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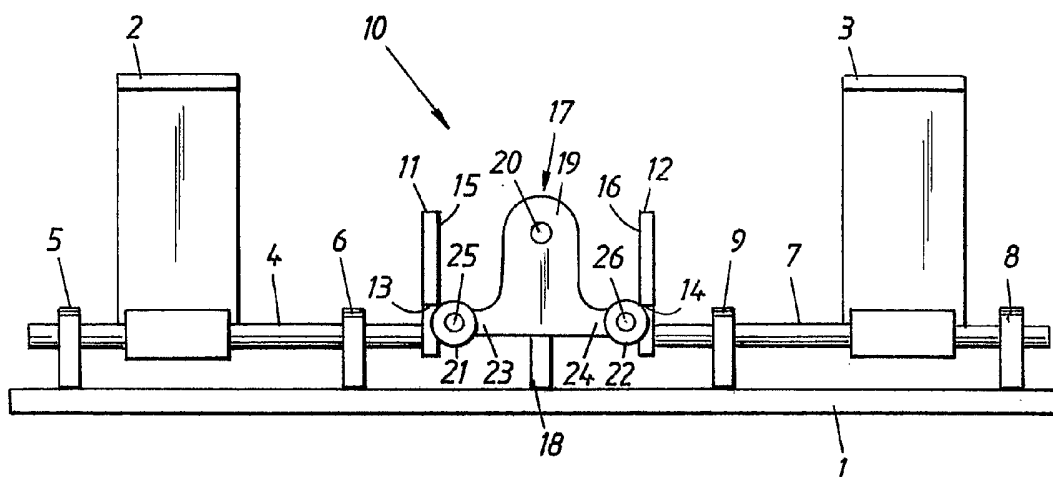
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(54) Title: PEDAL ARRANGEMENT



(57) Abstract: An arrangement for changing the direction of travel of a vehicle in two opposite directions has a first accelerator pedal (2) for driving in a first direction and a second accelerator pedal (3) for driving in a second direction. According to the invention, the arrangement includes a blocking member (17) being arranged for blocking accelerator pedals in their neutral positions when a pressure is applied onto them simultaneously and, furthermore, being arranged for blocking the first accelerator pedal in its neutral position when a pressure is applied onto the second accelerator pedal in order to drive the vehicle in the second direction, and for blocking the second accelerator pedal in its neutral position when a pressure is applied onto the first accelerator pedal in order to drive the vehicle in the first direction.

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Pedal arrangement

The present invention relates to an arrangement for changing the direction of travel of a vehicle in two opposite directions, including a first accelerator pedal for driving in a first direction and a second accelerator pedal for driving in a second direction which is opposite to the first direction.

Foot-operated pedals for changing the direction of travel of a vehicle in a forward or backward direction have been on the market for many years, inter alia, in hydrostatic transmissions. One variant of such a foot-operated pedal has a hard braking characteristic, thereby making it possible to accelerate and brake with the same pedal. In this connection, a type of pedals has been used where the pedals are interconnected so that the non-active pedal is pushed up in the same proportion as the active pedal is depressed. Such a movement upwards of the non-active pedal, however, becomes straining on the foot since the ankle of the foot is bent into an angle.

The object of the present invention is to provide an arrangement which eliminates the above-mentioned problems and which thus is designed in such a way that it creates satisfactory foot ergonomics for the operator.

The arrangement according to the invention is characterized in that it includes a blocking member arranged for blocking both accelerator pedals in their neutral positions when a pressure is applied on them simultaneously, and that the blocking member is arranged for blocking the first accelerator pedal in its neutral position when a pressure is applied on the second accelerator pedal in order to drive the vehicle in the

second direction, and for blocking the second accelerator pedal in its neutral position when a pressure is applied on the first accelerator pedal in order to drive the vehicle in the first direction.

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The invention will be explained further in the following with reference to the drawings.

Figure 1 shows a pedal arrangement according to a first
10 embodiment of the invention, viewed from the front.

Figure 2 shows the arrangement according to Figure 1, viewed from one side.

15 Figure 3 shows a pedal arrangement according to a second embodiment of the invention, viewed from above.

Figure 4 shows the arrangement according to Figure 3, viewed from one side.

