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(54) FLOOR CASSETTE FOR THE CONSTRUCTION OF A FLOOR

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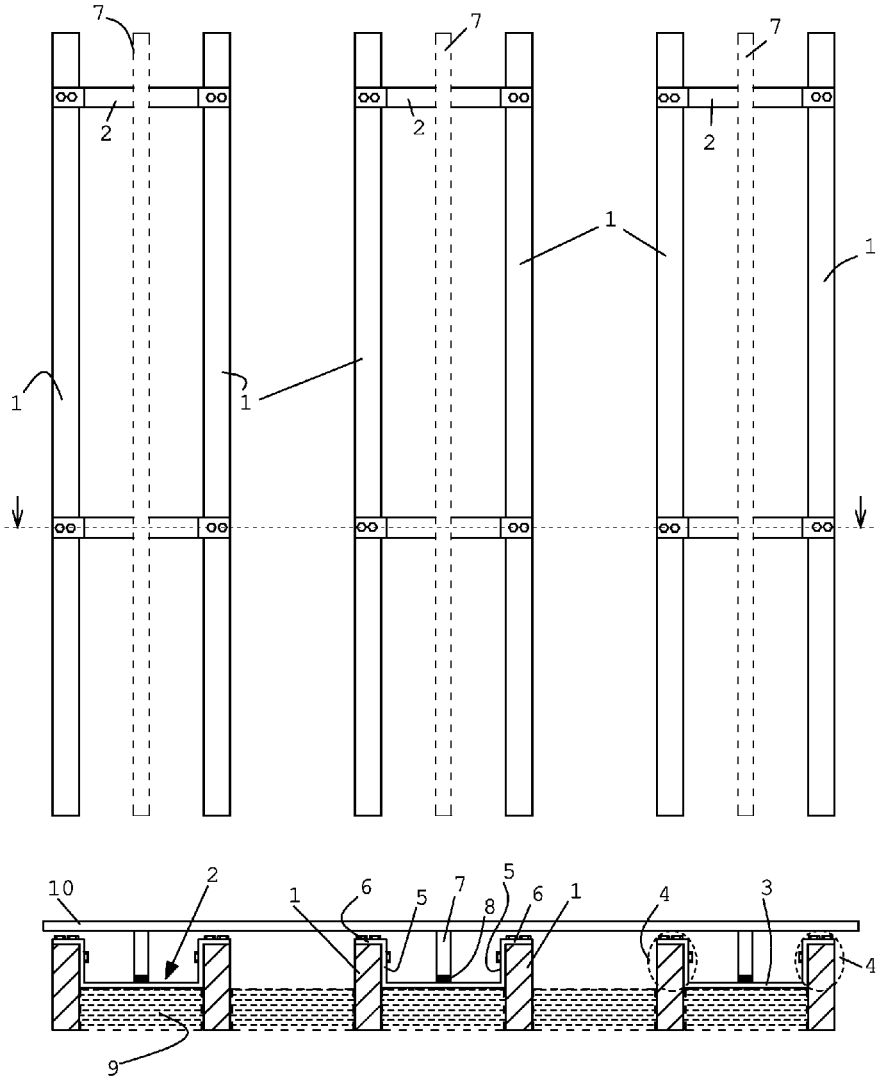
(57) **ABSTRACT**

The invention relates to a floor cassette for the construction of a floating floor, the floor cassette comprising a wooden base panel and a plurality of wooden beams attached to one of the surfaces of the base panel, the beams being essentially parallel to one another, wherein the floor cassette further comprises a plurality of support devices mounted between two adjacent beams, the support devices comprising two ends respectively fixed at least to a lateral wall of the two adjacent beams, and a central part connecting the two ends, the central part being configured to support the floor so that the latter is not directly attached to the beams.



