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(54) **SYSTEM AND METHOD OF MOUNTING, SEALING AND THERMAL INSULATION OF WINDOWS, FACADES AND DOORS PROFITABLY IN THE WARMING ZONE**

SYSTEM UND VERFAHREN ZUM NUTZBRINGENDEN MONTIEREN, ABDICHTEN UND WÄRMEISOLIEREN VON FENSTERN, FASSADEN UND TÜREN IN EINEM AUFWÄRMBEREICH

SYSTÈME ET PROCÉDÉ DE MONTAGE, D'ÉTANCHÉITÉ ET D'ISOLATION THERMIQUE DE FENÊTRES, DE FAÇADES ET DE PORTES DE MANIÈRE RENTABLE DANS LA ZONE DE CHAUFFE

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(56) References cited:
**EP-A2- 1 788 181 WO-A1-2012/015342
DE-U1-202006 018 203 DE-U1-202012 008 857
KR-U- 20090 003 592 KR-Y1- 200 451 584
US-A1- 2009 211 184**

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Description

[0001] A subject of this invention are system of mounting, sealing and thermal insulation of windows, facades and doors profitably in the building warming zone and method of mounting, sealing and thermal insulation of windows, facades and doors profitably in the jamb building warming zone. Developed invention includes complex system of solutions for mounting, regulation, insulation and thermal insulation, waterproofing and vapor proofing the window, which at the same time is vapor permeable and is leading away any possible vapor outside, according to rules of gases diffusion. Elaborated system and method are designed for installation of windows, facades and doors made both out of PVC as well as out of aluminum or wood, beside of their width and weight.

[0002] So far there are many known constructions and methods of mounting window joinery in windows openings.

[0003] Out of polish description of the patent application nr of the application P-384409 (published BUP nr 17/2009) there is known "Method of mounting window frames in jambs and support for mounting window frames in the jambs". The method of mounting window frames in the jambs lies in the fact that window frame is positioned on at least two supports, permanently embedded in bearing wall and insulating layer. Each support has a shape of crossed high T-section and is divided into two unequal parts by dragging wall which is perpendicular to upper plane and axis of support wall. Dragging wall, during the installation of windows, is leaned on inner bearing wall or outer façade wall of three layer wall. Above dragging wall there is setting lath, parallel to upper plane of the support and sticking above it. Window frame footing is positioned above insulating layer, on upper plane of the support and is leaned on outer vertical wall of setting lath.

[0004] Out of polish description of the patent application nr of the application PL-214536 (published BUP nr 22/2010) there is known "Sunroof with fastening section". This window main feature is that fastening section has two parallel arms, wherein one of the arms, mounted to roof construction, is entirely located below lower plane of window jamb and at the same time below upper plane of rafter, and other arm which is mounted to jamb is covered with insulating element.

[0005] Yet another solution was shown in polish description of the patent application nr of the application Ru-66073 entitled "Window with outer lining" (published BUP number 04/2012). The subject of a utility model is a window with outer lining, containing jamb and wing, which frames are made out of plastic and have vertical and oblique plane covered with lining made out of aluminum, except that each of linings has a hitch shaped along the edge which are used to mount it to edge of the vertical plane and to the edge of oblique plane. It is also glued on the inner side to the oblique plane of the covered

frame. The glue is distributed constantly along edge of the oblique plane and in proximity of the edge of oblique plane.

[0006] Out of Polish description of the patent application nr of the application P-392912 (published BUP number 11/2012) there is also known "Method of founding and mounting window frames in jambs and support for founding window frames in jambs". It based on a fact that window frame with doorstep lath fixed to it is settled on at least two supports, permanently embedded in bearing wall and insulating layer, after previously cutting that layer slantwise right near the wall. Each support has a shape of crossed high T-section and is dived into two unequal parts by dragging wall which is perpendicular to upper plane and axis of support. Supports are settled in slots incised or mason at the corners of the bearing wall in a such way that plane of the dragging wall support is leaning on outer side of bearing wall mounted with an extra support anchor. Window frame with doorstep lath is placed above insulating layer, on the upper plane and tightened against dragging support salience. Oblique cut of the insulation makes room for low-resilience PU foam which is bounding window frame with bearing wall and is also insulating periphery.

[0007] DE 20 2006 018203 U1 discloses a system for mounting, sealing and thermal insulating of windows, façades and doors favourably in the building warming zone, wherein it comprises beams with anchors, the beams are for being placed around a window opening, wherein the anchors are arranged in two rows, and the peripheral anchors from one row are for mounting in the window opening, and the peripheral anchors from the other row are for mounting to the wall.

[0008] DE 20 2006 018203 U1 thereby discloses all the features of the preamble of claim 1. Objective of elaborated invention is creating a complex, complete and universal system and way of building window, door and shop windows holes, which would minimize heat permeation and would be also user friendly and easy to install.

[0009] That objective was realized by developing a system of mounting, insulating and thermic isolation of window, facades and door favorably in building warming zone, which is characterized by a fact that basic elements used in this method are beams with anchors inside of it, which are placed around bodied holes of the building. Anchors are so to say placed in two rows, and peripheral parts of one of anchor row is mounted in window hole and other row of anchor peripheral parts is mounted to the wall and an integral part of the beam is a hard, waterproof, longitudinal, spacer chunk. Favorably anchors are deployed in the beam according to the load, which beam is supposed to carry, usually every 250mm.

[0010] Favorably each anchor is adapted to carry a load of 150kg, which means that beam is adapted to carry a load of 600kg per 1 meter of its length.

[0011] Favorably in the system it is foreseen that beam can have different cross-section, including square, rectangular, triangular and polygonal.

[0012] Favorably optimal width of metal anchor is from 50 to 90mm, relatively from 100 to 150mm to the wall in warming zone.

[0013] Favorably in the system it is foreseen, that there is a way of using different anchors, with trebly joints, which can be stiff joints or hinge joints, relatively extendable elements, wherein each anchor described above can be made with block of plastic material, metal or wood which has any shape and is cut out of a chunk or which is made out of plastic material, metal or wood which has any shape and is made by extrusion, wherein block are embedded in the beam.

[0014] Favorably block is made favorably out of plastic material, especially out of PVC, ABS, PE or PP, relatively out of metal, wood or another hard material.

[0015] Favorably anchors, are anchors with hinged joint mounted in the window hole and hinged joint mounted to the wall or anchor with hinged joint mounted in the window hole and stiff joint mounted to the wall, or anchor with stiff joint mounted in the window hole and hinged joint mounted to the wall, or anchor with stiff joint mounted in the window hole and stiff joint mounted to the wall, or anchor with hinged joint mounted in the window hole and extendable element mounted to the wall, or anchor with extendable element mounted in the window hole and hinged joint mounted to the wall, or anchor with extendable element mounted in the window hole and extendable element mounted to the wall, or anchor with extendable element mounted in the window hole and stiff joint mounted to the wall, or anchor with stiff joint mounted in the window hole and extendable element mounted to the wall.

[0016] Favorably, in the peripheral parts of the anchor, those which are not embedded in the beam - independently of the fact if it is a stiff joint, hinged joint or extendable element - there are two holes, which can be oval, in which montage screws are entered. Then those screws are entered into the wall through the anchor via double or triple nut.

[0017] Favorably triple nut consists so to say out of three following nuts-screws, which have thread on their outside circumference in the same direction as the thread on outside circumference of the montage screw, whereas inside circumference of these nuts have their threads in opposite directions.

[0018] Favorably between the anchor and the wall there are placed some washers, in which there are at least two recesses, made on the side of the longer edge of the washer, relatively both on the longer and shorter edge of the washer.

[0019] Favorably in the middle part of the double nut there is montage screw screwed in, which is fixing the anchor to the wall, and favorably there is an extra blockade with spikes, which block in the hole preventing the montage screw from withdrawal.

[0020] Favorably part of the anchor - that part which is embedded in the beam - is at least one pipe, made favorably from metal or plastic material, placed perpendic-

ularly to that side of the beam which will face the frame of the mounted element, which stabilizes anchor in the beam and by which montage screw will be inserted, then it will go through the beam into the frame of mounted element (either window frame, door frame or facade frame). After then it is being sealed and covered.

[0021] Favorably in the part between beams and frame of mounted element, or between the anchor and the wall, there is washer placed, which favorably is 1,0mm or 2,0mm or 5,0mm or 10,0mm in thickness.

[0022] Favorably beam with anchors embedded in it is made by filling suitable mold with foamed plastic material, in a process where head is being slowly pulled from the most inside part of the mold to the outside and it is covering anchors with material. The filling material is favorably foamed EPDM or foamed PE or foamed polystyrene or foamed polyurethane or styrodur or foamed PVC or polystyrene or hard Styrofoam or composite made out of polyurethane and glass fiber with density higher than 100kg/m³ or composite made out of polyurethane and glass fiber and mineral wool with density higher than 100kg/m³ or another foamed and stiff material which has closed cells, favorably with density from 40 kg/m³ to 100 kg/m³.

[0023] Favorably the integral part of the beam which is a hard, waterproof, longitudinal, spacer chunk is made out of material made from compressed wood dust and plastic material which is polyurethane or foamed PVC or hard Styrofoam or styrodur or composite made out of polyurethane and glass fiber with density higher than 100kg/m³ or composite made out of polyurethane and glass fiber and mineral wool with density higher than 100kg/m³ or another foamed and stiff material which has closed cells, favorably with density from 40 kg/m³ to 100 kg/m³.

[0024] Favorably entire beam with spacer chunk is covered with band, wherein the top side and outside and also down side of the beam is covered with outside band which is vapor permeable but waterproof, but the inner side of the beam is covered with inner band which is waterproof and vapor proof.

[0025] Favorably waterproof and vapor permeable outside band is a band favorably with vapor permeability factor μ from 30 to 30.000 and it is usually made on a base of fleece and EPDM, while inner band is a waterproof and vapor proof band, favorably with vapor permeability factor μ from 90.000 to 300.000 or $\mu \pm 3.000.000$ and similary it is usually made on a base of fleece and EPDM.

[0026] Favorably on spacer chunk there is placed extra cushioning and sealing lath, on which window profile is mounted, wherein the lath is made from waterproof and vapor permeable material, favorably it is foamed EPDM or foamed PE or expanding band 300 Pa or expanding band 600 Pa or combination of expanding bands 300 Pa and 600 Pa.

[0027] Favorably both longitudinal edges of spacer chunk, which are being the top part of the beam - are

filled with expanding band, favorably 300 Pa, which is sealing contact area of the spacer chunk and most extended parts of window profile.

