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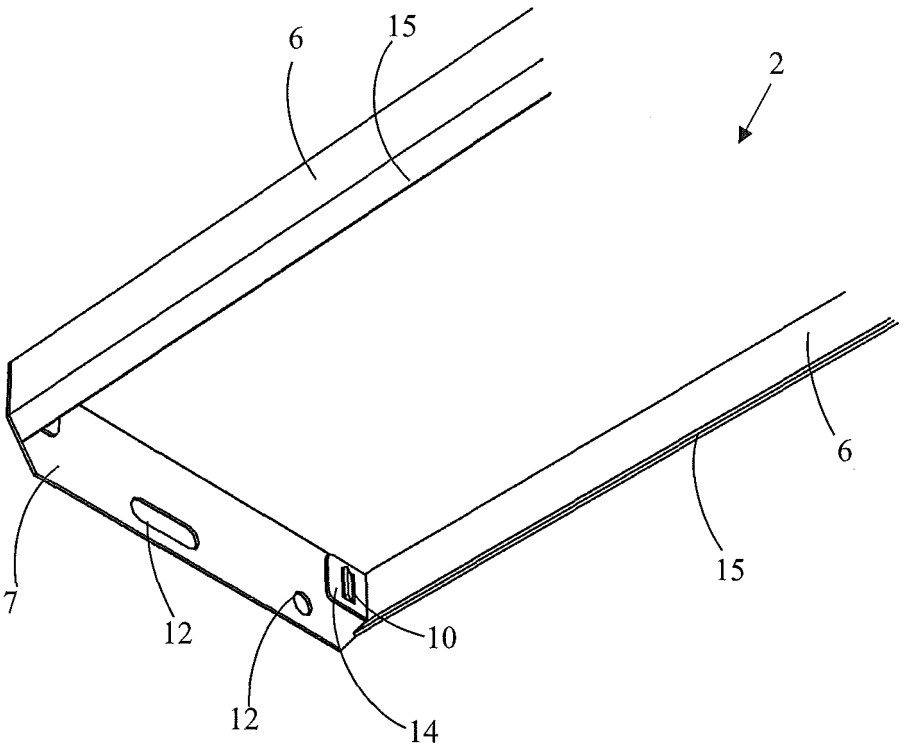
(54) **TREAD AND METHOD OF MANUFACTURING THEREOF**

(57) A tread in a sheet material, comprises a tread surface (5), side walls (6) and end walls (7), which are bent down from the tread surface (5). Each side and end wall (6, 7) is joined with the adjacent walls (6, 7) at an angle (8). A snap connection (9) is arranged at each angle (8), for keeping the side and end walls (6, 7) in their bent down positions.

A method of manufacturing a tread comprises that a blank is cut from a sheet material, and corresponding parts of a snap connection (9) are formed therein. A first bending of blank parts, comprising parts of the snap connection (9), is performed, and a bending down of side and end walls (6, 7) of the tread (2) is performed, resulting in simultaneous interaction of the snap connection parts.

Fig 5



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Description

TECHNICAL FIELD

[0001] The invention concerns a tread in a sheet material, comprising a tread surface, side walls and end walls, which are bent down from the tread surface, wherein each side and end wall is joined with the adjacent walls at an angle.

[0002] The invention also concerns a method of manufacturing a tread.

PRIOR ART

[0003] There are numerous applications for treads manufactured in sheet metal. They may be included in stairs inside or outside buildings, or they may form a part of vehicles, machinery, or fixed constructions such as docks or swimming pools.

[0004] Depending on the intended use, different materials and surface treatments may be used. Some materials and treatments are weldable, while others are not. This poses some restrictions on the manufacturing process, such as that the welding has to be performed before the tread is coated with zinc.

[0005] Recently, corrosion resistant materials which do not require a surface coating have come into use. Welding of these materials is not always possible, or is complex and time consuming.

[0006] Sheet metal treads are often formed with an upper, planar tread surface and side and end walls extending downwards from the edges of the tread surface. The side and end walls provide strength to the tread and prevents bending or buckling thereof, when a load is placed on the tread surface. Also, the side and end walls may be used for fixing the treads on a staircase or other construction.