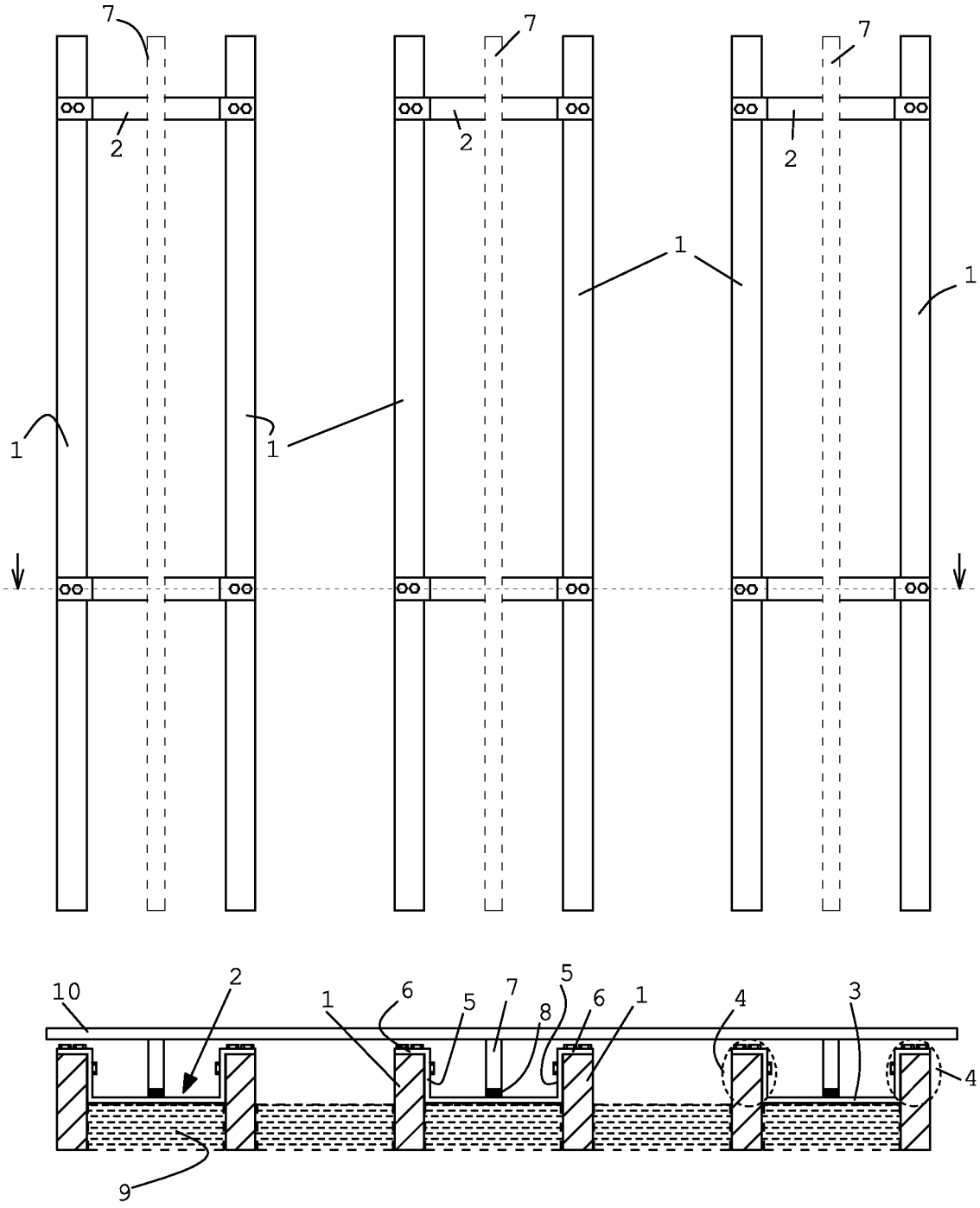


FIG. 1

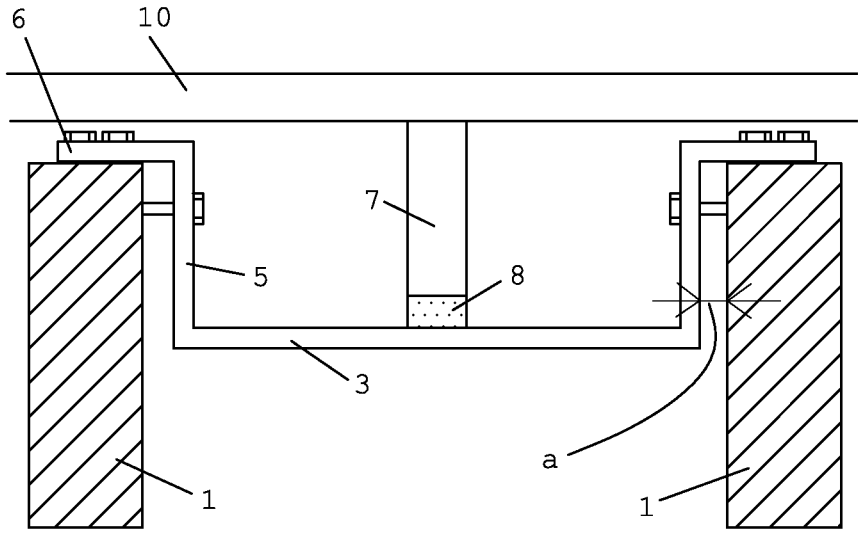


FIG. 2

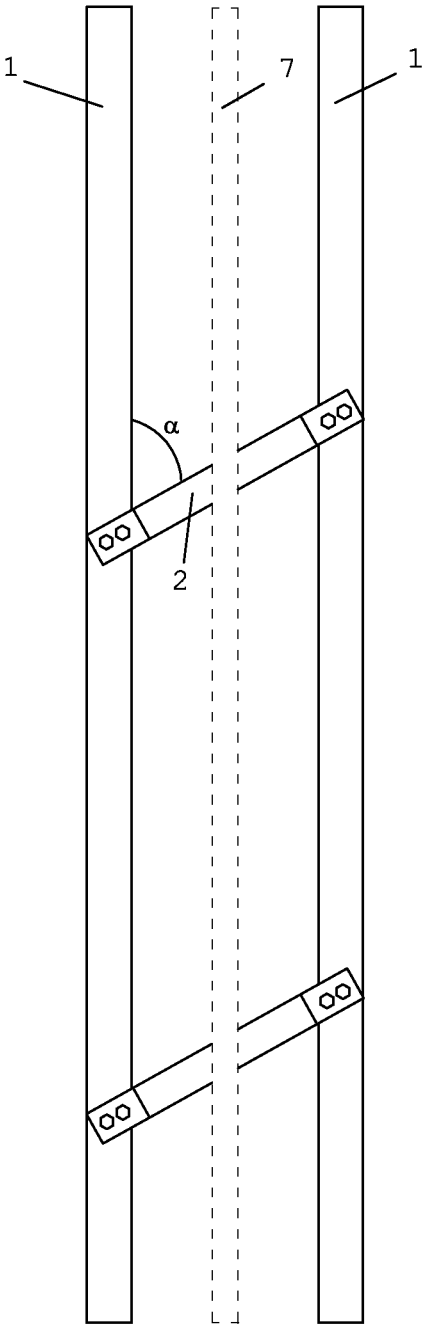


FIG. 3

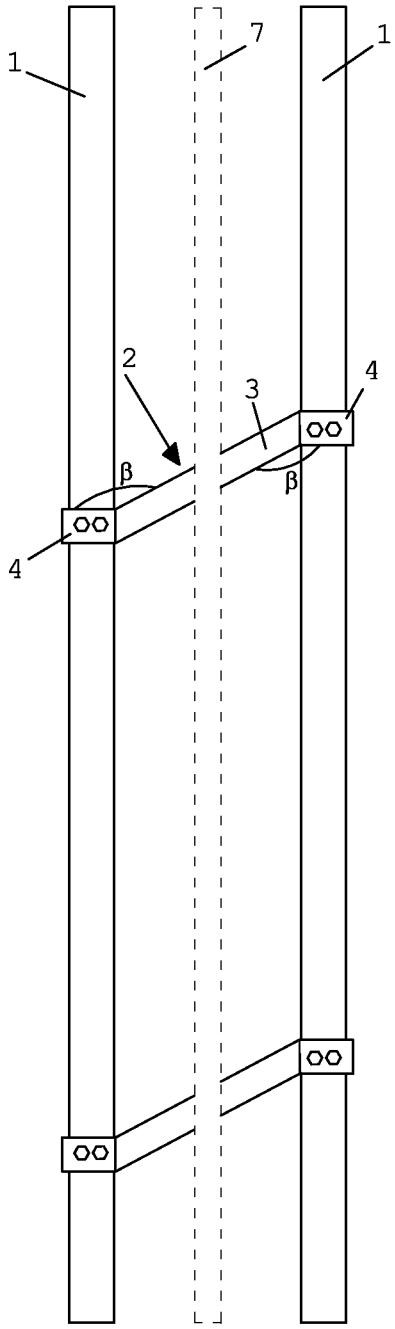


FIG. 4

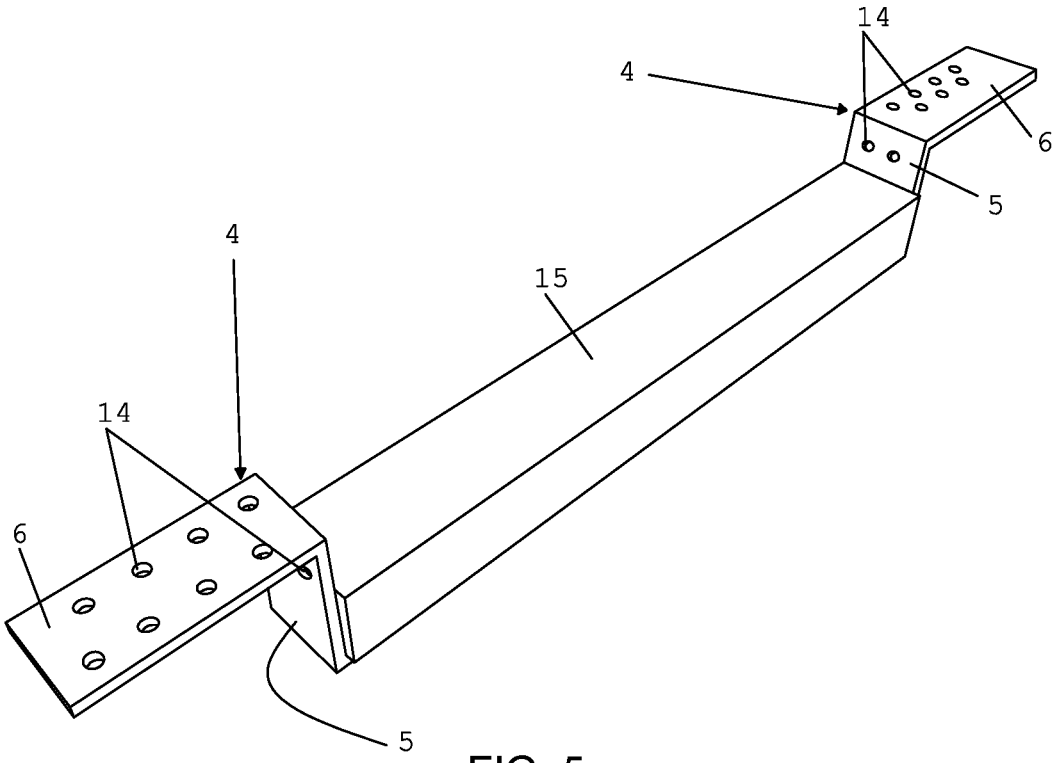


FIG. 5

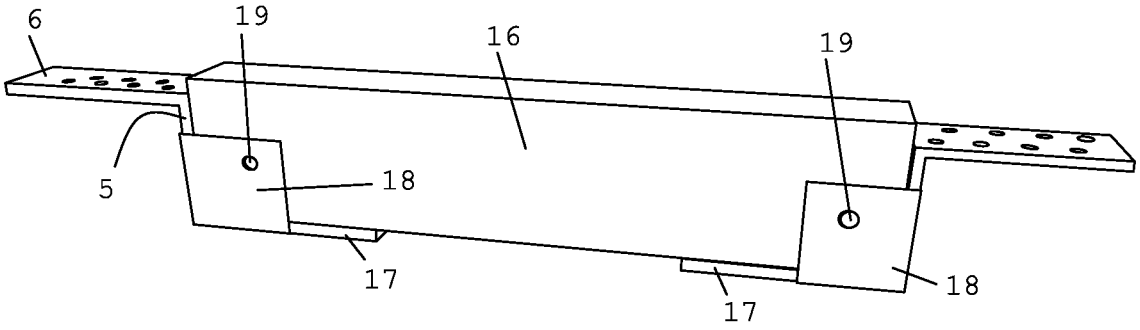


FIG. 6

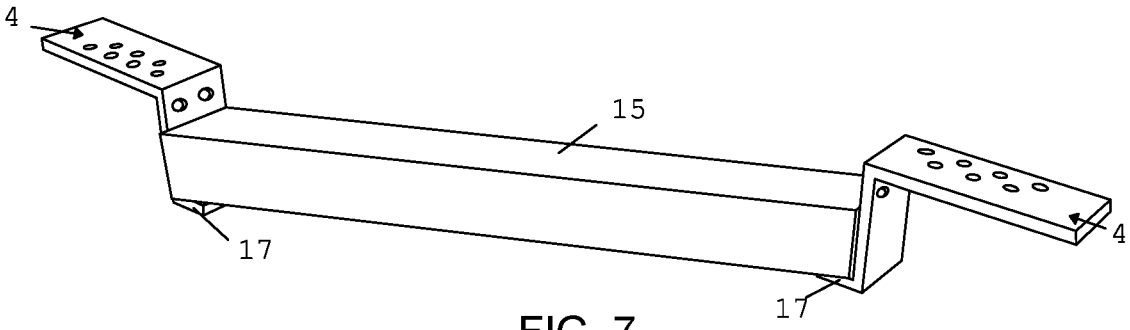


FIG. 7

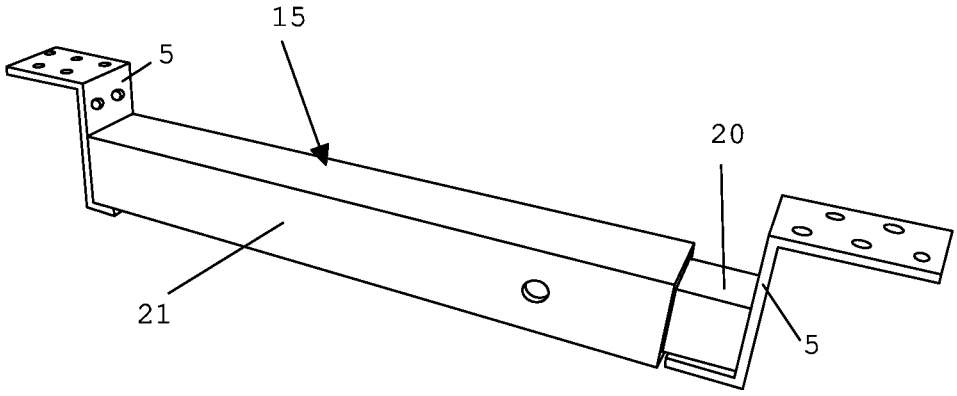


FIG. 8

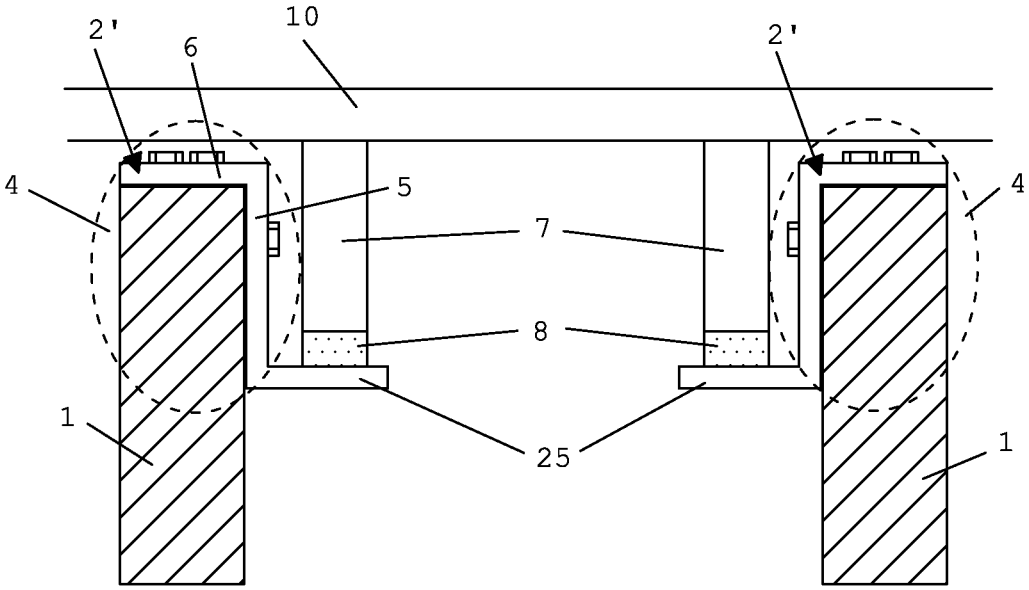


FIG. 9

