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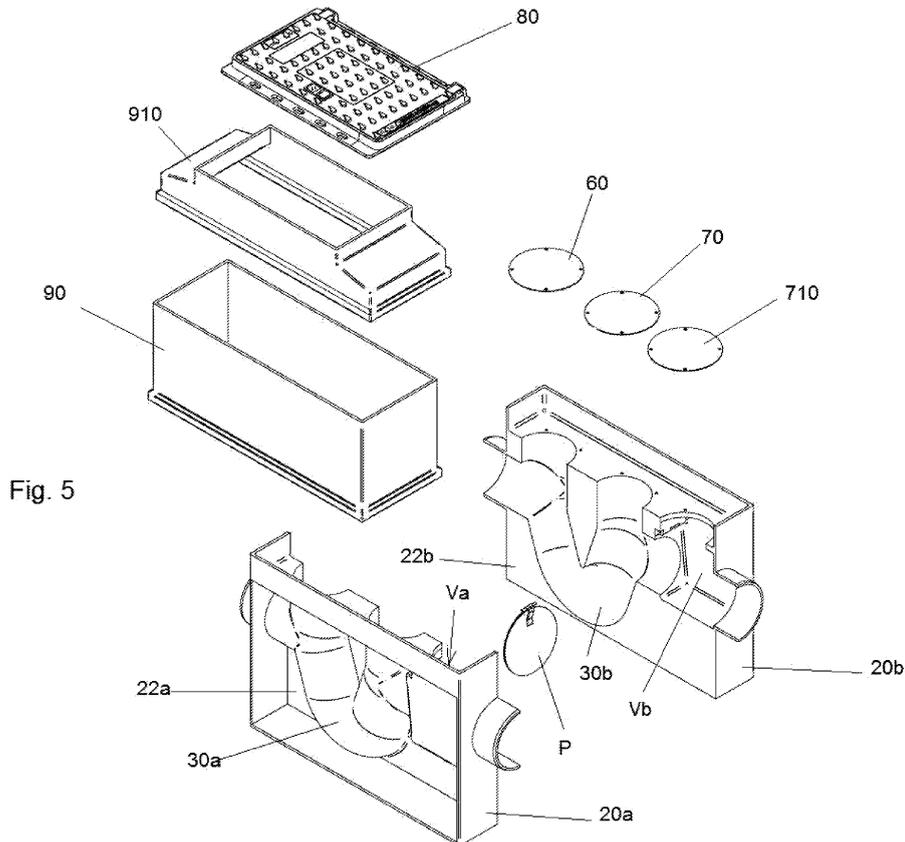
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(54) Inspectionable manhole

(57) The present invention relates to an inspectionable manhole (1,10) of type comprising at least one case (2,20) that houses a section of internal pipe (3,30) ending on at least one wall of the case (2,20) with two unions (4,40,5,50) adapted to be connected in operational condition of the manhole to corresponding branches of a network pipe, wherein said section of internal pipe (3,30)

is provided with at least one inspection opening closed by an inspection cap (6,60,7,70), wherein the case (2,20) is formed of at least two case semi-shells (2a,2b,20a,20b) and said section of internal pipe (3,30) is formed of two pipe semi-shells (3a,3b,30a,30b) obtained in one piece with the corresponding case semi-shell (2a,2b,20a,20b).



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Description

[0001] The present invention relates to an inspectionable manhole as claimed in the preamble of the first claim.

[0002] Said inspectionable manholes are normally buried into the ground and provided in sewerage systems, waterworks, cableways or similar installations and are typically composed of a case internally provided with a portion of pipe that is connected to the pipe on which the manhole is applied.

[0003] The section of pipe inside the case is configured as a trap or more generally is simply bent as U or V in such a way to create an obstacle for the passage of odors and/or impurities carried by the fluid that flows in the pipe.

[0004] The section of internal pipe is made accessible from the outside by means of at least one inspection cap, in such a way to verify and/or remove said impurities and control the state of the fluid.

[0005] The case is buried into the ground and closed on top with a removable lid that can be of walk-over or drive-over type, according to the specific requirements, and is therefore flush with the ground or road surface.

[0006] The known types of inspectionable manholes are obtained as follows: the concrete case is made and the section of inspectionable pipe is housed inside it: the concrete case is normally made by casting concrete in a formwork inside which the section of internal pipe has already been positioned, in such a way to protrude from two opposite walls of the same case.

