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(54) **Compensation device to be applied on structural beams, foundations, walls, slabs or the like for the compensation of natural subsidences and/or bendings caused by load stresses**

(57) The present compensation device permits to obviate usual structural subsidences of buildings, especially whenever there occur subsidences of walls resting on long beams or other components subjected to downward bendings.

Generally, this compensation device includes a plurality of containing elements (2) which are cushion elements or the like. The containing elements (2) are carried out by utilizing two or more sheets. Suitable materials for the sheets may be steel, reinforced rubber, nylon or carbon. The sheets are bent and shaped suitably.

The said containing elements (2) are placed side by side consecutively and are connected with each other through connecting elements (3).

The containing elements (2) are filled with a suitable fluid which may be liquid or gaseous. In this way, it is possible to obtain an intercommunication among the containing elements so that a compression of one or more containing elements causes a corresponding expansion in one or more of the other containing elements.

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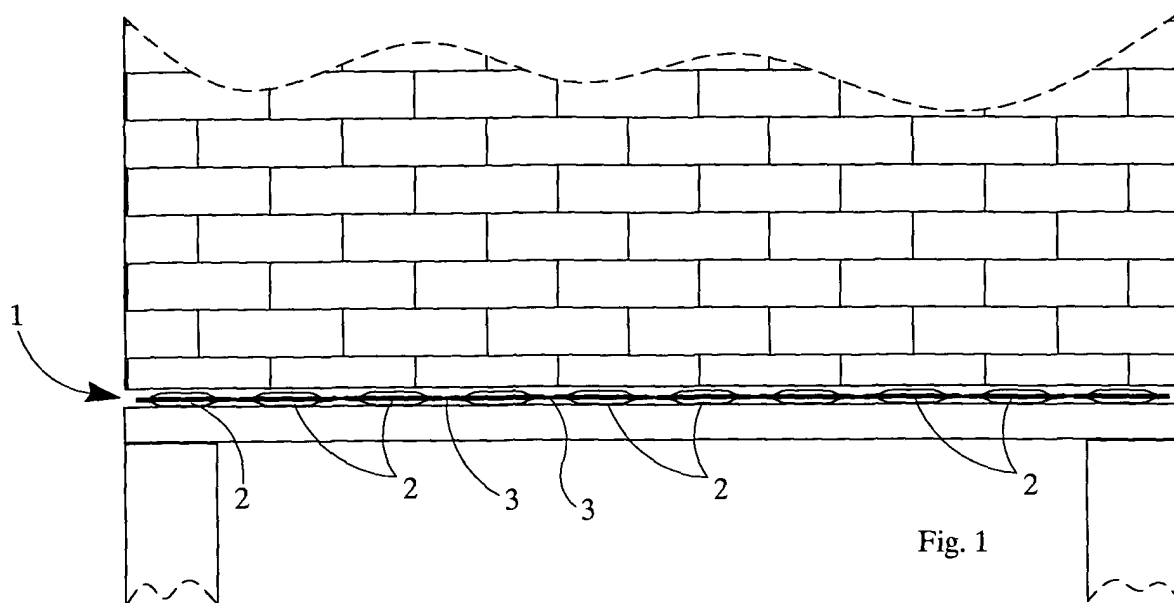


Fig. 1

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Description

[0001] The present invention proposes a compensation device to be applied on structural beams, foundations, walls, slabs or the like for the compensation of natural subsidences and/or bendings caused by load stresses or other reasons.

[0002] The present compensation device permits to obviate usual structural subsidences of buildings, especially whenever there occur subsidences in walls which rest on long beams or other components subjected to downward bendings.

[0003] In addition, the walls or other supported structures are subjected to slight subsidences and/or bendings which give rise to the formation of unaesthetic cracks and fissures.

[0004] As is known, in the field of building there are many problems as concerns the structural settling of building components which are mutually supported.

[0005] For instance, one of the classical building structures consists in the realization of walls or brickworks which are built on structural planes, slabs or the like.

[0006] In these cases, in the long run the structural planes and slabs get deformed and warp downward owing to the weight of the upper structure on causing a deformation in the upper part and the formation of cracks, fissures and other similar inconveniences which are difficult to repair.

[0007] In addition, the repairing and plastering interventions on wall cracks and fissures caused by the deformation of the lower structure are never resolute and such inconveniences arise again in the long run.

[0008] The aim of the present invention is to conceive and carry out a system to solve the aforesaid inconveniences to the root by utilizing an innovating compensation device for the elimination of any possibility of structural deformation, in particular in great vertical walls or surfaces.

[0009] Within the said general aim, the present invention proposes a compensation system to solve the structural problems, which system is simple as regards its construction and application and reaches very important results in the field of building.

