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(54) Method of constructing a basement beneath an existing building

(57) A method of constructing a basement (13) beneath an existing building (1), whereby a bed (4) is formed at at least part of a useful surface area (3) of the building (1); the bed (4) is connected to a wall structure (2) of the building (1); a number of foundation piles (11)

are inserted through the bed (4) into the ground (12) beneath the bed (4); the foundation piles (11) are fixed to the bed (4); and the ground about the foundation piles (11) and beneath substantially the whole of the bed (4) is excavated to form the basement (13).

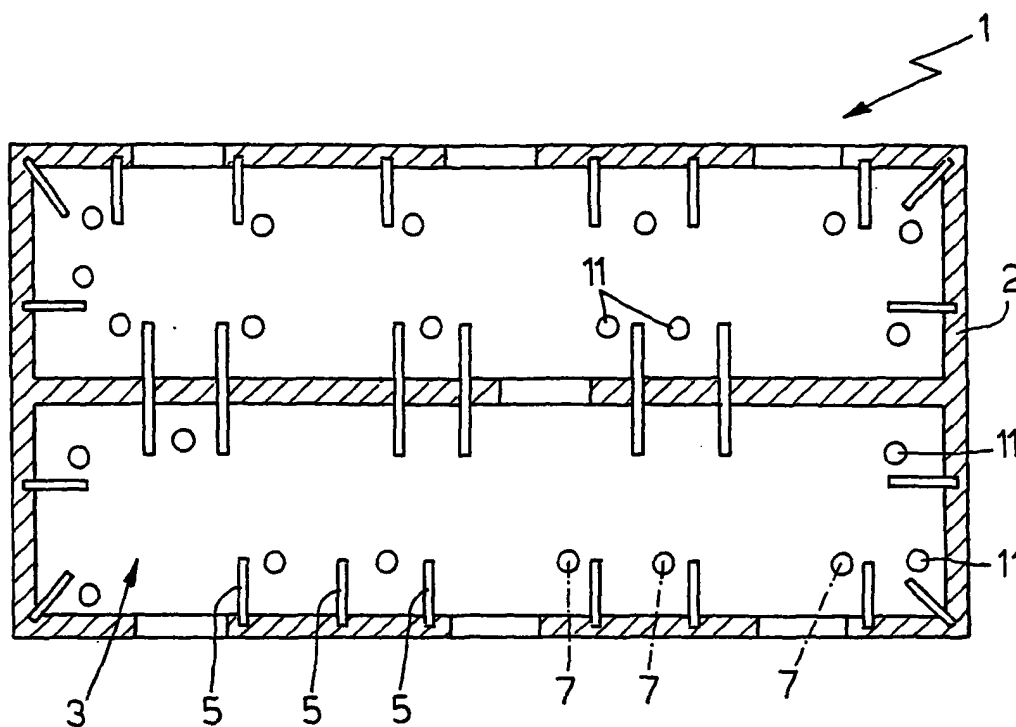


Fig.1

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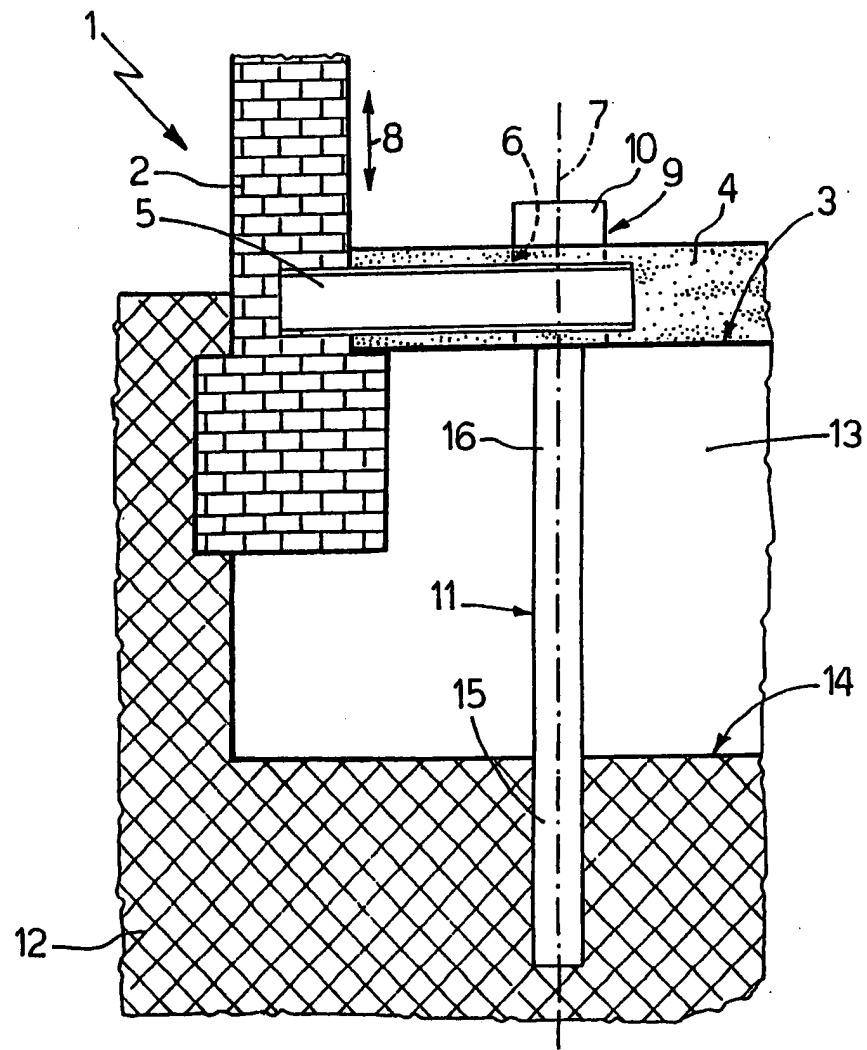


Fig.4

Description

[0001] The present invention relates to a method of constructing a basement beneath an existing building.

[0002] In the building industry, the method employed to construct a basement beneath an existing building normally comprises the steps of forming, in the ground beneath the building, a number of vertical holes substantially equally spaced along a wall structure of the building; inserting inside each hole a foundation pile smaller in cross section than the hole; pouring building material between each foundation pile and the relative hole to form a foundation pillar; connecting each foundation pillar to the wall structure; and excavating, within the foundation structure defined by the foundation pillars, as required to construct the basement.

[0003] Since, for building reasons, the holes are normally formed in the wall structure of the building, a major drawback of the known method described above lies in the basement having a relatively small useful surface area, and at any rate smaller than that of the building.

[0004] It is an object of the present invention to provide a method of constructing a basement beneath an existing building, designed to eliminate the aforementioned drawback, and which is cheap and easy to implement.

[0005] According to the present invention, there is provided a method of constructing a basement beneath an existing building having a wall structure defining a useful surface area of the building, the method being characterized by comprising the steps of forming a bed at at least part of said useful surface area; connecting said bed to said wall structure; inserting a number of foundation piles through said bed into the ground beneath the bed; locking said foundation piles axially; and excavating about said foundation piles and beneath substantially the whole of said bed to form said basement.

[0006] A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic plan view, with parts in section and parts removed for clarity, of an existing building beneath which a basement is constructed using the method according to the present invention;

Figures 2 to 4 show a sequence of operating steps in the method according to the present invention.

[0007] Number 1 in Figure 1 indicates as a whole an existing building comprising a wall structure 2 defining a useful surface area 3 of building 1.

[0008] As shown in Figure 2, a horizontal, reinforced concrete bed 4 is constructed at the ground level of building 1, extends inside structure 2, is of substantially the same surface area as surface area 3 in the example shown, and is connected to structure 2 by a number of

steel connecting members 5.

