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(54) **Road blocking device**

Vorrichtung zum Sperren von Strassen

Dispositif de barrage de routes

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Description

[0001] The present invention relates to a device for blocking a roadway and the like for road users, which device comprises an obstacle which can be placed in a first position, in which the obstacle projects above the road surface, and a second position, in which the obstacle hardly projects above the road surface, if at all, which obstacle can be pivoted about a pivot from said first position to said second position, and vice versa, by driving means disposed below the road surface.

[0002] A road barrier according to the above introduction is known, for example from NL-A-94/00571, in which the obstacle is a straight beam. The object of such known road barriers is in the first place to draw the road users' attention, by their very presence, to the fact that the roadway behind the obstacle is out of bounds. In the second place, the obstacle makes it physically impossible in the first position thereof to reach the roadway behind the obstacle, for example with a vehicle, at least without sustaining damage.

[0003] One drawback of such a road barrier, which is known per se, is the fact that the obstacle may be blocked under a vehicle which is already present while being pivoted to the first position, which may result in unintentional damage to the vehicle and to the obstacle. In addition to that, the obstacle in the form of a straight beam is unsafe for pedestrians and cyclists in the first position thereof. Partly because of that, road barriers as disclosed in NL-A-94/00571 are being used less and less. Furthermore, the current road barriers are characterized by having considerable spatial dimensions, both above and below the road surface.

[0004] Another road barrier, as disclosed in US-A-5,762,443, employs an obstacle which can be moved vertically up and down to a position below and above the road surface, which road barrier is likewise considered to be unsafe for pedestrians and/or cyclists.

[0005] The object of the present invention is to provide a road barrier of the kind referred to in the introduction, which, in addition to being compact and of simple design, is safe for the road users. In order to accomplish that objective, the road barrier according to the invention is characterized in that the obstacle is an elongated, curved element, which curved element is connected to the driving means, in such a manner that the curved element describes a (part of a) circular arc upon being moved to the first position.

[0006] The result obtained by designing the obstacle as an elongated, curved element which describes at least a part of a circular arc upon being moved to the first position, is not only a reduction of the installation space, in particular under the road surface, but also an aesthetic and ergonomically safe obstacle, which is quite suitable for performing its primary function, viz. blocking a roadway, and which is furthermore safe for the road user.

[0007] In one embodiment, the device according to the invention is characterized in that the curved element is

connected to the driving means by means of a connecting piece. The connecting piece may lie in the plane formed by the curved element. The advantage of using a connecting piece which is connected to the curved element on the one hand and to the driving means on the other hand is that any forces exerted on the curved element (by the road users) will not be transmitted to the driving means, as a result of which the life of the driving means is considerably prolonged.

[0008] The connecting piece may be in the form of a straight shaft, wherein, in order to achieve a more compact installation of the road barrier under the road surface, the length of the straight shaft equals the radius of the circle described by the curved element.

[0009] In more specific embodiments, the curved element forms a segment of a circle of about 90° or about 180°.

[0010] In another embodiment of the road barrier according to the invention, in which the risk of unnecessary damage to vehicles and/or accidents involving cyclists and pedestrians is eliminated, the detection means are arranged in the other, free end of the obstacle for timely detection of an object present right in front of the obstacle while said obstacle is being moved to the first position. Said detection means may comprise infrared or ultrasonic sensors, for example.

[0011] The invention will be explained in more detail hereinafter with reference to a drawing, which drawing successively shows in:

Figure 1 various views of a first embodiment of the road barrier according to the invention;
Figure 2 another embodiment of the road barrier according to the invention; and in
Figure 3 yet another embodiment of the road barrier according to the invention.

[0012] Figures 1a-1d show various operational stages of a road blocking device according to the invention. Characteristic of a road blocking device which can be moved to a position under the road surface 5 is the installation space 1, in which the device can be accommodated as a whole.

