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(54) **Device for producing textile of the defined thickness**

Vorrichtung zur Herstellung von Textilien bestimmter Dicke

Dispositif de fabrication textile d'épaisseur définie

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Description

Technical field

[0001] The invention relates to the device for producing a textile of defined thickness by folding a two-dimensional textile into folds, which comprises a group of forming disks arranged on the first working shaft and a group of forming disks arranged on the second working shaft, which is parallel with the first working shaft, whereas each of the forming disks on its periphery is equipped with a system of working protrusions and working interspaces.

Background art

[0002] It is generally known that the structure of textiles influences an important effect as to their properties. Deformation properties, air permeability, permeability of liquids and insulation properties, both thermal insulating and noise insulating may significantly be effected by orientation of fibres in the inner structure of a textile. Based on this knowledge there was designed and produced several devices for forming of especially non-woven textiles, e.g. into the vertically organised lamellas.

[0003] Among such devices belong e.g. the device for piling a nonwoven from the vertically piled web known from the Czech patent CZ 280 153 or its analogy EP 516964, which remedies disadvantages of previous devices according to the Czech author's certificate 273997 and the Czech author's certificate 269300. The device is provided with a feeding mechanism formed of feeding roller, on which in the pitch of 3 to 100 mm the feed disks with roughened surface are positioned, and the guiding pan. Parallel with the feeding roller there is arranged the working roller on which the working disks equipped on its entire periphery with stuff pikes are mounted, while the working disks extend into areas between the feed disks on the feeding roller. Upon rotation of the working roller and working disks, the stuff pikes are producing the web fed by the feeding mechanism into lamellas producing the resultant textile, whose thickness usually is in the range of 15 to 50 mm. The disadvantage of this device is that it is not able to produce textiles having thickness under 15 mm, which expressively limits its application.

[0004] The goal of the invention is to design such a device that would be able to form a textile of defined thickness under 15 mm from a two-dimensional textile.

Principle of the invention

[0005] The goal of the invention has been reached by the device for producing a textile of defined thickness by folding a two-dimensional textile into folds, which comprises the first working shaft, on which the forming disks on its periphery equipped alternately by working protrusions and working interspaces are mounted, and the second working shaft, on which the forming disks on its periphery equipped on a rota basis by working protrusions

and working interspaces are mounted, while the second working shaft is parallel with the first working shaft. The principle of this device consists in that the forming disks mounted on the first working shaft are arranged against the forming disks mounted on the second working shaft, and the working protrusions of forming disks on the first working shaft extend at least partially into the working interspaces of forming disks on the second working shaft and vice versa, while in the space between the forming disks on the first working shaft and the forming disks on the second working shaft the forming space is formed, on whose output the off-take of the folded textile is arranged.

[0006] The off-take of the folded textile is formed by at least one first guiding surface in the space between the forming disks on the first working shaft, and at least one second guiding surface positioned in the space between the forming disks on the second working shaft. Next to the off-take of the folded textile from the forming space, the off-take also serves for a temporary fixing of the folded textile in its shape after exiting the forming space. The distance of the first guiding surface from the against it arranged second guiding surface therefore does not exceed the thickness of the folded textile.

[0007] From the point of view of maintenance and operation of the device it is advantageous if the first guiding surfaces are performed as non moveable.

[0008] Upon processing of the two-dimensional textiles at higher speeds, or upon processing of the two-dimensional textiles of greater surface weights it is advantageous, if at least one or more first guiding surfaces is moveable, which improves and makes easier the motion of the folded textile in the off-take and its transfer from the forming space.

[0009] The moveable first guiding surface is with advantage formed by a part of surface of the moving conveyor belt.

[0010] Similarly as the first guiding surface at least one second guiding surface may be performed as a non moveable or as a moveable, whereas it is possible to mutually combine this embodiment of the second guiding surfaces for the purpose to achieve an optimum structure of off-take and suitable conditions for transfer of the folded textile, and simultaneously to combine them with various embodiments of the first guiding surfaces.

[0011] For an easy and precise feeding of the two-dimensional textile into the working and forming space it is advantageous if at least one first guiding surfaces extends to both sides of the central plane, while, from this point of view, it is even more advantageous, if to both sides of the central plane at the same time also at least one second guiding surfaces extends.

[0012] The most suitable operational conditions and simultaneously the simplest production of forming disks of the device according to the invention is achieved in a case, when the lateral curve of the working protrusions is of an involute profile.

Description of the drawing

[0013] An example of the device for producing a textile of defined thickness according to the invention in vertical embodiment is schematically represented on the enclosed drawing, where the Fig. 1 represents axonometric view to this device, the Fig. 2 axonometric view to the forming section of this device and the Fig. 3 a cross section of the device according to the invention.

Examples of embodiment

[0014] The device for producing a textile of defined thickness by folding a two-dimensional textile according to the invention and its operation shall be explained on an exemplary embodiment illustrated on the Fig. 1, 2 and 3, where the device according to the invention is represented schematically in a vertical embodiment. Represented are only the main elements of this device, which are essential for understanding the principle of the invention, moreover in a simplified manner, regardless their real structure or technology of their production. To keep lucidity of the enclosed drawing, on each of working shafts in the Fig. 1 and Fig. 2 only two forming disks and one guiding pulley are represented, while due to the same reason there is not represented e.g. the drive of feeding means of the two-dimensional textile, the drives of working shafts or drives of twisting elements of the fixing unit, etc.

[0015] The device according to the invention comprises the forming section 1 and under it arranged fixing section 2.

[0016] The forming section 1 represented in the Fig. 2 comprises the known feeding means 3 of the two-dimensional textile, which in the represented example of embodiment is formed by a pair of parallel, horizontally arranged feeding rollers 31 and 32, which are rotatably mounted in the not represented frame of the device. One of the feeding rollers 31 and 32 is performed as an pressure one, and at least one of them is coupled with the not represented drive for its rotation movement around its longitudinal axis. Between the feeding rollers 31 and 32 the brought two-dimensional textile 33 is being compressed.

