heispatrone gesondert ein oder als Zuschaltung und wieder Nullstellung am Ende.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 323 of 2286

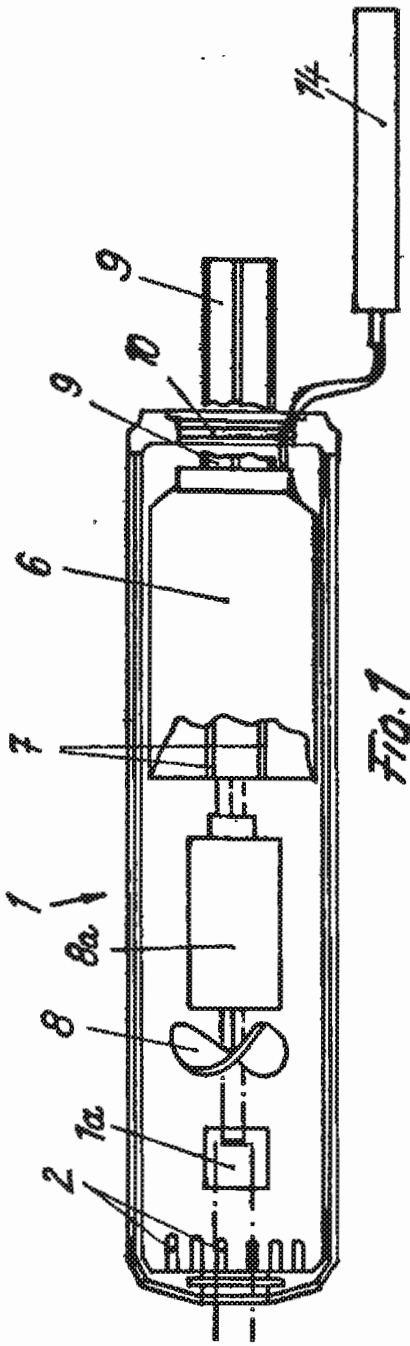



Fig.1

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 324 of 2286

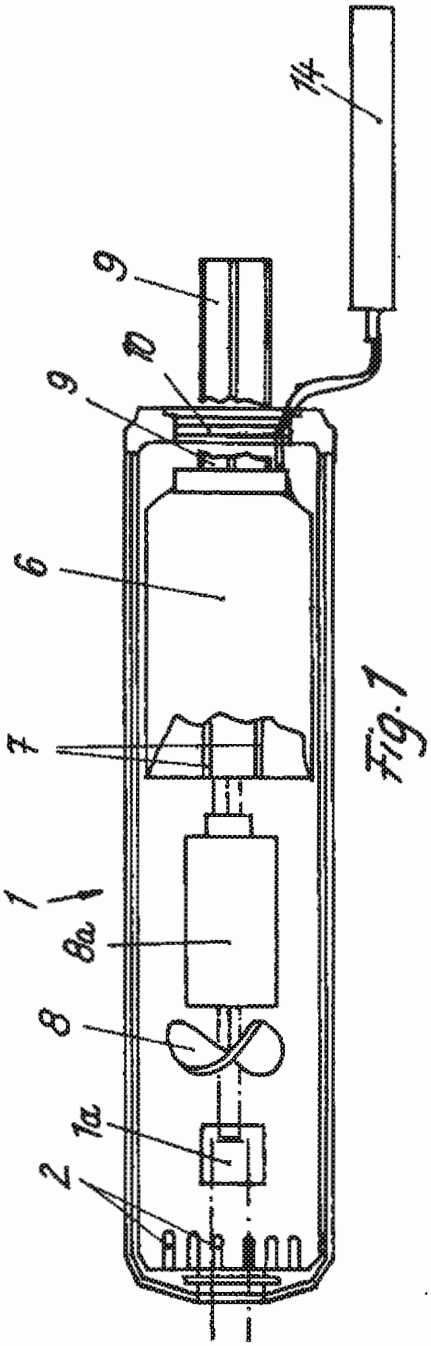



Fig.1

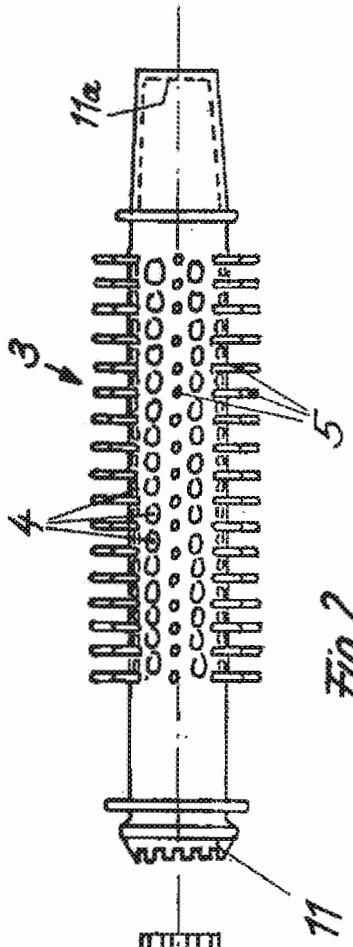



Fig.2

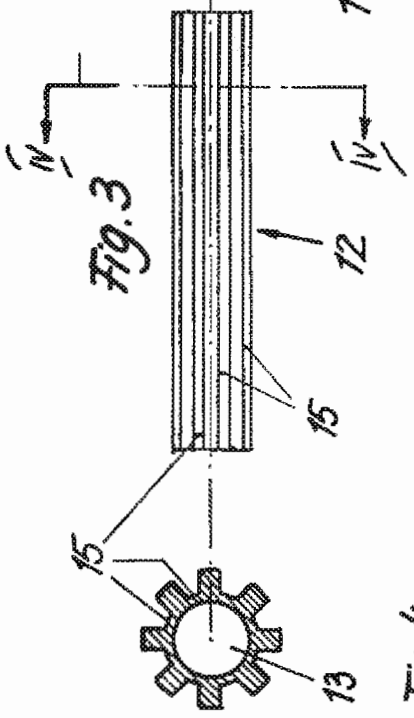



Fig.3

Fig.4

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 325 of 2286

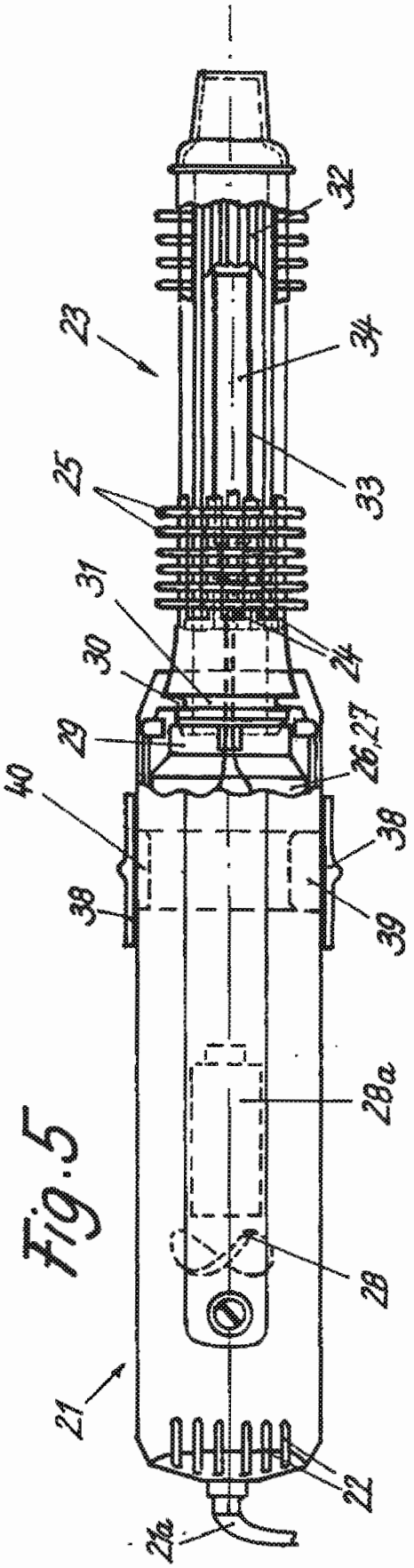



Fig.5

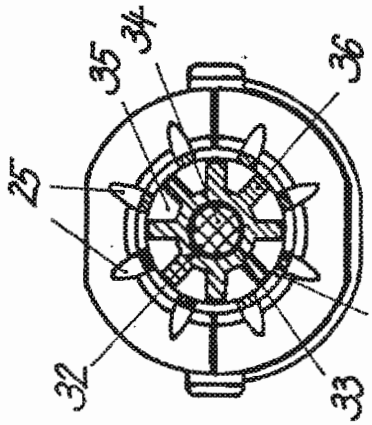



Fig.7

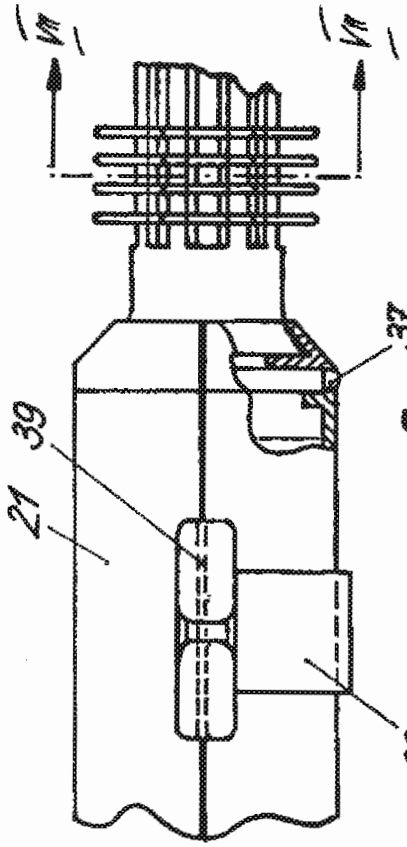



Fig.6

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 326 of 2286

Europäisches Patentamt

# EUROPÄISCHER RECHERCHENBERICHT

Nummer der Anmeldung

EP 88110857.5

## EINSCHLÄGIGE DOKUMENTE

| Kategorie | Kennzeichnung des Dokuments mit Angabe, soweit erforderlich, der maßgeblichen Teile | Betrifft Anspruch | KLASSIFIKATION DER ANMELDUNG (Int. Cl.4) |
|---|---|---|---|
| A | DE - B2 - 2 502 821 (LIEDTKE)<br>* Fig. 1,2,3 *<br>-- | 1,2 | A 45 D 20/50 |
| A | DE - A1 - 2 535 421 (MATSUSHITA ELEKTRIC WORKS LTD.)<br>* Fig. 10,11A,11B *<br>---- | 1,2 | |

RECHERCHIERTE SACHGEBIETE (Int. Cl.4)

A 45 D 20/00

Der vorliegende Recherchenbericht wurde für alle Patentansprüche erstellt.

| Recherchenort | Abschlußdatum der Recherche | Prüfer |
|---|---|---|
| WIEN | 11-11-1988 | PIRKER |

KATEGORIE DER GENANNTEN DOKUMENTEN

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 327 of 2286

Espacenet

# Bibliographic data: EP0306765 (A1) — 1989-03-15

## Hand-held electrical hair dryer.


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**Classification:** - international: ***A45D20/12;*** (IPC1-7): A45D20/12
- cooperative: **A45D20/12**

**Application number:** EP19880113689 19880823

**Priority number(s):** DE19873729774 19870905 ; DE19883802638 19880129 ; DE19883807287 19880305

**Also published as:** EP0306765 (B1)


## Abstract of EP0306765 (A1)


The hand-held electrical hairdryer (10) has a housing (11, 12), having at one end an inlet (13) and at the other end an outlet (14), for accommodating an electric motor (18) driving an impeller (22), a heater (16) for heating the air and a printed circuit board (43) for the motor with a triac (41) or another electronic component. The triac (41) or another electronic component is arranged in the region of the run-out device (20) in order to achieve optimum cooling. The heater (16) is received by a support (17) and connected by plugging-on to the counter-contacts (47) of the printed circuit board (43) for the motor via contacts (50, 51). In another embodiment, the printed circuit board (43) for the motor of the hand-held hairdryer (10) is constructed as a body surrounding the motor (18). The printed circuit board (43) for the motor is preferably an annular

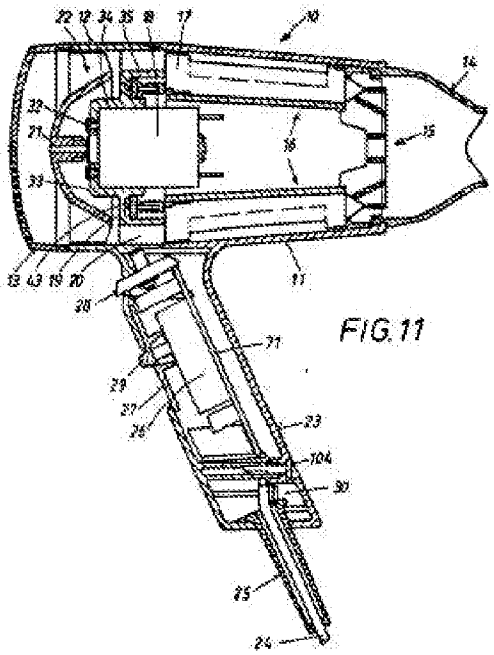



FIG.11

body.; Boundary walls of said annular body (41) serve as guide elements in interaction with adjacent parts of the housing (11, 12).

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324

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## DESCRIPTION EP0306765

[0001]

The invention relates to an electrically powered hand hair dryer with a one end an inlet and at the other an outlet comprising a housing for accommodating a a wheel driving electric motor, a blade comprising further conducting for guiding and a heater for heating the air and an engine circuit board with a triac having-the switching and control devices.

[0002]

Such electrically operated hand-held hair dryers are known in paid-rich embodiments.

There are also under-different types of accommodation for the motor circuit board with its switching and control facilities, which include includes a triac.

Under a triac is meant a thyristor, which passes both half cycles of an alternating current, and controls.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 330 of 2286

In a first embodiment of the arrangement of such a motor printed circuit board is made housed inside a hollow cylinder, which partially surrounds the electric motor at one end and carries on its lateral surface, the mounting of the heating of the hand hair drier.

This arrangement of the motor circuit board has not been proven, especially because in the almost closed cavity of the hollow cylinder no cooling air for the switchgear and control mechanisms, in particular special-was present for the triac.

It is therefore to überge-addressed the triac of the motor printed circuit board is in a range anzuord-NEN, which lies between the heating on the one hand and the inner wall of the housing of the hair dryer on the other hand.

With this arrangement, There have been improvements in the cooling of the triac, but experiments carried out have shown that the cooling effect in this region is not out-of-ranges to obtain optimum values.

[0003]

The invention has for its object to improve electric hand hair dryers of the type identified initially in more detail, in particular such that the triac is moved to such a position inside the housing of the hand hair dryer, in which optimum cooling.

Here, this goal should be achieved with simple and inexpensive means.

[0004]

To solve this problem, the invention proposes to arrange the triac of the hand hair dryer in the Nachleiteinrich-tion of the electrically driven hand hair dryer.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 331 of 2286

[0005]

In the preferred embodiment of the invention the blades of the further conducting is removed and instead the triac arranged in this region of the further conducting.

Tests carried out have shown that significant advantages over the known be achieved with a fiction,-according to the design of electrically operated hand hair dryer.

Thus, for example, in a further conducting, which is equipped with twelve blades twelfth removed and instead the triac in the lack region of the Nachleitein-direction.

With such an arrangement Runaway-led tests have shown that this optimum cooling of the triac is reached.

This not least because he is fully air current generated by the driven by the electric motor impeller.

Since the triac is practically take the place of the missing one scoop of Nachleiteinrich-tung, there are no changes in the dimen-tions of further conducting, so that the housing of the hand hair dryer can maintain its present shape.

[0006]

It is recommended to leave the further conducting in the area of a missing blade having a recess extending into a triac having extension of the motor plate.

The embodiment of the recess is selected so that the triac is pressed into the correct position and held in this well.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 332 of 2286

[0007]

It is recommended to leave the recess parallel and spaced-vonein other arranged have limitations, which are interconnected by an upper limit.

Whereas it is appropriate to let the upper limit a section for engaging the free end of the extension of the motor circuit board aufwei-sen.

It is advisable to solder the triac on the motor circuit board in such a way that it provides the missing blade of further conducting.

[0008]

It is recommended that a boundary wall of the section include such an angle with the horizontal to las-sen, which is approximately equal to the angle which a scoop of further conducting encloses with the horizontal.

Such an angle is about 60 [deg.].

[0009]

The invention is also concerned with an electrically operated hand hairdryer, wherein the heating of a substrate is broken-taken, the mating contacts can be connected by plugging contacts with the Motorleiterplat th.

These embodiments are known per se in manifold embodiments.

It is usually this uses a heater which comprises a support, is which is formed of two insulating plates which are arranged crosswise and take up at least one designed as a heating coil heater,



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 333 of 2286

which is held on the peripheral surface of the insulating plates in such a way that regions of the wendelför -migen engage in recesses in the heater edges of the insulating panels.

Thus, the helical heater is only set at some points.

Otherwise it bridges the free space between the portions of the insulating plates.

On the substrate and electrical contacts are secured, the need to cooperate with mating contacts, which are arranged on the motor printed circuit board.

This motor printed circuit board carrying the other in a known manner and the switching control means is usually attached to the end face of the electric motor and extending into the cavity of the fitting on the support in the heater.

Until now it now has the contacts which are provided on the supports of the heater is soldered to the corresponding counter-contacts of the motor printed circuit board.

This connection between the contacts of the carrier of the heater on the one hand and the mating contacts of the motor circuit board on the other hand is very complex and costly to manufacture hand hairdryer.

Moreover, after soldering the contacts to the mating contacts in practice a rigid, non-releasable connection be-tween the heater and the carrier on the one hand and the Motorleiterplat th other hand.

The mechanical cohesion but it made only on the solder joints.

Again, the invention is intended to remedy.

It is based on the additional on-task of improving electric hand hair dryer the genann-th type further, in particular the production of a slight connection between the contacts of the heater and


SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 334 of 2286

the motor circuit board is to be achieved.

[0010]

To solve this task according to the invention is further pre-propose that the heater carrier holding the plate under Motorleiter- providing a detachable connection between his contacts and the mating contacts of the motor circuit board by plugging is connected.

This design of electrically operated hand hair dryer has rise to major advantages over the known.

So the heater with the carrier and the zugeord-Neten contacts can be prefabricated as a unit, which is then plugged as a whole on the engine PCB.

In this plugged into the end position, the contacts of the heater come with the mating contacts of the motor circuit board in conducting connec-tion.

The complicated and considerable costs soldering the contacts and the mating contacts deleted.

This becomes particularly noticeable cost, that even with a plurality of contacts, and these mating contacts are all transferred during insertion of the assembly to the motor printed circuit board in its conductive connection.

Nevertheless, a solubility between the heater and the support and the motor cable-terplatte is possible.

For this purpose, the unit merely needs to be withdrawn from the motor printed circuit board.

The contacts come with the mating contacts disengaged.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 335 of 2286

Such separability is for example desirable when the heater is faulty.

[0011]

In the inventive design of the electrically driven hand hair dryer so no longer - as before - only one connection between the heater and its support on the one hand and the motor circuit board on the other hand emerged over the solder joints yet but it is a rigid mechanical connection in that when attaching the carrier with the heaters are mechanically coupled to the motor circuit board areas of these two parts.

It is advisable to let the carriers have with the heater connected conductively contact tabs which engage in his plugging in with conductor tracks together-acting slots of the motor circuit board.

In this way, during mating of the two parts were slightly soluble, but mechanically stable connection is established.

Characterized the position of the carrier of the heater is also fixed in relation to the motor printed circuit board.

[0012]

To allow easy manufacturing of the compound, it is em-mends to arrange the slots on the front end surface of the motor printed circuit board, wherein the angled free ends of the tabs engage in contact-making in the slots.

The slots can be produced with this in the production of the motor printed circuit board, so that additional working processes are eliminated.

[0013]



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 336 of 2286

It is advisable to refrain from any contact tab consist of a metal strip which is connected in its central region with one of the carriers forming intersecting arranged insulating panels and one end with said heating means is conductively connected, while the opposite other end in the slots of the motor circuit board engages.

It is advisable to make the contact tabs not only from an electrically conductive metallic material but to let these also have resilient properties.

This can be exploited in a simple manner to produce the desired contact pressure.

[0014]

In one proposed embodiment of an electrically operated hand-held hair dryer is the long-sized, as seen in plan view, approximately rectangularly designed motor printed circuit board, which has at its front free end on one side open slots into which can engage the attaching parts of the carrier of the heater.

This corresponds to the length of the motor circuit board as that of the carrier of the heater.

The attachment area between the engine PCB and the support of the heater is kept relatively short.

In contrast to this proposed embodiment of the electrically driven hand hair dryer improvement should also be made, particularly to an inexpensive plug-together individual parts of electrically operated hand hair dryer can be achieved.

[0015]



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 337 of 2286

To solve this further object of the invention is pre-propose to design the motor circuit board as the engine encompassing body, the guide and support areas as well as its the outlet grille facing surface includes contacts that are releasably connected to the mating contacts of the heater by plugging.

Preferably is provided to form the motor printed circuit board as an annular body, the central recess is penetrated by the motor and the outer boundary wall being usable as a guiding area, while a portion acting as a supporting area.

The motor board is therefore designed not seen as a top view of rectangular body which is arranged in the extension of the axis of the electric motor but the motor circuit board embraces now this electric motor, which guide and support spaces provided on the engine PCB, with adjacent areas of the housing the hand hair dryer cooperate.

In this case, a detachable connection of this motor circuit board is given to the support of the heater of preference.

As before, the motor circuit board may include all essential electronic or electrical components.

A montage relief is obtained by pre-prepared assemblies.

[0016]

Another advantage is that the motor circuit board located in the immediate vicinity of the engine, so that very short Verbindun-gen to the terminal contacts of the motor are available.

[0017]

It is advisable to organize in the area of the central portion of a holder of a further conducting a receptacle for the motor, which is limited in its upper part by a circumferential extension of the


SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 338 of 2286

central part, which can interact leading to the inner limiting wall of the engine PCB.

Such long-held leadership makes noticeably advantageous when at bringing the mounting plate.

[0018]

It is recommended to let cooperate in the assembly, the outer boundary wall of Motorleiterplat-te with the inner wall of a blade support member to further improve the guide.

[0019]

For limiting the insertion movement, it is advantageous that both the said extension and the inner wall of the blade support member comprises a support shoulder for the support region of the motor printed circuit board.

These support shoulders can be produced readily with in the production of the housing of the hand hair drier.

Since the two support shoulders are arranged away from each other, there is the advantage that the annular engine board is supported both in the region of its inner-diameter and in the region of the outer diameter.

[0020]

It is expedient laterally offset in the bottom of the holder of further conducting is to be placed on the shoulders supporting a free space to accommodate protruding parts of the engine PCB.

This free space is kept in its dimensions so that the usual, on the engine PCB angeord-Neten



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 339 of 2286

electrical or electronic components or the connection points can be accommodated in it.

[0021]

In principle it is not necessary to connect the annular motor printed circuit board with the adjacent parts of the housing of the hand hair drier.

Where a detachable connection between the two parts is used, it is expedient to provide the motor board with notches that cooperate with Gegenra th to the adjacent walls of the holder of Nachleitein-direction.

This snap-in connection ensures that even at the pre motor circuit board is connected to the associated portion of the housing.

On the other hand it is also possible, if required, such a latching connection to release.

[0022]

It is recommended that the motor circuit board perpendicular from its base plane projecting contacts that can be plugged together with Gegenkon-clocking, which are arranged on the support of the heater.

Respect to the design of the contacts and the mating contacts are several possibilities.

According to a first proposal is to form the contacts of the Motorleiterplat th as flat plug, the rear end thereof is soldered to the motor printed circuit board, while the front end cooperates with a counter-contact formed as a spring clip of the heater.

In other Ausführungsorm is provided to form the other hand, the mating contacts of the heater as



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 340 of 2286

a flat connector and the contacts on the motor printed circuit board as Klemmfe-countries.

In both cases it is advisable to let the protruding counter-contacts respectively on the face of the wearer of the heater and to provide them with a tap.

Such a construction has the advantage first that a light fitting together of the contacts and counter-contacts take place.

The measures provided for taps then provide the desired electrical connection to the respective parts, eg.

B. forth to the heater.

When plugging the modules connect the existing electric elements is achieved immediately.

It can eg.

The heater itself, a winding tap, a thermostat, the motor can be connected immediately characterized as the like.

Here is an adaptation to a wide variety of existing components.

[0023]

It is recommended to connect the annular motor circuit board via interconnectors with another board, namely a switch circuit board to form a prefabricated unit.

Such a prefabricated assembly facilitates assembly of the parts of the electrically operated hand-held hair dryer significantly.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 341 of 2286

[0024]

For enabling a simple mounting of the switch circuit board to the housing, it is provided that the switch conductor plate, or the like, which interconnect ports. can take in any number and composition comprises recesses which cooperate with retaining projections.

The latter are provided directly on the inner wall of the handle.

This Haltevorsprün-ge are thus generated in the production of handle halves.

[0025]

In the drawing, the invention is illustrated in more Ausführungsbei-play and show namely:

1 shows a longitudinal section through a first embodiment of an electrically driven hand hair drier with an attached shaping die.

2 shows a cross section through the electrically operated dryer of FIG 1 -.. The cross-section lies in the area of further conducting, and is perpendicular to an axis out of the hand hair drier AA.

FIG. 3 on an enlarged scale, partly in section, partially, in elevation and partly broken away for the post-guide means of the electrically operated hand-held hair dryer of Fig. One with existing blades cutting plane taken along line III-III of Fig. 2,

, Partially broken away, Fig. 4 is a view of the further conducting the electrically operated hand-held hair dryer, and in the absence of the blade is not inserted triac



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 342 of 2286

FIG. 5 the area of Fig. 4 the further conducting after insertion into the hand hairdryer and after application of the triac and the motor circuit board,

FIG. 6 shows a second embodiment of the present invention formed, electrically operated hand-held hair dryer, in longitudinal section,

FIG. 7 on an enlarged scale and in side view - partially in section, -. Carrier of the heater of the electrically driven hand hair dryer according to the Figure 6 of his place in the direction of arrow B pushing on the engine board (exploded view)

Fig. 8 the position of the carrier and the printed circuit board motor of the electrically operated hand-held hair dryer of FIG. 6, partially cut away and partially in phantom, wherein the carrier and the motor is now printed circuit board are transferred to its final position,

FIG. 9 is a plan view of the assembled parts of the electrically operated hand-held hair dryer, but after the attachment of the heater, the latter partially shown in dot-dash lines,

FIG. 10 in a third embodiment of a rear view of the invention according trained hand hair dryer,

FIG. 11 is a longitudinal sectional view of the handheld hair-dryer in accordance with the Fig. 10 on an enlarged scale, partly broken-Wegge,

FIG. 12 in plan view the rear part of the housing of the electrically operated hand hair drier according to Figs. 10 and 11 with integral handle half removed at offal

FIG. To 13 are inserted in plan view an assembly consisting of a circuit board and a motor switch circuit board which are connected by lines and which is intended, in the housing part according to FIG. 12 of the drawing,

FIG. But 14 is a sectional, partly broken away through the rear housing part of the electrically operated hand-held hair dryer in accordance with Fig. 10 and 11 after the mounting of the motor printed circuit board and the electric motor, prior to the mounting of the heater,



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 343 of 2286

FIG. Part 15 of the motor circuit board after the attachment of the elec-rule heater, partially broken away and in section, on an enlarged scale and

FIG. Another embodiment 16 of the contacts and the mating contacts of the electrically operated hand-held hair dryer, similar to FIG. The drawing 14, also partially cut away in section.

[0026]

It is first noted that in the figures of the drawings, only those parts are shown of electrically operated hand hair driers, which are relevant to the understanding of the invention.

In particular, missing a part of the switching and control devices.

Furthermore, in many drawing-tions of the electrical heater is not shown.

Moreover, all of the missing in the figures of the drawings, parts may have a known structure.

[0027]

The dryer of the embodiment shown in FIGS. 1-5 is generally designated 10.

Hand hair-dryer 10 has a housing composed of a front housing part 11 and a rear housing part 12.

The two 11 and 12 can be connected to one another are known per se and therefore not shown means of an insulating material, in particular plastic-made housing parts.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 344 of 2286

On the rear opening of the rear housing member 12, an inlet mesh 13 is arranged for sucking the fresh air.

This intake grill 13 can be locked for example with the rear end of the housing part 12.

In a known manner has such intake grill 13, a plurality of inlet openings, which are suitably arranged in concentric part rings.

[0028]

Across the other side of the electric hand hair dryer 10 has an outlet grille 15th

This is in the selected embodiment, a one-piece plastic-body, the aufwist an outer ring and a plurality of inner rings concentric to the center-point of lying.

These have different diameters and are connected together by connecting webs.

[0029]

In the selected embodiment, at least one of the inner rings inclined to the longitudinal axis of the hair dryer 10 is hand-arranged.

The inclination of the inner ring is about 25 [deg.].

[0030]



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 345 of 2286

In the vicinity of the outer ring of the exit grid 15 a unspecified return is provided.

In this way, space is created for the engagement of the rear end of a die 14 which can be releasably connected, if required by the user, with the front part 11 of the housing of the hand hair drier 10.

Suitably chosen as the detachable connection a snap-connection.

It can rest and be co-generated directly counter-raced in the preparation of the case or the forming die.

[0031]

From the Fig. The drawing 1 is best seen that the outlet grille 15 is inserted into the interior of the front part 11 of the housing.

The rear end of the outlet grid 15 it interacts with the facing ends of beams 17, a heater generally designated 16 operatively connected.

For this purpose are described in detail.

Recordings at Ver-bond webs of the exit grid 15.

[0032]

The heater 16, which is arranged approximately in the center of the housing ds hand hair drier, having a known training.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 346 of 2286

It consists of a plurality of flat carriers 17 extending substantially in the direction of the longitudinal axis of the hand hair-dryer 10.

The actual, borne by the carriers heating wire 17 or the heating coil is omitted in FIGS. 1-5 for simplicity.

[0033]

Before the heater 16 is located in the air flow direction seen a generally designated 20 further conducting, whose training in FIGS. 1 and 2 of the drawings is best ersicht- Lich.

It follows that it is the Nachleitein-direction is a single piece made of an insulating material body, which is broken Reclassi--changed into several sections.

Thus, the further conducting a first medium 20 has, just held substantially central portion 33 having a center lying in the opening for the passage of the motor shaft 21 of an electric motor, generally designated 18.

In the area of planar central portion 33 and mounting screws 32 are provided, which is carried a set of further conducting 20.

Are provided in the selected embodiment three fastening screws 32 which are offset by 120 [deg.] To each other.

[0034]

A connecting member 34 connects to the flat central part 33 of the further conducting 20 to which AA of the hand hair drier 10 extends approximately in the direction of the longitudinal axis and then changes into a plane perpendicular to the longitudinal axis AA, unspecified other part, to which in turn Gradient of the blade support member 35 connects in direction of the longitudinal



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 347 of 2286

axis AA.

In the selected embodiment 35, the blade-supporting member at a total of eleven blades 36, one of which is shown in FIG. 3 of the drawing.

The result is that each blade 36 extends further conducting the 20 is curved.

36 defined by the ends of the blades connecting line connects with the horizontal an angle [alpha] of about 60 [deg.] A.

To the further conducting 20 has twelve vanes 36, but the present invention is the twelfth in this blade is removed and the missing portion of the Triac 41 of the motor printed circuit board 43 is arranged, are located on the further switching and Regelein-devices of known type.

The arrangement of the triac 41 is effected in the upper right part of FIG. 2 of the drawing.

[0035]

As Figs. 4 of the drawing reveals, in the region of the one missing blade 36 has a generally by 37 denoted recess is present.

This recess has parallel and spaced apart boundaries 38, which are interconnected by a further upper limit 39.

The upper limit of 39 has a cutout 40 for engaging the free end of an extension 42 of the motor printed circuit board 43 (see FIG. To Figs. 5 of the drawings).

Shown in Figs. Right boundary wall 4 and 5 of the cutouts 40 encloses an angle [beta] with the horizontal, which is approximately equal to the angle, the one of the blades 36 with the horizontal.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 348 of 2286

This means that the angle [alpha] is substantially equal to the angle [beta].

In the selected embodiment, the size of each of these angles is 60 [deg.].

[0036]

Through the position shown in FIGS. 4 and 5 forming the off recess 37 and the cutout 40 of the triac 41 is pressed and held in the correct position.

The triac 41 which may have a known Ausbiuldung is, it soldered to the motor circuit board 43 and forms the missing twelfth scoop of further conducting 20th

It is therefore in the airflow and optimal cooling.

[0037]

It remains to be added that the support 17 of the heater 16 is arranged in offset relation to the blades of the further conducting 20.

Ie the blades and the carrier 17 is not contiguous region.

The offset arrangement of the two said parts is chosen to provide a swirling of the intake air and thus a reduction of the temperatures occurring in the region of the heater.

The temperatures are reduced to such a level that any adverse effect on the surrounding area of the heater housing is eliminated.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 349 of 2286

[0038]

As already mentioned, the further conducting 20 simultaneously forms a holder for the electric motor 18th

This electric motor 18 has a known construction and is also used in a known manner to drive a wheel 22.

This is rotatably mounted on the motor shaft 21.

The impeller 22 has him doing a molded hub 31, in the middle of which a hole is present, in which the motor shaft 21 engages into.

The sucked by unspecified openings of the inlet grating 13 air first reaches the intended use of the electrically driven hand hair dryer in the region of the impeller 22, then in the scope of further conducting 20 and thus also in the area of the triac 41, the yes at the point of further conducting 20 is arranged on the one of the blades 36 has been previously removed.

From further conducting 20, the sucked air passes eventually to the heater 16th

There taking place in accordance with the He-warm the air leaves the outlet grille 15 and, optionally, the front opening of a die 14, when it is detachably connected by the user before the housing part 11.

[0039]

As Figs. The drawing 1 is best seen, the handheld hair-dryer 10 has a handle 23, which includes with the longitudinal axis an angle smaller than a right angle.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 350 of 2286

The handle is hollow.

Therefore, it can be used for sub-Brin-tion of parts of the hand hair dryer.

In the embodiment shown a switch 26 of known design is housed in the interior of the hollow handle 23, which is covered outwardly by a cover plate 27.

The covering aperture 27 is limited slidable on the inner walls of the handle 23.

This does not serve-illustrated guides that can interact 27, for example, by a margin of Abdeckplat th.

By moving the filler panel of the switch to its input or exhibition can be transferred.

Above the switch 26 is in the cavity of the handle or a scroll wheel 28 rotatably mounted, which engages with a portion of its peripheral surface through an opening of the wall of Handgrif-fes 23 outwards and thus is available to the user.

This jog wheel can be, for example, regulate the power of the electrically driven hand hair dryer 10.

[0040]

In the area of the end surface of the handle 23 a bend protection grommet 25 having a continuous bore for accommodating one end of an electrical lead 24.

The other, in the Fig. 1 invisible end of the power cable 24 carries a known plug that can be inserted by the user into a wall socket to power the electric motor 11 with the power after the switch using its handle portion 29 in the closed position is brought.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 351 of 2286

[0041]

Introduced in the hollow interior of the handle 23 end of the power cable interacts in a known manner with a strain relief clamp 30 through which a relief of the connection points to be brought about by tensile forces.

[0042]

In the FIG. 6-9 another embodiment of the inventive electrically operated hand hair dryer is illustrated.

Where the parts of this electrically-powered hand hair dryer of the second embodiment are opposite the first remain unchanged, the above-mentioned reference numerals have been retained.

[0043]

The general with 43 designated motor circuit board of the hand hair-dryer 10 is a flat, fabricated of electrically insulating material plant-body is arranged in the direction of the longitudinal axis of the hand hair dryer 10.

In this case, the rear end of the motor printed circuit board 43 of the one end face of the electric motor 18 is turned.

The known motor conductor connections are indicated at 44 in FIG. 7 of the drawings.

Moreover, the motor circuit board 43 carries manner known in principle switching and control devices.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 352 of 2286

[0044]

In the selected embodiment 43, the motor circuit board on a central, a substantial portion of the length of the motor PCB detected recess 45 which is open towards the front face.

Laterally adjacent to the recess 45 are disposed in the front face of the motor circuit board 43 slots 46 which also remain free to face towards open.

Each of the two available slots 46 is associated with a conductor 47 which may be mounted in known manner on the motor printed circuit board 43.

The motor circuit board 43 thus has mating contacts 47 which cooperate with the contacts of the heater 16.

[0045]

How can the Fig. 8 and 9 of the drawings, best seen, part of the heater 16, a carrier 17, which is composed of two plate-shaped insulators, which are arranged crosswise.

These insulation panels are designated in the selected embodiment 48 and reciprocally-connected.

They each have in their motor board 43 facing one area towards the end face open Ausspa-tion 49th

The two crossing arranged, assembled insulating take 48 in a known manner the heater 16.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 353 of 2286

The heater 16 is designed in the selected embodiment as a heating coil.

The outwardly facing end face of the insulation 48 have in a known manner a plurality of adjacent grooves which are engaged by a respective portion of the coils of the heater.

Since the loading of the mounting of the heater coil is known in principle, only a portion of the same is shown in FIG. 9.

[0046]

In the selected embodiment 17 contact plates 50 and 51 are attached to the insulation 48 of the carrier.

These contact lugs are conductively connected to the coil of the heater is connected in a known manner.

A region of each contact lug 50 and 51 is fixed to one of the insulating plates 48.

This can occur, for example, that one uses a hollow rivet.

But you can make also have the contact lugs connecting tongues, pass through the openings in the insulation and then crimped.

The rear ends of the tabs, so those who are to be electrically connected to the heater 16 are denoted by 52 and 53.

It is in the selected Ausfüh-ing example to solder joints.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 354 of 2286

[0047]

The front free ends of the contact tabs 50 and 51 are denoted by 54 and 55.

You reach for the assembly of the individual parts into the slots 46 of the motor circuit board 43.

Characterized once a light connection between the contact tabs 50 and 51 and the mating contacts 47 einrseits results on the other hand.

Characterized on the other hand, a mechanical connection between the support 17 and the motor printed circuit board 43 is prepared.

In order to achieve out-reaching contact, it is recommended that the contact tabs 50 and 51 are constructed of a metallic material with elastic-properties.

In this way, a good contact between the free ends 54 and 55 of the two contact lugs results and the associated Gegenkon-47 overclock the engine PCB 43rd

[0048]

From the exploded view of FIG. 7 of the drawing shows that an assembly is prefabricated comprising 50 or 51 comprising the carrier 17, the heater 16 and the contact tabs.

For simplicity, in the upper part of Figure 7. The helical heater omitted.

A prepared constructional unit in such a way is then advanced in the direction of the arrow B to the motor printed circuit board 43 which is already connected via the connecting lines 44 to the motor 18.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 355 of 2286

Then arrive in the end position, the front free ends 54 and 55 of the tabs 50 and 51 into the open slots 46 at the forward end face of the motor printed circuit board 43rd

This not only an electrically conductive connection between the contacts and mating contacts, but also a mechanical link between the motor 43 and the printed circuit board carrier 17 is made.

This end position of the said parts can be seen from FIG. 9 of the drawings.

In this position, the front free ends are located 54 and 55 of the tabs 50 and 51 in the slots 46 of the motor PCB 43rd

[0049]

Shown in FIGS. 10-16, a third embodiment of the electrically operated hand hair dryer is illustrated.

Where the parts of the two above-mentioned exemplary embodiments are off remains unchanged in the reference above, the same reference numerals have been retained.

To be electrically-driven dryer of Figs. 10-16, in turn, is part of an electric motor 18th

To accommodate the same in a cross-section of circular-shaped receptacle 67 is located in the rear housing part 12.

In this receptacle 67, the electric motor 18 with its rear region introduced as shown in FIG. Manner shown 11.

The receptacle 67 for the motor 18 is limited by the back of the hand hair-dryer 10 through the flat central portion 33 and the side through the connecting portion 34.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 356 of 2286

This connecting portion 34 has a circumferential extension 88 comp. To Figs. The drawing 14.

The wall thickness of the front part of the extension 88 is thick moderately reduced, so that a peripheral support shoulder 89 is formed.

This support shoulder 89 engages areas of the motor circuit board 43 together, which in this example - compare to Figure 13 of the drawing -.. Has an annular shape.

[0050]

From the Fig. 13 of the drawing that the motor printed circuit board, a central recess 97 which in this case, which is penetrated by the motor 18, but also engages the extension 88 in Fig. Fourteen manner shown in this recess.

In this way, comes in the installed position of FIG. 14 of the drawing, the circuit board 43 is not directly connected to the peripheral surface of the motor 18 in connec-tion.

Rather, the outer boundary wall 100 is located on the motor printed circuit board 43 on the inside of extension 88.

Here, the support portion 101 of the Motorleiterplat th 43 is on the support shoulder 89 each.

There are two such support shoulders 89 available.

The second is in the area of the inner wall of the blade support member 35th

In the end position shown in Fig. 14 is thus the outer boundary wall 100 to the inner wall of the blade support member 35, while the inner limiting wall 102 cooperates with the exten-tion 88.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 357 of 2286

Below the motor circuit board 43, a space 90 is created in the bottom 36 of the further conducting 20.

This space 90 is dimensioned so that the visit of the floor 66 facing electronic or electrical components-rule 92 of the motor circuit board 43 in his place.

[0051]

At the outlet of the hand facing side of the hair dryer 10 is - as the 13 of the drawings reveals -. Motor circuit board 43 first provided with a number of electronic or electrical components 82.

Further facilities include ports for connecting lines 98 and An-tions for the moving motor terminals 96 which are engageable in conductive connection with the stationary motor terminals 87, the latter area to the front free end face of the electric motor 18 are provided.

[0052]

According to a further feature of the invention are mounted on the motor circuit board 43 contacts, of which 13 to 16, several embodiments are shown in FIGS..

In the embodiment according to FIGS. 14 and 15 of the drawing each of the contacts 84 is ausgebil-DET as a flat plug.

This flat plug 84 penetrates an unspecified hole in the engine PCB 43rd

His back-wärtiges end is connected via a solder joint 91 with the motor wire plate 43.

The front free end of each tab 84 interacts with a mating contact.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 358 of 2286

These counter contacts have also different education, but each of the heater 16 is assigned.

[0053]

In the embodiment of FIGS. 14 and 15 of the drawing of the designated 85 contact ausgebil-DET as a clamping spring, ie it is designed seen in the Querscnitt bow-shaped, contact with the outer surface of the flat connector in conductive connection inwardly drawn bends of the clamping spring.

Each mating contact 85 is fixed to the heater 16 is connected by a rivet 86.

Here, the hollow rivet holds 86 also establishes a non-descript tap.

[0054]

The mating contacts 85 are respectively arranged facing the front surface of the heater 16, so that a simple fitting together with the contacts 84 of the motor printed circuit board 43 can be carried out.

In the selected embodiment three tabs 84 are provided on the Motorleiterplat th 43.

However, if necessary more tabs can be attached easily, which then a corresponding number of Gegenkon clocks 85 must be associated to the heater 16.

In the drawings, it is left open, which part of the heater cooperating mating contacts conductive.

This is because this can be effected in a basically known way.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 359 of 2286

Because of the well-known one is to dispense with the drawing Dar-position of the resistance of the heater wires.

[0055]

Figs. The drawing 16 differs from the FIG. 14 and 15 only in that a swapping of the flat connector and of the clamping springs is made.

This means that the spring clips 93 are now assigned to the motor circuit board, while the flat plugs which are now designated 94 beds, the heater 16.

The mating of the parts 93 and 94 is carried out by transferring the heater 16 in the direction of the electric motor 18th

During this movement, which takes place in the longitudinal direction of the hand hair drier rich, the clamping spring 93 are in the end position of the tabs 94 in the area between the two legs lie, so that here also made of a good electrical connection.

. Like Figure 11 of the drawing reveals, the handheld hair-dryer 10 - as already mentioned - a handle 23, which is kept hollow and is comprised of two halves, of which the allocated one of the front housing part 11 and the other to the rear part 12 is assigned.

This cavity is used for housing electrical switchgear and control mechanisms.

Thus, a switch 26 is accommodated in the known design Ausführungsbei game inside the hollow handle 23 first.

The handle portion 29 of this switch engages through a window 69, cf. To Figs. The drawing 12.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 360 of 2286

In the boundary wall of the Handgrif-fes 23 above the window 69 is another, but smaller sized window 68 is arranged.

By this rises in the manner shown in Fig. Portion of a controller 11 of the wheel 28 passes.

This jog wheel 28 is rotatably mounted.

With it can be in a known manner, the power of the electrically driven hand hair dryer 10 regulate.

[0056]

The switch 26 is associated with a general with 71 designated switch circuit board, the - compare to the 13 -.. Designed is seen -in plan view rectangularly.

To this switch circuit board 71 interconnects ports 99 and are arranged in a known manner.

To its mounting in the cavity of the handle 22, the switch circuit board 71 has four openings, two of which in FIG. 13 Darge-set top are designed as rectangular openings, during which are designed like slots lying in the region of the lower end face.

The recesses are respectively designated by 72.

They interact with retaining projections 70, which are of an inner wall of the handle 23 immediately be-formed.

The switch circuit board 71 is thereby secured in its final, in FIG. Reproduced position 11, that the two halves of the handle 23 and thus the housing parts 11 and 12 of the hand hair drier 10 together quantity-added.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 361 of 2286

To make this possible, the inner wall of a handle 23 having bores with inner Vorsprün gene 103 is provided, which engage in the retaining screws 104, see FIG. To Figs. 11 and 12 of the drawing.

[0057]

Figs. The drawing 13 reveals, furthermore, that the annular motor printed circuit board 43 is combined with the 71-th Schalterleiterplat to form a unit.

This is done by using a plurality of connecting lines 98th

These are so dimensioned that the annular motor may surround the circuit board motor 18, as shown in FIG. 11.

In contrast, the switch circuit board 71 is attached to the holding projections 70.

The connection lines 98 may be present in unspecified, are placed to the front open slots that are present in the region of the end face of the blade support member 35.

[0058]

In the illustrated embodiment of FIGS. 10-16 is provided, that the annular motor printed circuit board rests on the support shoulders 89 without any special fixing means.

As a rule, such an arrangement is sufficient, because the security situation of the motor circuit board 43 is accomplished by combining body parts of the add-hand hair dryer 10.

In special cases, however, can utilize additional connection medium.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 362 of 2286

However, this should be solvable.

Specifically, it is also possible for the engine 43 to the printed circuit board is provided with catches which cooperate with counter-catches on the adjacent walls of the holder 20 of the further conducting.

In this way, a positional securing of the motor printed circuit board 43 is already achieved when it is placed in the in the Fig. Dargestell 14-th position, where, therefore, the housing parts 11 and 12 are not yet assembled.

[0059]

The use of a annular circuit board motor, as it is shown in Fig. Figure 13 is not necessarily required.

It is important that in the embodiment of FIGS. 10-16 of the drawing, the motor printed circuit board is formed so that it can surround the electric motor 18.

If this motor z 18.

B. should have other than a circular-shaped cross-sectional area, the engine head-plate can be fitted with a correspondingly shaped recess 97.

The contacts and mating contacts of the motor circuit board 43 and the heater can have a different design of the illustrated embodiments.

Also, the number of the existing co-operating contacts and mating contacts vary.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 363 of 2286

[0060]

As mentioned above, the illustrated embodiments are only examples of implementations of the invention and is not limited to this.

Rather, various other embodiments and applications are still possible.

Thus, in the embodiment can of FIGS. 1-5 of the drawing, both the construction as well as the shape of the recess 37 and the cutout 40 in the further conducting be varied.

The blades 36 of the 20 can further conducting one of 60 [deg.] Angle deviating from the horizontal einschlies-sen.

In this case, the angle [beta] 5 of the drawing would according to FIG. Be changed according to practical.

Further, the invention according to FIGS. 1-5 of the drawing, in the embodiment, it would be also possible to arrange the triac 20 in another region of the further conducting than the illustrated.

It is important that it is fully covered by the cooling airflow and thus optimally cooled.

If the foregoing as an electronic module is always called a triac, so, other electronic devices, such as a diode or the like., Be used in the inventive manner in which a hair dryer.

It is always aims to give each electronic device in hand hairdryer optimum cooling.

[0061]

Whereas in the embodiment of the invention according to FIGS. 6-9 only two contact tabs 50 and



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 364 of 2286

51 are provided, more than two contact lugs can be attached to the carrier 17 if necessary.

Regardless of the number of existing contact has tabs postponing or

Attaching the support to the motor printed circuit board has the advantage that all existing contacts and mating contacts may be converted into their conductive connection or it is a common separate possible.

Finally, the invention may also be used in other known electrically operated hand hairdryers.

List of Reference Numerals

[0062]

10 - The dryer

11 - front housing part

12 - rear housing part

13 - intake grille

14 - forming die

15 - outlet grille

16 - heater



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 365 of 2286

17 - holder (of 16)

18 - Electric Motor

19 - Holder

20 - further conducting

21 - motor shaft

22 - impeller

23 - Handle

24 - lead

25 - bend relief

26 - switch

27 - switch panel

28 - jog

39 - handle part

30 - strain relief



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 366 of 2286

31 - hub (22)

32 - mounting screw

33 - middle section (20)

34 - connecting part (30)

35 - blade support member (20)

36 - Scoop (30)

37 - recess (20)

38 - lateral boundaries (of 37)

39 - upper limit (of 37)

40 - Neck

41 - Triac

42 - Extension (43)

43 - Motor PCB



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 367 of 2286

44 - motor terminal

45 - recess (43)

46 - slot (43)

47 - conductor track (43)

48 - Insulation (17)

49 - recess (48)

50 - I. Contact tab

51 - II. Contact tab

52 - soldering point (from 51 to 16)

53 - solder joint (50 to 16)

54 - free end (50)

55 - free end (51)

66 - Soil

67 - Recording (for 18)



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 368 of 2286

68 - window (for 28)

69 - window (for 26)

70 - retaining projection

71 - Switches PCB

72 - recess (41 in)

84 - Contact (flat connector)

85 - mating contact (clamp spring with tap)

86 - hollow rivet

87 - motor connections

88 - Extension

89 - support switch (for 43)

90 - Space (36)

91 - solder joint

92 - Electronic Components (43)



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 369 of 2286

93 - Contact (. Execution II Figure 8.)

94 - mating contact (II. Execution Figure 8.)

95 - rpckwärtige electronic parts and connectors (43)

96 - moving motor connections

97 - central recess (43)

98 - Connecting cables

99 - conductors and connectors (41)

100 - outer boundary wall (43)

101 - support area (43)

102 - inner boundary wall (43)

103 - projection

104 - retaining screw



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 370 of 2286

AA Längsachsde (10)

The slip-B (FIG.

7)



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 371 of 2286

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# Notice

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## CLAIMS EP0306765

1.

Electrically powered hand-held hair dryer (10) having at one end an inlet (13) and at the other an outlet (14)-the housing (11, 12) for accommodating a a wheel (22) driving the electric motor (18), a heater (16) for heating the air motor and a printed circuit board (43) with a triac (41) or other electrical unit, such as diode or the like. having switching and control devices

characterized in

that the triac (41) or other electronic component of the hand hair drier (10) in the region of the further conducting (20) is arranged.

2.

The dryer of claim 1, characterized in that one of the blades (36) of the further conducting (20) is removed and, instead, the triac (41) is arranged in this area.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 372 of 2286

3.

The dryer of claim 1 and 2, characterized in that the further conducting (20) in the area of a missing-of the vane (36) has a recess (37) in which a triac (41) having the extension (42) of the motor printed circuit board (43) projects.

4.

The dryer of claim 3, characterized in that the recess (37) parallel and spaced apart boundaries (38) that are interconnected by an upper boundary (39) and that the upper limitation (39) a cutout (40) for engagement of the free end of the extension (42).

5.

The dryer according to claim 3 and 4, characterized in-net that a boundary wall of the cutout (40) an angle () with the horizontal line includes, which is approximately equal to the angle (), the one blade (36) to the horizontal including ( FIG. 3 and 5).

6.

Electrically powered hand-held hair dryer as claimed in claim 1, in which the heater is held by a carrier and connected by contacts to opposing contacts of the motor printed circuit board,

characterized in

that the heater (16), holding carriers (17) to the motor printed circuit board (43) under establishment of a detachable connection between its contacts (50, 51) and the mating contacts (47) of the motor printed circuit board (43) is connectable by plugging.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 373 of 2286

7.

The dryer of claim 1 and 6, characterized marked in that the carrier (17) with the heater (16) conductively connected to contact tabs (50, 51), cooperating with its insertion in the conductor tracks (47), slots (46) of the motor circuit board (43) to intervene.

8.

The dryer of claim 6 and 7, characterized in-net that the slots (46) are arranged on the front free end face of the motor printed circuit board (43) and that the abge-angled free ends (54, 55) of the contact lugs (50, 51) intervene making contact in the slots (46).

9.

The dryer of claim 6, characterized in that each contact lug (50, 51) consists of a metal strip which is connected in its central region to one of the support forming, cross arranged insulating panels, and having one end connected to the heater (16) in conductive connected, whereas (46) of the motor printed circuit board (43) engages the opposite other end (54, 55) into the slots.

10.

The dryer of claim 1 and 6, characterized marked in that the motor printed circuit board (43) as the motor (19) engages around the body is formed, the guide and support areas (100, 101) and facing on its side facing the outlet grid (15) surface contacts (84, 93), with the mating contacts (85, 94) of the heater (16) On-plug releasably connectable (FIGS. 11-16).



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 374 of 2286

11.

The dryer of claim 10, characterized in that the motor printed circuit board (43) is designed as an annular body whose central recess (57) from the motor (18) is engaged by and the outer boundary wall (100) is usable as a guiding area, while part of the region of its surface serves as a supporting area (101).

12.

The dryer of claim 10 or 11, characterized marked in that in the region of the central part (33) of the holder (19) is a further conducting (20) a receptacle (67) for the motor (19) by at its upper part a circumferential extension (88) of the central part (33) is limited, with the inner boundary wall (102) of the motor printed circuit board (43) cooperates.

13.

The dryer of claim 10, characterized in that the outer boundary wall (100) of the motor printed circuit board (43) with the inner wall of a blade support member (35) together-acting, and that both the extension (88) and the inner wall of the blade support member (35) has a support shoulder (89) having the supporting portion (101) of the motor printed circuit board (43).

14.

Disposed dryer of claim 13, characterized in that in the bottom (66) of the holder (19) of the further conducting (20) laterally offset from the support shoulders (89) a free space (90) for accommodating projecting parts of the motor printed circuit board (43) is.

15.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 375 of 2286

The dryer of claim 10, characterized in that the motor printed circuit board (43) is provided with notches, with the mating catches on the adjacent walls of the holder (19) of the further conducting (20) cooperate.

16.

The dryer of claim 10, characterized in that the motor printed circuit board (43) vertically from its base plane projecting contacts (84, 93) which can be plugged together with counter-contacts (85 and 94) on the support (17) of the heater (16) are arranged.

17.

The dryer of claim 16, characterized in that the contacts (84) are designed as flat plug, the rear end thereof with the motor printed circuit board (43) is ver-solder and the front end with a as a clamping spring (85) constructed counter-contact of the heater (16) interacting (Fig. 14 and 15).

18.

The dryer of claim 16, characterized in that the mating contacts (94) to the heater (16) of a flat plug and the contacts (93) on the motor printed circuit board (43) are formed as spring clamps (Fig.

16).

19.

The dryer of claim 16 to 18, characterized marked in that the mating contacts (85 and 94) on the



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 376 of 2286

Stirnflä-surface of the carrier (17) projecting of the heater (16) and are provided with a tap.

20.

The dryer of claim 10, characterized in that the motor printed circuit board (43) via connecting lines (98) with a switch circuit board (71) is connected to a pre-prepared assembly.

21.

The dryer of claim 20, characterized in that the conductor track connections or the like. having switch circuit board (71) has recesses (72) which serve to its attachment to the retaining projections (70) on the inner walls of the handle (23).



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 377 of 2286

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PN - EP0306765 A1 19890315
PNFP - EP0306765 B1 19920422
TI - (A1)
Hand-held electrical hair dryer.
- (B1)
HAND-HELD ELECTRICAL HAIR DRYER
AB - (A1)
The hand-held electrical hairdryer (10) has a housing (11, 12), having at one end an inlet (13) and at the other end an outlet (14), for accommodating an electric motor (18) driving an impeller (22), a heater (16) for heating the air and a printed circuit board (43) for the motor with a triac (41) or another electronic component. The triac (41) or another electronic component is arranged in the region of the run-out device (20) in order to achieve optimum cooling. The heater (16) is received by a support (17) and connected by plugging-on to the counter-contacts (47) of the printed circuit board (43) for the motor via contacts (50, 51). In another embodiment, the printed circuit board (43) for the motor of the hand-held hairdryer (10) is constructed as a body surrounding the motor (18). The printed circuit board (43) for the motor is preferably an annular body. Boundary walls of said annular body (41) serve as guide elements in interaction with adjacent parts of the housing (11, 12). <IMAGE>
PA - (A1)
KRUPS STIFTUNG [DE]

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AN - 1989-078281
TI - Hand-held hair-drier with optimally cooled triac - has duct for turbulent air flow between rotor and heater to reduce temp. of electronic components
AB - The motor (18) drives a rotor (22) drawing air through an inlet (13) and forcing it through a heater (16) to an outlet (14) behind a grille (15). The heater (16) is mounted in a carrier (17) on which electrical contacts co-operate with those on the motor circuit board (43) to supply heating current.
The circuit board (43) is pref. annular with boundary walls for guiding adjacent parts of the housing (11,12). The triac or equiv. electronic component is positioned in a duct (20) between the rotor (22) and heater carrier (17), where turbulence in the induced air stream reduces the temp. to prevent overheating.
- ADVANTAGE :
Triac is placed in best position for cooling by simple and inexpensive arrnagement, with circuit board close to motor whose wires are of min. length.

| | | |
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- (KRUP-N) KRUPS R STIFTUNG





SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 378 of 2286

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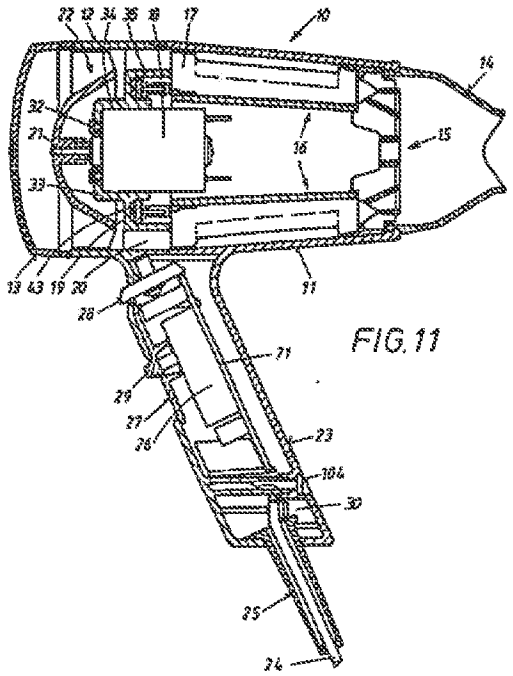
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## (54) Elektrisch betriebener Handhaartrockner.

(57) Es handelt sich um einen elektrisch betriebenen Handhaartrockner (10) mit einerends einen Einlaß (13) und anderenends einen Auslaß (14) aufweisenden Gehäuse (11, 12) zum Unterbringen eines ein Laufrad (22) antreibenden Elektromotors (18), einem Heizer (16) zum Erwärmen der Luft sowie einer Motorleiterplatte (43) mit einem Triac (41) oder einer anderen elektronischen Baueinheit. Der Triac (41) oder ein anderes elektronisches Bauteil ist im Bereich der Nachleiteinrichtung (20) angeordnet, um eine optimale Kühlung zu erzielen. Der Heizer (16) ist von einem Träger (17) aufgenommen und über Kontakte (50, 51) mit den Gegenkontakten (47) der Motorleiterplatte (43) durch Aufstecken verbunden. Bei einer anderen Ausführungsform ist die Motorleiterplatte (43) des Handhaartrockners (10) als den Motor (18) umgreifender Körper ausgebildet. Vorzugsweise ist die Motorleiterplatte (43) ein Ringkörper. Begrenzungswandungen dieses Ringkörpers (41) dienen als Führungselemente im Zusammenwirken mit benachbarten Teilen des Gehäuses (11, 12).




EP 0 306 765 A1



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 379 of 2286

# Elektrisch betriebener Handhaartrockner

Die Erfindung bezieht sich auf einen elektrisch betriebenen Handhaartrockner mit einem einerends einen Einlaß und anderenends einen Auslaß aufweisenden Gehäuse zur Unterbringung eines ein Laufrad antreibenden Elektromotors, einer Schaufeln aufweisenden Nachleiteinrichtung zum Führen und einem Heizer zum Erwärmen der Luft sowie einer Motorleiterplatte mit einen Triac aufweisenden Schalt- und Steuereinrichtungen.

Derartige elektrisch betriebene Handhaartrockner sind in zahlreichen Ausführungsformen bekannt. Dabei gibt es auch unterschiedliche Unterbringungsarten für die Motorleiterplatte mit ihrem Schalt- und Steuereinrichtungen, zu denen u.a. auch ein Triac gehört. Unter einem Triac versteht man einen Thyristor, der beide Halbschwingungen eines Wechselstromes durchläßt und steuert. Bei einer ersten Ausführungsform der Anordnung einer solchen Motorleiterplatte hat man diese im Inneren eines Hohlzylinders untergebracht, welcher mit seinem einen Ende den Elektromotor teilweise umgreift und der an seiner Mantelfläche die Halterung der Heizung des Handhaartrockners trägt. Diese Anordnung der Motorleiterplatte hat sich nicht bewährt, insbe sondere weil in dem fast geschlossenen Hohlraum des Hohlzylinders keine Kühlluft für die Schalt- und Steuereinrichtungen, insbesondere für den Triac vorhanden war. Man ist daher dazu übergegangen, den Triac der Motorleiterplatte in einem Bereich anzuordnen, der zwischen der Heizung einerseits und der Innenwandung des Gehäuses des Handhaartrockners andererseits liegt. Bei dieser Anordnung hat es zwar Verbesserungen hinsichtlich der Kühlung des Triacs gegeben, jedoch haben durchgeführte Versuche gezeigt, daß die Kühlwirkung in diesem Bereich noch nicht ausreicht, um optimale Werte zu erhalten.

Der Erfindung liegt die Aufgabe zugrunde, elektrisch betriebene Handhaartrockner der eingangs näher gekennzeichneten Art weiter zu verbessern, insbesondere derart, daß der Triac an eine solche Stelle im Inneren des Gehäuses des Handhaartrockners verlegt wird, in der eine optimale Kühlung erfolgt. Dabei soll dieses Ziel mit einfachen und wohlfeilen Mitteln erreicht werden.

Zur Lösung dieser Aufgabe wird erfindungsgemäß vorgeschlagen, den Triac des Handhaartrockners im Bereich der Nachleiteinrichtung des elektrisch betriebenen Handhaartrockners anzuordnen.

Bei der bevorzugten Ausführungsform der Erfindung wird eine der Schaufeln der Nachleiteinrichtung entfernt und stattdessen der Triac in diesem Bereich der Nachleiteinrichtung angeordnet. Durchgeführte Versuche haben ergeben, daß mit einer erfindungsgemäßen Ausbildung des elektrisch betriebenen Handhaartrockners wesentliche Vorteile gegenüber dem Bekannten erreicht werden. So wurde beispielsweise bei einer Nachleiteinrichtung, die mit zwölf Schaufeln ausgerüstet ist, die zwölfte entfernt und stattdessen der Triac in dem fehlenden Bereich der Nachleiteinrichtung angeordnet. Die mit einer derartigen Anordnung durchgeführten Versuche haben ergeben, daß damit eine optimale Kühlung des Triacs erreicht ist. Dies nicht zuletzt deshalb, weil er voll im Luftstrom liegt, der von dem durch den Elektromotor angetriebenen Schaufelrad entsteht. Da der Triac praktisch an die Stelle der fehlenden einen Schaufel der Nachleiteinrichtung tritt, ergeben sich auch keine Veränderungen in den Abmessungen der Nachleiteinrichtung, so daß auch das Gehäuse des Handhaartrockners seine bisherige Gestalt beibehalten kann.

Es empfiehlt sich, die Nachleiteinrichtung im Bereich der einen fehlenden Schaufel eine Ausnehmung aufweisen zu lassen, in die eine den Triac aufweisende Verlängerung der Motorplatte hineinragt. Die Ausführungsform der Ausnehmung wird dabei so gewählt, daß der Triac in die richtige Position gedrückt und in dieser auch gehalten wird.

Es empfiehlt sich, die Ausnehmung parallel und in Abstand voneinander angeordnete Begrenzungen aufweisen zu lassen, die durch eine obere Begrenzung miteinander verbunden sind. Ferner ist es zweckmäßig, die obere Begrenzung einen Ausschnitt zum Eingriff des freien Endes der Verlängerung der Motorleiterplatte aufweisen zu lassen. Dabei ist es zweckmäßig, den Triac auf die Motorleiterplatte zu löten und zwar derart, daß er die fehlende Schaufel der Nachleiteinrichtung ergänzt.

Es empfiehlt sich, die eine Begrenzungswand des Ausschnittes einen solchen Winkel mit der Horizontalen einschließen zu lassen, der etwa gleich ist dem Winkel, den eine Schaufel der Nachleiteinrichtung mit der Horizontalen einschließt. Ein solcher Winkel beträgt etwa 80°.

Die Erfindung befaßt sich auch mit einem elektrisch betriebenen Handhaartrockner, bei dem die Heizung von einem Träger aufgenommen ist, dessen Gegenkontakte mit Kontakten der Motorleiterplatte durch Aufstecken verbindbar sind. Auch diese Ausführungsformen sind an sich in mannigfachen Ausführungsformen bekannt. Es wird dabei in aller Regel ein Heizer benutzt, der einen Träger aufweist, welcher aus zwei Isolierplatten gebildet ist, die überkreuz angeordnet sind und die wenigstens eine als Heizwendel ausgebildete Heizung aufnehmen, die an der Umfangsfläche der Isolierplatten derart gehalten ist, daß Bereiche des wendelförmigen Heizers in Vertiefungen in den Rän-



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 380 of 2286

dem der Isolierplatten eingreifen. Damit ist der wendelförmige Heizer lediglich an einigen Punkten festgelegt. Ansonsten überbrückt er den freien Zwischenraum zwischen den Bereichen der Isolierplatten. Auf dem Träger sind dabei auch elektrische Kontakte befestigt, die mit Gegenkontakten zusammenwirken müssen, welche auf der Motorleiterplatte angeordnet sind. Diese Motorleiterplatte, die im übrigen in bekannter Weise Schalt- und Steuereinrichtungen trägt, ist in der Regel an der Stirnfläche des Elektromotors befestigt und ragt in den Hohlraum des auf dem Träger sitzenden Heizers hinein. Bisher hat man nun die Kontakte, die auf den Trägern des Heizers vorgesehen sind, mit den zugehörigen Gegenkontakten der Motorleiterplatte verlötet. Diese Verbindungsart zwischen den Kontakten des Trägers der Heizeinrichtung einerseits und den Gegenkontakten der Motorleiterplatte andererseits ist sehr aufwendig und verteuert die Herstellung der Handhaartrockner. Darüber hinaus ist nach dem Verlöten der Kontakte mit den Gegenkontakten praktisch eine starre, nicht lösbare Verbindung zwischen dem Heizer und dem Träger einerseits und der Motorleiterplatte andererseits vorhanden. Der mechanische Zusammenhalt wird dabei aber nur über die Lötstellen hergestellt. Auch hier will die Erfindung Abhilfe schaffen. Ihr liegt die zusätzliche Aufgabe zugrunde, elektrisch betriebene Handhaartrockner der genannten Art weiter zu verbessern, wobei insbesondere die Herstellung einer leichten Verbindung zwischen den Kontakten des Heizers und der Motorleiterplatte erreicht werden soll.

Zur Lösung dieser weiteren Aufgabe wird erfindungsgemäß vorgeschlagen, daß der den Heizer haltende Träger mit der Motorleiter platte unter Schaffung einer lösbaren Verbindung zwischen seinen Kontakten und den Gegenkontakten der Motorleiterplatte durch Aufstecken verbindbar ist. Diese Ausbildung des elektrisch betriebenen Handhaartrockners hat gegenüber dem Bekannten erhebliche Vorteile. So kann der Heizer mit dem Träger und den zugeordneten Kontakten als Baueinheit vorgefertigt werden, die dann als Ganzes auf die Motorleiterplatte aufgesteckt wird. Bei diesem Aufstecken kommen in der Endlage die Kontakte des Heizers mit den Gegenkontakten der Motorleiterplatte in leitende Verbindung. Das umständliche und erhebliche Kosten verursachende Verlöten der Kontakte und der Gegenkontakte entfällt. Dabei macht es sich besonders kostengünstig bemerkbar, daß auch bei einer Vielzahl von Kontakten und Gegenkontakten diese sämtlich beim Aufstecken der Baueinheit auf die Motorleiterplatte in ihre leitende Verbindung überführt werden. Trotzdem ist eine Lösbarkeit zwischen dem Heizer und dem Träger und der Motorleiterplatte möglich. Zu diesem Zweck braucht die Baueinheit lediglich von der Motorleiterplatte abgezogen zu werden. Dabei kommen die Kontakte mit dem Gegenkontakten außer Eingriff. Eine solche Trennbarkeit ist beispielsweise dann erwünscht, wenn der Heizer defekt sein sollte.

Bei der erfindungsgemäßen Ausbildung des elektrisch betriebenen Handhaartrockners ist also nicht mehr - wie bisher - lediglich eine Verbindung zwischen dem Heizer und seinem Träger einerseits und der Motorleiterplatte andererseits über die Lötstellen vorhanden sondern es ist eine formstabile mechanische Verbindung dadurch entstanden, daß beim Aufstecken des Trägers mit dem Heizer auf die Motorleiterplatte Bereiche dieser beiden Teile mechanisch gekuppelt werden. Dabei empfiehlt es sich, den Träger mit dem Heizer leitend verbundene Kontaktlaschen aufweisen zu lassen, die bei seinem Aufstecken in mit Leiterbahnen zusammenwirkende Schlitze der Motorleiterplatte eingreifen. Auf diese Weise ist beim Zusammenstecken der beiden Teile eine zwar leicht lösbare, jedoch mechanisch stabile Verbindung hergestellt. Dadurch ist zusätzlich die Lage des Trägers des Heizers im bezug auf die Motorleiterplatte fixiert.

Um ein leichtes Herstellen der Verbindung zu ermöglichen, empfiehlt es sich, die Schlitze an der vorderen Stirnfläche der Motorleiterplatte anzuordnen, wobei die abgewinkelten freien Enden der Kontaktlaschen unter Kontaktgabe in die Schlitze eingreifen. Die Schlitze können dabei bei der Herstellung der Motorleiterplatte mit erzeugt werden, so daß zusätzliche Arbeitsvorgänge entfallen.

Es empfiehlt sich, jede Kontaktlasche aus einem Metallstreifen bestehen zu lassen, der jeweils in seinem Mittelbereich mit einem der den Träger bildenden, überkreuz angeordneten Isolierplatten verbunden ist und deren eines Ende mit der Heizeinrichtung in leitender Verbindung steht, während das gegenüberliegende andere Ende in die Schlitze der Motorleiterplatte eingreift. Dabei empfiehlt es sich, die Kontaktlaschen nicht nur aus einem stromleitenden, metallischen Werkstoff herzustellen sondern diese auch federnde Eigenschaften aufweisen zu lassen. Diese können in einfacher Weise zur Erzeugung des gewünschten Kontaktdruckes ausgenutzt werden.

Bei einer vorgeschlagenen Ausführungsform eines elektrisch betriebenen Handhaartrockners hat dieser eine lang bemessene, in Draufsicht gesehen etwa rechteckig gestaltete Motorleiterplatte, die an ihrem vorderen freien Ende einseitig offene Schlitze aufweist, in die beim Aufstecken Teile des Trägers des Heizers eingreifen können. Dabei entspricht die Länge der Motorleiterplatte etwa derjenigen des Trägers des Heizers. Der Aufsteckbereich zwischen der Motorleiterplatte und dem Träger des Heizers ist dabei verhältnismäßig kurz gehalten. Gegenüber dieser vorgeschlagenen Ausfüh-



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 381 of 2286

rungsform des elektrisch betriebenen Handhaartrockners soll ebenfalls eine Verbesserung erzielt werden, insbesondere soll ein kostengünstiges Zusammenstecken der Einzelteile des elektrisch betriebenen Handhaartrockners erreicht werden.

Zur Lösung dieser weiteren Aufgabe der Erfindung wird vorgeschlagen, die Motorleiterplatte als den Motor umgreifenden Körper auszubilden, der Führungs- und Stützbereiche sowie auf seiner dem Austrittsgitter zugekehrten Fläche Kontakte aufweist, die mit den Gegenkontakten der Heizeinrichtung durch Aufstecken lösbar verbindbar sind. Bevorzugt ist vorgesehen, die Motorleiterplatte als Ringkörper auszubilden, dessen mittlere Ausnehmung vom Motor durchgriffen wird und dessen äußere Begrenzungswand als Führungsbereich benutzbar ist, während ein Teilbereich als Stützbereich dient. Die Motorleiterplatte ist daher nicht mehr als in Draufsicht gesehen rechteckiger Körper ausgebildet, der in Verlängerung der Achse des Elektromotors angeordnet ist sondern die Motorleiterplatte umgreift nunmehr diesen Elektromotor, wobei Führungs- und Stützbereiche an der Motorleiterplatte vorgesehen sind, die mit benachbarten Bereichen des Gehäuses des Handhaartrockners zusammenwirken. Dabei wird einer lösbaren Verbindung dieser Motorleiterplatte mit dem Träger des Heizers der Vorzug gegeben. Nach wie vor kann die Motorleiterplatte alle wesentlichen elektronischen oder elektrischen Bauteile aufweisen. Eine Montageerleichterung ergibt sich durch vorgefertigte Baugruppen.

Ein weiterer Vorteil ist der, daß die Motorleiterplatte in unmittelbarer Nähe des Motors liegt, so daß sehr kurze Verbindungen zu den Anschlußkontakten des Motors vorhanden sind.

Es empfiehlt sich, im Bereich des Mittelteils eines Halters einer Nachleiteinrichtung eine Aufnahme für den Motor anzuordnen, die in ihrem oberen Teil durch eine umlaufende Verlängerung des Mittelteiles begrenzt ist, die mit der inneren Begrenzungswand der Motorleiterplatte führend zusammenwirken kann. Eine solche lang gehaltene Führung macht sich vorteilhaft beim Anbringen der Montageplatte bemerkbar.

Es empfiehlt sich, zur weiteren Verbesserung der Führung bei der Montage die äußere Begrenzungswand der Motorleiterplatte mit der Innenwand eines Schaufeltragteiles zusammenwirken zu lassen.

Zur Begrenzung der Einschiebbewegung ist es zweckmäßig, daß sowohl die erwähnte Verlängerung als auch die Innenwand des Schaufeltragteiles eine Stützschulter für den Stützbereich der Motorleiterplatte aufweist. Diese Stützschultern lassen sich bei der Fertigung des Gehäuses des Handhaartrockners ohne weiteres mit erzeugen. Da die beiden Stützschultern entfernt voneinander angeordnet sind, ergibt sich der Vorteil, daß die ringförmige Motorleiterplatte sowohl im Bereich ihres Innendurchmessers als auch im Bereich des Außendurchmessers abgestützt ist.

Zweckmäßig ist es, im Boden des Halters der Nachleiteinrichtung seitlich versetzt zu den Stützschultern einen Freiraum zur Unterbringung von vorstehenden Teilen der Motorleiterplatte anzuordnen. Dieser Freiraum wird dabei in seinen Abmessungen so gehalten, daß die üblichen, auf der Motorleiterplatte angeordneten elektrischen oder elektronischen Bauteile oder auch die Anschlußstellen in ihm Platz finden können.

Grundsätzlich ist es nicht erforderlich, die ringförmige Motorleiterplatte mit den benachbarten Teilen des Gehäuses des Handhaartrockners zu verbinden. Sofern eine lösbare Verbindung zwischen den beiden Teilen benutzt wird, ist es zweckmäßig, die Motorleiterplatte mit Rasten zu versehen, die mit Gegenrasten an den benachbarten Wandungen des Halters der Nachleiteinrichtung zusammenwirken. Diese Rastverbindung sorgt dafür, daß schon bei der Vormontage die Motorleiterplatte mit dem zugehörigen Teil des Gehäuses verbunden ist. Auf der anderen Seite ist es bei Bedarf auch möglich, eine solche Rastverbindung wieder zu lösen.

Es empfiehlt sich, daß die Motorleiterplatte senkrecht aus ihrer Grundebene vorragende Kontakte aufweist, die mit Gegenkontakten zusammensteckbar sind, die am Träger der Heizeinrichtung angeordnet sind. Hinsichtlich der Ausbildung der Kontakte und der Gegenkontakte ergeben sich mehrere Möglichkeiten. Nach einem ersten Vorschlag ist vorgesehen, die Kontakte der Motorleiterplatte als Flachstecker auszubilden, deren rückwärtiges Ende mit der Motorleiterplatte verlötet ist, während das vordere Ende mit einem als Klemmfeder ausgebildeten Gegenkontakt des Heizers zusammenwirkt. Bei der anderen Ausführungsform ist demgegenüber vorgesehen, die Gegenkontakte an der Heizeinrichtung als Flachstecker und die Kontakte an der Motorleiterplatte als Klemmfedern auszubilden. In beiden Fällen empfiehlt es sich, die Gegenkontakte jeweils über die Stirnfläche des Trägers des Heizers vorstehen zu lassen und sie mit einem Abgriff zu versehen. Eine solche Ausbildung hat zunächst den Vorteil, daß ein leichtes Zusammenstecken der Kontakte und Gegenkontakte erfolgen kann. Die vorgesehenen Abgriffe stellen dann die gewünschte elektrische Verbindung zu den jeweiligen Teilen, z.B. zum Heizer her. Beim Zusammenstecken der Baugruppen wird sofort eine Verbindung der vorhandenen elektrischen Elemente erreicht. Es können z.B. sofort dadurch verbunden werden der Heizer selbst, eine Wicklungsanzapfung, ein Thermostat, der Motor od.dgl. Hier kann eine Anpassung an die unterschiedlichsten



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 382 of 2286

vorhandenen Bauelemente erfolgen.

Es empfiehlt sich, die ringförmige Motorleiterplatte über Verbindungsleitungen mit einer weiteren Leiterplatte, nämlich einer Schalterleiterplatte zu einer vorgefertigten Baueinheit zu verbinden. Eine derartig vorgefertigte Baueinheit erleichtert die Montage der Teile des elektrisch betriebenen Handhaartrockners wesentlich.

Um dabei ein einfaches Anbringen der Schalterleiterplatte an dem Gehäuse zu ermöglichen, ist vorgesehen, daß die Schalterleiterplatte, welche Leiterbahnenanschlüsse od.dgl. in beliebiger Anzahl und Zusammensetzung tragen kann, Ausnehmungen aufweist, die mit Haltevorsprüngen zusammenwirken. Letztere sind unmittelbar an der Innenwand des Handgriffes vorgesehen. Diese Haltevorsprünge werden somit bei der Herstellung der Handgriffhälften mit erzeugt.

Auf der Zeichnung ist die Erfindung in mehreren Ausführungsbeispielen dargestellt und zwar zeigen:

Fig. 1 einen Längsschnitt durch eine erste Ausführungsform eines elektrisch betriebenen Handhaartrockners mit einer aufgesetzten Formdüse;

Fig. 2 einen Querschnitt durch den elektrisch betriebenen Handhaartrockner nach der Fig. 1 - der Querschnitt liegt im Bereich der Nachleiteinrichtung und ist senkrecht zu einer Achse A-A des Handhaartrockners geführt.,

Fig. 3 im vergrößerten Maßstab, teilweise im Schnitt, teilweise in Ansicht und teilweise weggebrochen die Nachleiteinrichtung des elektrisch betriebenen Handhaartrockners nach Fig. 1 mit einer der vorhandenen Schaufeln Schnittverlauf entlang der Linie III-III der Fig. 2,

Fig. 4 eine Ansicht der Nachleiteinrichtung des elektrisch betriebenen Handhaartrockners, teilweise weggebrochen, bei fehlender Schaufel und bei nicht eingesetztem Triac,

Fig. 5 den Bereich der Fig. 4 der Nachleiteinrichtung nach dem Einsetzen in den Handhaartrockner und nach dem Anbringen des Triacs und der Motorleiterplatte,

Fig. 6 eine zweite Ausführungsform des erfindungsgemäß ausgebildeten, elektrisch betriebenen Handhaartrockners im Längsschnitt,

Fig. 7 im vergrößerten Maßstab und in Seitenansicht - teilweise geschnitten - den Träger des Heizers des elektrisch betriebenen Handhaartrockners gemäß der Fig. 6 von seinem in Richtung des Pfeiles B erfolgenden Aufschieben auf die Motorleiterplatte (explosionsartige Darstellung),

Fig. 8 die Lage von Träger und Motorleiterplatte des elektrisch betriebenen Handhaartrockners nach der Fig. 6, teilweise weggeschnitten und teilweise gestrichelt, wobei nunmehr Träger und Motorleiterplatte in ihre Endlage überführt sind,

Fig. 9 eine Draufsicht auf die zusammengesetzten Teile des elektrisch betriebenen Handhaartrockners, jedoch nach dem Anbringen des Heizers, letzterer teilweise strichpunktiert dargestellt,

Fig. 10 in einer dritten Ausführungsform eine Rückansicht eines erfindungsgemäß ausgebildeten Handhaartrockners,

Fig. 11 einen Längsschnitt durch den Handhaartrockner gemäß der Fig. 10 im vergrößerten Maßstab, teilweise weggebrochen,

Fig. 12 in Draufsicht den hinteren Teil des Gehäuses des elektrisch betriebenen Handhaartrockners nach den Fig. 10 und 11 mit angeformter Handgriffhälfte bei entfernten Innereien,

Fig. 13 in Draufsicht eine Baueinheit, die aus einer Motorleiterplatte und einer Schalterleiterplatte besteht, die durch Leitungen miteinander verbunden sind und die dazu bestimmt ist, in den Gehäuseteil gemäß der Fig. 12 der Zeichnung eingesetzt zu werden,

Fig. 14 einen Schnitt durch den hinteren Gehäuseteil des elektrisch betriebenen Handhaartrockners nach den Fig. 10 und 11 nach dem Anbringen der Motorleiterplatte und des Elektromotors, jedoch vor dem Aufstecken des Heizers, teilweise weggebrochen,

Fig. 15 im Schnitt und im vergrößerten Maßstab einen Teil der Motorleiterplatte nach dem Aufstecken des elektrischen Heizers, teilweise weggebrochen und

Fig. 16 im Schnitt eine andere Ausführungsform der Kontakte und der Gegenkontakte des elektrisch betriebenen Handhaartrockners, ähnlich der Fig. 14 der Zeichnung, ebenfalls teilweise weggeschnitten.

Es sei zunächst erwähnt, daß in den Figuren der Zeichnungen nur diejenigen Teile von elektrisch betriebenen Handhaartrocknern dargestellt sind, welche für das Verständnis der Erfindung Bedeutung haben. So fehlen insbesondere ein Teil der Schalt- und Steuereinrichtungen. Ferner ist in vielen Zeichnungen der elektrische Heizer nicht mit dargestellt. Im übrigen können alle in den Figuren der Zeichnungen fehlenden Teile einen an sich bekannten Aufbau haben.

Der dem Ausführungsbeispiel nach den Fig. 1 bis 5 dargestellte Handhaartrockner ist generell mit 10 bezeichnet. Der Handhaartrockner 10 hat ein Gehäuse, das aus einem vorderen Gehäuseteil 11 und einem hinteren Gehäuseteil 12 zusammengesetzt ist. Dabei können die beiden aus einem isolierenden Werkstoff, insbesondere Kunststoff, gefertigten Gehäuseteile 11 und 12 mit an sich bekannten und daher nicht dargestellten Mitteln miteinander verbunden werden. Auf der rückwärtigen Öffnung des hinteren Gehäuseteiles 12 ist ein Einlaßgitter 13 zum Ansaugen der Frischluft angeordnet. Dieses Einlaßgitter 13 kann beispielsweise mit



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 383 of 2286

dem rückwärtigen Ende des Gehäuseteiles 12 verrastet werden. In bekannter Weise hat ein solches Einlaßgitter 13 eine Vielzahl von Einlaßöffnungen, die zweckmäßig in konzentrischen Teilringen angeordnet sind.

Auf der gegenüberliegenden anderen Seite hat der elektrisch betriebene Handhaartrockner 10 ein Auslaßgitter 15. Dieses ist im gewählten Ausführungsbeispiel ein einstückiger Kunststoffkörper, der einen Außenring und mehrere konzentrisch zum Mittelpunkt liegende Innenringe aufwist. Diese haben unterschiedliche Durchmesser und sind über Verbindungsstege miteinander verbunden.

Im gewählten Ausführungsbeispiel ist wenigstens einer der Innenringe geneigt zur Längsachse A-A des Handhaartrockners 10 angeordnet. Die Neigung des Innenringes beträgt etwa 25°.

In der Nähe des Außenringes des Austrittsgitters 15 ist ein nicht näher bezeichneter Rücksprung vorgesehen. Auf diese Weise wird Raum zum Eingriff des hinteren Endes einer Formdüse 14 geschaffen, die bei Bedarf von dem Benutzer mit dem vorderen Teil 11 des Gehäuses des Handhaartrockners 10 lösbar verbunden werden kann. Zweckmäßig wird als lösbare Verbindung eine Rastverbindung gewählt. Dabei können Rasten und Gegen-rasten bei der Herstellung des Gehäuses bzw. der Formdüse unmittelbar miterzeugt werden.

Aus der Fig. 1 der Zeichnung ist am besten ersichtlich, daß das Austrittsgitter 15 in den Innenraum des vorderen Teiles 11 des Gehäuses eingesetzt ist. Das rückwärtige Ende des Austrittsgitters 15 tritt mit den ihm zugekehrten Enden von Trägern 17 eines generell mit 16 bezeichneten Heizers in Wirkverbindung. Zu diesem Zweck sind nicht näher bezeichnete. Aufnahmen an Verbindungsstegen des Austrittsgitters 15 vorgesehen.

Der Heizer 16, der etwa in der Mitte des Gehäuses ds Handhaartrockners angeordnet ist, hat eine an sich bekannte Ausbildung. Er besteht aus einer Mehrzahl von flachen Trägern 17, die sich im wesentlichen in Richtung der Längsachse A-A des Handhaartrockners 10 erstrecken. Der eigentliche, von den Trägern 17 getragene Heizdraht oder die Heizwendel ist in den Fig. 1 bis 5 der Einfachheit halber fortgelassen.

Vor dem Heizer 16 liegt in Strömungsrichtung der Luft gesehen eine generell mit 20 bezeichnete Nachleiteinrichtung, deren Ausbildung am besten aus den Fig. 1 und 2 der Zeichnung ersicht lich ist. Daraus ergibt sich, daß es sich bei der Nachleiteinrichtung um einen einstückig aus einem isolierenden Werkstoff gefertigten Körper handelt, der in mehrere Teilbereiche aufgegliedert ist. So hat die Nachleiteinrichtung 20 zunächst einen mittleren, im wesentlichen eben gehaltenen Mittelteil 33 mit einer im Zentrum liegenden Öffnung zum Durchgriff der Motorwelle 21 eines generell mit 18 bezeichneten Elektromotors. Im Bereich des ebenen Mittelteiles 33 sind auch Befestigungsschrauben 32 vorgesehen, mit denen ein Festlegen der Nachleiteinrichtung 20 erfolgt. Es sind im gewählten Ausführungsbeispiel insgesamt drei Befestigungsschrauben 32 vorgesehen, die jeweils um 120° zueinander versetzt liegen.

An den ebenen Mittelteil 33 der Nachleiteinrichtung 20 schließt sich ein Verbindungsteil 34 an, welcher etwa in Richtung der Längsachse A-A des Handhaartrockners 10 verläuft und der dann in einen senkrecht zu der Längsachse A-A liegenden, nicht näher bezeichneten weiteren Teil übergeht, an den sich dann wiederum in Richtung der Längsachse A-A verlaufend der Schaufeltragteil 35 anschließt. Im gewählten Ausführungsbeispiel weist der Schaufeltragteil 35 insgesamt elf Schaufeln 36 auf, von denen die eine in der Fig. 3 der Zeichnung dargestellt ist. Daraus ergibt sich, daß jede Schaufel 36 der Nachleiteinrichtung 20 gekrümmt verläuft. Die durch die Enden der Schaufeln 36 gelegte Verbindungslinie schließt mit der Horizontalen einen Winkel $\alpha$ von etwa 60° ein. An sich hat die Nachleiteinrichtung 20 zwölf Schaufeln 36, jedoch ist erfindungsgemäß die zwölfte Schaufel entfernt und in diesem fehlenden Bereich ist der Triac 41 der Motorleiterplatte 43 angeordnet, auf den auch weitere Schalt- und Regeleinrichtungen bekannter Art untergebracht sind. Die Anordnung des Triacs 41 erfolgt in dem rechten oberen Bereich der Fig. 2 der Zeichnung.

Wie die Fig. 4 der Zeichnung erkennen läßt, ist im Bereich der einen fehlenden Schaufel 36 eine generell mit 37 bezeichnete Ausnehmung vorhanden. Diese Ausnehmung hat parallel und im Abstand voneinander angeordnete Begrenzungen 38, die durch eine weitere obere Begrenzung 39 miteinander verbunden sind. Dabei hat die obere Begrenzung 39 einen Ausschnitt 40 zum Eingriff des freien Endes einer Verlängerung 42 der Motorleiterplatte 43 (vergl. dazu die Fig. 5 der Zeichnung). Die in den Fig. 4 und 5 rechte Begrenzungswand der Ausschnitte 40 schließt einen Winkel $\beta$ mit der Horizontalen ein, der etwa gleich ist dem Winkel, den eine der Schaufeln 36 mit der Horizontalen einschließt. Dies bedeutet, daß der Winkel $\alpha$ im wesentlichen gleich dem Winkel $\beta$ ist. Im gewählten Ausführungsbeispiel beträgt die Größe jedes dieser Winkel 60°.

Durch die in den Fig. 4 und 5 dargestellte Ausbildung der Ausnehmung 37 und des Ausschnittes 40 wird der Triac 41 in die richtige Position gedrückt und gehalten. Der Triac 41, der eine bekannte Ausbiuldung haben kann, ist dabei mit der Motorleiterplatte 43 verlötet und bildet die fehlende zwölfte Schaufel der Nachleiteinrichtung 20. Er liegt somit im Luftstrom und wird optimal gekühlt.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 384 of 2286

Es bleibt noch nachzutragen, daß die Träger 17 der Heizung 16 im bezug auf die Schaufeln der Nachleiteinrichtung 20 versetzt angeordnet sind. D.h. die Schaufeln und die Träger 17 liegen nicht unmittelbar hintereinander. Die versetzte Anordnung der beiden genannten Teile wird gewählt, um eine Verwirbelung der angesaugten Luft und dadurch eine Reduzierung der im Bereich des Heizers auftretenden Temperaturen zu erzielen. Die Temperaturen werden auf ein solches Maß reduziert, daß jede nachteilige Beeinträchtigung des den Heizer umgebenden Gehäusebereiches entfällt.

Wie schon erwähnt, bildet die Nachleiteinrichtung 20 zugleich einen Halter für den Elektromotor 18. Dieser Elektromotor 18 hat eine an sich bekannte Bauart und wird in ebenfalls an sich bekannter Weise zum Antrieb eines Laufrades 22 benutzt. Dieses ist drehbar auf der Motorwelle 21 angeordnet. Das Laufrad 22 hat dabei eine ihm angeformte Nabe 31, in deren Mitte eine Bohrung vorhanden ist, in welche die Motorwelle 21 hineingreift. Die durch nicht näher bezeichnete Öffnungen des Eintrittsgitters 13 angesaugte Luft gelangt beim bestimmungsgemäßen Gebrauch des elektrisch betriebenen Handhaartrockners zunächst in den Bereich des Laufrades 22, danach in den Wirkungsbereich der Nachleiteinrichtung 20 und damit auch in den Bereich des Triacs 41, der ja an derjenigen Stelle der Nachleiteinrichtung 20 angeordnet ist, an der vorher eine der Schaufeln 36 entfernt wurde. Von der Nachleiteinrichtung 20 gelangt die angesaugte Luft schließlich zum Heizer 16. Nach dem dort erfolgenden Erwärmen verläßt die Luft das Austrittsgitter 15 und gegebenenfalls die vordere Öffnung einer Formdüse 14, wenn diese vorher von dem Benutzer mit dem Gehäuseteil 11 lösbar verbunden ist.

Wie die Fig. 1 der Zeichnung am besten erkennen läßt, hat der Handhaartrockner 10 einen Handgriff 23, der mit der Längsachse A-A einen Winkel einschließt, der kleiner als ein rechter ist. Der Handgriff ist hohl ausgebildet. Daher kann er zur Unterbringung von Betriebsteilen des Handhaartrockners benutzt werden. Im dargestellten Ausführungsbeispiel ist im Inneren des hohlen Handgriffes 23 ein Schalter 26 bekannter Bauart untergebracht, der nach außen hin durch eine Abdeckblende 27 verdeckt ist. Die Abdeck-blende 27 ist an den Innenwandungen des Handgriffes 23 begrenzt verschiebbar. Hierzu dienen nicht näher dargestellte Führungen, die beispielsweise mit einem Vorsprung der Abdeckplatte 27 zusammenwirken können. Durch Verschieben der Abdeckblende kann der Schalter in seine Ein- oder Ausstellung überführt werden. Oberhalb des Schalters 26 ist in dem Hohlraum des Handgriffes noch ein Reglerrad 28 drehbar gelagert, das mit einem Bereich seiner Umfangsfläche durch eine Öffnung der Wandung des Handgriffes 23 nach außen tritt und damit für den Benutzer zugänglich wird. Mit diesem Reglerrad läßt sich beispielsweise die Leistung des elektrisch betriebenen Handhaartrockners 10 regulieren.

Im Bereich der Stirnfläche des Handgriffes 23 ist eine Knickschutztülle 25 mit einer durchlaufenden Bohrung zur Unterbringung des einen Endes einer elektrischen Zuleitung 24 angeordnet. Das andere, in der Fig. 1 nicht sichtbare Ende der elektrischen Zuleitung 24 trägt einen bekannten Stecker, der vom Benutzer in eine Steckdose eingesteckt werden kann, um den Elektromotor 11 mit Strom zu versorgen, nachdem der Schalter unter Benutzung seines Griffteiles 29 in die Einschaltstellung gebracht ist.

Das in dem hohlen Innenraum des Handgriffes 23 eingeführte Ende der elektrischen Zuleitung wirkt in bekannter Weise mit einer Zugentlastungsschelle 30 zusammen, durch die ein Entlasten der Anschlußstellen von Zugkräften herbeigeführt werden soll.

In den Fig. 6 bis 9 ist ein weiteres Ausführungsbeispiel des erfindungsgemäßen elektrisch betriebenen Handhaartrockners dargestellt. Soweit die Teile dieses elektrisch betriebenen Handhaartrockners der Zweiten Ausführungsform gegenüber der ersten unverändert geblieben sind, sind die vorgenannten Bezugszeichen beibehalten worden.

Die generell mit 43 bezeichnete Motorleiterplatte des Handhaartrockners 10 ist ein flacher, aus elektrisch isolierendem Werkstoff gefertigter Körper, der in Richtung der Längsachse A-A des Handhaartrockners 10 angeordnet ist. Dabei ist das rückwärtige Ende der Motorleiterplatte 43 der einen Stirnfläche des Elektromotors 18 zugekehrt. Die an sich bekannten Motorleiteranschlüsse sind mit 44 in der Fig. 7 der Zeichnungen gekennzeichnet. Im übrigen trägt die Motorleiterplatte 43 in grundsätzlich bekannter Weise Schalt- und Steuereinrichtungen.

Im gewählten Ausführungsbeispiel weist die Motorleiterplatte 43 eine mittige, einen wesentlichen Teil der Länge der Motorleiterplatte erfassende Ausnehmung 45 auf, die zur vorderen Stirnfläche hin offen ist. Seitlich neben dieser Ausnehmung 45 sind in der Stirnfläche der Motorleiterplatte 43 Schlitze 46 angeordnet, die ebenfalls zur freien Stirnfläche hin offen bleiben. Jedem der beiden vorhandenen Schlitze 46 ist eine Leiterbahn 47 zugeordnet, die in bekannter Weise auf der Motorleiterplatte 43 angebracht sein können. Die Motorleiterplatte 43 hat somit Gegenkontakte 47, die mit den Kontakten des Heizers 16 zusammenwirken.

Wie die Fig. 8 und 9 der Zeichnungen am besten erkennen lassen, gehört zum Heizer 16 ein Träger 17, der aus zwei plattenförmigen Isolierkör-



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 385 of 2286

pern zusammengesetzt ist, die überkreuz angeordnet sind. Diese Isolierplatten sind im gewählten Ausführungsbeispiel mit 48 bezeichnet und ineinandergesteckt. Sie haben jeweils in ihrem der Motorleiterplatte 43 zugekehrten Bereich eine zur Stirnfläche hin offene Aussparung 49. Die beiden überkreuz angeordneten, zusammengesteckten Isolierplatten 48 nehmen in bekannter Weise den Heizer 16 auf. Der Heizer 16 ist im gewählten Ausführungsbeispiel als Heizwendel gestaltet. Die nach außen weisenden Stirnfläche der Isolierplatten 48 haben in bekannter Weise eine Vielzahl von nebeneinander angeordneten Nuten, in die jeweils ein Teilbereich der Wendeln des Heizers eingreifen. Da die Befestigung der Wendel des Heizers grundsätzlich bekannt ist, ist in der Fig. 9 nur ein Teilbereich derselben dargestellt.

