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(54) **TILE LEVELLING DEVICE**

FLIESENIVELLIERVORRICHTUNG

DISPOSITIF DE MISE À NIVEAU DE TUILES

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Description

[0001] The invention relates to a tile levelling device used on a surface to level at least two adjacent tiles. The said device is of the type comprising a support designed to be positioned between at least two adjacent tiles and which, in addition to fulfilling a spacing function, is also equipped with a base envisaged to be placed under the two tiles and an elongated body or rod, which extends vertically from the base in a perpendicular manner thereto. The body has an elongated or stem form and is equipped with gripping means which form a coaxial connection, by means of a thread, with a pressure body. The said body is endowed with a lower edge endowed with a flat support surface intended to operate through contact with parts of the upper surfaces of at least two adjacent tiles. The task of the said flat support surface, which is arranged perpendicular to the central axis of the pressure body, is to perform the levelling, i.e. aligning the upper flat surfaces of the two or more adjacent tiles lying in the same plane when the said support surface is pushed against the upper surfaces of the adjacent tiles, exploiting the counteraction applied by the base to the lower surfaces of the said tiles. This operation is performed using the screw connection, whereby the pressure body is screwed onto the thread with which the elongated body or rod is equipped, with the result that the support surface of the pressure body ends up in contact and pushing against the flat upper surfaces of adjacent tiles.

[0002] According to prior art, this operation is performed manually at each point in the flooring at which levelling is performed. Clearly, significant amounts of time are required to carry out both the screwing on and unscrewing steps. Once a grip has been achieved and the tiles are locked in position ready to level the upper surfaces thereof, the various pressure parts employed thus far must be removed and decoupled, i.e. unscrewed from the relative elongated bodies or rods in order to be reused in new laying operations.

[0003] One drawback of the aforesaid prior art lies in the considerable manoeuvring time required to perform each levelling operation described above, consisting in manually screwing and unscrewing the pressure member onto the external threaded part of the elongated body or rod.

[0004] The drawback is so great that an idea for a solution to the problem has already been proposed, as disclosed in EP3455432 (filed by the same applicant as this document), which essentially consists in preparing a special embodiment of the seat designed to allow mechanical connection with the elongated body or rod of the pressure member by means of at least two mutually movable parts which are mutually connected in an elastic manner so that they can be both moved away, as needed, to undo the connection with the externally threaded part of the elongated body or rod and allow recovery of the pressure member - without needing to unscrew the said parts - and also to be coupled onto the said threaded part

by simply bringing the said parts together - without needing to perform any screwing - in order to make the mechanical connection and therefore then allow the pressing required for levelling to be carried out manually.

[0005] This facilitates the coupling and uncoupling of the pressure member with the relative elongated body or rod with quick and easy manoeuvres.

[0006] EP3567183A1 discloses a device according to the preamble of claim 1.

[0007] The main object of the present invention is to further speed up the entire levelling operation which, according to prior art, is strongly conditioned by the lengthy screwing and unscrewing times.

[0008] This object and others besides are achieved by the present invention, which relates to a tile levelling device according to the claims, as described and illustrated in the appended drawings in which:

- Figure 1 shows a schematic exploded view thereof;
- Figure 2 shows, schematically and in sequential order, the nine main steps constituting a single levelling operation carried out by means of the present invention;
- Figure 3 shows a schematic axonometric view of a step consisting of the application of the embodiment in Figure 1;
- Figure 4 shows a schematic axonometric view of a step following that shown in Figure 3
- Figures 5 and 6 show the axial sections of certain parts.

[0009] With reference to the appended figures, 1 denotes the individual tiles used to make a floor. The tiles 1 are laid on a surface with a layer of glue 2 interposed therebetween.

[0010] Laying is complete once the levelling action has been performed by means of levelling devices distributed over the entire floor being laid.

