(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 586 354 A1**

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
01.05.2013 Bulletin 2013/18

(51) Int Cl.:
A47L 15/42 *(2006.01)*

(21) Application number: **12190086.4**

(22) Date of filing: **26.10.2012**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **28.10.2011 IT TO20110983**

(71) Applicant: **Bitron S.p.A.**
10122 Torino (TO) (IT)

(72) Inventors:
- **Brignone, Enzo**
  I-12025 FRAZ. MONASTERO DRONERO (Cuneo) (IT)
- **Giordano, Giovanni**
  I-12100 CUNEO (Italy) (IT)

(74) Representative: **Gerbino, Angelo et al**
Jacobacci & Partners S.p.A.
Corso Emilia 8
10152 Torino (IT)

(54) Water supply device for a dishwasher

(57) The water supply device for a domestic washing appliance comprises a plastic monolithic body (10) obtained by means of injection-moulding and without welds. The body (10) has two main faces (12) facing each other and connected by a perimetral transverse wall (14) so that it defines an internal cavity (16) and has a substantially flat shape. The body (10) also has a through-hole (18) passing through one of the two main faces (12) and a vapour escape chamber (20) formed within the internal cavity (16) and communicating with the outside and with the through-hole (18).

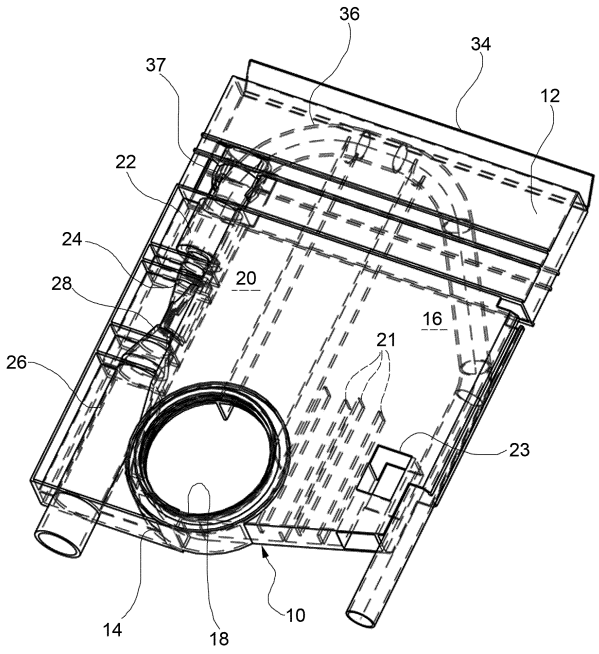

FIG.4

EP 2 586 354 A1

Description

[0001] The present invention relates to a water supply device for domestic washing appliances, such as dishwashers and laundry washing machines.

[0002] A device of this kind typically comprises a flat and hollow plastic body which is connected to other components of the electric household appliance and shaped so as to be able to perform various functions, such as venting of the vapours which form inside the wash-tub, providing an air-break for the supply water, collection of water intended to form the brine for regeneration of the ion exchange resins of the limescale remover, and so on.

[0003] Attempts at manufacturing this body by means of blow-moulding have not been successful since with this technology it is not possible to obtain, in a piece with such a complex shape, the small dimensional tolerances which are indispensable for operation thereof.

[0004] In practice, therefore, this body has hitherto been designed as two or more parts which are injection-moulded separately and then welded together so as to define internally a cavity. The corresponding welds may, however, be defective so that strict quality control is necessary, making the production process complex and costly.

[0005] The object of the present invention is therefore to overcome the abovementioned drawbacks of the prior art.

[0006] According to the invention, this object is achieved by means of a water supply device having the features indicated in Claim 1 below. Preferred features of this device are indicated in the dependent claims.

[0007] The device according to the invention does not have any welds, so that the associated production process may dispense with a corresponding quality control step, while still being able to achieve a high-quality product.

[0008] In particular, the monolithic body of the supply device according to the invention includes an air-break device for the supply water, which in turn comprises a first half-duct tapering at one end and a second half-duct tapering at one end, the aforementioned tapering ends facing each other.

[0009] It should be noted that the expression whereby the first and second half-ducts are described as having "tapering ends facing each other" means that the aforementioned ends are substantially aligned, namely are arranged on a same straight line. This allows in particular the provision of the two half-ducts with the respective ends formed as one piece with the monolithic body, since at the end of the moulding procedure the mould cores may be extracted from the half-ducts. On the other hand, such extraction would not have been possible in practical terms if the two half-ducts were arranged with their respective ends along a curved line.

[0010] Furthermore, the device may be completed where necessary by means of inserts assembled inside the body. Rubber parts, in particular gaskets, may also be co-moulded on the body.

[0011] The present invention relates furthermore to a domestic washing appliance comprising a supply device of the type indicated above.

[0012] Further advantages and features of the present invention will become clear from the detailed description which follows, provided purely by way of a non-limiting example with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a device according to the invention;
Figure 2 is a perspective view of the device according to Figure 1 from another angle;
Figure 3 is a cross-sectional view along the line III-III of Figure 2;
Figure 4 is a transparent view of the device according to Figure 1 inside which a water supply pipe has been inserted;
Figure 5 shows the incorporation of a flow meter in the device according to the preceding figures;
Figure 6 is a cross-sectional view along the line VI-VI of Figure 1;
Figure 7 shows schematically the structure of a mould for production of the device according to the preceding figures;
Figure 8 is a view which shows a first constructional variant of a detail of the device according to the preceding figures;
Figure 9 is a view, corresponding to that of Figure 3, of a second constructional variant of the device according to the invention;
Figure 10 is a view, corresponding to that of Figure 1, of a further constructional variant of the device according to the invention; and
Figure 11 is a cross-sectional view along the line X-X of Figure 10.

[0013] A water supply device for a domestic washing appliance comprises (Figures 1-6) a plastic monolithic body 10 obtained by means of injection-moulding and without welds. The body has two parallel main faces 12 facing each other and connected by a perimetral transverse wall 14 so as to define an internal cavity 16. The body 10 has a substantially flat shape and has, in plan view, a cross-section shaped as an irregular quadrilateral having a top rectilinear side which is substantially orthogonal to substantially rectilinear right and left sides which have different lengths, and a bottom side formed by several differently inclined sections.

[0014] A circular hole 18 passes through one of the two main faces 12, while a vapour escape chamber 20 is formed within the internal cavity 16 and communicates both with the outside and with the through-hole 18. Alternately arranged ribs 21 which define winding paths suitable for stopping any water spray protrude into the chamber 20 from the inner walls of the main faces 12. The main faces 12 are also passed through by a further

through-hole 23 which is intended to communicate with the outside and defines the maximum level which may be reached by the water inside the wash-tub of the domestic appliance.