In dem gewählten Ausführungsbeispiel sind an den Isolierplatten 48 des Trägers 17 Kontaktlaschen 50 und 51 angebracht. Diese Kontaktlaschen sind in bekannter Weise mit der Wendel des Heizers leitend verbunden. Ein Bereich jeder Kontaktlasche 50 bzw. 51 ist an einer der Isolierplatten 48 befestigt. Dies kann beispielsweise dadurch geschehen, daß man einen Hohlniet benutzt. Man kann aber auch die Kontaktlaschen Verbindungszungen aufweisen lassen, die Durchbrüche der Isolierplatte durchgreifen und danach umgebördelt werden. Die rückwärtigen Enden der Kontaktlaschen, also diejenigen, die mit dem Heizer 16 leitend verbunden werden sollen, sind mit 52 und 53 bezeichnet. Es handelt sich im gewählten Ausführungsbeispiel um Lötstellen.

Die vorderen freien Enden der Kontaktlaschen 50 bzw. 51 sind mit 54 und 55 bezeichnet. Sie greifen nach der Montage der Einzelteile in die Schlitze 46 der Motorleiterplatte 43 ein. Dadurch ergibt sich einmal eine leichte Verbindung zwischen den Kontaktlaschen 50 und 51 einrseits und der Gegenkontakte 47 andererseits. Zum anderen wird dadurch auch eine mechanische Verbindung zwischen dem Träger 17 und der Motorleiterplatte 43 hergestellt. Um einen ausreichenden Kontakt zu erzielen, empfiehlt es sich, die Kontaktlaschen 50 und 51 aus einem metallischen Werkstoff mit elastischen Eigenschaften herzustellen. Auf diese Weise ergibt sich eine gute Kontaktierung zwischen den freien Enden 54 und 55 der beiden Kontaktlaschen und den zugehörigen Gegenkontakten 47 der Motorleiterplatte 43.

Aus der explosionsartigen Darstellung der Fig. 7 der Zeichnung ergibt sich, daß eine Baueinheit vorgefertigt wird, die den Träger 17, den Heizer 16 und die Kontaktlaschen 50 bzw. 51 aufweist. Der Einfachheit halber ist in dem oberen Teil der Fig. 7 der wendelförmige Heizer fortgelassen. Eine der art vorbereitete Baueinheit wird dann in Richtung des Pfeiles B auf die Motorleiterplatte 43 aufgeschoben, die über die Anschlußleitungen 44 mit dem Motor 18 bereits verbunden ist. In der Endlage gelangen dann die vorderen freien Enden 54 bzw. 55 der Kontaktlaschen 50 und 51 in die nach vorn offenen Schlitze 46 an der Stirnseite der Motorleiterplatte 43. Dadurch wird nicht nur eine elektrisch leitende Verbindung zwischen den Kontakten und Gegenkontakten sondern auch eine mechanische Verbindung zwischen der Motorleiterplatte 43 und dem Träger 17 hergestellt. Diese Endlage der genannten Teile ist aus der Fig. 9 der Zeichnungen ersichtlich. In dieser Lage befinden sich die vorderen freien Enden 54 und 55 der Kontaktlaschen 50 und 51 in den Schlitzen 46 der Motorleiterplatte 43.

In den Fig. 10 bis 16 ist eine dritte Ausführungsform des elektrisch betriebenen Handhaartrockners dargestellt. Soweit dessen Teile in bezug auf die beiden vorher genannten Ausführungsbeispiele unverändert geblieben sind, wurden die gleichen Bezugszeichen beibehalten. Zu dem elektrisch betriebenen Handhaartrockner nach den Fig. 10 bis 16 gehört wiederum ein Elektromotor 18. Zur Unterbringung desselben ist in dem hinteren Gehäuseteil 12 eine im Querschnitt kreisförmige Aufnahme 67 angeordnet. In diese Aufnahme 67 wird der Elektromotor 18 mit seinem hinteren Bereich in der in Fig. 11 dargestellten Weise eingeführt. Die Aufnahme 67 für den Motor 18 wird nach der Rückseite des Handhaartrockners 10 durch den ebenen Mittelteil 33 und seitlich durch den Verbindungsteil 34 begrenzt. Dieser Verbindungsteil 34 hat eine umlaufende Verlängerung 88, vergl. dazu die Fig. 14 der Zeichnung. Die Wandstärke des vorderen Teiles der Verlängerung 88 ist dickenmäßig reduziert, so daß eine umlaufende Stützschulter 89 entsteht. Diese Stützschulter 89 wirkt mit Bereichen der Motorleiterplatte 43 zusammen, die bei diesem Ausführungsbeispiel - vergl. dazu die Fig. 13 der Zeichnung - ringförmig gestaltet ist.

Aus der Fig. 13 der Zeichnung ist ersichtlich, daß die Motorleiterplatte in diesem Falle eine mittlere Ausnehmung 97 aufweist, die vom Motor 18 durchgriffen wird, wobei jedoch in diese Ausnehmung auch die Verlängerung 88 in der Fig. 14 dargestellten Weise eingreift. Auf diese Weise kommt in der Einbaulage nach Fig. 14 der Zeichnung die Leiterplatte 43 nicht direkt mit der Umfangsfläche des Motors 18 in Verbindung. Vielmehr liegt die äußere Begrenzungswand 100 der Motorleiterplatte 43 an der Innenseite der Verlängerung 88 an. Dabei liegt der Stützbereich 101 der Motorleiterplatte 43 jeweils auf der Stützschulter 89. Es sind zwei solcher Stützschultern 89 vorhanden. Die zweite befindet sich im Bereich der Innenwandung des Schaufeltragteiles 35. In der in der Fig. 14 dargestellten Endlage liegt somit die äußere Begrenzungswand 100 an der Innenwand des Schaufeltragteiles 35 an, während die innere Begren-



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 386 of 2286

zungswand 102 mit der Verlängerung 88 zusammenwirkt. Unterhalb der Motorleiterplatte 43 ist im Boden 38 der Nachleiteinrichtung 20 ein Freiraum 90 geschaffen. Dieser Freiraum 90 ist so bemessen, daß die auf der dem Boden 66 zugekehrten elektronischen oder elektrischen Bauteile 92 der Motorleiterplatte 43 in ihm Platz finden.

Auf der dem Auslaß des Handhaartrockners 10 zugekehrten Seite ist - wie die Fig. 13 der Zeichnungen erkennen läßt - die Motorleiterplatte 43 zunächst mit einer Anzahl von elektronischen oder elektrischen Bauteilen 82 versehen. Ferner befinden sich dort Anschlüsse für Verbindungsleitungen 98 sowie Anschlüsse für die beweglichen Motoranschlüsse 96, die mit den ortsfesten Motoranschlüssen 87 in leitende Verbindung bringbar sind, wobei letztere an der vorderen freien Stirn fläche des Elektromotors 18 vorgesehen sind.

Gemäß einem weiteren Vorschlag der Erfindung sind auf der Motorleiterplatte 43 Kontakte angeordnet, von denen in den Fig. 13 bis 16 mehrere Ausführungsbeispiele dargestellt sind. Bei der Ausführungsform nach den Fig. 14 und 15 der Zeichnung ist jeder der Kontakte 84 als Flachstekker ausgebildet. Dieser Flachstecker 84 durchdringt eine nicht näher bezeichnete Bohrung in der Motorleiterplatte 43. Sein rückwärtiges Ende ist über eine Lötstelle 91 mit der Motorleiterplatte 43 verbunden. Das vordere freie Ende jedes Flachstecker 84 wirkt mit einem Gegenkontakt zusammen. Diese Gegenkontakte haben ebenfalls unterschiedliche Ausbildung, sind aber jeweils dem Heizer 16 zugeordnet.

Bei der Ausführungsform nach den Fig. 14 und 15 der Zeichnung ist der mit 85 bezeichnete Gegenkontakt als Klemmfeder ausgebildet, d.h. er ist im Querschnitt gesehen bügelförmig gestaltet, wobei nach innen gezogene Abwinkelungen der Klemmfeder mit der Außenfläche des Flachsteckers in leitende Verbindung treten. Jeder Gegenkontakt 85 ist durch einen Hohlniet 86 mit dem Heizer 16 fest verbunden. Dabei hält der Hohlniet 86 zugleich einen nicht näher bezeichneten Abgriff fest.

Die Gegenkontakte 85 sind jeweils vor der Stirnfläche des Heizers 16 angeordnet, so daß ein einfaches Zusammenstecken mit den Kontakten 84 der Motorleiterplatte 43 erfolgen kann. Im gewählten Ausführungsbeispiel sind auf der Motorleiterplatte 43 insgesamt drei Flachstecker 84 vorgesehen. Bei Bedarf können jedoch ohne weiteres mehr Flachstecker angebracht werden, denen dann eine entsprechende Anzahl von Gegenkontakten 85 an dem Heizer 16 zugeordnet werden müssen. In den Zeichnungen ist es offengelassen, mit welchen Teilen des Heizers die Gegenkontakte leitend zusammenwirken. Dies deshalb, weil dies in grundsätzlich bekannter Art erfolgen kann. Wegen des Bekanntseins ist auf die zeichnerische Darstellung der Widerstandsdrähte des Heizers verzichtet.

Die Fig. 16 der Zeichnung unterscheidet sich von den Fig. 14 und 15 lediglich dadurch, daß ein Vertauschen der Flachstecker und der Klemmfedern vorgenommen ist. Dies bedeutet, daß die Klemmfedern 93 nunmehr der Motorleiterplatte zugeordnet sind, während die Flachstecker, die jetzt mit 94 bezeichnet sind, am Heizer 16 liegen. Das Zusammenstecken der Teile 93 und 94 erfolgt durch Überführen des Heizers 16 in Richtung auf den Elektromotor 18. Bei dieser Bewegung, die in Längsrichtung des Handhaartrockners erfolgt, kommen in der Endlage die Flachstecker 94 in den Bereich zwischen den beiden Schenkeln der Klemmfeder 93 zu liegen, so daß auch hier für eine gute elektrische Verbindung gesorgt ist. Wie die Fig. 11 der Zeichnung erkennen läßt, hat der Handhaartrockner 10 - wie schon erwähnt - einen Handgriff 23, der hohl gehalten ist und aus zwei Hälften besteht, von denen die eine dem vorderen Gehäuseteil 11 und die andere dem rückwärtigen Teil 12 zugeordnet ist. Dieser Hohlraum dient zur Unterbringung elektrischer Schalt- und Steuereinrichtungen. So ist im Ausführungsbeispiel im Inneren des hohlen Handgriffes 23 zunächst ein Schalter 26 bekannter Bauart untergebracht. Der Griffteil 29 dieses Schalters durchgreift ein Fenster 69, vergl. dazu die Fig. 12 der Zeichnung. In der Begrenzungswand des Handgriffes 23 oberhalb des Fensters 69 ist ein weiteres, jedoch kleiner bemessenes Fenster 68 angeordnet. Durch dieses ragt in der in Fig. 11 dargestellten Weise der Teilbereich eines Reglerrades 28 hindurch. Dieses Reglerrad 28 ist drehbar gelagert. Mit ihm läßt sich in bekannter Weise die Leistung des elektrisch betriebenen Handhaartrockners 10 regulieren.

Dem Schalter 26 ist eine generell mit 71 bezeichnete Schalterleiterplatte zugeordnet, die - vergl. dazu die Fig. 13 - in Draufsicht gesehen rechteckig gestaltet ist. Auf dieser Schalterleiterplatte 71 sind in bekannter Weise Leiterbahnen und Anschlüsse 99 angeordnet. Zu seiner Anbringung im Hohlraum des Handgriffes 22 hat die Schalterleiterplatte 71 insgesamt vier Ausnehmungen, von denen die beiden in der Fig. 13 dargestellten oberen als rechteckige Öffnungen ausgebildet sind, während die im Bereich der unteren Stirnfläche liegenden schlitzartig gestaltet sind. Die Ausnehmungen sind jeweils mit 72 bezeichnet. Sie wirken mit Haltevorsprüngen 70 zusammen, die der einen Innenwand des Handgriffes 23 unmittelbar angeformt sind. Die Schalterleiterplatte 71 wird dadurch in ihrer endgültigen, in der Fig. 11 wiedergegebenen Lage gesichert, daß die beiden Hälften des Handgriffes 23 und damit auch die Gehäuseteile 11 und 12 des Handhaartrockners 10 zusammengefügt werden. Um dieses zu ermöglichen, ist die eine Innenwand des Handgriffes 23 mit Innenboh-



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 387 of 2286

rungen aufweisenden Vorsprüngen 103 versehen, in welche Halteschrauben 104 eingreifen, vergl. dazu die Fig. 11 und 12 der Zeichnung.

Die Fig. 13 der Zeichnung läßt ferner erkennen, daß die ringförmige Motorleiterplatte 43 mit der Schalterleiterplatte 71 zu einer Baueinheit vereinigt ist. Dies geschieht durch Verwendung mehrerer Verbindungsleitungen 98. Diese sind so bemessen, daß die ringförmige Motorleiterplatte den Motor 18 umgreifen kann, so wie dies in der Fig. 11 dargestellt ist. Demgegenüber wird die Schalterleiterplatte 71 auf die Haltevorsprünge 70 aufgesteckt. Die Verbindungsleitungen 98 können dabei in nicht näher bezeichnete, nach vorn offene Schlitze eingelegt werden, die im Bereich der Stirnfläche des Schaufeltragteiles 35 vorhanden sind.

Im dargestellten Ausführungsbeispiel nach den Fig. 10 bis 16 ist vorgesehen, daß die ringförmige Motorleiterplatte ohne besondere Befestigungseinrichtungen auf den Stützschultern 69 aufliegt. In aller Regel genügt eine derartige Anordnung, weil die Lagesicherung der Motorleiterplatte 43 durch Zusammenfügen der Gehäuseteile des Handhaartrockners 10 erfolgt. In Sonderfällen kann man jedoch auch zusätzliche Verbindungsmittel einsetzen. Jedoch sollten diese lösbar sein. Speziell ist es auch möglich, die Motorleiterplatte 43 mit Rasten zu versehen, die mit Gegenrasten an den benachbarten Wandungen des Halters der Nachleiteinrichtung 20 zusammenwirken. Auf diese Weise wird eine Lagesicherung der Motorleiterplatte 43 schon dann erzielt, wenn sie in die in der Fig. 14 dargestellte Lage gebracht ist, wo also die Gehäuseteile 11 und 12 noch nicht zusammengesetzt sind.

Die Verwendung einer ringförmigen Motorleiterplatte, so wie sie in der Fig. 13 gezeigt ist, ist nicht unbedingt erforderlich. Wichtig ist, daß bei dem Ausführungsbeispiel nach den Fig. 10 bis 16 der Zeichnung die Motorleiterplatte so ausgebildet ist, daß sie den Elektromotor 18 umgreifen kann. Falls dieser Motor 18 z.B. eine andere als eine kreisförmige Querschnittsfläche haben sollte, kann die Motorleiterplatte mit einer entsprechend gestalteten Ausnehmung 97 ausgestattet sein. Die Kontakte und Gegenkontakte der Motorleiterplatte 43 und der Heizer können eine von den dargestellten Ausführungsbeispielen abweichende Gestaltung haben. Auch läßt sich die Anzahl der vorhandenen zusammenwirkende Kontakte und Gegenkontakte variieren.

Wie bereits erwähnt, sind die dargestellten Ausführungen nur beispielsweise Verwirklichungen der Erfindung und diese nicht darauf beschränkt. Vielmehr sind noch mancherlei andere Ausführungen und Anwendungen möglich. So kann bei der Ausfüh rungsform nach den Fig. 1 bis 5 der Zeichnung sowohl die Ausbildung als auch die Gestalt der Ausnehmung 37 und auch des Ausschnittes 40 in der Nachleiteinrichtung variiert werden. Die Schaufeln 38 der Nachleiteinrichtung 20 können einen von 60° abweichenden Winkel zur Horizontalen einschliessen. In diesem Falle müßte auch der Winkel $\beta$ gemäß der Fig. 5 der Zeichnung zweckmäßig entsprechend geändert werden. Ferner wäre es bei der Ausführungsform der Erfindung nach den Fig. 1 bis 5 der Zeichnung auch möglich, den Triac in einem anderen Bereich der Nachleiteinrichtung 20 als dem dargestellten anzuordnen. Wesentlich ist, daß er von dem kühlenden Luftstrom voll erfaßt und somit optimal gekühlt wird. Wenn im Vorstehenden als elektronischer Baustein immer ein Triac genannt ist, so können auch andere elektronische Bauelemente, wie eine Diode od.dgl., in der erfindungsgemäßen Weise in dem Haartrockner eingesetzt werden. Es wird immer das Ziel verfolgt, dem jeweiligen elektronischen Bauelement im Handhaartrockner eine optimale Kühlung zu geben.

Während bei der Ausführungsform der Erfindung nach den Fig. 6 bis 9 lediglich zwei Kontaktlaschen 50 und 51 vorgesehen sind, können bei Bedarf auch mehr als zwei Kontaktlaschen am Träger 17 angebracht sein. Unabhängig von der Anzahl der vorhandenen Kontaktlaschen hat das Aufschieben bzw. Aufstecken des Trägers auf die Motorleiterplatte den Vorteil, daß alle vorhandenen Kontakte und Gegenkontakte in ihre leitende Verbindung überführt werden können bzw. es ist ein gemeinsames Trennen voneinander möglich. Und schließlich können die Erfindungen auch bei anderen an sich bekannten elektrisch betriebenen Handhaartrocknern benutzt werden.

Bezugszeichenliste :

10 - Handhaartrockner
11 - vorderer Gehäuseteil
12 - hinterer Gehäuseteil
13 - Einlaßgitter
14 - Formdüse
15 - Austrittsgitter
16 - Heizer
17 - Träger (von 16)
18 - elektrischer Motor
19 - Halter
20 - Nachleiteinrichtung
21 - Motorwelle
22 - Laufrad
23 - Handgriff
24 - Zuleitung
25 - Knickschutztülle
26 - Schalter
27 - Schalterblende



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 388 of 2286

28 - Reglerrad
39 - Griffteil
30 - Zugentlastungsschelle
31 - Nabe (von 22)
32 - Befestigungsschraube
33 - Mittelteil (von 20)
34 - Verbindungsteil (von 30)
35 - Schaufeltragteil (von 20)
36 - Schaufel (von 30)
37 - Ausnehmung (in 20)
38 - seitliche Begrenzungen (von 37)
39 - obere Begrenzung (von 37)
40 - Ausschnitt
41 - Triac
42 - Verlängerung (von 43)
43 - Motorleiterplatte
44 - Motoranschluß
45 - Ausnehmung (in 43)
46 - Schlitz (in 43)
47 - Leiterbahn (auf 43)
48 - Isolierplatte (von 17)
49 - Aussparung (von 48)
50 - I. Kontaktlasche
51 - II. Kontaktlasche
52 - Lötstelle (von 51 an 16)
53 - Lötstelle (von 50 an 16)
54 - freies Ende (von 50)
55 - freies Ende (von 51)
66 - Boden
67 - Aufnahme (für 18)
68 - Fenster (für 28)
69 - Fenster (für 26)
70 - Haltevorsprung
71 - Schalterleiterplatte
72 - Ausnehmung (in 41)
84 - Kontakt (Flachstecker)
85 - Gegenkontakt (Klemmfeder mit Abgriff)
86 - Hohlniet
87 - Motoranschlüsse
88 - Verlängerung
89 - Stützschalter (für 43)
90 - Freiraum (über 36)
91 - Lötstelle
92 - elektronische Bauteile (auf 43)
93 - Kontakt (II. Ausführung Fig. 8)
94 - Gegenkontakt (II. Ausführung Fig. 8)
95 - rpckwärtige Elektronikteile und Anschlüsse (von 43)
96 - bewegliche Motoranschlüsse
97 - mittlere Ausnehmung (von 43)
98 - Verbindungsleitungen
99 - Leiterbahnen und Anschlüsse (von 41)
100 - äußere Begrenzungswand (von 43)
101 - Stützbereich (von 43)
102 - innere Begrenzungswand (von 43)
103 - Vorsprung
104 - Halteschraube
A-A Längsachsde (von 10)
B Aufsteckrichtung (Fig. 7)

## Ansprüche

1. Elektrisch betriebener Handhaartrockner (10) mit einerends einen Einlaß (13) und anderenends einen Auslaß (14) aufweisenden Gehäuse (11, 12) zum unterbringen eines ein Laufrad (22) antreibenden Elektromotors (18), einem Heizer (16) zum Erwärmen der Luft sowie einer Motorleiterplatte (43) mit einen Triac (41) oder eine andere elektrische Baueinheit, wie Diode od.dgl. aufweisenden Schalt- und Steuereinrichtungen
**dadurch gekennzeichnet,**
daß der Triac (41) oder ein anderes elektronisches Bauteil des Handhaartrockners (10) im Bereich der Nachleiteinrichtung (20) angeordnet ist.

2. Handhaartrockner nach Anspruch 1, dadurch gekennzeichnet, daß eine der Schaufeln (36) der Nachleiteinrichtung (20) entfernt und stattdessen der Triac (41) in diesem Bereich angeordnet ist.

3. Handhaartrockner nach Anspruch 1 und 2, dadurch gekennzeichnet, daß die Nachleiteinrichtung (20) im Bereich der einen fehlenden Schaufel (36) eine Ausnehmung (37) aufweist, in den eine den Triac (41) aufweisende Verlängerung (42) der Motorleiterplatte (43) hineinragt.

4. Handhaartrockner nach Anspruch 3, dadurch gekennzeichnet, daß die Ausnehmung (37) parallel und im Abstand voneinander angeordnete Begrenzungen (38) aufweist, die durch eine obere Begrenzung (39) miteinander verbunden sind und daß die obere Begrenzung (39) einen Ausschnitt (40) zum Eingriff des freien Endes der Verlängerung (42) aufweist.

5. handhaartrockner nach Anspruch 3 und 4, dadurch gekennzeichnet, daß die eine Begrenzungswand des Ausschnittes (40) einen Winkel ( ) mit der Horizontalen einschließt, der etwa gleich ist dem Winkel ( ), den eine Schaufel (36) mit der Horizontalen einschließt (Fig. 3 und 5).

6. Elektrisch betriebener Handhaartrockner nach Anspruch 1, bei dem der Heizer von einem Träger aufgenommen und über Kontakte mit Gegenkontakten der Motorleiterplatte verbunden ist,
**dadurch gekennzeichnet,**
daß der den Heizer (16) haltende Träger (17) mit der Motorleiterplatte (43) unter Schaffung einer lösbaren Verbindung zwischen seinen Kontakten (50, 51) und den Gegenkontakten (47) der Motorleiterplatte (43) durch Aufstecken verbindbar ist.

7. Handhaartrockner nach Anspruch 1 und 6, dadurch gekennzeichnet, daß der Träger (17) mit dem Heizer (16) leitend verbundene Kontaktla-



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 389 of 2286

schen (50, 51) aufweist, die bei seinem Aufstecken in mit Leiterbahnen (47) zusammenwirkende Schlitze (46) der Motorleiterplatte (43) eingreifen.

8. Handhaartrockner nach Anspruch 6 und 7, dadurch gekennzeichnet, daß die Schlitze (46) an der vorderen freien Stirnfläche der Motorleiterplatte (43) angeordnet sind und daß die abgewinkelten freien Enden (54, 55) der Kontaktlaschen (50, 51) unter Kontaktgabe in die Schlitze (46) eingreifen.

9. Handhaartrockner nach Anspruch 6, dadurch gekennzeichnet, daß jede Kontaktlasche (50, 51) aus einem Metallstreifen besteht, der jeweils in seinem Mittelbereich mit einem der den Träger bildenden, überkreuz angeordneten Isolierplatten verbunden ist und deren eines Ende mit dem Heizer (16) in leitender Verbindung steht, während das gegenüberliegende andere Ende (54, 55) in die Schlitze (46) der Motorleiterplatte (43) eingreift.

10. Handhaartrockner nach Anspruch 1 und 6, dadurch gekennzeichnet, daß die Motorleiterplatte (43) als den Motor (19) umgreifender Körper ausgebildet ist, der Führungs- und Stützbereiche (100, 101) sowie auf seiner dem Austrittsgitter (15) zugekehrten Fläche Kontakte (84, 93) aufweist, die mit den Gegenkontakten (85, 94) des Heizers (16) durch Aufstecken lösbar verbindbar sind (Fig. 11 bis 16).

11. handhaartrockner nach Anspruch 10, dadurch gekennzeichnet, daß die Motorleiterplatte (43) als Ringkörper ausgebildet ist, dessen mittlere Ausnehmung (57) vom Motor (18) durchgriffen wird und dessen äußere Begrenzungswand (100) als Führungsbereich benutzbar ist, während ein Teilbereich seiner Oberfläche als Stützbereich (101) dient.

12. Handhaartrockner nach Anspruch 10 und 11, dadurch gekennzeichnet, daß im Bereich des Mittelteiles (33) des Halters (19) einer Nachleiteinrichtung (20) eine Aufnahme (67) für den Motor (19) angeordnet ist, die in ihrem oberen Teil durch eine umlaufende Verlängerung (88) des Mittelteiles (33) begrenzt ist, die mit der inneren Begrenzungswand (102) der Motorleiterplatte (43) zusammenwirkt.

13. Handhaartrockner nach Anspruch 10, dadurch gekennzeichnet, daß die äußere Begrenzungswand (100) der Motorleiterplatte (43) mit der Innenwand eines Schaufeltragteiles (35) zusammenwirkt und daß sowohl die Verlängerung (88) als auch die Innenwand des Schaufeltragteiles (35) eine Stützschulter (89) für den Stützbereich (101) der Motorleiterplatte (43) aufweisen.

14. Handhaartrockner nach Anspruch 13, dadurch gekennzeichnet, daß im Boden (68) des halters (19) der Nachleiteinrichtung (20) seitlich versetzt zu den Stützschultern (89) ein Freiraum (90) zur Unterbringung von vorstehenden Teilen der Motorleiterplatte (43) angeordnet ist.

15. Handhaartrockner nach Anspruch 10, dadurch gekennzeichnet, daß die Motorleiterplatte (43) mit Rasten versehen ist, die mit Gegenrasten an den benachbarten Wandungen des Halters (19) der Nachleiteinrichtung (20) zusammenwirken.

16. Handhaartrockner nach Anspruch 10, dadurch gekennzeichnet, daß die Motorleiterplatte (43) senkrecht aus ihrer Grundebene vorragende Kontakte (84 bzw. 93) aufweist, die mit Gegenkontakten (85 bzw. 94) zusammensteckbar sind, die am Träger (17) des Heizers (16) angeordnet sind.

17. Handhaartrockner nach Anspruch 16, dadurch gekennzeichnet, daß die Kontakte (84) als Flachstecker ausgebildet sind, deren rückwärtiges Ende mit der Motorleiterplatte (43) verlötet ist und deren vorderes Ende mit einem als Klemmfeder (85) ausgebildeten Gegenkontakt des Heizers (16) zusammenwirkt (Fig. 14 und 15).

18. Handhaartrockner nach Anspruch 16, dadurch gekennzeichnet, daß die Gegenkontakte (94) an dem Heizer (16) als Flachstecker und die Kontakte (93) an der Motorleiterplatte (43) als Klemmfedern ausgebildet sind (Fig. 16).

19. Handhaartrockner nach Anspruch 16 bis 18, dadurch gekennzeichnet, daß die Gegenkontakte (85 bzw. 94) über die Stirnfläche des Trägers (17) des Heizers (16) vorstehen und mit einem Abgriff versehen sind.

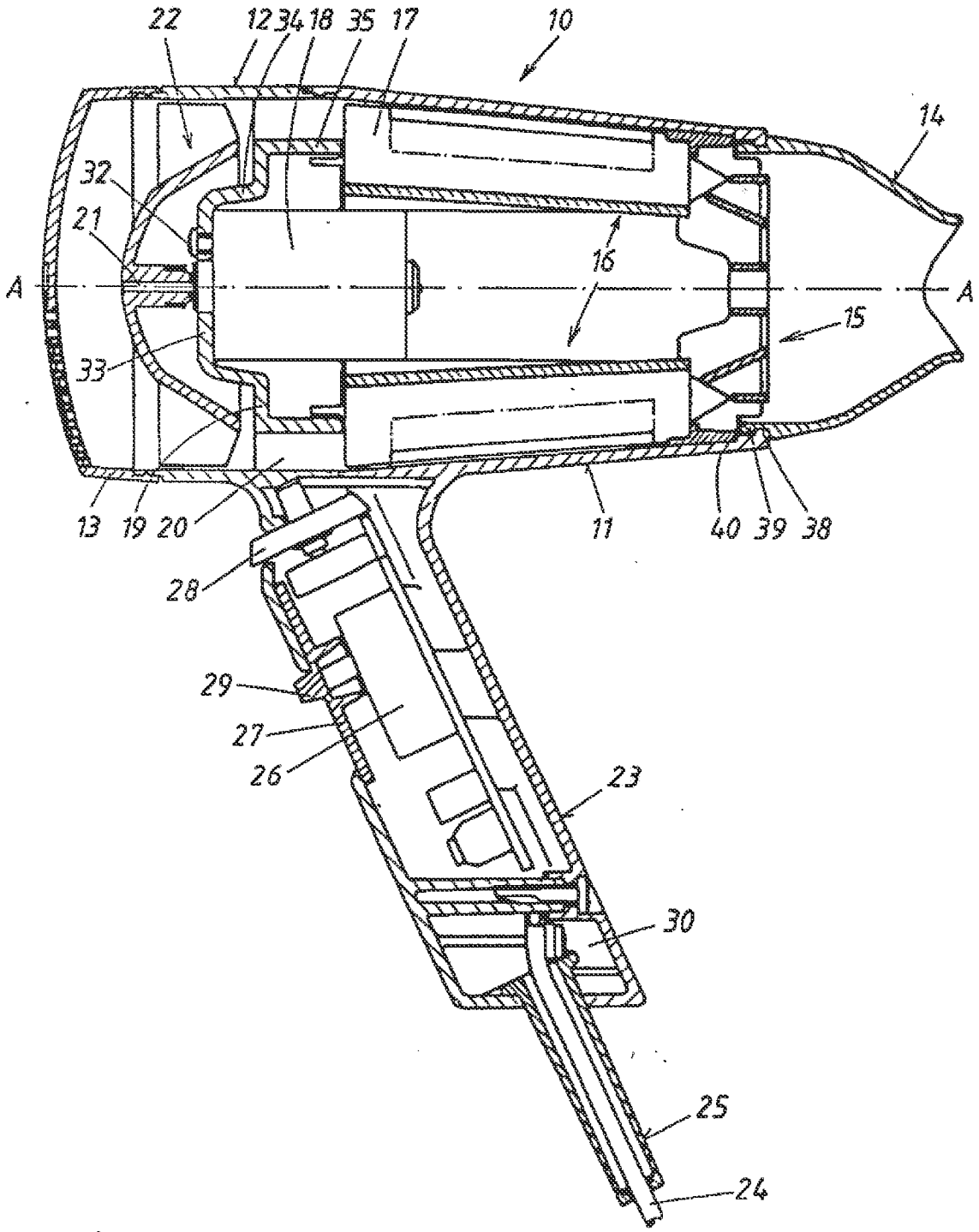
20. Handhaartrockner nach Anspruch 10, dadurch gekennzeichnet, daß die Motorleiterplatte (43) über Verbindungsleitungen (98) mit einer Schalterleiterplatte (71) zu einer vorgefertigten Baueinheit verbunden ist.

21. Handhaartrockner nach Anspruch 20, dadurch gekennzeichnet, daß die Leiterbahnenanschlüsse od.dgl. aufweisende Schalterleiterplatte (71) Ausnehmungen (72) aufweist, die zu ihrem Aufstecken auf Haltevorsprünge (70) an den Innenwandungen des Handgriffes (23) dienen.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 390 of 2286

FIG. 1




Fa. Robert Krups Stiftung & Co. KG

FIG. 2

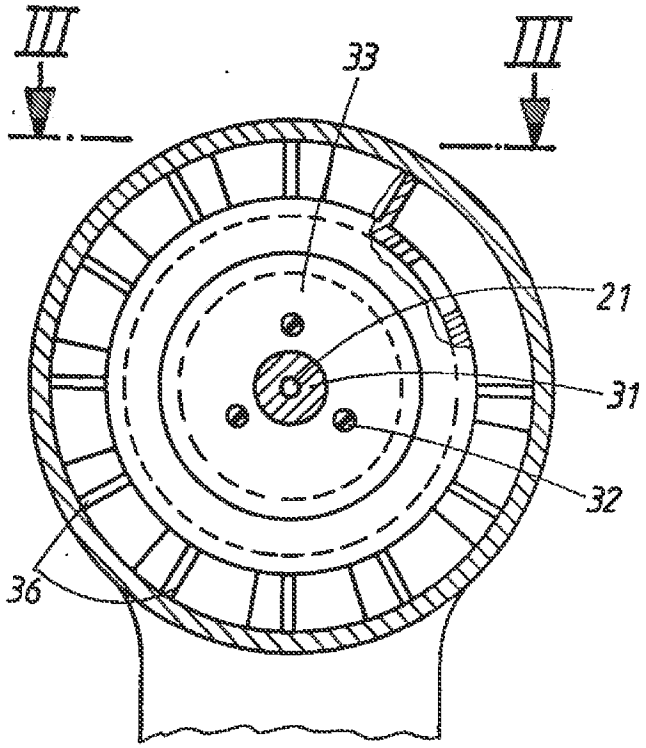



FIG. 3

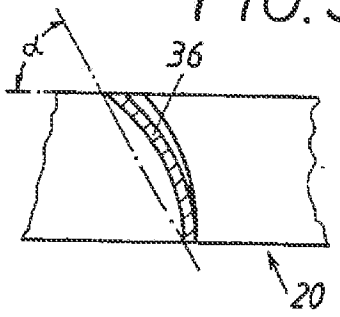



FIG. 4

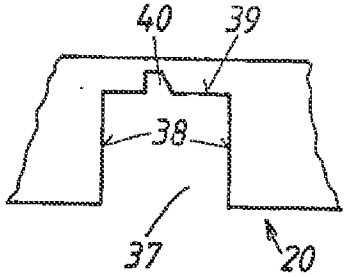
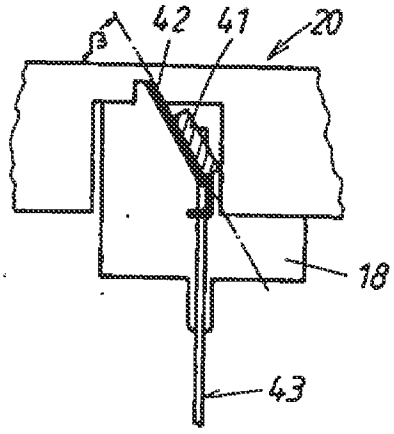


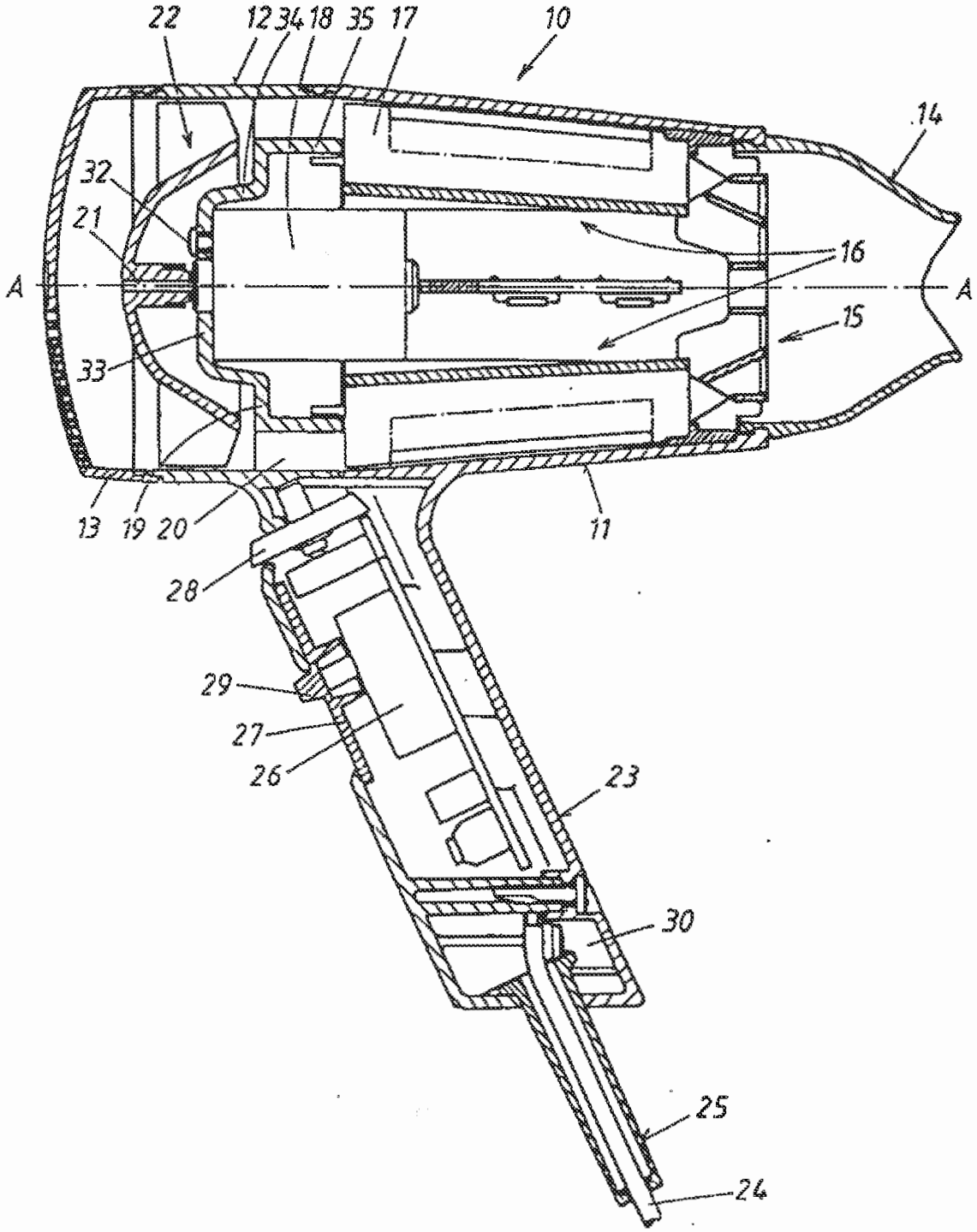

FIG. 5






SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 392 of 2286

FIG.6




Fa. Robert Krups Stiftung & Co. KG

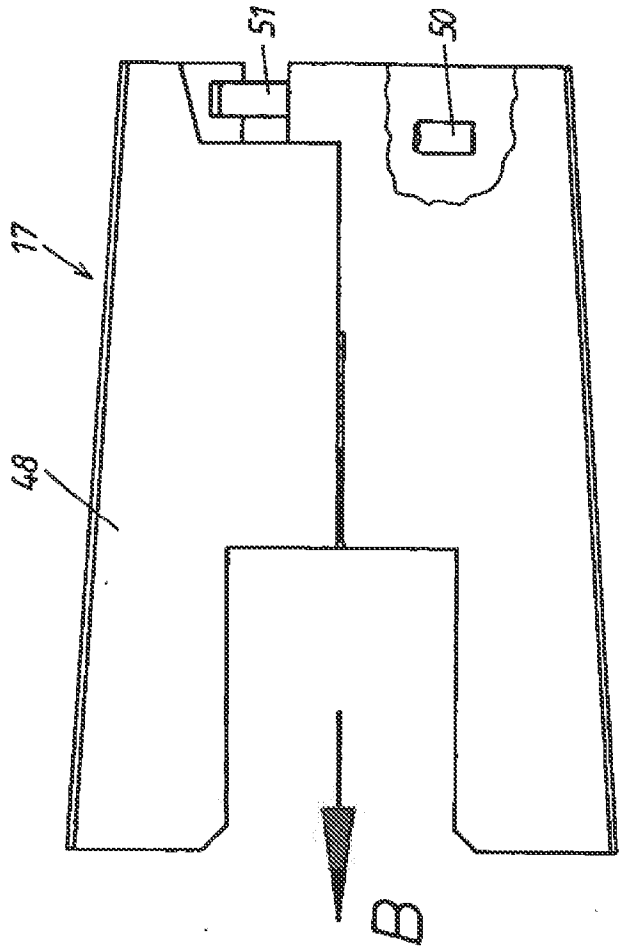
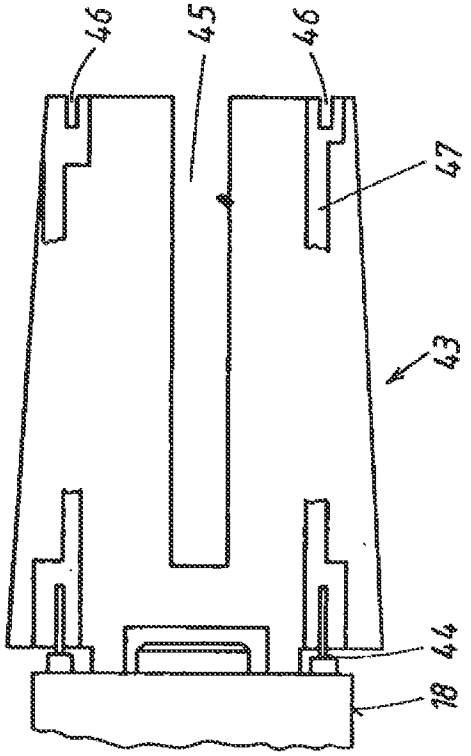



FIG. 7




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FIG. 8

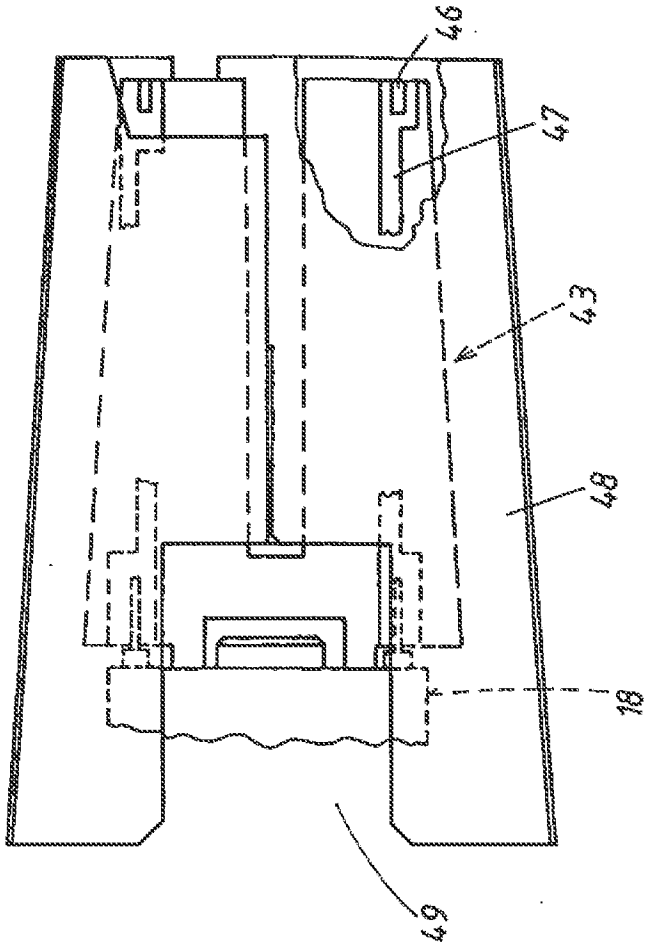
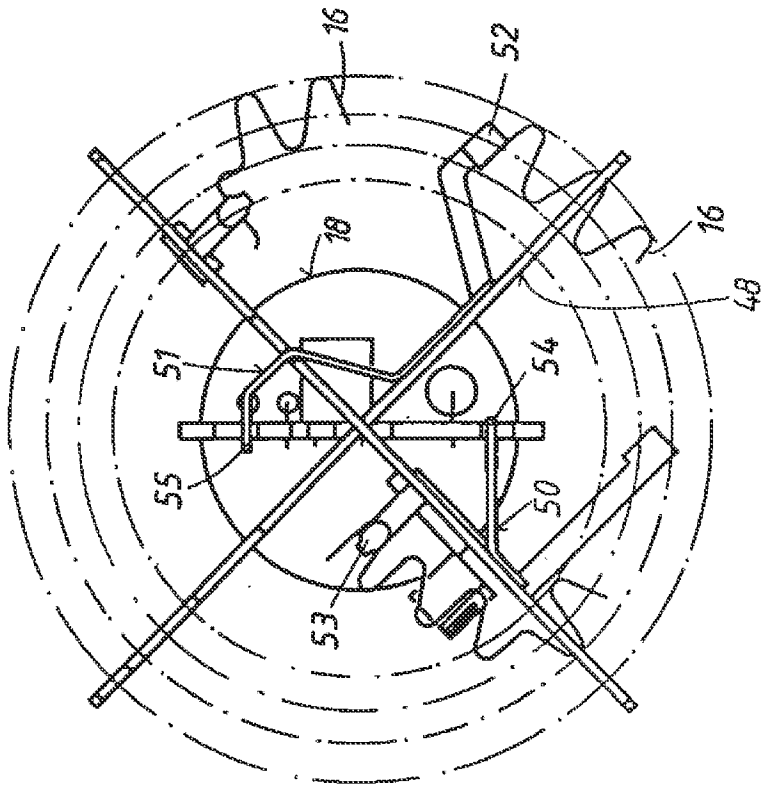


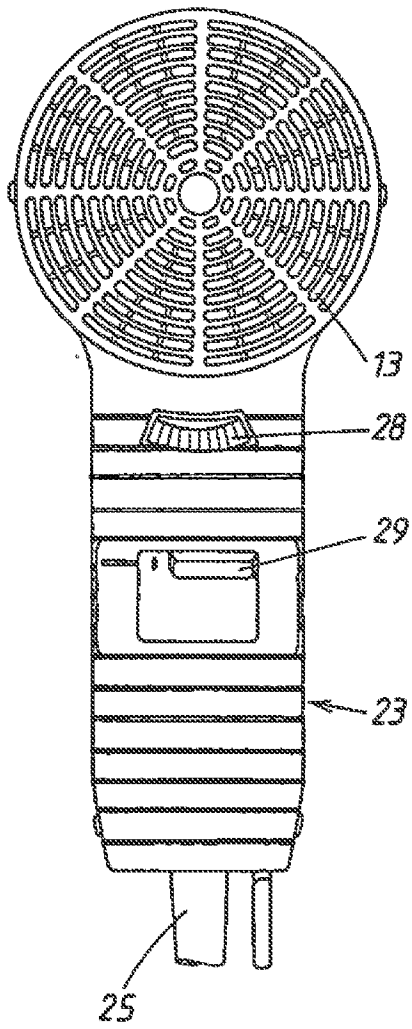

FIG. 9






SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 395 of 2286

FIG. 10






SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 396 of 2286

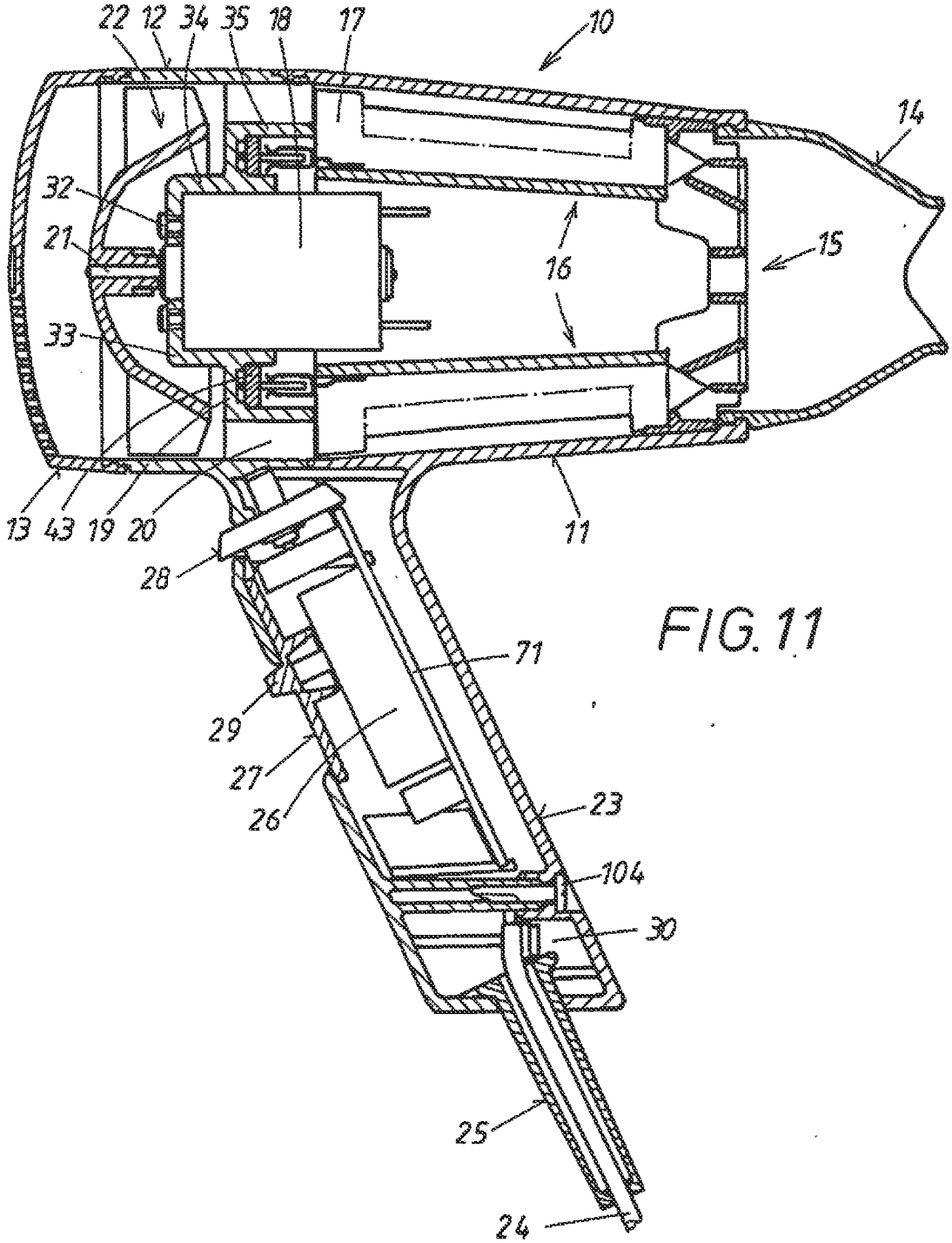



FIG. 11

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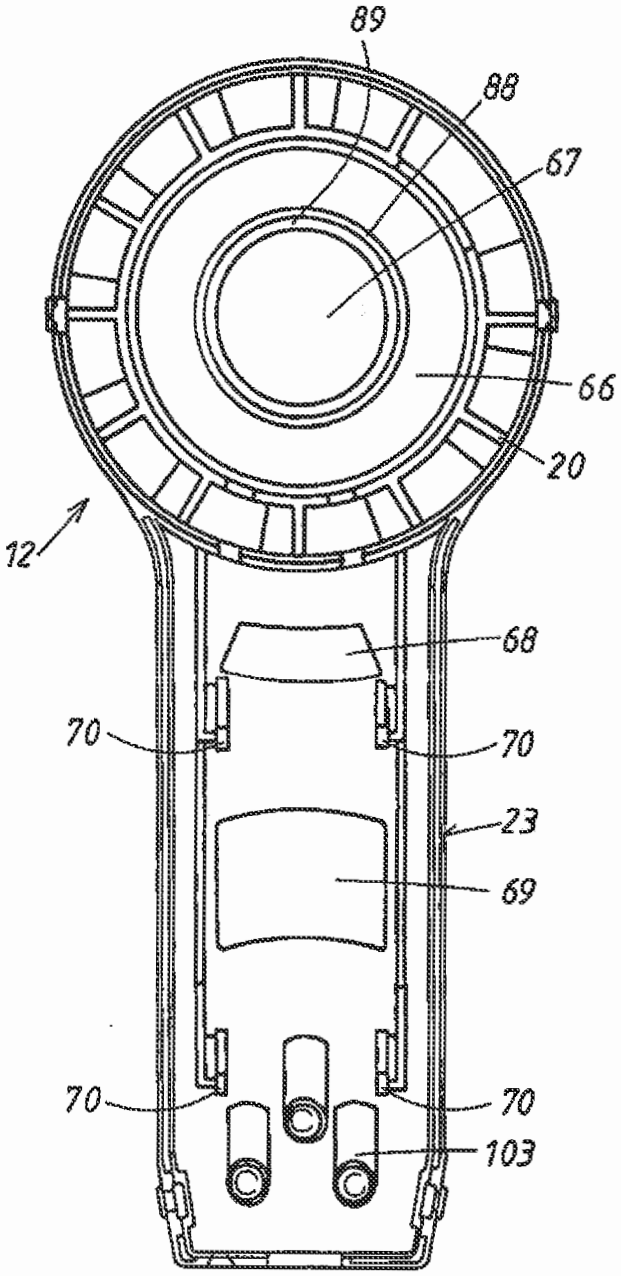



FIG. 12

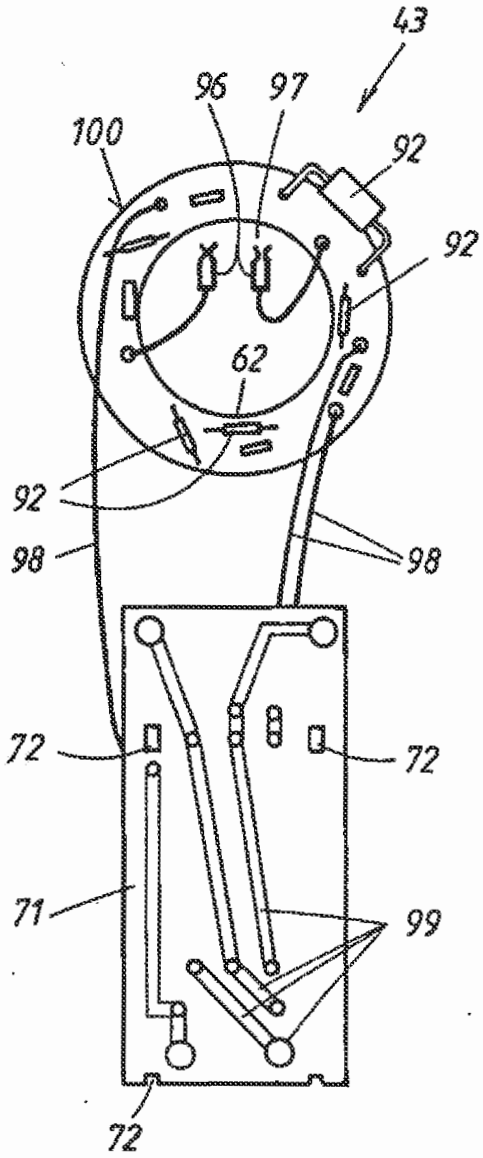



FIG. 13



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 398 of 2286

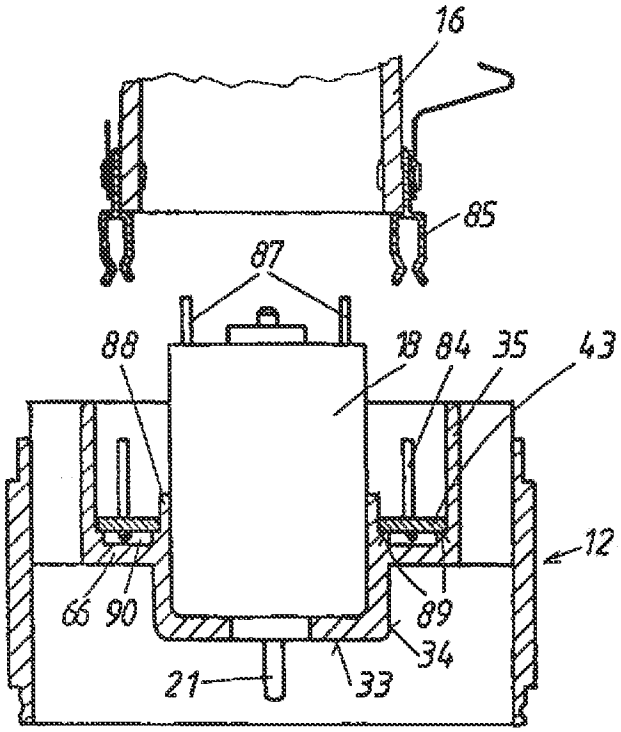



FIG. 14

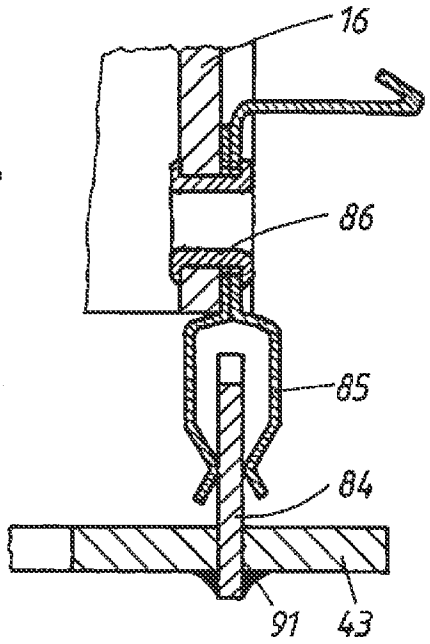



FIG. 15

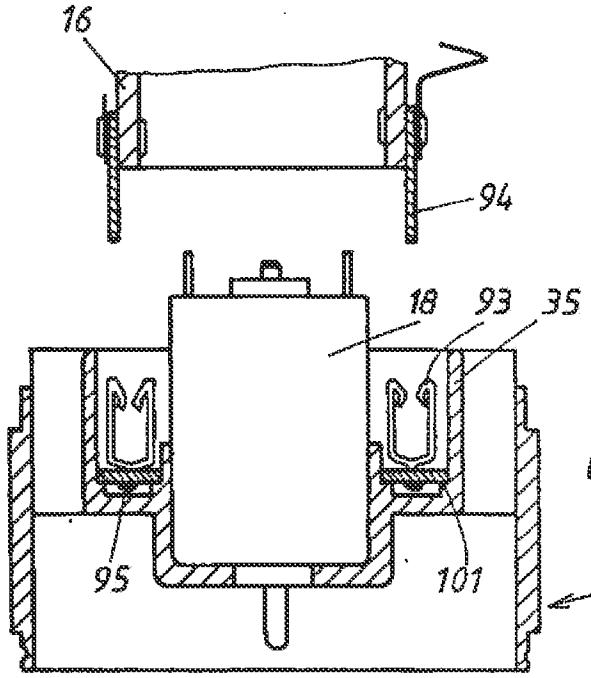



FIG. 16

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Europäisches Patentamt

# EUROPÄISCHER RECHERCHENBERICHT

Nummer der Anmeldung

EP 88113689.9

## EINSCHLÄGIGE DOKUMENTE

| Kategorie | Kennzeichnung des Dokuments mit Angabe, soweit erforderlich, der maßgeblichen Teile | Betrifft Anspruch | KLASSIFIKATION DER ANMELDUNG (Int. Cl.4) |
|---|---|---|---|
| A | GB - A - 2 174 900 (CAPMAELS & RANSFORD)<br>* Gesamt *<br>-- | 1-21 | A 45 D 20/12 |
| A | EP - A1 - 0 010 795 (BRAUN AKTIENGESELLSCHAFT)<br>* Gesamt *<br>-- | 1-21 | |
| A | WO - A1 - 80/00 783 (DYER-HUGH; FIRTH CLEVELAND LIMITED)<br>* Fig. 3,4 *<br>---- | 1,6-21 | |

RECHERCHIERTE SACHGEBIETE (Int. Cl.4)

A 45 D 20/00

Der vorliegende Recherchenbericht wurde für alle Patentansprüche erstellt.

| Recherchenort | Abschlußdatum der Recherche | Prüfer |
|---|---|---|
| WIEN | 08-11-1988 | PIRKER |

KATEGORIE DER GENANNTEN DOKUMENTEN

X : von besonderer Bedeutung allein betrachtet
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E : älteres Patentdokument, das jedoch erst am oder nach dem Anmeldedatum veröffentlicht worden ist
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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 400 of 2286

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PN - JP1027506 A 19890130

TI - BLOWER

AB - PURPOSE: To provide a blower having no wind quantity reduction and low noises by opening the back face of the bell mouth of the suction port of a housing into the housing, and providing a sound absorbing material on the back face. CONSTITUTION: The bell mouth 2 is arranged on a suction port at the rear end of a tubular housing 5, and a sound absorbing material 1 is fitted onto the back face of the bell mouth 2. Urethane foam, glass wool, or sponge is used for the sound absorbing material 1. The air sucked from the bell mouth 2 by the rotation of moving blades 4 passes in the housing 5, and it is discharged from a duct 7 after being heated by a heater 9. Since the sound absorbing material 1 is arranged on the air intake port where the sound pressure becomes high, modes are hardly formed, the resonance amplification in the housing 5 is suppressed, and the noises sent to the outside from the housing 5 are reduced.

PA - MATSUSHITA ELECTRIC WORKS LTD



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 401 of 2286

⑲日本国特許庁(JP)　⑪特許出願公開

# ⑫公開特許公報(A)　昭64-27506

| ⑤Int.Cl.⁴ | 識別記号 | 庁内整理番号 | ⑬公開 |
|---|---|---|---|
| A 45 D 20/12 | | B-7618-3B | 昭和64年(1989)1月30日 |

審査請求 未請求 発明の数 1 (全3頁)

⑭発明の名称　送風機

⑳特　願　昭62-182906
㉒出　願　昭62(1987)7月22日

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㉔代理人　弁理士　竹元　敏丸　外2名

## 明　細　書

1．発明の名称

送　風　機

2．特許請求の範囲

(1)　ハウジングの吸込口にベルマウスを有する送風機において、ベルマウスの裏面をハウジング内に開口すると共に該裏面に吸音材を設けたことを特徴とする送風機。

3．発明の詳細な説明

(技術分野)

本発明は、ファンの風切り音、モータの回転音やハウジング内共鳴音等の発生音の低減ならびにハウジング内で発生した騒音の外部への伝播を抑制した低騒音の送風機に関するものである。

(背景技術)

ベルマウスを有する送風機として第4図のようなドライヤがある。筒状ハウジング5の後端の吸込口にベルマウス2を配し、内部に配した動翼4の働きにより、該ベルマウス2より吸込んだ空気をヒーター6にて加熱したのち先端のダクト7より吐出するものである。近年、ドライヤは大風量、高ワットが主流となってきており、その基本性能としては軽量で大風量が得られるものが望まれている。

大風量を得るためには、一般に回転数を上げればよいが、送風機騒音の相似則より、回転数が上がると、騒音が大きくなるという問題が生じる。一般的に知られている送風機騒音の相似則を以下に示す。即ち、風量$Q_1$が$Q_2$に、回転数$N_1$が$N_2$に変った場合の騒音の変化量は次式で与えられる。

$$\Delta L = K_1 \log \frac{Q_2}{Q_1} + K_2 \log \frac{N_2}{N_1}$$

上式より回転数が上がるに従って、騒音も増加する傾向にあることがわかる。

上述のように、現在ドライヤは高回転のため、必然的に騒音レベルが高くなる傾向にあり、一般家庭で使用する場合、話し声やテレビからの音が聞こえにくいという問題点があった。



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 402 of 2286

このため、ドライヤの静音化のため、動翼、モータ特性やハウジング形状等の改良がなされているが、現段階ではあまり効果が得られていない。

また、騒音低減要素として、ハウジング内の通気ダクト等に多孔質吸音材等を用いることが考えられるが、減音効果を得るためにはある程度の厚みが必要であり、そのため、送風経路の有効面積が減少し、また気流に対する抵抗があるという問題があるため、ドライヤのハウジングに内張した場合、減音効果はあるが風量が低下するという問題があった。

なお、上記説明では、送風機としてドライヤを例示したが、これに限定されるものではなく、送風機であればポンプ、空調機等の他の装置に使用されるものでも同様に騒音が問題となっている。

〔発明の目的〕

本発明は、上記事由に鑑みてなされたもので、その目的とするところは、安価で、簡単な構造のもとに風量低下のない低騒音の送風機を提供することにある。

〔発明の開示〕

〔構　成〕

本発明に係る送風機は、ハウジングの吸込口にベルマウスを有する送風機において、ベルマウスの裏面をハウジング内に開口すると共に該裏面に吸音材を設けることにより、ファンの風切り音、モータの回転音やハウジング内の共鳴音等の発生音の低減ならびに、ハウジング内で発生した騒音の外部への伝播を抑制するものである。

〔実施例〕

第１図乃至第３図に示すのは、この発明の一実施例である。この実施例は、送風機がドライヤーの場合である。

このドライヤーは、筒状のハウジング５の後端の吸込口にベルマウス２を配している。

４は、ハウジング５内においてベルマウス２に対応させて配した動翼である。

８は、動翼４より内部に配した静翼である。

ベルマウス２、動翼４及び静翼８は同軸上に配されている。

静翼８の内部には、動翼４を駆動させるモーター（図示略）が配されている。

静翼８の出口側にはヒーター９が配されている。

またハウジング５の先端部には吐出ダクト７が配されている。

ベルマウス２の裏面はハウジング５内の動翼４方向（筒状ハウジング５の軸方向）に開口している。

ベルマウス２の入口径は５０㎜程度、出口後は３０㎜程度で、奥行は２５㎜程度のものである。

ベルマウス２の裏面には、吸音材１が取着されている。吸音材１としては、ウレタンフォーム、グラスウール、スポンジ等が用いられる。而して動翼４の回転によりベルマウス２より吸込んだ空気は、ハウジング５内を通過し、ヒーター９にて加熱されてのちダクト７より吐出される。

このようにして形成したドライヤの騒音レベルは、吸音材１を使用しなかったものに比較して減音効果が得られる。第３図は、ドライヤにより発生する騒音レベルの周波数特性を示すグラフであり、縦軸は騒音レベル（ｄＢ）、横軸が周波数を示す。第３図において破線で示すのは、吸音材１を使用しなかった場合であり、実線で示すのは上記実施例の吸音材１を使用した例である。この図より、両周波数３．１５Ｋ～１０ＫＨｚ（図面の斜線で示す部分）で減音効果が認められ、最大減音量は５ＫＨｚで５ｄＢ程度である。

これは、音圧の高くなる空気の吸込口に吸音材を配しているので、モードがたちにくくハウジング内共鳴増幅が抑制され、かつハウジング内より外部に出る騒音も低減されるのである。またこの実施例では、吸音材１が動翼４に対向しているので風切り音等の直接的な吸音効果も期待できるのである。

尚、上記実施例では、送風機としてドライヤの例を示したが、送風機であればポンプ、空調機等であっても同様の効果を得ることができる。

〔発明の効果〕

以上のように本発明による送風機は、ハウジン



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 403 of 2286

グの吸込口にベルマウスを有する送風機において、ベルマウスの裏面をハウジング内に開口すると共に該裏面に吸音材を設けたことを特徴とするものであり、音圧の高くなる空気の吸込口に吸音材を配しているので、モードが高次にくくハウジング内の共鳴増幅が抑制され、かつ、ハウジング内より外部に出る騒音も低減されるのである。

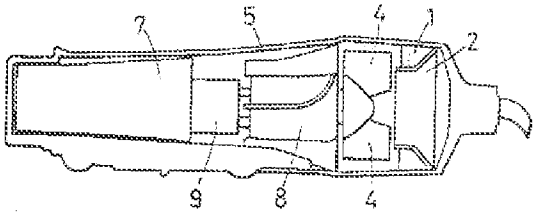
4. 図面の簡単な説明

第1図乃至第4図は本発明の一実施例を示す図で、第1図及び第2図は断面図、第3図はグラフ、第4図は従来例を示す断面図である。

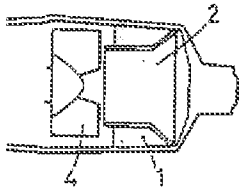
1…吸音材、2…ベルマウス、4…動翼、5…ハウジング、7…ダクト、8…静翼、9…ヒーター。

特許出願人
松下電工株式会社
代理人弁理士 竹元敏丸
（ほか2名）

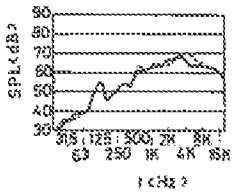
第1図



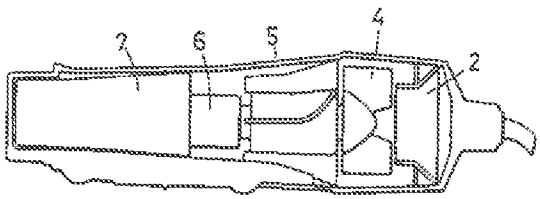

第2図




第3図




第4図






SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 404 of 2286

# D3: PATENT ABSTRACTS OF JAPAN

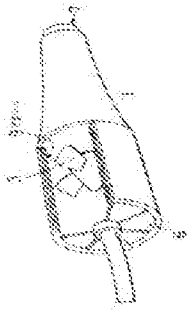
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(51)Int.Cl. **A45D 20/12**

(21)Application number : **62-187392** (71)Applicant : **MATSUSHITA ELECTRIC WORKS LTD**
(22)Date of filing : **27.07.1987** (72)Inventor : **OKUDAIRA YUZO**
**UMEOKA KAZUAKI**

(54) **HAIR DRIER**

(57)Abstract:
PURPOSE: To lessen the occurrence of a noise without lowering air volume by attaching a noise eliminating sheet at least to a part of the inner surface of an air passage in a housing.
CONSTITUTION: At least a part of the internal surface of a housing 1 containing a motor, a fan 3, a heater or the like is lined with a noise eliminating sheet 9 formed out of two stacked layers of viscoelastic material, nonwoven fabric, filter paper and a porous material such as felt, so as to keep the viscoelastic material layer exposed to the flow passage of air. According to this construction, the occurrence of a noise can be lessened without lowering air volume.





SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 405 of 2286

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PN - JP1029208 A 19890131

TI - HAIR DRYER

AB - PURPOSE: To lessen the occurrence of a noise without lowering air volume by attaching a noise eliminating sheet at least to a part of the inner surface of an air passage in a housing. CONSTITUTION: At least a part of the internal surface of a housing 1 containing a motor, a fan 3, a heater or the like is lined with a noise eliminating sheet 9 formed out of two stacked layers of viscoelastic material, nonwoven fabric, filter paper and a porous material such as felt, so as to keep the viscoelastic material layer exposed to the flow passage of air. According to this construction, the occurrence of a noise can be lessened without lowering air volume.

PA - MATSUSHITA ELECTRIC WORKS LTD



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 406 of 2286

⑲日本国特許庁(JP)　⑪特許出願公開

⑫公開特許公報(A)　昭64-29208

⑤Int.Cl.⁴　識別記号　庁内整理番号　⑬公開　昭和64年(1989)1月31日
A 45 D 20/12　C-7618-3B

審査請求　未請求　発明の数 1　(全3頁)

⑭発明の名称　ヘアドライヤ

⑳特　願　昭62-187392
㉒出　願　昭62(1987)7月27日

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㉔代理人　弁理士　竹元　敏丸　外2名

明　細　書

1．発明の名称

ヘアドライヤ

2．特許請求の範囲

(1)　粘弾性を有する材料と不織布、ろ紙、フェルトなどの多孔質材料を2層に積層した消音シートをモータ、ファン、ヒータ等が納装されたハウジングの内面の少なくとも一部に粘弾性を有する材料層が空気の通路側になるように内張りしたことを特徴とするヘアドライヤ。

(2)　ハウジングの一ケ所に形成された吸込口からファンに至る流路上に配設され空気流を絞り込むベルマウスに消音シートを張ったことを特徴とする特許請求の範囲第1項に記載のヘアドライヤ。

3．発明の詳細な説明

(技術分野)

本発明は、モータの回転音やファンの風切り音等の騒音を低減させたヘアドライヤに関するものである。

(背景技術)

一般にヘアドライヤは、第6図に示すように、中空のハウジング1内に、駆動源であるモータ2、モータ2により回転駆動されるファン3、ファン3により加速された空気流を整流する整流板4、熱源であるヒータ5等を配設して構成され、ハウジング1の一所に設けた吸込口6からファン3の回転によりハウジング1内に導入された空気をヒータ5で加熱した後にハウジング1の他所に設けた吐出口7から熱風として吐出するようになっている。ヘアドライヤは、小型、軽量でかつ所定の風量を確保するという要求が基本性能として要求されており、このような要求を満たすために、ファン3の回転数を高めて風量を増大させることが考えられる。しかしながら、ファン3の回転数が高くなるにしたがって騒音が増大するという問題が生じる。このような問題を回避するために、モータ2の特性やファン3の形状を改善することにより、低回転数で所定の風量を確保する努力がなされているが、満足な結果を得るには至ってい



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 407 of 2286

ない。

（発明の目的）

本発明は上述の点に鑑みて為されたものであり、その目的とするところは、ハウジングの空気通路の内面の少なくとも一部に消音シートを張ることにより、風量を低下させることなく騒音の発生を低減させたヘアドライヤを提供することにある。

（発明の開示）

本発明に係る低騒音ヘアドライヤーは、粘弾性を有する材料と多孔質材料を２層に積層した消音シートをドライヤのハウジングの内面の少なくとも一部に粘弾性を有する材料層が空気の通路側になるように内張りすることにより、ファンやモータから発生した騒音をハウジング外部へ伝播する間に消音し、ヘアドライヤの発生騒音を低減させるものである。

以下、本発明を図面に基づいて説明する。消音シート９の従来例を第３図と第４図に示す。第３図に示す消音シート９は粘弾性を有する材料層１０を形成するビニール・ゴム等の粘弾性材料からなるシートと不織布、ろ紙、フェルト等の多孔質材料からなるシート１１を接着剤で接着積層したものであり、第４図に示す消音シート９は多孔質材料からなるシート１１の表面に溶解したゴムを塗布したのち固めて粘弾性を有する材料層１０を形成したものであり、粘弾性を有する材料層１０が多孔質材料からなるシート１１の表面の一部にはいりこんでいるものであり、いずれも以下に述べるごとく消音効果があるものである。

即ち、第３図または、第４図に示すような消音シート９の粘弾性を有する材料層１０の表面上を音波が伝播していく時、第５図に示すごとく、粘弾性を有する材料層１０が音波によって振動し、音波のエネルギが粘弾性を有する材料内部のヒステリシス損として消費され音波が減衰することになる。粘弾性を有する材料層１０の振動は、多孔質材料からなるシート１１に支持されているので、空気バネにより支持され効率よくおこなわれるのである。

而して一般にヘアドライヤにおける主な騒音源は駆動源たるモータ２と送風用のファン３であり、騒音源より発生した騒音は主として吸入口５と吐出口７とから漏れるので、ハウジング１における騒音の伝達経路である空気の通路に消音シート９を張ることにより、騒音が低減されるのである。消音シート９は表面が滑らかな粘弾性を有する材料層１０が空気通路に面しているので流れに対する抵抗が小さいうえ、消音シート９の厚みは通常２～３㎜以内と薄いものを使用するので消音シート９を張ることによる風量の低下は小さい。

（実施例１）

第１図に示すドライヤーでは、直管状に形成されているハウジング１の内面のファン３から一端の吸込口６の間に消音シート９が粘弾性を有する材料層１０が空気の通路側になるように張りつけてある。７は他端の吐出口である。而してファン３から発生した騒音は吸込口６まで伝播する間に消音シート９により低減させられる。結果としてドライヤ全体の騒音が小さくなる。

（実施例２）

第２図に示すドライヤーでは、吸込口６に配設され空気の通路を形成するベルマウス８の内側に消音シート９を粘弾性を有する材料層１０が空気の通路側になるように張りつけた実施例である。ファン３から発生した騒音はベルマウス８の内側を通って吸込口６まで伝播する間に消音シート９により低減させられ、ドライヤ全体の騒音が小さくなる。

（発明の効果）

本発明のヘアドライヤは、粘弾性を有する材料層と多孔質材料層の２層からなる薄い消音シートを、粘弾性を有する材料層が空気の通路側になるようにしてハウジング内面の少なくとも一部に内張りしているので騒音を低減できるという利点を有する。しかも粘弾性を有する材料層を支持する空気層は、多孔質材料の孔の部分を利用しているので消音シートは安価に形成でき、かつヘアドライヤのハウジング内への取付けも容易かつ簡単であるという利点がある。また消音シートに表面が



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 408 of 2286

なめらかで薄いのでハウジング内を通る空気の流通を妨げないから、ファンの回転数を高めても大きな騒音が発生せず、低騒音かつ風量の大きいヘアドライヤが提供できるのである。

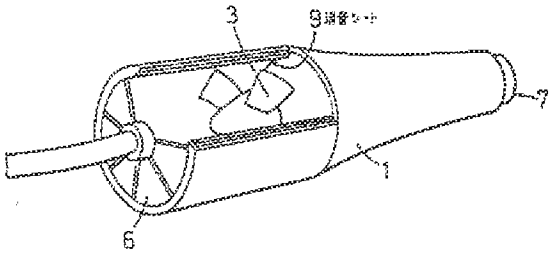
4. 図面の簡単な説明

第1図は本発明の一実施例を示す部分断面斜視図、第2図は本発明の異なる実施例を示す部分断面図、第3図乃至第5図は消音シートの断面図、第6図は従来例を示す断面図である。

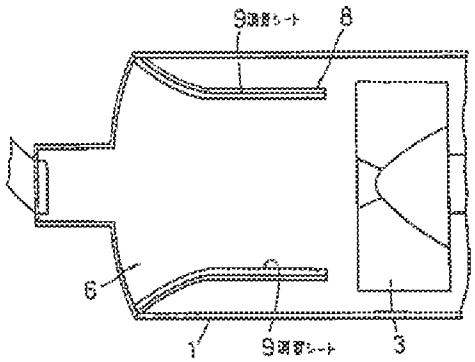
1…ハウジング、2…モータ、3…ファン、5…ヒータ、6…吸込口、7…吐出口、8…ベルマウス、9…消音シート、10…材料層、11…シート。

特許出願人
松下電工株式会社
代理人弁理士 竹元敏丸
(ほか2名)

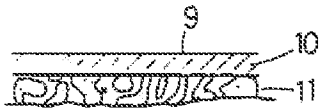
第1図



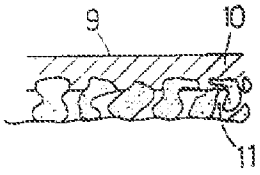

第2図



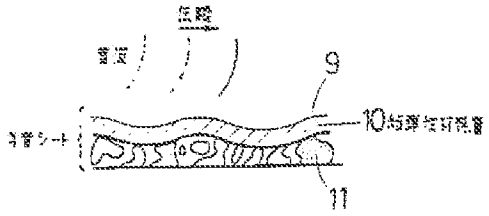

第3図



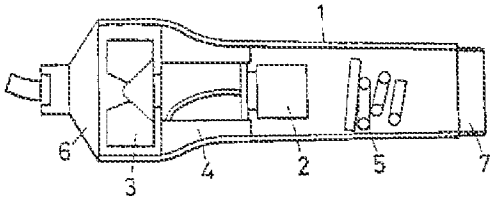

第4図




第5図




第6図






SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 409 of 2286

(19) Europäisches Patentamt
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(11) Publication number: **0 400 381**
**A2**

(12) # EUROPEAN PATENT APPLICATION

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(54) **Hair drier with differentiable airflow delivery.**

(57) The hair drier (1) with differentiable airflow delivery has a casing (2) which defines a grip portion and internally accommodates a fan (5) for generating an airflow and an actuation motor (4) for operating the fan (5). The casing has two mutually spaced-apart airflow delivery outlets (10, 11). Airflow heating elements (13, 14) are provided inside the casing (2) at each of the outlets (10, 11) and can be actuated independently of one another.

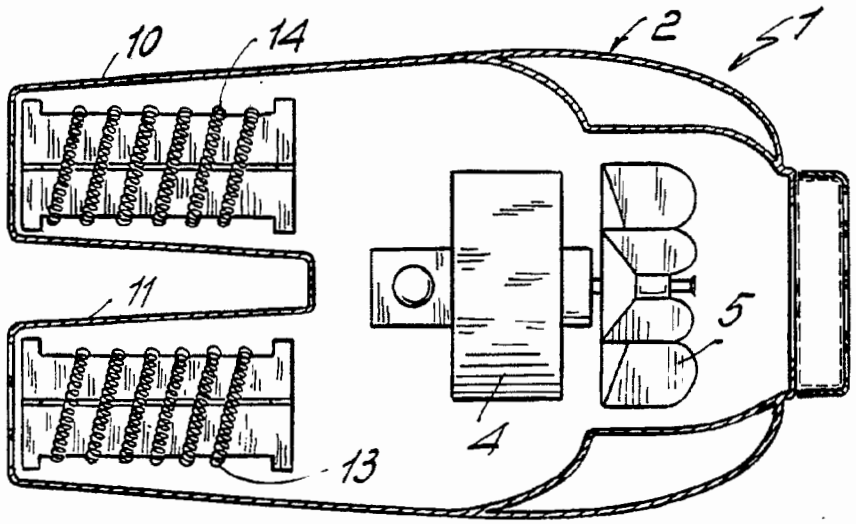



Fig.3

EP 0 400 381 A2



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 410 of 2286

The present invention relates to a hair drier with differentiable airflow delivery.

As known, hair driers, in their most general embodiments, are constituted by an outer casing which defines the grip handle and internally accommodates a motor for the actuation of a fan which, by sucking in air from outside, feeds the airflow to a delivery outlet where an electric heating resistor is provided.

In so-called professional hair driers, the structure of the hair drier remains unchanged, with the only difference that the power of the electric resistors and the power of the motor are increased.

The operator consequently has available a considerable amount of air which can be delivered at a relatively high temperature.

In this manner, the operator can significantly reduce the time required to dry hair, but on the other hand there is the disadvantage that the relatively concentrated airflow has a temperature which can be high and consequently unpleasant for the user.

Even the adoption of the ordinary airflow diffusion nozzles which are conventionally used is not capable of solving the problem completely, since it is not possible to obtain diffusion of the air in the affected regions as the areas of application of the airflow also vary.

The aim of the present invention is to eliminate the above described disadvantages by providing a hair drier which allows to deliver the airflow in differentiated areas and possibly even with mutually different temperatures.

Within the scope of the above described aim, a particular object of the invention is to provide a hair drier which allows, for an equal installed power, with respect to conventional devices, to reach a temperature which is less unpleasant for the user while having a very short drying time.

Still another object of the present invention is to provide a hair drier which, by virtue of its peculiar characteristics, is capable of giving the greatest assurances of reliability and safety in use.

A further object of the present invention is to provide a hair drier which can be easily manufactured with commonly commercially available elements and materials and which is furthermore competitive from a merely economical point of view.

This aim, the objects mentioned and others which will become apparent hereinafter are achieved by a hair drier with differentiable airflow delivery, according to the invention, which comprises a casing defining a grip portion and internally accommodating at least one fan for generating an airflow and at least one actuation motor for operating said fan, characterized in that it comprises, on said casing, at least two airflow delivery outlets arranged in mutually spaced-apart relationship, airflow heating means being provided, at each of said outlets, inside said casing.

Further characteristics and advantages will become apparent from the description of a preferred but not exclusive embodiment of a hair drier with differentiable airflow delivery, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a schematic perspective view of the hair drier according to the invention;

figure 2 is a sectional view of the hair drier, taken along the line II-II of figure 1;

figure 3 is a sectional view of the hair drier, taken along the line III-III of figure 2;

figure 4 is a sectional view of the hair drier taken along the line IV-IV of figure 2.

With reference to the above figures, the hair drier with differentiable airflow delivery, generally indicated by the reference numeral 1, comprises a casing 2 which defines, in a per se known manner, a grip portion 3.

An electric motor 4 is provided inside the casing 2 and actuates a fan 5 which draws air in from the outside by means of an intake region 6 and generates an airflow which can be delivered externally.

The important peculiarity of the invention is constituted by the fact that said casing defines two separate and spaced delivery outlets, respectively indicated by the reference numerals 10 and 11, which allow to feed outwardly two separate air streams.

Heating means, constituted by a first electric resistor 13 and by a second electric resistor 14 arranged at the respective delivery outlets, are provided at the delivery outlets 10 and 11.

Said electric resistors have independent power supply means and can therefore be activated either simultaneously or selectively, according to the application requirements of the operator.

The delivery outlets have a preferably mutually parallel path or possibly a slightly convergent or divergent path, so as to deliver two separate airflows which converge into one another at a certain distance from the delivery outlets or diverge.

The presence of two separate delivery outlets allows to generate airflows which have mutually different temperatures and in particular it is possible to use a warm airflow and a cold airflow.

The presence of two different air streams or flows allows the user to have an airflow which is, for example, directed tangent to the user's head and an airflow which remains outward, in practice creating an outward conveying air curtain which allows to significantly reduce drying times.

Different delivery nozzles can furthermore be applied to the delivery outlets and can be orientated in various manners, thus allowing to create,



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 411 of 2286

with a single hair drier, an entire range of airflow types according to the particular treatment to be performed by the operator.

To the above it should be furthermore added that it is also possible to provide internal baffles which choke the passage of the airflows between the two delivery outlets, so as to vary the amount of air delivered by the individual outlets according to the contingent requirements.

It is furthermore possible to apply, in a per se known manner, means which allow to adjust the rotation rate of the motor and consequently the amount of air delivered, as well as means which allow to vary the heating temperatures of the various electric resistors, thus obtaining a whole range of operating conditions which can be used in each instance by the operator.

From what has been described it can thus be seen that the invention achieves the proposed aim and objects, and in particular the fact is stressed that the provision of at least two distinct delivery outlets on a hair drier allows to obtain, for an equal installed power, considerable functional advantages, since it is possible to have at least two streams which can be directed independently of one another in an adjustable manner and to reduce the working time required.

The invention thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept.

All the details may furthermore be replaced with other technically equivalent elements.

In practice, the materials employed, as well as the contingent shapes and dimensions, may be any according to the requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

## Claims

1. Hair drier with differentiable airflow delivery comprising a casing defining a grip portion and internally accommodating at least one fan for generating an airflow, and at least one actuation motor for operating said fan, characterized in that it comprises on said casing, at least two airflow delivery outlets arranged in mutually spaced-apart relationship, airflow heating means being provided inside said casing, at each of said outlets.

2. Hair drier, according to claim 1, characterized in that said heating means provided in said delivery outlets are powered independently of one another.

3. Hair drier, according to claim 1 or 2, characterized in that said heating means are constituted by electric resistors accommodated at each delivery outlet.

4. Hair drier, according to one or more of the preceding claims, characterized in that said delivery outlets are arranged substantially parallel to one another for delivering parallel airflows.

5. Hair drier, according to claim 1, 2, 3 or 4, characterized in that said delivery outlets are mutually convergent.

6. Hair drier, according to claim 1, 2, 3 or 4,characterized in that said delivery outlets are mutually divergent.

7. Hair drier, according to one or more of the preceding claims, characterized in that it comprises variously shaped nozzles which are removably applicable to said delivery outlets.

8. Hair drier, according to claim 1, 2, 3, 4, 5, 6 or 7, characterized in that it comprises baffle means for dividing said airflow between said delivery outlets.

9. Hair dryer according to claim 8, characterized in that said baffle means are movable.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 412 of 2286

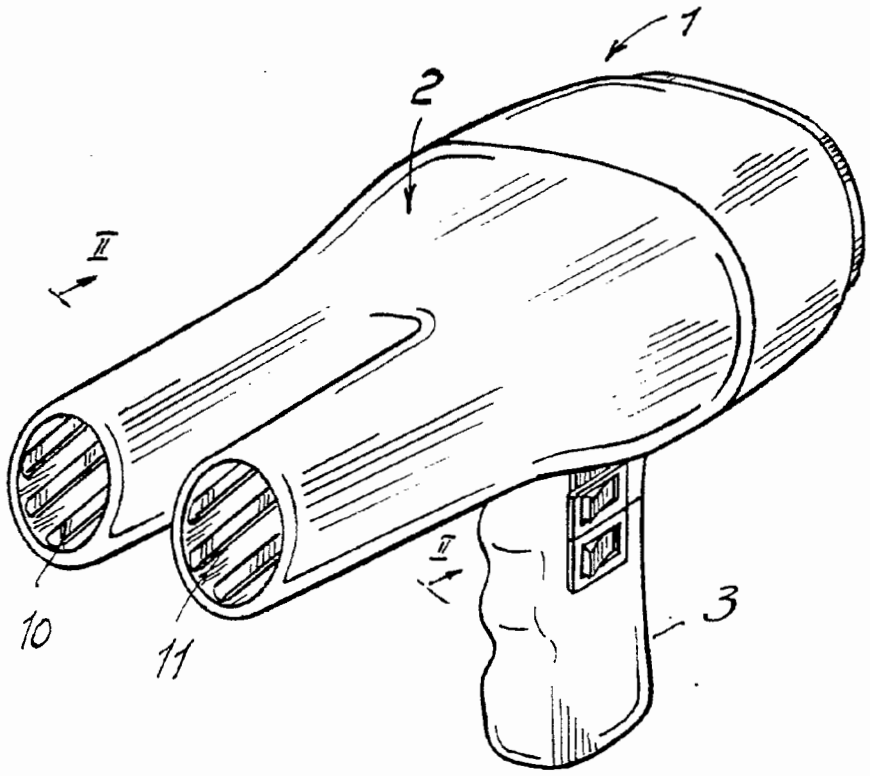



Fig.1

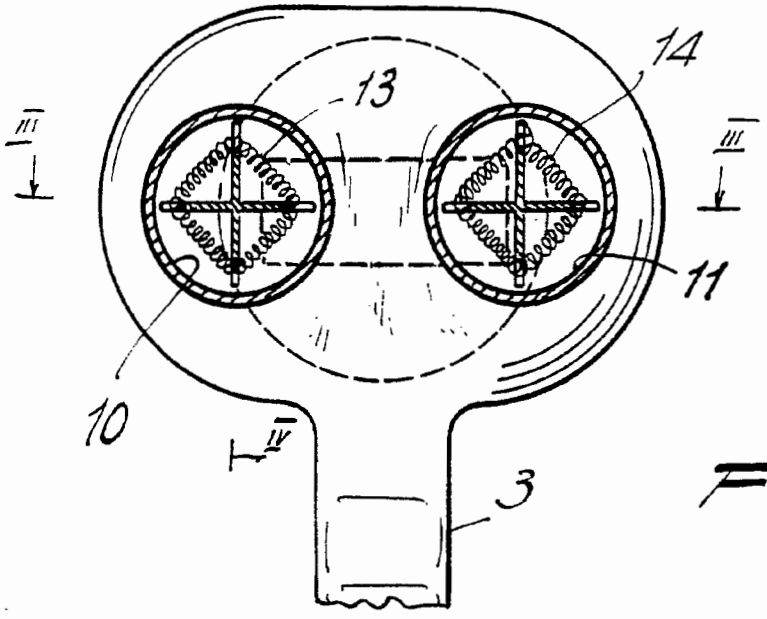



Fig.2

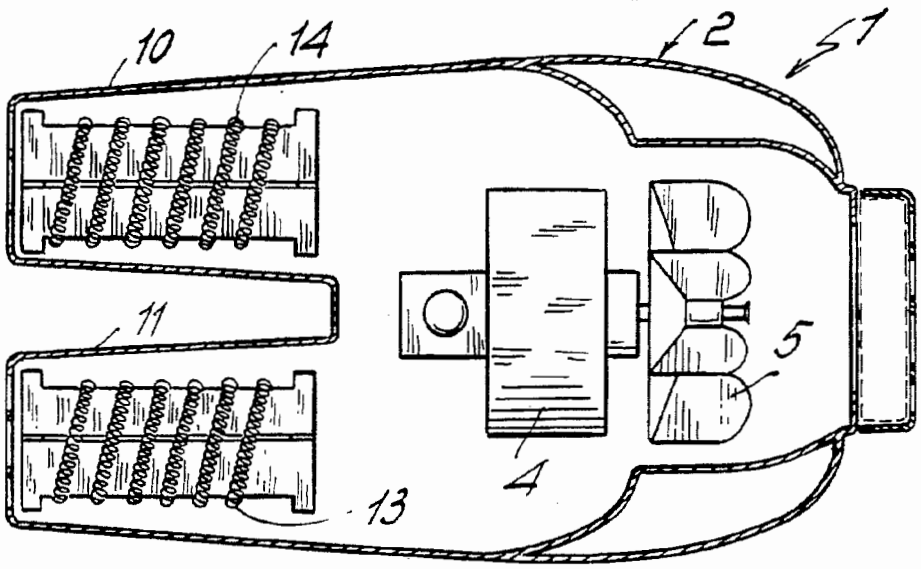



Fig.3

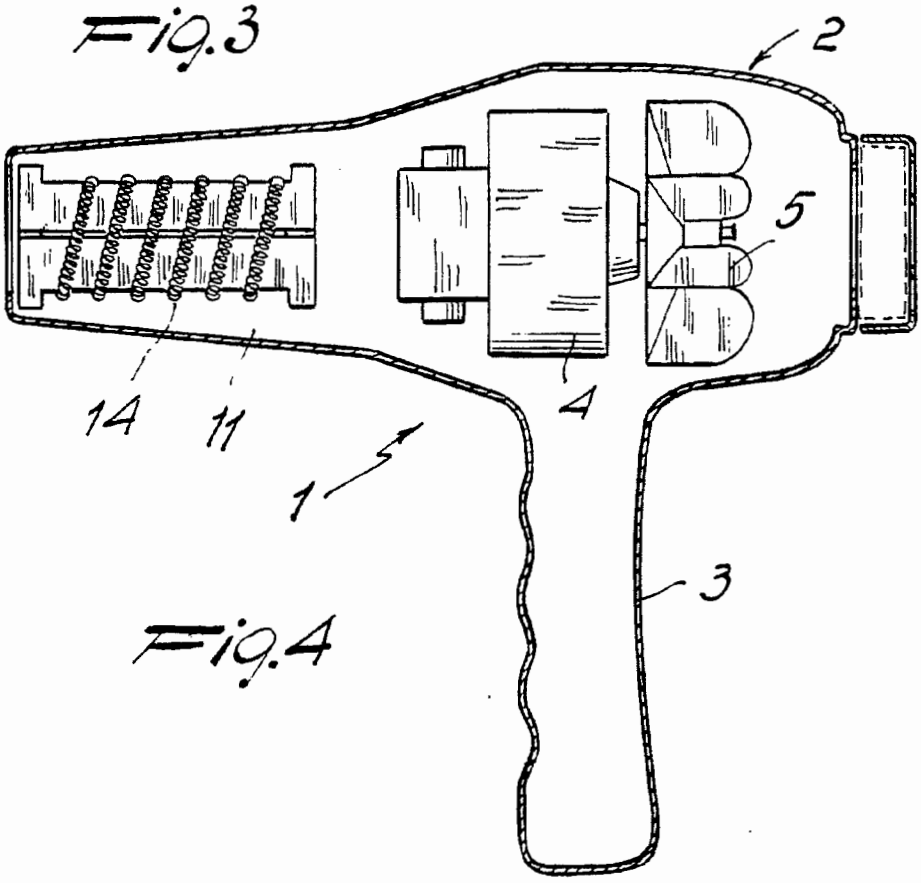



Fig.4

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 414 of 2286

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PN - JPH04221507 A 19920812

TI - HEATER BLOCK FOR HAIR DRYER

AB - PURPOSE:To cope with automatic assembling by machinery. CONSTITUTION:In a device wherein a pair of base boards 1, 2 are combined crosswise with each other and a heater coil 3 is wound around both the base boards, electronic components are fitted in a conical shape on one surface of one of the base boards while locking parts for locking these electronic components are provided on the other base board.

