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Description

The present invention relates to mobile vehicle barriers. More precisely the present invention relates to a mobile vehicle
5 barrier which tips over when driven over by a vehicle, becomes wedged between the vehicle and the ground and thus stops the movement of the vehicle.

Mobile vehicle barriers are used for protection at mostly
10 temporary events and meetings and are set up when necessary.

Barriers which correspond to the prior art and tests are based on the principle that the moving energy and impulse of the vehicle impacting on the barriers is transferred to the barrier
15 and thus leads to a reduction in the speed of the vehicle. As the most recent tests have shown, these barriers which are mainly made of concrete offer however only a limited protection since they can be moved sideways by heavy vehicles, or more disadvantageously, can themselves be spun away by the vehicle
20 to then represent additional sources of danger. The effectiveness of such a barrier also depends heavily on the angle at which the vehicle strikes the vehicle barrier and in particular on the mass of the barrier. The mass of such a vehicle barrier based on the impulse transmission must for its
25 effectiveness be clearly greater than that of the impacting vehicle. Furthermore, in the event of panic these vehicle barriers represent significant obstructions for the fleeing people.

30 A vehicle barrier comprising interconnected segments is known from the US application 2005/0201829. Here flat plates are connected to one another at several places in order to form a barrier. However, as a result of the jointed sharp-edged design there are various possibilities for injuring passers-by for
35 example.

The object of the present invention is therefore to provide a vehicle barrier which reliably stops in particular heavy

vehicles such as trucks or transporters. The stopping action and bringing the vehicle to a complete stop are preferably to be achieved in the shortest possible distance. Furthermore, it is advantageous if the fewest possible pieces of debris caused
5 by the stopping of the vehicle arise and are spun away.

This is achieved by the features of Claim 1. The dependent claims relate to embodiments of the present invention.

10 Within the scope of the present invention the directional details used relate to a vehicle barrier standing on level ground or on the roadway. Thus a transverse direction of the vehicle barrier is a direction which is in a direction relative to a driving direction of a vehicle driving up to the vehicle barrier.
15 The descriptions given here are based on a vehicle whose driving direction is parallel to the transverse direction (width) of the vehicle barrier. However, the vehicle barrier is likewise effective if a vehicle drives up to the vehicle barrier not parallel to the transverse direction. Furthermore, a
20 longitudinal direction of the vehicle barrier is the longest extent of the vehicle barrier parallel to the surface of the roadway and thus the transverse direction is at right angles to the longitudinal direction. The ground or roadway can be of any condition. The term "height" is to mean extending up from the
25 roadway. A longitudinal edge of the vehicle barrier is parallel to the longitudinal direction.

A mobile vehicle barrier according to one aspect of the present invention comprises a base portion and an upward-extending
30 portion. The centre of gravity of the mobile vehicle barrier is situated in the upward-extending portion. The upward-extending portion is furthermore spaced from a longitudinal edge of the base portion. The vehicle barrier can hereby be tipped up in the driving direction of the vehicle by a vehicle driving
35 up to it and the vehicle itself becomes jacked up onto the upturned vehicle barrier. The upturned vehicle barrier is then clamped between the vehicle and roadway. The stopping action of the vehicle barrier is caused by this clamping and jacking

up of the vehicle. Additional braking action is achieved when the base portion of the barrier wedges between the vehicle on the upper side of the base portion and the roadway on the underneath side of the base portion, and the upward-extending portion of the barrier makes ground contact. Additional friction is thereby produced which helps to brake the vehicle with the vehicle barrier.

In other words, the upward-extending portion acts as a lever via which the base portion and thus the entire vehicle barrier is tipped in the driving direction by the incoming vehicle. The vehicle is thus jacked up by the part of the base portion which it has already driven over when reaching the upward-extending portion.

The position of the centre of gravity in the upward-extending portion is preferably selected so that the vehicle barrier cannot be tipped over by hand by people, but only tips over when impacted by a vehicle.

