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(54) **FOLDING BASE**

KLAPPBARER SOCKEL

BASE PLIABLE

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Description

[0001] The invention relates to a folding base for a roof unit, intended to be installed on the roof of a building to mount a roof unit on it, especially a roof hatch, a skylight or a smoke damper.

[0002] The base is fixed on edges of an opening in the roof of a building, and when fixed said base is an upstand to which a roof unit is attached.

[0003] There is a number of solutions of bases for fixing this type of roof units. A known solution is disclosed in Polish patent application No. P 315827. This invention relates to the issue of development of a lightweight base for smoke vents and skylights, in which the possibility of the formation of heat leakage bridges is eliminated, characterised by a simple design capable of being unified and standardised to a large extent. The base for smoke vents and skylights, according to this known solution, comprises a body made of aluminium sheets, having in a cross-section the shape of a trapezium with a bigger base, arranged in the lower base plane, comprising a bottom external fixing plate. The body comprises on a smaller, upper base a shaped horizontal retaining plate in the form of a flat rigid flange. On the flange an upper covering frame is mounted, in an interference fit, made of a plastic profile. On the outer surface of the body, between its fixing plate and the upper retaining plate, an insulating layer in the form of mineral wool is permanently fixedly applied.

[0004] Another known solution is disclosed in Polish patent specification No. PL 202876. This solution relates to an insulating frame comprising upper, bottom and side members which, in principle, are made of a material with good insulation properties, and a roof window in an installation position is adjusted to adhere with its frame to the insulating frame. The frame is made up of separate frame members and each member of the frame has such a cross-section that the frame on at least a substantial portion of its height comprises a light transmitting opening which is bigger than the outer dimensions of the frame. The frame is provided with fixing means for fixing said frame on a roof structure and/or a roof window.

[0005] Another known solution is disclosed in Polish patent specification No. PL 217605. This solution relates to a roof base intended to be installed on the roof of a building for mounting various kinds of ventilation units thereon, in particular fans. According to this solution, a rectangular flange is tiltably fixed in relation to a cuboidal ventilation pipe. The size of a rectangular through opening in the rectangular flange, used to mount the cuboidal ventilation pipe thereon is variable, depending on the angle of inclination of the rectangular flange in relation to the cuboidal ventilation pipe.

[0006] Another known solution is disclosed in Polish utility model application No. W.114256. The model relates to a roof flange comprising a hollow pass-through base inside connected to a fixing skirt and a cap, covering the base, with a vent pipe sleeve clamp. The base and the cap have flat side walls matched to one another and front walls arched in a cross-section. The front walls of the base have different lengths and different inclinations in relation to the bottom plane of the base, and the front walls of the cap- different lengths. The front walls of the base are rectilinear along their length within interaction with the cap, and the front walls of the cap are curved along their length to create a convex arc.

[0007] Another solution is also known disclosed in the publication of the invention applied under the international procedure No. WO 94/08108. For a tight connection of an attic with a skylight or other roof installation, a mounting flange is provided comprising substantially flat U-shaped film members with a bending, on the sides of which flange portions are arranged for fixing the mounting flange to the mutually connected outer sides of the main frame structure of a window or a roof installation so that the film portion extends substantially parallel to the roof surface in order to connect it with adjacent parts of an attic. The mounting flange can be made in a simple way so that transverse seals are made on two overlapping film strips in distances corresponding to a predetermined width of the frame. As a result, an obliquely extending portion of each seal with two parallel-sealed sections is formed, and in edge zones, on opposite sides of the film strip in the extension of the one and the other, respectively, from two parallel-sealed sections, sealed sections are formed which are perpendicular to side edges. The flange members are then separated by cutting along the lines of cuts between the parallelly combined sections and in parallel to the sealed sections perpendicular to the side edges, and the structure of the flange is ended by cutting one film strip along a central line between the sealed sections with the occurring upward bending of the fixing flange portions.

[0008] European patent application No. EP 2351893 discloses a rectangular shaped base comprising a top base element and a bottom element. The base is a kind of an upstand with a central through opening between four slanting side walls on a rectangular plan and is based on the edges of a roof opening. An upper rim of the base is intended for mounting a window or a roof hatch thereon. According to this known solution the base is a folding structure. Each of the four substantially vertical corner angles comprises two hooks near each of the vertical edges. On each two corner angles, on said hooks a side wall is mounted, which in appropriate places comprises slots for fixing the side wall on the hooks of the corner angles. In this way the four base walls are mounted on the hooks of the corner angles, and then the whole is topped by the upper rim which stabilises the folded base.

[0009] Another European patent application No. EP 0967345 discloses another solution of a base for skylights, ventilation system units and any roof units. The base is preferably made of fibreglass with the aim to avoid the stagnation of rain water around a skylight. Said base creates a continuous surface of the insulating cover.