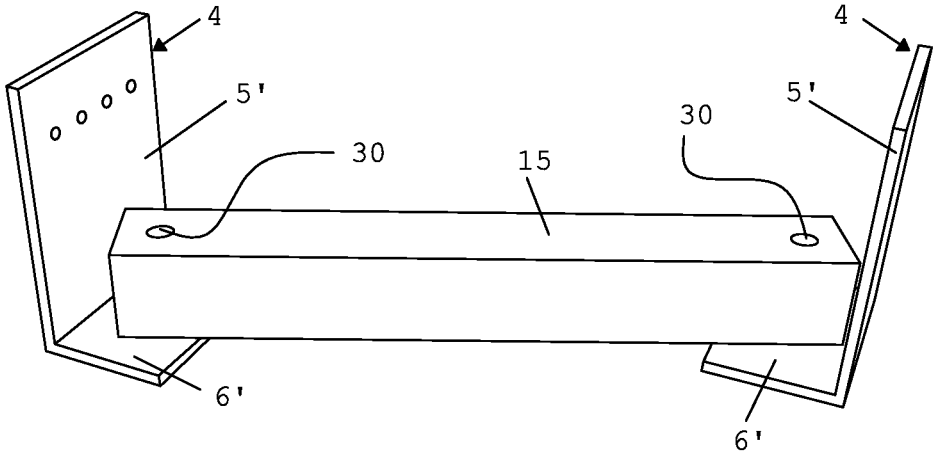


FIG. 10

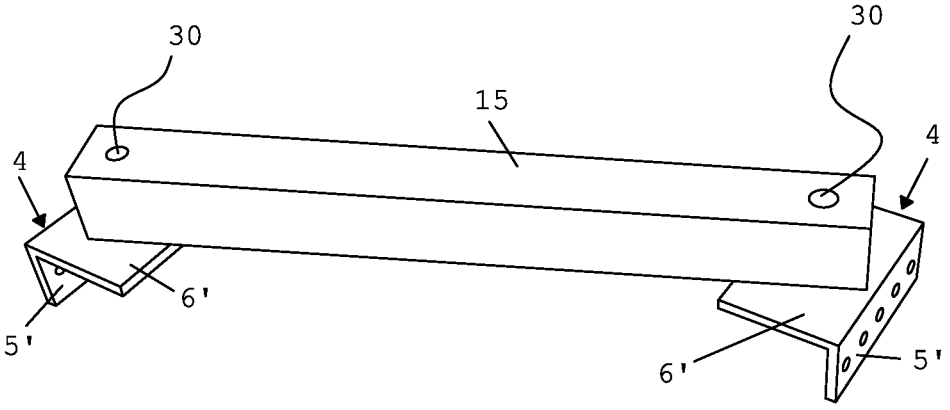


FIG. 11

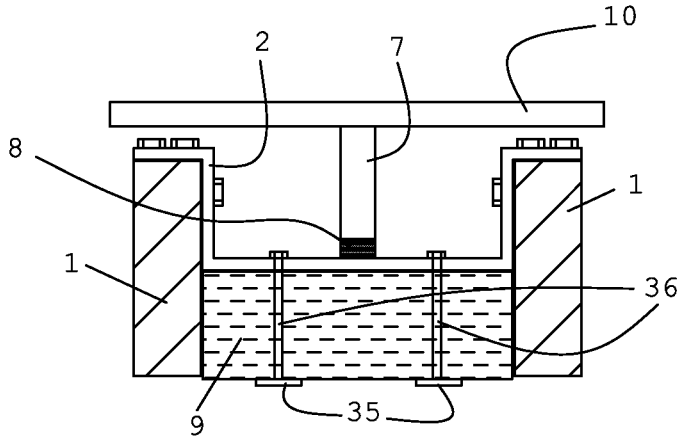


FIG. 12a

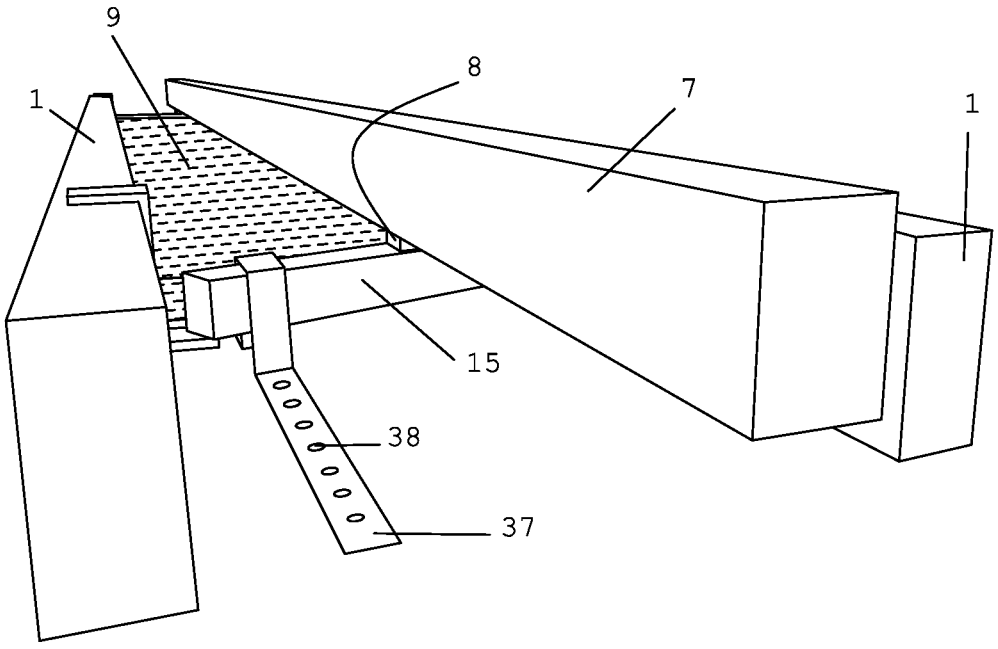


FIG. 12b

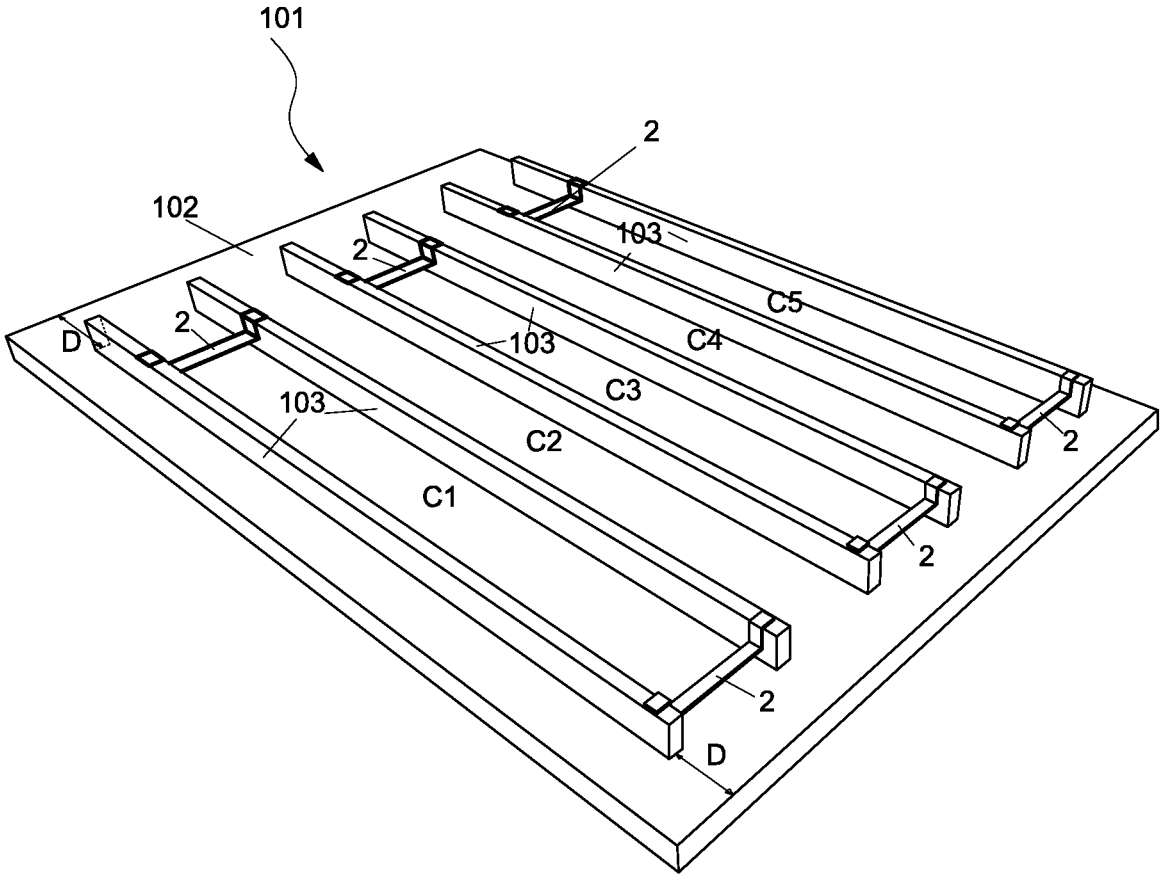


FIG. 13

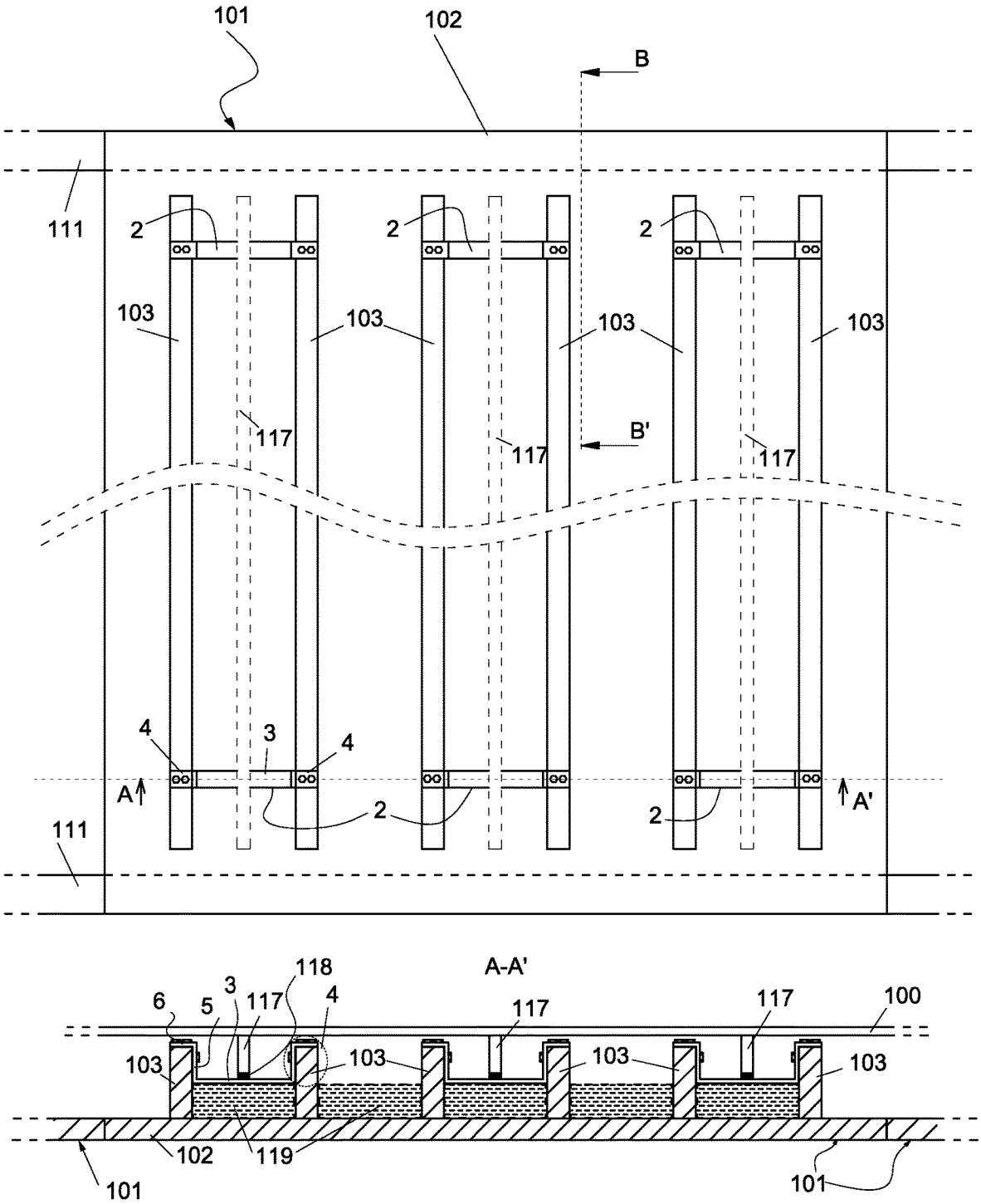


FIG. 14

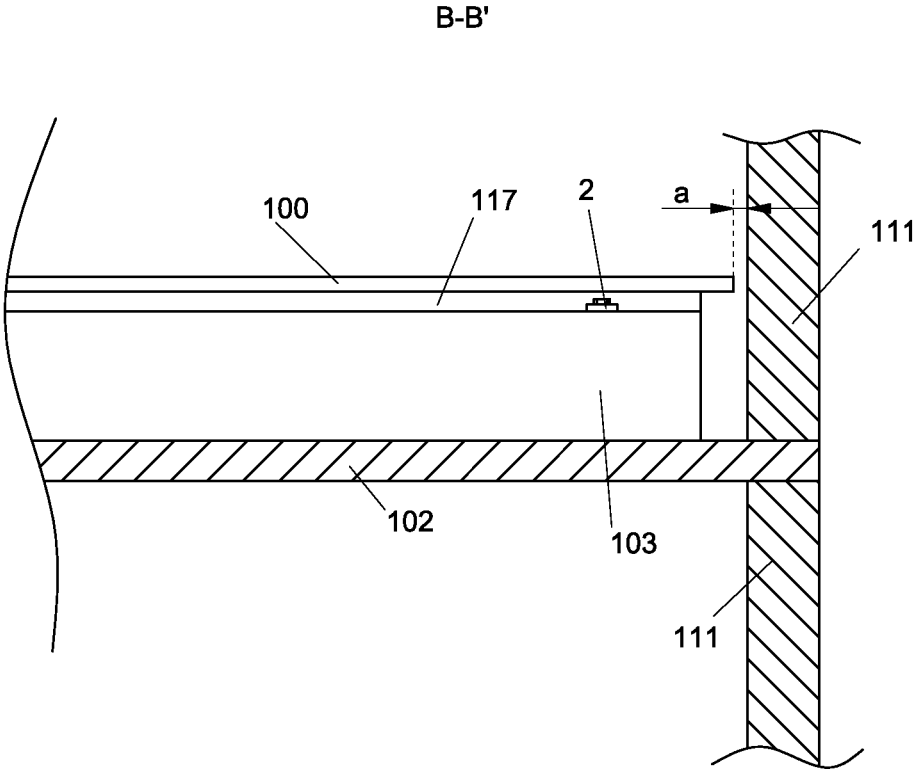


FIG. 15

FLOOR CASSETTE FOR THE CONSTRUCTION OF A FLOOR

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This patent application is a divisional of U.S. patent application Ser. No. 16/052,092, filed Aug. 1, 2018, now allowed, which is a continuation-in-part of PCT/EP2017/052357, filed Feb. 3, 2017, which claims priority to Belgian Application No. 2016/5097, filed Feb. 5, 2016, and also claims priority to Belgian Application No. 2017/5549, filed Aug. 9, 2017. The entire teachings and disclosure of these applications are incorporated herein by reference thereto.

