

Description

The present invention relates to a telescopic elevator door assembly.

Conventional elevator telescopic two-speed doors use two panels, two tracks, four rollers and four counterrollers. In the case of four panel two-speed centre opening door, the situation is the same but with double the elements.

These systems which use two tracks have various inconveniences, among which the following can be cited:

- It is difficult to accurately position both tracks;
- special fastenings for connecting each track to the door frame are necessary;

- high costs are involved;

- the tracks normally require special machining, welding and special fasteners;

- the rollers and counterrollers are mounted on overhanging supporting shafts with poor stiffness due to space and cost constraints, and

- the perpendicularity and accurate positioning of the supporting shafts are very difficult to achieve and adjustments are always needed.

Also, these systems lead to jerk and can cause distortion in the perpendicularity of the roller and counterroller shafts.

In any case the conventional prior art systems are very complex, heavy and voluminous, creating problems of misalignment and requiring unstable adjustments and have, in general terms, extremely weak connections between the overhanging roller shafts and the hanging support of the door.

Each one of these factors contributes to producing jerks and noise during movement of the door panels, finally, giving rise to deterioration of the rollers and even, the tracks.

Further, the door lintel on which the tracks have to be fastened must have flat support points to form exact reference points for the tracks, in at least three points. Also, it is necessary to use separators to fasten and install the two tracks in their position.

Above mentioned drawbacks are solved in US-A-4 073 034 disclosing a telescopic door assembly having a single common track. This solution, however, has the disadvantage that, the rolling parts are not protected against dust and dirt which is a major problem in elevators, as the environment is very dirty and difficult to clean, and the repair and cleaning of rollers damaged by dust is very hard to effect due to their inaccessibility.

All of the above leads to problems of quality, to the need to make adjustments, and to overdimensioning, causing the cost of manufacturing and installation of the system to be very high.

The present invention aims to overcome the above problems by providing a telescopic elevator

door assembly in which both the high and low speed doors are mounted on a single common track, the doors sliding along said track by means of roller assemblies, characterised in that said roller assemblies each comprise a housing connected to one of said doors and rolling means mounted within and surrounded by said housing, said track extending through said housing, and said rolling means running on said track.

Thus, as the rolling means are mounted in the housing, they are protected from dirt and dust, and are also held in a set position so that when the whole assembly is connected to a door the rolling means automatically take up their correct position which means that no adjustments are required. Moreover, by using such rolling means with a single track, a sub-assembly can be formed of the roller assemblies and track, which can be placed in the door lintel without the need for complicated alignment procedures.

The rolling assembly can have many different embodiments compatible with the type of track chosen, each of which provide stiff shafts or supports for rolling elements of the rolling means.

The rolling elements themselves may comprise a roller and counterroller mounted in said housing and having guide flanges which engage the track over which they roll or slide. The housing may be formed by two cups facing each other and fastened to one another by means of transversal pins, which may be threaded and may not only form the fastening means of both cups, but also the fastening means of the device to the hanger support of the door, as well as the axles for the rolling elements themselves which roll along the track.

On the other hand, the rolling elements could consist of a non-flanged roller guided and supported at the top on the track, a bottom counterroller, and a set of side rollers, or even convex contact surfaces running along both sides of the track.

Another alternative rolling element for use with a track of circular cross-section consists of a set of linear ball bearings mounted circumferentially around the track.

Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which;

Figure 1 shows a front view of the top part of the two doors of an elevator, which hang from corresponding hanging supports.

Figures 2, 3, 4 and 5 show various embodiments in cross-section of the rolling device itself, but with the common feature that the track is formed by a single piece lodged, along with the rest of the rolling elements, in a box or housing duly fastened to the hanging support of the door.

As shown in Figure 1, high and low speed doors 1 and 2 respectively, are connected to a corresponding hauling cable 3 from which a counterweight 4 hangs.

The sliding track of both doors 1 and 2 is made up of a single common element 5, which may have different forms as far as its cross-section is concerned. The rolling elements of both the high-speed panel 2 and low-speed panel 1 slide over this track 5.

The hanging support 6 of the slow-speed panel or door 2 is longer than the hanging support 7 of the high-speed panel or door 1, making it possible to leave a free area in the central part of the track 5 to situate said hanging support 7 therein. Thus, the two high speed rolling elements are positioned on the track between the two low speed door rolling elements. In order to allow the two doors to telescope into the space to the right of Figure 1 such that the doorway is fully open without an edge of the high speed door projecting out further than the low speed door 2, the distance D between the two right-hand rolling elements must be longer than half the total opening width of the door. Such a single track system is disclosed in our co-pending application, of even date herewith, entitled "A Telescopic Door Assembly".

On the basis of this concept of a sole track 5, all the separators and fastening means which are typical in two-speed doors are eliminated, with the particular feature that the track 5 need only be supported by its end parts in a very simple friction device, which completely avoids any mechanization of the same.

The rolling unit itself, may use linear ball bearings 8 for a circular section track 5' shown in Figure 4, while for a rectangular section track 5 further constructions as shown in Figures 2, 3 and 5, can be used.