[0013] Figure 1a shows the road blocking device in its second position, i.e. the position in which the entire device is present in the space 1 below the road surface 5. The road blocking device comprises an obstacle 2 in the form of an elongated, curved element 2, which describes a part of a circular arc of about 180° in this embodiment. The curved obstacle 2 is connected to a connecting piece 3 with one end 2b, which connecting piece is a straight shaft in this embodiment, which connects the end 2b of the curved element 2 to the pivot 4, which, as appears from the front view of Figure 1d, forms the axis of rotation of a driving means 6.

[0014] whereas the side elevation of Figure 1a shows the road blocking device in its second position, the side elevation of Figure 1b shows the road blocking device in

a first position, in which the curved obstacle 2 as well 1 as the straight shaft 3 have been rotated through an angle of 90° about the pivot 4. The free end 2a has thereby been moved to a position above the road surface 5, and that in such a manner that the curved obstacle describes a (part of arc) circular arc (refer to the dotted lines in Figure 1b in this connection).

[0015] Another operational stage, in which the curved obstacle has been moved to a first position above the road surface 5, is shown in the side elevation of Figure 1c. In this position, the curved obstacle 2 has been rotated through an angle of 180° about the pivot 4 by means of the straight shaft 3.

[0016] As the front view of Figure 1d shows, the driving means 6, which may be an electric motor, for example, is connected to the pivot 4 via a reduction gearing 7. In order to protect the reduction gearing 7 and the driving means 6 against forces that may be exerted on the curved obstacle 2 by road users, plastic shear pins are placed between the reduction gearing 7 and the pivot 4, which pins will shear off in the case of excessive forces being exerted on the curved obstacle 2, thus preventing damage to the reduction gearing and to the driving means.

[0017] In the two respective first positions that are shown in Figures 1b and 1c, the curved obstacle forms an effective road barrier for road users, which is not only aesthetic but also ergonomically very safe for cyclists and pedestrians. In addition, the road blocking device according to the invention can thus be used in various orientations, with the first position as shown in Figure 1b being intended for blocking the traffic approaching the road blocking device from the right to the left, seen in the figure, or vice versa.

[0018] The first position of the curved obstacle 2 as shown in Figure 1c is generally used in a traffic situation in which the direction of the traffic extends perpendicularly to the drawing.

[0019] Figures 2a-2c show different embodiments of the road blocking device according to the invention, in which the connecting piece 3a is not a straight shaft as shown in Figures 1a-1d, but a plate-shaped element fixed to the pivot 4 and over part of the circular arc described by the curved obstacle 2. As is clearly shown in the side elevation of Figure 2a, the connecting piece 3a is in the form of a quarter wedge of pie in this embodiment.

[0020] The driving means, which are in the form of an electric motor 6 in Figures 1a-1d, are in the form of a linear motor 8 in this embodiment, which motor moves the connecting piece 3a and the curved obstacle 2 connected thereto about the pivot 4 from the first second position to the first position, and vice versa, by means of a crank shaft-connecting rod transmission (8a, 9). In this embodiment, however, the rotation of the curved obstacle 2 about the pivot 4 is limited to about 45°.

[0021] On the other hand, the linear motor 8 guarantees a mechanical locking in the first and in the second position by means of the crank shaft-connecting rod transmission 8a, 9.

[0022] Figures 2a-2c show yet another embodiment of the road blocking device according to the invention. In this embodiment, detection means 10 are arranged in the free end 2a of the curved obstacle 2, which detection means ensure timely detection of the possible presence of an object right in front of the obstacle 2 when the obstacle 2 is being moved from the second position to the first position. If the detection means detect such an object, which may be a vehicle or a person, for example, during the upward movement of the curved obstacle 2, the operation of the driving means 8 (or the driving means 6 from Figures 1a-1d) will be interrupted on the basis thereof, thus preventing any contact between the free end 2a and the detected object. This safety aspect provides a road blocking device which on the one hand is safe for the road users but which, on the other hand, is also capable of providing an adequate road block.

