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(54) **INSTALLATION FOR TRANSPORTING PERSONS**

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(57) **ABSTRACT**

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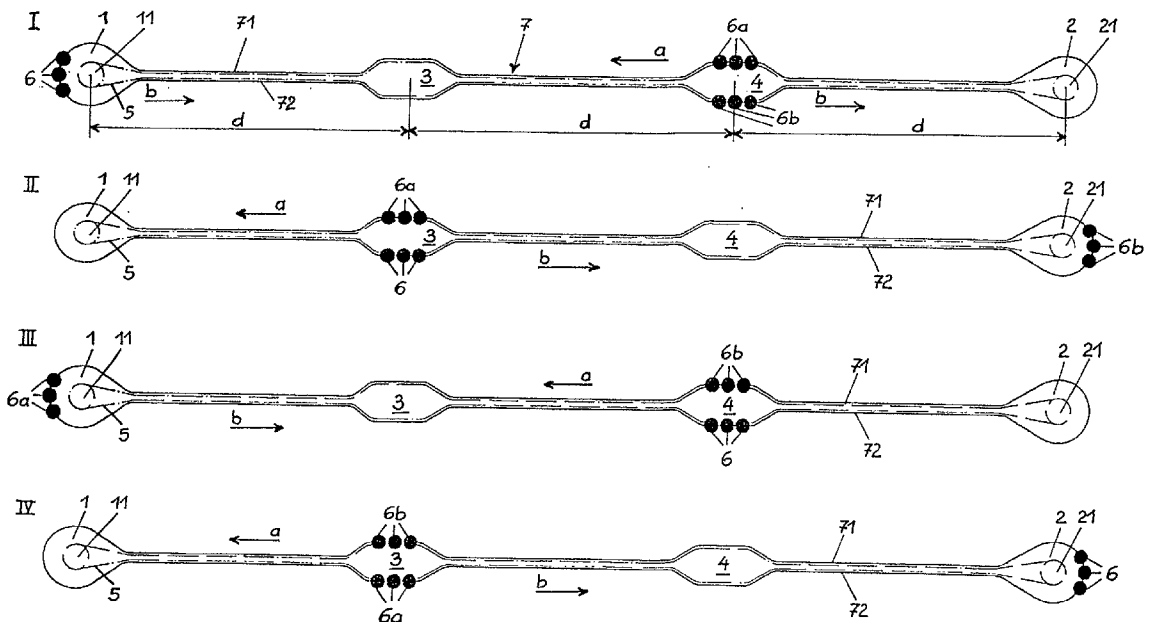
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The installation conveys passengers along a self-contained track which extends between two end stations and has at least one intermediate station between the end stations. Traveling devices, such as cablecars or carriages can be moved along the track by a self-contained traction cable which are guided in the end stations about drive pulleys and deflecting pulleys. The traveling devices are moved through the stations at such a speed that passengers can embark and disembark. The intermediate station is situated at an equal distance from the respectively adjacent stations, the traveling devices, which are optionally arranged in groups, are coupled onto the traction cable at a spacing distance equal to twice the distance between the stations. Subsections of the track allow the traveling devices to move in opposite directions only in the stations.