PA - MATSUSHITA ELECTRIC WORKS LTD



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 415 of 2286

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(43)公開日　平成４年(1992)８月12日

| (51)Int.Cl.[5] | 識別記号 | 庁内整理番号 | Ｆ Ｉ | 技術表示箇所 |
|---|---|---|---|---|
| Ａ４５Ｄ　20/10 | １０２ | 6704－3Ｂ | | |

審査請求　未請求　請求項の数２(全　９　頁)

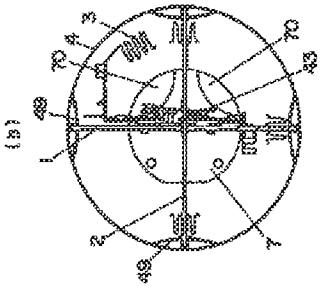
(21)出願番号　特願平2－406161

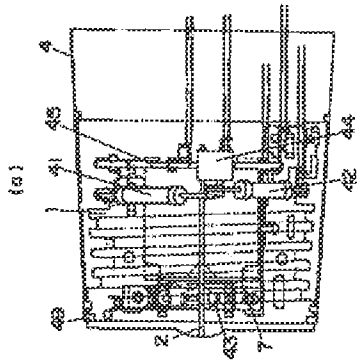
(22)出願日　平成２年(1990)12月25日

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(54)【発明の名称】　ヘアドライヤのヒーターブロック

(57)【要約】
【目的】　機械による自動組立に対応することができるものとする。
【構成】　一対の基板１，２が十字型に組合わされるとともに、両基板の両面にヒーターコイル３が巻かれたものにおいて、一方の基板の一面に電子部品が山形をなすように取り付け、他方の基板には上記電子部品を係止する係止部を設ける。







SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 416 of 2286

1

【特許請求の範囲】

【請求項1】　一対の基板が十字型に組合わされるとともに、両基板の周囲にヒーターコイルが巻かれたものであって、一方の基板の一面には電子部品が山形をなすように取り付けられており、他方の基板には上記電子部品を係止する係止部が設けられていることを特徴とするヘアドライヤのヒーターブロック。

【請求項2】　一対の基板を十字型に組み合わせた状態に保持する保持基板を備えているとともに、この保持基板は電子部品が位置する側の部分に切欠を備えていることを特徴とする請求項1記載のヘアドライヤのヒーターブロック。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明はヘアドライヤにおけるヒーターブロックに関するものである。

【0002】

【従来の技術】従来のヒーターブロックの一例を図28以下に示す。一対の基板1，2が十字型に組合わされているとともにヒーターコイル3がこの基板1，2の周囲に巻かれている。また、分圧抵抗41やサーモスイッチ43、ダイオード44等の各電子部品は，上記両基板1，2の各両面に分散して配置されているとともに一部の電子部品は両基板1，2にまたがるように取り付けられている。

【0003】

【発明が解決しようとする課題】この場合、ヒーターブロックの組み立ては、手作業によるしかなく、機械による自動組立とすることができない。本発明はこのような点に鑑み為されたものであり、その目的とするところは機械による自動組立に対応することができるヘアドライヤのヒーターブロックを提供するにある。

【0004】

【課題を解決するための手段】しかして本発明は、一対の基板が十字型に組合わされるとともに、両基板の周囲にヒーターコイルが巻かれたものであって、一方の基板の一面には電子部品が山形をなすように取り付けられており、他方の基板には上記電子部品を係止する係止部が設けられていることに特徴を有している。

【0005】本発明によれば、一方の基板の一面に電子部品を実装すればよく、そして他方の基板を組合わせれば、これら電子部品の位置決め固定がなされる。

【0006】

【実施例】以下本発明を図示の実施例に基づいて詳述すると、図2はヘアドライヤの一例を示しており、後端に吸い込み口51、前端にノズル53が着脱自在とされた吐出口52を備えている円筒状ハウジング5内には、吸い込み口51側からファン55、モータ50、そしてヒーターブロックが配設されている。

【0007】ここにおけるヒーターブロックは、図1に

2

示すように、十字型に組合わされた一対の基板1，2と、両基板1，2の周囲に巻かれたヒーターコイル3と、これらを囲む円筒状の囲み枠4とからなるものとして形成されている。基板1から説明すると、これは第3図に示すように、コ字形をなす平板状のもので、その一面には端子11～15がが取り付けられている。これら端子11～15は、いずれも基板1に設けた取付孔や縁に設けた切り込みの部分に通した取付片16を基板1の他面側で折り曲げることで基板1に取り付けられたものとなっている。そしてこの基板1の一面に、ヒーターコイル2を除く各種電子部品が上記端子11～15への接続ですべて実装されている。

【0008】図4は分圧抵抗41，42を取り付けた状態を示しており，一端側で互いに接続されることで山型にされた両分圧抵抗41，42の各他端は、端子13，14に形成されたオープンパレル部16に各他端がかしめられることで基板1に取り付けられている。図5は更にサーモスイッチ43、半波整流用ダイオード44、温度ヒューズ45を基板1の一面に取り付けた状態を示している。サーモスイッチ43は基板1に添うように取り付けられているが、ダイオード44と温度ヒューズ45とは熱溶着されて山形をなすように接続された上で、基板1に接続されている。

【0009】他方の基板2は、上述のように電子部品が一面から取り付けられた基板1にその前方側から組合わされるものであり、基板1と同様にコ字形の平板状のものとなっていて、基板1と組合わされた際、図8に示すように、分圧抵抗41，42の接続部と、温度ヒューズ45がつながったダイオード44とをその側縁に設けた係止部21，22で係止し、これらの電子部品の位置決めを行う。尚、ダイオード44が係止する係止部22は、基板2が前方（図中左方）から組付けられることから、係止部21よりも内側に配設されている。

【0010】分圧抵抗41，42やダイオード44、温度ヒューズ45は、電流が流れることで自己発熱するために、ファン55による送風路に位置させて冷却する必要がある上に、その配置位置も他方の基板2を組み合わせる際に邪魔とならないようにすることが必要であり、これらの理由によって上記の部品のリード線を成形して前述のように山形の形状となるようにしているものである。

【0011】ここにおいて、両基板1，2で分割される4つの空間を図7に示すように，第1象限A，第2象限B、第3象限C，そして第4象限Dとすると，分圧抵抗41，42やダイオード44や温度ヒューズ45が基板1の一面側に組付けられる関係上、第2象限Bと第3象限Cとにこれらが位置することになり、第1象限A及び第4象限Dに比して風量が少なくなってヒーターコイル3の温度上昇が大きくなり、赤熱、風温分布の不均一といった事態を招くことになるために，ここでは両基板1，



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 417 of 2286

2が十字型をなす状態に保持するために両基板1，2の後端側から挿入組立される保持基板7の第2象限B及び第3象限C側の部分に、上記の電子部品の送風方向における投影面積に匹敵する面積の切欠70，70を設けて、送風量が各象限で同じとなるようにしている。また、前記保持基板7よりも吐出口52側に位置することになるサーモスイッチ43については、図1に示すように、切欠70と一致するところに接点部を配置するようにすることで、サーモスイッチ43の冷却を図っている。

【0012】図6は上述のように組合わされた基板1，2の周囲に巻かれるヒータコイル3の形状を示している。このヒーターコイル3は、基板1，2の各側縁に設けた溝12を通るように巻かれることで位置決めされるわけであるが、スパイラル状に巻かれることを考慮し、その波形の屈曲線をヒーターコイル3の長手方向から所定角度傾けることで、送風方向と一致するようにしている。ヒーターコイル3による送風損失が最小となるようにしているわけである。

【0013】また波形部分の内面の曲面Rは、図9に示すように、基板1，2の厚みよりも小さくて、基板1，2の溝12にはめ込んだ時、基板1，2の厚みでヒーターコイル3が広がるようにしている。このために基板1，2とヒーターコイル3との間に確実に隙間が生じるものとなっている。また、上記溝12は、図10に示すように、奥端での幅がヒーターコイル3の幅よりも大きくなっている係止溝14を備えると同時に、開口寄りの部分に対向間隔がヒーターコイル3の幅よりも小さくなっている係止部13，13を両側縁に備えているために、溝12から浮き上がってしまうことはない。

【0014】尚、囲み枠4は、基板1，2の先端部側縁に設けた係止溝19に係止片49をはめ込んで係止することで取り付けられるものであり、その内面には絶縁のための絶縁マイカ48が取り付けられている。図12～図14は溝12の他例を示すもので、ここでは基板1，2の側縁に設けられるいくつかの溝12のうちのいくつかを、その深さ方向において複数個の係止溝14を備えたものとし、ヒーターコイル3の係止位置を任意の係止溝14に選んで設定することができるようにしている。このために、風速分布や風温分布，赤熱、サーモ温度等の特性を改善する場合、あるいはこのヒーターブロックを何種類かのヘアドライヤで共用できるようにする場合、容易に対応することができるものとなっている。

【0015】図15～図18に他の実施例を示す。基本的形状は前記実施例と同じであるが、ここでは基板1，2に形成する溝12の内周側にこの溝よりも幅狭の溝12'を形成するとともに、ヒーターコイル3の幅を上記の溝12，12'に対応したものとし、外周側の溝12に配されるヒーターコイル3と内周側の溝12'に配されるヒーターコイル3'とを並列に、且つ内周側に配されるヒーターコイル3'には直列にスイッチ70を接続している。このスイッチ70は、分圧抵抗42に直列に接続したスイッチ71に連動するもので、スイッチ72，73を閉じればモータ50及びヒーターコイル12，12'に通電されるが、スイッチ70，71が開いている時には、ヒーターコイル12と分圧抵抗41のみに電流が流れるために、発熱量が低く、モータ50の回転数も低い。しかし、スイッチ70，71を投入すれば、ヒーターコイル12'及び分圧抵抗42にも電流が流れるために、発熱量が増すとともにモータ50の回転数も高くなって送風量が増える。



【0016】図19～図21は、溝12'の内周側に更に幅狭の溝12"を設けてここに丸型断面のヒーターコイル12"を通したものであり、この場合、発熱量及び風速を3段階で切り替えることができるものとなる。また、このようにした場合、ヒーターブロックの全長を短くすることができるために、ヘアドライヤの小型化に寄与する。

【0017】図22～図24は、囲み枠4に設けられて基板1，2の係止溝19にはめ込まれるM型形状をなす係止片48を、いずれの囲み枠4の内周側に突出したものとして形成し、基板1，2の寸法と囲み枠4の内径との間に夫々Xa，Yaの余裕を持たせたものである。またこの余裕は、単に寸法差の吸収だけでなく、基板1，2に対する囲み枠4の位置の調整にも利用することができる。

【0018】図25～図27は夫々回路例を示すもので、図25に示すものにおいては、分圧抵抗41，42を並列に接続するとともに、分圧抵抗42にはスイッチ81を直列に接続してある。このスイッチ81が開いている時には、電源は分圧抵抗41で降圧されてモータ50に印加されており、低出力状態にある。スイッチ81が閉じた時には、分圧抵抗41，42が並列に接続されているために、全体の抵抗値は下がり、モータ50にかかる電圧が高くなって高出力状態になる。この両状態を比較すると、分圧抵抗41に流れる電流はいずれの場合にも同じであるために、分圧抵抗41，42にかかる負担が出力によって変化してしまうことがない。

【0019】図26に示すものでは、分圧抵抗41とスイッチ81との直列回路と、分圧抵抗42とスイッチ82との直列回路を並列に接続したもので、スイッチ81，82のいずれか一方を閉じることと、両方を共に閉じることとによって3段階に出力を調整することができる。この場合においても、各分圧抵抗41，42に流れる電流は、出力状態を問わずに同じであり、どちらか一方の分圧抵抗41，42のみに大きな電流が流れるということがなく、分圧抵抗41，42を小型化することができる。

【0020】更に図27に示すものでは、3個の分圧抵抗41，42，47を並列に接するとともに、分圧抵抗



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 418 of 2286

４２，４７にスイッチ８１，８３を夫々直列に接続したもので、各分圧抵抗４１，４２，４７の抵抗値はこの順に高くなっている。このものでは、スイッチ８１，８３の開閉状態の組み合わせによって、４段階の風量切換を行うことができ、またこのものにおいてもいずれかの分圧抵抗に大きな電流が流れてしまうということがない。

【００２１】

【発明の効果】以上のように本発明においては、一方の基板の一面に電子部品を実装すればよく、そして他方の基板を組合わされば、これら電子部品の位置決め固定がなされるものであり、このために機械による自動組立への対応が容易なものである。

【図面の簡単な説明】

【図１】本発明の一実施例を示しており、(a) は側面図、(b) は正面図である。

【図２】同上を備えたヘアドライヤの断面図である。

【図３】一方の基板を示しており、(a) は側面図、(b) は正面図、(c) は部分断面図である。

【図４】一部の電子部品を組み付けた状態の一方の基板を示しており、(a)は側面図、(b) は正面図である。

【図５】更に電子部品を組み付けた状態の一方の基板を示しており、(a) は正面図、(b) は側面図、(c) は背面図である。

【図６】ヒーターコイルを示すもので、(a) は正面図、(b) は平面図である。

【図７】組立状態の正面図である。

【図８】組立状態の側面図である。

【図９】ヒーターコイルの取付状態を示す断面図である。

【図１０】溝の形状を示す拡大図である。

【図１１】溝の断面図である。

【図１２】他の溝の例を示す側面図である。

【図１３】溝の形状を示す拡大図である。

【図１４】ヒーターコイルの取付状態を示す断面図である。

【図１５】他の実施例の側面図である。

【図１６】正面図である。

【図１７】溝の形状を示す拡大図である。

【図１７】回路図である。

【図１９】他例の正面図である。

【図２０】溝の形状を示す拡大図である。

【図２１】回路図である。

【図２２】別の実施例の側面図である。

【図２３】正面図である。

【図２４】囲み枠の係止片の正面図である。

【図２５】他例の回路図である。

【図２６】更に他例の回路図である。

【図２７】別の例の回路図である。

【図２８】従来例を示すもので(a) は側面図、(b) は正面図である。

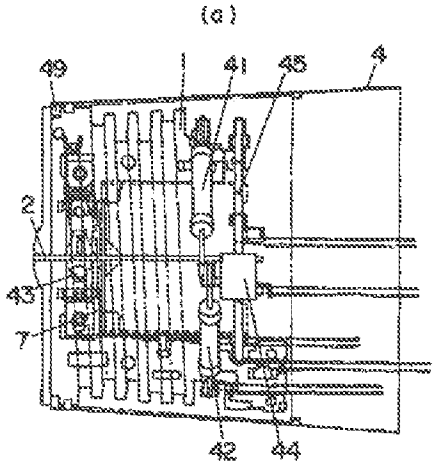
【図２９】同上の底面図である。

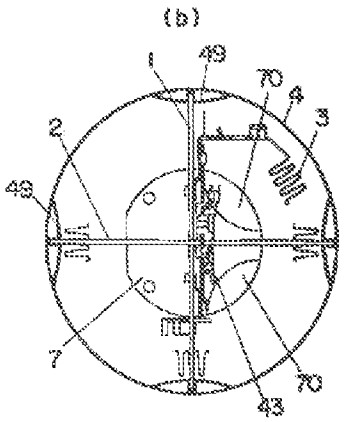
【図３０】同上の他方の側面を示す側面図である。

【符号の説明】

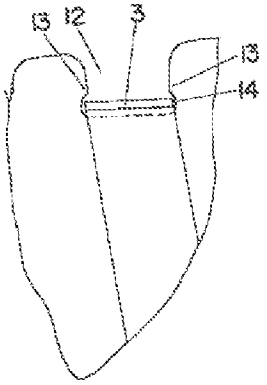
1　基板
2　基板
3　ヒーターコイル

【図１】



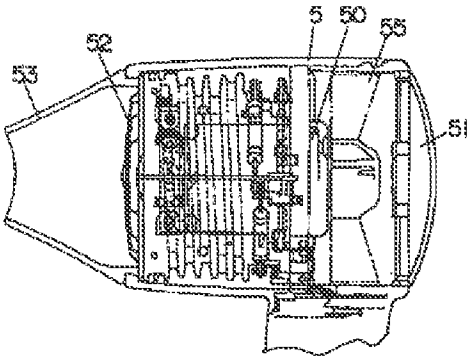

【図１０】



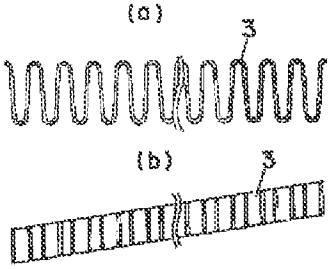



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 419 of 2286

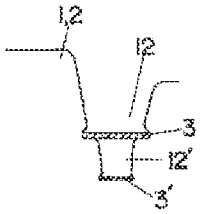
【図2】



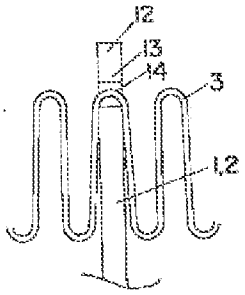

【図6】



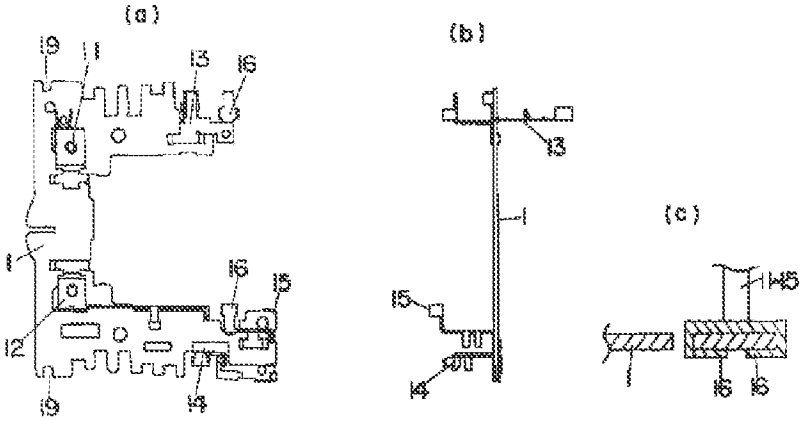

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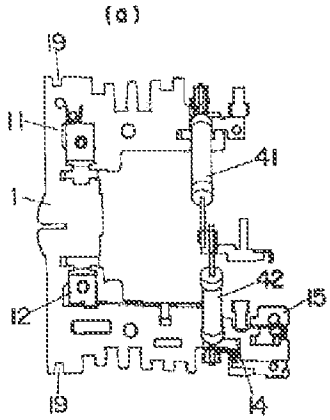

【図11】



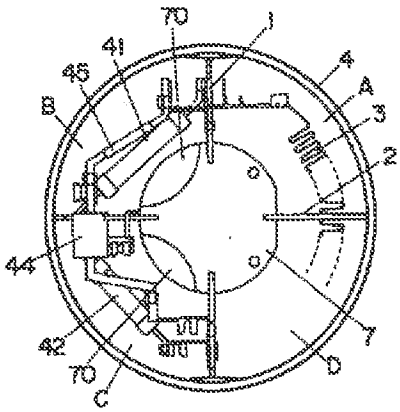

【図3】




【図4】



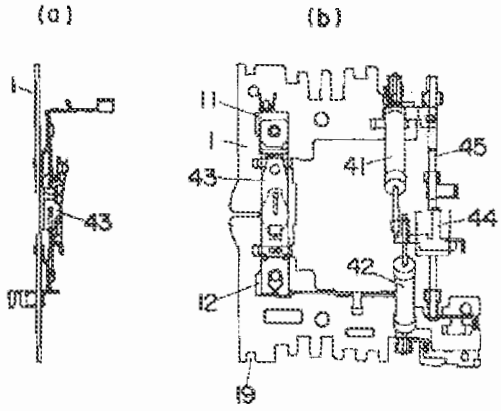

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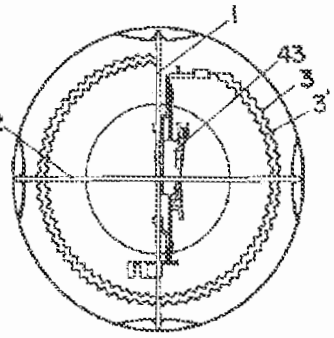



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 420 of 2286

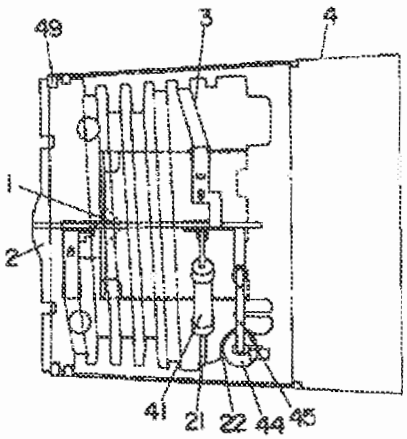
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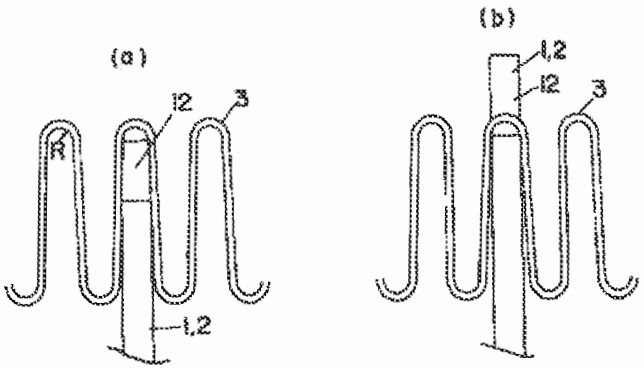

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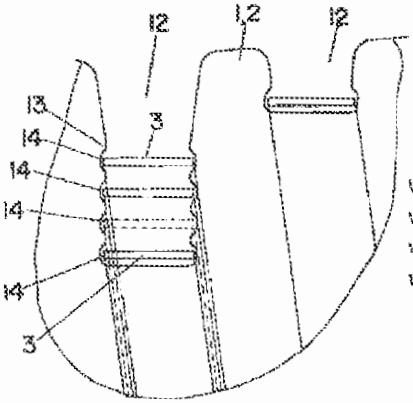

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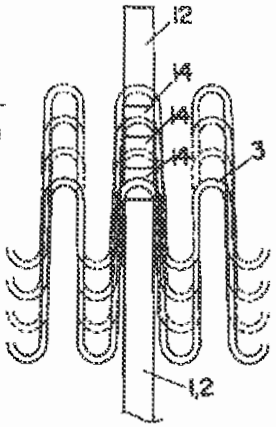

【図9】



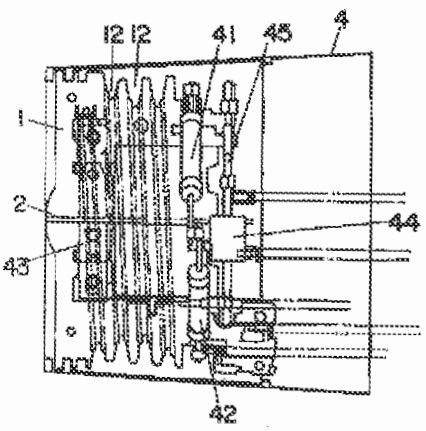

【図13】




【図14】



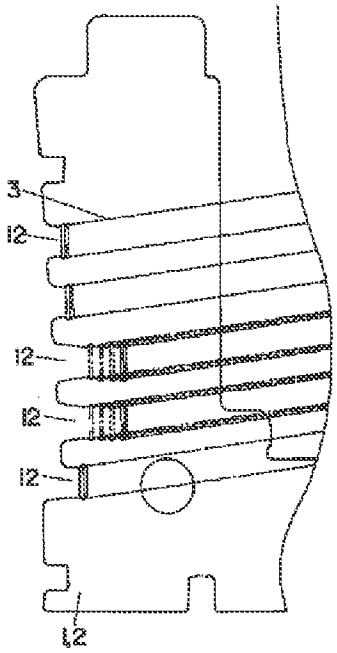

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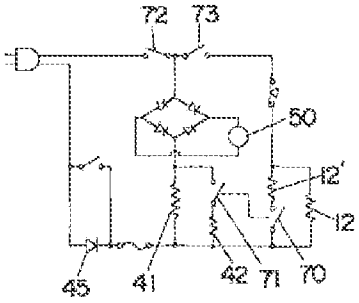



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 421 of 2286

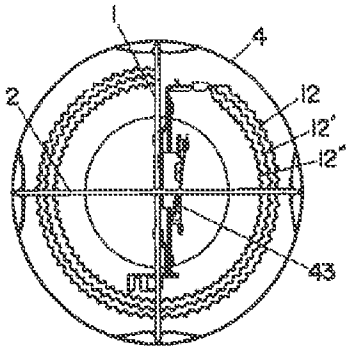
【図12】



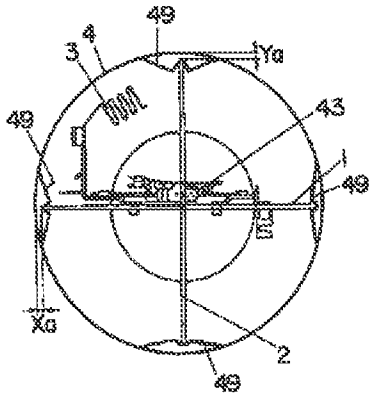

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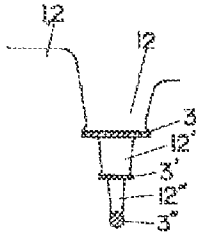

【図19】



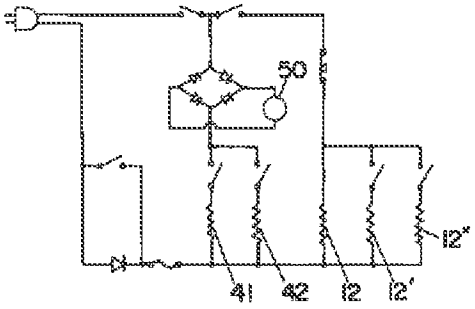

【図23】



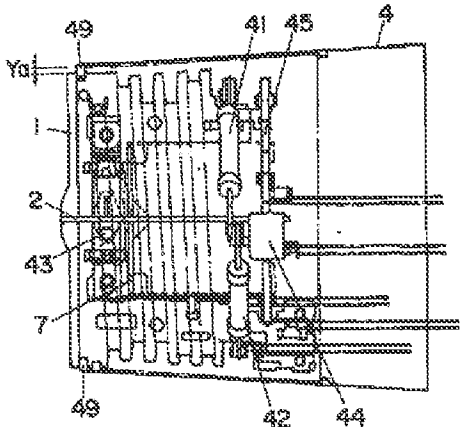

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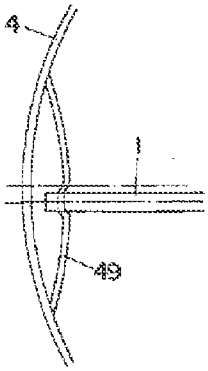

【図21】



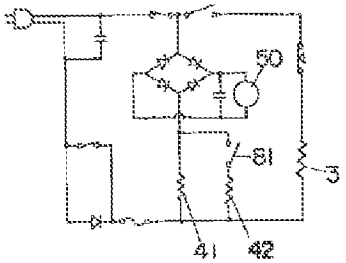

【図22】




【図24】



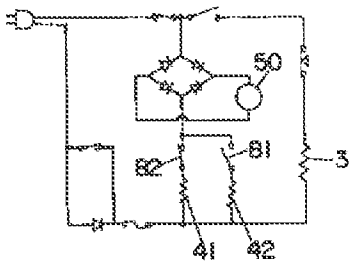

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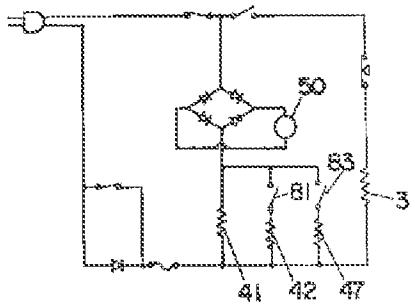



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 422 of 2286

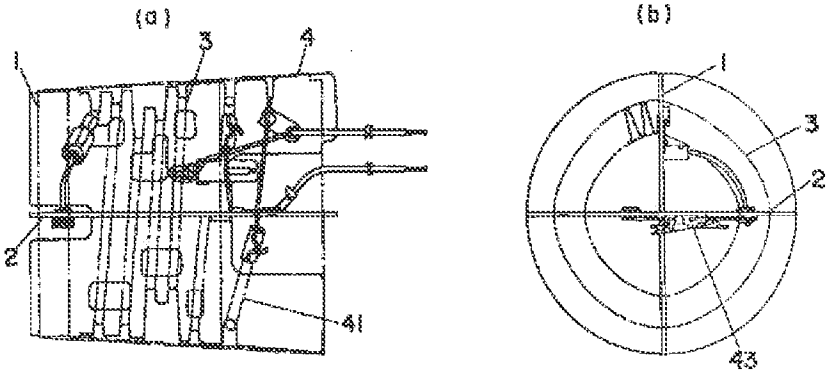
【図26】



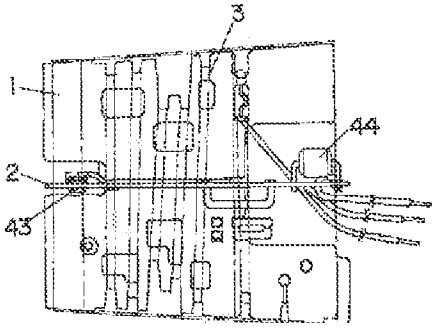

【図27】



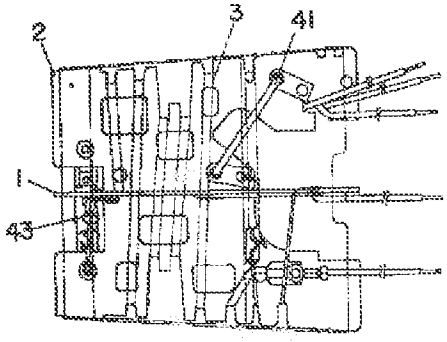

【図28】




【図29】




【図30】




【手続補正書】
【提出日】平成3年4月12日
【手続補正1】
【補正対象書類名】明細書
【補正対象項目名】図面の簡単な説明
【補正方法】変更
【補正内容】
【図面の簡単な説明】
【図1】本発明の一実施例を示しており、（a）は側面図、（b）は正面図である。
【図2】同上を備えたヘアドライヤの断面図である。
【図3】一方の基板を示しており、（a）は側面図、（b）は正面図、（c）は部分断面図である。
【図4】一部の電子部品を組み付けた状態の一方の基板を示しており、(a)は側面図、(b)は正面図である。
【図5】更に電子部品を組み付けた状態の一方の基板を示しており、(a)は正面図、(b)は側面図、(c)は背面図



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 423 of 2286

である。
【図6】ヒーターコイルを示すもので、(a)は正面図、(b)は平面図である。
【図7】組立状態の正面図である。
【図8】組立状態の側面図である。
【図9】ヒーターコイルの取付状態を示す断面図である。
【図10】溝の形状を示す拡大図である。
【図11】溝の断面図である。
【図12】他の溝の例を示す側面図である。
【図13】溝の形状を示す拡大図である。
【図14】ヒーターコイルの取付状態を示す断面図である。
【図15】他の実施例の側面図である。
【図16】正面図である。
【図17】溝の形状を示す拡大図である。
【図18】回路図である。
【図19】他例の正面図である。
【図20】溝の形状を示す拡大図である。
【図21】回路図である。
【図22】別の実施例の側面図である。
【図23】正面図である。
【図24】囲み枠の係止片の正面図である。
【図25】他例の回路図である。
【図26】更に他例の回路図である。
【図27】別の例の回路図である。
【図28】従来例を示すもので(a)は側面図、(b)は正面図である。
【図29】同上の底面図である。
【図30】同上の他方の側面を示す側面図である。
【符号の説明】
1　基板
2　基板
3　ヒーターコイル



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 424 of 2286

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PN - JPH057507 A 19930119

TI - DRYER

AB - PURPOSE:To provide the title dryer which is suitable for downsizing and has working efficiency better for assembling. CONSTITUTION:In the title dryer composed so that a heater assemblage 7, a fan 6 and a circuit board 18 are placed in a case 2, and for the heater assemblage 7, heating wires H1, H2 are wound around insulating boards 11a, 11b; the title dryer is composed so that both a cut-out part 16 at which the circuit board 18 is placed, and an engagement part on which the circuit board 18 placed in this cut-out part 16 is fixed, are formed at the end part of the insulating boards 11a, 11b.

PA - SANYO ELECTRIC CO; TOKYO SANYO ELECTRIC CO





SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 425 of 2286

(19)日本国特許庁（JP）　(12)公開特許公報（A）　(11)特許出願公開番号
特開平5－7507
(43)公開日　平成5年(1993)1月19日

| (51)Int.Cl.⁵ | 識別記号 | 庁内整理番号 | F I | 技術表示箇所 |
|---|---|---|---|---|
| A45D 20/10 | 102 | 6704-3B | | |

審査請求　未請求　請求項の数1(全 4 頁)

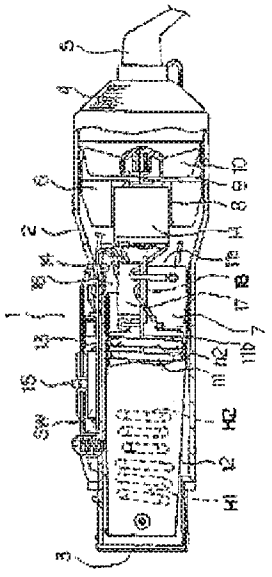
(21)出願番号　特願平3－161782

(22)出願日　平成3年(1991)7月2日

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(74)代理人　弁理士　西野　卓嗣
最終頁に続く

(54)【発明の名称】　ドライヤ

(57)【要約】
【目的】本発明は、小型化に適し、しかも組立て作業性のよいドライヤを提供するものである。
【構成】　本発明は、ケース2内にヒータ組立体7、送風機6、回路基板13を収納するとともに、前記ヒータ組立体7は絶縁基板11a，11bにヒータ線H1，H2を巻いた構成のドライヤにおいて、前記絶縁基板11a，11bの端部に前記回路基板13を支持する切欠部16と、この切欠部16に収容された前記回路基板13を固定する係合部とを形成して構成したものである。




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
http://www4.ipdl.inpit.go.jp/Tokujitu/tjcontentdben.ipdl?N0000=21&N0005=Sfnlgkn... 26/11/2023
Page 426 of 2286

1

【特許請求の範囲】

【請求項1】　ケース内にヒータ組立体、送風機、前記ヒータ組立体あるいは前記送風機と接続された回路基板を収納するとともに、前記ヒータ組立体は絶縁基板にヒータ線を巻装してなるドライヤにおいて、前記絶縁基板の端部に前記回路基板を収容する切欠部と、前記回路基板を固定する係合部とを形成したことを特徴とするドライヤ。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明はケース内に回路基板を収納したドライヤに関する。

【０００２】

【従来の技術】従来、この種のドライヤは、例えば特開昭59－209305号公報に示されているように、ヒータやモータを制御するための回路部品などを取付けた回路基板を、ヒータ組立体と送風機間に配置し、ネジなどによって固定するようにしている。

【０００３】

【発明が解決しようとする課題】ところが、回路基板を収納するための空間を上記のように、ヒータ組立体と送風機の間に設けるとドライヤの長さが長くなるとともに、ヒータ組立体あるいは送風機の外周部に設けるとドライヤの外径が大きくなるという問題がある。また、回路基板をネジなどによって固定する構成とすると、組立て作業性が悪くなるという問題がある。

【０００４】そこで本発明は、小型化に適し、しかも組立て作業性のよいドライヤを提供するものである。

【０００５】

【課題を解決するための手段】本発明は、ケース内にヒータ組立体、送風機、前記ヒータ組立体あるいは前記送風機と接続された回路基板を収納するとともに、前記ヒータ組立体は絶縁基板にヒータ線を巻装してなるドライヤにおいて、前記絶縁基板の端部に前記回路基板を収容する切欠部と、該切欠部に収容された前記回路基板と係合してこの回路基板を固定する係合部とを形成して構成したものである。

【０００６】

【作用】本発明は上記のように構成しているので、ヒータ組立体の占有する空間内に回路基板を収容してドライヤの小型化を可能とするとともに、回路基板の固定を絶縁基板に形成した係合部との係合により行うことができ、組立て作業性が向上する。

【０００７】

【実施例】以下、本発明の実施例を図面を参照して説明する。ドライヤ1は半円筒状のケースを組合わせた円筒状のケース2により外装されており、このケースの前端には温風の吹出口3が設けられ、後端には網目状のカバーで被われた吸入口4と、電源コード5が設けられている。ケース2内には、吸入口4側に位置して送風機6が配置され、送風機6と吹出口3の間に位置してヒータ組立体7が配置されている。送風機6はモータMとこれを収納するモータケース8とモータ軸9に固定されたファン10により構成している。ヒータ組立体7は、十字状に組み合わせられたマイカ板などの絶縁基板11a、11bの外周に加熱用のヒータ線H1、H2や検圧用の抵抗線h1、h2を巻装して構成され、円筒状の遮熱板12内に収納固定されている。この遮熱板12と外装ケース2の間には、後述する回路を構成する切換スイッチSWや種々の回路部品SCR、ZD1、ZD2などを取り付けた第1回路基板13が配置され、ケース2とその内側の縦長リブ14により挟持して固定されている。そして、切換スイッチSWはケース2の外方に突出したノブ15により切換えられるように構成している。

【０００８】ヒータ組立体7の吸入口4側の端部には、絶縁基板11a、11bを切り欠いて形成した切欠部16が設けられ、この切欠部16にはリレー組立体17などの部品を取り付けた第2回路基板18を収容固定している。詳述すると、縦の絶縁基板11aにおける切欠部16aは、図2～4に示すように、第2回路基板18が横の絶縁基板11bの下側に位置するように、横の絶縁基板11bとの交差点Xよりも少しだけ位置まで形成され、また、縦の絶縁基板11aの後端部分には前記交差点X近くまで延びる係合片19を形成している。一方、横の絶縁基板11bにおける切欠部16bは、図4、図5に示すように、回路基板18の横幅よりも狭く形成され、切欠部16bの左右に位置する左右片20、20が回路基板18の上方への動きを規制する作用を成すようにしている。

【０００９】第2回路基板18には、図6に示すように、縦の絶縁基板11aの係合片21が嵌り込む切欠22を前端に形成し、縦の絶縁基板11aの係合片19が嵌り込む係合孔23を後方に形成している。係合片21は第2回路基板18の前方及び左右への移動を規制する作用を有する。また、係合片19は第2回路基板18の後方及び左右への移動を規制する作用を有する。尚、第2回路基板18に切欠22と係合孔23を設けない場合には、第2回路基板18の前後端を係合片21と係合片19により挟持するように構成としてもよい。リレー組立体17は、送風機6から送られる風の抵抗を最小限に抑えるべく、その長手方向が第2回路基板18の前後方向（風路）と平行となるように第2回路基板18に半田付けされ、縦及び横の絶縁基板11a、11bの切欠部16a、16b内に配置されている。

【００１０】次に、組立てについて説明すると、まず、十字型に組立てた絶縁基板11a、11bにヒータ線H1、H2及び抵抗線h1、h2を巻装してヒータ組立体7を組立てた後、リレー組立体17を半田付けした第2回路基板18を取り付ける。この時、第2回路基板18を横の絶縁基板11bの左右片20、20と縦の絶縁基

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
http://www4.ipdl.inpit.go.jp/Tokujitu/tjcontentdben.ipdl?N0000=21&N0005=Sfnlgkn... 26/11/2023 IPR2023-01324
Page 427 of 2286

板11aの係合片19の間を通るように移動させ、リレー組立体17を横の絶縁基板11bの切欠部16bに案内する。そして、規制片21を第2回路基板18の切欠22にはめ込んだ後、左右片20、20を上方に少したわませて係合片19を係合孔23にはめ込み第2回路基板18を固定する。続いて第2回路基板18を組み込んだヒータ組立体7を遮熱板12内に収納後固定する。そして半円筒のケース内の所定位置に、記載済みの遮熱板12、送風機6、第1回路基板13などを配置し、半円筒のケースを組立て円筒ケース2とし、吸入口4、吹出口3などを取り付け完成する。

【0011】次に回路について図7を参照して説明する。交流電源ACは電源コード5、5及び温風冷風切換え用の前記スイッチSWを介してドライヤに供給される。切換スイッチSWは、冷風スイッチSW1と温風スイッチSW2を有し、切換ノブ15が「切」になっている時は両スイッチが開成し、「切」から「冷風」になると冷風スイッチSW1が閉成し、「冷風」から「温風」になると冷風スイッチSW1と温風スイッチSW2の両者が閉成するように切換えられる。そして、冷風スイッチSW1は、モータ回路MKと電圧切換回路KKと電源電圧判定回路DKに給電し、一方、温風スイッチSW2はヒータ回路HKに給電する。

【0012】前記モータ回路MKは、前記ヒータ抵抗h1（150オーム）及びh2（220オーム）、ダイオードブリッジDB、前記モータMなどにより構成している。そして、ヒータ抵抗h2の両端に常開の第1リレー接点ry1を接続し、このリレー接点を電源電圧に応じて開閉するようにしている。

【0013】前記ヒータ回路HKは、200V用の前記ヒータH2（110オーム）と100V用のヒータH1（31オーム）などにより構成している。そして両ヒータの一端を常開の第2リレー接点ry2を介して接続し、このリレー接点を電源電圧に応じて開閉するようにしている。

【0014】前記電源電圧判定回路DKは、コンデンサーC3、ツェナーダイオードZD1、抵抗R3、ツェナーダイオードZD2などにより構成され、抵抗R2を介して充電されるコンデンサーC3の電圧が低い時（約140V以下の時）はツェナーダイオードZD2が非導通に維持され、高い時（約160V以上の時）はツェナーダイオードZD2が導通するように構成されている。



【0015】前記電圧切換回路KKは、サイリスタSCR、前記リレー組立体17内のリレーRY及びその接点ry1、ry2などにより構成され、前記ツェナーダイオードZD2が導通した（高電圧と判定された）時、サイリスタSCRが導通してリレーRYに通電させ、その接点ry1、ry2を開成するよう構成されている。

【0016】このような回路においては、回路構成が複雑化し、回路基板に取り付ける回路部品も数多くなり、また、リレーなどの大型なものも必要となるため、回路基板の占める空間も大きくなるが、上記のように一部の回路基板を、従来はヒータ組立体が占有していた空間内に収容することにより、ドライヤの形状を小型化することができる。

【0017】尚、上記の実施例は棒状のドライヤを例にとって説明したが、本発明はこれに限定されるものではなく、例えば、ピストルタイプ、折りたたみタイプのドライヤなどにも適用することができる。

【0018】

【発明の効果】以上のように、本発明によれば、ヒータ組立体が占有していた空間内に回路基板を収容してドライヤの小型化ができるとともに、回路基板の固定をネジを用いることなくできるので、組立て作業性を向上することができる。

【図面の簡単な説明】

【図1】本発明のドライヤの一実施例を示す一部切欠き側面図である。

【図2】図1の要部の側面図である。

【図3】図2の要部の側面図である。

【図4】図2の矢印A方向から見た後面図である。

【図5】図2の矢印B方向から見た底面図である。

【図6】図5の要部の底面図である。

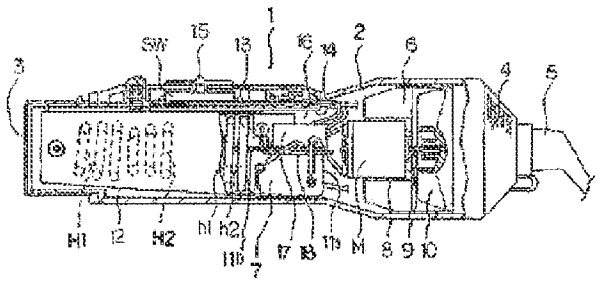
【図7】同実施例の回路図である。

【符号の説明】

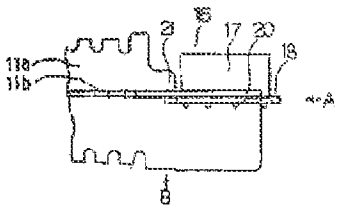
2　ケース
6　送風機
7　ヒータ組立体
11a　絶縁基板
11b　絶縁基板
18　回路基板
19　係合片

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324

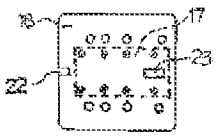
【図1】



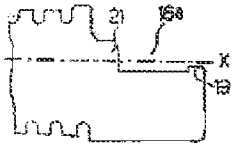

【図2】



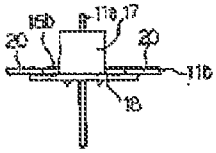

【図6】



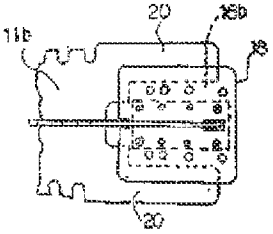

【図3】



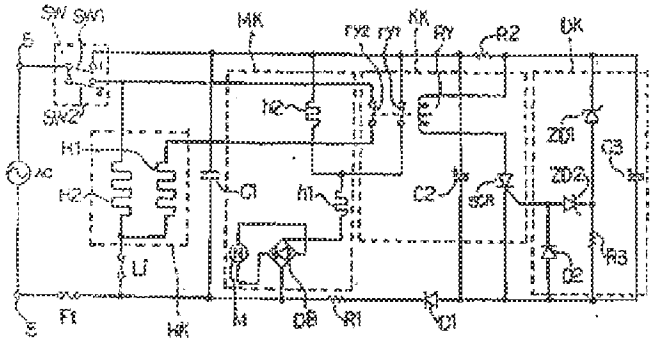

【図4】




【図5】




【図7】




フロントページの続き

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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324

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PN - JP5130915 A 19930528
PNFP - JP3151568B2 B2 20010403
TI - (A)
HAIR DRYIER
AB - (A)
PURPOSE:To attain the smooth slidability of a shutter on a nozzle in a hair drier provided with the nozzle and the shutter which change the pattern of blow-out wind and a blow-out arear freely. CONSTITUTION:A diffuser grill 22 with rigidity higher than that of the nozzle 20 is fitted with pressure to the inner periphery of the nozzle 20. Thereby, it is possible to correct and roundness of the nozzle 20, and to slide the shutter 21 moothly along the inner or outer periphery of the nozzle 20.
PA - (A)
HITACHI MAXELL





SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 430 of 2286

[Detailed Description of the Invention]
[0001]
[Industrial Application]The present invention relates to the hair dryer provided with the nozzle and shutter which enable change of the pattern of the blow-off style, or blow-off area, and relates to improvement of the structure of a nozzle in more detail.
[0002]
[Description of the Prior Art]As this kind of a hair dryer, for example as it discloses in JP,S45-18529,Y to the air outlet at that tip, The nozzle (a truncated cone outer cylinder is called in the gazette.) of the truncated cone form which has two or more jet holes on the circumference is attached, The inner circumference of this nozzle is equipped with the shutter (a truncated cone inner cylinder is called in the gazette.) of the truncated cone form which has two or more holes which agree with the aforementioned jet hole, enabling free rotation, If a shutter is rotated and it closes, a concentration wind can be blown out from a nozzle, and when a shutter is opened, there is a thing which enabled it to blow out a broad diffusion wind.
[0003]
[Problem to be solved by the invention]The case where the shutter sliding section of the above-mentioned nozzle is not formed in the perfect circle uses a problem here. For example, in order to attain the whole weight saving, when plastic molding of the nozzle is carried out, it is hard to come by contraction, distortion, etc. out of the deviation from circular form. It becomes impossible to make a shutter slide smoothly in accordance with the inner circumference of a nozzle in such a case. The object of this invention was made in order to eliminate such a problem, by correcting the deviation from circular form of a nozzle using an air outlet grill, improves the slide nature of a shutter to a nozzle, and is at the point of aiming at improvement in the switching operation nature.
[0004]
[Means for solving problem]The body casing 1 which the hair dryer of the present invention has the air outlet 5 at the tip like an illustrated example, and arranged the blower module 15 inside, In what consists of the cylindrical nozzle 20 which was attached to the air outlet 5 of the body casing 1, and which has the jet hole 23 in a peripheral wall, and the shutter 21 which opens and closes the jet hole 23, and with which it is equipped in accordance with the inner circumference or the periphery of the nozzle 20 enabling a free slide, Press fitting of the disc-like air outlet grill 22 which becomes the inner circumference of the shutter sliding section of the nozzle 20 from a high rigidity material rather than the nozzle 20 is carried out.
[0005]
[Function]The original function which prevents that hair enters into the air outlet 5, or the air outlet grill 22 is obtained is exhibited. This air outlet grill 22 is formed in disc-like [ which consists of high rigidity materials rather than the nozzle 20 ], and when this presses fit in the inner circumference of the nozzle 20, it can correct the deviation from circular form of the circumference of the shutter sliding section of the nozzle 20.
[0006]
[Effect of the Invention]According to the present invention, it is user-friendly to be able to make the shutter 21 slide smoothly in accordance with the inner circumference or the periphery of the nozzle 20, and perform the switching operation lightly by an easy means to correct the deviation from circular form of the nozzle 20 using the air outlet grill 22.

[0007]
[Working example]One working example of the hair dryer concerning the present invention is described based on Drawings. The body casing 1 of this consists of the in forward/rearward direction long blast cylinder part 2 and the handle part 3 which protruded integrally to the lower part from the lower part of the peripheral surface of rear slippage of the blast cylinder part 2 in Fig.1. The air outlet 5 is turned on the tip side of the blast cylinder part 2 of the body casing 1, and the opening of the suction opening 6 is carried out to the back end side, respectively. The air outlet 5 is equipped with the nozzle group 7, and the suction opening 6 is equipped with the suction opening grill 9, respectively.
[0008]In Fig.1, to the inside of the blast cylinder part 2, the pyrogen unit 12 which twists the heater 11 around the periphery of the electric insulating plate 10 of section cross-joint type, and the blower module 15 consisting of the fan 14 rotated by the motor 13 and the motor 13 are made into order, and are arranged. The handle part 3 is equipped with the switch group for controlling the blower module 15 and the pyrogen unit 12. The switch group controls the energization to the blower module 15 and the pyrogen unit 12, The changeover switch 17 of the sliding type of a multiple-string form which switches operational status possible from power OFF in order of cold blast, weak warm air, and strong warm air, After setting the changeover switch 17 by the position of either [ cold blast and ] weak warm air or strong warm air, it consists of the push type switch 19 which makes warm air or cold blast blow out by carrying out pushing operation.
[0009]In Fig.3, the above-mentioned nozzle group 7 combines the nozzle 20, the shutter 21, and the air outlet grill 22. It is plastic molding, and as for the nozzle 20, the point narrows from the ring tubular part 20a, and it projects integrally and molds the truncated cone tubular part 20b of a taper, and the ellipse tubular part 20c of the cross-sectional-length circle configuration which crosses the section of the truncated cone tubular part 20b to a diametral direction. The opening of the jet hole 23 is symmetrically carried out to the peripheral wall of the truncated cone tubular part 20b so that it may correspond to the direction right-and-left position of a minor axis of the ellipse tubular part 20c. The formal ring tubular part 21a which the shutter 21 is also plastic molding and laps with the inner circumference of the ring tubular part 20a of the above-mentioned nozzle 20, The formal truncated cone tubular part 21b which laps with the inner circumference of the truncated cone tubular part 20b is formed integrally, and the opening of the hole 24 of the form which agrees with the jet hole 23 in the truncated cone tubular part 21b is carried out symmetrically.
[0010]As shown in Fig.6, this shutter 21 is inserted in the inner circumference of the truncated cone tubular part 20b of the nozzle 20, and the ring tubular part 20a from the open end of the ring tubular part 20a. And the two knobs 26 which carry out switching operation of the shutter 21 are prepared, By inserting in the right and left hole 27 which carried out the opening to the ring tubular part 21a of the shutter 21, respectively, and engaging with it from the slot 25 of two right and left which carried out the opening of the elastic leg 26a which was provided to each knob 26, and in which expanding-and-contracting deformation is free to the ring tubular part 20a of the nozzle 20, The shutter 21 and the switching operation knob 26 are combined integrally.
[0011]The air outlet grill 22 is formed in disc-like [ which has a lattice like / molding material / metal or / of the nozzle 20 / a hard plastic as a high rigidity material is also from

the nozzle 20 ]. As shown in Fig.1 and Fig.6, if press fitting of this air outlet grill 22 is carried out to the ring tubular part 20a of the nozzle 20 which has an inner diameter slightly smaller than that outer diameter, since the ring tubular part 20a has elasticity, it will be pressed by the periphery of the air outlet grill 22 by the method of the outside of a radius, and will be corrected by deviation from circular form.Therefore, the shutter 21 will carry out slide rotation smoothly in accordance with the inner circumference of the ring tubular part 20a of the nozzle 20 by moving the switching operation knob 26 along the slot 25. Although deviation from circular form is made hard for the ring tubular part 20a to tend to lack strength, to be easy to deform, and to take out, if formed in the form where the nozzle 20 carries out the opening of the slot 25 to the ring tubular part 20a, When carrying out press fitting of the air outlet grill 22 of high rigidity also at such time, while being able to correct the deviation from circular form, the strength can especially be compensated and it is effective.

[0012]The nozzle group 7 combined in this way inserts in the nozzle 20 the ring 30 shown in Fig.2 from the tip side of this, It engages with the outward protruded piece 29 which was suitable among the rings 30 and protruded the flange 31 on the method of outside from the open end of the ring tubular part 20a of the nozzle 20 as shown in Fig.1, By fitting the ring 30 into the periphery of the air outlet 5 of the body casing 1, and stopping with the screw 32 (refer to Fig.2), the nozzle 20 is suitable the tip of the body casing 1, and among the rings 30, and is attached to removal impossible pivotable between the flanges 31.

[0013]If the shutter 21 is rotated with the switching operation knob 26 and it opens when using it, Only the up-and-down portion in the ellipse tubular part 20c is closed in the blind wall part 28 between the holes 24.24 of the shutter 21, and the blow-off area of the ellipse tubular part 20c is extracted at the same time the hole 24 of the shutter 21 agrees in the jet hole 23 of the nozzle 20, as shown in Fig.5. At this time, as shown in Fig.8, it can blow out to the pattern which makes a wind broad from the nozzle 20, and it is suitable for hair drying etc.

[0014]The hole 24 of the shutter 21 is placed at the up-and-down portion in the ellipse tubular part 20c of the nozzle 20 at the same time the jet hole 23 of the nozzle 20 will be closed in the blind wall part 28 of the shutter 21 as shown in Fig.4 if the shutter 21 is rotated and it shuts. At this time, as shown in Fig.7, a wind can be centralized from the nozzle 20 and it can blow out, and it is suitable for hairdressing etc.

[0015]as for the nozzle 20 of the above-mentioned working example, since it is a form which consists of combination of the ring tubular part 20a, the truncated cone tubular part 20b, and the ellipse tubular part 20c, the flow of a wind is resistance -- it can carry out efficiently few. However, it is not restricted to this. For example, it may be a thing of the form where it forms in the form where consist of combination of the ring tubular part 20a and the ellipse tubular part 20c, and it does not have the truncated cone tubular part 20b as shown in Fig.11, and the shutter 21 also consists only of the ring tubular part 21a in accordance with the ring tubular part 20a. The shutter 21 may be a thing of formal arc shape which meets the inner circumference of the nozzle 20 as it is not restricted to a cylindrical thing but is shown in Fig.10. If the shutter 21 is changed into elliptic form with the clamp capacity of the switching operation knob 26 and these major axis direction both ends are made to a partial hit to the inner circumference of the nozzle 20 as shown in Fig.9, the shutter 21 can carry out slide

rotation of the sliding resistance more smoothly few. Although it equips with the shutter 21 in accordance with the inner circumference of the nozzle 20 in the above-mentioned working example, enabling a free slide, the shutter 21 is applicable also like that with which it equips to the periphery of the nozzle 20 enabling a free slide.

[0016]Such a hair dryer D is installed and used for the bathroom of a hotel, etc. In this case, as shown in Fig.12, the holder 34 which has the concave part 33 of transverse-plane open type is fixed to a wall, and as shown in Fig.13, while inserting the blast cylinder part 2 of the hair dryer D in the concave part 33, it stores in the attitude in which the handle part 3 is made to project caudad from the notch 35 provided at the bottom of the concave part 33 part.In this case, gap $S_1$ between the tip of the nozzle 20 of the hair dryer D and the inner surface 36 of the holder 34 which opposes to this is set up smaller than gap $S_2$ between the push type switch 19 of the hair dryer D, and the supporting part 37 by the side of one of the notch 35 of the holder 34 which opposes to this. Since the tip of the nozzle 20 is equivalent to the inner surface 36 of the holder 34 previously rather than the push type switch 19 hits the supporting part 37 even if the hair dryer D deviates carelessly and moves within the holder 34 by this, The push type switch 19 is carelessly pushed with the supporting part 37, can prevent beforehand generation of heat and carrying out a fire outbreak, and it is safe.

## DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is a vertical section front view of the whole hair dryer.

[Drawing 2]It is a perspective view shown where a nozzle group and body casing are separated.

[Drawing 3]It is an exploded perspective view of a nozzle group.

[Drawing 4]It is a front view of a nozzle showing the closing state of a shutter.

[Drawing 5]It is a front view of a nozzle showing the opening condition of a shutter.

[Drawing 6]It is an A-A line cross sectional view in Fig.5.

[Drawing 7]It is a perspective view showing the blow-off mode of the wind in the closing state of a shutter.

[Drawing 8]It is a perspective view showing the blow-off mode of the wind in the opening condition of a shutter.

[Drawing 9]It is a cross sectional view of a nozzle and a shutter showing other working examples.

[Drawing 10]It is a cross sectional view of a shutter showing a yet another working example.

[Drawing 11]It is an exploded perspective view of a nozzle group showing other working examples again.

[Drawing 12]It is a perspective view of the holder of a hair dryer.

[Drawing 13]It is a front view showing the state where the hair dryer was stored in the holder shown in Fig.12.

[Explanations of letters or numerals]

1 Body casing
5 Air outlet
15 Blower module
20 Nozzle
21 Shutter
22 Air outlet grill

23 Jet hole

## CLAIMS

[Claim(s)]

[Claim 1]A hair dryer which is provided with the following, carries out press fitting of the disc-like air outlet grill 22 which becomes the inner circumference of a shutter sliding section of the nozzle 20 from a high rigidity material rather than the nozzle 20, and is characterized by things.

Body casing 1 which has the air outlet 5 at the tip, and arranged the blower module 15 inside.

The cylindrical nozzle 20 which was attached to the air outlet 5 of the body casing 1 and which has the jet hole 23 in a peripheral wall.

The shutter 21 which opens and closes the jet hole 23 and with which it is equipped in accordance with inner circumference or a periphery of the nozzle 20 enabling a free slide.

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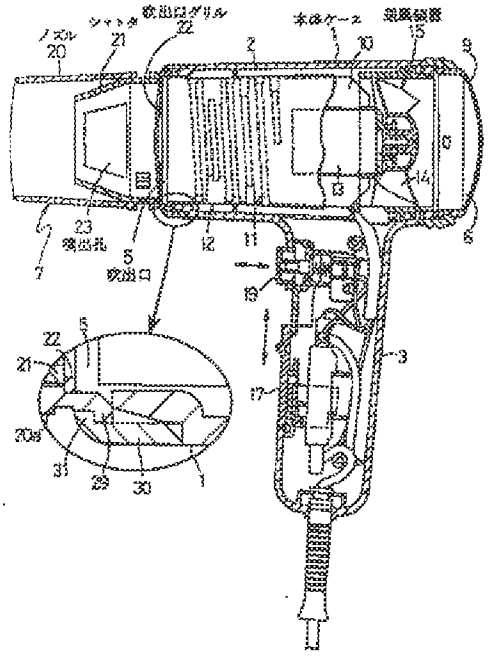
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(54)【発明の名称】　ヘアードライヤ

(57)【要約】
【目的】　吹出風のパターンや吹出面積を変更自在にするノズルおよびシャッタを備えたヘアードライヤにおいて、ノズルに対するシャッタのスライド性の円滑化を図る。
【構成】　ノズル２０の内周に該ノズル２０よりも高剛性の吹出口グリル２２を圧入する。これによりノズル２０の真円度を補正でき、シャッタ２１をノズル２０の内周または外周に沿って円滑にスライドさせることができる。




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 436 of 2286

【特許請求の範囲】
【請求項１】　その先端に吹出口５を有し、かつ内部に送風装置１５を配備した本体ケース１と、本体ケース１の吹出口５に取り付けられた、周壁に噴出孔２３を有する筒状のノズル２０と、ノズル２０の内周または外周に沿ってスライド自在に装着されて噴出孔２３を開閉するシャッタ２１とからなり、
ノズル２０のシャッタスライド部分の内周に、ノズル２０よりも高剛性材料からなる円板状の吹出口グリル２２を圧入嵌合してなることを特徴とするヘアードライヤ。
【発明の詳細な説明】
【０００１】
【産業上の利用分野】本発明は吹出風のパターンや吹出面積を変更自在にするノズルおよびシャッタを備えたヘアードライヤに係り、より詳しくはノズルの構造の改良に関する。
【０００２】
【従来の技術】この種のヘアードライヤとして、たとえば、実公昭４５－１８５２９号公報に開示されているようにその先端の吹出口に、その円周に複数個の噴出孔を有する截頭円錐形状のノズル（同公報中では截頭円錐外筒と称する。）を取り付け、このノズルの内周に前記噴出孔と合致する複数個の孔を有する截頭円錐形状のシャッタ（同公報中では截頭円錐内筒と称する。）を回動自在に備え、シャッタを回動させて閉じるとノズルから集中風を吹き出すことができ、シャッタを開くと幅広い拡散風を吹き出すことができるようにしたものがある。
【０００３】
【発明が解決しようとする課題】ここで問題にするのは、上記ノズルのシャッタスライド部分が真円に形成されていない場合である。たとえば、全体の軽量化を図るためにノズルをプラスチック成形した場合収縮や歪みなどによりその真円度が出にくい。こうした場合シャッタはノズルの内周に沿って円滑にスライドさせることができなくなる。本発明の目的はこうした問題を解消するためになされたもので、吹出口グリルを利用してノズルの真円度を補正することによりノズルに対するシャッタのスライド性を高め、その開閉操作性の向上を図る点にある。
【０００４】
【課題を解決するための手段】本発明のヘアードライヤは、図示例のように、その先端に吹出口５を有し、かつ内部に送風装置１５を配備した本体ケース１と、本体ケース１の吹出口５に取り付けられた、周壁に噴出孔２３を有する筒状のノズル２０と、ノズル２０の内周または外周に沿ってスライド自在に装着されて噴出孔２３を開閉するシャッタ２１とからなるものにおいて、ノズル２０のシャッタスライド部分の内周に、ノズル２０よりも高剛性材料からなる円板状の吹出口グリル２２を圧入嵌合したものである。
【０００５】
【作用】吹出口グリル２２は、吹出口５に髪が侵入したり手が入れられるのを防止する本来の機能を発揮する。この吹出口グリル２２はノズル２０よりも高剛性材料からなる円板状に形成され、これがノズル２０の内周に圧入することによりノズル２０のシャッタスライド部分の円周の真円度を補正できる。
【０００６】
【発明の効果】本発明によれば、吹出口グリル２２を利用してノズル２０の真円度を補正するという簡単な手段で、シャッタ２１をノズル２０の内周または外周に沿って円滑にスライドさせることができ、その開閉操作が軽快に行えて使い勝手が良い。
【０００７】
【実施例】本発明に係るヘアードライヤの一実施例を図面に基づき説明する。図１において、これの本体ケース１は前後方向に長い送風筒部２と、送風筒部２の後部寄りの周面下部から下方へ一体に突設したハンドル部３とからなる。本体ケース１の送風筒部２の先端側に吹出口５を、後端側に吸込口６をそれぞれ開口している。吹出口５にはノズル組７を、また吸込口６には吸込口グリル９をそれぞれ装着する。
【０００８】図１において、送風筒部２の内部には断面十字形の絶縁板１０の外周にヒータ１１を巻き付けてなる発熱装置１２と、モータ１３とモータ１３で回転駆動されるファン１４からなる送風装置１５とを前後にして配備する。ハンドル部３には送風装置１５および発熱装置１２を制御するためのスイッチ組を備える。そのスイッチ組は、送風装置１５および発熱装置１２への通電を制御して、運転状態を電源オフから冷風・弱温風・強温風の順に切り換えを可能にする多連形のスライド式の切換えスイッチ１７と、切換えスイッチ１７を冷風、弱温風、または強温風のいずれかの位置に合わせた後、押し操作することにより温風または冷風を吹き出させるプッシュ式スイッチ１９とからなる。
【０００９】図３において、上記ノズル組７はノズル２０とシャッタ２１、および吹出口グリル２２を組み合わせてなる。ノズル２０はプラスチック成形品で、リング筒部２０ａから先すぼまりテーパの截頭円錐筒部２０ｂと、截頭円錐筒部２０ｂの断面を直径方向に横切る断面長円形状の長円筒部２０ｃとを一体に突出成形してなる。截頭円錐筒部２０ｂの周壁には噴出孔２３を長円筒部２０ｃの短軸方向左右位置に対応するよう左右対称に開口している。シャッタ２１はこれ又プラスチック成形品で、上記ノズル２０のリング筒部２０ａの内周に嵌なる形のリング筒部２１ａと、截頭円錐筒部２０ｂの内周に嵌なる形の截頭円錐筒部２１ｂとを一体成形してなり、截頭円錐筒部２１ｂに噴出孔２３と合致する形の孔２４を左右対称に開口している。
【００１０】図６に示すように、このシャッタ２１はノ

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 437 of 2286

ズル２０の截頭円錐筒部２０ｂおよびリング筒部２０ａの内周にリング筒部２０ａの開口端からはめ込まれる。そして、シャッタ２１を開閉操作するノブ２６は２個用意し、各ノブ２６に設けた拡縮変形自在な弾性脚部２６ａをノズル２０のリング筒部２０ａに開口した左右２本の溝２５からシャッタ２１のリング筒部２１ａに開口した左右の孔２７にそれぞれ差し込み係合することによって、シャッタ２１と開閉操作ノブ２６とが一体的に結合される。

【００１１】吹出口グリル２２は金属またはノズル２０の成形材料よりも硬質のプラスチックなどのようにノズル２０より高剛性材料でもって格子を有する円板状に形成される。図１および図６に示すように、この吹出口グリル２２はその外径より若干小さい内径を有するノズル２０のリング筒部２０ａに圧入嵌合すると、リング筒部２０ａは弾性を有しているため吹出口グリル２２の外周により半径外方に押圧されて真円度に補正される。したがって、開閉操作ノブ２６を溝２５に沿って移動させることによりシャッタ２１はノズル２０のリング筒部２０ａの内周に沿って円滑にスライド回動することになる。ノズル２０がリング筒部２０ａに溝２５を開口する形に形成されると、そのリング筒部２０ａは強度を欠きやすく、変形しやすくて真円度を出しにくくするが、こうしたときも高剛性の吹出口グリル２２を圧入嵌合しておくことによりその真円度を補正できるとともに、その強度を補うことができて特に有効である。

【００１２】このように組み合わせたノズル組７は、図２に示すリング３０をノズル２０にこれの先端側から差し込み、図１に示すごとくリング３０の内向き鍔３１をノズル２０のリング筒部２０ａの開口端から外方に突設した外向き突片２９に係合し、本体ケース１の吹出口５の外周にそのリング３０を嵌合しねじ３２（図２参照）で止め付けることにより、ノズル２０は本体ケース１の先端とリング３０の内向き鍔３１との間で回転可能にかつ取外し不能に取り付けられる。

【００１３】使用に際し、開閉操作ノブ２６を持ってシャッタ２１を回転させて開けると、図５に示すようにシャッタ２１の孔２４がノズル２０の噴出孔２３に合致すると同時に、長円筒部２０ｃ内の上下部分のみがシャッタ２１の孔２４・２４間の盲壁部２８で閉じられて長円筒部２０ｃの吹出面積が絞られる。このときは、図８に示すようにノズル２０から風を幅広くするパターンに吹き出すことができ、髪乾燥などに適する。

【００１４】シャッタ２１を回転させて閉めると、図４に示すようにノズル２０の噴出孔２３がシャッタ２１の盲壁部２８で閉じられると同時に、シャッタ２１の孔２４がノズル２０の長円筒部２０ｃ内の上下部分に位置する。このときは、図７に示すようにノズル２０から風を集中させて吹き出すことができ、整髪などに適する。

【００１５】上記実施例のノズル２０はリング筒部２０ａと截頭円錐筒部２０ｂと長円筒部２０ｃの組合わせからなる形であるため、風の流れが抵抗少なく効率よく行える。しかし、これに限られるものではない。たとえば、図１１に示すようにリング筒部２０ａと長円筒部２０ｃの組合わせからなって截頭円錐筒部２０ｂを有しない形に形成し、シャッタ２１もそのリング筒部２０ａに合わせてリング筒部２１ａのみからなる形のものであってもよい。また、シャッタ２１は筒状のものに限られず、図１０に示すようにノズル２０の内周に沿う形の円弧形状のものであってもよい。図９に示すように開閉操作ノブ２６の締付け力でシャッタ２１を楕円状に変形させてこの長軸方向両端部をノズル２０の内周に対し部分的な当たりになすと、シャッタ２１は摺動抵抗を少なく、より円滑にスライド回動させることができる。また、上記実施例ではシャッタ２１をノズル２０の内周に沿ってスライド自在に装着するが、シャッタ２１はノズル２０の外周に対しスライド自在に装着するものにも同様に適用できる。

【００１６】なお、このようなヘアードライヤＤはホテルの浴室などに据えつけて使用される。この場合、図１２に示すように正面開放形の凹部３３を有するホルダ３４を壁に固定し、図１３に示すようにヘアードライヤＤの送風筒部２を凹部３３に嵌め込むとともに、ハンドル部３を凹部３３の底一部に設けた切欠部３５から下方に突出させる姿勢に納める。この場合ヘアードライヤＤのノズル２０の先端とこれに対向するホルダ３４の内面３６との間の隙間$S_1$を、ヘアードライヤＤのプッシュ式スイッチ１９とこれに対向するホルダ３４の切欠部３５の一側の支持部３７との間の隙間$S_2$よりも小さく設定する。これによりヘアードライヤＤがホルダ３４内で不用意にずれ動いても、プッシュ式スイッチ１９が支持部３７に当たるよりも先にノズル２０の先端がホルダ３４の内面３６に当たるため、プッシュ式スイッチ１９が支持部３７で不用意に押されて発熱や火災発生するのを未然に防止できて安全である。

【図面の簡単な説明】

【図１】ヘアードライヤ全体の縦断正面図である。

【図２】ノズル組と本体ケースを分離した状態で示す斜視図である。

【図３】ノズル組の分解斜視図である。

【図４】シャッタの閉じ状態を示すノズルの正面図である。

【図５】シャッタの開き状態を示すノズルの正面図である。

【図６】図５におけるＡ－Ａ線断面図である。

【図７】シャッタの閉じ状態での風の吹出し態様を示す斜視図である。

【図８】シャッタの開き状態での風の吹出し態様を示す斜視図である。

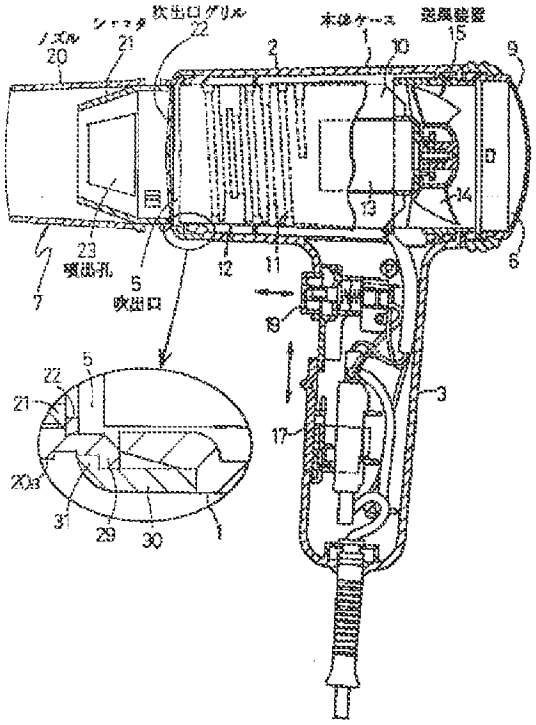
【図９】他の実施例を示すノズルおよびシャッタの断面

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 438 of 2286

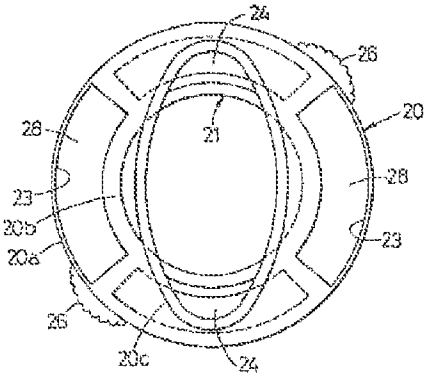
図である。
【図１０】更に他の実施例を示すシャッタの断面図である。
【図１１】更に又、他の実施例を示すノズル組の分解斜視図である。
【図１２】ヘアードライヤのホルダの斜視図である。
【図１３】図１２に示すホルダにヘアードライヤを納めた状態を示す正面図である。

【符号の説明】
１　本体ケース
５　吹出口
１５　送風装置
２０　ノズル
２１　シャッタ
２２　吹出口グリル
２３　吸出孔

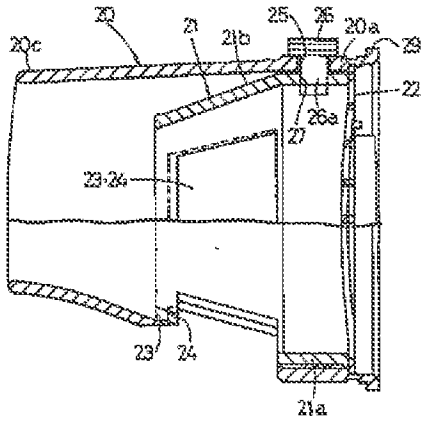
【図１】



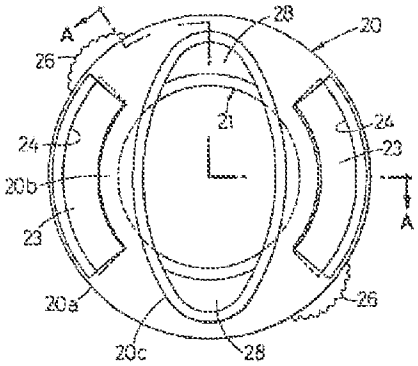

【図４】



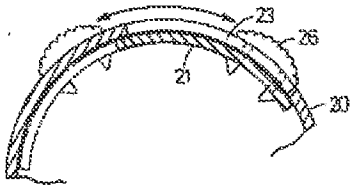

【図６】




【図５】

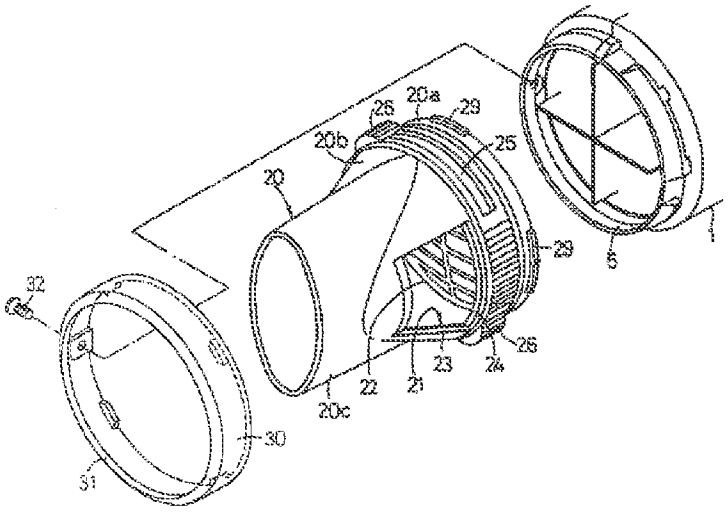



【図１０】

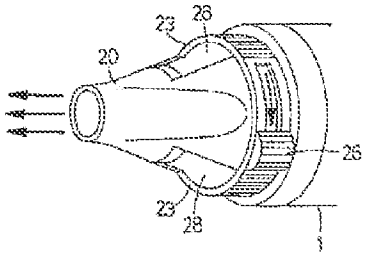



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 439 of 2286

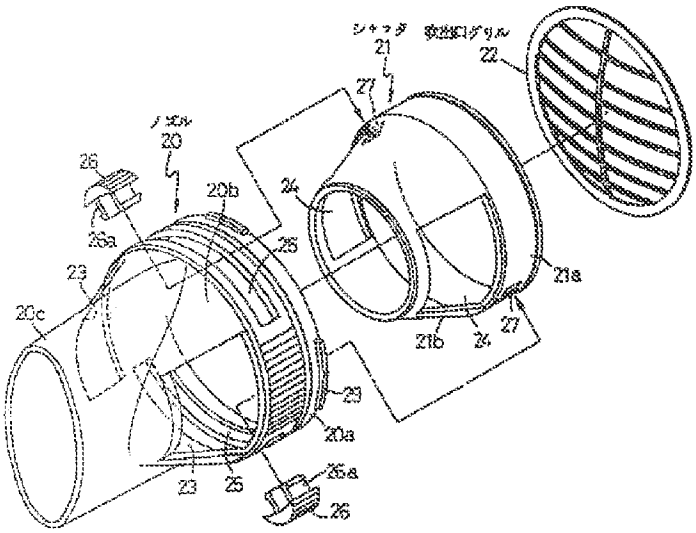
【図2】



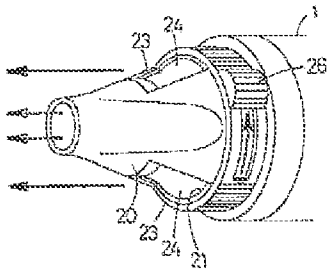

【図7】



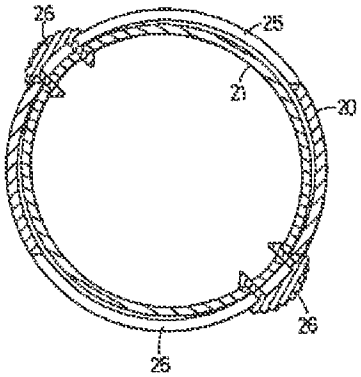

【図3】




【図8】

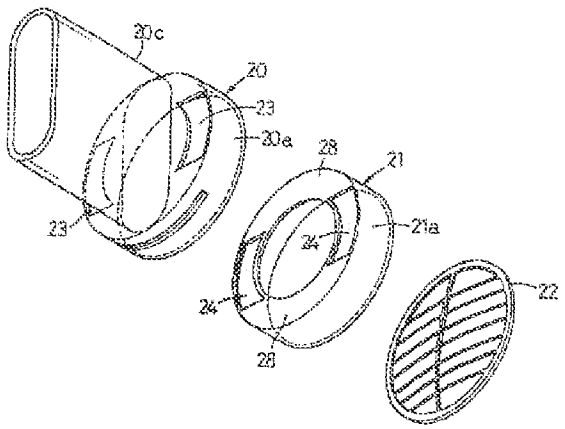



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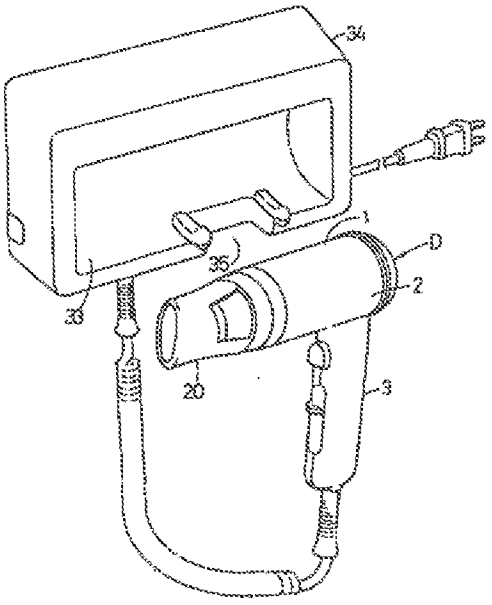



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 440 of 2286

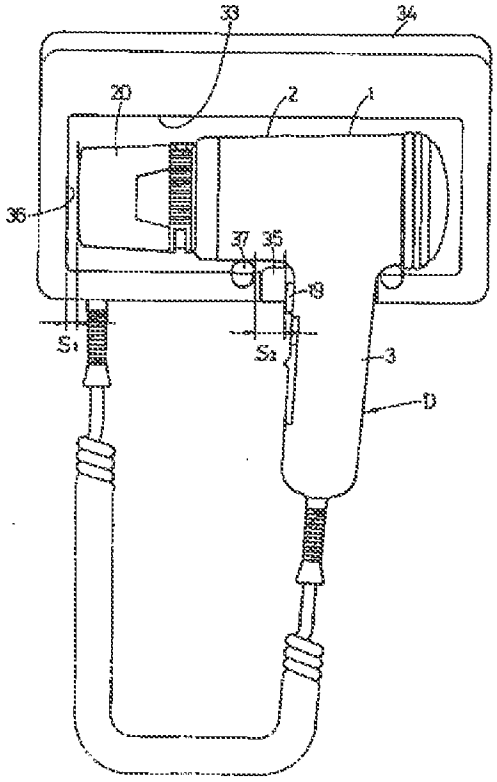
【図11】




【図12】




【図13】




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 441 of 2286

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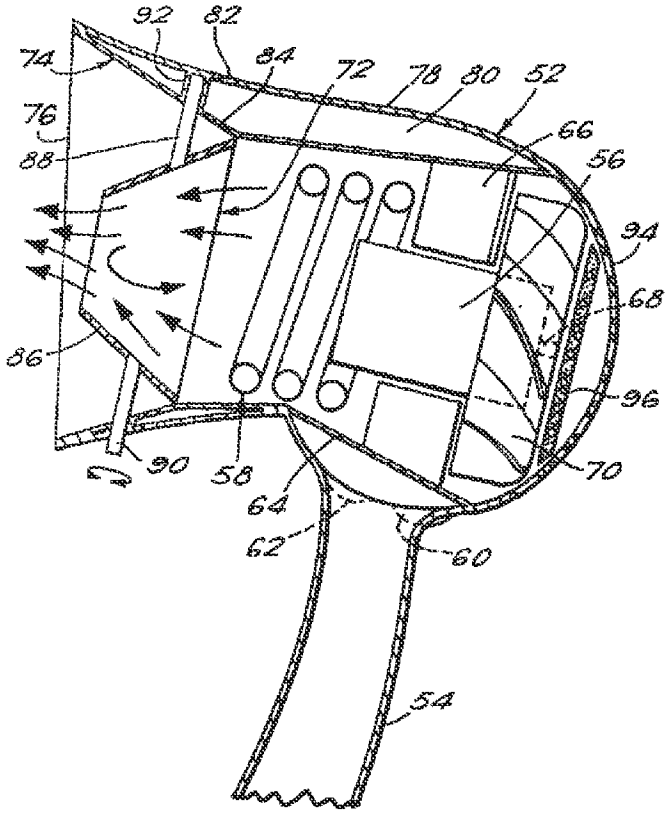
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(54) Title: HAIRDRYERS

(57) Abstract

Large volume flow warm not hot air hairdryers are disclosed. They have a casing with a motor and fan, and an outwardly-divergent outlet passage. In one embodiment the passage may have a pivotable baffle (86) mounted in it to control the flow of the issuing air stream. In one of its limit positions (Figure 6), the pivotable baffle (86) effectively closes a throat of the drier to cause virtually all the air leaving the drier to issue from the narrower end of the baffle as a fast narrow stream. In its other limit position, the baffle guides the outgoing airstream into slow-moving warm airstream at a flow rate of 60-90 litres per section through the housing, and which at a distance of 40-46 cm from the dryer has a speed of 220 to 360 cm/second and a temperature of 45-60 °C.



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BNSDOCID: <WO_____9423811A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 443 of 2286

# HAIRDRYERS

This invention relates to hairdryers, and particularly those of the type connected by flexible cable to the electricity mains and incorporating an electric motor driving a fan and electric heater elements over which air from the fan is passed to heat it. As is already known, the motor may be of two-speeds, and the heater element may be energised selectively to impart different rates of heating to the air passing through the heater.

Many known hairdryers have outlet passages of fixed geometry, so that the dimensions of the issuing stream of heated air are fixed. When the heater element is switched to produce its maximum amount of heat, this can result in the hairdryer producing a relatively-narrow stream of very hot air, which can be potentially damaging, particularly in the hands of an inexperienced user.

Most known hairdryers produce a parallel-sided circular-sectioned stream of cold or hot air. This stream may have its cross-sectional shape changed (reduced) by pushing a 'concentrater nozzle' on the end of the

BNSDOCID: <WO 9423611A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 444 of 2286

hairdryer nozzle, to produce a rectangular-sectioned stream of accelerated air. It is also known to substitute a 'diffuser' for a concentrater nozzle, to disperse the warm air to give a gentle air flow. Such diffusers take the form of perforated surfaces intended to extend across the outlet of the hairdryer. In contradistinction, in the hairdryer of the present invention the desired gentle outflow of air is achieved without blocking the outlet. The hairdryer of this invention produces a 'warm breeze' rather than a 'hot blast' which is highly desirable when drying some hairstyles.

The present invention aims at providing a hairdryer adapted to produce a wide and/or divergent stream of heated air moving at relatively-low speed.

In its broadest aspect, the present invention provides an electric hairdryer comprising a housing, an electric motor therein, an axial fan secured to the motor and adapted to pass a stream of air over electrically-energised heater elements located within the housing to cause the heated air to flow through a circular throat, the housing having an outlet passage with divergent axial cross-section, wherein the hairdryer, when it is running, is capable of producing a stream of air at a flow rate through the housing of between 60-90 litres per second and preferably 70-80 litres per second, having a speed of between 220-360 cm per second and preferably of 268-313 cm per second and a temperature of 45°-60°C at a working distance of 40-46 cm from the outlet passage.

According to another aspect of the present invention, a method of drying hair consists in passing a warm flow of

SHSDOCID: <WO 9423611A1_1_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 445 of 2286

air through a venturi and then allowing the stream of air emerging from the venturi to expand outwardly yet be constrained along an outwardly flared path without any obstruction to the air flow, whereby a substantially smooth stream of warm air emerges from the outwardly flared path into the ambient air.

The fact that the air stream is hardly obstructed is in contrast to the flows of turbulent air produced in the known diffusers of the prior art and there is the added advantage with such hardly obstructed air streams that back pressure and the problems it causes are eliminated or at least substantially reduced.

By means of this aspect of the invention, a substantially uniform flow is obtained. Moreover, it is possible to ensure by the appropriate choice of flare angle that the air stream does not break up, i.e. it maintains it integrity for a sufficient distance to provide a drying air stream for the hair after it has emerged from the constraint applied by the outwardly flared path and into the ambient air.

Preferably the flare angle is in the range of 10° to 25° is suitable with an angle in the range of 10° to 13° being particularly preferred.

Preferably the outwardly flared path is of frusto-conical form with the venturi being coaxial with the axis of the frusto-conical path.

Whilst the outwardly flared path acts also to increase the volume of air in the emergent air stream in relation to the amount of heat contained in the stream, the

SNSDOCID: <WO 9423611A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 446 of 2286

increase in the velocity imparted by the venturi to the air flowing therethrough may be utilised to increase the volume of air still further by providing the neck of the venturi with at least one airflow aperture which is in communication with the ambient air. In this manner, ambient air is drawn into the air stream which will be at a lower temperature of the emergent air stream, thereby increasing still further the volume to heat ratio in the emergent airstream.

The ambient air is conveniently drawn into the venturi by at least one air entry aperture in a surrounding wall which is preferably of circular cross-section and advantageously through a plurality of apertures which form a ring of apertures around the wall.

In a preferred embodiment, the or each air entry aperture communicates with the air exit aperture in the venturi via an air reservoir which, during use of the attachment on a hairdryer, is at a lower pressure than that of the ambient air.

Alternatively, air channels communicating with the ambient air open out onto the venturi to permit flows of ambient air to be sucked into the attachment by the action of the venturi.

The air exit apertures and air channels may open out onto the venturi at it narrowest portion, i.e. its neck, but by arranging for the air exit apertures or channels to open out onto the venturi at locations that are downstream of its neck may be more advantageous because when the air pressure is increased by compression at the neck, when the air flow out again, a slight vacuum may be

SNSDOCID: <WO 9423611A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 447 of 2286

created and the sucked in air also helps in reducing turbulence.

In order to ensure that the accelerated air stream exiting from the venturi into the outwardly flared path expands to occupy the full area of the path, at least one inner vane may be provided at a location downstream of the venturi and positioned such as to guide or deflect air outwardly without obstructing the air flow.

Preferably, the inner guide vane is arranged coaxially in the outwardly flared flow path.

According to a further aspect of the present invention, the hair is dried by creating a warm air stream in the ambient air which is variable between a first air stream which has a substantially uniform cross-sectional area and which has a volume of air which is high in relation to the amount of heat in the air stream and between a second air stream which is narrower and flows at a relatively higher velocity than that of first air stream.

The variation in the air stream may be produced by providing at least one outer vane disposed outwardly of and extending downstream of the inner vane and by moving a member which defines the frusto-conical path axially with respect to, and towards the venturi, and into a position in which the outer vane cooperates with the venturi to guide or deflect the air exiting from the venturi in a stream which extends substantially parallel to the axis of the frusto-conical path and into the ambient air.

With attachments constructed in accordance with the

SNSDOCID: <WO 9423611A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 448 of 2286

invention, the smoothly flowing first air stream will have a cross-sectional area that is several times larger than that of the second air stream yet dry the hair in an efficient and careful manner.

The outwardly flared member may be moved in any suitable way relative to the venturi, e.g. by means of a slidable connection defining at least two positions and being held in those positions by any appropriate means such as a detent engaging in a recess or by a turnable connection involving say cooperative screw threads.

The hairdryer of the invention may be constructed to give the features set out above by using an existing hairdryer of sufficient capacity (most are not) plus an attachment including the divergent outlet passage, but it is preferred to embody the invention in a purpose built and designed unit.

The flexibility of being able to use the hairdryer, if desired, as a prior art type drier producing a hot narrow airstream can, however, be retained if needed; this may be done in a hairdryer according to the invention by arranging the outlet passage a frusto-conical hollow baffle which is rotatable about an axis transverse to the airflow between one limit position in which its wider end substantially closes the throat to direct the air passing through the throat to issue from the narrower end of the baffle, and another limit position in which its narrow end is spaced substantially uniformly from the throat to direct the air passing through the throat both through and around the baffle.

In accordance with one feature of the hairdryer of this



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 449 of 2286

invention, the electric motor body is mounted on substantially radially-extending fins adapted to reduce the turbulence of the air leaving the fan.

According to another feature, the housing of the hairdryer is perforated on the upstream side of the fan, and a disc of filter material is positioned between the perforated wall of the housing and the fan.

The present invention includes not only hairdryers as set out above, but also extends to attachments for conventional hairdryers which convert them to hairdryer comprising any one or more of the features referred to hereinabove, kits of parts comprising such attachments and hair driers incorporating such attachments.

The present invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a hairdryer attachment constructed in accordance with one aspect of the invention, fitted to the nose of a hand-held hairdryer, also perspective,

Figure 2 is a longitudinal section through the attachment of Figure 1, in one position in which the attachment delivers a broad, diffused warm air stream into the ambient air,

Figure 3 is a longitudinal cross-section of the attachment of Figure 1, in another position in which the attachment delivers a narrower, more concentrated warmer air stream into the ambient

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 450 of 2286

ENSDOCID: <WO 9423611A1_I_>

air, and

Figure 4 is a cross-sectional detail of a modification.

Figure 5 is a diagrammatic sectional view of another form of the hairdryer of the present invention, with the section being taken along the line of flow of the air;

Figure 6 is a view similar to Figure 5 of the hairdryer of Figure 5 with its baffle in its other limit position;

Figure 7 is a front elevation of the outlet end of the hairdryer of Figures 5 and 6, with the baffle in one limit position, and

Figure 8 is a view similar to Figure 7 of the hairdryer with its baffle in the other limit position.

Referring to Figures 1 to 4 of the drawings, there is shown an attachment 1 for a hairdryer 2 which is fitted over the hairdryer note 3, with a tight fit, by means of an annular portion 4. The annular portion 4 is provided with a ring of air flow apertures 5 which pass through a ridge 6 in a cylindrical portion 11 and communicate via a reservoir 7 with air flow apertures 8 in a venturi 9. In this illustrated embodiment, the air flow apertures 8 are located in the neck 10 of the venturi 9.

The cylindrical portion 11 has a plurality (four) of circumferentially extending locating notches 12 for the purpose of adjusting the position of an outwardly flared member 13 having an upstream frusto-conical portion 13a

BNSDOCID: <WO 9423611A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 451 of 2286

and a downstream cylindrical portion 14 which is sliding fit on the cylindrical portion 11. In order to locate the member 13 with respect to the cylindrical 11, the cylindrical portion 14 is provided with a push button catch 15 which in its rest position, as illustrated in Figure 2, leaves an associated detent 16 in engagement with the most downstream notch 12 to prevent relative sliding movement of the two cylindrical portions with respect to each other. When the catch 15 is pressed, the detent 16 is pushed out of engagement with the particular notch 12 so that the two cylindrical portions can be slid axially with respect to each other to locate the member 13 in another position by engagement of the detent 16 with a different notch 12 by releasing the catch 15.

An inner frusto-conical vane 17 is mounted coaxially within the member 13 just upstream of the diverging portion 22 of the venturi 9 on which it is supported by thin axially extending support plates 18. An outer frusto-conical vane 19 is mounted coaxially within the member 13 radially outwardly of the vane 7 as by thin axially extending support plates 20. It should be appreciated that the vanes 17 and 19 with their associated support plates 18 and 20 serve to guide the stream of warm air through the outwardly flared path 21 defined by the member 13 and venturi portion 22 and whilst causing some deflection of the air stream hardly obstruct the air stream as will be hereinafter more readily understood.

In use, the hand-held hairdryer 3 is switched on at a temperature setting such as to heat air passing over the drier heating elements and out through the hairdryer nose 3 and into the attachment 1, as indicated by the arrow

BNSDOCID: <WO_____9423611A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 452 of 2286

30. The velocity and pressure of the warm air passing into the attachment is increased by the action of the venturi 9, whereby cool air as indicated by the arrows 25 is drawn in through the air entry apertures 5, into the reservoir 7 and out through the venturi aperture 8 as indicated by the arrows 26 in Figures 2 and 3. The cool air sucked in by the venturi mixes with the hot air passing through the venturi, as indicated by the arrows 32, to cause an increase in the volume, and a reduction in the temperature, of the air stream exiting from the venturi 9 as indicated by the arrows 33.

The kind of air stream which emerges from the attachment 1 depends upon the position of the outwardly flared member 13 in relation to the venturi 9. Thus, in the position where the member 13 is fully extended and the detent 16 engages in the most downstream of the notches 12 on the cylindrical portion 11, the location of the vane 19 in relation to the vane 17 and the diverging portion 22 of the venturi 9 is such that mixed air stream represented by the arrows 33 passes through and around the vane 17 and the vane 19 so as to expand, disperse or diffuse to fill the whole area of the outwardly flared path of 21. Thus, there is produced a smooth substantially uniform, unidirectional air stream represented by the arrows 34 which is substantially turbulence free when it emerges from the constraint of the outwardly flared path 21.

In the embodiment of Figures 1 to 3, the angle at the outlet of the outwardly flared path 51 defined by the inner surface of the frusto-conical portion 13 with respect to the axis 28 of the attachment is 11°, this angle being critical to avoid breakup of the air stream



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 453 of 2286

after it has emerged from the constraint of the path 21. The critical angle can, however, be any other angle in the range of 10° to 25°. In tests where a ribbon was positioned at various points in the cross-section of the emergent air stream 34, it was found that the ribbon remained at substantially the same angle with respect to the axis 28 of the flow path 21, indicating that the air stream delivered by the attachment 1 is of substantially uniform cross-section.

If it is desired or necessary, circumferentially extending spaced apart slots 27 may be provided in the member 13 adjacent the outlet of the path 21, as shown in Figure 2 with a view to reducing any possible risk of turbulence at the outlet of the path 21. However, applicant has found that a substantially turbulence free flow can be produced without such slots.

In the retracted position of the outwardly flared member 13 as shown in Figure 3, the vane 19 cooperates with the vane 18 to prevent the air stream from diffusing outwardly to fill the entire area of the flow path 21. As will be apparent from Figure 2, the mixed air stream as indicated by the arrows 35 is centred, i.e. the air stream is reduced in width to provide a more concentrated flow of air emerging from the attachment as indicated by the arrows 36. Such an air stream will be at a higher temperature and of a greater velocity and pressure than those of the air stream 34 illustrated in Figure 2 and may be used where blow drying is required to shape the hair.

With a view also to avoiding any risk of turbulence adjacent the outwardly divergent portion 22 of the

SNSDOCID: <WO 9423611A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 454 of 2286

venturi 9, where indicated at 29 in Figure 2, the wall of the member 13 may be provided with some small baffles (now shown) which project slightly into the periphery of the air stream.

In Figure 4, the embodiment of Figures 1 to 3 is modified by providing the venturi 59 with an annular array of six air channels 5a which are equispaced around the cylindrical portion 11 and which open at locations which are downstream of the neck 10 of the venturi instead of the air apertures 5. Besides the venturi effect which sucks cool air through the air channels 5a when the air pressure is increased by compression of the air at the narrowest point of the venturi, i.e. the neck 10, when the air flow flows out again, a slight vacuum is created and the sucked in air also helps in preventing turbulence.

The hairdryer shown in Figure 5 comprises a housing 52 from which extends a hollow handle 54 from the remote end of which (not shown) extends a length of flexible cable connecting the electrical components in the hairdryer to the electricity mains supply. As is already known, the handle 54 may house control circuitry in the form of components mounted on a printed circuit board to provide for selective energisation of both the electric motor 56 of the hairdryer and the coiled heater elements 58. By means which are already known, and which do not in themselves form part of the subject-matter of this invention, when a switch 60 or 62 positioned at the junction between the handle 54 and housing 52 is operated appropriately, the motor 56 may be switched between 'off', low-speed and high-speed positions. Similarly different parts of the heater element 58 may be connected

to the mains supply so that the heater can be independently 'off' or heat the air passing through it at up to three different rates.

The hairdryer of this invention may be designed to be hand-held, in which case its handle 54 may be shaped to facilitate its being gripped; or designed to be mounted on a stand for use, or designed to be detachable from the stand for independent use.

The stator of motor 56 is secured to an inner frusto-conical wall 64 forming part of casing 52 by means of radially-extending fins 66. At least one of the fins may be hollow in order to provide a conduit for the electric cables providing power to the motor windings. Fixedly mounted on the rotor 68 of the motor is an annular fan 70. When the motor is energised, the fan is arranged to pass a stream of air down the body of motor 56, through the fins 66 and over the heater elements 58 towards a circular throat 72. The throat forms the outer end of a parallel-walled or slightly frusto-conical continuation of the inner wall 64 of the housing. It will be appreciated that this change in shape of the airflow passage presented by wall 64 causes the direction of flow of the air leaving fan 70 to change to a small angular extent as it approaches throat 72.

