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(54) **Water drain system**

(57) Water drain system for precipitation that falls onto a building, wherein the building is provided with a roof and a water gutter receiving precipitation from said roof, wherein the building is furthermore provided with a cavity wall, wherein the water drain system comprises a drain line that at the upstream end is connected to a drain of the gutter and at the downstream end is connected to a further section of the water drain system, wherein the drain line is accommodated in the cavity of the cavity wall at least with a vertically draining drain line section.

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Description

BACKGROUND OF THE INVENTION

[0001] The invention relates to a water drain system for buildings, in particular houses, provided with gutters along their roofs.

[0002] For collecting and draining water that flows down along the inclined roof faces, houses with inclined roofs normally have gutters which transmit the collected water to rain water drains, which outside along the outside wall run vertically downward to a connection to a sewerage or collector that is provided at ground level.

[0003] In an alternative arrangement the vertical water drain system is connected at the lower end to a horizontal line, laid through the house to the opposite outside wall.

[0004] A drawback of the known water drain systems is that the rain water drain along the outside wall forms a physical and/or esthetical obstacle. Physical because of restrictions imposed on laying pavings, outer wall fittings such as window blinds etc. Furthermore the tube that extends along the outer wall forms a settlement for spiders and other vermin, that can contaminate the outer wall.

[0005] It is an object of the invention to provide a system for precipitation that falls onto a building, that forms an improvement with respect to these issues.

[0006] It is another object of the invention to provide a water drain system for precipitation that falls onto a building, with which a high drainage capacity can be achieved.

SUMMARY OF THE INVENTION

[0007] At least one of these objects is achieved according to the invention by means of a water drain system for precipitation that falls onto a building, wherein the building is provided with a roof and a water gutter receiving precipitation from said roof, wherein the building is furthermore provided with a cavity wall, wherein the water drain system comprises a drain line that at the upstream end is connected to a drain of the gutter and at the downstream end is connected to a further section of the water drain system, wherein the drain line is accommodated in the cavity of the cavity wall at least with a vertically draining drain line section.

[0008] In the water drain system according to the invention the cavity of a cavity wall is used for downward drainage of the rain water from the roof to for instance a sewer. There the drainage line is placed at the interior of the outer liner of the cavity wall, where it forms no obstacle.

[0009] The upstream end of the drain line that is accommodated in the cavity may be at the location of the gutter and/or the downstream end may be at the location of the ground level. Because of this the above-mentioned hindrance is reduced to a minimum.

[0010] Between the upstream end and the gutter drain a connection device may be provided that is at least partially accommodated in the outer liner of the cavity wall. There the connection device may comprise a tube connection between the gutter drain and the drain line in the cavity wall.

[0011] In an alternative embodiment the connection device comprises a container that on the one hand receives water from the gutter and on the other hand delivers water at the upstream end of the drain line that is accommodated in the cavity. Such a container can be accommodated in the outer liner when this is being built, while later on a connection can be made to the gutter when the latter has been installed at a height that is known only then.

[0012] The connection device may comprises a construction element, that is provided with a wall section that can be placed in the outer face of the outer liner of the cavity wall and through which the tube connection passes. Thus a passage can be realised that coincides with the outer face of the outer liner. This prevents vermin from making nests.

[0013] In a further development hereof the outer liner is composed of wall elements, such as bricks for stonework, wherein the construction element as to dimensions in the outer face of the outer liner of the cavity wall is attuned to the wall elements. Thus the water drain is adapted to the pattern of the outer liner.

[0014] In one embodiment the construction element is hollow. The construction element may be casing-shaped or box-shaped, or shaft-shaped.

[0015] The construction element may be made of synthetic material.

[0016] In a section that lies outside the wall, the connection device may comprise a flexible tube, if necessary to balance the displacement of the gutter drain as a consequence of expansion of the gutter.

[0017] In one embodiment the connection device at the downstream side thereof is connected to a substantially horizontal section of the drain line.-- Then the water drain extends through the cavity for instance first with a horizontal pipe and subsequently with a vertical pipe.

[0018] In one embodiment the connection device at the downstream side thereof is connected to a substantially vertical section of the drain line. Then the water drain extends through the cavity for instance first with a vertical pipe and subsequently with a horizontal pipe.

[0019] It is particularly advantageous if the gutter drain comprises a fill-up funnel. Because of this the diameter of the drain line can be limited, and be accommodated more easily in a cavity, in particular next to an insulating layer. Then the afore-mentioned container is connected air-tight to the funnel, via one or more pipe sections.

[0020] In one embodiment the cavity wall is provided with a heat-insulating layer. The insulating layer also forms an acoustic insulation of the water flowing through the drain line from the occupied zones of the dwelling. The presence of the drain line does not necessarily form a local restriction of the insulation values, in particular not when a fill-up system is involved.

[0021] Thus the drain line in the cavity wall may for instance have a diameter of less than approximately 5 cm.

[0022] In one embodiment the downstream end is connected to a sewerage.

