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(54) **DETACHABLE FORMWORK SET WITH A MULTI-LAYERED WALL BLANK**

(57) The removable formwork set with a sandwich wall blank is used, in particular, in construction of cast-in-situ skeleton buildings with different number of floors and sandwich walls. The removable formwork set comprises the tray with sandwich wall blank located in its internal cavity and the form cover. The sandwich wall blank is composed of at least one decorative and at least one heat insulating layer interconnected by reinforcement. The tray comprises a bottom and side pieces po-

sitioned at an obtuse angle to the bottom plane and detachable end panels positioned perpendicular to the tray bottom at its ends. The cover comprises a top sheet and side pieces positioned at an obtuse angle to the top sheet plane. The tray has grooves and the formwork cover features interconnection locks. The cover length is less than the tray length by the value equal to the building ceiling height. Use of the formwork set make easier concreting when erecting cast-in-situ skeleton buildings with decorative wall front surface.

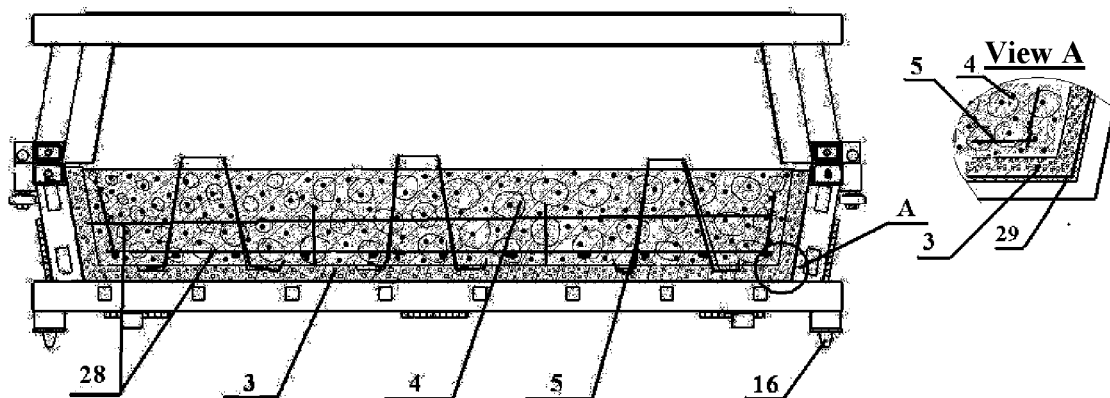


Fig. 5

Description

[0001] The invention relates to the construction area, in particular to construction of cast-in-place concrete frame buildings with different numbers of storeys and sandwich walls, using removable formworks.

[0002] There is a sandwich wall panel containing interconnected layers, one of which is the bearing one being formed between removable formworks and the other one is heat-insulating. The bearing layer is composed of expanded-clay concrete reinforced with vertical PVC pipes placed vertically and horizontally laid metal bars. The heat-insulating layer is made of a foamed plastic, with service lines laid therein. In addition, the sandwich wall panel contains a facade layer of concrete backer-board (CBB); reinforcing layer of fine-meshed glass-fabric gauze; heat-, moisture- and sound-insulating layer of extruded foam polystyrene and interior finish layer of water-proof gypsum plasterboard (WGPPB), with all the layers glued. At the top, between the heat-, moisture- and sound-insulating layer of extruded foam polystyrene and the heat-insulating layer of foamed plastic a cavity is formed by making the CBB facade layer, heat-, moisture- and sound-insulating layer of extruded foam polystyrene and heat-insulating layer of foamed plastic with the WGPPB interior finish layer higher than the interior base layer of expanded-clay concrete (see RU2336395, Class E 04 C 2/284, published on 2008). These panels are technically complex and designed for building construction with further concreting into the cavities of PVC pipes located in the interior expanded-clay concrete layer.

[0003] There is a hinged formwork panel comprising two shaped elements pivotally connected on the axis, with cross-section of each shaped element formed by two bases interconnected by two walls. There is a groove on one of the walls, extended by a partition connecting the groove with the opposite wall or one of the bases. The wall opposite to the wall with the groove is extended by a shank. The base adjoining the shank and the wall with the groove are extended by a console with a tip, featuring a panel axle hole, the console being formed by the base extension, part of the wall adjoining this wall base and the rig outgoing from the groove (see RU2326216, Class E 04 G 9/02, published on 2006). This device is tackling the task of producing concrete modules of various dimensions, but it is not meant to produce construction modules containing a decorative surface.

[0004] There is a formwork intended for producing cast-in-situ reinforced concrete modules, comprising a base on which rectangle-shape (in plan view) internal and external formwork panels are placed. The internal formwork panels comprise four corner sections, whose exterior surface forms a deck, and their length may be adjusted with a certain step. The external formwork panels are movable and may be shifted toward the internal formwork panels. Two oppositely positioned external lateral panels may be adjusted for length and the other two oppositely positioned external longitudinal panels have

a fixed length. The inside of the external longitudinal panels features wedge-type retainers interacting with counterpart retainers on the lateral panel ends (see RU2330148, Class E 04 G 11/20, published on 2008).