On the upstream side of fan 70, the casing 72 is provided with perforations 94. Positioned between the perforated area of casing 52 and the inlet face of fan 70 is a substantially-circular disc 96 of air filter material. Although this is not shown in the drawings, part of the casing 52 may be removable in order to provide access to the filter 96 for cleaning or replacement purposes.

SNSDOCID: <WO_____9423611A1_L_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 456 of 2286

Contiguous with throat 72, the inner wall of the casing 52 defies a belled-out outlet passage 74 ending in a circular outlet 76 lying in a plane which is not parallel to the plane containing throat 72. The outer wall 78 of housing 52 is spaced outwardly of inner wall 64 for most of its length to form chambers 80 between the two walls. The outer wall has in it a circular series of openings 82 which permit air from the ambient atmosphere to enter chamber 80. The wall 74 of the outlet passage also has a circular series of openings 84 permitting air to flow from chamber 80 into the outlet passage when a pressure differential is established between the outlet passage and chamber 80.

In the broadest aspect of the present invention, the issuing airflow is always divergent. This may be achieved simply by making the outlet passage 74 of outwardly-divergent form, leaving the issuing airflow to expand laterally after it passes through throat 72, thus losing speed as it does so. This desirable airflow may be achieved by fitting one or more baffles 86 in the outlet passage, along the lines shown in Figure 6. The baffle 36 may have the same solid angle as passage 74, or a smaller one, so that a desired speed profile across the airflow leaving the hairdryer is obtained.

Positioned in the outlet passage is a frusto-conical baffle 86, having a pair of stub shafts 88 and 90 extending from it. Stub shaft 88 is journalled in a cylindrical extension 92 of the outlet wall 74. Although this is not shown in the drawing, either or both of the stub shafts 88 and 90 may be provided with means limiting their axial movement, so as to prevent the baffle 86 from becoming jammed against the inner wall 64. In addition

BNSDOCID <WO 9423811A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 457 of 2286

to being journalled in both the inner and outer walls of the casing, the lower (as viewed) stub shaft 90 has its outer end projecting from the casing 52. A knob or lever of suitable heat-resistant material is secured to the projecting end of shaft 90 so as to enable the user to pivot the baffle 86 between the position shown in Figure 5 and that shown in Figure 6.

When in the position shown in Figure 5, the baffle has its wider end virtually blocking throat 72, so that all the heated air leaving the heater elements 58 is constrained to flow towards and out of the narrow end of the baffle. This reduction in cross-sectional area of flow causes the speed of the air to increase, leading to the dryer producing a narrow stream of fast-flowing air, which may be very hot if all portions of the heater element 58 are energised.

In order to allow the hairdryer to produce a wide stream of slower-moving air, whether heated or not, the baffle is pivoted through 180° until it reaches the limit position shown in Figure 6. In this position, the air leaving the heater elements has a choice of two outlet passages. The first is through the centre of the baffle. As the cross-sectional area of this passage increases rapidly, the speed of the air entering the baffle rapidly decreases as it approaches the wider end of the diffuser. The other passage is the annular one provided between wall 74 and the diffuser. The cross-sectional area of this passage changes relatively slightly, if at all, so that the air leaves this divergent passage at substantially the same speed as it entered. Thus in this mode, the hairdryer provides a slow moving central airstream enclosed in a stream of faster-moving air.

BNSDOCID: <WO 9423611A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 458 of 2286

However, the airflow speeds obtained in the Figure 6 mode are nowhere near as high as those obtained in the Figure 5 mode. In the Figure 6 mode, the hairdryer can provide a wide and divergent slower stream of hot air compared with the narrow and very-fast stream provided in the other mode.

The effect of the throat 72 in the Figure 6 embodiment is to accelerate the airstream and therefore to reduce its pressure, to produce the Venturi effect. The reduction of pressure in the throat and immediately downstream of it is to cause air to flow through passages 84 from chamber 80, and into chamber 30 through passages 82 from the atmosphere, thus leading to an air-cooled hairdryer.

As shown in Figure 7, but omitted from the earlier two Figures for clarity, the outlet 76 of the hairdryer may be provided with a grille 98. The grille may be in a relatively-thin disc, or it may have appreciable thickness. In the latter case, the bars of the grille may be shaped to provide parallel-sided individual outlet passages 100. This is effective in reducing any turbulence that there might be in the air which would issue from the drier and will also tend to cause the issuing airstream to be less divergent than without the grille.

Accordingly it will be seen that the present invention, in its broadest aspect, provides an electric hairdryer which ejects a wide slow airstream. In a preferred form a narrow fast airstream may be additionally provided by simple adjustment. A broad slow warm airstream does not damage the hair and can be used to dry the hair without the movement necessary to avoid damaging the hair when

SNSDOCID: <WO 9423611A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 459 of 2286

using prior art hairdryers. If desired, the hairdryer of the invention may be used fixed on a mounting stand, leaving the person drying the hair both hands free.

Whilst particular embodiments have been described, the invention also includes all modifications and variations falling within its scope. For example, instead of having a sliding connection between the outwardly flared member 13 and the cylindrical portion 11, cooperating screw threads could be provided on the respective cylindrical portions 11 and 14. Moreover, although the attachment 1 has been described as being for use with a hand-held hairdryer, the attachment could well be adapted for use as part of, or for connection to, professional hairdryers which are not suitable for manual use.

BNSDOCID: <WO 9423611A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 460 of 2286

CLAIMS

1. An electric hairdryer comprising a housing, an electric motor therein, an axial fan secured to the motor and adapted to pass a stream of air over electrically-energised heater elements located within the housing to cause the heated air to flow through a circular throat, the housing having an outlet passage of divergent axial cross-section, wherein the hairdryer when it is running is capable of producing a stream of air at a flow rate through the housing of 60-90 litres per second having a speed of 220-360 cm per second and a temperature of 45°-60°C at a working distance of 40-46 cm from the outlet passage.

2. A hairdryer as claimed in Claim 1, having a venturi of circular cross-section located coaxially between the circular throat and outlet passage.

3. A hairdryer as claimed in Claim 2, wherein a surrounding wall of the venturi has at least one air entry aperture which is in communication with the ambient air.

4. A hairdryer as claimed in Claim 3, wherein the venturi has a plurality of air entry apertures which form a ring of apertures around the surrounding wall.

5. A hairdryer as claimed in Claim 3 or 4, wherein the or each air entry aperture communicates with the air exit aperture of the venturi via an air reservoir, which in use, is at a lower pressure than that of



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 461 of 2286

the ambient air.

6. A hairdryer as claimed in Claim 2 having air channels which are in communication with the ambient air that open out onto the venturi.

7. A hairdryer as claimed in Claims 2, 3, 4, 5 or 6 having at least one inner vane downstream of the venturi.

8. A hairdryer according to Claim 7 having at least one outer vane disposed outwardly of and extending downstream of the inner vane.

9. A hairdryer as claimed in any of the preceding claims, including at least one hollow frusto-conical baffle mounted in the outlet passage with its narrow end near the throat, and its wide end remote from the throat.

10. A hairdryer as claimed in Claim 9, in which the baffle is rotatable about an axis transverse to the airflow between one limit position in which its wider end substantially closes the throat to direct the air passing through the throat to issue from the narrower end of the baffle, and another limit position in which its narrow end is spaced substantially uniformly from the throat to direct the air passing through the throat both through and around the baffle.

11. A hairdryer as claimed in Claim 10, in which the baffle has stub shafts projecting from it which are each journalled in the housing to define the axis of



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 462 of 2286

rotation of the baffle, and in which one stub shaft projects beyond the outer wall of the housing and carries on its outer end actuating means by which the shaft can be turned to pivot the baffle between its two limit positions.

12. A hairdryer as claimed in any preceding claim, in which the motor body is mounted on substantially radially-extending fins adapted to reduce the turbulence of the air leaving the fan.

13. A hairdryer as claimed in any preceding claim, in which the housing of the hairdryer is perforated on the upstream side of the fan, and in which a disc of filter material is positioned between the perforated wall of the housing and the fan.

14. A hairdryer as claimed in any preceding claim, in which the housing is double-walled whereby the outer wall of the housing is insulated by air from the inner wall of the housing, which inner wall is heated directly by the air flowing through the drier.

15. A hairdryer as claimed in Claim 14, in which the space between the walls is in communication with the ambient atmosphere through a circular series of apertures, and with the outlet passage downstream of the throat through another series of apertures.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 463 of 2286

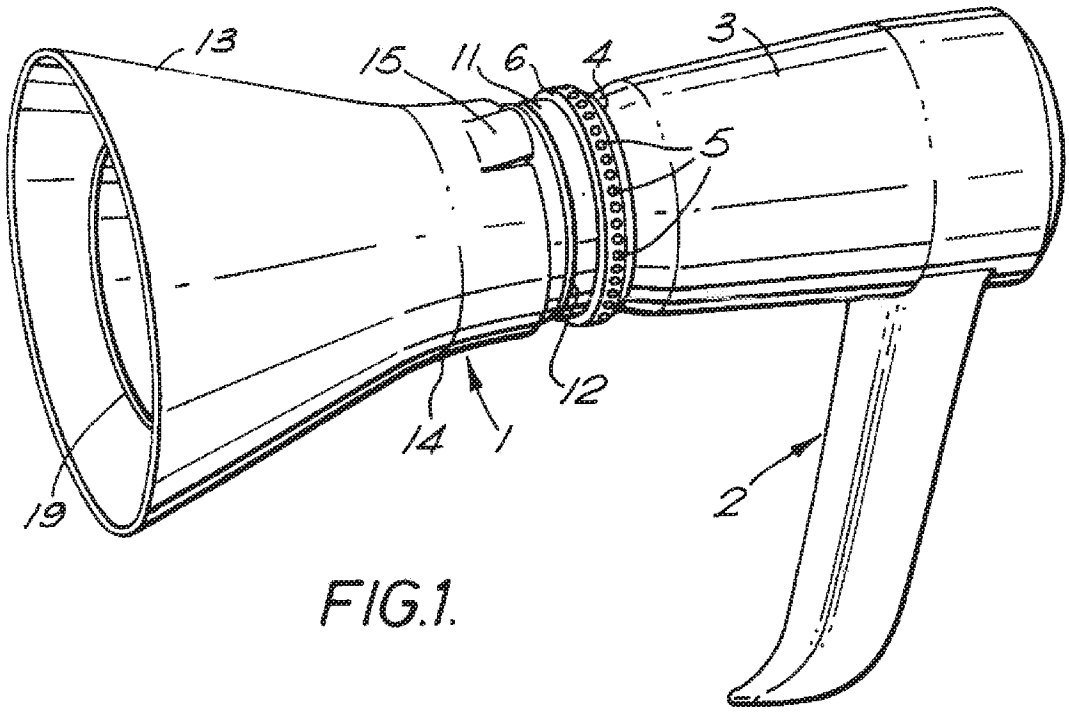



FIG.1.

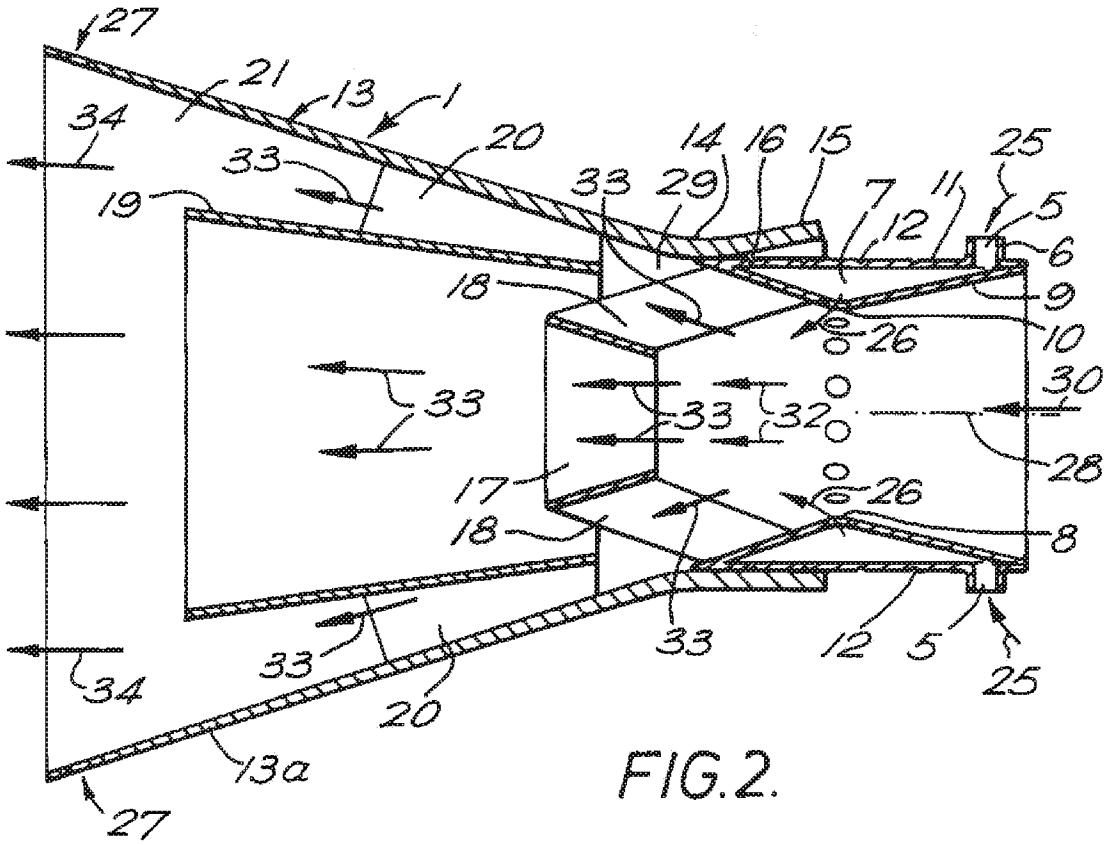



FIG.2.



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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 464 of 2286

FIG. 3.

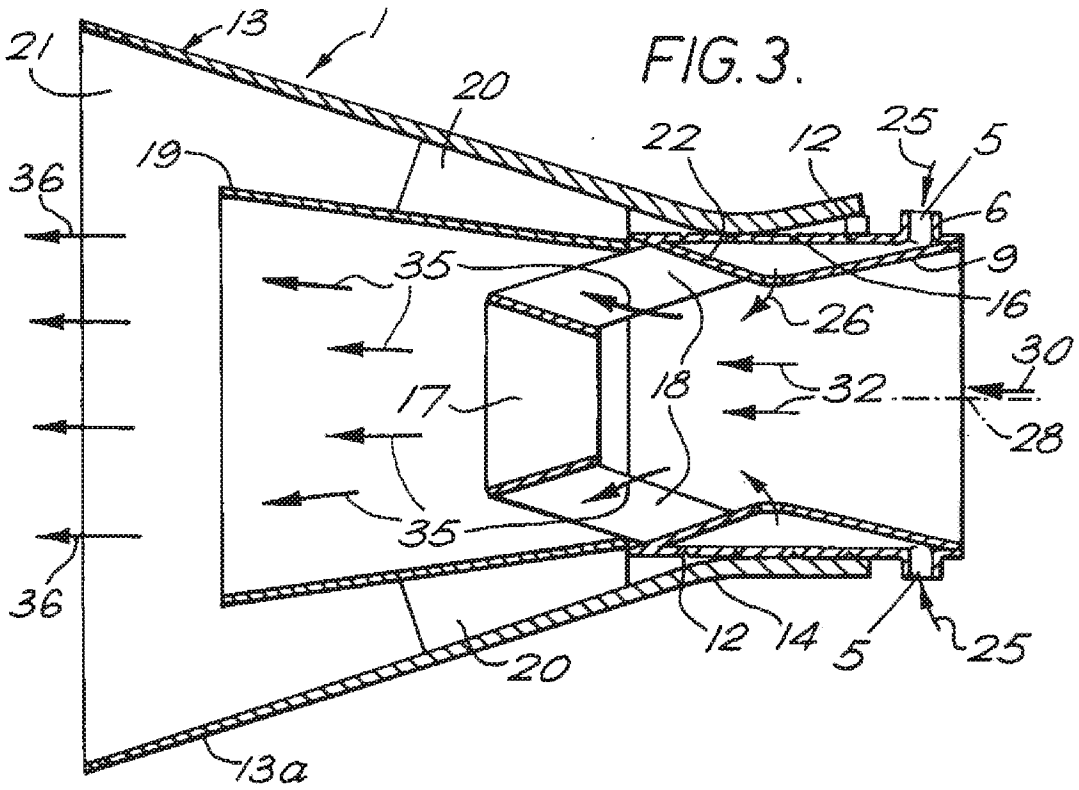
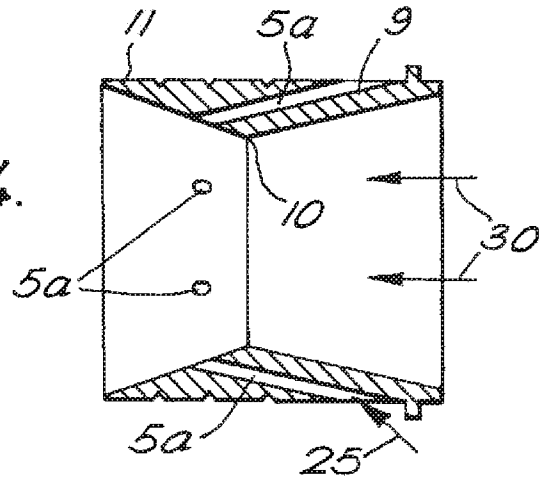



FIG. 4.






SNSDOCID: <WO 9423611A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 465 of 2286

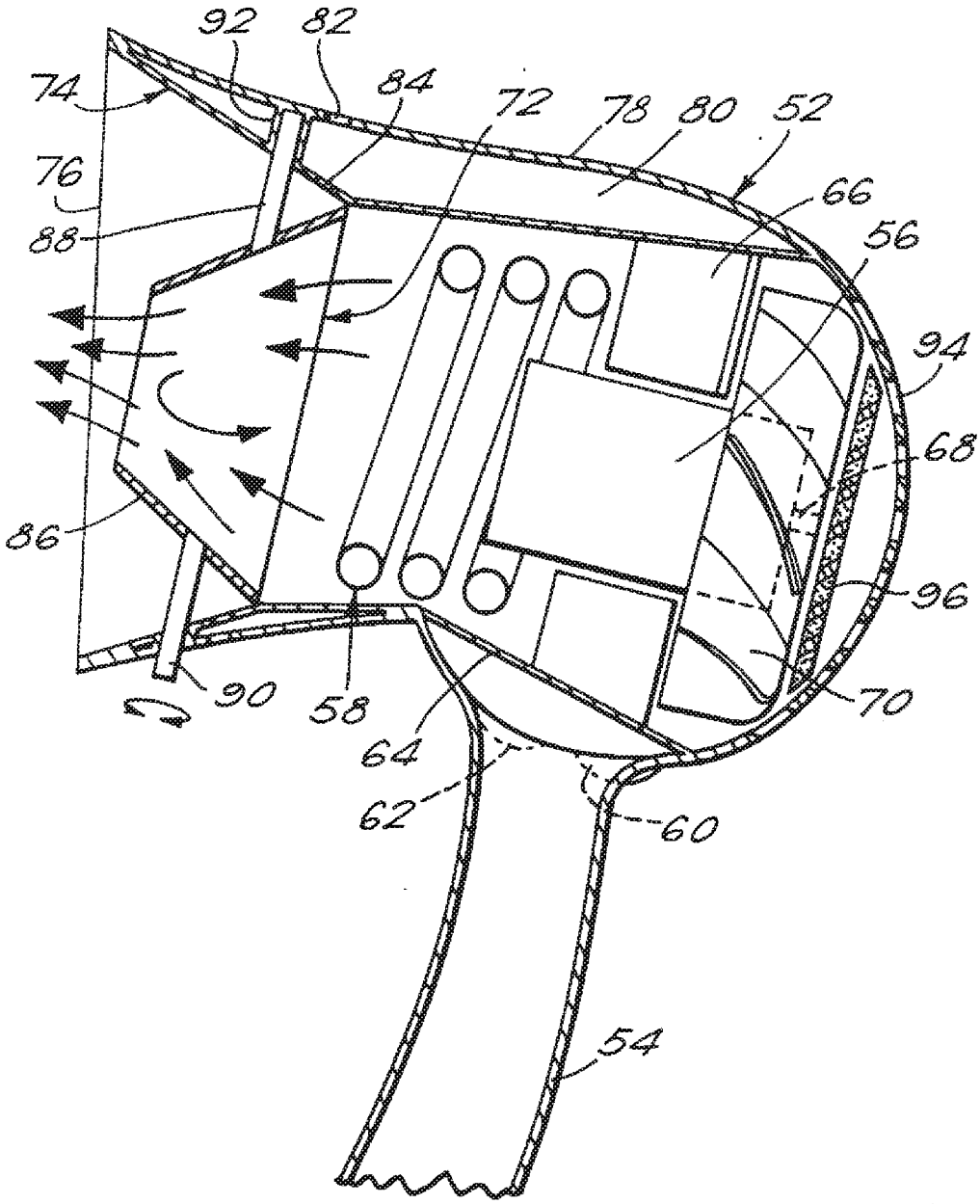



FIG. 5.



SNSDOCID: <WO 9423611A1_L>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 466 of 2286

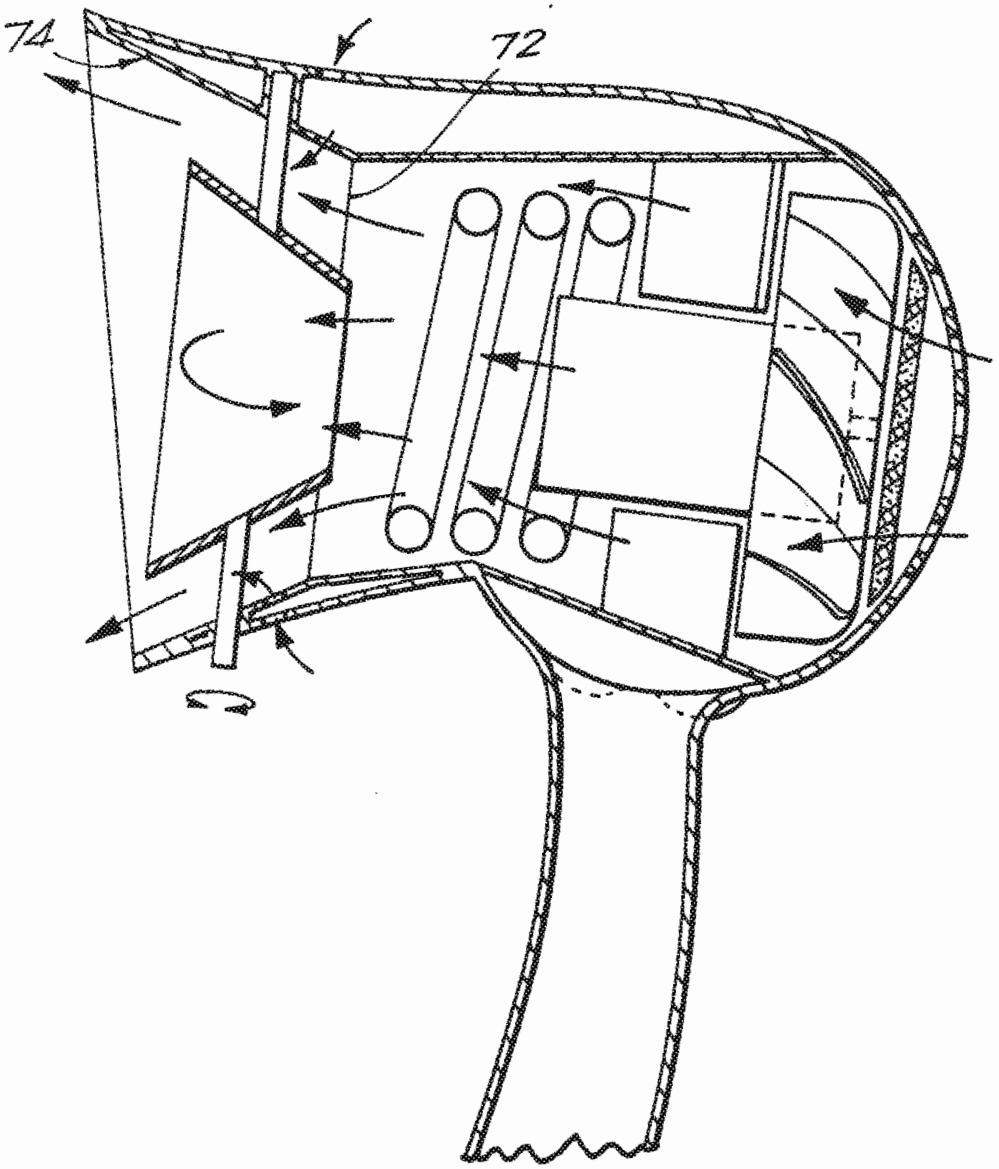



FIG.6.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 467 of 2286

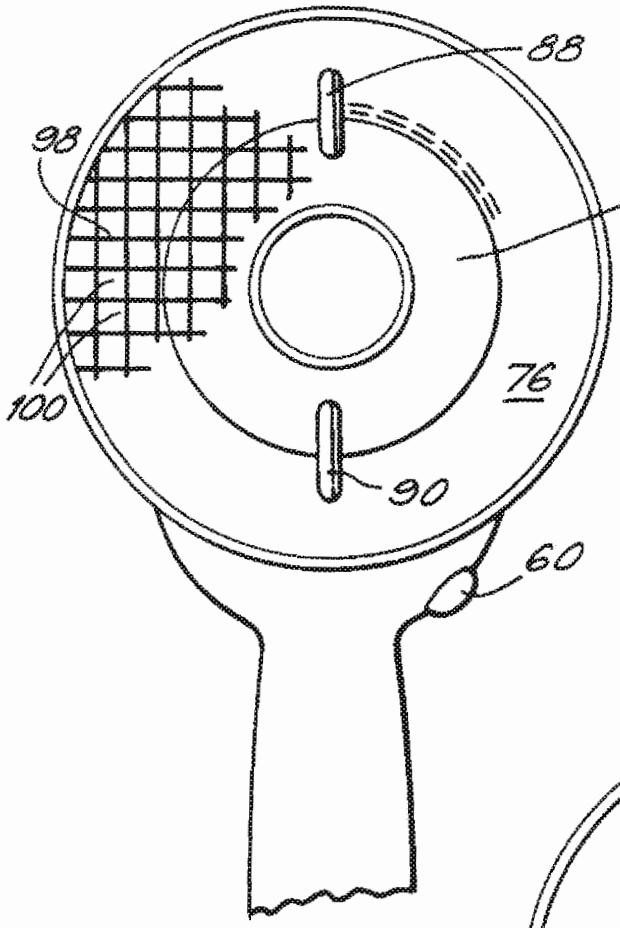



FIG. 7.

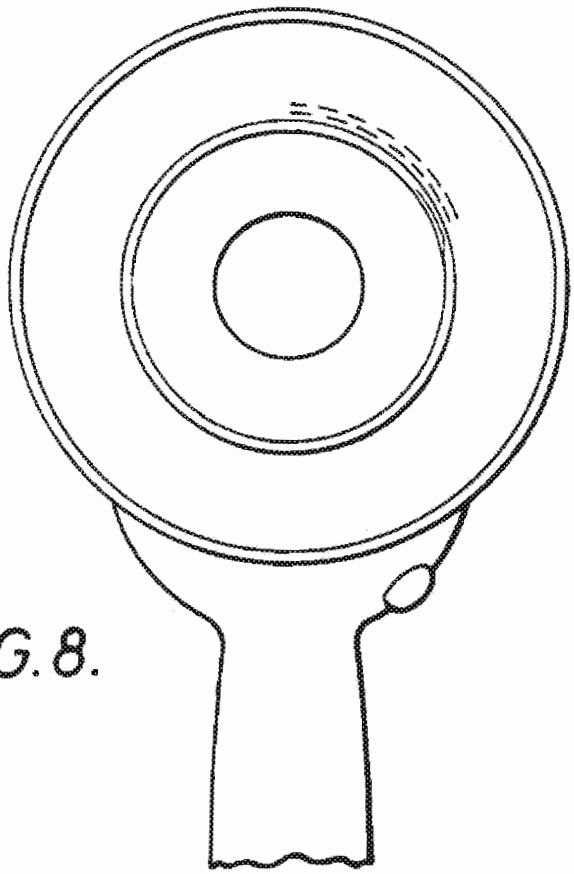


FIG. 8.



BNSDOCID: <WO 9423611A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 468 of 2286

# INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB 94/00797

A. CLASSIFICATION OF SUBJECT MATTER
IPC 5 A45D20/12 A45D20/10

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)
IPC 5 A45D F15C F04D F26B

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | GB,A,2 068 222 (SUNBEAM) 12 August 1981<br>see the whole document | 1 |
| A | EP,A,0 260 371 (GLUCKSMAN) 23 March 1988<br>see column 6, line 44 - column 8, line 49;<br>figure 1 | 1 |
| A | GB,A,2 232 589 (MORPHY RICHARDS CONSUMER ELECTRONICS) 19 December 1990<br>see the whole document | 1 |
| A | FR,A,2 446 615 (VELECTA) 14 August 1980<br>see the whole document | 1 |
| A | US,A,5 060 398 (WOLENS) 29 October 1991<br>see the whole document | 1 |

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

* Special categories of cited documents :

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 28 July 1994 | 31.08.94 |

| Name and mailing address of the ISA | Authorized officer |
|---|---|
| European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl,<br>Fax (+ 31-70) 340-3016 | Sigwalt, C |

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BNSDOCID: <WO_____9423611A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 469 of 2286

# INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB 94/00797

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | EP,A,0 439 781 (BRAUN) 7 August 1991<br>see the whole document | 1 |

Form PCT/ISA/210 (continuation of second sheet) (July 1992)



SNSDOCID: <WO_____9423611A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 470 of 2286

# INTERNATIONAL SEARCH REPORT

information on patent family members

International application No.
PCT/GB 94/00797

| Patent document cited in search report | Publication date | Patent family member(s) | | Publication date |
|---|---|---|---|---|
| GB-A-2068222 | 12-08-81 | US-A- | 4287673 | 08-09-81 |
| | | AU-A- | 6610481 | 16-07-81 |
| | | CA-A- | 1143935 | 05-04-83 |
| EP-A-0260371 | 23-03-88 | US-A- | 4767914 | 30-08-88 |
| GB-A-2232589 | 19-12-90 | NONE | | |
| FR-A-2446615 | 14-08-80 | NONE | | |
| US-A-5060398 | 29-10-91 | NONE | | |
| EP-A-0439781 | 07-08-91 | DE-A- | 4002944 | 14-08-91 |



SNSDOCID: <WO_____9423813A1_I_>

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 471 of 2286

Espacenet

# Bibliographic data: DE4332300 (C1) — 1994-12-22

**Hair dryer with a cable winding device**

| | |
|---|---|
| **Inventor(s):** | KORTMANN THORSTEN [DE] ± (KORTMANN, THORSTEN, 65396 WALLUF, DE) |
| **Applicant(s):** | BRAUN AG [DE] ± (BRAUN AG, 60326 FRANKFURT, DE) |
| **Classification:** | **- international:** ***A45D20/12; B65H75/42;*** (IPC1-7): A45D20/10; B65H75/38<br>**- cooperative:** **A45D20/12**; **B65H75/42** |
| **Application number:** | DE19934332300 19930923 |
| **Priority number (s):** | DE19934332300 19930923 |

**Abstract of DE4332300 (C1)**

The invention sets out from an electric hair dryer (10) which is fitted with a cable winding device and has a housing consisting of at least two housing parts (12, 14), means for generating and possibly heating the air flow being accommodated in the first housing part (12) which is provided with an air inlet opening (16) and an air outlet opening (18), and the first housing part (12) being rotatably mounted in the second housing part (14), and the second housing part (14), which at least partially surrounds the first housing part (12), having a handle part (26) through which a connection cable (28) is guided onto a winding drum. In this case, the hollow-cylindrical, first housing part (12) forming the winding drum is displaceable, by rotating it about its longitudinal axis (32), in the axial direction relative to the second housing part (14).

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324

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## DESCRIPTION DE4332300

The invention relates to a equipped with a cable winding electric hair dryer, having an at least two housing parts, existing housing, provided with an air inlet opening and an air outlet opening housing part means for generating and gegebenenf heating of the air current are accommodated in the first, and the first housing part is rotatably mounted in the second housing part and wherein the second housing part, which the first housing part at least partially surrounds, comprising a grip part, through which a connecting cable is routed to a winding drum by the.

Such a hairdryer is already known from DE 37 28 885 A1.

In this hair dryer, the first housing portion adjacent to the electrical device in a manner to Aufnah cable drum of the cable for connecting the power supply.

Through the hollow handle, the cable is routed to the cable drum, and wound in multiple layers in this, for which purpose a coiling zuminde chamber.

This winding chamber is enclosed by the second housing part.

When rigging or



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 473 of 2286

Unwinding the cable rotates the entire first housing part with einschliess electrical device.

The handle is in the rear region of the second housing part, underneath the winding chamber.

The disadvantage is that is moved by the arrangement of the entire electrical device in the first housing part of Schwerp of the hair dryer in the direction of the front housing part.

This displacement of the center of gravity of the hair dryer is a total front-heavy.

So that the handling for the user is difficult and tiring in the long run.

A further disadvantage is that the cord storage inside the hair dryer housing and can be done in multiple layers and not always controlled by the user or influences beyond.

Result possibly occurring inaccuracies during the Aufrollvorganges, the Commission may draw problems when following out <N = 2> of the cable, can only be solved by separating the two housing parts, but this is not provided due to the selected compound of the two housing parts and damage to the hair dryer, but would at least lead to the hair dryer housing.

Characterized in that the cable drum at the rear in the direction of the housing longitudinal axis connects to the other components of the hair dryer, the dimensions of the hair dryer, in particular the length of the housing, greatly enlarged.

The invention is therefore the object of developing a hair dryer with a cable winding with the features of the preamble of claim 1 such that a simple and secure installation or

Settlement of the cable is ensured and the dimensions of the hair dryer at best only marginally enlarge.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 474 of 2286

This object is achieved in that the winding drum forming hollow cylindrical first housing part is moved relative to the second housing part by a Drehun about its longitudinal axis of the housing in the axial direction.

During the first housing part is rotated by hand and thereby moved relative with respect to the second housing part, is visible to the user and thus controllable wound the connecting cable ply on the first housing part.

Characterized the circumference of the first housing part is only slightly increased, and the otherwise avoided required additional storage space in the interior of the hair dryer.

The total size of the device, in particular its length, thereby hardly or not at all affected.

The focus is on using the appliance m unwound cable ideal in the grip area and thus allows easy handling of the hair dryer by the user.

From an advantageous embodiment, the hollow cylindrical first housing part outside circumference on a thread.

The cable is run in the thread, so that a uniform winding is done.

In addition, an advantageous mounting for the cable can be achieved without bending stress and cable breaks avoided by the cylindrical shape of the housing part.

Characterized in that the threaded threads of a round thread having a laterally laid down web, the


SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 475 of 2286

cable in this thread contour can be almost completely so incorporated and form-fitting approximately through d region having a nearly semi-circular inner contour between the webs.

The present form by the closing low friction between thread contour and connection cable to provide safe storage of the connection cable in the thread and thus prevents unintentional unwinding it.

In an advantageous further development of the invention the first housing part provided at the air inlet opening to an inlet grating which is connected to a ring with a front groove.

Is handled by the first housing part by train on the cable the cable moves by the rotation of this ring together with the first housing part in the axial direction to the ring on the second housing part encounters and thus forms a rotation limit for the first housing part.

The groove overlaps the first thread of the cable connections and thus prevents transmission of the pulling action on the cable connections.

In an advantageous development of the invention the second housing part is formed substantially as a hollow cylinder and has an internal thread.

By this design, the first housing part can be mounted in the second housing part.

The thread of the second housing part is absorbed by the thread of the first casing part, whereby a rotatable arrangement of the two housing parts to each other can take place.

Moreover, the hollow cylinder serves as a guide for the first housing portion during rotation of the cord storage.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 476 of 2286

The handle is fixedly connected to the second housing part is located under the center of gravity, so that the handling of the hair dryer can be done in the usual way.

Advantageously, the internal thread of the threads with a convex outer contour and a groove provided in each case laterally a This outside contour corresponds approximately to the contour of which has the outer peripheral side of the first housing part with thread wound cable.

Since the second housing portion encloses always the first housing portion substantially in an area without cable, so a form just interaction of external and internal threads of the two housing parts and a smooth rotation of the two housing parts is possible.

In an advantageous embodiment of the hollow cylinder has one end on an extension to the guidance and an opening for the connecting cable.

The cable, after it passes out of the handle through the opening in the hollow cylinder, accommodated in the extension and guided on the thread which is surrounded by the extension in the respective positions of the two housing parts to each other.

With rotation of the first housing part shifts this relative to the second housing part and thus to the extension, which due to the chosen thread contours of the two housing parts, the extension always exactly encloses a thread and thus both provide the upward and the unwinding of the cable for proper cable routing ,

Due to the fact that the position of the extension as well as the opening for the cable is fixed, the connection cable in the area of the grip itself can not tilt or move by easing on the enlargement beyond.

So that an accurate single-ply winding of the lead wire is achieved in the first housing part and a clamping, for example. Excluded between two Gewindegäng.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 477 of 2286

Expressed in an advantageous variant of the invention, the second housing part is designed as a cylindrical ring and has a form of a hollow cylindrical sleeve which receives the first housing part substantially in itself.

The connection cable, which is wound on the rotatably mounted first housing part can way out both in the office of the threads as well as by the sleeve as an upper system over the entire length of the housing part, and thus a loosening of individual coils can be avoided.

In addition, the shell serves as a safeguard against accidental automatic reverse rotation of the first housing part and Abwicke the connecting cable.

Account for another anti-rotation for the first housing part or brakes for the connecting cable.

Advantageously, the cylinder ring has an internal thread and is connected by a neck with a grip plate of the handle portion.

By this design of the cylinder ring both housing parts can be arranged rotatably with each other, wherein the second housing part of the first housing part partially surrounds.

The connection of the formed as a cylindrical ring second housing part on the grip plate and the approach to the handle ensures a secure fit of the grip on the hair dryer.

In an advantageous development of the internal thread has threads with a convex outer contour and a laterally groove provided.

This thread contour is so gewähl that the threads of both housing parts engage in a form-fitting


SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 478 of 2286

around each other, whereby a smooth rotation of the two housing parts is possible.

In an advantageous development of the invention, the sleeve has in a lower region of a long slot-like opening Au in this opening the batch is performed during the rotation of the first housing part, so that the opening of the sleeve forms a limit for the axial displacement of the two housing parts to each other.

In that the first housing part in the region of the air outlet opening, a threaded ring is screwed, is secured to the sleeve over the end of the first housing part, that the air exit port, it can not be moved.

In the drawings:

Figure 1 is a schematic diagram of a hair dryer with cable winding device according to a first embodiment of the invention, partly in longitudinal section.

Fig. 2, the first housing part according to Fig 1 in longitudinal section.

Fig. 3, the second housing part shown in FIG 1 in longitudinal section.

Fig. 4 is a schematic diagram of a hair dryer with a cable winding device according to a second embodiment of the invention, partly in longitudinal section.

The hair dryer 10 is composed of two housing parts 12, 14 which are formed as a hollow cylinder and rotatably mounted to each other, wherein the second housing part 14 at least partially


SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 479 of 2286

surrounds the first housing part 12.

At the respective ends of the first housing part 12, an air inlet opening 16 and an air outlet opening 18 are provided.

The air inlet opening 16 has an inlet grille 36, which is connected to a ring 38.

This ring 38 is fixed to the first housing part 12.

In the first housing part 12, the means for generating, and optionally heating the air flow are (not shown in the drawing) and is connected via a switch 40 on the inlet grille 36 to a connection cable 28 with a plug 30.

The connection cable 28 is passed over a fixed connected to the second housing part 14 and handle part 26 an opening 51 for carrying out the cable 28, which is provided in an extension 50 of the second housing part 14 to the switch 40 on the intake grille 36.

The outer peripheral side, the first housing part 12 has a thread 34.

Is now the first housing part 12 is rotated via the ring 38 with the hand by the user, the connection cable 28, starting at the inlet grid 36 in a single layer is wound onto the thread 34.

It is thereby added to the threads 35 of a round thread with an approximately semi-circular inner contour, each side formed ridges 37 provide an exact separation of the individual cable windings.

The first housing part 12 runs over its thread 34 in an inner thread 46 of the cylinder 44 formed as a hollow second housing part 14, which has threads 48 with a convex outer contour and a groove 49 provided each side.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 480 of 2286

In all embodiments, it runs a thread of the external thread 34 always from the center of a web 37 to the middle of the next ridge, so that the area is provided with the semi-circular inner contour approximately centrally between the webs 37.

Wherein the internal thread 46 is a thread 48 extending respectively from the center of a groove 49 to the center of the next slot, so that the portion with the convex outer contour is provided in each case centrally between the grooves 49. 49.

As rotation limiting during the winding for the first housing portion 12 of the plug 30 which remains outside of the handle portion 26 and thus serves as a stop works.

The unwanted reverse rotation of the first housing portion 12 (not shown) with known means, eg.

B. are verhind by a finger switch or other equivalent brake.

The settlement of the connecting cable 28 is carried out by train on the connection cable 28, whereby the first housing part 12 is set in rotary motion.

Simultaneously with the rotational movement takes place via the thread 34 a displacement of the first housing part 12 in the axial direction to a housing longitudinal axis 32 relative to the second housing part fourteenth

The fixed on the first housing part 12 ring 38 at the air inlet opening 16 thereby also moves in the direction of the second housing portion 14 until it impinges on the housing part 14, whereby the ring 38 prevents further rotation of the first housing part 12 and serves as a stop.

The first of the thread of the round thread 35 is thereby covered by a recess 39 of the ring 38, so that the connection of the connecting cable 28 is invisible to the user and a contact of the cable connections is avoided by the user.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 481 of 2286

Via the switch 40 on the intake grille 36 of the hair-dryer 10 may be turned on.

Depending on the type of the switch 40 the air flow rate and the temperature of the air stream can be varied beyond.

It is also possible to automatically turn on the hair dryer 10 via a contact switch when approaching the two housing parts 12, 14 and falls below a minimum distance between the ring 38 and the second housing part 14.

In Fig. 2, the first housing part 12 is shown.

It is a hollow cylindrical configuration and has the outside circumference of the thread 34.

This screw 34 has threads 35 of a round screw thread with a laterally laid down web 37, between which webs 37 are areas having an approximately semi-circular inner contour are provided, in which the lead wire 28 almost completely received and guided over the entire length of the first housing part 12 will.

Also possible would be another thread geometries, eg.

As modified flat- or trapezoidal screw advantageously enable a secure recording and storage of the cable 28.

A decreasing in the direction of the air outlet port 18 has circumferential housing to the second housing portion 14.

It is designed as a hollow cylinder 44 and is provided with an internal thread 46.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 482 of 2286

The thread 46 has threads 48 having a convex outer contour and a laterally groove provided 49th

The shape of the thread 34 of the first housing part 12 with an internal connecting cable corresponding shape of the internal thread 46 thus allowing a 28 mesh form just the two housing parts 12, 14 and a smooth rotational movement of the housing parts 12, 14th

The hollow cylinder 44 comprises at one end an extension 50 with an opening 51 through which the cable 28 is led out of the grip part 26 in the direction of thread 34.

The outer shape of the housing part 14 can also be formed cylindrically and strongly conical shape.

In a second embodiment, the hollow-cylindrical first housing part 12 is taken in from a preferably transparent, configured as a hollow cylinder 42, the sleeve 24 substantially.

By a threaded ring 58 which is screwed in the region of the air outlet opening 18 of the first housing part 12 and rigidly connected to the first housing part 12, ring 38 in the region of the air inlet opening 16, this sleeve 24 is secured on the first housing part 12 against unintended axial displacement, and during movement of the two housing parts 12, 14 relative to one another out.

A guide sleeve 24 in the direction radlaler carried by the second housing part 14th

In the region of the handle part 26, the sleeve 24 is a längschlitzartige, extending almost over the entire length the opening 56 within which the grip part 26 during assembly and

Unwinding of the connecting cable 28 moves parallel to the longitudinal axis of the housing 32.

The second housing part 14 is formed as a cylindrical ring 52 and has an internal thread 46, which has threads 48 with a convex outer contour and a groove 49 provided each side.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 483 of 2286

Connected is the cylindrical ring 52 with the handle 26 via a handle plate 22 and an approach 20th

Now, the first housing part 12 is rotated about the firmly connected to this ring 38 by hand, there is a winding of the connection cable 28, the cable is received in the successive threads 35 of the thread 34, 28 a single layer, with the laterally laid down webs 37 for exact separation of the individual cable windings provide.

The first of the threads 35 is covered by a recess 39.

During the rotation of the first housing part 12 moves relative to the second housing part 14, wherein the längschlitzartige opening 56 in the sleeve 24 corresponds to the region in which the displacement of the two housing parts 12, 14 to each other and can be carried out.

An additional rotation limit for the cord storage is also the connection cable 28 having a plug 30, the 26 remains outside of the handle portion.

The settlement of the connecting cable 28 is carried out by train on the connection cable 28th

Characterized the first housing part 12 is set into a rotational movement about the longitudinal axis of housing 32, wherein it moves in the direction of the second housing part 14.

The opening 56 in the sleeve 24 also serves here as a rotary limitation for the two housing parts 12, 14, the displacement thereof to each other can take place only within the range of the opening 56.

During processing, the cable 28 is guided through the handle portion 26 of the thread 34 through the opening 56 in the sleeve 24 and a recess 54 in the handle plate 22.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 484 of 2286

The hair dryer is turned on 10 via a switch 40 which is disposed at an inlet grille 36 of the air inlet opening 16 and fixedly connected to the ring 38.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 485 of 2286

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## CLAIMS DE4332300

1.

With a cable winding device equipped electric hair dryer (10) having an at least two housing parts (12, 14) existing housing, the first with an air inlet opening (16) and an air outlet opening (18) with which the housing part (12) means for generating and optionally heating the air stream are stored and the first housing part (12) rotatably mounted in the second housing part (14), and wherein the second housing part (14) which at least partially surrounds the first housing part (12) having a handle portion (26) through passing a cable (28) is led to a winding drum, characterized in that the winding drum forming hollow cylindrical first housing part (12) is displaceable in the axial direction relative to the second housing part (14) by a rotation about its body axis (32).

2.

Hair dryer with a cable winding device according to claim 1, characterized in that the hollow-cylindrical first housing part (12) has its outer circumference a thread (34).

3.

Hair dryer with a cable winding device according to claim 2, characterized in that the thread (34) threads (35) of a round screw thread with a laterally provided web (37).



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 486 of 2286

4.

Hair dryer with a cable winding device according to one of the preceding claims, characterized in that the first housing part (12) provided for the air inlet opening (16) has an inlet grill (36), which is connected to a ring (38) having an end groove (39).

5.

Hair dryer with cable winding device according to one of the preceding claims, characterized in that the second housing part (14) is formed substantially as a hollow cylinder (44) and has an internal thread (46).

6.

Hair dryer with cable winding device according to claim 5, characterized in that the internal thread (46) threads (48) having a convex outer contour and a groove provided laterally in each case (49).

7.

Hair dryer with cable winding device according to claim 5, characterized in that the hollow cylinder (44) at one end has an extension (50) for guiding, and an opening (51) for carrying out the connecting cable (28).

8.

Hair dryer with cable winding device according to one of claims 1 to 4, characterized in that the second housing part (14) formed as a cylinder ring (52) and formed of a as a hollow cylinder (42) sleeve (24) comprises the first housing part (12) essentially takes one in.

9.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 487 of 2286

Hair dryer with a cable winding device according to claim 8, characterized in that the cylindrical ring (52) has an internal thread (46) and is connected via a shoulder (20) with a handle plate (22) of the handle part (26).

10.

Hair dryer with cable winding device according to claim 9, characterized in that the internal thread (46) on threads (48) with a convex outer contour and a groove provided laterally in each case (49) has.

11.

Hair dryer with cable winding device according to claim 8, characterized in that the sleeve (24) in a lower region has a long slot-like opening (56).

12.

Hair dryer with a cable winding device according to claim 8, characterized in that on the first housing part (12) to the air outlet opening (18) a threaded ring (58) can be screwed.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 488 of 2286

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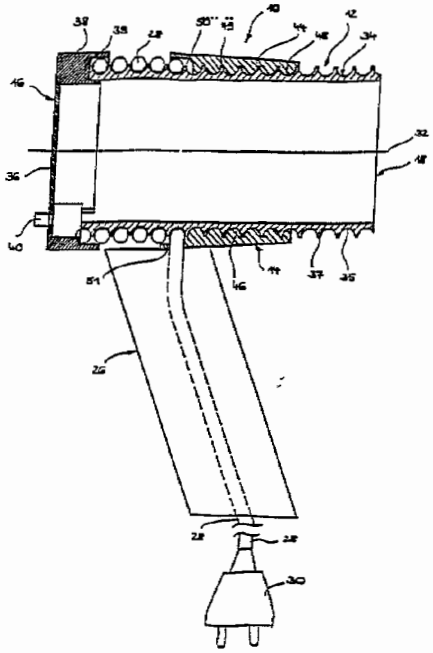
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DE 37 28 885 A1

# (54) Haartrockner mit Kabelaufwickelvorrichtung

(57) Die Erfindung geht aus von einem mit einer Kabelaufwickelvorrichtung ausgestatteten elektrischen Haartrockner (10), der ein wenigstens aus zwei Gehäuseteilen (12, 14) bestehendes Gehäuse aufweist, wobei im ersten, mit einer Lufteintrittsöffnung (16) und einer Luftaustrittsöffnung (18) versehenen Gehäuseteil (12) Mittel zur Erzeugung und gegebenenfalls Erwärmung des Luftstromes untergebracht sind und das erste Gehäuseteil (12) drehbar im zweiten Gehäuseteil (14) gelagert ist und wobei das zweite Gehäuseteil (14), welches das erste Gehäuseteil (12) wenigstens teilweise umgreift, ein Griffteil (26) aufweist, durch das hindurch ein Anschlußkabel (28) auf eine Wickeltrommel geführt ist. Dabei ist das die Wickeltrommel bildende, hohlzylindrische erste Gehäuseteil (12) durch eine Drehung um seine Gehäuselängsachse (32) in axialer Richtung relativ zum zweiten Gehäuseteil (14) verschiebbar.



DE 43 32 300 C 1

DE 43 32 300 C 1



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 489 of 2286

Beschreibung

Die Erfindung geht aus von einem mit einer Kabelaufwickelvorrichtung ausgestatteten elektrischen Haartrockner, der ein wenigstens aus zwei Gehäuseteilen, bestehendes Gehäuse aufweist, wobei im ersten, mit einer Lufteintrittsöffnung und einer Luftaustrittsöffnung versehenen Gehäuseteil Mittel zur Erzeugung und gegebenenfalls Erwärmung des Luftstromes untergebracht sind und das erste Gehäuseteil drehbar im zweiten Gehäuseteil gelagert ist und wobei das zweite Gehäuseteil, welches das erste Gehäuseteil wenigstens teilweise umgreift, ein Griffteil aufweist, durch das hindurch ein Anschlußkabel auf eine Wickeltrommel geführt ist.

Ein derartiger Haartrockner ist bereits aus der DE 37 28 885 A1 bekannt. Bei diesem Haartrockner weist das erste Gehäuseteil neben der elektrischen Einrichtung eine Art Kabeltrommel zur Aufnahme des Anschlußkabels für die Stromversorgung auf. Über den hohl ausgebildeten Griff wird das Kabel auf die Kabeltrommel geführt und auf diese mehrlagig aufgewickelt, wobei hierfür zumindest eine Wickelkammer vorgesehen ist. Diese Wickelkammer wird vom zweiten Gehäuseteil umschlossen. Während des Auf- bzw. Abwickelns des Kabels dreht das gesamte erste Gehäuseteil einschließlich elektrischer Einrichtung mit. Der Griff befindet sich im hinteren Bereich des zweiten Gehäuseteiles, unterhalb der Wickelkammer. Von Nachteil ist, daß durch die Anordnung der gesamten elektrischen Einrichtung im ersten Gehäuseteil der Schwerpunkt des Haartrockners in Richtung des vorderen Gehäuseteiles verschoben ist. Durch diese Verschiebung des Schwerpunktes wird der Haartrockner insgesamt vorderlastig. Damit wird die Handhabung für den Benutzer erschwert und auf die Dauer anstrengend. Von Nachteil ist weiterhin, daß die Kabelaufwicklung im Inneren des Haartrocknergehäuses und darüber hinaus mehrlagig erfolgt und vom Benutzer nicht immer kontrolliert bzw. beeinflußt werden kann. Eventuell auftretende Ungenauigkeiten während des Aufrollvorganges, die gegebenenfalls zu Problemen beim folgenden Herausziehen des Kabels führen, können nur behoben werden, indem man die beiden Gehäuseteile trennt, was jedoch aufgrund der gewählten Verbindung der beiden Gehäuseteile nicht vorgesehen ist und zu Beschädigungen am Haartrockner, zumindest jedoch am Haartrocknergehäuse, führen würde. Dadurch, daß die Kabeltrommel sich in Richtung der Gehäuselängsachse hinten an die anderen Bauteile des Haartrockners anschließt, werden die Abmessungen des Haartrockners, insbesondere die Länge des Gehäuses, erheblich vergrößert.

Der Erfindung liegt daher die Aufgabe zugrunde, einen Haartrockner mit einer Kabelaufwickelvorrichtung mit den Merkmalen des Oberbegriffs des Anspruchs 1 derart weiterzubilden, daß eine einfache und sichere Auf- bzw. Abwicklung des Kabels gewährleistet ist und die Abmessungen des Haartrockners sich allenfalls nur unwesentlich vergrößern.

Gelöst wird diese Aufgabe dadurch, daß das die Wickeltrommel bildende, hohlzylindrische, erste Gehäuseteil durch eine Drehung um seine Gehäuselängsachse in axialer Richtung relativ zum zweiten Gehäuseteil verschiebbar ist.

Während das erste Gehäuseteil von Hand gedreht wird und sich dadurch relativ bezüglich des zweiten Gehäuseteiles bewegt, wird für den Benutzer sichtbar und damit kontrollierbar das Anschlußkabel einlagig auf



das erste Gehäuseteil aufgewickelt. Dadurch wird der Umfang des ersten Gehäuseteiles nur gering vergrößert und der anderenfalls im Inneren des Haartrockners erforderliche zusätzliche Stauraum vermieden. Die Größe des Gerätes insgesamt, insbesondere seine Länge, wird dadurch kaum bzw. gar nicht beeinflußt. Der Schwerpunkt befindet sich bei Gebrauch des Gerätes mit abgewickeltem Kabel ideal im Griffbereich und ermöglicht somit eine problemlose Handhabung des Haartrockners durch den Benutzer.

Von einer vorteilhaften Ausgestaltung weist das hohlzylindrische erste Gehäuseteil außenumfangsseitig ein Gewinde auf. Das Kabel wird im Gewinde geführt, so daß eine gleichmäßige Aufwicklung erfolgt. Darüberhinaus werden durch die zylindrische Form des Gehäuseteiles eine vorteilhafte Lagerung für das Kabel ohne Biegebeanspruchung erreicht und Kabelbrüche vermieden.

Dadurch, daß das Gewinde Gewindegänge eines Rundgewindes mit einem jeweils seitlich vorgesehenen Steg aufweist, kann durch den Bereich mit einer nahezu halbkreisförmigen Innenkontur zwischen den Stegen das Kabel in dieser Gewindekontur nahezu vollständig und damit in etwa formschlüssig aufgenommen werden. Die durch den Formschluß vorhandene geringe Reibung zwischen Gewindekontur und Anschlußkabel sorgt für eine sichere Lagerung des Anschlußkabels im Gewinde und verhindert somit ein ungewollt es Abwikkeln.

In einer vorteilhaften Weiterbildung der Erfindung weist die am ersten Gehäuseteil vorgesehene Lufteintrittsöffnung ein Einlaßgitter auf, welches mit einem Ring mit einer stirnseitigen Nut verbunden ist. Wird durch Zug am Kabel das Kabel vom ersten Gehäuseteil abgewickelt, verschiebt sich durch die Drehbewegung dieser Ring gemeinsam mit dem ersten Gehäuseteil in axialer Richtung bis der Ring am zweiten Gehäuseteil antrifft und damit eine Drehbegrenzung für das erste Gehäuseteil bildet. Die Nut überdeckt den ersten Gewindegang des Kabels mit Anschlüssen und verhindert damit eine Übertragung der Zugwirkung auf die Kabelanschlüsse.

In einer vorteilhaften Weiterbildung der Erfindung ist das zweite Gehäuseteil im wesentlichen als Hohlzylinder ausgebildet und weist ein Innengewinde auf. Durch diese Ausbildung kann das erste Gehäuseteil im zweiten Gehäuseteil gelagert werden. Das Gewinde des zweiten Gehäuseteiles wird vom Gewinde des ersten Gehäuseteiles aufgenommen, wodurch eine drehbare Anordnung beider Gehäuseteile zueinander erfolgen kann. Der Hohlzylinder dient darüber hinaus als Führung für das erste Gehäuseteil während der Drehbewegung für die Kabelaufwicklung. Der mit dem zweiten Gehäuseteil fest verbundene Griff befindet sich unter dem Schwerpunkt, so daß die Handhabung des Haartrockners in gewohnter Weise erfolgen kann.

Von Vorteil weist das Innengewinde Gewindegänge mit einer konvexen Außenkontur und einer jeweils seitlich vorgesehenen Nut auf. Diese Außenkontur entspricht in etwa der Kontur, die das außenumfangsseitige Gewinde des ersten Gehäuseteiles mit aufgewickeltem Kabel aufweist. Da das zweite Gehäuseteil das erste Gehäuseteil im wesentlichen immer in einem Bereich ohne Kabel umschließt, ist so ein formgerechtes Ineinandergreifen von Außen- und Innengewinde beider Gehäuseteile und ein leichtgängiges Drehen beider Gehäuseteile möglich.

In vorteilhafter Weiterbildung weist der Hohlzylinder

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 490 of 2286

einerends eine Erweiterung zur Führung und eine Öffnung zur Durchführung des Anschlußkabels auf. Das Anschlußkabel wird, nachdem es aus dem Griff über die Öffnung in den Hohlzylinder gelangt, in der Erweiterung aufgenommen und auf den Gewindegang geführt, der von der Erweiterung in der jeweiligen Position beider Gehäuseteile zueinander umschlossen wird. Mit Drehung des ersten Gehäuseteiles verschiebt sich dieses relativ zum zweiten Gehäuseteil und damit auch zur Erweiterung, wobei bedingt durch die gewählten Gewindekonturen beider Gehäuseteile die Erweiterung immer exakt einen Gewindegang umschließt und somit sowohl beim Auf- als auch beim Abwickeln des Kabels für eine einwandfreie Kabelführung sorgt. Bedingt dadurch, daß die Position der Erweiterung wie auch der Öffnung zum Kabel unveränderlich ist, kann sich das Anschlußkabel im Bereich des Griffteiles weder verkanten noch durch Lockerung über die Erweiterung hinaus verschieben. Damit wird ein exaktes, einlagiges Aufwikkeln des Anschlußkabels auf das erste Gehäuseteil erreicht und ein Verklemmen, bspw. zwischen zwei Gewindegängen, ausgeschlossen.

In einer äußert vorteilhaften Variante der Erfindung ist das zweite Gehäuseteil als Zylinderring ausgebildet und von einer als Hohlzylinder ausgebildeten Hülse umfaßt, die das erste Gehäuseteil im wesentlichen in sich aufnimmt. Das Anschlußkabel, welches auf das drehbar angeordnete erste Gehäuseteil aufgewickelt wird, kann so sowohl in der Kontor der Gewindegänge als auch durch die Hülse als obere Anlage über die gesamte Länge des Gehäuseteiles geführt und somit eine Lockerung einzelner Wicklungen vermieden werden. Darüber hinaus dient die Hülle als Sicherung gegen ein ungewolltes selbsttätiges Rückdrehen des ersten Gehäuseteiles und Abwickeln des Anschlußkabels. Weitere Verdrehsicherungen für das erste Gehäuseteil oder Bremsen für das Anschlußkabel entfallen.

Mit Vorteil weist der Zylinderring ein Innengewinde auf und ist über einen Ansatz mit einer Griffplatte des Griffteiles verbunden. Durch diese Ausbildung des Zylinderringes können beide Gehäuseteile drehbar zueinander angeordnet werden, wobei das zweite Gehäuseteil das erste Gehäuseteil teilweise umschließt. Die Verbindung des als Zylinderring ausgebildeten zweiten Gehäuseteiles über die Griffplatte und den Ansatz mit dem Griff sorgt für einen sicheren Sitz des Griffteiles am Haartrockner.

In einer vorteilhaften Weiterbildung verfügt das Innengewinde über Gewindegänge mit einer konvexen Außenkontur und einer jeweils seitlich vorgesehenen Nut. Diese Gewindekontur ist so gewählt, daß die Gewinde beider Gehäuseteile in etwa formschlüssig ineinander eingreifen, wobei ein leichtgängiges Drehen der beiden Gehäuseteile möglich ist.

In einer vorteilhaften Weiterbildung der Erfindung weist die Hülse in einem unteren Bereich eine langschlitzartige Öffnung auf. In dieser Öffnung wird der Ansatz während der Drehbewegung des ersten Gehäuseteiles geführt, so daß die Öffnung der Hülse eine Begrenzung für die axiale Verschiebung beider Gehäuseteile zueinander bildet.

Dadurch, daß auf das erste Gehäuseteil im Bereich der Luftaustrittsöffnung ein Gewindering aufschraubbar ist, ist gesichert, daß die Hülse nicht über das Ende des ersten Gehäuseteiles, d. h. die Luftaustrittsöffnung hinaus verschoben werden kann.

Es zeigen:

**Fig. 1** eine schematische Darstellung eines Haartrockners mit Kabelaufwickelvorrichtung, gemäß einem ersten Ausführungsbeispiel der Erfindung, teilweise im Längsschnitt;

**Fig. 2** das erste Gehäuseteil gemäß **Fig. 1** im Längsschnitt;

**Fig. 3** das zweite Gehäuseteil gemäß **Fig. 1** im Längsschnitt;

**Fig. 4** eine schematische Darstellung eines Haartrockners mit Kabelaufwickelvorrichtung, gemäß einem zweiten Ausführungsbeispiel der Erfindung, teilweise im Längsschnitt.

Der Haartrockner **10** besteht aus zwei Gehäuseteilen **12, 14**, die hohlzylindrisch ausgebildet und drehbar zueinander angeordnet sind, wobei das zweite Gehäuseteil **14** wenigstens teilweise das erste Gehäuseteil **12** umgreift. An den jeweiligen Enden des ersten Gehäuseteiles **12** sind eine Lufteintrittsöffnung **16** bzw. eine Luftaustrittsöffnung **18** vorgesehen. Die Lufteintrittsöffnung **16** weist ein Einlaßgitter **36** auf, welches mit einem Ring **38** verbunden ist. Dieser Ring **38** ist am ersten Gehäuseteil **12** festgelegt. Im ersten Gehäuseteil **12** sind die Mittel zur Erzeugung und gegebenenfalls Erwärmung des Luftstromes (in der Zeichnung nicht dargestellt) angeordnet und über einen Schalter **40** am Einlaßgitter **36** mit einem Anschlußkabel **28** mit Stecker **30** verbunden. Das Anschlußkabel **28** wird über ein fest mit dem zweiten Gehäuseteil **14** verbundenes Griffteil **26** und eine Öffnung **51** zur Durchführung des Kabels **28**, die in einer Erweiterung **50** des zweiten Gehäuseteiles **14** vorgesehen ist, zum Schalter **40** am Einlaßgitter **36** geführt. Außenumfangsseitig weist das erste Gehäuseteil **12** ein Gewinde **34** auf.

Wird nunmehr das erste Gehäuseteil **12** über den Ring **38** mit der Hand vom Benutzer gedreht, so wird das Anschlußkabel **28**, beginnend am Einlaßgitter **36** einlagig auf das Gewinde **34** aufgewickelt. Es wird dabei in den Gewindegängen **35** eines Rundgewindes mit einer annähernd halbkreisförmigen Innenkontur aufgenommen, wobei jeweils seitlich ausgebildete Stege **37** für eine exakte Trennung der einzelnen Kabelwicklungen sorgen. Das erste Gehäuseteil **12** läuft dabei über sein Gewinde **34** in einem Innengewinde **46** des als Hohlzylinder **44** ausgebildeten zweiten Gehäuseteiles **14**, welches Gewindegänge **48** mit einer konvexen Außenkontur und einer jeweils seitlich vorgesehenen Nut **49** aufweist. In allen Ausführungsbeispielen verläuft dabei ein Gewindegang des Außengewindes **34** immer von der Mitte eines Steges **37** bis zur Mitte des nächsten Steges **37**, so daß der Bereich mit der in etwa halbkreisförmigen Innenkontur jeweils mittig zwischen den Stegen vorgesehen ist. Bei dem Innengewinde **46** verläuft ein Gewindegang **48** jeweils von der Mitte einer Nut **49** bis zur Mitte der nächsten Nut **49**, so daß der Bereich mit der konvexen Außenkontur jeweils mittig zwischen den Nuten **49** vorgesehen ist. Als Drehbegrenzung während des Aufwickelvorganges für das erste Gehäuseteil **12** wirkt der Stecker **30**, der außerhalb des Griffteiles **26** verbleibt und damit als Anschlag dient. Das ungewollte Rückdrehen des ersten Gehäuseteils **12** kann mit an sich bekannten Mitteln (nicht dargestellt), z. B. durch einen Fingertaster oder eine andere gleichwertige Bremse, verhindert werden.

Die Abwicklung des Anschlußkabels **28** erfolgt durch Zug am Anschlußkabel **28**, wodurch das erste Gehäuseteil **12** in eine Drehbewegung versetzt wird. Gleichzeitig mit der Drehbewegung erfolgt über das Gewinde **34** eine Verschiebung des ersten Gehäuseteiles **12** in axialer Richtung zu einer Gehäuselängsachse **32** relativ

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 491 of 2286

zum zweiten Gehäuseteil **14**. Der am ersten Gehäuseteil **12** festgelegte Ring **38** an der Lufteinlaßöffnung **16** bewegt sich dadurch ebenfalls in Richtung des zweiten Gehäuseteiles **14** bis zum Auftreffen am Gehäuseteil **14**, wodurch der Ring **38** eine weitergehende Drehung des ersten Gehäuseteiles **12** verhindert und als Anschlag dient. Der erste der Gewindegänge **35** des Rundgewindes wird dabei von einer Ausnehmung **39** des Ringes **38** überdeckt, so daß der Anschluß des Anschlußkabels **28** für den Benutzer unsichtbar ist und eine Berührung der Kabelanschlüsse durch den Benutzer vermieden wird. Über den Schalter **40** am Einlaßgitter **36** kann der Haartrockner **10** eingeschaltet werden. Je nach Art des Schalters **40** können darüber hinaus der Luftdurchsatz und die Temperatur des Luftstromes variiert werden. Es ist ebenso möglich, über einen Kontaktschalter bei Annäherung beider Gehäuseteile **12, 14** und Unterschreiten eines Minimalabstandes zwischen dem Ring **38** und dem zweiten Gehäuseteil **14** den Haartrockner **10** automatisch einzuschalten.

In **Fig. 2** ist das erste Gehäuseteil **12** dargestellt. Es ist hohlzylindrisch ausgebildet und weist außenumfangsseitig das Gewinde **34** auf. Dieses Gewinde **34** verfügt über Gewindegänge **35** eines Rundgewindes mit einem jeweils seitlich vorgesehenen Steg **37**, wobei zwischen den Stegen **37** jeweils Bereiche mit einer annähernd halbkreisförmigen Innenkontur vorgesehen sind, in denen das Anschlußkabel **28** nahezu vollständig aufgenommen und über die gesamte Länge des ersten Gehäuseteiles **12** geführt wird. Ebenso möglich wären andere Gewindegeometrien, z. B. abgewandelte flach- oder Trapezgewinde, die in vorteilhafter Weise eine sichere Aufnahme und Lagerung des Kabels **28** ermöglichen.

Einen in Richtung der Luftaustrittsöffnung **18** abnehmenden Gehäuseumfang weist das zweite Gehäuseteil **14** auf. Es ist als Hohlzylinder **44** ausgebildet und mit einem Innengewinde **46** versehen. Das Gewinde **46** hat Gewindegänge **48** mit konvexer Außenkontur und einer jeweils seitlich vorgesehenen Nut **49**. Die der Form des Gewindes **34** des ersten Gehäuseteiles **12** mit innenliegendem Anschlußkabel **28** entsprechende Form des Innengewindes **46** gestattet somit ein formgerechtes Ineinandergreifen beider Gehäuseteile **12, 14** und eine leichtgängige Drehbewegung der Gehäuseteile **12, 14**. Der Hohlzylinder **44** weist einerends eine Erweiterung **50** mit einer Öffnung **51** auf, durch die das Anschlußkabel **28** aus dem Griffteil **26** in Richtung Gewinde **34** geführt wird. Die äußere Form des Gehäuseteiles **14** kann ebenso zylindrisch wie auch stark kegelförmig ausgebildet sein.

In einem zweiten Ausführungsbeispiel wird das hohlzylindrisch ausgebildete erste Gehäuseteil **12** von einer bevorzugt durchsichtigen, als Hohlzylinder **42** ausgebildeten Hülse **24** im wesentlichen in sich aufgenommen. Durch einen Gewindering **58**, der im Bereich der Luftaustrittsöffnung **18** des ersten Gehäuseteiles **12** aufgeschraubt ist und dem fest mit dem ersten Gehäuseteil **12** verbundenen Ring **38** im Bereich der Lufteintrittsöffnung **16**, wird diese Hülse **24** auf dem ersten Gehäuseteil **12** gegen eine ungewollte axiale Verschiebung gesichert und während einer Bewegung der beiden Gehäuseteile **12, 14** relativ zueinander geführt. Eine Führung der Hülse **24** in radlaler Richtung erfolgt durch das zweite Gehäuseteil **14**. Im Bereich des Griffteiles **26** weist die Hülse **24** eine längschlitzartige, sich nahezu über ihre gesamte Länge erstreckende Öffnung **56** auf, innerhalb der sich das Griffteil **26** während des Auf- bzw. Abwickelns des Anschlußkabels **28** parallel zur Gehäuselängsachse **32** verschiebt. Das zweite Gehäuseteil **14** ist als Zylinderring **52** ausgebildet und weist ein Innengewinde **46** auf, welches über Gewindegänge **48** mit konvexer Außenkontur und einer jeweils seitlich vorgesehenen Nut **49** verfügt. Verbunden ist der Zylinderring **52** mit dem Griffteil **26** über eine Griffplatte **22** und einen Ansatz **20**.

Wird nunmehr das erste Gehäuseteil **12** über den fest mit diesem verbundenen Ring **38** von Hand gedreht, erfolgt eine Aufwicklung des Anschlußkabels **28**, wobei das Anschlußkabel **28** einlagig in den aufeinanderfolgenden Gewindegängen **35** des Gewindes **34** aufgenommen wird, wobei die jeweils seitlich vorgesehenen Stege **37** für eine exakte Trennung der einzelnen Kabelwicklungen sorgen. Der erste der Gewindegänge **35** wird von einer Ausnehmung **39** überdeckt. Während der Drehbewegung verschiebt sich das erste Gehäuseteil **12** relativ zum zweiten Gehäuseteil **14**, wobei die längschlitzartige Öffnung **56** in der Hülse **24** dem Bereich entspricht, in welchem die Verschiebung beider Gehäuseteile **12, 14** zueinander erfolgen soll und kann. Eine zusätzliche Drehbegrenzung für die Kabelaufwicklung ist auch hier das Anschlußkabel **28** mit einem Stecker **30**, der außerhalb des Griffteiles **26** verbleibt.

Die Abwicklung des Anschlußkabels **28** erfolgt durch Zug am Anschlußkabel **28**. Dadurch wird das erste Gehäuseteil **12** in eine Drehbewegung um die Gehäuselängsachse **32** versetzt, wobei es sich in Richtung zweites Gehäuseteil **14** verschiebt. Die Öffnung **56** in der Hülse **24** dient auch hier als Drehbegrenzung für die beiden Gehäuseteile **12, 14**, deren Verschiebung zueinander nur innerhalb des Bereiches der Öffnung **56** erfolgen kann. Während der Abwicklung wird das Kabel **28** vom Gewinde **34** über die Öffnung **56** in der Hülse **24** und eine Ausnehmung **54** in der Griffplatte **22** durch das Griffteil **26** geführt. Eingeschaltet wird der Haartrockner **10** über einen Schalter **40**, der an einem Einlaßgitter **36** der Lufteintrittsöffnung **16** angeordnet und fest mit dem Ring **38** verbunden ist.

## Patentansprüche

1. Mit einer Kabelaufwickelvorrichtung ausgestatteter elektrischer Haartrockner **(10)**, der ein wenigstens aus zwei Gehäuseteilen **(12, 14)** bestehendes Gehäuse aufweist, wobei im ersten, mit einer Lufteintrittsöffnung **(16)** und einer Luftaustrittsöffnung **(18)** versehenen Gehäuseteil **(12)** Mittel zur Erzeugung und gegebenenfalls Erwärmung des Luftstromes untergebracht sind und das erste Gehäuseteil **(12)** drehbar im zweiten Gehäuseteil **(14)** gelagert ist und wobei das zweite Gehäuseteil **(14)**, welches das erste Gehäuseteil **(12)** wenigstens teilweise umgreift, ein Griffteil **(26)** aufweist, durch das hindurch ein Anschlußkabel **(28)** auf eine Wickeltrommel geführt ist, **dadurch gekennzeichnet,** daß das die Wickeltrommel bildende, hohlzylindrische erste Gehäuseteil **(12)** durch eine Drehung um seine Gehäuselängsachse **(32)** in axialer Richtung relativ zum zweiten Gehäuseteil **(14)** verschiebbar ist.

2. Haartrockner mit Kabelaufwickelvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das hohlzylindrische erste Gehäuseteil **(12)** außenumfangsseitig ein Gewinde **(34)** aufweist.

3. Haartrockner mit Kabelaufwickelvorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß das Gewinde **(34)** Gewindegänge **(35)** eines Rundgewindes mit einem jeweils seitlich vorgesehenen Steg **(37)** aufweist.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 492 of 2286

4. Haartrockner mit Kabelaufwickelvorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die am ersten Gehäuseteil (12) vorgesehene Lufteintrittsöffnung (16) ein Einlaßgitter (36) aufweist, welches mit einem Ring (38) mit einer stirnseitigen Nut (39) verbunden ist.

5. Haartrockner mit Kabelaufwickelvorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß das zweite Gehäuseteil (14) im wesentlichen als Hohlzylinder (44) ausgebildet ist und ein Innengewinde (46) aufweist.

6. Haartrockner mit Kabelaufwickelvorrichtung nach Anspruch 5, dadurch gekennzeichnet, daß das Innengewinde (46) Gewindegänge (48) mit einer konvexen Außenkontur und einer jeweils seitlich vorgesehenen Nut (49) aufweist.

7. Haartrockner mit Kabelaufwickelvorrichtung nach Anspruch 5, dadurch gekennzeichnet, daß der Hohlzylinder (44) einerends eine Erweiterung (50) zur Führung und eine Öffnung (51) zur Durchführung des Anschlußkabels (28) aufweist.

8. Haartrockner mit Kabelaufwickelvorrichtung nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß das zweite Gehäuseteil (14) als Zylinderring (52) ausgebildet und von einer als Hohlzylinder (42) ausgebildeten Hülse (24) umfaßt ist, die das erste Gehäuseteil (12) im wesentlichen in sich aufnimmt.

9. Haartrockner mit Kabelaufwickelvorrichtung nach Anspruch 8, dadurch gekennzeichnet, daß der Zylinderring (52) ein Innengewinde (46) aufweist und über einen Ansatz (20) mit einer Griffplatte (22) des Griffteiles (26) verbunden ist.

10. Haartrockner mit Kabelaufwickelvorrichtung nach Anspruch 9, dadurch gekennzeichnet, daß das Innengewinde (46) über Gewindegänge (48) mit einer konvexen Außenkontur und einer jeweils seitlich vorgesehenen Nut (49) verfügt.

11. Haartrockner mit Kabelaufwickelvorrichtung nach Anspruch 8, dadurch gekennzeichnet, daß die Hülse (24) in einem unteren Bereich eine langschlitzartige Öffnung (56) aufweist.

12. Haartrockner mit Kabelaufwickelvorrichtung nach Anspruch 8, dadurch gekennzeichnet, daß auf das erste Gehäuseteil (12) an der Luftaustrittsöffnung (18) ein Gewindering (58) aufschraubbar ist.

Hierzu 3 Seite(n) Zeichnungen

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 493 of 2286

Nummer: DE 43 32 300 C1
Int. Cl.[5]: B 65 H 75/38
Veröffentlichungstag: 22. Dezember 1994

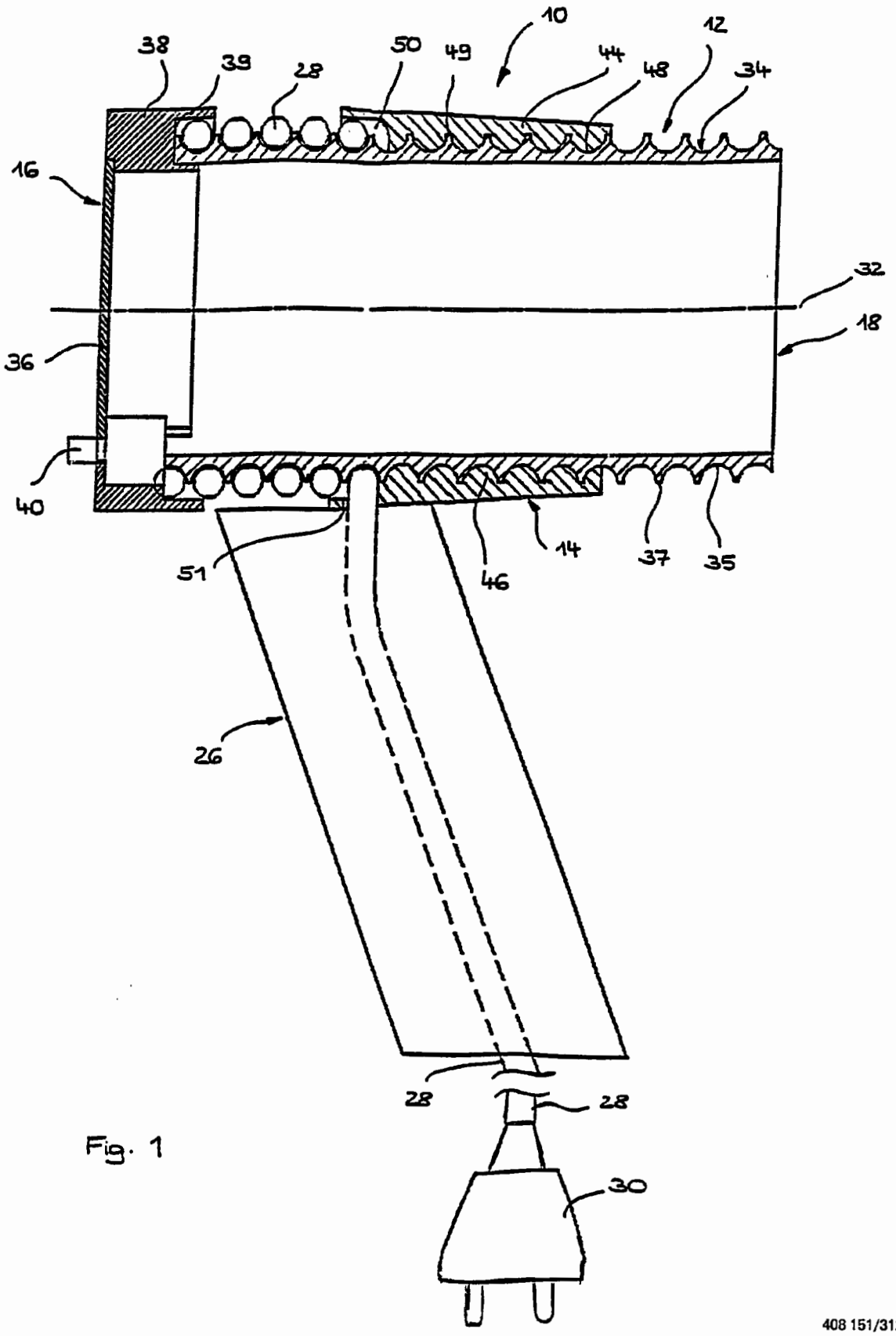



Fig. 1

408 151/312

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 494 of 2286

Nummer: DE 43 32 300 C1
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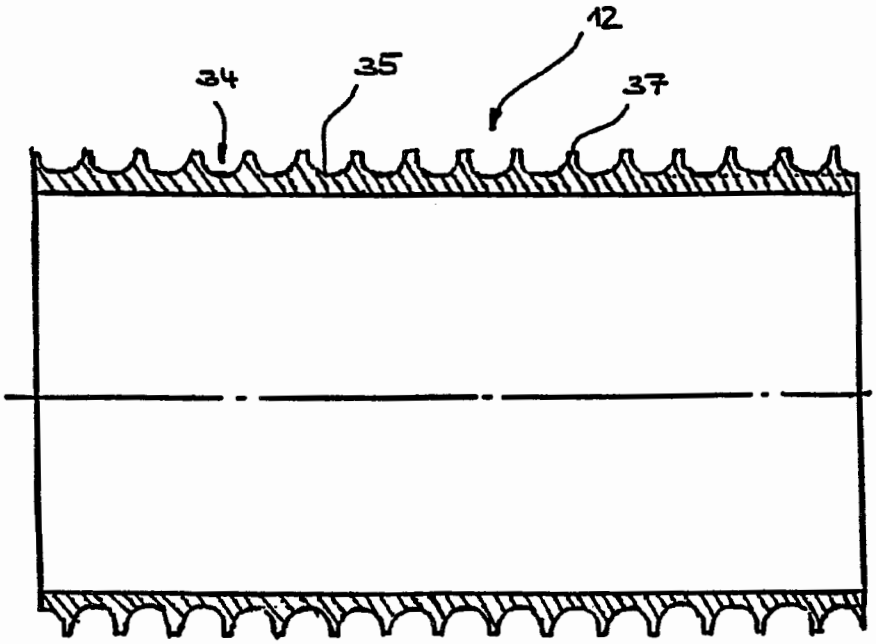



Fig. 2

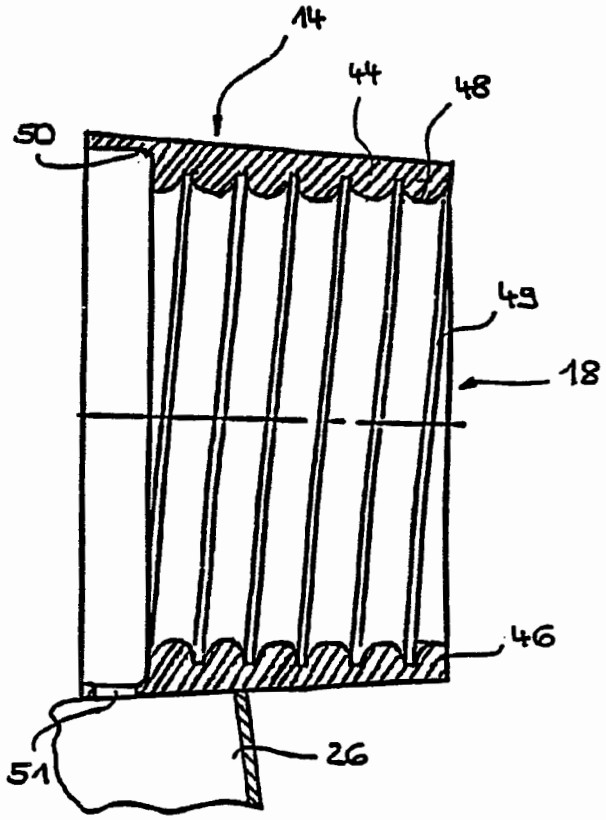



Fig. 3



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 495 of 2286

Nummer: DE 43 32 300 C1
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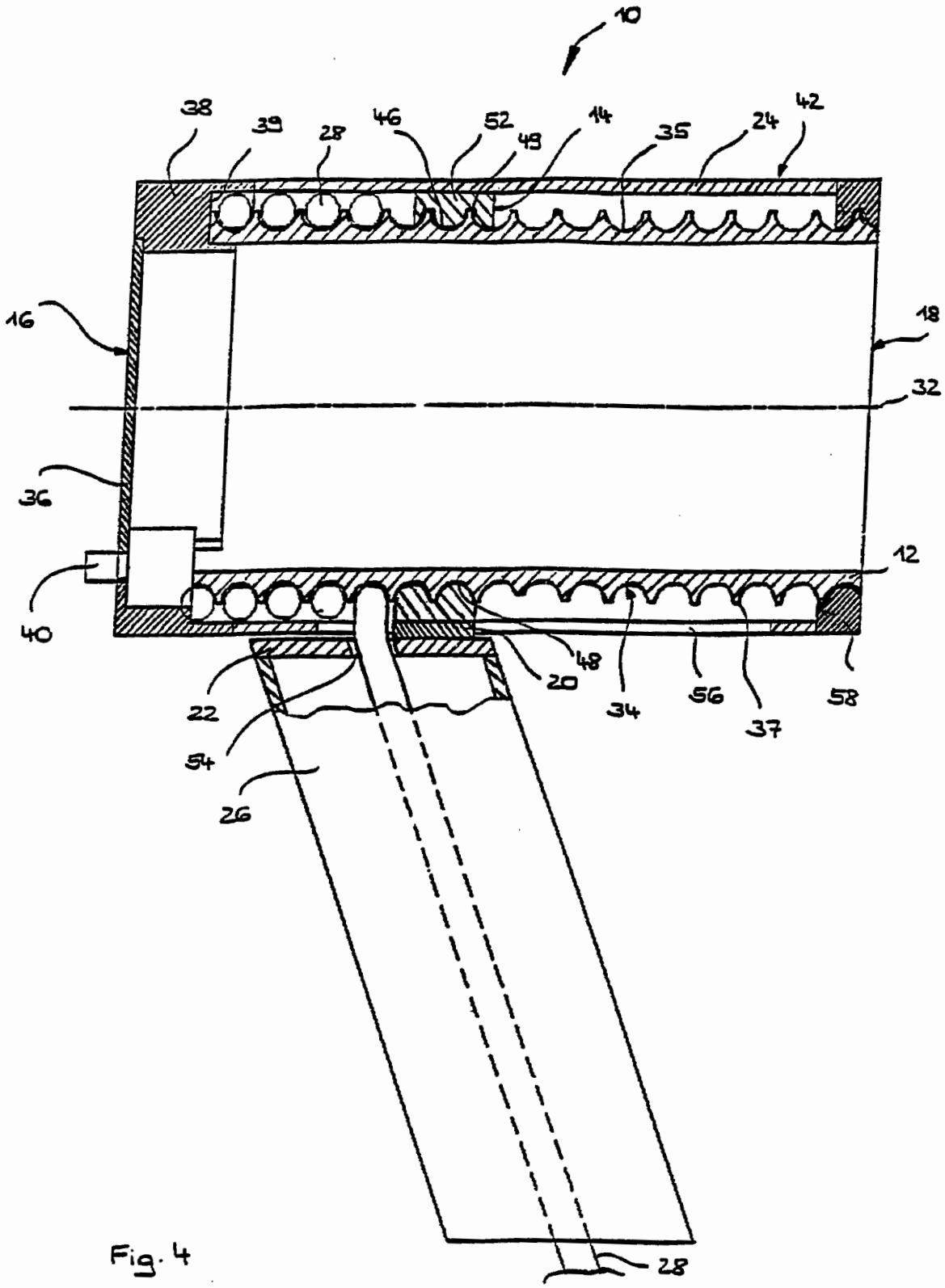



Fig. 4



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 496 of 2286

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(71)Applicant: **TOSHIBA HOME TECHNOL CORP**
(22)Date of filing: **30.06.1993**
(72)Inventor: **IURA TOMIO**

# (54) HAIR DRYER

(57)Abstract:
PURPOSE: To suppress the rise of the peripheral surface temp. of a dryer body by preventing back flow of hot air into the spacing between the outer peripheral surface of an air tunnel of a fan unit and the inside peripheral surface of the dryer body.
CONSTITUTION: This hair dryer has the dryer body 10, a fan unit 20 and shielding plate 21 disposed within the dryer body 10 and a heater 22 disposed on the inner side of the shielding plate 21. This fan unit 20 is constituted by disposing a fan 27 driven by a motor 26 within the cylindrical air tunnel 23 fitted to the inner periphery of the dryer body 10 and ribs 18 are integrally projected and formed at the outer peripheral edge on one end side adjacent to the shielding plate 21 in the air tunnel 23 of the fan unit 20. Further, the ribs 28 are brought into tight contact with the inner peripheral surface of the dryer body 10 to seal the spacing (a) between the outer peripheral surface of the air tunnel 23 and the inner peripheral surface of the dryer body 10.

## CLAIMS

[Claim 1]Have the following and the aforementioned fan unit provides a fan driven by a motor in a cylindrical air duct which fitted into inner circumference of a dryer body, In a drier which sucks air from the aforementioned inlet port to dryer body Uchi with the aforementioned fan, ventilates the circumference of the aforementioned heater through inside of the aforementioned air duct, makes this air warm air, and discharges this warm air from the aforementioned discharge port, A drier carrying out formed protruding of the rib to a periphery edge by the side of an end which adjoins the aforementioned heat shield plate integrally, making an air duct in the aforementioned fan unit stick this rib to an inner peripheral surface of a dryer body, and having sealed a crevice between Hazama of an outer peripheral surface of the aforementioned air duct, and an inner peripheral surface of a dryer body to it.
A cylindrical dryer body with [ tip surface / discharge port ] an inlet port to a rear end face.
A fan unit provided by this dryer body Uchi.
A heat shield plate provided by inner peripheral surface of a dryer body of Hazama of this fan unit and the aforementioned discharge port.
A heater provided inside this heat shield plate.

## DETAILED DESCRIPTION

[0001]
[Industrial Application]This invention relates to the drier used for hairdressing etc.
[0002]
[Description of the Prior Art]A part of structures of the conventional drier are shown in Fig.3, and the fan unit 2 and the heat shield plate 3 are provided in this dryer body 1 with the dryer body in which the code 1 was cylindrically formed with the synthetic resin. The heat shield plate 3 consists of metal plates, it is attached so that the inner peripheral surface of the dryer body 1 may be met, and the heater 4 is arranged inside this heat shield plate 3.
[0003]The air duct 5 in which the fan unit 2 was formed cylindrical with the synthetic resin, The holder 7 supported by the central part of the end side edge of this air duct 5 via two or more blade 6 --, It comprises the motor 8 with which it was equipped in this holder 7, and the fan 9 which was attached to the axis of rotation 8a of this motor 8, and has been arranged in the air duct 5, and the aforementioned air duct 5 fits into the inner circumference of the dryer body 1, and is supported.
[0004]At the time of use of a drier, the heater 4 and the motor 8 energize, and the fan 9 drives by the motor 8, it rotates, and air is sucked one by one in the dryer body 1 by rotation of this fan 9 from the inlet port (not shown) by the side of the back end of the dryer body 1.
[0005]The air sucked in the dryer body 1 circulates the inside of the air duct 5 of the fan unit 2, and is ventilated at the arrangement side of the heater 4. And this air is heated by contact with the heater 4, it becomes warm air, and this warm air is discharged one by one from the discharge port (not shown) by the side of the tip of the dryer body 1.

[0006]
[Problem to be solved by the invention]The heat shield plate 3 provided by the inner peripheral surface of the dryer body 1 is provided in order to intercept the radiant heat of the heater 4 and to inhibit the rise of the peripheral surface temperature of the dryer body 1.
[0007]However, few crevices a are between the outer peripheral surface of the air duct 5 and the inner peripheral surface of the dryer body 1 in the fan unit 2, The high temperature warm air heated with the heater 4 flows backwards and enters in this crevice a, and there is a problem that this warm air will contact the inner peripheral surface of the dryer body 1, and will raise the peripheral surface temperature of the dryer body 1.
[0008]The place which this invention was made paying attention to such a point, and is made into that purpose, It is in providing the drier which can prevent the back run of the warm air into the crevice between the outer peripheral surface of an air duct and the inner peripheral surface of a dryer body in a fan unit, and can inhibit the rise of the peripheral surface temperature of a dryer body reliably.
[0009]
[Means for solving problem]A cylindrical dryer body with [ tip surface / discharge port ] an inlet port to a rear end face in order that this invention may attain such a purpose, The fan unit provided by this dryer body Uchi and the heat shield plate provided by the inner peripheral surface of the dryer body between this fan unit and the aforementioned discharge port, Provide the heater provided inside this heat shield plate, and the aforementioned fan unit, The fan driven by a motor in the cylindrical air duct which fitted into the inner circumference of a dryer body is provided, In the drier which sucks air from the aforementioned inlet port to dryer body Uchi with the aforementioned fan, ventilates the circumference of the aforementioned heater through the inside of the aforementioned air duct, makes this air warm air, and discharges this warm air from the aforementioned discharge port, Carry out formed protruding of the rib to the periphery edge by the side of the end which adjoins the aforementioned heat shield plate integrally, the air duct in the aforementioned fan unit is made to stick this rib to the inner peripheral surface of a dryer body, and the crevice between the outer peripheral surface of the aforementioned air duct and the inner peripheral surface of a dryer body is sealed to it.
[0010]
[Function]The radiant heat of a heater is intercepted by a heat shield plate, and the direct exposure to the dryer body of the radiant heat is prevented. And the back run of the warm air into the crevice between the outer peripheral surface of an air duct and the inner peripheral surface of a dryer body in a fan unit is prevented by the rib formed in the periphery edge of an air duct, therefore the rise of the peripheral surface temperature of a dryer body is inhibited reliably.
[0011]
[Working example]Hereafter, with reference to Fig.1 and Fig.2, it describes about one working example of this invention.The side view of the whole drier is shown in Fig.2, and with the cylindrical dryer body in which 10 was formed with the synthetic resin, this dryer body 10 is fitting in and assembling the front case 10a and the rear case 10b, and shines.
[0012]The opening of the tip surface of the dryer body 10 is carried out as the discharge port 11, and this discharge port 11 is equipped with the blast cylinder 12, and the opening of the rear end face of the dryer body 10 is carried out as the inlet port 13, and the guard 14 of mesh state is provided by this inlet port 13.
[0013]The cord reel device 15 is provided at the back end side in the dryer body 10, and the power cord 16 is twisted around this cord reel device 15. The foldable handle 17 is attached to the lower surface of back end slippage of the dryer body 10, and the aforementioned power cord 16 is introduced in this handle 17. And the plug 18 is attached to the point of this power cord 16.
[0014]In the lower part of the handle 17, notching formation of the drawer mouth 19 can be carried out at the portion ranging from that rear face to a lower end surface, and the aforementioned power cord 16 can be pulled out now through this drawer mouth 19 at the lower part side of the handle 17.

[0015]The heat shield plates 21 of metal [ fan unit / 20 / side / tip ] were provided by the pars intermedia in the dryer body 10, respectively, and these fan units 20 and the heat shield plate 21 adjoin and arrange to it. And the heat shield plate 21 is attached so that the inner peripheral surface of the dryer body 10 may be met, as shown in Fig.1, and the heater 22 is provided inside this heat shield plate 21.
[0016]The air duct 23 in which the aforementioned fan unit 20 was formed cylindrical with the synthetic resin, The holder 25 supported by the central part of the end side edge of this air duct 23 via two or more blade 24 --, It comprises the motor 26 with which it was equipped in this holder 25, and Hwang 27 who was attached to the axis of rotation 26a of this motor 26, and has been stationed in the air duct 23, and the aforementioned air duct 23 fits into the inner circumference of the dryer body 10, and is supported.
[0017]And formed protruding of the rib 28 of section triangular shape which is along the periphery edge by the side of the end which adjoins the aforementioned heat shield plate 21 in the hoop direction is integrally carried out to the aforementioned air duct 23, This rib 28 sticks to the inner peripheral surface of the dryer body 10, and the crevice a between Hazama of the outer peripheral surface of the air duct 23 and the inner peripheral surface of the dryer body 10 is sealed by this adhesion in airtight.
[0018]29 shown in Fig.2 is an operation switch of the sliding type provided by the front face of the handle 17. At the time of use of a drier, the power cord 16 is pulled out from the drawer mouth 19, the plug 18 is inserted in an indoor electric socket, and the operation switch 29 is operated. The heater 22 and the motor 26 energize according to this operation, and Hwang 27 drives by the aforementioned motor 26, it rotates, and air is sucked one by one in the dryer body 10 from the inlet port 13 by this Hwang 27 rotation.
[0019]The air sucked in the dryer body 10 circulates the inside of the air duct 23 of the fan unit 20, and is ventilated at the arrangement side of the heater 22. And this air is heated by contact with the heater 22, it becomes warm air, and this warm air is discharged one by one from the discharge port 11.
[0020]The radiant heat of the heater 22 is intercepted by the heat shield plate 21 arranged to the periphery side of this heater 22, therefore the direct exposure of the radiant heat to the dryer body 10 is prevented. And the crevice a between Hazama of the outer peripheral surface of the air duct 23 and the inner peripheral surface of the dryer body 10 in the fan unit 20 is sealed in airtight by the rib 28 integrally formed in the periphery edge of the air duct 23, and, for this reason, the back run of the warm air into this crevice a is prevented by the aforementioned rib 28. Therefore, the rise of the peripheral surface temperature of the dryer body 10 is inhibited reliably, and a drier can be treated safely.
[0021]
[Effect of the Invention]As described above, according to this invention, with an easy structure of carrying out formed protruding of the rib to the periphery edge of the air duct in a fan unit integrally, and sticking this rib to the inner peripheral surface of a dryer body, The effect that the back run of the warm air into the crevice between Hazama of the outer peripheral surface of an air duct and the inner peripheral surface of a dryer body can be prevented, and the rise of the peripheral surface temperature of a dryer body can be inhibited reliably is generated.

