

Carriageway boundary element and arrangement consisting of two carriageway boundary elements

5 The present invention relates to a carriageway boundary element and to an arrangement consisting of two carriageway boundary elements according to the precharacterizing clause of the independent claim.

10 Various such carriageway boundary elements, also colloquially called crash barriers, are known from the prior art. The purpose of the carriageway boundary is to retain vehicles on the carriageway in the event of an accident. However, carriageway boundary elements of the type in question are intended to make it possible to provide a passage for emergency situations or for
15 the traffic, for example if the latter has to be diverted.

DE 20 2004 011 860 U1 has disclosed a device for opening and/or closing a passage in a carriageway boundary. This involves a carriageway boundary element which is of two-part design, and
20 wherein a first element is arranged in a stationary manner and a second element is arranged so as to be movable relative to said first stationary element. It is proposed in DE 20 2004 011 860 U1 to displace the second element by means of a traction element transmission. Disadvantages of the device according to the
25 document cited above include the circumstance of accommodating the traction element transmission. The traction element transmission is arranged within a cavity or under a cover plate. However, the abovementioned construction has a complex design and the maintenance is complicated.

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It is the object of the invention to eliminate these and further disadvantages of the prior art.

This object is achieved by the devices defined in the independent patent claims. Further embodiments emerge from the dependent patent claims.

5 A carriageway boundary element according to the invention comprises a stationary element and a telescopic element. The stationary element and the telescopic element each have two side walls. The side walls of the respective elements are each connected to each other. They are preferably connected to each
10 other in such a manner that the telescopic element and/or the stationary element are formed as a hollow profile. The telescopic element is arranged within the stationary element so as to be displaceable along a longitudinal axis. The carriageway boundary element has a traction element drive, in particular a
15 chain drive, for displacing the telescopic element relative to the stationary element. The traction element drive is arranged between a side wall of the stationary element and a side wall of the telescopic element, in particular in a depression of the telescopic element, and extends in the direction of the
20 longitudinal axis. The traction element drive is preferably arranged vertically, that is to say, an axis of rotation of the drive extends substantially horizontally during use as intended.

Additionally or alternatively, provision can preferably be made
25 to arrange the traction element drive in a bulge of the stationary element.

Carriageway boundary elements are typically erected along a carriageway in the direction of travel. Carriageway boundary
30 elements therefore typically have an elongate extent in the carriageway direction, wherein the carriageway boundary elements have a longitudinal axis which extends in the direction of

travel during use of the carriageway boundary element as intended.

5 The vertical arrangement of the traction element drive makes it possible to dispense with an additional support of the individual strands.

10 The telescopic element is preferably arranged within the stationary element, wherein, in a cross section transversely with respect to the longitudinal axis, the telescopic element is substantially surrounded by the stationary element.

15 The arrangement of the traction element drive between a side wall of the stationary element and a side wall of the telescopic element has the advantage that an actuating device of the traction element drive is firstly easily accessible and is secondly protected against weather influences.

20 If the traction element drive is arranged in a depression or in a bulge of a side wall of the telescopic element or of a side wall of the stationary element, this contributes to the stability of the carriageway boundary element. The moment of inertia of carriers is increased by bulges or depressions. This leads to a higher flexural rigidity of the element.

25 The traction element drive preferably has a reduction ratio. This makes it possible to displace the telescopic element by hand, i.e. an external drive or an external supply of energy is unnecessary and can be avoided. This is of advantage if the
30 telescopic element has to be actuated, for example, in terms of an emergency situation, e.g. by the crew of a rescue vehicle or other emergency personnel.

Provision is preferably made to use a crank which can be operated manually on the traction element drive.

The use of a separate crank makes it possible for the latter to
5 be removed. A separate crank therefore does not have to be provided for each carriageway boundary element. In order to use the carriageway boundary element, i.e. in order to move the telescopic element relative to the stationary element, it therefore suffices for the worker, or the user, who manipulates
10 the carriageway boundary element to have to be equipped merely with a single crank. In addition, by removal of the crank, an unintentional manipulation is prevented. A coupling between the traction element drive and the crank can be arranged recessed in the side wall. The risk of an accident is reduced since no
15 protruding elements, for example the crank, remain on the carriageway boundary element.