[0023] Figures 3a-3c show other applications of a road blocking device as shown in Figures 1a-1d and/or 2a-2c. The road blocking device according to the invention can in particular be used in pairs, with Figure 2 showing two road blocking devices according to the invention disposed side by side, both in their second position. Roadway 5 is thus available for use by road users. In Figure 3b, the two curved obstacles 2 have been rotated through an angle of 90° about their pivot 4 and thus occupy a first position, in which an intermediate space is present between the two free ends 2a of the curved obstacles 2 facing towards each other. Said intermediate space allows pedestrians and cyclists to pass whilst blocking the passage for road users such as cars and delivery vans. A complete road block, in which the passage of pedestrians and cyclists is blocked, is shown in Figure 3c, in which the two curved obstacles 2 have been rotated through 180° about their respective pivots 4, thus blocking the roadway completely.

[0024] It will be apparent that the present road blocking device provides a widely usable instrument which is not only capable of blocking the roadway to road users in a very effective manner, but which also provides a blocking device which is safer for the road users.

Claims

1. A device for blocking a roadway and the like for road users, which device comprises
 - i) an obstacle (2) which can be placed in a first position, in which the obstacle (2) projects above the road surface (5), and a second position, in which the obstacle (2) hardly projects above the road surface (5), if at all, and
 - ii) driving means (6) disposed below the road surface (5) and being arranged for pivoting the obstacle (2) about a pivot (4) from said first position to said second position, and vice versa, characterized in that the obstacle is shaped

as an elongated, circular curved element, which circular curved element is connected to the driving means, in such a manner that the circular curved element is rotatable about its circular center point thereby describing at least a part of a circular arc upon being moved from the second to the first position.

2. A device according to claim 1, **characterized in that** the curved element is connected to the driving means by means of a connecting piece (3-3a). 5
3. A device according to claim 2, **characterized in that** the connecting piece lies in the plane formed by the curved element. 10
4. A device according to claim 2 or 3, **characterized in that** the connecting piece is in the form of a straight shaft (3). 15
5. A device according to claim 4, **characterized in that** the length of the straight shaft (3) equals the radius of the circle described by the curved element. 20
6. A device according to any one or more of the preceding claims, **characterized in that** the circular curved element forms a segment of a circle of about 90°. 25
7. A device according to any one or more of the preceding claims, **characterized in that** the circular curved element forms a segment of a circle of about 180°. 30
8. A device according to any one or more of the preceding claims, **characterized in that** detection means (10) are arranged in the free end (2a) of the obstacle (2) for timely detection of an object present right in front of the obstacle while said obstacle is being moved to the first position. 35
9. A device according to claim 8, **characterized in that** said detection means comprise infrared sensors. 40
10. A device according to claim 8, **characterized in that** said detection means comprise ultrasonic sensors. 45

Patentansprüche

1. Vorrichtung zum Sperren einer Straße oder Ähnliches für Straßenbenutzer, wobei die Vorrichtung umfasst
 - i) ein Hindernis (2), das in einer ersten Position platziert werden kann, in der das Hindernis (2) über der Straßenoberfläche (5) hervor steht, und in einer zweiten Position, in der das Hinder-

nis (2) kaum über der Straßenoberfläche (5) hervor steht, wenn überhaupt, und

(ii) ein Antriebsmittel (6), das unter der Straßenoberfläche (5) angeordnet ist und so angeordnet ist, dass es das Hindernis (2) von der ersten Position zu der zweiten Position und umgekehrt um einen Zapfen (4) schwenkt, **dadurch gekennzeichnet, dass** das Hindernis als ein verlängertes, kreisförmiges, gebogenes Element geformt ist, wobei das kreisförmige gebogene Element mit dem Antriebsmittel verbunden ist, auf solch eine Weise, dass das kreisförmige gebogene Element drehbar um seinen kreisförmigen Mittelpunkt ist, wobei es mindestens einen Teil eines kreisförmigen Bogens beschreibt, nachdem es von der zweiten zur ersten Position bewegt wird.