[0010] Moreover, the system is advantageous for it may be applied in many solutions, also to recover subsidences of foundations.

[0011] All the above indicated aims and advantages are reached according to the present invention through a compensation device to be applied on structural beams, foundations, walls, slabs or the like for the compensation of natural subsidences and/or bendings caused by load stresses, characterized in that this device includes a plurality of containing elements which are cushion elements or the like, the containing elements being carried out with two or more sheets of a suitable material such as steel, reinforced rubber, nylon or carbon, the sheets being bent and shaped suitably,

and that the said containing elements are placed side by side consecutively, are connected with each other through connecting elements and are filled with a suitable fluid which may be liquid or gaseous to obtain an intercommunication among the containing elements so that a compression of one or more containing elements causes a corresponding expansion in one or more of the other containing elements.

[0012] Further features and details of the invention will be better understood from the following specification which is given as a non-limiting example on the hand of the accompanying drawings wherein:

Fig. 1 is a schematic view of a compensation device on the whole according to the invention as applied in a conventional building structure;

Fig. 2 is a schematic, perspective view of one of the intercommunicating containing elements;

Fig. 3 is a schematic view of a detail of a possible arrangement of one of the containing elements between the brickwork and the lower supporting slab;

Fig. 4 is a schematic view of a possible utilization of the present compensation system after a downward bending has occurred in the central part of a lower beam.

[0013] With reference to the accompanying drawings, number 1 denotes a compensation device 1 on the whole to be applied on structural beams, foundations, walls, slabs or the like for the compensation of natural subsidences and/or bendings of walls or the like caused by load stresses.

[0014] Generally, this compensation device according to the invention includes a plurality of containing elements 2 which are cushion elements or the like.

[0015] The containing elements 2 are carried out with two or more sheets.

[0016] Suitable materials for the sheets may be steel, reinforced rubber, nylon or carbon. The sheets are bent and shaped suitably.

[0017] For instance, the containing elements 2 may be realized through suitable coupling and bending of two shaped sheets made of metal material such as steel or other material such as reinforced rubber, nylon, carbon or the like in order to obtain an inner tight cavity in which a liquid and/or gaseous fluid may be contained.

[0018] At least one of the two opposite sides or both opposite sides of each containing element 2 show openings in which it is possible to insert connections for the application of connecting elements 3 which permit to connect each containing element 2 with all the other containing elements of the same series.

[0019] In fact, the said containing elements 2 are to be put side by side consecutively, are connected with each other through the connecting elements 3 and are filled with a suitable fluid which may be liquid or gaseous in order to obtain an intercommunication among the containing elements 2. In this way, a compression of one

or more containing elements 2 causes a corresponding expansion in one or more of the other containing elements 2.

[0020] The example represented in Fig. 4 shows that when a lower beam bends downward owing to the load stresses of the upper part, the compensation device reacts and the central containing elements expand in consequence of the compression of the lateral containing elements.

[0021] In this way, the upper wall remains in a perfect settling state and the formation of cracks and fissures is avoided.

[0022] This compensation system acts constantly in the long run since the containing elements are always in communication with each other and modify their volumes as pressures vary. In this way, the containing elements 2 create a constantly linear supporting base for the upper wall.

[0023] As said previously, the so-described compensation structure may be applied advantageously on any kind of building structure so as to obtain different advantages depending on the selected shapes.

[0024] Another advantage is that any shape, size and number of containing compensation elements 2 may be selected according to the form and dimensions of the building structure to be compensated.

[0025] Furthermore, the so-described compensation system may be applied under the walls or where there are wooden beams on which walls or brickworks rest.

[0026] As said, the present system is advantageous for it may be applied in many other situations also to recover subsidences of foundations.

[0027] Finally, each connecting element 3 arranged between two containing compensation elements 2 may be coupled by utilizing also rapid coupling elements or other suitable elements.

