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(54) **AN IMPROVED STEP FOR TREADABLE GRATING**

(57) An improved step for treadable-grating staircases, of the type comprising a grating stair tread (1) having a length suitable for the width of the staircase, as well as at least two end plates (5) for attachment of the step to the outer stringers of the staircase, welded on which are the bars of the grating. To obtain a functional and structural co-operation between said stair tread (1) and reinforcement elements that are provided underneath the treading surface of the step itself, in the bottom part of the stair tread (1) an obscuring panel with inclined bars (2') is integrated to implement an anti-vertigo function, which inclined bars (2') are rendered fixed to the end plates (5), as well as structurally participating by means of one or more bands (3) made of sheet metal arranged orthogonal thereto and to the treading surface.

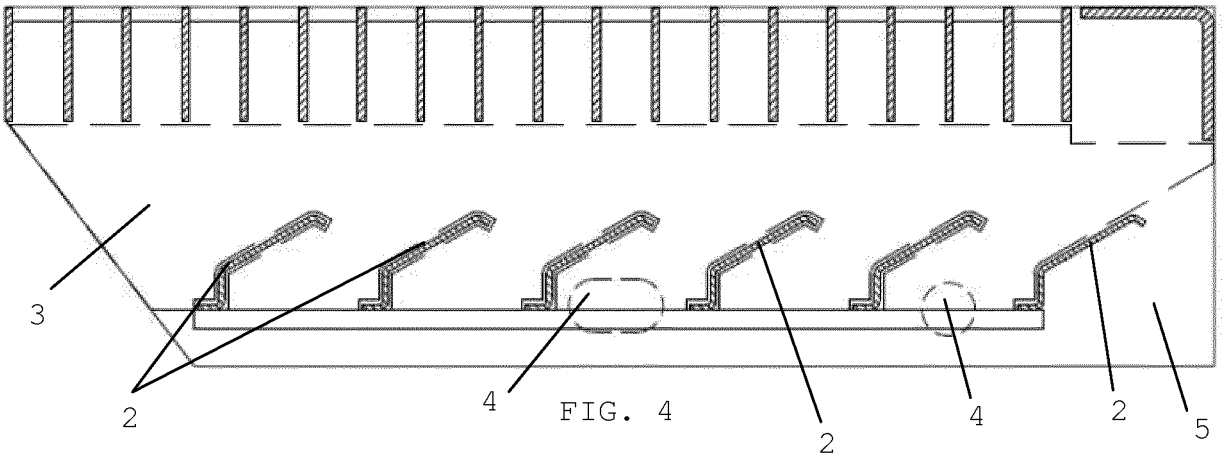

FIG. 4

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Description

[0001] The present invention relates to the sector of metal staircases provided with treadable-grating surfaces, permeable to air and light.

[0002] The weight of grating surfaces to be laid *in situ,* including steps, is one of the main aspects that involve great resources both from the commercial standpoint (for quantifying the costs when drawing up the bid) and from the technical standpoint (when drawing up the detailed design).

[0003] Another important aspect is the anti-vertigo function, which constitutes an important element for marketability of the product.

[0004] Consequently, a first purpose of the present invention is to reduce the weight of each step, at the same time enabling wide operating spans.

[0005] A second purpose of the invention is to guarantee an anti-vertigo function that would not otherwise be possible with grating steps of a conventional type.

[0006] A better understanding of the invention will be obtained from the ensuing detailed description and with reference to the attached drawings, which illustrate, purely by way of non-limiting example, some preferred embodiments of the invention.

[0007] In the drawings:

Figures 1A and 1B regard a step of a currently known type;

Figure 2 is a cross-sectional view of a step according to a preferred embodiment of the invention;

Figure 3 shows a constructional detail of one of the transverse reinforcement bands of the step of Figure 2;

Figure 4, which is similar to Figure 2, shows a variant with anti-vertigo function; and

Figure 5, which is similar to Figure 3, shows a constructional detail of one of the transverse reinforcement bands of the anti-vertigo step of Figure 4.

[0008] The inventive idea underlying the present invention basically consists in providing a functional and structural co-operation between a step of a standard type and reinforcement elements of various types that can be inserted underneath the treading surface of the step itself.

