(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 540 930 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.01.2013 Bulletin 2013/01

(51) Int Cl.:
E04F 11/035 *(2006.01)*

(21) Application number: **12168892.3**

(22) Date of filing: **22.05.2012**

(84) Designated Contracting States:
AL 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 RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **29.06.2011 TR 201106446**

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(54) **Spine staircase system with adjustable stair height**

(57) The present invention relates to a new configuration, which provides a fixed stair height between all the stairs, by preventing height differences between the lowermost and/or uppermost stairs measurement and the other intermediate stairs due to the fact that the measurement between the floors differ from standard stair measurement in the place where the staircase system is to be located, in staircase systems composed of spines (1) on which stairs are mounted and which are contacted with one another by means of connecting pieces (8); characterized by comprising a clamping piece (2) mounted in the spine (1), which permits stair height adjustment by being tightened and loosened, a connector (5) fixing the said clamping piece (2) into the spine (1), and a washer (4).

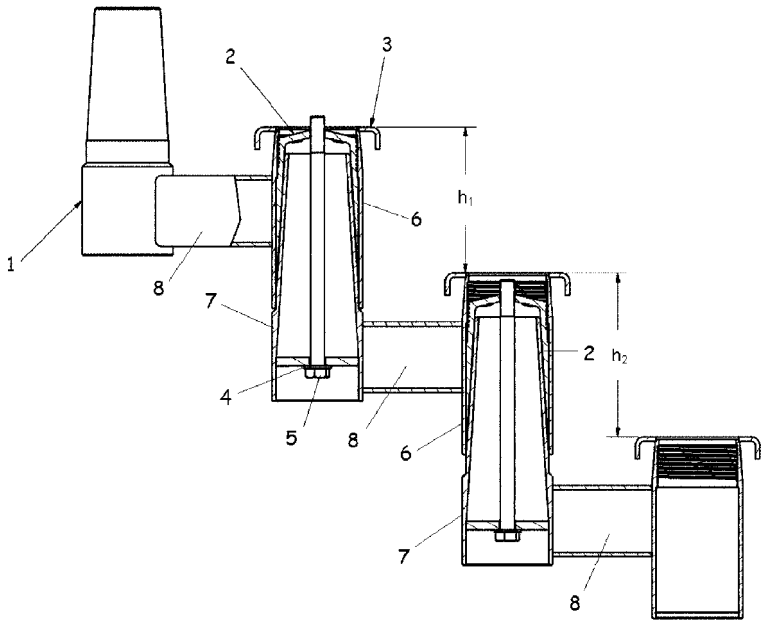

Fig. 1

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Description

TECHNICAL FIELD

[0001] The invention relates to a development providing a fixed stair height between all the stairs, by preventing the differences between the lowermost and/or uppermost stairs measurement and the other intermediate stairs due to the fact that the measurement between the floors differ from standard stair measurement in the place where the staircase system is to be located, in the spine staircase system allowing access between constructions or platform staircase systems with at least two floors, where a vertical height difference exists.

STATE OF THE ART

[0002] Within the state of the art, the distance between the stairs is equal and fixed in spine staircase system. In other words, the distance between the stairs is equal, having only one numerical value (e.g. 17 cm). The former characteristic of the spine staircase system configuration may cause differences in between the lowermost and/or uppermost stairs measurement and the other intermediate stairs due to the fact that the measures differ between the floors where the staircase is to be located. In particular, there is measurement difference between the uppermost stair and floor; thus, the height of the uppermost stair becomes different from that of the other stairs. That measurement difference may be ergonomically inconvenient in some cases, in architectural positioning terms.

[0003] The fact that the distance between the lowermost and uppermost stairs differs from middle stairs in which the difference between stairs is equal damages the functionality of the spine staircase system in architectural terms, as well as causing ergonomic and aesthetic disadvantages.

