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(71) Applicant: **Freitas & Silva, S.A.**
3701-906 Cesar (PT)

(72) Inventors:
- **Coutinho de Freitas Brêda, José Carlos**
3701-906 Cesar (PT)
- **Domingos Louro, Rul Pedro**
3701-906 Cesar (PT)
- **Azevedo da Rocha, Silvio**
3701-906 Cesar (PT)

(74) Representative: **Ferreira, Maria Silvina**
Clarke, Modet & Co.
Rua Castilho, 50-9°
1269-163 Lisboa (PT)

Remarks:
Amended claims in accordance with Rule 137(2) EPC.

(54) Manhole or inspection chamber

(57) The present invention refers to manholes or inspection chambers for sewer or rainwater drainage systems, which allow, due to the special configuration of its bases, the connection of the inlet pipes in the manhole, independently of the angle that these form with the outlet pipe, keeping the guided flow channel in the direction of the outlet. The present invention possibly contains a central flow channel (2) and lateral flow channels (3) that guide the effluent to the outlet (1) thus allowing, independently of the position of the pipe connection in the sidewall (5) of the Manhole or inspection chamber, the manhole to be opened "in situ" and the connection of the pipes in a specific position, always maintaining the flow guided.

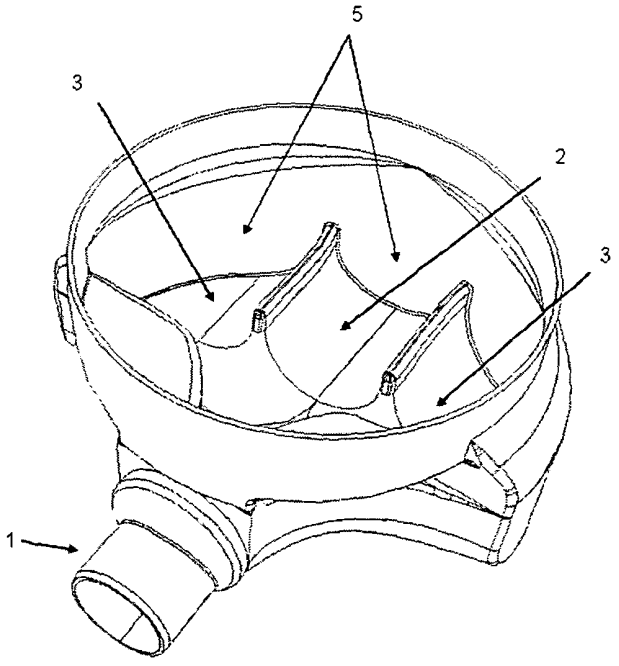

Figure 1

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Description

Field of the invention

[0001] The present invention refers to manholes or inspection chambers for sewer or rainwater drainage systems which allow, due to the special configuration of its bases, the connection of the inlet pipes, independently of the angle that these form with the outlet pipe, keeping the flow guided in the direction of the outlet.

Summary of the invention

[0002] The purpose of the present invention is to allow -whatever the inlet angle in the manhole, i.e. the angle that the inlet pipe forms with the extension of the outlet pipe , and therefore any inlet position of the pipe in the manhole or inspection chamber - the manhole to be opened "in situ", using a Hole Saw, enabling the connection of the pipes in this specific position, with permissible guide flow channel, i.e. channel with the purpose of keeping the guided flow and whose height is defined by legislation, for example in Portugal it must be equivalent at least to 2/3 of the diameter of the largest-diameter permissible pipe.

[0003] The present invention is useful for situations in which, according to the configuration of the streets, connections of branches to the main collector are required, where the angle formed by both is not a standard angle, i.e. the inlet angles 0° (in front of the outlet) and 45° and 90°, either to the left or to the right of the outlet, cases in which some existing manhole bases already provide these connections.

Backgroung of the Invention

[0004] The sewer or rainwater drainage systems have intercept points for the pipes and/or access points to the same for cleaning and monitoring purposes. These access points are called manholes, should they be accessible to human operators for the accomplishment of the related works; they are called inspection chambers if they are only accessible to mechanical means for cleaning and inspecting.

[0005] The manholes are traditionally made in concrete, the bottom being made "in situ" guiding the flows in the pipes from the inlet(s) to the outlet, the sidewalls being also possible to be made "in situ", or using prefabricated concrete rings mainly opening the holes for the inlet(s) and outlet.

[0006] The problem of this solution is that the construction time is very widened, implying a long time of construction "in situ", besides the necessary time to the complete curing of the concrete, before proceeding with the works.

