(19) DANMARK

(10) **DK/EP 3453241 T3**

(12) Oversættelse af europæisk patentskrift

Patent- og Varemærkestyrelsen

(51) Int.Cl.: ***A 01 C 21/00 (2006.01)*** ***A 01 C 17/00 (2006.01)***

(45) Oversættelsen bekendtgjort den: **2025-01-06**

(80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2024-11-20**

(86) Europæisk ansøgning nr.: **18401077.5**

(86) Europæisk indleveringsdag: **2018-08-28**

(87) Den europæiske ansøgnings publiceringsdag: **2019-03-13**

(30) Prioritet: **2017-09-11 DE 102017120871**

(84) Designerede stater: **AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**

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(54) Benævnelse: **FREMGANGSMÅDE TIL UDSPREDNING AF UDSPREDNINGSMATERIALE**

(56) Fremdragne publikationer:
EP-A1- 3 241 420
DE-A1- 102011 009 761
DE-A1- 102014 103 968

METHOD FOR DISTRIBUTING SPREAD GOODS

Description

The invention relates to a method for applying spreading material according to the preamble of claim 1, to a spreader according to the preamble of claim 12, and to an application combination according to the preamble of claim 13.

In order to avoid overlaps and/or gaps when applying spreading material, modern spreaders, such as fertilizer spreaders, have a so-called partial-width control system, by means of which the spreading width of the centrifugal discs and thus the working width of the spreader can be changed. In a partial-width control system, the maximum spreading width of a centrifugal disc or the maximum working width of a spreader is divided into several partial widths, wherein one or more partial widths can be temporarily excluded from the application of spreading material. Individual partial widths can therefore be switched on or off independently of one another when applying spreading material.

In particular, when the spreading limits extend obliquely into the spreading pattern of the spreader, for example in the area of field edges or on headlands, it is essential to adjust the spreading width on the centrifugal discs to avoid incorrect spreading. However, the precision of this type of application control system depends heavily on the switching time at which individual partial widths of a partial-width control system are switched on or off. In order to ensure that individual or multiple partial widths are switched on or off at an appropriate time, a switching distance from the fertilizer spreader to the spreading limit must be determined.

Different approaches to determining suitable switching distances are already known from the prior art. For example, the publication EP 2 417 848 A2 or DE 10 2011 009 761 A1 discloses a method in which the setting parameters for the application of spreading material are switched at transition points, wherein the determination of the spreader is carried out in the field interior as well as a characteristic value that is empirically determined and characterizes the flight properties of the fertilizer. These and other known methods for applying spreading material can no longer meet the increasing demands on application precision and/or require a complex control method, the implementation of which is time-consuming and costly.

The object of the invention is therefore to improve and/or simplify the adjustment of the spreading width when applying spreading material.

The object is achieved by a method of the type mentioned at the outset, wherein the at least one switching distance is determined depending on a throwing direction of the at least one centrifugal disc of the spreader by means of the spreader or by means of an application combination comprising the spreader and a vehicle pulling or carrying the spreader, wherein the throwing direction, dependent upon which the at least one switching distance is determined, is a set target throwing direction of the at least one centrifugal disc of the spreader or a current actual throwing direction of the at least one centrifugal disc of the spreader.

The invention makes use of the knowledge that the throwing direction of a centrifugal disc is a parameter which influences the spreading material distribution to a considerable extent, since the orientation of the spreading fan generated depends primarily on the throwing direction of at least one centrifugal disc. Thus, by taking into account the throwing direction of the at least one centrifugal disc, the spreading width of the at least one centrifugal disc can be adapted much more precisely to a spreading range defined by a spreading limit. The spreading limit can, for example, be a field-internal spreading limit, particularly in the headland area, or a field boundary. The detected spreading limit preferably runs in the direction of movement of the spreader in front of the spreader.

It is particularly preferred that the method according to the invention is carried out with a spreader designed as a fertilizer spreader, wherein the spreader designed as a fertilizer spreader has two centrifugal discs arranged next to one another.

Furthermore, a method according to the invention is preferred in which the throwing direction, dependent upon which the at least one switching distance is determined, is a set target throwing direction of the at least one centrifugal disc of the spreader or a current actual throwing direction of the at least one centrifugal disc of the spreader. Preferably, the set target throwing direction is the direction which the operator of the spreader has previously set manually, for example via an input device. Using a spreading table, for example, which is provided, for example, by the manufacturer of the spreader, the operator of the spreader can determine the target

throwing direction that is to be set. Due to various influences, the actual throwing direction present during the application of the spreading material may differ from the set target throwing direction. Since the current actual throwing direction reflects the orientation of the spreading fan extremely precisely, the determination of the at least one switching distance can also be carried out with higher precision if this is carried out depending on the current actual throwing direction. For this purpose, the method according to the invention preferably comprises detecting the target throwing direction of the at least one centrifugal disc of the spreader and/or detecting the current actual throwing direction of the at least one centrifugal disc of the spreader.