This formwork has a fairly complex design and intended for building construction requiring subsequent exterior wall finish.

[0005] The closest technical solution is a movable axonometric formwork set containing composite L-shaped half-tunnel formwork panels with end panels, each pair forming a tunnel, panel abutting joint fasteners, adjustable-length brace struts, rolls, bars, bearing parallel channel stiffening girders of vertical panels, ceiling and end panels butted with locking swivel clamps with paired fixing bolt, embedded elements in the form of concrete crosses and auxiliary equipment - roll-out and mounted scaffolding (see RU2171878, Class E 04 G 11/20, published on 2001). This set has a fairly complex design and neither makes it possible to produce walls of the higher quality nor makes it easier to install them.

[0006] This invention addresses the technical problem of enhancing versatility and improving performance characteristics of removable formworks for walls building that do not require additional finishing and repair of interior and exterior surfaces, reduction of labor intensity and simplification of the concreting process when building cast-in-situ skeleton buildings with decorative wall front surface as well as strength and seismic resistance improvement.

[0007] The current technical task is deal with as follows: in the removable formwork set with a sandwich wall, comprising a tray with the sandwich wall located in its internal cavity and a form cover, the sandwich wall blank consists of at least one decorative and at least one heat insulating layer interconnected by reinforcement. The tray has a bottom attached to the lower ribs from their inside, and side pieces positioned at an obtuse angle to the bottom plane and attached to the side and end ribs of the tray from their inside. The tray end ribs are positioned parallel to the bottom plane, while the tray side ribs are positioned perpendicular to the tray end ribs and at an obtuse angle to the bottom plane. The tray has detachable end panels positioned perpendicular to the tray bottom at its ends. At least one decorative layer is channel-shaped and the inside of the tray bottom and side pieces is made to ensure reproduction of a convex design on the surface of at least one decorative layer of the sandwich wall blank. The form cover is composed of the top sheet located on the inside of the top ribs and side pieces positioned at an obtuse angle to the top sheet plane and attached to the inside of the cover side and end ribs. The cover end ribs are positioned parallel to the cover top sheet plane and the cover side ribs are positioned perpendicular to the cover end ribs and at an obtuse angle to the cover top sheet plane. The tray features grooves, the form cover has interconnection locks and the cover length is less than the tray length by the value equal to the building ceiling height. The tray lower ribs

are positioned perpendicular to one another, forming lattice surfaces for attachment of the bottom, while the cover top ribs are positioned perpendicular to one another, forming lattice surfaces for attachment of the attachment of the top sheet. The tray has guide rails located on the outside of the bottom lower ribs. The tray bottom and side pieces have internal ribs for impressing a design on the decorative surface of at least of one decorative surface, located adjacent to the inside surfaces of the bottom and the side pieces. The form bottom and cover have adjusting struts secured to one of the ends and designed to adjust the form position on the building floor slab. The inside and the top sheet area of the form cover have ball elements with transportation rod fastening holes. At least one decorative layer is made of fiber concrete containing either mineral or steel or polymer fibers. At least one decorative and at least one heat-insulating layer contain a reinforcement lattice whose meshes extend beyond the heat-insulating layer for connection to the building load-bearing cast-in-situ wall. The removable formwork with a sandwich wall has at least one matrix for making a convex design on the decorative layer of a cast-in-situ building wall, located on the inside of the tray bottom and side pieces.

[0008] The invention is supported by drawings. Fig.1 depicts an assembled form frame, form side view. Fig.2 - the same, side view. Fig.3 - the same, cover view. Fig. 4 - the same, end view. Fig.5 depicts a finished set of removable formwork with double-layer wall, end view. Fig.6 depicts a finished set of removable formwork with sandwich wall blank, end view. Fig.7 depicts a set of removable formwork with a site-formed base layer filled with concrete mix.

[0009] The removable formwork with sandwich wall contains tray 1 and cover 2. Tray 1 contains a sandwich wall blank comprising at least one decorative layer 3 and at least one heat-insulating layer 4 interconnected by reinforcement 5. A set with double-layer wall is shown in Fig.5. A set with double-layer wall is shown in Fig.6. Part of reinforcement 5 made in the form of meshes extend beyond at least one heat-insulating layer 4. Tray 1 comprises lower ribs 6 and 7. Lower ribs 6 are positioned perpendicular to lower ribs 7 and form the lattice surface on which bottom 8 is located on the inside of tray 1. Positioned at an obtuse angle to bottom 8 are side ribs 9 connected to end ribs 10 and internal ribs 11, to which side pieces 12 are secured. Internal ribs 11 and side pieces 12 are also positioned at an obtuse angle to bottom 8. Internal ribs 11 are used in the form structure, if required, to obtain a design on the exterior surface of decorative layer 3 as horizontal grooves. Located on tray 1 ends are detachable end panels 13 with locking wedges 14. Guide rails 15 located in the exterior surface of lower ribs 6 and 7 are designed for moving the form within the transport line when manufacturing a sandwich wall. Retaining supports 16 located on the outside of lower ribs 6 are designed for form stacking and grooves 17 - for connection to cover 2. Lower ribs 6 and 7, side ribs 9 and

end ribs 10 may be made from rectangular section pipe to enhance their stiffness. The internal surface of bottom 8 may be made with a convex design for its reproduction on the surface of at least one decorative layer 3 of the form wall. Detachable end panels 13 are installed on tray 1 only prior to the concreting of decorative layer 3 and heat-insulating layer 4 and removed after drying. The length of tray 1 is chosen based on one building floor height adding the ceiling height.

