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JP-A- 2006 029 047
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DESCRIPTION

FIELD OF THE INVENTION

[0001] The present invention relates to a stormwater drain baffle to be disposed in a flow-through stormwater sump or chamber for baffling a stormwater flow-path according to the preamble of claim 1.

BACKGROUND OF THE INVENTION

[0002] Stormwater drainage system is designed to drain excess rain and ground water from impervious surfaces such as paved streets, car parks, parking lots, footpaths, sidewalks, and roofs. Stormwater drains vary in design from small residential dry wells to large municipal systems. Many stormwater drainage systems are designed to drain the untreated stormwater containing pollutants into sea, lakes or rivers. In the stormwater drainage system, stormwater is collected to a flow-through stormwater sump or well. The stormwater sump is generally a concrete cylinder having an inlet pipe and an outlet pipe located at distance from the bottom of the sump. The particles suspended in stormwater are supposed to settle as a sediment layer on the bottom of the sump. Under low flow conditions sump is able to remove suspended sediment, but under high flow conditions the sump is unable to retain the particles when the water enters the sump at high flow rate. Then the sump becomes filled with water and the incoming high rate flow creates an undesirable circular flow pattern inside the sump which causes resuspension and wash out of the sediment from the bottom to the outlet pipe. In prior art, documents US 8715507, US 8663466 and US 2012/0255622 have proposed to retrofit the sump with a baffle. The baffle has proved to be efficient to reduce the undesirable wash out of the sediment. US 8663466 and US 2012/0255622 disclose stormwater drain baffles having a plurality of openings distributed over the area of the baffle. The baffle comprises at least two baffle portions connected to each other. The baffle portions are attached to a support frame structure which is rather complicated having many different parts.

OBJECTIVE OF THE INVENTION

[0003] It is an objective of the present invention to provide an improved stormwater drain baffle with a simple and stiff structure and which easily can be adjusted to a variety of different diameters of sumps.

[0004] It is also an objective of the present invention to provide a baffle which has integrated stiffening and fixing elements and provides to be attachable to the sidewall of the sump or chamber.

SUMMARY OF THE INVENTION

[0005] According to the present invention, there is provided a stormwater drain baffle having the features of claim 1.

[0006] The technical effect of the invention is that the structure of the baffle is simple having a few parts and the baffle width can easily be adjusted to fit to sumps with different diameters for fixing to the sidewall of the sump.

[0007] Further preferred embodiments are defined by the features of dependent claims 2-14.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The accompanying drawings, which are included to provide a further understanding of the invention and constitute a part of this specification, illustrate embodiments of the invention and together with the description help to explain the principles of the invention. In the drawings:

Figure 1 is an axonometric view of a stormwater drain baffle according to one embodiment of the invention the baffle being shown as installed in a stormwater sump,

Figure 2 shows the baffle portions of the baffle of Figure 1 as separated,

Figure 3 shows the two baffle portions of Figure 2 in a stacked position,

Figure 4 shows a cross-section of a stormwater sump wherein the baffle is installed, and demonstrating insertion of the baffle portions via the manhole into the sump,

Figure 5 shows a cross-section V-V from Figure 4,

Figure 6 shows a cross-section VI-VI from Figure 6,

Figure 7 is a cross-section of a sump corresponding to Figure 6 wherein the sump has a greater diameter and the width of the baffle being adjusted accordingly,

Figure 8 is a cross-section of a sump corresponding to Figure 7 wherein the sump has a still greater diameter and the width of the baffle being adjusted accordingly,

Figures 9 and 10 shows steps of installation of the baffle into the sump, and

Figure 11 shows a cross-section XI-XI from Figure 10.

DETAILED DESCRIPTION OF THE INVENTION

[0009] Figures 1, 4 and 5 show a stormwater drain baffle 1 which is disposed in a flow-through stormwater sump 2. In the sump 2 the baffle 1 baffles a stormwater flow-path. The baffle has a plurality of openings 3 distributed over the area of the baffle 1. The baffle 1 comprises two substantially planar and rectangular baffle portions 4, 5 connected to each other. The baffle portions 4, 5 are disposed near to and in superposed relation to each other, so that the baffle 1 portions overlap each other and are adjustably connected to each other for adjusting the width W_{tot} of the baffle 1. The baffle portions 4, 5, comprise fixing members 7, 8 which are monolithic with the baffle portion 4, 5 and adapted for fixing the baffle 1 to the inner sidewall of the sump or the chamber.

[0010] With reference to Figures 1, 2 and 4, the fixing members 7, 8 comprise fixing flanges 9 having bolt holes 10 to enable forming first bolted joints A by which the baffle portions can be attached to the sidewall of the sump.

[0011] As can be seen in Figures 1 and 2, the baffle portions 4, 5 comprise stiffening members 11, 12, 13, 14; 15, 16, 17, 18 disposed at the edges of the rectangular baffle portions 4, 5. In the shown embodiments the stiffening members 11, 12, 13, 14; 15, 16, 17, 18 are disposed at all four edges of each rectangular baffle portions 4, 5. However, some other embodiments may have stiffening members in a less number of edges. Preferably, the stiffening members 11, 12, 13, 14; 15, 16, 17, 18 are stiffening flanges which are monolithic with the baffle portions 4, 5. The stiffening flanges 11, 12, 13, 14; 15, 16, 17, 18 may be bent at right angle in relation to the plane of the baffle portion 4, 5. The fixing flanges 9 of the baffle portions 4, 5 also act as stiffening flanges 11, 15.

[0012] Referring to Figures 2 and 4, the baffle portion 4, 5 has a width w which is smaller than the diameter D of the manhole 19 of the stormwater sump 2 into which the baffle 1 is to be installed. For example, the width w of the baffle portion 4, 5, 6 is preferably somewhat smaller than 600 mm, if the diameter D of the manhole 19 is 600 mm.

[0013] In the embodiments shown in Figures 1-7 the number of baffle portions is two. The baffle 1 comprises a rectangular first baffle portion 4 and a rectangular second baffle portion 5.

[0014] Figure 8 shows an embodiment of the baffle 1 which has three overlapping baffle portions 4, 5, 6 to span between the opposite sidewall parts of a large diameter sump 2.

[0015] Referring to Figure 2, the first baffle portion 4 and the second baffle portion 5 have a first side I and a second side II, and the second side is the opposite side in relation to the first side. In the following description the terms "vertical", "horizontal", "upper" and "lower" should be understood in reference to the orientation of the implementations shown in the drawings. The vertical fixing flange 9 of the first baffle portion 4 is directed towards the first side I and the vertical fixing flange 9 of the second baffle portion 5 is directed to the second side II. The stiffening flange 14 of the first baffle portion 4, which is disposed at the edge that is parallel in relation to the vertical fixing flange 9 of the first baffle portion, is directed to the second side II.

