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(54) **BUILDING STRUCTURAL CONNECTOR AND THE METHOD OF ERECTING WALLS**

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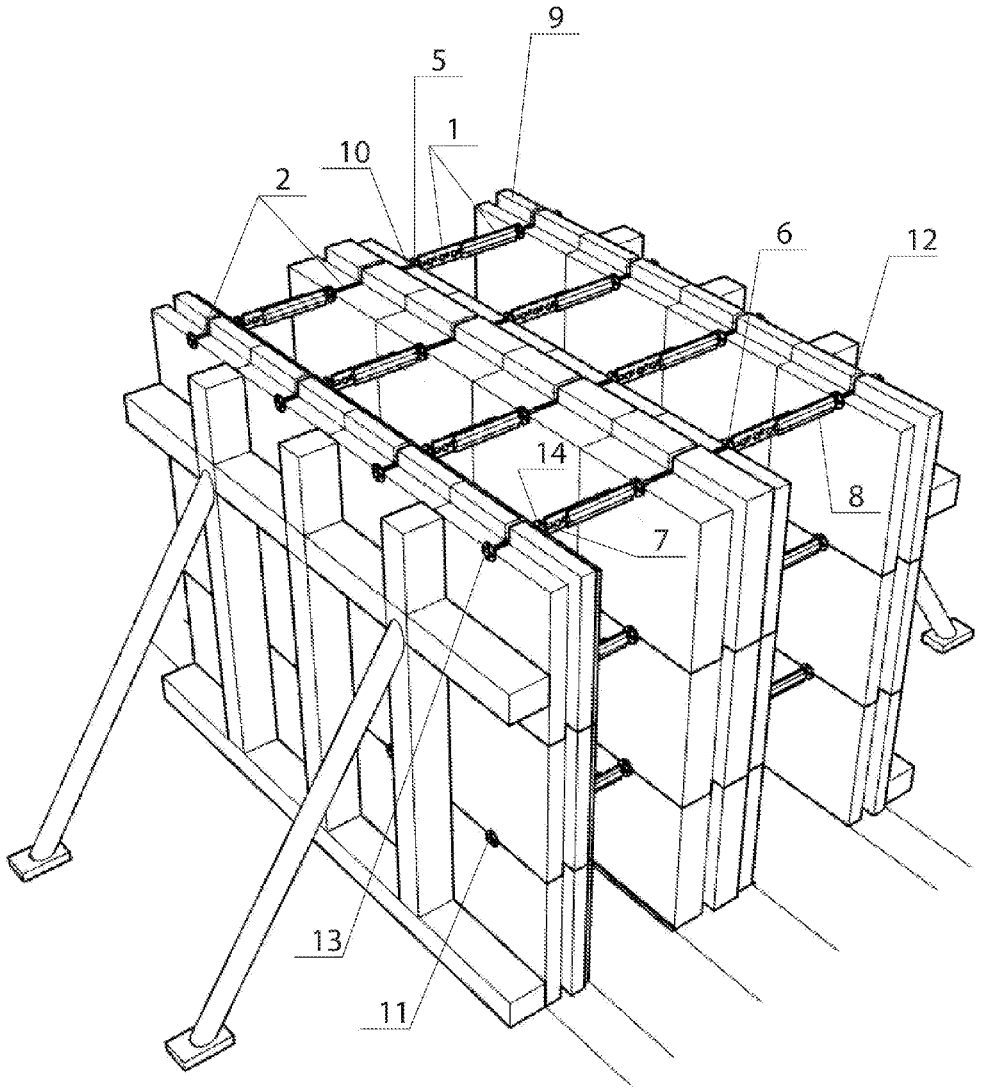
(57) **ABSTRACT**

Building structural connector having at least one longitudinal two-part distancing member fitted with technical measures allowing to adjust its length, as well as fixing members connected thereto on both sides for the fixing of the connector to the shuttering panels, as well as fitted with vertical plates perpendicular to the longitudinal axis of the connector, characterized in that the entire distancing member (**1**) is placed between the inner surfaces of the shuttering panels (**9**) and ends on its both ends with distancing plates (**5**) having sockets (**6**) with a thread corresponding to the threaded end (**10**) of the fixing member (**2**) inserted therein, where the fixing member (**2**) ends on its other end with the limiting plate (**11**) and takes the form of a rod slipped into the ducts (**12**) of the shuttering panel.



