

PERIMETER AND STRUCTURAL CLADDING PROFILE FOR THE CONVERSION OF
FACADES INTO THE PRIMARY THERMAL AND INDOOR AIR QUALITY MANAGEMENT
SYSTEM AND FACADE CLADDING INTERCHANGEABILITY SYSTEM WITHOUT
REMOVAL OF THE LOAD-BEARING GRID

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The present invention concerns a perimeter profile of a
cladding surface of a building facade and a system for moving and
interchanging said cladding surface mounted on a facade grid.

Cladding systems consisting of glass panels equipped with
fixing and handling systems for the glass structure are known.

In particular, IT 102007901554891 describes a system for
fixing and moving glass-chambers with respect to a profile,
comprising a fixing profile to which at least one glass-chamber
is connected on at least a portion of its front profile, in which
the spacer is shaped to form an additional cavity with respect to
the cavity to contain salts and to have a joint seat for engagement
with the head of an arm held in engagement with the profile, said
arm being apt to allow the glass-chamber to swing by a
predetermined angle.

This solution solves the problems related to aesthetic meters
very well: the structure thus realised allows any visible frame,
even if internal, not to support the glass, since the channel is
close approximate to both the external and internal glass panel,
without any specific contact.

Although aesthetically pleasing, the solution thus created
tends to realize a thermal bridge so that the outside temperature
through the metal channel is transferred to the inner glass panel,
significantly raising the thermal conductivity of the system so
that - in particularly humid days - condensation is generated
inside the building.

Furthermore, the structure so realised requires a predefined
inner chamber thickness (equal to 20 mm) which can not be overcome,
in order to determine important structural restrictions of the
panel itself and the surrounding support structure. In fact, the
solution devised and protected in the aforementioned patent does
not allow a thickness of insulating material, or of the air

chamber, greater than this dimension, which also limits the width of the panel that can be fabricated, because the air chamber also has the function to allow the correct distance between the two opposing panels that make up a cladding panel, below which there is the risk of a deflection that leads to a clash between the two panels.

In addition, the structure described in IT102007901554961 is strictly limited to single glass-chamber, as it is not possible to envisage the use of double glass-chamber and other types of architectural panels, thus clearly reducing freedom of design.

On the other hand, there is a need to provide for panels in materials other than double glass-chamber, and in particular to be able to use any architectural panel that guarantees the necessary performance at the time of installation, and contemporarily, that it is not a tailor-made solution.

As it is well understood, these are important limitations of the system because it allows us to use the solution according to the patent only in areas with mild climatic conditions and where there is no significant difference between the temperature outside and inside the buildings. In other words, the solution thus realised cannot be installed in any northern European or American country and in any skyscraper, or other architectural structure with an 'all-glass' appearance, or the use of 'oversize' architectural panels.

The facade of a skyscraper - even if located in mild climatic zones - is subject to considerable thermal variation, according to a thermal gradient that is inversely proportional to the height, with the non-trivial issue of being able to mount such a system on the lower floors of a skyscraper, but not being able to mount it on the higher floors.

EP4092240 describes a partially frameless window comprising a supporting element with an adjustable housing, the inner dimensions of which can be precisely adapted to the outer dimension of multiple panels of glass so that fluctuations in the thickness of the multiple panels of glass can be easily compensated for. Thus, the bonding between the axially adjustable

5 jaws of the support element and the respective outer surfaces of panels of glass of the multiple glazing unit is realised by means of an adhesive tape with a constant thickness of the adhesive layer. Multiple glass panel can be glued into the support element, and the bonding can adhere directly to the desired installation location of the window, so that pre-assembly, factory storage and transport of the pre-assembled window can be avoided.

10 The solution now described is optimal for reducing certain logistical problems; however, it does not solves the problems related to climate and related to the use implemented by the structure. In addition, the use of an adhesive tape can appear complex if it is necessary to work on the air thicknesses to be achieved between one glaze and another, thus

15 Therefore it is required, and it is the object of the present invention, to create a profile for a cladding panel of a facade that is able to overcome this disadvantage, i.e. a profile for a cladding panel for a portion of a facade that is able to maintain the well known aesthetic requirements, but at the same time that it is able overcome the limitations in terms of climate, size or use of the structure on which the panel is installed.

