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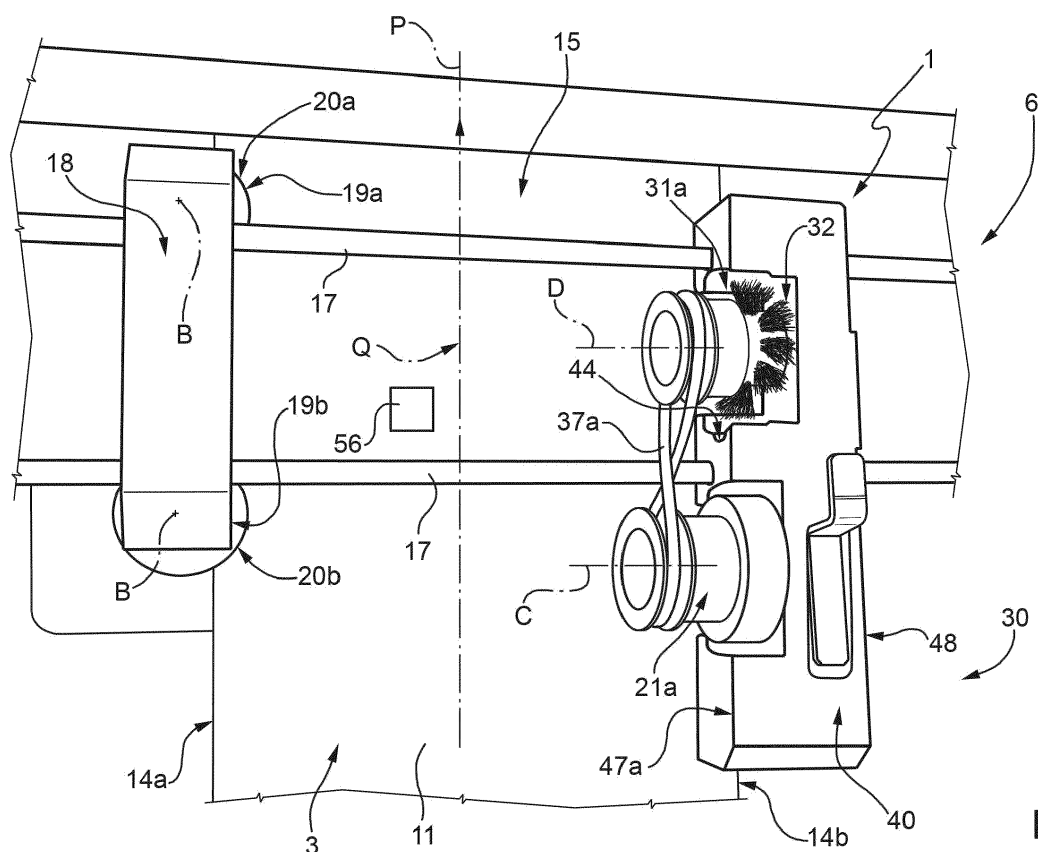
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(54) **A device for cleaning a piece of packaging material**

(57) There is disclosed a cleaning device (30) for cleaning a piece (3) of packaging material adapted to form at least one sealed package (2) for a pourable food product; device (30) comprises: a pair of first wheels (31a, 31b) adapted to be arranged, in use, on respective op-

posite sides of piece (3), rotatable about respective axes (D), and each provided with a relative set of bristles (32) so as to remove residues of dust from piece (3); and suction means (29) for sucking away from piece (3) residues removed by said first wheels (31a, 31b).



**FIG. 2**

## Description

**[0001]** The present invention relates to a device for cleaning a piece of packaging material.

**[0002]** As is known, many food products, such as fruit juice, pasteurized or UHT (ultra-high-temperature treated) milk, wine, tomato sauce, etc., are sold in packages made of sterilized packaging material.

**[0003]** A typical example of this type of package is the parallelepiped-shaped package for liquid or pourable food products known as Tetra Brik Aseptic (registered trademark), which is made by folding and sealing laminated strip packaging material.

**[0004]** The packaging material has a multilayer structure substantially comprising a base layer for stiffness and strength, which may comprise a layer of fibrous material, e.g. paper, or of mineral-filled polypropylene material; and a number of layers of heat-seal plastic material, e.g. polyethylene film, covering both sides of the base layer.

**[0005]** In the case of aseptic packages for long-storage products, such as UHT milk, the packaging material also comprises a layer of gas- and light-barrier material, e.g. aluminium foil or ethyl vinyl alcohol (EVOH), which is superimposed on a layer of heat-seal plastic material, and is in turn covered with another layer of heat-seal plastic material forming the inner face of the package eventually contacting the food product.

**[0006]** As is known, packages of this sort are produced on fully automatic packaging units having a supply station fed with reels of a web of packaging material.

**[0007]** In particular, the web of packaging material is cut in a paper factory, at a first lateral edge and a second lateral edge, which are opposite to each other.

**[0008]** The supply station comprises a pair of first wheels defining relative grooves engaged by the first lateral edge, and a pair of second wheels cooperating with relative opposite sides of the web in a position close to the second lateral edge.

**[0009]** The first wheels and second wheels are effective in guiding the web of packaging material, as the latter advances.

**[0010]** This guiding action is especially important in the supply station. As a matter of fact, a photocell is mounted inside the supply station, with the aim of detecting the passage of a plurality of markers carried by the web and associated to the position of relative packages to be formed.

**[0011]** In this way, the real speed of the web is detected. The real speed of the web is compared with the nominal speed and the web is accordingly accelerated or decelerated.

**[0012]** In particular, a continuous tube is formed from the web-fed packaging material in the packaging unit; the web of packaging material is sterilized in a sterilizing unit, e.g. by moving the web inside a dip of a chemical sterilizing agent such as a hydrogen peroxide solution, which is subsequently removed, e.g. by heating and

evaporation, from the surfaces of the packaging material.

**[0013]** The sterilized web is maintained in a closed, sterile environment, and is folded into a cylinder and sealed longitudinally to form a tube.

**[0014]** The tube is fed in a first vertical direction parallel to its axis, is filled continuously with the sterilized or sterile-processed food product and is heat-sealed at equally spaced cross sections by two pairs of jaws to form pillow packs each having a top and a bottom transverse sealing band, i.e. a band extending along a second direction orthogonal to the first direction. Pillow packs are separated by cutting respective sealing bands and are then fed to a folding station, in which they are fold so as to form respective packages.

**[0015]** Alternatively, the packaging material may be cut in blanks, which are folded on forming spindles to form the packages, which are then filled with the food product and sealed. An example of this package is the "gable-top" package commonly known by the trade name of Tetra Rex (registered trademark).

**[0016]** Though highly reliable and efficient, the above-described packaging technologies leave room for further improvement.

**[0017]** In particular, the Applicant has found that some deposits of waste particles, such as polyethylene fibres and/or dust and/or carton fibres, may form on the first and second edge of the packaging material.

**[0018]** This is due, on one hand, to the fact that the layer of fibrous material is cut at the first edge and second edge, and, on the other hand, to the fact that the waste particles have a natural tendency to accumulate at the first and the second edge of the web.

**[0019]** A need is felt to remove these deposits before the formation of the sealed packages, in order to avoid that these deposits may contaminate the food product.

**[0020]** Furthermore, when packages are formed from a tube of packaging material, these deposits may cause the malfunctioning of the stations downstream from the supply station, for example they may cause the gripping of the bearings of the stations downstream from the supply station, so increasing the maintenance cost of the packaging machine.

**[0021]** A need is therefore felt within the industry to avoid the above-identified malfunctioning.

**[0022]** Moreover, these deposits are normally removed when the web of packaging material crosses the dip of sterilizing agent.

