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Granule portioning device for an agricultural dispensing machine

Abstract

The invention relates to a granule portioning device for an agricultural dispensing machine, comprising a portioning chamber for forming granule portions and a portioning rotor located in the portioning chamber and having at least one contact body, the contact body being designed to move along a circular path during a rotational movement of the portioning rotor and to combine granules located in the portioning chamber into a granule portion.

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Background/Summary

(1) The invention relates to a granulate portioner for an agricultural dispensing device, an agricultural dispensing device, and a method for producing granulate portions.

(2) In a granulate portioner with a portioning rotor arranged in a portioning chamber, which combines granulate grains located in the portioning chamber to form a granulate portion, jamming can occur between the portioning rotor and granules. Such jamming can impair portioning operation and cause damage to the granulate portioner.
(3) Gap areas between the portioning rotor and the wall of the portioning chamber cannot be completely and permanently avoided due to manufacturing tolerances and wear. Since the granules can have different sizes, jamming between the portioning rotor and the granules can occur if the gap dimensions differ.
(4) To avoid wear problems during the use of a corresponding granulate portioner, the contact bodies of the portioning rotor, which move on a circular path, must be made of a dimensionally stable material, for example hard metal. Elastically deformable contact bodies or contact bodies with elastically deformable outer edges, for example contact bodies with lobes or brushes, are unsuitable for closure reasons.
(5) The object underlying the invention is thus to prevent or at least reduce jamming between the portioning rotor of a granulate portioner and granules.
(6) The object is solved by a granulate portioner of the type mentioned above, wherein the portioning rotor of the granulate portioner according to the invention has an escape mechanism which allows the contact body to temporarily leave the circular path during the rotational movement of the portioning rotor in order to break up and/or avoid jamming between the portioning rotor and granulate grains.
(7) The deflection mechanism allows the contact body to make swerving movements to initiate and/or prevent jamming between the portioning rotor and the granules. The deflection mechanism can also be used to compensate for manufacturing tolerances that lead to unintentional gaps within the granulate portioner. In addition, the deflection mechanism also compensates for wear effects that lead to dimensional deviations in the components of the granulate portioner. The deflection mechanism thus effectively prevents jamming-related functional impairment and damage to the granulate portioner.
(8) The portioning chamber of the granulate portioner is preferably arranged in a housing of the granulate portioner. The portioning rotor is preferably rotationally drivable. For this purpose, the granulate portioner is preferably equipped with a rotor drive. The rotor drive can be an electric, pneumatic or hydraulic drive. The circular path on which the contact body moves during the rotational movement of the portioning rotor is preferably a circular path. The granules, which are portioned with the granulate portioner, are preferably fertilizer. Consequently, the granulate portioner is preferably a fertilizer portioner.
(9) The swerving movements of the contact body are preferably caused by the contact of the contact body with granules. Jammed granules block or impair the rotational movements of the portioning rotor, thus exerting a blocking force on the contact body. This blocking force emanating from a granule causes the swerving movement of the contact body, which deflects the contact body.
(10) In a preferred embodiment of the granule portioner according to the invention, the deflection mechanism allows a radial swerving movement of the contact body to leave the orbit during a rotational movement of the portioning rotor. Alternatively or additionally, the deflection mechanism allows an axial swerving movement of the contact body to leave the circular path during a rotational movement of the portioning rotor. Thus, the deflection mechanism may also permit a swerving movement of the contact body, which comprises a radial component and an axial component. The deflection mechanism allows the contact body to temporarily leave the circular path in the radial direction and/or in the axial direction during a rotational movement of the portioning rotor to break up and/or prevent jamming between the portioning rotor and granules. The contact body performs a swerving movement in the radial direction, in particular inwards or towards the axis of rotation of the portioning rotor, if granules are located in a gap between the, in particular cylindrical or v-shaped, circumferential surface, which radially bounds the portioning

chamber at least in sections, and a radially outer edge of the contact body. If the contact body performs a swerving movement in the radial direction inwards or towards the axis of rotation of the portioning rotor, the radial extension of the portioning rotor is reduced and thus also the diameter. The contact body performs a swerving movement in the axial direction when granules are located in a gap between a side wall, which at least in sections laterally delimits the portioning chamber, and a lateral edge of the contact body.