The stiffening flange 18 of the second baffle portion 5, which is disposed at the edge that is parallel in relation to the vertical fixing flange 9 of the second baffle portion 5, is directed to the first side I. The stiffening flange 12, which is at the horizontal lower edge of the first baffle portion 4, is directed to the first side I. The stiffening flange 16, which is at the horizontal lower edge of the second baffle portion 5, is directed to the first side I. The stiffening flange 13, which is at the horizontal upper edge of the first baffle portion 4, is directed to the first side I. The stiffening flange 17, which is at the horizontal upper edge of the second baffle portion 5, is directed to the first side I.

[0016] According to the invention, the inner distance H1 between the lower and upper stiffening flanges 12 and 13 of the first baffle portion 4 is larger than the outer distance H2 of the lower and upper stiffening flanges 16 and 17 of the second baffle portion 5.

[0017] Referring to Figure 3, this dimensioning enables stacking of the baffle portions 4, 5 so that the planar portions having openings 3 are closely in relation to each other to form a compact package suitable for warehousing and delivery.

[0018] The stiffening flanges 12 and 16 at the lower edges of the baffle portions 4, 5 also have an ability to restrain the flow of the stormwater in the sump, when in use.

[0019] Figure 9 shows that for the installation of the baffle in an existing stormwater sump 2 bolt holes are drilled to the sidewall of the sump 2. The first baffle portion 4 is connected by first bolted joints A to the sidewall in vertical orientation at a suitable height from the bottom of the sump and substantially at the center, or offset from the centerline, of the sump, as shown in Figures 6 or 7. The baffle 1 should be oriented such that a centerline of the inlet conduit intersects a major plane of the baffle at a point above the bottom of the baffle. After the first baffle portion 4 has been installed, the second baffle portion 5 is connected likewise to the opposite sidewall by first bolted joints A. Finally, the first and second baffle portions 4, 5 are connected to each other by second bolted joints B located at the overlapping parts of the baffle portions, as shown in Figures 10 and 11. As can also be seen in Figure 2, the baffle portions 4 and 5 comprise bolt holes 20 and horizontal slots 21 which have been made near to the vertical edges of the baffle portions 4, 5 and which bolt holes 20 and slots 21 are aligned to enable the bolted joints B.

[0020] The baffle portions 4, 5 may be made from a variety of materials, such as steel, aluminum or plastics. The shown examples of the baffles 1 are designed to be made of plastics. The wall thickness of the baffle made of plastics is between 5 to 15 mm. The weight of the baffle 1 is less than 5 kg. The light weight of the baffle makes it easy to handle during installation.

[0021] It is obvious to a person skilled in the art that with the advancement of technology, the basic idea of the invention may be implemented in various ways. The invention and its embodiments are thus not limited to the examples described above, instead they may vary within the scope of the claims.

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US8715507B [0002]
- US8663466B [0002] [0002]
- US20120255622A [0002] [0002]

PATENTKRAV

1. En regnvandsafløbsbaffle (1) til anbringelse i en gennemstrømningsregnvandssump (2) eller et kammer til forstyrning af en regnvandstrømningsbane, hvor bafflen har et antal åbninger (3) fordelt over området af bafflen, der omfatter mindst to baffledele (4, 5, 6) forbundet med hinanden, hvor baffledelene (4, 5, 6) er anbragt tæt på og i overlejret forhold til hinanden, således at baffledelene overlapper hinanden og er justerbart forbundet til hinanden for at justere bredden (W_{tot}) af bafflen (1); og hvor i det mindste de yderste baffledele af bafflen (1) omfatter fastgørelsesorganer (7, 8), som er monolitiske med baffledelene (4, 5) og er indrettet til fastgørelse af bafflen (1) til den indvendige side af sumpen eller kammeret, hvor baffledelene (4, 5, 6) omfatter kanter og afstivningsorganer (11, 12, 13, 14; 15, 16, 17, 18), som er placeret ved kanterne, hvor afstivningsorganerne (11, 12, 13, 14; 15, 16, 17, 18) er afstivningsflanger, der er monolitiske med baffledelene (4, 5, 6), hvor bafflen (1) omfatter en rektangulær første baffledel (4) og en rektangulær sekundær baffledel (5), hvor den første baffledel (4) og den sekundære baffledel (5) har en første side (I) og en sekundær side (II), og den sekundære side er den modsatte side i forhold til den første side,
kendetegnet ved, at de nederste og øverste afstivningsflanger (12, 13; 16, 17) af baffledelene er rettet mod den første side (I), og at den indre afstand (H1) mellem nedre og øvre afstivningsflanger (12, 13) af den første baffledel (4) er større end den ydre afstand (H2) af de nedre og øvre afstivningsflanger (16, 17) af den sekundære baffledel (5).
2. Bafflen ifølge krav 1, **kendetegnet ved**, at fastgørelsesorganerne (7, 8) omfatter en fastgørelsesflange (9) med mindst et bolthul (10) til en første boltsamling (A).
3. Bafflen ifølge krav 1 eller 2, **kendetegnet ved**, at baffledelene (4, 5, 6) i det væsentlige er plane.
4. Bafflen ifølge ethvert af kravene 1 til 3, **kendetegnet ved**, at afstivningsorganerne (11, 12, 13, 14; 15, 16, 17, 18) er afstivningsflanger, som er bøjet i en vinkel i forhold til planet af baffledelene (4, 5, 6).
5. Bafflen ifølge krav 4, **kendetegnet ved**, at afstivningsflangerne (11, 12, 13, 14; 15, 16, 17, 18) er bøjet i ret vinkel i forhold til planet af baffledelene (4, 5, 6).

6. Bafflen ifølge krav 2, **kendetegnet ved**, at fastgørelsesflangen (9) er en afstivningsflange (11, 15).
- 5 7. Bafflen ifølge ethvert af kravene 1 til 6, **kendetegnet ved**, at hver baffledel (4, 5, 6) har en bredde (w), der er mindre end diameteren (D) af mandehullet (19) på regnvands-
sumpen (2), i hvilken bafflen (1) skal installeres.
- 10 8. Bafflen ifølge krav 7, **kendetegnet ved**, at bredden (w) af hver baffledel (4, 5, 6) er mindre end 600 mm.
- 15 9. Bafflen ifølge krav 1, **kendetegnet ved**, at den lodrette fastgørelsesflange (9) af den første baffledel (4) er rettet mod den første side (I), og den lodrette fastgørelsesflange (9) af den sekundære baffledel (5) er rettet mod den sekundære side (II).
- 20 10. Bafflen ifølge krav 1, **kendetegnet ved**, at afstivningsflangen (14) af den første baffledel (4), der er anbragt ved kanten, der er parallel i forhold til den lodrette fastgørelsesflange (9) af den første baffledel, er rettet mod den sekundære side (II).
- 25 11. Bafflen ifølge krav 1, **kendetegnet ved**, at afstivningsflangen (18) af den sekundære baffledel (5), der er anbragt ved kanten, der er parallel i forhold til den lodrette fastgørelsesflange (9) af den sekundære baffledel (5), er rettet mod den første side (I).
- 30 12. Bafflen ifølge krav 1, **kendetegnet ved**, at baffledelene (4, 5) er forbundet med hinanden ved hjælp af en sekundær boltsamling (B).
13. Bafflen ifølge krav 1, **kendetegnet ved**, at baffledelene (4, 5, 6) er fremstillet af plast.
14. Bafflen ifølge krav 13, **kendetegnet ved**, at baffledelene har en vægtykkelse på 5 - 15 mm.