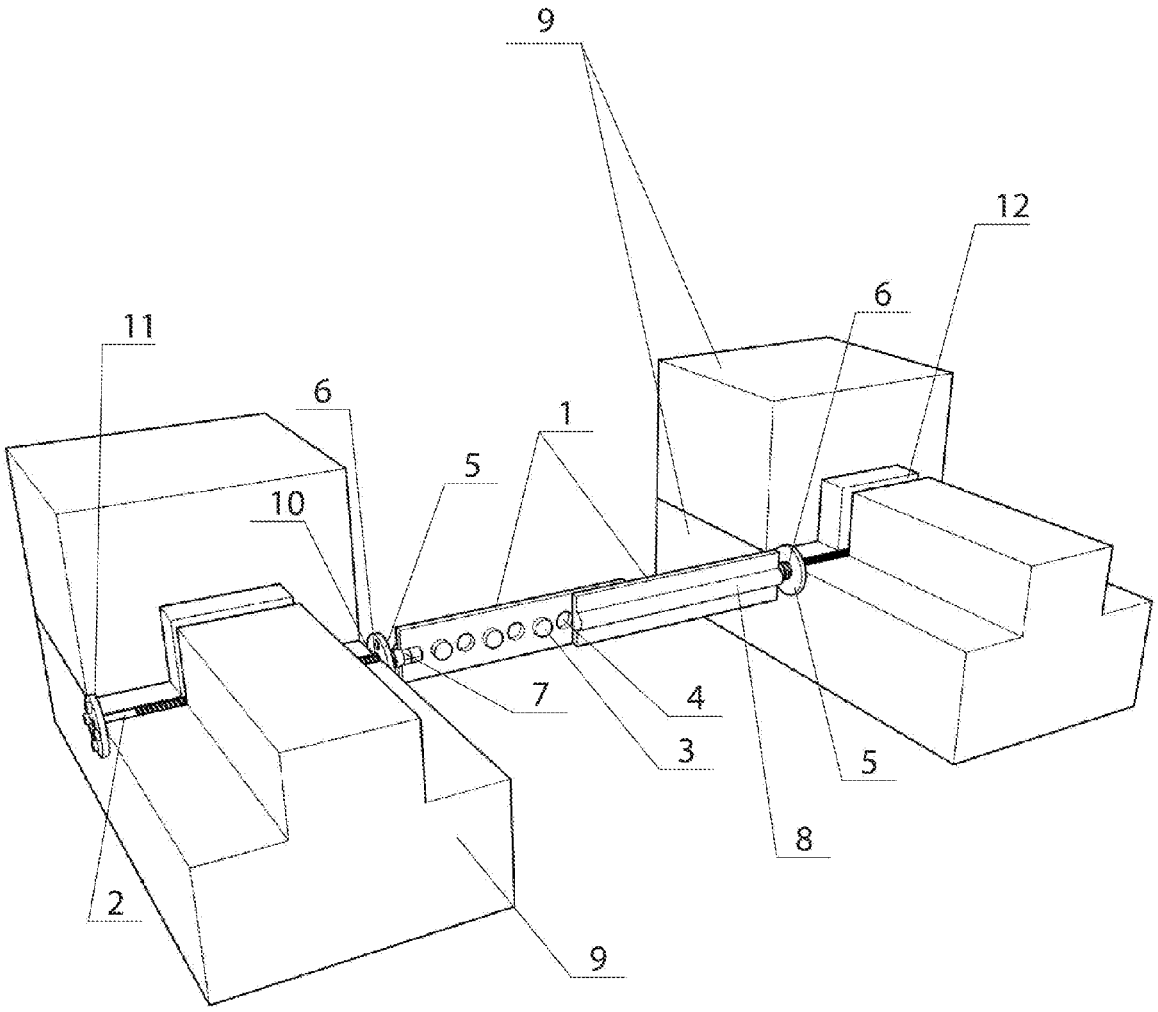


Fig. 1

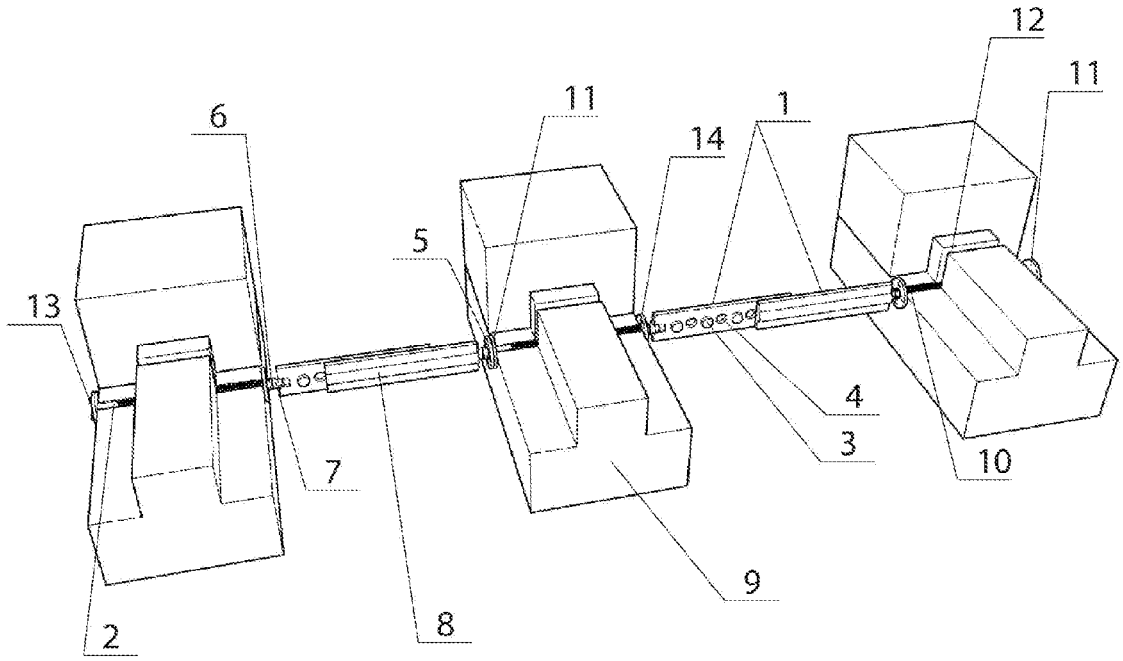


Fig. 2

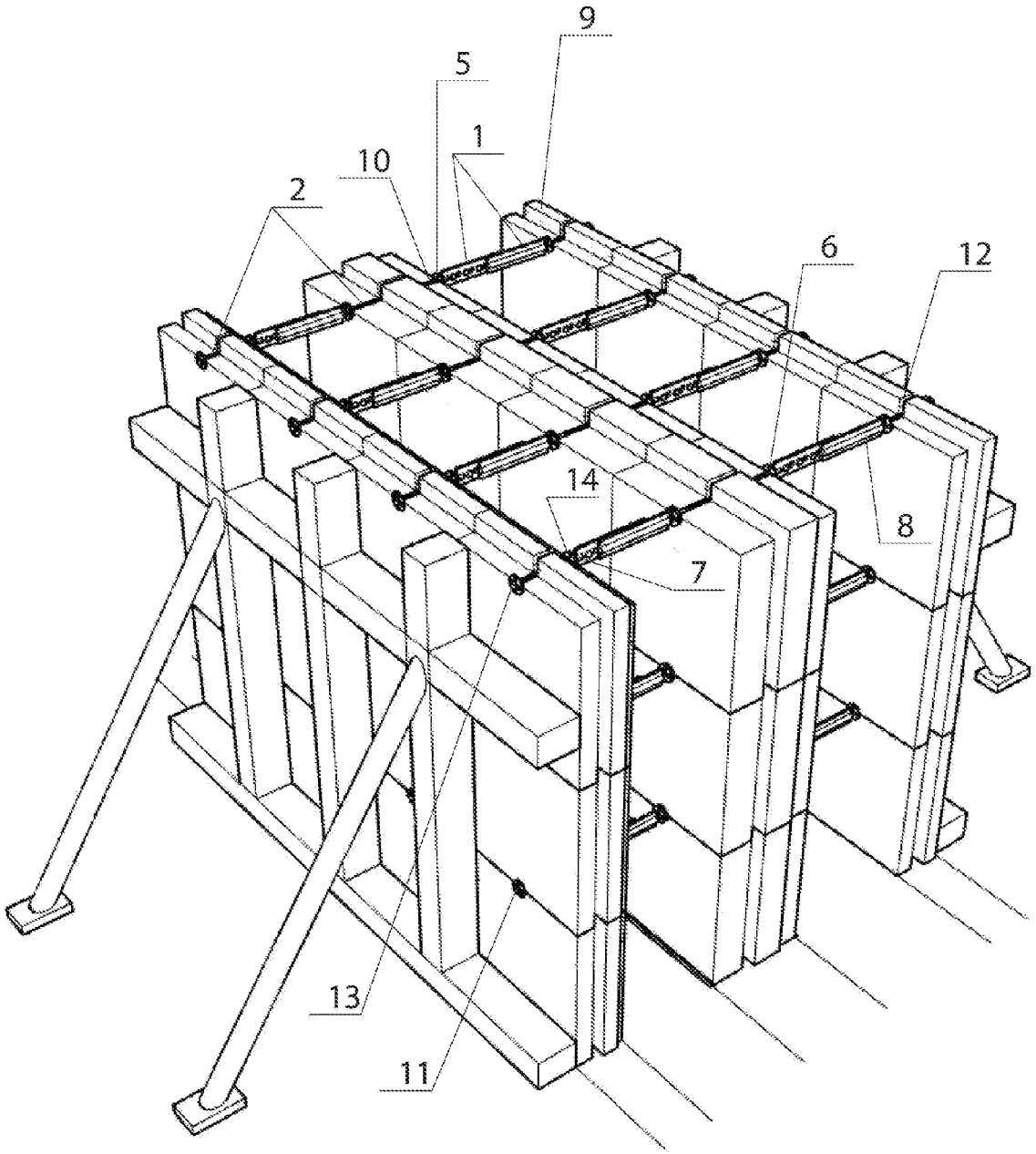


Fig. 3

BUILDING STRUCTURAL CONNECTOR AND THE METHOD OF ERECTING WALLS

[0001] The invention concerns a building structural connector and a method of erecting walls using the building structural connector which is intended for use in building concrete walls, especially when shuttering panels of foamed polystyrene are applied. Known are building structural connectors of different types designated for joining panels which form the shuttering for the erected walls and for ensuring an appropriate distance between the parallel panels forming the shuttering. The structure of the connectors is adjusted to the specific application and depends, in particular, on the type of the material of which shuttering panels are made and on whether the shuttering is removed once the wall is erected or left to serve as e.g. insulation layer or cladding, etc. The connectors used in the so-called ICF (Insulating Concrete Forms) systems, i.e. technologies of erecting concrete walls in a shuttering made of interconnected Styrofoam profiles, represent a specific group of connectors. These connectors are either integrated with the shuttering panels or constitute separate elements slipped into the dedicated openings in the connected panels.

Among many different known methods of erecting walls there is a method which consists in filling the space between the shuttering walls with liquid concrete mix, particularly when the shuttering is assembled of Styrofoam panels. The shuttering walls are formed by connecting individual panels one to another using the tong-and-groove connections formed therein and/or using connectors integrated with the panels, or slipped into the dedicated openings formed in the panels. The methods used to stabilize the vertical shuttering walls