



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
24.08.2016 Bulletin 2016/34

(51) Int Cl.:
E06B 9/386 (2006.01) E06B 9/384 (2006.01)

(21) Application number: **15161360.1**

(22) Date of filing: **27.03.2015**

(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

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(30) Priority: **23.02.2015 LT 2015011**

(54) **VENETIAN BLIND WITH AN AIRFLOW-FORMING STRUCTURAL ELEMENT AND METHODS OF ITS ATTACHMENT**

(57) Conventional venetian blind system is improved with airflow-forming and upwardly directing forming slats. Forming slats can be implemented as a separate structural element attached to slat-holding vertical cord or they can be formed within the slats themselves. In order to shape airflow-forming structural elements, openings are made in the slats for air to go upwards and the bent plane, which is obtained when making openings, serves as a guide for an airflow. Forming slats of both types can be used in combination for forming airflow. Slat of venetian blinds having a direct optical contact with the sun can be covered with material that increases absorption and release of heat at one side and with material that reflects solar heat on the other.

Forming slats direct airflow upwards towards slats above, where air gets even warmer resulting in the increased velocity of going upwards. Thus the venetian blind system produces more intensive flow of warm air, which results in the increased air circulation in the area around the venetian blinds. Greater airflow allows for more efficient use of solar heat for heating the room, reduces fogging of the window pane, and reduces possibility of mould forming on the window reveals. Such venetian blind system is easy to manufacture, one of the embodiments is easy to install in the existing venetian blind system.

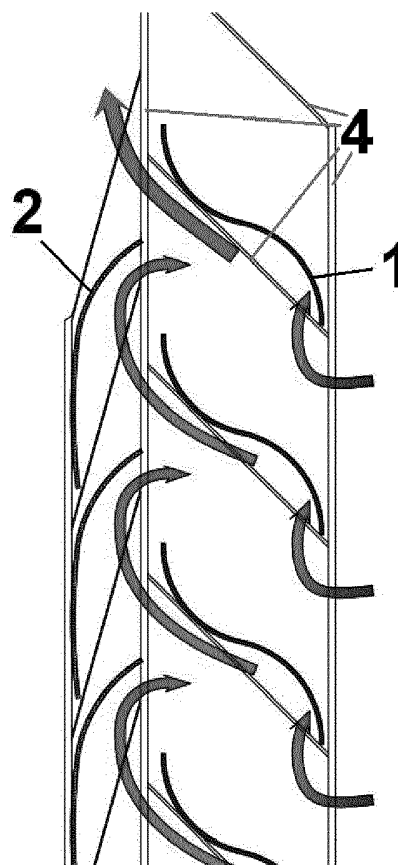


Fig. 1

Description

FIELD OF THE INVENTION

[0001] The invention relates to fixed or adjustable coverings of openings in buildings, specifically horizontal venetian blinds capable of not only proper control of sunlight and heat entry into the building, but also of forming increased airflow. Airflow is formed and directed upwards by means of forming slats.

BACKGROUND OF THE INVENTION

[0002] One of the most important functions of coverings (curtains, vertical or horizontal blinds, etc.) of building openings, which provide visual contact of the internal premises with the outside (windows, glass doors, etc.), is to limit and control the amount of light entering the premises. While staying inside building premises, probably the most important and intense irritant for a human is glare, which is promptly tried to avoid by using coverings of openings. However, reduction of sunlight also reduces entry of solar heat into the room, leading to the increased heating costs during the cold season. Whereas during the hot season, when premises require cooling, coverings of openings may reduce cooling costs by restricting entry of solar heat into the premises. Efficient management of luminous energy and thermal energy is a complex task. Seeking achievement of both of these goals (to properly manage both sunlight energy and thermal energy), various technical solutions are being created and patented.

[0003] Venetian blinds serve to achieve two main goals of heat flow management: a) the first one: when there is excess of heat in the room, venetian blinds have to reflect as much solar heat back to the outside as possible thus preventing excess solar heat from entering the room; b) the second one: when there is a lack of heat in the room, venetian blinds must ensure the maximum ingress of solar heat into the room. In both cases, venetian blinds must also efficiently perform the function of management of flow of light.

[0004] Conventional venetian blinds consist of a plurality of slats placed one above another and interconnected by a cord system that holds the slats and can change the slat tilt angle with respect to window glass plane. The cord system consists of at least two vertical cords with a multitude of cords attached to both vertical cords. The cords connecting the said vertical cords are usually slightly longer than the slat width, the quantity of the said cords between the two vertical cords corresponds to the quantity of slats; the slats are mounted and attached to them. The two vertical cords and a multitude of interconnecting cords perpendicular to the vertical cords resemble a ladder by their layout. In certain cases, the third vertical cord can be placed in parallel between the two vertical cords passing through the slats to ensure stability of the slats in the cord system. The cords are

made of a material (such as woven nylon, cotton threads, rubber, plastic, etc.) that provides great flexibility of the said system, possibility to roll up and retract, simultaneously providing sufficient strength to hold slats for a long time. A single venetian blind system incorporates several cord systems (ladders); these are attached along the slats at certain intervals to ensure that the slats do not sag under their own weight. The said cord system with the attached slats is connected to the mechanism that is located at the top of the entire venetian blind system and that facilitates and ensures the control of the venetian blind system. One of the main components of venetian blinds is slats. Standard sizing of slats is as follows: thickness ranges from decimal fractions of a millimetre to several centimetres; width ranges from several millimetres to dozens of centimetres; length ranges (depending on window width) from several centimetres to several metres. These dimensions may be different in exceptional cases.

[0005] The patent US8307602B2, published on 13 November 2012, describes an invention where grate is mounted exterior to a window. The grate is made of transparent material and consist of segments shaped as a cube without two opposite planes; these segments are attached to each other at the surfaces of their planes. The geometrical structure of the grate resembles a honeycomb. The thickness of the grate and tilt angle of internal walls are selected so that in summer, when the sun is high above the horizon, the direct sunlight cannot pass the grate and enter the room. In winter, when the sun is not high above the horizon, sunlight passes the grate and thereby can contribute to heating the room. Nothing is said about active management of glare; the grate itself seems to restrict the view from the window leading to discomfort; it is impossible to fold it away or otherwise reduce the window area it occupies (contrary to the use of venetian blinds); for maximum efficiency, the segment size and the internal partition tilt angle must be precisely adjusted for the specific geographic latitude.