[0011] In particular, each levelling device is used to act between at least two adjacent tiles 1 and comprises a support which is designed to be inserted between at least two adjacent tiles 1 and is endowed with a base 5, which is positioned under the two adjacent tiles and embedded in the layer of glue 2.

[0012] Part of the support is an elongated body or rod 4 which extends orthogonally from the base 5 and is equipped with means for the gripping thereof from the outside, which essentially consist of an external thread 40.

[0013] The external thread 40 is featured and sized so that a pressure body 3 couples therewith in a removable manner by means of a tapped hole 33 with which the said pressure body is endowed.

[0014] The pressure body 3 has a lower edge 30 which is in turn provided with a flat support surface 31 intended to operate in contact with at least part of the upper surfaces of the adjacent tiles 1, either with or without a scratch guard plate interposed therebetween. The sup-

port surface 31 is arranged perpendicular to the central axis of the pressure body 3, which is overall axially symmetric.

[0015] The pressure body 3 may be coaxially coupled to an external rotating member 7 designed to be driven by an external screwing tool 10 whose task is to generate, on command, the rotation thereof in both directions.

[0016] The pressure body 3 may be coaxially coupled to the external rotating member 7 by means of a coupling achieved by magnetic attraction.

[0017] The external rotating member 7 is, in turn, equipped with a tang 9 for coupling with the external screwing tool 10.

[0018] The pressure body 3 is cylindrical overall and is equipped with protruding ribs 35 on part of the external surface thereof. It is also equipped with an annular insert 32, made of a ferrous or ferromagnetic material, arranged integrally therewith and coaxially on part of the side walls thereof.

[0019] The external rotating member 7 have an axially symmetrical bell shape, shaped to accommodate - perfectly centred therewithin - at least part of the upper portion of the pressure body (3), and comprises, integrally coupled with at least part of the internal surface thereof, at least one insert consisting of a magnet 8 configured in an annular shape.

[0020] The task of the magnet 8 is to provide magnetic attraction to attract the annular insert made of a ferromagnetic material 32 with which the single pressure body 3 is equipped

[0021] The mutual arrangement of the materials used to provide the magnetic attraction between the pressure body 3 and the external rotating member 7 may be swapped and therefore a magnet may be coupled with the pressure body 3 instead of the ferromagnetic material and the external rotating member 7 may be coupled with a ring made of ferromagnetic material or the like instead of the magnet 8.

[0022] As regards the construction of the external rotating member 7, various possible methods may be suggested, namely:

- using a magnetic plastic material for the production thereof;
- using a ferrous or ferromagnetic plastic material for the production thereof;
- using a plastic material for the production thereof with a pressure-co-moulded magnetic ring inside;
- using a plastic material for the production thereof with a co-moulded metal ring or washer.

[0023] Similar production methods can be used for the construction of the pressure body 3.

[0024] The entire levelling operation, which - for the sake of simplicity - refers to a case of two tiles 1, is easily schematised by a sequence of steps, which are identified with the numbers 1 to 9 and shown, schematically, in Figure 2.

[0025] Alongside the tile 1 placed on the layer of glue 2, the elongated body 4 is positioned in a vertical arrangement, so that the base 5 thereof is inserted into the layer of glue 2 underneath the edge of the said tile. A new tile 1 is then laid alongside the previous one. The lower part of the elongated body 4 keeps the edge of the new tile away from the edge of the tile laid previously. The tile layer then acts by preparing the assembly consisting of the pressure body 3 magnetically constrained to an external rotating member 7 and then coupling the tang 9 with a screwing tool 10. Activation of the screwing tool 10 screws the pressure body 3 onto the external thread 40 of the elongated body or rod 4 until the lower supporting surface 31 is forced to operate through contact with the upper surfaces of the two tiles 1. The action just described is the result of the pressure applied by the pressure body 3 to the upper surfaces of the tiles 1 through the counteraction applied by the base 5 to the lower surfaces of the said tiles 1.

[0026] Unscrewing can be performed just as quickly using the same screwing tool 10.

