

(19) **DANMARK**



Patent- og
Varemærkestyrelsen

(12)

Oversættelse af europæisk patentskrift

(10) **DK/EP 2840201 T3**

-
- (51) Int.Cl.: **E 04 F 13/08 (2006.01)** **E 04 D 3/36 (2006.01)** **E 04 D 13/16 (2006.01)**
- (45) Oversættelsen bekendtgjort den: **2016-01-04**
- (80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2015-09-23**
- (86) Europæisk ansøgning nr.: **14184909.1**
- (86) Europæisk indleveringsdag: **2002-12-05**
- (87) Den europæiske ansøgnings publiceringsdag: **2015-02-25**
- (30) Prioritet: **2001-12-05 DE 10159632** **2002-03-26 DE 10213490**
- (62) Stamansøgningsnr: **14163551.6**
- (84) Designerede stater: **AT BE BG CH CY CZ DE DK EE ES FI FR GB GR IE IT LI LU MC NL PT SE SI SK TR**
- (73) Patenthaver: **EJOT GmbH & Co. KG, Astenbergstr. 21, 57319 Bad Berleburg, Tyskland**
- (72) Opfinder: **Tiemann Joachim, Christian-Wiesen-Str. 3, 59846 Sundern, Tyskland**
Knebel, Ulrich, An der Struth 5, 57319 Bad Berleburg-Berghausen, Tyskland
Hackler, Erhard, Am Winterscheid 7, 57319 Bad Berleburg-Berghausen, Tyskland
- (74) Fuldmægtig i Danmark: **Chas. Hude A/S, H.C. Andersens Boulevard 33, 1780 København V, Danmark**
- (54) Benævnelse: **Dyvel og fremgangsmåde til en dybmontage af en sådan i isolationsmaterialeplader**
- (56) Fremdragne publikationer:
EP-A1- 0 189 569
EP-A2- 0 931 892
DE-A1- 3 321 623
DE-A1- 4 324 598

Description

The present invention relates to a method for the assembly of insulating plates on a substructure, wherein the dowel comprising a pressing plate and a dowel sleeve adjacent to the pressing plate for receiving an expansion element having an expansion element head, wherein the dowel sleeve comprises an expansion zone, and wherein a recess is formed in the insulating plate by the dowel itself during assembling.

10 Conventional dowels for the assembly of insulating plates, as for example depicted in EP 0 931 892 A2 or DE 33 21 623, have the disadvantage that they cannot entirely prevent the formation of thermal bridges, which also applies for dowels having a plastic coating or heads made of plastic. Substantially, this results from the diversity of the materials of which the insulating material on the one hand and the dowel on the other hand are made. This diversity may also lead to undesirable dowel show-through in the plastering layer at the outer walls, especially when exposed to moisture and wetness. This disadvantage occurs frequently when applying basic plastering qualities. To achieve a better thermal insulation and to avoid dowel show-through in the plastering layer, a sunk-in assembling of the dowel in the insulating plate has been suggested.

A process where a recess is formed in the insulating plate for receiving the dowel, simultaneously with the drilling of the bore-hole for the dowel is known from EP 0 086 452. In this case, a recess corresponding to the diameter of the pressing plate is carved into the insulating plate when drilling the bore-hole in the same process step, by means of a countersink drill which includes a carving head and a plate-like stopper, and subsequently closed with a covering which is already arranged on said pressing plate and subsequently filled by a covering which was already placed on the pressing plate. Due to the fact that the covering is arranged on the pressing plate or on the dowel head, respectively, by the factory, an additional process step is avoided during assembly. However, the carving leads to an extensive abrasion of insulating material. Considering the large number of dowels which are regularly used for the assembly of

insulating plates when building a house, the generated carving dust poses an extensive pollution of the environment, and, in larger amounts, may also lead to health issues for the construction personnel. Further, the assembling properties of dowels having coverings applied at the factory are clearly inferior to
5 comparable dowels without applied covering. Due to the insufficient resistance to pressure of the insulating material and as such the limited drive-in-forces, only low dowel expansion forces are possible, which can lead to considerably poorer values regarding the draw-out resistance. Further, in production such dowels are significantly more expensive than conventional embodiments.
10 Additionally, for carrying out the known process a specific countersink drill is required, being likewise expensive in production.

A further known solution comprises a carving crown, e.g. made out of plastic, by means of which a recess is carved into the insulating material after the bore-
15 hole has been drilled. Then the dowel is introduced into the bore-hole and subsequently assembled. Thereafter, the covering is applied. This solution contains two more process steps as compared to EP 0 086 452 and therefore is more time-consuming. Apart from that, there is also an extensive environmental burden because of the generated carving dust.

20 EP 1 088 945 discloses an insulating element, which consists of mineral fibers and comprises markings for the arrangement of dowels for insulating material. The markings can be located in recesses within the insulating element respectively be formed as recesses. Preferably, the recesses are formed
25 mechanically or in the case of thermoplastic insulating materials by local heating. On the one hand the production of such insulating elements is associated with extensive costs, on the other hand the pre-fabricated recesses leave no room for the construction personnel on-side for an assembly of the dowel for insulating material which deviates from the predetermined pattern. It is
30 also not taken into consideration that the respectively most advantageous geometric arrangement of the dowels for insulating material with regard to the insulating plate may vary enormously depending on the special areal circumstances and the weather conditions.

