

(19)



(11)

EP 1 518 969 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
11.07.2007 Bulletin 2007/28

(51) Int Cl.:
E03F 5/04 ^(2006.01)

(21) Application number: **04019574.5**

(22) Date of filing: **18.08.2004**

(54) **Drain unit**

Bodenablauf

Bouche d'égout

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PL PT RO SE SI SK TR**

(30) Priority: **26.09.2003 DK 200301397**

(43) Date of publication of application:
30.03.2005 Bulletin 2005/13

(73) Proprietor: **Blücher Metal ApS
DK-7480 Vildbjerg (DK)**

(72) Inventor: **Lohmann, Hans
4180 Soro (DK)**

(74) Representative: **Nielsen, Leif et al
Patrade A/S
Fredens Torv 3A
8000 Aarhus C (DK)**

(56) References cited:
**CH-A- 272 194 DE-C- 842 779
FR-A- 1 550 526 US-A- 3 593 347
US-A- 3 651 826**

- **PATENT ABSTRACTS OF JAPAN vol. 1998, no.
05, 30 April 1998 (1998-04-30) -& JP 10 018382 A
(HOKUSATSU HOME:KK), 20 January 1998
(1998-01-20)**

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 1 518 969 B1

Description

Scope of the Invention

[0001] The present invention concerns a drain system including a grate element, a bell part, a funnel part, a drain bowl, a stand-pipe and a drain stub, where an upper part of the bell part is secured to the grate element for forming a dismountable lid which is adapted for fastening to the upper part of the funnel part that is downwards connected to the drain bowl in which the stand-pipe is disposed so that it extends from a bottom of the said drain bowl and up into the bell part, and where stand-pipe downwards includes a connection sleeve for the drain stub, wherein the bottom of the drain bowl is shaped inclining at least over a sub-distance, and the drain stub is angle-bent

Background of the Invention

[0002] In buildings with storey partitions it is difficult to integrate drain systems from wet rooms and/or kitchens, as there is to be a certain height from drain to down pipe, so that it is ensured that the water from the drain runs out into the down pipe in order not to stand in the pipes.

[0003] Also, in countries where building tradition and environment do not require drain pipes and sewer system to be placed at frost-proof depth, it is necessary with drain units with low installation height, since there is to be provided enough fall from the drain and out to a collector well and/or to the sewer system.

[0004] Therefore, a number of different drain units with low installation height have been produced, e.g. by making the drain units smaller and/or with a drain bowl with a side outlet.

[0005] An example of a drain system described in the introductory paragraph is known from FR-A-1 550 526. This document discloses a system which is inclining over the bottom around the drain stub without any part of the bottom being flat. Moreover the drain stub has no varying cross-section. Therefore the system does not have flat bottom part it may be used for abutting on a side narrowing of the drain stub.

[0006] There are some more drawbacks in drain units of the above type, for example:

- the water trap effect itself in such a drain is not so efficient as in a drain unit where the water trap effect is produced by means of an upright stand-pipe,
- the capacity is considerably reduced when the drain units are made with less dimensions.

[0007] The disadvantage of an upright stand-pipe which is connected with a drain stub is that it requires an installation height corresponding to the height of a drain unit, a drain bowl plus the cross-sectional dimension of a drain stub/pipe bend.

[0008] Furthermore, prior art drain units are not made

flexible, as the drain stub is typically fixed and oriented at a certain direction in relation to the grate element of the drain unit. This may entail difficult mounting of the drain unit in e.g. existing wet room installations, as the existing pipe systems either do not fit the drain stub of the drain unit or are oriented in an inappropriate direction in relation to the grate element of the drain system, causing extra work with adapting pipe system and installation opening.

[0009] In order to avoid/reduce the extra adaptation work, prior art drain units exist, with a stand-pipe that includes a sleeve, whereby the mounting of the drain unit is effected in that the drain bowl is disposed and pressed down over a drain stub.

[0010] The disadvantage of this type is, however, that the drain stub is permanently mounted and thus not very flexible. This implies that it may be difficult to adapt the drain unit to existing installations, since the sleeve connection between drain stub and stand-pipe only allows a vertical movement and not a horizontal movement.

[0011] In order that the prior art drain unit may be adapted to different types of installation situations, the installation worker is required to carry different types of fittings, as e.g. connecting pieces, sockets, pipe sections and pipe bends with different dimensions.

[0012] For example, it is a disadvantage for the maker of the drain unit that other elements in addition to the drain unit itself, which are depending on the specific installation option, are to be used.

[0013] The maker can decide to produce an assortment of fittings and to deliver these with each drain unit, implying increased production cost and waste of resources since each time there will be some fittings in excess.