FIELD OF THE INVENTION

[0002] The invention relates to a floor cassette for the construction of a floating floor in a building. This floor cassette will mostly be used for the construction of new wooden buildings.

[0003] A floating floor is a floor that is not fastened to the fixed structure of the building, which gives the floor advantageous acoustic characteristics, whilst allowing long spans

PRIOR ART

[0004] A beam structure is a set of beams, often wooden beams, mounted in a parallel manner and forming the separation between two levels of a building. Spacers, often wooden spacers, are fixed between the beams to impart stiffness to the structure. It is conventional for a floor to be mounted directly on the beams. The direct contact between the floor and the beam structure results in a structure that has mediocre acoustic behavior.

[0005] Systems for executing a floating floor that is not in direct contact with the beams of the beam structure are known. In particular, the document GB 2451686 describes a device that enables the floor to be not directly attached to the beam structure. The device is mounted between two beams and itself carries a floating upright that in turn supports the floor. This device suffers from a number of drawbacks: it is formed from a thin steel plate that has a low resistance to the high forces exerted on the floor. The resistance to transverse vibrations is also low given the manner in which the device is fixed to the beam. The floating uprights must be provided with transverse channels to provide access to transverse reinforcing bars, placed under the devices that support the uprights, which further weakens the system. This particular configuration results in a system of high technical complexity and that is thus relatively uneconomic, without guaranteeing convincing acoustic results.

[0006] In the construction of wooden buildings, one solution for separating two successive storeys consists in laying floor cassettes in the form of a closed or open box comprising a panel provided with longitudinal and parallel beams fixed to a surface of the panel. Closed boxes comprise a second panel mounted parallel to the first panel, the beams then being placed between the two panels. This type of box is generally not the optimum from an acoustic point of view.

CHARACTERISTIC ELEMENTS OF THE INVENTION

[0007] The present invention relates to methods and devices as described in the claims.

[0008] The present invention relates to a floor cassette as described in the claims. The invention relates firstly to a floor cassette for the construction of a floating floor, the floor cassette comprising a wooden base panel and a plurality of wooden beams attached to one of the surfaces of the base panel, the beams being essentially parallel to one another, wherein the floor cassette further comprises a plurality of support devices mounted between two adjacent beams, the support devices comprising two ends respectively fixed at least to a lateral wall of the two adjacent beams, and a central part connecting the two ends, the central part being configured to support the floor so that the latter is not directly attached to the beams. The beams are preferably rectangular section beams mounted upright on the surface of the base panel. The base panel is a load-bearing panel configured to rest on two lateral walls or equivalent support structures, such as two rows of support columns for example. The panel has sufficient thickness and thereby mechanical strength to serve as a base for a building level. This implies that the floor cassette itself is a structural element, that is to say a load-bearing element configured to support the loads caused by persons and objects located on a storey of a building.

[0009] According to one embodiment of the cassette according to the invention, the support devices are formed and sized so that the central parts of the support devices mounted on a plurality of pairs of adjacent beams are respectively able to support a plurality of joists configured to support the floor, a resilient material acoustic element being placed between each central part and the joist that it supports.

[0010] According to one embodiment of the cassette, a plurality of acoustic elements respectively attached to the central parts of the support devices form part of the floor cassette.

[0011] According to one embodiment, a plurality of said joists attached to the acoustic elements form part of the floor cassette.

[0012] According to one embodiment, the floor cassette comprises a part of said floor attached to the joists.

[0013] According to one embodiment, the floor cassette comprises a thermal insulation material between the base panel and the support devices and/or above the support devices.

[0014] According to one embodiment, the base panel has a rectangular shape in which the length of the base panel exceeds the length of the beams on both sides of said beams.

[0015] According to one embodiment, the beams are attached to the surface of the base panel by at least a glue.

[0016] According to one embodiment, said glue is a polyurethane-based glue applicable in liquid form and hardening with moisture from the wood and/or from the air.

[0017] According to one embodiment, the length of the floor cassette measured in the direction of the beams is between 6 and 12 m and the width of the floor cassette is between 1 and 3 m.

[0018] According to one embodiment, the support devices are mounted alternatingly on the channels formed by the beams.

[0019] According to one embodiment of the cassette, at least one end of the support devices is an angle-bracket-shaped element comprising a vertical part and a horizontal part, the horizontal part being fixed to the upper surface of

a beam and the vertical part being fixed to a lateral wall of the same beam, the central part being connected to the vertical part.

[0020] According to one embodiment of the cassette, the ends comprise a second horizontal part that supports the central part.

[0021] According to one embodiment of the cassette, the ends are angle-bracket-shaped elements comprising a vertical part and a horizontal part, the vertical part being fixed to a lateral wall of a beam, the horizontal part supporting the central part of the support device.

[0022] According to one embodiment of the cassette, the ends are fastened to the central part and oriented at obtuse angles different from 180° defined relative to the central part in a horizontal plane when the floor cassette is installed, said angles being opposite one another.

[0023] According to one embodiment of the cassette, the central part of the support devices is formed by a steel or wooden bar.

[0024] According to one embodiment of the cassette, one or more of the support devices is fabricated from steel plate or formed by the assembly of a plurality of parts of a steel plate.

[0025] According to one embodiment of the cassette, the length of the central part of at least one of the support devices is adjustable when said device is removed from the floor cassette.

[0026] The invention is further related to a floating floor comprising one or more floor cassettes according to the invention.

[0027] The invention is also related to the use of one or more floor cassettes according to the invention for the construction of a floating floor.

BRIEF DESCRIPTION OF THE FIGURES

[0028] FIG. **1** represents the installation of a plurality of devices on a beam structure for supporting a floor that is not directly attached to the beam structure.

[0029] FIG. **2** represents an installation in which the distance between two beams of the beam structure is greater than the length of the central part of the device.

[0030] FIG. **3** represents an installation in which the devices are oriented at a non-perpendicular angle relative to the beams of the beam structure.

[0031] FIG. **4** represents an embodiment in which the ends of the device are oriented at an obtuse angle relative to the central part.

[0032] FIG. **5** represents an embodiment in which the central part of the device is formed by a steel bar.

[0033] FIG. **6** represents an embodiment in which the central part of the device is formed by a wooden bar.

[0034] FIG. **7** represents a 3D image of an embodiment in which the ends of the device are oriented at an obtuse angle relative to the central part.

[0035] FIG. **8** represents an embodiment in which the length of the central part can be adjusted or modified.

[0036] FIG. **9** represents an alternative embodiment.

[0037] FIGS. **10** and **11** represent alternative embodiments of the device intended to support the joists.

[0038] FIGS. **12***a* and **12***b* represent other embodiments that include means for supporting an insulating material.

[0039] FIG. **13** represents a floor cassette according to one embodiment of the invention.

[0040] FIG. **14** represents plan and front views of a floor mounted on a plurality of floor cassettes according to the invention, resting on two walls.

[0041] FIG. **15** represents a view in section in a plane perpendicular to the walls.

DETAILED DESCRIPTION OF THE INVENTION

[0042] The invention utilizes support devices intended to be mounted between two beams of a beam structure or on a single beam, so as to be able to support a floor, whilst making it possible for this floor to be not directly attached to the beam structure (floating floor). It should be noted that the various embodiments are described in the situation where the floor is positioned in an essentially horizontal manner on a beam structure, itself comprising a plurality of parallel beams disposed horizontally.

[0043] FIG. **1** shows plan and front views of a plurality of beams **1** that form a beam structure and that are provided with devices in the form of stirrups **2**. Each of the stirrups **2** comprises a central part **3** and two ends **4** that constitute angle-bracket-shaped fixing elements. Each end (when in position) comprises a vertical part **5** and a horizontal part **6**. The ends **4** are fixed to the beams **1**, by fixing the horizontal parts **6** to the upper surface of the beams, preferably using vertical screws. The vertical parts **5** of the ends are fixed to the lateral walls of the beams, preferably by means of horizontal screws. This double fixing of the ends **4**, facilitated by the angle-bracket shape of these ends, provides a high resistance to transverse vibrations and ensure that the beams are tied together.

