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- SMITH, Stephen
Malmesbury, Wiltshire SN16 0RP (GB)
- STEPHENS, Philip
Malmesbury, Wiltshire SN16 0RP (GB)
- SMITH, Mark
Malmesbury, Wiltshire SN16 0RP (GB)

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(71) Applicant: **Dyson Technology Limited**
Malmesbury Wiltshire SN16 0RP (GB)

(72) Inventors:
• **IMHASLY, Nathan**
Malmesbury, Wiltshire SN16 0RP (GB)

(74) Representative: **Fowler, Maria Jayne et al**
Dyson Technology Limited
Intellectual Property Department
Tetbury Hill
Malmesbury, Wiltshire, SN16 0RP (GB)

Remarks:

Claims 25 to 30 are deemed to be abandoned due to non-payment of the claims fees (Rule 45(3) EPC).

(54) **HAND HELD APPLIANCE**

(57) Disclosed is a hair care appliance comprising a body having an outer wall, a chassis extending within the outer wall, wherein the chassis comprises a locking feature and the body comprises an engaging feature adapted to retain the chassis in position within the outer wall when the locking feature is rotated with respect to the engaging feature. The outer wall may comprise an inner surface and the engaging feature extends radially in-

wards from the inner surface. The engaging feature may comprise a rib that extends from an inner surface of the outer wall. The engaging feature may extend at least partially around the inner surface of the outer wall. The engaging feature may comprise a pair of engaging features which may be radially spaced apart. The locking feature may comprise a locking rib which may extend radially from the chassis towards the outer wall.

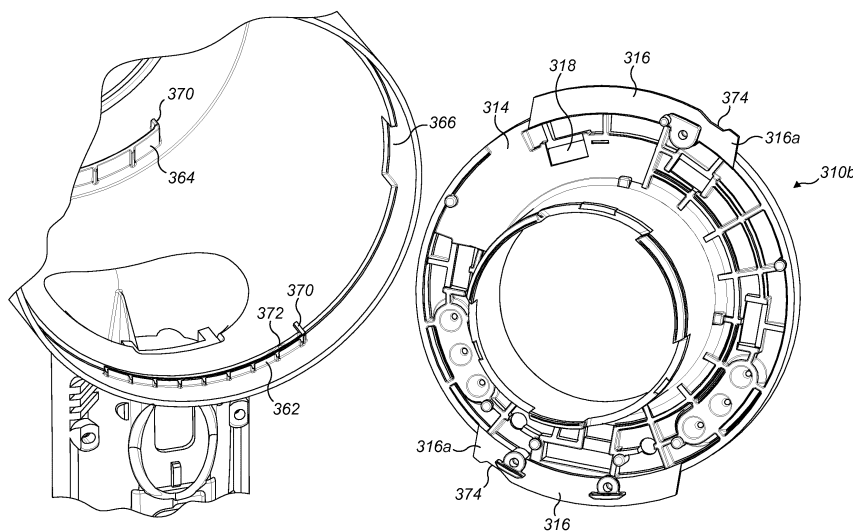


FIG. 4b

Description

[0001] This invention relates to a hand held appliance, in particular a hair care appliance and a fluid outlet from such an appliance.

[0002] 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.

[0003] 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.

[0004] According to a first aspect, the invention provides a hair care appliance comprising a body having an outer wall, a chassis extending within the outer wall, wherein the chassis comprises a locking feature and the body comprises an engaging feature adapted to retain the chassis in position within the outer wall when the locking feature is rotated with respect to the engaging feature.

[0005] Preferably, the outer wall comprises an inner surface and the engaging feature extends radially inwards from the inner surface.

[0006] It is preferred that the engaging feature comprises a rib that extends from an inner surface of the outer wall.

[0007] Preferably, the engaging feature extends at least partially around the inner surface of the outer wall.

[0008] It is preferred that the engaging feature comprises a pair of engaging features.

[0009] Preferably, the pair of engaging features are radially spaced apart. This feature helps maintain concentricity of the chassis within the outer wall.

[0010] It is preferred that the locking feature comprises a locking rib.

[0011] Preferably, the rib extends radially from the chassis towards the outer wall.

[0012] It is preferred that when the chassis is retained in position, the chassis is constrained both radially and longitudinally within the outer wall.

[0013] Preferably, the body comprises a first end and a second end and the outer body and the chassis comprise cooperating locking and engaging features adjacent both the first end and the second end.

[0014] It is preferred that the chassis comprises a first part and a second part.

[0015] Preferably, the first part of the chassis connects to the second part of the chassis in one orientation.

[0016] It is preferred that the first part of the chassis

and the second part of the chassis each comprise at least two asymmetrical cooperating projections and recesses which engage in only one orientation.

[0017] Preferably, the body houses a heater and the heater is mounted on the first part of the chassis.

[0018] It is preferred that the heater comprises a locating ring which cooperates with the at least two asymmetrical cooperating projections and recesses on the first part of the chassis such that the heater can only be mounted on the first part of the chassis in one orientation.

[0019] Preferably, the body comprises a PCB and the PCB is mounted on the second part of the chassis.

[0020] It is preferred that the body comprises a PCB baffle connected to the PCB.

[0021] Preferably, the PCB baffle comprises orientating features such that the PCB and PCB baffle are mountable on the second part of the chassis in one orientation.

[0022] It is preferred that the body comprises a retaining wall wherein the retaining wall retains the chassis in a rotated position with respect to the outer wall..

[0023] Preferably, the retaining wall extends over the chassis at one end of the body.

It is preferred that the retaining wall engages with the outer wall and the chassis to maintain the chassis in a rotated position with respect to the outer wall.

[0024] Preferably, the chassis comprises a first part and a second part and the retaining wall extends from one end of the body over a junction formed between the first part of the chassis and the second part of the chassis.