Purpose of the Invention

[0014] The purpose of the present invention is thus to indicate a drain unit which is made of few parts and which has a low installation height, simultaneously with the mounting of the drain unit is easy and rapid.

[0015] This is achieved with a unit as described in the preamble of claim 1, and where the inclining sub-distance extends between mutually parallel flat sub-surfaces of the bottom and that the drain stub has varying cross-section

Description of the Invention

[0016] In order to prevent air and return flow in the drain system, the drain unit is designed with a water trap whereby the drain water collected in the drain bowl passes down by the bell part and up between the stand-pipe and the bell part, after which the drain water may leave the drain system via stand-pipe and drain stub.

[0017] Thereby, an amount of water will always stand in the drain bowl, preventing smell from the drain stub, which is connected to the sewer network, from going back through the drain unit.

[0018] The bell part is fastened to a grate element so that they together form a dismountable lid which, e.g. by means of screws, can be removed from the funnel part of the drain unit.

[0019] By cleaning, it is an advantage that the drain unit is provided with a dismountable part, e.g. it is possible to remove the dismountable lid and thereby access the stand-pipe and parts of the drain stub. This provides that it is easy to clean the drain unit itself while at the same time it is possible to flush pipe/sewer system, or to use a cleaning wire from the drain side, in case of clogging in some part of the succeeding pipe/sewer system.

[0020] The grate element is typically a circular or polygonal plate in which is provided a number of openings which may be arranged symmetrically or in certain patterns. The important thing is that there are enough openings, or that the openings are large enough, to allow the amount of drain water appearing to be collected/led down into the drain bowl.

[0021] The grate element may have a slight concave or convex shape, where the concave shape may contribute to prevent large elements in the drain water from penetrating down into the drain bowl, while the convex shape may contribute to leading the drain water down into the drain bowl.

[0022] In order to safeguard against leaking of drain water from the drain unit to the surroundings, e.g. in the storey partitioning, where a leaking drain unit may cause expensive damage on floor and ceiling, the connecting end of the drain stub is inserted in the stand-pipe, which in the lower end includes a connection sleeve in which is disposed a sealing ring that ensure a tight connection between stand-pipe and drain stub.

[0023] In order to produce drain units with as few individual parts as possible, and simultaneously to achieve great flexibility so that the drain unit can be mounted in new as well as existing installations, the drain stub is angle-bent and with varying cross-section.

[0024] The flexibility of the drain unit is achieved in that the drain stub is angle-bent and with varying cross-section. Hereby, the installation worker may cut in the part of the drain stub with varying cross-section so that the drain stub has appropriate length and cross-sectional dimension that fit the succeeding connection in the pipe/sewer system.

[0025] In order to reduce the installation height of the drain unit according to the present invention, the bottom of the drain bowl is shaped inclining over a sub-distance. This entails that the bottom in the area on the angle-bent drain stub, which has a varying cross-section, can be adapted, whereby the total installation height of the drain system becomes less than if the drain unit had a flat bottom and a vertically downwards directed drain stub with an angled bend thereon.

[0026] The reduction in the installation height may be up to half the cross-sectional dimension of the drain stub, e.g. if the drain stub has diameter 40 around the angle-bent part of the drain stub, the succeeding varying cross-

section of the drain stub will be reduced so that the installation height of the total drain unit will be equal to the height of the drain bowl plus about 20 mm from the drain stub.

[0027] In order to ensure stable mounting of the drain unit, the said inclining sub-distance extends between mutually parallel sub-surfaces of the bottom. In a preferred embodiment of the invention, the inclining sub-distance will be the part of the bottom of the drain bowl that includes the area in which the stand-pipe is placed.

[0028] This implies that the drain bowl has sub-surfaces in two parallel areas along each side edge of the bottom bowl. By a flat bottom part it may be used for abutting on the side narrowing of the drain stub. This means that when the bottom face is abutting on the side narrowing of the drain stub, the drain bowl will be disposed supported in a stable way.

[0029] Furthermore, the flat bottom parts may be used for blocking-up, e.g. in situations where the mounting opening is too deep or uneven for stable mounting of the drain unit, e.g. by using a wedge a support of the drain bowl of the drain unit in the desired position may be provided.

[0030] The stand-pipe in the drain bowl is typically disposed centrally so that it is possible to mount the drain stub projecting at any angle relative to the drain bowl, while at the same time the drain water may flow uniformly around the bell part, irrespectively of the direction in which the drain water passes the grate element.

