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(54) Method and unit for fringing sheet wrapping material

(57) A method and unit (1) for longitudinally fringing a strip (2) of wrapping material, wherein the strip (2) is step-fed through a fringing device (10), and, at each stop, the portion (2b) of the strip (2) at the fringing device (10) is gripped between two jaws (14, 15) defining at least one comb (32), which extends along a longitudinal edge (2a) of the strip (2) and is engaged by a series of blades (38) arranged combfashion along a fringing roller (36).

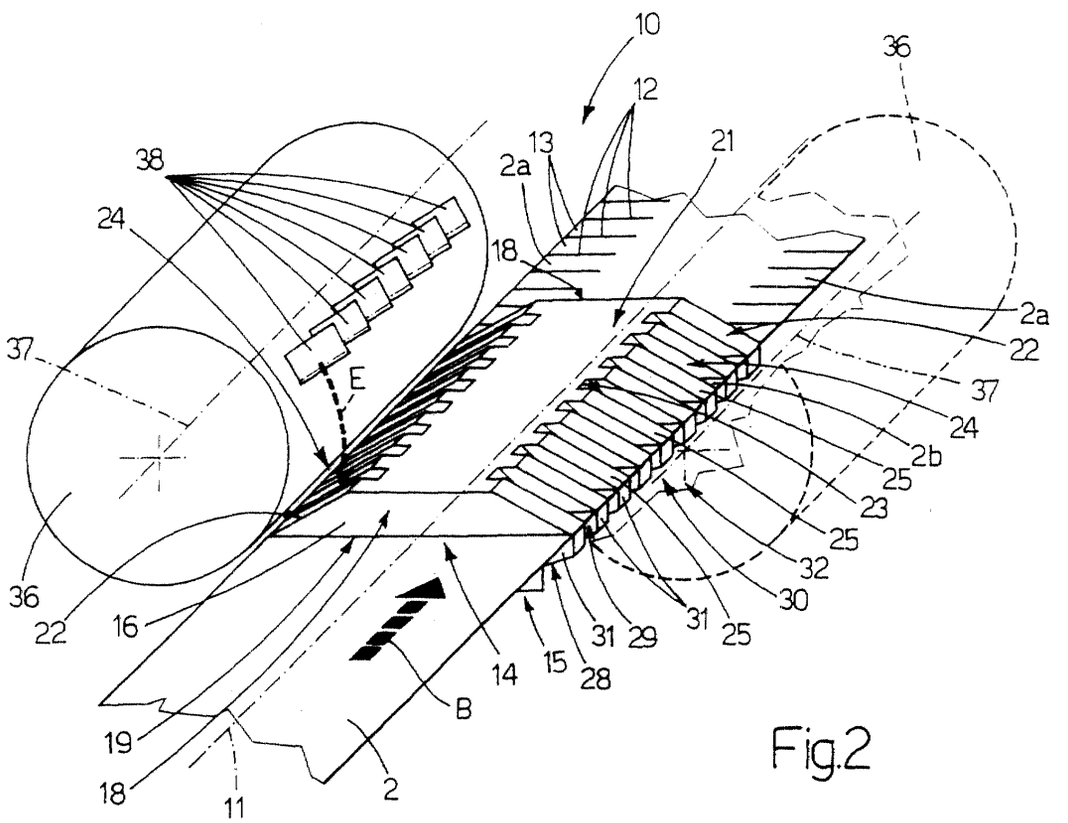

Fig.2

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Description

[0001] The present invention relates to a method of fringing sheet wrapping material.

[0002] More specifically, the present invention relates to a method of fringing sheets of wrapping material for sweets, chocolates or similar, or at least one longitudinal edge of a continuous strip subsequently cut transversely into sheets of wrapping material.

