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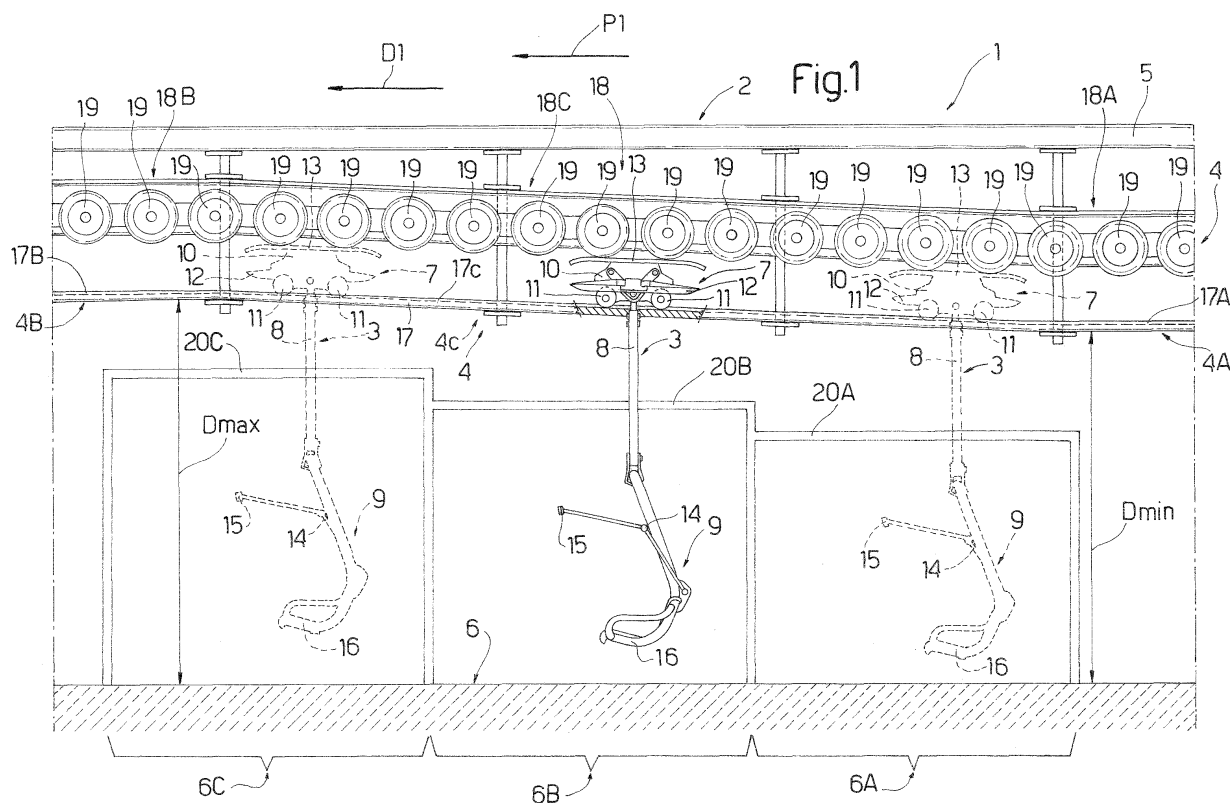
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(54) **Cable transportation system**

(57) A cable transportation system has an arrival/departure station (2); a number of transportation units (3) movable in a travelling direction (D1) along a given path (P1); a conveyor assembly (4) for guiding and suspending the transportation units (3) at the arrival/departure station (2); and a passenger boarding zone (6) beneath

the conveyor assembly (4); the conveyor assembly (4) and the boarding zone (6) being arranged with respect to each other so that the distance between the boarding zone (6) and a reference region of the conveyor assembly (4) varies within a given range (I) in the travelling direction (D1) along the boarding zone (6).



Description

[0001] The present invention relates to a cable transportation system.

[0002] More specifically, the present invention relates to a cable transportation system comprising an arrival/departure station; a number of transportation units movable along a given path; a conveyor assembly for guiding and suspending the transportation units at the arrival/departure station; and a passenger boarding zone beneath the conveyor assembly.

[0003] In one type of so-called detachable cable transportation system, the transportation units are advanced at a cruising speed between at least two arrival/departure stations, and at a boarding speed through the arrival/departure station boarding zones, to allow passengers to board the transportation units.

[0004] In another type of so-called non-detachable cable transportation system, the transportation units are not releasable automatically from the cable.

