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Boundary spreading device

[0001] The invention relates to a boundary spreading device according to the preamble of Patent Claim 1, to a spreader according to the preamble of Patent Claim 8 and to a method for dispensing spreading material according to Patent Claim 9.

[0002] A similar method for dispensing spreading material is disclosed in EP 2 944 175 A1 wherein only a simple boundary spreading device, without a spreading-material stream separating device, is positioned in the spreading-material ejection area of a spreading disc.

[0003] When dispensing spreading material, such as for example fertilizer, there is regularly a problem where using an intended transverse distribution of the spreading material is not possible in the areas close to the boundary. This is due in particular to the fact that the distribution characteristic of known spreaders has a flank which falls down flat in the transverse direction.

[0004] When dispensing spreading material over a large surface area the area to be cultivated is driven over as the spreading material is discharged such that a substantially uniform distribution of the spreading material is achieved overall by the spreading patterns overlapping one another in the transverse direction. A corresponding overlap of individual spreading patterns cannot be readily achieved in the boundary areas so that corresponding boundary spreading devices are used in order to improve the uniformity of the transverse distribution in the areas close to the boundaries. Known boundary spreading devices normally have a deflection device by means of which a spreading-material stream produced by the ejection of the spreading material is deflected during the flight phase after leaving the spreading disc. Boundary spreading devices of this kind can be attached by a fastening device to the spreader being used. The printed specification EP 2 944 177 A1 discloses for example a boundary spreading device which comprises several upright guide surface elements via which the flight path of a part of the ejected spreading material can be influenced.

[0005] Furthermore the printed specification DE 199 49 537 A1 discloses a boundary spreading device according to the preamble of Claim 1 which comprises several guide plates running substantially horizontal and parallel to one another and via which a spreading pattern can be achieved whose spreading flank falls steeply down to the boundary.

[0006] The spreading pattern close to the boundary cannot however be sufficiently adapted by means of the known boundary spreading devices so that a relatively uneven spreading material distribution close to the boundary cannot as yet be avoided. The known boundary spreading devices furthermore have a restricted variability and cannot be adapted to different discharging situations and apparatus configurations.

[0007] The object of the invention is thus to further improve the distribution of the spreading material close to the boundary whereby the boundary spreading device employed here can be used in variable manner.

[0008] This is achieved by a boundary spreading device of the type mentioned at the beginning wherein the spreading-material stream separating device of the boundary spreading device according to the invention has an upper deflection plate for deflecting the upper spreading-material part-stream, and a lower deflection plate for deflecting the lower spreading-material part-stream, wherein the upper deflection plate and the lower deflection plate have different inclinations from one another.

[0009] The invention is based on the knowledge that as a result of the different inclinations of the upper deflection plate and lower deflection plate from one another the upper spreading-material part-stream and the lower spreading-material part-stream are deflected into different directions. The spreading patterns which arise from the upper spreading-material part-stream and the lower spreading-material part-stream can thus be overlapped in suitable manner to produce a uniform distribution of the spreading material close to the boundary. The spreading material can thus also be dispensed significantly more evenly close to the boundary.

[0010] The upper deflection plate and/or the lower deflection plate are preferably oriented inclined to the horizontal in an operating direction of the boundary spreading device. The amount of the inclined angle of the upper deflection plate and/or of the lower deflection plate with respect to the horizontal is preferably between 5 degrees and 60 degrees, particularly preferably between 15 and 50 degrees, in an operating direction of the boundary spreading device. The upper deflection plate and/or the lower deflection plate can be formed rigid and immovable. Alternatively, the upper deflection plate and/or the lower deflection plate can also be attached in a movable manner, in particular pivotable and/or slidable manner. The boundary spreading device can also be termed a boundary spreading screen.

[0011] In a preferred embodiment of the boundary spreading device according to the invention, the deflection device has a spreading-material inlet side and a spreading-material outlet side. The upper deflection plate and the lower deflection plate diverge from the spreading-material inlet side towards the spreading-material outlet side. Alternatively, or additionally, the upper deflection plate and the lower deflection plate together form a wedge shape narrowing in the direction of the spreading-material inlet side. The upper deflection plate and the lower deflection plate preferably converge towards the spreading-material inlet. The upper deflection plate and the lower deflection plate can be in contact with one another and/or welded to one another. As a result of the diverging orientation of the upper deflection plate and lower deflection plate or as a result of their wedge-shaped arrangement the upper spreading-material part-stream is preferably deflected upwards and the lower spreading-material part-stream is deflected downwards.

[0012] Furthermore a boundary spreading device according to the invention is advantageous in which the deflection device has a baffle plate which is arranged behind the spreading-material stream separating device in the flight direction of the spreading material, and which is set up to deflect at least one part of the upper spreading-material part-stream and/or lower spreading-material part-stream already deflected by the spreading-material stream separating device. The baffle

plate can be set up to deflect down at least a part of the upper spreading-material part-stream already deflected by the spreading-material stream separating device. In a suitable alternative arrangement, the baffle plate can be set up to deflect a part of the upper spreading-material part-stream upwards. The baffle plate can alternatively be set up to deflect at least a part of the lower spreading-material stream, already deflected by the spreading-material stream separating device, downwards or by a suitable arrangement upwards. The deflection device can also comprise several, for example two, baffle plates wherein a first baffle plate is formed for deflecting at least one part of the upper spreading-material part-stream already deflected by the spreading-material separating device, and a second baffle plate is formed for deflecting at least one part of the lower spreading-material part-stream already deflected by the spreading-material stream separating device. It is hereby advantageous that the respective spreading-material part-stream can be deflected in the downward and upward direction by the baffle plate or plates. Consequently, there is therefore advantageously a further setting possibility to influence the spreading pattern which is achieved.

[0013] Furthermore, a boundary spreading device according to the invention is advantageous where the inclination of the baffle plate is adjustable and the baffle plate can be fixed in several inclination orientations. The inclination of the baffle plate is preferably adjustable relative to a horizontal so that the baffle plate has a substantially horizontally aligned pivotal axis. The inclination of the baffle plate is preferably manually adjustable. The baffle plate can also be coupled to an angle guide which allows the inclination angle to be set. The deflection device can have coding and/or markings from which the actual inclination orientation of the baffle plate can be derived and/or read. By varying the inclination of the baffle plate, it is possible to set the extent to which the spreading material striking the baffle plate is deflected downwards or upwards. This in combination with the spreading-material stream separating device produces an extremely variable adjustable boundary spreading system.

[0014] In a further embodiment of the boundary spreading device according to the invention the deflection device has several mutually spaced-apart upright

deflection slats which are designed to change the radial flow direction of the upper spreading-material part-stream and/or of the lower spreading-material part-stream. Some individual, or all of the deflection slats preferably have deflection angles which deviate from one another so that the shape of the spreading pattern is also adapted by the deflection slats. The deflection slats can furthermore have one or more bends whereby the individual deflection slats are divided up into several deflection segments and the individual deflection segments cause different deflections of the spreading material.