Further, pre-forms of mineral wool for acoustic and thermal insulation of household appliances are known from utility model DE 296 22 196. These form-parts comprise areas of material, in which recesses are formed. These areas of material are thereby exposed across the depths of the predetermined recess by cut-ins with regard to the surrounding material, and are already pre-compressed during the production by means of a pressure piston. Thereby, the material is compressed in such a way that it comprises a remaining elasticity for enabling a limited adaptation to changes in the configuration during the assembly of ovens etc. Also in this case, expensive pre-formed parts are considered. For the construction industry, especially with regard to the assembly of insulating material with dowels, parts produced in such a way are not suitable since they do not comprise the required stiffness.

It is the object of the invention to provide a method by which the pollution of the environment by carving the insulating material can be avoided, a recessed assembling of the dowel in the insulating material with as few process steps as possible can be insured, a properly formed surface of the insulating material can be generated, reasonably priced dowels can be used and finally a tight anchorage of the dowel in the substructure can be achieved. This shall be achieved for beat-in dowels as well as for screw dowels.

According to the invention, this object is solved by a method according to independent claim 1.

25

In context of the method according to the invention, a dowel with cutting means at the lower side of the pressing plate is used wherein the method comprises that a) a bore-hole is drilled through the insulating plate into a substructure, b) the dowel and the expansion element are inserted into the bore-hole, c) the expansion element is driven into the dowel sleeve, and wherein simultaneously d) the pressing plate is pulled into the insulating plate under compression of the insulating plate, and the insulating plate is cut at the circumference of the pressing plate by ease of cutting means. Thereby, all steps a) to d) could be

performed simultaneously; the steps a) and b) could however also take place before steps c) and d), either together or separated.

In a further method, which is only described exemplarily, but is not claimed, also
5 at least the following steps could be performed a) drilling of a bore-hole through the insulating plate into the substructure, b) cutting in a circle with at least the radius R into the insulating plate by means of cutting means, c) inserting the dowel and the expansion element into the bore-hole, d) driving in the expansion element into the pressing plate and the dowel sleeve and simultaneously e)
10 pulling in the pressing plate into the insulating plate under compression of the insulating plate. These steps could be carried out in this order, but this is not necessarily the case.

In a preferred embodiment of the invention, the pressing plate may comprise a
15 pressing plate shaft which can be axially shifted along the dowel sleeve. By the shift of the pressing plate shaft along the dowel sleeve, the length of the dowel when driven into the bore-hole can be shortened. The relocatability can be achieved in various ways, such as by slide grooves in both parts. Instead of a relocatability of the devices against each other, deformable devices, such as a
20 dowel sleeve having some kind of crumple zone, can also be used.

Preferably, the pressing plate can comprise a recess for accommodating a drive, for example a hexagonal drive, with which its rotation motion can be transferred to the pressing plate. Alternatively, for example also an inside torx
25 can be provided in the pressing plate, with which the expansion element engages.

Preferably, the dowel can comprise an anti-twist device in order to transfer the initial insertion torque when driving in the expansion element. This can be
30 achieved in the pre-assembly position by having the pressing plate already inserted in the insulating material or in the bore-hole by external ribs at the dowel sleeve.

In a preferred alternative of the method according to the invention, the method comprises the steps a) to d), after the complete pulling-in of the pressing plate into the insulating plate, in a further step e) a covering is put onto the completely sunk-in pressing plate which may possibly lead to quicker operations - provided
5 that there is an appropriate division of labor -, as if the covering is for instance individually placed on the hexagonal drive of a bit before.

For a sunk-in assembly of a conventional dowel for driving in the expansion element into the dowel sleeve, a device is used, which comprises a depth stop
10 with cutting means for cutting in the insulating plate along the circumference of the pressing plate.

In the method described above already before the insertion of the dowel and the expansion element into the bore-hole, a circle can be cut into the insulating
15 plate, namely by use of cutting means, which are arranged on a device for drilling the bore-hole. Subsequently, when driving in the expansion element, the circular cut-out in the insulating plate is compressed.

In an appropriate alternative of the exemplarily described method, step b) is
20 carried out before step a), i.e. initially the circle is cut into the insulating plate and then the bore-hole is drilled. If the bore-hole would be arranged eccentrically with regard to the cut-in circle, the dowel would compress the circular surface area which overlaps with the cutting circle while pulling in and thus holes would be generated in the insulating plate after putting on the
25 coverings.

In a further preferred alternative of the exemplarily described method, steps a) and b) can be performed simultaneously, so that time can be saved when the dowel is assembled.

30

In a further preferred alternative of the exemplarily described method, a covering is put onto the completely sunk-in pressing plate after pulling in the pressing plate, whereby actually one process step more is generated compared

to dowels having coverings applied already at the factory, but all in all a much more stable anchorage of the dowel in the substructure is achieved.

In a further preferred embodiment of the exemplarily described method, the
5 cutting means comprising a depth stop, so that it can be cut in the insulating plates evenly deep, a uniform assembly depth of the dowels can be ensured, and finally also the coverings can be well-fitting inserted.

The already above exemplarily described device for drilling a bore-hole through
10 an insulating plate into a substructure, can comprise a shaft for inserting a drill attachment, wherein the shaft is designed such that thereon cutting means for cutting in a circle in the insulating plate can be arranged. By means of this device, the circles can be cut into the insulating plates either before or after the drilling of the bore-hole. This can happen in a rotating manner, but also in a
15 non-rotating manner.

In the exemplarily described device, the cutting means comprise a depth stop in order to ensure an even cut-in depth.

20 A further here only exemplarily described device for drilling a bore-hole through an insulating plate into a substructure may comprise a drill shaft, wherein at the drill shaft cutting means for cutting in a circle into the insulating plate are arranged. Thus, for example not only after the drilling of the bore-hole and the bore-holes, respectively, a new attachment has to be clamped in the holder of
25 the device in order to generate the circular cut-in in the insulating plates. Moreover, in this way, the concentric arrangement of the cut-in circle relative to the bore-hole is ensured. In order to ensure an even cut-in depth, the cutting means can also comprise a depth stop.

