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(71) Applicants:

- **Inthebubble S.r.l.**
28100 Novara (NO) (IT)
- **Poeta, Giuseppe**
95037 San Giovanni la Punta (CT) (IT)

(72) Inventor: **Poeta, Giuseppe**
95037 San Giovanni la Punta CT (IT)

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(74) Representative: **Perani & Partners S.p.A.**
Piazza Armando Diaz, 7
20123 Milano (IT)

(54) **A MODULAR ELEMENT FOR AT LEAST PARTIALLY DEFINING A BOTTOM DRAIN OF A TANK AND KIT FOR BUILDING A BOTTOM DRAIN**

(57) A modular element (1) for at least partially defining a bottom drain of a tank of a swimming pool, and comprising: a main body (2) extending between a base (21) and an opposite top (22) in a first direction (X-X) and comprising a through channel (23) adapted to be connected to a hydraulic circuit; the main body (2) has an insert portion (26) located proximate to the base (21) and configured to be located inside a wall of the tank; the main body (2) comprises anchor means located at the insert portion (26) and configured to keep the main body (2) anchored to the wall of the tank; the main body (2) has a cut-off portion (27) located proximate to the top (22), which is configured to project out of the wall of the tank and is removable to define a suction port (271) configured to provide fluid communication between the through channel (23) and the tank, and having a first dimension of 5 to 10 mm.

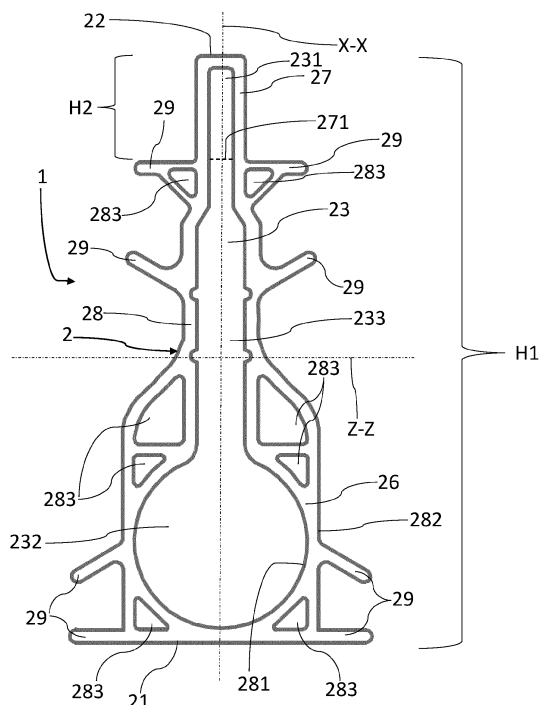


FIG.1

Description

Field of the invention

[0001] The present invention relates to a modular element for at least partially defining a bottom drain of a tank of a swimming pool. The present invention also relates to a kit for building a bottom drain of a tank of a swimming pool.

Background art

[0002] A swimming pool comprising a tank is known in the art. This tank comprises a bottom drain connected to a water treatment plant for treating the water contained in the swimming pool. This treatment plant comprises a pump that draws water from the tank via the bottom drain. For example, the existing bottom drains have a square or circular shape of different sizes according to the flow rate of the water that is drawn from the swimming pool.

[0003] A grate is also known to be used to cover the bottom drain. The grate prevents objects and/or possibly swimmers that use the swimming pool from getting caught in the bottom drain.

Problem of the prior art

[0004] Nevertheless, in spite of the presence of the grate, the bottom drain of the prior art cannot ensure adequate safety for the swimming pool users, in particular for children.

[0005] That is, the suction force exerted by the pump of the treatment plant connected to the bottom drain of the prior art swimming pool may potentially cause a part of the body of a user of the swimming pool to be sucked in and trapped in the bottom drain. Children are most exposed to the risk of being trapped in the bottom drain, due to their small size.

[0006] The safety problem of prior art bottom drains is even more serious if the grate is removed or damaged.

[0007] Whenever a person gets caught in the bottom drain, if not promptly rescued, he/she may drown.

Summary of the invention

[0008] Therefore, the technical purpose of the present invention is to provide a modular element for at least partially defining a bottom drain of a tank that can obviate the problems of the prior art.

[0009] In particular, an object of the present invention is to provide a modular element adapted to at least partially define a bottom drain through which water can be efficiently drawn from the swimming pool tank, while preventing objects and/or parts of the body of users of the swimming pool from being trapped and/or suctioned.

[0010] A further object of the present invention is to provide a kit for building a bottom drain of a tank of a swimming pool, comprising at least one pair of modular

elements.

[0011] The aforementioned technical purpose and objects are substantially fulfilled by the modular element and the kit comprising the technical features as disclosed in one or more of the accompanying claims.

