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(54) **Structure of waste water well of plastic material**

(57) Waste water well (1) for waste water comprising a hollow body (2) and a cover (10), made of thermoplastic material and adapted to sealably couple with respect to each other.
In particular, the hollow body (2) comprises a base (6) and a side surface (4) from which four pluralities of ducts (3a-3d) of different diameter protrude. In particular, each plurality comprises ducts (3a-3d) of different diameter arranged in such a way that the element of larger diameter (3d) encircles inside those of smaller diameter (3a-3c). In particular, the tubular elements (3a- 3d) of each plurality are arranged according to result close to one another, or overlapped, at a respective generatrix close to the base (6). More in detail, the different pluralities, and therefore the respective ducts (3a-3d), are arranged at a same distance from the base (6).

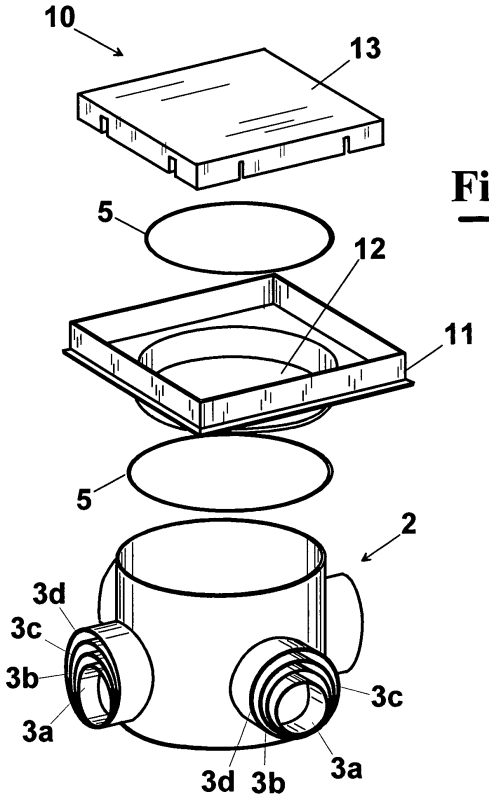

Fig. 1

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Description

Field of the invention

[0001] The present invention relates to a structure of waste water well of plastic material.

Description of the prior art.

[0002] Waste water wells are known, i.e. for black water and soapy water, used as collecting reservoirs, expansion reservoirs, but also as connection receptacles for sewer systems.

[0003] The waste water wells of known type have box-like shape and are made of concrete, of fiberglass reinforced plastic, or of moulded plastic material.

[0004] While waste water wells in concrete have the drawback of having a high weight that requires a complex and difficult installation, and fo this reason then they are used only when high resistance against mechanical actions is required, waste water wells of plastic material are widespread on the market even if they cannot be used in case resistance against high mechanical actions is required, such as resistance to walking and vehicle transit, since they are not capable of assuring enough mechanical resistance.

[0005] Among waste water wells of plastic material some wells are adapted to be easily connected to ducts of different diameter. More in detail, on the sides of the box-like portion of a waste water well tubular concentric portions of different diameter are provided. This way, waste water wells have a certain flexibility since they can be connected to the sewer network system simply connecting at the side surface of the waste water well on a tubular portion having diameter corresponding to that of the duct to which it has to be connected, and cutting away the tubular portions of smaller diameter.

[0006] However, this solution can cause the solid material to deposit in the waste water well. The apertures made on the surface of the waste water well for connecting it to the network via the inlet and outlet ducts are, in fact, arranged at different heights. Therefore, the flow of the liquid between the inlet and outlet ducts of the waste water well meeting different levels that are created inside causes the solid material to deposit in determined points. This phenomenon is further enhanced by the box-like structure of the waste water well.

[0007] Therefore, a maintenance treatment is required periodically for removing manually the solid material that, by accumulating in the waste water well, can cause it to jam and then to affect its correct operation.

Summary of the invention

[0008] It is then a feature of the present invention to provide a waste water well to prevent solid material to stop inside it in order to reduce the necessary number of maintenance treatments.

[0009] It is another feature of the present invention to provide a waste water well capable of bearing high mechanical actions in order to improve its resistance to walking and vehicle transit actions.

[0010] It is still a feature of the invention to provide a waste water well easily assemblable and cheap with respect to the prior art.

[0011] These and other features are accomplished with one exemplary structure of a waste water well, according to the present invention, comprising:

- a hollow body of thermoplastic material having a base, a side surface and a opening on the surface opposite to said base,
- at least one plurality of inlet ducts and at least one plurality of outlet ducts for the waste water, said ducts protruding outside from said side surface and being arranged in such a way that the duct of larger diameter encircles the ducts of smaller diameter,
- a cover suitable for sealably coupling with said hollow body at said opening,

whose main feature is that the ducts of each plurality are arranged close to each other at a respective generatrix close to the base of the hollow body.