30 Alternatively, cutting means for cutting in a circle into an insulating plate can be designed as such that they can be arranged on a device for drilling of a bore-hole through an insulating plate into a substructure. Thereby, the cutting means can comprise a depth stop.

By means of the drawings, the assembly of a dowel having cutting means and of a conventional dowel with a device according to the invention are illustrated. It shows:

5

Fig. 1 a longitudinal section through a dowel having cutting means at the beginning of the assembly according to the invention,

Fig. 2 a longitudinal section through a dowel having cutting means in final
10 assembly position according to the invention,

Fig. 3 a longitudinal section through a dowel having cutting means in a final assembly state with applied covering,

15 Fig. 4 a longitudinal section through a conventional dowel and a drive-in device, the depth stop of which is provided with cutting means,

Fig. 5a a longitudinal section through a conventional device for drilling of a bore-hole,
20

Fig. 5b a longitudinal section through a device for cutting in a circle into the insulating material,

Fig. 6 a longitudinal section through a device for drilling a bore-hole and
25 simultaneously cutting in a circle into the insulting material,

Fig. 7 a longitudinal section through a dowel with expansion element before assembly,

30 Fig. 8 a longitudinal section through a dowel in a final assembly position,

Fig. 9 a longitudinal section through a dowel in a final assembly position with applied covering.

Fig. 1 shows the dowel 1 which has already been put through an insulating plate 2 and an intermediate layer 5 into the brickwork 3. The pressing plate shaft 14 and the dowel sleeve 15 are connected with each other in this state, for inserting the dowel in full length. The pressing plate 13 which is provided at its lower side with radial cutting means 17 lies on the surface of the insulating plate 2, wherein the cutting means 17 are stuck in the insulating material. The pressing plate 13 is usually provided with co-axially arranged openings; however, regarding compressing the insulating material as uniformly as possible, also embodiments without openings are contemplated. The expansion element 11, preferably an inside torx screw, in this case has been inserted into the dowel sleeve 15 up to the expansion zone 18 by means of a respective drive 32, 33, so that the expansion element head 12 does not yet bear on the recess 16. The expansion element 11 can be realized without plastic extrusion coating or plastic head, since there is no contact with the plastering layer and thus no danger of corrosion. When the head 12 of the screw 11 finally bears on recess 16, the process of compressing the insulating material starts. For achieving that the pressing plate 13 also rotates during the assembly, the drive 32, 33 engages in a recess 19 in the pressing plate 13 which is provided for this reason. Another possibility is that the screw 11 engages into pressing plate 13 by means of an engaging means, as for example an inside torx. The rotating pressing plate 13 cuts itself into the insulating material by means of its cutting means 17 being arranged at its outer edge and simultaneously it begins to compress the circular cut out in the insulating material which is located beneath the pressing plate 13. The outer cutting means cause that a clean, i.e. smooth, in this case radial face surface is generated, which is the precondition for a well-fitting insertion and a tight fit of the covering within the insulating plate. Thus, the insulating material beneath the pressing plate 13 is substantially compressed, instead of being carved. There might also be a slight abrasion of insulating material, for instance by means of the cutting edges on a rotating pressing plate 13. In any case, the pollution of the environment can be decreased significantly by reducing the carving waste. The connection between dowel-sleeve 15 and pressing plate 13 is loosened by the tensile force of the

screw, whereby the pressing plate 13 can be axially displaced across the dowel sleeve 15 for the compression. The dowel length is then so to speak reduced by the assembly depth. Preferably, the assembly depth is 20 mm. The area between dowel sleeve 15 and pressing plate 13 which in this example is formed as pressing plate shaft 14 and in which the axial length compensation takes place, is provided with special sealing areas, as for example sealing lips, in order to ensure the tightness of dowel sleeve 15. During the compression of the insulating material, the screw further screws in axially in the expansion zone 18 of dowel sleeve 15 with increasing pull-in depth, and generates for example by means of frictional engagement the desired solid anchorage in the brickwork 3. The term "expansion zone" in this case describes any form of anchorage or clamping mechanism of dowel 1 in the substructure 3 due to the insertion of expansion element 11. The screw length is coordinated with the final assembly state. If the thread for example sticks in the expansion zones by 10 mm before compression, and if the dowel is then mounted in this example 20 mm deep in the insulating material, this results in a length of the screwing/driving into the brickwork by 30 mm. These values may vary significantly, depending on the type of insulating material used. To ensure uniform assembly depth, the drive in device 30 is provided with a depth stop 31.

The compression of the insulating material causes that deliberately compressive strains are brought into the insulating material by squeezing the insulating material, to compress the latter. Thereby the system of insulating material and pressing plate 13 becomes stiffer in the loaded state. The reason for this is that in loaded state, when pulling the insulating material over the pressing plate, respectively pulling the pressing plate through the insulating material, the latter can no longer be compressed easily, since it is already compressed or packed, respectively. Thereby the load-deformability behavior is formed more stiffly, since at equal load significantly shorter deformation ways exist, as compared to non-compressed respectively carved insulating materials which are not packed.