Advantages of the invention

[0012] The modular element as described herein, in addition to defining a bottom drain that affords efficient suction and recirculation of the water in the tank of a swimming pool, ensures a safety level for use of the swimming pool according to the requirements of UNI EN 13451-3 and UNI EN 16713-2 standards.

BRIEF DESCRIPTIONS OF THE DRAWINGS

[0013] Further features and advantages of the present invention will result more clearly from the illustrative, non-limiting description of a preferred, non-exclusive embodiment of a modular element and a kit as shown in the accompanying figures, in which:

- Figure 1 is a front view of a modular element according to the present invention;
- Figure 2 is lateral sectional view of the modular element of Figure 1;
- Figure 3 is a front view of a connecting element of a kit of the present invention;
- Figure 4 is a front view of a closure element of a kit according to the present invention;
- Figure 5 is a perspective view of a pair of modular elements, as individually shown in Figure 1 of the connecting element of Figure 3 and of the closure element of Figure 4;
- Figure 6 is a further perspective view of a pair of modular elements, as individually shown in Figure 1, of the connecting element of Figure 3 and of the closure element of Figure 4.

DETAILED DISCLOSURE

[0014] Particularly referring to the accompanying figures, numeral 1 designates a modular element for at least partially defining a bottom drain of a tank of a swimming pool (not shown). It should be further noted that this modular element 1 is adapted to at least partially define a feed line of a tank of a swimming pool.

[0015] This modular element 1 comprises a main body 2 extending between a base 21 and an opposite top 22 along a first direction X-X. This main body 2 further comprises a through channel 23 adapted to be connected to a hydraulic circuit and extending between a first end 24 and a second end 25 which are opposite to each other in a second direction Y-Y, transverse to the first direction X-X. The hydraulic circuit, adapted to be connected to the through channel 23, corresponds, for example, to a circuit for treating the water contained in the tank and

comprises a pump for drawing water from such tank.

[0016] Preferably, the main body 2 extends along the first direction X-X to define a first height H1 preferably ranging from 150 to 250 mm. More preferably, the first height H1 is 190 mm.

[0017] Preferably, the through channel 23 has a first connecting opening 241 located at the first end 24 and a second connecting opening 251 located at the second end 25.

[0018] Also preferably, the main body 2 is made of plastic. More preferably, the main body 2 is made of PVC.

[0019] In addition, the main body 2 has an insert portion 26 located proximate to the base 21 and configured to be located inside a wall of the tank. For example, the insert portion 26 of the main body 2 is inserted while the tank is being built. As a further example, the insert portion 26 of the main body 2 is inserted into the concrete that is used to make the tank, before the concrete sets.

[0020] Still as an example, the wall in which the insert portion 26 is inserted corresponds to a bottom of the tank of the swimming pool.

[0021] Furthermore, the main body 2 comprises anchor means located at the insert portion 26 and configured to keep the main body 2 anchored to the wall of the tank. Advantageously, these anchor means prevent the main body 2 from accidentally coming out of the wall of the tank.

[0022] In addition, the main body 2 has a cut-off portion 27 proximate to the top 22. This cut-off portion 27 is configured to project out of said wall of the tank and is removable to define a suction port 271 configured to provide fluid communication between the through channel 23 and the tank. In other words, once the insert portion 26 of the main body 2 has been inserted into the wall of the tank, the cut-off portion 27 that projects out of the wall of the tank is removed to define the suction port 271.

[0023] For example, if the insert portion 26 is inserted into a bottom of the tank, this cut-off portion 27 is configured to project out of such bottom of the tank.

[0024] Preferably, the cut-off portion 27 extends along the first direction X-X to define a second height H2 ranging from 10 to 60 mm, more preferably of 35 mm.

[0025] It should be noted that, when the hydraulic circuit is connected in fluid communication with the through channel 23, the tank is in fluid communication with this hydraulic circuit via the suction port 271.

[0026] This suction port 271 has a first dimension of 5 to 10 mm, preferably 8 mm. Advantageously, this specific dimension of the suction port 271 prevents objects and/or limbs of users of a swimming pool from being caught in such suction port 271.

[0027] Due to this dimension of the suction port 271, fluid is drawn along a suction line.

[0028] It should be noted that, if a single modular element 1 is used to define the bottom drain, the suction port 271 has a second dimension of about 10-50 cm. In other words, if a single modular element 1 is used to define the bottom drain, the suction port 271 has a rec-

tangular shape with a first side having a dimension of 5 to 10 mm, preferably 8 mm and a second side having a dimension of about 10-50 cm, thereby defining a suction line.

[0029] According to a preferred embodiment of the invention, the through channel 23 has at least one section. For example, this section is arranged along a third direction Z-Z, transverse to the first direction X-X and to the second direction Y-Y.

[0030] This section has a first rectangular zone 231 located at the cut-off portion 27, a second circular zone 232 located proximate to the base 21 and an intermediate connecting zone 233 between the first zone 231 and the second zone 232. The second zone 232 and the intermediate zone 233 are located at the insert portion 26 of the main body 2.

