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(71) Applicant: **Arçelik Anonim Sirketi**
34445 Istanbul (TR)

(72) Inventors:
- **TEKES, YUNUS EKREM**
34445 ISTANBUL (TR)
- **KARA, MEHMET**
34445 ISTANBUL (TR)

(54) A COMBINED FILTER FOR A DRYING MACHINE

(57) The present invention relates to a combined filter assembly (10) suitable to be used in a laundry drying machine, comprising an inner filter (11) and an outer filter (12), wherein said outer filter (12) structure is located on the outside of the combined filter assembly (10) and is configured to contain said inner filter (11) structure in a large amount by volume, said inner filter (11) structure is designed and configured so as to be removed only after the outer filter (12) is removed, in accordance with the structure of the combined filter assembly (10), and said combined filter assembly (10) further comprises a locked handle cover (13) during operation, which create a temporary structural relationship between the inner and outer filters (11, 12) so as to prevent the outer filter (12) from falling when the inner filter (11) is opened.

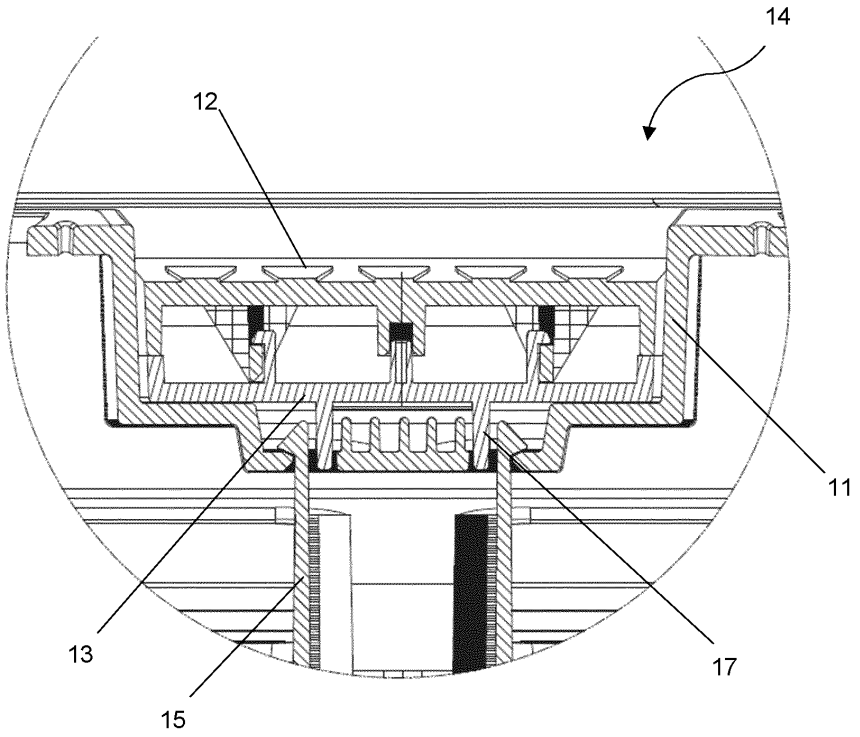

Figure 4

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Description

[0001] The present invention generally relates to filtration systems developed for use in laundry drying machines. More particularly, the present invention relates to a combined filter structure consisting of inner and outer filters with different pore structures, which are placed in the door region of the drying machine.

[0002] The laundry drying machines comprise filtering systems, which are placed on the front bearing in the door area and positioned in the air passage channel in front of the heat exchangers. Said filtration systems are combined in many products and attached to the front bearing in the door area. The combined filters have different pore structures and are composed of two different parts, inner and outer filters.

[0003] It is recommended that said filters be cleaned by the user after each cycle of the laundry drying machine. In state of the art drying machines, the user must remove both the inner and outer filters together to perform this cleaning process. Performing the filter removal operations in two different steps causes difficulty for the user and means a weakness in terms of the ease of application of the machine.