[0015] In another further preferred embodiment of the boundary spreading device according to the invention the deflection device has an upper deflection channel for the upper spreading-material part-stream. The upright deflection slats are arranged, in particular only, within the upper deflection channel. In the region through which the lower spreading-material part-stream flows, there are preferably no upright deflection slats. The deflection device can also have a lower deflection channel for the lower spreading-material part-stream wherein the upright deflection slats can be arranged, in particular only, within the lower deflection channel. Since only one spreading-material part-stream is deflected by the deflection slats, the spreading patterns produced from the part-streams can be adapted precisely to one another so that when the spreading patterns overlap one another the most uniform spreading-material distribution possible is produced.

[0016] The boundary spreading device according to the invention is furthermore advantageously developed so that the fastening device and the deflection device can be fixed in different relative positions against one another. The fastening device thus enables a variable adaption of the basic setting as regards height and sector to the spreading disc used and/or to the thrower blade used or the thrower blades used on the spreading disc. The fastening device preferably has several mutually spaced-apart fixing regions which are each configured for attaching the deflection device to the fastening device. The height and/or inclination of the deflection device in the operating position is hereby adjustable. Different spreading discs differ as regards their attachment height, so that corresponding differences in height have to be compensated by a suitable fastening of the

boundary spreading device. Recesses, in particular bores, can be positioned inside the fixing regions in which the deflection device can be fixed. The recesses of the fixing regions can form a bore pattern.

[0017] The object on which the invention is based is further achieved by a spreading device of the type mentioned at the beginning wherein the boundary spreading device of the spreader according to the invention is configured according to one of the embodiments previously described. For the advantages and modifications of the spreader according to the invention reference is first made to the advantages and modifications of the boundary spreading device according to the invention.

[0018] The spreader can be an agricultural spreader, in particular a centrifugal fertilizer spreader and /or a twin-disc fertilizer spreader. The mounting on which the boundary spreading device is fixed can have for example an actuator member, in particular an adjusting cylinder, by means of which the boundary spreading device can be moved to and fro between an operating position and a stowage position. Thus, when discharging spreading material over regions of the agricultural area away from the boundary the boundary spreading device can be moved into the stowage position in order to avoid deflection of the ejected spreading material by the boundary spreading device. When discharging spreading material in regions close to the boundary the boundary spreading device can then be moved into the operating position in order to be able to achieve a uniform spreading-material distribution also close to the boundary.

[0019] The object on which the invention is based is furthermore achieved by a method of the type mentioned at the beginning wherein the setting of the boundary-spreading discharging point of the spreading material onto the spreading disc takes place in the method according to the invention in dependence on the spreading disc used and/or in dependence on the ejection properties of the spreading material.

[0020] According to the invention the discharging of the spreading material is carried out with a boundary spreading device according to one of the embodiments previously described. In particular, the boundary spreading device is positioned on

the side, facing the boundary, of the spreading-material discharge region of the spreading disc facing away from the boundary. The spreading disc facing the boundary is preferably deactivated during the discharging. The spreading disc used can be defined manually by a user or can be detected by the spreader. The spreading discs can differ from one another for example in their blade geometry, in particular their blade length. The ejection properties of the spreading material can be defined for example by a throwing direction value assigned to the spreading material. The throwing direction value of the spreading material can be defined manually by a user or detected by the spreader. The throwing direction value depends on the time of the spreading material staying on the spreading disc prior to the spin-off of the spreading material. The smaller the throwing direction value of the spreading material so the further the boundary-spreading discharging point has to turn out from the region covered by the boundary spreading device so that a later discharge of the spreading material onto the spreading disc takes place. This avoids over fertilization at the field edge. The greater the throwing direction value of the spreading material so the further the boundary-spreading discharging point has to turn into the region covered by the boundary spreading device so that an earlier discharge of the spreading material onto the spreading disc takes place. It is thus ensured that a sufficient quantity of spreading material is thrown in the direction of the boundary region. Spreading discs have a critical ejection angle for the spreading material from which too much spreading material is thrown into a spray guard of the spreader. This critical ejection angle is to be taken into consideration when setting the boundary-spreading discharging point.

[0021] In a preferred embodiment of the method according to the invention the setting of the boundary-spreading discharging point of the spreading material onto the spreading disc takes place in dependence on the distance of the spreader or the spreading disc from the boundary and/or in dependence on the orientation of a baffle plate of a deflection device of the boundary spreading device deflecting the spreading-material stream. The smaller the distance to the boundary so the further the boundary-spreading discharging point has to turn out from the region covered by the boundary spreading device, so that a later discharge of the spreading material onto the spreading disc takes place. Overfertilization in the immediate vicinity of

the boundary is thus avoided. The greater the distance to the field boundary so the further the boundary-spreading discharging point has to turn into the region covered by the boundary spreading device so that early discharge of the spreading material onto the spreading disc takes place. It is thus ensured that a sufficient quantity of spreading material is ejected in the direction of the boundary region.

[0022] In a further preferred embodiment of the method according to the invention, to set the boundary-spreading discharging point of the spreading material onto the spreading disc a calculation of the boundary-spreading discharging point is carried out, in which the starting point is a normal-spreading discharging point suitable for normal spreading. The normal-spreading discharging point is thus adapted in dependence on the currently available boundary spreading conditions. The calculation of the boundary-spreading discharging point can be carried out for example by the spreader so that adapting the discharging point close to the boundary can be carried out automatically by the spreader.

[0023] In a further preferred embodiment the method comprises the automatic setting of a boundary-spreading discharging quantity of spreading material onto the spreading disc. Setting the boundary-spreading discharging quantity of spreading material is preferably carried out in dependence on the set discharging point and/or in dependence on the distance of the spreader from the boundary. Automatically setting the boundary-spreading discharging point and the boundary-spreading discharging quantity produces an automatic adaption of the spreading pattern close to the boundary automatically without the need for manual setting processes. The discharging comfort is thus considerably improved.

[0024] In another embodiment of the method according to the invention, the spreading disc used has different thrower blades and the boundary spreading device is set up to split the spreading-material stream into an upper spreading-material part-stream and a lower spreading-material part-stream. The positioning of the boundary spreading device in the spreading-material ejection region of the spreading disc preferably takes place so that the spreading material ejected by a first thrower blade is split by the boundary spreading device into an upper

spreading-material part-stream and a lower spreading-material part-stream, and the spreading material ejected by a second thrower blade is deflected by the boundary spreading device so that it follows substantially completely the upper spreading-material stream. The proportions of the spreading material which fall onto the upper spreading-material part-stream and the lower spreading-material part-stream vary depending on the spreading disc used. As a result of different thrower blades different throwing heights of the spreading material and thus different impacting regions onto the boundary spreading device are produced.

[0025] By splitting the ejected spreading-material stream into different spreading-material part-streams several mutually overlapping individual spreading patterns are formed which overall lead to a uniform spreading material distribution close to the boundary. The spreading disc preferably has thrower blades of different length. The spreading material ejected by a short thrower blade is preferably divided by a wedge of the deflection device of the boundary spreading device. The spreading material directed upwards is preferably deflected additionally radially by deflection slats. The flight path of the upwardly directed spreading material is preferably further influenced by a baffle plate. The downwardly directed spreading material ensures a basic discharge and thus a discharge of a basic amount of spreading material. The spreading material ejected by a long thrower blade is preferably deflected practically only upwards.

