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(54) A balustrade

(57) A balustrade comprises a handrail (1) with a joint (2) and at least one grid section (3, 4) extending approximately parallel with the handrail and beneath it. The handrail (1) with joint is interconnected in both the longitudinal direction of the handrail and transversely thereof by a joint device. The grid section (3, 4) has a joint (8, 9). Mutually meeting end portions of the grid

section (3, 4) in the joints (8, 9, respectively) are disposed end-to-end. The end portions are surrounded by a sleeve-shaped joint element which prevents movement of the end portions transversely of the longitudinal direction of the grid section.

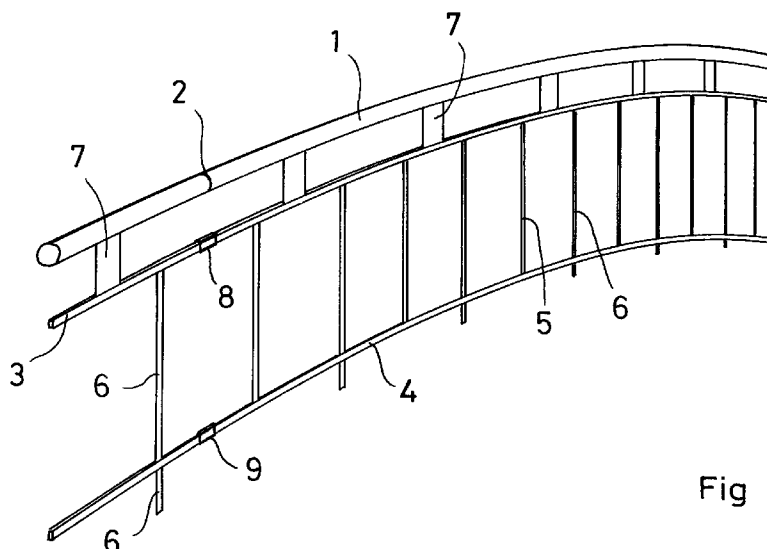


Fig 1

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Description**TECHNICAL FIELD**

The present invention relates to a balustrade which comprises a handrail with a joint which, in both the longitudinal direction of the handrail and transversely thereof, is interconnected by a joint device, and at least one grid section which extends approximately parallel with the handrail and beneath it, the grid section having a joint.

BACKGROUND ART

Balustrades of the above-mentioned type are common and are frequently employed, for example, in spiral staircases. In such instance, it is normal that the handrail is produced from a circular tube profile, while the grid section may consist of so-called flat iron or possibly slimmer tubular profiles.

Specification WO93/14285 discloses a well-functioning joint device by means of which the handrail may be joined. This joint device is designed in such a manner that, in an extremely accurate manner, it may centre and align mutually meeting parts of the handrail. In addition, the mechanical strength in the joints of the handrail realised by means of the joint device is extremely good.

In prior art designs and constructions, it has been common to join the grid sections by screw connection or by welding. Both methods are less satisfactory, int. al. because such spiral staircases on which the invention is often applied are intended for assembly outdoors, for which reason they are protected against corrosion by hot galvanizing. In both cases, the galvanized protection is damaged, but most seriously when welding work is carried out.

Because of the good mechanical strength and alignment in the joints of the handrail, the joining of the grid baluster or balusters is also excessive in pure terms of mechanical strength, at least in applications where the handrail is reliably and rigidly connected to the grid balusters.

PROBLEM STRUCTURE

The present invention has for its object to design the balustrade mentioned by way of introduction in such a manner that this may be joined in a simple and convenient manner without the use of screw connections, welding or similar methods. The present invention also has for its object to realise a balustrade in which a previously applied surface treatment is not damaged. Furthermore, the present invention has for its object to realise a balustrade which may be prefabricated in finished and surface-treated sections which, with simple and economical means, may be mounted in place in an extremely easy and convenient manner.

SOLUTION

The objects forming the basis of the present invention will be attained if the balustrade mentioned by way of introduction is characterized in that end portions of the grid section meeting one another at the joints of the grid section are disposed end-to-to-end, and that mutually meeting end portions are surrounded by a sleeve-shaped joint element which prevents movement of the end portions transversely of the longitudinal direction of the grid section.

