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(54) Set of construction elements for mounting elevation panels

(57) The object of the patent is a set of construction elements for mounting elevation panels (1), especially for external elevations, especially for mounting elevation panels (1) at heights or on planes (2) facing downwards.

The set of construction elements for mounting elevation panels (1) on the plane (1) includes clamping elements (3) and the support construction (4). The set also includes mouldings (5) with a cylindrical hole (6), thanks to which the elevation panel (1) is mounted with clamping elements (3) to the support construction (4). At least two mouldings (5) are permanently and rigidly embedded in every elevation panel (1), and the cylindrical hole (6) of the moulding (5) is threaded on the inside. The support construction (4) is made of channel bars (7) with additional walls (8), parallel to each other fixed on the plane (2) with adjusted mandrel spacing elements (9). The walls (8) are resilient (7) and they point inside it leaving a slit (10) of width D between each other.

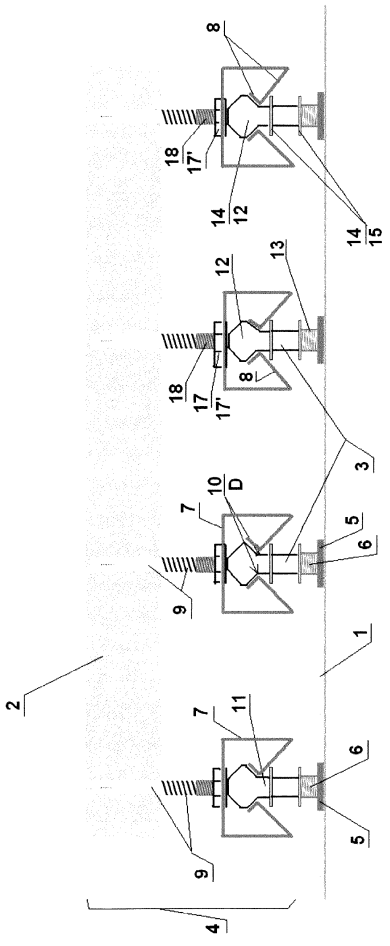

Fig.6

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Description

[0001] The object of the patent is a set of construction elements for mounting elevation panels, especially for external elevations, especially for mounting elevation panels at heights or on planes facing downwards.

[0002] In common knowledge there are known systems for mounting elevation panels that involve mounting those panels with adhesive chemical bonding systems, which allow for permanent bonding of the elevation panel with the surface on which it is placed. There are also known systems, which additionally or separately, using mandrels to hold the elevation panel assure durable adhesion. There are also known framing constructions, which press panels from outside and/or hold adjacent panels together. For this purpose mandrels and framing constructions are mounted successively and in accordance with progression of works with individual panels. Unfortunately, they remain visible after finishing works and they do not assure aesthetics of the entirety of the erected elevation. Sometimes, even after covering them during the process of mounting, they are also thermal bridges, which show the places where they have been mounted. Regardless of the abovementioned disadvantages, the kind of performed works does not guarantee attaining a perfectly flat surface of the final elevation, and also does not allow for quick performance of such works. Most technologies is additionally dependant on weather conditions.

[0003] To speed up the process of constructing elevation on large surfaces, there are constructions used, which are mounted on the surface that is to be covered elevation, and those constructions are the surface for elevation panels.

[0004] A formed element is known from patent PL183748, which is used for example to mount elevation constructions in the post and beam system. It includes a channel for screwing in mounting bolts. This channel is restricted from the sides with two walls of the mounting channel in the formed element. On the walls of the mounting channel, within the hole there is a pair of two boards pointing at each other, which are deformed when a bolt is screwed in, to create an opening in the area of screwing in, and they cling, similarly to claws, to the side of the bolt.

[0005] Whereas from patent PL189809, a framing construction is known, especially for elevations, consisting of posts and beams in the form of boxed section structurals, in which posts and beams overlap each other and in the overlapping area they are screwed together. Preferably, on the beam there is at least one bolt pit, and the bolt is preferably screwed into a bolt channel preferably located in the post. The bolt channel is also a groove going along the post. Inside the bolt channel the tightening and steadying element is embedded as well as two, protruding to the sides, spacing boards, which adjoin to the face surface bordering the outside edge of the bolt channel.

