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(54) METHOD FOR PRODUCING WOODEN HOUSES, STRUCTURES AND CONSTRUCTIONS

(57) The method for producing wooden houses, structures and constructions relates to the field of building and can be used for producing separate units consisting of wood and for constructing timber houses, bath houses and other structures. The technical effect of fastening wooden parts by a spring-actuated fastening joint provides, along with the simplicity of installing the parts, a consistently forced, high-quality contraction of the structure, thus preventing linear deformations of the structure parts and at the same time reducing the formation of fractures in the parts and of cracks and gaps therebetween throughout the entire period of use of the building on account of a chessboard-type arrangement of corner and offset spring-actuated fastening joints when producing a corner connection of the structure, mounting the corner spring-actuated fastening joint in a seat drilled coaxially with respect to the axis of the corner connection of the structure walls, and off setting the axis of the offset fastening joints, which connect a successive pair of parts of one wall, by up to 200 mm from the axial line of the corner connection of the structure walls along the length of each part.

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Description

FIELD OF THE INVENTION

[0001] The claimed method for constructing wooden houses, buildings, and structures is related to the construction industry and can be used for making individual blocks of timber and for constructing log houses, bath houses, and other structures.

BACKGROUND OF THE INVENTION

[0002] There are several methods for joining wooden components by grooves and pins, metal rods and ties, dowels, and pins, in which the structure remains in a loose state and further experiences all kinds of wood deformation. For example, dowels and ties become no longer of any use, being loosely fitted in their holes, and prevent any finishing jobs being done on the outside, heat insulation of the joints between the timbers, paintwork, and interior carpentry, and within the next two years, and still further, another two to three years, the structure would be subjected to all kinds of deformation and develop new cracks and cause destruction of heat-insulated joints between the timbers.

[0003] A prior art method for fastening the walls of wood panel houses is disclosed in Patent No. 2,135,708, "A Prefabricated Wood Panel Building," of February 24, 1998, published on August 27, 1999, IPC 6 E04B1/10. The method comprises joining the panels by grooves and spikes provided at the ends of the panels and metal rods placed in holes 3 mm in diameter, and ties.

[0004] This prior art method weakens the corner joints because of the grooves provided in the beams, for which reason the durability and lifetime of the building are reduced. The weak cross (vertical) rods in holes and absence of resilient elements do not close the gaps as the beams shrink with drying.

[0005] Another method for constructing wooden houses, buildings, and structures is described in Patent RU 2,250,312 of October 9, 2002, published on April 20, 2005, IPC 7 E04B1/10.

[0006] The prior art method comprises drilling cross holes in the beams, or logs, or other components, extending cross ties through the beams, or logs, or other components, and tightening them on the ties with nuts. The beams, or logs, or other components used in the walls are shifted by two or a larger number relative to the preceding beams, or logs, or other components to produce projections and recesses. Adhesive is applied between the beams, or logs, or other components. Longitudinal ties are placed in the grooves, and each of them, with both ends thereof extending short of the wall ends, is connected to one of the cross ties. The walls are placed on a foundation. All the walls, including intermediate walls and partitions, are joined, the joints are sealed, with projections of one wall inserted into the recesses of another wall. The house units, each wall, and the blocks are pressed by longitudinal ties and nuts against one another. Cross ties are extended through the projections of the walls to be joined, and all joints are tightened by nuts through resilient elements. Panels of the floor, ceiling, and roof, their joists provided with vertical holes for ties to be extended therethrough, are suspended on cantilevers hung by the holes provided therein on the cross ties, the floor and cantilevers being supported by the beams, or logs, or other components. The walls are joined to the foundation, floor, ceiling, and roof through resilient elements by cross ties or nuts movable in the grooves upon wood shrinkage with drying or moistening.

[0007] The prior art method for building walls of prefabricated log or beam houses and a prefabricated wall of Patent RU 2,041,842 of September 27, 1995, published on September 27, 1995, IPC^6 E04B 2/00, E04C 2/12, which is closest to the present invention in technical idea, comprises making a beam or log of two lengths placed successively on each other, drilling through cross holes therein and tightening them by a screw joint such as a rod provided at one end thereof with a support element in the form of a heel, and at the other end thereof with a thread for a coupling nut and washer to be screwed thereon.