[0006] Patent application US4593738A, published on 10 June 1986, describes a venetian blind system comprised of the slats of two types that differ in their optical transparency. Slats of different types are placed one above another, planes of slats in certain cases can be parallel and in contact with each other. Slats of different types are mounted so that they can be controlled independently. Venetian blinds of this type are intended for efficient control of light entering the room but they have no advantages in control of thermal energy flow compared to traditional venetian blinds. The same shortcoming is inherent to another invention described in document US20110259529A1, published on 27 October 2011. It also presents venetian blinds comprised of two systems of slats, but in this case the slats are attached one next to another (some closer to the window pane and some further) and in certain implementation cases they can make Z-shaped blinds provided that additional structural component is introduced. Documents

US5184659A (date published: 9 February 1993), US4880044A (date published: 14 November 1989) and many others present a venetian blind solution where all slats are connected into a single element resembling W-shape comprising the entire window covering that differs from the conventional curtains only in the method of folding away. This solution also does not offer efficient heat flow management.

[0007] Documents US4577619A (25 March 1986), WO2011023218A1 (03 March 2011) present efficient system of both heat and light management by using window coverings. Window coverings are placed in the space that depending on position of air valves located inside the window frame can have direct contact with interior or exterior of the room. When the room requires heat, the valves are positioned so that the heat accumulated in the slats enters the room, and vice versa: when there is excess heat in the room, the heat accumulated in the slats is directed to the outside. The system should be efficient, however proper and active control of air valves is required in order to ensure this. The system itself is rather complicated to manufacture and its installation in the existing windows requires replacement or essential remodelling of all the windows. Moreover, the blind system itself should be resistant to environmental impact.

[0008] Patent US6192963B1 (27 February 2001) describes a device for positioning and control of slats of venetian blinds. It also mentions the method for attachment of slats to slat-controlling cords: horizontal cords are placed between two main vertical cords and venetian blind slats are put on or attached to these cords to obtain ladder-shaped reliable system for control and positioning of slats. The said method for attachment of slats is very popular, however we could not find any application of this method for mounting of heat flow-forming slats.

[0009] US5918657A (06 July 1999) provides a method for attachment of slats, which does not require holes in slats. Slats are attached to holding cords with clips or clamps, which grip and hold the slat on its both flat sides, and loops that are attached to vertical holding cords. This method for attachment is also not used for attachment of heat flow-forming slats.

[0010] All the presented documents are aimed at ensuring efficient control of solar heat and light ingress into the room in one way or another, but they all have the following shortcomings:

- does not resolve the problem of active prevention of glare;
- window coverings may encumber seeing outside the building, leading to discomfort for people inside;
- window coverings are not efficient in resolving the problem of solar heat ingress into the building;
- efficient heat and light control system requires substantial modifications to traditional window design, and the control itself is complicated;
- venetian blinds are often used to prevent excess

- heat in the room, but rarely for heating the room;
- we could not find any solution aimed at intensifying airflow in or at a building opening (depending on where venetian blinds are installed).

SUMMARY OF THE INVENTION

[0011] This invention is aimed not only at efficient control of solar heat and light ingress into the building, but also at forming and intensifying airflow passing the plane of venetian blinds. Conventional venetian blind system is improved with airflow forming and upwardly directing slats. These forming slats can be implemented as a separate structural element attached to slat-holding vertical cord or they can be formed within the slats themselves. In order to form airflow, openings for air to go upwards are made in the forming slats and the bent plane, which is obtained when making openings, serves as an airflow guide. Forming slats of both types can be used in combination to form airflow.

[0012] Slats of venetian blinds can be covered with material that increases absorption and release of heat at one side and with material that reflects solar heat on the other.

[0013] Elements forming airflow direct air upwards towards slats above, where air gets even warmer resulting in the increased speed of going upwards. Thereby the venetian blind system equipped with this invention produces more intensive flow of warm air compared to conventional venetian blind system, which results in increased air circulation in the area around the venetian blinds. Greater airflow allows for more efficient use of solar heat for heating the room, reduces fogging of window pane, and reduces possibility of mould forming on the window reveals. The venetian blind system equipped with this invention is easy to manufacture, one of the implementation options is easy to install in the existing venetian blind system.

[0014] This invention also presents designs that enable application of new methods for attachment of forming slats as separate structural elements.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] Before describing the drawings we are going to introduce and explain some important terms used in the present invention description. This invention utilizes slats (or their forms) of different purposes, which serve at least two major functions: a) management of flow of light, as usual; b) airflow forming and management, which is novel. Depending on the implementation version of this invention, both functions can be performed by either a single slat, shaped in a special way, or a system of two different slats. In this description, the term *slat* (1) refers to a slat used in conventional venetian blinds and applied in related art and serving to manage flow of light; another term is *forming slat* (2) that denotes a venetian blind system component as an individual structural element that

forms and controls airflow (this is novel). There is yet another structural element located in the said slat (1) and made by making an opening in the slat (1) and bending a part of the slat (1) up - this will be called a bent-up forming slat (3) (remark: here the expression "bent-up" does not mean direction of bending of the slat (1), it means that the process is finished, because the slat (1) itself can be bent in both directions: to up or to down).

Fig. 1 shows a venetian blind system with slats (1), forming slats (2) and cord system (4). It also shows air flow trajectories. This is a lateral view. In this and other figures the window pane is to the right of the object and building interior is to the left.

Fig. 2 shows a venetian blind system with slats (1) and bent-up forming slats (3) made within the slats (1). This is a lateral view.

Fig. 3 shows a venetian blind system with slats (1), bent-up forming slats (3) made within the slats (1), and apertures (17). This is an axonometric projection.

Fig. 4 shows a venetian blind system where bent-up forming slats (3) made within the slats (1) are used together with separately-attached forming slats (2). This is a lateral view.

Fig. 5 shows a venetian blind system with forming slats (2) and attachment method utilizing a double ladder. There is a general view (on the left) and enlarged fragment from the side (on the right).

Fig. 6 shows a venetian blind system with forming slats (2) and attachment method utilizing a flexible loop. There is a general view (on the left) and enlarged fragment from the side (on the right).