[0026] Preferred embodiments of the invention will now be explained in further detail and described with reference to the accompanying drawings, in which:

Fig. 1 shows an exemplary embodiment of the boundary spreading device according to the invention in a perspective view;

Fig 2 shows the boundary spreading device illustrated in Fig 1, in a further perspective view;

Fig. 3 shows a part of the boundary spreading device illustrated in Fig. 1, in a perspective view;

Fig. 4 shows an exemplary embodiment of the boundary spreading device according to the invention in a diagrammatic sectional view during a spreading process;

Fig 5 shows the boundary spreading device illustrated in Fig 4, in a diagrammatic sectional view during a spreading process;

Fig. 6 shows an exemplary embodiment of the boundary spreading device according to the invention in a diagrammatic plan view during a spreading process; and

Fig. 7 shows the boundary spreading device shown in Fig 6, in a diagrammatic plan view during a spreading process.

[0027] Figs. 1 to 3 show a boundary spreading device 10 which can be used to discharge spreading material over an agricultural area.

[0028] The boundary spreading device 10 comprises a deflection device 12 and a fastening device 14. The deflection device 12 serves for deflecting a spreading-material stream 200. The spreading-material stream 200 is produced when spreading material is discharged onto a rotary driven spreading disc 100 of a spreader and the spreading disc 100 accelerates the discharged spreading material such that it is spun away by the spreading disc 100. As a result of the deflection device 12 the uniformity of the transverse distribution of the ejected spreading material in regions close to the boundary of an agricultural area can be considerably improved. The boundary spreading device 10 can be attached to the spreader by means of the fastening device 14.

[0029] The deflection device 12 has a spreading-material inlet side 18 and a spreading-material outlet side 20. Between the spreading-material inlet side 18 and the spreading-material outlet side 20 there is a spreading-material stream separating device 16 by means of which the spreading-material stream 200 is split into an

upper spreading-material part-stream 202 and a lower spreading-material part-stream 204.

[0030] So that in addition to the separation of the spreading-material stream 200 into two spreading-material part-streams 202, 204 there is at the same time a change in the flow directions deviating from one another of the upper spreading-material part-stream 202 and the lower spreading-material part-stream 204, the spreading-material stream separating device 16 has an upper deflection plate 22 for deflecting the upper spreading-material part-stream 202, and a lower deflection plate 24 for deflecting the lower spreading-material part-stream 204, wherein the upper deflection plate 22 and the lower deflection plate 24 have inclinations deviating from one another. The upper deflection plate 22 and the lower deflection plate 24 diverge from the spreading-material inlet side 18 in the direction of the spreading-material outlet side 20 so that the upper spreading-material part-stream 202 is deflected upwards and the lower spreading-material part-stream 204 is deflected downwards.

[0031] The deflection device 12 furthermore has a baffle plate 28 which is arranged behind the spreading-material separating device 16 in the flight direction of the spreading material and by means of which a part of the upper spreading-material part-stream 202 already deflected by the spreading-material stream separating device 16 is deflected downwards again. The baffle plate 28 is attached for pivotable movement and extends a cover plate 26 of the deflection device 12. The baffle plate 28 can be pivoted by an adjusting device along the illustrated pivotal direction 30 so that the inclination of the baffle plate 28 can be adjusted and the baffle plate 28 can be fixed in several inclination directions. The inclination of the baffle plate 28 can be changed relative to a horizontal. The setting of the inclination of the baffle plate 28 takes place manually wherein the baffle plate 28 is guided in an angle guide 36. A user can read off the updated inclination orientation of the baffle plate 28 via markings 38.

[0032] The deflection device 12 furthermore has several mutually spaced upright deflection slats 32a-32f. The deflection slats 32a-32f serve to change the radial

flow direction of the upper spreading-material part-stream 202. The upper deflection plate 22 and the cover plate 26 define an upper deflection channel 34 for the upper spreading-material part-stream 202. The upright deflection slats 32a-32f are mounted only within the upper deflection channel wherein there are no upright deflection slats in the region through which the lower spreading-material stream 204 flows.

[0033] The fastening device 14 and the deflection device 12 can be fixed on one another in different relative positions. For this, the fastening device 14 has several recesses 42a-42c, 44a-44c which form a bore pattern. By means of corresponding fastening elements 46, 48 it is thus possible to set the height and/or the inclination of the deflection device 12 in the operating position. The fastening elements 46, 48 can be formed for example as pins or bolts.

[0034] The boundary spreading device 10 can be fastened on a mounting of the spreader via the fastening bolts 40 of the fastening device 14. The mounting of the spreader can have for example an adjusting cylinder by means of which the boundary spreading device 10 can be moved to and fro between an operating position and a stowage position. In the operating position the boundary spreading device 10 is situated in the spreading-material ejection area of a spreading disc 100 of the spreader. In the storage position the boundary spreading device 10 is situated outside of the spreading-material ejection area of the spreading disc 100 of the spreader so that there can be no deflection of the spreading material by the boundary spreading device 10 during the spreading process.

[0035] Fig. 4 and Fig. 5 show a boundary spreading device 10 during the discharging of the spreading material. The boundary spreading device 10 is positioned in the spreading-material ejection area of a spreading disc 100. During boundary spreading the boundary spreading device 10 is positioned on the side, facing the boundary, of the spreading-material ejection area of the spreading disc 100 facing away from the boundary. The spreading disc facing the boundary is deactivated during the boundary spreading process. The spreading disc 100 used has two different thrower blades 102a, 102b which differ from one another as

regards their blade length. The thrower blade 102a (cf. Fig. 4) is shorter than the thrower blade 102b (cf. Fig. 5).

[0036] Fig. 4 shows the ejection of the spreading material by the shorter thrower blade 102a. The boundary spreading device 10 splits the spreading-material stream 200 into an upper spreading-material part-stream 202 and a lower spreading-material part-stream 204. The division of the spreading-material stream 200 into two spreading-material part-stream 202, 204 is carried out by the spreading-material stream separating device 16. The spreading-material stream separating device 16 has an upper deflection plate 22 and a lower deflection plate 24 which together form a wedge shape tapering towards the spreading-material inlet side 18. The lower spreading-material part-stream 204 is deflected downwards by the lower deflection plate 24. The upper spreading-material part-stream 202 is initially deflected upwards by the upper deflection plate 22 wherein the upper spreading-material part-stream 202 after deflection impacts on a baffle plate 28 which deflects the upper spreading-material part-stream 202 down again. Furthermore, the upper spreading-material part-stream 202 undergoes further deflection in the radial direction which is achieved with upright deflection slats 32a-32f. In this respect reference is made to Fig. 6 and Fig. 7.

[0037] Fig. 5 shows the ejection of the spreading material by means of the long thrower blade 102b. As a result of the position and geometry of the thrower blade 102b substantially the entire amount of spreading material is ejected into the upper deflection channel 34.

[0038] Since the two thrower blades 102a, 102b are arranged opposite one another, the states shown in Fig. 4 and Fig. 5 appear in alternating sequence during the discharging of the spreading material.

