TRANSLATION
SPECIFICATION

Vehicle having articulated Steering, in particular Armored Vehicle

The invention relates to a vehicle having articulated steering, preferably for transport of a vehicle crew.

In order to design also larger vehicles with better steering and handling ability, or in order to provide same with higher modularity, vehicles are frequently subdivided. Known among others is the armored all-terrain transport-vehicle BV 206 made by the Hägglund Company (see for example http://www.deutschesheer.de/portal/a/heer/kcxml/04 Sj9SPykssyOxPLMnMzOvMOY QjzKLNzSLt3COAMmZxbvHM7mb60eCGOYmRhAxkLyBMOgQqjloJVXf1yM N1XfWz9AvyA3NKLcOVERAHsLzog!/delta/base64xml/L2dJQSEvUUt3QS8OS VVFLzZfMTZfOEFC?yw contentURL=%2FC1256F870054206E%2FW269WBR6361INFODE%2Fcontent.jsp or http://www.google.de/imgres?imgurl=http://www.panzerbaer.de/helper/pix/bw bv 206 d-1906.jpg&imgrefurl=http://www.panzerbaer.de/helper/bw trspfz bv206d-a.htm&h=332&w=650&sz=115&tbnid=X4pFmZPhzhhG6M::&tbnh=70&tbnw=137&prev=/images%3Fq%3Dh%25C3%25A4gglund&hl=de&usg=6XY17d4oCj8iQKnFcYzFQ8fylY=&ei=8r6aSfLtNsam-gaf4LizCA&sa=X&oi=image result&resnum=4&ct=image&cd=1).

In this case, the anterior vehicle pulls a posterior vehicle or vehicle part of equal construction height. In the anterior vehicles with drive are, in addition to the driver and the front seat passenger, other persons who are to be transported. Persons can also be transported in the posterior vehicle part.

It is the object of the invention to propose a novel concept for vehicles of this type, which are preferably armored and which guaranty adequate steering and handling capability.

The means for attaining the object of the invention is provided by the characteristics of Patent Claim 1, with beneficial embodiments being listed in the sub-claims.

The invention is based on the idea of dividing a vehicle into an anterior drive module and a posterior mission module, which are both connected with each other by articulated steering or an articulated steering drive in such manner that the anterior module is steered by the posterior module, holding at least one driver, with the anterior module driving and moving the posterior module by means of the articulated steering drive.

It is possible to ascertain the tendency from DE 10 2004 026 237 A1 of providing the drives of the vehicle in a separate front- and rear component, separated from a main component. This is done for greater vehicle protection against the effect of a land mine. Steering is done in the conventional manner.

A vehicle with articulated steering is known from DE 101 00 775 A1, which contains two chassis components arranged behind each other in longitudinal vehicle direction, to which is attached, on the one side, a front axle, and on the other side, a rear axle. Both chassis components are in contact with each other via an essentially vertically aligned articulated axle in such manner that they can be swiveled relative to each other using a steering device, thus permitting vehicle steering.

A vehicle with articulated steering is disclosed in AT-PS 332-231, in which the anterior chassis component is connected with the posterior chassis component via a dual articulated joint. In the steering linkage between the dual articulated joint and the anterior chassis component on the one side and the posterior chassis component on the other side is respectively arranged a hydraulically operable lifting aggregate etc.

DD 219 003 A3 describes a steering linkage for vehicles with articulated steering. In order to achieve improved steering behavior it is proposed that the steering rod be arranged displaceably on one vehicle component, so that a steering movement causes the actuation of the servomotors for mutual articulation of the vehicle components.

A vehicle with articulated steering, in particular wheel loaders, is also known from DE 20 2006 015 828 U1. In this case, a front carriage and a rear carriage are joined together by means of a fixed spherical bearing.

A description of steering an unmanned vehicle by means of an electronic tow-bar from a constructively de-coupled vehicle, located behind, is given in DE 10 2004 003 055 A1.