[0012] Preferably, the inlet ducts and the outlet ducts of the waste water consist of two respective pluralities of ducts of different diameter having a lowest generatrix substantially at a same distance to the base of the hollow body, said distance being the same for said inlet and outlet ducts.

[0013] Preferably, the hollow body and the pluralities of inlet and outlet ducts are made as a single part obtained for injection moulding.

[0014] In particular, the ducts of each plurality can be arranged in such a way that the respective lowest generatrix close to the base of the hollow body that are coincident to one another. In this case, the different ducts are arranged all at a same distance from the base of the hollow body. This simplifies remarkably the flow of the waste water towards/away from the hollow body and avoids any accumulation of solid material inside.

[0015] Advantageously, the cover and the hollow body have mutual engagement means. For example, the cover at the surface that in use is oriented towards the hollow body has a projection adapted to couple with the inner side face of the hollow body.

[0016] Preferably, between the projection of the cover and the hollow body tightness elements are arranged, for example seals.

[0017] In particular, the inner side face of the hollow body has at least one support on which the projection of the cover abuts.

[0018] According to another aspect of the invention a waste water well comprises:

- a hollow body of thermoplastic material having a base, a side surface and an opening on the surface opposite to said base,

- at least one plurality of inlet ducts and at least one plurality of outlet ducts for the waste water, said ducts protruding outside from said side surface and being arranged in such a way that the duct of larger diameter encircles the ducts of smaller diameter,

- a cover suitable for sealably coupling with said hollow body at said opening,

whose main feature is that said cover has a portion protruding beyond the side surface of the hollow body, said portion resting in use on a support, for example a concrete casting, in order to load on it large part of the mechanical actions to which the waste water well is subject.

[0019] In particular, the cover can comprise:

- a portion engaging with the hollow body,

- a stiff portion adapted to couple with the embracing portion and comprising:

    - a plurality of circumferential concentric ribs that start from the central portion of the cover become less frequent towards the periphery,
    - a plurality of radial ribs connecting two next circumferential ribs.

[0020] In particular, two next circumferential ribs have a ratio between the respective diameters set between 1.2 and 2.5, advantageously set between 1.4 and 2.0, preferably between 1.6 and 1.8. This way, the circumferential ribs are concentrated in the central portion of the cover and become less frequent towards the periphery. This gives a higher mechanical resistance at the central portion of the cover where, in the presence of mechanical actions, in particular, pushing actions, the maximum flexion is recorded.

[0021] In particular, the hollow body may have a cylindrical shape, or alternatively, polyedric shape. In the latter case, the hollow body, at the inner side surface, has beveled edges suitable to assist the outflow of the waste water treated from the recess of said hollow body.

[0022] In particular, the cover can be connected to the hollow body by an interposition duct adapted to engage with said cover and with said hollow body at the end.

Brief description of the drawings.

[0023] The invention will be made clearer with the following description of an exemplary embodiment thereof, exemplifying but not limitative, with reference to the attached drawings wherein:

- Figure 1 shows an exploded perspective view of a first exemplary embodiment of a structure of waste water well, according to the invention;
- Figure 2 shows a perspective view of the structure of waste water well of figure 1 in an assembled configuration;
- Figure 3 shows a perspective view of an exemplary embodiment of the structure of waste water well of figure 1 in operative conditions;
- Figure 4 shows in an elevational side view the structure of waste water well of figure 3 in operative conditions;
- Figure 5 shows an exploded perspective view of a possible exemplary embodiment of a cover of waste water well as shown in figure 1;
- Figure 6 shows a perspective view from below of an element, and precisely the embracing portion, of the cover of figure 5;
- Figure 7 shows a top plan view of an element, and precisely the stiff portion, of the cover of figure 5;
- Figure 8 shows in a elevational side view of the cover of figure 5;
- Figure 9 shows a perspective view of an exemplary embodiment of the hollow body of figure 1;
- Figure 10 shows a perspective view from below of the hollow body of figure 10.

Description of an preferred exemplary embodiments.

[0024] With reference to figure 1, a waste water well 1, according to the present invention, comprises a hollow body 2 and a cover 10, which are made of thermoplastic material and are adapted to sealingly couple to each other. Hollow body 2 comprises a base 6 and a side surface 4 from which four pluralities of ducts protrude 3a-3d having different diameter. In particular, each plurality comprises ducts 3a-3d of different diameter arranged in such a way that the element of larger diameter 3d encircles those of smaller diameter 3a-3c.