[0025] It is preferred that the retaining wall comprises a tube that extends at least partially along the body from one end and radially within the chassis over the junction.

[0026] Preferably, the tube comprises a lip seal extending radially around the tube between the tube and the chassis.

[0027] It is preferred that an O-ring is provided between the retaining wall and one or both of the outer wall and the chassis..

[0028] Preferably, the O-ring is disposed between the retaining wall and the outer wall.

[0029] Preferably, the appliance is a hairdryer.

[0030] The invention will now be described by example, with reference to the accompanying drawings, of which:

Figure 1 shows a perspective view of an appliance according to the invention;

Figure 2 shows a cross section through the appliance of Figure 1;

Figure 3 shows an exploded view of parts of the appliance of Figures 1 and 2;

Figure 4a shows a front isometric view of parts of an appliance according to the invention;

Figure 4b shows a rear isometric view of parts of an

appliance according to the invention;

Figure 5 shows an assembled cartridge without components mounted according to the invention;

Figure 6 shows internal views of the second end of the body of an appliance according to the invention; and

Figure 7 shows an enlarged side view through the body of an appliance according to the invention.

[0031] 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 fluid inlet 40. Power is supplied to the hairdryer 10 via a cable 50. At a distal end of the cable 50 from the hairdryer 10 a plug (not shown) is provided, the plug may provide electrical connection to mains power or to a battery pack for example.

[0032] The handle 20 has an outer wall 200 which extends from the body 30 towards 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 fluid inlet 40 in the handle 20 includes first apertures that extend around and along 42 the outer wall 200 of the handle in a series of rows and/or columns that extend from the distal end 24 of the handle 20 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 handle 20 has a longitudinal axis X-X along which the outer wall 200 extends from the body 30 towards the distal end 24.

[0033] 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.

[0034] Upstream of the primary fluid 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 fluid inlet 40 towards the body 30 through a primary fluid flow path 400 that extends from the primary fluid inlet 40 and into the body 30 where the handle 20 and the body 30 are joined 90. The body 30 has a first end 32 and a second end 34, the primary 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.

[0035] 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 inner duct 310 towards the primary fluid outlet 440 at the second end 34 of the body 30.

[0036] An inner wall 260 extends within the outer wall 360. The inner wall 260 at least partially defines the primary fluid outlet 440 and extends from the second end 34 of the body 30 between the inner duct 310 and the outer wall 360.

[0037] 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.

[0038] 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 inner 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 inner duct 310 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 inner duct 310. This side wall 350 at least partially defines the fluid inlet 320. The primary fluid outlet 440 is annular and surrounds the fluid flow path.

[0039] 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 inner duct 310 between the inner 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 inner duct 310.

[0040] The PCB 75 controls parameters such 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.

[0041] Downstream of the PCB 75, is the heater 80 and a PCB baffle 700 is provided between the PCB 75 and the heater 80. The PCB baffle provides thermal protection for the PCB 75 when the heater 80 switched on amongst other things.

[0042] 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 2, 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.

[0043] Referring in particular to Figures 3 to 7, the duct 310 is formed from a number of parts, a first part 310a that extends from the first end 32 of the body 30, a second part 310b that extends from the second end 34 of the body and a third part 310c that extends from the first end 32 of the body 30 within the first part 310a. The first and second parts of the duct 310a, 310b comprise a chassis onto which various components of the hairdryer are mounted. The third part of the duct 310c is a retaining wall for the chassis.

[0044] The first part 310a is conveniently formed of a tube 312 and an inner end wall 314. The tube 312 extends within the outer wall 360 of the body 30 and the inner end wall 314 extends from one end 312a of the tube towards the outer wall 360. The PCB 75 and PCB baffle 700 are mounted on the tube 312 with the inner end wall 314 adjacent the PCB 75.

[0045] The second part 310b is a tube 330 which is conveniently formed as a single unit with the inner wall 260 which are moulded together with supporting ribs (not shown). The inner wall 260 channels fluid flowing in the primary fluid flow path 400 towards the primary fluid outlet 440. The inner wall 260 includes a flow directing portion 132 which channels or directs flow exiting the heater 80 towards the primary fluid outlet 440 as the diameter of the body 30 decreases towards the second end 34 of the body 30. The heater 80 is mounted on the second part 310b. The heater 80 has an outer wall 180 and an inner wall 84 which both extend around the heater element (not shown).

[0046] The third part 310c is a further tube 322 which is formed as a single unit with the side wall 350. The further tube 322 extends radially inside the tube 312 of the second part.

[0047] In order that components are maintained in the correct position within the body 30, the first part 310a and the second part 310b are connected together to form a cartridge 250. The first part 310a and the second part 310b additionally comprise a number of retaining features.

[0048] Referring specifically to Figure 7, the inner wall 260 extends radially around the downstream end of the heater 80. The inner wall 260 has a pair of lips 262, 264 that extend towards the heater 80 into which the outer wall 180 of the heater 80 is inserted. A radially inner surface 260a of the inner wall 260 directs the fluid that exits the heater 80 towards the fluid outlet 440.

[0049] The upstream end 80a of the heater 80 includes a locating ring 82. The locating ring 82 includes locating features 86 which extend radially inwards of the inner wall 84. The second part 310b includes legs 186 which

extend longitudinally towards the first end 32 of the body 30. Locating features 86 and legs 186 are non-symmetrical so the legs 186 can only pass around the locating features 86 in one orientation.

[0050] The first part 310a has first locating features 102 at an upstream end 312a of the tube 312 these first locating features 102 are adapted to engage between the legs 186 again, as legs 186 are non-symmetrical this engagement can only occur in one orientation. First locating features 102 and legs 186 are provided with a groove 104 into which a circlip 106 is located to loosely retain the parts of the cartridge 250 together in the known orientation for further assembly.

