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METHOD FOR GUIDING AN AGRICULTURAL TRAILER AND AGRICULTURAL TRAILER COMBINATION

The present invention relates to a method for steering a trailer having the features of independent claim 1, and to an agricultural tractor-trailer combination having the features of independent claim 9.

In order to minimise the area travelled when performing crop protection measures using towed field sprayers, it is desirable for the field sprayer towed by a towing vehicle or the trailer towed by the towing vehicle to travel as exactly as possible behind the rear wheels of the towing vehicle, i.e. for the wheels of the field sprayer or the trailer to travel in the trail of the towing vehicle. Particularly when negotiating a bend, there is the problem that the towed trailer or the field sprayer travels through a smaller turning radius and cuts short the path predefined by the towing vehicle and thus defines new tracks.

Some solutions for precise tracking of a trailer behind a towing vehicle are already known in the prior art, in which solutions for example the distance between the rear axle and coupling point has the same length as the drawbar length of the trailer. If these distances between the rear axle and coupling point are too great, however, a path deviation between the towing vehicle and trailer results in the case of irregular movement radii, this being the case amongst other things when entering and leaving a bend.

It is also known, in order to achieve precise tracking of the towing vehicle, to detect the movement of the towing vehicle or of the overall system formed of towing vehicle and trailer, for example by sensors and/or measurement of the relative movements of the towing vehicle and/or the overall system. With known path of the towing vehicle, an optimal steering angle for the trailer in a bend can then be determined so as to follow the path defined by the towing vehicle. For example, the vehicle geometry can be used to determine a compensation angle for the wheels of the trailer by determination of the tangent of the negotiated bend. Methods of this kind either presuppose sensors on the pulling towing vehicle or require another type of detection of the overall system formed of towing vehicle and trailer.

The use of sensors for precise tracking of a generic trailer is disclosed by DE 603 19 896 T2 and by US 2003/0167107 A1. Means associated with a steering device are used to detect the path covered by the tractor. The means are composed of an angle detector and a speed sensor. The angle detector is preferably arranged in the region of the hitch point, whereas the speed sensor is connected to the trailer. Actuators can ensure an appropriate adjustment torque on the basis of an analysis of the detected values.

EP 1 081 020 B1 discloses a steering device for agricultural trailers. The control device continuously receives input signals via sensors that are associated with the towing vehicle and the trailer, said signals being converted by said control device into output signals for controlling the setting of an articulated drawbar or kingpin steering system.

The disadvantages of existing solutions lie in the fact that the movements of the towing vehicle

and of the trailer have to be ascertained so as to be able to determine the movement pattern of the overall system on the basis of this information. In order to achieve this, communication and/or a sensory connection is generally required between the towing vehicle and trailer. This results in an additional effort when hitching and unhitching the trailer to/from the towing vehicle. Trailer control systems of this kind have also proven to be complex and costly.

The object of the invention is to provide trailer control for a trailer towed by a towing vehicle, which trailer can follow the path of the towing vehicle where possible without additional communication and/or a sensory and/or a mechanical connection between the towing vehicle and trailer, and which control can be provided in a simple way. A further object of the present invention can be considered that of providing an agricultural tractor-trailer combination having the aforementioned advantages. Further advantageous embodiments are described by the dependent claims.

The method according to the invention for steering a trailer towed by a towing vehicle, the trailer having at least one steerable axle, wherein the towing vehicle and the trailer are connected to each other at a hitch point by means of a towing device, can detect a movement of the trailer with at least one sensor unit that is functionally and/or spatially associated exclusively with the trailer and can analyse the sensor data during a driving movement of the towing vehicle and the trailer for the purpose of obtaining control data for steering the at least two wheels of the trailer. In addition, the steering angle of the at least two steerable wheels and/or the drawbar of the trailer can be calculated based on a path of the towing vehicle as calculated from the sensor data and for approximately following the path of the towing vehicle by the variable steer angle of the wheels of the trailer.