Fig. 2 shows the dowel 1 in the final assembly position, wherein depth stop 31 of the drive in device 30 bears on the surface of the insulating plate and wherein the distance between the depth stop 31 and the lower edge 130 of pressing plate 13 is preferably 20 mm. The dowel length is now reduced by the assembly depth, i.e. the pressing plate 13 with pressing plate shaft 14 has been displaced on the dowel sleeve during the compressing of the insulating material. The initial connection between the dowel sleeve 15 and the pressing plate shaft 14 is released. The circumferential projection 150 being located at the end of the dowel sleeve 15 which faces the outside, and the corresponding circumferential projection 140 being located at the end of the pressing plate shaft 14 which faces the brickwork, guarantee for a sliding axial guidance of the pressing plate shaft 14 on the dowel sleeve 15. The projections 140, 150 are connected before the assembly by non-positively connection, positively connection or material connection, for example bonded or connected via a breaking line; at the beginning of the compression procedure, this connection is released due to the tensile force of the expansion element 11 while screwing/driving in. In the final assembly state, the circumferential projection 150 is located closely beneath the screw head 12, which bears on recess 16.

Fig. 3 shows dowel 1 in the final assembly state with put on covering 21, wherein the covering 21, shown in the example, exactly terminates with the surface of the insulating plate 2. A subsequent abrasion of a partly projecting covering 21 is indeed also possible. In this case, however, one has to accept some carving respectively abrasion waste. The covering can be inserted separately subsequently to the assembly of the dowel, or it may be set simultaneously with the assembly, in such a way that it is put on a hexagonal drive 32 of a bit 33. To create an especially tight fit of the covering it is contemplated, to direct the cutting means 17 slightly outward, to form the resulting recess slightly conical. This deformation of the cutting means may for example take place by a bulging of the pressing plate during the assembly. Equally, the covering can be formed conical in case of a cylindrical recess. Preferably, the covering is made of the same material as the used insulating

plates. Possible materials are for example styrofoam, polyurethane foam, insulating cork, wood wool, wood fiber, coco fiber or mineral wool.

Fig. 4 finally shows a conventional dowel 1, the expansion element 11 of which is driven into the dowel sleeve 15 by means of a device 30 respectively its drive 32, 33. The dowel 1 comprises no cutting means, instead cutting means 17 are arranged on the depth stop 31 along the circumference of the pressing plate 13, which cut into the insulating plate 2, while the pressing plate 13 pulls in and compresses the insulating material. In this way, also conventional dowels may be assembled sunk-in.

Fig. 5a shows the device 40 for drilling of a bore-hole 4 with the drill bit 43 being clamped at the drill shaft 44 when drilling a bore-hole 4 through the insulating plate 2, the intermediate layer 5 and the brickwork 3.

Fig. 5b shows the device 40 for cutting in the insulating material, with the cutting means 42 being clamped at the shaft 44' which also comprises a depth stop 41. The cutting means 42 with depth stop 41 may for instance be provided with an inside torx or a hexagon-like opening and thus may be pinned up on a corresponding shaft 44', respectively a corresponding assembling bit. It is also contemplated that the cutting means 42 with the depth stop 41 are fixed to the shaft 44' or engaged with the latter or cooperate with it in another suitable manner. The rotating cutting means 42 cut into the insulating plate 2 after the bore-hole 4 has been drilled with a conventional device, and cause that a proper, i.e. smooth, in this case radial surface is generated, which is the precondition for a well-fitting insertion and a tight fit of the covering 21 in the insulating plate 2. In this connection, however, some insulating material may be removed by the rotating cutting edges. Depending on the insulating material, the device for cutting into the insulating material does not have to be driven-in in a rotating manner, but can also just be pushed into the insulating material as a sort of cut-out-tool. In any case however, the environmental pollution is significantly decreased by the substantial reduction of the carving waste. The depth stop 41 provides for a uniform cut-in depth X into the insulating plate 2.

Fig. 6 shows a device 40 for drilling of a bore-hole 4 with the drill bit 43 being clamped at the drill shaft 44, wherein the cutting means 42 with the depth stop 41 are also arranged at the drill shaft 44. It is also possible for this embodiment that the cutting means 42 with depth stop 41 are arranged fixedly at the drill shaft 44, or that they, depending on the design of the drill shaft 44, can be pinned up on the latter, engage with it or cooperate otherwise with it. The device 40 enables that simultaneously with the drilling of the bore-hole 4, the circular cut-in with the depth X into the insulating plate 2 is carried out. Furthermore, the desired arrangement of the cut-in circle with respect to the bore-hole is guaranteed by means of the device, and thus, holes respectively gaps in the insulating material are avoided.

Fig. 7 shows a dowel 1 in the pre-assembly state, which has been inserted through the insulating plate 2 and the intermediate layer 5 into the brickwork 3. The pressing plate 13, having the recess 16 for receiving the expansion element head 12 thereby bears on the surface of the insulating plate 2, and namely in such a way that the insulating material area defined by the cut-in circle is located exactly beneath the pressing plate 13. This surface area being destined for compression is equally large or somewhat larger as the area of the pressing plate 13. The expansion zone 18 of dowel 1 already extends into the brickwork 3. The expansion element 11 with the expansion element head 12 is already inserted into the dowel sleeve 15, but does not yet bear on the recess 16 of the pressing plate 13. The expansion element 11 in this example is formed as a nail, but a screw can also be used. Further, the expansion element 11 can be formed with or without a plastic coating or plastic head, since there is no contact with the plastering layer and thus also no danger of corrosion.

