



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
03.06.2020 Bulletin 2020/23

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

(21) Application number: **19211634.1**

(22) Date of filing: **26.11.2019**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(71) Applicant: **OY Prevx AB**
66900 Nykarleby (FI)

(72) Inventors:
• **PILAT, Rafal**
61-304 Poznan (PL)
• **WIEWIÓRA, Mikołaj**
60-164 Poznan (PL)

(30) Priority: **29.11.2018 SE 1851491**

(74) Representative: **Bergensträhle Group AB**
P.O. Box 17704
118 93 Stockholm (SE)

(54) **LINEAR DRAIN**

(57) A drain assembly (1) comprises an elongated channel member (10) adapted for fixture in a floor with a bottom (10a) and two side walls (10b). A cover (20) is adapted to cover the interior of the channel member; and a plurality of mounting elements (30) is adapted to be attached to the channel member (10) for mounting the cover (20) in a position wherein the interior of the channel member is covered. By providing the side walls (10b) of the channel member (10) with ridges and grooves ex-

tending in the longitudinal direction of the channel member, and providing the mounting elements (30) with ridges and grooves (32b) mating with the ridges and grooves of the side walls (10b) of the channel member (10), the mounting elements are attachable at predefined distances from the bottom (10a) of the channel member (10). Thereby, a linear drain is provided which is easy to assemble with a high degree of flexibility.

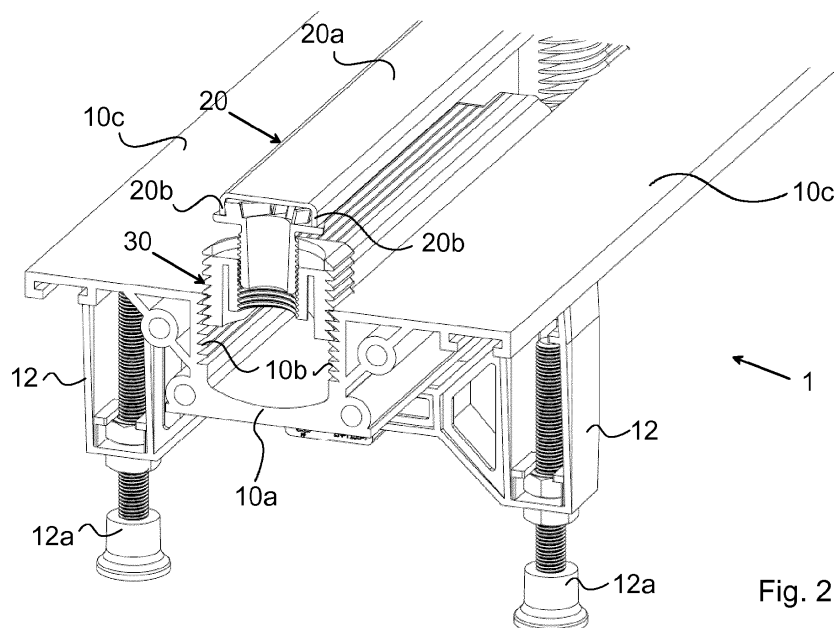


Fig. 2

Description

Technical field

[0001] The present invention relates generally to drains and more specifically to a linear drain having an improved assembly.

Background art

[0002] Due to increased demand for new designs and different drain options, manufacturers of drains experience a demand for elongated drains for use in wet areas in building structures, e.g. in bathrooms or in shower cubicles where the drain extends along a relatively large length of the shower room floor.

[0003] There is also an increased demand for cost-efficient and flexible solutions, which means that the drain assemblies must be easy to manufacture, be flexible and also easy to install and assemble.

Summary of invention

[0004] An object of the present invention is to overcome the problems of the prior art and to provide a linear drain which is easier to assemble with a high degree of flexibility.

[0005] According to the invention, there is provided a drain assembly comprising: an elongated channel member adapted for fixture in a floor, the channel member having a bottom and two side walls extending from the bottom, defining an interior of the channel member; wherein the side walls of the channel member are provided with ridges and grooves extending in the longitudinal direction of the channel member, and a cover adapted to cover the interior of the channel member; the drain assembly being characterized by a plurality of mounting elements adapted to be attached to the channel member for mounting the cover onto the top of the mounting elements in a position wherein the interior of the channel member is covered; wherein each of the mounting elements is provided with ridges and grooves mating with the ridges and grooves of the side walls of the channel member, whereby the mounting elements are attachable at predefined distances from the bottom of the channel member. This provides for a drain assembly which is each to assemble with a high degree of flexibility.

[0006] In a preferred embodiment, each of the mounting elements comprises a body provided with a threaded hole and a screw adapted to be received in the hole. This provides for a fine-tuning of the level of the cover.