Furthermore, a method according to the invention is advantageous in which adjusting the spreading width of the at least one centrifugal disc, in particular by means of a partial-width control system, when the at least one switching distance of the spreader to the spreading limit is reached, comprises gradually interrupting the spreading material ejection of all centrifugal discs after reaching a switching distance of the spreader to a spreading limit extending substantially orthogonally to the tramline being traveled along and/or gradually removing an interruption to the spreading material ejection of all centrifugal discs after a switching distance of the spreader to a spreading limit extending substantially orthogonally to the tramline being traveled along is reached. If the spreading width of the at least one centrifugal disc is adjusted by means of a partial-width control system, gradually interrupting the spreading material ejection of all centrifugal discs comprises gradually switching off all partial-widths of the partial-width control system. In this case, gradually removing an interruption of the spreading material ejection of all centrifugal discs comprises gradually switching on all partial widths of the partial-width control system. If the spreading pattern of the spreader has a parabolic shape in which the central partial widths of a partial-width control system have the greatest distance in the direction of travel and the outer partial widths have the smallest distance in the direction of travel from the spreader, it is preferred that when the spreading material ejection of all centrifugal discs is gradually interrupted, the outer partial widths are switched off first, wherein the partial widths arranged laterally on the inside of the outer partial widths are also subsequently switched off gradually with a time delay until finally the central partial widths are also switched off. In this case, it is also preferred that when the

interruption of the spreading material ejection of all centrifugal discs is gradually removed, the outer partial widths are switched on first, wherein the partial widths arranged laterally on the inside of the outer partial widths are also subsequently switched on gradually with a time delay until finally the central partial widths are also switched on. An adjustment of the parabolic shape of the spreading pattern can require a change in size and/or shape of individual or all partial widths of the partial-width control system. For example, stretching the parabolic shape leads to partial widths with an increased length, wherein the offset of adjacent partial widths in the direction of travel can also be increased. For example, compression of the parabolic shape leads to partial widths with a reduced length, wherein the offset of adjacent partial widths in the direction of travel can also be reduced.

In a further preferred embodiment of the method according to the invention, the adjustment of the spreading width of the at least one centrifugal disc, in particular by means of a partial-width control system, takes place step by step when successive switching distances of the spreader to a spreading limit extending obliquely to a tramline being traveled along are reached. In particular, the spreader has two rotationally drivable centrifugal discs which are arranged next to one another, wherein one centrifugal disc is arranged on a side facing the spreading limit and one centrifugal disc is arranged on a side facing away from the spreading limit. Due to the oblique course of the spreading limit, the centrifugal discs arranged next to each other have different distances from the spreading limit. It is therefore advantageous if the two centrifugal discs have partial-width control systems that can be controlled independently of one another, so that the adjustment of the spreading width of the centrifugal disc facing away from the spreading limit can be carried out independently of the adjustment of the spreading width of the centrifugal disc facing the spreading limit. Particularly in the area of obliquely extending spreading limits, the two centrifugal discs can have different throwing directions, so that the adjustment of the spreading material ejection depending on the respective throwing directions must be carried out separately for each centrifugal disc.

In a further preferred embodiment of the method according to the invention, the partial widths of the partial-width control system that are to be switched when the at least one switching distance is reached are determined. The adjustment of the spreading width of the at least one centrifugal disc by means of the partial-width control system

when the at least one switching distance of the spreader to the spreading limit is reached comprises switching the partial widths of the partial-width control system that are to be switched. Switching a partial width can comprise switching off a partial width, i.e. interrupting the spreading material ejection in this area, and switching on a partial width, i.e. carrying out the spreading material ejection in this area.

Furthermore, a method according to the invention is advantageous in which an input device is provided by means of which an operator can input a throwing direction to be set by the spreader, can input a throwing direction set manually by an operator, can input one or more parameters to be set by the spreader, from which the throwing direction to be set can be determined, and/or can input one or a plurality of parameters set manually by an operator, from which the set throwing direction can be determined. The one or more parameters to be set by the spreader and/or the one or more parameters manually set by an operator may comprise, for example, the throwing distance, the working width, the type of spreading material and/or properties of the spreading material to be applied. The method can be carried out, for example, in conjunction with spreaders where the operator has to manually adjust the spreading material ejection. Alternatively or additionally, the method according to the invention can also be used in conjunction with spreaders in which individual or all device parameters relating to the spreading material ejection are adjusted automatically or independently. The input device may, for example, comprise a touchscreen, one or more keys and/or one or more push buttons. Furthermore, the input device can comprise pressure-sensitive input elements and/or distance-sensitive input elements, the actuation of which does not require contact by the operator. In addition, the input device can be configured to capture input commands by means of speech recognition. Furthermore, the input device can be configured to detect input commands from an operator by means of gesture recognition.

In a further embodiment of the method according to the invention, the throwing direction of the at least one centrifugal disc is determined, in particular calculated, on the basis of the one or more input parameters from which the throwing direction that is to be set or is set can be determined. Alternatively or additionally, the determined, in particular calculated, throwing direction is provided for determining the at least one switching distance. Determining the throwing direction of the at least one centrifugal disc may comprise determining the throwing angle of the at least one centrifugal disc.

