

ESCALATOR AFFIXING SHEET AND METHOD OF AFFIXING SHEET

PIECES TO ESCALATOR

FIELD OF THE INVENTION

[0001] The present invention relates to an escalator affixing sheet of which sheet pieces are suitably affixed to bottom surfaces of a plurality of parallel grooves formed in a tread or a riser of a step of an escalator and to a method of affixing the sheet pieces to the escalator.

BACKGROUND

[0002] Conventionally, it has been practiced to affix sheet pieces, on which information such as advertisement is printed, to bottom surfaces of a plurality of parallel grooves formed in a tread or a riser of a step of an escalator. Since the sheet pieces to be affixed to the bottom surfaces of the grooves are thin in width and long in length, however, work for affixing the sheet pieces to the bottom surfaces of the grooves is complex and takes a lot of time.

[0003] To solve the aforementioned problem, Patent document 1 discloses an affixing method as follows. That is, before affixing sheet pieces (25) to bottom surfaces of grooves in a tread or a riser, an adhesive tape (3) is adhered to surfaces of the plural sheet pieces (25) so as to prevent the sheet pieces (25) from being separated and a peelable paper (28) of the sheet pieces (25) is peeled off more than a part where the adhesive tape (3) is adhered. Then, the sheet pieces (25) are positioned to the

corresponding grooves, respectively, and the parts of the sheet pieces (25) where the peelable paper (28) is peeled are pressed against the bottom surfaces of the grooves by a pressing member (4) so that the pressed parts of the sheet pieces (25) are affixed to the bottom surfaces of the grooves. Subsequently, the sheet pieces are affixed to the bottom surfaces of the grooves while peeling the rest of the peelable paper (28).

[0004] According to the affixing method, the respective sheet pieces (25) are positioned by the adhesive tape (3) so as to prevent the adjacent sheet pieces (25) from being misplaced and prevent misalignment between respective sheet pieces (25), thereby achieving effective affixing work.

PRIOR ART DOCUMENTS

PATENT DOCUMENTS

[0005] Patent document 1: JP2010-179990A

SUMMARY OF THE INVENTION

PROBLEM TO BE SOLVED BY THE INVENTION

[0006] However, the aforementioned method of affixing sheet pieces disclosed in Patent document 1 still has the following problems:

[1] The method requires adhesion of the adhesive tape (3) on the surfaces of the plural sheet pieces (25) and this adhering work is troublesome. In addition, the adhesive tape (3) must be prepared besides the sheet pieces (25), thus increasing the number of parts and blocking reduction in cost.

[0007] [2] If the adhesion position of the adhesive tape (3) is shifted in the longitudinal direction of the sheet pieces (25) when adhering the adhesive tape (3) to the

surfaces of the plural sheet pieces (25), the affixing positions of the sheet pieces (25) are shifted for each tread (11) when the positioning relative to the tread (11) is conducted by the adhesive tape (3). For avoiding this, the adhesion position of the adhesive tape (3) should be defined to be constant relative to the longitudinal direction of the sheet pieces (25) with high accuracy. For this, another tool for adhering with high accuracy may be required or the workability for adhesion may be poor because of careful adhering work.

[0008] [3] Though the adhesive tape (3) must be peeled off from the surfaces of the sheet pieces (25) finally, parts of adhesive layer of the adhesive tape (3) may remain on the surfaces of the sheet pieces (25). If parts of adhesive layer remain, dust or the like in the grooves (110) may adhere to the adhesive layer so that the printed matter on the sheet pieces (25) may be contaminated.

[0009] The present invention was made in the light of the above described problems. It is an object of the present invention to provide an escalator affixing sheet enabling the easy and secure affixing of sheet pieces to bottom surfaces of grooves formed in a tread or a riser of a step of an escalator, being capable of reducing the number of parts, enabling easy and secure positioning of the sheet pieces when affixing them to the tread or the riser, and further having no risk of an adhesive layer remaining on surfaces of the sheet pieces and to provide a method of affixing the sheet pieces to the escalator.