Fig. 7 shows a venetian blind system with forming slats (2) and attachment method utilizing a pair of loops (or one loop) and supplemental vertical cord that passes through the loop and the aperture in the forming slat (2). There is a general view (on the left) and enlarged fragment from the side (on the right).

Fig. 8 shows a venetian blind system with forming slats (2) and attachment method utilizing a hook. There is a general view (on the left) and enlarged fragments from the side (right, top) and from the front (right, bottom).

Fig. 9 shows a venetian blind system with forming slats (2) and attachment method utilizing a holder. There is a general view (on the left) and enlarged fragment from the side (on the right).

Fig. 10 shows several (three) detailed versions of bent-up forming slats (3) shaped within the slats (1) by making apertures (17) in them: left - view from the side, right - axonometric projection.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0016] Slat (1) (Fig. 1) (Fig. 2) in accordance with this invention can be made of metal or other material of high thermal conductivity. In order to improve heat flow man-

agement characteristics of the said slat (1), one side/plane of it is covered with heat-absorbing layer (such as titanium oxide particles (Tinox) or similar), and the other side/plane of the slat is covered with material that efficiently reflects solar heat. If it is desired to increase air temperature in the room, then heat-absorbing side of the slat is directed against the sun, and if temperature in the room is too high, then heat-reflecting side of the slat is directed against the sun.

[0017] Depending on the desired effect, the said slat (1) can be additionally covered with materials providing different functionalities: anti-virus and anti-bacterial material (such as silver nano particles); material intensifying release of accumulated solar heat to the outside (such as silicon dioxide); electricity-producing (photovoltaic) material; material emitting light in the dark (fluorescent), or materials providing other functionality.

[0018] The best embodiment is with slats (1) taking the form of "S" (slightly straightened "S") at their cross-sections. Such a form features the most efficient absorption of solar energy and it is sufficiently firm. For other embodiments the cross-section shape may differ.

[0019] Angle between slat (1) plane and window glass plane can be easily changed, just like in conventional venetian blinds. Once the heat-absorbing side of slats (1) is directed against the sun, the temperature of slats (1) starts rising. Slats (1) begin releasing the accumulated thermal energy into the surrounding air, the air gets hot and starts rising. In case of conventional venetian blinds, most of the air enters the room and the remaining part of the air rises towards the slats (1) that are above and warms up the air some more. The present invention utilizes the upward air flow forming slats (2). These forming slats (2) direct air flow towards the slats (1) above; their purpose is to reduce the quantity of air that enters the room directly. Thus air going upwards is warmed up even more by the slats (1) above, resulting in further increase of upward velocity of air. Having increased the upward velocity of air, more air is sucked into the venetian blind system, thus improving the efficiency of heat absorption by the entire venetian blind system from solar radiation and the circulation of air in the heated room. Air enters venetian blind system through the lowest part and lateral parts; heated air exits the venetian blind system at the uppermost part of the system.

[0020] The heat flow forming slat (2) in accordance with the present invention is intended for directing air heated by slats (1) vertically upwards, towards the other slats (1) that are above in order to minimize the quantity of heated air released into the room instantly and direct air to the upper part instead. The said forming slat (2) can be embodied as a separate structural element or made as a component of slats (1); it is also possible to have an embodiment with separate forming slats (2) used for forming vertical air flow together with their component made within slats: a bent-up forming slat (3) (Fig. 3) (Fig. 4).

[0021] Forming slat (2) as a separate structural com-

ponent resembles a slat (1) in its geometrical dimensions. Horizontal cross-section takes shape of "U". In some embodiments the lower part of the said form can be slightly bent in the direction opposite to the direction of the whole incurvation. Forming slat (2) can be made of optically transparent material (such as APET, PVH or polycarbonate), and for certain embodiments it can be made of material that does not distort the natural view. Forming slat (2) can be covered just like slat (1): with the same supplemental materials performing different functions. Contrary to slats (1), forming slats (2) can also be covered with photochromic materials that change optical transparency level depending on the amount of incoming light. Forming slats (2) can come in various colours and decorated with pictures.

[0022] Inclination angle of forming slats (2) with respect to window plane is such that vertical air flow is formed most efficiently, it depends on geographical latitude (it may range from 5° to 45°).

[0023] To depict bent-up forming slats (3) in different embodiments more clearly, Fig. 10 is provided that shows detailed multiple (three) embodiments of bent-up forming slats (3) made in the slats (1) by making apertures (17) there: on the left-view from the side, on the right - axonometric view.

[0024] What comes next is presentation and description of novel designs making it possible to embody novel methods of attachment of forming slats (2) as separate structural elements:

1. the first new method of attachment enables easy change of tilt angle of forming slats (2) without possibility to freely raise or lower forming slats (2) only;
2. the second new method of attachment does not offer the possibility to freely change tilt angle and no possibility to raise or lower forming slats only (2).

First novel attachment method and design in accordance with the present invention

[0025] Ability of forming slats (2) as separate structural element to freely change tilt angle without possibility to freely raise and lower is ensured by cord design shown in Fig. 5. This ladder-like structure holding slats (1) is comprised of horizontal cords (5) and vertical cords (8). The number of the said horizontal cords (5) on one vertical cord (6) corresponds to the number of forming slats (2). One more vertical cord (6) is attached to the other end of all the said attached horizontal cords (5). Such a system comprises one more cord system that is also ladder-like. Thus three vertical cords and the plurality of interconnecting horizontal cords make up a system (7) that resembles double ladder connected at its longer borders. Slat (1) are placed and attached in the cord system (7) part that is closer to the window plane, forming slats (2) are placed and attached in the cord system (7) part that is further away from window and facing the interior of the room. The said three vertical cords are at their upper part

connected to the venetian blind control mechanism. Three vertical cord double ladder-like system (7) enables tilt functionality of slats (1) and forming slats (2), this is performed by raising and lowering corresponding vertical cords.