The throwing angle corresponds to the angle between the longitudinal axis of the spreader and the axis bisecting the spreading fan of at least one centrifugal disc.

In an alternative embodiment of the method according to the invention, the determination of the at least one switching distance is additionally carried out on the basis of a set spreading width of the at least one centrifugal disc and/or a set working width of the spreader. The set spreading width influences the spreading fan of at least one centrifugal disc to a considerable extent. Thus, a further increase in the precision in the switching distance detection can be achieved if the set spreading width is also taken into account when determining at least one switching distance. The same applies analogously to the working width of the spreader, which can comprise the spreading width of multiple, for example two, centrifugal discs.

Furthermore, a method according to the invention is preferred in which the determination of the at least one switching distance is additionally carried out on the basis of the set throwing distance of the at least one centrifugal disc. Alternatively or additionally, the at least one switching distance is also determined on the basis of the set rotational speed of the at least one centrifugal disc and/or the set point of application of the at least one centrifugal disc. The set throwing distance significantly influences the size of the spreading fan, so that the throwing distance also influences the area-related amount of spreading material. In the area of obliquely extending spreading limits, a further increase in precision in the switching distance determination can be achieved by taking the set throwing distance into account.

Furthermore, a method according to the invention is advantageous in which the determination of the at least one switching distance is additionally carried out on the basis of a set point of application of the spreading material onto the at least one centrifugal disc and/or the parabola of the spreading fan of the spreading material ejected by the at least one centrifugal disc. The point of application of the spreading material onto the at least one centrifugal disc can be changed, for example, in the radial direction inwards or outwards or in the circumferential direction clockwise or anti-clockwise. The change in the point of application of the spreading material onto the at least one centrifugal disc causes a rotation of the spreading fan of the at least one centrifugal disc and thus also affects the throwing direction of the at least one centrifugal disc. The parabola formed by the spreading fan, in particular its shape

and size, also influences the spreading material ejection to a considerable extent. Taking this parameter into account when determining the at least one switching distance leads to a further increase in precision when applying spreading material. By adjusting the ejection parameters, different parabolic shapes for the spreading pattern can be achieved. The parabolic shapes that can be set can differ from one another, for example, in their lateral extension transverse to the direction of travel and/or in their extension in the direction of travel. Furthermore, compressed and stretched parabolic shapes can be set, and the change in parabolic width can also be set with increasing distance from the parabolic center.

Furthermore, a method according to the invention is preferred in which a spreading table is generated which comprises information on a throwing direction to be set for the spreading material, wherein the spreading table is generated in particular by the manufacturer of the spreader or a third party provider. Alternatively or additionally, the method according to the invention comprises providing the spreading table containing the information on the throwing direction to be set for the spreading material to the operator of the spreader, in particular by the manufacturer of the spreader or a third party provider. Furthermore, the method according to the invention can comprise inputting information on the throwing direction to be set for the spreading material from the spreading table into an input device, in particular an input device of the spreader or of the vehicle pulling or carrying the spreader. The throwing direction can be adjusted, for example, via a throwing angle which is listed in the spreading table. Alternatively, the spreading table can also contain information on a scale attached to the spreader, wherein the scale is used to set the throwing direction. The spreading table can be made available to the operator, for example, as a printed product or as a document file prepared for printing. Furthermore, the spreader or a vehicle pulling or carrying the spreader can be designed to retrieve the spreading table from a central computer, such as a server, for example a central computer of the manufacturer of the spreader or of a third party.

The object of the invention is further achieved by a spreader of the type mentioned above, wherein the spreader is configured to carry out the method for applying spreading material according to any one of the embodiments described above. With regard to the advantages and modifications of the spreader

according to the invention, reference is made to the advantages and modifications of the method according to the invention.

The object of the invention is further achieved by an application combination of the type mentioned above, wherein the application combination is configured to carry out the method for applying spreading material according to any one of the embodiments described above. With regard to the advantages and modifications of the application combination according to the invention, reference is made to the advantages and modifications of the method according to the invention.

Further details of the invention can be found in the description of the figures and in the drawings, in which

Fig. 1 shows an exemplary embodiment of a spreader according to the invention when carrying out the method according to the invention;

Fig. 2 shows the spreader shown in Fig. 1 when carrying out the method according to the invention; and

Fig. 3 shows the spreader shown in Fig. 1 when carrying out the method according to the invention.

Fig. 1 shows a spreader 10 designed as a fertilizer spreader for applying spreading material, namely fertilizer. The spreader 10 has two rotationally drivable centrifugal discs 12a, 12b which are arranged next to one another, and a partial-width control system 14.

The centrifugal discs 12a, 12b accelerate the applied spreading material and eject it in a throwing direction 22a, 22b. The throwing directions 22a, 22b can be defined, for example, via throwing angles α1, α2, wherein the throwing angles α1, α2 correspond to the angles between the longitudinal axis of the spreader 10 and the axis bisecting the spreading fan of the respective centrifugal disc 12a, 12b.

The spreader 10 can, for example, be pulled or carried by a vehicle designed as a tractor, so that the vehicle and the spreader 10 form an application combination.