In addition, it is conceivable to equip each carriageway boundary element with a crank which is inserted into the
20 coupling when required. For this purpose, the crank can be fitted in a recessed manner on the carriageway boundary element.

The telescopic element is preferably mounted on the stationary element by means of rollers. The rollers are preferably located
25 within the stationary element and are operatively connected to one or more surfaces of the stationary element that are located inside the stationary element.

This makes it possible to use the carriageway boundary element
30 irrespective of the underlying surface on which it is placed. In particular, it is thereby possible to displace the telescopic element independently of the underlying surface. In addition, the rollers are protected from being soiled.

A plurality of rollers is preferably provided, wherein the rollers are preferably each arranged in pairs opposite one another.

- 5 By means of an opposite arrangement of rollers, torques can be absorbed. The telescopic displacement is thereby facilitated.

It can be provided here to provide rollers which support a side wall of the telescopic element on a side wall of the stationary
10 element. Vertical guidance is thereby made possible. In addition, it can be provided to provide rollers in each case in pairs on the telescopic element, at the top and bottom in the intended installation position. Horizontal guidance of the telescopic element is therefore made possible.

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In a preferred embodiment, a supporting roller for receiving at least part of the dead weight of the telescopic element can be additionally formed on the telescopic element. A force at the end of the telescopic element can therefore be absorbed with an
20 additional supporting roller.

That is to say, when the telescopic element is moved or extended telescopically, one end of the telescopic element moves away from the stationary element when the telescopic element is
25 displaced relative to the stationary element. By means of the dead weight of the telescopic element, the latter has a tendency to be bent downward at said end. A remedy for this behaviour can be provided by a separate supporting roller, as described here.

30 In a preferred embodiment, the carriageway boundary element, as described here, has at least one first element of a locking device.

This makes it possible to lock and to secure the carriageway boundary element and in particular the telescopic element in its extended position.

- 5 The first element of the locking device is preferably designed as a retaining bolt or as a hook.

The telescopic element can be securely locked with the hook.

- 10 It is conceivable to form the hook with a tapering fastening slot, wherein a distance of the fastening slot from a pivot point is greater in a first position than the distance of the fastening slot from the pivot point in a second position. The first element of the locking device can be designed here as a
15 disc with an eccentric.

- By means of the formation of a tapering contour, in particular with an eccentric, it is possible, during locking of the telescopic element, to bring the latter under a prestress into
20 operative connection with a second element, in particular a retaining bolt. The prestress permits a secure and force-fitting connection.

- The side walls of the stationary element and/or the side walls
25 of the telescopic element can each be formed parallel to one another.

Simple assembly and a simple arrangement of the individual elements is thereby made possible.

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The telescopic element and/or the stationary element preferably has a cross section which is symmetrical with respect to a vertical plane extending through the longitudinal axis L.

This simplifies the assembly and makes it possible to use standard elements which can be used on both sides.

The depression on the telescopic element can be placed substantially centrally with respect to a vertical height of the telescopic element, which height substantially corresponds to the external dimensions of the telescopic element. That is to say, the depression is located in the central third of the telescopic element.

This permits a uniform transmission of the forces. It is thereby also made possible to arrange the traction element drive approximately centrally on the stationary element.

Provision can be made here for the carriageway boundary element to have two mutually opposite traction element drives.

The force transmission is thereby additionally facilitated and distributed uniformly on both sides of the telescopic element.

In a preferred refinement of the carriageway boundary element, the telescopic element and/or the stationary element is/are manufactured from curved sheet-metal elements. With regard to the position of the carriageway boundary element during use as intended, the stationary element of the carriageway boundary element can substantially have the contour of an upside down T. The arms of the T form a base, the leg of the T forms a hollow profile. The telescopic element is located inside the leg. Said telescopic element has a substantially rectangular cross section. Depressions are provided on both sides of the telescopic element. The base of the stationary element can have a baseplate which closes off the hollow profile of the stationary element. By definition, side walls are elements which

are arranged laterally with respect to a vertical plane extending through the longitudinal axis. Both the telescopic element and the stationary element are preferably designed as a welded structure.