[0028] Favorably between beam and the wall there is and cushioning strap, which is favorably made out of foamed EPDM or foamed PE or expanding band 300 Pa or low pressure PUR foam or adhesive mortar.

[0029] The essence of the development of this method is that its realization is being started from dismantling window sash, then you cut lower beam to the window width favorably reduced by 10mm, then it is leveled and slid into elevation according to the project. You are also initially regulating, screwing the montage screws into most far holes of the peripheral anchors, regulate it with washer and triple relatively double nut and then secure it to the wall, next you measure the height of the mounted element, for example window, then add thickness of the lower beam to it and subtract favorably 5mm - this is how long two side beams, placed on the sides of the window hole, should be. Side beam is secured to the wall, verticality and leveling is checked, then its insertion is regulated according to the project of the elevation, next it window frame is put and screw are screwed into it, starting from joining lower beam to side beams. Then you measure width of the window and favorably add two lower beam thicknesses and side beam thicknesses - this is how long the upper beam should be. Upper beam is placed on the top of window hole and screwed into upper window frame and two side beams. At the end window sash is mounted, wherein the order of measuring and cutting each beam fragment is not specified.

[0030] The essence of the development of this method is that you do some steps in sequence - wherein the sequence can be changed. You start from dismantling the window sash, then you measure lower beam to the width of window subtracted by 10mm and you cut the beam. Then you measure two beams to the height of the window adding thickness of the beam to it and subtracting 5mm from it, then you cut it, wherein beam will be placed on the sides of window hole. After that you measure a width of the window adding two thicknesses of the beam to it and then you cut the beam. Next part of the montage is done according to one of the schemes: described elements which are two beams are precisely joined together keeping in mind that you need to keep 90 degree angle, forming an "L" shape, described elements which are three beams precisely joined together keeping in mind that you need to keep 90 degree angle, forming an "U" shape or described elements which are four beams precisely joined together, keeping in mind that you need to keep 90 degree angle, forming an "O" shape. Module joined like that is then leveled and set vertically. After that you secure it with montage screw to the wall, on the window hole, or in it, then using montage screws it is secured to the window frame, relatively in the reverse order described order: is joined together using screws with window frame, then it is being leveled and placed vertically, after that you secure it inside window hole, on it, or to the

wall using montage screws, wherein in both cases, if module described like that is missing one beam - that beam is added and joined with wall, window frame and window hole. During that step you favorably precisely level it and check whether it is vertical, you make sure that is secured properly using washer and triple nut, relatively double nut, tube, through which screws were moved in are sealed.

[0031] Developed system of montage, sealing, and thermal insulation of window, facades and door favorably in the warming zone - is using elements, which allow the process of building glassed holes in the wall very easy and possible to do even for unqualified worker. This system is reliable and if you keep basic precision always leads to splendid results. The only term of splendid result is to properly level lower beam and to keep side beams vertical.

[0032] Transportation is very convenient for that system, montage also. Anchors, which optionally are retractable or extendable, allow to be easily bended, which lets you transport it very comfortably because you can put twice more beams on one pallet than you would be able to if you had stiff anchors. Introducing the bending anchors is also very helpful during the montage. Wherein the usage of stiff anchors during the montage has its own pros, because it allows you to join each beam together before securing it in window hole.

[0033] System provides an ability to put any number of the anchors in the beam, according to the projected and expected strength of the beam. They can be mounted each 30, 40cm or at any distance between them, wherein they are adjusted to carry any, predicted load per one meter of length, the more that strength of the anchors can be planned and adjusted by choosing its thickness. Side beams and upper beams aren't carrying such loads as lower beam, and that's why their parameters can be lowered and different.

[0034] Both construction of each element and materials used to make them - eliminate possibility of creating thermal bridges between the surroundings and inside of the building.

[0035] So far there weren't known any complex system of elements allowing full montage of window, doors and facades. System like that wasn't even assumed, because it was thought that building window hole should be a sum of separate stages of work, organized independently, usually done by different special team and independently prepared employees.

[0036] Described complete and multi-option system is reliable and easy to implement.

[0037] System of mounting, sealing and thermal insulating of windows, doors and facades is presented on the drawing on which fig.1 - shows beams with unfolded anchors - in perspective view, fig.2 - shows cross section of square shaped beam settled on the wall, fig.3 - shows cross section of rectangular shaped beam settled on the wall, fig.4 - shows cross section of triangular shaped beam settled on the wall, fig.5 - show cross section of

polygonal beam settled on the wall, fig.6 - shows metal anchor with two hinged joints, fig.7 - shows metal anchor with one hinged joint and one extending element, fig.8 - shows metal anchor with two extending elements, fig.9 - shows metal anchor with two hinged joints and plastic material chunk, fig.10 - shows vertical cross-section of the triple nut, fig.11 - shows triple nut - top view, fig.12 - shows vertical cross-section of the double nut, fig.13 - shows spacer for under the anchor, fig.14 - also shows spacer for under the anchor, fig.15 - shows vertical cross-section of the double nut being placed in the anchor, fig.16 - shows vertical cross-section of the double nut placed in the anchor, fig.17 - shows example of mounting a PVC profile on the lower beam, fig.18 - shows diagram drawing showing order and way of montage of the system according to the invention.

[0038] According to further described way, while using described system, you mount, seal and insulate thermally favorably in the building warming zone.

[0039] Basic elements used in that way are beams 1 with anchors 2 embedded in them, which are placed around window hole.

[0040] Anchors 2 are distributed in the beam 1 according to the loads which are supposed to be carried by the beam 1, favorably each 250mm. Technical parameters of those elements are chosen so each anchor 2 can carry a load of 150kg, which means that beam 1 can carry 600kg per one meter of its length. Distributing anchors 2 each 250mm allows easy division of the beam 1 into 30 or 60cm sections. That, easy to count and project ability to cut a beam 1 allows building any size of window, for example 10 x 10m, which gives the possibility of building facades construction, not only windows, which other system can't provide.

[0041] In the system there are predicted beams 1 with different cross-sections, for example square, rectangular or triangular and others.

[0042] Metal anchors 2 are adapter to mount windows, doors, and facades out of PVC, aluminium and wood and then their optimal width is from 50 to 90mm or relatively from 100 to 150mm to the wall in the warming zone.

[0043] We provided a possibility to use different types of anchors 2 in our system with trebly resolved joints, which can be: stiff joints 3 or hinged joints 4 relatively extending elements 5. Each of the anchors 2 described above has an option of using plastic chunk 6, relatively metal or wood or another hard material, which can be cut and has any shape, or has an option of using plastic chunk which is extruded and has any shape, wherein chunks 6 are embedded in the beam 1. Chunk 6 is made favourably out of plastic material, for example:

- PVC
- ABS
- PE
- PP
- Relatively from another type of plastic material

[0044] Anchors 2 are embedded in the beam 1 so to say in two rows. Configuration of the joints and extending elements 5 in the anchor 2 is free, yet always - if it is hinged joint 4 then after unfolding, and if it is extended element 5 then after its protrusion - peripheral elements of the anchor 2 from one of the row is mounted in the window hole, and from the second row to the wall 7. Therefore beam 1 is equipped with two rows of anchors 2 for example:

- With hinged joint 4 mounted in the window hole and hinged joint 4 mounted to the wall 7
- With hinged joint 4 mounted in the window hole and stiff joint 3 mounted to the wall 7
- With stiff joint 3 mounted in the window hole and hinged joint 4 mounted to the wall 7
- With stiff joint 3 mounted in the window hole and stiff joint 3 mounted to the wall 7
- With hinged joint 4 mounted in the window hole and extending element 5 mounted to the wall 7
- With extending element 5 mounted in the window hole and hinged joint 4 mounted to the wall 7
- With extending element 5 mounted in the window hole and extending element 5 mounted to the wall 7
- With extending element 5 mounted in the window hole and stiff joint 3 mounted to the wall 7
- With stiff joint 3 mounted in the window hole and extending element 5 mounted to the wall 7

[0045] In the system, there is predicted a possibility to use stiff joint 3 of the anchor 2. Whereas other anchors 2 with moving joints, both with hinged joint 4 and extending element, allow to fold during the transportation and remain folded during the first phase of the montage, during the settling of the beam 1 around the window hole. Wherein axle of rotation of hinged joint 4 is parallel to the edge of the beam 1, and a part of extending element 5 is perpendicular. As it is shown on the drawing, in the not embedded (peripheral) parts of the anchor- independently if they are outside parts of the stiff joint 3, or hinged joint 5, or extending element 5 - favourably there are made two holes 8, which can be oval, thanks to that, during the montage of the anchor 2 you can choose a spot to secure it, in the bounds of the holes 8. Montage screws 9 are put through anchor 2 to the wall 7 via triple nut 10 or double nut 11. Triple nut 10 contains so to say of three separate nuts-screws, which have thread on their outside circumference in the same direction as the thread on outside circumference of the montage screw 9, whereas inside circumference of these nuts have their threads in opposite directions, so that while screwing in the montage screw 9 they squeeze together to the anchor. Thanks to the triple nut 10 there is a way to regulate any height of the anchor 2 to the wall 7. Wherein construction of the triple nut 10 allows control being done with all three elements of the triple nut 10. The task of its outer part is to fasten all three parts of the triple nut 10 stiffly to the tin anchor 2, and stiffening with anchors 2 plane. Addi-

tionally in the optimal placing of the anchor 2 to the wall 7 washers 12 are helpful, in which there are at least two cavities 13 done on the longer edge of the washer 12, relatively both on the longer and shorter edge of the washer 12. Washers 12 allow smooth height regulation, and if you move them using hole 8, which favorably longer, in which you screw montage screw 9, without fastening as hard as you can. Then you can move it in any direction, after that in the smaller hole 8 screw it in:

[0046] A little bit differently we constructed a double nut 11, because its outer part has spikes 14, in a shape of small pins, which are thin enough to "fall" into hole 8 and block their selves in the hole 8 in the peripheral part of the anchor 2. That element also allows smooth regulation of whole beam 1 (up, down, right, left). Middle part of the double nut 11 is projected in such a way that you can screw montage screw 9 securing anchor 2 to the wall 7. I doesn't interfere with turning any other part of the double nut 11. Spikes 14 are some kind of a blockade, which block itself in the hole 8, preventing the montage screw 9 from withdrawal.

[0047] As described below, way of mounting, sealing and thermal insulating, is done by fastening - on the outside part of the window hole and around it - beams 1, which via anchors 2 are secured using montage screws 9 to the outside part of the wall 7 in the warming zone, relatively partially in the warming zone and partially in the window hole.