Fig. 8 shows a dowel 1 after the compression of the circular insulating material cut-out being located beneath the pressing plate 13. The process of compressing the insulating material starts when the head 12 of expansion element 11 bears in the recess 16 of pressing plate 13, and the required force for setting dowels 30 is applied by means of a suitable device for completely

driving in the expansion elements. In case of nail-like expansion elements 11, this may also be done manually by means of a hammer 50. Thus, the insulating material beneath the pressing plate is substantially compressed, instead of being carved. During the compression of the insulating material, the expansion
5 element 11 is brought further axially into the expansion zone 18 of dowel sleeve 15 and generates the desired tight anchorage in the brickwork 3, for example by force transmission by non-positively connection, positively connection or material connection. The term "expansion zone" herein describes any form of anchorage or clamping mechanism of dowel 1 in the substructure 3 due to the
10 insertion of expansion element 11. By the shown usage of a dowel 1 with a crumple zone 155, which is formed during the compression procedure within the insulating material, it can be avoided that the expansion zone 18 slides forward in the brickwork 3. The reduction of the dowel sleeve 15 created in this way, further enables the use of shorter, thus less expensive expansion elements 11.

15

Fig. 9 shows the dowel 1 in the final assembly state with crumple zone 155 being formed and covering 21 being put on, wherein the covering 21 in the example exactly terminates with the surface of the insulating plate 2. To avoid a subsequent abrasion of the covering, a space can be provided between the
20 pressing plate and the covering, thereby the covering can always be positioned surface-flush with regard to the insulating plate. The covering may be inserted separately following the assembly of the dowel, or it can be set simultaneously with the assembly, by putting it on the device for setting the dowels 30 beforehand. Equally, the covering may be formed conical in case of a cylindrical
25 recess. Preferably, the covering is made out of the same material as the used insulating plates. Possible materials are for example styrofoam, polyurethane foam, insulating cork, wood wool, wood fiber, coco fiber or mineral wool.

The above-described invention is not only suitable for a screw dowel, it may
30 also be applied for a beat-in dowel.

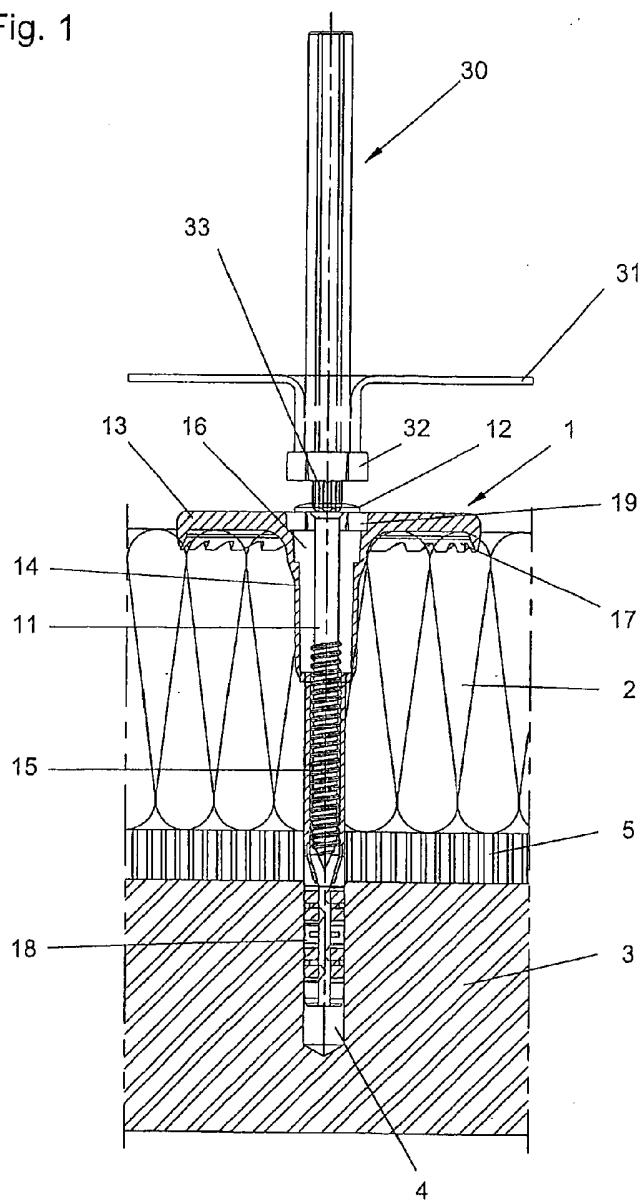
Patentkrav

1. Fremgangsmåde til montage af en isolationsmaterialeplade (2) på en underkonstruktion (3) ved hjælp af en dyvel (1) med en trykplade (13), og hvor
5 trykpladen har et trykpladeskaft (14), og hvor trykpladen (13) på undersiden har skæreindretninger (17) til indskæring i isolationsmaterialepladen (2), og hvor der findes en dyvelhylse (15) til optagelse af et ekspansionsorgan (11), og hvor dyvelhylsen (15) har en ekspansionszone (18), hvilken fremgangsmåde omfatter:
- 10 at man borer et borehul (4) gennem isolationsmaterialepladen (2) i underkonstruktionen (3),
at man indfører dyvelen (1) og ekspansionsorganet (11) i det borede hul (4),
- 15 **kendetegnet ved,**
at man driver ekspansionsorganet (11) ind i dyvelhylsen (15) og samtidigt trækker trykpladen (13) ind i isolationsmaterialepladen (2) under sammentrykning af denne plade (2), og
at man ved trykpladens (13) omkreds samtidig tilvejebringer
20 indskæringer i isolationsmaterialepladen (2), og dette ved hjælp af skæreindretningerne (17).
2. Fremgangsmåde ifølge krav 1, **kendetegnet ved, at** man trækker trykpladen (13) fuldstændigt ind i isolationsmaterialepladen (2), og at man
25 påsætter en overdækning (21) på den fuldstændigt nedsænkede trykplade (13).
3. Fremgangsmåde ifølge krav 1, **kendetegnet ved, at** man på samme tid udfører boringen af borehullet (4) og indføringen af dyvelen (1) og ekspansionsorganet (11) i borehullet (4).
- 30 4. Fremgangsmåde ifølge krav 1, **kendetegnet ved, at** man ved inddrivningen af ekspansionsorganet (11) i dyvelhylsen (15) aksialt forskyder trykpladens skaft (4) i forhold til dyvelhylsen (15).

