

(19) **DANMARK**

(10) **DK/EP 2236886 T3**



(12)

Oversættelse af
europæisk patentskrift

Patent- og
Varemærkestyrelsen

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- (51) Int.Cl.: **F 16 L 3/23 (2006.01)** **H 02 G 3/32 (2006.01)**
- (45) Oversættelsen bekendtgjort den: **2015-10-12**
- (80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2015-07-08**
- (86) Europæisk ansøgning nr.: **10157236.0**
- (86) Europæisk indleveringsdag: **2010-03-22**
- (87) Den europæiske ansøgnings publiceringsdag: **2010-10-06**
- (30) Prioritet: **2009-04-01 DE 202009002019 U**
- (84) Designerede stater: **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 SE SI SK SM TR**
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- (54) Benævnelse: **Installationsdel**
- (56) Fremdragne publikationer:
EP-A1- 1 180 838
DE-U1- 9 109 806
FR-A1- 2 010 049
US-A- 3 971 105
US-B1- 7 162 790

Description

[0001] The invention relates to an installation part for holding installation lines, having an adapter groove which is undercut, at least in areas, for connecting a fastening adapter to the installation part for mounting same to a fastening base, and having a fastening adapter which is molded on in an articulated manner, the fastening adapter having, or being designed as, a locking shoe for insertion into the adapter groove of the installation part, the locking shoe being held in the adapter groove in a positive-fit manner in the load-receiving direction.

[0002] Various installation parts are used for laying installation lines, for example electrical or sanitary installation lines. For electrical installations, these may be, for example, cable holders for individually mounting or holding a single cable. Multi-cable supports are also used for holding multiple electrical lines or also other installation lines when these are to be laid in a bundle. These multi-cable supports are designed in the manner of an openable clamp, and enclose the lines to be laid in a ring-like manner. Multi-cable supports of this type are customarily designed as a rectangular ring, whose leg opposite from the back side of the multi-cable support is designed as a closure leg for opening and closing the multi-cable support. On its free end, the closure leg bears a first portion of a snap lock which cooperates with a second portion, held stationary with respect to the first portion, for closing the multi-cable support. Multi-cable supports of this type are mounted in a directional manner, specifically, in a configuration such that the snap lock is situated on top. In the area of their back side and in the area of their upper crossbar, multi-cable supports also typically have means for connecting a fastening adapter, with which the multi-cable support may be fastened on the wall or ceiling side. Fastening adapters of this type are used when direct mounting of the multi-cable support on a wall or a ceiling is not desired or is not possible.

[0003] Such a multi-cable support is known from DE 91 09 806 U1. In this multi-cable support, the fastening adapter is integrally molded onto the installation part, with two flexible strips in between. Due to the two flexible strips, the fastening adapter is captively connected to the installation part, designed as a multi-cable support. The multi-cable support has an adapter groove in the area of its upper crossbar and in the area of its back side. The length of the flexible strips is such that the fastening adapter is easily insertable with its locking shoe into the adapter groove of the crossbar, which is open at the top, or

into the adapter groove of the rear leg, which is open at the rear. In order not to damage the two flexible strips of the fastener during mounting of the multi-cable support, in which the fastening adapter with its locking shoe is inserted into the adapter groove of the rear leg, the rear leg is appropriately bent to provide a receptacle for the flexible strips.

[0004] Although such a multi-cable support has the advantage that the fastening adapter is captively molded onto the multi-cable support, handling of the multi-cable support is sometimes cumbersome, since the typically folded flexible strips may cause interference. Moreover, in this multi-cable support there is no option for connecting two multi-cable supports to one another in a back-to-back arrangement.

[0005] Based on this prior art, the object of the invention is therefore to refine an installation part which is designed as a multi-cable support, for example, for installation lines of the type mentioned at the outset, in such a way that handling is improved while at least largely avoiding the disadvantages described for the prior art.

[0006] This object is achieved according to the invention by a generic installation part, as described at the outset, in which the fastening adapter is connected to the installation part via the at least one flexible strip in such a way that, and the flexible strip has a length such that, the length of the flexible strip allows a pivoting movement between the installation part and the fastening adapter, in the course of which the installation part comes to rest on the locking shoe to form a support arrangement in which the installation part forms a two-arm lever, onto one arm of which the at least one flexible strip is integrally molded, and upon further pivoting of the installation part relative to the fastening adapter, the lever may be placed under tensile stress for separating the installation part from the fastening adapter.

