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(54) Shower with fan-like jets

(57) A shower (1) of a shower unit, including a shower body (2), a plate (8) with at least one hole from which a water jet emerges, and means for conveying water to the said holes. The said means of conveyance include injector means capable of widening in one direction and narrowing in another direction the flow of water conveyed to the said hole, forming it into a blade or waterfall shape or into the form of a cross.

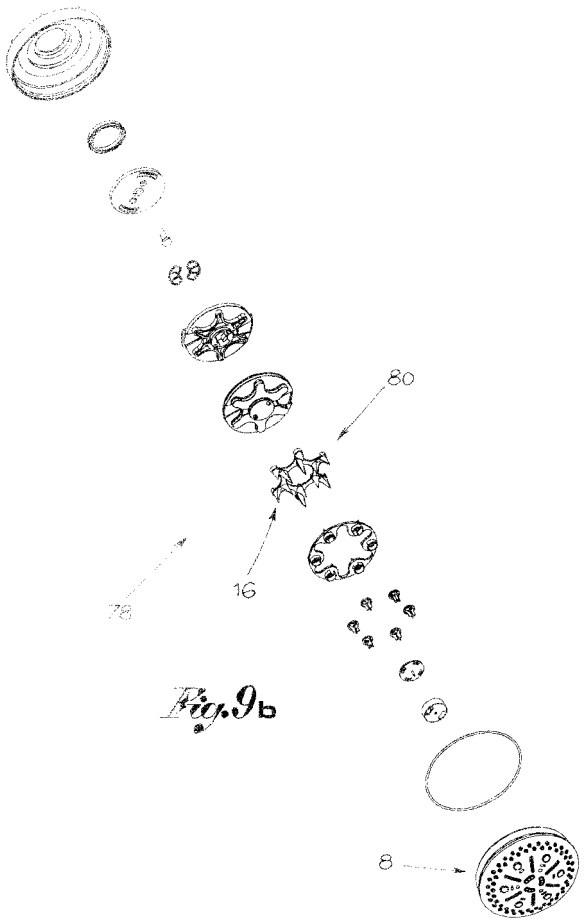

Fig.9b

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Description

[0001] . The subject of this invention is a shower of a shower unit.

[0002] . Generally a shower consists of a shower body terminating in a cartridge diffuser including a plate with a plurality of holes such as to make the water emerge in the form of numerous separate jets.

[0003] . There are numerous well known solutions today for showers created as described above. One example is shown, purely indicatively, in the document EP 1038585 of the Applicant.

[0004] . With view above all to rendering more pleasant the contact between water jets and the human body, certain well known solutions have the plate supplied with holes of special forms and layouts.

[0005] . Other solutions include a shower with elements of the cartridge that are capable of modifying the form of the jet in accordance with requirements.

[0006] . For example, one solution of this type is described in the document US-2002-170984.

[0007] . Nevertheless these solutions, though they permit effective modification of the traditional, substantially cylindrical form of a jet of water, do not effectively produce a jet in the desired form.

[0008] . These jets in fact evince the natural tendency to get progressively narrower from the exit hole downwards.

[0009] . The purpose of this invention is to create the shower of a shower unit which makes the jet or jets take on the form desired, in particular a blade or waterfall form.

[0010] . This purpose is achieved with a shower in accordance with claim 1 below. The claims dependent thereon describe embodiments.

[0011] . The features and advantages of the shower as per this invention will be clear from the description below, which is given as an example and is not limitative, in accordance with the attached figures in which:

[0012] . - figure 1 shows a three-dimensional view of a shower in accordance with one form of implementation;

[0013] . - figures 2a to 2e represent plan or sectioned views of a blade jet cartridge;

[0014] . - figure 2f shows a three-dimensional view of the blade jet cartridge of figures 2a to 2e;

[0015] . - figures 3a to 3e represent plan or sectioned views of an injector holder bush;

[0016] . - figures 3f and 3g show three-dimensional views of the bush in figures 3a to 3e;

[0017] . - figures 4a to 4d represent plan or sectioned views of an injector element;

[0018] . - figure 4e shows a three-dimensional view of the injector element in figures 4a to 4d;

[0019] . - figures 5a to 5d represent plan or sectioned views of a cartridge for cross jet;

[0020] . - figure 5e shows a three-dimensional view of the cross jet cartridge in figures 5a to 5d;

[0021] . - figures 6a to 6d represent plan or sectioned views of an injector holder bush for cross jet;

[0022] . - figure 6e shows a three-dimensional view of the bush in figures 6a to 6d;

[0023] . - figures 7a to 7d represent plan or sectioned views of an injector element for cross jet;

[0024] . - figures 7e and 7f show three-dimensional views of the injector element in figures 7a to 7d;

[0025] . - figure 8 shows a three-dimensional separate part view of a multijet diffuser cartridge for a shower in accordance with a further form of implementation;

[0026] . - figures 9a and 9b represent three-dimensional separate part views of a multijet diffuser cartridge for a shower in accordance with another further form of implementation, and

[0027] . - figure 9c shows a three-dimensional view of a plate of the diffuser in figures 9a and 9b.

[0028] . In accordance with the attached figures: figure 1 indicates, overall, a shower as per this invention.

[0029] . The said shower 1 consists of a shower body 2 suitable for being passed through by a main flow of water.

[0030] . The said shower body extends between a first extremity 4, operatively connected to a water supply device, and a second extremity 6 from which at least one jet of water emerges.

[0031] . Moreover the said shower includes a plate 8, placed in correspondence to the said second extremity 6 of shower body 2, supplied with at least one hole from which the said jet of water emerges.

[0032] . In accordance with a preferred implementation the said plate 8 has holes of different shape.

[0033] . In particular, the said plate 8 has at least one elongated hole 10a, which is to say a hole in the form of a slit.

[0034] . In a variant, the said plate has at least one circular hole 10b.

[0035] . Plate 8 encloses a chamber internal to shower body 2.

[0036] . Furthermore, shower 1 includes means of conveying water, set in the said chamber of shower body 2, suitable for conveying at least a part of the main water flow to the said elongated holes 10a.

[0037] . The said means of water conveyance include injector means suitable for widening and narrowing the said portion of the water flow conveyed to the said hole 10a giving it a blade or waterfall form.

[0038] . In a preferred implementation the said injector means include a hollow cartridge for blade jet 14 (figures 2a to 2f).

[0039] . The blade jet cartridge 14 is substantially cylindrical, developed along a cartridge axis X-X which is substantially rectilinear.

[0040] . In normal assembly of shower 1, cartridge 14 is passed through by at least a part of the main water flow, in the direction shown by the arrows in figures 2c and 2e.

[0041] . The said cartridge 14 is internally shaped in such a way as to envisage a first transversal section, obtained from the section with a first plane of section on

which the said axis X-X lies, with a filler profile which narrows in the direction of water flow (figure 2c).

[0042] . Furthermore, the said cartridge 14 has a further transversal section, perpendicular to the first, obtained with a second plane of section, perpendicular to the first, with a filler profile that widens in the direction of water flow towards the plate hole (figure 2e).

[0043] . In other words, the part of the main water flow passing through cartridge 14 undergoes narrowing on the one hand and widening on the other, thus forming the said portion of flow into a blade or waterfall jet.

[0044] . A further form of implementation envisages the said injector means, including an injector element for blade jet 16 suitable for housing in an injector holder bush for blade jet 18 (figures 3a to 4e).

[0045] . The said bush for blade jet 18, substantially cylindrical around bush axis Y-Y, includes housing 20 suitable to house the said injector element 16 and terminates with slit aperture 22.

[0046] . Injector element 16 includes base perforated disc 24 from which two substantially pyramid shaped projections protrude, which is to say tapering in the direction of water flow.

[0047] . The two projections 26 are set in diametrically opposed position.

[0048] . In particular, the said projections 26 have facing surfaces 28, preferably curved, which diverge reciprocally in the direction of water flow.