MEANS FOR SOLVING THE PROBLEMS

[0010] An escalator affixing sheet according to the present invention comprises: sheet pieces to be affixed to bottom surfaces of parallel grooves formed in a tread or a

riser of a step of an escalator; and a joining portion for joining said sheet pieces which are arranged in parallel at distances corresponding to the distances of said grooves, wherein said sheet pieces and said joining portion are composed of a single sheet.

According to the present invention, the sheet pieces can be affixed to the bottom surfaces of the grooves under the condition that the positioning of the sheet pieces is made by attaching the joining portion to the tread or the riser of the escalator, thereby facilitating and ensuring the work of affixing the respective sheet pieces. Especially, since the respective sheet pieces are securely kept to be spaced at a desired distance (distance between adjacent grooves formed in the tread or the riser of the escalator) by the joining portion, the sheet pieces are easily and securely affixed to the bottom surfaces of the grooves formed in the tread without twisting.

Further, the plural sheet pieces and the joining portion are composed of a single sheet, thus not only minimizing the number of parts but also simplifying the manufacturing of the escalator affixing sheet. Accordingly, reduction in cost is achieved.

Since there is no need of an adhesive tape (3) as used in Patent document 1, there is no possibility of remaining an adhesive layer on the surfaces of the sheet pieces and also no possibility of contamination of the printed matter on the sheet pieces due to adhesion of dust or the like in the grooves.

[0011] The present invention is also characterized in that said joining portion is connected to one ends of said sheet pieces.

Since the joining portion is connected to one ends of the sheet pieces, the sheet pieces can be easily and securely affixed to the bottom surfaces of the grooves by

attaching the joining portion along one edge (leading edge or trailing edge) of the tread or the riser of the step of the escalator.

The joining portion is also used as a positioning member for positioning the proximal ends of the sheet pieces. That is, only by attaching the joining portion to coincide with the one edge of the tread or the riser of the escalator or to coincide with some mark provided near the one edge (for example, in case that there is a frame painted with yellow or white color in a predetermined width for hazard prevention, to coincide with the inner periphery of the frame), the positioning of the sheet pieces relative to the longitudinal direction of the grooves is easily and securely conducted. This can completely eliminate the possibility of shifting in position of sheet pieces relative to the tread or the riser.

[0012] The present invention is further characterized in that at connection between each sheet piece and the joining portion, a cutoff facilitation portion for facilitating the cutoff there between is formed.

Accordingly, after the sheet pieces are affixed to the bottom surfaces of the grooves of the tread or the riser, the joining portion can be cut off easily.

[0013] A method of affixing sheet pieces to an escalator according to the present invention comprises: a preparing step for preparing an escalator affixing sheet and a tool, wherein said escalator affixing sheet comprises sheet pieces to be affixed to bottom surfaces of parallel grooves formed in a tread or a riser of a step of an escalator, a joining portion for joining said sheet pieces which are arranged in parallel at distances corresponding to the distances of said grooves, said sheet pieces and said joining portion being composed of a single sheet, and an adhesive layer formed on back surfaces of said sheet pieces and said joining portion, and wherein said tool has fitting

portions to be inserted into said grooves; a positioning step for positioning said sheet pieces by attaching said joining portion to the tread or the riser of said escalator; an affixing step for affixing said sheet pieces to bottom surfaces of said grooves by pressing said sheet pieces into said grooves with the fitting portions of said tool inserted in said grooves; and a connection breaking step for cutting off said joining portion from said sheet pieces by moving the fitting portions of said tool inserted in said grooves toward said joining portion to apply tension at a portion between said joining portion and each sheet piece.

According to the present invention, the sheet pieces can be affixed to the bottom surfaces of the grooves by inserting the fitting portions of the tool into the grooves of the tread or the riser under the condition that the positioning of the sheet pieces is made by attaching the joining portion to the tread or the riser of the escalator, thereby facilitating the work of affixing the sheet pieces, and, in addition, the joining portion can be cut off from the sheet pieces by using the tool, thereby further facilitating the work of affixing the sheet pieces.