(11) The granulate portioner according to the invention is further advantageously embodied in that the deflection mechanism has a radial spring connected to the contact body, which allows the radial swerving movement of the contact body to leave the circular path during a rotational movement of the portioning rotor. The radial spring is positioned between the rotor mounting on the rotor drive and the contact body. The radial spring holds the contact body movably deflectable against a restoring force in a reference position in which the contact body is on the circular path. The deflection mechanism can have a stop which limits the restoring movement of the contact body caused by the radial spring and/or displacements due to centrifugal forces acting on the contact body. The stop ensures that the contact body is moved back to the circular path after an swerving movement and is held there in an evasive manner towards the inside, and preferably not towards the outside.

(12) It is furthermore advantageous to have a granulate portioner according to the invention, wherein the portioning rotor comprises at least one portioning wing, wherein the portioning wing has two contact bodies movable relative to one another, wherein the deflection mechanism permits axial swerving movements of the two contact bodies, by means of which the two contact bodies, preferably independently of one another, can temporarily leave their circular path during a rotational movement of the portioning rotor. The two contact bodies can overlap in portions in the axial direction. A swerving movement of a contact body in the axial direction can temporarily cause a reduction in the overall width of the contact surface bond, resulting in gap formation or gap propagation. A lateral outer edge of a first contact body preferably runs along a first side wall of the portioning chamber. A lateral outer edge of a second contact body preferably runs along a second side wall of the portioning chamber. The division into two parts avoids a collision with the wall when a contact body performs an swerving movement, since the respective contact body can swivel in the direction of rotation in front of or behind the corresponding other contact body.

(13) In another embodiment of the granulate portioner according to the invention, the contact body has elastically deformable or resiliently movable side cheeks on one or both sides, which allow an axial swerving movement of the contact body in the direction of a side wall of the portioning chamber to continue even after a side cheek has come into contact with a side wall. For example, the contact body may have a blade shape. The side cheeks of the contact body can be beveled and/or designed from an elastic material, for example spring steel, so that the beveled side cheeks can be resiliently pressed inward. To protect against wear, hard metal flakes or other wear-reducing bodies can be brazed onto the elastic material. The side cheeks of the contact body can be rotatably mounted and pulled against a stop by a cheek spring. Preferably, a stop against the direction of rotation of the portioning rotor prevents the width of the paddle from increasing due to the force exerted by the granules on the blade. Preferably, the blade shape does not comprise a back wall.

(14) It is further advantageous to have a granulate portioner according to the invention in which the portioning chamber is bounded radially and/or axially at least in portions in the environment of the circular path by an at least partially circumferential shell surface. The portioning rotor is preferably arranged in the portioning chamber in such a manner that a radial gap results between the radially outer edge of the contact body and a partial area of the shell surface which radially bounds the portioning chamber at least in sections during the rotational movement of the rotor. Alternatively or additionally, the portioning rotor is arranged in the portioning chamber in such a manner that axial gaps are formed between the axially outer edges of the contact body and partial areas of the shell surface which axially bound the portioning chamber at least in sections during the rotational

movement of the rotor. The portioning rotor can further be arranged in the portioning chamber in such a manner that the gap width of the radial gap and/or the axial gaps changes when the contact body moves out of the way. The shell surface and/or the contact body can each have a trapezoidal, V-shaped or W-shaped cross-section. The outer edges of the contact body and the shell surface preferably extend parallel to one another.

(15) In a further preferred embodiment of the granule portioner according to the invention, the portioning rotor is arranged in the portioning chamber in such a manner that the gap width of the radial gap changes during a swerving movement of the contact body in the axial direction and/or during a deflection movement of the contact body in the radial direction. Alternatively or additionally, the portioning rotor is arranged in the portioning chamber in such a manner that the gap widths of the axial gaps change during a swerving movement of the contact body in the axial direction and/or during a swerving movement of the contact body in the radial direction. A radial swerving movement of the contact body can therefore lead to a widening of the axial gaps. The radial swerving movement can be supplemented by an axial swerving movement of the contact body, which leads to a further widening of the axial gap on one side of the contact body.