[0005] The arrival/departure station often comprises a moving walkway to assist boarding by reducing the relative speed between boarding passengers and the transportation units; in which case, the topside surface of the walkway defines the boarding zone.

[0006] In both the above systems, boarding moving transportation units is not easy, especially when the units are chairs. At the arrival/departure station, in fact, the chairs are guided by the conveyor assembly so that the seat is positioned a given distance from the boarding zone.

[0007] This given distance is calculated according to average passenger height, which means any passengers differing considerably from average height often have difficulty in boarding and settling correctly on the transportation unit. Children, in particular, must be lifted by adults and placed in the correct sitting position.

[0008] One object of the present invention is to provide a cable transportation system designed to eliminate the above drawback of the known art.

[0009] Another object of the present invention is to provide a straightforward, low-cost cable transportation system designed to enable passengers of different heights to board easily.

[0010] According to the present invention, there is provided a cable transportation system comprising an arrival/departure station; a number of transportation units movable in a travelling direction along a given path; a conveyor assembly for guiding and suspending said transportation units at the arrival/departure station; and a passenger boarding zone beneath said conveyor assembly; the cable transportation system being characterized in that the conveyor assembly and the boarding zone are arranged with respect to each other so that the distance between the boarding zone and a reference region of the conveyor assembly varies within a given range in the travelling direction along the boarding zone.

[0011] By virtue of the present invention, passengers

of different heights can board the transportation units easily at different points along the boarding zone.

[0012] In a preferred embodiment of the present invention, the arrival/departure station comprises at least two gates to the boarding zone, and a control unit; each gate comprising two wings movable selectively between an open position and a closed position, and operated by said control unit as a function of the position of the transportation unit with respect to the boarding zone, and of passenger height.

[0013] A number of non-limiting embodiments of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic side view, with parts removed for clarity, of a cable transportation system in accordance with the present invention;

Figure 2 shows a schematic side view, with parts removed for clarity, of a cable transportation system in accordance with a second embodiment of the present invention;

Figure 3 shows a schematic plan view, with parts removed for clarity, of the Figure 2 cable transportation system.

[0014] Number 1 in Figure 1 indicates as a whole a cable transportation system comprising a passenger arrival/departure station 2; and transportation units 3 (only one shown in Figure 1) movable along a given path P1.

[0015] In the example shown, cable transportation system 1 is a detachable system, wherein the arrival/departure station 2 comprises a conveyor assembly 4 for guiding and advancing transportation units 3, detached from the cable (not shown in Figure 1), at arrival/departure station 2. More specifically, conveyor assembly 4 also serves to slow down transportation units 3, to feed transportation units 3 forward at a boarding speed in a travelling direction D1, and to accelerate transportation units 3 at arrival/departure station 2.

[0016] In addition to conveyor assembly 4, arrival/departure station 2 also comprises a supporting structure 5 from which conveyor assembly 4 is suspended; and a boarding zone 6 defined by a surface beneath conveyor assembly 4.

[0017] In the example shown, each transportation unit 3 comprises a trolley 7, a suspension arm 8, and a chair 9 connected to trolley 7 by suspension arm 8.

[0018] Trolley 7 comprises a frame 10 supporting wheels 11, a clamp 12, and a panel 13.

[0019] Chair 9 comprises a safety bar 14 movable between an open position and a closed position (not shown in the drawings); a footrest 15 connected to safety bar 14; and a seat 16.

[0020] Conveyor assembly 4 comprises a runner 17; and a conveying device 18 - in the example shown, a wheel conveyor comprising a number of wheels 19 rotated in the same direction by known drives not shown in the drawings.

[0021] In other words, wheels 11 of trolley 7 rest on runner 17, while wheels 19 of conveying device 18 engage panel 13 to push transportation unit 3 along path P1.

[0022] Conveyor assembly 4 comprises two portions 4A and 4B located at respective distances Dmin and Dmax from boarding zone 6; and a portion 4C connecting portion 4A to portion 4B, and located at a distance from boarding zone 6 that varies, along boarding zone 6 and in travelling direction D1, within a range I between distances Dmin and Dmax and preferably of 15 to 30 cm.

[0023] In the Figure 1 example, portions 4A, 4B, 4C are straight, which means runner 17 comprises three straight portions 17A, 17B, 17C, and conveying device 18 comprises three straight portions 18A, 18B, 18C.

[0024] Portion 17C of runner 17 extends over boarding zone 6; and runner 17 defines the reference region by which to calculate the distance from boarding zone 6.