[0007] Manholes in prefabricated concrete are known, that substantially diminishes the construction time but are limited to the predefined inlet angles and respective channels for flow guiding, being plastic manholes also known, monoblock or consisting of modular elements, comprising a limited number of inlets with the respective flow channels in the base, i.e., in the lower element of the modular systems or the lower part of the monoblock systems.

[0008] This solution, having all the advantages of the plastic manholes comparatively to the concrete ones (sealing, easiness of construction and transport and respective costs, security in the assembly) is limited to the prefabricated solutions, and doesn't allow a connection in different angles from the predefined ones.

[0009] Systems are known that provide connections in a plurality of angles besides the standard ones, but obtained by increasing the number of available bases, thus increasing the number of moulds and storage requirements, which are nevertheless limited solutions.

[0010] Bases of manholes in plastic are known whose lower section of the base is semi spherical, being the inlets opened in the sidewall immediately above the spherical zone, the outlet being at the bottom or solutions according to US200516088. In both cases the connection possibility is total, but compels to an increased deepness in systems with many manholes in line of this type, or implies the existence of pump stations to bring the effluent again to a higher level.

[0011] On the other hand, in any of the systems previously identified, should there be the need to change the predetermined angle, it is necessary to change the provided base. These alterations frequently occur due to the existence of errors in the register of existing systems in the ground, such as water supply, and sewer systems or telecommunication systems, only detectable during construction works.

[0012] The present invention eliminates the problems previously identified by means of allowing the opening "in situ" at any position once openings can only be made using a hole saw, after the opening of the trench for the manhole and pipes, being only then assessed any alteration requirement of the position.

[0013] As an example, in manholes with nominal diameter (DN)/ inside diameter(ID) 1000 mm available with inlets in standard angles, it is not possible to conceive the connection of pipes of nominal size(DN)/Outside diameter(OD) 315 mm, maintaining a permissible guide flow channel, the existing solutions implying either the pipe connection with an inferior maximum DN (e.g. DN/OD 200) or the non-existence of a permissible guide flow channel.

[0014] Because of the particular geometry of the base type I, wherein the manhole is circular, the inferior section of the base has a rather oval geometry, this invention allows connections in standard angles even for pipes DN/OD 315, in a manhole DN/ID 1000.

[0015] Manhole bases DN/ID 1000 are known, with possibility of connection in standard angles but with maximum inlet diameters DN/OD 200, maintaining the permissible guide flow channel, as well as systems with pos-

sibilities of connection up to DN/OD 315 but without permissible guide flow channel.

[0016] This invention allows the interaction of the advantages of each system.

[0017] Manholes which allow the maintenance operator to place each foot on each side of the outlet are known, but in manholes with only one inlet pipe, or situations in which maximum opening amplitude is inferior to 90°, as for example in the solution proposal for our base type II. The known manholes that allow connections in the 5 standard points, do not allow the placement of the feet on a dry and safe place and thus proceed with the cleaning and maintenance operations.

[0018] The Base of type I solves this problem keeping the possibilities in the standard angles.

[0019] It is the main goal of the present invention to provide the opening of the connections "in situ" without the abovementioned inconvenient.

Brief Description of the figures

[0020] Drawings are attached for a simplified and non-limitative understanding of the invention, representing preferred embodiments of the invention.

Figure 1: General view of the base type I
Figure 2: Side view of the base type I
Figure 3: Detailed view of the manhole base type I
Figure 4: Plan view of the manhole base type I
Figure 5: Cross sectional view of the frontal part of the chamber type I (section AA in figure 4)
Figure 6: Cross sectional view of the rear part of the chamber type I (section BB in figure 4)
Figure 7: General view of the base type II
Figure 8: Side view of the manhole base type II
Figure 9: General view of the base of the manhole or inspection chamber type II, without feet-holder and with pipe-holders.
Figure 10: Side view of the base of the manhole and inspection chamber type II, without feet-holder and with pipe-holders
Figure 11: example of the introduction of pipes DN/OD 315 in base DN/ID type I in the standard angles
Figure 12: Example of the introduction of pipes DN/OD 315 in base DN/ID of type II in the standard angles

Wherein:

1 - Outlet
2 - Central flow channel
3 - Side flow channel
4 - Wall of the central flow channel
4b - Extension of the wall of the central flow channel
5 - Sidewall
6 - Lower Section of the base
7 - Upper cylindrical Section
8 - Feet-holder
9 - Drainage zone under the feet-holder
10 - Pipe-holder

General description of the invention

[0021] The present invention relates to a base for manhole or inspection chamber, having an outlet (1), a central flow channel (2) intended to guide the flow from the 0° inlet, i.e. aligned with the outlet (1), and being also possible to have side flow channels (3) that allow the inlet of pipes at any point between angles 45° and 90°, on both sides of the outlet (1) in its lower section (6).