5. Fremgangsmåde ifølge krav 1, **kendetegnet ved, at** man ved inddrivningen af ekspansionsorganet (11) i dyvelhylsen (15) indskruer ekspansionsorganet (11) i dyvelhylsen (15).

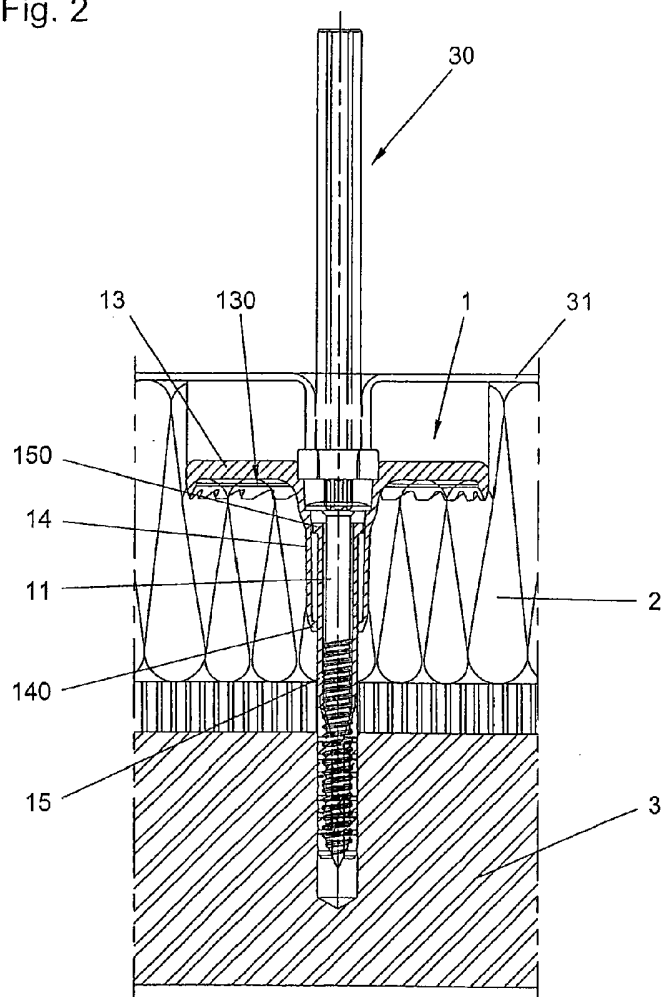
1

Fig. 1



2

Fig. 2