[0010] Cover 2 is comprised of top ribs 18 and 19 located perpendicular to each other and forming a latticed surface (similar to tray lower ribs 6 and 7). Secured to the inside of ribs 18 and 19 is top sheet 20. Side ribs 21 of the cover are positioned at an obtuse angle to top sheet 20 plane. Side pieces 24 of cover 2 are secured to side ribs 21 and end ribs 22 with inside ribs 23. Located on the outside edges of end ribs 22 of cover 2 are locks 25 for connection to locks 17 of tray 1. The outside surface of cover 2 features ball elements 26 with transport rod holes used to move cover 2 and finished forms. Adjusting supports 27 are installed on the ends of tray 1 and cover 2. The length of cover 2 is less than that of tray 1 by the value equal to the building wall ceiling height. A variety of materials may be used to make tray 1 and cover 2: steel alloys, light alloys (including aluminum ones), titanium alloys, ductile material and composite materials (including fiber glass with adhesive).

[0011] At least one decorative layer 3 of the wall is channel-shaped, replicating the shape of bottom 8 with side pieces 12 and internal ribs 11 adjacent thereto at an obtuse angle. It may be made from fibred concrete containing either mineral or steel or polymer fiber. Decorative layer 3 may also be made from other similar materials that allow a fine relief design of exterior building surface to be obtained requiring neither finishing nor repair. For this form set version, bottom 8 and side pieces 12 are made with a relief (convex) design on the inside of tray 1, which reproduces decorative layer 3. Such 3D reproduction of decorative layer 3 ensures decorative properties of the form wall used to erect in-situ skeleton building walls on three sides of a partially convex wall. The building skeleton containing a few vertical walls with window and door apertures, erected using the form wall and having a decorative design on three sides enable building exterior variations. Apart from the decorative capacity, each vertical convex wall with relief designs on three sides has high strength properties as well as high weather resistance. One heat-insulating layer, as a minimum, may be filled with light concretes, such as foamed concrete, pumice concrete, gas concrete, expanded-clay concrete and foam polystyrene concrete or made from other materials with high sound and heat-insulating properties. Reinforcement 5 provides reliable retention of the form wall in tray 1 and pulls layers 3 and 4 together, which is especially important for subsequent transportation of the form to the construction site. To strengthen the connection of layers 3 and 4 when pouring heat-insulating layer 4, use may be made of fabric reinforcement 28. The

inside of bottom 8 and side pieces 12 may be used to place interchangeable matrix 29 with any relief (convex) design for decorative layer 3. Matrix 29 for making a convex design on the surface of decorative layer 3 of an in-situ building wall may be made from a polymer material, for example, from polypropylene or polyethylene by the vacuum molding method. Using interchangeable matrix 29 obviates the need to make bottom 8 and side pieces 12 with a relief design. For this form set version bottom 8 and side pieces 12 are made with a smooth surface.

[0012] The removable formwork set with a sandwich wall is made as follows. Tray 1 is installed with bottom 8 down, positioning it horizontally relative to the ground level. End panels 13 are installed on tray 1 and retained with wedges 14. Decorative layer 3 may be applied immediately to bottom 8 and side pieces 12, if their surface has a preset relief design. When using interchangeable matrix 29 with a design, it is placed on side pieces 12 and bottom 8 and then the mix is poured. The mix for decorative layer 3 pouring is a viscous mass allowing uniform covering of the inside cavity of tray 1: its bottom 8, inclined side pieces 12 and internal ribs 11. These conditions are met, for instance, by fibred concrete containing either mineral or steel or polymer fibers. Fibred concrete forms decorative layer 3 of a channel-shaped form with high decorative, weather resistant and strength properties on three sides of the form wall. After the filling of at least one decorative layer 3, reinforcement 5 with fabric reinforcement 28 is installed on it. The most technological option is making fabric reinforcement 28 as a single whole with reinforcement 5, representing clamps whose lower ends are connected to fabric reinforcement 28. Fabric reinforcement 28 is channel-shaped replicating the form of bottom with side pieces 12 of tray 1. Fabric reinforcement 28 sides are pressed against decorative layer 3 of fibred concrete applied to side pieces 12. Reinforcement 5 is installed so that after filling the top meshes extend over the surface of heat-insulating layer 4.

[0013] Then at least one heat-insulating layer 4 by pouring light concrete into a cavity formed by channel-shaped decorative layer 3 with reinforcement 5 and fabric reinforcement 28 in tray 1. To make heat-insulating layer 4, use may be made of various mixes with various sound and heat-insulating properties. After pouring of heat-insulating layer 4 laying it is smoothed out lengthwise and edgewise in tray 1. Tray 1 is then supplied for drying to obtain a wall blank located in the internal cavity of tray 1. Upon drying of heat-insulating layer 4, end panels 13 are removed and the removable formwork set with the wall blank is prepared for transportation. To this end, trays 1 are placed horizontally on each other so that retaining supports 16 a higher-level tray 1 rest on end ribs 10 of a lower-level tray 1. Thus trays in a stack are attached to one another and cover 2 is placed on top tray 1, retaining its locks 25 in grooves 17 of tray 1.