[0006] These constructions make mounting faster and in part make the process of mounting panels independent from weather conditions. Unfortunately, they do not provide aesthetics, because it is still necessary to use mandrels or framing constructions for mounting and they are visible on the external side of elevation panels. To hide them it is necessary to mask them with additional masking layer after mounting the elevation panels, which causes the making of elevation to consume more time.

[0007] From the patent application PL326328, a method of mounting and a system of mounting glass panels is known, especially elevation glass. The system for mounting glass panels, especially elevation glass, is a glass plate, preferably circle shaped with a hole, and tempered, and in the hole of the glass plate there is a thimble through which the glass plate is connected by a thread with the clamping element. The front of the plate is glued to the glass surface of the glass plane surface in mounting points. Next, such prepared glass plane is mounted with clamping elements to the support construction. The described construction masks elements connected to the support construction best out of all the above mentioned constructions. Unfortunately, mounting large surface glass plates is still based on connection only using glue. They are not permanently connected in any other way with the support construction, which makes the connection unreliable. A combination of clamping elements however, is not the best possible seamless and flat external elevation surface made of glass plates.

[0008] In accordance with the patent, the solution eliminates all the above mentioned disadvantages. It allows to become entirely independent of weather conditions while mounting, it allows for attaining a surface without creases, i.e. an ideal plane is attained of the elevation made of elevation panels, aesthetics is preserved by using invisible from outside mounting system, which does not need to be covered with an additional masking layer applied onto the elevation panels while they are being mounted or right after they have been mounted, it also provides strong connection between elevation panels with the surface they are mounted on.

[0009] The set of construction elements for mounting elevation panels on a surface, according to the patent includes clamping elements and the support construction. The set also includes mouldings with cylindrical holes, through which the elevation panel is mounted using clamping elements to the support construction. The solution, according to the patent is characterised in that at least two mouldings are permanently and stiffly embedded in each elevation panel, and the cylindrical hole of the moulding is threaded from the inside. The moulding is embedded inside the elevation panel, and the hole is pointing the support construction. The support construction is made of channel bars with additional walls, parallel to each other, fixed on the plane with adjusted mandrel spacing elements. The walls are resilient and they point inside the channel bar leaving a slit of width D between each other. The slit D is equal to the narrow part of the clamping element which is right behind the head of this

element. The head of the clamping element is on the opposite side in relation to the threaded section of the clamping element. The number of clamping elements preferably is equal to the number of mouldings, The distance between the centres of channel bars located in adjacent rows corresponds to the distance between the centres of the clamping elements located in mouldings in rows of opposite directions. The threaded section of the clamping element is embedded in the moulding hole. The distances between the centres of adjacent mouldings embedded in the elevation panel are preferably identical and amount to L. Independently, the distance between the centres of adjacent mouldings embedded in two adjacent elevation panels can be identical and amount to L. It is especially important if the mouldings are located close to one another in order to obtain the best possible connection of elevation panels with the support construction. It is also important for initial preparation of the support construction and mounting it on the surface. Channel bars on the plane preferably are fixed horizontally, which makes their mounting easier and assures that the elevation panels fixed on it will not slide downwards on these channel bars due to gravity, which could also be eliminated by using other additional elements. The clamping element can have at least one movement limiter and/or a turning limiter. The adjustable mandrel spacing element can independently have a movement limiter and/or a turning limiter. The limiter can be a nut, a head, a cork, which do not exclude one another depending on their construction, or it can be a plug, where each limiter type can have at least a one-sided thread implemented, preferably internal. The adjustable mandrel spacing element can be a double threaded rawlplug or another plug, e.g. pre-rammed and having a protruding threaded section in relation to the surface to which it was fixed. The moulding is preferably jammed inside the elevation panel, which is especially legitimate because of the reliability of holding the elevation panel at heights, or if the decorative surface is facing downwards. Jamming the moulding guarantees it stays inside the elevation panel regardless of the load and tension forces. The support construction arranged in intervals can cover the entire surface, on which the elevation panels are mounted, however, it is also possible that the mounting points to the plane of the support construction correspond to the calculated and expected points in which the moulding will be placed with the clamping element screwed into it at the moment of mounting the elevation element. The distances between channel bars in the support construction correspond to the dependencies provided earlier, and it is preferable form them to amount to L.

