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(54) **A mobile traffic barrier**

Bewegliche Strassenverkehrssperre

Barrière de contrôle de circulation mobile

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**US-A- 5 035 082**

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## Description

**[0001]** The present invention relates to a mobile traffic barrier, adapted to manage the vehicular traffic and particularly the access to limited traffic areas, as specified in the preamble of claim 1. Such a mobile traffic barrier is known eg from US-A-4 658 543.

**[0002]** A number of traffic barriers are known, generally comprising a moving element, that can be positioned in at least two positions to open or close the barrier itself. Generally speaking, the moving element can slide perpendicularly to the road, being associated to a fixed base element comprising a linear guide, or swing around a vertical axis of rotation.

**[0003]** US-A-4 658 543 discloses a mobile traffic barrier comprising a moving elongate element for being adapted to realize an obstacle to vehicles, said moving element comprising a ground rest to stop its swinging movement around a vertical axis of a base element, said moving element being also connected to said base element through means comprising a hinge with horizontal axis, allowing said moving element to tilt on a vertical plane. During the two movements of swinging and tilting however all the weight of the moving element is supported by the base element and this is a disadvantage if the moving element is an element for street furniture, which are very heavy.

**[0004]** Nowadays, these barriers are also requested to be aesthetically pleasant, for minimizing their impact on locations like historical centres or tourist resorts; therefore the moving element is often an element for street furniture, such a seat or a flower-holder. However, the considerable weight of these elements makes nearly indispensable to provide a ground rest, e.g. a ground wheel, at the end of the moving element.

**[0005]** A known type of motorized mobile traffic barrier, for example, essentially comprise a moving element swinging on a horizontal plane, having one end pivoted to a vertical axis and the other end provided with a ground wheel, driven by an electric motor housed in the moving element itself.

**[0006]** A disadvantage of these barriers is that they are not suited for roads with a roadbed that is not plane, but has some gradient, waving or bumps. As the moving element is resting on the ground, in fact, these may generate rather high stress on the pin of rotation or linear guide, or even stop the movement of the barrier.

**[0007]** It is known that this disadvantage can be limited in road barriers comprising a swinging body connected to the vertical axis of rotation by means of a ball-and-socket joint; however, this is only a partial solution to the problem, because only small angles of inclination are permitted by this kind of joint.

**[0008]** Another way to avoid the inconvenient could be to provide a rail-guide buried in the roadbed for the moving element, but such a solution is clearly very expensive and does not allow to move the barrier from one place to another according to the needs.

**[0009]** The aim of the invention is to eliminate this and others disadvantages, realizing a traffic barrier adapted to compensate bumps and/or depressions of the roadbed, thus adapted to use on roads having a non-plane roadbed, without any inconvenience.

**[0010]** The aim of the invention is also to realize a road barrier that is easy to install, without breaking the roadbed, adapted to be moved and positioned according to needs.

**[0011]** Another aim is to realize a barrier that can be easily placed in historical centres or tourist resorts, with a good visual impact.

**[0012]** This aim is achieved with a mobile traffic barrier as claimed in claim 1.

**[0013]** The base element is conveniently substantially cylindrical or polygonal, said vertical axis passing at the center of the base element itself; the moving element is conveniently a main longitudinally extending element, for being adapted to realize an unsurmountable obstacle to vehicles.

**[0014]** A first general embodiment of the invention refers to a manual barrier, comprising a fixed base element provided with a pin, and a moving element that comprise an arm with one end pivotally connected to said pin and the opposite end connected to the moving element by a hinge with horizontal axis.

**[0015]** A second general embodiment of the invention refers to a motorized mobile traffic barrier wherein the ground rest is mobile and connected to motor means, and:

- the motor means are housed in the base element and supported by a frame structure, which is also rotating around said axis, said body being connected to said structure by a hinge pin with horizontal axis;
- said ground rest is connected to said motor means by a transmission shaft provided with at least one articulated joint.

**[0016]** The main advantage of the invention is that the swinging element can freely tilt on a vertical plane, following the profile of the roadbed. Therefore, the barrier can be used on any road even in case of considerable roughness of the roadbed, or when cross-section of the road is convex or concave for draining the rain.

**[0017]** Another advantage is that all the control- and power electric connections of motorized barriers can be housed in the base element, that results in easier realization and on-site installation.

**[0018]** Yet another advantage is that the invention allows to realize a road barrier aesthetically pleasant, suited for historical and tourist resorts.

**[0019]** The invention is now described more in detail, with the help of the drawings showing some embodiments by way of non-limiting examples.

**[0020]** Fig. 1 is a schematical top view of a manual barrier according to the invention.

**[0021]** Fig. 2 is a front view of the barrier of Fig. 1.

**[0022]** Fig. 3 is a top view of a barrier similar to that of Fig. 1, further comprising a seat.

**[0023]** Fig. 4 is a lateral view of a barrier similar to that of Fig. 1, but comprising two moving elements connected to a single fixed element.