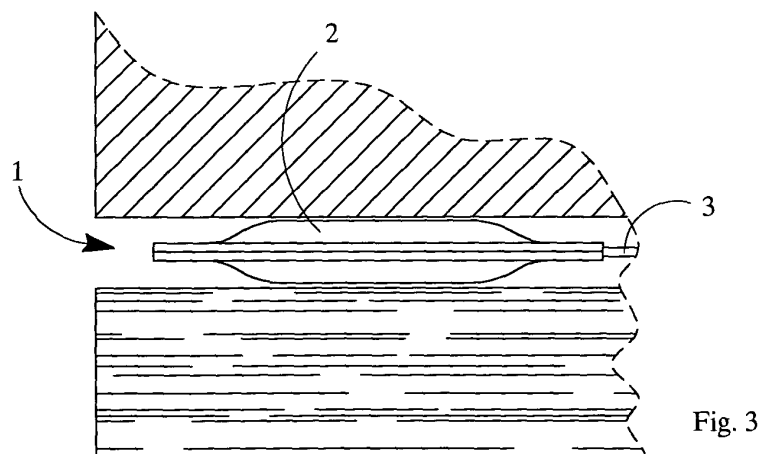
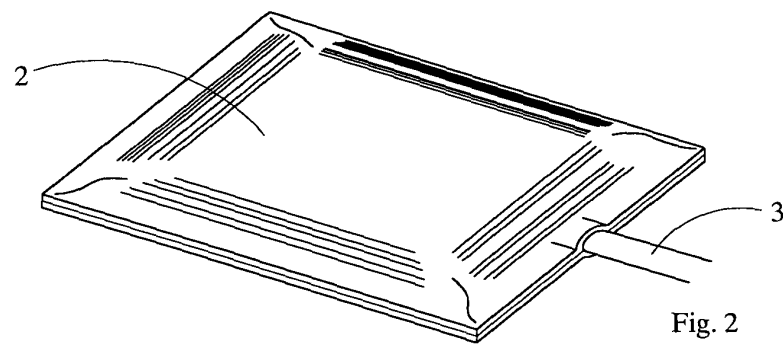
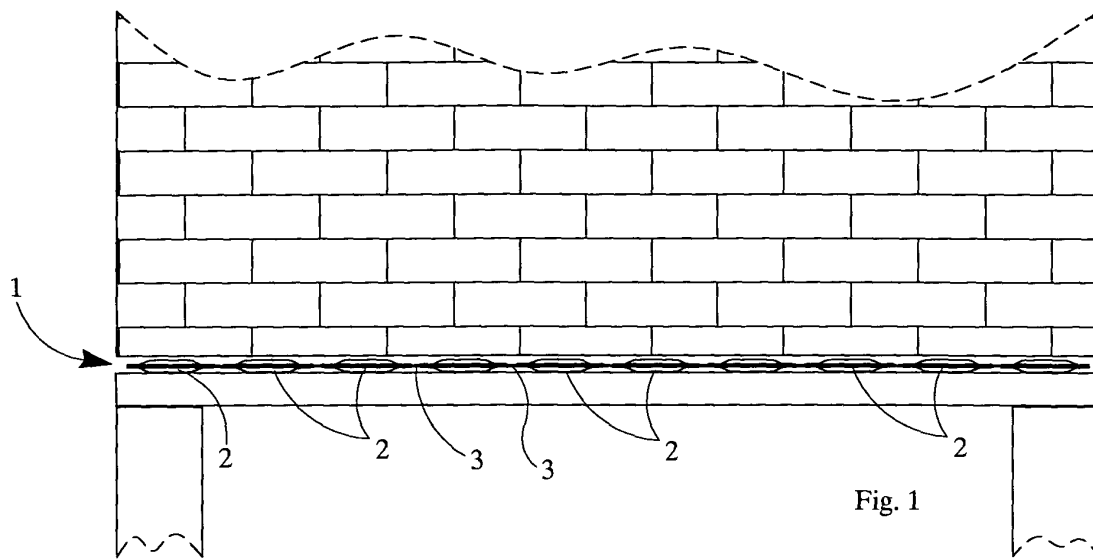
[0028] A technician of this field can make modifications and changes in the so-described represented compensation device and obtain solutions which are to be considered as included in the scope of protection of the present invention as further defined in its features in the following claims.

Claims

1. Compensation device (1) to be applied on structural beams, foundations, walls, slabs or the like for the compensation of natural subsidences and/or bendings caused by load stresses, **characterized in that** this device includes a plurality of containing elements (2) carried out with two or more sheets made of a suitable material such as steel, reinforced rubber, nylon or carbon, the sheets being bent and shaped suitably, and that the said containing elements (2) are placed side by side consecutively, are connected with each other through connecting elements (3) and are filled with a suitable fluid which

may be liquid or gaseous to obtain an intercommunication among the containing elements (2) so that a compression of one or more containing elements causes a corresponding expansion in one or more of the other containing elements.

