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(54) **Self-propelled vacuum cleaner**

(57) A self-propelled vacuum cleaner has a moving device (10) and a vacuuming device (20). The moving device (10) has a casing (11) and a control module (15). The casing (11) has at least one wheel (12), a vacuuming hole (13), a clapboard (13), a mounting chamber (14), an assembling chamber (16) and a communicating hole (17). The vacuuming device (20) is detachably connected to the moving device (10) and has a vacuuming module

and a filtering module. The vacuuming module is mounted in the assembling chamber (16) and has a front shell (21), a power supply (22), a fan (23) and a communicating cover (24). The filtering module is mounted in the mounting chamber (14), is connected to the vacuuming module and has a rear shell (25), a filter holder (27) and a filter (26).

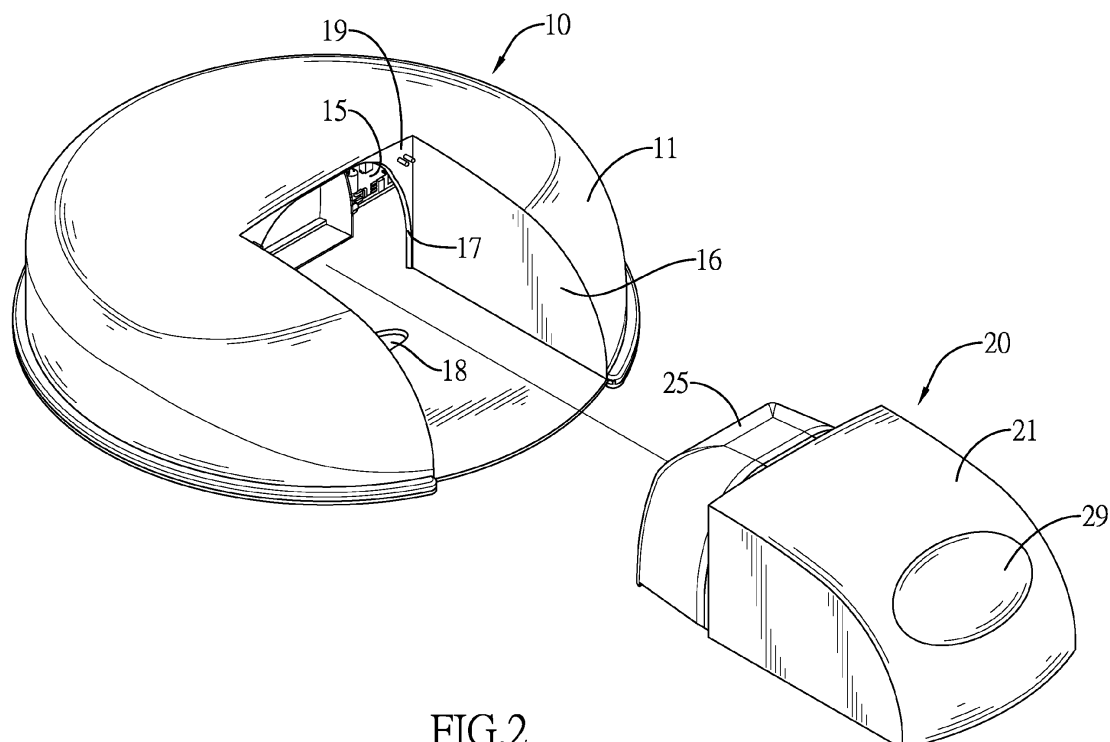


FIG.2

Description

1. Field of the Invention

[0001] The present invention relates to a vacuum cleaner, and more particularly to a self-propelled vacuum cleaner that can be disassembled for improving the applicability of the self-propelled vacuum cleaner.