20 Said object is achieved by means of a perimeter profile of a cladding panel characterised in that it consists of a central body from which a longitudinal arm containing a first panel and a transversal arm containing a second slab are opposed, said profile providing recesses apt to accommodate and stabilise a structural silicone interposed between said cladding panel and said opposed arms.

30 It is also required to create a profile that can support structural panels that can be opened in such a way that their performance and appearance is different from the conventional appearance provided today, in order to allow for the study of valid alternatives in respect of forced ventilation and at the same time to have equipment inside the panel that reduces energy waste, such as photovoltaic cells arranged in such a way that they can exponentially increase the yield compared to the vertical cells conventionally provided on building facades.

The present invention provides a motorised and automatically operable opening system of the panel reatis capable of changing the angle of the panel with respect to the facade wall to the possible required angles.

5 Furthermore, it was found that the performance evolution of facades during its life cycle is currently not predicted: whenever the life cycle of a facade comes to an end, i.e. the energy spent in order to maintain the desired climatic conditions inside the building becomes unsustainable, either the facade in its entirety
10 has to be replaced or supplemented with an additional 'double skin' facade, according to a process called 'recladating'.

Therefore, the disadvantage of a cladding structure of a building facade that is on the one hand rigidly structured and on the other hand extremely complex to manage is obvious, particular
15 when these buildings are of considerable height, up to skyscrapers.

Therefore it is a further object of the present invention to realise an interchangeable system of existing facades where the panels can be replaced or converted to openable or fixed from the
20 inside, according to the evolution of the building and its use, thus drastically reducing maintenance time and sites, without interrupting normal activity inside the building, thus making it possible to update the building during the normal life cycle, minimizing costs and environmental consumption.

25 This object is achieved by a fixing system of the panels to a lattice, which makes 100% of the facade surface - whether it is a glass panel or a panel made of other material - replaceable from open to fixed and vice versa without removing the lattice, without requiring external building site installations and with limited
30 building site space inside the building.

Finally, the upheave of all common lifestyles in recent years and the development of smartworking, often within correct preparation of housing units and offices, has led to the considerable problem of depth rethinking the philosophical
35 concepts associated with the design of buildings. It is not only a question of creating an environment suitable for smartworking,

but rather, a question of realize buildings easily modifiable by use and type of user, including making provision for transforming lighting conditions and ventilation within the building.

5 It is well known that it is possible to modify a facade by
converting a fixed door into an opening door and vice versa, or
after the termination of the building to replace a fixed door with
a motorised opening door. However, today this operation
necessarily requires an activity in the facade grid. It is easy
10 to understand that this has a considerable impact in terms of
cost, environment and use of the building, as an architectural
modification on the facade lattice requires a complex activity
that substantially affects the entire building.

Therefore, a further object of the present invention is to
realise a facade composed only of openable modules managed by a
15 centralised system, maintaining performance at least at the
current level, that is capable of allowing the maintenance of the
thermal regulation and air quality in an essentially natural
manner, with minimal - if any - input from air treatment systems.
This would reduce operating and environmental costs associated
20 with the building. This would allow to make the building versatile
for a variety of uses in the course of everyday life, without the
need to change the load-bearing structure and the external
structure. In particular, the intention would be to implement a
facade opening management system that would be able to provide
25 the correct natural ventilation, managing CO₂ concentrations in
the most performant way possible, whatever the building's intended
use, without having to proceed with structural modifications to
the facade panels, or to the facade itself, or make use of air
treatment systems, thus reducing the building's environmental
30 impact.

This object is achieved by means of an automated and
invisible facade cladding panel management system, characterised
in that an assembly actuator-electromechanical lock is arranged
within a cavity provided in the facade grid transom, said
35 actuator-electromechanical lock complex being held in stable
contact with a chain bracket connected to the panel support

profile body. In this way, it is possible to create a facade composed only of opening modules managed by a centralised system with the aim of regulating the building's thermal insulation and air quality in a natural manner, without compromising on performance, limiting or eliminating the use of air treatment systems which are responsible for the high level of pollution in the environment.

