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

VERBESSERTE STUFE FÜR TRITTFESTES GITTER

MARCHE AMÉLIORÉE POUR DES ESCALIERS À GRILLE POUVANT ÊTRE FOULÉE

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(73) Proprietor: **Italiana Keller Grigliati Soc. Coop. a R.L.**
05035 Narni (TR) (IT)

(72) Inventor: **LEONARDI, Sandro**
05035 Narni (TR) (IT)

(74) Representative: **Fezzardi, Antonio et al**
IJ Srl - Consulenti in Proprieta Industriale
Via R. Cadorna, 29
00187 Rome (IT)

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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] It is known, from EP2698483, an improved high-strength lightweight metal sectional element, for treadable gratings, envisages a cross section presenting one or more bends and/or counter-bends at least one of the ends in order to have a high moment of inertia to bending as compared to other metal sectional elements with cross sections of equal area.

[0007] It is also known, from ES2317740, a visually screened grating, in particular for walkable surfaces in elevated position, including a plurality of adjacent supporting bars, parallel to each other, and having a stamped profile, with at least one fold or curvature.

[0008] Neither EP2698483 nor ES2317740 disclose or suggest a standard grating stair tread step provided with reinforced elements which are inserted under - and therefore separated from - the step itself.

[0009] 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.

[0010] 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.

[0011] 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.

[0012] 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.

[0013] 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.

[0014] 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.

[0015] 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.

[0016] 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'.

[0017] 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.

[0018] 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.

[0019] 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).

[0020] A further peculiar characteristic of the invention lies in the fact that said bands 3 are fixed to the sectional elements 2, 2' at the edges of the shaped slots or notches 6.

[0021] The present invention has been described and illustrated in a preferred embodiment and some variants thereof, but it is evident that modifications may be made within the scope of the appended claims.

Claims

1. A step for treadable-grating staircases, comprising:

- a grating stair tread (1) having a length suitable for the width of a staircase; and
- at least two end plates (5) for attachment of the step to the outer stringers of the staircase; wherein the bars of the grating stair tread (1) are welded on said end plates (5),

said step being **characterized in that**:
reinforcement elements are provided underneath said grating stair tread (1) of the step itself, said reinforcement elements comprising:

- L-shaped sectional elements (2) integrated on the underside of the grating stair tread (1) and fixed to the end plates (5); and
- one or more reinforcement bands (3) made of sheet metal arranged orthogonal to the L-shaped sectional elements (2) and to the treading surface;

whereby a functional and structural co-operation is obtained between said grating stair tread (1) and said reinforcement elements.

2. A step for treadable-grating staircases, comprising:

- a grating stair tread (1) having a length suitable for the width of a staircase; and
- at least two end plates (5) for attachment of the step to the outer stringers of the staircase; wherein the bars of the grating stair tread (1) are welded on said end plates (5),

said step being **characterized in that**:
reinforcement elements are provided underneath said grating stair tread (1) of the step itself, said reinforcement elements comprising:

- an obscuring panel with inclined bars (2') for implementing an anti-vertigo function, which is appropriately arranged on the underside of the grating stair tread (1), and
- one or more reinforcement bands (3) made of sheet metal arranged orthogonal to the inclined bars (2') and to the treading surface;

wherein said inclined bars (2') are rendered structurally participating by means of said reinforcement bands (3).

3. The step according to claim 2, **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.

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 L-shaped sectional elements (2) to which they are constrained.

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

6. The step according to Claim 2, **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 inclined bars (2') to which they are constrained.

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

Patentansprüche

1. Stufe für trittfeste Gittertreppen, umfassend:

- einen Gittertreppenauftritt (1) mit einer Länge, die für die Breite einer Treppe geeignet ist; und
- zumindest zwei Endplatten (5) zur Anbringung der Stufe an den äußeren Längsträgern der Treppe; wobei die Stäbe des Gittertreppenauftritts (1) auf den Endplatten (5) angeschweißt sind,

wobei die Stufe **dadurch gekennzeichnet ist, dass**:
Verstärkungselemente unterhalb des Gittertreppenauftritts (1) der Stufe selbst vorgesehen sind, wobei die Verstärkungselemente umfassen:

- L-förmige Profilelemente (2), die an der Unterseite des Gittertreppenauftritts (1) eingegliedert und an den Endplatten (5) befestigt sind; und
- ein oder mehr Verstärkungsbänder (3) aus Metallblech, die senkrecht zu den L-förmigen Profilelementen (2) und zur Trittfläche angeordnet sind;

wodurch eine funktionelle und strukturelle Zusammenwirkung zwischen dem Gittertreppenauftritt (1) und den Verstärkungselementen erzielt ist.

