(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 552 606 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
15.11.2017 Bulletin 2017/46

(21) Application number: **11720858.7**

(22) Date of filing: **30.03.2011**

(51) Int Cl.:
B07B 1/12 *(2006.01)* ***B07B 1/15*** *(2006.01)*

(86) International application number:
PCT/IB2011/000676

(87) International publication number:
WO 2011/121426 (06.10.2011 Gazette 2011/40)

(54) **SIFTING APPARATUS TO SELECT MATERIALS HAVING DIFFERENT SIZES**

SIEBGERÄT ZUR AUSWAHL VON MATERIALIEN MIT VERSCHIEDENEN GRÖSSEN

APPAREIL DE CRIBLAGE PERMETTANT DE SÉLECTIONNER DES MATÉRIAUX DE TAILLES DIFFÉRENTES

(84) Designated Contracting States:
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

(30) Priority: **31.03.2010 IT UD20100059**

(43) Date of publication of application:
06.02.2013 Bulletin 2013/06

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Description

FIELD OF THE INVENTION

[0001] The present invention concerns a sifting apparatus to select materials having different sizes, for example wood slivers or chip, pieces of paper or of plastic material, or fibrous elements, and is applied in various industrial fields for the recovery of recycled material, such as for example in the field of wood, rubber, plastics and solid urban waste.

[0002] In particular, the apparatus according to the present invention allows to effect a grading or sifting of materials having different sizes, in order to separate the smaller size pieces from the larger size ones.

BACKGROUND OF THE INVENTION

[0003] Different technologies are known for selecting the sizes of streams of solid and loose material. In order to obtain fractions of materials with a precise grain size, or when very extreme sifting operations are required, the most efficient known sifting apparatus is the one that uses a sifter subjected to vibration or oscillation.

[0004] When the stream of material is very differentiated (different geometries, sizes, materials of the individual particles) and has a high level of humidity, the system with sifters is no longer functional and therefore other systems are adopted.

[0005] Some examples are sifters having discs or rolls, used for example in the field of wood, like the one described in the Italian patent IT-B-1.330.681, in the name of the present Applicant, where the selection is made by a train of elements rotating in a concordant direction, coupled with each other so as to define predefined discharge gaps with a variable size, in the direction of feed of the stream of material. These are efficient machines, more versatile than the classical oscillating or vibrating sifters, but the level of differentiation of the stream of material to be processed is in any case limited. In fact, it has been found that when it is necessary to sift materials with a large surface, or which have fibrous elements, they cause problems of clogging or blockage, because such materials tend to roll around the sifting rolls, disadvantageously reducing the sizes of the discharge gaps and altering the degree of differentiation of the stream of material to be processed.

[0006] Other known apparatuses are drum-type sifters, used in plants for recovering waste, which comprise a rotary drum, horizontal or inclined, and fed by the stream of falling material, and a peripheral net, attached to the drum, with differentiated meshes along the longitudinal development of the machine, which allow to separate the different fractions.

[0007] Although these apparatuses are very versatile, since they can select any stream of material and are simple from the constructional point of view, they are not very efficient.

[0008] Other known sifters are the ballistic ones, which exploit the different reactions of the heavy or light particles, with mechanical impulses supplied by blade systems, but which do not have a very efficient selection either.

[0009] In particular, the Australian patent application AU-A-2004/202132 which is considered the closest prior art, describes a sifting apparatus that comprises a hollow vertical hopper, having an upper aperture for the introduction of the material to be sifted and a lower aperture through which the selected material exits. In the lower part of the hopper, in proximity to the exit aperture, a plurality of sifters are disposed, each of which is centrally connected to an oscillating roll, so that the sifters oscillate too, with respect to the axis of the corresponding roll.

[0010] The US patent US-A-4,471,876 describes an apparatus for cleaning potatoes or other vegetables, which comprises a plurality of counter-rotating rolls, disposed longitudinal, parallel and distanced from each other, and having their axes of rotation lying on a single plane, inclined downward. One roll of each pair of rolls is provided with a helical surface rib that thrusts the potatoes downward. The potatoes advance in a direction parallel to the axis of rotation of the rolls and the discarded material descends into the spaces between the rolls.

[0011] The US patent US-A-4,430,210 describes a sifting apparatus that comprises a plurality of counter-rotating rolls, also disposed longitudinal, parallel and distanced from each other. In this apparatus the rolls have their axis of rotation lying on a single horizontal plane and are all provided with a helical fin that functions as a sifting element and feeds the material to be selected in a direction parallel to that of the rolls.

[0012] The European patent application EP-A-2062658 describes a sifting device that comprises a plurality of vibrating elements, parallel to each other and disposed longitudinal, which are connected to a mechanism with oscillating shafts that makes them vibrate so as to perform the selection of the material to be sifted.

[0013] One purpose of the present invention is to achieve an apparatus for the dimensional selection of materials or elements having different sizes, which does not cause problems of clogging and blockages.

[0014] Another purpose of the present invention is to achieve an apparatus having an efficiency in differentiation that is higher than that of known apparatuses, while still maintaining maximum versatility in the processing of material with different levels of differentiation.

[0015] The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

SUMMARY OF THE INVENTION

[0016] The present invention is set forth and characterized in the independent claim, while the dependent claims describe other characteristics of the invention or

variants to the main inventive idea.

[0017] In accordance with the above purposes, a sifting apparatus to select materials having different sizes according to the present invention comprises a separation chamber, open downward, into which the materials to be sifted are able to be inserted by means of introduction means disposed in correspondence with a first side of the separation chamber, and from which the materials not selected are able to exit through an exit aperture disposed in correspondence with a second side of the separation chamber, opposite the first side. The apparatus also comprises a plurality of sifting rolls, mounted rotatable on parallel axes of rotation and lying substantially on the same plane as the separation chamber so as to define a substantially horizontal sifting bed, or at most inclined by some degrees upward, between the first side and the exit aperture, and a rotary motor member.