[0010] Another solution known from US patent speci-

fication No. US 5687514 discloses another solution of a curb for encasing openings for units mounted on a roof. The curb has a rectangular box structure, delimited by four side walls. Each side wall in an upper part is bent outwards forming on the upper edge of the curb a flange to which an external unit in the form of a smoke vent window and other roof units can be mounted. The connected side walls using pre-drilled holes are mounted on a bottom flange. In this known solution, the curb is folding and is connected by means of screws using corner angles.

[0011] According to utility model description DE 20 2006 000881, a base comprises side walls each having integral fixing elements for fixing a neighboring side wall. The side walls are made from bendable sheet metal. The side walls have slots on the edge side into which a protruding clip from a neighboring side wall is inserted. Each side wall has a base flange with angled wall sections and an upper edge section.

[0012] According to patent description US 6041557 the four metal panel portions of an air conditioning unit roof curb have spaced sets of inwardly projecting lanced portions positioned adjacent their ends and defining tab-receiving slots. With the panel portions in a rectangular assembly orientation, specially designed drive cleats are used to lock the contiguous ends of the panel portions together at the corners of the curb.

[0013] Other bases for roof units are known from US 5148647 and US 3802131.

[0014] The invention solves the problem of reducing the dimensions of a base during its transport. The dimensions of a base before it is assembled in the place of destination result in a need for a certain space in means of transport to deliver a base to a construction site, where the internal space of a base is an empty space to a large extent. The solution to this problem is the development of a folding base of flat parts which do not contain empty spaces. In prior art solutions a base is assembled by connecting previously prepared parts using screws, which is labour-intensive, especially in the case of roofs of industrial or commercial facilities with a huge number of such roof units. However, in other known solutions of a folding base, individual parts are assembled by putting hooks of some parts into slots formed in other parts. This type of connections using hooks in slots are characterised by certain clearance in these connections, because making a slot in one part with exactly the same width as the thickness of an interacting hook will make it impossible to put such a hook into this slot. To make this possible, it is necessary to design a slot which is slightly wider than the thickness of a hook. However, after putting a hook into such a slot, there is a certain degree of clearance in such a connection. As a result of wind gusts from different directions this natural clearance in connections of parts of a base, in particular in roof units, can be greater over time. These effects can be eliminated but this requires additional treatments.

[0015] The purpose of the invention is to develop a base structure for roof units, in particular such units as roof hatches, skylights, smoke vents and ventilation flaps, as a folding base, which is easy and quick to assemble, and at the same time characterised by a rigid structure, without clearance in connections of individual parts and enabling quick and easy elimination of clearance, if any. This task has been solved by the development of the folding base structure according to claim 1 and the subsequent claims.

[0016] According to the invention, the folding base, in particular for window roof units and ventilation and fire protection units has the form of side walls and connecting members. Each side wall comprises an upper and bottom edge and two side edges with connecting members. The side walls comprise portions of a bottom flange fixing the base to the roof and portions of an upper flange to which a roof unit is attached.

[0017] The folding base according to the invention is characterised by the features of claim 1, in particular in that the side edges of the adjacent side walls comprise rows of projections. Each projection has the form of a flat being an extension of the surface of the side wall. Each projection is bent along a line parallel to the edge of the side wall at an acute angle outwards of the base. The projections described above with a comb-like arrangement on each side edge of the base side wall are separated from one another by spaces. A row of comb-like projections on one side edge of the side wall is moved in relation to a row of comb-like projections on another side edge of the side wall, so that after putting two perpendicular side walls together, in the areas of spaces on the edge of one side wall in the assembled base the comb-like arranged projections of another side wall are arranged. In this patent specification, the side edge of the side wall should be understood as a common line determined by the spaces between the comb-like arranged projections.

[0018] The bent sections of the projections of two combined at a right angle, adjacent side walls of the base, in a view consistent with the direction of the connection edge of the two walls preferably form a semi-enclosed section.

[0019] The projections are preferably bent along the lines parallel to the side edges determined by the projections on the side edge of the side wall.

[0020] Inside the semi-enclosed section between the bent projections along the entire length of contact of the side edges of two side walls, there is an inserted pin, parallel to the contact, with a section corresponding to the form of the semi-enclosed section.

[0021] The semi-enclosed section preferably has the shape of a triangle, and the pin has the form of an angle whose arms correspond to the length of the arms of the triangle of the semi-enclosed section.

