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(54) Title: VALVE UNIT OF A RACK OF A WASHING APPARATUS

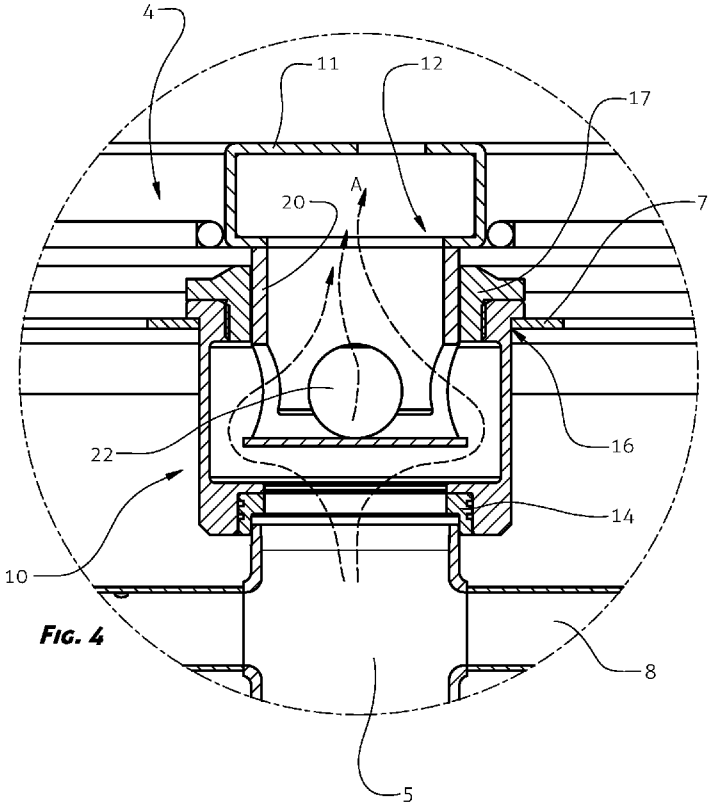

FIG. 4

(57) Abstract: The present invention refers to a washing apparatus particularly to a tunnel washing apparatus in a central disinfecting department of a hospital for washing and/or disinfecting of surgical instruments and similar, for example, and more particularly to a rack of said washing apparatus, and even more particularly to a valve unit of said rack. It is provided for according to the invention that a valve unit (10) is arranged with the first end thereof on the free section of the upper end of a hollow axle (5), whereas its second, free end, is intended to cooperate with a module (4) of a rack (1).

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Valve unit of a rack of a washing apparatus

The present invention refers to a washing apparatus particularly to a tunnel washing apparatus in a central disinfecting department of a hospital for washing and/or disinfecting of surgical instruments and similar, for example, and more particularly to a rack of said washing apparatus, and even more particularly to a valve unit of said rack.

A washing apparatus of the aforementioned kind is generally known and comprises a pair of door arranged in the opposite walls with regard to the flow direction of the objects to be washed and/or disinfected in said washing apparatus. A rack can be inserted into said washing apparatus comprising at least one module carrying objects to be washed and/or disinfected in said washing apparatus. The described solution comprises a drawback which reflects in poor washing of the objects arranged between the modules since the jets of the washing fluid from rotating nozzles do not reach all the objects to be washed and/or disinfected. In addition, problems with module guides occur very often since each module is to be pulled out in the opposite direction to the direction of introducing the module into the washing apparatus and, respectively, into the rack.

It is the object of the present invention to create a washing apparatus particularly a tunnel washing apparatus in a central disinfecting department of a hospital for washing and/or disinfecting of surgical instruments and similar which remedies the drawbacks of the known solutions.

According to the present invention, the object as set above is solved with characteristics disclosed in claim 1. Details of the invention are disclosed in the corresponding sub-claims.

