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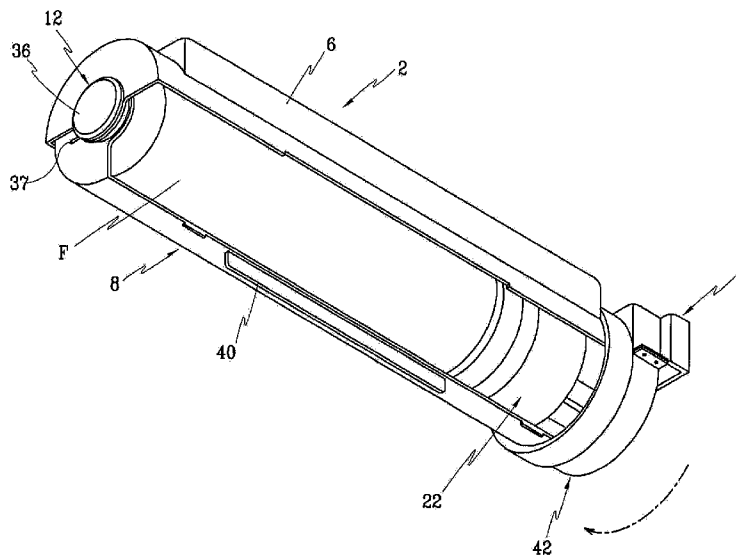
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(54) Title: WATER FILTER ASSEMBLY FOR A REFRIGERATOR



(57) Abstract: Disclosed is a water filter assembly for a refrigerator, which is designed such that a filter cartridge can be easily replaced. The filter assembly includes a base mounted on a ceiling or a sidewall of the refrigerator, a manifold installed on the base and being capable of moving downward, a filter cartridge detachably mounted on the manifold, and a cover coupled to the base and moving between an open position and a closed position, wherein the cover is formed in a semi-cylindrical shape, moves into the base in the open position by pivoting about a length direction axis of the base, and pivots toward an external side from the base to cover the filter cartridge in the closed position.



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WATER FILTER ASSEMBLY FOR A REFRIGERATOR

Technical Field

The present invention relates to a water filter assembly for a refrigerator.
5 More particularly, the present invention relates to a water filter assembly that is designed such that a filter cartridge can be easily replaced.

Background Art

A refrigerator includes a unit for making ice cubes or supplying cool water. The unit is supplied with water from water supply facilities or a water storage
10 container installed in the refrigerator.

A filter assembly for filtering off foreign objects contained in the water is installed in the refrigerator regardless of the structure.

A filter cartridge that substantially filters off the foreign objects is mounted in the water filter assembly. The filter cartridge must be replaced with a new one
15 when a predetermined period of time has elapsed.

However, as the water filter assembly is built in a ceiling or sidewall of the refrigerator, it is very inconvenient to replace the filter cartridge.

In order to solve the drawback, U.S. Patent No. 7,056,435 B2 discloses a water filter assembly in which a manifold on which a filter cartridge is mounted is
20 pivotally mounted on a base and a cover is pivotally mounted on the manifold.

However, in the water filter assembly disclosed in the U.S. Patent 7,056,435 B2, the pivotal motion of the manifold on the base is realized at a location lower than a location where the pivotal motion of the cover is realized, so the cover maintains a substantially opened position in the refrigerator when the filter
25 cartridge is replaced.

Therefore, when the filter cartridge is replaced, the cover disturbs the replacement of the cartridge. When the cover is to be opened downward, all of the food stuffs stored under the cover in the refrigerator have to be taken out of the refrigerator.

30 The above information disclosed in this Background section is only for enhancement of understanding of the background of the invention and therefore it may contain information that does not form the prior art that is already known in this country to

a person of ordinary skill in the art.

DISCLOSURE

Technical Problem

5 Technical Object

The present invention has been made in an effort to solve the problems of the prior art. It is an object of the present invention to provide a water filter assembly for a refrigerator, which is designed such that a filter cartridge can be easily replaced.

10 Technical Solution

To achieve the object, the present invention provides a water filter assembly for a refrigerator, comprising:

- a base mounted on a ceiling or a sidewall of the refrigerator;
- a manifold installed on the base and being capable of moving downward;
- 15 a filter cartridge detachably mounted on the manifold; and
- a cover coupled to the base and moving between an open position and a closed position,

wherein the cover is formed in a semi-cylindrical shape, moves into the base in the open position by pivoting about a length direction axis of the base, and pivots
20 toward an external side from the base to cover the filter cartridge in the closed position.

Advantageous Effects

According to the filter assembly of the present invention, since the cover that is opened and closed for the replacement of the filter cartridge pivots
25 toward an inside of the base, the problems of the prior art filter assembly having a cover that pivots toward a food storage chamber of the refrigerator can be solved.