[0022] According to the invention, the base is proposed for roof units, such as windows, smoke vents, air vents and smoke vent flaps, assembled of side walls which contain on edges a system of comb-like connecting pro-

jections. In two side edges of adjacent side walls, the comb-like projections of one side wall enter into spaces between the same projections of the adjacent perpendicular side wall. The comb-like projections are formed so that the meshed projections of adjacent walls form a fully rigid vertical connection, very easy to be assembled on the roof. The vertical rigidity in this solution is achieved by inserting a connecting member in the form a pin into a chamber formed by the projections of one side wall alternately arranged one under the other and the projections of the adjacent side wall. The shape of the connecting pin is matched to the shape of the internal chamber which is created in a view corresponding to the direction of the chamber by the bent projections put between one another of two adjacent side walls. A connection is achieved by simple inserting the connecting pin, which is a very simple activity to perform during the assembly process of such a base. The solution according to the invention has proved to be particularly advantageous in work performed on the roof. When all the side walls are connected, the final rigidity of the base structure is obtained by fixing parts of the bottom flange to the roof surface. Since usually a lot of this kind of bases for roof units are installed on large industrial or commercial facilities, the issues of transport of often a huge number of bases to a construction site are important. The solution according to the invention has greatly enabled the reduction of the volume of the flat base according to the invention, before assembly on the roof, in transport operations.

[0023] The subject of the invention is shown in the embodiment in the accompanying drawing in which the individual figures show:

Fig. 1 - the view of the assembled base.
Fig. 2 - the view of a connection detail of Fig. 1.
Fig. 3 - the view of edges of side walls before connecting the edges.
Fig. 4 - the view of the edges according to Fig. 3 after moving the edges of side walls towards each other.
Fig. 5 - the view of the projection's bending profile.
Fig. 6 - the top view of the assembled base.
Fig. 7 - a connection detail of Fig. 6.
Fig. 8 - the assembled base with the smoke vent.

[0024] The accompanying Fig. 1, Fig. 6 and Fig. 8 show one embodiment of the base according to the invention comprising four side walls on a square plan. The base comprises the side walls 1,2,3,4, a bottom flange 5 and an upper flange 6. The flanges 5,6 can be shaped as parts of the side walls 1,2,3,4 and connected at corners by means of corner connectors 7.

[0025] Each side wall 1,2,3,4 comprises an upper and bottom edge and two side edges with connecting members. As shown in the figures in this embodiment, the side walls 1,2,3,4 are connected by the side edges and form a square. In other embodiments they can form a rectangle or other flat geometrical figure. Fig. 1 shows fixed to the upper flange 6 hinges 14 to which, for example, a smoke vent can be fixed, as shown in Fig. 8. This type of a vent or a roof window is usually fitted with a mechanism for remote closing and opening, which is, however, not shown here, because it is not the subject of the invention.

[0026] Fig. 2, Fig. 3 and Fig. 4 show that the side edges of the adjacent side walls 1,2 comprise rows of projections. The side wall 1 comprises the projections 8 and the side wall 2 also comprises the projections 8. Fig. 3 and Fig. 4 show only parts of the edges of the side walls 1,2 in an enlarged view. Fig. 1 and Fig. 2 show that each side edge of the side wall 1,2 comprises three projections 8. In other embodiments the number of projections on the edges of the side walls can be different.

[0027] Fig. 3 and Fig. 4 show that each projection 8 has the form of a flat being an extension of the surface of the side wall 1,2,3,4. Each projection 8 is bent along a bending line 9 parallel to the edge of the side wall 1,2,3,4 at an acute angle outwards of the base. The term outwards of the base should be understood in this patent specification so that the end portion of the projection 8 is bent from the inside of the base to the outside.

[0028] The comb-like arranged, one in a certain distance from the other, projections 8 on each side edge of the side wall 1,2,3,4 of the base are separated from one another by spaces 10. A row of the comb-like projections 8 on one side edge of the side wall 1 is moved in relation to a row of the comb-like projections 8 on another side edge of the side wall 1. In the areas of the spaces 10 on the edge of one side wall 1 in the assembled base the comb-like arranged projections 8 of another side wall 2 of the base are arranged. In this patent specification, the side edge of the side wall 1,2,3,4 should be understood as a common line determined by the spaces 10 between the comb-like arranged projections 8. Each of the side walls 1,2,3,4 of the base according to the invention has the same arrangement of the comb-like projections 8 but moved on one side edge in relation to the other side edge of the side wall 1,2,3,4. As a result, on each of the four edges of the side walls 1,2,3,4 of the base arranged on a square plan in this embodiment, the comb-like arranged projections 8 of one side wall take the place of the comb-like arranged projections 8 of the other side wall. The projections 8 are preferably bent along the bending lines 9 parallel to the side edges determined by the projections 10 on the side edges of the walls 1,2,3,4. Fig. 5 shows that the projections 8 of the wall 1 are bent along the bending edge 9 at an angle of 45°. This figure schematically shows stiffening embossments of the side wall 1 in this embodiment.

