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(54) **DRUM OF A MACHINE FOR THE CAREFUL TREATMENT OF CLOTHES**

TROMMEL EINER MASCHINE ZUR PFLEGLICHEN BEHANDLUNG VON KLEIDUNGSSTÜCKEN

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(56) References cited:

EP-A2- 1 505 188 EP-A2- 1 568 812
DE-A1- 2 225 130 DE-C- 171 862
GB-A- 841 783

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Description**Technical field of the invention**

[0001] The present invention relates to a drum of a machine for the careful treatment of clothes, particularly of a washing machine, a washer-dryer, a tumble dryer or suchlike according to the pre-characterizing part of claim 1. The invention also relates to a machine for the careful treatment of clothes with a drum of this type.

Prior art

[0002] EP 1,568,812 A2 and EP 1,505,188 A2 describe such a drum (200 in Fig. 12) of a washing machine according to the pre-characterizing part of claim 1, with a drum casing (400) which is in principle cylindrical in its basic form, with a cylinder axis forming the axis of rotation (A), about which the drum casing (400) can rotate. The drum casing (400) has a tubular main casing part (400a), with a first and second front wall (400b, 400c), which are connected to a first and second axial edge region of the main casing part (400a). The drum (200) also has at least one reinforcing piece that surrounds the main casing part (400a) on the outside circumference of the drum and counteracts the bulging of the main casing part (400a) under the influence of the centrifugal force (indicated in Fig. 12 by a thick dashed line) during the rotation of the drum (200). This ensures a reliable connection between the first and second front wall (400b, 400c) on the one hand, and the first and second axial edge region of the main casing part (400a) on the other hand, which could otherwise be damaged during a rapid rotation of the drum (200), with pronounced bulging of the main casing part (400a). In these two documents of the prior art, the reinforcing piece is respectively a reinforcing strip (500) or a reinforcing metal band, that is to say, a metal band in the form of a thin metal plate.

[0003] GB-A-841783 discloses a drum according to the preamble of claim 1.

[0004] Although the reinforcing strip (500) basically offers a high-quality solution, the production of the reinforcing strip (500) and the fitting of strip (500) in the drum are quite complicated and expensive as far as the production and fitting methods are concerned, and call for special tools and machinery. The cross-section of the reinforcing strip (500) should almost always be slightly raised like an arc to ensure that the convex side of the strip can then be positioned in such a way that the edges of the strip (500) do not rub against the drum later. Furthermore, the fitting of the pretensed reinforcing strip (500) to the drum requires a strong mechanical force, as well as special preventive measures or tensing components in said reinforcing strip (500). Such reinforcing strips (500) therefore cannot be adapted to drums of different shapes and sizes, or can only be adapted to them by the use of extremely strong forces, for example in different washing machines or machines for the careful treatment of

clothes.

Description of the invention

[0005] The task or technical problem of the present invention is to provide a drum with a reinforcing piece of the type mentioned at the beginning, which can be produced simply and effectively, can be fitted to the main casing part, and even so reliably counteracts the bulging of the main casing part during the rapid rotation of the drum, and can also be used in drums of different shapes and sizes. A machine for the careful treatment of clothes with a drum of this type should also be available.

[0006] This task is accomplished according to a first aspect of the invention by a drum according to the invention, with characteristics set out in claim 1.

[0007] This drum of a machine for the careful treatment of clothes, particularly a washing machine, a washer-dryer, a tumble dryer or suchlike, is provided with a drum casing that is essentially cylindrical in its basic form, with a central cylinder axis that forms an axis of rotation about which the drum can rotate, where the drum casing has a tubular main casing part with a first and a second front wall, which are connected to a first and second axial edge region of the main casing part, and it also has at least one reinforcing piece that surrounds the main casing part over the outside circumference of the drum and counteracts the bulging of the main casing part during the rotation of the drum under the influence of the centrifugal force, characterized in that the reinforcing piece is at least one cord-like component, which encircles the outside circumference of the main casing part at least once. The drum is characterized in that the reinforcing piece is at least one cord-like component that is passed around the circumference of the main casing part at least once.

[0008] In the present invention, the term "cord-like component" is used to denote any type of component made at least with one wire and at least one fiber or at least one filament or similar elongated and ductile (and therefore also flexible) component for the transmission of forces of traction. The cord-like component is made of a number of separate wires, cords, fibers or filaments, which are for example twisted, braided or grouped together to form one or more strands by some optional other means. The cord-like component also has a certain elasticity. The cross-section of the cord-like component or the profile of its cross-section is preferably essentially circular, elliptical or at least round.

[0009] Since in the case of the drum according to the invention the reinforcing piece is a cord-like component, it can be joined to the drum or to the main casing part thereof in a simple form and manner as regards the production and fitting techniques. For example, the cord-like component can be simply unwound during the manufacture of a reel, cut to the required length, passed around the drum and fixed to it. No special tools or machines are needed for this operation. The cord-like component can also be a standard one, such as for example normal stain-

less steel wires and suchlike. These have by nature a circular or round cross-section that ensures that the cord-like component, in the final state of fitting and working in the drum, does not rub against the outside surface. Unlike in the case of the prior art described above, there is no need in this case for any treatment or deformation of the reinforcing piece.

[0010] The cord-like component can also be encircled in the pretensed state, around the outside circumference of the main casing part and fixed in this state in a relatively simple way without costly procedures. Due to the ductility of the cord-like component, it can also be easily mounted around the main casing part in several turns or passes and at one or more angles of tilt, and in this way it can reach, if necessary, different points on the outside circumference of the main casing part. This makes it possible to reinforce the drums in a simple and effective form and manner at the points that are subjected to particularly strong forces. The cord-like component can also be used for reinforcing drums of different sizes and/or drums of different types of machines for the careful treatment of clothes, without calling for an essential adaptation or modification of the cord-like component or for tools for fitting it. The production of the drum according to the invention is therefore simpler, more effective and more economic than that of known drums. Furthermore, the component acts by securely and reliably counteracting the undesirable bulging of the main casing part during the rapid rotation of the drum (for example at a speed of 1400 rpm or more).

[0011] Other preferred and advantageous characteristics of the drum according to the invention are the subject of claims 2-26, which are based on the subsequent description of examples of preferred embodiments.

[0012] Furthermore, the underlying aim of the invention is achieved by a machine for the careful treatment of clothes according to the invention, with the characteristics specified in claim 27.

[0013] The machine for the careful treatment of clothes, in particular a washing machine, a washer-dryer, a tumble dryer or suchlike, has a drum according to one or more of claims 1-26.

[0014] The machine for the careful treatment of clothes basically makes it possible to achieve the same technical advantages as those set out above in connection with the drum according to the invention.

[0015] The preferred embodiments of the invention, with their combined design features and other advantages, are described and explained below in detail with reference to the attached drawings.

Description of the figures

[0016]

Fig. 1 is a diagrammatic longitudinal cross-section, not drawn to scale, taken across a washing machine drum according to the invention in a first embodiment

Fig. 2 is an external diagrammatic perspective drawing of a first site of the drum that is shown in Fig. 1 and which is proposed according to the invention, the figure being drawn along the longitudinal direction of the drum

Fig. 3 is an external diagrammatic perspective drawing of a second site of the drum that is shown in Fig. 1 and which is proposed according to the invention, the figure being drawn along the longitudinal direction of the drum

Fig. 4 is a diagrammatic longitudinal cross-section taken across a cord-like component of the drum according to the invention

Fig. 5a is a diagrammatic longitudinal cross-section taken across the cord-like component in Fig. 4, shown in its first state

Fig. 5b is a diagrammatic longitudinal cross-section taken across the cord-like component in Fig. 4, shown in its second state

Fig. 6 is a diagrammatic longitudinal cross-section taken across a cord-joining component of the cord-like component

Fig. 7 is a diagrammatic side view, not drawn to scale, of a drum according to the invention in a second embodiment

Figs. 8a-8c show a perspective view of other cord-joining components that may be used in drums according to the second embodiment

Fig. 9 is a diagrammatic side view, not drawn to scale, of a drum according to the invention in a third embodiment

Fig. 10 is a diagrammatic side view, not drawn to scale, of a drum according to the invention in a fourth embodiment

Fig. 11 is a diagrammatic side view, not drawn to scale, of a drum according to the invention, in a fifth embodiment, and

Fig. 12 is a diagrammatic longitudinal cross-section taken across a drum according to the prior art, which is fitted with a reinforcing strip.

Description of a preferred embodiment

[0017] In the following description and in the drawings, in order to avoid repetitions, identical parts are denoted by the same symbol if there is no need to differentiate between them in other respects.

[0018] Fig. 1 shows a diagrammatic longitudinal cross-section, not drawn to scale, taken across a drum (2) according to the invention in a first embodiment, the drum being the drum of a washing machine here. This drum (2) has a drum casing (4), which is essentially cylindrical in its basic form and has a central cylinder axis that forms an axis of rotation (A), about which the drum (2) can rotate. The drum casing (4) has a tubular main casing part (4a), with a first and a second front wall (4b, 4c), which are connected to a first and second axial edge region (RB₁, RB₂), these being shown in the drawing by a dot-and-dash circle. The connection is achieved in this example by a folded joint (6). Welded joints, the integral coupling of said parts, or any other suitable optional forms of coupling are also possible.

[0019] The drum (2) also has at least one reinforcing piece, which encircles the main casing part (4a) on the outside circumference of the drum (2) and which counteracts the bulging of the main casing part (4a) that occurs during the rotation of the drum (2) under the influence of the centrifugal force (this bulging is indicated in Fig. 1 by a thick dashed line).

[0020] This ensures a long service life for the folded joint (6) and consequently a secure and reliable connection between the first and a second front wall (4b, 4c), on the one hand, and the first and a second axial edge region (RB₁, RB₂) of the main casing part (4a) on the other hand, which might otherwise be damaged in the case of the rapid rotation of the drum (2), with strong bulging of the main casing part (4a). As shown in the drawing, the reinforcing piece is at least one cord-like component (8) (called simply "cord (8)" in the following), which encircles the outside circumference of the main casing part (4a) at least once. In the embodiment under discussion, a single turn is envisaged. In the final, mounted state of the cord (8), the latter preferably encircles the main casing part (4a) in the pretensed form.

[0021] As can be seen from Fig. 1, the cord (8) is arranged centrally with respect to the axial extension of the main casing part (4a).