2. Description of Related Art

[0002] As people nowadays are busy in work and life, for convenience in cleaning tasks, different kinds of vacuum cleaners are provided. Among the vacuum cleaners, a conventional self-propelled vacuum cleaner is particularly favored by the users because the conventional self-propelled vacuum cleaner can move on the ground automatically to provide a vacuuming-cleaning operation. The conventional self-propelled vacuum cleaner has a casing, a control module and a vacuuming module. The casing has a bottom, an annular sidewall, multiple wheels and at least one side brush. The wheels are rotatably mounted on the bottom of the casing. The at least one side brush is rotatably mounted on the annular sidewall of the casing. The control module is mounted in the casing to control the rotation of the wheels. The vacuuming module is connected to the casing and has a fan, a connecting tube and a dust-collecting element. The connecting tube is connected to the fan and the dust-collecting element. The dust-collecting element has a vacuuming hole extending out of bottom of the casing.

[0003] In use, the conventional self-propelled vacuum cleaner can only be used to clean the flat areas. When the conventional self-propelled vacuum cleaner moves to a corner, the vacuuming hole of the dust-collecting element that is disposed on a center of the casing and cannot suck dust from the corner. The conventional self-propelled vacuum cleaner needs to use the at least one side brush to sweep the dust to the vacuuming hole of the dust-collecting element. However, the sweeping force of the at least one side brush is not strong enough to sweep all of the dust to the vacuuming hole of the dust-collecting element, and this will affect the cleaning effect of the conventional self-propelled vacuum cleaner. Furthermore, the conventional self-propelled vacuum cleaner cannot be used to vacuum dust on the vertical curtains, on the screen window, or in the car, and the user needs to buy another kind of conventional cleaning device. As such, the conventional self-propelled vacuum cleaner has insufficient and limited applicability.

[0004] To overcome the shortcomings, the present invention provides a self-propelled vacuum cleaner to mitigate or obviate the aforementioned problems.

[0005] The main objective of the present invention is to provide a self-propelled vacuum cleaner that can be disassembled and can improve the applicability of the self-propelled vacuum cleaner.

[0006] The self-propelled vacuum cleaner in accord-

ance with the present invention has a moving device and a vacuuming device. The moving device has a casing and a control module. The casing has at least one wheel, a vacuuming hole, a clapboard, a mounting chamber, an assembling chamber and a communicating hole. The communicating hole is formed through the clapboard and communicates with the mounting chamber and the assembling chamber. The control module is mounted in the mounting chamber to control the rotation of the at least one wheel. The vacuuming device is detachably connected to the moving device in the assembling chamber and has a vacuuming module and a filtering module. The vacuuming module is mounted in the assembling chamber and has a front shell, a power supply, a fan and a communicating cover. The filtering module is mounted in the mounting chamber, is connected to the vacuuming module and has a rear shell, a filter holder and a filter.

[0007] Other objectives, advantages and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

IN THE DRAWINGS:

[0008]

Fig. 1 is a perspective view of a self-propelled vacuum cleaner in accordance with the present invention;

Fig. 2 is an exploded perspective view of the self-propelled vacuum cleaner in Fig. 1;

Fig. 3 is an exploded perspective view of a vacuuming device of the self-propelled vacuum cleaner in Fig. 2; and

Fig. 4 is a side view in partial section of the self-propelled vacuum cleaner in Fig. 1.

[0009] With reference to Figs. 1, 2 and 4, a self-propelled vacuum cleaner in accordance with the present invention comprises a moving device 10 and a vacuuming device 20.

[0010] The moving device 10 has a casing 11 and a control module 15. The casing 11 has a bottom, a middle, a front side, a rear side, at least one wheel 12, a vacuuming hole 13, a clapboard 19, a mounting chamber 14, an assembling chamber 16, a communicating hole 17 and a positioning hole 18. The at least one wheel 12 is rotatably mounted on the bottom of the casing 11 near the rear side of the casing 11. The vacuuming hole 13 is formed through the bottom of the casing 11 near the at least one wheel 12.

[0011] The clapboard 19 is formed on and protrudes from the bottom of the casing 11 at the middle of the casing 11. The mounting chamber 14 is formed in the casing 11 between the clapboard 19 and the rear side of the casing 11. The assembling chamber 16 is formed partially through the front side of the casing 11 to form two sidewalls to connect with the clapboard 19. The com-

municating hole 17 is formed through the clapboard 19 of the casing 11 and communicates with the mounting chamber 14 and the assembling chamber 16. The positioning hole 18 is formed through the bottom of the casing 11 and communicates with the assembling chamber 16.