3

Fig. 3

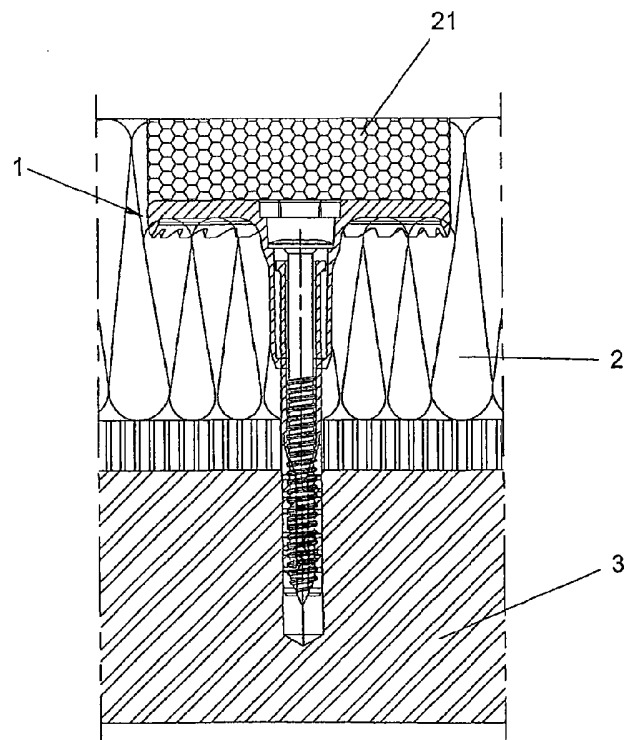


Fig. 4

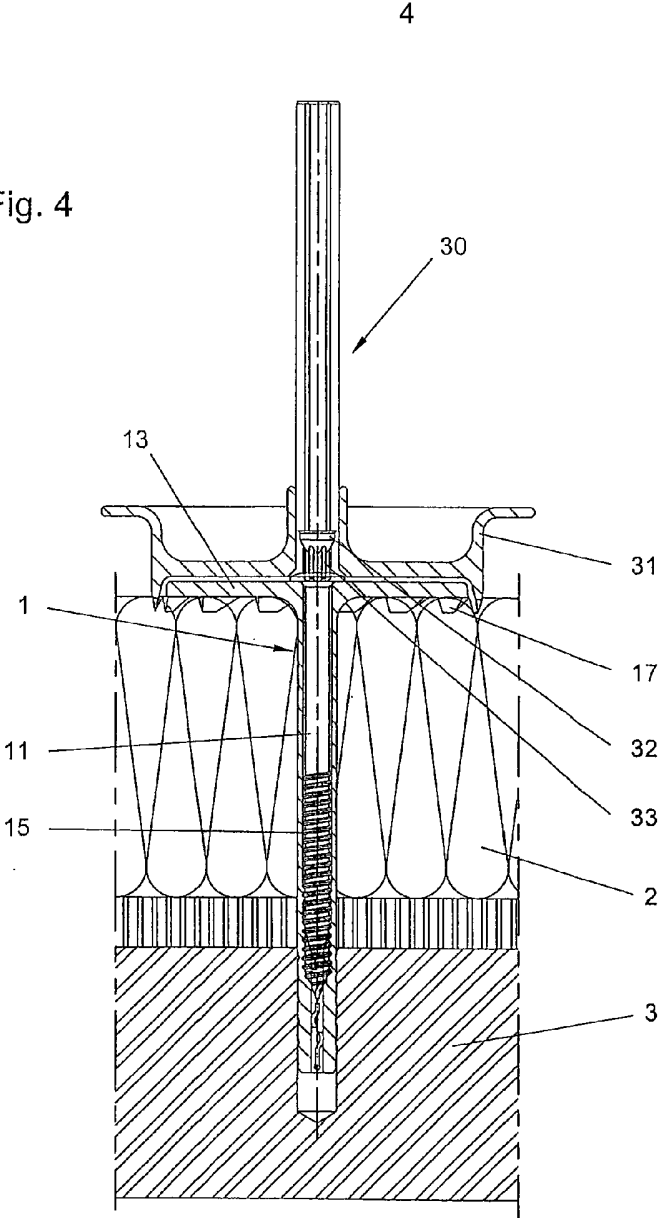


Fig. 5a

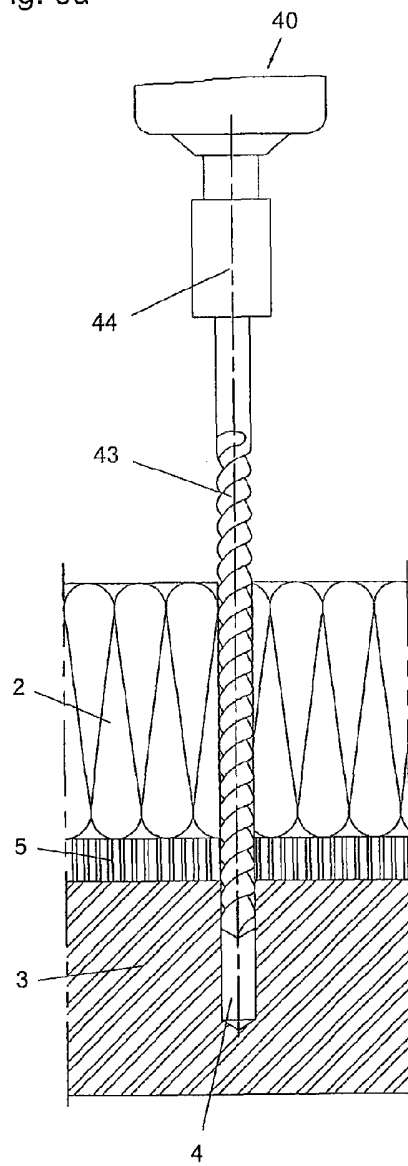
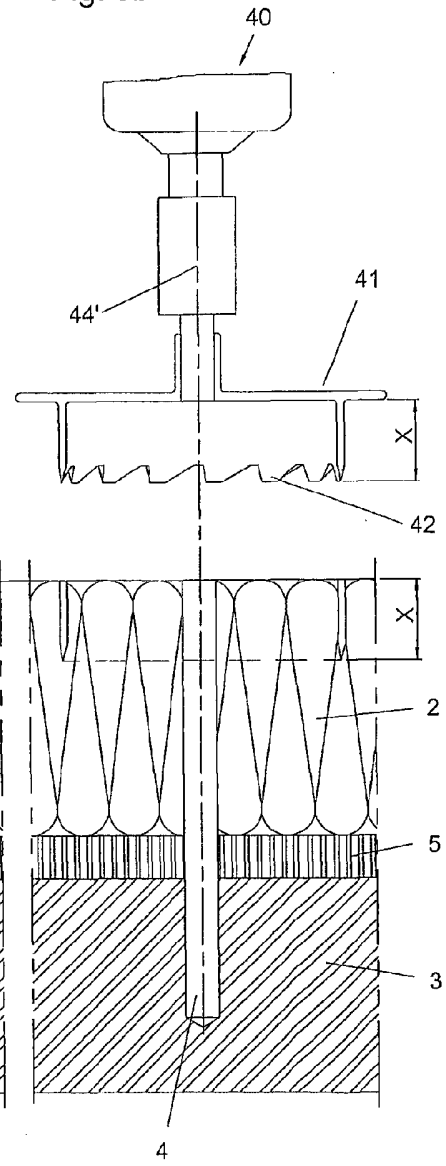
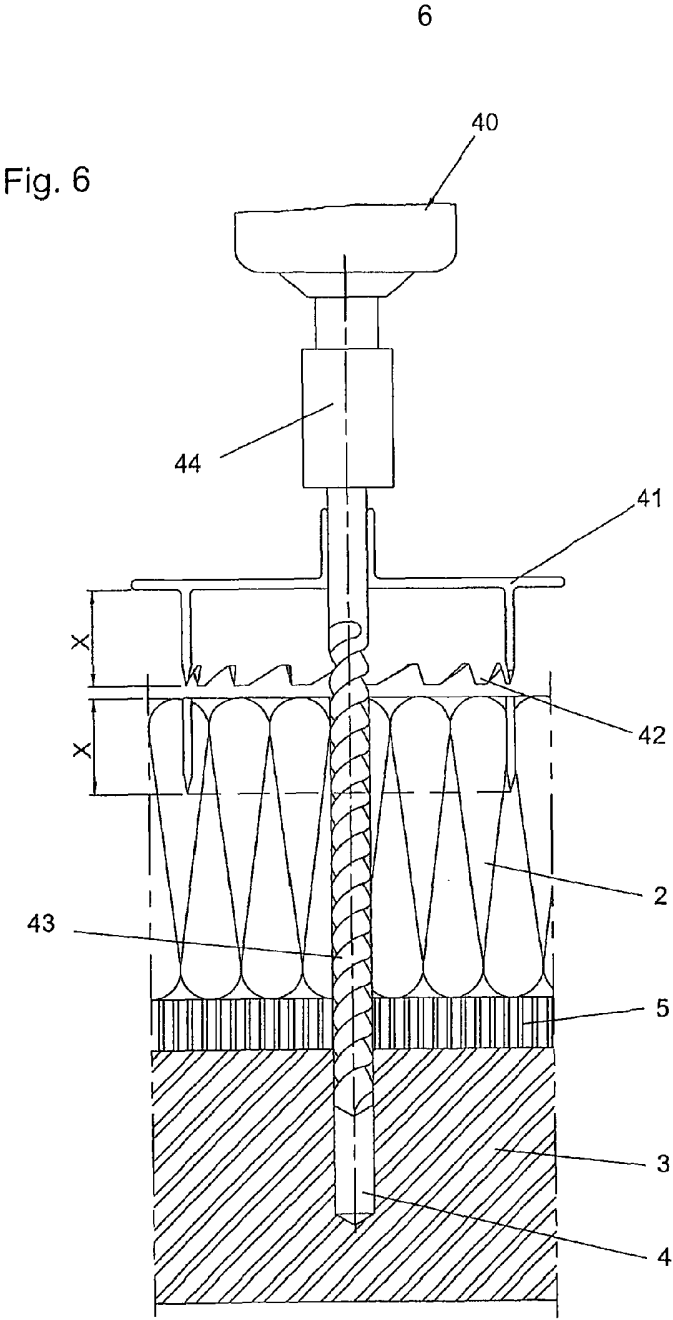