DRAWINGS

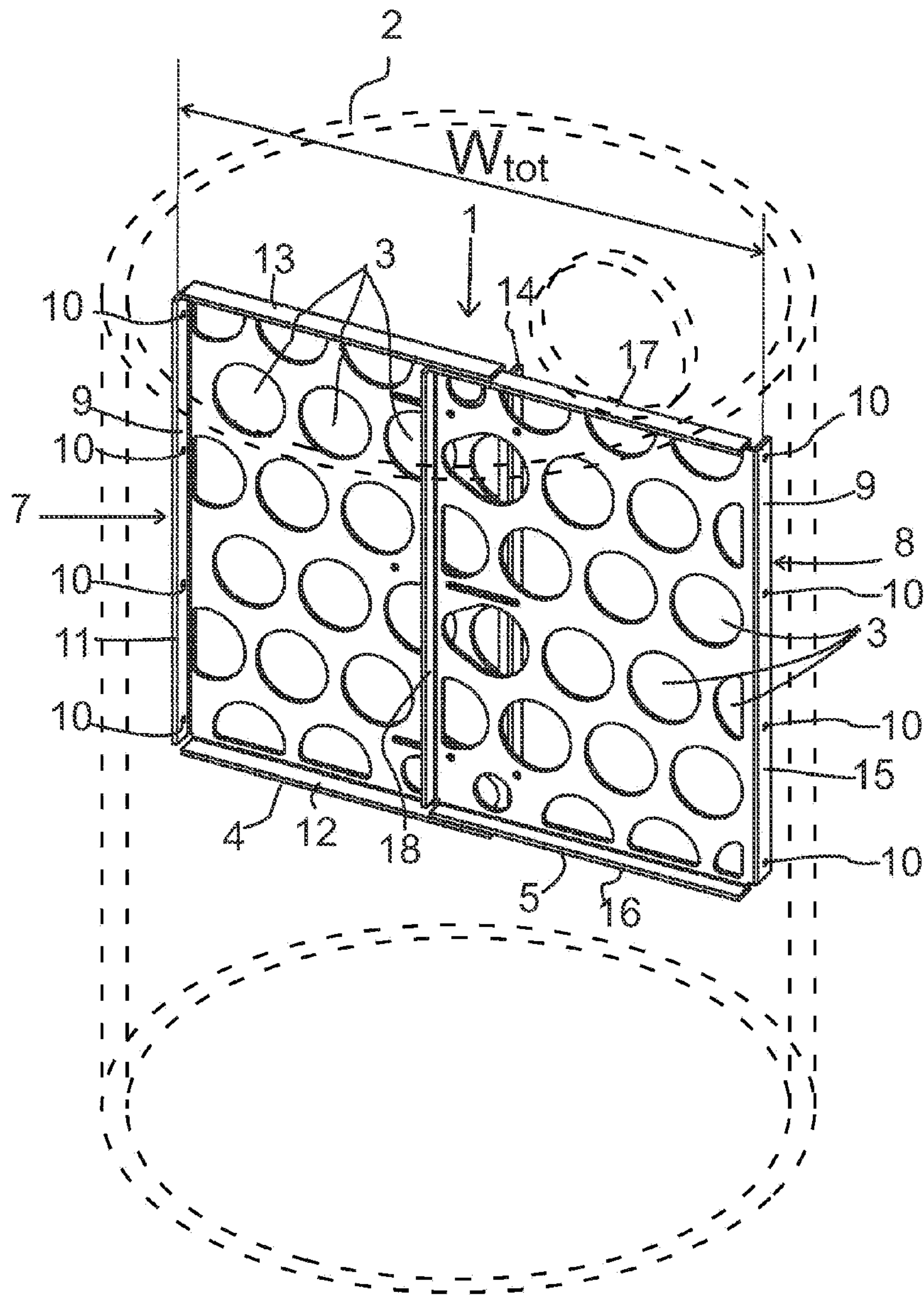
