(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 530 863 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
28.08.2019 Bulletin 2019/35

(21) Application number: **16918998.2**

(22) Date of filing: **01.12.2016**

(51) Int Cl.:
E06B 9/24 *(2006.01)*

(86) International application number:
PCT/ES2016/070853

(87) International publication number:
WO 2018/078195 (03.05.2018 Gazette 2018/18)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(30) Priority: **24.10.2016 ES 201600889**

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(54) IMPROVEMENT IN SMART PRACTICABLE CLOSING ELEMENT

(57) The invention relates to an improvement in a smart, practicable closure, wherein the purpose is to equip the smart, practicable closure (window or door in a building), as a support, with a wider range of features and uses by means of incorporating a series of pieces of electronic and telecommunications equipment, without modifying the structural features of the closure. Said smart, practicable closure is formed by a technical LCD film which allows viewing texts, data and pixelated color images overlapping the view of the outside, another technical film (2) constituting a tactile and interactive surface connected to one another and to the assembly by means of a series of electronic circuits and modules capable of using audiovisual computer and communication applications for receiving, storing, treating and processing the information that they receive from the sensors and antennas (10), microphones (8), cameras (9) and other data inputs, as well as outputs including speakers (7) and other modules or ports (10). The smart, practicable closure of the present invention additionally comprises a technical liquid crystal film (5) as an incident light filtering element, going from being transparent to translucent and supported by a secondary illumination system, all of which can be connected to the conventional power grid, and a photovoltaic cell (12) for recharging the accumulator (11), as the secondary power supply system. The present invention is provided with a system (13) for unlocking closing points and deactivating the mechanization for opening in the case of an emergency, and an internal pressure regulation system.

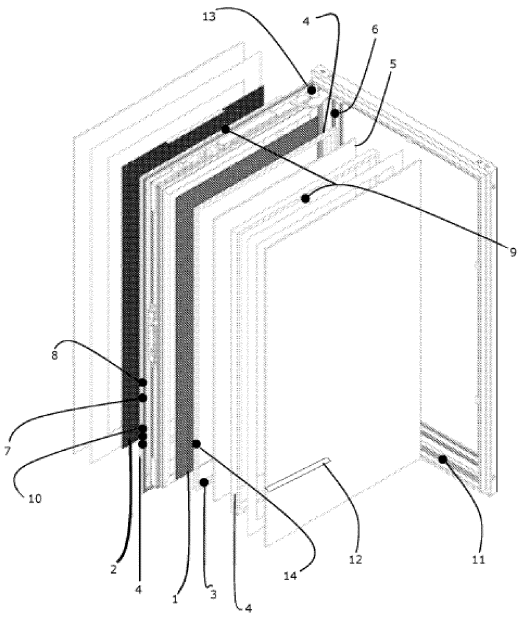

FIGURE 2

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Description

[0001] The increase in the human population on this planet and the increasingly more difficult access to existing resources for a large part of said population has led to an overall decrease in the size of private individual habitats. This combined with the current aesthetic trends of minimalism and bareness of internal parameters (less is more), as well as those trends based on recycling that is increasingly necessary, and mobility have all made it necessary for systems and equipment to be increasingly more multifunctional, just as the increasingly greater mobility of individuals has given rise to combination of different apparatus, which have in the past filled all the pockets of articles of clothing, but are now configured as a single small object that can easily be carried around at all times (portability) or stored. It is already common to combine into one device a clock, calendar, agenda, calculator, transistors, GPS, biosensors, telephones, means of payment and even a photographic camera, video camera and a music and/or film recording/reproducing device.

[0002] In homes and rooms, there is the indicated need to reduce the number of objects and equipment to the lowest number possible, and nevertheless the size of those objects is to be increasingly bigger. Therefore, bigger refrigerators, larger ovens, work tops with a number of cooking areas, large work areas, sinks with several heights and infinite electrical appliances are desired, but houses have not increased in size, and neither have kitchens. In the living room, dining room, kitchen, many bedrooms and even in some bathrooms, there is a desire to install huge displays, screens and television sets, where people do not carry around a telephone, tablet or laptop at all times as if it were a new bodily appendage in order to stay connected at all times, that is, the more portable it is, the less visible and therefore the less relationship with it (less enveloping).

