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(54) **PEDAL ARRANGEMENT**

PEDALANORDNUNG

SYSTEME PEDALE

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Description

[0001] 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,
- a second accelerator pedal for driving in a second direction which is opposite to the first direction, and
- a blocking mechanism arranged for blocking both accelerator pedals in their neutral positions when a pressure is applied onto them simultaneously, said blocking mechanism 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 said 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 said first direction.

[0002] An arrangement as defined in the preamble of claim 1 is known through US-A-3 412 627. However, this document discloses a pedal control mechanism that includes two biased, vertically displaceable rods connected to the pedals, and a ball received in a port and two grooves in the rods. The ball, port and groove surfaces cooperate with each other in order to permit one rod to be displaced by the influence of associated pedal and the other rod to be non-displaceable, or the reverse.

[0003] 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.

[0004] 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.

[0005] The arrangement according to the invention is characterized in that the blocking mechanism is pivotally journalled and arranged for being pivoted into a first blocking position while being influenced by the second accelerator pedal in order to block the first accelerator pedal in its neutral position, and into a second blocking position while being influenced by the first accelerator pedal in order to block the second accelerator pedal in its neutral position, and that the blocking mechanism is provided with two pulleys which are arranged at a distance from each other and at an equal distance from and below the bearing axis of the pivoting blocking mechanism and each being arranged for interacting with a counter element of its own for being in contact with a downward-facing supporting surface of the counter element in order to form said blocking position and for being in contact with an opposite, vertical supporting surface of the counter element in order to enable vertical movement of the counter element when depressing the associated accelerator pedal.

[0006] The invention will be explained further in the following with reference to the drawings.

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

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

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.

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

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

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

[0007] 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.

[0008] According to this embodiment of 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.

[0009] 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.

[0010] The arrangement according to this embodiment of 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.

[0011] 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 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 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.

[0012] The T-shaped blocking mechanism 17 is provided with two 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 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 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 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 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.

Claims

1. An arrangement for changing the direction of travel of a vehicle in two opposite directions, including

   - a first accelerator pedal (2) for driving in a first direction,
   - a second accelerator pedal (3) for driving in a second direction which is opposite to the first direction, and
   - a blocking mechanism (17) arranged for blocking both accelerator pedals (2, 3) in their neutral positions when a pressure is applied onto them simultaneously, said blocking mechanism (17) being arranged 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 in said 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 said first direction,

   characterized in that the blocking mechanism (17) is pivotally journalled and arranged for being pivoted 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, 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, and that the blocking mechanism (17) is provided with two pulleys (21, 22) which are arranged at a distance from 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).

2. An arrangement according to claim 1, **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.

Patentansprüche

1. Anordnung zur Änderung der Fahrtrichtung eines Fahrzeugs in zwei entgegengesetzte Richtungen mit

   - einem ersten Fahrpedal (2) zum Fahren in einer ersten Richtung,
   - einem zweiten Fahrpedal (3) zum Fahren in einer zweiten Richtung, die zur ersten Richtung entgegengesetzt ist, und
   - einem Sperrmechanismus (17), der angeordnet ist derart, dass beide Fahrpedale (2, 3) in ihrer Neutralposition gesperrt sind, wenn auf die beiden Fahrpedale (2, 3) zeitgleich ein Druck aufgebracht wird, und der Sperrmechanismus (17) angeordnet ist derart, dass das erste Fahrpedal (2) in seiner Neutralposition gesperrt ist, wenn auf das zweite Fahrpedal (3) ein Druck aufgebracht wird, um das Fahrzeug in die zweite Richtung zu bewegen, und das zweite Fahrpedal (3) in seiner Neutralposition gesperrt ist, wenn auf das erste Fahrpedal (2) ein Druck aufgebracht wird, um das Fahrzeug in die erste Richtung zu bewegen,

   dadurch gekennzeichnet, dass
   der Sperrmechanismus (17) drehbar gelagert und angeordnet ist derart, dass der Sperrmechanismus (17) unter Einfluss des zweiten Fahrpedals (3) in eine erste Sperrposition schwenkbar ist, um das erste Fahrpedal (2) in seiner Neutralposition zu sperren, und unter Einfluss des ersten Fahrpedals (2) in eine zweite Sperrposition schwenkbar ist, um das zweite Fahrpedal (3) in seiner Neutralposition zu sperren, und dass der Sperrmechanismus (17) zwei Rollen (21, 22) umfasst, die voneinander beabstandet angeordnet sind und unterhalb der Drehachse des Sperrmechanismus (17) zu dieser jeweils einen gleichen Abstand aufweisen und angeordnet sind der-

art, dass die Rollen (21, 22) jeweils mit einem Gegenelement (11, 12) wechselwirken, wobei die Rollen (21, 22) eine nach unten weisende Stützfläche (13, 14) des Gegenelements (11, 12) berühren, um die Sperrposition zu bilden, und wobei die Rollen (21, 22) eine gegenüber vertikal angeordnete Stützfläche (15, 16) des Gegenelements (11, 12) berühren, um eine vertikale Bewegung des Gegenelements (11, 12) zu ermöglichen, wenn das zugeordnete Fahrpedal (2, 3) gedrückt wird.

