

[54] **ARRANGEMENT IN OR RELATING TO
A TERRACE FLOOR AND A METHOD
FOR THE PRODUCTION OF SAME**

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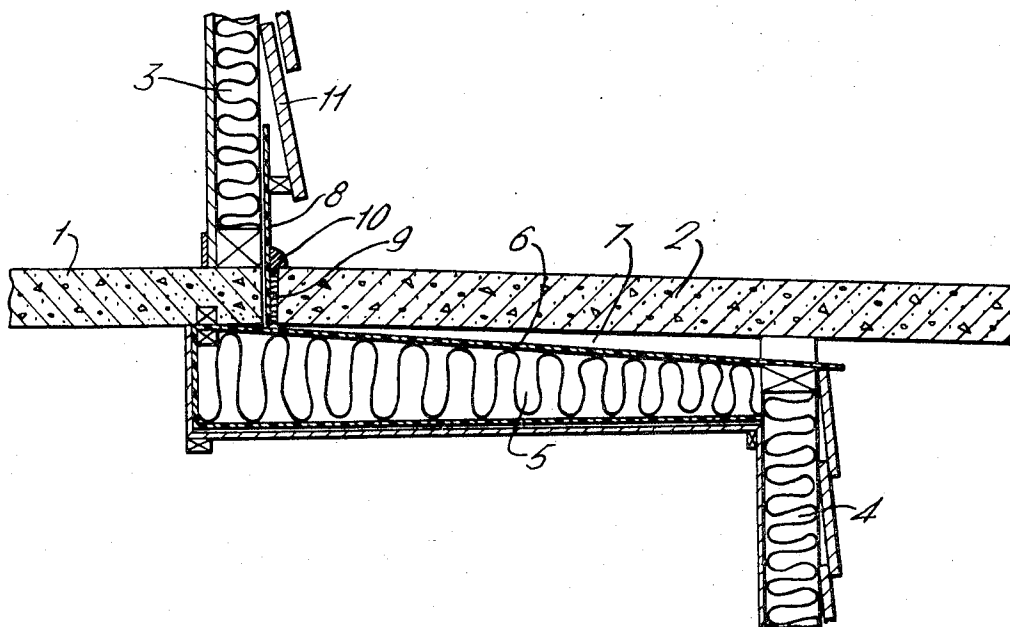
