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(71) Applicant: **DYSON TECHNOLOGY LIMITED** [GB/GB]; Tetbury Hill, Malmesbury Wiltshire SN16 0RP (GB).

(72) Inventors: **BEAUMONT, Rory**; c/o Dyson Technology Limited, Tetbury Hill, Malmesbury Wiltshire SN16 0RP (GB). **COULTON, Robert**; c/o Dyson Technology Limited, Tetbury Hill, Malmesbury Wiltshire SN16 0RP (GB). **IMHASLY, Nathan**; c/o Dyson Technology Limited, Tetbury Hill, Malmesbury Wiltshire SN16 0RP (GB).

(74) Agent: **FOWLER, Maria** et al.; Intellectual Property Department, Dyson Technology Limited, Tetbury Hill, Malmesbury Wiltshire SN16 0RP (GB).

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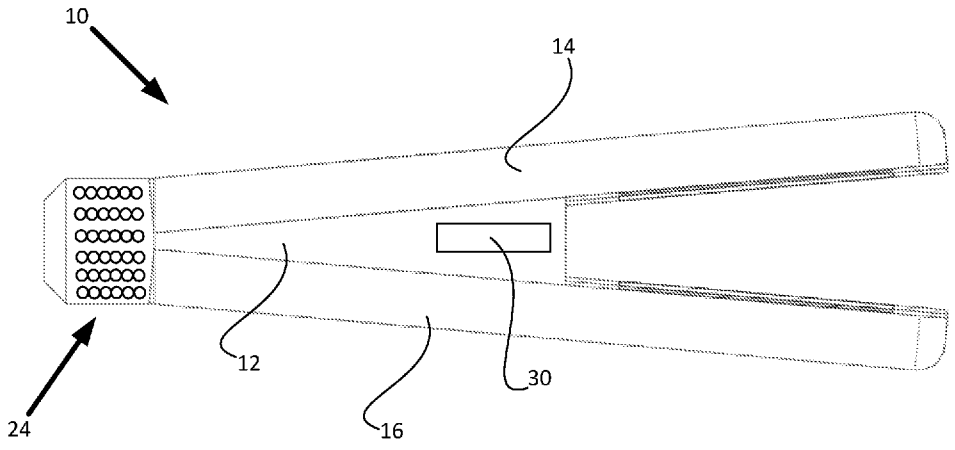

Fig. 1

(57) Abstract: A haircare appliance is described having first and second arms that define a hair treatment chamber, an infrared emitter configured to emit infrared radiation into the hair treatment chamber, and an airflow generator configured to generate an airflow within the hair treatment chamber. The hair treatment chamber comprises a minimal width of greater than 5mm.

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A HAIRCARE APPLIANCE

Field of the Invention

The present invention relates to a haircare appliance.

Background of the Invention

Conventional hair straighteners utilise heated plates to contact and style hair in use. Hair dryers are typically used to dry hair via convective heating of airflow. Such convective heating may be relatively inefficient.

Summary of the Invention

The present invention provides a haircare appliance comprising first and second arms that define a hair treatment chamber, an infrared emitter configured to emit infrared radiation into the hair treatment chamber, and an airflow generator configured to generate an airflow within the hair treatment chamber, wherein the hair treatment chamber comprises a minimal width of greater than 5mm.

Use of an airflow generator configured to generate an airflow within the hair treatment chamber may enable air containing evaporated liquid within the hair treatment chamber to be removed from the chamber, and hence moved away from hair within the hair treatment chamber. This may reduce an impact of evaporated liquid on the drying or styling of hair within the hair treatment chamber in use. Providing a hair treatment chamber having a minimal width of greater than 5mm may ensure that pressure within the hair treatment chamber due to airflow is not excessive in use.

The airflow generator may be configured to generate airflow at a flow rate of greater than 4L/s, greater than 8L/s, greater than 10L/s, or greater than 12L/s. This may ensure that

evaporated liquid is removed from the hair treatment chamber at a sufficient rate such that evaporated liquid does not negatively impact on dry times for hair located within the hair treatment chamber in use. The airflow generator may be configured to generate airflow at a flow rate of around 13L/s.

The airflow generator may comprise a motor driven impeller.

The haircare appliance may comprise a hair straightener. The first and second arms may oppose one another, for example such that the hair treatment chamber is defined between the first and second arms.

The hair treatment chamber may be open to ambient air. For example at least one side of the chamber may be open to ambient air. This may enable air containing evaporated liquid to be removed from the hair treatment chamber in use, for example removed under action of the airflow from the airflow generator within the hair treatment chamber.

The first and second arms may be movable relative to one another to selectively vary a width of the hair treatment chamber. Relative movement of the first and second arms to selectively vary a width of the hair treatment chamber may allow for accommodation of different volumes of hair, whilst ensuring that the hair treatment chamber has a minimal width of greater than or equal to 5mm may ensure that pressure within the hair treatment chamber due to airflow is not excessive in use.

The infrared emitter may be configured to emit infrared radiation comprising a peak wavelength greater than 900nm. This may enable relatively quick drying of hair compared to, for example, an emitter configured to emit radiation having a peak wavelength less than 900nm. The infrared emitter may be configured to emit infrared radiation comprising a peak wavelength in the region of 1000-3500nm, for example in the region of 2000-3000nm. This may enable efficient drying of hair contained within the hair treatment chamber in use. The infrared emitter may be configured to emit infrared

radiation targeted to evaporate water. The infrared emitter may be configured to emit infrared radiation comprising a peak wavelength of less than 1mm. The infrared emitter may be configured to emit broadband infrared radiation having a peak wavelength in the region of 1000-3500nm, for example in the region of 2000-3000nm.

