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(54) **CUTTING DEVICE**

SCHNEIDWERK

DISPOSITIF COUPANT

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(56) References cited:
US-A- 4 690 337

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Description

[0001] The present invention relates to a cutting device including a movable and a fixed cutting means for comminution of refuse, preferably paper refuse, whereby the movable cutting means is rotatable relative to the fixed cutting means, whereby the cutting means cut or comminute refuse passing therebetween when the movable cutting means rotates relative to the fixed cutting means, whereby the movable cutting means has teeth and the fixed cutting means recesses corresponding with said teeth and whereby the teeth of said movable cutting means are brought into engagement in the recesses of said fixed cutting means so that comminution or cutting occurs continuously during rotation of said movable cutting means.

[0002] Such a cutting device has been known for a long time in a number of various embodiments. Thus, the cutting device according to e.g. US-A-4 690 337 comprises movable cutting means (rolls 3) and during normal operation fixed cutting means (wall sections 20) which cooperate with each other as defined above. The fixed cutting means 20 in US-A-4 690 337 however, are journaled on shafts 22 so that said cutting means 20 are retracted (by means of hydraulic cylinders 23) into an inoperative position when the pressure or load thereon from the refuse to be comminuted exceeds a predetermined value or limit. "Fixed" cutting means in the literal sense of the word are not provided, but rather a kind of resilient suspension thereof.

[0003] In the cutting device according to the invention however, the fixed cutting means and/or the movable cutting means can be set and then locked relative to each other for altering and then, during comminution or cutting of the refuse, maintaining the altered tear angle which the front side of the teeth of the movable cutting means, said front side facing the fixed cutting means, defines with a front side of said fixed cutting means facing said movable cutting means when the respective tooth is in a position wherein, seen from the side, the outermost portion of the front side of the tooth is located in a plane in which the front side of the fixed cutting means is situated.

[0004] In US-A-4 690 337 nothing is mentioned about such an adjustable tear angle which is set by displacement of the fixed and/or movable cutting means, whereafter the cutting means which has/have been displaced, is/are locked in the new position(s). If there is a change of the tear angle during retraction of the cutting means 20 into inoperative position, nothing is stated thereabout and it seems to be of no importance. Furthermore, one change of the tear angle is not permanent, but is once again changed when the pressure or load from the refuse ceases.

[0005] The resilient mounting of the cutting means 20 in the prior art device of US-A-4 690 337 also indicates that the device is not intended for preferably paper refuse as the cutting device according to the present

invention, since the optimum tear angle for comminution or cutting of paper of various qualities is no longer present if the cutting means 20 are displaced. Another indication of that the prior art cutting device is not adapted preferably for paper refuse is the small number of teeth 30 on the movable cutting means 3. A cross section through the rolls 3 at a portion with a tooth 30 shows that along the entire periphery or envelope surface of each roll there is at each portion only one tooth, and, seen in the longitudinal direction of the rolls 3, the teeth 30 are displaced relative to each other so that they run only one turn around each roll. This means that at each point of time only one tooth 30 on each roll 3 engages each wall section 20 and the teeth 21 thereon. The play or clearance becomes too large for efficient comminution or cutting of paper, packages and similar.

[0006] In summary, it can thus be established that the prior art cutting device according to US-A-4 690 337 is not intended for and therefore, not constructed for comminution of preferably paper refuse. Consequently, it also lacks the characterizing features of the present invention with, primarily, a tear angle which is adjustable by means of displaceable or settable cutting means and which can be maintained during the entire operation by locking the cutting means.

[0007] According to the invention it is possible, by means of the cutting device, to comminute waste products with a certain consistency at one occasion and comminute other waste products with a totally different consistency at another occasion, e.g. in one case soft paper and the other case harder cardboard. Comminution or cutting occurs quickly and effectively irrespective of the consistency. Adjustment of the tear angle also permits quick and effective drawing-in of the waste or refuse products into the cutting device.

[0008] The abovementioned and other characterizing features of the invention will be further described below with reference to the accompanying drawings, wherein

fig. 1 schematically illustrates the basic structure and main components of the cutting device according to the invention;

fig. 2 is a perspective view of the cutting means of the cutting device;

fig. 3 is an enlarged detailed view of fig. 1; and

fig. 4 is another enlarged side view of the fixed cutting means of the cutting device.

[0009] The cutting device according to the present invention, which preferably is transportable and thereby applicable wherever necessary, consists basically of a movable cutting means 1 and a fixed cutting means 2 for comminuting refuse A1, preferably paper refuse, which through a feed hopper 3 defining an input is fed down to said cutting means 1, 2. The movable cutting means 1 is rotatable relative to the fixed cutting means 2 and is thereby, through a conduit 4, powered by a motor 5. The

cutting means 1, 2 comminute or cut refuse passing therebetween when the movable cutting means 1 rotates relative to the fixed cutting means 2. Comminuted or cut refuse A2 falls through a discharge hopper 6 down into a collecting container, bag or similar for further transport for recycling, destruction or burning.

