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(71) Applicant: **Green, Uno**
371 34 Karlskrona (SE)

(72) Inventor: **Green, Uno**
371 34 Karlskrona (SE)

(74) Representative: **Hjalmarsson, Magnus Axel**
Awapatent AB,
Box 5117
200 71 Malmö (SE)

(54) Balcony extension

(57) The invention relates to a method of extending a concrete balcony slab (1), which has an upper horizontal surface and at least one free vertical edge surface (2). In the method, a steel plate is bent in the form a U-beam (3) with a web (4), a first leg (5) and a second leg (6), the web being narrower than the thickness of the balcony slab (1). Furthermore the free end of the first leg is bent substantially at right angles away from the second leg, thus forming a flange (5a). The free end, projecting from the first leg, of the second leg (6) is made to abut, with its inside, against the upper surface of the balcony slab (1) and is attached thereto, and the flange is made to abut against said edge surface (2) and is attached thereto.

The invention also relates to a balcony extension (3) provided with this method.

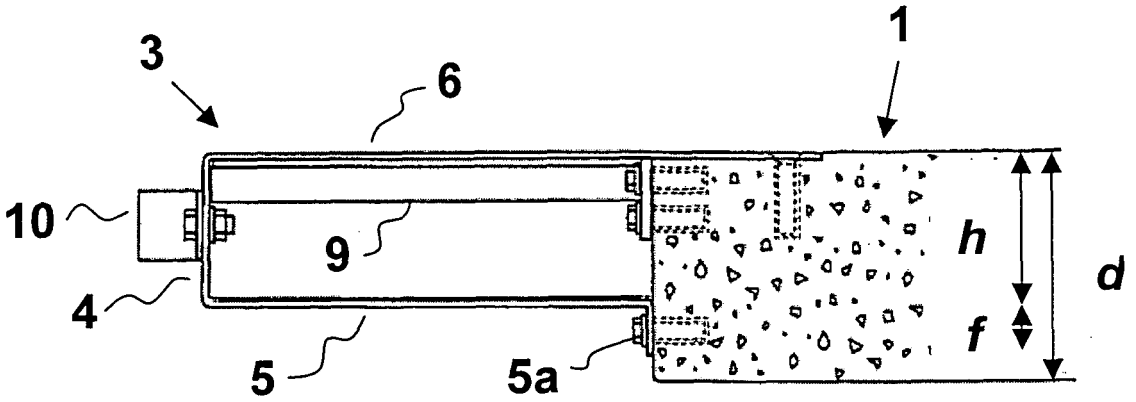

Fig 2

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Description

Field of the Invention

[0001] The present invention relates to a balcony with a balcony extension adapted to extend a concrete balcony slab projecting from a house wall and having an upper horizontal surface and at least one free vertical edge surface, and a method of providing such a balcony extension.

Object of the Invention

[0002] It is currently known to enlarge a balcony slab by building a concrete extension along the free edge surfaces of the slab. Such a method is disclosed in SE469287.

[0003] In the prior-art method, which is very time-consuming, first a mould is fixed to the balcony slab. Then the mould is braced by struts before being filled with concrete up to the level of the upper surface of the balcony slab. Once the concrete has set, the mould and the struts are removed. This takes a total of about 36 h. Moreover a balcony can only be extended about 12 cm in this way; otherwise columns and reinforcing beams are required.

[0004] The object of the present invention therefore is to provide a method, in which a greater extension of a balcony slab can be made in a shorter time without necessitating columns, and a balcony provided with such an extension.

Summary of the Invention

[0005] Regarding the method, this object is achieved by a method which is characterised in that a steel plate is bent in the form of a U-beam with a web, a first leg and a second leg, the web being narrower than the thickness of the balcony slab, the free end of the first leg is bent substantially at right angles away from the second leg, thus forming a flange, the free end, projecting from the first leg, of the second leg is made to abut, with its inside, against the upper surface of the balcony slab and is attached thereto, and the flange is made to abut against said edge surface and attached thereto.

