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(54) **Method and device for scissor cutting strip material**

Verfahren und Vorrichtung zum Scheren eines streifenförmigen Materials

Procédé et dispositif pour le cisaillement d'un matériau en forme de ruban

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Description

The present invention relates to a method and device for scissor cutting strip material.

Here and hereinafter, the term "scissor cutting" is intended to mean a cut made by two blades contacting each other at successive points, which contact may be made in two distinct ways depending on whether the planes of the two blades are inclined or parallel to each other.

With blades in inclined planes, scissor cutting is normally effected by "grazing" of the substantially coplanar cutting edges of the blades which are moved substantially crosswise to their planes. With blades in parallel planes, on the other hand, scissor cutting is normally effected by "penetration", the cutting edge of one blade being positioned obliquely in relation to that of the other, and the two blades being moved in relation to each other within the plane.

Both the above scissor cutting methods are used to advantage in the tobacco industry in general, and in the manufacture of cigarettes in particular to which specific reference is made in the following description purely by way of example, and wherein scissor cutting is employed, among other things, on filter assembly machines, for cutting filter-cigarette connecting bands from a continuous strip.

Connecting bands are known to be graze scissor cut from a continuous strip using the device described in US Patent n. 4,943,341 granted to the present Applicant, wherein a strip feed roller presents a number of inclined blades, the cutting edge of each of which is grazed at successive points by the cutting edge of a respective blade on another roller to cut the strip into segments.

Though highly accurate, in general, graze scissor cutting as described in the above patent requires relatively accurate assembly of the blades, adapts poorly to variations in temperature, and is subject to relatively severe wear of the cutting edges of the blades.

In an attempt to overcome the above drawbacks, British Patent Application n. 2,220,878 relates to a penetration scissor cutting device comprising a conveyor roller for feeding a continuous strip to a cutting station and in turn comprising a succession of peripheral suction sectors separated by grooves extending along respective generating lines of the roller. Each of the grooves presents a cutting edge and is gradually engaged, in the region of the cutting station, by the oblique cutting end of an outer blade positioned substantially radially on a cutting roller parallel to and rotating in the opposite direction and in time with the conveyor roller.

The above penetration scissor cutting device presents several drawbacks which are especially troublesome in the event the strip, as in the specific application referred to herein, presents an outward gummed surface facing the outer blades. In which case, each outer blade, as it penetrates inside the respective groove, draws part of the strip with it inside the groove and is inevitably soiled with gum which, despite the provision of cleaning assemblies contacting the outer blades clear of the cutting station, may result in frequent stoppage of the filter assembly machine for cleaning purposes. Moreover, deformation of the strip by the outer blade, so that part of the strip penetrates inside the groove, may result in inaccurate cutting of the strip.

It is an object of the present invention to provide a method of penetration scissor cutting a continuous strip, designed to overcome the aforementioned drawbacks.

According to the present invention, there is provided a method of scissor cutting strip material, the method comprising the steps of:

- feeding a continuous strip onto a first rotating cutting cylinder and into a cutting region in between of the first cutting cylinder and a second cutting cylinder parallel to the first cutting cylinder and rotated in synchronisation therewith, the first cutting cylinder comprising a plurality of circumferentially spaced first cutting means and transport segments therebetween for holding the strip at a peripheral surface of the first cutting cylinder; the second cutting cylinder comprising a plurality of second cutting means having second cutting edges, which are inclined in relation to an axis of rotation of the second cutting cylinder so that, in the cutting region, the successive second cutting means engage with the first cutting means, progressively and in a longitudinal direction of the first cutting means, to cut the strip into strip segments; and
- successively transporting the strip segments held by the transport segments to a conveyor;

characterised in that each first cutting means comprises a cutting blade arranged in a radially and longitudinally extending slit provided through said peripheral surface; each cutting blade having a first cutting edge and being radially movable in the relevant slit between a first position, in which said first cutting edge is inside said peripheral surface, and a second position in which said first cutting edge protrudes out of the slit and outside said peripheral surface; each cutting blade being moved so that the relevant first cutting edge protrudes outside said peripheral surface at least when the cutting blade travels through the cutting region, and is arranged inside said peripheral surface when the cutting blade travels through another region.

According to the present invention, there is also provided a device for scissor cutting strip material, the device comprising:

- a first cutting cylinder mounted for rotation about a first axis, and by which a continuous strip can be fed into a cutting region; the first cutting cylinder com-

prising a plurality of circumferentially spaced first cutting means and transport segments therebetween for holding the strip at a peripheral surface of the first cutting cylinder, said first cutting means being provided with relevant first cutting edges;

- a second cutting cylinder mounted for rotation in synchronisation with the first cutting cylinder about a second axis parallel to the first axis; the second cutting cylinder comprising a plurality of second cutting means having relevant second cutting edges which are inclined in relation to the second axis so that, in the cutting region, the successive second cutting means engage with the first cutting means, progressively and in a longitudinal direction of the first cutting means, to cut the strip into strip segments; and
- a conveyor for successively receiving the strip segments at a transfer region;

characterised in that each first cutting means comprises a cutting blade disposed in a radially and longitudinally extending slit provided through said peripheral surface; each cutting blade being radially movable in the relevant slit between a first position, in which the relevant said first cutting edge is inside said peripheral surface, and a second position in which said first cutting edge protrudes out of the slit and outside said peripheral surface; activating means being provided for moving each cutting blade so that the relevant first cutting edge protrudes outside said peripheral surface at least when the cutting blade travels through the cutting region, and is arranged inside said peripheral surface when the cutting blade travels through another region.

The invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic cross section of a preferred embodiment of the cutting device according to the present invention;

Figure 2 shows a larger-scale detail of Figure 1;

Figure 3 shows a section of a detail in Figure 2 in a plane perpendicular to the Figure 2 plane.

Numeral 1 in Figure 1 indicates a filter assembly machine comprising a device 2 for cutting and feeding a succession of bands 3 to a known conveyor roller 4 on which groups 5, comprising two cigarette portions separated by a double filter, are retained pneumatically in known manner inside respective seats 6 parallel to the generating lines of roller 4. Roller 4 feeds groups 5 transversely through a transfer station 7 where bands 3 are applied by device 2 to the outer periphery of respective groups 5.

Device 2 comprises a feed unit 8 in turn comprising a conveyor roller 9 for receiving a strip 10 of sheet material with a gummed surface 10a opposite the surface contacting roller 9, and for feeding strip 10 through a cutting station 11 where it is cut into bands 3 by a cutting unit 12 forming part of device 2.

Roller 9 is rotated clockwise (in Figure 1) by known drive means (not shown) about a substantially horizontal axis 13 perpendicular to the Figure 1 plane, and presents a cylindrical outer surface 14 tangent to conveyor roller 4 at transfer station 7. Roller 9 is a tubular roller defined by a succession of suction segments or sectors 15 equally spaced about axis 13 and each separated from the adjacent sector 15 by a radial axial slit 16. Sectors 15 are connected to one another by end plates 15a (Figure 3), and each presents a number of through axial suction channels 17, each of which communicates on one side with a known suction device (not shown) and on the other with a number of holes 18 extending radially through sector 15 and communicating externally through surface 14.

Cutting unit 12 comprises two rollers 19 and 20 fitted to respective drive shafts 21 and 22 rotating, the first in the opposite direction and the second in the same direction as roller 9, about respective axes 23 and 24 parallel to axis 13.

Roller 19 presents a number of substantially radial appendixes 25 equal in number to slits 16, equally spaced about axis 23, and each fitted by means of a respective screw 26 with a respective blade 27 (hereinafter referred to as the "outer blade") lying in a plane parallel to axis 23 and presenting a cutting edge 28 on its free end. Each edge 28 is oblique in relation to axis 23, and presents a tip 29 facing surface 14 of roller 9 and traveling along a circular path interfering with surface 14 at cutting station 11.

Roller 20 is a cylindrical roller housed inside roller 9 and which presents a number of substantially radial blades 30 (hereinafter referred to as "inner blades") equally spaced about axis 24 and fitted to the periphery of roller 20 by means of respective fastening devices 31. Inner blades 30 are equal in number to slits 16, and each engages a respective slit 16 in radially-sliding transversely-slack manner.

As shown particularly in Figure 2, each inner blade 30 presents a free end portion 32 in turn presenting an axial groove 33 on the side facing upstream in the rotation direction of roller 20. On the side facing roller 19, portion 32 is also defined by a surface 34 sloping inwards and downstream in relation to a plane tangent to surface 14 and moving with inner blade 30. Groove 33 is defined by a first surface 35 crosswise to respective inner blade 30, and by a second surface 36 extending outwards from surface 35 and obliquely in relation to the mid radial plane of respective inner blade 30, and which intersects surface 34 along an edge parallel to axis 13 and constituting the cutting edge 37 of inner blade 30.

Axis 24 of roller 20 is eccentric in relation to axis 13, and lies within a sector having its apex at axis 13 and subtended by an arc extending between stations 11 and

7; and the diameter of roller 20 is such that the outer surface 38 of roller 20 is substantially tangent to the cylindrical inner surface 39 of roller 9 inside said sector. Moreover, inner blades 30 project outwards of surface 38 by a length greater than the distance between surfaces 38 and 14, and at most equal to the sum of this distance and the difference between the diameters of surfaces 38 and 39, so that, when rollers 9 and 20 are rotated at the same speed about respective axes 13 and 24, inner blades 30 move through roller 9 and to and from an extracted position which is assumed at least at said sector and wherein edge 37 of each inner blade 30 projects outwards of surface 14.

In actual use, rollers 9 and 20 on one side and roller 19 on the other are rotated in opposite directions, at the same speed, and in time with one another about respective axes 13, 24 and 23, so that each outer blade 27 laterally contacts a respective inner blade 30 at cutting station 11. Strip 10 is fed in known manner on to surface 14 and, due to the eccentricity of axis 24 in relation to axis 13, the inner blade 30 approaching station 11 begins to project outwards of surface 14 before reaching station 11, thus detaching strip 10 from surface 14. At the same time, the oblique cutting edge 28 of the corresponding outer blade 27 contacts successive points of the cutting edge 37 of inner blade 30 and penetrates gradually inside groove 33 to scissor cut strip 10 transversely. The connecting bands 3 so formed are fed successively to station 7 where they are applied by their gummed surfaces 10a to the periphery of respective groups 5.

