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(54) **AN OPTIMAL CONSTRUCTION SYSTEM FOR BUILDINGS AND A METHOD OF USING THREE ELEMENTS AND THEIR COMPONENTS**

(57) The present invention is referred to a building structure, more particularly to the structure involving the main three elements. The elements are structural insulated panels (SIP) (1) and insulated connectors (2, 3) and parts thereof, which are adapted by cutting, dissecting or joining. These elements are of respective dimensions and made of materials with respective properties that when joining them and their parts together in a certain manner, securing with nails, screws or wood screws, and sealing the joining points with mounting foam, a closed, tight shell-type frame structure of the building is obtained. Thermal bridges are prevented due to insulated connectors applied. The shell type structure provides the building with the spatial stability, tightness, lightness, and thermal efficiency. Blocks assembled from such elements can be used for floors, walls, slabs and roofs in residential, commercial or individual buildings. These elements are universal; therefore, there is no need for a specific project design - availability of continuous manufacturing at the workshop and delivery to the warehouse. There are no concentrated loads, and no need for traditional foundations. It is just necessary for construction to prepare the site of compacted soil/gravel and arrange engineering network piping. The construction cost is considerably reduced due to universal application of three elements and their parts of the system, and effectiveness obtained, and continuous manufacturing to store in warehouse.

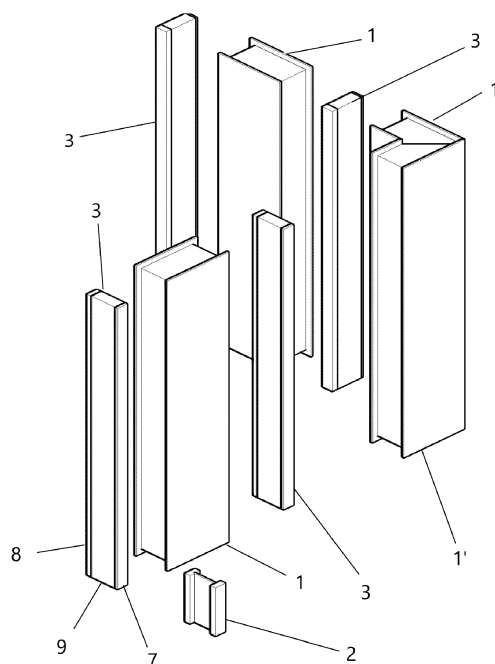


Fig. 1

Description

Technical field

[0001] The invention relates to a building structure, more particularly a structure involving prefabricated structural insulated panels (SIPs), panel systems with joining elements such as connectors to support an insulation barrier along the wall, with fastening elements, to reduce thermal changes between the exterior and interior of the building. Moreover, the connectors serve as slab reinforcement. The blocks assembled from such elements can be used for floors, walls, slabs and roofs in residential, commercial or individual buildings. With uniform load distribution throughout the building.

Technical background

[0002] It has been known for a long time that buildings remain warmer in cold environments and cooler in hot environments when certain materials with insulating properties are used in the walls, slabs and floors of the building. In order to improve energy efficiency, the wall thickness is increased by increasing the insulating material amount in the walls. The amount of supplies used, construction duration and labor force increase the construction costs.

[0003] With a view to increasing energy efficiency and reducing the costs the structural insulated panels (SIP) are applied. Since 1965 the SIP has been known all over the globe as a durable and heat-resistant system for wall and roof construction. The first buildings of this type have been already constructed in North America since 1930.

[0004] SIP panel houses are assembled quickly and qualitatively on site, using specially prefabricated panels. Timber beams or timber I-joists are used for assembling. <https://ecohouse.eu/technologija/>

[0005] Panels with frame structures are glued with specific adhesive and/or secured with wood screws. The house structure becomes homogeneous, moisture-resistant, and weather-resistant (to rain, cold, snow and heat).

[0006] There are many worldwide registered inventions related to frame house construction. Among them is, US4578909 (A), 1986-04-01. Insulated building construction. The construction comprising: first and second walls; first means for joining said first and second walls; one of said first and second walls including first and second panels each having: an interior skin; an exterior skin; and an insulating core fastened between said interior and exterior skins, said interior skin, said exterior skin and said core all having vertical edges, the vertical edges of said interior skin and said exterior skin extending in a horizontal direction beyond the vertical edges of said core at one end to form a first groove at such end of each of said first and second panels; and means for connecting said first and second panels together. The above joining member consists of three parts: exterior and interior fas-

tening elements, and insulated compacted polystyrene in-between.

[0007] The stability of this joint (fastening element) is insufficient to apply for slabs or roofing.

[0008] The above system involves many additional elements that must be manufactured separately for each building of different architectural structure.

[0009] Besides, specific knowledge is required to construct a building.

[0010] It is also known that timber beams are used as joining elements. However, such material is insufficiently insulating, heavy and expensive.

[0011] Furthermore, the foundation is required due to concentrated loads.

[0012] FR3043418, 2015-11-10. This invention relates to a kit of composite and wooden frame elements for the construction of thermally passive buildings. Light insulating components are provided therein. Assembly can be easily carried out by a single installer, and excellent thermal and air insulation can be obtained.

[0013] The disadvantage of the above invention is that it is necessary to build the frame of the house and then attach the insulation components to it. Such a building requires a pre-designed frame and specialized tools as well as respective knowledge for construction. It also involves additional elements that increase construction costs.

[0014] Furthermore, the foundation loads are concentrated at certain areas, uneven load distribution, and the foundation is necessary.

[0015] WO2022081011, 2020-10-16. This invention is in the field of a self-supporting modular system for a building, in particular for structural elements thereof, a building comprising said modular system, such an office building, a utility building, and a house, and a kit of parts comprising at least one element of said modular building system.