The rectangular section track 5 is specifically shown in Figure 2, as well as the corresponding hanger support 7 of the door. The rolling unit is made up of a housing formed by two halves or cups 9 facing each other, inside of which are a top roller 10 that rests on the longitudinal top edge of the track 5 and a bottom counterroller 11 which lies below the longitudinal bottom edge of the track 5. Thus the traditional overhanging shape of a conventional rolling assembly can be eliminated. Also the stiffness of the connections between the rolling assembly and the hanger support are increased and, at the same time, the depositing of dust and dirt, etc. on the movable elements is avoided.

Moreover, the roller and counterroller are held in position by the housing and so there is no need to make any adjustments to them when the housing is attached to the door as they will automatically be in their correct alignment.

The two cups or halves 9 which form the housing of the rolling unit remain fastened to each other by screws 12 which, aside from being the fastening means of the roller 10 and counterroller 11, form the fastening means of the rolling unit to the hanger support 7.

An alternative embodiment of the rolling unit is shown in Figure 3, where the case is again formed by opposing semi-enveloping cases or cups 9' fastened together, and to the hanger support 7, by means of screws 12'. However, in this case the profiled rollers have been replaced by side friction rollers or wheels 13, which collaborate in the guiding of the non-profiled roller 10' in its sliding over the top edge of the track 5.

A similar embodiment to the one shown in Figure 3 is shown in Figure 5, but the particular feature in this case is that the side friction wheels 13 of Figure 3 have been replaced by some curvo-convex surface pieces 13' which are inexpensive to manufacture, easy to replace, and offer reduced friction over the side rollers 13.

In all of the embodiments, the housing may have additional protection for fireproof doors without complicating the structure of the unit.

Finally, as has been mentioned already, when the track 5' has a circular section, as shown in Figure 4, the rolling elements may be made up of linear ball bearings 8 protected by a case 9" which likewise fastens to the hanger support 7 by means of corresponding screws 12".

According to what has been described it is possible to substantially reduce the number of pieces of the door unit, given that it is possible to prepare a special sub-unit comprising the track, the rolling units and the hanger supports. It being possible to assemble the same together at the factory without having to worry about any alignment problems.

Claims

1. A telescopic elevator door assembly in which high and low speed doors (1,2) are mounted on a single common track (5,5'), the doors sliding along said track (5,5') by means of roller assemblies, characterised in that said roller assemblies each comprise a housing (9,9',9'') connected to one of said doors, and rolling means (8,10,10',11) mounted within said housing (9,9',9''), said rolling means (8,10,10',11) running along said track (5,5') which extends through said housing (9,9',9''), said housing (9,9',9'') surrounding said rolling means (8,10,10',11).
2. An elevator door assembly according to claim 1, wherein said rolling means (10,10',11) com-



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2. An elevator door assembly according to claim 1, wherein said rolling means (10,10',11) com-



prises a roller (10,10') which runs along the top edge of said track (5), and a counterroller (11) positioned below said track.

3. An elevator door assembly according to claim 2, wherein said rolling assemblies are connected to said doors (1,2) by means of the axles of said roller (10,10') and counterroller (11).

4. An elevator door assembly according to claim 3, wherein said roller (10) has profiled edges which engage with the sides of said track (5) to guide said assemblies therealong.

5. An elevator door assembly according to claim 3, wherein guide rollers (13) are provided within said housing (9'), each side of said track (5), for guiding said assemblies therealong.

6. An elevator door assembly according to claim 3, wherein guide surfaces (13') are provided within said housings (9'), said surfaces being convex to the sides of said track (5) and contacting therewith to guide said assemblies therealong.

7. An elevator door assembly according to any of claims 3 to 4, wherein said housing (9) comprises a pair of opposed substantially U-shaped cup members, said cup members being held together by said axles.

8. An elevator door assembly according to claim 5 or 6, wherein said housing (9') comprises two sets of substantially U-shaped cup members, one set enclosing said roller (10') and being held together by the roller axle and the other set enclosing said counterroller (11) and being held together by the counterroller axle.

9. An elevator door assembly according to claim 1, wherein said track (5') is substantially circular in cross-section and said rolling means (8) comprises a set of linear ball bearings encircling said track (5').

Patentansprüche

1. Teleskopische Aufzugstüranordnung, bei der eine Türe für eine hohe Geschwindigkeit und eine Türe für eine niedrige Geschwindigkeit (1,2) an einer einzelnen, gemeinsamen Bahn (5,5') angebracht sind, wobei die Türen entlang der Bahn (5,5') mittels Rollanordnungen laufen, dadurch gekennzeichnet, daß die Rollanordnungen je ein mit einer der Türen verbundenes Gehäuse (9,9',9'') und in

dem Gehäuse (9,9',9'') angeordnet eine Rolleinrichtung (8,10,10',11) aufweisen, die entlang der Bahn (5,5') läuft, die durch das die Rolleinrichtung (8,10,10',11) umgebende Gehäuse (9,9',9'') ragt.