**[0024]** Fig. 5 is a view of a motorized road barrier according to the invention, where thicker lines show the main internal mechanism.

**[0025]** Fig. 6 and Fig. 7 are enlargements of some particulars of Fig. 5.

**[0026]** Fig 8a and Fig. 8b show the functioning of a position sensor for detecting the end of the stroke, that is provided in a preferred embodiment of the invention.

**[0027]** Fig. 9 is a top view of the barrier of Fig. 5 in closed and open position, respectively with thick lines and thin lines.

**[0028]** Fig. 10 is a perspective view of the barrier of Fig. 5, where the cover of the base element is removed to show the motor and other internal components.

**[0029]** Referring now to the figures, two general embodiments of the invention are shown.

**[0030]** According to the first embodiment of figures 1 to 4, the traffic barrier essentially comprise a base element 101 and a moving element 102, pivotally connected to the base element 101 by means of a hinge 103. Said hinge 103 allows the moving element 102 to swing along a substantially arc-shaped trajectory T.

**[0031]** Both elements 101 and 102 are conveniently elements for urban decoration such as flower-holders, seats or others, made of wood or concrete.

**[0032]** The moving element 102 comprise a ground rest, preferably obtained with pivoting wheels 104, and is connected to the fixed element 101 by means of a hinge 105 with a substantially horizontal axis, that allows the moving element 102 to tilt on a vertical plane, following the profile of the roadbed.

**[0033]** In the shown embodiment, the upper face of the base element 101 comprise a pin 106; the moving element 102 is connected to the base element 101 with an arm 107, having one end fitted with a collar 108 adapted to be freely inserted on said pin 106.

**[0034]** The opposite end of the arm 107 is connected to the moving element 102 by said hinge 105. More in detail, the moving element 102 comprise a support 109, for example a tubular made of stainless steel; two drilled plates 110 are fixed to said support 109, and the end of the arm 107 has a hole and is connected to said plates 110 by a pin 111, thus realizing the hinge 105.

**[0035]** The moving element 102 may also comprise a plurality of supports 109, for easy connection to other elements for urban decoration, in a modular system.

**[0036]** The above described embodiment is convenient for manually-operated barriers, comprising a removable handle 113; however, suitable motor means may also be housed in the base element 101.

**[0037]** The moving element 102 is preferably fitted with stop means, realized for example with a further ground rest 112 that can be extracted with a screw drive, for

avoiding undesired movement of the element 102, e.g. caused by its weight.

Advantageously, the upper face of the base element 101 comprise a plate 114 with holes 115, that allows to connect other fixed element like a seat 116, by means of screws 117 or equivalent reversible connecting means.

**[0038]** A plurality of moving elements 102 may be connected to the same base element 101, for regulating traffic on crossroads. In this case, the arms 107 of the various elements 102 are staggered as shown in fig. 4.

**[0039]** The embodiment of Fig. 5 to 10 is a motorized road barrier realized according to the invention, essentially comprising a moving element 201, which is main longitudinally extending, pivotally connected to a vertical axis 202 and provided with a mobile ground rest, realized by a wheel 203, connected to an electric motor 204.

**[0040]** The motor 204 is housed in a base element 205, external to the moving element 201, and is supported by a frame structure 206 which is also rotating around the vertical axis 202.

**[0041]** The moving element 201 is connected to said structure 206 by means of a hinge pin 207 having a substantially horizontal axis, thus realizing a hinge that allows the moving element to tilt on a vertical plane.

**[0042]** The motor 204 is connected to the driving wheel 203 by a transmission shaft 208, that is provided with at least one articulated joint, advantageously a Cardan- or universal joint.

**[0043]** In the shown embodiment, the transmission shaft 208 is connected to the driving shaft of the motor 204 by a first universal joint 211, and is connected to the wheel 203 by a second universal joint 212.

**[0044]** The transmission shaft is conveniently realized in two parts connected by a slip joint 213. A certain axial slip between the two parts of the shaft is therefore permitted to compensate for the variation of axial distance between motor 204 and wheel 203, that is caused by the inclination of the moving element 201 that can be induced by a roadbed with a considerable gradient.

**[0045]** A reduction gear 210 is provided between the motor 204 and the transmission shaft 208, which in the preferred embodiment is an angular reduction gear, for allowing to install the motor 204 with vertical axis, thus reducing overall dimensions.

**[0046]** The frame structure 206 is substantially realized with a casing that comprises vertical rods, reinforcing collars and a bottom platform, resting on a plate 214, this last being fixed with screws to a counter-plate 215 secured to the ground.

**[0047]** The resting of the rotating frame structure 206 on the plate 214, which remains stationary, is realized with an axial bearing 216 and self-lubricating supports 217, such as Teflon supports.

**[0048]** The moving element 201 is connected to the pin 207 through a bracket 209, whose arms have one end fixed to said body and the opposite end engaging said pin.