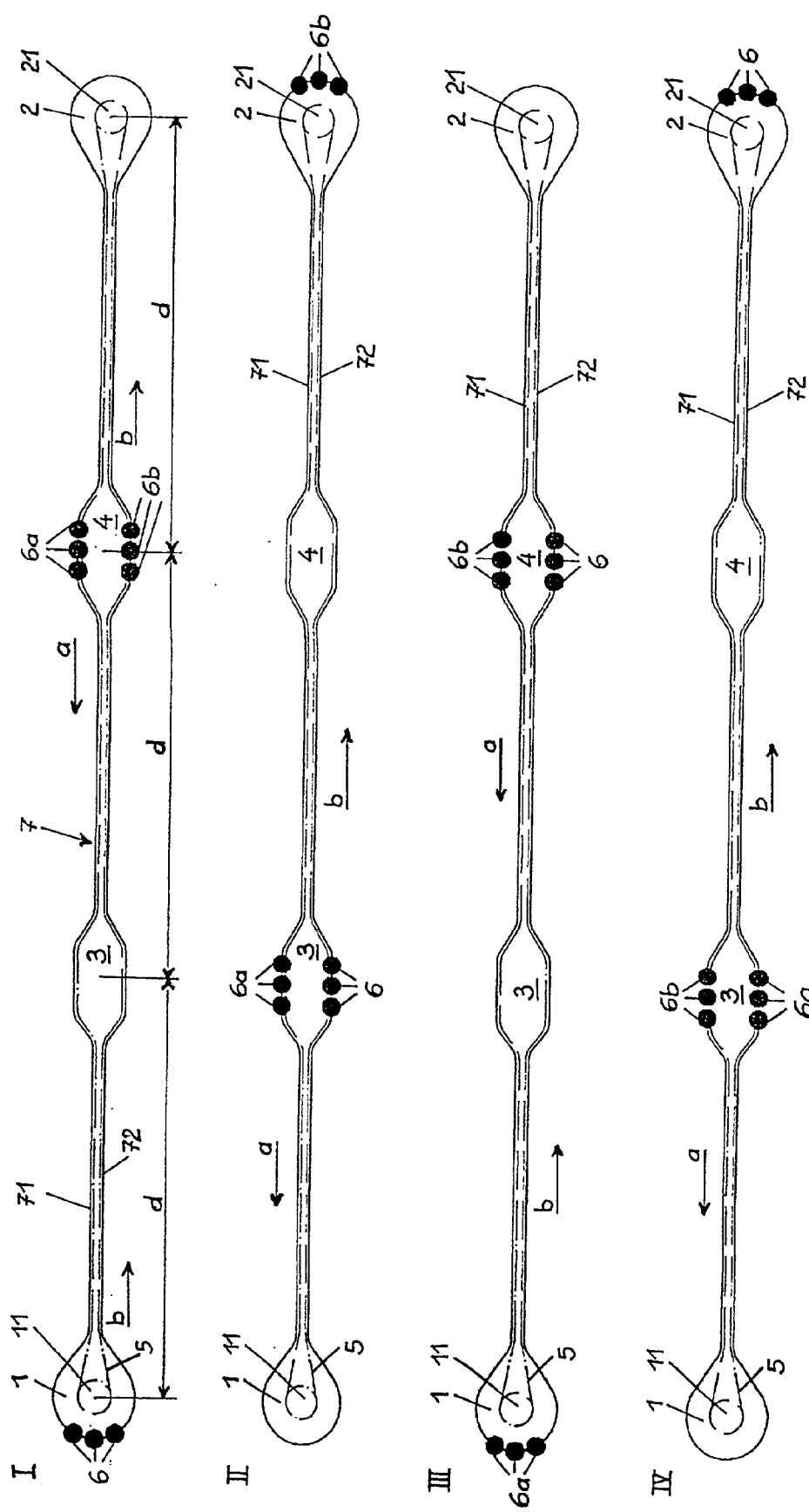


FIG.1

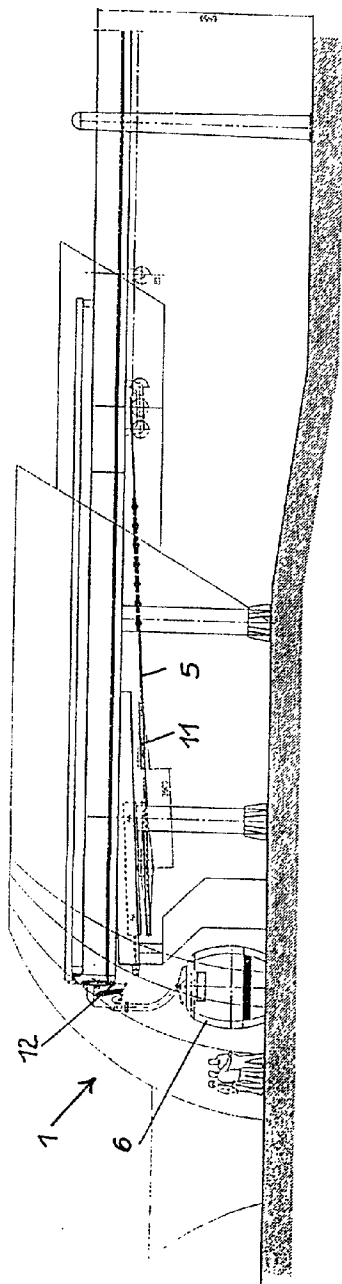


FIG. 2