Other features and advantages of the invention will become clear from the in-depth description of a preferred embodiment of the present invention, which is given below in connection with the appended figures. This description and these figures serve only as an explanation of the scope of the invention as defined by the appended claims.

Fig. 1 is a sectional view of a profile according to prior art, with two glass plates attached to it;

Fig. 2 is a sectional view of a first embodiment of the profile according to the invention;

Fig. 2a is a sectional view of a profile according to the first embodiment housing three glass panes;

Fig. 2b is a sectional view of a second embodiment of the profile according to the invention;

fig. 2c is the exploded view of the joint detail of the profile of fig. 2a

fig. 3 is the perspective view from above;

Fig. 4 is a front view of a cladding panel mounting the profile according to the invention;

Figs. 5a - 5e show the elements that make up the clamping system of the cladding panel of fig. 4

Figs. 6a to 6c are the side, bottom and perspective views from above of the handling element of the cladding panel;

Fig. 7 is a sectional view of a facade grid mounting the profile according to the invention;

Fig. 8 is a sectional view of the contact point between said handling element of cladding panel and said perimeter profile;

Fig. 9 is a cross-sectional view of a facade closing complex fitted with the movement element.

Fig. 10 is a cross-sectional view of the top area of a facade grid complex fitted with the handling element according to the invention

5 fig. 11 is a cross-sectional view of a facade grid complex provided with a parapet according to the invention

A profile P according to prior art is composed of a central body C, typically made of aluminium or similar metal, or metal alloy having equivalent physical properties, from which a longitudinal arm L for containing a first external cladding panel D and a transversal arm T for containing a second cladding panel E, or internal panel, are opposed. On the upper surface, a circular cavity A is provided for housing a hinge H held in engagement with the said central body C for the movement of the internal panel E. Finally, an insert I of dehydrating material is provided, apt to
10 reduce the risk of humidity in the chamber created between the two panels.
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The structure created in this manner has two points where the channel is in contact with the surface of the inner panel and one point having the channel in contact with the surface of the outer panel. This in fact creates a thermal bridge that has quite problematic management of the building's internal cubage and quite problematic management of humidity in the volume inside the two panels. Specifically, the variation of temperature between outside and inside leads to the creation of condensation.
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25 The innovative solution shown in the figures provides for a perimeter profile 1 of a cladding panel comprising a central body 2 from which a longitudinal arm 3 containing a first cladding panel 4 and a transversal arm 5 containing a second cladding panel 6 are opposed. Along the perimeter of the profile 1, recesses are
30 provided for housing and stabilising structural silicone interposed between said cladding panel 6 and said opposed arms 3, 5. For the same purpose, a profile recess is provided along the longitudinal arm 3, from which a longitudinal appendix 3a of a thickness less than the main element of said cross-arm is
35 departed. Preferably, the outer surface of said appendix 3a is knurled, in order to allow the correct grip of the structural

silicone and to facilitate the adhesion between the profile and the panel.

Preferably, the recesses along the central body 2 are two opposing trapezoidal recesses 7 along the side walls of said central body 2 and a substantially cylindrical recess 8 on the base surface of said central body 2, while a recess 9 is provided on the outer side wall of the transverse arm 5, which in turn departs from a lateral appendix of the upper surface of said central body 2 and comprises a substantially irregular polygonal profile body, with one side angled to said lateral appendix.

The recesses so realised have the same purpose as previously defined for the knurled surface of the longitudinal appendix 3a, i.e. to favour the correct distribution of the structural silicone, creating in particular a correct engagement between the silicone and the profile.

The profile preferably has other structural elements that refine its structure and allow it to be engaged with other devices and artefacts, in order to achieve the intended purpose. In particular, the shape of the transverse retaining arm 5 has a lightening groove 10 along the inner wall.

Moreover, said longitudinal retaining arm 3 and said transversal retaining arm 5 present along the inner wall opposing projections 11 of identical dimensions, which define below them a superiorly open recess 12 having as its base the summit surface of said central body 2, the recess 12 being arranged to accommodate a perimeter closing rod 13.

