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(54) PUMPING ASSEMBLY WITH LOGISTICS MANAGEMENT, ELECTRIC PUMP AND BASE FOR SUCH A PUMPING ASSEMBLY

(57) A pumping assembly (10, 110, 210) comprising:
- a base (11, 111, 211) provided with one or more footings (13),
- one or more electric pumps (12), each associated with one of the one or more footings (13),
- two manifolds (14a, 14b), the manifolds being a first delivery manifold (14a) and a second intake manifold (14b),

the pumping assembly (10, 110, 210) being characterized in that it comprises means for fluidic connection between two or more of the electric pumps (12).

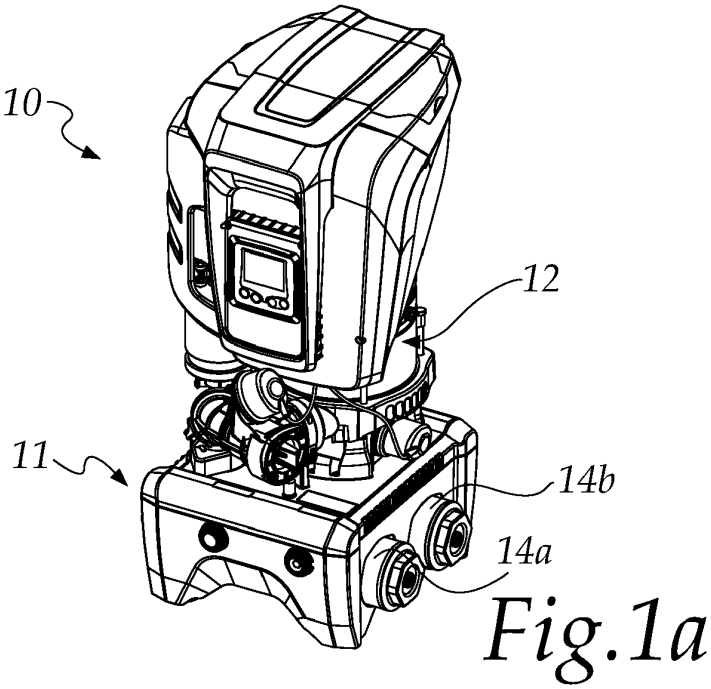

Fig.1a

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Description

[0001] The present invention relates to a pumping assembly with logistics management.

[0002] The invention relates also to an electric pump and to a base for such a pumping assembly.

[0003] Currently, one or more electric pumps, optionally connected in series, depending on the use and the flow rate of the liquid to be provided, are used to provide pumping assemblies.

[0004] An electric pump is a device for moving a liquid, generally water, by drawing it from a first region, by means of an intake duct, and sending it to a second region, by means of a delivery duct.

[0005] The electric pump comprises:

- a mechanical section, which comprises an intake port and a delivery port, to which the intake and delivery ducts are connected, and contains one or more impellers, which are interleaved by diffusers and are keyed on a driving shaft adapted to turn them, for the movement of the liquid,
- an electromechanical section, which comprises an electric motor for the movement of the driving shaft.

[0006] The electric pump is then associated with an element for connection/coupling to the intake and delivery ducts.

[0007] The pumping assembly comprising multiple electric pumps is provided directly at the factory, by the manufacturer.

[0008] In the case of two or more electric pumps, they are installed on a common frame, with a common electrical management panel, and are connected to common delivery/intake ducts.

[0009] This background art has some drawbacks.

[0010] First of all, in order to be able to provide pumping assemblies with multiple electric pumps it is necessary to have the electric pumps individually preassembled in stock, adapted to be connected individually to a system, and subsequently fluidically connect together the ports of each one of the electric pumps.

[0011] This leads to long and cumbersome operations.

[0012] Furthermore, the pumping assemblies provided at the factory cause considerable space occupations, which lead to a reduced utilization of the available stock volume, also due to the fact that these electric pumps can remain thus stored for years before being installed.

[0013] Again, usually pumping assemblies are provided by using/assembling together electric pumps and other components already defined/provided for other uses.

[0014] The fact of not using, in a pumping assembly, electric pumps designed specifically for this purpose entails the provision of assemblies that are not optimized in terms of space occupation, with consequent economical disadvantages in terms of storage and transport.