[0015] The body 10 also incorporates an air-break device formed by a first half-duct 22 located in the internal cavity 16 and tapering at one end 24 and by a second half-duct 26 located in the internal cavity 16 and tapering at one end 28, the tapering ends 24, 28 of the two half-ducts 22, 26 facing each other and being separated by a gap and having - as shown in the figures - a tubular structure, namely a closed cross-section. In particular, the two half-ducts 22, 26 with the respective tubular ends are substantially aligned, namely are arranged on a same straight line. A seat 30 for a supply-water flow meter 32 is also formed in the body 10, upstream of the air-break device.

[0016] A portion of the transverse wall which forms the top side of the body is formed as a flap 34 hinged along one side on a main face 12.

[0017] A water supply pipe 36, which partially closes off communication with the outside of the vapour escape chamber 20 and/or promotes vapour condensation, is located within the chamber 20. The pipe 36 is fixed to the body 10 by teeth 37 and supplies water to the air-break device which has the function of preventing any undesirable backflow into the water network.

[0018] Figure 7 shows in schematic form a mould for the production of the body 10, comprising a pair of parts 38 movable in opposite senses along the same direction for formation of the two half-ducts 22, 26, an auxiliary part 40 movable orthogonally with respect to the latter direction for forming the gap between the facing ends 24, 28 of the two half-ducts 22, 26, and a main movable part 42.

[0019] Figure 8 shows a further embodiment of the device according to the invention in which numbers identical to those used in the preceding Figures 1-6 identify identical or equivalent parts.

[0020] The only substantial difference from the preceding embodiment is that the flap 34 is formed by two independent sections 44, 46: the first section 44 acts selectively as an external closure for the vapour escape chamber 20, while the second section 46 acts selectively as a closure for a further chamber 48 formed within the body 10.

[0021] Figure 9 shows a further embodiment of the device according to the invention in which numbers identical to those used in the preceding Figures 1-6 identify identical or equivalent parts.

[0022] The only substantial difference from the preceding embodiment according to Figures 1-6 is that the body 10 has a small tank 50 for collecting water for forming a regenerating brine, which small tank 50 is formed within the internal cavity 16.

[0023] Figures 10 and 11 show a further embodiment of the device according to the invention in which numbers identical to those used in the preceding figures identify identical or equivalent parts.

[0024] The only substantial difference from the embodiment of Figures 1-6 is that the air-break device is not formed integrally with the body 10, but is formed by an insert 52 assembled inside the body after moulding thereof, so as to form a length of a water supply duct.

[0025] Of course, without modifying the principle of the invention, the constructional details and embodiments may be greatly varied with respect to that described purely by way of example, without thereby departing from the scope of the invention as defined in the accompanying claims.

Claims

1. Water supply device for a domestic washing appliance, comprising a monolithic body (10) of plastic material obtained by means of injection-molding and without any welds, said body (10) having two main faces (12) facing each other and connected by a perimetral transverse wall (14) so that it defines an internal cavity (16) and has a substantially flat shape, said body (10) having at least:

   - a through-hole (18) passing through one of the two main faces (12), and
   - a vapour escape chamber (20) formed within said internal cavity (16) and communicating with the outside and with said through-hole (18), said monolithic body (10) further including an air-break device for the supply water.

2. Device according to Claim 1, wherein said air-break device includes:

   - a first half-duct (22) located in said internal cavity (16) and tapering at one end (24); and
   - a second half-duct (26) located in said internal cavity (16) and tapering at one end (28), said tapering ends (24, 28) facing each other.

3. Device according to Claim 2, wherein the facing tubular ends of the first and second half-ducts (28, 30) are arranged along a same straight line.

4. Device according to Claim 1, wherein an insert (52) acting as an air-break device is assembled within said body (10) instead of being integral therewith.

5. Device according to Claim 4, wherein said insert (52) constitutes a length of a water supply duct.

6. Device according to any one of the preceding claims, wherein said body (10) has, within said internal cavity (16) and upstream of the air-break device, a seat (30) for a supply-water flow meter (32).

7. Device according to any one of the preceding claims, wherein a water supply pipe (36), which pipe (36) preferably partially closes off communication with the outside of said vapour escape chamber (20) and/or promotes vapour condensation, is located within said vapour escape chamber (20).

8. Device according to any one of the preceding claims, wherein said body (10) has a small tank (50) for collecting water for forming a regenerating brine, which small tank (50) is formed within said internal cavity (16).

9. Device according to any one of the preceding claims, wherein a portion of said transverse wall (14) constituting the top side of the body (10) is formed as a flap (34) hinged along one side on one of the main faces (12).

10. Device according to Claim 9, wherein said flap (34) is formed by two independent sections (44, 46), the first section (44) acting selectively as an external closure for said vapour escape chamber (20) and the second section (46) acting selectively as a closure for a further chamber (48) formed within said body (10).

11. Device according to any one of the preceding claims, wherein said body (10) has, in plan view, a cross-section shaped as an irregular quadrilateral having a top rectilinear side which is substantially orthogonal to substantially rectilinear right and left sides which have different lengths, and a bottom side formed by several differently inclined sections.