**[0023]** In this case, the deposits may reduce the effectiveness of the sterilizing unit, thus rendering necessary a periodical cleaning action of the dip.

**[0024]** A need is therefore felt to reduce the cleaning cost of the dip, which forms the sterilizing unit.

**[0025]** Furthermore, the sterilizing unit may also comprise, instead of a dip of a sterilizing agent, a radiation emitting device, which emits a radiation against the web.

**[0026]** In this case, the residues can in no way be removed by the sterilizing unit and can, therefore, reach the stations where the tube is formed and filled with the

pourable food product.

**[0027]** A need is therefore especially felt within the industry to prevent the residues from reaching the stations where the tube is formed and filled with the pourable food product.

**[0028]** Finally, a need is felt within the industry to improve the residues removal action, without requiring an extensive intervention on the structure of the known packaging unit.

**[0029]** It is therefore an object of the present invention to provide a device for cleaning a piece of packaging material, designed to meet at least one of above-identified need in a straightforward and economic manner.

**[0030]** This object is achieved by a device for cleaning a piece of packaging material, as claimed in claim 1.

**[0031]** A preferred, non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a schematic perspective view of a packaging machine inside which a device for cleaning according to the present invention is incorporated; Figure 2 is an enlarged frontal view of a supply station of the machine and of the device of Figure 1, with parts removed for clarity;

Figure 3 is an enlarged exploded view of the device of Figures 1 and 2;

Figure 4 is a further enlarged perspective view of the device of Figures 1 to 3;

Figure 5 shows the device of Figures 1 to 3 during an operating step, with parts removed for clarity;

Figures 6 and 7 are a cross-section and a perspective enlarged view respectively of a first component of the device of Figures 1 to 5;

Figure 8 is a cross-section of a second component of the device of Figures 1 to 5; and

Figure 9 is a perspective view of the device of Figures 1 to 5, with parts removed for clarity.

**[0032]** Number 1 in Figure 1 indicates as a whole a packaging machine for continuously producing sealed packages 2 of a food product from a web 3 of packaging material, which is unwound off a reel 4 and fed along a forming path P.

**[0033]** Machine 1 preferably produces sealed packages 2 of a pourable food product, such as pasteurized or UHT milk, fruit juice, wine, peas, beans, etc.

**[0034]** Machine 1 may also produce sealed packages 2 of a food product that is pourable when producing packages 2, and sets after packages 2 are sealed. One example of such a food product is a portion of cheese, that is melted when producing packages 2, and sets after packages 2 are sealed.

**[0035]** The packaging material has a multilayer structure substantially comprising a base layer for stiffness and strength, which may comprise a layer of fibrous material, e.g. paper, or of mineral-filled polypropylene material; and a number of layers of heat-seal plastic material,

e.g. polyethylene film, covering both sides of the base layer.

**[0036]** In the case of aseptic packages for long-storage products, such as UHT milk, the packaging material may also comprise a layer of gas- and light-barrier material, e.g. an aluminum foil or an ethyl vinyl alcohol (EVOH) foil, which is superimposed on a layer of heat-seal plastic material, and is in turn covered with another layer of heat-seal plastic material forming the inner face of the package eventually contacting the food product.

**[0037]** Web 3 comprises a pair of sides 11, 12 opposite to each other. Web 3 is also bounded by a pair of opposite lateral edges 14a, 14b parallel to path P.

**[0038]** In particular, web 3 is cut, in a not-shown paper factory, along edges 14a, 14b.

**[0039]** Machine 1 comprises a plurality of guide members 5 adapted to feed web 3 along path P through a number of work stations, of which are shown schematically:

- a supply station 6 adapted to receive a new reel 4 to be processed and to join an edge 13a of new reel 4 to an edge 13b of a terminated reel 4;
- a sterilizing station 7 for sterilizing web 3;
- a forming station 8 for forming a tube 10 of a packaging material and which has an axis A; and
- a station 9 for heat sealing a longitudinal sealing 16 along tube 10.

**[0040]** Machine 1 further comprises a fill device 41 (shown in Figure 1) for pouring the sterilized or sterile-processed food product continuously into tube 10 of packaging material.

**[0041]** Supply station 6 comprises (Figure 2):

- a frame 15;
- not-shown supporting means for rotatably supporting reel 4 in process; and
- a not-shown cutting head movable within frame 15, and adapted to cut edge 13b from a terminated reel 4 and to weld edge 13b to edge 13a of reel 4 to be processed.

**[0042]** In particular, as shown in Figure 1, edges 13a, 13b are slanted relative to path P and extend between edges 14a, 14b.

**[0043]** Frame 15 is shown only with reference to a pair of bars 17 (Figure 2) parallel to each other and extending orthogonally to path P and, in the embodiment shown, horizontally.

**[0044]** Bars 17 support a body 18 arranged close to edge 14a.

**[0045]** In the embodiment shown, bars 17 are arranged on side 11 of web 3.

**[0046]** In detail, body 18 rotatably supports a pair of idle wheels 19a, 19b rotatably about relative axes B, which are parallel to each other and orthogonal to axis A and path P and to bars 17 (Figure 2).

**[0047]** Wheels 19a, 19b define relative grooves 20a, 20b through which edge 14a of web 3 advances.

**[0048]** Frame 15 also supports a pair of idle wheels 21a, 21b arranged on opposite sides of web 3 and close to edge 14b.

**[0049]** Wheels 21a, 21b have respective axes C orthogonal to axes B and to path P, and will be described more in detail in the foregoing of the present description.

**[0050]** Sterilizing station 7 substantially comprises a dip of a chemical sterilizing agent such as hydrogen peroxide solution, through which tube 10 advances.

**[0051]** The chemical sterilizing agent is subsequently removed, e.g. by heating and evaporation, from the surfaces of the packaging material.

**[0052]** Alternatively, sterilizing station 7 may comprise a radiation emission device, which emits a radiation against the web.

**[0053]** Forming station 8 comprises a number of forming assemblies 24 (Figure 1) arranged successively along path P, and which interact gradually with web 3 to fold it into the form of tube 10.

**[0054]** More specifically, forming assemblies 24 comprise respective numbers of rollers defining respective compulsory packaging material passages, the respective sections of which vary gradually from a C shape to a substantially circular shape.

**[0055]** Machine 1 further comprises:

- a forming and cutting unit (not-shown) for forming and cutting pillow packs 60 from tube 10; and
- a folding unit (not-shown) for folding packs 60 into relative packages 2.

**[0056]** Supply station 6 of machine 1 also comprises a device 30 for cleaning web 3.

**[0057]** Device 30 advantageously comprises (Figures 2, 3 and 4):

- a pair of wheels 31a, 31b arranged on and cooperating with sides 11, 12 of web 3 respectively, rotatable about respective axes D, and provided with relative sets of bristles 32 so as to remove residues of dust from web 3; and
- suction means 29 for sucking away from web 3 the residues removed by wheels 31a, 31b.

**[0058]** Axes D are parallel to axes C and define a plane orthogonal to path P.

**[0059]** In the embodiment shown, wheels 31a, 31b and, therefore, axes D are arranged downstream of wheels 21a, 21b and axes C, with reference to the advancing direction of web 3 along path P.

**[0060]** Wheels 31a, 31b cooperate with sides 11, 12 respectively of web 3 in a position which is close to edge 14b.

**[0061]** Wheels 31a, 31b may rotate about relative axes D independently from each other.

**[0062]** Bristles 32 are arranged as a helix about axis

D of relative wheel 31a, 31b.

**[0063]** In the embodiment shown, bristles 32 are made of fine silk in polyester.

**[0064]** Suction means 29 substantially comprise (Figure 3):

- a vacuum generator 33 adapted to create a suction air-current which removes the residues of dust from web 3; and
- a filter 34 fluidly connected to vacuum generator 33 and adapted to filter the residues from the air-current.