[0015] Moreover, such pumping assemblies usually comprise electric pumps without integrated onboard electronics which allows the electric pumps to operate in multiple work locations, optimizing their efficiency.

[0016] Therefore, it is necessary to define and manage multiple codes, each associated with a specific pumping assembly, which can be equipped with a motor and/or different mechanical sections, in order to be able to obtain the various desired performances, with consequent increases in terms of costs arising from the management of all these codes.

[0017] In order to be able to connect multiple electric pumps so as to form a single pumping assembly it is then necessary for them to be connected to the same intake duct and to the same delivery duct, with the resulting difficulties caused by the fact of having to connect multiple intake ports or delivery ports to a same duct.

[0018] Furthermore, the pumping assembly is taken to the installation site, generally a technical room.

[0019] This, in some cases, is defined by narrow and awkward spaces.

[0020] The handling of such pumping assembly, especially with more than one electric pump, is inconvenient and often the installation technician is forced, due to space occupation reasons, to disassemble it and then reassemble it, in order to make it pass, for example, through doors and/or stairs and/or passages.

[0021] Moreover, the installation technician must always know in advance which pumping assembly he needs, and with how many electric pumps, and provide for its optional supply.

[0022] This can cause long waiting times for goods and consequent increase of the installation time of the pumping assembly.

[0023] Furthermore, the need to ship preassembled pumping assemblies also leads to drawbacks in the shipping step, which derive from the overall space occupation of the electric pumps and from the limited possibility to utilize the available volume of the means of transport.

[0024] Another drawback is determined by the fact that both in the step for providing the supplies for the installation of the pumping assembly and for any maintenance thereon, the installation/maintenance technician might be required to purchase/replace an entire preassembled pumping assembly, with a consequent significant expense.

[0025] Finally, pumping assemblies are currently known which are provided with reduced/no modularity and/or versatility of their components, i.e., the possibility to provide assemblies with different sizes and flow rates starting from a single type of electric pump.

[0026] The aim of the present invention is to provide a pumping assembly that is capable of improving the background art in one or more of the aspects mentioned above.

[0027] Within this aim, an object of the invention is to provide a pumping assembly with a space occupation which is reduced with respect to similar pumping assemblies of the known type and allow a better utilization of the available storage space.

[0028] Another object of the invention is to provide a pumping assembly in which the electric pumps can be assembled and connected quickly and easily at the installation site so as to form the pumping assembly.

[0029] Another object of the invention is to provide a pumping assembly which allows an easier and faster management of logistics than similar pumping assemblies of the known type, in terms of both storage and shipping.

[0030] Another object of the invention is to provide a pumping assembly which has a greater modularity and versatility of its components than similar pumping assemblies of the known type.

[0031] A further object of the present invention is to overcome the drawbacks of the background art in a manner that is alternative to any existing solutions.

[0032] Not least object of the invention is to provide a pumping assembly that is highly reliable, relatively easy to provide and at competitive costs.

[0033] This aim and these and other objects which will become better apparent hereinafter are achieved by a pumping assembly comprising:

- a base provided with one or more footings,
- one or more electric pumps, each associated with one of said one or more footings,
- two manifolds, said manifolds being a first delivery manifold and a second intake manifold,

said pumping assembly being characterized in that it comprises means for fluidic connection between two or more of said electric pumps.

[0034] This aim and these and other objects which will become better apparent hereinafter are achieved by a base for such a pumping assembly, characterized in that it has one or more footings crossed by two manifolds:

- a first delivery manifold,
- a second intake manifold.

[0035] This aim and these and other objects which will become better apparent hereinafter are achieved by an electric pump for such a pumping assembly, characterized in that it comprises:

- a mechanical section, which comprises an intake port and a delivery port and contains one or more impellers which are interleaved by diffusers and are keyed on a driving shaft adapted to turn them,
- an electromechanical section, which comprises an electric motor for the movement of said driving shaft.

[0036] Further characteristics and advantages of the invention will become better apparent from the description of preferred but not exclusive embodiments of the pumping assembly according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1a is a perspective view of the pumping assembly according to the invention in a first configuration;

Figure 1b is a perspective view of the pumping assembly according to the invention in a second configuration;

Figure 1c is a perspective view of the pumping assembly according to the invention in a third configuration;

Figure 2 is a view of a portion of a pumping assembly according to the invention;

Figure 3a is a view of a portion of a pumping assembly according to the configuration of Figure 1a;

Figure 3b is a view of a portion of a pumping assembly according to the configuration of Figure 1b;

Figure 3c is a view of a portion of a pumping assembly according to the configuration of Figure 1c.