[0025] As transportation unit 3 moves forward, the height of seat 16 with respect to boarding zone 6 therefore varies continuously at arrival/departure station 2, so passengers can choose the easiest boarding point along boarding zone 6 as a function of their own height. In other words, the reference region and boarding zone 6 are not parallel along at least one portion of boarding zone 6 in travelling direction D1.

[0026] To help passengers choose the right boarding point, boarding zone 6 comprises boarding sub-zones 6A, 6B, 6C covering respective sub-ranges IA, IB, IC of range I.

[0027] Boarding sub-zones 6A, 6B, 6C have respective gauge members 20A, 20B, 20C for gauging passenger height and accordingly indicating the appropriate boarding sub-zone 6A, 6B, 6C.

[0028] Number 21 in Figure 2 indicates as a whole a cable transportation system comprising an arrival/departure station 22; and a number of transportation units 23 (only one shown in Figure 2) movable along a given path P2.

[0029] Cable transportation system 21 is a non-detachable system, and arrival/departure station 22 comprises a conveyor assembly 24, in turn comprising a cable 25, a vertical-axis pulley 26, a horizontal-axis pulley 27, and a supporting structure 28 supporting pulleys 26 and 27.

[0030] Between pulleys 26 and 27, cable 25 provides for both guiding and supporting transportation units 23, and for drawing transportation units 23 forward.

[0031] Arrival/departure station 22 also comprises a moving walkway 29 beneath the portion of conveyor assembly 24 between pulleys 26 and 27.

[0032] Moving walkway 29 comprises a belt 30 looped about two rollers 31, one of which is powered; and the topside surface of belt 30 defines a passenger boarding zone 32.

[0033] In the example shown, each transportation unit 23 comprises a clamp 33 fixed to cable 25; a suspension arm 34; and a chair 35, in turn comprising a safety bar 36 movable between an open position and a closed po-

sition (not shown in the drawings), a footrest 37 connected to safety bar 36, and a seat 38.

[0034] In the Figure 2 example, the distance between boarding zone 32 and a reference region of conveyor assembly 24 varies, along boarding zone 32 and in a travelling direction D2, within a range I between two values Dmin and Dmax and preferably of 15 to 30 cm. In the example shown, the reference region is defined by cable 25 of cable transportation system 21. Cable 25 remains at a substantially constant height, whereas moving walkway 29 slopes downwards in travelling direction D2 to gradually increase the distance between boarding zone 32 and cable 25 in travelling direction D2.

[0035] In this case, too, the reference region and boarding zone 32 are not parallel along at least one portion of boarding zone 32 in travelling direction D2.

[0036] With reference to Figure 3, arrival/departure station 22 comprises four entry gates 39, each comprising two wings 40 which are opened by the arrival of transportation units 23 at moving walkway 29.

[0037] Arrival/departure station 22 comprises a control unit 41; sensors 42 for determining the position of transportation units 23; and sensors 43 for determining the height of passengers at gates 39. Each gate 39 is controlled by control unit 41, which opens gates 39 at different times, as a function of parameters recorded by sensors 42 and 43.

[0038] In other words, moving walkway 29 advances at a constant speed slower than the travelling speed of transportation units 23, and gates 39 are opened in time with the arrival of a transportation unit 23 and as a function of the passenger's height. Gates 39 are opened first for tall passengers, and later for short passengers, so that short passengers can board first, at points along boarding zone 32 where seat 38 is closer to boarding zone 32, and tall passengers can board last.

[0039] In an alternative embodiment of the present invention, sensors 43 are eliminated, and each gate 39 caters to passengers within a given height range. The short-passenger gate 39 is opened after the tall-passenger gates 39, so that short passengers can board first, i.e. at points along boarding zone 32 where seat 38 is closer to boarding zone 32.

[0040] In the embodiments described, the distance between the boarding zone and the reference region increases gradually in the travelling direction.