Since the sensor unit is functionally and/or spatially associated exclusively with the trailer, there is advantageously no longer any need to detect the state of the overall system and thus the movement of the overall system. The at least one sensor unit functionally and/or spatially associated with the trailer can preferably be positioned on the frame of the trailer. On the basis of the trailer movement or detected running path thereof or parts of said running path, the movement of the pulling towing vehicle can be determined sufficiently precisely to determine the hitch point of the towing vehicle, with known position and orientation of the trailer with the drawbar thereof. The position of the towing vehicle can thus be localised, wherein the position of the towing vehicle may still indeed be ambiguous when considering individual measurements. The trajectory of the towing vehicle can also be determined sufficiently precisely under consideration of the course over time of the individual positions and the changes in position of the trailer. On the basis of the calculated trajectory, the movement of the towing vehicle is thus also known, and therefore the steering angle of the trailer or the individual turning of the at least two wheels can be calculated on the basis of the obtained data. By means of the described solution it is possible for the trailer to follow the path of the towing vehicle on the basis of the movement data thereof, i.e. the method for guiding the turning of a trailer is based exclusively on the detected trailer movement. In order to determine the path of the towing vehicle, the current steer angle of the at least two wheels

and/or of the drawbar of the trailer must also be detected and are/is included in the calculation of the steering angle.

To summarise, the device according to the invention is characterised in that the path of any point of the trailer can be determined. If the hitch point is known at all times, the path predefined by the towing vehicle can be determined for each program cycle. The path to be followed may be entered into and stored in a local two-dimensional (or more) map. The movement of the trailer, i.e. the current position of the trailer, can be detected by means of the at least one sensor unit functionally and/or spatially associated with the trailer.

The current position of the trailer and hitch point thereof can also be entered in the local two-dimensional (or more) map. The steering angle of the at least two wheels and/or the drawbar can be calculated on the basis of the current position of the trailer and hitch point thereof. The trailer can thus follow the path predefined by the towing vehicle and/or can be returned to this path in the event of any deviations.

If all positions of the towing vehicle and the trailer are known, a path deviation, caused by sluggish steering behaviour, can be calculated. This path deviation can be minimised by an improved steering angle control or by an additional correction angle, which guides towards the desired path. Advantages are provided amongst other things in this sense in that there is no need for a mechanical connection between the towing vehicle and the trailer for angle detection in the present invention. There is also no need to attach an electrical connection, for example in the form of a gyroscope, to the towing vehicle, since the position of the trailer is determined via a sensor unit associated exclusively with the trailer.

A development of the invention provides that the movement of the trailer can be detected by means of at least one gyroscope and/or acceleration sensor.

It must be emphasised that the at least one gyroscope and/or the acceleration sensors is/are associated with the trailer. These can be arranged fixedly and/or removably on the trailer. The at least one gyroscope can preferably be positioned on the frame of the trailer. It is advantageous that changes in direction of the trailer can be measured by means of the gyroscope, such that, conversely, it is possible to determine the path of the towing vehicle in respect of the travelled section measured by means of the path-measuring system and/or speed sensor. Possible changes in direction of the trailer can result when cornering and/or when the towing vehicle turns. When cornering, the rotary speed of the trailer about the vertical axis can be detected by means of the at least one gyroscope. The rotary speed of the trailer is detected. The movement in translation, by contrast, can be taken from at least one wheel of the trailer. In principle, however, the rotary speed of the trailer about the vertical axis can be detected by means of the gyroscope at each time step, in particular also when travelling straight ahead.