Through the jacking up fewer pieces of debris arise since the full force action by the vehicle barrier occurs underneath the vehicle and thus the distribution of the pieces of debris is already screened off by the vehicle itself. Furthermore, in the case of vehicles, the region in which the vehicle barrier acts is for the most part of a very stable design which further reduces the probability of pieces of debris arising.

A mobile vehicle barrier according to the above aspect can furthermore have an extent of the base portion in the transverse direction which is less than or approximately equal to a height of the upward-extending portion. Tipping of the vehicle barrier is hereby easier and the vehicle barrier can be adapted for different useful purposes, e.g., only for passenger vehicles in regions which cannot in any case be reached by larger vehicles, or for vehicle barriers which can keep out all vehicle sizes.

The mobile vehicle barrier according to the invention will

comprise posts in the upward-extending portion. The vehicle barrier can consequently be passed by pedestrians who can pass through between the posts. The barrier can also be passed by mounted police. When the vehicle barrier tips up then it lies
5 with a head region of the posts on the roadway. In the case of posts or in general an upward-extending portion which cannot be passed through, the centre of gravity of the vehicle barrier need not physically lie in a part of the upward-extending portion but can also be located in an interspace between the post or
10 outside of the physical part of the upward-extending portion.

A mobile vehicle barrier according to one of the above aspects can have a spacing of at least 80 cm between the posts. This is advantageous since this then meets the German regulations on
15 escape routes.

A mobile vehicle barrier according to one of the above aspects can have an extent of the base portion in the longitudinal direction of less than 2.5 m. This is advantageous since the
20 vehicle barrier can thus be loaded onto a truck transversely to the direction of travel.

A mobile vehicle barrier according to one of the above aspects can comprise a reception for industrial trucks. This is
25 advantageous since the vehicle barrier can be loaded and/or transported easily with for example fork-lift trucks, telescopic loaders or pallet trucks.

A mobile vehicle barrier according to one of the above aspects can comprise at least one attachment point. This is advantageous
30 since the vehicle barrier can thus be easily loaded and/or transported with for example the loading crane of a truck. An attachment point can be for example a thread in which a ring screw can be screwed, or eyelets, hooks, lifting points etc.
35 which are formed directly on the vehicle barrier.

A mobile vehicle barrier according to one of the above aspects can comprise a base portion which is formed sloping towards a

circumferential edge of the base portion. A base portion is thus formed which is elevated in a middle area, compared with a circumferential edge area or the circumferential edge. The upward-extending portion is preferably arranged in this middle area. The curvature or flat area from the middle area to the circumferential edge is advantageous since the trip hazard is reduced for pedestrians who pass the vehicle barrier. Also driving up to the base portion is easier, this relates to the vehicle to be stopped on the one hand, and also to prams or cycles on the other hand who pass the vehicle barrier.

A mobile vehicle barrier according to one of the above aspects can have a sharp edge at the upper end of the upward-extending portion. This more advantageously improves the stopping action of the vehicle barrier since the vehicle barrier can wedge better with the roadway and the wedging action is increased. A sharp edge in the sense of this invention is provided so that people and animals (e.g., police horses) cannot injure themselves at it but the edge is as distinctive as possible.

It is likewise conceivable that the vehicle barrier has in the upward-extending portion at least one spike which after being tipped over by the oncoming vehicle drills into the roadway or is pushed by the movement in the driving direction into the roadway. Since a spike of this kind represents a source of injury for pedestrians and animals, it is conceivable to likewise provide this spike with a protective cover which opens up the spike when the vehicle barrier is tipped over. This could be for example of a suitable foam material or a breakable plastic.

A mobile vehicle barrier according to one of the above aspects can have an overall weight of equal to or less than 1000 kg. This is advantageous since a vehicle barrier of this kind is on the one hand easy to load and transport and on the other hand has sufficient mass to reliably stop an incoming vehicle.