and protect them against being pushed apart include dismountable external reinforcing elements of different kinds, supports, and bracings, such as planks, poles, bolts, or props. Depending on the needs, conditions, and the parameters of the materials used, the erected shuttering walls differ in height, and the space between them is filled either in a single concrete pouring operation; alternatively, the subsequent layers of shuttering and concrete are erected only once the preceding layer of the concrete mix has set. After the entire building wall has been erected, the shuttering panels and their connectors can be left as a stay-in-place formwork to serve as an insulating layer on the wall which can then be covered with plaster, cladding, etc. Such technologies are applied in particular when expanded polystyrene (EPS) panels are used. The profiles of such panels are made by pre-foaming polystyrene and injecting it to the dedicated injection mould in which either special locks or openings to accommodate specific connectors etc. are formed, or where panels with integrated plastic connectors are moulded. If the Styrofoam panels need to be removed from the concrete layer, additional technological operations need to be performed which leave the panels unfit for further use, and the concrete wall is left with fragments of connectors or openings, which may be undesirable.

Known from Polish patent application PL205634 is a connecting member of a structural element in the form of a single connector or a pair of connectors. The single connecting member takes the form of a longitudinal structural element fitted with fixing plate elements on its ends, having at least one transverse narrowing and axial fixing and guiding protrusions located on the external sides of the fixing plate elements, where the protrusions may have longitudinal openings reaching down to the transverse narrowings.