[0023] In a further aspect the invention provides a water drain system for precipitation that falls onto a building, wherein the building is provided with a roof and a water gutter receiving precipitation from said roof, wherein the building is furthermore provided with a cavity wall, wherein the water drain system comprises a drain line that at the upstream end is connected to a drain of the gutter and at the downstream end is connected to a further section of the water drain system, wherein the drain line is accommodated in the cavity of the cavity wall with a draining drain line section, wherein the upstream end of the drain line that is accommodated in the cavity, is at the location of the gutter.

[0024] Such a water drain system may be provided with one or more of the features as described above per se as possible part of the invention.

[0025] The invention furthermore provides a building that is provided with a drain system according to the invention.

[0026] In one aspect the invention provides a gutter, destined to be placed in the roof base area of a dwelling house, wherein the gutter at the location of a drain is provided with a fill-up funnel.

[0027] In a further aspect the invention provides a dwelling house that is provided with one or more of such gutters.

[0028] The aspects and measures described and/or shown in the application may where possible also be used individually. Said individual aspects and other aspects may be the subject of divisional patent applications relating thereto.

SHORT DESCRIPTION OF THE DRAWINGS

[0029] The invention will by way of example be elucidated on the basis of a number of exemplary embodiments shown in the attached drawings, in which:

Figure 1 is a schematic cross-section through a building that is provided with a water drain system according to the invention, in a first embodiment;

Fig. 1B shows the building of figure 1A, with an alternative, second embodiment of a water drain system according to the invention;

Figures 2A-D show a schematic cross-section of the cavity wall in the embodiment of figure 1A, a schematic cross-section of a cavity wall in the embodiment of figure 1B, a detail of the gutter drain for the embodiments of figures 1A and 1B, and a detail of the gutter connection in the embodiments of figures 1A and 1B, respectively;

Figures 3 and 3A show a schematic cross-section of a building with a third embodiment of a water drain system according to the invention, as well as a schematic cross-section through the cavity wall of the embodiment of figure 3; and

Figure 4 is an alternative embodiment of a wall passage in a water drain system according to the invention.

DETAILED DESCRIPTION OF THE DRAWINGS

[0030] In figure 1A a building 1 is being shown in a schematic manner, with a cross-section through the cavity of a cavity wall that extends parallel to the plane of the drawing, wherein a layer of insulating material 5 in said cavity wall is shown in front view.

[0031] The connection cavity walls 2, which are perpendicular thereto, extend perpendiculr to the plane of the drawing, and also each comprise an outer liner 3, a cavity 4, a layer of insulating material 5, and an inner liner 6. The outer liner 3 will usually be built up of stonework. The building 1 stands on a foundation 100, schematically depicted, and has a roof 101, that is inclined. On the board of the roof a gutter 7 has been mounted that, near the corner of the cavity walls, is provided with a drain 8, with a leafed basket 30 and and a funnel 9 that belongs to a fill-up system (also called a UV-system). The exit side of the funnel connects to an elbow 10, that may optionally be flexible/bellows-shaped so as to be able to follow the displacement of the gutter 7. It is remarked that also other gutter constructions may be used.

[0032] The elbow 10 connects to a horizontal pipe section 12, that has been passed through a - for instance - synthetic insert element 11, further depicted in figure 2D. Via the elbow 13 the horizontal pipe section 11 changes into standpipe 14, at the upstream end of it. At the downstream end or lower end, near the foundation 100, the standpipe 14 changes, via an elbow 15a, into a horizontal pipe section 12, that also extends through an insert element 11, and ends in opening 18, that will be connected to a not further depicted further section of the drain system or drains freely.

[0033] The embodiment of figure 1b mainly corresponds with that of figure 1A, but instead of the elbow 15a an oppositely directed elbow 15b has been arranged therein, that connects to horizontal drain line 19, that extends through the cavity and at the downstream and at the location of the other cavity wall 2 with pipe section 12 extends through the outer liner 3 thereof, also via an insert element 11 that has been accommodated in an outer liner 3.

[0034] As can be seen in figures 2A and 2B, either the standpipe 14 or the pipe 19 is mainly in the cavity section 4 of the cavity wall 2. Here the pipes 14/19 may abut the layer 5 of insulating material, or press into it to a small extent. It is also possible to provide the layer 5 of insulating material, if the latter consists of plate material, with slots for - at least partial - accommodation of the pipes 14/19.

[0035] As figure 2D suggests, it is also possible to

make the standpipe 14 extend through the cavity 4 at the location of the corner of the two connecting cavity walls 2, in a space 5 left between the vertical crosscut end edges of the layers 5 of insulating material of both cavity walls 2.

[0036] With the fill-up funnel 9 in the drain 8 of the gutter a sufficient drain capacity can be achieved with smaller diameters of the drain line than in normal, existing drain systems for houses. Although usual standpipes have a diameter of 70-80 mm, in this case a diameter of 40-50 mm will suffice. With such a diameter the standpipe 14, and also the pipe 19, can be accommodated easily in the cavity space 4, without forming a cold bridge, the heat insulation being deteriorated locally and/or generating undesirable impact noise.

[0037] Figures 3, 3A give an alternative for the embodiment of figure 1B, wherein the pipe section 12 that extends through the outer liner 3, continues in a horizontal pipe 20, also accommodated in the cavity wall 2. Via the elbow 21 the pipe 20 changes into a standpipe 22, that at the lower end via the elbow 23, changes into a pipe section 12 that extends through an insert element 11.