[0017] Under the feeding means 3 of the two-dimensional textile 33 on the frame of the device rotatably is mounted the first working shaft 41 coupled with the not represented drive, and the second working shaft 42 parallel with the first working shaft 41. Longitudinal axis 51 of the first working shaft 41 and the longitudinal axis 52 of the second working shaft 42 are horizontal and the plane interposed through them forms the central plane 6.

[0018] On the first working shaft 41 there are firmly mounted the forming disks 71, while each of them on its entire periphery is equipped with plurality of working protrusions 81 of the same size whose lateral curve in the represented example of embodiment has an involute profile, and which are separated by a working interspaces

91. The working protrusions 81 of neighbouring forming disks 71 on the first working shaft 41 are arranged in alignment, and their peaks are laying on straight lines parallel with longitudinal axis 51 of the first working shaft 41.

[0019] Outer circles 101 are circles escribed of the respective forming disks 71. Semi-diameter of the outer circle 101 equals to the semi-diameter of the head circle of working protrusions 81 increased by the thickness of the two-dimensional textile 33. Outer circles 101 are intersecting the central plane 6 in the first working points 111. All first working points 111 lie on the first working straight line 121.

[0020] Through the first working straight line 121 perpendicular to the central plane 6 the first working plane 61 is passing.

[0021] In the space between the neighbouring forming disks 71 on the first working shaft 41 freely rotatably are mounted the guiding pulleys 131, whose diameter is smaller than the diameter of forming disks 71.

[0022] On the second working shaft 42 in the embodiment represented in the Fig. 1 to Fig. 3 are mounted the forming disks 72 of the same structure and the same diameter as the forming disks 71 on the first working shaft 41, while in the space between them freely rotatably are mounted the guiding pulleys 132 of the same structure as the guiding pulleys 131 on the first working shaft 41. The outer circles 102 assigned to the forming disks 72 on the second working shaft 42 are intersecting the central plane 6 in the second working points 112, while all the second working points 112 lie on the second working straight line 122.

[0023] Through the second working straight line 122 perpendicular to the central plane 6 intersects the second working plane 62, which together with the first working plane 61 encloses the working space 60. Part of the working space 60 limited from below by the central plane 6 and from side by planes interlaid by outer faces of outer forming disks 71 and 72 forms the forming space 600, in which the two-dimensional textile 33 is folded into folds 331, through which the folded textile 330 is produced. Into this forming space at least partially extend the working protrusions 71 of forming disks on the first working shaft 41 and/or working protrusions 72 of forming disks on the second working shaft 42.

[0024] The forming disks 71 on the first working shaft 41 and forming disks 72 on the second working shaft 42 are arranged against each other, while some working protrusions 81 of the forming disks 71 on the first working shaft 41, which in the given instant of time are to be found in the forming space 600, extend into the respective working interspaces 92 of forming disks 72 arranged on the second working shaft 42 and vice versa.

[0025] In the Fig. 3 in front of the forming disk 71 on the first working shaft 41 is represented the first guide-rail 141 and in front of the forming disk 72 on the second working shaft 42 is represented the second guide-rail 142. The first guide-rail 141 on its surface adjoining to

the working space 60 is provided with a sliding surface 1410. A part of sliding surface 1410 under the central plane 6 is perpendicular to the central plane 6 and parallel with the second working plane 62, while a part of the first guide-rail 141 and its sliding surfaces 1410 extending above the central plane 6 is bent in direction from the working space 60. The first guide-rail 141 in example of embodiment represented in the Fig. 1 to Fig. 3 is arranged between each two neighbouring forming disks 71 on the first working shaft 41. The structure of the second guide-rail 142 is identical with structure of the first guide-rail 141, while positioning and arrangement of the second guide-rail 142 is mirrored to arrangement of the first guide-rail 141. That means the second guide-rail 142 on its surface adjoining to the working space 60 is provided with sliding surface 1420, whose part under the central plane 6 is perpendicular to the central plane 6, and parallel with the first working plane 61, while a part of the second guide-rail 142 and its sliding surfaces 1420 extending above the central plane 6 is bent in direction from the working space 60, which together with similar shaping of a part of the first guide-rail 141 makes easier introduction of the two-dimensional textile 33 into the forming space 600. The second guide-rail 142 in example represented in the Fig. 1 to Fig. 3 is arranged between each two neighbouring forming disks 72 on the second working shaft 42.

[0026] Above the forming disks 71 mounted on the first working shaft 41 on frame of the device rotatably is mounted the upper shaft 151 being parallel with the first working shaft 41, while the working length of the upper shaft 151 extends above all guiding pulleys 131 mounted on the first working shaft 41.

[0027] In the space under the forming disks 71 of the first working shaft 41 on frame of the device rotatably is mounted the tensioning shaft 161, which is parallel with the first working shaft 41. Operating length of the tensioning shaft 161 extends under all guiding pulleys 131 mounted on the first working shaft 41.

[0028] Under the tensioning shaft 161 on frame of the device rotatably, parallel with the tensioning shaft 161 is arranged the lower shaft 171, whose working length extends under all guiding pulleys 131 mounted on the first working shaft 41.

[0029] In space under the guide-rails 141 is arranged the driving shaft 181, adjoined rotatably on frame of the device. The driving shaft 181 is parallel with the first working shaft 41 and its working length extends under all guiding pulleys on the first working shaft 41, while the plane interlaid with sliding surfaces 1410 of the first guide-rails 141 is towards the driving shaft 181 tangential. The driving shaft 181 is coupled with the not represented drive for its rotating movement around the longitudinal axis.

[0030] A part of surface of the upper shaft 151, of the guiding pulley 131, of the tensioning shaft 161, lower shaft 171, driving shaft 181 and the sliding surface 1410 of the first guide-rail 141 forms a system for guiding the conveyor belt 191, which is arranged between each two

neighbouring forming disks 71 on the first working shaft 41. Each conveyor belt 191 is guided from the upper shaft 151 to the surface of guiding pulley 131, from where is continues to the surface of the tensioning shaft 161 and further to the surface of lower shaft 171. From the lower shaft 171 the conveyor belt 191 is guided to the surface of the driving shaft 181, from which it transfers to the sliding surface 1410 of the respective guide-rail 141. On the sliding surface 1410 of the first guide-rail 141 the conveyor belt 191 is brought back to the upper shaft 151 and it is closed into an infinite loop. Outer surface of each conveyor belt 191 on a part of the sliding surface 1410, which is perpendicular to the central plane 6, and the outer surface of a part of the conveyor belt 191 between the guide-rail 141 and driving shaft 181 forms the first guiding surface 201.