A mobile vehicle barrier according to one of the above aspects

can comprise the following dimensional ranges wherein all the intermediate dimensions are expressly named and the dimensions can be selected independently of one another; an extent in the transverse direction of the base portion of at least 65 cm or
5 less or equal to 100 cm, an extent in the longitudinal direction of a maximum of 250 cm, and a height of the upward-extending portion of at least 93 cm or 125 cm maximum.

10 A mobile vehicle barrier according to one of the above aspects can be manufactured of metal and/or concrete. This is advantageous for a stable commercially viable design of the vehicle barrier. The metal can be a ductile metal.

15 A mobile vehicle barrier according to one of the above aspects can have a hollow base portion. This can be advantageous for selecting the centre of gravity of the vehicle barrier. The vehicle barrier furthermore stands with a hollow base portion on the ground or the roadway only by its circumferential edge. These favours wedging of the vehicle barrier when a vehicle
20 drives into it. This can likewise be combined with the aforementioned curvature or flat area from the middle area to the circumferential edge.

25 A mobile vehicle barrier according to one of the above aspects can have recesses formed in a head area of the posts. This is advantageous since the resulting web formed between the recess and the outer sides of the posts produces an edge which facilitates the wedging between the incoming vehicle and the roadway and thus increases the stopping action.

30 The above features can be freely combined with one another.

Further characteristics and advantages of the invention will be apparent during the following description of the embodiments
35 which are given only by way of example and are non-limiting when viewed together with the accompanying drawings in which:

Fig. 1 shows a perspective view of an embodiment of the mobile

vehicle barrier.

Fig. 2 shows a front view of the vehicle barrier shown in Fig. 1.

Fig. 3 shows a sectional view of the middle post of the vehicle barrier shown in Figs. 1 and 2.

Fig. 4 shows a side view of the vehicle barrier, shown in Fig. 1, in the tipped state.

With an initial reference to Fig. 1 an embodiment of a mobile vehicle barrier 10 is shown which has a base portion 20 and three posts 30. The posts 30 are arranged in a middle area of the base portion 20. The base portion 20 has two longitudinal edges 40 which are parallel to one another and parallel to a longitudinal direction of the vehicle barrier 10. A circumferential edge 50 encloses the longitudinal edges 40.

The middle area of the base portion 20 in which the three posts 30 are arranged is designed elevated compared with the circumferential edge 50. This produces a curvature of the base portion 20 from the circumferential edge 50 towards the posts 30. In the present case the base portion 20 is hollow, that is it lies on the roadway or stands on the ground only by its circumferential edge 50. This favours on the one hand the ability of pedestrians to pass by without danger of tripping and on the other the tipping up of the entire vehicle barrier 10. The curvature of the base portion 20 can be clearly seen in Fig. 2.

The posts 30 in the illustrated embodiment are furthermore hollow in a lower region and solid in the head region (see Fig. 3). Through the ratio between the hollow and solid proportions of the posts 30, as well as the configuration of the base portion, it is possible in this embodiment to select or adjust the centre of gravity of the vehicle barrier 10 accordingly and thus to influence or select the tipping behaviour (force application

etc.).

The posts 30 extend upwards from the base portion 20. The posts 30 are substantially cuboid and have in the head area a circumferential head edge 60 and a recess 70 wherein in the recess 70 there is a thread 75 (see Fig. 3). An attachment point (e.g., ring screw) can be screwed into the thread 75 in order for example to be able to lift the vehicle barrier 10.

The recess 70 has the effect that the head area of the posts 30 has a portion with a reduced wall thickness 65. The head area and in particular the head edge 60 can thus in the tipped state bore better into the roadway or ground (see Fig. 4).

The side faces of the cuboid posts 30 in this embodiment are furthermore turned round 45° to the longitudinal edge 40 (see Figs. 1 and 2) so that, when tipping over, only the corners of the head edge 60 rest on the ground and can thus be easily wedged with the ground or can bore into same.