[0027] Once levelling has been achieved and sufficient time has lapsed for stabilisation of the assembly, for example, the elongated body 4 may be broken - by hammering the pressure body (3 (step 7)) - and detached therefore from the base 5, which remains in position under the adjacent tiles 1.

[0028] Unscrewing can be performed quickly using the same screwing tool 10 (see steps 8 and 9).

[0029] The magnetic attraction exerted between the magnet 8 fixed to the external rotating member 7 and the annular insert 32 made of ferromagnetic material makes the pressure body 3 integral with the said external rotating member 7, thereby ensuring easy manoeuvrability of the assembly which is further increased by the possibility of use thereof in conjunction with a screwing tool.

Claims

1. A tile levelling device of the type used on a surface to level at least two adjacent tiles and comprising:

- a support designed to be positioned between at least two adjacent tiles (1) and equipped with a base (5) designed to be positioned underneath the at least two tiles; an elongated body or rod (4) which extends orthogonally from the base (5) and is equipped with means for the gripping thereof consisting of an external thread (40);
- a pressure and levelling body (3) designed to be removably connected to the said support by means of the elongated body or rod (4) and comprising a structure which is endowed with a lower edge (30) endowed with a flat support surface (31) intended to operate in contact with at least one of the upper surfaces of the at least two adjacent tiles (1), the said support surface

- (31) being positioned perpendicular to the central axis of the pressure body (3);
 - whereby the pressure body (3) may be coaxially coupled to an external rotating member (7), **characterised in that** the task of said external rotating member (7) is to generate, on command, the rotation of the pressure body (3) in both directions.
2. . A device according to Claim 1 **characterised by** the fact that the pressure body (3) may be coaxially coupled to an external rotating member (7) by means of a magnetic attraction coupling, the said external rotating member (7) being equipped with a tang (9) for coupling with an external screwing tool (10).
3. . A device according to Claim 2 **characterised by** the fact that the external rotating member (7) has an axially symmetrical bell shape, shaped to accommodate - perfectly centred therewithin - at least part of the upper portion of the pressure body (3), and comprises, integrally coupled with at least part of the internal surface thereof, at least one insert consisting of a ring-shaped magnet (8).
4. . A device according to Claim 3 **characterised by** the fact that the pressure body (3) has a cylindrical shape overall and is provided with an annular insert (32), which is made of a ferromagnetic material and is positioned integrally and coaxially with the side walls of the said device.
5. . A device according to Claim 4 **characterised by** the fact that the axially symmetrical bell-shaped external rotating member (7) comprises, integrally coupled with at least part of the internal surface thereof, at least one insert consisting of a ring-shaped magnet (8), the magnet (8) fulfilling the function of providing the magnetic attraction with the annular insert made of ferrous material or ferromagnetic material (32).
6. . A device according to Claim 3 **characterised by** the fact that the pressure body (3) has a cylindrical shape overall and is made of a magnetic material.
7. . A device according to Claim 6 **characterised by** the fact that the axially symmetrical bell-shaped external rotating member (7) is made of a ferromagnetic material, thereby fulfilling the function of providing the magnetic attraction with the magnetic material of which the pressure body (3) is made and with which it is coupled, the external rotating member (7) having an axially symmetrical bell shape, shaped to accommodate - perfectly centred therewithin - at least part of the upper portion of the pressure body (3), and comprising, integrally coupled with at least part of the internal surface thereof, at least one insert consisting of a magnet 8 configured in an annular shape.