[0010] The cutting device further comprises an exhausting device 8 for exhausting or sucking out dust resulting from the comminution of the waste A1. The cutting device according to the invention has hereby also environmental advantages, particularly to the personell working at and adjacent to the cutting device. The exhausting device 8 includes a pump 9 which generates the required negative pressure for sucking out the resulting dust. The exhausting device 8 also comprises a preferably square or quadrangular frame 11 provided with a suction opening 12 and connected with the pump 9 through a suction conduit 10. The frame 11 preferably also has a square cross section with an internal suction passage 13 extending around the input defined by the feed hopper 3 and above the cutting means 1, 2 and with the suction opening in the form of a suction slit 12. Since the suction slit 12 preferably is located at the lower portion of the suction passage 13 closest to the cutting means 1, 2, in the junction between the lower side ha of the frame 11 and the inwardly directed side surface or inner side 11b thereof (see fig. 4), the sucking-out or exhaustion of the dust resulting from the comminution of the refuse A1 is very effective.

[0011] For optimum function of the cutting device according to the invention regarding the amount of refuse A1 for comminution said cutting device can receive per time unit, it is of course also important that the relative positions of the cutting means 1, 2 are the best in relation to the flow of refuse fed towards the cutting means. A fine way to obtain this at the present embodiment is to locate the fixed cutting means 2 on the exhausting device 8 mounted above the cutting means 1, 2 and extending around the feed hopper 3 defining the input for the refuse. The fixed cutting means 2 is hereby attached to the exhausting device 8 at the lower side 11a of the frame 11 and so that said fixed cutting means 2 is directed obliquely downwards towards the axis of rotation of the movable cutting means 1 or substantially towards said axis.

[0012] The movable cutting means 1 has, as is shown in fig. 2, teeth 15 and the fixed cutting means 2 recesses 16 corresponding with said teeth. The teeth 15 are brought into engagement in the recesses 16 so that comminution or cutting occurs continuously during rotation of the movable cutting means 1, i.e. that the teeth preferably are arranged in one or more screw or helical lines on the envelope surface of a drum 19 which is suspended beneath the feed hopper 3 in bearings 14 and which through a driving wheel 17 and a driving belt 18 is rotatably driven about the axis of rotation RA by the motor 5, so that when teeth 15 leave the recesses 16 at one end of the fixed cutting means, other teeth engage

the recesses at the opposite end of the fixed cutting means 2. The cutting means 1, 2 thus operate as a type of lawn mower.

[0013] The teeth of the movable cutting means 1 preferably consist of triangular, suitably planar plates which are transverse to the direction of rotation R of the movable cutting means. The teeth 15 are preferably provided in a line two and two together (see fig. 2) and fixedly or releasably mounted on the drum 19. The fixed cutting means 2 consists of a toothed, preferably planar plate 20 with recesses 16 for the teeth 15.

[0014] The fixed cutting means 2 and/or the movable cutting means 1 can be set and thereafter locked relative to each other in order to alter and then, during comminution or cutting of the refuse A1, maintain the altered tear angle RV which the front side 15a of the teeth 15 of the movable cutting means 1, said front side facing the fixed cutting means 2, defines with a front side 20a of said fixed cutting means 2 facing said movable cutting means 1 when the respective tooth 15 is in a position wherein, seed from the side, the outermost portion of the front side of the tooth, i.e. in the embodiment shown the point 15b between said front side 15a and the edge or tip 15c of said tooth substantially perpendicular to said front side, is located in a plane P in which the front side 20a of the fixed cutting means is located (see fig. 3). The possibility to alter the tear angle RV enables optimum setting of the cutting device according to the invention in relation to the refuse A1, preferably paper refuse such as paper, pasteboard, cardboard, corrugated cardboard etc., but also e.g. frigidolite, to be comminuted or cut in said cutting device. The tear angle RV is for these types of refuse settable between 0° and 30°, preferably between 0° and 15°.