[0018] According to a characteristic feature of the present invention, the apparatus also comprises a transmission device suitable to transform the rotation of the rotary motor member into an alternating rotational motion of the sifting rolls, in a clockwise and anti-clockwise direction, with an amplitude of less than 360°, so that each sifting roll rotates in the opposite direction to that of the adjacent sifting roll, so as to allow the materials (M) to be fed on the sifting bed in a direction substantially perpendicular to the axes of the sifting rolls, from the first side of the separation chamber to the exit aperture, so that the selected material falls downward between the sifting rolls and the material not selected exits laterally from the separation chamber through the exit aperture.

[0019] In other words, the smaller pieces that pass through the sifting rolls fall vertically toward a zone below the separation chamber, whereas the larger pieces that do not pass through the sifting rolls are made to advance by the latter in a substantially horizontal direction, or at most inclined by a few degrees upward, toward the lateral exit aperture, from which they exit.

[0020] According to one form of embodiment, the amplitude of rotation of the sifting rolls is comprised between 30° and 90°, for example 65°.

[0021] In this way the sifting rolls, which are subjected to a rotational and alternate movement, advantageously allow to process fibrous materials as well, and having large surface sizes, without these materials rolling around the rolls, thus increasing the efficiency of the apparatus according to the present invention.

[0022] Advantageously, the sifting rolls are divided into two series, which are disposed offset with respect to each other by one position.

[0023] In particular, the transmission device comprises a first transmission mechanism able to move a first series of sifting rolls and a second transmission mechanism able to move a second series of sifting rolls.

[0024] According to another characteristic feature of the present invention, the transmission mechanisms each comprise a crank, a rod, a bar and connection arms to the sifting rolls. In particular, each crank is keyed onto the rotary motor member and is connected to the corresponding rod which in turn is connected to the connection bar. Each arm is hinged on the corresponding bar and keyed to a sifting roll.

[0025] Advantageously, the crank of the first transmission mechanism is keyed on the rotary motor member, offset by 180° with respect to the crank of the second transmission mechanism. This form of embodiment allows to make the first series of sifting rolls rotate in a direction of rotation opposite that of the second series.

[0026] Advantageously, the first series of sifting rolls comprises first sifting elements having a determinate shape whereas the second series of sifting rolls comprises second sifting elements having a different shape from that of the first.

[0027] In particular, the first sifting elements are shaped so as to have two active surfaces converging toward the center, which are able to promote the transfer of the materials from one sifting roll to the adjacent one.

[0028] Each of the second sifting elements instead comprises two upper cusps also able to promote the transfer of the materials from one sifting roll to the adjacent one, and a lower cusp able to promote the passage of the materials downward, through the discharge gaps.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] These and other characteristics of the present invention will become apparent from the following description of a preferential form of embodiment, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 is a perspective view of a sifting apparatus according to the present invention;
- fig. 2 is a view from above of the apparatus in fig. 1;
- fig. 3 is a first lateral view of the apparatus in fig. 1;
- fig. 4 is a second lateral view, schematic and partly in section, of the apparatus in fig. 1;
- figs. 5 to 8 show in sequence some details of the apparatus in fig. 1 in some operating positions.

[0030] To facilitate comprehension, the same reference numbers have been used, where possible, to identify common elements in the drawings that are substantially identical. It is understood that elements and characteristics of one form of embodiment can conveniently be incorporated into other forms of embodiment without further clarifications.

DETAILED DESCRIPTION OF A PREFERENTIAL FORM OF EMBODIMENT

[0031] With reference to fig. 1, a sifting apparatus 10 according to the present invention, to select materials having different sizes, comprises a metal bearing structure 11 shaped substantially like a parallelepiped and having two lateral walls 15 and 16 that define a separation

chamber 12, open downward.

[0032] The materials to be graded are able to be introduced into the separation chamber 12 from above, through a hopper-type mouth 18 (fig. 3).

[0033] Inside the separation chamber 12 a first series of sifting rolls 13 is disposed (fig. 1), and a second series of sifting rolls 14, which is offset by one position with respect to the first series of sifting rolls 13. In this case, there are five sifting rolls 13, and four sifting rolls 14.

[0034] In this way the five sifting rolls 13 are disposed in odd positions (first, third, fifth, seventh and ninth) while the four sifting rolls 14 are disposed in the even positions (second, fourth, sixth and eighth).

[0035] Both the sifting rolls 13 and the sifting rolls 14 are mounted rotatable on the lateral walls 15 and 16 of the structure 11 and have their axes of rotation parallel and lying substantially on the same plane, so as to form a single sifting bed. This plane can be either horizontal or inclined by a few degrees, advantageously upward, so as to increase the sifting efficiency of the materials.

[0036] Each sifting roll 13 comprises a shaft 20 on which a plurality of first sifting elements 17 (fig. 4) are mounted, adjacent and distanced from each other by means of interposed spacer rings of a known type.

[0037] Each sifting roll 14 comprises a shaft 25 on which a plurality of second sifting elements 19 are mounted, also adjacent and distanced from each other by means of interposed spacer rings of a known type.

[0038] The sifting elements 17 and 19 are disposed in a comb-like manner with respect to each other (fig. 2), so as to define discharge gaps through which the materials to be sifted can pass.

[0039] One end of each shaft 20 protrudes from the lateral wall 15, whereas one end of each shaft 25 protrudes from the lateral wall 16.

[0040] The sifting apparatus 10 also comprises an electric motor 30 which, by means of a reducer 34, is able to transmit motion to a rotary shaft 38 which in turn, by means of a transmission device 31, transmits motion to the sifting rolls 13 and 14.

[0041] In particular the transmission device 31 is able to transform the continuous rotation of the shaft 38, in a determinate direction of rotation, into an alternate rotational motion of the sifting rolls 13 and 14, in a clockwise direction and an anti-clockwise direction, with an amplitude β (fig. 3), advantageously 65°, so that the rotation of each sifting roll 13, 14 always occurs in the direction opposite that of the adjacent sifting roll 14, 13.