[0031] Similar conveyor belts 192 are arranged also between the neighbouring forming disks 72 on the second working shaft 42, when each of these conveyor belts 192 is guided on sliding surface 1420 of the second guide-rail 142 and on a part of surface of the upper shaft 152, of the guiding pulley 132, the tensioning shaft 162, lower shaft 172 and driving shaft 182. Outer surface of each conveyor belt 192 on a part of the sliding surface 1420 being perpendicular to the central plane 6, and outer surface of a part of conveyor belt 192 between the guide-rail 142 and the driving shaft 182, forms the second guiding surface 202. All first guiding surfaces 201 and all second guiding surfaces 202 form the off-take 200 of the folded textile 330 from the forming space 600, while the distance of the first guiding surface 201 from against it arranged second guiding surface 202 equals to the height of the working protrusion 81 or 82 of the forming disks 71 or 72 extending into the working interspace 92 or 91 of the opposite forming disk 72 or 71 in the central plane 6 increased by double thickness of the two-dimensional textile 33, this is the thickness of the folded textile 330.

[0032] Under the driving shafts 181 and 182 on frame of the device rotatably are mounted the first tensioning shaft 211 and the second tensioning shaft 212, which are parallel with the driving shafts 181 and 182, while working length of the tensioning shafts 211 and 212 is identical with working length of the driving shafts 181 and 182.

[0033] In space under the tensioning shafts 211 and 212 is arranged the fixing unit 22, which in the represented example of embodiment is performed as a device according to the patent document CZ 281287.

[0034] Under the fixing unit 22 to frame of the device are rotatably connected the first rolling shaft 231 and the second rolling shaft 232, which are parallel with the tensioning shafts 211 and 212 and are of the same working length as the tensioning shafts 211 and 212.

[0035] Under the rolling shafts 231 and 232 to the frame of the device are rotatably connected the first terminal shaft 241 and the second terminal shaft 242, which are parallel with the rolling shafts 231 and 232 and are of the same working length as the rolling shafts 231 and

232.

[0036] On surface of the driving shaft **181** between each two neighbouring conveyor belts **191** is guided one the first shifting belt **251**. Each first shifting belt **251** is guided from surface of the driving shaft **181** to the first tensioning shaft **211**, into the fixing unit **22**, and to the surface of the first rolling shaft **231** and from here to surface of the first terminal shaft **241**. From surface of the terminal shaft **241** the shifting belt **251** is guided between the twisting elements **220** of fixing unit **22** to the driving shaft **181**, while outer surface of the shifting belt **251** between the terminal shaft **241** and driving shaft **181** forms the first shifting surface **2510**, which in the represented example of embodiment lies in the second working plane **62**. The first shifting belt **251** on surface of the driving shaft **181** is enclosed into an infinite loop.

[0037] On surface of the driving shaft **182**, of the second tensioning shaft **212**, of the second rolling shaft **232** and the second terminal shaft **242** there is guided the second shifting belt **252** enclosed into an infinite loop, whose outer surface between the driving shaft **181** and the terminal shaft **242** forms the second shifting surface **2520**, which in the represented example of embodiment lies in the first working plane **61**.

[0038] Upon operation of the device the two-dimensional textile **33** is caught between the rollers **31** and **32** of the feeding means **3**, and it is brought into the working space **60** and into the forming space **600** between the rotating forming disks **71** on the first working shaft **41** and the rotating forming disks **72** on the second working shaft **42**. In the forming space **600** the two-dimensional textile **33** by means of the working protrusions **81** and **82** on periphery of the forming disks **71** and **72** of the first working shaft **41** and the second working shaft **42** is folded into the shape of the folded textile **330** formed by folds **331**, whose height during passing through the forming space **600** gradually increases, while the actual height of the fold **331** corresponds to the sum of a depth of penetration of the given working protrusion **81** or **82** into the working interspace **92** or **91** and the thickness of the two-dimensional textile **33**. The greatest height of the fold **331**, which corresponds to the thickness of the textile **332** of a defined thickness is achieved at the moment, when the working protrusion **81** or **82** extending into the corresponding working interspace **92** or **91** is passing through the central plane **6**.

[0039] After passing through the central plane **6** the depth of penetration of the working protrusions **81** and **82** of the forming disks **71** and **72** gradually decreases, till these working protrusions **71** and **72** exit from the working space **60**, while the folded textile **330** is compressed between the first guiding surfaces **201** and the second guiding surfaces **202**, which in the represented example of embodiment are formed by the surface of moving conveyor belts **191** and **192**, which move in the same direction as the forming disks **71** and **72**. Through motion of the first guiding surfaces **201** and second guiding surfaces **202** the folded textile **330** is brought between

in the same direction moving the first shifting surface **2510** and the second shifting surface **2520**.

[0040] Between the first shifting surface **2510** and the second shifting surface **2520** the folded textile **330** is brought into contact with the twisting elements **220** of the fixing unit **22**. The twisting elements **220** perpendicular to the plane of the folded textile **330** after then twist the fibres protruding from peaks of individual folds **331** into a stable linear formations similar to the yarns, through which the folded textile **330** is mechanically fixed and transformed into the textile **332** of defined thickness, which is of a stable shape and appearance.

[0041] Further not represented examples of embodiment differ from the described example e.g. by that the drive is not only coupled with the first working shaft **41**, but also with the second working shaft **42**. By mutual control of these drives e. g. by means of PC, it is possible between the working protrusions **81** and **82** of the forming disks **71** and **72** to maintain permanently clearance of certain sizes, which prevents any possible damage of the two-dimensional textile **33** or the folded textile **330** due to pressure between the side surfaces of working protrusions **81** and **82** and their mutual motion.