Second novel attachment method and design in accordance with the present invention

[0026] Fitting of forming slats (2) as separate structural element without possibility to freely adjust tilt angle of all forming slats (2) and without possibility to raise and lower can be embodied in one of the several ways. In this case forming slats (2) are attached tilted in such angle that best ensures passage of hot air towards slats above (1) and then towards the upper part of venetian blind system, through which it enters the room. Forming slats (2) are attached so that their plane angle in respect of window glass plane can be changed, however the change and locking of that angle by means of controls is not ensured. Generally forming slats (2) form a single plane parallel to a window pane. Some of the aforementioned mounting methods: the following elements can be attached (woven, glued, passed through or otherwise fixed) to the vertical cord (8) of the cord system (4) (Fig. 6), located further from the window pane and oriented toward the room interior:

a) flexible loops (9) (Fig. 6). The loops (9) are made of materials ensuring the functions and features of cords; the loop (9) size is selected so that forming slats (2) could be easily passed through them; a loop (9) is fastened to the vertical cord (8) in one point, i.e. forming slat (2) in the loop (9) can easily change its angle against the window pane, the apex of which corresponds to the longer axis of the forming slat (2). Another loop (9) from the existing on a vertical cord (8) is fastened at a distance close to the width of the forming slat (2). Thus, a number of flexible loops (9) corresponding to the number of forming slats (2) is attached to the vertical cord (8).

b) flexible loop pairs (11) (Fig. 7). Loops (10) in a loop pair (11) are made of materials ensuring the functions and features of cords; they are attached to the cord (8) of the the vertical cord system (4) oriented toward the room interior. Each flexible loop (10) in a pair is fixed close to each other. Another pair of flexible loops (11), in relation to the previous one, is fixed at the distance, which is close to the width of the forming slat (2), thus flexible loop pairs (11) are fixed along the entire length of the vertical cord (8). Between separate loops (10) of flexible loop pair (11) a forming slat (2) is placed, which has an opening, the distance of which from the edge of the forming slat (2) is not greater than the length of a loop (10) in a loop pair (11); the diameter of the opening should be sufficient for a vertical cord (8) to pass through. Having placed the forming slat (2) between

the two loops (10) of a loop pair (11), a vertical cord (12) is passed through the aforementioned opening in the forming slat (2) and through each of the loops (10) in the loop pair (11); the length of the cord shall be equal to or very close to the length of the vertical cord (8) in the slat cord system. In this way, loops (10) in a pair of loops (11) ensure the height of the forming slat (2) and the said vertical cord (12) ensures a stable position on a horizontal plane. This fixing method can be also implemented with only one loop (10) in a pair of loops (11).

c) hooks (13) (Fig. 8). Hooks (13) are made of metal, plastic or other material with similar strength properties. Hook (13) is formed by bending in half an oblong (cord-like) element made of the said material, thus obtaining a twofold oblong element; the hook (13) is formed out of the twofold oblong element; the two free ends of the hook are fixed to the vertical cord; the forming slat (2) is hung on the hook's curvature. Another possible method of attachment is when the said twofold oblong element is fixed in the vertical cord at its bending point and the forming slat (2) is hung on two free ends forming the hook's curvature. Openings are made in the forming slat (2), where the said hook (13) is hung up. The openings are made close to the edge of the forming slat (2), which will be oriented toward the cord system, but not too close to the edge in order to avoid breakaway.

d) holders (14) (Fig. 9). Holders (14) are made of plastic or other material with similar strength and flexibility properties. Proper embodiment of the holder (14) may have the shape of rectangular parallelepiped. The function of the holder (14) is to firmly embrace the vertical cord (8) holding the slats (1) at one end and fix the forming slat (2) at the other end. The said holder (14) can be manufactured so that the user of venetian blinds having no special skills or tools could attach forming slats (2) to the vertical cord (8) by himself. The end of the holder (14) dedicated for embracing the vertical cord (8) is shaped as two separate ends and the gap between them. Gap size should be close to the vertical cord (8) thickness; vertical cord (8) should easily fit through the gap. Having positioned vertical cord (8) into the gap, a technical measure should be taken to ensure tight closure of the said gap, thus rigidly embracing the vertical cord (8) with the said end of the holder (14). Technical measure for closing the said gap can be a structural element of an elongated form, which is placed into the openings (15) located at both parallel ends separated by the said gap. Openings (15) should be equipped with a locking element preventing the elongated structural element from free fall-out without using additional force. The aforementioned locking element may be a widening/thickening of any shape in the elongated element and a constriction/thinning of similar shape in the opening (15) where the elongated element is placed.

The other end of the holder is dedicated for fixing of a forming slat (2). Holder's (14) edge may have a horizontal opening (16) over the entire width of the holder. The part limiting the said opening (16) is removed, thus forming an opening with a C-shaped transversal cross-section. In the said opening, throughout its length, through the removed part, a forming slat (2) is mounted, the edge of which (or only part of it), which is fastened to the said holder, has a thickening, which ensures locking of the forming slat (2) in the holder (14).

There are other embodiment options for structural element performing holder (14) functions.

[0027] All of the above fixing elements mentioned in options a), b), c) and d) are attached to vertical cords (8) holding the slats (1). Forming slats (2) are raised and lowered together with the slats (1). Fixing point must be such that the upper edge of the forming slat (2) is approximately midway between the slat (1) fixing points. If the upper edge of the forming slat (2) is close to the side of the slat (1), the clearance for airflow would be severely restricted, which may reduce the performance of venetian blind system. Forming slats (2) are mounted on a vertical cord (8) at uniform distances; all forming slats (2) fixed to the vertical cord (8) comprise almost an integral plane when looking from the inside.

[0028] Airflow-forming structural elements may be formed in the slats (1) by forming an opening (17) or many openings. The length of an opening (17) along the slat (1) may vary. An opening (17) or many openings are formed along the entire length of a slat (1). If a slat (1) mounting method requires, excluding the places, where the slat (1) is attached to the cord system; also leaving an integral slat (1) area at the ends of it to ensure structural rigidity of a slat (1). Opening width - opening (17) is formed at the long side of the slat (1), which is further from the window pane (when the slat (1) is in a horizontal position) towards the room. When forming an opening (17), one side of it is left integral with the slat (1), i.e. not separated from the slat; a part of the slat, which was separated from the rest of the slat, is bent up along this edge, thus forming a plane (3) (hereinafter - bent-up forming slat (3)); its angle with the surface of the rest of the slat (1) shall be greater than approximately 25°. Possible method of forming an opening (17) is leaving three sides of the opening integral with the slat (1): one - same as in the case with a single integral side, the other two - the sides adjacent to the said side. In this case, the shape of the opening resembles a normal clothing (e.g. shirt) pocket. Both embodiments are preferred - when the said shaped surface (3) is bent up towards the upper slats (1), as well as towards the slats (1) located below. Through the formed opening (17), warm air can go towards the upper slats (1) and the bent-up forming slat (3) directs the airflow upwards.