[0038] The insert element 11 (figure 2D) is made of - for instance - synthetic material and is shaft-shaped, with walls 11a-d. The dimensions of the walls 11a, 11c can be attuned to those of a brick in the outer liner 3. Thus the insert element 11 can be accommodated easily in the outer liner 3. The wall 11a is provided with an opening 16 and the wall 11d is provided with an opening 17. The pipe section 12, as well as a connecting section of the elbow 13, extends between the openings 16 and 17. When placing the insert element 11, provided with pipe section 12 and elbow 13, the elbow 13 can be secured onto the upper end of the pipe 14. When placing the gutter 7 the elbow 10 can be connected to the opening 16.

[0039] In the embodiment of figure 4 the fill-up funnel 9 connects to a drain pipe 24, that is connected in an airtight manner to and thus drains in a container 25 of synthetic material, that is accommodated in the outer liner 3 and extends into the cavity space 4. The pipe 14 is connected at the lower end of the container 25, in the cavity space. When the wall is being built, the container can be accommodated therein, wherein there is some liberty as to the choice of the height of the gutter 7 that is to be placed later. Then the length of the pipe 24 can easily be adapted, to it. In the container subnormal pressure prevails in accordance with the principles of the fill-up system, in relation to the funnel 9.

Claims

1. Water drain system for precipitation that falls onto a building, wherein the building is provided with a roof and a water gutter receiving precipitation from said roof, wherein the building is furthermore provided with a cavity wall, wherein the water drain system comprises a drain line that at the upstream end is connected to a drain of the gutter and at the downstream end is connected to a further section of the water drain system, wherein the drain line is accommodated in the cavity of the cavity wall at least with a vertically draining drain line section.

2. Water drain system according to claim 1, wherein the upstream end of the drain line that is accommodated in the cavity is at the location of the gutter and/or the downstream end is at the location of the ground level.

3. Water drain system according to claim 1 or 2, wherein between the upstream end and the gutter drain a connection device is provided that is at least partially accommodated in the outer liner of the cavity wall.

4. Water drain system according to claim 3, wherein the connection device comprises a tube connection between the gutter drain and the drain line in the cavity wall.

5. Water drain system according to claim 3, wherein the connection device comprises a container that on the one hand receives water from the gutter and on the other hand delivers water at the upstream end of the drain line that is accommodated in the cavity.

6. Water drain system according to claim 3, 4 or 5, wherein the connection device comprises a construction element, that is provided with a wall section that can be placed in the outer face of the outer liner of the cavity wall and through which the tube connection passes.

7. Water drain system according to claim 6, wherein the outer liner is composed of wall elements, such as bricks for stonework, wherein the construction element as to dimensions in the outer face of the outer liner of the cavity wall is attuned to the wall elements.

8. Water drain system according to claims 4 and 7, wherein the construction element is embodied for flat, horizontal accommodation in the outer liner.

9. Water drain system according to claims 5 and 7, wherein the construction element is embodied for upright, vertical accommodation in the outer liner.

10. Water drain system according to any one of the claims 6-9, wherein the construction element is hollow, casing-shaped or box-shaped, shaft-shaped and/or made of synthetic material.

11. Water drain system according to any one of the claims 3-10, wherein the connection device comprises a flexible tube.

12. Water drain system according to any one of the claims 3-11, wherein the connection device at the downstream side thereof is connected to a substantially horizontal section of the drain line.

13. Water drain system according to any one of the claims 3-11, wherein the connection device at the downstream side thereof is connected to a substantially vertical section of the drain line.

14. Water drain system according to any one of the preceding claims, wherein the gutter drain comprises a fill-up funnel.