[0022] This section of the base is not circular but approximately oval to allow pipes of bigger diameters to enter simultaneously in the angles of 45° and 90°, than those that would the whole base be of circular plant; because of the proximity to the wall of the central flow channel (4) in the case of the angle 45°, and due to the internal volume for a simultaneous inlet of a pipe of the same diameter at 90° angle.

[0023] The present invention, in the case of manholes, can have 2 central platforms feet-holder (8) that will enable the operator to locate the feet during cleaning and maintenance operations, allowing the flow to pass underneath the platforms, thus not compromising the drainage. These platforms are inclined towards the central flow channel so that in lack of capacity downstream due to eventual anomalies (for example, clogging) and rise of the effluent level above the feet-holder; after troubleshooting, the accumulated debris can de drained to the central flow channel.

[0024] In the case of modular manholes or inspection chambers in which the riser module is formed by a riser pipe, the present invention can further provide pipe-holders(10), that are small platforms destined to support the rise pipe and to constitute a stop wall to the pipe does not enter in the base.

[0025] The present invention further comprises a second base (type II) intended to allow inlets in the angles not covered by the first one (type I).

Detailed description of the invention

[0026] According to the invention, the base for manhole or inspection chamber has in detail an approximate hollow cylindrical form, with the axle vertically aligned with an upper cylindrical section (7) on the top; in the extension of the upper cylindrical section (7), there is a lower section of the base (6), preferably with a nearly oval shape, in whose sidewall (5), in the frontal part, openings for the desired entrances can be made; in the extension of the upper cylindrical section (7) there is an outlet (1), preferably with a nearly radial direction in relation to the axle of the chamber, preferably in tubular shape, located at the rear part of the base; in the front part of the manhole, there is a central flow channel (2) with a semicylindrical or other shapes, and whose walls

(4) set the limits of 2 side flow channels (3); the wall of the central flow channel can be extended in parallelepiped (4b) so that the height of the wall of the flow channel is, for example equal to 2/3 of the diameter of the widest permissible pipe; it can have two feet-holders (8) consisting of two saliencies extending to the rear part of the base, located between the upper cylindrical section (7) and the outlet (1) and whose upper surface is inclined towards the central flow channel (2); it can have pipe-holders (10) consisting of saliencies, located between the upper cylindrical section (7) and the lower section of the base(6) and whose upper surface is horizontal.

[0027] In this first preferable representation, type I, we can have a base for manhole or inspection chamber with a semicylindrical central flow channel (2), and two side flow channels (3) which are enclosed in both sides by the wall of the corresponding central semicylinder (4) and by the sidewall (5) of the manhole.

[0028] The sidewall (5) of the manhole, in the lower section of the base (6), is not aligned with the remaining vertical cylinder (7), that constitutes the upper section of the chamber base, but rather on the outside of it, in order to allow a greater area of sidewall (5) and a bigger internal volume, turning the introduction of one or more pipes of bigger diameters in angles 45° and 90° (fig. 7) possible. In one second preferential representation, type II, we can have a base for manhole or inspection chamber with a single central flow channel (2) enclosed by the sidewalls (5) of the chamber base.

[0029] The inlets and the outlet (1) can, depending on the situation, be opened "in situ" or already made before the installation.

[0030] The manhole might have one or more inlets as sockets or tubular insertions equivalents to the outlet (1), but whose DN/ID is superior to the DN/OD of the pipe allowing the coupling of the pipe to the chamber.

Examples

[0031] Base type I for modular manhole DN/ID 1000, with possible connection of pipes DN/OD 315 in angles 0°, 45° 90ª (fig. 1 the 6), complemented by base of manhole type II, that allows connections from 0° to 65° for each side of pipes DN/OD 315 (fig. 7 and 8). Inspection chamber base type II, that allows connections of 0° to 65° for each side of pipes DN/OD 315 (fig. 9 and 10).

[0032] It must be noted that the embodiments of the present manhole or inspection chamber with adaptable angles of connection to the angles of the external pipes, previously are simply possible examples of implementation, merely enclosed for a clear understanding of the basis of the invention. Variations and modifications to the cited embodiments can be made without moving away from the scope and standards of the invention. All of these modifications and variations must be enclosed in the scope of the present invention and protected by the following claims.

Claims

1. Manhole or inspection chamber for sewage or draining of rainwater, **characterized in that** the base has a nearly hollow cylindrical form, and a vertically-aligned axle, further comprising:

   - an upper cylindrical section (7) in the top;
   - a lower section of the base (6), in the extension of the upper cylindrical section (7), in whose sidewall (5) the openings for the desired inlets are made;
   - an outlet (1), in the extension of the upper cylindrical section (7),with a nearly radial direction towards the axle of the chamber, preferably of tubular shape, located in the rear part of the chamber;
   - in the front part of the chamber, a central flow channel (2) with a semicylindrical shape or other, and whose walls (4), together with the sidewall (5), delimit 2 lateral flow channels(3);
   - on the sidewalls of the central flow channel (4) there can be an extension in parallelepiped shape (4b) so that the height of the wall of the flow channel is the adequate one to guide the flow.