[0022] The cord (8) used in this embodiment is a standard steel cable that is made of stainless steel and is corrosion-proof. The cord (8) has a diameter of about 2.5 mm and basically a round cross-section. Other diameters are of course also possible in any application, depending on the size of the drum (2) and on the planned speed of rotation. The cord (8) is preferably made of a number of separate elements that are twisted, stranded together or combined in another way. However, in a very simple embodiment, it can also be a single length of wire or suchlike.

[0023] Other suitable materials, that is to say, other materials that resist oxidation and corrosion, can also be used basically for making the cord (8). For example, the cord (8) can thus also be made of a number of non-metallic fibers, a number of filaments or a composite fibrous material.

[0024] Figs. 2 and 3 show further details of the drum (2) according to the invention. Fig. 2 shows in this case

a diagrammatic external perspective view of a first site of the drum (2) according to the invention illustrated in Fig. 1, with a view taken in the direction along its longitudinal axis or axial direction (compare the reference symbol A).

[0025] Fig. 3 shows a diagrammatic external perspective view of a second site of the drum (2) according to the invention illustrated in Fig. 1, again with a view taken in the direction along its longitudinal axis or axial direction.

[0026] As shown in Fig. 3, the tubular main casing part (4a) is made from a basic sheet material (here a stainless steel plate), which is deformed to obtain a tubular structure with two edges of the sheet. These correspond to each other and are inserted over an extended inserting region (B_F) that extends lengthways, basically parallel to the cylinder axis (A). The inserting region (B_F) extends over the whole width of the main casing part (4a). In the present example, the two edges of the sheet are connected together with the aid of a folded joint (V_F). To strengthen the folded joint (V_F), the latter is provided with several grooved elbows (10) beyond the inserting region (B_F), where the longitudinal axes (10_A) of the grooved elbows extend essentially in the direction of the circumference of the main casing part (4a). Furthermore, the main casing part (4a) has on its outside circumferential surface several slot-like elbows (12), which extend essentially parallel to the axis of rotation (A) and form a type of blade-like breaker inside the main casing part (4a). The transition zone of the slot-like elbows (12) toward the outside circumferential surface of the main casing part (4a) is rounded.

[0027] In this example, the cord (8) is in the form of a finite length of cord whose ends (8a, 8b) are joined together by a cord-joining component (14) in the mounted state, that is to say, in a state in which it is fixed to the main casing part (4a). However, in principle, the cord (8) can also be an infinite cord, for example in the form of a ring. The cord-joining component (14) is preferably a cord-joining component that is chosen from a group of cord-joining components comprising: a shape-based joint, a joint working by friction, an adhesive or glued joint, in particular a knotted joint, a plaited joint, an interlacing joint, a spliced joint, a (strong) welded joint, a soldered or brazed joint, a cast joint, a joint working by clamping or pressure (for example, also in the form of two screwed pieces or partially riveted elements), an interlocking joint, a hooking joint, or a combination of at least two of the above-mentioned cord-joining components. In the present example, the cord-joining component (14) is a clamping joint or a pressure joint, as described later in detail.

[0028] As can be seen from Fig. 2, the cord-joining component (14) is arranged on the first site of the drum (2) according to the invention, in the area of one of the slot-like elbows (12). Depending on the number of slot-like elbows (12) distributed along the circumference of the drum (2), this is the first site (see Fig. 2), with respect

to the basically circular cross-section of the drum (2), separated from the second side (see Fig. 3). In three elbows, the first side is facing the second site continuously at about 120°, in two, four, eight, etc. The elbows (12) are preferably facing continuously at 180°. The cord-joining component (14) is arranged, at least in part (here, with interior side), inside the elbow (12). Since the second site (see Fig. 3) is the site that has the extended inserting region (B_F), the cord-joining component (14) in this embodiment is then arranged in a region of the circumference of the main casing part (4a), separate from (preferably exactly opposite to) the extended inserting region (B_F). In the area of the second site, the cord (8) preferably runs through one of the grooved elbows (10), so that the latter secures the cord (8) in the axial direction (compare with A) of the drum (2) against lateral slippage.

[0029] Fig. 4 shows a diagrammatic longitudinal view taken across the cord (8) and illustrates further technical details of the cord (8) and the cord-joining component (14). The cord-joining component (14) has at least one first coupling element (14a), which is, or can be, fixed to the first end (8a) of the cord, and at least one second coupling element (14b), which is, or can be, fixed to the second end (8b) of the cord. Each coupling element (14a, 14b) has a cord-joining region (14a1, 14b1) where the corresponding end (8a, 8b) of the cord (8) is inserted. The corresponding cord-joining region (14a1, 14b1) is pressed with the appertaining end (8a or 8b), respectively. The two coupling elements (14a, 14b) are so shaped that they can be inserted into each other. In this case, the coupling element (14b) is made in the form of a capsule and has a tubular receiving region (14b3) with a deformation zone (14b2). The coupling element (14a) is shaped like a bolt. The coupling element (14a) has a head (14a2) whose outside diameter is insignificantly smaller than the inside diameter of the receiving region (14b3) of the corresponding capsule-like coupling element (14b), so that the two coupling elements (14a, 14b) can be easily inserted into each other. The head (14a2) is combined with a cylindrical section that extends lengthwise, passing through a step or a projection, whose diameter is smaller than that of the head (14a2) and which forms the cord-joining region (14a1). Alternatively, this region (14a1) can have on its outside circumference for example also several annular protuberances or other suitable pieces for a form-locking joint. The coupling element (14b) has a limiter (16) for the head (14a2) of the coupling element (14a).

[0030] To facilitate mounting on the main casing part (4a) in this example, the cord (8) is prefabricated as a single mounting unit, with a cord-joining component (14) or its separate components, which mounting unit has a predetermined mounting length (L_M). In this example, the mounting length L_M is given as follows:

$$L_M = L_A - D_X$$

[0031] In this case, L_A is the length of the outside circumference of the main casing part (4a) in the region where the cord (8) is to be located, and D_X is a length of considerable magnitude for the reversible elastic tensing of the cord (8) in a later step. In this example, the actual length of the cord (L_S), to which the cord (8) should be cut for making said mounting unit, is somewhat smaller than the mounting length (L_M), since the coupling elements (14a, 14b) themselves have a predetermined length.

[0032] Fig. 5a shows a diagrammatic longitudinal view taken across the cord (8) or across the mounting unit shown in Fig. 4 in a first, unmounted state, in which the cord (8) loosely encircles the main casing part (4a), which is not shown. Fig. 5b shows a diagrammatic longitudinal view taken across the cord (8) shown in Fig. 4 in a second state, in which it is mounted, and its cord ends (8a, 8b) are firmly joined together with the aid of the cord-joining component (14), and in which the cord (8) encircles the main casing part (4a) in the pretensed state.

[0033] When the cord (8) is in the first state (see Fig. 5a) and the coupling elements (14a, 14b) are inserted into each other, the head (14a2) of the coupling element (14a) is located a predetermined distance (D_X) in front of the limiter (16). This defines for the cord (8) or said mounting unit a first predetermined encircling length, which corresponds here to the mounting length (L_M), and which, as already mentioned, is somewhat smaller than the length of the outside circumference (L_A) of the main casing part (4a). To be able to take now the cord (8) or the mounting unit to the above-mentioned second state, the cord (8) is tensed until the head (14a2) reaches the limiter (16) (see Fig. 5b). In this case, the receiving region (14b3) similarly serves as a guide for the head (14a2). The tensing can be carried out with a relatively simple tool, applied to both coupling elements (14a, 14b). In the second state (see Fig. 5b), the cord (8) or the reversible elastic mounting unit, is then extended to a second predetermined encircling length, which is somewhat greater than the first predetermined encircling length and which corresponds basically to the length of the outside circumference (L_A) of the main casing part (4a). In this way, the cord (8) in the mounted state encircles the main casing part (4a) in the pretensed state. It is obvious that, with predetermined cord parameters, parameters of the drum and a predetermined mounting length (L_M), the cord-joining component (14) or the combined action of its coupling elements (14a, 14b) and the limiter (16) define the length of the second turn and the pretensing magnitude of the cord (8). In this example, the cord-joining component (14) also acts as a cord-tensing element and a safety element.

[0034] To be able to effect the pretensing of the cord (8) mentioned above, it is basically also possible to use a cord (8) or a mounting unit that has in the second state a smaller length than the outside circumference (L_A) of the main casing part (4a). However, this would mean that the cord (8) then locally strongly presses on the drum (2). This should be largely avoided, because the sheet

used for making the drum (2) is usually very thin.

[0035] Another possibility is a composite shape, starting with the first and second variant; this is an actual solution in practice, since not only the cord (8) but also the drum (2) always exhibit a certain elasticity or yield. In the second state shown in Fig. 5b, the deformation zone (14b2) of the right-hand coupling element (14b) is plastically deformed and pressed on the outside circumference of the cord-joining region (14a1) in such a way that the material in the deformation zone (14b2) surrounds the head (14a2) both in the radial and in the axial direction. The cord-joining component (14) therefore forms a kind of pressure terminal, in which the two coupling elements (14a, 14b) have a form-locking shape in the pressed state as regards the longitudinal direction of the cord (8). The joining of the cord is therefore ensured in a reliable way, so the cord cannot become detached even during the rapid rotation of the drum (2).

[0036] Fig. 6 shows a longitudinal diagrammatic view taken across a cord-joining component (18) for the cord (8). This cord-joining component (18) is similar to the cord-joining component (14) shown in Figs. 4, 5a and 5b. Unlike the latter, however, it has two coupling elements (18a, 18b) shaped like the coupling element (14a) of the variant shown in Figs. 4, 5a and 5b. In addition, the construction shown in Fig. 6 has a separate capsule (18c) in the middle, with one opening for insertion on the left and one on the right - into which can be inserted the first and second coupling element (18a, 18b) each of which is coupled to an end of the cord (8a, 8b). The capsule in the middle (18c) has an internal separating wall (18c1) whose lateral surfaces act as a limiter (16) for the heads (18a2, 18b2) of the two coupling elements (18a, 18b). The capsule in the middle (18c) therefore acts as a separate limiter for the cord-joining component (18) to which are assigned at least a first coupling element and then a second coupling element (18a, 18b). The application of the coupling elements (18a, 18b) to the capsule in the middle (18c) and with it the joining of the ends of the cord, as well as the tensing of the cord (8) take place in the same way as in the case of the variant shown in Figs. 4, 5a and 5b. In other words, the heads (18a2 and 18b2) are drawn together, and the capsule regions (18c2) are pressed over the cord-joining regions (18a1, 18b1) of the coupling elements (18a, 18b), and they surround the heads (18a2, 18b2) in the radial and axial direction. The capsule in the middle (18c) also acts as a tensing and safety element for the cord and the coupling elements (18a, 18b).