[0016] The disadvantage of the system is that this modular system consists of considerable number of parts to be specially manufactured resulting in increased construction cost.

Summary

[0017] Modern construction challenges are to make construction efficient, affordable, and fast. But at the same time, it is essential for constructed buildings to meet durability and energy efficiency requirements.

[0018] A new "Optimal Wall" construction system consisting of three main elements is proposed to reduce the construction costs of single or double storey residential, public, or industrial buildings of different architecture without compromising energy efficiency, durability, and structural strength. These elements are universal; therefore, there is no need for a specific project design - availability of continuous manufacturing at the workshop and delivery to the warehouse. The above elements are structural insulated panels (SIP) and insulated connectors and parts thereof, which are adapted by cutting, dissecting,

or joining. A tight frame-shell structure is obtained by securing the above elements and their parts together using nails, screws, or wood screws, and sealing the joining points with mounting foam. Thermal bridges are prevented due to insulated connectors applied. The shell-type structure ensures the spatial stability of the building, making it tight, light, and thermally efficient (A++, passive). There are no concentrated loads, and no need for traditional foundations. It is just necessary for construction to prepare the site of compacted soil/gravel and arrange engineering network piping.

[0019] The present invention, involving the usage of three elements, their application by cutting or dissecting, and interconnection with each other, allows obtaining the preferred technical result:

- lightweight structure - the weight of the heaviest part is approx. 65 kg; therefore, the construction can be carried out without additional machinery - manpower of two persons is sufficient;
- simplified construction process - no need for people with special skills, easy to train the new ones;
- uniform load distribution - no need for specific frame-work - the building structural frame consists of connectors evenly spaced throughout the building structure and therefore does not require special foundations; a compacted soil base is sufficient;
- high energy efficiency, structural durability, integrity, and stability - thermal bridges prevented by insulated connectors applied, and connections sealed with construction foam and secured with nails or wood screws do form a tight closed shell-type structure.

[0020] The construction cost is considerably reduced due to universal application of three elements and their parts of the system, and effectiveness obtained, and continuous manufacturing to store in warehouse.

[0021] In order to achieve the preferred technical effect with this new "Optimal wall" construction system, consisting of set of three elements and the parts thereof, the main three elements with optimal sizes are proposed:

the first element - structural insulating panel (SIP) with length of 3 m, which corresponds to the traditional height of the room, and width of 0,6 m - optimal step of frame struts, the recess between the external and internal SIP surfaces with smaller insulation layer therebetween, designed for placing the joining elements - connectors - uniform along the perimeter - 0,05 m, and the insulating layer thickness depends on desired level of energy efficiency, can be thinner/thicker, where optimal thickness is 0,2 - 0,3 m;

the second element - connector with width of 0,1 m and height corresponding to the insulation layer thickness, optimal sizes 0,2 - 0,3 m, which determines the optimality of structural connections, is designed for higher load-bearing as bottom, slabs, and

roof, or for reinforcement of window, door edges, and for maintaining thermal insulation properties, which comprises: insulated I-joist consisting of two timber beams and plywood therebetween, and insulating materials in the gaps between timber beams;

the third element - connector with width of 0,1 m and thickness corresponding to the insulation layer thickness, optimal sizes 0,2 - 0,3 m, which determines the optimality of structural connections, is designed for walls, which comprises: internal part - timber beam as frame strut; external part - plywood as binding between SIP external surfaces; and insulation layer therebetween,

or if greater strength is required around windows or doors:

connector reinforced when additional plywood is added to the plywood, the width remains the same as other joining elements, but the insulation is narrowed, through the thickness of the plywood, or

connector reinforced when timber beam inserted instead of plywood, the width remains the same as other joining elements, and the insulation layer is respectively narrower.

[0022] The indicated technical effect is also achieved due to building construction system involving three elements and materials of the latter element parts that are stable, durable and ecological: non-flammable, water-resistant and inert panels are preferred for the external and internal surface of SIP, the best suitable are fibrolite (GreenBoard) boards, which consist of: wood wool - 60%, portland cement (ordinary cement) - 39%, mineralizer (Sodium metasilicate - molten glass) - 1%; insulating layer - a material where layer thickness, depending on the value of the thermal conductivity coefficient, is selected according to the desired level of energy efficiency - the most acceptable is polystyrene foam EPS 100N with thermal conductivity coefficient λ_D : 0,03 m²K/W and compressive strength ≥ 100 kPa, bending strength ≥ 150 kPa or polyisocyanurate/polyurethane foam (PIR) with thermal conductivity coefficient λ_D : 0,022 m²K/W, and the like, these materials allow reaching the energy efficiency class A++; calibrated construction timber is also used in the connections.

[0023] Applying the construction system of buildings formed of three elements and a set of parts of these elements, the technical effect is achieved when:

bottom construction comprises: on a compacted soil base, with communications installed, based on the selected project area, joining of the SIP elements, for greater strength, through insulated double-tee connectors, edge sealing between the SIP surfaces with a cut-in-half connector along the entire perime-

ter and the cut external surface of the SIP of required size;

wall construction comprises: fixing the dissected connector at the bottom along the wall perimeter, fixing the vertical SIPs at this connector and joining them through connections, where greater strength is required, at windows or doors, through double-tee or reinforced connectors to reinforce the wall along the perimeter, at the top, fastening with a dissected connector, between the SIP surfaces;

wall or roof angle construction comprises: joining two SIPs cut at the required angle, without cutting off the external surface of the SIP towards the insulation part, at the corner through a timber beam and gluing the insulation part to each other;

roof or slab construction comprises: laying the SIPs, on top of the formed wall, for greater strength through double-tee connectors, and fixing, on top of the walls to the dissected connector fixed between the SIP surfaces, edge sealing between the SIP surfaces with a dissected connector along the entire perimeter and the cut external surface of the SIP of required size.