Particularly, since the replacement of the filter cartridge is not disturbed even in the cover opened position, the replacement can be easily realized.

Furthermore, since the fixing plate provided with an elastic portion is
30 integrally formed with the manifold to which the filter cartridge is connected, the downward pivot motion of the manifold can be naturally realized.

DESCRIPTION OF DRAWINGS

FIG. 1 is a perspective view of a water filter assembly according to an exemplary embodiment of the present invention when a cover of the water filter assembly is in a closed position.

5 FIG. 2 is a perspective view of the filter assembly of the present invention when the cover is in an opened position.

FIG. 3 is a view illustrating a filter cartridge replacement location of the water filter assembly of the present invention.

10 FIG. 4 is an exploded perspective view of the water filter assembly of the present invention.

FIG. 5 is a view illustrating a coupling structure of a manifold of the water filter assembly of the present invention.

FIG. 6 is a side sectional view of the cover of the water filter assembly of the present invention when the cover is in an opened position.

15 FIG. 7 is a side sectional view of the cover of the water filter assembly of the present invention when the cover is in the closed position.

FIG. 8 is a view of the cover of the filter assembly of the present invention when the cover is in the closed position.

20 FIG. 9 is a view of the cover of the filter assembly of the present invention when the cover is in the opened position.

BEST MODE

The following will describe a water filter assembly for a refrigerator according to an exemplary embodiment of the present invention with reference to the accompanying drawings.

25 FIG. 1 is a perspective view of a water filter assembly according to an exemplary embodiment of the present invention when a cover of the water filter assembly is in a closed position, FIG. 2 is a perspective view of the filter assembly of the present invention when the cover is in an opened position, FIG. 3 is a view illustrating a filter cartridge replacement location of the water filter assembly of the present invention, and FIG. 4 is an exploded perspective view of the water filter assembly of the present invention.

30

Reference numeral 2 indicates a base. Although not shown in the

drawings, the base 2 is contained within a ceiling of the refrigerator. Alternatively, the base 2 may be mounted on an inner sidewall of the refrigerator.

The base 2 includes a manifold mounting unit 4, a body 6 for receiving a filter cartridge F, and first and second guide units 10 and 12 that are located on
5 respective end portions of the body 6 to guide the pivotal motion of a cover 8 that will be described later.

The cover 8 is formed in a semi-cylindrical shape and is designed to pivot by the first and second guide units 10 and 12 of the base, in the course of which the cover 8 opens and closes an opening 14 of the base 2.

10 A manifold 16 is mounted on the manifold mounting unit 4. The manifold F includes an intake port 18 and an exhaust port 20 that respectively communicate with an inlet and an outlet of the filter cartridge F. The manifold F further includes a fixing plate 22 that is fixed on the base 2.

The fixing plate 22 includes a fixing end 24 extending from the manifold 16,
15 a free end 26 spaced apart from the fixing end 24 and arranged approximately parallel with the fixing end 24, and an elastic unit 28 that elastically interconnects the fixing end 24 and the free end 26.

The elastic unit 28 is formed in an approximate arc shape. The elastic unit 28 integrally interconnects the fixing end 24 and the free end 26.

20 The free end 26 is fixed on the manifold mounting unit 4 by, for example, a screw. In order to more securely fix the free end 26, the fixing end 24 is provided with a hole 30 and the manifold mounting unit 4 is provided with a protrusion 32 inserted in the hole 30 (see FIG. 5).

25 Meanwhile, the first guide unit 10 includes a semi-circular guide groove 11 formed on the body 6 and a guide protrusion 13 that is formed on one end of the cover 8 and that is guided by the first guide unit 10 and surfaces-contacts the guide groove 11.

The second guide unit 12 is provided to allow a rear end of the cover 8 to easily pivot. The second guide unit 12 includes a guide protrusion 34 that is
30 formed on the rear end of the cover 8 and a guide groove 36 that is formed on a rear end of the body 6 to receive the guide protrusion 34.

Since the guide groove 26 is provided with a stopper protrusion 35, a

locking protrusion 38 can be elastically pushed out in an opened position of the cover 8 as shown in FIG. 6. However, when the cover 8 is closed, the stopper protrusion 35 contacts a rear portion of the locking protrusion 38 and thus the locking protrusion 38 is not pushed out.

5 For this purpose, the stopper protrusion 35 is formed at a location where it does not contact the locking protrusion 38 in the opened position of the cover 8.

The cover 8 includes the locking protrusion 38 as a unit for preventing a rear end of the filter cartridge F from dropping when the filter cartridge F is mounted on and coupled to the manifold 16.