[0048] As shown on the drawings and described above, anchors 2 are placed in beams 1 in two rows. One row contains anchors 2, which will be put on the hole in the wall 7, in which you want to put window etc. Whereas second row of the anchors 2 is being used to put montage screws 15 inside of them allowing to secure beams 1 with element between them, which beams 1 are surrounding.

[0049] The task of anchor 2 is on one side - to fix beams to the wall 7, and on the other side beams 1 to window frame, or another mounted element between beams 1. To make it possible there is necessary to surely secure anchors 2 with beams 1. Part of the anchor 2 - that part, which is embedded in the beam - is at least one, made favorably out of metal or plastic material tube 16, which stabilizes anchor 2 in the beam, and simultaneously so to say cover the sector which secures anchor 2 with window frame, because it allows convenient insertion into the tube 16 - that is into embedded in the beam 1 anchor 2, and then via the beam 1 into the window frame - securing screw 15, which is screwed into window frame or door frame or facade frame. On the drawings it is shown placing of the lower beam 1, on which there is placed horizontally, lower window frame. Tube 16 allows deep insertion from the outside - in this case from the bottom - securing screw 15, which is inserted so to say from the outside to the inside of build window hole. Tube 16 creates some kind of a distance to the securing screw 15, making it easier to secure beam 1 to the window frame. Length of the tube 16 is chosen to make it easy to screw screws in using wrenches, cordless screwdriver. Practi-

cally it means that securing screw 15 is already in the tube 16 by the manufacturer of the beam 1, during the montage it is easy, fast and deep and stable to screw securing screw 15 into the window frame, door frame or facade frame. After screwing in the securing screw 15 tube 16 is sealed and covered.

[0050] During the montage of the beam 1 with anchors 2 to the window frame it is possible to also use spacing washers 12, for example thermal insulating, that have various thickness, which will overcome any inequalities in the wall 7, and will provide extra thermal insulation. Washers 12 optimal thicknesses are 1,0mm or 2,0mm or 5,0mm or 10,0mm.

[0051] Construction of the whole system, including beams 1 and anchors 2 imposes such a way of securing it to the wall 7, that every element is carrying forces, which vector is perpendicular to the axis of the securing element, which means that they are subjected to shear strength and not to flexural or grab strength. That means that strength of developed system is as big as possible.

[0052] Thanks to such simple yet functional construction of the anchors 2 and cooperating with them elements, during the montage, it doesn't matter if there are any inequalities in the wall or window hole.

[0053] Juxtaposition of the developed and described elements allows regulation of the position of the beam 1 according to the wall 7, using three ways of regulations: using spacing washers 12, using properly regulated triple nut 10 or relatively using double nut 11.

[0054] Beam 1 with anchors 2 embedded in it - with properly chosen joints - is made by filling proper mold starting from the most inside part of it slowly extracting the head to the most outside part of the mold, covering everything with foamed plastic material, filling the mold and embedding anchors 2 in the beam 1. Favorably the material used is:

- foamed EPDM
- foamed PE
- foamed polyurethane
- foamed polystyrene
- styrodur
- foamed PVC
- polystyrene
- hard Styrofoam
- composite containing out of polyurethane and glass fiber with density higher than 100kg/m³
- composite containing out of polyurethane and glass fibre and mineral wool with density higher than 100kg/m³
- another foamed stiff material with closed cells, favourably with density from 40 to 100kg/m³

[0055] Integral part of the beam 1 is hard, waterproof, longitudinal, spacer chunk 17, which task is to lock mounted element frame, for example window frame, which basing on the spacer chunk 17 will not fall out, even if they aren't fixed properly yet.

[0056] Spacer chunk 17 is made out of material, which favourably is made out of:

- compressed wood dust and plastic material with polyurethane
- polystyrene
- foamed PVC
- hard Styrofoam
- styrodur
- composite consisting of polyurethane and glass fiber with density higher than 100kg/m^3
- composite consisting of polyurethane and glass fibre and mineral wool with density higher than 100kg/m^3
- another foamed stiff material with closed cells, favourably with density from 40 to 100kg/m^3

[0057] Entire beam 1 with spacer chunk 17 is covered with band, wherein the top side and outside and also down side of the beam 1 is covered with outside band 18 which is vapor permeable but waterproof, but the inner side of the beam 1 is covered with inner band 19 which is waterproof and vapor proof. Both bands were chosen according to rules of gasses diffusion. They allow vapor to go outside, but prevent getting water inside the room and thereby creating vapor and water proof insulation of the room. Waterproof and vapor permeable outside band 18 is a band with favorably vapor permeability factor μ from 30 to 30.000 and is usually made based on fleece and EPDM. Whereas inner band 19, is a waterproof and vapor proof band, favorably vapor permeability factor μ from 90.000 to 300.000 and similarly is usually made based on fleece and EPDM.

[0058] On the spacer chunk 17 there is also extra cushioning and sealing lath 20, on which mounted profile will be placed. Lath 20 is made out of waterproof and vapor permeable material, and favorably it is:

- foamed EPDM
- foamed PE
- expanding band 300 Pa
- expanding band 600 Pa
- combination of expanding bands 300 Pa and 600 Pa

[0059] Favorably both longitudinal edges of spacer chunk, which are being the top part of the beam - are filled with expanding band, favorably 300 Pa, which is sealing contact area of the spacer chunk and most extended parts of window profile.

[0060] Between beam 1 and a wall 7 there is an cushioning strip 22 which favorably is made out of :

- foamed EPDM
- foamed PE

- low pressure PUR foam
- adhesive mortar

[0061] Way of montage, sealing and thermal insulation of windows, facades and door favorably in the building warming zone, is being done by doing specified task, which do not require any previous preparations, or technical knowledge. The work is started by dismantling window sash, to leave window frame alone.

[0062] Then you cut lower beam 1a to the width of the window subtracted by 10mm, then it is leveled and slid into elevation according to the project. You are also regulating it, screwing montage screws 9 into border holes with oval cross section, then you regulate it with washers 12 and tripe nut 10, relatively double nut 11 and secure it to the wall 7.

[0063] Next, you measure height of the window, add height of the lower beam 1a and subtract 5mm - this is the length you cut the side beams 1b, 1c, which will be placed on the side of window hole, of which side beam 1b is secured to the wall 7, then you check if it is vertical and level, next you adapt it into sliding slot in the building elevation. Afterwards you put in window frame and screw in montage screws 15, starting from connecting lower beam 1a, then side beam 1b.

[0064] Subsequently you measure width of the window and add two widths of beam 1a and beam 1b-that's the length of the beam 1d, which will be placed on the top of the window hole.

[0065] Then you screw beam 1c to the other side of beam 1a and to the window frame.

[0066] Respectively screw upper beam 1d to the side beams 1b and 1c. Tubes 16 which were used to insert montage screws are sealed and covered.

[0067] Described way can also be done by doing everything in different order of doing tasks. And so, way of montage, sealing and thermal insulation of windows, facades and doors favorably in the building warming zone, is being done by doing specific task - order of this task can be changed - which do not require any previous preparations, or technical knowledge. The work is started by dismantling window sash, to leave window frame alone.

[0068] Then:

- You measure lower beam 1a to the width of the window subtracted by 10mm, and cut it
- You measure two beam 1b and 1c to the height of the window, adding height of the lower beam 1a and favorably subtracting 5mm. Then you cut beams to length. Those beams will be placed on the sides of window hole.
- You measure beam 1d to the width of the window, adding two thicknesses of beams 1a and 1b, intended for placing on the side of the window - this is the length of the beam 1d you should cut. It will be placed

on the top of the window hole.

[0069] Next stage of described way is done by choosing one of options listed below:

- described elements, which are beam 1a and 1b also beam 1c and 1d, are precisely connected together keeping in mind that there must be 90 degree angle between them, into two "L" shaped modules
- described elements, which are beam 1a and 1b also beam 1c, are precisely connected together keeping in mind that there must be 90 degree angle between them, into two "U" shaped module
- described elements, which are beam 1a and 1b also beam 1c and 1d, are precisely connected together keeping in mind that there must be 90 degree angle between them, into two "O" shaped module

[0070] And that module is: leveled an set vertically, and next you secure it to the window hole, on the window hole or to the wall 7 with montage screws 9, then you secure window frame to it using securing screws 15, relatively in reverse order described module is secured to the window frame using securing screw 15, then it is being leveled and set vertically and using montage screws secure it to the window hole, in the window hole or to the wall 7, wherein in both cases, if such described module is missing beam 1c or 1d - those beams are placed and secured to the wall 7 and window frame using montage screws 9 and securing screws 15, while being on stage of connecting elements together favorably you properly level them out and make sure they are vertical by using washers 12 and triple nut 10 relatively using double nut 11, and tubes 16 which were used to insert screws are sealed and covered.

List of items

[0071]

1. Beam (1a -lower beam, 1b and 1c - side beam, 1d-upper beam)
2. Anchor
3. Stiff joint
4. Hinged joint
5. Extending element
6. Chunk
7. Wall
8. Hole
9. Montage screw
10. Triple nut
11. Double nut
12. Washer
13. Cavities (in the washer)
14. Spikes (in the double nut)
15. Montage screw (beam to the frame)

16. Tube (embedded in the beam)
17. Spacer chunk
18. Outer band
19. Inner band
20. Lath (on spacer chunk)
21. Expanding band (on the edge of spacer chunk)
22. Strip (cushioning, placed between beam and wall)

Claims

1. System for mounting, sealing and thermal insulating of windows, facades and doors favourably in the building warming zone, **characterized by** comprising beams (1) with anchors (2) embedded into them, the beams (1) are for being placed around a window opening, wherein the anchors (2) are arranged in two rows, and the peripheral anchors (2) from one row are for mounting in the window opening, and the peripheral anchors (2) from the other row are for mounting to the wall (7), wherein an integral part of the beam (1) is a hard, waterproof, longitudinal, spacer chunk (17).
2. System according to claim 1, **characterized in that** basic elements used **in that** system are beams (1) with anchors (2) embedded into them, which are placed 250mm from each other.
3. System according to claim 1, **characterized in that** the beams (1) have rectangular, square, triangular or polygonal cross sections.
4. System according to claim 1 or 2 or 3, **characterized in that** the anchors (2) are selected from stiff joints (3), hinged joints (4) or extending elements (5), wherein each of the anchors (2) optionally comprises a chunk (6) made of plastic material or metal or wood or other hard material which is cut out and has any shape, and optionally with a chunk (6) made of plastic material or metal or other hard material, which is extruded and has any shape, wherein the chunks (6) are embedded in the beam (1).
5. System according to claim 4, **characterized in that** chunk (6) is made of plastic material such as PVC, ABS, PE, PP or another hard material.
6. System according to claims 1 to 3, **characterized in that** in not embedded parts of the anchors (2) selected from outer parts of extending elements (5), or hinged joints (4), or stiff joints (3) there are preferably made two holes that are preferably oval, in which montage screws (9) are inserted through the anchor (2) to the wall (7), by means of a triple nut (10) or a double nut (11).