In connection with the above, it should be pointed out that, by gradually projecting outwards of surface 14, each inner blade 30 constitutes an inner support for strip 10, for preventing strip 10 from folding inwards of slit 16 during the cutting operation, and so ensuring a precise cut, while at the same time preventing outer blade 27, with the exception of cutting edge 28, from contacting gummed surface 10a, thus substantially eliminating fouling of blade 27 by the gum during the cutting operation.

Claims

1. A method of scissor cutting strip material, the method comprising the steps of:

   - feeding a continuous strip (10) onto a first rotating cutting cylinder (9) and into a cutting region (11) in between of the first cutting cylinder (9) and a second cutting cylinder (12) parallel to the first cutting cylinder (9) and rotated in synchronisation therewith, the first cutting cylinder (9) comprising a plurality of circumferentially spaced first cutting means (30) and transport segments (15) therebetween for holding the strip (10) at a peripheral surface (14) of the first cutting cylinder (9); the second cutting cylinder (12) comprising a plurality of second cutting means (27) having second cutting edges (28), which are inclined in relation to an axis (23) of rotation of the second cutting cylinder (12) so that, in the cutting region (11), the successive second cutting means (27) engage with the first cutting means (30), progressively and in a longitudinal direction of the first cutting means (30), to cut the strip (10) into strip segments (3); and
   - successively transporting the strip segments (3) held by the transport segments (15) to a conveyor (4);

   characterised in that each first cutting means (30) comprises a cutting blade (30) arranged in a radially and longitudinally extending slit (16) provided through said peripheral surface (14); each cutting blade (30) having a first cutting edge (37) and being radially movable in the relevant slit (16) between a first position, in which said first cutting edge (37) is inside said peripheral surface (14), and a second position in which said first cutting edge (37) protrudes out of the slit (16) and outside said peripheral surface (14); each cutting blade (30) being moved so that the relevant first cutting edge (37) protrudes outside said peripheral surface (14) at least when the cutting blade (30) travels through the cutting region (11), and is arranged inside said peripheral surface (14) when the cutting blade (30) travels through another region.

2. A device for scissor cutting strip material, the device comprising:

   - a first cutting cylinder (9) mounted for rotation about a first axis (13), and by which a continuous strip (10) can be fed into a cutting region (11); the first cutting cylinder (9) comprising a plurality of circumferentially spaced first cutting means (30) and transport segments (15) therebetween for holding the strip (10) at a peripheral surface (14) of the first cutting cylinder (9), said first cutting means (30) being provided with relevant first cutting edges (37);
   - a second cutting cylinder (12) mounted for rotation in synchronisation with the first cutting cylinder (9) about a second axis (23) parallel to the first axis (13); the second cutting cylinder (12) comprising a plurality of second cutting means (27) having relevant second cutting edges (28) which are inclined in relation to the second axis (23) so that, in the cutting region (11), the successive second cutting means (27) engage with the first cutting means (30), progressively and in a longitudinal direction of the first cutting means (30), to cut the strip (10) into

strip segments (3); and

- a conveyor (4) for successively receiving the strip segments (3) at a transfer region (7);

characterised in that each first cutting means (30) comprises a cutting blade (30) disposed in a radially and longitudinally extending slit (16) provided through said peripheral surface (14); each cutting blade (30) being radially movable in the relevant slit (16) between a first position, in which the relevant said first cutting edge (37) is inside said peripheral surface (14), and a second position in which said first cutting edge (37) protrudes out of the slit (16) and outside said peripheral surface (14); activating means (20) being provided for moving each cutting blade (30) so that the relevant first cutting edge (37) protrudes outside said peripheral surface (14) at least when the cutting blade (30) travels through the cutting region (11), and is arranged inside said peripheral surface (14) when the cutting blade (30) travels through another region.

3. A device as claimed in Claim 2, characterised in that said first cutting cylinder (9) comprises a tubular roller (9) having a cylindrical inner surface (39) and mounted for rotation at a given angular speed about said first axis (13); said peripheral surface (14) being a cylindrical outer surface (14) of said tubular roller (9) and being provided with said slits (16); said cutting blades (30) being mounted, together with said activating means (20), inside the tubular roller (9); and each cutting blade (30) engaging the respective said slit (16) in a radially sliding manner.

4. A device as claimed in Claim 3, characterised in that said activating means (20) comprise an inner roller (20) having a cylindrical outer surface (38) and mounted eccentrically inside the tubular roller (9) so as to rotate at said angular speed about a third axis (24) parallel to the first axis (13); the inner roller (20) having a diameter smaller than a diameter of said cylindrical inner surface (39).