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PN - JP7016113 A 19950120

TI - HAIR DRYER

AB - PURPOSE:To suppress the rise of the peripheral surface temp. of a dryer body by preventing back flow of hot air into the spacing between the outer peripheral surface of an air tunnel of a fan unit and the inside peripheral surface of the dryer body. CONSTITUTION:This hair dryer has the dryer body 10, a fan unit 20 and shielding plate 21 disposed within the dryer body 10 and a heater 22 disposed on the inner side of the shielding plate 21. This fan unit 20 is constituted by disposing a fan 27 driven by a motor 26 within the cylindrical air tunnel 23 fitted to the inner periphery of the dryer body 10 and ribs 18 are integrally projected and formed at the outer peripheral edge on one end side adjacent to the shielding plate 21 in the air tunnel 23 of the fan unit 20. Further, the ribs 28 are brought into tight contact with the inner peripheral surface of the dryer body 10 to seal the spacing (a) between the outer peripheral surface of the air tunnel 23 and the inner peripheral surface of the dryer body 10.

PA - TOSHIBA HOME TECH KK



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 500 of 2286

(19)日本国特許庁（ＪＰ）　(12) 公開特許公報（Ａ）　(11)特許出願公開番号

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| Ａ４５Ｄ　20/12 | | Ｃ　7114－3Ｂ | | |

審査請求　未請求　請求項の数１　ＯＬ　（全　４　頁）

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(22)出願日　平成５年(1993)６月30日

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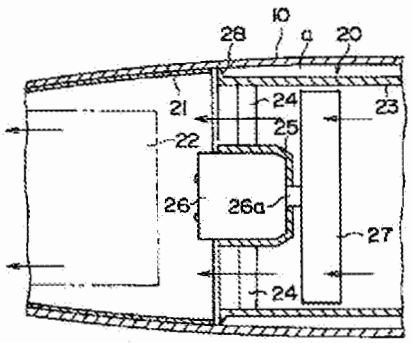
(74)代理人　弁理士　鈴江　武彦

(54)【発明の名称】　ヘアドライヤー

(57)【要約】

【目的】　ファンユニットにおける風洞の外周面とドライヤー本体の内周面との間の隙間内への温風の逆流を防止してドライヤー本体の周面温度の上昇を抑制する。

【構成】ドライヤー本体１０と、このドライヤー本体１０内に設けられたファンユニット２０および遮熱板２１と、前記遮熱板２１の内側に設けられたヒータ２２とを具備し、前記ファンユニット２０はドライヤー本体１０の内周に嵌合した筒状の風洞２３内にモータ２６で駆動されるファン２７を設けてなり、前記ファンユニット２０における風洞２３には、前記遮熱板２１と隣接する一端側の外周縁にリブ２８を一体的に突出形成し、このリブ２８をドライヤー本体１０の内周面に密着させて前記風洞２３の外周面とドライヤー本体１０の内周面との間の隙間ａを封止してある。




10…ドライヤー本体
11…吐出口
13…吸気口
20…ファンユニット
21…遮熱板
22…ヒータ
23…風洞
26…モータ
27…ファン

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 501 of 2286

【００１３】ドライヤー本体１０内の後端側にはコードリール装置１５が設けられ、このコードリール装置１５に電源コード１６が巻き付けられている。またドライヤー本体１０の後端寄りの下面には、折り畳み可能なハンドル１７が取り付けられ、前記電源コード１６がこのハンドル１７内に導入されている。そしてこの電源コード１６の先端部にプラグ１８が取り付けられている。

【００１４】ハンドル１７の下部には、その後面から下端面に亘る部分に引出口１９が切欠形成され、この引出口１９を通して前記電源コード１６をハンドル１７の下方側に引き出すことができるようになっている。

【００１５】ドライヤー本体１０内の中間部にはファンユニット２０が、先端側には金属製の遮熱板２１がそれぞれ設けられ、これらファンユニット２０と遮熱板２１とが隣接して配置している。そして遮熱板２１は図１に示すように、ドライヤー本体１０の内周面に沿うように取り付けられ、この遮熱板２１の内側にヒータ２２が設けられている。

【００１６】前記ファンユニット２０は、合成樹脂により円筒状に形成された風洞２３と、この風洞２３の一端側端面の中央部に複数のブレード２４…を介して支持されたホルダ２５と、このホルダ２５内に装着されたモータ２６と、このモータ２６の回転軸２６ａに取り付けられて風洞２３内に配置したファン２７とで構成され、前記風洞２３がドライヤー本体１０の内周に嵌合して支持されている。

【００１７】そして前記風洞２３には、前記遮熱板２１と隣接する一端側の外周縁にその周方向に沿う断面三角形状のリブ２８が一体に突出形成され、このリブ２８がドライヤー本体１０の内周面に密着し、この密着により風洞２３の外周面とドライヤー本体１０の内周面との間の隙間ａが気密的に封止されている。

【００１８】なお、図２に示す２９は、ハンドル１７の前面に設けられたスライド式の操作スイッチである。ヘアドライヤーの使用時には、電源コード１６を引出口１９から引き出し、プラグ１８を室内コンセントに差し込み、操作スイッチ２９を操作する。この操作に応じてヒータ２２およびモータ２６が通電され、前記モータ２６によりファン２７が駆動されて回転し、このファン２７の回転で吸気口１３からドライヤー本体１０内に空気が順次吸入される。

【００１９】ドライヤー本体１０内に吸入された空気は、ファンユニット２０の風洞２３内を流通してヒータ２２の配置側に送風される。そしてこの空気がヒータ２２との接触で加熱されて温風となり、この温風が吐出口１１から順次吐出される。

【００２０】ヒータ２２の輻射熱は、このヒータ２２の外周側に配置した遮熱板２１により遮断され、したがってドライヤー本体１０への輻射熱の直接の照射が防止される。そしてファンユニット２０における風洞２３の外周面とドライヤー本体１０の内周面との間の隙間ａが、風洞２３の外周縁に一体に形成されたリブ２８により気密的に封止されており、このためこの隙間ａ内への温風の逆流が前記リブ２８により阻止される。したがってドライヤー本体１０の周面温度の上昇が確実に抑制され、ヘアドライヤーを安全に取り扱うことができる。

【００２１】

【発明の効果】以上説明したようにこの発明によれば、ファンユニットにおける風洞の外周縁にリブを一体的に突出形成し、このリブをドライヤー本体の内周面に密着させるという簡単な構造で、風洞の外周面とドライヤー本体の内周面との間の隙間内への温風の逆流を防止してドライヤー本体の周面温度の上昇を確実に抑制することができるという効果を奏する。

【図面の簡単な説明】

【図１】この発明の一実施例に係るヘアドライヤーの要部の断面図。

【図２】そのヘアドライヤーの全体の側面図。

【図３】従来のヘアドライヤーの一部の断面図。

【符号の説明】

１０…ドライヤー本体
１１…吐出口
１３…吸気口
２０…ファンユニット
２１…遮熱板
２２…ヒータ
２３…風洞
２６…モータ
２７…ファン

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 502 of 2286

**Reference D4**

Utility Model:

Application No: H6-13233

Filing Date: September 30, 1994

Registration No: 3014299

Publication date: August 8, 1995

Title of Invention: Hair dryer having a converging nozzle

Applicant: Kyushu Hitachi Maxel

Please see Fig. 1

Reference numerals

7. outlet

8. converging nozzle

33. outlet cylinder

34. inlet cylinder

35. nozzle cylinder

37. throttle wall

38. curved wall

39. outside air introducing recess

41. conduit wall

43. suction passage



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 503 of 2286

(19)日本国特許庁（ＪＰ）　(12) **登録実用新案公報**（U）　(11)実用新案登録番号

**第3014299号**

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| (51)Int.Cl.[6] | 識別記号 | 庁内整理番号 | ＦＩ | 技術表示箇所 |
|---|---|---|---|---|
| Ａ４５Ｄ　20/12 | | | Ｊ | |

評価書の請求　未請求　請求項の数５　ＦＤ　(全 15 頁)

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(22)出願日　平成６年(1994)９月30日

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(74)代理人　弁理士　折寄　武士

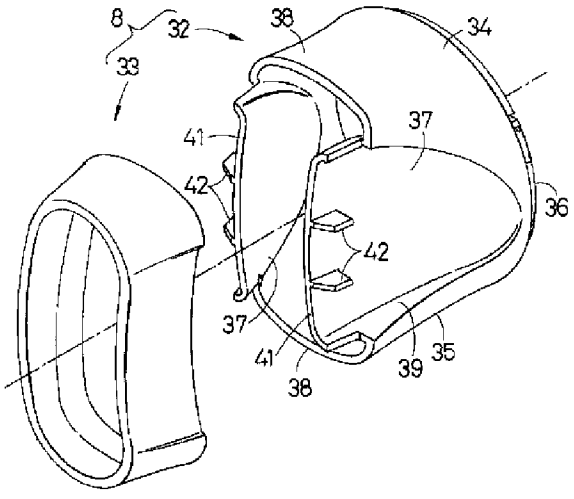
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(54)【考案の名称】　収束ノズルを備えたヘアードライヤ

(57)【要約】

【目的】　吹出口に収束ノズルが設けてあるヘアードライヤにおいて、収束ノズルのベンチュリー作用で外気をノズル内へ効率良く導入し、ノズル内を吹き抜ける温風の温度および湿度を適正に緩和できるようにする。

【構成】　ノズル本体３２と、出口筒３３で収束ノズル８を構成する。ノズル本体３２は円筒状の入口３４と、ノズル内をくさび状に絞るノズル筒３５で構成する。出口筒３３は偏平筒状に形成する。ノズル筒３５に先すぼまり状に対向する左右一対の絞り壁３７を設け、これを他の周壁より凹ませて、外気導入凹部３９とする。絞り壁３７の端部に導風壁４１を突設する。導風壁４１を出口筒３４内に位置させ、両者間に吸気通路４３を形成する。一次吹出風が絞り壁３７で偏平に絞られる間に、吸気通路４３と外気導入凹部３９を介して外気を導入し、一次吹出風に合流させる。




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 504 of 2286

1

【実用新案登録請求の範囲】

【請求項１】　ドライヤ本体１の一端に円筒形の吹出口７が設けられており、この吹出口７に着脱自在に装着される収束ノズル８を備えているヘアードライヤであって、

収束ノズル８は、断面円形の入口筒３４と、偏平筒形の出口筒３３と、入口筒３４と出口筒３３との間のノズル内空間をくさび状に絞るノズル筒３５とを有し、

ノズル筒３５は、出口筒３３の側へ向かって先すぼまり状に傾斜する一対の絞り壁３７と、両絞り壁３７に連続する一対の湾曲壁３８とからなり、

両絞り壁３７は湾曲壁３８との境界においてノズル内方へ段落ち状に凹み形成されて、その外面に外気導入凹部３９を形成しており、

両絞り壁３７の先端に突設した導風壁４１を出口筒３３の内面内方に位置させて、両者３３・４１間に外気導入凹部３９と出口筒３３の内部空間を連通する吸気通路４３を区画した収束ノズルを備えているヘアードライヤ。

【請求項２】　偏平筒形の出口筒３３の内面長手方向のほぼ全長にわたって吸気通路４３が区画してある請求項１記載の収束ノズルを備えているヘアードライヤ。

【請求項３】　外気導入凹部３９の凹み深さが入口筒３４から出口筒３３に近付くに従って漸増するよう形成されており、外気導入凹部３９の凹部幅が出口筒３３に近付くほど拡がるよう形成してある請求項１又は２記載の収束ノズルを備えているヘアードライヤ。

【請求項４】　吸気通路４３の内部に、導風壁４１と出口筒３３の間隔を保持するリブ４２が設けてある請求項１又は２又は３記載の収束ノズルを備えているヘアードライヤ。

2

＊【請求項５】　収束ノズル８が、それぞれ射出成形品からなる偏平筒形の出口筒３３と、ノズル筒３４および入口筒３４を一体に形成したノズル本体３２との２部品からなり、出口筒３３をノズル本体３２に接合固定して収束ノズル８を構成した請求項１又は２又は３又は４記載の収束ノズルを備えているヘアードライヤ。

【図面の簡単な説明】

【図１】図１（ａ）は図２におけるＡ－Ａ線断面図、図１（ｂ）は図１（ａ）におけるＢ－Ｂ線断面図である。

【図２】ヘアードライヤの側面図である。

【図３】ヘアードライヤの縦断側面図である。

【図４】ドライヤ本体の主要部材の分解斜視図である。

【図５】フロントケースの接合構造を示す一部破断平面図である。

【図６】図５におけるＣ－Ｃ線断面図である。

【図７】収束ノズルの分解斜視図である。

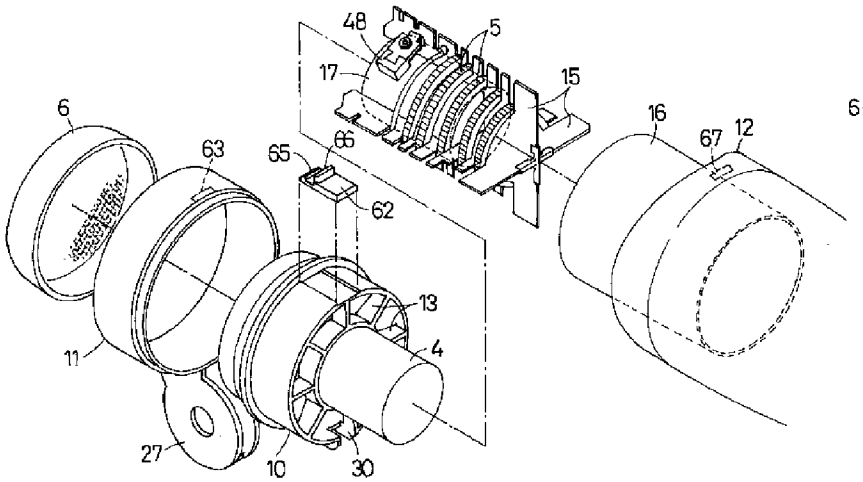
【図８】収束ノズルの側面図である。

【図９】ヘアードライヤの電気回路図である。

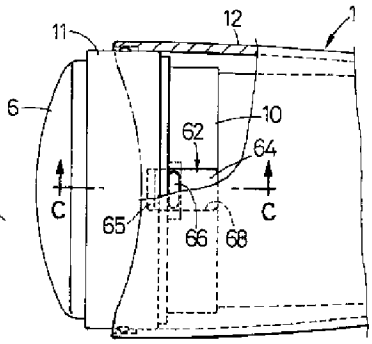
【符号の説明】

１　ドライヤ本体
７　吹出口
８　収束ノズル
３３　出口筒
３４　入口筒
３５　ノズル筒
３７　絞り壁
３８　湾曲壁
３９　外気導入凹部
４１　導風壁
４３　吸気通路

【図４】

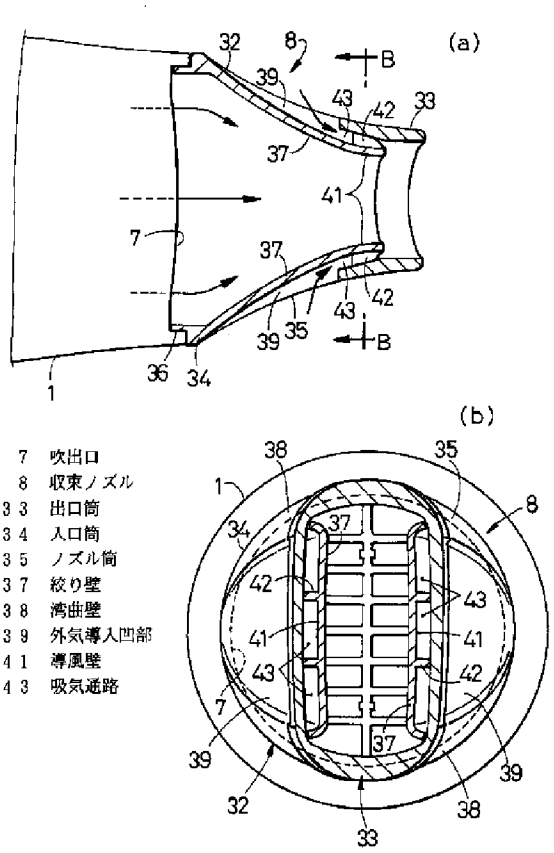



【図５】

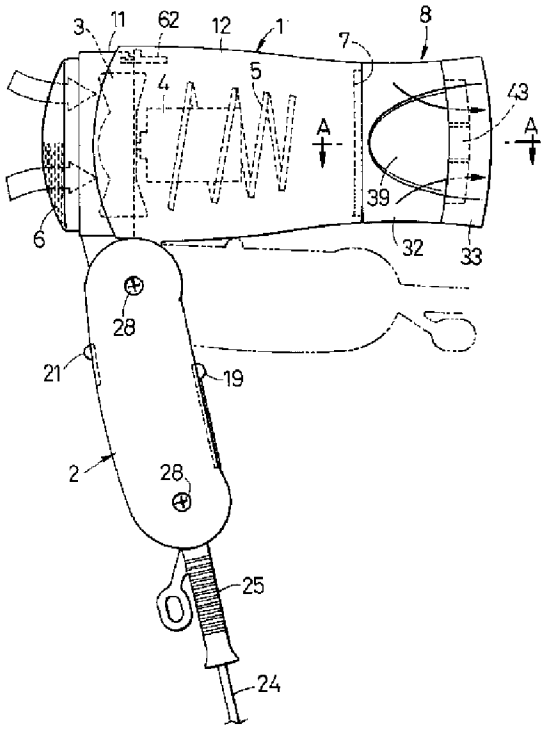



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 505 of 2286

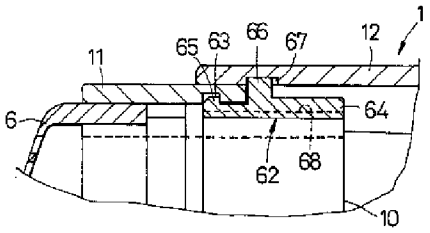
【図１】



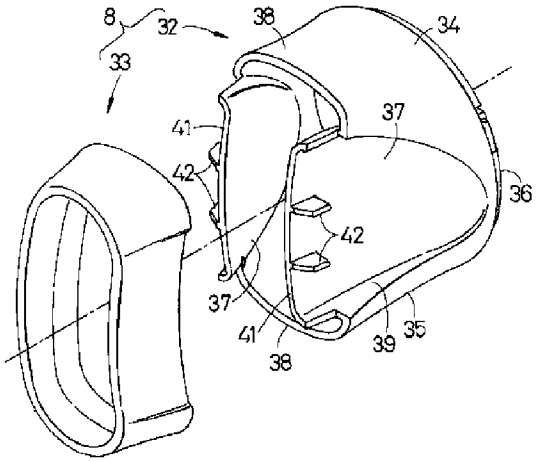

【図２】




【図６】

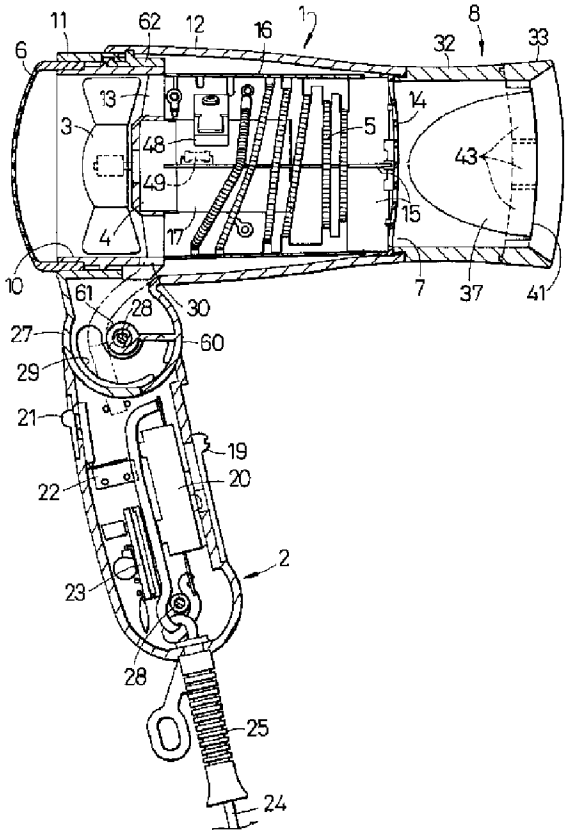


【図７】

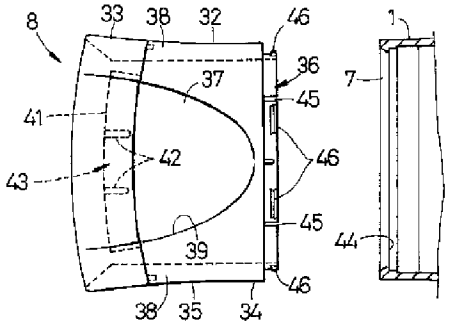


SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 506 of 2286

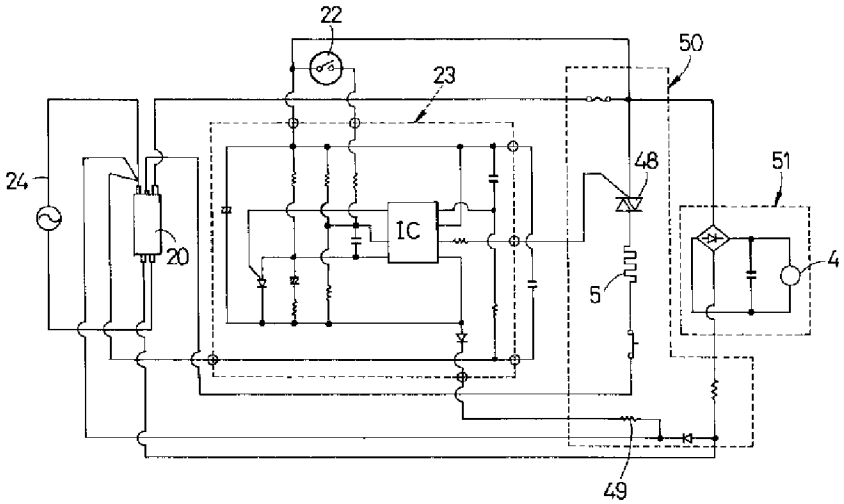
【図３】




【図８】




【図９】




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 507 of 2286

【手続補正書】
【提出日】平成７年１月２６日　　＊【補正方法】変更
【手続補正１】　　【補正内容】
【補正対象書類名】明細書　　【考案の名称】　収束ノズルを備えたヘアードライヤ
【補正対象項目名】考案の名称　　＊

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フロントページの続き

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【考案の詳細な説明】

【０００１】

【産業上の利用分野】

この考案は、吹出風を偏平に絞った状態で送出する収束ノズルを備えているヘアードライヤ、とくに収束ノズルを通過する吹出風の流動作用で外気を吸引し、外気を混合した状態で吹出風を送出する収束ノズルを備えたヘアードライヤに関する。

【０００２】

【従来の技術】

この種の収束ノズルは、実開昭５５－２１８号公報に公知である。そこでは、入口側において円筒形の筒壁を、出口側へ向かってくさび状に変形させて通路を絞っている。さらに出口へ向かって傾斜する一対の絞り壁のそれぞれに外気導入孔を通設し、絞り壁の内面内方に送風制御板を配置している。送風制御板は、ノズルの吹出風が外気導入孔からノズル外へ吹き出るのを防ぐために設けてある。

外気を吹出風に混合するヘアードライヤは、実開昭６３－８３１０４号公報にも公知である。そこでは、ドライヤ本体の吹出口を先すぼまりの断面十字形に絞っている。この絞られた収束部に、テーパーコーン形のノズル壁を備えた収束ノズルを外嵌装着している。外気は、収束ノズルの取付筒壁と十字形の絞り壁の外面内隅との間の隙間から吸引される。

【０００３】

【考案が解決しようとする課題】

上記のように、熱風に外気を加えて送出するヘアードライヤによれば、収束ノズルからの吹出風の温度および湿度を導入外気によって緩和調整できるので、傷んだ髪の乾燥やくせ付けを行う場合に、髪の状態がさらに悪化するのを良く防止できる。しかし、いずれの従来技術によっても、外気を能率良く導入することが困難であり、吹出風の温度および湿度を十分に緩和調整できない。前者の収束ノズルでは、外気導入孔群の内面内方を平板状の送風制御板で内外に仕切るだけであるから、ノズル内へ供給された吹出風の一部が送風制御板の周縁を回り込んで、外気導入孔からノズル外へ吹き出てしまう。平板状の送風制御板を片持ち支持

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 509 of 2286

しているので、その遊端における絞り壁と送風制御板の間隔を一定に維持するのが困難であり、外気が局部的に吸引されやすい。一対の送風制御板を別部品として用意する必要があり、収束ノズルの構造が複雑になる不利もある。

【０００４】

後者のヘアードライヤは、十字形に絞ったドライヤ本体の吹出口にテーパーコーン形の収束ノズルを装着する形態を採るので、髪のくせ付けや局部乾燥に適した偏平な吹出口が得られない。ドライヤ本体の吹出口が常時十字形に絞られているので、導風ケース内における通風抵抗が大きく熱がこもりやすい。十字形に絞った吹出口をテーパーコーン形の収束ノズルで再度絞るので、ノズル内の入口寄りに高圧部を生じ、外気導入作用が十分に得られにくい。

【０００５】

この考案の目的は、吹出風の漏洩がなく、外気を効率良く、しかも偏平な吹出風に対して均等に導入混合でき、吹出風の温度および湿度を適正に緩和調整できる収束ノズルを備えたヘアードライヤを提供することにある。

この考案の他の目的は、偏平に絞られた熱風の周囲を包み込むように外気を混合できる収束ノズルを備えたヘアードライヤを提供することにある。

この考案の目的は、容易にプラスチック成形でき、製造に要するコストを減少するのに好適な収束ノズルを備えたヘアードライヤを提供することにある。

【０００６】

【課題を解決するための手段】

この考案のヘアードライヤは、ドライヤ本体１の一端に円筒形の吹出口７を有し、この吹出口７に着脱自在に装着される収束ノズル８を備えている。

収束ノズル８は、断面円形の入口筒３４と、偏平筒形の出口筒３３と、入口筒３４と出口筒３３との間のノズル内空間をくさび状に絞るノズル筒３５とを有する。

ノズル筒３５は、出口筒３３の側へ向かって先すぼまり状に傾斜する一対の絞り壁３７と、両絞り壁３７に連続する一対の湾曲壁３８とからなる。

両絞り壁３７は湾曲壁３８との境界においてノズル内方へ段落ち状に凹み形成されて、その外面に外気導入凹部３９を形成する。

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 510 of 2286

両絞り壁３７の先端に突設した導風壁４１を出口筒３３の内面内方に位置させて、両者３３・４１間に外気導入凹部３９と出口筒３３の内部空間を連通する吸気通路４３を区画する。

【０００７】

具体的には、偏平筒形の出口筒３３の内面長手方向のほぼ全長にわたって吸気通路４３を区画する。

外気導入凹部３９の凹み深さを入口筒３４から出口筒３３に近付くに従って漸増するよう形成し、外気導入凹部３９の凹部幅が出口筒３３に近付くほど拡がるよう形成する。

吸気通路４３の内部に、導風壁４１と出口筒３３の間隔を保持するリブ４２を設ける。

収束ノズル８を、それぞれ射出成形品からなる偏平筒形の出口筒３３と、ノズル筒３４および入口筒３４を一体に形成したノズル本体３２との２部品で形成し、出口筒３３をノズル本体３２に接合固定して収束ノズル８を構成する。

【０００８】

【作用】

使用状態において、ドライヤ本体１の吹出口７から収束ノズル８内へ吹き出された一次吹出風は、一対の絞り壁３７でくさび状に絞られながらノズル内空間を通過し、偏平筒形の出口筒３３から偏平な二次吹出風として吹き出される。同時に、流速が増加した一次空気の吸引作用で、ノズル外面の空気が外気導入凹部３９と吸気通路４３を介して吸引導入されて、一次空気と共に出口筒３３から吹き出される。

このとき、導風壁４１を出口筒３３の内面内方に位置させて、吸気通路４３を導風壁４１と出口筒３３とでノズル内空間から完全に区分された通路として区画するので、一次吹出風が吸気通路４３を介してノズル外へ漏出することを防止できる。絞り壁３７を凹ませて外気導入凹部３９とし、その前端に連続する吸気通路４３を出口筒３３の内面に区画するので、外気の吸引経路を絞り壁３７で絞られる気流の流動方向とほぼ平行にして一次吹出風と合流させることができ、外気を抵抗なく吸引できる。しかも、吸引導入された外気は一次吹出風の面積の大き

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 511 of 2286

な偏平面に沿って流動するので、一次吹出風と十分に接触して均等に混合される。つまり、収束ノズル８で形成された二次吹出風の温度および湿度は、吸引導入した外気によって緩和され、一次吹出風に比べて低温で高湿度の、髪を傷めにくい気流に調整できる。

【０００９】

吸気通路４３を出口筒３３の長手方向のほぼ全長にわたって区画する収束ノズル８によれば、絞り壁３７で加速される気流による外気吸引作用をより有効に発揮できる。出口筒３３の側へ向かって凹み深さが斬増し、しかも凹部幅が出口筒３３に近付くほど拡がる外気導入凹部３９によれば、ノズル内空間における絞り壁３７の形状変化を滑らかにできるので、絞り壁３７を設けることに伴うノズル内の通風抵抗を減少しながら、一次吹出風を無理なく偏平に絞ることができる。吸気通路４３の内部にリブ４２を設け、このリブ４２で導風壁４１と出口筒３３の間隔を保持する収束ノズル８によれば、吸気通路４３の断面間隔を常に一定に保持して、吸引外気量を吸気通路４３の全体にわたって均等化できる。出口筒３３とノズル本体３２の２部品で形成した収束ノズル８によれば、複雑な成形用金型を用いることなく出口筒３３およびノズル本体３４を容易にプラスチック成形でき、吸引通路４３を備えた収束ノズル８を安価に製造できる。

【００１０】

【考案の効果】

この考案の収束ノズルを備えたヘアードライヤでは、一次吹出風が吸気通路４３からノズル外へ漏出するのを防止し、さらに凹み形成した外気導入凹部３９と吸気通路４３を介して外気を抵抗なく吸引し、一次吹出風の偏平面に合流させるので、全体として外気を効率良く導入して一次吹出風に均等に混合することができる。これにより、一次吹出風に比べて温度および湿度が適正に緩和調整された二次吹出風をロスなく確実に供給し、傷んだ髪の状態をさらに悪化させることのないヘアードライヤが得られる。

【００１１】

【実施例】

図１ないし図９はこの考案に係るヘアードライヤの実施例を示す。図２におい

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 512 of 2286

て、ヘアードライヤは、横長筒状のドライヤ本体１と、ドライヤ本体１の大径端側の下面に設けたグリップ２とを有し、ドライヤ本体１の内部に軸流型のファン３と、ファン駆動用のモータ４、およびファン３で起生した空気流を加熱するヒータ５などを配置する。ファン３で起生される空気流は、ドライヤ本体１の端部に設けたキャップ状の吸込口グリル６から導入され、ドライヤ本体１の他端の円筒形の吹出口７から吹き出される。この吹出口７に収束ノズル８を着脱自在に装着して、吹出口７から吹き出した一次吹出風を偏平な気流に絞りながら、その温度および湿度を緩和調整する。

【００１２】

図３および図４において、ドライヤ本体はいずれもプラスチック成形品からなるファンケース１０と、ファンケース１０に外嵌装着されるリヤケース１１と、リヤケース１１に外嵌装着される先すぼまり筒状のフロントケース１２とで外郭部を構成する。吸込口グリル６はファンケース１０に圧嵌装着し、その筒壁外面をリヤケース１１で抜け外れ不能に保持固定する。ファンケース１０の内部には、ファン３で起生された旋回気流を整流する静翼１３とボスとが設けてあり、このボスでもモータ４およびファン３を支持している。ファンケース１０より吹出口７側のフロントケース１２内にヒータユニットを配置し、吹出口７の端部内面に吹出グリル１４を設けている。

【００１３】

フロントケース１２の大径端側の下面中央には、部分円弧状のカバー壁６０とボス６１が一体に設けてあり、これらを後述するリヤケース１１の接続部２７に嵌め込んで、グリップ２と共にビス２８で共締め固定する。さらに、大径端側の上部中央の内面壁を、図５および図６に示す係合ピース６２を介してリヤケース１１に係合固定する。図２に示すように、フロントケース１２の大径端は左右中央部がリヤケース１１側へ円弧状に膨出し、上部中央は左右中央より小径端側へ凹んだ外形になっている。そのため、既存のリヤケース１１を利用するとき、フロントケース１２とリヤケース１１の重なり量を十分に確保することができない。こうした事態に対処するために、係合ピース６２をリヤケース１１の内面の凹部６３に係合固定したうえで、これにフロントケース１２を圧嵌係合している。

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 513 of 2286

係合ピース６２は長方形状のベース６４を有し、その一端に前記凹部６３と係合する爪６５を設ける。さらにベース６４の中途部上面に係合片６６を突設し、これにフロントケース１２の内面に設けた係合凹部６７を係合する。係合ピース６２はリヤケース１１の上面に凹設した溝６８に嵌め込まれて、遊動不能に保持固定される。

【００１４】

図４においてヒータユニットは、十字状に組まれたヒータ枠１５と、ヒータ枠１５に螺旋状に巻き掛けたヒータ５と、ヒータ枠１５に外嵌した円筒状の導風筒１６と、ヒータ枠１５の交差部に配置されてモータ４に外嵌する絶縁筒１７およびヒータ枠１５に実装される電気部品などで構成する。ヒータ枠１５と絶縁筒１７はそれぞれ耐熱性と電気絶縁性を備えたマイカ板等の板材で形成する。図示していないが、導風筒１６の内面にも絶縁筒１７と同じ絶縁材で形成した絶縁筒が嵌め込んである。

【００１５】

図３においてグリップ２は左右一対の半割り鞘状体を接合して中空体状に形成してあり、その内部空間を利用して、モータ４およびヒータ５の作動を制御する電気部品、および電子部品を収容している。具体的には、半割り鞘状体の一方の接合縁間に上下スライド自在に挟み保持した主操作ノブ１９と、このノブ１９で切り換え操作されるメインスイッチ２０と、半割り鞘状体の他方の接合縁間に上下スライド自在に挟み固定される副操作ノブ２１と、このノブ２１でオンオフ操作されるマイクロスイッチ２２、およびＩＣチップ等の電子部品が実装された回路基板２３などを収容している。両操作ノブ１９・２１は、それぞれ下端スライド限界位置をオフ位置にして、上方へスライド操作することでオン操作でき、主操作ノブ１９は、オフ、冷風、弱温風、強温風の順にメインスイッチ２０を切り換えることができる。２４は電源コード、２５はコードアーマである。

【００１６】

リヤケース１１の下部に前縁側が開口する中空円盤状の接続部２７を一体に形成し、これにグリップ２を連結している。詳しくは、半割り鞘状体の上端で接続部２７の左右外面を挟持し、一方の半割り鞘状体の外面から挿通したビス２８を

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 514 of 2286

、他方の半割り鞘状体の内面のボスにねじ込むことにより、グリップ２を接続部２７に連結している。図示していないが接続部２７には節動機構が組み込んであり、グリップ２を図２に実線で示す使用位置と、同図に想像線で示す折りたたみ位置において、それぞれ位置保持できるようになっている。グリップ２内の電装品と、ドライヤ本体１の電装品を接続する一群のリード線は、図３に想像線で示すように、接続部２７の一側壁に通設した円弧溝２９を介してグリップ２内から接続部２７へ引き込まれ、ファンケース１０の下端中央に切り欠かれた導入口３０を介してドライヤ本体１内へ導入される。従って、グリップ２はリード線群に邪魔されることなく自由に折りたたみ操作できる。

【００１７】

図７および図８において、収束ノズル８はそれぞれ射出成形品からなるノズル本体３２と出口筒３３の２部品で構成する。ノズル本体３２は、吹出口７に接続される断面円形の入口筒３４と、ノズル内空間をくさび状に絞るノズル筒３５と、入口筒３４の端縁に段落ち状に設けた連結リング３６とからなる。ノズル筒３５の基本断面形状は、入口筒３４の側では円筒形であるが、入口筒３４から遠ざかるほど左右にひしゃげた縦長の偏平筒形になっている。詳しくは、入口筒３４から出口筒３３の側へ向かって先すぼまり状に傾斜する左右一対の絞り壁３７と、両絞り壁３７の上下をなめらかに接続する一対の湾曲壁３８でノズル筒３５を形成する。絞り壁３７は、先に述べたノズル筒３５の基本断面形状を仮想基準面にして、これよりケース内方へ凹み形成し、その外面を外気導入凹部３９とする。この凹部３９の凹み深さは、入口筒３４側で最も浅く、出口筒３３に近付くほど漸増するよう形成し、さらにその上下幅を入口筒３４の側で小さく、出口筒３３に近付くほど上下に拡がる形状とする。この実施例では、外気導入凹部３９の正対外形形状を二次曲線状にした。

【００１８】

絞り壁３７を上下の湾曲壁３８の側端よりさらに出口筒３３の側へ突設して、浅い樋形断面の導風壁４１を設け、その外面の中央寄り二箇所に水平のリブ４２を外向きに突設する。この導風壁４１に外嵌する状態で出口筒３３をノズル筒３５に連結し、超音波溶着あるいは接着によって両者３３・３５を一体化する。超

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 515 of 2286

音波溶着時の溶着面は、上下の湾曲壁３８の突端面とリブ４２の突端面となる。出口筒３３は、上下の湾曲壁３８に連続する左右にひしゃげた縦長の偏平筒状に形成する。

【００１９】

上記のように、出口筒３３をノズル本体３２に固定することにより、図１に示すように導風壁４１が出口筒３３の内面壁と正対して、両者３３・４１間に吸気通路４３を区画形成する。このとき、導風壁４１の上下の屈曲端壁が出口筒３３の内面に接当し、あるいは極く微量の組み立て隙間を介して近接対向するので（図１（ｂ）参照）、吸気通路４３はノズル内空間から完全に区分された通路となる。吸気通路４３は、出口筒３３の内面長手方向のほぼ全長にわたって形成されており、外気導入凹部３９と出口筒３３の内部空間とを連通する。

ここて注目すべきは、吸気通路４３が絞り壁３７で絞られる気流線とほぼ平行になることであり、さらに凹み形成した外気導入凹部３９が吸気通路４３になめらからに連続して、吸気通路４３の側へ向かってその凹み深さを漸増することである。こうした外気導入構造を採ることで、外気を抵抗なく導入でき、導風壁４１の突端近傍において、導入外気を絞られて加速された気流に均等に接触させ混合できる。

【００２０】

ヘアードライヤを温風モードで連続使用するとき、収束ノズル８は加熱されて熱くなるが、外気導入凹部３９および出口筒３３の内面は、ノズル内へ導入される常温の外気と接触して冷却される。そのため、外気導入凹部３９および出口筒３３が手で触れられないほど加熱されることはなく、使用直後であって出口筒３３および外気導入凹部３９に手を直接触れることができる。例えば、使用直後に出口筒３３を手で持って、収束ノズル８を吹出口７から取り外すことができ、このとき、出口筒３３の外気導入凹部３９に面する周縁壁は、指先を引っ掛けて操作するための段部として役立つ。

【００２１】

図８において、収束ノズル８はその入口端に設けた連結リング３６を吹出口７に圧嵌装着して、フロントケース１２の先端に支持される。そのために、吹出口

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 516 of 2286

７の開口内面に沿って係止段部４４を突設する。なおこの図では、吹出口グリル１４やヒータユニットなどの内部構造を省略している。連結リング３６は上下二箇所のスリット４５で四分割されており、分断された上下のリング片の中央一箇所、および左右のリング片の上下二箇所のそれぞれに、係止段部４４と係合する突起４６を設ける。スリット４５で分断されたリング片は、それぞれ径方向内側へ僅かに弾性変形して係止段部４４を乗り越える。吹出口７に装着した収束ノズル８は、必要に応じて周方向へ回動操作できる。

【００２２】

図９にヘアードライヤの電気回路図を示す。既に説明した電気部品等には同一符号を付している。マイクロスイッチ２２は、温風モード時にヒータ５への通電状態を制御するために設けられており、これをオン操作すると回路基板２３上の制御回路がトリガー信号を間欠的にサイリスタ４８に引加して、ヒータ５への通電を間欠的にオン・オフし、例えば温風を４秒間、冷風を６秒間送出するモードを周期的に繰り返し行う。回路基板２３に低電圧電流を供給するために、電源リード部と基板入力部との間に電圧降下用の抵抗４９を配置するが、この抵抗４９および上記のサイリスタ４８はいずれも発熱量が大きく、グリップ２内に他の電気部品と共に組み込むことができない。そこで、図３に示すようにサイリスタ４８は、ヒータ枠１５のファン３側の端部に配置し、抵抗４９はヒータ枠１５の水平壁のファン３側の端部に配置している。つまり、ヒータ５より風上側のヒータ枠１５にサイリスタ４８および抵抗４９を配置することにより、加熱される前の常温気流で両部材４８・４９を強制冷却できるようにしている。図９において符号５０はヒータユニットとして取り扱われる電気部品群を、５１はモータユニットとして取り扱われる電気部品群をそれぞれ示している。

【００２３】

上記の実施例では、収束ノズル８をノズル本体３２と出口筒３３の２部品に分けて構成したが、その必要はなく一個の成形部品として形成できる。収束ノズル８はドライヤ本体１側の送風機構やヒータ配置構造とは無関係に、各種のヘアードライヤ、ブロワーなどに適用できるので、ドライヤ本体１の構造は吹出口７が円筒状であること以外は一切限定しない。

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 517 of 2286

外気導入凹部３９の外形形状は半長円形状や台形状、三角形状などに変更できる。絞り壁３７は湾曲壁で形成する以外に平坦壁や複数の屈折する平坦壁などで形成することができる。リブ４２は出口筒３３と一体に形成することができ、場合によっては省略できる。

出口筒３３はノズル本体３２に対して、分離自在に係合連結することができる。こうした収束ノズル８によれば、ノズル本体３２のみを吹出口７に装着して、偏平に絞られた一次吹出風を送出する形態で使用できる。上記の実施例の場合も含めて、出口筒３３は透明プラスチック材で形成することができる。さらに、ゴムや軟質プラスチック材で出口筒３３を形成して、誤って出口筒３３が地肌に接当した場合の痛感を軽減することができる。出口筒３３の出口側の直線状筒壁を櫛形に形成しておき、髪を梳きながら整髪しあるいは乾燥することができる。

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 518 of 2286

# PATENT ABSTRACTS OF JAPAN

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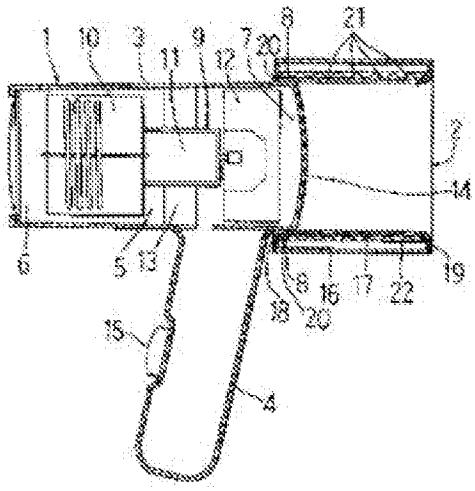
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## (54) HAIR DRYER

(57)Abstract:
PURPOSE: To provide a hair dryer reducing the sound generated in the air cave.
CONSTITUTION: In a hair dryer provided with a main body housing 3 having a delivery opening 6 at one end side and a suction opening 7 at the other end side and also having an air cave 5 between the delivery opening 6 and the suction opening 7, and a fan 9 equipped in the air cave 5, the dryer is also equipped with a silencer 2 provided with an external cylinder 16, an internal cylinder 17 having round holes 21,..., and a sound-absorbing material 22 filled in the air layer between the external cylinder and the internal cylinder.




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 519 of 2286

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## CLAIMS

[Claim(s)]
[Claim 1]A hair drier which provides noise absorption equipment characterized by comprising the following which decreases a sound to the other end of the aforementioned body housing in a hair drier.
Body housing with [ make the one end side into a discharge port, make the other end side into a suction opening, and ] a wind tunnel part to between a suction opening and discharge ports.
A blower module which is provided by wind tunnel part, inhales air from a suction opening, and is breathed out from a discharge port.
A heater device which is provided by wind tunnel part and heat generates.

[Claim 2]The hair drier according to claim 1 which forms the aforementioned noise absorption equipment in profile tubed.
[Claim 3]The hair drier according to claim 2 which forms an air layer of fixed thickness with an inner cylinder characterized by comprising the following, and provides a sound-absorbing material to this air layer.
The aforementioned noise absorption equipment is an outer cylinder.
A pore which lets a sound pass.

[Claim 4]The hair drier according to claim 2 or 3 which forms the aforementioned noise absorption equipment so that it may become largely as an inner diameter goes to the other end from one end.
[Claim 5]Any of Claims 2-4 which form the aforementioned noise absorption equipment so that the length of an axial direction may be 20 to 70% to the length of an axial direction of body housing, or a hair drier of a description.
[Claim 6]Any of Claims 3-5 which form the aforementioned noise absorption equipment so that thickness of an air layer between an outer cylinder and an inner cylinder may be 5 to 15% to an inner diameter by the side of the other end of body housing, or a hair drier of a description.
[Claim 7]Any of Claims 3-6 which form the aforementioned noise absorption equipment so that a pore may become not less than about 25% of inner cylinders, or a hair drier of a description.
[Claim 8]Any of Claims 1-7 which form a press in part in the other end of the aforementioned body housing, and form a press in part which a press in part is made to press fit in one end of noise absorption equipment, or a hair drier of a description.
[Claim 9]Any of Claims 1-8 which form noise absorption equipment so that a grip part may be placed at a side part of the aforementioned body housing in a thing with a grip part in abbreviated direction crossing at a right angle at an approximately center of an overall length of an axial direction of body housing and noise absorption equipment to an axial direction, or a hair drier of a description.

[Translation done.]

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## DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application]The present invention relates to the hair drier used for the xerasia etc.
[0002]
[Description of the Prior Art]Body housing with [ this kind of hair drier makes the one end side a discharge port make the other end side into a suction opening, and ] a wind tunnel part to between a suction opening and discharge ports, The thing provided with the blower module which is provided by the wind tunnel part, inhales air from a suction opening, and is breathed out from a discharge port, and the heater device which is provided by the wind tunnel part and heat generates is provided.
[0003]
[Problem to be solved by the invention]At the time of use, the conventional hair drier mentioned above had the problem that noise was loud. The main noise source is based on the sound by the disorder of a wind which takes place by the wind tunnel part and a suction opening since a wind is generated with a blower module, and the sound by the air column resonance generated since body housing is making tubed. The length L of the axial direction of body housing and the sound of the frequency f decided by the inner diameter D serve as an ordinary wave within a wind tunnel part according to an air column resonance, and turn into a loud noise. Here, when acoustic velocity is set to C, the frequency f is denoted by a following formula.
[0004]
[Mathematical formula 1]

$$f = \frac{C}{2(L + 0.6D)}$$

[0005]the present invention is made in view of such a point, and comes out. the purpose is to provide a hair drier in which there can be small a sound come out of and generated.

[0006]
[Means for solving problem]In order to attain the aforementioned purpose, the hair drier according to claim 1, Body housing with [ make the one end side into a discharge port, make the other end side into a suction opening, and ] a wind tunnel part to between a suction opening and discharge ports, It has composition which is provided by the wind tunnel part and provides the noise absorption equipment which decreases a sound to the other end of the aforementioned body housing in the hair drier provided with the blower module which inhales air from a suction opening and is breathed out from a discharge port, and the heater device which is provided by the wind tunnel part and heat generates.
[0007]The hair drier according to claim 2 is considering the noise absorption equipment of the thing according to claim 1 as the composition formed in profile tubed.
[0008]The noise absorption equipment of the thing according to claim 2 forms the air layer of fixed thickness with an outer cylinder and an inner cylinder with the pore which lets a sound pass, and is considering the hair drier according to claim 3 as the composition which provides a sound-absorbing material to this air layer.
[0009]The hair drier according to claim 4 is considering the noise absorption equipment of the thing according to claim 2 or 3 as the composition formed so that it may become largely as an inner diameter goes to the other end from one end.
[0010]The hair drier according to claim 5 is considered as the composition which forms the noise absorption equipment of any of Claims 2-4, or the thing of a description so that the length of an axial direction may be 20 to 70% to the length of the axial direction of body housing.
[0011]The hair drier according to claim 6 is considered as the composition which forms the noise absorption equipment of any of Claims 3-5, or the thing of a description so that the thickness of the air layer between an outer cylinder and an inner cylinder may be 5 to 15% to the inner diameter by the side of the other end of body housing.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 521 of 2286

[0012]The hair drier according to claim 7 is considered as the composition which forms the noise absorption equipment of any of Claims 3-6, or the thing of a description so that a pore may become not less than about 25% of inner cylinders.
[0013]The hair drier according to claim 8 is considered as the composition which forms a press in part in the other end of the body housing of any of Claims 1-7, or the thing of a description, and forms the press in part which a press in part is made to press fit in one end of noise absorption equipment.
[0014]In a thing with [ in the side part of the body housing of any of Claims 1-8, or the thing of a description / hair drier / according to claim 9 / to the axial direction ] a grip part to abbreviated direction crossing at a right angle, It has composition which forms noise absorption equipment so that a grip part may be placed at the approximately center of the overall length of the axial direction of body housing and noise absorption equipment.
[0015]
[Function]Since the sound which came out from the suction opening among the sounds generated in the wind tunnel part declines with noise absorption equipment according to the composition according to claim 1, a sound becomes small.
[0016]According to the composition according to claim 2, it becomes low in between [ until the frequency of the sound which came out from the suction opening among the sounds generated in the wind tunnel part goes into an inside from the 1 open-end surface of noise absorption equipment and goes away from other open end surfaces ].
[0017]According to the composition according to claim 3, the energy of the sound which came out from the suction opening among the sounds generated in the wind tunnel part is absorbed with a sound-absorbing material.
[0018]According to the composition according to claim 4, it becomes difficult to generate the ordinary wave by the air column resonance within a wind tunnel part.
[0019]According to the composition according to claim 5, the miniaturization of noise absorption equipment can be attained by limiting within limits which had the operation which makes [ sound ] small sufficiently the length of the axial direction of noise absorption equipment.
[0020]According to the composition according to claim 6, the miniaturization of noise absorption equipment can be attained by limiting within limits which had the operation which makes [ sound ] small sufficiently thickness of the air layer between an outer cylinder and an inner cylinder.
[0021]According to the composition according to claim 7, there can be small a sound further. According to the composition according to claim 8, noise absorption equipment can be easily attached to body housing.
[0022]According to the composition according to claim 9, the whole form balance becomes good.
[0023]
[Working example]The 1st working example of the present invention is described based on Fig.1 thru/or Fig.4.The hair drier of this example is constituted by the main part 1 of a hair drier, and the noise absorption equipment 2.
[0024]First, it describes about the main part 1 of a hair drier. 3 It is the body housing which makes ****** tubed, and from direction crossing at a right angle, it inclines a little in the rear lower surface part, and the handle 4 is provided in it. This body housing 3 makes [ that inside ] the discharge port 6 and back end side the suction opening 7 for the wind tunnel part 5 and front-of-solvent side, and forms the projection 8 in the upper and lower sides by the side of the back end. In the wind tunnel part 5, the blower module 9 which inhales air from the suction opening 7 and is breathed out from the discharge port 6, and the heater device 10 which heat generates are provided. The blower module 9 comprises the motor 11, the fan 12 attached in the axis of rotation of the motor 11, and the straightening vanes 13 which rectify a wind. In the suction opening 7, the filter 14 formed more nearly reticulated than a synthetic resin is provided. 15 is a switch which performs ON/OFF of a power supply, and the change of warm air/cold blast.
[0025]Next, it describes about the noise absorption equipment 2. The outer cylinder in which 16 makes approximate circle tubed, the inner cylinder in which 17 makes approximate circle tubed, and 18 and 19 are connecting plates which connect the outer cylinder 16 and the inner cylinder 17, and they form the air layer of fixed thickness with the outer cylinder 16 and the inner cylinder 17.
[0026]The inner cylinder 17 is a product made from a plastic, or metal.
the inner diameter is made substantially identical with an outer diameter by the side of the back end of the body housing 3, and it does not separate from it still more simply so that an outer peripheral part by the side of the back end of the body housing 3 can be equipped by press fit -- as -- the inside by the side of an end -- projection 8. a key which carries out engagement -- the slot 20 is formed.
The inner cylinders 17 are two or more round holes 21, -- is regularly formed with a predetermined pitch over the whole circumference.
In an outer peripheral surface, the sound-absorbing materials 22, such as class wool yarn, are provided, and an air layer of fixed thickness is formed between the sound-absorbing material 22 and the outer cylinder 16.
The connecting plate 18 is approximately annular, and is formed in plate-like, and the connecting plate 19 is

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324

approximately annular, and is formed in the shape of a bell mouth.
[0027]Next, it describes about operation of the hair drier of this example. When the main part 1 of a hair drier is equipped with the noise absorption equipment 2 and the blower module 9 is driven with the switch 15, they are the wind tunnel part 5 and the suction opening 7. The sound by the disorder of a wind which takes place near, and the sound of the ordinary wave by the air column resonance generated since the body housing 3 is making tubed are made. The sound which came out from the suction opening 7 among these sounds is the noise absorption equipment 2. It is transmitted inside and the part enters between the outer cylinder 16 and the inner cylinder 17 from the round hole 21. After the energy of a sound decreases the sound which has entered from this round hole 21 with the sound-absorbing material 22, it reflects on the basis of the inner surface of the outer cylinder 16, and the energy of a sound decreases it further with the sound-absorbing material 22 again. And although the part of them is left from the round hole 21, the energy of the sound decreases the remainder further with the sound-absorbing material 22. Among these sounds to decrease, the sound of the ordinary wave especially by an air column resonance is decreased with the sound-absorbing material 22 while it serves as a low frequency wave with the noise absorption equipment 2.
[0028]Therefore, since the sound which came out from the suction opening 7 in part declines with the noise absorption equipment 2 even if a sound is made at the time of use, a sound becomes small as a whole and it can carry out that it is hard to make those who are in a user or its circumference cause the displeasure by a sound. Since the noise absorption equipment 2 is freely attachable/detachable on the main part 1 of a hair drier, it can make small a storage space of the noise absorption equipment 2 and the main part 1 of a hair drier.
[0029]Here, based on Fig.2, it describes about the amount of sound absorption by length $L_1$ of the axial direction of the noise absorption equipment 2. In [ Fig.2 sets inner diameter $D_0$ by the side of 130 mm and the back end to 60 mm for length $L_0$ of the axial direction of the body housing 3 in the main part 1 of a hair drier, and ] the noise absorption equipment 2, In [ 72 mm and inner diameter $D_{22}$ of the inner cylinder 17 shall be / outer diameter $D_{11}$ of the outer cylinder 16 / 70 mm 82 mm and outer diameter $D_{21}$ of the inner cylinder 17 for 84 mm and inner diameter $D_{12}$ of the outer cylinder 16, and ] the inner cylinder 17, They are 8 mm and the round hole 21 about the pore diameter of each round hole 21, They are 10 mm and the round hole 21 about the pitch between -- -- It experiments by making into about 50% an aperture ratio (the round hole 21 in the inner cylinder 17, and the ratio that -- occupies), and the result is expressed.
[0030]As shown in Fig.2, the amount of sound absorption by length $L_1$ of the axial direction of the noise absorption equipment 2 rises so that $L_1$ becomes long, but the rise beyond it of it is almost lost from the hit beyond $L_1$=1/3, and $L_0$. Therefore, since it can attain a miniaturization so much if its $L_1$ is short, the noise absorption equipment 2 is sufficient if $L_1$ is determined in the range, i.e., the range of (several 2), from which sufficient amount of sound absorption is obtained. It is within the limits of (several 2), and when the noise absorption equipment 2 is formed so that the handle 4 may be placed at the approximately center of the overall length ($L_1$+$L_0$) of the noise absorption equipment 2 and the body housing 3 (Fig.1), the whole form balance becomes good and usability can be improved further.
[0031]
[Mathematical formula 2]

$$\frac{1}{5}L_0 < L_1 < \frac{2}{3}L_0$$

[0032]Next, based on Fig.3, it describes about the amount of sound absorption by thickness t (=$D_{12}$-$D_{21}$) of the air layer of the noise absorption equipment 2. In [ Fig.3 sets inner diameter $D_0$ by the side of 130 mm and the back end to 60 mm for length $L_0$ of the axial direction of the body housing 3 in the main part 1 of a hair drier, and ] the noise absorption equipment 2, In [ 72 mm and inner diameter $D_{22}$ of the inner cylinder 17 shall be 70 mm 70 mm and outer diameter $D_{21}$ of the inner cylinder 17 for length $L_1$ of an axial direction, and ] the inner cylinder 17, They are 8 mm and the round hole 21 about the pore diameter of each round hole 21, They are 10 mm and the round hole 21 about the pitch between -- -- It experiments by making an aperture ratio into about 50%, and the result is expressed.
[0033]As shown in Fig.3, the amount of sound absorption by thickness t of the air layer of the noise absorption equipment 2 rises so that t becomes largely, but the rise beyond it of it is almost lost from the hit beyond t=1/10, and $L_0$. Therefore, since it can attain a miniaturization so much if its t is small, the noise absorption equipment 2 is sufficient if t is determined in the range, i.e., the range of (several 3), from which sufficient amount of sound absorption is obtained.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324

[0034]
[Mathematical formula 3]

$$\frac{1}{20} D_0 < t < \frac{3}{20} D_0$$

[0035]Next, round hole 21 in the inner cylinder 17, Based on Fig.4, it describes about the amount of sound absorption by the aperture ratio X of --. In [ Fig.4 sets inner diameter $D_0$ by the side of 130 mm and the back end to 60 mm for length $L_0$ of the axial direction of the body housing 3 in the main part 1 of a hair drier, and ] the noise absorption equipment 2, Length $L_1$ of an axial direction is experimented [ / 84 mm and / of the outer cylinder 16 / inner diameter $D_{12}$/ / 82 mm and / of the inner cylinder 17 / outer diameter $D_{21}$] in 70 mm and outer diameter $D_{11}$ of the outer cylinder 16 by 72 mm and inner diameter $D_{22}$ of the inner cylinder 17 being 70 mm, and the result is expressed.

[0036]Round hole 21 in the inner cylinder 17, As shown in Fig.4, the amount of sound absorption by the aperture ratio X of -- rises so that X becomes largely, but the rise beyond it of it is almost lost from the hit exceeding X= 30%. Therefore, it is sufficient if X is determined in the range, i.e., the range of (several 4), from which sufficient amount of sound absorption is obtained.

[0037]
[Mathematical formula 4]

$$X \geqq 25 \quad [\%]$$

[0038]At this example, although the air layer of fixed thickness was formed between the sound-absorbing material 22 and the outer cylinder 16, it is not restricted to this and it is not necessary to form an air layer between the sound-absorbing material 22 and the outer cylinder 16 by the present invention.

[0039]In Claim 9, although it should "have a grip part to the axial direction in the side part of body housing in" abbreviated direction crossing at a right angle, and this abbreviated direction crossing at a right angle makes natural direction crossing at a right angle and is included, the thing a little inclined from direction crossing at a right angle like this example shall also be contained.

[0040]Next, the 2nd working example of the present invention is described based on Fig.5. About the component which has the substantially same function as the 1st previous working example, the same code is attached and a description is omitted.

[0041]It describes about the noise absorption equipment 2 of this example. The outer cylinder 16 and the inner cylinder 17 are formed in a taper type (here, the taper is used at an angle of about 30% to the axial direction) so that it may become largely, as each path goes to the other end from one end, and they are connected by the connecting plates 18 and 19. The inner cylinder 17 is a product made from a plastic, or metal.

The inner diameter is made substantially identical with an outer diameter by the side of the back end of the body housing 3 so that an outer peripheral part by the side of the back end of the body housing 3 can be equipped by press fit.

The inner cylinders 17 are two or more round holes 21, -- is regularly formed with a predetermined pitch over the whole circumference. In an outer peripheral surface, the sound-absorbing materials 22, such as class wool yarn, are provided, and an air layer of fixed thickness is formed between the sound-absorbing material 22 and the outer cylinder 16.

[0042]When the main part 1 of a hair drier is equipped with the noise absorption equipment 2 and the blower module 9 is driven with the switch 15 here, they are the wind tunnel part 5 and the suction opening 7. Although the sound by the disorder of a wind which takes place near is made, Since the noise absorption equipment 2 serves as a taper type, it is difficult to make the sound of the ordinary wave by an air column resonance.

[0043]Therefore, in this example, since the sound which came out from the suction opening 7 among the sounds which the sound of the ordinary wave by an air column resonance did not make easily, and were made at the time of use declines with the noise absorption equipment 2 like the 1st working example, there can be small a sound as a whole.

[0044]
[Effect of the Invention]The hair drier according to claim 1 can be carried out that it is hard to make those who a sound becomes small since the sound which came out from the suction opening among the sounds generated in the wind tunnel part declines with noise.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 524 of 2286

absorption equipment, and are in a user or its circumference as a result cause the displeasure by a sound.

[0045]since the hair drier according to claim 2 becomes low in between [ until in addition to the effect according to claim 1 the frequency of the sound which came out from the suction opening among the sounds generated in the wind tunnel part goes into an inside from the 1 open-end surface of noise absorption equipment and goes away from other open end surfaces ], it can be further made [ sound ] small.

[0046]Since the energy of the sound which came out from the suction opening among the sounds generated in the wind tunnel part is absorbed with a sound-absorbing material in addition to the effect according to claim 2, the hair drier according to claim 3 can be further made [ sound ] small.

[0047]Since it becomes difficult to generate the ordinary wave by the air column resonance within a wind tunnel part in addition to the effect according to claim 2 or 3, the hair drier according to claim 4 can be further made [ sound ] small.

[0048]By limiting within limits which had the operation which makes [ sound ] small sufficiently the length of the axial direction of noise absorption equipment in addition to any of Claims 2-4, or the effect of a description, the hair drier according to claim 5 can attain the miniaturization of noise absorption equipment, and can improve usability.

[0049]By limiting within limits which had the operation which makes [ sound ] small sufficiently thickness of the air layer between an outer cylinder and an inner cylinder in addition to any of Claims 3-5, or the effect of a description, the hair drier according to claim 6 can attain the miniaturization of noise absorption equipment, and can improve usability.

[0050]In addition to any of Claims 3-6, or the effect of a description, the hair drier according to claim 7 can be further made [ sound ] small.

[0051]In addition to any of Claims 1-7, or the effect of a description, the hair drier according to claim 8 can attach noise absorption equipment to body housing easily.

[0052]In addition to any of Claims 1-8, or the effect of a description, the whole form balance becomes good and the hair drier according to claim 9 can improve usability.

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[Translation done.]

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審査請求　未請求　請求項の数９　ＯＬ　（全 ７ 頁）

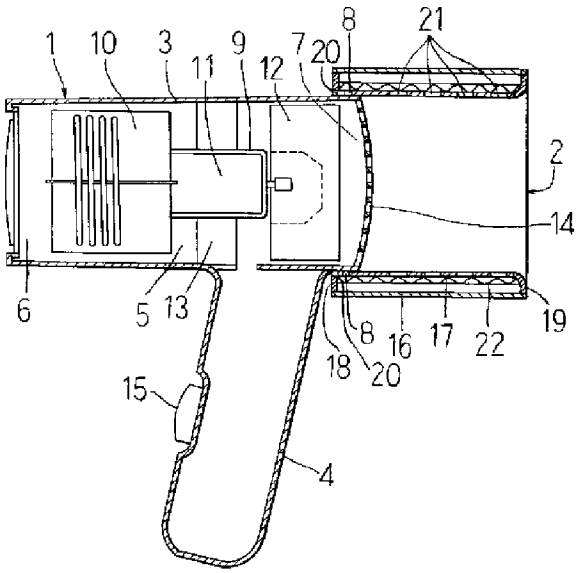
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(54)【発明の名称】　ヘアードライヤー

(57)【要約】
【目的】　風洞部で発生した音を小さくすることができるヘアードライヤーの提供を目的とする。
【構成】　一端側を吐出口6 とし他端側を吸込口7 とし吐出口6 と吸込口7 との間に風洞部5 を有した本体ハウジング3 と、風洞部5 に設けられた送風装置9 とを備えたヘアードライヤーにおいて、本体ハウジング3 の他端に、外筒16と、丸孔21，…を有した内筒17と、外筒16と内筒17との間の空気層に設けられた吸音材22とを具備した吸音装置2 を装着した。






SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 526 of 2286

1

【特許請求の範囲】

【請求項１】　一端側を吐出口とし他端側を吸込口とし吸込口と吐出口との間に風洞部を有した本体ハウジングと、風洞部に設けられ空気を吸込口から吸い込んで吐出口から吐き出す送風装置と、風洞部に設けられ熱が発生するヒータ装置とを備えたヘアードライヤーにおいて、前記本体ハウジングの他端に、音を減衰する吸音装置を設けてなるヘアードライヤー。

【請求項２】　前記吸音装置を、大略筒状に形成してなる請求項１記載のヘアードライヤー。

【請求項３】　前記吸音装置は、外筒と、音を通す孔部を有した内筒とにより一定厚みの空気層を形成し、該空気層に吸音材を設けてなる請求項２記載のヘアードライヤー。

【請求項４】　前記吸音装置を、内径が一端から他端に向かうにつれて大きくなるよう形成してなる請求項２又は３記載のヘアードライヤー。

【請求項５】　前記吸音装置を、軸方向の長さが本体ハウジングの軸方向の長さに対して２０～７０％になるよう形成してなる請求項２乃至４の何れか記載のヘアードライヤー。

【請求項６】　前記吸音装置を、外筒と内筒との間の空気層の厚みが本体ハウジングの他端側の内径に対して５～１５％になるよう形成してなる請求項３乃至５の何れか記載のヘアードライヤー。

【請求項７】　前記吸音装置を、孔部が内筒の約２５％以上になるよう形成してなる請求項３乃至６の何れか記載のヘアードライヤー。

【請求項８】　前記本体ハウジングの他端に被圧入部を形成し、吸音装置の一端に被圧入部に圧入させる圧入部を形成してなる請求項１乃至７の何れか記載のヘアードライヤー。

【請求項９】　前記本体ハウジングの側部に軸方向に対し略直交方向に把持部を有したものにおいて、把持部が本体ハウジングと吸音装置との軸方向の全長の略中央に位置するように、吸音装置を形成してなる請求項１乃至８の何れか記載のヘアードライヤー。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、毛髪乾燥等に用いられるヘアードライヤーに関するものである。

【０００２】

【従来の技術】この種のヘアードライヤーは、一端側を吐出口とし他端側を吸込口とし吸込口と吐出口との間に風洞部を有した本体ハウジングと、風洞部に設けられ空気を吸込口から吸い込んで吐出口から吐き出す送風装置と、風洞部に設けられ熱が発生するヒータ装置とを備えてなるものが提供されている。

【０００３】

【発明が解決しようとする課題】前述した従来のヘアードライヤーは、使用時において、騒音が大きいという問題があった。その主な騒音源は、送風装置により風を発生するために風洞部及び吸込口で起こる風の乱れによる音と、本体ハウジングが筒状をなしているために発生する気柱共鳴による音とによるものであった。本体ハウジングの軸方向の長さＬ、内径Ｄにより決まる周波数ｆの音が、気柱共鳴により風洞部内で定常波となり、大きな騒音となる。ここで、音速をＣとすると、周波数ｆは、次式で表される。

2

【０００４】

【数１】

$$f = \frac{C}{2(L + 0.6D)}$$

【０００５】本発明は、このような点に鑑みなされたものであり、その目的とするところは、風洞部で発生した音を小さくすることができるヘアードライヤーを提供することにある。

【０００６】

【課題を解決するための手段】前記目的を達成するために、請求項１記載のヘアードライヤーは、一端側を吐出口とし他端側を吸込口とし吸込口と吐出口との間に風洞部を有した本体ハウジングと、風洞部に設けられ空気を吸込口から吸い込んで吐出口から吐き出す送風装置と、風洞部に設けられ熱が発生するヒータ装置とを備えたヘアードライヤーにおいて、前記本体ハウジングの他端に、音を減衰する吸音装置を設けてなる構成としている。

【０００７】また、請求項２記載のヘアードライヤーは、請求項１記載のものの吸音装置を、大略筒状に形成してなる構成としている。

【０００８】また、請求項３記載のヘアードライヤーは、請求項２記載のものの吸音装置が、外筒と、音を通す孔部を有した内筒とにより一定厚みの空気層を形成し、該空気層に吸音材を設けてなる構成としている。

【０００９】また、請求項４記載のヘアードライヤーは、請求項２又は３記載のものの吸音装置を、内径が一端から他端に向かうにつれて大きくなるよう形成してなる構成としている。

【００１０】また、請求項５記載のヘアードライヤーは、請求項２乃至４の何れか記載のものの吸音装置を、軸方向の長さが本体ハウジングの軸方向の長さに対して２０～７０％になるよう形成してなる構成としている。

【００１１】また、請求項６記載のヘアードライヤーは、請求項３乃至５の何れか記載のものの吸音装置を、外筒と内筒との間の空気層の厚みが本体ハウジングの他端側の内径に対して５～１５％になるよう形成してなる構成としている。

【００１２】また、請求項７記載のヘアードライヤーは、請求項３乃至６の何れか記載のものの吸音装置を、孔部が内筒の約２５％以上になるよう形成してなる構成



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 527 of 2286

としている。

【００１３】また、請求項８記載のヘアードライヤーは、請求項１乃至７の何れか記載のものの本体ハウジングの他端に被圧入部を形成し、吸音装置の一端に被圧入部に圧入させる圧入部を形成してなる構成としている。

【００１４】また、請求項９記載のヘアードライヤーは、請求項１乃至８の何れか記載のものの本体ハウジングの側部に軸方向に対し略直交方向に把持部を有したものにおいて、把持部が本体ハウジングと吸音装置との軸方向の全長の略中央に位置するように、吸音装置を形成してなる構成としている。

【００１５】

【作用】請求項１記載の構成によれば、風洞部で発生した音のうち吸込口から出てきた音が、吸音装置によって減衰されるので、音が小さくなる。

【００１６】請求項２記載の構成によれば、風洞部で発生した音のうち吸込口から出てきた音の周波数が、吸音装置の一開口端面から内部に入って他開口端面から出ていくまでの間に低くなる。

【００１７】請求項３記載の構成によれば、風洞部で発生した音のうち吸込口から出てきた音のエネルギーが、吸音材によって吸収される。

【００１８】請求項４記載の構成によれば、風洞部内での気柱共鳴による定常波が発生しにくくなる。

【００１９】請求項５記載の構成によれば、吸音装置の軸方向の長さを、十分に音を小さくする作用を有した範囲内に限定することにより、吸音装置の小型化を図ることができる。

【００２０】請求項６記載の構成によれば、外筒と内筒との間の空気層の厚みを、十分に音を小さくする作用を有した範囲内に限定することにより、吸音装置の小型化を図ることができる。

【００２１】請求項７記載の構成によれば、さらに音を小さくすることができる。請求項８記載の構成によれば、吸音装置を本体ハウジングに容易に取り付けることができる。

【００２２】請求項９記載の構成によれば、全体の形状バランスが良くなる。

【００２３】

【実施例】本発明の第１実施例を図１乃至図４に基づいて説明する。本実施例のヘアードライヤーは、ヘアードライヤー本体1 と、吸音装置2 により構成されている。

【００２４】まず、ヘアードライヤー本体1 について説明する。3 は略円筒状をなす本体ハウジングであり、その後部下面部に直交方向よりやや傾斜をなして把手4 を設けてある。この本体ハウジング3 は、その内部を風洞部5 、前端側を吐出口6 、後端側を吸込口7 としており、後端側の上下面に突起8 を形成している。風洞部5 には、空気を吸込口7 から吸い込んで吐出口6 から吐き出す送風装置9 と、熱が発生するヒータ装置10とを設けてある。送風装置9 は、モータ11と、モータ11の回転軸に取着されたファン12と、風を整流する整流翼13とから構成されている。吸込口7 には、合成樹脂より網状に形成されたフィルター14を設けてある。15は、電源のＯＮ／ＯＦＦ及び温風／冷風の切り換えを行うスイッチである。



【００２５】次に、吸音装置2 について説明する。16は略円筒状をなす外筒、17は略円筒状をなす内筒、18, 19は外筒16と内筒17とを連結する連結板であり、外筒16と内筒17とにより一定厚みの空気層を形成している。

【００２６】内筒17は、プラスチック製又は金属製であり、本体ハウジング3 の後端側の外周部に圧入にて装着できるように、その内径を本体ハウジング3 の後端側の外径と略同一とし、さらに、簡単に外れないように、一端側の内側に突起8 を係合させるかぎ溝20を形成している。また、内筒17は、複数個の丸孔21, …を全周にわたって所定ピッチで規則正しく形成しており、さらに、外周面には、クラスウール等の吸音材22を設けて、吸音材22と外筒16との間に一定厚みの空気層を形成している。連結板18は、略環状でかつ平板状に形成され、連結板19は、略環状でかつベルマウス状に形成されている。

【００２７】次に、本実施例のヘアードライヤーの動作について説明する。ヘアードライヤー本体1 に吸音装置2 を装着して、スイッチ15により送風装置9 を駆動すると、風洞部5 及び吸込口7 付近で起こる風の乱れによる音と、本体ハウジング3 が筒状をなしているために発生する気柱共鳴による定常波の音とが生じる。これらの音のうち吸込口7 から出てきた音は、吸音装置2 内に伝わり、その一部が丸孔21から外筒16と内筒17との間に侵入する。この丸孔21から侵入してきた音は、吸音材22にて音のエネルギーが減衰された後、外筒16の内面を基準として反射し再び吸音材22にて音のエネルギーがさらに減衰される。そして、そのうちの一部は、丸孔21から出ていくが、残りは、吸音材22にて音のエネルギーがさらに減衰されていく。また、これらの減衰される音のうち、特に気柱共鳴による定常波の音は、吸音装置2 により低周波となるとともに吸音材22にて減衰される。

【００２８】したがって、使用時に音が生じてもその一部すなわち吸込口7 から出てきた音が吸音装置2 によって減衰されるので、全体として音が小さくなり、使用者やその周囲にいる人に、音による不快感を起こさせにくくすることができる。また、吸音装置2 は、ヘアードライヤー本体1 に着脱自在となっているので、吸音装置2 及びヘアードライヤー本体1 の保管スペースを小さくすることができる。

【００２９】ここで、吸音装置2 の軸方向の長さ$L_1$ による吸音量について図２に基づいて説明する。なお、図２は、ヘアードライヤー本体1 において、本体ハウジング3の軸方向の長さ$L_0$ を130㎜ 、後端側の内径$D_0$ を60㎜とし、吸音装置2 において、外筒16の外径$D_{11}$を84m



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 528 of 2286

5

m、外筒16の内径$D_{12}$を82mm、内筒17の外径$D_{21}$を72mm、内筒17の内径$D_{22}$を70mmとし、内筒17において、各丸孔21の孔径を8mm 、丸孔21，…間のピッチを10mm、丸孔21，…の開口率（内筒17における丸孔21，…の占める割合）を約50％として、実験を行いその結果を表したものである。

【００３０】吸音装置2 の軸方向の長さ$L_1$ による吸音量は、図２に示すように、$L_1$ が長くなるほど上昇していくが、$L_1 = 1/3 \cdot L_0$ を越えたあたりからそれ以上の上昇がほとんどなくなる。したがって、吸音装置2 は、$L_1$ が短ければそれだけ小型化を図ることができるので、十分な吸音量が得られる範囲すなわち（数２）の範囲で$L_1$ を決定すれば十分である。さらに、（数２）の範囲内であって、把手4 が吸音装置2 と本体ハウジング3 との全長（$L_1 + L_0$ ）の略中央に位置するように吸音装置2 を形成した場合（図１）、全体の形状バランスが良くなり、さらに使い勝手を良くすることができる。

【００３１】

【数２】

$$\frac{1}{5} L_0 < L_1 < \frac{2}{3} L_0$$

【００３２】次に、吸音装置2 の空気層の厚さｔ（$= D_{12} - D_{21}$）による吸音量について図３に基づいて説明する。なお、図３は、ヘアードライヤー本体1 において、本体ハウジング3 の軸方向の長さ$L_0$ を130mm 、後端側の内径$D_0$ を60mmとし、吸音装置2 において、軸方向の長さ$L_1$ を70mm、内筒17の外径$D_{21}$を72mm、内筒17の内径$D_{22}$を70mmとし、内筒17において、各丸孔21の孔径を8mm 、丸孔21，…間のピッチを10mm、丸孔21，…の開口率を約50％として、実験を行いその結果を表したものである。

【００３３】吸音装置2 の空気層の厚さｔによる吸音量は、図３に示すように、ｔが大きくなるほど上昇していくが、$t = 1/10 \cdot L_0$ を越えたあたりからそれ以上の上昇がほとんどなくなる。したがって、吸音装置2 は、ｔが小さければそれだけ小型化を図ることができるので、十分な吸音量が得られる範囲すなわち（数３）の範囲でｔを決定すれば十分である。

【００３４】

【数３】

$$\frac{1}{20} D_0 < t < \frac{3}{20} D_0$$

【００３５】次に、内筒17における丸孔21，…の開口率Ｘによる吸音量について図４に基づいて説明する。なお、図４は、ヘアードライヤー本体1 において、本体ハウジング3 の軸方向の長さ$L_0$ を130mm 、後端側の内径$D_0$ を60mmとし、吸音装置2 において、軸方向の長さ$L_1$ を70mm、外筒16の外径$D_{11}$を84mm、外筒16の内径$D_{12}$

6

を82mm、内筒17の外径$D_{21}$を72mm、内筒17の内径$D_{22}$を70mmとして、実験を行いその結果を表したものである。

【００３６】内筒17における丸孔21，…の開口率Ｘによる吸音量は、図４に示すように、Ｘが大きくなるほど上昇していくが、Ｘ＝30％を越えたあたりからそれ以上の上昇がほとんどなくなる。したがって、十分な吸音量が得られる範囲すなわち（数４）の範囲でＸを決定すれば十分である。

【００３７】

【数４】

$$X \geq 25 \quad [\%]$$

【００３８】なお、本実施例では、吸音材22と外筒16との間に一定厚みの空気層を形成したが、本発明では、これに限られることはなく、吸音材22と外筒16との間に空気層を形成しなくても良い。

【００３９】また、請求項９では、「本体ハウジングの側部に軸方向に対し略直交方向に把持部を有したもの」としているが、この略直交方向とは、直交方向は当然にして含まれるが、本実施例のように直交方向よりやや傾斜をなしたものも含まれるものとする。

【００４０】次に、本発明の第２実施例を図５に基づいて説明する。なお、先の第１実施例と実質的に同様な機能を有する部材については、同一の符号を付して説明を省略する。

【００４１】本実施例の吸音装置2 について説明する。外筒16及び内筒17は、各々の径が一端から他端に向かうにつれて大きくなるようにテーパ型（ここでは、軸方向に対して約30％の角度でテーパにしてある）に形成され、連結板18, 19 にて連結されている。内筒17は、プラスチック製又は金属製であり、本体ハウジング3 の後端側の外周部に圧入にて装着できるように、その内径を本体ハウジング3 の後端側の外径と略同一としている。また、内筒17は、複数個の丸孔21，…を全周にわたって所定ピッチで規則正しく形成しており、さらに、外周面には、クラスウール等の吸音材22を設けて、吸音材22と外筒16との間に一定厚みの空気層を形成している。

【００４２】ここで、ヘアードライヤー本体1 に吸音装置2 を装着して、スイッチ15により送風装置9 を駆動すると、風洞部5 及び吸込口7 付近で起こる風の乱れによる音は生じるが、気柱共鳴による定常波の音は、吸音装置2 がテーパ型となっているために生じにくくなっている。

【００４３】したがって、本実施例では、気柱共鳴による定常波の音が生じにくく、また、使用時に生じた音のうち吸込口7 から出てきた音が第１実施例と同様に吸音装置2 によって減衰されるので、全体として音が小さくすることができる。

【００４４】

【発明の効果】請求項１記載のヘアードライヤーは、風洞部で発生した音のうち吸込口から出てきた音が、吸音



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 529 of 2286

7

装置によって減衰されるので音が小さくなり、その結果、使用者やその周囲にいる人に、音による不快感を起こさせにくくすることができる。

【００４５】請求項２記載のヘアードライヤーは、請求項１記載の効果に加え、風洞部で発生した音のうち吸込口から出てきた音の周波数が、吸音装置の一開口端面から内部に入って他開口端面から出ていくまでの間に低くなるので、さらに音を小さくすることができる。

【００４６】請求項３記載のヘアードライヤーは、請求項２記載の効果に加え、風洞部で発生した音のうち吸込口から出てきた音のエネルギーが、吸音材によって吸収されるので、さらに音を小さくすることができる。

【００４７】請求項４記載のヘアードライヤーは、請求項２又は３記載の効果に加え、風洞部内での気柱共鳴による定常波が発生しにくくなるので、さらに音を小さくすることができる。

【００４８】請求項５記載のヘアードライヤーは、請求項２乃至４の何れか記載の効果に加え、吸音装置の軸方向の長さを、十分に音を小さくする作用を有した範囲内に限定することにより、吸音装置の小型化を図ることができ、使い勝手を良くすることができる。

【００４９】請求項６記載のヘアードライヤーは、請求項３乃至５の何れか記載の効果に加え、外筒と内筒との間の空気層の厚みを、十分に音を小さくする作用を有した範囲内に限定することにより、吸音装置の小型化を図ることができ、使い勝手を良くすることができる。

【００５０】請求項７記載のヘアードライヤーは、請求項３乃至６の何れか記載の効果に加え、さらに音を小さくすることができる。

8

【００５１】請求項８記載のヘアードライヤーは、請求項１乃至７の何れか記載の効果に加え、吸音装置を本体ハウジングに容易に取り付けることができる。

【００５２】請求項９記載のヘアードライヤーは、請求項１乃至８の何れか記載の効果に加え、全体の形状バランスが良くなり、使い勝手を良くすることができる。

【図面の簡単な説明】

【図１】本発明の第１実施例の断面図である。

【図２】その吸音装置の軸方向の長さと吸音量との関係を示すグラフである。

【図３】その吸音装置の空気層の厚さと吸音量との関係を示すグラフである。

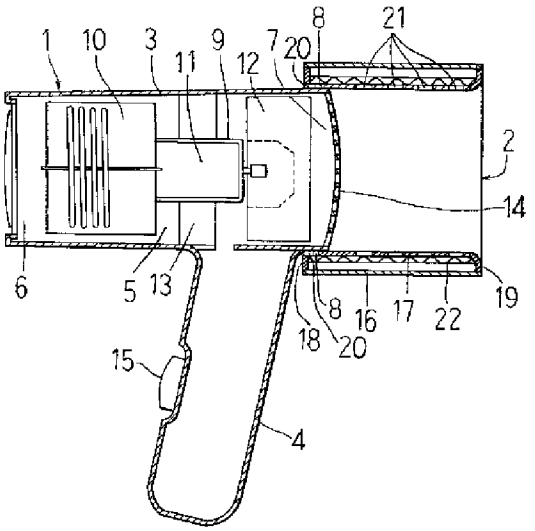
【図４】その内筒における丸孔の開口率と吸音量との関係を示すグラフである。

【図５】本発明の第２実施例の吸音装置を示す断面図である。

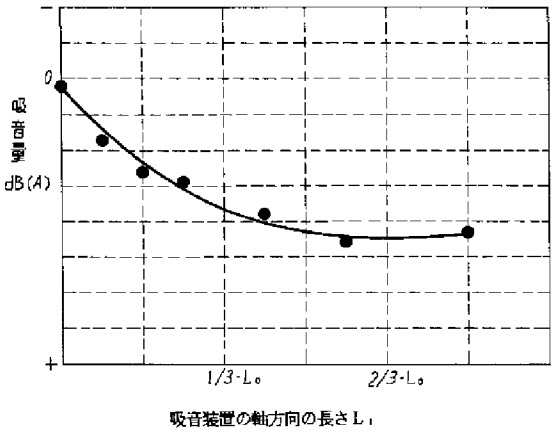
【符号の説明】

2　吸音装置
3　本体ハウジング
4　把手
5　風洞部
6　吐出口
7　吸込口
9　送風装置
10　ヒータ装置
16　外筒
17　内筒
21　丸孔
22　吸音材

【図１】



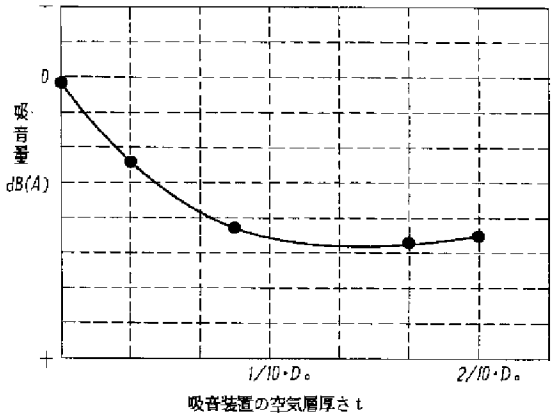

【図２】



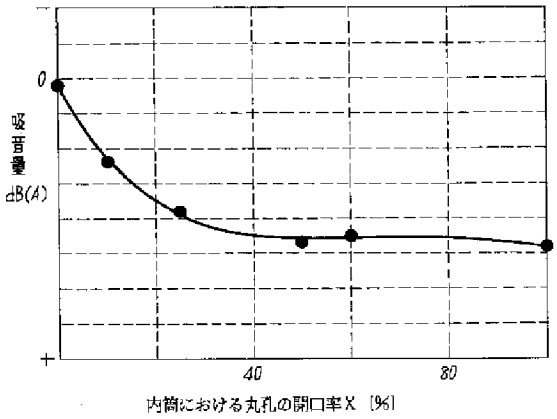



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 530 of 2286

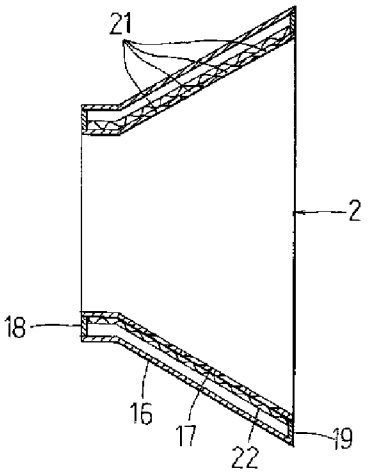
【図３】




【図４】




【図５】




【手続補正書】
【提出日】平成６年２月２日
【手続補正１】
【補正対象書類名】明細書
【補正対象項目名】請求項１
【補正方法】変更
【補正内容】
【請求項１】　一端側を吐出口とし他端側を吸込口とし吸込口と吐出口との間に風洞部を有した本体ハウジングと、風洞部に設けられ空気を吸込口から吸い込んで吐出口から吐き出す送風装置と、風洞部に設けられ熱が発生するヒータ装置とを備えたヘアードライヤーにおいて、前記本体ハウジングの吸込口に、音を減衰する吸音装置を設けてなるヘアードライヤー。
【手続補正２】
【補正対象書類名】明細書
【補正対象項目名】０００６
【補正方法】変更
【補正内容】
【０００６】
【課題を解決するための手段】前記目的を達成するために、請求項１記載のヘアードライヤーは、一端側を吐出口とし他端側を吸込口とし吸込口と吐出口との間に風洞部を有した本体ハウジングと、風洞部に設けられ空気を吸込口から吸い込んで吐出口から吐き出す送風装置と、風洞部に設けられ熱が発生するヒータ装置とを備えたヘアードライヤーにおいて、前記本体ハウジングの吸込口に、音を減衰する吸音装置を設けてなる構成としている。
【手続補正３】
【補正対象書類名】明細書



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 531 of 2286

【補正対象項目名】００１５
【補正方法】変更
【補正内容】
【００１５】
【作用】請求項１記載の構成によれば、風洞部で発生した音が吸音装置によって減衰されるので、音が小さくなる。
【手続補正４】
【補正対象書類名】明細書
【補正対象項目名】００１６
【補正方法】変更
【補正内容】
【００１６】請求項２記載の構成によれば、風洞部で発生した気柱共鳴による音の周波数が低くなり、風洞部で発生した風の乱れによる音が吸音装置の一開口端面から内部に入って他開口端面から出ていくまでの間に減衰され小さくなる。
【手続補正５】
【補正対象書類名】明細書
【補正対象項目名】００１７
【補正方法】変更
【補正内容】
【００１７】請求項３記載の構成によれば、風洞部で発生した音が吸音材によって吸収される。
【手続補正６】
【補正対象書類名】明細書
【補正対象項目名】００４４
【補正方法】変更
【補正内容】
【００４４】
【発明の効果】請求項１記載のヘアードライヤーは、風洞部で発生した音が吸音装置によって減衰されるので音が小さくなり、その結果、使用者やその周囲にいる人に、音による不快感を起こさせにくくすることができる。
【手続補正７】
【補正対象書類名】明細書
【補正対象項目名】００４５
【補正方法】変更
【補正内容】
【００４５】請求項２記載のヘアードライヤーは、請求項１記載の効果に加え、風洞部で発生した気柱共鳴による音の周波数が低くなり、風洞部で発生した風の乱れによる音が吸音装置の一開口端面から内部に入って他開口端面から出ていくまでの間に減衰され小さくなるので、さらに音を小さくすることができる。
【手続補正８】
【補正対象書類名】明細書
【補正対象項目名】００４６
【補正方法】変更
【補正内容】
【００４６】請求項３記載のヘアードライヤーは、請求項２記載の効果に加え、風洞部で発生した音が吸音材によって吸収されるので、さらに音を小さくすることができる。



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 532 of 2286

# PATENT ABSTRACTS OF JAPAN

D4

(11)Publication number : 08-000343
(43)Date of publication of application : 09.01.1996

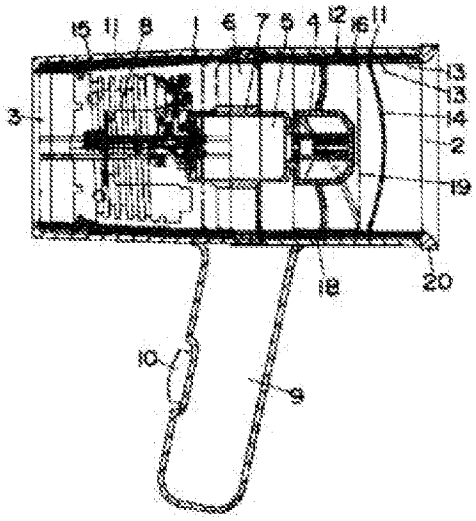
(51)Int.Cl. A45D 20/12

(21)Application number : 06-145159
(22)Date of filing : 27.06.1994

(71)Applicant : MATSUSHITA ELECTRIC WORKS LTD
(72)Inventor : KAMATA KENJI

## (54) HAIR DRIER

(57)Abstract:
PURPOSE: To absorb a sound produced by disturbance of wind generated from a suction opening which is the main noise source of a hair drier as well as from the periphery of a fan and a sound produced by the columnar resonance in the interior of the main body housing while a clearance between the fan and its peripheral main body housing is stabilized.
CONSTITUTION: An air blowing device 7 comprising a fan 4, a motor 5 for driving the fan 4 and a streamline blade 6 intended for holding the motor 5 and streamlining wind is disposed in the inside of a cylindrical main body housing 1 having respectively a suction port 2 at one end of the front side and an exhaust port 3 at the other end of the rear side. A heater 8 is disposed on the trailing side which is the exhaust port 3 side from the air blowing device 7 in the inside of the main body housing 1. In this arrangement, an inner pipe 16 is provided on the inner peripheral side of the main body housing 1 at least between the rear edge part of the fan 4 and the suction port 2 to make a double structure having space interposed. A sound absorbing material 11 is fitted to the outer surface side of the space side of the inner pipe 16, and an air layer 12 is provided between the sound absorbing material 11 and the inner surface of the main body housing 1.



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2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

## CLAIMS

[Claim(s)]
[Claim 1]He is Hwang to an inside of cylindrical body housing which has a suction opening at the one end of a front side, and has a blower outlet in the other end of a rear side.
A motor which drives Hwang.
Straightening vanes aiming at holding of a motor, and rectification of a wind.
in a hair drier which a blower module provided with the above has been arranged, and has arranged a heater from a blower module inside body housing by the slipstream side which is a blower outlet side
A hair drier which make it dual structure which provided an inner tube from Hwang's rear edge to the inner circumference side of body housing between suction openings at least, and passed space in between, and a sound-absorbing material is attached to the outer surface side by the side of above-mentioned space of an inner tube, and provides an air layer between a sound-absorbing material and a body housing inner surface, and is characterized by things.

[Claim 2]The hair drier according to claim 1 as it uses an inner tube inside dual structure as a rigid body, and it provides a hole to an inner tube from Hwang's front tip part before a suction opening, and air of a portion of a sound-absorbing material and air by the side of inner circumference of an inner tube touch, wherein they change via a hole.
[Claim 3]The hair drier according to claim 1 providing so that a network for product tampering prevention may not bulge outside from a suction opening but may be placed at an inside of body housing.
[Claim 4]The hair drier according to claim 1 which covers an overall length of forward/rearward direction, makes inner circumference of body housing dual structure, and is characterized by things.
[Claim 5]The hair drier according to claim 4 having provided steel surrounding frames inside body housing of a circumference of a heater, and considering it as dual structure in this surrounding frame and body housing.
[Claim 6]The hair drier according to claim 1 with which body housing which is the outer tube which constitutes dual structure is characterized by an inner tube being cylindrical shape with square tubed.

[Translation done.]

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## DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application]The present invention relates to the structure of attaining especially low noise-ization of a hair drier, about the hair drier used for xerasia.
[0002]
[Description of the Prior Art]If it is in a common hair drier, as shown in Fig.6, provide the suction opening 2 at the one end of the front side of the sideways tubed body housing 1, and provide the blower outlet 3 to the other end of the rear side of the body housing 1, and The fan 4, The inner package of the blower module 7 which consists of holding of the motor 5 which drives the fan 4, and the motor 5, and the straightening vanes 6 aiming at rectification of a wind is carried out to the body housing 1, The inner package of the heater 8 is carried out to the body housing 1 in the rear position of the blower module 7, the handle 9 is caudad hung from the body housing 1, and the operation switch 10 is provided for the handle 9.
[0003]Since the heater 8 etc. which rotate the fan 4, and send air and serve as a resistance thing after that at the flow side exist if it is in such a hair drier, it is easy to generate the noise by disorder of a wind, and the noise by an air column resonance is also loud because of the shape of a cartridge. The measure which provides the dual structure using the inner tube which consists of material which has viscoelasticity like JP,S63-238807,A as the measure against noise, and absorbs sound the generated noise is considered.
[0004]
[Problem to be solved by the invention]By the way, there is a close relation to the noise of a hair drier and the body housing of the circumference of a fan, and when the inner tube of the material of viscoelasticity is used like JP,S63-238807,A, the gap between a fan and the body housing around it is not stabilized, but it becomes a cause of a new noise.
[0005]It has generated most between the suction opening of a hair drier, and a fan, and if the noise by disorder of a wind does not install a sound absorbing function in this portion, it cannot reduce noise of the whole hair drier. The place which the present invention is made in view of the above-mentioned problem, and is made into the object of this invention stabilizing the gap between a fan and the body housing around it. It is in providing the hair drier of the low noise which can absorb sound the sound by disorder of the wind generated in the circumference of a fan from the suction opening which are the main noise sources of a hair drier, and the sound by the air column resonance inside body housing.
[0006]
[Means for solving problem]In order to attain the above-mentioned purpose a present invention hair drier, To body housing 1 cylindrical inside which has the suction opening 2 at the one end of a front side, and has the blower outlet 3 in the other end of a rear side, the fan 4, Arrange the blower module 7 which consists of the motor 5 which drives the fan 4, and holding of the motor 5 and the straightening vanes 6 aiming at rectification of a wind, and. from the blower module 7 in the hair drier which has arranged the heater 8 by the slipstream side which is the blower outlet 3 side to body housing 1 inside, It is made the dual structure which provided the inner tube 16 from the rear edge of the fan 4 to the inner circumference side of the body housing 1 between the suction openings 2 at least, and passed space in between, The sound-absorbing material 11 is attached to the outer surface side by the side of above-mentioned space of the inner tube 16, and the air layer 12 is provided between the sound-absorbing material 11 and body housing 1 inner surface.
[0007]It is also preferable that it is characterized by using the inner tube 16 inside dual structure as a rigid body, providing the hole 13 to the inner tube 16 from the front tip part of the fan 4 before the suction opening 2, and changing via the hole 13 as the air of the portion of the sound-absorbing material 11 and the air by the side of the inner circumference of the inner tube 16 touch. It is also preferable that it is characterized by providing so that the network 14 for product tampering prevention may not bulge outside from the suction opening 2 but may be placed at the inside of the body housing 1.
[0008]Also as for things, it is as preferable as the characteristics smoothly in things to cover the overall length

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 535 of 2286

of forward/rearward direction and to make inner circumference of the body housing 1 into dual structure. It is also preferable that it is characterized by having provided the steel surrounding frames 15 inside the body housing 1 of the circumference of the heater 8, and considering it as dual structure by this surrounding frame 15 and body housing 1.