[0007] In this installation part, the fastening adapter is connected to the installation part via at least one flexible strip, designed as a film hinge, for example, in particular in such a way that, due to the configuration of the installation part and the fastening adapter relative to one another and the length of the flexible strip, the installation part may be easily separated from the fastening adapter. This is made possible when the flexible strip is relatively short compared to that of the prior art, and when, during a pivoting movement relative to the fastening adapter, which is already fixed to the fastening base, the installation part with one of its surfaces is brought into contact with the fastening adapter, in particular the locking shoe thereof. During this contact between the installation part and the fastening adapter, the planes of the two mutually adjacent surfaces are oriented at an

angle with respect to one another, so that the installation part is supported, for example, on an edge of the fastening adapter, and is then supported in the manner of a two-arm lever. The flexible strip is integrally molded onto one arm of the two-arm lever. The length of the strip is selected in such a way that in such an angled configuration of the installation part and the fastening adapter, the at least one flexible strip is tensioned, and in principle does not allow a further pivoting movement in which the mutually adjacent surfaces are brought into a parallel configuration with respect to one another. This is utilized to place the at least one flexible strip under tensile stress upon further pivoting of the installation part relative to the fastening adapter, and in particular in such a way that the fastening adapter may be separated from the installation part. For this purpose, the at least one flexible strip may have a predetermined breaking point. Such a predetermined breaking point may be situated at the direct transition between the flexible strip and the fastening adapter, at the transition between the at least one flexible strip on the installation part, or in an area between these two transitions. Since the installation part is typically much larger than the fastening adapter, the arm of the two-arm lever which is formed by the support arrangement, onto which the at least one flexible strip is not integrally molded, may be longer than the arm onto which the strip is integrally molded. As a result, it is easily possible to apply a force to the flexible strip that is necessary for separating the fastening adapter from the installation part. This, and the possibility for applying a sufficient separating force due to the support arrangement described above, allows a design in which the flexible strip is rigid enough to hold the fastening adapter in a position protruding from the installation part. This is advantageous, since for mounting the fastening adapter to a fastening base, it is not the fastening adapter that must then be securely held, but, rather, the installation part, which typically has a larger surface and therefore has a better grip base. When this installation part is designed as a multi-cable support, for example, for mounting the fastening adapter on the closure leg on the front side of the installation part, it may be held as a handle in order to fix the fastening adapter to the wall or ceiling side. If the fastening adapter is fixed to the wall or ceiling side, the installation part is pivoted by undergoing the above-described pivoting movement relative to the fastening adapter, and is separated from same. The adapter groove of the installation part is subsequently brought into engagement with the locking shoe of the fastening adapter, thus mounting the multi-cable support.

[0008] In order to hold the fastening adapter with sufficient rotational locking with respect

to the installation part, it is useful to provide two flexible strips separated at a distance from one another, the fastening adapter being integrally molded onto the installation part with the flexible strips placed in between.

[0009] Such an installation part, designed as a multi-cable support, for example, is preferably a plastic part that is manufactured in a plastic injection molding process.

[0010] Further advantages of the invention result from the following description of one exemplary embodiment, with reference to the appended figures, which show the following:

Figure 1: shows a perspective view of a multi-cable support as an installation part,

Figure 2: shows an enlarged perspective view of the multi-cable support in Figure 1, with a view of the upper area of the rear side thereof,

Figure 3: shows a side view of the multi-cable support in Figure 1, with the fastening adapter fixed to a wall in a position of the installation part for separating same from the fastening adapter, and

Figure 4: shows a longitudinal sectional illustration of the rear leg of the multi-cable support, with the fastening adapter inserted into an adapter groove provided in the rear leg.