12. Domestic washing appliance comprising a supply device according to any one of the preceding claims.

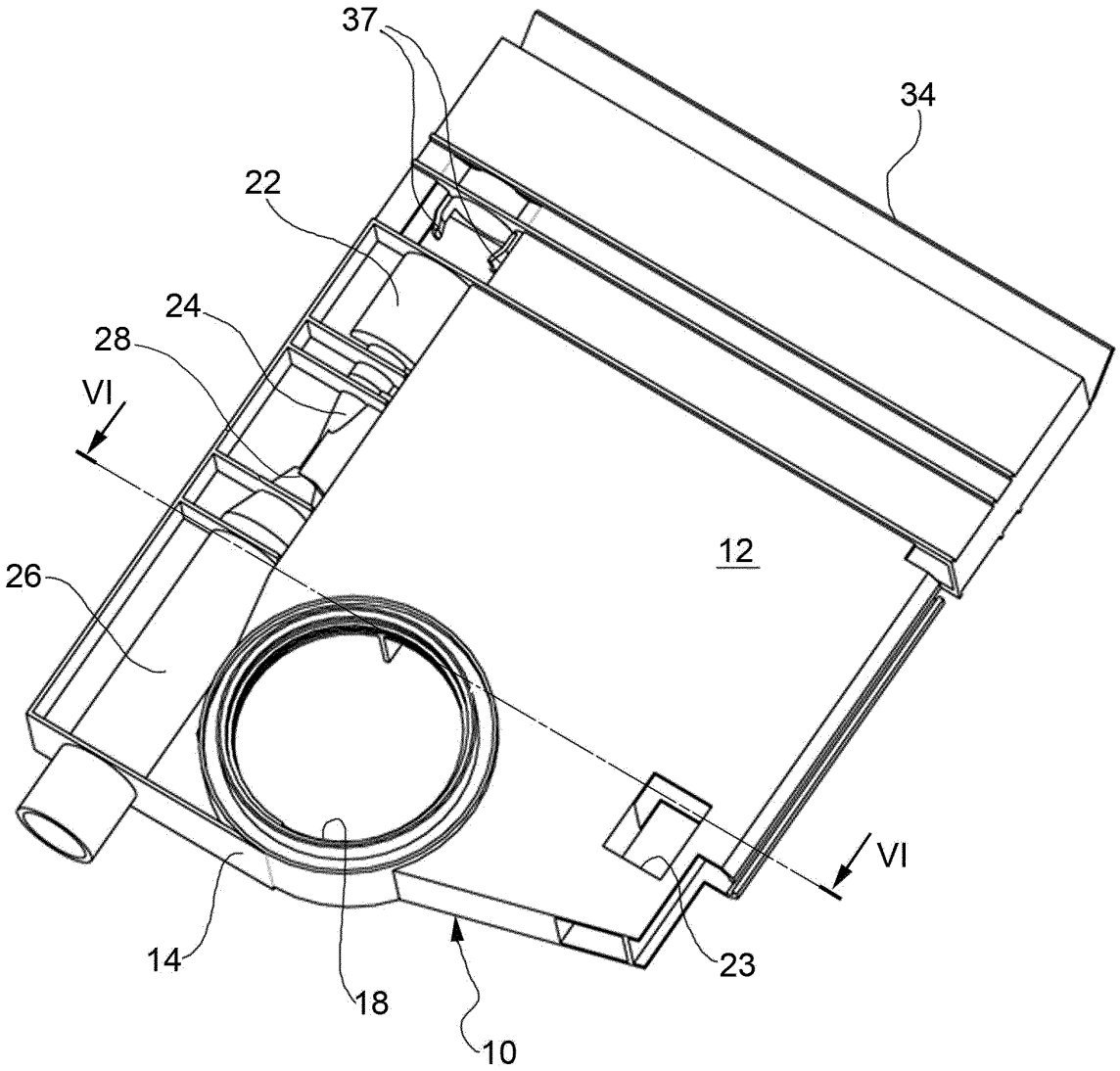

FIG.1

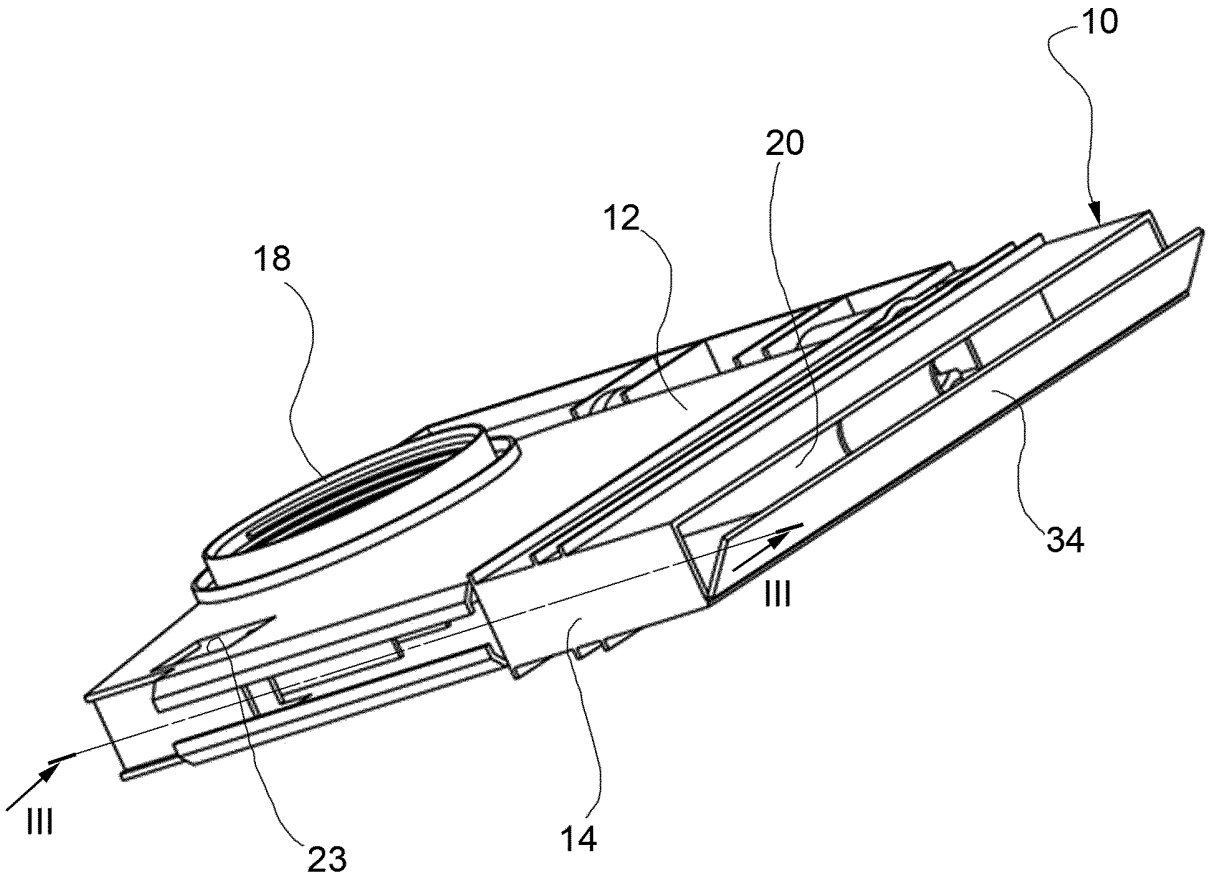

FIG.2

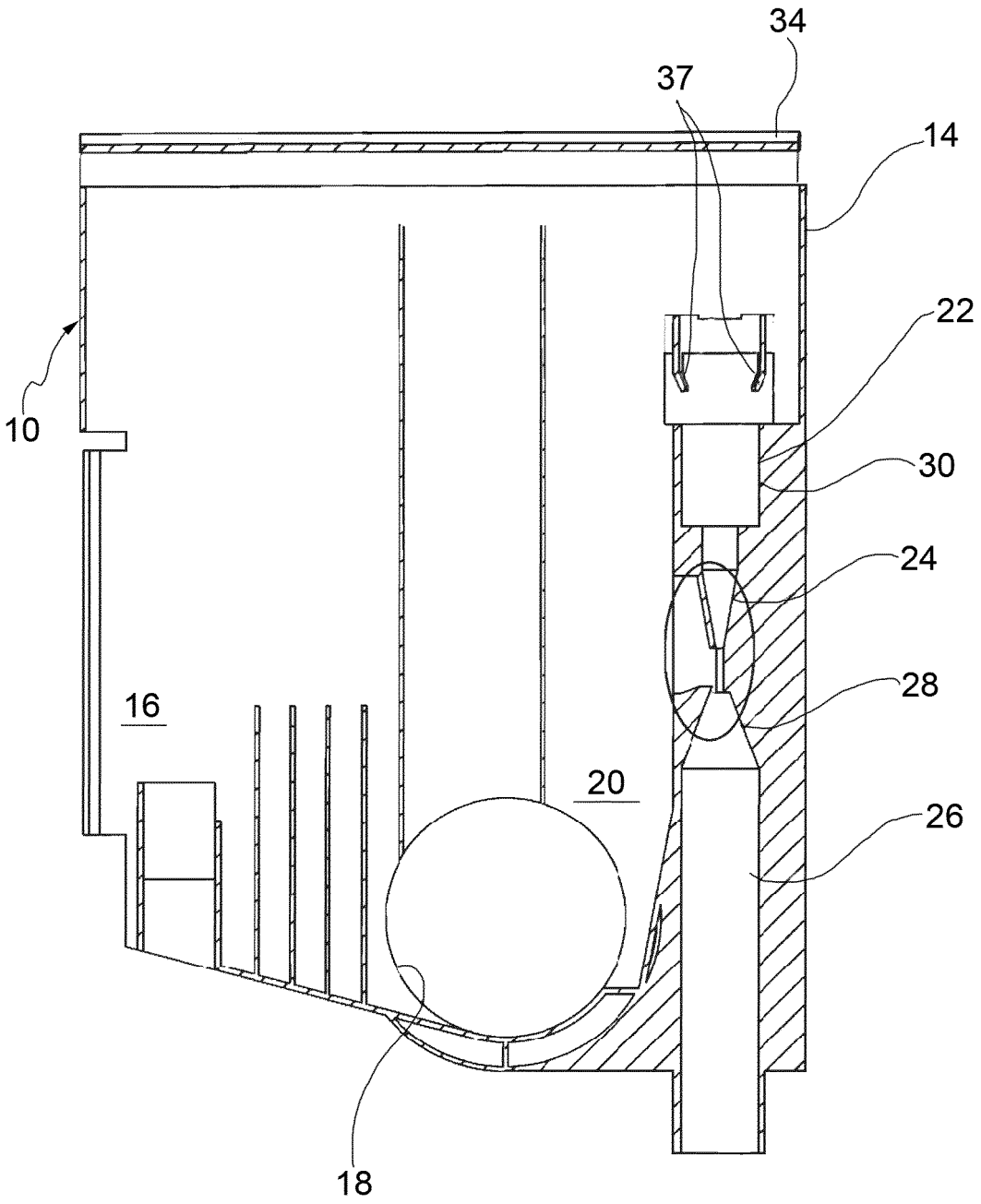

FIG.3

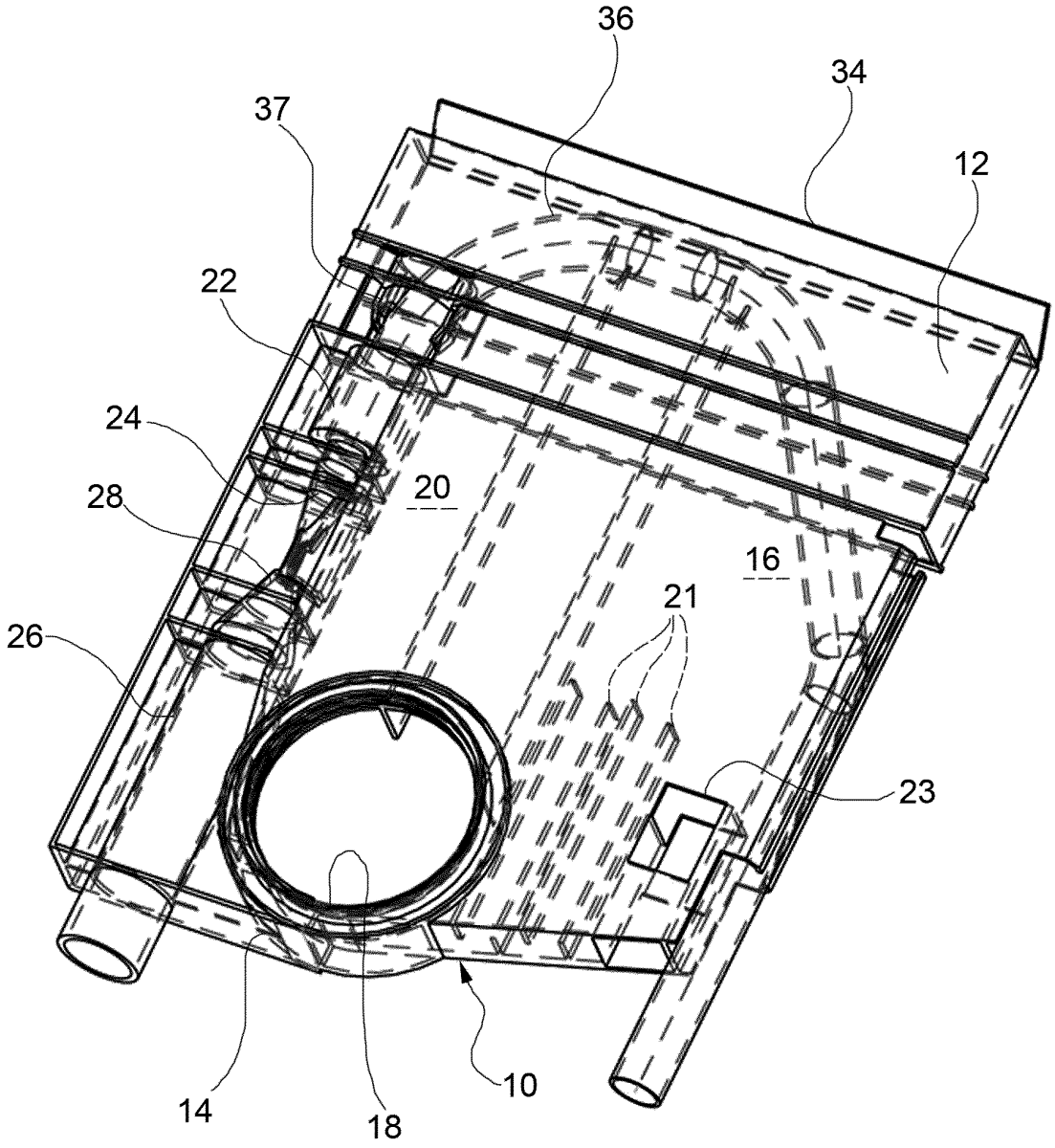

FIG.4

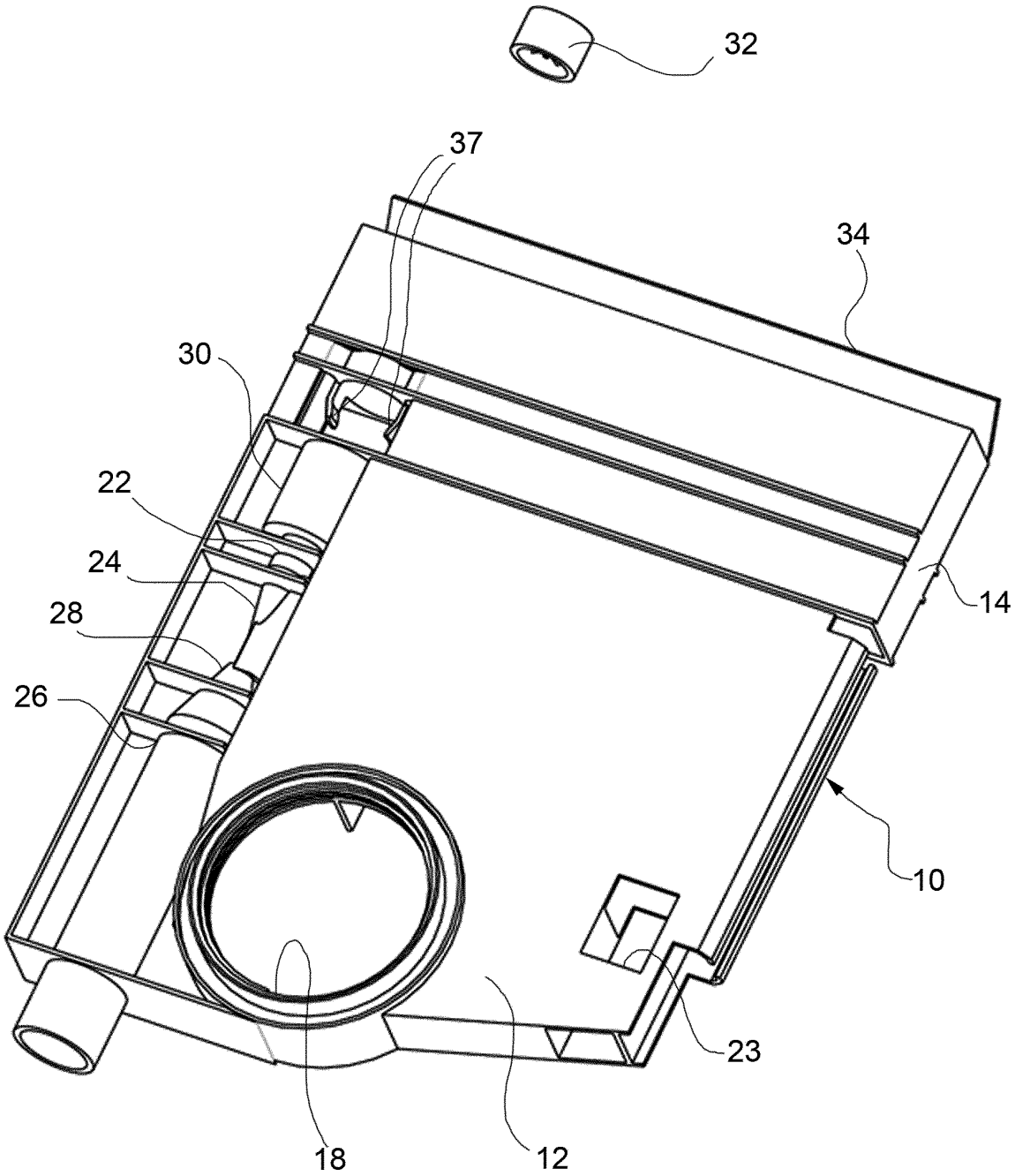

FIG.5

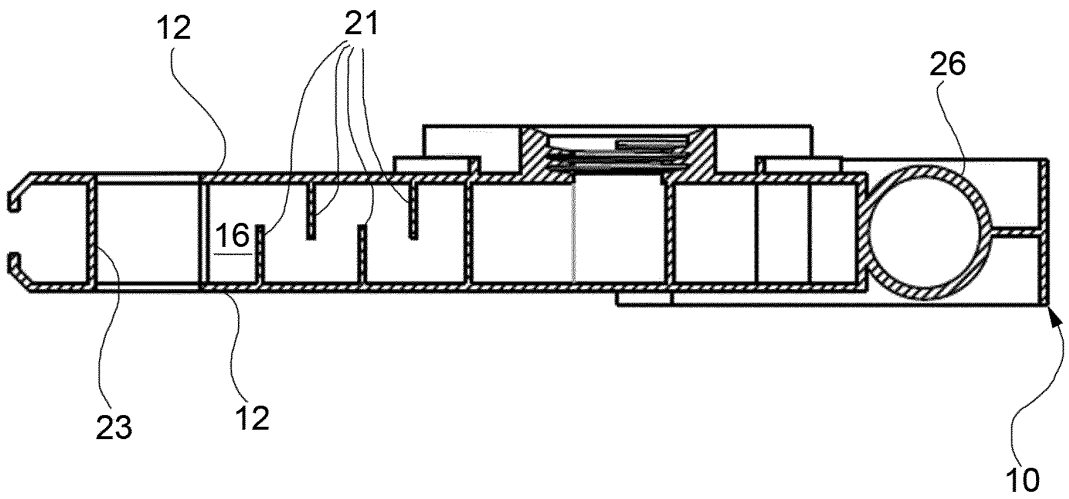