[0051] Having all the components retained in a single known orientation is advantageous during manufacture as internal looming will always be routed along the same path requiring the same lengths of wiring; the connection for control buttons 64 on the PCB will be in the correct place; and PCB components will be orientated correctly.

[0052] Once the cartridge 250 has been assembled as described, the cartridge 250 is inserted into the body 30. The cartridge 250 is radially constrained within the body 30 and longitudinally constrained within the body 30. Ideally the cartridge is constrained at the first end 32 and the second end 34 and by constraining features that are radially spaced around the cartridge. In this example, there are four constraining features.

[0053] An outer surface 260b of the inner wall 260 is provided with two radially spaced apart ribs 266 which extend towards the outer wall 360 and radially around the inner wall 260 in an arc. In addition, the inner end wall 314 is provided with two radially spaced apart ribs 316 which extend towards the outer wall 360 and radially around the inner end wall 314 in an arc. An inner surface 360a of the outer wall 360 has two pairs of cooperating ribs 362, 364 which extend radially inwards from the inner surface 360a and radially around the outer wall 360 in an arc. One pair of cooperating ribs 362 is located near the first end 32 of the body 30 and the second pair of cooperating ribs 364 is located near the second end 34 of the body 30. When the cartridge 250 is pushed into the body, when the radially spaced apart ribs 266, 316 are upstream of the two pairs of cooperating ribs 362, 364, the cartridge is rotated until a stop 370 is reached.

[0054] In order to retain the cartridge 250 in the rotated state, one set of ribs is provided with a retaining feature. In this example, the cooperating ribs 362, 364 of the body 30 are provided with a restriction 372, in this case a protrusion which cooperates with a corresponding recess 374 on the respective ribs 266, 316. When the ribs 266, 316 and cooperating ribs 362, 364 are rotated an end 266a, 316a of the ribs 266, 316 must be pushed passed the restriction 372 to allow the corresponding recess 374 to accommodate the restriction 372.

[0055] A sealing gasket 116 is provided between the inner wall 260 and the outer wall 360 of the body 30. This sealing gasket 116 is deformed when the radially spaced apart ribs 266, 316 are pushed downstream of the two

pairs of cooperating ribs 362, 364. This provides a seal between the outer wall 360 and the inner wall 260 and helps to prevent movement of the cartridge 250, including an opposite rotational movement, within the body 30.

[0056] To seal the gap formed between the first part 310a and the second part 310c, the third part 310c is provided with a lip seal 340 which extends radially around the radially outer surface 322a of the tube 322. When the third part 310c is inserted within the body 30, the lip seal 340 engages with the second part 310b downstream of the legs 186 to prevent fluid flowing through the duct 310 entering the primary fluid flow path 400.

[0057] At the first end 32 of the body 30, an O-ring 352 is provided between the side wall 350 and the outer wall 360 to seal this gap and prevent fluid entering the primary fluid flow path 400 via this gap and the one between the inner end wall 314 and the outer wall 360.

[0058] The side wall 350 has radially spaced snap fits 354 which extend out from an inner surface 350a of the side wall and engage with apertures 318 provided in the inner end wall 314. To stop rotation of the cartridge 250, the side wall has a pair of protrusions 356 which engage recesses 366 provided in the inner surface 360a of the outer wall (See Figures 3 and 4b).

[0059] Thus, the components of the cartridge 250 are located in the body 30 in a known orientation and are prevented from being dislodged from this orientation by a combination of the restriction 372 and corresponding recess 374 of the ribs; the protrusion 356 of the side wall 350 engaging the recess 366 of the outer wall 360; all in conjunction with the snap fits 354 which cannot be removed from the apertures 318 without breaking them.

[0060] The invention has been described in detail with respect to a hairdryer however, it is applicable to any appliance that draws in a fluid and directs the outflow of that fluid from the appliance.

[0061] The appliance can be used with or without a heater; the action of the outflow of fluid at high velocity has a drying effect.

[0062] 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.

[0063] 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 body having an outer wall, a chassis extending within the outer wall, wherein the chassis comprises a locking feature and the body comprises an engaging feature adjacent both the first end and the second end, the cooperating locking and engaging features adapted to retain

the chassis in position within the outer wall when the locking features are rotated with respect to the engaging features.

2. An appliance according to claim 1, wherein the outer wall comprises an inner surface and the engaging feature extends radially inwards from the inner surface.
3. An appliance according to claim 1 or claim 2, wherein the engaging feature comprises a rib that extends from an inner surface of the outer wall.
4. An appliance according to claim 2 or claim 3, wherein the engaging feature extends at least partially around the inner surface of the outer wall.
5. An appliance according to any preceding claim, wherein the engaging feature comprises a pair of engaging features.
6. An appliance according to claim 5, wherein the pair of engaging features are radially spaced apart.
7. An appliance according to any preceding claim, wherein the locking feature comprises a locking rib.
8. A hair care appliance according to claim 7, wherein the rib extends radially from the chassis towards the outer wall.
9. An appliance according to any preceding claim, wherein when the chassis is retained in position, the chassis is constrained both radially and longitudinally within the outer wall.
10. An appliance according to any preceding claim, wherein the chassis comprises a first part and a second part.
11. An appliance according to claim 10, wherein the first part of the chassis connects to the second part of the chassis in one orientation.
12. An appliance according to claim 11, wherein the first part of the chassis and the second part of the chassis each comprise at least two asymmetrical cooperating projections and recesses which engage in only one orientation.
13. An appliance according to any preceding claim, wherein the body houses a heater and the heater is mounted on the first part of the chassis.
14. An appliance according to claim 13 when dependent on claim 12, wherein the heater comprises a locating ring which cooperates with the at least two asymmetrical cooperating projections and recesses on

the first part of the chassis such that the heater can only be mounted on the first part of the chassis in one orientation.