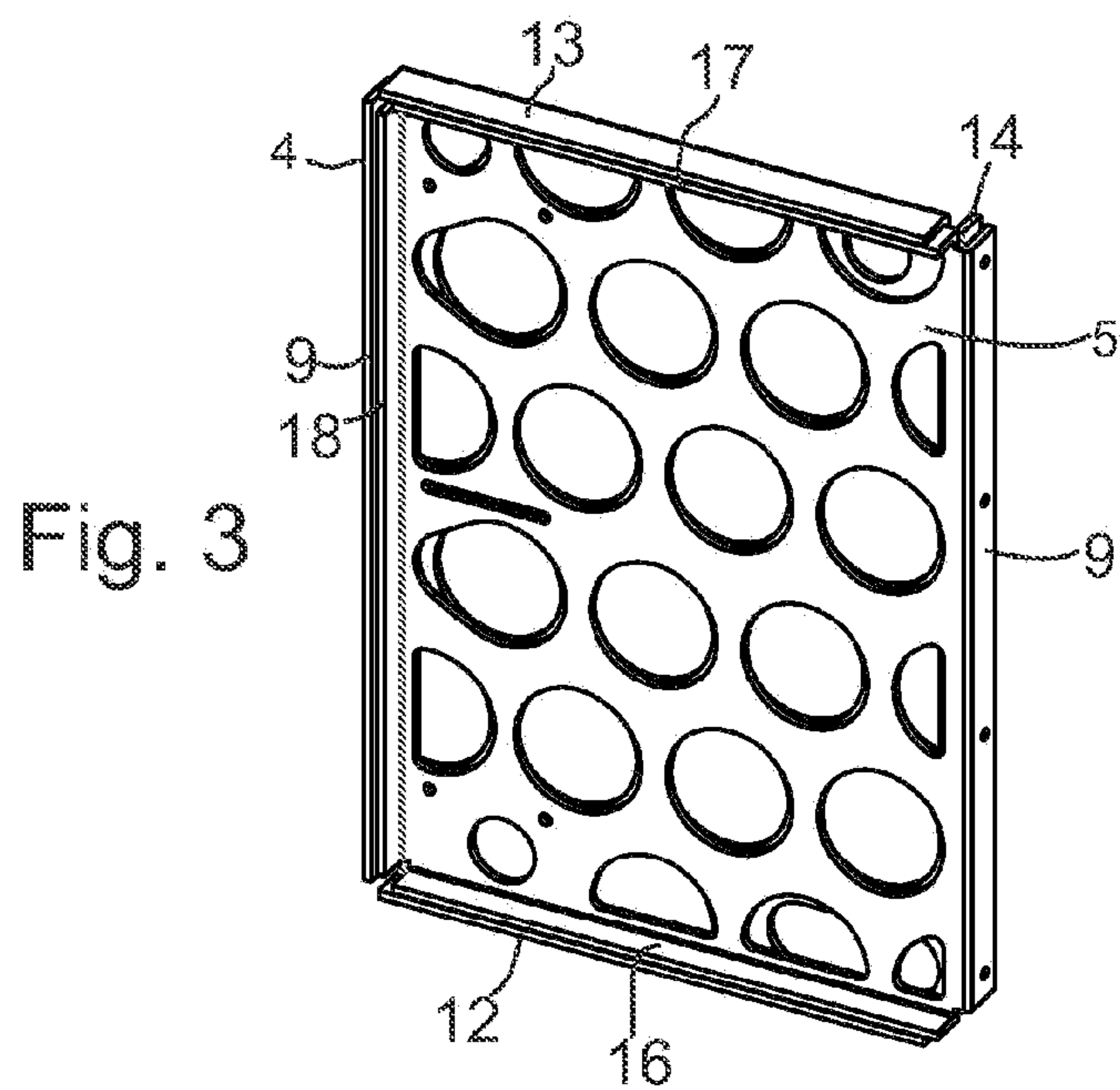
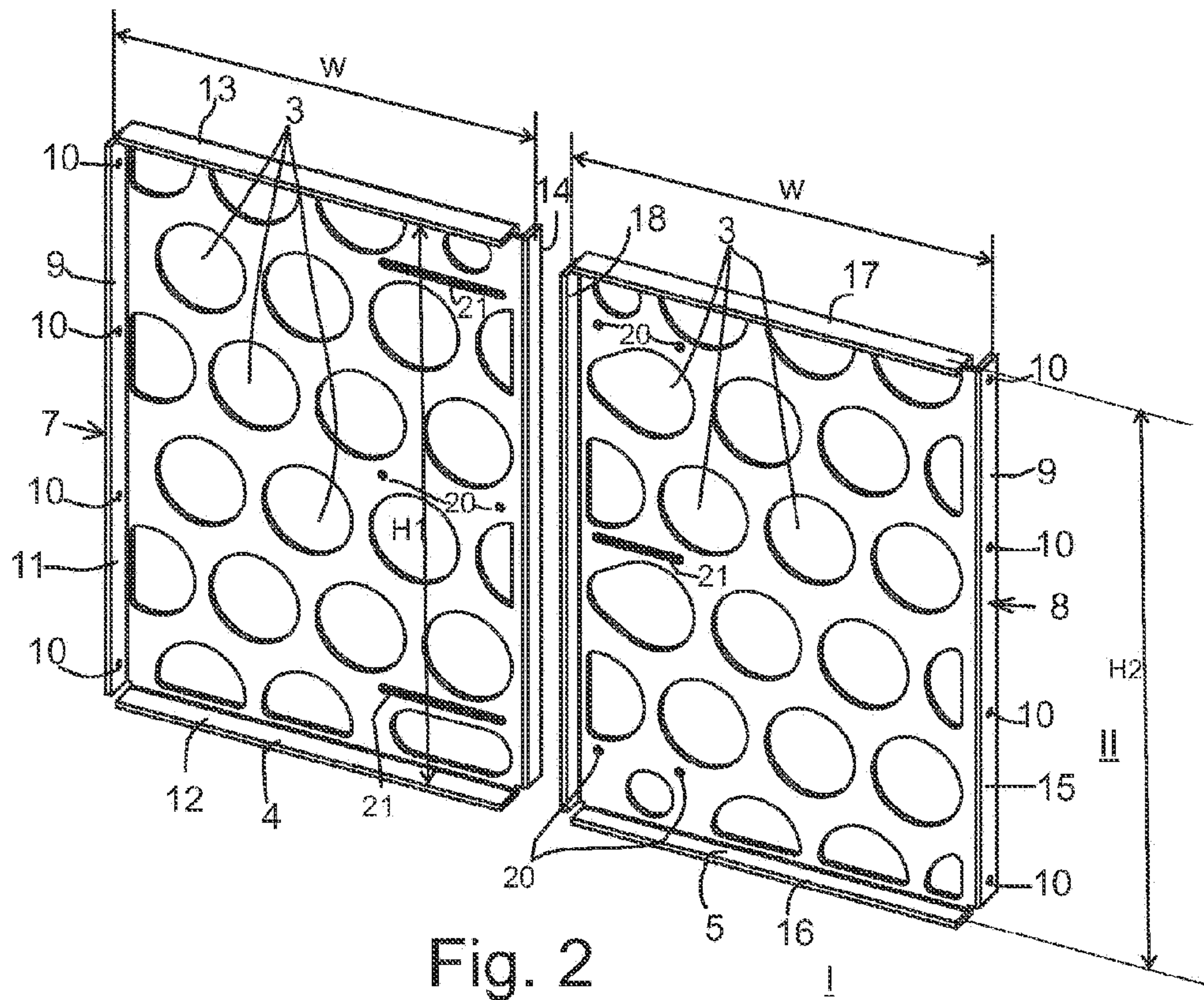