In the form of embodiment illustrated, the profile structure thus constructed is associated with a spacer 14 below the base body 2 having commonly available properties and shapes. It is possible that in alternative embodiments, i.e. in the case of the use of architectural panels, the spacers coincide with the accessories inserted inside the grooves.

In a second preferred embodiment, the features described so far are further envisaged by the insertion of punctual centring elements 14a substantially S-shaped, one end being in contact with panel 4 and the other end having a profile suitable for stable

engagement with said recesses 7: these elements serve to guarantee the correct central arrangement of panel 4 with respect to the facade grid. These elements 14a are fundamental for the centring of the structural profile with respect to the two cladding panels, thus guaranteeing the hermetic closure of the facade, the panel being perfectly adherent to the grid, and therefore closed, without the risk of overlapping, albeit imperceptible. -.

In order to allow blocking and opening of the profile, locking accessories consisting of shaped blocks 15 are provided for engagement and holding. The block 15 comprises a substantially parallelepiped body provided with through holes 16 for inserting screws on the long side of an edge partially removed to form an oblique wall on the other long side, on the front surface being provided a recess 17 for housing a point plate 18 provided with a sliding sealing cylinder 19, mechanically anchored to said perimeter locking rod 13. Preferably, the point plate 18 is mechanically anchored to said perimeter locking rod 13.

The presence of the system composed of the perimeter closing rod 13 and the blocks 15 provided inside the profile makes it possible to obtain the correct closure of the panel, guaranteeing its tightness despite the depressions acting on the facade. The number of blocks 15 varies according to the size of the panel and depending on the negative and positive pressures to which the panel is exposed. In particular, the perimeter locking rod 13 - kept constantly engaged with the profile - reinforces the structure, while the sliding sealing cylinder 19 of the point plate 18 fits inside the groove 17 of the block 15, guaranteeing the perfect seal of the system.

This arrangement is useful to overcome the problems related to the depression forces acting on the facade, and which tend to deform the facade constituent panel, generally reducing the perfect adherence of the opening door to the grid. In particular, by arranging a sufficient number of blocks 15 around the perimeter of the profile and the respective strikers fixed on the perimeter rod, it is ensured that the panels adhere perfectly to the facade grid.

It should also be noted that the window structure realised in this way, theoretically allows the window itself to be installed with a reverse opening to create optimal cross-ventilation without the need for additional devices, and it is essentially the prerogative of facade mechanics, with no support of the artificial intelligence.

In order to allow the movement and precisely automatic movement as it will be better described in the description below the longitudinal arm 3 and the transversal 5 arms passes measures apt to house a chain bracket 20 substitution.

Preferably, said chain bracket 20 comprises a parallelepiped body 21 provided on one side with a shaped wedge-shaped appendix 22 for engagement with said transversal body 5 and said longitudinal body 3 and on the opposite side with a shaped appendix 23 for engagement with a pivot pin. Preferably, said shaped wedge appendix 22 provides holes 24 for attachment to said transverse body 5 of said profile and pins 25 for engagement with said longitudinal body 3 and pins 26 for spacing with said transverse body 5.

For the correct movement of the panel, a hinge element 27 shaped in order to have a spherical head 28 apt to be housed within a special recess 29 provided in a spacer 30 housed within said profile 1 in correspondence with the recess 12, in place of the perimeter closure rod 13, from which a rod 31 having an approximately S-shaped profile departs, the distal end of which has a notched appendix 32 of engagement with the grid of the facade. The rod 31 is shaped so that rotation of the cladding structure can be provided for an angle between 0° and 35°, preferably between 0° and 25°. The angle swept by the cladding panel of the facade is thus considerably enlarged, allowing for a different ventilation of the building and greater versatility in the maintenance of the panel itself.

The profile thus constructed is associated with a management system for the facade cladding panels comprising an assembly actuator - electric lock 33 arranged within the external groove 34a provided on a transom 34 of the facade grid, which is connected

by means of appropriate rods both to the chain bracket 20 and to the perimeter locking rod 13. A top cladding element 38 ensures the correct covering of the chamber, thus providing a watertight seal for the actuator - electric lock assembly.

