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Device for mounting a tube in a groove of a thermal conduction profile

Description

The invention relates to a device for mounting a pipe in a groove of a heat-conducting profile.

The device according to the invention is particularly applicable to heat-conducting profiles, which are part of a ceiling or wall and are covered in the finished state with plasterboard. In the normal case of application, a device according to the invention is then used if heat-conducting profiles are already fitted to a ceiling or wall and must be provided with pipes before they are covered with plasterboard.

DE 10 2004 057 384 B1, DE 198 03 114 C2, DE 201 06 884 U1, EP 733 866 A2 and WO 2010121283 A2 show heat-conducting profiles which have two grooves, the cross-sectional area of which has approximately the shape of a circular segment, the central angle of which is slightly more than 180° . Through the flexible widening of the groove openings – by means of flexible bending of the profile wall bordering the relevant groove – a round pipe, which can carry a heat carrier medium, can be respectively clamped into a groove. The procedure of pressing a pipe into a groove of the heat-conducting profile with the simultaneously required flexible deformation of the heat-conducting profile and/or the pipe is – if pre-manufactured complete elements are not used, with which the pipe pieces have to be retrospectively joined – a strenuous, difficult and time-consuming manual job.

The object at the basis of the invention is to create a device, which helps to simplify the fitting of a pipe into a groove of a heat-conducting profile being already mounted on a wall or ceiling.

The device according to claim 1 is proposed to solve the object.

The device is preferably equipped with a housing having two opposite open surfaces and rollers being rotatable towards this, wherein the rolling direction of the rollers is aligned parallel to the profile direction of the heat-conducting profile.

The invention is illustrated on the basis of the drawings.

Fig. 1: shows in the part sectional view a schematic sketch of a first assembly device according to the invention in use. The direction of view is parallel to the profile direction of the heat-conducting profile.

Fig. 2: shows in the part sectional view a schematic sketch of a second assembly device according to the invention in use. The direction of view is horizontal, perpendicular to the profile direction of the heat-conducting profile.

Fig. 3: shows in the profile view the heat-conducting profile of Fig. 1 including a pipe clamped thereon.

Fig. 4 and 5: show in the profile view a section of a second or further heat-conducting profile, on which a device according to the invention is also well applicable.

The assembly device 3 according to Fig. 1 has for each groove 1.1 of the heat-conducting profile 1 into which a pipe 2 is to be clamped at least three rollers 3.1, 3.2, 3.3, the rolling direction of which is parallel to the profile direction of the heat-conducting profile 1.

The two rollers 3.1, 3.2 are arranged at an axial distance from one another and press with their lateral surfaces relative to the plane of the opening of the groove 1.1 from different sides on the heat-conducting profile 1. The longitudinal section of a groove 1.1 being located in the area of this pair of rollers is thereby widened, such that its opening area there is at least approximately as wide as the diameter of the pipe 2 when this is not deformed.

The lateral surface of the third roller 3.3 is tapered and it protrudes onto the opening surface of the groove 1.1. The pipe 2 runs to the side facing the groove 1.1 of the lateral surface of the roller 3.3.

By moving the entire assembly device 3 in the profile direction of the heat-conducting profile 1, the roller 3.3 presses the longitudinal area located on it of the pipe 2 into the groove 1.1, the flanks of which on this longitudinal area are flexibly widened by the rollers 3.1, 3.2 compared with the non-deformed state.

In the example shown in Fig. 1, the rollers 3.2 and 3.3 are arranged on a shared axis, consolidated to a shared roller body and motor driven. The drive contains a motor 3.5 and a friction wheel 3.4 driven by the same, which abuts with its circumferential surface on the aforementioned roller body. Drive and rollers are held in an approximately C-shaped housing 3.6, which is held for its part on a shaft 3.7, through which the energy supply for the drive also runs. Through the shaft 3.7, the device can be held and guided by a person and be set on a heat-conducting profile 1 already being hung on the ceiling of a room.

The device 13 according to the invention of Fig. 2 moves intentionally according to Fig. 2 from right to left. The device 13 is supplemented with additional rollers in comparison to the one in Fig. 1.

On the top side of the heat-conducting profile, a whole series of consecutively arranged rollers 3.1 roll.