[0039] Fig. 6 and Fig. 7 likewise show a spreading material discharging with a spreading disc 100 whose thrower blades 102a, 102b have different lengths. The sectional illustration shows the upper deflection channel 34 of the deflection device 12 of the boundary spreading device 10 in each case. Inside the upper deflection

channel 34 there are several mutually spaced upright deflection slats 34a-34f which serve for changing the radial flow direction of the upper spreading-material part-stream 202. In the region through which the lower spreading-material part-stream 204 flows there are no deflection slats. The deflection slats 34a-34f in the upper deflection channel 34 each have a bend so that a multi-deflection is achieved by the deflection slats.

[0040] Fig. 6 shows a state in which the spreading material has been ejected by means of the short thrower blade 102a. As previously described, in this case it leads to the formation of an upper spreading-material part-stream 202 and a lower spreading-material part stream 204.

[0041] Fig. 7 shows a state in which the spreading material is ejected by the long thrower blade 102b. As a result of the position and geometry of the thrower blade 102b, in this case only an upper spreading-material stream 202 is formed which is initially deflected upwards by the upper deflection plate 22 and then deflected down again by the baffle plate 28.

[0042] A deflection by the lower deflection plate 24 does not take place in the state shown in Fig. 7.

Reference numeral list

[0043]

10	Boundary spreading device
12	Deflection device
14	Fastening device
16	Spreading-material stream separating device
18	Spreading-material inlet side
20	Spreading-material outlet side
22	Upper deflection plate
24	Lower deflection plate
26	Cover plate
28	Baffle plate
30	Pivotal direction
32a-32f	Deflection slats
34	Deflection channel
36	Angle guide
38	Markings
40	Fastening bolts
42a-42c	Recesses
44a-44c	Recesses
46	Fastening element
48	Fastening element
100	Spreading disc
102a,102b	Thrower blades
200	Spreading-material stream
202	Upper spreading-material part-stream
204	Lower spreading-material part-stream

Patentkrav

1. Grænsespredeanordning (10) til en spreder, med

- en afbøjningsanordning (12), som er indrettet til at afbøje en spredematerialestrøm (200); og
- en fastgørelsesanordning (14), ved hjælp af hvilken grænsespredeanordningen (10) kan fastgøres på en spreder;

hvor afbøjningsanordningen (12) har en spredematerialestrømsepareringsanordning (16), som er indrettet til at opdele spredematerialestrømmen (200) i en øvre spredematerialedelstrøm (202) og en nedre spredematerialedelstrøm (204);

hvor spredematerialestrømsepareringsanordningen (16) har en øvre afbøjningsplade (22) til at afbøje den øvre spredematerialedelstrøm (202) og en nedre afbøjningsplade (24) til at afbøje den nedre spredematerialedelstrøm (204), **kendetegnet ved, at** den øvre afbøjningsplade (22) og den nedre afbøjningsplade (24) har hældninger, som er forskellige fra hinanden.

2. Grænsespredeanordning (10) ifølge krav 1,

hvor afbøjningsanordningen (12) har en spredematerialeindløbsside (18) og en spredematerialeudløbsside (20),

kendetegnet ved, at den øvre afbøjningsplade (22) og den nedre afbøjningsplade (24) fra spredematerialeindløbssiden (18) strækker sig væk fra hinanden i retning mod spredematerialeudløbssiden (20), og/eller sammen danner en kileform, som bliver smallere i retning mod spredematerialeindløbssiden (18).

3. Grænsespredeanordning (10) ifølge krav 1 eller 2,

kendetegnet ved, at afbøjningsanordningen (12) har en prelplade (28) anbragt bag spredematerialestrømsepareringsanordningen (16) i spredematerialets flyveretning, som er indrettet til at afbøje i det mindste en del af den øvre spredematerialedelstrøm (202) og/eller nedre spredematerialedelstrøm (204), som allerede er afbøjet af spredematerialestrømsepareringsanordningen (16).

4. Grænsespredeanordning (10) ifølge krav 3,

kendetegnet ved, at hældningen af prelpladen (28) kan indstilles, og prelpladen (28) kan fastgøres i flere hældningsorienteringer.

5. Grænsespredeanordning (10) ifølge et af de foregående krav, **kendetegnet ved, at** afbøjningsanordningen (12) har flere oprette afbøjningslameller (32a-32f) med afstand til hinanden, som er indrettet til at ændre radialstrømningsretningen af den øvre spredematerialedelstrøm (202) og/eller den nedre spredematerialedelstrøm (204).

6. Grænsespredeanordning (10) ifølge krav 5,
hvor afbøjningsanordningen (12) har en øvre afbøjningskanal (34) til den øvre spredematerialedelstrøm (202),
kendetegnet ved, at de oprette afbøjningslameller (32a-32f), særligt kun, er anbragt inden for den øvre afbøjningskanal (34).

7. Grænsespredeanordning (10) ifølge et af de foregående krav,
kendetegnet ved, at fastgørelsesanordningen (14) og afbøjningsanordningen (12) kan fikseres til hinanden i forskellige relative positioner.

8. Spreder til udbringning af spredemateriale, med
- to spredeskiver (100), som er anbragt ved siden af hinanden og kan drives roterende; og
- en grænsespredeanordning (10) fastgjort på et ophæng;

kendetegnet ved, at grænsespredeanordningen (10) er udformet ifølge et af de foregående krav.

9. Fremgangsmåde til udbringning af spredemateriale i området af en grænse af et landbrugsareal ved hjælp af en spreder, med følgende trin:
- positionering af en grænsespredeanordning (10) ifølge et af kravene 1-7 i en spredeskives (100) spredematerialeudkastområde;
- automatisk indstilling af et grænsesprede-afgivelsespunkt for spredematerialet på spredeskiven (100) via sprederen;
- udkast af det afgivne spredemateriale via spredeskiven (100) i retning mod grænsespredeanordningen (10);

hvor indstillingen af grænsesprede-afgivelsespunktet for spredematerialet på spredeskiven (100) sker afhængigt af den anvendte spredeskive (100) og/eller afhængigt af spredematerialets udkastegenskaber.

10. Fremgangsmåde ifølge krav 9, **kendetegnet ved, at** indstillingen af grænsesprede-afgivelsespunktet for spredematerialet på spredeskiven (100) sker

afhængigt af sprederens eller spredeskivens (100) afstand til grænsen og/eller afhængigt af orienteringen af en prelplade (28) på en afbøjningsanordning (12) på grænsespredeanordningen (10), som afbøjer spredematerialestrømmen (200).

11. Fremgangsmåde ifølge krav 9 eller 10, **kendetegnet ved, at** der til indstilling af grænsesprede-afgivelsespunktet for spredematerialet på spredeskiven (100) gennemføres en beregning af grænsesprede-afgivelsespunktet, ved hvilken der tages udgangspunkt i et normalsprede-afgivelsespunkt egnet til normalspredning.

