(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 801 301 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
27.06.2007 Bulletin 2007/26

(51) Int Cl.:
E04B 1/35 *(2006.01)*

(21) Application number: **06396023.1**

(22) Date of filing: **27.12.2006**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(30) Priority: **23.12.2005 FI 20051326**

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(54) Method of adding extra floors on a building

(57) A method of adding extra floors on a building, whereby the floors, which are to be raised, are formed by lifting up the mantle, the partition wall (9) and the mid-sole elements (6) and mounting them in place. At least a part of the raising part bearing-frame is made to run from the ground off the earth footing, whereby several load-bearing structures running vertical from the said earth footing, are placed outside the building, and which in the initial phase of the method the said bearing structures are extended to the final height of the building, and whereby at least said structures (2) on the opposite sides are interlocked and that in the method bearing-force from said load bearing structures (2) is arranged to at least some structures of the extra floors forming structures (6; 9).

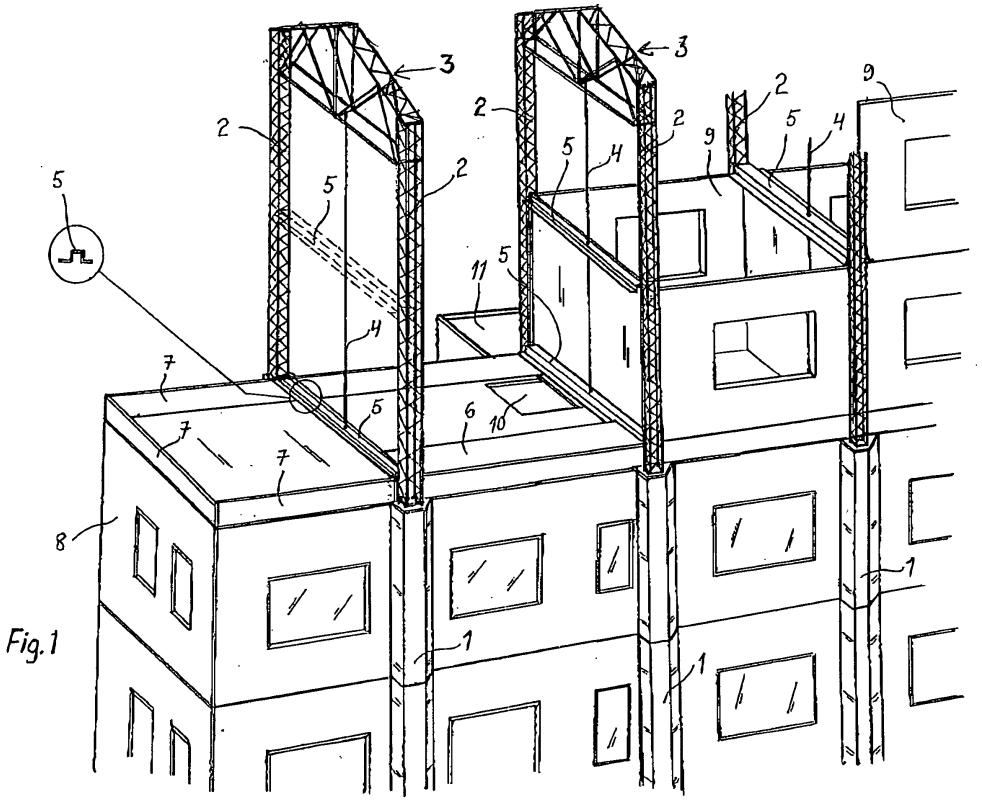

Fig. 1

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Description

[0001] The invention relates to a method of adding extra floors on a building mainly retaining the external dimensions, in which method the roof of the building, which is to be raised, is either an already free upper floor, as a flat roof, or it is arranged as a free upper floor or otherwise as a flat surface, in order to start the raising, for instance demolishing the ridge roof on it, and the floors, which are to be raised, are formed in lifting up the mantel, the partition wall, midsole elements and mounting them in place, whereby at least a part of the raising part bearing-frame is made to run from the ground off the earth footing, whereby several vertical load-bearing structures are placed outside the building.