5. A device as claimed in Claim 4, characterised in that the third axis (24) lies within a sector having its apex at the first axis (13) and subtended by an arc through said cutting and transfer regions (11, 7); the inner roller (20) having a diameter such that its cylindrical outer surface (38) is substantially tangent to the cylindrical inner surface (39) of the tubular roller (9) within said sector.

6. A device as claimed in Claim 5, characterised in that each cutting blade (30) projects radially outwards from the inner roller (20); each cutting blade (30) projecting outwards of the cylindrical outer surface (38) of the inner roller (20) by a length greater than the distance between the cylindrical inner and outer surfaces (39, 14) of the tubular roller (9), and at most equal to the sum of this distance and the difference between the diameters of the inner surface (39) of the tubular roller (9) and the outer surface (38) of the inner roller (20).

7. A device as claimed in Claim 6, characterised in that each said first cutting edge (37) is parallel to said third axis (24).

8. A device as claimed in Claim 7, characterised in that each second cutting means (27) comprises an outer blade (27) moving about said second axis (23); said first and second axes (13, 23) being located on either side of the cutting region (11).

Patentansprüche

1. Verfahren zum Scheren eines streifenförmigen Materials, umfassend die folgenden Schritte:

- Zuführung eines zusammenhängenden Streifens auf einem ersten sich drehenden Schneidzylinder (9) zu einem Schneidbereich (11) zwischen dem ersten Schneidzylinder (9) und einem zweiten Schneidzylinder (12), der parallel zum ersten Schneidzylinder (9) angeordnet und synchron zu diesem gedreht wird, wobei der erste Schneidzylinder (9) eine Anzahl von peripher beabstandeten ersten Schneidmitteln (30) sowie Transportabschnitten (15) zwischen diesen zum Festhalten des Streifens (10) auf der peripheren Fläche (14) des ersten Schneidzylinders (9) aufweist; und der zweite Schneidzylinder (12) eine Anzahl von zweiten Schneidmitteln (27) mit zweiten Schneidkanten (28) aufweist, welche in bezug zu einer Drehachse (23) des zweiten Schneidzylinders (12) so abgewinkelt sind, daß im Schneidbereich (11) die nachfolgenden zweiten Schneidmittel (27) fortschreitend und in Längsrichtung der ersten Schneidmittel (30) mit diesen zusammenwirken, um den Streifen (10) in Streifensegmente (3) zu schneiden; und
- nachfolgendes Transportieren der Streifensegmente (3), die von den Transportsegmenten (15) gehalten werden, zu einem Förderer (4);

dadurch gekennzeichnet, daß jedes erste Schneidmittel (30) eine Schneidklinge (30) umfaßt, die in einem sich radial und längs in der peripheren Fläche (14) erstreckenden Schlitz (16) angeordnet ist; wobei jede Schneidklinge (30) eine erste Schneidkante (37) besitzt und radial in dem zugehörigen Schlitz (16) zwischen einer ersten Position, in welcher die erste Schneidkante (37) sich inner-

halb der peripheren Fläche (14) befindet, und einer zweiten Position, in welcher die erste Schneidkante (37) aus dem Schlitz (16) hervorragt und sich außerhalb der peripheren Fläche (14) befindet, bewegbar ist, und jede Schneidklinge (30) so bewegt wird, daß die erste zugehörige Schneidkante (37) zumindest dann aus der peripheren Fläche (14) vorsteht, wenn die Schneidklinge (30) sich durch den Schneidbereich (11) bewegt, und innerhalb der peripheren Fläche (14) angeordnet ist, wenn die Schneidklinge (30) sich durch einen anderen Bereich bewegt.

2. Vorrichtung zum Scheren von streifenförmigen Material, welche umfaßt:

- einen ersten Schneidzylinder (9), welcher um eine erste Achse (13) drehbar angeordnet ist, und durch welchen ein zusammenhängender Streifen in einen Schneidbereich (11) zugeführt wird; und der erste Schneidzylinder (9) eine Anzahl von peripher beabstandeten ersten Schneidmitteln (30) und Transportsegmenten (15) zwischen diesen zum Festhalten des Streifens (10) an einer peripheren Fläche (14) des ersten Schneidzylinders (9) aufweist, und die ersten Schneidmittel (30) mit entsprechenden ersten Schneidkanten (37) versehen sind;
- einen zweiten Schneidzylinder (12), der zum ersten Schneidzylinder (9) um eine zweite Achse (23), die parallel zur ersten Achse (13) liegt, synchron drehbar angeordnet ist, und der zweite Schneidzylinder (12) eine Anzahl von zweiten Schneidmitteln (27) aufweist, die entsprechende zweite Schneidkanten (28) aufweisen, die in bezug zur zweiten Achse (23) so abgewinkelt sind, daß im Schneidbereich (11) die nachfolgenden zweiten Schneidmittel (27) mit den ersten Schneidmitteln (30) fortschreitend und in Längsrichtung der ersten Schneidmittel (30) zusammenwirken, um den Streifen (10) in Streifensegmente (3) zu schneiden; sowie
- einen Förderer (4) zur fortfolgenden Abnahme der Streifensegmente (3) in einem Überleitungsbereich (7); **dadurch gekennzeichnet, daß** jedes erste Schneidmittel (30) eine Schneidklinge (30) umfaßt, die in einem sich radial und längs in der peripheren Fläche (14) erstreckenden Schlitz (16) angeordnet ist; wobei jede Schneidklinge (30) in dem betreffenden Schlitz (16) zwischen einer ersten Position, in welcher die betreffende erste Schneidkante (37) sich innerhalb der peripheren Fläche (14) befindet, und einer zweiten Position, in welcher die erste Schneidkante (37) aus dem Schlitz (16) vorsteht und sich außerhalb der peripheren Fläche (14) befindet, bewegbar ist; und eine Antriebseinrichtung (20), die zur Bewegung jeder Schneidklinge (30) vorgesehen ist, so daß die betreffende erste Schneidkante (37) aus der peripheren Fläche (14) zumindest dann nach außen vorsteht, wenn die Schneidklinge (30) sich durch den Schneidbereich (11) bewegt, und innerhalb der peripheren Fläche (14) angeordnet ist, wenn sich die Schneidklinge (30) durch einen anderen Bereich bewegt.