[0049] . Coupling the said injector element 16 and the said injector holder bush 18, within the said bush a chamber is created which has a first transversal section, obtained from the section with a first plane of section on which the said bush axis Y-Y lies, with a filler profile which narrows in the direction of water flow to the hole in the plate.

[0050] . Furthermore, this chamber has a further transversal section, obtained with a second plane of section, perpendicular to the first, with a filler profile that widens in the direction of water flow.

[0051] . In other words, the part of the water flow penetrating the chamber undergoes narrowing on the one hand and widening on the other, thus forming a blade or waterfall jet.

[0052] . In another further form of implementation the said injector means include cross jet cartridge 50 with a pair of slits on the bottom 52a, 52b which intersect in the form of a cross (figures 5a to 5e).

[0053] . Cross jet cartridge 50 has a substantially cylindrical configuration and develops chiefly around a cross cartridge axis Z-Z.

[0054] . Cross jet cartridge 50 has a transversal section, obtained with a second plane of section on which the said cross cartridge axis Z-Z lies, with a filler profile that widens in the direction of water flow to one of the said slits 52a (figure 5d).

[0055] . Cross jet cartridge 50 also includes a pair of convergent facing walls 54 which, in the direction of water flow, converge towards the said slit 52a.

[0056] . The said convergent walls 54 each have an undercut 56 so that, on a second plane of section, perpendicular to the said first plane of section, the cross cartridge 50 has a transversal section once more with a filler profile that widens in the direction of water flow towards the other of the said slits, 52b.

[0057] . In other words, the part of the main water flow passing through cartridge 50 undergoes narrowing along two directions and widening along two directions, thus forming the said portion of flow into a cross in which each arm of the cross is blade or waterfall shaped.

[0058] . In a further preferred implementation, the said injector means include cross jet bush 60 and an injector element for cross jet 62 (figures 6a to 7f).

[0059] . Cross bush 60 is substantially cylindrical and developed chiefly along cross bush axis W-W. On the bottom of the said bush there are a pair of slits 64a, 64b which intersect in the form of a cross.

[0060] . Furthermore, bush 60 includes housing 66 to house the said cross injector element 62. The said housing is cruciform with two arms intersecting preferably perpendicularly.

[0061] . The configuration of each arm of the cross traces that of the housing of the blade jet injector holder bush 18 described above.

[0062] . The cross injector element 62 consists of a perforated disc 68 from which project two pairs of projections 70 which face each other. Preferably the said pairs of projections are set on reciprocally perpendicular planes.

[0063] . Each pair of projections 70 traces the configuration described for the injector element 16 described above.

[0064] . Coupling the said cross injector element 62 with the said cross bush 60, within the said bush a cross chamber is created with two arms, each arm with a conformation tracing the one described above of the chamber obtained by coupling the blade jet injector element 16 and the blade jet injector holder bush 18.

[0065] . In other words, the part of the main water flow reaching cross injector element 62 undergoes narrowing along two directions and widening along two different directions, thus forming the said portion of flow into a cross in which each arm of the cross has a blade or waterfall configuration.

[0066] . In a further implementation the said shower includes a multiplicity of blade jet injector elements 16 coupled with a respective multiplicity of blade jet injector holder bushes 18, which is to say a multiplicity of blade jet cartridges 14.

[0067] . In another further implementation the said shower includes a multiplicity of cross injector elements 62 coupled with a respective multiplicity of cross jet injector holder bushes 60, which is to say a multiplicity of cross jet cartridges 50.

[0068] . In accordance with one form of implementation the said shower 1 consists of a cartridge diffuser 78 including a system for blade or waterfall jets 79.

[0069] . The said system for blade or waterfall jets 79 includes a ring of injectors 80 which can be coupled with a ring of injector holder bushes 82 (figure 8).

[0070] . The said ring of injectors 80 includes a connection portion 84 to which a multiplicity of injector elements are connected 16.

[0071] . The said ring of injector holder bushes includes a connection portion 86 to which a multiplicity of injector holder elements are connected 88.

[0072] . Each injector holder element 88 has a slit 90 on the bottom and walls converging towards the said slit in the direction of the water flow.

[0073] . Each coupling of an injector element 16 with its respective injector holder 88 produces a blade or waterfall jet.

[0074] . The said shower preferably includes a system 100 suitable for separating the main flow into cylindrical jets.

[0075] . The said shower preferably includes moreover the means 110 of diverting or partially shutting the main flow so it reaches the said blade jet system 79 or the said cylindrical jet system 100.

[0076] . In accordance with a preferred form of implementation the said shower 1 includes a cartridge diffuser 78 with injector holder elements incorporated in plate 8 (figures 9a, 9b and 9c).

[0077] . In other words, in the said preferred implementation the ring of injectors 80, including a plurality of injector elements 16, can be housed in a ring housing 120, directly obtained from the plate 8, including a plurality of housings for injector elements 122.

[0078] . The said housings for injector elements 122 reflect the structure described above for the said housing 20 of the injector holder bush for blade jet 18.

[0079] . Preferably the said housings for injector elements 122 are set in sunburst fashion, which is to say they extend in a prevalently radial direction with regard to the centre of plate 8.

[0080] . Preferably the said plate 8 also includes housing for further means suitable for creating jets of the desired form.

[0081] . For example, the said plate 8 includes a housing 124 for means suitable for generating body massage jets. This housing is preferably concentric to the ring housing 120 and internal thereto.

[0082] . In a further variation the said plate 8 includes housing 128 for means suitable for generating aerated jets. This housing is preferably concentric to ring housing 120 and external thereto and includes a plurality of substantially cylindrical conduits 129.

[0083] . The said housing for the said further means is, moreover, preferably separated from the said ring housing 120 by a dividing wall.

[0084] . In particular, the said housing 124 for means suitable for generating body massage jets is separated by the said ring housing 120 by a first dividing wall 126, substantially cylindrical.

[0085] . The said housing 128 for means suitable for generating aerated jets is separated from the said ring housing 120 by a second dividing wall 130, star shaped in such a way as to simultaneously brush, with a smoothing effect, seven housings for injector elements 122 and the said conduits 129 of the means suitable for generating aerated jets.

[0086] . In normal functioning of the shower the main water flow passing through the shower body reaches the said injector means in full or in part.

[0087] . This flow is then modelled by the conformation of the chamber of the cartridge or the chamber internal to the injector-bush or ring-housing system.

[0088] . In particular, the said flow is narrowed in one direction and widened in another and conveyed to an outlet in the form of a slit.

[0089] . This geometry of the conduits permits obtaining a blade or waterfall jet from the shower.

[0090] . In the same way the cross jet cartridge or the cross-bush injector element system produce a cross formed jet.

[0091] . Different combinations of these systems and of traditional cylindrical jets produce a shower with combinations of blade, cross and cylindrical jets and other forms of jet in accordance with tastes and requirements.

[0092] . Innovatively, the shower of the present invention produces a jet or jets in the desired form, in particular a blade or waterfall or cross form, or combinations thereof.

[0093] . A further advantage of the shower described above is the possibility of combining blade or waterfall, cross or circular jets as desired, in accordance with requirements, and to shut them off at will.

[0094] . A further advantageous aspect is the cartridge diffuser which is compact and integrates means for generating blade or waterfall jets and/or jets for massage and/or aerated jets.

[0095] . Clearly a sector technician, in order to satisfy contingent and specific needs, would be able to carry out numerous variants and modifications with regard to the shower described above.

[0096] . For example, in one variant the blade and cylindrical jet systems - or other conformations - are variously combined to obtain a shower with different configurations of the plate perforations.

[0097] . These variants should also be considered in the context of safeguarding as defined in the following claims.