In the illustrated embodiment the middle post 30 has a reception 80 for industrial trucks. The reception 80 is formed by recesses 81 in the foot area of the middle post 30 (see for example Fig. 3). When the prongs of an industrial truck are inserted into the reception 80 and the vehicle barrier 10 is then lifted, the vehicle barrier 10 rests on the shoulders 82 (see Fig. 3).

Fig. 4 shows the vehicle barrier 10 in the tipped position when a vehicle (not shown) is driven onto it. In the illustrated case the vehicle would be driven from left to right onto the vehicle barrier 10 (see arrow in Fig. 4). The part of the base portion 20 extending up from the ground is wedged with the vehicle, and the lower part of the base portion 20 is wedged with the ground. As can be seen, the head area of the posts 30 (only one visible) lies with its head edge 60 likewise on the ground and wedges or is bored into the ground when the tipped vehicle barrier 10 is pushed to the right in Fig. 4. This corresponds to the driving direction of the vehicle which tips

over the vehicle barrier 10 and has wedged with it. The vehicle wedged with the vehicle barrier 10 is thus braked by the friction between the circumferential edge 50 and the head edge 60 and the ground.

REFERENCE NUMERAL LIST

	10	Mobile vehicle barrier
	20	Base portion
5	30	Post
	40	Longitudinal edge
	50	Circumferential edge
	60	Head edge
	65	Portion with reduced wall thickness
10	70	Recess
	75	Thread
	80	Recipient
	81	Recess
	82	Shoulder

Patentkrav

1. Mobil køretøjsbarriere (10) omfattende et basisafsnit (20) og et opad ragende afsnit (30), idet tyngdepunktet i den mobile køretøjsbarriere er i det opad ragende afsnit, og det opad ragende afsnit har afstand til en længdekant (40) på basisafsnittet, idet det opad ragende afsnit omfatter poster (30), idet køretøjsbarrieren kan passeres af fodgængere mellem de enkelt poster.
2. Mobil køretøjsbarriere (10) ifølge krav 1, hvor basisafsnittet (20) har en udstrækning i den tværgående retning, som er mindre end højden på det opad ragende afsnit (30).
3. Mobil køretøjsbarriere (10) ifølge et af de foregående krav endvidere omfattende et optag (80) til gaffeltrucks.
4. Mobil køretøjsbarriere (10) ifølge et af de foregående krav endvidere omfattende i det mindste et anslagspunkt.
5. Mobil køretøjsbarriere (10) ifølge et af de foregående krav, hvor basisafsnittet i et område i midten er forhøjet og er formet, så det falder hen mod en omfangskant på basisafsnittet.
6. Mobil køretøjsbarriere (10) ifølge et af de foregående krav, hvor det opad ragende afsnit (30) i sin øvre ende har i det mindste en omløbende hovedkant (60), idet hovedkanten er udført skarpkantet.
7. Mobil køretøjsbarriere (10) ifølge et af de foregående krav, som har i det mindste et af følgende punkter:
- en samlet vægt på lig med eller mindre end 1.000kg;
 - afstanden mellem posterne (30) er i det mindste 80cm;
 - basisafsnittet (20) har en udstrækning i længderetningen på mindre end 2,5m.
8. Mobil køretøjsbarriere (10) ifølge et af de foregående krav, som er fremstillet af metal og/eller beton.