[0025] In particular, the tubular elements 3a-3d of each plurality are arranged according to result close to one another, or overlapped, at a respective generatrix close to base 6. More in detail, the different pluralities, and therefore the respective ducts 3a-3d, are arranged at a same distance from base 6. This particular arrangement allows a high flexibility, for the presence of ducts of different diameter, as well as an optimal efficiency of operation. In operative conditions, the flow of treated waste water does not meet obstacles, i.e. different heights, between the inlet ducts and the outlet ducts, and can then outflow freely from the waste water well 1.

[0026] To avoid an accumulation of solid material dragged by the current of waste water, hollow body 2 may have cylindrical shape (figure 1) or, alternatively, polyedric shape with beveled edges at the inner side face (figures 9 and 10).

[0027] When assemblng the waste water well 1, the surface 4 of hollow body 2 is cut at each plurality of tubular elements, for removing the tubular elements of smaller

diameter than the desired diameter.

[0028] For example, in the case shown in figure 3, waste water well 1 is connected by means of inlet ducts 80-82 to three different users at the plurality 3'-3''' of ducts. The waste water flow then from waste water well 1 towards the sewer network system through a duct 83 connected to hollow body 2 at the plurality of ducts 3^{iv}.

[0029] Also in case of ducts 80-83 of different diameter, the particular arrangement of tubular elements 3a-3d allows to arrange the ducts 80-83 substantially on a same plane α (figure 4).

[0030] The cover 10 and hollow body 2 are coupled through mutual engagement means. For example, cover 10, at surface 12 that in use is oriented towards hollow body 2, has a projection 35 adapted to couple with the inner side face of hollow body 2. A seal 5 connecting hollow body 2 and the projection 35 ensures then the necessary tightness between the two bodies.

[0031] In case of a hollow body 2 of cylindrical shape, the projection 35 of the cover 10 is, in use, arranged abutting on supports 7, for example 4 arranged at 90°, protruding towards the inside of waste water well 1 starting from the inner surface of hollow body 2.

[0032] In the case, instead, of hollow body 2' with polyedric shape, at an end that adapted to couple with the cover a containing neck 14 can be provided. More in detail, the walls 17 of hollow body 2' protrude from the neck 14 towards the inside of the waste water well 1, whereby the projection 35 of the cover 10 can abut on them.

[0033] As shown in detail in figure 4, the cover 10 has a portion 13 that extends beyond the side surface 4 of hollow body 2. In particular, portion 13 in use is arranged on a support, for example a concrete casting 100, on which large part of the mechanical actions are loaded to which the waste water well is subject 1. Therefore, it is not necessary to provide particular stiffening structure for base 6 of hollow body 2. This remarkably simplifies the production process for hollow body 2 and, in particular, the shape of the mould from which it is obtained.

[0034] If waste water well 1 is installed at high depth, the cover 10 is connected to the body 2 by a duct 85. More in detail, the duct 85 at its end has mutual engagement means with the cover 10 and with hollow body 2.

[0035] In a particular exemplary embodiment of the invention, the cover 10 is made of two parts (figure 5). In detail, it comprises a portion 30 of engagement with hollow body 2, and a stiffening portion 20 adapted to couple with it, for example with a click engagement. Between engagement portion 30 and stiffening portion 20 a seal 15 is arranged.

[0036] Stiff portion 20 at the surface that faces portion 30 is equipped with a plurality of circumferential concentric ribs, for example 5 51-55, concentrated at the central portion of the cover 10 and more sparse towards the periphery. In particular, two next circumferential ribs 51-52, 52-53, 53-54 and 54-55 have a ratio between the respective diameters set between 1.2 and 2.5, for example 1.8. this gives a higher mechanical resistance at the central portion of cover 10 where in the presence of mechanical actions, in particular, pushing actions, the maximum flexion is recorded (figure 8). Between two next circumferential ribs 51-55 furthermore, a plurality of radial ribs 60 is provided.

[0037] Finally, in an exemplary embodiment not shown in the figures, hollow body 2 has inside a shaped surface suitable to assist the outflow of the waste water treated by the waste water well 1.

[0038] The foregoing description of a specific embodiment will so fully reveal the invention according to the conceptual point of view, so that others, by applying current knowledge, will be able to modify and/or adapt for various applications such an embodiment without further research and without parting from the invention, and it is therefore to be understood that such adaptations and modifications will have to be considered as equivalent to the specific embodiment. The means and the materials to realise the different functions described herein could have a different nature without, for this reason, departing from the field of the invention. It is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

Claims

1. Structure of waste water well comprising:

   - a hollow body of thermoplastic material having a base, a side surface and an opening on the surface opposite to said base,
   - at least one plurality of inlet ducts and at least one plurality of outlet ducts for the waste water, said ducts protruding outside from said side surface and being arranged in such a way that the duct of larger diameter encircles the ducts of smaller diameter,
   - a cover suitable for sealably coupling with said hollow body at said opening,

   characterised in that said ducts of each plurality ducts are arranged close to each other at a respective generatrix close to the base of said hollow body.