Fig. 5b





8

Fig. 8

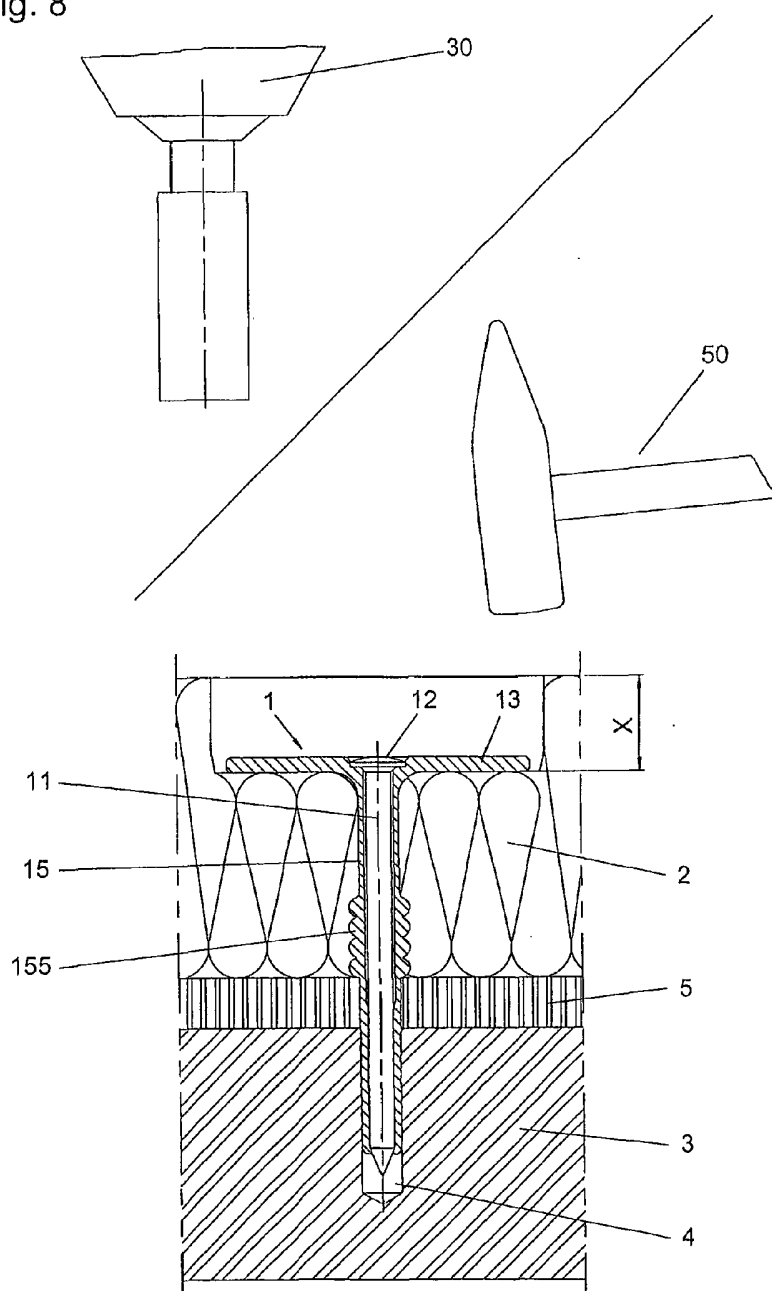


Fig. 9

