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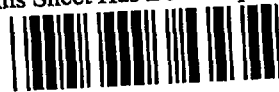
**DEVICE FOR IMMOBILIZING A VERTICAL STIFFENER FOR
A BALUSTRADE WITH RESPECT TO A SUPPORT
FOR BEARING ON THE GROUND**

The present invention relates to a device for
5 immobilizing a vertical stiffener with respect to a
rigid support, capable of supporting a balustrade for a
balcony, terrace, staircase or another similar
construction.

It is known that a balustrade of this kind,
10 intended to provide protection from the void, usually
consists of a bottom rail, generally horizontal, indeed
inclined at a given angle when the balustrade forms the
guard rail of a staircase in particular and a top rail,
parallel to the first, surmounted as the case may be by
15 a handrail in the upper part of the balustrade, the
latter including, between these rails, one or more
solid panels or panels made of transparent material or
else a plurality of suitably spaced vertical balusters,
the maximum distance separating the latter being
20 determined by a Standard, in particular to prevent an
infant's head passing through.

This protective system is supported with
respect to the ground of the balcony, terrace or
staircase, at the edge of which it is extended by
25 vertical posts or stiffeners provided with means of
linkage with the top and bottom rails so as to keep
them at a suitable height.

These stiffeners conventionally consist of
sections of solid cross-section, which are fixed to the
30 ground either directly or through the agency of bearing
mounting plates in which their lower ends engage. In



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the first case, each mounting plate includes drillholes for mounting locking screws; in the second case, the base of the stiffeners is fixed in the associated mounting plate by means of wedges which are also moved
5 by a locking-screw system.

In these two alternative forms, the whole assembly produced is heavy, expensive to manufacture, because of the solid structure of the stiffeners, relatively lengthy to install and, above all, not very
10 attractive because of the relief-type mounting of the mounting plate which thereafter cannot be harmoniously integrated into the general line of the product, the fixing means, of the screw kind or the like, furthermore always being visible. What is more,
15 optimization of the material with respect to bending forces to which these stiffeners are subjected is generally poor. Finally, these systems have a predetermined fixed height and therefore cannot be adapted to balustrades in which the vertical dimension
20 may possibly be non-standard.

The invention relates to a fixing device which avoids these drawbacks, by virtue of the use of a tubular stiffener having an internally hollowed cross-section, giving it, for a minimal weight, an equivalent
25 mechanical strength, in particular with respect to bending forces to which the balustrade is subjected, it being possible for such a stiffener, obtained from a metal section, to be easily shaped so as to harmonize with the cross-section of the balusters mounted between
30 the rails.

Furthermore, the use of a tubular stiffener makes it possible to mount, inside the latter, all the screw systems necessary for clamping the various assembled parts, which is therefore concealed from the
35 outside, further improving the general appearance of the balustrade.

Finally, this device makes it possible to instal the balustrade more simply, and therefore more quickly, allowing, moreover, easy take-up of



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misalignments in the stiffener with respect to its place of fixing to the ground, but at the same time using only a single locking screw, independently of the means which it has for correcting, if necessary, any
5 defects in the planarity of the ground.

For this purpose, the device in question is characterized in that the stiffener has a tubular profile, the cross-section of which enables it to be fitted, by sliding, onto a vertical rigid support which
10 is fastened to a mounting plate for bearing on the ground extending substantially horizontally or vertically and fixed to the latter, the tubular stiffener including a substantially plane rear face provided at its lower end with an open longitudinal
15 recess and, on each side of this recess, with bearing rims for a clamp for immobilizing this stiffener against a bearing surface of the rigid support, the stiffener being locked against the support by the agency of the clamp by means of at least one locking
20 screw acting in conjunction with a tapped bore provided in the support.

Advantageously, the support consists of a solid rigid section, having an I-shaped or rectangular cross-section at its base, with a central leg and two
25 tranverse legs, the tubular stiffener, including two side faces and a front face opposite its rear face which includes the recess, being fitted vertically onto the section, the transverse legs of which extend substantially perpendicularly to the side faces of the
30 stiffener and the height of which is limited so that such a fitting is achieved satisfactorily.