Further specific sensors can be inertia sensors and/or sensors for determining the speed and/or acceleration. Furthermore, any other kind of detection can be applied that describes the movement of the towed trailer in two-dimensional (or more) space. The obtained sensor data of

the trailer can then be analysed by a control unit and/or regulating unit for the steering of the at least two wheels or the axle of the trailer or the drawbar, such that the steering angle of the at least two wheels of the trailer or the drawbar for tracking the path of the towing vehicle can then be calculated. An appropriate adjustment torque can be generated on the basis of this result by the actuator in order to deflect the at least two wheels or axles of the trailer of the drawbar of the trailer.

It can also be provided that the movement of the trailer is detected by means of at least one path-measuring system and/or speed sensor.

The at least one path-measuring system and/or speed sensor is associated exclusively with the trailer, which can be designed to be fixed and/or removable. Furthermore, any other kind of detection can be applied that describes the movement of the towed trailer in two-dimensional (or more) space.

It can also be provided that the position and/or the movement of the trailer can be detected using a positioning system that is functionally and/or spatially associated exclusively with the trailer.

Within the scope of this method, the position of the trailer can be detected for example by means of GPS, such that the current position of the trailer is emitted constantly. It is also advantageous that the speed of the trailer can also be determined within the scope of the position-determining system, for example by means of GPS conclusions. The measured data can be analysed here by the control unit and/or regulating unit in respect of the calculation of the steering angle of the at least two wheels and/or the drawbar of the trailer. In order to determine the path of the towing vehicle, the current steer angle of the at least two wheels and/or of the drawbar of the trailer must also be detected and are/is included in the calculation of the steering angle. Positioning systems of this kind can be arranged fixedly and/or removably on the trailer.

An expedient development provides that the sensor data from the sensor unit are updated during a driving movement of the towing vehicle at regular intervals .

The trailer consequently also moves on further continuously as a result of the movement of the towing vehicle. In order to enable approximate tracking of the path of the towing vehicle, it is necessary to regularly query the position of the trailer. Changes in the position of the trailer can be directly detected and analysed, such that the steering angle of the at least two wheels and/or the drawbar can be calculated on that basis. The intervals for updating the sensor data correspond generally to a defined time period. It is also advantageous that the inertia of the system in respect of the deflection of the at least two wheels and/or the drawbar of the trailer can be taken into consideration.

In accordance with a development of the invention a steering movement of the trailer can be carried out in real time upon detection of the movement of the trailer by the sensor unit.

Within the scope of this embodiment of the invention it is possible to detect the movement and the position of the trailer in real time so as to carry out a steering movement of the trailer on that basis. The real-time data can use the sensor unit to draw conclusions as to the current position

and the movement of the trailer and to calculate the steering angle of the at least two wheels and/or the drawbar of the trailer on that basis.

A development of the invention provides that the steering of the at least two wheels and/or of the drawbar of the trailer is carried out based on the calculated movement data of the trailer.

It is advantageous that the at least two wheels and/or the drawbar of the trailer are/is steered based on the calculated steering angle and by the variable steer angle of the wheels of the trailer on the basis of the previously detected movement data of the trailer. Thus, the at least two wheels and/or the drawbar of the trailer are/is deflected by an adjustment torque generated by the actuator, in such a way that they follow the path of the towing vehicle.

It can also be provided that the steering movement of the trailer is performed in the opposite direction to the cornering of the towing vehicle.

Due to the deflection of the trailer in the opposite direction, the path of the trailer corresponds to the same radius as the path of the towing vehicle, i.e. the trailer with its own wheels covers the same curve radii or the same path as the rear wheels of the pulling towing vehicle. Otherwise, the trailer would choose a smaller curve radius, due to its towed movement, and would travel over a shorter path inside the trajectory defined by the towing vehicle.