[0010] The invention is applied as follows:

The support construction, made of channel bars with additional walls, is mounted to the plane. They are mounted parallel to each other, to the plane, using adjustable mandrel spacing elements with adjustable spacing. The distance between centres of the channel bars located in adjacent rows corresponds to the distance between centres of mouldings placed in elevation panels in rows of opposite direction when perceived at the moment of mounting. In a favourable case, where the distances between centres of adjacent mouldings embedded in the elevation panel are identical and amount to L, it is easy to determine the points of foundations for the support construction on the surface as a regular periodic spacing L. Depending on the actual choice, the limiters are fixed on the elements and placed in a position that prevents them from moving after they have been fixed, respectively of the clamping element on the support construction and the support construction on the mandrel spacing element in relation to the surface, and at this moment at least the position of the support construction is adjusted using limiters in relation to the plane in order to attain a flat mounting surface. Additional walls of the channel bar are resilient and stem from the ends of the channel bar and point inside the channel bar on both sides leaving a slit of width D between each other. The heads of clamping elements are inserted into the slit. When they are inserted the slit spreads elastically for the head to get in, and after the head goes through, the slit returns to distance D wedging the head in the channel bar, and in fact in its additional walls acting as claws. The slit is now the same width as the narrow part of the clamping element that is right behind the head of this element. The head of the clamping element is on the opposite end of the clamping element in relation to the threaded section of this element, which is embedded in the threaded hole of the mouldings in the elevation panels. The moulding is embedded earlier in the elevation panel, and its hole is pointing towards the support construction. The other side of the moulding in relation to the hole is not visible, because it is hidden in the elevation panel, preferably also by being locked in it. Mounting the elevation panel on the plane thanks to the construction consists in placing and locking it in the ready support construction mounted in the plane.

[0011] The advantage of this solution according to the patent is the possibility to precisely calculate and plan the mounting of the support construction even before the elevation panels are delivered to the location of mounting. It is also an advantage that such elevation is vented, there is space between elevation panels and the surface they are mounted on. Finally, it is also an advantage to be able to easily replace individual elevation panels, if necessary, and such replacement will not result in losing or damaging the support construction but just the faulty panel.

[0012] The solution is presented according to the patent in the example drawing, where Fig.1 schematically presents elevation panels embedded in the support construction on the plane in the view from below, Fig. 2

presents a clamping element with limiters from perspective, Fig. 3 presents a single clamping element with limiters embedded in a moulding inside the elevation panel in cross section, Fig. 4 presents the method of mounting the support construction in cross section, Fig. 5 presents the method of mounting the clamping element in the channel bar in cross section, Fig. 6 presents a part of the elevation panel mounted in the plane in cross section.