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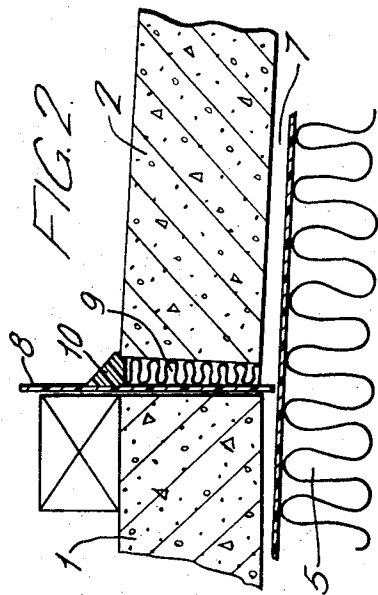
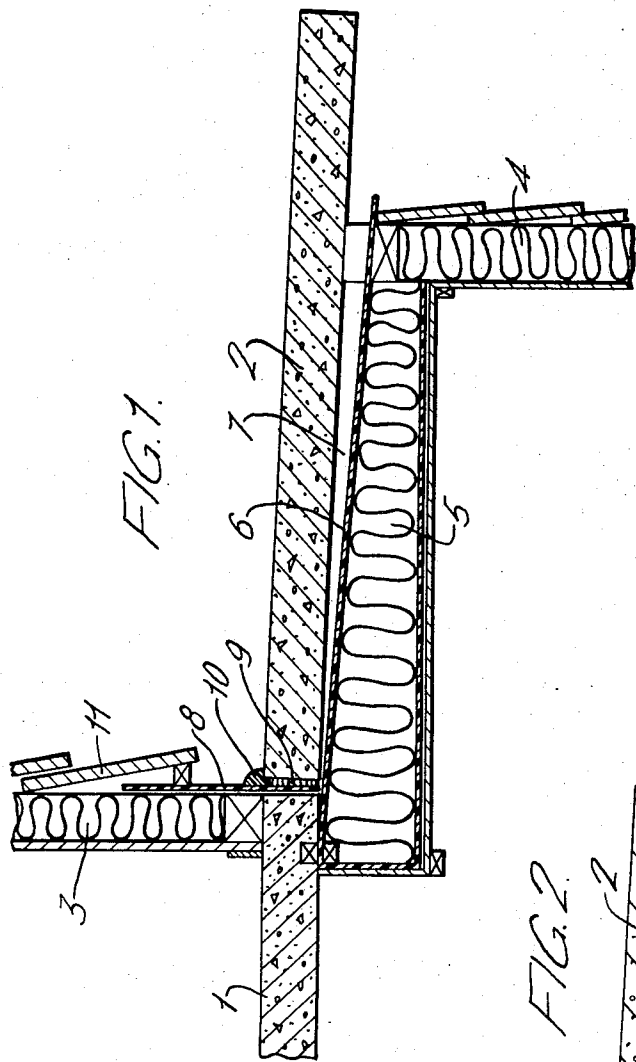
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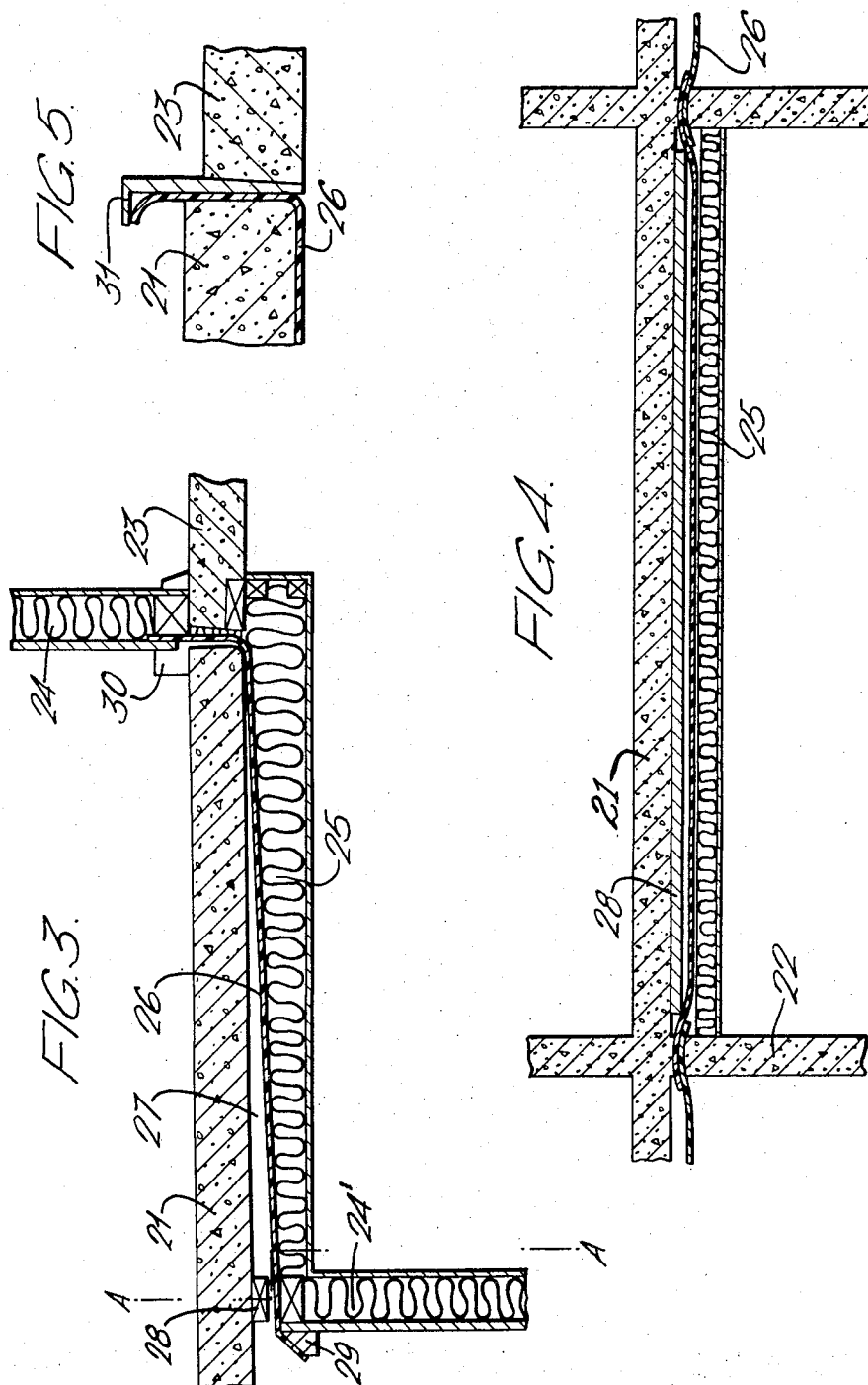
[57] **ABSTRACT**

