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(54) **A DEVICE FOR NON-INVASIVE FIXING OF BUILDING INSULATION TO A STRUCTURAL OR DECORATIVE COMPONENT OF MECHANICALLY FIXED CLADDING, A SYSTEM INCLUDING SUCH DEVICE AND A METHOD FOR FIXING BUILDING INSULATION**

(57) The non-invasive fixing device for fixing of building insulation to a constructive or decorative component of mechanically fixed cladding, in accordance with the invention, is applicable in the field of construction. It includes a supporting element for penetration through insulation, connected at one end with a transverse pressing disc (2) for pressing of insulation, while after the pressing disc (2), the device for fixing has a fixing element, configured to be fixed to a load-bearing profile subconstruc-

tion or cladding panel, where the supporting element is a needle (1) with a length less than or equal to the thickness of the insulation. It is possible to have an adjustment part (4) between the fixing element and the stress element. The non-invasive fixing device for fixing of insulation can be part of a system for non-invasive fixing of insulation and is used in a method for non-invasive fixing of insulation.

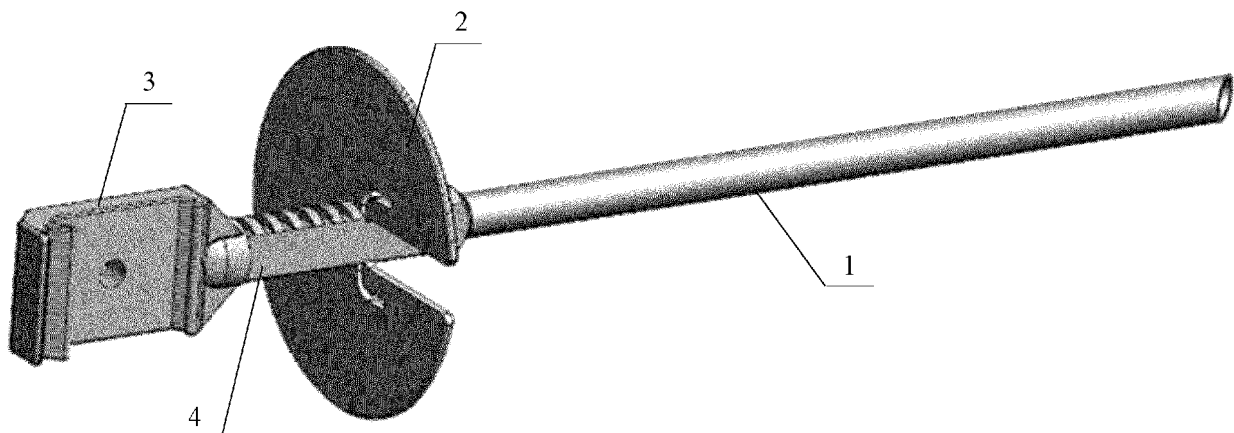


Figure 1

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Description

TECHNICAL FIELD

[0001] The non-invasive fixing device for fixing of building insulation to a structural or decorative component of mechanically fixed cladding, according to the invention, is applicable in the field of construction; for example, during the erection of insulated ventilated facades or interior constructions.

BACKGROUND ART

[0002] Considering the condition of the equipment, we are aware of a fixing method for outer insulation to a building during erection of ventilated facades, during which the insulation is fixed to the basic construction (the building wall) with the help of special dowels.

[0003] The process includes the following operations:

- pre-fastening of the insulation to the wall;
- final fastening of the insulation that includes:
 - drilling holes in the insulation and the wall, which represents invasion of the wall;
 - placing the dowel in the hole;
 - fixing the dowel with a clamping nail.

[0004] The so-called insulation fixing is applied to other elements of building construction, aside from ventilated facades. All of them contain a number of disadvantages, which are:

- wall invasion - compromising the basic construction, which is particularly undesirable when placing insulation on old buildings, because it creates a risk of compromising their strength;
- low productivity during insulation fixing due to the need for drilling dowel installation holes for fixing of insulation;
- different levels of productivity during the process of drilling holes, depending on the type of wall: concrete, brick, wood, etc.;
- a need for different technology and types of dowels for different wall materials;
- the dowel length has to be conformable to the insulation thickness;
- a need for use of specialized power tools - drills or hammers.