**[0049]** The bracket 209 is advantageously provided

with a top cover, not shown, which is openable or removable. Said cover allows easy access to the universal joint 211, for disconnection of shaft 208 from reduction gear 210 and manual operation of the barrier in case of power failure. For this purpose, the universal joint 211 is conveniently of the kind with a locking ring, for quick coupling to the shaft.

**[0050]** The top cover of the bracket 209 can be realized essentially with two metal sheets, positioned in contact one on the other, for leaving the element 201 free to tilt around the pin 207.

**[0051]** The element 201 may be, for example, made of concrete, the wheel 203 being supported by a journal 218 fixed to a steel cross-member screwed to the bottom of the element 201 itself.

**[0052]** For automatic operation, mobile contacts with adjustable position, activated by contact with a stationary element, are advantageously provided, to produce a signal that is correlated to the angular position of the moving element 201 on the horizontal plane, for example for automatic stop at the end of the stroke.

**[0053]** Referring now to the example of Fig. 8a and Fig. 8b, said contacts may comprise a switch 220 fixed to a support 221, whose position is adjustable on a guide 222 associated to the frame structure 206.

**[0054]** More in detail, said switch 220 comprise a contact 223 and a flexible blade 224, adapted to cooperate with a stationary element 225, that is fixed, for example, to the plate 214.

**[0055]** The contact between the blade 224 and the element 225, during the movement of the barrier, close the switch 220 as shown in Fig. 8b, thus detecting the end of the stroke.

**[0056]** For safety reasons, the barrier may also comprise some sensors, not shown, housed in the base 205 and rotating with the moving element 201, that detect obstacles on its trajectory and, if any, immediately stop the motor.

**[0057]** The barrier is also equipped with a control panel 230, advantageously housed in the base 205. According to the needs, a key, badge or remote command system can be provided, as well as a temporized automatic command system for opening or closing at predetermined hours and for emergency and automatic stop.

**[0058]** The moving element 201 is preferably a flower-holder, having the shape illustrated in the figures, substantially of a parallelepiped with rounded ends, that is nice-looking and easy to introduce even in historical centres.

**[0059]** It is clear that the moving element 201 may also be another element for street furniture, and may comprise light signals, road signs, information for tourists, and so on.

**[0060]** The base element 205 is conveniently provided with a protective cover, and is shaped as a common cylindrical traffic barrier.

**[0061]** In practice, the materials employed, so long as they are compatible with the specific use, as well as the

dimensions, may be any according to requirements and to the state of the art.

## 5 Claims

1. A mobile traffic barrier comprising a moving element (102), (201) swinging around a vertical axis and comprising at least one ground rest (104), (203), a base element (101), (205) to which said moving element is connected through means (107), (209) comprising a hinge with horizontal axis, allowing said moving element to tilt on a vertical plane, **characterized in that** said ground rest comprises at least one wheel that moves on the roadbed during the swinging movement and, in cooperation with said hinge with horizontal axis, allows said moving element to tilt on a vertical plane, so that the moving element can follow the profile of the roadbed.
2. A barrier according to claim 1, **characterized in that** said moving element (102), (201) is main longitudinally extending, for being adapted to realize an obstacle to vehicles, and said base element (101), (205) is substantially cylindrical or polygonal.
3. A barrier according to claim 1, **characterized in that** said vertical axis is passing at the centre of said base element (101), (205).
4. A barrier according to claim 1, **characterized in that** it comprises a removable handle (113) for manual operation.
5. A barrier according to claim 1, **characterized in that** it comprises stop means (112).
6. A barrier according to claim 1, **characterized in that** said base element (101) comprise connecting means (114) for further elements (116) of urban decoration or utility.
7. A barrier according to claim 1, **characterized in that** said base element (101) is stationary and comprises a pin (106), and means connecting the moving element (102) to the base element (101) comprise an arm (107) having one end fitted with a collar (108), adapted to be freely inserted on said pin (106), while said hinge with horizontal axis (105) is connecting the other end of the arm (107) to the moving element (102).
8. A barrier according to claim 1, wherein the ground rest (203) of the moving element (201) is connected to motor means (204), **characterized in that:**
  - the motor means (204) are associated to said base element (205) and supported by a frame

structure (206), which is also rotating around said vertical axis;  
 - the ground rest (203) is connected to said motor means (204) by a transmission shaft (208) provided with at least one articulated joint (211), (212).

9. A barrier according to claim 6, **characterised in that** the moving element (201) is connected to the frame structure (206) through a bracket (209), comprising arms with one end fixed to said body (1) and the opposite end engaging a pin (207) for realizing said hinge with horizontal axis.
10. A barrier according to claim 6, **characterised in that** the transmission shaft (208) is provided with a first Cardan joint (211) for connection to the driving shaft of the motor (204) and a second Cardan joint (212) for connection to the mobile ground rest (203).
11. A barrier according to claim 6, **characterised in that** the transmission shaft (208) is realized in at least two parts, connected each other by means of an axial slip joint (213).
12. A barrier according to claim 6, **characterised in that** said frame structure (206) is resting on a plate (214) that can be fixed to a counter-plate (215) secured to the ground.
13. A barrier according claim 6, **characterized in that** it comprises mobile contacts (224) associated to the moving element and cooperating with stationary contacts (225) to give a signal correlated to the angular position of said moving element on a horizontal plane.
14. A barrier according to claim 6, **characterized in that** it comprises sensors housed in the base element (205) adapted to detect obstacles on the trajectory of the moving element (201) and to stop the motor (204).