[0004] In the state of the art, the stair distance of the stair system constructed for allowing access between two floors of different heights is calculated by dividing the elevation difference between floors, which is mostly 295 cm, by standard stair values. As a result of this calculation, mostly a stair number having decimal values is obtained, which causes problems in terms of clarity and understandability in stair number calculation.

[0005] Currently, an illustrative embodiment relates to a rotary staircase disclosed in the application numbered US5515657. Horizontally formed different grooves are provided for achieving different heights in the staircase used in constructions. A curved end plate is provided at the narrow end of each stair of the rotary staircase. A curved flange, on the other hand, is mounted in a way to extend upwards along the curved end plate. Each stair is contacted with the curved end plate in a way that they will surround the column.

[0006] Another embodiment relates to a rotary staircase disclosed in the application numbered DE3220918. According to this application, a rotary staircase is disclosed, wherein the stairs, which are located with the support of staircase walls and floor, by means of steel slide bars, rotate in half or quarter form.

[0007] Another embodiment relates to a spiral staircase disclosed in the application numbered JP2002161619. According to this application, a spiral staircase comprising, apart from the circular support element made of steel, a spine made of steel, which is arranged and mounted in spiral form, support legs mounted on the upper surfaces of the spines horizontally, and wooden stairs mounted on the support legs.

[0008] Another application is related to a steel spine staircase disclosed in the application numbered TR 2004 01453 U. The abstract of the said application includes the following: "The present invention is steel spine staircase capable of supporting itself, which can be manufactured in desired sizes, which has stairs and equilibrium profiles made of steel, where pipes of Q25-60X2mm proportional to platina sheet are used, configured with empty sections of 30X40, 40X80, technically proportional to platina sheet in the carrier system; wherein the spine of the staircase is composed of platform and stair carrier, between 6mm - 50mm in thickness, made of steel st 37 or stainless sheet.

[0009] None of the above mentioned staircase systems has a characteristic that provides a fixed height value in between all the stairs, by adjusting the stair height according to the elevation difference height between floors.

[0010] As a consequence, new configurations are required to eliminate the above mentioned disadvantages and to offer solutions for the existing systems since, in the current spine staircase systems, developments providing equal stair heights are made.

OBJECT OF THE INVENTION

[0011] The present invention pertains to a new spine staircase configuration that meets the above mentioned needs, eliminates all the disadvantages, and provides some additional advantages.

[0012] It is an object of the invention to allow the stair height to be adjusted between minimum -1 cm and maximum +1 cm, thanks to a clamping piece mounted in the spines that form the staircase system.

[0013] In the spine staircase system configurations, differences in between the lowermost and/or uppermost stairs measurement and the other intermediate stairs may occur due to the fact that the measures differ between the floors where the staircase is to be located. In particular, there is measurement difference between the uppermost stair and floor; thus, the height of the uppermost stair becomes different from that of the other stairs. A further object of the invention is to permit adjustment of the stair heights, including the lowermost and uppermost stairs, to a fixed value, thanks to the stair height which can be of different numerical values.

[0014] A further object of the invention is to rule out the

negative aspects that are not ergonomically convenient in architectural positioning terms, and to provide an aesthetical appearance, by eliminating the measure differences between stairs.

[0015] A yet further object of the invention is to eliminate the problem regarding the stair number calculation yielding decimal values; and hence, to make the stair number calculation more clear and understandable.

[0016] In cases where lowermost and/or uppermost stair height is different, a special configuration and effort are required for the stairs to be mounted. It is also aimed to eliminate the said negative aspects, owing to the equal stair distance characteristic provided by the invention in the entire staircase system.

[0017] In order to achieve all the above mentioned advantages, which will also be understood from the detailed description, the present invention relates to a new development providing a fixed stair height between all the stairs, by preventing height differences between the lowermost and/or uppermost stairs measurement and the other intermediate stairs due to the fact that the measurement between the floors differ from standard stair measurement in the place where the staircase system is to be located, in staircase systems composed of spines (1) on which stairs are mounted and which are contacted with one another by means of connecting pieces (8); characterized by comprising:

- a clamping piece (2) mounted in the spine (1), which permits stair height adjustment by being tightened and loosened,
- a connector (5) fixing the said clamping piece (2) into the spine (1) and a washer (4).