**[0065]** Vacuum generator 33 substantially comprises (Figure 3) a conduit 81 fluidly connected to a compressed air source, and a conduit 82 fluidly connected to filter 34.

**[0066]** Conduit 82 defines, at the fluidic connection with conduit 81, a constricted section 83, which by Venturi effect, creates a depression inside conduit 81.

**[0067]** Device 30 also comprises a body 40 which supports wheels 21a, 21b; 31a, 31b rotatably about relative axes C; D, and is supported by bars 17 close to edge 14b of web 3 and in front of body 18.

**[0068]** In detail, when supported by bars 17, body 40 is elongated along path P.

**[0069]** Body 40 comprises (Figures 3 and 4);

- a wall 48 on the side opposite to body 18; and
- two walls 47a, 47b on the side of body 18.

**[0070]** Wall 47a rotatably supports wheels 21a, 31a while wall 47b rotatably supports wheels 21b, 31b,

**[0071]** In detail, wheels 21a, 31a (21b, 31b) are arranged on the opposite side of wall 47a (47b) relative to wall 48.

**[0072]** Walls 47a, 47b, 48 are substantially orthogonal to axes C, D.

**[0073]** Walls 47a, 47b are separated by a blind groove 43 (Figure 4) elongated parallel to path P and which receives edge 14b of web 3, when the latter advances along path P.

**[0074]** Furthermore, body 40 comprises a conduit 45 (Figure 3) parallel to axes C, D, fluidly connected on one side with openings 44 (Figures 4, 5 and 9) defined by relative walls 47a, 47b, and, on the opposite side, with filter 34 through a tube 36.

**[0075]** In particular, conduit 45 protrudes from wall 48 on the opposite side of walls 47a, 47b.

**[0076]** Openings 44 are arranged close to bristles 32 of relative wheels 31a, 31b, so as to gather the residues of dust removed by bristles 32 (Figure 6).

**[0077]** The profile of each opening is C-shaped and open towards relative axis D.

**[0078]** Body 40 also comprise a pair of through holes 55 (Figure 5) engaged by respective bars 17.

**[0079]** Holes 55 are open at wall 47a and are arranged on opposite sides of wheel 31a.

**[0080]** Body 40 also comprises a pair of idle wheels 85 (Figure 3, 4 and 5) protruding inside groove 43 and ro-

tatable about respective axes parallel to axes B.

**[0081]** In case that web 3 moves away from its correct position, wheels 85 are adapted to cooperate with edge 14b of web 3 to re-arrange web 3 in the correct position.

**[0082]** In the embodiment shown, wheels 21a, 21b are interposed between wheels 85, proceeding along path P.

**[0083]** Each wheel 21a (21b) is operatively connected to a relative wheel 31a (31b).

**[0084]** In the embodiment shown, each wheel 21a (21b) is connected to relative wheel 31a (31b) through a belt 37a (37b).

**[0085]** Belt 37a (37b) is looped about wheels 21a, 31a (21b, 31b) and is crossed between wheels 21a, 31a (21b, 31b).

**[0086]** In this way, both wheels 21a, 21b and wheels 31a, 31b counter-rotate about relative axes C, D.

**[0087]** With reference to Figures 6 and 7, each wheel 21a (21b) extends about relative axis C, is hollow and substantially comprises:

- a body 22 at least partially housed inside a curved recess 50 defined by a relative wall 47a (47b), and which cooperates with side 11 (12) of web 3 and which is driven in rotation about relative axis C by the advancement of web 3 along path P; and
- a pulley 23 which defines a groove 38 engaged by belt 37a (37b).

**[0088]** In the embodiment shown, grooves 38 are V-shaped and annular about relative axes C.

**[0089]** The diameter of body 22 is greater than the diameter of pulley 23.

**[0090]** Furthermore, wheel 21a is pressed towards side 11 of web 3, and therefore, towards wheel 21b by a cam device 46 (Figure 5). In this way, it is ensured that both sides 11, 12 of web 3 contact wheels 21a, 21b respectively.

**[0091]** With reference to Figure 8, each wheel 31a (31b) integrally comprises:

- a pin 26 rotatably fitted to wall 47a (47b) and which defines a first axial end of wheel 31a (31b);
- a pulley 27 which forms a second axial end, opposite to pin 26, of wheel 31a (31b); and
- a body 28 axially interposed between pin 26 and pulley 27, onto which bristles 32 are fitted and which is at least partly housed inside a curved recess 51 defined by wall 47a (47b).

**[0092]** More precisely, bristles 32 cooperate with side 11 (12) of web 3 and defines a groove 39 for belt 37a (37b).

**[0093]** In the embodiment shown, grooves 39 are V-shaped and annular about relative axes C.

**[0094]** Furthermore, the diameter of body 28 is smaller than the diameter of pulley 27 and greater than the diameter of pin 26.

**[0095]** Device 30 also comprise a pair of covers 25

(Figure 9) which cover respective recesses 50 on the side of relative walls 47a, so as to ease the conveying of waste particles towards relative openings 44.

**[0096]** Path P comprises a zone Q (Figures 1 and 2) within which web 3 is guided by wheels 19a, 19b; 21a, 21b; 31a, 31 inside supply station 6.

**[0097]** Furthermore, station 6 comprises a photo-cell 56 (Figures 1 and 2) for sensing the real position inside zone Q of a plurality of markers, for example bar-codes, associated to relative packages 2 and for detecting accordingly the real speed of web 3.

**[0098]** Machine 1 also comprises a control unit configured for comparing the real speed of web 3 detected by photo-cell 56 with a nominal speed value and for accordingly accelerating or decelerating web 3.

**[0099]** In actual use, web 3 is cut along edges 14a, 14b in the paper factory.

**[0100]** Accordingly, some deposits of waste particles, such as polyethylene fibres and/or dust and/or carton fibres, may form on edges 14a, 14b of the packaging material.

**[0101]** Supply station 6 is then fed with reel 4 formed by web 3 and edge 13a of new reel 4 is joined to edge 13b of terminated reel 4.

**[0102]** At this stage, web 3 is unwound off reel 4 and fed along path P.

**[0103]** As web 3 advances inside station 6, edge 14a of web 3 engages grooves 20a, 20b of wheels 19a, 19b, side 11 of web 3 cooperates with wheels 21a, 31a of device 30 and side 12 of web 3 cooperates with wheels 21b, 31b of device 30.

**[0104]** In particular, web 3 drives in counter-rotation idle wheels 21a, 21b of device 30 about respective axes C.

**[0105]** The rotation of wheels 21a, 21b cause, thanks to respective belts 37a, 37b, the counter-rotation of wheels 31a, 31b of device about respective axes D.

**[0106]** Accordingly, bristles 32 of wheels 21a, 21b are driven in rotation and remove residues of dust and/or waste material from web 3, especially from the area close to edge 14b of web 3.

**[0107]** At the same time, vacuum generator 33 creates a vacuum suction inside conduit 45 and openings 44.

**[0108]** Accordingly, the residues of dust and/or waste material removed by bristles 32 from web 3 are sucked by openings 44 and conveyed towards conduit 45 and filter 34.

**[0109]** In this way, device 30 substantially cleans web 3 by the residues of dust and/or waste material within station 6.

**[0110]** Cleaned web 3 is then fed by guide members 5 along path P and through stations 7, 8 and 9.

**[0111]** Cleaned web 3 is sterilized within station 7 by using a sterilizing agent, hydrogen peroxide in the embodiment shown.

**[0112]** The sterilizing agent is subsequently evaporated by heating, and/or by subjecting the packaging material to radiation of appropriate wavelength and intensity.