Patentansprüche

1. Vorrichtung zum Höhenausgleich bei Fliesen, die auf einer Ebene verwendet wird, um mindestens nebeneinander befindliche Fliesen auszugleichen, einschließlich:
- einer Halterung, die geeignet ist, zwischen mindestens zwei nebeneinander befindlichen Fliesen (1) platziert zu werden, und mit einem Fuß (5) versehen ist, der unter den mindestens zwei Fliesen platziert werden kann; einen länglichen Körper oder Schaft (4), der sich rechtwinklig vom Fuß (5) erstreckt und mit Hilfsmitteln ausgestattet ist, die das Greifen ermöglichen, bestehend aus einem Außengewinde (40);
 - einem Druck- (3) und Höhenausgleichselement, das geeignet ist, mit Hilfe des länglichen Körpers oder Schaftes (4) lösbar mit der Halterung verbunden zu werden, das über eine Struktur mit einer Unterkante (30) verfügt, die mit einer ebenen Auflagefläche (31) versehen ist, die dazu dient, bei Berührung mindestens einer der Oberseiten von mindestens zwei nebeneinander liegenden Fliesen (1,) einzuwirken, wobei diese Auflagefläche (31) senkrecht zur Mittelachse des Druckelements (3) angeordnet ist;
 - **Dadurch gekennzeichnet, dass** das Druckelement (3) coaxial mit einem externen rotierenden Teil (7) gekoppelt werden kann, das die Funktion hat, auf Befehl eine Drehung in beide Richtungen hervorzurufen.
2. Vorrichtung gemäß Patentanspruch 1, die **dadurch gekennzeichnet ist, dass** das Druckelement (3) mittels einer durch magnetische Anziehung erfolgten Kopplung coaxial an ein externes rotierendes Teil (7) gekoppelt werden kann; dieser externe rotierende Teil (7) ist mit einem Zapfen (9) zur Verbindung mit einem externen Schraubwerkzeug (10) ausgestattet.
3. Vorrichtung gemäß Patentanspruch 2, die **dadurch gekennzeichnet ist, dass** das äußere rotierende Teil (7) die axialsymmetrische Form einer Glocke hat, die so geformt ist, dass sie zumindest einen Teil des oberen Teils des Druckelements (3) zentriert aufnehmen kann und umfasst einen mit ihm fest verbundenen Einsatz, an dem zumindest ein Teil seiner Innenfläche aus einem ringförmig ausgebildeten Magneten (8) besteht.
4. Vorrichtung gemäß Patentanspruch 3, die **dadurch gekennzeichnet ist, dass** das Druckelement (3) insgesamt eine zylindrische Form aufweist und mit einem ringförmigen Einsatz (32) aus ferromagnetischem Material versehen ist, der fest und coaxial zu den Seitenwänden dieser Vorrichtung angeordnet

ist.

5. Vorrichtung gemäß Patentanspruch 4, die **dadurch gekennzeichnet ist, dass** das äußere rotierende Teil (7) in Form einer axialsymmetrischen Glocke, das fest mit zumindest einem Teil seiner Innenfläche mit mindestens einen Einsatz bestehend aus einem ringförmig ausgebildeten Magneten (8) verbunden ist; der Magnet (8) erfüllt die Aufgabe, die Funktion der magnetischen Anziehungskraft auf den ringförmigen Einsatz aus eisenhaltigem Material oder magnetischem Eisen (32) auszuüben.
6. Vorrichtung gemäß Patentanspruch 3, die **dadurch gekennzeichnet ist, dass** das Druckelement (3) eine insgesamt zylindrische Form aufweist und aus einem magnetischen Material besteht.
7. Vorrichtung gemäß Patentanspruch 6, die **dadurch gekennzeichnet ist, dass** das äußere rotierende Teil (7) in Form einer axialsymmetrischen Glocke aus eisenhaltigem oder magnetischem Material besteht und die Aufgabe erfüllt, die Funktion der magnetischen Anziehung auf das magnetische Material des Druckelements (3), mit dem es gekoppelt ist, auszuüben; das äußere rotierende Teil (7) weist eine axialsymmetrische Form einer Glocke auf, das so geformt ist, dass es zumindest einen Teil des oberen Teils des Druckelements (3) zentriert aufnehmen kann und umfasst einen fest verbundenen Einsatz an zumindest einem Teil seiner Innenfläche, der aus einem ringförmig ausgebildeten Magneten (8) besteht.