(16) In another preferred embodiment of the granulate portioner according to the invention, at least one axially outer edge of the contact body is inclined outwardly, such that the axial gap between the axially outer edge of the contact body and a partial area of the shell surface axially bounding the portioning chamber, at least in sections, increases together with the radial gap during a radially inwardly directed swerving movement of the contact body. The axial outer edge of the contact body thus extends at an angle to a plane which is orthogonal to the axis of rotation of the portioning rotor. The at least one axially outer edge of the contact body thus slopes inward laterally outward in the radial direction. Preferably, the axially outer edges of the contact body located on both sides are each inclined outwardly, such that the axial gaps between the axially outer edges of the contact body and the partial areas of the shell surface axially bounding the portioning chamber, at least in sections, increase together with the radial gap during a radially inwardly directed swerving movement of the contact body.

(17) It is further advantageous to have a granulate portioner according to the invention in which at least one partial area of the shell surface axially delimiting the portioning chamber at least in sections is inclined outwardly, so that the axial gap between the axially outer edge of the contact body and the partial area of the shell surface axially delimiting the portioning chamber at least in sections increases together with the radial gap during a radially inwardly directed swerving movement of the contact body. The partial area of the shell surface axially bounding the portioning chamber at least in sections is thus inclined relative to a plane which is orthogonal to the axis of rotation of the portioning rotor. The partial area of the lateral surface that delimits the portioning chamber at least in portions thus slopes inward laterally outward in the radial direction. Preferably, the partial areas of the shell surface axially bounding the portioning chamber at least in portions on both sides are each inclined outwardly, such that the axial gaps between the axially outer edges of the contact body and the partial areas of the shell surface axially bounding the portioning chamber at least in portions increase together with the radial gap during a radially inwardly directed swerving movement of the contact body.

(18) In another preferred embodiment of the granule portioner according to the invention, the contact body is connected to a hub of the portioning rotor via a connection of a portioning wing. The connecting link can be part of the radial suspension or form the radial suspension itself. The connecting link preferably has a smaller width, i.e. a smaller extension in the axial direction, than the contact body. The width of the connecting link is preferably no more than half the width of the contact body. The connecting link is thus narrower than the contact body, such that the connecting link encounters a smaller number of granules during the rotational movement. In this manner, the formation of cross-grain impacts in the circumferential direction is prevented or at least considerably reduced.

(19) The granulate portioner according to the invention is further advantageously embodied in that the portioning chamber has an inlet opening via which granulate can enter the portioning chamber, wherein the inlet opening is arranged in a side wall of the portioning chamber laterally bounding the portioning chamber on an inlet side. The granules therefore flow into the portioning chamber from the side. The side walls laterally bounding the portioning chamber are preferably designed to be flat or free of curvature. The portioning chamber is preferably laterally bounded by two opposing side walls, wherein the opposing side walls are arranged parallel to one another.
(20) In another preferred embodiment of the granule portioner according to the invention, the connecting link is largely or completely arranged on a chamber side of the portioning chamber opposite the inlet side. Due to this arrangement of the connecting link, the axial distance between the inlet opening and the connecting link is comparatively large, so that the connecting link does not move directly past the inlet opening during the rotational movement of the portioning rotor. A shear point at the inlet opening that causes jamming is avoided. In the axial clearance between connecting link and inlet opening, granule jamming in the area of the edges of the inlet opening is avoided. In addition, there is a considerable reduction in wear during operation of the granulate portioner. Fewer cross-grain impacts occur because the granules are less likely to be hit by the connecting link. This significantly reduces the number of granules that unintentionally leave the portioning chamber between two granule portions. The connecting link preferably has an elongated basic shape.
(21) In a particularly preferred embodiment of the granulate portioner according to the invention, the radially outer edge of the inlet opening has a distance from the circular path of the contact body which increases in the direction of rotation of the portioning rotor. The inlet opening is preferably located in an area of the side wall that is not or only partially swept by the contact body. Since the inlet opening is partially swept, it is advantageous if the outer edge of the inlet opening is radially recessed so that, viewed in the direction of rotation, no shear edge results when the end of the inlet opening is swept. The radially outer edge of the inlet opening has a shallow rising angle in the direction of rotation of the portioning rotor. A continuous transition is thus created between an area of the inlet opening that is swept by the contact surface and the area that is not swept.
(22) In another embodiment, the wall of the housing of the granule portioner axially and/or radially delimiting the portioning chamber can be equipped with a housing-side deflection mechanism as an alternative to or in addition to the rotor-side deflection mechanism on the portioning rotor. For example, the side wall is configured to perform axial swerving movements. Furthermore, the circumferential shell surface can be configured to perform radial and/or axial swerving movements.
(23) The object underlying the invention is further solved by an agricultural dispensing device of the type mentioned at the outset, wherein at least one granulate portioner of the agricultural dispensing device according to the invention is designed according to one of the embodiments described above. Thus, with respect to the advantages and modifications of the agricultural dispensing device according to the invention, reference is made to the advantages and modifications of the granule portioner according to the invention.
(24) The object underlying the invention is further solved by a method of the kind mentioned at the beginning, wherein the contact body temporarily leaves the circular path during the rotational movement of the portioning rotor by means of a deflection mechanism of the portioning rotor within the scope of the method according to the invention, in order to dissolve or prevent jamming between the portioning rotor and granules. The method for producing granule portions is preferably performed by means of a granule portioner according to one of the embodiments described above. With regard to the advantages and modifications of the method according to the invention, reference is thus made to the advantages and modifications of the granulate portioner according to the invention.

