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EP-A2- 1 531 208
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DE-A1- 10 160 194
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GB-A- 1 555 767
US-A- 357 893
US-A- 2 810 173
US-A1- 2002 130 237
US-A1- 2005 166 465
US-A1- 2016 073 549

Connection of drainage components and pipe element with a clamp spring

The present invention relates to a connection of drainage components, in particular for connecting roof drainage components, for example for connecting a pipe bend or a downpipe to an inlet funnel or water collecting box of a roof drainage system. It also relates to a pipe socket with a clamping spring.

Inlet funnels are generally connected to gutters which collect rainwater from building roofs and which are correspondingly fastened with gutter brackets along the lower edge of roofs, which collect the water from the gutter and transfer it via at least one intermediate pipe bend or directly to a connected downpipe. In the case of flat roofs, a water collecting box is usually provided, which transfers the water collected from the flat roof accordingly to a pipe bend or directly to a downpipe. Corresponding inlet funnels and water collecting boxes are usually positioned at a great height away from the ground, which is difficult to reach. If, for example, the pipe bend or the downpipe becomes detached from the inlet funnel or water collecting box due to the force of weight or stresses, the effort of reattachment is sometimes considerable. Therefore, the pipe bends or the downpipes are usually fastened separately to the inlet funnels or water collecting boxes to prevent accidental loosening. It is understood that such separate fastening is also possible between pipe bends or a pipe bend and the downpipe or at other positions in the roof drainage system.

The separate fastening can be carried out, for example, by screwing, by pushing the components to be fastened together onto each other and then screwing in a self-tapping screw from the outside. This has the disadvantage that the self-tapping screw damages the usually galvanized drainage component, which can lead to corrosion and an undesired leakage, and moreover the insertion of the screw means an additional effort during installation. Therefore, a clamping spring has already been proposed for connecting a pipe bend or a downpipe to an inlet funnel, as shown in Fig. 1. Such a clamping spring 10 has a foot part 1 which is flat and with which the clamping spring 10 is riveted from the outside onto the pipe socket of the inlet funnel. Connected to the foot part 1 is a spring part 2 which has the same width as the foot part 1 and which is angled at an obtuse angle relative to the foot part 1, wherein an end section 5, which carries two claws 3, is angled somewhat more sharply so that the claws 3 firmly claw into the material of the pipe

section pushed over the pipe socket.

In order to be able to push the pipe section over the pipe socket with the spring element riveted on, the inlet funnel has an indentation into which the spring element is inserted and which has a contour corresponding to the contour of the spring element so that the spring element can be largely pressed into the indentation when the pipe section is pushed on. For clarification, Fig. 2 shows a cross-section through an inlet funnel having a pipe section 8, which has an indentation 9 into which a spring element 10 according to the prior art is inserted.

In practice, it has now been found that situations can arise, in particular when the connection of the drainage components is exposed to direct strong solar radiation, in which the clamping force between the drainage components should be reinforced in order to reliably prevent unintentional loosening of the components from one another. In principle, this can be carried out by inserting several clamping springs into several indentations in the pipe socket, whereby approximately twice the clamping force can be achieved if two clamping springs are provided, compared to providing a single clamping spring. However, the number of clamping springs also increases the manufacturing cost of the corresponding drainage component provided with the clamping springs.

Other solutions provide not only the drainage component carrying the clamping spring but also the mating component, for example the downpipe or the pipe socket, with an indentation into which a clamping spring can positively engage. This solution is also associated with increased effort and thus increased costs in the manufacture of the components. In addition, assembly is complicated because it must be ensured that the clamping spring engages sufficiently in the indentation of the mating component and the two components must be suitably aligned with each other in the circumferential direction for this purpose.

From DE 101 60 194 A1 a connection of drainage component with a clamping spring and a pipe socket with a clamping spring are known.

The present invention is based on the object of specifying a connection of drainage components, in particular roof drainage components, which provides a better holding force and does not increase the manufacturing costs of the components or the assembly effort.

The object according to the invention is solved by a connection having the features of claim 1 and by a pipe socket having the features of claim 9. In the dependent claims, advantageous and particularly useful designs of a connection according to the invention and of a pipe socket according to the invention are provided.

The connection of drainage components according to the invention, in particular of roof drainage components, has a clamping spring with a plate-shaped foot part and a spring part adjoining the latter, wherein the spring part is provided with at least one claw at its free end facing away from the foot part. By means of this claw, the clamping spring can claw into a drainage component pushed over it, wherein the spring force of the clamping spring presses the claw into the material of the drainage component that is pushed over it.