[0044] The central part **3** of the stirrups is oriented horizontally and functions as a support for a joist **7** that rests on an element **8**, preferably a block of resilient material, that serves as acoustic insulation. The floor **10** is in turn supported by the joists **7**. The floor **10** may for example be screwed to the joists **7**. In the embodiment represented in FIG. **1**, the total height of the element **8** and the joist **7** is greater than the height of the vertical parts **5** of the two ends **4**, so that the floor **10** is not directly attached to the beam structure.

[0045] The joists **7** are supported by at least two stirrups **2** placed at a regular distance, for example at a distance of 2.5 m for a beam structure in which the distance between the beams **1** is approximately 40 cm. In the example shown, the joists **7** are placed in the middle of the central parts **3** of the stirrups.

[0046] The joists **7** may be placed outside the central zone of the central parts **3**, according to the requirements and constraints of the building. This enables great flexibility that is above all useful in the case of renovating a floor where beam structures comprising beams at variable distances are often encountered.

[0047] It is sometimes necessary to add additional beams to reinforce the structure. The appropriate placement (with some flexibility) of the joists **7** enables better distribution of the forces, which can result in a reduction of the number of beams **1** to be added. An insulating material **9** such as rock wool may be placed in the spaces located between the beams and under the stirrups/supports. In one specific embodiment of the invention, this insulating material **9** fills not only the space under the stirrups/supports but also above these elements, and therefore the spaces that are located on either side of the joists **7**.

[0048] As already mentioned, an advantage of the embodiment represented in FIG. **1** consists in the fastening of the device **2** not only to the horizontal surface of the beams **1** but also to the lateral walls of the beams. This does not imply that the addition of the length of the central part **3** and twice the thickness of the vertical parts **5** must correspond exactly to the distance between the beams **1**.

[0049] As shown in FIG. **2**, a certain clearance (distance 'a') between the vertical parts **5** and the beams **1** is allowed and does not prevent said fastening, provided that the distance 'a' remains less than a given value. Variability of the distance between the beams therefore does not represent an obstacle to the use of the device **2** according to the invention. When the distance between two beams is less than the length of the central part **3**, the stirrups **2** may be mounted to form an angle α (not a right angle) relative to the beams **1**, as shown in FIG. **3**. It remains possible to fasten the vertical parts **5** against the walls of the beams **1** by screwing them thereto, provided that the angle α remains less than a given value.

[0050] FIG. **4** shows an embodiment that is particularly advantageous in the case of beams at short intervals. The ends **4** are oriented at an obtuse angle (that is to say at an angle β between 90° and 180°) relative to the central part **3**, the orientation of one end **4** being opposite the orientation of the other end **4**, so that the same angles β and $-\beta$ are present between the central part **3** and each of the ends **4**. This embodiment makes it possible to mount the stirrup **2** between two beams that are located at a distance less than the length of the central part **3** whilst maintaining the optimum fastening between the stirrup **2** and the horizontal surface of the beams **1** and the lateral surfaces of the beams **1**.

[0051] A number of embodiments of the stirrups **2** may be envisaged. The stirrups **2** that are represented in FIGS. **1-4** are preferably made from a steel plate, or formed by an assembly of a plurality of parts of a plate (including the angle-bracket-shaped parts **4** and the central part **3** that are produced from plates). According to preferred embodiments, the plate has a thickness of 4 to 7 mm, preferably of 5 to 7 mm.

[0052] FIG. **5** shows a stirrup the central part of which is in the form of a steel bar **15** connected to the ends **4** by welding. This shape combines the features described above and has high mechanical strength. The ends **4** take the form of angle-bracket-shaped parts connected to the central bar. These are preferably steel parts, made from steel plates between 4 and 7 mm (preferably between 5 and 7 mm) thick, welded to the bar **15**. The ends **4** are provided with holes **14** in their vertical parts **5** and horizontal parts **6** to facilitate vertical and horizontal screwing of the ends **4** against the beams **1**.

[0053] An alternative is shown in FIG. **6**: the central part **3** of the stirrup is a wooden bar **16** that is connected to the steel angle-bracket-shaped ends **4** provided with horizontal plates **17** that support the bar **16** and vertical plates **18** that retain the bar in place. Openings **19** may be provided for screwing the bar **16** to the vertical plates **18**. The wood utilized for the bar **16** must have a sufficient mechanical force resistance.

[0054] FIG. **7** shows the device with the central part in the form of a bar **15**, and with the ends **4** oriented at an obtuse angle relative to said bar **15**. This embodiment represents a specific embodiment of the devices shown in FIG. **4**. It is seen that in this embodiment, horizontal plates **17** that are positioned under the bar **15** are attached to the ends **4**. The horizontal plates **17** are preferably also present in the embodiment shown in FIG. **5**.

[0055] A particularly advantageous embodiment is shown in FIG. **8**. The steel bar **15** is designed in two parts **20** and **21**, one being movable relative to and inside the other so as to adjust and to modify the length of the bar. This solution makes it possible to assemble the stirrups in an optimum manner, that is to say with the vertical parts **5** of the ends **4** in contact with the walls of the beams **1**, catering for great variability of the distance between the beams.

[0056] Other embodiments that have an adjustable length may be imagined by the person skilled in the art.

[0057] Another embodiment is shown in FIG. **9**. This device is an element **2'** configured to be mounted on a single beam **1** of the beam structure. The element **2'** comprises a horizontal support **25** attached to a fixing element **4** of angle-bracket shape the shape and the function of which correspond to the ends **4** of the first embodiment. The angle-bracket-shaped element **4** therefore comprises a horizontal part **6** and a vertical part **5**, each attached to a beam **1**, preferably using screws. The horizontal support **25** supports a joist **7** and the acoustic elements **8** that in turn support the floor **10**. In the example given in FIG. **9**, two elements **2'** according to this latter embodiment are mounted either face-to-face or in a quincunx arrangement, each carrying a joist **7** and an acoustic element **8**. The horizontal support **25** may be provided with a vertical extension at its distal end, so that the joist **7** is mounted between said vertical extension and the vertical part **5**. The vertical extension may serve to retain the joist laterally.

[0058] According to another embodiment, angle-bracket-shaped fixing elements **4** are used but the horizontal parts are not connected directly to the beams of the beam structure. Said horizontal parts serve as supports for a horizontal support. Two examples of this embodiment are shown in FIGS. **10** and **11**. It is seen that each fixing element **4** consists of a vertical part **5'** screwed against the lateral wall of a beam and a horizontal part **6'** that carries a bar **15** that serves as a horizontal support. In this embodiment, the floor is closer to the beams because of the absence of a part of the ends **4** on the upper surface of the beams **1**. The bar **15** may be replaced by a horizontal support **3**, **16**, **25**, **20+21** according to any of the other embodiments described above or equivalent embodiments.

[0059] The bar **15** can advantageously pivot relative to the horizontal parts **6'** about a vertical axis on pivot pins **30**, whilst maintaining the contact between the bar **15** and said horizontal parts **6'**. This embodiment therefore enables adjustment of the angle of the central bar **15** relative to the ends **4** so as to adapt the stirrup as a function of the distance between two beams. The feature of a horizontal support that can be pivoted relative to horizontal parts **6'** of the fixing elements **4** is not limited to the embodiments of FIGS. **10** and **11**. All the embodiments of the horizontal support (**3**, **16**, **25**, **20+21**), described in the present specification, together with equivalent embodiments, may be configured in a pivotable manner as mentioned above. For example, in the embodiment shown in FIG. **7**, the bar **15** can be pivotable relative to the horizontal plates **17**.

[0060] According to one embodiment, the insulating material **9** mounted under the stirrups **2** or elements **2'** (FIG. **9**) is retained in place by support means connected to the

stirrups **2** or to the elements **2'**. FIG. **12***a* represents a first variant of this embodiment, in which transverse laths **35** are connected to the stirrups **2**. The laths **35** are suspended from the stirrups with the aid of rods **36** or the like (for example steel wires) to support the insulation **9**. FIG. **12***b* represents a second variant: the insulation is supported by a strip **37**, preferably made of steel and preferably comprising perforations **38**, which has parts that are folded around the bars **15** (or the like) of the stirrups **2** as well as flat parts to support the insulating material elements **9**. The strips **37** are easier to fit than the rods **36**. The retention of the insulation in place (by the laths **35**, the strips **37** or other like supporting means) guarantees slowing of the carbonization of the wood in the event of a fire arriving from below and therefore makes it possible to ensure fire protection with a rock wool type insulation of a given density. The laths **35** can also serve as fixing structures for ceiling panels. The means for supporting the insulating material **9**, such as the laths **35** or strips **37**, are usable in combination with each of the embodiments described in the present specification.

[0061] A method for mounting a floating floor on a beam structure comprises the steps of:

[0062] placing on the beams **1** of the beam structure a plurality of devices such as the stirrups **2** and/or the elements **2'** suitable for mounting on a single beam (see FIG. **9**) in accordance with any one of the embodiments described or equivalent embodiments,

[0063] mounting joists **7** with the insertion of elements **8** consisting of an acoustic insulating material on the supports **3**,**15**,**16**,**25** of the devices, each joist being carried by at least two devices, the combined height of the joists **7** and the acoustic elements **8** being such that the upper surface of the joists is situated at a greater height than the beams **1** of the beam structure. In the situation where the devices comprise a horizontal part **6** mounted on the upper surface of the beams **1**, the upper surface of the joists **7** is situated at a height greater than that of said horizontal part **6** (which can include where applicable the screws that fix the horizontal part **6** to the beams). The upper surface of the joists is preferably situated at least 1 cm above the upper surface of the beams or the horizontal parts **6**,

[0064] mounting the floor **10** on the upper surfaces of the joists **7**.