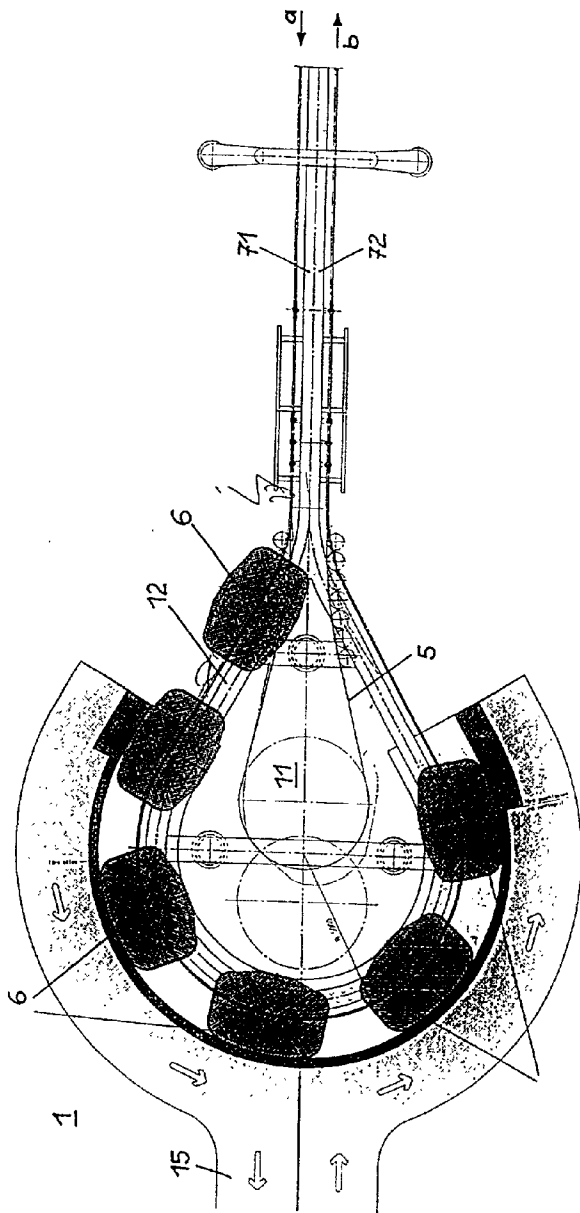
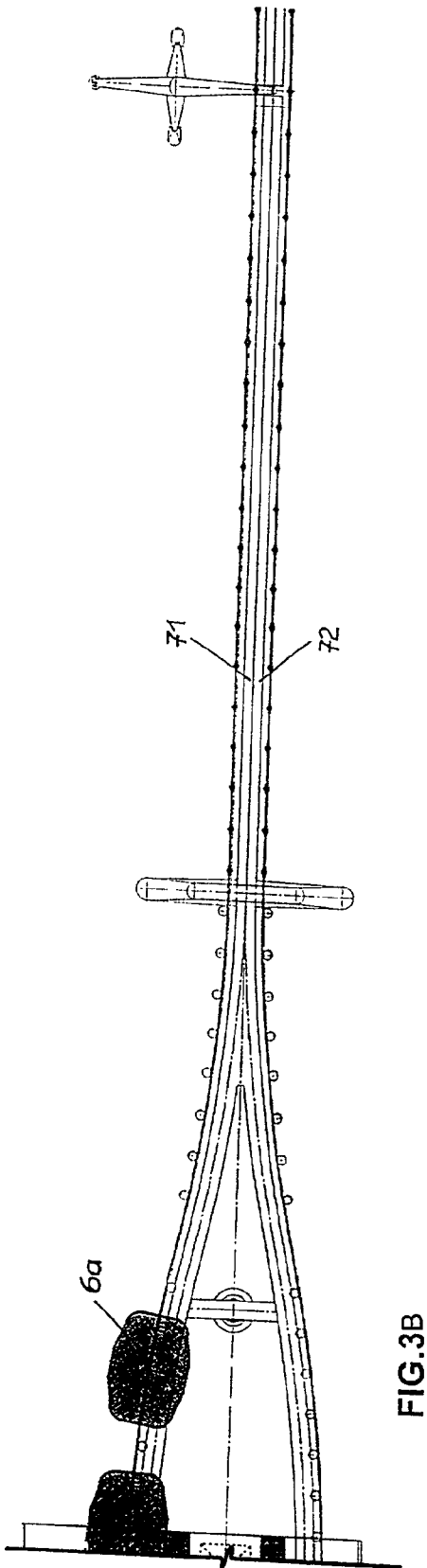
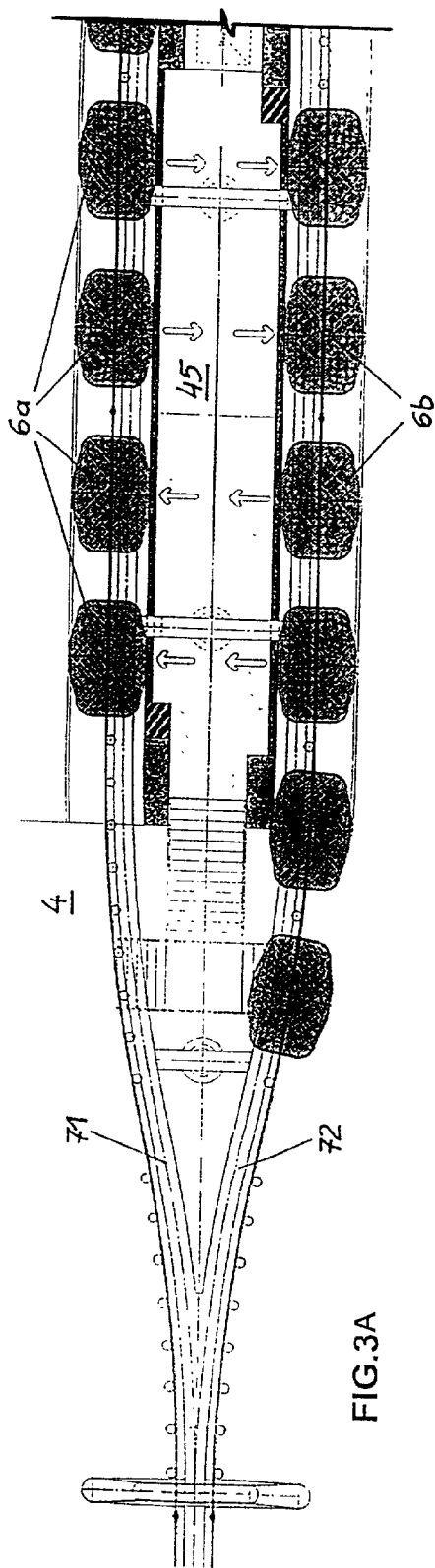