[0002] Previously known as methods to add floors in buildings are, among others, a method known from patent publication US 5,174,085, where for the additional floors of the building an external footing is made, on which the additional floors are built. From the footing several vertical pillars reach up to the height of the original building and are tied together with many horizontal beams at the downstairs floors. The additional floors are also separable from the original building in regard to shocks and vibrations.

[0003] The disadvantage of this method is that the building gets padded with lashings of vertical pillars and horizontal beams, which are still at a distance from the wall of the building. The additional floors are made by the conventional method of construction, with the exception that the base floor of each additional floor is of quite thick reinforced concrete slab, because there is in the centre of the building structure, which would be bearing from the under-side.

[0004] From Japanese publication JP 40470703 a similar method is known, the additional floors are completely supported by means of external pillars of the building. At each additional floor there are through the building external pillars supporting thick connecting beams, on which each floor is built.

[0005] The disadvantage of above described methods is the remarkable deterioration of the external appearance of the building, and that the residents of the original building will not in general necessarily accept that sort of additional building as described above.

[0006] Thick horizontal beams running through the building must be mounted to hold up the additional floors. These ones hinder apartment planning and may possibly add the floor height for nothing.

[0007] In order to eliminate the above described disadvantages and to achieve a new method which is surprisingly improving the mounting of additional floors in a building, a new invention is made, characteristic of which is that in the initial phase of the method the said bearing structures are extended to the final height of the building, whereby at least said structures on the opposite sides of the building are interlocked and that in the method bearing force is taken to the structures, which form the raising, both from said load-bearing structures and a part of the bearing-force is formed interlocking the load-bearing structures from their upper ends by means of a bearing structure, as a lattice, and from the lattice bearing-force is arranged by means of pulling means to the horizontal beams which at least partly hold up the structures, which form the raising.

[0008] In the following the invention is disclosed with reference to the enclosed drawing, where Figure 1 shows a an apartment house, in which additional floors are built.

[0009] In fig. 1 there is presented an original apartment house, in the upper edge of which there are low platform elements 7, which have formed the edge parts of the flat roof structure in the original building. The original building can also have a ridge roof, whereby it has to be demolished. If there has been a flat roof or similar it is easier to start building additional floors. The method according to the invention includes at first building of additional footings outside the building in many places determined in advance for vertical bearing pillars. In figure 1 these footings are shown at each cantilever outside the building. The cantilevers 1 are built in conformity with the outer surface of the building possibly as covered pillars, which are tied also to the original wall structure most suitably at the joints between the elements. The pillars are of reinforced concrete structure or lattice columns of steel.

[0010] In the method pillars 1, 2 are extended to the final height of the building with added floors. An especially good solution is to join pillars 2 from their upper ends by a structure 3, which is a already finished roof truss of the new building. Figure 1 shows a solution of such kind. Mainly the additional floors are supported by means of pillars 2. If there in the upper part of the original building are no low elements, so it is profitable to form such ones, for instance as a portion of and together with the mantle element, which as raising part is at first mounted, so that a low attic space would be formed.

[0011] Additional floors are built with a crane, by means of which midsole elements 6 and 9 are in a usual way lifted in their place. Thick beams according to known solutions are not needed in this method. Between pillars 2 steel profiles 5 or similar are mounted, the height of which is identical with the height of midsole element 6. Profiles 5 are fixed to pillars 2 from their upper ends and, furthermore, they are suspended by structure 3 that joins pillars 2 from above means of pulling means 4. Pulling means 4 can be directed also diagonally from structures 2 or structure 3 to horizontal beam 5. Midsol elements 6 are so mounted that the ends rest on profiles 5. At the same time at least a part of the wall elements re also supported by means of midsole elements 6. In figure 1 no pillars 1 and 2 are shown to be positioned in the building gable. In the gables there can also be corresponding pillars. In the figure 1 case, for instance, the pillar is lifted so that raising part is removed and from above the old gable wall one advances with new wall elements, for the support of which all the ends of the midsoles and of the other ends of the upper floors of all floors are fitted.

[0012] After each additional floor horizontal beams 5 are mounted to support the next floor.