2. Structure of waste water well, according to claim 1, wherein said inlet ducts and said outlet ducts of the waste water of said respective plurality have a lowest generatrix substantially at a same distance to the base of the hollow body, said distance being the same for said inlet and outlet ducts.

3. Structure of waste water well, according to claim 1, wherein said hollow body comprising said plurality of ducts is made of a single part obtained for injection moulding.

4. Structure of waste water well, according to claim 1,

wherein said cover and said hollow body have mutual engagement means.

5. Structure of waste water well, according to claim 1, wherein between said cover and said hollow body tightness elements are arranged.

6. Structure of waste water well comprising:

- a hollow body of thermoplastic material having a base, a side surface and an opening on the surface opposite to said base,
- at least one plurality of inlet ducts and at least one plurality of outlet ducts for the waste water, said ducts protruding outside from said side surface and being arranged in such a way that the duct of larger diameter encircles the ducts of smaller diameter,
- a cover suitable for sealably coupling with said hollow body,

characterised in that said cover has a portion protruding from said side surface of said hollow body, said protruding portion resting in use on a support.

7. Structure of waste water well, according to one among claims 1 and 6, wherein said cover comprises:

- a portion engaging with said hollow body,
- a stiff portion adapted to couple with said protruding portion and comprising:

  - a plurality of circumferential concentric ribs that start from the central portion of said cover and become less frequent towards the periphery,
  - a plurality of radial ribs connecting two next circumferential ribs.

8. Structure of waste water well, according to claim 7, wherein two next circumferential ribs have a ratio between the respective diameters set between 1.2 and 2.5, advantageously set between 1.4 and 2.0, preferably set between 1.6 and 1.8.

9. Structure of waste water well, according to one among claims 1 and 6, wherein said hollow body has cylindrical shape.

10. Structure of waste water well, according to one among claims 1 and 6, wherein said hollow body has polyedric shape and has, at the inner side surface, beveled edges suitable to assist the outflow from the recess of said hollow body of the waste water treated.

11. Structure of waste water well, according to one among claims 1 and 6, wherein said hollow body is connected to said cover by an interposition duct.