FIG. 2A



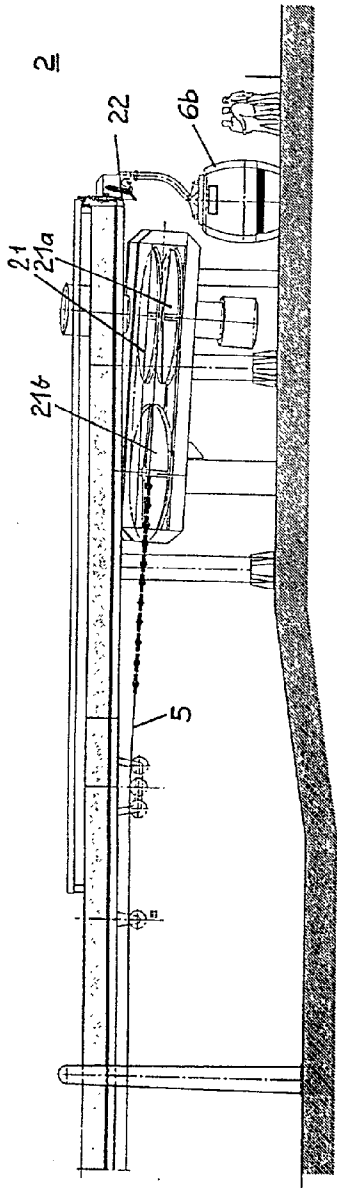


FIG.4

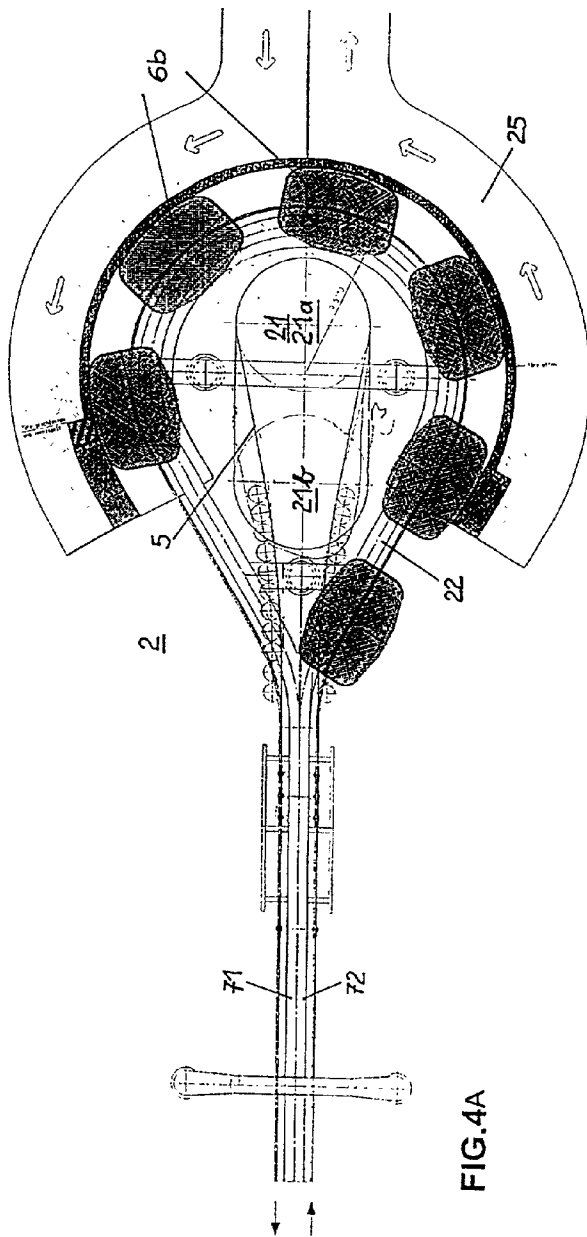


FIG.4A

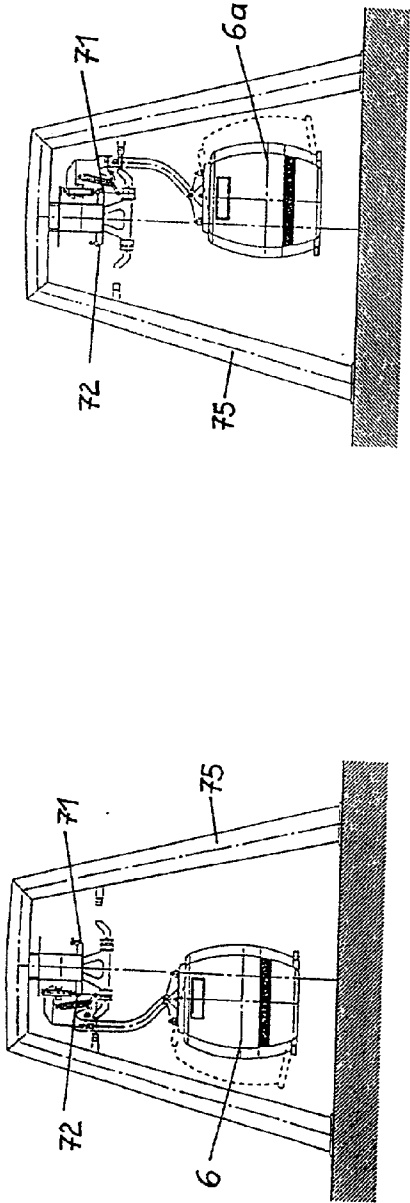


FIG. 5B

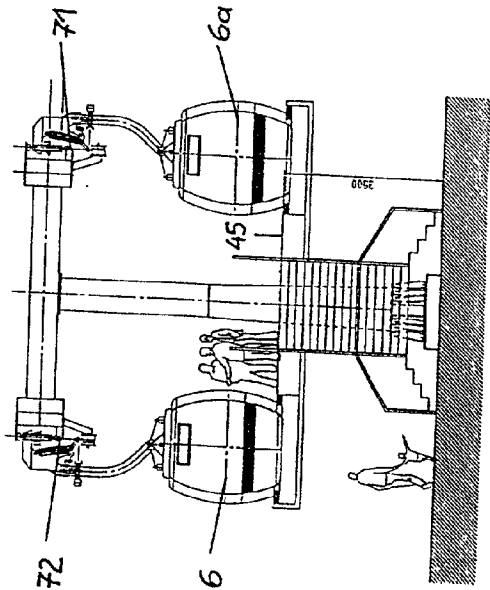


FIG. 5C

INSTALLATION FOR TRANSPORTING PERSONS

BACKGROUND OF THE INVENTION

[0001] Field of the Invention

[0002] The present invention relates to a system for conveying persons along a self-contained track which extends between two end stations and has at least one intermediate station situated between the end stations. The system includes traveling devices, such as cablecars or carriages, which can be moved along the track by a self-contained traction cable, and driving or deflecting pulleys for the traction cable which are arranged in the end stations. The traveling devices are moved through the stations at such a speed that will allow persons to safely embark or disembark.

[0003] Prior art systems of the foregoing type have a self-contained carriageway for traveling devices which can be moved between the two end stations by means of a traction cable. The traveling devices are uncoupled from the traction cable in the end stations and, if the need arises, in intermediate stations situated between the end stations and are moved through the stations at such a speed that passengers can enter or leave them.

[0004] In these prior art systems the lanes for traveling devices moving in opposed directions are situated along the entire route at such a distance from one another that traveling devices can meet at any location on the track and can pass one another. This is required, since, in the prior art systems, firstly the intermediate stations are situated at any desired locations which are suitable for them for topographical or traffic-engineering reasons, and since, secondly, the traveling devices are coupled onto the traction cable in accordance with demand only the minimum distance required between them must thereby be observed. However, there is the requirement here for traveling devices moving in opposite directions to be able to move past one another at every point on the track.

[0005] This requirement means that at every point on the track the entire system has to be of approximately twice the width of the width required for a traveling devices. This requirement necessitates, however, a predetermined space requirement along the entire route of the system, which space requirement causes a high financial outlay, particularly in the case of engineering structures, such as bridges or tunnel systems.

SUMMARY OF THE INVENTION

[0006] The object of the present invention is to provide a system for conveying persons which overcomes the above-noted deficiencies and disadvantages of the prior art devices and methods of this general kind, and wherein the space requirement is decreased without reducing the conveying capacity of the system as a result, that is, which provides for a decisive reduction in particular in the financial outlay required for engineering structures.

