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(54) ELEVATOR HOISTWAY DOOR SEPARATION PREVENTIVE STRUCTURE

STRUKTUR ZUR VERMEIDUNG DER TRENNUNG EINER AUFZUGSSCHACHTTÜR

STRUCTURE DE PRÉVENTION DE LA SÉPARATION DE LA PORTE PALIÈRE D'ASCENSEUR

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Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is based on and claims priority from Korean Patent Application No. 2008-0035946, filed on April 18, 2008, in the Korean Intellectual Property Office, the disclosure of which is incorporated herein in its entirety by reference.

BACKGROUND OF THE INVENTION

Field of the invention

[0002] The present invention relates to an elevator hoistway door separation preventive structure, and more particularly to an elevator hoistway door separation preventive structure, which prevents opening of hoistway doors by an external force and accidents caused by such opening of the hoistway doors through reinforcement of a door closure force when the hoistway doors are in a closed state.

Description of the Prior Art

[0003] In general, elevator hoistway doors are installed in places where passengers can make direct contact with the doors rather than any other place of an elevator, and are exposed to passenger's mischief and accidents.

[0004] With reference to FIG. 1, a left door LD and a right door RD are installed in a hoistway portion of an elevator, and upper portions of the left door and the right door are connected to connection plates 400 of a hoistway door device.

[0005] Also, the left door LD and the right door RD have lower portions with respective shoes 100, and a sill 200, in which the shoes 100 are inserted and guided, is installed in the lower portions of the hoistway portion.

[0006] Accordingly, when the left door LD and the right door RD are opened or closed by the driving of the hoistway door device, the door opening or closing operation is performed by operation of the connection plate 400 and guide operation of the shoes 100 and the sill 200.

[0007] That is, the hoistway door device may have a structure in which the hoistway doors are connected together through a wire 300 or the like in the hoistway door device and if one door (e.g. LD) is moved, the other door (e.g. RD), which receives force transferred through the wire 300, is opened or closed, or a structure in which the respective connection plates are driven to operate. When the doors are closed, the upper portions of the doors are fixed to the connection plates 400 which are connected together through the wire 300. However, according to this structure, the doors interlock with each other only when the doors move in the left or right direction, but on the rigidity or mass which supports the doors against pushing and lifting forces that occur when an impact is applied to a lower front surface of one door (e.g. LD), the other door (e.g. RD) exerts no effect.

[0008] Accordingly, as illustrated in FIG. 2, if the door does not have sufficient rigidity when an abnormal impact is applied to the door LD or RD (as indicated by an arrow in FIG. 2) due to an unavoidable accident or the like, the bending of the door occurs greatly, and thus the shoe 100, which serves to guide the lower portion of the door, may be separated from a groove 210 of the sill 200.

[0009] EP 0 559 988 A1 is related to preamble of claim 1.

[0010] JP H03 79583 A shows an elevator door sill with a groove having walls which are inclined towards each other.

SUMMARY OF THE INVENTION

[0011] Accordingly, the present invention has been made to solve the above-mentioned problems occurring in the related art while advantages achieved by the related art are maintained intact.

[0012] One subject to be achieved by the present invention is to provide an elevator hoistway door separation preventive structure, which prevents separation of the sill and hoistway doors without greatly increasing the strength of the hoistway doors to primarily secure a user's safety, and makes it possible for manufacturers to develop an inexpensive structure of the elevator to help the manufacturers.

[0013] According to the present invention, there is provided an elevator hoistway door separation prevention structure having the features of claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The above and other objects, features and advantages of the present invention will be more apparent from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a front view illustrating the structure of a general elevator;

FIG. 2 is a view illustrating hoistway door separating process of an elevator in the related art;

FIG. 3 is a view illustrating an operation state according to a first embodiment ;

FIG. 4 is a view illustrating an operation state according to a second embodiment ;

FIG. 5 is a view illustrating an operation state according to a third embodiment ;

FIG. 6 is a view illustrating an operation state according to a fourth embodiment;

FIG. 7 is a view illustrating an operation state according to a fifth embodiment;

FIG. 8 is a view illustrating an operation state according to a sixth embodiment, which is in accordance with the present invention;

FIG. 9 is a view illustrating an operation state according to a seventh embodiment; and

FIG. 10 is a view illustrating an operation state according to an eighth embodiment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0015] In an elevator hoistway door separation preventive structure including left and right doors having lower portions with respective shoes guided therein and a sill having a groove for guiding the shoes according to an embodiment, a stepped portion is formed on a lower end of the shoe by bending the lower end of the shoes, and a slit is formed on an inner surface of the groove of the sill to correspond to the stepped portion.