[0007] In a preferred embodiment, the screw is made up of a threaded stem and a head, wherein the upper surface of the head is provided with a profile, preferably with a hexagonal outer shape. Preferably, the cover has an inverted U shape with an essentially planar upper section and two flanges extending down from the outer edges of the upper section, and wherein the distance between two

opposite sides of the profile of the screw head essentially corresponds to the distance between the two flanges. This allows for mounting of the cover on the head of the screw.

[0008] In a preferred embodiment, the pitch of threads of the screw is adapted so that a full turn of the screw corresponds to a height adjustment within the range of 0.6 - 3.0 mm, preferably 1.5 mm, which gives a sufficient resolution.

[0009] In a preferred embodiment, the body of each of the mounting elements is provided with four side surfaces, wherein two opposite side surfaces are provided with ridges and grooves. Preferably, the distance between the opposite side surfaces provided with ridges and grooves corresponds to the distance between the two walls of the channel member, and wherein the distance between the other side surfaces of the body is less than the distance between the two walls of the channel member. With this design, the mounting elements can easily be attached to the channel member at a desired level by a turning movement.

[0010] In a preferred embodiment, two opposite intersections between the side surfaces of the body are rounded, whereby the turning movement is facilitated.

[0011] In a preferred embodiment, the distance between two adjacent ridges or grooves is within a range of 2 - 4 mm, preferably 2.85 mm. This gives a sufficient resolution, particularly in combination with the finetuning possibility, and at the same time a structure which is suitable for manufacturing and assembly.

Brief description of drawings

[0012] The invention is now described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a perspective overview of a drain assembly according to the invention;

Fig. 2 is a cross-sectional view of the drain assembly of Fig. 1; and

Fig. 3a shows a mounting element used in the drain assembly shown in Fig. 1;

Fig. 3b is a sectional view through the mounting element of Fig. 3a;

Figs. 4a-d show different steps of the assembly of the drain assembly of Fig. 1.

Description of embodiments

[0013] In the following, a detailed description of a drain assembly according to the invention will be described.

[0014] Fig. 1 is a perspective overview of a linear drain assembly, generally designated 1. The drain assembly

comprises an open-topped elongated channel member 10 which is adapted to be fixed in a floor structure (not shown). To this end, leg supports 12 with height adjustable legs 12a may be attached to the underside of the channel member 10. By means of these leg supports, the channel member 10 may be positioned and leveled in the floor structure for subsequent embedment. The channel member 10 is preferably made by a suitable plastic material but can also be made at least partly by a suitable metal or metal alloy, such as aluminum or stainless steel. In Fig. 1 the channel member 10 is provided with two end elements 14, one attached to each end portion of the channel member 10. These end elements 14 close the channel in the end portions. In other configurations (not shown), end elements may serve the purpose of interconnecting two channel members.

[0015] An elongated cover 20 is adapted to cover the interior of the channel member 10. This cover is preferably made by stainless steel and is attached to the channel member 10 by means of a plurality, in the shown example five mounting elements 30.

[0016] The structure of the drain assembly 1 will now be described in more detail with reference to Fig. 2, showing a cross-sectional view of the channel member 10 at one of the mounting elements 30. The channel element 10 comprises a bottom 10a, from which two side walls 10b extend upward. A wing-shaped flange 10c extends laterally outward from each of the side walls 10b. The channel member is, before embedment, positioned to that the upper surfaces of these flanges will be in level with the floor in which the channel member is embedded. A drain opening (not shown) may be formed in the bottom 10a of the channel member 10, allowing the attachment of a siphon thereto.

[0017] The side walls 10b of the channel member 10 are on the inside thereof provided with ridges and grooves extending in the longitudinal direction of the channel member. The mounting element 30 is provided with ridges and grooves mating with the ridges and grooves of the side walls 10b of the channel member 10, whereby the mounting element 30 can be mounted at predefined distances from the bottom of the channel member, as will be described in detail below with reference to Figs. 4a-d. The distance between two adjacent ridges (or grooves) is in a preferred embodiment 2.85 mm, which is also the resolution by which the mounting element 30 can be attached to the channel member 10. However, this distance may be anywhere within a range of 2 - 4 mm.

[0018] The mounting element 30, see also Figs. 3a and 3b, comprises a body 32 provided with four side surfaces and a preferably thoroughgoing threaded hole 32a adapted to receive a screw 34. The screw is made up of a treaded stem 34a and a head 34b. The upper surface of the head 34b is provided with a profile 34c with a hexagonal outer shape. The distance between two opposite sides of the profile 34c is adapted to allow mounting of the cover 20 on top of the screw head 34b, see fig. 2. In

other words, the cover 20 has an inverted U shape with an essentially planar upper section 20a and two flanges 20b extending down from the outer edges of the upper section 20a, and the distance between two opposite sides of the profile 34c essentially corresponds to the distance between the two flanges 20b. The width of the cover 20, i.e., the distance between the two flanges 20b thereof, is preferably slightly smaller than the distance between the two side walls 10b of the channel member 10, so that small slits are formed between the cover 20 and the wing-shaped flanges 10c, allowing water to pass there through.