[0009] With reference to Figures 1A and 1B, it should be pointed out that the steps of a conventional type that are shown in the (non-limiting) example of embodiment referred to in the present description have a mesh with bars having a cross section smaller than the one specified in the load tables: in fact, according to the present invention, the required strength is obtained thanks to insertion of elements underneath the step to achieve the desired load-bearing capacity, at the same time providing a product having a lower weight as compared to products so far known.

[0010] The standard step (Figure 1A) is constituted by a grating that may be of various types (e.g., 15-76/30-3) and is basically made up of:

- the grating stair tread 1 having a length suitable for the width of the staircase;
- a visual-barrier sectional element set on one of the two long sides of the step (downstream side);
- two end plates 5, which are set at the ends for attachment of the step to the outer stringers of the staircase (normally having a thickness of 3 mm) and welded on which are the bars of the grating; these end plates are provided with a hole and a slot (which are both designated by the reference 4) for fixing to the stringers.

[0011] According to the invention (Figure 2), it is envisaged to provide a step with a greater inertia by integrating, in the bottom part of the grating, press-bent L-shaped sectional elements 2 (represented in cross-sectional view hatched), which are rendered fixed to the end plates 5 - which are adequately enlarged - as well as structurally participating by means of one or more bands 3 made of sheet metal set orthogonal thereto and to the treading surface. In Figure 3 one of said bands 3 is shown with its perimeter represented with a dashed line.

[0012] Given the same load-bearing capacity, the step shown in Figure 2 presents a considerably lower weight than steps of a traditional type that are designed to withstand the same load, and at the same time creates an anti-vertigo function by means of the underlying sectional elements.

[0013] A variant of the step forming the subject of the present invention (Figure 4) has a more marked and specific anti-vertigo function, in so far as it envisages the use, once again on the underside of the grating of the step itself, of an obscuring panel with inclined bars 2'.

[0014] In particular, the inclined bars 2' have an inclination and are set at a distance from one another such as to prevent the user from seeing through the grating of the steps, eliminating the possibility of the user realizing the height reached when he is looking where he puts his feet.

[0015] In addition, the distance of the inclined bars 2' from the grating is a function of the necessary load-bearing capacity, and the inclined bars 2' are rendered fixed with respect to the end plates 5 (adequately enlarged) and structurally participating by means of one or more bands 3 made of sheet metal arranged orthogonal thereto and to the treading surface. In Figure 5 one of these bands 3 is shown with a perimeter identified by a dashed line.

[0016] According to a peculiar characteristic of the invention, it is envisaged that said bands 3 be provided with appropriate shaped notches or slots 6 designed to mate with the boundaries of the cross section of the sectional elements 2 described previously (Figures 3 and 5).

[0017] A further peculiar characteristic of the invention lies in the fact that said bands 3 are fixed to the end plates

5 at their ends, whereas they are fixed to the sectional elements 2, 2' at the edges of the shaped slots or notches 6.

[0018] The present invention has been described and illustrated in a preferred embodiment and some variants thereof, but it is evident that technically equivalent modifications and/or replacements may be made by any person skilled in the branch, without thereby departing from the sphere of protection of the claims of the present industrial patent right.

Claims

1. An improved step for treadable-grating staircases, of the type comprising: a grating stair tread (1) having a length suitable for the width of the staircase, as well as at least two end plates (5) for attachment of the step to the outer stringers of the staircase welded on which are the bars of the grating, said step being **characterized in that** to obtain a functional and structural co-operation between said stair tread (1) and reinforcement elements that are provided underneath the treading surface of the step itself, it envisages that integrated on the underside of the stair tread (1) are L-shaped sectional elements (2) that are rendered fixed to the end plates (5), as well as structurally participating by means of one or more bands (3) made of sheet metal arranged orthogonal thereto and to the treading surface, and **in that**, for implementing an anti-vertigo function, as an alternative to said L-shaped sectional elements (2), it envisages an obscuring panel with inclined bars (2'), which is appropriately arranged on the underside of the grating of the step itself.

2. The step according to preceding claim, **characterized in that** said inclined bars (2') have an inclination and are set at a distance from one another such as to prevent the user from seeing through the grating of the steps, thus eliminating the possibility of the user realizing the height reached when he is looking where he puts his feet.