Revendications

1. Dispositif niveleur pour carreaux du type utilisé sur un plan pour niveler au moins deux carreaux adjacents et comprenant :
 - un support adapté pour être disposé entre au moins deux carreaux adjacents (1) et muni d'une base (5) apte à être disposée sous les au moins deux carreaux ; un corps de forme allongée ou tige (4) qui se développe orthogonalement à partir de la base (5) et est muni de moyens qui en permettent la prise en main constitués d'un filetage externe (40) ;
 - un corps de pression (3) et de nivellement apte à être relié de manière amovible audit support par l'intermédiaire du corps de forme allongée ou tige (4) et comprenant une structure qui est munie d'un bord inférieur (30) doté d'une surface d'appui (31) plane destinée à fonctionner en contact avec au moins une des surfaces supérieures des au moins deux carreaux (1) adjacents ; ladite surface d'appui (31) étant

disposée perpendiculairement à l'axe central du corps de pression (3) ;

- **caractérisé en ce que** le corps de pression (3) est coaxialement couplable à un organe rotatif externe (7) ayant pour fonction d'en produire, sur commande, la rotation dans les deux sens.

2. Dispositif selon la revendication 1, **caractérisé en ce que** le corps de pression (3) est coaxialement couplable à un organe rotatif externe (7) par un couplage réalisé par attraction magnétique ; ledit organe rotatif externe (7) étant doté d'une queue (9) pour le couplage avec un outil de vissage externe (10).
3. Dispositif selon la revendication 2 **caractérisé en ce que** l'organe rotatif externe (7) a une forme axiale-symétrique de cloche conformée pour accueillir, centrée sur mesure à l'intérieur, au moins une partie de la portion supérieure du corps de pression (3) et comprend solidairement associé, au niveau d'au moins une partie de sa surface interne au moins un insert constitué d'un aimant (8) configuré en forme annulaire.
4. Dispositif selon la revendication 3 **caractérisé en ce que** le corps de pression (3) a une forme globalement cylindrique et est doté d'un insert annulaire (32) en matériau ferromagnétique disposé solidairement et coaxialement au niveau des parois latérales du dispositif.
5. Dispositif selon la revendication 4 **caractérisé en ce que** l'organe rotatif externe (7) de forme axiale-symétrique de cloche comprend, solidairement associé, au niveau d'au moins une partie de sa surface interne, au moins un insert constitué d'un aimant (8) configuré en forme annulaire ; l'aimant (8) remplissant la tâche d'exercer la fonction d'attraction magnétique sur l'insert annulaire en matériau ferreux ou ferromagnétique (32).
6. Dispositif selon la revendication 3 **caractérisé en ce que** le corps de pression (3) a une forme globalement cylindrique et est réalisé dans un matériau magnétique.
7. Dispositif selon la revendication 6 **caractérisé en ce que** l'organe rotatif externe (7) de forme axiale-symétrique de cloche est réalisé en matériau ferromagnétique remplissant la fonction d'attraction magnétique sur le matériau magnétique du corps de pression (3) avec lequel il est couplé ; l'organe rotatif externe (7) a une forme axiale-symétrique de cloche qui est conformée pour accueillir, centrée sur mesure à l'intérieur, au moins une partie de la portion supérieure du corps de pression (3) et comprend solidairement associé, au niveau d'au moins une

partie de sa surface interne au moins un insert constitué d'un aimant (8) configuré en forme annulaire.