Description

(1) Preferred embodiments of the invention are explained and described in more detail below with reference to the accompanying drawings, in which:
(2) FIG. **1** shows an embodiment of the granulate portioner according to the invention in a perspective view;
(3) FIG. **2** shows a sectional view of the granulate portioner shown in FIG. **1**;
(4) FIG. **3** shows an embodiment of the granulate portioner according to the invention in a sectional view;
(5) FIG. **4** shows a sectional view of the granulate portioner shown in FIG. **3** with a deflected contact body;
(6) FIG. **5** shows a portioning rotor of a granule portioner according to the invention in a perspective view;
(7) FIG. **6** shows a detailed illustration of the portioning rotor shown in FIG. **5**;
(8) FIG. **7** shows an embodiment of the granulate portioner according to the invention in a sectional view;
(9) FIG. **8** shows a contact body of the granulate portioner shown in FIG. **7**;
(10) FIG. **9** shows a contact body of the granulate portioner shown in FIG. **7** during a swerving movement;
(11) FIG. **10** shows a contact body of the granulate portioner shown in FIG. **7** during a swerving movement;
(12) FIG. **11** shows an embodiment of the granulate portioner according to the invention in a perspective view;
(13) FIG. **12** shows a sectional view of the granulate portioner shown in FIG. **11**;
(14) FIG. **13** shows the granulate portioner shown in FIG. **11** in a further sectional view; and
(15) FIG. **14** shows a perspective view of the granulate portioner shown in FIG. **11**.
(16) FIGS. **1** and **2** show a granulate portioner **10**, which can be used to produce fertilizer portions. The granulate portioner **10** is thus a fertilizer portioner.
(17) The granulate portioner **10** has a housing **12** in which a portioning chamber **14** is located. The portioning chamber **14** is bounded axially, i.e. laterally, by side walls **18**. The boundary of the portioning chamber **14** in the radial direction is provided by a sectional circumferential shell surface **16**. The shell surface **16** is interrupted in one area by the outlet opening **22**.
(18) Granule portions **10** are formed in the portioning chamber **14** during operation of the granulate portioner. For this purpose, a portioning rotor **24** is arranged in the portioning chamber **14**, which performs a rotational movement about the axis of rotation **26** during operation of the granulate portioner **10**. The portioning rotor **24** is connected via the hub **28** to a rotor drive **30**, which rotationally drives the portioning rotor **24**.
(19) The portioning rotor **24** has two opposing portioning wings **32***a*, **32***b*. The portioning wing **32***a* comprises two contact bodies **34***a*, **34***b* that move along circular paths **38***a*, **38***b* during a rotational movement of the portioning rotor **24**. The portioning wing **32***b* comprises two contact bodies **36***a*, **36***b* which also move along circular paths **38***a*, **38***b* during a rotational movement of the portioning rotor **24**. During the rotational movement of the portioning rotor **24**, the contact bodies **34***a*, **34***b*, **36***a*, **36***b* bring together the granules G in the portioning chamber **14** to form granule portions. The granules G enter the portioning chamber **14** of the granule portioner **10** via the inlet opening **20**.
(20) Contact bodies **34***a*, **34***b* are connected to hub **28** via connecting links **40***a*, **40***b* and radial spring **46***a*. The contact bodies **36***a*, **36***b* are connected to the hub **28** via the connecting links **42***a*, **42***b* and the radial spring **46***b*. The connecting links **40***a*, **40***b*, **42***a*, **42***b* and the radial springs **46***a*, **46***b* are components of a deflection mechanism of the portioning rotor **24**. The deflection mechanism of the portioning rotor **24** allows the contact bodies **34***a*, **34***b*, **36***a*, **36***b* to temporarily