Claims

1. Shower (1) of a shower unit, in which the said shower comprises:

   - a shower body (2) suitable for being passed through by a main flow of water, in which the said shower body extends between a first extremity 4, operatively connected to a water sup-

ply device, and a second extremity 6 from which at least one jet of water emerges;
- a plate (8) placed in correspondence to the said second extremity 6 of shower body 2, supplied with at least one hole from which the said jet of water emerges; the said plate closes a chamber within the shower body (2);
- means of conveying water which are set in this internal chamber of the shower body and are capable of conveying at least a part of the main flow to the said holes;

the said shower being **characterised by** the fact that the said conveying means include injector means (14;16,18;50;60,62;80,82;120) capable of widening in one direction and narrowing in another direction the said part of the water flow conveyed to the said hole, giving the jet a blade form.

2. Shower in accordance with claim 1 in which the said injector means comprise an injector body (14;16,18; 50;60,62;80,82), suitable for being passed through by the said portion of water flow and possessing an internal chamber with a slit opening from which the jet emerges; this slit opening has a longitudinal extension prevalent over its transversal extension.

3. Shower in accordance with claim 2, in which the said chamber is delimited by diverging walls in the direction of water flow up to the said longitudinal extension of the slit aperture.

4. Shower in accordance with claim 2 or 3, in which the said chamber is delimited by diverging walls in the direction of water flow up to the said transversal extension of the slit aperture.

5. Shower in accordance with any of the foregoing claims, in which the said injector means comprise a cartridge for blade jet (14) with a water inlet opening at the water inlet part.

6. Shower in accordance with claim 5, in which the said opening is circular.

7. Shower in accordance with any of the foregoing claims, in which the said injector means comprise an injector element for blade jet (16) and an injector holder bush for blade jet (18) suitable for housing the said injector element (16).

8. Shower in accordance with claim 7, in which the said injector element includes a perforated disc from which two substantially pyramid shaped projections protrude, which is to say tapering in the direction of water flow.

9. Shower in accordance with claim 8, in which the said projections have facing surfaces that diverge in the direction of water flow.

10. Shower in accordance with claim 9, in which the said facing surfaces are concave.

11. Shower in accordance with any of the preceding claims, in which the said injector means comprise a cartridge for cross jet (50) with a circular hole at the water inlet part.

12. Shower in accordance with any of the preceding claims, in which the said injector means comprise an injector element for cross jet (62) and an injector holder bush for cross jet (60), suitable for housing the said injector element (62).

13. Shower in accordance with claim 12, in which the said injector element (62) comprises a perforated disc from which two pairs of diametrically opposed substantially pyramid shaped projections protrude, which is to say tapering in the direction of water flow.

14. Shower in accordance with claim 13, in which the said projections have respectively facing surfaces which diverge in the direction of water flow.

15. Shower in accordance with claim 14, in which the said respectively facing surfaces are concave.

16. Shower in accordance with any of the preceding claims, in which the said injector means comprise an injector ring (80) and an injector holder bush ring (82) that can be coupled to the said injector ring (80).

17. Shower in accordance with claim 16, in which the said injector ring (80) comprises a connection portion (84) to which are connected a plurality of injector elements (16).

18. Shower in accordance with claim 16 or 17, in which the said injector holder bushes ring (82) comprises a connection portion (86) to which are connected a plurality of injector holder elements (88).

19. Shower in accordance with claim 18, in which each injector holder element (88) has a slit (90) on the bottom and walls converging towards the said slit in the direction of water flow.

20. Shower in accordance with any of the claims from 16 to 19, in which each coupling of an injector element (16) with the respective injector holder element (88) produces a blade form jet.

21. Shower in accordance with any of the preceding claims, in which the said injector means comprise a cartridge diffuser 78 with injector holder elements

incorporated in the plate 8.

22. Shower in accordance with claim 21, comprising an injector ring (80), comprising a plurality of injector elements (16), that can be housed in a ring housing (120), directly created in the plate(8).

23. Shower in accordance with claim 22, in which the said housing (120) comprises a plurality of housings for injector elements (122).

24. Shower in accordance with claim 23, in which the said housings for injector elements (122) are set out in sunburst fashion.

25. Shower in accordance with any claim from 21 to 24, in which the said plate (8) comprises moreover a housing for further means suitable for creating jets of the desired form.

26. Shower in accordance with claim 25, in which the said plate (8) comprises a housing (124) for means suitable for generating body massage jets.

27. Shower in accordance with claim 26, in which the said housing (124) is concentric with the ring housing (120) and internal thereto.

28. Shower in accordance with any claim from 25 to 27, in which the said plate (8) comprises a housing (128) for means suitable for generating aerated jets.

29. Shower in accordance with claim 28, in which the said housing (128) is concentric with the ring housing (120) and external thereto, and includes a plurality of water outlet conduits (129).

30. Shower in accordance with any claim from 25 to 29, in which the said housing for the said further means is separated from the said ring housing (120) by a dividing wall (126,130).

31. Shower in accordance with any of the previous claims, comprising moreover a system (100) for cylindrical jets, suitable for separating the main flow into cylindrical jets.

32. Shower in accordance with claim 31, comprising moreover means (110) for diverting the main flow and suitable for diverting it or shutting it towards the said injector means or towards the said system (100) for cylindrical jets.