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A further aspect of the invention relates to an arrangement consisting of two carriageway boundary elements, as described here. Said two carriageway boundary elements are connectable by means of a locking device, as described here, or are connected to each other. If an arrangement consisting of two carriageway boundary elements is designed in such a manner that the carriageway boundary elements are arranged opposite one another, then, by means of the telescopic extension of the telescopic element of the first carriageway boundary element and the telescopic extension of the telescopic element of the second carriageway boundary element, an opening can be realized in the carriageway boundary, the opening essentially corresponding to twice the distance of the extension of an individual telescopic element.

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Vehicles of any type can therefore be brought from one carriageway onto the second carriageway by means of the carriageway boundary element. This is advantageous in particular, for example, if there is a traffic jam on one carriageway, caused by an accident or the like.

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Rescue personnel can therefore drive as far as the site of the accident on a carriageway which is a carriageway which is remote from the accident and is separated by a carriageway boundary element, and, by opening, i.e. telescopically extending, the respective telescopic elements, can change the carriageway and thus arrive at the accident site.

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However, these carriageway boundary elements can also be used to divert the traffic. It is therefore possible, for example, to connect the element, which is referred to here as stationary, at an end remote from the telescopic element to fixed carriageway boundary elements in an articulated manner. By unhooking or opening the locking device and rotating the carriageway boundary element and hooking in the locking device again, carriageways can thus be diverted.

For example, in the case of tunnel entrances which have multiple lanes or in the case of toll booths or customs posts, such an arrangement can be configured to be stationary. It is conceivable here to couple the drive to a mechanical drive. Thus, for example, a hydraulic or an electric drive can be provided.

A carriageway boundary element according to the invention is explained by way of example with reference to the following figures, in which:

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Figure 1: shows a carriageway boundary element in a perspective view,

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Figure 2: shows the carriageway boundary element from Figure 1 in a perspective view, wherein a side wall of the carriageway boundary element is hidden,

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Figure 3: shows the carriageway boundary element from Figure 1 in a side view,

Figure 4: shows a cross section along the line B from Figure 3,

Figure 5: shows a cross section along the line E from Figure 3,

Figure 6: shows a cross section along the line A from Figure 3,

Figure 7: shows an arrangement consisting of two carriageway
boundary elements,

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Figure 8: shows a detailed view of the locking element from
Figure 7,

Figure 9: shows a lateral view of the locking element from
Figure 8.

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Figure 1 shows a carriageway boundary element 100 according to
the invention. The carriageway boundary element 100 has two main
elements, the stationary element 10 and the telescopic element
15 20. The telescopic element 20 is arranged within the stationary
element 10. The carriageway boundary element 100 is typically
arranged along a carriageway (not shown here) and therefore has
a longitudinal axis L in the direction of travel. The
carriageway boundary element 100 substantially has the contour
20 of an upside down T. The arms of the T form a base which, when
used as intended, is placed substantially in a plane parallel to
the carriageway on or next to the carriageway. The telescopic
element is located in the leg of the T profile.

25 Figure 2 shows the carriageway boundary element 100 from Figure
1, wherein a part, namely a side wall, of the stationary element
10 is hidden. As a result, the telescopic element 20 is visible.
Also visible is the traction element drive 30 which is designed
here as a chain drive. The chain drive 30 has two axes (not
30 illustrated specifically here) and sprockets which are arranged
on the stationary element 10. The traction element drive 30 has
a load strand 31 and a slack strand 32 (see Figure 4 in this
respect, illustrated in simplified form in this figure), wherein

the load strand 31 is connected at at least one point to the telescopic element 20 by a driver 33. By rotation on one of the gearwheels, the telescopic element 20 can now be displaced along the longitudinal axis (see Figure 1). One of the gears is preferably rotated with a hand crank. In order to facilitate the displacement of the telescopic element, lateral rollers 23 and top rollers 24 and bottom rollers 24 (not visible here) are arranged on the telescopic element 20 (see Figure 6 in this respect). Said top and bottom rollers 24 here absorb vertical forces, and the rollers 23 horizontal forces. The traction element drive 30 is arranged in a depression 22. The drive gears of the traction element drive 30 are oriented vertically. Said drive gears are mounted on the side wall (hidden here) of the stationary element 10.