[0019] The position of the cover 20 can be height adjusted or fine-tuned by turning the screw 34 one sixth of a turn, wherein the pitch of the screw threads preferably is adapted so that this correspond to a height adjustment of 0.25 mm in the preferred embodiment, i.e., a full turn of the screw corresponds to a height adjustment of 1.5 mm. However, this value may be anywhere within the range of 0.6 - 3.0 mm.

[0020] Two opposite side surfaces of the body 32 are provided with ridges and grooves 32b, while the two other side surfaces 32c are smooth. As can be seen in Fig. 3a, two opposite intersections between the side surfaces of the body 32 are rounded, i.e., having a radius, while the two other intersections are sharp. The distance between the opposite side surfaces provided with ridges and grooves 32b corresponds to the distance between the ridges and grooves of the two walls 10b of the channel member 10. However, the distance between the other side surfaces 32c of the body 32 is smaller - less than the distance between the two walls 10b of the channel member 10. The function of this design will now be explained with reference to Figs. 4a-d, explaining the assembly of the drain assembly.

[0021] In a first step, see Fig. 4a, when the channel member 10 has been positioned in the floor and been embedded therein, the mounting elements are inserted into the area between the two opposing side walls 10b of the channel member 10, with the smooth surfaces 32c of the mounting element 30 facing the side walls 10b of the channel member 10. This insertion is possible due to the fact that the distance between the two smooth surfaces 32c of the mounting element 30 is less than the distance between the two side walls 10b. In this way, the mounting element 30 is lowered to a level which is deemed to be appropriate for subsequent assembly of the cover 30 onto the head 34b of the screw 34.

[0022] In a second step, see Fig. 4b, the mounting element 30 is turned clockwise about the center axis thereof. This is possible thanks to the design with two rounded corners. The grooves and ridges 32b of the mounting element 30 also extend to the rounded corners, so that, by turning the mounting element 30, the grooves and ridges 32b of the mounting element 30 and the grooves and ridges of the side walls 10b of the channel member 10 start to engage. This turning of the mounting element 30 continues until it has been turned a quarter of a full

turn, see Fig. 4c. Further turning is not possible due to the sharp intersection between the two walls of the body 32 opposite to the rounded intersections. By the turning of the mounting element 30, it has been firmly attached to the channel member 10 as a height which is approximately suitable for the mounting of the cover 20.

[0023] All mounting elements 30 are attached to the channel member 10 in the same way and at the same height, i.e., engaging the same ridges and grooves of the side walls 10b of the channel member 10.

[0024] In a third, final step, the level of the upper surface of the screw 34 is fine-adjusted by turning the screw so that the head 34b extends a suitable distance from the body 32. The cover 20 is finally mounted onto the top of the screw head 34b, see Fig. 4d. It will be appreciated that the mounting elements 30 preferably are attached to the channel member 10 fully lowered into the channel formed between the two side walls 10b thereof, so that the upper surface of the cover 20 will be essentially flush with the upper surfaces of the wing-shaped flanges 10c, thus forming a smooth surface for walking on.

[0025] A preferred embodiment of a drain assembly according to the invention has been described. It will be realized that this may be modified within the appended claims without departing from the inventive idea. Thus, the upper surface of the screw head may be provided with a profile different from a hexagonal outer shape, such as square or octagonal, as long as it cooperates with the cover.

[0026] In the described embodiment, the two other side surfaces of the mounting elements not being provided with ridges and grooves are smooth. However, it will be realized that these two other side surfaces may take any shape and have any structure, as long as the distance between them allows insertion of the mounting elements between the side walls of the channel member.

[0027] In the described embodiment, two opposite intersections between the side surfaces of the body are rounded while the two other intersections are sharp. It will be realized that these two other intersections may take other shapes, as long as the mounting elements may be turned into place in the channel member.

[0028] An elongated channel member adapted for fixture in a floor has been described. It will be appreciated that the inventive idea is applicable also to other kind of elongated channel members.

Claims

1. A drain assembly (1) comprising:

- an elongated channel member (10) adapted for fixture in a floor, the channel member having a bottom (10a) and two side walls (10b) extending from the bottom, defining an interior of the channel member;
- wherein the side walls (10b) of the channel

member (10) are provided with ridges and grooves extending in the longitudinal direction of the channel member, and

- a cover (20) adapted to cover the interior of the channel member;

characterized by

- a plurality of mounting elements (30) adapted to be attached to the channel member (10) for mounting the cover (20) onto the top of the mounting elements (30) in a position wherein the interior of the channel member is covered;
- wherein each of the mounting elements (30) is provided with ridges and grooves (32b) mating with the ridges and grooves of the side walls (10b) of the channel member (10), whereby the mounting elements are attachable at predefined distances from the bottom (10a) of the channel member (10).