[0011] An installation part designed as a multi-cable support 1 is used for holding installation lines, in particular electrical installation lines. Of course, the multi-cable support 1 may also be used for holding other installation lines, for example of pipes, data lines, or the like. The multi-cable support 1 is fastened on the wall or ceiling side for holding these types of installation lines. The multi-cable support is designed in the manner of an openable ring. In the illustrated exemplary embodiment, the multi-cable support 1 is formed by an approximately rectangular body. The multi-cable support includes a rear leg 2, an upper crossbar 3, a lower crossbar 4, and a closure leg 5 which forms the front leg. The closure leg 5 has a closure section 6 which is material-elastically adjustable with respect to a leg part 7 which is integrally molded onto the lower crossbar 4, as indicated by the double arrow in Figure 1. On its free end the closure leg 5 bears a first portion of a snap lock, known per se, whose complementary second closure part 9 is integrally molded

onto the free end of the upper crossbar 3, protruding in the direction of the crossbar 4. Figure 1 shows the multi-cable support 1 with the closure section 6 open. In the closed position of the multi-cable support, the two closure parts 8, 9 are set in engagement with one another for closing the ring body.

[0012] A fastening adapter 10, which in the illustrated exemplary embodiment is connected to the rear side R of the rear leg 2 via two film hinges 11, 11.1, is integrally molded onto the upper end of the rear leg 2. The fastening adapter is used for mounting the multi-cable support 1 on the wall or ceiling side. The film hinges 11, 11.1 are designed so that, although the fastening adapter 10 is articulatedly connected to the multi-cable support 1, the film hinges 11, 11.1 are still sufficiently stiff so that, without further action, the fastening adapter 10 remains essentially in the position relative to the multi-cable support 1 shown in Figure 1. The fastening adapter 10 has a fastening opening 12 which passes through same, through which a fastener, for example a screw, may be inserted for mounting the fastening adapter 10 to a wall, a ceiling, or some other fastening base. The fastening adapter 10 includes a locking shoe 13 with which the fastening adapter engages with an adapter groove associated with the multi-cable support, and is held therein in a locking manner.

[0013] The locking shoe 13 of the fastening adapter 10 is integrally molded onto a mounting plate 14. The mounting plate 14 is used as a contact plate which rests with its rear side against a fastening base for connection to same. The locking shoe 13 is made up of a spacer piece 15 and a locking plate 16 which protrudes from the spacer piece 15 and is integrally molded onto the side opposite from the mounting plate 14. The diameter of the spacer piece 15 essentially corresponds to the internal clearance of the non-undercut portion of an adapter groove of the installation part, while the locking plate 16 is designed for engaging with the undercut portion of such an adapter groove.

[0014] The multi-cable support 1, starting from the rear side R of the rear leg 2, has a first adapter groove 17 in the area of its upper crossbar 3, and has a second adapter groove 18 which is introduced into the rear leg 2. The configuration of the adapter grooves 17, 18 is apparent from the rear side view of the multi-cable support 1 in Figure 2. This applies in particular to the cross-sectional geometry of the adapter groove 17. The adapter groove 17 follows the longitudinal extension of the crossbar 3, and has a leadthrough section 19 and an undercut 20 adjoining the leadthrough section 19. The internal clearance of the leadthrough section 19, with the necessary play of movement, corresponds to the diameter

of the spacer piece 15 of the locking shoe 13. The locking plate 16 is designed for insertion into the undercut 20. The adapter groove 18 has a corresponding geometry.

[0015] The fastening adapter 10 is integrally molded onto the rear leg 2 by means of the film hinges 11, 11.1 for purposes of simplified handling and for mounting same on a fastening base. For handling the multi-cable support 1 during mounting of the fastening adapter 10 on a fastening base, the closure leg 5 with its closed closure section 6 may be used as the grip of a handle. The fastening adapter 10 may be easily held in this way, in particular also at a distance from the fastening adapter 10 itself, and thus at a distance from tools that are used during mounting of the fastening adapter 10.