15. An appliance according to any preceding claim, wherein the body comprises a PCB and the PCB is mounted on the second part of the chassis. 5
16. An appliance according to claims 15, wherein the body comprises a PCB baffle connected to the PCB. 10
17. An appliance according to claim 16, wherein the PCB baffle comprises orientating features such that the PCB and PCB baffle are mountable on the second part of the chassis in one orientation. 15
18. An appliance according to any preceding claim, wherein the body comprises a retaining wall wherein the retaining wall retains the chassis in a rotated position with respect to the outer wall. 20
19. An appliance according to claim 18, wherein the retaining wall extends over the chassis at one end of the body. 25
20. An appliance according to claim 19, wherein the retaining wall engages with the outer wall and the chassis to maintain the chassis in a rotated position with respect to the outer wall. 30
21. An appliance according to any of claims 17 to 20, wherein the chassis comprises a first part and a second part and the retaining wall extends from one end of the body over a junction formed between the first part of the chassis and the second part of the chassis. 35
22. An appliance according to claim 21, wherein the retaining wall comprises a tube that extends at least partially along the body from one end and radially within the chassis over the junction. 40
23. An appliance according to claim 22, wherein the tube comprises a lip seal extending radially around the tube between the tube and the chassis. 45
24. An appliance according to any of claims 20 to 23, wherein an O-ring is provided between the retaining wall and one or both of the outer wall and the chassis.. 50
25. An appliance according to claim 24, wherein the O-ring is disposed between the retaining wall and the outer wall.
26. An appliance according to any preceding claim, wherein the primary fluid outlet is at a downstream end of the body. 55

27. An appliance according to claim 26, wherein the inner wall has a downstream end and an upstream end and the downstream end at least partially defines the primary fluid outlet.

28. An appliance according to claim 27, wherein the upstream end of the inner wall extends towards the outer wall.

29. An appliance according to claim 27 or claim 28, wherein the inner wall includes a sealing portion that extends to the outer wall.

30. An appliance according to claim 29, wherein the sealing portion is between the upstream end and downstream end of the inner wall.

31. An appliance according to any of claims 1 to 30 wherein the appliance is a hairdryer.

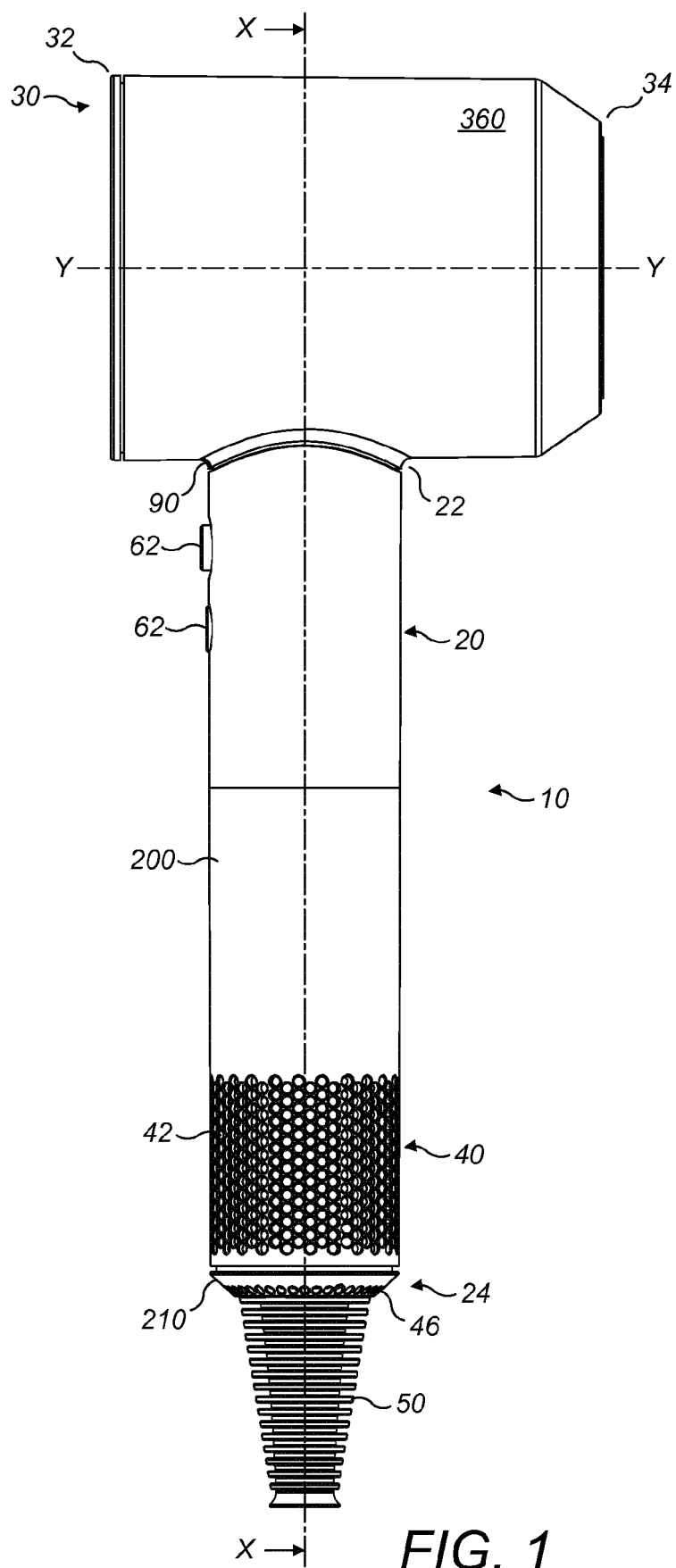
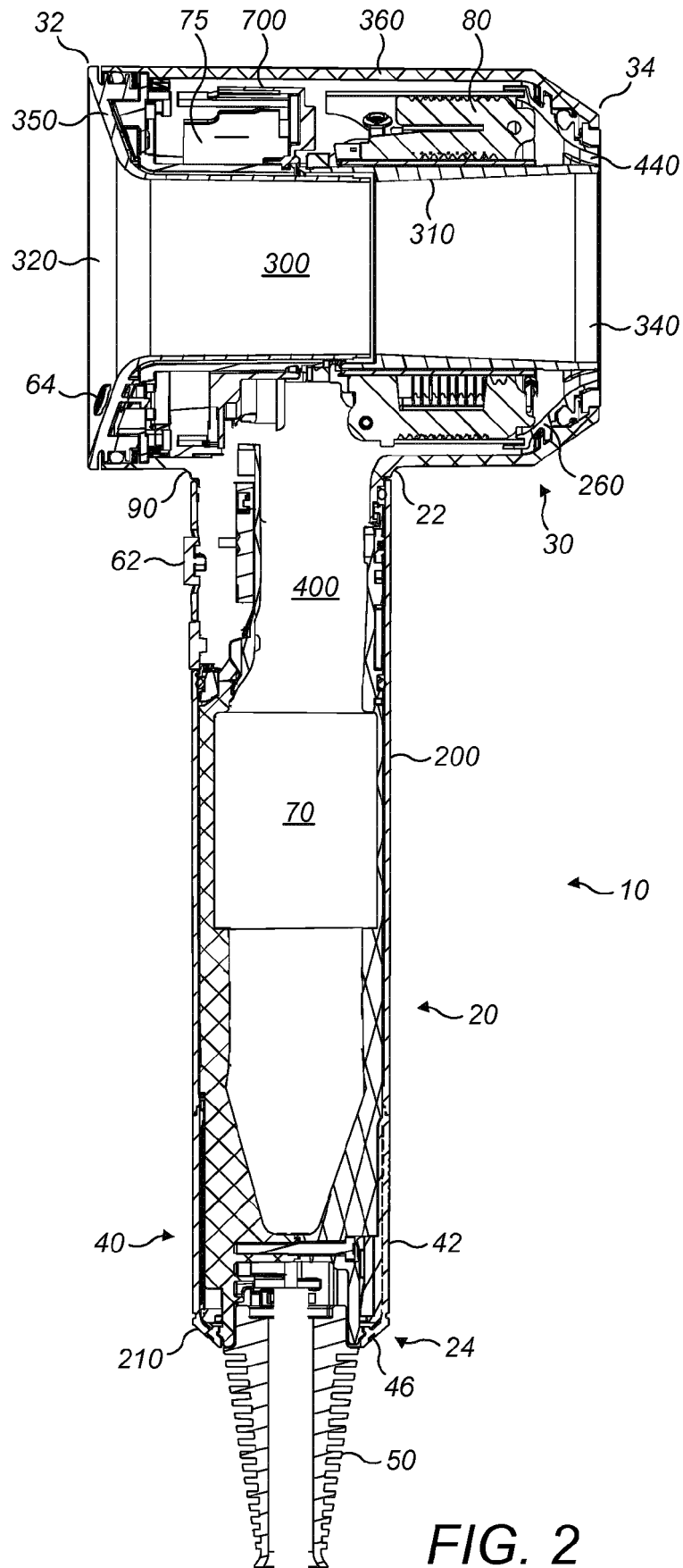