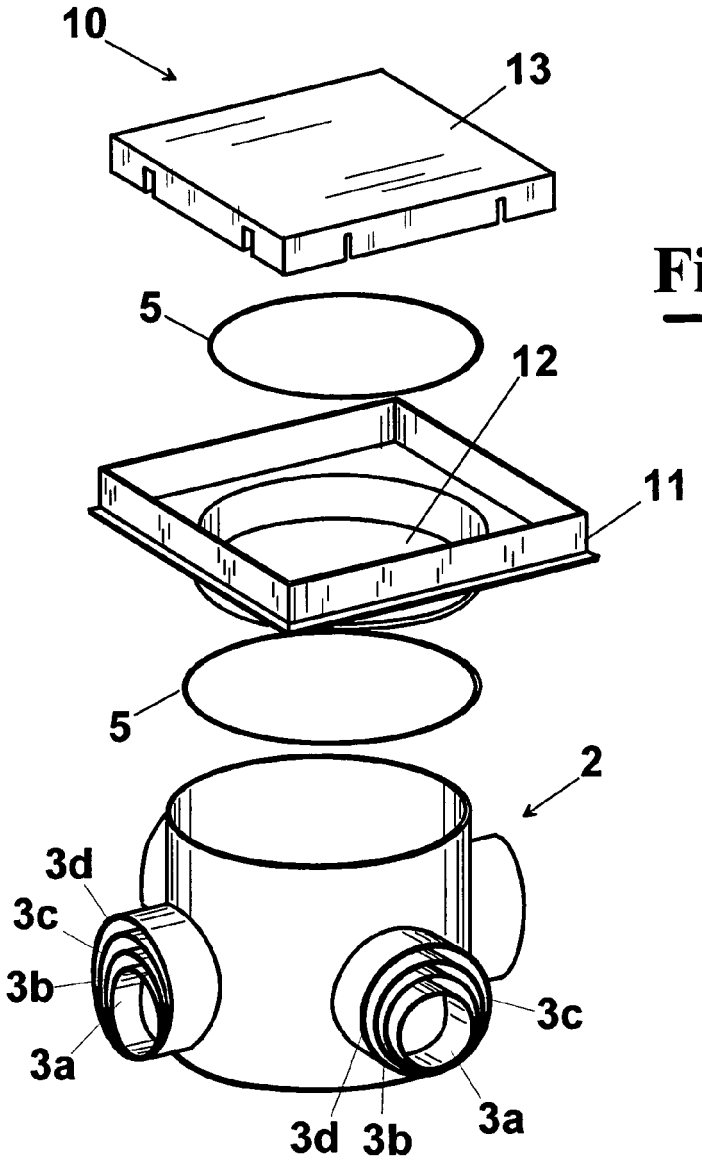


Fig. 1

Fig. 2

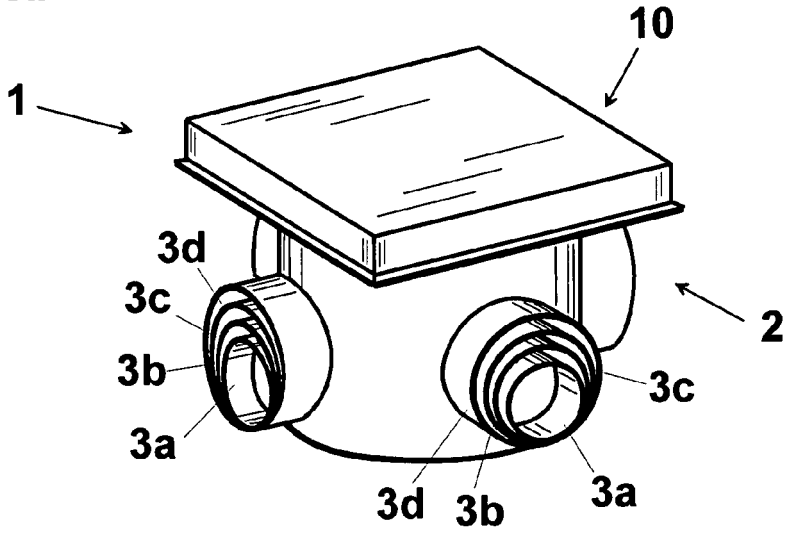
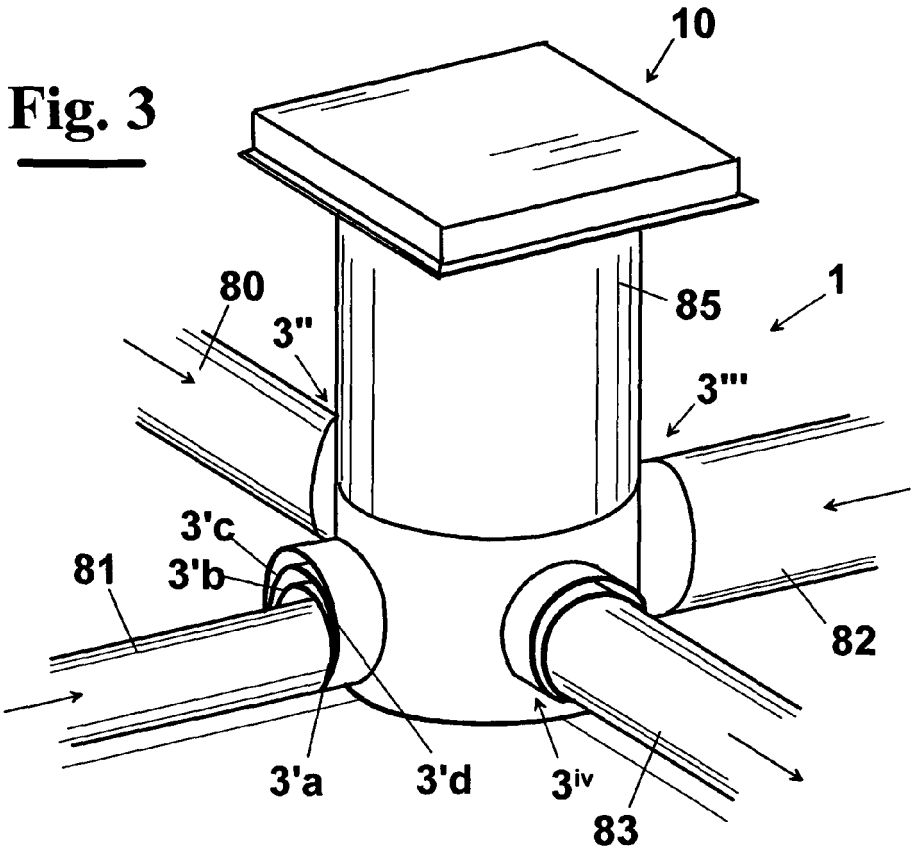