5 In order to ensure tightness, and to avoid the risk of moisture leakage, a film of elastic material 39 such as neoprene, is placed between said chain bracket 20 and said horizontal bulkhead 36, which also has the function of attenuating vibrations.

10 Sensors placed inside and outside the building are connected by means of conducting cables within the structure of the facade grid, thus for routes totally protected from view and from all agents, designed to define the correct ventilation conditions within the structure, in order to allow natural ventilation,
15 according to the temperature and humidity requirements of the moment, with no risk of condensation forming or the creation of undesirable, or dangerous, vortices due to the inaccurate opening of windows.

 A safety guard 40 is held to the facade grid in a stable
20 engagement, as required by current regulations. The parapet is housed within a recess 41, which also houses the components that enable the integration of the guard 40 to the facade system and the maintenance of a stable position. In particular, at least one cylindrical profile accessory 42 made of metallic material is
25 provided at the contact end with said guard 40 being covered with a front seal 43. The accessory 42 imparts a lateral pressure on the guard 40, the adjustment of which takes place by means of the rotation of its distal end, arranged within a threaded cavity 44. A vertical wall 45 made of elastic material, is opposed to said
30 cylindrical profile accessory 42 for engagement with the surface of the guard opposite to that in engagement with the accessory 42.

 In order to facilitate sealing against moisture and dust, there are also seals 46 inserted in the labyrinth of the facade
35 lattice with interlocking engagements in order to engage and seal said guard 40 within said housing cavity 41.

Finally, a horizontal base 47 in elastic end material is provided to ensure the correct positioning of the guard 40,.

The structure thus formed is ready to be installed and used. It is well understood from the above description that such a structure is perfectly watertight, because there is no provision for water or moisture to condense within the facade grid, nor at the interface between the panels and the internal volume of the building.

Operationally, the panel and its layering must first be made, according to structural requirements - in glass or other material - with the assembly of the external architectural panels, any accessories such as sound-absorbing and thermo-absorbing material, preparing the perimeter groove with the relative spacers, and the subsequent perimeter sealing. Before insertion into the facade grid, care is taken to bring the panels into contact with the profile, inserting the spacer to maintain the correct distance between two panels, so that there is the required volume of air between the panels, the structural silicone sealant making the profile integral with the panel.

Then, in order to mount the panel on the facade wall, so that it functions properly, the profile is placed in the planned facade grid, taking care to also insert the supporting elements such as rods and blocks.

The fastening of the panel to the structure takes place by engagement between the notched appendix 32 of the hinge 27 with an appendix 48 protruding from the upper cross-beam. To reinforce the tightness of the hinge, a transverse pin 49 is provided which passes through a slot provided on the hinge body 27 and engages stably, for example by threading, with said upper cross member.

More precisely, before installing the panel in the grid, it is required to have a panel with the following characteristics: The perimeter channel is able to house inside it a single prefabricated and self-supporting panel, already prepared for quick installation in the facade grid and also to be used as an openable, outer architectural layer, air chamber for ventilation and for the addition of insulating and fireproofing material,

inner architectural closure layer and additional layers according to project requirements.

It is therefore clear that reference has been made to a spacer in the description, but it is evident to the experts of the art that - if it is needed - it is possible to have several panels interposed between the two main panels, with the requisite spacers. This option would allow the builder to achieve technical and aesthetic effects that would otherwise be more difficult to achieve.

Once applied in position, the panel can be moved manually or by means of the previously described home automation system.

The home automation system constantly monitors the state of the weather conditions, so that it manoeuvres the opening of windows in order to have the correct conditions of light, temperature, wind and CO₂, and whatever other parameters are considered necessary and appropriate.

In addition to these properties, that are particularly advantageous, as will be easily deduced later, the presence of a home automation system allows to prevent the sash from opening if there is an imminent danger outside, such as a particularly aggressive weather event. Furthermore it avoids to independently activate the opening of the windows to help extinguish the start of a fire or ventilate the building if smoke or toxic substances are detected in the air. As is easy to understand, in fact, the correct opening of windows dissipates smoke more quickly, ensures faster air recycling and intensifies the cross-ventilation system in calm wind conditions. In particular, we would like to emphasise the fact that the reverse opening solution, in joint action with the selective and synchronised opening of the projecting sashes, allows the correct air circulation, which enables the rapid dissipation of smoke inside the building.