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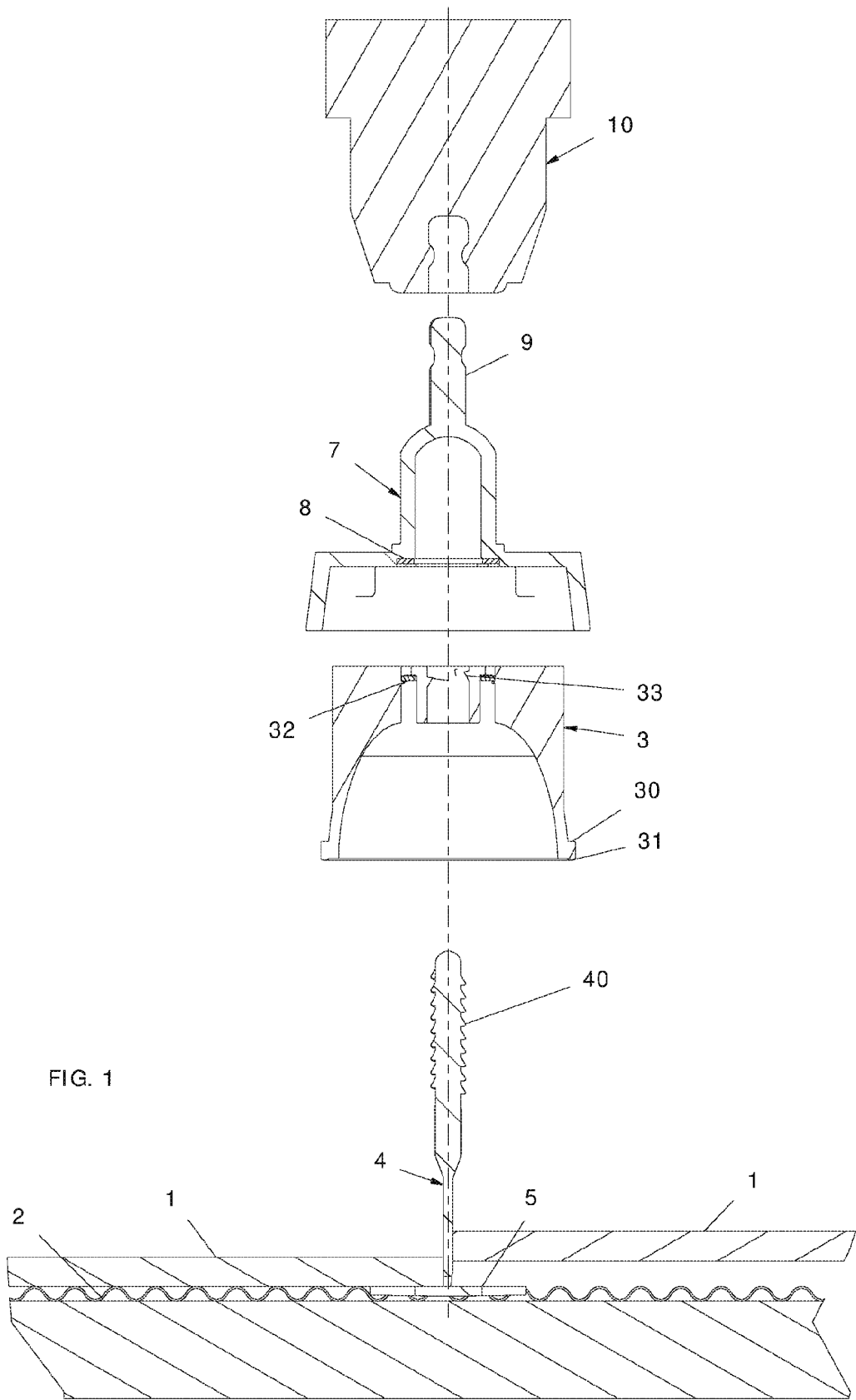
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