[0016] In an elevator hoistway door separation preventive structure including left and right doors having lower portions with respective shoes guided therein and a sill having a groove for guiding the shoes according to an embodiment, a stepped member is welded on a lower side surface of the shoe, and the slit that corresponds to the stepped portion is formed on the inner surface of the sill.

[0017] In an elevator hoistway door separation preventive structure including left and right doors having lower portions with respective shoes guided therein and a sill having a groove for guiding the shoes according to an embodiment, a bolt is fastened to the lower end of the shoe, and the slit that corresponds to the bolt is formed on the inner surface of the groove of the sill.

[0018] In an elevator hoistway door separation preventive structure including left and right doors having lower portions with respective shoes guided therein and a sill having a groove for guiding the shoes according to an embodiment, the stepped portion is formed by bending the lower end of the shoe, a slit is formed by cutting a bottom surface of the groove of the sill, and an inclined portion, which is in contact with the stepped portion, is formed on the end portion of one side of the slit.

[0019] In an elevator hoistway door separation preventive structure including left and right doors having lower portions with respective shoes guided therein and a sill having a groove for guiding the shoes according to an embodiment, a stepped member is formed to project from an outer surface of the lower end of the shoe, an inclined surface is formed on one side of the inner portion of the groove of the sill, and a vertical surface is formed on the other side of the groove, wherein an upper portion of the groove is formed to be narrow and a lower portion of the groove is formed to be wide.

[0020] In an elevator hoistway door separation preventive structure including left and right doors having lower portions with respective shoes guided therein and a sill having a groove for guiding the shoes according to an embodiment, a stepped member is formed to project from the outer surface of the lower end of the shoe, and inclined surfaces are formed on both sides of the inner portion of the groove of the sill in the same direction.

[0021] In an elevator hoistway door separation preventive structure including left and right doors having lower portions with respective shoes guided therein and a sill having a groove for guiding the shoes according to an embodiment, an overlay member having a tetragonal cross section is installed on the outer surface of the lower end of the shoe, wherein if the shoe is bent over a predetermined angle, corners of upper and lower ends of the overlay member are in frictional contact with the groove so that the shoe is not separated from the groove.

[0022] In an elevator hoistway door separation preventive structure including left and right doors having lower portions with respective shoes guided therein and a sill having a groove for guiding the shoes according to an embodiment, the shoe is formed to have a rectangular cross section with a predetermined thickness and to be in close contact with the inner surface of the groove, wherein if the shoe is bent over a predetermined angle, the outer surface of the shoe is in frictional contact with the groove so that the shoe is not separated from the groove.

[0023] Hereinafter, a preferred embodiment will be described in detail with reference to FIG. 8.

[0024] FIG. 3 is a view illustrating an operation state according to a first embodiment.

[0025] As illustrated in FIG. 3, in the first embodiment, an elevator includes left and right doors LD and RD having lower portions in which respective shoes 100 are guided, and a sill 200 having a groove 210 for guiding the shoes 100. In the elevator hoistway door separation preventive structure according to the first embodiment, a stepped portion 110 is formed on the lower end of the shoe 100 by bending the lower end of the shoe 100, and a slit 214 that corresponds to the stepped portion 110 is formed on an inner surface of the groove 210 of the sill 200.

[0026] Accordingly, during a normal operation of the doors, as illustrated on the left side of FIG. 3, the lower stepped portion 110 of the shoe 100 moves along the groove 210 of the sill 200, while if an impact is applied to the door and the shoe 100 is bent to be separated from the groove 210, as illustrated on the right side of the FIG. 3, the lower stepped portion 110 of the shoe 100 is locked on an upper end of the groove 210 of the sill 200 to prevent the separation of the shoe 100 from the groove 210.

[0027] FIG. 4 is a view illustrating an operation state according to a second embodiment.

[0028] As illustrated in FIG. 4, in the second embodiment, the elevator includes left and right doors LD and RD having lower portions in which respective shoes 100 are guided, and a sill 200 having a groove 210 for guiding the shoes 100. In the elevator hoistway door separation preventive structure according to the second embodiment, a stepped member 120 is welded on a lower side surface of the shoe 100, and the slit 214 that corresponds to the stepped portion 120 is formed on the inner surface of the groove 210 of the sill 200.

