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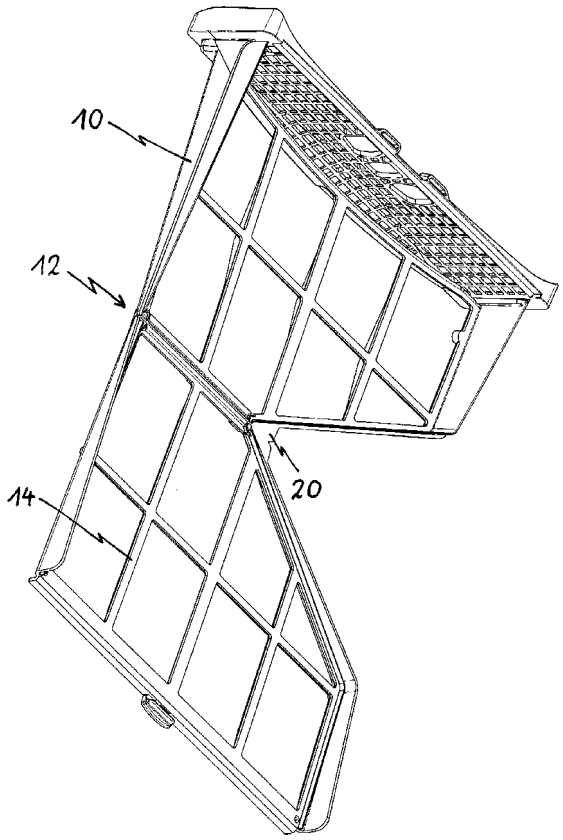
(54) Air stream filter for a laundry dryer

(57) The present invention relates to an air stream filter, in particular for an air stream channel in a laundry dryer (22). The air stream filter includes at least one plastic frame (10). The plastic frame (10) comprises two substantially symmetric wings. A net sheet covers the plastic frame (10) and is provided for filtering fluff. A hinge (12) extends along a symmetry axis between the wings of the plastic frame (10), so that the plastic frame (10) is openable and closable in a book-like fashion. In the closed state of the plastic frame (10) the air stream filter is formed as a pocket. The hinge (12) is shorter than the half of the wing sides opposite to said hinge (12), so that in the open state of the plastic frame (10) a space between the wings is formed beyond at least one end of the hinge (12). At least one reinforcing element (20) is attached on the at least one end of the hinge (12), so that the reinforcing element (20) fills a part of the intermediate space between the wings of the plastic frame (10). Further, the present invention relates to a laundry dryer (22) with at least one air stream filter.

FIG 1



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Description

[0001] The present invention relates to an air stream filter for a laundry dryer. Further, the present invention relates to a laundry dryer with at least one air stream filter.

[0002] In a laundry dryer a hot and dry air stream passes a laundry drum containing laundry to be dried. After passing the laundry drum the humidity of the air stream increases and its temperature decreases. Further, the air stream carries an amount of fluff removed from the laundry to be dried. Thus, the air stream has to be filtered in order to remove the fluff. Moreover, the air stream has to be dehumidified by passing an evaporator of a heat pump circuit or by a heat exchanger receiving cold ambient air. Additionally, the air stream has to be heated up by a condenser of the heat pump circuit or by an electric resistance, for example. These three operations are carried out in that order before the air stream is reintroduced again into the laundry drum.

[0003] In laundry dryers having a heat pump circuit, the dehumidifying and heating up of the air stream require an air stream filter with a frontally asymmetrical shape in order to avoid that the air stream filter interferes with components of said heat pump circuit, e.g. compressor or cooling fan, arranged in the basement of the laundry dryer in close proximity of the air stream filter.

[0004] In a usual laundry dryer with a heat pump circuit, the frontally asymmetrical air stream filter entraps fluff from the air stream exiting the laundry drum. The frontally asymmetrical air stream filters have the form of an openable pocket. A rigid plastic frame over-injected on a net sheet forms a grid supporting said net sheet. A hinge connecting two parts of the plastic frame is provided on the bottom part of the pocket in order to allow an opening of the air stream filter and removing the fluff.