[0015] For resetting the tear angle RV, the fixed cutting means 2 is in the embodiment shown pivotally mounted about a pivot axis V which is parallel with the axis of rotation RA of the movable cutting means 1 or drum 19. For resetting the tear angle RV and adaptation of the cutting device to the coarseness of the refuse material, the fixed cutting means 2 is preferably pivotally as well as displaceably mounted relative to the movable cutting means 1. The fixed cutting means 2 is thereby, by means of one or more bolt or screw joints 21 (see fig. 4) releasably attached to a mounting member 22 which in turn is adjustably attached to a bracket 23. The bracket 23 is attached to or mounted on the lower side 11a of the frame 11 of the exhausting device 8, e.g. welded thereto. In the embodiment according to fig. 4, the bracket 23 has three straight and parallel in the direction of displacement of the fixed cutting means 2 extending long-holes 24 and the mounting member 22 a round hole 25 as well as two curved long-holes 26 on opposite sides of the hole 25. Members 22 and 23 are connected to each other through bolt or screw joints extending through the holes 24, 25, 26 so that a bolt or screw joint 27 runs through respectively one of the outer long-holes 24 in the bracket and one opposed curved

long-hole 26 in the mounting member 22, while a third bolt or screw joint 28 runs through the intermediate long-hole 24 in the bracket 23 and the hole 25 in the mounting member 22. The curved long-holes 26 in the mounting member 22, are shaped so that said member 22 can pivot relative to the bracket 23, i.e. that said long-holes 26 are curved with their ends directed towards each other so that they define preferably arc-shaped or arcuate sections around the hole 25 with the centre of the arc or circle in the hole 25 and with the bolt or screw joint 28 extending therethrough as pivot axis V for the mounting member 22 and thereby for the complete fixed cutting means 2.

[0016] When pivoting the mounting member 22 relative to the bracket 23 and thereby, the fixed cutting means 2 relative to the movable cutting means 1, the bolt or screw joints 27, 28 are loosened so much that pivoting may occur about the bolt or screw bolt 28 and guidance during pivoting is permitted by cooperation between the curved long-holes 26 and the bolt or screw joints 27 therethrough. If displacement is to be carried through between the cutting means 1, 2, the bolt or screw joints 27, 28 are loosened and the mounting member 22 and thereby, the bolt or screw joints, are moved in the longitudinal direction of the long-holes 24 in the bracket 23. After each resetting, all bolt or screw joints 27, 28 are once again tightened.

[0017] It is obvious to a skilled person that the present invention can be modified and altered within the scope of the subsequent claims without departing from the idea and purpose of the invention. Beyond what has been described above and illustrated in the drawings, the components forming part of the cutting device may vary in shape, number and location. The exhausting device 8 may e.g. be designed and placed in other ways than as shown in the drawings and described above. Also, the teeth 15 on the movable cutting means 1 may vary in shape and number and be located in other ways than as shown and described and this is true also for the fixed cutting means 2 and the recesses 16 therein fitting the teeth. The fixed cutting means 2 is preferably also designed so that the tear angle RV between the cutting means 1, 2 can exceed 30° if necessary. Within the scope of the invention is also that the fixed cutting means 2 is fixedly mounted relative to the movable cutting means 1, e.g. fixedly mounted on e.g. the frame 11 of the exhausting device 8. In such an embodiment, the movable cutting means 1 is of course also journaled or mounted so that it can be set for adjustment of the tear angle RV. The choice of motor 5 and pump 9 is done in view of what is required or with regard to the desired capacity of the cutting device according to the invention.

Claims

1. Cutting device including a movable and a fixed cutting means (1 and 2 respectively) for comminution of refuse (A1), preferably paper refuse, whereby the

movable cutting means (1) is rotatable relative to the fixed cutting means (2), whereby the cutting means (1, 2) cut or comminute refuse (A1) passing therebetween when the movable cutting means (1) rotates relative to the fixed cutting means (2), whereby the movable cutting means (1) has teeth (15) and the fixed cutting means (2) recesses (16) corresponding with said teeth and whereby the teeth (15) of said movable cutting means (1) are brought into engagement in the recesses (16) of said fixed cutting means (2) so that comminution or cutting occurs continuously during rotation of said movable cutting means (1), **characterized in** that the fixed cutting means (2) and/or the movable cutting means (1) can be set and then locked relative to each other for altering and then, during comminution or cutting of the refuse (A1), maintaining the altered tear angle (RV) which the front side (15a) of the teeth (15) of the movable cutting means (1), said front side (15a) facing the fixed cutting means (2), defines with a front side (20a) of said fixed cutting means (2) facing said movable cutting means (1) when the respective tooth (15) is in a position wherein, seen from the side, the outermost portion (15b) of the front side (15a) of the tooth (15) is located in a plane (P) in which the front side (20a) of the fixed cutting means (2) is situated.