leave the circular paths **38***a*, **38***b* during the rotational movement of the portioning rotor **24** for breaking and/or avoiding jamming between the portioning rotor **24** and granules G. The contact bodies **34***a*, **34***b*, **36***a*, **36***b* can thus perform a swerving movement, wherein the contact bodies **34***a*, **34***b*, **36***a*, **36***b* briefly leave the respective circular path **38***a*, **38***b* when performing the swerving movement. The circular paths **38***a*, **38***b* in this case are circular paths. The granules G, which are brought together by the contact bodies **34***a*, **34***b*, **36***a*, **36***b* to form granule portions, are fertilizer granules.

(21) The contact bodies **34***a*, **34***b* and the contact bodies **36***a*, **36***b* each form contact body pairs. The contact bodies **34***a*, **34***b*, **36***a*, **36***b* of a pair of contact bodies are deflected together during a radial swerving movement, which is made possible by the radial springs **46***a*, **46***b*. Due to the individual suspension of the contact bodies **34***a*, **34***b*, **36***a*, **36***b* via the connecting links **40***a*, **40***b*, **42***a*, **42***b*, the contact bodies **34***a*, **34***b*, **36***a*, **36***b* of a pair of contact bodies can perform swerving movements in the axial direction independently of one another. A lateral deflection of a contact body **34***a*, **34***b*, **36***a*, **36***b* therefore does not necessarily cause a lateral deflection of another contact body **34***a*, **34***b*, **36***a*, **36***b*. The contact bodies **34***a*, **34***b* and the contact bodies **36***a*, **36***b* overlap in portions in the axial direction. The swerving movement of the contact bodies **34***a*, **34***b*, **36***a*, **36***b* in the axial direction can temporarily cause a reduction in the overall width of the contact body pairs, resulting in the formation of a gap between a contact body **34***a*, **34***b*, **36***a*, **36***b* and a side wall **18** of the housing **12** or in a widening of the gap. Gap formation or widening can prevent and dissolve grain jams. Via the radial springs **46***a*, **46***b*, the contact bodies **34***a*, **34***b*, **36***a*, **36***b* can perform a radial swerving movement to leave the circular paths **38***a*, **38***b* during the rotational movement of the portioning rotor **24**. Thus, the deflection mechanism of the pellet portioner **10** allows a radial and an axial swerving movement of the contact bodies **34***a*, **34***b*, **36***a*, **36***b* to leave the circular paths **38***a*, **38***b* during the rotational movement of the portioning rotor **24**.

(22) FIGS. **3** and **4** show a granulate portioner **10**, wherein the contact bodies **34**, **36** of the portioning rotor **24** in FIG. **3** move along the circular path **38**. Unlike FIGS. **1** and **2**, the portioning wings **32***a*, **32***b* each comprise only one contact body **34**, **36**. In the state shown in FIG. **4**, the contact body **36** performs a swerving movement such that it has temporarily left the circular path **38**. By leaving the circular path **38**, jamming with the granule G can be prevented or resolved, since the widening of the radial gap **48***b* between the radially outer edge of the contact body **36** and the shell surface **16** radially bounding the portioning chamber **14** occurs. The radial gap **48***a* between the radially outer edge of the contact body **34** and the shell surface **16** remains unchanged.