[0029] An example of a connection of the side walls 1,2 prepared in this way is shown in Fig. 7 in a view consistent with the direction of the resulting connection. As it is shown in this figure, the projections 8 of the side walls 1,2 constitute in a top view an internal chamber in the form of a semi-enclosed section 11 in the form of a triangle. In a view as in Fig. 7, the section seems to be

closed. The semi-enclosed section 11 has the shape of an equilateral triangle. A connector in the form of a pin 12 is inserted into the semi-enclosed section 11. The same pin 12 is shown in Fig. 4 before being inserted between the projections 8 of the adjacent walls 1,2. In this embodiment, the pin 12 has the length corresponding to the height of connections of the side walls 1,2,3,4. In this embodiment, the pin 12 has the form of an angle with an angle of 90°, whose width of arms corresponds to the length of the catheti of said triangle of the semi-enclosed section 11. When the pin 12 is inserted, the particular projections 8 may be individually subjected to the pressure of the pin 12 which contributes to the resulting rigidity of the edge of each connection of two perpendicular side walls of the base. Where some of the projections 8 protrude from the pin 12, these projections can be simply struck with a hammer to the pin 12, which in working conditions on the roof is not a complicated activity.

[0030] Fig. 8 shows the assembled base according to the invention with a smoke vent 13 which is in this figure an example of a roof unit mounted on the base according to the invention.

List of designations in the figures

[0031]

1. Side wall.
2. Side wall.
3. Side wall.
4. Side wall.
5. Bottom flange.
6. Upper flange.
7. Corner connector.
8. Projection.
9. Bending edge.
10. Space.
11. Semi-enclosed section.
12. Pin.
13. Smoke vent.
14. Hinge.

Claims

1. A folding base for roof units in particular for window roof units or for ventilation or fire protection roof units, comprising side walls (1,2,3,4) and connecting members,

- where each side wall (1,2,3,4) comprises an upper and bottom edge and two side edges, and at least one connecting member connecting two adjacent side walls (1,2,3,4) together,
- where the side walls (1,2,3,4) comprise portions of a bottom flange (5) fixing the base to the roof and portions of an upper flange (6) to which a roof unit is attached,
- wherein the connecting members of the adjacent side walls (1,2,3,4) comprise rows of comb-like arranged projections (8) on side edges of the side walls (1,2,3,4),
- where each projection (8) is made of a flat element being an extension of the surface of the side wall (1,2,3,4),
- where each projection (8) is bent along a bending edge (9) parallel to the side edge of the side wall (1,2,3,4),
- and the comb-like arranged projections (8) on each side edge of the side walls (1,2,3,4) of the base are separated from one another by spaces (10),
- where during assembly a row of the comb-like projections (8) on one side edge of each side wall (1,2,3,4) is moveable in relation to a row of the comb-like projections (8) on another side edge of another side wall (1,2,3,4), so that in the assembled base, in the areas of the spaces (10) between the comb-like projections (8) on the edge of one side wall (1,2,3,4), the comb-like projections (8) of the adjacent side wall (1,2,3,4) of the base are arranged

characterised in that,
each projection (8) is bent along a bending edge (9) parallel to the side wall (1,2,3,4) at an acute angle outwards of the base.

2. The folding base, according to claim 1, **characterised in that** the bent sections of the projections (8) of two combined adjacent side walls (1,2,3,4) of the base in a view consistent with the direction of the connection edge of the two side walls (1,2,3,4) form a semi-enclosed section (11).

3. The folding base, according to claim 2, **characterised in that** inside the semi-enclosed section (11) between the bent projections (8) along the entire length of contact of the side edges of two adjacent side walls (1,2,3,4) there is an inserted connecting member in the form of a pin (12) of the shape of a section corresponding to the shape of the semi-enclosed section (11).

4. The folding base, according to claim 2 or 3, **characterised in that** the semi-enclosed section (11) is a triangle, and the pin (12) has the form of an angle whose width of arms corresponds to the length of two arms of the triangle of the semi-enclosed section (11).

Patentansprüche

1. Klappbarer Sockel für Dachanlagen, insbesondere unter Fenster-Dachanlagen oder unter Lüftungs-

oder Brandschutz-Dachanlagen, umfassend Seitenwände (1,2,3,4) und Verbindungselemente,

- wobei die Seitenwände (1,2,3,4) jeweils eine obere und eine untere Kante, zwei seitliche Kanten sowie mindestens ein Verbindungselement, welches zwei benachbarte Seitenwände (1,2,3,4) miteinander verbindet, aufweisen,
- wobei die Seitenwände (1,2,3,4) Abschnitte eines unteren Kragens (5), welcher den Sockel an das Dach fixiert, sowie Abschnitte eines oberen Kragens (6), an welchem die Dachanlage befestigt wird, aufweisen,
- wobei die Verbindungselemente der benachbarten Seitenwände (1,2,3,4) kammartig angeordnete Reihen von Vorsprüngen (8) an seitlichen Kanten der Seitenwände (1,2,3,4) sind,
- wobei jeder der Vorsprünge (8) aus einem flachen Element ausgemacht wurde, was eine Verlängerung der Fläche der Seitenwand (1,2,3,4) darstellt,
- wobei jeder der Vorsprünge (8) entlang einer zur seitlichen Kante der Seitenwand (1,2,3,4) parallel angeordneten Biegungskante (9) gebogen ist,
- wobei die kammartig aufgereihten Vorsprünge (8) an jeder seitlichen Kante der Seitenwände (1,2,3,4) des Sockels durch Abstände (10) voneinander getrennt sind,
- wobei während der Montage eine Reihe der kammartigen Vorsprünge (8) an einer seitlichen Kante jeder Seitenwand (1,2,3,4) gegenüber einer Reihe der kammartigen Vorsprünge (8) an der anderen seitlichen Kante der Seitenwand (1,2,3,4) so verschoben ist, dass in dem montierten Sockel, in den Bereichen von Abständen (10) zwischen den kammartigen Vorsprüngen (8) an der Kante einer Seitenwand (1,2,3,4) die kammartigen Vorsprünge (8) der benachbarten Seitenwand (1,2,3,4) des Sockels angeordnet sind,