Also preferably, the stiffener has a vertical plane of symmetry which coincides with the central leg of the section of the support.

35 According to another characteristic, the immobilizing clamp consists of a small rectangular plate having a central part capable of engaging in the open recess in the stiffener.



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In a preferred embodiment, the device includes two superimposed locking screws lying on either side of a vertically elongate hole made both in the clamp and the central leg of the section of the support, these screws lying substantially in the mid-plane of the stiffener. Advantageously, the elongate hole is freely penetrated by a fixing bolt, passing into the hole in the clamp and that in the central leg of the section, in order to fix, on the opposite side from the immobilizing clamp, a member for supporting the bottom rail of the balustrade, this support member being held against the external surface of the front wall of the stiffener independently of the height adjustment of the latter with respect to its rigid support, depending on the relative position of the bolt in the mid-plane of the stiffener inside the elongate hole.

Also preferably, the member for supporting the bottom rail with respect to the stiffener includes a pincer-shaped projecting part delimiting a groove in engagement with a projecting rim of the rail which is mounted against the stiffener and applied against its front wall by the fixing bolt.

According to yet another complementary characteristic, the stiffener includes, in its external surface, substantially in the vicinity of its rear face, two grooves extending along vertical generatrices lying symmetrically with respect to the mid-plane of the stiffener and reserved for the mounting, in the manner of a clip, of the curved side ends of a cover, masking the immobilizing clamp and the locking screws from the outside, completing the visible contour of the stiffener beyond its open longitudinal recess.

Advantageously, the lower part of the stiffener is associated in its external surface, in line with the clearance made between the base of the stiffener and the mounting plate for bearing on the ground, depending on their relative longitudinal position, with a flexible finishing sleeve, concealing this clearance,



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this sleeve being formed by a collar, preferably made of plastic, closed up on itself.

In a particular embodiment, the collar comprises a rear part joined by two linkage regions forming hinges and capable of being arranged on either side of the stiffener, with two lateral arms extending beyond these linkage regions, these arms being provided at their opposite ends with a snap-in linkage in order to close the collar on itself and to encircle the base of the stiffener completely.

Also in accordance with another characteristic of the device in question, the mounting plate for bearing on the ground includes an open housing, laterally offset with respect to the stiffener beyond its rear face, this housing including a vertical hole through which a screw for fixing the mounting plate passes freely. Advantageously, this screw rests with its head on a flat washer, mounted in the open housing and including an oblong central hole, capable of laterally positioning the screw according to the angular orientation of the washer, so as to take up any defect in the position of a drillhole provided in the ground for accommodating the end of the screw.

According to yet another particular characteristic, the mounting plate includes, on either side of the open housing, auxiliary screws penetrating the mounting plate in order to adjust beforehand the horizontality of the latter with respect to the ground. Also preferably, the housing is closed by a cap which ends up being fixed to the sides of this housing by engaging in a mounting groove provided on the body of the mounting plate.

Finally, and in an alternative embodiment, the mounting plate for bearing on the ground consists of a fixing piece mounted against the nose of a slab or the like, this piece vertically extending the section of the support onto which the stiffener fits and including an open housing accommodating a screw for fixing against the slab, this fixing screw lying horizontally



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in the housing in order to end up locking the piece against the vertical face of the nose.

Other characteristics of a device for immobilizing a vertical stiffener on a rigid support for a balustrade further appear in the description which follows of two exemplary embodiments, given by way of indication but implying no limitation, with reference to the appended drawings in which:

- Figure 1 is an exploded perspective view of the various elements which constitute the device according to the invention in a first alternative embodiment;

- Figure 2 is a partial longitudinal sectional view of the lower part of the stiffener and of the rigid support onto which it fits, in the embodiment in Figure 1;

- Figure 3 is a view from above of the elements illustrated in Figure 2;

- Figure 4 represents, on a slightly larger scale, the flexible finishing sleeve mounted at the lower part of the stiffener;

- Figure 5 is a longitudinal sectional view, on a slightly smaller scale, of another alternative embodiment, more particularly adapted to the mounting of a stiffener against the vertical nose of a support slab.