15. Building comprising a drain system according to any one of the preceding claims.

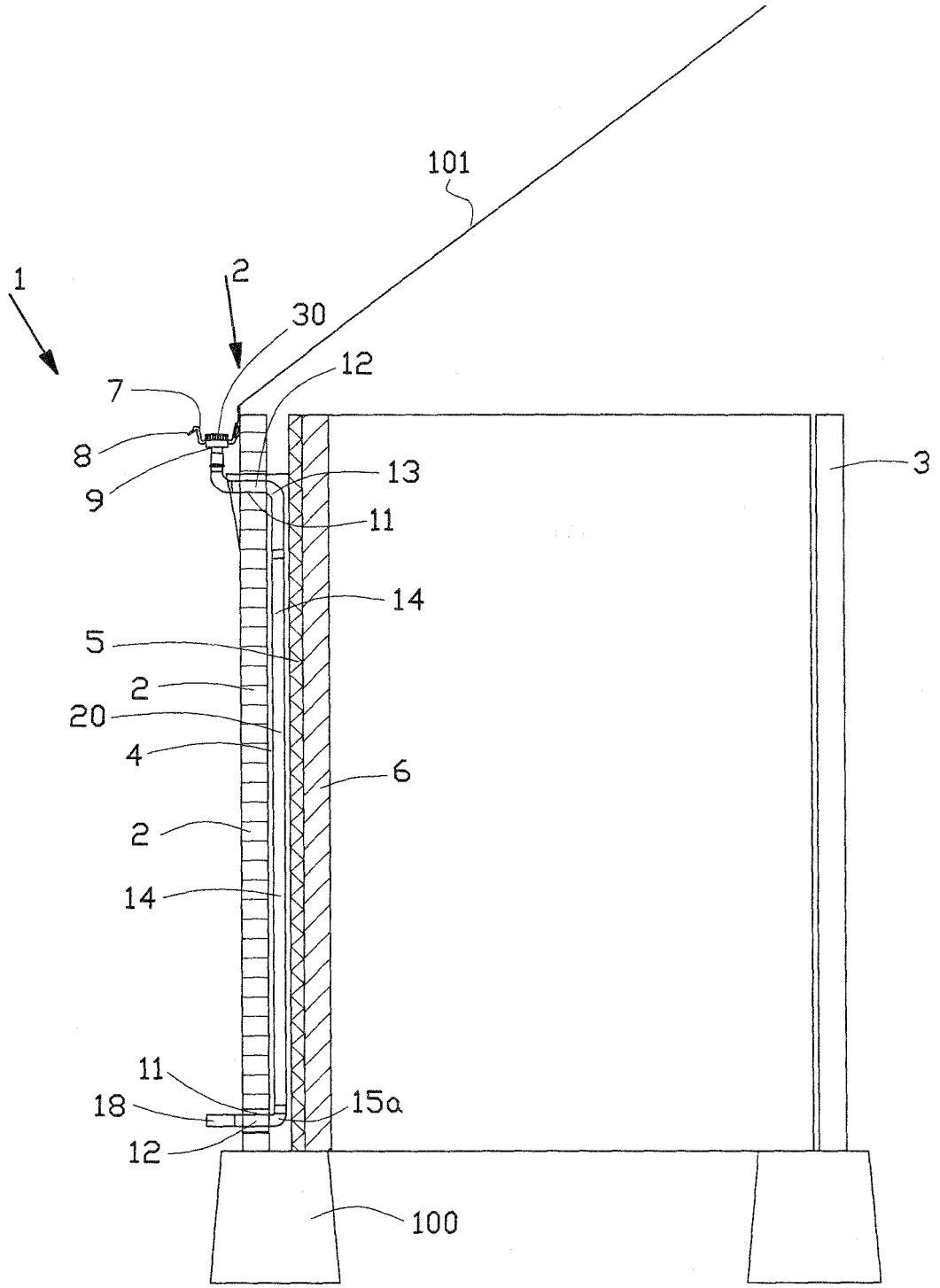
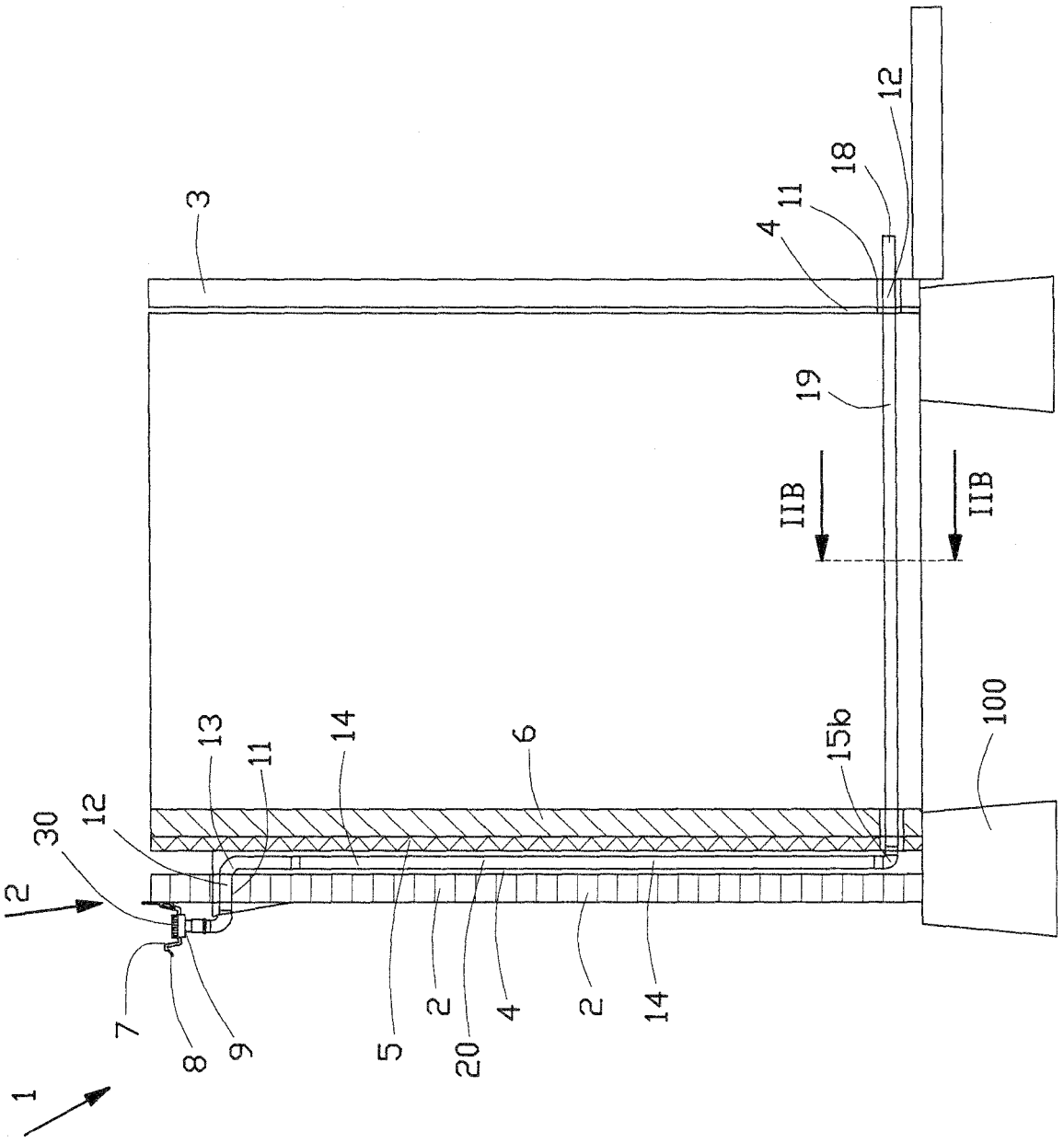