[0042] In further examples of embodiment it is advantageous if the first working shaft **41** and/or the second working shaft **42** is connected to the frame of the device in an adjustable manner, so that the axial distance between them is adjustable, and as a result of which adjustable is also the size of forming space **600** and size of penetration of the working protrusions **81** and **82** of the forming disks **71** and **72** into the working interspaces **91** and **92** of opposite forming disks **72** and **71**. Adjustment of axial distance between the first working shaft **41** and the second working shaft **42** enables a certain degree control of the height of folds **331** and thus the thickness of the folded textile **330** and thus also of the final thickness of the textile **332** of defined thickness. In this case it is nevertheless essential to secure that simultaneously with axial distance of the first working shaft **41** and the second working shaft **42** by the same value is changed also the distance between at least some of the first guiding surfaces **201** and at least some of the second guiding surfaces **202**, so that these guiding surfaces **201** and **202** may fulfil their function, this is to maintain the folded textile **330** in the same status as it leaves the forming space **600**.

[0043] By controlling the speed of motion of the conveyor belts **191** and **192** there is enabled the control of density of folds **331** of the folded textile **330** and change of its surface weight, and as a result of it also control of a surface weight of the textile **332** of defined thickness.

[0044] In other examples of embodiment the diameter of forming disks **71** on the first working shaft **41** is different from diameter of forming disks **72** on the second working shaft **42**. By a change in ratio of diameters of the forming disks **71** and **72** also the size of forming space **600** is changed.

[0045] Another difference between the described example of embodiment and any from possible not repre-

sented examples of embodiment of the device according to the invention is that the working protrusions 81 and 82 of neighbouring forming disks 71 and 72 need not be unconditionally aligned - their peaks need not lie on straight lines being parallel with axis of the working shaft 51 and 52. Neighbouring forming disks 71 on the first working shaft 41 may towards one another be turned in principle arbitrarily, while it is important that in the same manner are turned one towards another also the forming disks 72 on the second working shaft 42, and so the arrangement of working protrusions 81 and 82 and working interspaces 91 and 92 necessary for folding the two-dimensional textile 33 into folds 331 is achieved. Such device is applicable for producing the folded textile 330 from the two-dimensional textile 33 of suitable flexible-elastic properties.

[0046] The working protrusions 81 and 82 on the forming disks 71 and 72 are not limited only to their shapes with involute profile of lateral curve, but they can be substantially arbitrary shaped, nevertheless it must enable folding of the two-dimensional textile 33 into folds 331 and the easiest transport of the formed fold from the working interspace 91 and/or 92. From this point of view it is therefore advantageous if the broadest place of each working protrusion 81 and 82 is its base. Through various shaping of working protrusions 81 and 82 it is possible to a certain degree to influence the shape, arrangement and density of folds 331 of the textile 332 of defined thickness.

[0047] The structure of the textile 332 of defined thickness and its properties may be changed also by that the working protrusions 81 and 82 on periphery of the forming disks 71 and 72 are of a different size - for example on periphery of the forming disks 71 and 72 the working protrusions 81 and 82 of two different sizes are changing, whereas in these cases the outer circle 111 and 112 is understood to be the head circle of the working protrusions 81 and 82 with the greatest diameter, which is increased by thickness of the two-dimensional textile 33. In another examples of embodiment the working protrusions 81 or 82 are performed only on a part of periphery of the forming disks 71 or 72.

[0048] Further modifications with respect to the device of the described structure may further consist in shaping the first guiding surfaces 201 and the second guiding surfaces 202 and in its number. The first guiding surfaces 201 and the second guiding surfaces 202 may substantially be formed arbitrarily, in any case it is necessary, that the second guiding surfaces 202 were under the central plane 6 parallel with the first guiding surfaces 201, so that their distance under the central plane 6 is not greater than the thickness of the folded textile 330 (though it may be smaller), and at least a part of the off-take 200 of the folded textile 330 was arranged under the forming space 600, from where the folded textile 330 is brought into the off-take 200. Number of the first guiding surfaces 201 as well as the second guiding surfaces 202 is nearly arbitrary, nevertheless sufficient for that these

guiding surfaces secure the folded textile 330 transporting from the forming space 600 in its shape.

[0049] The first guiding surfaces 201 as well as the second guiding surfaces 202 in the represented example of embodiment are moveable - they are formed by parts of outer surfaces of moving conveyor belts 191 and 192, nevertheless in further not represented examples of embodiment they may be non-moveable, e.g. formed by the sliding surfaces 1410 and 1420 of the guide-rails 141 and 142, possibly some of the first guiding surfaces 201 and/or the second guiding surfaces 202 may be fixed, and the remaining guiding surfaces 201 or 202 moveable.

[0050] In cases when the first guiding surfaces 201 and/or the second guiding surfaces 202 are formed by parts of outer surfaces of conveyor belts 191 and 192, these conveyor belts 191 and 192 in the device may be guided nearly arbitrarily, nevertheless their parallelism under the central plane 6 must be preserved and their distance under the central plane 6 may not exceed thickness of the folded textile 330 transporting from the forming space 600. In examples of embodiment, when the conveyor belts 191 and 192 are guided identically or similarly as in example represented in the Fig. 1 to Fig 3, it is possible, that any of the shafts, on which the conveyor belts 191 and 192 are guided, this is the upper shaft 151 and 152, tensioning shaft 161 and 162, lower shaft 171 and 172 or the driving shaft 181 and 182 were performed as the static ones, while the conveyor belts 151 or 152 at their movement are sliding on their surface. Any of these shafts, which in the frame of the device is attached rotatably, may be coupled with a drive for rotation motion and for drive of conveyor belt. Any of these shafts may also on its surface be provided with some of the known surface treatment to prevent the undesired motion of conveyor belts, or their slippage.