The invention also comprises an agricultural tractor-trailer combination comprising a towing vehicle and a trailer towed by the towing vehicle, said trailer having at least one steerable axle and/or a steerable drawbar, the tractor-trailer combination comprising at least one sensor unit that is functionally and/or spatially associated exclusively with the trailer and that can detect the movements of the trailer, at least one actuator by way of which a steering movement of the axle and/or drawbar is effectible, and a control unit and/or regulating unit that is in operative connection with the at least one sensor unit and the at least one actuator, wherein the control unit and/or regulating unit is designed such that it can control the at least one actuator in consideration of the trailer movement as detected by way of the at least one sensor unit for the purpose of a specified movement of the at least one steerable axle and/or drawbar such that a particular trailer wheel coupled to the steerable axle is at least approximately movable in a wheel rut of the towing vehicle. It is advantageous that trailer control is provided, such that the towed trailer moves over the same path as its towing vehicle without having to communicate with the towing vehicle and/or otherwise detect the movement of the overall system formed by towing vehicle and trailer. The tracking of the trail of the towing vehicle is made possible merely by the detection of the trailer movement and movement data thereof. Here, at least one sensor unit is functionally and/or spatially associated exclusively with the trailer, i.e. the path of any point of the trailer and hitch point thereof can be determined by means of the at least one sensor unit functionally and/or spatially associated exclusively with the towing vehicle. Since the hitch point and thus the current position of the trailer are known at all times, the path defined by the towing vehicle can be determined by means of the at least one sensor unit for any program cycle. The path to be followed and the current position of the trailer and hitch point thereof can be saved and stored in a two-dimensional

(or more) local map. The determined sensor data can then be concerted by the control unit and/or regulating unit into a steering movement via at least one actuator by calculating a steering angle of the at least two wheels and/or the drawbar. The at least one actuator can comprise at least one cylinder which can be controlled hydraulically and/or electrically. On this basis an adjustment element for each of the at least two wheels of the steerable axle and/or the steerable drawbar can be produced by the actuator so as to be able to perform the previously calculated steering angle in the opposite direction to the cornering of the towing vehicle and a rotary movement of the at least two wheels or the axle or of the trailer.

If all positions of the towing vehicle and the trailer are known, a path deviation, caused by sluggish steering behaviour, can be calculated. This path deviation can be minimised by an improved steering angle control or by an additional correction angle, which guides towards the desired path. An expedient development of the invention provides that the at least one sensor unit functionally and/or spatially associated with the trailer can comprise motion and/or speed sensors and/or a gyroscope.

In order to be able to detect the movement of the trailer by the towing vehicle, various kinds of sensors for example are associated with the trailer, amongst other things in the form of motion and/or speed sensors. Any other kind of detection can also be applied that describes the movement of the towed trailer in two-dimensional (or more) space. In order to be able to determine the path of the towing vehicle precisely enough, it is also necessary for the current steer angle of the at least two wheels of the steerable axle and/or of the steerable drawbar to be detected in addition. Within the scope of the present invention it is thus possible to achieve an at least approximate tracking of the path of the towing vehicle based on the determined movement data of the trailer in that an adjustment element is activated by the at least one actuator in order to deflect each of the at least two wheels of the axle and/or the drawbar. Sensor units of this kind can be arranged fixedly and/or removably on the trailer.

It can also be provided that the at least one sensor unit that is functionally and/or spatially associated exclusively with the trailer is designed as a positioning system.

It is furthermore advantageous to detect the movement of the trailer by means of various positioning methods and to then steer the at least one steerable axle and/or a drawbar of the trailer. For example, GPS can be used as a positioning system, and therefore the position and speed of the trailer can be detected continuously. Systems of this kind can be arranged fixedly and/or removably on the trailer.

Exemplary embodiments of the invention and the advantages thereof are explained in more detail below with reference to the attached figures. The proportions of the individual elements to each another in the figures do not always correspond to real proportions since some forms are simplified and other forms are shown enlarged in relation to other elements for better illustration. Figure 1 shows a schematic view of a tractor-trailer combination according to the present invention;

Figure 2 shows individual steps for carrying out the method according to the invention.