[0003] Likewise, in homes and rooms with vertical closures there is a need to make it easier to darken the room and protect it from sunlight as well as to provide privacy, so elements are installed inside and outside the room such as curtains, screens, window covers, or blinds, shutters, bars, awnings and an infinite number of accessories taking up a certain amount of time as they require cleaning, maintenance and additional conservation together with their corresponding economic cost.

[0004] It should be noted that each of said elements requires a drive that is additional to that of the actual closure (windows and doors). On an added note, there are different occultation systems included in the glass chamber (Venetian blinds) that can be operated from the actual window, but which reduce the useful viewing and illuminating surface of the window or door, and therefore of the room, to a strip once they are taken up.

[0005] There are new needs today in the supply and distribution chain which require solutions making it easier for small delivery drones to access homes and buildings. There is a growing need to establish new direct communication channels with people for their protection, health, monitoring, emergencies, prevention and consumption, as well as to obtain a response generating an active, two-way communication channel. The ageing of the population requires apparatus that are more manageable, visual, intuitive and easier to be located by the user. Furthermore, young children require elements that are simple to use so that they can learn to use them.

[0006] It is therefore desirable to combine the real, tangible world immediately outside the room, i.e., the actual window that allows observing the everyday environment, the inner window that sees the user and asks "how are you?" or "how do you feel?", e.g. the mirror, with the digital world, the world of communication, the world of the user's community, in a single piece of equipment or system: a window to the world. It is also desirable to provide a solution to darkening, protection against sunlight and privacy in the same window element without reducing the useful viewing and illumination surface of the room, and thereby minimizing maintenance of the entire assembly.

State of the Art

[0007] WO2016159672A1 describes a liquid crystal device and the like. The liquid crystal device can be put into practice in a complete transparent state, a transparent black state, and a scattering state according to the frequency and/or the amount of voltage that is applied. US2015346575A1 discloses various optically switchable devices available for controlling the tinting, reflectivity, etc., of window panes. KR20150126199A describes a transparent liquid crystal display (LCD) installed in a window, which improves the transmission of light that is used for seeing a rear side when an image or a video is not shown on it, or it is used as the skylight whereby it is held by a transparent window or is installed instead of a window. CN204743429 (U) describes an interactive product display device, comprising: a base plate and directly above the plate having a window between the front, rear panel, a left side plate and right side plates, a bottom plate, a separator plate on the left and right side plates, a transparent display panel means mounted on the inside of the front cover. The utility model Interactive Products means easy assembly and disassembly and allows users to view up close behind the exhibits through the screen.

[0008] None of the solutions proposed in the prior art meets the purpose for which it is intended, that is, to provide a window or door in a building that combines different apparatus existing in the pockets, homes and rooms of people as well as the handling, viewing and locating thereof. They do not improve the two-way communication channel, do not eliminate elements for protecting against the sunlight, for darkening and for privacy outside the windows and doors, nor do they solve the needs for home deliveries.

Description of the Improvement

[0009] The object of the proposed improvement is to equip the smart, practicable closure (window or door in a building) described in patent document P201530668, where the outer and inner surfaces of the closure cover the casing such that said casing is not visible in the closed position and the closure has a continuous glazed surface on its two faces, and now a support is generated, with a wider range of features and uses (initially not developed) by means of incorporating a series of pieces of electronic and telecommunications equipment, as well as technical films that will allow emitting and receiving images, texts, audio and data as well as filtering incident light, while at the same time being equipped with inputs, outputs and applications for interacting with the assembly, all without modifying the structural features of the closure. The smart, practicable closure comprises:

A technical film based on liquid crystals (LCD) reacting to electrical impulses, located in an intermediate position within the composition of the glazing, which allows viewing texts, data and pixelated color images overlapping the view of the outside.

[0010] A technical film constituting a tactile and interactive surface which is located, adhered or laminated on one of the glazed planes, in an intermediate position within the composition of the glazing, in contact with the inside, based on cells or regions that react upon detecting one or more fingers on the glazed surface protecting it.