7. System according to claim 4, **characterized in that** the triple nut (10) consists of three following nuts-screws, which have thread on their outside circumference in the same direction as the thread on outside circumference of the montage screw (9), whereas inside circumference of these nuts have their threads in opposite directions. 5
8. System according to claim 5, **characterized in that** between the anchor (2) and the wall (7) there are washers (12), in which there are at least two recesses (13), on the side of the longer edge of the washer (12), optionally both on the longer and shorter edge of the washer (12). 10
9. System according to claim 4, **characterized in that** in the middle part of the double nut (11) there is montage screw (9) for fixing the anchor (2) to the wall (7), and preferably there is an extra blockade with spikes (14), for blocking in the hole (8) and preventing the montage screw (9) from withdrawal. 20
10. System, according to claim 4, **characterized in that** part of the anchor (2) - that part which is embedded in the beam (1) is formed of at least one pipe (16), preferably made of metal or plastic material, and placed perpendicularly to that side of the beam (1) which is facing the frame of the mounted element, the pipe (16) stabilizes the anchor (2) in the beam (1) and through which the montage screw (15) is inserted, then it goes through the beam (1) into the frame of the mounted element formed by either a window frame, a door frame or a facade frame, whereas the pipe (16) is sealed and covered. 25 30
11. System according to claims 1 to 8, **characterized in that** in the part between the beams (1) and the frame of mounted element, or between the anchor (2) and the wall (7), there is a washer (12) placed, which preferably is 1.0 mm or 2.0 mm or 5.0 mm or 10.0 mm in thickness. 35 40
12. System according to claim 1 to 9, **characterized in that** the entire beam (1) with the spacer chunk (17) is covered with band, wherein the top side and outside and also down side of the beam (1) is covered with an outside band (18) which is vapor permeable and waterproof, and the inner side of the beam (1) is covered with an inner band (19) which is waterproof and vapor proof. 45 50
13. System according to claim 12, **characterized in that** on the spacer chunk (17) there is placed an extra cushioning and sealing lath (20), on which window profile is mounted, wherein the lath (20) is made from waterproof and vapor permeable material. 55
14. System according to claims 1 to 11, **characterized**

in that both longitudinal edges of the spacer chunk (17), which form the top part of the beam (1) are filled with an expanding band (21), for sealing the contact area of the spacer chunk (17) and the most extended parts of the window profile.

15. System according to claims 1 to 11, **characterized in that** between the beam (1) and the wall (7) there is a cushioning strap (22), which is preferably made of foamed EPDM or foamed PE or expanding band 300 Pa or low pressure PUR foam or adhesive mortar.

15 Patentansprüche

1. System und verfahren zum nutzbringenden montieren, abdichten und wärmeisolieren von fenstern, fassaden und türen in einem aufwärmbereich ist **dadurch gekennzeichnet, dass** die balken (1) mit den darin angebrachten ankern (2), die um die bebaute gebäudeöffnung angebracht werden, wobei die anker (2) im balken (1) gewissermaßen in zwei reihen angeordnet sind und die peripheren ankerelemente (2) der einen reihe in der fensternische befestigt, der zweiten reihe auf der mauer (7) montiert werden, wobei ein harter, länglicher distanzklotz (17), der kein wasser aufsaugt, einen integralen teil des balkens 1 bildet.
2. System gemäß anspruch 1 ist **dadurch gekennzeichnet, dass** die basiselemente in diesem system von balken (1) mit ankern (2) gebildet werden, die darin im abstand von 250 mm voneinander eingebettet sind.
3. System gemäß anspruch 1 ist **dadurch gekennzeichnet, dass** die balken (1) quadratische, rechteckige, dreieckige oder polygonale querschnitte haben.
4. System gemäß anspruch 1 oder 2 oder 3 ist **dadurch gekennzeichnet, dass** die anker (2), aus steifen gelenken (3) oder scharnierartigen gelenken (4) bzw. aus herausgeschobenen elementen (5) ausgewählt werden, wobei jeder der anker (2), optional mit klotz (6) aus kunststoff oder aus metall oder aus holz oder aus einem anderen harten material, der ausgeschnitten wurde und eine beliebige form hat, auch optional mit einem klotz (6) aus kunststoff oder aus metall oder aus einem anderen harten material, der im strangpressverfahren hergestellt wurde und eine beliebige form hat, wobei die klötze (6) im balken (1) versenkt wurden.
5. System gemäß anspruch 4 ist **dadurch gekennzeichnet, dass** der klotz (6) aus kunststoff, wie PVC, ABS, PE, PP, oder aus einem anderen harten

Material gefertigt wurde.

6. System gemäß den Ansprüchen von 1 bis 3 ist **gekennzeichnet dadurch, dass** in den nicht versenkten, äußeren, peripheren Ankerteilen (2) - ausgewählt aus den äußeren Teilen herausgeschobener Elemente (5) oder scharnierartiger Gelenke (4) oder steifer Gelenke (3) - günstigerweise zwei Öffnungen gefertigt wurden (8), die günstigerweise oval sind, in die Montageschrauben (9) eingeführt werden, die weiter durch den Anker (2) in die Mauer (7) durch eine dreifache (10) oder zweifache Mutter (11) eingeführt werden.
7. System gemäß Anspruch 4 ist **dadurch gekennzeichnet, dass** die dreifache Mutter (10) aus drei aufeinanderfolgenden Muttern-Schrauben besteht, die auf ihrem äußeren Umfang ein Gewinde mit dem gleichen Drehsinn wie auf dem äußeren Umfang der Montageschraube (9), wogegen die Innengewinde dieser Muttern Gewinde mit entgegengesetztem Drehsinn haben.
8. System gemäß Anspruch 5 ist **dadurch gekennzeichnet, dass** sich zwischen dem Anker (2) und der Mauer (7) Unterlegscheiben (12) befinden, in denen mindestens zwei Vertiefungen (13) an der längeren Kante der Unterlegscheibe (12) bzw. sowohl an der längeren wie auch an der kürzeren Kante der Unterlegscheibe (12) gefertigt wurden.
9. System gemäß Anspruch 4 ist **dadurch gekennzeichnet, dass** sich im Mittelteil der doppelten Mutter (11) die Montageschraube (9) zur Befestigung des Ankers (2) an der Mauer (7), und günstigerweise ihre zusätzliche Blockade mit Vorsprüngen (14) zur Blockade in der Öffnung (8) befindet, die der Rückwärtsbewegung der Montageschraube (9) vorbeugt.
10. System gemäß Anspruch 4 ist **dadurch gekennzeichnet, dass** der Teil des Ankers (2)-der Teil, der im Balken (1) versenkt ist-aus mindestens einem Rohr geformt wurde (16), das günstigerweise aus Metall oder Kunststoff gefertigt wurde und senkrecht zu der Balkenfläche (1) positioniert wurde, die am Rahmen des montierten Elements anliegt, wobei das Rohr (16) den Anker (2) im Balken (1) stabilisiert, durch den die Befestigungsschraube (15) eingeführt und dann durch den Balken (1) zum Rahmen des montierten Elements hindurchgeführt wird -geschaffen durch den Fenster-, Tür- oder Fassadenrahmen -wobei das Rohr (16) abgedichtet und verblendet wird.
11. System gemäß den Ansprüchen von 1 bis 8 ist **dadurch gekennzeichnet, dass** sich im Teil zwischen den Balken (1) und dem Rahmen des montierten Elements oder zwischen dem Anker (2) und der

Mauer (7) eine Distanzunterlegscheibe (12), günstigerweise mit einer Dicke von 1,0 mm oder 2,0 mm oder 5,0 mm oder 10,0 mm, befindet.

12. System gemäß den Ansprüchen von 1 bis 9, ist **dadurch gekennzeichnet, dass** der gesamte Balken (1) zusammen mit dem Distanzklotz (17) mit Band beklebt sind, wobei an der oberen Oberfläche, an der Außenseite und an der unteren Oberfläche des Balkens (1) Außenband (18) verklebt wird, das dampfdurchlässig aber wasserdicht ist, dagegen an der Innenseite des Balkens (1) Innenband verklebt wird (19), dass wasser- und dampfdicht ist.
13. System gemäß Anspruch 12 ist **dadurch gekennzeichnet, dass** auf den Distanzklotz (17) zusätzlich eine amortisierende und abdichtende Leiste (20) gelegt wird, auf der das montierte Profil angebracht wurde, wobei die Leiste (20) aus wasserdichten und dampfdurchlässigen Material gefertigt wurde.
14. System gemäß den Ansprüchen von 1 bis 11 ist **dadurch gekennzeichnet, dass** beide Längskanten des Distanzklotzes (17), der den oberen Teil des Balkens (1) bildet, mit Spreizband (21) zur Abdichtung der Kontaktstelle des Distanzklotzes (17) mit den am weitesten herausgeschobenen Elementen des eingebetteten Fensterprofils ausgefüllt sind.
15. System gemäß den Ansprüchen von 1 bis 11 ist **dadurch gekennzeichnet, dass** zwischen dem Balken (1) und der Mauer (7) ein amortisierender Gurt (22) angebracht ist, der günstigerweise aus geschäumten EPDM oder aus geschäumten PE oder aus Spreizband 300 Pa oder Montageband mit niedriger Spannkraft oder aus Klebemörtel gefertigt ist.

Revendications

1. Système et procédé de montage, d'étanchéité et d'isolation thermique de fenêtres, de façades et de portes de manière rentable dans la zone de chauffe, **caractérisé en ce que** les poutres (1) avec les ancrages (2) intégrés dans ces poutres sont situés autour de l'ouverture maçonnée du bâtiment, et où les ancrages sont disposés dans la poutre (1) en deux rangées, et les éléments périphériques de l'ancrage (2) comprennent une rangée où ils sont fixés dans l'évidement de fenêtre, puis une deuxième rangée, où ils sont montés sur la maçonnerie (7), et où la partie intégrale de la poutre 1 est constituée par un bloc d'entretoise longitudinal dur et n'absorbant pas l'eau (17).
2. Système selon la revendication 1, **caractérisé en ce que** les éléments de base dans ce système sont des poutres (1) avec les ancrages (2) intégrés dans

celles-ci espacés de 250 mm l'un de l'autre.