[0024] Dimensions, materials, arrangement, and inter-connection of three elements and a set of parts of these elements of the system provide for the uniform load distribution of building bottom, wall, slab, and roof structures; tightness; high energy efficiency level; lightness; fast, easy, and cost-saving construction.

Brief description of the drawings

[0025]

- Fig. 1. - Schematic view of building wall and corner components.
- Fig. 2. - Schematic view of building wall with corner and bottom joining.
- Fig. 3. - Schematic view of building bottom joining.
- Fig. 4. - Schematic view of building wall corner parts.
- Fig. 5. - Reinforced connection view.
- Fig. 6. - Reinforced I-joist view.
- Fig. 7. - Roof or slab structure joining view.
- Fig. 8. - Layout of building structure joining.
- Fig. 9. - Schematic view of integrated load-bearing frame.

[0026] Drawings show the elements and their parts:
1 - structural insulating panel (SIP) (the first element of

building structure); 1' - SIP angle section (SIP cut at the right angle for the wall corner); 2 - connector (the second element of building structure); 2' - I-joist; 3 - connector (the third element of building structure); 3' - connector (connector 3 cut-in-half longitudinally); 3'' - reinforced connector (when plywood added to connector 3, the width remains the same as connector 3, and insulating part is narrower, through plywood thickness); 3''' - reinforced connector (when timber beam is added in the connector 3 instead of plywood, the width remains the same as connector 3, and insulating layer respectively narrower); 4 - SIP external surface (a part of the first element of building structure); 4' - SIP external surface (cut based on the height of connector 3); 5 - SIP internal surface (a part of the first element of building structure); 5' - cut internal panel of SIP; 6 - SIP insulating layer (a part of the first element of building); 6' - cut insulating part of SIP; 7 - timber beam; 7' - timber beam (cut-in-half; 8 - insulating layer (component of connector 3); 8' - insulating layer (component of connector 3'); 8'' - insulating layer of reinforced connector 3'' (insulating layer 8 narrower through plywood thickness); 8''' - insulating layer of reinforced connector 3''' (narrower to the extent that the width of reinforced connector 3''' is the same as connector 3, when timber beam is placed instead of plywood); 9 - plywood (component of connector 2); 9' - plywood (component of connector 3'); 10 - plywood (a part of I-joist 2'); 11 - insulating material (for thermal insulation of I-joist 2') 12 - plywood (for reinforcement of I-joist 2').

Invention embodiments

[0027] The embodiment (Fig. 8) provides the optimal construction system, where the only main three (Fig. 1) elements (1), (2) and (3) with their parts are applied, and the building structural frame consists of (Fig. 9) evenly spaced throughout the building structure (Fig. 1, Fig. 5, Fig. 6) connectors (2, 3, 3', 3'', 3''') joining SIP (1). The above three elements, where needed, are applied by cutting or dissecting, and joined to each other, and secured with nails, screws or wood screws, then sealed with mounting foam and thereby forming a tight frame shell structure. Thermal bridges are prevented due to insulated connectors. The closed type shell structure provides the building with the spatial stability, tightness, lightness, and thermal efficiency (A++, passive).

[0028] The embodiments (Fig. 3, Fig. 7, Fig. 8) provide the connector (2) designed for higher load-bearing, as bottom, slab, and roof or for reinforcement of window, door edges, and for maintaining thermal insulation properties, which comprises: insulated I-joist consisting of two timber beams (7) and plywood (10) therebetween, and insulating materials (11) in the gaps between timber beams. Where needed, the reinforced joists (Fig. 6) can be used for longer slabs, when the plywood (12) is fixed to I-joist (2') from both sides, and the like.

[0029] The provided embodiments (Fig. 1, Fig. 2, Fig. 8) show the view and application of the connector (3) for

walls, comprising: internal part - timber beam (7) as frame strut, external part - plywood (9), insulating layer (8) therebetween or, if greater strength is required around windows or doors, (Fig. 5a) reinforced connector (3'') when additional plywood (9) is joined to the plywood or (Fig. 5b) connector (3'''), when timber beam (7) is added instead of plywood.

[0030] The provided embodiment (Fig. 3) for bottom construction, comprises: on a compacted soil base - standard foundation is not required - with communications installed, based on the selected project area, joining of the SIP (1) elements, for greater strength, through connectors (2), edge sealing between surfaces (4, 5) with connector (3') - cut-in-half connector (3), and external surface (4).

[0031] The provided embodiment (Fig. 2) for building wall construction, comprises: a joining element (3') fixed at the bottom along wall perimeter, fixing the vertical SIP (1) on this joining element (3') and joining them with connectors (3), where greater strength is required, at windows or doors, with connectors (2) or (3'') to reinforce the wall along wall perimeter, at the top, fixing with connector (3'), between the surfaces (4, 5).

[0032] The provided embodiment (Fig. 4) for building wall angle construction, comprises: joining two SIPs cut at the required angle, without cutting off the part of external surface (4) of the SIP towards the insulation part (if right 90° angle is joined, the cut is done at 45° angle in respect of SIP external and internal surfaces (4, 5)), at the corner through a timber beam and gluing the cut insulation parts (6') of SIP to each other.

[0033] The provided embodiment (Fig. 7) for building roof or slab construction, comprises: SIP laying, on the formed wall for greater strength, joining through connectors (2), and fixing to the connector (3') fixed on top of the walls between SIP external and internal surfaces (4, 5), edge sealing between SIP external and internal surfaces (4, 5) with connector (3') and SIP external surface (4').