[0031] In an alternative embodiment of the invention, the entire bottom of the drain bowl is shaped inclining so that the drain bowl does not have one or more mainly horizontal bottom parts. An advantage of this embodiment of the invention is that the drain system may be adjusted in height in relation to the surrounding floor surface by rotating the drain bowl around the centre axis of the stand-pipe, whereby the inclining bottom of the drain bowl will contact the top side of the drain stub, where rotation of the drain bowl will either move the drain bowl and the grate element upwards or downwards until the grate element fits the level of the surrounding floor surface.

[0032] In order to attain reduction of the installation height, in a preferred embodiment of the invention there is provided a drain stub which is designed with a connecting end for inserting in the connecting sleeve and close thereby a side narrowing, and that the varying cross-section is found opposite to the connecting end.

[0033] The side narrowing of the drain stub which is close at the connecting end, entails that the preferably flat bottom part of the drain bowl corresponds in shape with the side narrowing, whereby these two elements engage each other, whereby the bottom part bear on the top side of the side narrowing and not on the top side of the other varying cross-sections of the drain stub, providing that the installation height is substantially reduced

[0034] By using a side narrowing with a length approximately corresponding to the width of the bottom of the

part of the bottom of the bottom bowl formed by stand-pipe and drain bowl, due to the side narrowing there will not be a reduction of the capacity of the drain unit since the side narrowing is only provided over this short length and is preferably disposed immediately at the connecting end/angle bend.

[0035] Following the side narrowing, opposite the connecting end, the drain stub will be shaped with varying cross-section. This entails that during mounting, the installation worker may place the drain unit so that the grate element by rotation of drain stub and/or drain bowl can be adapted to the desired position in relation to the surrounding floor surface and may cut off the drain stub subsequently in the said varying cross-sections so that the drain stub has a length and cross-section that fit the succeeding course of the pipe/sewer system.

[0036] In order to attain further flexibility of the drain unit, the dimensions of the said connecting end and a section after the side narrowing are identical. This means that the installation worker can cut off the drain stub in/or around the section after the side narrowing, and then choose which part of the drain stub that is to be mounted in the connection sleeve of the stand-pipe

[0037] The decision is dependent on which mounting situation is the case. For example:

- the part of the drain stub with the angle bend is typically used in situations where there is not much space,
- in other situations, the part of the drain stub with varying cross-section is used, where an end part is mounted in the connecting sleeve is mounted in the stand-pipe, whereby the drain stub extends downwards with varying cross-section which the installation worker cuts off at the point having the cross dimension that fits the succeeding pipe/sewer system.

[0038] A horizontal adjusting possibility of the drain bowl of the drain unit would be desirable when the drain unit is placed in e.g. existing installations in old buildings, and therefore the said varying cross-section is laterally displaced, as they have a common sidewall.

[0039] This entails that rotation of the drain stub about the centre line of the stand-pipe causes an eccentric movement of the connecting end of the drain stub to the succeeding pipe/sewer system, and rotation of the drain stub about the centre line of the connecting end of the drain stub causes an eccentric movement of the drain bowl.

[0040] Alternatively, the said varying cross-sections may be provided coaxially, providing the advantage that the drain stub can be mounted for different types of cross-sectional dimensions of the succeeding pipe/sewer system.

Short Description of the Drawing

[0041] The invention will now be described further with

reference to the accompanying drawing, where:

- Fig. 1 shows a perspective view of a drain unit according to the invention,
- Fig. 2 shows a perspective view of the drain unit in Fig. 1,
- Fig. 3 shows section of the perspective view of the drain unit in Fig. 1,
- Fig. 4 shows a sectional view of a drain unit according to the invention,
- Fig. 5 shows a sectional view of the drain unit in Fig. 4,
- Fig. 6 shows a section of a drain stub according to the invention,
- Fig. 7 shows a section of a drain bowl according to the invention, and
- Fig. 8 shows a section of a drain bowl and a drain stub according to the invention

Detailed Description of the Invention

[0042] Figs. 1 and 2 shows a drain unit 1 that includes a grate element 2 which is shown here mounted to a funnel part 4 with corner screws 20. The funnel part 4 continues in a drain bowl 5, where under drain bowl 5 there is fitted a drain stub 7. On the Figure it may be faintly seen that bottom part 9 of drain bowl 5 is disposed down into side narrowing 12 of drain stub 7.

[0043] Fig. 3 shows a section in drain unit 1, where it appears that grate element 2 is mounted on bell part 3 which forms a dismountable lid 8 that is fastened to a funnel part 4 continuing into drain bowl 5 where a centred stand-pipe 6 is disposed.

[0044] Drain stub 7 is mounted in the connecting sleeve 10 which is disposed internally and in the lower part of stand-pipe 6 so that it ensures that drain unit 1 is not leaking to the surroundings.