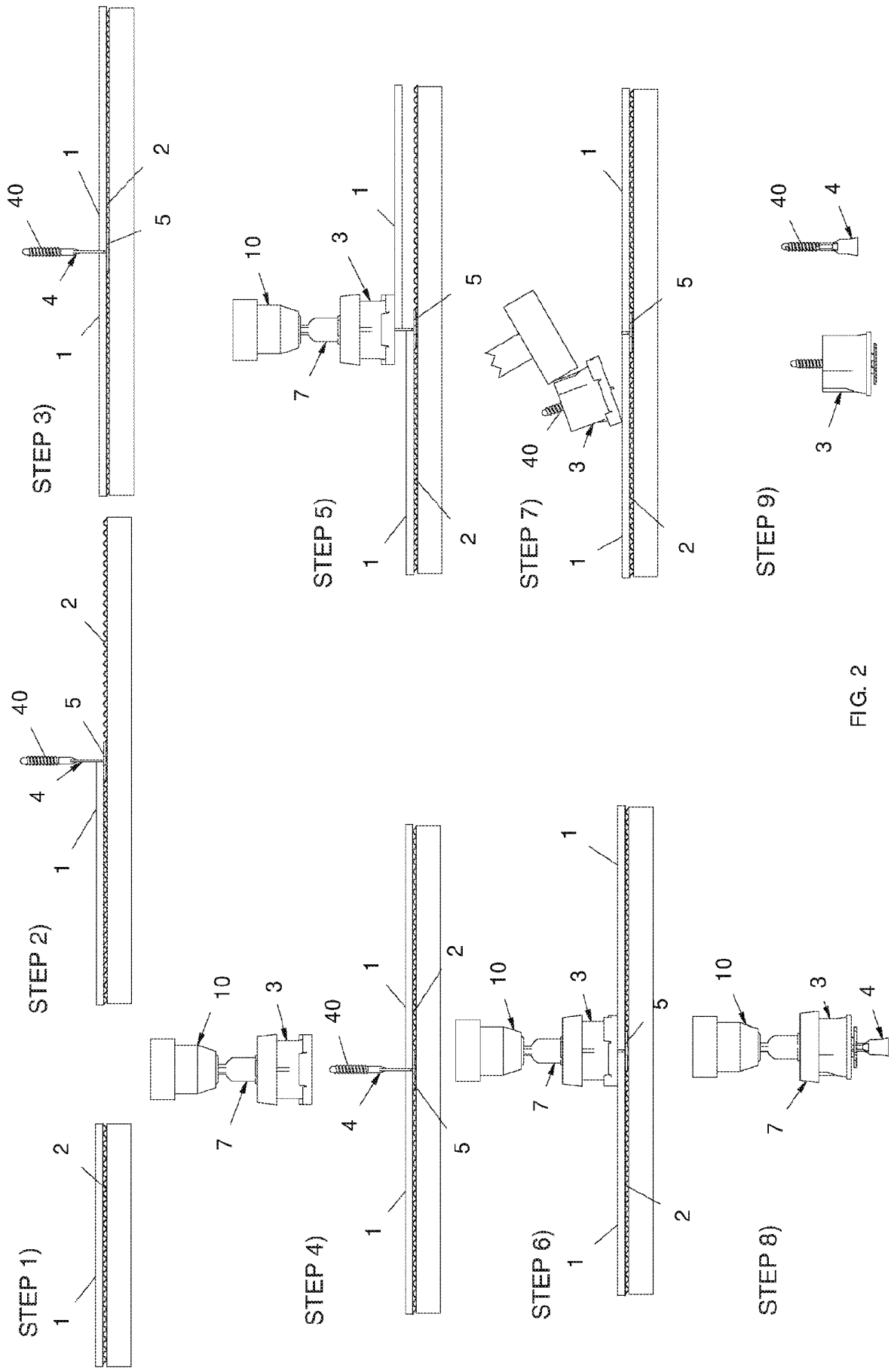
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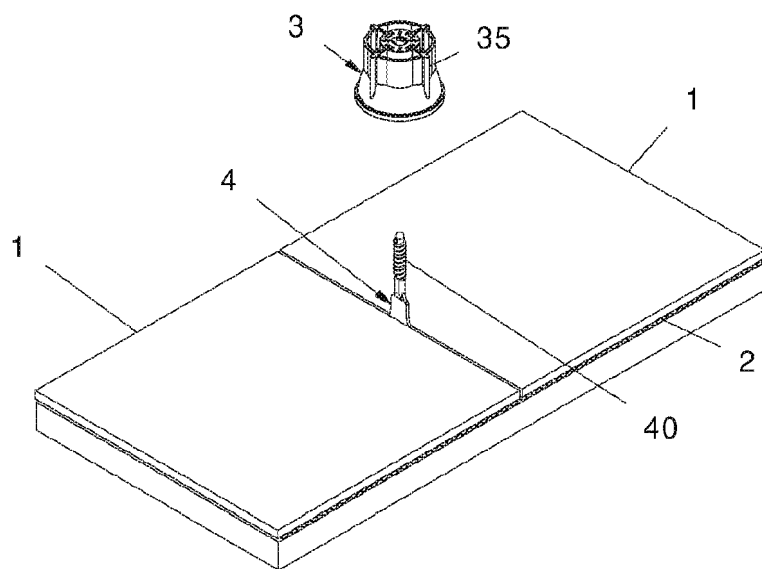