[0037] With reference to the figures, a pumping assembly according to the invention is generally designated

- by the reference numeral 10, in a first configuration thereof,
- by the reference numeral 110, in a second configuration thereof,
- by the reference numeral 210, in a third configuration thereof.

[0038] The pumping assembly 10, 110, 210, comprises a base 11, 111, 211 provided with at least one footing 13, and one or more electric pumps 12, each associated with a footing 13.

[0039] Each one of the electric pumps 12 comprises:

- a mechanical section, not shown in the figures, which comprises an intake port and a delivery port and contains one or more impellers which are interleaved by diffusers and are keyed on a driving shaft adapted to turn them,
- an electromechanical section, also not shown in the figures, which comprises an electric motor for the movement of the driving shaft.

[0040] The electric pumps 12 are of the vertical type.

[0041] The expression "vertical electric pump" in the present description is understood to mean that the electric pump 11 has a vertical axis when in use, with the mechanical section below the electromechanical section.

[0042] The pumping assembly 10, 110, 210 comprises two manifolds 14a, 14b:

- a first delivery manifold 14a,
- a second intake manifold 14b.

[0043] The two manifolds 14a, 14b are arranged in the base 11, 111, 211 of the pumping assembly 10, 110, 210, crossing each footing 13 that is present, and are connected fluidically, respectively:

- the first manifold 14a to the delivery port of the electric pump 12,
- the second manifold 14b to the intake port of the electric pump 12.

[0044] One of the particularities of the invention resides in that the pumping assembly 10, 110, 210 comprises means for fluidic connection between two or more electric pumps 12.

[0045] These connection means are constituted by the manifolds 14a, 14b. Specifically, with reference to Figures 3a-3c, each manifold 14a, 14b has one or more inlets 15a, 15b.

[0046] In particular:

- the first manifold 14a is provided with one or more inlets 15a, each for connection to the delivery port of a respective electric pump 12,
- the second manifold 14b is provided with one or more inlets 15b, each for connection to the intake port of a respective electric pump 12.

[0047] Another particularity of the invention resides in that it is possible to obtain pumping assemblies 10, 110, 210 with different dimensions and flow rates by using a single type of electric pump 12.

[0048] In particular, with the electric pump 12 it is possible to obtain:

- a pumping assembly 10 with a single electric pump 12, as shown in Figure 1a,
- a pumping assembly 110 with two electric pumps 12, as shown in Figure 1b,
- a pumping assembly 210 with three electric pumps 12, as shown in Figure 1c.

[0049] In order to do this it is sufficient to use, depending on the requirements:

- a base 11 with a single footing 13, as shown in Figure 3a,
- a base 111 with two footings 13, as shown in Figure 3b,
- a base 211 with three footings 13, as shown in Figure 3c,

and mount on these footings 13 a matching number of electric pumps 12.

[0050] In other embodiments, not shown in the figures, the pumping assembly according to the invention comprises a larger number of footings and electric pumps.

[0051] Such a pumping assembly 10, 110, 210 allows considerable versatility in installation, by varying only the type of the base 11, 111, 211, and the number of electric pumps 12.

[0052] It should be noted that with a pumping assembly according to the invention it is possible:

- to assemble the pumping assembly 10, 110, 210 at the installation site, transporting the base 11, 111, 211 and the electric pumps separately, even at different times, reducing transport costs and volumes,
- to preassemble the pumping assembly 10, 110, 210, transporting it to the installation site and reducing installation times.

[0053] A pumping assembly according to the invention also allows easy and quick management of stock and of order shipment, besides improving the utilization of the stock volumes or of the means of transport in which the preassembled pumping assemblies 10, 110, 210 and/or the individual electric pumps 12 and bases 11, 111, 211 are inserted.

[0054] With the invention it is possible to assign an identification code to each individual electric pump 12, to each individual base 11, 111, 211, and to each preassembled pumping assembly 10, 110, 210, and order/ship or retrieve from stock only the item necessary by means of the corresponding code.