[0037] In this variant, the following relationship holds for the mounting length (L_M) mentioned above:

$$L_M = L_A - (D_{X1} + D_{X2})$$

[0038] D_{X1} and D_{X2} can be identical or different. As far

as possible, the sum of $D_{X1} + D_{X2}$ should be equal to the value of D_X in the example illustrated in Figs. 4, 5a and 5b in order to be able to obtain relations for the tension in the cord (8) when the latter is in the second state mentioned above.

[0039] Fig. 7 shows a diagrammatic side view, not drawn to scale, of a drum (2) according to the invention, and specifically a second embodiment. In this variant, the cord (8) encircles the outside circumference of the main casing part (4a) several times, i.e. in a number of turns ranging from W_1 to W_X . In this example, the adjacent turns extend directly side by side, that is to say, in principle without any space between them. However, it is just as possible to allow a space between the adjacent turns W_1 to W_X . The turns W_1 to W_X of the cord (8) can lie at the same angle of tilt and/or at different angles of tilt around the main casing part (4a).

[0040] Figs. 8a-8c show preferred examples of cord-joining components, which can be used in the type of drum (2) according to the invention, where the cord (8) encircles the main casing part (4a) several times, and its turns extend side by side and/or one over the other (for example in the drum shown in Fig. 7). For these cases, the cord-joining component can be made for example as a flat coupling element operating by clamping or pressure (20) (see Fig. 8a, with deformed regions in the form of folds running in the longitudinal direction, which increase the mechanical strength of the cord-joining component) like a metal band (22) (Fig. 8b), folded, pressed or spot-welded around the cord (8) and its turns, or shaped like a coupling element (24) in Fig. 8c that is glued or injected around the cord (8) and its turns, using for example a zinc alloy (in particular Zamak), an aluminum alloy or suchlike.

[0041] Fig. 9 shows a diagrammatic side view, not drawn to scale, of a drum (2) according to the invention, and specifically a third embodiment. In this variant, the cord (8) is arranged at different sites (P_1 , P_2) on the main casing part (4a), in an axially adjacent configuration. One individual cord (8) is placed at each of the different sites (P_1 , P_2), running axially to each other.

[0042] Fig. 10 shows a diagrammatic side view, not drawn to scale, of a drum (2) according to the invention, and specifically a fourth embodiment. In this place, a single cord (8) is used for forming the turns at different sites (P_1 , P_2) on the main casing part (4a), which sites run axially to each other, and which single cord extends from one of the sites (P_1) to the second (or x-th) site (P_2), or vice versa, passing over the transition zone T.

[0043] In this case, the ends of the cord can:

- have the same beginning and end (and be combined there together over a shared cord-joining component), or
- have different beginnings and ends, where the ends of the cord may be for example fixed at different sites, e.g. also to the same casing of drum (4).

[0044] The beginning and/or end of the turn of the cord can also be located in the transition zone T.

[0045] Fig. 11 shows a diagrammatic side view, not drawn to scale, of a drum (2) according to the invention, and specifically a fifth embodiment. In this variant, lengths of the cord (8) cross over one another as the cord encircles the outside circumference of the main casing part (4a) a number of times. This makes it possible in particular to strengthen the drum (2) locally in various areas, using a grid or lattice pattern.

[0046] Mixed forms based on the variants described above are also possible and are envisaged according to the invention.

[0047] The drum (2) according to the invention is used in a machine for the careful treatment of clothes, in particular a washing machine, a washer-dryer, a tumble dryer or suchlike.

[0048] The invention is not limited to the examples described above. The drum according to the invention and the machine for the careful treatment of clothes according to the invention can also have other embodiments not described above in concrete terms while similarly lying within the scope of protection. It is also possible in this way to couple or premount the cord in order to form a grid or lattice pattern. The cord or the cord-like component can also be fixed to the main casing part at least at one site in the direction of the circumference and/or in its axial direction. In this case, the cord-joining component can act as a similar kind of fixing element in at least one embodiment of the invention. The cord-joining component can also have internal cord-tensing devices. In addition, various cord-joining components can also be used. Furthermore, the coupling element(s) of the cord-joining component can have different forms than those described above in concrete terms. Thus, it is also possible to have one or more connectable coupling elements. The main casing part may also have, on the outside, elbows and/or bends or other elements matching the shape of the cross-section and dimensions of the cord-like component and serving to fix their position, as well as guiding and securing them. Instead of a grooved elbow, other guiding and securing elements can also be employed.

[0049] In the claims, description and drawings, the symbols only serve for the better understanding of the invention and cannot be taken to limit the scope of protection.

[0050] List of symbols used

2	Drum
4	Drum casing
4a	Main casing part of 4
4b	First front wall of 4
4c	Second front wall of 4
6	Folded joint
8	Cord or cord-like component
8a	End of the cord
8b	End of the cord

10	Grooved elbow(s)
10A	Longitudinal axis of 10
12	Slot-like elbow(s)
14	Cord-joining component
5 14a	First coupling element of 14
14a1	Cord-joining region of 14a
14a2	Head of 14a
14b	Second coupling element of 14
14b1	Cord-joining region of 14b
10 14b2	Deformation zone of 14b
14b3	Receiving region
16	Limiter
18	Cord-joining component
18a	First coupling element of 18
15 18a1	Cord-joining region of 18a
18a2	Head of 18a
18b	Second coupling element of 18
18b1	Cord-joining region of 18b
18b2	Head of 18b
20 18c	Capsule of 18 in the middle
18c1	Internal separating wall of 18c
18c2	Regions of the deforming capsules of 18c
20	Flat coupling element operating by clamping or pressure
25 22	Pressed and spot-welded metal band
24	Injection joint or cast joint
200	Drum
400	Drum casing
30 400a	Main casing part
400b	First front wall
400c	Second front wall
500	Reinforcing strip
35 A	Cylinder axis / axis of rotation
B _F	Extended inserting region
D _X	Predetermined distance
O _{X1}	First predetermined distance
O _{X2}	Second predetermined distance
40 L _A	Length of the outside circumference of 4a / length of the second turn
L _M	Mounting length / length of the first turn
L _S	Length of the cord
P1	First position
45 P2	Second position
RB ₁	First edge region of 4a
RB ₂	Second edge region of 4a
T	Transition zone
V _F	Folded joint
50 W ₁	First turn of the cord 8
W _X	x-th turn of the cord 8.

Claims

- 55 1. A drum (2) of a machine for the careful treatment of clothes, particularly a washing machine, a washer-dryer, a tumble dryer or suchlike, with

- a drum casing (4), which is essentially cylindrical in its basic form, with a central cylinder axis that forms an axis of rotation (A), about which the drum (2) can rotate, where the drum casing (4) has a tubular main casing part (4a) made from a basic sheet material with a first and a second front wall (4b, 4c), which are connected to a first and second axial edge region (RB₁, RB₂) of the main casing part (4a); and

- at least one reinforcing piece that surrounds the main casing part (4a) over the outside circumference of the drum (2) and counteracts the bulging of the main casing part (4a) during the rotation of the drum (2) under the influence of the centrifugal force,

characterized in that the reinforcing piece is at least one cord-like component (8), which encircles the outside circumference of the main casing part (4a) at least once.

2. The drum (2) as claimed in claim 1, **characterized in that** the cord-like component (8) encircles the outside circumference of the main casing part (4a) several times (W₁ to W_x turns).
3. The drum (2) as claimed in claim 2, **characterized in that** the adjacent turns (W₁ to W_x) of the cord-like component (8) that encircle the outside circumference of the main casing part (4a) several times extend directly side by side.
4. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** there is a space between the adjacent turns (W₁ to W_x) of the cord-like component (8).
5. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** the turns (W₁ to W_x) of the cord-like component (8) encircle the outside circumference of the main casing part (4a) at different angles of tilt.
6. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** lengths of the cord-like component (8) that encircles the outside circumference of the main casing part (4a) a number of times cross over one another.
7. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** said at least one cord-like component (8) is arranged in a central region with respect to the axial extension (A) of the main casing part (4a).
8. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** said at least one cord-like component (8) is placed in different

positions (P1, P2) on the main casing part (4a), with axial spacing between them.

9. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** at least one individual cord-like component (8) is placed in each of the axially spaced positions (P1, P2) on the main casing part (4a).
10. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** a single cord-like component (8) is used for the turns in the various axially spaced positions (P1, P2) of the main casing part (4a).
11. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** the cord-like component (8) of the main casing part (4a) is fixed to the circumference of the same on at least one site in the direction of the circumference and/or the axial direction (A).
12. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** the cord-like component (8) encircles the main casing part (4a) in the pretensed state.
13. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** the cord-like component (8) is composed of a number of wires or filaments.
14. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** the cord-like component (8) is made of a stainless, anticorrosive material.
15. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** the cord-like component (8) is a finite cord-like component whose ends (8a, 8b) are joined together by a cord-joining component (14, 18, 20, 22, 24).
16. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** the cord-joining component (14, 18, 20, 22, 24) is a cord-joining component that is chosen from a group of cord-joining components comprising: a shape-based joint, a joint working by friction, an adhesive or glued joint, in particular a knotted joint, a plaited joint, an interlacing joint, a spliced joint, a (strong) welded joint, a soldered or brazed joint, a cast joint, a joint working by clamping or pressure, an interlocking joint, a hooking joint, or a combination of at least two of the above-mentioned cord-joining components.
17. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** the cord-

joining component (14, 18) has at least one first coupling element (14a, 18a) that can be fixed to a first end (8a) of the cord, and at least one second coupling element (14b, 18b) that can be fixed to a second, end (8b) of the cord.

18. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** the two coupling elements (14a, 14b) can be inserted into each other.

19. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** the cord-joining component (14, 18) is made in the form of a pressure terminal, and both coupling elements (14a, 14b, 18a, 18b) have, in the pressed-in state, a form-locking joint in the longitudinal direction of the cord (8).

20. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** the cord-like component (8), with its cord-joining element (14) in a first, unmounted state, in which the cord-like component (8) loosely encircles the main casing part (4a), has a predetermined first encircling length (L_M), which is shorter than the longitudinal length of the outside circumference (L_A) of the main casing part (4a); and the cord-like component (8) - in a second state, in which it is mounted and encircles the main casing part (4a), and its cord ends (8a, 8b) are joined together by means of the reversible and elastic cord-joining component (14) - is extended to a second predetermined encircling length (L_A), which is longer than the first predetermined encircling length (L_M) and basically matches the length of the outside circumference (L_A) of the main casing part (4a), so that the cord-like component (8), in the mounted state, encircles the main casing part (4a) in the pretensed state.

21. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** the cord-joining component (14, 18) has a limiter (16) for at least one of the coupling elements (14a, 18a, 18b); when the cord-like component (8) is in its first state, at least this coupling element (14a, 18a, 18b) is placed at a predetermined distance (D_X , D_{X1} , D_{X2}) in front of the limiter (16), thus defining the length (L_M) of the first-turn; and, when the cord-like component (8) is in its second state, at least this coupling element (14a, 18a, 18b) is adjusted at the limiter (16) and - cooperating with the latter - thus defines the length (L_A) of the second turn and the magnitude of pretensing of the cord-like component (8):

22. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** the limiter

(16) is formed on at least one (14b) of the coupling elements.

23. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** the cord-joining component (18) has a separate limiter (18c, 18c1), which is associated with at least a first and at least a second coupling element (18a, 18b).

24. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** the main casing part (4a) has - on its outside circumferential surface - several grooved elbows (12), which extend essentially parallel to the length of the axis of rotation (A) and which form a blade-like breaker inside the main casing part (4a); and the cord-joining component (14) is placed at least in the area of one of these elbows (12).

25. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** the tubular main casing part (4a) is made from a basic sheet material, which is deformed to obtain a tubular structure and is joined at the two edges of the sheet to an extended inserting region (B_F) that extends essentially parallel to the cylinder axis (A), and the inserting region (B_F) is fitted with at least one elbow (10) in the form of a small channel, whose longitudinal axis (10_A) extends substantially in the direction of the circumference of the main casing part (4a); and the cord-like component (8) extends through the grooved elbow (10) in such a way that the latter secures the cord-like component (8) in the axial direction (A) of the drum (2).

26. The drum (2) as claimed in any one or more of the preceding claims, **characterized in that** the cord-joining component (14) is placed in a region of the circumference of the main casing part (4a) opposite the extended inserting region (B_F).

27. A machine for the careful treatment of clothes, in particular a washing machine, a washer-dryer, a tumble dryer or suchlike, with a drum (2) as claimed in one or more of claims 1-26.

Patentansprüche

1. Trommel (2) einer Maschine zur schonenden Behandlung von Kleidungsstücken, besonders einer Waschmaschine, eines Waschtrockners, eines Wäschetrockners o. Ä. mit

- einem Trommelgehäuse (4), das in seiner Grundform im Wesentlichen zylindrisch ist, mit einer mittleren Zylinderachse, die eine Rotationsachse (A) bildet, um die sich die Trommel

(2) drehen kann, wobei das Trommelgehäuse (4) einen rohrförmigen Hauptgehäuseteil (4a) hat, der aus einem einfachen Blechmaterial hergestellt ist und eine erste und eine zweite Vorderwand (4b, 4c) hat, die mit einem ersten und einem zweiten axialen Randbereich (RB₁, RB₂) des Hauptgehäuseteils (4a) verbunden sind, und

- mindestens einem Verstärkungsteil, das den Hauptgehäuseteil (4a) über den Außenumfang der Trommel (2) umgibt und dem Ausbauchen des Hauptgehäuseteils (4a) während der Drehung der Trommel (2) unter dem Einfluss der Zentrifugalkraft entgegenwirkt,

dadurch gekennzeichnet, dass das Verstärkungsteil mindestens eine kordartige Komponente (8) ist, die den Außenumfang des Hauptgehäuseteils (4a) mindestens einmal umgibt.

2. Trommel (2) nach Anspruch 1, **dadurch gekennzeichnet, dass** die kordartige Komponente (8) den Außenumfang des Hauptgehäuseteils (4a) mehrmals (W₁ bis W_x Windungen) umgibt.
3. Trommel (2) nach Anspruch 2, **dadurch gekennzeichnet, dass** sich die benachbarten Windungen (W₁ bis W_x) der kordartigen Komponente (8), die den Außenumfang des Hauptgehäuseteils (4a) mehrmals umgeben, direkt nebeneinander erstrecken.
4. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** ein Abstand zwischen den benachbarten Windungen (W₁ bis W_x) der kordartigen Komponente (8) liegt.
5. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Windungen (W₁ bis W_x) der kordartigen Komponente (8) den Außenumfang des Hauptgehäuseteils (4a) in verschiedenen Neigungswinkeln umgeben.
6. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Längen der kordartigen Komponente (8), die den Außenumfang des Hauptgehäuseteils (4a) mehrere Male umgibt, sich überkreuzen.
7. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die mindestens eine kordartige Komponente (8) in einem mittleren Bereich bezüglich der axialen Erstreckung (A) des Hauptgehäuseteils (4a) angeordnet ist.
8. Trommel (2) nach einem oder mehreren der vorher-

gehenden Ansprüche, **dadurch gekennzeichnet, dass** die mindestens eine kordartige Komponente (8) in verschiedenen axial beabstandeten Positionen (P1, P2) auf dem Hauptgehäuseteil (4a) platziert ist.

9. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** mindestens eine kordartige Komponente (8) in jeder der axial beabstandeten Positionen (P1, P2) auf dem Hauptgehäuseteil (4a) platziert ist.
10. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** eine einzige kordartige Komponente (8) für die Windungen in den verschiedenen axial beabstandeten Positionen (P1, P2) des Hauptgehäuseteils (4a) verwendet wird.
11. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die kordartige Komponente (8) des Hauptgehäuseteils (4a) an mindestens einer Stelle in der Richtung des Umfangs und/oder der axialen Richtung (A) an seinem Umfang befestigt ist.
12. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die kordartige Komponente (8) den Hauptgehäuseteil (4a) im vorgespannten Zustand umgibt.
13. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die kordartige Komponente (8) aus mehreren Drähten oder Filamenten besteht.
14. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die kordartige Komponente (8) aus einem rostfreien, korrosionsverhütenden Material hergestellt ist.
15. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die kordartige Komponente (8) eine endliche kordartige Komponente ist, deren Enden (8a, 8b) durch eine Kordverbindungskomponente (14, 18, 20, 22, 24) miteinander verbunden sind.
16. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** es sich bei der Kordverbindungskomponente (14, 18, 20, 22, 24) um eine Kordverbindungskomponente handelt, die aus einer Gruppe von Kordverbindungskomponenten ausgewählt ist, die Folgendes umfasst: eine formschlüssige Verbindung, eine Reibverbindung, eine Klebeverbindung, insbesondere eine geknotete Verbindung, eine geflochtene Verbindung, eine verknüpfte Verbindung, eine ge-

spleißte Verbindung, eine (stark) geschweißte Verbindung, eine gelötete oder hartgelötete Verbindung, eine Gussverbindung, eine Klemm- oder Druckverbindung, eine verrastete Verbindung, eine Hakenverbindung oder eine Kombination aus mindestens zwei der oben genannten Kordverbindungskomponenten.

17. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Kordverbindungskomponente (14, 18) mindestens ein erstes Koppelement (14a, 18a) hat, das an einem ersten Ende (8a) des Kords befestigt sein kann, und mindestens ein zweites Koppelement (14b, 18b), das an einem zweiten Ende (8b) des Kords befestigt sein kann.
18. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die beiden Koppelemente (14a, 14b) ineinander eingeführt werden können.
19. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Kordverbindungskomponente (14, 18) in der Form einer Druckklemme hergestellt ist und beide Koppelemente (14a, 14b, 18a, 18b) im eingedrückten Zustand eine formschlüssige Verbindung in der Längsrichtung des Kords (8) haben.
20. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die kordartige Komponente (8) eine vorbestimmte erste Umgebungslänge (L_M) hat, wenn ihr Kordverbindungselement (14) in einem ersten nicht montierten Zustand ist, in dem die kordartige Komponente (8) den Hauptgehäuseteil (4a) lose umgibt, wobei die vorbestimmte erste Umgebungslänge (L_M) kürzer als die Länge (L_A) des Außenumfangs des Hauptgehäuseteils (4a) in Längsrichtung ist, und die kordartige Komponente (8) in einem zweiten Zustand, in dem sie montiert ist und den Hauptgehäuseteil (4a) umgibt und in dem ihre Kordenden (8a, 8b) mittels einer reversiblen und elastischen Kordverbindungskomponente (14) miteinander verbunden sind, auf eine zweite vorbestimmte Umgebungslänge (L_A) verlängert ist, die länger als die erste vorbestimmte Umgebungslänge (L_M) ist und im Grunde genommen der Länge (L_A) des Außenumfangs des Hauptgehäuseteils (4a) entspricht, so dass die kordartige Komponente (8) im montierten Zustand den Hauptgehäuseteil (4a) in einem vorgespannten Zustand umgibt.
21. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Kordverbindungskomponente (14, 18) einen Begrenzer (16) für mindestens eines der Kop-

pelelemente (14a, 18a, 18b) hat, mindestens dieses Koppelement (14a, 18a, 18b) in einem vorbestimmten Abstand (D_X , D_{X1} , D_{X2}) vor dem Begrenzer (16) platziert ist, wenn die kordartige Komponente (8) in ihrem ersten Zustand ist, wodurch die Länge (L_M) der ersten Windung definiert ist, und mindestens dieses Koppelement (14a, 18a, 18b) am Begrenzer (16) verstellt wird, wenn die kordartige Komponente (8) in ihrem zweiten Zustand ist, und unter Zusammenwirkung mit dem Begrenzer (16) somit die Länge (L_A) der zweiten Windung und das Vorspannungsmaß der kordartigen Komponente (8) definiert.

22. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Begrenzer (16) an mindestens einem (14b) der Koppelemente ausgebildet ist.
23. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Kordverbindungskomponente (18) einen getrennten Begrenzer (18c, 18c1) hat, der mindestens einem ersten und mindestens einem zweiten Koppelement (18a, 18b) zugeordnet ist.
24. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Hauptgehäuseteil (4a) an seiner äußeren Umfangsfläche mehrere genutete Winkelstücke (12) hat, die sich im Wesentlichen parallel zu der Länge der Rotationsachse (A) erstrecken und die im Hauptgehäuseteil (4a) eine lamellenartige Unterbrechung bilden, und die Kordverbindungskomponente (14) mindestens im Bereich eines dieser Winkelstücke (12) platziert ist.
25. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der rohrförmige Hauptgehäuseteil (4a) aus einem einfachen Blechmaterial hergestellt ist, das zum Erhalt einer rohrförmigen Struktur deformiert ist und an den beiden Rändern des Blechs mit einem verlängerten Einführungsbereich (B_F) verbunden ist, der sich im Wesentlichen parallel zur Zylinderachse (A) erstreckt und mit mindestens einem Winkelstück (10) in der Form eines kleinen Kanals ausgerüstet ist, dessen Längsachse (10_A) sich im Wesentlichen in der Richtung des Umfangs des Hauptgehäuseteils (4a) erstreckt, und sich die kordartige Komponente (8) so durch das genutete Winkelstück (10) erstreckt, dass Letzteres die kordartige Komponente (8) in der axialen Richtung (A) der Trommel (2) befestigt.
26. Trommel (2) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Kordverbin-

duongskomponente (14) in einem Bereich des Umfangs des Hauptgehäuseteils (4a) gegenüber dem verlängerten Einführungsbereich (B_F) platziert ist.

27. Maschine zur schonenden Behandlung von Kleidungsstücken, besonders einer Waschmaschine, eines Waschtrockners, eines Wäschetrockners o. Ä. mit einer Trommel (2) nach einem oder mehreren der Ansprüche 1 - 26.

Revendications

1. Tambour (2) d'une machine servant à traiter des vêtements avec ménagement, notamment d'une machine à laver, d'une laveuse-sécheuse, d'un sèche-linge ou similaire, comprenant

- un carter de tambour (4) dont la forme de base est essentiellement cylindrique, avec un axe de cylindre central qui forme un axe de rotation (A) autour duquel le tambour (2) peut tourner, le carter de tambour (4) ayant une partie de carter principale tubulaire (4a) fabriquée à partir d'un matériau en feuille de base présentant une première et une seconde parois frontales (4b, 4c) qui sont reliées à une première et une seconde zones de bordure axiales (RB₁, RB₂) de la partie de carter principale (4a) ; et

- au moins une pièce de renforcement qui entoure la partie de carter principale (4a) sur la circonférence extérieure du tambour (2) et s'oppose au bombement de la partie de carter principale (4a) pendant la rotation du tambour (2) sous l'influence de la force centrifuge,

caractérisé en ce que la pièce de renforcement est au moins un composant similaire à une corde (8) qui encercle la circonférence extérieure de la partie de carter principale (4a) au moins une fois.

2. Tambour (2) selon la revendication 1, **caractérisé en ce que** le composant similaire à une corde (8) encercle la circonférence extérieure de la partie de carter principale (4a) plusieurs fois (W₁, à W_x tours).
3. Tambour (2) selon la revendication 2, **caractérisé en ce que** les tours adjacents (W₁ à W_x) du composant similaire à une corde (8) qui encerclent la circonférence extérieure de la partie de carter principale (4a) plusieurs fois s'étendent directement côte à côte.
4. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce qu'il y a un espace entre les tours adjacents** (W₁ à W_x) du composant similaire à une corde (8).

5. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** les tours (W₁ à W_x) du composant similaire à une corde (8) encerclent la circonférence extérieure de la partie de carter principale (4a) avec des angles d'inclinaison différents.

6. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** des longueurs du composant similaire à une corde (8) qui encercle la circonférence extérieure de la partie de carter principale (4a) un nombre de fois se croisent.

7. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** ledit au moins un composant similaire à une corde (8) est placé dans une zone centrale par rapport à l'extension axiale (A) de la partie de carter principale (4a).

8. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** ledit au moins un composant similaire à une corde (8) est placé en différentes positions (P1, P2), présentant une distance axiale entre elles, sur la partie de carter principale (4a).

9. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce qu'au moins un composant similaire à une corde individuel** (8) est placé dans chacune des positions axialement distantes (P1, P2) sur la partie de carter principale (4a).

10. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce qu'un seul composant similaire à une corde** (8) est utilisé pour les tours dans les différentes positions axialement distantes (P1, P2) de la partie de carter principale (4a).

11. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** le composant similaire à une corde (8) de la partie de carter principale (4a) est fixé sur la circonférence de cette dernière sur au moins un site dans le sens de la circonférence et/ou dans la direction axiale (A).

12. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** le composant similaire à une corde (8) encercle la partie de carter principale (4a) à l'état précontraint.

13. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** le composant similaire à une corde (8) est cons-

titué d'un nombre de fils ou filaments.

14. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** le composant similaire à une corde (8) est formé d'un matériau inoxydable anticorrosif. 5
15. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** le composant similaire à une corde (8) est un composant similaire à une corde fini dont les extrémités (8a, 8b) sont jointes par un composant de jointure de corde (14, 18, 20, 22, 24). 10
16. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** le composant de jointure de corde (14, 18, 20, 22, 24) est un composant de jointure de corde qui est choisi dans un groupe de composants de jointure de corde comprenant : un joint basé sur la forme, un joint fonctionnant par frottement, un joint adhésif ou collé, notamment un joint noué, un joint torsadé, un joint entrelacé, un joint épaissuré, un joint soudé (solide), un joint soudé tendre ou brasé, un joint coulé, un joint fonctionnant par serrage ou pression, un joint de verrouillage, un joint d'accrochage ou une combinaison d'au moins deux des composants de jointure de corde mentionnés ci-dessus. 15 20 25
17. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** le composant de jointure de corde (14, 18) comprend au moins un premier élément d'accouplement (14a, 18a) qui peut être fixé à une première extrémité (8a) de la corde et au moins un second élément d'accouplement (14b, 18b) qui peut être fixé à une seconde extrémité (8b) de la corde. 30 35
18. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** les deux éléments d'accouplement (14a, 14b) peuvent être insérés l'un dans l'autre. 40
19. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** le composant de jointure de corde (14, 18) est réalisé sous la forme d'une cosse et les deux éléments d'accouplement (14a, 14b, 18a, 18b) ont, à l'état enclenché, un joint par conjugaison de forme dans la direction longitudinale de la corde (8). 45 50
20. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** le composant similaire à une corde (8), avec son composant de jointure de corde (14) dans un premier état non monté dans lequel le composant similaire à une corde (8) encercle la partie de carter principale (4a) sans la serrer, a une première longueur d'encerclement prédéterminée (L_M) qui est inférieure à la longueur longitudinale de la circonférence extérieure (LA) de la partie de carter principale (4a) ; et le composant similaire à une corde (8) - dans un second état dans lequel il est monté et encercle la partie de carter principale (4a) et ses extrémités de corde (8a, 8b) sont jointes au moyen d'un composant de jointure de corde (14) réversible et élastique - est allongé, prenant une seconde longueur d'encerclement prédéterminée (LA) qui est supérieure à la première longueur d'encerclement prédéterminée (L_M) et correspond essentiellement à la longueur de la circonférence extérieure (L_A) de la partie de carter principale (4a), de manière à ce que le composant similaire à une corde (8), à l'état monté, encercle la partie de carter principale (4a) à l'état précontraint. 55
21. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** le composant de jointure de corde (14, 18) est pourvu d'un élément limiteur (16) pour au moins un des éléments d'accouplement (14a, 18a, 18b) ; lorsque le composant similaire à une corde (8) est dans son premier état, au moins cet élément d'accouplement (14a, 18a, 18b) est placé à une distance prédéterminée (D_x , D_{x1} , D_{x2}) en face de l'élément limiteur (16), définissant ainsi la longueur (L_M) du premier tour ; et lorsque le composant similaire à une corde (8) est dans son second état, au moins cet élément d'accouplement (14a, 18a, 18b) est ajusté au niveau de l'élément limiteur (16) et - coopérant avec celui-ci - définit ainsi la longueur (LA) du second tour et la grandeur de la précontrainte du composant similaire à une corde (8).
22. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** l'élément limiteur (16) est formé sur au moins un (14b) des éléments d'accouplement.
23. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** le composant de jointure de corde (18) est pourvu d'un élément limiteur séparé (18c, 18c1) qui est associé à au moins un premier et au moins un second élément d'accouplement (18a, 18b).
24. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** la partie de carter principale (4a) présente - sur sa surface circonférentielle extérieure -, plusieurs gorges courbes (12) qui s'étendent de manière essentiellement parallèle à la longueur de l'axe de rotation (A) et qui forment une sorte de lame de rupture à l'intérieur de la partie de carter principale (4a) ; et le composant de jointure de corde (14) est placé au

moins dans la zone de l'une de ces gorges courbes (12).

25. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** la partie de carter principale tubulaire (4a) est formée d'un matériau en feuille de base qui est déformé pour obtenir une structure tubulaire et est réuni au niveau des deux bords de la feuille pour former une zone d'insertion étendue (B_F) qui s'étend de manière essentiellement parallèle à l'axe du cylindre (A) et la zone d'insertion (B_F) est pourvue d'au moins un coude (10) sous la forme d'un petit canal dont l'axe longitudinal (10_A) s'étend essentiellement dans la direction de la circonférence de la partie de carter principale (4a) ; et le composant similaire à une corde (8) s'étend à travers la cannelure coudée (10) de manière à ce que cette dernière fixe le composant similaire à une corde (8) dans la direction axiale (A) du tambour (2).
26. Tambour (2) selon l'une quelconque ou plusieurs des revendications précédentes, **caractérisé en ce que** le composant de jointure de corde (14) est placé dans une zone de la circonférence de la partie de carter principale (4a) opposée à la zone d'insertion étendue (B_F).
27. Machine servant à traiter des vêtements avec ménagement, notamment une machine à laver, une laveuse-sècheuse, un sèche-linge ou similaire, pourvue d'un tambour (2) selon l'une quelconque ou plusieurs des revendications 1-26.