Fig. 3



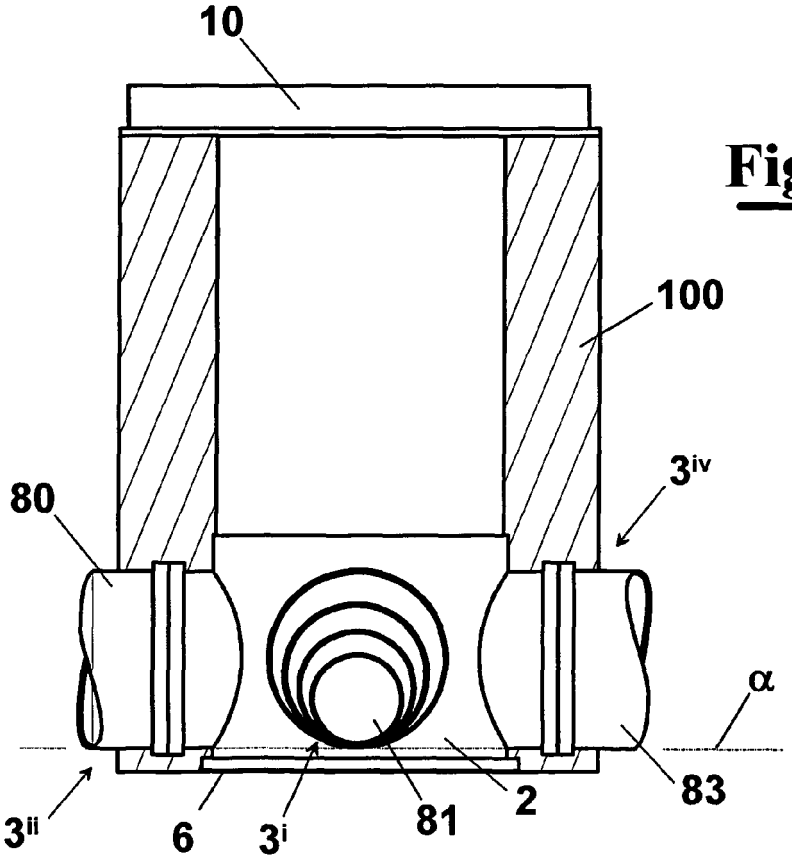


Fig. 4

Fig. 5

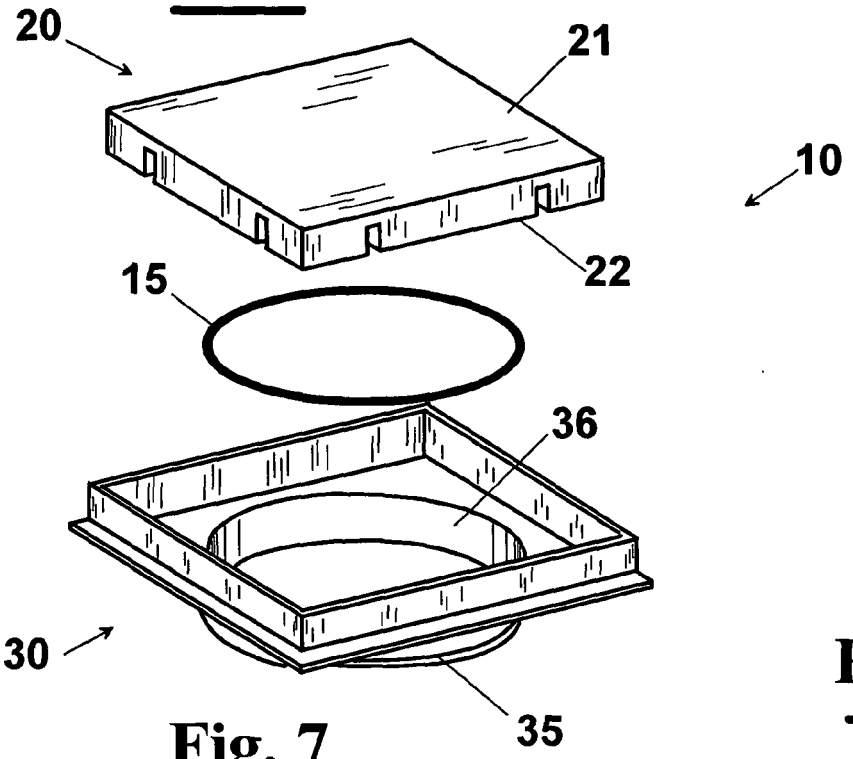


Fig. 6

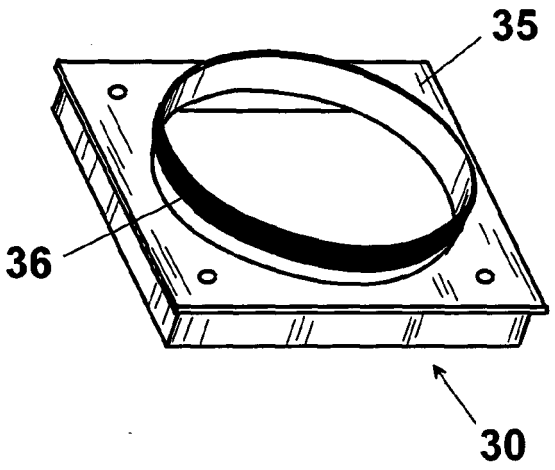


Fig. 7