2. Stufe für trittfeste Gittertreppen, umfassend:

- einen Gittertreppenauftritt (1) mit einer Länge, die für die Breite einer Treppe geeignet ist; und
- zumindest zwei Endplatten (5) zur Anbringung der Stufe an den äußeren Längsträgern der Treppe; wobei die Stäbe des Gittertreppenauftritts (1) auf den Endplatten (5) angeschweißt sind,

wobei die Stufe **dadurch gekennzeichnet ist, dass**:
Verstärkungselemente unterhalb des Gittertreppenauftritts (1) der Stufe selbst vorgesehen sind, wobei die Verstärkungselemente umfassen:

- eine Verdeckungsplatte mit geneigten Stäben (2') zum Implementieren einer Höhenangstschutzfunktion, die zweckmäßig an der Unterseite des Gittertreppenauftritts (1) angeordnet ist, und
- ein oder mehr Verstärkungsbänder (3) aus Metallblech, die senkrecht zu den geneigten Stäben (2') und zur Trittfläche angeordnet sind;

wobei die geneigten Stäbe (2') mithilfe der Verstärkungsbänder (3) strukturell beteiligt werden.

3. Stufe nach Anspruch 2, **dadurch gekennzeichnet, dass** die geneigten Stäbe (2') eine derartige Neigung aufweisen und in einem derartigen Abstand zueinander eingerichtet sind, dass verhindert ist, dass ein Benutzer durch das Gitter der Stufen durchschauen kann, wodurch die Möglichkeit beseitigt ist, dass der Benutzer die erreichte Höhe erfasst, wenn er schaut, wohin er seine Füße setzt.

4. Stufe nach Anspruch 1, **dadurch gekennzeichnet, dass** die Bänder (3) mit zweckmäßig geformten Kerben oder Schlitzen (6) versehen sind, die zum Zusammenpassen mit den Konturen des Querschnitts der L-förmigen Profilelemente (2), an denen sie eingezwängt sind, gestaltet sind.

5. Stufe nach dem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** die Bänder (3) an den L-förmigen Profilelementen (2) an den Kanten der geformten Schlitze oder Kerben (6) befestigt sind, und dass die L-förmigen Profilelemente (2) an den Endplatten (5) an ihren Enden befestigt sind.

6. Stufe nach Anspruch 2, **dadurch gekennzeichnet, dass** die Bänder (3) mit zweckmäßig geformten Kerben oder Schlitzen (6) versehen sind, die zum Zusammenpassen mit den Konturen des Querschnitts der geneigten Stäbe (2'), an denen sie eingezwängt sind, gestaltet sind.

7. Stufe nach dem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** die Bänder (3) an den geneigten Stäben (2') an den Kanten der geformten Schlitze oder Kerben (6) befestigt sind, und dass die geneigten Stäbe (2') an den Endplatten (5) an ihren Enden befestigt sind.

Revendications

1. Marche pour des escaliers à grille pouvant être foulée, comprenant :

- un giron à grille (1) ayant une longueur convenant pour la largeur d'un escalier ; et
- au moins deux plaques d'extrémité (5) pour attacher la marche aux limons extérieurs de l'escalier ;

dans laquelle les barres du giron à grille (1) sont soudées sur lesdites plaques d'extrémité (5),
ladite marche étant **caractérisée en ce que** :
des éléments de renforcement sont ménagés sous ledit giron à grille (1) de la marche elle-même, lesdits éléments de renforcement comprenant :

- des éléments sectionnels en forme de L (2) intégrés sur le dessous du giron à grille (1) et fixés aux plaques d'extrémité (5) ; et
- une ou plusieurs bandes de renforcement (3) réalisées en tôle métallique agencées orthogonalement aux éléments sectionnels en forme de

L (2) et à la surface à fouler ;

moyennant quoi une coopération fonctionnelle et structurelle est obtenue entre ledit giron à grille (1) et lesdits éléments de renforcement.