SUMMARY OF THE INVENTION

[0005] The task of the invention is to create a means for fixing of insulation to a constructive or decorative component of mechanically fixed cladding, which does not compromise the elements of the basic construction of the building, to which the insulation is attached; in other words, be non-invasive to the building structure and op-

timize the insulation fixing process.

[0006] This task is solved through the creation of a non-invasive fixing device for fixing of building insulation to a constructive or decorative component of mechanically fixed cladding, including a structural member for piercing through insulation, connected at one end with a transverse pressing disc for pressing insulation. After the pressing disc, the device for fixing has a fixing element, configured to be fixed to a load-bearing profile subconstruction or cladding panel.

[0007] The structural element is represented by a needle with a length less than or equal to the insulation thickness.

[0008] It is advisable to have an adjustment part between the fixing and the structural element, to which the pressing disc is fixed in an adjustable manner and with an option to fix in different positions along the adjustment part. In one variant of execution, the adjustment part has a shallow cylindrical thread, while the pressing disc has a central bore with a thread, in which case the pressing disc is installed with its central bore towards the cylindrical thread of the adjustment part. Alternatively, it is possible for the adjustment part to have a shallow cylindrical thread and to be installed with its central bore through the use of an additional device with a threaded bore to the cylindrical thread of the adjustment part. Another alternative is that the adjustment part could represent an area with cross transverse ring-shaped ribs, placed at distance intervals from one another along the adjustment part, that distance being larger than the thickness of the pressing disc, while the pressing disc has a slot with a width less than the outer diameter of the transverse ring-shaped ribs and larger than the diameter of the adjustment part.

[0009] In an implementation option of the invention, the fixing element is represented by a mount for attachment to a load-bearing profile subconstruction or a cladding panel. Another option is that the fixing element could be a foot mount for support against a cladding panel.

[0010] An additional task for the invention is the creation of a system, including the non-invasive fixing device for fixing of isolation, in relation to the invention.

[0011] This task is performed through the creation of a system for non-invasive fixing of building insulation to a constructive or decorative component of mechanically fixed cladding, including insulation, at least one insulation fastener, a load-bearing profile subconstruction, located on the opposite side of the insulation that faces a main construction element of a building and at least one cladding panel, fixed to the load-bearing profile subconstruction. The aforementioned (at least) one insulation fastener is represented by a non-invasive fixing device for fixing of building insulation, in accordance with the invention, in which the needle of the non-invasive fixing device for fixing of insulation is inserted into the insulation at a depth less than or equal to the thickness of the insulation, while through the use of a fixing element, the non-invasive fixing device for fixing of insulation is installed and fixed to

the load-bearing profile subconstruction or to at least one of the cladding panels.

[0012] An additional task of the invention is the creation of a method for fixing of insulation through the non-invasive fixing device for fixing of insulation, according to the invention.

[0013] That task is accomplished through the creation of a method for non-invasive fixing of building insulation to a constructive or decorative component of mechanically fixed cladding, including the stages of:

- placing an insulation element to a load-bearing construction element of a building;
- fixing the insulation element through a non-invasive fixing device for fixing, in accordance with the invention, in which the needle of the fixing device is inserted in the insulation element, so that it is located at a distance from the load-bearing construction element of a building;
- attaching the fixing element of the fixing device to a profile of a load-bearing profile subconstruction or cladding panel.

[0014] The non-invasive fixing device for fixing can have an adjustable pressing disc, as described above, preferably after the insertion of the needle into the insulation and the fastening of the fixing element, the adjustable pressing disc to press against the outer surface of the insulation element until its full jam to the load-bearing construction element of the building and to be locked in the respective position along the non-invasive fixing device for fixing.