FIG. 1A

FIG. 1B



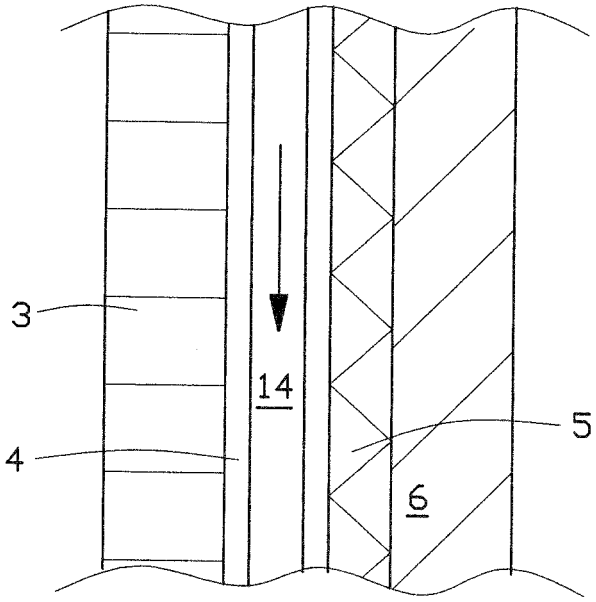


FIG. 2A

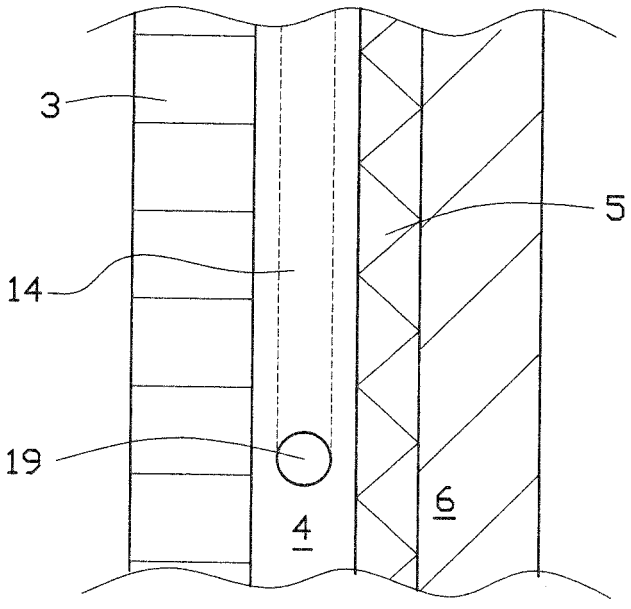


FIG. 2B