2. Marche pour des escaliers à grille pouvant être foulée, comprenant :

- un giron à grille (1) ayant une longueur convenant pour la largeur d'un escalier ; et
- au moins deux plaques d'extrémité (5) pour attacher la marche aux limons extérieurs de l'escalier ;

dans laquelle les barres du giron à grille (1) sont soudées sur lesdites plaques d'extrémité (5),
ladite marche étant **caractérisée en ce que** :

des éléments de renforcement sont ménagés sous ledit giron à grille (1) de la marche elle-même,
lesdits éléments de renforcement comprenant :

- un panneau de dissimulation avec des barres inclinées (2') pour mettre en œuvre une fonction anti-vertige, qui est agencé de façon appropriée sur le dessous du giron à grille (1), et
- une ou plusieurs bandes de renforcement (3) réalisées en tôle métallique agencées orthogonalement aux barres inclinées (2') et à la surface à fouler ;

dans laquelle lesdites barres inclinées (2') sont rendues structurellement participatives au moyen desdites bandes de renforcement (3).

3. Marche selon la revendication 2, **caractérisée en ce que** lesdites barres inclinées (2') ont une inclinaison et son installées à une distance les unes des autres de façon à empêcher l'utilisateur de voir à travers la grille des marches, éliminant ainsi la possibilité que l'utilisateur se rende compte de la hauteur atteinte lorsqu'il regarde où il met les pieds.

4. Marche selon la revendication 1, **caractérisée en ce que** lesdites bandes (3) sont pourvues d'encoches ou de fentes conformées appropriées (6) conçues pour s'apparier avec les pourtours de la section des éléments sectionnels en forme de L (2) auxquels elles sont contraintes.

5. Marche selon la revendication précédente, **caractérisée en ce que** lesdites bandes (3) sont fixées aux éléments sectionnels en forme de L (2) au niveau des bords des fentes ou encoches conformées (6), et lesdits éléments sectionnels en forme de L (2) sont fixés aux plaques d'extrémité (5) au niveau de leurs extrémités.

6. Marche selon la revendication 2, **caractérisée en ce que** lesdites bandes (3) sont pourvues d'encoches ou de fentes conformées appropriées (6) conçues pour s'apparier avec les pourtours de la section des barres inclinées (2') auxquelles elles sont contraintes.

7. Marche selon la revendication précédente, **caractérisée en ce que** lesdites bandes (3) sont fixées aux barres inclinées (2') au niveau des bords des fentes ou encoches conformées (6), et lesdites barres inclinées (2') sont fixées aux plaques d'extrémité (5) au niveau de leurs extrémités.