[0005] To avoid interference with other components on the one hand and allow a sufficiently wide filtering area on the other hand, the side of the hinge is shorter than those sides opposite to the hinge. Often, the side of the hinge is shorter than the half width of the opposite side.

[0006] The hinge is formed by the net sheet. Since the net sheet is damageable and the pocket is frequently opened and closed by the user, often the net sheet breaks in the connecting portion between the two parts of the plastic frame. The air stream filter has to be cleaned after one or two drying cycles. Further, the plastic frame of large size air stream filters is heavy.

[0007] It is an object of the present invention to provide an air stream filter mentioned above, wherein said air stream filter has an improved connecting portion between the two parts of the plastic frame.

[0008] The object of the present invention is achieved by the air stream filter according to claim 1.

[0009] The present invention relates to an air stream filter, in particular for an air stream channel in a laundry dryer, wherein

- the air stream filter includes at least one plastic frame,
- the plastic frame comprises two substantially symmetric wings,
- a net sheet, provided for filtering fluff, covers the plastic frame,
- a hinge extends along a symmetry axis between the wings of the plastic frame, so that the plastic frame is openable and closable in a book-like fashion,
- the hinge is shorter than the half of the wing sides opposite to said hinge, so that an intermediate space between the wings is formed beyond at least one end of the hinge in an open state of the plastic frame, and
- at least one reinforcing element is attached on at least one end of the hinge, so that the reinforcing element fills a part of the intermediate space between the wings of the plastic frame.

[0010] According to the present invention a reinforcing element attached between the wings of the plastic frame and beyond at least one end of the hinge portion makes the hinge formed between the wings of the plastic frame more resistant to repetitive wings opening and closing movement thereby making the air stream filter more durable.

[0011] The plastic frame comprises a grid. The grid provides a support for a filtering net applied thereto and an increased stability of the plastic frame and the air-stream filter.

[0012] According to a preferred embodiment of the present invention the intermediate space or at least the portion of the intermediate space besides the hinge comprises a triangular base area, and the reinforcing element is formed as a triangular sheet element.

[0013] For example, the reinforcing element is a plastic layer connecting the wings of the plastic frame.

[0014] Further, the plastic frame may comprise at least two layers, wherein the net sheet is sandwiched between said two layers. Preferably, the at least two layers of the plastic frame extend over the two wings of the plastic frame. The net sheet is preferably a single sheet extending over both wings.

[0015] For example, a part of the net sheet is over-injected by the plastic frame. In a similar way, a part of the net sheet between the wings of the plastic frame may be over-injected by the reinforcing element.

[0016] At last, the present invention relates to a laundry dryer with at least one air stream filter, wherein the laundry dryer comprises at least one air stream filter mentioned above.

[0017] The novel and inventive features believed to be the characteristic of the present invention are set forth in the appended claims.

[0018] The invention will be described in further detail with reference to the drawings, in which

FIG 1 shows a schematic perspective view of a plastic frame of an air stream filter according to a pre-

ferred embodiment of the present invention,

FIG 2 shows a schematic front view of the plastic frame of the air stream filter according to the preferred embodiment of the present invention,

FIG 3 shows a detailed schematic front view of the plastic frame of the air stream filter according to the preferred embodiment of the present invention,

FIG 4 shows a partial front view of a laundry dryer with the air stream filter according to the preferred embodiment of the present invention, and

FIG 5 shows a partial perspective view of the laundry dryer with the air stream filter according to the preferred embodiment of the present invention.

[0019] FIG 1 illustrates a schematic perspective view of a plastic frame 10 of an air stream filter according to a preferred embodiment of the present invention. The air stream filter is preferably provided for a laundry dryer.