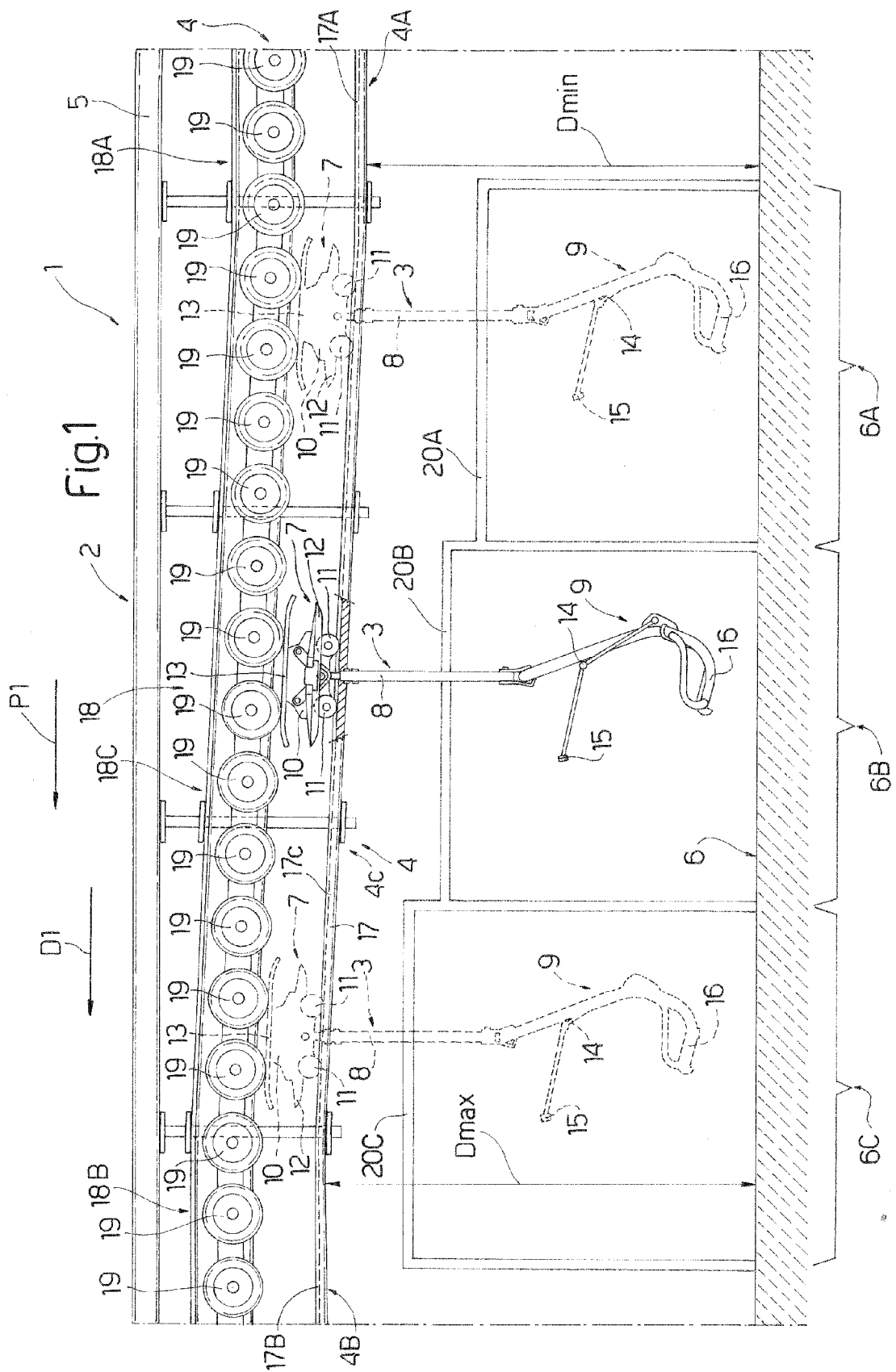
[0041] In a variation of the present invention, said distance decreases in the travelling direction.

[0042] The present invention obviously also includes embodiments not covered in the above detailed description, as well as equivalent embodiments within the scope of the accompanying Claims.