#### Patentansprüche

1. Ortsveränderliche Verkehrsschranke bestehend aus einem beweglichen Element (102), (201), das um eine Hochachse schwingt und mindestens eine Bodenstütze (104), (203) umfasst, einem Grundelement (101), (205), an das genanntes bewegliches Element durch Einrichtungen (107), (209) verbunden ist, die ein Gelenk mit waagerechter Achse umfassen, sodass genanntes bewegliches Element an einer Hochachse schwenken kann, **dadurch gekennzeichnet, dass** genannte Bodenstütze mindestens ein Rad umfasst, das sich am Straßenbett während der Schwenkbewegung bewegt und das in

Kooperation mit genanntem Gelenk mit waagerechter Achse ermöglicht, dass das bewegliche Element an einer senkrechten Ebene schwenkt, sodass das bewegliche Element dem Profil des Straßenbetts folgen kann.

2. Verkehrsschranke nach Anspruch 1, **dadurch gekennzeichnet, dass** sich genanntes bewegliches Element (102), (201) hauptsächlich der Länge nach erstreckt, damit es in der Lage ist, zu einem Hindernis für die Fahrzeuge zu werden und dass genanntes Grundelement (101), (205) im wesentlichen zylindrisch oder polygonal ist.
3. Verkehrsschranke nach Anspruch 1, **dadurch gekennzeichnet, dass** genannte Hochachse in der Mitte des genannten Grundelementes (101), (205) verläuft.
4. Verkehrsschranke nach Anspruch 1, **dadurch gekennzeichnet, dass** sie einen abnehmbaren Hebel (113) für manuelle Eingriffe umfasst.
5. Verkehrsschranke nach Anspruch 1, **dadurch gekennzeichnet, dass** sie Halteeinrichtungen (112) umfasst.
6. Verkehrsschranke nach Anspruch 1, **dadurch gekennzeichnet, dass** genanntes Grundelement (101) Verbindungseinrichtungen (114) für weitere Elemente (116) zum Zwecke städtischer Dekoration oder anderer Nutzen umfasst.
7. Verkehrsschranke nach Anspruch 1, **dadurch gekennzeichnet, dass** genanntes Grundelement (101) ortsgebunden ist und einen Stift (106) umfasst und dass die Einrichtungen zum Verbinden des beweglichen Elements (102) an das Grundelement (101) einen Arm (107) umfassen, der ein mit einem Bund (108) ausgerüstetes Ende hat, um auf genannten Stift (106) frei eingesetzt zu werden, während genannter Gelenkteil mit der waagerechten Achse (105) das andere Ende des Arms (107) an das bewegliche Element (102) verbindet.
8. Verkehrsschranke nach Anspruch 1, in der die Bodenstütze (203) des beweglichen Elements (201) an Motoreinrichtungen (204) verbunden ist, **dadurch gekennzeichnet, dass:**
  - die Motoreinrichtungen (204) an genanntes Grundelement (205) verbunden und von einer Rahmenstruktur (206) getragen sind, die auch um genannte Hochachse rotiert;
  - die Bodenstütze (203) an genannte Motoreinrichtungen (204) durch eine mit mindestens einem Gelenk (211), (212) ausgerüstete Übertragungswelle (208) verbunden ist.