[0045] On the Figure is clearly seen how narrowing 12 in drain stub 7 corresponds in shape with a part of drain bowl 5 and stand-pipe 6, and thereby it is possible to rotate drain stub 7 360 degrees so that drain unit 1 can be adjusted laterally and in height.

[0046] On Fig. 4 is shown how drain stub 7 is mounted in centrally disposed stand-pipe 6 of drain bowl 5 by inserting the connecting end into connecting sleeve 10 which is provided with a packing unit 21 that prevents water from penetrating to the exterior of the drain unit 1.

[0047] Drain stub 7 is here shown in the preferred embodiment of the invention, where the drain stub 7 is provided with an angle bend 7a, a narrowing 12 and varying cross-sections 7b and 7c.

[0048] On Fig. 5 is shown an embodiment of the invention, where drain stub 7 is shown in a situation of use where the installation worker has cut off an end part 7c of drain stub 7. This entails that drain unit 1 in the shown embodiment may be mounted with drain stub 7 having an end part 7b with the same cross-sectional diameter as connecting end of drain stub 7.

[0049] Furthermore, on the Figure it may be seen that

the bottom 9 of the drain bowl 5 is designed with varying level, entailing that when drain bowl 5 is rotated about the centre line of the connecting end of the drain stub 7, the drain bowl 5 may be adjusted in height.

[0050] On Fig. 6 is shown another possibility, where the installation worker, instead of cutting off the end part 7c of drain stub 7, is cutting off angle bend 7a and the narrowed part 12, so that the part used by the drain stub are the parts 7b and 7c. It is to be noted that parts 7b and 7c of drain stub 7 are having a common sidewall 13 which is laterally offset.

[0051] On Fig. 7 is shown a sectional view of drain bowl 5 where it is seen that bottom 9 over a sub-distance 11 is formed inclining, and that this inclining sub-distance 11 extends between parallel sub-surfaces 9a and 9b of the bottom 9.

[0052] On Fig. 8 is shown how the part of drain stub 7, which was shown on Fig. 6, is used for mounting in a drain bowl 5 which was shown on Fig. 7.

[0053] Part 7b of drain stub 7 is mounted in the connecting sleeve 10 of the stand-pipe 6. By the sections 7b and 7c being laterally offset and having a sidewall 13 in common, it is possible by rotating the drain stub 7 about the centre line of the stand-pipe 6 to cause an eccentric movement of the connecting end of the drain stub 7 to the succeeding pipe/sewer system, or by rotating the drain stub 7 about the centre line of the lower connecting end of the drain stub 7 to cause an eccentric movement of the drain bowl.

[0054] The invention is not limited to the embodiments shown in the Figures and described above. Other embodiments with other shapes of the drain unit parts, including grate element, bell part, funnel part, drain bowl, stand-pipe and drain stub are possible within the scope of this invention and the matter specified in the claims.

Claims

1. Drain system (1) including a grate element (2), a bell part (3), a funnel part (4), a drain bowl (5), a stand-pipe (6) and a drain stub (7), where an upper part of the bell part (3) is secured to the grate element (2) for forming a dismountable lid (8) which is adapted for fastening to the upper part of the funnel part (4) that is downwards connected to the drain bowl (5), in which the stand-pipe (6) is disposed so that it extends from a bottom (9) of the said drain bowl (5) and up into the bell part (3), and where the stand-pipe (6) downwards includes a connection sleeve (10) for the drain stub (7), wherein the bottom (9) of the drain bowl (5) is shaped inclining at least over a sub-distance (11), and the drain stub (7) is angle-bent (7a), **characterised in that** the inclining sub-distance (11) extends between mutually parallel flat sub-surfaces (9a, 9b) of the bottom (9) and that the drain stub (7) has varying cross-section (7b, 7c).

2. Drain system (1) according to claim 1, **characterised in that** the drain stub (7) has a connecting end (7a) for inserting in the connecting sleeve (10) and close thereby a side narrowing (12), and that the varying cross-section (7b, 7c) is found opposite to the connecting end (7a).

3. Drain system (1) according to claim 2, **characterised in that** the dimensions of the connecting end (7a) and a section (7b) after the side narrowing (12) are the same.

4. Drain system (1) according to claims 1 -3, **characterised in that** the varying cross-sections (7b, 7c) are laterally offset, as they have a sidewall (13) in common.