FIG. 1



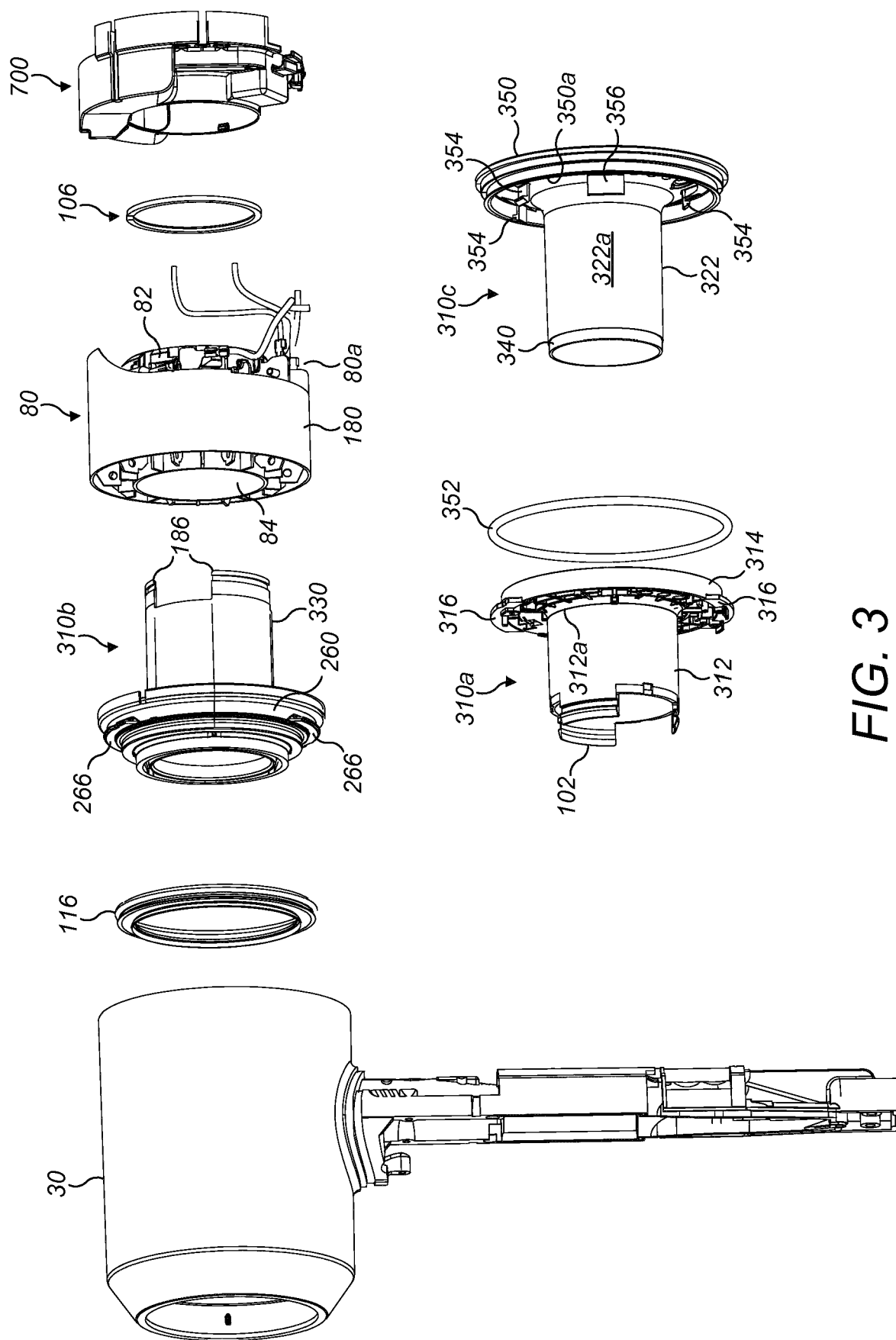


FIG. 3