[0031] Preferably, one side of the first zone 231 coincides with the first dimension of the suction port 271. In other words, one side of the first zone 231 has a dimension of 5 to 10 mm, preferably 8 mm, as the first dimension of the suction port 271.

[0032] Still preferably, the second zone 232 has a radius of 40 to 70 mm. More preferably, the second zone 232 has a radius of 58 mm.

[0033] According to the preferred embodiment of the invention, the main body 2 comprises a side wall 28 connecting the base 21 and the top 22. This side wall 28 has an inner surface 281 facing the through channel 23 and an opposite outer surface 282.

[0034] Preferably, the side wall 28 has a thickness of 4 mm.

[0035] Still preferably, the anchor means of the main body 2 are formed of one piece with the side wall 28 of the main body 2.

[0036] Still preferably, the anchor means comprise fins 29 projecting away from the outer surface 282 of the side wall 28. If the wall of the tank is made of concrete and the insert portion 26 of the main body 2 is inserted before the concrete sets, the concrete sets around the fins 29, thereby anchoring the main body 2 to the wall of the tank.

[0037] According to the preferred embodiment of the invention, the side wall 28 of the main body 2 comprises through cavities 283 at the insert portion 26 of the main body 2. These through cavities 283 assist the anchor means in keeping the main body 2 stuck in the wall of the tank. That is, again, if the wall of the tank is made of concrete and the insert portion 26 of the main body 2 is inserted before the concrete sets, the unset concrete fits into the through cavities 283 and sets inside such through cavities 283, thereby anchoring the main body 2 to the wall of the tank.

[0038] Still according to the preferred embodiment of the invention, the insert portion 26 of the main body 2 is contiguous to the cut-off portion 27 of the main body 2. Advantageously, since in use the cut-off portion 27 of the main body 2 is removed to define the suction port 271, the cut-off portion 27 being contiguous to the insert portion 26, the suction port 271 will be level with the wall of

the tank in which the main body 2 is inserted. In other words, if the insert portion 26 is inserted into a bottom of the tank, this suction port 27 defines the bottom level of the tank of the swimming pool.

[0039] The present invention also relates to a kit for building a bottom drain of a tank of a swimming pool. This kit is also suitable for the formation of a feed line of the swimming pool tank.

[0040] This kit comprises at least one pair of modular elements 1. Each modular element 1 of the pair of modular elements 1 corresponds to the modular element 1 as described herein.

[0041] This kit comprises at least one connecting element 3. For example, the kit comprises a connecting element 3 for each pair of modular elements 1 of the kit. As a further example, if the kit comprises three modular elements 1, the kit comprises two connecting elements 3.

[0042] Each connecting element 3 is configured to connect a respective pair of modular elements 1 so that the through channels 23 of the modular elements 1 of such pair of modular elements 1 will be in fluid communication with each other to at least partially define the bottom drain of a tank of a swimming pool. In other words, in use, each connecting element 3 is interposed between a respective pair of modular elements 1.

[0043] Preferably, each connecting element 31 comprises a respective through channel 31. When a connecting element 3 connects a respective pair of modular elements 1, the through channels 23 of said modular elements 1 are in fluid communication with each other via the through channel 31 of said connecting element 3.

[0044] Preferably, each connecting element 31 has the same shape as the through channel 23 of the modular element 1.

[0045] It should be noted that the suction ports, defined by removing the cut-off portion 27 of each modular element 1 of the kit, have a first dimension of 5 to 10 mm, preferably 8 mm, respectively. Also, the sum of the second dimensions of each suction port 271 defined using the modular elements 1 of the kit is about 1 m. In other words, a suction line is also defined by the kit. Therefore, the suction line so defined has a rectangular shape with a first side with a dimension of 5 to 10 mm, preferably 8 mm, and a second side having a length of 1 m.

[0046] According to the preferred embodiment of the invention, the kit comprises a closure element 4 designed to be connected to a modular element 1 at a respective end 24, 25 of this modular element 1 to at least partially close a connecting opening 241, 251 of the through channel 23 of this modular element 1. Preferably, the closure element 4 completely closes a connecting opening 241, 251 of the through channel 23 of the modular element 1 to which it is connected.

[0047] Preferably, each closure element 4 has the same shape as the through channel 23 of the modular element 1.

[0048] It should be noted that, if a swimming pool tank has a suction line defined by the modular elements 1,

this suction line meets the requirements as defined by the UNI EN 13451-3 and UNI EN 16713 standards. In order to fulfill the requirements of these standards, obstruction tests must be carried out. Thus, these obstruction tests were carried out on the suction line defined by the modular elements 1. In particular, the suction line analyzed has a rectangular shape with a first side of 8 mm and a second side of 1 m. The obstruction tests were carried out by applying an oval 285 x 90 mm obstruction device with an elastomeric foam plate simulating the consistency of a human body, along this suction line. The test was carried out by simulating a maximum suction flow rate of 14,40 cubic meters/h and applying a vacuum of 90 kPa. The obstruction device came off the suction line with a force considerably lower than 300 N, which is the maximum value allowed for the test to be passed. The force value was measured using a precision digital dynamometer.

