



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**19.05.2010 Bulletin 2010/20**

(51) Int Cl.:  
**E04B 1/00 (2006.01) E04G 23/02 (2006.01)**

(21) Application number: **09396010.2**

(22) Date of filing: **12.11.2009**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR**  
Designated Extension States:  
**AL BA RS**

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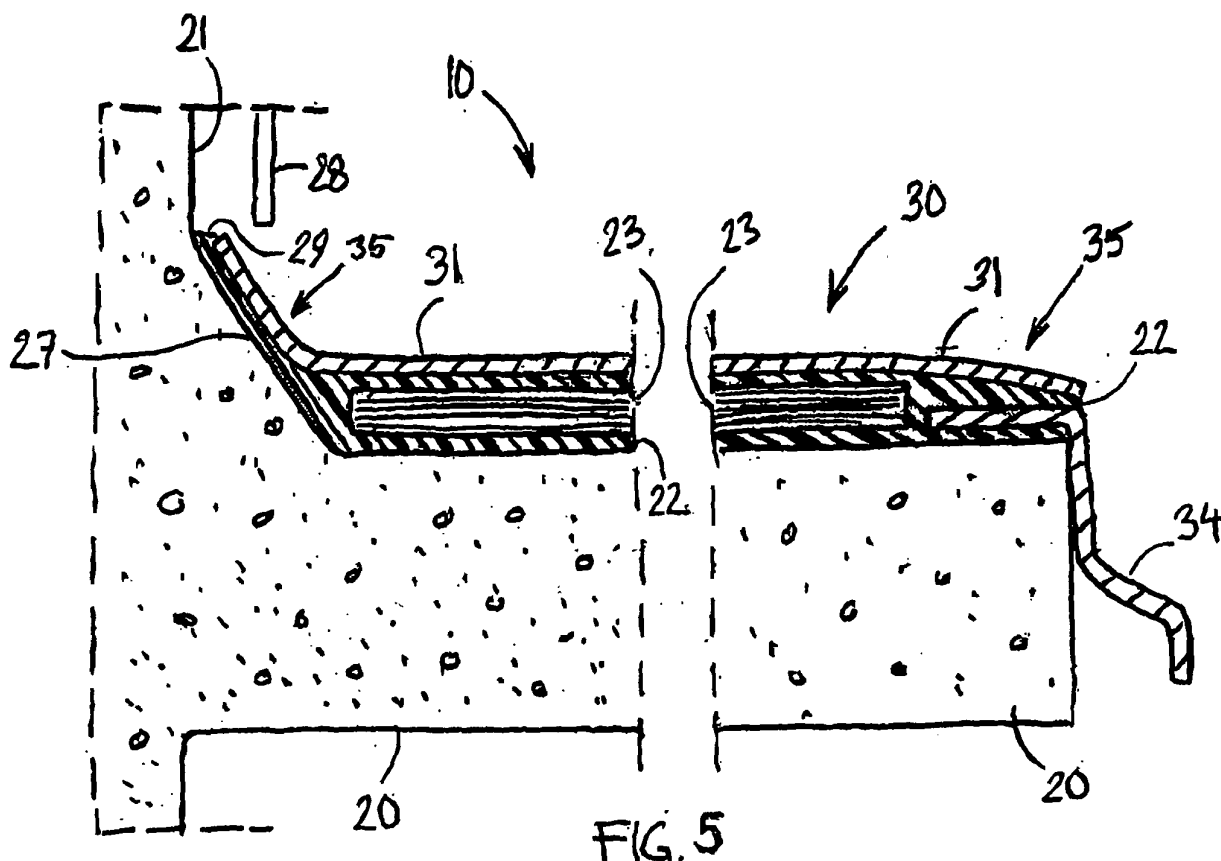
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(30) Priority: **12.11.2008 FI 20080618**

(54) **Method for preparing a concrete floor, e.g. for a balcony; and a floor structure**

(57) A method for repairing a balcony floor (20), a patio floor, or any other concrete floor, in which the balcony floor is coated with a prefabricated, pliable coating system (30) resistant to wear and weather conditions, the coating system being attached onto the floor using a

waterproof and elastic adhesive and sealant paste (22). In a balcony floor structure (10), the coating system (30) comprises a plastic overcoat layer and a tissue-like or sheet-like reinforcing layer (23), the edges of which may have a flashing (34) as required.



## Description

### METHOD ACCORDING TO THE INVENTION

5 **[0001]** The object of the present invention is a method for repairing a concrete floor, such as a balcony or patio floor, or another concrete surface.

### PRIOR ART

10 **[0002]** Repairing balconies of a concrete block of flats is a lengthy and expensive operation. Vertical walls are generally less liable to damage, and repainting or nowadays increasingly applying new boarding often suffices for their repair. Old balustrade slabs are also increasingly replaced with new ones. Even so, most of both the cost and the duration of the work is taken up by the repair of the concrete flooring. This is because stagnant water on the horizontal concrete surface and various forms of mechanical wear will, over the years, break the concrete surface. Moisture seeping into the structure and changes in temperature result in the dissolving of the adhesive agents in the concrete and cracking, as the moisture freezes in the pores of the concrete.

15 **[0003]** Typical types of damage in a balcony floor include paint coat wear as well as various degrees of cracking and fractures or erosion in the surface, and rusting in rebar close to the surface or in contact with air due to cracking. Such damage will eventually lead to the balcony floor losing structural strength, which in the worst case makes it necessary to rebuild the entire balcony.