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Figure 5 shows a blocking mechanism of the pedal arrangement according to Figure 3 in a neutral position.

25 Figure 6 shows the blocking mechanism according to Figure 5 in a first blocking position for blocking the right-hand accelerator pedal.

30 Figure 7 shows the blocking mechanism according to Figure 5 in a second blocking position for blocking the left-hand accelerator pedal.

35 Figures 1 and 2 show schematically a first embodiment of an arrangement according to the invention for changing the direction of travel of a vehicle, e.g. a truck or another machine for handling goods or material, in order

to drive the vehicle in a forward and a backward direction, respectively, as desired. The arrangement, thus being mounted on the floor 1 in the operator's cab of the vehicle, includes a first accelerator pedal 2 for driving the vehicle in a first direction, e.g. forwards, and a second accelerator pedal 3 for driving the vehicle in a second direction, i.e. backwards according to the example. The first accelerator pedal 2 is rigidly joined to a pivoting axle 4, which is pivotally journalled in two bearing elements 5, 6 directed upwards and welded to the cab floor 1. Also the second accelerator pedal 3 is rigidly joined to a pivoting axle 7 which is coaxial to the pivoting axle 4 of the first accelerator pedal 2 and being pivotally journalled in two bearing elements 8, 9 directed upwards and welded to the cab floor 1. The two accelerator pedals 2, 3 are pretensioned by means of suitable spring devices (not shown) in order to assume neutral positions, and to be depressed by means of a foot in order to open the throttle while being influenced by this spring force. The accelerator pedals 2, 3 are arranged at a suitable distance from each other, so that a space 10 is formed therebetween.

According to the invention, each accelerator pedal 2, 3 is provided with a counter element 11, 12, which is arranged in said space 10 between the accelerator pedals 2, 3 and which, in the embodiment shown in Figures 1 and 2, is rigidly, permanently joined to the pivoting axle 4; 7 of the accelerator pedal 2, 3 at the end portion extending into said space 10, said pivoting axle 4; 7 being elongated and extends beyond the inner bearing element 6; 9 in order to support the counter element 11; 12. Accordingly, the accelerator pedal 2; 3, the counter element 11; 12 and their common pivoting axle 4; 7 together constitute a pivotal unit which can pivot

around the centre axis of the pivoting axle 4; 7. In the embodiment shown, the counter element is constituted of a flat, form-stable disc, which is located in a vertical plane to which the pivoting axle 4; 7 makes a right angle. The counter disc 11; 12 has a downward-facing supporting surface 13; 14 which is located at a sufficient distance from the cab floor 1 so that the counter disc 11; 12 does not obstruct the depression of the accelerator pedal 2; 3, i.e. the supporting surface 13; 14 of the counter disc 11; 12 will get clear of the cab floor 1 also when the accelerator pedal 2; 3 is fully depressed. Furthermore, the counter disc 11; 12 has a flat supporting surface 15; 16 which faces away from the associated accelerator pedal 2; 3 which extends upwards from the downward-facing supporting surface 13; 14 and is located in a vertical plane to which the pivoting axle 4; 7 makes a right angle. The counter disc 11; 12 and its connection to the pivoting axle 4; 7 are sufficiently rigid, so that the counter disc 11; 12 resists lateral forces acting against its vertical supporting surface 15; 16.

In the embodiment according to Figures 3-7, each counter disc 11; 12 is rigidly, permanently joined to a horizontal connecting piece 27; 28, which in its turn is rigidly, permanently joined to the underside of the associated accelerator pedal 2; 3, approximately at the centre of the accelerator pedal 2; 3, i.e. at a distance from the pivoting axle 4; 7. In other respects, this embodiment is similar to the one shown in Figures 1 and 2. Accordingly, the accelerator pedal 2; 3, the counter disc 11; 12 and the pivoting axle 4; 7 together constitute a pivotal unit which can pivot around the centre axis of the pivoting axle 4; 7.

The arrangement according to the invention further includes a blocking member 17 arranged for interacting with the counter discs 11, 12 of the accelerator pedals 2, 3 in order to prevent depression of the first accelerator pedal 2 or, alternatively, the second accelerator pedal 3, when the second accelerator pedal 3, alternatively the first accelerator pedal 2, is to be depressed for driving backward and forward, respectively, but also in order to prevent depression of the accelerator pedals 2, 3 when a pressure is applied simultaneously onto both accelerator pedals 2, 3 and the vehicle, consequently, remains in its position.