3. Vorrichtung nach Anspruch 2, **dadurch gekennzeichnet, daß** der erste Schneidzylinder (9) eine rohrförmige Rolle (9) mit einer zylindrischen Innenfläche (39) umfaßt und zwecks Drehung mit einer vorgegebenen Winkelgeschwindigkeit um eine erste Achse (13) angeordnet ist; wobei die periphere Fläche (14) eine zylindrische Außenfläche (14) der rohrförmigen Rolle (9) ist und mit Schlitzen (16) versehen ist; und die Schneidklingen (30) zusammen mit der Antriebseinrichtung (20) innerhalb der rohrförmigen Rolle (9) angeordnet sind; und jede Schneidklinge (30) in dem entsprechenden Schlitz (16) in einer radial gleitenden Weise geführt ist.

4. Vorrichtung nach Anspruch 3, **dadurch gekennzeichnet, daß** die Antriebseinrichtung (20) eine innere Rolle (20) mit einer zylindrischen Außenfläche (38) umfaßt und innerhalb der rohrförmigen Rolle (9) so angeordnet ist, daß sie sich mit der bestimmten Winkelgeschwindigkeit um eine dritte Achse (24), die parallel zur ersten Achse (13) angeordnet ist, dreht; wobei die innere Rolle (20) einen Durchmesser aufweist, der kleiner ist als der Durchmesser der zylindrischen Innenfläche (39).

5. Vorrichtung nach Anspruch 4, **dadurch gekennzeichnet, daß** die dritte Achse (24) innerhalb eines Abschnittes liegt, dessen Scheitelpunkt sich auf der ersten Achse (13) befindet, und der einem durch den Schneid- und Überleitungsbereich (11, 7) führenden Freisbogen gegenüberliegt; wobei die innere Rolle (20) einen solchen Durchmesser aufweist, daß deren zylindrische Außenfläche (38) im wesentlichen tangential zu der zylindrischen Innenfläche (39) der rohrförmigen Rolle (9) innerhalb des Abschnittes liegt.

6. Vorrichtung nach Anspruch 5, **dadurch gekennzeichnet, daß** jede Schneidklinge (30) von der inneren Rolle (20) radial nach außen vorsteht; wobei jede Schneidklinge (30) von der zylindrischen Außenfläche (38) der inneren Rolle (20) mit einer Länge, die größer ist als der Abstand zwischen der zylindrischen Innen- und Außenfläche

(39, 14) der rohrförmigen Rolle (9), und die im Höchstfall der Summe dieses Abstandes und der Differenz zwischen den Durchmessern der Innenfläche (39) der rohrförmigen Rolle (9) und der Außenfläche (38) der inneren Rolle (20) gleich ist, nach außen vorsteht.

7. Vorrichtung nach Anspruch 6, **dadurch gekennzeichnet, daß** jede erste Schneidkante (37) parallel zur dritten Achse (24) liegt.

8. Vorrichtung nach Anspruch 7, **dadurch gekennzeichnet, daß** jedes zweite Schneidmittel (27) eine äußere Klinge (27), die sich um die zweite Achse (23) dreht, umfaßt; wobei die erste und die zweite Achse (13, 23) zu beiden Seiten des Schneidbereiches (11) angeordnet sind.