(23) The deflection mechanism of the granule portioner **10** further has stops **44***a*, **44***b* which ensure that the contact bodies **34**, **36** are returned to the circular path **38** after performing a swerving movement. The springback of the portioning wings **32***a*, **32***b* is limited by the stops **44***a*, **44***b* so that after the granule G has passed, the original radial gap width is restored at the outer edge of the contact body **36**. Further, the stops **44***a*, **44***b* thus also counteract centrifugal forces impacting the contact bodies **34**, **36**, so that the contact bodies **34**, **36** do not leave the circular path **38** radially outward.

(24) FIGS. **5** and **6** show a portioning rotor **24** in which the contact bodies **34**, **36** are connected to the hub **28** via the connecting links **40**, **42** and the radial springs **46***a*, **46***b*.

(25) The contact bodies **34**, **36** each have resiliently movable side cheeks **54***a*, **54***b*, **56***a*, **56***b* on both sides, which allow an axial swerving movement of the contact bodies **34**, **36** in the direction of a side wall **18** of the portioning chamber **14** to continue even after a side cheek **54***a*, **54***b*, **56***a*, **56***b* comes into contact with a side wall **18**. In the illustrated embodiment, the contact bodies **34**, **36** have a blade shape. The side cheeks **54***a*, **54***b*, **56***a*, **56***b* are designed from an elastic material, in this case spring steel, such that they can be resiliently pressed inwards. In the illustrated embodiment, the blade shape of the contact bodies **34**, **36** does not have a back wall. Thus, in the event of wall contact due to an axial swerving movement of a contact body **34**, **36**, the side cheeks **54***a*, **54***b*, **56***a*, **56***b* can perform an inwardly directed spring movement **58***a*, **58***b*. After a jam has

been cleared or the critical granule G has passed, a spring-induced restoring force ensures that the side cheeks **54***a*, **54***b*, **56***a*, **56***b* are moved back to their original position.
(26) FIG. **7** shows a granulate portioner **10** in which the portioning chamber **14** is radially and axially bounded in the environment of the circular path **38** of the contact bodies **34**, **36** by a partially circumferential shell surface **16**. Taking FIG. **8** into account, it can be seen that the portioning rotor **24** is arranged in the portioning chamber **14** in such a manner that radial gaps **48***a*, **48***b* are formed between the radially outer edges of the contact bodies **34**, **36** and the partial area of the shell surface **16** radially bounding the portioning chamber **14** during a rotational movement of the portioning rotor **24**. Further, the portioning rotor **24** is arranged in the portioning chamber **14** in such a manner that axial gaps **50***a*, **50***b*, **52***a*, **52***b* are formed between the axially outer edges of the contact bodies **34**, **36** and the partial areas of the shell surface **16** axially bounding the portioning chamber **14** during a rotational movement of the portioning rotor **24**. The outer edges of the contact bodies **34**, **36** and the shell surface **16** extend parallel to one another. The axially outer edges of the contact bodies **34**, **36** and the partial areas of the shell surface **16** axially bounding the portioning chamber **14** are inclined outward.
(27) FIG. **9** shows that the portioning rotor **24** is arranged in the portioning chamber **14** in such a manner that the gap width **60** of the radial gap **48***a* changes when the contact body **34** undergoes a swerving movement in the radial direction. As the contact body **34** moves radially inward, the radial gap **48***a* widens. In this manner, grain jams at the radially outer edge of the contact body **34** can be resolved by a swerving movement. FIG. **9** also shows that the portioning rotor **24** is arranged in the portioning chamber **14** in such a manner that the gap widths **62***a*, **62***b* of the axial gaps **50***a*, **50***b* change when the contact body **34** undergoes a swerving movement in the radial direction. During a radially inward swerving movement of the contact body **34**, the axial gaps **50***a*, **50***b* are enlarged.
(28) FIG. **10** shows that the radial swerving movement of the contact body **34** can be combined with an additional axial swerving movement of the contact body **34**. Due to the axially resilient connecting links **40**, **42**, the contact bodies **34**, **36** can therefore also perform axial swerving movements to prevent or trigger grain jamming. During an axial swerving movement, the gap width **62***b* of one axial gap **50***b* is reduced, wherein the gap width **62***a* of the opposite axial gap **50***a* is simultaneously increased. Thus, jamming caused by granules G at the axially outer edges of the contact bodies **34**, **36** can be resolved by a radial and/or by an axial swerving movement of the contact bodies **34**, **36**.
(29) FIGS. **11** to **14** show a granulate portioner **10** in which the contact bodies **34**, **36** are each connected to a hub **28** of the portioning rotor **24** via a connecting link **40**, **42** of a portioning wing **32***a*, **32***b*. The connecting links **40**, **42** have a smaller width, i.e. a smaller extension in the axial direction, than the contact bodies **34**, **36**. The width of the connecting links **40**, **42** is less than half the width of the contact bodies **34**, **36**. The connecting links **40**, **42** are designed to be so narrow that grain cross-blows caused by the connecting links **40**, **42** are considerably reduced in the circumferential direction. This considerably reduces the number of granules G leaving the portioning chamber **14** between individual granule portions.
(30) The portioning chamber **14** has an inlet opening **20** through which granules can enter the portioning chamber **14**. The inlet opening **20** is arranged in a side wall **18** of the portioning chamber **14** laterally defining the portioning chamber **14** on an inlet side **64***a*. The connecting links **40**, **42** are arranged entirely on a chamber side **64***b* of the portioning chamber **14** opposite the inlet side **64***a*. The axial spacing of the inlet opening **20** and the connecting links **40**, **42** creates a clearance **66**. Thus, the connecting links **40**, **42** are not moved directly past the inlet opening **20** during the rotational movement of the portioning rotor **24**. There is no shearing at the inlet opening **20**, which could lead to jamming or additional wear of the inlet opening **20**. The clearance **66** further prevents grain ricochets due to unintentional contact of the connecting links **40**, **42** with granules G in the area of the inlet opening **20**.