Identical reference symbols are used for identical or identically functioning elements of the invention. Furthermore, for the sake of clarity, only reference signs needed for describing the figure in each case are shown in the individual figures. The illustrated embodiments only represent examples of how the method according to the invention or the device according to the invention can be designed, and do not constitute a definitive limitation.

Figure 1 shows a tractor-trailer combination 5 comprising a towing vehicle 1 and a trailer 2, which is towed by the towing vehicle 1 and which comprises at least one steerable axle 9, in a left turn. The towing vehicle 1 and the trailer 2 are connected to one another here at a hitch point 4 by means of a towing device. At least one sensor unit (not shown here) is spatially and/or functionally associated with the trailer 2 and detects the movement of the trailer 2. The at least one sensor unit is preferably associated with the frame of the trailer and is formed as a gyroscope. The rotary speed of the trailer 2 about the vertical axis is detected at each time step by means of the gyroscope. The speed in translation is at the same time taken at least at one wheel of the trailer 2.

The tractor-trailer combination 5 also comprises an actuator, by means of which a steering movement of the steerable axle 9 can be effected, and a control and/or regulating unit S, which is connected to the at least one sensor unit and the at least one actuator. The control and/or regulating unit S is formed in such a way that it can control the at least one actuator based on the movement of the trailer 2 detected by the sensor unit for a specified movement of the at least one steerable axle 9. To this end, the steering angle 7 of the at least two wheels 6 of the trailer 2 is calculated on the basis of the sensor data so as to achieve an at least approximate tracking of the path 8 of the towing vehicle 1. An adjustment element is produced by means of the actuator, such that the at least one steerable axle 9 steers in the calculated steering angle 7. The steering movement is performed based on the calculated movement data of the trailer 2 in the opposite direction of the cornering or path 8 of the towing vehicle 1, such that the at least two wheels 6 of the trailer 2 follow the path 8 of the towing vehicle 1. Due to the updating of the sensor data from the sensor unit during a driving movement of the towing vehicle at regular intervals, it is possible to continuously determine the path of the towing vehicle 1 or the path to be followed and the path and position of the trailer 2 and to correct and/or adapt the steering angle 7 continuously as appropriate.

For example, the towing vehicle 1 in Figure 1 is negotiating a left turn, however the at least two wheels 6 of the trailer 2 are deflected to the right by the regulating unit and/or control unit S. The same is also true, conversely, when negotiating a right turn.

Figure 2 shows individual steps for carrying out the method according to the invention for steering a trailer 2 towed by a towing vehicle 1, said trailer having at least one steerable axle 9, wherein the towing vehicle 1 and the trailer 2 are connected to each other at a hitch point 4 by means of a towing device. The movement of the trailer 2 towed by a towing vehicle 1 is detected by at least

one sensor unit, which is functionally and/or spatially associated exclusively with the trailer 2. The at least one sensor unit is preferably a gyroscope, so as to be able to detect the rotary speed of the trailer 2 in the event of any changes in direction. The sensor data are then analysed during the movement of the towing vehicle 1 and the trailer 2 in order to obtain control data. These control data are used as the basis for the steering of the at least two wheels 6 of the trailer 2 and for the determining of the path of the towing vehicle 1. The steering angle 7 of the at least two wheels 6 of the trailer 2 is then calculated by means of the obtained control data in order to follow the path 8 of the towing vehicle 1 approximately. A variable steer angle of the wheels 6 of the trailer 2 is initiated. In order to be able to constantly adapt the steering movement of the trailer 2 to the position, movement and speed thereof, the sensor data are updated during the movement of the towing vehicle 1 at regular time intervals, such that the movement of the trailer 2 is detected anew. The path of any point of the trailer 2 can be determined with the present method. Since the hitch point 4 is known at all times, the path 8 predefined by the towing vehicle 1 can be determined for each program cycle. The path 8 to be followed may be entered and stored in a local two-dimensional (or more) map. The movement of the trailer, i.e. the current position of the trailer 2, can be detected by means of the sensor unit functionally and/or spatially associated exclusively with the trailer 2. The current position of the trailer 2 and hitch point 4 thereof can also be entered in the local two-dimensional (or more) map. The steering angle of the wheels of the trailer 2 and/or of the drawbar can be calculated on the basis of the current position of the trailer 2 and hitch point 4 thereof. The trailer 2 can thus follow the path 8 predefined by the towing vehicle 1 and/or can be returned to this path in the event of any deviations.