[0042] In particular (fig. 2), on each side of the bearing structure 11 and outside the lateral walls 15 and 16, the transmission device 31 comprises a first transmission mechanism 40 and a second transmission mechanism 41, substantially identical but specular, each of which comprises in turn a crank 33 (figs. 2 and 3), a rod 35, a bar 36 and connection arms 37.

[0043] Each crank 33 is keyed to the shaft 38 and is connected to the corresponding rod 35, which in turn is connected to the corresponding bar 36. The connection arms 37 are hinged on the latter, and in turn they are keyed to the shafts 20, respectively 25.

[0044] The crank 33 (fig. 2) of the first transmission mechanism 40 is keyed on the drive shaft of the reducer, offset by 180° with respect to the crank 33 of the second transmission mechanism 41, so that when the crank 33 of the first transmission mechanism 40 is in the position of bottom dead center, that is, when the rod 35 and the bar 36 are in the position of maximum travel to the right, the crank 33 of the second mechanism 41 is in the position of top dead center, that is, with the rod 35 and the bar 36 in the position of maximum travel to the left.

[0045] When the two cranks 33 are made to rotate by the electric motor 30, the first and the second transmission mechanism 40 and 41 impart to the connection arms 37 a substantially pendular motion, and therefore the sifting rolls 13 and 14 connected to them perform a rotational and alternate motion, and with a direction of rotation that is opposite for the sifting rolls 13 with respect to that of the sifting rolls 14.

[0046] The separation chamber 12 (fig. 4) below the mouth 18 comprises a plurality of conveyor blades 42, mounted fixed to the bearing structure 11, which allow to convey the materials to be sifted toward the first sifting roll 13, preventing any dead zones inside the separation chamber 12, where the materials can accumulate.

[0047] Similarly, on the side opposite the feed side, a plurality of receptor blades 43 are mounted fixed, which convey the materials toward a discharge aperture 45.

[0048] In particular, each first sifting element 17 (fig. 5) comprises two active surfaces 21 and 22, which converge toward the center and form an angle α of about 170°, to promote the transfer of the materials.

[0049] Each second sifting element 19 is shaped with a different geometry from that of the first sifting element 17 and comprises an upper surface 23 and a lower surface 24. The upper surface 23 comprises two upper cusps 26 which promote the transfer of the materials to be sifted M toward the adjacent sifting roll 13. In proximity to one end, the lower surface 24 comprises a lower cusp 27 that promotes the passage downward of the materials M between the sifting elements 17.

[0050] The sifting apparatus 10 as described heretofore functions as follows.

[0051] The materials to be sifted M are fed inside the separation chamber 12 through the mouth 18 (figs. 3 and 4). Some of the smaller-sized materials M falls through the discharge gaps defined by the first sifting roll 13, whereas the remaining part is sifted by the sifting bed formed by the sifting rolls 13 and 14. In particular, the materials M remain on the active surfaces 21 and 22 (fig. 5) of the first sifting elements 17. In this configuration the active surface 22 is parallel to the plane on which the shafts 20 and 25 lie, which in this case is horizontal. The direction of rotation of the first elements 17 is anti-clockwise, while that of the second elements 19 is clockwise.

[0052] During the alternate rotation of the sifting rolls 13 and 14, the materials M not sifted are fed toward the

discharge aperture 45, that is, toward the left in figs. 4 and 8, thanks to the thrust exerted by the active surfaces 22 of the first elements 17, while the sifted materials are thrust downward by the lower surfaces 24 of the second elements 19. During the thrust exerted by the active surfaces 22, the non-sifted materials M knock against each other, and also against the sifting elements 17 and 19: this causes the individual parts that make up the materials M to become detached.

[0053] When the first and second elements 17 and 19 reach their maximum rotation (fig. 7), that is, when the active surfaces 22 have been rotated by the angle β with respect to the horizontal condition, the active surfaces 22 of the first elements 17 discharge the non-sifted material M onto the upper surfaces 23 of the second elements 19.

[0054] When they have reached this position, which also corresponds to the position shown in fig. 3, the sifting rolls 13 and 14 invert their direction of rotation.

[0055] During the return rotation toward the initial position shown in fig. 5, passing from the intermediate position shown in fig. 8, the materials M disposed on the upper surfaces 23 of the second elements 19 are subjected to a left-ward thrust, that is, toward the adjacent first elements 17. After a rotation of 65° all the sifting elements 17 and 19 return to their initial position as shown in fig. 5, to receive further material on their active surfaces 21 and 22.

[0056] It is clear that modifications and/or additions of parts may be made to the sifting apparatus as described heretofore, without departing from the field and scope of the present invention.

[0057] For example, the transmission device may be made using one or more transmission chains, or kinematisms with toothed wheels connected to the two series of sifting rolls, in order to achieve the movements described above.

[0058] It is also clear that, although the present invention has been described with reference to some specific examples, a person of skill in the art shall certainly be able to achieve many other equivalent forms of sifting apparatus, having the characteristics as set forth in the claims and hence all coming within the field of protection defined thereby.

Claims

1. Sifting apparatus to select materials (M) having different sizes, comprising a separation chamber (12) open downward, into which said materials (M) are able to be inserted by means of introduction means (18) disposed in correspondence with a first side of said separation chamber (12), and from which the materials not selected are able to exit through an exit aperture (45) disposed in correspondence with a second side of said separation chamber (12), opposite said first side, a plurality of sifting rollers (13, 14) mounted rotatable on axes of rotation parallel to each other and lying substantially on the same plane as said separation chamber (12) so as to define a substantially horizontal sifting bed, or at most inclined by a few degrees upward, between said first side and said exit aperture (45), and a rotary motor member (38), which also comprises a transmission device (31) able to transform the rotation of said rotary motor member (38) into an alternating rotational motion of said sifting rollers (13, 14), in a clockwise and anticlockwise direction, of an amplitude (β) of less than 360°, so that the rotation of each sifting roller (13, 14) occurs in the opposite direction to that of the adjacent sifting roller (14, 13), in order to allow said materials (M) to advance in a direction substantially perpendicular to the axes of said sifting rolls (13, 14) on said sifting bed, from said first side of said separation chamber (12) to said exit aperture (45), so that the selected material falls downward between said sifting rolls (13, 14) and the material not selected exits laterally from said separation chamber (12) through said exit aperture (45).