The infrared emitter may be located in one of the first and second arms. This may locate the infrared emitter in the region of the hair treatment chamber defined by the first and second arms, and may provide a relatively short route for the infrared radiation to reach the hair treatment chamber when emitted by the infrared emitter. The first and/or second arm may comprise an infrared transmissive window, for example a window through which infrared radiation emitted by the infrared emitter can pass in use. The infrared transmissive window may have a length substantially corresponding to a length of the infrared emitter.

The infrared emitter may extend along at least 50% of the length of the hair treatment chamber, for example along at least 60%, at least 70%, or at least 80% of the length of the hair treatment chamber. The infrared emitter may comprise a length that it at least 50%, at least 60%, at least 70%, or at least 80%, of the length of the hair treatment chamber. This may maximise an area of the hair treatment chamber within which drying of hair using infrared radiation emitted by the infrared emitter can occur, which may lead to a more efficient drying process.

The infrared transmissive window may extend along at least 50% of the length of the hair treatment chamber, for example along at least 60%, at least 70%, or at least 80% of the length of the hair treatment chamber. The infrared transmissive window may comprise a length that it at least 50%, at least 60%, at least 70%, or at least 80%, of the length of the hair treatment chamber. This may maximise an area of the hair treatment chamber within which drying of hair using infrared radiation emitted by the infrared emitter can occur, which may lead to a more efficient drying process.

The haircare appliance may comprise a further infrared emitter located in the other of the second and first arms. This may enable a more efficient drying process by applying infrared radiation to opposing sides of hair located within the hair treatment chamber in use. The further infrared emitter may be configured to emit infrared radiation comprising a peak wavelength greater than 900nm. This may enable relatively quick drying of hair compared to, for example, an emitter configured to emit radiation having a peak wavelength less than 900nm.

The infrared emitter and the further infrared emitter may be independently actuable, for example such that the haircare appliance may be operated within only one of the infrared emitter and the further infrared emitter turned on. This may enable greater flexibility in drying and/or styling than, for example an arrangement where both the infrared emitter and the further infrared emitter are not independently controlled. The further infrared emitter may be configured to emit infrared radiation comprising a peak wavelength less than 900nm. This may allow, for example, for the infrared emitter to be used for drying of hair within the hair treatment chamber, and for the further infrared emitter to be used for styling of hair within the hair treatment chamber, as radiation having a smaller wavelength may be more suitable for styling whilst radiation having a larger wavelength may be more suitable for drying.

The second or first arm may comprise a further infrared transmissive window, for example a window through which infrared radiation emitted by the further infrared emitter can pass in use. The further infrared transmissive window may have a length substantially corresponding to a length of the further infrared emitter.

The further infrared emitter may comprise a length substantially corresponding to a length of the infrared emitter. The further infrared emitter may extend along at least 50% of the length of the hair treatment chamber, for example along at least 60%, at least 70%, or at least 80% of the length of the hair treatment chamber. The further infrared emitter may comprise a length that it at least 50%, at least 60%, at least 70%, or at least 80%, of the

length of the hair treatment chamber. This may maximise an area of the hair treatment chamber within which drying of hair using infrared radiation emitted by the further infrared emitter can occur, which may lead to a more efficient drying process.

The further infrared transmissive window may extend along at least 50% of the length of the hair treatment chamber, for example along at least 60%, at least 70%, or at least 80% of the length of the hair treatment chamber. The further infrared transmissive window may comprise a length that it at least 50%, at least 60%, at least 70%, or at least 80%, of the length of the hair treatment chamber. This may maximise an area of the hair treatment chamber within which drying of hair using infrared radiation emitted by the further infrared emitter can occur, which may lead to a more efficient drying process.

One of the first and second arms may comprise an air outlet through which airflow from the airflow generator is discharged into the hair treatment chamber. Locating the air outlet on one of the first and second arms may provide the air outlet in close proximity to the hair treatment chamber. The air outlet may be located on the same arm that houses the infrared emitter. This may ensure that airflow is delivered to the same side of hair within the hair treatment chamber that is heated by infrared radiation from the infrared emitter. Airflow discharged into the hair treatment chamber through the air outlet may comprise a temperature less than 60°C, less than 50°C, or less than 40°C.

The air outlet may comprise a length greater than or equal to a length of the infrared emitter. This may ensure that airflow can be provided to remove evaporated liquid from the hair treatment chamber along the length of the infrared emitter. The air outlet may extend along at least 50% of the length of the hair treatment chamber, for example along at least 60%, at least 70%, or at least 80% of the length of the hair treatment chamber. The air outlet may comprise a length that it at least 50%, at least 60%, at least 70%, or at least 80%, of the length of the hair treatment chamber. The air outlet may comprise a width of less than or equal to 4mm, for example less than or equal to 2mm, less than or equal to 1.5mm, or less than or equal to 1mm.

The air outlet may comprise a single aperture, for example a single continuous slot. This may enable a concentrated airflow to be provided along the length of the infrared emitter, which may efficiently remove evaporated liquid from the hair treatment chamber in use.

The haircare appliance may comprise an air inlet, the airflow generator may be configured to generate airflow from the air inlet to the air outlet along an airflow path, and the infrared emitter may be disposed in the airflow path. This may be beneficial as the airflow may provide a cooling effect to the infrared emitter, for example to provide a cooling effect to drive electronics of the infrared emitter. The haircare appliance may be configured such that airflow within the hair treatment chamber in use has a temperature of less than 60°C, less than 50°C, or less than 40°C.

The other of the second and first arms may comprise a further air outlet through which airflow from the airflow generator is discharged into the hair treatment chamber. Providing an air outlet on each of the first and second arms may allow for even distribution of airflow within the hair treatment chamber in use, and may provide for increased efficiency in removal of evaporated liquid from the hair treatment chamber. This may allow for even drying of opposing sides of hair located within the hair treatment chamber in use.