[0009]It is also preferable that body housing 1 which is the outer tube which constitutes dual structure further again is characterized by the inner tube 16 being cylindrical shape with square tubed.

[0010]

[Function]According to the above-mentioned composition, it is made the dual structure which provided the inner tube 16 from the rear edge of the fan 4 to the inner circumference side of the body housing 1 between the suction openings 2 at least, and passed space in between, By having attached the sound-absorbing material 11 to the outer surface side by the side of above-mentioned space of the inner tube 16, and having provided the air layer 12 between the sound-absorbing material 11 and body housing 1 inner surface, The noise generated inside the hair drier, the sound of the wind especially generated most between the fans 4 from the large suction opening 2 of influence, and the columnar resonance generated inside a tube can be absorbed sound by the sound-absorbing material 11, the air layer 12, etc., and the noise level of the whole hair drier can be lowered.

[0011]And by considering it as a rigid body wall by using the inner tube 16 inside [ body housing 1 ] the circumference of the fan 4 as a rigid body, The noise which the gap between the circumferences of the fan 4 generates in the gap stably can be reduced, When providing the hole 13 to the inner tube 16 furthermore from the front tip part of the fan 4 before the suction opening 2 and making it the air of the portion of the sound-absorbing material 11 and the air by the side of the inner circumference of the inner tube 16 touch via the hole 13, noise can touch the sound-absorbing material 11 directly, and can improve sound absorbing performance.

[0012]By providing so that the network 14 for product tampering prevention may not bulge outside from the suction opening 2 but may furthermore be placed at the inside of the body housing 1, It stops that the main part of a hair drier becomes largely more than needed even if the main part of a hair drier becomes largely, in order that the network 14 for product tampering prevention may not project out of the body housing 1 but may provide the hole 13 between Hwang 4 and the suction opening 2, and the miniaturization of a hair drier can be performed, And air capacity can be increased.

[0013]If the overall length of forward/rearward direction is covered and inner circumference of the body housing 1 is furthermore made into dual structure, more noise generated by the main part of a hair drier, especially noise by an air column resonance can be reduced. By providing the steel surrounding frames 15 inside the body housing 1 of the circumference of the heater 8 furthermore, and considering it as dual structure by this surrounding frame 15 and body housing 1, an operation of the above-mentioned inner tube 16 is made to use it as the surrounding frame 15, improvement in safety is aimed at and a miniaturization can be attained.

[0014]With square tubed, if it is made for the inner tube 16 to be cylindrical shape, making the same as a cylinder the size of the body housing seen from the side surface, the body housing 1 which is the outer tube which constitutes dual structure further again can do the size of the space part inside dual structure largely, and can improve sound absorbing performance.

[0015]

[Working example]It states from the working example first shown in Fig.1 thru/or Fig.3.As shown in Fig.1, the body housing 1 of the hair drier is carrying out cylindrical shape, makes the opening of one end of the front side of the body housing 1 the suction opening 2, and has made the opening of the other end of a rear side the blower outlet 3. The inside of the body housing 1 arranges the blower module 7 which consists of fixing of the fan 4, the motor 5 which drives the fan 4, and the motor 5, and the straightening vanes 6 which have a function of rectification of the wind which comes out of the fan 4. The motor 5 is fixed to the straightening vanes 6, and the straightening vanes 6 are fixed to the body housing 1. into the body housing 1, the inner package of the heater 8 is carried out in the position by the side of the slipstream of this blower module 7, and the air blasting from the blower module 7 can be changed now into warm air with the heater 8. The handle 9 is caudad hung integrally from the body housing 1, and the operation switch 10 is provided for the handle 9.

[0016]The cylindrical inner tube 16 made from a plastic extended to the suction opening 2 is integrally formed in the straightening vanes 13, and this inner tube 16 is made to be along by the inner circumference of the body housing 1, and has formed dual structure with the body housing 1 and the inner tube 16. The thing small as much as possible of the gap 18 between the inner tube 16 and the fan 4 is desirable, and in this example, a hit of the fan 4 when load is added to the body housing 1 is considered, for example, when the outer diameter of the fan 4 is 60 mm, the inner diameter of the inner tube 16 has been 62 mm. Space is provided between the body housing 1 and the inner tube 16, and it has equipped with the sound-absorbing material 11 so that it may stick outside at the outer surface side of the inner tube 16. In the case of this example, it has equipped with fire-resistant high-density cloth, such as glass wool and felt weaving, as the sound-absorbing material 11. Although the large thing as much as possible of the air layer 12 formed between the inner tube 16 and the inner surface of the body housing 1 is desirable, practicality is considered and it has set to a 3-mm interval in this example.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 536 of 2286

[0017]Since the effect of the sound-absorbing material 11 is furthermore increased, the hole 13 has been provided to the inner tube 16 so that noise may touch the sound-absorbing material 11. When providing the hole 13 to this inner tube 16, the hole 13 with a diameter of 8 mm is circumferentially made in 20 pieces and an axial direction two rows in the pitch of about 10 mm, for example. As for the distance of the hole 13 and the front tip part 19 of the fan 4, taking at least 2 mm is desirable.
[0018]The steel surrounding frames 15 are attached to the surroundings of the heater 8, and dual structure consists of the body housing 1 and the inner tube 16 so that the same operation of the above-mentioned inner tube 16 may be carried out to this surrounding frame 15. The sound-absorbing material 11 is attached to the periphery of this surrounding frame 15 like the surroundings of the above-mentioned fan 4. The side board 20 which carried out the bellmouth configuration is attached to the suction opening 2, and the side board 20 has closed the back end of the space part between the body housing 1 and the inner tube 16. The network 14 for product tampering prevention is provided inside the body housing 1 so that it may not bulge outside from the suction opening 2 the miniaturization of the main part of a hair drier, and for the purpose of the increase in air capacity.
[0019]Then, if the blower module 7 operates, the hair drier of the above composition will inhale the open air from the suction opening 2, will pass the heater 8, will discharge warm air from the blower outlet 2, and will dry hair etc. In this case, a wind is largely disturbed in a flow path, therefore noise occurs. Since the shape of a cartridge is furthermore carried out, an air column resonance is generated inside, and it becomes a factor in which the noise of a hair drier is enlarged. The generated noise passes the inner tube 16, and touches the sound-absorbing material 11 through the hole 13 between the suction opening 2 and the fan 4, and it absorbs sound there, and it becomes a low noise and is transmitted to the outside of a hair drier. The hair drier constituted in this way can reduce the noise of about 2-3 dB (A) compared with the hair drier of structure conventionally which provides neither the inner tube 16 nor the sound-absorbing material 11 nor the air layer 12 like this example.
[0020]Fig.4 and Fig.5 show other working examples.In the case of this example, the inner tube 16 is cylindrical, but the portion corresponding to the periphery of the inner tube 16 at least of the body housing 1 is made into the shape of a rectangular head, big space is formed between the inner surface of the body housing 1, and the outer surface of the inner tube 16, and the big air layer 12 is formed in it. If it does in this way, a sound absorption effect can be improved by the big air layer 12.
[0021]
[Effect of the Invention]The present invention is made into the dual structure which provided the inner tube from the rear edge of the fan to the inner circumference side of body housing between suction openings at least like description, and passed space in between, Since the sound-absorbing material was attached to the outer surface side by the side of space of an inner tube and the air layer was provided between the sound-absorbing material and the body housing inner surface, The noise generated inside the hair drier, the sound of the wind especially generated most between fans from the large suction opening of influence, and the columnar resonance generated inside a tube can be absorbed sound by sound-absorbing material, an air layer, etc., and the noise level of the whole hair drier can be lowered.
[0022]If it is in the invention of the present invention according to claim 2, Since the inner tube inside [ body housing ] the circumference of a fan is used as the rigid body, the gap between the circumferences of a fan is what can reduce the noise stably generated in the gap, And since a hole is provided to an inner tube from the front tip part of a fan before a suction opening and he is trying for the air of the portion of a sound-absorbing material and the air by the side of the inner circumference of an inner tube to touch via a hole, noise can touch a sound-absorbing material directly and can improve sound absorbing performance.
[0023]If it is in the invention of the present invention according to claim 3, Since it provided so that the network for product tampering prevention might not bulge outside from a suction opening but might be placed at the inside of body housing, It stops that the main part of a hair drier becomes largely more than needed even if the main part of a hair drier becomes largely, in order that the network for product tampering prevention may not project out of body housing but may provide a hole between a fan and a suction opening, and the miniaturization of a hair drier can be performed, And air capacity can be increased.
[0024]Since the overall length of forward/rearward direction is covered and inner circumference of body housing is made into dual structure if it is furthermore in the invention of the present invention according to claim 4, more noise generated by the main part of a hair drier, especially noise by an air column resonance can be reduced. Since steel surrounding frames are provided inside the body housing of the circumference of a heater and it is considered as dual structure in this surrounding frame and body housing if it is furthermore in the invention of the present invention according to claim 5, an operation of the above-mentioned inner tube is made to use it as a surrounding frame, improvement in safety is aimed at and a miniaturization can be attained.
[0025]If it is in the invention of the present invention according to claim 5 further again, Making the same as a cylinder the size of the body housing seen from the side surface, since the body housing which is the outer tube which constitutes dual structure is square tubed and the inner tube is cylindrical shape, the size of the space

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324

part inside dual structure is made largely, and sound absorbing performance can be improved.

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[Translation done.]

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 538 of 2286

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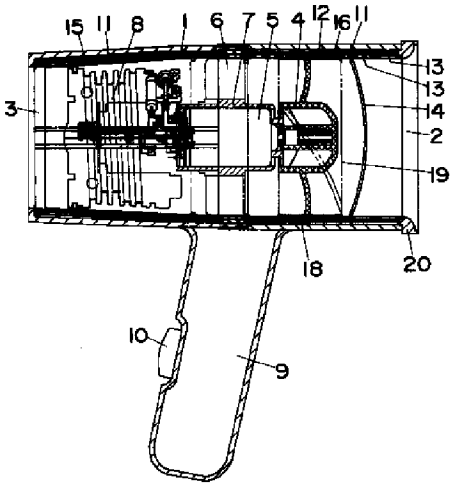
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(54)【発明の名称】　ヘアードライヤー

(57)【要約】
【目的】　ファンとその回りの本体ハウジングとの隙間を安定させつつ、ヘアードライヤーの主な騒音源である吸い込み口からファン周りで発生する風の乱れによる音と、本体ハウジング内部の気柱共鳴による音を吸音する。
【構成】　前側の一端に吸い込み口２を、後側の他端に吐風口３を有する筒状の本体ハウジング１内部に、ファン４と、ファン４を駆動するモータ５と、モータ５の保持と風の整流を目的とした整流翼６とよりなる送風装置７を配置する。本体ハウジング１内部に送風装置７より吐風口３側である後流側でヒータ８を配置する。これにおいて、少なくともファン４の後縁部から吸い込み口２の間で本体ハウジング１の内周側に内管１６を設けて間に空間を介した二重構造にする。内管１６の上記空間側の外面側に吸音材１１を取り付けると共に吸音材１１と本体ハウジング１内面との間に空気層１２を設ける。




１…本体ハウジング
２…吸い込み口
３…吐風口
４…ファン
５…モータ
６…整流翼
７…送風装置
１１…吸音材
１２…空気層
１３…穴
１４…異物混入防止用ネット
１５…開口枠
１６…内管



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 539 of 2286

1

【特許請求の範囲】

【請求項１】　前側の一端に吸い込み口を、後側の他端に吐風口を有する筒状の本体ハウジング内部に、ファンと、ファンを駆動するモータと、モータの保持と風の整流を目的とした整流翼とよりなる送風装置を配置すると共に、本体ハウジング内部に送風装置より吐風口側である後流側でヒータを配置したヘアードライヤーにおいて、少なくともファンの後縁部から吸い込み口の間で本体ハウジングの内周側に内管を設けて間に空間を介した二重構造にし、内管の上記空間側の外面側に吸音材を取り付けると共に吸音材と本体ハウジング内面との間に空気層を設けて成ることを特徴とするヘアードライヤー。

【請求項２】　二重構造の内側の内管を剛体とし、ファンの前縁部から吸い込み口までの間で内管に穴を設け、穴を介して吸音材の部分の空気と内管の内周側の空気とが接するようにして成ることを特徴とする請求項１記載のヘアードライヤー。

【請求項３】　異物混入防止用ネットが吸い込み口から外に膨出せず、本体ハウジングの内部に位置するように設けられたことを特徴とする請求項１記載のヘアードライヤー。

【請求項４】　本体ハウジングの内周を前後方向の全長に亙って二重構造にして成ることを特徴とする請求項１記載のヘアードライヤー。

【請求項５】　ヒータ回りの本体ハウジングの内側に鋼製の囲い枠を設け、この囲い枠と本体ハウジングにて二重構造としたことを特徴とする請求項４記載のヘアードライヤー。

【請求項６】　二重構造を構成している外管である本体ハウジングが四角筒状で、内管が円筒形状であることを特徴とする請求項１記載のヘアードライヤー。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、毛髪乾燥用に用いられるヘアードライヤーに関し、特にヘアードライヤーの低騒音化を図る構造に関するものである。

【０００２】

【従来の技術】一般のヘアードライヤーにあっては、図６に示すように横向き筒状の本体ハウジング１の前側の一端に吸い込み口２を設けると共に本体ハウジング１の後側の他端に吐風口３を設け、ファン４と、ファン４を駆動するモータ５とモータ５の保持と風の整流を目的とした整流翼６とよりなる送風装置７を本体ハウジング１に内装し、ヒータ８を送風装置７の後方位置で本体ハウジング１に内装し、本体ハウジング１から下方にハンドル９を下方に垂下し、ハンドル９に操作スイッチ１０を設けてある。

【０００３】このようなヘアードライヤーにあっては、ファン４を回転させて空気を送り、またその後流側に抵抗物となるヒータ８等が存在するため、風の乱れによる

2

騒音が発生しやすく、また筒形状のために気柱共鳴による騒音も大きい。その騒音対策として特開昭６３－２３８８０７号公報のように、粘弾性を有する材料からなる内管を使った二重構造を設け、発生した騒音を吸音する対策が考えられている。

【０００４】

【発明が解決しようとする課題】ところで、ヘアードライヤーの騒音とファン回りの本体ハウジングとには密接な関係があり、特開昭６３－２３８８０７号公報のように粘弾性の材料の内管を使った場合、ファンとその回りの本体ハウジングとの間の隙間が安定せず、新たなる騒音の原因となる。

【０００５】また風の乱れによる騒音はヘアードライヤーの吸い込み口とファンとの間で最も発生しており、この部分に吸音機能を設置しなければ、ヘアードライヤー全体の騒音を低減することができない。本発明は上記問題点に鑑みてなされたものであって、本発明の目的とするところはファンとその回りの本体ハウジングとの隙間を安定させつつ、ヘアードライヤーの主な騒音源である吸い込み口からファン回りで発生する風の乱れによる音と、本体ハウジング内部の気柱共鳴による音を吸音できる低騒音のヘアードライヤーを提供するにある。

【０００６】

【課題を解決するための手段】上記目的を達成するため本発明ヘアードライヤーは、前側の一端に吸い込み口２を、後側の他端に吐風口３を有する筒状の本体ハウジング１内部に、ファン４と、ファン４を駆動するモータ５と、モータ５の保持と風の整流を目的とした整流翼６とよりなる送風装置７を配置すると共に、本体ハウジング１内部に送風装置７より吐風口３側である後流側でヒータ８を配置したヘアードライヤーにおいて、少なくともファン４の後縁部から吸い込み口２の間で本体ハウジング１の内周側に内管１６を設けて間に空間を介した二重構造にし、内管１６の上記空間側の外面側に吸音材１１を取り付けると共に吸音材１１と本体ハウジング１内面との間に空気層１２を設けて成ることを特徴とする。

【０００７】また、二重構造の内側の内管１６を剛体とし、ファン４の前縁部から吸い込み口２までの間で内管１６に穴１３を設け、穴１３を介して吸音材１１の部分の空気と内管１６の内周側の空気とが接するようにして成ることを特徴とすることも好ましい。また、異物混入防止用ネット１４が吸い込み口２から外に膨出せず、本体ハウジング１の内部に位置するように設けられたことを特徴とすることも好ましい。

【０００８】また本体ハウジング１の内周を前後方向の全長に亙って二重構造にして成ることを特徴とするすることも好ましい。またヒータ８回りの本体ハウジング１の内側に鋼製の囲い枠１５を設け、この囲い枠１５と本体ハウジング１にて二重構造としたことを特徴とすることも好ましい。



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 540 of 2286

3

【０００９】さらにまた二重構造を構成している外管である本体ハウジング１が四角筒状で、内管１６が円筒形状であることを特徴とすることも好ましい。

【００１０】

【作用】上記構成によれば、少なくともファン４の後縁部から吸い込み口２の間で本体ハウジング１の内周側に内管１６を設けて間に空間を介した二重構造にし、内管１６の上記空間側の外面側に吸音材１１を取り付けると共に吸音材１１と本体ハウジング１内面との間に空気層１２を設けたことにより、ヘアードライヤー内部で発生した騒音、特に最も影響の大きい吸い込み口２からファン４の間で発生する風の音と、筒内部で発生する気柱共鳴音を吸音材１１や空気層１２等で吸音し、ヘアードライヤー全体の騒音レベルを下げることができる。

【００１１】そしてファン４回りの本体ハウジング１内側の内管１６を剛体として剛体壁とすることにより、ファン４回りの隙間が安定してその隙間で発生する騒音を低減でき、さらにファン４の前縁部から吸い込み口２までの間で内管１６に穴１３を設け、穴１３を介して吸音材１１の部分の空気と内管１６の内周側の空気とが接するようにすることにより、騒音が直接吸音材１１に触れて吸音性能を向上することができる。

【００１２】さらに異物混入防止用ネット１４が吸い込み口２から外に膨出せず、本体ハウジング１の内部に位置するように設けることにより、異物混入防止用ネット１４が本体ハウジング１外に突出せず、ファン４と吸い込み口２との間で穴１３を設けるためヘアードライヤー本体が大きくなっても必要以上にヘアードライヤー本体が大きくなるのを抑えてヘアードライヤーの小型化ができ、しかも風量を増加することができる。

【００１３】さらに本体ハウジング１の内周を前後方向の全長に亙って二重構造にすると、ヘアードライヤー本体で発生した騒音、特に気柱共鳴による騒音をより多く低減することができる。さらにヒータ８回りの本体ハウジング１の内側に鋼製の囲い枠１５を設け、この囲い枠１５と本体ハウジング１にて二重構造とすることにより、囲い枠１５に上記内管１６の作用を兼用させ、安全性向上を図ると共に小型化が図れる。

【００１４】さらにまた二重構造を構成している外管である本体ハウジング１が四角筒状で、内管１６が円筒形状であるようにすると、側面から見た本体ハウジングの大きさを円筒と同じにしながら、二重構造の内部の空間部の大きさを大きくでき、吸音性能を向上できる。

【００１５】

【実施例】先ず図１乃至図３に示す実施例から述べる。図１に示すようにヘアードライヤーの本体ハウジング１は円筒状をしており、本体ハウジング１の前側の一端の開口部を吸い込み口２とし、後側の他端の開口部を吐風口３としてある。本体ハウジング１内はファン４と、ファン４を駆動するモータ５と、モータ５の固定とファン

4

４から出る風の整流の機能を有する整流翼６とよりなる送風装置７を配置してある。モータ５は整流翼６に固定してあり、整流翼６は本体ハウジング１に固定してある。この送風装置７の後流側の位置で本体ハウジング１内にはヒータ８を内装してあり、送風装置７からの送風をヒータ８にて温風に変えることができるようになっている。本体ハウジング１から下方にハンドル９を一体に垂下してあり、ハンドル９に操作スイッチ１０を設けてある。

【００１６】整流翼１３には吸い込み口２までのびたプラスチック製の円筒状の内管１６が一体に形成されており、この内管１６は本体ハウジング１の内周に沿わせられ、本体ハウジング１と内管１６とで二重構造を形成してある。内管１６とファン４との間の隙間１８はできるだけ小さいことが望ましく、本実施例では本体ハウジング１に荷重が加わったときのファン４の当たりを考え、例えばファン４の外径が６０ｍｍである場合、内管１６の内径を６２ｍｍとしてある。本体ハウジング１と内管１６との間には空間を設けてあり、内管１６の外面側に外面に密着するように吸音材１１を装着してある。本実施例の場合、吸音材１１としてはグラスウール、フェルト製布等の難燃性の高密度の布を装着してある。内管１６と本体ハウジング１の内面との間に形成される空気層１２はできるだけ大きいことが望ましいが、実用性を考えて、本実施例では３ｍｍの間隔に設定してある。

【００１７】さらに吸音材１１の効果を増すため、騒音が吸音材１１に触れるように内管１６に穴１３を設けてある。この内管１６に穴１３を設ける場合、例えば、径８ｍｍの穴１３を約１０ｍｍのピッチで周方向に２０個、軸方向に２列あけている。穴１３とファン４の前縁部１９との距離は少なくとも２ｍｍとることが望ましい。

【００１８】またヒータ８の回りには鋼製の囲い枠１５を取り付けてあり、この囲い枠１５に上記内管１６の同様の作用をさせるように本体ハウジング１と内管１６とで二重構造を構成してある。この囲い枠１５の外周には上記ファン４の回りと同様に吸音材１１を取り付けてある。吸い込み口２にはベルマウス形状をした側板２０を取り付けてあり、側板２０にて本体ハウジング１と内管１６との間の空間部の後端を塞いでいる。異物混入防止用ネット１４はヘアードライヤー本体の小型化と風量増加を目的として、吸い込み口２から外に膨出しないように本体ハウジング１の内部に設けている。

【００１９】しかして、上記のような構成のヘアードライヤーは送風装置７が動作すると、吸い込み口２から外気を吸い込み、ヒータ８を通過し、吐風口２から温風を吐出し、毛髪等の乾燥を行う。この場合、流路内で大きく風が乱され、そのために騒音が発生する。さらに筒形状をしているために内部で気柱共鳴を発生し、ヘアードライヤーの騒音を大きくする要因となる。その発生した



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 541 of 2286

5

騒音は内管１６を通過し、また吸い込み口２とファン４との間の穴１３を通って吸音材１１に接し、そこで吸音され、ヘアードライヤーの外部には低騒音となって伝わる。このように構成されたヘアードライヤーは本実施例のように内管１６や吸音材１１や空気層１２を設けない従来構造のヘアードライヤーに比べて約２～３ｄＢ（Ａ）の騒音を低減することができる。

【００２０】また図４、図５は他の実施例を示す。本実施例の場合、内管１６は円筒状になっているが、本体ハウジング１の少なくとも内管１６の外周に対応する部分を四角状にしてあり、本体ハウジング１の内面と内管１６の外面との間に大きな空間を形成して大きな空気層１２を形成してある。このようにすると、大きな空気層１２にて吸音効果を向上できる。

【００２１】

【発明の効果】本発明は叙述のように少なくともファンの後縁部から吸い込み口の間で本体ハウジングの内周側に内管を設けて間に空間を介した二重構造にし、内管の空間側の外面側に吸音材を取り付けると共に吸音材と本体ハウジング内面との間に空気層を設けたので、ヘアードライヤー内部で発生した騒音、特に最も影響の大きい吸い込み口からファンの間で発生する風の音と、筒内部で発生する気柱共鳴音を吸音材や空気層等で吸音し、ヘアードライヤー全体の騒音レベルを下げることができるものである。

【００２２】また本発明の請求項２記載の発明にあっては、ファン回りの本体ハウジング内側の内管を剛体としているので、ファン回りの隙間が安定してその隙間で発生する騒音を低減できるものであり、しかもファンの前縁部から吸い込み口までの間で内管に穴を設け、穴を介して吸音材の部分の空気と内管の内周側の空気とが接するようにしているので、騒音が直接吸音材に触れて吸音性能を向上することができるものである。

【００２３】また本発明の請求項３記載の発明にあっては、異物混入防止用ネットが吸い込み口から外に膨出せず、本体ハウジングの内部に位置するように設けたので、異物混入防止用ネットが本体ハウジング外に突出せず、ファンと吸い込み口との間で穴を設けるためヘアードライヤー本体が大きくなっても必要以上にヘアードライヤー本体が大きくなるのを抑えてヘアードライヤーの

6

小型化ができ、しかも風量を増加することができるものである。

【００２４】さらに本発明の請求項４記載の発明にあっては、本体ハウジングの内周を前後方向の全長に亙って二重構造にしているので、ヘアードライヤー本体で発生した騒音、特に気柱共鳴による騒音をより多く低減することができるものである。さらに本発明の請求項５記載の発明にあっては、ヒータ回りの本体ハウジングの内側に鋼製の囲い枠を設け、この囲い枠と本体ハウジングにて二重構造とするので、囲い枠に上記内管の作用を兼用させ、安全性向上を図ると共に小型化が図れるものである。

【００２５】さらにまた本発明の請求項５記載の発明にあっては、二重構造を構成している外管である本体ハウジングが四角筒状で、内管が円筒形状であるので、側面から見た本体ハウジングの大きさを円筒と同じにしながら、二重構造の内部の空間部の大きさを大きくでき、吸音性能を向上できるものである。

【図面の簡単な説明】

【図１】本発明の一実施例の正面から見た断面図である。

【図２】同上の外観の斜視図である。

【図３】同上の要部の側面から見た断面図である。

【図４】同上の他の実施例の側面図である。

【図５】同上の側面から見た断面図である。

【図６】従来例の正面から見た断面図である。

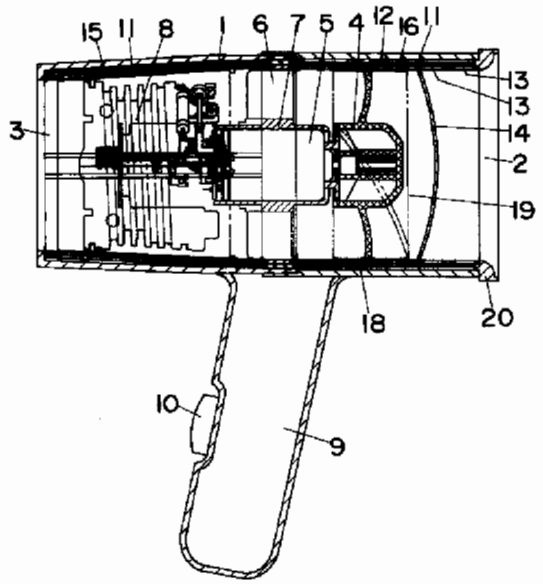
【符号の説明】

１　本体ハウジング
２　吸い込み口
３　吐風口
４　ファン
５　モータ
６　整流翼
７　送風装置
１１　吸音材
１２　空気層
１３　穴
１４　異物混入防止用ネット
１５　囲い枠
１６　内管

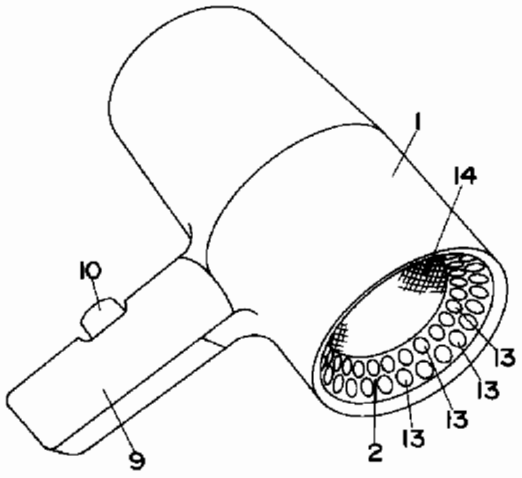


SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 542 of 2286

【図１】

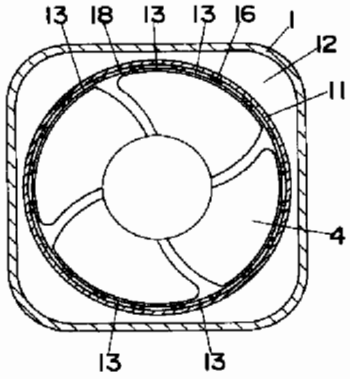



【図２】

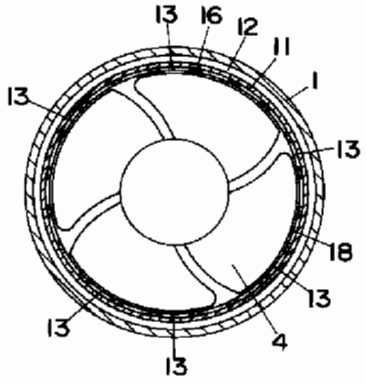



1…本体ハウジング
2…吸い込み口
3…吐風口
4…ファン
5…モータ
6…整流翼
7…送風装置
11…吸音材
12…空気層
13…穴
14…異物混入防止用ネット
15…囲い枠
16…内管

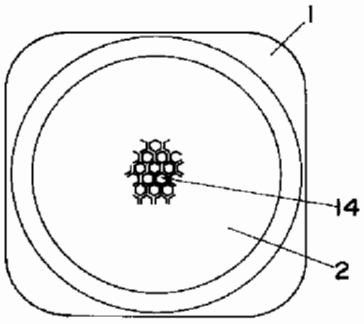
【図５】




【図３】



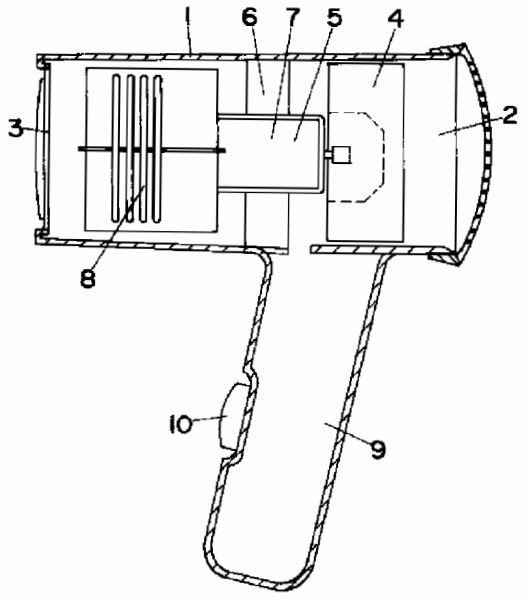

【図４】






SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 543 of 2286

【図６】






SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 544 of 2286

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(51) INT CL[6]
H02K 5/24 7/14 // F16F 7/00

(52) UK CL (Edition O )
H2A AKL1 AKL2 AKX2A AK121 AK125 AK404 AK405
AK706 AK812
F2X X7D3
U1S S2215

(56) Documents Cited
GB 2259205 A GB 0953057 A

(58) Field of Search
UK CL (Edition O ) H2A AKLL AKL1 AKL2 AKX2
INT CL[6] H02K 5/00 5/24 5/26

# (54) Supporting structure for vibration generating motor used in compact electronic device

(57) The present invention includes a motor 3 for generating vibration, an upper casing half 2 having first ribs 22 for supporting the motor and a lower casing half 1 having second ribs 11 for supporting the motor and a motor-receiving portion 12 for receiving the motor. A printed circuit board 5 is arranged adjacent to the motor-receiving portion. A motor holder 4 is formed by tightly wrapping the motor with a thin sheet having a corrugated surface, double sided adhesive being present between the motor and the sheet.

FIG.1

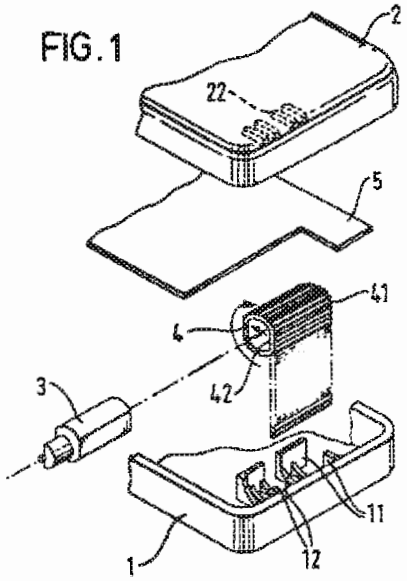
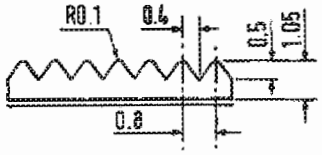



FIG.3(c)




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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 545 of 2286

FIG. 1

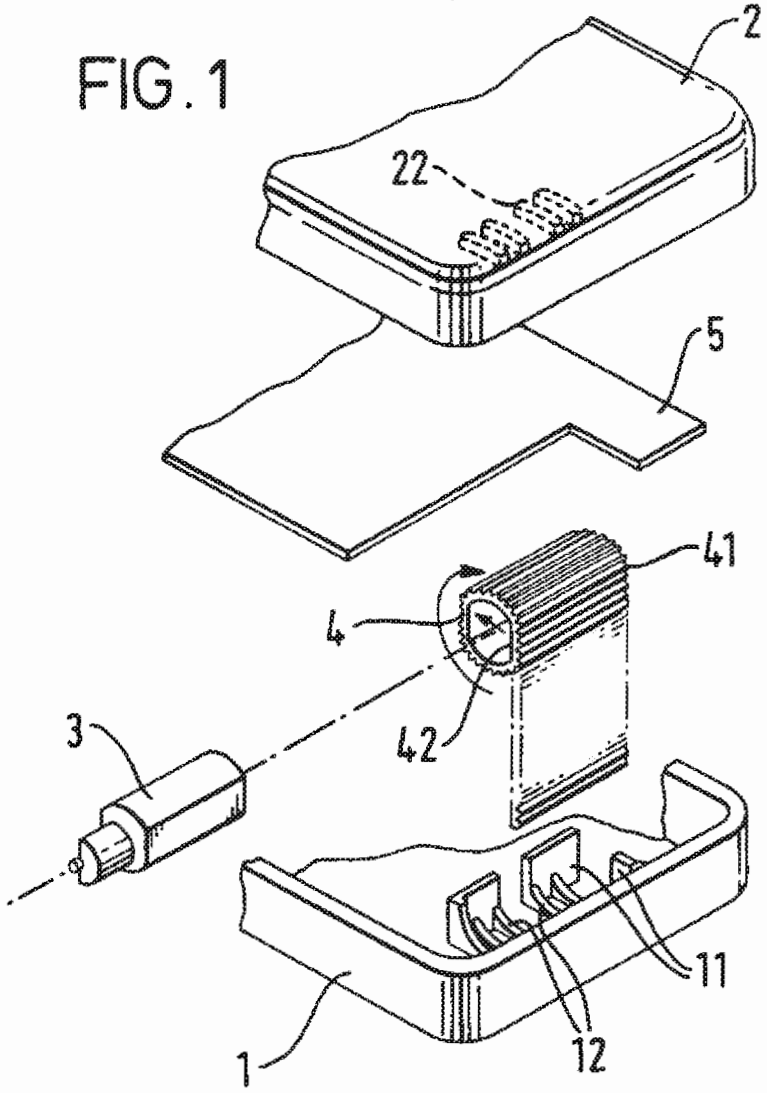
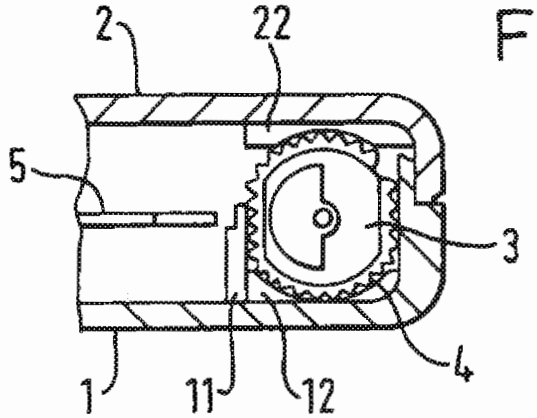



FIG. 2




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 546 of 2286

FIG. 3(a)

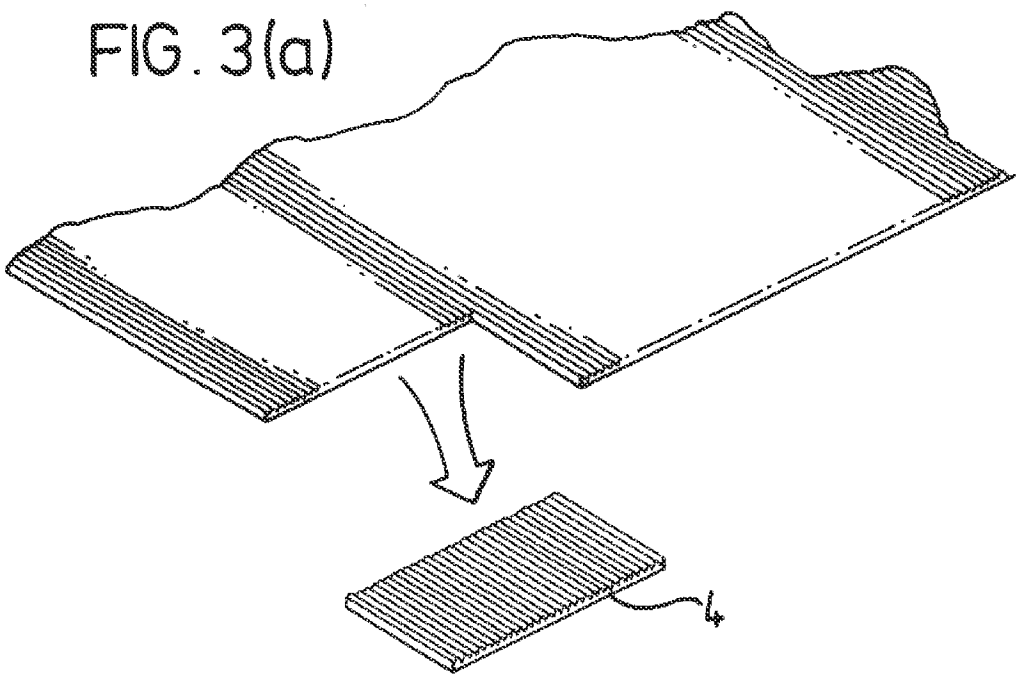



FIG. 3(b)

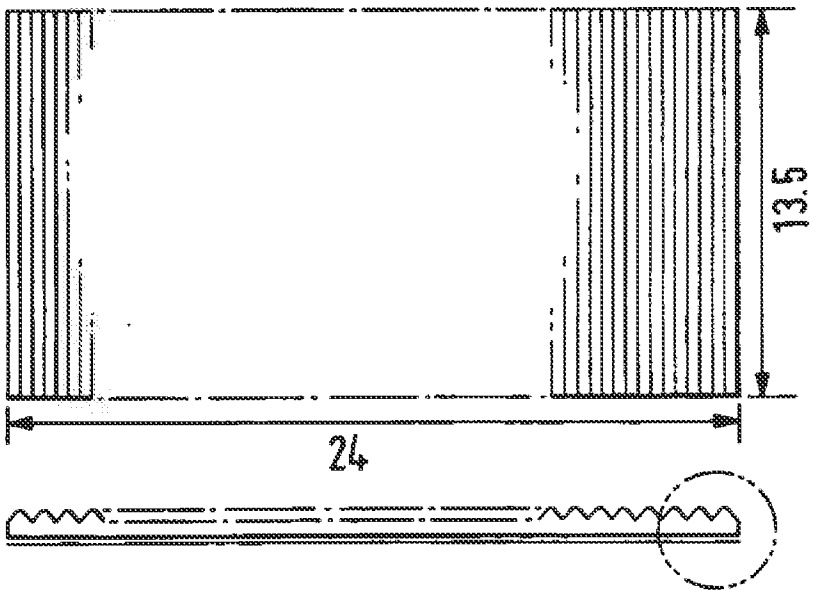
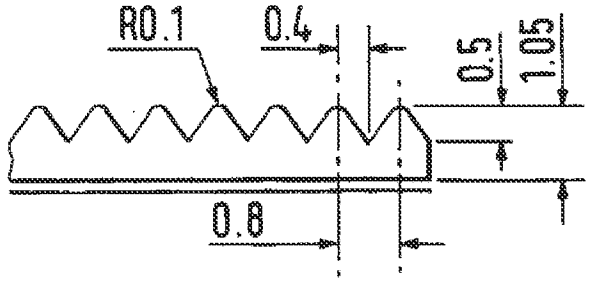
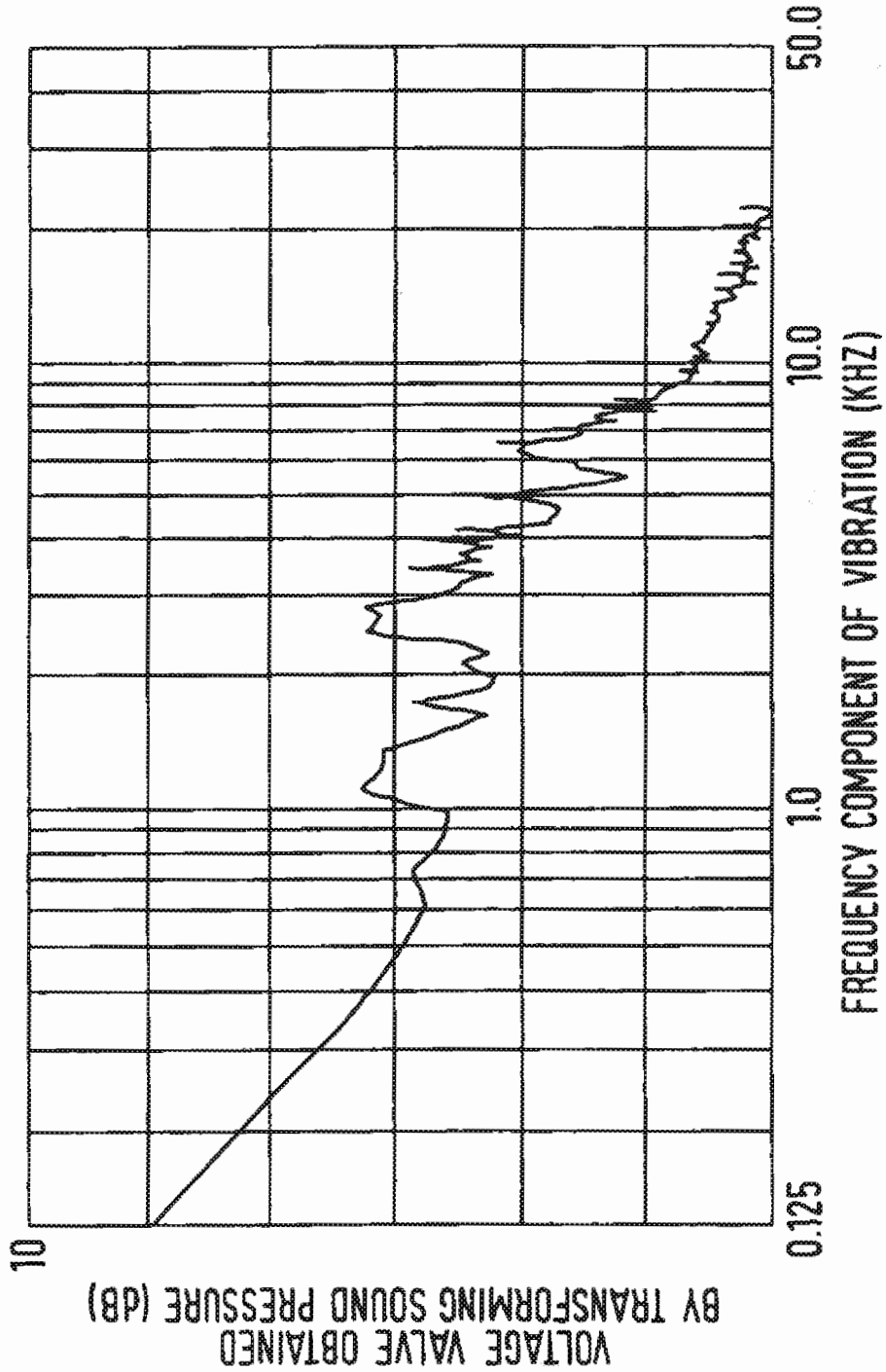



FIG. 3(c)




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 547 of 2286

FIG. 4




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 548 of 2286

# SUPPORTING STRUCTURE FOR VIBRATION GENERATING MOTOR USED IN COMPACT ELECTRONIC DEVICE

The present invention relates to a supporting structure for a vibration generating motor and, more particularly, to a supporting structure for a vibration generating motor for use in a compact electronic device.

A vibration generating motor (referred to as simply a "motor", hereinafter) is used in, for example, a selective calling receiver in which vibration is generated by the motor when the receiver notifies a user with call information.

However, when the selective calling receiver generates vibration by means of the motor thereof, there may be resonance between a high frequency component of the vibration and other electronic parts within the receiver, resulting in an irregular sound. Since vibration generation is used when notification of call information by means of sound is undesirable, in a case such as where the selective calling receiver is used in a quiet environment, restriction of irregular sound generation is an important problem.

Japanese Utility Model Publication No. H5-28914 (JP-Y2-05-28914) discloses a supporting structure of a

vibration generating motor for use in a selective calling receiver.

In the disclosed supporting structure, the motor is pressure-inserted into a motor receiving hole of a molded rubber holder having an outer configuration which can be fitted into a motor receiving space provided in a battery case.

In this supporting structure, high frequency components of the vibration generated by the motor are absorbed by the rubber holder. Therefore, resonance between the high frequency components of the vibration and electronic parts within the selective calling receiver is restricted and thus the generation of irregular sound is restricted.

Although the restriction of irregular sound is achieved by the disclosed motor supporting structure, the configuration of the rubber holder depends upon the configuration of the motor and it is necessary to produce rubber holders for every type of motor. Since there are many types of motor, there is a problem of cost performance in producing the rubber holders.

Further, in the disclosed motor supporting structure, the wall thickness of the rubber holder must be large enough to restrict the generation of irregular sound and, therefore, the size of the rubber holder itself necessarily becomes large, which causes

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 550 of 2286

miniaturization of a compact electronic device using such a vibration generator to be difficult.

The present invention in its various aspects is defined in the independent claims below, to which reference should now be made. Advantageous features are set forth in the appendant claims.

The invention will be described in detail by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of a holder structure of a vibration for generating motor which is used in a compact electronic device, according to an embodiment of the present invention;

Fig. 2 is a cross-section of the holder structure shown in Fig. 1;

Figs. 3(a), 3(b) and 3(c) are a perspective view, a plan view and a cross-sectional view of the holder structure shown in Fig. 1, respectively, showing the fabrication method thereof; and

Fig. 4 is a characteristic curve showing the spectrum of the vibration generated by a motor supported by the holder shown in Fig. 1.

In Figs. 1 and 2, a casing for a compact electronic device is provided by assembling a lower casing half 1 and an upper casing half 2, both of which are provided by plastic molding.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 551 of 2286

The upper casing half 2 has formed on a portion of an inner surface thereof, in which a motor-receiving space is to be provided, a plurality of parallel ribs 22 (two in Fig. 1) for holding a vibration generating motor 3. The ribs 22 extend perpendicularly to the axis of the vibration generating motor 3 which is to be received in the motor-receiving space of the electronic device.

The lower casing half 1 has formed on a portion of an inner surface thereof, in which the motor-receiving space is to be provided when the upper and lower casing halves 2 and 1 are assembled, a plurality of positioning ribs 11 for defining the position of the vibration generating motor 3 in the axial and radial directions when the vibration generating motor 3 is received in the motor- receiving space.

The lower casing half 1 is further formed in the motor-receiving space with a plurality of parallel motor holding ribs 12 which extend perpendicularly to the axis of the vibration generating motor 3. The positions of the motor holding ribs 12 correspond to those of the positioning ribs 11 of the upper casing half 2, respectively.

The upper and lower casing halves 2 and 1 are assembled with a printed circuit board 5 in between them. On the printed circuit board 5, various

electronic components of the compact electronic device are mounted and an edge portion of the printed circuit board 5 adjacent the motor-receiving space is in contact with the positioning ribs 11 in the casing of the compact electronic device.

A motor holder 4 in the form of a rectangular thin sheet having a double-sided adhesive tape 42 fixed on one surface thereof through one adhesive face of the tape is fixedly wound on a peripheral surface of the vibration generating motor 3 by the other adhesive surface of the adhesive tape 42. The vibration generating motor 3 with the holder 4 thereon is received in the motor-receiving space defined in the casing by the positioning ribs 11.

The other surface of the rectangular thin sheet which is, for example, of silicone rubber and forms the holder 4, which becomes an outer surface thereof when wound on the motor 3, is undulated or corrugated to provide a plurality of parallel ribs 41 extending in the axial direction of the motor 3. The parallel ribs 41 function to effectively restrict irregular sound from being generated by the motor 3 when the latter is actuated. The thickness of the holder 4 is smaller than the wall thickness of the known molded rubber holder by 0.5 to 1.0 mm.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 553 of 2286

The structure of the holder 4 and a fabrication method therefor will be described with reference to Figs. 3(a), 3(b) and 3(c).

As shown in Fig. 3(a), the holder 4 can be obtained by cutting a portion of a single thin silicone rubber sheet having one surface on which the parallel ribs 41 are formed and the other surface adhered to one surface of the double-sided adhesive tape 42. The dimensions of the thin silicone rubber sheet portion depend upon the size and configuration of the specific motor 3. The thin silicone rubber sheet portion 4 is rounded to fit on the configuration of the motor and adhered to the outer surface of the motor through the other surface of the adhesive tape 42, with the parallel ribs 42 of the sheet portion 4 being in the axial direction of the motor 3.

Fig. 3(b) shows an example of the dimensions of the thin silicone rubber sheet portion 4. In Fig. 3(b), the rectangular sheet portion 4 is 24 mm long and 13.5 mm wide.

Fig. 3(c) shows an example of dimensions of the parallel ribs 41 of the thin silicone rubber sheet portion 4. In Fig. 3(c), the top portion of each rib 42 is rounded with radius of curvature of 0.1 mm. The pitch of the ribs 41 is, for example, 0.8 mm and the height is 0.5 mm. The thickness of the sheet 4 measured

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 554 of 2286

from the top of the ribs on the one surface thereof to the other surface is 1.05 mm.

Returning to Figs. 1 and 2, the assembly procedure of the supporting structure of the vibration generating motor 3 will be described.

First, in Fig. 1, the vibration generating motor 3 is tightly wrapped by the rectangular sheet 4 with the aid of the one surface of the adhesive tape 42 of the rectangular sheet 4.

Then, the vibration generating motor 3 wrapped by the sheet 4 is put in the space portion of the lower casing half 1, which is defined by the positioning ribs 11, such that the parallel ribs 41 of the sheet 4 become perpendicular or orthogonal to the ribs 12.

After the vibration generating motor 3 is received in the space portion of the lower casing half 1, the printed circuit board 5 is disposed on the casing half 1 such that the edge portion of the circuit board 5 is in contact with the ribs 12.

Finally, the upper casing half 2 is put thereon such that the ribs 11 becomes perpendicular to the ribs 41 and is fixedly secured to the lower casing half 1, with the circuit board 5 being in between the upper and lower casing halves 1 and 2. Thus, the motor holder formed from the thin sheet has on its surface a friction portion in frictional contact with the ribs 12 and 22.

In this final securing step, the motor 3 is fixed in the motor-receiving space defined by the upper and lower casing halves 1 and 2 by means of the upper and lower supporting ribs 12 and 22 of the upper and lower casing halves 1 and 2, as shown in Fig. 2.

High frequency vibration components, due to which irregular sound is generated, are absorbed by the parallel ribs 41 formed on the outer surface of the silicone rubber holder 4. Further, since the upper and lower supporting ribs 12 and 22, the positioning ribs 11, and the upper and lower casing halves 1 and 2 are of plastic material and the motor holder 4 is formed on its outer surface with the linear ribs 41 extending perpendicularly to the upper and lower supporting ribs 12 and 22 in contact therewith, high frequency vibration components vibration generated by the motor 3 are effectively absorbed.

It is possible to change the frequency of the high frequency vibration components generated by the motor 3 by changing the pitch of the ribs 41 of the thin sheet.

Therefore, even if the material of such as the casing is changed and thus the frequency of the high frequency vibration components to be absorbed is changed, it is possible to absorb such frequency by changing the pitch of the ribs 41.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 556 of 2286

Next, the spectral characteristic of the vibration generated by the motor 3 will be described with reference to Fig. 4.

The spectral characteristics shown in Fig. 4 was measured by using an RB403 Digital Spectrum Analyzer commercially available from Advantest. In Fig. 4 the abscissa shows frequency components of the vibration generated by a motor 3 having the present motor holder 4 and the ordinate shows the voltage value obtained by transforming the vibration sound pressure.

In a known compact electronic device, irregular sound is usually generated by resonance of a printed circuit board 5 at a motor vibration frequency of 6 - 8 kHz. However, in the present device, irregular sound having frequencies within such frequency range are substantially absorbed, as shown in Fig. 4.

In the motor supporting structure illustrated, a motor holder for supporting a vibration generating motor in a space provided in the casing of an electronic device comprises a thin sheet of elastic material, which tightly wraps the motor. Since, in the above construction of the motor supporting structure, the motor holder is provided by a piece of a rectangular thin sheet cut from a large thin sheet, it is possible to generalize the fabrication of the motor holder regardless of the configuration and size of motor.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 557 of 2286

Further, since the motor holder is in the form of thin sheet, it contributes to miniaturization of the compact electronic device. With the provision of the linearly extending parallel ribs on the thin sheet, it is possible to effectively restrict generation of irregular sound.

Thus, as described, in the present device, which employs the thin sheet of elastic material as the motor holder, since the manufacture of the motor holders is generalized the initial investment for the manufacture of motor holders can be substantially reduced. Further, it is possible to reduce the size of the compact electronic device, that is, the width and height of the device can be reduced by 1 - 2 mm, respectively, compared with the known device.

Numerous additional modifications and variations of the present invention are possible in the light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described herein.

## CLAIMS

1. A supporting structure of a vibration generating motor, comprising:

a motor-receiving portion for receiving a motor; and

a motor holder formed by tightly wrapping the motor with a thin sheet.

2. The supporting structure claimed in claim 1, further comprising an upper casing half having first ribs for supporting said motor and a lower casing half having second ribs for supporting the motor and providing the motor-receiving portion.

3. The supporting structure claimed in claim 1, further comprising a printed circuit board having an edge portion arranged adjacent to the motor receiving portion.

4. The supporting structure claimed in claim 1, wherein the motor holder is formed on its surface with a friction portion in frictional contact with the first and second ribs.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 559 of 2286

5. The supporting structure claimed in claim 4, wherein the friction portion comprises a plurality of linearly extending ribs.

6. The supporting structure claimed in claim 4, wherein the friction portion is formed of silicone rubber.

7. The supporting structure claimed in claim 2, wherein the upper and lower casing halves are made of plastics material.

8. The supporting structure claimed in claim 2, wherein the first ribs are formed in positions opposite to the second ribs, respectively.

9. The supporting structure claimed in claim 5, wherein the motor is supported by an orthogonal crossing of the plurality of the linearly extending ribs and the first and second ribs.

10. The supporting structure claimed in claim 1, wherein the thin sheet has a double-sided adhesive sheet adhered with one adhesive side to one surface of the thin sheet and the motor holder is formed by rolling the

thin sheet around the motor with the other adhesive side being adhered to a peripheral surface of the motor.

11. The supporting structure claimed in claim 5, wherein the number of the linearly extending ribs and the pitch of the linearly extending ribs are determined by the frequency vibration components generated by the motor which are to be restricted.

12. The supporting structure claimed in claim 1, wherein the thin sheet forming the motor holder is cut out from a large thin sheet.

13. A method of mounting a motor for generating vibration in the casing of a compact electronic device, the casing being composed of an upper casing half and a lower casing half, the method comprising the steps of:

cutting a rectangular thin sheet portion from a large thin sheet;

adhering the rectangular thin sheet portion to the motor;

locating the motor having the rectangular thin sheet adhered thereto in a predetermined position within the lower casing half; and

bonding the upper casing half onto the lower casing half.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 561 of 2286

14. The setting method claimed in claim 14, further comprising, between the setting step and the bonding step, the step of arranging a printed circuit board in the vicinity of the predetermined position.

15. A supporting structure of a vibration generating motor, substantially as herein described with reference to the drawings.

16. A method of mounting a motor for generating vibration, substantially as herein described with reference to the drawings.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 562 of 2286

The Patent Office

| | | | |
|---|---|---|---|
| **Application No:** | GB 9522937.3 | **Examiner:** | John Cockitt |
| **Claims searched:** | 1-16 | **Date of search:** | 30 January 1996 |

## Patents Act 1977
## Search Report under Section 17

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): H2A [AKL1, AKL2, AKLL, AKX2]

Int Cl (Ed.6): H02K [05/00, 05/24, 05/26]

Other:

**Documents considered to be relevant:**

| Category | Identity of document and relevant passage | | Relevant to claims |
|---|---|---|---|
| Y | GB2259205A | NEC | 1,13 |
| Y | GB0953057A | ELECTROLUX - see rubber suspension ring | 1,13 |

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|---|---|---|---|
| X | Document indicating lack of novelty or inventive step | A | Document indicating technological background and/or state of the art. |
| Y | Document indicating lack of inventive step if combined with one or more other documents of same category. | P | Document published on or after the declared priority date but before the filing date of this invention. |
| & | Member of the same patent family | E | Patent document published on or after, but with priority date earlier than, the filing date of this application. |



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 563 of 2286

Description DE19527111

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The invention relates to a curling iron with the characteristics of the preamble of claim 1

To curly hair screwed into use is made of several methods.

Example, it is customary to wrap a wet strand of hair on a round brush and with the hot air from a hair dryer or hair dryer to dry. In this way, hair strand by strand of hair is dried.

Screw in the same multiple locks to be shot on the hair curlers and dried the prepared hair under a hair dryer.

Both methods are very time consuming and claim the scalp excessively with hot air.

In particular, the use of dry hoods are prone to the so-called cake pan effect.

Screw in a more convenient process curls, provides a curling iron, around which the wet hair can be wound and emitted from the interior of a hot air stream.

The use of such a curling iron is easy and less time consuming than the methods mentioned above.

The disadvantage is that the locks from the inside dry and sensitive hair ends are stressed most by the heat.

A further disadvantage is that the hairs are sometimes so tightly wrapped around the rod, that the air nozzles are moved and can pass the air flow is limited.

In order to achieve complete drying of the hair, the process must be repeated several times and the hair must first be pre-dried by air or with a hair dryer.

From DE-GM 86 02 580 is a electric hair dryer, hair curler is known to dry the hair with a letter addressed to the curlers air flow and thus circumvents the problems encountered when using conventional curling irons and due to the fact is that the curls from the inside out to be dried.

The hair dryer-curler has a flow channel which is arranged parallel to the curler and introduced into the nozzles are directed on the curler. The fan is located in the handle. The flow channel arranged below the hair curler is rotatable by a motor. The device is attached to the hair and wrapped a strand of a button. A disadvantage of the blow dryer curler is that it is extremely costly and inconvenient to handle this. The two electrical switches easily lead to confusion, so that sometimes unintentionally, instead of the hair dryer the wrapper are operated. Because of the automatic winding device, the device is heavy and can hardly be targeted attach to the hair. Another disadvantage is that you tie the hair on twisting slightly and that originates in clusters can be resolved because of the cumbersome fixed flow channel hardly.

Object of the invention is a curling iron according to the preamble of claim 1 further so that a comfortable and safe handling is guaranteed.

This problem is solved by a curling iron with the features of claim 1.

Advantageous embodiments of the invention are listed in the subclaims.

By using the inventive curling iron, it is possible to make a curly hairstyle with a small amount of time of about 10 minutes.

Here, the handling is as easy as with the conventional curling irons.

According to the inventive curling iron of the air flow is guided from the outside to the untwisted curls, so that these are homogeneous dried and remain inwardly curled hair ends spared effective.

The air impinges substantially from the outside to the wound hair and only a small portion penetrates through to the sensitive hair ends.

A burning of the hair strands and hair ends at a column of the use of the inventive curling iron is by its design effectively avoided.

The flow channel is formed by a one-or multi-part sleeve surrounding the rod and which are removed from the winding member by folding or shifting can.

Since the duct almost completely encircles the barrel, only a little hot air comes from the staff on the scalp.

In this way, the scalp and hair roots are sensitive to relatively little affected.

Because of the ease of use tangling the hair is almost impossible.

However, it should happen that still results in a ball, then this can be eliminated simply because the curler is not covered by the flow channel.

The curling iron is present in all cases easy to remove from the hair.

In a particularly advantageous embodiment of the curling iron can be adjusted between a stream of air from the outside and an air flow switch from the inside out.

It is possible to include the additional hot air, cold air, so that the air flow coming from the inside colder, and the hair ends are protected.

In this manner, a particularly homogeneous drying of the hair strand can be guaranteed.

This may help the cold air stream to protect the scalp lead to hair ends.

It is also advantageous to combine the blower and the flow channel to a common dry area, which can be moved as a whole on the curling iron.

It is possible to arrange the dry part on the handle side of the curling iron or on the side opposite the handle.

In a particular embodiment, the dry part can be removed completely.

In this embodiment, the curling iron can be controlled very easily with one hand before it is pushed with the other hand, the dry part.

Embodiments of the invention are illustrated in the drawing and are described in detail below.

In the drawings:

Fig. 1 shows a curling iron with stainless steel cover air duct;

Fig. 2 shows a curling iron with a folding air flow; and

Fig. 3 is a curling iron with detachable dry area.

The curling iron shown in Figure 1 has a handle 1 and a coaxial arrangement for a winding handle 1, Part 2

The winding member 2 is a preferably with PTFE (polytetrafluoroethylene) coated tube having at its end facing the handle 1 page opening 3.

The winding member 2 is closed in this specific embodiment, on the other end face, but may in another embodiment, there also have an opening.

The opening 3 is closed by a flap 12 or a non-illustrated valve.

The flap 12 is actuated by a handle 1 attached to lever 13.

Into the jacket of the tube bores 5 are incorporated.

The winding member 2 is occupied in a known manner with radially projecting bristles 4.

The bristles 4 take the hair 11 so that they can be wound up by rotation of the curling iron.

Instead of the bristles 4 may be attached to the winding member 2 in a known manner a bracket by means of which the hair is clamped 11 to the winding member.

In this particular embodiment is located on the handle 1, a cylindrical housing 6 in which the winding member 2 is attached.

The housing 6 is on the winding bar facing the open end side.

In the housing 6 is an electric motor 7 with a blower 8 is housed.

The fan draws air through to the housing 6 is brought slots 9 and blows it in the direction of winding, Part 2

Here, the air flow when required by means of a heating coil 10 are heated, which can be switched on or off at a switch 14.

To the housing 6 is an air duct 15 in the form of a cylindrical sleeve is pushed, which is displaceable in the axial direction.

In the wall of the air guide 15 is parallel to the winding member 2, a slot is introduced 16th

To wind up hair 11, the air guide 15 is initially pushed as far as 6 on the housing so that the winding member 2 is exposed.

Then, a strand screwed in and pushed the air duct 15 in such a 2 on the winding member, that the hairs are in the slot 16.

Is the air duct 15 so positioned, the blower 8 is turned on, the air flow blowing parallel to the winding member 2 from the housing 6.

The air guide 15 directs the flow of air passing from the outside by the hair 11th

With the flip open 12 branches a part of the air flow into the interior of the winding portion 2, and exits through the holes 5.

In this way, an optimum drying of the lock from the outside and inside are achieved.

Advantageously, the air guide 15 is double-walled.

The air flow is guided by the fan between the walls and passes through nozzles in the inner wall in the direction out onto the winding part 2.

In this way the wound hair 11 are urged radially with air.

A more homogeneous drying is ensured.

The Hair drying provided air can preferably emerge in the vicinity of the slot 16 from the air guide 15, wherein it is to protect the scalp one of the scalp directed away preferred direction issued.

The air then flows away between the air guide 15 and the hair 11 of the slot 16 and can exit through slots which are opposite the slot 16, emerge.

The scalp is then only marginally exposed to hot air.

Shown in Figure 2 in an exemplary embodiment, the air guide from two half shells 17 which are from the winding part 2 held folded away at the housing 6.

For operating the two half-shells are folded in the direction of winding member, so that they form a closed sleeve.

Each of the half-shells has at one edge a recess 18 through which the hair 11 can emerge with a closed air guidance.

In a further embodiment according to FIG 3 is a cylindrical air duct 20 is provided with a separate handle 21 and carries a hot air blower.

It forms a separate total dry area.

To this dry part, a known curling iron 22 is similarly provided a round brush, which may be designed such as the winding part of the previously described embodiments.

The curling iron like.

Fig. 3 are wound the hair curls on the first bar 22.

Here, the dry part of the user in either of the other hand maintain or even set aside.

On the untwisted Locke then the separate dry part is pushed so that the located to the scalp hair strand extending in a slot 23 and are completely surrounded otherwise the hair substantially from the dry part.

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PN - DE19527111 A1 19970130
PA - DOHMEN HEIKE [DE]

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AN - 1997-100827 [10]
TI - Hot air hair curling appliance - in which rotatable air duct is opposite handle
AB - The hand-held curling appliance consists of a handle part to which is fixed an in-line hollow curling cylinder, an electric motor driven fan and heating element, with a rotatable slotted outer warm air duct surrounding the curling cylinder. The hair strands are wound on a hollow plastic tube (2), attached coaxially to the handle (1), with bristles (4) on the surface and holes (5) through which air is driven at one end (3) by a fan (8) and motor (7). A variable shutter (12), operated by a lever (13), controls the air volume. A retractable cylindrical duct (15), containing a slot (16), is rotatably mounted on the housing (6) and enables a strand of hair (11) to be wound on to the tube (2). The rolled hair is thus dried uniformly from inside and outside.
- USE :
Hand-held electric warm air hair curling appliance.
- ADVANTAGE :
Time saving operation, comfort and ease of use.
PN - DE19527111 A1 19970130 DW199710
PA - (DOHM-I) DOHMEN H





SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 570 of 2286

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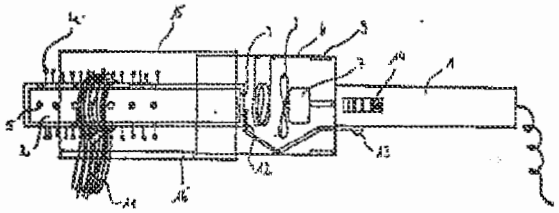
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(54) Lockenstab

(57) Ein einfach zu handhabender Lockenstab mit einem Wickelteil mit einem am Wickelteil drehfest angebrachten Griffteil und mit einer Luftführung, die in der Betriebsstellung im wesentlichen parallel zum Wickelteil angeordnet und davon beabstandet ist sowie mit einem Gebläse zur Erzeugung eines vorzugsweise warmen Luftstroms, wobei die Luftführung den Luftstrom auf das Wickelteil lenkt, wird dadurch geschaffen, daß die Luftführung gegenüber dem Griffteil beweglich ist.



DE 195 27 111 A1

Die folgenden Angaben sind den vom Anmelder eingereichten Unterlagen entnommen

BUNDESDRUCKEREI 11. 96 602 065/117



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 571 of 2286

## Beschreibung

Die Erfindung betrifft einen Lockenstab mit den Merkmalen des Oberbegriffs des Anspruchs 1.

Um Locken in Haare einzudrehen bedient man sich mehrerer Verfahren. Es ist beispielsweise üblich, eine nasse Haarsträhne auf eine Rundbürste zu wickeln und mit der heißen Luft aus Fön oder einem Haartrockner zu trocknen. Auf diese Weise wird Haarsträhne für Haarsträhne getrocknet. Um mehrere Locken gleichzeitig eindrehen zu können, werden die Haarsträhnen auf Lockenwickler gedreht und die so vorbereitete Frisur unter einer Trockenhaube getrocknet. Beide Verfahren sind sehr zeitaufwendig und beanspruchen die Kopfhaut übermäßig mit heißer Luft. Insbesondere beim Einsatz von Trockenhauben kommt es leicht zu dem sogenannten Kuchenform-Effekt.

Eine komfortablere Möglichkeit Locken einzudrehen, bietet ein Lockenstab, um den die feuchten Haare gewickelt werden und aus dessen Inneren ein heißer Luftstrom austritt. Der Gebrauch eines solchen Lockenstabes ist einfach und weniger zeitaufwendig als die oben genannten Verfahren. Nachteilig ist jedoch, daß die Locken von innen heraus getrocknet und die empfindlichen Haarspitzen am stärksten durch die Hitze beansprucht werden. Ein weiterer Nachteil ist, daß die Haare mitunter so fest um den Stab gewickelt werden, daß die Luftdüsen verlegt werden und der Luftstrom nur bedingt hindurchtreten kann. Um ein vollständiges Trocknen der Haare zu erreichen, muß der Vorgang mehrmals wiederholt oder die Haare müssen vorher durch die Luft oder mit einem Föhn vorgetrocknet werden.

Aus DE-GM-86 02 580 ist ein elektrischer Föhn-Lokkenwickler bekannt, der die Locken mit einem auf den Lockenwickler gerichteten Luftstrom trocknet und damit die Probleme umgeht, die beim Gebrauch von herkömmlichen Lockenstäben auftreten und auf die Tatsache zurückzuführen sind, daß die Locken von innen heraus getrocknet werden. Der Föhn-Lockenwickler weist einen Strömungskanal auf, der parallel zu dem Lockenwickler angeordnet ist und in den Düsen eingebracht sind, die auf den Lockenwickler gerichtet sind. Das Gebläse befindet sich im Griff. Der unterhalb des Strömungskanals angeordnete Lockenwickler ist mittels eines Motors drehbar. Das Gerät wird an die Frisur angesetzt und wickelt auf Knopfdruck eine Strähne auf.

Nachteilig an dem Föhn-Lockenwickler ist, daß er äußerst aufwendig und dadurch unkomfortabel zu handhaben ist. Die beiden elektrischen Schalter führen leicht zu Verwechslungen, so daß mitunter statt des Föns ungewollt der Wickler betätigt werden kann. Wegen der automatischen Wickelvorrichtung wird das Gerät schwer und läßt sich kaum zielgerichtet an die Frisur ansetzen. Ein weiterer Nachteil ist, daß sich die Haare beim Aufdrehen leicht verknoten können und ein so entstandenes Knäuel wegen des hinderlichen festen Strömungskanals kaum aufgelöst werden kann.

Aufgabe der Erfindung ist es einen Lockenstab gemäß dem Oberbegriff des Anspruchs 1 so weiterzuentwickeln, daß eine komfortable und sichere Handhabung gewährleistet ist.

Diese Aufgabe wird von einem Lockenstab mit den Merkmalen des Anspruchs 1 gelöst.

Vorteilhafte Ausgestaltungen der Erfindung sind in den Unteransprüchen aufgeführt.

Durch den Gebrauch des erfindungsgemäßen Lokkenstabes ist es möglich, eine Lockenfrisur mit einem geringen Zeitaufwand von etwa 10 Minuten anzufertigen. Dabei ist die Handhabung ebenso einfach wie bei den konventionellen Lockenstäben.



Bei dem erfindungsgemäßen Lockenstab wird der Luftstrom von außen an die aufgedrehten Locken geführt, so daß diese homogen getrocknet werden und die nach innen eingerollten Haarspitzen wirkungsvoll verschont bleiben. Die Luft prallt im wesentlichen außen an den aufgewickelten Haaren ab und nur ein geringer Teil dringt zu den empfindlichen Haarspitzen durch. Ein Verbrennen der Haarsträhnen und ein Spalten der Haarspitzen bei dem Gebrauch des erfindungsgemäßen Lockenstabes wird durch dessen Ausgestaltung wirkungsvoll vermieden.

Der Strömungskanal wird von einer ein- oder mehrteiligen Hülse gebildet, die den Stab umgibt und die durch Klappen oder Verschieben von dem Wickelteil entfernt werden kann. Da der Strömungskanal den Lokkenstab nahezu vollständig umgibt, trifft nur wenig heiße Luft aus dem Stab auf die Kopfhaut. Auf diese Weise werden die Kopfhaut und die empfindlichen Haarwurzeln vergleichsweise wenig in Mitleidenschaft gezogen.

Wegen der einfachen Handhabung ist ein Verwickeln der Haare nahezu ausgeschlossen. Sollte es jedoch einmal vorkommen, daß dennoch ein Knäuel entsteht, so läßt sich dieses einfach beseitigen, da der Lockenwickler nicht von dem Strömungskanal bedeckt wird. Der Lokkenstab ist in allen Fällen einfach aus dem Haar zu entfernen.

Bei einer besonders vorteilhaften Ausführungsform des Lockenstabes läßt sich zwischen einem Luftstrom von außen und einem Luftstrom von innen heraus umschalten. Dabei ist es möglich, der heißen Luft zusätzlich kalte Luft beizufügen, so daß der von innen kommende Luftstrom kälter ist und die Haarspitzen geschont werden. Auf diese Weise kann ein besonders homogenes Trocknen der Haarsträhne garantiert werden. Außerdem läßt sich der kalte Luftstrom zur Schonung der Kopfhaut an die Haarspitzen leiten.

Es ist weiterhin vorteilhaft, das Gebläse und den Strömungskanal zu einem gemeinsamen Trockenteil zusammenzufassen, die sich als Ganzes auf dem Lockenstab verschieben läßt. Dabei ist es möglich, das Trockenteil auf der Griffseite des Lockenstabes oder auf der dem Griff gegenüber liegenden Seite anzuordnen. In einer besonderen Ausführungsform läßt sich das Trockenteil vollständig abnehmen. In dieser Ausführungsform kann der Lockenstab besonders leicht mit einer Hand bedient werden, bevor mit der anderen Hand das Trockenteil aufgeschoben wird.

Ausführungsbeispiele der Erfindung sind in der Zeichnung dargestellt und werden im folgenden näher beschrieben.

Es zeigen:

Fig. 1 einen Lockenstab mit überschiebbarer Luftführung;

Fig. 2 einen Lockenstab mit klappbarer Luftführung; sowie

Fig. 3 einen Lockenstab mit abnehmbaren Trockenteil.

Der in Fig. 1 dargestellte Lockenstab hat einen Griff 1 und in koaxialer Anordnung zum Griff 1 ein Wickelteil 2. Das Wickelteil 2 ist ein vorzugsweise mit PTFE (Polytetrafluoroethylen) beschichtetes Rohr, das an seiner dem Griff 1 zugewandten Stirnseite eine Öffnung 3 aufweist. Das Wickelteil 2 ist in diesem speziellen Ausführungsbeispiel auf der anderen Stirnseite geschlossen, kann jedoch in einer anderen Ausführungsform dort ebenfalls eine Öffnung aufweisen. Die Öffnung 3 ist

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 572 of 2286

durch eine Klappe 12 oder einen nicht dargestellten Schieber verschließbar. Die Klappe 12 wird von einem am Griff 1 angebrachten Hebel 13 betätigt.

In den Mantel des Rohres sind Bohrungen 5 eingebracht. Das Wickelteil 2 ist in bekannter Weise mit radial abstehenden Borsten 4 besetzt. Die Borsten 4 ergreifen die Haare 11, so daß diese durch Drehen des Lockenstabes aufgewickelt werden können. Statt der Borsten 4 kann an dem Wickelteil 2 in bekannter Weise eine Klammer angebracht sein, mittels der die Haare 11 an das Wickelteil geklemmt werden.

In dieser besonderen Ausführungsform befindet sich an dem Griff 1 ein zylindrisches Gehäuse 6, in dem das Wickelteil 2 befestigt ist. Das Gehäuse 6 ist auf der dem Wickelstab zugewandten Stirnseite offen. In dem Gehäuse 6 ist ein Elektromotor 7 mit einem Gebläse 8 untergebracht. Der Ventilator saugt Luft durch in das Gehäuse 6 eingebrachte Schlitze 9 an und bläst sie in Richtung Wickelteil 2. Dabei kann der Luftstrom bei Bedarf mittels einer Heizwendel 10 aufgeheizt werden, die an einem Schalter 14 zu- oder abgeschaltet werden kann.

Auf das Gehäuse 6 ist eine Luftführung 15 in Form einer zylindrischen Hülse aufgeschoben, die in axialer Richtung verschiebbar ist. In die Wandung der Luftführung 15 ist parallel zum Wickelteil 2 ein Schlitz 16 eingebracht. Um Haare 11 aufzuwickeln, wird die Luftführung 15 zunächst so weit über das Gehäuse 6 geschoben, daß das Wickelteil 2 frei liegt. Dann wird eine Strähne eingedreht und die Luftführung 15 derart über das Wikkelteil 2 geschoben, daß die Haare sich in dem Schlitz 16 befinden. Ist die Luftführung 15 so positioniert, wird das Gebläse 8 eingeschaltet, das einen Luftstrom parallel zum Wickelteil 2 aus dem Gehäuse 6 bläst. Die Luftführung 15 leitet den Luftstrom von außen an den Haaren 11 vorbei. Bei geöffneter Klappe 12 zweigt ein Teil des Luftstromes in das Innere des Wickelteiles 2 ab und tritt durch die Bohrungen 5 aus. Auf diese Art kann eine optimale Trocknung der Locke von außen und innen erreicht werden.

Vorteilhafterweise ist die Luftführung 15 doppelwandig. Der Luftstrom wird von dem Gebläse zwischen die Wandungen geführt und tritt durch Düsen in der inneren Wandung in Richtung auf den Wickelteil 2 aus. Auf diese Art werden die aufgewickelten Haare 11 radial mit Luft beaufschlagt. Eine homogenere Trocknung ist gewährleistet. Die zum Trocknen der Haare vorgesehene Luft kann dabei bevorzugt in der Nähe des Schlitzes 16 aus der Luftführung 15 austreten, wobei ihr zur Schonung der Kopfhaut eine von der Kopfhaut weg gerichtete Vorzugsrichtung erteilt wird. Die Luft strömt dann zwischen der Luftführung 15 und den Haaren 11 von dem Schlitz 16 weg und kann durch Austrittsschlitze, die dem Schlitz 16 gegenüberliegen, austreten. Die Kopfhaut wird so nur unwesentlich mit Heißluft beaufschlagt.

In einem in Fig. 2 gezeigten Ausführungsbeispiel besteht die Luftführung aus zwei Halbschalen 17, die vom Wickelteil 2 wegklappbar am Gehäuse 6 gehaltert sind. Zum Betrieb werden die beiden Halbschalen in Richtung Wickelteil geklappt, so daß sie eine geschlossene Hülse formen. Jede der Halbschalen hat an einem Rand eine Ausnehmung 18, durch welche die Haare 11 bei geschlossener Luftführung austreten können.

In einer weiteren Ausführungsform gemäß Fig. 3 ist eine zylindrische Luftführung 20 mit einem eigenen Griff 21 versehen und trägt ein Warmluftgebläse. Sie bildet insgesamt ein separates Trockenteil. Zu diesem Trockenteil ist ein an sich bekannter Lockenstab 22 ähnlich einer Rundbürste vorgesehen, der so ausgestaltet sein kann, wie der Wickelteil der zuvor beschriebenen Ausführungsformen.

Bei dem Lockenstab gem. Fig. 3 werden die Haarsträhnen zunächst auf den Lockenstab 22 aufgewickelt. Dabei kann das Trockenteil von dem Benutzer entweder in der anderen Hand gehalten oder sogar beiseite gelegt werden. Über die aufgedrehte Locke wird dann das separate Trockenteil derart geschoben, daß sich der zur Kopfhaut verlaufende Haarstrang in einem Schlitz 23 befindet und ansonsten die Haare im wesentlichen vollständig von dem Trockenteil umgeben sind.

## Patentansprüche

1. Lockenstab mit einem Wickelteil (2, 22), mit einem am Wickelteil (2, 22) drehfest angebrachten Griffteil (1) und mit einer Luftführung (15, 17, 20), die in der Betriebsstellung im wesentlichen parallel zum Wickelteil (2, 22) angeordnet und davon beabstandet ist sowie mit einem Gebläse (7, 8) zur Erzeugung eines vorzugsweise warmen Luftstroms, wobei die Luftführung (15, 17, 20) den Luftstrom auf das Wickelteil (2, 22) lenkt, dadurch gekennzeichnet, daß die Luftführung (15, 17, 20) gegenüber dem Griffteil (1) beweglich ist.
2. Lockenstab nach Anspruch 1, dadurch gekennzeichnet, daß die Luftführung (15, 17, 20) auf dem Griffteil (1) achsparallel zum Wickelteil (2, 22) verschiebbar ist.
3. Lockenstab nach Anspruch 1, dadurch gekennzeichnet, daß die Luftführung (15, 17, 20) um eine Achse senkrecht zur Achse des Wickelteiles (1) verschwenkbar ist.
4. Lockenstab nach Anspruch 1, dadurch gekennzeichnet, daß die Luftführung (15, 17, 20) abnehmbar ist.
5. Lockenstab nach einem der vorherigen Ansprüche, dadurch gekennzeichnet, daß das Gebläse (7, 8) im Griffteil (1) angeordnet ist.
6. Lockenstab nach einem der vorherigen Ansprüche, dadurch gekennzeichnet, daß der Luftstrom von dem Gebläse (7, 8) aufgeheizt wird.
7. Lockenstab nach einem der vorherigen Ansprüche, dadurch gekennzeichnet, daß der Luftstrom durch eine Öffnung (3) in das Innere des hohlen Lockenstabes lenkbar ist, wobei der Querschnitt der Öffnung (3) von einer Klappe (12) einstellbar ist.
8. Lockenstab nach einem der vorherigen Ansprüche, dadurch gekennzeichnet, daß der Luftstrom zwischen einer Außenwand und einer Innenwand der Luftführung (15, 17, 20) verläuft und durch Düsen in der Innenwand austritt.
9. Lockenstab nach einem der vorherigen Ansprüche, dadurch gekennzeichnet, daß das Gebläse (7, 8) und die Luftführung (15, 17, 20) in einem gemeinsamen Trockenteil angeordnet ist.
10. Lockenstab nach Anspruch 9, dadurch gekennzeichnet, daß das Trockenteil gegenüber dem Griffteil (2, 22) beweglich angeordnet ist.
11. Lockenstab nach einem der vorherigen Ansprüche, dadurch gekennzeichnet, daß das Trockenteil von dem Lockenstab abnehmbar ist.
12. Lockenstab nach einem der vorherigen Ansprüche, dadurch gekennzeichnet, daß das Trockenteil auf der dem Griffteil (2, 22) abgewandten Seite des

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 573 of 2286

Lockenstabes angebracht ist.

13. Lockenstab nach einem der vorherigen Ansprüche, dadurch gekennzeichnet, daß die Luftführung (15, 17, 20) den Lockenstab umgibt und über nahezu die ganze axiale Länge einen Spalt aufweist.

14. Lockenstab nach einem der vorherigen Ansprüche, dadurch gekennzeichnet, daß die Luftführung zu der dem Griffteil (2, 22) abgewandten Seite eine Öffnung aufweist.

Hierzu 3 Seite(n) Zeichnungen

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 574 of 2286

– Leerseite –

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 575 of 2286

Nummer: DE 195 27 111 A1
Int. Cl.[6]: A 45 D 1/04
Offenlegungstag: 30. Januar 1997

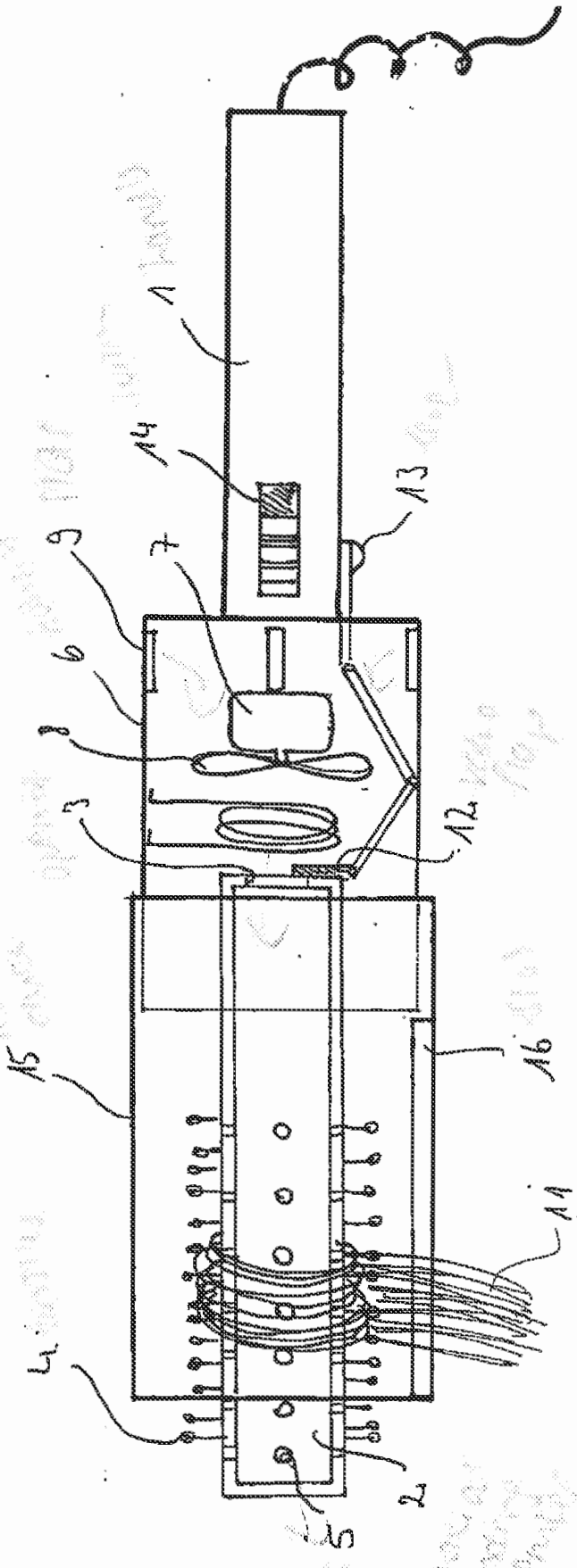



Fig. 1



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 576 of 2286

Nummer: DE 195 27 111 A1
Int. Cl.[6]: A 45 D 1/04
Offenlegungstag: 30. Januar 1997

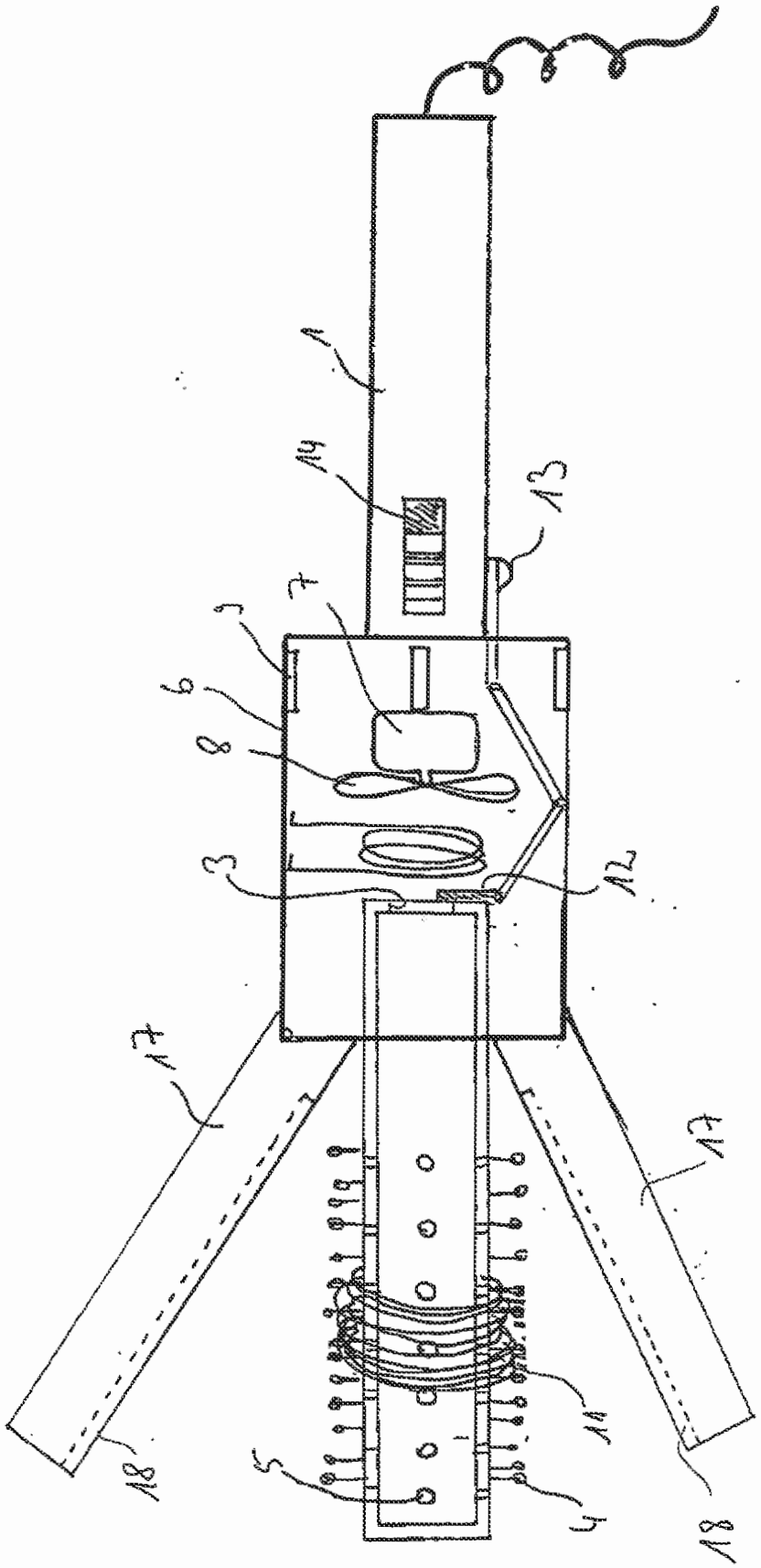



Fig. 2



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 577 of 2286

Nummer: DE 196 27 111 A1
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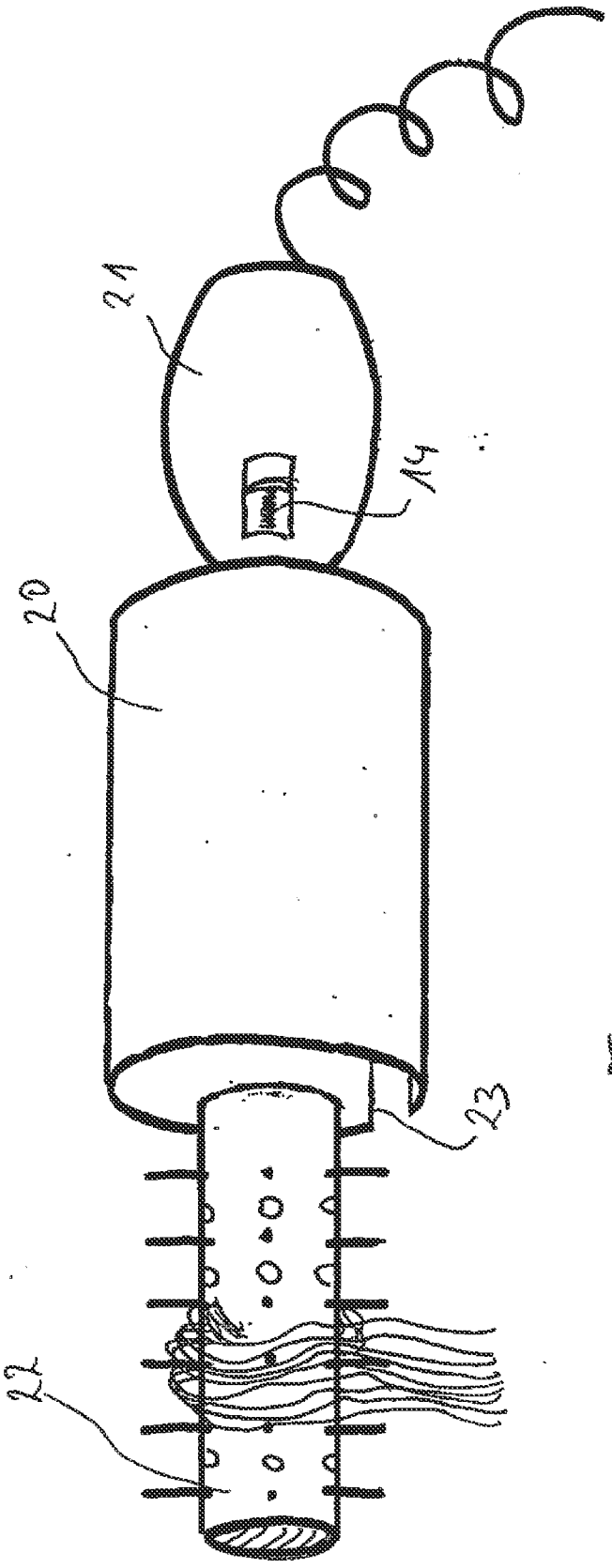



Fig. 3

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 578 of 2286

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(52) UK CL (Edition P)
A4V V29D

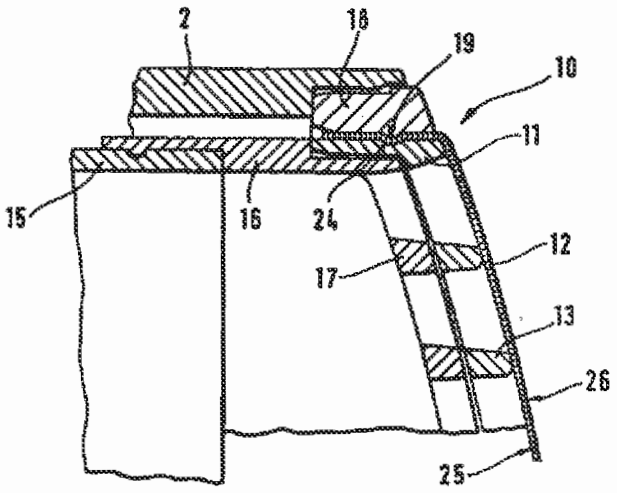
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(58) Field of Search
UK CL (Edition O) A4V V29D V29F
INT CL[6] A45D 2/36 20/10 20/12
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# (54) Filter for hot air hair dryer or curler

(57) The inlet filter 10 for a hot air hair dryer or curler is mounted externally of the air inlet with free access to the filter element 12 whereby it may be cleaned by simply wiping it; the filter may be black whereby entrained contaminants are readily seen. The element is of fabric (eg polyester) or a thin perforated foil and may be clamped permanently or releasably via its periphery to a support grille 11 by means of a ring 18. The complete supported element may be detachably or integrally mounted on the housing 2.