2. Manhole or inspection chamber for sewage or draining of rainwater, **characterized in that** the base has a nearly hollow cylindrical form, with the axle vertically aligned, comprising:

   - in the top, an upper cylindrical section (7);
   - in the extension of the upper cylindrical section (7) a lower section of the base (6), in whose sidewall (5) the openings for the desired inlets are made;
   - in the extension of the upper cylindrical section (7) an outlet (1) in the posterior part of the chamber;
   - in the frontal part of the chamber, a central flow channel (2) enclosed by the sidewalls (5) of the chamber.

3. Manhole or inspection chamber according to claims 1 or 2, **characterized in that** the lower section of the base (6) has in the frontal area a non-circular geometry plant, preferably oval, forming a wider sidewall (5) area to open the inlets "in situ" and a wider internal volume to introduce the pipes.

4. Manhole according to claims 1 or 2, comprising between the upper cylindrical section (7) and the outlet (1), two feet-holder (8) consisting of two saliencies, extending in the rear area of the Manhole, and whose upper surface is inclined towards the central flow channel(2).

5. Manhole or inspection chamber according to claims 1 or 2, comprising between the upper (7) and lower (6) cylindrical sections pipe-holders (10) consisting of saliencies of horizontal surface.

6. Manhole or inspection chamber according to claims 1 or 2, **characterized in that** the plant of the lower section of the base (6) has a circular shape with a superior diameter to the one of the upper cylindrical section (7).

7. Manhole or inspection chamber according to claims 1 or 2, comprising one or more circular holes already opened in the sidewall (5) of the manhole.

8. Manhole or inspection chamber according to claims 1 or 2 comprising one or more inlets as sockets or tubular insertions, but whose Nominal size/inside Diameter is superior to the Nominal size/Outside Diameter of the pipe, allowing the connection of the pipe to the chamber.

9. Manhole according to claims 1 or 2, **characterized in that** the outlet (1) is opened "in situ".

Amended claims in accordance with Rule 137(2) EPC.

1. Manhole or inspection chamber for sewage or draining **characterized in that** the lower section of the base (6) and the sidewall (5) form a wider cross-section than that of the top circular section (7), thereby broadening the volume available, said volume comprising one or more of the following:

a. openings for inlet pipes;
b. protrusions of said inlet pipes;
c. central flow channel (2);
d. side flow channels (3).

2. Manhole or inspection chamber according to the previous claim, wherein the lower section of the base (6) and the sidewall (5) have a non-circular geometry plant, that has:

a. the same cross-section of the manhole or inspection chamber along the longitudinal flow axis;
b. a wider cross-section perpendicular to the longitudinal flow axis.

3. Manhole or inspection chamber according to the previous claim wherein the said non-circular geometry is oval.

4. Manhole or inspection chamber according to the previous claim wherein said inlets can be placed at angles to the longitudinal flow axis continuously varying from - 90° to +90°, by means of opening circular holes in the sidewall (5).

5. Manhole or inspection chamber for sewage or draining of rainwater according to the previous claim wherein the base has a nearly hollow cylindrical form, and a vertically-aligned axle, further comprising:

- an upper cylindrical section (7) in the top;
- a lower section of the base (6), in the extension of the upper cylindrical section (7), in whose sidewall (5) the openings for the desired inlets are made;
- an outlet (1), in the extension of the upper cylindrical section (7), with a nearly radial direction towards the axle of the chamber, preferably of tubular shape, located in the rear part of the chamber;
- in the front part of the chamber, a central flow channel (2) with a semicylindrical shape or other, and whose walls (4), together with the sidewall (5), delimit 2 lateral flow channels(3).

6. Manhole or inspection chamber according to the previous claim wherein on the sidewalls of the central flow channel (4) there is an extension in parallelepiped shape (4b) so that the height of the wall of the flow channel is suitable to guide the flow.

7. Manhole or inspection chamber according to any of the previous claims wherein between the upper cylindrical section (7) and the outlet (1), there are two foot-holders (8) consisting of two saliencies, extending in the rear area of the manhole, and whose upper surface is inclined towards the central flow channel(2).

8. Manhole or inspection chamber according to any of the previous claims wherein it comprises, between the upper (7) and lower (6) cylindrical sections, pipe-holders (10) for a riser pipe, consisting of saliencies with horizontal surfaces.