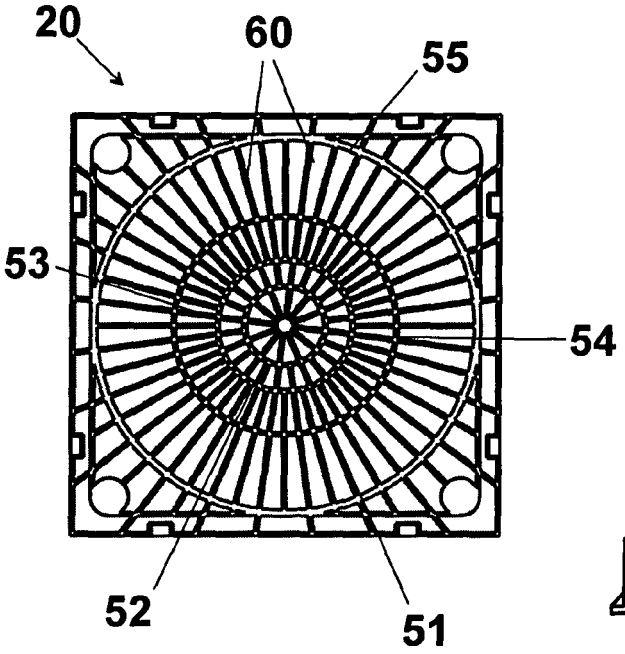


Fig. 8

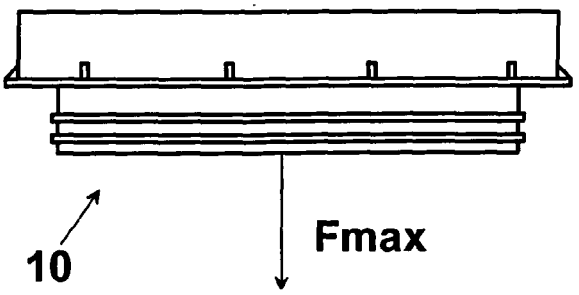


Fig. 9

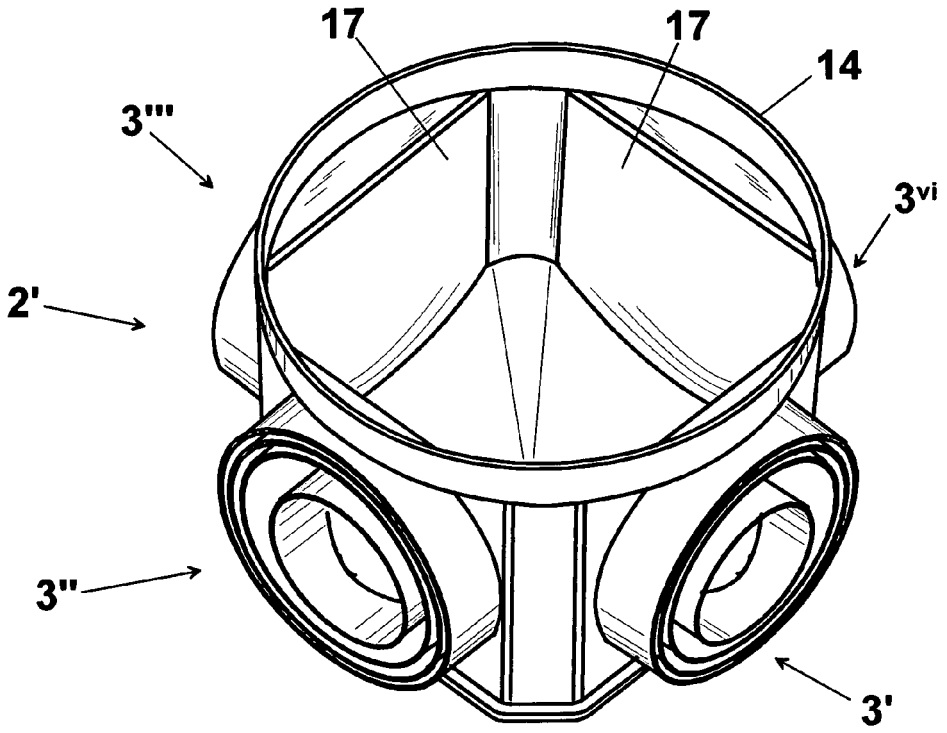
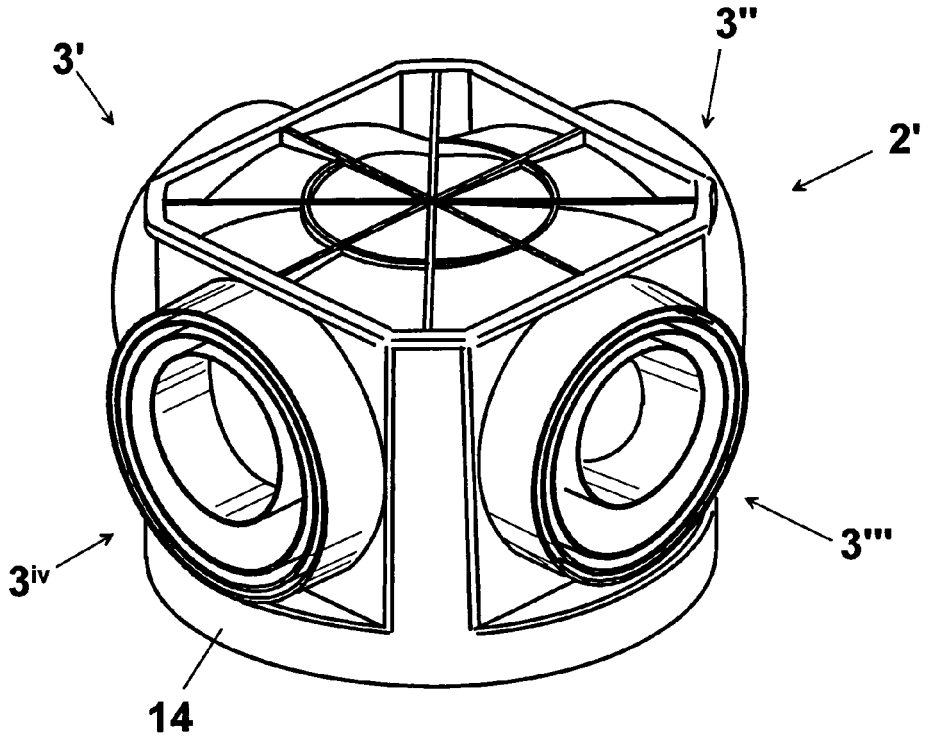