[0034] Optimal dimensions of three elements of the system: SIP length 3 m, which corresponds to the traditional height of the room, and width of 0,6 m - optimal step of frame struts, recess between SIP external and internal surfaces (4, 5) with smaller insulating layer (6) therebetween for placing the joining elements - connectors (2, 3, 3', 3'', 3''') of 0,05 m, uniform along the perimeter, and the width of connectors (2, 3, 3', 3'', 3''') is 0,1 m, and thickness corresponds to insulating layer (6) thickness; optimal insulating layer - 0,2-0,3 m (based on desired level of energy efficiency can be thinner/thicker); the element dimensions are interrelated depending on preferred energy efficiency level or optimality of structural connections to be achieved.

[0035] The materials of three elements of the system: non-flammable, water-resistant and inert panels are the most suitable for SIP external (4) and internal (5) surface; for insulating layer - material depends on preferred energy efficiency level, i.e thermal conductivity coefficient

value, to be achieved.

[0036] For SIP external (4) and internal (5) surface the best suitable are fibrolite (GreenBoard) boards, which consist of: wood wool - 60%, portland cement (ordinary cement) - 39%, mineralizer (Sodium metasilicate - molten glass) - 1% MgO (magnesium oxide) board is also suitable in terms of its parameters.

[0037] Insulating layer - the most acceptable is polystyrene foam EPS100N with thermal conductivity coefficient λ_D : 0,03 m²K/W and compressive strength ≥ 100 kPa, bending strength ≥ 150 kPa or polyisocyanurate/polyurethane foam (PIR) with thermal conductivity coefficient λ_D : 0,022 m²K/W.

[0038] For joining elements the most acceptable is calibrated pinewood or spruce wood, plywood, and for insulating layers (8, 8', 8'', 8''') or I-joist insulating materials (11) the most suitable is polystyrene foam EPS100N with thermal conductivity coefficient λ_D : 0,03 m²K/W and compressive strength ≥ 100 kPa, bending strength ≥ 150 kPa or polyisocyanurate/polyurethane foam (PIR) with thermal conductivity coefficient λ_D : 0,022 m²K/W.

[0039] In order to illustrate and describe the present invention, the above is a description of the embodiment. This is a partial representation of a building construction system that can be used to construct single and multi-storey buildings of different architecture and purpose. Construction of higher than double-storey building requires additional load-bearing structural solutions. This is not an exhaustive or limiting description. Materials having the same strength and insulation properties may be applied as well.

Claims

1. Optimal construction system of buildings formed of three elements and a set of parts of these elements, comprising of structural insulating panels (SIP) and joining elements to connect them, where each SIP has external and internal surfaces, and smaller insulation part bonded by gluing between the said external and internal surfaces, in the way to form a groove within the said surface edges for joining element placing and joining of two SIPs, **characterized in that** the three elements of the system comprise:

the first element - structural insulating panel (SIP) (1) with length of 3 m, which corresponds to the traditional height of the room, and width of 0,6 m - optimal step of frame struts, the recess between SIP external and internal surfaces (4, 5) with smaller insulation layer (6) therebetween designed for placing the joining elements - connectors (2, 3, 3', 3'', 3''') - uniform along the perimeter - 0,05 m, and the insulating layer (6) thickness depends on desired level of energy efficiency, can be thinner/thicker, where optimal thickness is 0,2 - 0,3 m;

the second element - connector (2) designed for higher load-bearing, as bottom, slab, roof or for reinforcement of window, door edges, and for maintaining thermal insulation properties, which comprises: insulated I-joint (2) consisting of two

timber beams (7) and plywood (10) therebetween, and insulating materials (11) in the gaps between timber beams.

the third element - connector (3) for walls, comprising: internal part - timber beam (7) as frame strut, external part - plywood (9) as binding between SIP external surfaces, insulating layer (8) therebetween.

or if greater strength is required around windows or doors:

- reinforced connector (3'') where additional plywood (9) is added to the plywood (9), the width remains the same as other joining element (3), but the insulation is narrowed, through the thickness of plywood (9), or
- reinforced connector (3''') where timber beam (7) inserted instead of plywood (9), the width remains the same as other joining element (3), and the insulation layer is respectively narrower;

when connectors (2, 3, 3', 3'', 3''') with width of 0,1 m and thickness corresponding to the insulating layer (6) thickness, optimal sizes 0,2 - 0,3 m, which determines the optimality of structural connections;

their application by cutting or dissecting, and interconnection with each other to form:

- load-bearing - bottom, wall, wall corner, slab, roof frame - uniform load distribution, when structural frame consists of connectors (2, 3, 3', 3'', 3''') evenly spaced throughout the building structure;
- and
- closed, tight, integral external and internal shell of the building, where connections sealed with mounting foam and secured with nails or wood screws thereby achieving high energy efficiency level, tightness, integrity and stability.

2. Optimal construction system of buildings formed of three elements and a set of parts of these elements according to Claim 1, **characterized in that** non-flammable, water-resistant and inert panels are the most suitable for SIP external and internal surfaces (4, 5); for insulating layer - material depends on preferred energy efficiency level, i.e thermal conductivity coefficient value desired to be achieved.

3. Optimal construction system of buildings formed of

three elements and a set of parts of these elements according to Claim 2, **characterized in that** optimal materials for SIP external and internal surfaces (4, 5) are fibrolite (GreenBoard) boards, which consist of: wood wool - 60%, portland cement (ordinary cement) - 39%, mineralizer (Sodium metasilicate - molten glass) - 1%; MgO (magnesium oxide) board is also suitable in terms of its parameters.