[0006] Preferably the steel plate is a 3 mm stainless steel plate.

[0007] For further stiffening of the balcony extension, brackets are attached to said edge surface, before fastening the U-beam to the balcony slab, in such a manner that the U-beam, when resting on the brackets, forms a plane with the balcony slab. This additionally stiffens the beam, which may be necessary in connection with a possible glazing of the balcony. In addition, the brackets are protected by the U-beam against external influence.

[0008] Moreover, seals are preferably arranged between two adjoining beams to prevent penetration of rain water.

[0009] Fixing clamps are preferably applied on the outside of the web to bolts, threaded from the inside of the web, for fixing of balcony parapet posts. With a balcony extension made of steel plate, it is easy to fasten fixing clamps for balcony parapet posts by means of bolts.

[0010] Moreover a cover plate can be applied to said bolts before the fixing clamps, which is an easy way of fastening a cover plate without requiring rivets.

[0011] Moreover, regarding the balcony, this object is achieved by a balcony, which is characterised in that the extension is made of a steel plate bent in the form of a U-beam with a web, a first leg and a second leg, the web being narrower than the depth of the balcony slab, the end of the first leg has a bend substantially at right angles away from the second leg, thus forming a flange, the free end, which projects from the first leg, of the second leg abuts with its inside against and is attached to the upper surface of the balcony slab, and the flange abuts against and is attached to said edge surface.

Brief Description of the Drawings

[0012] The invention will now be described in more detail with reference to the accompanying drawings.

[0013] Fig. 1 is an exploded view and shows a balcony with a balcony extension according to the invention.

[0014] Fig. 2 is a cross-section of a U-beam attached to a balcony slab.

Description of a Preferred Embodiment

[0015] Fig. 1 illustrates a preferred embodiment of the balcony according to the invention. The balcony consists of a horizontal balcony slab 1 of concrete, which slab projects from a house wall. The balcony is attached to the house wall in a cantilevered manner along its long side facing the wall and has a free edge surface 2 on three sides.

[0016] A balcony extension 3 is attached to the slab and consists of a plurality of stainless steel plates bent in the form of U-beams 3a, 3b and arranged along the three free sides. The thickness of the steel plate is 3 mm.

[0017] The extension shown in Fig. 1 is made of five U-beams, arranged in succession, with one U-beam 3a along each short side of the balcony and three U-beams 3b along the long side. The U-beams are mitred in the corners and form a right angle.

[0018] Although in the case shown the balcony is a cantilevered balcony extended along all three free sides, it will be appreciated that a balcony extension can also be used to extend a mounted balcony slab along its one free edge.

[0019] Each steel plate is bent in the form of a U-beam with a web 4, a first leg 5 and a second leg 6. The free end of the first leg 5 is bent substantially at right angles away from the second leg 6 and forms a support in the form of a flange 5a, which, when the U-beam is mounted on a balcony slab, absorbs shear forces. As shown in Fig. 2, the extent of the flange and the web in cross-

section, (f) and (h), respectively, taken together is slightly shorter than the thickness (d) of the balcony slab.

[0020] For mounting, the free end, projecting from the first leg 5, of the second leg 6 is made to abut with its inside against the upper surface of the balcony slab and the flange 5a against an edge surface. Subsequently the U-beam is fixed by bolts to the balcony slab.

[0021] Each bolt is preferably arranged in an expander sleeve inserted in a drilled hole in the concrete slab. Anchor bolts with chemical anchors, which require mounting at temperatures above +5° C, thus need not be used.

[0022] Moreover a seal 8 is arranged between two adjoining U-beams. After that the beams are welded to each other.

[0023] For additional stiffening of the balcony extension, brackets 9 are attached to the free edge surface 3. Each bracket 9 is placed in such a manner that its upper surface forms an extension of the upper surface of the balcony slab. In this way, the second leg 6 and the balcony slab 1 form one plane when a U-beam 3 rests on the brackets 9. Consequently the brackets are protected by the U-beams against external influence, thus increasing the length of their life. Therefore the brackets need not be pre- or aftertreated.