Revendications

1. Un procédé de cisaillement d'un matériau en forme de ruban, le procédé comprenant les étapes consistant à :

   - fournir un ruban continu (10), sur un premier cylindre de coupe rotatif (9) et dans une zone de coupe (11) située entre le premier cylindre de coupe (9) et un deuxième cylindre de coupe (12), parallèlement au premier cylindre de coupe (9) et entraîné en rotation en synchronisme avec lui, le premier cylindre de coupe (9) comprenant une pluralité de premiers moyens de coupe (30) espacés circonférentiellement et de segments de transport (15) disposés entre eux, pour maintenir le ruban (10) sur une surface périphérique (14) du premier cylindre de coupe (9); le deuxième cylindre de coupe (12) comprenant une pluralité de deuxièmes moyens de coupe (27) ayant des deuxièmes bords de coupe (28), qui sont inclinés en relation vis-à-vis d'un axe de rotation (23) du deuxième cylindre de coupe (12), de manière que, dans la zone de coupe (11), les deuxièmes moyens de coupe (27) successifs viennent en prise avec les premiers moyens de coupe (30), progressivement et en direction longitudinale des premiers moyens de coupe (30), afin de couper le ruban (10) en des segments de ruban (3); et successivement, transporter les segments de ruban (3) maintenus par les segments de transport (15) sur un transporteur (14);
     caractérisé en ce que chaque premier moyen de coupe (30) comprend une lame de coupe (30), agencée dans une fente (16) s'étendant radialement et longitudinalement, ménagée à travers ladite surface périphérique (14) ; chaque lame de coupe (30) comportant un premier bord de coupe (37) et étant déplaçable radialement dans la fente (16) concernée, entre une première position, dans laquelle ledit premier bord de coupe (37) est à l'intérieur de ladite surface périphérique (14), et une deuxième position, dans laquelle ledit premier bord de coupe (37) fait saillie hors de la fente (16) et à l'extérieur de ladite surface périphérique (14); chaque lame de coupe (30) étant déplacée de manière que le premier bord de coupe (37) concerné fasse saillie hors de ladite surface périphérique (14), au moins lorsque la lame de coupe (30) se déplace dans ladite zone de coupe (11), et soit disposé à l'intérieur de ladite surface périphérique (14), lorsque la lame de coupe (30) se déplace dans une autre zone.

2. Un dispositif de cisaillement d'un matériau en forme de ruban, le dispositif comprenant :

   - un premier cylindre de coupe (9), monté à rotation sur un premier axe (13) et au moyen duquel un ruban continu (10) peut être fourni dans une zone de coupe (11); le premier cylindre de coupe (9) comprenant une pluralité de premiers moyens de coupe (30) espacés circonférentiellement et de segments de transport (15) disposés entre eux, pour maintenir le ruban (10) sur une surface périphérique (14) du premier cylindre de coupe (9); lesdits premiers moyens de coupe (30) étant pourvus de premiers bords de coupe (37) afférents;
   - un deuxième cylindre de coupe (12), monté à rotation en synchronisme avec le premier cylindre de coupe (9), autour d'un deuxième axe (23) parallèle au premier axe (13); le deuxième cylindre de coupe (12) comprenant une pluralité de deuxièmes moyens de coupe (27) ayant des deuxièmes bords de coupe (28) afférents, qui sont inclinés en, relation vis-à-vis du deuxième axe (23), de manière que, dans la zone de coupe (11), les deuxièmes moyens de coupe (27) successifs viennent en prise avec les premiers moyens de coupe (30), progressivement et en direction longitudinale des premiers moyens de coupe (30), afin de couper le ruban (10) en des segments de ruban (3); et
   - un transporteur (4) destiné à recevoir successivement les segments de ruban (3) en une zone de transfert (7);
     caractérisé en ce que chaque premier moyen de coupe (30) comprend une lame de coupe (30), agencée dans une fente (16) s'étendant radialement et longitudinalement, ménagée à travers ladite surface périphérique (14), chaque lame de coupe (30) étant déplaçable radialement dans la fente (16) concernée, entre une première position, dans laquelle ledit premier

bord de coupe (37) est à l'intérieur de ladite surface périphérique (14), et une deuxième position, dans laquelle ledit premier bord de coupe (37) fait saillie hors de la fente (16) et à l'extérieur de ladite surface périphérique (14); des moyens d'activation (20) étant prévus pour déplacer chaque lame de coupe (30) de manière que le premier bord de coupe (37) concerné fasse saillie hors de ladite surface périphérique (14), au moins lorsque la lame de coupe (30) se déplace dans la zone de coupe (11), et soit disposé à l'intérieur de ladite surface périphérique (14), lorsque la lame de coupe (30) se déplace dans une autre zone.

3. Un dispositif selon la revendication 2, caractérisé en ce que ledit premier cylindre de coupe (9) comprend un rouleau tubulaire (9) ayant une surface intérieure cylindrique (39) et étant monté à rotation à une vitesse angulaire donnée autour dudit premier axe (13); ladite surface périphérique (14) étant une surface extérieure (14) cylindrique dudit rouleau tubulaire (9) et étant doté desdites fentes (16); lesdites lames de coupe (30) étant montées, conjointement avec lesdits moyens d'activation (20), à l'intérieur du rouleau tubulaire (9); et chaque lame de coupe (30) venant en prise avec ladite fente (16) respective, d'une manière faisant intervenir un coulissement radial.

4. Un dispositif selon la revendication 3, caractérisé en ce que lesdits moyens d'activation (20) comprennent un rouleau intérieur (20), ayant une surface extérieure (38) cylindrique et montés de façon excentrée à l'intérieur du rouleau tubulaire (9), de manière à tourner à ladite vitesse angulaire autour d'un troisième axe (24), parallèle au premier axe (13); le rouleau intérieur (20) ayant un diamètre inférieur au diamètre de ladite surface intérieure (39) cylindrique.