An arrangement of a terrace floor in front of a set back story of a building, which floor is provided with a layer of thermal insulation underneath. A waterproof layer is arranged between the thermal insulation and the terrace floor has an air space in communication with the atmosphere outside the building at least on its top surface and possibly below its base. The terrace floor is separated from the floor inside by a gap. A waterproof sheet or the like is placed in the gap, running from the waterproof layer, over the insulating material below the terrace floor, upwards through the gap and up inside the facing of the exterior wall above.

10 Claims, 5 Drawing Figures







ARRANGEMENT IN OR RELATING TO A TERRACE FLOOR AND A METHOD FOR THE PRODUCTION OF SAME

The present invention relates to an arrangement in a terrace floor in front of a set back story of a building, which floor is provided with a layer of thermal insulation underneath and where a waterproof layer arranged between the thermal insulation and the terrace floor has an air space in free connection with the atmosphere outside the building on its top surface and possibly below its base, and where the terrace floor is separated from the floor inside by a gap.

The invention represents a further development of the terrace floor according to the Norwegian Specification laid open for public inspection No. 121 016 and is characterized in that a waterproof sheet or the like is placed in the gap, running from the waterproof layer, over the insulating material below the terrace floor, upwards through the gap and up inside the facing of the exterior wall above.

This represents a simple and inexpensive solution, as it is not necessary to secure the waterproof sheet or the like by casting or to secure it to the terrace floor in a watertight manner. In connection with this solution it is not necessary to take measures to prevent water from penetrating through the gap to the base of the terrace floor, since it is effectively prevented from contact with such materials of the structure that are not waterproof.

An especially preferably embodiment of the invention is characterized in that waterproof sheet beneath the terrace floor is integral with the sheet in the gap, that the sheet is secured by casting or otherwise to cross walls supporting the terrace floor and is somewhat declining outwards and that there is a space between the outside wall of the gap and the sheet forming a watercourse between the terrace floor and the sheet arranged underneath.

According to the invention a structure has thus been created which eliminates or at least reduces the number of joints of the waterproof membrane underneath the terrace floor. As a consequence, the risk of leakage is considerably reduced, and the risk of dampness penetrating downwards and/or of leakage from the upper concrete cross wall to the cross wall below, between apartments is practically eliminated. At the same time the structure has been considerably simplified and the possibility of flaws has practically been eliminated.

The outer portion of the terrace floor represents a cold zone where snow and ice barriers may occur, preventing water from draining off when such barriers lie along the outer edge of the terrace floor. On the other hand, discharge along the inner edge of the terrace floor will never be prevented by ice, when there is water on the terrace, because the inner edge of the terrace is placed above the warm apartment situated below, and heat from said apartment will always melt any ice within this inner drain before any water worth mentioning can collect on the terrace itself. In connection with the solution according to the present invention the storm-water drain along the inner terrace edge will thus prevent water from rising to such a level on the terrace that it could penetrate into the apartment, the water having free access through the gap or the storm-water drain and being guided along the plastic sheet beneath the terrace floor out towards the terrace

of the floor below and then in the same manner from terrace to terrace down towards the ground.

An important feature of the invention is as follows:

In the previously known solutions the waterproof layer beneath the terrace floor was interrupted by the concrete wall between the separate terrace. Thus, water could be drawn or absorbed from a higher terrace via the monolithic concrete wall which forms a partition wall between the apartments on the lower story and could there result in annoying problems of dampness or even in leakages in case of flaws in the casting. This risk of wandering dampness and/or leakage is eliminated according to the invention because the watertight layer is continued unbroken through the concrete wall so as to form a continuous, watertight membrane along the entire length of the building.

The structure according to the invention can be produced in an especially simple manner. Thus, the plastic sheet can be placed directly in the formwork. According to the previously known solutions the terrace floor was cast at first, whereafter the plastic sheet or the membrane was secured up to and along the finished concrete walls and roofs. This method in itself presents problems as well as being time consuming and comparably expensive. Also the above mentioned possibility of wandering dampness via the concrete itself from a higher terrace downwards to the apartment below is obvious. The structure according to the invention automatically provides a drain channel in the base of the terrace floor when the formwork has been removed and the plastic sheet has been loosened from the hardened concrete. The plastic sheet can be loosened from the concrete roof simply by inserting a rod or the like between the sheet and the concrete.