[0003] In one known method, the strip, from which the sheets of wrapping material are formed, is fed continuously by a feed unit in a given traveling direction, and is fringed continuously, by a fringing device, along the opposite longitudinal edges parallel to the traveling direction. The fringing device makes, along the longitudinal edges, a succession of cuts crosswise to the traveling direction by means of two parallel, counter-rotating rollers located on opposite sides of the strip, and which, given the continuous travel of the strip or sheets of wrapping material, are necessarily mounted for rotation about respective axes. The rollers are cutting rollers with radial blades, which travel along circular trajectories in planes perpendicular to the traveling direction.

[0004] One drawback of the above method lies in the sheet or strip of wrapping material from the fringing device having a tendency to cling to the periphery of the cutting roller, thus deviating from its normal path and possibly jamming the feed unit. Not being supported or retained, the strip is also subject to tearing to the extent of it being unusable.

[0005] It is an object of the present invention to provide a method of fringing sheet wrapping material, designed to eliminate the aforementioned drawbacks in a relatively straightforward, low-cost manner.

[0006] According to the present invention, there is provided a method of fringing sheet wrapping material, the method comprising the steps of step-feeding said sheet wrapping material in a given traveling direction and in feed steps of a given length through a fringing device, said sheet wrapping material having two longitudinal edges and making a succession of stops in the course of its travel; and making in the stationary sheet wrapping material a number of transverse cuts through at least one portion of at least one said longitudinal edge by means of blades moving along respective trajectories crosswise to said traveling direction.

[0007] The present invention also relates to a unit for fringing sheet wrapping material.

[0008] According to the present invention, there is provided a unit for fringing sheet wrapping material, said unit comprising a fringing device, and feed means for step-feeding said sheet wrapping material in a given traveling direction and in feed steps of a given length through said fringing device; and the fringing device comprising a number of blades movable along respective trajectories extending crosswise to said traveling direction to make a succession of transverse cuts along at least one portion of at least one longitudinal edge of the sheet wrapping material.

[0009] A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows schematically, and partly in block form with enlarged details, a preferred embodiment of the fringing unit according to the present invention;

Figure 2 shows a view in perspective, with parts removed for clarity, of a detail in Figure 1;

Figure 3 shows an enlarged front view of the Figure 2 detail;

Figure 4 shows a view in perspective of a variation of a detail in Figure 2.

[0010] Number 1 in Figure 1 indicates as a whole a unit for fringing a continuous strip 2 step-fed to a user device 3 - in the example shown, a device for wrapping sweets or chocolates.

[0011] Unit 1 comprises a support 4 for a reel 5, from which strip 2 is unwound continuously by rotating support 4 continuously by means of a motor 6. Strip 2 is fed to user device 3 along a path P extending through a path-change device 7, which forms part of unit 1 and converts the continuous feed of strip 2 into step feed by cyclically varying a length of path P.

[0012] For which purpose, path-change device 7 comprises, in known manner, a transmission roller 8 mounted to rotate about an axis 9, and which translates back and forth in a direction crosswise to axis 9. More specifically, when roller 8 is moved in the direction of arrow A', path P of strip 2 is lengthened to take up the incoming strip 2 and so temporarily stop the portion of strip 2 extending downstream from roller 8; and, when roller 8 is moved in the direction of arrow A'' opposite arrow A', path P of strip 2 is shortened to feed strip 2 forward one step.

[0013] Unit 1 also comprises a fringing device 10 interposed between path-change device 7 and user device 3 along path P of strip 2. With reference to Figure 2, strip 2 has a longitudinal axis 11 and is step-fed to fringing device 10 in a traveling direction B parallel to axis 11. Fringing device 10 makes in strip 2 - more specifically, in each of the two longitudinal edges 2a of strip 2 on either side of axis 11 and parallel to direction B - a succession of cuts 12 crosswise to axis 11 and defining a succession of fringes 13.

[0014] With reference to Figures 2 and 3, fringing device 10 comprises two rigid, opposite, facing jaws 14 and 15, of which, jaw 14 is fixed, and jaw 15 is movable to and from jaw 14 in a direction C perpendicular to the traveling direction B of strip 2 to grip a portion 2b of strip 2 - in particular, along each longitudinal edge 2a - at each feed step of strip 2.