PRIOR ART

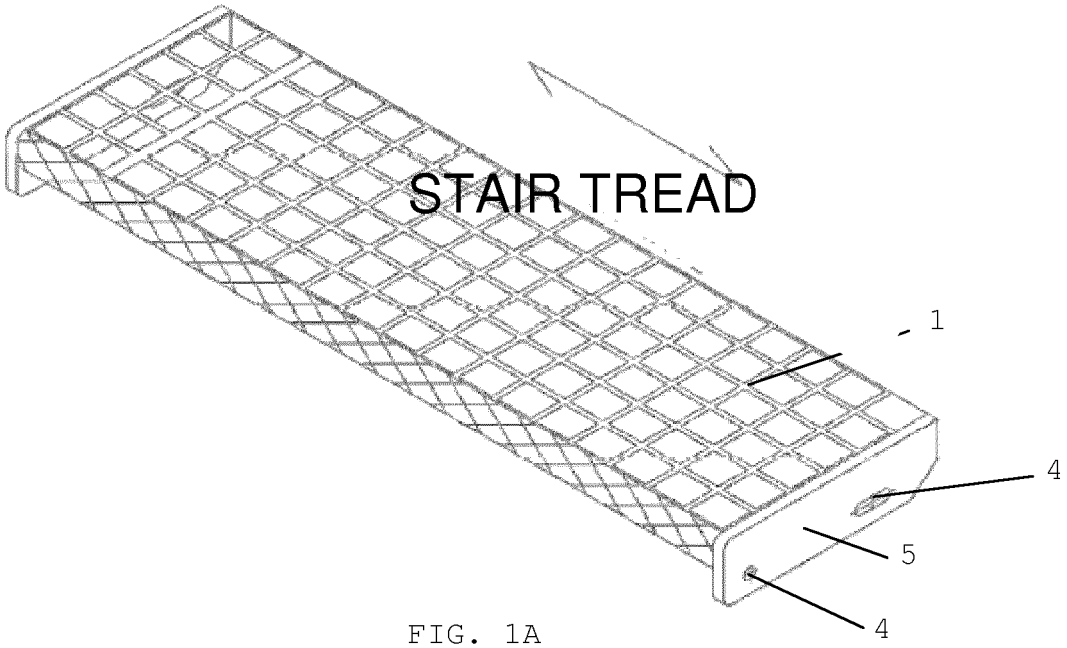

FIG. 1A

PRIOR ART

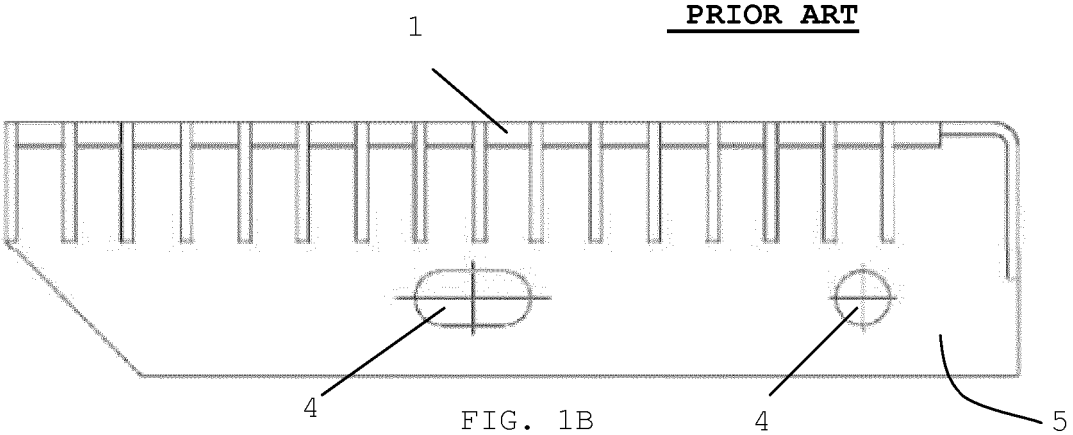

FIG. 1B

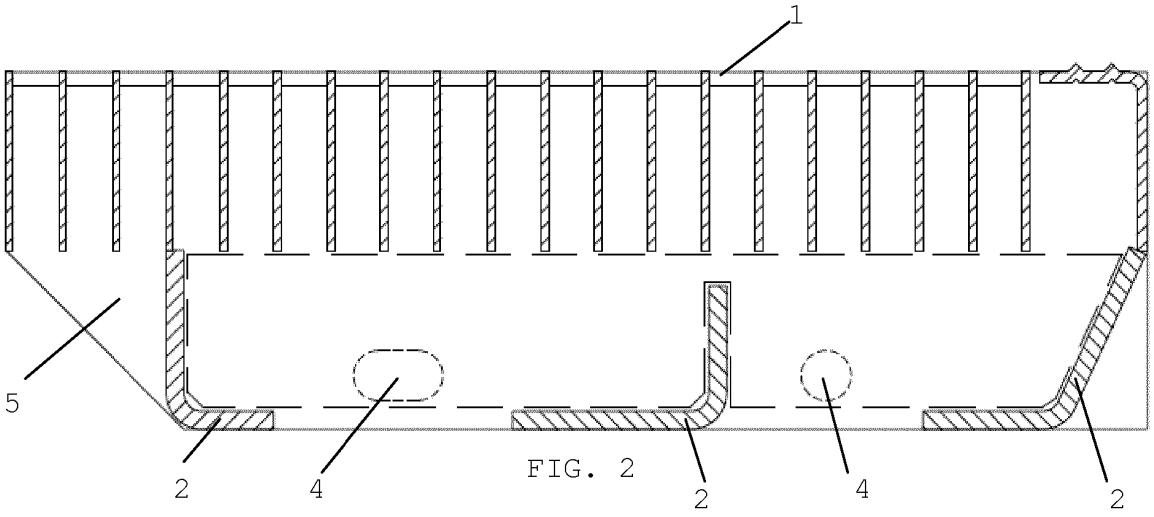

FIG. 2

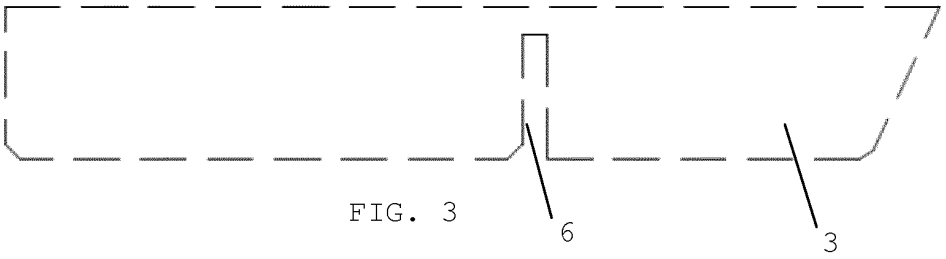