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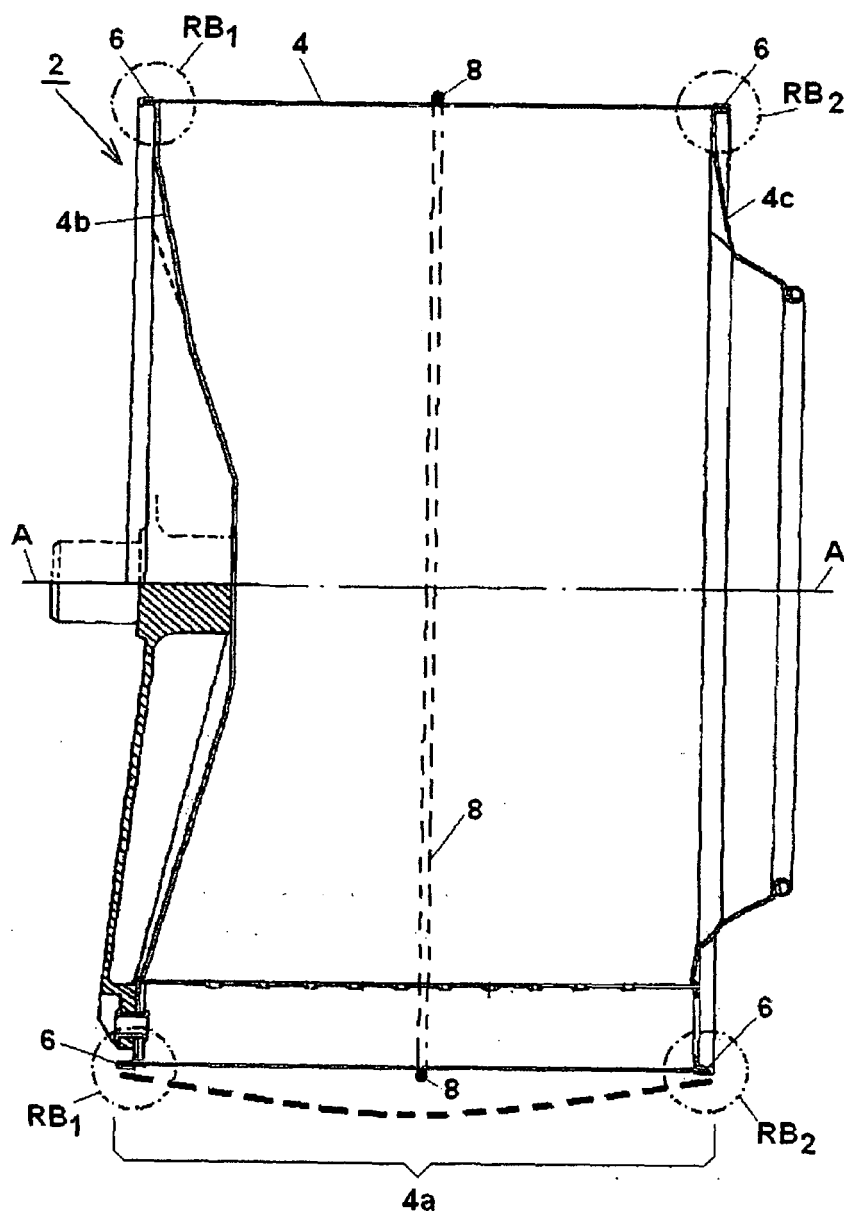