[0055] The seller of the pumping assemblies can, therefore, depending on the demands of his customers, decide which pumping assembly 10, 110, 210 and/or which base 11, 111, 211 and how many electric pumps 12 to use for the installation.

[0056] This allows to reduce the time of logistics, making it easier both for the installation technician and for the manufacturer.

[0057] In practice it has been found that the invention achieves the intended aim and objects, providing a pumping assembly which does not need to have individually preassembled electric pumps in stock, reducing the space occupations arising from said electric pumps and increasing the utilization of the available stock volume.

[0058] The invention provides a pumping assembly in which the electric pumps can be assembled and connected quickly and easily at the installation site so as to form the pumping assembly.

[0059] Moreover, the invention provides a pumping assembly which allows easier and quicker management of logistics with respect to similar pumping assemblies of the known type, in terms both of stock and shipping.

[0060] Finally, the invention provides a pumping assembly which has a greater modularity and versatility of its components than similar pumping assemblies of the known type.

[0061] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may furthermore be replaced with other technically equivalent elements.

[0062] In practice, the materials used, so long as they are compatible with the specific use, as well as the contingent shapes and dimensions, may be any according to the requirements and the state of the art.

[0063] The disclosures in Italian Patent Application No. 102020000004912 from which this application claims pri-

ority are incorporated herein by reference.

[0064] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A pumping assembly (10, 110, 210) comprising:

- a base (11, 111, 211) provided with one or more footings (13),
- one or more electric pumps (12), each associated with one of said one or more footings (13),
- two manifolds (14a, 14b), said manifolds being a first delivery manifold (14a) and a second intake manifold (14b),

said pumping assembly (10, 110, 210) being **characterized in that** it comprises means for fluidic connection between two or more of said electric pumps (12).

2. The pumping assembly (10, 110, 210) according to claim 1, **characterized in that** said means for fluidic connection between two or more of said electric pumps (12) are constituted by said manifolds (14a, 14b).

3. The pumping assembly (10, 110, 210) according to one or more of the preceding claims, **characterized in that** each one of said electric pumps (12) comprises:

- a mechanical section, which comprises an intake port and a delivery port and contains one or more impellers which are interleaved by diffusers and are keyed on a driving shaft adapted to turn them,
- an electromechanical section, which comprises an electric motor for the movement of said driving shaft.

4. The pumping assembly (10, 110, 210) according to one or more of the preceding claims, **characterized in that** said one or more electric pumps (12) are of the vertical type.

5. The pumping assembly (10, 110, 210) according to one or more of the preceding claims, **characterized in that**:

- said first manifold (14a) has one or more inlets (15a), each for fluidic connection to the delivery port of one of said one or more electric pumps (12),
- said second manifold (14b) is provided with one or more inlets (15b), each for fluidic connection to the intake port of one of said one or more electric pumps (12).

6. A base (11, 111, 211) for a pumping assembly (10, 110, 210) according to one or more of the preceding claims, **characterized in that** it is provided with one or more footings (13) crossed by two manifolds (14a, 14b):

- a first delivery manifold (14a),
- a second intake manifold (14b).

7. The base (11, 111, 211) according to claim 6, **characterized in that**:

- said first manifold (14a) is provided with one or more inlets (15a), each for connection to a delivery port of a respective electric pump (12),
- said second manifold (14b) is provided with one or more inlets (15b), each for connection to an intake port of a respective electric pump (12).

8. An electric pump (12) for a pumping assembly (10, 110, 210) according to one or more of claims 1 to 6, **characterized in that** it comprises:

- a mechanical section, which comprises an intake port and a delivery port and contains one or more impellers which are interleaved by diffusers and are keyed on a driving shaft adapted to turn them,
- an electromechanical section, which comprises an electric motor for the movement of said driving shaft.