[0024] Furthermore, fixing clamps 10 for fixing of balcony parapet posts are arranged on each U-beam on the outside of the web. These clamps are applied to bolts, which bolts are threaded from the outside of the web, as illustrated in Fig. 1, or more preferably from the inside of the web.

[0025] Between the web 4 and the clamps 10, a cover plate (not shown) can also be applied to these bolts threaded from the inside of the web. One cover plate is arranged on each U-beam 3a and one cover plate is arranged on the three U-beams 3b. The width of each cover plate is slightly greater than the thickness of the balcony slab. In this way, the cover plates give the edge of the balcony an aesthetic appearance, which does not require additional treatment in the form of painting for instance.

[0026] Each cover plate has, seen in cross-section, also an inwardly projecting lower flange, which together with a strip, which is fixed to the house wall under the balcony slab, forms an abutment surface for a roofing sheet which forms the roof of the underlying balcony.

[0027] This roofing sheet has a doubled upright border along its sides, which gives it such stiffness that it can be supported by said flange and said strip without being bent downwards, without necessitating additional fastening means.

[0028] No cutting or milling operation is usually required if the extension is to be fastened to an undamaged concrete slab. However, if the slab is damaged, the damaged layer must be cut away and cast again.

[0029] Also in the case where, for instance, a mat is to be placed on the balcony slab, a recess 7 must be milled along the free edges of the slab along a width corresponding to the length of the second leg free end, which projects from the first leg and with a depth corresponding to the thickness of the steel plate. In this way the upper surface of the second leg and the upper surface of the balcony slab form one plane.

[0030] In the cases where the upper surface of the balcony slab is covered with tiles, the U-beam is however placed directly on the slab, without preceding cutting or milling. After that the joint between steel plate and concrete is filled.

[0031] When brackets are used to hold the balcony, the balcony can only be extended 12 cm; otherwise upright columns and reinforcing beams are required. A balcony according to the invention can be extended up to 50 cm.

[0032] A balcony extension according to the invention is light, about 85 kg at a length of about 3 m, which should be compared to a corresponding extension of concrete which weighs about 1.8 tonnes. Such a low weight significantly simplifies handling during mounting.

[0033] The bending is carried out indoors, which means that the time required for outdoor work, which is dependent on weather and temperature, is kept at a minimum.

[0034] All mounting items are made of powder-coated stainless steel, which means that no surface-protecting or cosmetic finishing is required after mounting.

[0035] In contrast to mounting a balcony by casting according to prior-art technique, also operations such as milling of grooves for tie rods in the upper surface of the balcony slab, drilling for fastening of pin bolts by chemical anchors, and lashing of reinforcement bars are excluded.

[0036] With the method according to the present invention, it is thus possible to provide, in a very short time, about 8 h, of which about 5 h is mounting time, a greater balcony extension than is currently possible with conventional methods of extending balconies.

Claims

1. A method of extending a concrete balcony slab (1), which projects from a house wall and has an upper horizontal surface and at least one free vertical edge surface (2),
characterised in that a steel plate is bent in the form of a U-beam (3a, 3b) with a web (4), a first leg (5) and a second leg (6), the web being narrower than the thickness of the balcony slab, the free end of the first leg (5) is bent substantially at right angles away from the second leg, thus forming a flange (5a), the free end, projecting from the first leg (5), of the second leg (6) is made to abut, with its inside, against the upper surface of the balcony slab and is attached thereto, and
the flange is made to abut against said edge surface (2) and is attached thereto.

2. A method as claimed in claim 1, in which a stainless steel plate with a thickness of 3 mm is selected.

3. A method as claimed in claim 1 or 2, in which brackets (10) are attached to said edge surface, before fastening the U-beam (3) to the balcony slab (1), in such a manner that the U-beam, when resting on the brackets, forms a plane with the balcony slab.