Insulating layer - the most acceptable is polystyrene foam EPS100N with thermal conductivity coefficient λ_D : 0,03 m²K/W and compressive strength ≥ 100 kPa, bending strength ≥ 150 kPa or polyisocyanurate/polyurethane foam (PIR) with thermal conductivity coefficient λ_D : 0,022 m²K/W and the like, these materials allow reaching the energy efficiency class A++.

4. Optimal construction system of buildings formed of three elements and a set of parts of these elements according to any of Claims 1-3, **characterized in that** the building bottom comprises: on a compacted soil base, with communications installed, based on the selected project area, joining of SIP (1) elements, for greater strength, through connectors (2), edge sealing along the perimeter between external and internal surfaces (4, 5) with connector (3') and SIP external surface (4).

5. Optimal construction system of buildings formed of three elements and a set of parts of these elements according to any of Claims 1-3, **characterized in that** the walls comprise: fixing the connector (3') on the building bottom along the wall perimeter, on this connector (3') fixing of vertical SIPs and joining them with connectors (3), where greater strength is required, at windows or doors, with connectors (2, 3'') or (3''') to reinforce the wall along wall perimeter, at the top fixing with connector (3') between SIP external and internal surfaces (4, 5).

6. Optimal construction system of buildings formed of three elements and a set of parts of these elements according to Claims 1-3, **characterized in that** the wall or roof corner comprise: joining the two SIP angle parts (1') at the corner through timber beam (7) and gluing the SIP insulating parts (6') to each other.

7. Optimal construction system of buildings formed of three elements and a set of parts of these elements according to any of Claims 1-3, **characterized in that** the building roof or slab comprises: SIP laying, on the formed wall, for a stronger bond, joining through connectors (2), and fixing to the connector (3') fixed on top of the walls between SIP external and internal surfaces (4, 5), edge sealing between SIP external and internal surfaces (4, 5) with connector (3') and SIP external surface (4').

8. Method of application of the optimal construction system of buildings formed of three elements and a set of parts of these elements according to Claim 4, **characterized in that** the building bottom is constructed on a compacted soil base, with communications installed, based on the selected project area, SIP (1) elements are joined, for greater strength, through connectors (2), edges are sealed between SIP external and internal surfaces (4, 5) with connector (3') and fixed with SIP external surface (4). 5 10
9. Method of application of the optimal construction system of buildings formed of three elements and a set of parts of these elements according to Claim 5, **characterized in that** the wall is constructed when the connector (3') is fixed on the bottom along the wall perimeter, the vertical SIPs are fixed on this connector (3') and joined with connectors (3), where greater strength is required, at windows or doors, with connectors (2, 3") or (3'') to reinforce the wall along wall perimeter, at the top are fixed with connector (3') between SIP external and internal surfaces (4, 5). 15 20
10. Method of application of the optimal construction system of buildings formed of three elements and a set of parts of these elements according to Claim 6, **characterized in that** the wall or roof corner is constructed when the two SIP angle parts (1') are joined at the corner through timber beam (7) and the SIP insulating parts (6') are glued to each other. 25 30
11. Method of application of the optimal construction system of buildings formed of three elements and a set of parts of these elements according to Claim 7, **characterized in that** the building roof or slabs are constructed when SIP is laid on the formed wall, for greater strength are joined through connectors (2), and fixed to the connector (3') fixed on top of the walls, and edges are sealed between surfaces (4, 5) with connector (3') and the external surface (4') is sealed. 35 40

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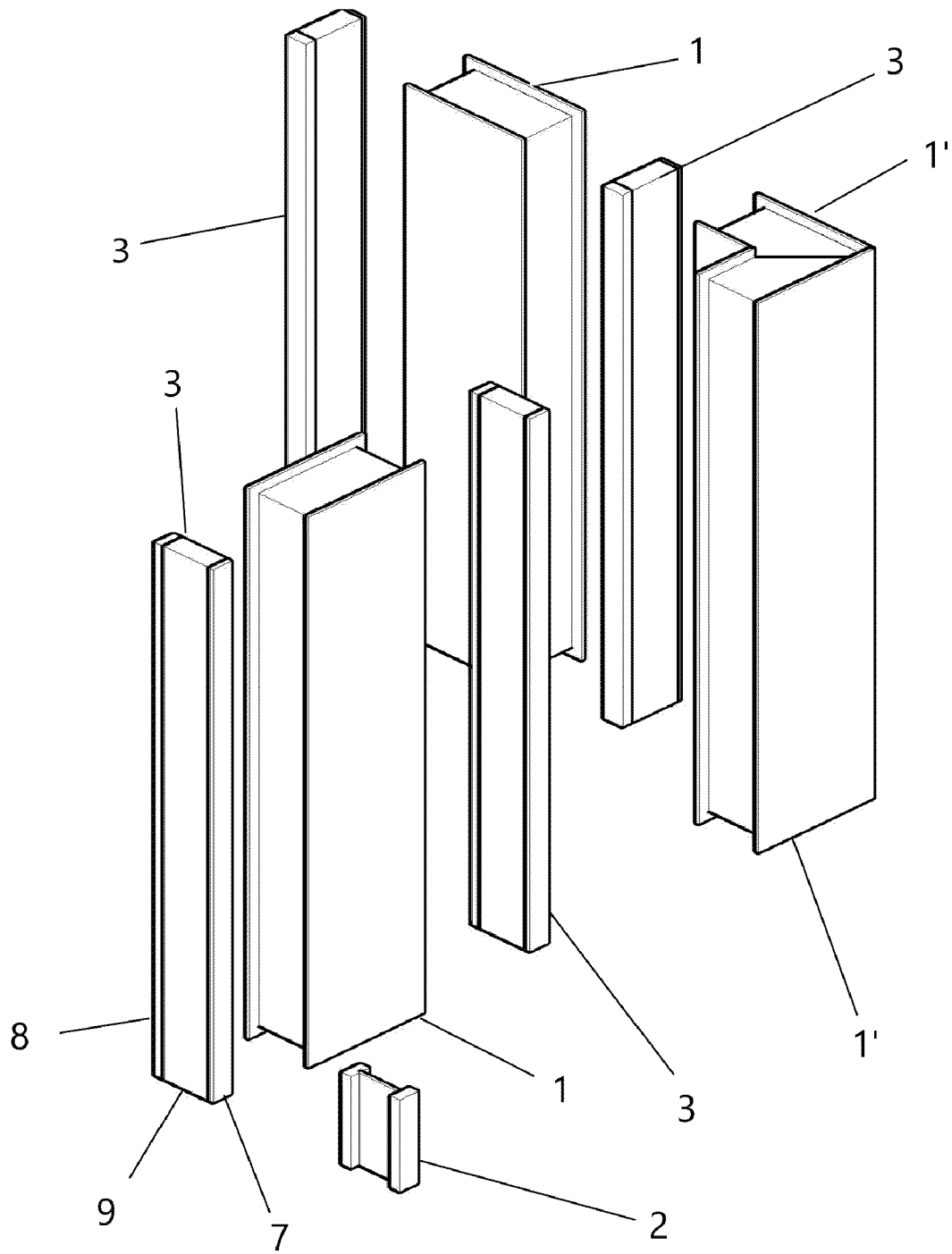