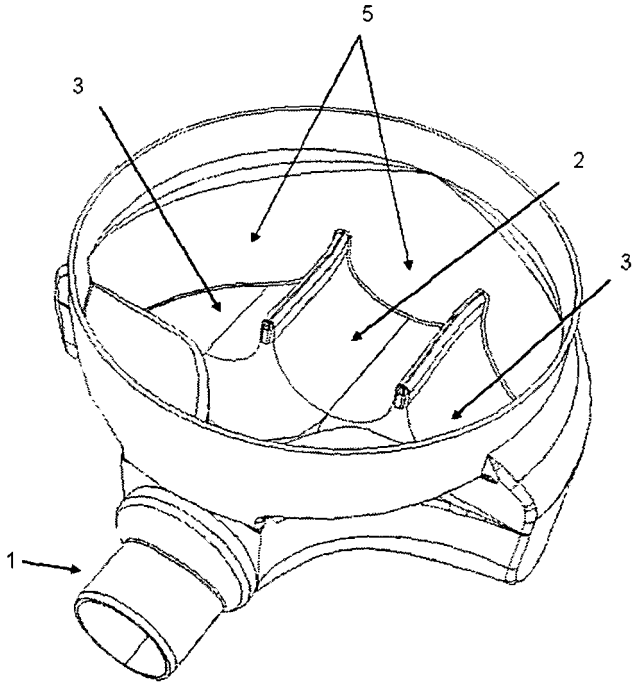

Figure 1

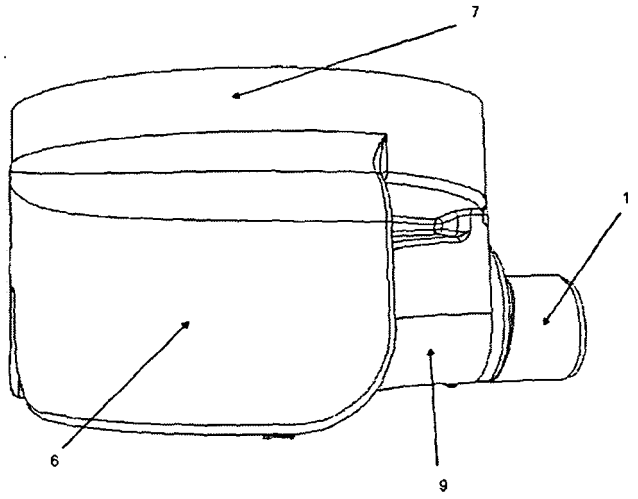

Figure 2

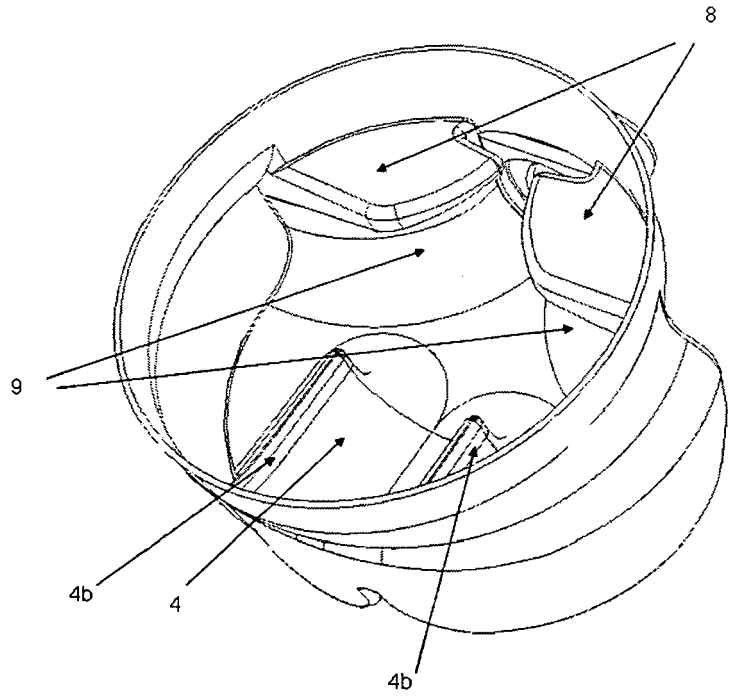

Figure 3

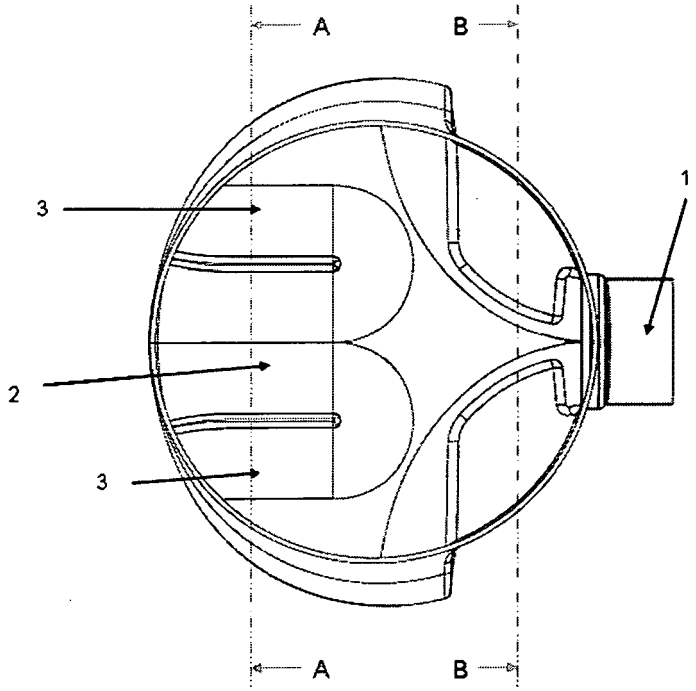

Figure 4

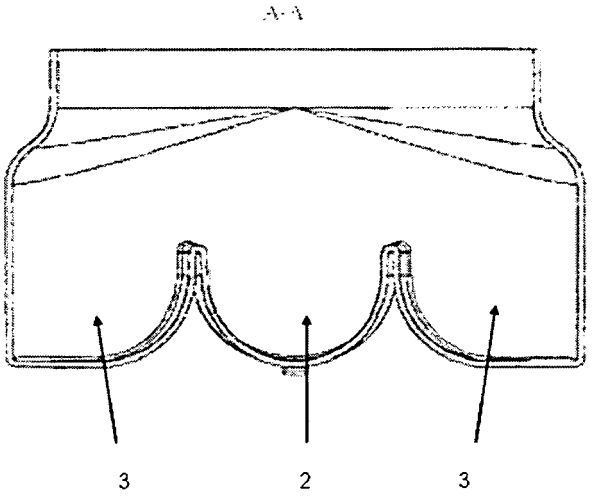

Figure 5

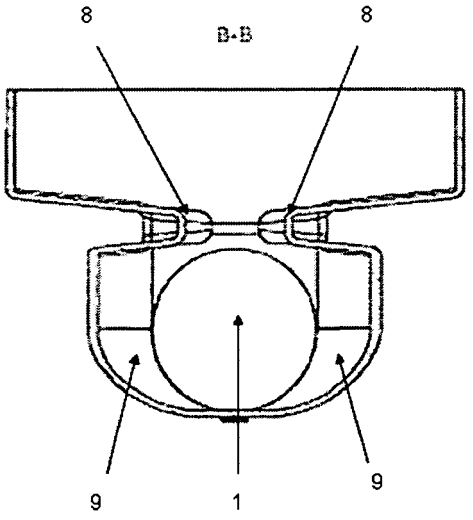

Figure 6

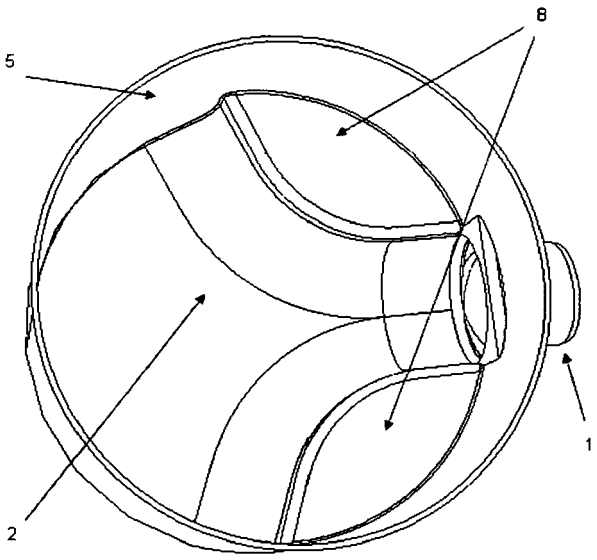

Figure 7

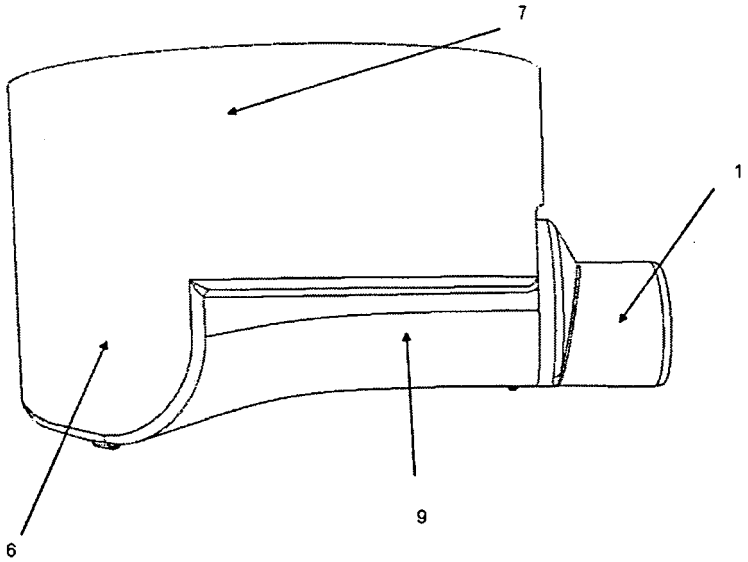

Figure 8