dadurch gekennzeichnet, dass
die Vorsprünge (8) jeweils unter einem spitzen Winkel außerhalb des Sockels, entlang einer Biegungskante (9) gebogen sind, welche zur seitlichen Kante der Seitenwand (1,2,3,4) parallel angeordnet ist.

2. Klappbarer Sockel nach Anspruch 1, **dadurch gekennzeichnet, dass** die gebogenen Abschnitte der Vorsprünge (8) von zwei benachbarten, zusammengesetzten Seitenwänden (1,2,3,4) des Sockels - in einer mit der Verlaufsrichtung der Verbindungskante dieser zwei Seitenwände (1,2,3,4) übereinstimmenden Sicht - einen halb geschlossenen Schnitt (11) bilden.

3. Klappbarer Sockel nach Anspruch 2, **dadurch gekennzeichnet, dass** innerhalb des halb geschlossenen Schnitts (11) zwischen den gebogenen Vorsprüngen (8) entlang der ganzen Stoßlänge der seitlichen Kanten von zwei benachbarten Seitenwänden (1,2,3,4) ein eingeführtes Verbindungselement in Form eines Stifts (12), dessen Schnittform der Form des halb geschlossenen Schnitts (11) entspricht, angeordnet ist.

4. Klappbarer Sockel nach Anspruch 2 oder 3, **dadurch gekennzeichnet, dass** der halb geschlossener Schnitt (11) ein Dreieck ist, wobei der Stift (12) die Form eines Winkels aufweist, wobei die Breite der Winkelschenkel der Länge von zwei Dreieckschenkeln des halb geschlossenen Schnitts (11) entspricht.

Revendications

1. Base pliable pour les dispositifs de toiture et notamment sous un dispositif de toiture de fenêtre ou sous un dispositif de toiture de ventilation ou de protection contre l'incendie, comprenant les parois latérales (1,2,3,4) et les éléments de connexion,

- où chaque paroi latérale (1,2,3,4) a un bord supérieur et un bord inférieur et les deux bords latéraux, et au moins un élément de connexion de deux parois latérales adjacentes (1,2,3,4) entre elles-mêmes,
- et les bords latéraux (1,2,3,4) contiennent des fragments de la bride inférieure (5) fixant la base au toit et des fragments de la bride supérieure (6) à laquelle le dispositif de toiture est fixé,
- et les éléments de connexion de deux parois latérales adjacentes (1,2,3,4) forment des rangées de rebords disposés en peigne (8) sur les bords latéraux de ces parois latérales (1,2,3,4),
- et chaque rebord (8) est constituée d'un élément plat constituant l'extension de surface de la paroi latérale (1,2,3,4),
- où chaque rebord (8) est plié le long du bord de courbure (9) parallèle au bord latéral de la paroi latérale (1,2,3,4),
- et les rebords disposés en peigne (8) sur chaque bord latéral des parois latérales (1,2,3,4) de la base sont séparés d'eux-mêmes par les espacements (10),
- où lors de l'assemblage, une rangée de rebords disposés en peigne (8) sur un bord latéral de chaque paroi latérale (1,2,3,4) est déplacé par rapport à la rangée de rebords disposés en peigne (8) sur l'autre bord latéral de cette paroi latérale (1,2,3,4), de façon à ce que dans la base assemblée, dans les zones d'espacements (10), parmi les rebords disposées en peigne (8) sur le bord latéral d'une paroi latérale (1,2,3,4),

sont placés les rebords disposés en peigne (8) de la paroi latérale adjacente (1,2,3,4) de la base,

caractérisé en ce que
chaque rebord (8) est plié le long du bord de courbure (9), parallèle au bord latéral de la paroi latérale (1,2,3,4) sous un angle aigu à l'extérieur de la base.

2. Base pliable selon la revendication 1 **caractérisé en ce que** les sections pliées des rebords (8) des deux parois latérales adjacentes assemblées (1,2,3,4) de la base dans la vue dans la direction des bords de connexion de ces deux parois latérales (1,2,3,4) forment une section transversale semi-fermée (11).