[0051] In the same way, arbitrarily may be guided the first shifting belts 251 and the second shifting belts 252, while the parallelism of the first shifting surfaces 2510 with the second shifting surfaces 2520 must be preserved and their distance may not exceed thickness of the folded textile 330. The first and second shifting surfaces 2510 and 2520 may as the first guiding surfaces 201 and second guiding surfaces 202 be formed as fixed non moveable surfaces. In some examples of embodiment it is possible and advantageous, if the non moveable first guiding surfaces 201 fluently verge into the first non moveable shifting surfaces 2510, or they merge in them, and the second non moveable guiding surfaces 202 continuously verge into the second non moveable shifting surfaces 2520, or they merge in them.

[0052] On the trajectory of the folded textile 330 in the fixing section 2 of the device which is delimited by the first shifting surfaces 2510 and the second shifting surfaces 2520 there may be installed nearly unlimited number of fixing units 22, which fix the folded textile 330 either by the described mechanical twisting of fibres on surfaces of the folds 331 or in other manner - e.g. by application of fusing binders, by laser, or by another

known manner or by their combinations.

[0053] The device represented and described in the vertical embodiment may further be arbitrarily tilted, possibly its forming section 1 and fixing section 2 may be mutually nearly arbitrarily arranged.

[0054] The described device according to the invention and its various technical embodiments is not applicable strictly only for processing of two-dimensional textiles **33** of various parameters and kinds, but it may process also similar two-dimensional materials, e.g. paper, cardboard, etc., while in these cases it is necessary to adjust to the material being processed also the type of fixing unit, possibly of units.

List of referential markings

[0055]

1	forming section of the device
2	fixing section of the device
3	feeding means of the textile
31	roller
32	roller
33	two-dimensional textile
330	folded textile
331	fold
332	textile of defined thickness
41	first working shaft
42	second working shaft
51	longitudinal axis of the first working shaft
52	longitudinal axis of the second working shaft
6	central plane
60	working space
600	forming space
61	first working plane
62	second working plane
71	forming disk
72	forming disk
81	working protrusion
82	working protrusion
91	working interspace
92	working interspace
101	outer circle
102	outer circles
111	first working point
112	second working point
121	first working straight line
122	second working straight line
131	guiding pulley
132	guiding pulley
141	guide-rail
1410	sliding surface
142	guide-rail
1420	sliding surface
151	upper shaft
152	upper shaft
161	tensioning shaft
162	tensioning shaft

171	lower shaft
172	lower shaft
181	driving shaft
182	driving shaft
5 191	first conveyor belt
192	second conveyor belt
200	off-take of the folded textile
201	first guiding surface
202	second guiding surface
10 211	first tensioning shaft
212	second tensioning shaft
22	fixing unit
220	twisting element
231	first rolling shaft
15 232	second rolling shaft.
241	first terminal shaft
242	second terminal shaft
251	first shifting belt
2510	first shifting surface
20 252	second shifting belt
2520	second shifting surface

Claims

- 25
1. The device for producing of a textile of defined thickness by folding a two-dimensional textile into folds, which comprises a group of forming disks arranged on the first working shaft and a group of forming disks arranged on the second working shaft, which is parallel with the first working shaft, whereas each of the forming disks on its periphery is equipped with a system of working protrusions and working interspaces, **characterised in that** the forming disks (71) mounted on the first working shaft (41) are arranged against the forming disks (72) mounted on the second working shaft (42), and the working protrusions (81) of forming disks (71) on the first working shaft (41) extend at least partially into the working interspaces (92) of forming disks (72) on the second working shaft (42), while the plane of symmetry of each working protrusion (81) comprises axis of rotation of the forming disc (71), and working protrusions (82) of forming disc (72) on second working shaft (42) extend at least partially into working interspaces (91) of forming discs (71) on the first working shaft (41), while plane of symmetry of each working protrusion (82) comprises axis of rotation of the forming disc (72), whereas in the space between the forming disks (71) on the first working shaft (41) and the forming disks (72) on the second working shaft (42) the forming space (600) is formed, on whose output the off-take (200) of the folded textile (330) is arranged.
- 30
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- 55 2. The device according to the claim 1, **characterised in that** the off-take (200) of the folded textile (330) comprises at least one first guiding surface (201) extending into the space between the forming disks

(71) on the first working shaft (41), and at least one second guiding surface (202) extending into the space between the forming disks (72) on the second working shaft (42).

3. The device according to the claim 2, **characterised in that** at least one first guiding surface (201) is fixed. 5
4. The device according to the claim 2 or 3, **characterised in that** at least one first guiding surface (201) is moveable. 10
5. The device according to the claim 4, **characterised in that** at least one first guiding surface (201) is formed by a part of surface of the moveable conveyor belt (191). 15
6. The device according to any of the claims 2 to 5, **characterised in that** at least one second guiding surface (202) is fixed. 20
7. The device according to any of the claims 2 to 6, **characterised in that** at least one second guiding surface (202) is moveable. 25
8. The device according to the claim 7, **characterised in that** at least one second guiding surface (202) is formed by a part of surface of the moveable conveyor belt (192). 30
9. The device according to any of the claims 2 to 8, **characterised in that** at least one first guiding surface (201) extends to both sides of the central plane (6). 35
10. The device according to any of the claims 2 to 9, **characterised in that** at least one second guiding surface (202) extends to both sides of the central plane (6). 40
11. The device according to any of the previous claims, **characterised in that** the lateral curve of the working protrusions (81) and (82) is of an involute profile. 45