The further air outlet may comprise a length corresponding substantially to a length of the infrared emitter or the further infrared emitter. This may ensure that airflow can be provided to remove evaporated liquid from the hair treatment chamber along the length of the infrared emitter or the further infrared emitter. The further air outlet may extend along at least 50% of the length of the hair treatment chamber, for example along at least 60%, at least 70%, or at least 80% of the length of the hair treatment chamber. The further air outlet may comprise a length that it at least 50%, at least 60%, at least 70%, or at least 80%, of the length of the hair treatment chamber. The further air outlet may comprise a

width of less than or equal to 4mm, for example less than or equal to 2mm, less than or equal to 1.5mm, or less than or equal to 1mm.

The further air outlet may comprise a single aperture, for example a single continuous slot. This may enable a concentrated airflow to be provided along the length of the infrared emitter, which may efficiently remove evaporated liquid from the hair treatment chamber in use.

The airflow generator may be configured to generate airflow from the air inlet to the further air outlet along a further airflow path, and the further infrared emitter may be disposed in the further airflow path. This may be beneficial as the airflow may provide a cooling effect to the further infrared emitter, for example to drive electronics of the further infrared emitter.

Each of the first and second arms may comprise a hair contacting rib. This may enable hair to be clamped and tensioned between the first and second arms in a manner similar to a conventional hair straightener. The hair contacting ribs may oppose one another on the first and second arms. The hair contacting ribs may limit motion of the first and second arms relative to one another, for example such that the hair treatment chamber adopts a configuration with its minimal width when the hair contacting ribs are in contact with one another. This may ensure that hair is free to move within the hair treatment chamber in use.

The airflow generator may be configured to generate airflow at a flow rate of greater than 4L/s, greater than 8L/s, greater than 10L/s, or greater than 12L/s. This may ensure that evaporated liquid is removed from the hair treatment chamber at a sufficient rate such that evaporated liquid does not negatively impact on dry times for hair located within the hair treatment chamber in use. The airflow generator may be configured to generate airflow at a flow rate of around 13L/s.

The airflow generator may comprise a motor driven impeller.

The infrared emitter may comprise an incandescent source of infrared radiation, for example a source configured to emit infrared radiation as a result of the temperature of the source.

The infrared emitter may be configured to output infrared radiation comprising a power density greater than $10W/cm^2$, greater than $15W/cm^2$, or greater than $20W/cm^2$, for example for the power density measure at hair located within the hair treatment chamber. Such power densities may enable relatively quick dry times for hair located within the hair treatment chamber in use.

The haircare appliance may comprise a power rating of greater than 1000W, greater than 1500W, or greater than 1600W.

The haircare appliance may comprise a first mode of operation in which the infrared emitter is configured to output infrared radiation comprising a first power density, and a second mode of operation in which the infrared emitter is configured to output infrared radiation comprising a second power density less than the first power density, and the first power density is greater than $10W/cm^2$. This may enable the haircare appliance to operate in different modes, for example a first drying mode where high power density infrared radiation is emitted to dry hair within the hair treatment cavity, and a second styling mode where lower power density infrared radiation is emitted to style hair within the hair treatment cavity.

The airflow generator may be configured to generate airflow at a first flow rate in the first mode of operation, and at a second flow rate less than the first flow rate in the second mode of operation. This may enable a high airflow rate to efficiently remove evaporated liquid from the hair treatment chamber when drying of hair takes place, but a lower, gentler, airflow rate to assist with styling.

The infrared emitter may comprise a tungsten-halogen lamp.

The haircare appliance may comprise a temperature sensor configured to sense a temperature of hair within the hair treatment chamber in use, and a controller to modify power supplied to the infrared emitter and/or the further infrared emitter in response to an output of the temperature sensor. This may provide a feedback loop which enables the infrared emitter to provide only the power necessary for a given hair temperature, which may be indicative of a wetness of hair, which may provide increased efficiency compared to a corresponding arrangement without a temperature sensor. This may also enable automatic switching between the first and second modes, with may reduce a level of user interaction required with the haircare appliance.

The temperature sensor may comprise a non-contact temperature sensor, for example an infrared temperature sensor.

Brief Description of the Drawings

Figure 1 is a schematic view of a haircare appliance according to the present invention;

Figure 2 is a first schematic cross-sectional view of the haircare appliance of Figure 1;

Figure 3 is a second schematic cross-sectional view of the haircare appliance of Figure 1, taken orthogonal to the first schematic cross-sectional view of Figure 2; and

Figure 4 is a third schematic cross-sectional view of the haircare appliance of Figure 1, taken orthogonal to the first schematic cross-sectional view of Figure 2 and the second schematic cross-sectional view of Figure 3.

Detailed Description of the Invention

A haircare appliance, generally designated 10, according to the present invention is shown schematically in Figures 1-4.

The haircare appliance 10 comprises a main body 12 and first 14 and second 16 arms pivotally connected to the main body 12. The haircare appliance 10 may take the general form of a hair straightener.

The main body 12 is generally tubular and hollow in form, and houses an airflow generator 18, a power source 20, and a controller 22. The main body 12 has an air inlet 24, which comprises a plurality of apertures, and the airflow generator 18 comprises a motor driven impeller to draw airflow into the main body 12 via the air inlet 24. An example of an appropriate airflow generator 18 is the Dyson® digital motor V9, produced by Dyson Technology Ltd.

The power source 20 is a battery that is configured to supply DC electrical power to the airflow generator 18 and other electrical components of the haircare appliance such as infrared emitters 26,28 disposed in the first 14 and second 16 arms, as will be discussed hereafter. Although shown here as comprising a power source 20, it will be appreciated that in alternative embodiments the haircare appliance may comprise an electrical connection for connecting to an AC mains power supply, with appropriate circuitry for converting the AC power to DC power for the airflow generator 18, for example.