[0007] The side and end walls could be screwed or welded onto the tread surface, but in most cases they are bent downwards in a direction transversal to that of the tread surface.

[0008] At the corners of a rectangular tread surface, the side and end walls will meet at an angle. According to the prior art, the walls are joined with a weld, in order to keep the walls in their bent down position and to maintain the overall strength of the tread.

[0009] If welding is not possible for joining, separate fastening elements, such as screws or rivets will have to be used, but the application thereof is time and labor consuming.

PROBLEM STRUCTURE

[0010] There is hence a need for a tread with an alternate construction, where welding is not needed in order to maintain the strength and integrity of the tread.

[0011] There is also a need for a method of manufacturing such a tread.

SOLUTION

[0012] The above objective will be attained, if the tread mentioned in the introduction is characterized in that a snap connection is arranged at each angle, for keeping the side and end walls in their bent down positions.

[0013] Regarding the method, the objective will be attained if the method is characterized by the treads that a blank is cut from a sheet material, corresponding parts of a snap connection are formed therein, a first bending of blank parts, comprising parts of the snap connection, is performed, and a bending down of side and end walls of the tread is performed, resulting in simultaneous interaction of the snap connection parts.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The invention will now be described with reference to the accompanying drawings. In the drawings:

Fig. 1 is a perspective view of a staircase including treads according to the invention;

Fig. 2 is a partial perspective view from above of a tread according to the invention;

Fig. 3 is a partial, planar view of a blank for forming the tread according to Fig.

2; Fig. 4 is an end view of the tread according to Fig. 2; and

Fig. 5 is a partial perspective view from below of the tread according to the invention.

PREFERRED EMBODIMENT

[0015] Fig. 1 shows an example of a staircase 1 with a couple of treads 2 according to the invention. Each tread 2 is connected with a stringer 3 on each side by means of screws, rivets or other fastening means 4.

[0016] Each tread 2 has an upwardly directed tread surface 5, which may have slits, grooves, or other perforations for providing a protection against slipping. Perforations in the tread surface 5 also keeps the water from rain or snow from collecting on stairs outdoors. The tread surface 5 may alternatively be covered with a carpet, if the stairs 1 are placed indoors.

[0017] In Fig 1 one side wall 6 on each tread 2 is visible. In the preferred embodiment, the tread 2 is made from a single piece of sheet metal, and the side wall 6 is bent downwards from the plane of the tread surface 5. In order to give the tread 2 a smooth finish and to avoid exposing sharp metal edges, the bottom edge of the side wall 6 may be bent further inwards under the tread 2.

[0018] Fig. 2 shows one end of the tread 2 according to the invention in further detail. An end wall 7 is bent downwards from the tread surface 5. Holes 12 for the

fastening means 4 are arranged in the end walls 7. Both the side and the end walls 6, 7 are transversal to the tread surface 5, and will increase the strength of the tread 2. In order to keep the side and end walls 6, 7 in place, and maintaining the strength of the tread 2, the side and end walls are joined at the angles 8 where they meet.

[0019] At each angle 8 there is an interconnection, and the interconnection includes a snap connection 9, which in turn comprises a hole 10 and a protrusion 11. Fig 2 shows the snap connection 9 in its connected state, and Fig. 3 shows the two parts 10, 11 of the snap connection 9 on a sheet metal blank 13, from which the tread 2 is formed.

[0020] Before the side and end walls 6, 7 are bent into their final position, the blank 13 has been cut out from a larger piece of sheet material. Holes 10, 12 have been cut out, and the protrusions 11 have been formed in that part of the blank 13, which is to become the end wall 7. The protrusions 11 extend in a direction inwards under the tread surface 5 in the finished tread 2. The holes 10, which form parts of the snap connections 9, are arranged on tabs 14 which are arranged as extensions of the side wall 6 material in the blank 13.