[0029] Accordingly, during a normal operation of the doors, as illustrated on the left side of FIG. 4, the stepped

member 120 of the shoe 100 moves along the groove 210 of the sill 200, while if an impact is applied to the door and the shoe 100 is bent to be separated from the groove 210, as illustrated on the right side of FIG. 4, the stepped member 120 fits into the groove 210 of the sill 200 to prevent the separation of the shoe 100 from the groove 210.

[0030] FIG. 5 is a view illustrating an operation state according to a third embodiment.

[0031] As illustrated in FIG. 5, in the third embodiment, the elevator includes left and right doors LD and RD having lower portions in which respective shoes 100 are guided, and a sill 200 having a groove 210 for guiding the shoes 100. In the elevator hoistway door separation preventive structure according to the third embodiment, a bolt 130 is fastened to the lower end of the shoe 100, and the slit 214 that corresponds to the bolt 130 is formed on the inner surface of the groove 210 of the sill 200.

[0032] The bolt 130 is formed so that its head portion is in close contact with and is fastened to the right surface of the lower end of the shoe 100 and its end portion has a length as long as it is not inserted into the slit 214.

[0033] Accordingly, during a normal operation of the doors, as illustrated on the left side of FIG. 5, the end portion of the bolt 130 of the shoe 100 moves along the groove 210 of the sill 200, while if an impact is applied to the door and the shoe 100 is bent to be separated from the groove 210, as illustrated on the right side of FIG. 5, the end portion of the bolt 130 of shoe 100 fits into the groove 210 of the sill 200 to prevent the separation of the shoe 100 from the groove 210.

[0034] FIG. 6 is a view illustrating an operation state according to a fourth embodiment.

[0035] As illustrated in FIG. 6, in the fourth embodiment, the elevator includes left and right doors LD and RD having lower portions in which respective shoes 100 are guided, and a sill 200 having a groove 210 for guiding the shoes 100. In the elevator hoistway door separation preventive structure according to the fourth embodiment, the stepped portion 110 is formed by bending the lower end of the shoe 100, a slit 214a is formed by cutting a bottom surface of the groove 210 of the sill 200 in a length direction, and an inclined portion 215, which is in contact with the stepped portion 110, is formed on the end portion of one side of the slit 214a.

[0036] Accordingly, during a normal operation of the doors, as illustrated on the left side of FIG. 6, the end portion of the stepped portion 110 of the shoe 100 moves along the groove 210 and the slit 214a of the sill 200, while if an impact is applied to the door and the shoe 100 is bent to be separated from the groove 210, as illustrated on the right side of FIG. 6, the end portion of the stepped portion 110 of the shoe 100 is locked on the inclined portion 215 of the silt 214a to prevent the separation of the shoe 100 from the groove 210.

[0037] FIG. 7 is a view illustrating an operation state according to a fifth embodiment.

[0038] As illustrated in FIG. 7, in the fifth embodiment, the elevator includes left and right doors LD and RD having lower portions in which respective shoes 100 are guided, and a sill 200 having a groove 210 for guiding the shoes 100. In the elevator hoistway door separation preventive structure according to the fifth embodiment, a stepped member 120 is formed to project from an outer surface of the lower end of the shoe 100, an inclined surface 216 is formed on one side of the inner portion of the groove 210 of the sill 200, and a vertical surface 217 is formed on the other side of the groove 210, wherein an upper portion of the groove 210 is formed to be narrow and a lower portion of the groove 210 is formed to be wide.

[0039] Accordingly, during a normal operation of the doors, as illustrated on the left side of FIG. 7, the stepped member 120 of the shoe 100 moves along the groove 210 of the sill 200, while if an impact is applied to the door and the shoe 100 is bent to be separated from the groove 210, as illustrated on the right side of FIG. 7, the stepped member 120 of the shoe 100 is locked on the inclined surface 216 of the groove 210 to prevent the separation of the shoe 100 from the groove 210.

[0040] FIG. 8 is a view illustrating an operation state according to a sixth embodiment, which is in accordance with the present invention.

[0041] As illustrated in FIG. 8, in the sixth embodiment, which is in accordance with the present invention, the elevator includes left and right doors LD and RD having lower portions in which respective shoes 100 are guided, and a sill 200 having a groove 210 for guiding the shoes 100. In the elevator hoistway door separation preventive structure according to the sixth embodiment, a stepped member 130 is formed to project from the outer surface of the lower end of the shoe 100, and inclined surfaces 216a and 216b are formed on both sides of the inner portion of the groove 210 of the sill 200 in the same direction.