2. Eine Anordnung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** jede Rolle (21, 22), betrachtet in der Neutralposition des Sperrmechanismus, mit ihrer Drehachse (25, 26) in vorbestimmten Abständen von den beiden Stützflächen (13, 15, 14, 16) des Gegenelements (11, 12) angeordnet ist und, betrachtet in einer erweiterten Ebene zu den beiden Stützflächen (13, 15, 14, 16), die Abstände zwischen jeweils einer Stützfläche (13, 15, 14, 16) und jeweils einer Drehachse (25, 26) kleiner als bzw. vorzugsweise gleich groß wie der Radius der Rollen (21, 22) sind.

Revendications

1. Dispositif pour changer le sens de déplacement d'un véhicule dans deux directions opposées, comprenant :

   - une première pédale d'accélérateur (2) pour l'entraînement dans une première direction ;
   - une seconde pédale d'accélérateur (3) pour l'entraînement dans une seconde direction opposée à la première direction ; et
   - un mécanisme de blocage (17) permettant de bloquer les deux pédales d'accélérateur (2, 3) dans leur position neutre lorsqu'une pression est appliquée sur elles simultanément, lequel mécanisme de blocage (17) est conçu pour bloquer la première pédale d'accélérateur (2) dans sa position neutre lorsqu'une pression est appliquée sur la seconde pédale d'accélérateur (3) afin d'entraîner le véhicule dans ladite seconde direction, et pour bloquer la seconde pédale d'accélérateur (3) dans sa position neutre lorsqu'une pression est appliquée sur la première pédale d'accélérateur (2) afin d'entraîner le véhicule dans ladite première direction ;

   caractérisé en ce que le mécanisme de blocage (17) est tourillonné de manière pivotante, et disposé pour être pivoté en une première positon de blocage lorsqu'il subit l'influence de la seconde pédale d'accélérateur (3) afin de bloquer la première pédale d'accélérateur (2) dans sa position neutre, et en une seconde positon de blocage lorsqu'il subit l'influence de la première pédale d'accélérateur (2) afin de bloquer la seconde pédale d'accélérateur (3) dans sa position neutre, et **en ce que** le mécanisme de blocage (17) comporte deux poulies (21, 22) qui sont disposées à une certaine distance l'une de l'autre et à égale distance de l'axe de support du mécanisme de blocage pivotant (17) en dessous de celui-ci, chaque poulie étant conçue pour entrer en interaction avec son propre élément contraire (11 ; 12) de manière à entrer en contact avec une surface de support orientée vers le bas (13 ; 14) de l'élément contraire (11 ; 12) afin de réaliser ladite position de blocage, et de manière à entrer en contact avec une surface de support verticale opposée (15 ; 16) de l'élément contraire (11 ; 12) afin de permettre le mouvement vertical de l'élément contraire (11 ; 12) lorsque l'on enfonce la pédale d'accélérateur (2 ; 3) associée.

2. Dispositif selon la revendication 1, **caractérisé en ce que** chacune des poulies (21 ; 22), telle qu'observée dans la position neutre du mécanisme de blocage, a son axe de support (25 ; 26) situé à des distances prédéterminées des deux surfaces de support (13, 15 ; 14 ; 16) de l'élément contraire (11 ; 12), tels qu'observées le long de leur plan étendu, lesdites distances étant inférieures au rayon de la poulie et de préférence égales.