[0013] The example set of construction elements for mounting elevation panels 1 on the plane 2 includes clamping elements 3 and the support construction 4. The set also includes mouldings 5 with a cylindrical hole, thanks to which the elevation panel 1 is mounted with clamping elements 3 to the support construction 4. The example set mounts eight elevation panels lon the plane 2, where forty-eight mouldings 5 were mounted in six of them of the following dimensions 240x80cm, twenty-four mouldings 5 in one of the following dimensions 120x80cm, and sixteen mouldings 5 in the last one of the following dimensions 80x80cm, permanently and rigidly embedded in every elevation panel 1. The cylindrical hole 6 of each moulding 5 is threaded inside. Each moulding 5 is embedded inside the elevation panel on one side 1, and its hole 6 is pointing towards the support construction 4. The support construction 4 is made of eight channel bars 7, each having additional walls 8, mounted on the plane 2 parallel to one another by adjustable mandrel spacing elements 9. The walls 8 are resilient and stem from the ends of the channel bar 7 and point inside it on both sides leaving a slit 10 between each other with width D equal to 1 cm. The width D of the slit 10 is the same as the narrow part 11 of the clamping element 3 located directly behind its head 12. The head 12 of the clamping element 3 is on the opposite end of the clamping element 3 in relation to the threaded section 13 of this element. The number of clamping elements 3 is a half of the number of the mounted moulds 5 and amounts to three hundred for the entire plane 2. The distance between the centres of channel bars 7 located in adjacent rows corresponds to the distance between the centres of the clamping elements 3 located in mouldings 5 in rows of opposite directions. The threaded section 13 of the clamping element 3 is embedded in the moulding 5 hole 6. The distances between the centres of adjacent mouldings 5 embedded in the elevation panel 1 are identical and amount to L equal to 20cm. Independently, the distance between the centres of adjacent mouldings 5 embedded in two adjacent elevation panels 1 are identical and amount to L equal to 20cm. Channel bars 7 on the plane 2 are fixed horizontally. Each clamping element 3 has three limiters 14. One is the head 12, the other two are rings 15 with external thread 16 impaled on the clamping element 3. After embedding it in the moulding 5 one of the rings 15 is screwed to the bottom plane 16 of the elevation panel 1 and the second ring 15 is set to appropriate distance from the head 12 right before embedding the clamping element 3 together with the elevation panel 1 on the support construction 4. The adjustable mandrel spacing element 9 independently has a limiter 17 to prevent it from moving and turning. This limiter 17 is a nut 17' screwed onto the double-sided threaded blanking plug 18, holding the channel bar 7 of the support construction 4 in a certain distance from the plane 2 thanks to mounting it on the adjustable mandrel spacing element 9 in the form of a double threaded rawlplug.

Claims

1. The set of construction elements for mounting elevation panels on a plane containing clamping elements and the support construction, as well as mouldings with a cylindrical hole, thanks to which the elevation panel is mounted to the support construction using clamping elements, **characterised in that** at least two mouldings (5) are permanently and rigidly embedded in every elevation panel (1), and the cylindrical hole (6) of the moulding (5) is threaded on the inside, and the moulding (5) is embedded inside the elevation panel (1) on one side, and its hole (6) is pointing towards the support construction (4), which is made of channel bars (7) with additional walls (8) parallel to each other mounted on the plane (2), by adjustable mandrel spacing elements (9), where the walls (8) are resilient and stem from the ends of the channel bar (7) and point inside it on both sides leaving a slit (10) of width D between each other, corresponding to the narrow part (11) of the clamping element (3) located directly behind its head (12) of this element, which is on the opposite end of the clamping element (3) in relation to the threaded section (13), and the number of clamping elements (3) preferably corresponds to the number of mouldings (5), the distance between the centres of the clamping elements (7) located in adjacent rows corresponds to the distance between the centres of the clamping elements (3) located in mouldings (5) in rows of opposite directions, and the threaded section (13) of the clamping element (3) is embedded in the moulding (5) hole (6)

2. The set of construction elements for mounting elevation panels on a plane in accordance with claim 1, **characterised in that** the distance between the centres of adjacent mouldings (5) embedded in the elevation panel (1) are identical and amount to L

3. The set of construction elements for mounting elevation panels on a plane in accordance with claim 1 or claim 2, **characterised in that** the distance between the centres of adjacent mouldings (5) embedded in two adjacent elevation panels (1) are identical and amount to L

4. The set of construction elements for mounting elevation panels on a plane in accordance with claim 1

or claim 2 or claim 3, **characterised in that** channel bars (7) on the plane (2) are fixed horizontally

5. The set of construction elements for mounting elevation panels on a plane in accordance with any claim from 1 to 4, **characterised in that** the clamping element (3) has at least one limiter (14) of its movement and/or a limiter (14) of its turning