According to one preferred embodiment, the end portions of the grid section are loosely inserted in opposing ends of the joint element, and this is provided with an inner abutment extending in the cross section of the joint element and located between adjacent end surfaces of mutually meeting end portions of the grid section.

Further advantages will be attained if the subject matter of the present invention is also given one or more of the characterizing features as set forth in appended Claims 2, 3 and 6 to 8.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

The present invention will now be described in greater detail hereinbelow, with reference to the accompanying Drawings. In the accompanying Drawings:

- Fig. 1 shows a balustrade, assuming the form of a balustrade for a spiral staircase, seen in perspective;
- Fig. 2 is a plan view of the joint element;
- Fig. 3 is an end elevation of the joint element of Fig. 2; and
- Fig. 4 is a further side elevation of the joint element of Fig. 2.

DESCRIPTION OF PREFERRED EMBODIMENT

Fig. 1 schematically shows in perspective a balustrade according to the invention, it being assumed that the balustrade shown on the Drawing is a balustrade intended for a spiral staircase. However, the present invention may be applied also to other types of balustrades, both for straight staircases and for straight or curved banisters and the like.

In Fig. 1, reference numeral 1 relates to a handrail for the balustrade, the handrail having a joint 2 which may be joined together in the manner described in WO93/14285.

While the joint device according to the above-mentioned PCT specification is advantageous and provides good function, other joint devices for the handrail 1 may

be employed, just as long as these are capable of positionally fixing the mutually meeting sections of the handrail both transversely of the longitudinal direction of the handrail and in its longitudinal direction proper, in other words to realise a joint which is three-dimensionally fixed.

In the balustrade according to Fig. 1, at least one grid section is included, but preferably an upper grid section 3 and a lower grid section 4, both of these grid sections being substantially parallel with one another and also with the handrail 1. A lattice or grid construction extends between the grid sections 3 and 4 and may include vertical connecting portions 5 and also balusters 6 which extend to the region beneath the lower grid section 4 in order to be secured in a substrate. In addition, connecting devices 7 are provided between the handrail 1 and the upper grid section 3, the connecting devices being, in one practical embodiment, in the form of "flat irons", tubular profiles or the like. The connecting devices 7 extend somewhat in the longitudinal direction of the handrail 1 and the grid sections 3 and 4, whereby the connecting devices may be considered as realising a substantially rigid interconnection between the handrail 1 and the upper grid section 3 seen in the longitudinal direction of the handrail. From this it follows that a longitudinal displacement between two meeting parts of the handrail 1 in the joints of necessity also entails a longitudinal displacement of the portions of the grid sections 3 and 4 which meet in the joints 8 and 9, which are suitably located straight over one another and straight beneath the joint 2 of the handrail 1.

As an alternative to the connecting devices 7 as these are described above, use may also be made of upwardly directed extensions of the connecting portions 5 and/or the balusters 6 which interconnect the handrail 1 and the upper grid section 3.

The joints 8 and 9 are designed in such a manner that mutually meeting end portions of the grid sections 3 and 4 lie end surface to end surface. The joints are surrounded by a sleeve-shaped joint element which prevents lateral displacement between the end portions. On the other hand, the joint element need not prevent the end portions from being distanced from one another, since this function is catered for by the joint device in the joint 2 of the handrail 1. Thus, the joint elements need only realise a substantially two-dimensional interconnection of the mutually meeting end portions of the grid sections.

The joint element has an inner cross sectional configuration which is approximately complementary to the cross sectional configuration of both of the grid sections 3 and 4. Further, the sleeve-shaped joint element is fixed in the longitudinal direction of the grid sections so that it cannot be displaced along them but remains in the correct position over the joints. The fit between the joint sleeve and the end portions of the grid sections is such that the end portions are loosely inserted in the opposing ends of the joint sleeve.

Figs. 2-4 show a joint sleeve which is manufactured from plate material, preferably stainless steel. The sleeve shown in the Figures is rectangular in cross section (see Fig. 3), for which reason it fits on grid sections produced from so-called hoop iron or band iron.

It will be apparent from Fig. 2 that the joint sleeve has a longitudinal joint 10 where the edges of the plate material from which the joint sleeve is produced meet. The meeting plate edges are joined via weld seams 11 and 12. It will further be apparent from Fig. 2 that the joint sleeve has an aperture 13, in which event the material separated on production of the aperture forms a tongue 14 which extends into the cross section of the joint sleeve. The tongue 14 acts as an arrest member which is located between meeting end portions of the grid sections 3 and 4, respectively, in the joints 8 and 9, whereby the joint sleeve is prevented from being displaced in the longitudinal direction of the grid sections.