2. Sifting apparatus as in claim 1, **characterized in that** said sifting rollers (13, 14) comprise a first series of sifting rollers (13) and a second series of sifting rollers (14), and that said first series of sifting rollers (13) is disposed in said separation chamber (12) in a position offset by one position with respect to said second series of sifting rollers (14).

3. Sifting apparatus as in claim 2, **characterized in that** said transmission device (31) comprises a first transmission mechanism (40) able to move said first series of sifting rollers (13) and a second transmission device (41) able to move said second series of sifting rollers (14).

4. Sifting apparatus as in claim 3, **characterized in that** said first transmission mechanism (40) and said second transmission mechanism (41) each comprise a crank (33) attached to said rotary motor member (38) and connected to a rod (35), which is connected to a bar (36), on which a plurality of connecting arms (37) is hinged, each of which is attached to one of said sifting rollers (13, 14).

5. Sifting apparatus as in claim 4, **characterized in that** the crank (33) of said first transmission mechanism (40) is attached to said rotary motor member (38), offset by 180° with respect to the crank (33) of said second transmission mechanism (41).

6. Sifting apparatus as in any claim from 2 to 5, **characterized in that** said first series of sifting rollers (13) comprises first sifting elements (17) each having two active surfaces (21 and 22) converging with respect to each other toward the centre and able to

promote the transfer of said materials (M) from said first sifting rollers (13) to said second sifting rollers (14).

7. Sifting apparatus as in any claim from 2 to 5, **characterized in that** said second series of sifting rollers (14) comprises second sifting elements (19), each having two upper cusps (26) able to promote the transfer of said materials (M) from said second sifting rollers (14) to said first sifting rollers (13).

8. Sifting apparatus as in claim 7, **characterized in that** said second sifting elements (19) also comprise a lower cusp (27), able to promote the passage of said materials (M) downward.

9. Sifting apparatus as in claim 1, **characterized in that** the amplitude of rotation (β) of said sifting rollers (13, 14) is comprised between 30° and 90°.

10. Sifting apparatus as in claim 9, **characterized in that** the amplitude of rotation (β) of said sifting rollers (13, 14) is 65°.

Patentansprüche

1. Siebgerät zur Auswahl von Materialien (M) mit verschiedenen Größen, umfassend eine nach unten offene Abscheidekammer (12), in welche die Materialien (M) durch Einführmittel (18) eingeführt werden können, die an einer ersten Seite der Abscheidekammer (12) angeordnet sind, und aus welcher die nicht ausgewählten Materialien durch eine Austrittsöffnung (45) austreten können, die an einer zweiten, der ersten Seite gegenüberliegenden, Seite der Abscheidekammer (12) angeordnet ist, eine Vielzahl von Siebwalzen (13, 14), die auf Drehachsen drehbar gelagert sind, welche zueinander parallel sind und im Wesentlichen auf derselben Ebene wie die Abscheidekammer (12) liegen, um ein im Wesentlichen horizontales, oder allenfalls um einige Grade nach oben geneigtes, Siebbett zwischen der ersten Seite und der Austrittsöffnung (45) zu definieren, und ein Drehmotorelement (38), das auch eine Übertragungseinrichtung (31) umfasst, die die Drehung des Drehmotorelements (38) in eine wechselnde Drehbewegung der Siebwalzen (13, 14), in Uhrzeigerrichtung und entgegen der Uhrzeigerrichtung, mit einer Weite (β) von weniger als 360° umwandeln kann, so dass die Drehung jeder Siebwalze (13, 14) in entgegengesetzter Richtung zu derjenigen der angrenzenden Siebwalze (14, 13) erfolgt, um den Materialien (M) zu ermöglichen, in einer Richtung, die im Wesentlichen senkrecht zu den Achsen der Siebwalzen (13, 14) ist, auf dem Siebbett, von der ersten Seite der Abscheidekammer (12) zu der Austrittsöffnung (45), vorzurücken, so dass das ausgewählte Material nach unten zwischen den Siebwalzen (13, 14) fällt und das nicht ausgewählte Material von der Abscheidekammer (12) durch die Austrittsöffnung (45) seitwärts austritt.

2. Siebgerät nach Anspruch 1, **dadurch gekennzeichnet, dass** die Siebwalzen (13, 14) eine erste Reihe Siebwalzen (13) und eine zweite Reihe Siebwalzen (14) umfassen, und dass die erste Reihe Siebwalzen (13) in der Abscheidekammer (12) in einer Stellung angeordnet ist, die um eine Stellung hinsichtlich der zweiten Reihe Siebwalzen (14) versetzt ist.

3. Siebgerät nach Anspruch 2, **dadurch gekennzeichnet, dass** die Übertragungseinrichtung (31) einen ersten Übertragungsmechanismus (40), der die erste Reihe Siebwalzen (13) bewegen kann, und eine zweite Übertragungseinrichtung (41), die die zweite Reihe Siebwalzen (14) bewegen kann, umfasst.

4. Siebgerät nach Anspruch 3, **dadurch gekennzeichnet, dass** der erste Übertragungsmechanismus (40) und der zweite Übertragungsmechanismus (41) jeweils eine Kurbel (33) umfassen, die am Drehmotorelement (38) befestigt und mit einer Stange (35) verbunden ist, die mit einem Stab (36) verbunden ist, an dem eine Vielzahl von Verbindungsarmen (37) angelenkt ist, von denen jeder an einer der Siebwalzen (13, 14) befestigt ist.