[0113] Tube 10 is formed within forming station 8 and longitudinally heat-sealed within station 9.

[0114] Finally, longitudinally sealed tube 10 is sealed and cut transversally to path P, so as to form packs 60 which are, then, subsequently folded to form relative packages 2.

[0115] The advantages of cleaning device 30 according to the present invention will be clear from the foregoing description.

[0116] In particular, the deposits of waste particles, such as polyethylene fibres and/or dust and/or carton fibres, are removed from web 3 by wheels 31a, 31b and are sucked away from suction means 29.

[0117] In this way, these deposits are prevented from contaminating the food product packaged inside packages 2.

[0118] The removal action is particularly effective at edge 14b (14a) of web 3, i.e. where web 3 is cut in the paper factory.

[0119] Device 30 is particularly advantageous when incorporated in supply station 6 of machine 1, which forms packages 2 from tube 10.

[0120] As a matter of fact, the Applicant has found that the action of device 30 is highly effective in preventing the gripping of the bearing of the stations arranged downstream from station 6, for example stations 7, 8, 9.

[0121] In this way, the overall maintenance cost and time of machine 1 are reduced.

[0122] In particular, the removal action carried out by device 30 reduces the risk that the effectiveness of the dip of hydrogen peroxide of sterilizing station 7 may be penalized by the waste particles.

[0123] The presence of device 30 is even more important, when sterilizing station 7 comprises a radiation emitting device.

[0124] As a matter of fact, in this case, sterilizing station 7 substantially does not remove any deposits of waste particles from web 3.

[0125] Accordingly, the removal of these deposits upstream of stations 8, 9 and 10 substantially relies only on device 30.

[0126] Device 30 also provides for an easy and cheap retro-fitting of an already existing machine 1.

[0127] As a matter of fact, the installation of device 30 simply requires to mount body 40 onto already existing bars 17 of supply station 6 of machine 1 and to connect openings 44 with vacuum generator 33.

[0128] Clearly, changes may be made to device 30 as described and illustrated herein without, however, departing from the scope defined in the accompanying Claims.

[0129] In particular, device 30 could be mounted in the paper factory, instead of in supply station 6 of machine 1.

[0130] Device 30 could also be used in a packaging machine which forms packages 2 starting from relative blanks of the packaging material.

[0131] Very briefly, in this packaging machine, the packaging material may be cut in blanks, which are folded

on forming spindles to form the packages, which are then filled with the food product and sealed.

[0132] In this case, device 30 might not comprise wheels 21a, 21b, and wheels 31a, 31b could be driven in rotation in a different way, for example by connecting them to a motor.

[0133] Furthermore, machine 1 could comprise a further device 30 fitted close to edge 14a, so as to remove the residues of waste material also from edge 14a.

[0134] Finally, wheels 31a, 31b and bristles 32 could extend parallel to axes C, D, up to edge 14a of web 3. In this way, the residues of waste material would be removed from the whole web 3.

## Claims

1. A cleaning device (30) for cleaning a piece (3) of packaging material adapted to form at least one sealed package (2) for a pourable food product, **characterized by** comprising:

- a pair of first wheels (31a, 31b) adapted to be arranged, in use, on respective opposite sides of said piece (3), rotatable about respective axes (D), and each provided with a relative set of bristles (32) so as to remove residues of dust from said piece (3); and
- suction means (29) for sucking away from said piece (3) said residues removed by said first wheels (31a, 31b).

2. The device of claim 1, **characterized in that** said bristles (32) are arranged as helices about said relative axes (D).

3. The device of claim 1 or 2, **characterized in that** said first wheels (31a, 31b) may be driven in rotation about relative axes (D) independently from each other.

4. The device of any one of foregoing claims, **characterized by** comprising a pair of second wheels (21a, 21b), arranged, in use, on respective opposite sides (11, 12) of said piece (3) of packaging material and adapted to guide said piece (3) of packaging material; each said second wheel (21a, 21b) being operatively connected to a relative said first wheel (31a, 31b).

5. The device of claim 4, **characterized in that** said second wheels (21a, 21b) are adapted to be driven in rotation, in use, by the advancement of said piece (3) of said packaging material along a path (P).

6. The device of claim 4 or 5, **characterized in that** said each said second wheel (21a, 21b) is operatively connected to a corresponding said first wheel

(31a, 31b) by a relative belt (37a, 37b);  
each said belt (37a, 37b) being looped about relative  
said first and second wheel (31a, 21a; 31b, 21b) and  
being crossed between relative said first and second  
wheel (31a, 21a; 31b, 21b).

7. The device of any one of the foregoing claims, **characterized in that** said first wheels (31a, 31b) are, in use, counter-rotating about relative axes (D).

8. The device of any one of the claims 4 to 7, **characterized by** comprising a first body (40) which comprises:

- a first wall (47a) rotatably supporting one said first and one said second wheel (31a, 21a);
- a second wall (47b) rotatably supporting the other said first and the other said second wheel (31b, 21b); and
- a groove (43) interposed between said first and second wall (47a, 47b) and adapted to be engaged by a first edge (14b) of said piece (3).

9. The device of any one of the foregoing claims, **characterized in that** said second wheels (31a, 31b) are arranged, in use, in such a position relative to said groove (43) that they can remove said residues from an area adjacent to at least one (14b) of a first and second edge (14a; 14b) opposite to each other of said web (3).

10. The device of claim 8 or 9, **characterized in that** at least one between of said first and second wall (47a, 47b) defines at least one suction opening (44) arranged, in use, in such a position that it can receive said residues removed by said first wheel (31a, 31b); said opening (44) being fluidly connectable to a vacuum generator (33).

11. The device of claim 10, **characterized in that** said suction means (29) comprise said vacuum generator (33).

12. The device of claim 11, when depending on claim 10, **characterized in that** said suction means (29) comprise a filter (34) fluidly interposed between said vacuum generator (33) and said opening (44).

13. The device of claim 11 or 12, when depending on claim 10, **characterized in that** said vacuum generator (33) is distinct from said first body (40).

14. A packaging machine (1) for producing said sealed packages (2) of a food product from a tube (10) formed by a web (3) of packaging material and filled continuously with said food product, comprising:

- a supply station (6) which may be fed with a

reel (4) formed by said web (3) of said packaging material; and

- a sterilizing station (7) arranged downstream of said supply station (6), with reference to said advancing first direction;

**characterized in that** said supply station (6) houses a device (30) according to any one of the foregoing claims.

15. The packaging machine of claim 14, when depending on any one of claims 8 to 13 being adapted to be driven in rotation, in use, by the advancement of said piece (3) of packaging material along a path (P) and, **characterized in that** said supply station (6) comprises a third body (18) rotatably supporting at least one third wheel (19a, 19b), and which defines a groove (20) adapted to be engaged, in use, by the other (14a) of said first and second edge (14a, 14b), of said web (3).

