D E S C R I P T I O N

"A construction system for wall cladding"

Technical sector of the invention

The invention relates to a construction system for wall cladding, suitable, for example for curtain walls or ventilated façades, which comprises a series of uprights and a series of cross-members intended to be supported between two uprights that are not aligned vertically. The system can be completed by a series of prepared cladding pieces to be attached to one or more cross-members at the same time.

Background of the invention

There are many known proposals in the area of construction solutions for the installation of curtain walls or ventilated façades. The most common are based on systems that comprise wall anchor elements to which systems for connecting cladding pieces can be attached. These coupling systems may be secured individually to a piece, or they may be designed to cooperate to hold more than one piece, especially when they have a parallelepiped arrangement.

Patent WO2006134182, for example, describes a fastening system for a ventilated façade comprising a set of profiles adapted to be connected to the main façade of the building and multiple fastening elements adapted to secure the cladding pieces to the profiles. One aspect that is of interest in this proposal is that the profiles are configured as guides into which the free terminal of the connection elements can be inserted. These connection elements have a protruding tab oriented vertically that can be inserted into a slot created for this purpose in the corresponding support pieces of the cladding pieces. These support pieces comprise a series of protrusions that are inserted into a series of lateral openings in the cladding pieces.

The solution described in WO2006134182 is of interest because it does not require screws or similar hardware, at least to mount the support pieces on the connection elements or to couple the cladding pieces to the support pieces.

Dispensing with anchoring by screws or similar hardware, facilitates the installation of the ventilated façade, and consequently installation costs are lower, in addition to facilitating the future replacement of cladding pieces, for example, for maintenance or replacement due to breakage or wear.

In this sense, there are other known proposals that seek ways of anchoring cladding pieces to a structure fixed to a wall easily and without the need for auxiliary components.

Patent EP1560991 describes, for example, an anchor element for linking structures, such as, for example, the cross-pieces between stanchions for the construction of ventilated or unventilated façades, which is made up of a resilient leaf spring in the form of a plate with a transversal base with hooking slots that form the hook points and connection points with the stanchions. The anchor elements can be configured in different ways, but always taking advantage of the return force that is generated when it deforms, for example, when a cladding piece is inserted between the plate and the stanchion on which the plate is hooked.

The combination of uprights or stanchions with cross pieces that extend transversally to the uprights to form a sort of mesh on which the support elements for the cladding pieces are secured, and which may be arranged in rows and columns is also known. In some known cases, the same crossbars are used to receive the direct support or to directly support the cladding pieces, although with the help of auxiliary elements in the form of clips or similar elements. One example is described in patent DE 29807808. One of the drawbacks of this type of system is that the replacement of cladding pieces is not practical, because this requires the removal of the associated cross pieces, which extend unbroken between more than one pair of uprights, thus requiring the removal of all of the pieces in the same row.

The patent document US 3456970 describes a coupling solution for mounting metal upright and beam components of racking and like frame structures wherein one hook provided upon a first component is engageable in a

hole in a second component, the solution further using auxiliary locking devices in the form of a spring strip.

The patent document DE 3539565 describes a device for fastening rectangular cladding panels, which can be folded down, on ceilings, bearings for in each case one filiform bracket are attached on four corners of a panel. By means of said brackets, the panel can be suspended on a load-bearing rail or the like such that one side of the panel can be folded down by displacing the brackets, the mutually opposite brackets serving as pivot bearings and permitting the folded-down panel to be displaced along the load-bearing rails.

One of the objectives of the present invention is to provide an alternative to the known systems that allows simple installation at the worksite. For example, one aspect of interest is that the system does not require screws or similar

greater detail below, it is possible to arrange the cross-members and/or, when applicable, cladding pieces, following patterns that are not necessarily in rows and columns, due to the fact that the system allows the cross-members to be extended between every two selected parallel uprights, with the possibility of disassembling them simply and without requiring auxiliary fastening elements such as screws or similar hardware. The system of the invention thus allows forming a kind of mesh with different grids, combining areas with a higher density of cross-members and/or cladding pieces with areas with lower densities, making it possible, for example, to adjust the percentage of light or incident sunlight through the system, when applicable, through the ventilated façade or curtain wall.

It is to be noted that the cross-members are firmly attached or held to the uprights by restoring force generated by elastically deforming at least one of the uprights or the terminal ends of the cross-members during the coupling thereof.

This construction system has a large number of applications in the construction and decoration sector, for outdoor or indoor cladding, in either dry or wet applications, and is of special interest for building envelopes.

The cross-members are be made of one piece.