FIG. 3

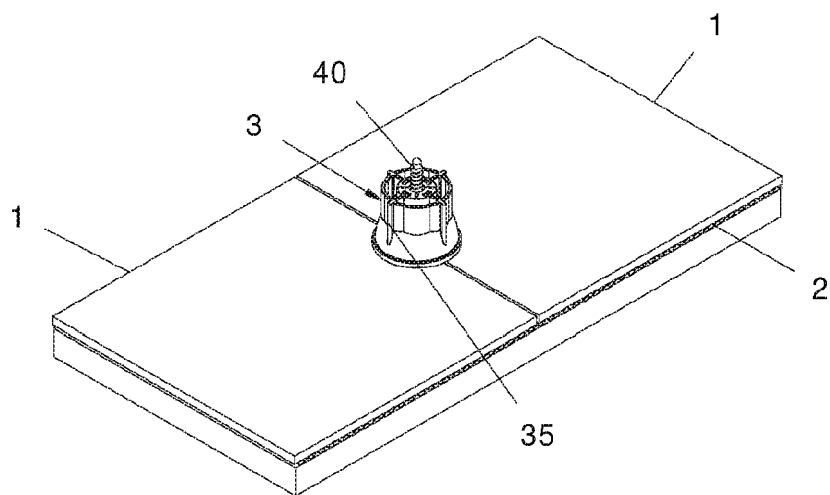


FIG. 4

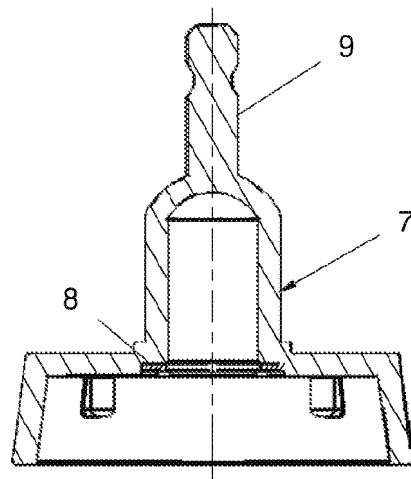


FIG. 5

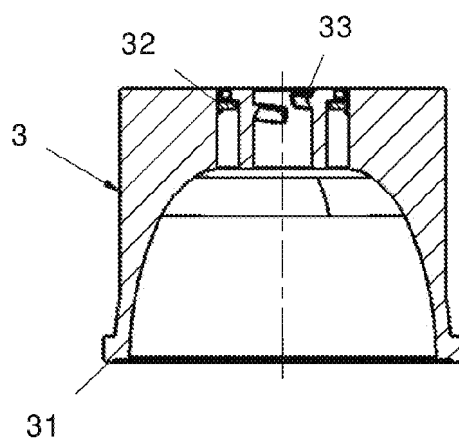


FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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