5. Siebgerät nach Anspruch 4, **dadurch gekennzeichnet, dass** die Kurbel (33) des ersten Übertragungsmechanismus (40) am Drehmotorelement (38), um 180° hinsichtlich der Kurbel (33) des zweiten Übertragungsmechanismus (41) versetzt, befestigt ist.

6. Siebgerät nach einem der Ansprüche 2 bis 5, **dadurch gekennzeichnet, dass** die erste Reihe Siebwalzen (13) erste Siebelemente (17) umfasst, die jeweils zwei aktive Oberflächen (21 und 22) haben, die zum Zentrum hin zueinander konvergieren und die Übergabe der Materialien (M) von den ersten Siebwalzen (13) zu den zweiten Siebwalzen (14) fördern können.

7. Siebgerät nach einem der Ansprüche 2 bis 5, **dadurch gekennzeichnet, dass** die zweite Reihe Siebwalzen (14) zweite Siebelemente (19) umfasst, die jeweils zwei obere Spitzen (26) haben, die die Übergabe der Materialien (M) von den zweiten Siebwalzen (14) zu den ersten Siebwalzen (13) fördern können.

8. Siebgerät nach Anspruch 7, **dadurch gekennzeichnet, dass** die zweiten Siebelemente (19) auch eine untere Spitze (27) umfassen, die den Durchgang der Materialien (M) nach unten fördern können.

9. Siebgerät nach Anspruch 1, **dadurch gekennzeichnet, dass** die Weite der Drehung (β) der Siebwalzen (13, 14) zwischen 30° und 90° liegt.

10. Siebgerät nach Anspruch 9, **dadurch gekennzeichnet, dass** die Weite der Drehung (β) der Siebwalzen (13, 14) 65° beträgt.

Revendications

1. Appareil de criblage permettant de sélectionner des matériaux (M) de tailles différentes, comprenant une chambre de séparation (12) ouverte vers le bas, dans laquelle peuvent être introduits lesdits matériaux (M) par des moyens d'introduction (18) situés au niveau d'un premier côté de ladite chambre de séparation (12), et de laquelle les matériaux non sélectionnés peuvent sortir à travers une ouverture de sortie (45) située au niveau d'un deuxième côté de ladite chambre de séparation (12), opposé audit premier côté, une pluralité de rouleaux de criblage (13, 14) montés de manière à pouvoir tourner sur des axes de rotation parallèles les uns par rapport aux autres et qui se trouvent sensiblement sur le même plan que ladite chambre de séparation (12), de manière à définir un lit de criblage sensiblement horizontal, ou tout au plus incliné de quelques degrés vers le haut, entre ledit premier côté et ladite ouverture de sortie (45), et un élément de moteur rotatif (38),
comprenant également un dispositif de transmission (31) qui peut transformer la rotation dudit élément de moteur rotatif (38) en un mouvement rotatif alternatif desdits rouleaux de criblage (13, 14) dans le sens des aiguilles d'une montre et dans le sens inverse des aiguilles d'une montre, ayant une amplitude (β) inférieure à 360°, de telle sorte que la rotation de chaque rouleau de criblage (13, 14) se produise dans la direction opposée à celle du rouleau de criblage adjacent (14, 13) afin de permettre l'avancement desdits matériaux dans une direction sensiblement perpendiculaire aux axes desdits rouleaux de criblage (13, 14) sur ledit lit de criblage, dudit premier côté de ladite chambre de séparation (12) à ladite ouverture de sortie (45), de manière que le matériau sélectionné tombe vers le bas entre lesdits rouleaux de criblage (13, 14) et le matériau non sélectionné sorte latéralement de ladite chambre de séparation (12) vers ladite ouverture de sortie (45).

2. Appareil de criblage selon la revendication 1, **caractérisé en ce que** lesdits rouleaux de criblage (13, 14) comprennent une première série de rouleaux de criblage (13) et une seconde série de rouleaux de criblage (14), et **en ce que** ladite première série de rouleaux de criblage (13) est agencée dans ladite chambre de séparation (12) dans une position décalée d'une position par rapport à ladite seconde série de rouleaux de criblage (14).

3. Appareil de criblage selon la revendication 2, **caractérisé en ce que** ledit dispositif de transmission (31) comprend un premier mécanisme de transmission (40) capable de déplacer ladite première série de rouleaux de criblage (13) et un second dispositif de transmission (41) capable de déplacer ladite seconde série de rouleaux de criblage (14).

4. Appareil de criblage selon la revendication 3, **caractérisé en ce que** ledit premier mécanisme de transmission (40) et ledit second mécanisme de transmission (41) comprennent chacun une manivelle (33) fixée audit élément de moteur rotatif (38) et reliée à une tige (35), qui est reliée à une barre (36) sur laquelle sont articulés une pluralité de bras de liaison (37), chacun desquels est fixé à un desdits rouleaux de criblage (13, 14).

5. Appareil de criblage selon la revendication 4, **caractérisé en ce que** la manivelle (33) dudit premier mécanisme de transmission (40) est fixée audit élément de moteur rotatif (38), décalé de 180° par rapport à la manivelle (33) dudit mécanisme de transmission (41).

6. Appareil de criblage selon n'importe laquelle des revendications 2 à 5, **caractérisé en ce que** ladite première série de rouleaux de criblage (13) comprend des premiers éléments de criblage (17) possédant chacun deux surfaces actives (21 et 22) convergeant l'une vers l'autre vers le centre et pouvant effectuer le transfert desdits matériaux (M) desdits premiers rouleaux de criblage (13) auxdits seconds rouleaux de criblage (14).

7. Appareil de criblage selon n'importe laquelle des revendications 2 à 5, **caractérisé en ce que** ladite seconde série de rouleaux de criblage (14) comprend des seconds éléments de criblage (19) possédant chacun deux chevrons supérieurs (26) pouvant effectuer le transfert desdits matériaux (M) desdits seconds rouleaux de criblage (14) auxdits premiers rouleaux de criblage (13).