[0016] When the fastening adapter 10 is fixed to a fastening base, for example a wall, the fastening adapter is separated from the multi-cable support 1. For this purpose, the multi-cable support 1 is swiveled upwardly, as is apparent from Figure 3, so that the top side of the upper crossbar 3 comes to rest against the locking plate 16 of the fastening adapter 10. In the illustrated exemplary embodiment, the upper crossbar 3 has an alignment contour 21 in which male and female connectors are situated in alternation, the male connectors protruding at one-half their height from the top side. The dimensions of the individual elements of the multi-cable support 1 and of the fastening adapter 10 are coordinated with one another in such a way that during this pivoting, the locking plate 16 comes to rest in the transition of the male connector of the alignment contour 21 closest to the rear leg 2 and the top side of the transverse leg 3. The installation part 1 is thus supported, in the manner of a two-arm lever, with its upper transverse leg on the fastening adapter 10 which is fixed to the wall side. The contact configuration between the locking plate 16 and the top side of the upper crossbar 3 represents the lever axis H. For connecting the installation part 1 to the fastening adapter 10, the film hinges 11, 11.1 are integrally molded onto the shorter arm of this two-arm lever. As is apparent from Figure 3, the length of the film hinges 11, 11.1 is dimensioned in such a way that the installation part 1 may be easily pivoted into the support arrangement described above. Upon further pivoting of the multi-cable support 1 corresponding to the arrow direction shown in Figure 3, the film hinges 11, 11.1 are placed under tensile stress, so that they subsequently tear off due to a material tapering in the area of their connection to the rear side R of the rear leg 2. For this purpose, the multi-cable support 1 may be gripped at its lower crossbar 4 or also in the area of the transition from the crossbar 4 to the rear leg 2. The distance of this grip location from the lever axis H is much greater than the distance of the location of the

connection of the film hinges 11, 11.1 to the installation part 1 from the lever axis H. As a result, a force that is necessary to be able to separate the two film hinges 11, 11.1 from the installation part 1 may be applied without effort. In this separation, use is made of the fact that the fastening adapter 10 is fixed on the wall side.

[0017] After the multi-cable support 1 is separated from its fastening adapter 10, the multi-cable support 1 is suspended on the fastening adapter 10, in particular in that, in the illustrated exemplary embodiment, the locking shoe 13 is inserted into the adapter groove 18 that is introduced into the rear leg 2. Since, in contrast to the adapter groove 17 which has a design starting from the rear side R of the rear leg 2, the adapter groove 18 does not have an opening on the edge side, and has a keyhole-shaped design, and has an insertion section 22 whose internal clearance is sufficiently large that the locking plate 16 of the fastening adapter 10 can be inserted. The insertion section 22 is adjoined by a locking section 23 which is smaller with regard to its internal clearance (see Figure 2). The internal clearance of the locking section 23 corresponds, with the necessary play of movement, to the diameter of the spacer piece 15 of the locking shoe 13 to be inserted into the adapter groove 18. A web 24 forms an upper stop with respect to the spacer piece 15, so that the multi-cable support 1 with its web 24 rests on the top side of the spacer piece 15 of the fastening adapter 10, and force is thus transmitted into the fastening adapter 10 and then into the wall.

[0018] For locking the locking shoe 13 which is inserted into the adapter groove 18, the locking shoe, on its two sides having walls which form the locking section 23, in each case bears a detent ridge 25 as the first snap lock element (see Figures 1 and 3). The locking section 23 of the adapter groove 18 has complementary detent recesses 26 on both of its side walls, with which the detent ridges 25 of the spacer piece 15 engage for locking the fastening adapter 10 or its locking shoe 13 inside the adapter groove 18. The adapter groove 17 has corresponding detent recesses.

[0019] The fastening adapter 10, which is connected to the rear leg 2 of the multi-cable support 1 and whose locking shoe 13 engages with the adapter groove 18, is shown in cross section in Figure 4. Figure 4 shows the spacer piece 15 in a cross section. The engagement of the detent ridges 25 with the complementary detent recesses 26 of the locking section 23 of the adapter groove 18 is apparent, as well as the contact configuration of the spacer piece 15 on the web 24.

[0020] The description of the fixing of the locking shoe within the adapter groove having

the mutually engaged locking elements makes it clear that such locking of a fastening adapter or its locking shoe in such a groove may be used, regardless of whether or not the fastening adapter is integrally molded onto the installation part, as described in the claims.