At the very back of the roller 3.3, which introduces the pipe 2 into the groove on the heat-conducting profile and which presses the same onto the heat-conducting profile from below with the roller 3.2, there is a further roller 3.7, which also has a tapered lateral surface. The roller 3.7 presses on such a longitudinal area from the side of the groove opening of the heat-conducting profile to the pipe 2 being located there in the groove, on said pipe the opening width of the groove to the heat-conducting profile is already somewhat narrowed compared to the maximally widened state. The roller 3.7 thereby guarantees that the pipe 2 is inserted fully into the groove.

A set of rollers 3.8 is arranged in the direction of movement of the device 13 on the heat-conducting profile 1 in front of the roller 3.3, through which the pipe 2 is inserted into the groove on the heat-conducting profile. On the lateral surfaces of these additional rollers 3.8, the rotary axes of which must not lie parallel to the previously discussed rollers, a longitudinal area not yet being clamped into the groove on the heat-conducting profile of the clamping pipe 2 is deliberately optimisingly orientated in terms of location and direction for the further course of action.

Whilst in relation to the profile direction of the heat-conducting profile 1 several rollers 3.1 or 3.3, 3.7 abut consecutively on the pipe 2 or on the heat-conducting profile, the alignment of the device 13 about pivot axes, which are positioned in relation to the heat-conducting profile parallel to the joining plane with a plasterboard (horizontal in Fig. 2) and perpendicular to the profile direction, is better defined than if this were not the case.

The device according to the invention is particularly well applicable on heat-conducting profiles, which are designed such that the grooves being used to house each of the pipes are particularly easily flexibly expandable in order to introduce the pipe.

According to the profile example of Fig. 3, this can be achieved particularly well thereby that each wall of the heat-conducting profile 1 abutting the clamping pipe 2 as a boundary of the groove 1.1 is formed by two parts 1.1.1, 1.1.2 of the heat-conducting profile 1, which are not connected together to the pipe 2 on the intended contact surface, but rather through such surface areas 1.3, 1.4 of the heat-conducting profile, which protrude from the intended contact surface to the pipe, wherein these surface areas 1.3, 1.4 consist of at least two layers, which are only connected directly together on one longitudinal area being positioned away from the groove 1.1. The heat-conducting profile according to Fig. 3 is easily manufacturable by means of roll forming a sheet metal band.

Fig. 4 shows a section of a heat-conducting profile 13, which is easy to manufacture by means of aluminium extrusion. There are two respectively two-layered wall areas 11.3, 11.13, which protrude from the groove 11.1 which is intended for housing a pipe, and which divide the border of the groove 11.1 into three surface areas 11.1.1, 11.1.2, 11.1.3, as the narrow gap between the two layers of one wall area 11.3, 11.13 end in the groove 11.1. Compared to a division of the groove border into just two subareas (as is outlined in Fig. 3), by dividing the groove border into three subareas the opening of the groove 11.1 can be flexibly expanded further and more smoothly.

In addition, the heat-conducting profile 13 has a profile wall 11.23, which protrudes from the wall area 11.3 and projects just over the free end of the wall area 11.13. The profile wall 11.23 is only joined with the wall area 11.3 by a very thin support, such that the profile wall 11.23 is pivotable towards the wall area 11.13 by means of plastic deformation of the thin support without great effort.

It is then intended, if a pipe has been inserted with a device according to the invention into the groove 11.1, that the profile wall 11.23 is pivoted downwards around the narrow joining support to the wall area 11.3, such that it meets with its free end the free end of the wall area 11.13, slides onto this, thereby turning the wall area 11.13 somewhat away from the wall area 11.3 and ultimately latching to an angular area 11.13.1 of the wall area. The procedure of pivoting the profile wall 11.23 can be achieved by means of a further roller of the device according to the invention, which is arranged behind the rollers, which act on the insertion of the pipe and presses onto the profile wall 11.23 from above. Whilst through the profile wall 11.23 the two wall areas 11.13, 11.3 are bent somewhat away from each other, a torque occurs respectively between the central surface area 11.1.2 and the outer surface areas 11.1.1 and 11.1.3 of the border surfaces of the groove 11.1, through which the groove 11.1 is narrowed. With the pipe being located in the groove 11.1, a better contact between the pipe and the border surfaces of the groove is thereby created.