Disclosed in American patent application No. U.S. Pat. No. 3,985,329 is a folded shuttering and special connectors therefor. The proposed connector has a distancing member at the ends of which holders are fixed on flexible hinges, where the holders have plates which rest on the shuttering panels, as well as longitudinal fixing elements which reach outside the shuttering through the openings in the panels and are fitted with threaded nuts.

[0002] Known from patent application No. U.S. Pat. No. 4,765,109 is an adjustable connector designated for joining parallel shuttering panels to each other. The connector consists of two separate longitudinal elements which are connected to each other on one side with pegs and the corresponding holes arranged alternatingly on their contacting surfaces so that the length of this part of the connector is adjustable. Every other end of the longitudinal element is fitted with two vertical plates, an inner one and an outer one, positioned perpendicular to the longitudinal axis of the connector, set at a distance from each another and connected to each other with at least two arms. The arms between the inner plate and the outer plate can be combined of two parts connected to each other with pegs and the corresponding holes arranged alternatingly. The connectors are slipped into the dedicated slots in the shuttering panels so that the external plate finds itself on the external panel wall, and the internal plate on the internal panel wall. If it is necessary to remove the shuttering panels once the building wall is complete, the external plates of the connectors must be cut off, following which it may be necessary to remove any protruding arms and internal plates.

[0003] Building structural connector having at least one longitudinal two-part distancing member fitted with technical measures allowing to adjust its length, as well as fixing members connected thereto on both sides for the fixing of the connector to the shuttering panels, as well as fitted with vertical plates perpendicular to the longitudinal axis of the connector, characterized in that the entire distancing member is placed between the inner surfaces of the shuttering panels and ends on its both ends with distancing plates having sockets with a thread corresponding to the threaded end of the fixing member inserted therein, where the fixing member ends on its other end with the limiting plate and takes the form of a rod slipped into the ducts of the shuttering panel.

[0004] The limiting plates on the external wall have at least two regularly arranged convex elements, and on the wall of the distancing plates on the side of the fixing member there are concave spots corresponding to the convex elements.

[0005] In one variant the connector consists of two identical distancing members and three identical fixing members.

[0006] In other variant the connector consists of a single distancing member and two identical fixing members.

[0007] The distancing member takes the form of two identical flat elements connected together with alternatingly arranged pegs and holes, and the axis of the socket in each of the distancing plates runs along the plane of contact of the flat elements.

[0008] The distancing member takes the form of two identical flat elements connected together with alternatingly

placed groove-and-tongue connections, and the axis of the socket in each of the distancing plates runs along the plane of contact of the flat elements.

[0009] Preferably, the sockets in the distancing plates extend into the flat elements.

[0010] The inner sides of the distancing plates fit tightly to the walls of the flat elements.

[0011] In other variant between the walls of the flat elements and the walls of the distancing plates there are slots formed around the socket.

[0012] Preferably, the sockets have at least one narrowing, the outer diameter of which is smaller than or equal to the inner diameter of the socket in the section which connects the distancing plate with the wall of the flat element, where the narrowing enables cutting the distancing plate off the flat element of the distancing member of the connector in the finished concrete wall by inserting a bore the diameter of which is larger than the diameter of the narrowing into the socket in the distancing plate and reaming the narrowing so as to detach the elements. The opening left after removing the distancing plate from the concrete wall can be filled with a filling material such as concrete which allows to obtain a smooth finish of the erected building wall.

[0013] Preferably, in the flat element of the connector there is a longitudinal groove which reaches up to the threaded part of the socket in the distancing plate and accumulates any potential moisture undesirable in the concrete wall. In three-layer walls and at specific temperature called the 'dew point' water vapor which permeates through the wall can condensate. The longitudinal groove enable to inspect the wall for moisture content by inserting a probe into the groove through the socket in the distancing plate. It is also possible to connect longitudinal grooves in a two-segment distancing member by making a hole in the corresponding pair of the fixing devices (peg and hole or tongue and groove). In this way it is possible to obtain an air duct going all across the concrete wall.

[0014] The convex elements of the limiting plates and concave spots of the distancing plates are cylindrical in shape.

[0015] Preferably, the convex elements end with a flange formed thereon, and the concave spots have a corresponding scoop, thus forming a clasp connection.

[0016] Besides enabling the setting of the joint with the limiting plate of the fixing member, the grooves in the distancing plates make it also possible to attach an additional spatial element between the distancing plate and the shuttering wall, as well as an element which would be removed after the concrete in the erected wall has set, thus facilitating the forming of e.g. installation ducts. In one of the possible solutions the additional spatial element may take the form of a strip with carves for the threaded end of the fixing member to pass through, as well as protruding elements to be connected with the distancing plate wall. In another solution a different spatial element may be used in a similar way, where the element takes the form of a stencil for making indented patterns on the concrete finishing layer in a simple and cost-effective way.

[0017] The method of erecting walls using the building structural connector which consists in drawing the line along which the building wall will run on the floor and then on erecting parallel vertical shuttering panel walls on both sides of the line, where the panels are connected to one another with connectors, stabilized, and braced using known technical measures, and where the space between the panels is filled with liquid concrete mix, and where, once the mix has set, the shuttering panels are either left in place or removed, according to the invention is characterized in that in the preparation phase there are at least two carves made in each shuttering panel in one of its horizontal edges, where the carves form ducts perpendicular to the line of the erected building wall, the depth of which is at least equal to the diameter of the rods of the fixing members of the building structural connector, the structure of which is described in claims **1** to **3**, where the connectors are assembled by joining together elements of the distancing members so that the length of each of the two distancing members corresponds with the designed thickness of the concrete layers. The limiting plate of the central fixing member is connected with the adjacent distancing plate of the distancing member, following which the fixing members are pre-screwed to the distancing members. Then, three rows of the shuttering panels are erected parallel to each other along the line of the designed building wall at pre-determined distances, and oriented so that their ducts run in their horizontal top edges aligned along common lines, whereupon rods of the fixing members are slipped into the ducts of the shuttering panels layer one so that that the distancing plates of the distancing members are adjacent to the internal walls of the shuttering panels, and the limiting plates of the external fixing members are adjacent to the external walls of the external shuttering panels. On the erected layer of the shuttering panels a subsequent layer of shuttering panels is arranged and positioned so that their ducts run in their top horizontal edge, whereupon the fixing members of the connector slipped into the ducts of the lower layer are screwed tight so that the distancing plates and the limiting plates overlap the side surfaces of the shuttering panels of the upper layer and fit closely to them.