2. The drain assembly (1) according to claim 1, wherein each of the mounting elements (30) comprises a body (32) provided with a threaded hole (32a) and a screw (34) adapted to be received in the hole.
3. The drain assembly (1) according to claim 2, wherein the screw (34) is made up of a threaded stem (34a) and a head (34b), wherein the upper surface of the head (34b) is provided with a profile (34c), preferably with a hexagonal outer shape.
4. The drain assembly (1) according to claim 3, wherein the cover (20) has an inverted U shape with an essentially planar upper section (20a) and two flanges (20b) extending down from the outer edges of the upper section (20a), and wherein the distance between two opposite sides of the profile (34c) of the screw head (34b) essentially corresponds to the distance between the two flanges (20b).
5. The drain assembly (1) according to any one of claims 2-4, wherein the pitch of threads of the screw (34) is adapted so that a full turn of the screw corresponds to a height adjustment within the range of 0.6 - 3.0 mm, preferably 1.5 mm.
6. The drain assembly (1) according to any one of claims 1-5, wherein the body (32) of each of the mounting elements (32) is provided with four side surfaces (32b, 32c), wherein two opposite side surfaces are provided with ridges and grooves (32b).
7. The drain assembly (1) according to claim 6, wherein the distance between the opposite side surfaces provided with ridges and grooves (32b) corresponds to the distance between the two walls (10b) of the channel member (10), and wherein the distance between the other side surfaces (32c) of the body (32) is less than the distance between the two walls (10b) of the

channel member (10).

8. The drain assembly (1) according to claim 7, wherein two opposite intersections between the side surfaces (32b, 32c) of the body (32) are rounded. 5
9. The drain assembly (1) according to any one of claims 1-8, wherein the distance between two adjacent ridges or grooves is within a range of 2 - 4 mm, preferably 2.85 mm. 10