It is understood that the system thus realised for the cladding of portions of the facade, which is based on the perimeter profile and its docking and handling system, thanks to the entire facade being made openable and interchangeable by the quick release system, allows for a substantial change in the philosophy

of design, construction, maintenance and renovation of buildings, and specifically large buildings such as skyscrapers.

In particular, the profile, with its structural channel, allows the elimination at all the frame in the opening door, drastically reducing costs and architectural impact of this arrangement, lightening both the structure and the view of the building facades. Moreover, the structure thus realised completely eliminates the dimensional limits of the opening surfaces: they could be the same size as the ornamental panel covering the building facade. The constructive dimensional problem is no longer related to the implementation in the facade, but to the manufacturing dimensional limit of the materials that make up the panel.

It is important to emphasise that the support grid is totally independent of the facade grid, the dimensioning of which is independent of the type of cladding to be inserted, i.e. whether it is fixed or openable and/or multilayer or a glass panel. In this way, there is freedom of choice in the type of panel to be installed, even after the structure has been completed and delivered to the user.

The gained freedom of manoeuvre is the necessary condition for a new form of ventilation to be designed into the internal volumes of the building. This is against the principle that the building should be considered as a closed box, introducing forced air to manage internal well-being. Rather, it is preferred to consider the building as an active part of the ecosystem, in its own way able to change the flow of air independently and without the consumption of external energy.

In addition, the system thus created allows the parapet to be integrated with the facade, thus allowing the panel to be opened over the entire height of the floor, guaranteeing a greater opening dimension of the compartment, without jeopardising safety. In particular, the integration of the parapet to the facade guarantees the simplicity of maintenance described above, without substantial risks for the operators.

The provision of motor for moving the panel contributes to the cleanliness of the facade, in the total absence of elements visible from the outside totally integrated within the facade grid and it is directly connected to the opening element. This connection is fundamental so that the entire facade can be operated in a centralised manner, possibly with the support of artificial intelligence systems that take into account external atmospheric conditions and internal climatic conditions, or individually.

The provision of home automation fully integrated in the façade is closely connected to the provision of the integrated motor. Integrated home automation management becomes fundamental in order to be able to compute the external and internal climatic conditions and automatically define the correct opening of the panels in order to obtain natural ventilation.

Finally, a system has been created to allow the interchangeability of the panels that make up the existing facades: the panels can be transformed into openable or fixed from the inside depending on the evolution of the building and its use, and thanks to its system for attaching the panels to the grid, 100% of the facade surface – whether it is glazed or made of other material – can be replaced without removing the facade grid. In fact, all that is needed is to pull out the old panel and replace it with a new one, thanks to the special conformation of the lattice. This property makes the solution now described particularly innovative, the system allowing building owners to work on existing buildings constructed according to this system and change the panels during its lifecycle to improve performance at a significantly lower value, even three orders of magnitude less, than the cost of a total demolition or recladding and without the need to rid the building of occupants.

These features were achieved through the design and installation of internal brackets for access to the perimeter strikers of the sash for opening, and the hinge system designed to release the panel from the outside and thus enable it to be replaced, as well as excellently fulfilling the opportunity to

extend - without any risk to the building's inhabitants - the opening angle of the opening panel.

The intended objects were therefore achieved, resulting in a building facade construction system that actually changes the function of the facade to the foundation of the design. It is not just a cladding element, but is instead a fundamental element in the realisation of a new construction and living concept, because it provides the building's internal volumes with natural ventilation, which on the one hand reduces consumption due to air conditioning and on the other makes the building an integral part of its surroundings, rather than a mere foreign element, a real intruder.