[0021] For forming the tread 2, the end wall 7 and the tabs 14 are bent to a position which is transversal to the plane of the tread surface 5, i. e. approximately perpendicular thereto. The bending lines for the tabs 14 and the end wall 7 are slightly offset, in order to take the thickness of the material into account. This means that the tabs 14 will be bent at a position further away from the outer end of the blank 13 than the end wall 7. Also, the bottom edges 15 of the side walls 6 will be bent slightly, in order to conform with the contours of the end wall 7, when they have reached their final positions.

[0022] When the side walls 6 are bent into their finished positions, the tabs 14, with the holes 10, will follow the end walls 7, and move along a curve into position inside the end wall 7. When the side walls 6 have reached their final positions and the side and end walls 6, 7 meet at the angles 8, the holes 10 in the tabs 14 also reach the protrusions 11, and snap into connection, as seen in Fig. 4. No further fixation of the side and end walls 6, 7 will be needed.

[0023] In order for the snap connection to be made, it is advantageous that the protrusion 11 has a ramp surface facing the direction of the tab 14, so that the tab 14 may slide along the inside of the end wall 7, ease over the ramp surface, and finally snap into the hole 10, when the side wall 6 is in its final position.

[0024] Fig 5 shows a perspective view of one end of the finished tread 2. The tab 14, which is visible in the figure, is arranged on the inside of the end wall 7 and bridges the angle 8 between the end wall 7 and the side wall 6. As the protrusion 11 extends inwards, the outside of the end wall 7 will be smooth and free from protruding details. There will be no obstacles when the tread 2 is to be mounted on the stringers 3.

[0025] The described tread 2 and method of manufacturing the tread 2 are suitable for use in virtually any type of sheet metal, provided that the type of material and thickness thereof are sufficient for providing the required strength in the finished tread 2. Also materials with a high resistance against corrosion may be used, regardless of whether they are suitable for welding or not. Any type of surface treatment may be performed before or after the production of the tread 2, since no welding is involved. Finally, the method is suitable for time and labor efficient production with a high level of automation,, since the amount of high precision labor needed is low.

ALTERNATIVE EMBODIMENTS

[0026] Although the positions of the tabs 14, holes 10, and protrusions 11 have described in a particular way in the preferred embodiment, the skilled person realizes that the holes 10 and the protrusions 11 may be interchanged, as long as the outside of the tread 2 is sufficiently smooth for mounting in a staircase. Also the arrangement of the tabs 14 on the side walls 6 could be changed so that they are arranged on the end walls 7, and the order of bending the walls 6, 7 is changed.

[0027] In the figures and the description of a preferred embodiment, a rectangular tread 2 has been shown and described. Such a tread is suitable for straight stairs 1. However, there may be cases where treads with different contours may be produced with the same method, e. g. treads for a spiral staircase. Such treads are often wider at one end and narrow at the other end. The provision of tabs for snap connections on the inside of the side and end walls would be similar in these cases, with the exception that the bending of the tab with the hole may have to be performed at a different angle, in order to comply with the different angle where the side and end walls meet.

[0028] Even in cases where the side or end walls are beveled, the provision of a snap connection with a tab with a hole and a corresponding protrusion, may be useful. Two parts of a side wall may be joined with the same type of connection, where the angle of the tab is adjusted so that it slides along the inside of the wall with the protrusion, before the snap connection is made.

Claims

1. Tread in a sheet material, comprising a tread surface (5), side walls (6) and end walls (7), which are bent down from the tread surface (5), wherein each side and end wall (6, 7) is joined with the adjacent walls (6, 7) at an angle (8), **characterized in that** a snap connection (9) is arranged at each angle (8), for keeping the side and end walls (6, 7) in their bent down positions.

2. Tread according to claim 1 **characterized in that** a tab (14), with one part (10, 11) of the snap connection

(9), extends from one of the walls (6, 7), overlaps the angle (8), and is joined with a second part of the snap connection (9) in the adjacent wall (6, 7).

3. Tread according to claim 1 or claim 2, **characterized in that** each snap connection (9) includes a hole (10) and a protrusion (11), where the protrusion (11) is positioned in the hole (10) in a mounted position of the tread (2).