Accordingly, the blocking member 17 forms an intermediate connection between the two counter discs 11, 12, and its blocking function is controlled by an application of pressure onto either the first accelerator pedal 2 or the second accelerator pedal 3 or onto both accelerator pedals 2, 3 simultaneously. In other words, the blocking member 17 is arranged for interacting with the counter discs 11, 12 in order to block both accelerator pedals 2, 3 in their neutral positions when a pressure is applied onto them simultaneously, see Figure 5, and for blocking the first accelerator pedal 2 in its neutral position when a pressure is applied onto the second accelerator pedal 3 in order to drive the vehicle backward, see Figure 7, and for blocking the second accelerator pedal 3 in its neutral position when a pressure is applied onto the first accelerator pedal 2 in order to drive the vehicle forward, see Figure 6.

The blocking member 17 is constituted of a pendulum-like blocking mechanism which is arranged for being moved into a first blocking position while being influenced by the second accelerator pedal 3 in order to block the first accelerator pedal 2 in its neutral position, see

Figure 6, and into a second blocking position while being influenced by the first accelerator pedal 2 in order to block the second accelerator pedal 3 in its neutral position, see Figure 7. The blocking mechanism 17 is
5 pivotally journalled to an attachment element 18 which is welded to the cab floor 1 in the centre of the space 10 between the accelerator pedals 2, 3. In the embodiments shown, the blocking mechanism 17 is designed as a symmetric, inverted T, the upwardly-directed portion or
10 stem 19 of which being provided with a bearing member 20, suitably a ball bearing, for the pivoting bearing of the blocking mechanism 17 to the blocking element 18.

The T-shaped blocking mechanism 17 is provided with two
15 pulleys 21, 22 which are rotatably journalled by means of bearing members, preferably ball bearings, on the end portions of the shanks 23, 24 facing away from each other. Each pulley 21; 22 is designed and arranged for interacting with the adjacent counter disc 11; 12 as is
20 shown in the Figures. When viewed in the neutral positions of the accelerator pedals 2, 3 the bearing axis 25; 26 of each pulley is located at predetermined distances from the vertical supporting surface 15; 16 and the downward-facing supporting surface 13; 14 of the
25 counter disc, when viewed along the extended plane of the supporting surfaces, so that a movement of the counter disc 11; 12 in a direction downwards causes the blocking mechanism 17 to perform a pendulous motion around its bearing axis. Accordingly, the above-mentioned
30 predetermined distance is smaller than the radius of the pulley 21; 22. Preferably, these distances are equal, i.e. half the radius of the pulley 21; 22. In the neutral position of the blocking mechanism 17, as shown in Figure 5, each of the two pulleys 21, 22 is in contact
35 with its associated counter disc 11; 12, and in case a

pressure is applied on both pulleys 21, 22 by means of the counter discs 11, 12 by the operator trying to depress both accelerator pedals 2, 3 simultaneously, the counter discs 11, 12 will counteract each other from pivoting the blocking mechanism 17 in any direction. If, on the other hand, only the left-hand accelerator pedal 3 is depressed the counter disc 12 will press down the pulley 22 so that it will roll along the supporting surface 16 of the counter disc 12, at the same time as the blocking mechanism 17 is pivoted in a direction away from the counter disc 12 in order to bring the opposite pulley 21 into a blocking position below the associated counter disc 11 being in contact with its downward-facing supporting surface 13, as is illustrated in Figure 6.

Figure 7 illustrates the corresponding situation when the right-hand accelerator pedal 2 is depressed. The blocking mechanism pivots back into its vertical, neutral position when the accelerator pedal 2; 3 returns to its unaffected neutral position.

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P A T E N T K R A V

1. An arrangement for changing the direction of travel of a vehicle in two opposite directions, including a
5 first accelerator pedal (2) for driving in a first direction and a second accelerator pedal (3) for driving in a second direction which is opposite to the first direction, **characterized in** that it includes a blocking member (17), arranged for blocking both accelerator
10 pedals (2, 3) in their neutral positions when a pressure is applied onto them simultaneously, and that said blocking member is arranged for blocking the first accelerator pedal (2) in its neutral position when a pressure is applied onto the second accelerator pedal (3)
15 in order to drive the vehicle in the second direction, and for blocking the second accelerator pedal (3) in its neutral position when a pressure is applied onto the first accelerator pedal (2) in order to drive the vehicle in the first direction.