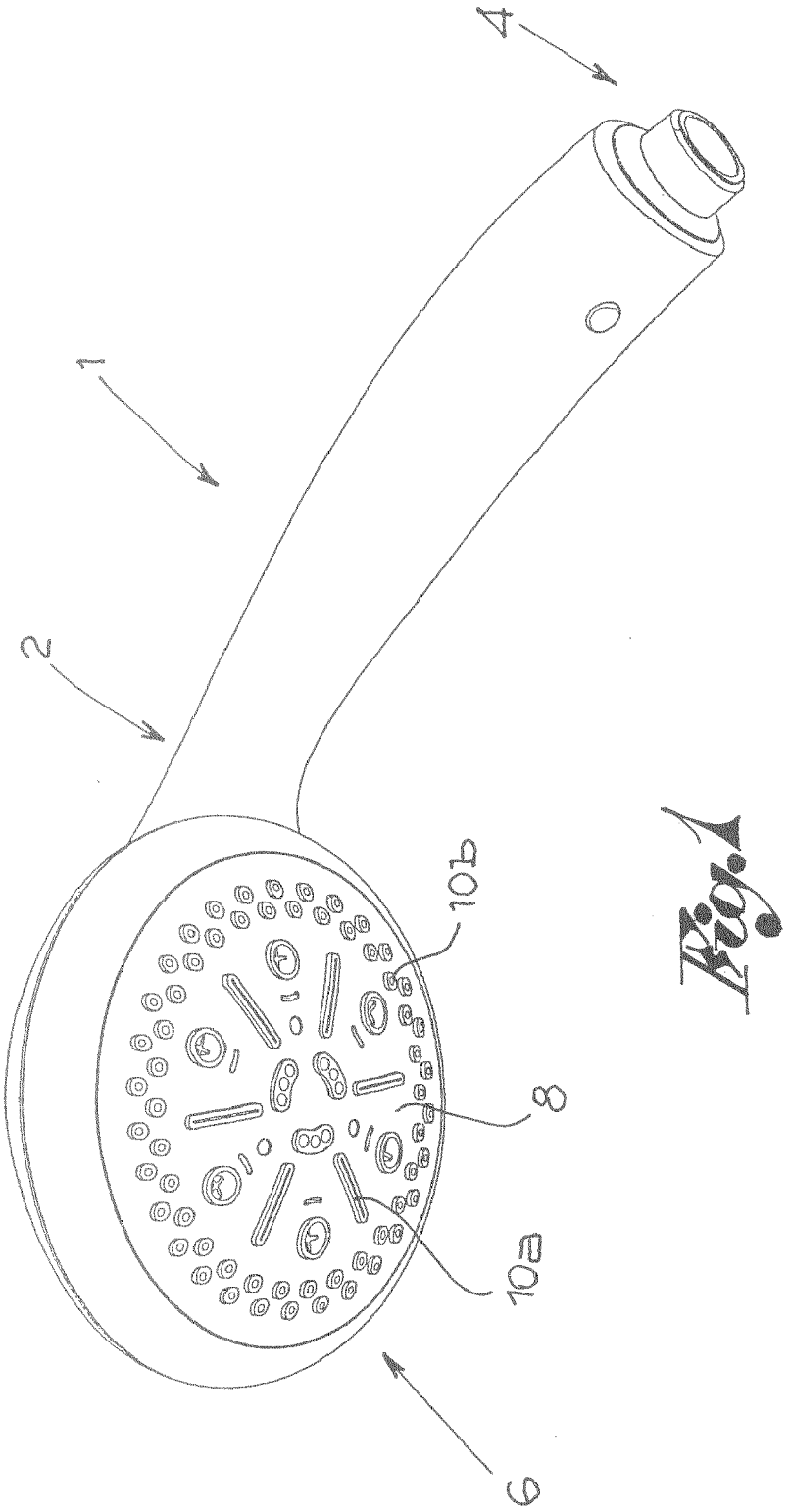


Fig. 1

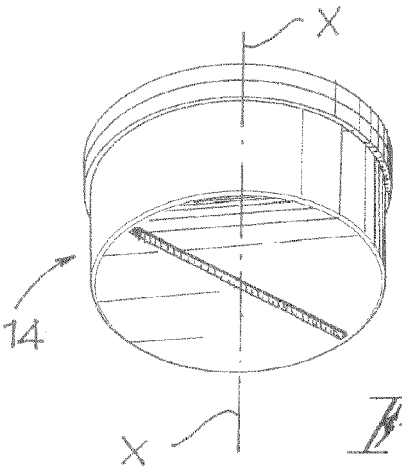


Fig. 2f

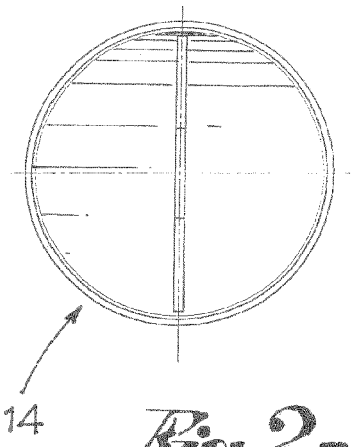


Fig. 2a

Fig. 2e

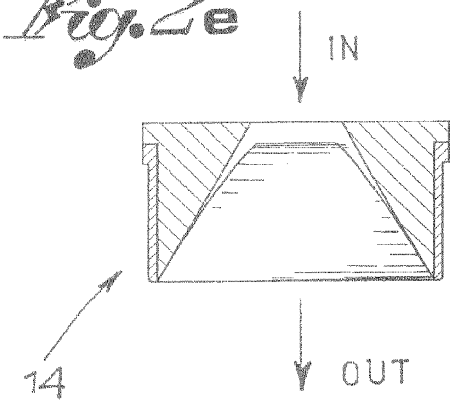


Fig. 2d

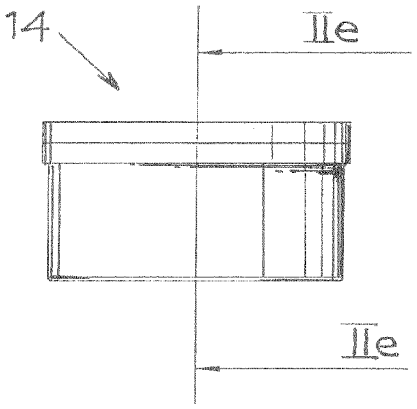
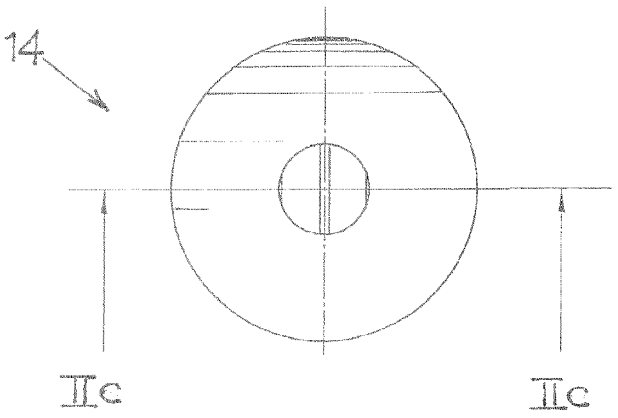