2. Cutting device according to claim 1, **characterized in** that the tear angle (RV) is 0°-30°, preferably 0°-15°.
3. Cutting device according to claim 1 or 2, **characterized in** that the fixed cutting means (2), for resetting the tear angle (RV), is pivotally mounted about a pivot axis (V) which is parallel with the axis of rotation (RA) of the movable cutting means (1).
4. Cutting device according to any preceding claim, **characterized in** that the fixed cutting means (2), for resetting the tear angle (RV), is pivotally as well as displaceably mounted relative to the movable cutting means (1).
5. Cutting device according to any preceding claim, **characterized in** that the fixed cutting means (2) is releasably attached to a mounting member (22) which in turn is settable or adjustably attached to a bracket (23).
6. Cutting device according to claim 5, **characterized in** that the bracket (23) has straight long-holes (24) and the mounting member (22) one round hole (25) and two curved long-holes (26), whereby said members (22, 23) are attached to each other through bolt or screw joints (27, 28) which extend through the holes (24, 25, 26) and whereby the curved long-holes (26) are designed so that the

mounting member (22) can pivot relative to the bracket (23).

7. Cutting device according to any preceding claim, **characterized in** that the fixed cutting means (2) is directed obliquely downwards towards the axis of rotation (RA) of the movable cutting means (1) or essentially towards said axis. 5
8. Cutting device according to any preceding claim, **characterized in** that there is an exhausting device (8) for exhausting or sucking-out dust resulting from the comminution or cutting of the refuse (A1). 10
9. Cutting device according to claim 8, **characterized in** that the exhausting device (8) has a suction opening (12) which extends around an input (3) for the refuse (A1) to the cutting means (1, 2). 15
10. Cutting device according to claim 9, **characterized in** that the exhausting device (8) has a suction passage (13) which extends around the input (3) and which includes a suction opening in the form of a suction slit (12) which preferably is located at the lower portion of the suction passage (13) closest to the cutting means (1, 2). 20 25
11. Cutting device according to any of claims 8 - 10, **characterized in** that the fixed cutting means (2) is located on the exhausting device (8), preferably at a lower side (11a) thereof. 30
12. Cutting device according to any preceding claim, **characterized in** that the teeth (15) of the movable cutting means (1) are made up of triangular, preferably planar plates which are transverse to the direction of rotation (R), that the teeth (15) preferably are provided in line two and two with each other, that the fixed cutting means (2) is made up of a toothed, preferably planar plate (20) with recesses (16) for the teeth (15) and that said teeth (15) are fixedly or releasably mounted on a rotatable drum (19). 35 40

Patentansprüche

1. Schneidwerk, enthaltend ein bewegliches und ein feststehendes Schneidmittel (1 bzw. 2) zur Zerkleinerung von Abfallmaterial (A1), vorzugsweise von Papierabfall, wobei das bewegliche Schneidmittel (1) relativ zum feststehenden Schneidmittel (2) drehbeweglich ist, die Schneidmittel (1, 2) sich bei Drehbewegungen des beweglichen Schneidmittels (1) relativ zum feststehenden Schneidmittel (2) zwischen den Schneidmitteln hindurchbewegendes Abfallmaterial (A1) zerschneiden bzw. zerkleinern, das bewegliche Schneidmittel (1) Zähne (15) und das feststehende Schneidmittel (2) zu den Zähnen komplementäre Vertiefungen (16) aufweist und 50 55

wobei die Zähne (15) des beweglichen Schneidmittels (1) derart in Eingriff mit den Vertiefungen (16) des feststehenden Schneidmittels (2) gebracht werden, daß während der Drehbewegung des beweglichen Schneidmittels (1) ein kontinuierliches Zerkleinern bzw. Zerschneiden erfolgt, dadurch gekennzeichnet, daß zur Neueinstellung das feststehende Schneidmittel (2) und/oder das bewegliche Schneidmittel (1) relativ zueinander ausgerichtet und sodann festgestellt werden können, wobei dann die Zerkleinerung bzw. das Zerschneiden des Abfallmaterials (A1) unter Beibehaltung des neu eingestellten Zerteilungswinkels (RV) erfolgt, der durch die dem feststehenden Schneidmittel (2) zugewandte Vorderseite (15a) der Zähne (15) des beweglichen Schneidmittels (1) und durch eine dem beweglichen Schneidmittel (1) zugewandte Vorderseite (20a) des feststehenden Schneidmittels (2) bestimmt wird, wenn der jeweilige Zahn (15) sich in einer Position befindet, in der, von der Seite betrachtet, der äußerste Bereich (15b) der Vorderseite (15a) des Zahns (15) in einer Ebene (P) liegt, in der sich auch die Vorderseite (20a) des feststehenden Schneidmittels (2) befindet.