[0012] The control module 15 is mounted in the mounting chamber 14 of the casing 11 to control the rotation of the at least one wheel 12.

[0013] With reference to Figs. 2 to 4, the vacuuming device 20 is detachably connected to the moving device 10 in the assembling chamber 16 and has a vacuuming module and a filtering module. The vacuuming module is mounted in the assembling chamber 16 of the casing 11 and has a front shell 21, a power supply 22, a fan 23 and a communicating cover 24. The front shell 21 is hollow and has a closed front side, an open rear side, a bottom, a mounting recess, a through hole 28 and a net 29. The mounting recess is formed in the front shell 21 and communicates with the open rear side of the front shell 21. The through hole 28 is formed through the bottom of the front shell 21, communicates with the mounting recess of the front shell 21 and aligns with the positioning hole 18 of the casing 11 when the vacuuming device 20 is connected to the moving device 10. The net 29 is mounted on the closed front side of the front shell 21 and communicates with the mounting recess of the front shell 21.

[0014] The power supply 22 is mounted on the bottom of the front shell 21 in the mounting recess between the through hole 28 and the closed front side of the front shell 21.

[0015] The fan 23 is mounted in the mounting recess of the front shell 21, is electrically connected to the power supply 22 and has a top, a bottom, a front side, an inlet hole 231, at least one outlet hole 232 and a positioning protrusion 233. The inlet hole 231 is formed through the top of the fan 23. The at least one outlet hole 232 is formed through the front side of the fan 23 and communicates with the inlet hole 231 and the net 29 of the front shell 21. The positioning protrusion 233 is formed on and protrudes from the bottom of the fan 23, engages and extends out of the positioning hole 18 of the casing 11 via the through hole 28 of the front shell 21. The communicating cover 24 is mounted in the mounting recess of the front shell 21, is mounted on the top of the fan 23, communicates with the inlet hole 231 and has a rear side.

[0016] The filtering module is mounted in the mounting chamber 14 via the communicating hole 17, is connected to the vacuuming module and has a rear shell 25, a filter holder 27 and a filter 26. The rear shell 25 is detachably connected to the front shell 21 and has an open front side, a closed rear side, and an inlet pipe 251. The open front side of the rear shell 25 is connected to the rear side of the communicating cover 24. The inlet pipe 251 is formed on the closed rear side of the rear shell 25 and communicates with the vacuuming hole 13 of the casing 11 when the vacuuming device 20 is connected to the moving device 10.

[0017] The filter holder 27 is porous, is mounted between the communicating cover 24 and the rear shell 25 and has a rear side. The filter 26 is mounted on the rear side of the filter holder 27.

[0018] When the vacuuming device 20 is connected to the moving device 10, the vacuum cleaner in accordance with the present invention can serve as a self-propelled vacuum cleaner. The control module 15 can control the rotation of the at least one wheel 12 to move the casing 11. Then, the vacuuming device 20 can be moved with the moving device 10 to provide a vacuuming-cleaning operation. In the vacuuming-cleaning operation, the power supply 22 supplies electricity to the fan 23 to enable the fan 23 to operate. The operation of the fan 23 can generate an air flow to suck the dust and the dirt into the rear shell 25 via the vacuuming hole 13 of the casing 11 and the inlet pipe 251 of the rear shell 25. When the air flow flows through the filter 26, the dust and dirt will be filtered and stored in the rear shell 25. Furthermore, the filtered air flow can be flowed out of the self-propelled vacuum cleaner via the communicating cover 24, the inlet hole 231, the at least one outlet hole 232 and the net 29 of the front shell 21.

[0019] When the user wants to clean a corner, a screen window, a car or any area inaccessible with the conventional self-propelled vacuum cleaner, the user can separate the vacuuming device 20 from the moving device 10 to vacuum the dust and dirt on the corner, the screen window or in the car conveniently and practically.