Figure 1 shows the various parts of a device in accordance with the invention, designated in its entirety by the reference 1 and including mainly a tubular stiffener 2 and a mounting plate 3 for bearing on the ground, formed, on the one hand, by a rigid support 4 extending vertically and onto which the lower end of the stiffener 2 fits and, on the other hand, a transverse foot 5 fastened to the support 4 and provided with means enabling it to be fixed to the ground of a balcony, a terrace or, in particular, a staircase, the balustrade providing satisfactory protection with respect to the void vertically below such a construction.



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The tubular stiffener 2 is produced by means of a suitably shaped hollow metal section, preferably having a symmetrical cross-section which narrows slightly towards the front, that is to say towards the outside part of the balustrade, although it should be pointed out that the particular cross-section adopted in the example described has no direct bearing on the invention and the one more particularly illustrated in the drawings is given merely by way of indication.

10 In the example in question, the tubular stiffener 2 thus has a front face 6, a rear face 7 and two side faces or walls 8 and 9, being mutually connected so that it is continuous.

At the lower end of its rear face 7, the stiffener includes a longitudinal recess 10 which is open at the bottom of this stiffener, this recess being delimited on each of its lateral sides by parallel bearing rims, respectively 11 and 12 (see Figure 3).

The tubular stiffener 2 is designed to fit onto the rigid support 4, the particular structure of which will be specified hereinbelow, and to be held by this support in the vertical position.

For this purpose, the stiffener 2 is locked with respect to the support 4 by means of an immobilizing clamp 13, shown separately from the support in Figure 1 but fixed onto the latter in Figures 2 and 3, this clamp, of rectangular general shape substantially corresponding to that of the recess 10, including a central part 14, suitable to be engaged inside this recess when the stiffener is mounted on the support, with two longitudinal edges, respectively 15 and 16, which bear, from the outside, on the rims 11 and 12 provided on the stiffener on each side of this recess.

35 At its top and bottom ends, the immobilizing clamp 13 has open notches 17 and 18 enabling screws 19 and 20 to be mounted in order to fix the clamp onto the support 4 with intermediate locking of the stiffener 2, these screws lying one on top of the other, preferably



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substantially in the vertical mid-plane of the clamp and of the stiffener.

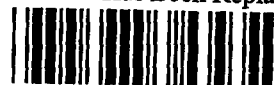
The support 4 consists of a solid metal piece, the cross-section of which, through a horizontal plane, has approximately the shape of an I, with a central part 21 in the mid-plane of the stiffener containing the screws 19 and 20 and two transverse end legs, respectively designated by the references 22 and 23, these legs extending across the stiffener 2 in two parallel planes which are approximately perpendicular to the lateral faces 8 and 9 of the latter (see Figure 3).

In its leg 23, the support 4 has a counterbore 24 (Figure 1) into which the central part 14 of the immobilizing clamp 13 is inserted when the latter is locked by its screws 19 and 20 against this support, trapping, between the immobilizing clamp and the leg 23, the rims 11 and 12 of the stiffener on each side of the recess 10, these rims bearing against the edges 15 and 16 of the clamp.

Through its thickness, the support 4 has tapped bores, respectively 25 and 26, into which the threaded ends of the screws 19 and 20 engage, thus enabling the clamp 13 to be progressively clamped and then immobilized.

The immobilizing clamp 13 and the support 4 moreover include, still in the mid-plane of the stiffener and across the central part 21 of this support, an elongate hole, referenced by the reference number 27 in the clamp and by 28 in the support, this hole being reserved for mounting a bolt 29, the head 30 of which has a diameter greater than that of the hole so as to be stopped by the latter, while its opposite end 31, provided with a suitable thread, enables, after it has penetrated the front wall 6 of the stiffener 2 when the latter sits on top of the support 4, a support member 32 to be immobilized against this wall.