In one variant of the invention, the anchor means are formed in a sheet of cut or stamped steel or plastic material according to the required design to determine in them the entry parts where the terminal ends of the cross-members can be attached.

For example, with the first entry part can be formed by a slot cut arranged in a first edge of the sheet, and the second entry part formed by an opening passing through said sheet, or by an auxiliary slot arranged in the edge opposite the first edge of the sheet.

Advantageously, the uprights can be supplied on rolls, which facilitates

branch 35, and a connecting bridge 36, with a length similar to the distance between the anchor through holes 27 and 28; and the second bend 39b ends with an anchoring end 37, where the terminal tip 38 is located. In this case, in order to insert the terminal 33 into the sheet 22a, the U-shaped frame must be deformed elastically, this time bringing their upper and lower branches 34 and 35 together, which will then expand, causing the terminal 33 to be secured to the sheet 22a by restoring force.

Alternatively or simultaneously it may be necessary to elastically deform sheet 22a.

The invention considers that in other embodiments, the anchor through holes are not coplanar, as illustrated, for example, in the embodiments of Figs. 8 and 9.

In the embodiment in Fig. 9a, the sheet 22a is oriented perpendicular to the direction of extension of the cross-member 3 and comprises a tab 29 that extends in the direction perpendicular to the sheet 22a, in which the first of the anchor through holes 27 is formed; with the terminal 33 bent back onto itself in a first bend *a* that orients a first section 41 of the terminal 33 precisely for insertion into the aforementioned first anchor through hole 27. A second bend *b* creates an anchoring end 37 in the terminal 33, where the terminal tip 38 is located, at an angle with the first section 41 of the terminal for insertion into the second anchor opening 28, all as shown in figure 9.

To achieve the coupling position, the terminal 33 must be elastically deformed around the first bend *a* and the first section 41 of the terminal 33 inserted into the first anchor through hole 27 and/or the sheet 22a must be elastically deformed. By elastic reaction of the elastically deformed parts, when the anchoring end 37 is lined up with the second anchor through hole 28, the anchoring end will automatically be held in the second anchor through hole 28.

The invention considers that the first anchor through hole 27 is open to the exterior, for example, by means of a lateral opening 27a in the tab 29 through which the first section 41 can be inserted, laterally, into the first anchor through

hole 27, as illustrated in the detail of Fig. 9b. This lateral opening will preferably be arranged such that the terminal 33 and/or the sheet 22a must be elastically deformed to insert the terminal 33 into the first anchor through hole 27. This prevents the terminal 33 from being withdrawn accidentally from the first anchor through hole 27 when it adopts its adjustment position on the sheet 22a.

Fig. 8 shows an alternative in which the terminal 33 has two bends to form a sort of hook and the sheet 22a has a housing 44, obtained by stamping the sheet 22a or formed by an extension welded onto the sheet 22a, intended to receive the terminal 33 through an access opening 45 and where the hook can be engaged.

In the specific example, the terminal 33 is bent to form a first bend that is followed by a straight first section 41 whose end is also bent to form a second bend b, which is followed by the anchoring end 37 of the terminal 33. In order to achieve the coupling position of the terminal 33 to the sheet 22a, it is first necessary to elastically deform the terminal around the first bend towards the exterior and/or the sheet 22a, inserting the terminal in the housing 44 and so that by restoring force it will tend to adopt its original shape when the anchoring end 37 is lined up with an anchor opening 23 included for this purpose in the sheet 22a, specifically in the front wall of the housing.

It should be noted that the housing 44 has a V-shaped cross-section, such that the first section 41 of the terminal will be supported, self-centered, against the vertex of the V-shaped cross section, thus preventing lateral displacements of the cross-member 33.

Another possible embodiment is illustrated in Fig. 10. In this case the anchor means 22 comprise in the sheet 22a, a first and a second entry opening A, B, formed by the opposing edges 30a, 30b of a same through slot 30 formed in said sheet 22a. Correspondingly, the terminal 33 is bent back onto itself, creating a sort of spring with two branches, an interior first section 41 branch and an exterior branch 42, and a connecting bridge 43, with each branch having an anti-return bend 41a, 42a oriented in the direction of the opposite branch and each intended to fit by

C L A I M S

1.- A construction system (1) for wall cladding, comprising a series of uprights (2) and a series of cross-members (3) intended to be supported between two uprights that are not aligned vertically, characterized in that

- the cross-members (3) are made of one piece, are elongated and have two opposing terminals (33) filiform or shaped to generate elastic force, made of an elastically deformable material and with at least two bends, and
- the uprights (2) are equipped with anchor means (22) in which the terminals (33) of the cross-members can be secured by restoring force, said anchor means, for this purpose, comprising, for each terminal (33), at least two entry parts (A, B), in the form of slots or openings, spatially arranged in relation to the at least two bends (a, b) of the terminal, each one of the at least two bends being able to be inserted simultaneously into one of these entry parts, first requiring that said terminal (33), said upright (2) or both the terminal and the upright, be elastically deformed so that said bends are pressed tightly against said entry parts through elastic reaction.