[0015] Jaw 14 comprises an elongated rectangular plate 16 with a longitudinal axis parallel to direction B and a substantially trapezoidal cross section. Plate 16

is connected at the top to a fixed rod 17, and is defined axially by two surfaces 18 perpendicular to direction B and each in the form of an isosceles trapezium. Plate 16 is also defined at the bottom by a flat surface 19 facing jaw 15, perpendicular to surfaces 18 and preferably coated with a layer 20 of resilient material, and at the top by a surface comprising a flat central portion 21 parallel to surface 19, and two sloping lateral portions 22 located on opposite sides of central portion 21 and connecting central portion 21 to surface 19.

[0016] Along each of its opposite longitudinal edges, plate 16 comprises a succession of transverse slots 23, which extend through plate 16 to a length substantially equal to the width of lateral portions 22, and define a comb 24 comprising a succession of transverse teeth 25.

[0017] Jaw 15 comprises a frame 26 located beneath jaw 14 and moved to and from jaw 14 in direction C, perpendicular to surface 19, by a known actuating device 27; and two sectors 28 fitted to frame 26 on opposite sides of axis 11.

[0018] Each sector 28 extends longitudinally in direction B, and comprises a succession of transverse slots 29, each located at a respective slot 23. Slots 29 extend through relative sector 28 to a length substantially equal to that of slots 23, and define a comb 30 comprising a number of teeth 31 located directly beneath respective teeth 25, and which in turn defines a composite comb 32 together with relative comb 24 when jaw 15 is set to a work position gripping strip 2 with jaw 14.

[0019] Each sector 28 is hinged to frame 26 by a pin 33 parallel to traveling direction B, so as to rotate with respect to frame 26 in opposition to elastic means defined by a helical shock-absorbing spring 34 interposed between relative sector 28 and frame 26 and housed inside a seat 35 formed partly in relative sector 28 and partly in frame 26.

[0020] Fringing device 10 also comprises two fringing rollers 36 located on opposite sides of plate 16. Each roller 36 is mounted to rotate about a respective longitudinal axis 37 parallel to traveling direction B, and has a number of substantially radial blades 38 equally spaced along a generating line of roller 36.

[0021] Each roller 36 is located beside a respective lateral portion 22 of the top surface of plate 16, and is so mounted that, as it rotates in the direction of arrow D, each blade 38 travels along a trajectory E crosswise to traveling direction B and downwards through relative comb 32, i.e. first through relative slot 23 and then through relative slot 29 towards jaw 15 and with no interference.

[0022] In actual use, strip 2 is fed continuously off reel 5, and is detoured and step-fed by path-change device 7 in traveling direction B to fringing device 10.

[0023] At each stop of strip 2 at fringing device 10, actuating device 27 pushes frame 26, and therefore jaw 15, against jaw 14 to grip portion 2b of strip 2 along longitudinal edges 2a; and, in time with strip 2 being stopped and portion 2b gripped, blades 38 on each roller 36 travel through comb 32 to make transverse cuts 12. As in the example shown, jaws 14 and 15 and rollers 36 are preferably at least as long as the feed step imparted to strip 2 by path-change device 7.

[0024] In the Figure 4 variation, each roller 36 comprises a number of blades 38 arranged along roller 36 in a cylindrical spiral, which has the advantage of enabling cuts 12 to be formed gradually and so reducing the stress on strip 2.

[0025] In a variation not shown, strip 2 is replaced by a succession of sheets of wrapping material step-fed through fringing device 10.

[0026] In a further variation not shown, strip 2 is not fringed at the point at which the strip is eventually cut transversely to form the sheet of wrapping material, and the end fringes 13 of the sheet are formed by a known transverse strip cutting device (not shown). This solution prevents the formation of any shreds due to tearing of the fringes close to the transverse cut.