Fig. 10



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EUROPEAN SEARCH REPORT

Application Number
EP 07 00 3076

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	FR 2 824 503 A (SONABAT CHANTAL [FR]) 15 November 2002 (2002-11-15) * page 1, line 3 - line 7 * * page 8, line 7 * * page 10, line 12 - line 15 *	1-5	INV. E03F5/02 ADD. E03B3/03 E02D29/14
A	FR 2 790 495 A1 (POLVA PIPELIFE BV [NL]) 8 September 2000 (2000-09-08) * abstract * * figures 1,3 *	1-6	E03F5/04
X	FR 2 509 343 A1 (SEPEREF [FR]) 14 January 1983 (1983-01-14) * page 1, line 1 - line 2 * * page 1, line 36 - page 2, line 13 * * page 2, line 20 - line 27 * * figure 1 * * page 3, line 5 - line 7 *	1-5	
X	US 5 934 315 A (BRASWELL C RICHARD [US] ET AL) 10 August 1999 (1999-08-10) * column 4, line 54 - line 67; figure 5 * * abstract *	1,2,4-9, 11	TECHNICAL FIELDS SEARCHED (IPC) E03F E02D E03B
X	DE 35 30 762 A1 (SERMEKA OY [FI]) 6 March 1986 (1986-03-06) * page 4, line 1 - line 10 * * page 6, line 16 - line 23; figures 1,3 *	6	
A	US 5 386 669 A (ALMEIDA ANTONIO V [US]) 7 February 1995 (1995-02-07) * abstract *	1-11	
A	US 5 622 117 A (BURIAN WILLIAM F [US] ET AL) 22 April 1997 (1997-04-22) * figures 1,2 *	7,8	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	8 October 2007	Flygare, Esa

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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Application Number
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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

European Patent Office

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 07 00 3076

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-5

   Structure of waste water comprising a plurality of ducts

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2. claims: 6-11

   Structure of waste water well comprising a protruding portion

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 07 00 3076

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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08-10-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2824503 A	15-11-2002	NONE	
FR 2790495 A1	08-09-2000	NONE	
FR 2509343 A1	14-01-1983	NONE	
US 5934315 A	10-08-1999	NONE	
DE 3530762 A1	06-03-1986	DK 401585 A	06-03-1986
		FI 843482 A	06-03-1986
		SE 8504108 A	06-03-1986
US 5386669 A	07-02-1995	NONE	
US 5622117 A	22-04-1997	CA 2178179 A1	07-12-1996

EPO FORM P0459

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