[0013] Usually there is no lift in the raised building, but a staircase, of course. The staircase of figure 1 has been at shaft 10, out of which it has been removed. In practice it is removed only when the lift and staircase are built in part 11 added to the building outside. This part is added in place of the former entrance and staircase. The possible old lift shaft and staircase 10 remain advantageously as a vertical shaft, along which it is easy to pull in the old house part the required channelling, tubing and cabling either up from downstairs or downwards from the roof of the new part from the ventilation machine, for instance. An especially good solution is that there will be on the same line together with shaft 10 a shaft leading upwards to the roof.

[0014] Adding roofs to a building does not necessarily require any change of the stair hall. Naturally, the old stair hall and lift can be raised only.

[0015] When a low horizontal attic space remains between the additional part and the old part, there are usually on the roof of the old part in many places ducts to be taken along this low space to vertical shaft 10 and from there further to the heat recovery machine on the roof. Correspondingly, from shaft 10 ventilation channels can be taken to each apartment of each floor by a very short horizontal draw through the wall.

[0016] When the old roof is a watertight flat roof, it is advantageous to keep it watertight with its roof outlets, whereby it remains as flood protection of the lower apartments in case of water damage of the upper part of the building .

[0017] The invention is not restricted to the enclosed embodiment, but can be modified in many ways.

Claims

1. A method of adding extra floors on a building, mainly retaining the external dimensions, in which method the roof to be raised on the building, where floors are added, is either an already free upper floor, as a flat roof, or it is arranged as a free upper floor or otherwise as a flat surface in order to start the raising, for instance, demolishing the ridge roof on it, and the floors, which are to be raised, are formed by lifting up the mantle, the partition wall (9) and the midsole elements (6) and mounting them in place, whereby at least a part the of the raising part bearing-frame is made to run from the ground off the earth footing, whereby several load-bearing structures, (1, 2) running vertical from the said earth footing, are placed outside the building, **characterized in that** in the initial phase of the method the said bearing structures, (1, 2) are extended to the final height of the building, whereby at least said structures (2) on the opposite sides of the building are interlocked and that in the method bearing force is taken to the structures (6);(9), which form the raising, both from said load-bearing structures (2)and a part of the bearing-force is formed interlocking the load-bearing structures (2) from their upper ends by means of a bearing structure, as a lattice (3), and from the lattice (3) bearing-force is arranged by means of pulling means (4) to horizontal beams (5) which at least partly hold up the structures (6);(9).

2. A method according to claim 1 **characterized in that** at each floor a midsole (6) elements (9) and several horizontal bearing beams (5) are placed.

3. A method according to claim 1 **characterized in that** between the added and the original part, in other words, between their base floor and upper floor a low part is left for horizontal mounting of channelling, piping and cabling.

4. A method according to claim 1 **characterized in that** the lift is dismounted for the part of the original building and the staircase and the freed shaft (10) are changed to an upwards transfer shaft for channelling, piping and cabling.

5. A method according to claim 1 **characterized in that** the staircase is dismounted at the part of the original building and at least a part of staircase is changed to an upwards transfer shaft for channelling, piping and cabling.

6. A method according to claim 1 **characterized in that** in the method outside the building a new space is built for the lift and/ staircase.

7. A method according to claim 1 **characterized in that** as load-bearing upwards structures (1);(2) are at least partly used as lattice structures, and by means of them horizontal beams (5) are hold up, which are mounted at each floor to connect structures (2) to each other.

8. A method according to claim 1 **characterized in that** at as load-bearing structures (1, 2) vertical structures are used and by means of pulling means (4) horizontal beams (5) are additionally hold up, which beams are mounted at each floor to connect structures (2) to each other.

9. A method according to claim 1 **characterized in that** connecting structure (3), which connects structures (2) from their upper ends, is arranged to work as roof truss of the roof to be built.