[0027] In a further variation not shown, strip 2 or the individual sheets referred to above are only fringed on one side; in which case, one of rollers 36 is turned off or eliminated together with the relative composite comb 32.

[0028] A method and unit for fringing sheet wrapping material as described herein affords numerous advantages, including that of forming a series of equally spaced cuts and so obtaining identical fringes 13 at all times.

Claims

1. A method of fringing sheet wrapping material (2), the method comprising the steps of step-feeding said sheet wrapping material (2) in a given traveling direction (B) and in feed steps of a given length through a fringing device (10), said sheet wrapping material (2) having two longitudinal edges (2a) and making a succession of stops in the course of its travel; and making in the stationary sheet wrapping material (2) a number of transverse cuts (12) through at least one portion (2b) of at least one said longitudinal edge (2a) by means of blades (38) moving along respective trajectories (E) crosswise to said traveling direction (B).

2. A method as claimed in Claim 1 and comprising the further step of gripping at least said portion (2b) of said longitudinal edge (2a) between two rigid, comb-shaped jaws (14, 15) inside said fringing device (10) and while the sheet wrapping material (2) is stationary, before the portion (2b) of said longitudinal'edge (2a) is engaged by said blades (38).

3. A method as claimed in Claim 1 or 2, wherein said transverse cuts (12) are made by at least one fring-

ing roller (36) rotated about an axis (37) substantially parallel to said traveling direction (B); each said blade (38) extending from said fringing roller (36) crosswise to said traveling direction (B).

4. A method as claimed in Claim 3, wherein said transverse cuts (12) are made successively by arranging said blades (38) along said fringing roller (36) substantially in the form of a cylindrical spiral.

5. A method as claimed in Claim 3 or 4, wherein said fringing roller (36) is of a length at most equal to the length of said feed step.

6. A method as claimed in one of the foregoing Claims, wherein said sheet wrapping material (2) is at least one sheet of wrapping material.

7. A method as claimed in one of Claims 1 to 5, wherein said sheet wrapping material (2) is a continuous strip (2).

8. A method as claimed in Claim 7, wherein said continuous strip (2) is step-fed by unwinding the continuous strip (2) continuously off a reel (5) to impart a continuous feed movement to the strip, and then converting said continuous feed movement into a step feed movement by cyclically varying the length of a path (P) of the continuous strip (2) between said reel (5) and said fringing device (10).

9. A unit for fringing sheet wrapping material (2), said unit comprising a fringing device (10), and feed means (4, 6, 7) for step-feeding said sheet wrapping material in a given traveling direction (B) and in feed steps of a given length through said fringing device (10); and the fringing device (10) comprising a number of blades (38) movable along respective trajectories (E) extending crosswise to said traveling direction (B) to make a succession of transverse cuts (12) along at least one portion (2b) of at least one longitudinal edge (2a) of the sheet wrapping material (2).

10. A unit as claimed in Claim 9, wherein said fringing device (10) comprises at least one fringing roller (36) mounted for rotation about an axis (37) parallel to said traveling direction (B); said blades (38) being carried by said fringing roller (36), projecting substantially radially from the fringing roller (36), and being arranged along the fringing roller (36).

11. A unit as claimed in Claim 10, wherein said blades are arranged along said fringing roller substantially in the form of a cylindrical spiral.

12. A unit as claimed in one of Claims 9 to 11, wherein said sheet wrapping material (2) is a continuous strip (2); said feed means (4, 6, 7) comprising a support (4) for a reel (5) of said continuous strip (2); actuating means (6) for rotating said support (4) continuously; and path-change means (7) for cyclically varying the length of a path (P) of said continuous strip (2) between said support (4) and said fringing device (10).

13. A unit as claimed in Claim 12, wherein said path-change means (7) comprise a transmission roller (8) for said continuous strip (2); said transmission roller (8) being interposed between said support (4) and said fringing device (10), and being mounted to translate back and forth in a direction crosswise to its axis (9) of rotation.