Fig. 2b



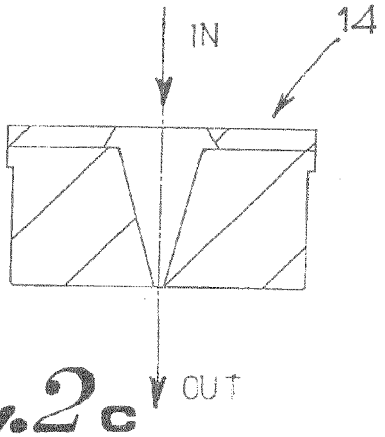


Fig. 2c

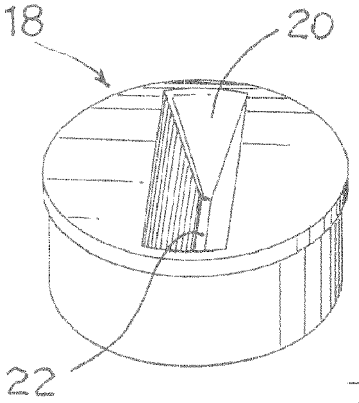


Fig.3g

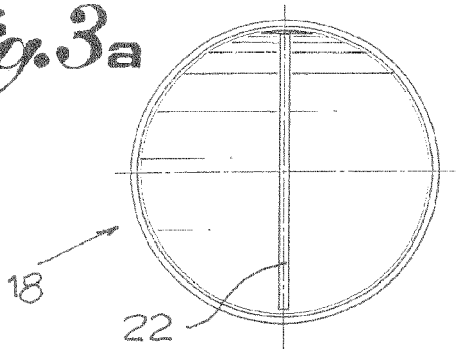


Fig.3a

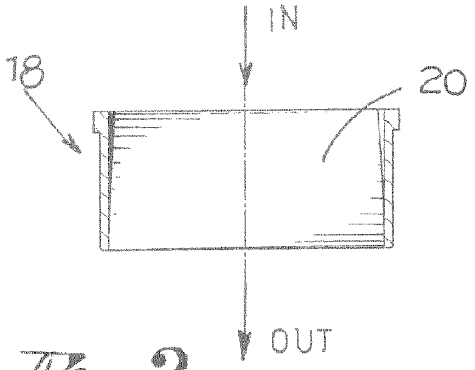


Fig.3e

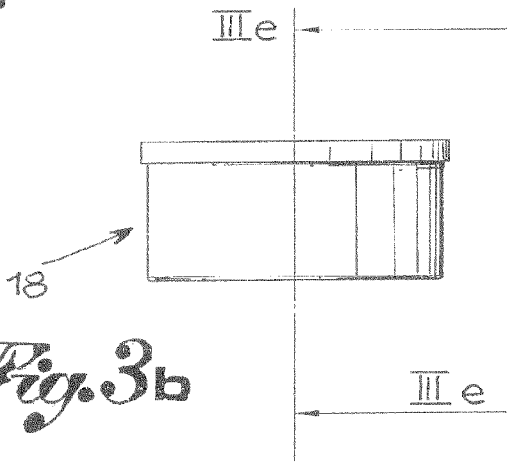


Fig.3b

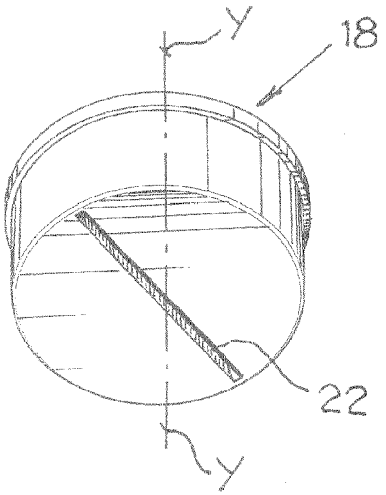


Fig.3f

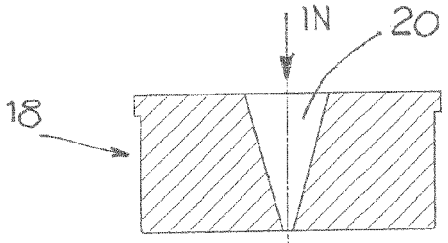


Fig.3c

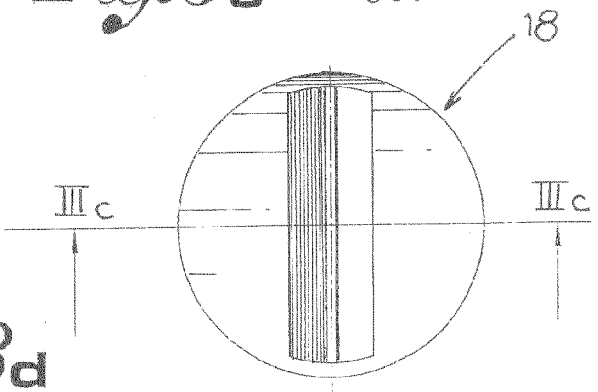


Fig.3d

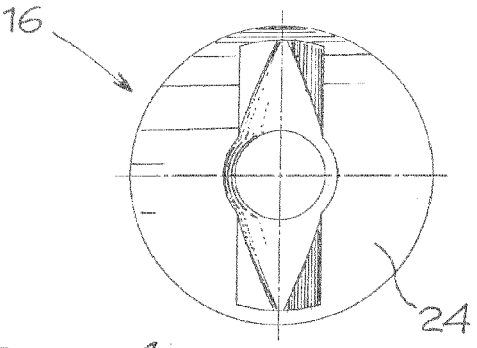


Fig. 4a

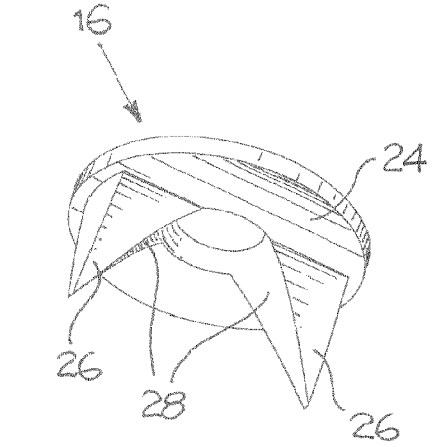


Fig. 4e

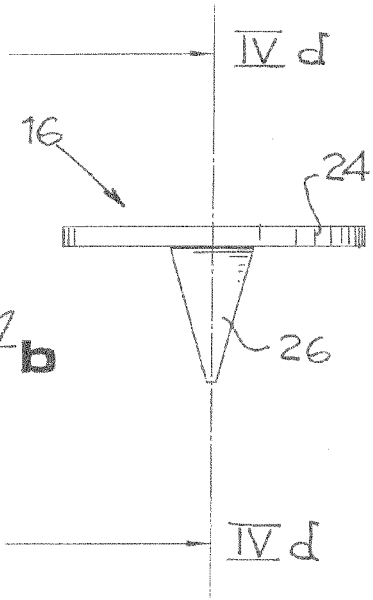


Fig. 4b

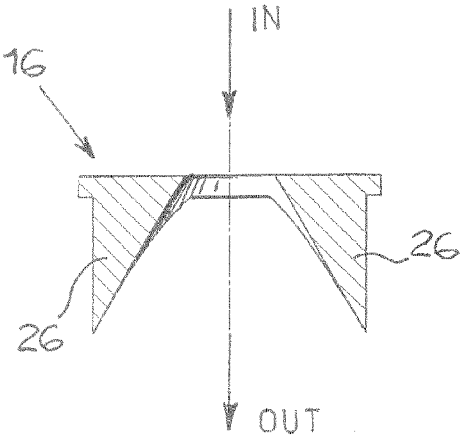


Fig. 4d

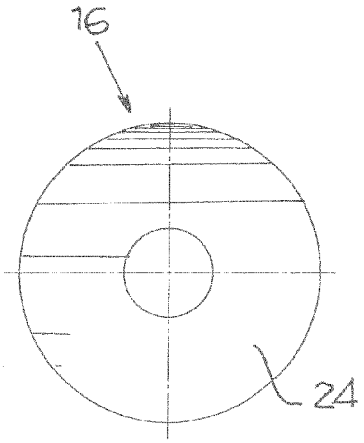


Fig. 4c

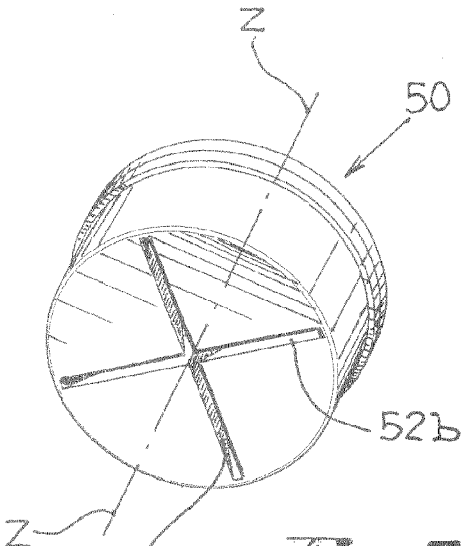


Fig.5e

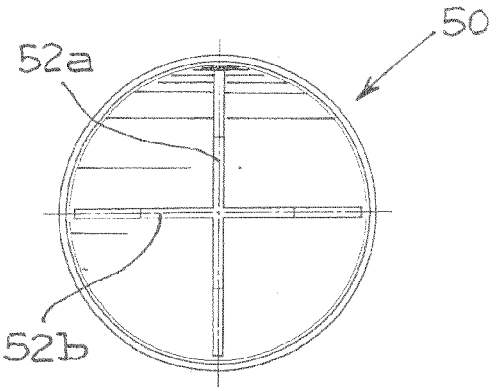
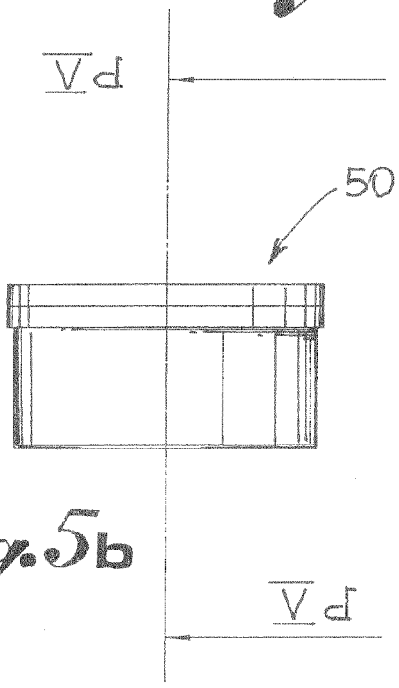


Fig.5a



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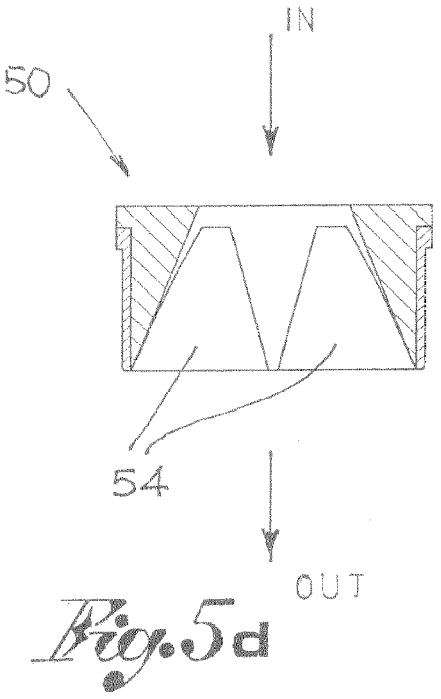