[0018] Once the concrete layer of the building wall solidifies, the rods of the external fixing members of the building structural connectors are screwed out and the external shuttering panels are removed. With the external shuttering panels taken off, the narrowing in the socket is reamed and the distancing plate with the cut-off fragment of the socket is removed. Removal of the distancing plate with a fragment of the socket opens access to the tunnel in the distancing member and enables inserting the probe to measure moisture content inside the finished concrete wall.

[0019] In one of the variants, at the initial preparatory stage indentations are formed under any known method to the predetermined pattern in the selected walls of the shuttering panels which will adhere to the external concrete wall surfaces.

[0020] Rectangular panels of expanded or extruded polystyrene are used as shuttering panels, and the ducts are formed in the panels under the thermal cutting method.

[0021] Preferably, there is a tongue formed along the top edge of the rectangular panel of expanded or extruded polystyrene which serve as the shuttering panels, and a corresponding groove along the bottom edge, where the ducts are formed by making in-depth cuts under the thermal cutting method.

[0022] The advantage of the solution according to the invention lies in the universality of the building structural connector which can be used in both the stay-in-place formwork technologies, and those in which the shuttering panels are removed. The connector structure according to

the invention makes it possible to erect both the typical building walls consisting of a single layer of concrete, as well as three-layer walls under the method according to the invention. Moreover, the solution according to the invention makes it possible to build typical walls using the existing panels of expanded polystyrene (EPS) and extruded polystyrene (XPS) without the need to produce dedicated panels, and enables re-using the removed panels and the connector fixing elements.

[0023] An exemplary embodiment of the building structural connector is illustrated on the drawing, where FIG. **1** shows the connector in the first exemplary embodiment in a perspective view, FIG. **2** depicts the connector in the second exemplary embodiment in a perspective view, and FIG. **3** shows the perspective view of the shuttering with connectors for a three-layer wall.

[0024] In the first exemplary embodiment shown on FIG. **1** the building structural connector is made of rigid plastic and is composed of a single distancing member **1** and two fixing members **2** connected thereto on its both ends. The distancing member **1** takes the form of two identical longitudinal flat elements, where there are cylindrical pegs **3** and cylindrical holes **4** corresponding thereto arranged alternatingly on one of the walls of the longitudinal flat elements, and where the two elements of the distancing member are joined together with the pegs **3** and holes **4**. At the opposite ends of the distancing member **1** there are vertical circular distancing plates **5** with a threaded socket **6** on their external walls, where the axis of the socket is aligned with the longitudinal axis of the connector and runs along the plane of contact of its flat elements. Socket **6** extends into the longitudinal element of the distancing member **1**, in which it takes the form of a semi-circular threaded scoop in the internal wall of the flat element.

[0025] Between the walls of the flat elements and the walls of the distancing plates **5** there are slots formed around the socket **6**. In the socket **6** there is a narrowing **7** between the distancing plate **5** and the wall of the flat element which enables cutting it off the flat element in the finished concrete wall. On the wall of the flat element there is a half-cylinder with tunnel **8** inside, which goes along the entire length of the flat element reaching up to the threaded socket **6**. The tunnel **8** follows the axis of the pegs **3** and holes **4** so as to enable drilling an additional hole therein down to the tunnel and linking two tunnels **8** of two identical flat elements set together to form a single distancing member **1**. The adjustable total length of the distancing member **1** is fixed by connecting together the longitudinal flat elements with pegs **3** and holes **4** so that the total length of the distancing member is equal to the distance between two parallel shuttering panels **9**, i.e. the planned thickness of the concrete layer of the building wall, in other words so that the entire distancing member **1** is placed between the shuttering panels **9** with its distancing plates **5** fitting tightly to the panels. The connector has two identical fixing members **2**, each in the form of a rod with a threaded end **10** on one side, screwed into the socket **6** in the distancing plate **5** of the distancing member **1**. Fixed to the opposite end of the rod of the fixing member **2** there is a limiting plate **11** in the shape of a disc perpendicular to the connector axis. The length of the fixing member **2** depends on the thickness of the shuttering panels **9** which the connector is intended to join. The length is selected so that once the end of the rod is screwed into the distancing member **1** the limiting plate **11** fits tightly to the external surface of the shuttering panel **9**. There may be an indentation of any desired shape formed in the external surface of the limiting plate **11**, where the indentation can be used to fix external finishing elements on the wall. Once the fixing members **2** are pre-screwed to the distancing member **1**, the rods of the fixing members are slipped into the transverse ducts **12** made in the top edges of the shuttering panels **9** arranged parallel to each other. The depth and width of the ducts correspond with the diameter of the fixing member rod selected so that the rod does not protrude above the top edge of the panel. Once a layer one of the shuttering panels **9** is erected and the panels are connected with the connectors, another layer of shuttering panels **9** is arranged thereon and oriented in such a way that the transverse ducts for the fixing rods run in the panel top edges. The distancing plates **5** and limiting plates **11** of the building structural connector slipped into the ducts **12** of the lower layer of shuttering plates **9** overlap the walls of that lower panel layer, as well as the walls of the next layer erected thereon. Then, the building structural connectors placed in the ducts **12** of the lower layer are screwed tight so that the distancing plates **5** and the limiting plates **11** fit tightly to the walls of the shuttering panels **9**, thanks to which the entire panel system gets stabilized. The space between the parallel shuttering panels **9** is filled under known method with concrete mix, and once it sets the shuttering panels and the connectors are either left on the concrete layer of the building wall or removed, depending on the selected technology. If the shuttering panels are left in place to serve as e.g. insulation, the limiting plates **11** can be used to fix the finishing elements. The shuttering panels are removed by screwing the rods of the fixing members **2** out of the sockets **6** in the distancing plates **5**. The process does not damage the shuttering panels **9** or the fixing members **2** of the building structural connector, thanks to which they can be re-used. At the same time none of the elements of the distancing members **1** left in the wall protrudes from the building wall face, thanks to which no further operations are necessary to obtain a smooth wall surface. The only elements left in the face of the concrete building wall are the visible distancing plates **5** which can be used to fix other external structural elements or removed by inserting a drill in their socket **6** and reaming the narrowing **7**, whereupon the distancing plate **5** is removed with a fragment of the socket **6**. The hollows thus formed in the wall face can be filled with e.g. concrete mix in the color matching the external finish of the entire wall.