[0009] Bed 4 has a number of selectively arranged through holes 6, each having a longitudinal axis 7 substantially parallel to a vertical direction 8. Each hole 6 is engaged in sliding manner by a tubular guide member 9, which is fitted inside hole 6 substantially coaxially with respective axis 7, and is locked axially in known manner along hole 6 so that a portion 10 projects outwards of hole 6.

[0010] In a variation not shown, holes 6 are formed so that each axis 7 forms an angle of 0° to 90° with direction 8.

[0011] With reference to Figure 3, a substantially cylindrical foundation pile 11 is inserted inside each member 9, extends coaxially with respective axis 7, and is fitted in sliding manner to respective member 9 so as to be driven into the ground 12 beneath bed 4 by a known actuating device (not shown) - in the example shown, a hydraulic jack for moving pile 11 in direction 8. Once driven into the ground 12, pile 11 is locked axially in direction 8 by a known retaining device (not shown) for fixing pile 11 to member 9.

[0012] In variations not shown, each pile 11 is other than cylindrical in cross section.

[0013] At this point, as shown in Figure 4, the ground around piles 11 and beneath substantially the whole of bed 4 is excavated to form, beneath building 1, a basement 13 having a useful surface area 14 at least equal to surface area 3. In the example shown in Figure 4, excavation also extends beneath at least part of structure 2, so that surface area 14 is greater than surface area 3.

[0014] Once the excavation work is completed, basement 13 can be completed by constructing a bed (not shown) on surface area 14, and a wall structure (not shown) on the lateral walls of basement 13.

[0015] Once the excavation work is completed, each pile 11 has a bottom portion 15 driven into ground 12, a top portion (not shown) housed inside respective member 9, and a free intermediate portion 16 extending between bottom portion 15 and the top portion (not shown) and inside basement 13. In this connection, it should be pointed out that each portion 16 of at least some of piles 11 may be provided with a reinforcing jacket (not shown) to form a foundation pillar (not shown) of basement 13, or may be detached from respective bottom portion 15 and the respective top portion (not shown) and removed from basement 13.

[0016] The method according to the present invention therefore provides for constructing a basement 13 having a relatively extensive useful surface area 14, at least equal to useful surface area 3 of building 1, calls for the use of a relatively small number of foundation piles 11, and is relatively cheap to implement.