FIG.6

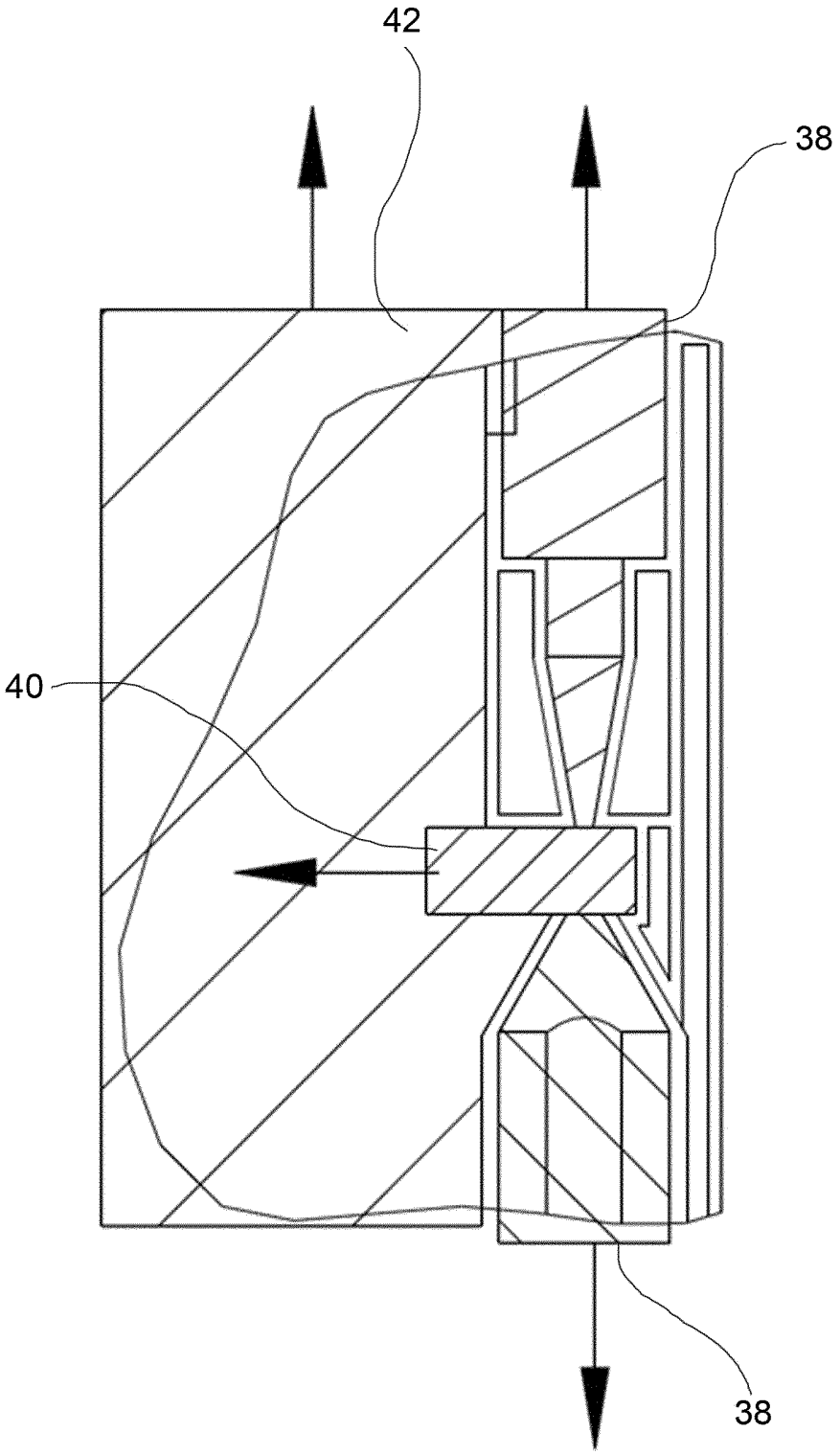

FIG.7

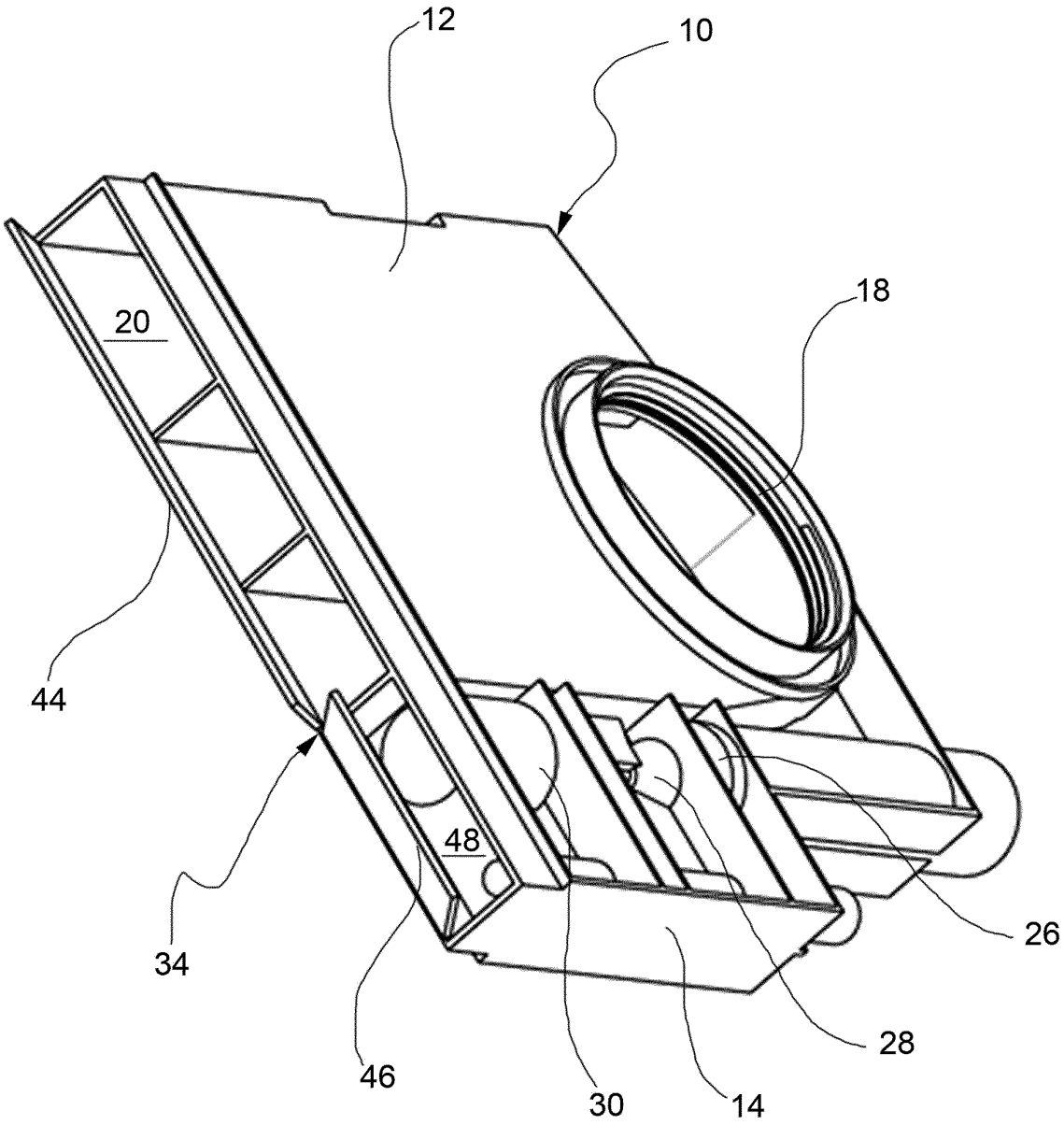

FIG.8

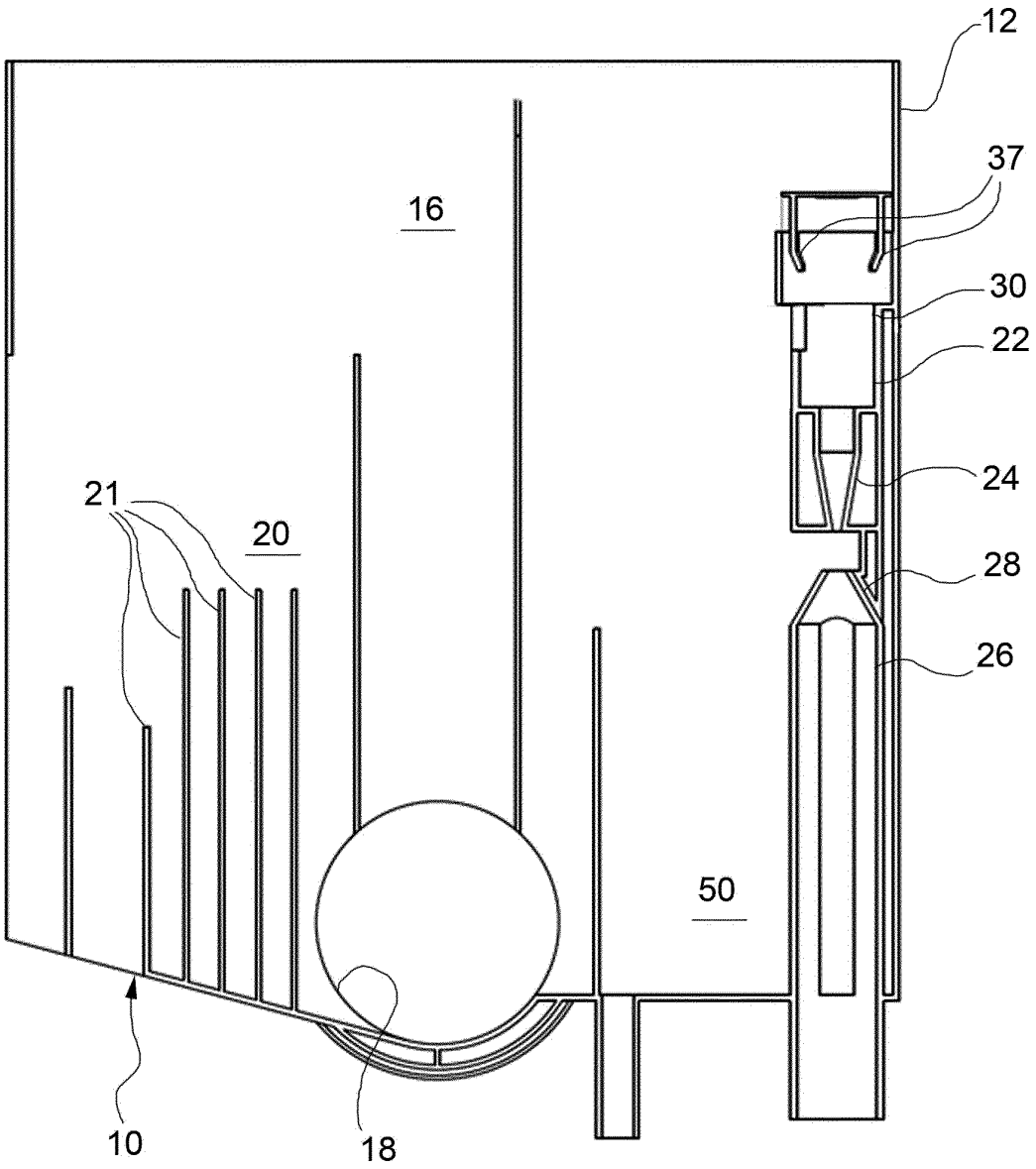

FIG.9

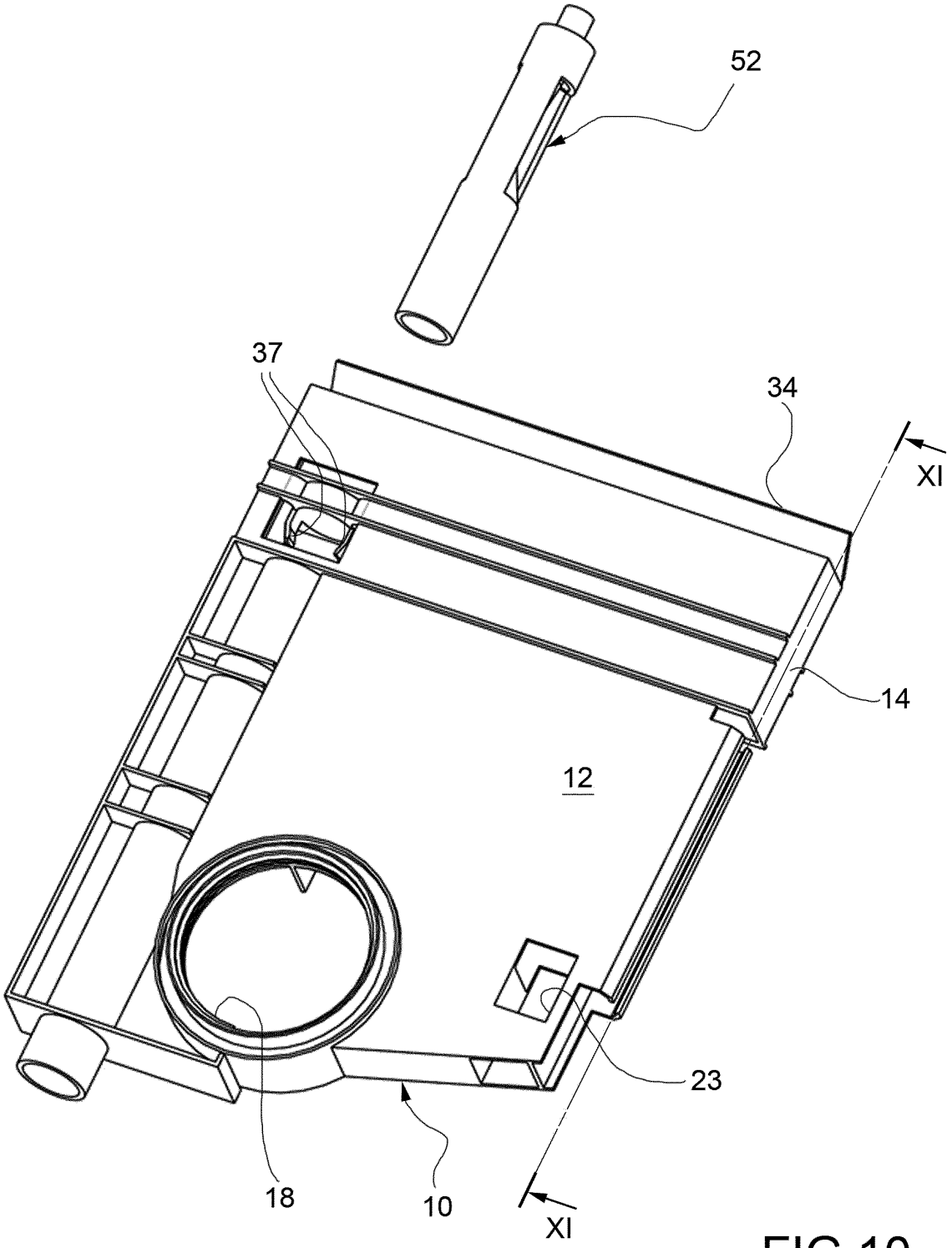

FIG.10

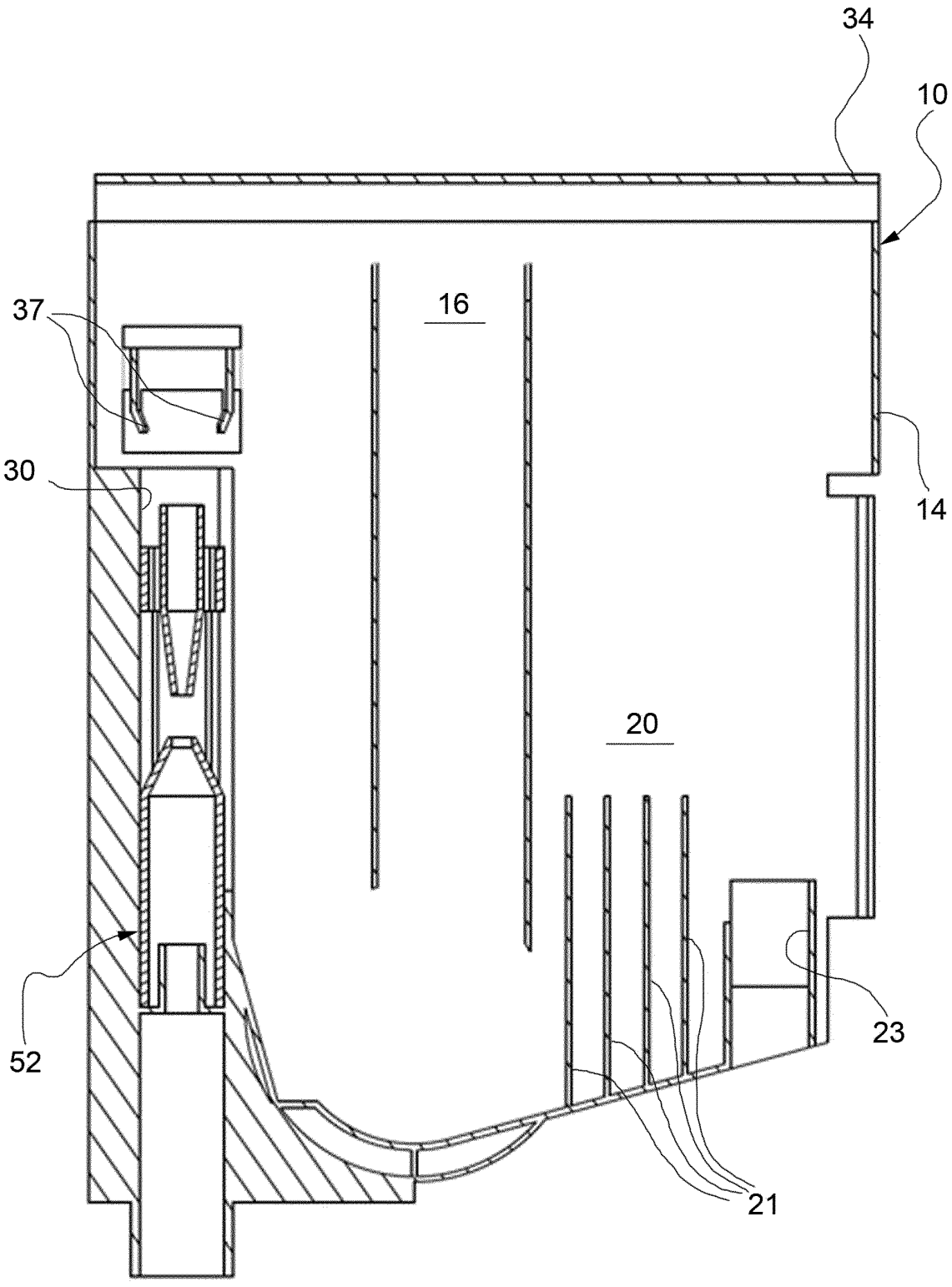

FIG.11

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 12 19 0086