In other variants of embodiment of the building structural connector its distancing member **1** can consist of two identical elements of different shapes joined together, where the elements are fitted with different known technical measures which enable setting those elements together and adjusting their total length. In particular, the measures can take the form of flat longitudinal elements with formed locking or wedging devices etc. In any case, the distancing member **1** is ended with the distancing plates **5** on its both ends, where the inner sides of the plates fit tightly to the walls of the longitudinal member elements, and their outer walls fit tightly, once the connector is placed in the shuttering panels, to the external walls of the shuttering. In another variant it is possible to connect an additional spatial element to the distancing plate **5** between the plate and the shuttering panel **9** to form installation ducts or other indentations in the concrete finish.

In the second exemplary embodiment shown on FIG. **2** the building structural connector consists of two identical distancing members **1** and three identical fixing members **2**. Each distancing member **1** consists of two identical flat elements with cylindrical pegs **3** and the corresponding cylindrical holes **4** arranged alternatingly on one of its wall, where the pegs and holes are used to join the two elements of the distancing member **1** together. At the opposite ends of the distancing member **1** there are vertical distancing discs **5** with a threaded socket **6** formed in their external walls, the axis of which is aligned with the longitudinal axis of the connector and runs along the plane of contact of its flat elements. There are slots formed between the distancing plates **5** and the flat elements of the distancing member **1** around the socket **6**, where the socket extends into the longitudinal element of the distancing member **1**, in which it takes the form of a semi-circular threaded scoop in the internal wall of the flat element. In the socket **6** there is a narrowing **7** between the distancing plate **5** and the wall of the flat element which enables cutting it off the flat element in the finished concrete wall. On the wall of the flat element there is a half-cylinder with the tunnel **8** inside, which goes along the entire length of the flat element reaching up to the threaded socket **6**. The tunnel **8** follows the axis of the pegs **3** and holes **4** so as to enable drilling an additional hole therein and link two tunnels **8** of two identical flat elements set together to form a single distancing member **1**. Each fixing member **2** takes the form of a rod with a threaded end **10** on one side, screwed into the socket **6** in the distancing plate **5** of the distancing member **1**, while at the other end of the rod there is a limiting plate **11** in the shape of a disc perpendicular to the connector axis. Formed on the external wall of the limiting plate **11** are four regularly arranged convex elements **13**, and on the internal wall of the distancing plate **5** there are four corresponding concave spots **14**. Preferably, the convex elements **13** end with a resilient flange, and the concave spots **14** have an expanded scoop at their bottoms so that the convex elements **13** and the concave spots **14** form clasps. The building structural connector in the exemplary embodiment shown on FIG. **2** is intended in particular for making stable connections of three rows of shuttering plates **9** erected when building concrete walls with an inner insulating layer. Elements of each of the distancing members **1** are set and connected together so that the distancing members **1** have the predetermined length equal to the thickness of the designed concrete layers. On its one end, the central fixing member **2** is connected to the first distancing member **1** with the threaded end inserted into the socket **6** of the distancing plate **1**, and on its other end to the other distancing member **1** by pressing the convex elements **13** of the limiting plate **11** into the concave spots **14** in the distancing plate **5**. The threaded ends **10** of the external fixing members **2** are inserted into the socket **6** of the external distancing plates **5**. Once all members of the connector are pre-connected together, the rods of the three fixing members **2** are slipped into the transverse ducts **12** in the three parallelly arranged shuttering panels **9**, while the distancing members **1** fall in between the panels. After erecting the next layer of the shuttering panels **9** the fixing members **2** are screwed tight to the distancing members **1** so that the distancing plates **5** and the limiting plates **11** rest on the walls of the shuttering panels **9**. Once the concrete mix poured into the two spaces between the parallel shuttering panels **9** has set, it is possible to remove the external shuttering panels by screwing the external fixing members **2** out of the distancing members **1**.