The joint sleeve may fit relatively loosely on the grid sections, whereby the risk of damage to the surface treatment of the grid sections is eliminated. Further, the loose fit implies that tolerances of, for example, the thickness of the surface treatment on the grid sections need hardly constitute any problems on assembly of the joints 8 and 9.

If the grid sections 3 and 4 are, for example, produced from tubular profiles of circular cross section, it will be self-evident that the joint sleeves 8 and 9 will have the same cross-sectional configuration and be dimensioned in such a manner that they can be slid on the ends of the grid sections without the use of force.

Finally, the one grid section and certain of the connecting portions 5 and balusters 6 may be replaced by other materials, which at least partly close off the area between the handrail 1 and the substrate on which the balustrade is secured, whereby pedestrians and objects are prevented from passing or falling through the balustrade.

Claims

1. A balustrade which comprises a handrail (1) with a joint (2) which, in both the longitudinal direction of the handrail and transversely thereof, is interconnected by a joint device, and at least one grid section (3, 4) which extends approximately parallel with the handrail and beneath it, the grid section having a joint (8, 9), **characterized in that** end portions of the grid section meeting one another at the joints (8, 9, respectively) of the grid section (3, 4) are disposed end-to-to-end; **and that** mutually meeting end portions are surrounded by a sleeve-shaped joint element which prevents movement of the end portions transversely of the longitudinal direction of the grid section.
2. The balustrade as claimed in Claim 1, **characterized in that** the handrail (1) and the grid section (3,

4) are mutually interconnected by the intermediary of connecting means (5, 6, 7) substantially rigid in the longitudinal direction of the balustrade.

3. The balustrade as claimed in Claim 1 or 2, **characterized in that** the end portions of the grid section (3, 4) are loosely inserted in opposing ends of the joint element. 5
4. The balustrade as claimed in any of Claims 1 to 3, **characterized in that** the joint element is fixed in the longitudinal direction of the grid section (3, 4). 10
5. The balustrade as claimed in any of Claims 1 to 4, **characterized in that** the joint element has an inner abutment (14) extending in the cross section of the joint element and located between adjacent end surfaces of mutually meeting end portions of the grid section (3, 4). 15
6. The balustrade as claimed in Claim 5, **characterized in that** the joint element is a sleeve produced from plate material and having an inner cross-sectional configuration which is approximately complementary to the configuration of the end portions; and that the abutment (14) is a tongue or flap provided in the plate material and bent in to a position interiorly in the joint element. 20 25
7. The balustrade as claimed in any of Claims 1 to 6, **characterized in that** the joints (8, 9, respectively) of the grid section (3, 4) are located substantially straight beneath the joint (2) of the handrail (1). 30
8. The balustrade as claimed in any of Claims 1 to 7, **characterized in that** it includes more than one grid section (3, 4). 35