9. The electric pump (12) according to claim 8, **characterized in that** it is of the vertical type.

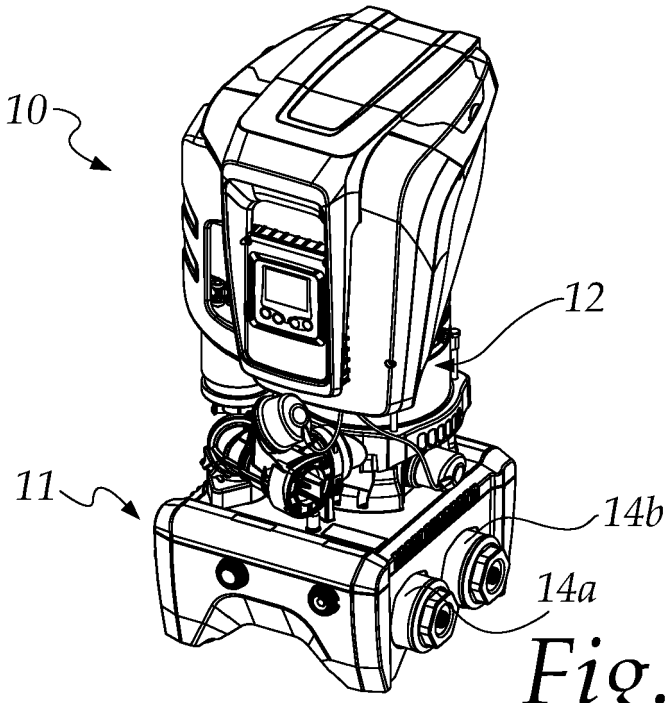

Fig.1a

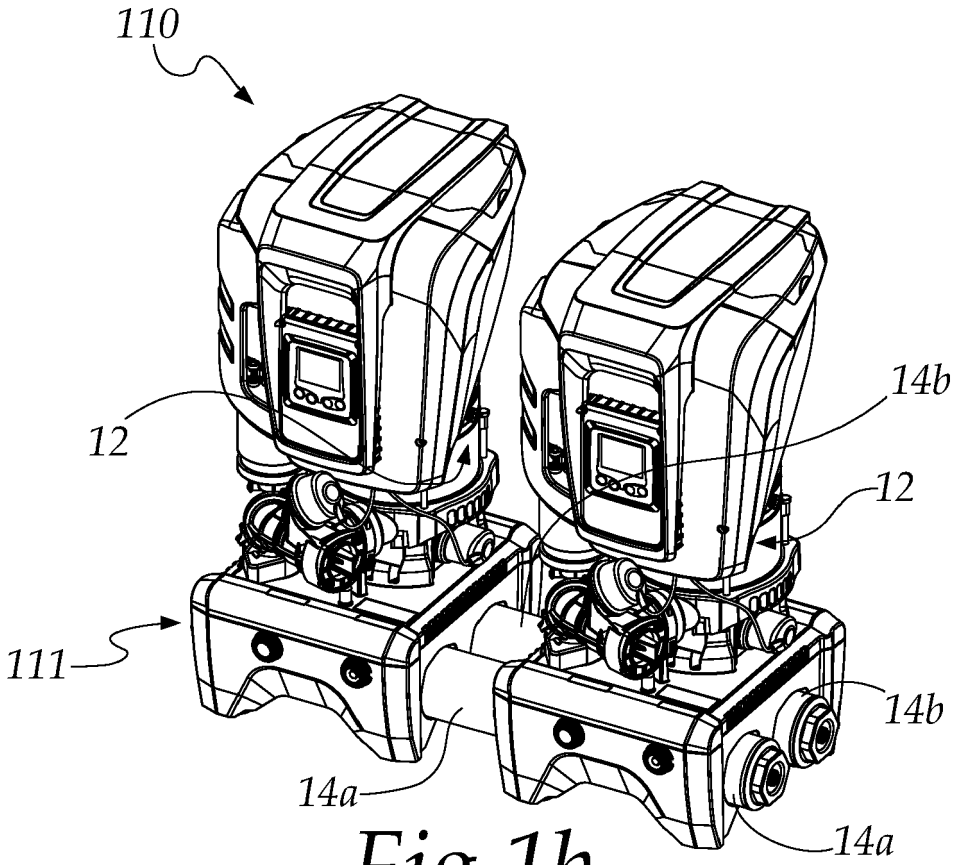

Fig.1b

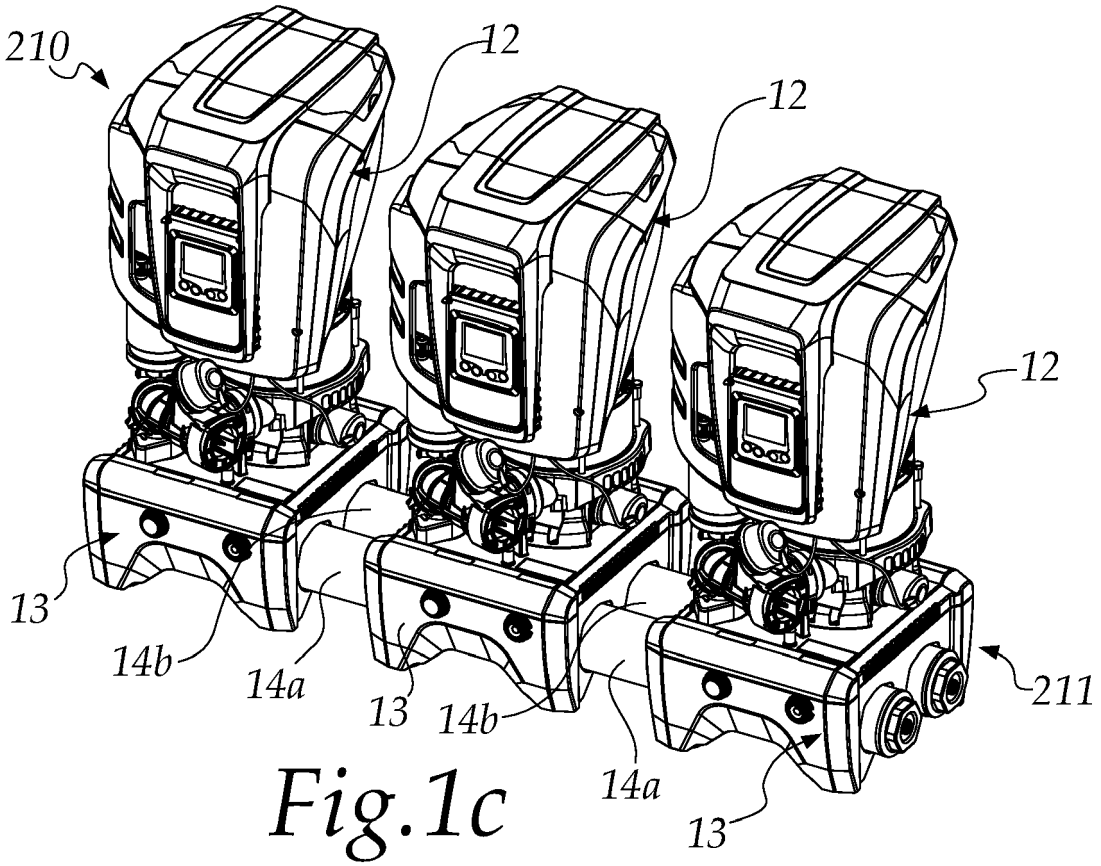

Fig.1c

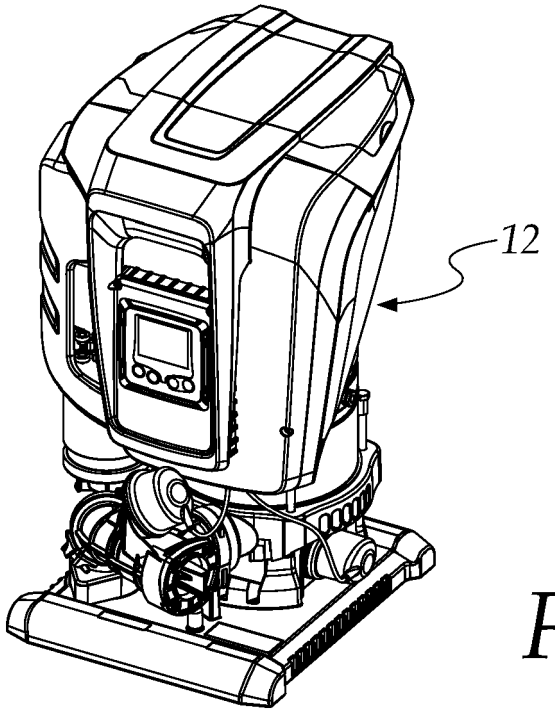

Fig.2

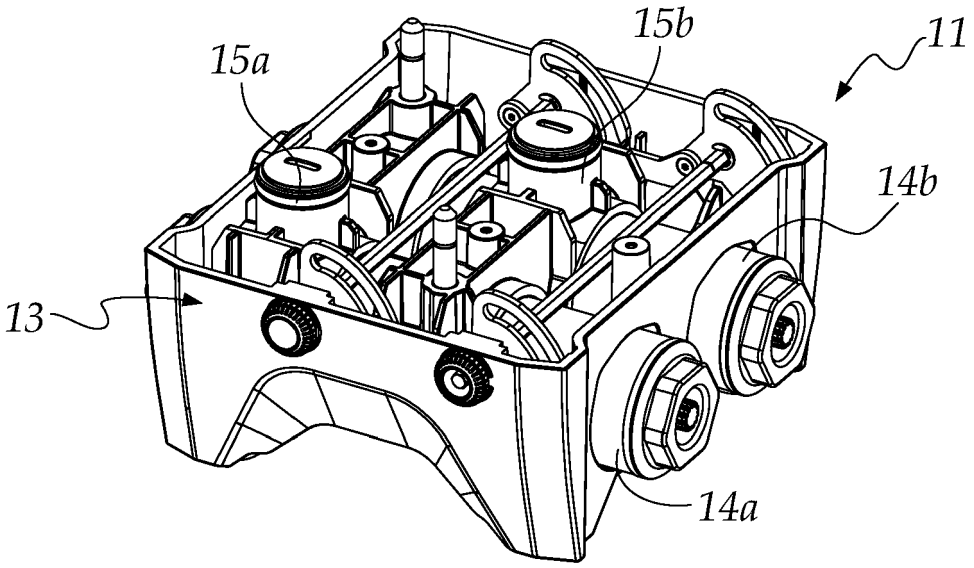