The invention has been described with reference to a preferred embodiment. However, it is conceivable to a person skilled in the art for modifications or changes to be made to the invention without departing from the scope of protection of the claims below.

List of reference symbols

- 1 towing vehicle
- 2 trailer
- 4 hitch point
- 5 tractor-trailer combination
- 6 wheels of the trailer
- 7 steering angle
- 8 path
- 9 axle
- S control unit and/or regulating unit

Fremgangsmåde til styring af en landbrugsanhænger og et landbrugsvogntog

Patentkrav

1. Fremgangsmåde til styring af en anhænger (2), som trækkes af et trækkende køretøj (1), og som indbefatter i det mindste en styrbar aksel (9) og/eller trækstang, hvor det trækkende køretøj (1) og anhængerens (2) er forbundet med hinanden ved hjælp af en trækanordning ved et fastgørelsespunkt (4), og hvor fremgangsmåden omfatter i det mindste de følgende trin:

- registrering af en bevægelse af anhængerens (2) på grundlag af sensordata fra i det mindste en sensorenhed, der udelukkende er tilordnet anhængerens (2) funktionelt og/eller rumligt;
- analyse af sensordataene under en kørebevægelse af det trækkende køretøj (1) og anhængerens (2) til tilvejebringelse af styredata til styring af i det mindste to styrbare hjul (6) og/eller trækstangen på anhængerens (2);
- beregning af drejningsvinkler (7) for de i det mindste to styrbare hjul (6) og/eller trækstangen på anhængerens (2) på grundlag af en bane (8) for det trækkende køretøj (1), der er beregnet på baggrund af sensordataene, og for tilnærmelsesvist at følge banen (8) for det trækkende køretøj (1) ved hjælp af den variable drejningsvinkel for hjulene (6) og/eller trækstangen på anhængerens (2), kendetegnet ved, at en bevægelse af anhængerens (2) registreres ved hjælp af i det mindste et gyroskop og/eller i det mindste en accelerationssensor, hvor sensorenheden, der udelukkende er tilordnet anhængerens (2) funktionelt og/eller rumligt, omfatter det i det mindste ene gyroskop og/eller den i det mindste ene accelerationssensor, hvor der på baggrund af anhængerbevægelsen eller dens registrerede kørebane eller dele heraf konstateres eller beregnes en banekurve for det trækkende køretøj (1), og hvor det trækkende køretøjs (1) fastgørelsespunkt (4) bestemmes ved en kendt position og orientering af anhængerens (2) med dennes trækstangslængde.

2. Fremgangsmåde ifølge krav 1, hvor anhængerens bevægelse registreres ved hjælp af i det mindste et vejmålesystem og/eller i det mindste en hastighedssensor.

3. Fremgangsmåde ifølge krav 1 eller 2, hvor en position af anhængerens (2) registreres med et positionsbestemmelsessystem, der er tilordnet anhængerens funktionelt og/eller rumligt.

4. Fremgangsmåde ifølge et af kravene 1 til 3, hvor sensordataene fra sensorenheden under en kørebevægelse af det trækkende køretøj (1) opdateres i regelmæssige, cykliske og/eller forudbestemte tidsintervaller.

5. Fremgangsmåde ifølge et af kravene 1 til 4, hvor en styrebevægelse af anhængerens (2) gennemføres i realtid eller tilnærmelsesvist i realtid via registrering af anhængerens (2) bevægelse ved hjælp af sensorenheden.