Fig. 1

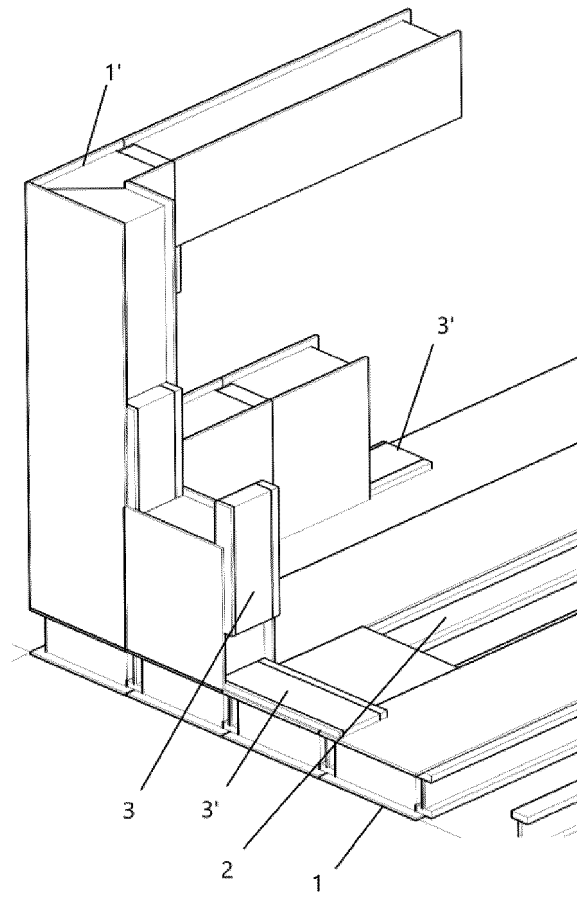


Fig. 2

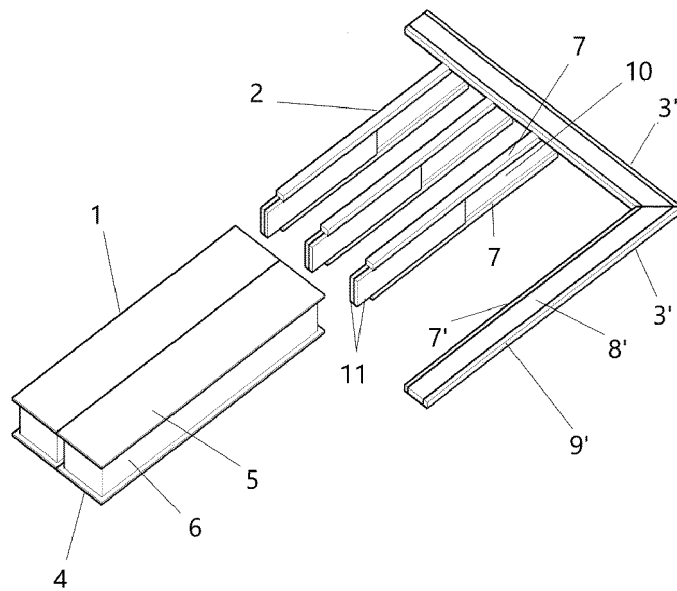


Fig. 3

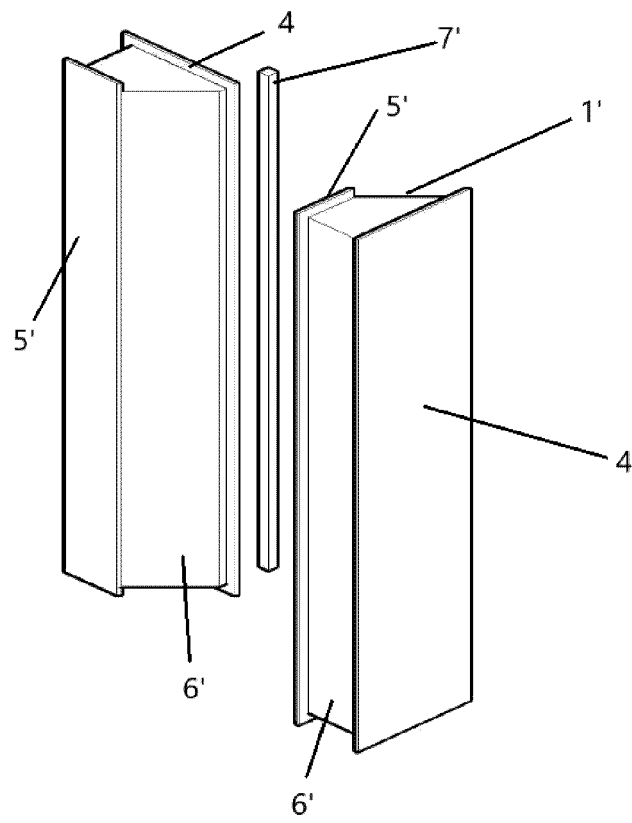


Fig. 4