[0015] The advantages of the non-invasive fixing device for fixing of insulation, according to the invention, as well as the system that includes such a device and the method for fixing such a device, are:

- The insulation is fixed to the cladding substructure, not to the basic structure of the building, therefore it is achieved without invasion of the main structure of the building;
- The time for fixing is decreased, because the insulation is fixed without drilling holes into the main structure, which takes the most amount of labour time in the insulation fixing process, especially for concrete constructions;
- The labour productivity is increased due to a smaller number of operations needed for insulation fixing;
- An opportunity for easy repairs and easy insulation replacement if needed, only through disassembly and then reassembly of the used devices for fixing of insulation;
- An opportunity to use the best insulation materials for the production of the needles of the insulation fixing device, for improvement of the overall insulation system of the building;
- An opportunity to use strong construction materials for fixing and adjustable elements of the system,

- which improves the overall strength of the facade;
- An opportunity for better control of the insulation fixing process.

5 BRIEF DESCRIPTION OF THE FIGURES

[0016] Further into the description, the device for fixing of insulation, object to the invention, is clarified through preferred variants of execution, given as examples that are non-limiting to the scope of the invention, with reference to the attached figures, where:

Figure 1 is an axonometric view of a variant of the device for insulation fixing, in accordance with the invention, in which the fixing element is a mount, while the pressing disc is mounted in an adjustable manner.

Figure 2 is an axonometric view of a second variant of the insulation fixing device, in accordance with the invention, in which the fixing element is a foot mount.

EXEMPLARY EMBODIMENT OF THE INVENTION

[0017] The non-invasive fixing device for fixing of building insulation, in accordance with the invention, is fixed to a constructive or decorative component of mechanically fixed cladding. Main constructive building elements are foundations, walls, floors, partition plates, stairs.

[0018] The non-invasive fixing device for fixing of building insulation includes a structural member for piercing through insulation, which is essentially a needle (1) with a length less than or equal to the thickness of the insulation. In an example implementation of the invention, the needle (1) is made of reinforced insulation material. The needle is connected at one end to a transverse pressing disc (2) for pressing against insulation. After the pressing disc (2), the device for fixing has a fixing element, configured to be fixed to a load-bearing profile subconstruction or cladding panel.

[0019] The fixing element can be a mount (3) for fixing to a load-bearing profile subconstruction or cladding panel (fig. 1), or alternatively, a foot mount (5) for support against a cladding panel (fig. 2). The mount can be fixed, for example, to a load-bearing profile or to a slot, cut in the thickness of the cladding panel. A foot mount (5) is used for non-loaded insulation pressing systems in places, where there is a need for additional pressing and can be supported by, for example, the back of the cladding panel. In alternative example implementations of the invention, the fixing element can be a bracket, a bracket with a screw, a clip, a hook, a plate with a screw or another type of construction for fixing to a constructive or decorative component.

[0020] Between the fixing element and the needle is an adjustment part (4), to which the pressing disc (2) is mounted in an adjustable manner and with an option to locking in different positions along the adjustment part

(4).

[0021] The adjustment part (4) can be executed in different ways, such as:

1) The adjustment part (4) can have a shallow cylindrical thread. In this variant, the pressing disc (2) is installed with its central bore towards the cylindrical thread of the adjustment part (4).

2) The adjustment part (4) can have a shallow cylindrical thread. In this variant, the pressing disc (2) has a central bore and is mounted with its central bore through an additional device with a threaded bore to the cylindrical thread of the adjustment part (4).

3) The adjustment part (4) can represent an area with transverse ring-shaped ribs, placed at a distance between them along the adjustment part (4), that distance being larger than the thickness of the pressing disc (2). In this variant, the pressing disc (2) has a slot with a width less than the outer diameter of the transverse ring-shaped ribs and larger than the diameter of the adjustment part (4) (fig. 1), while the pressing disc (2) is threaded with its slot sideways to the adjustment part (4) between two ring-shaped ribs.