The controller 22 is configured to control the airflow generator 18 and the infrared emitters 26,28, as discussed in more detail hereafter. Although shown here as a single controller 22 controlling both the airflow generator 18 and the infrared emitters 26,28, it will be appreciated that embodiments with multiple controllers are also envisaged, and that in such embodiments the controller(s) for the infrared emitters 26,28 may be disposed in the first 14 and/or second 16 arms, for example. The main body 12 has a user interface 30, which may take the form of buttons or a touch-sensitive display, for example, and

first 32 and second 34 air outlets, illustrated schematically in Figure 2, which enable airflow from the airflow generator 18 to pass into the interior of the first 14 and second 16 arms. The first 32 and second 34 air outlets of the main body 12 may be flexible or extendible conduits to account for relative motion between the first 14 and second 16 arms and the main body 12 in use.

The first 14 and second 16 arms are generally hollow, and each have a first section 36 and a second section 38. The first sections 36 are located in the region of the main body 12, and the first sections 36 have hollow portions (not shown) within which the main body 12 can be received to varying degrees depending on whether the first 14 and second 16 arms are in an open configuration, a closed configuration, or any state between the open and closed configurations. The first 14 and second 16 arms are typically biased toward the open configuration in the absence of any other applied forces, as seen in Figure 1. The first section 36 defines a handle portion of the haircare appliance 10 which can be grasped by a user to selectively move the first 14 and second 16 arms relative to one another.

The second sections 38 of the first 14 and second 16 arms are spaced apart to define a hair treatment chamber 40 therebetween. The hair treatment chamber 40 has a maximal width when the first 14 and second 16 arms are in the open configuration of Figure 1, and a minimal width when the first 14 and second 16 arms are in the closed configuration illustrated in Figure 4. A user of the haircare appliance 10 can selectively vary the width of the hair treatment chamber 40 between the maximal and minimal widths by applying pressure to the first 14 and second 16 arms, typically in the region of the first section 36.

The second sections 38 of the first 14 and second 16 arms each house a respective infrared emitter 26,28, and each comprise a hair contacting rib 42,44, an air outlet 46,48 and an infrared transmissive window 50,52, as can be seen from Figure 4.

Each infrared emitter 26,28 extends along the length of the second section 38 of its respective arm 14,16, with the infrared emitters 26,28 extending along at least 50% of the length of hair treatment chamber 40, and in the embodiment of Figures 1-4 extending along around 75% of the length of the hair treatment chamber 40. The infrared emitters 26,28 in the embodiment of Figures 1-4 are tungsten halogen lamps, which are incandescent sources of infrared radiation.

Each hair contacting rib 42,44 extends along an inwardly facing surface of a respective one of the first 14 and second 16 arms. Each hair contacting rib 42,44 extends along the length of the second section 38 of its respective arm 14,16, with the hair contacting ribs 42,44 extending along at least 50% of the length of hair treatment chamber 40, and in the embodiment of Figures 1-4 extending along around 75% of the length of the hair treatment chamber 40. Each hair contacting rib 42,44 has a length substantially corresponding to a length of a corresponding infrared emitter 26,28, air outlet 46,48 and infrared transmissive window 50,52.

The hair contacting ribs 42,44 are intended to contact hair in use, for example to tension hair held within the hair treatment chamber 40, and each hair contacting rib 42,44 is formed from a material, for example coated aluminium to enable the haircare appliance 10 to slide along hair when the hair is held between the hair contacting ribs 42,44 in use.

The hair treatment chamber 40 is defined between the first 14 and second 16 arms, with the hair contacting ribs 42,44 disposed upwardly of the hair treatment chamber 40 in Figure 4. The hair contacting ribs 42,44 are dimensioned such that when the hair contacting ribs 42,44 are in full contact with hair 56 in use and the first 14 and second 16 arms cannot move closer together, the hair treatment chamber 40 is at its minimal width. An appropriate minimal width for the hair treatment chamber 40 is 5mm or more, as will be discussed hereafter.

Each air outlet 46,48 extends along an inwardly facing surface of a respective one of the first 14 and second 16 arms. Each air outlet 46,48 extends along the length of the second section 38 of its respective arm 14,16, with the air outlets 46,48 extending along at least 50% of the hair treatment chamber 40, and in the embodiment of Figures 1-4 extending along around 75% of the length of the hair treatment chamber 40. Each air outlet 46,48 has a length substantially corresponding to a length of a corresponding infrared emitter 26,28, hair contacting rib 42,44 and infrared transmissive window 50,52.

Each air outlet 46,48 is disposed on a respective arm 14,16 between a hair contacting rib 42,44 and a corresponding infrared transmissive window 50,52. The air outlets 46,48 in the embodiment of Figures 1-4 comprise generally rectangular slots formed in a wall of the respective first 14 and second 16 arms, with each slot having a width of 2mm or less, typically between 1-1.5mm.

In use, the air outlets 46,48 receive airflow from the airflow generator 18 via the first 32 and second 34 air outlets of the main body 12. The air outlets 46,48, as seen in Figure 4, are angled obliquely relative to the hair contacting ribs 42,44 and the infrared transmissive window 50,52, and angled so as to introduce airflow into the hair treatment chamber 40 in use. The infrared emitters 26,28 are disposed between the respective first 32 and second 34 air outlets of the main body 12 and the respective air outlets 46,48 of the first 14 and second 16 arms, such that air flows over the infrared emitters 26,28 in use. In particular, air may flow over drive electronics of the infrared emitters 26,28, which may enable cooling of the drive electronics in use.

Each infrared transmissive window 50,52 extends along an inwardly facing surface of a respective one of the first 14 and second 16 arms. Each infrared transmissive window 50,52 extends along the length of the second section 38 of its respective arm 14,16, with the infrared transmissive windows 50,52 extending along at least 50% of the hair treatment chamber 40, and in the embodiment of Figures 1-4 extending along around 75% of the length of the hair treatment chamber 40. Each air outlet 46,48 has a length

substantially corresponding to a length of a corresponding infrared emitter 26,28, hair contacting rib 42,44 and air outlet 46,48.