2. Schneidwerk nach Anspruch 1, dadurch gekennzeichnet, daß der Zerteilungswinkel (RV) 0° bis 30°, vorzugsweise 0° bis 15° beträgt.
3. Schneidwerk nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß das feststehende Schneidmittel (2) zur Neueinstellung des Zerteilungswinkels (RV) schwenkbeweglich um eine Schwenkachse (V) gehalten ist, die parallel zur Drehachse (RA) des beweglichen Schneidmittels (1) verläuft.
4. Schneidwerk nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß das feststehende Schneidmittel (2) zur Neueinstellung des Zerteilungswinkels (RV) relativ zum beweglichen Schneidmittel (1) sowohl schwenkbeweglich als auch verschiebbar gehalten ist.
5. Schneidwerk nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß das feststehende Schneidmittel (2) lösbar an einem Halteelement (22) befestigt ist, welches seinerseits zuricht- bzw. einstellbar an einer Klammer (23) angebracht ist. 45 50
6. Schneidwerk nach Anspruch 5, dadurch gekennzeichnet, daß die Klammer (23) gerade Längsöffnungen (24) und das Halteelement (22) eine runde Öffnung (25) und zwei gebogene Längsöffnungen (26) aufweist, wobei die Halteelemente (22, 23) durch Bolzen- oder Schraubenverbindungen (27, 28) aneinander befestigt sind, die sich durch die 55

Öffnungen (24, 25, 26) erstrecken und wobei die gebogenen Längsöffnungen (26) so gestaltet sind, daß das Halteelement (22) sich relativ zur Klammer (23) verschwenken läßt.

7. Schneidwerk nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß das feststehende Schneidmittel (2) schräg nach unten auf die Drehachse (RA) des beweglichen Schneidmittels (1) hin bzw. im wesentlichen auf diese Achse hin ausgerichtet ist. 5 10
8. Schneidwerk nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß eine Abscheidevorrichtung (8) zur Abscheidung bzw. zum Absaugen von durch die Zerkleinerung bzw. das Zerschneiden des Abfallmaterials (A1) anfallendem Staub vorgesehen ist. 15
9. Schneidwerk nach Anspruch 8, dadurch gekennzeichnet, daß die Abscheidevorrichtung (8) eine Saugöffnung (12) aufweist, die sich rund um ein zur Zuführung des Abfallmaterials (A1) zu den Schneidmitteln (1, 2) dienendes Zuführmittel (3) erstreckt. 20 25
10. Schneidwerk nach Anspruch 9, dadurch gekennzeichnet, daß die Abscheidevorrichtung (8) eine Saugleitung (13) umfaßt, die sich rund um das Zuführmittel (3) erstreckt und eine Saugöffnung in Form eines Saugschlitzes (12) aufweist, der vorzugsweise am unteren, den Schneidmitteln (1, 2) am nächsten liegenden Bereich der Ansaugleitung (13) befindet. 30
11. Schneidwerk nach einem der Ansprüche 8 bis 10, dadurch gekennzeichnet, daß das feststehende Schneidmittel (2) an der Abscheidevorrichtung (8), und zwar vorzugsweise einer Unterseite (11a) der Abscheidevorrichtung, angeordnet ist. 35 40
12. Schneidwerk nach einem der vorangegangenen Ansprüche, dadurch gekennzeichnet, daß die Zähne (15) des beweglichen Schneidmittels (1) aus dreieckigen, vorzugsweise ebenen Platten bestehen, die quer zur Drehrichtung (R) ausgerichtet sind, daß die Zähne (15) vorzugsweise paarweise in einer Linie angeordnet sind und daß das feststehende Schneidmittel (2) aus einer gezahnten, vorzugsweise ebenen Platte (20) mit Vertiefungen (16) für die Zähne (15) besteht und die Zähne (15) fest oder lösbar auf einer drehbaren Trommel (19) gehalten sind. 45 50

Revendications

1. Appareil de coupe comprenant un dispositif mobile et un dispositif fixe de coupe (1 et 2 respective-

ment) destinés au déchiquetage de déchets (A1), de préférence de déchets de papier, tel que le dispositif mobile (1) de coupe peut tourner par rapport au dispositif fixe (2) de coupe, dans lequel les dispositifs de coupe (1, 2) coupent ou déchiquettent les déchets (A1) passant entre eux lorsque le dispositif mobile (1) de coupe tourne par rapport au dispositif fixe (2) de coupe, dans lequel le dispositif mobile (1) de coupe a des dents (15) et le dispositif fixe (2) de coupe a des cavités (16) qui correspondent aux dents, et dans lequel les dents (15) du dispositif mobile (1) de coupe sont mises en coopération avec les cavités (16) du dispositif fixe (2) de coupe si bien que le déchiquetage ou la coupe se produit de façon continue pendant la rotation du dispositif mobile (1) de coupe, caractérisé en ce que le dispositif fixe (2) de coupe et/ou le dispositif mobile (1) de coupe peuvent être réglés puis verrouillés l'un par rapport à l'autre afin que l'angle de déchiquetage (RV) puisse être modifié puis, pendant la coupe ou le déchiquetage des déchets (A1), maintenu, cet angle étant formé par la face avant (15a) des dents (15) du dispositif mobile (1) de coupe, la face avant (15a) étant tournée vers le dispositif fixe (2) de coupe, et par une face avant (20a) du dispositif fixe (2) de coupe tournée vers le dispositif mobile (1) de coupe lorsque la dent respective (15) est en position dans laquelle, en vue de côté, la partie la plus externe (15b) de la face avant (15a) de la dent (15) se trouve dans un plan (P) dans lequel se trouve la face avant (20a) du dispositif fixe (2) de coupe.