Patentansprüche

1. Abflusssystem (1) mit einem Rostelement (2), einem Glockenteil (3), einem Trichterteil (4), einer Abflusswanne (5), einem Stehrohr (6) und einem Abflusssutzen (7), wo ein oberer Teil des Glockenteils (3) am Rostelement (2) zur Bildung eines abnehmbaren Deckels (8) befestigt ist, der angepasst ist zur Befestigung am oberen Teil des Trichterteils (4), das nach unten mit der Abflusswanne (5) verbunden ist, in welcher das Stehrohr (6) angeordnet ist derart, dass dieses vom Boden (9) der Abflusswanne (5) nach oben in das Glockenteil (3) sich erstreckt, und wo das Stehrohr (6) nach unten eine Verbindungshülse (10) für den Abflusssutzen (7) umfasst, wobei der Boden (9) der Abflusswanne (5) wenigstens über einen Teilabstand (11) geneigt und der Abflusssutzen (7) unter einem Winkel (7a) gebogen ist, **dadurch gekennzeichnet, dass** sich der geneigte Teilabstand (11) zwischen gegenseitig parallelen flachen Teilflächen (9a, 9b) des Bodens (9) erstreckt und der Abflusssutzen (7) einen veränderlichen Querschnitt (7b, 7c) aufweist,
2. Abflusssystem (1) gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der Abflusssutzen (7) ein Verbindungsende (7a) zum Einführen in die Verbindungshülse (10) und daran nahe eine Seitenverengung (12) aufweist, und dass der veränderliche Querschnitt (7b, 7c) gegenüber dem Verbindungsende (7a) angeordnet ist.
3. Abflusssystem (1) gemäß Anspruch 2, **dadurch gekennzeichnet, dass** die Dimensionen des Verbindungsendes (7a) und eines Abschnitts (7b) nach der Seitenverengung (12) die selben sind.
4. Abflusssystem (1) gemäß den Ansprüchen 1 bis 3, **dadurch gekennzeichnet, dass** die veränderlichen Querschnitte (7b, 7c) seitlich versetzt sind, wo-

bei diese eine gemeinsame Seitenwand (13) aufweisen.

Revendications

5

1. Bouche d'égout (1) comprenant un élément formant grille (2), une partie formant tulipe (3), une partie formant entonnoir (4), une coupe d'évacuation (5), une conduite verticale (6) et un tronçon d'évacuation (7), dans laquelle une partie supérieure de la partie formant tulipe (3) est fixée sur l'élément formant grille (2) pour former un couvercle (8) démontable qui est adapté à être fixé sur la partie supérieure de la partie formant entonnoir (4) qui est raccordée, en direction du bas, à la coupe d'évacuation (5), dans laquelle la conduite verticale (6) est disposée de telle sorte qu'elle s'étend depuis un fond (9) de la coupe d'évacuation (5) pour monter dans la partie formant tulipe (3), et dans laquelle la conduite verticale (6) comprend, en direction du bas, un manchon de liaison (10) destiné au tronçon d'évacuation (7), le fond (9) de la coupe d'évacuation (5) présentant une forme inclinée sur au moins une sous-distance (11) et le tronçon d'évacuation (7) étant coudé selon un angle (7a), **caractérisée en ce que** a sous-distance (11) inclinée s'étend entre des sous-surfaces (9a, 9b) plates, parallèles les unes aux autres, du fond (9) et **en ce que** le tronçon d'évacuation (7) présente une section transversale (7b, 7c) variable.

10
15
20
25
30
2. Bouche d'égout (1) selon la revendication 1, **caractérisée en ce que** le tronçon d'évacuation (7) présente une extrémité de liaison (7a) destiné à l'insertion dans le manchon de liaison (10) et, à proximité, un rétrécissement latéral (12), et **en ce que** la section transversale (7b, 7c) variable se trouve à l'opposé de l'extrémité de liaison (7a).

35
3. Bouche d'égout (1) selon la revendication 2, **caractérisée en ce que** l'extrémité de liaison (7a) et une section (7b) située en aval du rétrécissement latéral (12) présentent les mêmes dimensions.

40
4. Bouche d'égout (1) selon les revendications 1-3, **caractérisée en ce que** les sections transversales (7b, 7c) variables sont décalées latéralement, à l'endroit où elles ont une paroi latérale (13) en commun.