14. A unit as claimed in one of Claims 9 to 13, wherein said fringing device (10) also comprises gripping means in turn comprising two jaws (14, 15) for gripping said sheet wrapping material (2) along said portion (2b) of said longitudinal edge (2a).

15. A unit as claimed in Claim 14, wherein said two jaws (14, 15) are positioned opposite and facing each other, and are movable one to and from the other in a direction (C) perpendicular to said traveling direction (B).

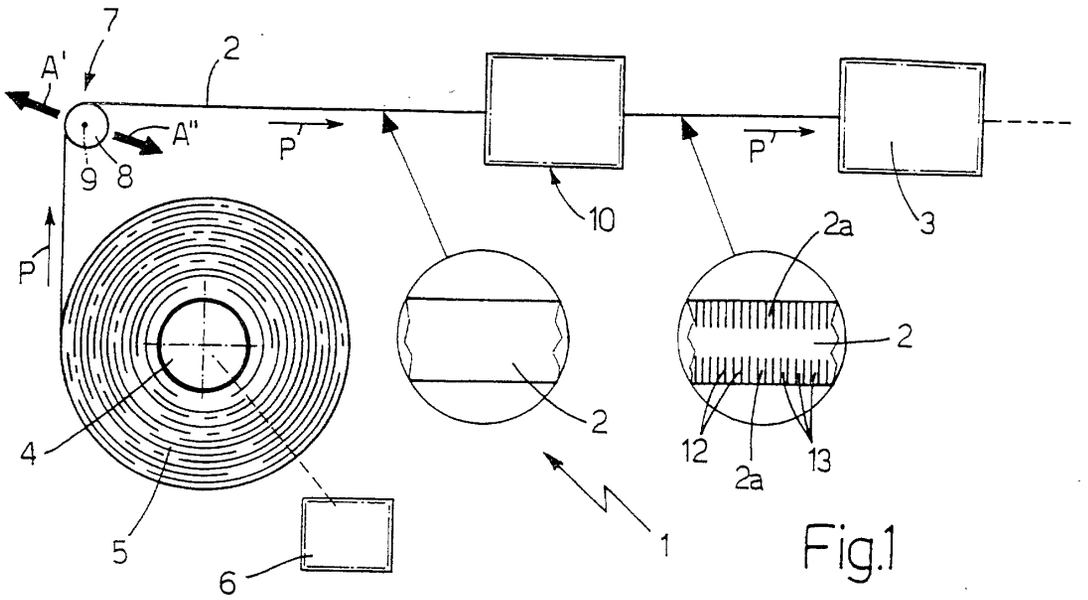
16. A unit as claimed in Claim 14 or 15, wherein each said jaw (14; 15) comprises a number of transverse teeth (25; 31) defining, with the transverse teeth (31; 25) of the other jaw (15; 14), at least one comb (32) extending parallel to said traveling direction (B); each said trajectory (E) extending between the teeth (25; 31) of two respective pairs of corresponding teeth of said two jaws (14, 15).

17. A unit as claimed in Claim 16, wherein one (14) of said two jaws (14, 15) is a fixed jaw (14) and is defined by a plate (16), at least one edge of which comprises the relative said teeth (25).

18. A unit as claimed in Claim 16 or 17, wherein one (L5) of said two jaws (14, 15) is a movable jaw (15) and comprises at least one sector (28), one edge of which comprises the relative said teeth (31).

19. A unit as claimed in Claim 18, wherein said movable jaw (15) comprises a movable frame (26); said sector (28) being fitted to said movable frame (26); and elastic means (34) being fitted between said movable frame (26) and said sector (28) to grip the wrapping material (2) between said two jaws (14, 15).