Claims

1. A cable transportation system comprising an arrival/departure station (2; 22); a number of transportation

- units (3; 23) movable in a travelling direction (D1; D2) along a given path (P1; P2); a conveyor assembly (4; 24) for guiding and suspending said transportation units (3; 23) at the arrival/departure station (2; 22); and a passenger boarding zone (6; 32) beneath said conveyor assembly (4; 24); the cable transportation system (1; 21) being **characterized in that** the conveyor assembly (4; 24) and the boarding zone (6; 32) are arranged with respect to each other so that the distance between the boarding zone (6; 32) and a reference region of the conveyor assembly (4; 24) varies within a given range (I) in the travelling direction (D1; D2) along the boarding zone (6; 32).
2. A cable transportation system as claimed in Claim 1, wherein said given range (I) is of 15 to 30 cm.
 3. A cable transportation system as claimed in Claim 1 or 2, wherein said distance varies constantly between a minimum value (Dmin) and a maximum value (Dmax) of said given range (I).
 4. A cable transportation system as claimed in any one of the foregoing Claims, wherein the boarding zone (6) comprises at least a first boarding sub-zone (6A) **characterized by** a first sub-range (IA) of the given range (I) and associated with a first passenger height gauging member (20A); and a second boarding sub-zone (6B) **characterized by** a second sub-range (IB) of the given range (I) and associated with a second passenger height gauging member (20B).
 5. A cable transportation system as claimed in Claim 4, wherein the first and second sub-range (IA, IB) are separate.
 6. A cable transportation system as claimed in any one of the foregoing Claims, wherein the arrival/departure station (22) comprises a moving walkway (29); the boarding zone (32) being defined by the topside surface of the moving walkway (29).
 7. A cable transportation system as claimed in any one of the foregoing Claims, wherein the arrival/departure station (22) comprises at least two gates (39) to the boarding zone (32), and a control unit (41); each gate (39) comprising wings movable selectively between an open position and a closed position, and operated by said control unit (41) as a function of the position of the transportation unit (23) with respect to the boarding zone (32), and as a function of passenger height.
 8. A cable transportation system as claimed in any one of the foregoing Claims, wherein each transportation unit (3; 23) comprises a chair (9; 35).
 9. A cable transportation system as claimed in any one of the foregoing Claims, wherein said conveyor assembly (24) is located at a substantially constant height, and said boarding zone (32) is a sloping surface.
 10. A cable transportation system as claimed in any one of Claims 1 to 9, wherein said conveyor assembly (4) comprises a sloping portion (4C).
 11. A cable transportation system as claimed in any one of the foregoing Claims, wherein the conveyor assembly (4) comprises a runner (17) and a conveying device (18).