2. Appareil de coupe selon la revendication 1, caractérisé en ce que l'angle de déchiquetage (RV) est compris entre 0 et 30° et de préférence entre 0 et 15°.
3. Appareil de coupe selon la revendication 1 ou 2, caractérisé en ce que le dispositif fixe (2) de coupe, destiné à régler l'angle de déchiquetage (RV), est monté de manière pivotante autour d'un axe de pivot (V) qui est parallèle à l'axe de rotation (RA) du dispositif mobile (1) de coupe.
4. Appareil de coupe selon l'une quelconque des revendications précédentes, caractérisé en ce que le dispositif fixe (2) de coupe destiné à régler l'angle de déchiquetage (RV) est monté afin qu'il puisse pivoter et se déplacer par rapport au dispositif mobile (1) de coupe.
5. Appareil de coupe selon l'une quelconque des revendications précédentes, caractérisé en ce que le dispositif fixe (2) de coupe est fixé de façon amovible à un organe de montage (22) qui est lui-même fixé de façon réglable ou ajustable sur une équerre (23).

6. Appareil de coupe selon la revendication 5, caractérisé en ce que l'équerre (23) a des trous allongés rectilignes (24) et l'organe de montage (22) a un trou circulaire (25) et deux trous allongés courbes (26), dans lequel les organes (22, 23) sont fixés mutuellement par des joints à boulon ou vis (27, 28) qui passent par les trous (24, 25, 26), et dans lequel les trous allongés et courbes (26) sont réalisés afin que l'organe de montage (22) puisse pivoter par rapport à l'équerre (23). 5 10
7. Appareil de coupe selon l'une quelconque des revendications précédentes, caractérisé en ce que le dispositif fixe (2) de coupe est dirigé obliquement vers le bas, vers l'axe de rotation (RA) du dispositif mobile (1) de coupe ou essentiellement vers l'axe. 15
8. Appareil de coupe selon l'une quelconque des revendications précédentes, caractérisé en ce qu'un dispositif (8) d'évacuation est destiné à évacuer ou aspirer la poussière résultant du déchiquetage ou de la coupe des déchets (A1). 20
9. Appareil de coupe selon la revendication 8, caractérisé en ce que le dispositif d'évacuation (8) a une ouverture d'aspiration (12) qui s'étend autour d'une entrée (3) des déchets (A1) vers les dispositifs de coupe (1, 2). 25
10. Appareil de coupe selon la revendication 9, caractérisé en ce que le dispositif d'évacuation (8) a un passage d'aspiration (13) qui s'étend autour de l'entrée (3) et qui comprend une ouverture d'aspiration sous forme d'une fente d'aspiration (12) qui est placée de préférence à la partie inférieure du passage d'aspiration (13) la plus proche du dispositif de coupe (1, 2). 30 35
11. Appareil de coupe selon l'une quelconque des revendications 8 à 10, caractérisé en ce que le dispositif fixe de coupe (2) est placé sur le dispositif d'évacuation (8), de préférence du côté inférieur (11a) de celui-ci. 40
12. Appareil de coupe selon l'une quelconque des revendications précédentes, caractérisé en ce que les dents (15) du dispositif mobile (1) de coupe sont constituées de plaques triangulaires, planes de préférence, qui sont transversales à la direction de rotation (R), en ce que les dents (15) sont de préférence placées en ligne deux à deux, en ce que le dispositif fixe (2) de coupe est formé d'une plaque dentée (20), plane de préférence, ayant des cavités (16) destinées aux dents (15), et en ce que les dents (15) sont montées de manière fixe ou amovible sur un tambour rotatif (19). 45 50 55