[0029] This invention can be embodied using the following:

- a) conventional blinds equipping them with forming slats (2);
- b) slats (1) with bent-up forming slats (3);
- c) slats (1) with bent-up forming slats (3) together with forming slats (2).

[0030] Slats (1) with bent-up forming slats (3); and, but not necessarily, forming slats (2); cord system (4) (7), holding all the slats; control mechanism, which is connected to the holding cord system (4) (7) - all this and some additional elements form an integral venetian blind system, which not only effectively manages the solar light and heat energy ingress into the room, but also intensifies air movement in the wall opening and/or next to it, where the system is installed.

[0031] The said venetian blind system is fitted inside the room, in the openings (cavities) (or covering the openings, rather than installing the blinds inside the opening), which have a direct optical contact with the outside environment (e.g. window opening, glass door opening, etc.). The maximum efficiency of heating the premises is achieved when installing venetian blind systems in the openings, oriented to the south. In the openings oriented to the north, the efficiency of heat accumulating and radiating venetian blinds is the lowest. Typically, blinds can be fitted to the existing windows, doors (or other) structures without changing anything there.

[0032] The main difference between the venetian blinds with forming slats and the conventional venetian blinds is their design, which absorbs solar energy more efficiently and ensures more intense airflow around the blind area by means of forming and controlling airflow.

[0033] Airflow greater than with conventional blinds allows for grater air circulation in the wall opening, which may reduce the possibility of mould forming and fogging of the window pane.

[0034] The above description of the preferred embodiments is provided in order to illustrate and describe the present invention. This is not an exhaustive or limiting description, seeking to determine the exact form or embodiment. The above description should be considered more like an illustration, rather than a limitation. It is evident that numerous modifications and variations may be obvious to the specialists of that field. Embodiment is chosen and described so that the experts of this field in the best way clarify the principles of this invention and the best practical application for various embodiments with various modifications suitable for a particular use or application of the embodiment. It is intended that the scope of the invention is defined in the claim appended thereto and its equivalents, where all of the said terms have meaning within the widest range, unless indicated otherwise.

[0035] In the embodiment options described by the specialists of this field changes can be created without deviations from the scope of this invention as specified in the following claim.

Claims

1. Venetian blinds for glazed building openings, located inside the room and having:

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slats (1) intended to obstruct or divert sun light and heat flow entering the room;
cord system (4) intended to hold the slats (1), tilt them at a required angle, partly or completely raise them up towards the control mechanism; control mechanism, where the cord system (4) is attached to, and which provides the transfer of user's control operations to the slats (1);

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characterised in that

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an airflow-forming structural element is formed in the slat (1) itself by shaping an opening (17), through which the airflow will go upwards towards the upper slats (1),
and when forming the opening (17), a part of the plane is separated from the base slat (1) shaping a bent-up forming slat (3).

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2. Venetian blinds according to claim 1, **characterised in that** the airflow-forming slats (2) are shaped as a separate structural element attached to the vertical cords (8) of the blind system.

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3. Venetian blinds according to claim 2, **characterised in that** the forming slats (2) are attached to the venetian blind system by forming loops (9), which are attached to the vertical cord (8) holding the venetian blinds, oriented towards the room interior; forming slats (2) are passed through the loops (9).

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4. Venetian blinds according to claim 2, **characterised in that** the forming slats (2) are attached to the venetian blind system by means of at least one flexible loop (10) attached to the vertical cord (8) holding the venetian blinds; another vertical cord (12) is passed through the loop (10) and the opening in the forming slat (2).

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5. Venetian blinds according to claim 2, **characterised in that** the forming slats (2) are attached to the venetian blind system by means of passing a hook (13) made of strong material, fitted in the vertical cord (8) holding the venetian blinds, through the opening in the forming slat (2).

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6. Venetian blinds according to claim 2, **characterised in that** the forming slats (2) are attached to the venetian blind system by means of a holder (14), which can be attached to the vertical cord (8) of the venetian blind system without any special skills or knowledge by firmly clamping it, and the forming slats (2) are fitted to the other end of the holder (14).

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7. Venetian blinds according to claims 1 and 2, **char-**

acterised in that in a single system the forming slats (2) are used as a separate structural element and bent-up forming slats (3) are shaped within these slats.

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8. Venetian blinds according to claim 1, **characterised in that** the shape of the transversal cross-section of slats (1) with a bent-up forming slat (3) is close to the shape of "~" and resembles the shape of slightly straightened letter "S".

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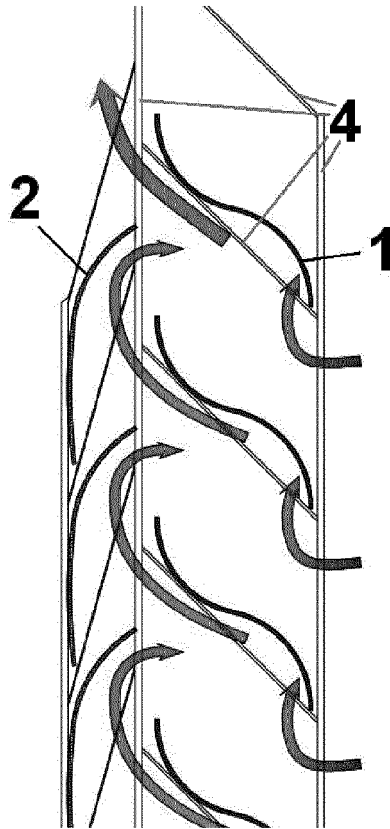