Furthermore, some additional advantages have been obtained aimed at refining the properties of the profile according to the invention, making the described and protected solution even more performing. In particular, the recesses obtained along the profile of the central body of the perimeter profile supporting the cladding panels create the conditions for the bond between the groove and the panel to be more integral and allow for the housing of spacing elements that favour the centring of the panel with respect to the groove, reducing error margins and installation times and guaranteeing both application and aesthetic perfection.

The solution thus realised also allows to envisage the use of panels of any type, and not necessarily only glass surfaces, as we are currently used to seeing, given the need to provide supporting frames arranged along the entire facade wall.

The solution now described is not only a sound technical solution, but is evidence of a conceptual paradigm shift in the construction of buildings, particularly skyscrapers: the building may not necessarily be enclosed and, above all, changes can be made to the facade surface without necessarily modifying the entire wall.

It would also like to emphasise the fact that the solution described above is in full alignment with the recommendations of the Paris Agreement agenda regarding the properties that buildings should be constructed with after 2030. With the solution now

described, in fact, the possibility of upgrading the facade to allow for compliance with current regulations and world trends even after the facade has been completed is made realistic, without necessarily having to proceed with recladding.

5 In addition, we would like to emphasise once again the basic concept underlying the entire innovative solution described above: the profiles described here, whether or not the movement system associated with them is used, are entirely interconnected with the rest of the facade, providing the opportunity for a synergetic
10 action to be created between the various cells that make up the facade body. The construction paradigm is also overturned in this case, as the panels cooperate to ensure proper ventilation and consequently a reduction in the emission of carbon dioxide into the air. The solution thus realised, in fact, allows natural
15 ventilation to be guaranteed inside the building, which enables the reduction of energy consumption and consequently the direct reduction of the building's environmental impact. To this end, it is understandably fundamental to have a home automation system such as the one described, which is able to define the correct
20 opening of the facade panels, instant by instant, without any risk to the safety of people inside the building.

 It should also be emphasised that all the innovative features described so far can be present and used as a 'complete package', or one or more of them can be selected in order to partially
25 achieve the results now described, depending on the needs and structure of the building.

 It is clear that - however extensively described - only one specific embodiment has been referred to above, but there can be many variants of the innovative solution as defined by the
30 attached claims.

CLAIMS

1) A perimeter profile 1 of a cladding panel of the type consisting of a central body 2 from which a longitudinal retaining arm 3 of a first cladding panel and a transverse retaining arm 5 of a second cladding panel 6 are opposed, characterised in that said profile provides recesses 7 apt to house and stabilise connection and sealing elements interposed between said cladding panel and said opposed arms, said connection and sealing elements comprising at least structural silicone.

2) Perimeter profile of a cladding panel as in 1 characterised by what said recesses 7 are two opposing trapezoidal recesses along the side walls of said central body 2 and a substantially cylindrical recess 8 on the base surface of said central body 2.

3) Perimeter profile of a cladding panel as in 1 or 2 characterised in that along said longitudinal arm 3 a profile recess is additionally provided at the top, from which a longitudinal appendix 3a thinner than the main element of said cross-arm 5 departs.

4) Profiled as in 3, characterised in that said longitudinal appendix has a knurled engagement surface with the inner surface of said panel to ensure adhesion with structural silicone.

5) A perimeter profile of a cladding panel as in any one of the preceding claims characterised in that said transverse containment arm 5 departs from a side appendix from the upper surface of said central body 2 and comprises a substantially irregular polygonal profile body, with one side angled with respect to said side appendix, a recess 9 being provided on the outer side wall of said polygonal profile body.

6) Perimeter profile of a cladding panel as in any one of the preceding claims characterised in that said transverse retaining arm 5 has a groove 10 along one of its walls.

7) Perimeter profile of a cladding panel as in 5 characterised in that said longitudinal retaining arm 3 and said

transverse retaining arm 5 have opposing protrusions 11 of identical size along the inner wall, said protrusions 11 identifying a recess 12 capable of accommodating a perimeter rod 13 for closure.

5 8) A perimeter profile of a cladding panel as in any one of the preceding claims characterised in that said connecting and sealing elements also comprise point centring elements 14a substantially S-shaped, one end being in contact with said panels and the other end providing a profile suitable for stable
10 engagement with said recesses 7.