Depending on the set device configuration and the spreading material to be applied, the spreading material is ejected by the centrifugal discs 12a, 12b up to a throwing distance 24a, 24b. The throwing distances 24a, 24b are constant along the respective spreading widths 20a, 20b of the centrifugal discs 12a, 12b. This is shown in a simplified and schematic way in the figures.

The spreading widths 20a, 20b of the centrifugal discs 12a, 12b overlap in a central area of the spreading material ejection. The spreading widths 20a, 20b of the centrifugal discs 12a, 12b and their overlapping area also define the set working width 18 of the spreader 10. The working width 18 is divided into several partial widths 16a-16p, which can be temporarily excluded from the application of spreading material by the partial-width control system 14. The partial-width control system 14 is designed to adjust the working width 18 of the spreader 10 by adjusting the spreading width 20a, 20b of the centrifugal discs 12a, 12b by switching one or more partial widths 16a-16p on and off.

The spreader 10 and/or the vehicle carrying or pulling the spreader 10 is designed to detect a spreading limit which requires an adjustment of the spreading width 20a, 20b of a centrifugal disc 12a, 12b and/or both centrifugal discs 12a, 12b of the spreader 10 while traveling along a tramline. The spreading limit can, for example, be a field edge or an internal field spreading limit, for example in the area of the headland.

After the spreading limit has been detected, one or more switching distances are determined, and when said distances are reached, the partial-width control system 14 switches off one or more partial widths 16a-16p, so that incorrect application in the area of the spreading limit is avoided. The determination of the one or more switching distances is carried out on the basis of the throwing directions 22a, 22b of the centrifugal discs 12a, 12b of the spreader 10.

The throwing directions 22a, 22b, dependent upon which the one or more switching distances are determined, are the target throwing directions, set by an operator, of the centrifugal discs 12a, 12b of the spreader 10. In order for the operator to be able to input the throwing directions 22a, 22b suitable for the spreading process, the spreader 10 or the vehicle carrying or pulling the spreader 10 has an input device, such as a touchscreen. Alternatively or additionally, the throwing directions 22a, 22b

of the centrifugal discs 12a, 12b can also be calculated by the spreader 10 or the vehicle carrying or pulling the spreader 10 on the basis of one or more parameters, for example if the spreader 10 is designed to automatically set suitable throwing directions 22a, 22b on the centrifugal discs 12a, 12b.

After the one or more switching distances have been determined, the spreading width 20a, 20b of one centrifugal disc 12a, 12b or both centrifugal discs 12a, 12b can be adjusted by means of the partial-width control system 14 when the one or more switching distances are reached.

The adjustment of the spreading width 20a, 20b of the centrifugal discs 12a, 12b by means of the partial-width control system 14 takes place step by step, for example in the case of a spreading limit extending obliquely to the tramline. For this purpose, the partial widths 16a-16p of the partial-width control system 14 that are to be switched when individual switching distances are reached are determined, so that the respective partial widths 16a-16p can be switched off when successive switching distances of the spreader 10 from the spreading limit extending obliquely to the tramline being traveled along are reached.

The determination of the one or more switching distances can additionally be carried out on the basis of the set spreading widths 20a, 20b of the centrifugal discs 12a, 12b, the set working width 18 of the spreader 10, the set throwing distances 24a, 24b of the centrifugal discs 12a, 12b, the set points of application of the spreading material onto the centrifugal discs 12a, 12b and/or the parabolic shape of the spreading fans of the spreading material ejected by the centrifugal discs 12a, 12b.

In the state shown in Fig. 2, the centrifugal discs 12a, 12b each have different throwing directions 22a, 22b, throwing angles α1, α2 and throwing distances 24a, 24b compared to the state shown in Fig. 1. The changed ejection parameters can arise, for example, from the adjustment of the spreading pattern to a different spreading material.

The changed ejection parameters lead to a spreading fan of the spreader 10 that is positioned further outwards and forwards on both sides, which also results in a parabolic shape of the spreading pattern that is different from the state shown in Fig. 1. The changed parabolic shape of the spreading pattern also results in a

changed alignment of the partial widths 16a-16p of the partial-width control system 14. The extension of the parabolic shape leads to partial widths 16a-16p, which have an increased length compared to the partial widths 16a-16p shown in Fig. 1, wherein the offset of adjacent partial widths 16a-16p in the direction of travel is additionally increased.

In order to ensure that the switching of the partial widths 16a-16p in an area of a spreading limit continues to result in a uniform and also precise application of the spreading material, the new state of the spreader 10 is taken into account when determining the switching distances. This always happens when the configuration of the spreading pattern is deliberately modified. For this purpose, the switching distances are determined on the basis of the throwing directions 22a, 22b and the throwing distances 24a, 24b of the centrifugal discs 12a, 12b and the working width 18 of the spreader 10.