Patentansprüche

1. Vorrichtung zur Erzeugung eines textilen Gebildes einer vorgegebenen Dicke durch Falten eines textilen Flächengebildes in die Falte, die eine Gruppe der Formscheiben, die auf der ersten Arbeitswelle angeordnet sind, und eine Gruppe der Formscheiben aufweist, die auf der zweiten Arbeitswelle angeordnet sind, die mit der ersten Arbeitswelle parallel-laufend ist, wobei jede der Formscheiben auf ihrem Umfang mit einem System der Arbeitsvorsprünge und der Arbeitslücken versehen ist, **dadurch gekennzeichnet, dass** die Formscheiben (71), die auf

der ersten Arbeitswelle (41) gelagert sind, gegen die Formscheiben (72) angeordnet sind, die auf der zweiten Arbeitswelle (42) gelagert sind, und die Arbeitsvorsprünge (81) der Formscheiben (71) auf der ersten Arbeitswelle (41) mindestens teilweise in die Arbeitslücken (92) der Formscheiben (72) auf der zweiten Arbeitswelle (42) eingreifen, wobei die Symmetrieebene von jedem Arbeitsvorsprung (81) die Rotationsachse der Formscheibe (71) aufweist, und die Arbeitsvorsprünge (82) der Formscheiben (72) auf der zweiten Arbeitswelle (42) mindestens teilweise in die Arbeitslücken (91) der Formscheiben (71) auf der ersten Arbeitswelle (41) eingreifen, wobei die Symmetrieebene von jedem Arbeitsvorsprung (82) die Rotationsachse der Formscheibe (72) aufweist, wobei in dem Raum zwischen den Formscheiben (71) auf der ersten Arbeitswelle (41) und den Formscheiben (72) auf der zweiten Arbeitswelle (42) ein Formraum (600) gebildet ist, auf dessen Ausgang die Abführung (200) des gefalteten textilen Gebildes (330) gelagert ist.

2. Vorrichtung nach dem Anspruch 1, **dadurch gekennzeichnet, dass** die Abführung (200) des gefalteten textilen Gebildes (330) mindestens eine erste Führungsfläche (201), die in den Raum zwischen den Formscheiben (71) auf der ersten Arbeitswelle (41) eingreift, und mindestens eine zweite Führungsfläche (202) aufweist, die in den Raum zwischen den Formscheiben (72) auf der zweiten Arbeitswelle (42) eingreift.
3. Vorrichtung nach dem Anspruch 2, **dadurch gekennzeichnet, dass** mindestens eine erste Führungsfläche (201) fest ist.
4. Vorrichtung nach dem Anspruch 2 oder 3, **dadurch gekennzeichnet, dass** mindestens eine erste Führungsfläche (201) beweglich ist.
5. Vorrichtung nach dem Anspruch 4, **dadurch gekennzeichnet, dass** mindestens eine erste Führungsfläche (201) von einem Teil der Oberfläche eines beweglichen Förderbandes (191) gebildet ist.
6. Vorrichtung nach einem der Ansprüche 2 bis 5, **dadurch gekennzeichnet, dass** mindestens eine zweite Führungsfläche (202) fest ist.
7. Vorrichtung nach einem der Ansprüche 2 bis 6, **dadurch gekennzeichnet, dass** mindestens eine zweite Führungsfläche (202) beweglich ist.
8. Vorrichtung nach dem Anspruch 7, **dadurch gekennzeichnet, dass** mindestens eine zweite Führungsfläche (202) von einem Teil der Oberfläche eines beweglichen Förderbandes (192) gebildet ist.

9. Vorrichtung nach einem der Ansprüche 2 bis 8, **dadurch gekennzeichnet, dass** mindestens eine erste Führungsfläche (201) auf beide Seiten der Mittelebene (6) eingreift.
10. Vorrichtung nach einem der Ansprüche 2 bis 9, **dadurch gekennzeichnet, dass** mindestens eine zweite Führungsfläche (202) auf beide Seiten der Mittelebene (6) eingreift.
11. Vorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Seitenkurve der Arbeitsvorsprünge (81) und (82) ein Evolventenprofil aufweist.

Revendications

1. Le dispositif pour la formation du tissu à l'épaisseur définie par le pli du tissu de surface qui comprend le groupement des galets à former sur le premier arbre de travail et le groupe des galets à former sur le deuxième arbre de travail qui est parallèle avec le premier arbre, en temps que chacune des galets à former est sur son circonférence procuré de système des saillies de travail et des entre-saillies de travail, **caractérisé en ce que** les galets à former (71), placés sur le premier arbre de travail (41), sont rangés contre les galets à former (72), qui sont placés sur le deuxième arbre de travail (42) et, les saillies de travail (81) des galets à former (71) sur le premier arbre de travail (41), découpent au moins partiellement les entre-saillies de travail (92) des galets à former (72) sur le deuxième arbre de travail (42), en temps que la superficie de la symétrie de chacune des saillies de travail (81) comprend l'axe de rotation du galet à former (71) et, les saillies de travail (82) des galets à former (72) sur le deuxième arbre de travail (42), découpent au moins partiellement les entre-saillies de travail (91) des galets à former (71) sur le premier arbre de travail (41), en temps que la superficie de la symétrie de chacune des saillies de travail (82) comprend l'axe de rotation du galet à former (72), en temps que dans l'espace entre les galets à former (71) sur le premier arbre de travail (41) et les galets à former (72) sur le deuxième arbre de travail (42) est formé l'espace à former (600), à la sortie duquel est rangée la livraison (200) du tissu plié (330).
2. Le dispositif selon la revendication 1, **caractérisé en ce que** la livraison (200) du tissu plié (330) comprend au moins une première surface de guidage (201), qui porte dans l'espace entre les galets à former (71) sur le premier arbre de travail (41) et, au moins une deuxième surface de guidage (202), qui porte dans l'espace entre les galets à former (72) sur le deuxième arbre de travail (42).

3. Le dispositif selon la revendication 2, **caractérisé en ce qu'**au moins une première surface de guidage (201) est fixe.
4. Le dispositif selon la revendication 2 ou 3, **caractérisé en ce qu'**au moins une première surface de guidage (201) est mobile.
5. Le dispositif selon la revendication 4, **caractérisé en ce qu'**au moins une première surface de guidage (201) est formée par une partie de la superficie de la bande de transporteur (191).
6. Le dispositif selon quelconque des revendications de 2 à 5, **caractérisé en ce qu'**au moins une deuxième surface de guidage (202) est fixe.
7. Le dispositif selon quelconque des revendications de 2 à 6, **caractérisé en ce qu'**au moins une deuxième surface de guidage (202) est mobile.
8. Le dispositif selon la revendication 7, **caractérisé en ce qu'**au moins une deuxième surface de guidage (202) est formée par une partie de la superficie de la bande de transporteur (192).
9. Le dispositif selon quelconque des revendications de 2 à 8, **caractérisé en ce qu'**au moins une première surface de guidage (201) porte sur les deux côtés du plan central (6).
10. Le dispositif selon quelconque des revendications de 2 à 9, **caractérisé en ce qu'**au moins une deuxième surface de guidage (202) porte sur les deux côtés du plan central (6).
11. Le dispositif selon quelconque des revendications précédentes, **caractérisé en ce que** la courbe latérale des saillies de travail (81) et (82) a le profil en développante.