[0022] The non-invasive fixing device for fixing of insulation can be a part of a system for non-invasive fixing of building insulation to a constructive or decorative component of mechanically fixed cladding, which includes more insulation, a load-bearing profile subconstruction, located on the insulation side, facing towards a main construction element of a building and at least one cladding panel, fixed to the load-bearing profile subconstruction. The needle (1) of the non-invasive fixing device for fixing of insulation is inserted into the insulation at a depth less than or equal to the thickness of the insulation in a way that it does not touch the construction element of the building, to which the insulation is applied. Through a fixing element, the non-invasive fixing device for fixing of insulation is attached and fixed to the load-bearing profile subconstruction or to at least one cladding panel.

[0023] In the case of the method for non-invasive fixing of building insulation to a constructive or decorative component of mechanically fixed cladding, in accordance with the invention, the following steps are taken:

- Placing of insulation element to a main construction element of a building;
- Fixing of insulation element through the non-invasive fixing device for fixing, in accordance with the invention, in which the needle (1) of the fixing device is inserted into the insulation element, while it is not necessary to pierce a hole beforehand, so that the tip of the needle (1) is located at a distance from the main constructive element of the building;
- In case the non-invasive fixing device for fixing of

insulation includes an adjustable pressing disc (2), after the insertion of the needle (1) into the insulation and the attaching of the fixing element, the adjustable pressing disc (2) is pressed against the outer surface of the insulation element until its complete press against the main constructive element of the building and is fixed in the respective position along the adjustment part (4) of the non-invasive fixing device for fixing;

- Attachment of the fixing element of the device for fixing to a profile of a load-bearing profile subconstruction or cladding panel. In the example implementation of the invention, where the fixing element of the non-invasive fixing device for fixing is a mount (3), it is attached to the load-bearing profile subconstruction of cladding panel with a screw, a groove, a hook-like adapter or another fixing device, depending on the mount construction in question (3). In the example implementation of the invention, in which the fixing element of the non-invasive fixing device for fixing is a foot mount (5), it presses against a cladding panel.

[0024] The reference numbers of the technical features are included in the claims only with the aim to increase the intelligibility of the claims and, therefore, those reference numbers have no limiting effect in regards to the interpretation of the elements, marked with these reference numbers.

Claims

1. Non-invasive fixing device for fixing of building insulation to a constructive or decorative component of mechanically fixed cladding, including a supporting element for penetration of insulation, connected at one end to a transverse pressing disc (2) for pressing of insulation, **characterized in that** after the pressing disc (2), the non-invasive fixing device has a fixing element, configured to be fixed to a load-bearing profile subconstruction or cladding panel, and **in that** the supporting element is a needle (1) with a length less than or equal to the thickness of the insulation.
2. Non-invasive fixing device for fixing of building insulation in accordance with claim 1, **characterized in that** between the fixing element and the supporting element there is an adjustment part (4), to which the pressing disc (2) is mounted in an adjustable manner and with an option for locking in different positions along the adjustment part (4).
3. Non-invasive fixing device for fixing of building insulation in accordance with claim 2, **characterized in that** the adjustment part (4) has a shallow cylindrical thread, while the pressing disc (2) has a central bore

with a thread that corresponds to the thread of the adjustment part, where the pressing disc (2) is fixed with its central bore to the cylindrical thread of the adjustment part (4).

4. Non-invasive fixing device for fixing of building insulation in accordance with claim 2, **characterized in that** the adjustment part (4) has a shallow cylindrical thread, while the pressing disc (2) has a central bore and is installed with its central bore through the use of an additional device with a threaded bore to the cylindrical thread of the adjustment part (4).

5. Non-invasive fixing device for fixing of building insulation in accordance with claim 2, **characterized in that** the adjustment part (4) is an area with transverse ring-shaped ribs, located at a distance from one another along the adjustment part (4), that distance being larger than the thickness of the pressing disc (2), while the pressing disc (2) has a slot with a width less than the outer diameter of the transverse ring-shaped ribs and more than the diameter of the adjustment part (4).