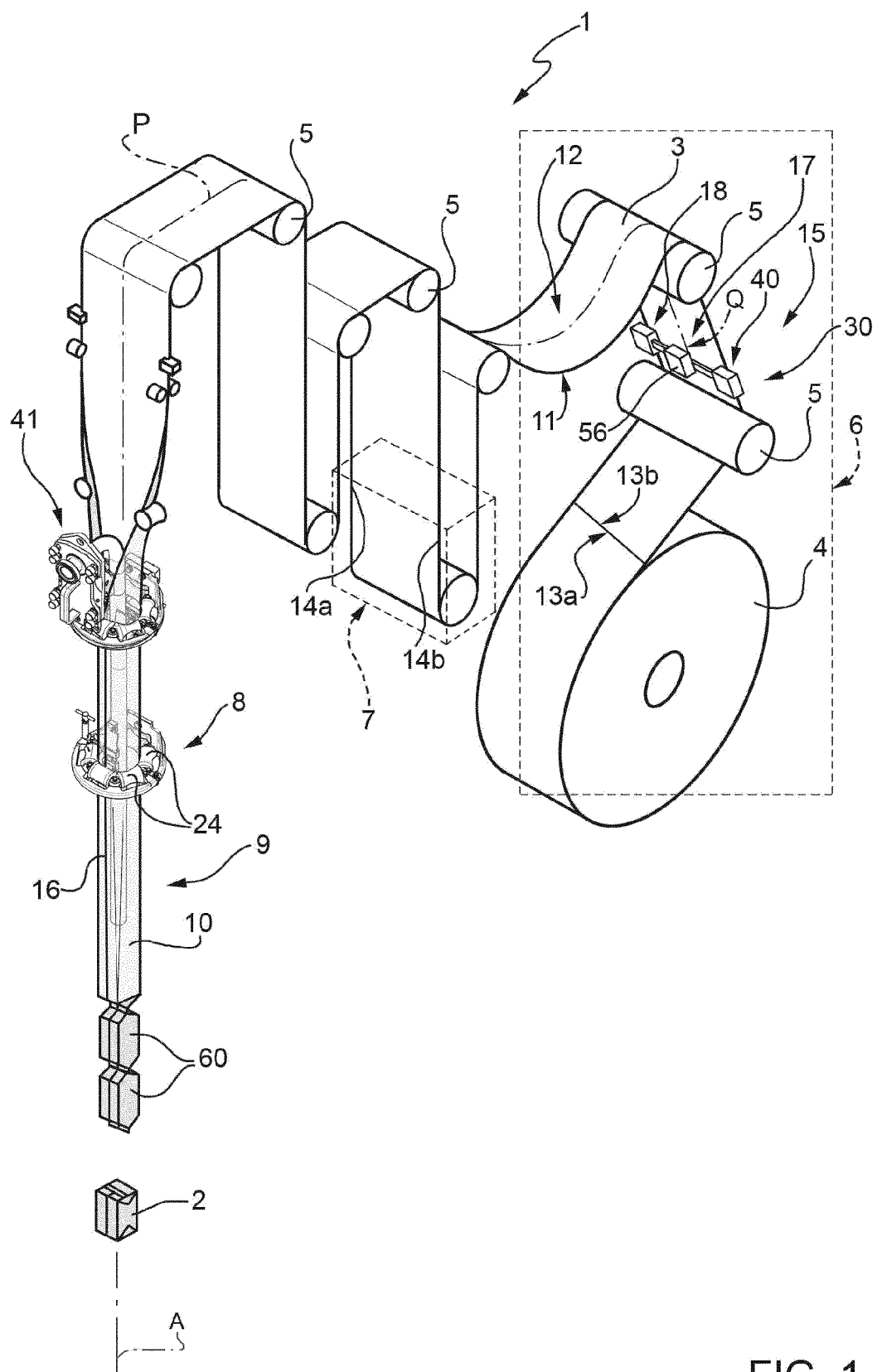
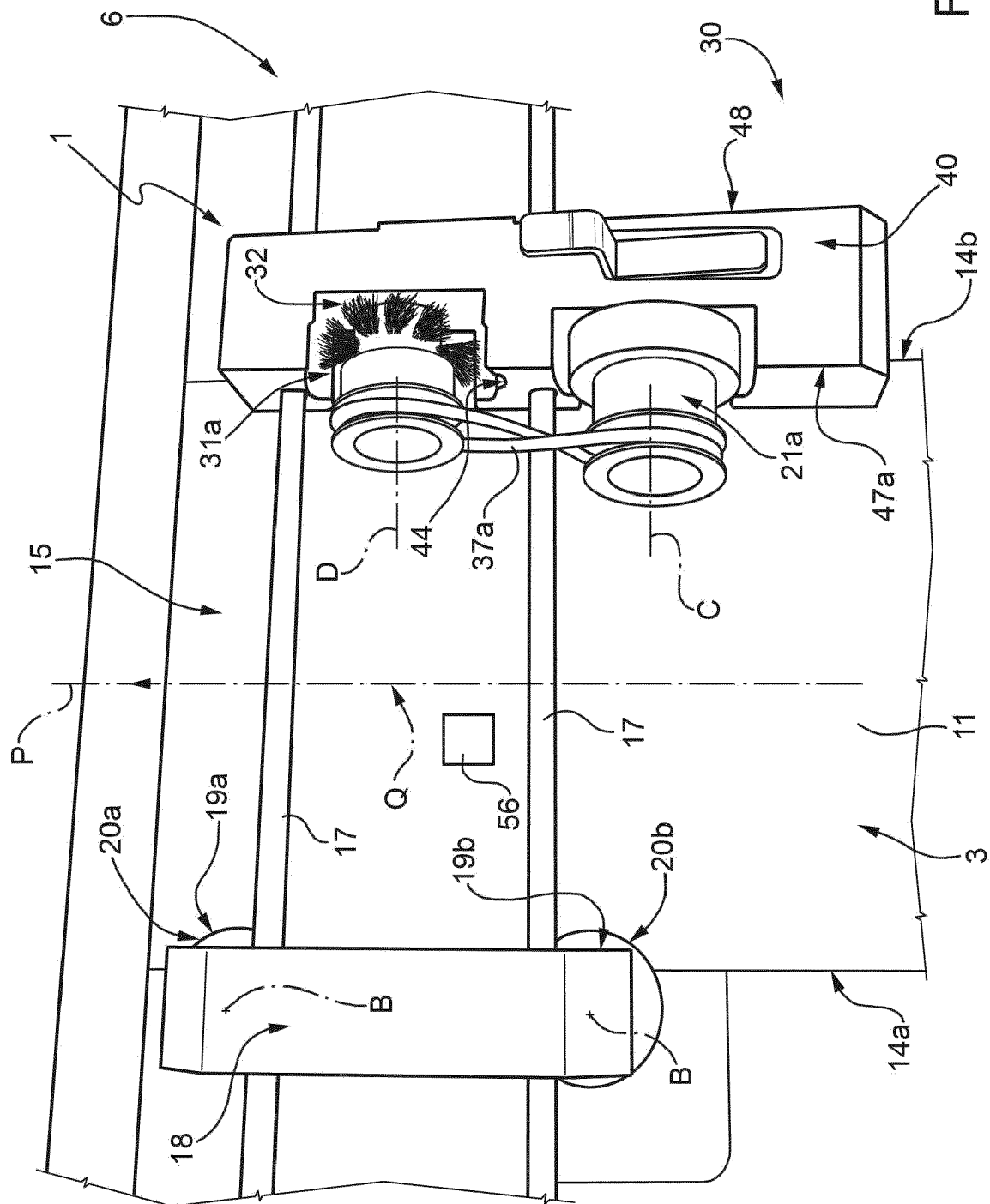