[0014] When mounting a wall, the set of removable formwork with wall blank and cover 2 is installed vertically, with tray 1 placed outside, on prepared vertical rein-

forcement 30, setting the form true-vertical by adjusting supports 27. Then a concrete mix is poured into the form cavity with reinforcement 30, formed by heat-insulating layer 4 with reinforcement 5 and cover 2, forming base layer 31 of the building wall. Reinforcement 5 connecting decorative layer 3 and heat-insulating layer 4 provides stiff connection of the entire wall blank structure with reinforcement 30 and base layer 31 of the base layer 31 of the building wall, the form is removed. To this end, locks 25 of cover 2 are removed from grooves 17 of tray 1. Owing to the position of side pieces of tray 1 and side pieces 24 of cover 2 at an obtuse angle, cover 2 and tray 1 can be easily removed from a ready building wall after the opening of lock 25 from groove 17. Cover 2 is removed from the inside of the building on the side of base layer 31. Tray 1 is removed from the outside. Decorative layer 3 of the building wall has lateral decorative recesses formed by internal ribs 11 when pouring layers 3 and 4, and a fine relief (convex) design. Use of matrix 29 facilitates the removal of tray 1 during form removal. When installing doors and windows in the building, they are jointed to base layer 31 of the building and decorative layer 3 forms projecting trapezoidal-section half columns adjoining base layer 31 of the building and having a relief design on three sides. The design on IIPH decorative layer 3 has high strength and weather resistance properties. Factory production of a sandwich wall blank enhances the quality of decorative layer 3. Because the length of cover 2 is less than that of tray 1 by the value equal to the building ceiling height, reinforcement 30 adjoining heat-insulating layer 4 of the wall blank remains unfilled with a concrete mix at the form top under the base layer. This form area is then used to form crossbars and floor structures of the building. Such a cast-in-situ skeleton structure helps improve seismic resistance of the building, as all of its vertical and horizontal elements are rigidly interconnected by base layer 31. As a result, the exterior building portion is made decorative immediately after form operations and requires no additional finishing work. The interior surface of walls filled with concrete floor-high, using the removable formwork set with wall blank and cover 2 requires no additional finishing and plastering either due to the high-quality finish of cover 2 internal surface.

[0015] The removable formwork set with sandwich wall blank 4 is shown in Fig.6. A wall blank may include at least one additional decorative layer 32 meant to strengthen basic decorative layer 3 and at least one additional heat-insulating layer 33 designed to improve heat and sound insulating properties of building walls. Additional decorative layer 32 may be made assign concrete and additional heat-insulating layer 33 may be made as one or more inserts of foamed plastic or another similar material, thereby considerably enhancing sound and heat insulating properties of building walls.

[0016] Thus, the technical result obtained using this invention is improved versatility and performance characteristics of the removable formwork, reduced labor in-

tensity and easier concreting when erecting cast-in-situ skeleton buildings with decorative wall front surface, not requiring additional finishing and repair of interior and exterior surfaces, enhanced sound and heat insulation, strength and seismic resistance of buildings under construction.

Claims

1. **The removable formwork set with a sandwich wall blank characterizing in that** it comprises a tray and a sandwich wall blank located in its internal cavity as well as the formwork cover, the sandwich wall blank is comprised of at least one decorative and at least one heat insulating layer interconnected by reinforcement that has outside ends extending beyond at least one heat insulating layer, whereby the tray is composed of the bottom and side pieces positioned at an obtuse angle to the bottom plane, the tray has detachable end panels positioned perpendicular to the tray bottom at its ends, whereby at least one decorative layer is channel-shaped and the inside of the tray bottom and side walls are made in the way to ensure reproduction of a convex design on the surface of the decorative layer of the sandwich wall blank, whereby the formwork cover is composed of the top sheet and side pieces of the cover positioned at an obtuse angle to the top sheet plane, whereby the tray has grooves and the formwork cover features interconnection locks and the cover length is less than the tray length by the value equal to the building ceiling height.
2. **The removable formwork set with a sandwich wall blank** of claim 1, **wherein** the tray bottom has lower ribs and secured thereto from the inside, while the tray side pieces positioned at an obtuse angle to the bottom plane have side and end ribs and secured thereto from their inside, whereby the end ribs of tray side pieces are parallel to the bottom plane and the side ribs of tray side pieces are positioned perpendicular to the end ribs of tray side pieces and at an obtuse angle to the to the bottom plane, whereby the formwork cover top sheet has top ribs and is located on their inside and the cover side pieces positioned at an obtuse angle to the top sheet plane have the cover side and end ribs and attached to their inside, whereby the cover top ribs are parallel to the cover top sheet plane and the cover side pieces are positioned perpendicular to the cover end ribs and at an obtuse angle to the cover top sheet plane.
3. **The removable formwork set with a sandwich wall blank** of claim 1, **wherein** the tray lower ribs are placed perpendicular to one another forming lattice surfaces for attachment of the bottom and the cover top ribs are perpendicular to one another form-

ing lattice surfaces for attachment of the top sheet.