9. Verkehrsschranke nach Anspruch 6, **dadurch gekennzeichnet, dass** das bewegliche Element (201) mit der Rahmenkonstruktion (206) durch eine Halterung (209) verbunden ist, bestehend aus Armen mit einem Ende, das am genannten Körper (1) befestigt ist und dem gegenüberliegenden Ende, das in einen Stift (207) eingreift, um genanntes Gelenk mit waagerechter Achse zu realisieren.
10. Verkehrsschranke nach Anspruch 6, **dadurch gekennzeichnet, dass** die Übertragungswelle (208) mit einem ersten Kardangelenk (211) für die Verbindung an die Triebwelle des Motors (204) und einem zweiten Kardangelenk (212) für die Verbindung an die bewegliche Bodenstütze (203) ausgerüstet ist.
11. Verkehrsschranke nach Anspruch 6, **dadurch gekennzeichnet, dass** die Übertragungswelle (208) aus mindestens zwei Teilen besteht, die durch ein axiales Schiebegelenk (213) miteinander verbunden sind.
12. Verkehrsschranke nach Anspruch 6, **dadurch gekennzeichnet, dass** genannte Rahmenstruktur (206) auf einer Platte (214) aufliegt, die auf eine am Boden gesicherte Gegenplatte (215) befestigt werden kann.
13. Verkehrsschranke nach Anspruch 6, **dadurch gekennzeichnet, dass** sie bewegliche Kontakte (224) umfasst, die mit dem beweglichen Element verbunden sind und mit standfesten Kontakten (225) zusammenwirken, um ein mit der Winkellage des genannten beweglichen Elements auf einer Horizontalebene korreliertes Signal zu geben.
14. Verkehrsschranke nach Anspruch 6, **dadurch gekennzeichnet, dass** sie im Grundelement (205) untergebrachte Sensoren umfasst, die in der Lage sind, Hindernisse auf der Kurve des beweglichen Elements (201) zu ermitteln und den Motor (204) zu arretieren.
- bile de s'incliner sur un plan vertical, de sorte que l'élément mobile puisse suivre le profil du terrain d'appui.
2. Une barrière selon la revendication 1, **caractérisée par le fait que** ledit élément mobile (102), (201) se prolonge principalement de manière longitudinale pour être adapté à réaliser un obstacle pour les véhicules et que ledit élément de base (101), (205) est substantiellement cylindrique ou polygonal.
3. Une barrière selon la revendication 1, **caractérisée par le fait que** ledit axe vertical passe au centre dudit élément de base (101), (205).
4. Une barrière selon la revendication 1, **caractérisée par le fait qu'elle** comprend une poignée amovible (113) pour l'actionnement manuel.
5. Une barrière selon la revendication 1, **caractérisée par le fait qu'elle** comprend un dispositif d'arrêt (112).
6. Une barrière selon la revendication 1, **caractérisée par le fait que** ledit élément de base (101) comprend un dispositif de connexion (114) pour d'autres éléments (116) de décoration urbaine ou de service.
7. Une barrière selon la revendication 1, **caractérisée par le fait que** ledit élément de base (101) est stationnaire et comprend une goupille (106) et un dispositif raccordant l'élément mobile (102) à l'élément de base (101) comprenant un bras (107) disposant d'une extrémité dotée d'un collier (108), prévu pour être librement introduit sur ladite goupille (106), tandis que ladite charnière à axe horizontal (105) raccorde l'autre extrémité du bras (107) à l'élément mobile (102).
8. Une barrière selon la revendication 1, où l'appui au sol (203) de l'élément mobile (201) est raccordé à un dispositif motorisé (204), **caractérisé par le fait que :**

#### Revendications

1. Une barrière de sécurité mobile comprenant un élément mobile (102), (201) basculant autour d'un axe vertical et comprenant au moins un appui au sol (104), (203), un élément de base (101), (205) auquel ledit élément mobile est relié par un dispositif (107), (209) comprenant une charnière avec un axe horizontal, permettant audit élément mobile de s'incliner sur un plan vertical, **caractérisée par le fait que** ledit appui au sol comprend au moins une roue qui se déplace sur le terrain de fondation pendant le mouvement basculant et, en coopération avec ladite charnière à axe horizontal, permet audit élément mo-
- le dispositif motorisé (204) est associé audit élément de base (205) et soutenu par une structure de châssis (206), qui pivote également autour dudit axe vertical ;
- l'appui au sol (203) est raccordé audit dispositif motorisé (204) par un arbre de transmission (208) doté d'au moins un joint articulé (211), (212).
9. Une barrière selon la revendication 6, **caractérisées par le fait que** l'élément mobile (201) est raccordé à la structure de châssis (206) par un support (209), comprenant des bras avec une extrémité fixée audit corps (1) et l'extrémité opposée s'engageant dans

une goupille (207) pour réaliser ladite charnière à axe horizontal.

10. Une barrière selon la revendication 6, **caractérisées par le fait que** l'arbre de transmission (208) est doté d'un premier joint de cardan (211) pour la connexion à l'arbre d'entraînement du moteur (204) et un deuxième joint de cardan (212) pour la connexion à l'appui au sol mobile (203). 5
- 10
11. Une barrière selon la revendication 6, **caractérisées par le fait que** l'arbre de transmission (208) est réalisé en au moins deux parties, connectées entre elles à l'aide d'un joint coulissant axial (213). 15
12. Une barrière selon la revendication 6, **caractérisées par le fait que** ladite structure de châssis (206) repose sur une plaque (214) qui peut être fixée à une contre-plaque (215) fixée au sol. 20
13. Une barrière selon la revendication 6, **caractérisées par le fait qu'**elle comprend des contacts mobiles (224) associés à l'élément mobile et coopérant avec des contacts stationnaires (225) pour fournir un signal lié à la position angulaire dudit élément mobile sur un plan horizontal. 25
14. Une barrière selon la revendication 6, **caractérisées par le fait qu'**elle comprend des capteurs logés dans l'élément de base (205) prévus pour détecter les obstacles sur la trajectoire de l'élément mobile (201) et pour arrêter le moteur (204). 30