Fig. 1

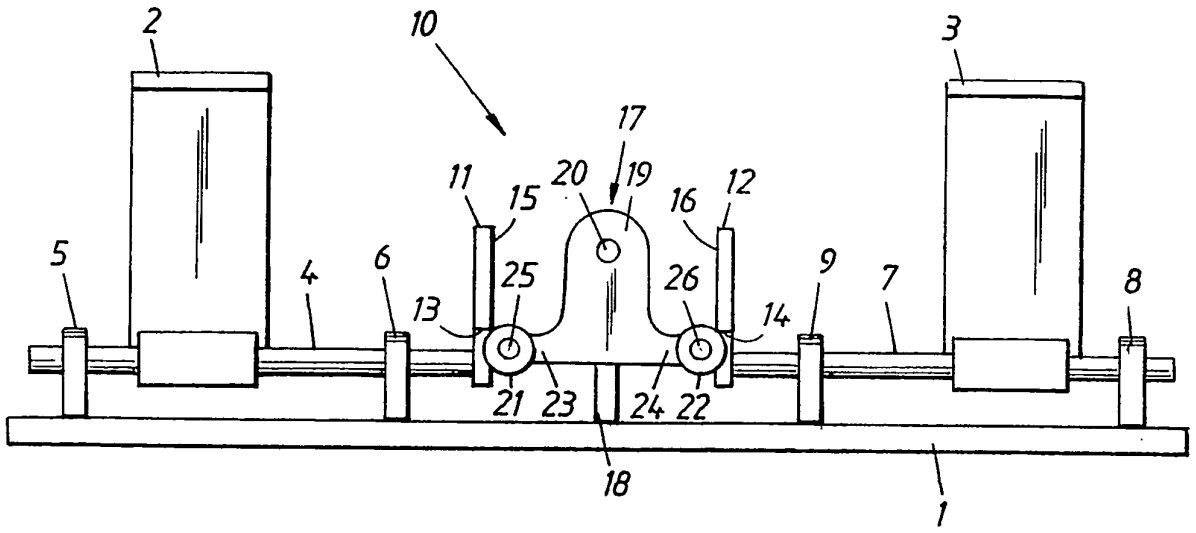

2
10
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Fig. 2

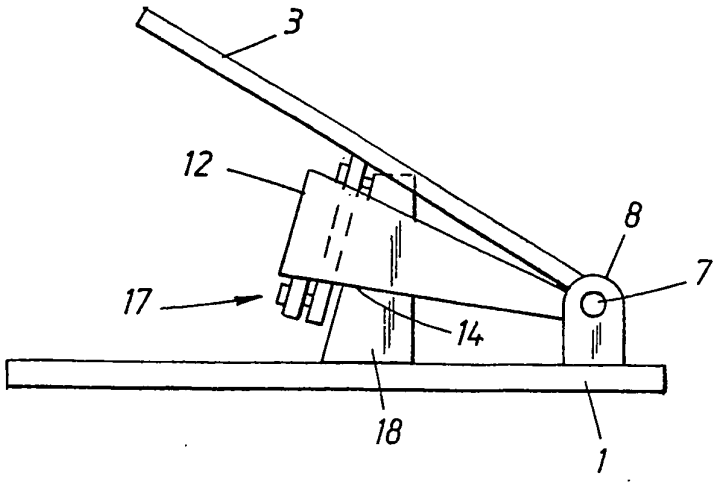

3
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17
14
18
1

Fig. 3

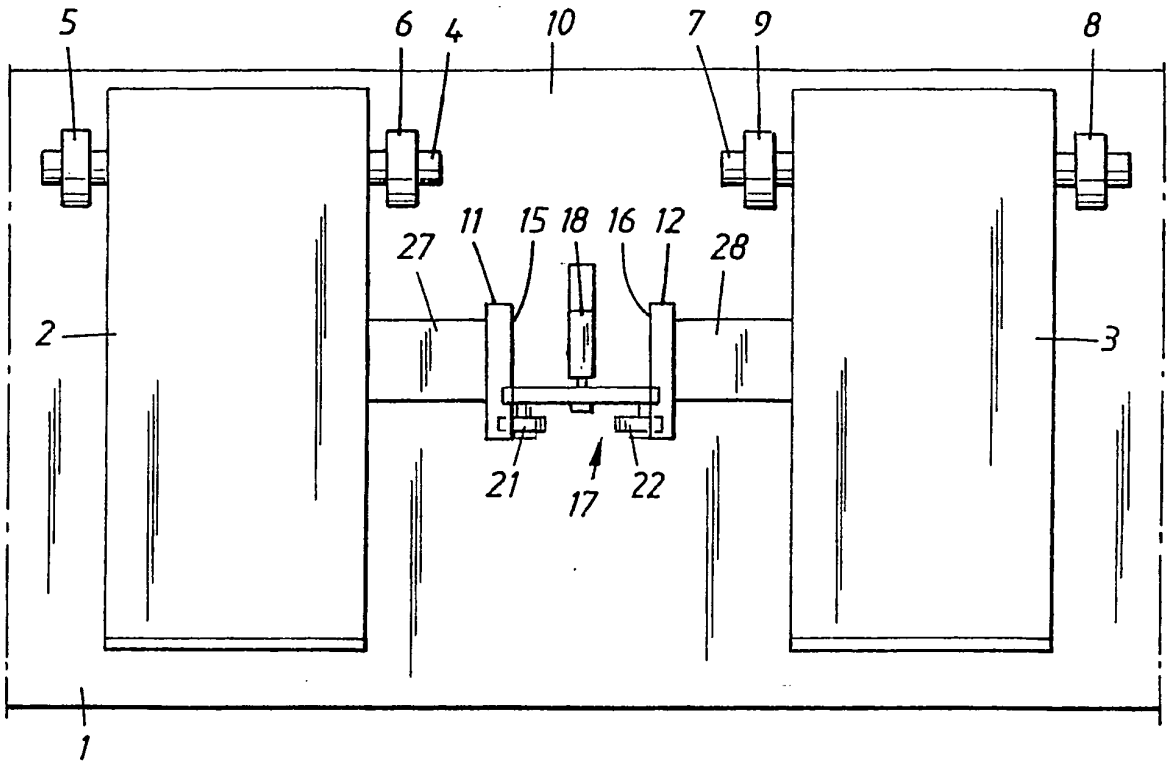


Fig. 4