In the state shown in Fig. 3, the centrifugal discs 12a, 12b each have different throwing directions 22a, 22b and throwing angles α1, α2 compared to the state shown in Fig. 1. In addition, the throwing distance 24a of the centrifugal disc 12a now differs from the throwing distance 24b of the centrifugal disc 12b. These changes were made due to the reconfiguration of the spreading fan of the spreader 10 to adjust to a different situation. The illustrated turning of the entire spreading fan of the spreader 10 by changing the throwing directions 22a, 22b and the throwing angles α1, α2 could, for example, be carried out to adjust the spreading pattern of the spreader 10 while the spreader 10 is cornering.

The changed ejection parameters lead to a laterally rotated spreading fan of the spreader 10, which also results in a changed orientation of the partial widths 16a-16p of the partial-width control system 14 compared to the state shown in Fig. 1.

In order to ensure that the switching of the partial widths 16a-16p in an area of a spreading limit continues to result in a uniform and also precise application of the spreading material, the new state of the spreader 10 is taken into account when determining the switching distances. This always happens when the configuration of the spreading pattern is deliberately modified and is achieved by determining the switching distances on the basis of the throwing directions 22a,

22b and the throwing distances 24a, 24b of the centrifugal discs 12a, 12b and the working width 18 of the spreader 10.

List of reference signs

10	Spreader
12a, 12b	Centrifugal disks
14	Partial-width control system
16a-16p	Partial widths
18	Working width
20a, 20b	Spreading widths
22a, 22b	Throwing directions
24a, 24b	Throwing distances
α1, α2	Throwing angles

PATENTKRAV

1. Fremgangsmåde til udspredning af udspredningsmateriale ved hjælp af en spreder (10), hvilken fremgangsmåde omfatter følgende trin:

- detektering af en udspredningsgrænse, der kræver en justering af udspredningsbredden (20a, 20b) for mindst én centrifugalskive (12a, 12b) på sprederen (10), mens der køres langs mindst én kørelinje; og

- justering af den mindst ene centrifugalskives (12a, 12b) udspredningsbredde (20a, 20b), især ved hjælp af et partialbreddestyresystem (14), når der for sprederen (10) er nået mindst én omskiftningsafstand til udspredningsgrænsen;

- bestemmelse af den mindst ene omskiftningsafstand afhængigt af en udkastningsretning (22a, 22b) for den mindst ene centrifugalskive (12a, 12b) på sprederen (10) ved hjælp af sprederen eller ved hjælp af en udspredningskombination, der omfatter sprederen (10) og et køretøj, som trækker eller bærer sprederen (10),

kendetegnet ved, at udkastningsretningen (22a, 22b), afhængigt af hvilken den mindst ene omskiftningsafstand bestemmes, er en indstillet måludkastningsretning for den mindst ene centrifugalskive (12a, 12b) på sprederen (10) eller en aktuel faktisk udkastningsretning for den mindst ene centrifugalskive (12a, 12b) på sprederen (10).

2. Fremgangsmåde ifølge krav 1,

kendetegnet ved, at udkastningsretningen (22a, 22b), afhængigt af hvilken den mindst ene omskiftningsafstand bestemmes, er en indstillet måludkastningsretning for den mindst ene centrifugalskive (12a, 12b) på sprederen (10) eller en aktuel faktisk udkastningsretning for den mindst ene centrifugalskive (12a, 12b) på sprederen (10).

3. Fremgangsmåde ifølge krav 1 eller 2,

kendetegnet ved, at justering af udspredningsbredden (20a, 20b) for den mindst ene centrifugalskive (12a, 12b), især ved hjælp af et partialbreddestyresystem (14), når der for sprederen (10) er nået mindst én omskiftningsafstand til udspredningsgrænsen, omfatter mindst ét af følgende trin:

- gradvis afbrydelse af samtlige centrifugalskivers (12a, 12b) udspredningsmaterialeudkastning, efter at der for sprederen (10) er nået en omskiftningsafstand til en udspredningsgrænse, som i det væsentlige strækker sig ortogonalt i forhold til den kørelinje, der køres langs;

- gradvis ophævelse af en afbrydelse af samtlige centrifugalskivers (12a, 12b) udspredningsmaterialeudkastning, efter at der for sprederen (10) er nået en omskiftningsafstand til en udspredningsgrænse, som i det væsentlige strækker sig ortogonalt i forhold til den kørelinje, der køres langs.

4. Fremgangsmåde ifølge et hvilket som helst af de foregående krav,

kendetegnet ved, at justeringen af den mindst ene centrifugalskives (12a, 12b) udspredningsbredde (20a, 20b), især ved hjælp af et partialbreddestyresystem (14), finder sted gradvist, når der for sprederen (10) er nået successive omskiftningsafstande til en udspredningsgrænse, som strækker sig skråt i forhold til den kørelinje, der køres langs.