4. Tread according to claim 2 **characterized in that** the tab (14) extends at the inside of the bent down walls (6, 7).

5. Tread according to claim 3, **characterized in that** the protrusion (11) extends inwards inside the bent down walls (6, 7).

6. Tread according to claim 3 or claim 5, **characterized in that** each protrusion (6, 7) has a ramp surface.

7. Method of manufacturing a tread according to any of claims 1 to 6, **characterized in** the treads (2) that a blank (13) is cut from a sheet material, corresponding parts (10, 11) of a snap connection (9) are formed therein, a first bending of blank parts, comprising parts (10, 11) of the snap connection (9), is performed, and a bending down of side and end walls (6, 7) of the tread (2) is performed, resulting in simultaneous interaction of the snap connection parts (10, 11).

8. Method according to claim 7, **characterized in that** the step of forming the snap connection parts (10, 11) include cutting holes (10) in the blank (13) and forming corresponding protrusions (11).

9. Method according to claim 7 or claim 8, **characterized in that** tabs (14) for overlapping the angles (8) of the bent down walls (6, 7) are formed in the blank (13) and are bent into a position for interaction.

Fig 1

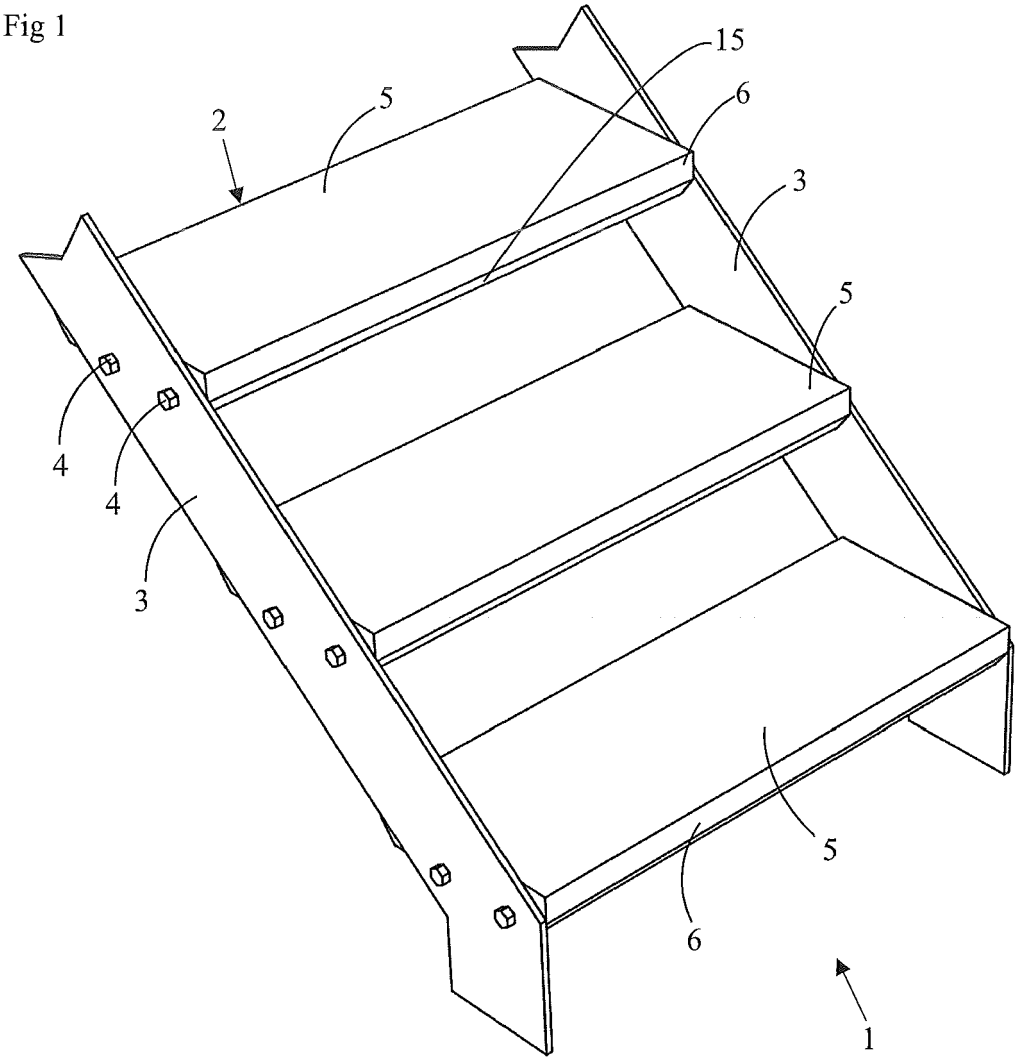


Fig 2

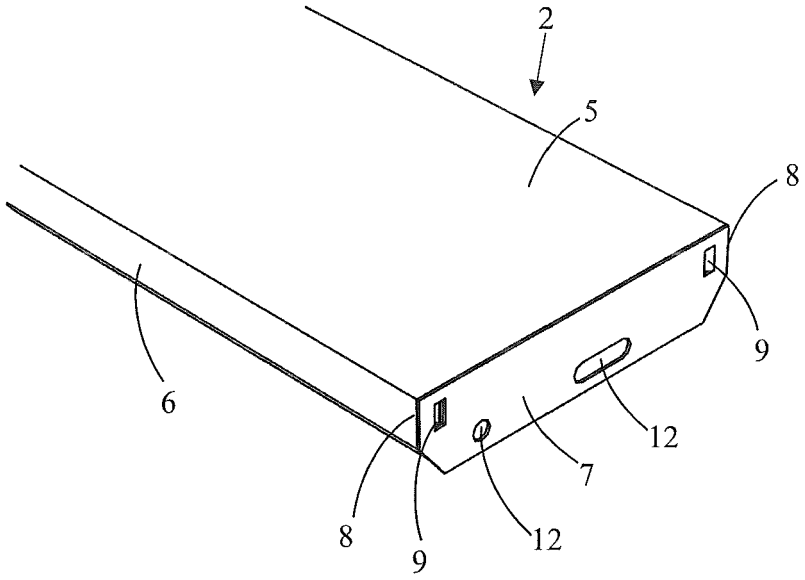


Fig 3

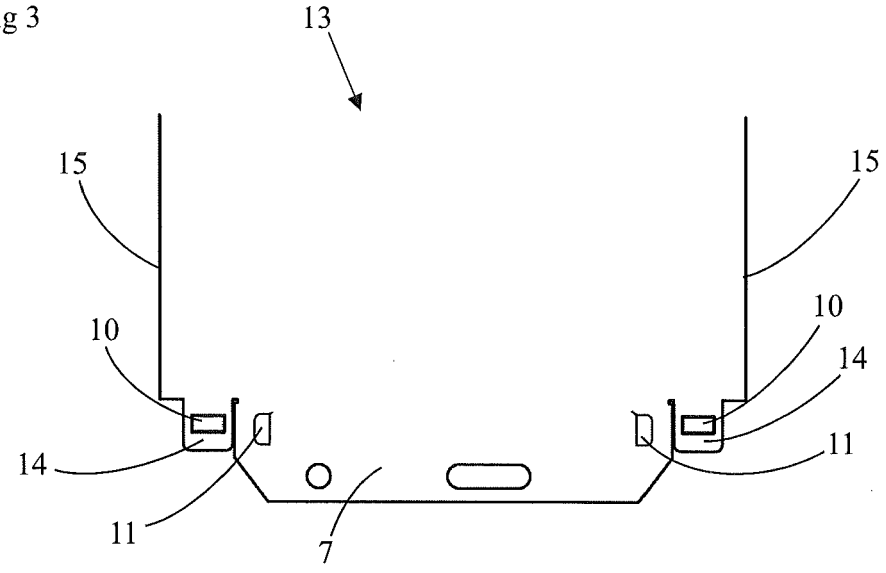


Fig 4

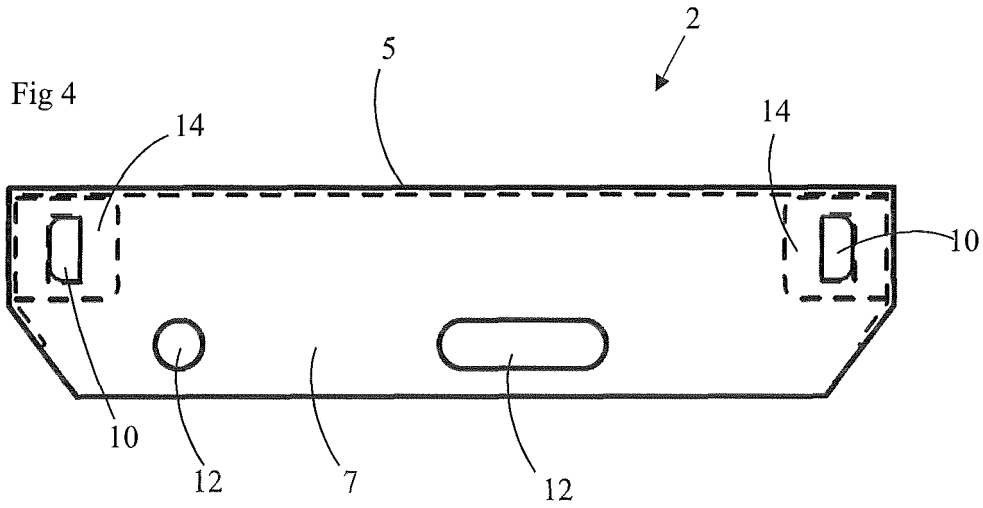
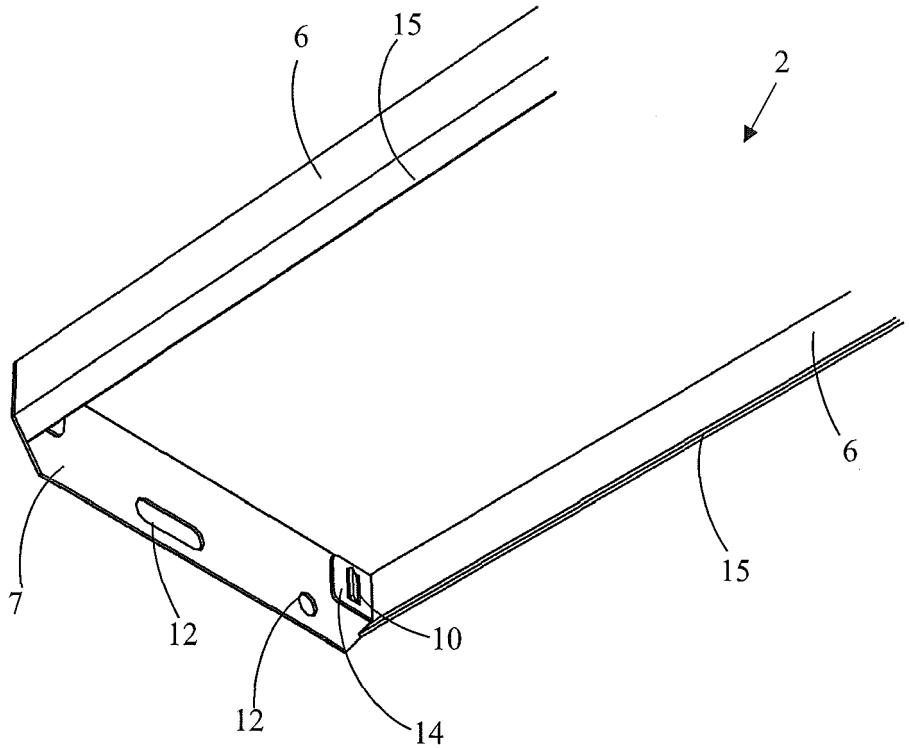


Fig 5



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EUROPEAN SEARCH REPORT

Application Number
EP 16 19 3700

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

E04F
B21D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	14 March 2017	Arsac England, Sally

CATEGORY OF CITED DOCUMENTS

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