[0018] The structural and characteristic aspects and all the advantages of the present invention will be more clearly understood by means of following figures, and the detailed description written with references to these figures, and therefore while making an evaluation; these figures and the detailed description should be taken into account.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] In order for the embodiment of present invention and the advantages thereof, together with the additional elements, to be best understood, it should be evaluated with the below described figures.

Fig. 1 is the side cross-sectional view of the spine staircase configuration with adjustable stair height according to the invention.

Fig.2 is the detailed view of the connector and washer which are used as connecting elements in the invention.

REFERENCE NUMERALS

[0020]

1. Spine
2. Clamping Piece
3. Stair Connecting Plate
4. Washer
5. Connector
6. Inner-pass Female Conical Section
7. Male Conical Section
8. Connecting Piece

DETAILED DESCRIPTION OF THE INVENTION

[0021] In this detailed description, the preferred embodiments of the present invention will be explained for the subject to be better understood, without any causing any limitations.

[0022] The present invention relates to a development made in the spine staircase systems allowing access between constructions or platform staircase systems with at least two floors, where a vertical height difference exists. Spines (1) are used in spine staircases for contacting the stairs with one another. Each spine (1) is contacted with another in a rotary or straight manner, and stairs are mounted thereon, and thus staircase system is formed.

[0023] The invention, in particular, relates to a new configuration providing a fixed stair height between all the stairs, by preventing the differences between the lowermost and/or uppermost stairs measurement and the other intermediate stairs due to the fact that the measurement between the floors differ from standard stair measurement in the places where the staircase system is to be located.

[0024] Fig. 1 shows the side cross-sectional view of the spine staircase configuration with adjustable stair height according to the invention. The primary structure of the staircase system is composed of interlocked spines (1) which are contacted with a connecting piece (8). Each spine (1) comprises an inner-pass female conical section (6) and a male conical section (7), wherein an outer-pass clamping piece (2) is provided between these two conical sections (6, 7). The clamping piece (2) is screwed into inner-pass female conical section (6) such that the desired stair height adjustment will be achieved, and then the male conical section (7) is positioned and fixed to the spine (1) from the inside, by means of connecting means (the detailed view is given in Fig. 2) composed of a washer (4) and a connector (5), which is preferably a hexagon bolt. A ring located in the channel provided in the inner surface of the spine (1) will prevent the clamping piece (2) from slipping and falling down while it is being loosened. Above the inner-pass female conical section (6), a stair connecting plate (3) contacted with clamping piece is provided. The stair is positioned on the said stair connecting plate (3), thereby allowing right and left adjustment of the stair.

[0025] Thanks to the invention, the stair height is designed such that there will be 2 cm in total between minimum and maximum values, being adjustable with a sensitivity of ± 1 cm. In the representative view in Fig. 1, stair heights showed by h_1 and h_2 vary between 16.5 cm and 18.5 cm, respectively, in a staircase system whose reference stair height is taken as 17.5 cm. In the representative cross-sectional view in Fig. 1, the reason for showing the stair heights in different values is only to make the operating principle of the system better understood. Here, the scale of 2 cm, to which the stair height can be adjusted, is emphasized by showing the location of the clamping piece (2) in the spine (1) in the lowest and highest values. If necessary, the stair height can be adjusted to intermediate values and a fixed value is achieved in all stair heights.

[0026] Thanks to this newly developed technical property, the distances between the stairs may be equal, including the lowermost and uppermost stairs. Thus, the adjustable spine staircase system is aesthetically and ergonomically configures in architectural terms and the system gains an overall functionality.