[0021] On the rear side R of the rear leg 2, the multi-cable support 1 bears a connecting section V, which is apparent on the rear side R of the rear leg 2 in an enlarged view in Figure 2. As explained below, the connecting section V bears alignment contours with which the multi-cable support 1 may be connected to a second, identical multi-cable support. The connecting section V of the illustrated exemplary embodiment is made up of two alignment contour sections A_1 , A_2 which are separated from another by an insertion groove 27. The alignment contour section A_1 is made up of alternating male and female connectors, this alternation extending in the direction of the height of the rear leg 2. The female connectors W_1 are designed as undercut grooves. The male connectors M_1 are mushroom-head webs having a geometry that is complementary to the design of the female connectors W_1 . In the illustrated exemplary embodiment, the male and female connectors M_1 , W_1 alternate in direct succession, so that each female connector W_1 is bordered by two male connectors M_1 . Due to the alternation provided in the illustrated exemplary embodiment, the male connectors M_1 situated between two female connectors W_1 have a T- or mushroom head-shaped design for forming an undercut which is associated in each case with the adjacent female connector W_1 . The longitudinal extension of the connectors M_1 , W_1 is transverse to the longitudinal extension of the rear leg 2. The alignment contour section A_2 , the same as the alignment contour section A_1 , is made up of alternating female and male connectors W_2 , M_2 . The connectors M_2 , W_2 of the alignment contour section A_2 , with respect to their longitudinal extension, are offset relative to the connectors M_1 , W_1 of the alignment contour section A_1 , in particular in such a way that one male connector M_2 of the alignment contour section A_2 is aligned with each female connector W_1 of the alignment contour section A_1 . Due to the dimensioning of the female connectors W_2 and the male connectors M_2 in the alignment contour section A_2 being identical to the connectors M_1 , W_1 of the alignment contour section A_1 , the female connectors W_2 of the alignment contour section A_2 are accordingly aligned with the male connectors M_1 of the alignment contour section A_1 .

[0022] The male connectors M_1 , M_2 protrude at one-half their height over the top side 16 of the rear side R of the rear leg 2. A supporting ridge S_1 , S_2 is located in each case at a distance from the respective bottommost connector of the alignment contour sections A_1 ,

A_2 , the height of the supporting ridge protruding from the surface 28 corresponding to the distance by which the male connectors M_1 , M_2 likewise protrude from the surface 28. Adjacent to the supporting ridges S_1 , S_2 , ridge receptacles are provided which in each case are offset with respect to one another.

[0023] In the illustrated exemplary embodiment, the longitudinal extension of the connectors M_1 , W_1 , M_2 , W_2 of the two alignment contour sections A_1 , A_2 is the same. In the illustrated exemplary embodiment, the internal clearance of the insertion groove 27 corresponds to the length of the connectors plus a certain play of movement.

[0024] In the illustrated exemplary embodiment, the web 24 is situated in the insertion groove 27, which separates the alignment contour sections A_1 , A_2 . In a mounting of two multi-cable supports in a back-to-back arrangement, this web is used as a mounting aid, since the top side of the web 17 is aligned with the lowest of the female connectors W_1 , W_2 of the adjoining alignment contour sections A_1 , A_2 , and this top side is therefore used as a contact surface on which the top sides of a male connector M_1 , M_2 of an alignment contour section rest against another multi-cable support. In the illustrated exemplary embodiment, a fastening opening 29 is introduced into the web 24, with which the multi-cable support 1 may be mounted on a fastening base without even using the fastening adapter 10.

[0025] For connecting the multi-cable support 1 to another, identical multi-cable support in a back-to-back arrangement, two multi-cable supports 1 are offset with respect to one another with their rear ends adjoining, so that in each case an alignment contour section of one multi-cable support engages with the insertion groove 27 of the other multi-cable support. The two multi-cable supports 1 are joined together by translationally moving the two multi-cable supports 1 relative to one another. During this joining operation, the connectors, which are aligned with one another, are placed into engagement, and the male connectors of the two alignment contour sections are thus pushed into the female connectors. Thus, despite an initially integrally molded fastening adapter, the multi-cable support 1 may be mounted on another multi-cable support in a back-to-back arrangement.

[0026] The invention has been described above with reference to one exemplary embodiment. There are numerous other embodiments with which those skilled in the art may implement the invention without departing from the scope of the claims.