20 **[0004]** Current floor repairing techniques include various phases of work, which makes the process a lengthy one. The duration is lengthened even more by the fact that the entire object, such as a block of flats, is repaired in separate phases to save costs. The process typically involves sandblasting, making it necessary to cover the entire building under tarpaulin to prevent detrimental effects caused by the abrasives. This has an adverse impact on the comfort of living and the pleasantness of the environment for several months.

### THE CURRENT METHOD OF REPAIR

30 **[0005]** Known methods for balcony repair have so far generally involved epoxy coating or tiling. Rigid, approximately 19 mm thick birch plywood, plastic coated at the works, has also been used for the decking of new balconies.

### STAGES OF WORK ACCORDING TO THE PRIOR ART

35 **[0006]** The following list shows the conventional stages of work according to the currently prevailing repair method:

1. Cutting by a demolition hammer to remove "loose" material, i.e. the damaged concrete layer which comes off relatively easily, and to expose the rebar close to the surface.
2. Cutting off of the rebar with no bearing to the strength of the structure to decrease the surface cracking risk due to expansion of steel oxidation products (rust). The volume of rusting steel expands by a factor of 9.
- 40 3. Sandblasting to remove rust and loose debris.
4. Exposing the rebar close to the surface to enable anti-corrosion treatment preventing rusting. This involves the removal of concrete around the rebar close to the surface for a distance of 10 to 15 mm.
5. High-pressure wash, generally with water applying a pressure of 100 to 200 bar, to remove sand and loose debris.
6. Anti-corrosion treatment of the rebar with runny mortar, in two stages to achieve sufficient layer thickness.
- 45 7. Smoothing out and patching of cavities and uneven spots, using concrete-based special mortars.
8. Surface treatment, with the following options

8a. Two-stage treatment with epoxy paste, applying first a primer and then an overcoat.

8b. Tiling, with ceramic tiles or natural stones.

50 9. Application of a flake finish if epoxy paste coating is used. To make the epoxy surface less slippery, the flakes are applied either by scattering them directly onto the epoxy surface or by mixing them with the epoxy.

10. Application of a topcoat to fix the flakes, because without this, approximately 50% of the flakes will have loosened in two years.

55 **[0007]** The known repair method furthermore may include patching and/or repair of expanded corners and edges as required, applying the above-listed stages.

**[0008]** A Japanese patent publication 07097871 presents a method consisting of several work stages, wherein the

balcony is coated in situ with multi-layer coating systems. Such a method is very complicated and requires several work stages.

[0009] A German application publication 24 33 317 presents a method applying fixed prefabricates. Here the entire balcony floor is covered by a fixed, single-part element prefabricated in a formwork equal in size to the balcony. The prefabricate consists of a horizontal part equal in size to the balcony floor and of parts tilted upwards at walls and downwards at edges. The usability of such a method is limited by the large weight of the prefabricate, which makes it very difficult to install the prefabricate in cramped spaces. Furthermore, the uniqueness of balcony sizes and shapes requires a very large selection of formwork. Due to its rigidity, such a solution is poorly applicable also for the commonly used type of balconies where the bonding area between the floor and the wall is seen with a concrete reinforcement of a few centimetres in width, which rises a couple of centimetres above the floor surface.

#### PURPOSE OF THE INVENTION

[0010] The purpose of this invention is to create a method which overcomes the above-mentioned drawbacks. Furthermore, the purpose of the invention is to create a repair method enabling the repair of a concrete floor, such as a balcony or patio floor, or any other concrete surface in a rapid and durable manner, offering new possibilities in terms of appearance or decoration, for an affordable financial cost.

#### CHARACTERISTICS OF THE METHOD ACCORDING TO THE INVENTION

[0011] The method according to the invention is **characterised in that** a concrete floor, such as a balcony or patio floor, or any other concrete surface is coated with a prefabricated, pliable coating system with a good resistance to wear and weather conditions, the coating system being attached onto the floor using an adhesive and sealant paste that retains its elasticity and provides a waterproof layer.

[0012] 'Pliable' here refers to a characteristic completely differing from a rigid plate in such a way that it is possible to sufficiently bend the coating system during installation and possibly also during transport. Some degree of bending is required when bringing the coating system onto the balcony and the installation site, possibly into a fairly cramped space. The coating system must also adapt to the shapes of any gradients made onto the balcony surface for the flow of water. Furthermore, the edge portions of the coating system must bend upwards from the balcony floor level, thereby providing an edging that restricts the flow of water at one or more edges of the coating system.

#### BENEFITS ACHIEVED BY THE INVENTION

[0013] Benefits achieved by the invention at hand are shown in the table below.

|                                   | Known method                       | Invention     |
|-----------------------------------|------------------------------------|---------------|
| Stages of installation work       | several                            | a few         |
| Need for protection               | requires tarpaulins due to dusting | no tarpaulins |
| Duration of work/non-availability | weeks to months                    | 1 to 2 days   |
| Relative cost                     | 100                                | 20 to 50      |

#### EMBODIMENTS OF THE METHOD ACCORDING TO THE INVENTION

[0014] The method according to the invention is based on substantially two stages: the prefabrication of a coating system in a separate production facility, and the installation in situ.

[0015] According to one preferred embodiment of the method according to the invention, a prefabricated, pliable coating system is first attached onto a cleaned balcony floor using an adhesive and sealant paste that retains its adhesiveness and elasticity for a long period of time. Thus the balcony floor is coated with such a prefabricated, pliable coating system resistant to wear and weather conditions, comprising first a reinforcing layer placed on the flat portion of the balcony floor, and an overcoat layer on top of that. According to some other embodiments, the coating system also incorporates separate overcoat and/or reinforcing layers.