[0011] A region of the technical tactile film is assigned to each of the parameters established by the computer applications, resulting in the desired corresponding actions.

[0012] A secondary illumination system made up of at least one source of illumination located within the composition of the glazing, and usually in one of the intercalary profiles.

[0013] A technical liquid crystal film located, adhered or laminated on one of the glazed planes, in an intermediate position within the composition of the glazing, which acquires a scattering state according to the frequency and/or the amount of voltage that is applied, going from being transparent to translucent.

[0014] A processing and communications module, usually located according to the preferred option in the casing of the window or door or in an opening in the nearby wall facing, integrating electronic circuits capable of using audiovisual computer and communication applications for receiving, storing, treating and processing the information that they receive from the sensors, antennas, microphone, cameras and other data inputs, including that of a tactile film, as well as outputs, including an LCD film and speakers.

[0015] Usually at least one speaker, usually located on the side of the casing, which allows emitting sounds when duly connected to the processing and communications module.

[0016] Usually at least one microphone usually located on the side of the casing which allows recording sounds when duly connected to the processing and communications module.

[0017] Usually at least two image capture sensors (cameras) protected by the outer glazed surfaces of the closure and oriented towards the outside and the inside of the room and located within the composition of the glazing, which allow recording images and videos when duly connected to the processing and communications module.

[0018] One or more modules with data input and output points or ports, by way of non-limiting example, USB, HDMI, WIFI, Bluetooth, infrared, and points or ports of external sensing elements usually located on the side of the casing.

[0019] Multiple computer, audiovisual and telecommunications applications that are both generic and specific for the system loaded in the processing and communications module which respond to the commands activated by the corresponding sensors bringing about the relevant operations.

[0020] Primary power supply system that can be connected to the conventional power grid for the purposes of providing the energy required for the drives and operation of the electrical, electromechanical and electronic equipment of the devices making up the system.

[0021] Usually at least one electrical energy accumulator concealed in the casing, for driving the systems of the window should the power supply fail.

[0022] Usually at least one photovoltaic cell in the space corresponding to the intercalary profile for recharging the accumulator as a secondary power supply system.

[0023] A system for unlocking closing points and deactivating the mechanization for opening the window or door in case of an emergency next to the drive motor for the closing points.

[0024] An internal pressure regulation system made up of one or more mechanical valves located the intercalary profiles of the composition of the glazing.

[0025] This configuration has different advantages:

It brings together in a single element the solution to two needs, a first basic need which is to ventilate and illuminate a room in a natural and controlled manner, and another increasingly more desired and even required need, which is to be able to be connected to digital and virtual communities without the usual interferences involving the excessive reflection of ambient light in relation to the furniture and competition for a priority location.

[0026] It creates synergies derived from the overlapping of functions: (a) Using the heat from the "screen" integrated in the glass to avoid condensation on the inner surface of the window. (b) Using the heat from the "screen" integrated in the glass to offer a warm surface, when the window is generally a cold surface in the room. (c) Using the surface of the pane as a heat sink and keeping the screen in a suitable temperature range. (d) Using the surface of the pane as a system for protecting the

screen against both physical aggressions and environmental aggressions. (e) Using the "screen" as a solar protection element. (f) Using the "screen" as a darkening element. (g) Using the "screen" as a control element for controlling incident visible and non-visible luminous radiation. (h) Using the "screen" as an element offering privacy from the outside world. i. Using outdoor natural light as a backlighting element of the "screen". (j) Using the pressure valves in the chambers to minimize overheating in the chamber and refresh "the screen". (k) Using the window as a work and leisure tool and making access to two-way communication channels, which are particularly acceptable for children and the elderly, easier.

[0027] It provides answers to certain needs: (a) Integrating and optimizing resources: (a.1) optimization of the resources used by not duplicating the use of glass to protect the laminate to form the actual window, of a frame or casing for the television set, of electrical and electronic components, of sensors, of transport, etc.; (a.2) reduction of the resources used by eliminating curtains, blinds, etc., in summary, solar protection, darkening and privacy elements (b) Making maintenance and cleaning easier. (c) Making it easier for small delivery drones to gain access. (d) Serving as support for advertisement, therapies, communications, etc.