[0008] The prior art method does not, however, make for permanent tightness of the walls and corner joints because of the need for periodic calibrated tightening of the screw joint nuts over the lifetime of the building as the beams change their dimensions variously upon shrinkage through drying and moistening considerably, the cross dimensions of the beams decrease and no tightening by the ties occurs automatically; and it is difficult to assemble the walls having a large number of projections and recesses formed by the beams.

SUMMARY OF THE INVENTION

[0009] It is an object of the present invention to provide a method for assembling elements of wooden structures, including those that have various defects, such as linear deformations, and allowing permanent forced shrinkage of the building to prevent linear deformations of elements of the wooden structures upon shrinkage, maintain tightness of contact between the elements during the lifetime of the structure owing to the high permanent stress generated by the fastening unit at the installation points thereof.

[0010] The object of this invention is achieved by a method for constructing wooden houses, buildings, and structures, wherein a fitting recess is drilled in the upper wooden component, a fastening unit is fitted therein, and the components are drawn together, said method comprising constructing a building by first tightening a corner, tightening the wooden components by a spring fastening unit, the spring fastening corner unit being fitted in the fitting recess drilled coaxially with the axis of the corner joint of the building walls; turning the spring fastening unit until the threaded part thereof comes out of the upper

component of the building and is screwed into the underlying component of the building; tightening the upper and underlying components until the spring is fully compressed and the gap is closed in the fitting recess between the timbers; compressing thereby a component of one wall between two components of another wall; drilling further fitting recesses in the next components placed on one and the other walls; spacing the axis of said fitting recesses away from the axial line of the corner joint of the building walls up to 200 mm along the length of each component to receive the spaced fastening units, said fastening units joining the next two components of one wall; fitting the corner fastening units and spaced fastening units in the next timbers of the building in a staggered pattern; distributing the remaining spring fastening units, after the corner has been fastened, over the length of the component at intervals of 900 mm to 1,300 mm for components measuring 180 to 240 mm in cross-section; the drilling depth being 80 to 100 mm for diameters more than 240 mm; the drilling depth being 60 to 70 mm for a log of 180 to 240 mm in diameter; and the interval between the spring fastening units being reduced to 1,000 mm for cross-sections in excess of the above figures.

[0011] The threaded spring fastening unit used to join the wooden components helps simplify the assembly of components without drilling holes in advance to receive the threaded part, said components including those that have various defects, such as linear deformations, spiral, or arch, and to make the building usable much faster and have a higher quality than is possible with components assembled by any other techniques.

[0012] A corner of wooden components joined by spring fastening units coaxial with the axis of the corner of building walls joined together and the fastening units provided in successive components placed on one and the other walls and spaced away from the axial line of the corner of building walls up to 200 mm along the length of each component help fasten the building corner reliably without placing all the fastening units along the axis of the corner of the building walls and allows forced permanent shrinkage of the building, without affecting the quality thereof, thereby reducing cracking of the components.

[0013] Providing the corner fastening units and spaced units in a staggered pattern on the successive timbers causes distribution of the tightening force along the length of the components, makes building corner fastening more reliable, and prevents linear deformation of the building components, and crack and gaps developing between them during the lifetime of the building.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The present method for constructing wooden houses, buildings, and structures is performed with the use of a fastening unit for assembling wooden buildings and structures. The idea of the claimed invention will be clear from the accompanying drawings, wherein FIG. 1 is a view of a spring fastening unit; FIG. 2 is a view of the spring fastening unit in the working position; and FIG. 3 is a diagrammatic view of the spring fastening unit fitted in timbers.

[0015] FIGS. 1, 2, and 3 show a fastening unit 1, a faceted head 2, an upper stop element 3, a spring 4, a lower stop element 5, a cylindrical rod 6, a smooth part 7 of the rod, a threaded part 8 of the rod, a tapered part 9 of the rod, an upper component (a log or beam) 10 of the building, a lower component (a log or beam) 11 of the building, a fitting recess 12 between the timbers, an axial line 13 of a corner joint of the walls, an axial line 14 of spaced fastening units, a corner fastening unit 15, a spaced fastening unit 16, and a fitting recess 17 of a fastening unit.

DESCRIPTION OF A PREFERRED EMBODIMENT

[0016] The number of fastening units 1 needed for construction is assessed first. Consideration is given to the diameter and cross-sectional area of a beam to have the number of units required.

[0017] Construction of a building begins with corner assembly. Lower component 11 of one building wall is put in place, and a component of the other building wall is placed on it at an angle, with upper component 10 of the first building wall placed on top with its timber fitting recess 12 facing downward.