12. Fremgangsmåde ifølge et af kravene 9 til 11,

kendetegnet ved trinnet:

- automatisk indstilling af en grænsesprede-afgivelsesmængde af spredemateriale på spredeskiven (100);

hvor indstillingen af grænsesprede-afgivelsesmængden af spredemateriale sker afhængigt af det indstillede afgivelsespunkt og/eller afhængigt af afstanden af spredematerialet til grænsen.

13. Fremgangsmåde ifølge et af kravene 9 til 12,

hvor den anvendte spredeskive (100) har forskellige udkastskovle (102a, 102b), og grænsespredeanordningen (10) er indrettet til at opdele spredematerialestrømmen (200) i en øvre spredematerialedelstrøm (202) og en nedre spredematerialedelstrøm (204);

kendetegnet ved, at positioneringen af grænsespredeanordningen (10) i spredeskivens (100) spredematerialeudkastområde sker på en sådan måde, at spredematerialet udkastet fra en første udkastskovl (102a) opdeles i en øvre spredematerialedelstrøm (202) og en nedre spredematerialedelstrøm (204) af grænsespredeanordningen (10), og spredematerialet udkastet fra en anden udkastskovl (102b) afbøjes af grænsespredeanordningen (10) på en sådan måde, at det i det væsentlige fuldstændig følger den øvre spredematerialestrøm (202).

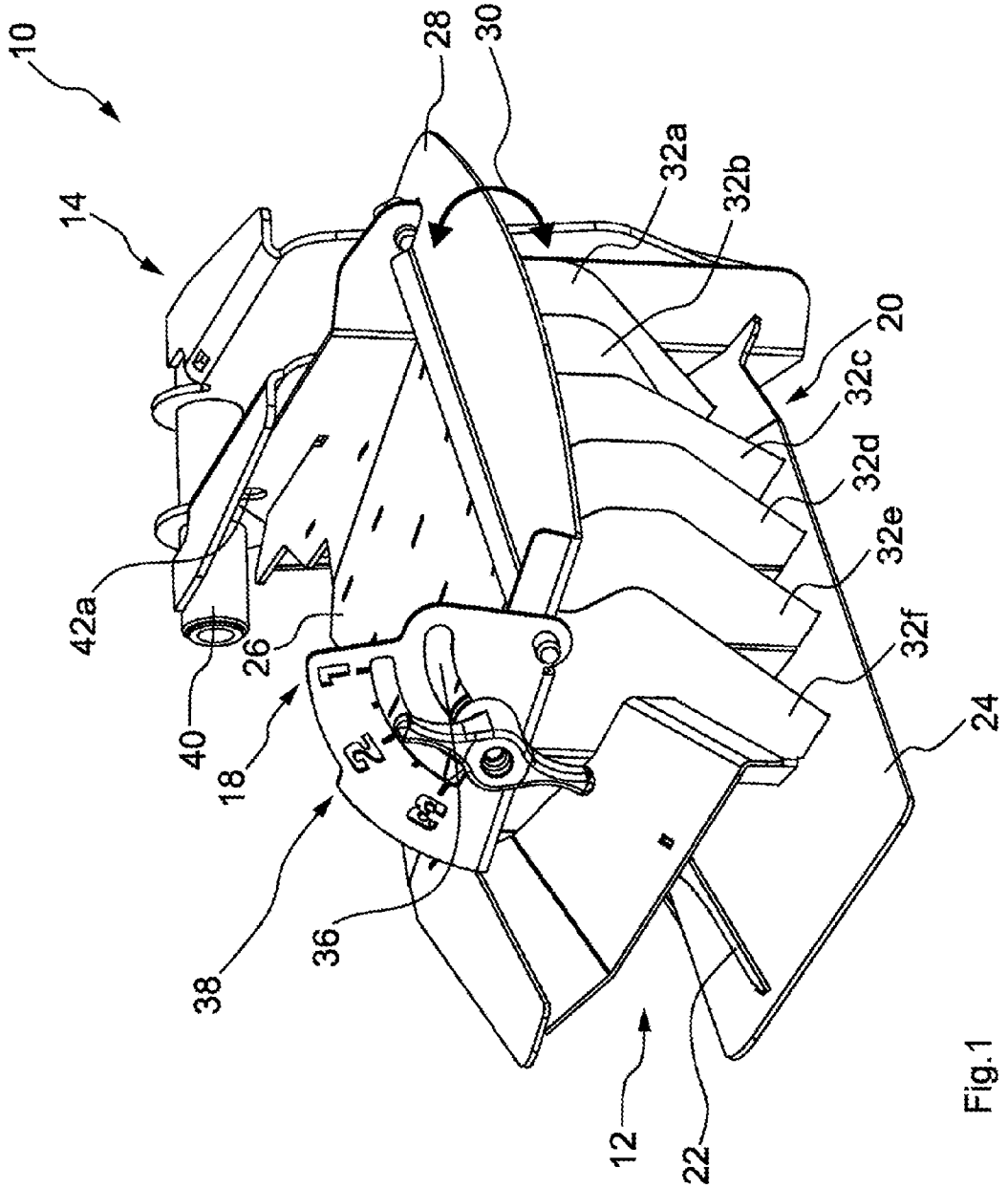

Fig.1

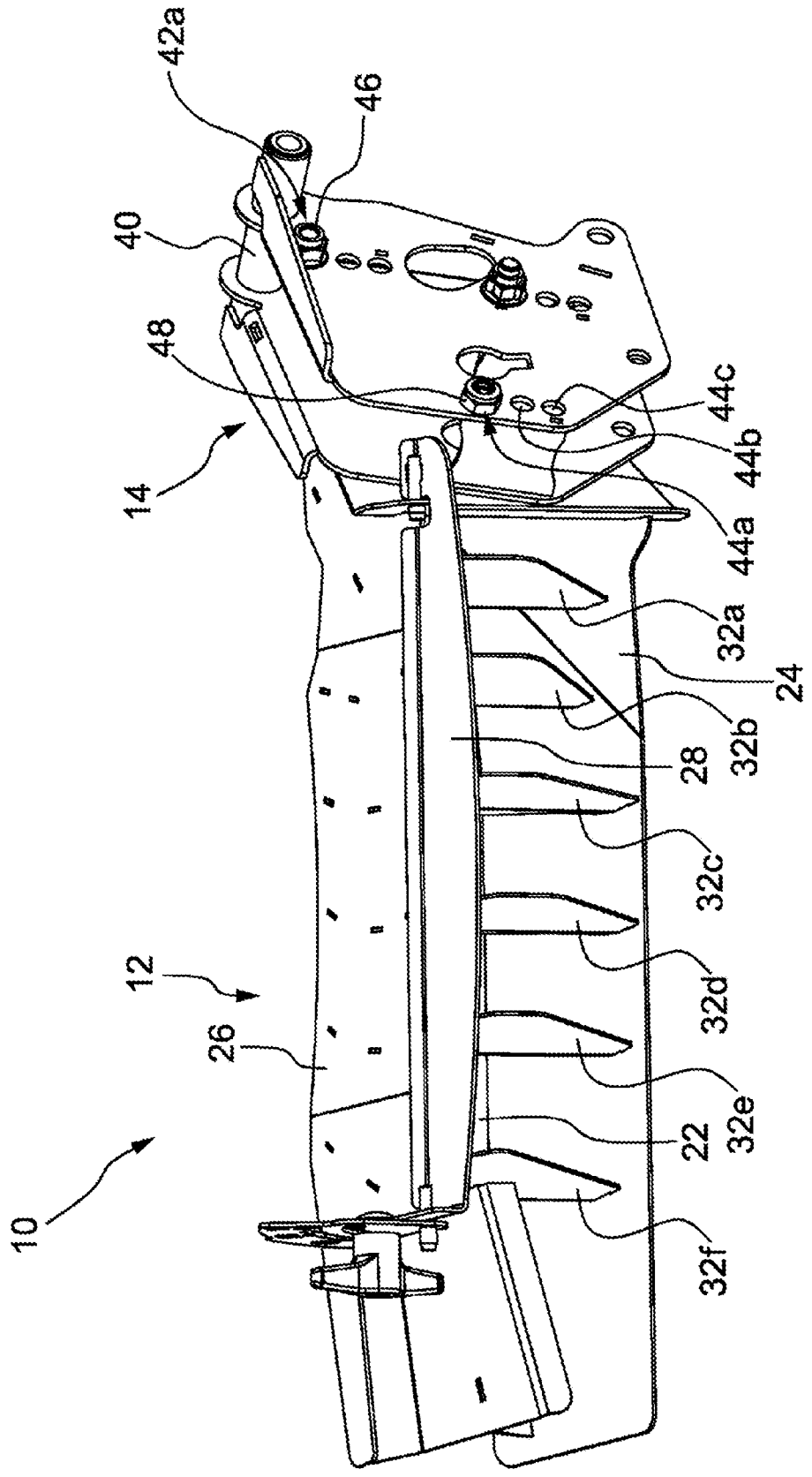
42a
46
40
48
14
44c
44b
44a
32a
24
32b
28
32c
12
32d
26
32e
22
10
32f