EFFECTS OF THE INVENTION

[0014] According to the present invention, it is possible to easily and securely affix sheet pieces to bottom surfaces of grooves formed in a tread or a riser of a step of an escalator, to reduce the number of parts, and to easily and securely position the sheet pieces when affixing them to the tread or the riser, and further there is no risk of an adhesive layer remaining on surfaces of the sheet pieces.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] Fig. 1 is a perspective view showing schematic design of an escalator affixing sheet 1.

Fig. 2 is an exploded perspective view of the escalator affixing sheet 1.

Fig. 3 is an enlarged plan view showing relevant parts in a position about connection between sheet pieces 11 and a joining portion 31.

Fig. 4 is an explanatory illustration of a method of affixing an escalator affixing sheet 1 to a tread 71 of an escalator 60.

Fig. 5 is an explanatory illustration of the method of affixing the escalator affixing sheet 1 to the tread 71 of the escalator 60.

Fig. 6A is an explanatory illustration of the method of affixing the escalator affixing sheet 1 to the tread 71 of the escalator 60.

Fig. 6B is an explanatory illustration of the method of affixing the escalator affixing sheet 1 to the tread 71 of the escalator 60.

Fig. 6C is an explanatory illustration of the method of affixing the escalator affixing sheet 1 to the tread 71 of the escalator 60.

Fig. 6D is an explanatory illustration of the method of affixing the escalator affixing sheet 1 to the tread 71 of the escalator 60.

Fig. 7A is an illustration showing an example of another configuration of a cutoff facilitation portion 21.

Fig. 7B is an illustration showing an example of another configuration of the cutoff facilitation portion 21.

Fig. 7C is an illustration showing an example without the cutoff facilitation portion 21.

DESCRIPTION OF EMBODIMENTS

[0016] Hereinafter, embodiments of the present invention will be described with reference to the drawings.

Fig. 1 is a perspective view showing schematic design of an escalator affixing sheet 1, and Fig. 2 is an exploded perspective view of the escalator affixing sheet 1. As shown in Figs. 1 and 2, the escalator affixing sheet 1 comprises an escalator affixing sheet body (hereinafter, referred to only as “sheet body”) 10 which has a plurality sheet pieces 11 arranged in parallel rows and a joining portion 31 connected to ends of the sheet pieces 11 and in which the sheet pieces 11 and the joining portion 31 are formed into a single sheet, and a peelable sheet 50 to be attached to the entire back surface of the sheet body 10. The escalator affixing sheet 1 shown in these figures is a sheet to be affixed to a tread 71 of an escalator 60 as described below.

[0017] Though the sheet body 10 is a polyvinyl chloride sheet in this example, sheets made of other various material (such as other synthetic resin or paper) may be employed. The sheet body 10 may have a single-layer structure or a multi-layer structure. In case of a double-layer structure, for example, it is preferable that a desired printing is made on a surface of a sheet (for example, white sheet) and a transparent sheet is superposed on and adhering to the surface of the sheet so that the printed surface is protected by the transparent sheet. Formed on the entire back surface of the sheet body 10 is an adhesive layer 19.

[0018] Each sheet piece 11 has a thin band shape and has a distal end (on the opposite side of the end connected to the joining portion 31) 13 formed in an arc shape. The other end i.e. proximal end (on the side connected to the joining portion 31) 15 of each sheet piece 11 is also formed in an arc shape. Each sheet 11 is designed to have

such a width as to be inserted into each groove 73 of the tread 71 of the escalator 60. On the plural sheet pieces 11, a desired printing 17 is made such that it is visible on a side of the surfaces of the sheet pieces. In this example, the desired printing 17 is characters “AMS” as a whole. It should be noted that illustration of the printing 17 is omitted in Fig. 4 and Fig. 5 referenced in the following description.

[0019] The joining portion 31 is formed in a band shape having a predetermined width. The proximal ends 15 of the respective sheet pieces 11 are connected to one edge in the longitudinal direction of the joining portion 31. Fig. 3 is an enlarged plan view showing relevant parts in a position about connection (indicated by A in Fig. 2) between sheet pieces 11 and the joining portion 31. As shown in Fig. 3, at the connection between each sheet piece 11 and the joining portion 31, a cutoff facilitation portion 21 having a reduced width is formed to facilitate cutoff therebetween. In other words, concavities 23 are formed by connecting the tip of the arc proximal end 15 of each sheet piece 11 to the edge of the joining portion 31, thereby forming the cutoff facilitation portion 21.