Fig. 1



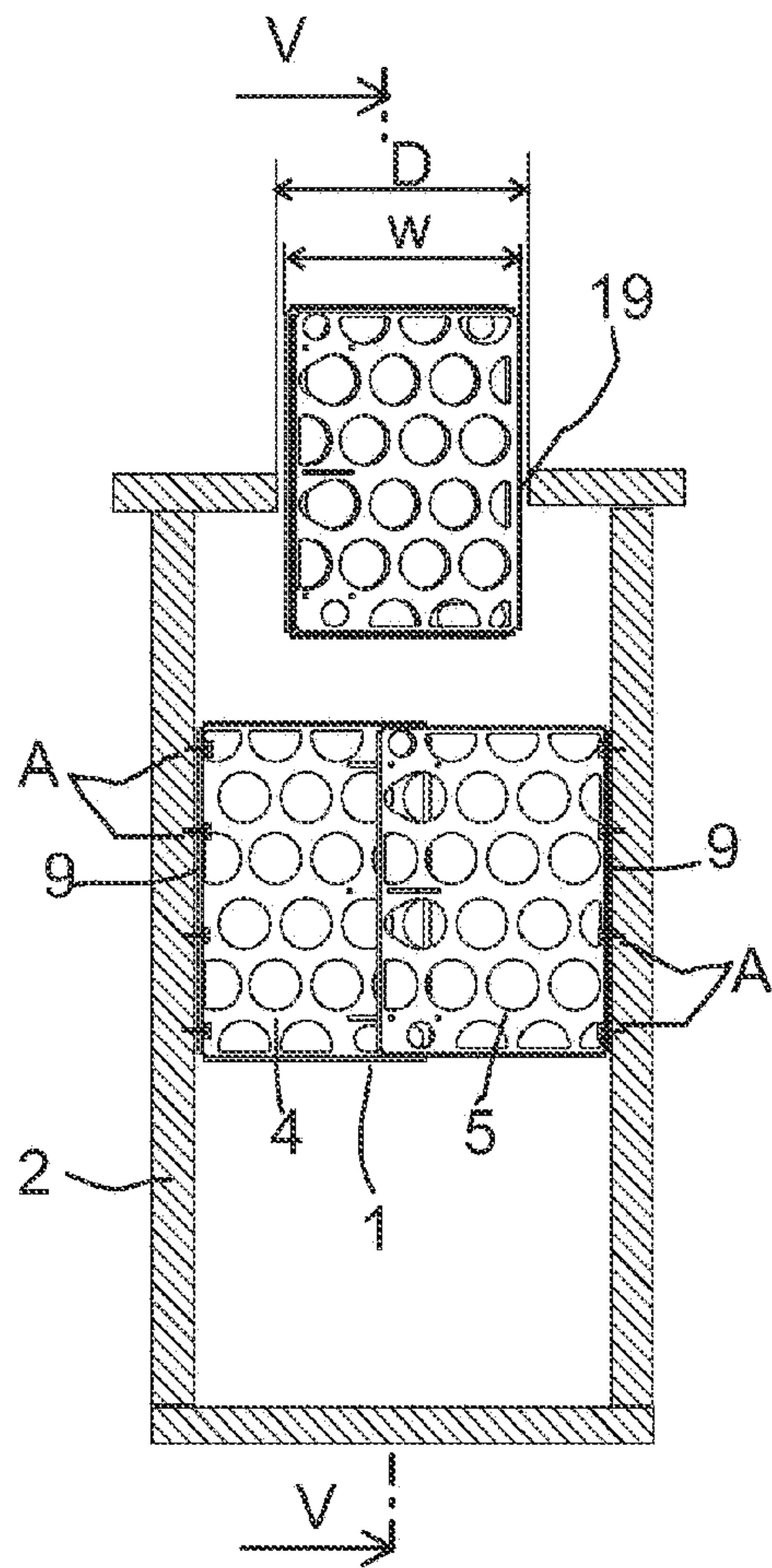


Fig. 4

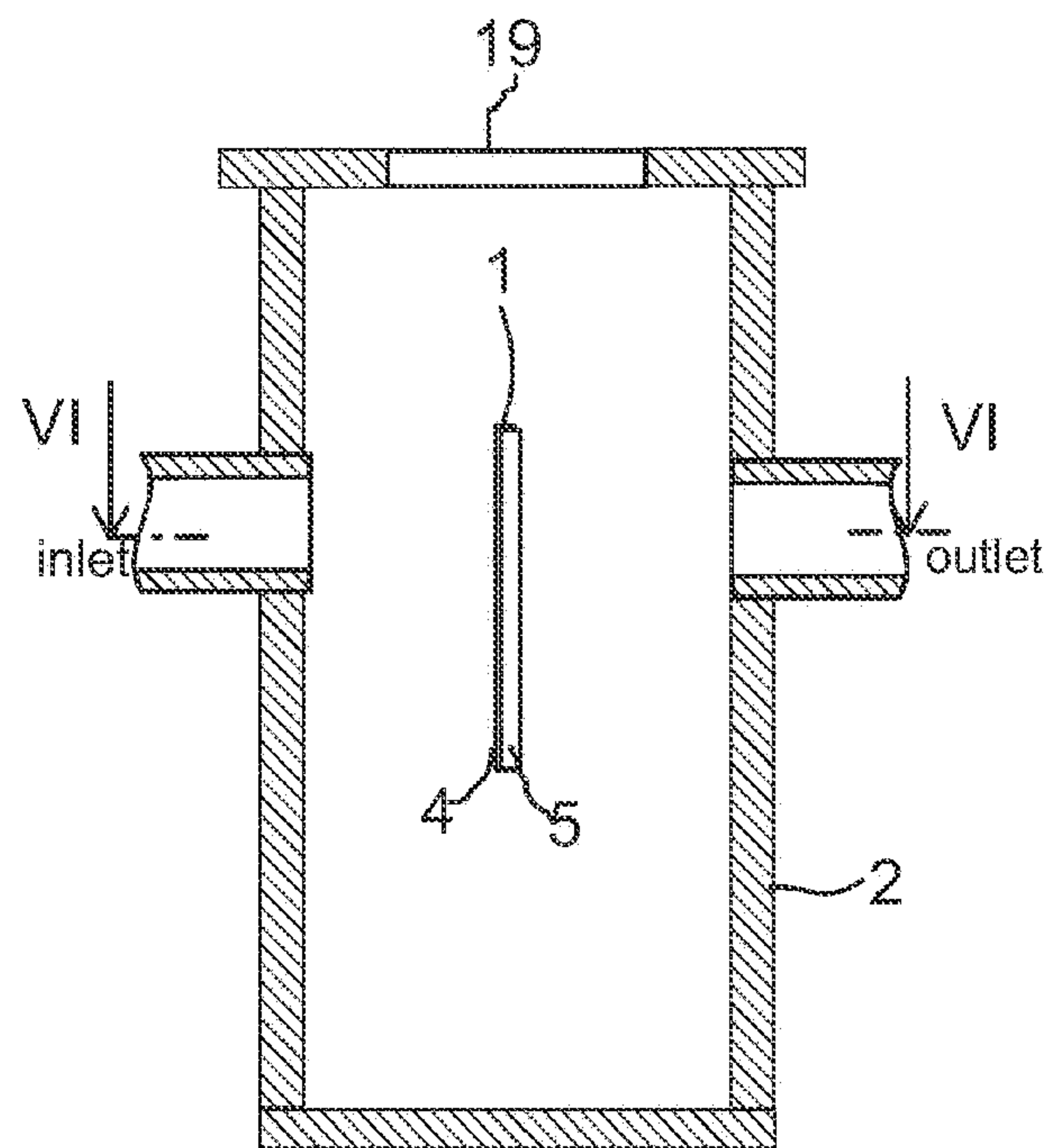