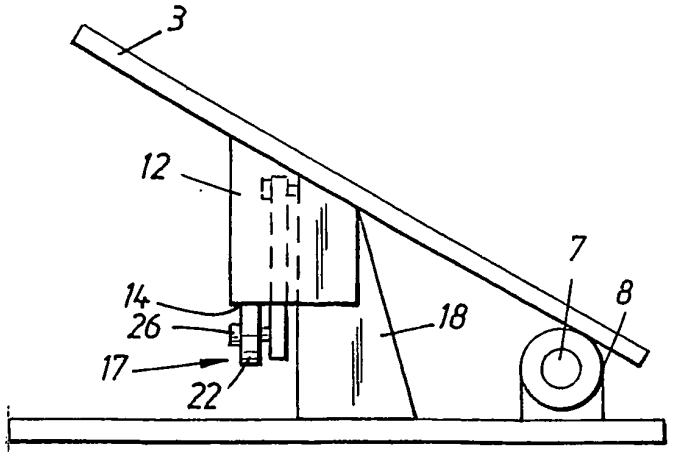


Fig. 5

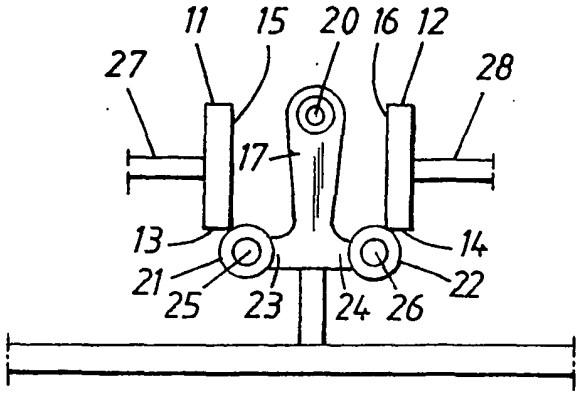


Fig. 6

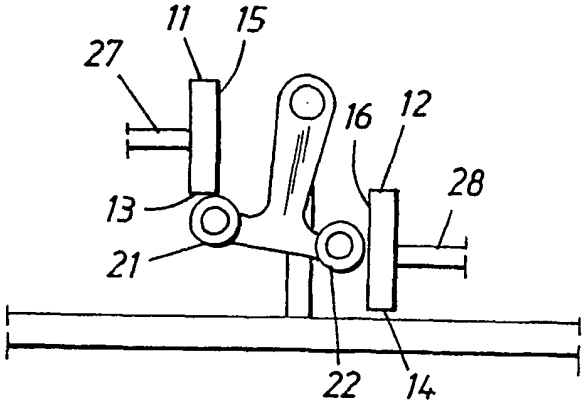
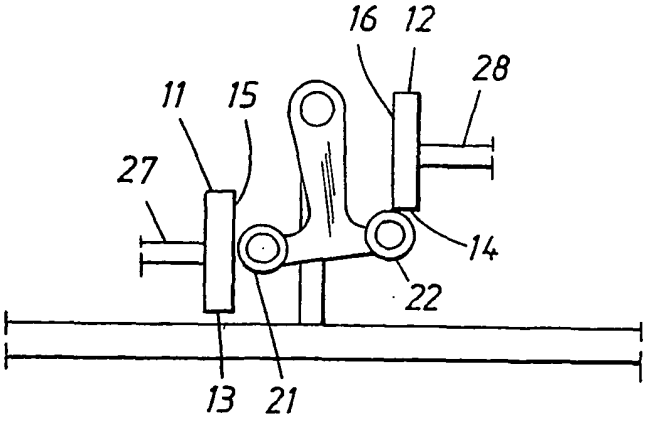


Fig. 7



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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