Fig. 5 shows a section of a further heat-conducting profile 21, which is also easy to manufacture by means of aluminium extrusion and which is well applicable on devices according to the invention. This heat-conducting profile also has two two-layer wall areas 21.3, 21.13, through which the border surface of the groove 21.1, into which a pipe is clamped, is divided into three partial surfaces. The heat-conducting profile has two profile walls 21.23, which protrude from the outer side of the central border surface of the groove 21.1 into the respective area of a two-layer wall area 21.3, 21.13. It is

then intended, if a pipe has been inserted into the groove 21.1, that the two wall areas 21.23 are bent by means of mechanical exposure around their connecting point with the border surface of the groove 21.1 such that they abut with their free end on the respective wall area 21.3, 21.13, bending this somewhat and thereby latching onto the wall area 21.3 or 21.13. With the pipe being located in the groove 21.1, a better contact between the pipe and the border surfaces of the groove is thereby created.

The bending of the wall areas 21.23 can also occur by means of a device according to the invention. In the examples according to Fig. 1 and Fig. 2, the rollers 3.1 should be designed to be so narrow that they find space between the base points of the profile walls 21.23 on the outer side of the border surface of the groove 21.1. With regards to the direction of movement of the device behind the rollers 3.1, a further roller should be mounted at about the same height and with an axis alignment being parallel to the axes of the rollers 3.1. By means of this additional roller, the profile walls 21.23 must be bent in the discussed manner. For this purpose, this additional roller must be so long that it abuts a wall area of these profile walls being positioned away from the base points of the profile walls 21.23 and presses this downwards.

Compared with the profile 11 of Fig. 4, the profile 21 of Fig. 5 is even better suited for the use of a device according to the invention.

In a not shown embodiment of a device according to the invention, a roller, which effects the widening of the opening of the groove, can be positioned further forward in relation to the direction of movement of the device on the heat-conducting profile than a roller with a tapered lateral surface, through which a pipe is inserted into a groove of the heat-conducting profile. The insertion of the pipe into the groove is thereby facilitated. (The connected disadvantage is that in order to use the device on a ceiling, a greater minimum clearance is required between the front sides of the heat-conducting profiles and the walls supporting the ceiling.)

In a further, not shown embodiment of a device according to the invention, an additional set of rollers can be provided, which is arranged on the device behind the previously mentioned roller sets and which is used to reverse any undesired plastic deformations of the heat-conducting profile and/or the pipe, which have been caused by the front roller set.

Anordning til montering af et rør i en not på en varmeledningsprofil

Patentkrav

1. Anordning (3, 13) til montering af et rør (2) i en not (1.1, 11.1, 21.1) på en varmeledningsprofil (1, 11, 21) ved en afsnitsvis bevægelse af længdeafsnit af røret (2)
5 vinkelret på dets længderetning og vinkelret på varmeledningsprofilens (1) profilretning ind i noten (1.1, 11.1, 21.1), hvor anordningen (3, 13) indbefatter en valse (3.3), hvis konvekse flade har et indsnit og når hen til notens (1.1, 11.1, 21.1) åbningsflade, og hvor røret (2), der skal føres ind i noten (1.1, 11.1, 21.1), ved monteringen ligger op til siden, der vender mod noten (1.1, 11.1, 21.1), af den konvekse flade med indsnit på denne valse
10 (3.3), kendetegnet ved, at
 - anordningen (3, 13) indbefatter et hus (3.6), som varmeledningsprofilen (1, 11, 21) kan føres igennem i sin profilretning, og ved hvilket yderligere valser (3.1, 3.2) er lejret drejeligt omkring akser, der ligger vinkelret på varmeledningsprofilens profilretning, hvor
15 - mindst to af disse yderligere valser (3.1, 3.2) ligger op til varmeledningsprofilens (1, 11, 21) tværsnitsfladeområder, der har en indbyrdes afstand, på varmeledningsprofilen (1, 11, 21) under tryk og udøver en bøjekraft omkring bøjekser, der forløber parallelt med profilretningen, på varmeledningsprofilen (1, 11, 21), ved hjælp af hvilken notens (1.1, 11.1, 21.1) åbning udvides.
- 20 2. Anordning ifølge krav 1, kendetegnet ved, at valserne, der udøver en bøjekraft på varmeledningsprofilen, ligger længere fremme på varmeledningsprofilen i anordningens bevægelsesretning end valsen, som røret (2), der skal føres ind i noten, ligger op til.
3. Anordning ifølge krav 1 eller 2, kendetegnet ved, at en yderligere valse (3.7) med konveks flade med indsnit bag ved valsen (3.3) rager ind i noten (1.1) på
25 varmeledningsprofilen (1).
4. Anordning ifølge et af kravene 1 til 3, kendetegnet ved, at der er placeret valser (3.8) i anordningens (13) bevægelsesretning på varmeledningsprofilen (1) før valsen (3.3), ved hjælp af hvilke røret (2) føres ind i noten på varmeledningsprofilen, og at et længdeafsnit af røret (2), der endnu ikke er ført ind i noten (11.1) på
30 varmeledningsprofilen (11), ligger op til konvekse flader på disse valser (3.8).