[0049] Therefore, the suction line defined by the modular elements 1 in a tank of a swimming pool, ensures an adequate level of safety of use of the swimming pool itself.

Claims

1. A modular element (1) for at least partially defining a bottom drain of a tank of a swimming pool, said modular element (1) comprising:

- a main body (2) extending between a base (21) and an opposite top (22) in a first direction (X-X), said main body (2) comprising a through channel (23) adapted to be connected to a hydraulic circuit and extending between a first end (24) and a second end (25) which are opposite to each other in a second direction (Y-Y) transverse to the first direction (X-X);

characterized in that:

- the main body (2) has an insert portion (26) located proximate to the base (21) and configured to be located inside a wall of the tank;
- the main body (2) comprises anchor means located at the insert portion (26) and configured to keep said main body (2) anchored to the wall of the tank;
- the main body (2) has a cut-off portion (27) located proximate to the top (22), said cut-off portion (27) being configured to project out of said wall of the tank and being removable to define a suction port (271) configured to provide fluid communication between the through channel (23) and the tank, said suction port (271) has a first dimension of 5 to 10 mm.

2. A modular element (1) as claimed in claim 1, wherein the first dimension of the suction port (271) is 8 mm.

3. A modular element (1) as claimed in claim 1 or 2, wherein the through channel (23) has at least one section having:
- a first rectangular zone (23) located at the cut-off portion (27); 5
 - a second circular zone (232) located proximate to the base (21);
 - an intermediate zone (233) connecting the first zone (231) and the second zone (232). 10
4. A modular element (1) as claimed in claim 3, wherein one side of said first zone (231) coincides with the first dimension of said suction port (271). 15
5. A modular element (1) as claimed in any of claims 1 to 4, wherein the main body (2) comprises a side wall (28) connecting the base (21) and the top (22), the anchor means of the main body (2) being formed integrally with the side wall (28) of the main body (2). 20
6. A modular element (1) as claimed in claim 5, wherein the side wall (28) has an inner surface (281) facing the through channel (23) and an opposite outer surface (282), the anchor means comprising lugs (29) projecting away from the outer surface (282) of the side wall (28). 25
7. A modular element (1) as claimed in claim 5, wherein the side wall (28) of the main body (2) comprises through cavities (283) at the insert portion (26) of the main body (2). 30
8. A modular element (1) as claimed in any of claims 1 to 7, wherein the insert portion (26) of the main body (2) is contiguous to the cut-off portion (27) of the main body (2). 35
9. A kit for building a bottom drain of a tank of a swimming pool, said kit comprising: 40
- at least one pair of modular elements (1) as claimed in any of claims 1 to 8;
 - at least one connecting element (3), each connecting element (3) being configured to connect a respective pair of modular elements (1) so that the through channels (23) of the modular elements (1) of said pair of modular elements (1) will be in fluid communication with each other to at least partially define the bottom drain of a tank of a swimming pool. 45 50
10. A kit as claimed in claim 9, comprising:
- a closure element (4) designed to be connected to a modular element (1) at a respective end (24, 25) of said modular element (1) to at least partially close a connecting opening (241, 251) of 55
- the through channel (23) of said modular element (1).