45
50
55

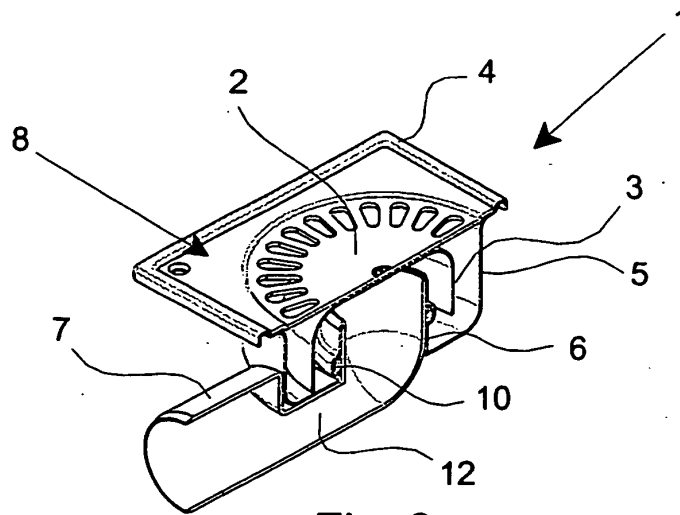


Fig. 3

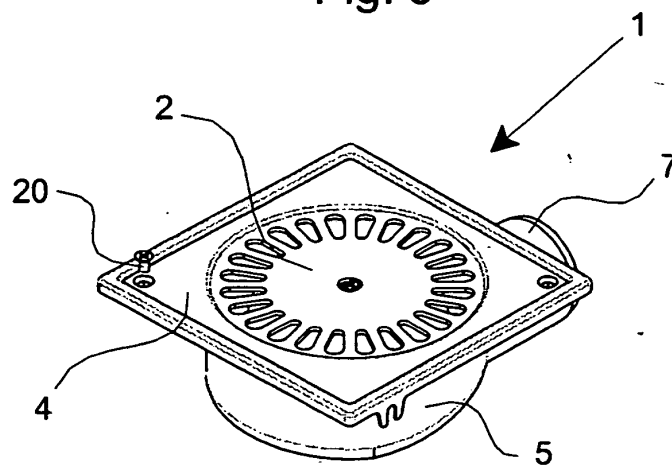


Fig. 2

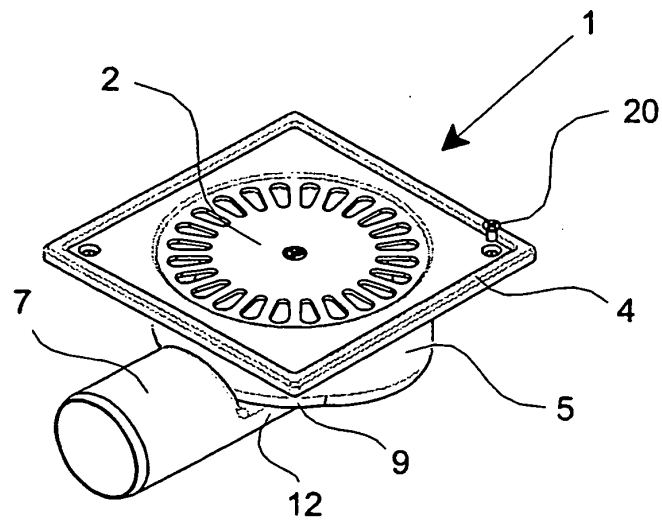