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2. An arrangement according to claim 1, **characterized in** that the blocking member (17) is in the form of a pivotally journalled blocking mechanism arranged for being pivoted into a first blocking position while being
25 influenced by the second accelerator pedal (3) in order to block the first accelerator pedal (2) in its neutral position, and into a second blocking position while being influenced by the first accelerator pedal (2) in order to block the second accelerator pedal (3) in its neutral
30 position.

3. An arrangement according to claim 2, **characterized in** that the blocking mechanism (17) is provided with two pulleys (21, 22) which are arranged at a distance from
35 each other and at an equal distance from and below the

bearing axis of the pivoting blocking mechanism (17) and each being arranged for interacting with a counter element (11; 12) of its own for being in contact with a downward-facing supporting surface (13; 14) of the counter element (11; 12) in order to form said blocking position and for being in contact with an opposite, vertical supporting surface (15; 16) of the counter element (11; 12) in order to enable vertical movement of the counter element (11; 12) when depressing the associated accelerator pedal (2; 3).

4. An arrangement according to claim 3, **characterized in** that each pulley (21; 22), when viewed in the neutral position of the blocking mechanism, is located with its bearing axis (25; 26) at predetermined distances from the two supporting surfaces (13, 15; 14, 16) of the counter element (11; 12), when viewed along their extended plane, said distances being smaller than the radius of the pulley and preferably being equal.