[0004] In the state of the art Utility Model Document No. DE8437357U1, a combined filter structure is disclosed, comprising an inner filter which is placed into an outer filter. In the teaching of said utility model, the inner and outer filter structures are configured so as to move axially around the separate hinge elements.

[0005] In the Document No. EP2870283B1, a drying machine is disclosed, comprising an air filtration cartridge having a first and a second air filtration body in the form of a bag or pocket, shaped so as to be inserted into the air duct, constructed to trap fluff and lint particles in the air. According to this disclosure, said first air filtration body is slid into said second air filtration body by being moved along a lateral movement axis perpendicular to the movement axis of the first air filtration body into the air duct, thus forming the outer and inner filter structures.

[0006] In the Document No. JP2008079855A, a combined filter structure is disclosed, which is placed into an opening on the body of the drying machine and which is composed of an inner filter and an outer filter which are nested into each other. In said filter structure, it is mentioned that there is a main filter operating in the circulation air that enters through the circulation air inlet port of the filtration receptacle and discharged from the circulation air discharge port, and a support filter that works together with the same. Since the support filter is inserted and removed before the main filter, and the main filter is inserted after the support filter and removed before the same, the main filter is removed independently, thus leaving the support filter in the receptacle thereof to handle the clogging.

[0007] The aim of the present invention is the realization of a filter assembly which can be used in laundry drying machines.

[0008] Another aim of the present invention is the realization of a filter assembly which is composed of an inner and an outer filter structure to be used in the laundry drying machines.

[0009] Yet another aim of the present invention is the realization of a filter assembly which is composed of an inner and an outer filter structure to be used in the laundry drying machines, as well as a handle cover.

[0010] Another aim of the present invention is the realization of a combined filter assembly structure wherein an inner and an outer filter structure as well as a handle cover can be grouped together to be used in the laundry drying machines.

[0011] The combined filter system of the present invention proposes solutions to problems in the prior art. First, the user is enabled to remove said filter in a in a single step instead of multiple separate steps which may be caused by the multi-part configuration of the combined structure,

[0012] If one of the filters is to be removed separately, in cases where the inner filter is desired to be opened, the outer filter is prevented from falling by means of the ribs extending from the handle to the body, thus preventing the outer filter from leaving the housing and scattering the lint therein.

[0013] The inner filter and the outer filter, which form the combined filter of the present invention, can be connected to each other and grouped together by means of the connection-joint members that can be positioned on either of said parts. In different embodiments of the present invention, said connection-joint parts may also be included in a handle cover, apart from the inner filter and the outer filter.

[0014] According to another aspect of the present invention, said filter assembly, when mounted in the laundry drying machine, is configured in such a way that in the grouped state, the outer filter must be removed first.

[0015] A laundry drying machine comprises the combined filter of the present invention.

[0016] Thus, in a broad sense, this document relates to a new filter assembly that exceeds the limitations of state of the art filtration assemblies by providing an especially compact design, comprising an inner and an outer filter, while the size of the filtration holes can be adjusted according to different embodiments.

[0017] The figures should not be interpreted as limiting the scope of protection defined in the claims, and should not be used simply to interpret the scope in the claims without referring to the technique in the description.

[0018] The combine filter assembly suitable to be used in laundry drying machines realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

Figure 1: is the exploded perspective view of the parts of the combined filter structure in an embodiment of the present invention.

Figure 2: is the front view of the grouped state of the

combined filter structure in an embodiment of the present invention.

Figure 3: is the close-up view of the upper cross-section of the grouped state of the combined filter structure in an embodiment of the present invention.

Figure 4: is the close-up view of the upper cross-section of the locked state of the combined filter structure in an embodiment of the present invention.

Figure 5: is the close-up view of the upper cross-section of the unlocked state of the combined filter structure in an embodiment of the present invention.

[0019] The elements illustrated in the figures are numbered as follows:

10. Filter assembly

11. Inner filter

12. Outer filter

13. Handle cover

14. Locking mechanism

15. Claw

16. Gap

17. Rib

[0020] The present invention relates to a combined filter assembly (10) which is placed on the front bearing in the door area in the laundry drying machines and positioned in the air passage channel in front of the heat exchangers.