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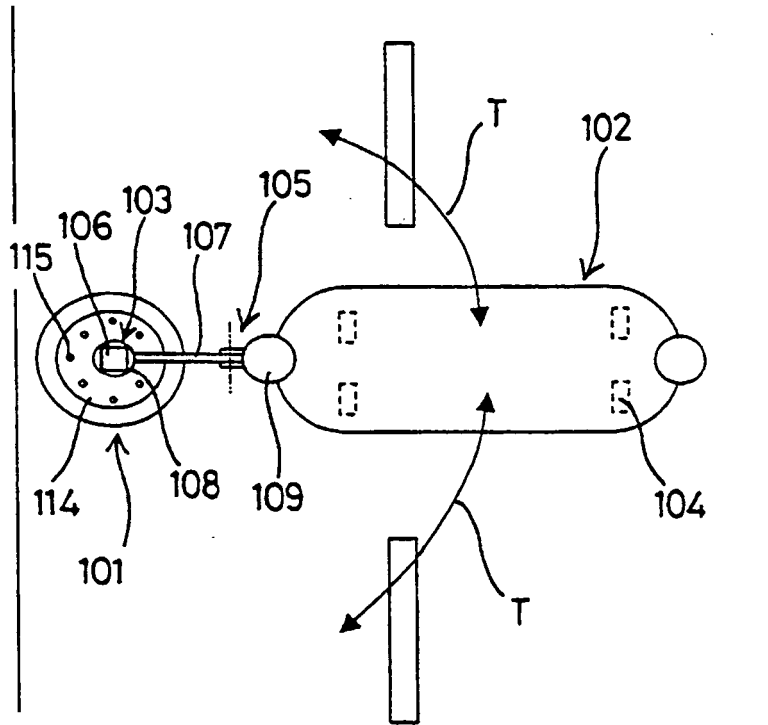