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Fig. 1

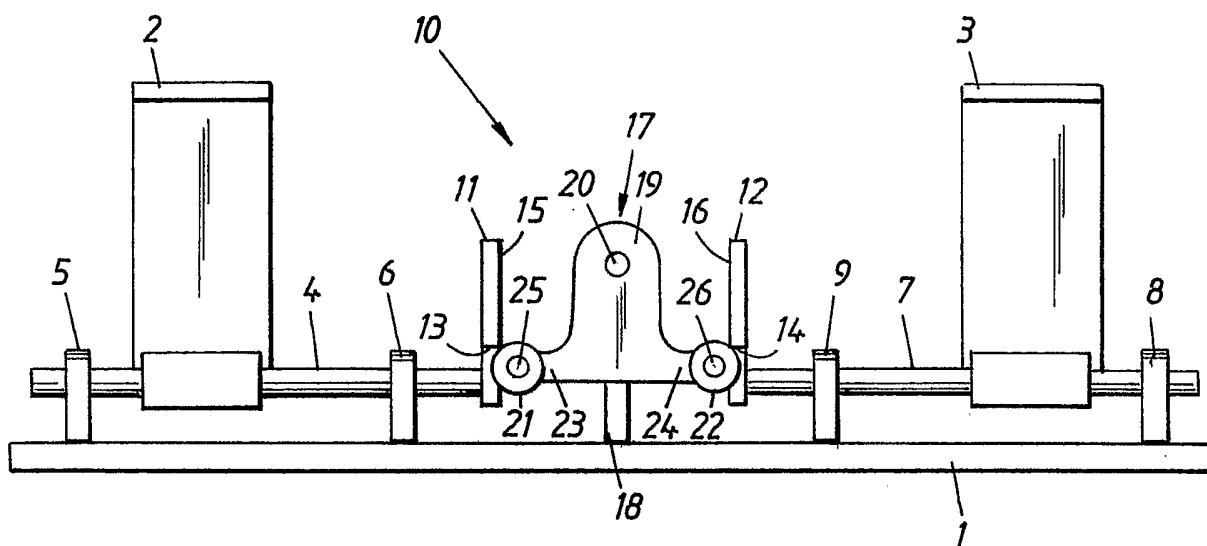


Fig. 2

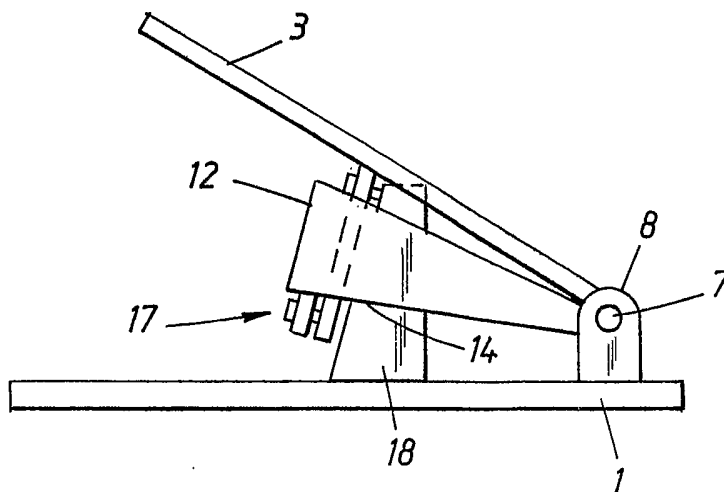


Fig. 3

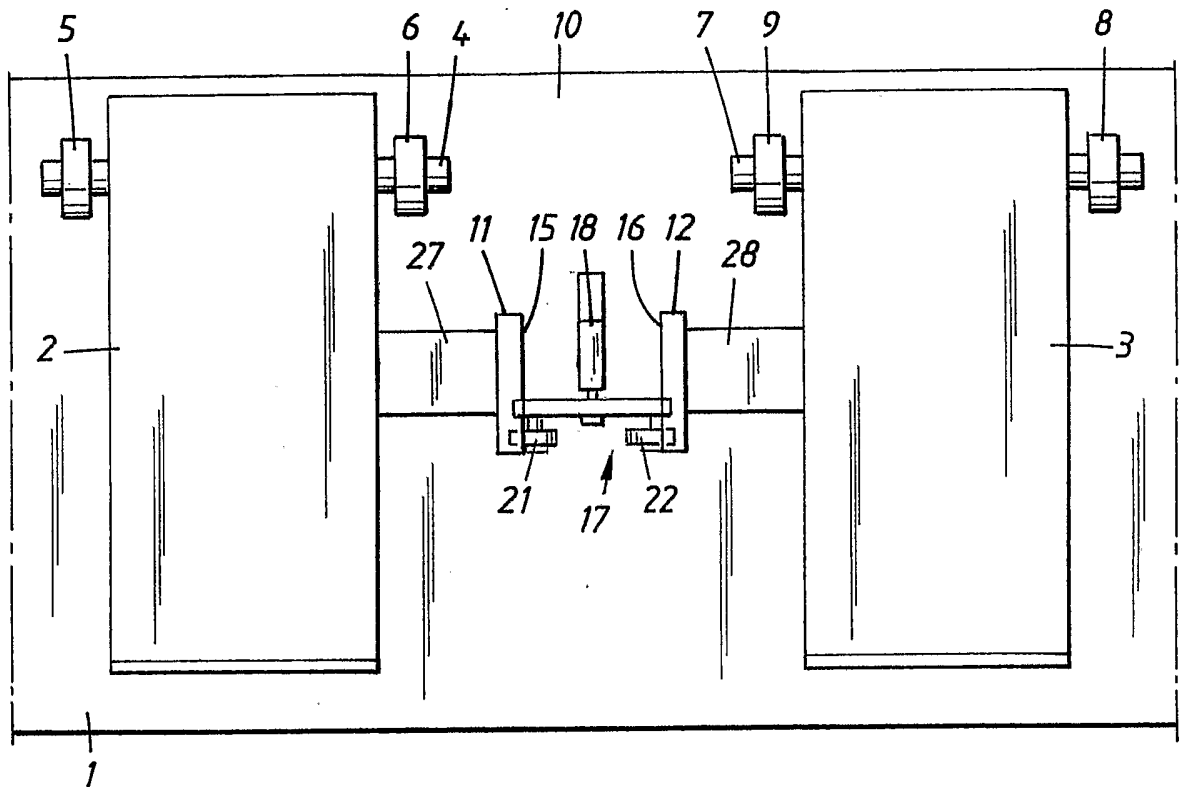


Fig. 4

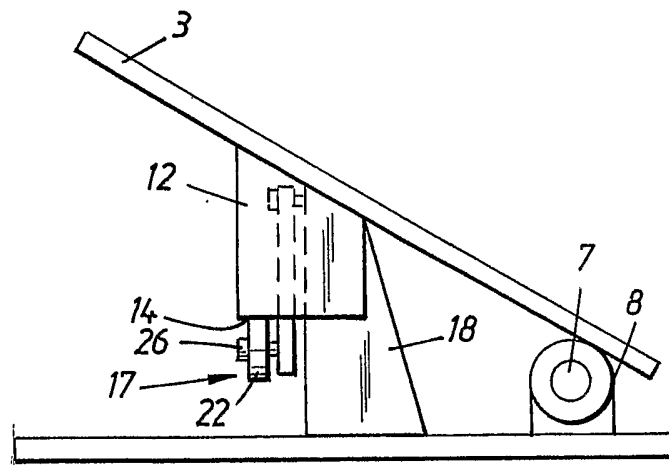


Fig. 5

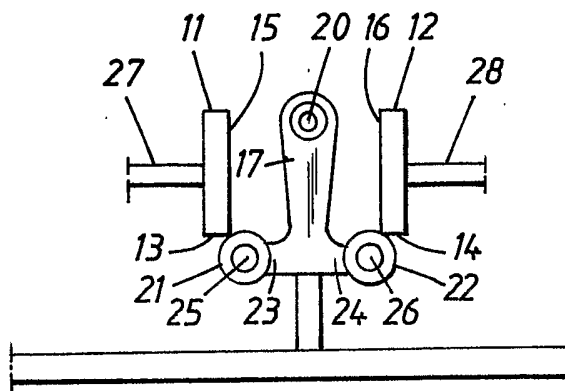


Fig. 6

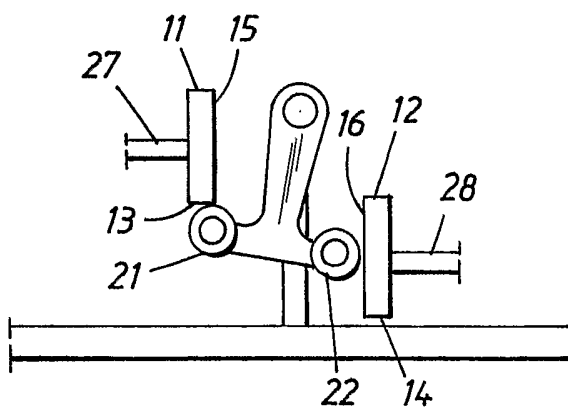
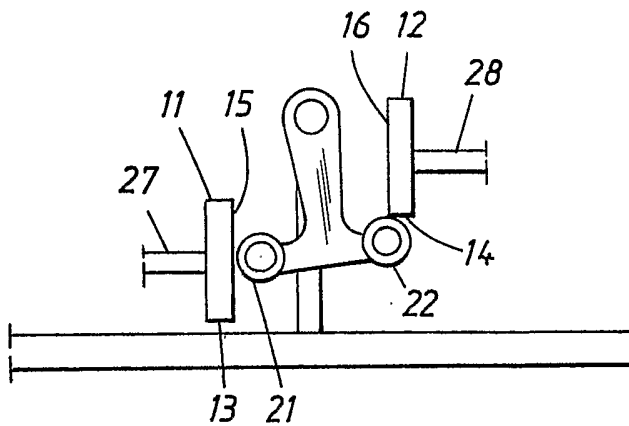


Fig. 7



INTERNATIONAL SEARCH REPORT

International application No.
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A. CLASSIFICATION OF SUBJECT MATTER				
IPC7: G05G 1/14 According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED				
Minimum documentation searched (classification system followed by classification symbols)				
IPC7: G05G				
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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)				
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C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
A	GB 1506803 A (CARRELLI ELEVATOR S.P.A.), 12 April 1978 (12.04.1978) <p style="text-align: center;">--</p>			
A	US 5216935 A (SHIMAMURA ET AL), 8 June 1993 (08.06.1993) <p style="text-align: center;">--</p>			
A	US 6357232 B1 (STRASHNY), 19 March 2002 (19.03.2002) <p style="text-align: center;">--</p> <p style="text-align: center;">-----</p>			
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.				
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INTERNATIONAL SEARCH REPORT

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