[0016] According to another preferred embodiment of the method according to the invention, a possibly industrially produced overcoat layer, prefabricated in conjunction with the prefabrication of the coating system, is cut to the size of the balcony, measured beforehand, so that its edges also include the edge portions, or so-called apron flashings, which are parts foldable upwards against the walls at the edges of the balcony and/or a portion at least partially overhanging

the edge strip. Thus a piece equal in shape to the balcony floor to be coated is cut out from the reinforcing layer, such as fibreglass fabric, and the reinforcing layer is coated with the pliable plastic overcoat layer, which extends over the edge of the reinforcing layer at least at one of its edges.

[0017] According to a third preferred embodiment of the method according to the invention, the reinforcing layer is cut to the shape of a straight, substantially horizontal balcony deck. After this, the overcoat layer and the reinforcing layer are attached to each other with elastic paste which retains its elasticity to create a pliable coating system, and the prefabricated, pliable coating system, substantially equal in shape to the balcony floor, is attached to the concrete deck of the balcony with adhesive and sealant paste that retains its elasticity.

## FLOOR STRUCTURE

[0018] Another purpose of the invention is to create a floor structure for a balcony, patio, or a similar concrete base which overcomes the above-mentioned drawbacks.

## CHARACTERISTICS OF A FLOOR STRUCTURE ACCORDING TO THE INVENTION

[0019] A floor structure according to the invention is **characterised in that** the floor structure has a fixed, pliable coating system with a good resistance to wear and weather conditions on top of a concrete floor, and the coating system is attached to the concrete floor with waterproof and elastic adhesive and sealant paste. It is essential that the adhesive and sealant paste retains its elasticity and thereby provides a waterproof layer resistant to various, alternating conditions. By using a floor structure according to the invention, a concrete floor can be repaired rapidly, durably and in a way offering new decoration possibilities while all the same producing an economical structure.

## EMBODIMENTS OF THE FLOOR STRUCTURE ACCORDING TO THE INVENTION

[0020] In a floor structure according to the invention, the coating system is comprised of an overcoat layer and a reinforcing layer attached to each other with elastic paste which retains its elasticity. Thus a preferred embodiment of the floor structure according to the invention is **characterised in that**

- the coating system of a balcony floor is substantially comprised of a sheet-like object equal in shape to the balcony floor, provided by a single reinforcing layer, and a pliable plastic overcoat layer, with which the reinforcing layer is coated,
- the reinforcing layer is made from a strong, tissue-like material, such as fibreglass fabric, filter fabric, or matting made from fibre, such as fibreglass matting, mineral wool or steel wire mesh, or from a pliable sheet, such as thin plywood, pliable plastic sheet or from a combination of these, and
- the pliable plastic overcoat layer in the coating system extends over the edge of the reinforcing layer at least at one point or at least at one edge.

[0021] The reinforcing layer is made from a strong, tissue-like material, such as fibreglass fabric, filter fabric, or matting made from fibre, such as fibreglass matting, mineral wool or steel wire mesh, or from a pliable sheet, such as thin plywood, pliable plastic sheet or from a combination of these. The purpose of the reinforcing layer is to provide strength to the overcoat so that it does not fail when people walk on it or if highly localised loads are exerted on it, for example legs of furniture, and to smoothen out any small uneven spots in the concrete surface below it.

[0022] Any of the above-mentioned embodiments according to the invention can easily be combined with flashing attached to the outside edge of the balcony, a so-called drip edge, which also makes the balcony neat in appearance.

### Example 1

[0023] A balcony repair operation according to the invention is comprised of the following stages, for example:

1. To remove any loose matter on the balcony floor, the old surface is cleaned by grounding it in places and by washing it, applying a high-pressure water blaster, subjecting the old floor to a water pressure of approximately 200 bar.
2. Elastic paste is applied onto the area to remain under the drip edge at the front edge of the balcony floor, this operation substantially being aimed to

2a. make it possible to attach the edge strip onto the balcony floor so that the bond between the materials to be joined, such as a metal sheet and concrete, will endure the shear loads caused by thermal and/or humidity

expansion

2b. fill in and even out or bridge over unevennesses, cracks and any other surface damage in the balcony floor base

2c. create waterproofing, and to

2d. stop the rusting of rebar.

3. A prefabricated edge strip is placed onto the pasted concrete surface, on top of the elastic paste, creating a protection system for the edge areas of the balcony floor and a drip edge to convey water away from the balcony floor, and providing the edge of the balcony slab with an advantageous appearance.

4. The elastic paste is applied across the whole surface of the balcony floor, including a portion of the top surface of the edge strip, for example in such a way that the elastic paste covers half of the horizontal surface of the edge strip, and also against the walls at the edges of the balcony floor, up to such a height that the paste will remain under the pliable edge portions of the coating system. The following advantageous effects will thus be achieved:

4a. the edge strip can be attached to the coating system and/or the overcoat layer so that the bond is waterproof and elastic, and endures the shear loads caused by thermal and/or humidity expansion;

4b. the prefabricated coating system attaches to the balcony base, such as concrete, by means of a bond that is elastic, and endures the shear loads caused by thermal and/or humidity expansion;

4c. bridging over, i.e. unevennesses, cracks and any other damage in the base can be filled;

4d. creating a waterproofing layer,

4e. stopping the rusting of rebar.