[0007] Such a process is rather complicated and expensive since it requires specialized labor to ensure the correct position of the section of pipe that must be positioned accurately inside the formwork where concrete is cast to obtain the case of the manhole.

[0008] The installation of the manhole is difficult due to the weight of the concrete case that often forces installers to use suitable lifting equipment, such as small excavators or lifting blocks that are used to handle the manhole and lower it inside the housing cavity.

[0009] Moreover, manholes differ according to burial depth.

[0010] The purpose of the present invention is to remedy the aforementioned drawbacks.

[0011] Said purpose is achieved by the inspectionable manhole as claimed in the first enclosed claim.

[0012] Additional advantageous characteristics are the object of the enclosed subclaims, which are an integral part of the present description.

[0013] Other characteristics and further advantages will be more evident from the embodiment of the invention described with reference to the enclosed drawings, which have an illustrative, not limitative purpose, wherein:

Fig. 1 is a perspective transparent view of a first embodiment of an inspectionable manhole according to the present invention;

Fig. 2 is a side view of the inspectionable device of

Fig. 1;

Fig. 3 is a perspective view of a second embodiment of an inspectionable manhole according to the present invention;

Fig. 4 is a side view of the inspectionable device of Fig. 3;

Fig. 5 is an exploded perspective view of a different version of the inspectionable manhole of Fig. 4;

[0014] Referring to Figs. 1 and 2 it can be noted that the inspectionable manhole (1) of the present invention comprises a case (2) that houses a section of internal pipe (3), which is preferably provided with curved section, in particular as V-shaped trap for the aforementioned reasons.

[0015] The section of internal pipe (3) comprises two end unions with horizontal axis (4 and 5) that are connected with the network pipeline (not shown in the enclosed figures) in operational condition of the manhole (1).

[0016] Said unions (4 and 5) pass through two opposite walls of the manhole (1).

[0017] According to this constructive version the section of pipe (3) is provided with two openings with upward direction closed by two inspection caps (6) and (7); the two openings are situated on the two branches of internal pipe (3) upstream and downstream the top of said curved section.

[0018] It must be noted that, as a valid alternative, instead of the two inspection caps (6) and (7) and of the inspection openings, only one could be provided: obviously, the presence of two inspection openings and two corresponding caps (6) and (7) advantageously allows for accessing the top of the V of the internal section of pipe (3) on both sides, in such a way to facilitate the removal of any impurities or obstructive bodies deposited herein and allow for a better inspection of the entire section of pipe (3).

[0019] The inspection caps (6) and (7) can be provided with internal thread in order to be screwed onto the section of pipe (3) that is suitably provided with corresponding thread, or they can be simply fitted and fixed by means of interference, just like a standard cap, or locked by means of reversible locking means, in particular screws.

[0020] The manhole (1) is closed on top by a lid (8) that rests on a collar (9) applied on the opening of the case (2).

[0021] According to the precepts of the present invention, the case (2) is obtained with two case semi-shells (2a) and (2b) that are specular and joined along a longitudinal plane of symmetry of the case (2).

[0022] The two semi-shells (2a) and (2b) are advantageously molded in order to be light and inexpensive.

[0023] Moreover, it must be noted that the internal section of pipe (3) is composed of two pipe semi-shells (3a) and (3b) that are obtained in one piece with the relevant case semi-shell (2a) and (2b).

[0024] Said pipe semi-shells (3a) and (3b) are specular

and joined along a longitudinal plane of symmetry of the internal section of pipe (3), which coincides with the longitudinal plane of symmetry of the case (2) and more in general with the longitudinal plane of symmetry of the manhole (1).

[0025] Preferably, said manhole (1) is made of plastic material, except for the lid (8) that is preferably made of cast-iron.

[0026] Such an embodiment is advantageously simple and inexpensive and allows for overcoming the aforementioned drawbacks of the known types of manhole.

[0027] The two case semi-shells (2a) and (2b) and the two pipe semi-shells (3a) and (3b) are mutually joined by means of techniques of known type (i.e. gluing, welding, interference, etc.) and provide watertight connection between the pipe semi-shells (3a) and (3b).

[0028] The case (2) has a longitudinal stiffening partition (22) that lies on the plane of symmetry of the case (2) and manhole (1).

