The elevator pit ladder structure with a safety switch according to the above aspect also may be configured such that a catch slot as a notch portion is formed at upper ends of the two guide rails, and the ladder is provided, at a position closer to the other end side than the plurality of tread portions, with a locking portion as the short side for connecting the two long sides, the locking portion being engaged in the catch slot in the storage state.

According to another aspect, the utility model relates to an elevator having an elevator pit ladder structure as claimed in any of the above aspects.

The elevator pit ladder structure with a safety switch as configured above and the elevator having the same elevator pit ladder structure with a safety switch have the advantages of being convenient to use and enhancing the safety.

Description of the Drawings

FIG. 1 is a view showing the ladder in usage state having the elevator pit ladder structure according to the present utility model.

FIG. 2 is a view showing the ladder in storage state having the elevator pit ladder structure according to the present utility model.

FIG. 3 is an enlarged view of a portion surrounded by a circle in FIG. 2, illustrating the ladder, the support mechanism, and the safety switch when the ladder having the elevator pit ladder structure according to the present utility model is about to be in a storage state.

FIG. 4 is an enlarged view of a portion surrounded by a circle in FIG. 2, illustrating the ladder, the support mechanism, and the safety switch when the ladder having the elevator pit ladder structure according to the present utility model has been in the storage state.

Embodiments

Hereinafter, the elevator pit ladder structure according to the present utility model will be described in detail with reference to the accompanying drawings.

FIG. 1 is a view showing the ladder in usage state having the elevator pit ladder structure according to the present utility model. FIG. 2 is a view showing the ladder in storage state having the elevator pit ladder structure according to the present utility model.

As shown in FIG. 1, the elevator is provided with a pit 11 at the bottom of the hoistway, and a hoistway wall 12 at one side has a pit port 10 for enabling the maintenance personnel to enter and exit the pit. The elevator pit ladder structure with a safety switch according to the present utility model is arranged in the pit 11.

Roughly speaking, the elevator pit ladder structure with a safety switch according to the present utility model comprises a ladder 2, a support mechanism 3, and a safety switch 4.

Next, the structures of the ladder 2, the support mechanism 3, and the safety switch 4 will be described in detail with reference to the drawings.

As shown in FIG. 1, the ladder 2 comprises two long sides 21 extending in parallel with each other in a predetermined direction; and a plurality of tread portions 22 that are connected between the two long sides vertically to the two long sides 21 and are disposed along an extension direction of the two long sides 21 at a predetermined interval that can be spanned by legs of a person.

As shown in FIGS. 1 and 2, the ladder 2 can be set to have a usage state and a storage state. FIG. 1 illustrates the usage state, in which one end (lower end) of the ladder 2 in the extension direction is placed at the bottom of the pit 11, and the other end (upper end) opposite the one end in the extension direction is laid on the lower edge of the pit port 10. In this case, the maintenance personnel can climb down the ladder 2 and enter the pit 11.

In addition, in the usage state shown in FIG. 1, a part of the upper end of the ladder 2 as the other end projects out from the pit port, that is, the ladder 2 has a projecting part that protrudes into the pit port 10. The projecting part acts as a handrail when the maintenance personnel start to step on the ladder 2.

In addition, in the usage state shown in FIG. 1, the ladder 2 in the usage state is inclined in such a way of going away from the hoistway wall 12 provided with the pit port 10 towards a lower end side as one end side (bottom side of the pit) from an upper end side as the other end side (port side of the pit).

Further, the ladder 2 is provided with hooks 24 on the upper end side as the other end side, and in the usage state, the hooks are coupled to the lading door dill, thereby firmly maintaining the inclined state of the ladder 2. However, the specific installation position of the hooks is not limited to the illustrated case, and it is only necessary to dispose the hooks on the ladder 2 side to maintain the ladder 2 in such a state in which the other end (upper end) is laid on the lower edge of the pit port.