In the example in question, this support member 32 has a pincer-shaped part 33, in the groove of which



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is engaged a projecting rim 34 provided at the lower end of a transverse rail 35, thus bearing against the various parallel and successive stiffeners equipping the balustrade. This rail 35 supports, in a manner which is no concern of the present invention, either a plane panel 36 extending in front of the balustrade or a succession of suitably spaced parallel vertical balusters. In this case, and as shown very diagrammatically in Figure 3, the cross-section of these balusters has a profile chosen to match harmoniously with that of the stiffener, which here is a profile substantially in the form of a partially curvilinear triangle. Of course, any other cross-section could be chosen, independently of the characteristics of the present invention.

The dispositions described above, and in particular the provision of a vertically elongate hole in the clamp 13 and the support 4, at the same time as the use of an open longitudinal recess 10 in the stiffener 2, enable the latter to be locked with respect to its support and in particular with respect to the foot 5 for the mounting plate 3 to bear on the ground, with a degree of latitude in terms of height, especially in order to take account of possible irregularities in the manufacture of the various pieces employed, or indeed any unevenness in the surface for bearing on the ground requiring relative adjustment of the successive stiffeners of the balustrade, or also to accept heights of these stiffeners which are not perfectly standard from one to another.

This results in the formation between the bottom part of each stiffener in line with the lower end of the open recess 10 in this stiffener, [lacuna] between this open recess and the upper surface of the foot 5, quite a large clearance which it is necessary, after the stiffener has been mounted on the support, to conceal from the outside in order to provide a pleasing continuity in the exterior appearance of the device.



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For this purpose, and in accordance with one advantageous characteristic of the invention, a sleeve 37, being in the form of a peripheral collar the structure of which is illustrated in more detail in Figure 4, is placed around the bottom end of the stiffener, in line with this clearance.

This collar includes, in particular, a rear part 38 which bears against the extreme edge of the rear face 7 of the stiffener 2, completely surrounding it and being extended on its lateral sides 8 and 9 to two hinges 39 and 40. The latter are formed by a simple notch in the material of the collar, which is preferably a suitable plastic, [lacuna] are extended by side arms 41 and 42 capable of bending about these hinges, so as, in particular, to enable the collar, which is open in its end part opposite the rear part 38, to envelop the base of the stiffener 2, before the bent-over ends of the arms 41 and 42, these ends being provided with a snap-in linkage consisting of a tongue 43 carried by one of the arms and engaging in a housing 44 in the other, close the collar, and therefore completely surround the stiffener.

Once the stiffener 2 has been fitted onto the support 4 and locked against the latter by the immobilizing clamp 13, and the bolt 29 and the sleeve 37 have been put into place, this stiffener is combined with an element for the external concealment of all of these various elements so as to exhibit a virtually continuous visible surface, without any projection or other element likely to impair the general aesthetic appearance of the mounting.

To this end, the stiffener 2 includes, in its side faces 8 and 9, two longitudinal grooves, respectively 45 and 46, which are designed to act in conjunction with the suitably curved and bent-over edges 47 and 48 of a cover 49 (Figure 1), which clips, from the outside, onto the stiffener and completely conceals the clamp 13, the screws 19 and 20 and the head 30 of the bolt 29.



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The equipping of the device is completed by a suitable arrangement of the foot 5 provided at the base of the support 4 in order to allow it to be immobilized with respect to the ground of the balcony, terrace or the like, accommodating the balustrade.

For this purpose, the foot 5 has a bearing body 50 of elongate general shape, as shown in Figures 1 and 2, which extends laterally from the support 4 in order to provide a suitable seat.

10 The body 50 comprises, offset with respect to the support 4 and in its surface 51 extending rearwards from the stiffener 2, an open housing 52 whose bottom 53 is drilled in order to accommodate a bearing ring 54 provided with a central passage hole 55 of diameter
15 very much larger than that of a fixing screw 56 which engages in a drillhole 57 made in the ground 58 of the terrace, balcony or the like.