[0007] With the above and other objects in view there is provided, in accordance with the invention, an installation for conveying persons, comprising:

[0008] a plurality of stations including two end stations and at least one intermediate station disposed equidistant from respectively adjacent the stations;

[0009] a self-contained track extending between the two end stations;

[0010] a self-contained traction cable extending along the track and pulleys for the traction cable disposed in the end stations;

[0011] a plurality of traveling devices coupled to the traction cable at a spacing distance from one another substantially equal to twice a distance between the stations, wherein the traction cable moves the traveling devices along the track, and the traveling devices are moved through the stations at a speed enabling persons to enter or leave the traveling devices in the stations; the track having subsections for traveling devices moving in opposite directions spaced apart only in the stations to allow two or more traveling devices to move past one another.

[0012] In other words, the objects are achieved in that the at least one intermediate station is situated at an equal distance from the respectively adjacent stations, in that the traveling devices, which are optionally arranged in groups, are coupled onto the traction cable at distances from one another which are equal to twice the distance of the stations from one another, and in that the tracks for traveling devices moving in opposed directions are situated only in the stations at such a distance from one another that two traveling devices can move past each other.

[0013] By virtue of the fact that the at least one intermediate station is situated at an equal distance from the respectively adjacent stations, namely the end stations and further intermediate stations, and the traveling devices are coupled onto the traction cable at a distance which is equal to twice the distance of the stations from one another, it is ensured that the traveling devices only ever meet in the stations wherein the tracks for traveling devices moving in opposed directions are situated at such a distance from one another that the traveling devices can move past one another.

[0014] In order to make it possible for the passengers to enter or leave the traveling devices in the stations, according to a first embodiment the traction cable is moved at a changing speed. In that case, the traveling devices are moved through the stations at a low speed and are moved along the stretches situated between the stations at a speed which is substantially increased with respect thereto, the traveling devices remaining coupled onto the traction cable in the stations. As an alternative to this, in the end stations devices can be provided for uncoupling the traveling devices from the traction cable, for moving the traveling devices through the end stations and for subsequently coupling them onto the traction cable.

[0015] In contrast, according to a second embodiment the traction cable is always moved at a uniform speed and devices are provided in all the stations for uncoupling the traveling devices from the traction cable, for moving the traveling devices through the stations and for subsequently coupling the traveling devices onto the traction cable.

[0016] By means of both these embodiments it is ensured that traveling devices moving in opposed directions only meet in the stations wherein the tracks are situated at such a distance from one another that the traveling devices can move past one another.

[0017] In the at least one middle station the platform for the people is preferably situated between the two sections of the track for traveling devices moving in opposed directions, whereas in the end stations the platforms for the passengers are situated radially outside the track which is guided in the end stations in a partially circular form.

[0018] The track of a system of this type can be formed by a rail along which the traveling devices can be moved, wherein case they can be designed in particular as cablecars which can be moved by means of a cradle. However, the track can also be formed by carriageways along which the traveling devices, which are designed as carriages, can be moved.

[0019] A system according to the invention differs decisively from prior art systems, wherein two carriages meet in the middle region of the system, by the fact that the traveling devices are kept continuously in circulation at changing speeds by means of a self-contained traction cable, in which case any desired number of intermediate stations can be provided. Limitations exist only to the effect that the number of the traveling devices and the number of groups of directly adjoining traveling devices have to be equal to half the number of the entry and exit points, and that the entry and the exit points have to be situated at equal distances from one another.

[0020] Summarizing once more, the system for conveying passengers along an endless track which extends between two end stations and has at least one intermediate station between the end stations, has traveling devices, such as cablecars or carriages, which can be moved along the track by means of an endless traction cable which is deflected about drive pulleys and deflecting pulleys in the end stations. The traveling devices are moved through the stations at such a speed that passengers can enter or leave them. The at least one intermediate station is situated at an equal distance from the respectively adjacent stations, the traveling devices, which are optionally arranged in groups, are coupled onto the traction cable at distances from one another which are equal to twice the distance of the stations from one another, and the subsections of the track for traveling devices moving in opposed directions are situated only in the stations at such a distance from one another that two traveling devices can move past each other.

[0021] Other features which are considered as characteristic for the invention are set forth in the appended claims.

[0022] Although the invention is illustrated and described herein as embodied in an installation for transporting persons, it is nevertheless not intended to be limited to the details shown, since various modifications and structural changes may be made therein without departing from the spirit of the invention and within the scope and range of equivalents of the claims.