5. The prefabricated, pliable coating system is placed onto the balcony floor and pressed against the elastic paste on the balcony floor and on the surface of the edge strip and against the wall, and thus a strong bond is created between the coating system and the concrete balcony floor, and between the coating system or the overcoat.

**[0024]** The balcony floor surface to be repaired, and poured from concrete, may also be of a shape other than flat. Minor unevennesses, such as recesses or protrusions or slight gradients made to assist flow of water away from the balcony, to the edge areas, can generally be created by means of a method and a coating system according to the example presented above.

#### Example 2

**[0025]** The area of a balcony deck is often surrounded, either entirely or at some edges, by an edge area of a few centimetres in width and generally about 2 to 3 cm higher than the balcony floor level made to reinforce the concrete structure. Such edge areas are treated as explained in Example 1 so that the elastic paste is applied also to the edge areas of the balcony floor, and the pliable edge portions of the coating system are pressed against the edge areas of the balcony floor so that a strong bond is created between the pliable edge portions of the coating system and the edge areas of the balcony floor.

#### Example 3

**[0026]** If the building has sheet metal cladding on external walls, the pliable edge portions of the coating system on the balcony floor can be conveniently fitted under the sheet metal cladding.

#### Example 4

**[0027]** To increase the rigidity of the coating system and to secure the flatness of the finished balcony floor, a reinforcing layer is attached under the coating system using elastic adhesive paste, thereby creating an additional support layer. The reinforcing layer can be made from thin, pliable plywood, pliable plastic sheet, filter fabric, fibreglass matting, mineral wool, steel wire mesh, or a combination of these. Most preferably, the reinforcing layer is prefabricated and possibly industrially produced.

**[0028]** Thus the reinforcing layer

- increases the layer thickness and strength of the prefabricated coating system while retaining the pliability, at least in edge portions
- makes the coating system more rigid particularly in areas with a pliable reinforcing layer, for example
- improves the adhesion to the balcony surface, as the adhesive surface area increases

- accelerates the curing of the bond to the balcony
- bonded with adhesive paste, provides a strong and pliable, multi-layer structure in the coating system.

**[0029]** Generally, the characteristics and purposes of the overcoat in a coating system for balcony floors according to the invention are most preferably as follows. The overcoat must be:

1. durable, resistant to mechanical wear and weather conditions, such as variations in temperature and humidity, and to UV radiation;
2. slip resistant, even when wet;
3. comfortable and warm under bare feet;
4. of even quality, such as industrially produced;
5. functional as a decorative element, creating an elegant and decorative appearance.

**[0030]** A suitable paste for fixing and sealing the coating system and/or the overcoat for balcony floors is, for example, Anyseal (Elastop) produced by Build Care Oy, but other suitable elastomers may also be applicable. Some most essential characteristics required from the paste are as follows. The paste must

1. secure durable adhesion between the materials to be attached to each other;
2. be elastic so as to be able to maintain the adhesion between the materials in spite of their differing characteristics in terms of thermal and/or humidity expansion;
3. prevent humidity from entering the structure, i.e. the paste must function as a sealant;
4. stop rusting of rebar by preventing the development of conditions that make rusting possible in the vicinity of the rebar;
5. have bridging properties, i.e. be able to even out the cracks, cavities and unevennesses in the base, also under varying conditions of use;
6. be durable in the long term.

**[0031]** The purpose of the reinforcing layer is:

1. to even out the coarseness of the balcony floor and make the surface rigid;
2. to be pliable to promote the installation and to be able to contour non-planar surfaces;
3. promote adhesion to the balcony base.

#### EXAMPLES OF EMBODIMENTS

**[0032]** In the following, the invention is described using examples with reference to the appended drawings, in which

#### LIST OF FIGURES

**[0033]**

- Figure 1 is a partial vertical sectional view of a balcony floor structure according to the invention.  
 Figure 2 is a top view of an embodiment of the coating system for balcony floors according to the invention.  
 Figure 3 is a partial cross section of a detail of the coating system for balcony floors according to another embodiment.  
 Figure 4 corresponds to Fig. 3 and shows a detail of the coating system for balcony floors according to a third embodiment.  
 Figure 5 is a vertical sectional view of the balcony floor structure according to a fifth embodiment.  
 Figure 6 is a cross section of the coating system for balcony floors according to the fifth embodiment.  
 Figure 7 shows the coating system for balcony floors from Fig. 6 as installed.

#### DESCRIPTION OF THE FIGURES

**[0034]**

Figure 1 shows a vertical sectional view of a balcony floor structure 10 according to the invention with a coating system 30 fixed with elastic adhesive and sealant paste 22 onto the concrete floor 20 of a balcony. In this example, the coating system 30 is a pliable skin sheet, for example a plastic sheet, a coated plywood board, or another similar type of sheet.

Figure 2 is a top view of the coating system 30 of a balcony floor, the coating system being prefabricated and substantially equal in shape to the balcony floor to be coated. A reinforcing layer 23 located under the coating system 30 is indicated on the coating system 30 with a dotted line, the reinforcing layer being smaller in size than the overcoat layer 31 topmost in the coating system 30. Thus the overcoat layer 31 in part extends outside the reinforcing layer 23 so that an edge portion 35 of the coating system 30 remains at one or more edges of the coating system 30. It is the purpose of the edge portion 35 that it can be folded upwards from the balcony deck 20 against the wall, or onto a reinforcing part in connection with the wall or the deck 20, the reinforcing part being shaped like an inclined surface 27, for example.