2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** das kreisförmige Element mittels eines Verbindungsstücks (3-3a) mit dem Antriebsmittel verbunden ist. 20
3. Vorrichtung nach Anspruch 2, **dadurch gekennzeichnet, dass** das Verbindungsstück in der Ebene liegt, die von dem gebogenen Element gebildet wird. 25
4. Vorrichtung nach Anspruch 2 oder 3, **dadurch gekennzeichnet, dass** das Verbindungsstück in Form eines geraden Schafts (3) vorliegt. 30
5. Vorrichtung nach Anspruch 4, **dadurch gekennzeichnet, dass** die Länge des geraden Schafts (3) dem Radius des Kreises gleicht, der von dem gebogenen Element beschrieben wird. 35
6. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das kreisförmige gebogene Element ein Segment eines Kreises von ungefähr 90° bildet. 40
7. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das kreisförmige gebogene Element ein Segment eines Kreises von ungefähr 180° bildet. 45
8. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** an dem freien Ende (2a) des Hindernisses (2) für die rechtzeitige Erkennung eines Objekts, das direkt vor dem Hindernis vorhanden ist, Erkennungsmittel (10) angeordnet sind, während das Hindernis zu der ersten Position bewegt wird. 50
9. Vorrichtung nach Anspruch 8, **dadurch gekennzeichnet, dass** das Erkennungsmittel Infrarotsensoren umfasst. 55

10. Vorrichtung nach Anspruch 8, **dadurch gekennzeichnet, dass** das Erkennungsmittel Ultraschallsensoren umfasst.

Revendications

1. Dispositif pour barrer une route et similaire aux usagers de la route, ledit dispositif comprenant :

- i) un obstacle (2) pouvant être placé dans une première position, dans laquelle l'obstacle (2) fait saillie au-dessus de la surface de la route (5), et dans une seconde position, dans laquelle l'obstacle (2) fait à peine saillie au-dessus de la surface de la route (5), voire pas du tout, et
- ii) des moyens de commande (6) disposés au-dessous de la surface de la route (5) et étant prévus de sorte à faire pivoter l'obstacle (2) autour d'un axe (4) de ladite première position vers ladite seconde position, et vice versa,

caractérisé en ce que ledit obstacle est configuré comme un élément incurvé circulaire allongé, ledit élément incurvé étant relié aux moyens de commande, de telle manière à pouvoir faire tourner l'élément incurvé circulaire autour de son point central de cercle, parcourant ainsi au moins une portion d'un arc de cercle lors de son passage de la seconde à la première position.

2. Dispositif selon la revendication 1, **caractérisé en ce que** l'élément incurvé est relié aux moyens de commande par l'intermédiaire d'une pièce de liaison (3-3a).

3. Dispositif selon la revendication 2, **caractérisé en ce que** la pièce de liaison est disposée dans le plan défini par l'élément incurvé.

4. Dispositif selon la revendication 2 ou 3, **caractérisé en ce que** la pièce de liaison est sous la forme d'un arbre droit (3).

5. Dispositif selon la revendication 4, **caractérisé en ce que** la longueur de l'arbre droit (3) est égale au rayon du cercle décrit par l'élément incurvé.

6. Dispositif selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** l'élément incurvé circulaire définit un segment de cercle de 90° environ.

7. Dispositif selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** l'élément incurvé circulaire définit un segment de cercle de 180° environ.

8. Dispositif selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** des moyens de détection (10) sont agencés dans l'extrémité libre (2a) de l'obstacle (2) de manière à détecter en temps opportun la présence d'un objet situé juste devant l'obstacle tandis que l'obstacle est déplacé vers la première position.

9. Dispositif selon la revendication 8, **caractérisé en ce que** lesdits moyens de détection comprennent des capteurs infrarouge.