[0021] The proposed filter assembly (10) comprises an inner filter (11) and an outer filter (12). Said inner filter (11) and said outer filter (12) are arranged one inside the other towards the center of the combined filter structure, and the inner filter (11) body can be fitted in the outer filter (12) body at least up to a sufficient height. In an embodiment of the present invention, said inner filter (11) body is in a structure that corresponds to said outer filter (12) body in terms of external frame, and can be fitted into said outer filter (12) body with a rail mechanism provided on the vertical axis.

[0022] Said inner filter (11) and said external filter (12) in the proposed filter assembly (10) may have different pore sizes. For example, in an embodiment of the present invention, the outer filter (12) can be configured to filter lint of a certain size, while the inner filter (11) can be configured to filter lint of another certain size.

[0023] In an embodiment of the present invention, a handle cover (13) is proposed in addition to said inner filter (11) and said outer filter (12) structures. Said handle cover (13) is configured to form the combined filter structure of the present invention by being grouped together with said inner filter (11) and said outer filter (12) structures. In this embodiment, a structural relationship is established between said inner filter (11) and said outer filter (12) structures so as to attach said structures to each other while including a locking mechanism to maintain this relationship. Said inner filter (11) and said outer filter (12) structures, which are locked to each other, cannot be separated from each other without physical intervention on the handle cover (13).

[0024] In an embodiment of the present invention, said handle cover (13) comprises at least one surface, hereinafter referred to as the first surface, in the functionally positioned state of the filter assembly (10), in other words attached to a laundry drying machine. Said handle cover (13) further comprises a second surface corresponding to the horizontally axially opposite surface of the first surface. Said first surface is surrounded by the outer wall of the inner filter (11) and defines an operationally locked, that is grouped, inner volume. Said inner volume comprises two gaps (16) which receive two claws (15) defined to enter the inner filter (11) body. Said two gaps (16) are configured to be wide enough to receive two ribs (17) which extend from said first surface along the axis of the two claws (15) in the opposite direction to the claws (15) and leave the inner volume from a point close to the said claws (15).

[0025] In at least one embodiment of the present invention, the locking mechanism (14) obtained with the handle cover (13) is operated as follows: The spacing provided by each of said two gaps (16) is large enough to receive at least one rib (17) and at least one claw (15). Thus, if said rib (17) is not removed and a sufficient amount of space is not provided, the sloping and outer-facing protrusions of the claws (15) make it impossible for the inner filter (11) to move away from said handle cover (13). Thus, the locking mechanism (14) prevents the removal of the inner filter (11) structure without prior physical intervention on the outer filter (12) body for the purpose of removal.

[0026] In an embodiment of the present invention, a combined filter assembly (10) is realized, suitable to be used in a laundry drying machine, comprising a grouped inner filter (11) and outer filter (12) structure.

[0027] In another embodiment of the present invention, said outer filter (12) structure is located on the outside of the combined filter assembly (10) and is configured to contain said inner filter (11) structure in a large amount by volume.

[0028] In another embodiment of the present invention, said inner filter (11) structure is designed and configured so as to be removed only after the outer filter (12) is removed, in accordance with the structure of the combined filter assembly (10).

[0029] In another embodiment of the present invention, said combined filter assembly (10) comprises a locked

handle cover (13) during operation, which create a temporary structural relationship between the inner and outer filters (11, 12) so as to prevent the outer filter (12) from falling when the inner filter (11) is opened.

[0030] In another embodiment of the present invention, when said handle cover (13) is applied between the inner filter (11) and the outer filter (12), the two claws (15) extending from said inner filter (11) are locked in the closed position by passing through the same, thus creating a gap (16) to attach said inner filter (11) and said outer filter (12) to each other.

[0031] In another embodiment of the present invention, said handle cover (13) comprises two ribs (17) which extend towards the inner filter (11) in the locked position and are configured to provide sufficient horizontal clearance for said two claws (15) to flex without being released.