 9) Perimeter profile of a cladding panel as in any of the preceding claims characterised in that for its length there are clamping accessories of said cladding panel, said accessories being shaped blocks 15 for mutual engagement.

15 10) Perimeter profile of a cladding panel as in 9 characterised in that said attachment comprises a block substantially in the form of a parallelepiped provided with through holes 16 for the insertion of screws on one long side of an edge partially removed to form an oblique wall on the other
20 long side, on the front surface being provided a recess 17 for housing a point plate 18 provided with a sliding sealing cylinder 19, mechanically anchored to said perimeter rod 13.

 11) A perimeter profile of a cladding panel as in any one of claims 3 to 10 characterised in that it provides on said
25 longitudinal arms 3 and transverse arms 5 means suitable for housing, and stably engaging with, a chain bracket 20 of automatic movement of said cladding panel, said transverse arm 5 presenting on its top surface threaded fixing holes and said longitudinal arm 3 presenting between said internal protrusion 11 and said
30 longitudinal appendix a housing and locating groove.

 12) A perimeter profile of a cladding panel as in 11 characterised in that said chain bracket 20 for automatically moving said cladding panel associated therewith comprises a substantially parallelepiped body 21 provided on one side with a
35 shaped wedge-shaped appendix 22 for engagement with said

transverse and longitudinal arms and on the opposite side with a shaped appendix 23 for engagement with a pivot pin.

13) Perimeter profile of a cladding panel as in 12 characterised in that said shaped wedge-shaped appendix provides
5 fixing holes 24 to said transverse body of said profile and spacing pins 25 for spacing and engagement with both said transverse body 5 and longitudinal body 3.

14) A perimeter profile of a cladding panel as in any one of claims 11 to 13 characterised in that said chain bracket 20
10 connected to the panel support profile body is associated - at its distal end - with an assembly actuator-electro-lock 33 arranged within a groove provided on a cross member 35 of a facade grid.

15) Perimeter profile of a cladding panel as in 14
15 characterised in that this cavity coincides with the external cavity provided in each facade grid, equipped with a second internal chamber 35 consisting of a horizontal bulkhead 36, a vertical bulkhead 37 and a summit cladding element 38.

16) A perimeter profile of a cladding panel as in any one
20 of claims 14 or 15 characterised in that between said chain bracket and said horizontal bulkhead is interposed a film 39 of elastic, vibration-damping material such as neoprene.

17) Perimeter profile of a cladding panel as in any one of claims 14 to 16 characterised in that from said actuator-electromechanical lock assembly 33 there is a bracket connecting
25 to said perimeter rod 13 of said profile, said bracket being accessible from inside the building.

18) A perimeter profile of a cladding panel as in any one of claims 14 to 17 characterised in that said facade grid provides
30 a housing recess 41 of a parapet 40, said recess 41 housing integration and holding components in a stable position of said parapet 40, said components being respectively:

- at least one cylindrical profile accessory of metal material provided with a face seal capable of imparting lateral
35 pressure to said guardrail 40, an arm, said accessory being housed at its distal end within a threaded groove 44

- a wall 45 made of elastic material opposed to said cylindrical profile attachment of said parapet 40
- gaskets 46 to engage and close said guardrail 40 within said housing recess 41
- 5 - a horizontal base 47 in elastic material for the end of said parapet 40.

19) A perimeter profile of a cladding panel as in any one of the claims characterised in that there is further provided a hinge element 27 shaped so as to have a spherical housing head within a
10 groove 29 provided in a spacer 30 housed within said profile at the groove, in place of the perimeter locking rod 13, from which a rod having an approximately S-shaped profile, the distal end of which has a notched engagement appendix 32 with the grid of the facade, the rod being shaped so that rotation of the cladding
15 structure can be provided for an angle of between 0° and 35°, preferably between 0° and 25°.

20) Perimeter profile of a cladding panel as in 19) characterised in that said notched appendix 32 of said hinge is brought into engagement with an appendix protruding from the upper
20 cross-piece of said facade grid, a transversal pin 49 passing through a slot provided on said hinge body and engaging stably with said upper cross-piece.