[0029] Such a partition (22) is formed of two stiffening semi-partitions (22a and 22b) that are respectively an integral part of the corresponding case semi-shell (2a and 2b).

[0030] Obviously, said stiffening semi-partitions (22a and 22b) are interrupted in correspondence with the pipe semi-shells (3a) and (3b).

[0031] Referring to Figs. 1 and 2, the case (2) comprises reinforcement walls (21) that extend transversally between the opposite longitudinal walls of the case (2) in order to make it stronger, especially when the manhole (1) is of drive-over type, that is to say when the manhole (1) is installed in a road with lid flush to the road surface and is subject to the stress originated by vehicular traffic.

[0032] It must be noted that the collar (9) is monolithic and discharges the stress on the case (2) that, as mentioned above, is composed of the two case semi-shells (2a) and (2b) and is potentially less sturdy.

[0033] Figs. 3 and 4 show a second embodiment of the manhole (10) of the present invention.

[0034] The same numbers followed by a "0" (zero) are used to indicate the same parts, with the same function, without providing any additional description for the sake of brevity.

[0035] According to this embodiment the manhole (10) also comprises an extension (91) of the collar (90) that is necessary when the case (20) must be installed at higher depth into the ground (for example because the network pipe is situated in lower position).

[0036] As it can be seen, the manhole (10) is identical to the aforementioned manhole (1) except for the extension (91): advantageously, this allows for obtaining a manhole that can be installed at different depth into the ground without having to provide - as in case of concrete manholes of the prior art - multiple models of the same manhole with different sizes, one for each burial depth; in such a case, it will be simply necessary to provide modular extensions (91) with different heights, while maintaining the case (20) and collar (9) basically un-

changed.

[0037] Obviously, the above has advantageous effects on scale economy for the fabrication of said manholes (1,10), since the case (2,20), the section of internal pipe (3,30), the collar (9,90) and the lid (8,80) are the same regardless of the installation depth and can therefore be manufactured by molding plastic materials with a minimum number of molds.

[0038] Another advantage consists in the reduction of costs and warehouse volumes; in fact, whereas in case of concrete manholes of the prior art it was necessary to hold several types of manhole in stock for installation at different heights, in this case it is sufficient to hold only several extensions (91) in stock.

[0039] It must be noted that the aforementioned manhole (10) is deprived of reinforcement walls (21). The above is due to the fact that, in the example shown, the manhole (10) needs no reinforcement, for instance because it is of walk-over, and not drive-over type, or because the thickness of the walls is such to withstand the stress transmitted during normal use.

[0040] It must be noted that all parts of the manhole (1) or (10) are advantageously made of plastic material.

[0041] The installation of a manhole (1, 10) made of plastic material is easy and quick and does not require the use of special lifting equipment, since the manhole (1, 10) according to the present invention is light and easy to handle by installers.

[0042] Given the fact that in the manhole of the invention the two case semi-shells (2a,20a) and (2b,20b) are made in one piece with the two pipe semi-shells (3a,30a) and (3b,30b), the following advantages are obtained with respect to the prior art: first of all, the manufacturing process is simpler because the same molding operation is used to obtain a case semi-shell (20a) or (20b) and the corresponding pipe semi-shell (30a) or (30b); also the assembly of the manhole (10) is easier and quicker, it only being necessary to couple two parts to obtain both the case (20), the section of internal pipe (30) and the two unions (40) and (50).

[0043] As shown in Fig. 5 the collar (90), extension (91) and lid (80) are monolithic, although they could be also obtained by coupling different plastic parts, same as for the case (20) and the section of internal pipe (30): according to the stress generated during the operation of the manhole (10) an expert of the art will easily make such a decision without any inventive effort.

[0044] Moreover, he will provide for different shapes of the manhole that differ from the ones that are shown in the enclosed drawings, with cylindrical or prismatic or any shape, according to the specific application.

[0045] Moreover, although in the examples contained in the enclosed figures only one section of internal pipe (3,30) is shown, multiple sections can be provided or disposed to obtain a Y-shaped or similar coupling or to house valves, etc.

[0046] Obviously, although in the aforementioned description the case semi-shells (2a,2b,20a,20b) and the

pipe semi-shells (3a,3b,30a,30b) are two specular semi-shells (2a,2b,20a,20b,3a,3b,30a,30b) equivalent advantages can be obtained by using three, four or more semi-shells that are suitably obtained and assembled consequently.