The method of erecting building walls with the use of the building structural connector according to the invention, an exemplary embodiment of which is illustrated on FIG. **3**, is used to obtain a three-layer building wall, where there is an integrated insulating layer in between the two layers of concrete. Used as the shuttering panels **9** are rectangular polystyrene panels, especially typical panels with a tongue along the center line of one of the edges, and the corresponding grooves along the opposite edge, which facilitate erection and stabilize the subsequent layer of panels stacked on the lower layer. At the first, preliminary stage identical and mutually parallel transverse carves are made in the top edge with the tongue of each of the shuttering panels **9**, where the carves serve as ducts **12** which go through the tongues and reach inside the panel. The dimensions of the ducts **12** are selected so that the rods of the fixing members **2** of the building structural connector slipped inside do not protrude above the surface of the top edge wall of the shuttering panel **9**, and their limiting plates **11** do protrude above the edge. The ducts **12** can be carved using any known method, the thermal cutting method in particular. The number of ducts and the distance between them are selected individually and depend on the dimensions of the panels and connectors, their endurance parameters, etc. Preliminary preparation of the building structural connector consists in pre-connecting its individual members together. To that end, two elements of the distancing members **1** are set together so that their length is equal to the designed thickness of the concrete layers, whereupon one end of the central fixing member **2** is connected to one of the distancing members **1** by placing its threaded end **10** in the threaded hole in the distancing plate **5**, and on the other side it is connected to the second distancing member **1** by joining the limiting plate **11** with the distancing plate **5** by inserting the convex elements **13** into the concave spots **14**. The external ends of the distancing members **1** are connected to the external fixing members **2** be pre-screwing the threaded ends **10** into the sockets **6** of the distancing plates **5**. Erection of a building wall starts from drawing the wall line on the prepared and even floor, along which three parallel rows of the first layer of the shuttering panels **9** are arranged at the distances determined by the designed thickness of the wall, so that the edge with the tongues and transverse ducts aligned across the three rows of the panels is on the top. Once the first layer of three rows of the shuttering panels **9** has been erected, the building structural connectors are put in place by inserting the rods of the fixing members **2** into the ducts **12** preformed in the shuttering panels. Then, another layer of the shuttering panels **9** is arranged on the first layer, where the tongues of the lower layer go into the grooves in the upper layer. Since the rods of the fixing members **2** do not protrude above the surface of the top edge of the first layer of panels with the connectors, the bottom edge of the next layer of shuttering panels **9** fits to it tightly, and the distancing plates **5** and the limiting plates **11** overlap the side walls of the two adjacent layers of the shuttering panels **9** at their convergence. Once the subsequent layer has been erected, all building structural connectors of the preceding layer are screwed tight so that the distancing plates **5** and the limiting plates **11** fit tightly to the side walls of the shuttering panels **9** of both layers. In the same way the subsequent layers of the shuttering are erected and stabilized with the building

structural connector. Depending on the needs, different known methods are used when erecting shuttering walls to fix them and brace on the outside for rigidity, by fixing square timber elements to the floor, and mounting supporting elements such as poles, bolts, or angle struts, with particular focus on stabilization and sealing the contact point between the bottom panels and the floor. Once the shuttering walls reach the predetermined height, the two spaces formed between the rows of the shuttering panels **9** are filled with concrete mix. After is has set and solidified, the rods of the external fixing members **2** are screwed out and the external layers of the shuttering panels **9** are removed. In effect a three-layer wall is obtained, with two concrete layers of smooth external surfaces and an insulating layer inside formed by the central row of the shuttering panels **9** left between the layers of concrete as a stay-in-place formwork. In one of the variants of the invention embodiment it is possible to make scoops in the selected walls of the shuttering panels **9** using any known method to a predetermined pattern which will be copied on the surface of the concrete wall once the external shuttering panels are removed. The removed shuttering panels **9** and the fixing members **2** of the building structural connector can be re-used when erecting another wall. The entire distancing members **1** are left inside the layers of concrete with no elements protruding which would require cutting off, nor are there any hollows left therein which would require filling. The distancing plates **5** on the concrete surfaces with concave spots **14** on their outer surfaces can be used for fixing finishing elements. It is also possible to take off the distancing plates **5** from the concrete finishing layer by reaming the narrowings **7** in the sockets **6** and removing the plates from the concrete wall. Moreover, it is possible to measure moisture content in the concrete wall by inserting a probe into the tunnel **8** in the distancing member **1**, and fill the openings in the wall with e.g. a concrete mix. The method enables erection of the entire building floor in a single operation in the form a stable shuttering which is braced on the outside for rigidity and its chambers are filled with concrete mix, or erection of the shuttering walls up to a certain height, filling the shuttering with a concrete mix and arranging subsequent shuttering layers once the mix has set. Erection of building walls under the described method involving the use of the building structural connector according to the invention does not require forming any special openings, locks, etc. in the polystyrene profiles in the process of their production, thanks to which it is possible to make the shuttering of uniform extruded polystyrene (XPS) panels, the endurance and thermal parameters of which are better than those demonstrated by expanded polystyrene (EPS) panels. Thanks to its structural solution the building structural connector finds universal applications, with the possibility of connecting together different numbers of its members, depending on the needs, where in any case the entire connector consists of two repeating types of members. An extra advantage is the possibility to re-use one of the connector members because it gets neither damaged, nor deformed when being removed.

1. Building structural connector having at least one longitudinal two-part distancing member fitted with technical measures allowing to adjust its length, as well as fixing members connected thereto on both sides for the fixing of the connector to the shuttering panels, as well as fitted with vertical plates perpendicular to the longitudinal axis of the connector, characterized in that the entire distancing member (**1**) is placed between the inner surfaces of the shuttering panels (**9**) and ends on its both ends with distancing plates (**5**) having sockets (**6**) with a thread corresponding to the threaded end (**10**) of the fixing member (**2**) inserted therein, where the fixing member (**2**) ends on its other end with the limiting plate (**11**) and takes the form of a rod slipped into the ducts (**12**) of the shuttering panel.

2. The building structural connector according to claim **1**, characterized in that formed on the external wall of the limiting plates (**11**) are at least two regularly arranged convex elements (**13**), and on the wall of the distancing plates (**5**) on the side of the fixing member (**2**) there are concave spots (**14**) corresponding to the convex elements (**13**).