Fig.2

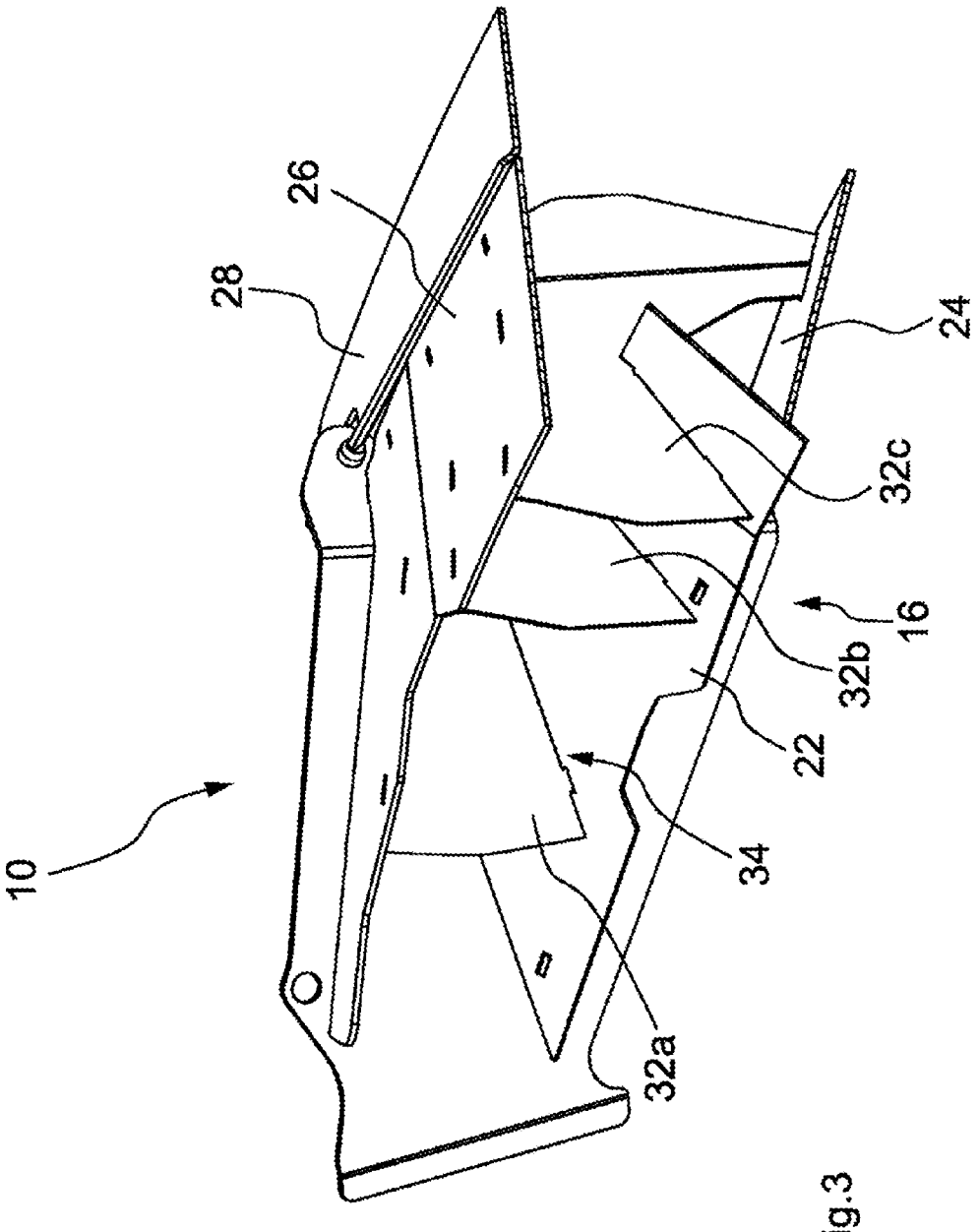

Fig.3

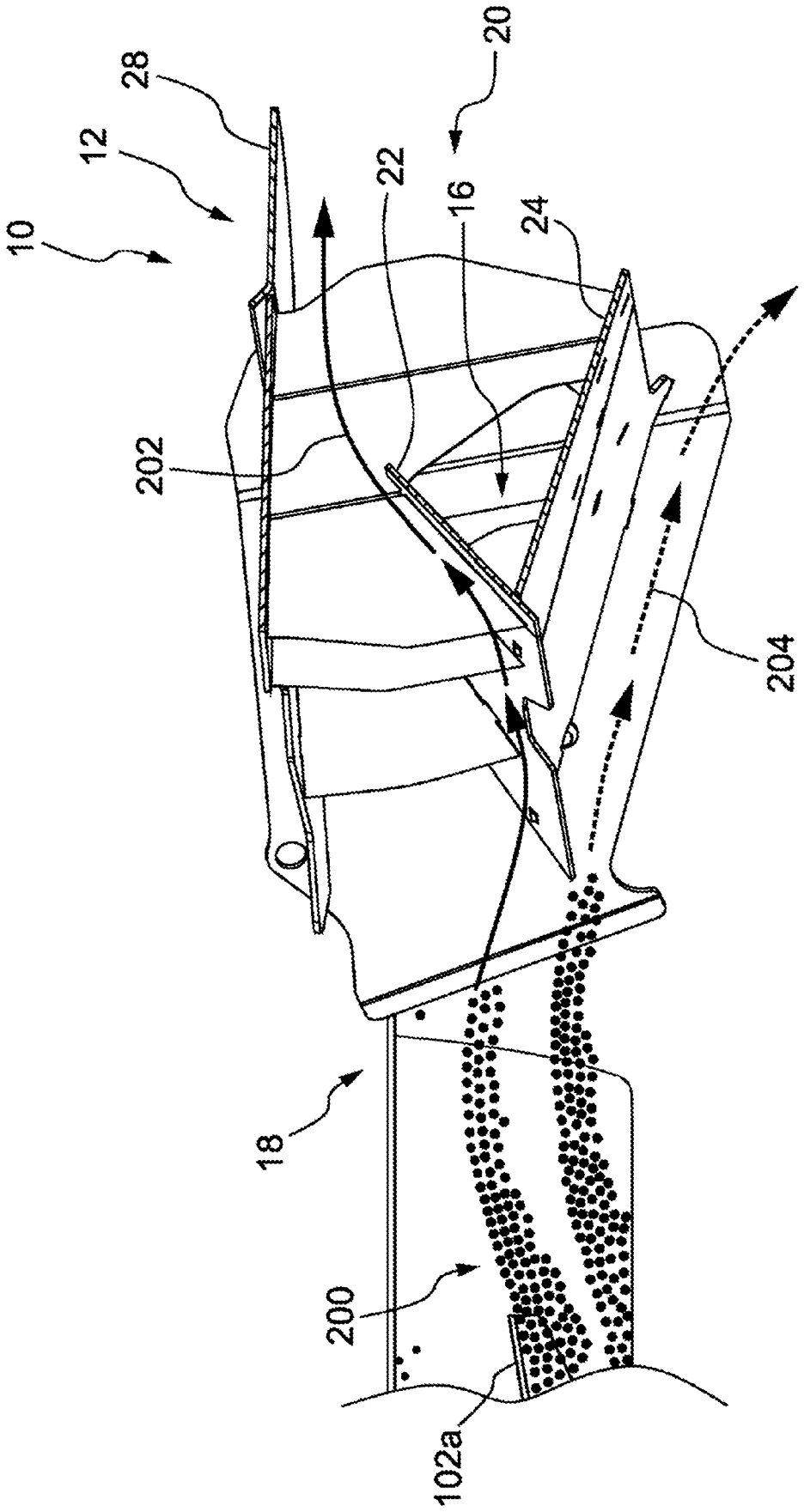