8. Appareil de criblage selon la revendication 7, **caractérisé en ce que** lesdits seconds éléments de criblage (19) comprennent également un chevron inférieur (27), pouvant réaliser le passage desdits matériaux (M) vers le bas.

9. Appareil de criblage selon la revendication 1, **caractérisé en ce que** l'amplitude de rotation (β) des rouleaux de criblage (13, 14) est comprise entre 30° et 90°.

10. Appareil de criblage selon la revendication 9, **caractérisé en ce que** l'amplitude de rotation (β) des rouleaux de criblage (13, 14) est de 65°.

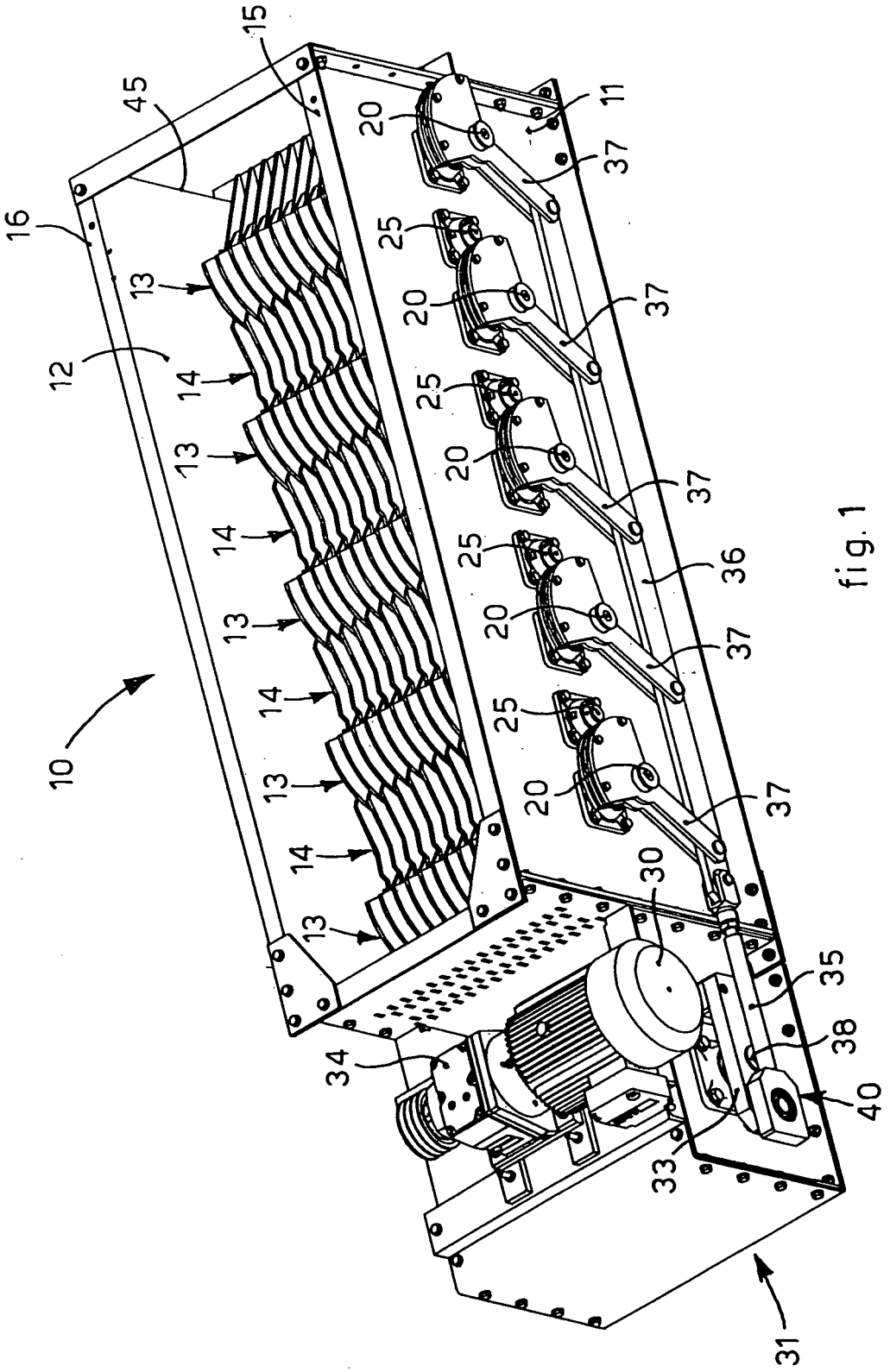

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fig. 1

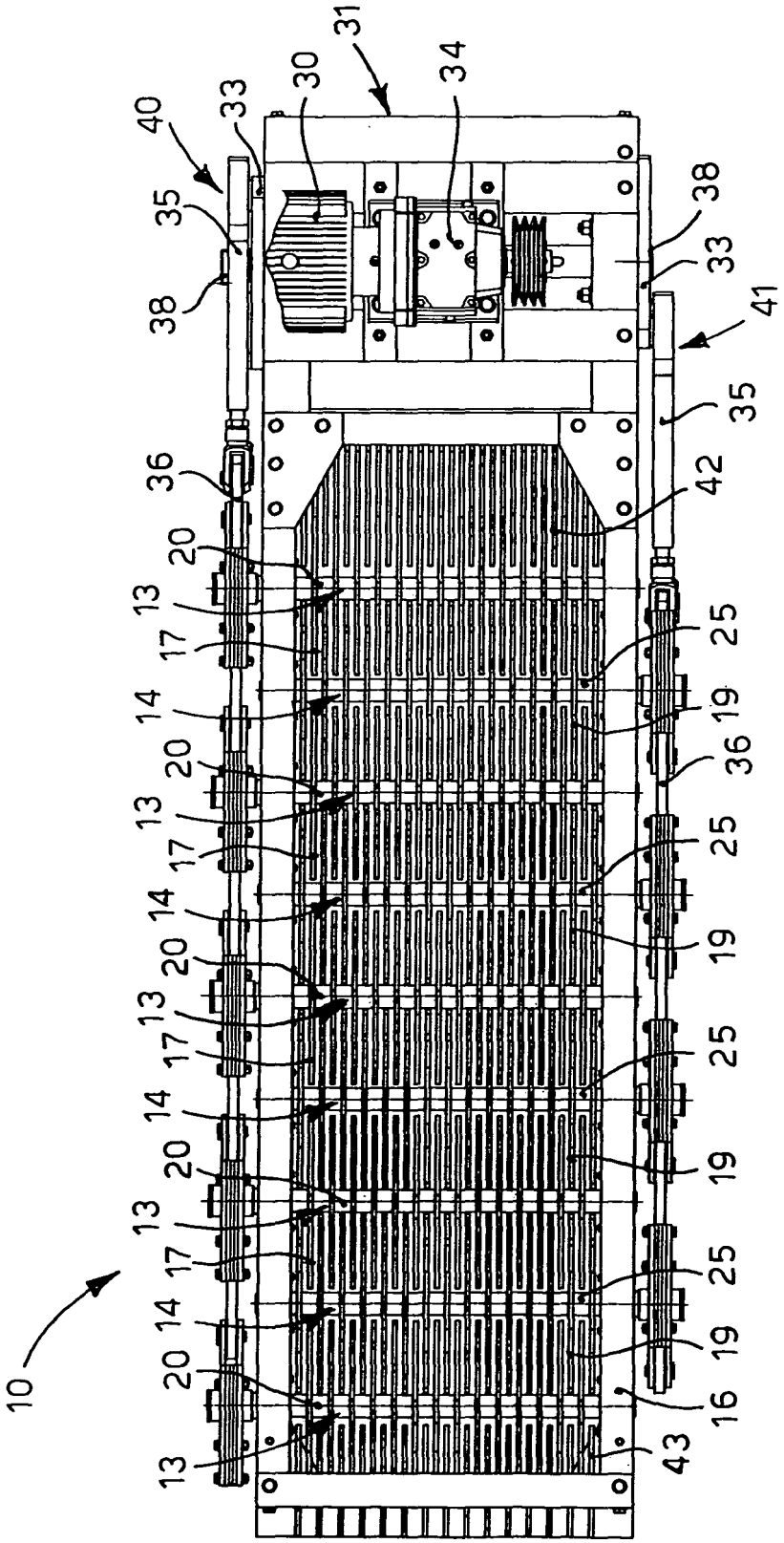


fig. 2

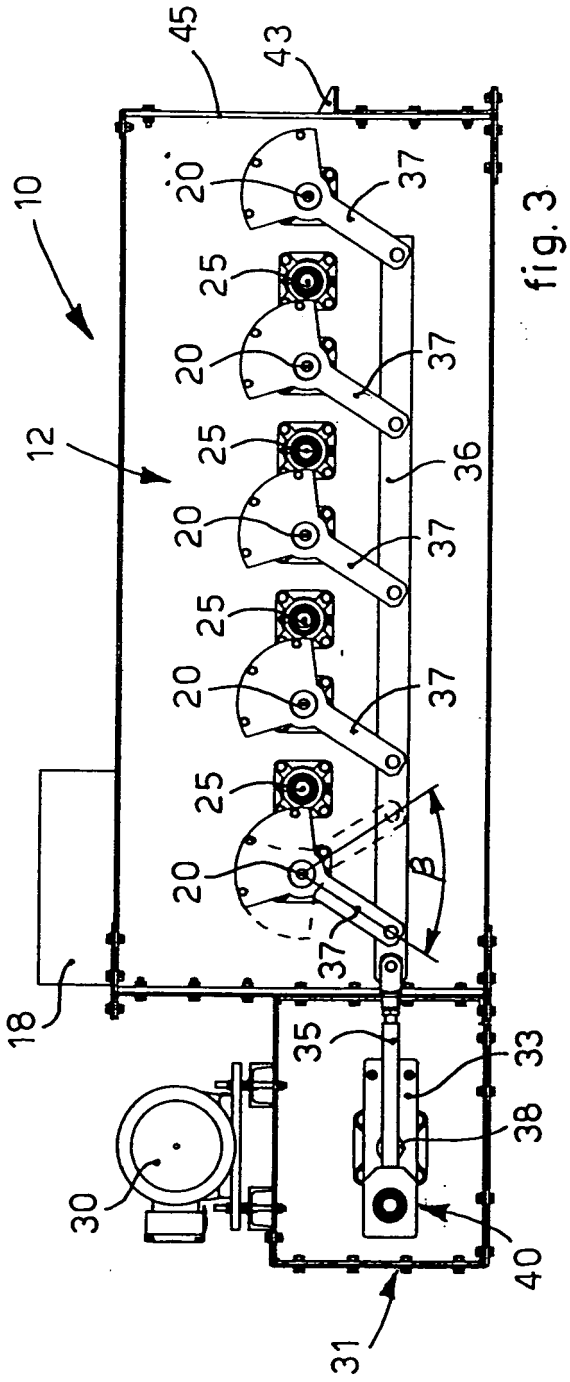

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fig. 3