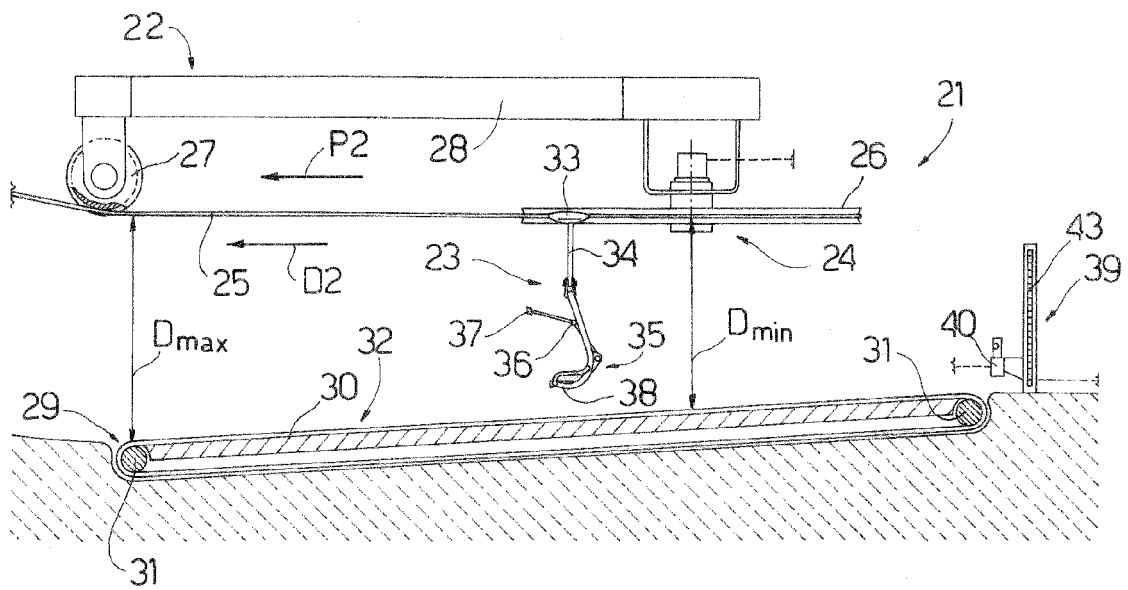


Fig. 2

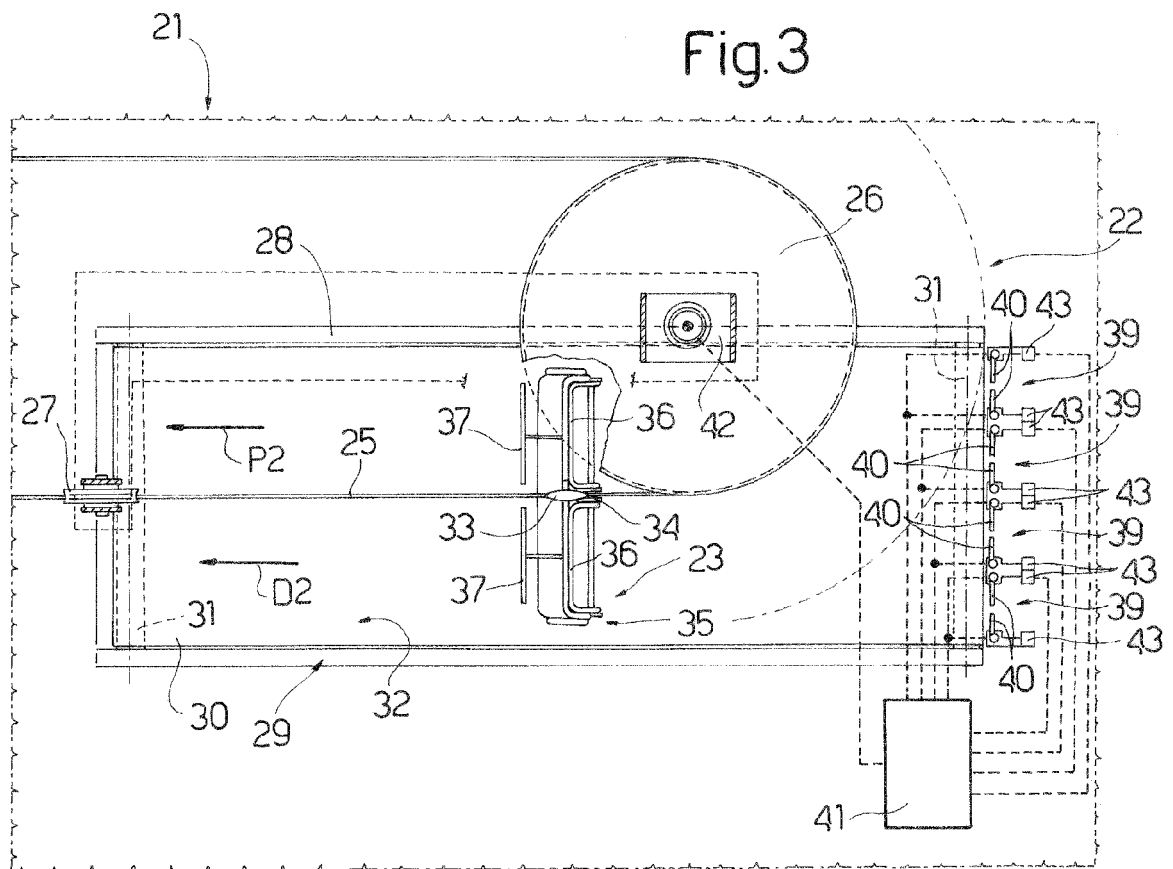


Fig. 3



EUROPEAN SEARCH REPORT

Application Number
EP 10 15 4039

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 518 645 C (CARL BENDER) 18 February 1931 (1931-02-18) * figure 2 *	1-11	INV. B61B12/00
A	FR 2 216 155 A (BUTZ ENG CORP [US]) 30 August 1974 (1974-08-30) * figure 2 *	1-11	
A	EP 1 227 022 A (HIGH TECHNOLOGY INVEST BV [NL]) 31 July 2002 (2002-07-31) * figure 2 *	1-11	
			TECHNICAL FIELDS SEARCHED (IPC)
			B61B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 25 March 2010	Examiner Lorandi, Lorenzo
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 15 4039

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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25-03-2010

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 518645	C	18-02-1931	NONE	

FR 2216155	A	30-08-1974	AU 5620773 A	28-11-1974
			CA 976496 A1	21-10-1975
			DE 2330669 A1	08-08-1974
			GB 1415238 A	26-11-1975
			JP 1220664 C	26-07-1984
			JP 49104375 A	02-10-1974
			JP 58046404 B	17-10-1983
			US 3848728 A	19-11-1974

EP 1227022	A	31-07-2002	AT 414332 B	15-04-2008
			AT 293553 T	15-05-2005
			DE 50105954 D1	25-05-2005
			ES 2236171 T3	16-07-2005