10. Dispositif selon la revendication 8, **caractérisé en ce que** lesdits moyens de détection comprennent des capteurs à ultrasons.

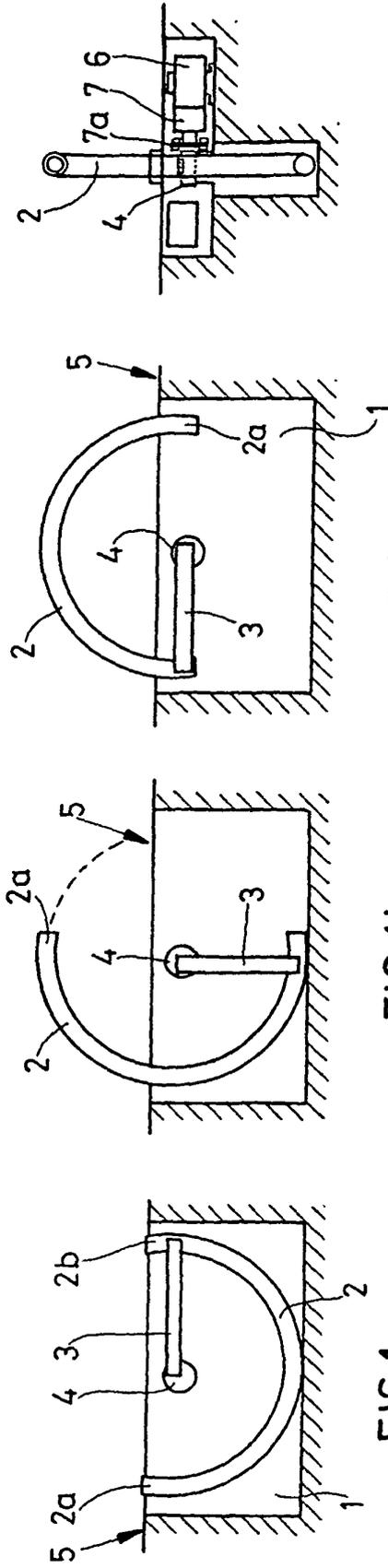


FIG.1a

FIG.1b

FIG.1c

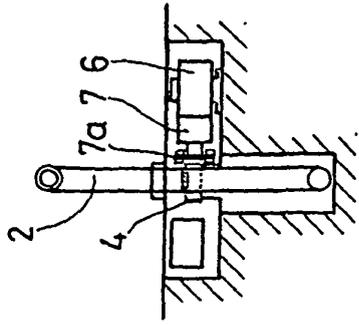


FIG.1d

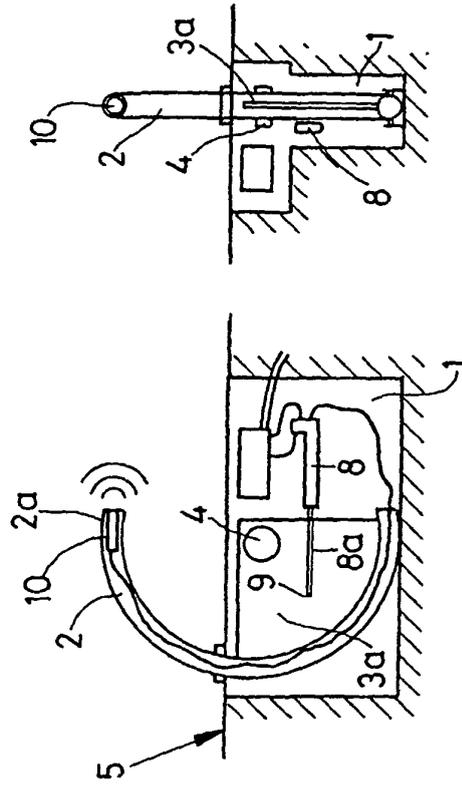


FIG.2a