5. Fremgangsmåde ifølge et hvilket som helst af de foregående krav,

kendetegnet ved, at justeringen af den mindst ene centrifugalskives (12a, 12b) udspredningsbredde (20a, 20b) udføres ved hjælp af partialbreddestyresystemet (14), og hvilken fremgangsmåde yderligere omfatter følgende trin:

- bestemmelse af de partialbredder af partialbreddestyresystemet (14), der skal omskiftes, når den mindst ene omskiftningsafstand er nået,

hvor justeringen af den mindst ene centrifugalskives (12a, 12b) udspredningsbredde (20a, 20b) ved hjælp af partialbreddestyresystemet (14), når den mindst ene omskiftningsafstand for sprederen (10) til udspredningsgrænsen

er nået, omfatter omskiftning af de partialbredder af partialbreddestyresystemet (14), der skal omskiftes.

6. Fremgangsmåde ifølge et hvilket som helst af de foregående krav,

kendetegnet ved følgende trin:

- tilvejebringelse af en indlæsningsenhed, ved hjælp af hvilken en operatør

- kan indlæse en udkastningsretning (22a, 22b), der skal indstilles af sprederen (10);

- kan indlæse en udkastningsretning (22a, 22b), der indstilles manuelt af en operatør;

- kan indlæse én eller flere parametre, der skal indstilles af sprederen (10), ud fra hvilken/hvilke udkastningsretningen (22a, 22b), der skal indstilles, kan bestemmes; og/eller

- kan indlæse én eller en flerhed af parametre, der indstilles manuelt af en operatør, ud fra hvilken/hvilke den indstillede udkastningsretning (22a, 22b) kan bestemmes.

7. Fremgangsmåde ifølge krav 6,

kendetegnet ved mindst ét af følgende trin:

- bestemmelse, især beregning, af den mindst ene centrifugalskives (12a, 12b) udkastningsretning (22a, 22b) på basis af den ene eller flere indlæsningsparametre, ud fra hvilken/hvilke den udkastningsretning (22a, 22b), der skal indstilles eller er indstillet, kan bestemmes;

- tilvejebringelse af den bestemte, især beregnede, udkastningsretning (22a, 22b) til bestemmelse af den mindst ene omskiftningsafstand.

8. Fremgangsmåde ifølge et hvilket som helst af de foregående krav,

kendetegnet ved, at bestemmelsen af den mindst ene omskiftningsafstand yderligere udføres på basis af en indstillet

udspredningsbredde (20a, 20b) for den mindst ene centrifugalskive (12a, 12b) og/eller en indstillet arbejdsbredde (18) for sprederen (10).

9. Fremgangsmåde ifølge et hvilket som helst af de foregående krav,

kendetegnet ved, at bestemmelsen af den mindst ene omskiftningsafstand yderligere udføres på basis af en indstillet udkastningsafstand (24a, 24b) for den mindst ene centrifugalskive (12a, 12b).

10. Fremgangsmåde ifølge et hvilket som helst af de foregående krav,

kendetegnet ved, at bestemmelsen af den mindst ene omskiftningsafstand yderligere udføres på basis af et indstillet udspredningspunkt for udspredningsmaterialet på den mindst ene centrifugalskive (12a, 12b) og/eller udspredningsviftens parabelform for det udspredningsmateriale, der udkastes med den mindst ene centrifugalskive (12a, 12b).

11. Fremgangsmåde ifølge et hvilket som helst af de foregående krav,

kendetegnet ved mindst ét af følgende trin:

- generering af en udspredningstabel, som omfatter informationer om en udkastningsretning (22a, 22b), der skal indstilles for udspredningsmaterialet, især foretaget af producenten af sprederen (10) eller en tredjepartsudbyder;

- tilvejebringelse af udspredningstabellen, som indeholder informationerne om udkastningsretningen (22a, 22b), der skal indstilles for udspredningsmaterialet, over for sprederens (10) operatør, især foretaget af producenten af sprederen (10) eller en tredjepartsudbyder;

- indlæsning af informationer om udkastningsretningen (22a, 22b), der ud fra udspredningstabellen skal indstilles for udspredningsmaterialet, i en indlæsningsenhed, især en indlæsningsenhed på sprederen (10) eller på det køretøj, som trækker eller bærer sprederen (10).

12. Spreder (10) til udspredning af udspredningsmateriale, især en gødningsspreder, med

- mindst én rotationsdrivbar centrifugalskive (12a, 12b);

kendetegnet ved, at sprederen (10) omfatter midler, der er udformet til at udføre fremgangsmåden til udspredning af udspredningsmateriale ifølge et hvilket som helst af de foregående krav.

13. Udspredningskombination med

- en spreder (10) til udspredning af udspredningsmateriale og med mindst én rotationsdrivbar centrifugalskive (12a, 12b), der især er udformet som en gødningsspreder; og

- et køretøj, der trækker eller bærer sprederen (10) og især er udformet som en traktor,

kendetegnet ved, at udspredningskombinationen omfatter midler, der er udformet til at udføre fremgangsmåden til udspredning af udspredningsmateriale ifølge et hvilket som helst af kravene 1 til 11.