Brief Description of the Drawings

[0028] For the purpose of illustrating the following description, two sheets of drawings are attached to the present specification in which in two figures depict the essence of the present improvement by way of non-limiting example, and in which:

Figure 1 shows a schematic perspective view of the invention in the assembled position, particularly with the leaf in the open position as seen from the inside and without being assembled in the insertion wall facing.

Figure 2 shows a schematic perspective view of the closure seen from the same point as Figure 1 in which the composition of the different elements configuring the closure, the composition of the glazing and the location of the technical films as well as the sensors, mechanizations, accumulators, power supply systems, processing module, cameras and element for unlocking, among others, can be seen in one of the assembly modes that is provided.

Description of the Preferred Embodiments

[0029] The object of the improvement proposed herein is to equip the smart, practicable closure (window or door in a building) described in patent document P201530668, as a support formed by intercalary profiles, with a wider range of features and uses by means of incorporating:
A technical film (1) based on liquid crystals (LCD) reacting to electrical impulses, located in an intermediate position within the composition of the glazing, which allows viewing texts, data and pixelated color images overlapping the view of the outside.

[0030] A technical film (2) constituting a tactile and interactive surface, based on cells or regions which react upon detecting one or more fingers on the glazed surface protecting it, which is located, adhered or laminated on one of the glazed planes, in an intermediate position within the composition of the glazing, in contact with the inside.

[0031] A region of the technical tactile film (2) is assigned to each of the parameters established by the computer applications, resulting in the desired corresponding actions.

[0032] According to a main configuration, a secondary illumination system (3) made up of at least one source of illumination is located within the composition of the glazing, and usually in one of the intercalary profiles (4).

[0033] According to one embodiment, a technical liquid crystal film (5) which acquires a scattering state according to the frequency and/or the amount of voltage that is applied, going from being transparent to translucent, located, adhered or laminated on one of the glazed planes, in an intermediate position within the composition of the glazing.

[0034] A processing and communications module (6) usually located, according to a preferred embodiment, in the casing of the window or door or in an opening in the nearby wall facing, integrating electronic circuits capable of using audiovisual computer and communication applications for receiving, storing, treating and processing the information that they receive from the sensors and antennas (10), microphones (8), cameras (9) and other data inputs, including that of a tactile film (2), as well as outputs including an LCD film (1), speakers (7) and other modules or ports (10).

[0035] Usually at least one speaker (7) located, according to the preferred embodiment, on the side of the casing, which allows emitting sounds when duly connected to the processing and communications module (6).

[0036] Usually at least one microphone (8) located, according to preferred option, on the side of the casing which allows recording sounds when duly connected to the processing and communications module (6).

[0037] According to a preferred but not exclusive embodiment, at least two image capture sensors (9) protected by the outer glazed surfaces of the closure and oriented towards the outside and the inside of the room and located within the composition of the glazing, which allow recording images and videos when duly connected to the processing and communications module (6).

[0038] One or more modules (10) with data input and output points or ports, by way of non-limiting example, USB, HDMI, WIFI, Bluetooth, infrared and points or ports of external sensing elements, usually located on the side of the casing and connected to the processing and communications module (6).

[0039] Multiple computer, audiovisual and telecommunications applications that are both generic and specific for the system loaded in the processing and communications module (6) which respond to the commands activated by the corresponding sensors (2)-(8)-(9)-(10) bringing about the relevant operations.

[0040] A primary power supply system that can be connected to the conventional power grid for the purposes of providing the energy required for the drives and operation of the electrical, electromechanical and electronic systems of the devices making up the system, among others the processing and communications module (6), technical films (1), (2) and (5) and the secondary illumination system (3).

[0041] Usually at least one electrical energy accumulator (11) concealed in the casing for driving the systems of the window should the power supply fail.

[0042] According to a preferred embodiment, at least one photovoltaic cell (12) located in the space corresponding to the outermost intercalary profile (4) for recharging the accumulator (11) as a secondary power supply system.

[0043] A system (13) for unlocking closing points and deactivating the mechanization for opening the window or door in case of an emergency.

[0044] An internal pressure regulation system (14) made up of one or more mechanical valves located in the intercalary profiles (4) of the composition of the glazing.