Further, the ladder 2 is provided, at a position closer to the other end side (upper end side) than the plurality of tread portions 22, with a short side that connects the two long sides, the short side acting as a locking portion 23 that stably supports the ladder in the storage state. The locking portion 23 as the short side may have substantially the same configuration as the plurality of tread portions 22.

As shown in FIG. 2, the support mechanism 3 of the elevator pit ladder structure according to the utility model is secured to the hoistway wall 13 adjacent to the pit port, and supports the ladder 2 in the storage state.

In the storage state shown by FIG. 2, the ladder 2 is removed from the pit port 10 and is supported on the hoistway wall 13 adjacent to the hoistway wall 12 provided with the pit port 10, in particular supported at a position of the hoistway wall 13 in close proximity to the pit port 10, wherein the proximity degree to the pit port 10 is such an extent that the

CLAIMS

1. An elevator pit ladder structure with a safety switch, characterized in that,

the elevator pit ladder structure has a ladder, the ladder comprising: two long sides extending in parallel with each other in a predetermined direction; and a plurality of tread portions that are connected between the two long sides vertically to the two long sides and are disposed at a predetermined interval along an extension direction of the two long sides,

the ladder is set to have a usage state and a storage state, wherein in the usage state, one end of the ladder in the extension direction is placed at the bottom of the pit, while the other end opposite to the one end in the extension direction is laid on the lower edge of a pit port, so the ladder is in a state enabling the user to climb; in the storage state the ladder is removed from the pit port and is supported at a position of a second hoistway wall close to the pit port, the second hoistway wall being adjacent to a first hoistway wall provided with the pit port,

the elevator pit ladder structure further comprises:

a support mechanism fixed to the second hoistway wall for supporting the ladder in the storage state, and

a safety switch that is turned on in accordance with the ladder being supported on the support mechanism to operate the elevator, and is turned off in accordance with the ladder being removed from the support mechanism to stop operation of the elevator,

in the usage state, the ladder is inclined in such a way of going away from the first hoistway wall towards one end side, i.e., bottom side of the pit, from the other end side, i.e., port side of the pit.

2. The elevator pit ladder structure with a safety switch as claimed in claim 1, characterized in that,

the safety switch comprises:

a switch casing mounted to the support mechanism; and

a switch connector mounted to the ladder,

the switch connector being connected with the switch casing to turn on the safety switch when the ladder is supported by the support mechanism, the switch connector being separated from the switch casing to turn off the safety switch when the ladder is removed from the support mechanism.

3. The elevator pit ladder structure with a safety switch as claimed in claim 1, characterized in that,

in the usage state, a portion of the other end of the ladder is exposed to the pit port.

4. The elevator pit ladder structure with a safety switch as claimed in claim 1, characterized in that,

in the storage state, the ladder is supported vertically and close to the second hoistway wall.

5. The elevator pit ladder structure with a safety switch as claimed in claim 1, characterized in that,

the ladder is provided, on the other end side, with a hook that is connected to a lading door dill in the usage state.

6. The elevator pit ladder structure with a safety switch as claimed in claim 1, characterized in that,

the support mechanism is a fixing holder, and the ladder is supported by hanging on the fixing holder in the storage state.

7. The elevator pit ladder structure with a safety switch as claimed in claim 6, characterized in that,

the fixing holder is formed with two guide rails extending in the up and down direction, and the inner sides of the two long sides slide on the two guide rails when the ladder is hung on the fixing holder, so that the ladder is guided.

8. The elevator pit ladder structure with a safety switch as claimed in claim 7, characterized in that,

a catch slot as a notch portion is formed at upper ends of the two guide rails,

the ladder is provided, at a position closer to the other end side than the plurality of tread portions, with a locking portion as the short side that connects the two long sides,

the locking portion is engaged in the catch slot in the storage state.

9. An elevator, characterized by comprising an elevator pit ladder structure as claimed in any one of claims 1-8.