10 As shown in FIGS. 4 and 6, the locking protrusion 38 is elastically provided on the rear end of the cover 8. In order to provide elastic force to the locking protrusion 38, cutting grooves 35 are formed around the locking protrusion 38.

Since the cutting grooves 37 are formed, the locking protrusion 38 has the elastic force by its material property.

15 The locking protrusion 38 depresses a rear end of the filter cartridge F during the installing process of the filter cartridge F. For this purpose, a groove H corresponding to the locking protrusion 38 may be formed on the filter cartridge F in order to ensure the operation (see FIG. 3).

20 In addition, a protrusion 44 is formed on an inner surface of the cover 8 to support the rear end of the filter cartridge F in the closed position of the cover 8. When the cover 8 pivots in the open direction, the protrusion 44 is located above the filter cartridge F, and it pushes the rear end of the filter cartridge F downward. The above operation becomes possible by the protrusion 44 provided on a rear end side of the inner surface of the cover 8.

25 The reference numbers 40 and 42 that are not described above respectively indicate a handle for opening/closing the cover 8 and a manifold cover.

The water filter assembly structure as described above is generally installed on the ceiling of the food storage chamber of the refrigerator through a conventional method. That is, the base 2 is fixedly mounted on the ceiling of the refrigerator.

30 Since the cover 8 is pivotally coupled to the opening 14 of the base 2, when the user grasps the handle 40 and pivots the cover 8 in a state when the cover 8 is closed as shown in FIG. 2, the cover 8 pivots to an inside of the base 6. At this

point, since the cover is formed in the semi-cylindrical shape, the filter cartridge F installed inside the base is exposed when the cover 8 pivots by about 180° .

In this state, as shown in FIG. 7, since the stopper protrusion 35 is separated from the locking protrusion 38, the locking protrusion 38 is released out of the groove H of the filter cartridge F when the filter cartridge F is pulled downward, in the course of which the rear portion of the filter cartridge F drops as shown in FIG. 3.

According to the filter cartridge of this exemplary embodiment, when the cover 8 is opened, the protrusion 44 formed inside the cover 8 is located above the filter cartridge F. Therefore, when the cover pivots to the opened position, the rear end of the cartridge is pushed downward by the protrusion 44 even if the filter cartridge is not pulled and thus the rear end of the filter cartridge drops naturally.

When the rear end of the filter cartridge F drops downward, the user takes the filter cartridge F out of the manifold 16 and replaces the same with a new one through a conventional method.

As shown in FIG. 5, when the rear end of the filter cartridge F drops, the elastic unit 28 extending from the manifold 16 elastically deforms downward by the weight of the filter cartridge F and thus the manifold 16 can move downward.

After replacing the filter cartridge F with the new one, when the user pushes the filter cartridge upward, the locking protrusion 38 is inserted into the groove H. At this point, the locking protrusion 38 moves elastically.

In this state, when the cover 8 pivots to the closed position, as shown in FIGS. 7 and 8, the stopper protrusion 35 is located behind the locking protrusion 38 and thus the locking protrusion 38 securely supports the rear end of the filter cartridge F.

Industrial Applicability

The filter assembly for the refrigerator according to the present invention can be applied to all refrigerators having a cooling water supplying unit.

WHAT IS CALIMED IS

1. A water filter assembly for a refrigerator, comprising:
a base mounted on a ceiling or a sidewall of the refrigerator;
5 a manifold installed on the base and being capable of moving downward;
a filter cartridge detachably mounted on the manifold; and
a cover coupled to the base and moving between an open position and a closed position,
wherein the cover is formed in a semi-cylindrical shape, moves into the base in the
10 open position by pivoting about a length direction axis of the base, and pivots toward an external side from the base to cover the filter cartridge in the closed position.
2. The water filter assembly of claim 1, wherein the cover has either
15 end portions that are pivotally supported on the base.
3. The water filter assembly of claim 1, wherein the manifold is connected to the base by a fixing plate having an elastic portion that is capable of elastically changing position.
20
4. The water filter assembly of claim 1, wherein the cover is provided at a rear end with a locking protrusion for fixing the filter cartridge.
5. The water filter assembly of claim 1, wherein the base is provided
25 at either end portions with guide grooves for guiding a pivotal motion of the cover.
6. The water filter assembly of claim 1, wherein the base is provided at an end with a manifold mounting portion having a protrusion for fixing the manifold.
30
7. The water filter assembly of claim 1, wherein the cover is provided at a rear end portion with a guide protrusion inserted in a guide groove of the base.