According to the invention, the spring part is folded or bent over at an angle of more than 90° relative to the foot part. This means that in the manufacture of the clamping spring, it can first be made from a flat sheet metal part, in particular spring steel, for example by stamping, and then a first part is folded or bent over at an angle of more than 90° relative to a second part to form the spring part and the foot part.

According to the invention, the spring part is further formed by at least two spring tongues arranged adjacent to each other, extend from the foot part, and can resiliently engage independently of each other, and each have at least one claw at its free end facing away from the foot part. Accordingly, the clamping spring provides two independently acting spring tongues which, as viewed in the direction from the foot part to the spring part in a width direction, which extends perpendicularly to the axial direction or direction of the longitudinal axis of the clamping spring from the foot part to the spring part, are positioned next to one another and, in particular, at a distance from one another.

By this design of the clamping spring, a more than twice as large holding force between the drainage components can be achieved compared to the clamping spring shown in Figs. 1 and 2 described at the beginning. Thus, a connection according to the invention with a single clamping spring can ensure a greater holding force than previously two clamping springs provided separately from each other on one and the same pipe socket. At the same time, the provision of only a single clamping spring reduces manufacturing costs compared with the provision of

two separate clamping springs.

In particular, the connection according to the invention with a clamping spring can be made from a thinner material, for example sheet metal, in particular spring steel, than the previous clamping spring and still exhibit the surprisingly large clamping force. For example, the clamping spring can have a thickness of less than 0.5 mm, in particular 0.4 mm or less, at least in the area of the spring part or in the spring part and foot part.

The folding over or bending of the spring part relative to the foot part can preferably be carried out in the cold state of the clamping spring or of a blank from which the clamping spring is manufactured.

The design of the clamping spring enables its use in a flat indentation in a pipe socket or even on a surface of a pipe socket without the need for an indentation at this point.

The two spring tongues, which resiliently engage independently from each other, adapt individually to the surface section of the drainage component pushed over them in each case. Due to their comparatively small width, they also engage better in curved surface sections.

Preferably, the spring part is bent or folded over by more than 120° or more than 135° relative to the foot part.

Each spring tongue is preferably designed angularly, having a web adjoining the foot part and with an end section adjoining the web at the end remote from the foot part, wherein the end section carries the at least one claw at its free end and is bent outwardly from the web in a direction away from the foot part, thus in a direction away from the foot part. This bend may also have a radius. For example, the web may extend at least substantially parallel to the foot part and the end section may extend at an acute angle to the foot part.

The transition from the foot part to the spring part preferably has a radius, so that accordingly a bend is preferably provided instead of a "sharp" folded-over portion. In particular, the radius is 1 mm or less.

According to one embodiment of the invention, the axial ends of the spring tongues facing the foot part coincide with the folded-over portion or the beginning of the bent-over portion, as as viewed from the foot part, so that the foot part does not have a slot corresponding to the distance between the spring tongues at its axial end facing the spring part. An alternative embodiment provides that the foot part already has a slot corresponding to the slot or the distance between the two spring tongues at its axial end facing the two spring tongues, i.e. the spring part, so that the spring tongues extend, as it were, into the foot part beyond the folded-over portion or bent-over portion.

Preferably, each spring tongue has at least two claws at its free end. In particular, an arcuate contour, preferably concave contour, of the free end can be provided between the claws.

A distance between the spring tongues is preferably 1/4 or 1/3 of the width of each spring tongue.

The spring tongues have, in particular, identical widths and can also be designed to be identical to one another in all other respects.

The foot part in particular has at least one hole for a rivet or a screw.

For example, the length of the clamping spring before folding or bending over is 25 to 40 mm, preferably between 30 and 35 mm. After folding or bending over, the clamping spring may have a length of less than 25 mm, as viewed in a plan view.

In particular, the spring tongues may have a length of 10 to 20 mm before the folding or bending over, for example from 14 to 17 mm, in particular 15 mm. If the bending or folding is carried out exclusively in the area of the spring tongues, these can correspondingly have a comparatively shorter axial length after their bending or folding, with which they are positioned above the foot part.

The web of each spring tongue preferably has a length which is a multiple of the length of the angled end section, for example three times, four times or more.