4. A method as claimed in any one of claims 1-3, in which seals (8) are arranged between two adjoining U-beams (3a, 3b).

5. A method as claimed in any one of claims 1-4, in which fixing clamps (10) are applied on the outside of the web (4) to bolts, threaded from the inside of the web, for fastening of balcony parapet posts.

6. A method as claimed in claim 5, in which a cover plate is applied to said bolts before the fixing clamps.

7. A balcony with a balcony extension (3) adapted to extend a concrete balcony slab (1) projecting from a house wall and having an upper horizontal surface and at least one free vertical edge surface (2),
characterised in that
the extension is made of a steel plate bent in the form of a U-beam (3a, 4b) with a web (4), a first leg (5) and a second leg (6), the web being narrower than the depth of the balcony slab,
the free end of the first leg (5) has a bend substantially at right angles away from the second leg (6), thus forming a flange (5a),
the free end, which projects from the first leg (5), of the second leg (6) abuts with its inside against and is attached to the upper surface of the balcony slab (1), and the flange (5a) abuts against and is attached to said edge surface (2).

8. A balcony as claimed in claim 7, in which the steel plate is a stainless steel plate with a thickness of 3 mm.

9. A balcony as claimed in claim 7 or 8, in which the extension (3) is made of at least two adjoining U-beams (3a, 3b) with an intermediate seal (8).

10. A balcony as claimed in any one of claims 7-9, in which the extension (3) is arranged along three free edge surfaces (2) of the balcony slab (1), with mitred U-beams in each corner.

11. A balcony as claimed in any one of claims 7-10, in which the balcony slab (1) on its upper surface along the free edge surface is recessed, forming a recess (7), whose depth corresponds to the thickness of the steel plate and whose width corresponds to the length of the second leg free end which projects from the first leg.

12. A balcony as claimed in any one of claims 7-11, in which brackets (9) are attached along the free edge surface in such a manner that said U-beam (3, 3b), when resting on the brackets, forms with its upper surface a plane with the upper surface of the balcony slab (1).

13. A balcony as claimed in any one of claims 7-12, in which fixing clamps (10) are attached, by means of bolts threaded from inside, to the outside of the web for fixing of balcony parapet posts.

14. A balcony as claimed in claim 13, in which a cover plate is applied to the bolts, threaded from inside, between the web (4) and said fixing clamps (10).