List of reference numerals**[0027]**

1	Multi-cable support
2	Rear leg
3	Crossbar
4	Crossbar
5	Closure leg
6	Closure section
7	Leg part
8	Snap lock part
9	Closure part
10	Fastening adapter
11, 11.1	Film hinge
12	Fastening opening
13	Locking shoe
14	Mounting plate
15	Spacer piece
16	Locking plate
17	Adapter groove
18	Adapter groove
19	Leadthrough section
20	Undercut
21	Alignment contour
22	Insertion section
23	Locking section
24	Web
25	Detent ridge
26	Detent recess
27	Insertion groove
28	Surface
29	Fastening opening

A_1, A_2	Alignment contour section
M_1, M_2	Male connector
W_1, W_2	Female connector
R	Rear side
S_1, S_2	Supporting ridge
V	Connecting section

Patentkrav

1. Installationsdel til at holde installationsledninger med en i det mindste om-
rådevist underskåret adapternot (17, 18) til tilslutning af en fastgørelsesadap-
ter (10) til installationsdelen (1) til montering af samme på en fastgørelses-
bund med en derpå ledmæssigt udformet fastgørelsesadapter (10) ved indfø-
5 jelse af mindst en fleksibel strimmel (11, 11.1), hvilken fastgørelsesadapter
(10) har en låsesko (13) til indsætning i adapternoten (17, 18) af installati-
onsdelen (1) eller er udformet som sådan, i hvilken adapternot (17, 18) lå-
seskoen (13) holdes formluttende i belastningsoptagelsesindretningen,
10 **kendetegnet ved, at** fastgørelsesadapteren (10) via den i det mindste ene
fleksible strimmel (11, 11.1) er tilsluttet installationsdelen (1) på en sådan
måde, og den fleksible strimmel (11, 11.1) har en sådan længde, at længden
af den fleksible strimmel (11, 11.1) muliggør en drejebevægelse mellem in-
15 stallationsdelen (1) og fastgørelsesadapteren (10), hvilket bevirker, at instal-
lationsdelen (1) kommer til at ligge an mod låseskoen (13) for at danne en
støtteanordning, ved hvilken støtteanordning installationsdelen (1) danner et
greb med to arme, hvor der på dets ene arm er udformet den i det mindste
ene fleksible strimmel (11, 11.1), og dette, når installationsdelen (1) drejes
20 yderligere i forhold til fastgørelsesadapteren (10), under trækspænding kan
indstilles til at fjerne denne fra fastgørelsesadapteren (10).

2. Installationsdel ifølge krav 1, **kendetegnet ved, at** fastgørelsesadapteren
(10), som rager ud over en øvre kant af installationsdelen (1), holdes af den i
25 det mindste ene fleksible strimmel (11, 11.1).

3. Installationsdel ifølge krav 1 eller 2, **kendetegnet ved, at** fastgørelses-
adapteren (10) omfatter en monteringsplade (14), der skal lægges på en
fastgørelsesbund, på hvilken monteringsplade låseskoen (13) er udformet,
30 der på den ene side via et afstandsstykke (15), som er udformet på monte-
ringspladen (14), og via en låserigelplade (16), som rager ud over afstands-
stykket (15) som sådant på den side, der ligger over for monteringspladen
(14), er udformet til at gribe ind i adapternotens underskæring (20).

4. Installationsdel ifølge et af kravene 1 til 3, **kendetegnet ved, at** den i det
mindste ene fleksible strimmel (11, 11.1) har et materialesvækket forudbe-

stemt sted.

5. Installationsdel ifølge et af kravene 1 til 4, **kendetegnet ved, at** den i det mindste ene fleksible strimmel (11, 11.1) er udført som filmhængsel.

5

6. Installationsdel ifølge et af kravene 1 til 5, **kendetegnet ved, at** fastgørelsesadapteren (10) er udformet på installationsdelen (1) ved indføjelse af to fleksible strimler (11, 11.1), der er anbragt parallelt med hinanden.

10

7. Installationsdel ifølge et af kravene 1 til 6, **kendetegnet ved, at** afstandsstykket (15) på mindst sin ene side, som vender mod de vægge, som ligger op til adapternoten (17, 18) af installationsdelen (1), bærer et første element (25) af en låsefiksering, og væggen af adapternoten (17, 18), hvilken væg er beregnet til at lægge an mod denne side af afstandsstykket (15), bærer det komplementære element (26) af låsefikseringen.