FIG. 1

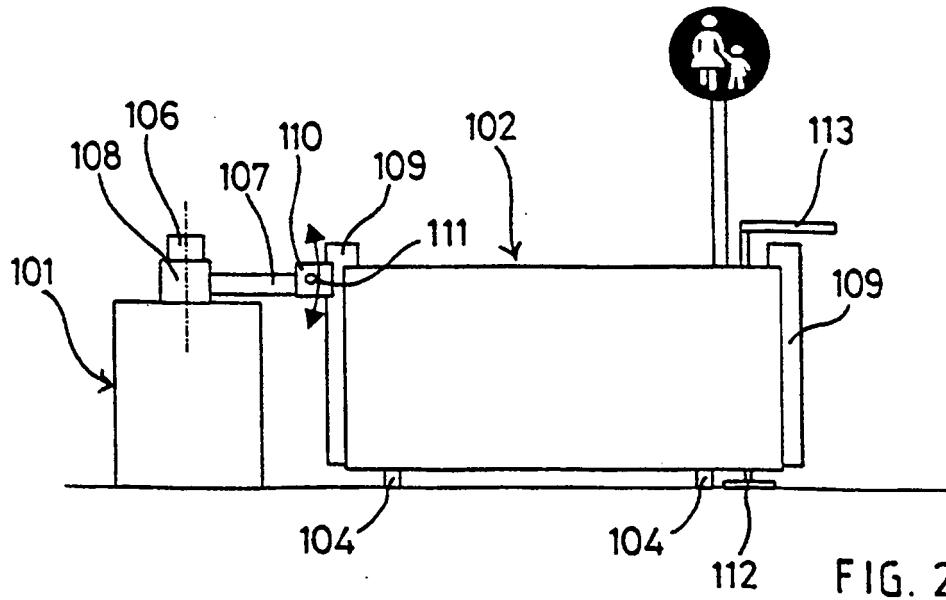


FIG. 2

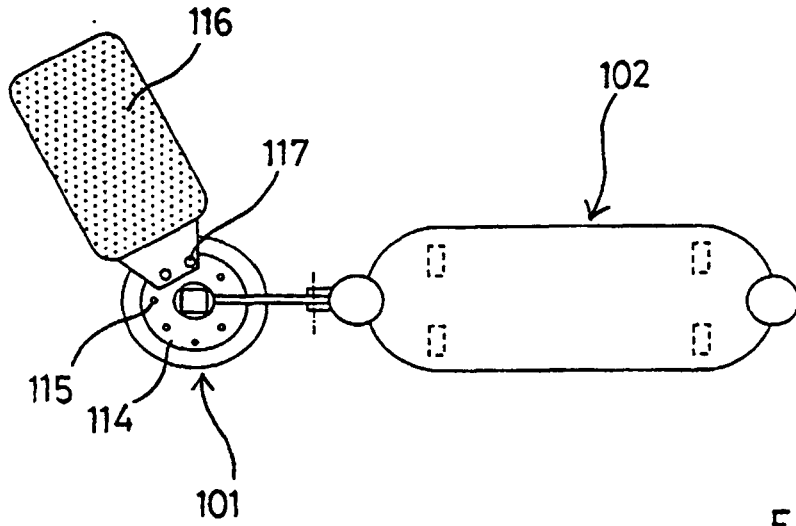


FIG. 3

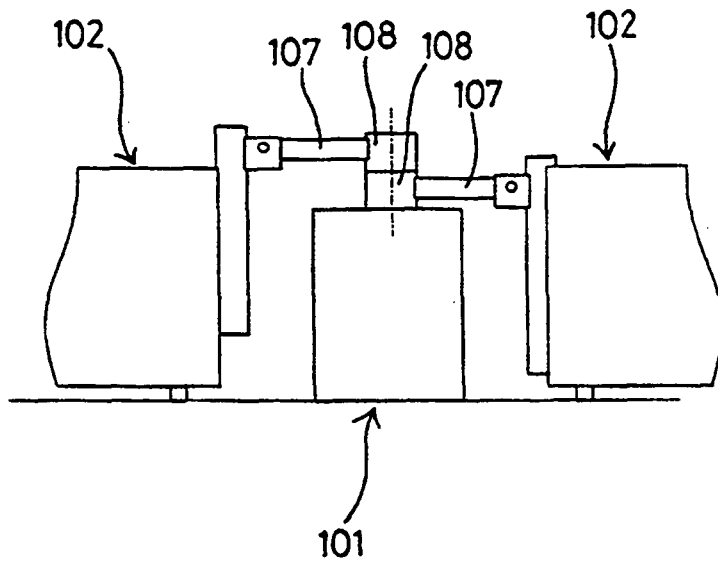
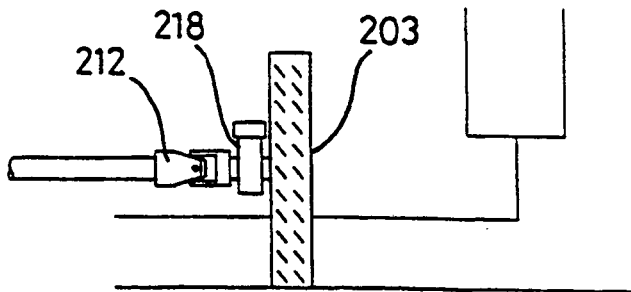
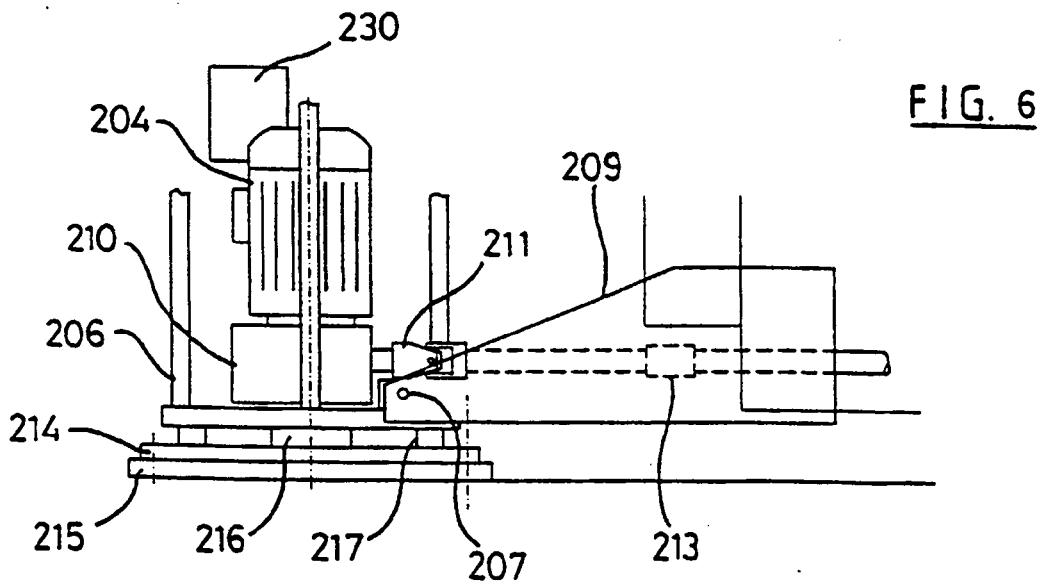
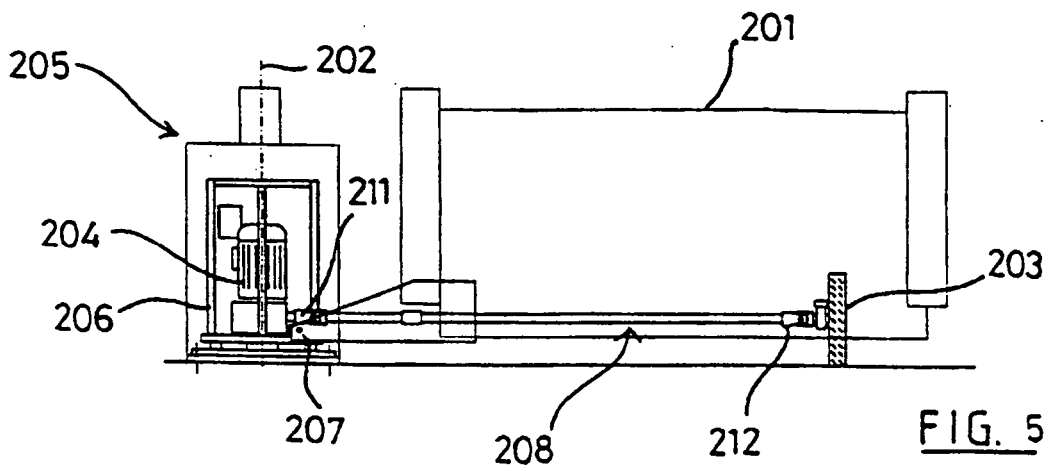