3. Système selon la revendication 1, **caractérisé en ce que** les poutres (1) ont des sections transversales carrées, rectangulaires, triangulaires ou polygonales. 5
4. Système selon la revendication 1 ou 2 ou 3, **caractérisé en ce que** les ancrages (2) sont choisis parmi des raccord rigides (3) ou des raccord articulés (4) ou des éléments relativement extensibles (5), où chacun des ancrages (2) est constitué éventuellement d'un bloc (6) en plastique ou en métal ou en bois ou en un autre matériau dur découpé et ayant une forme quelconque, ou aussi éventuellement d'un bloc (6) de plastique ou de métal ou d'un autre matériau dur extrudé de forme quelconque, et où ces blocs (6) sont intégrés dans la poutre (1). 10 15
5. Système selon la revendication 4, **caractérisé en ce que** le bloc (6) est réalisé en un matériau plastique tel que du PVC, de l'ABS, du PE, du PP ou autre matériau dur. 20
6. Système selon les revendications 1 à 3, **caractérisé en ce que**, dans les parties périphériques extérieures non intégrées des ancrages (2) - lesquelles sont choisies parmi : les parties extérieures des éléments coulissants (5) ou des raccords articulés (4) ou des raccords rigides (3) - sont perforées de préférence de deux ouvertures (8), qui sont de préférence ovales, dans lesquelles les boulons de fixation (9) sont insérés à travers l'ancrage (2) dans la maçonnerie (7) à travers un triple écrou (10) ou un double écrou (11). 25 30 35
7. Système selon la revendication 4, **caractérisé en ce que** l'écrou triple (10) est constitué de trois écrous-boulons consécutifs qui ont un filetage sur leur circonférence extérieure avec la même direction de torsion que celle pratiquée sur la périphérie externe du boulon de montage (9), tandis que les filetages internes de ces écrous ont des filetages contre-filetés. 40 45
8. Système selon la revendication 5, **caractérisé en ce qu'**entre l'ancrage (2) et la paroi (7) sont prévues des cales (12) dans lesquelles au moins deux évidements (13) sont réalisés à partir du bord long de la cale (12), de manière similaire du côté long et du côté court de la cale (12). 50
9. Système selon la revendication 4, **caractérisé en ce que** dans la partie centrale du double écrou (11) se trouve un boulon de montage (9) fixant l'ancrage (2) à la maçonnerie (7), et de préférence avec verrou additionnel à saillies (14), pour le bloquer dans l'ouverture (8) et empêcher le boulon de montage 55

(9) de se rétracter.

10. Système selon la revendication 4, **caractérisé en ce que** la partie de l'ancrage (2), celle qui est noyée dans la poutre (1), est formée d'au moins un tube (16), de préférence en métal ou en plastique qui est situé perpendiculairement à cette surface la poutre (1) qui adhère au châssis de l'élément assemblé, le tube (16) stabilise l'ancrage (2) dans la poutre (1) - au travers de ce tube est insérée la vis de fixation (15) qui traverse ensuite la poutre (1) jusqu'au cadre de l'élément à assembler, créé par le châssis d'une fenêtre, d'une porte ou d'une façade, tandis que le tube (16) est scellé et bouché.
11. Système selon l'une quelconque des revendications 1 à 8, **caractérisé en ce que** dans la partie entre les poutres (1) et le châssis de l'élément à monter ou entre l'ancrage (2) et la paroi (7) est prévue une entretoise (12) de préférence de 1,0 mm ou 2,0 mm ou 5,0 mm ou 10,0 mm.
12. Système selon l'une quelconque des revendications 1 à 9, **caractérisé en ce que** toute la poutre (1) et le bloc d'écartement (17) sont ensemble recouverts d'une bande, tandis que sur la surface supérieure, à l'extérieur et sur la surface inférieure de la poutre (1), se trouve une bande externe (18) perméable à la vapeur, et que sur la surface interne de la poutre (1) se trouve une bande interne (19) qui est étanche à l'eau et à la vapeur.
13. Système selon la revendication 12, **caractérisé en ce que** sur le bloc d'espacement (17) est disposée une bande supplémentaire d'amortissement et d'étanchéité (20) sur laquelle le profilé est monté, tandis que la bande (20) est réalisée dans un matériau étanche à l'eau et perméable à la vapeur.
14. Système selon l'une quelconque des revendications 1 à 11, **caractérisé en ce que** les deux bords longitudinaux de l'entretoise (17) constituant la partie supérieure de la poutre (1) sont remplis d'un ruban extensible (21) afin de sceller la surface de contact du bloc (17) avec les éléments les plus saillants du profil de fenêtre installé.
15. Système selon l'une quelconque des revendications 1 à 11, **caractérisé en ce que** entre la poutre (1) et la paroi (7) se trouve une bande d'amortissement (22), réalisée de préférence en EPDM expansé ou en PE expansé ou un ruban d'expansion de 300 Pa ou une bande d'assemblage à basse pression ou un mortier adhésif.