The sheet can be a thick plastic having grooves. The grooves are preferably placed perpendicular to the outer edges of the terrace floor and will thus contribute to an especially effective drainage of collected water.

Thus, according to the invention a structure is achieved which is technically better than the known structures as well as enabling us to build houses in a simpler and thus a less expensive manner.

The invention will now be described in detail with reference to an embodiment shown in the drawings, where

FIG. 1 shows a vertical section through a terrace floor according to the invention,

FIG. 2 shows a detail of FIG. 1 in a larger scale,

FIG. 3 shows a partial section through the terrace floor, the floor inside and the insulation underneath,

FIG. 4 shows a section along the line A—A in FIG. 3 and

FIG. 5 shows in detail a formwork formed as a knife for providing the gap between the concrete floor in the apartment and the terrace floor.

FIG. 1 shows a sitting room floor 1 of concrete and a terrace floor 2 of concrete, which has been cast declining outwards and is separated from the sitting room floor 1 by a gap. The exterior wall 3 above the sitting room floor 1 is arranged so as to make its outside run flush with the gap between the floors 1 and 2 respectively. The exterior wall of the apartment below is marked 4, and 5 is the insulating layer beneath the terrace floor. In the present embodiment the waterproof layer 6 consists of a plastic sheet running from a damp-

proof sheet (not shown) inside the exterior wall 4 beneath the insulating layer 5 and from there to the top of said layer where it runs declining towards the outside of the exterior wall 4. Between the sheet 6 on top of the insulating layer and the bottom surface of the terrace floor 2 is an air space 7 with free access to the atmosphere outside the building.

According to the invention a waterproof sheet or the like 8 runs from the waterproof layer 6 upwards through the gap between the floor 1 and the floor 2 and upwards inside the facing of the external wall 3. In the shown embodiment the exterior wall runs flush with the gap between the floors 1 and 2, but this is obviously not necessary. The gap is provided with an insulating material 9, preferably a fire resistant material, e.g., rock wool. Said insulating material is covered by a flexible, waterproof jointing compound 10. In this way, water is to a high degree prevented from penetrating down through the gap to the underside of the terrace floor. In case of a leakage, for instance because of damage, however, water penetrating into said gap will be guided by the waterproof sheet 8 down towards the waterproof layer 6, where the water will evaporate and disappear into the atmosphere outside of the exterior wall 4.

By filling the gap with a flexible material one achieves the advantage that it cannot be damaged due to changes of the gap dimensions as a consequence of variations of the temperature of the building. Such damages occurred in connection with the known solutions involving use of aeroconcrete or other porous and brittle materials for insulation.

By placing said gap flush with the outer edge of the exterior wall above a simple solution is achieved, compared with the known technique, according to which the wall was placed above the gap which is structurally more complicated. The watertight sheet or the like can thus run straight downwards along the outside of the exterior wall and one side of the gap, and it is not necessary to bend the sheet.

In FIG. 3 a terrace floor of concrete 21 is supported by cross walls 22. The floor 21 and the walls 22 form a grating, which is cast as an independent unit and heat insulated towards the supporting structures of the concrete building, as represented by the concrete floor 23. 24 is the external wall of the apartment and 25 is the heat insulating layer between the terrace floor and the apartment below. 26 is a membrane in the form of a plastic sheet, although other watertight materials can obviously be used instead. The membrane 26 runs upwards beneath the outer panel of the lower part of the exterior wall 24, continues approximately vertically through a comparably narrow gap between the terrace floor 21 and the concrete floor 23 of the apartment and runs sloping between the insulating material 25 and the terrace floor 21 to the patio of the apartment below. There is, thus, an intermediate space 27 so that water flowing down inside the terrace floor or possibly penetrating said floor can drain off.

A space between the sheet 26 and the terrace floor in the gap between the terrace floor and the apartment floor 23 can for instance be obtained by insertion of pressure-creosoted wooden pins or the like.

As shown in FIG. 4, the sheet 26 on both sides can pass through the cross wall 22, so that the sheets over-

lap in each terrace section. Due to its own weight, or possibly by the arrangement of a ledge 28 forming a distance means between the sheet and the terrace floor near the partition walls, the sheet will form a groove so that any leakage between two adjacent sheets is prevented.

The sheet may be nailed to a ledge 29 upmost on the exterior wall 24' to form a larmier.