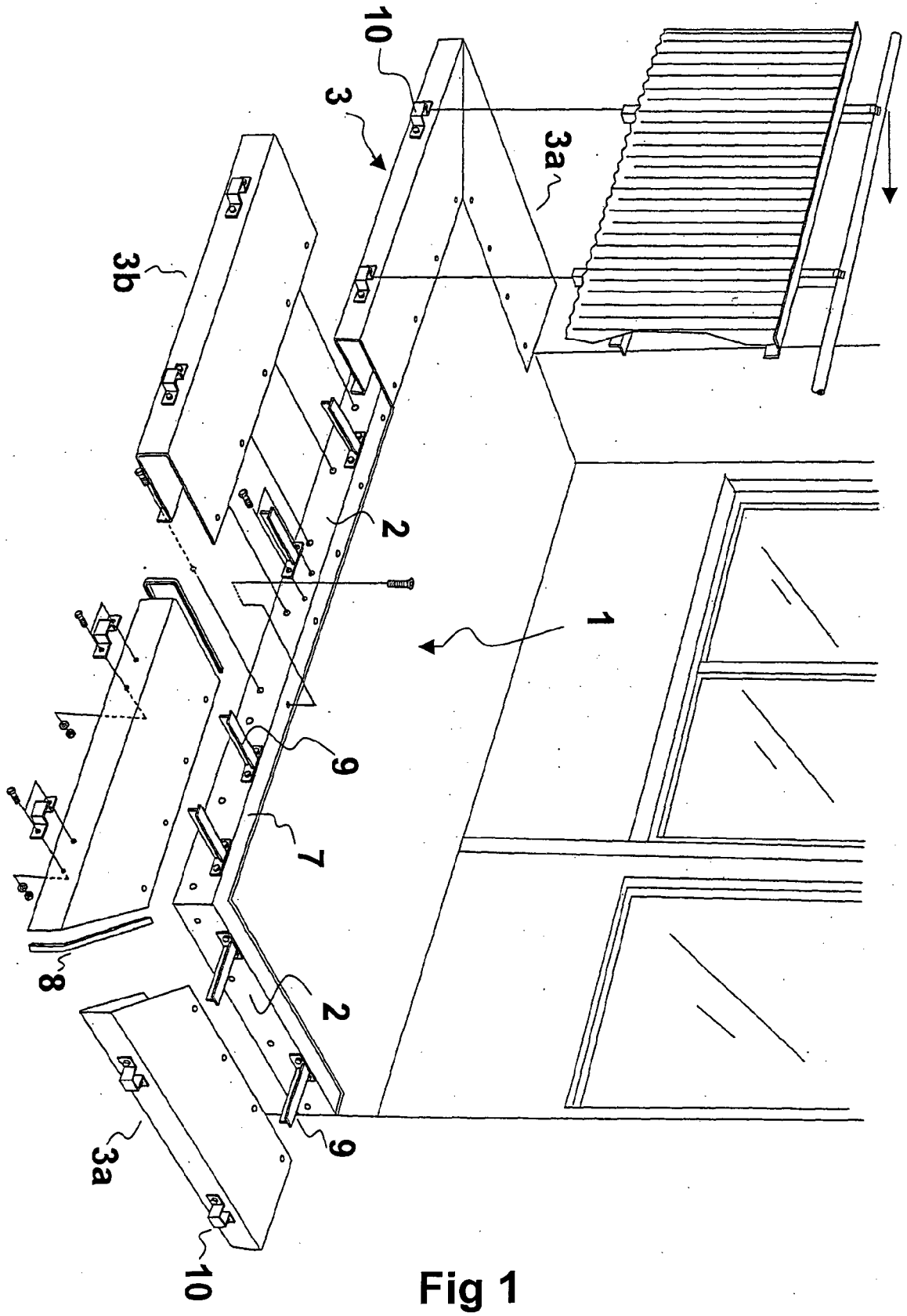

Fig 1

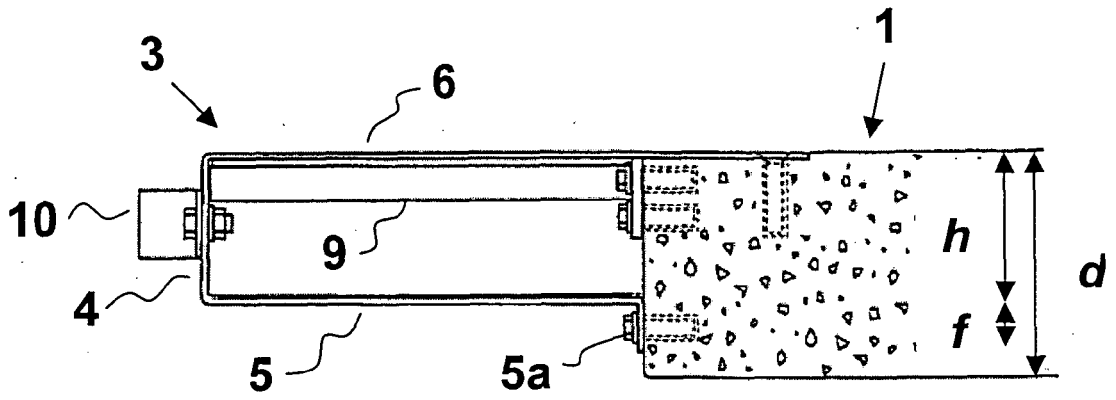

Fig 2

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- SE 469287 **[0002]**