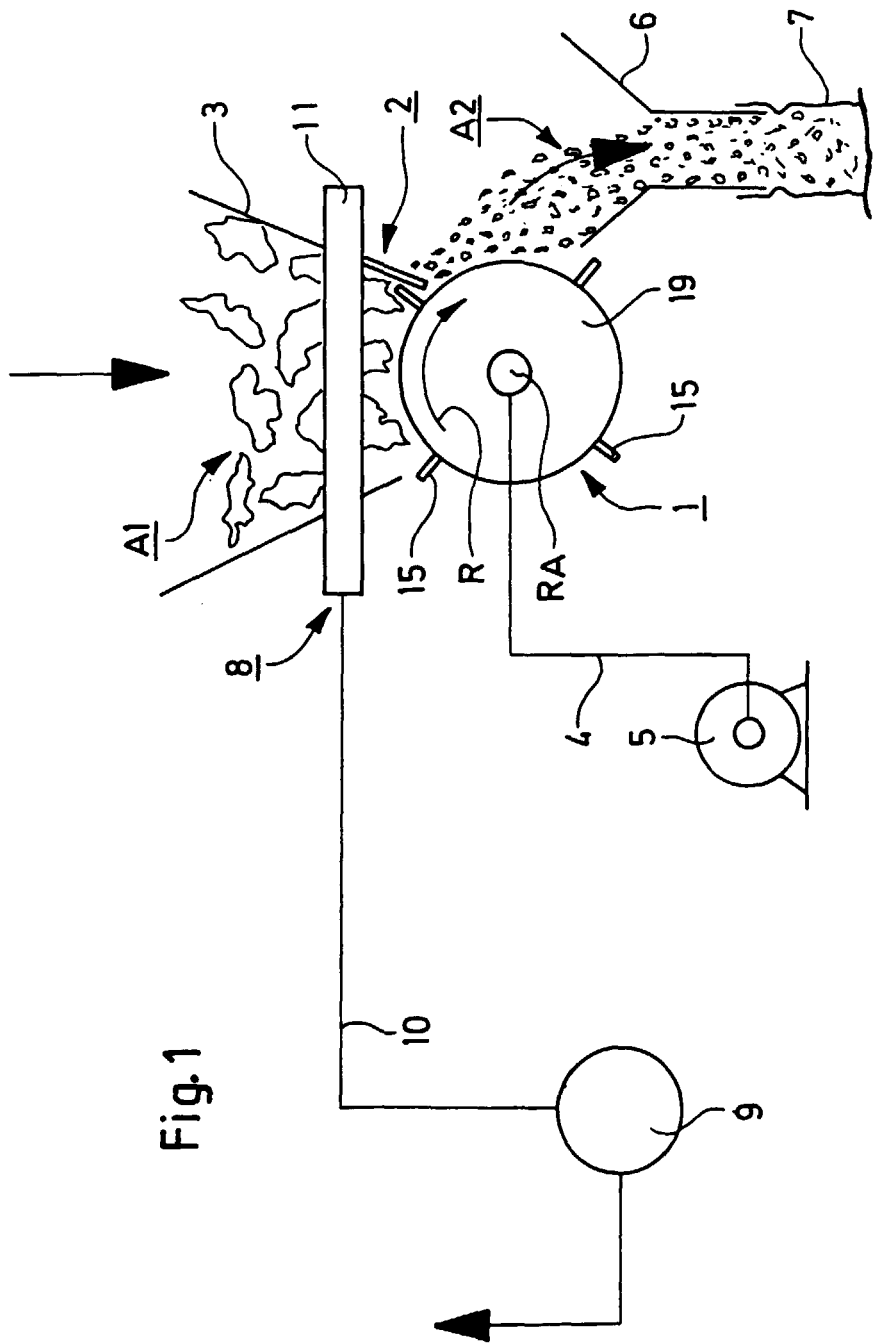
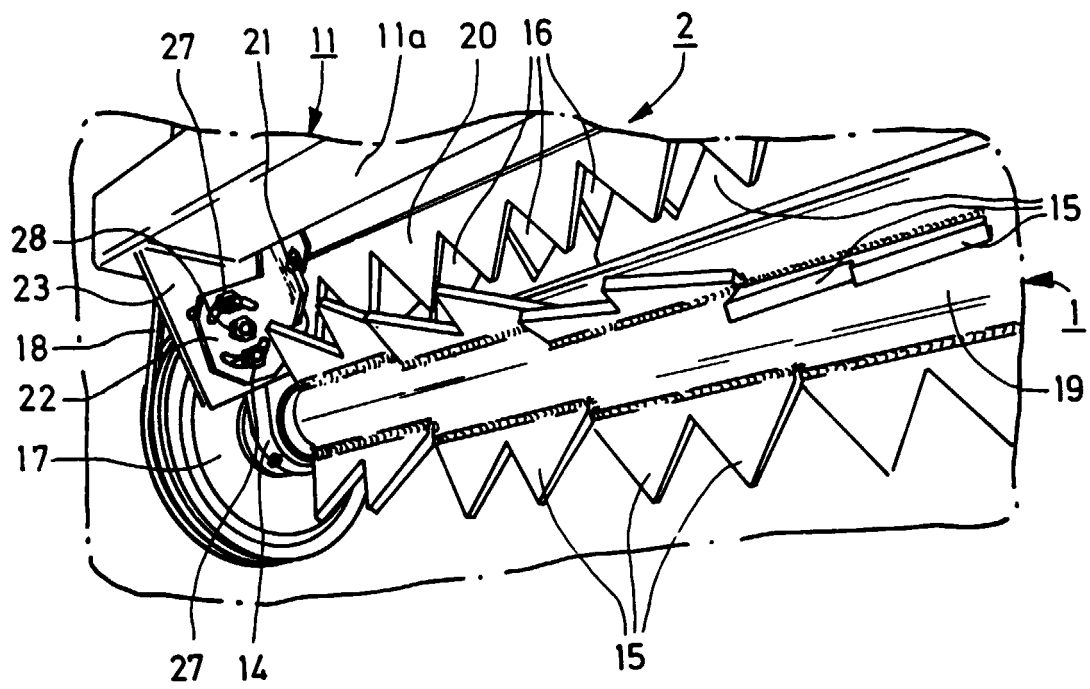