4. **The removable formwork set with a sandwich wall blank** of claim 1, **wherein** the tray has guide rails on the exterior surface of the bottom lower ribs.
5. **The removable formwork set with a sandwich wall blank** of claim 1, **wherein** the tray bottom and side pieces have internal ribs to form a design on the decorative surface of the decorative layer, which adjoin the internal surface of the bottom and side pieces.
6. **The removable formwork set with a sandwich wall blank** of claims 1 and 7, **wherein** the bottom and form cover have adjusting supports secured to one of the ends and designed to adjust the form position on the building floor slab.
7. **The removable formwork set with a sandwich wall blank** of claim 1, **wherein** the inside of the form cover is fitted with ball elements with transportation rod attachment holes.
8. **The removable formwork set with a sandwich wall** of claim 1, **wherein** at least one decorative layer is made of fibred concrete containing mineral or steel or polymer fibers.
9. **The removable formwork set with a sandwich wall** of claim 1, **wherein** decorative and heat-insulating layers contain a reinforcement lattice whose meshes extend beyond the heat-insulating layer for connection to the building load-bearing cast-in-situ wall.
10. **The removable formwork set with a sandwich wall** of claim 1, **wherein** it features at least one matrix to form a convex design on the surface of the cast-in-situ building decorative layer, located on the inside of the tray bottom and side pieces.
11. **The removable formwork set with a sandwich wall** of claim 1, **wherein** the tray bottom is fitted with retaining supports located on the outside of the horizontal ribs.