[0020] The peelable sheet 50 is formed to have such an outside dimension as to allow the entire sheet body 10 to adhere and have a smooth surface on a side where the sheet body 10 adheres, thus achieving mild adhesion allowing peeling between an adhesive layer 19 on the back surface of the sheet body 10 and the peelable sheet 50.

[0021] Description will now be made as regard to a method of affixing the escalator affixing sheet 1 to the tread 71 of the escalator 60. Fig. 4 through Fig. 6D are explanatory illustrations of the method of affixing the escalator affixing sheet 1 to the tread 71 of the escalator 60. The escalator 60 comprises a plurality of steps 61 linked to form an endless loop. Each step 61 has a tread 71 substantially parallel to the ground

and a riser 81 substantially perpendicular to the ground. Formed in the tread 71 and the riser 81 are a plurality of parallel grooves 73, 83, respectively.

[0022] To affix the escalator affixing sheet 1 to the tread 71, a part of the peelable sheet 50 adhering to the back surface 75 of the joining portion 31 of the escalator affixing sheet 1 is first peeled as shown in Fig. 4, and the back surface of the joining portion 31 is affixed to a portion along an edge of the tread 71 as shown in Fig. 5. During this, the edge of the joining portion 31 is positioned to the edge of the tread 71 (positioning step).

[0023] Then, while peeling the peelable sheet 50 off, the respective sheet pieces 11 are affixed to the bottom surfaces 75 of the respective grooves 73 as shown in Fig. 6A through Fig. 6D by using a tool 110 as shown in Fig. 5. The tool 110 has a plate-like shape and is provided with a plurality of fitting portions 111 like teeth of a comb formed in an edge (lower edge) thereof as shown in Fig. 5. Each fitting portion 111 is formed to have a dimension and length to be inserted into each groove 73. As shown in Fig. 6A, while peeling the peelable sheet 50 from the sheet pieces 11, the fitting portions 111 of the tool 110 are inserted into grooves 73 and the sheet pieces 11 are pressed from the above against the bottom surfaces 75 of the grooves 73 by ends of the fitting portions 111, whereby the sheet pieces 11 are affixed to the bottom surfaces 75. As shown in Fig. 6B, the affixing work is continued to the distal ends 13 of the sheet pieces 11 so that the entire sheet pieces 11 are affixed to the bottom surfaces 75 of the grooves 73. The affixing work is repeated relative to all of the sheet pieces 11 with changing the position of inserting the tool 110 and the peelable sheet 50 is removed completely (affixing step).

[0024] Then, as shown in Fig. 6B, the fitting portions 111 of the tool 110 inserted in the grooves 73 are moved from a position, for example, indicated by dotted line to a position near the joining portion 31 to depress the proximal ends 15 of the sheet pieces 11 near the joining portion 31 by the ends of the fitting portions 111, thereby breaking the cutoff facilitation portions 21 connecting the sheet pieces 11 with the joining portion 31. Accordingly, as shown in Fig. 6C, the proximal ends 15 of the sheet pieces 11 are also affixed to the bottom surfaces of the grooves 73 (connection breaking step). In this example, since the cutoff facilitation portions 21 are provided, the sheet pieces 11 can be easily cut off from the joining portion 31 in the process of affixing the sheet pieces 11 to the bottom surfaces 75 of the grooves 73 formed in the tread 71. The braking work is repeated relative to all of the sheet pieces 11 succeeding in the width direction with changing the position of inserting the tool 110 so that all of the sheet pieces 11 are affixed to the bottom surfaces 75 of the grooves 73.

[0025] As shown in Fig. 6D, the tool 110 is then removed and the joining portion 31 is peeled off, thus completing the affixing work of the sheet pieces 11. It should be noted that the aforementioned affixing procedure is an example and another different affixing procedure may be employed.