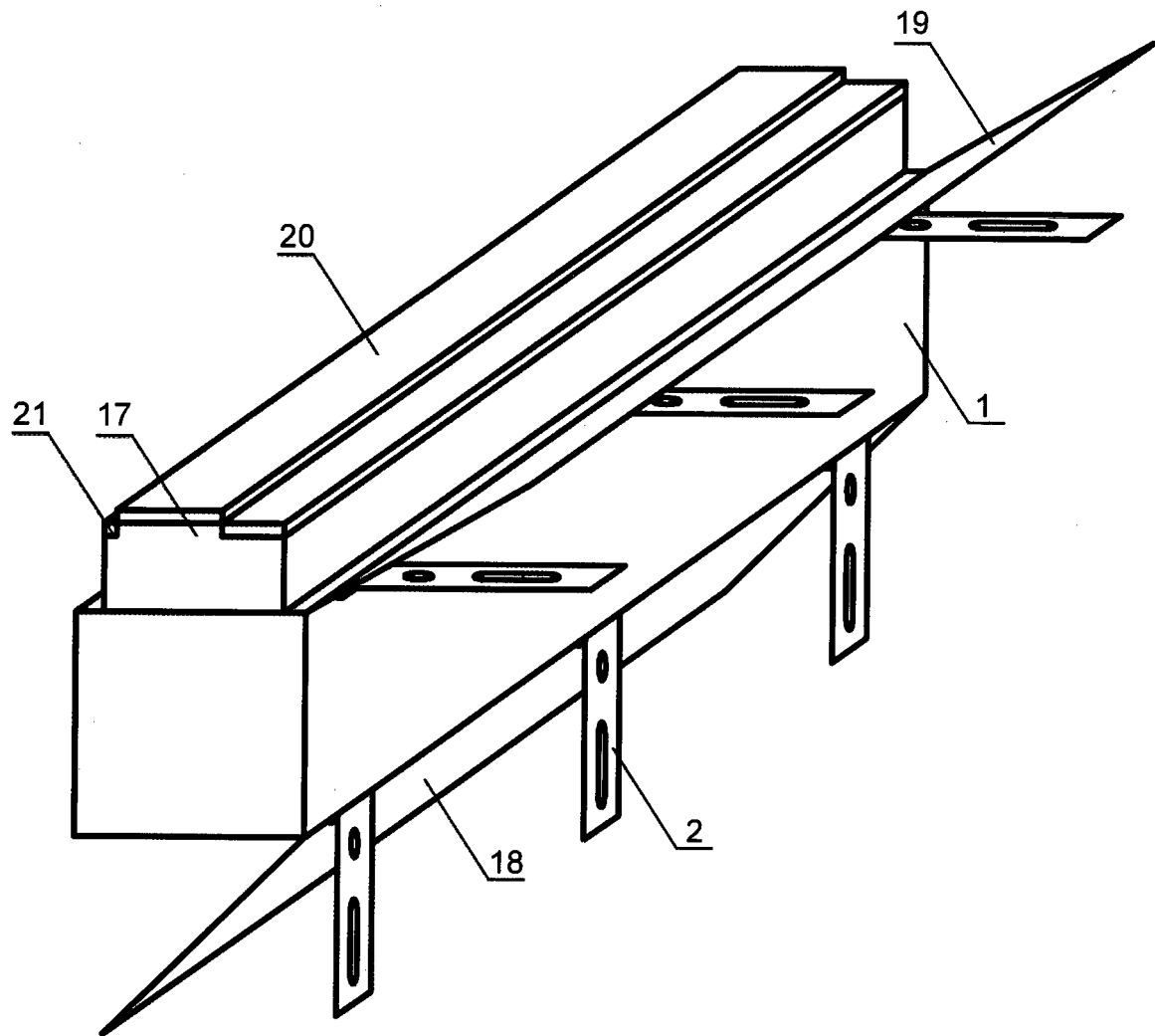


Fig. 1

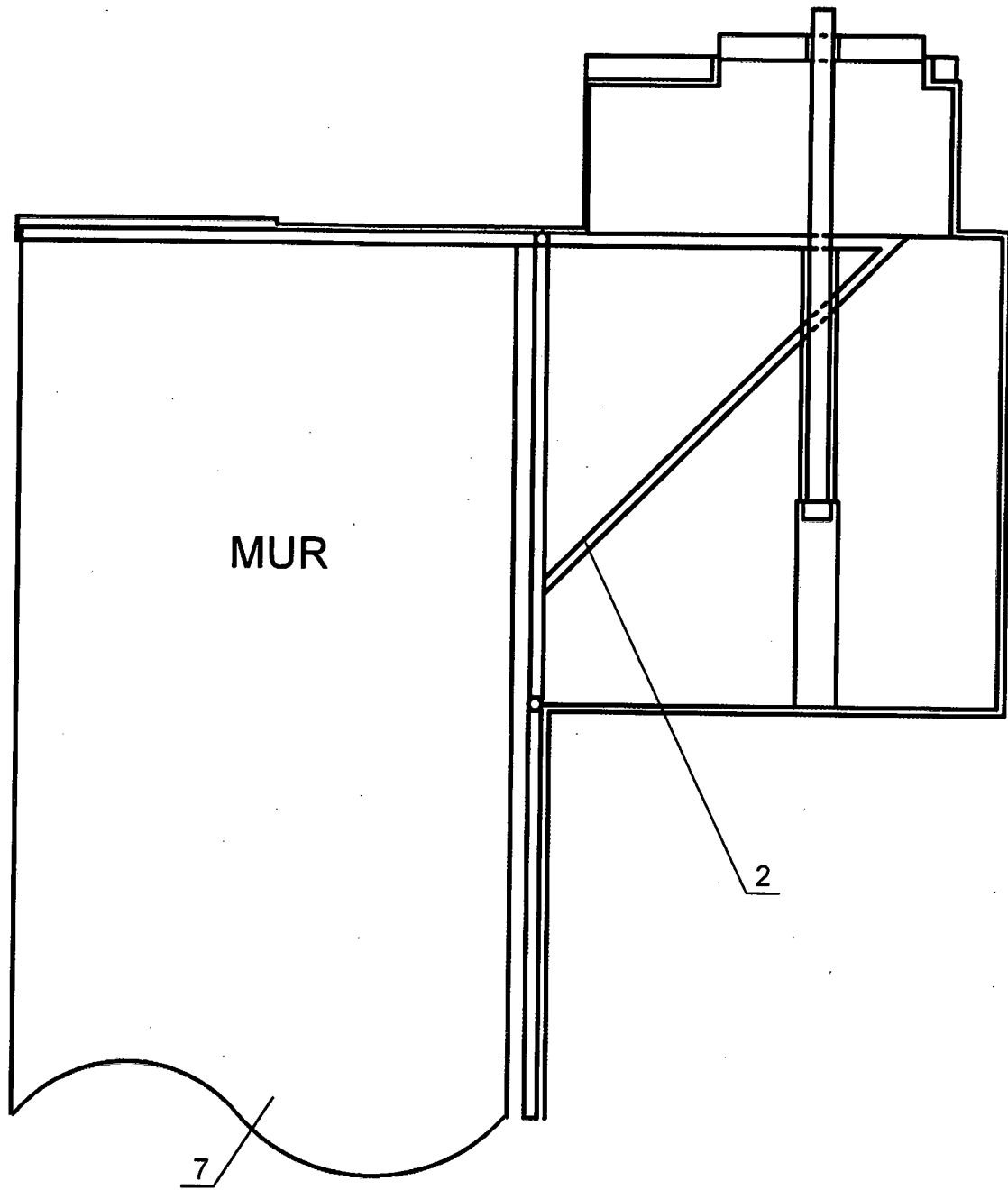


Fig. 2

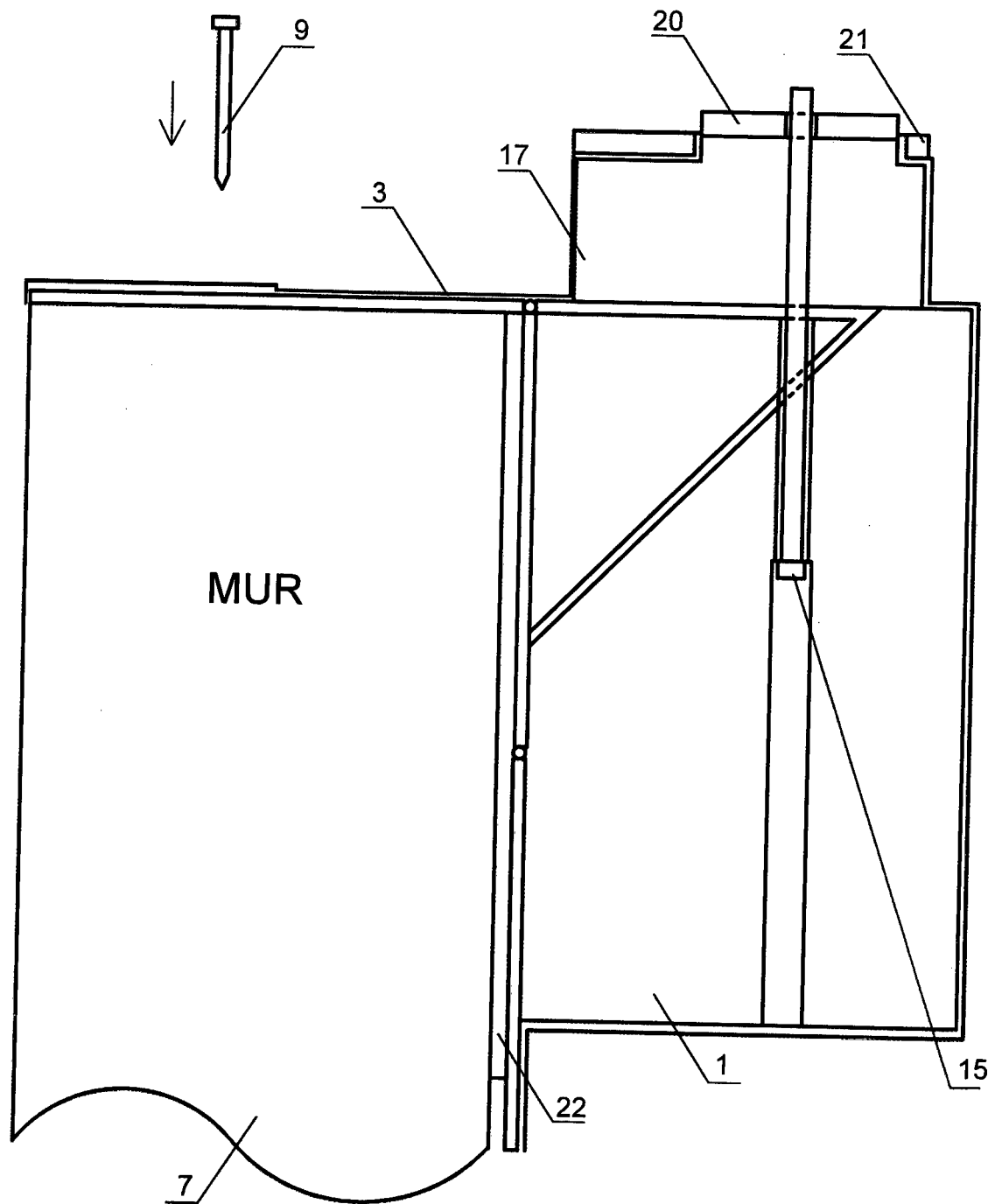


Fig. 3

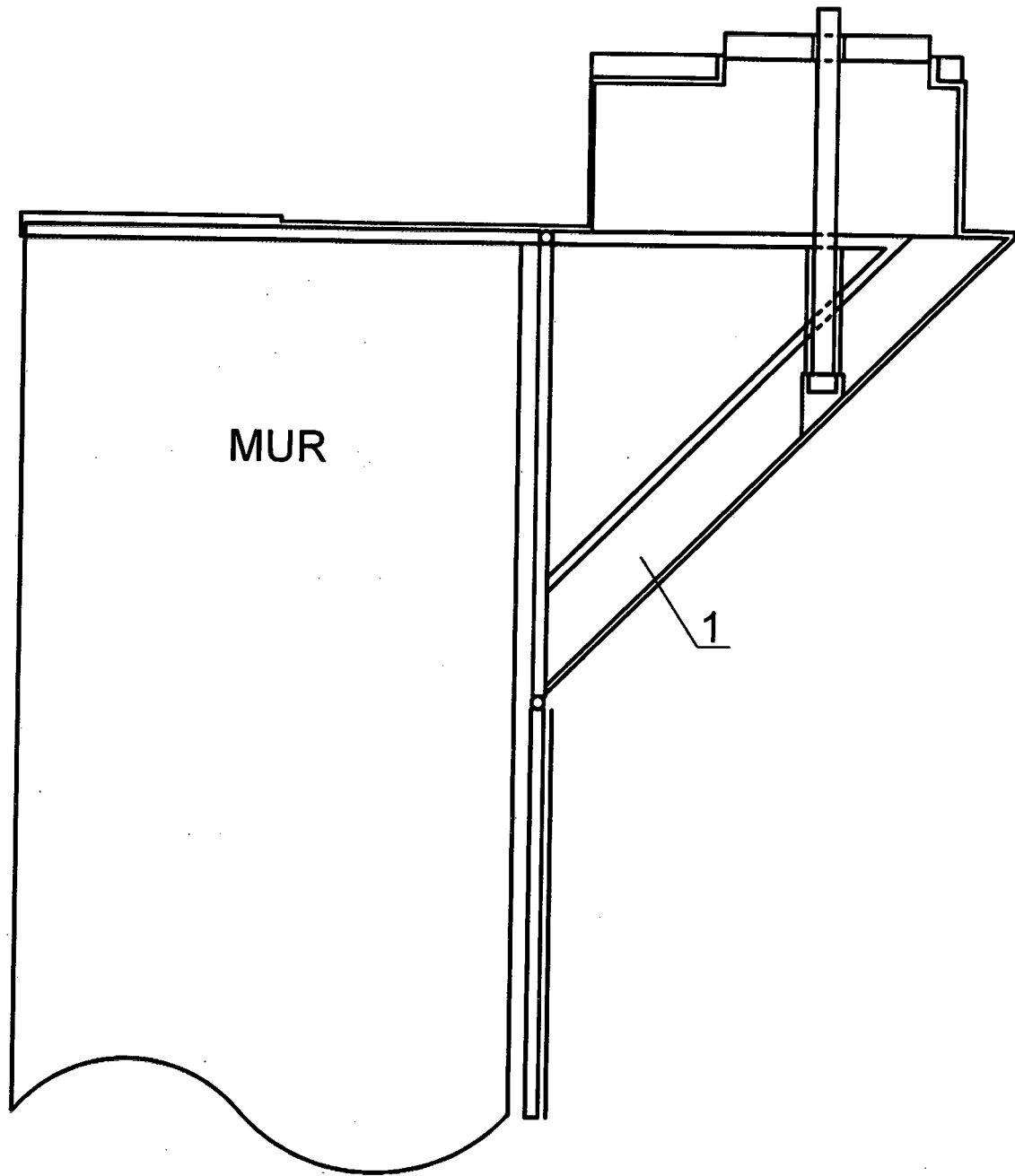


Fig. 4

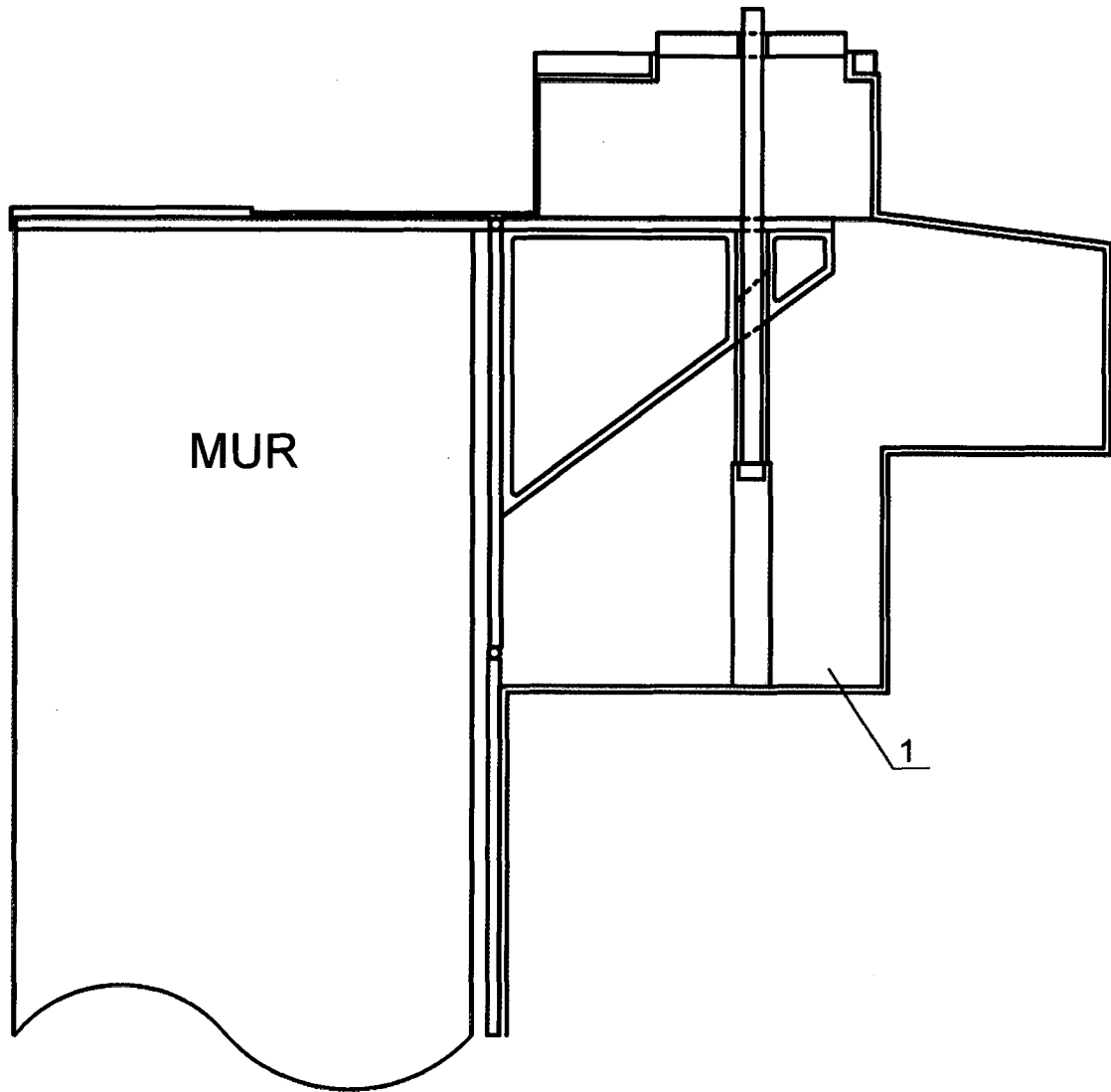


Fig. 5

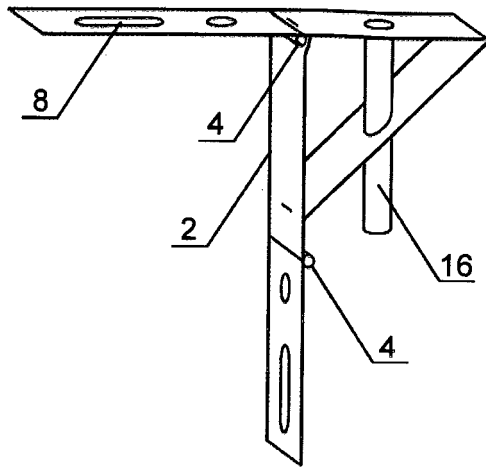


Fig. 6

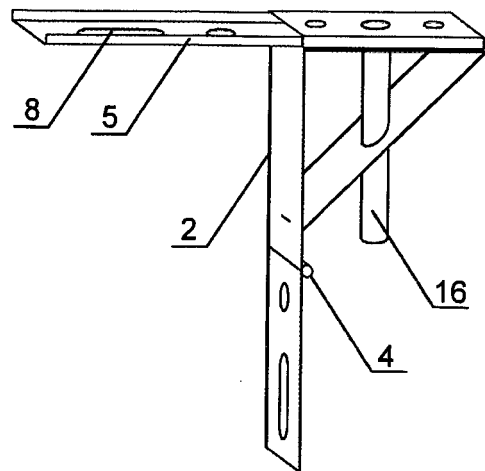


Fig. 7