[0042] Accordingly, during a normal operation of the doors, as illustrated on the left side of FIG. 8, the stepped member 130 of the shoe 100 moves along the groove 210 of the sill 200, while if an impact is applied to the door and the shoe 100 is bent to be separated from the groove 210, as illustrated on the right side of FIG. 8, the stepped member 130 of the shoe 100 is locked on the inclined surface 216a of the groove 210 to prevent the separation of the shoe 100 from the groove 210.

[0043] FIG. 9 is a view illustrating an operation state according to a seventh embodiment.

[0044] As illustrated in FIG. 9, in the seventh embodiment, the elevator includes left and right doors LD and RD having lower portions in which respective shoes 100 are guided, and a sill 200 having a groove 210 for guiding the shoes 100. In the elevator hoistway door separation preventive structure according to the seventh embodiment, an overlay member 150 having a tetragonal cross section is installed on the outer surface of the lower end of the shoe 100, wherein if the shoe 100 is bent over a predetermined angle, corners of upper and lower ends of the overlay member 150 are in frictional contact with

the groove 210 so that the shoe 100 is not separated from the groove 210.

[0045] Accordingly, during a normal operation of the doors, as illustrated on the left side of FIG. 9, the overlay member 150 of the shoe 100 moves along the groove 210 of the sill 200, while if an impact is applied to the door and the shoe 100 is bent to be separated from the groove 210, as illustrated on the right side of FIG. 9, the corners of the upper and lower ends of the overlay member 150 is locked on the inner surface of the groove 210 to prevent the separation of the shoe 100 from the groove 210.

[0046] FIG. 10 is a view illustrating an operation state according to an eighth embodiment.

[0047] As illustrated in FIG. 10, in the eighth embodiment, the elevator includes left and right doors LD and RD having lower portions in which respective shoes 100 are guided, and a sill 200 having a groove 210 for guiding the shoes 100. In the elevator hoistway door separation preventive structure according to the eighth embodiment, the shoe 100 is formed to have a rectangular cross section with a predetermined thickness and to be in close contact with the inner surface of the groove 210, wherein if the shoe 100 is bent over a predetermined angle, the outer surface of the shoe 100 is in frictional contact with the groove 210 so that the shoe is not separated from the groove.

[0048] Accordingly, during a normal operation of the doors, as illustrated on the left side of FIG. 10, the shoe 100 moves along the groove 210 of the sill 200, while if an impact is applied to the door and the shoe 100 is bent to be separated from the groove 210, as illustrated on the right side of FIG. 10, the corners of the lower ends of one surface and the other surface of the shoe 100 are locked on the inner surface of the groove 210 to prevent the separation of the shoe 100 from the groove 210.

[0049] Although a preferred embodiment of the present invention has been described for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope of the invention as disclosed in the accompanying claim.

Claims

1. An elevator hoistway door separation preventive structure including left and right doors having lower portions with respective shoes (100) installed therein and a sill (200) having a groove (210) for guiding the shoes, wherein a stepped member (130) is formed to project from the outer surface of the lower end of the shoe, **characterised in that** inclined surfaces (216a, 216b) are formed on both sides of the inner portion of the groove of the sill in the same direction.

Patentansprüche

1. Trennverhinderungseinrichtung für eine Aufzugsschachttür, umfassend eine linke und eine rechte Türe, deren untere Abschnitte mit entsprechenden Schienen (100) versehen sind, und eine Schwelle (200) mit einer Nut (210) zum Führen der Schienen, wobei ein abgestuftes Element (130) so gebildet ist, dass es von der Außenfläche des unteren Endes der Schienen vorsteht, **dadurch gekennzeichnet, dass** geneigte Flächen (216a, 216b) auf beiden Seiten des inneren Abschnitts der Nut von der Schwelle in derselben Richtung gebildet sind.

Revendications

1. Structure de prévention de séparation de porte palière d'ascenseur comprenant des portes droite et gauche présentant des parties inférieures avec des sabots respectifs (100) installés dans celles-ci et un seuil (200) présentant une rainure (210) pour guider les sabots, dans laquelle un élément étagé (130) est formé pour faire saillie depuis la surface extérieure de l'extrémité inférieure du sabot, **caractérisée en ce que** des surfaces inclinées (216a, 216b) sont formées, dans la même direction, sur les deux côtés de la partie intérieure de la rainure du seuil.