[0026] As described in the above, according to the escalator affixing sheet 1, the respective sheet pieces 11 can be affixed to the bottom surfaces 75 of the grooves 73 formed in the tread 71 of the escalator 60 under the condition that the positioning of the sheet pieces 11 is made by attaching the joining portion 31 to the tread 71, thereby facilitating and ensuring the work of affixing the respective sheet pieces 11. Especially, since the respective sheet pieces 11 are securely kept to be spaced at a desired distance (distance between adjacent grooves 73) by the joining portion 31, the sheet pieces 11

are easily and securely affixed to the bottom surfaces 75 of the grooves 73 formed in the tread 71.

[0027] In addition, the joining portion 31 is easily cut off from the sheet pieces 11 by using the tool 110 which is used for affixing the sheet pieces 11 to the bottom surfaces 75 of the grooves 73, thereby further facilitating the affixation of the sheet pieces 11 to the escalator 60.

[0028] Further, the plural sheet pieces 11 and the joining portion 31 are composed of a single sheet, thus not only minimizing the number of parts but also simplifying the manufacturing of the escalator affixing sheet 1. Accordingly, reduction in cost is achieved.

[0029] Since there is no need of an adhesive tape as disclosed in Patent document 1 adhering to the respective sheet pieces 11, there is no possibility of remaining an adhesive layer on the surfaces of the sheet pieces 11 and also no possibility of contamination of the printed matter on the sheet pieces 11 due to adhesion of dust or the like in the grooves 75.

[0030] Since the joining portion 31 is connected to the proximal ends of the sheet pieces 11, the sheet pieces 11 can be easily and securely affixed to the bottom surfaces 75 of the grooves 73 by attaching the joining portion 31 along one edge (leading edge or trailing edge) of the tread 71 of the escalator 60.

[0031] The joining portion 31 is also used as a positioning member for positioning the proximal ends of the sheet pieces 11. That is, only by attaching the joining portion 31 to coincide with the one edge of the tread 71 of the escalator 60, the positioning of the sheet pieces 11 relative to the longitudinal direction of the grooves 73 is easily and securely conducted. This can completely eliminate the possibility of shifting in position

of sheet pieces 11 relative to each tread 71. Though the joining portion 31 is attached to coincide with the one edge of the tread 71 of the escalator 60 in the above example, the joining portion 31 may be attached to coincide with some mark provided near the one edge of the tread 71. That is, there is a case that an yellow or white frame having a predetermined width for hazard prevention is provided for calling attention to users not to put their feet near the outer periphery of the tread 71. In this case, the edge of the joining portion 31 may be attached to coincide with the periphery of the frame as such a mark.

[0032] By the way, the configuration and structure of the cutoff facilitation portions 21 are not limited to the configuration and structure mentioned above and may be any configuration and structure that enable easy cutoff between the sheet piece 11 and the joining portion 31. Fig. 7A, Fig. 7B, Fig. 7C are illustrations showing examples of another configuration of the cutoff facilitation portion 21 (showing the same parts as shown in Fig. 3). In these figures, the same or corresponding parts of the escalator affixing sheet 1 shown in Fig. 1 through Fig. 6D are marked with the same reference numerals. Items other than items as will be described below are the same as those of the aforementioned escalator affixing sheet 1 shown in Fig. 1 through Fig. 6D. That is, as shown in Fig. 7A, the cutoff facilitation portions 21 may be provided with wedge-like concavities 23 to have reduced width dimension, thus facilitating cutoff between each sheet piece 11 and the joining portion 31. Alternatively, as shown in Fig. 7B, the cutoff facilitation portion 21 may be provided with a slit to have reduced width dimension, thus facilitating cutoff between each sheet piece 11 and the joining portion 31. The wedge-like concavity 23, the slit or the like may be formed only in one side of the sheet piece 11. Further, the cutoff facilitation portion 21 may have configuration and structure

different from the aforementioned configuration and structure. If the cutoff is facilitated even through the width dimension of the sheet piece 11 is not reduced (for example, if the joining portion 31 can be easily cut off from the sheet pieces 11 only by moving the fitting portions 111 of the tool 110 inserted in the grooves 73 toward the joining portion 31 to apply tension to portions between the joining portion 31 and the sheet pieces 11 because of material, thickness, width dimension or the like of the sheet pieces 11), the sheet pieces 11 may be connected to the joining portion 31 without the cutoff facilitation portion 21, i.e. without reduced width as shown in Fig. 7C.