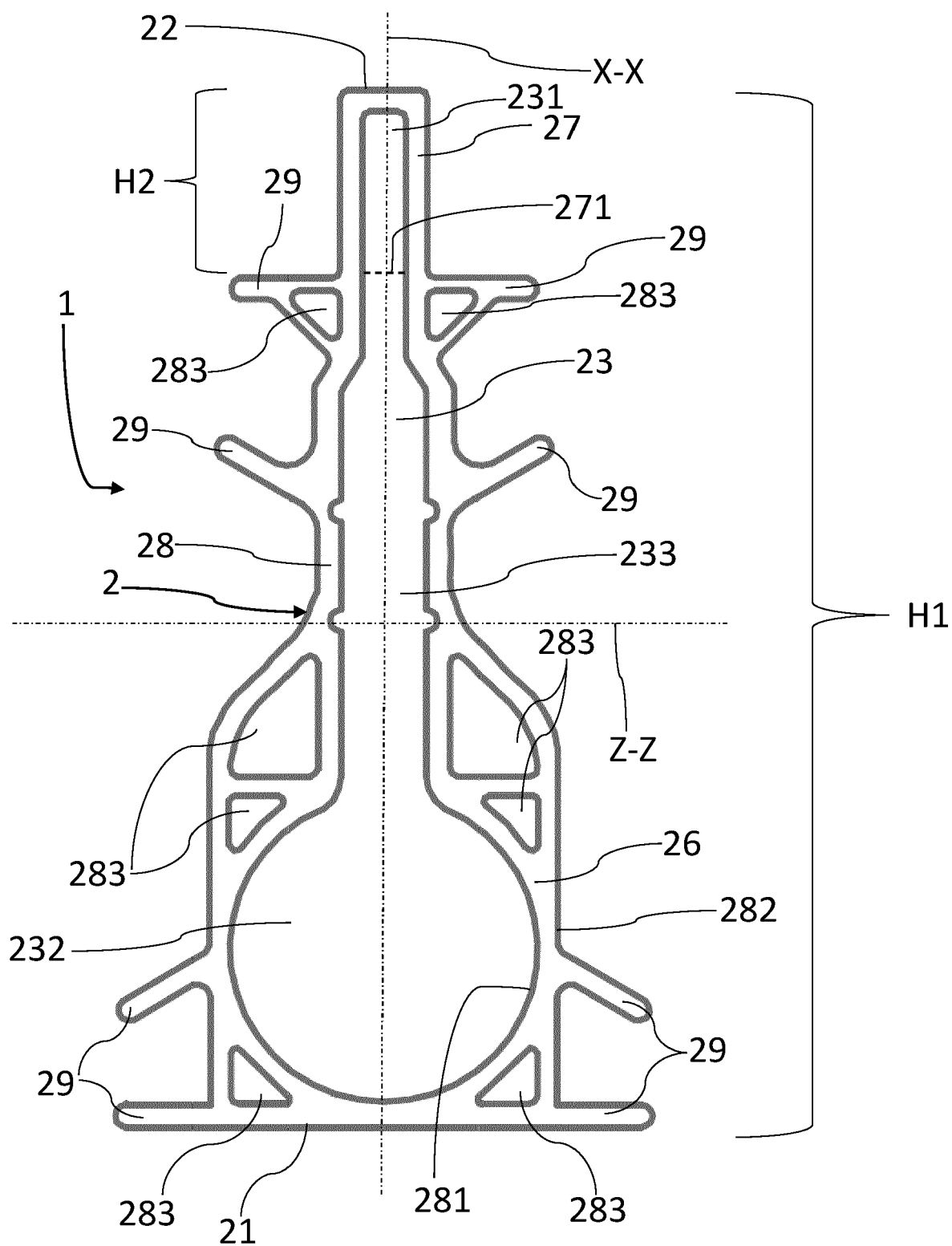


FIG.1

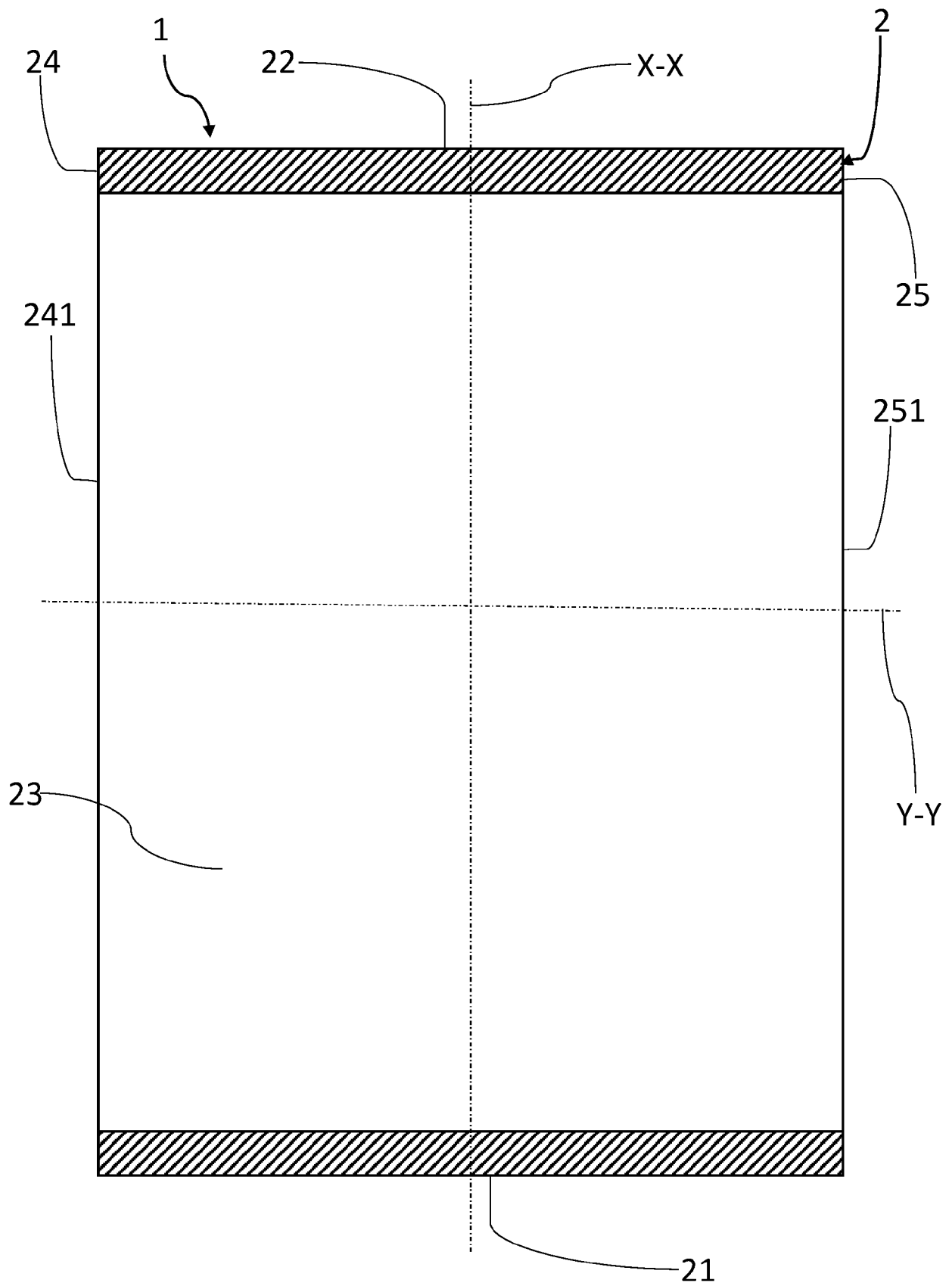


FIG.2

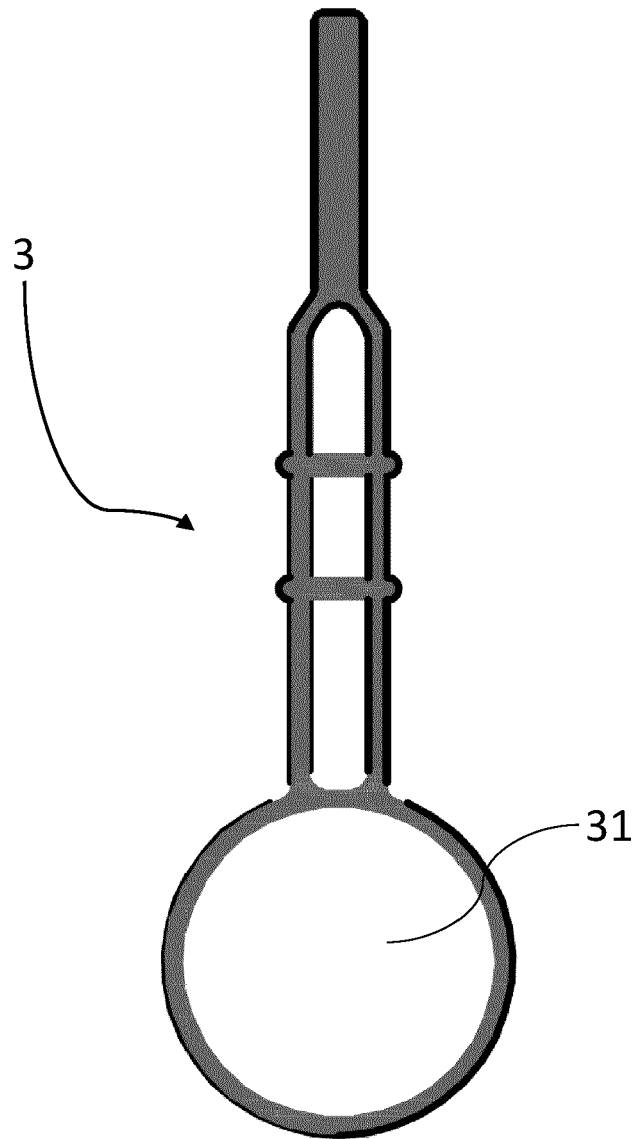


FIG.3

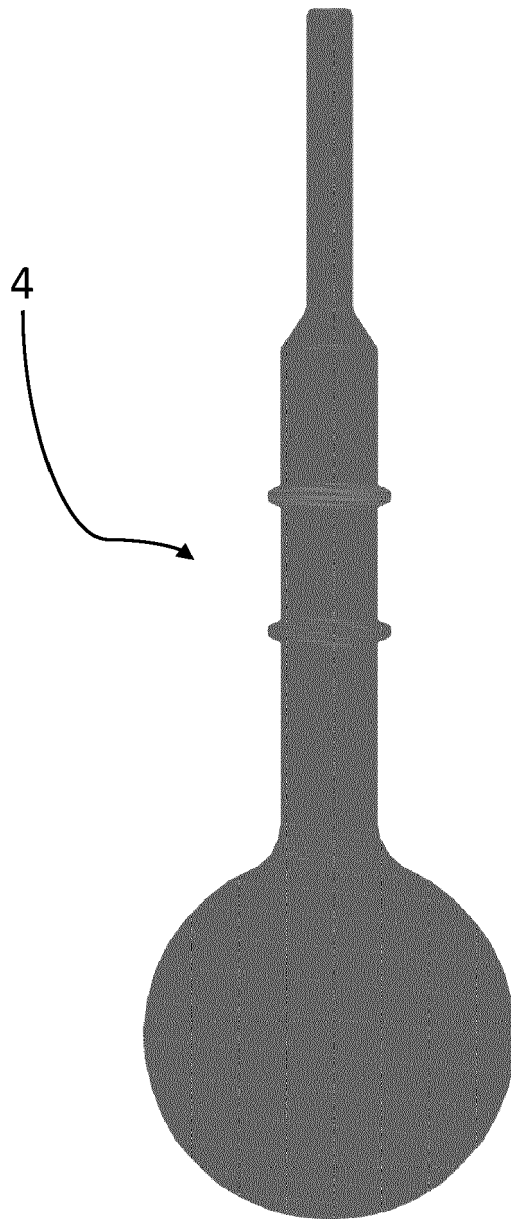


FIG.4

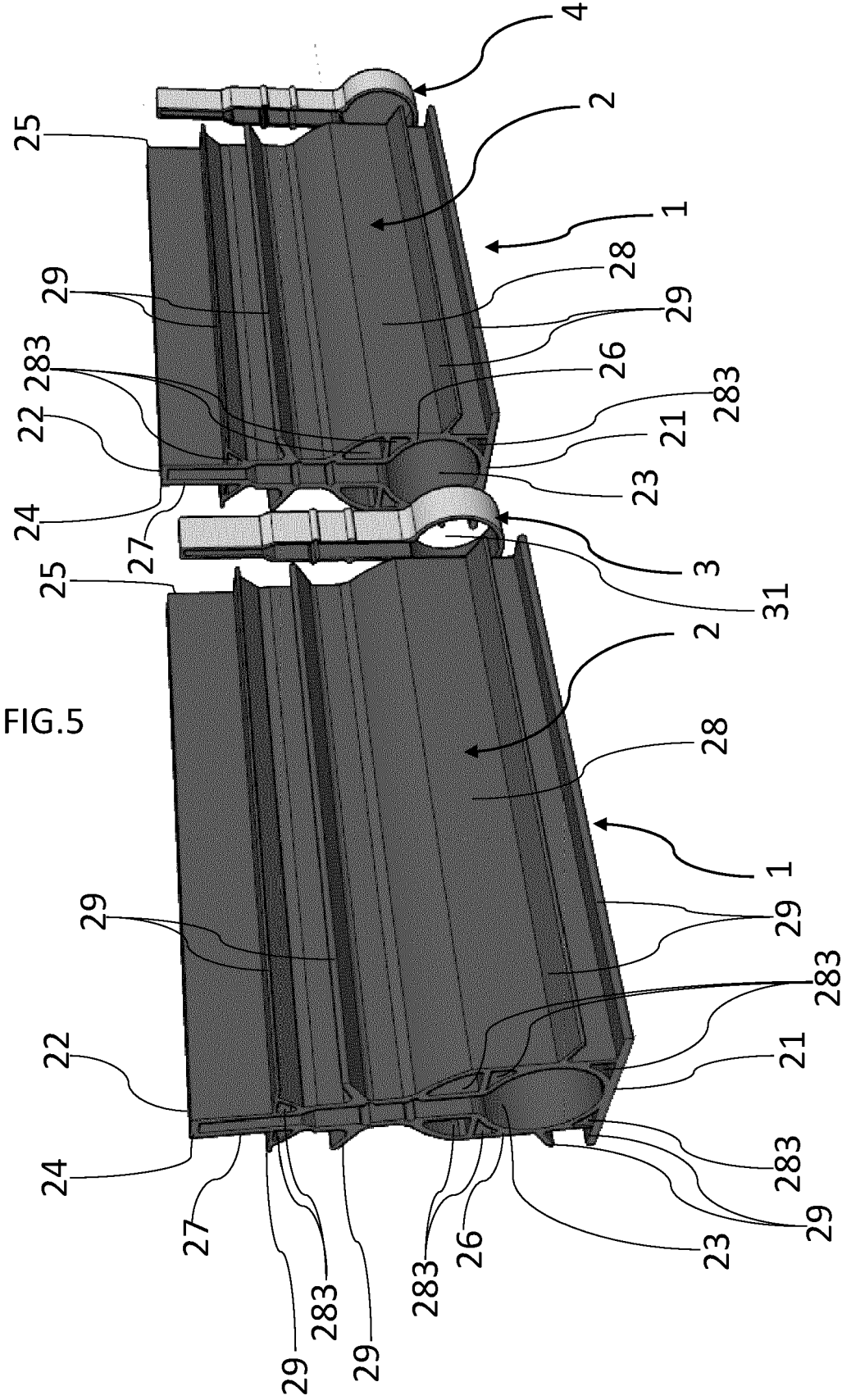
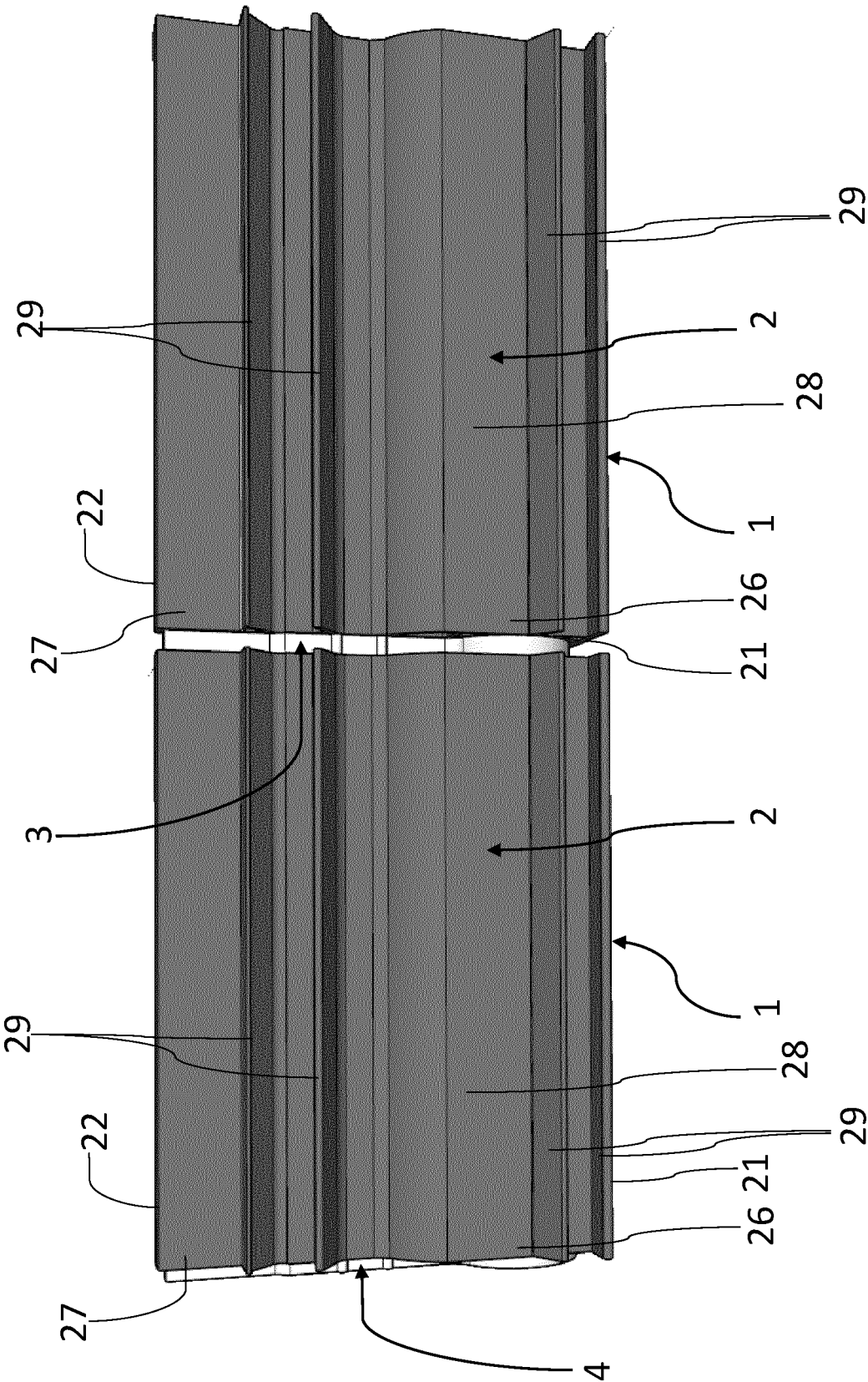


FIG.6





EUROPEAN SEARCH REPORT

Application Number

EP 21 18 8530

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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	US 6 170 095 B1 (ZARS LEIF ALEXANDER [US]) 9 January 2001 (2001-01-09) * figures 1,2, 5D *	1-10	INV. E04H4/12
A	US 2007/180605 A1 (GRIFFIN RONALD H [US] ET AL) 9 August 2007 (2007-08-09) * figures 1,4,5 *	1-10	
A	US 10 519 681 B1 (JACOBS BOB [US]) 31 December 2019 (2019-12-31) * figures 4-6 *	1-10	
			TECHNICAL FIELDS SEARCHED (IPC)
			E04H E01C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 21 December 2021	Examiner Decker, Robert
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10	Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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15	US 2007180605	A1	09-08-2007	NONE

	US 10519681	B1	31-12-2019	NONE

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