[0020] The plastic frame 10 includes two symmetric wings. A hinge 12 extends along the symmetry axis between said wings, so that the plastic frame 10 can be closed and opened in a book-like fashion. In the closed state of the plastic frame 10 the air stream filter is inserted in the laundry dryer in a region of an opening for loading laundry into a treating chamber. In the open state of the plastic frame 10 the air stream filter can be cleaned by the user. Each wing of the plastic frame 10 comprises a grid 14. The grids 14 provide an increased stability of the plastic frame and the airstream filter.

[0021] The hinge 12 is shorter than the half of the wing sides opposite to said hinge 12. Thus, an intermediate space is formed between the wings of the plastic frame 10 and beyond the end of the hinge 12. In this example, the intermediate space has a triangular base area.

[0022] A reinforcing element 20 is attached on one end of the hinge 12, so that the reinforcing element 20 fills a part of the intermediate space between the wings of the plastic frame 10. The reinforcing element 20 is formed as a triangular sheet element and forms a single-piece part with the plastic frame 10.

[0023] FIG 2 illustrates a schematic front view of the plastic frame 10 of the air stream filter according to the preferred embodiment of the present invention. A net sheet is provided for covering the whole plastic frame 10. The net sheet is not shown in FIG 2. The plastic frame 10 and the net sheet form the air stream filter.

[0024] The reinforcing element 20 may be formed as a plastic layer attached on one side of the net sheet beyond the end of the hinge 12. Alternatively, the net sheet may be embedded in the plastic frame 10 in the portion of the reinforcing element 20. In the latter case, the net sheet is sandwiched between two layers of the plastic frame 10 in the portion of the reinforcing element 20. Further, the net sheet is over-injected by the plastic frame 10. Thus, the plastic frame 10 is formed as a single-piece part. The net sheet and the reinforcing element 20 form the connection between the wings of the plastic frame 10. If desired, at least a portion of the net sheet extending between the two wings along the hinge may be over-injected by the plastic frame.

[0025] FIG 3 illustrates a detailed schematic front view of the plastic frame 10 of the air stream filter according to the preferred embodiment of the present invention. FIG 3 shows by more details the end hinge portion 18 in FIG 2.

[0026] For example, the reinforcing element 20 is a plastic layer connecting the wings of the plastic frame 10. The air stream filter according to the present invention allows a very solid hinge 12. The reinforcing element 20 prevents that the net sheet breaks in the portion of the hinge 12.

[0027] FIG 4 illustrates a partial front view of a laundry dryer 22 with the air stream filter according to the preferred embodiment of the present invention. FIG 5 illustrates a partial perspective view of the laundry dryer 22 with the air stream filter according to the preferred embodiment of the present invention.

[0028] FIG 4 and FIG 5 show the position of the air stream filter within the laundry dryer 22. The air stream filter is arranged below an opening 24 for loading a laundry drum. The air stream filter can be removed and inserted via said opening 24.

List of reference numerals

[0029]

10	plastic frame
12	hinge
14	grid
18	hinge end portion
20	reinforcing element
22	laundry dryer
24	opening

Claims

1. An air stream filter, in particular for an air stream channel in a laundry dryer (22), wherein

- the air stream filter includes at least one plastic frame (10),
- the plastic frame (10) comprises two substantially symmetric wings,

- a net sheet, provided for filtering fluff, covers the plastic frame (10),
- a hinge (12) extends along a symmetry axis between the wings of the plastic frame (10), so that the plastic frame (10) is openable and closable in a book-like fashion,
- the hinge (12) is shorter than the half of the wing sides opposite to said hinge (12), so that in an open state of the plastic frame (10) an intermediate space between the wings is formed beyond at least one end of the hinge (12),

characterised in that

at least one reinforcing element (20) is attached on the at least one end of the hinge (12), so that the reinforcing element (20) fills a part of the intermediate space between the wings of the plastic frame (10).

2. The air stream filter according to claim 1, **characterized in that**
the plastic frame (10) comprises a grid (14).

3. The air stream filter according to claim 1 or 2, **characterized in that**
the intermediate space or at least the portion of the intermediate space besides the hinge comprises a triangular base area, and the reinforcing element (20) is formed as a triangular sheet element.