**[0035]** The size and shape of the reinforcing layer 23 is as close to the size and shape of the planar balcony floor as possible. The reinforcing layer 23 is of a stiffening, sufficiently sturdy material, made either from solid wood or plastic board, or formed from a fibre material mentioned above, for example, by laminating with elastic paste or by another method, thus making sure that the repaired balcony floor will be sufficiently even. It should straighten or bridge over the finished coating system 30 so that any small recesses in the old concrete floor 20, for example, will be eliminated in the new floor coating system 30. However, the reinforcing layer 23 should be sufficiently pliable to adapt itself to the shape of the concrete balcony floor 20 in case it has shapes or gradients intended to make water flow away from the balcony floor, for example.

**[0036]** The overcoat layer 31 is, for example, of anti-slip patterned and weather resistant polyolefin plastic matting, which is sufficiently pliable so that the overcoat layer 31, as such or even when laminated with fibres and elastic paste, can be folded upwards from the balcony deck 20, against a wall, or onto an inclined edge reinforcing surface 27 of the concrete floor 20.

**[0037]** The coating system 30 in Fig. 2, which comprises both the reinforcing layer 23 and the overcoat layer 31, is most preferably industrially prefabricated and finished beforehand, prior to the actual installation. In this case the coating system 30 is for example made by first cutting a reinforcing sheet 23, providing the reinforcing layer 23, to the size and shape of the even part of a concrete balcony floor 20. Following this, the overcoat layer 31 is cut out from a polyolefin plastic mat, for example, so that it is larger than the reinforcing sheet 23 by the edge portions 35 of the coating system 30. The required edge portions 35 are measured beforehand from the balcony, and the edge portions 35 can thus be provided with a suitable width so that they fit onto the inclined edge reinforcing surface 27 of the concrete floor 20 of the balcony, or they can be folded upwards from the deck 20, sufficiently high up against the wall. After this, the reinforcing sheet 23 and the overcoat layer 31 are attached to each other with elastic adhesive and sealant paste 22, and when the bond is complete, the coating system 30 can be brought for installation onto the concrete floor 20 of the balcony.

**[0038]** However, the coating system in Fig. 2 can be prefabricated prior to the installation also by using other methods. According to one preferred method, the overcoat layer 31 is first cut out from a polyolefin plastic matting, for example. The overcoat layer 31 is cut to such a size and shape that it already includes the plane surface and the required edge portions 35 measured beforehand from the balcony floor. After that, a reinforcing layer 23, comprised of one or more of the above-mentioned reinforcing materials, is laminated with elastic paste 22 to bond with the overcoat layer 31. Advantageously, the reinforcing layer 23 is provided by laminating filter fabric or fibreglass matting onto the overcoat layer 31. The required strength and stiffness can be achieved for the reinforcing layer 23 in the coating system 30 by altering the properties and numbers of the layers to be laminated. The aim is not to render the reinforcing layer 23 completely stiff, but rather it should adapt itself to any gradients in the concrete surface 20 and other minor bending.

**[0039]** When the reinforcing layer 23 is created in the overcoat layer 31 of the coating system 30 by laminating, this also makes it possible to affect the properties of the edge portions 35 of the coating system 30, such as pliability. Thus according to one embodiment, the overcoat layer 31 in the coating system 30 is very thin because it can be made more rigid, if so required, by laminating onto it one or more layers of filter fabric, fibreglass matting or other reinforcing material with elastic paste 22. Most preferably, this reinforcing material is even of the same reinforcing material used for stiffening the reinforcing layer 23 in the coating system 30, but it can also be of another material. Thus less of this material is used to reinforce the edge portions 35. If required, the edge portions 35 foldable upwards from the balcony floor 20 can be provided as basin walls of sorts, which are sufficiently stiff as such. Thus only the folding areas of the edge portions 35, indicated by a dotted line in Fig. 2, are left unstiffened.

**[0040]** Figure 3 shows a cross section of the coating system 30 according to Fig. 2. The coating system 30 is made by gluing a reinforcing sheet 23, cut to the suitable size, with elastic adhesive and sealant paste 22 to a pliable plastic overcoat layer 31. Furthermore, a reinforcing fabric, such as gauze 24 for example, is attached with elastic adhesive and sealant paste 22 onto the underside surface of the coating system 30 shown in Fig. 3, to reinforce the structure of the coating system 30, thereby providing a tight layered structure.

**[0041]** Figure 4 shows a cross section of the edge of the coating system 30 of Figures 2 and 3. Fig. 4 shows that the flexible and pliable plastic overcoat layer 31 extends beyond the reinforcing sheet 23, thereby providing the edge portion 35 of the coating system 30. When installing the coating system 30, the pliable edge portion 35 can be folded and lifted up against the balcony wall or against an upwards rising, inclined surface 27 that may be located at the edge portion of

the balcony floor 20. Fig. 4 also shows that the reinforcing sheet 23 in the coating system 30 is entirely covered by elastic adhesive and sealant paste 22. Such a structure is particularly advantageous when there is a need to stiffen the edge portion 35 of the coating system.