15

20

25

30

35

40

45

50

55

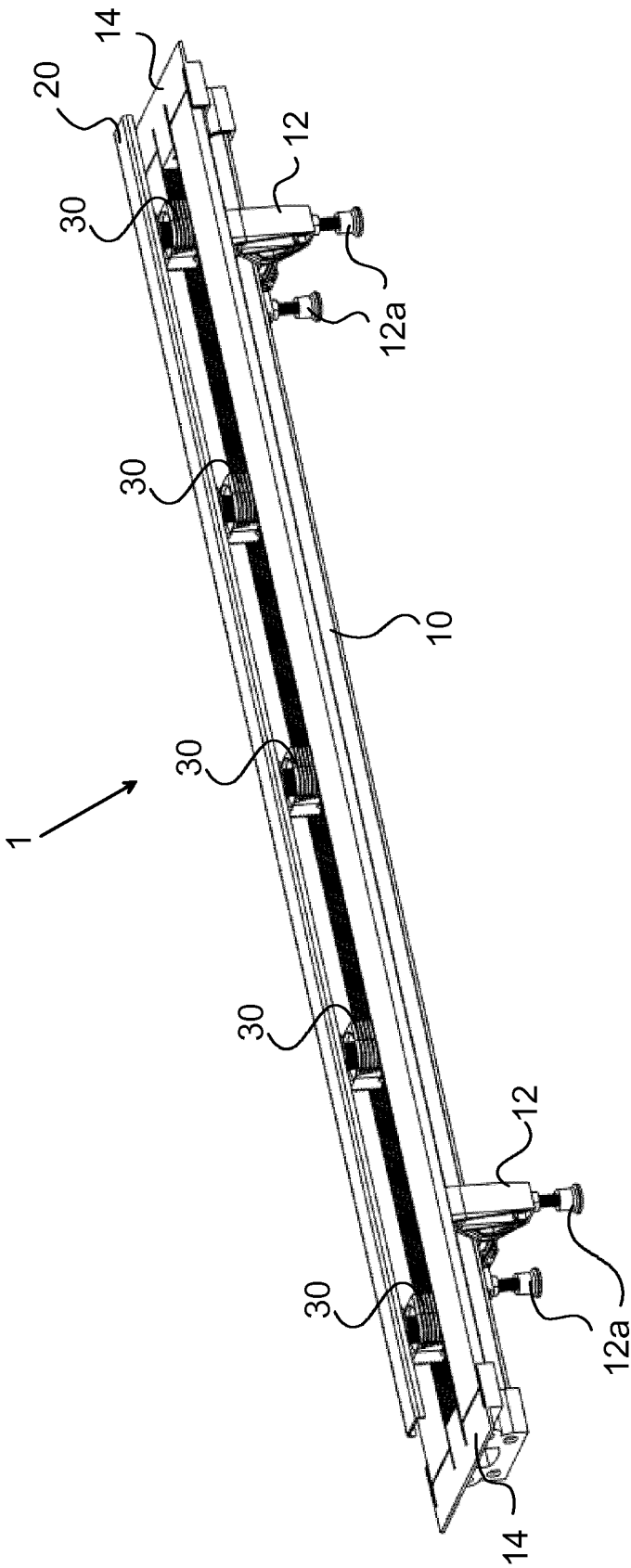
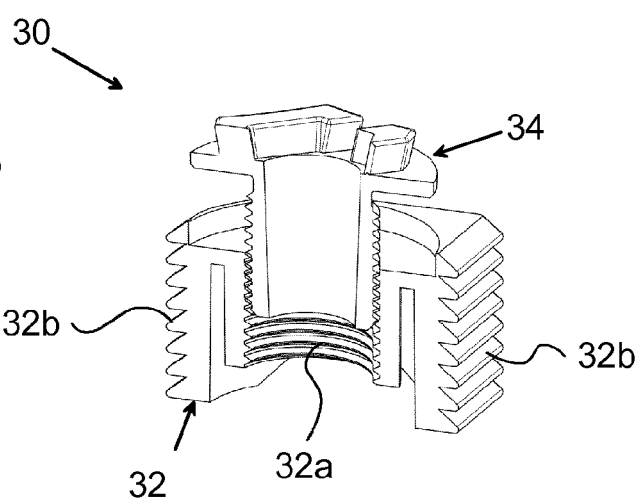
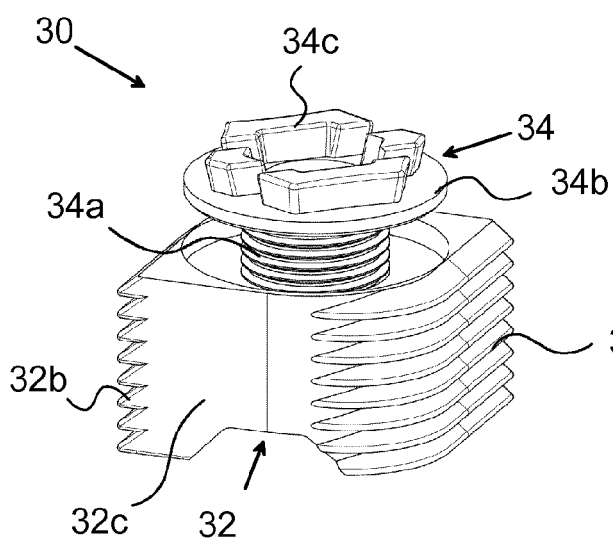
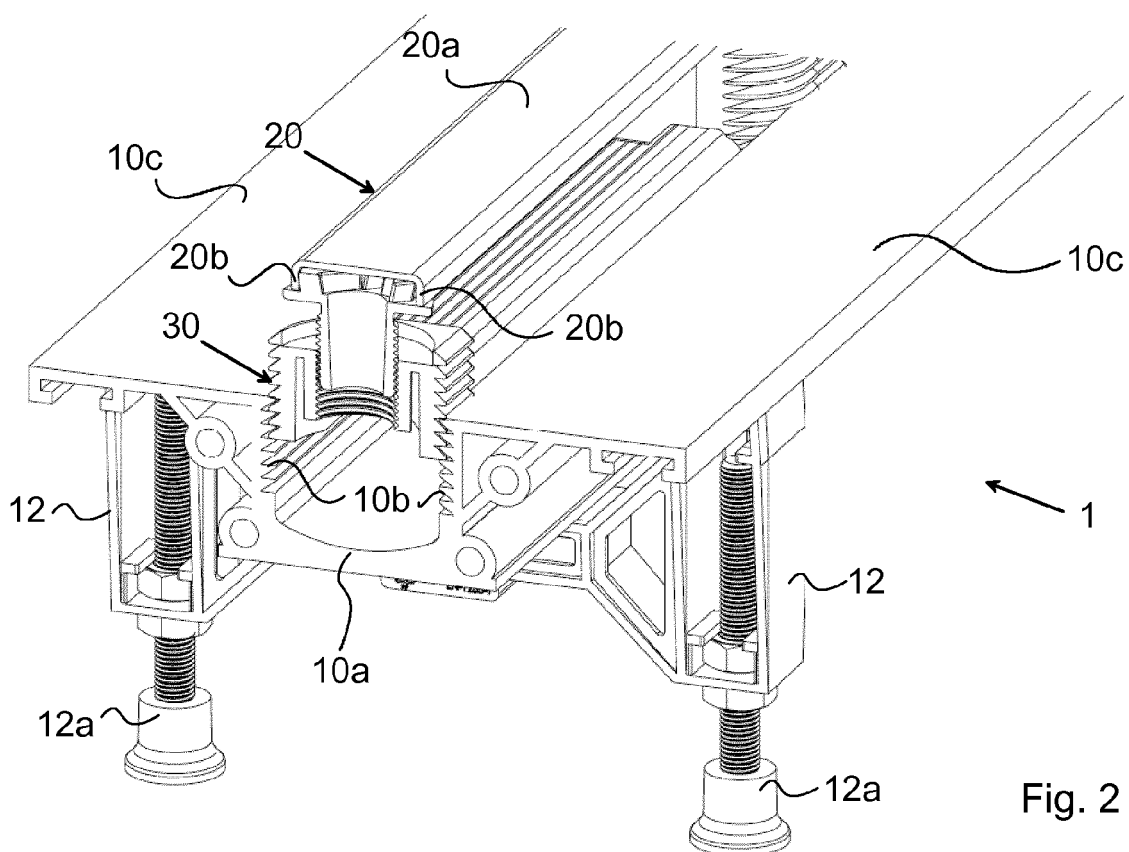