FIG. 1

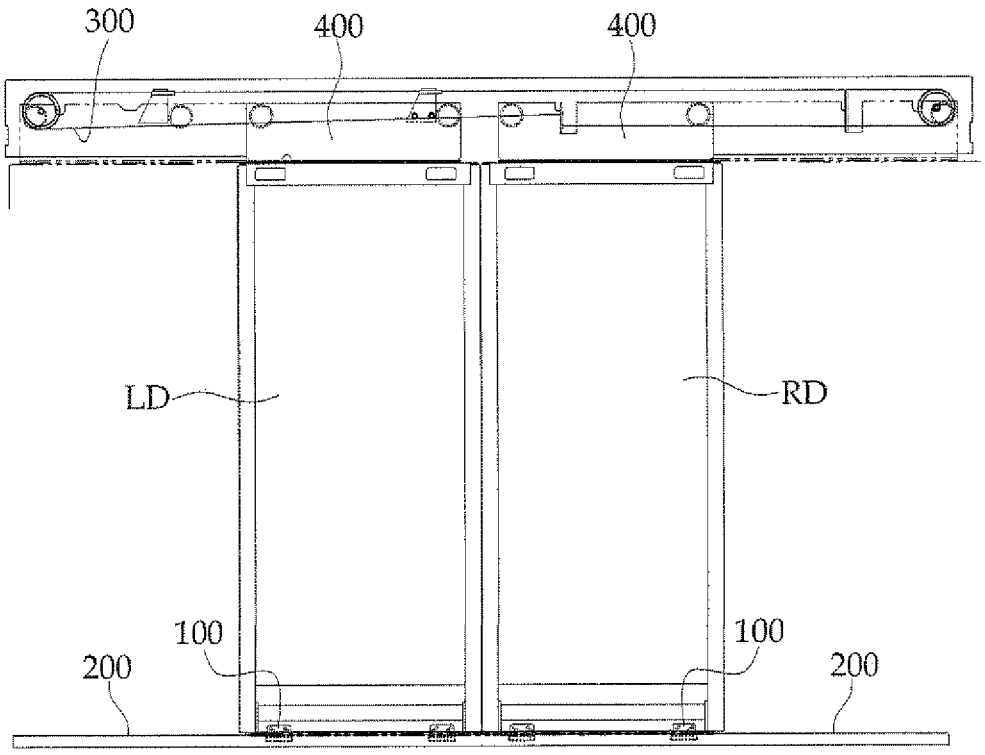


FIG. 2

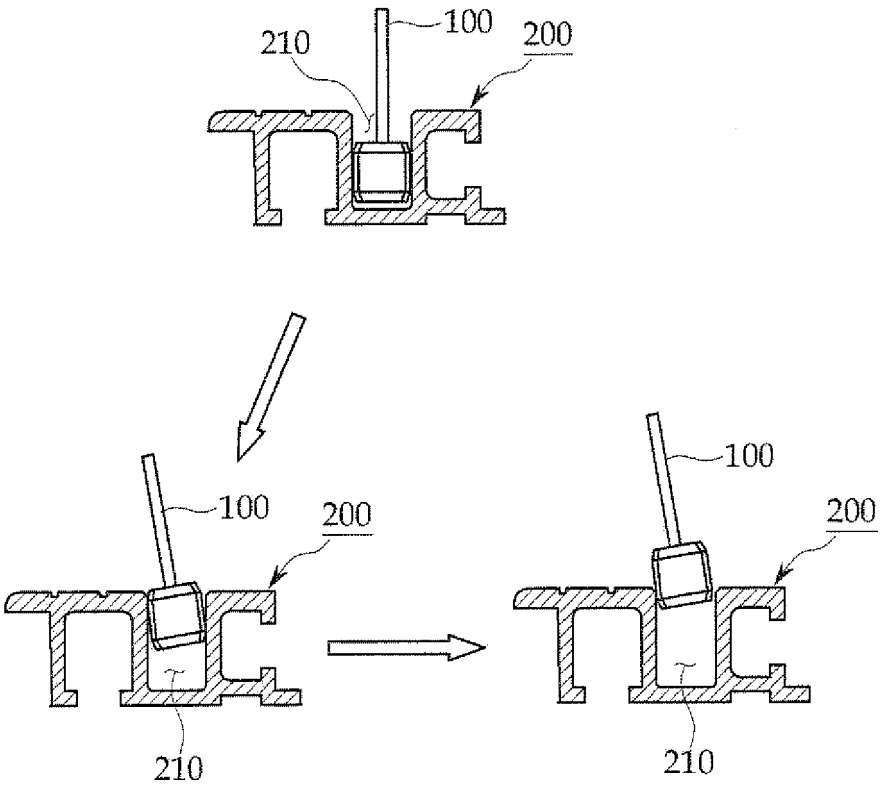


FIG. 3

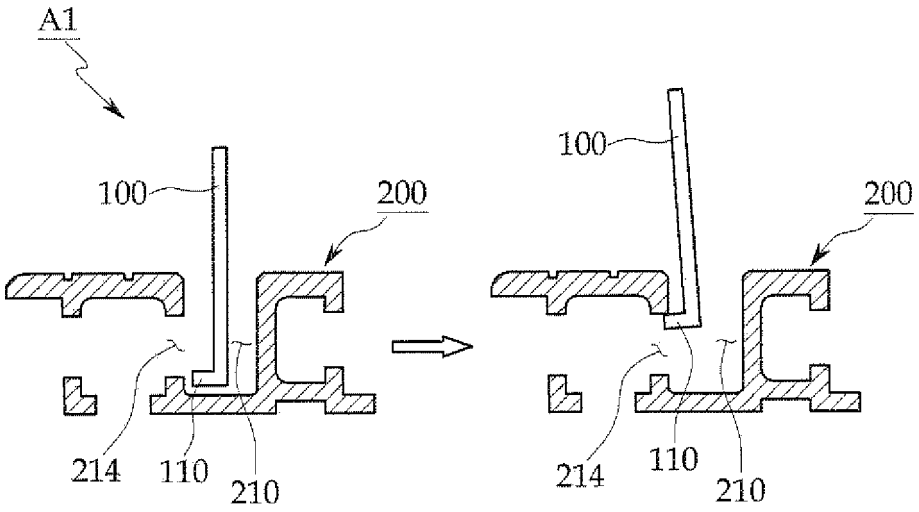

A1
100
200
214
110
210
100
200
214
110
210

FIG. 4

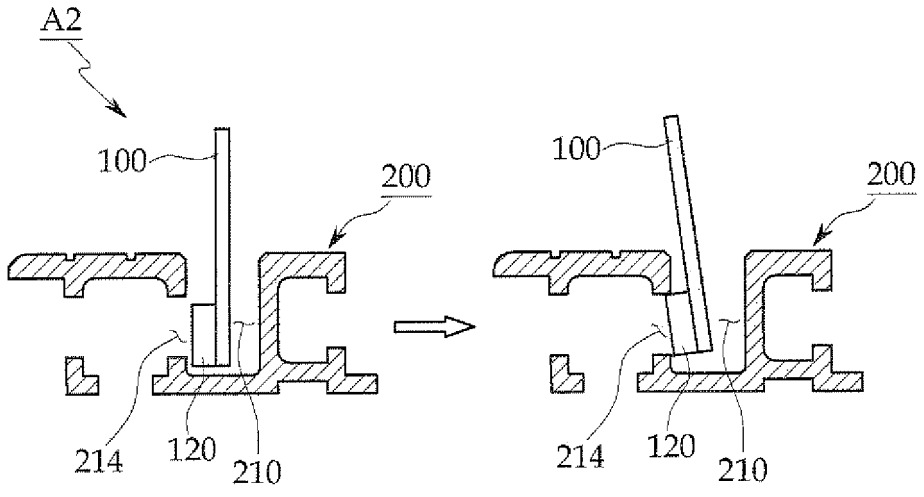