FIG.2b

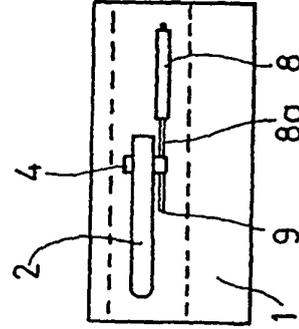


FIG.2c

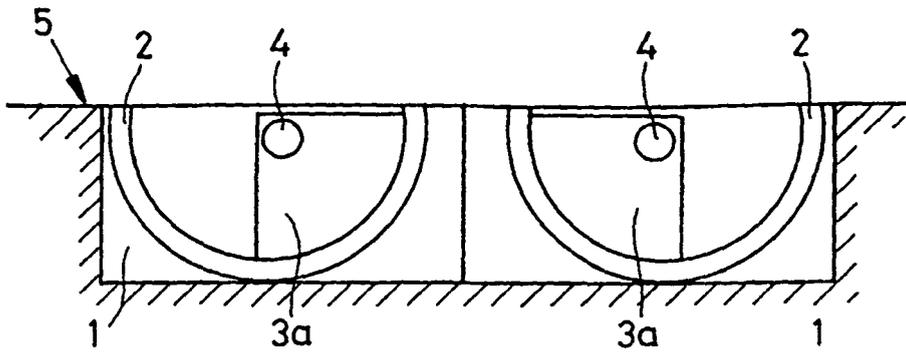


FIG. 3a

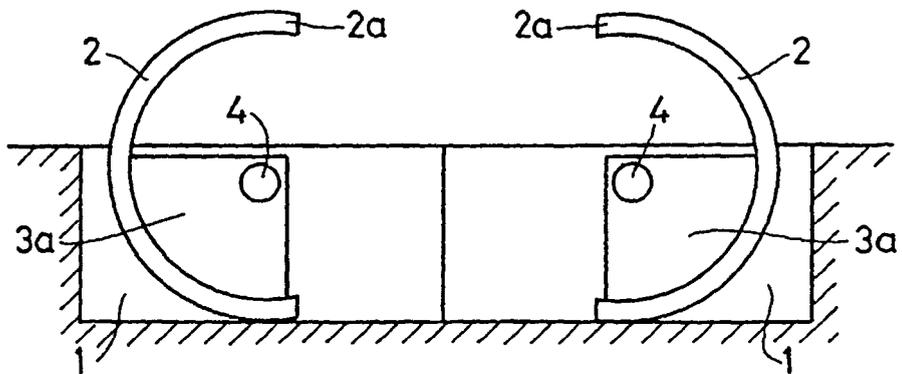


FIG. 3b

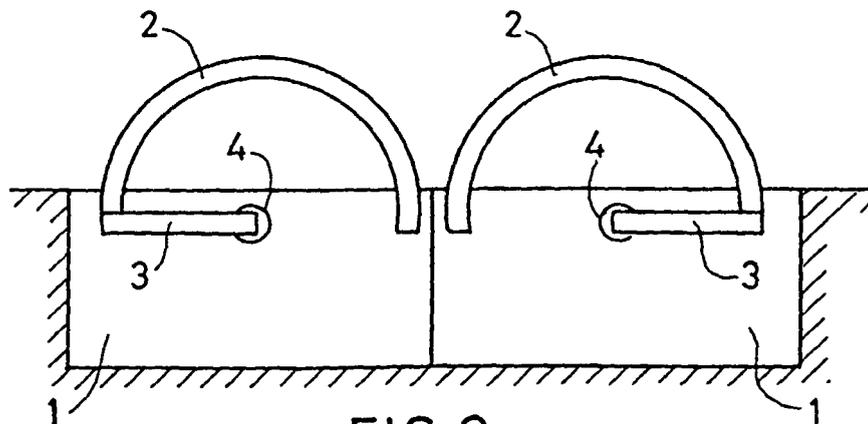


FIG. 3c

REFERENCES CITED IN THE DESCRIPTION

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