The invention is further described in detail by way of non-limiting embodiment, and with a reference to the accompanying drawings, where

Fig. 1 shows a three-dimensional view of a rack of a washing apparatus according to the invention,

Fig. 2 shows a three-dimensional exploded view of a valve unit of a rack of a washing

apparatus of Fig. 1,

Fig. 3 shows a cross-sectional view in a central vertical plane of an insertion of a valve unit of Fig. 2,

Fig. 4 shows a detailed cross-sectional view in a central vertical plane of a valve unit of a rack of a washing apparatus of Fig. 1.

Fig, 1 shows a three-dimensional view of a rack 1 of a washing apparatus in particular a tunnel washing apparatus in a central disinfecting department of a hospital. The term tunnel washing apparatus refers to a washing apparatus which comprises two door arranged in the opposite walls with regard to the flow direction of the objects to be washed and/or disinfected in said washing apparatus. Said rack 1 comprises a frame 2 formed in the sense of the edges of a cuboid which is moveable by means of a plurality of rolling elements 3 in the flow direction and adapted to enter said washing apparatus, and at least one module 4 to receive objects to be washed and/or disinfected in said washing apparatus. In the central area of the rack 1 there is arranged a vertically oriented hollow axle 5 that can be rotated about the body axis thereof, said hollow axle 5 is intended to supply washing fluid and extends in essence over the entire height of the rack 1. Said hollow axle 5 is held at the lower end thereof, close to the bottom area of the washing apparatus, by means of a lower transversal support 6 being connected to said frame 2, whereas said hollow axle 5 is held at the upper end thereof, close to the top of the washing apparatus, via a valve unit 10 by means of an upper transversal support 7 being connected to said frame 2. Furthermore, said hollow axle 5 is provided with at least one spraying nozzle 8, preferably with two spraying nozzles, arranged approximately perpendicularly to said axle 5. Each spraying nozzle 8 is formed with a plurality of openings 9 through which the washing fluid sprays inside the washing apparatus.

The valve unit 10 is arranged at the free section of the upper end of the hollow axle 5, said valve unit 10 being connected with its first end to said axle 5, whereas its second end, i.e. the free end, is intended for cooperation with said module 4. For this purpose said module 4 comprises a hollow longitudinal support 11 which is formed at its side facing the valve unit 10 with an opening 12 which cooperates with said valve unit 10.

The present embodiment of said valve unit 10 comprises a body 13 formed as a hollow cylinder that can be connected at the first end thereof with said upper end of the hollow axle 5. The body 13 is associated via an adapter 14 with a hollow axle 5 by means of a

plug connection which in essence is a liquid impermeable. The second end i.e. the free end of the body 13 extending through a corresponding cut-out 16 in a flange of the upper transversal support 7 is formed with a widening 15 extending radially outwards which at the side facing the top of the washing apparatus is placed on said flange of the support 7. A holding element 17 is attached to said free end of the body 13, in the present embodiment by means of a threaded connection, said element 17 being formed with a widening 18 extending radially outwards which, when assembled, is placed on said widening 15 of the body 13. Moreover, said holding element 17 comprises a central through-hole 19. Inside the body 13 is arranged a blocking element 20 in the form of a hollow cylinder which is formed at its side facing the connection of the body 13 with the hollow axle 5 with a widening 21 extending radially outwards. According to the present invention it is provided for that the widening 21 comprises a diameter which on one hand is larger than the diameter of the through-hole 19 to such an extent that it reliably prevents for the blocking element 20 to slide through said hole 19, whereas on the other hand said diameter of the widening 21 is smaller than the diameter of the inside of the body 13 to such an extent that the blocking element 20 can easily be inserted into the body 13. Furthermore, a wall of said blocking element 20 is formed in the area directly above said widening 21 with at least one aperture, preferably with a plurality of apertures 22. A cylindrical body 23 of the blocking element 20 is formed with an outside diameter which, when the valve unit is assembled, forms a sliding fit with said through-hole 19 in the holding element 17. In addition, it is provided for according to the preferred embodiment that the inner diameter of the cylindrical body 23 equals the diameter of the opening 12 in the longitudinal support 11 of the module 4.