A2
100
200
214
120
210
100
200
214
120
210

FIG. 5

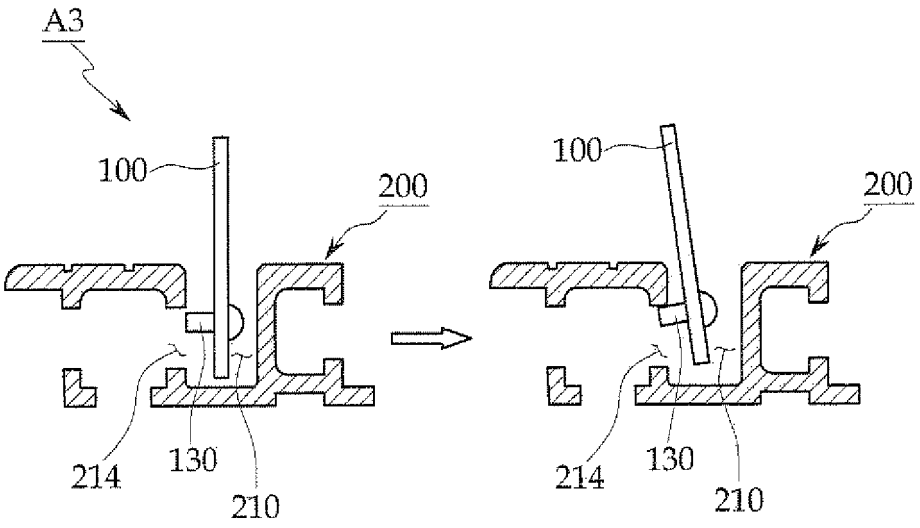

A3
100
200
214
130
210
100
200
214
130
210

FIG. 6

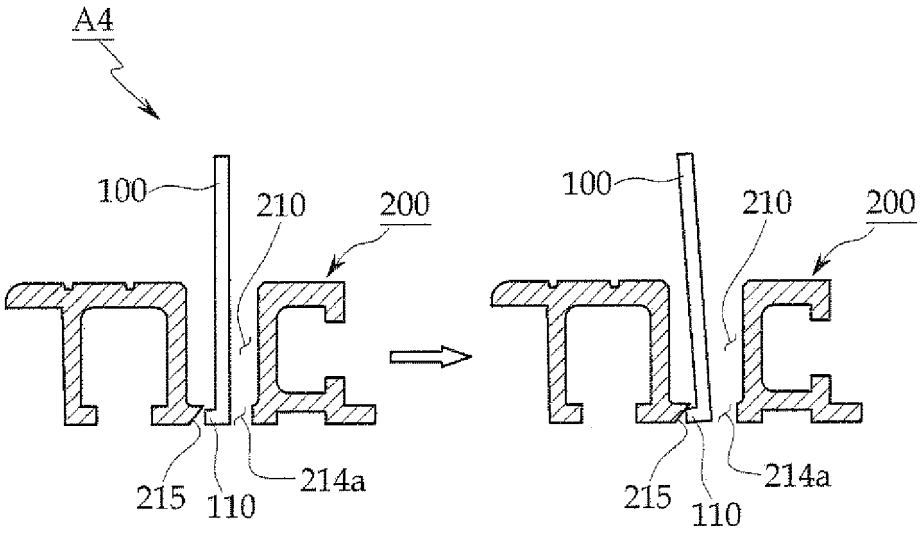

A4
100
210
200
215