As already mentioned, the present suggestion is different. It integrates an articulated steering drive between a fully self-contained drive module, which contains only the drive, and a mission module, which carries only the crew, with the steering of the (unmanned) front drive module taking place from the (manned) rear mission module via the articulated steering or articulated steering drive. The drive module [itself] drives both the drive module as well as the mission module via the articulated steering device. For energy supply of the mission module, lines can be arranged from the drive module to the mission module. Alternatively, one can also (additionally) install an independent power supply in the mission module, for example via an auxiliary drive of the gearbox elements driven by the articulated steering drive. The articulated steering drive thus connects both vehicle modules to form one vehicle entity.

The resulting benefit is that only the mission module needs to have a high degree of protection, i.e. it must be totally armored. The module itself which carries the crew (driver, front seat passenger/commander) has a small IR signature, since it does not have a motor.

Another benefit is the potentially low construction mode of the drive module, since no persons need to be carried and only the drive aggregate and the pertinent drive elements need to be stored. Moreover, the drive module needs only to be equipped with heat insulating means against its own IR-signature, for example, instead of the required armor-

plating for people. The circumstance that the drive module is only required to carry the drive and no longer some of the crew, the modularity of the drive is expanded to other mission modules as well (for example as drive for a corresponding medical first aid module).
Aside from greater flexibility and availability due to the readily exchangeable mission modules, the unmanned drive module can additionally serve as mine triggering unit, since the rear module accurately tracks the front module. As a result, all types of currently known anti-tank mines are triggered by the unmanned drive module, and the mission module, which carries the crew, is thus fully protected against all types of mine threats.

With modern chain vehicles, steering is done by means of hydrostatic overlay gearing mechanism, which assigns a different drive speed to the left and the right chain, thus facilitating a steering movement. The drawback of such design lay-out is that the major portion of the drive energy is consumed by the hydrostatic overlay gearing and is not available for forward drive. In the embodiment presented here, the steering movement takes place by articulation of the drive module from the mission module by means of the articulated steering drive, and not by different drive speeds on the right and the left side of the drive. Consequently, full engine output is available for driving even for executing turning maneuvers.

Both modules can be equipped either with wheels or with chains or with a combination of front chains, for example and rear wheels. Chain drive, however, is preferably presented here.

The anterior drive module is unmanned, has a low profile and comprises a motor, preferably automatic gear-box, a cooling system, transfer gear, differential and the articulated steering drive. Since the anterior drive module has a very low profile and thus presents a smaller signature, the likelihood of being hit in case of hostile attack is lower, due to the small silhouette.

The posterior mission module comprises the driver and the commander as well as the fixtures of the mission module(s) proper. This also results in the mission module not being affected by motor noise and motor vibration. Since due to the division of the vehicle and the reduction in total weight of the entire vehicle (drive module constructed smaller and has no or has less armor-plating) is it possible to employ rubber chains as chain drives, which also minimizes vibration due to chain excitation. In particular, maintenance and repair are made less complicated, since easier accessibility to the drive module and thereby its components are made possible. The employment of ABS-brakes can now likewise be realized.

The present mobility concept permits optimally protected operations in regions which are inaccessible for other vehicles; it is lighter and has a high degree of protection, it is structurally smaller in size than comparable known systems or concepts and possesses unlimited roadworthiness.

The invention and thus the concept shall be explained in more detail using an exemplary embodiment.

Fig. 1 depicts a vehicle with chain drive separated into two modules

Fig. 2 depicts a vehicle with wheel drive separated into two modules

Fig. 1 represents a vehicle 1, separated into a drive module 2 and a mission module 3. Drive module 2 and mission module 3 are joined by means of a conventional and therefore not shown articulated steering drive 4. Steering takes place via the articulated steering drive 4 and, if needed, also the supply of energy from the mission module 3, which can, however, also only be integrated in mission module 3, as well as the drive of the mission module 3.

To that end, the articulated steering drive 4 is integrated at the anterior housing part 20 of the mission module 3 and the posterior housing part of the drive module 2.

Both modules 2, 3 have their own chain-(drives) 5, 6, with the chain 7 of the anterior drive module 2 being moved via chain-wheel 5 and drive-track (not shown) of a drive motor (not shown), and the chains 8 of the posterior module 3 are moved by the chain wheel 6 via the articulated steering drive 4 and drive-track (not shown) by the drive of the drive module 2.