2. Compensation device (1) as claimed in the foregoing claim, **characterized in that** the containing elements (2) are realized through a suitable coupling and bending of two shaped sheets made of a metal material such as steel or other material such as reinforced rubber, nylon, carbon or the like also as a sole body in order to obtain an inner tight cavity in which a liquid and/or gaseous fluid is contained.
3. Compensation device (1) as claimed in the foregoing claims, **characterized in that** at least one of the two opposite sides or both opposite sides of each containing element (2) show openings in which it is possible to insert connections for the application of connecting elements (3) which permit to connect each containing element (2) with all the other containing elements of the same series.
4. Compensation device (1) as claimed in the foregoing claims, **characterized in that** the said containing elements (2) are placed side by side consecutively, are connected with each other through connecting elements (3) and are filled with a suitable fluid, which may be liquid or gaseous, to obtain an intercommunication among the containing elements (2) so that a compression of one or more containing elements causes a corresponding expansion in one or more of the other containing elements.
5. Compensation device (1) as claimed in the foregoing claims, **characterized in that** the shape, size and number of the containing compensation elements (2) may be selected according to the form and dimensions of the building structure to be compensated.
6. Compensation device (1) as claimed in the foregoing claims, **characterized in that** each connecting element (3) arranged between two containing compensation elements (2) may be coupled also by utilizing rapid coupling elements or other suitable elements.



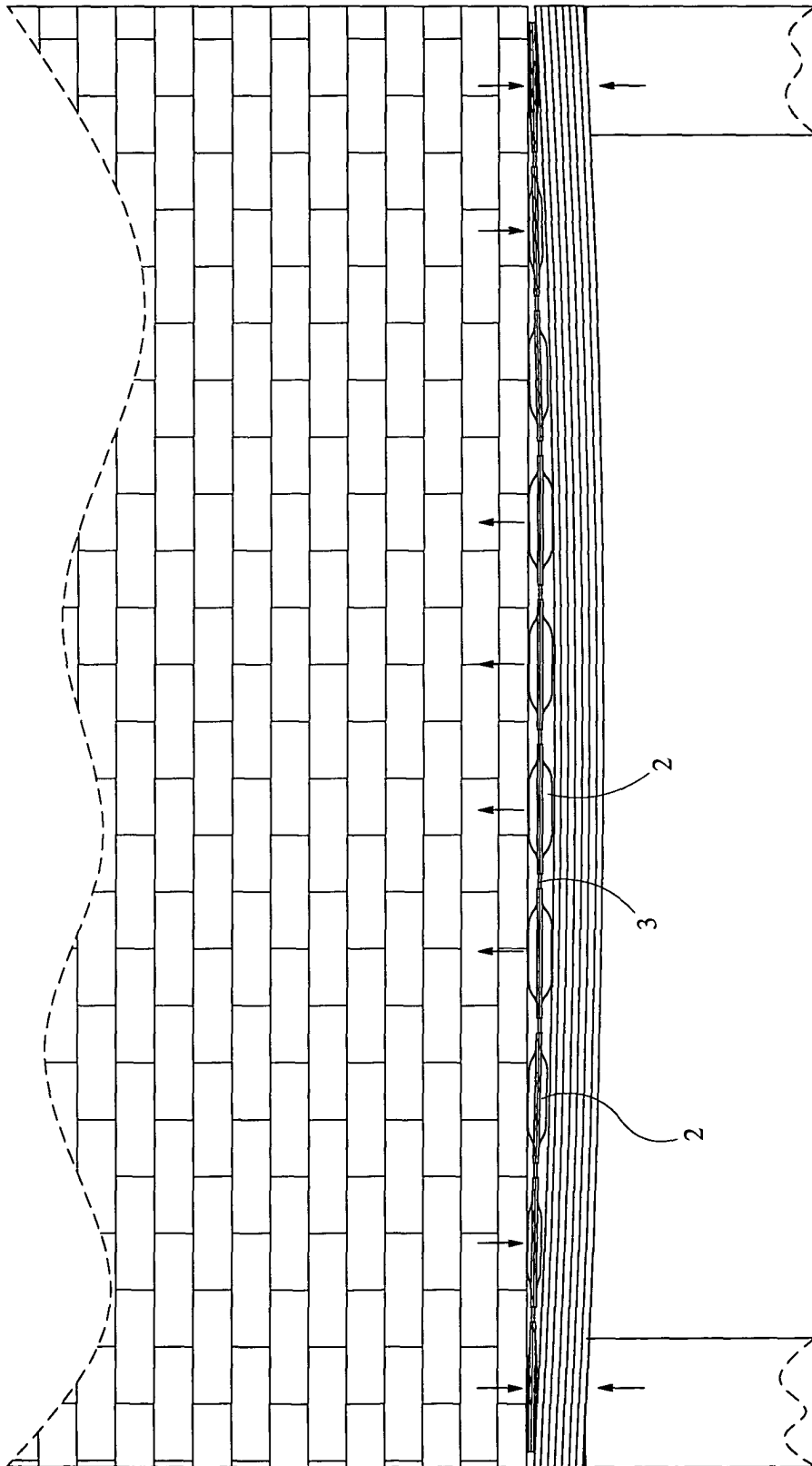


Fig. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 03 01 2250

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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 22 August 2003	Examiner Geiger, H
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 03 01 2250

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The members are as contained in the European Patent Office EDP file on
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