Fig. 5

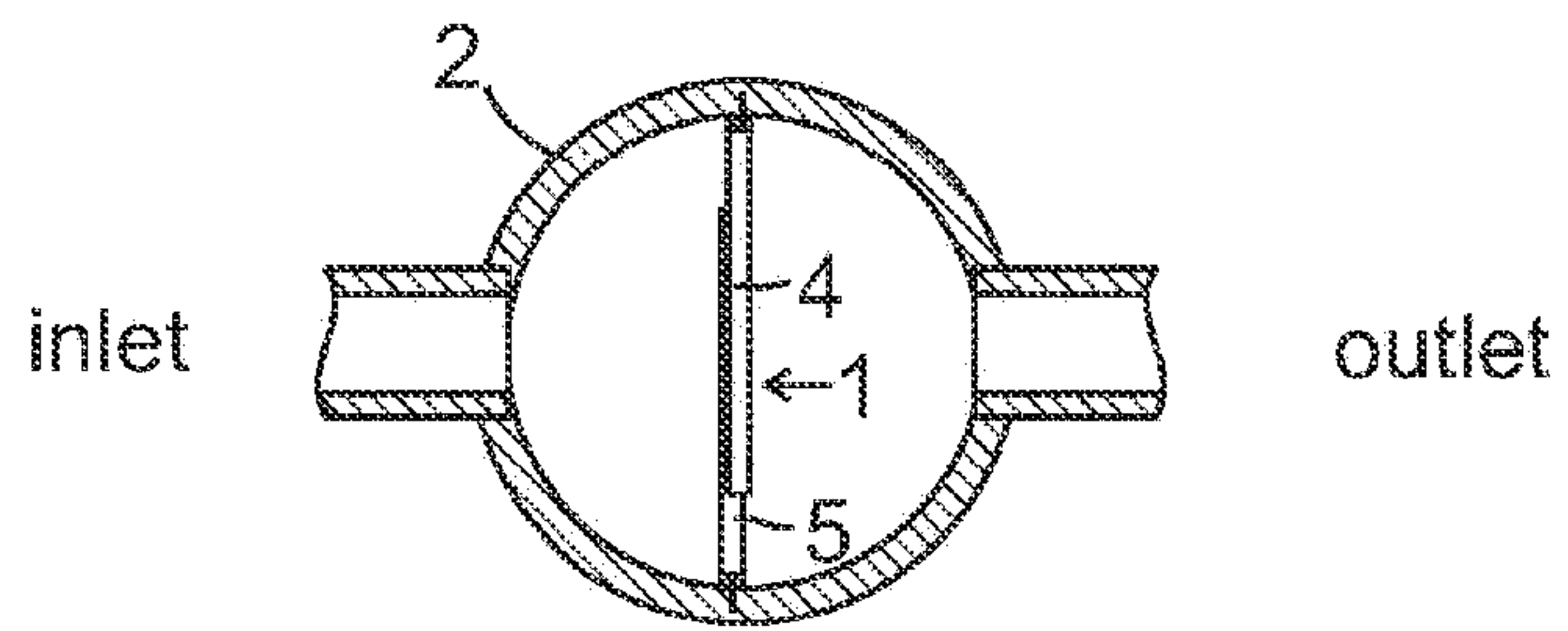


Fig. 6

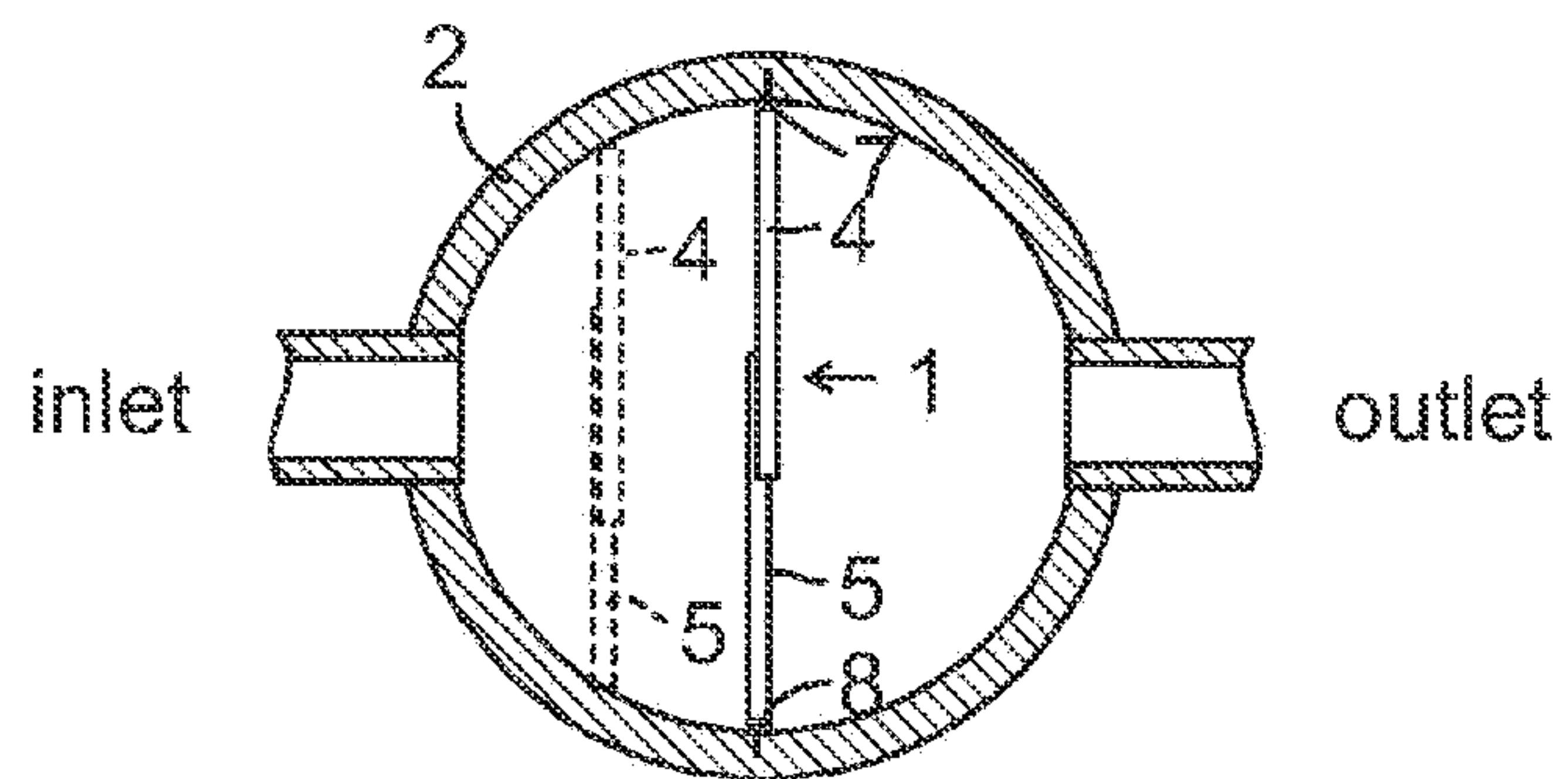