110
214a
100
210
200
215
110
214a

FIG. 7

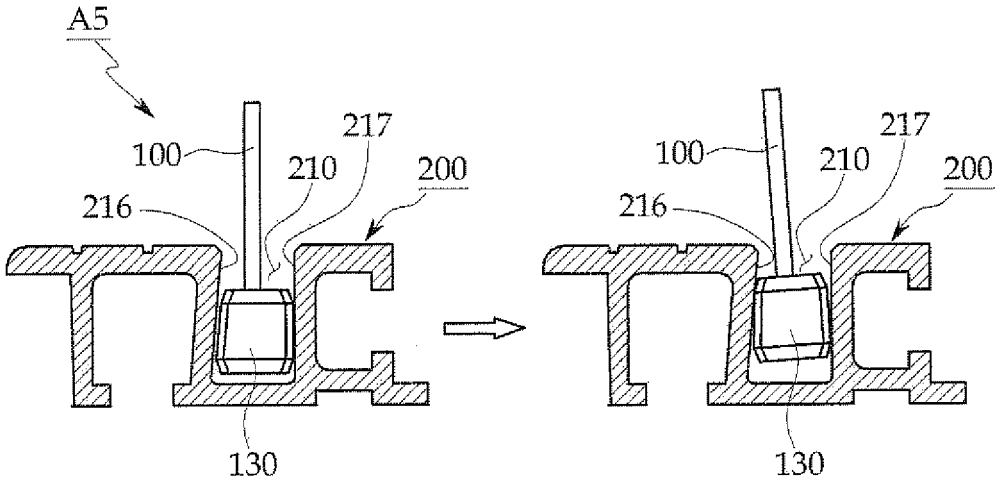

A5
100
217
210
200
216
130
100
217
210
200
216
130

FIG. 8

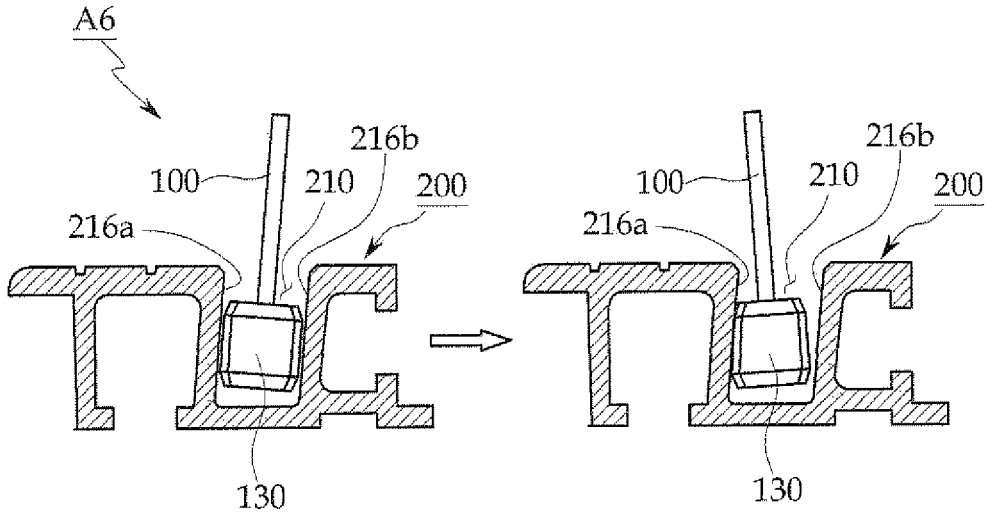

A6
100
216b
210
200
216a
130
100
216b