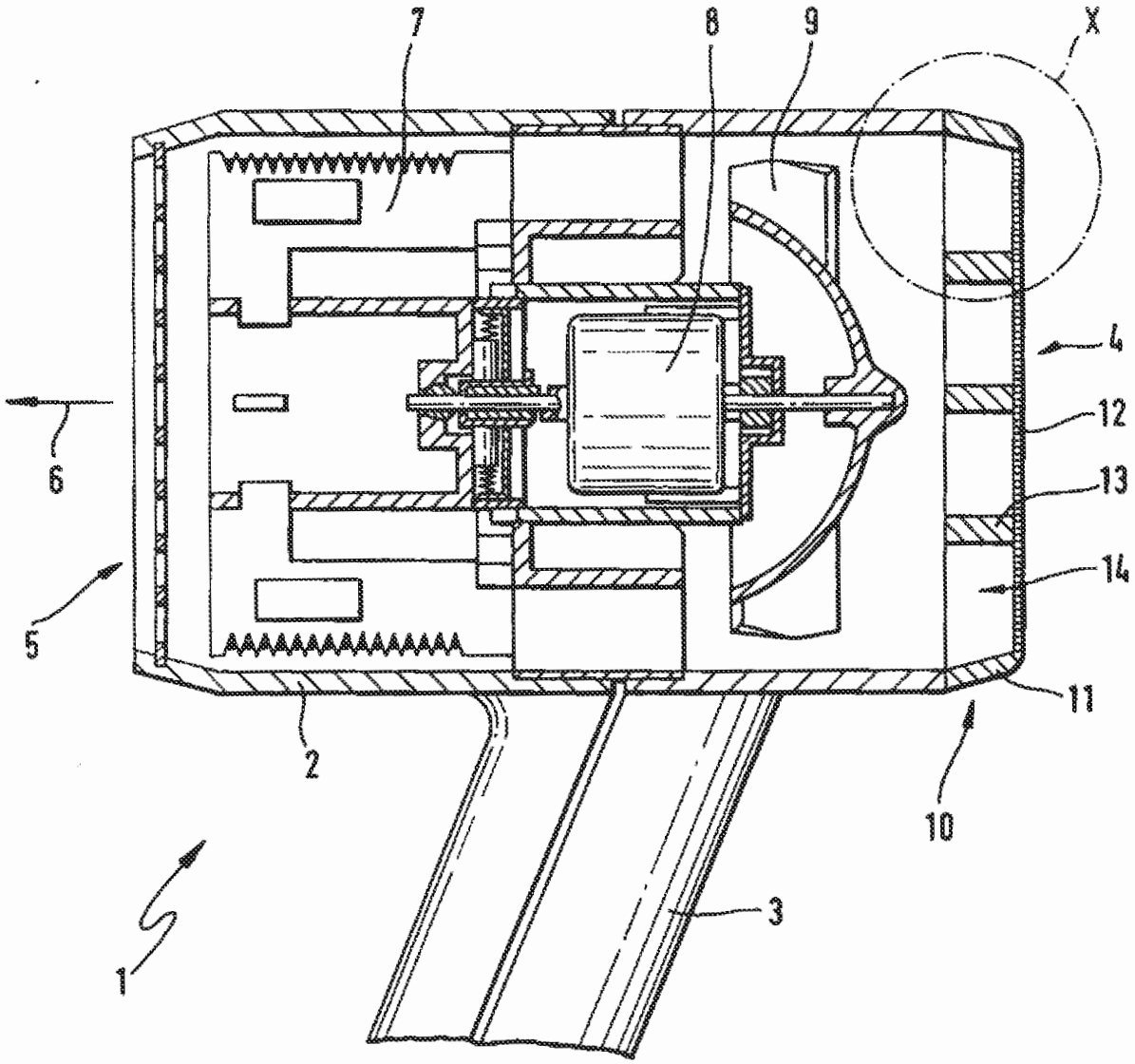
Fig.2




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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 579 of 2286

Fig . 1




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 580 of 2286

Fig. 2

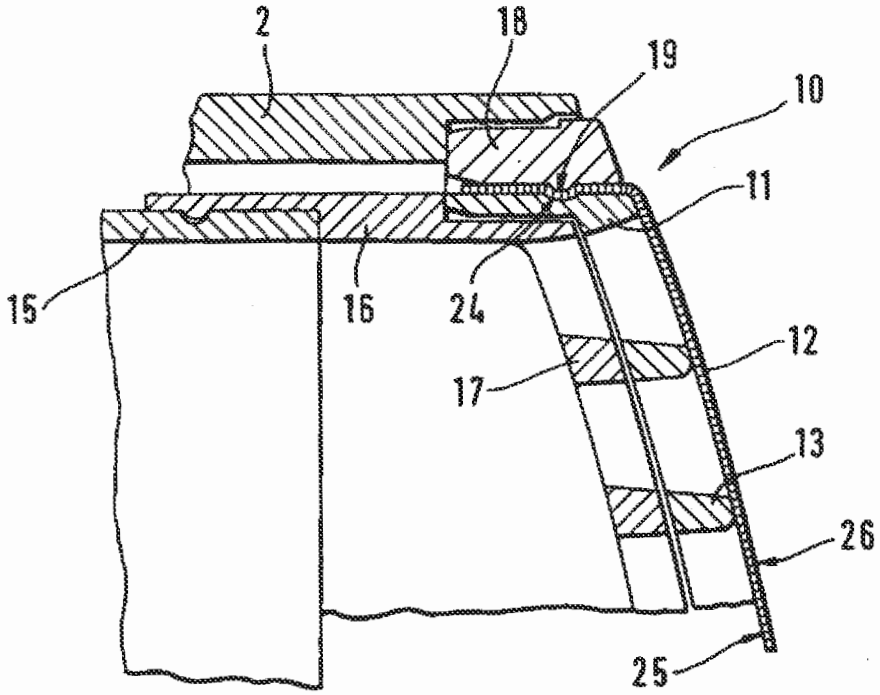
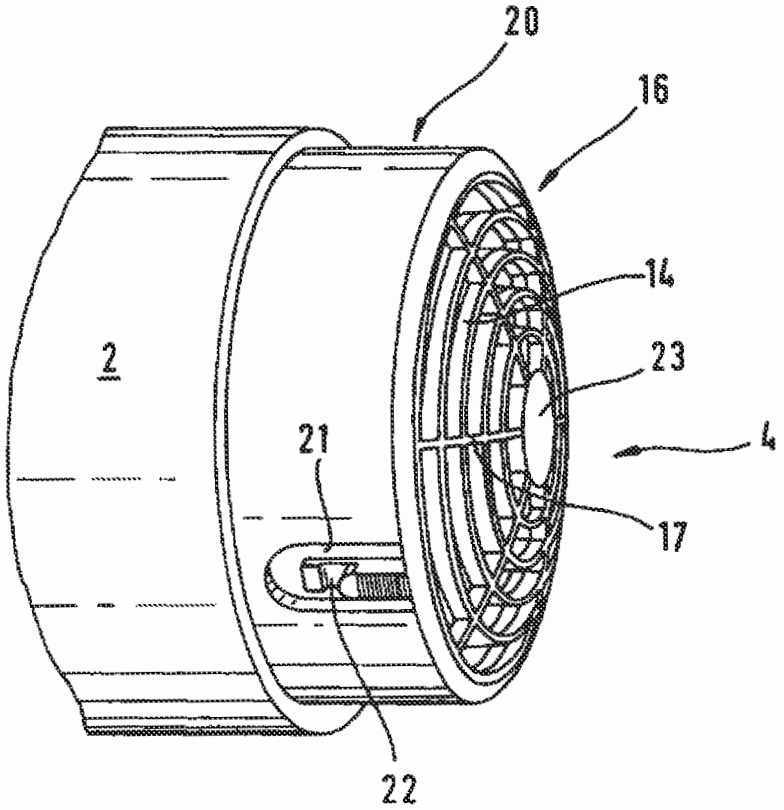



Fig. 3




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 581 of 2286

Title: FILTER DEVICE

The invention relates to a filter device and to a method of cleaning such a filter device for an electrically powered air-moving hair-care appliance, in particular for a hair dryer, a hot-air curling brush or the like, with a filter element having an inner and an outer side, in which the inner side of the filter element is arranged in the area of an air entrance opening of the appliance.

A filter device of this type is known from EP 0518035 B1. This specification discloses a hair aspiration filter which is arranged between an air entrance grille fixedly attached to the appliance housing and a removable grille cap. The filter element itself is made of a fabric mat. To clear the filter element, it is first necessary to remove the grille cap and then to take out the filter element for cleaning or replacement. Filter devices for air-moving appliances, particularly for hair dryers, are intended to stop undesired contaminants such as, for example, hair, fluff, dust or the like from entering the interior of the hair dryer and hence to prevent soiling of and potential damage to the hair dryer.

In the case of the above mentioned filter devices for electrically powered air-moving appliances, particularly for hair dryers, it has been shown that the necessary cleaning of the device by the user is either not performed regularly or it is neglected entirely. In the case of the appliance initially referred to which incorporates a removable filter element in accordance with EP 0518035 B1, experience indicates that the degree of contamination of the mat-type filter element is not always clearly identifiable by the user. However, severe contamination of the filter element results in a disadvantageously higher thermal loading of the hair dryer, which may lead to the appliance being switched off or damaged. The cleaning of the filter element is thus capable of improvement, because first the grille cap has to be dismantled and the filter element removed and then cleaned. Furthermore, cleaning is aggravated by an irregular structure of the mat-type filter element because predominantly hair, fluff and dust become

lodged or trapped in the filter element. Although wet cleaning of the filter element is possible, this requires proper drying before the filter element is reinstalled by the user.

Other filter devices that are not covered by a grille cap conventionally display a structure which may well prevent fluff and hair from entering the interior of the hair dryer but this fluff and hair can be removed by the user only with difficulty. Furthermore, because the outer appearance of a hair dryer both with and without a filter is nearly identical, many users omit to put the filter element, after its unsatisfactory cleaning, back on the air entrance opening of the dryer, using the hair dryer without a filter thereafter. It is inevitable therefore that hair, fluff or dust will get into the hair dryer resulting in a soiled, overheated or damaged appliance after a certain period of operation.

It is therefore an aim of the present invention to provide a filter device for an electrically powered air-moving hair-care appliance, in particular for a hair dryer, which includes a soiling indicator and warns the user to clean the filter device at the earliest possible moment. Further, the filter device is to be configured in such a way as to make its actual cleaning easy for the user to carry out.

According to the present invention, there is provided a filter device for an electrically powered air-moving hair-care appliance, in particular for a hair dryer, a hot-air curling brush or the like, with a filter element having an inner and an outer side, in which the inner side of the filter element is arranged in the area of an air entrance opening of the appliance, wherein the filter element is configured as a type of fabric, perforated foil or the like of small thickness, wherein contaminants such as hair, fluff, dust or the like which are retained by the filter element are substantially deposited on the outside of the filter element, and wherein the outside of the filter element is positioned on the hair-care appliance in a manner providing substantially free access to the user.

With a filter device of this type, it has proven to be advantageous that a major portion of the contaminants detaches on its own from the filter element after the appliance is switched off, particularly after the fan motor is switched off, firstly because of the condition of the filter element's surface structure according to the present invention, and secondly because the outside of the filter element is substantially freely accessible. The formation of a compartment on the outside of the filter element, such as is known from state-of-the-art appliances and which results in accumulations of hair and fluff in the compartments formed by the air entrance grille, is advantageously avoided. Any contaminants remaining on the filter element, such as hair and fluff, can be seen by the user directly after they collect and can be removed from the filter element by wiping over the outside of the filter element, for example, with the user's bare hand. Advantageously, there is thus no need of an additional soiling indicator. Each time the hair dryer is used, the user sees immediately and clearly the filter's current degree of soiling and is reminded accordingly to clean the filter element regularly.

In a particularly advantageous embodiment of the present invention, the filter element is configured as a screening fabric comprising threads of substantially round cross-sectional area. This results on the one hand in a flow-promoting cross-section of the fabric threads, and on the other hand in an easy removal of contaminants from the filter element or screening fabric without the contaminants having a chance to become trapped in the filter element.

The screening fabric may be manufactured from a thermoplastic material such as, for example, polypropylene or polyacrylics. The use of polyester (PES), which is a very easy-care, tear-resistant and non-hygroscopic material, has proven to be particularly advantageous. Alternatively, the screening fabric may be made of thermosetting plastics, natural yarns, metal or a glass fabric. It is thus possible, for example, to produce a particularly durable screening fabric or a soft or hard surface for a screening fabric.

According to a preferred embodiment of the invention, the screening fabric has a mesh width to thread diameter ratio of between 80 $\mu$m to 55 $\mu$m and 1200 $\mu$m to 400 $\mu$m, approximately, with an advantageous cleaning of the filter element having been accomplished in particular at a ratio of 400 $\mu$m to 200 $\mu$m. Hence a single-ply screening fabric, which is similar, for example, to a stocking fabric, can be used to advantage.

The filter element desirably has a dark colour, in particular black or anthracite, at least on the outside. Because the contaminants held back by the filter element are mostly light in colour, they can be seen by the user with particular ease and speed on the dark outside of the filter element, reminding the user in an advantageous manner to clean the filter element.

In a further embodiment of the present invention, the filter element is adapted to be fastened to the appliance housing by a fixing means which engages the filter element's outer edge surrounding the air entrance opening. Because the filter element is customarily comprised of a material that is not dimensionally stable in itself, in particular of a screening fabric, a perforated foil or the like, and which fastens only poorly to the appliance housing without fixing means, the filter element is fastened to the appliance housing advantageously by a separate fixing means. Thus, the fixing means which engages in particular the outer edge of the filter element does not reduce the area of cross-section of the air entrance opening and accordingly does not obstruct the flow of air through the appliance. The fixing means itself may be configured as a clamping ring and carrier element which desirably is shaped as a carrier grille. This results in the advantage of enabling the filter element to be fastened to the appliance housing by just the clamping ring or the carrier element. It is also possible, however, for the filter element to be fixed by the clamping ring and carrier grille, in which arrangement these parts combine to form the filter device. This is particularly advantageous because the carrier grille is on the inside of the filter element and the filter element is thus supported by the carrier grille.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 585 of 2286

In another embodiment, the screening fabric is held between the clamping ring and the carrier element, particularly the carrier grille. It is thus possible advantageously to also replace just the screening fabric and to insert and mount a new screening fabric between the clamping ring and carrier grille.

The screening fabric may be stretched over the carrier element, in particular over the outside of the carrier grille, and be fastened at its outer edge by the clamping ring. Simple and effective fastening of the screening fabric is thus proposed, enabling a taut fit of the screening fabric over the carrier grille and a secure attachment of the fabric at its outer edge between the clamping ring and the carrier grille.

The clamping ring and/or the carrier element may further include fastening means which are configured in particular as a bayonet catch, latching hooks, latching lugs or similar means and which are provided for effecting a releasable connection with the appliance housing. Simple fastening of the filter device to an appliance housing, for example, a hair dryer, is thus possible and the filter device can also be easily removed again from the appliance housing by the user. This is an advantage to the user, for example, for wet cleaning or when replacing a defective filter element.

Alternatively, the clamping ring and/or the carrier element may be fabricated from a plastics material and be non-releasably connected with the screening fabric, for example, by clipping, welding, injection-molding or the like. In particular it is proposed casting the screening fabric with the clamping ring and the carrier grille, thus enabling a solid, durable filter device unit.

In a particularly advantageous embodiment of the present invention, the open area of the filter element enabling the passage of air amounts to 30% to 60%, approximately, of the total area of the filter element impacted by the air current, and the fabric threads or segments of the perforated foil have a thread thickness

or segment width smaller than or equal to 400 $\mu$m. Hence the requisite volumetric rate of airflow through the appliance, particularly a hair dryer, is selected sufficiently large to prevent the hair dryer from overheating. At the same time, the thread thickness or segment width indicates a mesh size of the filter element able to retain fluff and hair effectively; by contrast, minutest dust particles can pass through the filter element and flow through the hair dryer.

In another embodiment of filter device according to the present invention, the filter element may comprise a perforated foil having essentially the same functional and structural features as described in the foregoing, for example, hole size and surface structure, as well as free access to the outside of the filter. The same advantages apply essentially to such a filter element made of a perforated foil as for the screening fabric previously described in detail. However, it is particularly advantageous for a perforated foil to be made of metal because metal is particularly well suited for the quantity production of perforated foils using, for example, an etching or photoresist process.

In a particularly advantageous feature of the present invention, a filter device incorporating the previously mentioned features is releasably connected with an electrically powered hair-care appliance, particularly a hair dryer, a hot-air curling brush or the like. Hence it is possible for a filter device of this type to be fastened to a hair dryer and easily detached again, for example, for cleaning or replacement purposes.

As an alternative to this feature, it is proposed connecting a filter device of the present invention integrally with a hair-care appliance, in particular a hair dryer. This thus provides advantageously a filter device which is connected permanently with a hair dryer and is therefore successful in protecting the hair dryer through its useful life in that it reliably prevents undesired contaminants, for example, hair or fluff, dust or the like, from getting into the interior of the hair dryer.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 587 of 2286

Another feature of the present invention provides a method of cleaning a filter device of the type referred to in the foregoing in which the presence of contaminants deposited on the outside of the filter element is indicated to the user in particular by the contrast of colour between the outside of the filter element and the contaminants themselves promptly after they are deposited. In a particularly advantageous manner, a user is thus given a visual warning of a soiled condition at the earliest possible moment. As a result of the filter element's surface structure as disclosed in the present invention, the user can then remove the contaminants simply by wiping over the outside of the filter element. Advantageously, the contaminants can be removed by the user without an additional tool, for example, the user can perform the wiping action with his bare hand, in particular with the fingers of one hand.

Further features, advantages and application possibilities of the present invention will become apparent from the subsequent description of embodiments illustrated in more detail in the accompanying drawings. It will be understood that any single feature and any combination of single features described and/or represented by illustration form the subject-matter of the present invention, irrespective of their summary in the claims and their back reference.

In the drawings:

Fig. 1 is a schematic, longitudinal sectional view of a hair dryer with a filter device constructed in accordance with the present invention;

Fig. 2 is a sectional view, on an enlarged scale, of a detail of a filter device similar to detail X of Fig. 1; and

Fig. 3 is a perspective view of an air entrance end of a hair dryer.

A hair dryer 1 (Fig. 1) is comprised essentially of a cylindrical housing 2 and a handle section 3 provided thereon. The housing 2 is provided with an air entrance opening 4 and an air exit opening 5 of a conventionally round cross-section of aperture, and a current of air generated in the interior of the hair dryer is caused to flow through the housing essentially in the main direction of flow 6. A heating device 7 and a motor 8 for driving a fan impeller 9 are provided in the housing 2. Attached to the air entrance opening 4 is further a filter device 10 which is essentially comprised of a carrier grille 11 and a filter element 12 which may be configured as a screening fabric or also as a perforated foil. The carrier grille 11 includes several grille bars 13, one compartment each being formed between various grille bars 13.

Provision is made in a hair dryer housing 2 (Fig. 2) for a heating tube 15 bounded at its air entrance end by an air entrance grille 16 having grille bars 17. A filter device 10 of the present invention is comprised of a carrier grille 11 with grille bars 13, in which the grille pattern of the carrier grille 11 coincides substantially with the grille pattern of the air entrance grille 16. A filter element, for example, a screening fabric or also a perforated foil, is provided on the outside of the carrier grille 11 and is stretched over the grille bars 13 and held by a clamping ring 18 against the outer lying surfaces of the carrier grille 11 when viewed in a circumferential direction. To fasten a filter element 12 between the carrier grille 11 and the clamping ring 18 in a way that enables the filter element to be replaced, the outside of the carrier grille 11 is provided, for example, with a circumferential groove 24 in which a circumferential lug 19 of the clamping ring 18 is received by locking engagement therewith. The filter element 12 is thus fixed in place by the lug 19 engaging within the groove 24.

The air entrance end of a housing 2 for a hair dryer (Fig. 3) is equipped with an annular surface 20 on which a filter device according to the present invention can be mounted and fastened. To fasten a filter device provision is made, for example, for a latching means 22 which is arranged in an opening 21 and has its

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 589 of 2286

one end freely movably mounted so it can snap into a corresponding opening of the filter device. In the air entrance opening 4 of the housing 2 provision is made for an air entrance grille 16 having grille bars 17 extending as stellate radial bars in concentrically arranged rings. These grille bars 17 and rings form separate compartments 14 through which the current of air flows. A disk 23 is provided at the centre of the air entrance grille 16.

In cases where a filter element is configured, for example, as a screening fabric, it can be placed directly on the outside of the air entrance grille 16 and be held against the grille's outer surface by a clamping ring. On the other hand, a filter device comprising the components previously described in Fig. 2, namely a carrier grille, a screening fabric and a clamping ring, can also be connected to the housing 2. As an alternative it is also possible for a central fastening button (not shown) to be provided on the outside of a filter element and be fastened, for example, in the disk 23 in order to press a filter element against the outside of the air entrance grille 16.

According to the present invention, the thickness of the filter element is dimensioned so small as to cause contaminants to settle essentially on the outside of the filter element and, particularly as the result of the small thickness, to prevent them from becoming trapped in the filter element.

While the mesh width of the screening fabric lies advantageously between 80 $\mu$m and 1200 $\mu$m, and the thread diameter between 55 $\mu$m and 400 $\mu$m, the dimensions are particularly those mentioned in the subsequent embodiment, resulting further in the aforementioned ratios of mesh width to thread diameter.

A particularly preferred configuration of a filter device of the present invention is equipped with a screening fabric made of polyester (PES) having a mesh width to thread diameter ratio of 400 $\mu$m to 200 $\mu$m and an open area enabling the passage of air of 44 %. The fabric is 370 $\mu$m thick, which means that the surface

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 590 of 2286

structure, particularly the surface roughness, of the fabric is of such condition that contaminants such as, for example, hair or fluff, held back by the filter element and adhering to the outside of the filter element are visually easy to identify by the user and can be removed readily from the outside of the filter using a simple wiping motion without major effort and also without an additional tool.

As an alternative to this filter element made of screening fabric, it is also possible to use a perforated foil, the segments of such a perforated foil preferably having a width greater than or equal to 180 $\mu$m and the foil a thickness greater than or equal to 580 $\mu$m.

## CLAIMS

1. A filter device for an electrically powered air-moving hair-care appliance, in particular for a hair dryer, a hot-air curling brush or the like, with a filter element having an inner and an outer side, in which the inner side of the filter element is arranged in the area of an air entrance opening of the appliance, wherein the filter element is configured as a type of fabric, perforated foil or the like of small thickness, wherein contaminants such as hair, fluff, dust or the like which are retained by the filter element are substantially deposited on the outside of the filter element, and wherein the outside of the filter element is positioned on the hair-care appliance in a manner providing substantially free access to the user.

2. A filter device as claimed in claim 1, wherein the filter element is configured as a screening fabric comprising threads of substantially round cross-sectional area.

3. A filter device as claimed in claim 2, wherein the screening fabric is manufactured from a thermoplastic material.

4. A filter device as claimed in claim 3, wherein the thermoplastic material is polypropylene-PP, polyacrylics-PA or polyester-PES.

5. A filter device as claimed in claim 2, wherein the screening fabric is made of thermosetting plastics, natural yarns, metal or a glass fabric.

6. A filter device as claimed in any one of claims 2 to 5, wherein the screening fabric has a mesh width to thread diameter ratio of between 80 $\mu$m to 55 $\mu$m and 1200 $\mu$m to 400 $\mu$m, approximately, in particular of 400 $\mu$m to 200 $\mu$m.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 592 of 2286

7. A filter device as claimed in any one of the preceding claims, wherein the filter element has a dark colour, in particular black or anthracite, at least on the outside.

8. A filter device as claimed in any one of the preceding claims, wherein the filter element is adapted to be fastened to the appliance housing by a fixing means which engages the filter element's outer edge surrounding the air entrance opening.

9. A filter device as claimed in claim 8, wherein the fixing means is configured as a clamping ring and/or a carrier element.

10. A filter device as claimed in claim 9, wherein the carrier element comprises a carrier grille.

11. A filter device as claimed in claim 9 or claim 10, wherein the filter element is held between the clamping ring and carrier element.

12. A filter device as claimed in any one of claims 9 to 11, wherein the filter element is stretched over the carrier element and is fastened at its outer edge by the clamping ring.

13. A filter device as claimed in any one of claims 9 to 12, wherein the clamping ring and/or the carrier element include fastening means, in particular a bayonet catch, latching hooks, latching lugs or the like for effecting a releasable connection with the appliance housing.

14. A filter device as claimed in any one of claims 9 to 13, wherein the clamping ring and the carrier element are fabricated from a plastics material and are non-releasably connected with the filter element by clipping, welding, injection-molding or the like, in particular by casting.

15. A filter device as claimed in any one of the preceding claims, wherein the open area of the filter element enabling the passage of air amounts to 30% to 60%, approximately, of the total area of the filter element impacted by the air current and wherein the fabric threads or segments of the perforated foil have a width smaller than or equal to 400 $\mu$m.

16. A filter device as claimed in claim 1, wherein the filter element is configured as a perforated foil comprising segments of substantially round cross-sectional area.

17. A filter device as claimed in claim 16, wherein the perforated foil is made of metal.

18. A filter device as claimed in claim 16, wherein the perforated foil is made of a plastics material or a glass fabric.

19. A filter device as claimed in any one of claims 16 to 18, wherein the perforated foil has a thickness smaller than or equal to 600 $\mu$m.

20. A filter device substantially as described herein with reference to the drawings.

21. An electrically powered air-moving hair-care appliance, in particular a hair dryer, a hot-air curling brush or the like, wherein a filter device as claimed in any one of the preceding claims is releasably connected with a housing of the appliance.

22. An electrically powered air-moving hair-care appliance, in particular a hair dryer, a hot-air curling brush or the like, wherein a filter device as claimed in any one of claims 1 to 20 is integrally connected with a housing of the appliance.

23. A method of cleaning the filter device claimed in any one of claims 1 to 20, in which the presence of contaminants such as hair, fluff, dust or the like deposited on the outside of the filter element is indicated to the user in particular by the contrast of colour between the outside of the filter element and the contaminants themselves promptly after they are deposited, such contaminants being capable of being removed simply by the user wiping over the outside of the filter element.

24. A method according to claim 23, in which the contaminants can be removed by the user without an additional tool.

25. A method according to claim 20 or claim 21, in which a user performs the wiping action with his bare hand, in particular with his fingers.

The Patent Office

15

**Application No:** GB 9624370.4 **Examiner:** R E Hardy
**Claims searched:** ALL **Date of search:** 10 February 1997

## Patents Act 1977
## Search Report under Section 17

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): A4V (V29D, V29F)

Int Cl (Ed.6): A45D (2/36, 20/10, 20/12)

Other: Online : WPI, CLAIMS

**Documents considered to be relevant:**

| Category | Identity of document and relevant passage | | Relevant to claims |
|---|---|---|---|
| X | US5490336 A | SMICK : Whole document | 1,5,21,22 |
| X | US5433017 A | BRAUCHLI : Whole document | 1,8-13, 21,22 |
| X | US5331748 A | MILLER : Whole document | 1,5,21,22 |
| X | US5325809 A | MULLE : Whole document | 1,8-13, 21,22 |
| X | US5216822 A | MADEIDO : Whole document | 1-5,8-13, 21,22 |
| X | US5112374 A | ACKERMAN : Whole document | 1-5,8-13, 21,22 |

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|---|---|---|---|
| X | Document indicating lack of novelty or inventive step | A | Document indicating technological background and/or state of the art. |
| Y | Document indicating lack of inventive step if combined with one or more other documents of same category. | P | Document published on or after the declared priority date but before the filing date of this invention. |
| & | Member of the same patent family | E | Patent document published on or after, but with priority date earlier than, the filing date of this application. |



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 596 of 2286

No documents available for this priority number.

Espacenet

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## Hair dryer with simultaneous delivery of cold and warm air

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## Abstract of EP0970633 (A1)

The hair dryer contains first and second adjacent air ways (17,19) which simultaneously deliver a parallel hot and cold air flow in the same direction (XX') and sense (18,20). The airways have a common wall which is parallel to the large side of the air flow. The hot air way (17) delivers an air through a channel shorter than that of the cold air flow channel (19). Preferred Features: The difference in length between the two channels is 1 cm.

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## (54) Sèche-Cheveux à air chaud et à air froid simultanés

(57) L'invention est relative a un sèche-cheveux à air chaud et à air froid simultanés, du type comportant un boîtier (1) de la forme générale d'une surface de révolution autour d'un axe longitudinal (XX') présentant une partie avant (2) et une partie arrière (3), un moteur électrique (4) monté à l'intérieur de la partie arrière (3) et entraînant un ventilateur (5) produisant un flux d'air (6), un premier conduit (8) canalisant une première partie (9) du flux d'air (6), un second conduit (10) entourant ledit premier conduit (8) et canalisant la seconde partie (11) du flux d'air (6), une résistance électrique (12) chauffant ladite première partie (9) du flux d'air (6), une poignée (13) munie de boutons (14, 15) de commande de la vitesse (14) du moteur (4) et de réglage de la puissance électrique (15) consommée par ladite résistance (12) à partir d'une source d'énergie électrique extérieure (16), une première buse (17) située dans le prolongement du premier conduit (8) délivrant de l'air chaud (18), et une seconde buse (19) située dans le prolongement du second conduit (10) délivrant de l'air froid (20). Un tel sèche-cheveux est caractérisé en ce que lesdites première et seconde buses (17, 19) délivrent simultanément, respectivement, une lame d'air chaud et une lame d'air froid parallèles à une même direction (XX') et dans le même sens (18, 20).

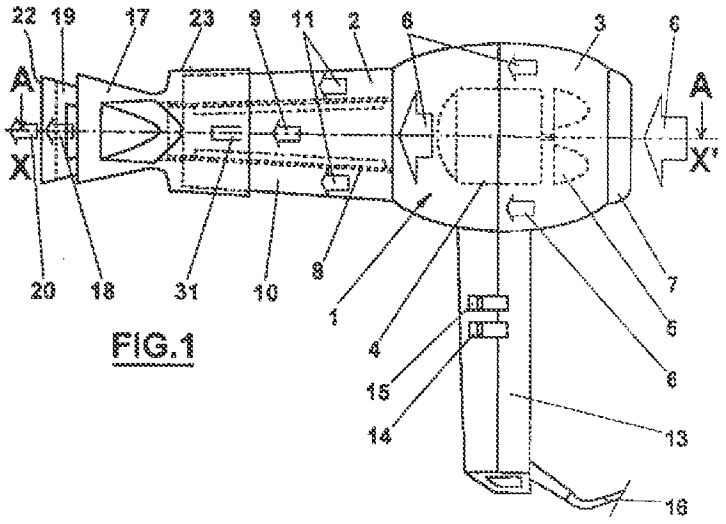



FIG.1

EP 0 970 633 A1



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 598 of 2286

## Description

[0001] Les sèche-cheveux électriques délivrant un flux d'air chaud sont des accessoires indispensables dans les salons de coiffure : ils permettent non seulement aux professionnels de sécher purement et simplement les cheveux mouillés après un shampooing, mais aussi, aux stylistes, de mettre en forme la coiffure et de créer les boucles et les ondulations que ceux-ci désirent.

[0002] Pour cette dernière opération, de l'air relativement chaud est absolument nécessaire : le cheveu ne peut être mis en plis qu'à partir d'une certaine température. Il doit être maintenu en forme jusqu'à ce qu'il se refroidisse, ce qui retarde d'autant l'achèvement de la coiffure.

[0003] Si un flux d'air froid était immédiatement disponible, il serait possible de refroidir rapidement les mèches et ainsi de gagner en temps et en qualité.

[0004] Les sèche-cheveux classiques peuvent délivrer de l'air froid en coupant l'alimentation électrique de la résistance de chauffage, mais, à cause de l'inertie thermique de l'ensemble, la commutation air chaud / air froid n'est pas instantanée.

[0005] Cet inconvénient des sèche-cheveux conventionnels, ne délivrant que de l'air chaud par une buse, avait été reconnu par Robert Bartolac, qui proposa une modification de ceux-ci, dévoilée dans le brevet américain US-A-4297564 publié le 27 octobre 1981.

[0006] La modification consiste à adjoindre à l'arrière de l'appareil une seconde buse délivrant de l'air froid dans la même direction, mais dans un sens opposé. L'air froid est prélevé directement au niveau du ventilateur interne. Un opercule rotatif permet de mettre en service ou de fermer cette seconde buse. Lorsque ladite seconde buse est active, un simple mouvement de la main suffit pour appliquer soit de l'air chaud, soit de l'air froid en retournant le sèche-cheveux tenu par la poignée.

[0007] Si le problème du refroidissement des mèches de cheveux est ainsi résolu élégamment, mais toutefois pas de manière vraiment satisfaisante dans la mesure où un tel refroidissement n'est pas immédiat, l'inconvénient des effets d'une chaleur intense sur la racine des cheveux, ainsi que sur la personne qui est coiffée elle-même, demeure.

[0008] Cet autre inconvénient des sèche-cheveux courants, dont la puissance électrique ne cesse d'augmenter, et, concomitamment, les risques de dommages et de brûlure dans leur usage, avait été clairement identifié par Andrew Hlavac. Le nouveau type de sèche-cheveux décrit dans le brevet américain US-A-3943329, publié au nom de cet inventeur le 9 mars 1976, comporte une buse de sécurité destinée à supprimer ces dangers. Cette buse, de forme pyramidale ou frusto-conique, prolonge la sortie d'air chaud. Sa taille plus grande réserve un espace par lequel de l'air froid est aspiré par effet venturi. La température du flux d'air projeté est ainsi plus faible et les cheveux de la personne coiffée ne sont pas susceptibles de venir en contact avec un élément très chaud de l'appareil.

[0009] Cependant, si la sécurité d'emploi est améliorée grâce à la mise oeuvre de ce type de buse, l'efficacité de ce nouveau sèche-cheveux est probablement moindre.

[0010] Le brevet suisse CH-A-669319 de la société Spemot, publié le 15 mars 1989, dévoile un autre type de sèche-cheveux délivrant simultanément de l'air chaud et de l'air froid. Une fraction de l'air produit par le ventilateur est, avant que l'air ne soit réchauffé, déviée par la résistance vers une sortie secondaire au moyen d'un clapet commandé par une gâchette. Cette disposition permet de rendre encore plus simples les gestes du coiffeur nécessaires pour arriver aux résultats obtenus en utilisant l'appareil décrit par le brevet US-A-4297564. Cependant, dans cette autre technique, la direction du flux d'air froid projeté par la sortie secondaire est différente de celle du flux d'air chaud principal.

[0011] Certaines opérations courantes, comme le "brushing" ou la mise en volume des cheveux, ne peuvent donc bénéficier de cette disposition.

[0012] Le document DE-U-9100860 rappelle que des sèche-cheveux soufflant soit de l'air chaud, soit de l'air froid, selon que la résistance chauffante est en service ou non, sont connus de l'état de la technique. Il rappelle également que la tenue du cheveu après la mise en pli à l'air chaud est d'autant meilleure que le refroidissement à l'air froid est rapide. Le sèche-cheveux décrit dans ce document a donc pour objectif de réduire au minimum le délai entre l'application de l'air chaud et l'application de l'air froid par un sèche-cheveux.

[0013] Dans ce but, la partie chauffante et la buse de sortie de l'appareil conforme à DE-U-9100860 sont partagées en deux par une cloison médiane, deux éléments chauffants commutables séparément étant montés de chaque côté de ladite cloison.

[0014] A l'intérieur du boîtier, deux conduits d'air chaud/froid sont ainsi juxtaposés. Si seulement une résistance chauffante est en service, cet appareil délivre donc un flux d'air chaud et un flux d'air froid qui sont collatéraux ; le flux d'air chaud est situé soit à droite, soit à gauche du plan de la poignée, selon que l'une ou l'autre résistance est commutée. Toutefois, selon cette construction, le flux d'air froid ne peut jamais être situé au-dessous du flux d'air chaud, d'abord pour éviter de brûler le cuir chevelu, quand l'appareil est tenu normalement en main, et ensuite et surtout pour refroidir immédiatement le cheveu qui vient d'être chauffé, car, d'une part, les deux flux d'air chaud et d'air froid sont collatéraux et, d'autre part, il est impossible que la buse de l'appareil puisse tourner autour de son axe.

[0015] Le document FR-A-1387334 décrit également un sèche-cheveux présentant deux conduits d'air chaud et d'air froid, ces deux conduits étant concentriques et entourant un élément chauffant unique. Ainsi, les flux produits par cet appareil demeurent concentriques - le



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 599 of 2286

flux chaud étant au centre - et par conséquent ils sont de larges sections et non pas laminaires.

[0016] Il ressort donc de l'état de la technique tel que décrit dans les documents cités ci-dessus que des sèche-cheveux délivrant simultanément de l'air chaud et de l'air froid sont connus, mais qu'il n'existe à ce jour aucun sèche-cheveux de ce type ayant des caractéristiques telles qu'il soit avantageusement utilisable pour tous les travaux du salon de coiffure, tout en garantissant l'absence totale d'inconvénient pour la personne coiffée.

## DESCRIPTION GÉNÉRALE DE L'INVENTION

[0017] La présente invention concerne un sèche-cheveux à air chaud et air froid simultanés.

[0018] De façon conventionnelle, ce sèche-cheveux comporte un boîtier de la forme générale d'une surface de révolution autour d'un axe longitudinal, présentant une partie avant et une partie arrière. Un moteur électrique est monté à l'intérieur de la partie arrière du boîtier et entraîne un ventilateur. Ce ventilateur produit un flux d'air d'arrière en avant, aspiré par une entrée d'air ménagée au travers de la paroi du boîtier. Un premier conduit canalise une première partie du flux d'air, tandis qu'un second conduit entourant ledit premier conduit canalise la seconde partie du flux.

[0019] Classiquement, une résistance électrique chauffe la première partie du flux d'air. Une poignée, solidaire du boîtier, est munie de boutons de commande de la vitesse du moteur et de réglage de la puissance électrique consommée par la résistance à partir d'une source d'énergie électrique extérieure. Une première buse, prévue dans le prolongement du premier conduit, délivre de l'air chaud et une seconde buse prévue dans le prolongement du second conduit délivre de l'air froid.

[0020] L'invention a précisément pour objet un sèche-cheveux de ce type, connu notamment du document FR-A-1.387.334, sèche-cheveux dont la caractéristique essentielle est que les première et seconde buses délivrent simultanément, respectivement, une lame d'air chaud et une lame d'air froid parallèles à une même direction et dans le même sens.

[0021] Une caractéristique additionnelle du sèche-cheveux selon l'invention est que les première et seconde buses sont adjacentes, leur paroi commune étant parallèle aux grands côtés des lames d'air chaud et d'air froid délivrées et étant située sensiblement dans un plan radial du boîtier.

[0022] Il est remarquable de prévoir additionnellement que la première buse délivrant la lame d'air chaud soit plus courte que la seconde buse délivrant la lame d'air froid et que le plan de l'orifice de sortie de ladite seconde buse soit incliné par rapport à un plan perpendiculaire à la direction commune des flux d'air, l'angle de cette inclinaison étant préférentiellement compris entre 30° et 45°.

[0023] Selon l'invention, les première et seconde buses peuvent avantageusement être constituées par une buse unique à double conduit et à double orifice. Cette buse unique est alors emmanchée sur la partie avant du boîtier, tout en étant maintenue fixe en translation longitudinalement et libre en rotation autour de ladite partie avant du boîtier.

[0024] Dans cette dernière variante de construction, le double conduit présente de façon avantageuse une entrée, correspondant au conduit de sortie le plus court, de section circulaire. Le premier conduit est alors un tube dont la partie avant présente également une section circulaire. La partie avant de ce tube est engagée dans cette entrée tout en demeurant libre en rotation. De préférence, la partie arrière du tube est, quant à elle, maintenue sensiblement au centre de la base de la partie avant du boîtier par au moins trois nervures longitudinales.

[0025] Très avantageusement, la section droite de chacun des orifices de sortie de la buse unique est rectangulaire, préférentiellement environ dix fois plus longue que large.

[0026] Une autre caractéristique du sèche-cheveux selon l'invention est que la buse unique est de préférence maintenue fixe en translation longitudinalement au moyen d'au moins deux clips coopérant avec une rainure annulaire taillée dans la partie avant du boîtier.

[0027] Selon une autre particularité intéressante, la section du premier conduit canalisant la partie du flux d'air à réchauffer peut avantageusement être sensiblement égale, voire légèrement supérieure, à celle du second conduit canalisant l'autre partie du flux d'air dont la température n'est pas modifiée.

[0028] Le sèche-cheveux à air chaud et à air froid simultanés selon l'invention est, de façon très avantageuse, utilisé pour la mise en oeuvre d'un procédé de séchage consistant à projeter sur l'objet ou le matériau à sécher un flux d'air laminaire présentant un gradient transversal de température, la partie la plus froide du flux étant maintenue la plus proche de la surface de l'objet ou du matériau par la manoeuvre en rotation de la buse unique de l'appareil.

## BRÈVE DESCRIPTION DES DESSINS

[0029] La Figure 1 montre, vue de droite, la structure générale du sèche-cheveux à air chaud et à air froid simultanés conforme à l'invention.

[0030] La Figure 2 est une coupe selon un plan médian A-A montrant la structure interne du sèche-cheveux à air chaud et à air froid simultanés conforme à l'invention.

[0031] Les Figures 3a et 3b sont respectivement une vue de face et une vue d'arrière de la buse unique à double orifice selon une caractéristique avantageuse du sèche-cheveux à air chaud et à air froid simultanés conforme à l'invention.



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 600 of 2286

## DESCRIPTION D'UNE FORME D'EXÉCUTION PRÉFÉRÉE DE L' INVENTION

**[0032]** Les références aux Figures 1, 2, 3a et 3b serviront à expliquer les différentes caractéristiques de l'invention.

**[0033]** La forme générale du boîtier (1) du sèche-cheveux est celle d'une surface de révolution autour d'un axe longitudinal (XX'). La partie avant (2) de ce boîtier a la forme générale d'un tronc de cône de faible ouverture, d'un diamètre moyen supérieur à la dimension courante d'un appareil de la même catégorie. Cette partie avant (2) est rapportée sur une partie arrière (3) dont l'allure générale, traditionnelle, est celle d'un cylindre qui serait renflé dans sa partie médiane, ou d'un petit tonneau. Dans l'exemple d'exécution de l'invention, cette partie est, toujours de façon traditionnelle, elle-même constituée de deux demi-coquilles s'emboîtant l'une dans l'autre.

**[0034]** Un moteur électrique (4) est monté à l'intérieur de la partie arrière (3) du boîtier (1). Il s'agit d'un moteur fonctionnant en courant alternatif 220-240 V et ayant une puissance d'une centaine de watts. Ce moteur (4) entraîne un ventilateur (5) de type centrifuge (l'un et l'autre représentés en pointillés sur la Figure 1), qui produit un flux d'air (6) d'arrière en avant à l'intérieur du boîtier (1).

**[0035]** L'air est aspiré par une entrée d'air (7) ménagée au travers de la paroi arrière du boîtier (1). Cette entrée d'air, munie d'une grille, est également un élément rapporté sur la partie arrière (3).

**[0036]** Un premier conduit (8), ayant la forme générale d'un tronc de cône d'ouverture sensiblement égale à celui formant la partie avant (2), canalise une première partie (9) du flux d'air (6) produit par le ventilateur (5). L'espace laissé libre par ce premier conduit tubulaire (8), dans la partie avant (2) du sèche-cheveux, constitue un second conduit (10) canalisant la seconde partie (11) du flux d'air (6).

**[0037]** Ainsi qu'il est visible à la Figure 2, une résistance électrique (12), enroulée sur des croisillons, se trouve à l'intérieur du premier conduit (8). D'une puissance électrique comprise entre 1500 W et 1700 W, elle chauffe la partie (9) du flux d'air circulant dans le premier conduit (8).

**[0038]** Une poignée (13) accolée à la partie arrière (3) du sèche-cheveux permet l'utilisation facile de celui-ci. Cette poignée se présente sous la forme de deux demi-coquilles réunies par des vis. De façon traditionnelle, ces deux demi-coquilles sont en fait avantageusement les prolongements des deux demi-coquilles constituant la partie arrière (3) de l'appareil.

**[0039]** La poignée (13) porte deux boutons (14, 15) de commande. L'un (14) fixe la vitesse du moteur électrique (4) : selon les besoins, le ventilateur (5) peut être arrêté ou bien être maintenu à un régime moyen ou maximum. L'autre bouton (15) permet de commuter la puissance électrique consommée par la résistance (12) de chauffage entre une valeur nulle, moyenne et maximum.

**[0040]** La poignée (13) est munie d'un passe fil destiné à maintenir le cordon d'alimentation secteur (16).

**[0041]** Une première buse (17) dont l'orifice de sortie est étroit et allongé se trouve dans le prolongement du premier conduit (8) contenant la résistance de chauffage (12), et elle délivre en conséquence une lame d'air chaud (18). Une seconde buse (19), dont l'orifice de sortie est également étroit et allongé, collecte le flux d'air froid (11) circulant entre la paroi interne de la partie avant (2) de l'appareil et le conduit (8) canalisant l'air chaud, pour l'éjecter sous la forme d'une lame d'air froid (20) dans la même direction (XX') et dans le même sens que la lame d'air chaud (18).

**[0042]** De préférence, la section du premier conduit (8) est sensiblement égale, voire légèrement supérieure, à celle du second conduit (10) afin que le débit d'air chaud produit par l'appareil selon l'invention soit égal ou, selon, légèrement supérieur au débit d'air froid.

**[0043]** Ainsi que le montrent les Figures 3a et 3b, les buses (17, 19) ont une forme complexe. L'ensemble se présente comme deux embouts plats, classiques, qui auraient été imbriqués latéralement l'un dans l'autre, une partie latérale inférieure de l'embout destiné à souffler de l'air froid ayant été supprimée. Une partie latérale de l'embout soufflant de l'air chaud constitue alors la paroi commune (21) des deux buses (17, 19). Les deux buses sont disposées de telle manière que cette paroi commune (21) correspond à un plan radial (BB) du boîtier (1).

**[0044]** Ainsi que l'indique la coupe selon le plan médian (AA) représentée à la Figure 2, la première buse (17) délivrant la lame d'air chaud est plus courte que la seconde buse (19) délivrant la lame d'air froid, la différence de longueur (E) valant sensiblement 1 cm dans ce mode de réalisation préférentielle.

**[0045]** De plus, le plan (CC) de l'orifice de sortie (22) de la seconde buse (19) présente un angle d'inclinaison ($\alpha$) par rapport à un plan perpendiculaire à l'axe longitudinal de celle-ci. Cet angle d'inclinaison ($\alpha$) est de l'ordre de 35° pour cette forme de réalisation particulière de la buse (19).

**[0046]** L'écart de longueur (E) entre les deux buses (17, 19) et la taille en biseau de la buse (19) délivrant la lame d'air froid dépendent de l'usage qui sera fait du sèche-cheveux, ainsi qu'il sera expliqué plus loin. Toutefois, l'angle d'inclinaison ($\alpha$) est préférentiellement compris entre 30° et 45°.

**[0047]** Les vues de face et d'arrière des buses (17, 19), présentées sur les Figures 3a et 3b, montrent qu'elles forment en fait une pièce d'un seul tenant constituant une buse unique (23) à double conduit (24, 25) et à double orifice (22, 26).

**[0048]** Comme pour les embouts plats conventionnels, la section droite de chacun des orifices de sortie (22, 26) de la buse unique (23) est rectangulaire, et d'environ dix fois plus longue que large. Les flux d'air froid



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 601 of 2286

(20) et d'air chaud (18) délivrés par la buse unique (23) sont donc bien l'un et l'autre laminaires.

**[0049]** Cette buse unique (23) peut être insérée manuellement sur la partie avant (2) du sèche-cheveux. Elle y est maintenue fixe longitudinalement, tout en y étant libre en rotation. En exerçant un effort suffisant, elle peut cependant être retirée manuellement pour être remplacée en cas de besoin.

**[0050]** L'entrée (27) du double conduit (24, 25) correspondant au conduit de sortie le plus court (25) est de section circulaire. L'extrémité avant (28) du conduit conique (8) contenant la résistance (12) est également de section circulaire, d'un diamètre légèrement inférieur à celui de l'entrée (27), et elle est engagée dans cette entrée (27) tout en demeurant libre en rotation dans les deux sens, rétrograde et direct.

**[0051]** La coupe (AA) de la Figure 2 montre que la partie arrière (29) du conduit tubulaire (8) est maintenue sensiblement au centre de la base (2') de la partie avant (2) du boîtier (1) par des nervures longitudinales (30). Ces nervures ont la largeur appropriée à l'arrière et elles se rétrécissent vers l'avant, jusqu'à disparaître : la partie avant (28) du conduit tubulaire (8) peut ainsi débattre librement à l'intérieur de toute la section de la partie avant (2) du boîtier (1).

**[0052]** Cette disposition particulière permet aux orifices (22, 26) d'être orientés, selon les besoins, par rotation de la buse unique (23) autour de la partie avant (2) du sèche-cheveux, tout en continuant d'être alimentés en air froid et en air chaud, respectivement. Au cours de cette rotation de la buse (23), et ce quel que soit le sens de ladite rotation, la partie avant (28) du conduit (8) demeure engagée dans l'entrée circulaire (27) de la buse, en sorte que le conduit (25) débouchant sur l'extérieur par l'orifice (26) souffle toujours de l'air chaud, et seulement de l'air chaud.

**[0053]** Selon le mode particulier de réalisation décrit, la buse unique (23) est maintenue longitudinalement au moyen d'au moins deux clips (31) coopérant avec une rainure annulaire (32) taillée dans la partie avant (2), à proximité de l'extrémité de celle-ci. Ce procédé est bien connu dans le domaine de la fabrication d'articles en matière plastique moulée. Il a été retenu ici parce qu'il contribue à la facilité d'utilisation de l'appareil.

**[0054]** Le sèche-cheveux selon l'invention présente de nombreux avantages, notamment du fait de la forme des orifices de sortie des buses (17, 19) constituant la buse unique (23), des positions relatives de ces orifices de sortie et des différences de longueur (E) des buses (17, 19).

**[0055]** Il permet à l'opérateur de vérifier immédiatement quelle est la sortie (26) d'air chaud (18) et quelle est la sortie (22) d'air froid (20).

**[0056]** Il offre surtout au professionnel la possibilité de mettre en oeuvre un procédé de séchage des cheveux nouveau, consistant à projeter sur la racine des cheveux un flux d'air laminaire présentant un gradient transversal de température, la partie la plus froide du flux étant avantageusement maintenue la plus proche du cuir chevelu.

**[0057]** Pour ce faire, la buse la plus longue (19), qui souffle de l'air froid (20), est placée à proximité, voire contre la tête, la buse la plus courte (17), qui délivre de l'air chaud (18), étant en revanche la plus éloignée de la tête. Selon que l'on coiffe la partie gauche ou droite, ou le dessus de la tête, ou le cou, on oriente la buse unique de sortie (23), en la faisant tourner autour de la partie avant (2) du boîtier (1), afin de respecter cette disposition des buses (17, 19).

**[0058]** Grâce à ce procédé, les cheveux, d'abord mis en forme et séchés par l'air chaud, sont immédiatement refroidis après le passage de l'air chaud. En effet, par tradition, le sèche-cheveux suit la brosse qui met en forme le cheveu selon un mouvement, commandé par le coiffeur, allant de la base du cheveu vers la pointe de celui-ci ; du fait de ce mouvement imposé au sèche-cheveux par le coiffeur, la lame d'air chaud est aussi déplacée de la base du cheveu à sécher et à mettre en forme en direction de sa pointe et la lame d'air froid suit immédiatement la lame d'air chaud dans ce même mouvement ; ainsi, la mise en forme donnée au cheveu par l'air chaud est immédiatement fixée par l'air froid.

**[0059]** Un tel traitement des cheveux avec un mélange air chaud / air froid conduit à un meilleur gonflé des cheveux, ainsi qu'à une meilleure tenue du "brushing" et de la mise en volume de la coiffure.

**[0060]** Enfin, l'utilisation de l'air froid au plus près du cuir chevelu permet d'éviter les effets de la chaleur sur la personne qui est coiffée.

**[0061]** La construction selon la présente invention constitue donc une solution globale différente au problème de la commutation rapide air chaud/air froid (flux laminaires parallèles) et au problème de la sécurité (éviter de projeter l'air chaud sur le cuir chevelu).

**[0062]** A cet égard, la construction selon l'invention, par sa structure et les résultats auxquels elle conduit, se distingue nettement de celle décrite dans le document DE-U-9100860. En effet, grâce à l'invention, le fait de prévoir que le conduit d'air froid entoure le conduit d'air chaud, au niveau d'un élément chauffant unique placé sensiblement axialement, permet de faire tourner la buse unique (23) et d'adopter la meilleure position des orifices de sortie (22, 26) pour le coiffage. Ensuite, les buses de sortie (17, 19) sont adjacentes, leur paroi commune (21) étant parallèle aux grands côtés des lames d'air froid et d'air chaud délivrées, alors que selon DE-U-9100860, les buses de sortie adjacentes ont une paroi commune qui est perpendiculaire aux grands côtés des deux lames d'air délivrées. Dans cette dernière construction, les flux d'air chaud et d'air froid ne se suivent donc pas de façon automatique dans le mouvement commandé par le coiffeur, allant de la base vers la pointe du cheveu.

**[0063]** Quant au sèche-cheveux conforme au document FR-A-1.387.334, il est inadapté pour la mise en oeuvre d'un séchage et d'une mise en forme du cheveu



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 602 of 2286

pour lesquels des flux d'air chaud et d'air froid sont distribués sous forme laminaires et parallèles, la lame d'air froid étant par ailleurs toujours maintenue au plus près du cuir chevelu ou de la surface de l'objet à refroidir si cet objet est autre qu'un cheveu.

[0064] Comme il va de soi, l'invention ne se limite pas aux seules spécifications techniques ci-dessus, données à titre d'exemple; elle embrasse, au contraire, toutes les variantes possibles de réalisations.

**Revendications**

1. Sèche-cheveux à air chaud et à air froid simultanés, comportant un boîtier (1) de la forme générale d'une surface de révolution autour d'un axe longitudinal (XX') présentant une partie avant (2) et une partie arrière (3), un moteur électrique (4) monté à l'intérieur de ladite partie arrière (3) et entraînant un ventilateur (5) produisant un flux d'air (6) d'arrière en avant aspiré par une entrée d'air (7) ménagée au travers de la paroi dudit boîtier (1), un premier conduit (8) canalisant une première partie (9) du flux d'air (6), un second conduit (10) entourant ledit premier conduit (8) et canalisant la seconde partie (11) dudit flux d'air (6), une résistance électrique (12) chauffant ladite première partie (9) du flux d'air (6), une poignée (13) munie de boutons (14, 15) de commande de la vitesse (14) dudit moteur (4) et de réglage de la puissance électrique (15) consommée par ladite résistance (12) à partir d'une source d'énergie électrique extérieure (16), une première buse (17) située dans le prolongement du premier conduit (8) délivrant de l'air chaud (18), et une seconde buse (19) située dans le prolongement du second conduit (10) délivrant de l'air froid (20), caractérisé en ce que lesdites première et seconde buses (17, 19) délivrent simultanément, respectivement, une lame d'air chaud et une lame d'air froid parallèles à une même direction (XX') et dans le même sens (18, 20).

2. Sèche-cheveux à air chaud et à air froid simultanés selon la revendication 1, caractérisé en ce que les première et seconde busses (17, 19) sont adjacentes, leur paroi commune (21) étant parallèle aux grands côtés des lames d'air chaud et d'air froid délivrées et étant située sensiblement dans un plan radial (BB) du boîtier (1).

3. Sèche cheveux à air chaud et à air froid simultanés selon l'une quelconque des revendications 1 ou 2, caractérisé en ce que la première buse (17) délivrant la lame d'air chaud est plus courte que la seconde buse (19) délivrant la lame d'air froid, la différence de longueur (E) valant préférentiellement 1 cm.

4. Sèche cheveux à air chaud et à air froid simultanés selon l'une quelconque des revendications 1 à 3, caractérisé en ce que le plan (CC) de l'orifice de sortie (22) de la seconde buse (19) présente un angle d'inclinaison ($\alpha$) par rapport à un plan perpendiculaire à la direction (XX'), ledit angle d'inclinaison ($\alpha$) étant préférentiellement compris entre 30° et 45°.

5. Sèche cheveux à air chaud et à air froid simultanés selon l'une quelconque des revendications 1 à 4, caractérisé en ce que les première et seconde buses (17, 19) sont constituées par une buse unique (23) à double conduit (24, 25) et à double orifice (22, 26) emmanchée sur la partie avant (2) du boîtier (1), tout en étant maintenue fixe en translation longitudinalement et libre en rotation autour de ladite partie avant (2).

6. Sèche-cheveux à air chaud et à air froid simultanés selon la revendication 5, caractérisé en ce que ledit double conduit (24, 25) présente une entrée (27), correspondant au conduit de sortie le plus court (25), qui est de section circulaire et en ce que la partie avant (28) du premier conduit (8) présente une section circulaire, ladite partie avant (28) du conduit (8) étant engagée dans l'entrée (27) tout en demeurant libre en rotation.

7. Sèche-cheveux à air chaud et à air froid simultanés selon la revendication 6, caractérisé en ce que la partie arrière (29) du conduit (8) est maintenue sensiblement au centre de la base (2') de la partie avant (2) du boîtier (1) par au moins trois nervures longitudinales (30).

8. Sèche-cheveux à air chaud et à air froid simultanés selon l'une quelconque des revendications 5 à 7, caractérisé en ce que la section droite de chacun des orifices de sortie (22, 26) de la buse unique (23) est rectangulaire, et préférentiellement d'environ dix fois plus longue que large.

9. Sèche-cheveux à air chaud et à air froid simultanés selon l'une quelconque des revendications 5 à 8, caractérisé en ce que la buse unique (23) est maintenue fixe en translation longitudinalement au moyen d'au moins deux clips (31) coopérant avec une rainure annulaire (32) taillée dans la partie avant (2) du boîtier (1).

10. Sèche-cheveux à air chaud et à air froid simultanés selon l'une quelconque des revendications 1 à 9, caractérisé en ce que la section du premier conduit (8) canalisant la partie (9) du flux d'air à réchauffer est sensiblement égale, voire légèrement supérieure, à celle du second conduit (10) canalisant l'autre partie (11) du flux d'air dont la température n'est pas



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 603 of 2286

modifiée.

11. Procédé de séchage, utilisant le sèche-cheveux à air chaud et à air froid simultanés selon l'une quelconque des revendications 1 à 10 précédentes, caractérisé en ce que l'on projette sur l'objet ou le matériau à sécher un flux d'air laminaire présentant un gradient transversal de température, la partie la plus froide du flux étant maintenue la plus proche de la surface dudit objet ou dudit matériau à sécher par la manoeuvre en rotation d'une buse unique (23).



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 604 of 2286

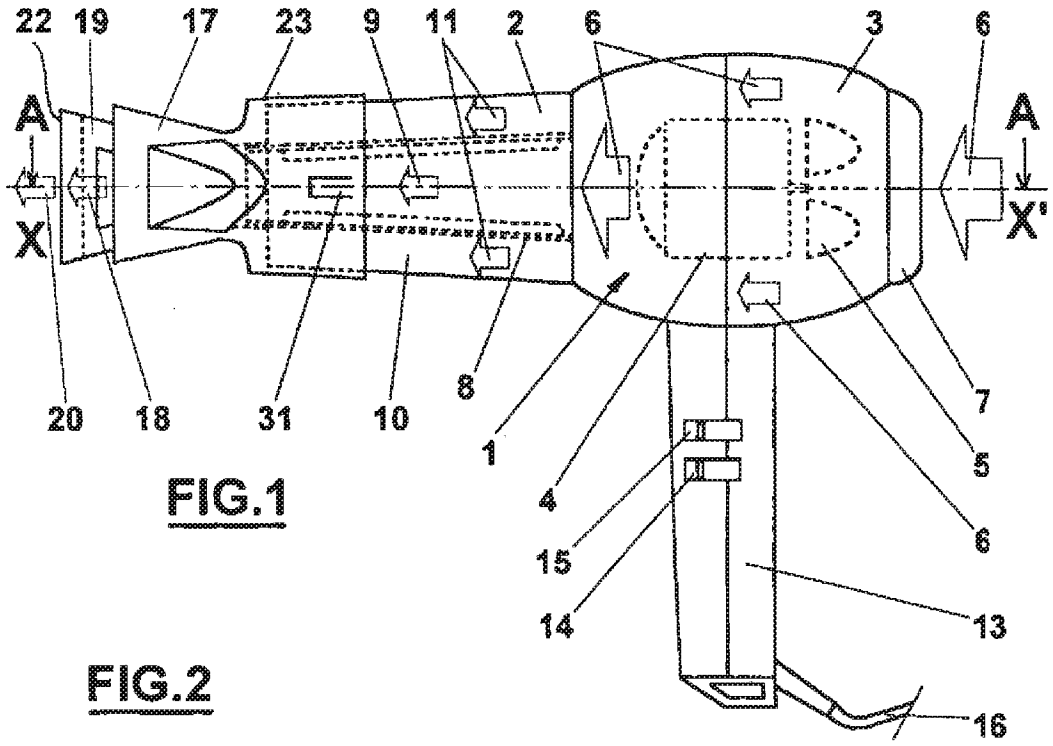



FIG.1

FIG.2

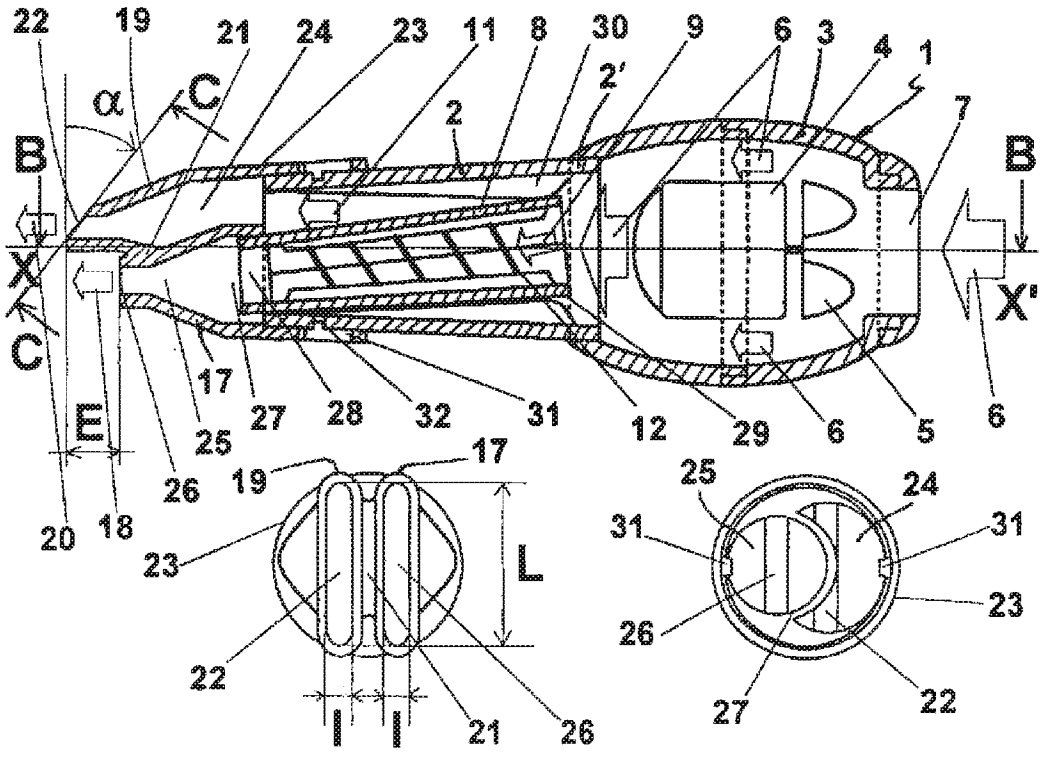



FIG.3a

FIG.3b



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 605 of 2286

Office européen des brevets

# RAPPORT DE RECHERCHE EUROPEENNE

Numéro de la demande
EP 99 40 1703

## DOCUMENTS CONSIDERES COMME PERTINENTS

| Catégorie | Citation du document avec indication, en cas de besoin, des parties pertinentes | Revendication concernée | CLASSEMENT DE LA DEMANDE (Int.Cl.7) |
|---|---|---|---|
| D,X | DE 91 00 860 U (FORFEX ALFRED POPP HAARPFLEGEGERÄTE)<br>18 avril 1991 (1991-04-18)<br>* le document en entier * | 1,2 | A45D20/12 |
| A | | 5,8 | |
| D,A | FR 1 387 334 A (TERANISHI)<br>19 mai 1965 (1965-05-19)<br>* le document en entier * | 1 | |
| D,A | CH 669 319 A (SPEMOT)<br>15 mars 1989 (1989-03-15)<br>* le document en entier * | 1 | |

DOMAINES TECHNIQUES RECHERCHES (Int.Cl.7)

A45D

Le présent rapport a été établi pour toutes les revendications

| Lieu de la recherche | Date d'achèvement de la recherche | Examinateur |
|---|---|---|
| LA HAYE | 4 octobre 1999 | Sigwalt, C |

CATEGORIE DES DOCUMENTS CITES

X : particulièrement pertinent à lui seul
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A : arrière-plan technologique
O : divulgation non-écrite
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T : théorie ou principe à la base de l'invention
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SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 606 of 2286

ANNEXE AU RAPPORT DE RECHERCHE EUROPEENNE
RELATIF A LA DEMANDE DE BREVET EUROPEEN NO. EP 99 40 1703

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04-10-1999

| Document brevet cité au rapport de recherche | Date de publication | Membre(s) de la famille de brevet(s) | Date de publication |
|---|---|---|---|
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| FR 1387334 A | 19-05-1965 | AUCUN | |
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EPO FORM P0459

Pour tout renseignement concernant cette annexe : voir Journal Officiel de l'Office européen des brevets, No.12/82



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 607 of 2286

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PN - JP2000201723 A 20000725

TI - HAIR DRYER WITH IMPROVED HAIR SETTING EFFECT

AB - PROBLEM TO BE SOLVED: To improve the hair setting effect and safety of a hair dryer by mounting a cold air exclusive outlet barrel separately from a hot air outlet barrel and integrating them so that hot and cold air can be blown at the same time from a common fan. SOLUTION: This hair dryer has a double-structure consisting of an inner hot air outlet barrel and an outer cold air outlet barrel, and air is blown by a common fan to the outer barrel 9 and the inner barrel 10 at the same time. The air blow surface to the hair has a hot air area 2 at the center and a cold air area 3 surrounding the hot air area. Therefore, by sliding the hair dryer, hair setting with hot air and with cold air can be automatically continued. Then, as cold air is blown out from the outer circumference, accidental contact of a high-temperature part of the hot air outlet 6 with a user's skin can be prevented and the safety will be improved.

PA - NAKANO HIROKATSU

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AN - 2000-528650

TI - Hair drier for cosmetic treatment, has inner tube provided with heater at its center and outer tube concentrically arranged with preset space between tube wells, and fan blows off hot and cold air, simultaneously

AB - NOVELTY :

A hair drier comprises an inner tube (10) which is provided with heater (12) at its center. An outer tube (9) is concentrically arranged with a preset space between two tube wells. A fan (13) blows off hot air from inner tube and cold air from outer tube, simultaneously.

- USE :

For cosmetic treatment, domestic use.

- ADVANTAGE :

Since the fan supplies hot and cold air simultaneously, the damage to the hair by heat of hot air is prevented. Power consumption is reduced. Heat injury is prevented and safety is enhanced.

- DESCRIPTION OF DRAWINGS :

The figure shows the sectional view of hair drier.

9 : Outer tube

10 : Inner tube

12 : Heater

13 : Fan

PN - JP2000201723 A 20000725 DW200048

PA - (NAKA-I) NAKANO H





SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 608 of 2286

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特開2000－201723
（P2000－201723A）
(43)公開日　平成12年7月25日(2000.7.25)

| (51)Int.Cl.' | 識別記号 | FI | | テーマコード(参考) |
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| A45D 20/12 | | A45D 20/12 | C | 3B040 |
| | | | J | |

審査請求 未請求 請求項の数1 書面 （全 3 頁）

(21)出願番号　特願平11－43584

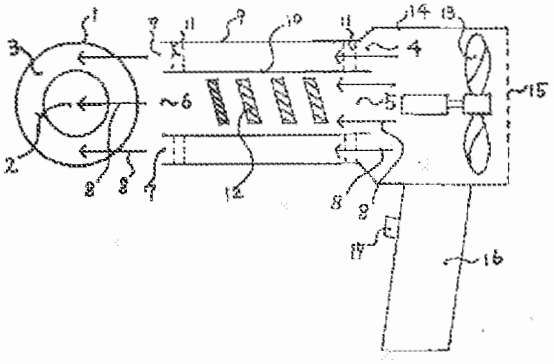
(22)出願日　平成11年1月11日(1999.1.11)

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Fターム(参考)　3B040 CC00 CH00

(54)【発明の名称】　セット効果のアップするヘアードライヤー

(57)【要約】
【課題】　ヘアードライヤーのセットの効果と安全性をアップする。
【解決手段】　温風吹出し筒を内側としてその外周に冷風吹出し筒を設けて筒を二重構造にして、外筒・内筒に同時に同一ファンから送風する事で、ヘアーに当る送風面は中心に温風域が、外周に冷風域が出来るので、ヘアードライヤーのスライドに伴い、温風によるヘアーセットと、冷風によるヘアーセットの固定を自動的に連続して行なう、又外周が冷風なので温風吹出し口の高温部分が誤って皮膚にふれる事を防ぎ安全性もアップする。



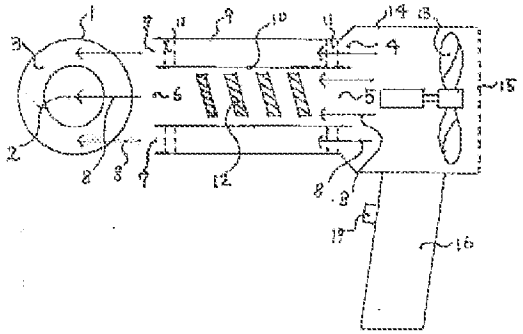
SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 609 of 2286

【特許請求の範囲】
【請求項１】　ヘアードライヤーの吹出し筒をヒーター（１２）が設置されている内筒（１０）とその外側周囲に約１～２ｃｍ巾の空間を設けた外筒（９）を取りつけ、筒を二層構造として、同一ファン（１３）からの送風を内筒からの温風と外筒からの冷風とを分離しながら同時に吹出させる、セット効果のアップするヘアードライヤー。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】理・美容及び一般家庭用でスタイリングの為のヘアーセットに用いるヘアードライヤーのセット力のアップと持続性・高温に対する安全性・消費電力の経済性の改善に関するものである。
【０００２】
【従来の技術】ドライヤーによるヘアーセットは温風によるセットと直後の冷風によるセットの固定でその安定と持続を目的としているが、従来のドライヤーは吹出し筒が単一構造で温風によるセット後、冷風にするにはスイッチで切り替えてもヒーターの残熱が冷えるまでのタイムロスがあるので、セットの安定性が劣化し、時間がかかるので冷風を用いず自然冷却にまかせるので、持続性を損ない、又温風吹出し口の高温化は誤って皮膚にふれて火傷する危険性と高温によるヘアーへのダメージが生じた。
【０００３】
【発明が解決しようとする課題】タイムロスのあるスイッチによる切り替えから、ヘアードライヤーのわずかな移行だけで瞬時に温風から冷風に変えられるようにする事と火傷を防止する為に温風吹出し口を冷温化する課題。
【０００４】
【課題を解決するための手段】温風吹出し筒と別ルートで、冷風専用吹出し筒を設け、同一ファンから同時に温風・冷風の送風が出来るように一体化したヘアードライヤーとする。
【０００５】
【発明の実施の形態】ヒーター１２設置している温風吹出し筒を内筒１０とし、その外周に外筒９を取りつけて一体化し、同一ファン１３より、内筒１０からの温風と、外筒９からは冷風とを同時に送風出来るように、吹出し筒を二層構造とする。
【０００６】
【実施例】温風吹出しの内筒１０と冷風吹出しの外筒９とは約１ｃｍ～２ｃｍ中の間隔を保つように支柱１１で固定し、外筒９をファンカバー１４と接続させる。ファン１３からの送風は、風の方向を示す矢印８のように、内筒１０に送られた風はヒーター１２を通って温風を、外筒９に送られた風は冷風をそれぞれ分離され同時に吹出し口から放出されヘアーに当った状態が送風面の領域１で、中心部分にヘアーセットの為の温風域２とその外周は約１ｃｍ～数ｃｍ巾でヘアーセット固定の作用をする冷風域３となる。実際のヘアーセットの作業は
１．ヘアードライヤーをブラシで押えたヘアーに当てて前後左右どの方向にスライドさせても、温風域２から冷風域３への移行がヘアードライヤーのスライドに伴なって連続作用で自動的に瞬時に行なわれる。
２．部分的なヘアーセットの場合は、ブラシでヘアーを押え、あるいは巻きつけて温風域２でセット処理し、そのままハンドル１６でドライヤーの吹出し口を少し振って、温風域２をヘアーからずらすと、瞬時に冷風域３に移行してヘアーセットを固定させ、次のセット作業に速やかに移行出来る。
３．高温になる温風吹出し口６は冷風吹出し口７の内側になるので、ヘアーの生え際近くのセット処理にも安心して使用出来る。
４．アタッチメントのノズルを使用する際は、外筒９とその外側に前後にスライド出来るよう密着したもう一本の外筒とで二重にし、外側の外筒をノズル先端までスライドさせて伸ばして、外筒９からの冷風をノズル先端にまで誘導して使用する事も出来る。
５．乾燥用ドライ専用で使用する場合は、外筒の冷風入口４に開閉自在の蓋を設けて温風吹出しのみで使用する事も出来る。
【０００７】
【発明の効果】１．ヘアーのセット効果としてセット力とその持続力が著じるしく向上する。
２．１の特性からヘアーに温風を当てる時間が短縮されるので
イ．熱によるヘアーへのダメージを防止
ロ．作業時間の短縮
ハ．消費電力の軽減
３．冷風吹出し口７が温風吹出し口６の外周にあるので、火傷を防止し安全性を高める。
【図面の簡単な説明】
【図１】側面の断面図とヘアーへの送風面の領域を示す。
【図２】前方からの平面図。
【符号の説明】
１　ヘアーへの送風面の領域の外周
２　温風域
３　冷風域
４　冷風入口
５　温風入口
６　温風吹出し口
７　冷風吹出し口
８　送風の方向を示す矢印
９　外筒
１０　内筒
１１　支柱

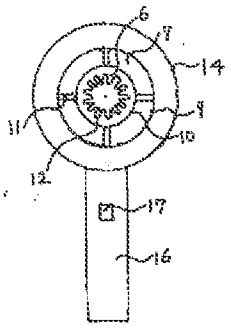
SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 610 of 2286

12 ヒーター
13 ファン
14 ファンカバー
15 吸込口
16 ハンドル
17 スイッチ

【図1】



【図2】



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PN - JP2001037530 A 20010213

TI - HOT AIR HAIR DRIER WITH COOLING PORT

AB - PROBLEM TO BE SOLVED: To cool and fix a hairstyle arranged by hot air without deformation by arranging a suction port in the vicinity of a blowout port in a hair drier main body and installing a cooling mechanism based on air suction from the same direction as the blowout direction. SOLUTION: A driving motor 4 with a fan 3 and a heating element 5 for heating air are fixed, and a cylindrical inner frame 2 feeding air to a blowout port 6 is provided with an elliptical cylinder type outer frame 1 arranged beside the blowout port 6 for sucking air in the same direction to the blowout port direction. In the outer frame 1, an ordinary suction port 7a is installed, and a flow rate through a cooling suction port 7b is regulated according to the dimension of an opening of the suction port 7a. When the fan 3 is turned by means of the driving motor 4, air is sucked from the suction port 7a and the cooling suction port 7b, passes through the inside of the inner frame 2, and is warmed up by means of the heating element 5 so as to be blown out of the blowout port 6.

PA - TAKESUE KIYOSHI

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AN - 2001-238761

TI - Hair drier has air suction opening provided around hot air blowing mouth

AB - NOVELTY :
The hair drier has blowing mouth (6) to blow hot air, and has air suction openings (7b) provided around the blowing mouth, to cool the hot air blowing mouth.
- USE :
For drying hair.
- ADVANTAGE :
Heat in hot air is reduced to desirable condition by adjusting suction opening. Operation of drier is made simple, as hair is cooled quickly.
- DESCRIPTION OF DRAWINGS :
The figure shows the schematic sectional view of hair drier. (Drawing includes non-English language text).
6 : Blowing mouth
7b : Air suction openings

PN - JP2001037530 A 20010213 DW200125

PA - (TAKE-I) TAKESUE K



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 612 of 2286

Withdrawn 2006

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（P2001－37530A）
(43)公開日　平成13年２月13日(2001.2.13)

| (51)Int.Cl.' | 識別記号 | ＦＩ | | テーマコード'(参考) |
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| Ａ４５Ｄ　20/10 | １０１ | Ａ４５Ｄ　20/10 | １０１ | ３Ｂ０４０ |

審査請求　未請求　請求項の数１　書面　（全　３　頁）

(21)出願番号　特願平11－243700

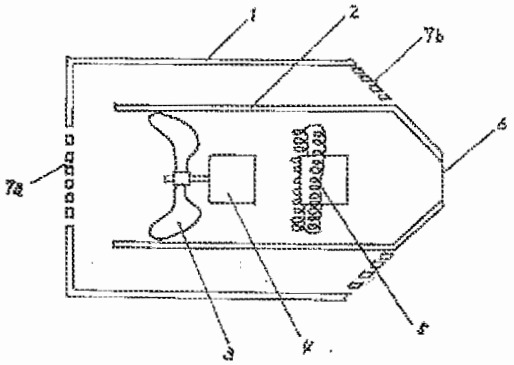
(22)出願日　平成11年７月27日(1999.7.27)

(71)出願人　599121285
武末　薫
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(72)発明者　武末　薫
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Ｆターム(参考)　3B040 CB03 CF00

(54)【発明の名称】　冷却口付き温風ヘアードライヤー

(57)【要約】
【課題】ヘアードライヤーでの整髪で、温風で整えた髪をすばやく冷却することにより、整えた髪形に固定できるようにすること。
【解決手段】温風であたためられた髪から、吸い込みによって熱を奪うようにするため、ヘアードライヤーの吹き出し口の近くに吸い込み口を取り付ける。

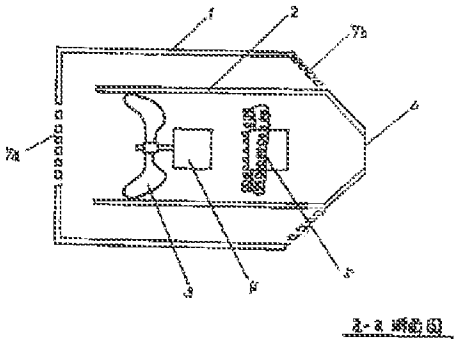



2-2 断面図

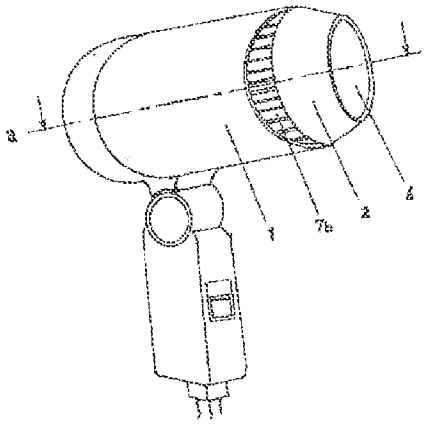
【特許請求の範囲】
【請求項１】ヘアードライヤー本体の吹き出し口（６）の近くに吸い込み口（７ｂ）を設け、吹き出し方向と同方向からの吸い込みによる冷却機構を取り付けたヘアードライヤー。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、ヘアードライヤーの温風吹き出し口と同方向に冷却用の吸い込み口を設けたヘアードライヤーに関するものである。
【０００２】
【従来の技術】従来のヘアードライヤーは、温風又は冷風を髪に当てることにより乾燥と整髪を行なっている。温風と冷風は、スイッチにより発熱体へ通電した状態と通電しない状態にすることで切り換えている。
【０００３】
【発明が解決しようとする課題】髪形を整える場合、ある程度乾燥させ、温風で髪形を整えた後すばやく冷却することにより、整えた髪形に固定される。しかし、冷風で冷却すると吹き出す風によって整えた髪形が崩れてしまう。又、発熱体への通電を切っても即冷風にならないという問題点があった。
【０００４】
【課題を解決するための手段】上記問題点を解決するために、吸い込み口を吹き出し口の近くに取り付け、温風であたためられた髪から、吸い込みによって熱のみを奪うようにする。これにより、温風で整えた髪形を崩さずに冷却し固定することが可能になる。
【０００５】
【発明の実施の形態】本発明は、ヘアードライヤー本体のフレームを一部２重構造とし、ファンによる吸引力を吹き出し方向からも得られるようにし、吹き出し口と反対方向にある従来の吸い込み口と冷却用の吸い込み口を合わせ持つようにしたものである。
【０００６】上記の吹き出し口と反対方向にある吸い込み口は、無くすことも可能である。
【０００７】吹き出し用のファンとは別に冷却のための吸い込み用ファンを設けることも可能である。
【０００８】
【実施例】実施例について図面を参照して説明すると、図１において、ファン（３）が取り付けられた駆動モータ（４）と温風に変換する発熱体（５）を固定し、且つ風を吹き出し口（６）に送る円筒形の内フレーム（２）に、吹き出し口の横で且つ同方向からの吸い込みを可能とするための楕円筒形の外フレーム（１）を取り付ける。外フレーム（１）には、従来の吸い込み口（７ａ）を取り付け、冷却用の吸い込み口（７ｂ）の流量を吸い込み口（７ａ）の開口の大きさにより調節している。駆動モータ（４）によりファン（３）を回転させると、空気が吸い込み口（７ａ）と冷却用の吸い込み口（７ｂ）から吸い込まれ内フレーム（２）の中を通り、さらに発熱体（５）で暖められ吹き出し口（６）から吹き出される。
【０００９】
【発明の効果】本発明は、以上発明したような形態で実施され、以下に記載されるような効果を奏する。
【００１０】吸い込み口を２系統に分け、一方を小流量の冷却口とし、熱せられた髪から髪形を崩さずに熱を奪い、固定することが可能になる。
【００１１】さらに、冷却用の吸い込み口を吹き出し口の近くに同じ方向へ向けて取り付けることにより、温風で整えた髪をすばやく冷却でき、ドライヤーを簡単に操作できる。
【図面の簡単な説明】
【図１】冷却口付き温風ヘアードライヤーの実施例を示す断面図である。（図２のａ－ａ断面図）
【図２】冷却口付き温風ヘアードライヤーの斜視図である。
【図３】冷却口付き温風ヘアードライヤーの冷却口を示す外形図である。
【符号の説明】
１　外フレーム
２　内フレーム
３　ファン
４　駆動モータ
５　発熱体
６　吹き出し口
７ａ、７ｂ　吸い込み口

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 614 of 2286

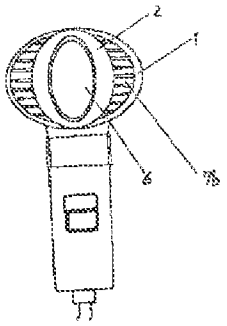
【図1】



【図2】



【図3】



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 615 of 2286

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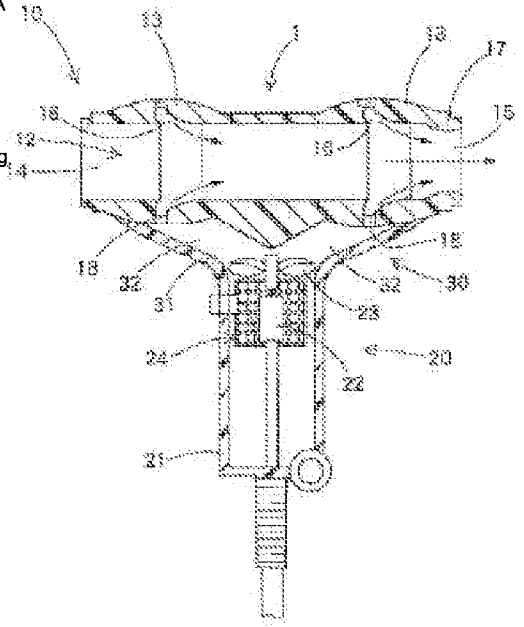
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| **Applicant(s):** | MIKOMA KK ± |
| **Classification:** | **- international:** ***A45D20/10; A45D20/12; D06F58/00; F04D29/54;*** (IPC1-7): A45D20/10; A45D20/12; D06F58/00; F04D29/54 |
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| **Priority number(s):** | JP20010040509 20010216 |

## Abstract of JP2002238649 (A)

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PROBLEM TO BE SOLVED: To provide a blower with which the flow of air is not disturbed even if either one of the air inlet or the air outlet is closed. SOLUTION: A hair dryer 1 has a main path 10 through which air flows, a grip portion 20 having an air generator, and connection passages with which the main path 10 and the grip portion 20 are connected. A main passage 12, from which air is flown out, is formed as a cylinder having openings at the inlet side 14 and the outlet side 15. A fan 23 for blowing air is driven by a motor 22 to blow air to a blowing opening 16 which is formed near the inlet 14 of the main passage 12 and to a blowing opening 16 which is formed near the outlet 15 through connection passages 32 and 32. The air flown in the main passage 12 is heated with a heater 19 fixed at a diameter-widening portion 13.






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## DESCRIPTION JP2002238649

BACKGROUND OF THE INVENTION The present relates to a blower that is configured to blast in one direction in a flow path by supplying to the passage of air, for example, the present invention is to dry the material to be dried by high temperature air on the blower, such as those or similar ship propulsion device for propelling an article and dryer, those similar to them, by or to be blown.

Conventionally, one that dries the objects of moisture to have a hot air generating function, for example, the blower, hair dryer for drying the Goods and Services or moisture futon and hair dryer dry the hair known.

The dryer these, the intake ports of the other, to allow air to flow toward the port ejecting it is opened, the housing of a cylindrical shape opened as a port spout at one end, with the motor in the air passages in the housing a rotating fan was provided.

For example, if a hair dryer, and a heater to the hot air the air is blown normally, a fan driven by the motor within the housing of the cylindrical, rotation of the fan, wind outlet air is high temperature By blowing out toward the hair more, it was configured to dry the wet hair.

However, problems to be solved by the invention, since the case dryer article drying for hair dryer and traditional, it is configured to spray out the warm air toward the drying object, hair in long women and young people in particular , in the case where it takes time to dry the hair wet, it was so jetted hot air close to the object the port ejecting.

However, it means that the drying object is too close to each port ejecting directly, and apply warm air, particularly, the air due to long-term use, flowing around the port ejecting is reservoir, the high-temperature drying object It was accompanied by the danger of thereby.

Also, if you set bundling elongate partially hair, and spouts and hot air hair is bundled set was walking easy turbulence.

Has been made to solve the problems described above, by blowing air without disturbing the flow of air to be clogged and can close the opening of one of the object, the present invention, a blower which can be used safely It is intended to provide.

Means for Solving the Problems] The blowing device according to the present invention, in order to solve the above problems, and constitutes, as follows.

That is, a main flow portion of air and blowing generating unit, supplied from the blower generating unit is distributed, there is provided an air blower There is provided, formed in a cylindrical shape of the main flow unit is opened at both ends it is, the blower generating means is disposed away from the main flow portion, between the said main flow unit and the blower generating unit supplies connected air to the outlet side at or near the inlet side of the main flow unit It is characterized in that the passage is provided.

Then, the blower generating unit, the blower, so that it blows air to the outlet side at or near the inlet side of the main flow unit.

The air flow in the main flow unit, air supplied to the outlet side or the inlet side regardless of the both ends are opened flows in from the inlet side to the outlet side near to approach the article to the inlet side of the main flow unit it is not affected by the flow of air or, even supposed to be or to close.

That is, for example, in the case of a hair dryer, and thereafter inserting the hair in the main flow portion, even if clogged or is in close proximity to the head opening of the inlet side, blowing apparatus, the air is jetted to the hair flow will be carried out smoothly without disturbance.

Further, by making the main flow section, by disposing the heat source unit, and hot air by high temperature air to be distributed to the main flow portion, if caused to pass through the drying object in the main flow portion, and dried it is possible to dry the object, for example, may be used as a dryer in

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324

the dryer and a hair dryer.

The outlet of the main flow unit, if it is reduced in diameter, it is possible to increase the pressure of the air blown from the outlet of the main flow unit.

When an abnormality occurs in the heat source site and delivery port of the main flow portion in the main flow section if configured separably in the axial direction, which facilitates maintenance by opening the interior to divide I could.

Further, formed in bifurcated toward the inlet and outlet ports of the main flow unit, the branch point of the connecting passage, the connecting passage, the inlet side air supplied from the blower generating unit As supplied in the direction of one of the outlet side, the switching valve, if one is provided, by sending air to the connection path of one, change the direction of air flow in the main flow portion in can be.

Thus, it is possible or only sprayed to the object in the main air flow portion, or blowing air to the object in the outside vicinity of the outlet air.

Further, in the main flow portion, by the inlet and outlet ports is provided with ventilation opening towards the opposite direction, and directs airflow delivery port towards the same direction of the blower opening the inlet side and the outlet side It is also possible to Te, to switch the direction of the flow of air.

DESCRIPTION OF THE PREFERRED EMBODIMENTS The present invention will be described with reference to the accompanying drawings an embodiment of the present invention.

The blower of the present invention, apply to the hair dryer to dry the hair, or a dryer to dry the other items, may be applied to the ship propulsion device further.

As shown in Figures 1-2, a main flow portion 10 is formed to allow air to flow in one direction both end surfaces are opened, hair dryer 1 in the exemplary embodiment, direction perpendicular to the main flow portion 10 It is constituted by a connecting passage 30 which connects the grip portion 20 for accommodating therein the blower generating device to deliver air to the main flow portion 10 is disposed, and a grip portion 20 and a main distribution unit 10, to be blown into the main distribution portion 10 from the inside than the openings at both ends of the main distribution unit 10 through the connecting passage 30 by the air of the blower drive generator.

As long as it has this configuration, it is not intended to be limited to the shape of each part.

In the hair dryer 1 in the exemplary embodiment, the main flow unit 10 is configured to have an upper housing 11 formed in a substantially cylindrical shape, and a main passage 12 formed in the upper housing 11.

Enlarged diameter portion 13, 13 is formed on the outer peripheral end portions of the upper housing 11, the main passage 12 so that it can be inserted into a portion of the hair to the inside ends of the outlet 15 side and the inlet 14 side is opened It is formed, the ventilation opening 16 spewing the air blown from the air blowing device generating the above-described inside the vicinity of the openings at both ends is formed between the inner peripheral surface of the entire circumference of the main passage 12.

The outlet 15 side inside the vicinity of the projecting portion 17 is formed within which guides the air is reduced in diameter so as to protrude toward the central axis from the inner circumferential surface.

Is disposed on the outlet 15 side or near the inlet 14 side, as shown in FIG 3, a supply passage 18 for supplying air to the main passage 12, the enlarged diameter portion 13 from the supply passage 18 or the supply passage 18 and a heater 19 to warm weather the air in the main passage 12 and is located near the air blowing port 16 which is connected.

Is formed by opening the entire circumference small holes in the upper housing 11, toward the inner peripheral surface of the 12 main passage from a part side of the supply passage 18, supply passage 18 is connected to the ventilation opening 16 along the entire circumference have.

The lower end portion of the supply passage 18 is connected to the connecting passage 32 to be described later is formed in the connecting passage portion 30.

Ventilation opening 16 is formed as shown in FIG 4, so as to flow into the air toward the outlet 15 side from the inlet 14 side.

Note that the ventilation opening 16 may be formed to provide a plurality of holes which are connected from the supply passage 18 to the inner circumferential surface of the main passage 12.

In this case, may also blowing direction of the blowing port 16, the distal end portion of the supply passage 18 during the molding of the upper housing 11, be formed on the hole to face in one direction in advance in the enlarged diameter portion 13 Install the piping components commercially available, and may be set the orientation.

The heater 19, as shown in FIG 5 or paste or copper plate or the like, or be arranged so as to insert (copperplate) or hot wire which is wound in a coil shape to the supply passage 18 of the above as shown in FIG 3 I be placed a copperplate or hot wire to only around 16 of the blower opening.

Both are configured to spray out from the blower port 16 air through the supply passage 18 is warmed by the heater 19.

The heater 19 is installed in this way, it can be safely used for drying the object (eg, hair) can be inserted into the main passage 12, there is no drying object is in contact with the heater 19 directly .

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324

Further, in the case where the jetted hot air directly from the outlet 15 to dry the object, in order to raise the temperature of the air jetted, as shown in FIG 6, and the inner peripheral surface of the enlarged diameter portion 13 as 191 auxiliary heater It may be arranged so as to surround around the main passage 12 is stored in a recess 131 that is formed.

In this case, also, may, auxiliary heater 191 may be wound helically one can be juxtaposed plural.

In the inner surface of the auxiliary heater 191 which is positioned in recess 131, can be supported by the cover 192 like a net attached to the inner peripheral surface of the enlarged diameter section 13, because of the fall prevention of the auxiliary heater 191 It is desirable to.

As shown in Figures 1-2, the grip portion 20 is located a fan 23 to the lower housing 21 having a smaller diameter is formed in the rectangular tube or cylindrical shape so as to be gripped by hand, is driven by a motor 22 therein have.

And is formed inlet 24 air having a small hole 241 a number below the fan 23.

It is arranged a push-button switch 26 for driving the motor 22, as can be operated from the outside, connecting 22 between the motor and the push button switch 26 and a wiring connecting the external wires and push button switches 26 to 22 near the motor, by wiring is housed.

24 air inlet, and arranged so as not to let located above the position held in the hand as possible to close the air inlet 24 by hand.

Central housing 31 is formed in a substantially triangular hollow internal toward the main passage 12 from the upper end of the grip portion 20, the connecting passage section 30, the enlarged diameter portion 13.13 of the main passage 12 from the fan 23 therein 32.32 connecting passage formed in the bifurcated toward is disposed.

The supply passage 18.18 and connecting passages 32.32, and is connected to be supplied to the supply passage 18 formed in the upper housing 11, the air blown from the connecting passage 32.32 a large diameter.

Note that the supply passage 18 may be formed to be connected with the connecting passage 32 and through the air pipe to the upper housing 11.

As shown in Figures 7-8, a hair drier 1 of the first embodiment constructed as described above, preferably used in the young people who have or women with long hair, the hair bundled by partially protrudes possible.

As shown in Figure 7, while Hold the bunch long hair, it is inserted into the main passage 12 of the hair dryer 1 a hair bundle.

In this state, when operating the push button switch 26, the fan 23 rotates the motor 22 is driven.

30 within the connecting passage, via a connecting passage 32, 32 formed in the bifurcated air by the rotation of the fan 23, and sucked from the inlet 24 is, the supply passage 18 of the outlet 15 side and the inlet 14 side, is fed to 18, further, from the blowing port 16 at the outlet 15 side or near the inlet 14 side near the main passage 12, and is supplied to the main passage 12.

Direction of the blower 12 in the main passage, so that it flows toward the outlet 15 side from the inlet 14 side.

At the same time and on the push button switch 26, 19 itself heater reaches the high temperature heater 19 is energized.

On the other hand, the air fed from the blowing port 16, so that it becomes hot by being heated by the heater 19, to dry the hair by blows to the hair which is inserted into the main passage 12.

In this case, for example, be close to the head or young women, the open side 14 of the main channel section 10, since it flows toward the outlet side from the inside from the inlet 14 side, hot air is distributed to the head not to shed hot air, also, it is not able to be blocked by attaching the head to the inlet 14 side, and is influenced by the flow of air to dry the hair which is inserted into the main passage 12.

Therefore, it is possible to secure and carry out a reliable operation.

The hair dryer may be formed in various forms by performing a slight further improvement.

For example, as shown in FIG 9, the position of the branch point of the connecting passage 32 formed in the connecting passage portion 30, the bifurcated connecting passage 32 and the connecting passage 32 toward the inlet 14 side toward the outlet 15 side It can be arranged the switching valve 35 so as to be blown to one of.

The air blowing port in this form, 15 side inlet and outlet 14 side also should be installed both to face.

That is, the air blowing port 36A disposed on the inlet 14 side is disposed directed towards the outlet 15 side, the air blowing port 36B which are arranged on the outlet 15 side is disposed to be directed to the inlet 14 side.

It should be noted, also, the switching valve 35, so that it is possible to close the inlet of the connection passage 32.32 each to be arranged so as to close the inlet of the connection passage 32 of any and is

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324

tilted from one end of the valve one in, and may be disposed near the inlet of the connecting passage 32.32 valves two.

Both may be configured to allow one-touch operation button (not shown).

Therefore, in this case, it is possible to be able also be possible to blow air toward the inlet 14 side, and also to blow air toward the outlet 15 side, the switch freely.

In the case of blowing air to the inlet 14 side, becomes to be jetted directly toward the object as in the dryer prior art, when it is blowing toward the outlet 15 side, as in the embodiment described above, the hair may be used to jetted air are passed through the main passage 12.

Note, there is a dry object on the inlet 14 side, when it is jetted air toward the inlet 14, since it is not inserted dry the object (e.g., hair) in the main passage 12, the outlet 15 side it can be fitted with an openable lid on and safety object does not enter into the main passage 12 is also possible.

Further, as shown in FiG 10, and a 52A · 52B or split path 42A · 42B, respectively, as divided into two connecting passage 32.32, which is formed toward the inlet 14 side to the outlet 15 side, the inlet 14 to the tip of each is provided with air blowing port 46A · 46B of the pair towards the opposite direction to the outlet 15 side and side, the 56.56 B, further, so that it can be blown to one division passage 42A, which is divided into two (52A) · 42B of (52B) It may be possible to be provided a switching valve 45, it is blown toward the inlet 14 side of the air blowing port 46A · 56B, and also to blow air toward the outlet 15 side of the ventilation opening 46B · 56A.

Further, by forming either two divided along the axial direction of the upper housing 11, 21, central housing 31 upper housing 11 and lower housing so as to be bisected along the axial direction by the upper housing 11, an internal it is possible to facilitate maintenance by opening.

As described above, it becomes that the fan 23, and blows air to the outlet 15 side or near the inlet 14 side of the main passage 12, the flow of air in the 12 main passage, a hair drier 1 of the present embodiment is opened The air supplied to the outlet 15 side or the inlet 14 side regardless of the both ends flows towards the outlet 15 side 15 side near the inlet, and supposed to be near or articies to the inlet 14 side of the main flow portion 12, or to block it is not affected by the air flow also.

That is, through the hair, even if clogged or is in close proximity to the head opening of the inlet 14 side in the main passage 12, the flow of air jetted to the hair so that it is smoothly without disturbance.

Further, by making the main passage 12, by providing the heater 19, and hot air by a high temperature of the air to flow through the main passage 12, and be caused to pass through the hair wet in the main passage 12, the hair It can be dried.

The outlet 15 of the main passage 12, if it is reduced in diameter to have an inner projecting portion 17, it is possible to increase the pressure of the air blown from the outlet 15 of the main passage 12.

Further, when an abnormality occurs in the heater 19 and blower port 16 of the main passage 12, the main passage 12, if it is configured separably, it is possible to easily perform maintenance by opening the internally divided.

The connection passage 32 is formed by bifurcated toward the outlet 15 side and the inlet 14 side of the main passage 12, the branch point of the connecting passage 32, the inlet 14 side of the air supplied from the fan 23 As supplied in the direction of one of the outlet 15 side, the switching valve 35, if one is provided, by sending air to the connecting passage 32.32 either one of the air in the main passage 12 it is possible to change the direction of flow.

Thereby, or only sprayed on the hair the air 12 within the main passage, or it can be jetted air to the hair at the inlet 14 near the outside air.