[0020] According to the above-mentioned features and structural relationship of the vacuum cleaner in accordance with the present invention, when the vacuuming device 20 is connected to and moved with the moving device 10, the vacuum cleaner can serve as a self-propelled vacuum cleaner, and this can provide an automatic cleaning effect to save manpower conveniently. In addition, the vacuuming device 20 of the self-propelled vacuum cleaner can be separated from the moving device 10 and can be individually used to provide a cleaning effect for the corner, the screen window and the car without interfering with the moving device 10, and this can improve the cleaning effect of the self-propelled vacuum cleaner. Therefore, the user can select either the vacuuming device 20 alone or the vacuuming device 20 connected with the moving device 10 according to the user's need, and this can improve the applicability of the self-propelled vacuum cleaner.

[0021] Even though numerous characteristics and advantages of the present utility model have been set forth in the foregoing description, together with details of the structure and features of the utility model, the disclosure is illustrative only. Changes may be made in the details, especially in matters of shape, size, and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

Claims**1. A self-propelled vacuum cleaner, characterized in that:**

a moving device (10) having

a casing (11) having

a bottom; 10
 a middle;
 a front side;
 a rear side;
 at least one wheel (12) rotatably mounted on the bottom of the casing (11) near the rear side of the casing (11); 15
 a vacuuming hole (13) formed through the bottom of the casing (11) near the at least one wheel (12);
 a clapboard (19) formed on and protruding from the bottom of the casing (11) at the middle of the casing (11); 20
 a mounting chamber (14) formed in the casing (11) between the clapboard (19) and the rear side of the casing (11); 25
 an assembling chamber (16) formed partially through the front side of the casing (11) to form two sidewalls to connect with the clapboard (19); and
 a communicating hole (17) formed 30
 through the clapboard (19) of the casing (11) and communicating with the mounting chamber (14) and the assembling chamber (16); and

a control module (15) mounted in the mounting chamber (14) of the casing (11) to control a rotation of the at least one wheel (12); and

a vacuuming device (20) detachably connected to the moving device (10) in the assembling chamber (16) and having an inlet pipe (251) communicating with the vacuuming hole (13) of the casing (11). 40

2. The self-propelled vacuum cleaner as claimed in claim 1, wherein the vacuuming device has

a vacuuming module mounted in the assembling chamber (16) of the casing (11) and having 50

a front shell (21) having

a closed front side;
 an open rear side; 55
 a bottom; and
 a mounting recess formed in the front shell (21) and communicating with the

open rear side of the front shell (21);

a power supply (22) mounted on the bottom of the front shell (21) in the mounting recess; a fan (23) mounted in the mounting recess of the front shell (21), electrically connected to the power supply (22), and having

a top;
 a bottom;
 a front side;
 an inlet hole (231) formed through the top of the fan (23);
 at least one outlet hole (232) formed through the front side of the fan (23) and communicating with the inlet hole (231); and

a communicating cover (24) mounted in the mounting recess of the front shell (21), mounted on the top of the fan (23), communicating with the inlet hole (231) and having a rear side; and

a filtering module mounted in the mounting chamber (14) via the communicating hole (17), connected to the vacuuming module and having

a rear shell (25) detachably connected to the front shell (21) and having

an open front side connected to the rear side of the communicating cover (24); and
 a closed rear side; and

wherein the inlet pipe (251) is formed on the closed rear side of the rear shell (25) and communicates with the vacuuming hole (13) of the casing (11) when the vacuuming device (20) is connected to the moving device (10).

3. The self-propelled vacuum cleaner as claimed in claim 2, wherein the rear shell (25) has

a filter holder (27) mounted between the communicating cover (24) and the rear shell (25) and having a rear side; and
 a filter (26) mounted on the rear side of the filter holder (27). 45

4. The self-propelled vacuum cleaner as claimed in claim 2, wherein

the casing (11) has a positioning hole (18) formed through the bottom of the casing (11) and communicating with the assembling chamber (16);
 the front shell (21) has a through hole (28) formed through the bottom of the front shell (21), communicating with the mounting recess of the front shell (21)

and aligning with the positioning hole (18) of the casing (11) when the vacuuming device (20) is connected to the moving device (10); and
the fan (23) has a positioning protrusion (233) formed on and protruding from the bottom of the fan (23), engaging and extending out of the positioning hole (18) of the casing (11) via the through hole (28) of the front shell (21); and
wherein the power supply (22) is mounted on the bottom of the front shell (21) in the mounting recess between the through hole (28) and the closed front side of the front shell (21).