The mission modules 3 are differently designed, depending upon their mission. In each case, driver and/or commander is/are seated in front. They have visibility in front and on the sides for steering of vehicle 1, through periscope 11, looking through hatches 9, 10 or from under armored protection. The drive module 2 is operated and steered, as a rule, by the driver via the articulated joint 3. Provision is likewise made for the possibility of steering by the Commander (front seat passenger).

As an alternative, integration of cameras in the drive module 2, with attachment at the mission module 3 is being considered as sufficient, since the drive module 2 is lower than the mission module 3, so that the driver as well as the commander, seated under hatches 9 and 10, and who are looking over and above drive module 2 are able to safely ascertain the path to be taken.

The mission equipment (not shown) is located behind the driver and the Commander, for example, the seats for transporting the crew. In addition, a weapons station may be located on the vehicle roof 21, hatch cover 19 (not shown here). Alternative possibilities are the design of the mission module additionally as medical aid vehicle, as radio communication vehicle or observation vehicle, as ABC vehicle with ABC mission, as weapons carrier with highly diversified weaponry, for example a remote controlled gun carriage for light and medium machine guns or for a mortar etc. and such other functions as known according to the state of the art.

The casing 22 of the drive module 2 and the mission module 3 can consist of bullet-proof protective materials, for example reinforced steel or similarly acting composite materials according to the state of the art. The degree of protection may differ depending upon the planned mission for the different mission modules 3.

Drive module 2 can have several openings 15, 16, 17, in order to provide combustion air for the motor and to supply the corresponding cooling air volume for cooling the motor. Access to the motor space can be facilitated through a hatch cover 18.

In another embodiment, the mission module 3 is only pulled by the drive module 2 and is only steered via the articulated steering unit 4, which in this case is not designed as drive.

Fig. 2 depicts an alternative embodiment to the vehicle represented in Fig. 1. In this case the chain drive has been replaced by a wheel drive with otherwise identical embodiment configuration. Each of the axles 13, 14, 15, 16 can be propelled, but that is not a requirement.
In another (not shown here) embodiment, the number of axles can be increased for the mission module 3.

PATENT CLAIMS

1.
Vehicle (1) in particular armored vehicles, divided into a drive module (2) and a mission module (3) having:

- the mission module (3) serving for accepting a vehicle crew of at least one driver as well as mission-specific expansions,

- the drive module (2) carrying at least one drive motor and being unmanned, and

- an [sic, the] articulated steering drive (4) being integrated between the drive module (2) and the mission module (3) in such manner

- that the drive module (2) is steered by the driver in the mission module (3) and the vehicle (1) is thus moved by tracking the mission module (3).

2.
Vehicle according to Claim 1, characterized in that the articulated steering drive (4) also drives the posterior mission module.

3.
Vehicle according to Claim 1 or 2, characterized in that the articulated steering unit (4) is attached at the anterior housing part (20) of the mission module (3) and at the posterior housing part of the drive module (2).

4.
Vehicle according to Claim 1 or 2, characterized in that only the mission module (3) has to have a high degree of protection, for which purpose armor-plating (22) is arranged only around the mission module (3).

5.
Vehicle according to one of Claims 1 to 4, characterized in that the drive module (2) has a low construction mode relative to the mission module (3), so that the driver can operate the drive module (2) by looking over and above the drive module 2.

6.
Vehicle according to one of Claims 1 to 5, characterized in that heat insulating means against its own IR-signature are arranged around the drive module (2).

7.
Vehicle according to one of Claims 1 to 6, characterized in that the mission module (3) is equipped with an angle mirror / periscope (11) on the roof (21) by means of which the driver and/or the Commander can steer the drive module (2), by looking over same.

8.
Vehicle according to one of Claims 1 to 7, characterized in that cameras are integrated for steering at the drive module (2) and/or the mission module (3).

9.
Vehicle according to one of Claims 1 to 8, characterized in that for energy supply of the mission module (3), energy lines are arranged from the drive module (2) to the mission module (3) and/or the mission module (3) disposes of its own supply of energy.