**[0042]** Figure 5 shows a vertical sectional view of an embodiment of the balcony floor structure 10. In the balcony floor structure 10 in Fig. 5, one can see, at the right-hand side of the figure, a bond between the coating system 30 and flashing 34. The structure is provided by first attaching the flashing 34 to the edge of the concrete balcony floor 20 with adhesive and sealant paste 22. Following this, the coating system 30, prefabricated to the shape of the balcony floor 20 and including a reinforcing sheet 23 providing the reinforcing layer and an overcoat layer 31 cut out from plastic matting, is brought onto the concrete floor 20. In the example shown, the reinforcing sheet 23 of the coating system 30 is a plastic sheet or a plywood board 23, which however in this example has been left slightly smaller than the balcony floor at its edge so that it does not extend onto the flashing 34. The coating system 30 is attached to the concrete balcony floor 20 so that, at the reinforcing sheet 23, it is attached to the concrete surface 20 with elastic paste 22, and the pliable plastic overcoat layer 31 remaining outside the reinforcing sheet 23 is attached to the flashing 34.

**[0043]** In another alternative, the reinforcing sheet 23 extends to the edge of the concrete balcony floor 20, but the example shown in Fig. 5 simultaneously provides the skin sheet 30 with a more advantageous gradient towards the balcony edge, which guarantees that rain water flows off the balcony.

**[0044]** The left hand side of Fig. 5 shows a detail on the reverse side of the balcony floor structure 10, i.e. the wall side. As shown in Fig. 5, the reinforcing sheet 23 in the coating system 30 has been sawn prior to the installation to the shape and size of the concrete balcony 20 deck. However, the pliable plastic overcoat layer 31 at the edge of the coating system 30 has been cut larger than the reinforcing sheet 23 so that it extends outside the reinforcing sheet 23 also at this edge of the balcony. This edge portion 35 of the coating system 30 has been lifted up against the inclined surface 27 at the edge of the balcony floor 20. The seam 29 at the edge portion 35 of the overcoat layer 31 provided by plastic matting thus remains above the floor surface and prevents leaks. The seam 29 is furthermore concealed under the sheet metal cladding 28 in this example.

**[0045]** Figure 6 shows a coating system 30 for balcony floors where a reinforcing tissue 24, for example filter fabric, fibreglass fabric or similar, is laminated onto a plastic overcoat layer 31 with elastic paste 22. The lamination is carried out beforehand, most preferably at an industrial facility, so as to render the coating system 30 ready for installation onto the concrete surface of a balcony floor 20. The laminated reinforcing fabric 24 provides the reinforcing layer 23 in the coating system 30, corresponding in size to the plane portion of the deck in the balcony to be repaired. The coating system 30 furthermore comprises the edge portions 35, which can be folded as necessary, for example upwards against the wall surrounding the balcony.

**[0046]** Figure 7 shows the coating system 30 in Fig. 6 as installed onto a concrete balcony floor 20. The coating system 30 is attached to the concrete 20 with elastic paste 22. The reinforcing layer 23 in the coating system 30 lies against the even surface of the balcony floor 20, and the edge portion 35 of the coating system 30, on the left in Fig. 7, has been folded upwards and attached to the inclined surface 27. On the opposite side, the edge portion 35 has been attached to a flashing, which thus remains between the concrete floor 20 and the edge portion 35 of the coating system 30.

#### ADDITIONAL NOTES

**[0047]** It is obvious to a person skilled in the art that the different embodiments of the invention may vary within the scope of the claims presented below. Thus various indentations or even holes may be made in the edge portion 35 of a coating system according to the invention if structures in connection with the balcony floor, such as the balusters of a guard rail, so require. Because the coating system, even at such a location, is attached to the balcony floor with elastic, waterproof adhesive and sealant paste, however, the structure will be waterproof also in this case.

#### LIST OF REFERENCE NUMBERS

##### **[0048]**

- 10 Balcony floor structure
- 20 Concrete floor
- 21 Side wall
- 22 Elastic adhesive and sealant paste
- 23 Reinforcing layer, reinforcing sheet
- 24 Reinforcing fabric, filter fabric
- 27 Inclined surface
- 28 Sheet metal cladding
- 29 Seam

- 30 Coating system
- 31 Overcoat layer, skin sheet
- 34 Flashing
- 35 Edge portion of the coating system

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## Claims

- 10 1. A method for repairing a concrete floor (20), such as a balcony or patio floor, or any other concrete surface, **characterised in that** said concrete floor (20), such as a balcony or patio floor, or any other concrete surface, is coated with a prefabricated, pliable coating system (30) resistant to wear and weather conditions, said coating system being attached onto the floor using an adhesive and sealant paste (22) that retains its elasticity and provides a waterproof layer.
- 15 2. The method of claim 1, **characterised in that** said balcony floor (20) is coated with said prefabricated, pliable coating system (30) resistant to wear and weather conditions comprising a reinforcing layer (23) placed on the flat portion of the balcony floor, and an overcoat layer (31) on top of that.
- 20 3. The method of either one of claims 1 or 2, **characterised in that**
  - a piece equal in shape to said balcony floor (20) to be coated is cut out from said reinforcing layer (23), such as fibreglass fabric,
  - said reinforcing layer (23) is coated with said pliable plastic overcoat layer (31), said overcoat layer extending over the edge of said reinforcing layer at least at one of its edges.
- 25 4. The method of any one of claims 1, 2 or 3, **characterised in that** said prefabricated, pliable coating system (30), substantially equal in shape with said balcony floor (20) is attached to the concrete deck of the balcony with said adhesive and sealant paste (22) that retains its elasticity.
- 30 5. A floor structure (10) for a balcony, patio, or a similar concrete base (20), **characterised in that** said floor structure (10) has a fixed, pliable coating system (30) resistant to wear and weather conditions on top of the concrete floor (20), said coating system being attached to said concrete floor with a waterproof and elastic adhesive and sealant paste (22).
- 35 6. The floor structure (10) of claim 5, **characterised in that**
  - said coating system (30) of said balcony floor (20) is substantially comprised of a sheet-like object equal in shape to said balcony floor, provided by a single reinforcing layer (23), and of a pliable plastic overcoat layer (31) whereby said reinforcing layer is coated,
  - 40 - said reinforcing layer (23) is made from a strong, tissue-like material, such as fibreglass fabric, filter fabric, or matting made from fibre, such as fibreglass matting, mineral wool or steel wire mesh, or from a pliable sheet, such as thin plywood, pliable plastic sheet or from a combination of these, and
  - said pliable plastic overcoat layer (31) in said coating system (30) extends over the edge of said reinforcing layer (23) at least at one point or at least at one edge.
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- 50
- 55