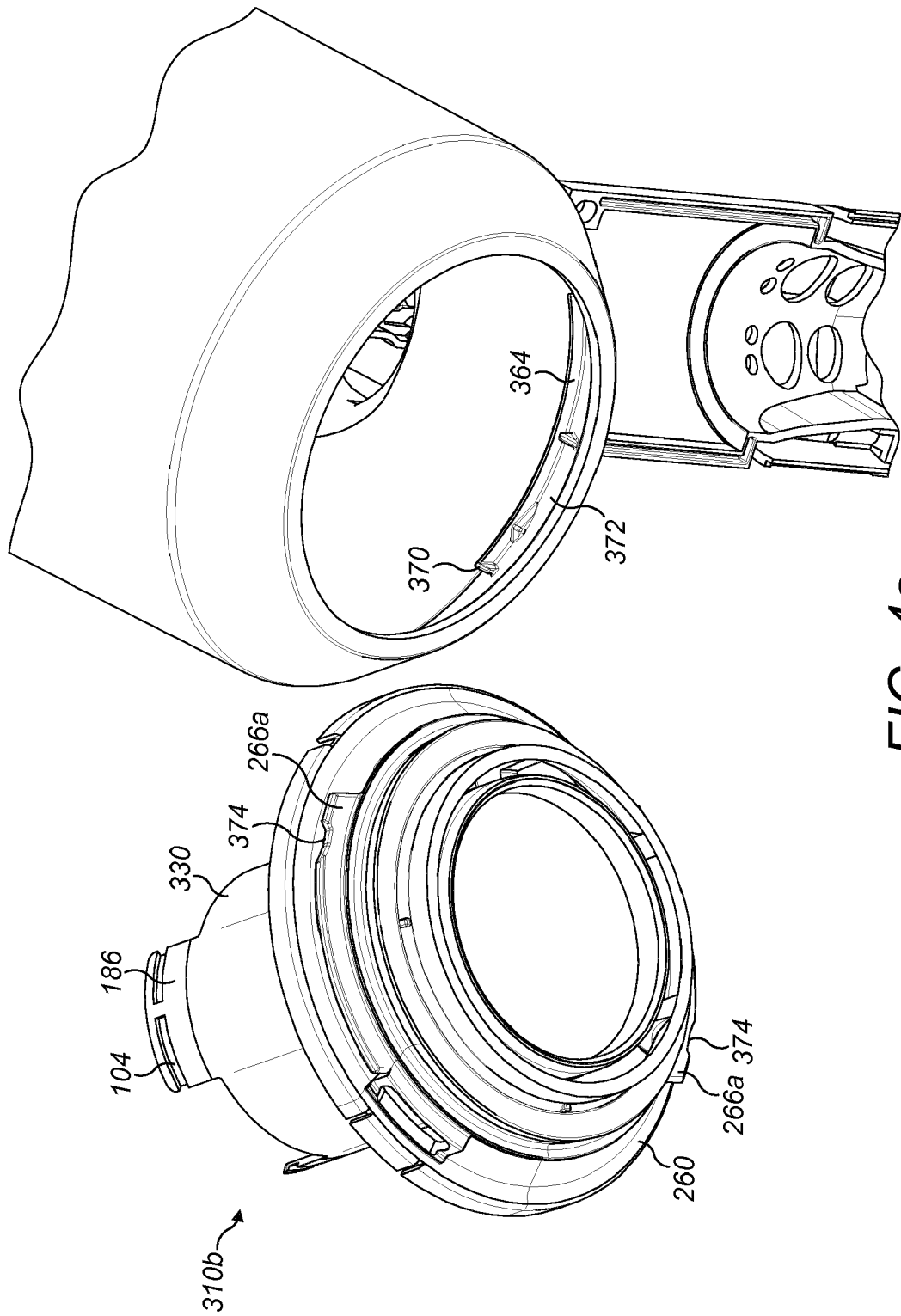


FIG. 4a

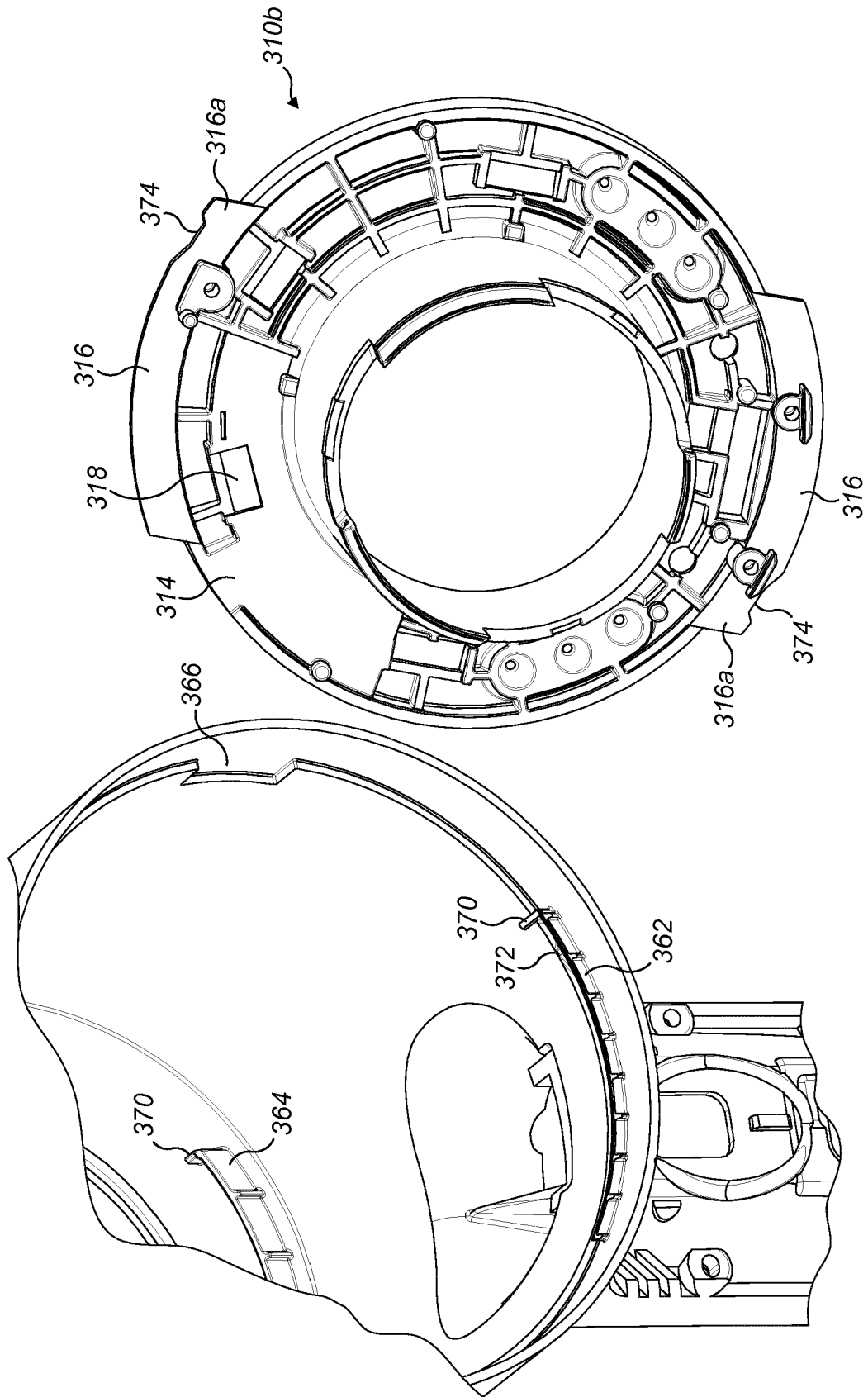