3. Base pliable selon la revendication 2 **caractérisé en ce qu'**à l'intérieur de la section transversale semi-fermée (11) parmi les rebords pliés (8) le long de toute la longueur de contact des bords latéraux de deux parois latérales adjacentes (1,2,3,4), il y a un élément de connexion introduit, sous forme d'une tige (12) ayant la forme de la section transversale correspondant à la forme de la section transversale semi-fermée (11).

4. Base pliable selon la revendication 2 ou 3 **caractérisé en ce que** la section transversale semi-fermée (11) forme un triangle et la tige (12) a la forme d'une cornière dont la largeur des côtés correspond à la longueur de deux côtés d'un triangle de section semi-fermée (11).

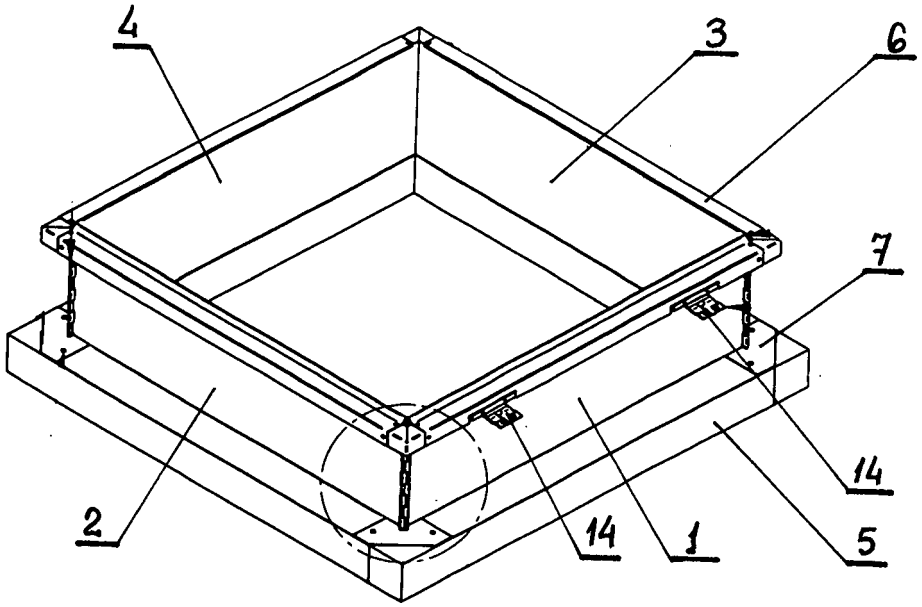

Fig. 1

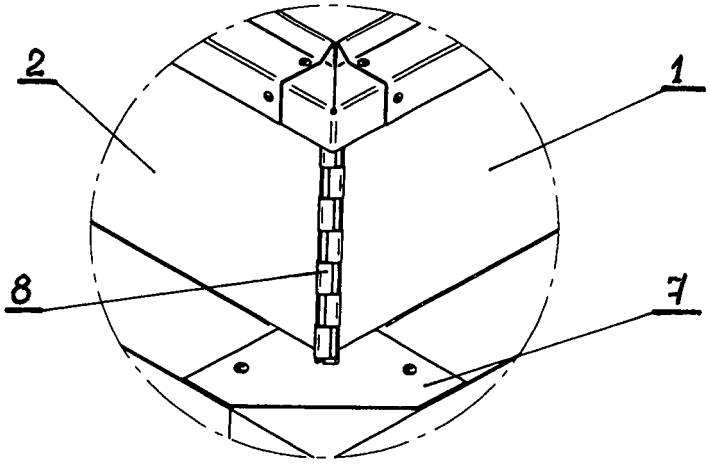