Initially, when there is no washing fluid in the washing apparatus, the blocking element 20 rests in its lower position abutting with its widening 21 against the bottom of said body 13. When washing fluid enters via said hollow axle 5 the washing apparatus, the blocking element 20 is lifted by means of said fluid due to the fluid pressure and pushed towards the opening 12 in the longitudinal support 11 of the module 4. Now, the face of the blocking element 20 facing said longitudinal support 11 is pressed against the wall of said support 11, and as a result a fluid communication is established between the hollow axle 5 and the longitudinal support 11 or, respectively, the nozzles arranged on said support 11 (cf. arrow A in Fig. 4). When, however, the module 4 is not mounted on said rack 1 said blocking element is moved due to the act of the washing fluid pressure against the widening 21 closely to the widening 18 of the holding element 17, thereby blocking the flow of the

washing fluid through the body 13.

Claims

1. A valve unit of a rack of a washing apparatus particularly of a tunnel washing apparatus in a central disinfecting department of a hospital for washing and/or disinfecting of surgical instruments and similar, for example, ***characterized in that*** a valve unit (10) is arranged with the first end thereof on the free section of the upper end of a hollow axle (5), whereas the second, free end of said valve unit is intended to cooperate with a module (4) of a rack (1).

2. A valve unit according to claim 1, ***characterized in that*** it comprises a body (13) connectible with said hollow axle (5) the free end of said body being closed with a holding element (17), wherein a blocking element (20) is both arranged within said body (13) and movable in longitudinal direction of said body (13).

3. A valve unit according to claim 2, ***characterized in that*** said blocking element (20) comprises a hollow cylindrical body (23) closed at the first end thereof by a widening (21) and cooperates by means of a face of the opposite end with a wall of a longitudinal support (11) of the module (4), wherein the wall of said blocking element (20) is formed in the area directly above said widening (21) with at least one aperture (22), preferably with a plurality of apertures (22).

4. A valve unit according to claims 1 to 3, ***characterized in that*** said holding element (17) is formed with a central through-hole (19) which forms a sliding fit with an outer diameter of the blocking element (20).

5. A valve unit according to any of the preceding claims, ***characterized in that*** the widening (21) comprises a diameter which is larger than the diameter of the through-hole (19) to such an extent that it reliably prevents for the blocking element (20) to slide through said hole (19).

6. A valve unit according to any of the preceding claims, ***characterized in that*** the widening (21) comprises a diameter which is smaller than the diameter of the inside of the body (13) to such an extent that the blocking element (20) can easily be inserted into the body (13).

7. A valve unit according to any of the preceding claims, ***characterized in that*** the inner diameter of the cylindrical body (23) equals the diameter of an opening (12) in the longitudinal support (11) of the module (4).