8. The water filter assembly of claim 1, wherein the cover is provided with a handle used for pivoting the cover.
- 5 9. The water filter assembly of claim 3, wherein the fixing plate includes a fixing end integrally formed with the manifold, an elastic portion extending from the fixing end, and a free end extending from the elastic portion and fixed on a manifold mounting portion while being in parallel with the fixing end.
- 10 10. The water filter assembly of claim 4, wherein the locking protrusion is formed by forming cutting grooves on a rear end of the cover.
- 15 11. The water filter assembly of claim 1, wherein the cover is provided at an inner surface with a protrusion for supporting the filter cartridge upward or pushing the filter cartridge downward.

FIG. 1

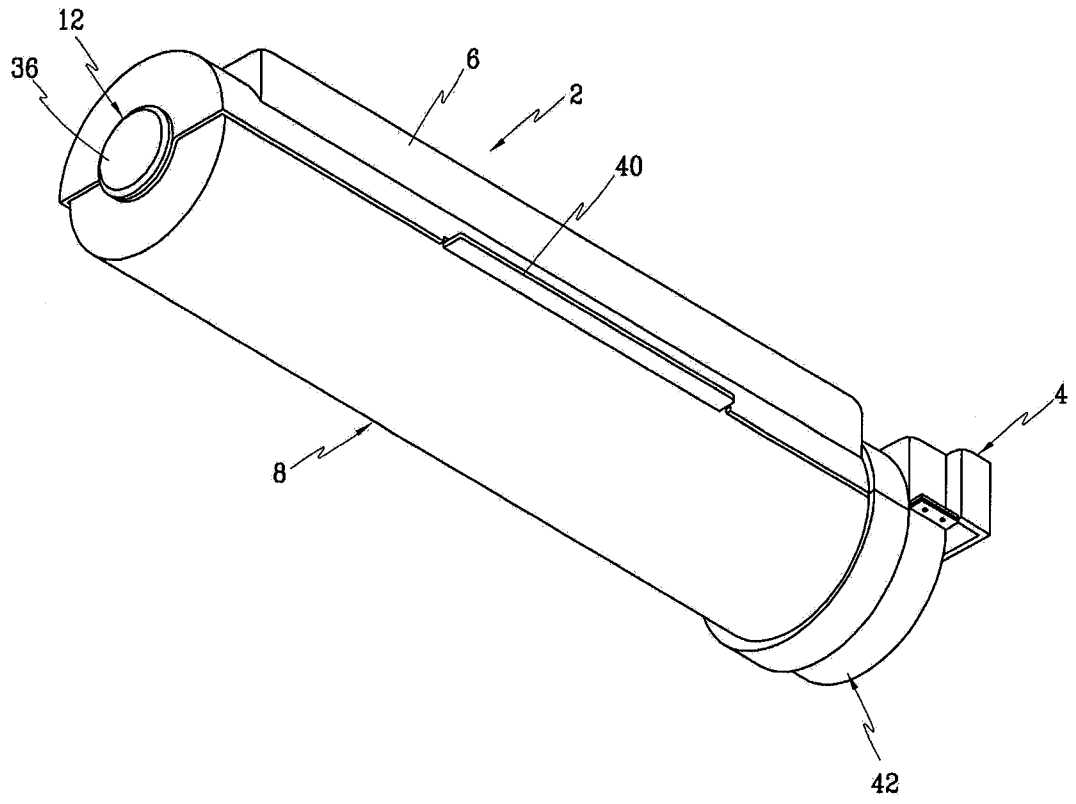


FIG. 2

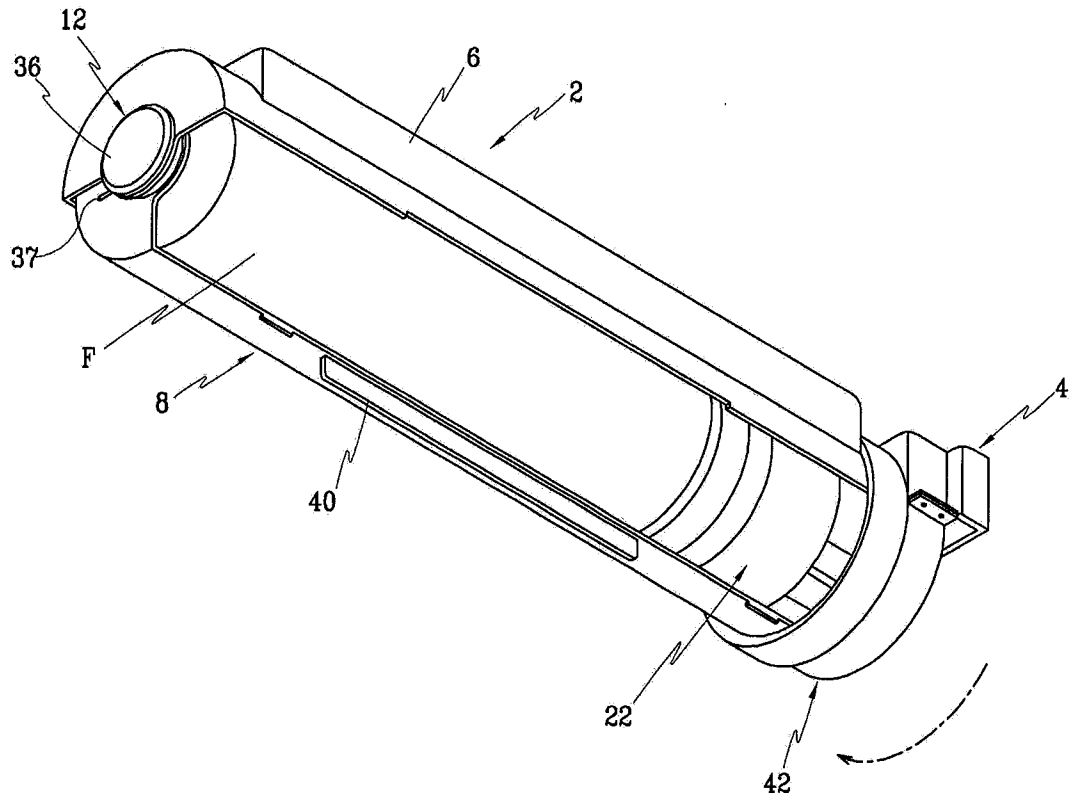


FIG. 3

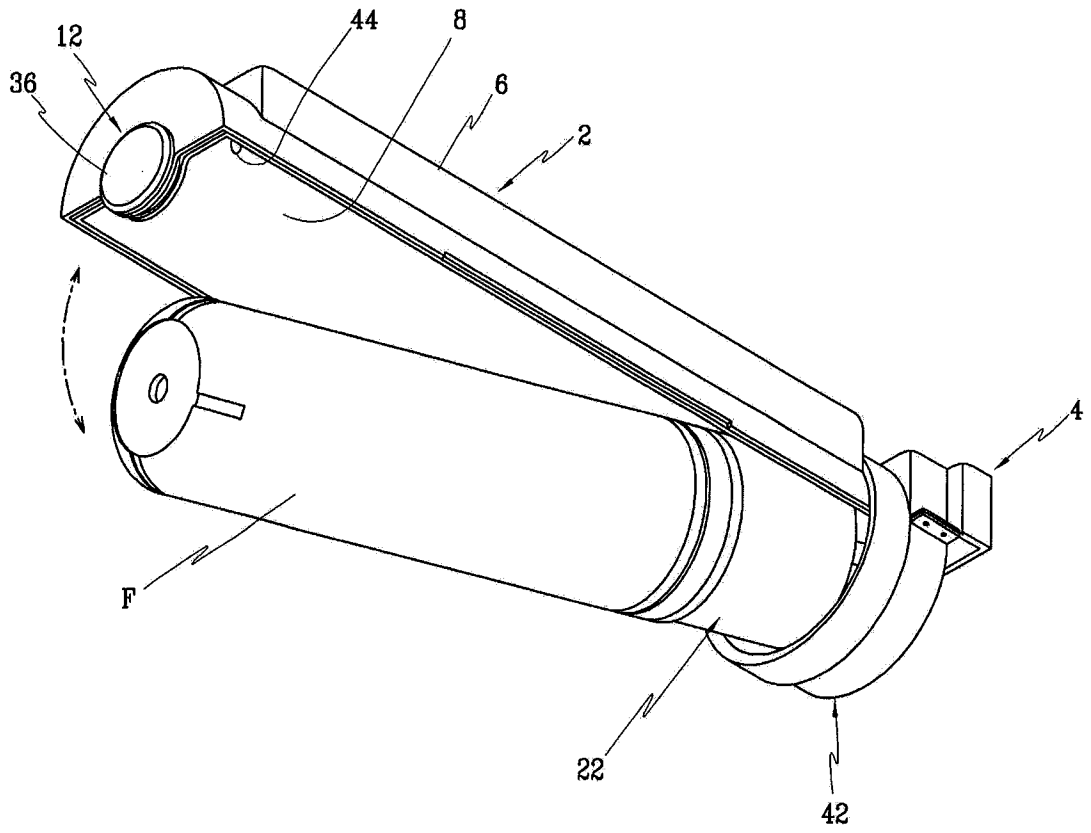


FIG. 4

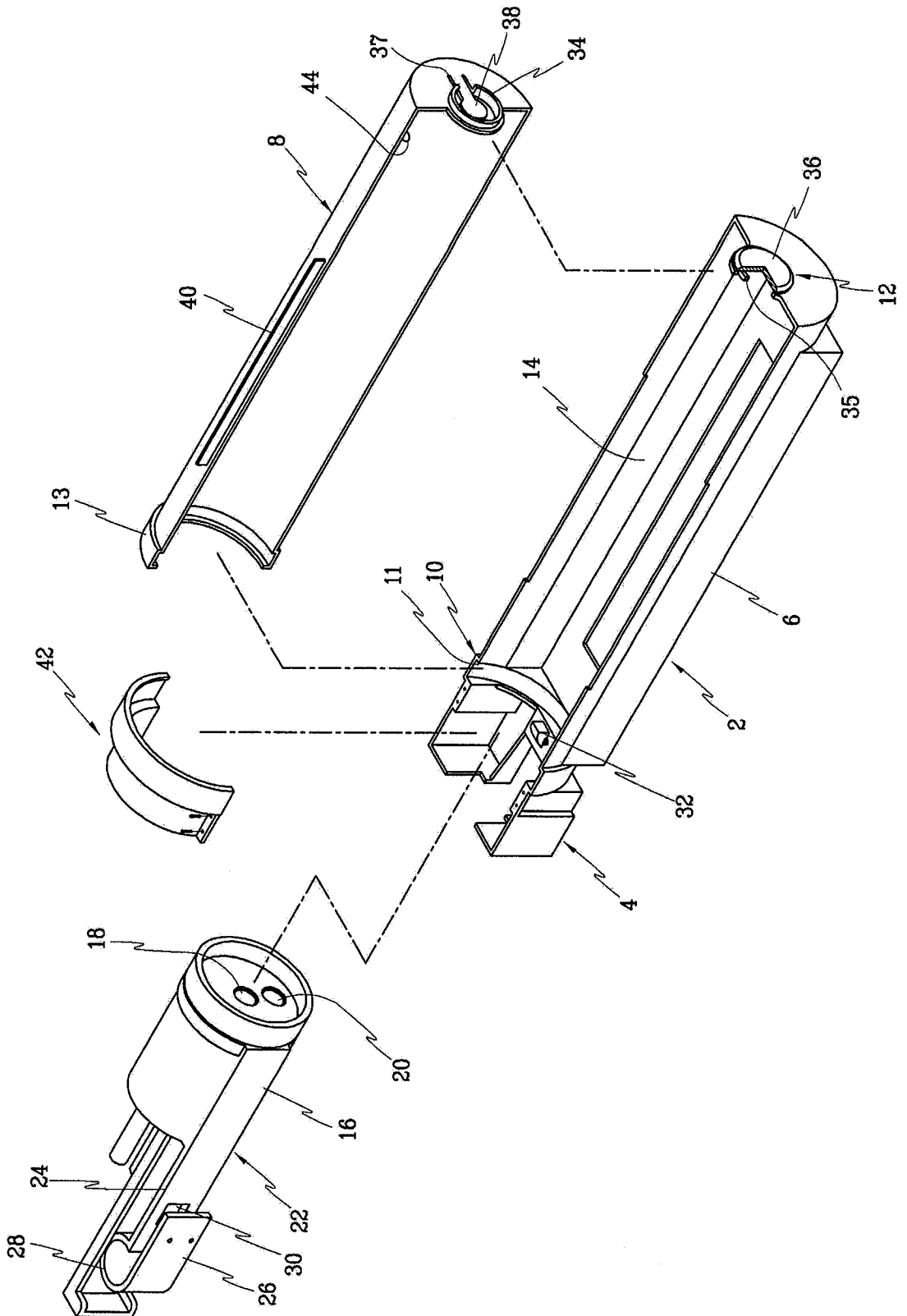


FIG. 5