5. Un dispositif selon la revendication 4, caractérisé en ce que le troisième axe (24) est situé dans un secteur ayant son sommet sur le premier axe (13) et sous-tendu par un arc passant par lesdites zones de coupe et de transfert (11, 7); le rouleau intérieur (20) ayant un diamètre tel que sa surface extérieure (38) cylindrique soit sensiblement tangente à la surface intérieure (39) cylindrique du rouleau tubulaire (9) à l'intérieur dudit secteur.

6. Un dispositif selon la revendication 5, caractérisé en ce que chaque lame de coupe (30) fait saillie radialement à l'extérieur du rouleau intérieur (20); chaque lame de coupe (30) faisant saillie à l'extérieur de la surface extérieure (38) cylindrique du rouleau intérieur (20), d'une longueur supérieure à la distance qu'il y a entre les surfaces intérieure et extérieure (39, 14) cylindriques du rouleau tubulaire (9), et au moins égale à la somme de cette distance et de la différence entre les diamètres de la surface intérieure (39) du rouleau tubulaire (9) et la surface extérieure (38) du rouleau intérieur (20).

7. Un dispositif selon la revendication 6, caractérisé en ce que chaque dit premier bord de coupe (37) est parallèle audit troisième axe (24).

8. Un dispositif selon la revendication 7, caractérisé en ce que chaque deuxièmes moyens de coupe (27) comprennent une lame extérieure (27) se déplaçant autour dudit deuxième axe (23); lesdits premier et deuxième axes (13, 23) étant situés de chaque côté de la zone de coupe (11).

Fig.1

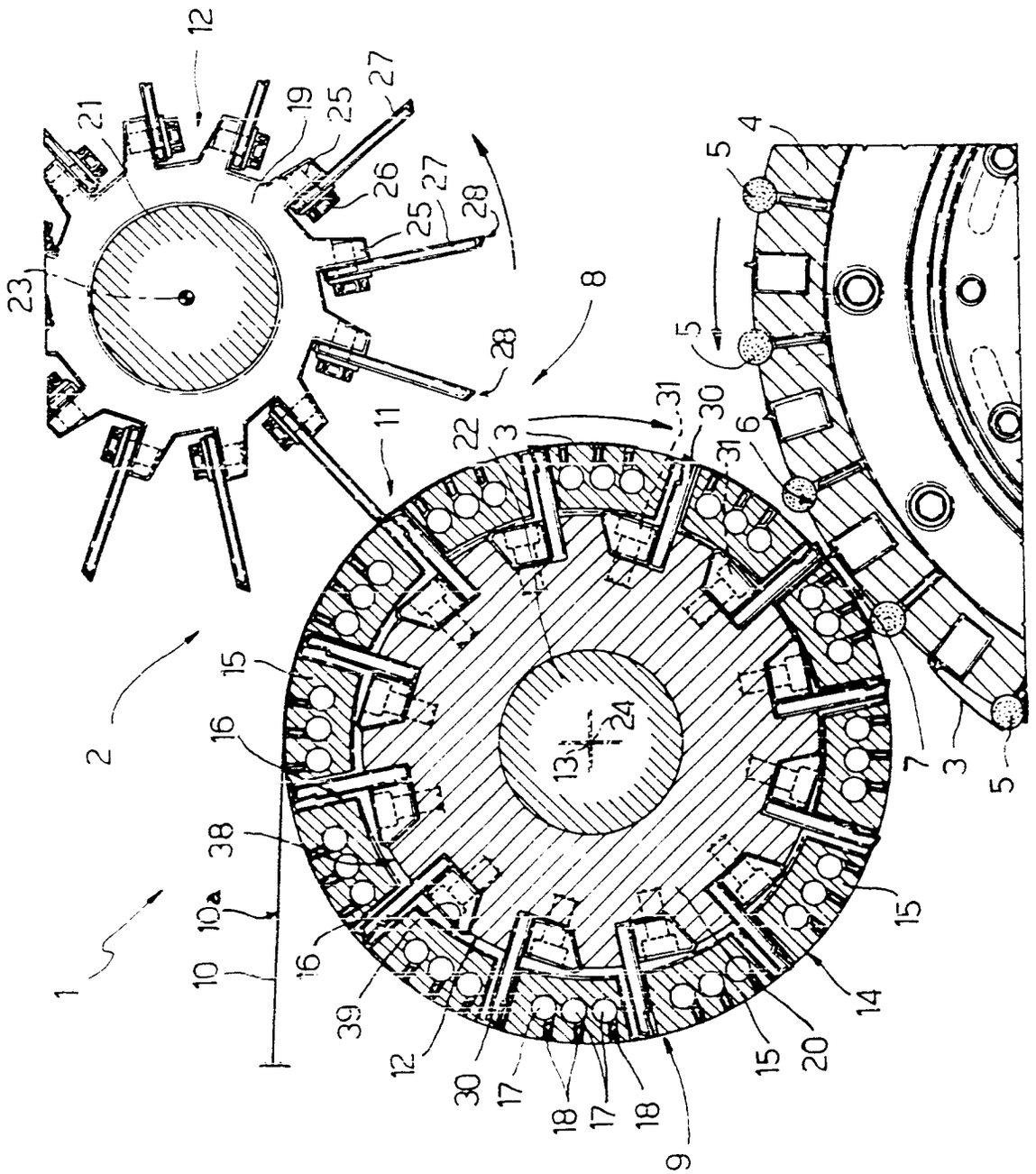
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Fig. 3