[0047] Moreover, as an additional version of the present invention, it must be noted that, although in the aforementioned examples the internal pipe ends on two opposite walls of the case, the internal pipe may end on the same wall or on contiguous walls or in other configurations that the expert of the field may possibly consider as convenient.

[0048] Referring to Figs. 3, 4 and 5, in the latter version of the manhole (10) of the invention a backflow valve (V) has been inserted.

[0049] Currently, in sewage systems, waterworks, cableways, etc., backflow valves are installed downstream the manhole in order to avoid the backward passage of animals inside the pipes, or prevent water from passing backwards through the circuit in case of backpressure.

[0050] Said backflow valves avoid internal flooding of rooms or houses and must be necessarily installed in some cases.

[0051] Their installation provides for positioning a pre-assembled valve along the pipe immediately downstream the manhole.

[0052] Referring to Figs. 3, 4 and 5, said valve (V) is obtained in one piece with the manhole (10) of the invention, wherein two pipe semi-shells (30a and 30b) are respectively provided with a valve body semi-shell (Va and Vb) upstream the curved section, in particular as a trap.

[0053] Within such a valve (V) a plate (P) is inserted and pivoted on top to a horizontal axis.

[0054] Normally said plate (P) is in basically vertical position and can rotate by 90° under the force of water only in the flow direction of the water.

[0055] The section of pipe (30) is also provided with an opening closed by a removable inspection cap (710) in correspondence with said valve (V).

[0056] Referring to Fig. 5, all inspection caps (60,70,710) of the manhole (10) are locked by means of tightening screws.

Claims

1. Inspectionable manhole (1, 10) of the type comprising at least a case (2, 20) that houses a section of internal pipe (3, 30) ending on at least one wall of the case (2, 20) with two unions (4, 40, 5, 50) adapted to be connected in operational condition of the manhole to corresponding branches of a network pipe, in which said section of internal pipe (3, 30) is provided with at least one inspection opening closed by an inspection cap (6, 60, 7, 70, 710)
characterized in that:

- said case (2, 20) comprises at least two case

semi-shells (2a, 2b, 20a, 20b);

- said section of internal pipe (3, 30) comprises at least two pipe semi-shells (3a, 3b, 30a, 30b) that are obtained in one piece with the case semi-shell (2a, 2b, 20a, 20b).

2. Inspectionable manhole (1, 10) as claimed in claim 1, **characterized in that** the case semi-shells (2a, 2b, 20a, 20b) and pipe semi-shells (3a, 3b, 30a, 30b) are specular and joined along a longitudinal plane of symmetry of the manhole (1, 10).

3. Inspectionable manhole (1, 10) as claimed in claim 1 or 2, **characterized in that** the case (2) has a longitudinal stiffening partition (22) that lays on the plane of symmetry of the case (2) and manhole (1).

4. Inspectionable manhole (1, 10) as claimed in claim 1, **characterized in that** said partition (22) is formed of two stiffening semi-partitions (22a and 22b), which are an integral part of the corresponding case semi-shells (2a and 2b), respectively.

5. Inspectionable manhole (1, 10) as claimed in any one of the preceding claims, **characterized in that** said section of internal pipe (3, 30) comprises at least a curved section, similar to a siphon, with V, U or similar shape, in which said section of pipe (3, 30) has two openings closed by two inspection caps (6, 60) and (7, 70, 710), said openings being situated on the two branches of internal pipe (3, 30) upstream and downstream said curved section.

6. Inspectionable manhole (1, 10) as claimed in any one of the preceding claims, **characterized in that** said manhole (1, 10) comprises at least a reinforcement transversal wall (21) that extends between said case semi-shells (2a and 2b).

7. Inspectional manhole (1, 10) as claimed in any of the preceding claims, **characterized in that** it also comprises a collar (9, 90) that extends above said case and a lid (8, 80) to close the manhole (1, 10).

8. Inspectionable manhole (10) as claimed in any one of the preceding claims, **characterized in that** it also comprises an extension (91) of said collar (90).

9. Inspectionable manhole (10) as claimed in one of claims 7 or 8, **characterized in that** said lid (8, 80) and/or collar (9, 90) and/or extension (91) are monolithic.