Fig.5d

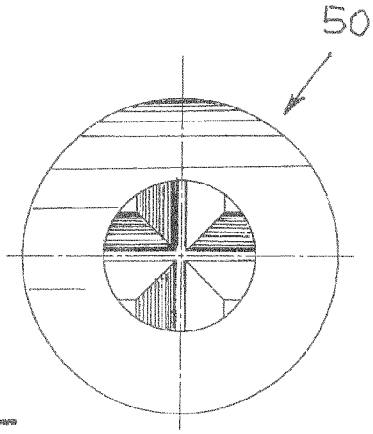


Fig.5c

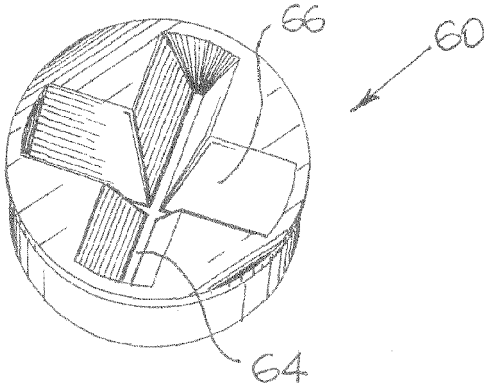


Fig. 6f

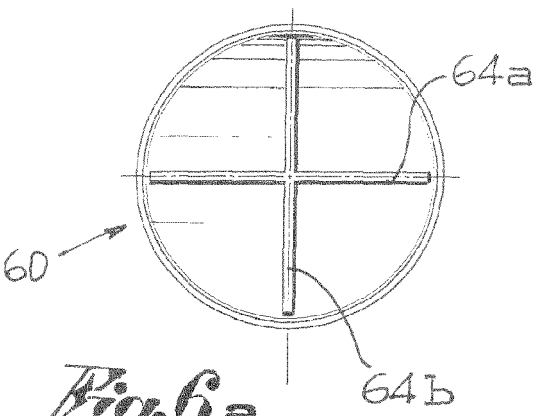


Fig. 6a

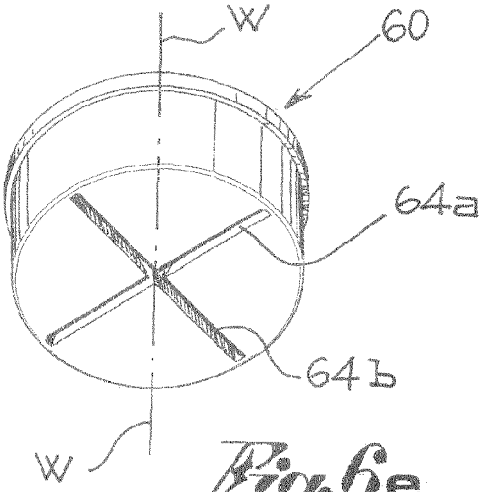


Fig. 6e

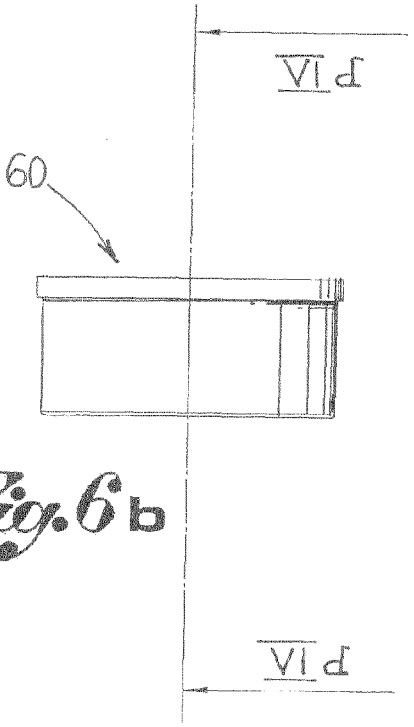


Fig. 6b

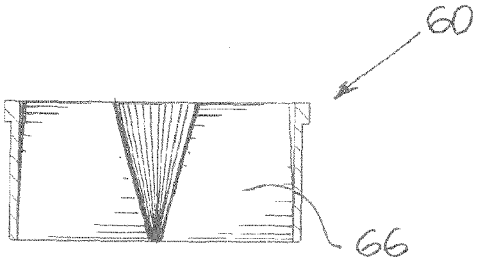
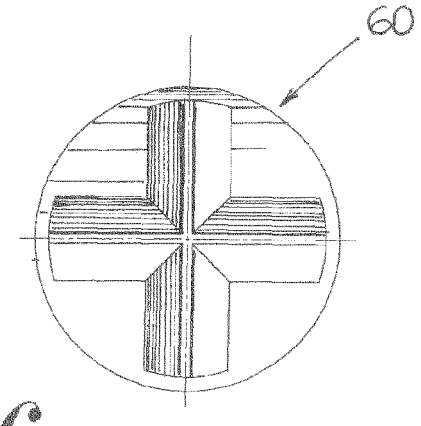


Fig. 6d



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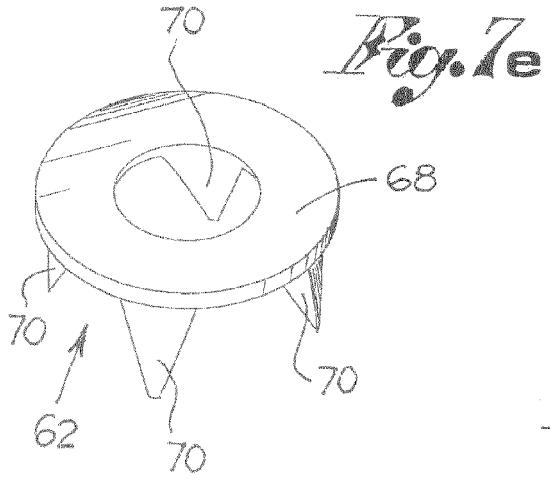


Fig. 7e

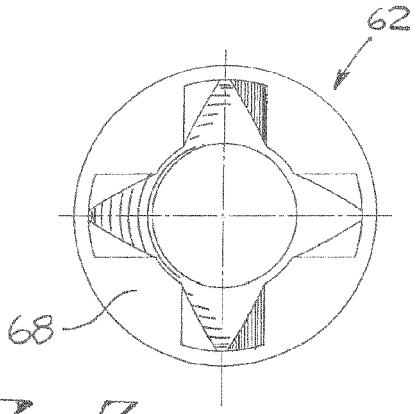


Fig. 7c

VII

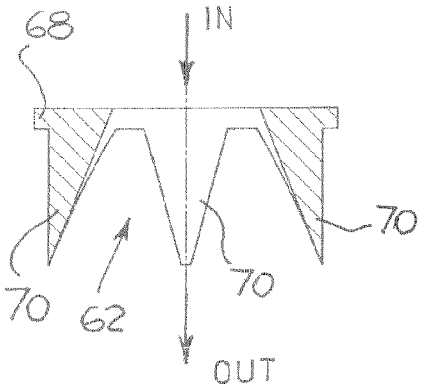


Fig. 7d

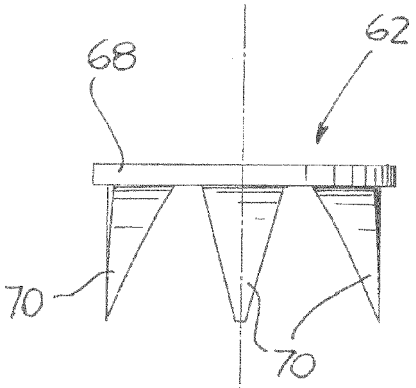
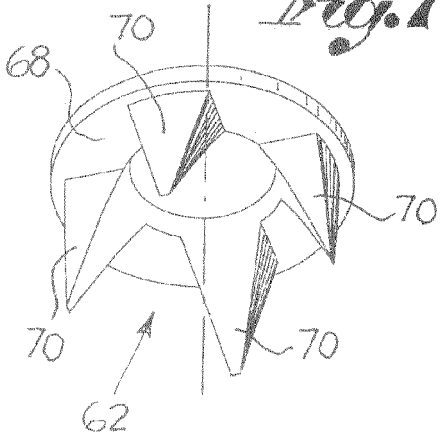