Fig.3a

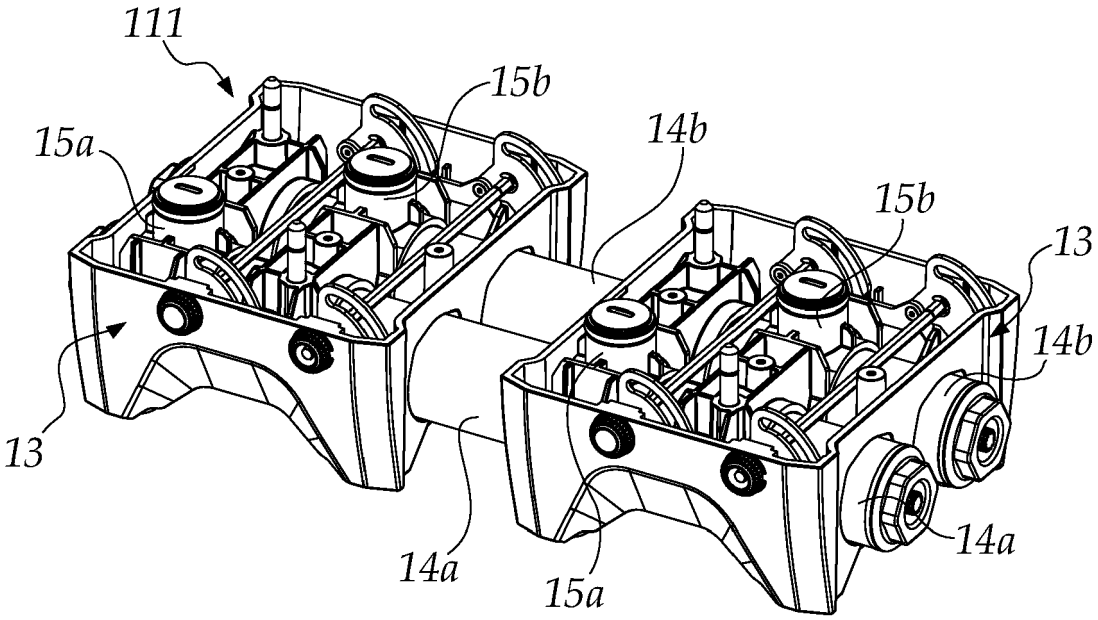

Fig.3b

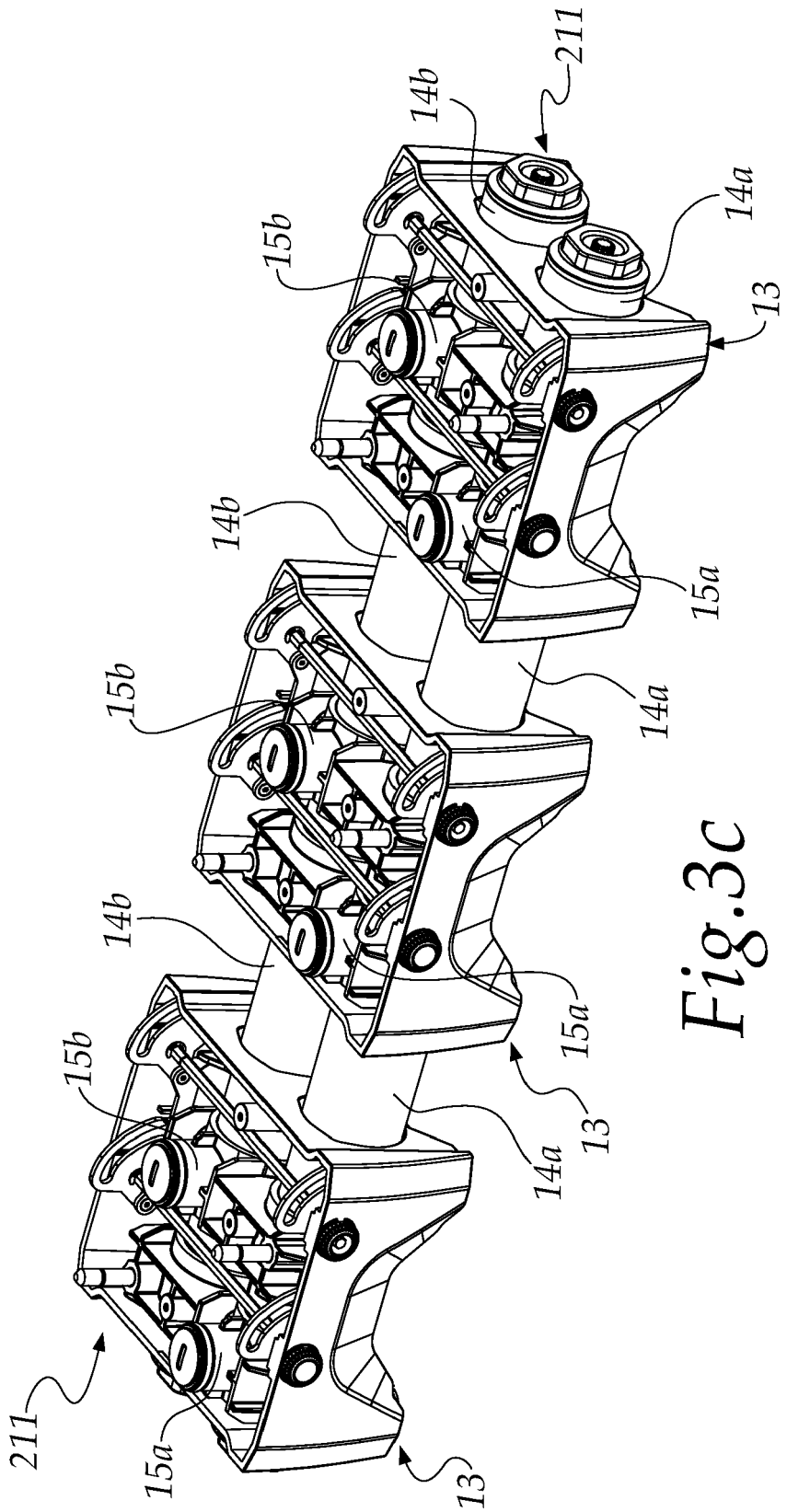

Fig.3c

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EUROPEAN SEARCH REPORT

Application Number
EP 21 15 3805

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	EP 3 171 036 A1 (ADWATEC OY [FI]) 24 May 2017 (2017-05-24) * paragraphs [0012] - [0048]; figures 1-5 * -----	1-9	INV. F04D13/06 F04D13/14 F04D29/60 F04D29/62
X	EP 2 775 145 A1 (DAB PUMPS SPA [IT]) 10 September 2014 (2014-09-10) * paragraphs [0015] - [0072]; figures 1-11 * -----	1-9	
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TECHNICAL FIELDS SEARCHED (IPC)

F04D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28 June 2021	Nobre Correia, S

CATEGORY OF CITED DOCUMENTS

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28-06-2021

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REFERENCES CITED IN THE DESCRIPTION

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