FIG. 1





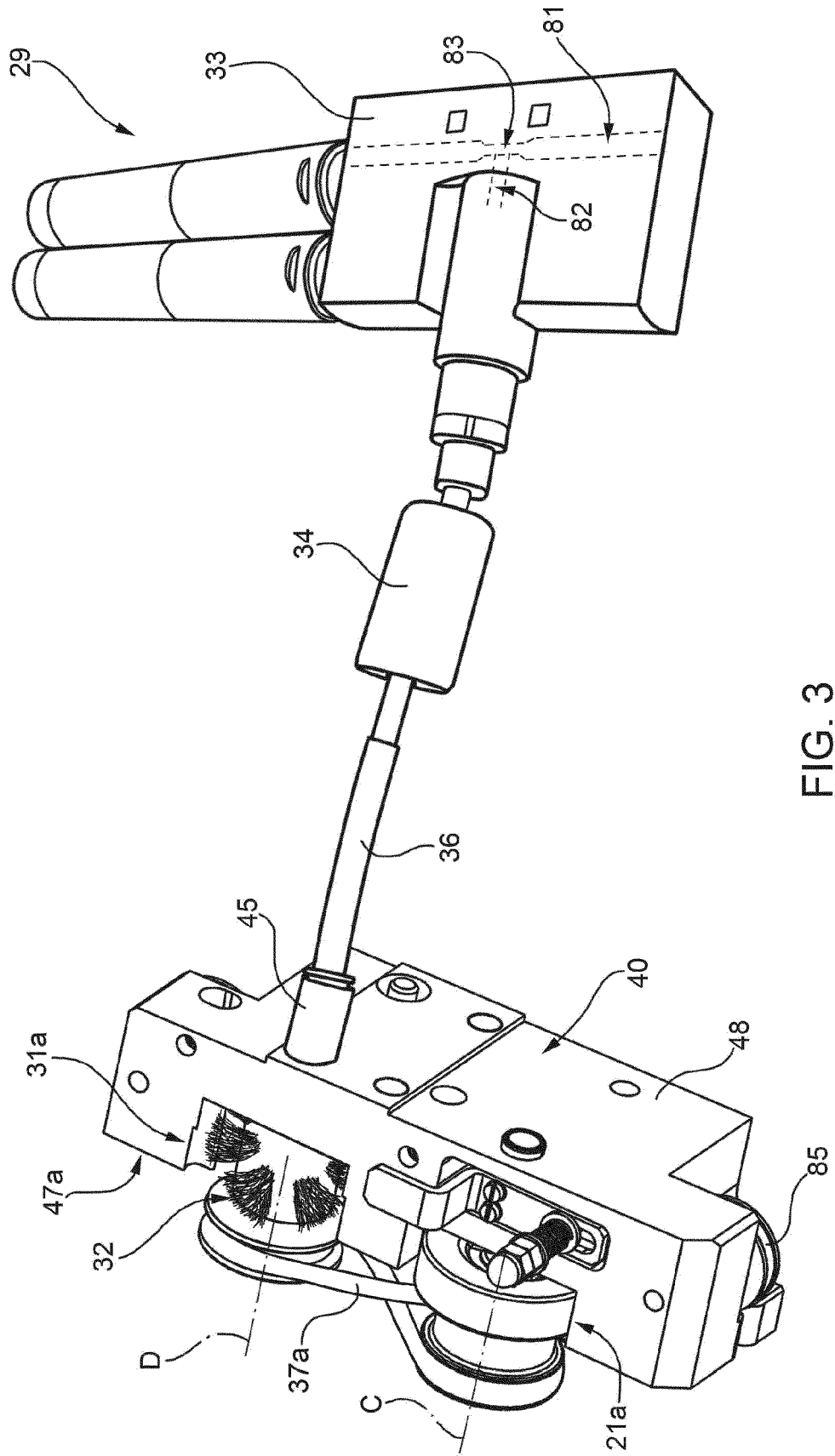


FIG. 3

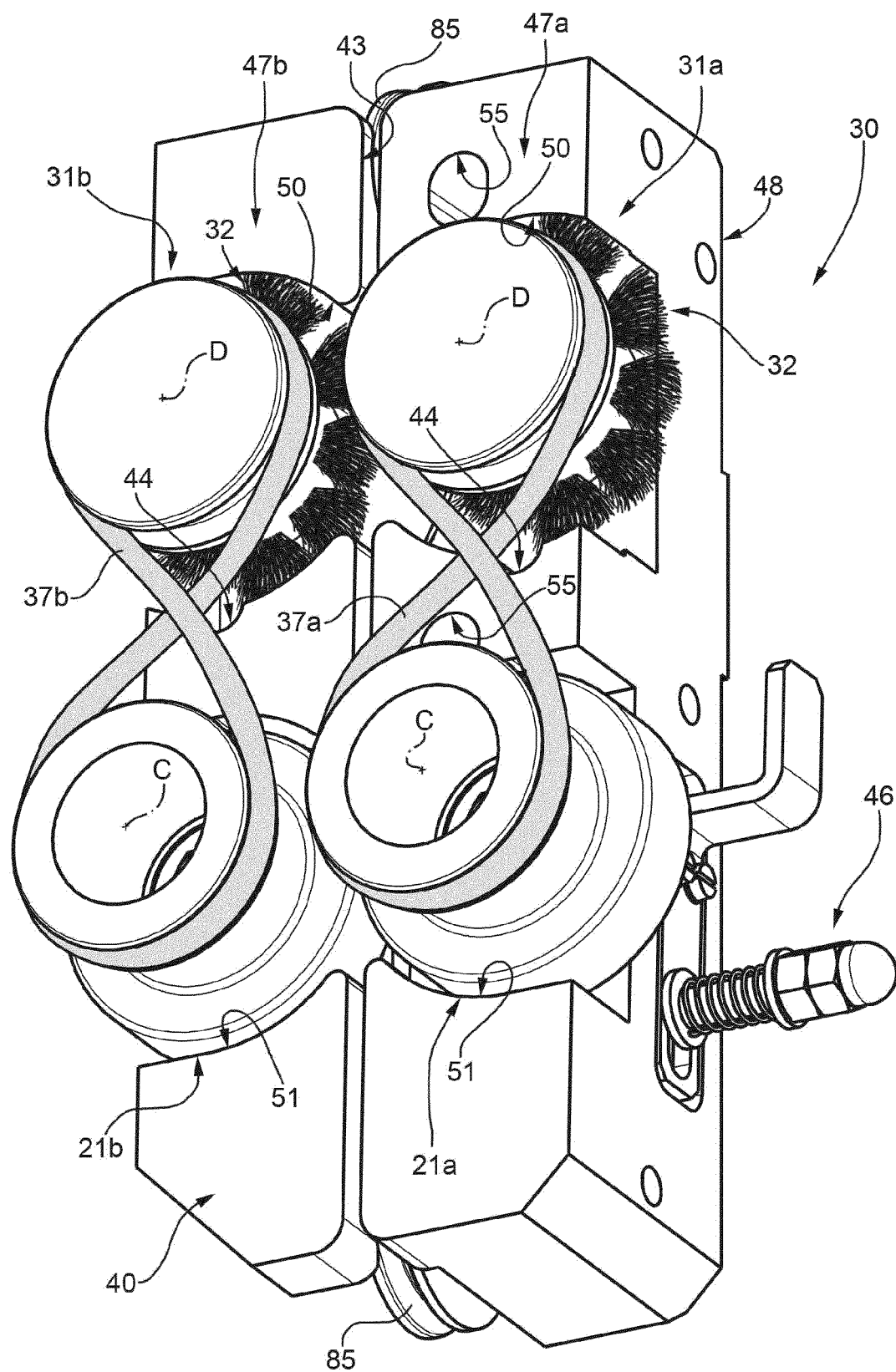


FIG. 4

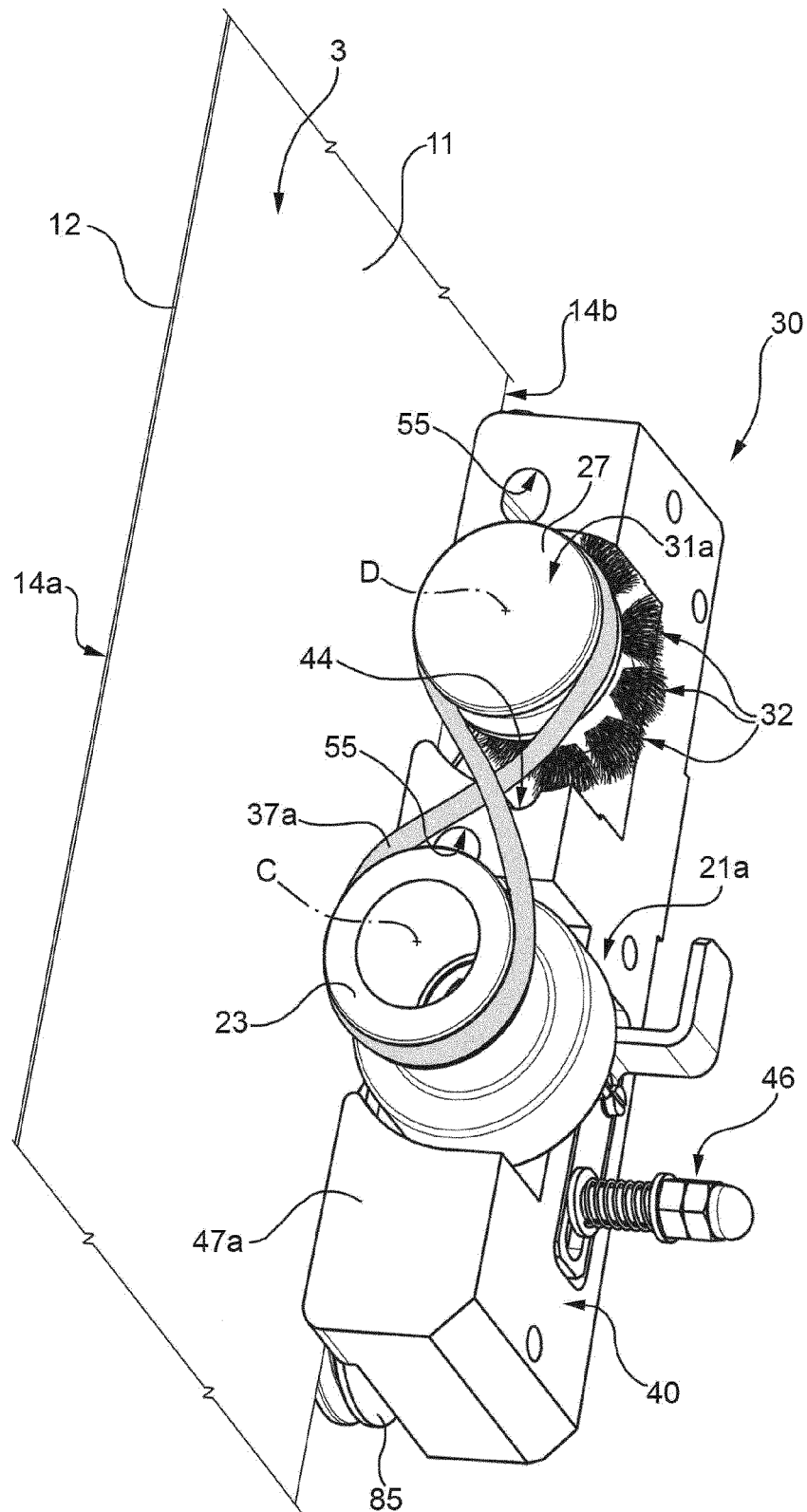


FIG. 5

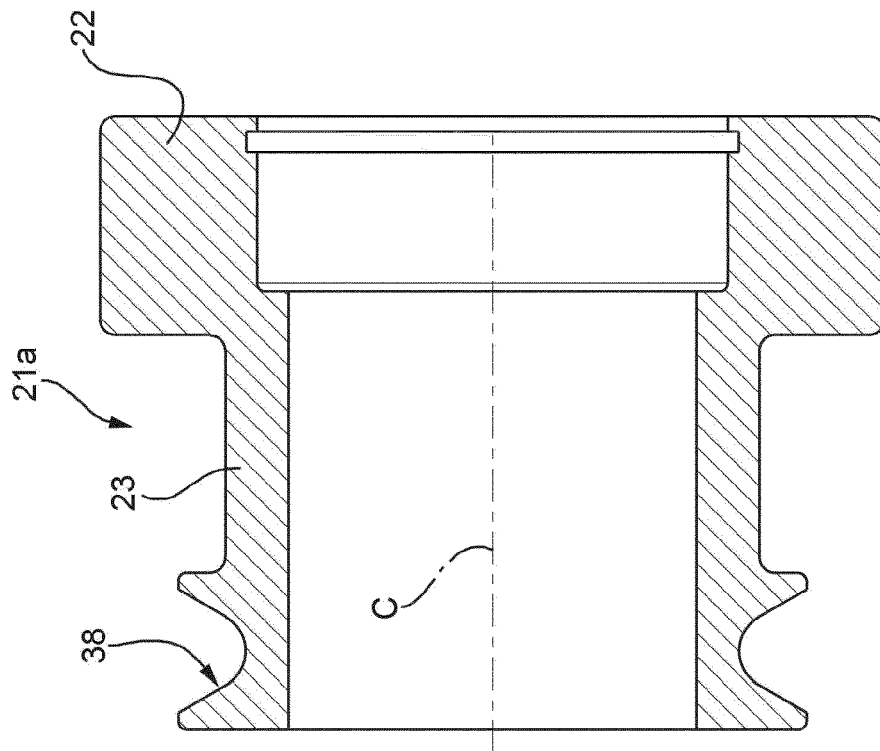


FIG. 6