Further, in the main passage 12, by the outlet 15 side and the inlet 14 side, to provide air blowing port 46A toward the opposite directions (56A) · 46B and (56B), the ventilation opening of the outlet 15 side and the inlet 14 side Of the 46, can also directs airflow (46B · 56A) or feed port 46A · 56B toward the same direction, and to switch the direction of air flow.

Since each main flow portion 12 is formed in a cylindrical shape, and has not been disposed obstacles therein, blowing apparatus of the present embodiment, it is not limited to the drier to dry the article, is used for ship propulsion device I could.

For example, it is disposed toward the upper supply passage is disposed in the sea in the main flow portion of the tubular is connected to the main flow portion, if you ask disposed blowing generator fan motor or the upper end of the supply passage, a main By supplying rearward with respect to the traveling direction, the air blown from the blower generator and distribution unit 10, sea water flows in the direction opposite to the traveling direction of the main flow section to propel forward the ship I can be.

Also, be allowed to flow so as to supply to the forward direction of travel of air, it is possible to perform an action as a brake.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324

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## CLAIMS JP2002238649

A main flow portion of air and blowing generating unit, supplied from the blower generating unit is distributed, there is provided an air blower There is provided, it is formed into a cylindrical shape of the main flow unit is open at both ends, the blower generating means is disposed away from the main flow portion, between the said main flow unit and the blower generating unit, supplies connecting passage to the air outlet side or near the inlet side of the main flow unit blower, characterized in that it is arranged.

By the main flow portion, disposing the heat source unit, the blower in accordance with claim 1, characterized in that it is adapted to the hot air the air that is flowing in the main flow portion.

Blowing device according to claim 1, characterized in that the outlet of the main flow portion is formed by a reduced diameter.

blower apparatus of claim 1, 2 or 3, characterized in that the main flow portion is configured separably in the axial direction.

Are formed in bifurcated toward the inlet and outlet ports of the main flow unit, the branch point of the connecting passage, the connecting passage, inlet and outlet side air supplied from the blower generating unit blower 4 according to claim 1, 2, 3, characterized in that to be supplied in the direction of one side, the switching valve is provided.

The inlet and outlet sides of the main flow unit, to allow air to flow toward the opposite directions, the air blowing port of the pair is connected from the connecting passage is arranged, of the air blowing port of the pair, blower according to claim 5, characterized in that it is the air is blown into the main passage in selectively from the blower opening of one.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324

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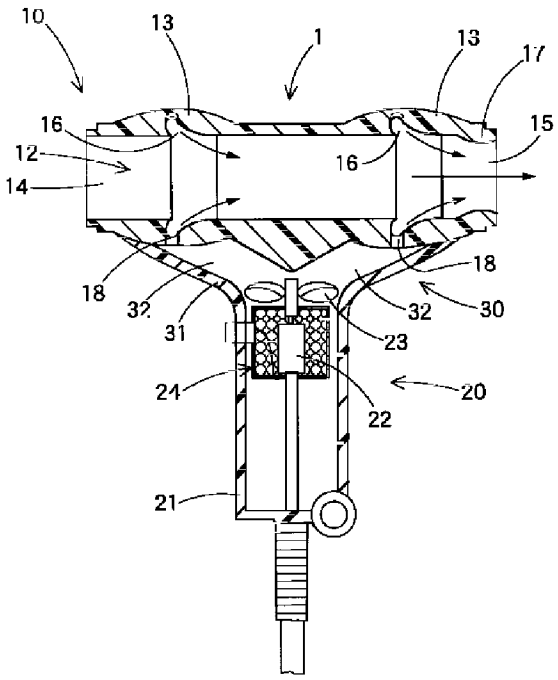
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(54)【発明の名称】　送風装置

(57)【要約】
【課題】吸い込み口又は噴き出し口の一方を塞いでも空気の流れを乱すことのない送風装置を提供すること
【解決手段】ヘアードライヤー１は、空気の流通する主流通部１０と、空気発生装置を有するグリップ部２０と、主流通部１０とグリップ部２０とを接続する接続通路部とを有して構成されている。空気を噴き出す主通路１２は入口１４側と出口１５側が開口した筒状に形成され、空気を送風するファン２３はモータ２２によって駆動されて、接続通路３２・３２を介して主通路１２の入口１４側付近に配置される送風口１６と出口１５側付近に配置される送風口１６に空気を送るように形成されている。主通路１２内を流通する空気は、拡径部１３内に装着されたヒータ１９によって高温化される。




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 622 of 2286

【特許請求の範囲】
【請求項１】　送風発生手段と、前記送風発生手段から供給された空気が流通される主流通部と、が配設される送風装置であって、
前記主流通部が両端を開口して筒状に形成され、
前記送風発生手段が、前記主流通部から離れて配置され、
前記送風発生手段と前記主流通部との間には、前記主流通部の入口側又は出口側付近に空気を供給する接続通路が配設されることを特徴とする送風装置。
【請求項２】　前記主流通部に、熱源手段を配設することによって、前記主流通部内に流通される空気を温風とするように構成されたことを特徴とする請求項１記載の送風装置。
【請求項３】　前記主流通部の出口が、縮径されて形成されることを特徴とする請求項１又は２記載の送風装置。
【請求項４】　前記主流通部が、軸方向に沿って分割可能に構成されていることを特徴とする請求項１，２又は３記載の送風装置。
【請求項５】　前記接続通路は、前記主流通部の入口側と出口側に向かって二股に分岐して形成され、前記接続通路の分岐点位置には、前記送風発生手段から供給される空気が入口側と出口側のいずれか一方の方向に供給されるように、切替弁が配設されていることを特徴とする請求項１，２，３又は４記載の送風装置。
【請求項６】　前記主流通部の入口側と出口側には、それぞれ反対の方向に向かって空気が流れるように、前記接続通路から接続された一対の送風口が配設され、前記一対の送風口のうち、いずれか一方の送風口から選択的に主通路部内に空気が送風されるされることを特徴とする請求項５記載の送風装置。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】この発明は、空気を流通路に供給して流通路内で一方の方向に送風させるように構成した送風装置に関し、例えば、空気を高温化して被乾燥物を乾燥させるドライヤーや、それらに類するもの、又は送風させることによって物品を推進させる船舶の推進装置やそれに類するもの等の送風装置に関する。
【０００２】
【従来の技術】従来、送風装置は、温風発生機能を有して湿気のある対象物を乾燥させるもの、例えば、髪の毛を乾かすヘヤドライヤーや布団や湿気のある物品等を乾燥させるドライヤー等が知られている。これらのドライヤーには、一端を噴き出し口として開口された円筒状のハウジング内を、他方の吸気口から、開口された噴き出し口に向かって空気が流れるように、ハウジング内の空気通路中にモータで回転するファンが設けられていた。
【０００３】例えば、ヘアドライヤーの場合、通常、円筒状のハウジング内にモータで駆動されるファンと、ファンの回転によって送風される空気を温風にさせるヒーターとを有し、高温化された空気を送風口より髪の毛に向かって噴き出すことによって、濡れた髪の毛を乾燥させるようにしていた。
【０００４】
【発明が解決しようとする課題】しかし、従来のヘアドライヤーや物品乾燥用のドライヤー場合、乾燥対象物に向かって温風を噴き出すように構成されていることから、特に髪の毛が長い女性や若者において、濡れた髪の毛を乾かすのに時間がかかる場合には、噴き出し口を対象物に近づけて高温の空気を噴き付けるようにしていた。しかし、噴き出し口を近づけ過ぎると乾燥対象物に、直接、温風を掛けることになり、特に、長時間の使用により、噴き出し口の回りに流れてくる空気が貯溜されて、乾燥対象物を高温化させて危険を伴っていた。また、髪の毛を部分的に長尺状に束ねてセットしている場合、束ねられた髪の毛に温風や噴き出すと、セットが乱れやすかったりしていた。
【０００５】この発明は、上述の課題を解決するものであり、対象物に一方の開口部を近づけたり塞いだりしても空気の流れを妨げないで空気を送風することによって、安全に使用できる送風装置を提供することを目的とする。
【０００６】
【課題を解決するための手段】この発明にかかわる送風装置では、上記の課題を解決するために、以下のように構成するものである。すなわち、送風発生手段と、前記送風発生手段から供給された空気が流通される主流通部と、が配設される送風装置であって、前記主流通部が両端を開口して筒状に形成され、前記送風発生手段が、前記主流通部から離れて配置され、前記送風発生手段と前記主流通部との間には、前記主流通部の入口側又は出口側付近に空気を供給する接続通路が配設されることを特徴とするものである。
【０００７】そして、送風装置は、送風発生手段によって、主流通部の入口側又は出口側付近に空気を送風することとなる。主流通部における空気の流れは、開口されている両端と関係なく入口側又は出口側に供給された空気が入口側付近から出口側に向かって流れるので、主流通部の入口側に物品を近づけたり、又は塞ぐことになっても空気の流れには影響されない。つまり、送風装置が、例えば、ヘアドライヤーの場合に、主流通部内に髪の毛を挿通させた後、入口側の開口部を頭部に極接近させたり塞いだりしても、髪の毛に噴き付ける空気の流れは乱れずにスムーズに行なわれることとなる。
【０００８】また、前記主流通部に、熱源手段を配設して、前記主流通部内に流通される空気を高温化して温風とすることによって、主流通部内に乾燥対象物を挿通させれば、乾燥対象物を乾燥させることができ、例えば、

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 623 of 2286

ヘアドライヤーや乾燥機におけるドライヤーとして使用することができる。

【０００９】また、前記主流通部の出口が、縮径されていれば、主流通部の出口から噴き出される空気の圧力を高めることができる。

【００１０】主流通部内の送給口や熱源部位に異常が発生した場合に、主流通部が軸方向に沿って分割可能に構成されていれば、分割して内部を開けることによってメンテナンスを容易に行なうことができる。

【００１１】さらに、前記接続通路は、前記主流通部の入口側と出口側に向かって二股に分岐して形成され、前記接続通路の分岐点位置には、前記送風発生手段から供給される空気が入口側と出口側のいずれか一方の方向に供給されるように、切替弁が配設されていれば、いずれか一方の接続通路に空気を送ることによって、主流通部内の空気の流れの方向を変更することができる。これによって、主流通部内で空気を対象物に噴き付けたり、又は空気の出口外付近で対象物に空気を吹き付けることができる。

【００１２】また、主流通部内において、入口側と出口側に、それぞれ反対方向に向けた送風口を設けることによって、入口側と出口側との送風口の内同方向に向けた送給口に空気を流して、空気の流れの方向を切り替えるようにすることもできる。

【００１３】

【発明の実施の形態】以下、本発明の一実施形態を図面に基づいて説明する。本発明の送風装置は、髪の毛を乾かすヘアドライヤーに適用したり、又は他の物品を乾燥させるドライヤー、さらには船舶の推進装置に適用することができる。

【００１４】実施形態におけるヘアドライヤー１は、図１～２に示すように、両端面が開口されて一方向に空気が流れるように形成される主流通部１０と、主流通部１０に対して直交する方向に配置されて主流通部１０に空気を送風させる送風発生装置を内部に収納するグリップ部２０と、主流通部１０とグリップ部２０とを接続する接続通路部３０とを有して構成され、送風発生装置の駆動によって空気を接続通路部３０を通って主流通部１０の両端開口部より内方から主流通部１０内に送風する。この構成を有するものであれば、各部位の形状には限定されるものではない。

【００１５】実施形態におけるヘアドライヤー１では、主流通部１０は、略円筒状に形成された上部ハウジング１１と、上部ハウジング１１内に形成された主通路１２と、を有して構成されている。上部ハウジング１１の外周両端部には拡径部１３、１３が形成され、主通路１２は入口１４側と出口１５側の両端が開口されて内部に髪の毛の一部を挿通することができるように形成されるとともに、両端開口部の内部付近に前述の送風発生装置から送風された空気を噴き出す送風口１６が主通路１２の内周面全周にわたって形成されている。さらに出口１５側内部付近には、内周面から中心軸側に向かって突出するように縮径されて空気を案内する内突出部１７が形成されている。

【００１６】拡径部１３は入口１４側又は出口１５側付近に配置されて、図３に示すように、主通路１２内に空気を供給するための供給通路１８と、供給通路１８内又は供給通路１８から連接された送風口１６付近に配置されて主通路１２内の空気を温風化させるヒータ１９とを有している。

【００１７】供給通路１８は、上部ハウジング１１内に小孔を全周にわたって明けることによって形成され、供給通路１８の一部側面から主通路１２の内周面に向かって、全周にわたって送風口１６と連接されている。また供給通路１８の下端部は接続通路部３０の内部に形成される後述の接続通路３２に連接されている。

【００１８】さらに送風口１６は、図4に示すように、入口１４側から出口１５側に向かって空気を流入できるように形成されている。なお、送風口１６は、主通路１２の内周面に供給通路１８から連接された複数個の孔を設けるように形成してもよい。この場合、送風口１６の送風方向は、上部ハウジング１１の成形時に、拡径部１３内に予め一方の方向に向かうように孔を形成しておいてもよく、又、供給通路１８の先端部に市販の配管部品を取り付けて、向きを設定するようにしてもよい。

【００１９】ヒータ１９は、図３のように前述の供給通路１８にコイル状に巻付けた熱線（又は銅版）を挿入するように配置するか、又は銅版等を貼りつけるか、あるいは図５に示すように送風口１６の回りだけに熱線や銅版を配置させる。いずれも供給通路１８内を通った空気がヒータ１９によって温められて送風口１６から噴き出すように構成されている。

【００２０】このように設置されたヒータ１９では、主通路１２内に乾燥対象物（例えば、髪の毛）が挿通されても、乾燥対象物が直接ヒータ１９に接触することがないため安全に使用することができる。

【００２１】さらに、乾燥対象物に出口１５から直接温風を噴き付ける場合では、噴き付ける空気の温度を上昇させるために、図６に示すように、補助用ヒータ１９１として拡径部１３の内周面に形成された凹部１３１内に格納されて主通路１２の回りを囲うように配置してもよい。この場合、補助用ヒータ１９１は複数本を並設してもよく、また、１本を螺旋状に巻付けるようにしてもよい。なお、凹部１３１内に配置された補助用ヒータ１９１の内側面には、拡径部１３の内周面に取り付けた網状のカバー１９２等で支持することが、補助用ヒータ１９１の落下防止のために望ましい。

【００２２】グリップ部２０は、図１～２に示すように、手でグリップできるように小径の下部ハウジング２１が円筒状又は角筒状に形成され、内部にモータ２２で

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 624 of 2286

駆動されるファン２３が配置されている。ファン２３の下方には空気吸い込み口２４が多数の小孔２４１を有して形成されている。さらにモータ２２付近にはモータ２２を駆動させる押し釦スイッチ２６が、外部から操作できるように配置されるとともに、押し釦スイッチ２６と外部電線とを繋ぐ配線及び押し釦スイッチ２６とモータ２２間を結ぶ配線が収納されている。空気吸い込み口２４は、できるだけ手で持つ位置より上方に配置させて、手で空気吸い込み口２４を塞ぐことのないように配置する。

【００２３】接続通路部３０は、中部ハウジング３１がグリップ部２０の上端から主通路１２に向かって内部が中空状の略三角状に形成され、内部にファン２３から主通路１２の拡径部１３・１３に向かって二股状に形成された接続通路３２・３２が配置されている。接続通路３２・３２と供給通路１８・１８とは、大径の接続通路３２・３２から送風された空気を、上部ハウジング１１内に形成された供給通路１８に供給できるように接続されている。なお、供給通路１８は、上部ハウジング１１内を空気用パイプを挿通して接続通路３２と連接するように形成してもよい。

【００２４】上記のように構成された第１の実施形態におけるヘアドライヤー１は、図７～８に示すように、長い髪の毛を有する女性や、部分的に突出して束ねられた髪の毛を有する若者に好適に使用できる。

【００２５】図７に示すように、長い髪の毛を一束を手で持ちながら、一束の髪の毛をヘアドライヤー１の主通路１２内に挿通させる。この状態で、押し釦スイッチ２６を操作すると、モータ２２が駆動されてファン２３が回転する。ファン２３の回転によって、吸い込み口２４から吸い込まれた空気が、接続通路部３０内で、二股状に形成された接続通路３２、３２を介して、入口１４側と出口１５側の供給通路１８・１８に送給され、さらに、主通路１２内の入口１４側付近又は出口１５側付近における送風口１６から、主通路１２内に供給される。主通路１２内における送風の方向は、入口１４側から出口１５側に向かって流れることとなる。

【００２６】押し釦スイッチ２６のオンと同時に、ヒータ１９が通電されてヒータ１９自体が高温に達する。一方、送風口１６から送給された空気は、ヒータ１９によって温められて高温となって、主通路１２内に挿入された髪の毛に噴き付けられて髪の毛を乾かすこととなる。

【００２７】この場合、主流路部１０の開口側１４を、例えば女性又は若者の頭に近づけても、流通されている温風は入口１４側より内方から出口側に向かって流れることから、頭部に高温の空気を当てることはなく、又、入口１４側を頭部に付けて塞いでも、空気の流れに影響されることなく、主通路１２内に挿入された髪の毛を乾かすことができる。従って安全で、確実な作業を行なうことができる。

【００２８】このヘアドライヤーは、さらに僅かな改良を行なうことによって様々な形態を形成することができる。

【００２９】例えば、図９に示すように、接続通路部３０内の、二股状に形成された接続通路３２の分岐点の位置に、入口１４側に向かう接続通路３２と、出口１５側に向かう接続通路３２のいずれか一方に送風できるように切替弁３５を配置させることができる。この形態における送風口は、入口１４側と出口１５側ともいずれも向かい合うように設置しておく。つまり、入口１４側に配置される送風口３６Ａは出口１５側に向けられて配置され、出口１５側に配置される送風口３６Ｂは入口１４側に向けられて配置されている。

【００３０】なお、切替弁３５は、１枚の弁を一端から傾倒させていずれかの接続通路３２の入口を塞ぐようにしてもよく、又、それぞれの接続通路３２・３２の入口を塞ぐことができるように、２枚の弁を各接続通路３２・３２の入口付近に設置させてもよい。いずれも、図示しない操作釦でワンタッチでできるように構成すればよい。

【００３１】従って、この場合、入口１４側に向かって空気を送風することもでき、又出口１５側に向かって送風することもできて、自由に切り替えることができる。入口１４側に向かって送風する場合には、従来のドライヤーのように対象物に向かって直接噴き付けることとなり、出口１５側に向かって送風する場合には、上述の形態のように、髪の毛を主通路１２内に挿通させて空気を噴き付けるように使用すればよい。なお、入口１４側に乾燥対象物があって、入口側１４に向かって空気を噴きつける場合には、主通路１２内には乾燥対象物（例えば、髪の毛）を挿通させないことから、出口１５側には開閉可能な蓋を装着して、対象物が主通路１２内に入らないように安全対策することも可能である。

【００３２】さらに、図１０に示すように、入口１４側、出口１５側に向かって形成される接続通路３２・３２を二分割してそれぞれ分割通路４２Ａ・４２Ｂ又は５２Ａ・５２Ｂとし、それぞれの先端に入口１４側と出口１５側とに相反する方向に向けた一対の送風口４６Ａ・４６Ｂ、５６・５６Ｂを設け、さらに、二分割された分割通路４２Ａ（５２Ａ）・４２Ｂ（５２Ｂ）の一方に送風できるように切替弁４５を設置すれば、送風口４６Ａ・５６Ｂから入口１４側に向かって送風することができ、又送風口４６Ｂ・５６Ａから出口１５側に向かって送風することができる。

【００３３】又、上部ハウジング１１・下部ハウジング２１・中部ハウジング３１を、上部ハウジング１１の軸方向に沿って二分割するか、上部ハウジング１１だけを軸方向に沿って二分割できるように形成すれば、内部を開放することによってメンテナンスを容易にすることができる。

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 625 of 2286

【００３４】上述のように、本形態のヘアドライヤー１は、ファン２３によって、主通路１２の入口１４側又は出口１５側付近に空気を送風することとなり、主通路１２における空気の流れは、開口されている両端と関係なく入口１４側又は出口１５側に供給された空気が入口１５側付近から出口１５側に向かって流れるので、主流通部１２の入口１４側に物品を近づけたり、又は塞ぐことになっても空気の流れには影響されない。つまり、主通路１２内に髪の毛を通して、入口１４側の開口部を頭部に極接近させたり塞いだりしても、髪の毛に噴き付ける空気の流れは乱れずにスムーズに行なわれることとなる。

【００３５】また、主通路１２に、ヒータ１９を配設して、主通路１２内に流通される空気を高温化して温風とすることによって、主通路１２内に濡れた髪の毛を挿通させれば、髪の毛を乾燥させることができる。

【００３６】また、主通路１２の出口１５が、内突出部１７を有して縮径されていれば、主通路１２の出口１５から噴き出される空気の圧力を高めることができる。

【００３７】さらに、主通路１２の送風口１６やヒータ１９に異常が発生した場合に、主通路１２が分割可能に構成されていれば、分割して内部を開けることによってメンテナンスを容易に行なうことができる。

【００３８】又、接続通路３２が、主通路１２の入口１４側と出口１５側に向かって二股に分岐して形成され、接続通路３２の分岐点位置には、ファン２３から供給される空気が入口１４側と出口１５側のいずれか一方の方向に供給されるように、切替弁３５が配設されていれば、いずれか一方の接続通路３２・３２に空気を送ることによって、主通路１２内の空気の流れの方向を変更することができる。これによって、主通路１２内で空気を髪の毛に噴き付けけたり、又は空気の入口１４外付近で髪の毛に空気を噴き付けることができる。

【００３９】また、主通路１２内において、入口１４側と出口１５側に、それぞれ反対方向に向けた送風口４６Ａ（５６Ａ）・４６Ｂ（５６Ｂ）を設けることによって、入口１４側と出口１５側との送風口４６のうち、同方向に向けた送給口４６Ａ・５６Ｂ（又は４６Ｂ・５６Ａ）に空気を流して、空気の流れの方向を切り替えるようにすることもできる。

【００４０】なお、本形態の送風装置は、主流通部１２が筒状に形成されて、内部に障害物を配置させていないことから、物品を乾燥させるドライヤーに限らず、船舶の推進装置に使用することができる。例えば、筒状の主流通部を海中内に配置させ、主流通部に接続する供給通路を上方に向かって配置させ、供給通路の上端にファンモータ等の送風発生装置を配置させれば、主流通部１０内に送風発生装置から送風された空気を、進行方向に対して後方に向かって供給することによって、海水が主流通部を進行方向と逆方向に流れて、船舶を前方に推進させることができる。又、空気を進行方向に向かって前方に供給するように流せば、ブレーキとしての作用を行なうことができる。

【図面の簡単な説明】

【図１】本発明の送風装置をヘアドライヤーに使用した形態の斜視図である。

【図２】図１における正面断面図である。

【図３】図２における供給通路・ヒータを示す側面断面図である。

【図４】図２における送風口を示す拡大断面図である。

【図５】図２におけるヒータを送風口付近に設けた状態を示す拡大断面図である。

【図６】補助用ヒータを配置させた状態を示す拡大断面図である。

【図７】図１のヘアドライヤーの使用態様を示す斜視図である。

【図８】図１のヘアドライヤーの別の使用態様を示す斜視図である。

【図９】図２における接続通路部の別の形態を示す断面図である。

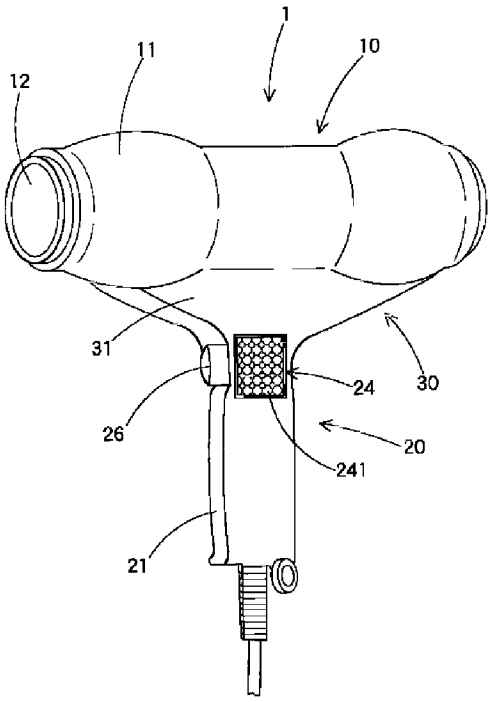
【図１０】図２における接続通路部のさらに別の形態を示す断面図である。

【符号の説明】

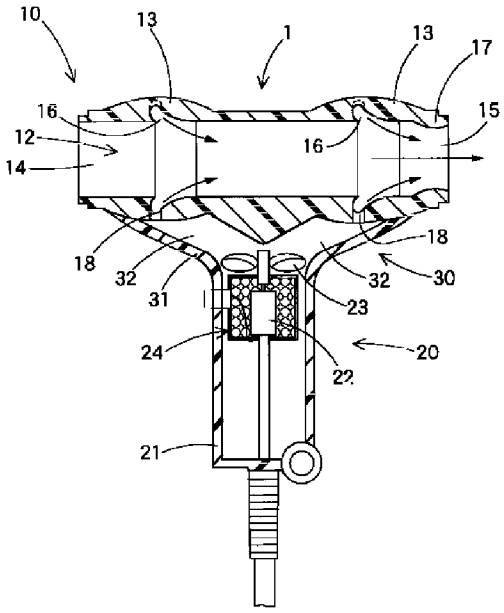
１…ヘアドライヤー（送風装置）
１０…主流通部
１１…上部ハウジング
１２…主通路
１３…拡径部
１４…入口
１５…出口
１６…送風口
１７…内突出部
１８…供給通路
１９…ヒータ（熱源手段）
２０…グリップ部
２２…モータ（送風発生手段）
２３…ファン（送風発生手段）
３０…接続通路部
３２…接続通路
３５、４５…切替弁

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 626 of 2286

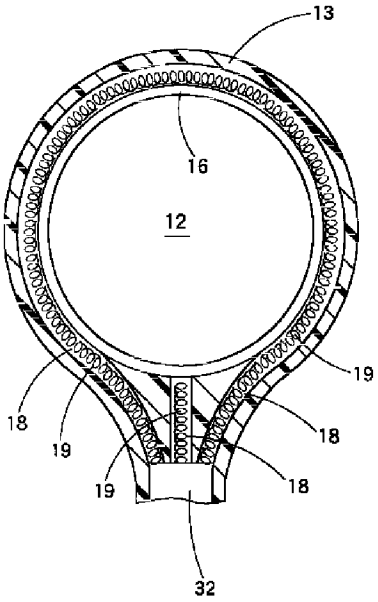
【図1】



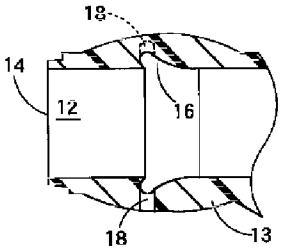

【図2】



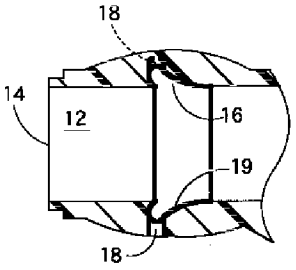

【図3】



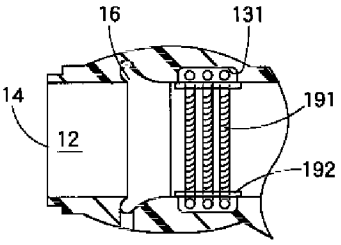

【図4】




【図5】

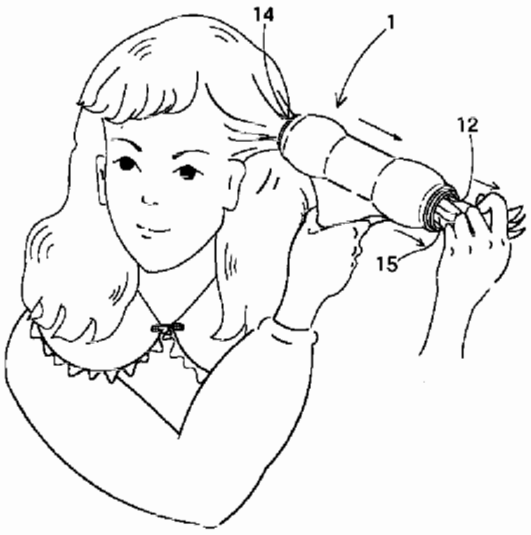



【図6】

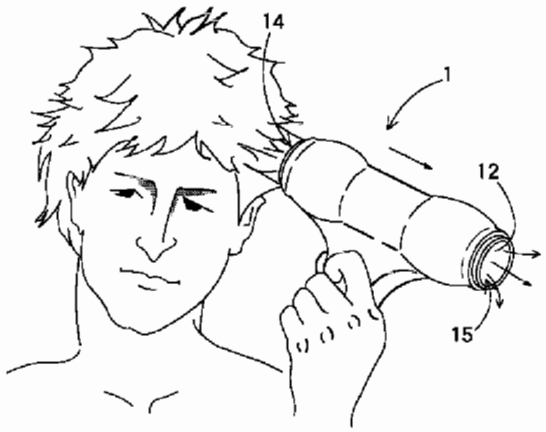



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 627 of 2286

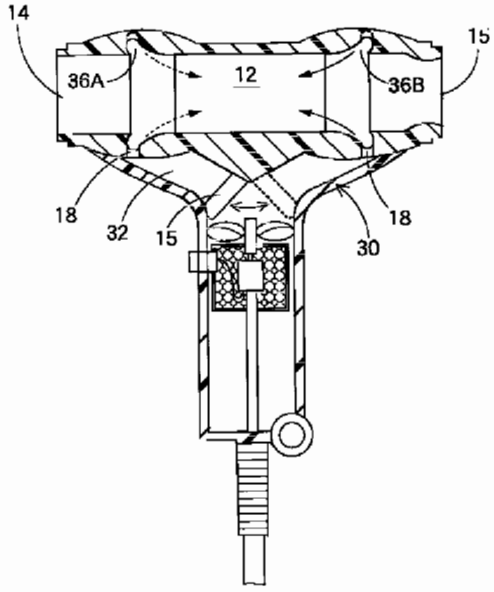
【図7】


14
1
12
15

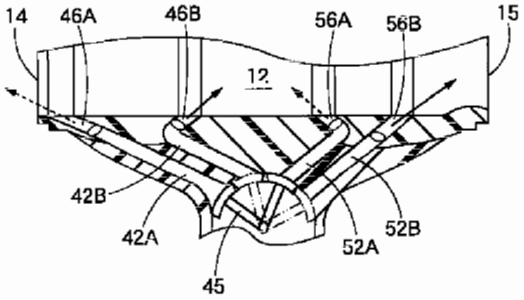
【図8】


14
1
12
15

【図9】


14
15
36A
12
36B
18
32
15
18
30

【図10】


14
46A
46B
56A
56B
15
12
42B
42A
52A
52B
45

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Claims
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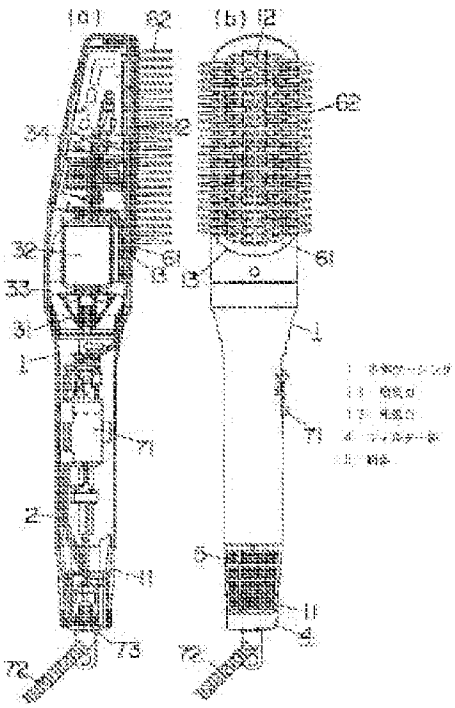
## HAIR DRYER

| | |
|---|---|
| **Page bookmark** | JP2003153731 (A) - HAIR DRYER |
| **Inventor(s):** | KODAMA HISAFUMI ± |
| **Applicant(s):** | MATSUSHITA ELECTRIC WORKS LTD ± |
| **Classification:** | **- international:** ***A45D20/12;*** (IPC1-7): A45D20/12 |
| | **- cooperative:** |
| **Application number:** | JP20010357828 20011122 |
| **Priority number(s):** | JP20010357828 20011122 |

## Abstract of JP2003153731 (A)

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PROBLEM TO BE SOLVED: To provide a hair dryer which can prevent a net body from separating from a filter frame, on which the net body is provided, while dust and hair can be favorably prevented from entering the inside from an air suction port by making the mesh of the net body, being a filter main body, finer. SOLUTION: This dryer sucks in air from the air suction port 11 of the main body casing 1, and discharges hot air from an air-discharging port 12. In such a hair dryer, the filter frame 4 is attached to the air suction port 11. In this case, for the filter frame 4, the net body 5, which is formed in advance, is integrally molded by an insert-molding with a synthetic resin.



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SharkNinja Ex. 1002
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## DESCRIPTION JP2003153731

The present invention relates, it relates to a hair dryer to make the set and dry hair by discharging warm air.

Hair Dryer Description of the Prior Art, and perform a set of dry hair by discharging warm air is being used and will be described below this hair dryer.

I shows a schematic diagram of a hair dryer in conventional FIG.

Forming an air flow path 2 inside the main body casing 1 having a substantially cylindrical shape, provided with a suction port 11 at the upstream end of the body casing 1, the hair dryer, nausea port 12 on the downstream side of the main body casing 1 It is provided with a.

Then, the air flow path 2 of the main body casing 1, rectifying the air stream and by holding the motor 32 and the motor 32 drives the fan 31 on the downstream side of the fan 31 on the downstream side of the intake port 11 The heater unit 34 for heating the air further downstream is provided, a rectifying vanes 33.

It energizes the heater 34 and the motor 32 after the power switch is turned on, then blown to the downstream side of the air flow path 2 by 31 fan air sucked from the inlet port 11, this hair dryer, heated by the heater 34 It is one that is discharged from the outlet 12 nausea hot air, perform a set or dry hair by the hot air.

By the way, hair dryer like this is what you attach the filter unit 4 'to the inlet 11 of the casing body 1, to prevent hair and dust from entering the body casing 1 in the intake opening.

'Is, mesh mounting frame 41' filter section 4 mesh and 5 'shall be integrally formed by injection molding and is often used, but it can be in this thing, mesh 5' because relatively coarse eyes , and in which there is a problem you can stop caught on fan or hair dust from entering the intake opening 11, a strange smell and the hair dust and burnt at the heater unit 34, hair and dust intrusion the intake opening 11 In order to reliably prevent you to, making finer the eyes of mesh 5 'were required, it was as technically difficult in manufacturing such a mold.

Therefore, as shown in FIG 7, those heat-welded 'and mesh attachment frame 41' and mesh 5 of miniaturizing the eyes advance is now commonly used, but in this case, the mesh was thermally welded It was that there is a problem such as peels 'mesh mounting frame 41 when cleaning is 5'.

THE INVENTION An object of the present invention is to provide a method has been made in view of the above, and has as its object the hair and dust from the air inlet to refine the mesh body is a filter mainly While is believed to be prevented well from entering, it is therefore an object of the present invention to provide a hair dryer which can prevent the mesh member from being separated from the filter frame provided with a mesh member.

Hair dryer according to the present invention in order to achieve the above object, according to solve the above problems, in hair dryer that discharges warm air from nausea port 12 by sucking air from inlet 11 of the main body casing 1, It is characterized in that it is obtained by attaching the inlet 11 to the filter frame 4 which is integrally formed by insert molding of a synthetic resin mesh member 5 previously formed.

By such a configuration, it is possible to prevent better hair and dust from entering the intake opening 11 made fine eyes of 5 mesh member is a filter main body, by insert-molding the net assembly 5 it is possible to prevent peeling off during cleaning, such as those mesh member 5 are heat welded Because it is formed integrally with the filter frame 4.

Further, by forming the rib portion 43 of a lattice filter frame 4.

By using such a structure, and in which the mesh member 5 is easily separated from the filter frame 4 even more easily if cleaned thereby.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324

Further, it is possible to form a grid unit in the intake port 11 of the body casing 1, and attached to the body casing 1 to the filter frame 4 the grating section to be located between the 43 rib portion 4 of the filter frame is preferred.

By using such a structure, and in which the mesh member 5 is easily separated from the filter frame 4 even more easily if cleaned thereby.

Further, it is formed into a cylindrical shape the netting 5.

By using such a structure, complicated operations, such as placing in a mold by bending into a cylindrical shape by hand the net body 5 of the plate is simplified.

Further, it is possible may or formed conically netting 5, even if a disk shape, to form a filter frame 4 different using a net assembly 5 having such a shape.

DESCRIPTION OF THE PREFERRED EMBODIMENTS The present invention will be described with reference to the embodiment shown in the accompanying drawings of the present invention.

As shown in FIG 1, and those having a substantially cylindrical air channel 2 is formed inside the body casing 1, Yes formed the intake port 11 for sucking the air in the upstream end, nausea port 12 for discharging air is formed at a downstream side.

The air flow path 2 of the main body casing 1, from (suction opening 11 ie) upstream, and a fan 31 to be sent to the air downstream to the inlet from the air inlet 11, a motor 32 for driving the fan 31, a motor 32 a rectifying vanes 33 for rectifying the airflow and can be held, a heater unit 34 for heating the air Yes be provided, and taking in the air from the intake port 11 by rotating the fan 31 by driving the motor 32 This is what Te blows on the downstream side, and discharges from nausea port 12 air warmed by the heater 34.

The body casing 1 as described above, the main casing 1 itself has a grip portion, a power switch 71 as well is provided on the outside of the body casing 1, the power cord 72 is formed.

Further, the outer surface 12 near nausea port of the body casing 1, the brush unit is provided, it is constituted such that the hair can while projecting the warm air from the exhalation port 12.

In this embodiment, the drilled mounting attachment portion 13 on the downstream side of the main body casing 1, attachment mounting attachment 61 perforated nausea port 12 while a plurality of projecting bristles 62 to the mounting attachment 13 Attach the unit 13, and are formed with the brush unit and vomiting port 12.

Then, the intake port 11 of the main body casing 1 is intended for mounting a filter frame 4 to prevent hair or dust from being mixed into the intake opening 11, the filter frame 4 is intended to mesh member 5 is integrally formed Yes, will be described below.

Well, netting 5 is not particularly limited as it may be formed by weaving a mesh of thin members, such as fibers, molded integrally with the mesh.

It is another object of the present invention the material of the mesh member 5 is not particularly limited.

As shown in FIG 3 in this embodiment, the mesh member 5 like this is made by forming a cylindrical shape of diameter slightly smaller than the diameter of the portion of the upstream side of the main body casing 1 having a cylindrical shape.

Further, it is also intended that as another example of the mesh member 5, formed in a truncated cone side surface shape, as shown in FIG 4 and a conical side surface shape, and formed into a disk shape as shown in FIG 5.

It is possible to form a filter frame 4 different using a net assembly 5 in the form such as these.

Further, it is to form integrally a filter frame 4 with netting 5 like this, but when injection molding the filter frame 4, which is a filter 4 by planting a 5 mesh member in the cavity of the mold It is intended to form a 5 mesh member to be embedded in the frame.

As shown in Figure 2 in the present exemplary embodiment, the filter frame 4, a circular frame 42 and a downstream circular frame 41 on the upstream side of substantially the same diameter as the diameter of the portion of the upstream side of the main body casing 1 having a cylindrical shape, I integrally formed by insert molding of synthetic resin and the rib portion 43 of the lattice is formed in both the 41 and 42 this circle frame, and netting 5, which is embedded in the ribs 41, 42 and 43 Ryoen-waku is intended.

It should be noted that in the integrally formed by insert molding, that the mesh member 5 is formed in a cylindrical shape, a complicated work of installing the mold is bent into a cylindrical shape by hand the net body 5 of the plate-shaped is simplified.

The one that is attached by fitting a circular frame 42 on the downstream side of the intake port 11 is formed at the upstream end of the body casing 1 having a cylindrical shape, the filter frame 4, the main body is circular frame 41 on the upstream side is fitted on the power cord connection portion 73 which projects from the inlet 11 of the casing 1, the upstream side of the main body casing 1 is closed and the power cord connection portion 73 and the filter frame by a factor of 4.

According to the configuration as described above, constitute the filter frame 4 is integrally molded by

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324

insert-molding a synthetic resin 5 mesh member previously formed in the upstream end of the main casing 1 and the filter frame 4 Because it is attached to the intake port 11, it is possible to prevent better hair and dust from entering the intake opening 11 made fine eyes 5 netting, a filter frame 4 by insert molding netting 5 Because it is formed integrally, it is possible to prevent peeling off during cleaning, such as those mesh member 5 is a filter main body are heat welded.

Further, that it is formed with ribs 43 of the lattice-shaped filter frame 4, and in which the mesh member 5 is easily separated from the filter frame 4 even more easily if cleaned thereby.

Although not specifically shown, to form a grid unit in the intake port 11 of the body casing 1, attached to the main body casing 1 the filter frame 4 the grating section to be located between the 43 rib portion 4 of the filter frame and those may be.

By doing this, it is intended by the grating portion of the body casing 1 which is disposed 43 between the ribs and the rib portion 43 of the four filter frame, the mesh member 5 is easily separated even more.

In the invention of claim 1, wherein the present invention as described above, according to the present invention, the hair dryer for discharging the hot air from nausea mouth to suck the air from the inlet of the main body casing, it has been pre-formed Because it is attached to the inlet of the filter frame with integrally molded with insert molding of synthetic resin mesh body, preventing good hair and dust from entering the intake opening to refining the mesh body is a filter mainly it is possible to prevent peeling off during cleaning, such as those mesh member is heat-welded as well may, Because it is formed integrally with the filter frame by insert-molding the net body.

Also In the invention of claim 2, in addition to the effects of the invention described in the claims, since the formation of the ribs of a lattice filter frame, the mesh member may be easily separated from the filter frame further , in which is easily cleaned if thereby.

Further, one or more embodiments of the invention according to claim 3, in addition to the effect of the invention as set forth in the preceding claims, forming a grating portion in the intake port of the main body casing, the grating portion is disposed between the ribs of the filter frame Since attached to the main body casing and the filter frame to be, and in which the mesh member is easily separated from the filter frame even more easily if cleaned thereby.

Also In the invention of claim 4, in addition to the effect of the invention of first aspect, since the cylindrical shape of the mesh member, the mold is bent into a cylindrical shape by hand the net body plate complicated work such as installing to is simplified.

Also In the invention of claim 5, in addition to the effect of the invention of first aspect, since formed on the conical mesh member, filters of other shapes by using a mesh member having a conical shape it is possible to form a frame.

Also In the invention of claim 6, in addition to the effects of the invention described in the claims, since the disc shape a mesh member, other shapes with a mesh member with the disk-shaped it is possible to form a filter frame.

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
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## CLAIMS JP2003153731

That the hair dryer for discharging the warm air from the exhalation port to suck the air from the air inlet of the body casing, and a is attached to the air inlet filter frame and integrally molded by insert-molding a synthetic resin mesh member previously formed hair dryer that features a.

Hair dryer according to claim 1, characterized in that it is obtained by forming a rib of a lattice filter frame.

Hair dryer according to claim 2, characterized in that it forms a grating portion in the intake port of the main body casing, and a is attached to the main body casing of the filter frame of the grating section to be disposed between the ribs of the filter frame .

Hair dryer in accordance with claim 1, characterized in that it is formed into a cylindrical shape mesh member.

Hair dryer according to claim 1, characterized in that it is obtained by forming the conical mesh member.

Hair dryer in accordance with claim 1, characterized in that it is formed in a disk shape and the mesh member.

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AN - 2003-454259
TI - Hair dryer has filter frame which is attached to lower section of integrally molded net, such that inlet port is formed on net to discharge hot air from nausea opening
AB - NOVELTY :
A filter frame (4) is attached to the lower section of an integrally molded net (5), such that an inlet port (11) is formed on the net to discharge hot air from a nausea opening (12).
- USE :
Hair dryer.
- ADVANTAGE :
Suppresses dust encroachment by providing the filter frame which is attached to the lower section of the integrally molded net.
- DESCRIPTION OF DRAWINGS :
The figure shows (a) sectional and (b) top views of the hair dryer. (Drawing includes non-English language text).
4 : Filter frame
5 : Net
11 : Inlet port
12 : Nausea opening
PN - JP2003153731 A 20030527 DW200343
PA - (MATW ) MATSUSHITA ELECTRIC WORKS LTD





SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 634 of 2286

(19)日本国特許庁（ＪＰ）　(12)公開特許公報（Ａ）　(11)特許出願公開番号
特開2003－153731
（Ｐ2003－153731Ａ）
(43)公開日　平成15年５月27日(2003.5.27)

| (51)Int.Cl.' | 識別記号 | ＦＩ | ﾃｰﾏｺｰﾄﾞ(参考) |
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| Ａ４５Ｄ　20/12 | | Ａ４５Ｄ　20/12 | Ｂ　３Ｂ０４０ |

審査請求　未請求　請求項の数６　ＯＬ　（全５頁）

(21)出願番号　特願2001－357828(Ｐ2001－357828)

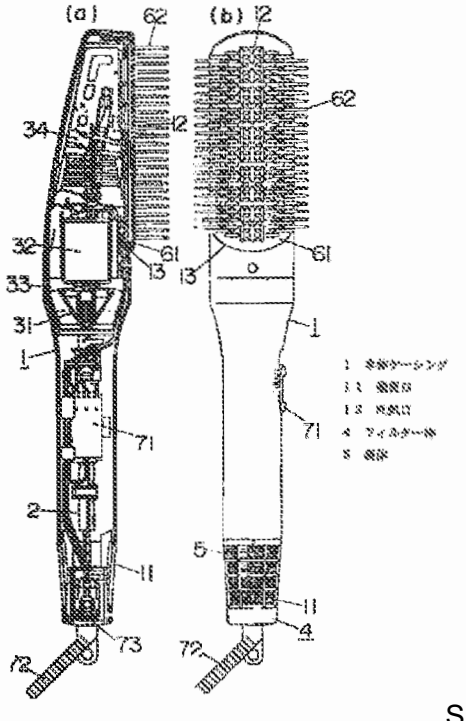
(22)出願日　平成13年11月22日(2001.11.22)

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Ｆターム(参考)　３Ｂ０４０　ＣＦＤ１

(54)【発明の名称】　ヘアードライヤー

(57)【要約】
【課題】　フィルター主体である網体の目を微細化して埃や毛髪が吸気口より侵入するのを良く防止できるものでありながら、網体が設けられたフィルター枠から網体が剥離するのを防止できるヘアードライヤーを提供する。
【解決手段】　本体ケーシング１の吸気口１１より空気を吸入して吐気口１２より温風を吐出するヘアードライヤーにおいて、予め形成された網体５を合成樹脂のインサート成形にて一体成形したフィルター枠４を吸気口１１に取り付けた。




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 635 of 2286

【特許請求の範囲】
【請求項１】　本体ケーシングの吸気口より空気を吸入して吐気口より温風を吐出するヘアードライヤーにおいて、予め形成された網体を合成樹脂のインサート成形にて一体成形したフィルター枠を吸気口に取り付けて成ることを特徴とするヘアードライヤー。
【請求項２】　フィルター枠に格子状のリブ部を形成して成ることを特徴とする請求項１記載のヘアードライヤー。
【請求項３】　本体ケーシングの吸気口に格子部を形成し、フィルター枠のリブ部の間に前記格子部が配置されるようにフィルター枠を本体ケーシングに取り付けて成ることを特徴とする請求項２記載のヘアードライヤー。
【請求項４】　網体を円筒状に形成して成ることを特徴とする請求項１記載のヘアードライヤー。
【請求項５】　網体を円錐状に形成して成ることを特徴とする請求項１記載のヘアードライヤー。
【請求項６】　網体を円板状に形成して成ることを特徴とする請求項１記載のヘアードライヤー。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、温風を吐出して毛髪の乾燥やセットを行うヘアードライヤーに関するものである。
【０００２】
【従来の技術】従来より、温風を吐出して毛髪の乾燥やセットを行うヘアードライヤーが使用されており、このヘアードライヤーについて以下に説明する。
【０００３】図６に従来のヘアードライヤーの概略説明図を示す。このヘアードライヤーは、略筒状をした本体ケーシング１の内部に空気流路２を形成し、本体ケーシング１の上流側の端部に吸気口１１を設け、本体ケーシング１の下流側に吐気口１２を設けてある。そして、本体ケーシング１内の空気流路２には、吸気口１１の下流側にファン３１を、その下流側にファン３１を駆動するモーター３２及びこのモーター３２を保持して且つ空気流を整流する整流翼３３を、更に下流側に空気を加温するヒータ部３４が設けてある。
【０００４】このヘアードライヤーは、電源スイッチを入れてモーター３２とヒータ部３４に通電し、吸気口１１より吸入した空気をファン３１により空気流路２の下流側に送風し、ヒータ部３４で加温して温風を吐気口１２より吐出し、この温風によって毛髪の乾燥やセットを行うものである。
【０００５】ところで、このようなヘアードライヤーは、本体ケーシング１の吸気口１１にフィルター部４'を取り付けて、埃や毛髪が吸気口より本体ケーシング１内に侵入するのを防止するものである。
【０００６】フィルター部４'は、メッシュ取付枠４１'とメッシュ５'とを射出成形にて一体成形するものが良く使用されているが、このものにあっては、メッシュ５'の目が比較的粗いため、埃や毛髪が吸気口１１より侵入してファンに引っ掛かって停止したり、ヒーター部３４にて埃や毛髪が焦げて異臭がするといった問題があるもので、埃や毛髪が吸気口１１より侵入するのを確実に防止するため、メッシュ５'の目を微細化することが必要であったが、金型の製作等において技術的に困難なものであった。そこで、図７に示すように、予め目を微細化したメッシュ５'とメッシュ取付枠４１'とを熱溶着したものが良く使用されるようになったが、この場合には、熱溶着したメッシュ５'が清掃時にメッシュ取付枠４１'が剥離してしまうといった問題があるものであった。
【０００７】
【発明が解決しようとする課題】本発明は上記の点に鑑みてなされたものであり、その目的とするところは、フィルター主体である網体の目を微細化して埃や毛髪が吸気口より侵入するのを良く防止できるものでありながら、網体が設けられたフィルター枠から網体が剥離するのを防止できるヘアードライヤーを提供することを課題とするものである。
【０００８】
【課題を解決するための手段】上記課題を解決するために本発明に係るヘアードライヤーは、本体ケーシング１の吸気口１１より空気を吸入して吐気口１２より温風を吐出するヘアードライヤーにおいて、予め形成された網体５を合成樹脂のインサート成形にて一体成形したフィルター枠４を吸気口１１に取り付けて成ることを特徴とするものである。このような構成とすることで、フィルター主体である網体５の目を微細化して埃や毛髪が吸気口１１より侵入するのを良く防止することができると共に、網体５をインサート成形にてフィルター枠４と一体に形成してあるので網体５が熱溶着されているもののように清掃時に剥離するのを防止することができる。
【０００９】また、フィルター枠４に格子状のリブ部４３を形成することが好ましい。このような構成とすることで、より一層網体５がフィルター枠４より剥離し難くなり、これによって清掃もし易くなるものである。
【００１０】また、本体ケーシング１の吸気口１１に格子部を形成し、フィルター枠４のリブ部４３の間に前記格子部が配置されるようにフィルター枠４を本体ケーシング１に取り付けることが好ましい。このような構成とすることで、更に一層網体５がフィルター枠４より剥離し難くなり、これによって清掃もし易くなるものである。
【００１１】また、網体５を円筒状に形成することが好ましい。このような構成とすることで、板状の網体５を人手によって円筒状に曲げて金型に設置するといったような煩雑な作業が簡略化される。
【００１２】また、網体５を円錐状に形成したり、円板

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 636 of 2286

状に形成しても良く、このような形状をした網体５を用いて様々なフィルター枠４を形成することが可能となる。

【００１３】

【発明の実施の形態】以下、本発明を添付図面に示す実施形態に基づいて説明する。

【００１４】本体ケーシング１は、図１に示すように、内部に空気流路２が形成される略円筒状をしたもので、上流側の端部には空気を吸入する吸気口１１が形成してあり、下流側には空気を吐出する吐気口１２が形成してある。

【００１５】本体ケーシング１内の空気流路２には、上流側（即ち吸気口１１側）より、吸気口１１より吸気した空気を下流へ送るファン３１と、ファン３１を駆動するモーター３２と、モーター３２を保持して且つ空気流を整流する整流翼３３と、空気を加温するヒータ部３４とが配設してあり、モーター３２を駆動してファン３１を回転させることで吸気口１１より空気を取り入れて下流側に送風し、ヒータ部３４にて加温した空気を吐気口１２より吐出するものである。このような本体ケーシング１は、本体ケーシング１自体が把持部となっており、本体ケーシング１の外側に電源スイッチ７１が設けてあると共に、電源コード７２が形成してある。

【００１６】また、本体ケーシング１の吐気口１２近傍の外面には、ブラシ部が設けてあり、吐気口１２より温風を突出させながら整髪可能となるようにしてある。なお、本実施形態においては、本体ケーシング１の下流側にアタッチメント取付部１３を穿設し、このアタッチメント取付部１３にブリスル６２を突設すると共に複数の吐気口１２を穿孔したアタッチメント６１をアタッチメント取付部１３に取り付けて、吐気口１２及びブラシ部が形成してある。

【００１７】そして、本体ケーシング１の吸気口１１には、吸気口１１より埃や毛髪が侵入されるのを防止するフィルター枠４を取り付けるもので、このフィルター枠４は網体５が一体成形されたものであり、以下に説明する。

【００１８】網体５は、繊維のような細い部材をメッシュ状に編んで形成したり、メッシュ状に一体成形したものでもよく、特に限定されない。また、網体５の材料も特に限定されないものである。このような網体５は、本実施形態では図３に示すように、円筒状をした本体ケーシング１の上流側の部分の径より若干小径の円筒状に形成したものである。また、網体５の他例として、円錐台側面状や図４に示すように円錐台側面状に形成したもの、図５に示すように円板状に形成したものでもよい。これらのような形状をした網体５を用いて様々なフィルター枠４を形成することができる。そして、このような網体５を用いてフィルター枠４を一体に形成するのであるが、これは、フィルター枠４を射出成形する際、金型のキャビティ内に網体５を設置してフィルター４枠に網体５が埋設されるように形成するものである。

【００１９】フィルター枠４は、本実施形態では図２に示すように、円筒状をした本体ケーシング１の上流側の部分の径と略同径の上流側の円枠４１及び下流側の円枠４２と、この両円枠４１，４２間に形成される格子状のリブ部４３と、両円枠４１，４２及びリブ部４３に埋設される網体５とを合成樹脂のインサート成形にて一体に形成するものである。なお、インサート成形にて一体に形成する際、網体５が円筒状に形成してあることで、板状の網体５を人手によって円筒状に曲げて金型に設置するという煩雑な作業が簡略化される。

【００２０】このフィルター枠４は、円筒状をした本体ケーシング１の上流側の端部に形成してある吸気口１１に下流側の円枠４２を嵌め込んで取り付けるもので、上流側の円枠４１は本体ケーシング１の吸気口１１より突出する電源コード接続部７３に被嵌され、これによって本体ケーシング１の上流側はフィルター枠４と電源コード接続部７３とで閉塞される。

【００２１】以上のような構成によれば、予め形成された網体５を合成樹脂のインサート成形にて一体成形してフィルター枠４を構成し、このフィルター枠４を本体ケーシング１の上流側の端部の吸気口１１に取り付けてあるので、網体５の目を微細化して埃や毛髪が吸気口１１より侵入するのを良く防止することができると共に、網体５をインサート成形にてフィルター枠４と一体に形成してあるので、フィルター主体である網体５が熱溶着されているもののように清掃時に剥離するのを防止することができる。

【００２２】また、フィルター枠４に格子状のリブ部４３を形成してあることで、より一層網体５がフィルター枠４より剥離し難くなり、これによって清掃もし易くなるものである。

【００２３】また、特に図示はしないが、本体ケーシング１の吸気口１１に格子部を形成し、フィルター枠４のリブ部４３の間に前記格子部が配置されるようにフィルター枠４を本体ケーシング１に取り付けてもよいものである。

【００２４】このようにすることで、フィルター枠４のリブ部４３とこのリブ部４３間に配置された本体ケーシング１の格子部とで、更に一層網体５が剥離し難くなるものである。

【００２５】

【発明の効果】上記のように本発明の請求項１記載の発明にあっては、本体ケーシングの吸気口より空気を吸入して吐気口より温風を吐出するヘアードライヤーにおいて、予め形成された網体を合成樹脂のインサート成形にて一体成形したフィルター枠を吸気口に取り付けたので、フィルター主体である網体の目を微細化して埃や毛髪が吸気口より侵入するのを良く防止することができる

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 637 of 2286

と共に、網体をインサート成形にてフィルター枠と一体に形成してあるので網体が熱溶着されているもののように清掃時に剥離するのを防止することができる。

【００２６】また請求項２記載の発明にあっては、上記請求項１記載の発明の効果に加えて、フィルター枠に格子状のリブ部を形成したので、より一層網体がフィルター枠より剥離し難くなり、これによって清掃もし易くなるものである。

【００２７】また請求項３記載の発明にあっては、上記請求項２記載の発明の効果に加えて、本体ケーシングの吸気口に格子部を形成し、フィルター枠のリブ部の間に前記格子部が配置されるようにフィルター枠を本体ケーシングに取り付けたので、更に一層網体がフィルター枠より剥離し難くなり、これによって清掃もし易くなるものである。

【００２８】また請求項４記載の発明にあっては、上記請求項１記載の発明の効果に加えて、網体を円筒状に形成したので、板状の網体を人手によって円筒状に曲げて金型に設置するといったような煩雑な作業が簡略化される。

【００２９】また請求項５記載の発明にあっては、上記請求項１記載の発明の効果に加えて、網体を円錐状に形成したので、この円錐状をした網体を用いて他の形状のフィルター枠を形成することが可能となる。

【００３０】また請求項６記載の発明にあっては、上記請求項１記載の発明の効果に加えて、網体を円板状に形成したので、この円板状をした網体を用いて他の形状のフィルター枠を形成することが可能となる。

【図面の簡単な説明】

【図１】本発明の一実施形態を示し、（ａ）は側断面図であり、（ｂ）は正面図である。

【図２】同上におけるフィルター枠の正面図である。

【図３】網体の斜視図である。

【図４】網体の他例の斜視図である。

【図５】網体の更に他例の斜視図である。

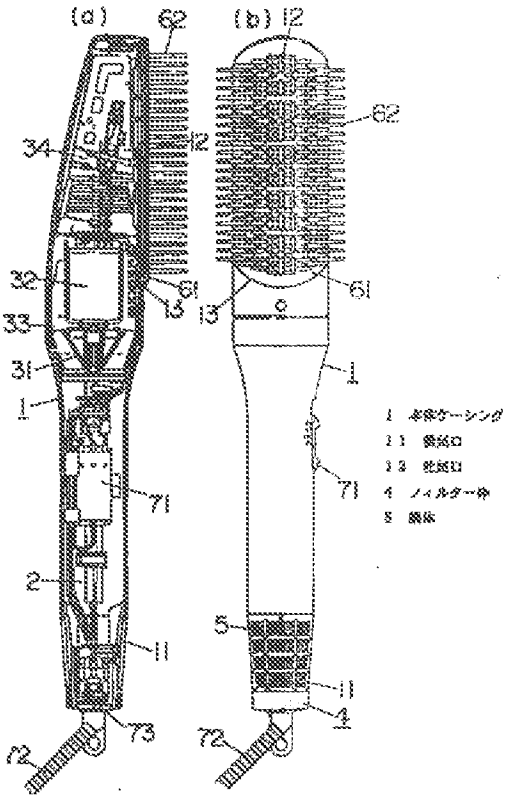
【図６】従来例のヘアードライヤーを示し、（ａ）は正面断面図であり、（ｂ）は側面図である。

【図７】従来例のフィルター部におけるメッシュのメッシュ取付枠への取り付けを説明する図を示し、（ａ）は正面図であり、（ｂ）は側断面図である。

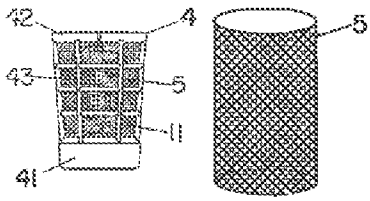
【符号の説明】

１　本体ケーシング
１１　吸気口
１２　吐気口
４　フィルター枠
５　網体

【図１】



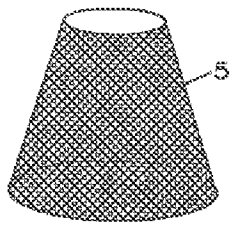

【図２】




【図３】



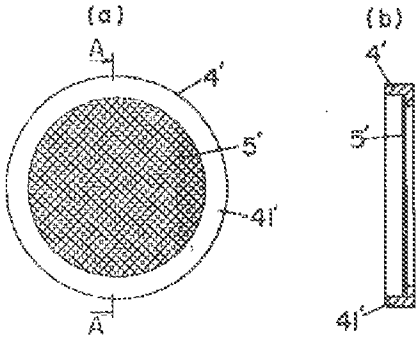

【図４】




【図５】

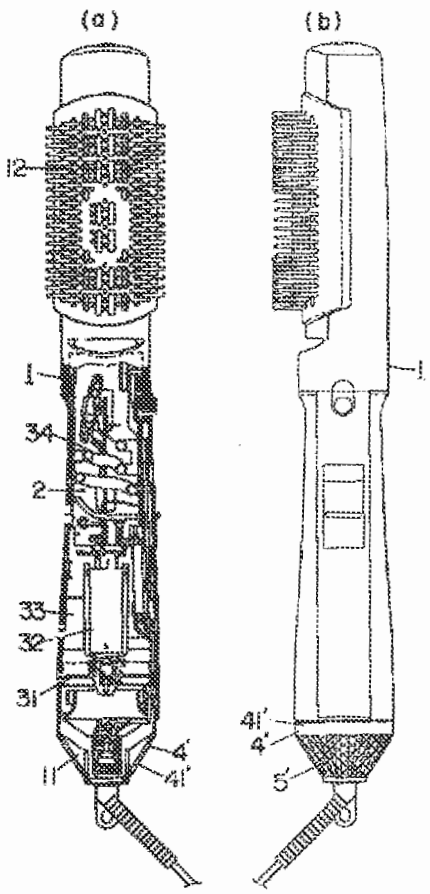



【図７】




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 638 of 2286

【図6】




SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 639 of 2286

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PN - JP2004000312 A 20040108
PNFP - JP4600877B B2 20101222
TI - (A)
WARM AIR SUPPLIER
AB - (A)
PROBLEM TO BE SOLVED: To surely prevent a body case from overheating, in a warm air supplier provided with a blowing fan and a heater unit in the body case.
- SOLUTION: A blowing fan 10, a motor 11 for driving the blowing fan 10, and a heater unit 12 for heating air are installed into the body case 1 shaped like a hollow tube. The heater unit 12 includes a heater 16 and a thermal insulation case 17 surrounding the heater 16. A thermal insulation body 20 shaped like a tube is placed between an outlet of the insulation case 17 and a blowing outlet 19 of the body case 1 so as to prevent overheating of the body case 1. A part of the air from the blowing fan 10 is supplied into a space formed between the insulation case 17 and the body case 1 and into a space formed between the insulation body 20 and the body case 1.
- COPYRIGHT: (C)2004,JPO
PA - (A)
HITACHI MAXELL

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AN - 2004-147935
TI - Hot-air feeders, for use in e.g. hair dryer, guides wind from ventilation fan to spaces which are respectively formed between insulation case and main case and between insulation housing and main case
AB - NOVELTY :
A heat insulation case (17) surrounds a heater arranged in a heating unit (12). A heat insulation housing (20) is arranged between the case (17) and an outlet (19) to prevent over heating of a main case (1). The wind from a ventilation fan (10) is guided to the spaces (S1,S2) which are formed between the insulation case and main case and between insulation housing and the main case.
- USE :
For use in hair dryer, finger drying machine, medical treatment device and hot-air-type hair curler.
- ADVANTAGE :
The surface temperature of the main case is suppressed effectively, by guiding wind for cooling through the spaces. The number of components is reduced, reducing the manufacturing cost of the hot-air feeder.
- DESCRIPTION OF DRAWINGS :
The figure shows a side sectional view of the hot-air feeder.
1 : main case
10 : ventilation fan
12 : heating unit
17 : heat insulation case
19 : outlet
20 : heat insulation housing
S1,S2 : spaces
PN - JP2004000312 A 20040108 DW200415
JP4600877B B2 20101222 DW201101
PA - (HITM ) KYUSHU HITACHI MAXELL KK





SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 640 of 2286

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| A45D 20/12 | A45D 20/12 | Z | |

審査請求 未請求　請求項の数 7　OL　(全 17 頁)

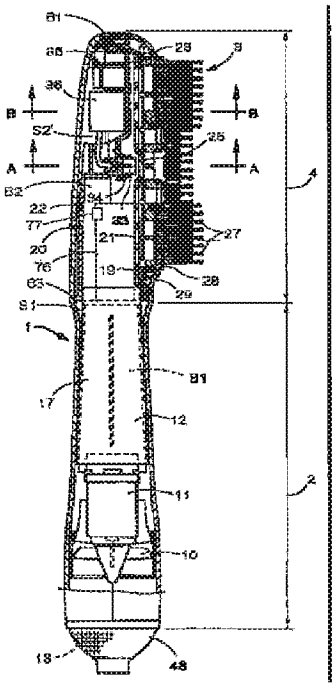
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(22)出願日　平成14年4月15日(2002.4.15)
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(33)優先権主張国　日本国(JP)

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(54)【発明の名称】温風供給機

(57)【要約】
【課題】本体ケースの内部に送風ファンとヒーターユニットとが設けてある温風供給機において、本体ケースが過熱されるのを確実に防止する。
【解決手段】中空筒状の本体ケース１の内部に、送風ファン１０と、送風ファン１０を駆動するモータ１１と、風を加熱するヒーターユニット１２とが設けてある。ヒーターユニット１２は、ヒーター１６と、この周囲を囲む断熱ケース１７とを含んでいる。断熱ケース１７の出口と、本体ケース１の吹出口１９との間には、本体ケース１の過熱を防ぐための筒状の断熱体２０が配置されている。断熱ケース１７と本体ケース１間に形成される空間、及び断熱体２０と本体ケース１間に形成される空間に、送風ファン１０からの風の一部を送給する。
【選択図】　図１



SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 641 of 2286

【特許請求の範囲】
【請求項1】
中空筒状の本体ケース１の内部に、送風ファン１０と、送風ファン１０を駆動するモータ１１と、送風ファン１０から送られる風を加熱するヒーターユニット１２とが設けられており、
ヒーターユニット１２は、ヒーター１６と、このヒーター１６の周囲を囲む断熱ケース１７とを含んでおり、
断熱ケース１７の出口に連続して、本体ケース１の過熱を防ぐ筒状の断熱体２０が配置してあり、
断熱ケース１７と本体ケース１間に形成される空間、及び断熱体２０と本体ケース１間に形成される空間に、送風ファン１０からの風の一部を送給することを特徴とする温風供給機。
【請求項2】
断熱体２０と本体ケース１間に形成される空間に付加電気機器を配設したことを特徴とする請求項１に記載の温風供給機。
【請求項3】
断熱ケース１７と本体ケース１間に形成される空間に電源スイッチ１８を配設したことを特徴とする請求項１または請求項２に記載の温風供給機。
【請求項4】
本体ケース１が、送風ファン１０を含む電装品を内蔵する風洞部２と、吹出口１９が開口している吹出部４とで構成されており、
断熱体２０が、断熱ケース１７の出口と、本体ケース１の吹出口１９との間に配置されて吹出部４のケース内面壁の過熱を防いでいることを特徴とする請求項１乃至請求項３の何れかに記載の温風供給機。
【請求項5】
断熱体２０が、吹出口１９用のグリルを兼ねていることを特徴とする請求項１乃至請求項４の何れかに記載の温風供給機。
【請求項6】
吹出部４の内部に、付加電気機器が配置されており、
付加電気機器への給電リード線４６が、断熱体２０と本体ケース１との間に配線されていることを特徴とする請求項２乃至請求項５の何れかに記載の温風供給機。
【請求項7】
付加電気機器がイオン発生装置であって、
イオン発生装置は、高電圧発生部６４と一対の放電電極３３・３４とを含んでおり、
高電圧発生部６４を断熱体２０と本体ケース１間に形成される空間に配設し、一対の放電電極３３・３４を断熱体２０内の空間に露呈するように配設したことを特徴とする請求項２乃至請求項６の何れかに記載の温風供給機。

【発明の詳細な説明】
【０００１】
【発明の属する技術分野】
本発明は、ヘアードライヤー、手指乾燥機、温熱治療器等の温風供給機に関する。
【０００２】
【従来の技術】
例えば、実開平５－７４４０５号公報に開示のヘアーブロッサーは、中空筒状の本体ケースと、本体ケースの吹出口に装着されるブラシユニットとからなる。本体ケースの内部つまり風洞部内には、送風ファン、モータおよびヒーターユニットなどが直線列状に配置されている。ヒーターユニットは、十文字状に組んだ絶縁板と、絶縁板の周囲に螺旋状に巻き付けたヒーター線と、これらの外周囲を覆う金属板製の断熱ケースとで構成されている。送風ファンから送出された風は、断熱ケース内を通過する間にヒーター線で加熱されてブラシユニット側へ吹き出される。本体ケースから吹き出た温風は、ブラシユニットの内

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 642 of 2286

部で直交する向きへ変向されて、一群のブリッスルの間から吹き出し供給される。
【０００３】
【発明が解決しようとする課題】
この種のヘアーブロッサーにおいては、細長い筒状の本体ケースの内部に送風ファンとモータ、およびヒーターユニットなどが直線列状に集約配置されている。その風洞部は、グリップを兼ねていることもあって、風の通路断面積が極端に小さい。そのため、風の通路内におけるヒーターの空間占有量は、ピストル型ドライヤーにおけるヒーターの空間占有量に比べてかなり大きい。
【０００４】
つまり、乾燥風の通路の殆どがヒーターによって塞がれている。そのため、ヒーターユニットの発熱温度が一定値以下に制限してあるにもかかわらず、乾燥風の温度が異常に高くなり、本体ケースが局部的に過熱され使用者が熱さを感じ、不安感を生じさせることがあった。
【０００５】
とくに、ブラシユニットが装着される吹出部の内部にイオン発生装置やスチーム発生装置などが組み込んであるヘアーブロッサーの場合には、先の装置が乾燥風の通過の邪魔になるため、断熱ケースの出口の周辺部に熱がこもりやすく、本体ケースが局部的に過熱されやすかった。
【０００６】
本発明の目的は、本体ケースが過熱されるのを確実に防止できる温風供給機を提供することにある。
【０００７】
本発明の目的は、吹出部の内部にイオン発生装置やスチーム発生装置などが組み込んである温風乾燥機において、これらの機器に繋がる給電線が乾燥風に晒されて風切音を生じたり、あるいは過熱されて劣化するのを防止できる温風供給機を提供することにある。
【０００８】
本発明の目的は、イオン発生装置を構成する高電圧発生部の温度上昇を防止する温風供給機を提供することにある。
【０００９】
【課題を解決するための手段】
本発明の温風供給機は、図１に示すように中空筒状の本体ケース１の内部に、送風ファン１０と、送風ファン１０を駆動するモータ１１と、乾燥風を加熱するヒーターユニット１２とが設けてある。ヒーターユニット１２は、ヒーター１６と、このヒーター１６の周囲を囲む断熱ケース１７とを含んでいる。そして、断熱ケース１７の出口に連続して、本体ケース１の過熱を防ぐ筒状の断熱体２０が配置してある。さらに、断熱ケース１７と本体ケース１間に形成される空間、及び断熱体２０と本体ケース１間に形成される空間に、送風ファン１０から送られる風の一部を送給することを特徴とする。
【００１０】
更に具体的に説明すると、断熱体２０と本体ケース１間に形成される空間に付加電気機器を、断熱ケース１７と本体ケース１間に形成される空間に電源スイッチ１８を配設した。
【００１１】
また、本体ケース１が、送風ファン１０を含む電装品を内蔵する風洞部２と、吹出口１９が開口している吹出部４とで構成されており、断熱体２０が、断熱ケース１７の出口と、本体ケース１の吹出口１９との間に配置されて吹出部４のケース内面壁の過熱を防いでいる。
【００１２】
断熱体２０は、図１および図５に示すごとく、一群の通気スリット１６が開口していて、吹出口１３用のグリルを兼ねている。
【００１３】
吹出部４の内部には、付加電気機器が配置されており、付加電気機器への給電リード線４

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 643 of 2286

６が、断熱体２０と本体ケース１との間に配線されている（図６、図７参照）。付加電気機器としては、後述するイオン発生装置、水素気発生装置、振動発生装置、オゾン発生装置などがある。

【００１４】

付加電気機器がイオン発生装置であって、イオン発生装置は、高電圧発生部６４と一対の放電電極３３・３４とを含んでおり、高電圧発生部６４を断熱体２０と本体ケース１間に形成される空間に配設し、一対の放電電極３３・３４を断熱体２０内の空間に露呈するように配設した。

【００１５】

【発明の作用効果】

本発明の請求項１によれば、ヒーターユニット１２の周囲を囲む断熱ケース１７の出口に連続して、本体ケース１の過熱を防ぐ筒状の断熱体２０が配置されているので、ヒーターユニット１２から送給される風の温度が異常に高くなる場合でも、その熱を断熱体２０で遮断して本体ケース１が局部的に過熱されるのを防止でき、使用者の不快感や不安感を解消できる。この温風供給機を連続使用した場合、特に断熱体２０が高温となり、これに伴って本体ケース１と断熱体２０との間の空気が温度上昇をし、この影響で断熱体２０周辺の本体ケース１に熱が伝わることで使用者が熱さを感じることがあった。しかし、本発明の請求項１では断熱ケース１７と本体ケース１間に形成される空間、及び断熱体２０と本体ケース１間に形成される空間に、送風ファン１０からの風の一部を送給することで、高温となりつつある空気を排出することができるので、例え連続使用しても、本体ケース１の温度上昇は少なく、使用者が熱さを感じ誤って落下させるといった危険性が少なくなる。

【００１６】

本発明の請求項２によれば、断熱体２０と本体ケース１間に形成される空間に付加電気機器を配設したことにより、ヒーターユニット１２から送出されたばかりの熱風に付加電気機器が直接晒されないばかりか、その配置空間に、ヒーターユニット１２を通過しない送風ファン１０からの風の一部が流入するので、配置空間内の空気を冷却することができ、付加電気機器を熱から確実に保護できる。

【００１７】

本発明の請求項３によれば、断熱ケース１７と本体ケース１間に形成される空間に電源スイッチ１８を配設したことにより、ヒーターユニット１２から送出されたばかりの熱風に電源スイッチ１８が直接晒されないのはもちろんのこと、その配置空間に、ヒーターユニット１２を通過しない送風ファン１０からの風の一部が流入するので、配置空間内の空気を冷却することができる。従って、電源スイッチ１８の接点部やリード線との接続部の温度上昇を防止することができ、接点不良を確実に防止できる。

【００１８】

本発明の請求項４によれば、断熱ケース１７の出口と、本体ケース１の吹出口１９との間に断熱体２０を配置しているので、熱風を断熱体２０で送給案内して、吹出部４のケース内面壁が過熱空気に晒されるのを阻止でき、吹出部４のケース内面壁が過熱されるのをさらに確実に防止できる。

【００１９】

本発明の請求項５によれば、断熱体２０を吹出口１９用のグリルを兼ねるよう構成しているので、吹出口１９用のグリルを独立部品として構成する場合に比べて部品点数が減り、その分だけ温風供給機の製造コストを削減化できる。

【００２０】

本発明の請求項６によれば、吹出部４の内部に、イオン発生装置などの付加電気機器を配置し、付加電気機器への給電リード線４６を断熱体２０と本体ケース１との間に配線しているので、給電リード線４６が熱風に晒されるのを防止でき、給電リード線４６によって風切音が発生するのを防止できるうえ、給電リード線４６が過熱されてその絶縁被覆が溶融したり、あるいは欠落したりするのを防止できる。

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 644 of 2286

【００２１】
本発明の請求項７によれば、付加電気機器がイオン発生装置であって、イオン発生装置は、高電圧発生部６４と一対の放電電極３３・３４とを含んでおり、高電圧発生部６４を断熱体２０と本体ケース１間に形成される空間に配設し、一対の放電電極３３・３４を断熱体２０内の空間に露呈するように配設しているので、耐熱性の低い高電圧発生部６４を熱から保護しながら、放電電極３３・３４によって発生したイオンを送風ファン１０からの風によって対象物に効果的に送給することが可能となる。
【００２２】
【実施例】
図１ないし図１２は、本発明に係る温風供給機、ヘアーブロッサーの第１実施例を示す。ヘアーブロッサーは、中空筒状の本体ケース１が図２に示すごとく前後に分割形成された前ケース１Ａと後ケース１Ｂとを重合わせ状に接合して構成され、グリップを兼ねる下半側の風洞部２と、ブラシユニット３が装着される上半側の吹出部４とを備えている。
【００２３】
風洞部２の側面上部にはドライヤーの運転状態を切り換えるスイッチベース５が装着されており、その中央にスイッチノブ６を上下スライド可能に組み付けてある。符号７は運転状態であることを点灯表示するＬＥＤから成る表示灯、８はブラシユニット３をロック解除操作するための着脱ボタンである。
【００２４】
図３において風洞部２の内部には、乾燥風を生起する送風ファン１０と、送風ファン１０を回転駆動するモータ１１と、乾燥風を加熱するヒーターユニット１２とが下側から順に直線列状に配置してある。送風ファン１０は、風洞部２の下端に設けた吸込口１３から吸い込んだ空気を加圧して、ヒーターユニット１２を介して吹出部４へ向かって送給する。ヒーターユニット１２は、十文字に組まれた絶縁枠（ヒーター支持体）１５にコイル状のニクロム線（ヒーター）１６を螺旋状に巻き付け（図１２参照）、その周囲を断熱ケース１７で覆って構成してある。断熱ケース１７は、１枚の金属板を筒状に折り曲げて形成される。その内部を乾燥風が通過する空間Ｂ１としている。ヒーター１６は、ニクロム線のような電気式のものに限らず、ガス式のものであってもよい。
【００２５】
断熱ケース１７はメッキ処理された金属板製の筒体からなり、熱伝導作用で熱を分散させることによって、ニクロム線１６に近接する壁部分が局部的に高温化するのを防止し、さらに輻射熱を反射させるために存在する。断熱ケース１７の筒内面には絶縁シートを貼り付けてある。断熱ケース１７と本体ケース１との間に形成される空間Ｓ１に、モータ１１およびニクロム線１６への通電状態を切り換えるための電源スイッチ１８を配置してあり、先のスイッチノブ６で本体ケース１の外面側から電源スイッチ１８を切り換え操作できる。
【００２６】
吹出部４は風洞部２の上方に一体成形によって連続して中空筒状に形成されている。吹出部４に臨む前ケース２Ａの前面は、ほぼ全面にわたって吹出口１９として開口しており、その内面に筒状の断熱体２０と、後述するマイナスイオンを生成するためのイオン発生装置（付加電気機器）とが配置してある。吹出口１９は本体ケース１の中心軸と交差する向きに開口してあって、本体ケース１内を流れる風を直交方向へ変向できるので、本体ケース１を無理せず自然に握るだけで、風及びマイナスイオンを簡単に対象物へ送給できる。
【００２７】
断熱体２０を本体ケース１内に配置することで、断熱体２０と本体ケース１間に空気層（空間Ｓ２、Ｓ２’、Ｓ２’’）が形成される。従って、断熱ケース１７から吹き出る加熱された乾燥風によって、本体ケース１の一部が過熱されて熱くなるのを防止できる。図５において断熱体２０は、吹出口１９に臨む前側の前分割体２１と、後ろ側の後分割体２２と、両分割体２１・２２の上部間に挟み固定されるホルダー２３とからなり、図６に示すように、その下端の筒口６８が断熱ケース１７の出口に被さる状態で配置してある。この

SharkNinja et al. v. Dyson Technology Limited, IPR2023-01324
SharkNinja Ex. 1002
Page 645 of 2286

ように、断熱ケース１７の出口に筒状の断熱体２０を外嵌すると、両者の隣接部分から乾燥風が漏れ出るのを解消でき、漏れ出た過熱乾燥風による本体ケース１の温度上昇をよく防止できる。また、１枚の金属板を筒状に折り曲げて形成した断熱ケース１７の出口を断熱体２０で保形保持して、断熱ケース１７の接合縁の解離をよく防止できる。断熱体２０を区成する各部材２１・２２・２３はそれぞれ耐熱性に優れたポリフェニレンサルファイドを素材にして成形してあり、例えばポリブチレンテレフタレートで成形した本体ケース１の耐熱温度が２００℃であるのに対し、前記三者２１・２２・２３は２７０℃までの熱に耐える。このように、本体ケース１よりも断熱体２０の耐熱温度が高いと、例えばヒーター１６が落下衝撃によって変形し、あるいは位置ずれして巻き密度が不均一になり、発生熱量が局部的に大きくなったとしても、断熱体２０の変形を確実に防止でき、さらに本体ケース１が耐熱温度を越えて過熱されるのを確実に防止して、その一部が変形し、あるいは変質して脆くなってしまうのを防止できる。なお、温風供給機の構造によっては、断熱体２０と本体ケース１とを同じ材質で構成できる。

【００２８】

後ろ向きに開口する錐状に形成された前分割体２１は吹出口１９用のグリル２６を兼ねており、そのために吹出口１９に臨む周面全体に一群の通気スリット２４が開口しており、その中央部にイオン出口２５が開口している（図４参照）。吹出口１９の左右側縁に沿って、ブラシユニット用の装着部を設けてあり、図４に示すようにこの装着部にあてがったブラシユニット３を上方から下方にスライド操作することにより、ブラシユニット３を吹出部４に係合装着できる。着脱ボタン８を押すことで、係合を解除することができ、その状態でブラシユニット３を下方から上方にスライドさせれば、ブラシユニット３を吹出部４から脱することができる。ブラシユニット３を外せば単なる毛髪乾燥用に使用でき、ブラシユニット３を装着すれば、毛髪のカールや癖付けを効果的に行うことが可能なヘアーブロッサーとして使用できる。なお、着脱ボタン８は押圧動作を解除するとコイルばねによって押圧前の位置に戻る。

【００２９】

図中７６は、マイカから成る熱遮断板であり、断熱体２０内に押圧式の着脱ボタン８側に寄せて設けられている（図４、図７参照）。この熱遮断板７６の存在により、熱遮断板７６、断熱体２０、本体ケース１の三層構造となることで、着脱ボタン７６側の本体ケース１表面の温度上昇をさらに抑制できる。したがって、使用者が整髪しながらの乾燥中（ブロッサーとして使用中）、ブラシユニット３を外して使おうと考え、着脱ボタン８およびその周辺を強く押そうとするとき、着脱ボタン８周辺の温度が抑制されているので、熱さを感じることはなく、不快に感じることはない。特に、本実施例のブラシユニット３の着脱構造は、ブラシユニット３側の凹と着脱ボタン８側の凸の係合を解除した状態（着脱ボタン８を押し続けた状態）で、ブラシユニット３を上方にスライドさせないと脱することができないので、押す時間が長く必要となり熱さを感じ易かったが、着脱ボタン８側の三層の断熱構造によりそれを解消できる。熱遮断板７６は、その上方側を断熱ケース２０に設けられたリブ７７に嵌合され、下方側を断熱体２０の内壁と断熱ケース１７との間に嵌合されることで固定されている。熱遮断板７６は、断熱体２０と一体成形で形成されていてもよい。ただ熱伝導を考慮すれば本実施例のように別体で熱遮断板７６を設けた方が熱の影響は少なくなる。

【００３０】

図７および図８においてブラシユニット３は、一群のブリッスル２７が植設されたアーチ形断面のベース２８と、ベース２８を固定支持するブラシ枠２９などで構成されている。ベース２８には、前分割体２１と同様に、イオン出口３０と一群の通気スリット３１とがそれぞれ形成してある。

【００３１】

図５および図９において後分割体２２は、前向きに開口する錐体状のプラスチック成形品からなり、その上部にU字状の受座４１を有し、受座４１の後ろ側に絶縁壁４２（図６参照）が形成されている。前分割体２１と後分割体２２とは重合わせ状に接合されて乾燥風

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 646 of 2286

の通路空間Ｂ２を区画形成しており、その上部に挟み固定したホルダー２３、後分割体２２で乾燥風の大半をイオン出口２５の周辺へ向かって変向案内する。後述するように乾燥風の一部はホルダー２３と前分割体２１との間の隙間Ｅへ入り込んだのち、上側の通気スリット２４から外部に吹き出る。

【００３２】

図５および図６においてイオン発生装置は、高電圧発生部６４と一対の放電電極３３・３４とを含んでおり、これらの機器をホルダー２３に組み付けて、一個のユニット部品としてまとめてある。高電圧発生部６４は、整流回路４３およびパルス発生回路４４で構成する電気部品（パルス電流発生回路）が実装されたイオン発生用の回路基板３５と、高電圧を生成するトランス３６とからなる。

【００３３】

ホルダー２３は後向きに開口する容器状に形成してあり、その下壁３７に取付座３８が下向きに突出している。ホルダー２３の下壁３７と後分割体２２の上端壁２２ａとは、乾燥風の一部をホルダー２３と前分割体２１との間の隙間Ｅへ案内するために斜め上向きに傾斜している。ホルダー２３の容器部分に回路基板３５とトランス３６とを組み、取付座３８の中央とその周りを囲むボスとに放電電極３３・３４を組み付けてある。

【００３４】

高電圧発生部６４と放電電極３３・３４とが組み付けられたホルダー２３は、図６および図９に示すごとくその取付座３８が受座４１に接合する状態で後分割体２２に組み、前分割体２１を後分割体２２に組み付け、これらを後ケース１Ｂに組み付けることにより、イオン発生装置の全体を本体ケース１に固定する。このときホルダー２３は、後ケース１Ｂ内壁にＵ字状に立設したリブ６５に接合した状態で固定される（図９参照）。この組み付け状態において、放電電極３３・３４は前分割体２１に設けたイオン出口２５と正対し、ホルダー２３と前分割体２１との間に、乾燥風の進入を許す通気隙間Ｅが確保される。従って、吹出部４内に吹き出た乾燥風は、イオン出口２５より下方の通気スリット２４から吹き出るのはもちろんのこと、先の通気隙間Ｅ内へも入り込んで、通気隙間Ｅに臨む通気スリット２４からも吹き出る。つまり、前分割体２１に設けた全ての通気スリット２４とイオン出口２５から乾燥風を吹き出ることになる。グリル２６は、吹出口１９を覆うことで通気隙間Ｅを確保するとともに、イオン発生用の回路基板３５とトランス３６とから成る高電圧発生部６４や放電電極３３などの吹出部４内の電装部品を外部から保護している。また、グリル２６は熱が伝導しにくいプラスチック材で形成してあるので、仮に身体が触れたとしても熱さを感じ難く、熱さのあまりヘアードライヤーを落下させるといった危険性は低い。また火傷の危険性も少ない。断熱体２０と本体ケース１との間に形成される空間Ｓ２、Ｓ２’’や、断熱体として機能しているホルダー２３と本体ケース１との間に形成される回路基板３５やトランス３６が収納される空間Ｓ２’は、乾燥風の通路空間Ｂ２と、図６、７、８に示すようにホルダー２３、取付座３８、断熱体２０によって区分されているので、乾燥風が空間Ｓ２、Ｓ２’、Ｓ２’’内へ入り込むことはない。従って、回路基板３５に実装された電気部品や、トランス３６、および高圧リード線４５、給電リード線４６などが高温の乾燥風に晒されて劣化したり、あるいは風切音が発生するのをよく防止できる。

【００３５】

ホルダー２３の下壁３７と後分割体２２の上端壁２２ａを設けることによって、放電電極３３．３４の近傍を吹出口１９に向かって流れる乾燥風が、その上方側（先端）、および下方側に比べて増大するので、放電電極３３．３４によって生成されたマイナスイオンを大量の乾燥風によって遠くまで飛ばすことができ、乾燥を行いながら毛髪などの対象物に効果的にマイナスイオンを送給することができる。なお、図６における実線矢印，破線矢印は、風の流れを表している。

【００３６】

図１０はヘアードライヤーの電気回路の概略を示しており、商用電源からの１００Ｖの電流を整流回路４３で半波整流した後、パルス発生回路４４でパルス電流に変換する。つい

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 647 of 2286

でパルス電流をトランス３６で昇圧（４ＫＶ）して、針状の放電電極３３に印加し、該電極３３から周囲の放電電極３４に向かって電子を放出させる。これにより、空気中の酸素、微少水滴、塵がマイナスに帯電してマイナスイオン化する。マイナスイオンは、乾燥風によって主にイオン出口２５から吹き出て髪に付着することで、プラスに帯電し易い髪を中和でき、髪のぱさつきを防止できる。また、身体のリラックス効果も期待できる。

【００３７】

ヘアーブロッサーの駆動状態は、スイッチノブ６を上下にスライド操作することによって、次のように切り替わる。ＯＦＦ位置から一段階のスライドで、モータ１１、イオン発生装置の駆動を行う（冷風による乾燥風）。二段階のスライドで、モータ１１、イオン発生装置、およびヒーター１６の半波駆動（３５０Ｗ）を行う（温風による乾燥風）。三段階のスライドで、モータ１１、イオン発生装置、およびヒーター１６の全波駆動（７００Ｗ）を行う（熱風による乾燥風）。一段階～三段階の何れの状態でも運転状態を表示する表示灯Ｌは点灯する。図２に示すように表示灯Ｌはスイッチノブ５のスライド方向の延長線上にあり、使用者が運転状況を把握し易い。仮にモータに毛髪が絡みつきモータロックの状態のまま放置すれば発火のおそれがあり危険であるが、それを使用者に可及的に速やかに認識させることができる。また、表示灯Ｌの延長線上に着脱ボタン８があることで、表示灯Ｌから視線が外れることがさらに少なくなり不具合な状態を認識させ易い。また各操作部や表示部が集約配置されるので使い勝手が向上する。

【００３８】

ここで改めてファン１０によって生起された風の流れについて説明する。ファン１０によって生起された風の大半（８割以上）は、ヒータ線１６が収納される空間Ｂ１に流入する。流入した風は、ヒータ１６によって加熱されて断熱ケース１７の出口から吹出部２に向けて吹き出る。吹き出た熱風は断熱体２０によって形成される空間Ｂ２を通過したのち、通気スリット２４から本体外に吹き出でる。

【００３９】

またこれと同時に、ファン１０によって生起された風の一部（空間Ｂ１、Ｂ２を通過する風に比べ風量も風速も非常に少ない風）は以下に示すように本体内を通過する。すなわち、ファン１０によって生起された冷風の一部は断熱ケース１７と本体ケース１との間に形成されている空間Ｓ１に流入する。空間Ｓ１に流入した冷風はスイッチ１８等の電装品を冷却しながら空間Ｓ１を通過し、風洞部２と吹出部４との間に形成される入口６３から断熱体２０と本体ケース１との間に形成される空間Ｓ２に流入する。空間Ｓ２に流入した冷風は上方に流れていき、回路基板３５やトランス３６が収納される空間Ｓ２’とその脚方に位置する空間Ｓ２’’に流入する（図８参照）。空間Ｓ２’に流入した冷風は、回路基板３５やトランス３６を冷却しながら通過し、Ｕ字状リブ６５の上方側に形成された出口６２から排出される。排出された風はスリット状の排出口６１から本体外に排出される。一方空間Ｓ２’’に流入した風はそのまま排出口６１から排出される（図９参照）。なお、空間Ｓ２、Ｓ２’、Ｓ２’’は何れも断熱体２０と本体ケース１との間に形成された熱風が流入することのない空間である。

【００４０】

このように、断熱ケース１７と本体ケース１間に形成される空間Ｓ１、及び断熱体２０と本体ケース１間に形成される空間Ｓ２、Ｓ２’、Ｓ２’’に、送風ファン１０からの風の一部を送給することで高温となりつつある空気を排出口６１から排出することができ、空間Ｓ１、空間Ｓ２、Ｓ２’、Ｓ２’’の温度上昇を、さらには本体ケース１の温度上昇を抑制することができるので、本体ケース１に触れる使用者が熱さを感じることがなくなる。特に、空間Ｂ２内には全てのヒータ線を通過した熱量の大きい熱風（７００Ｗ駆動時、常時１２０℃以上の熱風が流入する。部分的には２００℃を超える場合がある。）が通過するので、空間Ｓ２、Ｓ２’、Ｓ２’’については高温となり易く、それに伴い本体ケース１の表面温度が上昇し易すかったが、送風ファン１０からの風の一部を空間Ｓ２、Ｓ２’、Ｓ２’’に流入させることで、空間Ｓ２、Ｓ２’、Ｓ２’’の温度を下げることができ、本体ケース１の温度上昇を効果的に抑制できるものとなった。さらに、空間Ｓ２’に

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 648 of 2286

は熱をきらう回路基板３５（耐熱温度１０５℃）等の電装品が配設されているが、これも、送風ファン１０からの風の一部を空間Ｓ２’に流入させることで効果的に冷却できる。空間Ｓ２、Ｓ２’、Ｓ２’’では冷風の流入によって－１５ｄｅｇの効果がある。

【００４１】

これに対し、空間Ｓ１の温度は、ファン１０からの風が断熱ケース１７内壁近傍を通過することによる冷却効果やヒータ１６が長手方向に螺旋状に配置してあることで断熱ケース１７に影響する熱量が部分的となることから、ヘアーブロッサー駆動中においても、室温より若干高い程度である。従って、本体のコンパクト化のため、図１２に示すように断熱ケース１７と本体ケース１とを空間Ｓ１部分を除き近接配置している。つまり、ここで形成している空間Ｓ１は、空間Ｓ２へ風を導くための通路として考える。空間Ｓ１はスイッチ１８を収納する空間であると同時に、空間Ｓ２、Ｓ２’、Ｓ２’’側に冷風を送給するための通路でもあるのでスペースを無駄にすることがない効率的な構造である。もちろん本体ケース１が太くなることを度外視すれば、空間Ｓ１を断熱ケース１７の全周に設けることができ、これによって断熱ケース１７の周囲に位置する本体ケース１全周の表面温度を可及的に下降させることができる。

【００４２】

図６及び図１７に示すように、高電圧発生部６４を断熱体２０と本体ケース１間に形成される空間Ｓ２’に配設し、一対の放電電極３３・３４を断熱体２０によって形成される空間Ｂ２に露呈するように配設しているので、耐熱性の低い高電圧発生部６４を熱から保護しながら、放電電極３３・３４によって発生したマイナスイオンを送風ファン１０からの風によって対象物に効果的に送給することが可能となる。

【００４３】

図６に示すように中央の放電電極３３とトランス３６とを接続する高圧リード線４５と、高電圧発生部６４に電流を給電する給電リード線４６とは、後分割体２２の受座４１の近傍で隣接し、とくに高圧リード線４５の耐圧仕様が６～１０ＫＶであるのに対し、給電リード線４６の絶縁被覆の耐圧仕様が３００Ｖと小さいため、被覆が途切れる高圧リード線４５と針状の放電電極３３との接続箇所から、給電リード線４６に向けて放電するおそれがある。このような異常放電を避けるために、後分割体２２に絶縁壁４２を設け、両リード線４５・４６が異常接近しないよう隔絶している。なお、針状の放電電極３３は、図７に示すように高圧リード線４５による絶縁被覆が途切れる接続箇所をシリコンゴム７１で絶縁被覆して、針の先端以外からの放電を防止しているが、落下衝撃や経時的にシリコンゴムにクラックが入り、絶縁状態が不十分になるおそれがある。このとき耐圧の低い給電リード線４６が高圧リード線４５に近づくと、給電リード線４６側に放電し、放電電極３３・３４によるイオン発生作用が低下するおそれがある。しかし、絶縁壁４２で高圧リード線４５と給電リード線４６の接近を確実に防止して、異常放電を防止できる。

【００４４】

図６および図１３に示すように、給電リード線４６を後分割体２２と後ケース１Ｂとの間に形成されたの空間に配線するので、給電リード線４６が乾燥風に晒されて風切音を生じるのを避け、さらに高温の乾燥風に晒されてその絶縁被覆が劣化するのを避けることができる。とくに断熱ケース１７から吹き出る加熱乾燥風の中でも、上述したように吹き出した直後の加熱乾燥風は非常に高温になる部分があるが、断熱体２０はこの高温の乾燥風から給電リード線４６をよく保護することができる。イオン発生用の回路基板３５側から電力が供給される表示灯７用のリード線７ａも、給電リード線４６と同様に後分割体２２と後ケース１Ｂとの間に配線され熱から保護されている。

【００４５】

ヘアーブロッサーを構成するすべての電気機器は、図５に示すように予め結線したうえで、３個のブロックＢ１～Ｂ３にまとめて後ケース１Ｂに組み込む。詳しくは、送風ファン１０とモータ１１とがひとまとめにされたファンブロックＢ１と、ヒーターユニット１２を含むヒーターブロックＢ２と、イオン発生装置およびホルダー２３を含む付加機器ブロックＢ３とにまとめたうえで、これらの各ブロックＢ１～Ｂ３を接続リード線や給電リー

SharkNinja Ex. 1002
SharkNinja et al. v. Dyson Technology Limited,
IPR2023-01324
Page 649 of 2286