The infrared transmissive windows 50,52 form part of the surface of the respective arms 14,16, and define at least part of the hair treatment chamber 40, as seen in Figure 4. The infrared transmissive windows 50,52 are generally rectangular in form, and are formed from any appropriate material which enables passage of infrared radiation from the infrared emitters 26,28. An appropriate material may comprise infrared transmissive glass. The infrared transmissive windows 50,52 are aligned with the respective infrared emitters 26,28, such that infrared radiation emitted by the infrared emitters 26,28 can pass into the hair treatment chamber 40 in use.

A temperature sensor 54 is located within the first arm 14 adjacent to the infrared transmissive window 50, and is configured to measure a surface temperature of hair within the hair treatment chamber 40 in use. The temperature sensor 54 is an infrared temperature sensor in the embodiment of Figures 1-4.

The haircare appliance 10 of Figures 1-4 has a first so-called “drying” mode in which the haircare appliance is configured to dry hair 56 located within the hair treatment chamber 40. The first 14 and second arms 16 are moved to the closed configuration by application of pressure by a user, such that hair 56 is located within the hair treatment chamber 40 and tensioned by the hair contacting ribs 40,42. The infrared emitters 26,28 are configured to emit infrared radiation having a peak wavelength in the region of 700nm-1mm, typically greater than 900nm, and in some instances having a peak wavelength in the region of 2000-3000nm. The emitted infrared radiation has a power density greater than $10W/cm^2$, and in some instances a power density in the region of $20W/cm^2$. Such infrared radiation may be particularly suited to drying hair at a relatively quick rate.

At the same time as introducing infrared radiation into the hair treatment chamber 40 via the infrared transmissive windows 50,52, the airflow generated by the airflow generator

18 is fed into the hair treatment chamber 40 via the air outlets 46,48 of the first 14 and second 16 arms, where it flows over hair located in the hair treatment chamber 40 before leaving via open sides of the hair treatment chamber 40. This assists with the drying process by removing evaporated liquid from the hair treatment chamber 40, and may result in increased drying efficiency and reduced drying times, along with greater styling control.

The airflow generator 18 is configured to generate airflow at a flow rate of greater than 4L/s, and in some examples around 13L/s, and such a flow rate has been found to be beneficial to drying efficiency. In view of the flow rates used, the minimal width of the hair treatment chamber 40, ie the minimal width of the hair treatment chamber when the first 14 and second 16 arms are in the closed configuration, is greater than 5mm. This may avoid adverse pressures being experienced within the hair treatment chamber 40 in use.

The temperature of airflow introduced into the hair treatment chamber 40 is typically less than 60°C, for example less than 50°C, or less than 40°C, even where the airflow generated by the airflow generator 18 picks-up some heat through convective heating, for example where the airflow travels over drive electronics of an infrared emitter 26,28 in use.

The temperature sensor 54 monitors a surface temperature of the hair within the hair treatment chamber 40, and feeds back to the controller 22. The controller 22 may then automatically control the airflow generator 18 and/or the infrared emitters 26,28, for example to increase or decrease airflow rate and power or wavelength of emitted infrared radiation, or provide an alert to a user of the haircare appliance 10, in response to the monitored temperature.

In some embodiments the haircare appliance 10 has a second so-called “styling” mode where the infrared emitters 26,28 are configured to emit infrared radiation having a lower

wavelength and/or lower power density than infrared radiation emitted in the first "drying mode", and/or the airflow generator 18 is configured to generate airflow at a flow rate lower than the flow rate generated in the first "drying" mode. This may enable the haircare appliance 10 to provide flexibility and be utilised for both drying and styling hair.

In some embodiments the infrared emitters 26,28 may be independently actuable, for example with one infrared emitter configured to be on whilst the other is off, or one infrared emitter configured to emit infrared radiation at a high or lower wavelength and/or a higher or lower power density than the other infrared emitter. This may provide greater flexibility when drying or styling hair.

Whilst described above with the first 14 and second 16 arms pivotally connected to the main body, and with each of the first 14 and second 16 arms having a respective infrared emitter 26,28 and a respective air outlet 46,48, it will be appreciated that other configurations of the haircare appliance 10 are also envisaged.

For example, in some embodiments only one of the first 14 and second 16 arms may be pivotally connected to the main body 12. Embodiments are also envisaged where the airflow generator 18 and/or the power source 20 and/or the controller 22 are located in one of the first 14 and second 16 arms rather than in the main body 12.

In some alternative embodiments, only one of the arms 14,16 may comprise an infrared emitter 26,28 and an air outlet 46,48, or one arm 14,16 may comprise an infrared emitter 26,28 with the other opposing arm 16,14 comprising an air outlet. In each embodiment, however, the infrared emitter may be configured to emit infrared radiation having a peak wavelength greater than 900nm, such that the haircare appliance 10 may be used to efficiently dry hair within the hair treatment chamber in use.

Claims

1. A haircare appliance comprising first and second arms that define a hair treatment chamber, an infrared emitter configured to emit infrared radiation into the hair treatment chamber, and an airflow generator configured to generate an airflow within the hair treatment chamber, wherein the hair treatment chamber comprises a minimal width of greater than 5mm.

2. A haircare appliance as claimed in Claim 1, wherein the airflow generator is be configured to generate airflow at a flow rate of greater than 4L/s.

3. A haircare appliance as claimed in Claim 1 or Claim 2, wherein the first and second arms are movable relative to one another to selectively vary a width of the hair treatment chamber.

4. A haircare appliance as claimed in any preceding claim, wherein the infrared emitter is configured to emit infrared radiation comprising a peak wavelength greater than 900nm.