[0023] The construction and method of operation of the invention, however, together with additional objects and advantages thereof will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] FIG. 1 is a diagram illustrating the system according to the invention in four phases I, II, III and IV of service;

[0025] FIG. 2 is a side view of a first end station of the system;

[0026] FIG. 2A is a plan view thereof;

[0027] FIGS. 3A and 3B illustrate a plan view onto an intermediate station of the system;

[0028] FIG. 4 is a side view of a second end station of the system according to the invention;

[0029] FIG. 4A is a plan view thereof;

[0030] FIGS. 5A, 5B, and 5C are respective end views of three locations of the installation according to the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0031] Referring now to the figures of the drawing in detail and first, particularly, to FIG. 1 thereof, there is seen an installation according to the invention, also referred to as a system, which comprises a first end station 1, a second end station 2, and two intermediate stations 3 and 4 which are situated between the end stations 1 and 2. Driving pulleys or deflecting pulleys 11 and 21 are situated in the end stations 1 and 2 and are intended for a self-contained (i.e., endless) traction cable 5 onto which traveling devices 6, 6a and 6b can be coupled, enabling them to be moved along a self-contained, (i.e., endless) track 7. The track 7 comprises two subsections 71 and 72 which run approximately parallel over the route and are intended for the traveling devices. In this case, these subsections 71 and 72 are situated only in the stations 1 to 4 at such a distance from one another that traveling devices moving in opposite directions can be moved past one another. Accordingly, these subsections 71 and 72 are situated so closely together between the stations 1 to 4 that traveling devices 6, 6a and 6b can in each case only be moved in one direction. In order to make possible this structural design it is necessary for the stations 1 to 4 to be situated at a fixed distance d from one another in each case and for successive traveling devices to always be situated at the distance 2d from one another.

[0032] This system is operated such that at the beginning (phase I) a first group of the traveling devices 6 is situated in the first end station 1 and that the two other groups of traveling devices 6a and 6b are situated in the middle station 4.

[0033] During movement of the traveling devices 6, 6a and 6b in the direction of the arrows a and b said traveling devices pass onto the sections situated between the stations 1 to 4, where the traveling devices 6 and 6a then meet each other in the middle station 3 wherein the subsections 71 and 72 of the track 7 are situated at such a distance from one another that the traveling devices can move past one another. At the same time, the traveling devices 6b pass into the second end station 2 (phase II). The traveling devices 6a then pass into the first end station 1 and the traveling devices 6 and 6b

[0034] meet one another in the second middle station 4 (phase III). Finally, the traveling devices 6a and 6b meet one another in the first middle station 3 and the traveling devices 6 pass into the second end station 2 (phase IV).

[0035] The traveling devices 6, 6a and 6b are guided through the stations 1 to 4 at such a speed that passengers

can enter or leave them. The movement of the traveling devices **6**, **6a** and **6b** takes place in this case either by virtue of the fact that the traction cable **5** is moved at changing speed to the effect that the traveling devices **6**, **6a** and **6b** are moved through the stations at a relatively low speed of approximately 0.3 m/sec and thereafter the speed is increased to up to 10 m/sec. In this embodiment, the traveling devices **6**, **6a** and **6b** remain clamped onto the traction cable **5** in the stations.

[0036] As an alternative to this, the traveling devices **6**, **6a** and **6b** can be uncoupled from the traction cable **5** in the two end stations **1** and **2**, wherein case they are moved along circulating rails by conveying wheels in these stations.

[0037] According to one design variant, the traction cable **5** is maintained at a constant speed of, say, 8 m/sec and the traveling devices **6**, **6a** and **6b** are uncoupled from the traction cable **5** in all of the stations and are moved by conveying wheels through the stations **1** and **4** at the required speed so as to enable the passengers to embark and/or disembark. They are then re-coupled onto the traction cable **5** and moved along the track **7**.

[0038] A decisive factor for this operation is that all of the stations **1** to **4** are situated at a given distance d from one another and that it is ensured that the traveling devices **6**, **6a** and **6b** are coupled onto the traction cable **5** in such a manner that they are situated at the distance $2d$ from one another.

[0039] The construction of the stations is explained in greater detail below with reference to an exemplary embodiment. With reference to **FIGS. 2 and 2A**, in the first end station **1**, a circulating rail **12** is provided outside the cable pulley **11**. A first group of traveling devices travels about the circulating rail **12**. The traveling devices are formed by cablecars **6**, and they are moved through the end station **1** whereby they are uncoupled from the traction cable **5**. Situated outside the circulating rail **12** is a platform **15** via which the passengers leave the station or enter the cablecars **6**.

[0040] **FIGS. 3A and 3B** illustrate the middle station **4** wherein the second and third group of cablecars **6a** and **6b** are situated. Situated between the two sections **71** and **72** of the track, which sections in this station **4** are situated at such a great distance that the cablecars **6a** and **6b** which are moving in opposed directions can move past one another, is a platform **45** via which the passengers enter the cablecars **6a** and **6b** or disembark from them.

[0041] Furthermore, **FIGS. 4 and 4A** illustrate the second end station **2**. In order to obtain the required traction, two cable-driving pulleys **21** and **21a** and a mating pulley **21b**, around which the traction cable **5** is guided, are provided in the second end station **2**. Also in the second end station **2** the cablecars **6b** are uncoupled from the traction cable **5** and are moved through this station **2** along a circulating rail **22**. A platform **25** is situated outside the path of movement of the cablecars **6b**.