4. The air stream filter according to any one of the preceding claims,
characterized in that
the reinforcing element (20) is a plastic layer.

5. The air stream filter according to any one of the preceding claims,
characterized in that
the plastic frame (10) comprises at least two layers, wherein the net sheet is sandwiched between said two layers.

6. The air stream filter according to claim 5, **characterized in that**
the at least two layers of the plastic frame (10) extend over the two wings of the plastic frame (10).

7. The air stream filter according to any one of the preceding claims,
characterized in that
a part of the net sheet is over-injected by the plastic frame (10).

8. The air stream filter according to any one of the preceding claims,
characterized in that
a part of the net sheet between the wings of the plastic frame (10) is over-injected by the reinforcing element (20).

9. The air stream filter according to any one of the preceding claims,
characterized in that
the reinforcing element (20) forms a connection between two bars of the grid (14).

10. The air stream filter according to any one of the preceding claims,
characterized in that
in the closed state of the plastic frame (10) the air stream filter is formed as a pocket.

11. A laundry dryer with at least one air stream filter, **characterized in, that**
the laundry dryer comprises at least one air stream filter according to any one of the claims 1 to 10.

FIG 1

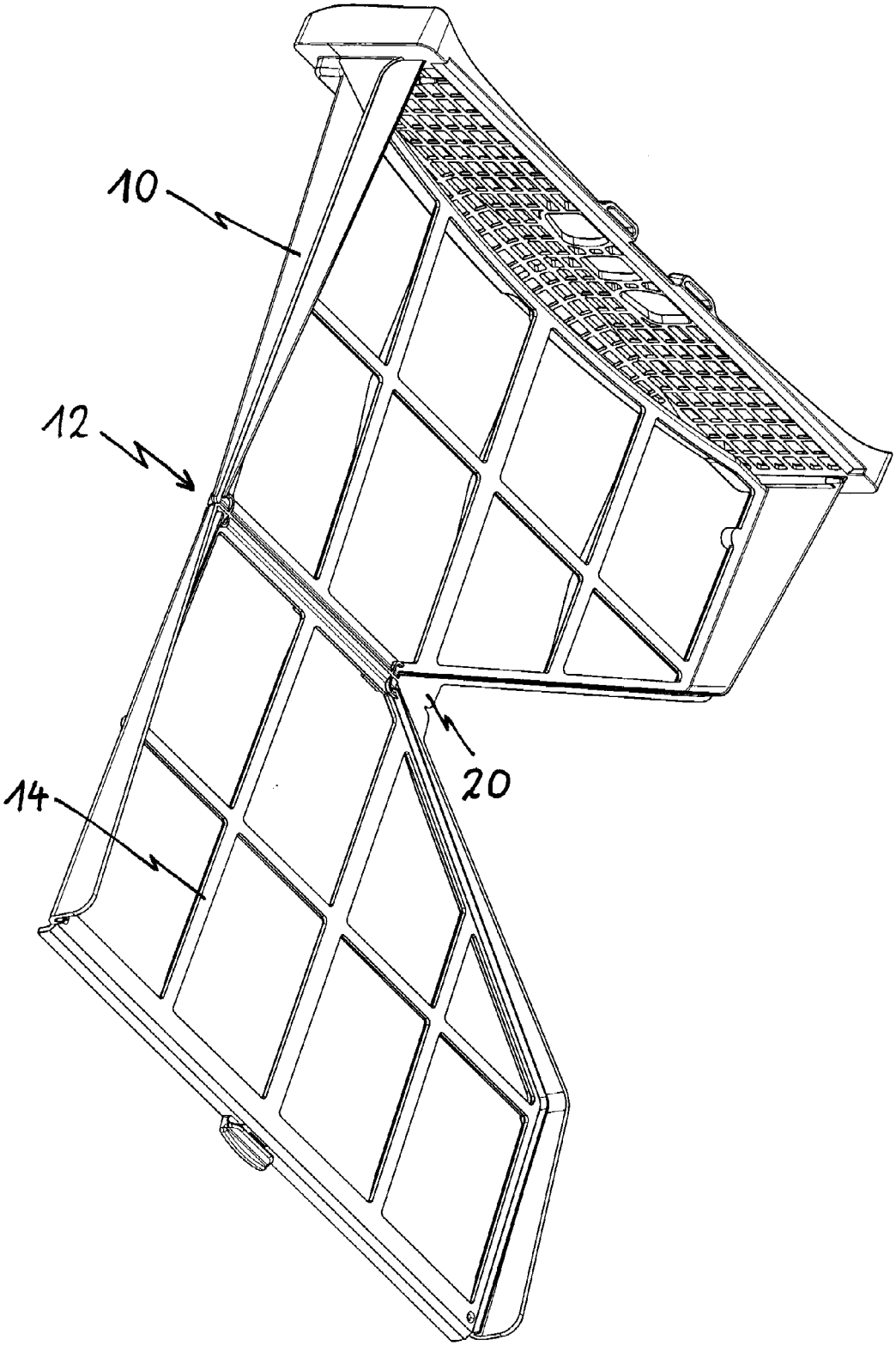


FIG 2

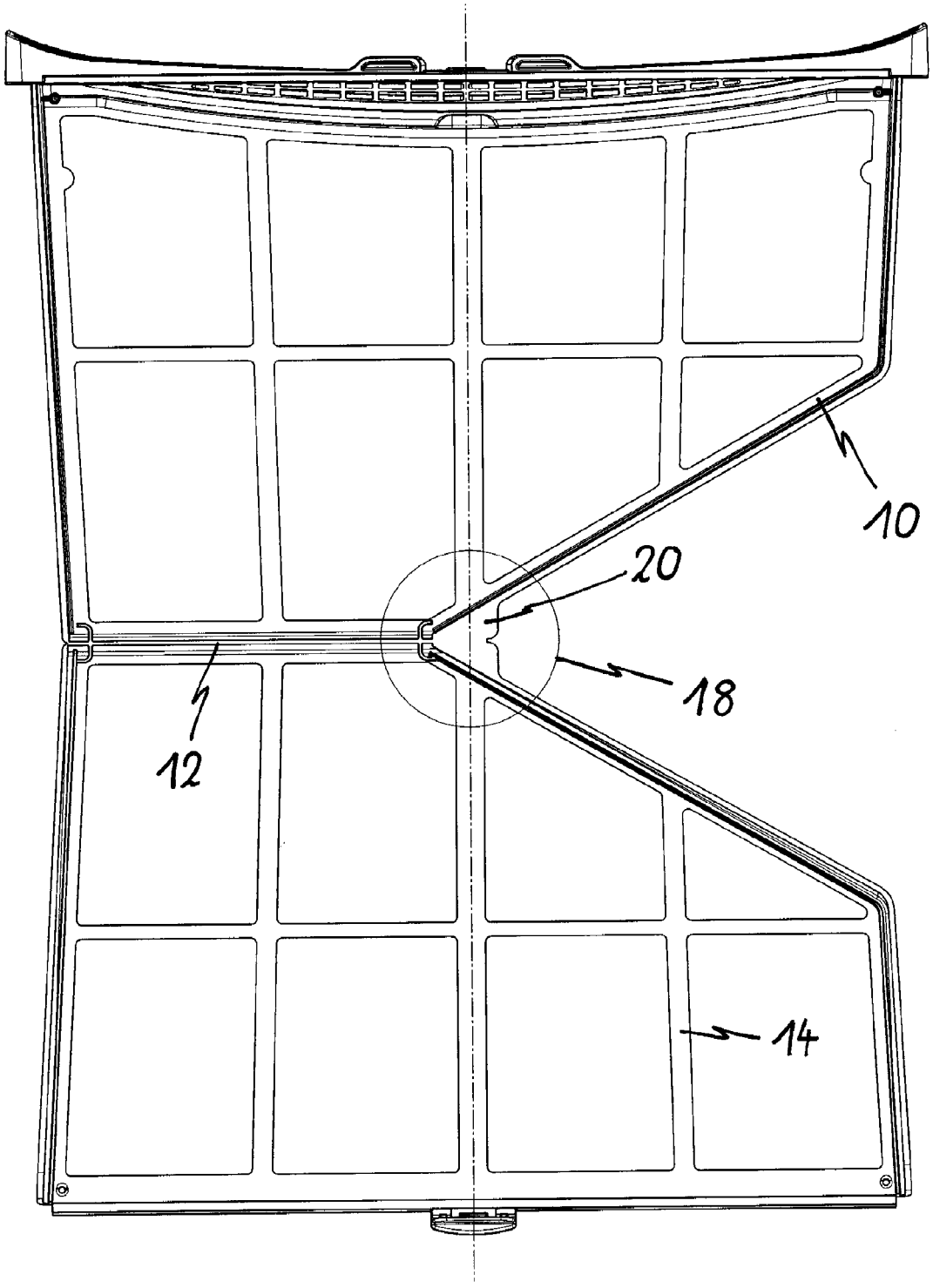


FIG 3

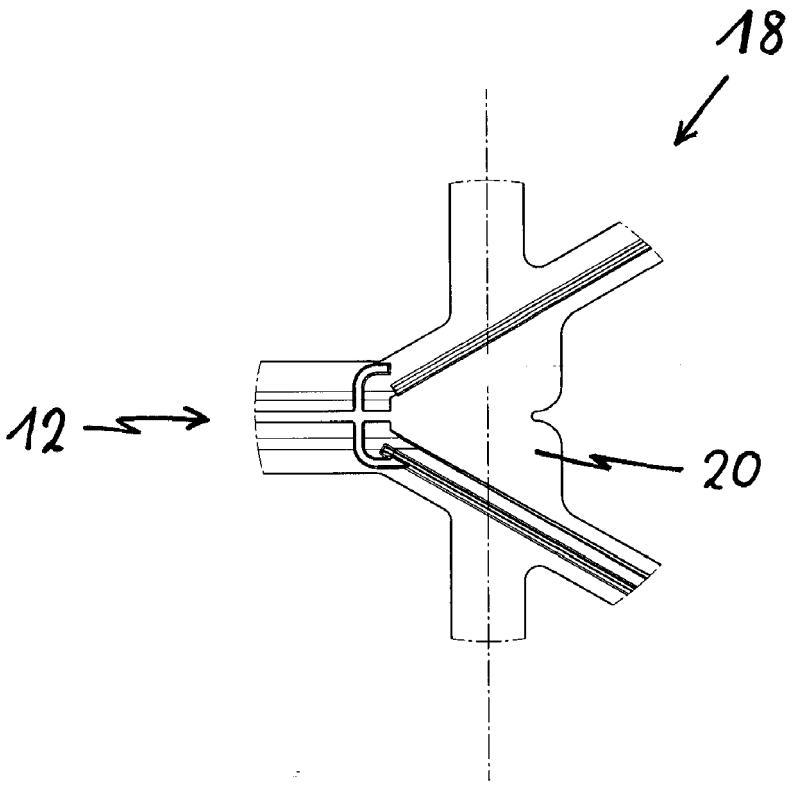


FIG 4

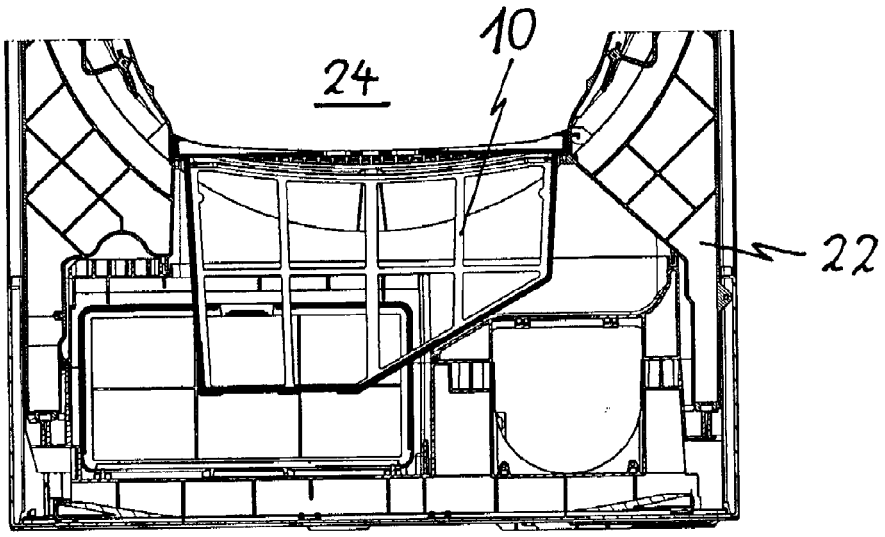
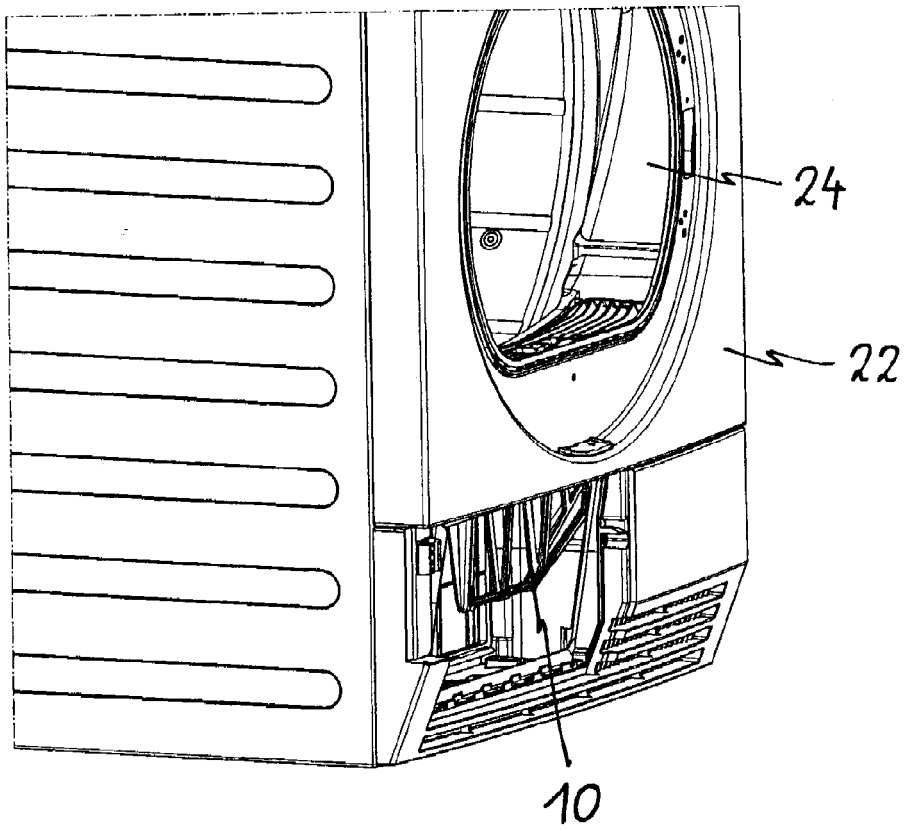


FIG 5



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EUROPEAN SEARCH REPORT

Application Number
EP 11 17 8604

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	GB 2 091 123 A (BAUKNECHT GMBH G) 28 July 1982 (1982-07-28) * the whole document * -----	1-11	INV. D06F58/22
			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	13 February 2012	Diaz y Diaz-Caneja

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 11 17 8604

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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13-02-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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