 The head 59 of the screw 56 rests on the ring 54 through the agency of a washer 60, provided at its
20 centre with an oblong hole 61 (Figures 1 and 3), in such a way that, depending on the relative orientation of the washer with respect to the ring, the shank of the screw 56 is offset laterally, thus making it possible to take up any deviations found between the
25 position of the foot 5 and the axis of the drillhole 57 accommodating the threaded part of the screw 56.

 The bottom 53 of the housing 52 moreover supports supplementary screws 53a which make it possible to take up any defect in the planarity of the
30 ground, thereby suitably rectifying the position of the bearing plane of the foot on this ground.

 Next, the open housing 52 is closed by a cover 62, provided with a tongue 63 and a bent-over heel 64, which is clipped under the bottom 53, as may be easily
35 understood from Figures 1 and 2.

 Figure 5 illustrates diagrammatically another embodiment in which the stiffener 2, fitted onto the support 4, is no longer fixed to the horizontal ground



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58 of a terrace, balcony or other slab but against the vertical nose of such a slab.

In this variant, the support 4 is extended by a piece 65, similar to the foot 5 in the first exemplary embodiment envisaged, but lying in the vertical extension of the support. This piece 65 includes an open housing 66 for mounting a locking screw 67 whose head acts in conjunction with a washer 68, likewise similar to the washer 60 in the first example, the housing finally being closed off by a cover 69. Screws 70 once again make it possible to take up deviations between the bearing plane of the piece 65 and the nose of the slab.

Irrespective of the embodiment variant employed, a device is thus produced which immobilizes a vertical stiffener with respect to a support onto which the lower end of this stiffener fits, this support itself being fastened to a mounting plate or to a similar linkage piece, suitable to be fixed to the ground or against the nose of a slab, depending on the example in question.

In all cases, the stiffener used is tubular, enabling it to have effective mechanical strength, in particular satisfactory strength to withstand bending forces, for a minimal weight, this weight being in particular significantly less than that of a conventional solid stiffener.

The aesthetic appearance of the whole assembly is greatly improved, in particular by enabling, when the cross-section of the stiffener narrows slightly towards the front, as in the example in Figures 1 to 4, the balusters supported by the rails of the balustrade to have a profile matching the terminal shape of the stiffener.

Once the mounting has been effected, only the foot of the mounting plate for the support to bear on the ground is visible, all of the locking and fixing screws being concealed. This mounting is moreover particularly simple and rapid, while at the same time



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it allows possible deviations in the positioning of the
drillholes accommodating the means for immobilizing
this mounting plate to be taken up easily, as well as
those due to defects in the planarity of the slab
5 itself.

Of course, it goes without saying that the
invention is not limited to the exemplary embodiments
more especially described with reference to the
appended drawings; on the contrary, it embraces all
10 variants thereof.



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CLAIMS

1. Device for immobilizing a vertical stiffener for a balustrade with respect to a support for bearing on the ground, characterized in that the stiffener (2) has a tubular profile, the cross-section of which enables it to be fitted, by sliding, onto a vertical rigid support (4) which is fastened to a bearing mounting plate (3, 65) extending substantially horizontally or vertically, this tubular stiffener including a substantially plane rear face (7) provided at its lower end with an open longitudinal recess (10) and, on each side of this recess, with bearing rims (11, 12) for a clamp (13) for immobilizing this stiffener against a bearing surface of the rigid support, the stiffener being locked against the support by the agency of the clamp by means of at least one locking screw (19, 20) acting in conjunction with a tapped bore (25, 26) provided in the support.
2. Device according to Claim 1, characterized in that the support (4) consists of a solid rigid section, having an I-shaped or rectangular cross-section at its base, with a central leg (21) and two tranverse legs (23, 24), the tubular stiffener, including two side faces (8, 9) and a front face (6) opposite its rear face (7) which includes the recess (10), being fitted vertically onto the section, the transverse legs of which extend substantially perpendicularly to the side faces of the stiffener and the height of which is limited so that such a fitting is achieved satisfactorily.
3. Device according to Claim 2, characterized in that the stiffener (2) has a vertical plane of symmetry which coincides with the central leg (21) of the section of the support (4).
4. Device according to any one of Claims 1 to 3, characterized in that the immobilizing clamp (13) consists of a small rectangular plate having a central



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part (14) capable of engaging in the open recess (10) in the stiffener (2).