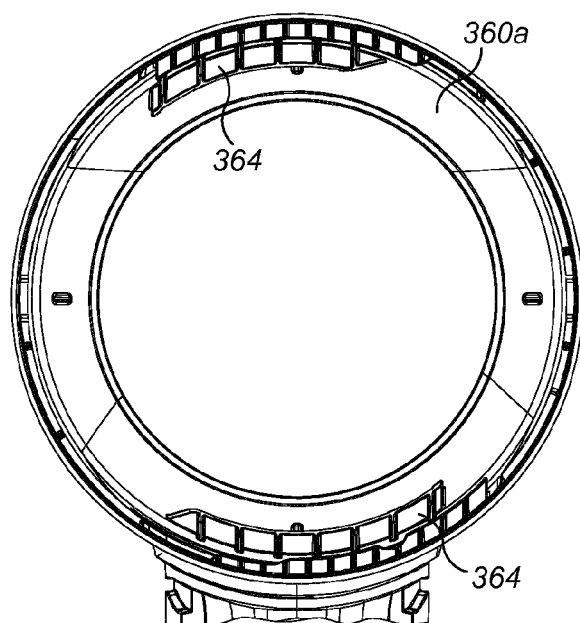
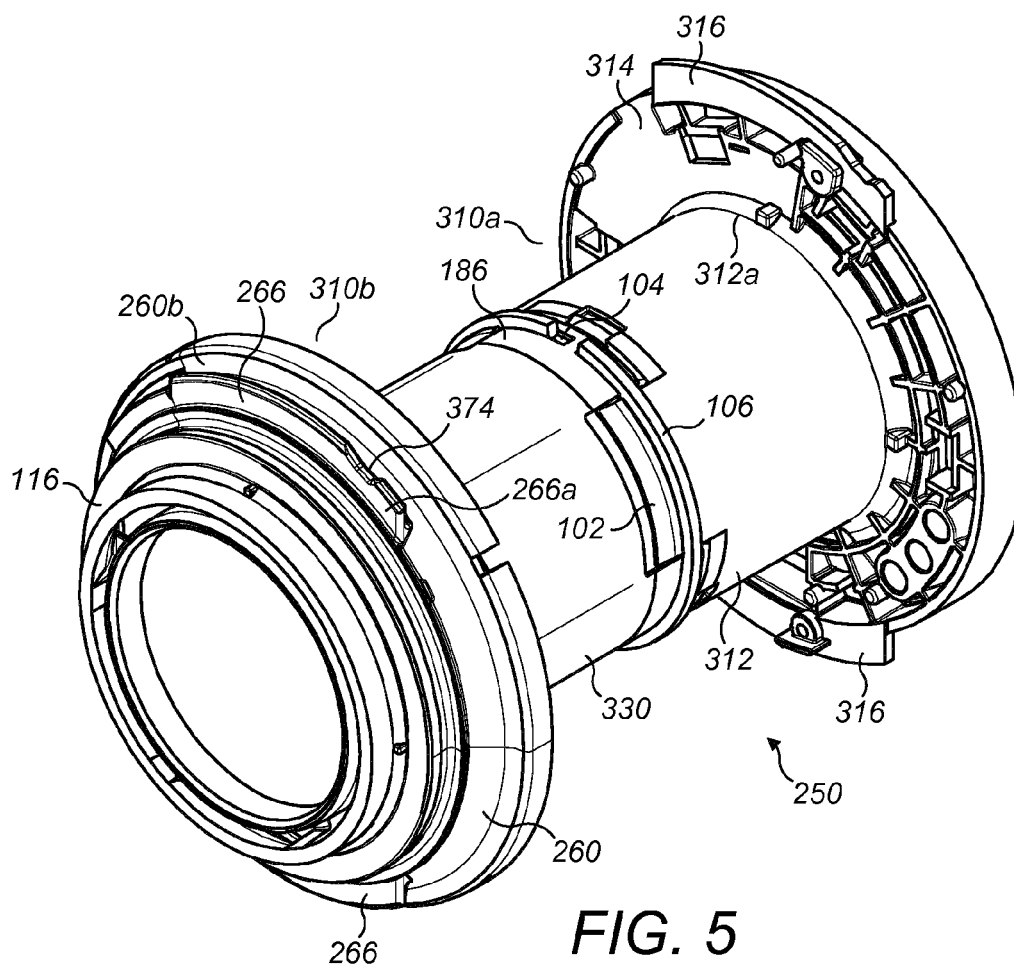