A pipe socket according to the invention has a clamping spring of the type shown, wherein the clamping spring is attached to an outer or inner surface of the pipe

socket, preferably to an outer surface of the pipe socket, and the folded-over or bent-over portion between the foot part and the spring part faces a free end of the pipe socket. This means that when a second pipe component is pushed onto the pipe socket, the second component is first pushed over the folded-over portion or bent-over portion before coming into contact with the claws at the free ends of the spring tongues.

Preferably, the pipe socket has an indentation into which the foot part of the clamping spring is inserted, wherein the indentation is of flat design.

Such a pipe socket can, for example, be part of an inlet funnel or water collecting box to which a pipe bend or downpipe is connected by means of the pipe socket.

The invention will be described below by reference to an exemplary embodiment and the figures, wherein:

Fig. 1 shows a clamping spring according to the prior art in a side view and a top view;

Fig. 2 shows a schematic cross-section through a clamping spring according to the prior art which is mounted on the pipe socket of an inlet funnel;

Fig. 3 shows a blank for the manufacture of a clamping spring before the spring part is bent over;

Fig. 4 shows a side view of a connection according to the invention;

Fig. 5 shows a pipe socket with clamping spring according to the invention;

Fig. 6 shows a cross-section through the pipe socket of Fig. 5.

Fig. 3 shows, for example, a stamped sheet metal part for the manufacture of a clamping spring according to the invention, which still has a flat shape. The clamping spring 10 according to Fig. 4 is produced from this blank by bending the spring part 2 relative to the foot part 1. The foot part 1 still has a flat shape even after the spring part 2 has been bent over. In the exemplary embodiment shown, a bore 6 is made in the foot part 1 for inserting a rivet or a screw in order to fasten

the clamping spring 10 to a pipe socket, for example.

As can also be seen from Fig. 5, the spring part 2 has two individually resiliently engageable spring tongues 2.1, 2.2, each of which carries two claws 3 at its free end facing away from the foot part 1. The spring part 2 or the spring tongues 2.1, 2.2 are bent at an angle of at least approximately 180° relative to the foot part 1, so that a web 4, which adjoins the foot part 1 behind the bent-over portion, is positioned essentially parallel to the foot part 1, whereas an end section 5 at the end of the web 4 facing away from the foot part 1 extends at an acute angle to the foot part 1. This end section 5 carries the claws 3 at its free end.

The claws 3 engage the material of a drainage component 11 pushed onto the pipe socket 8 on which the spring element 10 is mounted, see in particular Fig. 6.

The foot part 1 is inserted into an indentation 9 of the pipe socket 8, wherein the indentation 9, as can be seen from Fig. 6, can be flat, in contrast to the design according to Fig. 2. For example, the foot part 1 is fixed in the indentation 9 by means of the rivet 7.

The two spring tongues 2.1,2.2 have a distance D in the width direction of the clamping spring 10, which extends perpendicularly to the longitudinal axis 12 shown here, which is for example at least 1/4 or 1/3 of the width B of each spring tongue 2.1, 2.2.

List of reference signs

1	Foot part
2	Spring part
2.1, 2.2	Spring tongue
3	Claw
4	Web
5	End section
6	Bore
7	Rivet
8	Pipe socket
9	Indentation
10	Clamping spring
11	Drainage component
12	Longitudinal axis
D	Distance
B	Width

Patentkrav

1. Forbindelse af drænkomponenter (8, 11) med en første drænkomponent (8), på hvis overflade der er fastgjort en klemmefjeder (10), og en anden drænkomponent (11), som skubbes hen over klemmefjederen (10), hvor klemmefjederen (10) har en pladeformet foddel (1) og en til denne stødende fjederdel (2); hvor fjederdelen (2) har mindst én klo (3) på sin frie ende, der vender væk fra foddelen (1); hvor en fjederkraft fra klemmefjederen (10) presser mindst den ene klo (3) ind i materialet på den overskubbede drænkomponent (11). Kendetegnet ved, at fjederdelen (2) er foldet eller bøjet i en vinkel på mere end 90 grader i forhold til foddelen (1) og dannes og understøttes af mindst to uafhængige indfjedringsbare fjedertunger (2.1, 2.2), som hver især strækker sig fra foddelen (1) og er udformet med mindst en klo (3) på den frie ende, der vender væk fra foddelen (1).

2. Forbindelse ifølge krav 1, kendetegnet ved, at fjederdelen (2) er foldet eller bøjet mere end 120° eller 135° i forhold til foddelen (1).