6. Fremgangsmåde ifølge et af kravene 1 til 5, hvor styringen af de i det mindste to hjul (6) og/eller trækstangen på anhængerens (1) udføres på baggrund af de udregnede bevægelsesdata for

anhænger (2).

7. Fremgangsmåde ifølge et af kravene 1 til 6, hvor anhængerens (2) styrebevægelse foretages i modsat retning af det trækkende køretøjs (1) kurvekørsel.

8. Landbrugsvogntog (5), der er dannet af mindst et trækkende køretøj (1) og en anhænger (2), der trækkes af det trækkende køretøj (1), med i det mindste en styrbar aksel (9) og/eller trækstang, hvor vogntoget (5) desuden omfatter i det mindste de følgende komponenter:

- i det mindste en sensorenhed, der er tilordnet anhænger (2) funktionelt og/eller rumligt og kan registrere anhængerens (2) bevægelser;
- i det mindste en aktuator, via hvilken der kan bevirkes en styrebevægelse af akslen (9) og/eller trækstangen;
- en styre- og/eller reguleringsenhed (S), der står i en virksom forbindelse med den i det mindste ene sensorenhed og den i det mindste ene aktuator, hvor styre- og/eller reguleringsenheden (S) er udformet på en sådan måde, at den under hensyntagen til anhængerens (2) bevægelse, der er registreret ved hjælp af den i det mindste ene sensorenhed, kan aktivere den i det mindste ene aktuator til en defineret bevægelse af den i det mindste ene styrbare aksel (9) og/eller trækstang, således at et respektivt hjul på anhænger (2), der er forbundet med den styrbare aksel (9), i det mindste tilnærmelsesvist kan bevæges i et kørespor for det trækkende køretøj (1), kendetegnet ved, at den i det mindste ene sensorenhed, der udelukkende er tilordnet anhænger (2) funktionelt og/eller rumligt, er dannet af bevægelses- og/eller hastighedssensorer og/eller et gyroskop, hvor der på baggrund af anhængerbevægelsen eller dens registrerede kørebane eller dele heraf kan konstateres eller beregnes en banekurve for det trækkende køretøj (1), og hvor det trækkende køretøjs (1) fastgørelsespunkt (4) kan bestemmes ved en kendt position og orientering af anhænger (2) med dennes trækstangslængde.

9. Landbrugsvogntog ifølge krav 8, hvor den i det mindste ene sensorenhed, der udelukkende er tilordnet anhænger (2) funktionelt og/eller rumligt, er udformet som et positionsbestemmelsessystem.

10. Landbrugsvogntog ifølge krav 8, hvor den i det mindste ene sensorenhed, der udelukkende er tilordnet anhænger (2) funktionelt og/eller rumligt, er dannet af et vejmålesystem og/eller af en hastighedssensor.