Fig. 2



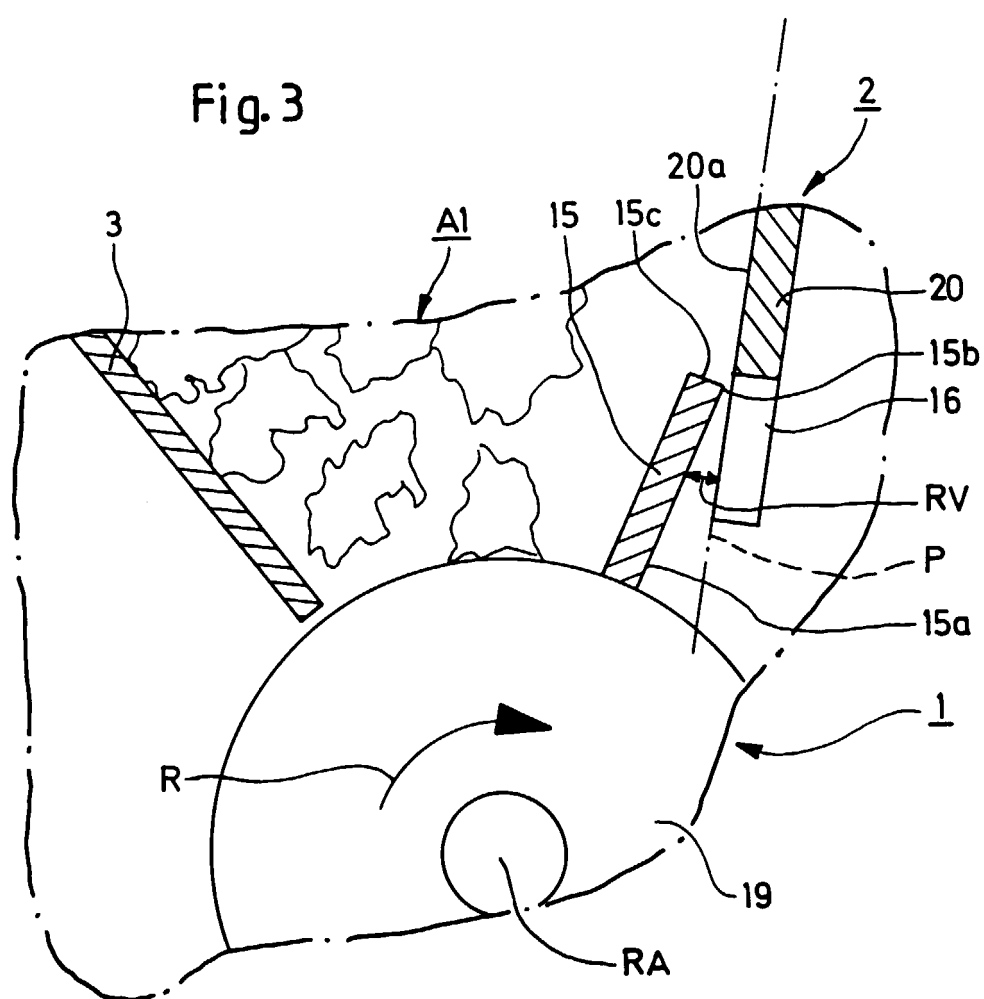


Fig. 4