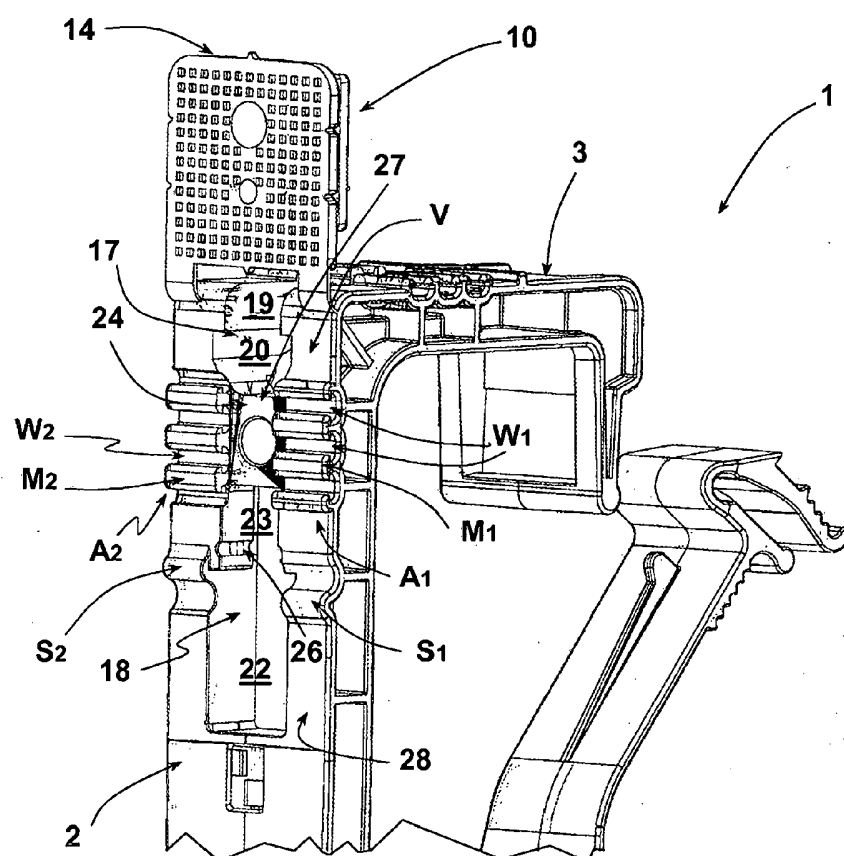
15

8. Installationsdel ifølge krav 7, **kendetegnet ved, at** de to vægge af adapternoten (17, 18), hvilke to vægge følger sammenføjningsretningen og vender mod hinanden, bærer et sådant komplementært element (26) af en låsefiksering.

20

9. Installationsdel ifølge krav 8, **kendetegnet ved, at** afstandsstykket (15) på sine begge sider, der vender mod de vægge, der respektivt ligger op til adapternoten (17, 18) af installationsdelen (1), bærer et første element (25) af en låsefiksering.