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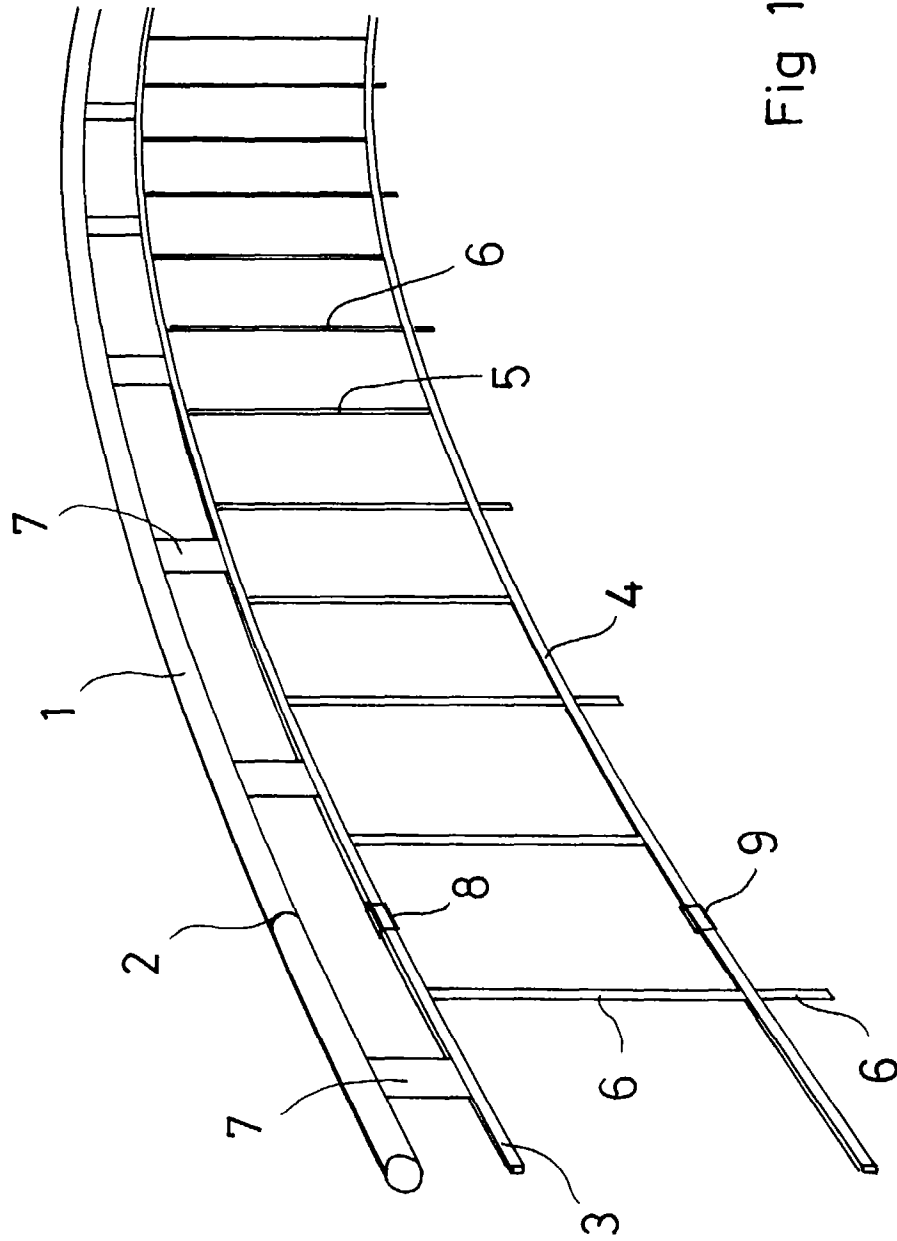


Fig 1

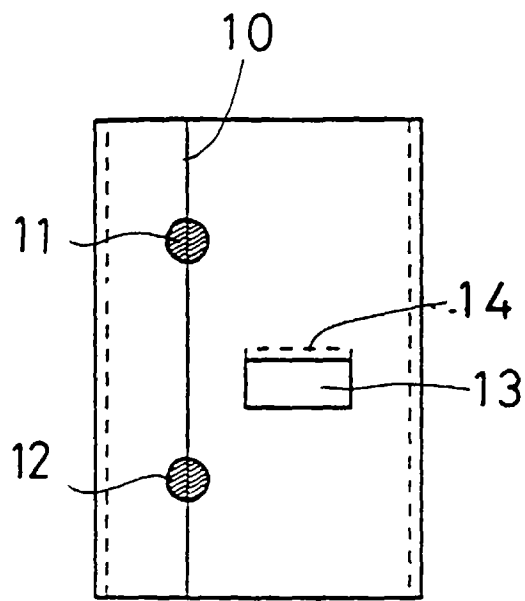


Fig 2

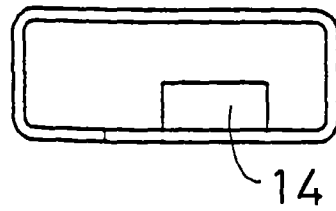


Fig 3

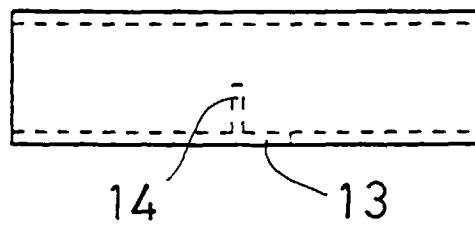


Fig 4