2.- The construction system (1) according to claim 1, characterized in that it comprises a series of cladding pieces (10) prepared to be suspended from one or more cross-members (3) at the same time.

3.- The construction system (1) according to any one of claims 1 to 2, characterized in that the anchor means (22) are formed in a sheet (22a), the first entry part (A) being formed by a slot (23) arranged in a first edge of the sheet, and the second entry part (B) formed by an opening (24) passing through said sheet, or by an auxiliary slot (25) arranged in the edge opposite the first edge of the sheet.

4.- The construction system (1) according to the preceding claim, characterized in that at least one of the slots (23) and the auxiliary slot (25), if any, are not straight slots.

5.- The construction system (1) according to claims 3 or 4, characterized

in that the terminal (33) is bent back onto itself, forming,

- a generally U-shaped frame with an interior branch (34), exterior branch (35), and a connecting bridge (36); and
- an anchoring end (37), wherein the terminal tip (38) is located, at an angle with the exterior branch (35) of the frame,

the terminal (33) being able to be attached to the sheet (22a) by inserting the connecting bridge (36) into the slot (23), the interior and exterior branches holding the sheet (22a), one on each side thereof, and the terminal tip (38) being inserted at the same time into the opening (24), or if applicable, into the auxiliary slot (25).

6.- The construction system (1) according to the preceding claim, characterized in that the sheet (22a) is oriented perpendicular to the direction in which the cross-member (3) extends and the frame is also oriented perpendicular to the direction of extension of the cross-member.

7.- The construction system (1) according to any one of claims 3 to 6, characterized in that the second entry part (B) is an opening (24) passing through the sheet (22a), the exterior branch (35) of the anchor frame is shorter than the interior branch (34); and in that the length of the anchoring end (37) is such that it passes through the sheet and can provide support for the interior branch (34) of the frame.

8.- The construction system (1) according to any one of claims 3 to 5, characterized in that the second entry part (B) is the auxiliary slot (25), the sheet (22a) is provided with an adjustment window (26) and the interior branch (34) of the frame with a bend (34a) that engages into the adjustment window (26).

9.- The construction system (1) according to any of the claims 1 or 2, characterized in that the anchor means (22) comprise a sheet (22a), with the first and second entry parts (A, B) formed by two anchor through holes (27, 28).

10.- The construction system (1) according to the preceding claim, characterized in that the terminal (33) is bent back onto itself, forming at least two

bends (39a, 39b) that correspond to said openings through the plate, with the terminal able to be aligned on the sheet (22a) through the anchor through holes (27, 28).

11.- The construction system (1) according to claim 9, characterized in that the anchor through holes (27, 28) are not coplanar.

12.- The construction system (1) according to the preceding claim, characterized in that the sheet (22a) is oriented perpendicular to the direction of extension of the cross-member (3) and comprises a tab (29) that extends in the direction of the cross-member on which one of the anchor through holes (27) is formed; and in that the terminal (33) is bent back onto itself in a first bend (a) that orients a first section (41) of the terminal for insertion into the anchor through hole (27); and a second bend (b) determining an anchoring end (37), wherein the terminal tip (38) is positioned, at an angle with the first section of the terminal, and is able to be inserted into the second anchor through hole (28).

13.- The construction system (1) according to the preceding claim, characterized in that the anchor through hole (27) extends to the edge of the sheet (22a), offering a lateral access (27a) for the insertion of the terminal (33).

14.- The construction system (1) according to anyone of claims 1 or 2, characterized in that the anchor means (22) comprise a sheet (22a), with the first and second entry parts (A, B) being formed by the opposing sides (30a, 30b) of a through slot (30) formed in said sheet; and in that the terminal (33) is bent back onto itself, determining a sort of spring with two branches, one interior first section (41) and one exterior (42), a connecting bridge (43), each branch having an anti-return bend (41a, 42a) oriented in the direction of the opposite branch, with each aimed at fitting by restoring force in one side (30a, 30b) of the through slot, requiring the compression of the spring, bringing the branches together and inserting the bridge into the through slot.