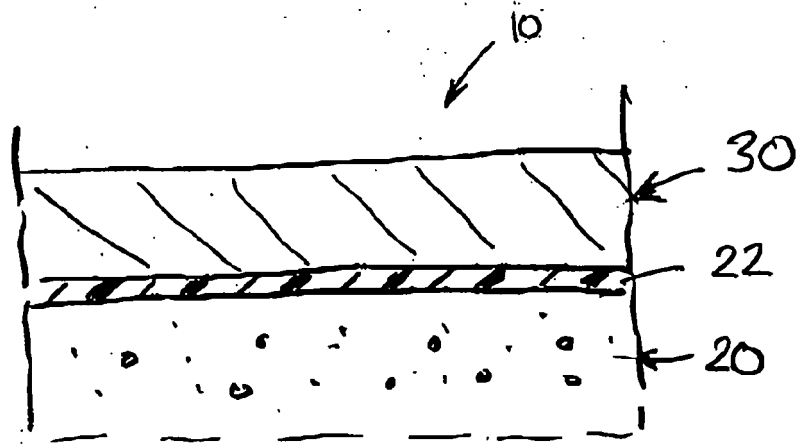


FIG. 1

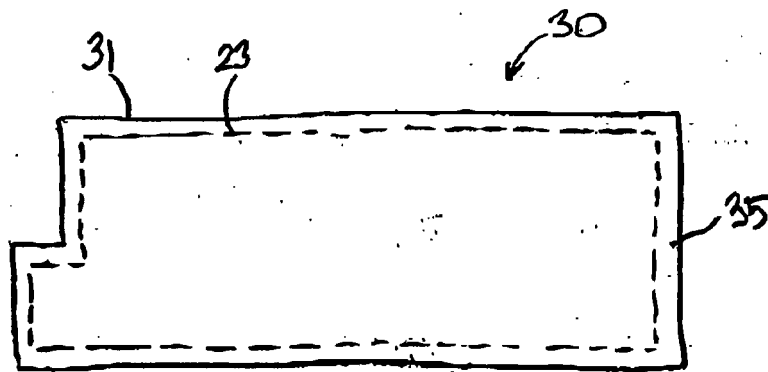


FIG. 2

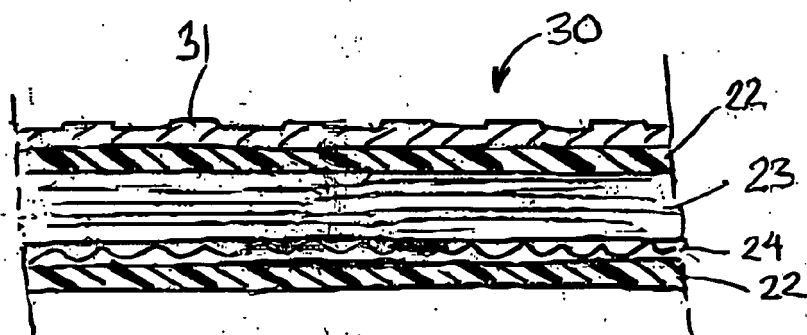


FIG. 3

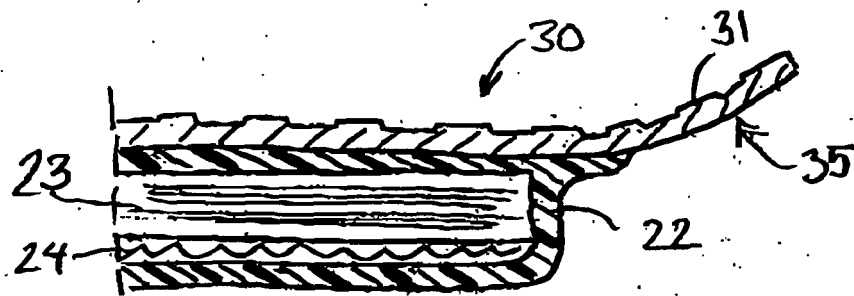


FIG. 4