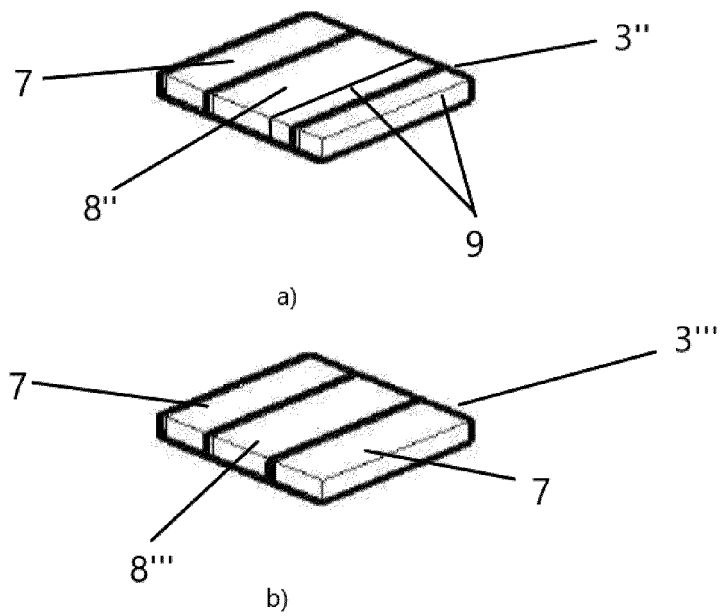


Fig. 5

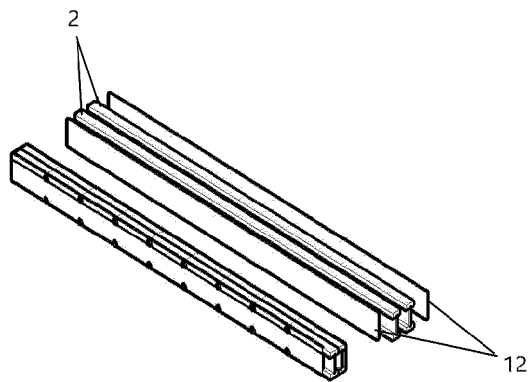


Fig. 6

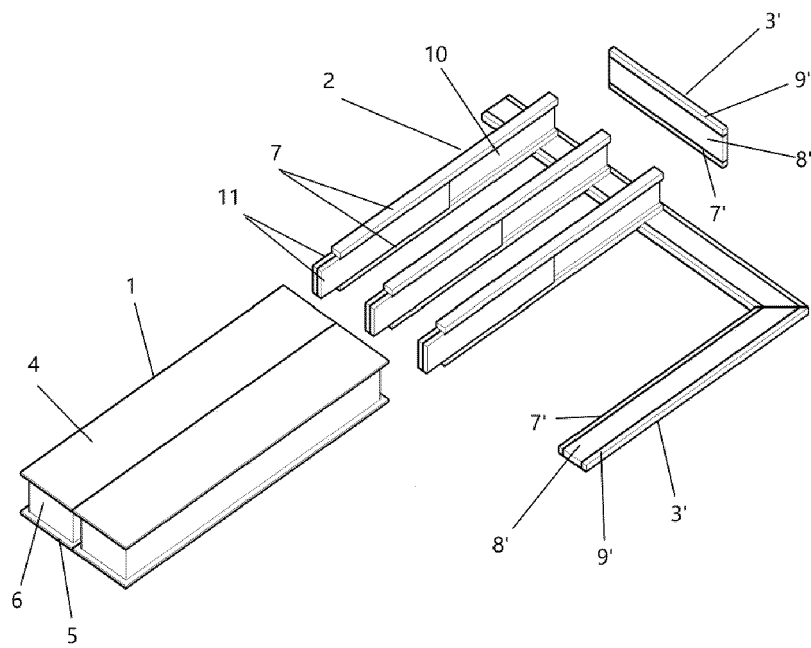


Fig. 7

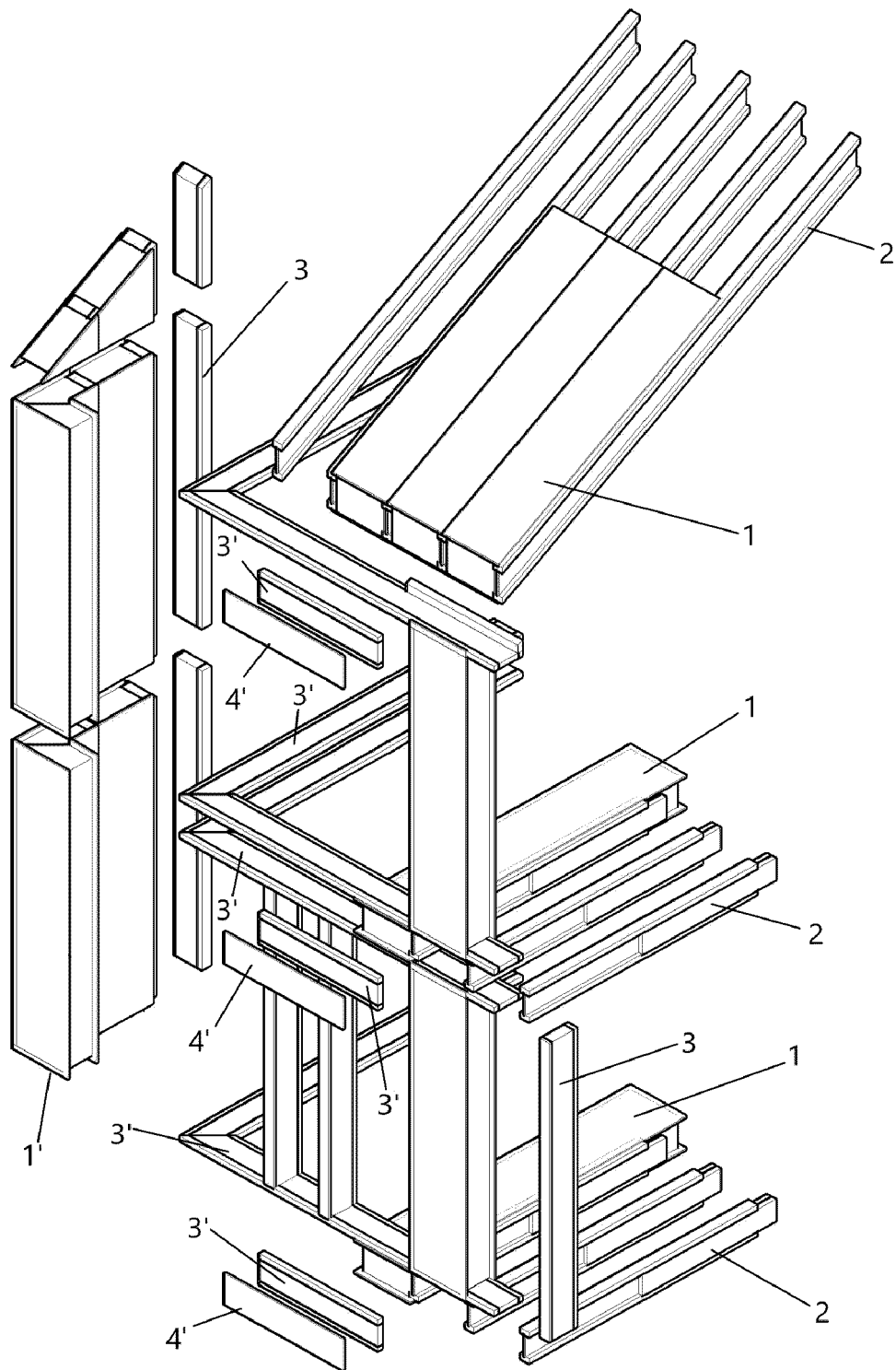