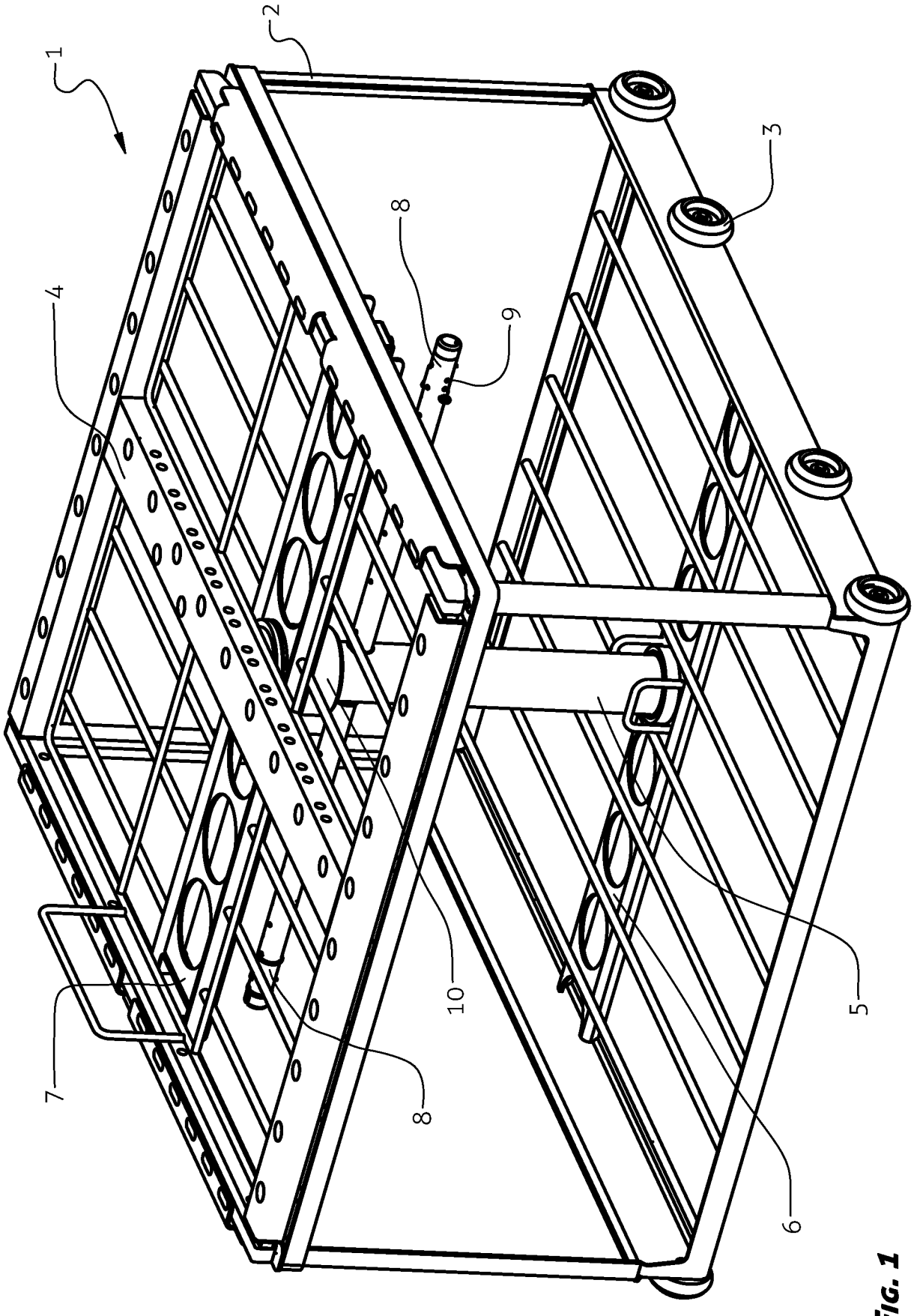

FIG. 1

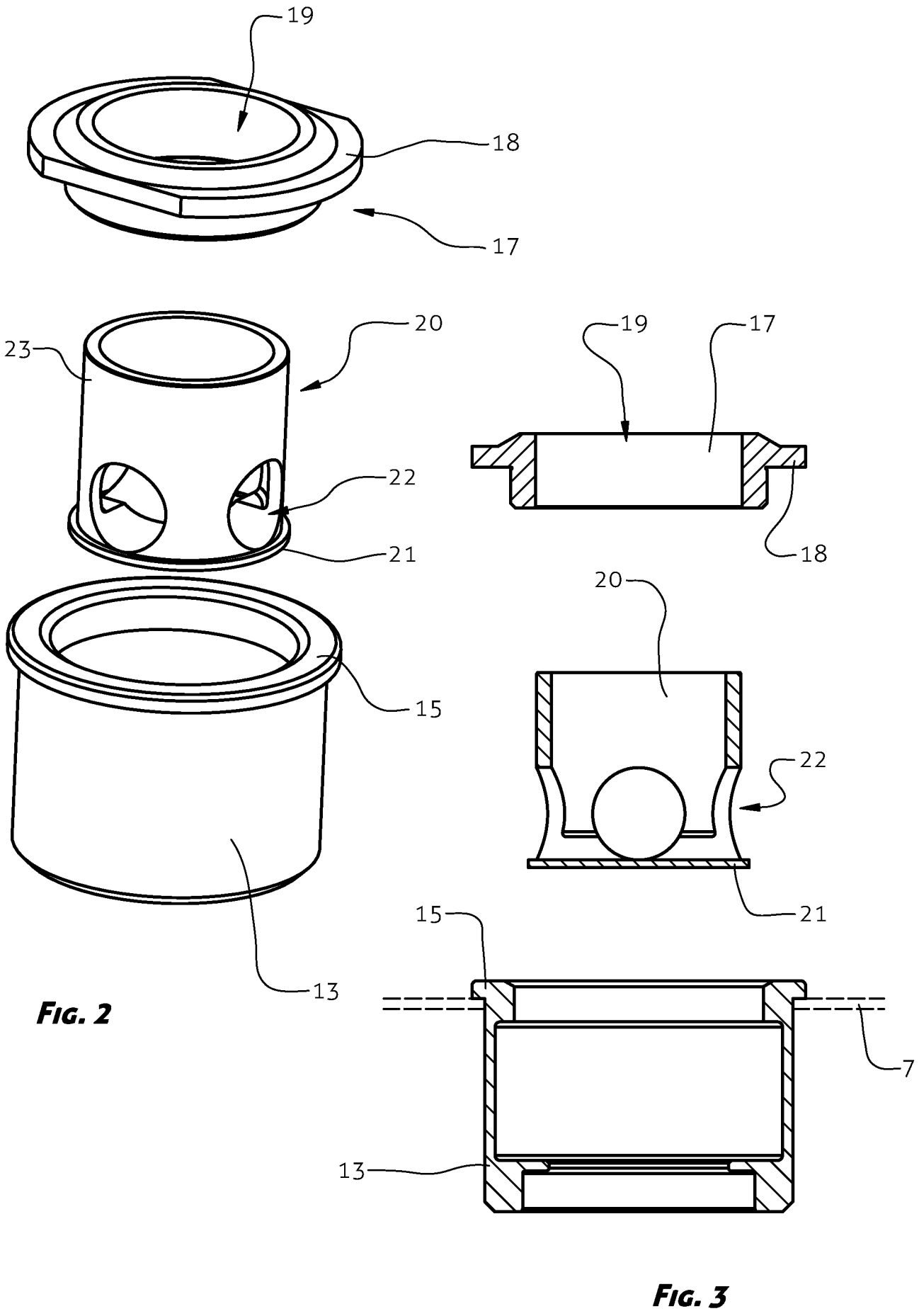

FIG. 2

FIG. 3

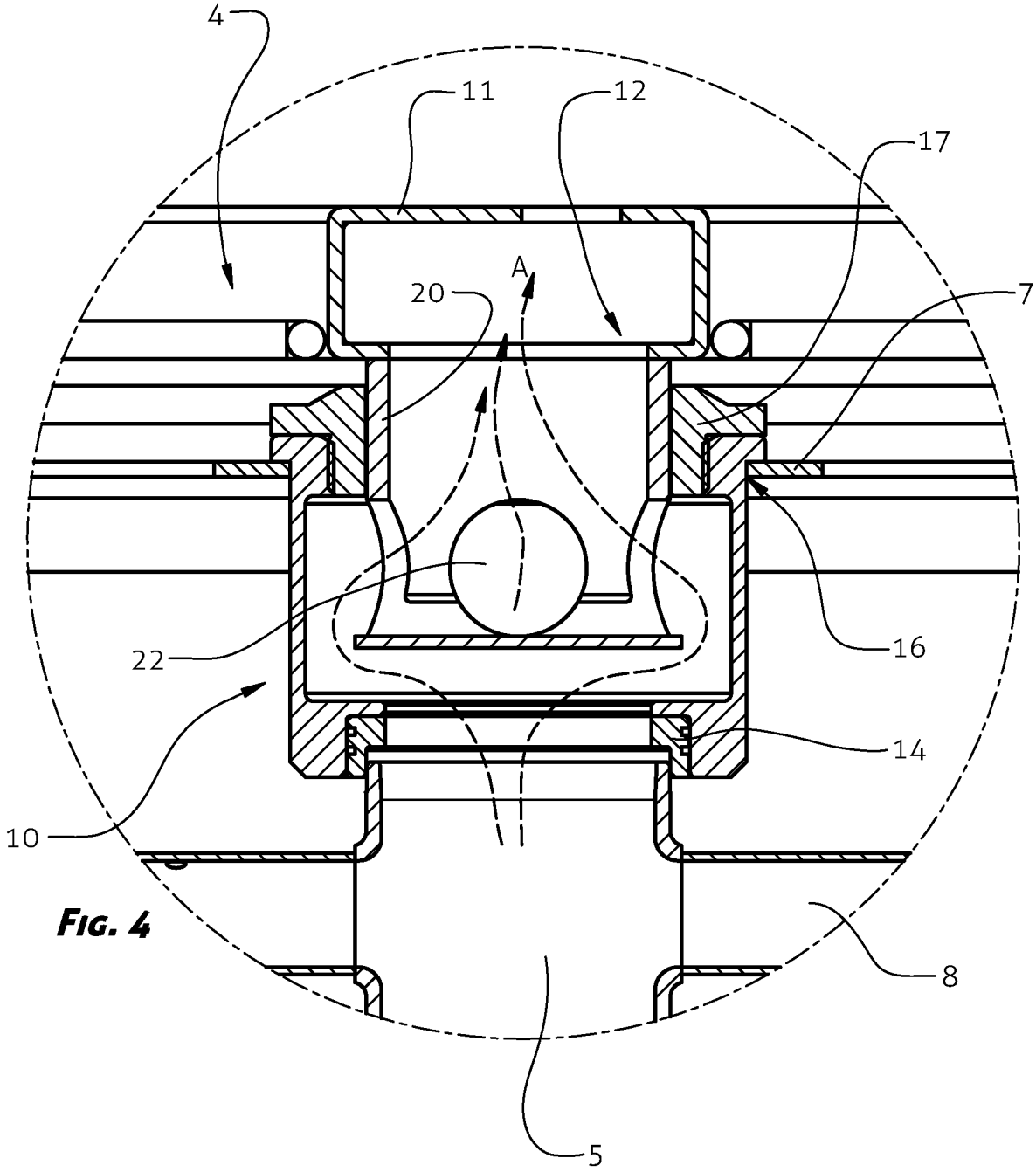

FIG. 4

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. A61B19/00 A47L15/24 A47L15/50
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61B A47L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 829 221 A2 (MERLONI ELETTRODOMESTICI SPA [IT]) 18 March 1998 (1998-03-18) column 4, line 1 - column 7, line 17; figures 1-5	1,2
A	US 2010/170544 A1 (CASONATO OTTORINO [IT]) 8 July 2010 (2010-07-08) paragraph [0053] - paragraph [0065]; figures 1-3	1
A	DE 103 32 150 B3 (MIELE & CIE [DE]) 18 November 2004 (2004-11-18) paragraph [0029] - paragraph [0034]	1
A	US 4 708 153 A (HAMBLETON LARRY G [US] ET AL) 24 November 1987 (1987-11-24) abstract; figures 4, 5	1

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
5 June 2014	13/06/2014

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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2012/305037 A1 (PETRIC SAMO [SI] ET AL) 6 December 2012 (2012-12-06) abstract; figures 1-7 -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
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