Fig. 1

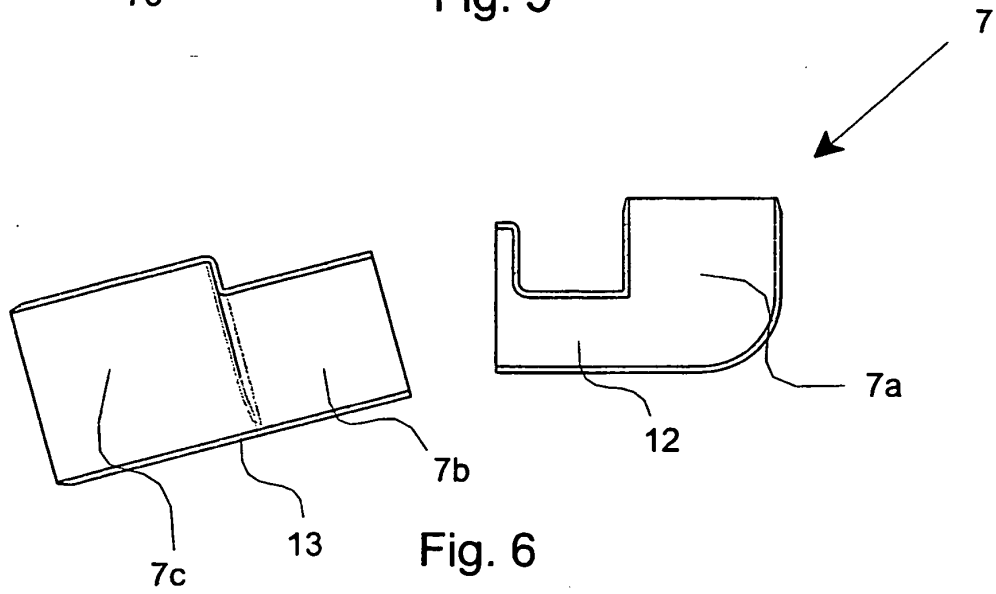
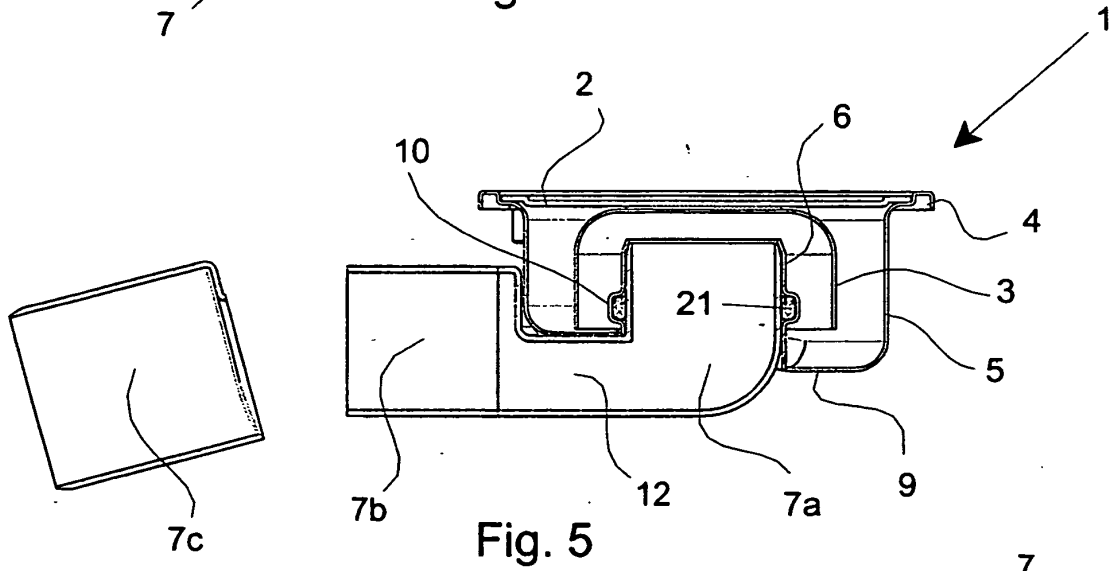
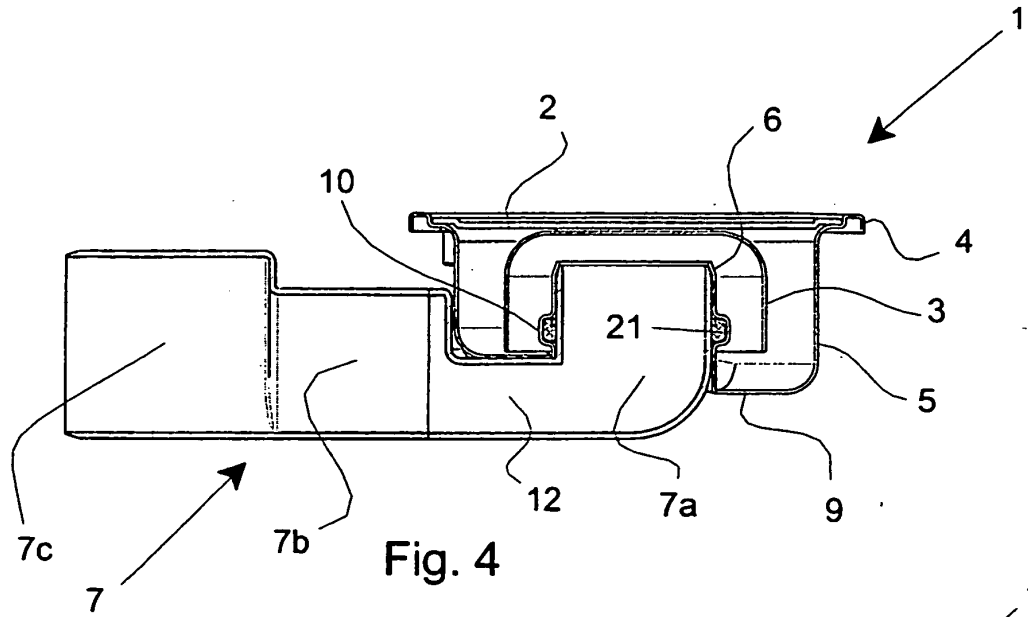