Fig. 8

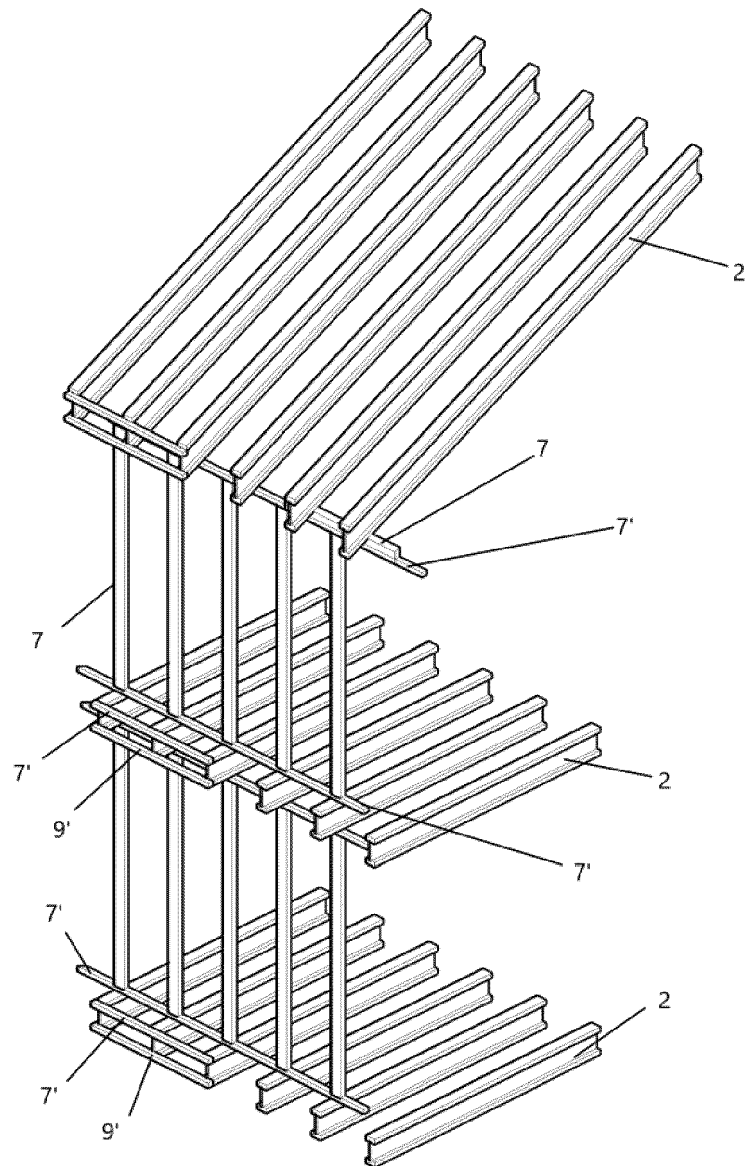


Fig. 9

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 4578909 A [0006]
- FR 3043418 [0012]
- WO 2022081011 A [0015]