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 Y A	GB 2 151 466 A (BAUKNECHT HAUSGERAETE) 24 July 1985 (1985-07-24) * the whole document * -----	1,6-8, 11,12 2-5 9,10	INV. A47L15/42
Y A	FR 2 469 172 A3 (ZANUSSI A SPA INDUSTRIE [IT]) 22 May 1981 (1981-05-22) * page 1, line 1 - line 3 * * page 2, line 28 - page 5, line 10 * * figure 1 * -----	2-5 1,12	
A	FR 2 172 184 A1 (BAUKNECHT GMBH G [DE]) 28 September 1973 (1973-09-28) * the whole document * -----	1,12	
A	EP 1 462 050 A2 (DIHR SPA [IT]) 29 September 2004 (2004-09-29) * abstract * * figures 1-4 * -----	1,12	
			TECHNICAL FIELDS SEARCHED (IPC) A47L D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	29 January 2013	Redelsperger, C

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 12 19 0086

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

29-01-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2151466 A	24-07-1985	DE 3345603 A1	27-06-1985
		FR 2556579 A1	21-06-1985
		GB 2151466 A	24-07-1985
		IT 1178755 B	16-09-1987
FR 2469172 A3	22-05-1981	AR 223903 A1	30-09-1981
		AU 536260 B2	03-05-1984
		AU 6437080 A	21-05-1981
		DK 489280 A	16-05-1981
		FR 2469172 A3	22-05-1981
		GB 2063658 A	10-06-1981
		NL 8005727 A	16-06-1981
		SE 446937 B	20-10-1986
		SE 8007977 A	16-05-1981
FR 2172184 A1	28-09-1973	AT 325806 B	10-11-1975
		CH 549991 A	14-06-1974
		FR 2172184 A1	28-09-1973
		GB 1349338 A	03-04-1974
		IT 979012 B	30-09-1974
		JP 48097372 A	12-12-1973
		NL 7302175 A	21-08-1973
EP 1462050 A2	29-09-2004	NONE	

EPO FORM P0459

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