Fig. 7

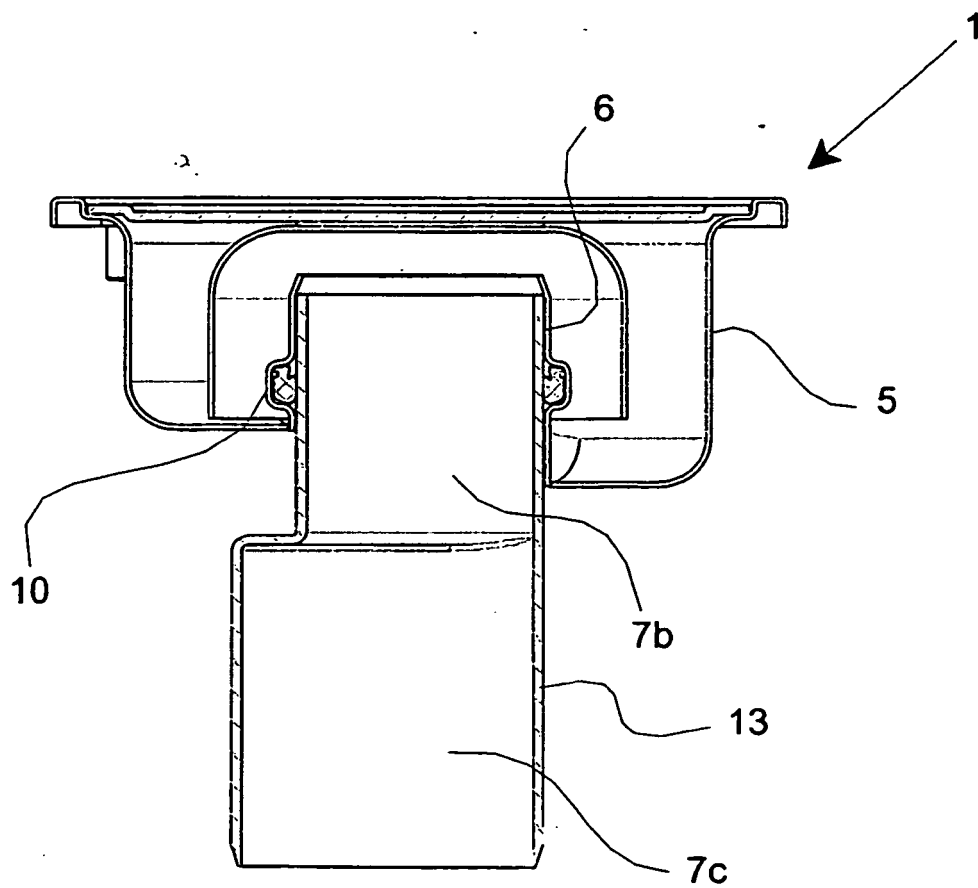
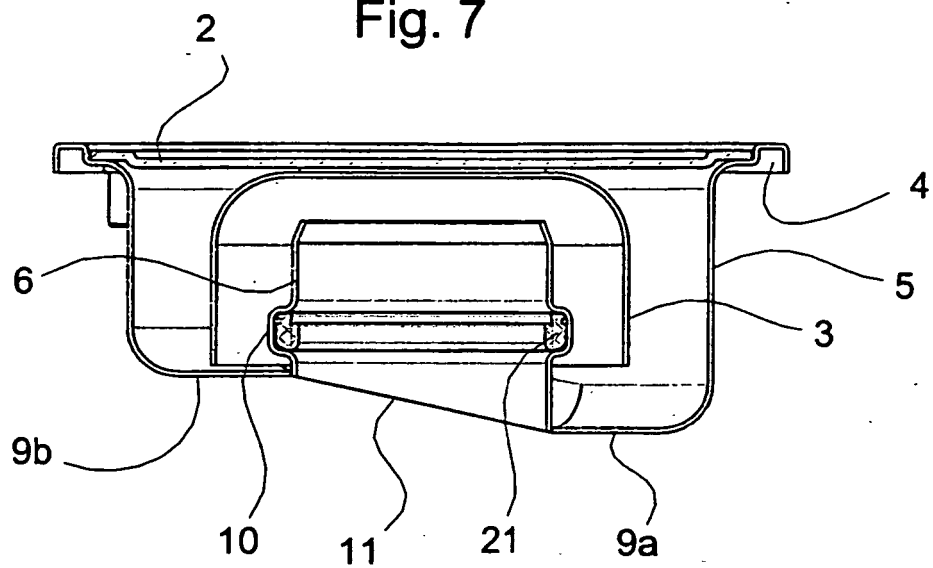


Fig. 8

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- FR 1550526 A [0005]