5. Device according to any one of Claims 1 to 4, characterized in that it includes two superimposed locking screws (19, 20) lying on either side of a vertically elongate hole (27, 28) made both in the clamp (13) and the central leg (21) of the section of the support (4), these screws lying substantially in the mid-plane of the stiffener.

6. Device according to Claim 5, characterized in that the elongate hole is freely penetrated by a fixing bolt (29), passing into the hole (27) in the clamp (13) and that (28) in the central leg (21) of the section of the support (4), in order to fix, on the opposite side from the immobilizing clamp, a member (32) for supporting the bottom rail (35) of the balustrade, this support member being held against the external surface of the front wall of the stiffener (2) independently of the height adjustment of the latter with respect to its rigid support, depending on the relative position of the bolt in the mid-plane of the stiffener inside the elongate hole.

7. Device according to Claim 6, characterized in that the member (32) for supporting the bottom rail (35) with respect to the stiffener (2) includes a pincer-shaped projecting part (33) delimiting a groove engaged with a projecting rim (34) of the rail which is mounted against the stiffener and applied against its front wall by the fixing bolt (29).

8. Device according to any one of Claims 1 to 7, characterized in that the stiffener (2) includes, in its external surface, substantially in the vicinity of its rear face (7), two grooves (45, 46) extending along vertical generatrices lying symmetrically with respect to the mid-plane of the stiffener and reserved for the mounting, in the manner of a clip, of the curved side ends (47, 48) of a cover (49), masking the immobilizing clamp (13) and the locking screws (19, 20) from the



outside, completing the visible contour of the stiffener beyond its open longitudinal recess (10).

9. Device according to any one of Claims 1 to 8, characterized in that the lower part of the stiffener (2) is associated in its external surface, in line with the clearance made between the base of the stiffener and the mounting plate (3) for bearing on the ground, depending on their relative longitudinal position, with a flexible finishing sleeve (37), concealing this clearance, this sleeve being formed by a collar, preferably made of plastic, closed up on itself.

10. Device according to Claim 9, characterized in that the collar (37) comprises a rear part (38) joined by two linkage regions (39, 40) forming hinges and capable of being arranged on either side of the stiffener, with two lateral arms (41, 42) extending beyond these linkage regions, these arms being provided at their opposite ends with a snap-in linkage in order to close the collar on itself and to encircle the base of the stiffener completely.

11. Device according to any one of Claims 1 to 10, characterized in that the mounting plate (3) for bearing on the ground includes an open housing (52), laterally offset with respect to the stiffener (2) beyond its rear face (7), this housing including a vertical hole (55) through which a screw (56) for fixing the mounting plate passes freely.

12. Device according to Claim 11, characterized in that the screw (56) rests with its head (59) on a flat washer (60), mounted in the housing (52) and including an oblong central hole (61), capable of laterally positioning the screw according to the angular orientation of the washer, so as to take up any defect in the position of a drillhole provided in the ground for accommodating the end of the screw.

13. Device according to either of Claims 11 and 12, characterized in that the mounting plate (3) includes, on either side of the open housing (52), auxiliary screws (53a) penetrating the mounting plate in order to



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adjust beforehand the horizontality of the latter with respect to the ground.

14. Device according to one of Claims 11 to 13, characterized in that the housing (52) is closed by a cap (62) which ends up being fixed to the sides of this housing.

15. Device according to Claim 1, characterized in that the bearing mounting plate consists of a fixing piece (65) mounted against the nose of a slab or the like, this piece vertically extending the section of the support (4) onto which the stiffener (2) fits and including an open housing (66) accommodating a screw (67) for fixing against the slab, this fixing screw lying horizontally in the housing in order to end up locking the piece against the vertical face of the nose.