Claims

1. A smart, practicable glazed closure system, **characterized by** supporting a processing and communications module (6), integrating electronic circuits capable of using audiovisual computer and communication applications for receiving, storing, treating and processing the information that they receive from the sensors and antennas (10), microphones (8), cameras (9) and other data inputs, including that of a tactile film (2), as well as outputs including an LCD film (1), speakers (7) and other modules or ports (10).

2. The smart, practicable glazed closure system according to the preceding claim 1, **characterized by** supporting a technical film (1) based on liquid crystals (LCD) reacting to electrical impulses, located in an intermediate position within the composition of the glazing, which allows viewing texts, data and pixelated color images overlapping the view of the outside.

3. The smart, practicable glazed closure system according to the preceding claims 1 and 2, **characterized by** supporting a technical film (2) constituting a tactile and interactive surface which is located, adhered or laminated on another one of the glazed planes in an intermediate position within the composition of the glazing, in contact with the inside, where a region of this technical film is assigned to each of the parameters established by the computer applications, resulting in the desired corresponding actions.

4. The smart, practicable glazed closure system according to the preceding claims 1 to 3, **characterized by** supporting a technical liquid crystal film (5) which acquires a scattering state according to the frequency and/or the amount of voltage that is applied, going from being transparent to translucent, which is located, adhered or laminated on one of the glazed planes in an intermediate position within the composition of the glazing.

5. The smart, practicable glazed closure system according to the preceding claims 2 and 4 **characterized by** supporting a secondary illumination system (3) made up of at least one source of illumination located within the composition of the glazing, and usually in one of the intercalary profiles (4).

6. The smart, practicable glazed closure system according to the preceding claim 2, **characterized by** supporting at least one speaker (7), preferably located on the side of the casing which allows emitting sounds when duly connected to processing and communications module (6).

7. The smart, practicable glazed closure system according to the preceding claims 1 and 6, **characterized by** supporting at least one microphone (8) preferably located on the side of the casing which allows recording sounds when duly connected to the processing and communications module (6).

8. The smart, practicable glazed closure system according to the preceding claims 1 and 2, **characterized by** preferably supporting two image capture sensors (9) protected by the outer glazed surfaces of the closure and oriented towards the outside and the inside of the room and located within the composition of the glazing, which allow recording images and videos when duly connected to the processing and communications module (6).

9. The smart, practicable glazed closure system according to the preceding claims 1 to 8, **characterized by** supporting one or more modules (10) with data input and output points ports, by way of non-limiting example, USB, HDMI, WIFI, Bluetooth, infrared and points or ports of external sensing elements, preferably located on the side of the casing and connected to the processing and communications module (6).

10. The smart, practicable glazed closure system according to the preceding claims 1 to 9 **characterized by** supporting multiple computer, audiovisual and telecommunications applications that are both generic and specific for the system loaded in the processing and communications module (6) which respond to the commands activated by the corresponding sensors (2)-(8)-(9)-(10) bringing about the relevant operations.

11. The smart, practicable glazed closure system according to the preceding claims 1 to 10, **characterized by** supporting a primary power supply system that can be connected to the conventional power grid for the purposes of providing the energy required for the drives and operation of the electrical, electromechanical and electronic systems of the devices making up the system.

12. The smart, practicable glazed closure system according to the preceding claims 1 to 11, **characterized by** preferably supporting at least one electrical energy accumulator (11) concealed in the casing, for driving the systems of the window should the power supply fail.

13. The smart, practicable glazed closure system according to the preceding claim 12, **characterized by** preferably supporting at least one photovoltaic cell (12) located in the space corresponding to the outermost intercalary profile (4) for recharging the accumulator (11) as a secondary power supply system.

14. The smart, practicable glazed closure system, **characterized by** supporting a system (13) for unlocking closing points and deactivating the mechanization for opening the window or door in case of an emergency.

15. The smart, practicable glazed closure system according to the preceding claims 2 and 4, **characterized by** supporting an internal pressure regulation system (14) made up of one or more mechanical valves located in the intercalary profiles (4) of the composition of the glazing.