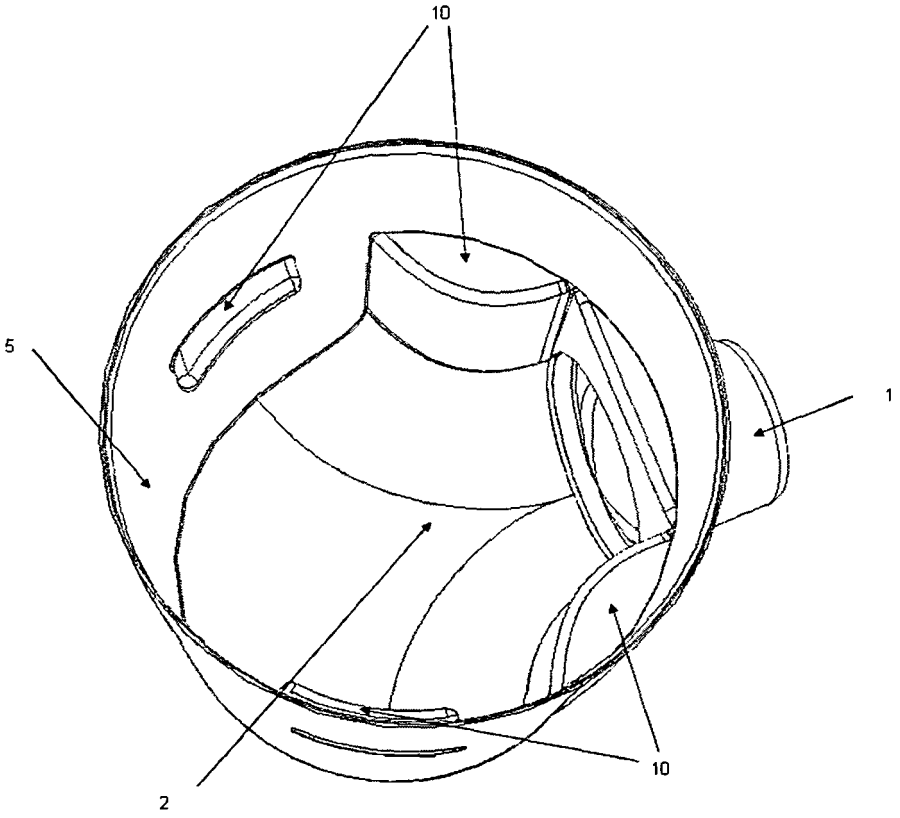

Figure 9

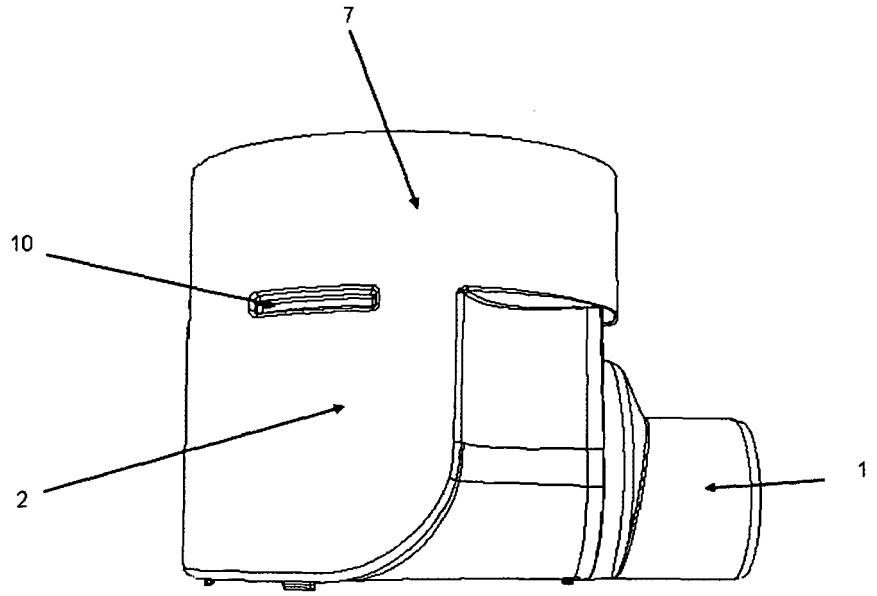

Figure 10

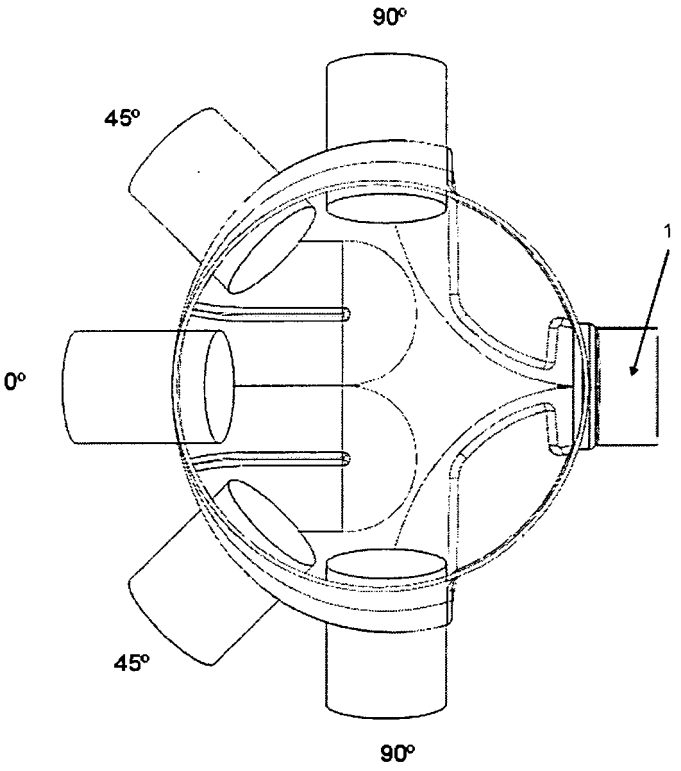

Figure 11

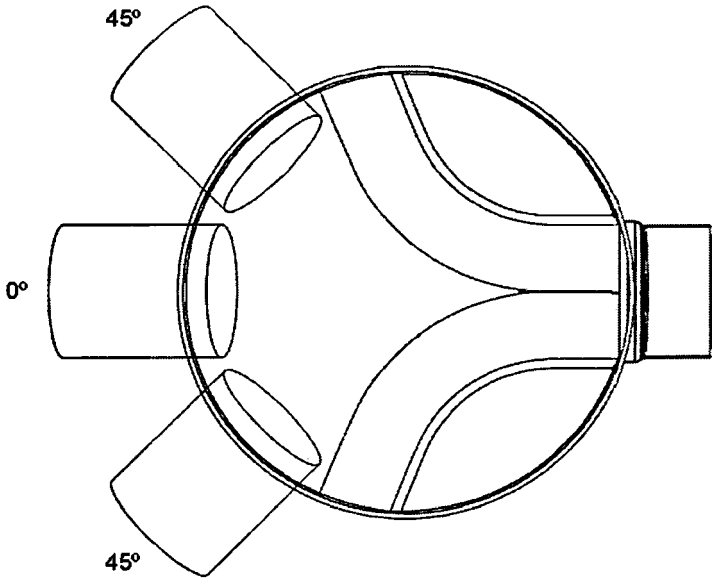

Figure 12

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 39 8011

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	US 2005/161088 A1 (MOKRZYCKI JOHN [CA] ET AL) 28 July 2005 (2005-07-28) * paragraph [0021] - paragraph [0037]; figures 1-4 *	1-9	INV. E03F5/02
X	WO 2004/007857 A (UPONOR INNOVATION AB [SE]; HIPPELAEINEN ESKO [FI]) 22 January 2004 (2004-01-22) * paragraph [0009] - paragraph [0013]; figure 4 *	1-9	
X	DE 201 12 315 U1 (KIRCHNER FRAENK ROHR [DE]) 27 September 2001 (2001-09-27) * page 5, paragraph 3 - page 7, paragraph 1; figure 1 *	1-9	
X	DE 199 39 033 C1 (SENDENHORST KUNSTSTOFFROEHREN [DE]) 8 February 2001 (2001-02-08) * column 3, line 40 - column 5, line 50; figures 1,3 *	1-9	TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	4 March 2008	Geiger, Harald

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 07 39 8011

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04-03-2008

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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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