6. Non-invasive fixing device for fixing of building insulation in accordance with all of the aforementioned claims, **characterized in that** the fixing element is a mount (3) for attachment to a load-bearing profile subconstruction or cladding panel.

7. Non-invasive fixing device for fixing of building insulation in accordance with claims 1 to 5, **characterized in that** the fixing element is a foot mount (5) for support against a cladding panel.

8. System for non-invasive fixing of building insulation to a constructive or decorative component of mechanically fixed cladding that includes insulation, at least one fixing element for insulation, a load-bearing profile subconstruction, located on the side of the insulation, which is opposite the side of the insulation facing a main construction element of a building, and at least one cladding panel fixed to the load-bearing profile subconstruction, **characterized in that** the aforementioned at least one fixing element for insulation is a non-invasive fixing device for building insulation, as described in claims 1 - 7, where the needle (1) of the non-invasive fixing device for insulation is inserted into the insulation at a depth less than or equal to the thickness of the insulation, while with the fixing element, the non-invasive fixing device for insulation is attached and fixed to the load-bearing profile subconstruction or at least to one cladding panel.

9. Method for non-invasive fixing of building insulation to a constructive or decorative component of mechanically fixed cladding, including the stages of:

- Placing an insulation element to a main construction element of a building;
- Fixing of the insulation element through a non-invasive fixing device in accordance with claims 1 to 7, in which the needle (1) of the non-invasive fixing device is inserted into the insulation element, so that it is located at a distance from the main construction element of a building;
- Attachment of the fixing element of the fixing device to a profile of a load-bearing profile subconstruction or cladding panel.

10. Method for non-invasive fixing of building insulation in accordance with claim 9, **characterized in that** the non-invasive fixing device is in accordance with claims 2 to 6 and has an adjustable pressing disc (2), which, during the insertion of the needle (1) into the insulation and the attachment of the fixing element, the adjustable pressing disc (2) presses against the outer surface of the insulation element until it is fully pressed against the main construction element of a building and is fixed **in that** position along the non-invasive fixing device.

11. Method for non-invasive fixing of building insulation in accordance with claims 9 to 10, **characterized in that** the fixing element of the non-invasive fixing device is a mount (3), which attaches to a load-bearing profile subconstruction or a cladding panel.

12. Method for non-invasive fixing of building insulation in accordance with claims 9 to 10, **characterized in that** the fixing element of the non-invasive fixing device is a foot mount (5) for support against a cladding panel.