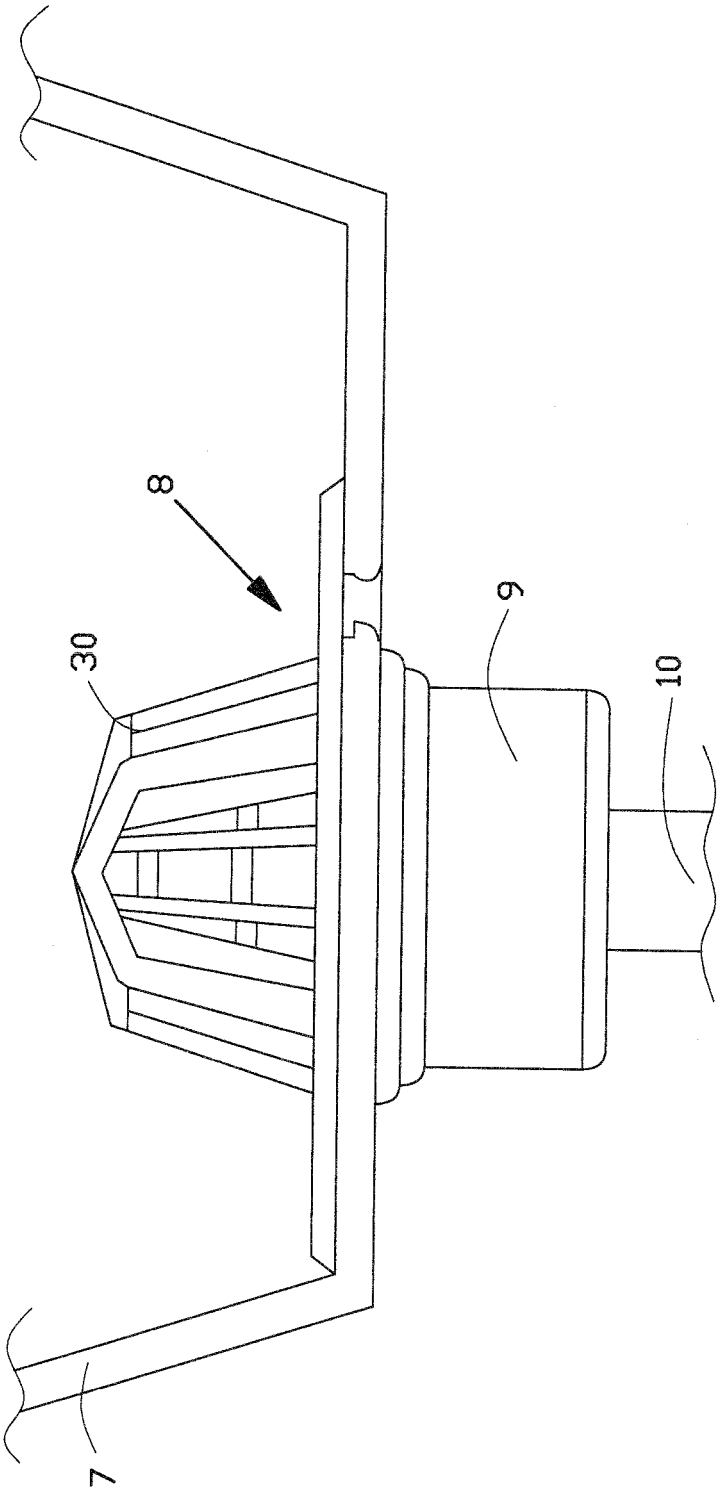


FIG. 2C

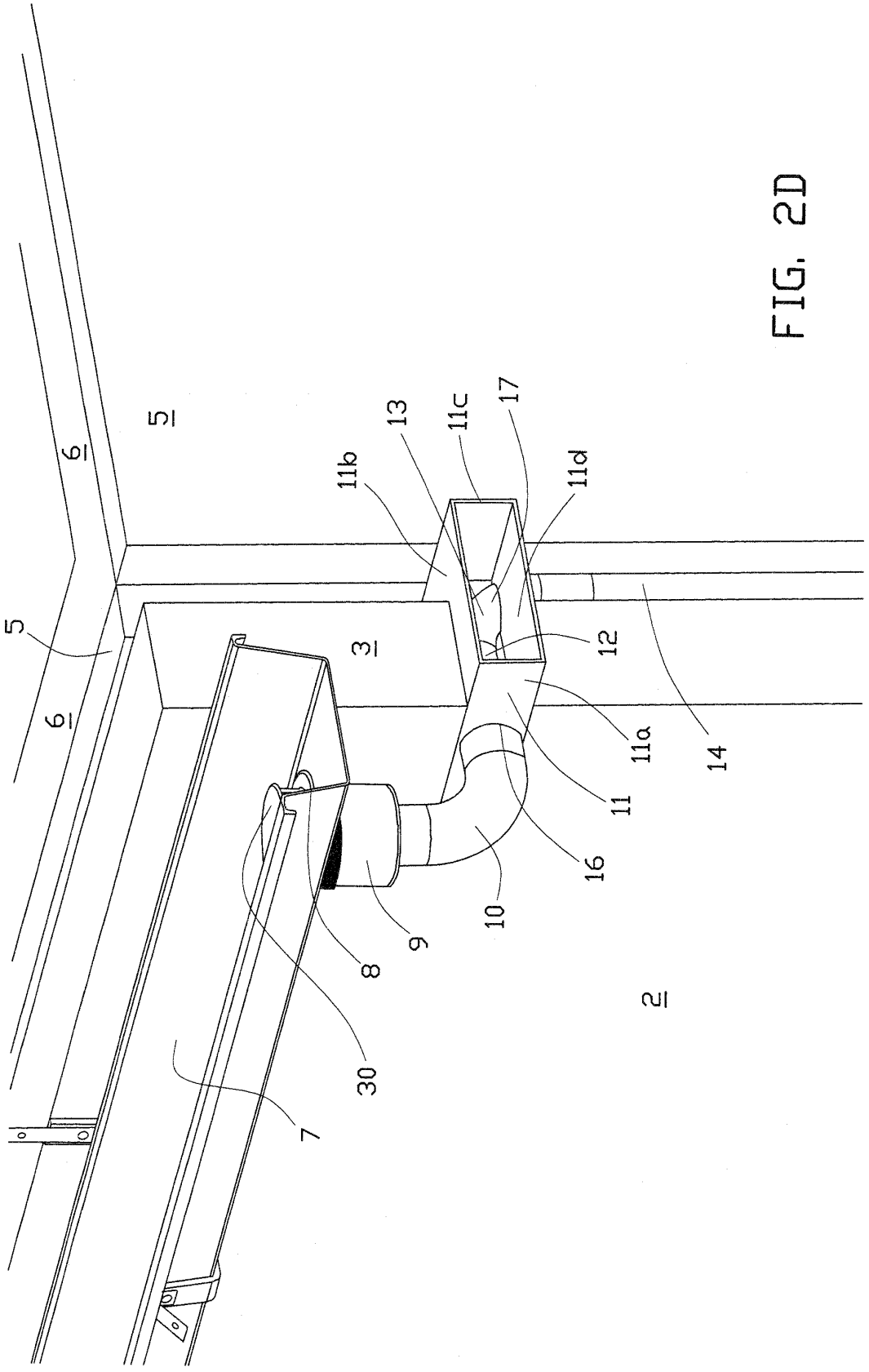
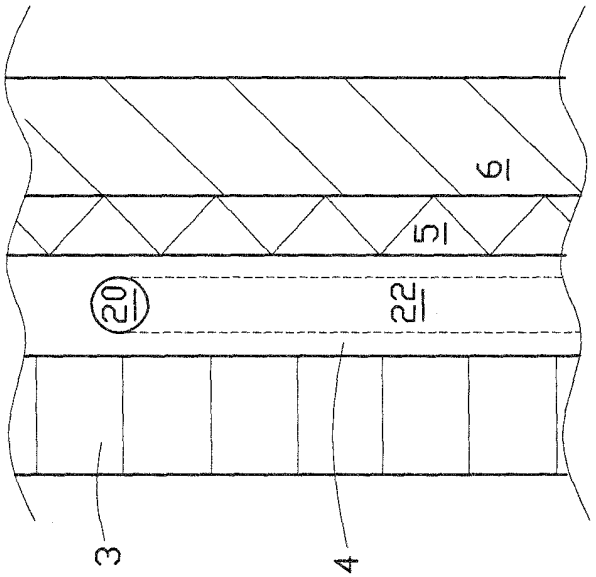