FIG. 4b



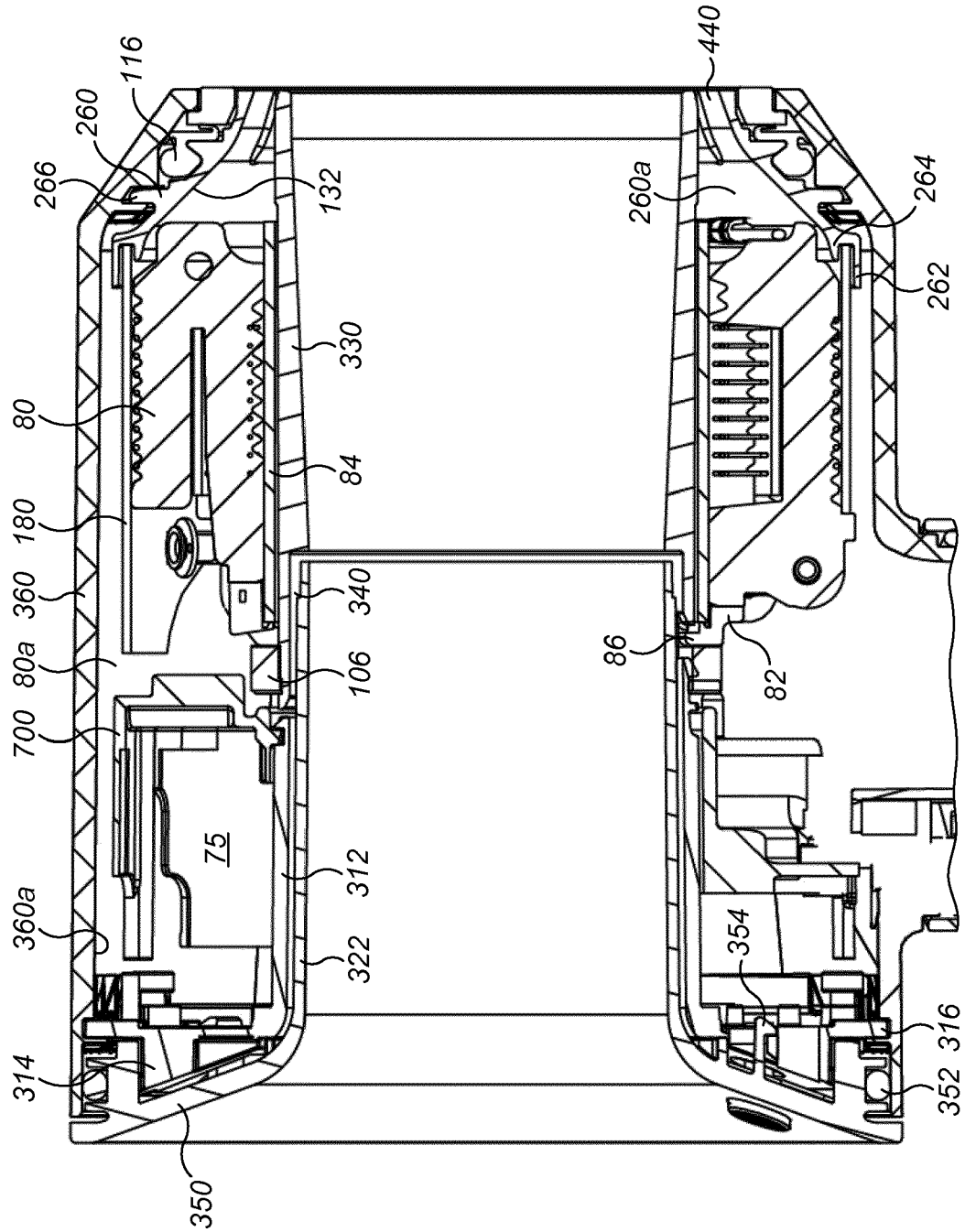


FIG. 7



EUROPEAN SEARCH REPORT

Application Number
EP 16 20 0469

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			A45D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 30 August 2017	Examiner Nicolás, Carlos
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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EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 16 20 0469

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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30-08-2017

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