Fig. 1



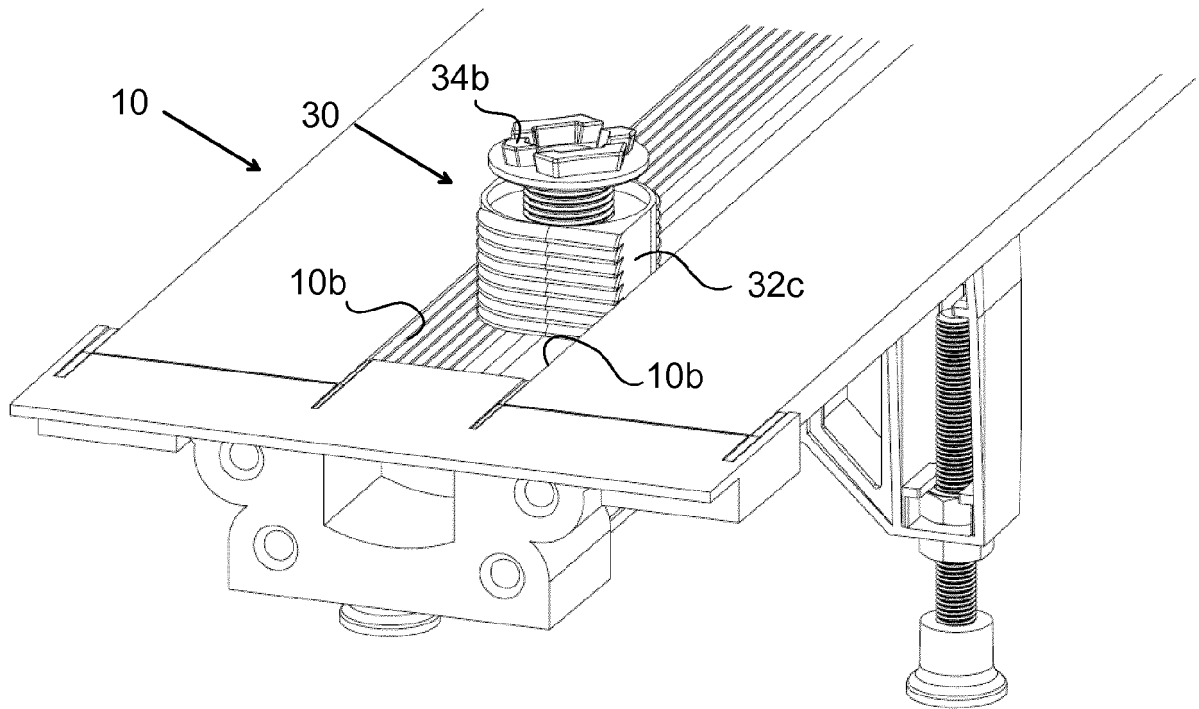


Fig. 4a

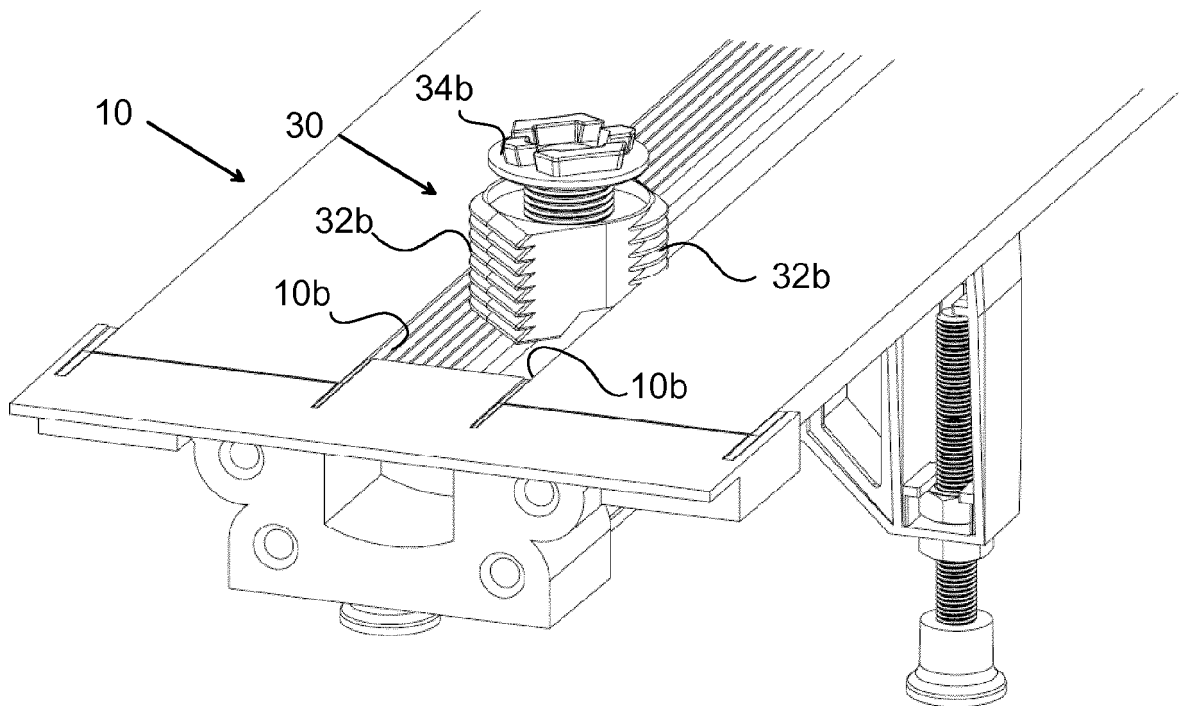


Fig. 4b

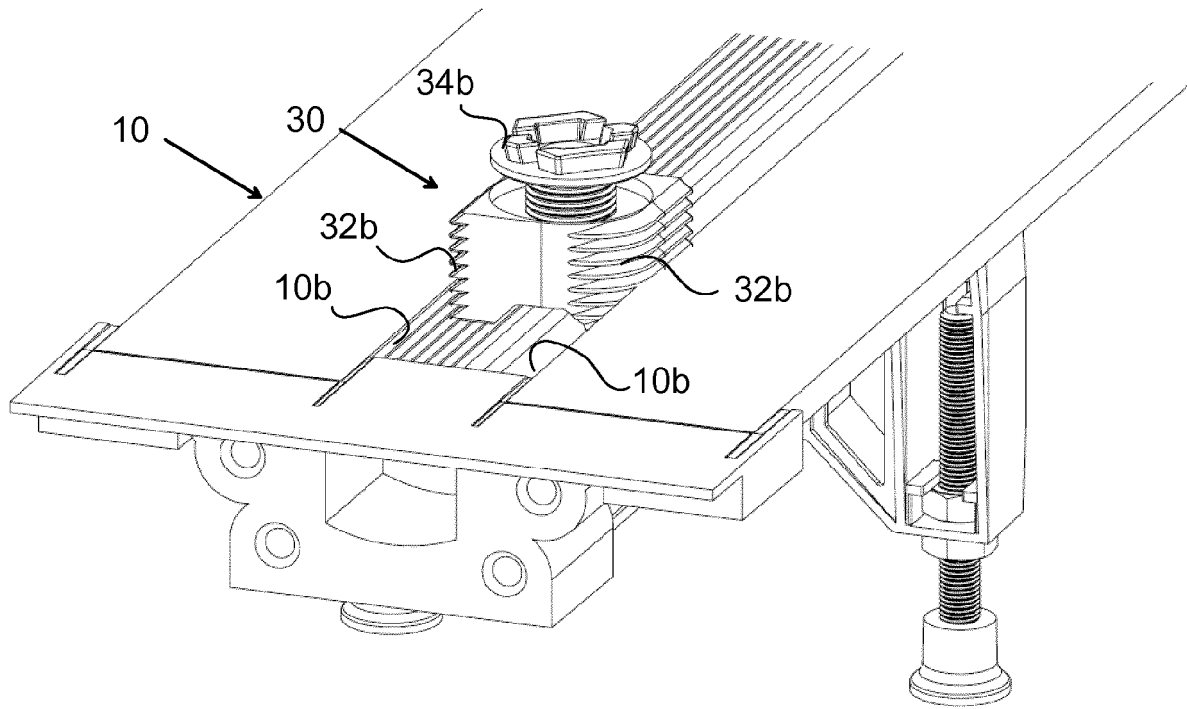


Fig. 4c

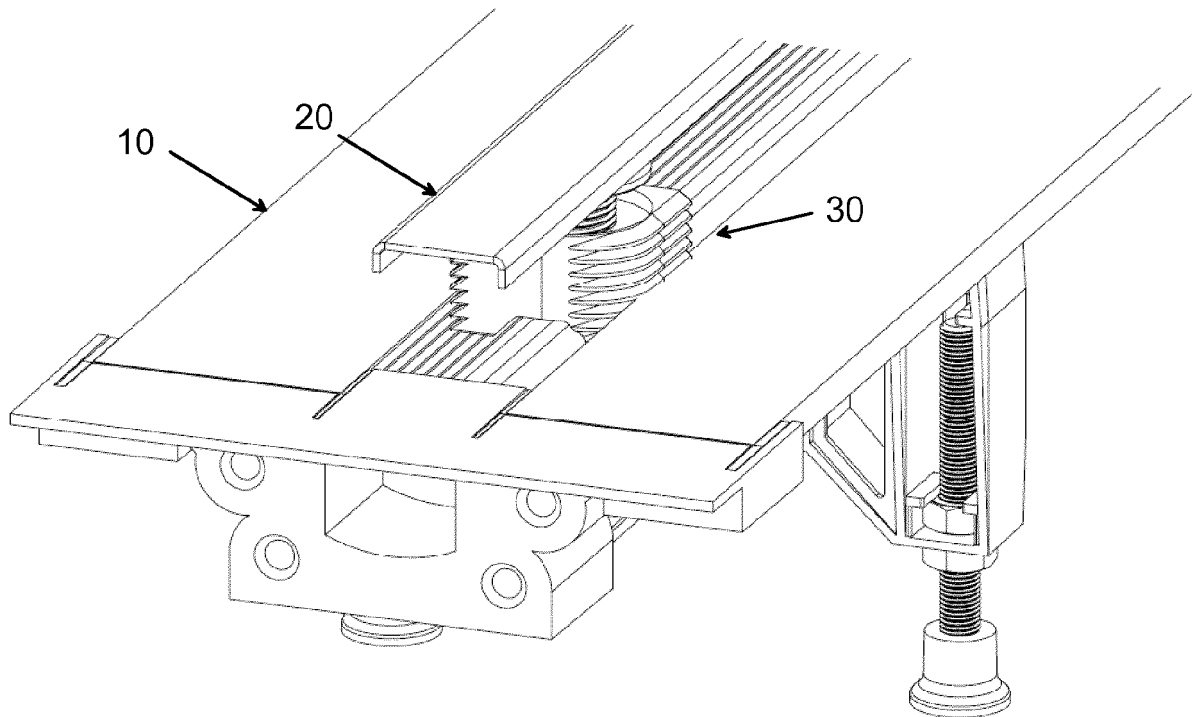


Fig. 4d



EUROPEAN SEARCH REPORT

 Application Number
 EP 19 21 1634

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2009/241440 A1 (MUSSE DARELL W [US]) 1 October 2009 (2009-10-01)	1,6,9	INV. E03F5/04
A	* paragraph [0010]; figure 1 * * paragraph [0009] * * paragraph [0034] * * paragraph [0036] - paragraph [0038] *	2-5,7,8	
X	US 7 637 694 B1 (MUSSE DARELL W [US]) 29 December 2009 (2009-12-29)	1,6,9	
A	* columns 3-8; figure 1 *	2-5,7,8	
A	US 2004/062602 A1 (DAHOWSKI DONALD E [US] ET AL) 1 April 2004 (2004-04-01)	1-9	
A	* paragraph [0002]; figure 1 * * paragraph [0009] - paragraph [0010] *	1-9	