3. The step according to Claim 1, **characterized in that** the distance of the inclined bars (2') from the stair tread (1) is a function of the necessary load-bearing capacity and of the fact that the inclined bars (2, 2') are rendered fixed with respect to the end plates (5) and structurally participating by means of one or more bands (3) made of sheet metal arranged orthogonal thereto and to the treading surface.

4. The step according to Claim 1, **characterized in that** said bands (3) are provided with appropriate shaped notches or slots (6) designed to mate with the contours of the cross section of the sectional elements (2, 2') to which they are constrained.

5. The step according to preceding claim, **characterized in that** said bands (3) are fixed to the plates (5) at their ends, and are moreover fixed to the sectional elements (2, 2') at the edges of the shaped slots or notches (6).

6. The step according to any one of the preceding claims, **characterized in that** said stair tread (1) has a mesh with bars of a cross section smaller than what is specified in the grating load tables; it being envisaged that the required strength is obtained thanks to the insertion of structural elements underneath the stair tread (1) of the step to reach the desired load-bearing capacity, thus obtaining, given the same weight that it can withstand, a product with lower weight as compared to known products.

PRIOR ART

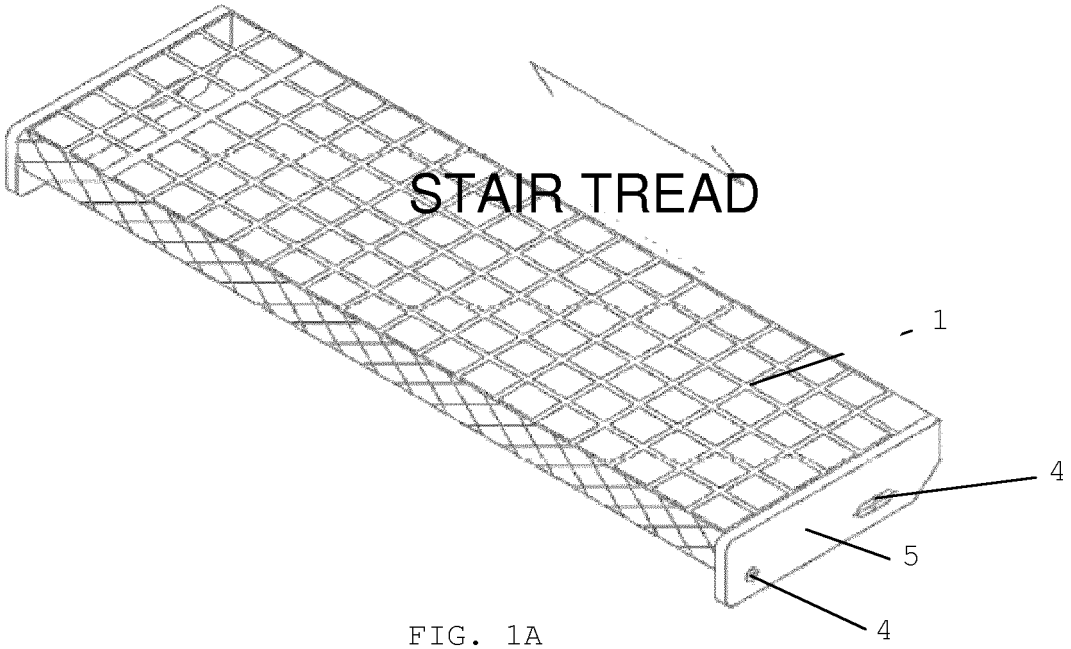

FIG. 1A

PRIOR ART

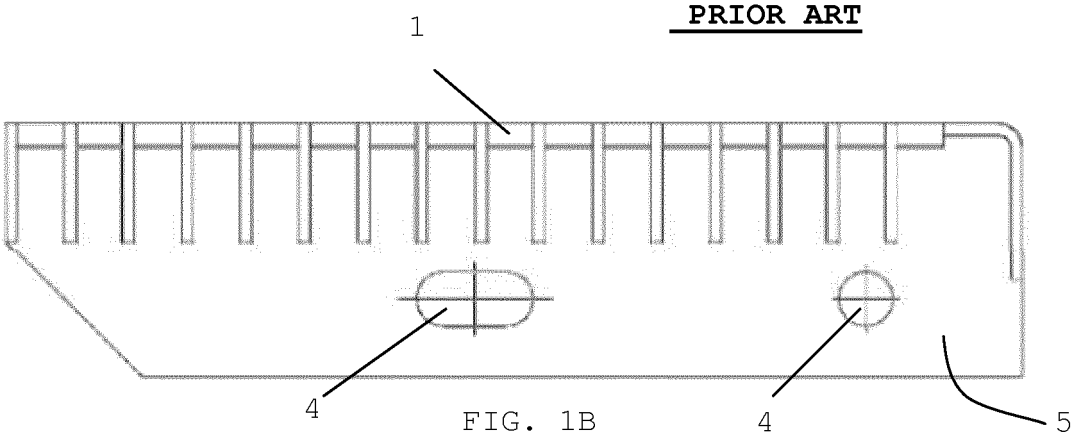

FIG. 1B

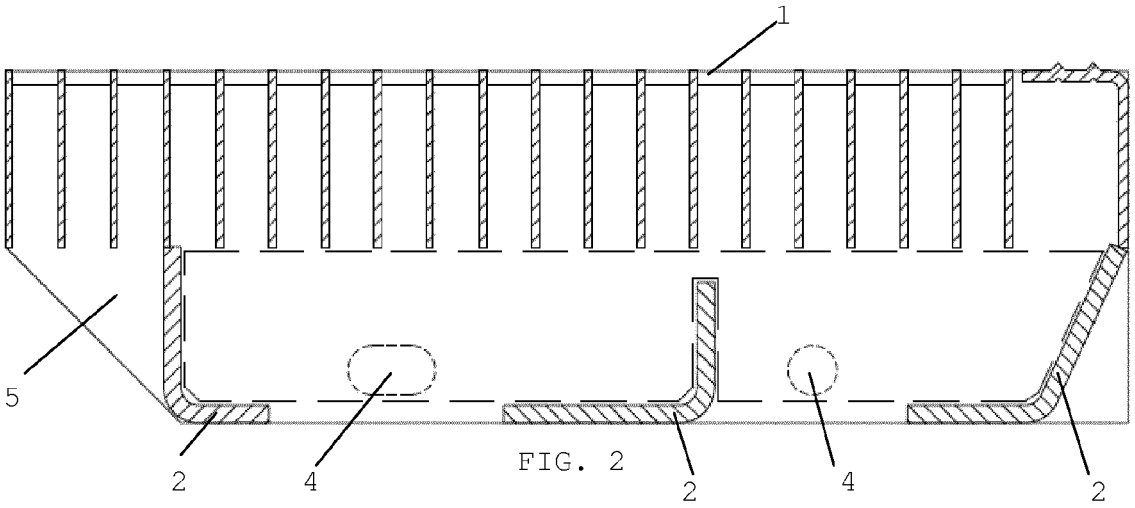

FIG. 2

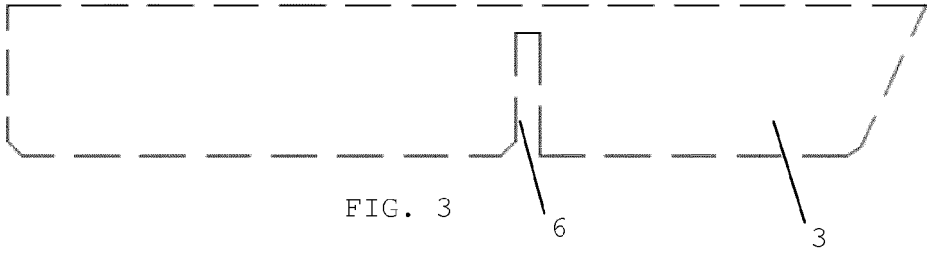

FIG. 3

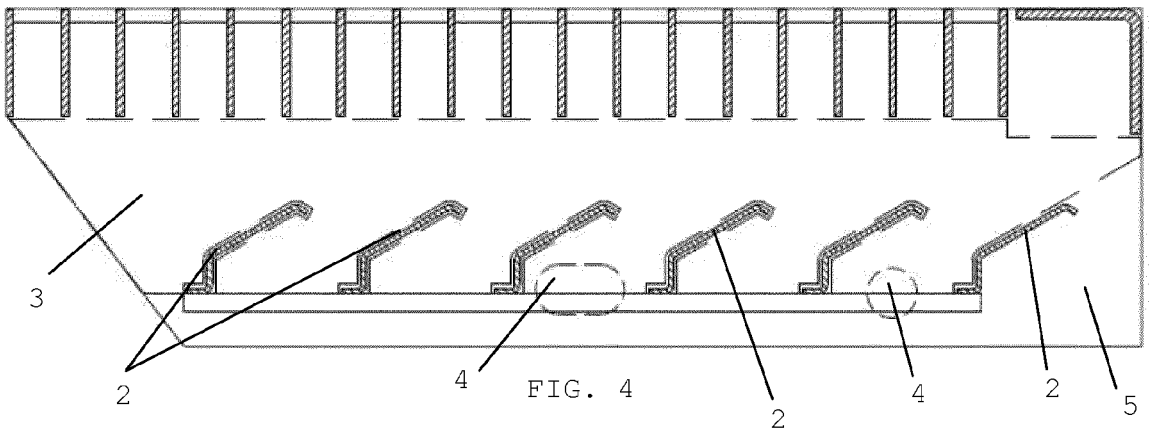

FIG. 4

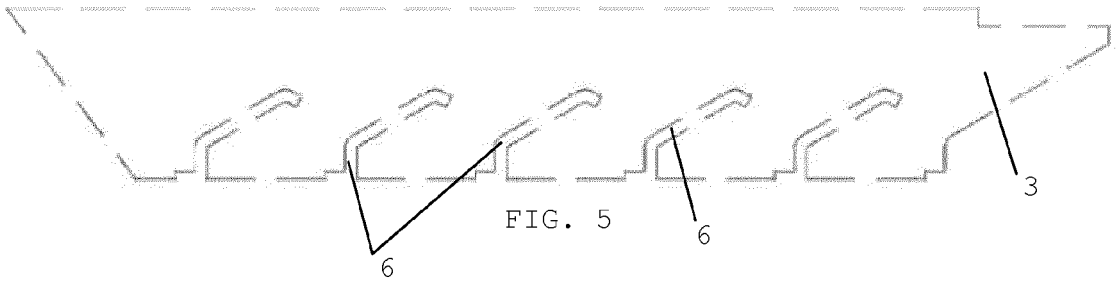

FIG. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 16 17 4241

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 2 698 483 A1 (ITALIANA KELLER GRIGIATI SOC COOP A R L [IT]) 19 February 2014 (2014-02-19) * paragraphs [0001], [0011], [0024], [0025], [0030] - [0042] * * figures 12,14,18,23 *	1-6	INV. E04F11/112 E04C2/42 ADD. E04F11/104
X	ES 2 317 740 A1 (ORSOGRIL S P A [IT]) 16 April 2009 (2009-04-16) * figures 1-5 *	1-6	
A	DE 27 32 593 A1 (BAECKER JOSEF FA [DE]) 1 February 1979 (1979-02-01) * pages 1-3 * * figures 1-3 *	1-6	
A	DE 100 33 530 A1 (HEIFA KAMIN UND KORROSIONSSCHUTZ [DE]) 31 January 2002 (2002-01-31) * paragraphs [0001] - [0003] * * figure 1 *	1-6	TECHNICAL FIELDS SEARCHED (IPC)
A	DE 19 78 791 U (LICHTGITTER GMBH [DE]) 15 February 1968 (1968-02-15) * pages 1-2 * * figure 1 *	1-6	E04F E04C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	13 October 2016	Arsac England, Sally

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 16 17 4241

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13-10-2016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2698483 A1	19-02-2014	NONE	
ES 2317740 A1	16-04-2009	NONE	
DE 2732593 A1	01-02-1979	NONE	
DE 10033530 A1	31-01-2002	NONE	
DE 1978791 U	15-02-1968	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82