Fig. 7b

VII

Fig. 7f



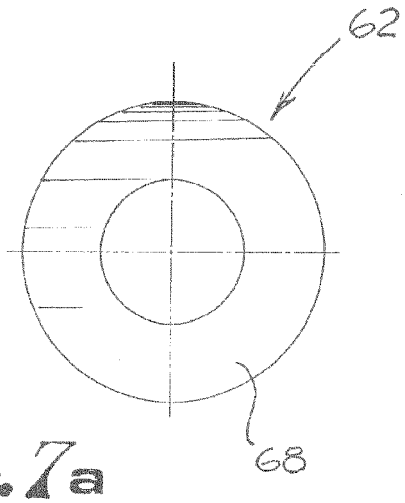


Fig. 7a

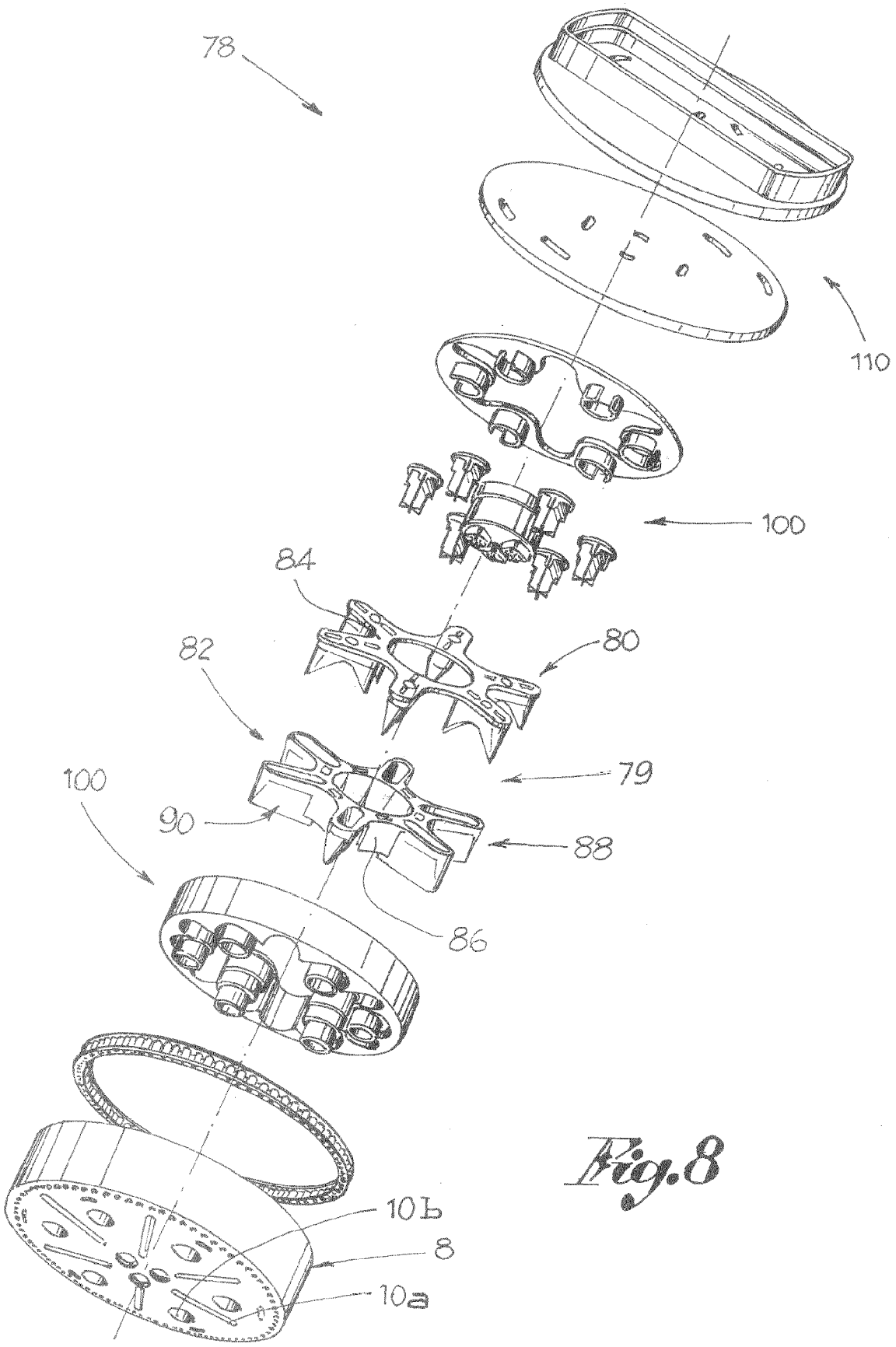


Fig.8

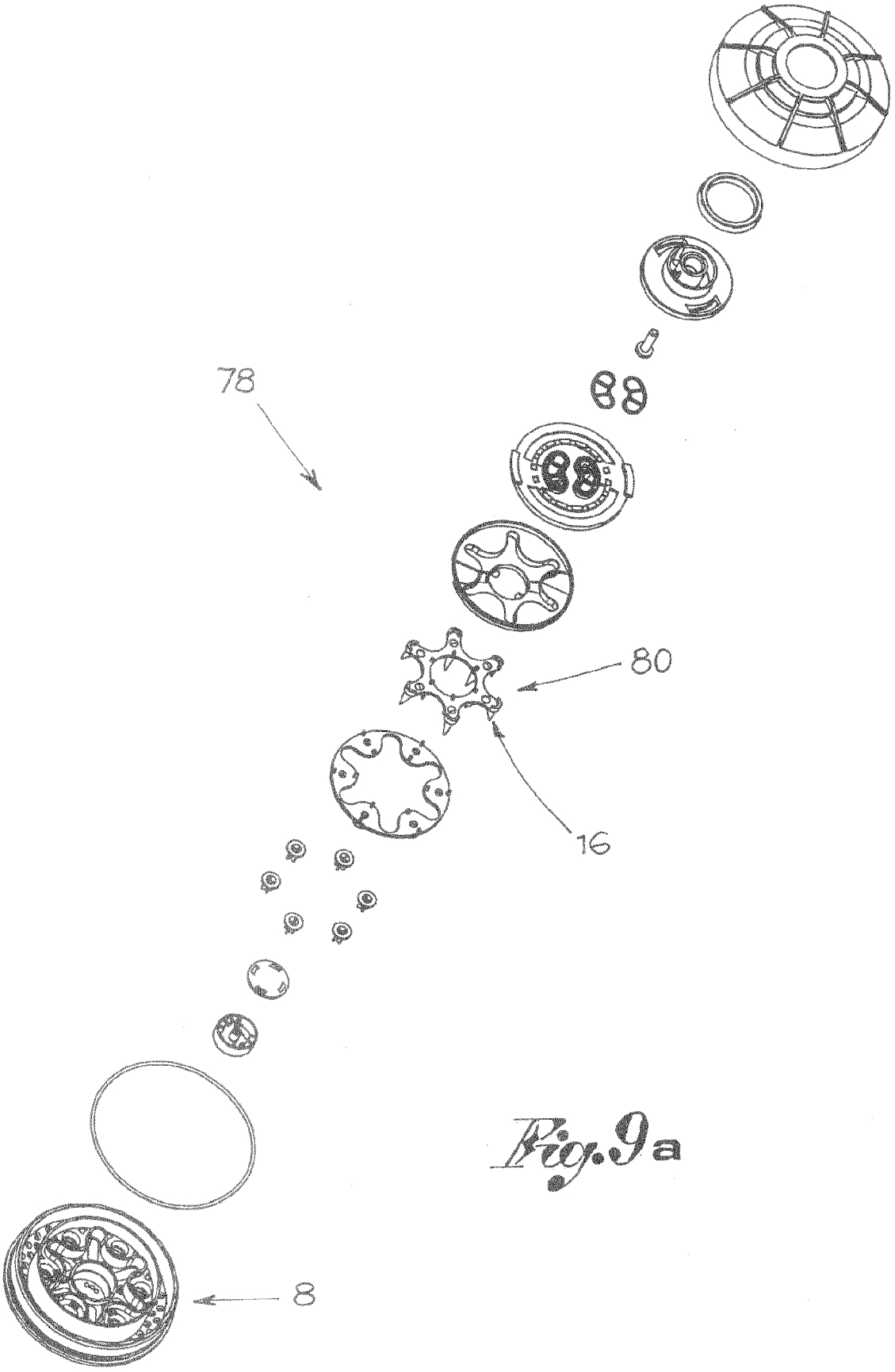


Fig. 9a

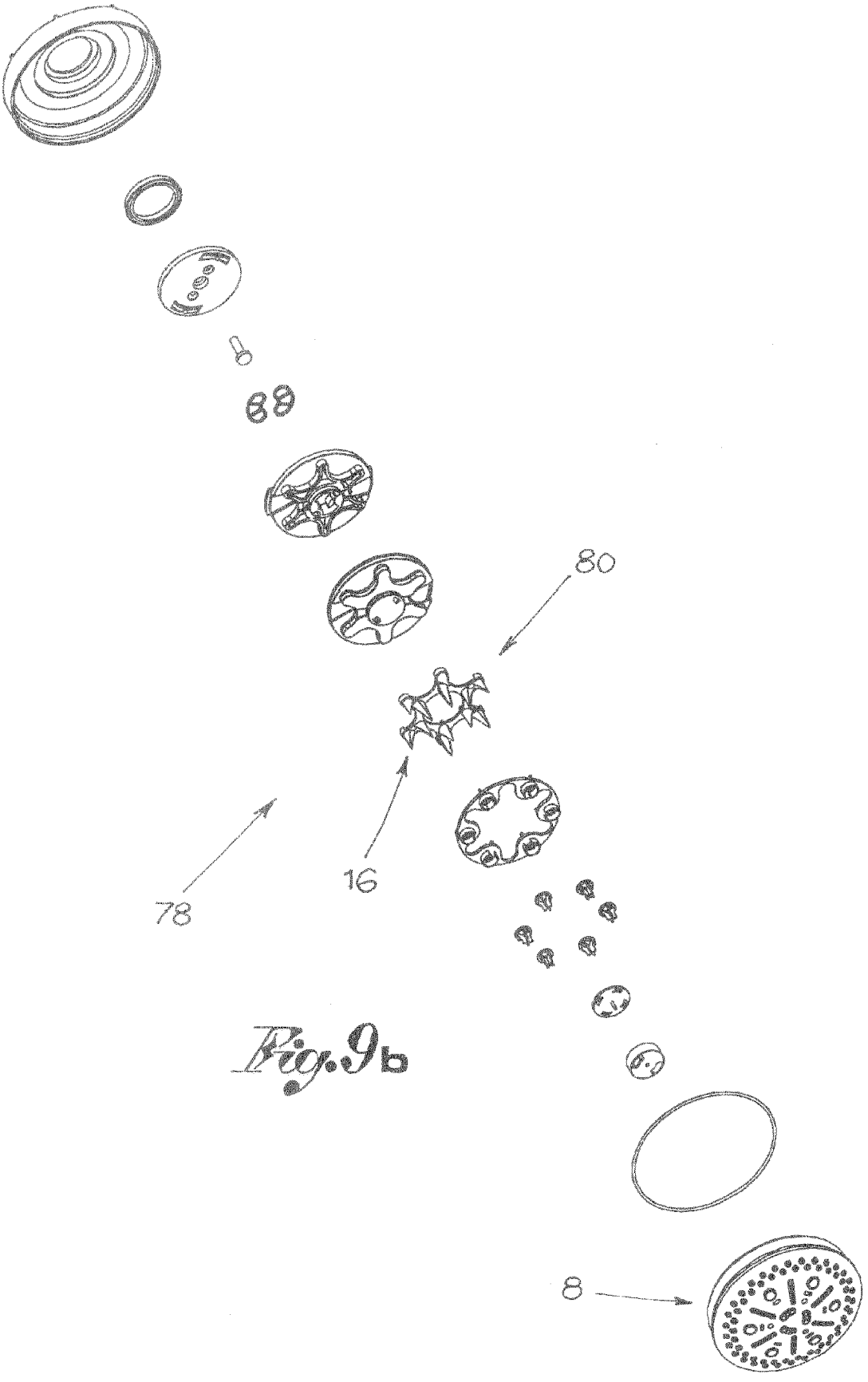


Fig. 9b

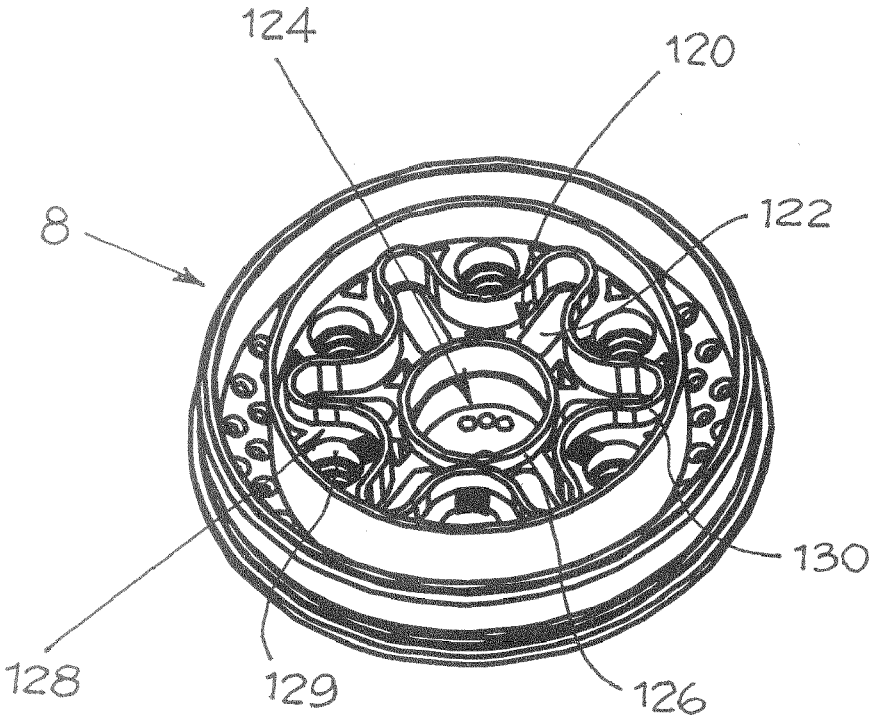


Fig. 9c

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 10 6899

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X Y	EP 0 810 034 A (LEGO IRRIGATION LTD) 3 December 1997 (1997-12-03) * column 1, paragraph 1 * * column 2, paragraphs 2,3 * * column 3, paragraph 2 * * column 3, paragraphs 5,6 * * column 4, paragraph 1; claims; figures *	1-3,6, 31,32 5-7,25, 26	B05B1/18 B05B1/04
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	28 April 2005	Thanbichler, P

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