6. The set of construction elements for mounting elevation panels on a plane in accordance with any claim from 1 to 5, **characterised in that** the adjustable mandrel spacing element (9) has a limiter (17) to prevent it from moving and/or a limiter (17) to prevent it from turning

7. The set of construction elements for mounting elevation panels on a plane in accordance with claim 5 or claim 6, **characterised in that** the limiter (17) is a nut (17') and/or a head and/or a cork (18) or a plug, preferably with at least one sided thread

8. The set of construction elements for mounting elevation panels on a plane in accordance with any claim from 1 to 7, **characterised in that** the adjustable mandrel spacing element (9) is a double threaded rawlplug

9. The set of construction elements for mounting elevation panels on a plane in accordance with any claim from 1 to 8, **characterised in that** the moulding (5) is wedged inside the elevation panel (1)

10. The set of construction elements for mounting elevation panels on a plane in accordance with any claim from 1 to 9, **characterised in that** the support construction (4) arranged in certain distance from each other covers the entire plane (2)

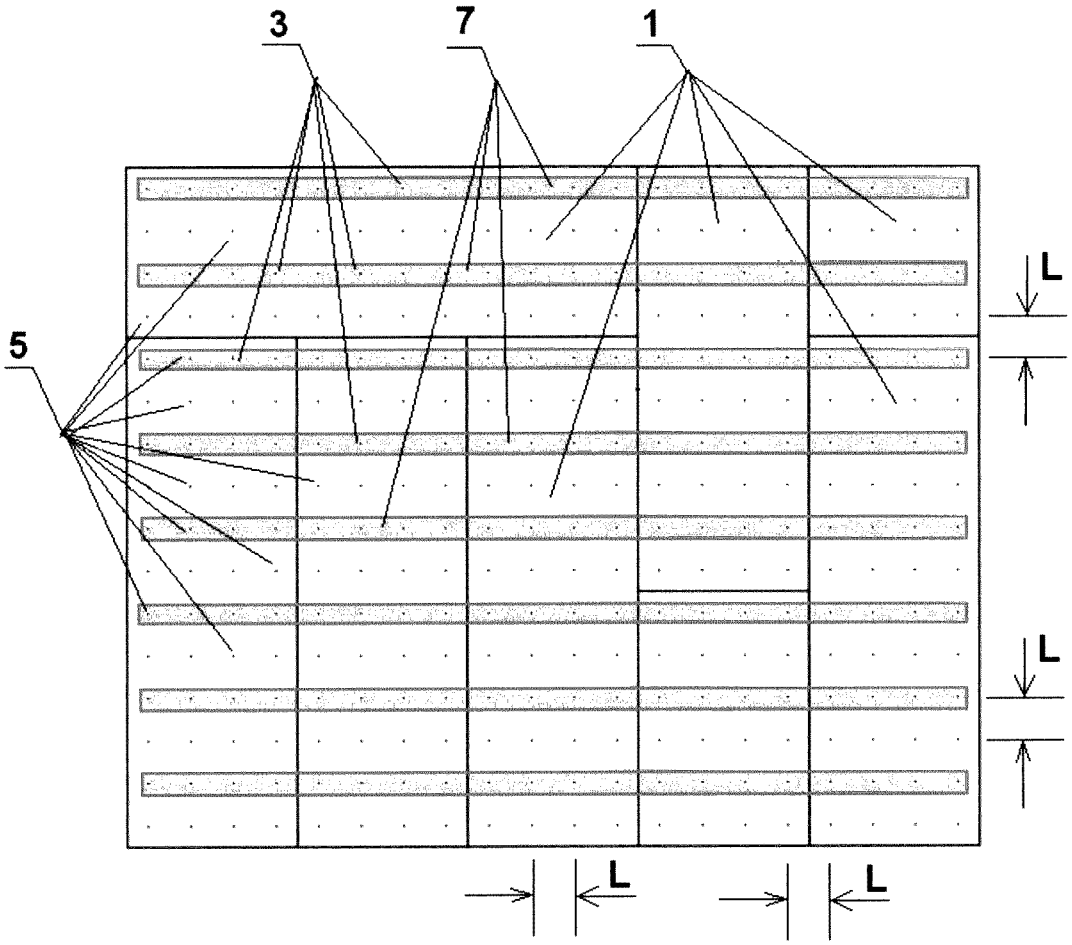

Fig.1

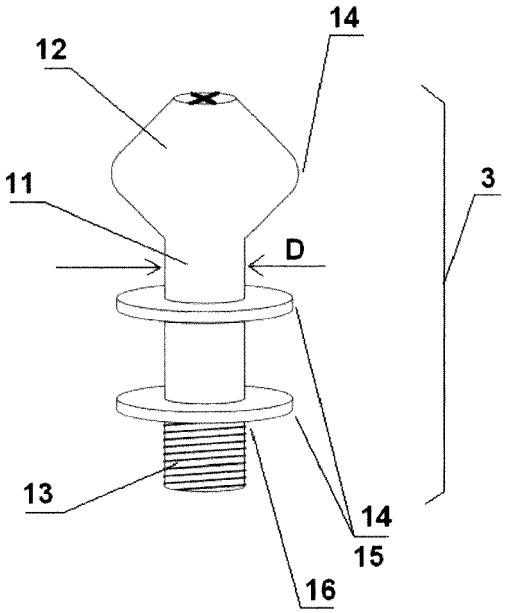

Fig.2

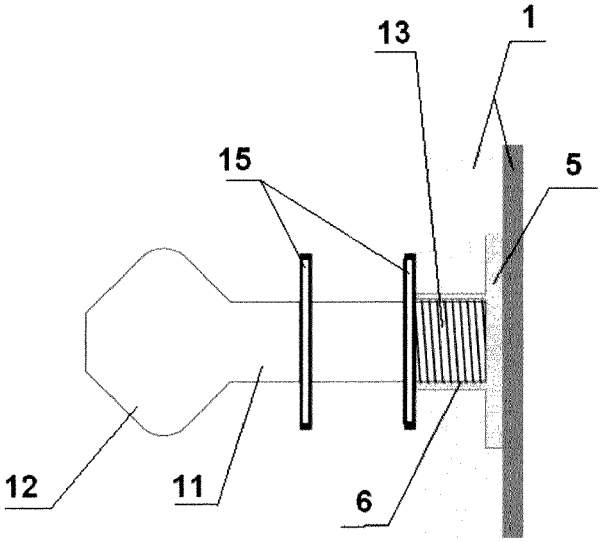

Fig.3

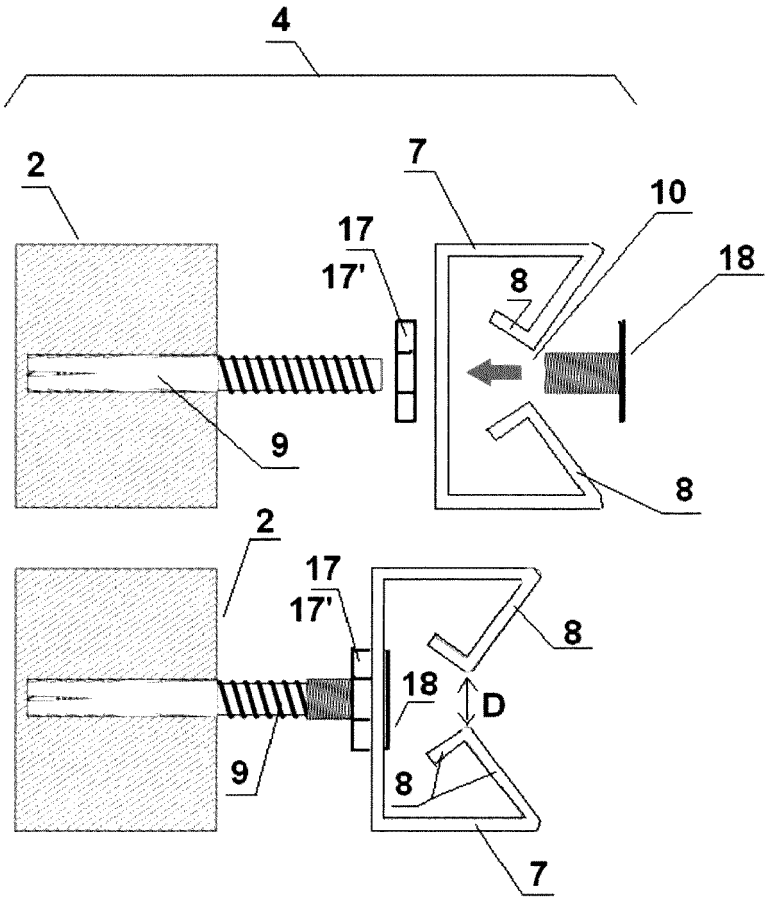

Fig.4

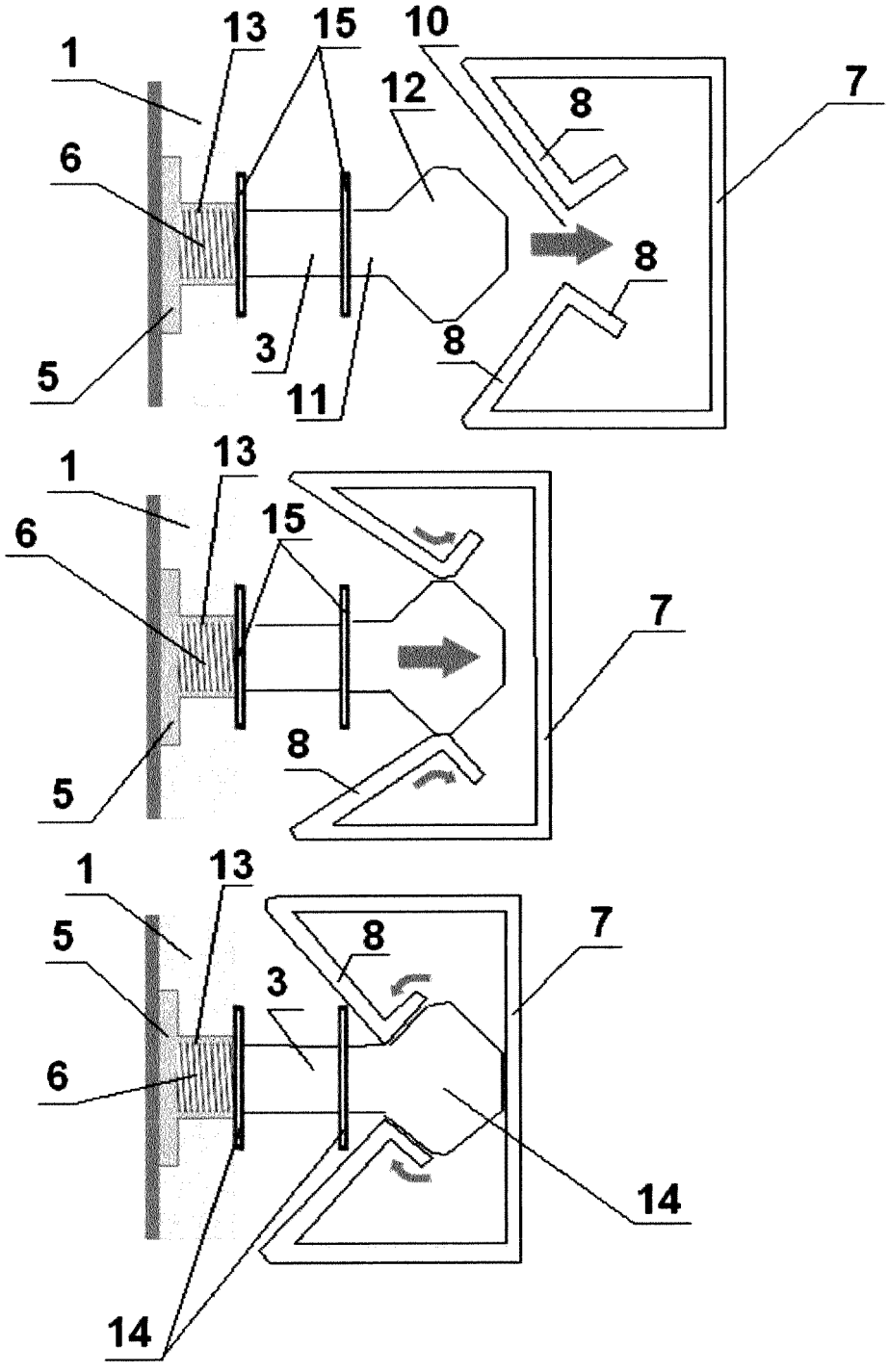

Fig.5

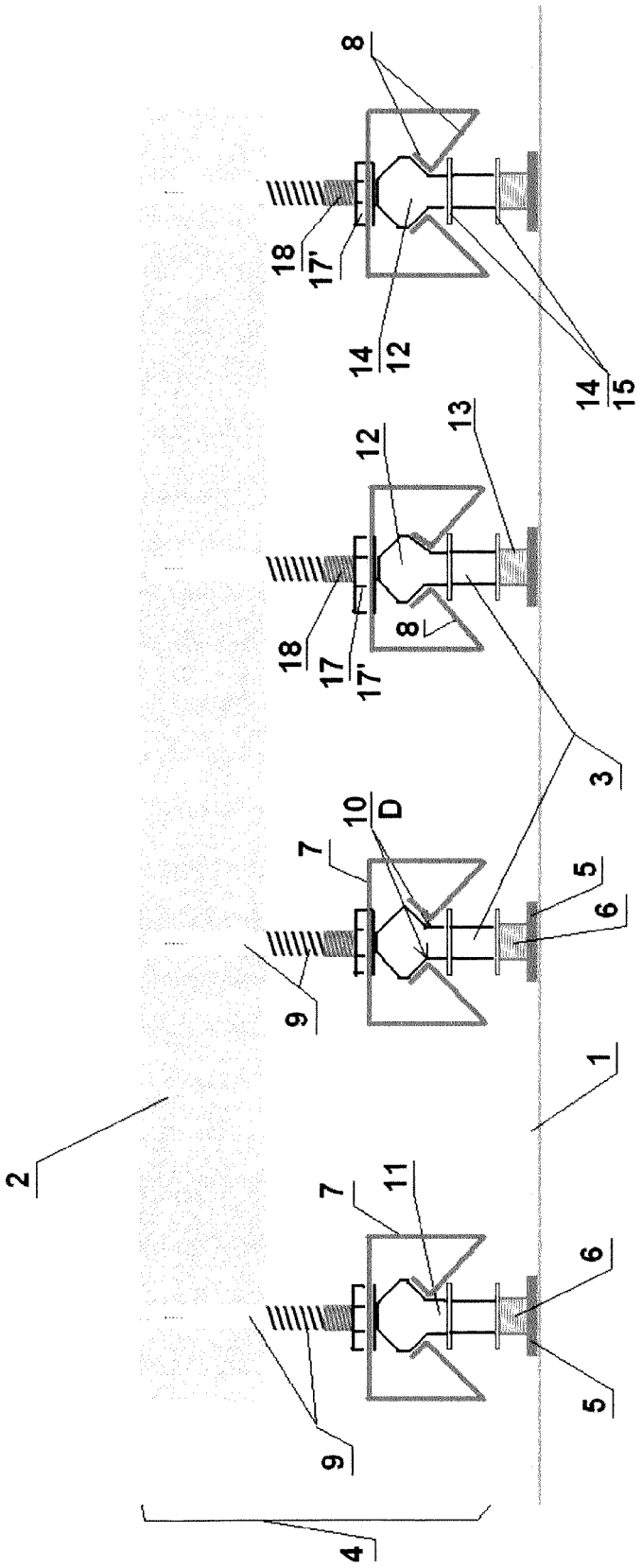

Fig.6

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- PL 183748 **[0004]**
- PL 189809 **[0005]**
- PL 326328 **[0007]**