[0065] Moreover, the method preferably comprises placing insulating material elements **9** between a plurality of (normally all of) the pairs of adjacent beams. This insulating material is preferably a material that has acoustic insulation properties. Rockwool elements, such as mats or panels may be used. Elements of a dense insulating material, such as high-density rock wool, are preferably used. The elements **9** preferably have a density of at least 45 kg/m^3. The elements **9** may be retained in place by being gripped between said beams.

[0066] According to specific embodiments of the method, the placing of the insulating material elements **9** is effected by fixing to the devices **2** or **2'** means for supporting the insulating material **9**, such as the laths **35**, the rods **36** or the strips **37** described above, which will improve the retention in place of the insulating material. In combination with a material of high density, this will increase the fire resistance of the building. The elements **9** essentially fill the space between two beams, at least under the devices **2** or **2'**, where applicable in a manner locally interrupted at the level of the devices **2** or **2'**, for example in the case of the use of strips **37**, as shown in FIG. **12***b*.

[0067] The joists or at least some of the joists **7** may be formed by a metal bar (preferably a steel bar) with a wooden part mounted on the bar. The metal part imparts better stiffness to the joist, whilst the wooden part enables the screwing on of the floor panels.

[0068] The fact that the floor **10** is not directly attached to the beams **1** of the beam structure in combination with the acoustic material element **8** allows the construction of a floor that has better vibration damping qualities. The devices that support the joists (stirrups **2** according to different embodiments described as well as devices **2'** for a single beam) are robust and enable fixing to the lateral surfaces and preferably also to the upper surfaces of the beams. These features enable the implementation of a floor that is supported only by said devices and not by the beam structure itself.

[0069] Another advantage consists in the recovery of flatness of the beams at a much lower cost and with much easier implementation than with any other prior art solution. It suffices to place the ends **4** of the devices **2** or **2'** at a common level, which represents a time saving.

[0070] Moreover, the support devices of the joists allow flexibility in terms of the placement of the joists **7** (in the middle or away from the middle for example), as well as flexibility in terms of mounting the devices **2** or **2'** on beam structures with a variable spacing between the beams.

[0071] The invention is related to a floor cassette for the construction of a floating floor, wherein the floor cassette is provided with stirrup-type support devices as described above.

[0072] In FIG. **13** a floor cassette **101** according to a first embodiment of the invention for the construction of a floating floor is shown. The floor cassette **101** comprises a base element in the form of a wooden panel **102**, preferably having a thickness between 25 and 75 mm and preferably formed of laminated wood such as LVL (Laminated Veneer Lumber). According to this preferred embodiment, the thickness of the base panel **102** is at least 33 mm. Depending on the material used, the use of a base panel at least 33 mm thick, preferably at least 50 mm thick, enables a floor cassette to be produced that resists fire for at least one hour. The base panel **102** preferably has a rectangular shape but may of course be adapted to any other shape. According to one embodiment of the invention, the width of the panel is between 1 and 2.5 m while the length may vary between 6 and 12 m. Wooden beams **103**, preferably of rectangular section, are fixed upright on the upper surface of the base panel **102**, the beams being mounted parallel to one another and oriented in the longitudinal direction of the rectangle constituting the upper surface of the panel **102**. The beams **103** are preferably placed equidistantly, for example with a distance of approximately 40 cm between two adjacent beams. The beams **103** may equally be produced in laminated wood such as LVL. In the embodiment represented in the figures, and without constituting a limitation on the scope of the invention, the thickness of the beams **103** of a floor cassette **101** is preferably of the same order of magnitude as the thickness of the base panel **102** of said floor cassette **101**.

[0073] According to a preferred embodiment, the base panel **102** extends beyond the beams by a distance D measured in the longitudinal direction of the beams **103**.

This distance D will preferably be the same at both ends of the beams **103**. The beams **103** are fastened to the base panel **102**. According to a preferred embodiment, the fastening means provided consist of a glue that is described hereinafter in relation to the method of assembling the floor cassette.

[0074] Moreover, the floor cassette of the invention comprises a plurality of support devices **2**, which may be any type of the stirrup-type support device described above, each of these devices being mounted between two adjacent beams **103** so as to be able to support a floor (not represented in FIG. **13**), whilst allowing this floor not to be directly attached to the beams **103** of the floor cassette **101**.

[0075] According to embodiments of the invention, the support devices **2** are formed and sized so that they allow the supporting of joists oriented essentially parallel to the beams **103** and on which the floor will be mounted. At least two support devices **2** are mounted between two adjacent beams **103**. The support devices **2** are preferably installed alternately in the hollows or channels formed by the beams, as shown in FIG. **13** the floor cassette **101** comprises 6 beams **103**, separated by 5 channels C**1** to C**5**, support devices **2** being mounted in channels C**1**, C**3** and C**5**. The floor cassette represented in FIG. **13** has a limited length that enables the various elements to be seen clearly: it comprises only two support devices **2** mounted on each of channels C**1**, C**3** and C**5**. Of course, the floor cassette may have a greater length, which will necessitate a greater number of support devices **2**. The support devices **2** mounted on a pair of beams **103** may for example be placed at a distance from one another between 1 and 4 m.

[0076] FIG. **14** represents plan and front views of a floor **100** installed on a plurality of floor cassettes **101** as defined by the present invention. A single floor cassette **101** is represented in the figure, although the floor **100** may be supported by a plurality of floor cassettes mounted alongside one another (which is symbolized by the dashed ends of the lines in FIG. **14**). The base panel **102** and the beams **103** can be seen. The longitudinal ends of the panel rest on two lateral walls **111**. The support devices **2** represented in FIGS. **13** and **14** are stirrup-shaped. Each of the stirrups **2** comprises a central part **3** and two ends **4** that constitute angle-bracket-shaped fixing elements. Each end **4** comprises a vertical part **5** and a horizontal part **6**. The ends **4** are fixed directly to the beams **103**, by fixing the horizontal parts **6** to the upper surface of the beams **103**, preferably using vertical screws. The vertical parts **5** of the ends are fixed to the lateral walls of the beams **103**, preferably by horizontal screws. This double fixing of the ends **4**, facilitated by the angle-bracket shape of these ends, enables resistance to transverse vibrations to be provided. On the other hand the invention is not limited to the shapes of the support devices **2** as shown in the figures. As a general rule, the support devices **2** comprise a central part **3** and two ends **4**, these ends comprising at least one vertical part **5** fixed to a lateral wall of a beam **103**, the central part **3** connecting the ends **4**.

[0077] The central part **3** of the support devices **2** operates as a support for a joist **117**, for example in metal or in wood or in a combination of the two, which rests on an acoustic element **118**, preferably a block of resilient material, which serves as acoustic insulation. The floor **100** is in its turn supported by the joists **117**. The floor **100** may for example be screwed to the joists **117**. The total height of the elements **118** and the joists **117** is calculated so that the floor **100** does not come into contact with the beams **103** of the floor cassettes **101**. In other words, the upper surface of the joists **117** is situated at a greater height than the beams **103** of the cassette **101**. The floor **100** is thereby not directly attached to the beams **103**. If the ends of the support devices **2** comprise ends **4** that extend on the upper surface of the beams **103** (as is the case in FIGS. **13** and **14**) the combined height of the blocks **118** and the joists **117** is such that the floor **100** is also not directly attached to these ends themselves, nor to the means for fixing them to the beam (such as the screws attaching the horizontal parts **6** to the beams **103**).

[0078] The joists **117** are supported by at least two stirrups **2** placed at a regular distance, for example at a distance of 2.5 m for a distance between the beams **103** of approximately 40 cm. In the example shown, the joists **117** are placed at the middle of the central parts **3** of the stirrups.

[0079] The preferred embodiment of a floor cassette **101** according to the invention comprises the base panel **102**, the beams **103** fixed to the panel and a plurality of support devices **2** such as the stirrups fixed to the beams **103**.

[0080] On site, the ends of the base panel **102** that extend beyond the beams **103** are placed on two supporting walls **11** or on any equivalent pair of support structures, e.g. two rows of pillars, or a row of pillars on one side and a wall on the other. The insulating material blocks **118**, the joists **117** and the floor **100** are in this case assembled in situ. According to another embodiment, the acoustic elements **118** form part of the floor cassette **101** as produced and shipped to the site. The elements **118** may be glued to the central parts **3** of the support devices **2**. According to a further embodiment, the elements **118** and the joists **117** form part of the floor cassette **101**. The joists **117** may in this case be glued or retained beforehand on the elements **118** which are themselves preferably glued to the central parts **3** of the support devices **2**. According to a further embodiment, the floor cassette of the invention is provided with the elements **118**, the joists **117** and also a part of the floor **100**, preferably a part the area of which corresponds to the area of the floor cassette. The floor part is preferably mounted on the joists **117** in a way that is known in the art for the assembly of a floor on a set of joists. After assembling a plurality of floor cassettes of this type, the various parts of the floor will preferably be connected together by appropriate connecting means.