(31) Further, the radially outer edge of the inlet opening **20** has a distance from the circular path **38** of the contact bodies **34**, **36** that increases in the direction of rotation of the portioning rotor **24**. A continuous transition is created between the area of the inlet opening **20** swept by the contact bodies **34**, **36** and the area not swept by the contact bodies **34**, **36**.
(32) The shell surface **16** of the granule portioner **10** further has a V-shaped cross-section. The V-shaped cross-section builds up continuously in the portion of the shell surface **16** located behind the outlet opening **22**. This is converted via a crescent-shaped surface **68** in the vicinity of the outlet opening **22**.
LIST OF REFERENCE SYMBOLS
(33) **10** Granulate portioner **12** Housing **14** Portioning chamber **16** Shell surface **18** Side wall **20** Inlet opening **22** Outlet opening **24** Portioning rotor **26** Axis of rotation **28** Hub **30** Rotor drive **32**A,**32***b* Portioning wing **34**, **34***a*, **34***b* Contact body **36**, **36***a*, **36***b* Contact body **38**, **38***a*, **38***b* Circular paths **40**, **40***a*, **40***b* Connecting links **42**, **42***a*, **42***b* Connecting links **44***a*, **44***b* Stops **46***a*, **46***b* Radial springs **48***a*, **48***b* Radial gap **50***a*, **50***b* Axial gap **52***a*, **52***b* Axial gap **54***a*, **54***b* Side cheeks **56**A, **56***b* Side cheeks **58***a*, **58***b* Spring movements **60** Gap width **62***a*, **62***b* Gap widths **64***a*, **64***b* Chamber side **66** Clearance **68** Surface G Granules