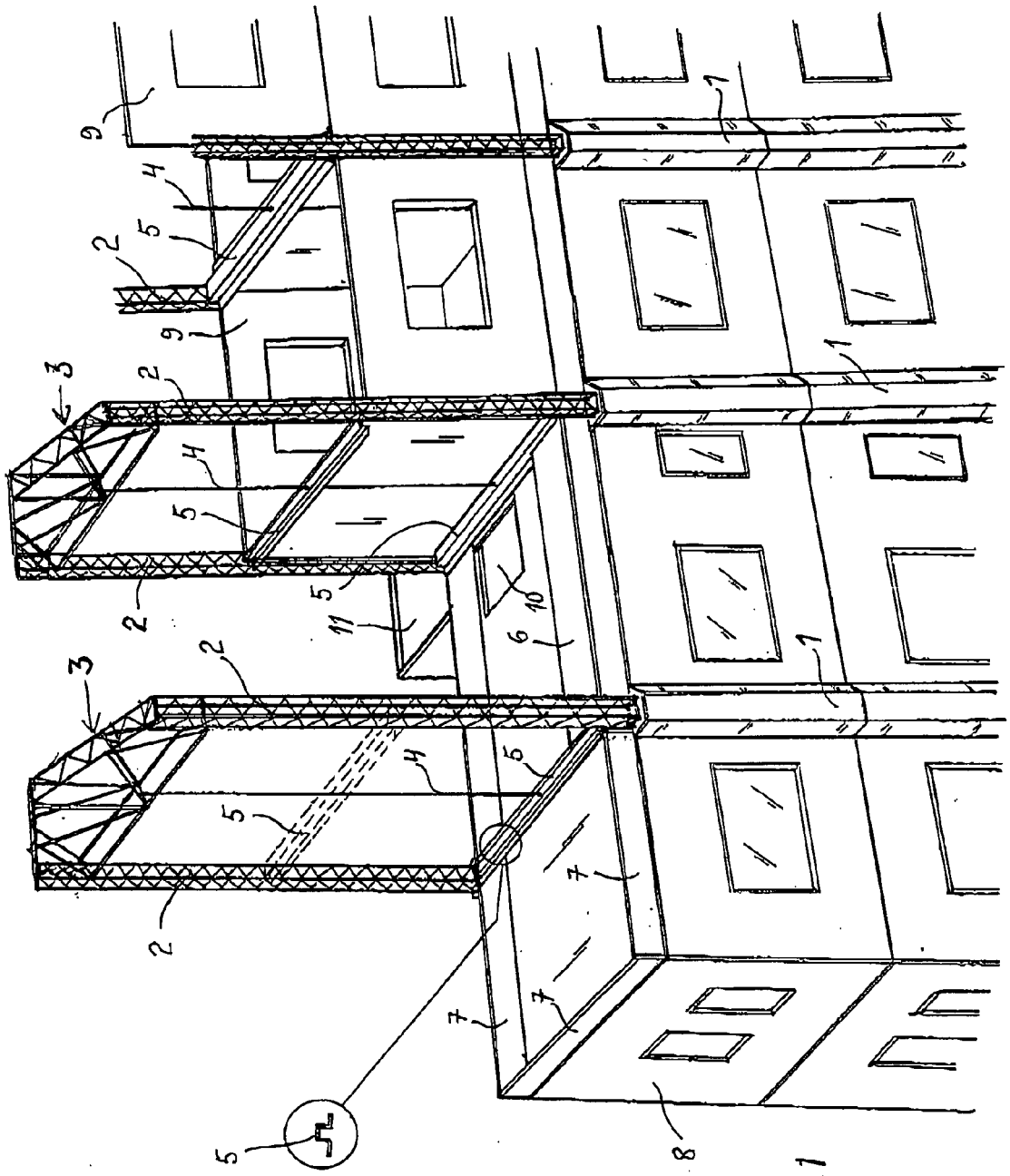

Fig.1

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EUROPEAN SEARCH REPORT

Application Number
EP 06 39 6023

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	US 4 980 999 A1 (TERENZONI ROBERT S [US]) 1 January 1991 (1991-01-01) * claim 1; figures 1-6 *	1,2,5 6	INV. E04B1/35
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			TECHNICAL FIELDS SEARCHED (IPC) E04B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	21 March 2007	Rosborough, John

CATEGORY OF CITED DOCUMENTS

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21-03-2007

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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- JP 40470703 A **[0004]**