25

**Fig. 2**

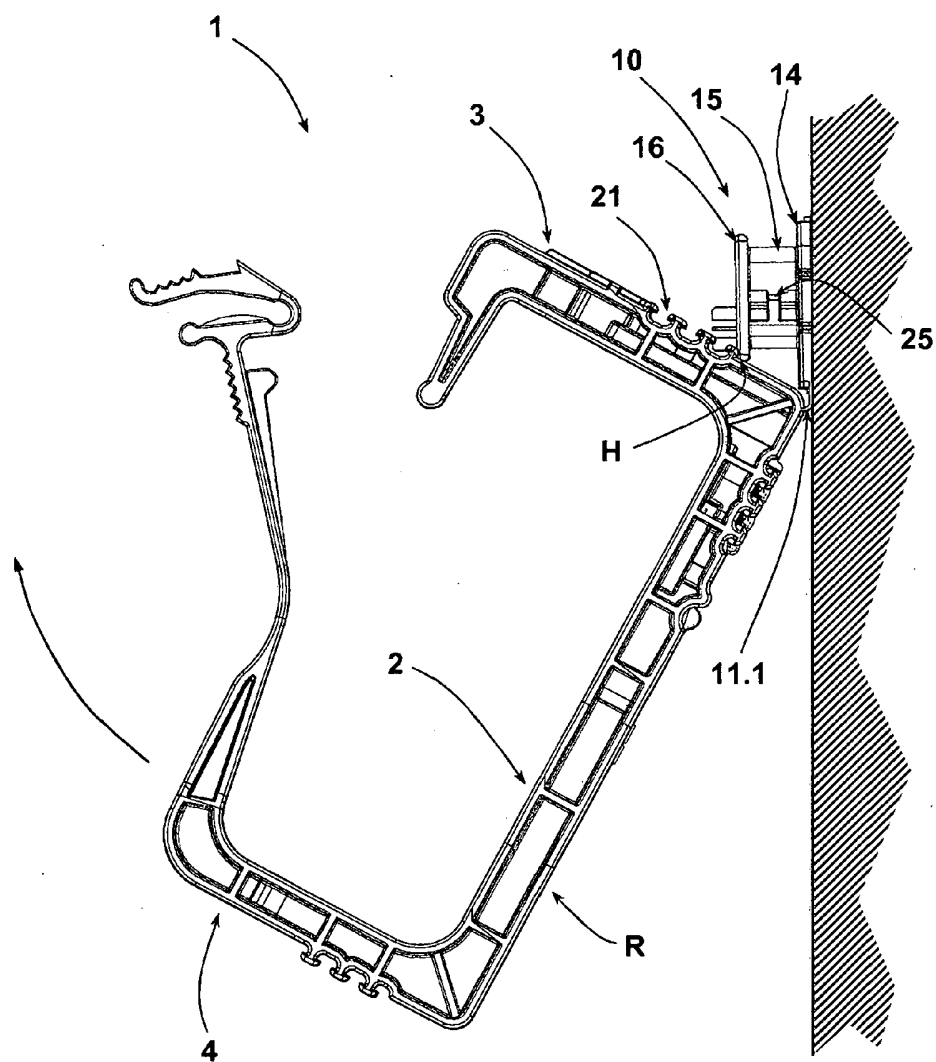


Fig. 3

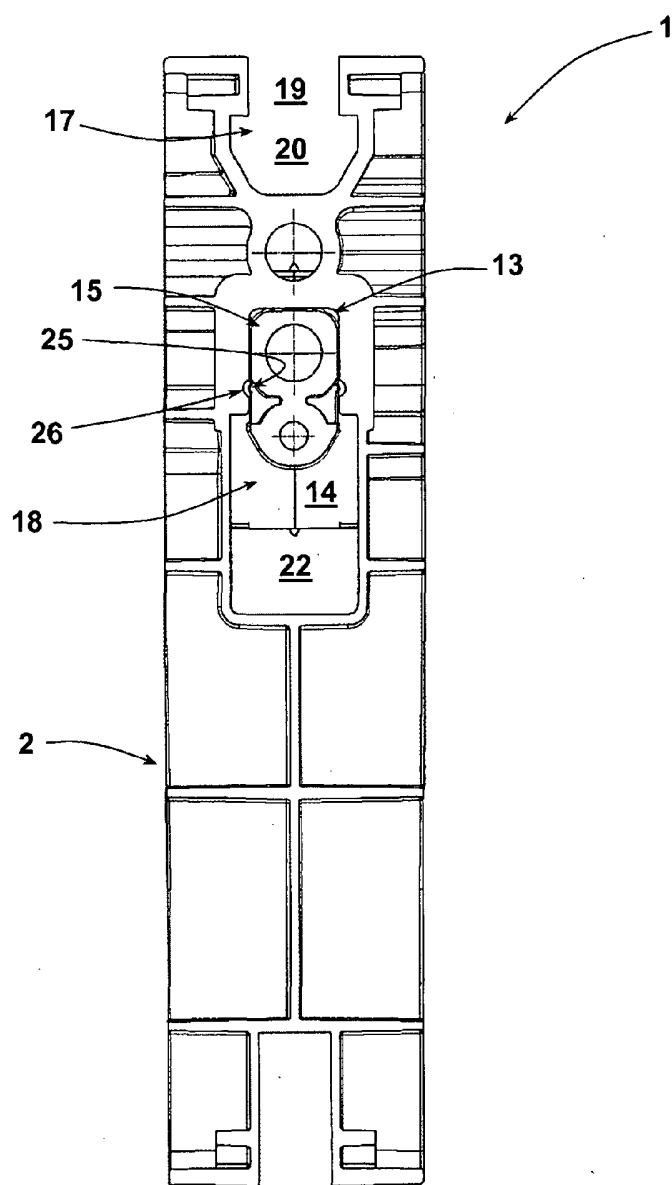


Fig. 4