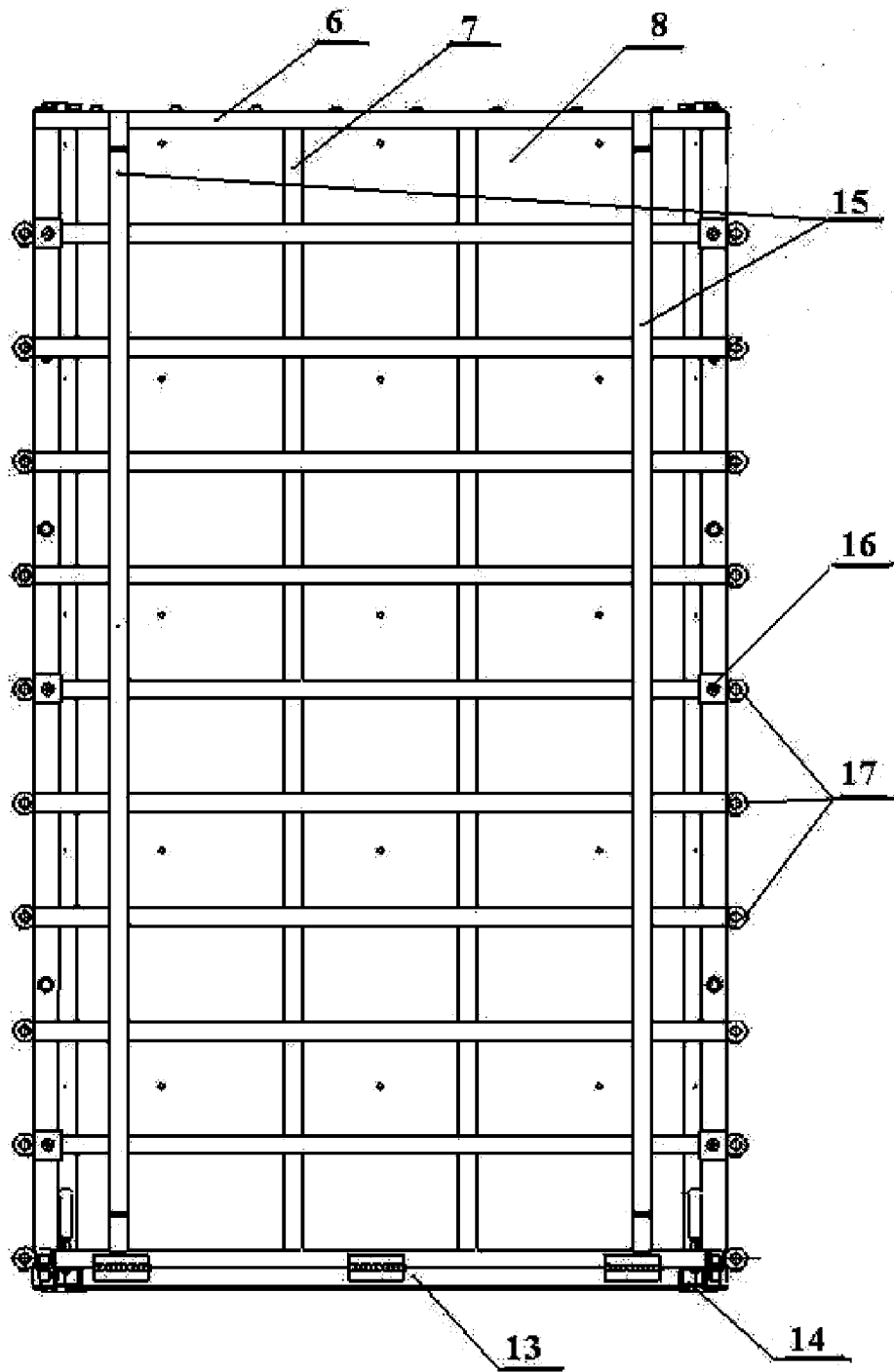


Fig. 1

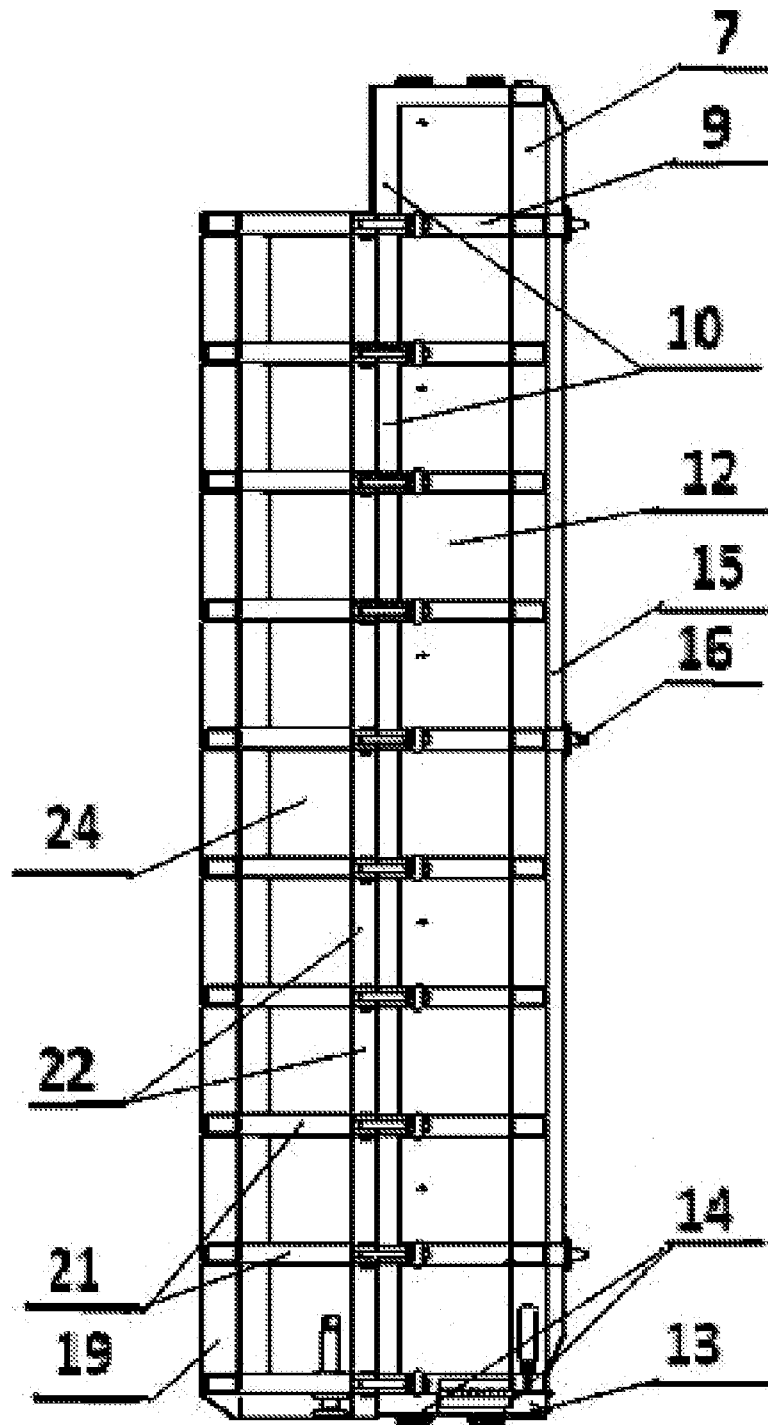


Fig. 2

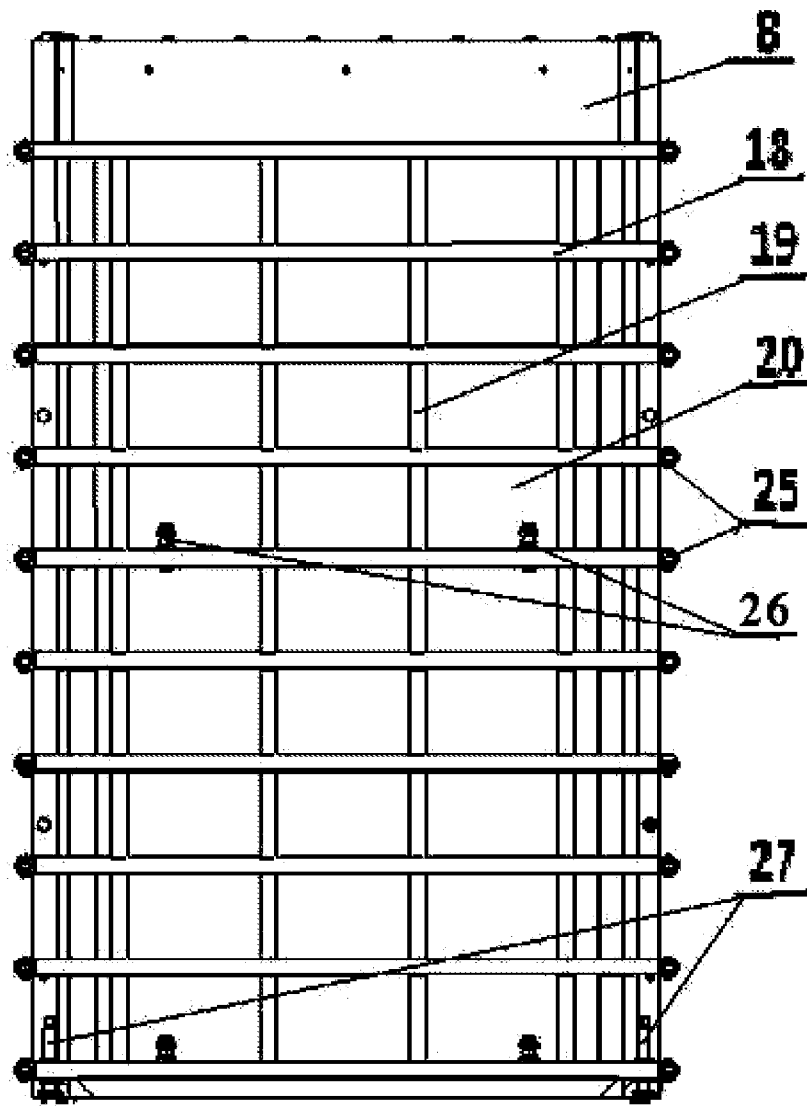


Fig. 3

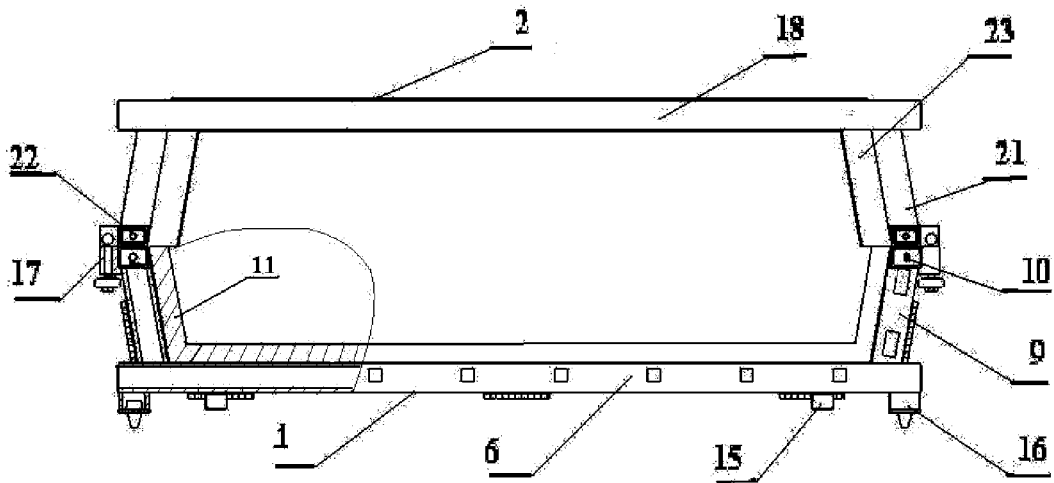


Fig. 4

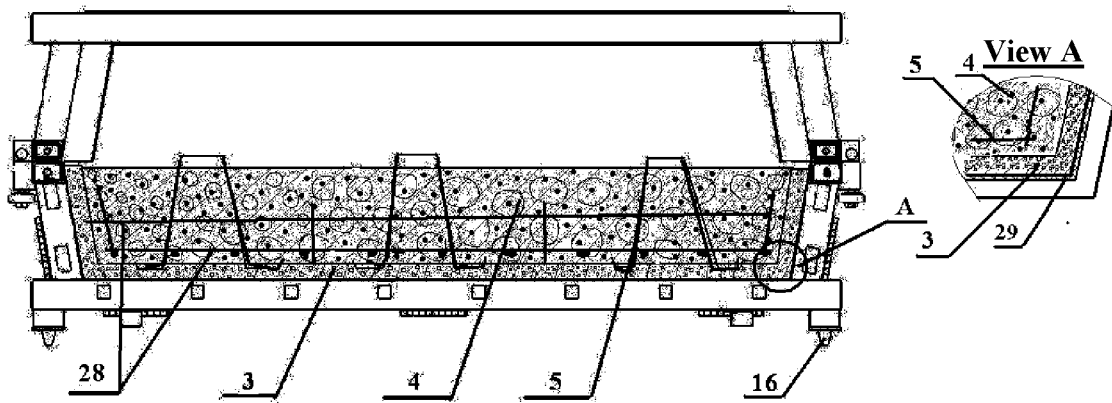


Fig. 5

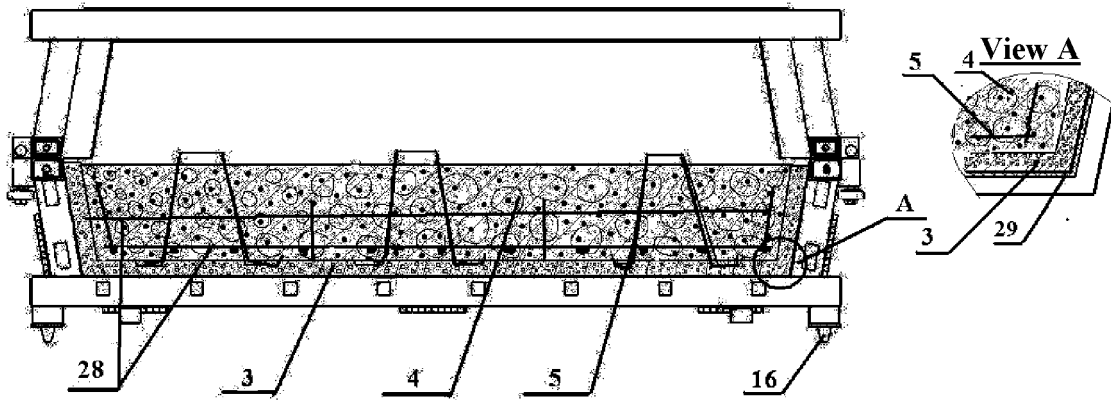


Fig. 6

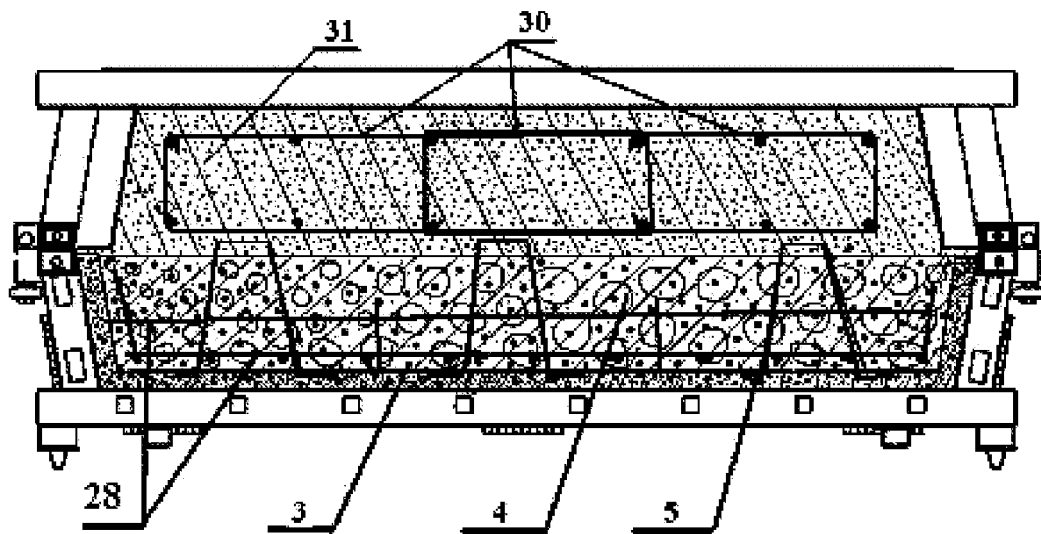


Fig. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/RU 2010/000679

A. CLASSIFICATION OF SUBJECT MATTER				
E04G 11/32 (2006.01)				
According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED				
Minimum documentation searched (classification system followed by classification symbols) E04G 11/00-11/02, 11/06- 11/10, 11/20, 11/32-11/34, B28B 7/08, E04B 2/56, 2/84				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Esp@cenet				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