3. The building structural connector according to claim **2**, characterized in that it consists of two identical distancing members (**1**) and three identical fixing members (**2**).

4. The building structural connector according to claim **2**, characterized in that it consists of a single distancing member (**1**) and two identical fixing members (**2**).

5. The building structural connector according to claim **2**, characterized in that the distancing member (**1**) takes the form of two identical flat elements connected together with alternatingly arranged pegs (**3**) and holes (**4**), and the axis of the socket (**6**) in each of the distancing plates (**5**) runs along the plane of contact of the flat elements.

6. The connector according to claim **2**, characterized in that the distancing member (**1**) takes the form of two identical flat elements connected together with alternatingly placed groove-and-tongue connections, and the axis of the socket (**6**) in each of the distancing plates (**5**) runs along the plane of contact of the flat elements.

7. The connector according to claim **5** or **6**, characterized in that between the walls of the flat elements and the walls of the distancing plates (**5**) there are slots formed around the socket (**6**).

8. The connector according to claim **7**, characterized in that the sockets (**6**) in the distancing plates (**5**) extend into the flat elements.

9. The connector according to claim **7** or **8**, characterized in that the sockets (**6**) have at least one narrowing (**7**) between the wall of the distancing plate (**5**) and the wall of the flat element, the outer diameter of which is smaller than or equal to the inner diameter of the socket (**6**).

10. The connector according to claim **9**, characterized in that in the flat element there is a longitudinal tunnel (**8**) reaching up to the threaded socket (**6**) in the distancing plate (**5**), following the axis of the pegs (**3**) and holes (**4**) or the groove-and-tongue connections.

11. The connector according to claim **8**, characterized in that the inner sides of the distancing plates (**5**) fit tightly to the walls of the flat elements.

12. The connector according to claim **2**, characterized in that the convex elements (**13**) and concave spots (**14**) are cylindrical in shape.

13. The connector according to claim **12**, characterized in that the convex elements (**13**) end with a flange formed thereon, and the concave spots (**14**) have a corresponding scoop, thus forming a clasp connection.

14. The connector according to claim **1**, characterized in that used as the shuttering panels (**9**) are rectangular panels of expanded and/or extruded polystyrene of density from 10 kg/m3 to 55 kg/m3

15. The method of erecting building walls using the building structural connector which consists in drawing the line along which the building wall will run on the floor and then on erecting parallel vertical shuttering panel walls on both sides of the line, where the panels are connected to one another with connectors, stabilized, and braced using known technical measures, and where the space between the panels is filled with liquid concrete mix, and where, once the mix has set, the shuttering panels are either left in place or removed, characterised in that in the initial preparation phase there are at least two carves made in each shuttering panel (**9**) in one of its horizontal edges, where the carves form ducts (**12**) perpendicular to the line of the erected building wall, the depth of which is at least equal to the diameter of the rods of the fixing members (**2**) of the building structural connector the structure of which is described in claims **1** to **3**, where the connectors are assembled by joining together elements of the distancing members (**1**) so that the length of each of the distancing members (**1**) corresponds with the designed thickness of the concrete walls, whereupon the limiting plate (**11**) of the central fixing member (**2**) is connected with the adjacent distancing plate (**5**) of the distancing member (**1**), following which the fixing members (**2**) are pre-screwed to the distancing members (**1**); then, three rows of the shuttering panels (**9**) are erected parallel to each other along the line of the designed building wall at pre-determined distances, and oriented so that their ducts (**12**) run in their top horizontal edges aligned along common lines, whereupon rods of the fixing members (**2**) are slipped into the ducts (**12**) of the shuttering panels (**9**), layer one, so that the distancing plates (**5**) of the distancing members (**1**) are adjacent to the external walls of the shuttering panels (**9**), and the limiting plates (**11**) of the external fixing members (**2**) are adjacent to the external walls of the external shuttering panels (**9**), following which on the erected layer of the shuttering panels (**9**) a subsequent layer of shuttering panels (**9**) is arranged so that their ducts (**12**) run in their top horizontal edge, whereupon the fixing members (**2**) of the connector slipped into the ducts of the lower layer are screwed tight so that the distancing plates (**5**) and the limiting plates (**11**) overlap the side of the side surfaces of the shuttering panels (**9**) of the upper layer and fit closely to them.

16. The method according to claim **14**, characterised in that once the concrete layers of the building wall solidify, the rods of the external fixing members (**2**) of the building structural connector are screwed out and the external shuttering panels (**9**) are removed.

17. The method according to claim **15**, characterised in that at the initial preparatory stage indentations are formed under any known method to the predetermined pattern in the selected walls of the shuttering panels (**9**) which will adhere to the external concrete wall surfaces.

18. The method according to claim **15**, characterised in that with the external shuttering panels (**9**) taken off, the narrowing (**7**) is reamed and the distancing plate (**5**) with a fragment of the socket (**6**) is removed.

19. The method according to claim **17**, characterised in that removal of the distancing plate (**5**) with a fragment of the socket (**6**) opens access to the tunnel (**8**) in the distancing member (**1**) and enables inserting the probe to measure moisture content inside the concrete wall.

20. The method according to any of the claims **14** to **16**, characterised in that rectangular panels of expanded and/or extruded polystyrene of density from 10 kg/m3 to 55 kg/m3 are used as the shuttering panels (**9**), and the ducts (**12**) are formed in the panels under the thermal cutting method.

21. The method according to any of the claims **14** to **16**, characterised in that rectangular panels of expanded and/or extruded polystyrene of density from 10 kg/m3 to 55 kg/m3 are used as the shuttering panels (**9**) with a tongue formed along their top edge and the corresponding groove along the bottom edge, where the ducts (**12**) are formed by making in-depth cuts under the thermal cutting method.

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