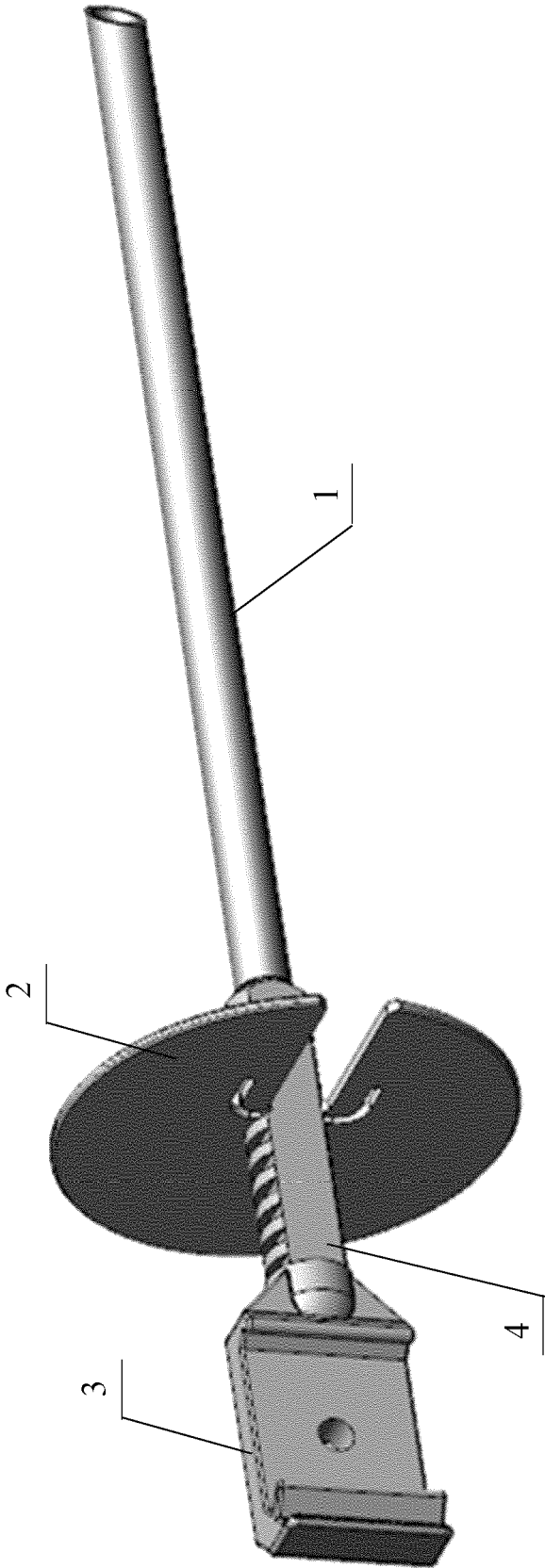


Figure 1

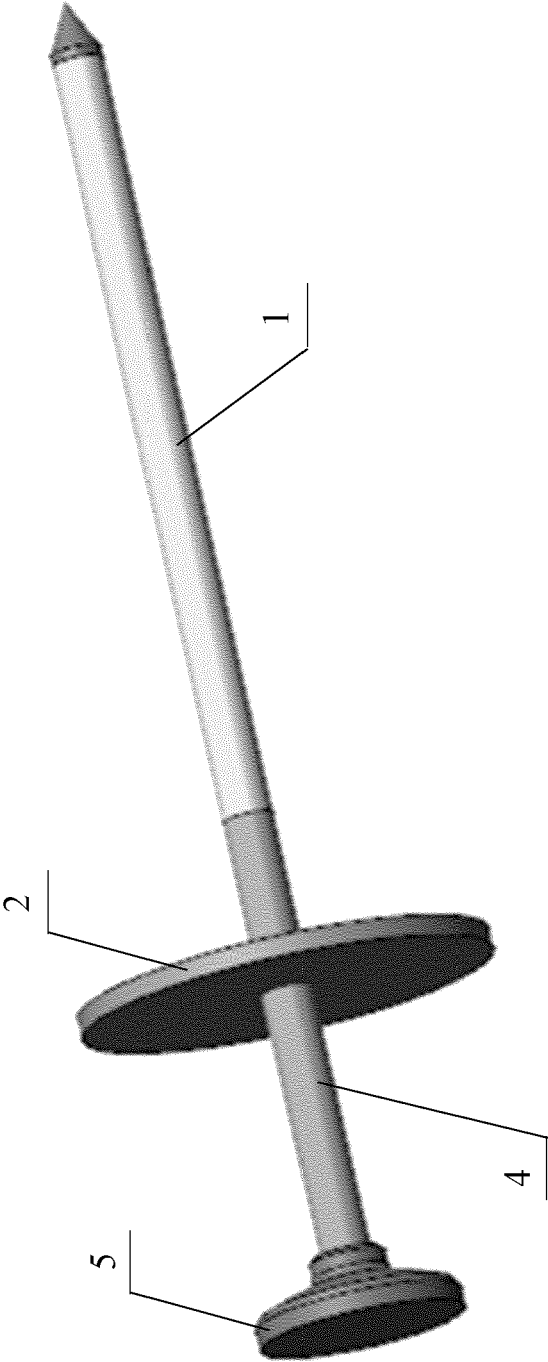


Figure 2



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Application Number

EP 21 47 2006

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1 The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 2 March 2022	Examiner Estorgues, Marlène
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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

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