[0033] In the escalator affixing sheet 1 as mentioned above, the reason why the both ends of the sheet pieces 11 are formed in arc shape is for preventing formation of easily peelable portions. That is, if the ends of the sheet pieces 11 are formed to have acute-angled portions, the acute-angle portions are peeled easily as compared to other portions.

[0034] While the embodiments of the present invention have been described above, the present invention is not limited to the aforementioned embodiments and various changes and modifications may be made within the scope of technical idea as described in the appended claims, specification and drawings. It should be noted that any configuration and structure achieving the function and effect of the present invention, even though it is not illustrated directly in the specification and the drawings, is also within the scope of the technical idea of the present invention. For example, though the escalator affixing sheet 1 according to the present invention is affixed to the tread of the escalator in the aforementioned embodiments, the escalator affixing sheet 1 may be used to be affixed to bottom surfaces of a plurality of parallel grooves formed in a riser

of a step of an escalator. In this case, for example, the upper edge of the joining portion is attached along a line near the upper edge of the riser.

[0035] Though one ends of the respective sheet pieces are connected to the joining portion in the aforementioned embodiment, the both ends of the respective sheet pieces may be connected to the joining portions (that is, two joining portions), if required. Further, if required, another joining portion may be provided at middle locations of the respective sheet pieces for joining across the respective sheet pieces. In this case, it is preferable that, at the connection between each sheet piece and the joining portion, a cutoff facilitation portion such as concavity or slit in the longitudinal direction of the sheet piece is formed. Further, in addition, a cutter or the like may be used to cut the connection between the joining portion and each sheet piece.

EXPLANATION OF REFERENCES

[0036]	1	escalator affixing sheet
10		sheet body (escalator affixing sheet body)
11		sheet piece
13		distal end
15		proximal end
17		printing
19		adhesive layer
21		cutoff facilitation portion
23		concavity
31		joining portion
50		peelable sheet

60	escalator
61	step
71	tread
73	groove
75	bottom surface
81	riser
83	groove
85	bottom surface
110	tool
111	fitting portion

WHAT IS CLAIMED IS:

1. An escalator affixing sheet comprising:

sheet pieces to be affixed to bottom surfaces of parallel grooves formed in a tread or a riser of a step of an escalator; and

a joining portion for joining said sheet pieces which are arranged in parallel at distances corresponding to the distances of said grooves, wherein

said sheet pieces and said joining portion are composed of a single sheet.
2. An escalator affixing sheet as claimed in claim 1, wherein said joining portion is connected to one ends of said sheet pieces.
3. An escalator affixing sheet as claimed in claim 1, wherein at connection between each sheet piece and said joining portion, a cutoff facilitation portion for facilitating the cutoff there between is formed.
4. A method of affixing sheet pieces to an escalator comprising:

a preparing step for preparing an escalator affixing sheet and a tool, wherein said escalator affixing sheet comprises sheet pieces to be affixed to bottom surfaces of parallel grooves formed in a tread or a riser of a step of an escalator, a joining portion for joining said sheet pieces which are arranged in parallel at distances corresponding to the distances of said grooves, said sheet pieces and said joining portion being composed of a single sheet, and an adhesive layer formed on back surfaces of said sheet pieces and said joining portion, and wherein said tool has fitting portions to be inserted into said grooves;

a positioning step for positioning said sheet pieces by attaching said joining portion to the tread or the riser of said escalator;

an affixing step for affixing said sheet pieces to bottom surfaces of said grooves by

pressing said sheet pieces into said grooves with the fitting portions of said tool inserted in said grooves; and

a connection breaking step for cutting off said joining portion from said sheet pieces by moving the fitting portions of said tool inserted in said grooves toward said joining portion to apply tension at a portion between said joining portion and each sheet piece.