Fig. 1

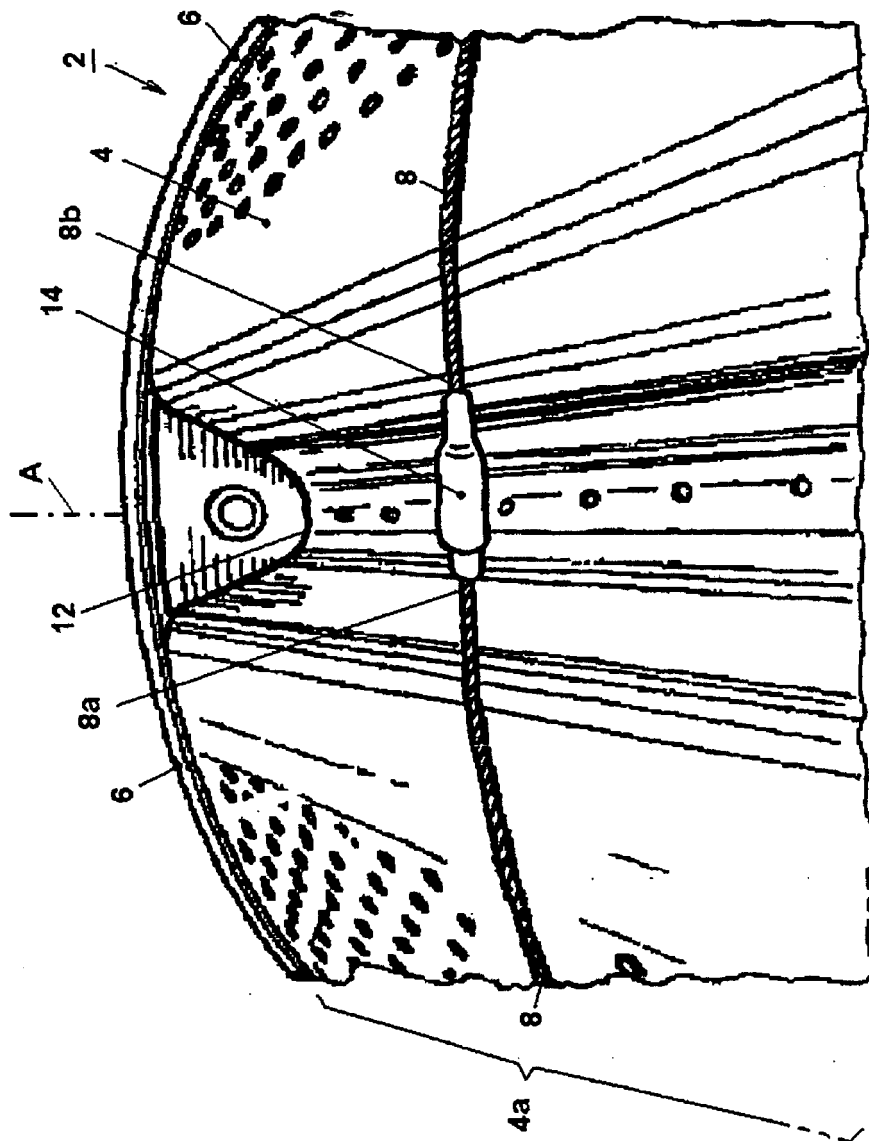


FIG.2

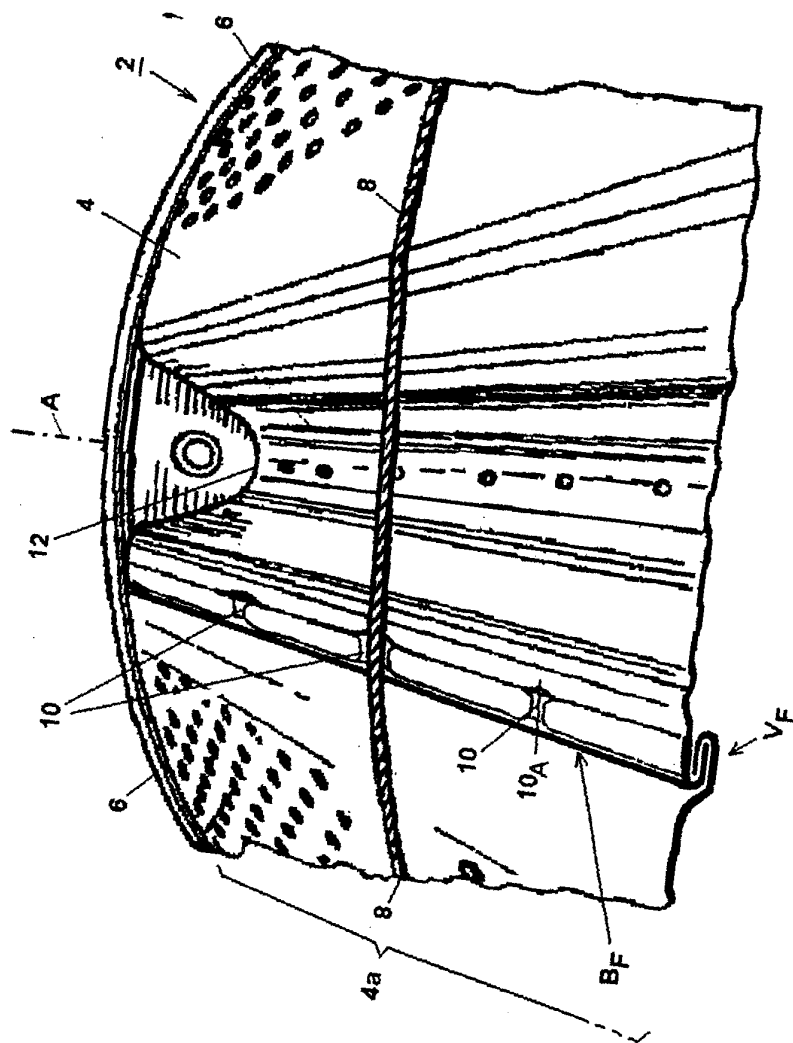


FIG.3

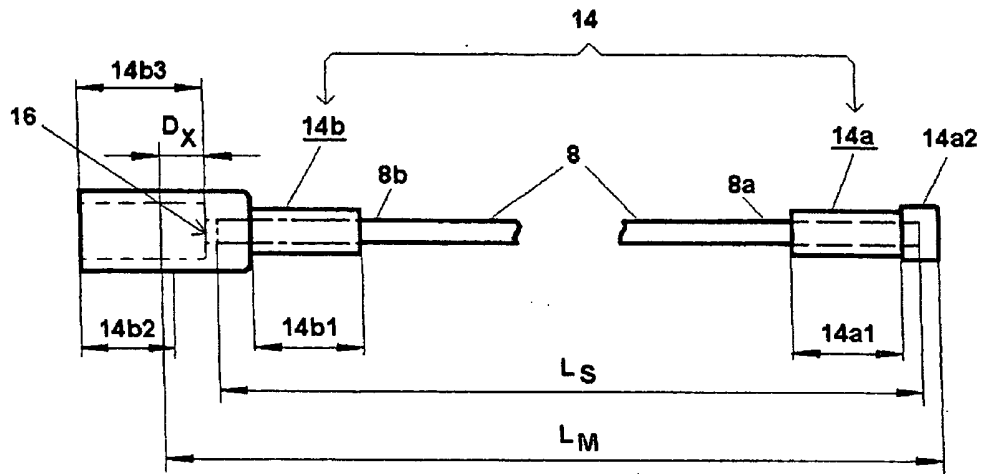


Fig. 4

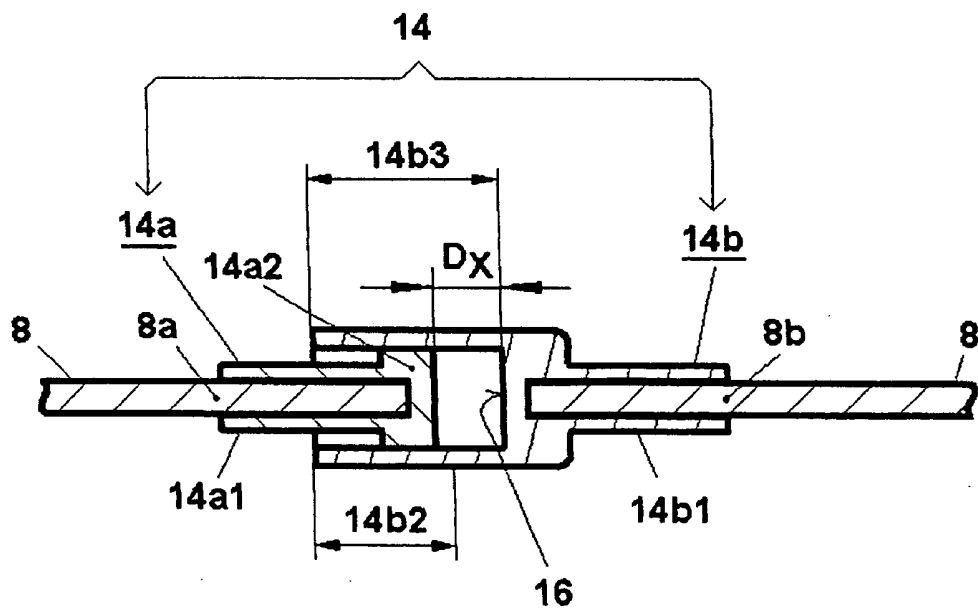


Fig. 5a

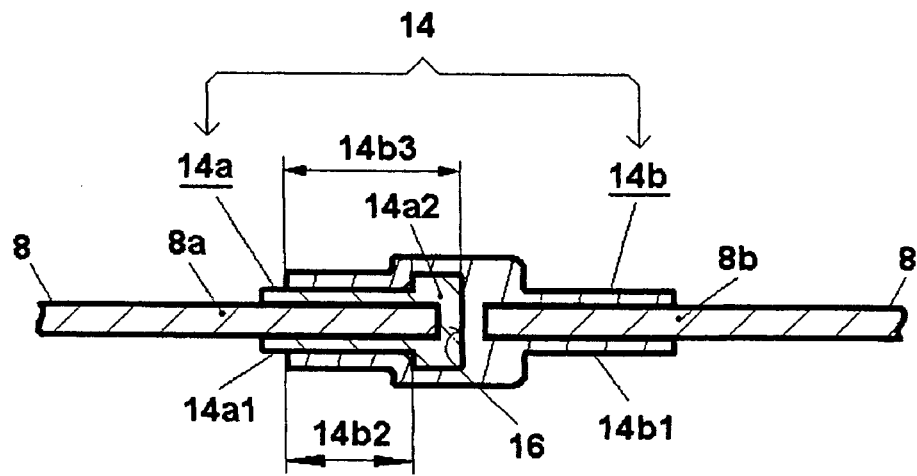


Fig. 5b

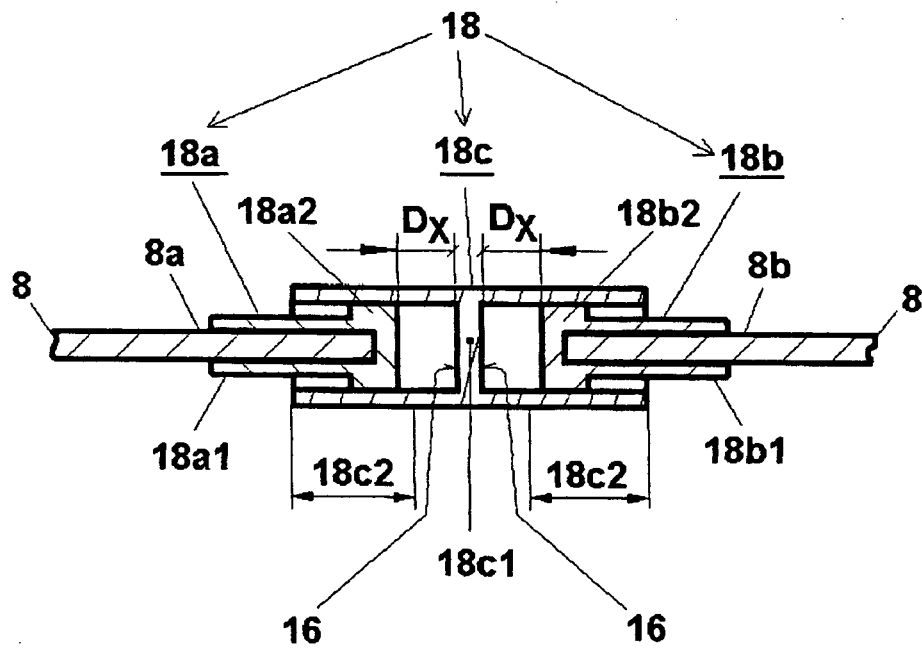


Fig. 6

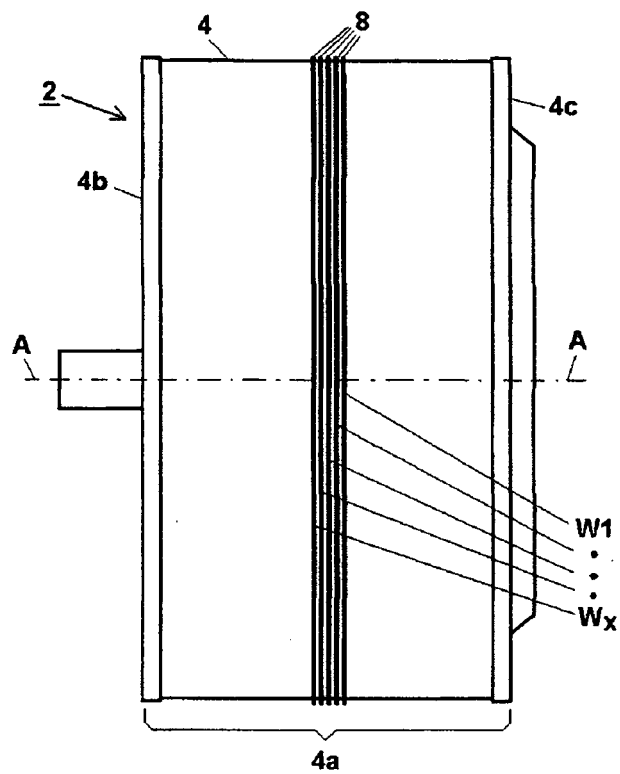


Fig. 7

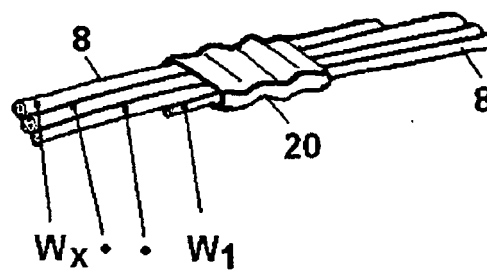


Fig. 8a