FIG. 2D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22
3
4

FIG. 3A

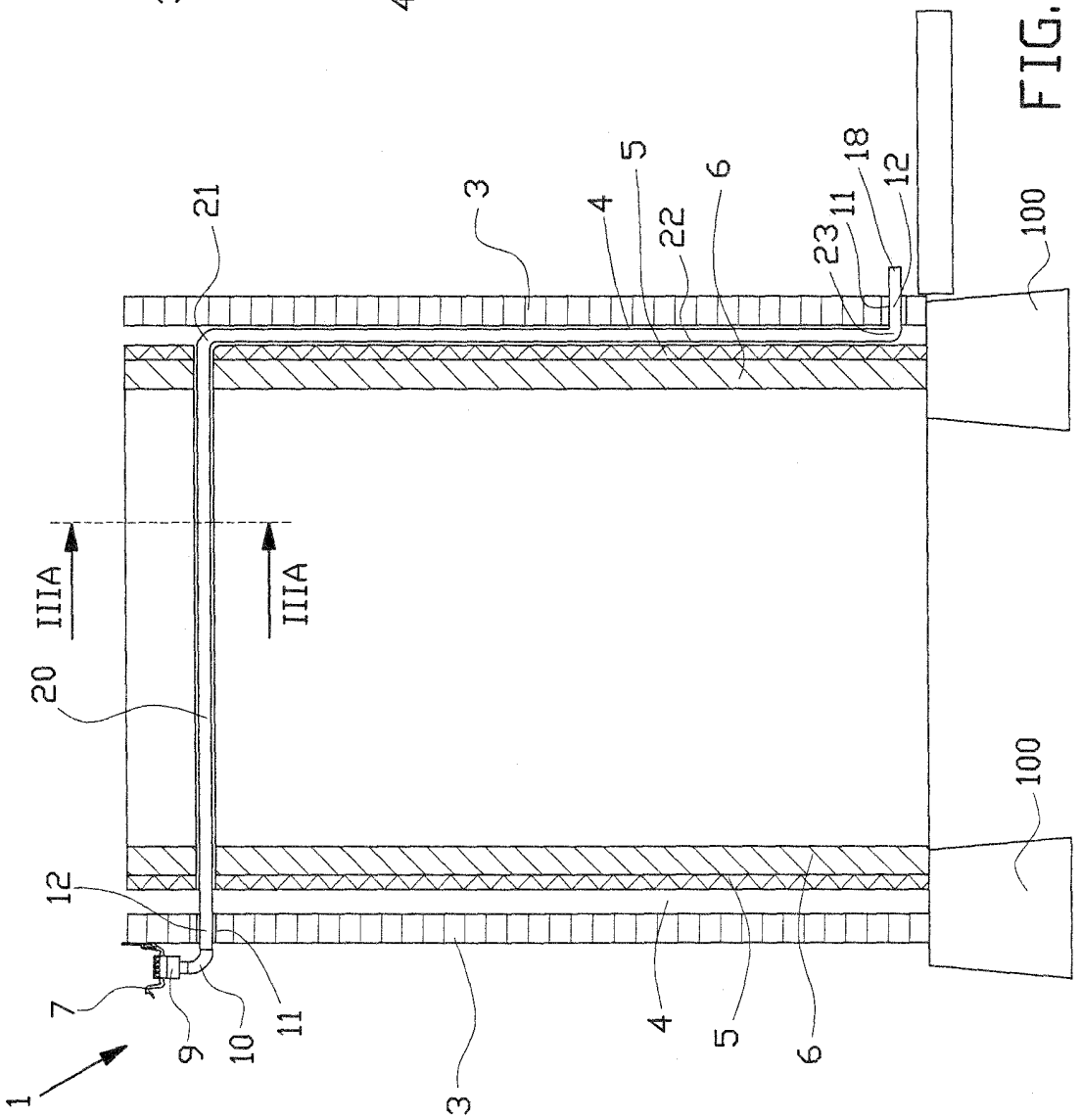
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FIG. 3