Claims

1. A method of constructing a basement (13) beneath an existing building (1) having a wall structure (2) defining a useful surface area (3) of the building (1), the method being **characterized by** comprising the steps of forming a bed (4) at at least part of said useful surface area (3); connecting said bed (4) to said wall structure (2); inserting a number of foundation piles (11) through said bed (4) into the ground (12) beneath the bed (4); locking said foundation piles (11) axially; and excavating about said foundation piles (11) and beneath substantially the whole of said bed (4) to form said basement (13). 5
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2. A method as claimed in Claim 1, wherein said foundation piles (11) are selectively arranged on said bed (4).
3. A method as claimed in Claim 1 or 2, wherein said basement (13) has a further useful surface area (14) at least equal to said useful surface area (3). 20
4. A method as claimed in any one of the foregoing Claims, wherein said excavating step extends beneath said wall structure (2); the basement (13) having a further useful surface area (14) greater than said surface area (3). 25
5. A method as claimed in any one of the foregoing Claims, wherein said basement (13) has a further useful surface area (14); a further bed being constructed on at least part of said further useful surface area (14). 30
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6. A method as claimed in any one of the foregoing Claims, and also comprising the step of constructing a further wall structure of said basement (13).
7. A method as claimed in any one of the foregoing Claims, and also comprising the step of providing each of at least some of said foundation piles (11) with a respective reinforcing jacket to form a respective foundation pillar of said basement (13). 40
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8. A method as claimed in any one of the foregoing Claims, wherein, at the end of the excavating step, each foundation pile (11) has a first portion (15) driven into the ground (12), a second portion extending inside said bed (4), and a third portion (16) extending between said first (15) and second portion; the third portion (16) of each of at least some of said foundation piles (11) being detached from the relative said first (15) and second portion, and being removed from said basement (13). 50
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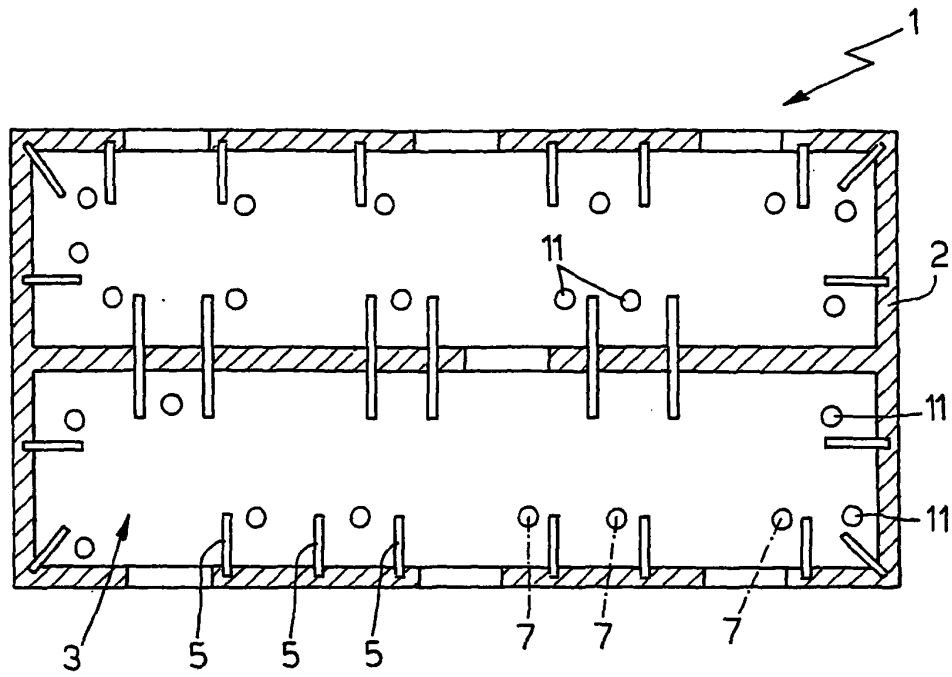


Fig.1

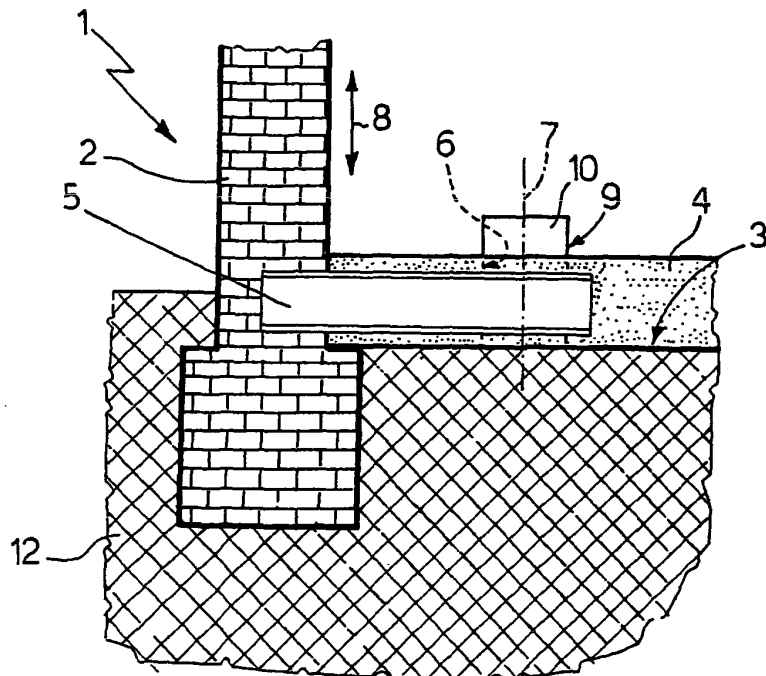


Fig.2