10. Inspectionable manhole (1, 10) as claimed in one of the preceding claims, **characterized in that** it is provided with a backflow valve (V) obtained in one piece with the manhole (1, 10), in which the two pipe semi-shells (3a, 30a and 3b, 30b) are respectively provid-

ed with a valve body semi-shell (Va and Vb) upstream the curved section; in which the valve (V) houses a plate (P) pivoted on top to a horizontal axis, which is normally positioned in vertical position and rotates under the thrust of water only in the flowing direction of the water. 5

11. Inspectionable manhole (1, 10) as claimed in the preceding claim, **characterized in that** the pipe section (3, 30) is provided on the valve (V) with an opening closed by a removable inspection cap (710). 10

12. Inspectionable manhole (10) as claimed in any one of the preceding claims, **characterized in that** it is entirely made of plastics. 15

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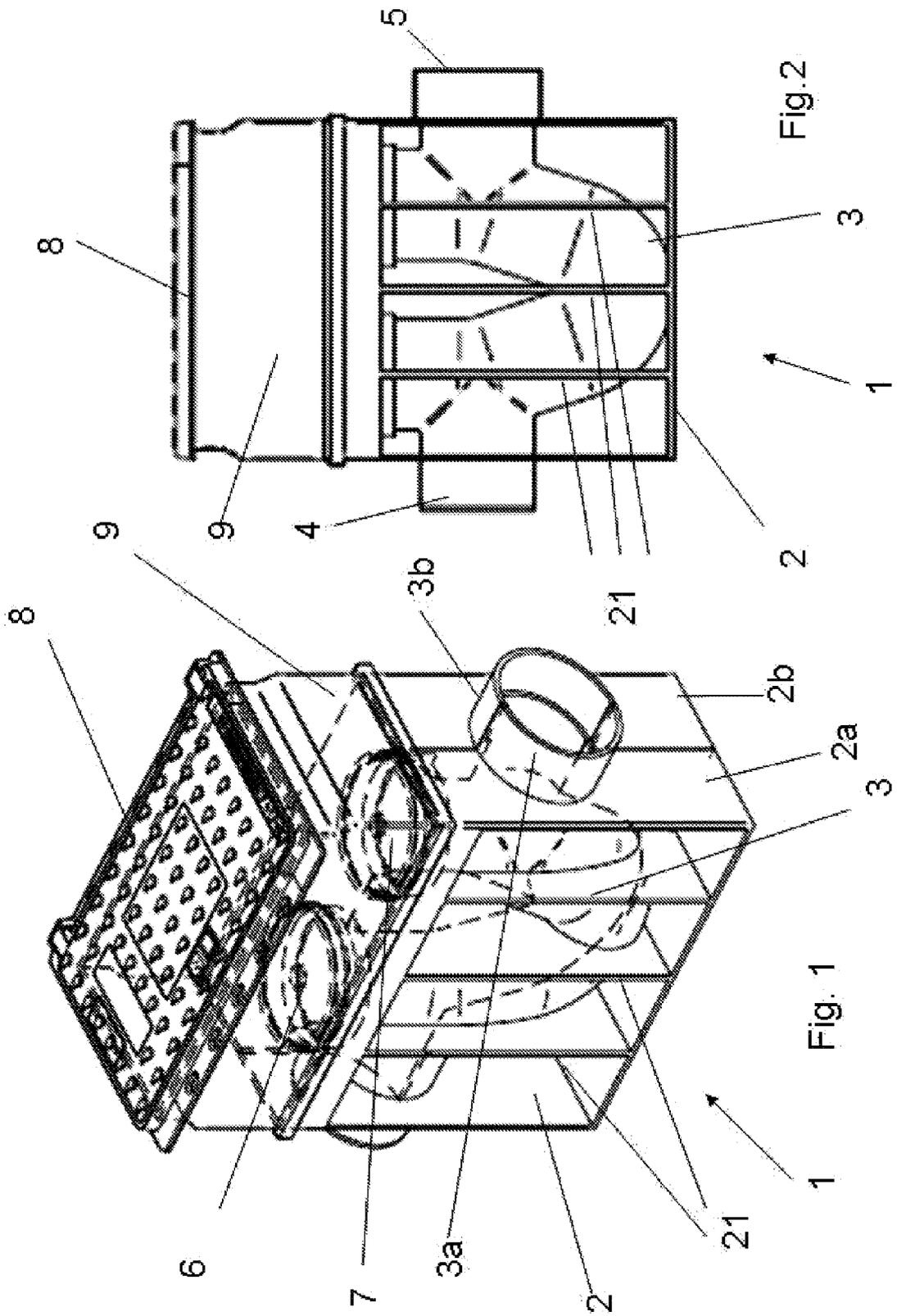
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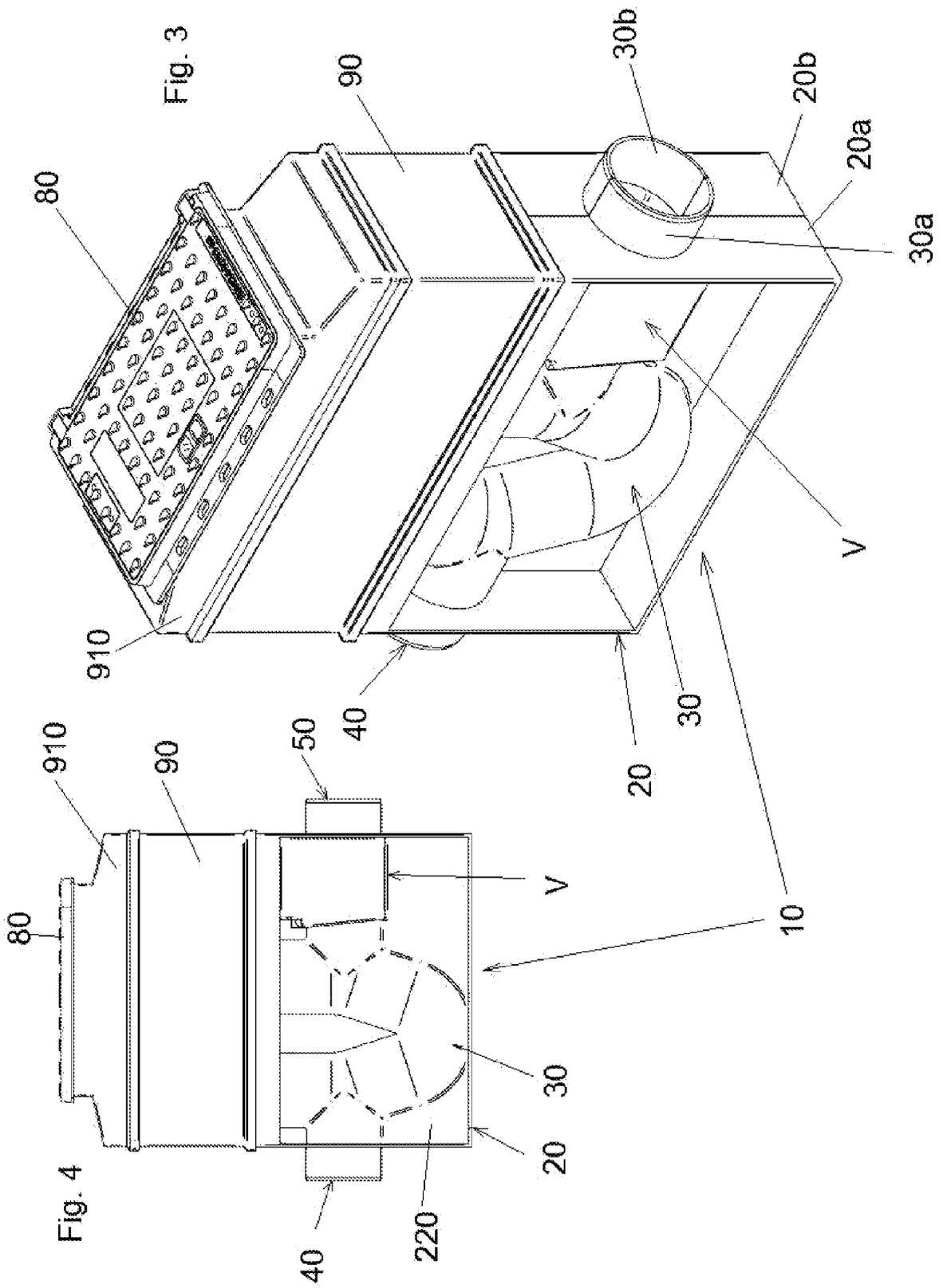
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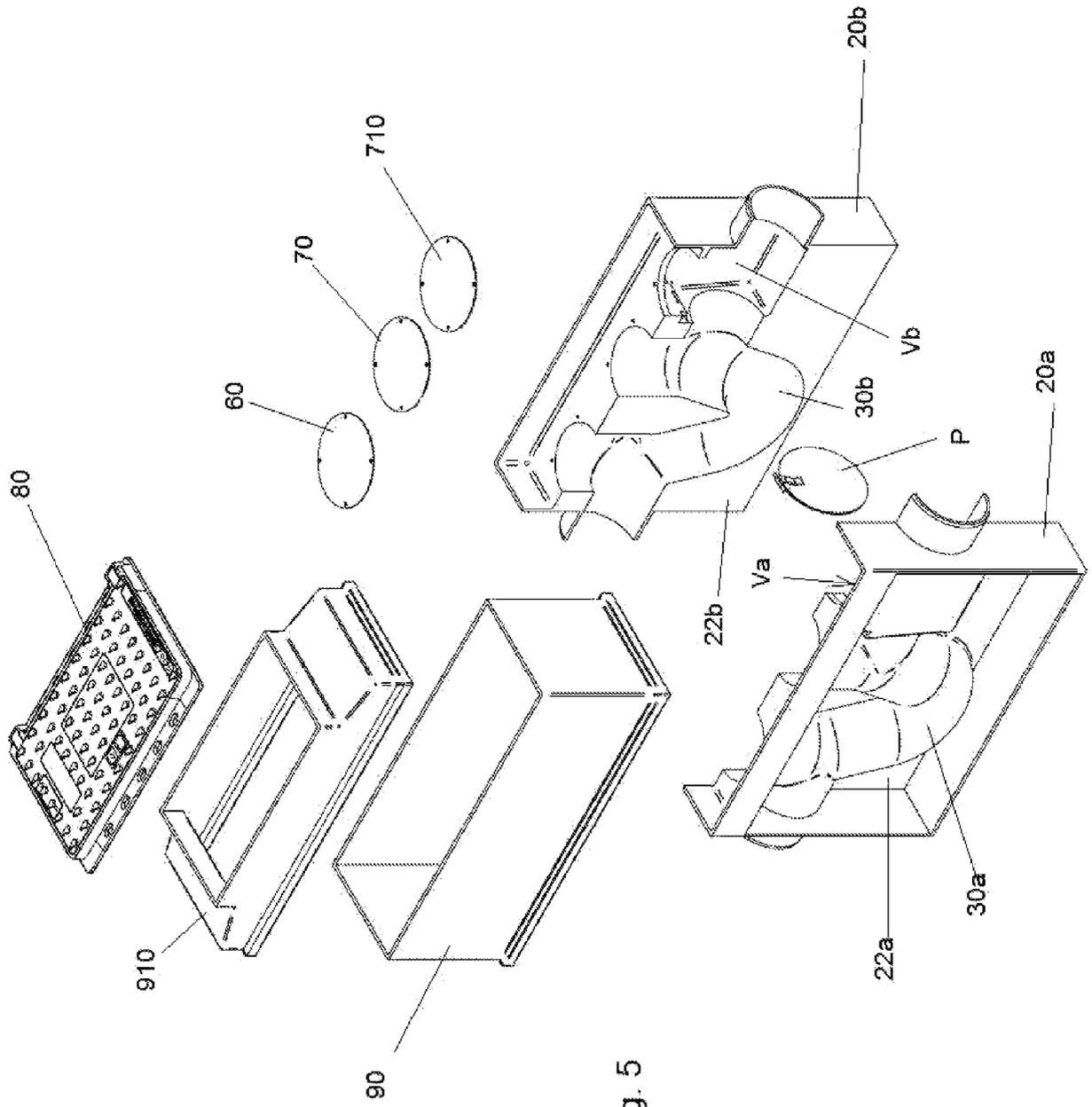


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 10 17 6691

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	EP 1 061 183 A2 (SWINTEX [GB]) 20 December 2000 (2000-12-20) * paragraphs [0002], [0024], [0031], [0037], [0056]; figures 5,10-12 *	1-4,7-9,12	INV. E03F5/02 E02D29/12
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			E03F E02D
1	Place of search Munich	Date of completion of the search 25 October 2010	Examiner Leher, Valentina
CATEGORY OF CITED DOCUMENTS		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	
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			

EPO FORM 1503 03/02 (P04/C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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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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25-10-2010

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