[0081] There will advantageously be placed in the spaces located between the beams **103** and below the support devices **2** a thermally insulating material **119** such as rock wool. For example rock wool with a density of at least 35 kg/m^3 may be placed during the construction of the floor using floor cassettes **101** according to the invention. This insulating material **119** may fill not only the spaces under the support devices **2** but also above these devices, thus the spaces located on either side of the joists **117**. According to one embodiment, the thermally insulating material **119** forms part of a floor cassette according to the invention, and the floor cassette arriving on site is therefore provided with thermally insulating material **119** under and/or above the support devices **2**.

[0082] FIG. **15** represents a view in section in a plane perpendicular to the walls **111**. It is seen therein that the floor **100** is separated from the walls **111** by a distance 'a'. The floor is therefore entirely 'floating', i.e. not only is it not directly attached to the beams **103** but it is also not directly attached to the walls **111**. Thanks also to the presence of the

resilient material block **118**, there is therefore no rigid connection between the floor **100** and the fixed structure of the building, which represents an ideal situation acoustically. The noise generated by persons or tools carried by the floor **100** is not or not greatly distributed to the other storeys of the building. The floor cassette **101** according to the invention allows this floating floor construction on each storey of a new building, thus creating an acoustic solution for the entire building.

[0083] The support devices **2** may be assembled at an angle α (not a right angle) relative to the beams **103**, in the same way as shown with respect to the beams **1** of a beam structure, as shown in FIG. **3**. Fastening the vertical parts **5** against the walls of the beam **103** using screws remains possible, provided that the angle α remains below a given value.

[0084] The embodiments of the stirrup-type support element shown in FIGS. **4** to **8** and in FIGS. **10** and **11** are applicable as such in a floor cassette according to the invention. The above paragraphs describing these embodiments are therefore applicable to the support devices **2** of a cassette in accordance with the invention.

[0085] For example, the support device **2** shown in FIG. **4** allows the device **2** to be mounted between two beams **103** of a cassette according to the invention, located at a distance less than the length of the central part **3** whilst maintaining the optimum fastening between the device **2** and the horizontal surface of the beams **103** and the lateral walls of the beams **103**.

[0086] The embodiments of the support **2** having a central part **3** that is pivotable relative to the ends **4**, as illustrated in FIGS. **10** and **11**, with the central part **3** (being the bar **15** in the case of the figures in question) being pivotable about pins **30**, is applicable in a cassette according to the invention. This embodiment allows adjustment of the angle of the central part **3** (for example the bar **15**) relative to the ends **4** so as to adapt the support device as a function of the distance between two beams **103** during the assembly of a floor cassette **101** according to the invention or when the support device **2** is removed from the floor cassette **101**.

[0087] Likewise, the support device that is adjustable in length, as shown in FIG. **8** is usable for the assembly of floor cassettes **101** according to the invention, that comprise beams **103** placed at different or variable distances.

[0088] The floor **100** may be made from any material available for this purpose, such as OSB (Oriented Strand Board) panels. The floor may comprise a plurality of layers. According to a specific embodiment, fiber cement panels are used for the floor **100**. According to another embodiment, the floor is provided with an underfloor heating system.

[0089] As already mentioned, the beams **103** of a floor cassette **101** according to the invention are preferably glued to the base panel **102**. In a preferred embodiment, the beams **103** are made of laminated wood and the glue used is a glue based on polyurethane (PUR), which is applied in liquid form and which hardens with moisture from the wood and/or the surrounding air, and under the impact of a contact pressure between the glued components. One glue that may be used is Jowapur® type 686.60 glue. The glue is preferably applied over the entirety of the face of the beams (full dip application) in contact with the panel by an automated process to obtain an ideal and reproducible distribution of the glue. The beams **103** are then pressed against the panel **102**, for example by a mechanical press that applies the pressure required according to the specifications of the glue, for a time period necessary for the polymerization of the glue. Instead of using a mechanical press, the glued beams **103** may be pressed against the panel **102** by screws, screwed in from the panel side. The screws will remain in the finished floor cassette, in which the connection between the beams **103** and the panel **102** is therefore established by the glue and by the screws.

[0090] The use of glue based on PUR in combination with an automated process for assembling the beams **103** to the panel **102** has resulted in a structure that has a high mechanical strength compared to existing floor cassettes that have an open structure, thus without the beams being mounted between two parallel panels. This has enabled the inventors to produce floor cassettes having a span greater than 6 metres, preferably between 6 and 12 m, that necessitate only two support points (like the two walls **111** in FIG. **14**).

[0091] The invention is equally related to the use of one or more cassettes according to the invention for constructing a floating floor, and to a floating floor comprising one or more cassettes according to the invention. When applying cassettes which are provided only with the support devices **2**, the above-named use is equivalent to a method comprising the steps of :

[0092] mounting one or more cassettes **101** according to the invention on support structures such as walls or their equivalent (e.g. rows of pillars), wherein each cassette is supported by at least two support structures,

[0093] mounting acoustic elements **118** on the central parts **3** of the support devices **2** of said one or more cassettes,

[0094] mounting joists **117** onto said acoustic elements **118**, the joists being oriented transversely to the central parts **3**, wherein the upper surface of the joists **117** is at a height that is superior to the beams **103** of the one or more cassettes **101**,

[0095] mounting one or more floor boards **100** onto said joists, to thereby form a floating floor, i.e. a floor that is not directly attached to the beams **103**. The second step of the above method is not required when cassettes are used which are already provided with acoustic elements **118**. The second and third step of the above method are not required when cassettes are used which are already provided with acoustic blocks and with joists **117**.

1. Floor cassette for the construction of a floating floor, the floor cassette comprising a wooden base panel and a plurality of wooden beams attached to one of the surfaces of the base panel, the beams being essentially parallel to one another, the base panel being configured to rest on two lateral walls, so that said floor cassette forms a load-bearing element configured to support the loads caused by persons and objects that are located on a storey of a building, wherein the floor cassette further comprises a plurality of support devices mounted between two adjacent beams, the support devices comprising two ends respectively fixed at least to a lateral wall of the two adjacent beams, and a central part connecting the two ends, the central part being configured to support the floor so that the latter is not directly attached to the beams.

2. Floor cassette according to claim **1**, in which the support devices are formed and sized so that the central parts of the support devices mounted on a plurality of pairs of adjacent beams are respectively able to support a plurality of

joists configured to support the floor, a resilient material acoustic element being placed between each central part and the joist that it supports.

3. Floor cassette according to claim **2**, in which a plurality of acoustic elements respectively attached to the central parts of the support devices form part of the floor cassette.

4. Floor cassette according to claim **3**, in which a plurality of said joists attached to the acoustic elements form part of the floor cassette.

5. Floor cassette according to claim **4**, in which the floor cassette comprises a part of said floor attached to the joists.

6. Floor cassette according to claim **1** in which the floor cassette comprises a thermal insulation material between the base panel and the support devices and/or above the support devices.

7. Floor cassette according to claim **1**, in which the base panel has a rectangular shape and in which the length of the base panel exceeds the length of the beams on both sides of said beams.

8. Floor cassette according to claim **1**, in which the beams are attached to the surface of the base panel by at least a glue.

9. Floor cassette according to claim **8**, in which said glue is a polyurethane-based glue applicable in liquid form and hardening with moisture from the wood and/or from the air.

10. Floor cassette according to claim **1**, in which the length of the floor cassette measured in the direction of the beams is between 6 and 12 m and the width of the floor cassette is between 1 and 3 m.

11. Floor cassette according to claim **1**, in which the support devices are mounted alternatingly on the channels formed by the beams.

12. Floor cassette according to claim **1**, in which at least one end of the support devices is an angle-bracket-shaped element comprising a vertical part and a horizontal part, the horizontal part being fixed to the upper surface of a beam and the vertical part being fixed to a lateral wall of the same beam, the central part being connected to the vertical part.

13. Floor cassette according to claim **12** in which the ends comprise a second horizontal part that supports the central part.

14. Floor cassette according to claim **1**, in which the ends are angle-bracket-shaped elements comprising a vertical part and a horizontal part, the vertical part being fixed to a lateral wall of a beam, the horizontal part supporting the central part of the support device.

15. Floor cassette according to claim **12**, in which the ends are fastened to the central part and oriented at obtuse angles different from 180° defined relative to the central part in a horizontal plane when the floor cassette is installed, said angles being opposite one another.

16. Floor cassette according to claim **13**, in which the central part of the support devices is formed by a steel or wooden bar.

17. Floor cassette according to claim **12**, in which one or more of the support devices is fabricated from steel plate or formed by the assembly of a plurality of parts of a steel plate.

18. Floor cassette according to claim **11**, in which the length of the central part of at least one of the support devices is adjustable when said device is removed from the floor cassette.

19. Floating floor comprising one or more floor cassettes according to claim **1**.

20. Use of one or more floor cassettes according to claim **11**, for the construction of a floating floor.

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