[0027] In addition to the above mentioned achievements, thanks to the invention, the problem regarding the stair number calculation yielding decimal values is eliminated; and hence, the stair number calculation is made more clear and understandable. The said advantage can be illustrated as follows: In a place where the height between floors is 295 cm (the elevation difference is 295 cm between the lower and upper floors), the standard stair heights having values of minimum 16,5 cm and maximum 17,5 cm, if the stair height is 17 cm (the present height value), to obtain the stair number, 295cm is divided by 17cm, and 17.35 stairs are obtained. The obtained 17.35 value is rounded up to 17 stair number. This time, the new stair height, 17.35 cm, is obtained by dividing 295 to 17.

[0028] As a result these operations, it is obvious that, in the adjustable spine staircase configuration to be installed in a place where the distance between floors is 295 cm, the distance between the stairs will be equal, including the uppermost and lowermost stairs, i.e. each having a value of 17.35, and a total of 17 stairs will be obtained.

[0029] In the spine staircase systems, differences in between the lowermost and/or uppermost stairs measurement and the other intermediate stairs may occur due to the fact that the measures differ between the floors where the staircase is to be located. In particular, there is measurement difference between the uppermost stair and floor; thus, the height of the uppermost stair becomes different from that of the other stairs. This measure difference may cause problems ergonomically in architectural positioning terms in some cases; moreover, a special configuration and effort are required for these stairs to be mounted.

[0030] Owing to the new technical solution developed by the present invention, the distance between the stairs are equal, as in the prior case, but being adjustable this time, in a way to have different numerical values, and the above explained negative aspects are eliminated. Thanks to the present invention, the distance between the stairs will be equal, at the same time; they will have more than one numerical value.

Claims

1. The present invention is a staircase system composed of spines (1) on which stairs are mounted and which are contacted with one another by means of connecting pieces (8); ***characterized in that*** *it* comprises ;
   the following components, which provide a fixed stair height between all the stairs, by preventing height differences between the lowermost and/or uppermost stairs measurement and the other intermediate stairs due to the fact that the measurement between the floors differ from standard stair measurement in the place where the staircase system is to be located:
   - a clamping piece (2) mounted in the spine (1), which permits stair height adjustment by being tightened and loosened,
   - a connector (5) fixing the said clamping piece (2) into the spine (1).

2. A connector according to Claim 1; ***characterized in that*** it comprises a washer (4) contacted prior to the connector (5) allowing the clamping piece (2) to be fixed into the spine (1).