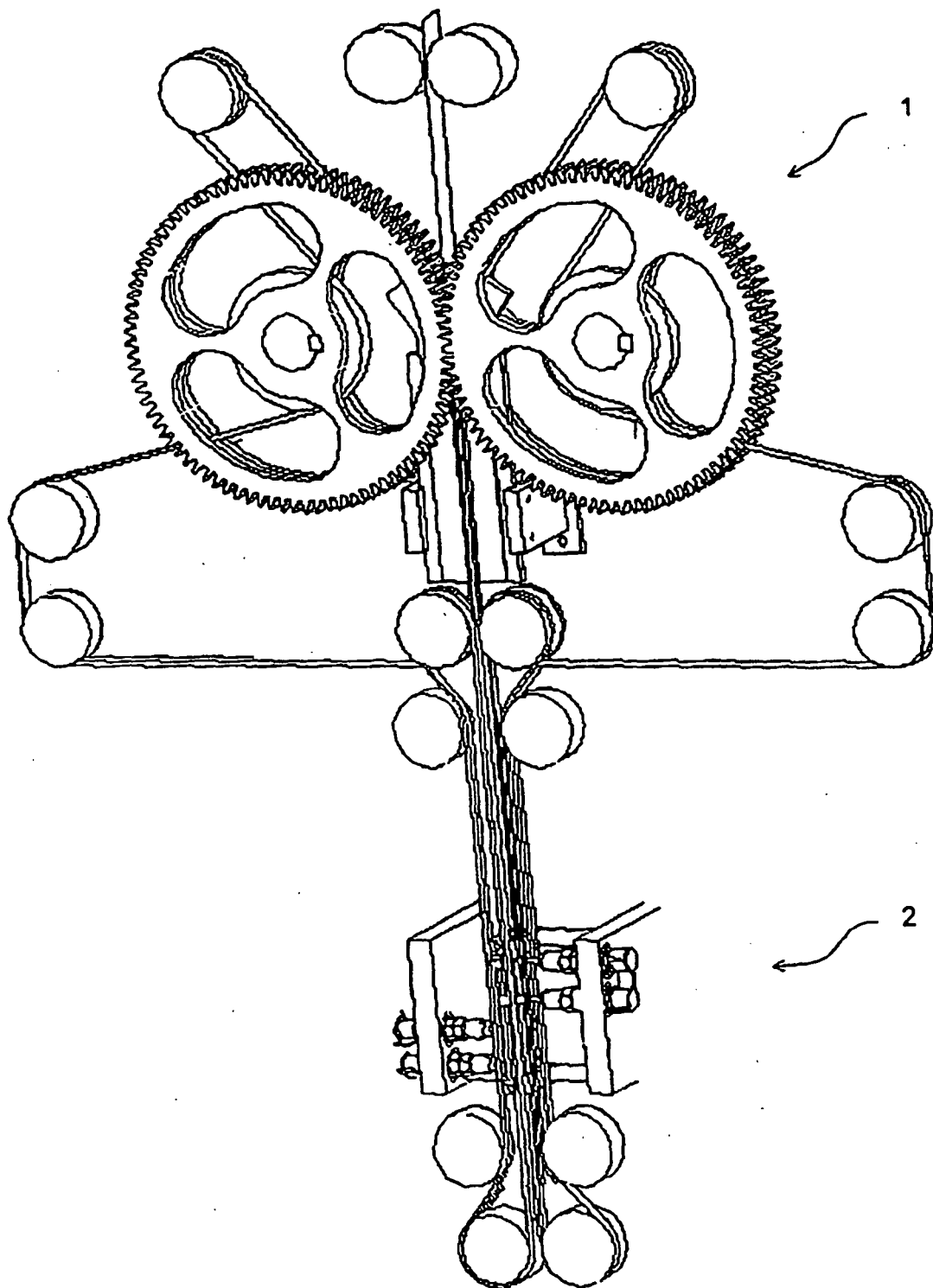
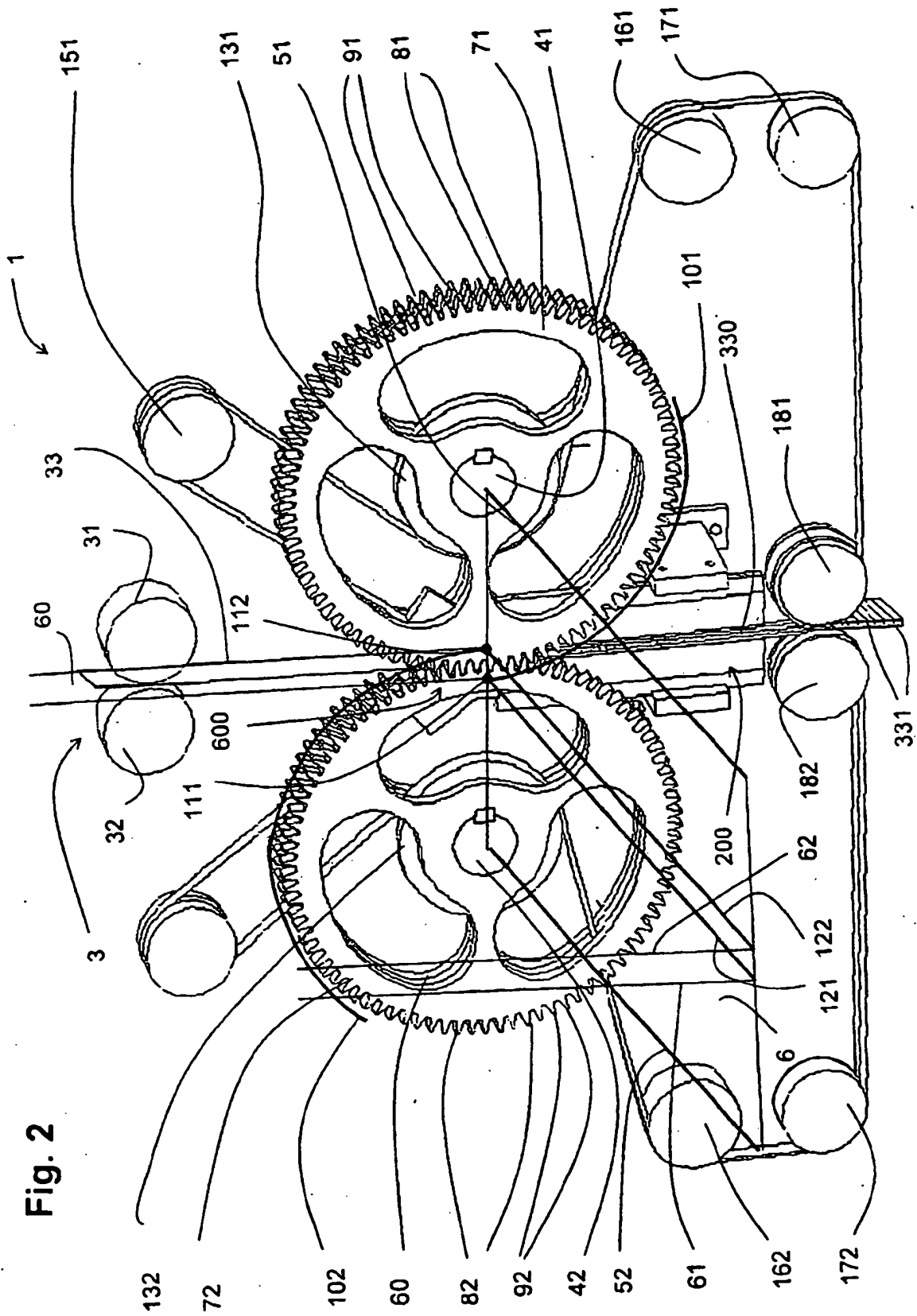