5. The self-propelled vacuum cleaner as claimed in claims 2 or 3 or 4, wherein the front shell (21) has a net (29) mounted on the closed front side of the front shell (21) and communicating with the mounting recess of the front shell (21) and the at least one outlet hole (232) of the fan (23).

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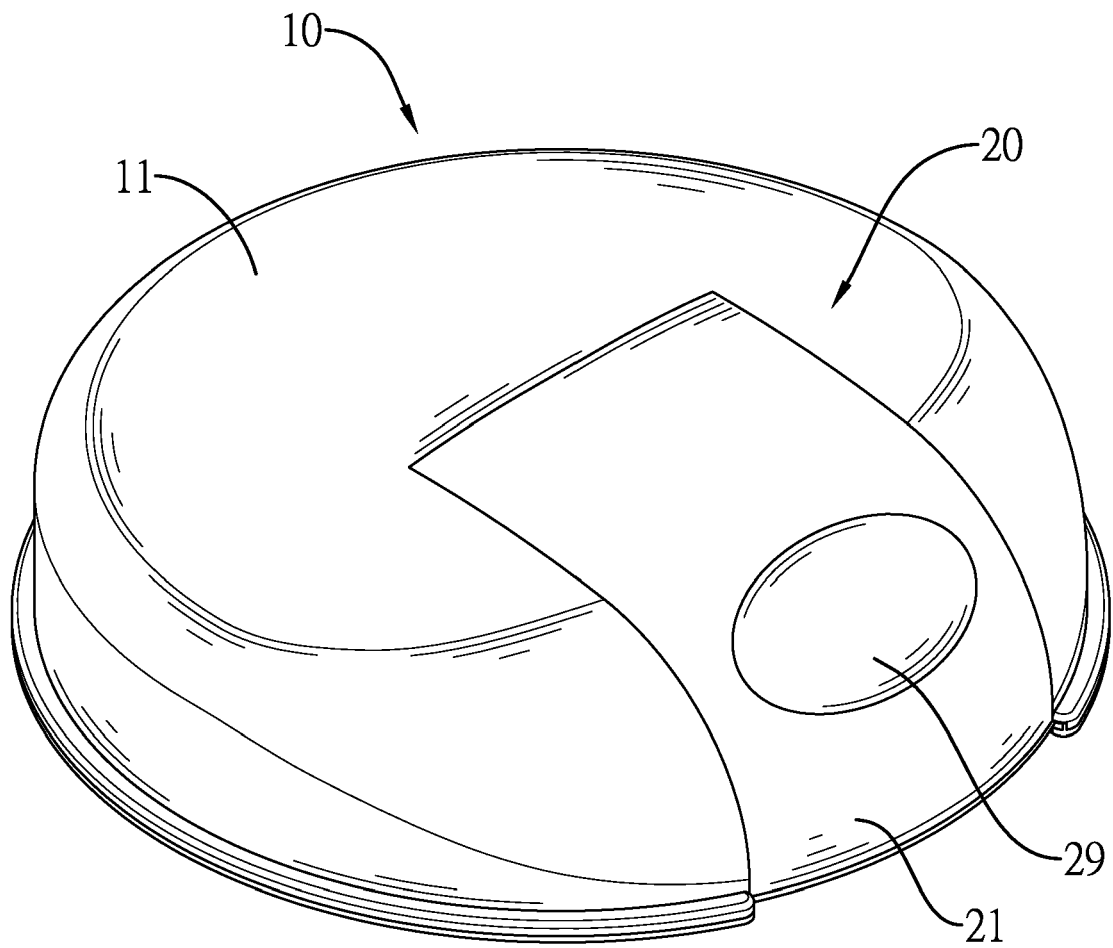