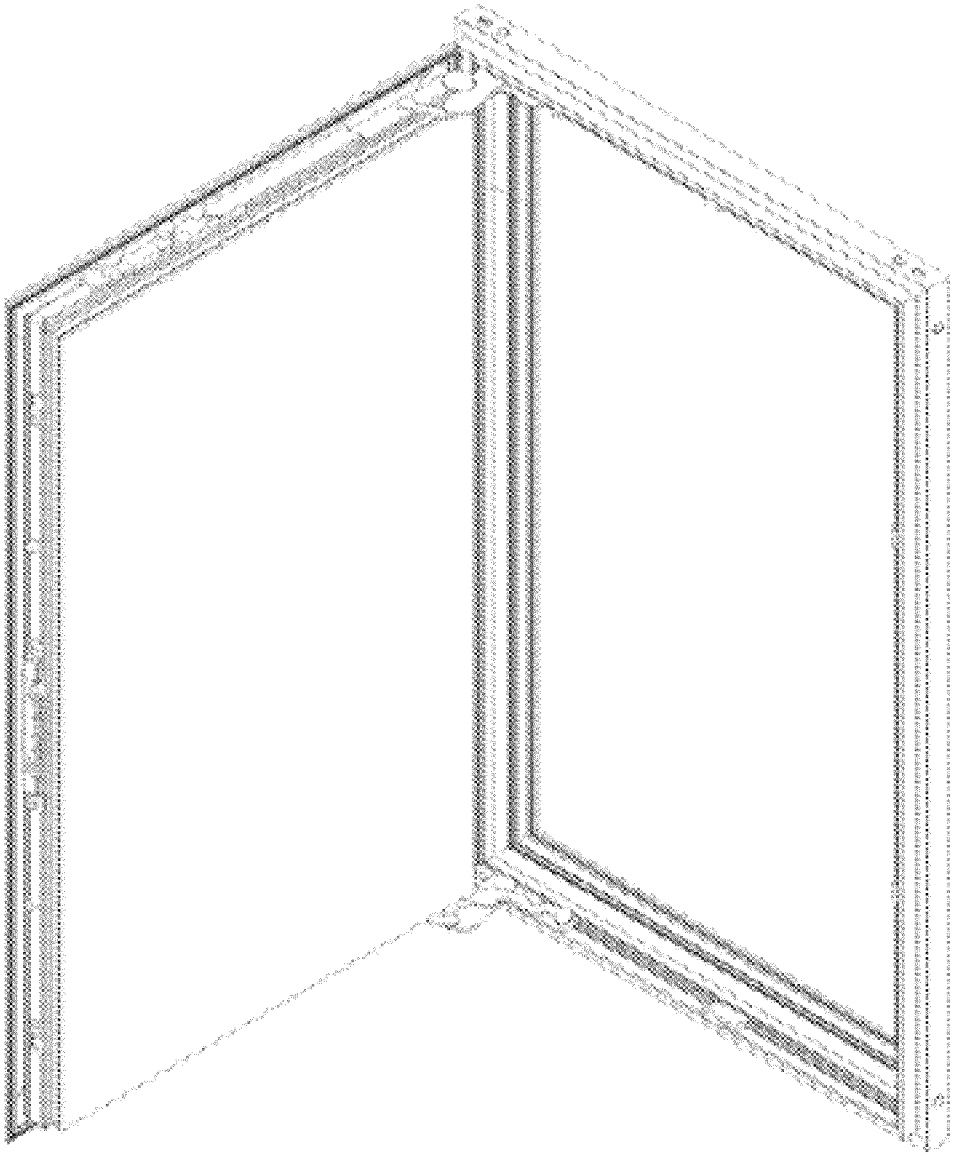

FIGURE 1

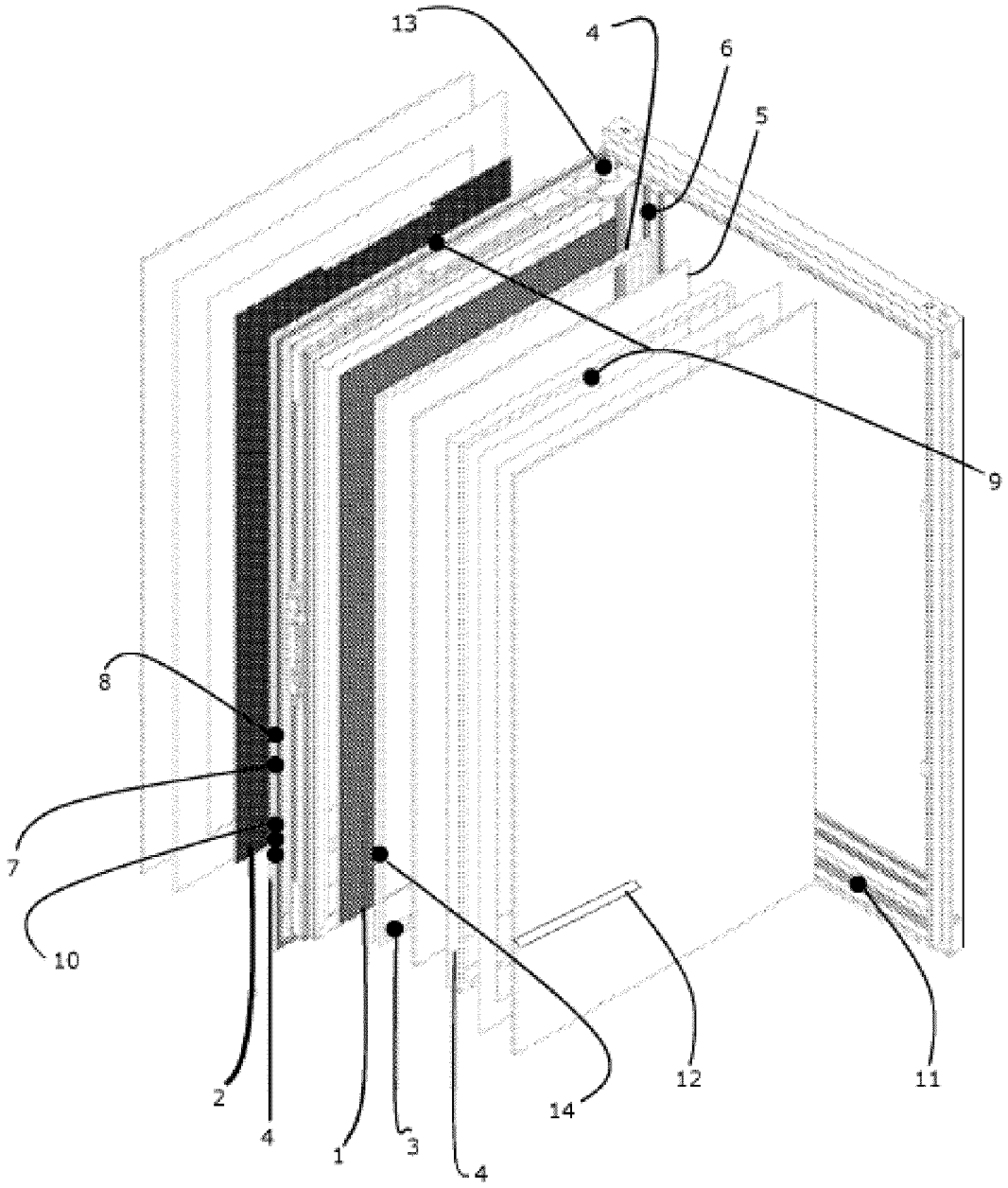

FIGURE 2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2016/070853

A. CLASSIFICATION OF SUBJECT MATTER

E06B9/24 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E06B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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X	CES 2012: Transparent Samsung Smart Window. Video retrieved from YouTube (10/01/2012). URL:https://www.youtube.com/watch?v=tE06ELPwrH4>	1-4
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☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
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"E" earlier document but published on or after the international filing date
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"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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Date of the actual completion of the international search	Date of mailing of the international search report
30/05/2017	**(01/06/2017)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer R. Peñaranda Sanzo Telephone No. 91 3493051

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2016/070853

C (continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of documents, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2005024501 A1 (KONINKL PHILIPS ELECTRONICSNV ET AL.) 17/03/2005, the whole document.	1-15
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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