210
200
216a
130

FIG. 9

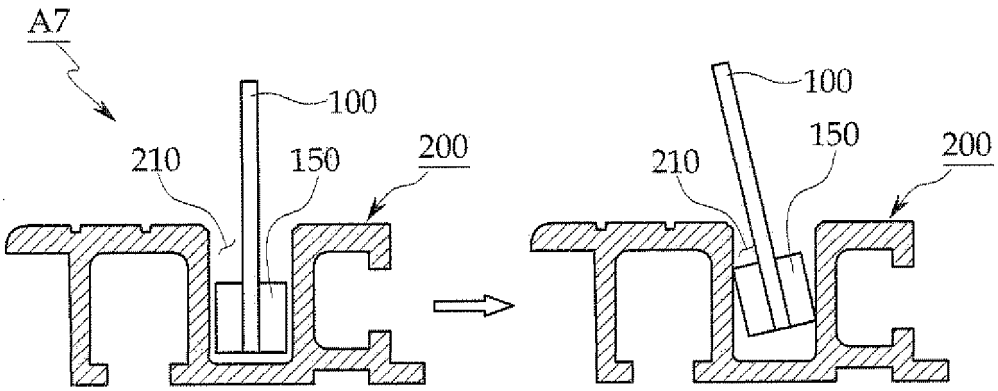
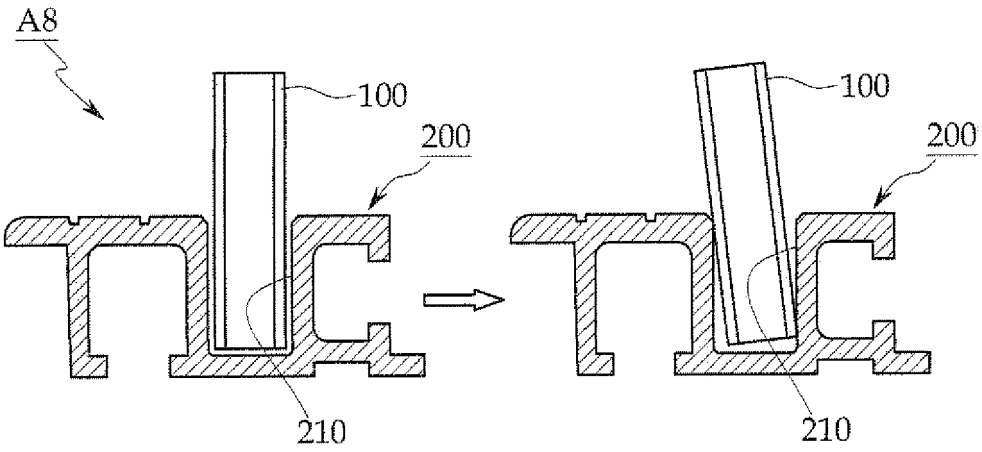


FIG. 10



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- EP 0559988 A1 **[0009]**
- JP H0379583 A **[0010]**