2. Aufzugstüranordnung nach Anspruch 1, bei der die Rolleinrichtung (10,10',11) eine Rolle (10,10'), die entlang der oberen Begrenzung der Bahn (5) läuft, und eine Gegenrolle (11) aufweist, die unter der Bahn angeordnet ist.

3. Aufzugstüranordnung nach Anspruch 2, bei der die Rollanordnungen mit den Türen (1,2) mittels der Achsen von Rolle (10,10') und Gegenrolle (11) verbunden sind.

4. Aufzugstüranordnung nach Anspruch 3, bei der die Rolle (10) profilierte Ränder hat, die mit den Seiten der Bahn (5) zusammenwirken, um die Anordnungen daran entlang zu führen.

5. Aufzugstüranordnung nach Anspruch 3, bei der Führungsrollen (13) in dem Gehäuse (9') an jeder Seite der Bahn (5) vorgesehen sind, um die Anordnungen daran entlang zu führen.

6. Aufzugstüranordnung nach Anspruch 3, bei der Führungsflächen (13') in den Gehäusen (9') vorgesehen sind, wobei die Oberflächen zu den Seiten der Bahn (5) hin ausgewölbt sind und mit diesen in Berührung sind, um die Anordnung daran entlang zu führen.

7. Aufzugstüranordnung nach einem der Ansprüche 3 bis 4, bei der das Gehäuse (9) ein Paar von gegenüberliegenden, im wesentlichen U-förmigen Schalenbauteilen aufweist, die durch die Achsen zusammengehalten sind.

8. Aufzugstüranordnung nach Anspruch 5 oder 6, bei der das Gehäuse (9) zwei Sätze vom im wesentlichen U-förmigen Schalenbauteilen aufweist, wobei ein Satz die Rolle (10') einschließt und durch die Rollenachse zusammengehalten ist und der andere Satz die Gegenrolle (11) einschließt und durch die Gegenrollenachse zusammengehalten ist.

9. Aufzugstüranordnung nach Anspruch 1, bei der die Bahn (5') im Querschnitt im wesentlichen rund ist, und die Rolleinrichtung (8) die Bahn (5') umgebend einen Satz von Linearkugellagern aufweist.



Revendications

1. Construction de porte d'ascenseur dans laquelle les portes à grande et petite vitesse (1,2) sont montées sur une voie de roulement unique (5,5'), les portes glissant le long de ladite voie de roulement (5,5') au moyen d'ensembles de roulement, caractérisée en ce que lesdits ensembles de roulement comprennent chacun un habitacle (9,9',9'') relié à une desdites portes, lesdits moyens de roulement (8,10,10',11) parcourant ladite voie de roulement (5,5') qui s'étend à travers ledit habitacle (9,9',9''), ledit habitacle (9,9',9'') entourant lesdits moyens de roulement (8,10,10',11). 5 10 15
2. Construction de porte d'ascenseur selon la Revendication 1, dans laquelle lesdits moyens de roulement (10,10',10'') comprennent un roulement (10,10') qui parcourt le bord supérieur de ladite voie de roulement (5), et un contre-roulement (11) positionné sous ladite voie de roulement. 20
3. Construction de porte d'ascenseur selon la Revendication 2, dans laquelle lesdits ensembles de roulement sont reliés auxdites portes (1,2) au moyen des axes dudit roulement (10,10') et du contre-roulement (11). 25 30
4. Construction de porte d'ascenseur selon la Revendication 3, dans laquelle ledit roulement (10) a des bords profilés qui s'enclenchent sur les côtés de ladite voie de roulement (5) pour le guidage longitudinal desdits ensembles de roulement. 35
5. Construction de porte d'ascenseur selon la Revendication 3, dans laquelle lesdits roulements de guidage (13) sont disposés à l'intérieur dudit habitacle (9'), de chaque côté de ladite voie de roulement (5) pour le guidage longitudinal desdits ensembles de roulement. 40
6. Construction de porte d'ascenseur selon la Revendication 3, dans laquelle lesdites surfaces de guidage (13') sont disposées à l'intérieur desdits habitacles (9'), lesdites surfaces étant convexes vers les côtés de ladite voie de roulement (5) et en contact avec elle pour le guidage longitudinal desdits ensembles de roulement. 45 50
7. Construction de porte d'ascenseur selon l'une quelconque des Revendications 3 à 4, dans laquelle ledit habitacle (9) comprend une paire d'éléments coupelles opposés sensiblement en forme de U, lesdits éléments coupelles 55

étant fixés ensemble par lesdits axes.

8. Construction de porte d'ascenseur selon la Revendication 5 ou 6, dans laquelle ledit habitacle (9') comprend deux jeux d'éléments coupelles sensiblement en forme de U, un premier jeu renfermant ledit roulement (10') et étant maintenu avec lui par l'axe du roulement, et un second jeu renfermant ledit contre-roulement (11) et étant maintenu avec lui par l'axe du contre-roulement.
9. Construction de porte d'ascenseur selon la Revendication 1, dans laquelle ladite voie de roulement (5') est sensiblement de section circulaire et lesdits moyens de roulement (8) comprennent un jeu de roulements à billes linéaires entourant ladite voie de roulement (5').