3. A connector (5) according to Claims 1 and 2; wherein the connecter is a bolt.

4. A connector (5) according to Claim 3; wherein the connector is a hexagon bolt.

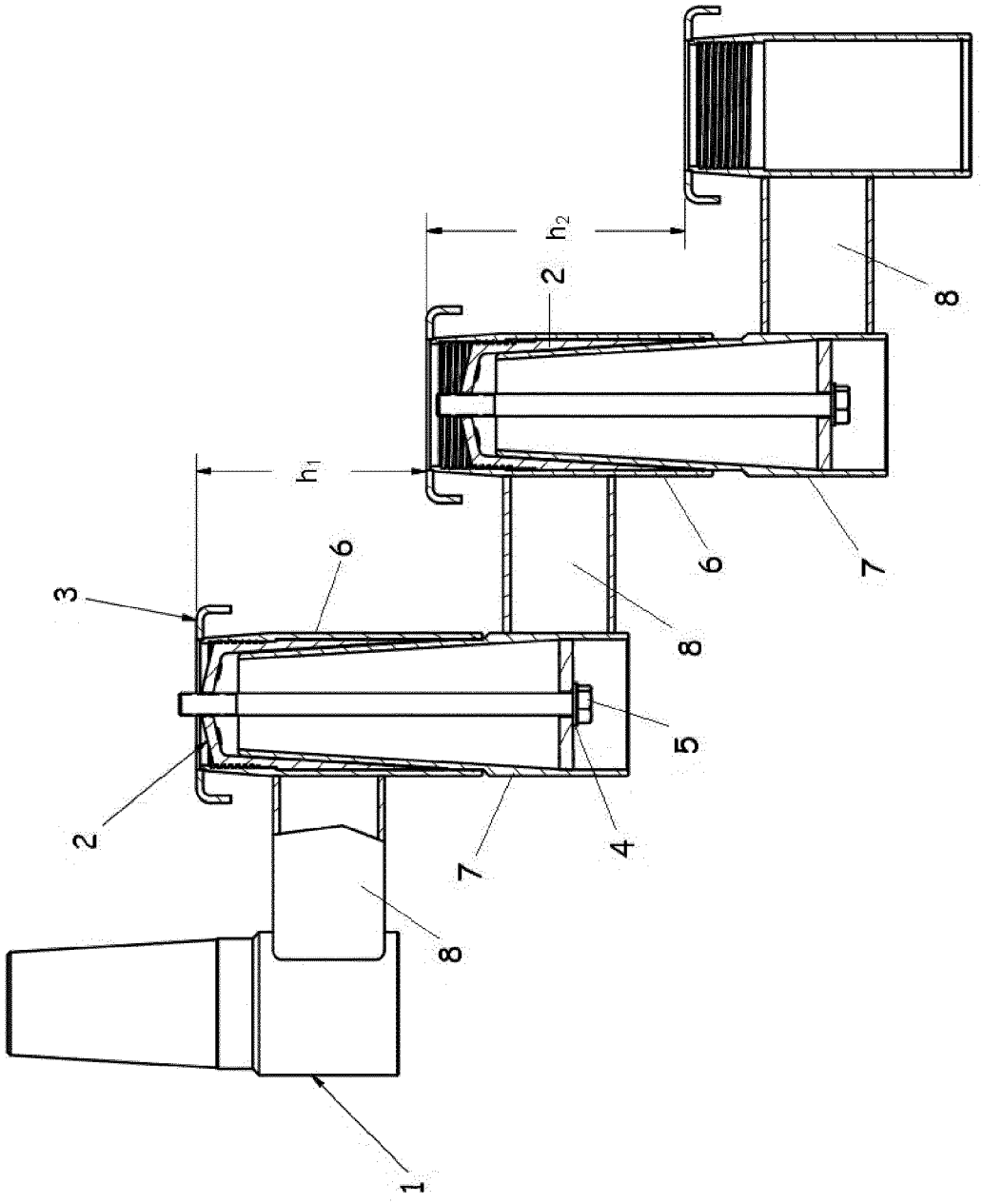

Fig. 1

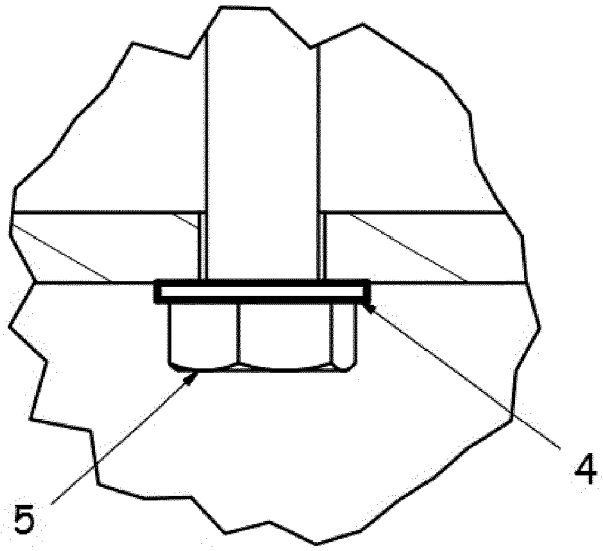

Fig. 2

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 5515657 A **[0005]**
- DE 3220918 **[0006]**
- JP 2002161619 B **[0007]**
- TR 200401453 U **[0008]**