Figure 3 shows the carriageway boundary element 100 from Figure 2 in a side view. Various cross sections, to which reference will be made below, are shown.

Figure 4 shows a cross section along the line B from Figure 3. The telescopic element 20 is arranged within the stationary element 10. The two elements are formed substantially from two separate halves each. However, integral manufacturing would also be conceivable. Two diametrically opposite, lateral rollers 23 are arranged within the telescopic element 20. Said rollers are supported on a side wall 11 of the stationary element 10. A second pair of rollers formed symmetrically to said first pair of rollers along a plane extending through the longitudinal axis L (see Figure 1) and through the leg of the T profile is located in a plane parallel to the plane of the sheet. That is to say that the telescopic element is therefore supported on both sides of the stationary element 10 by two rollers in each case. It is apparent with reference to Figure 2 that there are two such

arrangements of rollers 23 on the present telescopic element. In addition, a depression 22 in which the chain drive 30 (see Figure 6) is arranged is apparent in Figure 4. In the illustration according to Figure 4, only slack strand 32 and the load strand 31 of the chain drive 30 are visible.

Figure 5 shows a cross section along the line E from Figure 3. A supporting roller 25 which is arranged on the telescopic element 20 can be seen in Figure 5. Said supporting roller 25 extends through a baseplate (not denoted specifically) of the base of the stationary element 10 such that said supporting roller 25 can come into contact with the underlying surface.

Figure 6 shows a cross section along the line A from Figure 3. Rollers 24 which support the telescopic element in relation to the stationary element 10 are visible in Figure 6. The rollers 24 at the bottom in Figure 6 are in contact with the base of the stationary element 10 and roll over said base. In addition, further rollers 24 which limit the mobility of the telescopic element vertically upward are arranged on the upper region of the telescopic element 20. A depression 22 in the side wall 21 of the telescopic element 20 is also visible in Figure 6. The chain drive 30 is arranged within said depression 22.

Figure 7 shows an arrangement consisting of two carriageway boundary elements 100 and 100'. The carriageway boundary element 100 is designed according to the invention and has a telescopic element 20. The carriageway boundary element 100' is formed here without a telescopic element 20. However, it has an inner element 50 identical in shape to the telescopic element 20. It is conceivable, however, for the carriageway boundary element 100' to likewise be formed with a telescopic element 20. The

locking device 40 is formed at the ends of the carriageway boundary elements 100 and 100'.

Figure 8 shows a detail of the locking device 40 from Figure 7.

5 The locking device 40 is formed here from two main elements, a retaining bolt 41 and a hook with a tapering contour. The hook is designed here as a disc with an eccentric 42. The retaining bolt 41 is arranged on the carriageway boundary element 100', and the eccentric on the carriageway boundary element 100. The
10 eccentric 42 is mounted rotatably about a rotary bolt 43.

Figure 9 shows a lateral view according to Figure 8. As explained with respect to Figure 8, the eccentric 42 is designed so as to be mounted rotatably about a rotary bolt 43. The

15 eccentric 42 can be rotated in the arrow direction P. A fastening slot 44 is arranged on the eccentric 42. The fastening slot 44 has a first distance X1 and a second distance X2 from the rotary bolt 43, i.e. is tapering. The fastening slot 44 is configured with said distance to enter into operative connection
20 with the retaining bolt 41. The distance X1 is larger here than the distance X2. The eccentric 42 can therefore be brought into engagement with the retaining bolt 41. By rotation of the eccentric 42 in the arrow direction P, a distance between the carriageway boundary element 100 and the carriageway boundary
25 element 100' is shortened. As soon as the end sides of the carriageway boundary elements 100 and 100' strike against each other and the eccentric 42 is rotated further in the arrow direction P, a prestress arises between the carriageway boundary elements 100 and 100'. The carriageway boundary elements 100 and
30 100' are therefore securely connected.