Fig. 7

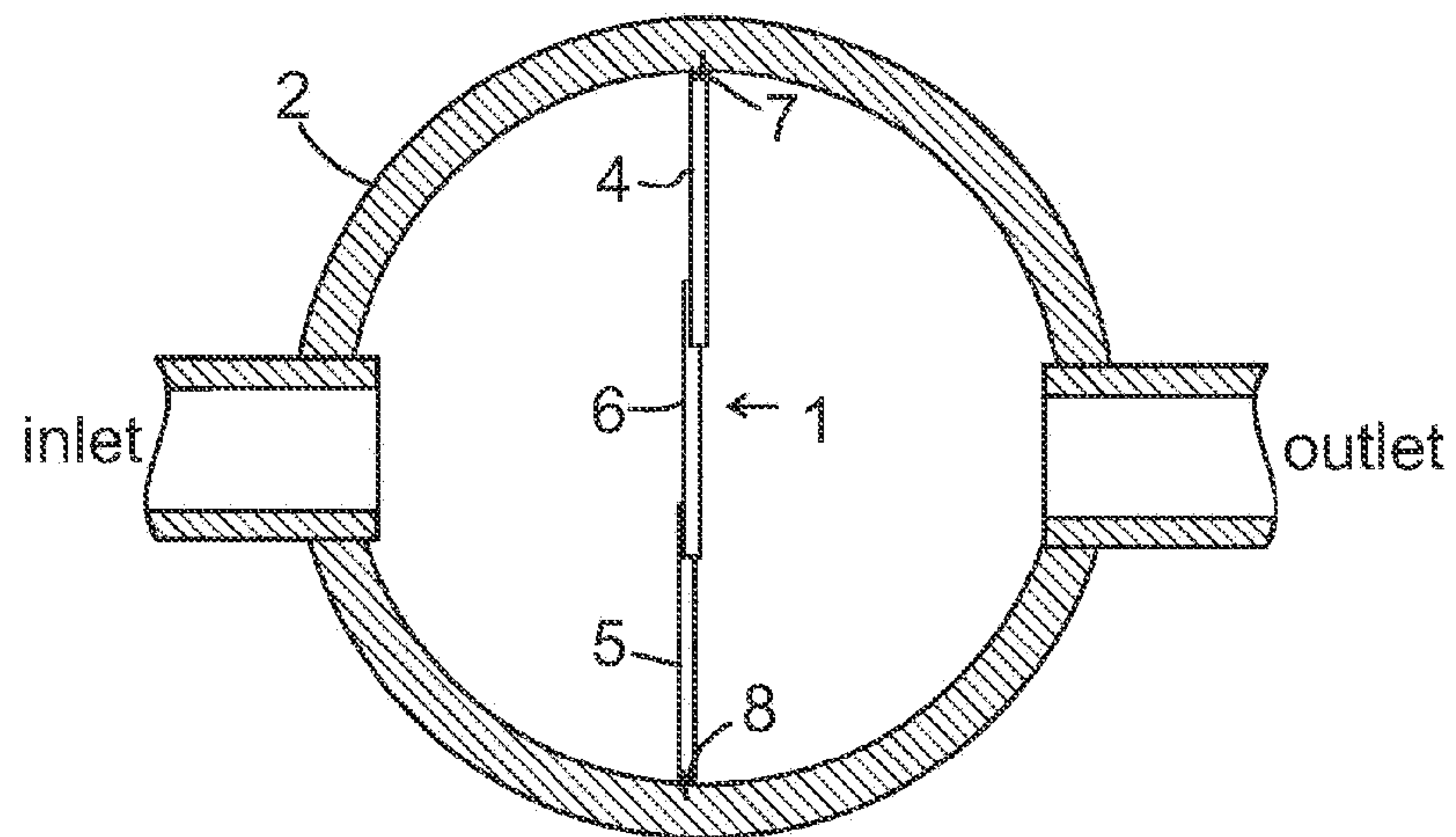


Fig. 8

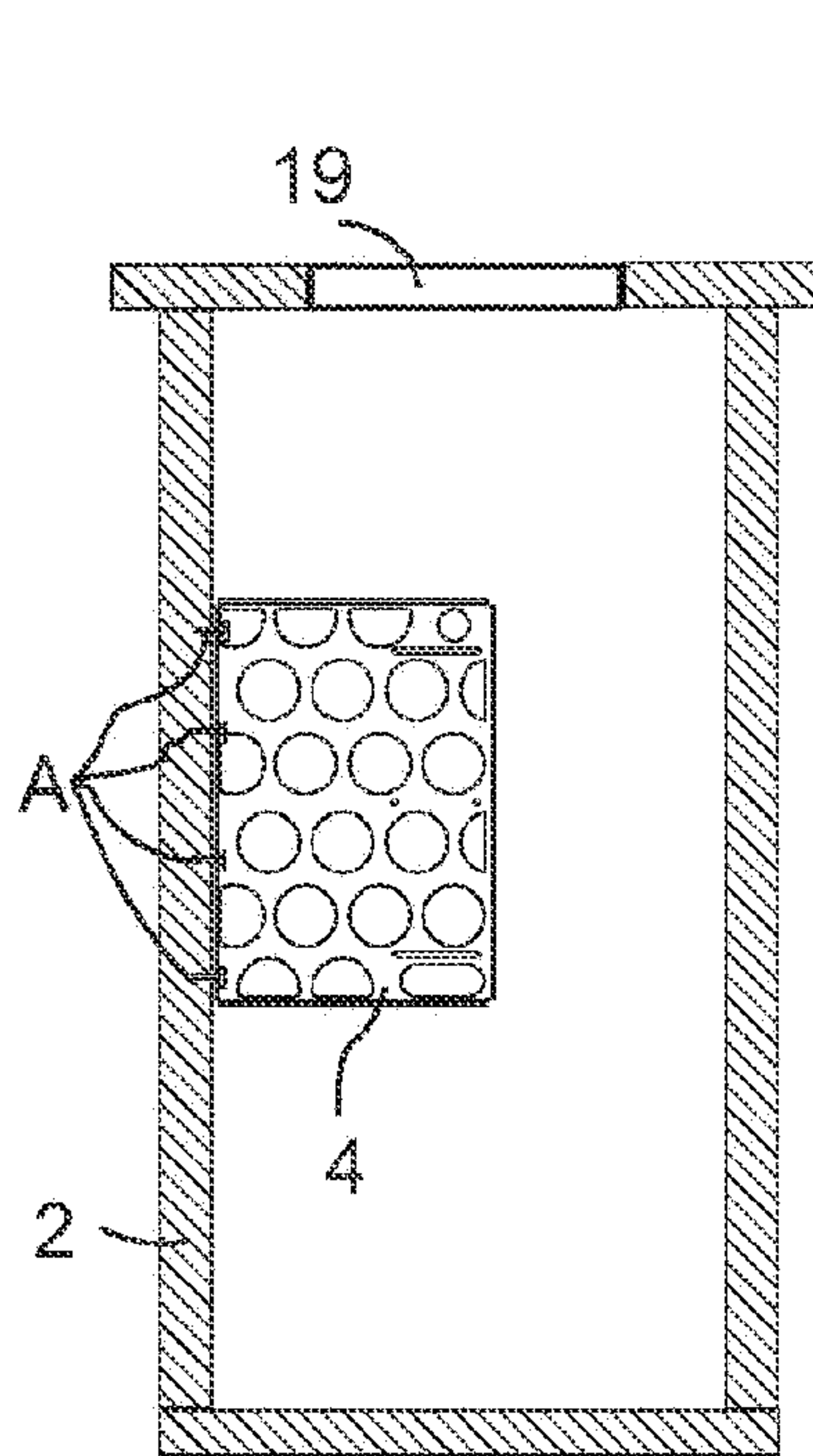


Fig. 9