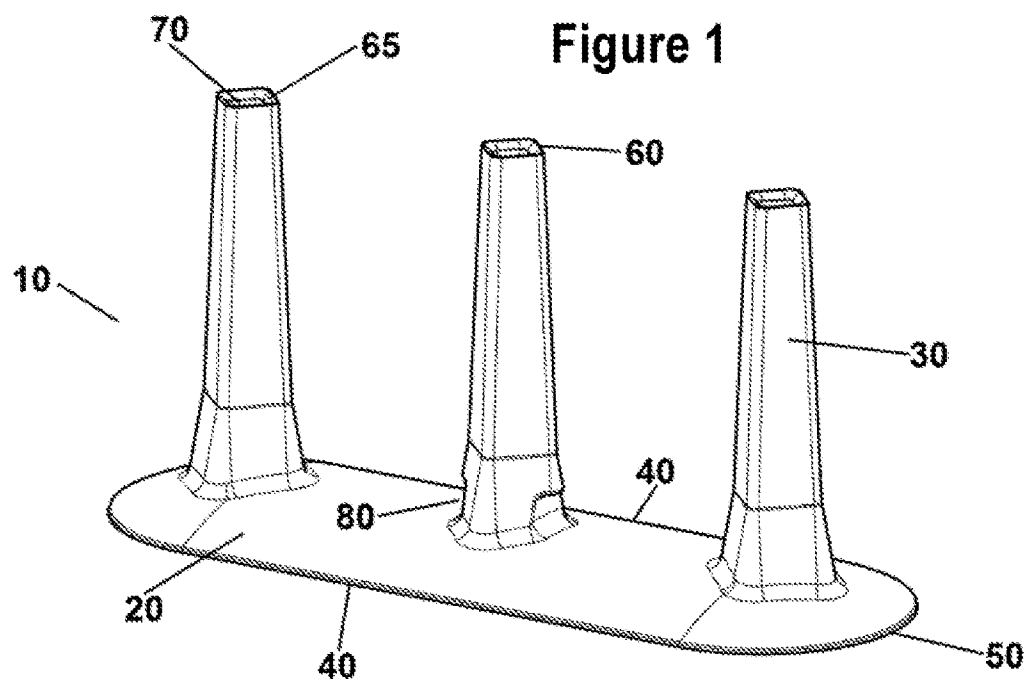
9. Mobil køretøjsbarriere (10) ifølge krav 8, hvis der anvendes metal, idet barrieren i så fald er fremstillet af et duktilt metal.

5

10. Mobil køretøjsbarriere (10) ifølge et af de foregående krav, hvor der i et hovedområde på posterne er udformet fordybninger (70).

10 11. Mobil køretøjsbarriere ifølge et af de foregående krav, hvor basisafsnittet (20) er hult.