3. Forbindelse ifølge et af kravene 1 eller 2, kendetegnet ved, at hver fjedertunge (2.1, 2.2) er vinklet i sin udformning, med en bane (4), der støder mod foddelen (1) og en endedel (5), der støder op til banen (4) ved den ende, der vender bort fra foddelen (1), som i sin frie ende bærer mindst én klo (3) og er foldet bort fra banen (4) i en retning væk fra foddelen (1).

4. Forbindelse ifølge krav 3, kendetegnet ved, at banen (4), i det mindste i det væsentlige, strækker sig parallelt med foddelen (1), og endedelen (5) strækker sig i en spids vinkel med foddelen (1).

5. Forbindelse ifølge et af kravene 1 til 4, kendetegnet ved, at fjedertungerne (2.1, 2.2) hver har mindst to kløer (3) ved deres frie ende.

6. Forbindelse ifølge et af kravene 1 til 5, kendetegnet ved, at fjedertungerne (2.1, 2.2) strækker sig parallelt med hinanden i en afstand (D).

7. Forbindelse ifølge krav 6, kendetegnet ved, at afstanden (D) er mindst 1/4 eller 1/3 af bredden (B) af hver fjedertunge (2.1, 2.2).

8. Forbindelse ifølge et af kravene 1 til 7, kendetegnet ved, at foddelen (1) har et borehul (6) til en nitte (7) eller en skrue.

9. Rørstuds (8) med en klemmefjeder (10), hvor klemmefjederen (10) har en pladeformet foddel (1) og en fjederdel (2), der støder op hertil; fjederdelen (2) har mindst en klo (3) på sin frie ende, der vender væk fra foddelen (1) til at kunne blive presset ind i materialet på en drænkomponent (11), der er skubbet over den; kendetegnet ved, at fjederdelen (2) er foldet eller ombøjet i en vinkel på

mere end 90° i forhold til foddelen (1) og er forsynet med mindst to fjedertunger (2.1, 2.2), som er anordnet ved siden af hinanden og strækker sig ud fra foddelen (1), og som hver har mindst en klo (3) på deres frie ende, der vender væk fra foddelen (1), og at klemmefjederen (10) er fastgjort til en ydre eller indvendig overflade på rørstudsen (8) og kanterne eller bøjningen mellem foddel (1) og fjederdel (2) vender mod en fri ende på rørstudsen (8).

10. Rørstuds (8) ifølge krav 9, kendetegnet ved, at rørstudsen (8) har en fordybning (9), hvori klemmefjederens (10) foddel (1) er indsat, idet fordybningen (9) er flad.

11. Indløbstragt eller vandopsamlingsbeholder med en rørstuds (8) ifølge et af kravene 9 eller 10 til at forbinde en rørbøjning eller et nedløbsrør.

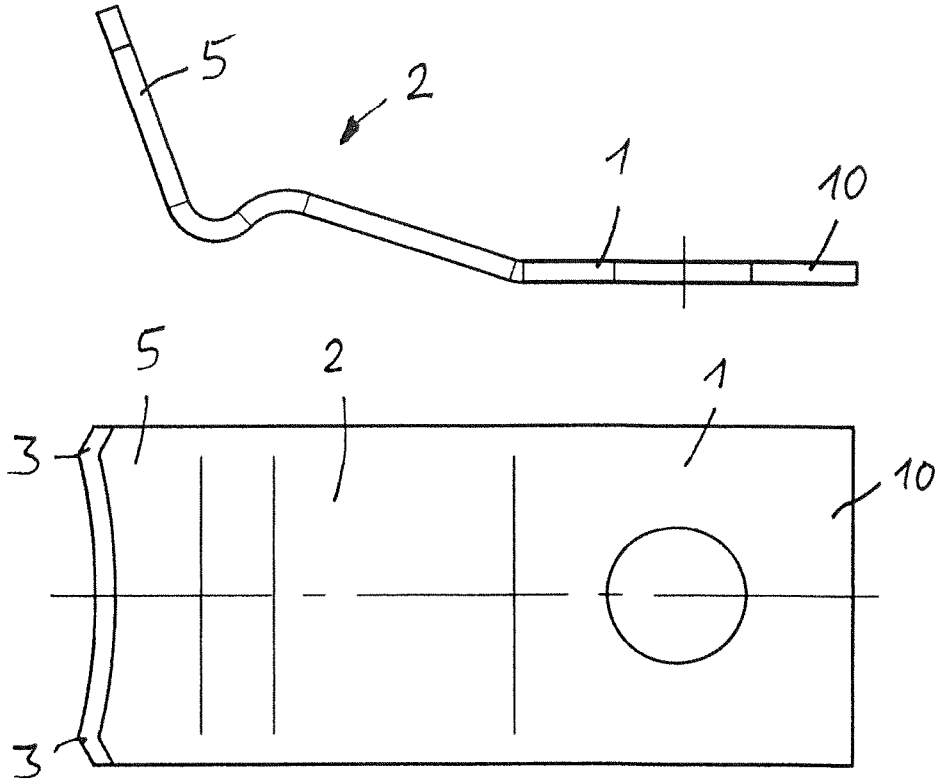

Fig. 1
(prior art)