Fig.4

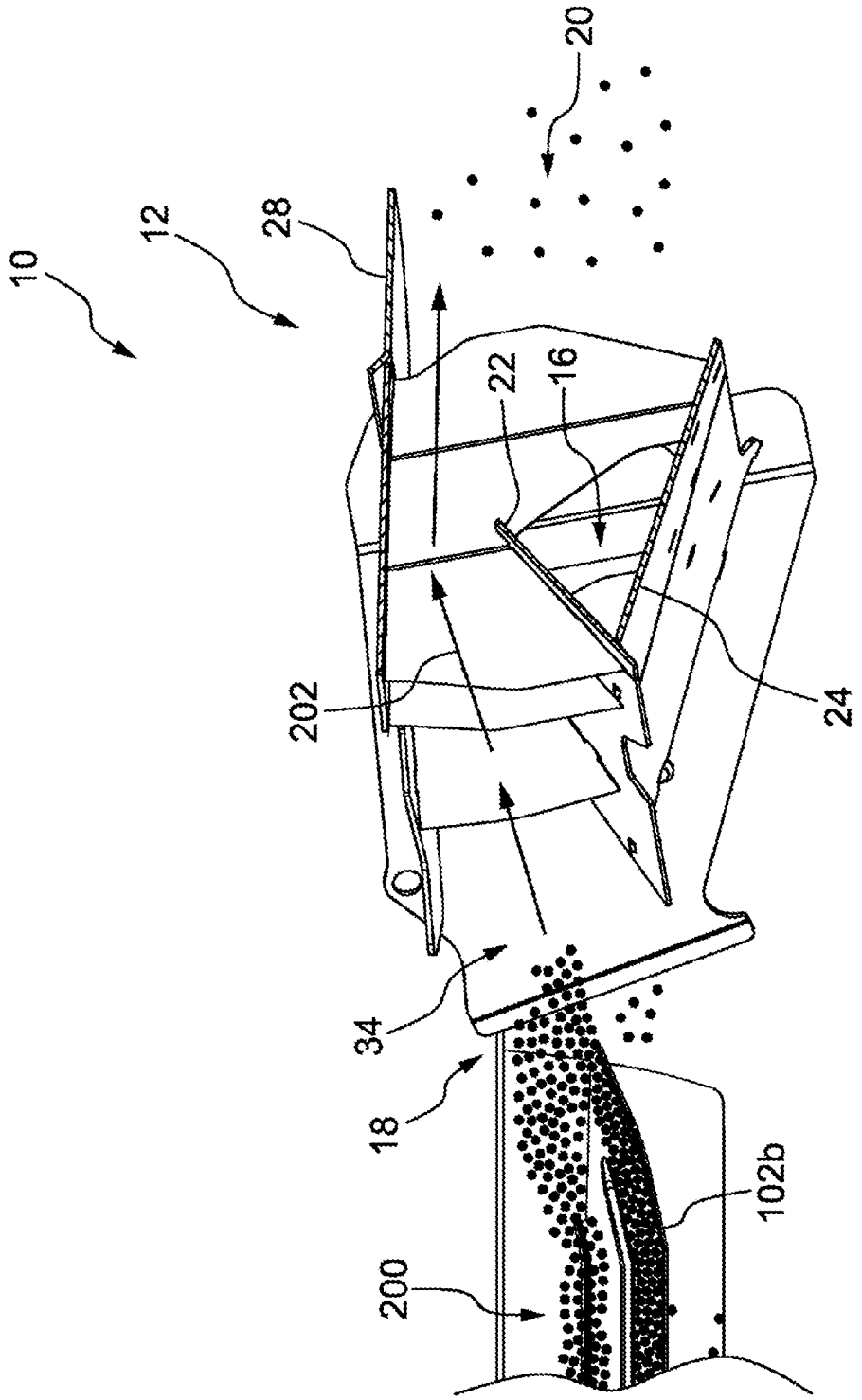

Fig.5