Fig. 1

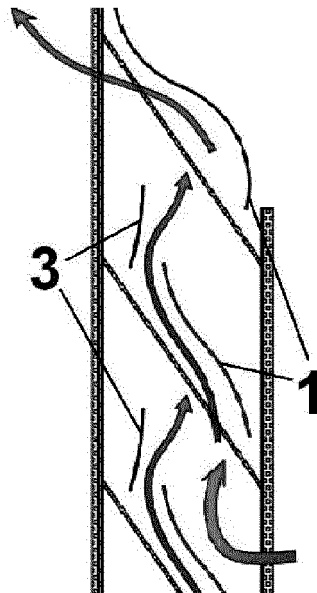


Fig. 2

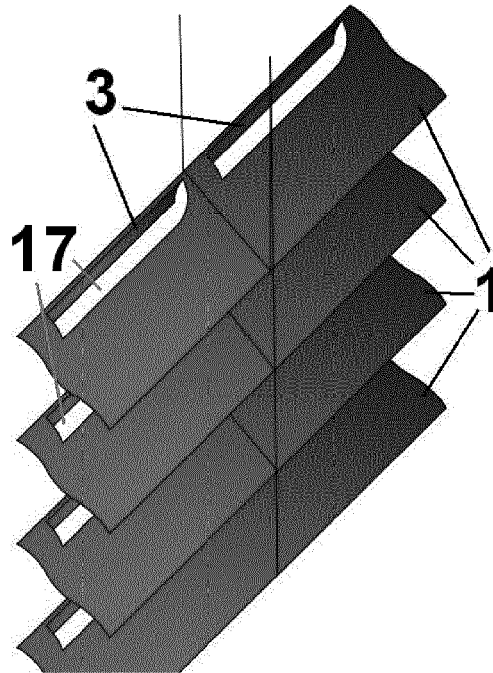


Fig. 3

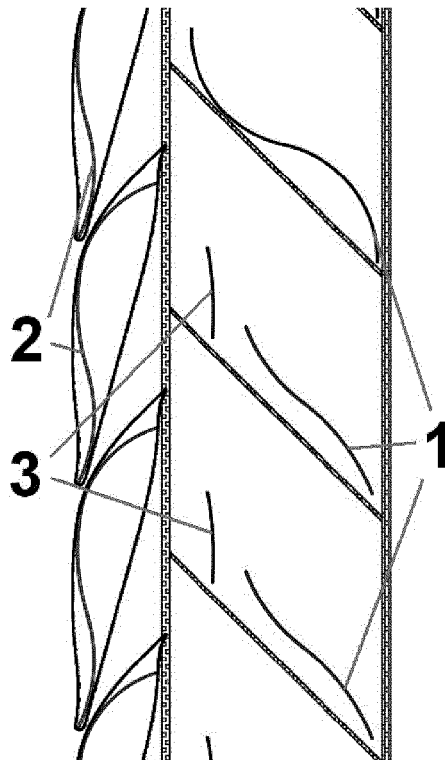


Fig. 4

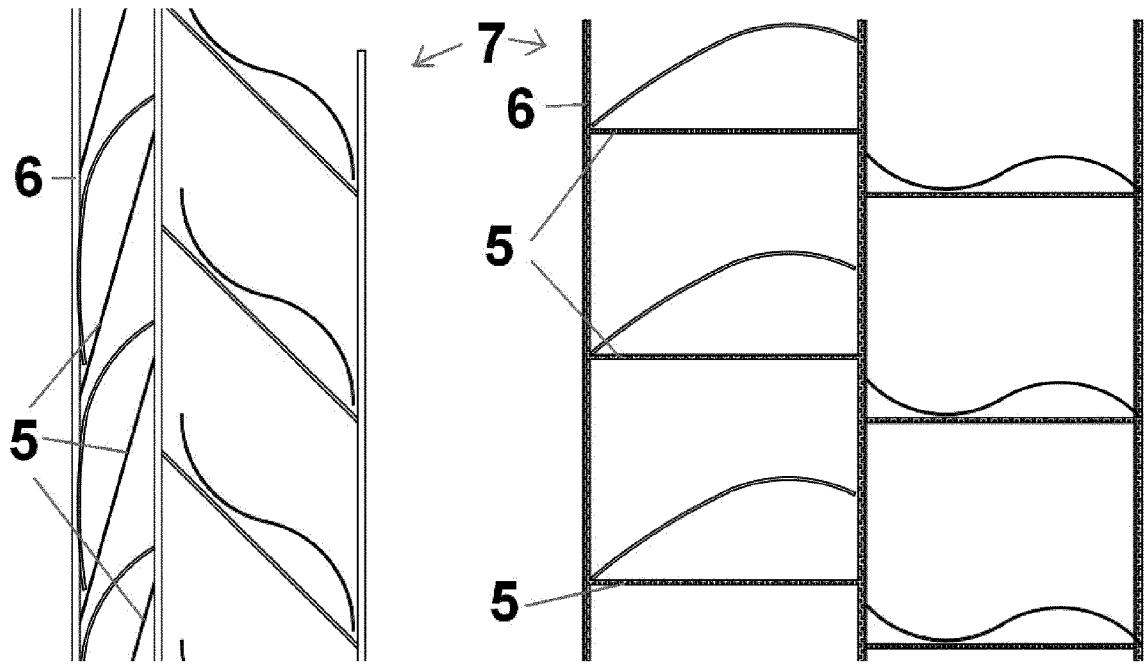


Fig. 5

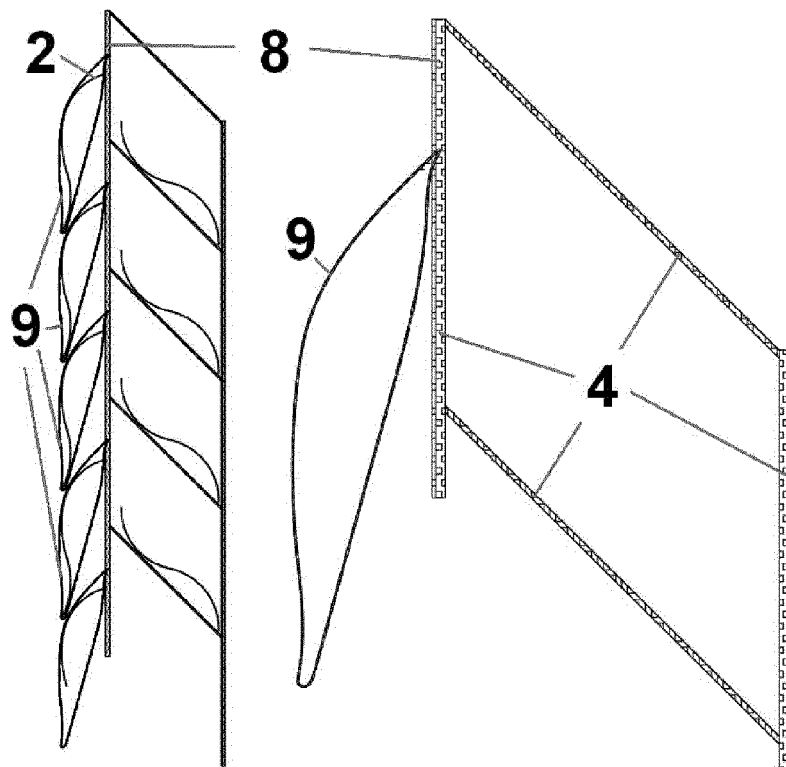


Fig. 6