Fig. 2 (prior art)

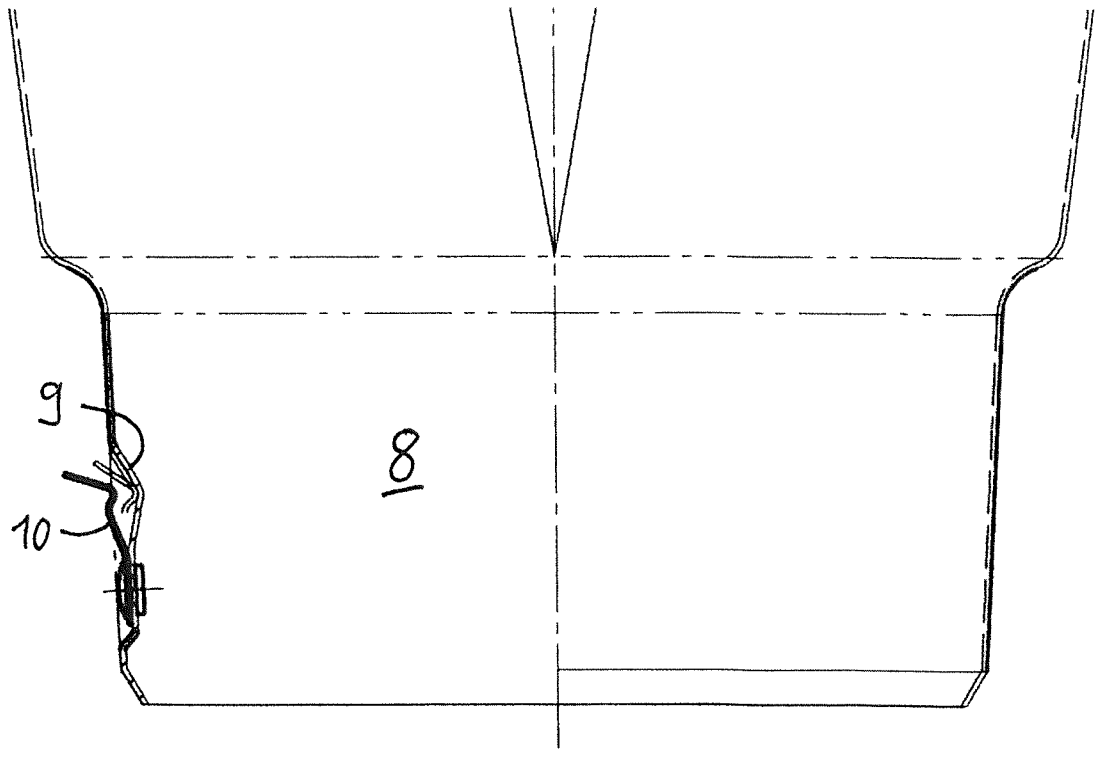

Fig. 3

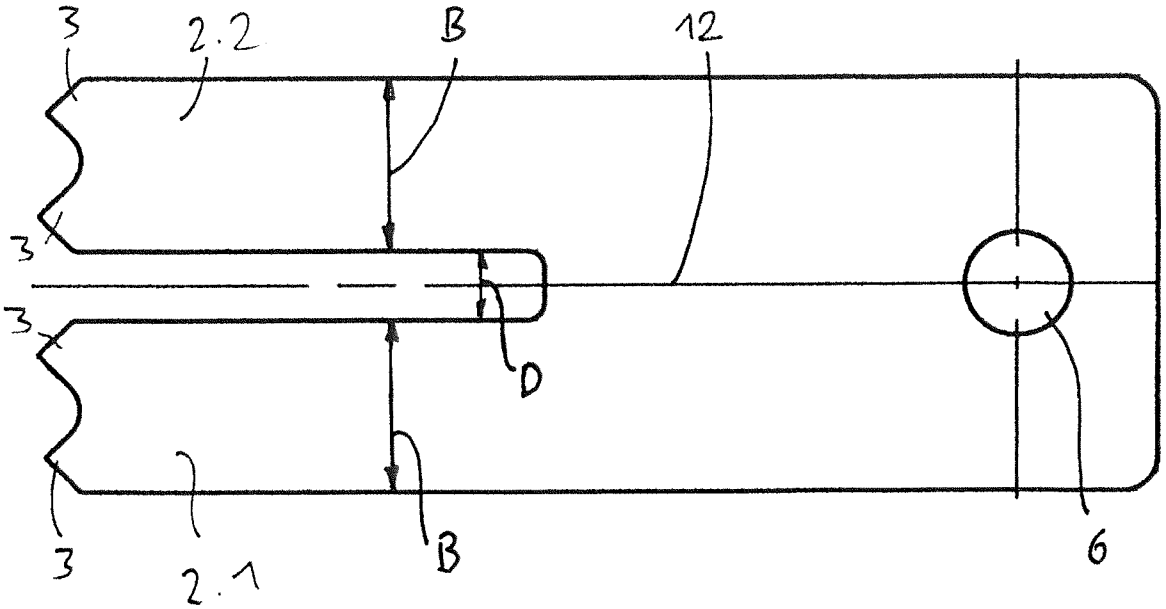