[0018] A fitting recess 17 is drilled in upper component 19 of the building corner formed in this way for corner fastening unit 15 coaxially with axis 13 of the corner assembly of the building walls. The depth of the recess drilled depends on the cross-sectional area of the log. The depth of the recess ranges from 60 to 70 mm for a log diameter of 180 to 240 mm, and between 80 and 100 mm for log diameters over 240 mm.

[0019] A first corner spring fastening unit 15 is fitted into recess 17 drilled, without drilling a hole for the threaded part of the fastening unit that is screwed in until threaded part 8 comes out of upper building component 10 and enters lower building component 11, and the upper and lower components are pressed against one another until the spring is fully compressed to close the gap in fitting recess 12 and the component of one wall is clamped between the two components of the other wall.

[0020] A further component is placed thereupon on the first and second walls, and fitting recesses 17 are drilled in each component to make the fastening of the building corner more secure and to distribute the tightening force over the length of the wall for spaced fastening units 16 having axis 14 thereof spaced to a distance of 200 mm along the length of the first and second components from axial line 13 of the building corner assembly (FIG. 3). Spaced fastening units 16 join each successive pair of wall components together.

[0021] The building is further assembled in the same manner. The corner is assembled from successive components by drilling fitting recess 17 in upper component

10 for corner fastening unit 15 coaxially with axis 13 of the corner assembly of the building, and so on.

[0022] Corner fastening units 15 and spaced units 16 are fitted in the successive timbers of the building in a staggered pattern, the axes of all corner units being aligned with axial line 13 of the corner wall assembly (FIG. 3) and the axes of spaced units 16 being spaced to a distance of up to 200 mm from axial line 13 of the corner wall assembly.

[0023] After the corner has been fastened, the remaining fastening units are distributed along the length of the log or beam at a spacing of 900 to 1,300 mm for log diameters or beam cross-section of 180 to 240 mm. The spacing of units 1 is reduced to 1,000 mm for diameters or cross-sections over 240 mm.

[0024] Spring fastening unit 1 applies constant stress to the component during assembly when the spring is compressed to 95 kgf^2, without requiring further regular tensioning of the fastening units during the lifetime of buildings.

[0025] Since a log or beam of a building most frequently has a length of 5,500 mm, four fastening units are used to produce a total force of 380 kgf that presses the components against one another. The spring fastening units absorb the forces originating in the components every second and in this way help keep the building intact.

[0026] Comparative climate endurance tests of buildings assembled by different techniques have shown that finishing jobs can be started inside and on the outside of the buildings assembled by the claimed methods using an experimental batch of spring fastening units immediately, rather that two or three years upon shrinkage. The spring fastening units absorb the forces generated by the components every moment and, in this way, keep the building intact.

[0027] The technical effect of a spring fastening unit holding wooden components together in a simple assembly arrangement maintains constant forced shrinkage of the building without causing adverse effects and prevents linear deformations of the building components, reducing cracking of the components and formation of splits and gaps between them during the lifetime of the building as a result of the staggered pattern of the corner and spaced spring fastening units as the building corner is assembled and a corner spring fastening unit is placed in its fitting recess drilled coaxially with the axis of the corner assembly of the building walls, and the axis of the spaced fastening units is moved up to 200 mm away from the axial line of the corner assembly along the length of each component to join a successive pair of components of one wall.

Claims

1. A method for constructing wooden houses, buildings, and structures by drilling a fitting recess in an upper wooden component, fitting a fastening unit therein, and compressing the components, wherein construction of a building begins with forming a corner assembly; the wooden components are joined by a spring fastening unit; a corner fastening unit is fitted in the fitting recess drilled coaxially with the axis of the corner assembly of the building walls; the fastening unit is screwed in until the threaded part thereof comes out of the upper component of the building and enters the underlying component of the building; the upper and underlying components of the building are pressed together until the spring is fully compressed to close the gap in the fitting recess between the timbers, the component of one wall being compressed between the two components of the other wall; and fitting recesses are drilled in each of the successive components placed one upon the other, the axis of said recesses being spaced from the axial line of the corner assembly of the walls of the building along the length of each component, to receive the spaced fastening units to join a successive pair of components of one wall.

2. The method of claim 1, wherein the axis of the spaced fastening units is spaced from the axial line of the corner assembly of the walls of the building up to 200 mm along the length of each component.

3. The method of claim 1, wherein corner fastening units and spaced fastening units are fitted in the successive timbers of the building in a staggered pattern.