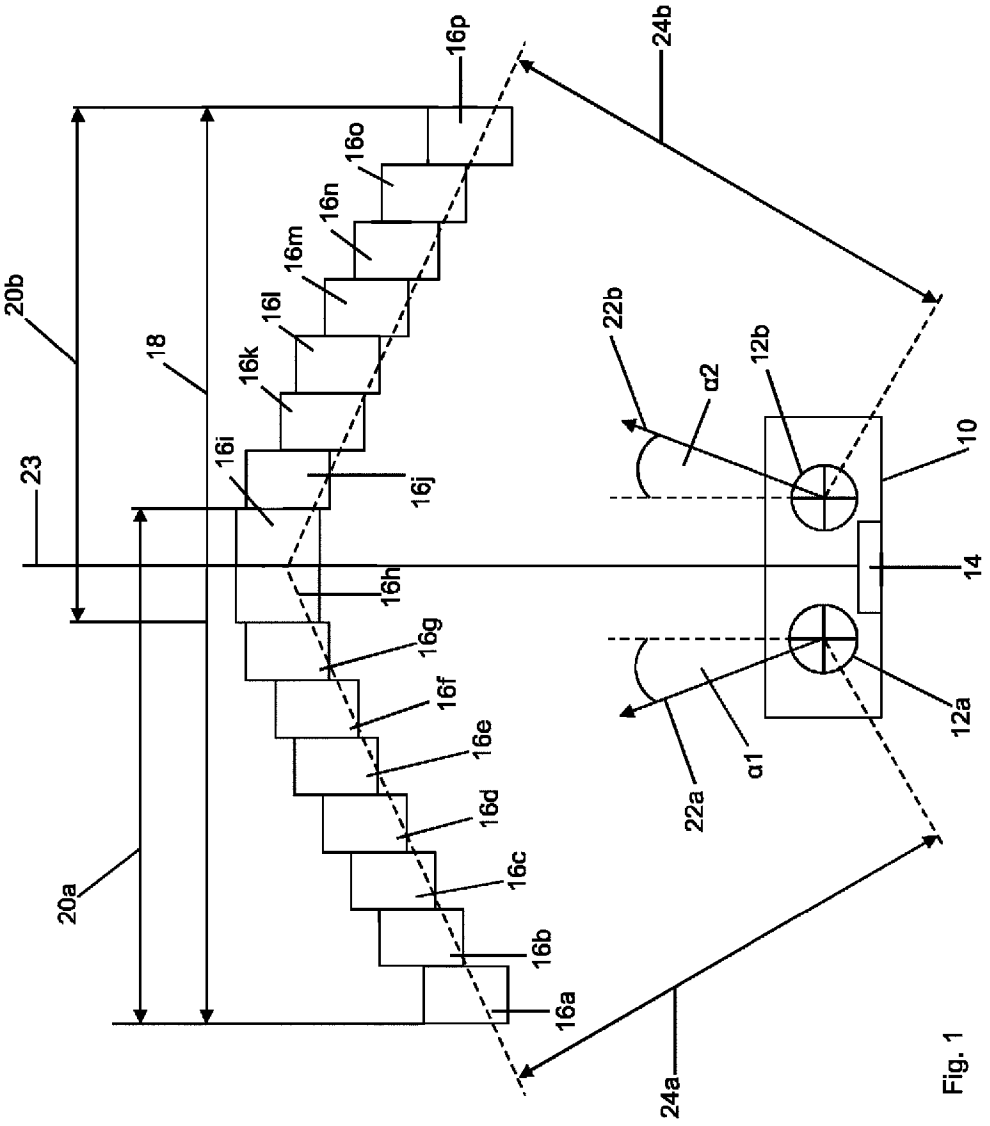
16p
24b
16o
16n
16m
16l
16k
16i
16j
16h
16g
16f
16e
16d
16c
16b
16a
20b
18
23
20a
22b
α2
12b
10
14
12a
α1
22a
24a

Fig. 1

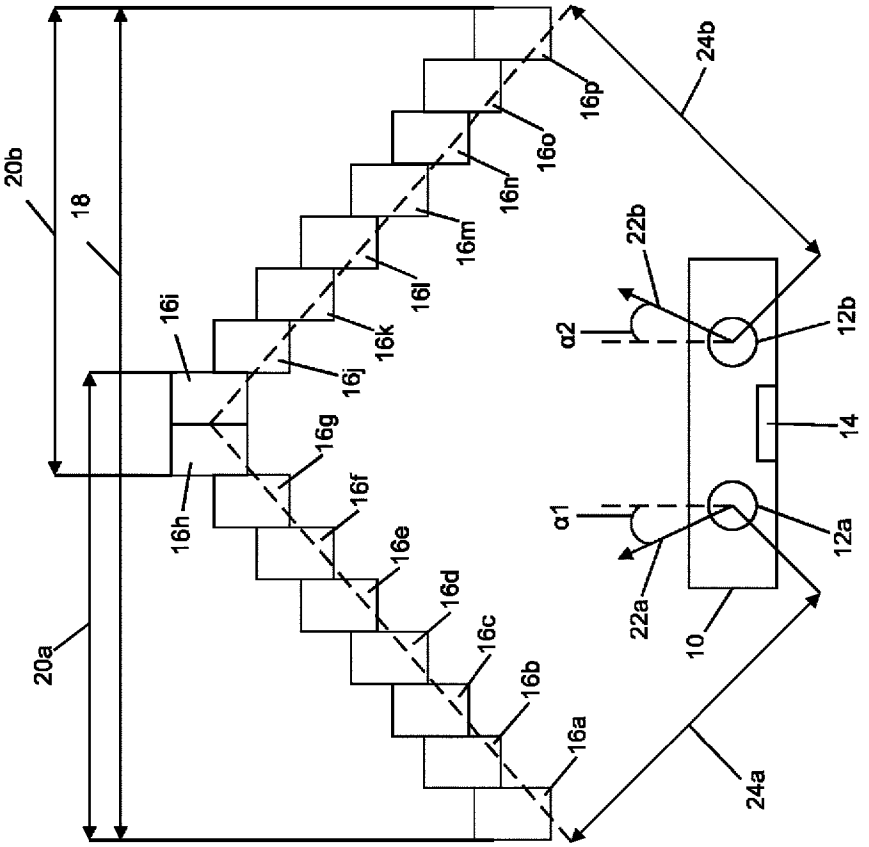
20b
18
16i
16h
16g
16f
16e
16d
16c
16b
16a
20a
16p
16o
16n
16m
16l
16k
16j
24b
22b
α2
12b
14
α1
12a
22a
10
24a