FIG. 3

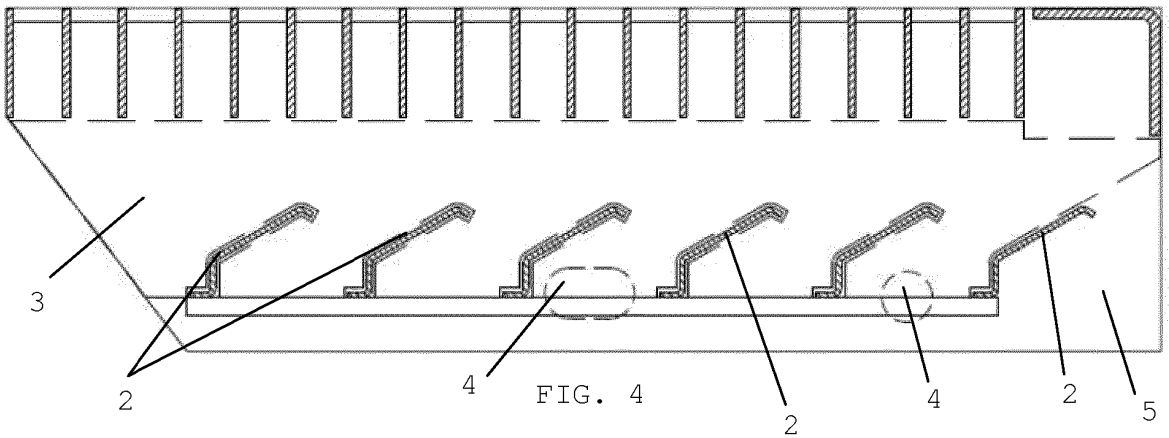

FIG. 4

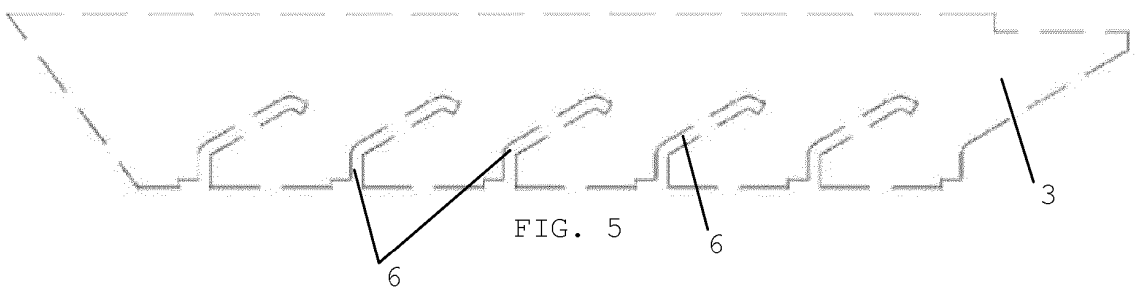

FIG. 5

REFERENCES CITED IN THE DESCRIPTION

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