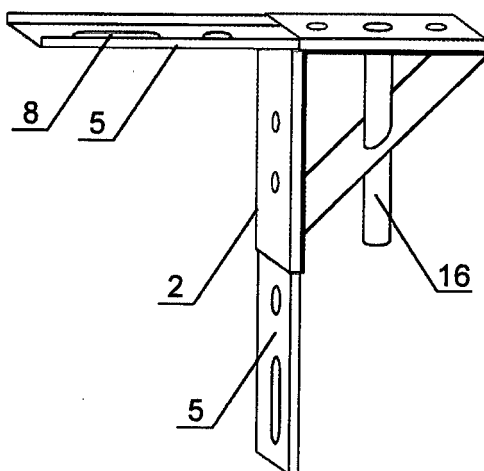


Fig. 8

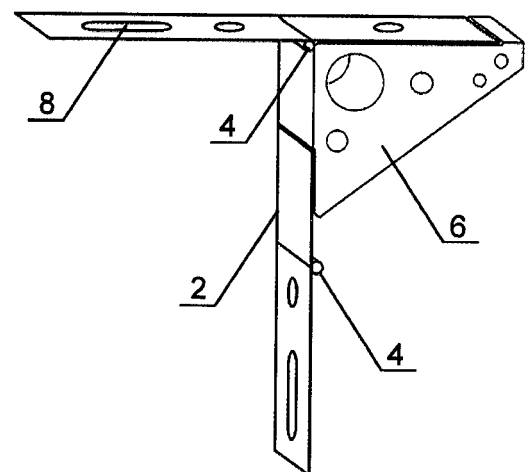


Fig. 9

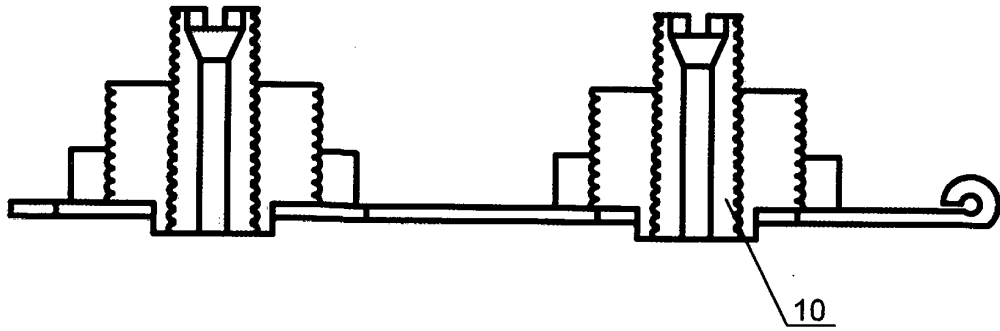


Fig.10

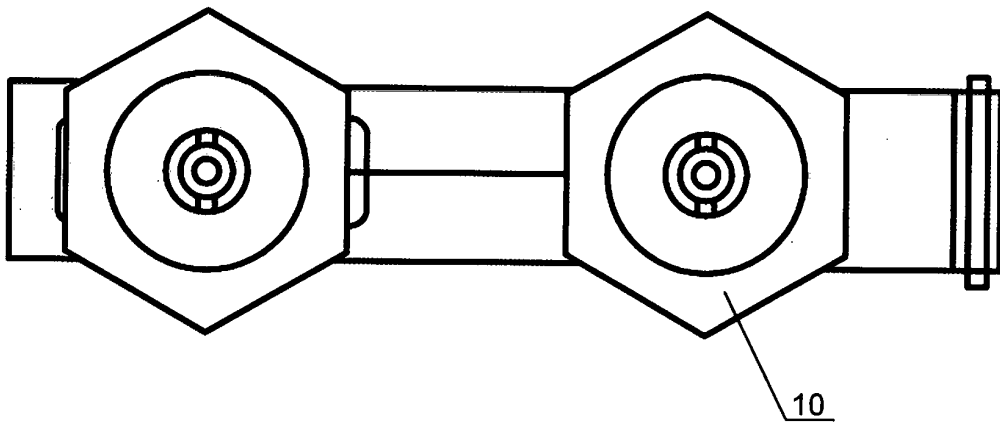


Fig.11

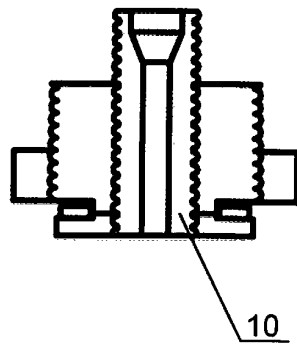


Fig.12

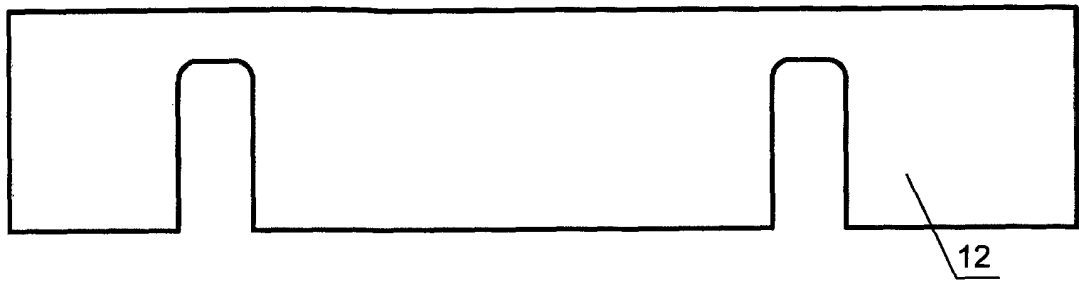


Fig. 13

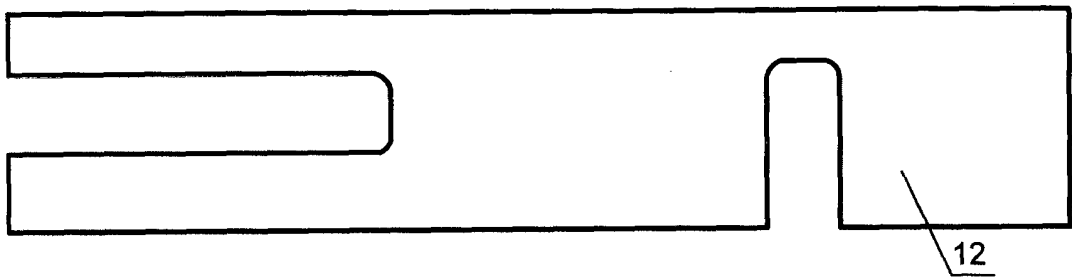


Fig. 14