20. A unit as claimed in Claim 19, wherein said elastic means (34) comprise at least one helical spring (34).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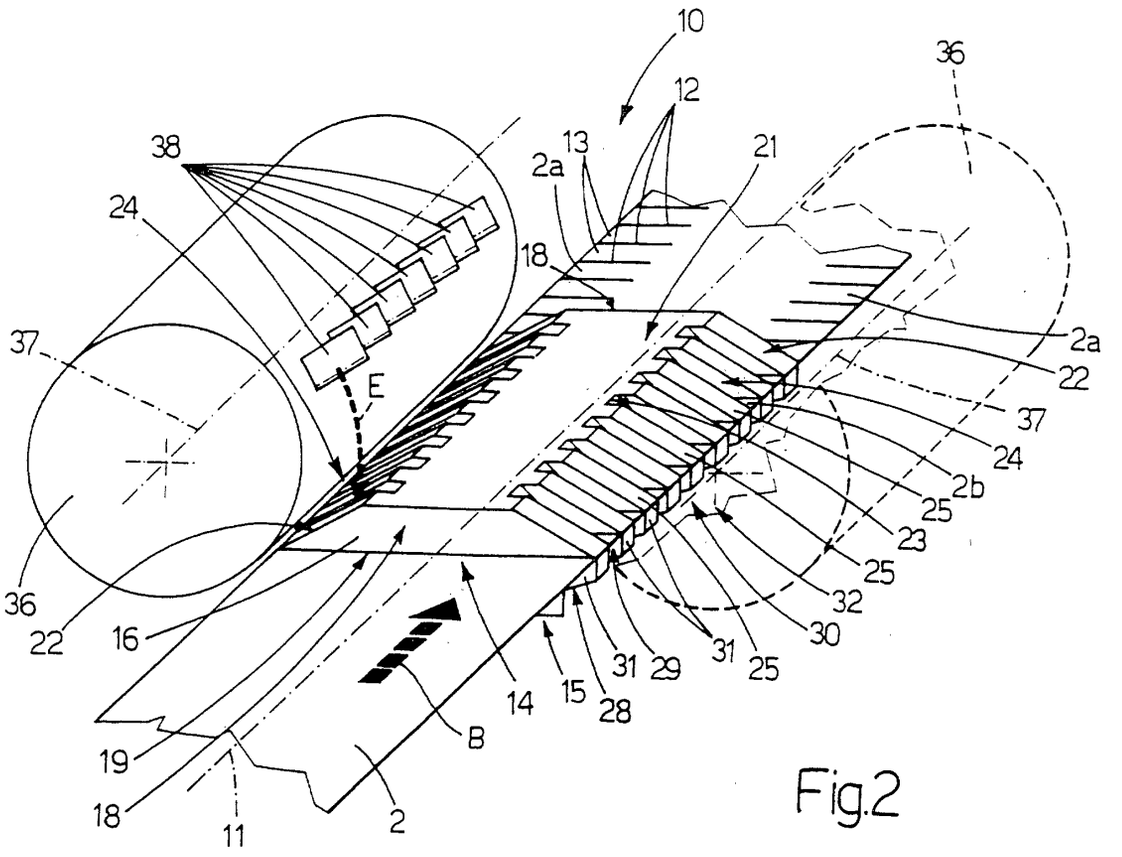
A'
2
A"
P'
9
8
10
P'
3
P
2a
2
4
2
12
2a
13
5
1
6