A	US 2017/266588 A1 (KACHMAN CHRISTOFER JAY [US]) 21 September 2017 (2017-09-21)	1-9	TECHNICAL FIELDS SEARCHED (IPC) E03F
A	* paragraph [0002]; figure 1 *	1-9	
A	CH 614 004 A5 (WARTHMAN ROBERT [CH]) 31 October 1979 (1979-10-31)	1-9	
A	* figure 1 *	1-9	
A	GB 625 547 A (JOSAM MFG CO) 29 June 1949 (1949-06-29)	1-9	
A	* figure 1 *	1-9	
A	US 8 347 906 B1 (ISMERT JOSEPH P [US] ET AL) 8 January 2013 (2013-01-08)	1-9	
A	* figure 1 *	1-9	
A	US 4 365 911 A (ROSSBERG SHELTON R) 28 December 1982 (1982-12-28)	1-9	
	* figure 8 *		
	----- -/--		
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 17 March 2020	Examiner Posavec, Daniel
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			



EUROPEAN SEARCH REPORT

Application Number
EP 19 21 1634

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 5 454 663 A (STEGMEIER WILLIAM J [US]) 3 October 1995 (1995-10-03) * figure 3 *	1-9	
A	US 6 027 283 A (SCHWEINBERG F MATTHEW [US] ET AL) 22 February 2000 (2000-02-22) * figure 2 *	1-9	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
Place of search Munich		Date of completion of the search 17 March 2020	Examiner Posavec, Daniel
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 19 21 1634

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-03-2020

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2009241440 A1	01-10-2009	NONE	
US 7637694 B1	29-12-2009	NONE	
US 2004062602 A1	01-04-2004	CA 2405982 A1 US 2004062602 A1	30-03-2004 01-04-2004
US 2017266588 A1	21-09-2017	NONE	
CH 614004 A5	31-10-1979	NONE	
GB 625547 A	29-06-1949	NONE	
US 8347906 B1	08-01-2013	US 7735512 B1 US 8347906 B1	15-06-2010 08-01-2013
US 4365911 A	28-12-1982	NONE	
US 5454663 A	03-10-1995	NONE	
US 6027283 A	22-02-2000	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82