Claims

1. A combined filter assembly (10) suitable to be used in a laundry drying machine, **comprising** an inner filter (11) and an outer filter (12), **characterized by**

   - the outer filter (12) which is positioned on the outside of the combined filter assembly (10) and configured to at least partially contain the inner filter (11) by volume,
   - the inner filter (11) which is disposed in the outer filter (12) and which is suitable to be removed only after the outer filter (12) is removed, and
   - a locked handle cover (13) which connect the inner and outer filters (11 and 12) to each other so as to prevent the outer filter (12) from falling when the inner filter (11) is opened.

2. A combined filter assembly (10) as in Claim 1, **characterized by** two gaps (16) which enable two claws (15) extending from the inner filter (11) to be locked in the closed position so as to attach the inner filter (11) and the outer filter (12) to each other when said handle cover (13) is applied between the inner filter (11) and the outer filter (12).

3. A combined filter assembly (10) as in Claim 1 or 2, **characterized by** two ribs (17) which extend towards the direction of the inner filter (11) in the locked position of the handle cover (13) and are configured to provide clearance for lateral movement by being placed in the gap (16) so that the two claws (15) can flex without being released.

4. A laundry drying machine comprising a combined filter assembly (10) as in any one of the Claims 1 to 3.

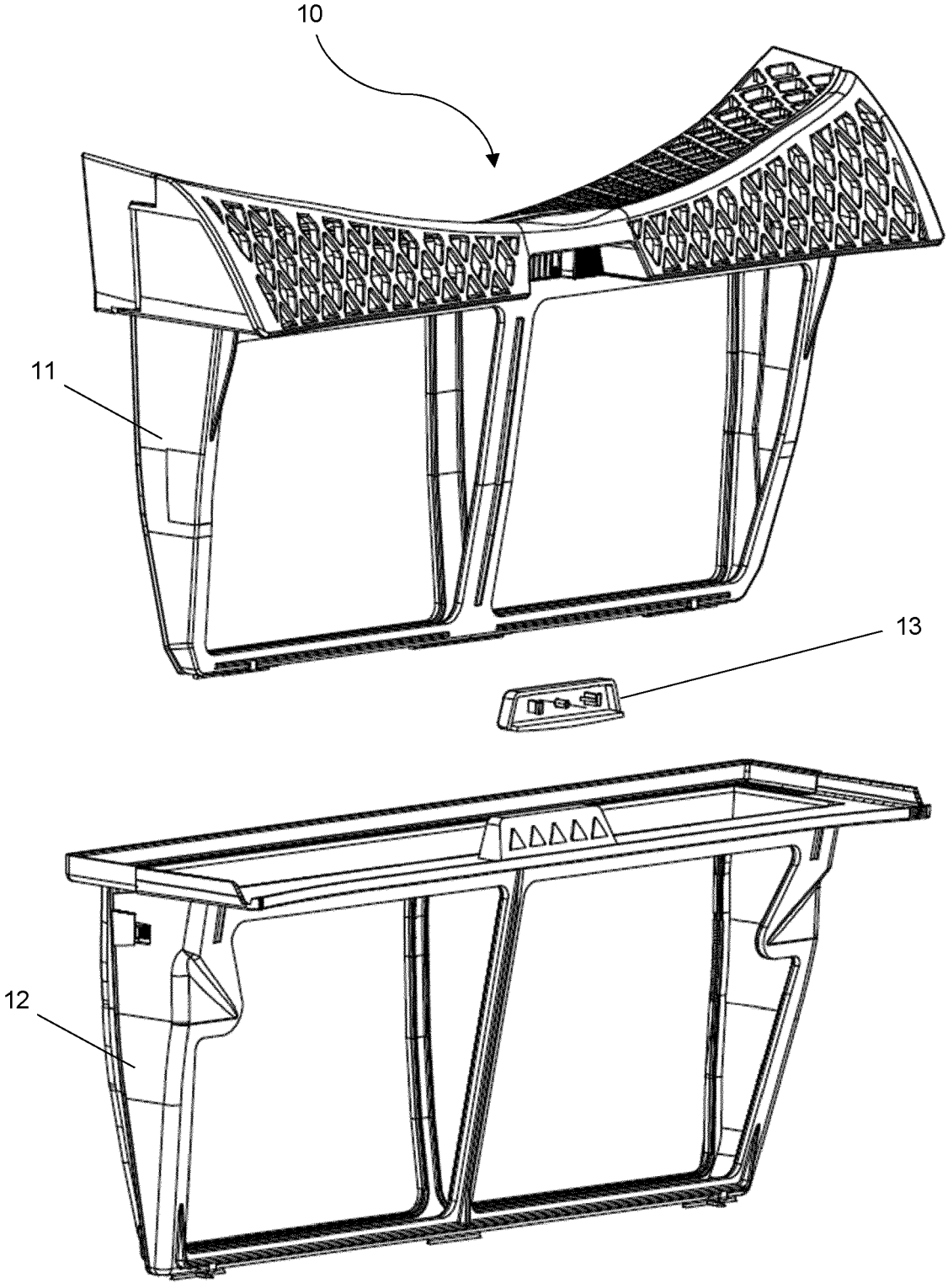

Figure 1

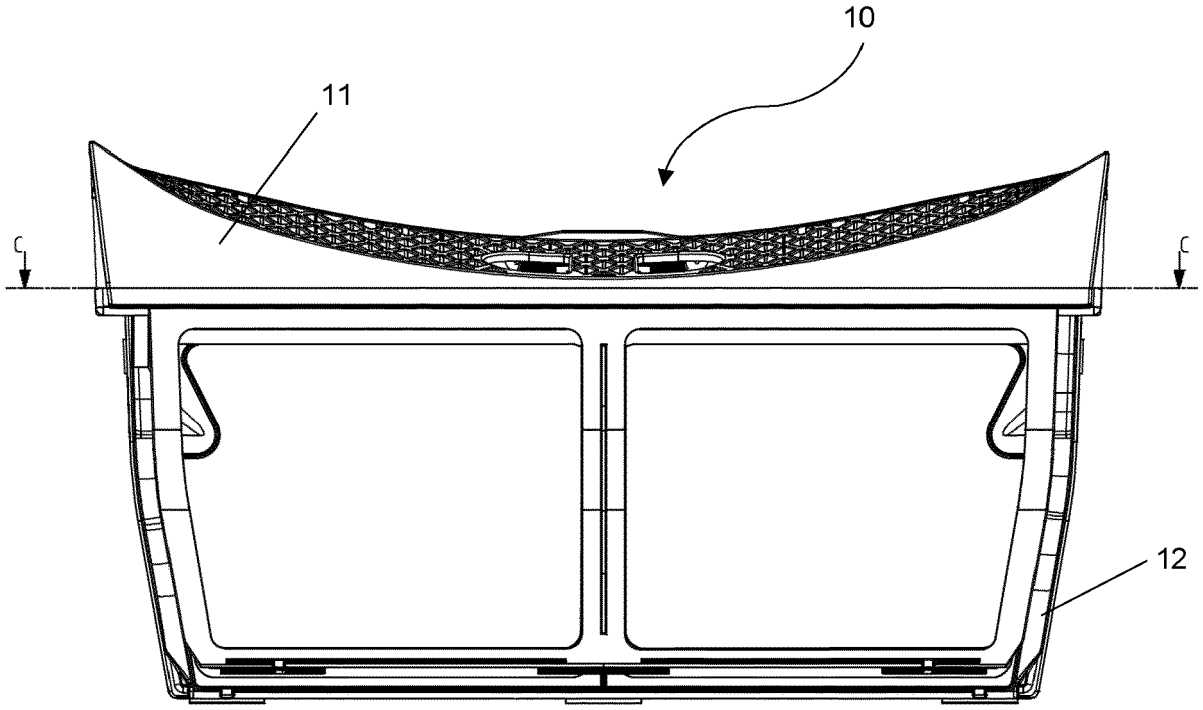

Figure 2

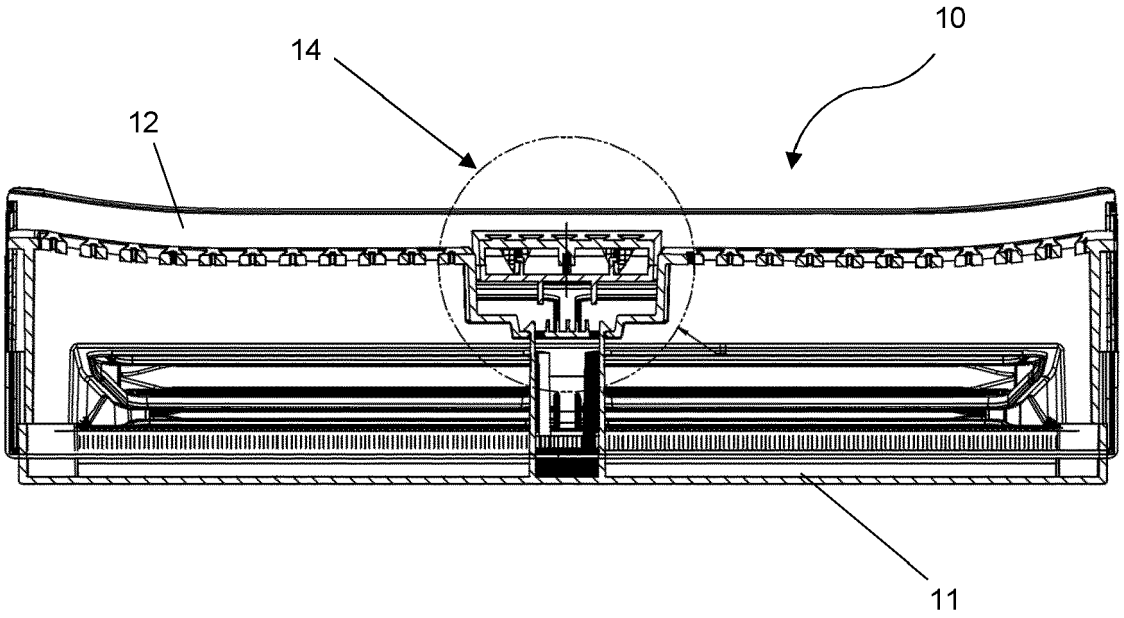

Figure 3

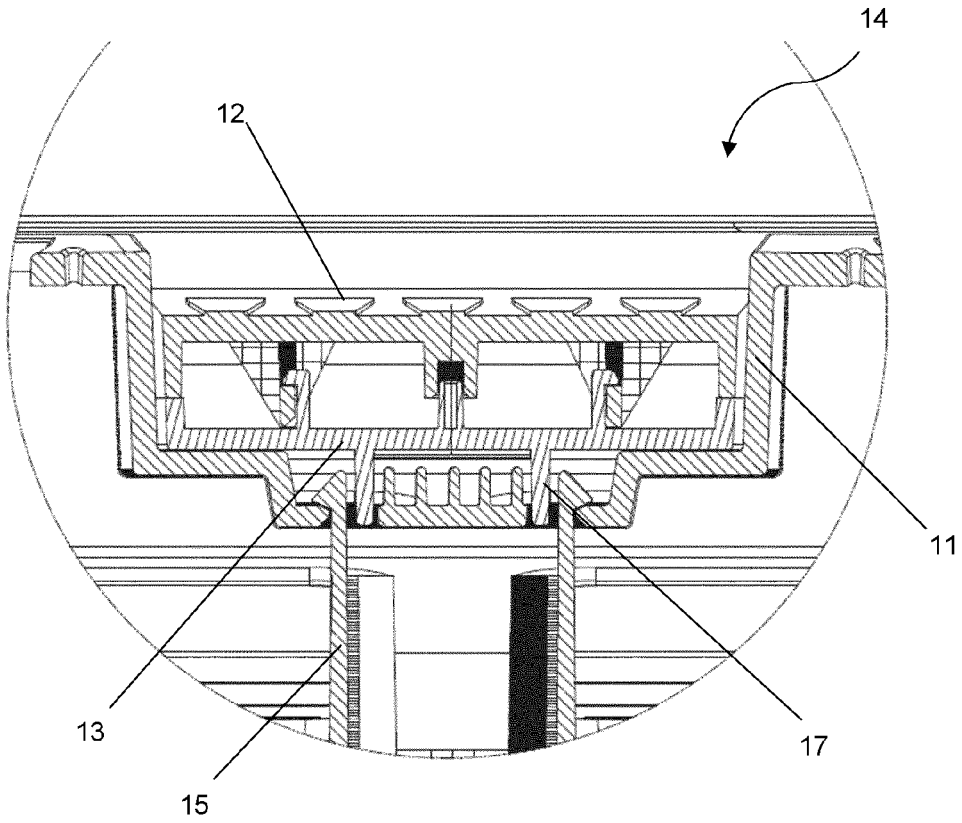

Figure 4

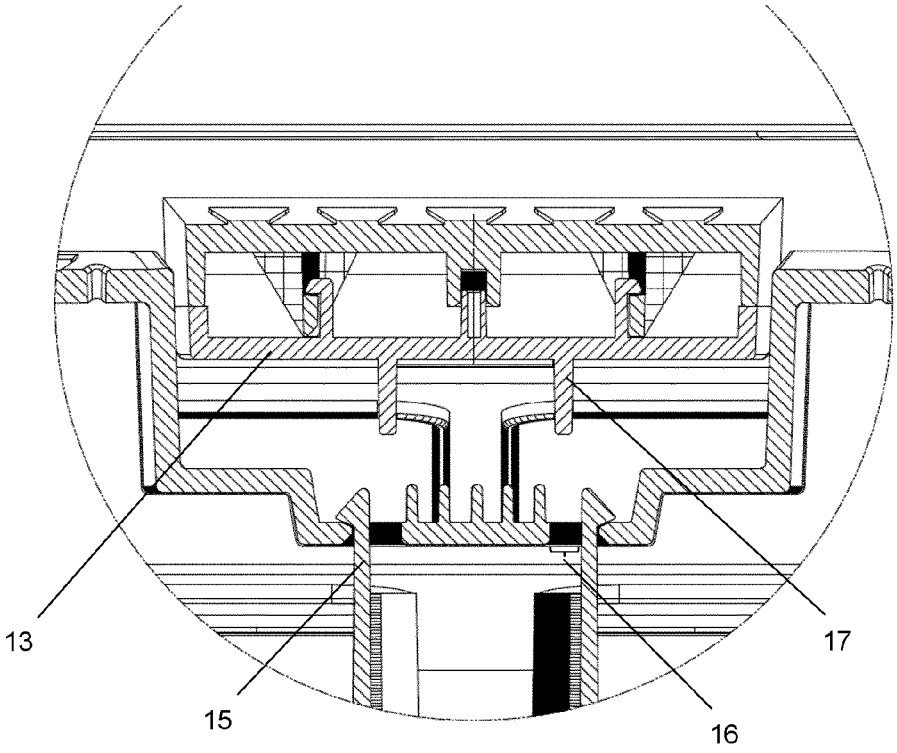

Figure 5

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EUROPEAN SEARCH REPORT

Application Number
EP 22 20 4777

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 A	KR 2021 0076777 A (LG ELECTRONICS INC [KR]) 24 June 2021 (2021-06-24) * figures 1, 11-13 * * paragraph [0079] *	1,4 2,3	INV. D06F58/22
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			TECHNICAL FIELDS SEARCHED (IPC)
			D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	17 May 2023	Werner, Christopher

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

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17-05-2023

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

REFERENCES CITED IN THE DESCRIPTION

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