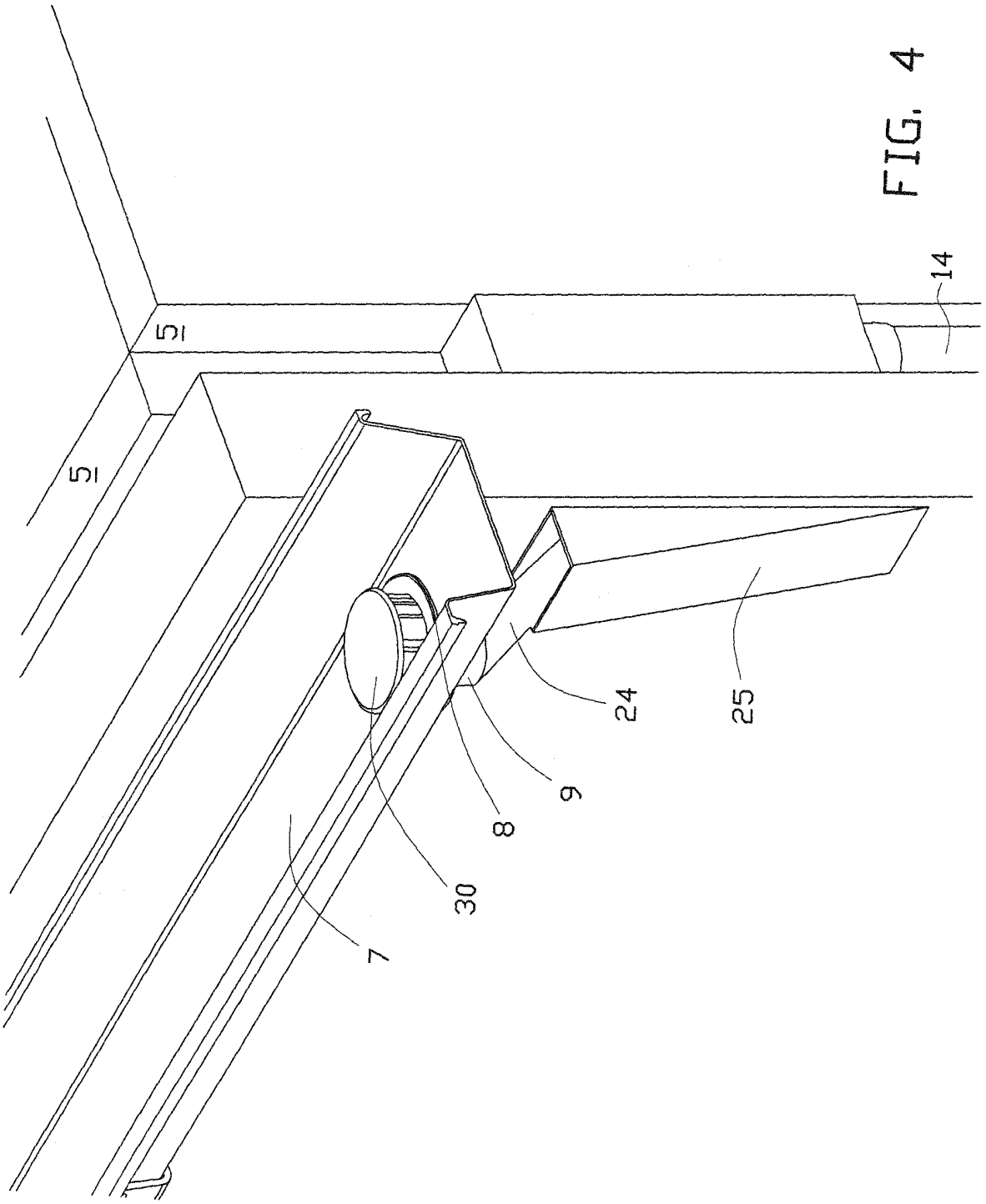

FIG. 4