Fig. 1

Fig. 2



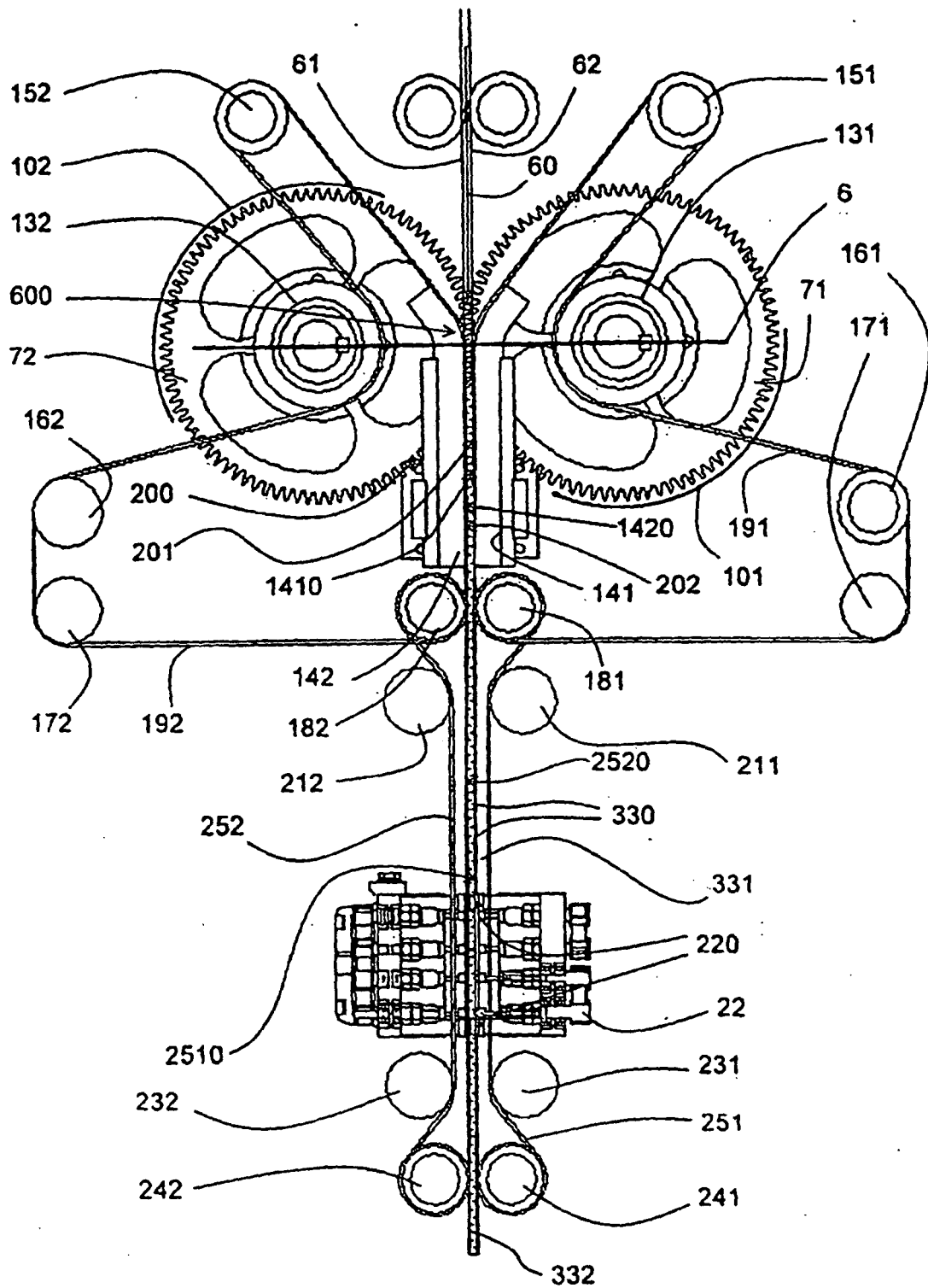


Fig. 3