FIG.1

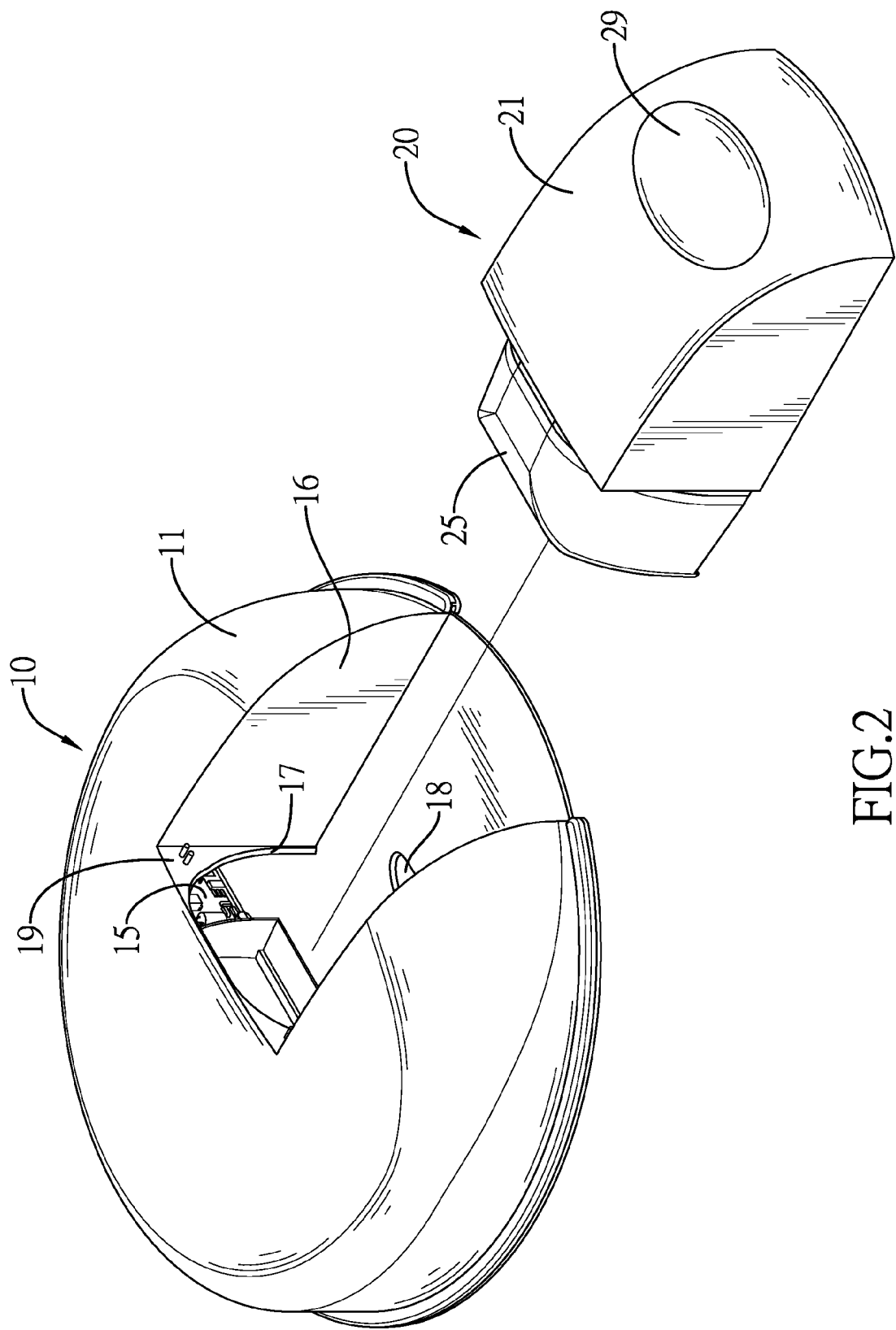


FIG. 2

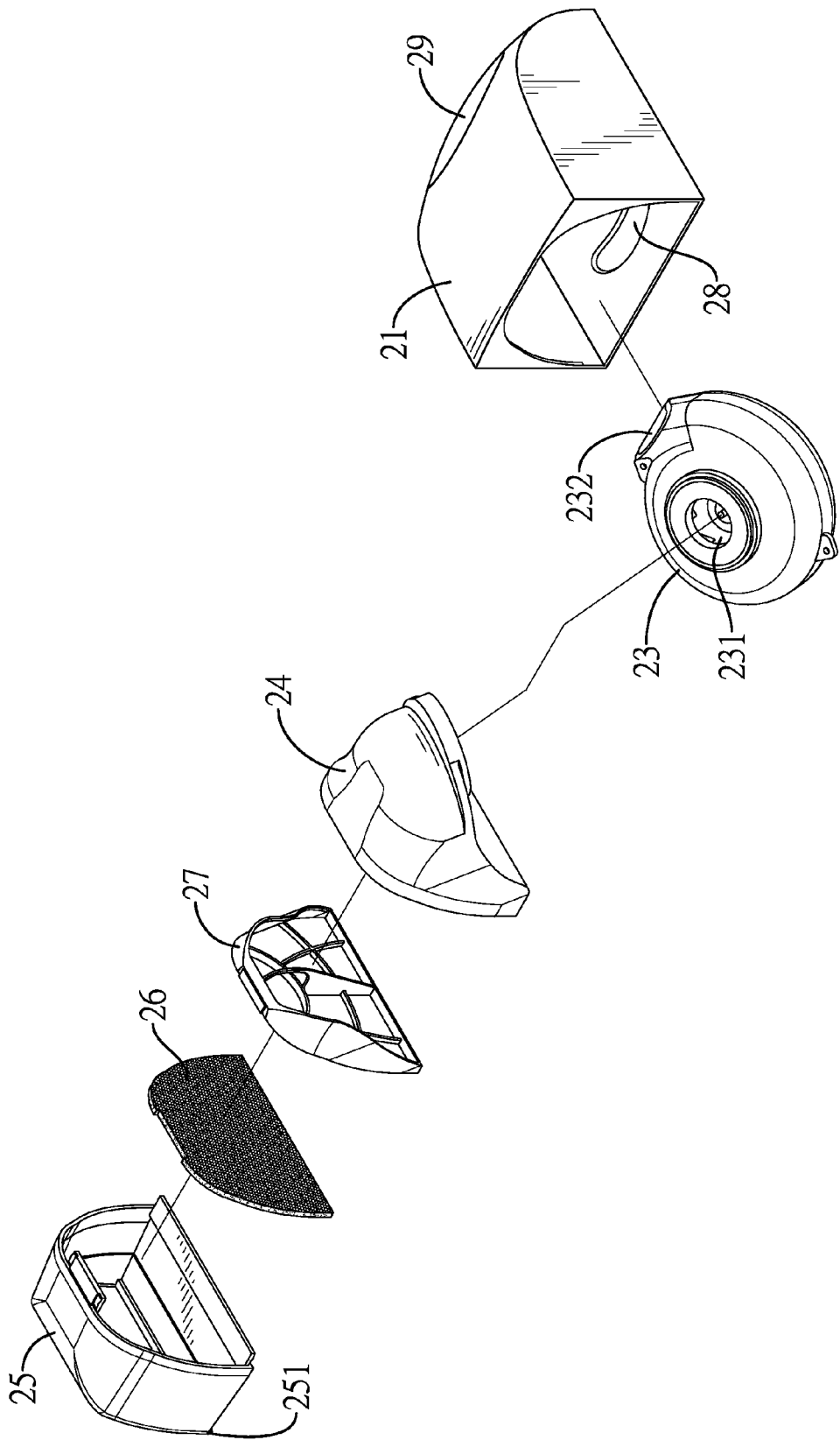


FIG.3

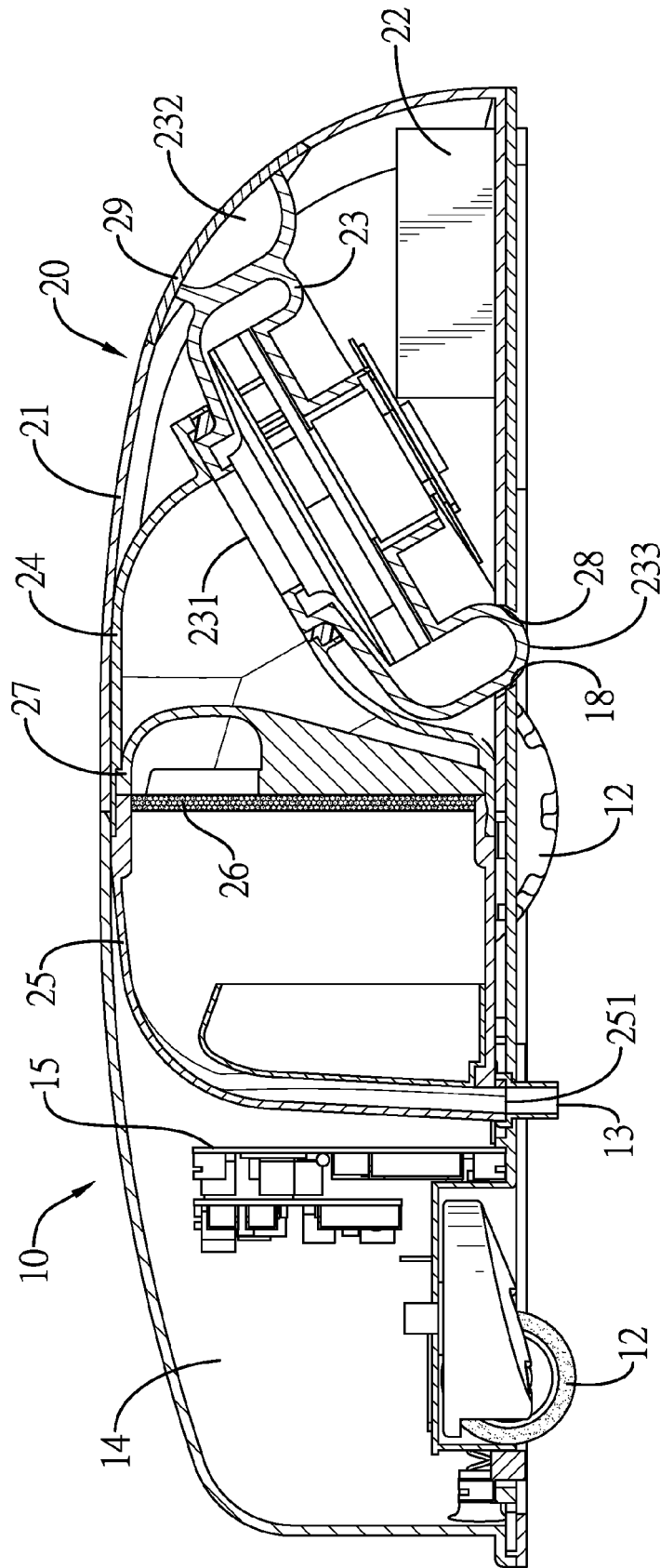


FIG.4



EUROPEAN SEARCH REPORT

Application Number
EP 13 19 5996

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2012/199006 A1 (SWETT DAVID ORRIN [US] ET AL) 9 August 2012 (2012-08-09)	1	INV. A47L9/22
A	* paragraph [0042] - paragraph [0072]; figures 1a,1b,2-4,5a,5d *	2-5	

X	US 2012/084935 A1 (CHIU TING-YIN [TW]) 12 April 2012 (2012-04-12)	1	
A	* paragraph [0022] - paragraph [0030]; figures 1-4,6 *	2-5	

A	GB 2 344 778 A (NOTETRY LTD [GB]) 21 June 2000 (2000-06-21)	1-5	
	* abstract; figures 1,5,6,8 *		

The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			A47L
Place of search		Date of completion of the search	Examiner
Munich		28 February 2014	Blumenberg, Claus
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			

EPO FORM 1503 03.82 (P04C01)

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

EP 13 19 5996

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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28-02-2014

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2012199006 A1	09-08-2012	NONE	

US 2012084935 A1	12-04-2012	CN 201840415 U	25-05-2011
		US 2012084935 A1	12-04-2012

GB 2344778 A	21-06-2000	AU 1575100 A	12-07-2000
		GB 2344778 A	21-06-2000
		GB 2360960 A	10-10-2001
		WO 0036967 A1	29-06-2000

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82