Figure 1



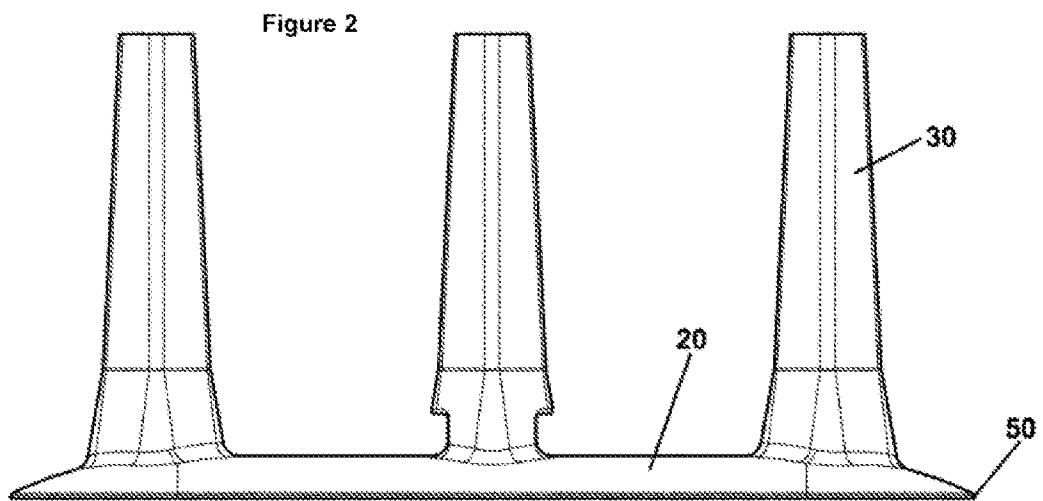


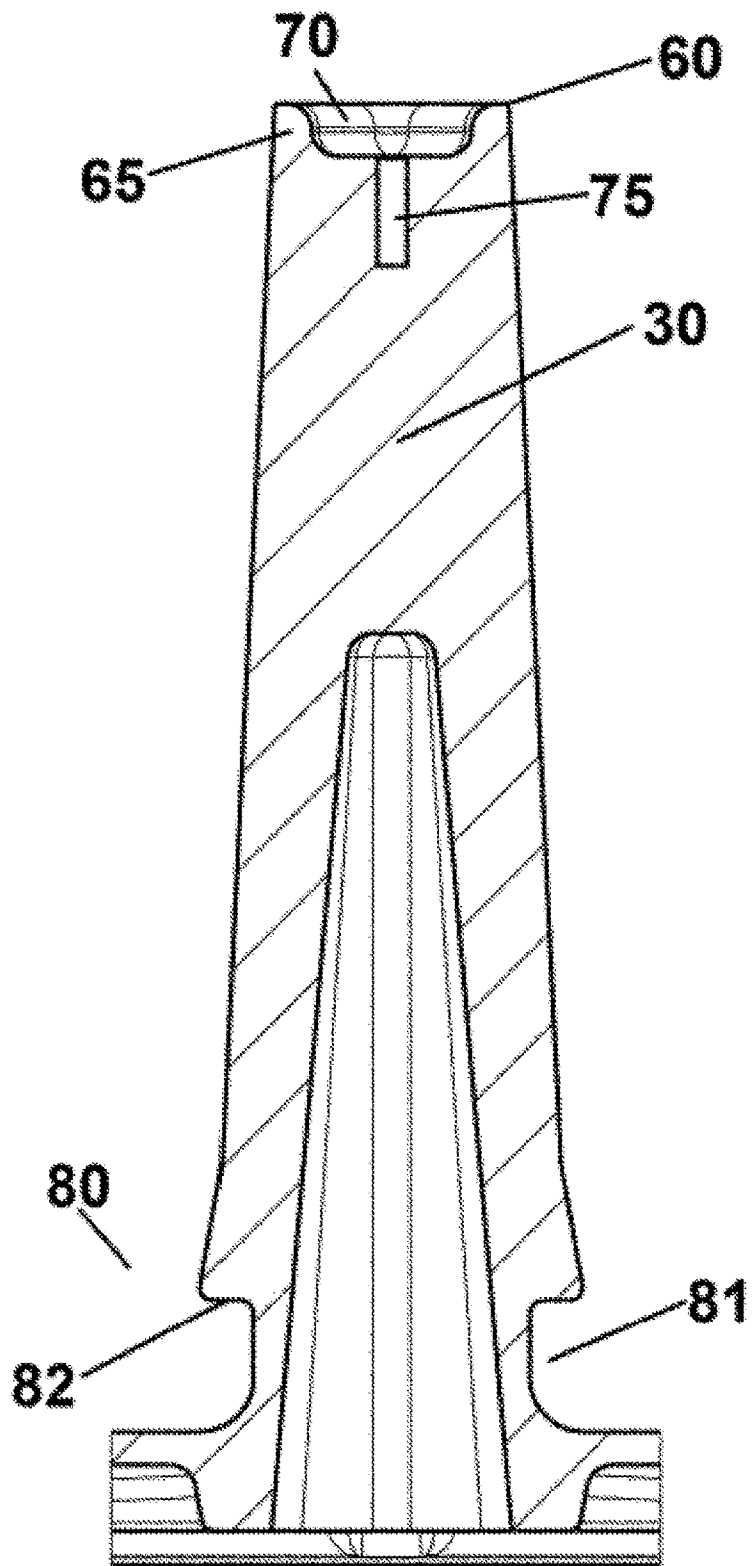
Figure 3

Figure 4