5. A haircare appliance as claimed in any preceding claim, wherein the infrared emitter is configured to emit infrared radiation comprising a peak wavelength in the region of 1000-3500nm.

6. A haircare appliance as claimed in any preceding claim, wherein the infrared emitter extends along at least 50% of the length of the hair treatment chamber.

7. A haircare appliance as claimed in any preceding claim, wherein the infrared emitter is located in one of the first and second arms, and the haircare appliance comprises a further infrared emitter located in the other of the second and first arms.

8. A haircare appliance as claimed in Claim 7, wherein the further infrared emitter extends along at least 50% of the length of the hair treatment chamber.

9. A haircare appliance as claimed in any preceding claim, wherein one of the first and second arms comprises an air outlet through which airflow from the airflow generator is discharged into the hair treatment chamber.

10. A haircare appliance as claimed in Claim 9, wherein the air outlet comprises a length greater than or equal to a length of the infrared emitter.

11. A haircare appliance as claimed in Claim 9 or Claim 10, wherein the air outlet comprises a single aperture.

12. A haircare appliance as claimed in any of Claims 9 to 11, wherein the air outlet has a maximal width of less than 4mm, less than 2mm, less than 1.5mm, or less than 1mm.

13. A haircare appliance as claimed in any of Claims 9 to 12, wherein the haircare appliance comprises an air inlet, the airflow generator is configured to generate airflow from the air inlet to the air outlet along an airflow path, and the infrared emitter is disposed in the airflow path.

14. A haircare appliance as claimed in any of Claims 9 to 13, wherein the other of the second and first arms comprises a further air outlet through which airflow from the airflow generator is discharged into the hair treatment chamber.

15. A haircare appliance as claimed in Claim 14, wherein the further air outlet comprises a length greater than or equal to a length of the infrared emitter.

16. A haircare appliance as claimed in Claim 14 or Claim 15, wherein the further air outlet comprises a single aperture.

17. A haircare appliance as claimed in any of Claims 14 to 16, wherein further the air outlet has a maximal width of less than 4mm, less than 2mm, less than 1.5mm, or less than 1mm.

18. A haircare appliance as claimed in any preceding claim, wherein each of the first and second arms comprises a hair contacting rib.

19. A haircare appliance as claimed in any preceding claim, wherein the infrared emitter comprises an incandescent source of infrared radiation.

20. A haircare appliance as claimed in any preceding claim, wherein the infrared emitter is configured to output infrared radiation comprising a power density greater than $10W/cm^2$.

21. A haircare appliance as claimed in any preceding claim, wherein the haircare appliance comprises a first mode of operation in which the infrared emitter is configured to output infrared radiation comprising a first power density, and a second mode of operation in which the infrared emitter is configured to output infrared radiation comprising a second power density less than the first power density, and the first power density is greater than $10W/cm^2$.

22. A haircare appliance as claimed in Claim 21, wherein the airflow generator is configured to generate airflow at a first flow rate in the first mode of operation, and at a second flow rate less than the first flow rate in the second mode of operation.

23. A haircare appliance as claimed in any preceding claim, wherein the haircare appliance comprises a temperature sensor configured to sense a temperature of hair within

the hair treatment chamber in use, and a controller configured to modify power supplied to the infrared emitter in response to an output of the temperature sensor.