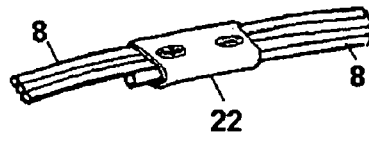


Fig. 8b

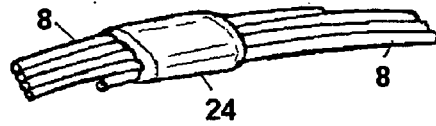


Fig. 8c

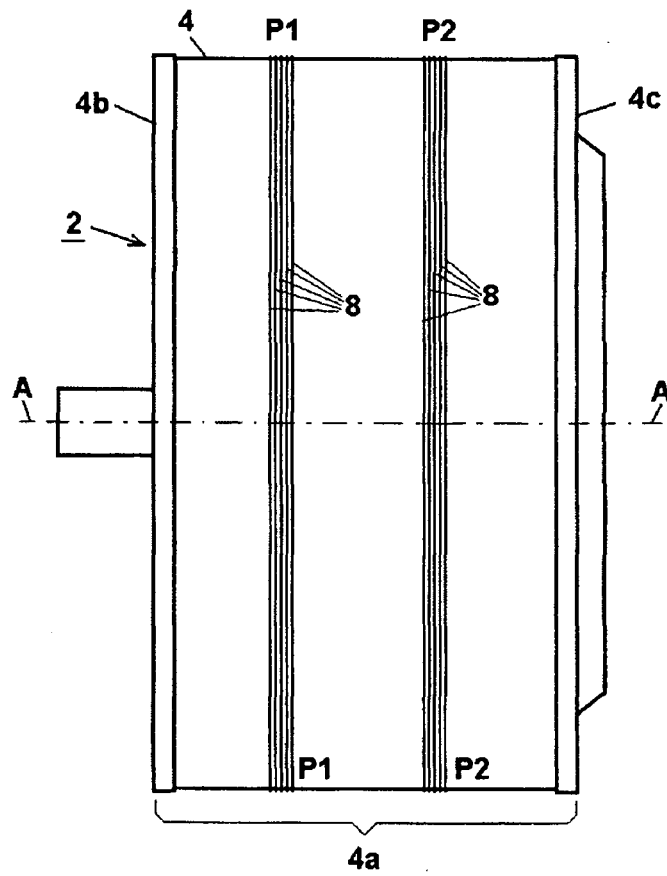


Fig. 9

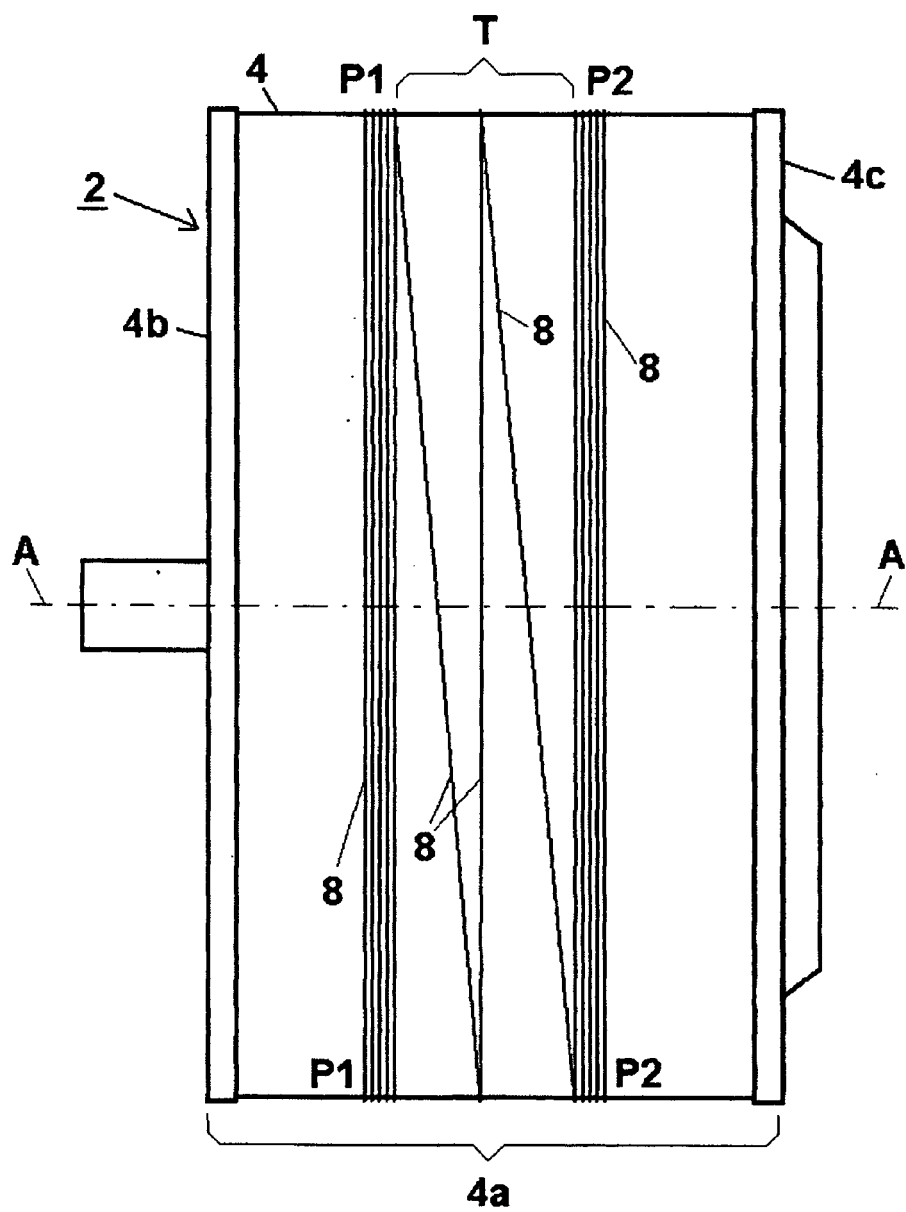


Fig. 10

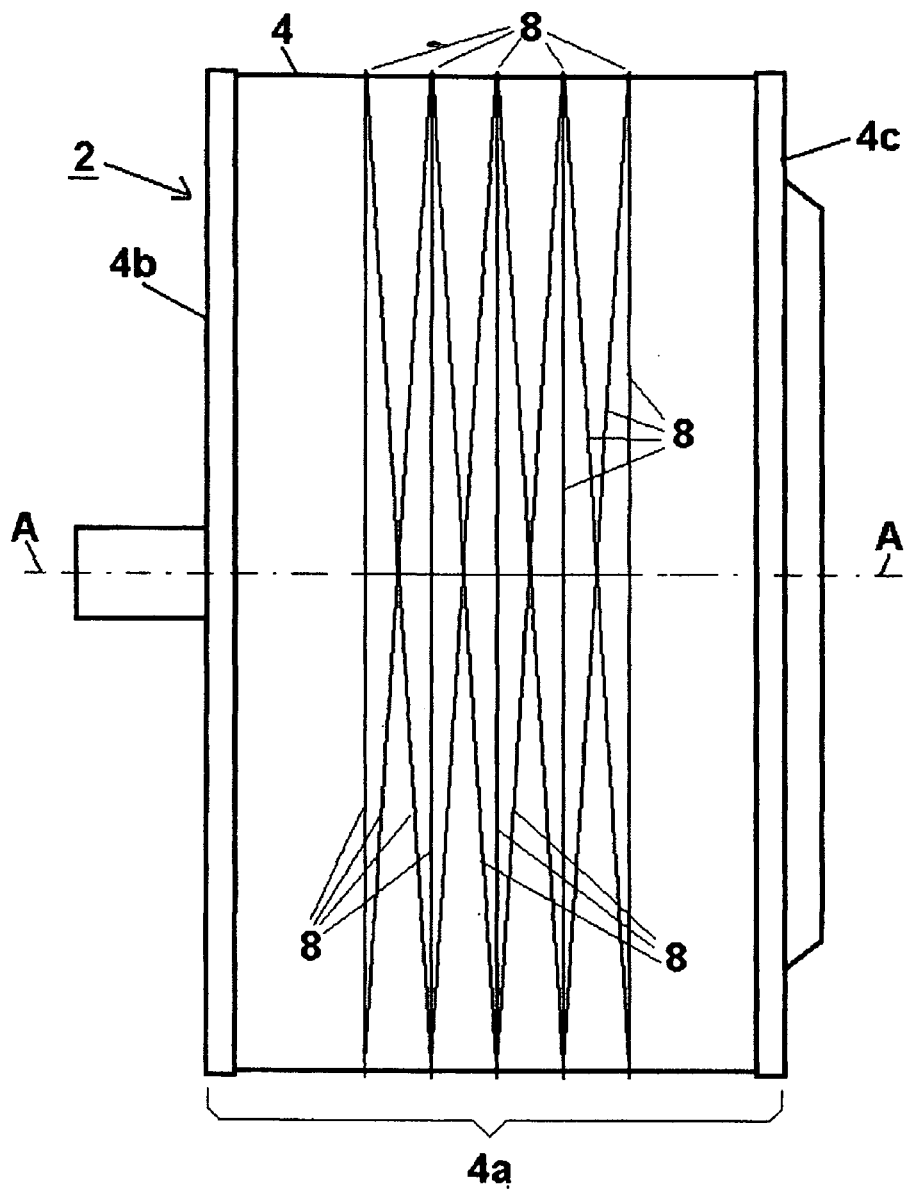
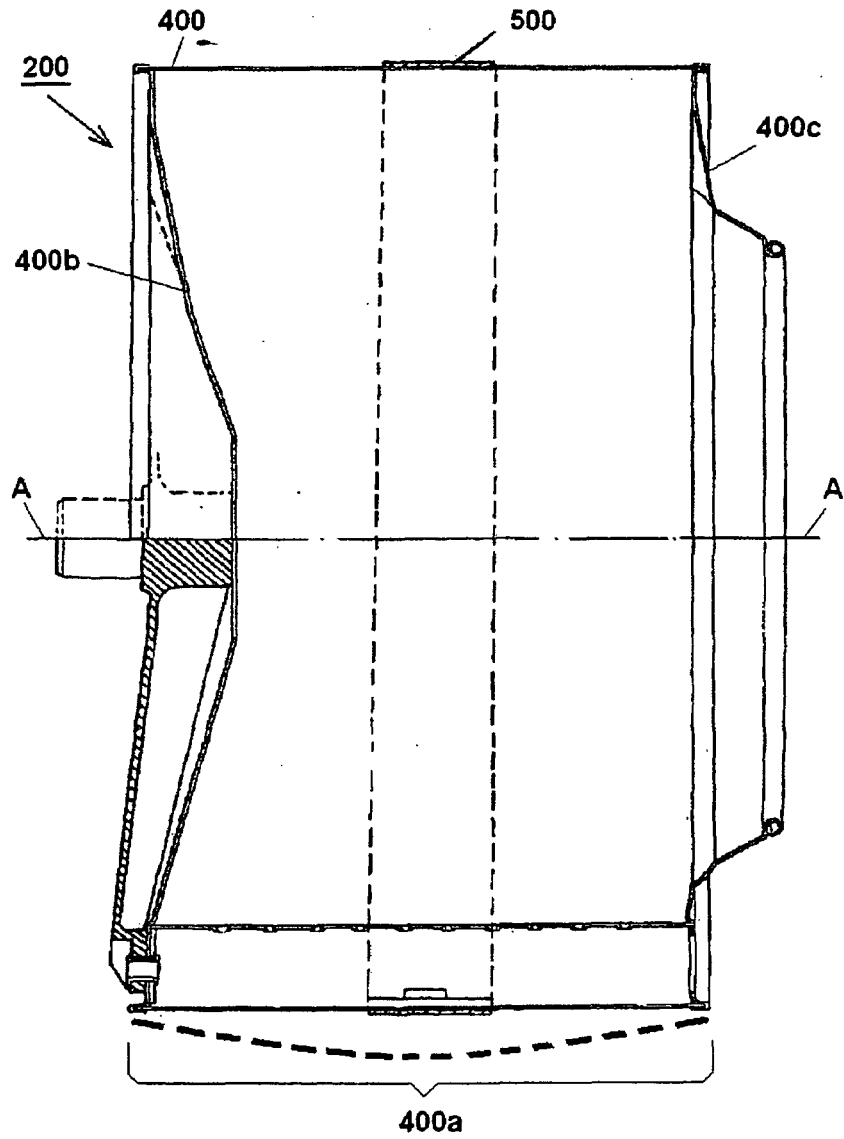


Fig. 11



Prior art

Fig. 12

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 1568812 A2 [0002]
- EP 1505188 A2 [0002]
- GB 841783 A [0003]