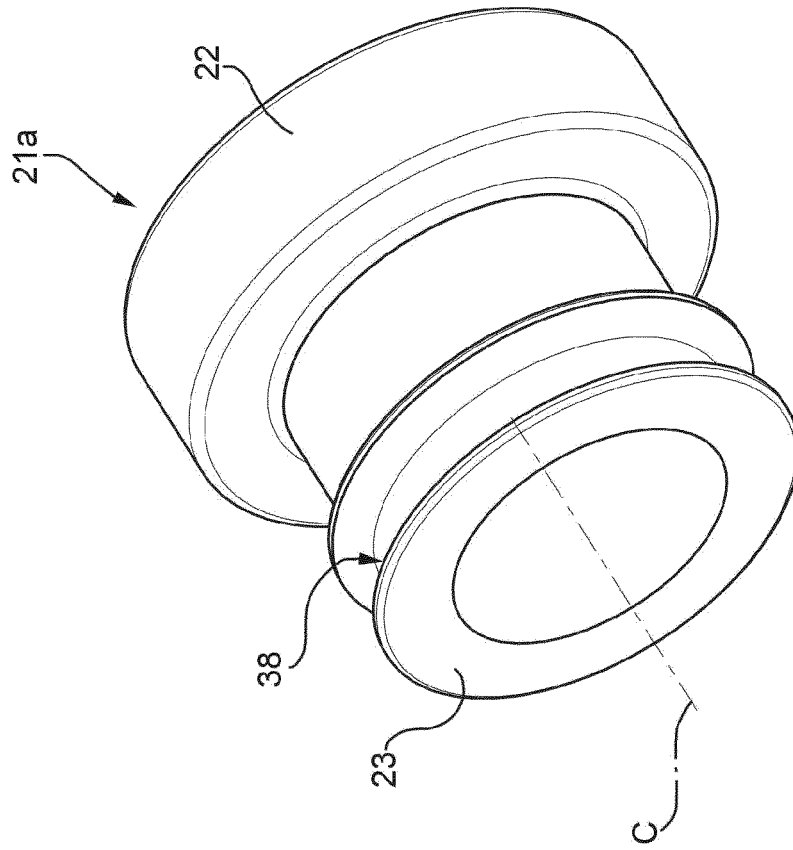


FIG. 7

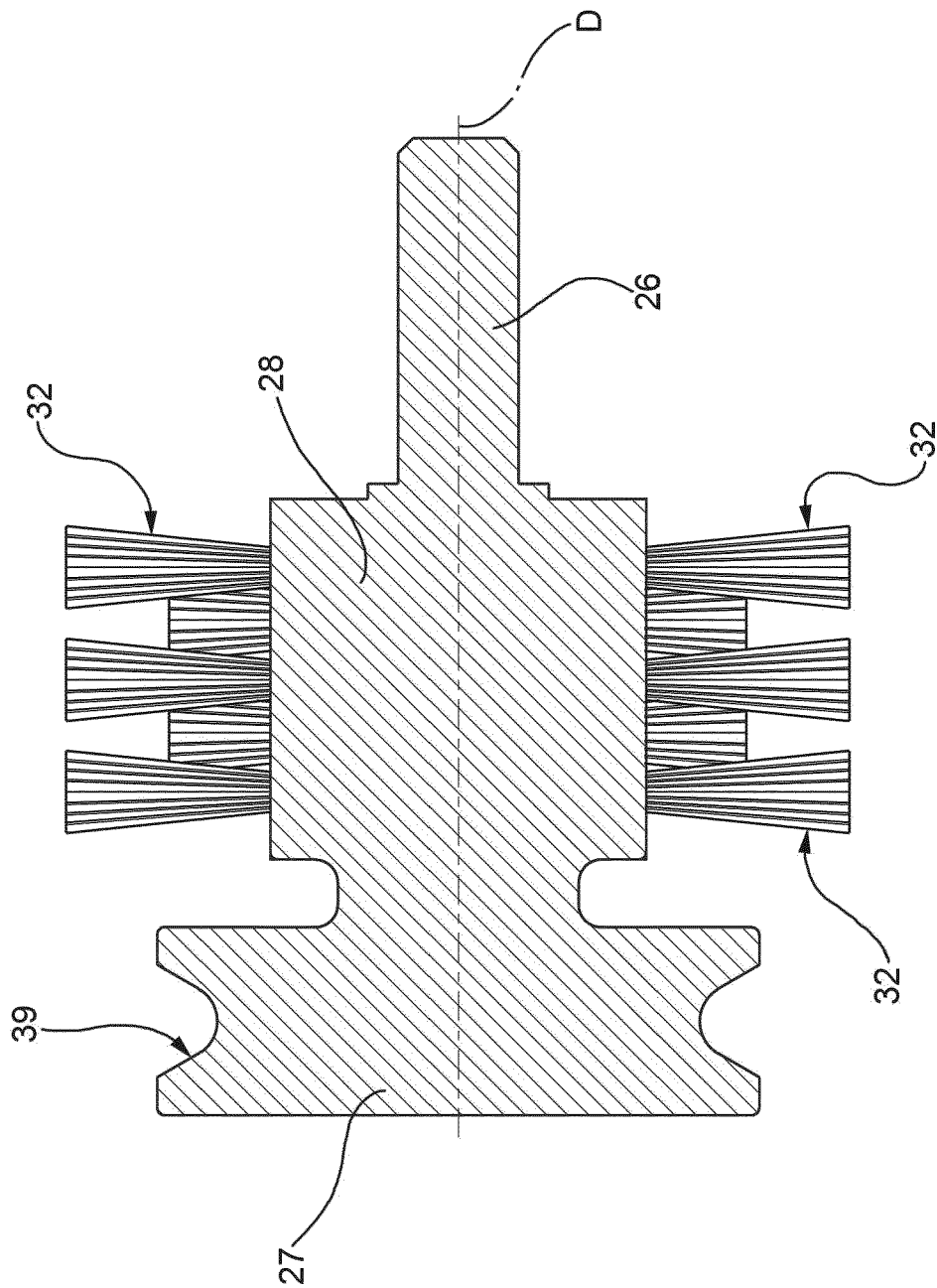


FIG. 8

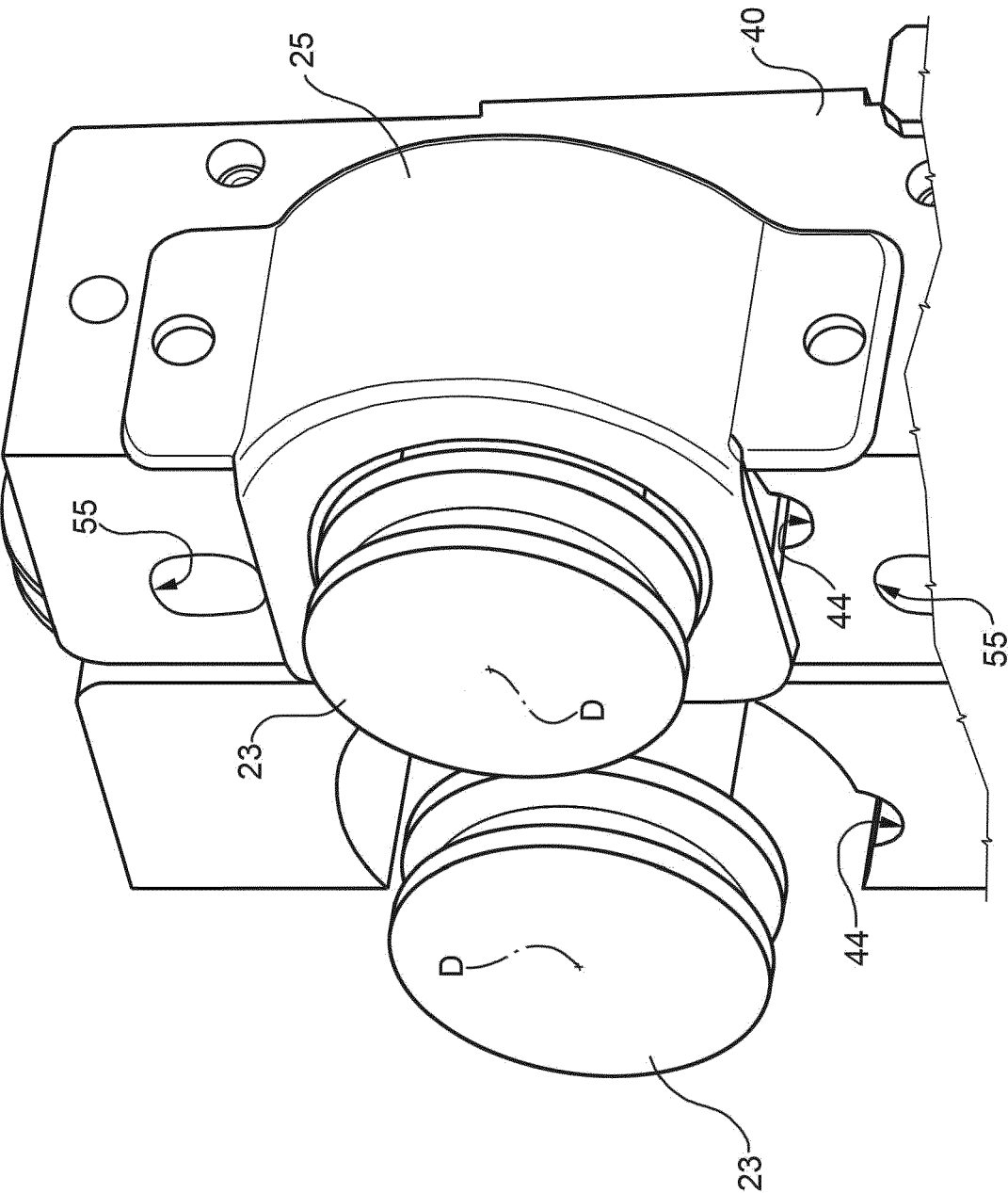


FIG. 9



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Application Number  
EP 12 15 2019

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Place of search Munich		Date of completion of the search 6 July 2012	Examiner Dick, Birgit
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