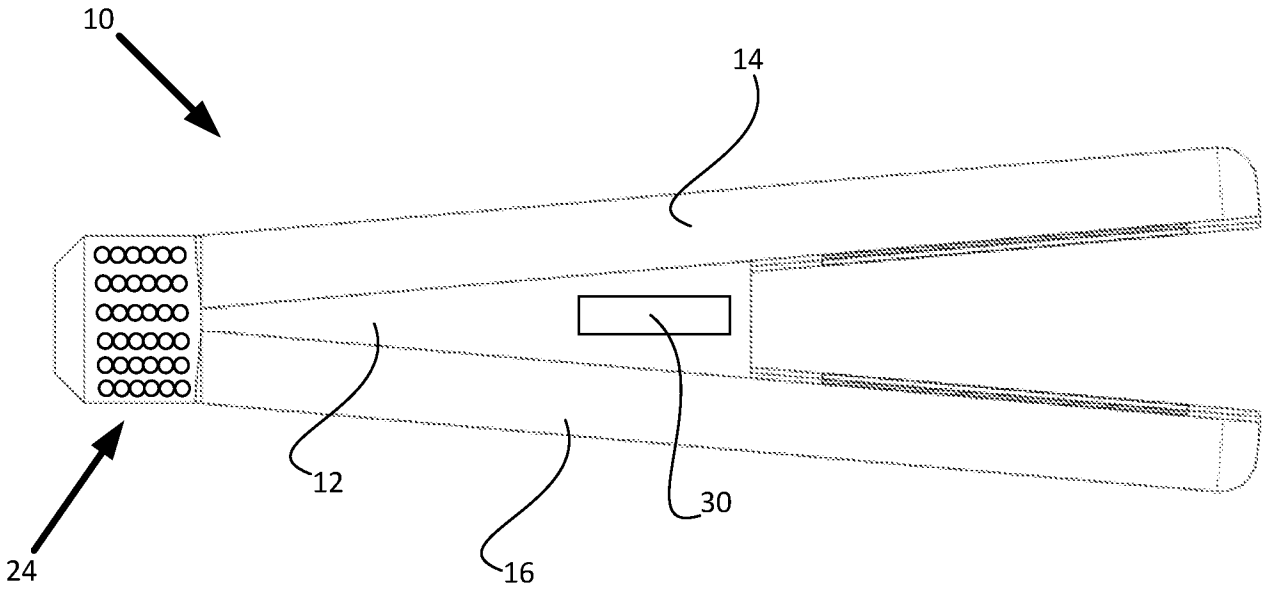

Fig. 1

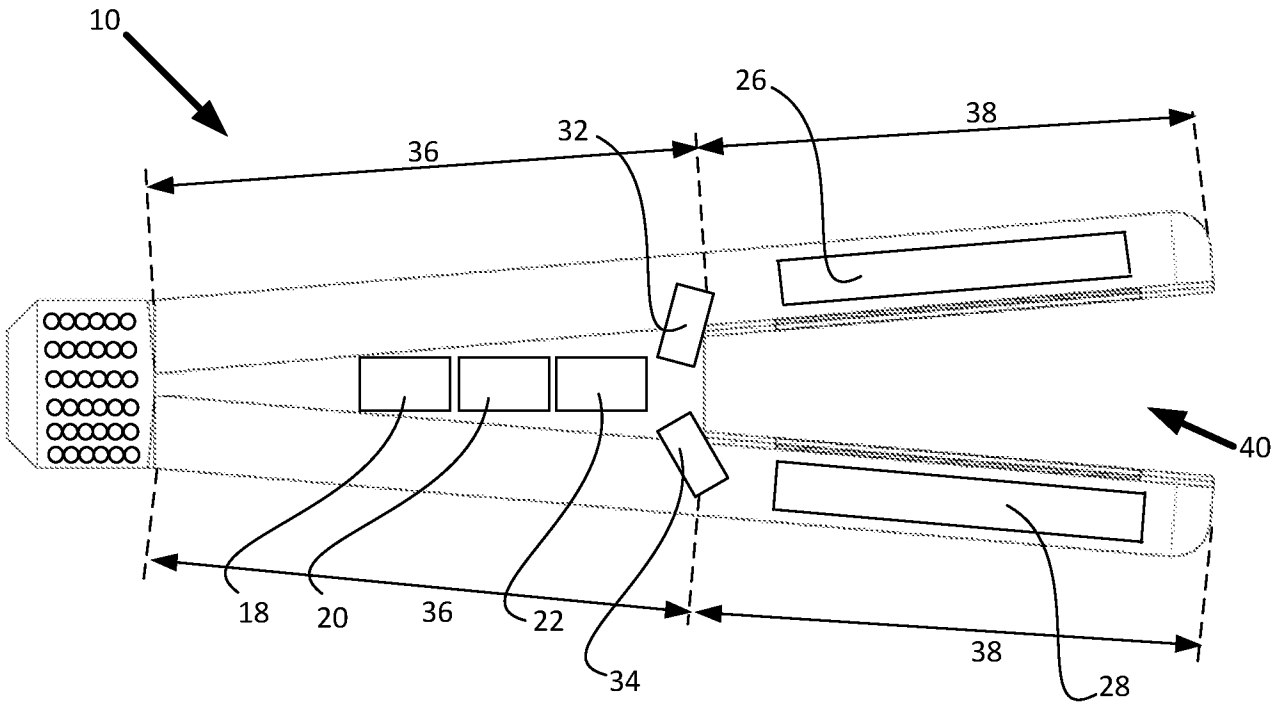

Fig. 2

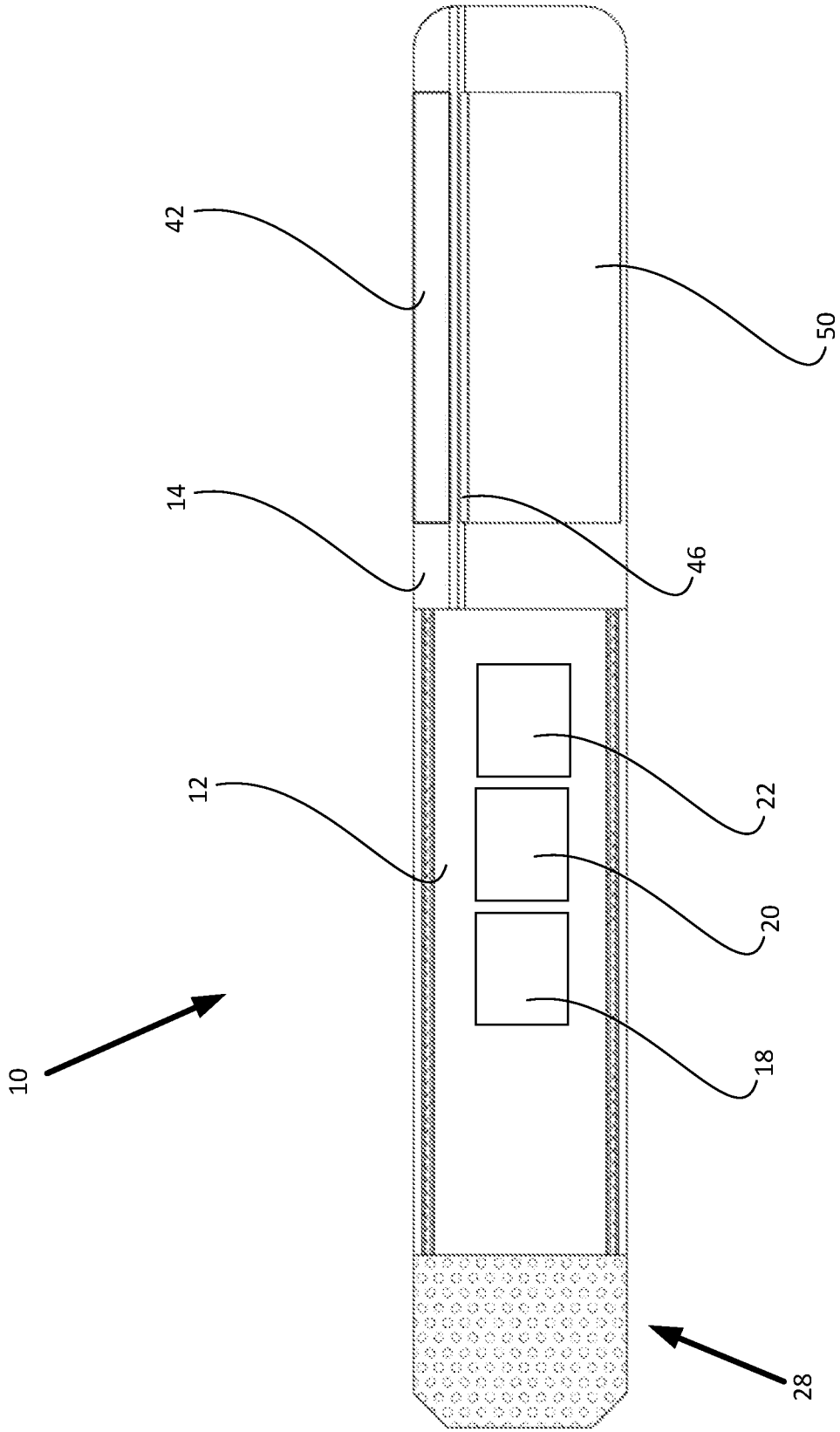

Fig. 3

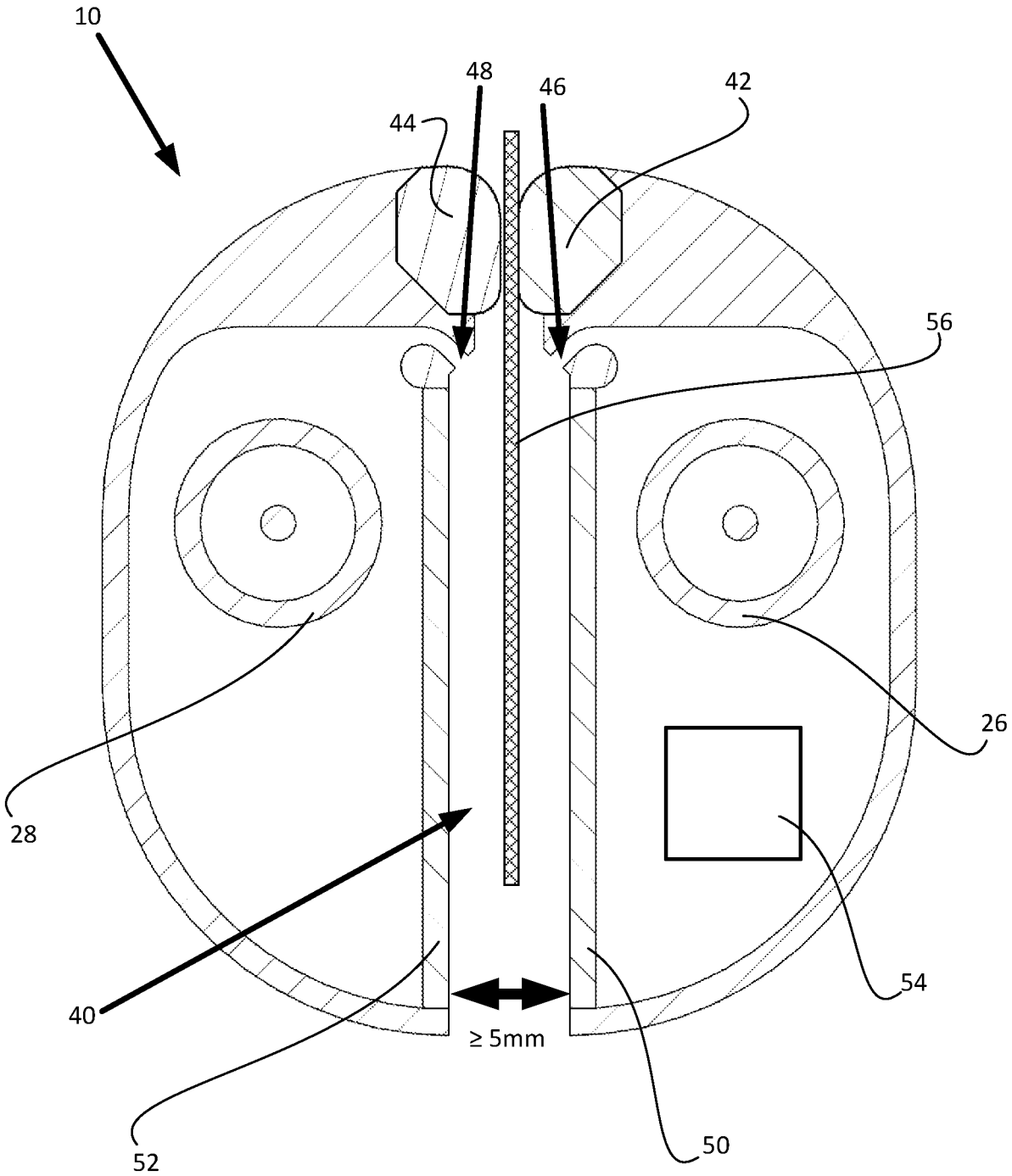

Fig. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2021/052662

A. CLASSIFICATION OF SUBJECT MATTER
INV. A45D1/06 A45D2/00 A45D20/10 A45D1/04 A45D20/12
A45D20/50
ADD.
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)
A45D

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 practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2020/193940 A1 (DYSON TECHNOLOGY LTD [GB]) 1 October 2020 (2020-10-01) page 8, line 12 - page 13, line 24; figures	1-23
Y	CN 202 890 915 U (SEB SA) 24 April 2013 (2013-04-24) paragraph [0050] - paragraph [0052]; figures	1-23

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"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

"X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"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

Date of the actual completion of the international search	Date of mailing of the international search report
18 January 2022	26/01/2022

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	van de Beek-Duijker

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/GB2021/052662

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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		KR 20210143262 A	26-11-2021
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		IT TO20120145 U1	01-03-2013