A	RU 2057864 C1 (INZHEGORODSKAYA GOSUDARSTVENNAYA ARKHITEKTURNO-STROITELNAYA AKADEMIYA) 10.04.1996	1-11		
A	SU 1560707 A1 (GORKOVSKY INZHENERNO-STROITELNY INSTITUT IM. V.P. CHKALOVA) 30.04.1990	1-11		
A	FR 2581111 A1 (LE GAC YVES) 31.10.1986	1-11		
A	FR 2780742 A1 (SARREMEJEANNE GUY) 07.01.2000	1-11		
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.				
<p>* Special categories of cited documents:</p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent but published on or after the international filing date</p> <p>“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="vertical-align: top;"> <p>“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>“&” document member of the same patent family</p> </td> </tr> </table>			<p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent but published on or after the international filing date</p> <p>“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p>	<p>“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>“&” document member of the same patent family</p>
<p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent but published on or after the international filing date</p> <p>“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p>	<p>“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>“&” document member of the same patent family</p>			
Date of the actual completion of the international search 24 March 2011 (24.03.2011)	Date of mailing of the international search report 31 March 2011 (31.03.2011)			
Name and mailing address of the ISA/ Facsimile No.	Authorized officer Telephone No.			

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- RU 2326216 [0003]
- RU 2330148 [0004]
- RU 2171878 [0005]