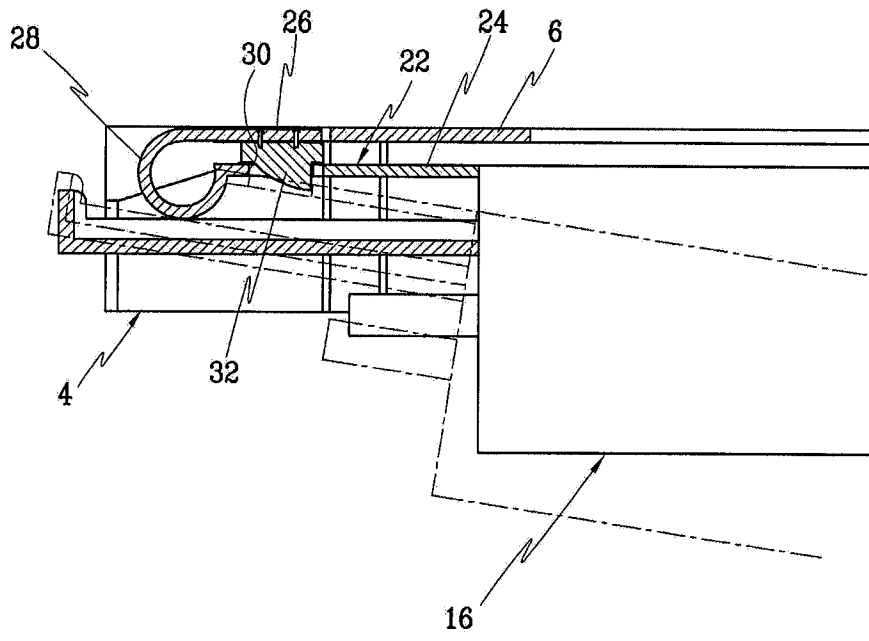


FIG. 6

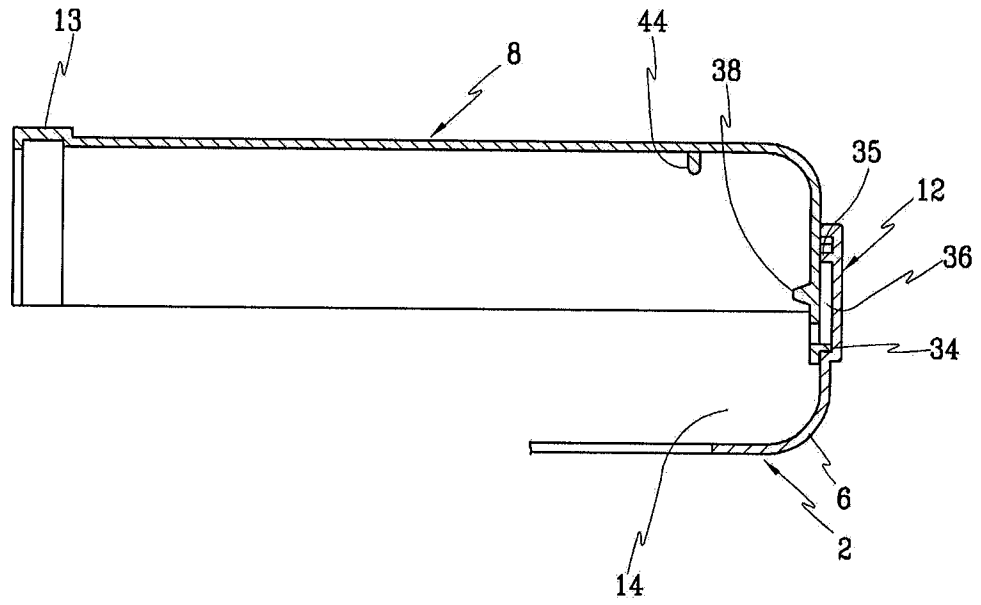


FIG. 7

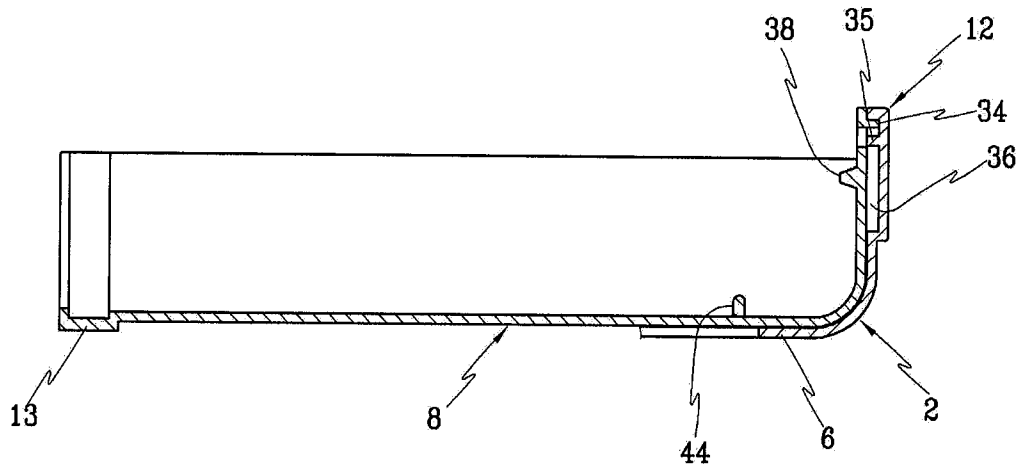


FIG. 8

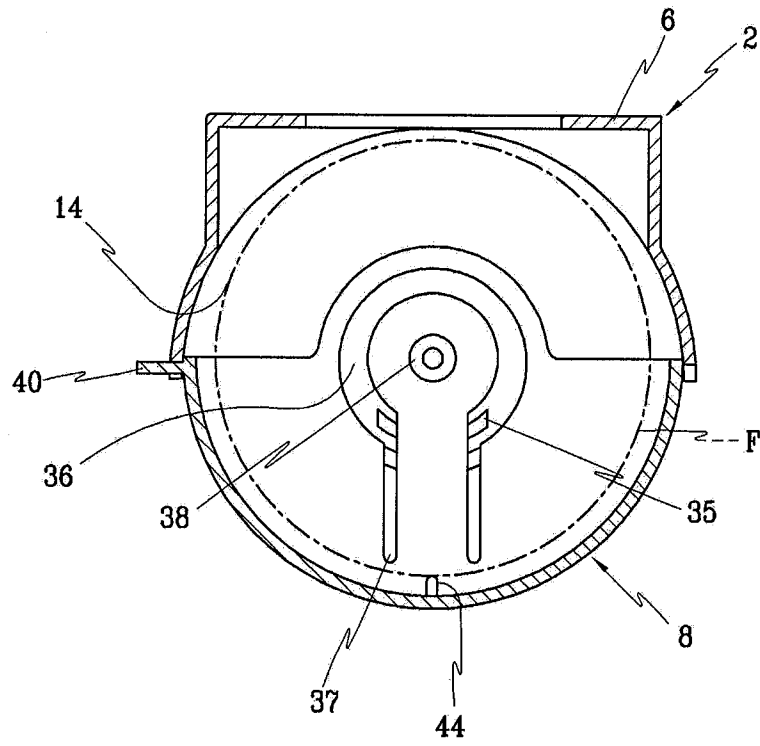
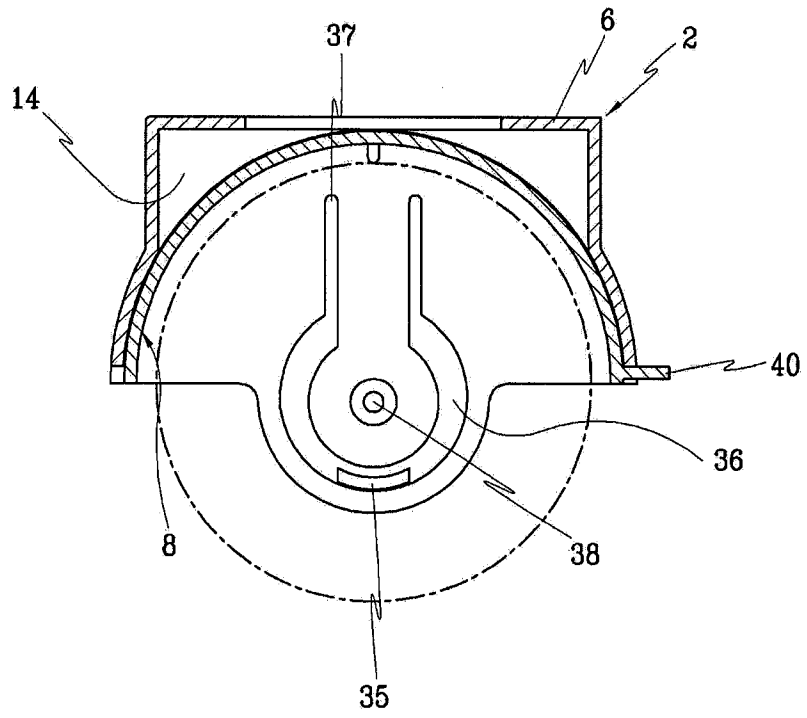


FIG. 9



A. CLASSIFICATION OF SUBJECT MATTER*B01D 35/00(2006.01)i*

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 8 : B01D 35, F25D 1, 11,23,25

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Utility models and applications for Utility models since 1975
Japanese Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKIPASS(KIPO interna) "water", "filter", "refrigerator", "cartridge", "assembly", "cover", "base", "pivot", "exchange", "manifold"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 7056435 B2 (JAMES H. JENKINS et al.) 06 June 2006 See abstract, claims 1-7, figures 2-3	1-11
A	KR 10-2006-0036499 A (SAMSUNG ELECTRONICS CO., LTD.) 02 May 2006 See abstract, claims 1-4, figures 1-3	1-11
A	KR 10-2004-0085251 A (USEONG ELECTRO-MECHANICS CO., LTD.) 08 October 2004 See abstract, claims 1-5, figures 3-4	1-11
P, A	KR 10-2007-0009937 (SAMSUNG ELECTRONICS CO., LTD.) 19 January 2007 See abstract, claims 1, 3-6, figures 2-5	1-11

 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

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"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

"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

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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