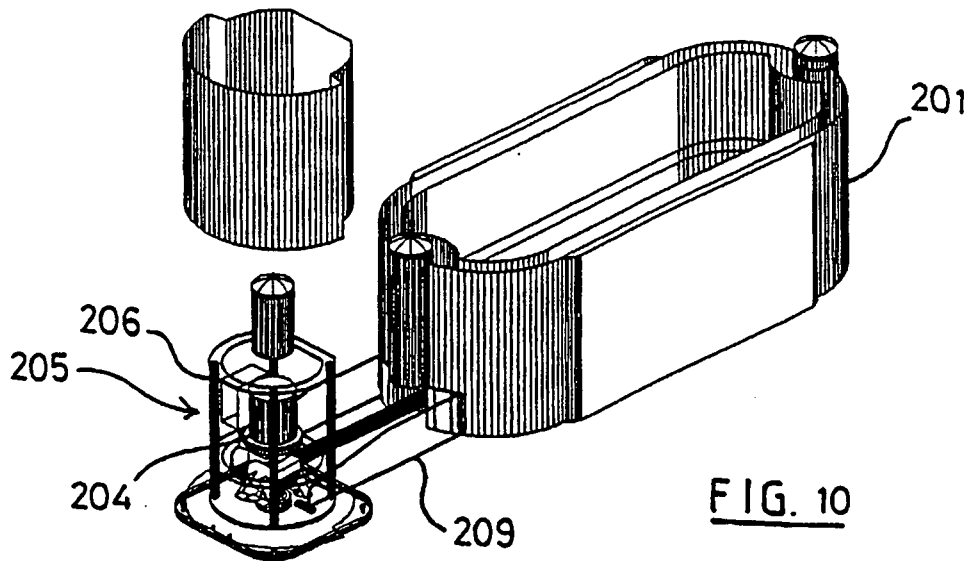
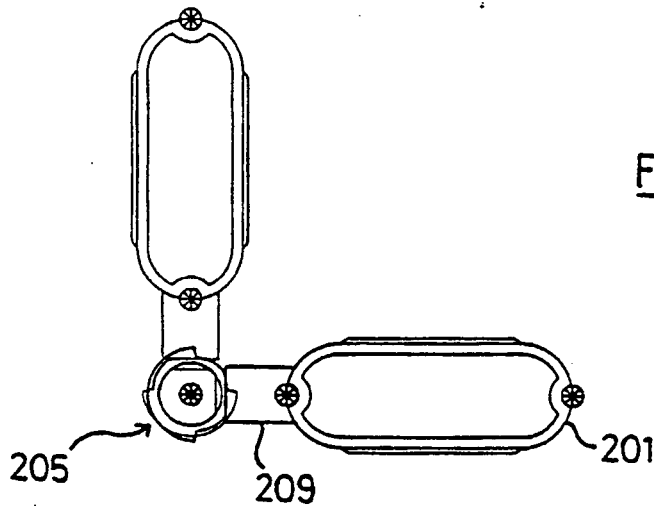
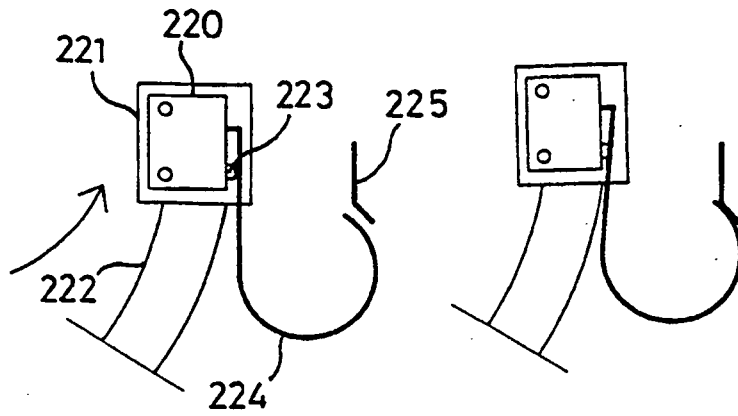


FIG. 4





**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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