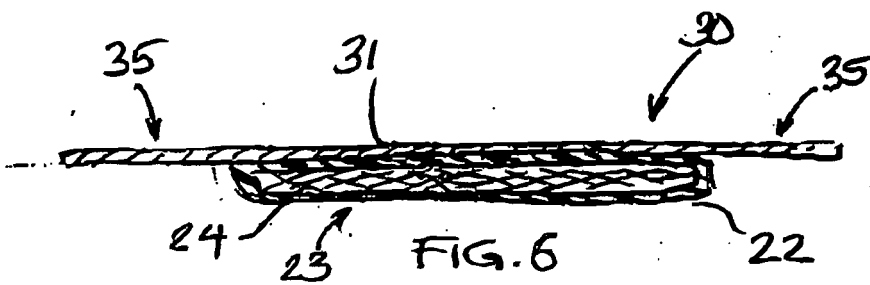


FIG. 6

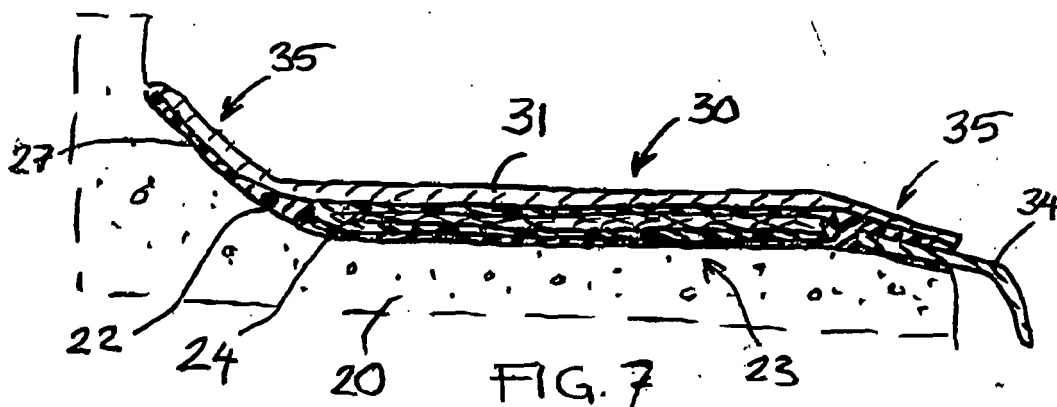
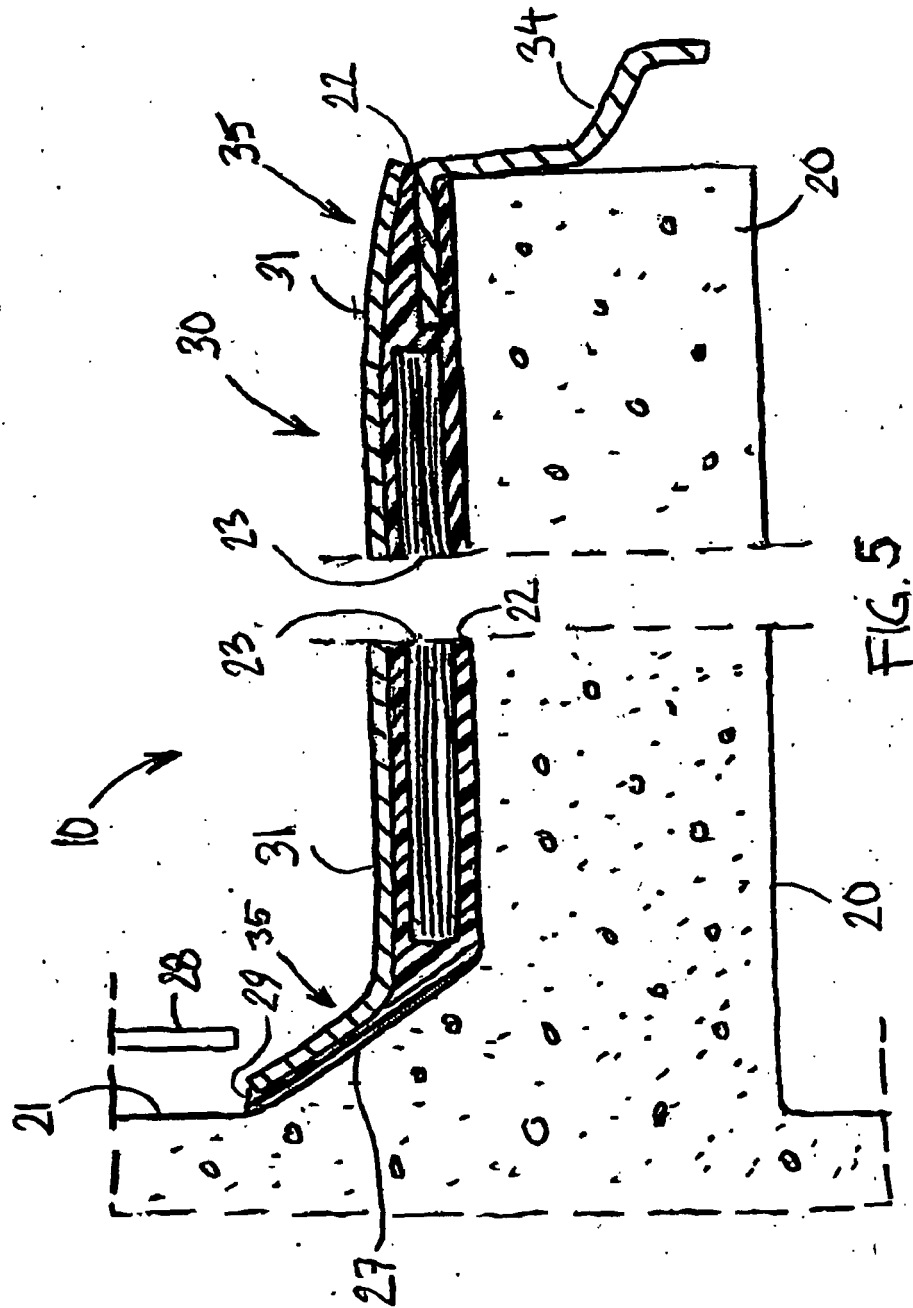


FIG. 7



**REFERENCES CITED IN THE DESCRIPTION**

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