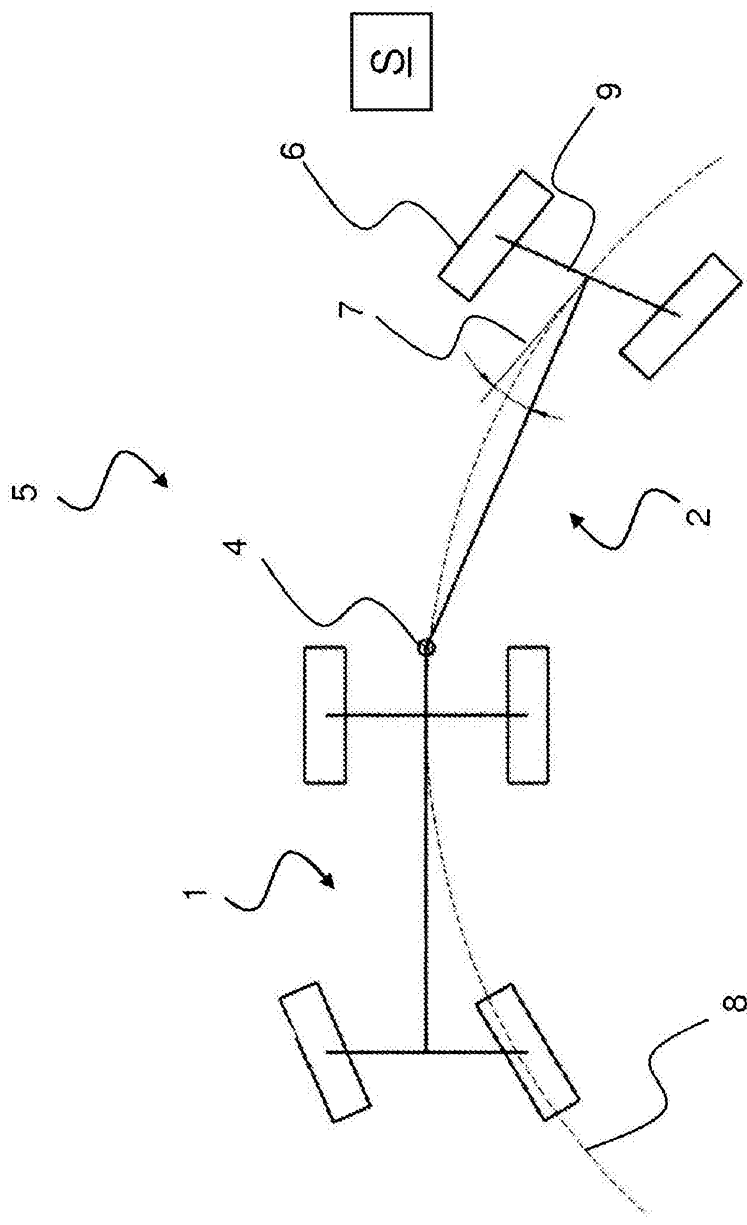


Fig. 1

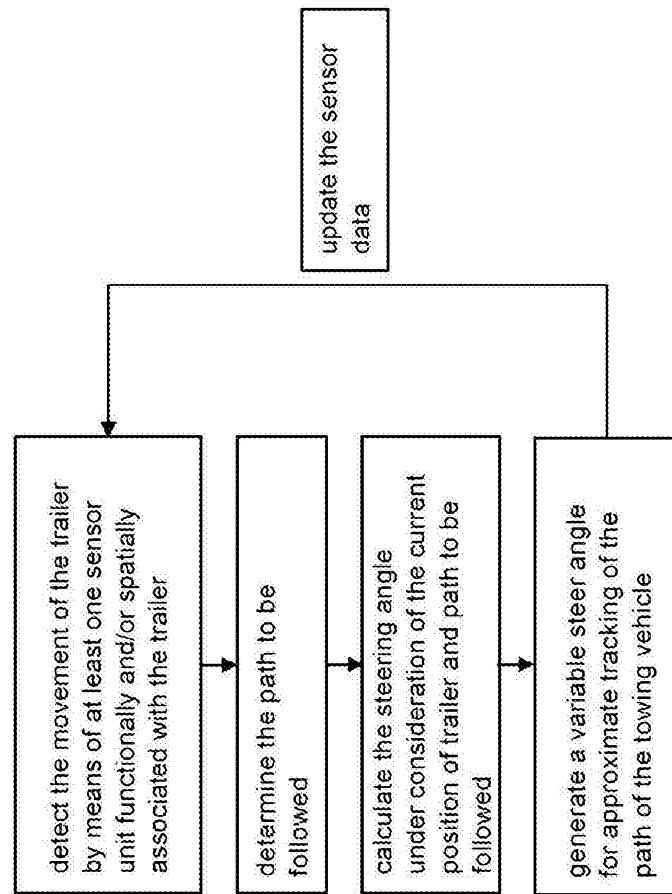


Fig. 2