Fig. 2

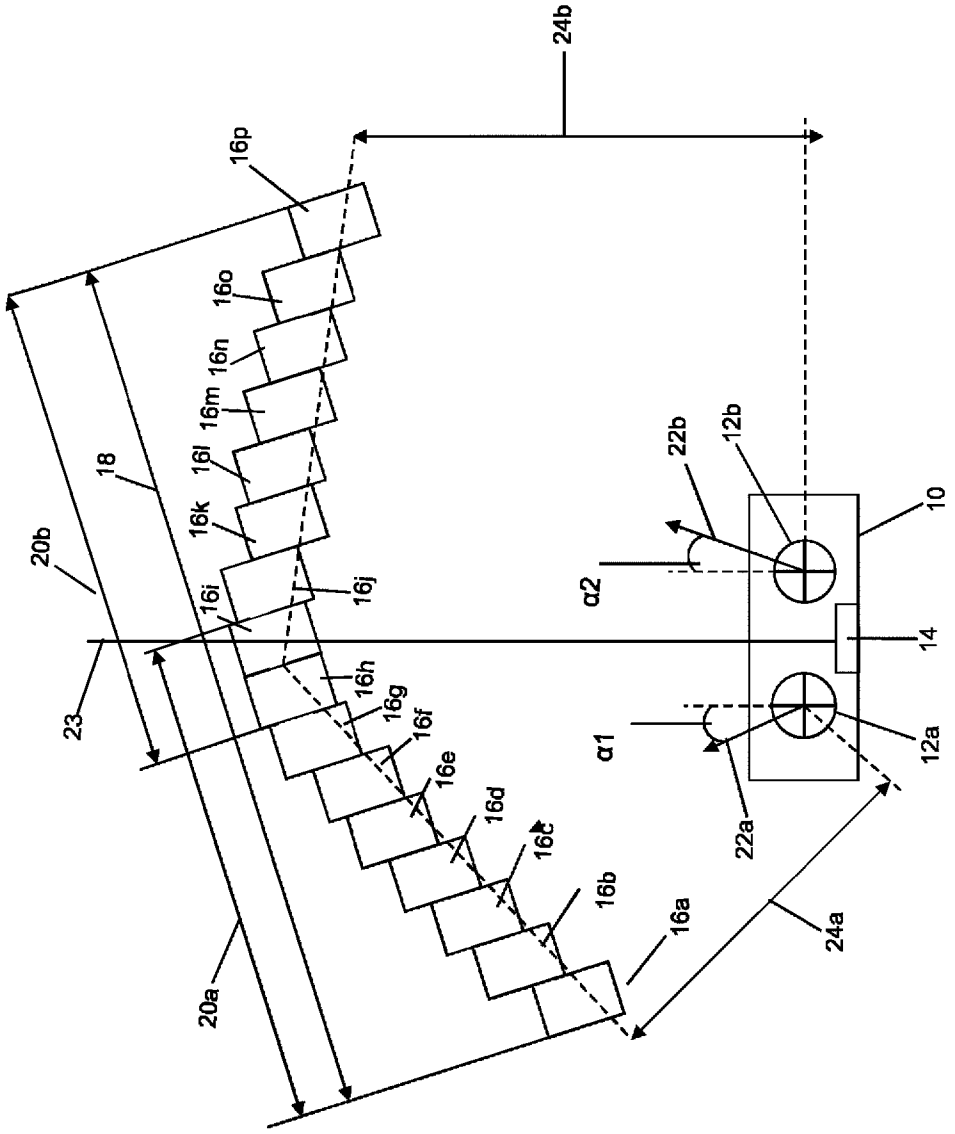
24b
16p
16o
16n
16m
16l
16k
16i
16j
16h
16g
16f
16e
16d
16c
16b
16a
18
20b
23
20a
22b
12b
10
α2
14
α1
12a
22a
24a

Fig.3