[0042] **FIGS. 5A and 5B** illustrate the subsections of the track **7**, which are formed by the rails **71** and **72**, outside the stations. As is apparent from these figures, the rails **71** and **72** are supported by frame-shaped supports **75** whose clear width is so small that just a single cablecar **6** or **6a** is able to pass between them. In contrast, in the middle stations, one of which is illustrated in **FIG. 5C**, the rails **71** and **72** are

situated at a sufficiently great distance from one another that two cablecars **6** and **6b** moving in opposed directions pass by one another and wherein case the platform **45** is situated between them.

[0043] The traveling devices may be designed as cablecars which have a traveling mechanism which can be moved along a rail or a cable. The traveling devices may also be designed as carriages which can be moved along carriage-ways. In addition, the traveling devices can be arranged individually in each case or in groups. Both the traveling mechanisms of the cablecars and the carriages are designed with controllable clamping devices by means of which they can be coupled onto the traction cable.

[0044] The system according to the invention achieves a decisive reduction in the cost of the construction without necessitating a restriction in operation as a result.

[0045] The variant wherein the cablecars **6**, **6a** and **6b** are uncoupled from the traction cable **5** in the end stations **1** and **2** and are guided through the stations along guide rails is therefore advantageous, since in this case cable-deflecting pulleys of relatively small diameter can be used. Since in the case of cable-deflecting pulleys of this type smaller torques occur than in the case of cable-deflecting pulleys of large diameter, relatively small gear mechanisms can also be used. In order to obtain the required traction, two coaxial driving pulleys and a mating pulley assigned to them are provided. A further advantage of the movement of the cars in the stations along guide rails arranged radially outside the cable-deflecting pulleys resides in the fact that substantially more space is available as a result for the passengers when leaving or entering the cars.

I claim:

1. An installation for conveying persons, comprising:

a plurality of stations including two end stations and at least one intermediate station disposed equidistant from respectively adjacent said stations;

a self-contained track extending between said two end stations;

a self-contained traction cable extending along said track and pulleys for said traction cable disposed in said end stations;

a plurality of traveling devices coupled to said traction cable at a spacing distance from one another substantially equal to twice a distance between said stations, wherein said traction cable moves said traveling devices along said track, and said traveling devices are moved through said stations at a speed enabling persons to enter or leave said traveling devices in said stations;

said track having subsections for traveling devices moving in opposite directions spaced apart only in said stations to allow two or more traveling devices to move past one another.

2. The installation according to claim 1, wherein said traveling devices are arranged in groups.

3. The installation according to claim 1, wherein said traveling devices are selected from the group consisting of cablecars and carriages.

4. The installation according to claim 1, wherein said pulleys are selected from the group consisting of driving pulleys and deflecting pulleys.

5. The installation according to claim 1, wherein said traction cable is moved at a changing speed, whereby said traveling devices are moved through said stations at a relatively slow speed and are moved along stretches of said track between said stations at a speed substantially increased with respect to said relatively slow speed, and wherein said traveling devices are coupled onto the traction cable in said intermediate stations.

6. The installation according to claim 5, which comprises devices in said end stations for uncoupling said traveling devices from said traction cable, for moving said traveling devices through said end stations detached from said traction cable and for subsequently coupling said traveling devices onto said traction cable.

7. The installation according to claim 1, wherein said traction cable is driven at a uniform speed, and wherein devices are provided in all of said stations for uncoupling said traveling devices from said traction cable in said stations, for moving said traveling devices through said stations detached from said traction cable and for subsequently coupling said traveling devices onto said traction cable.

8. The installation according to claim 1, which comprises a platform for passengers in said at least one intermediate station disposed between said two subsections of said track whereon said traveling devices move in mutually opposite directions.

9. The installation according to claim 1, which comprises platforms at said end stations for passengers disposed radially outside said track guided in said end stations along a substantially circular arc.

10. The installation according to claim 1, wherein said track is formed by a rail along which said traveling devices are movable.

11. The installation according to claim 1, wherein said track is formed by a carriageway along which said traveling devices are movable.

12. An installation for conveying persons, comprising:

a plurality of stations including two end stations and at least one intermediate station disposed a given distance from one of said end stations and from another one of said stations;

a self-contained track extending between said two end stations;

a self-contained traction cable extending along said track and pulleys for said traction cable disposed in said end stations;

a plurality of groups of traveling devices coupled to said traction cable at a spacing distance from one another substantially equal to twice the given distance, wherein said traction cable drives said traveling devices along said track and drives said traveling devices through said stations at a speed enabling passengers to embark and disembark from said traveling devices in said stations;

said track having subsections extending between said stations spaced apart to allow said traveling devices to only move in one direction at a time and subsections in said stations spaced apart to allow said groups of traveling devices to move past one another.

13. The installation according to claim 12, wherein said groups of traveling devices each include at least one traveling device.

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