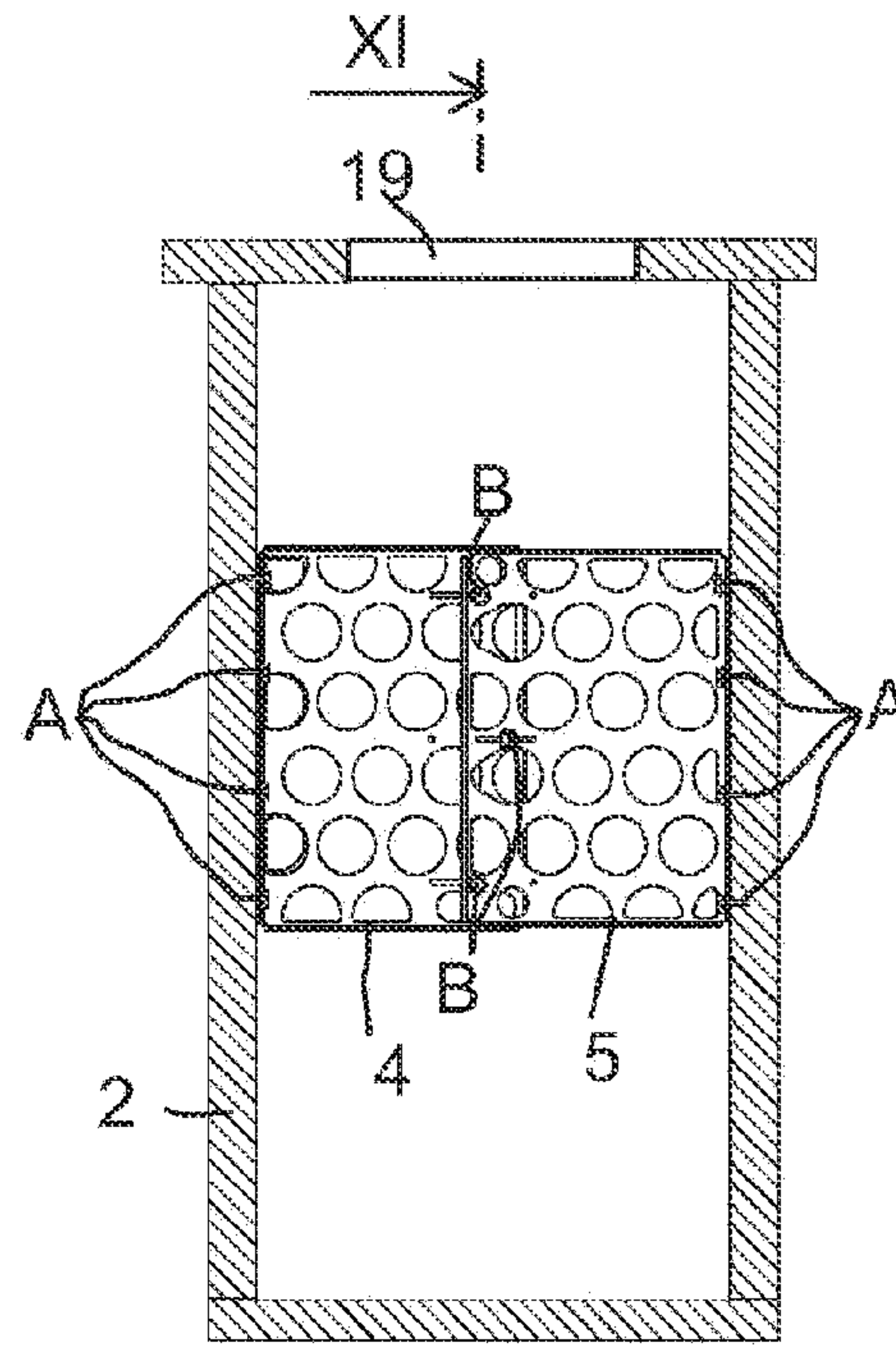


Fig. 10

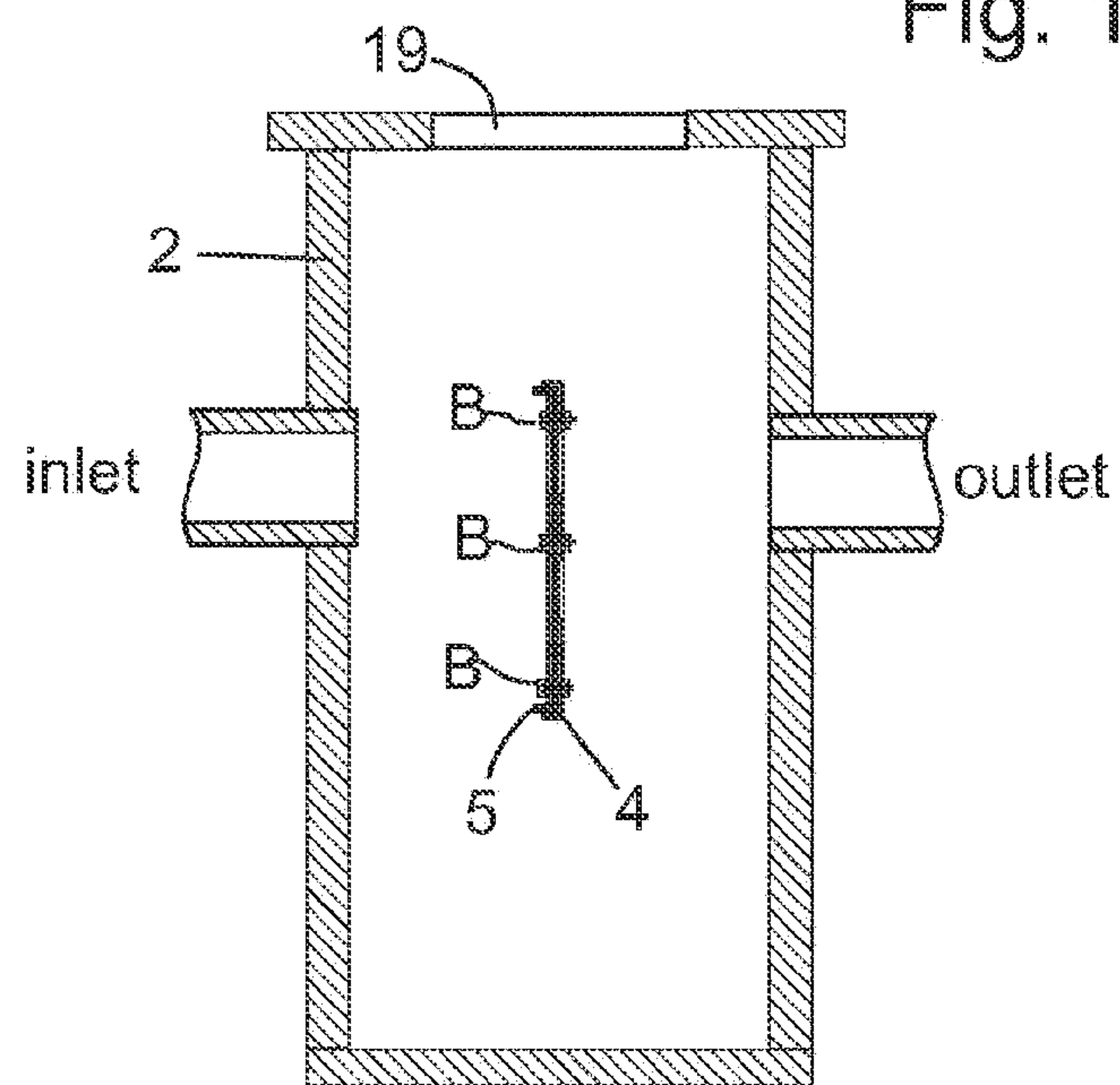


Fig. 11