Fig. 4

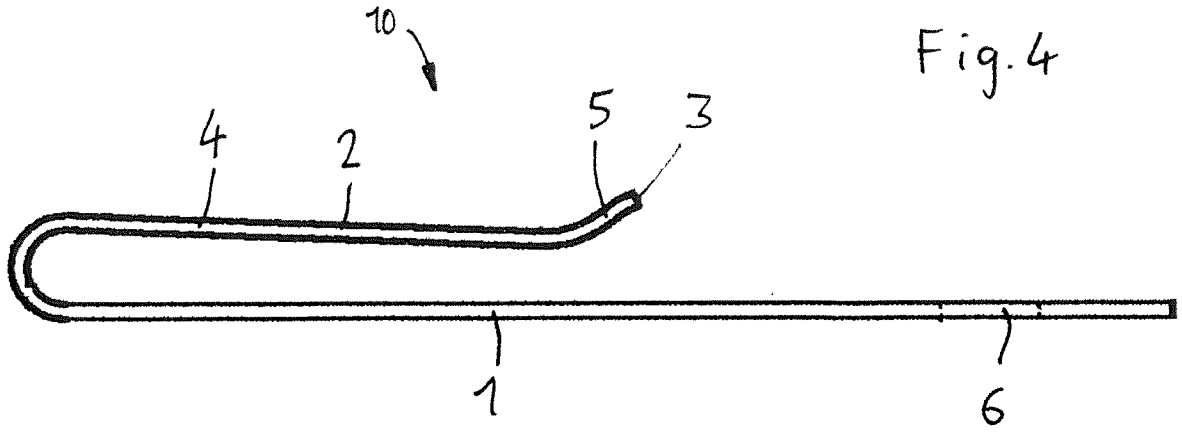

Fig. 6

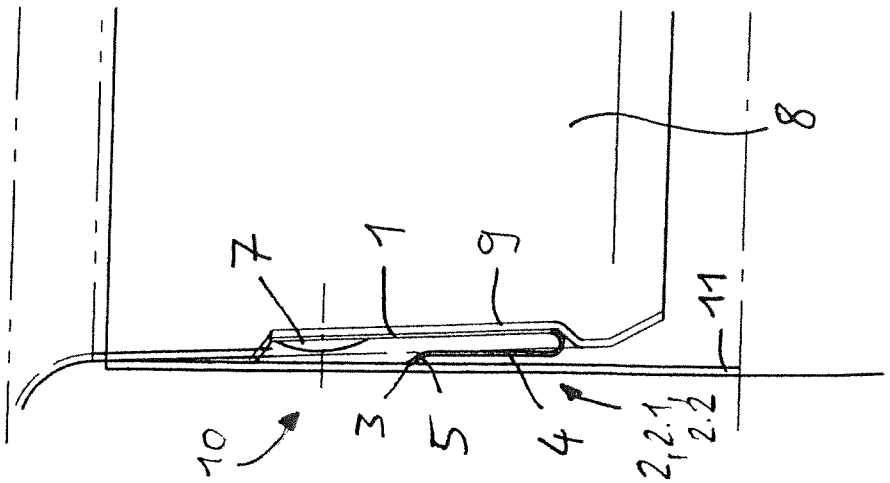

Fig. 5