5. Anordning ifølge et af kravene 1 til 4, kendetegnet ved, at en eller flere valser (3.1, 3.2), der pesser mod varmeledningsprofilen (1), kan drejes ved motorkraft omkring deres akse i forhold til huset (3.6).
6. Anordning ifølge et af kravene 1 til 5, kendetegnet ved, at den indbefatter en valse, 5 der ved et sådant længdeområde af varmeledningsprofilen (11), ved hvilket røret (2) allerede er ført ind i noten (11.1), ligger op til en væg (11.23, 21.23) og svinger denne.

Fig. 1

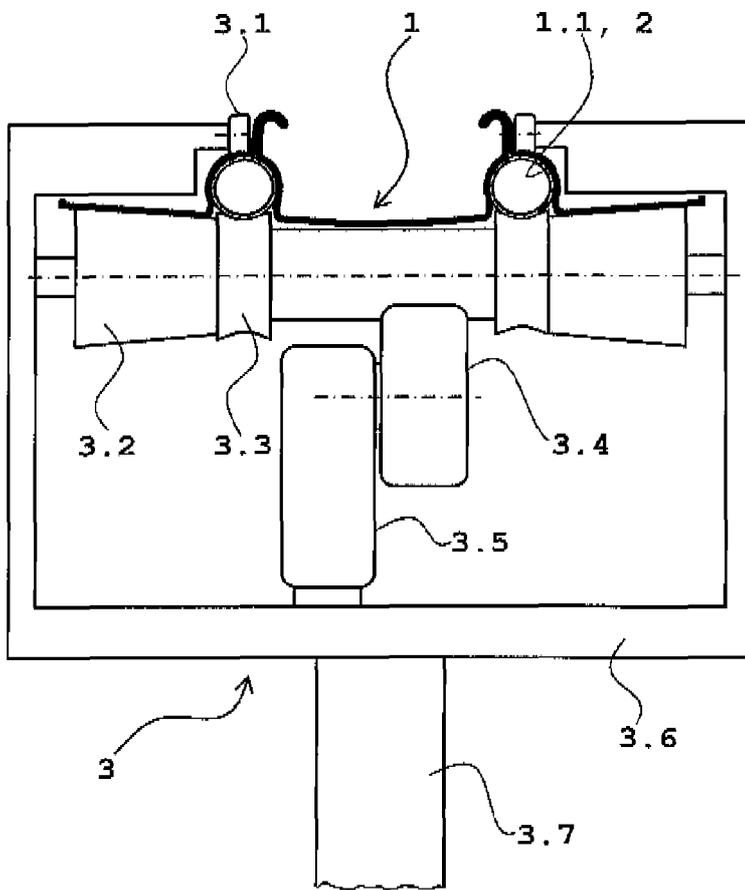


Fig. 2

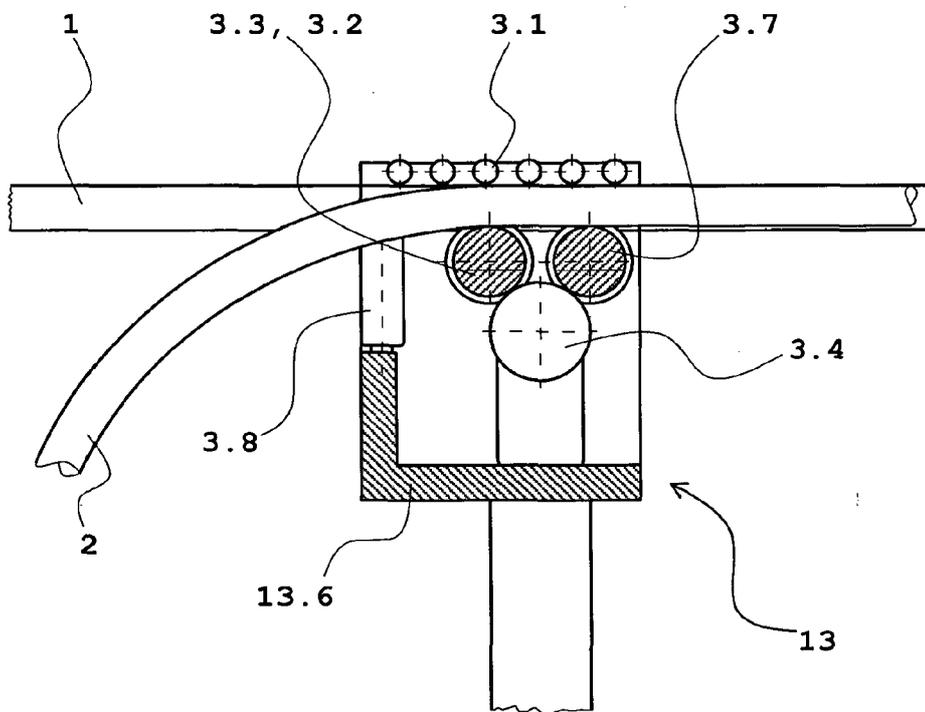


Fig. 3

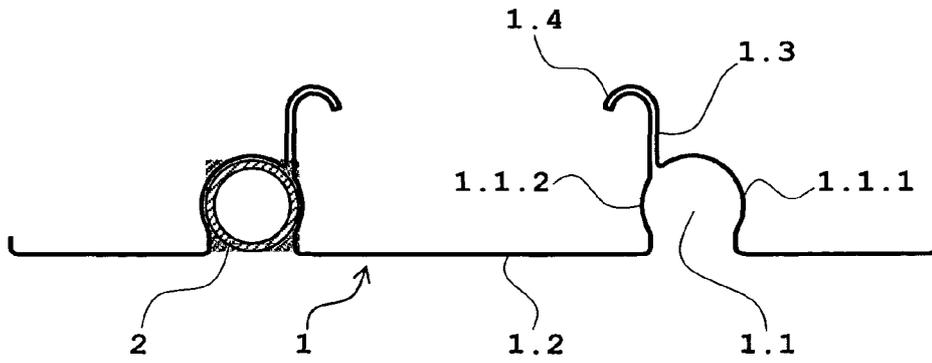


Fig. 4

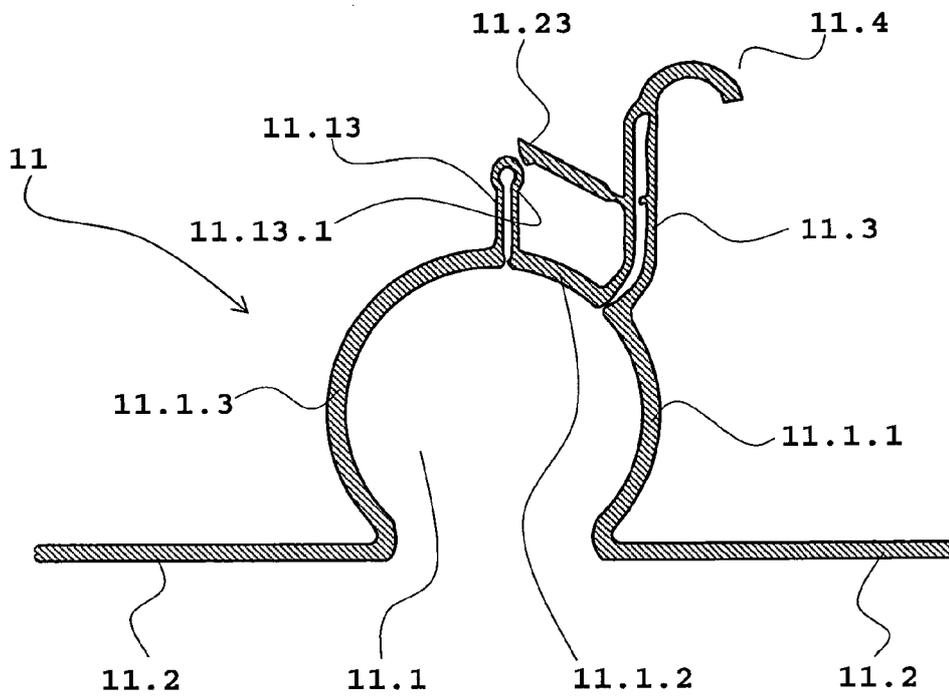


Fig. 5