Claims

1. A granulate portioner for an agricultural dispensing device, comprising a portioning chamber for forming granular portions; and a portioning rotor arranged in the portioning chamber, the portioning rotor having at least one contact body, wherein the contact body is configured to move along a circular path during a rotational movement of the portioning rotor and to bring together granules located in the portioning chamber to form a granule portion; wherein the portioning rotor has a deflection mechanism which allows the contact body to temporarily leave the circular path during the rotational movement of the portioning rotor for disengaging and/or avoiding jamming between the portioning rotor and granules.
2. The granulate portioner according to claim 1, wherein the deflection mechanism allows a radial swerving movement and/or an axial swerving movement of the contact body to leave the circular path during a rotational movement of the portioning rotor.
3. The granulate portioner according to claim 2, wherein the deflection mechanism has a radial spring connected to the contact body which allows radial swerving movement of the contact body to leave the circular path during rotational movement of the portioning rotor.
4. The granulate portioner according to claim 1, wherein the portioning rotor comprises at least one portioning wing, wherein the portioning wing has two contact bodies movable relative to one another, wherein the deflection mechanism allows axial swerving movements of the two contact bodies, by which the two contact bodies temporarily leave their circular path during a rotational movement of the portioning rotor.
5. The granulate portioner according to claim 1, wherein the contact body has elastically deformable or resiliently movable side cheeks on one or both sides, which allow an axial swerving movement of the contact body in the direction of a side cheek of the portioning chamber to continue even after a side cheek has come into contact with a side cheek.
6. The granulate portioner according to claim 1, wherein the portioning chamber in the environment of the circular path is bounded radially and/or axially at least in portions by an at least partially circumferential shell surface, wherein the portioning rotor is arranged in the portioning chamber in such a manner that a radial gap is formed between the radially outer edge of the contact body and a partial area of the shell surface radially delimiting the portioning chamber at least in portions and/or between the axially outer edges of the contact body and partial areas of the shell surface axially delimiting the portioning chamber at least in portions, and partial areas of the shell surface axially delimiting the portioning chamber at least in sections, axial gaps result during the

rotational movement of the portioning rotor, and the gap width of the radial gap and/or the axial gaps changes during a swerving movement of the contact body.

7. The granulate portioner according to claim 6, wherein the portioning rotor is arranged in the portioning chamber in such a manner that the gap width of the radial gap changes during a swerving movement of the contact body in the axial direction and/or during a swerving movement of the contact body in the radial direction; and/or the gap widths of the axial gaps change during a swerving movement of the contact body in the axial direction and/or during a swerving movement of the contact body in the radial direction.

8. The granulate portioner according to claim 6, wherein at least one axially outer edge of the contact body is inclined outwardly in such a manner that the axial gap between the axially outer edge of the contact body and a partial area of the shell surface axially bounding the portioning chamber at least in portions increases together with the radial gap during a radially inward swerving movement of the contact body.

9. The granulate portioner according to claim 6, wherein at least one partial area of the shell surface axially delimiting the portioning chamber at least in portions is inclined outwardly such that the axial gap between the axially outer edge of the contact body and the partial area of the shell surface axially bounding the portioning chamber at least in portions increases together with the radial gap during a radially inward swerving movement of the contact body.

10. The granulate portioner according to claim 1, wherein the contact body is connected to a hub of the portioning rotor via a connecting link of a portioning wing.

11. The granulate portioner according to claim 1, wherein the portioning chamber has an inlet opening via which granulate enters the portioning chamber, wherein the inlet opening is arranged in a side wall of the portioning chamber laterally bounding the portioning chamber on an inlet side.

12. The granulate portioner according to claim 10, wherein the connecting link is arranged mostly or completely on a chamber side of the portioning chamber opposite the inlet side.

13. The granulate portioner according to claim 11, wherein the radially outer edge of the inlet opening has a distance from the circular path of the contact body which increases in the direction of rotation of the portioning rotor.

14. An agricultural dispensing device for dispensing granulate portions onto an agricultural land, the agricultural dispensing device comprising: a plurality of granulate portioners for producing granulate portions; and at least one granulate portioner comprising: a portioning chamber for forming granular portions; and a portioning rotor arranged in the portioning chamber, the portioning rotor having at least one contact body, wherein the contact body is configured to move along a circular path during a rotational movement of the portioning rotor and to bring together granules located in the portioning chamber to form a granule portion; wherein the portioning rotor has a deflection mechanism which allows the contact body to temporarily leave the circular path during the rotational movement of the portioning rotor for disengaging and/or avoiding jamming between the portioning rotor and granules.

15. A method of producing granule portions by means of a granule portioner, the method comprising: introducing granules into a portioning chamber of the granule portioner, rotationally driving a portioning rotor disposed in the portioning chamber; and bringing together granules located in the portioning chamber by means of a contact body of the portioning rotor moving along a circular path during a rotary movement of the portioning rotor; wherein the contact body temporarily leaves the circular path during the rotational movement of the portioning rotor by means of a deflection mechanism of the portioning rotor in order to release or prevent jamming between the portioning rotor and granules.