Furthermore, a recess 30 can be provided in the partitions between the terrace sections down at the upper edge of the interior floor and near the exterior wall 24. Any local damming up can thus be prevented by overflow into adjacent sections.

The structure according to FIGS. 3 and 4 can be achieved in an especially simple manner. The sheet 26 can be placed on the bottom of the formwork for the terrace floor 21 and the floor 23. A formwork 31 shaped as a knife (FIG. 5) is provided to form said gap between the terrace floor and the apartment floor, and the sheet 26 runs upwards along one side of the formwork 31. Then the terrace floor and the concrete floor of the apartment are cast and when the formwork has been removed, the plastic sheet, which adheres badly to concrete, is loosened from the concrete, whereafter in a manner known per se, so that the sheet descends outwards.

The gap between the terrace floor and the cover inside is preferably filled with jointing compound in an area around the partition walls. Thus, security against leakage in the overlap area of two adjacent sheets is enhanced.

Even though it is stated in connection with the present embodiment that the sheet is joined by overlap at the cross walls, it is obviously within the scope of the invention to use a sheet running continuously through two or more terrace sections.

What we claim is:

1. A terrace floor arrangement for a building having a set back story, said arrangement comprising:
 - a lower apartment;
 - a set back upper apartment above said lower apartment;
 - a terrace floor located above said lower apartment and in front of an outer wall of said upper apartment, said terrace floor being separated from the floor of said upper apartment by a gap;
 - a layer of thermal insulation located underneath said terrace floor and above the lower apartment;
 - a first waterproof layer located above said layer of thermal insulation for collecting water which might penetrate down through said terrace floor, said layer of thermal insulation and said first waterproof layer being positioned such that a space in free communication with the atmosphere exists with the atmosphere outside the building, said first waterproof layer being declined such that any collected water on its top surface is drained off; and
 - a second waterproof layer extending upwardly from said first waterproof layer through said gap between said terrace floor and said upper apartment floor, and up into said outer wall of said upper apartment, said second waterproof layer being positioned behind the facing of said outer wall of said upper apartment.

2. An arrangement as stated in claim 1 wherein a fireproof insulating material (9) is placed in the gap in the floor and is covered on top by a flexible waterproof jointing compound (10).

3. An arrangement as stated in claim 1 wherein said gap between the terrace floor and the floor in the upper apartment runs flush with the outer surface of the outer wall of said upper apartment.

4. An arrangement as stated in claim 1 wherein said first waterproof layer below the terrace floor is integral with the second waterproof layer in the gap, said integral waterproof layer being secured by casting or otherwise to cross walls supporting the terrace floor a space being formed between the outside wall of the gap and the waterproof layer forming a watercourse between the terrace floor and the waterproof layer arranged underneath.

5. An arrangement as stated in claim 4, for the separate terrace sections for each storey continue a little further than the opposite side of the partition wall between the terrace sections so that two adjacent sheets overlap in said partition walls and for a distance on each side of them.

6. An arrangement as stated in claim 4 wherein a spacing means is secured between the waterproof layer and the terrace floor in the area of the exterior wall of said lower apartment at least near the cross walls.

7. An arrangement as stated in claim 4 further including a recess formed in the cross wall between two adjacent terrace sections, the lower edge of which recess is flush with the terrace floor and is near said gap.

8. A method of constructing a terrace floor arrangement for a building having a set back story comprising

the steps of: cross walls

providing a lower apartment having a floor and a ceiling;

providing an upper apartment above and set back of said lower apartment, said upper apartment including an outer wall;

providing formwork for casting a terrace floor above said ceiling of said lower apartment and in front of the floor of said upper apartment, a waterproof layer being provided on said formwork with a first portion over said ceiling of said lower apartment and a second portion extending upwardly adjacent the outer wall of said upper apartment and into said outer wall in such a way as to lie behind the outer facing of said outer wall;

casting said terrace floor in said formwork wherein a gap is formed between said terrace floor and the floor of said upper apartment, said second portion of said waterproof layer extending through said gap;

disengaging said waterproof layer from the cast terrace floor; and

positioning said first portion of said waterproof layer below said cast terrace floor such that a space is provided therebetween in free communication with the atmosphere outside said building.

9. A method as stated in claim 8 wherein said formwork includes a portion shaped as a knife said second waterproof layer portion being supported by the formwork shaped as a knife.

10. A method as stated in claim 8 wherein said waterproof layer is placed in the formwork overlapping in the area where cross walls between the terrace sections are placed.

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