Fig. 2

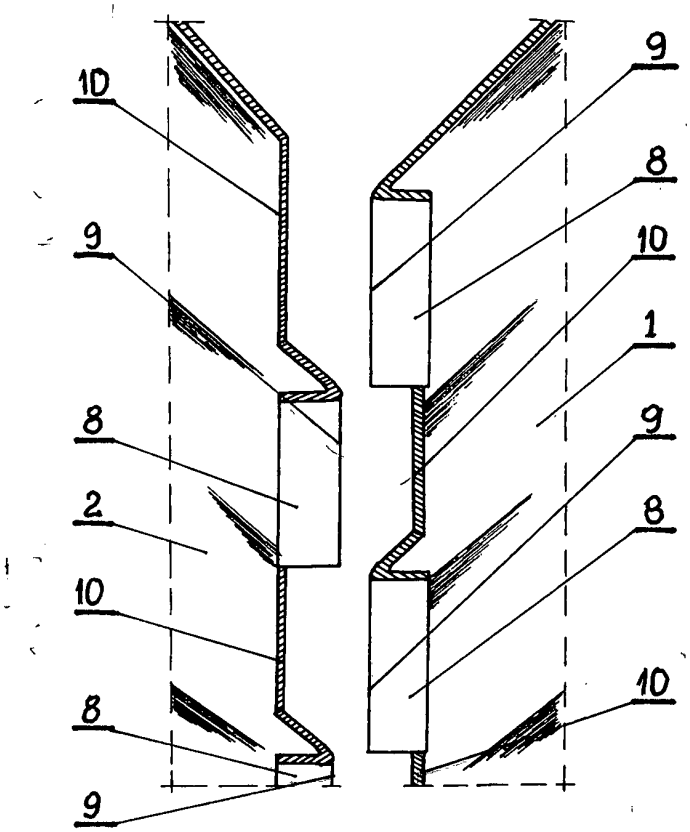

Fig. 3

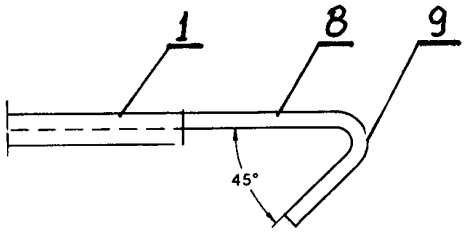

Fig. 5

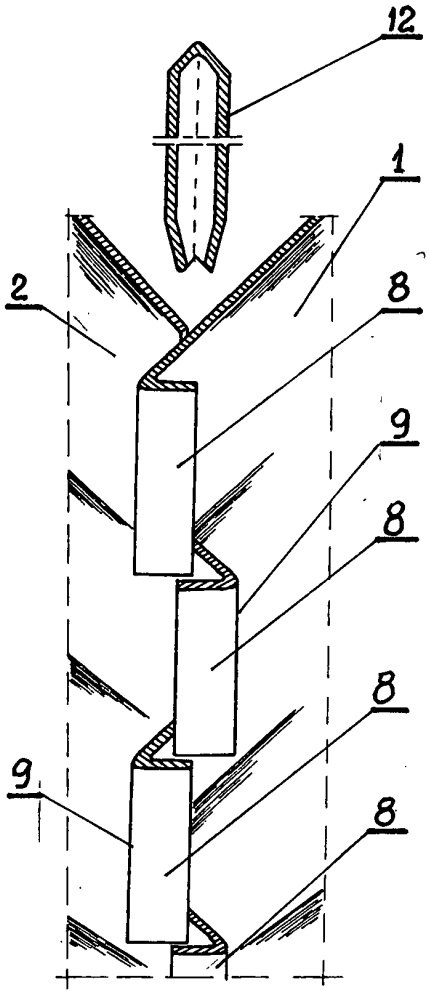

Fig. 4

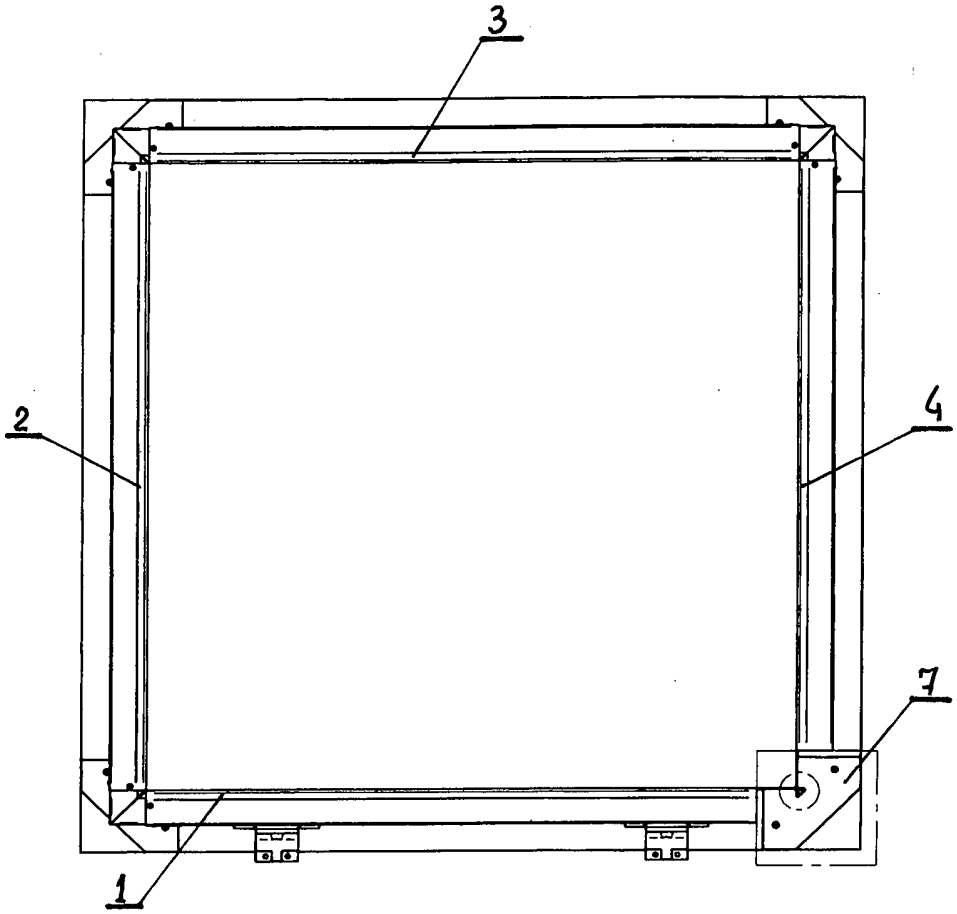

Fig. 6

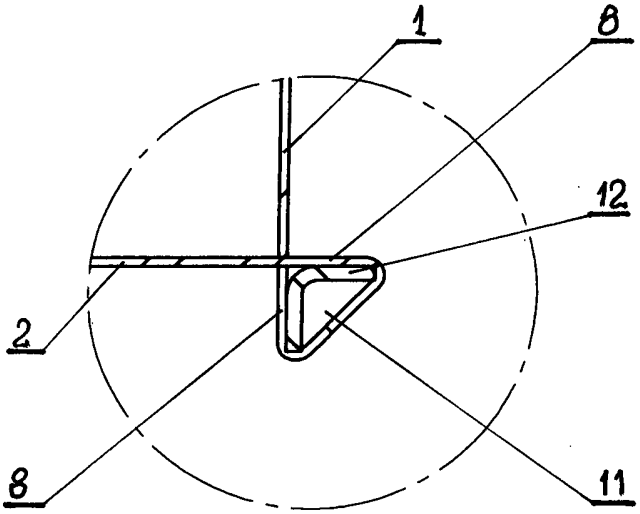

Fig. 7

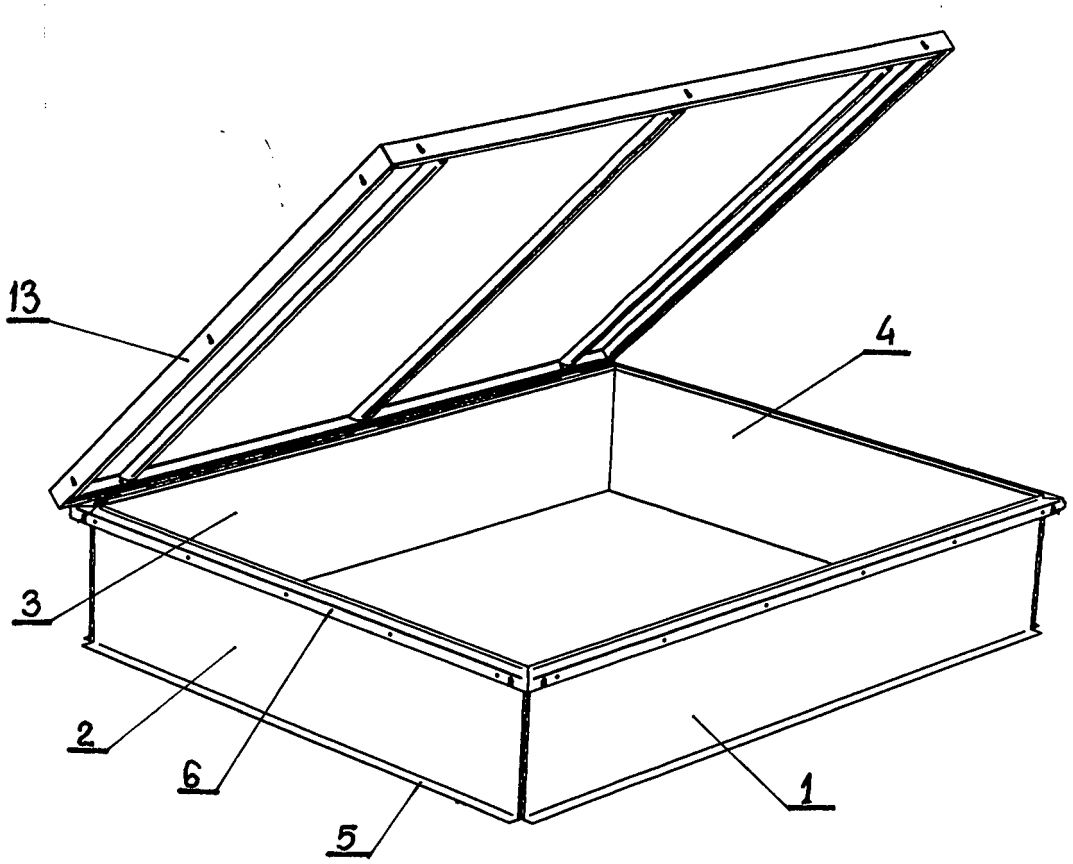

Fig. 8

REFERENCES CITED IN THE DESCRIPTION

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