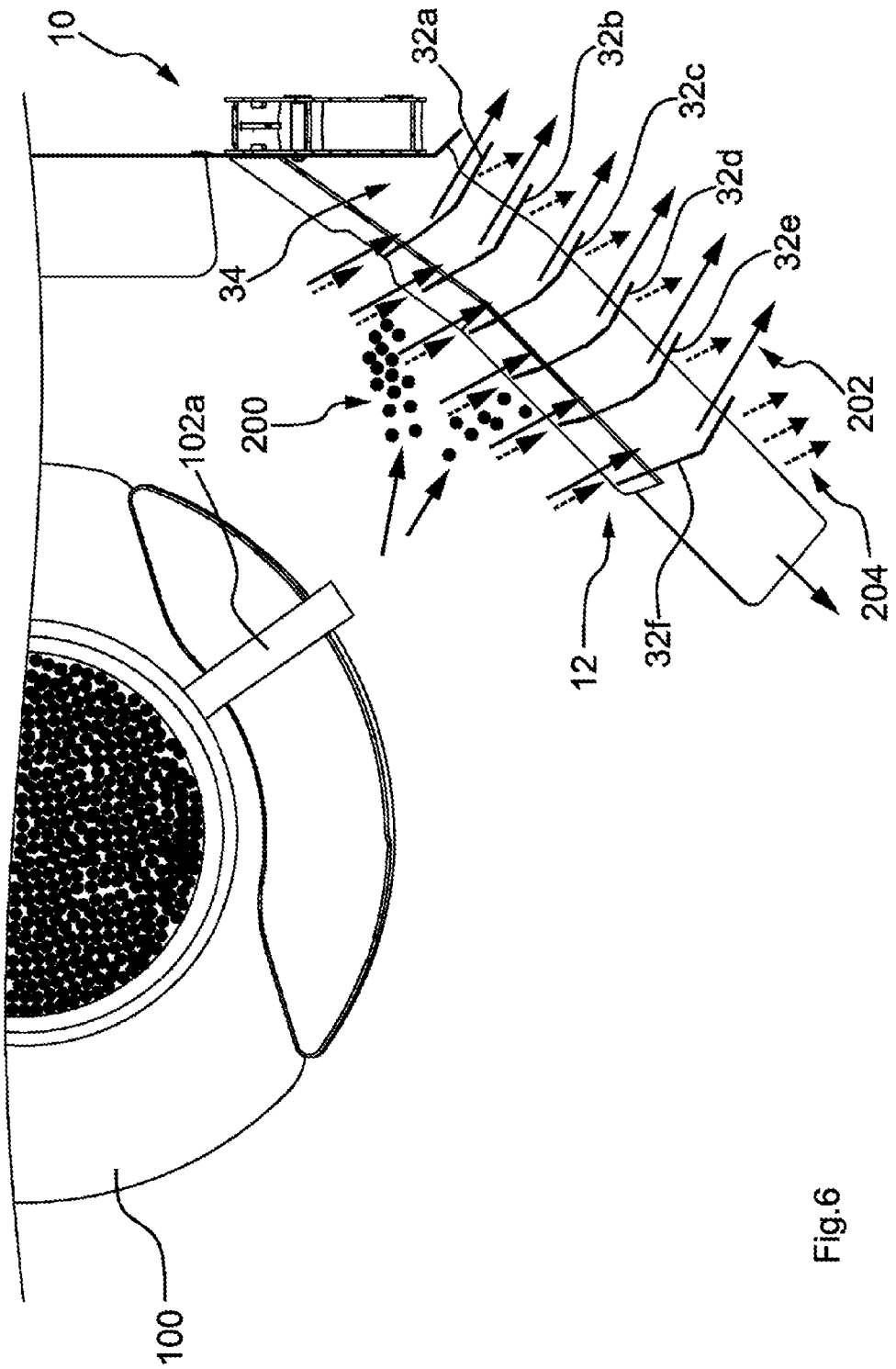

Fig.6

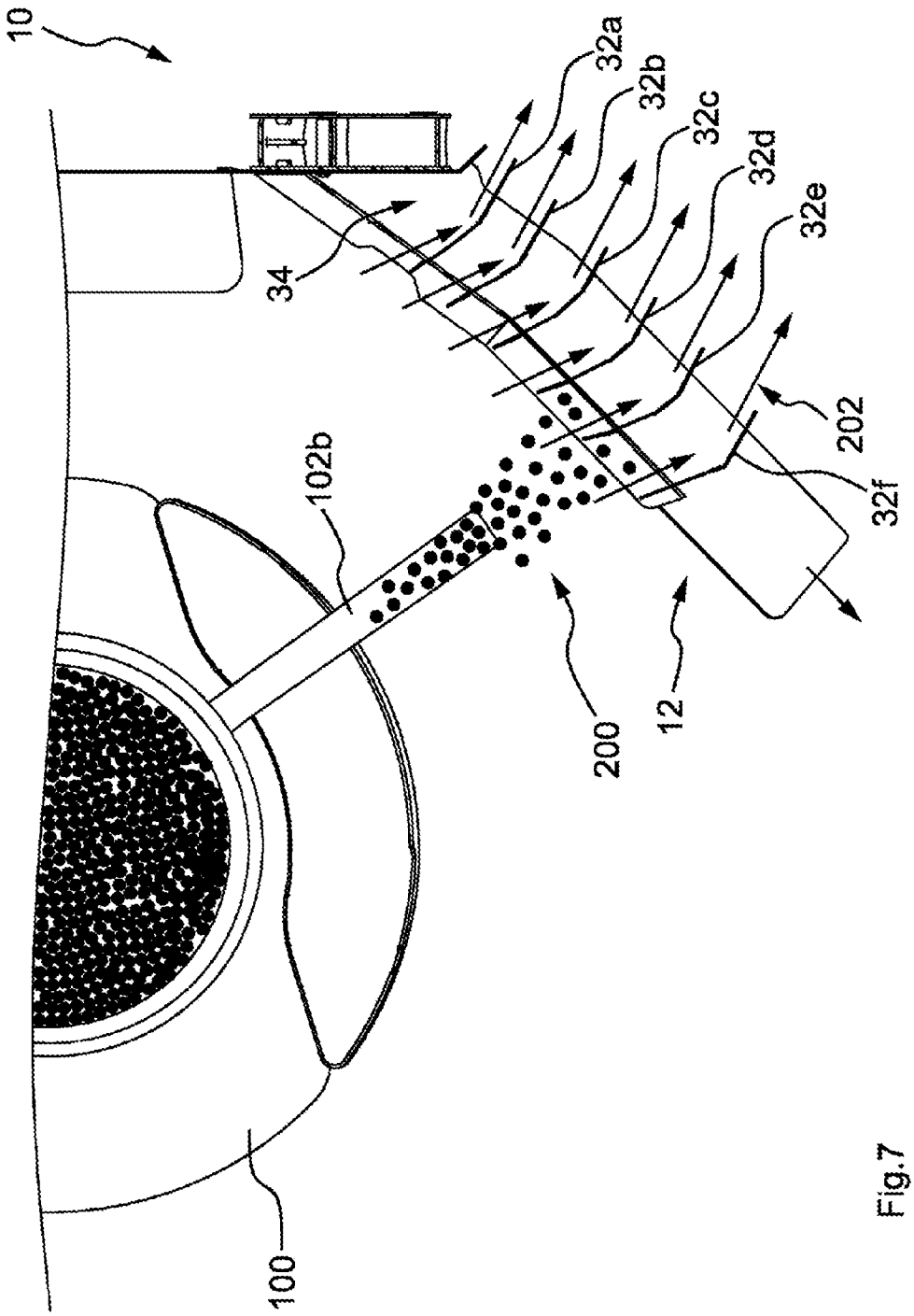

Fig.7