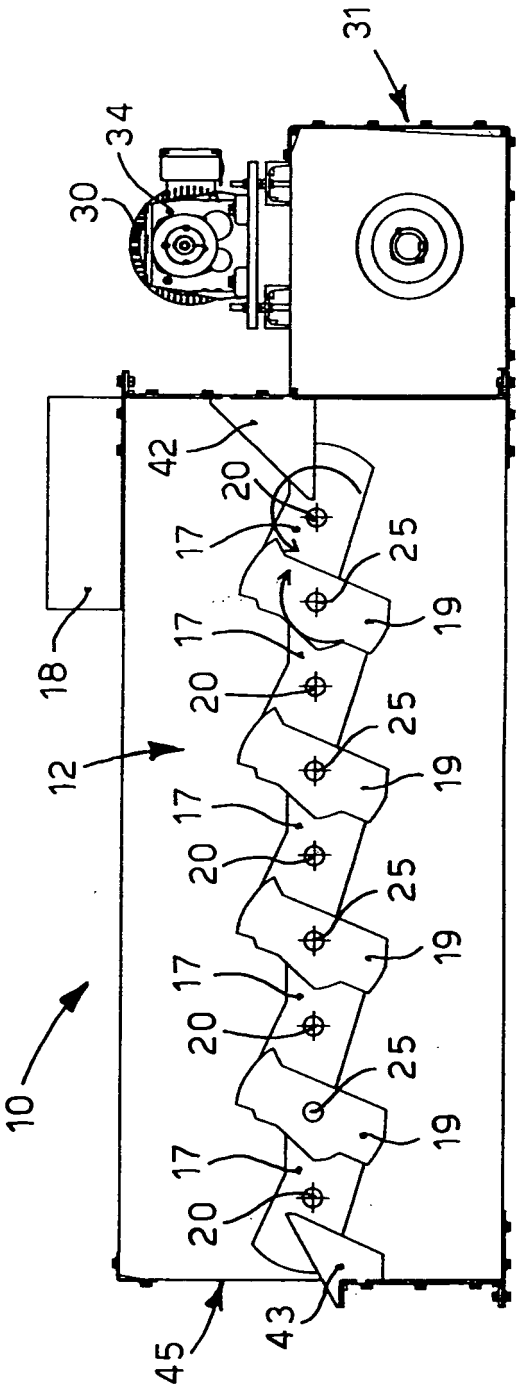

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fig. 4

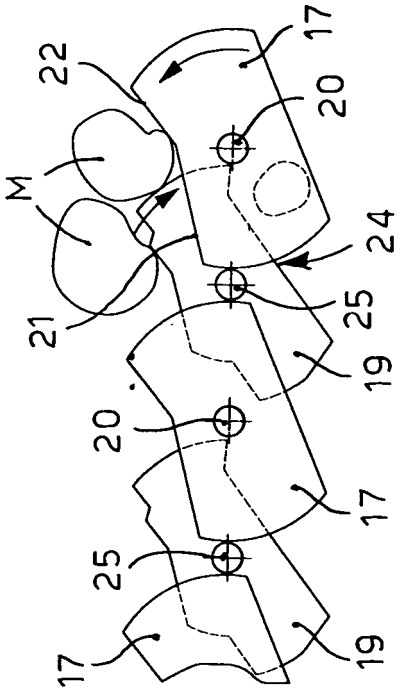


fig. 6

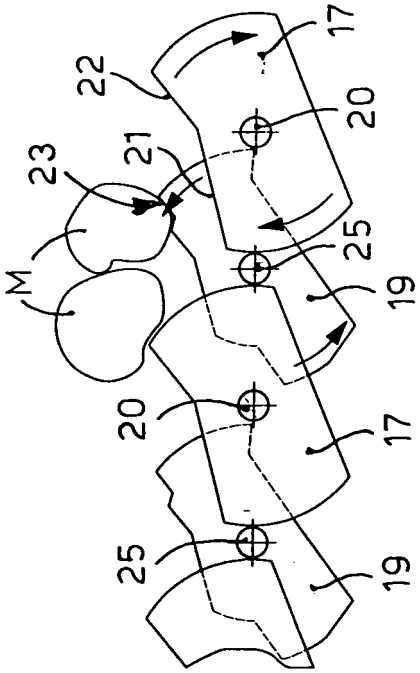


fig. 8

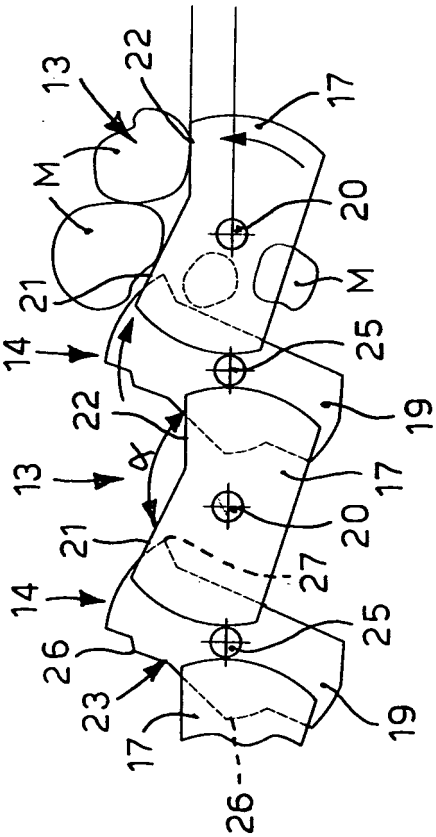


fig. 5

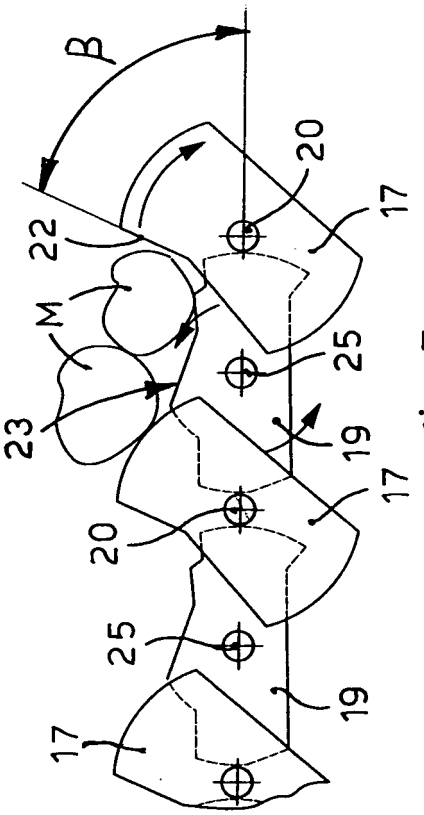


fig. 7

REFERENCES CITED IN THE DESCRIPTION

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