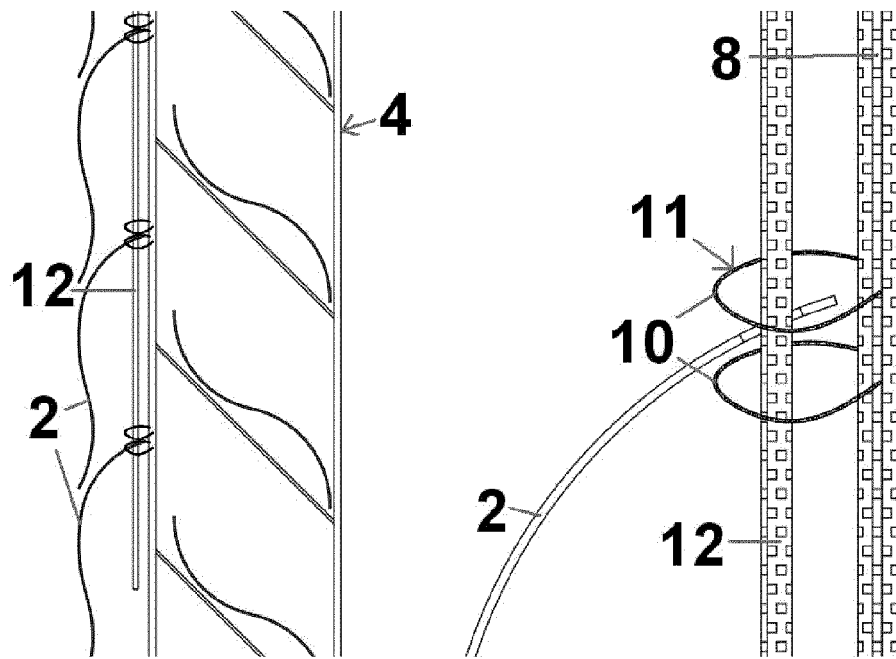


Fig. 7

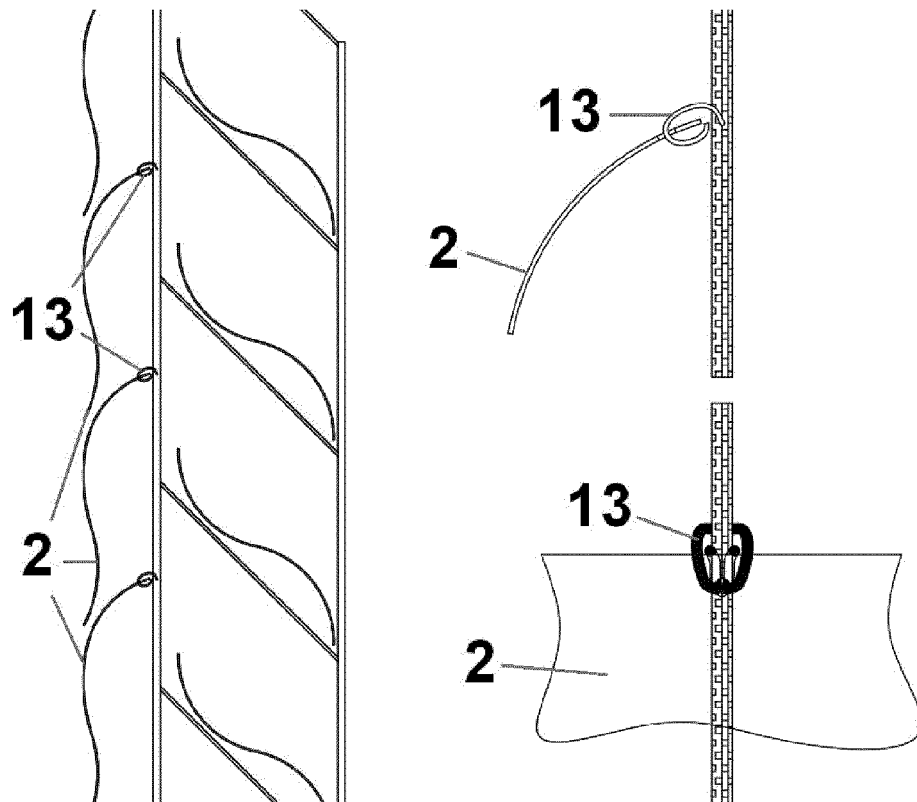


Fig. 8

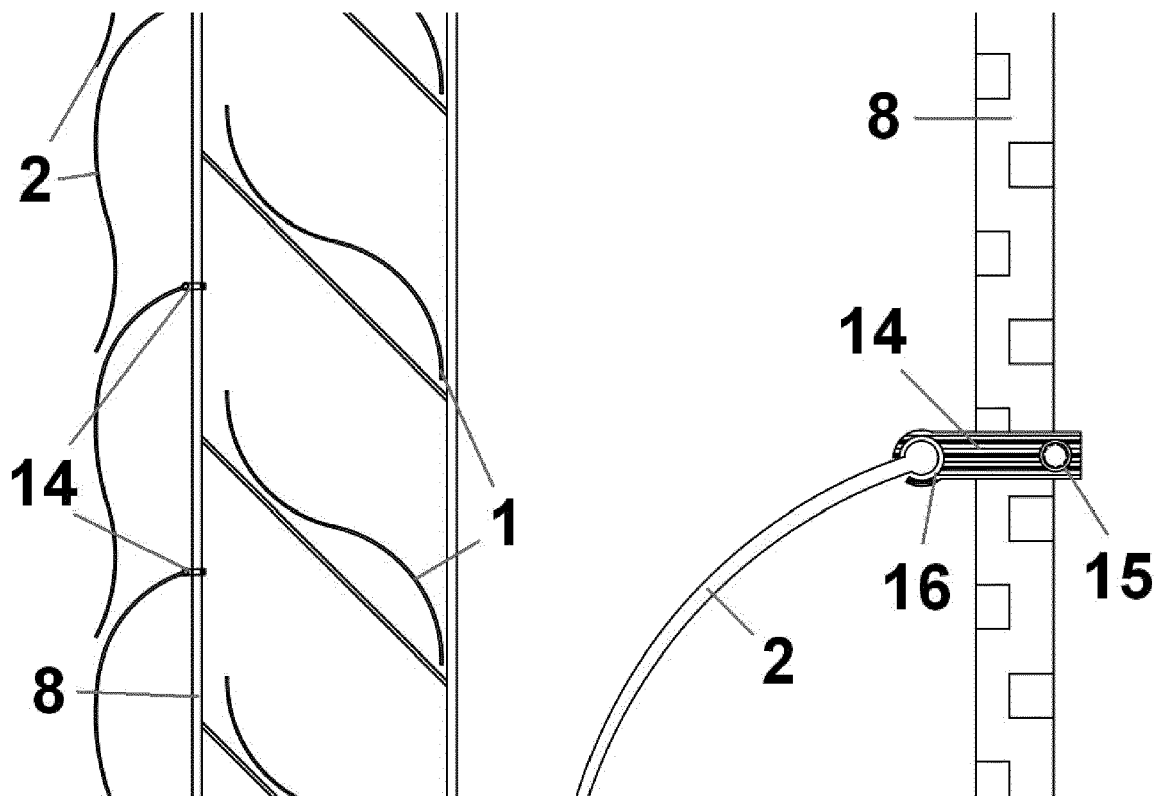


Fig. 9

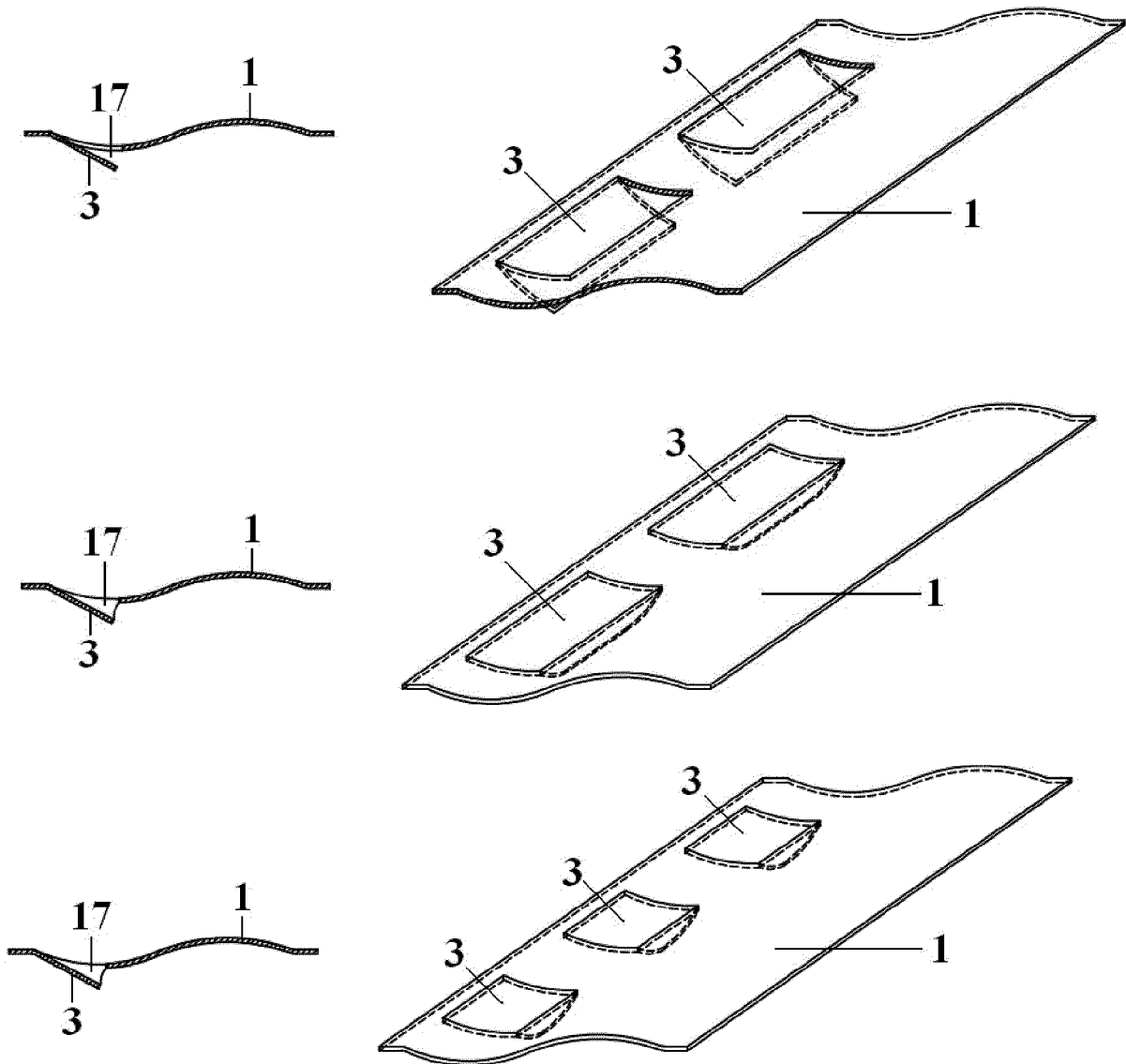


Fig. 10



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Application Number
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Place of search Munich		Date of completion of the search 24 May 2016	Examiner Knerr, Gerhard
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24-05-2016

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