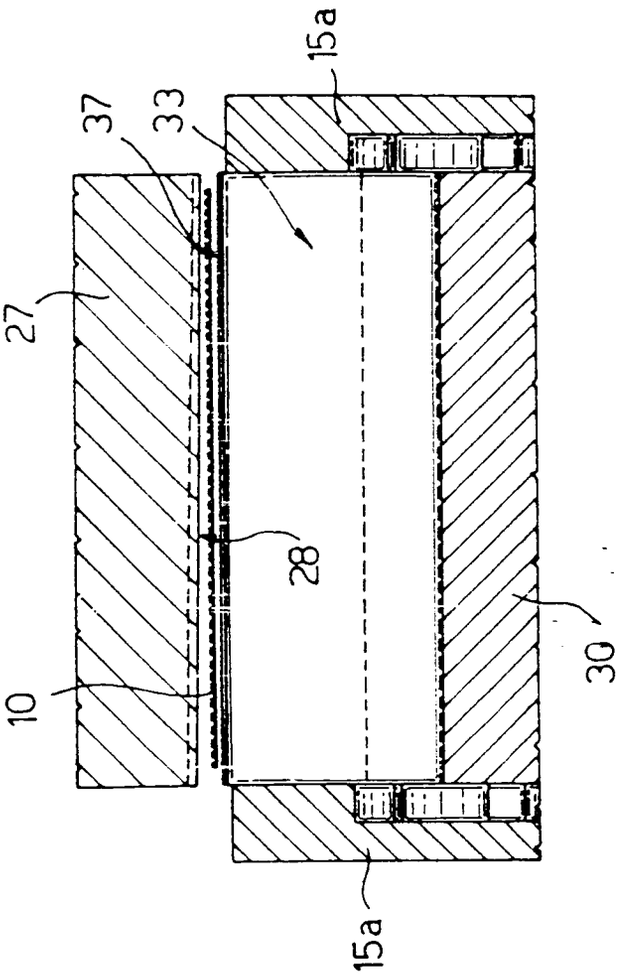
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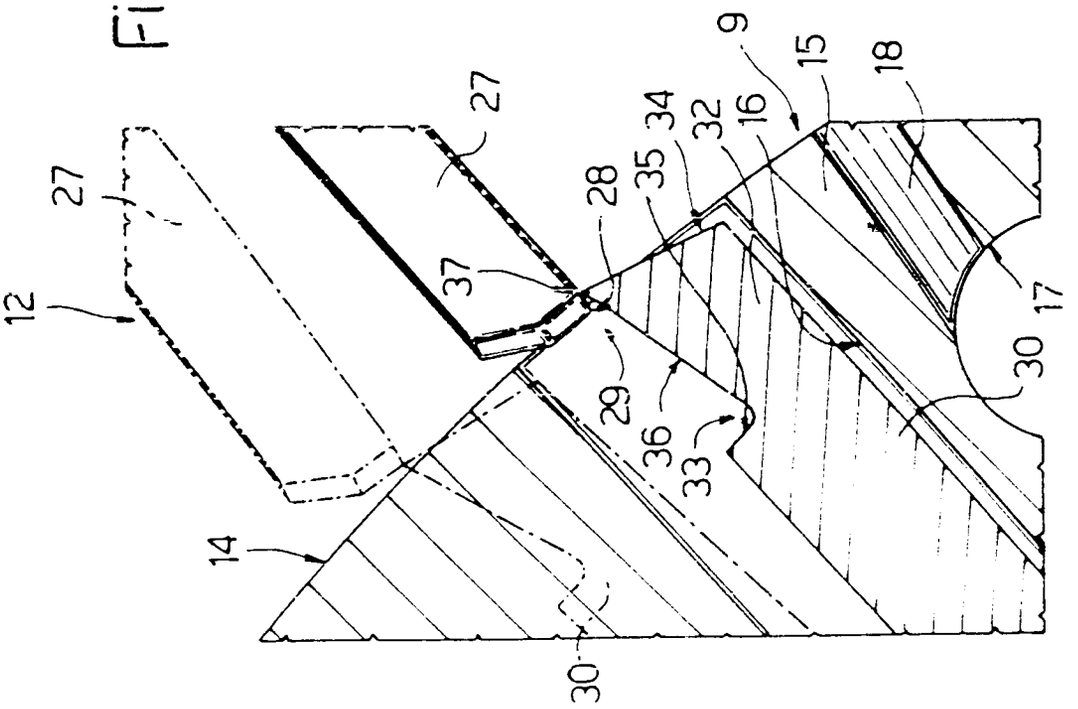
Fig. 2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