Fig.1


10
12
36
38
13
2a
21
24
18
2a
22
37
E
37
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2b
25
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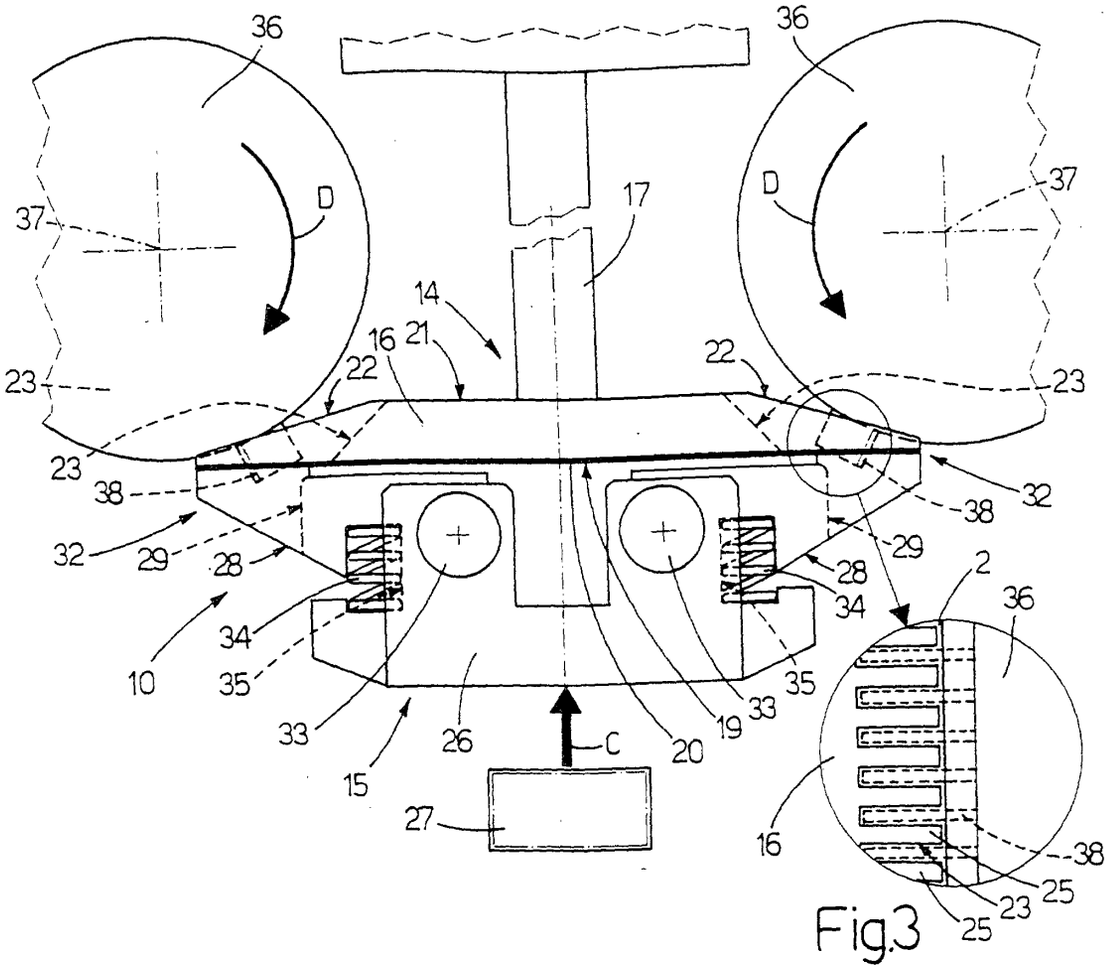
2

Fig.2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D
D
17
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10
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C
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36
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23
25

Fig.3

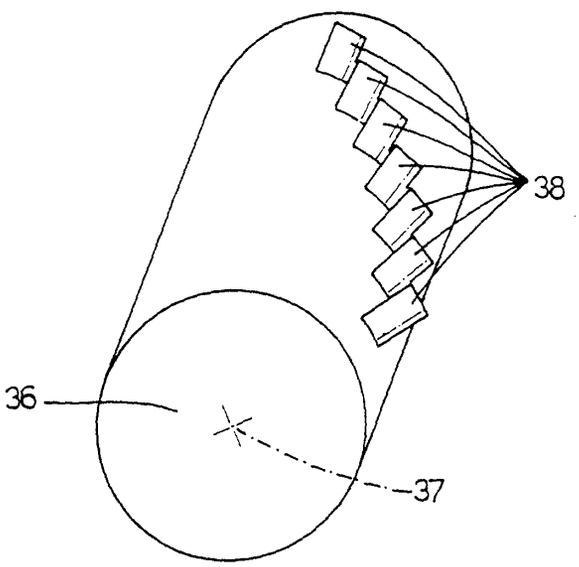
38
36
37

Fig.4