Patent Claims

1. Carriageway boundary element (100), comprising
a stationary element (10) and
5 a telescopic element (20)
wherein the stationary element (10) and the telescopic
element (20) each have two side walls (11; 21) and the
sidewalls are connected to each other,
wherein the telescopic element (20) is arranged within the
10 stationary element (10) so as to be displaceable along a
longitudinal axis (L), wherein the carriageway boundary
element (100) has a traction element drive (30) extending
in the direction of the longitudinal axis, in particular a
chain drive, for displacing the telescopic element (20)
15 relative to the stationary element (10),
characterized in that
the traction element drive (30) is arranged between a side
wall (11) of the stationary element (10) and a side wall
(21) of the telescopic element (20), in particular in a
20 depression (22) of the telescopic element (20).
2. Carriageway boundary element (100) according to Claim 1,
characterized in that the traction element drive (30) has a
reduction ratio, wherein the traction element drive is
25 preferably drivable with a hand crank.
3. Carriageway boundary element (100) according to either of
Claims 1 and 2, characterized in that the telescopic
element (20) is mounted on the stationary element (10) by
30 means of rollers (23, 23'; 24, 24').

4. Carriageway boundary element (100) according to Claim 3, characterized in that the rollers (23, 23'; 24, 24') are each arranged in pairs opposite one another.

5 5. Carriageway boundary element (100) according to one of Claims 1 to 4, characterized in that a supporting roller (25) for receiving at least part of the dead weight of the telescopic element is formed on the telescopic element (20).

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6. Carriageway boundary element (100) according to one of Claims 1 to 5, comprising at least one first element of a locking device (40).

15 7. Carriageway boundary element (100) according to Claim 6, characterized in that the first element of the locking device (40) is designed as a retaining bolt (41) or as a hook (42).

20 8. Carriageway boundary element (100) according to one of Claims 1 to 7, characterized in that the side walls (11) of the stationary element (10) and/or the side walls (21) of the telescopic element (20) are each formed parallel to one another.

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9. Carriageway boundary element (100) according to one of Claims 1 to 8, characterized in that the telescopic element (20) and/or the stationary element (10) have a cross section which is symmetrical with respect to a vertical
30 plane extending through the longitudinal axis L.

10. Carriageway boundary element (100) according to one of Claims 1 to 9, wherein the depression (22) on the

telescopic element (20) is placed substantially centrally with respect to a vertical height of the telescopic element.

- 5 11. Carriageway boundary element (100) according to one of Claims 1 to 10, wherein the carriageway boundary element (100) has two mutually opposite traction element drives (30).
- 10 12. Arrangement consisting of two carriageway boundary elements (100) according to one of Claims 6 or 7, characterized in that they are connectable by means of the locking device (40) or are connected to each other.
- 15 13. Arrangement according to Claim 12, characterized in that a prestress can be produced between the two carriageway boundary elements (100) by means of the locking device (40).
- 20 14. Carriageway boundary element (100) according to one of Claims 1 to 5, characterized in that the side walls (11) of the stationary element (10) and/or the side walls (21) of the telescopic element (20) are each formed parallel to one another.
- 25 15. Carriageway boundary element (100) according to one of Claims 1 to 5 and 14, characterized in that the telescopic element (20) and/or the stationary element (10) have a cross section which is symmetrical with respect to a
- 30 vertical plane extending through the longitudinal axis L.
16. Carriageway boundary element (100) according to one of Claims 1 to 5 and 14 to 15, wherein the depression (22) on

the telescopic element (20) is placed substantially centrally with respect to a vertical height of the telescopic element.

- 5 17. Carriageway boundary element (100) according to one of Claims 1 to 5 and 14 to 16, wherein the carriageway boundary element (100) has two mutually opposite traction element drives (30).
- 10 18. Arrangement consisting of two carriageway boundary elements (100) according to one of Claims 14 to 17, characterized in that they are connectable by means of a locking device (40) or are connected to each other.
- 15 19. Arrangement according to Claim 18, characterized in that a prestress can be produced between the two carriageway boundary elements (100) by means of the locking device (40).