4. The method of claim 1, wherein after the corner has been assembled, the remaining spring fastening units are distributed along the length of a component at a spacing of 900 to 1,300 mm for a component 180 to 240 mm in cross-section.

5. The method of claims 1 and 4, wherein the spacing of the spring fastening units is reduced to 1,000 mm for cross-sections larger than that of claim 3.

6. The method of claim 1, wherein the depth of the recess drilled is between 60 and 70 mm for a log diameter of 180 to 240 mm.

7. The method of claims 1 and 6, wherein the depth of the recess drilled is between 80 and 100 mm for diameters larger than 240 mm.

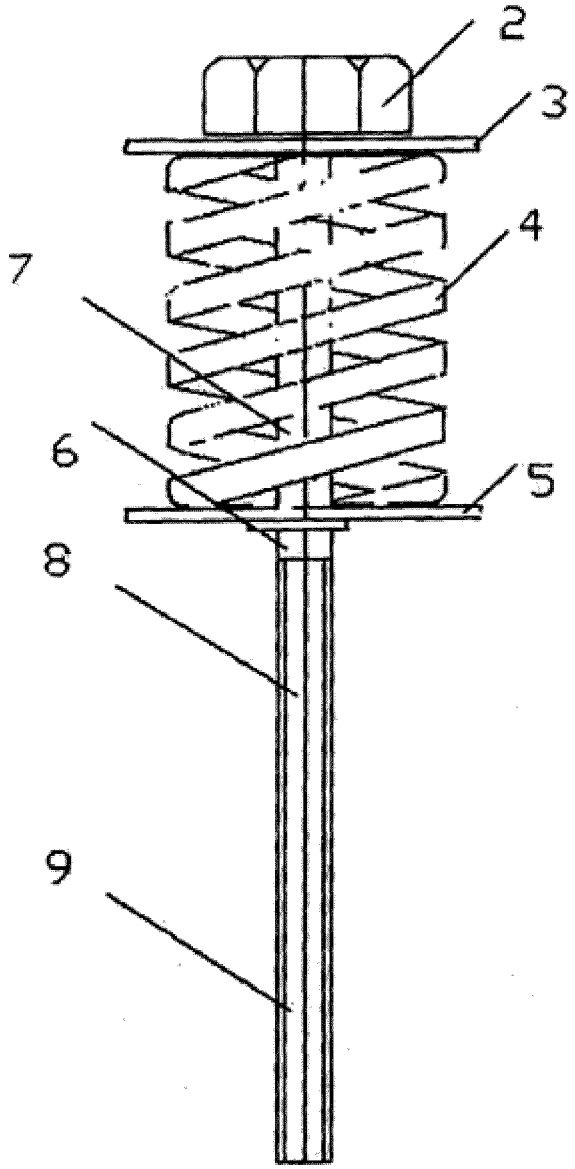

Fig. 1

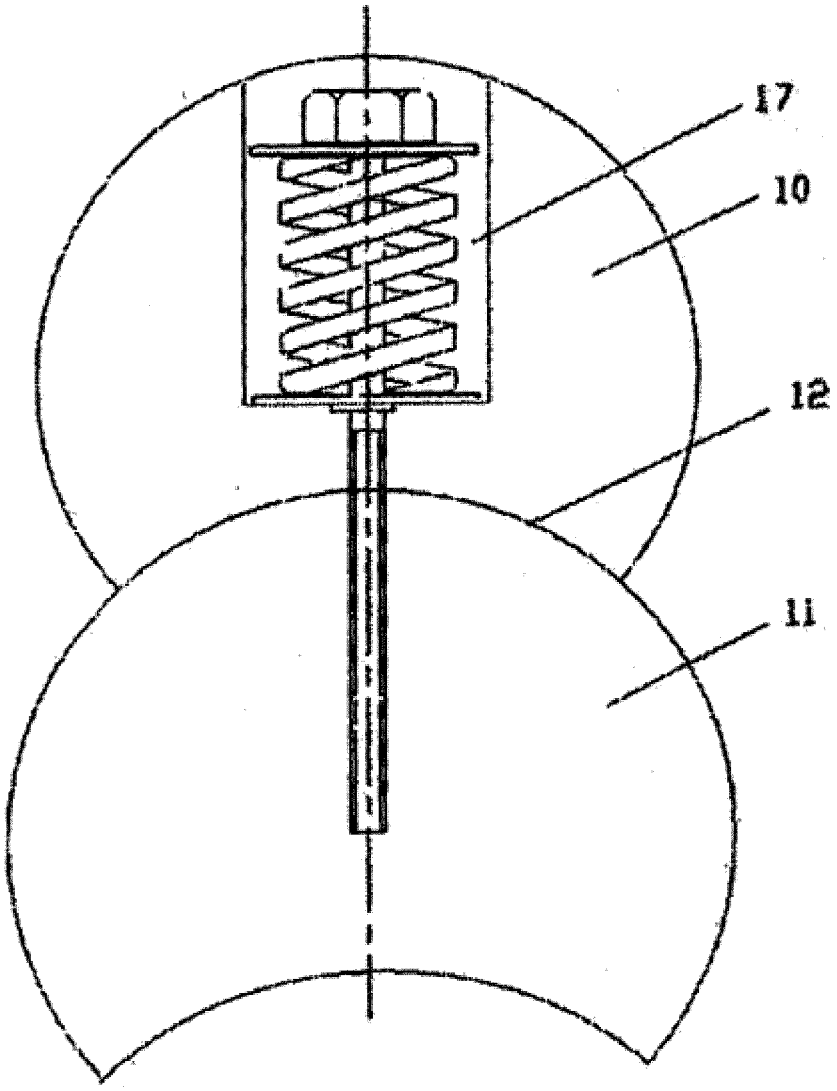

Fig. 2

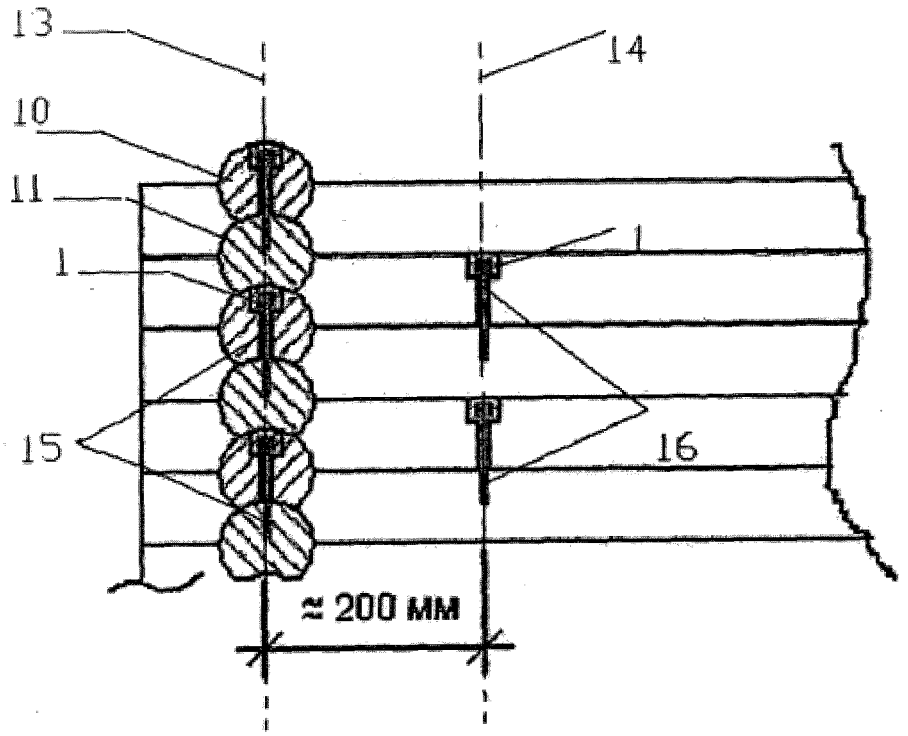

Fig. 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/RU 2010/000300

A. CLASSIFICATION OF SUBJECT MATTER

E04B 1/10 (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)

E04B 1/00, 1/10, 2/00

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	RU 2044842 C1 (KRIVSHENKO NIKOLAI ALEKSEEVICH et al.) 27.09.1995	1-7
A	US 4909012 A (RANSOM S. THOMPSON, JR. et al.) 20.03.1990	1-7
A	US 4463532 A (PRECISION INTERLOCK LOG HOMES, INC.) 07.08.1984	1-7

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 October 2010 (22.10.2010)	28 October 2010 (28.10.2010)
Name and mailing address of the ISA/ RU Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 1998)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 2135708 A **[0003]**
- RU 2250312 **[0005]**
- RU 2041842 **[0007]**