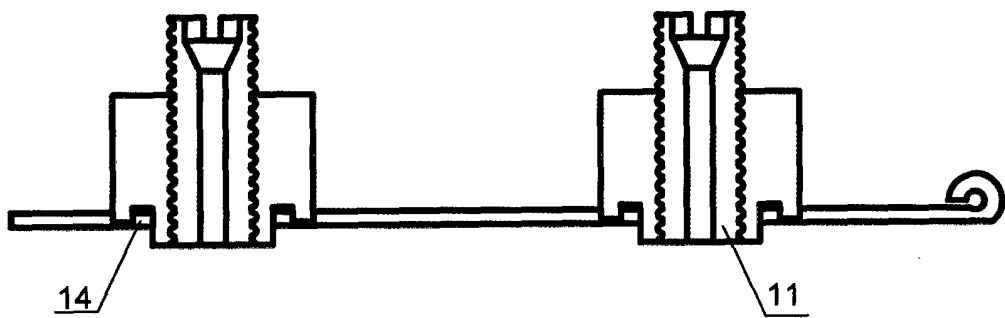


Fig. 15

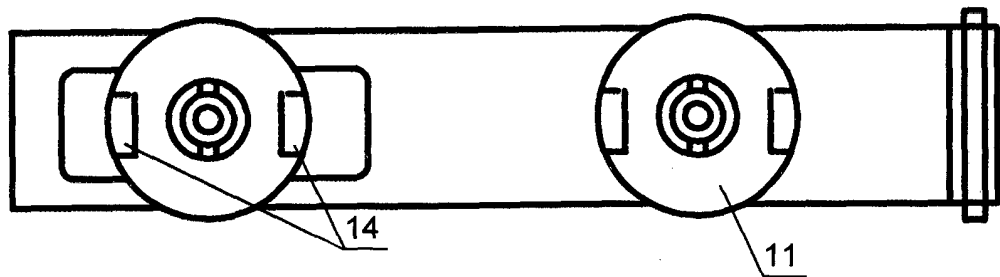


Fig. 16

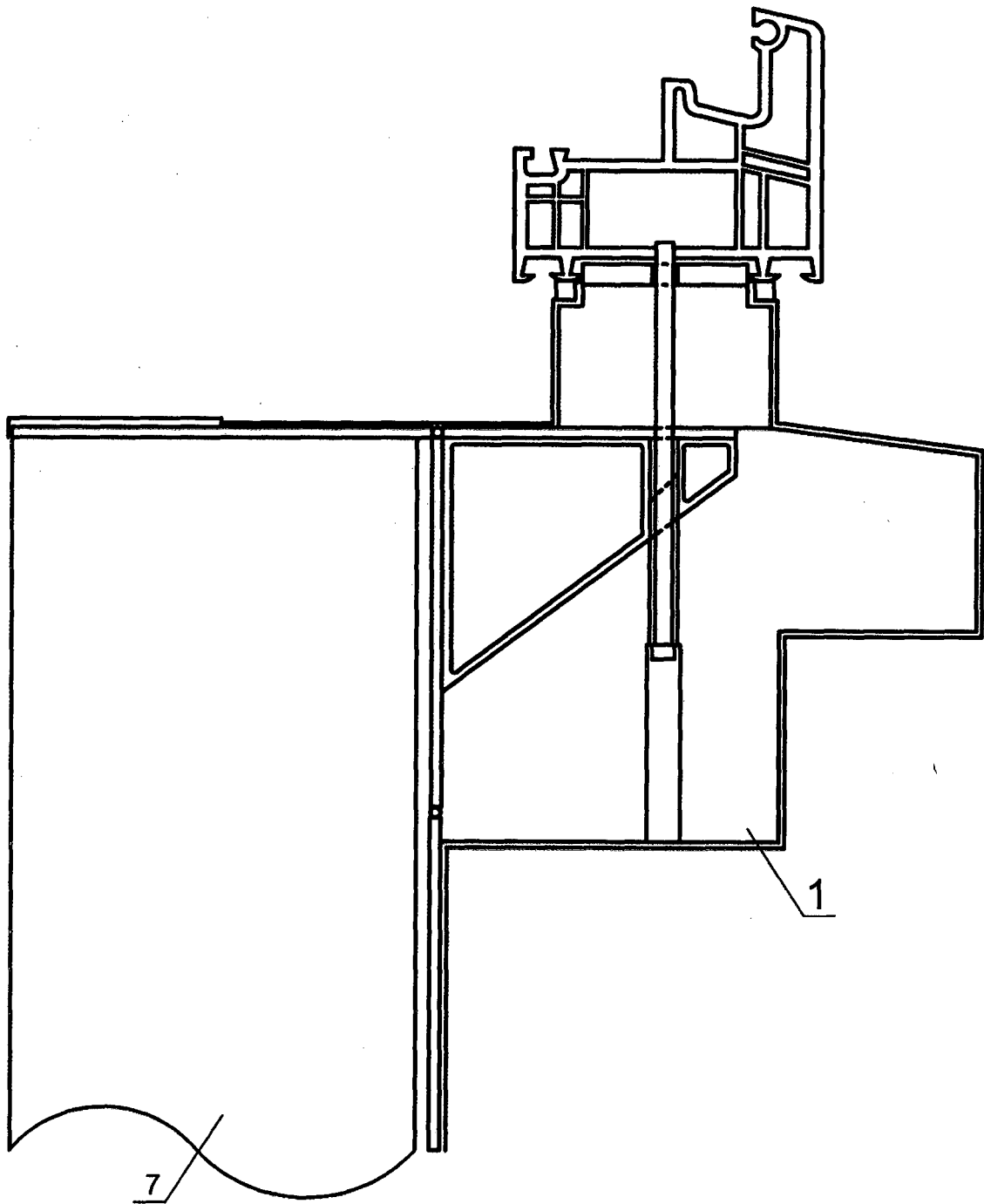


Fig. 17

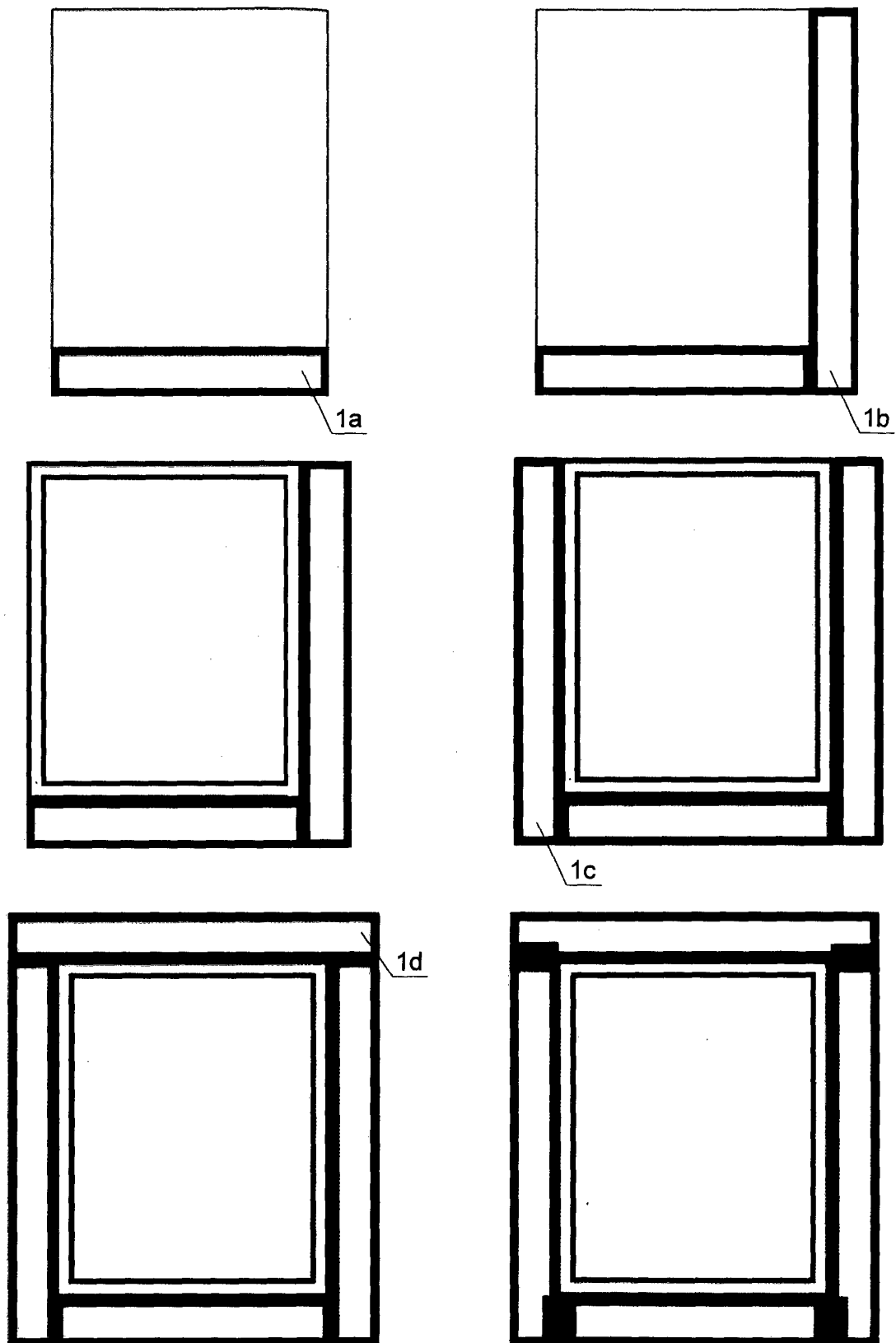


Fig. 18

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- PL P384409 [0003]
- PL 214536 [0004]
- RU 66073 [0005]
- PL P392912 [0006]
- DE 202006018203 U1 [0007] [0008]