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Mechanical take down device.

The invention relates to a mechanical take down device in a circular, particularly double cylinder knitting machine. The device consists of two circular parts (10, 11), where one (11) of them is full and fits into the other part (10), while the fabric (P) passes between them. On one of the parts is formed a screw-like surface (110) and neighbouring surface of the other part is circular and its slant equals that of the screw-like surface. One of the parts does not rotate, while the other forcedly rotates and is coupled with the needle cylinder (1).

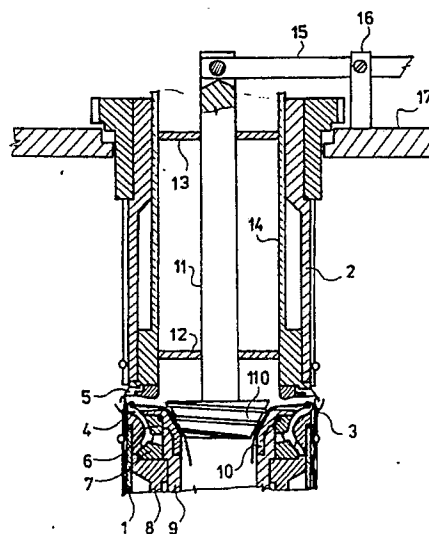


Fig. 1

MECHANICAL TAKE DOWN DEVICE

The invention relates to a mechanical take down device in a circular knitting machine, particularly a double cylinder knitting machine.

It is known that different types of mechanical take down devices are used in double cylinder circular knitting machines for the production of sock goods to take down the goods.

Machines are known, as described in Czechoslovak Author's Certificate 185,999, where the take down mechanism comprises vertically movable working elements being arranged in a circle. Vertical movement of working elements is controlled by a stationary cam and springs. Working ends of said elements are made in the form of flexible blades. Said device operates reasonably reliably, except for jacquard take down, where bars are sometimes visible. Said bars originate due to uneven take down between neighbouring working elements.

The above mentioned disadvantage is eliminated by a take down device described e.g. in Czechoslovak Author's Certificate 221,149, where there is a take down pin which catches up the fabric during welt knitting and during the course of further knitting it takes it down due to the action of a pneumatic mechanism. Said device practically eliminates longitudinal bars, but it is relatively complicated, takes up space and requires the supply of pressure air into the machine. A further disadvantage is that it does not permit to knit panties due to the lift of the device, or the lift may be performed in two parts, of course with the extension of the time to knit one product.

When knitting fabric of a low density, i.e. with high extensibility, wrinkling of the fabric takes place.

The task of the invention is to eliminate the above-mentioned disadvantages, what is principally achieved, so that the device comprises two coaxially arranged circular parts with the fabric passing between them, the surface of one of said parts coming in contact with the fabric is provided with a screw-like surface and one of them is arranged non-rotatably.

The advantage of the invention is that the device is very simple and not demanding as to the operation and servicing. Due to the fact that it acts around the whole periphery of the fabric by a continuous pull, it entirely eliminates creation of longitudinal bars and practically enables knitting of infinitely long products and replaces thus even a roller take down. Moreover, it smoothes up the fabric surface and the fabric quality is better. The device does not need to be adjusted and there is practically no wear, what guarantees its long service life. Faults due to the function are also entirely

eliminated. The device can operate like upper or lower take down.

Exemplary embodiments of the device according to the invention are illustrated in the drawings, where:

Fig. 1 is a schematic arrangement of the take down device in operational position in a double bed circular knitting machine;

Fig. 2 is a detail of both parts of the take down in non-operational position;

Fig. 3 is a detail of both parts of the take down in operational position;

Fig. 4 is a detail of both parts of the take down in non-operational position, where the working surfaces are formed on the base of cylindrical surfaces;

Fig. 5 the same like in Fig. 4, but the parts are in operational position,

Fig. 6 is another embodiment of both parts in operational position;

Fig. 7 is an illustration of the screw-like surface of the upper part according to Fig. 6 when viewed from down,

Figs. 8, 9 the same like Figs. 2 and 3, but the screw-like surface is on the second part.

A known double cylinder circular knitting machine for the production of sock goods is provided with a lower and upper needle cylinder, 1, 2, where there are located double-head needles 3 and further, known, not shown jacks to control needles 3. For the sake of forming the stitches, the machine is further provided with knock over sinkers 4 in the lower needle cylinder 1 and with stationary presser sinkers 5 in the upper needle cylinder 2. Knocking over sinkers 3 are controlled by stationary cam rings 6, 7 fixedly arranged on a non-rotary tube 8.

The machine is equipped with a mechanical take down device comprising the following parts. In the lower needle cylinder 1 there is a part 10 of a funnel-like shape with a central opening for fabric passage fixedly arranged on an internal rotating take down tube 9. In the upper needle cylinder 2 there is arranged an axially shiftable part 11, the working part of which is formed like an external, conical, screw-like surface 110. Both parts 10 and 11 fit into each other, while the slope of internal conical surface 100 (Fig. 2) of part 10 corresponds with the conical screw-like surface 110. Both parts 10 and 11 are arranged coaxially, while part 11 is located rotatably and shiftable in rings 12, 13 which are fixedly arranged in an internal tube 14 of the upper needle cylinder 2, while the tube 14 rotates with the needle cylinder 2. In the upper end of part 11 is arranged a lever 15 located swingably in a stand 16 on upper flange 17 of the machine. The

other arm of the lever 15 is controlled by the machine control drum through a not shown kinematic transmission.

Operation of the above-mentioned device is as follows. At the beginning of knitting the fabric, i.e. of the welt, part 11 is lifted so that the device is out of operation. Fabric P grows longer, while it contracts to the center due to laying of elastic thread. After finished knitting of the welt, part 11 (Fig. 3) is lowered by a command from the control drum. Fabric P is pressed by a conical screw-like surface 111 onto the internal conical surface 110. Pressure of part 11 causes entrainment of fabric P by rotating part 10. Due to the rotation, the fabric P is in fact screwed into the surface of conical screw-like surface 110 and it is thus in fact tensioned and taken down from the needles 3. After finished knitting, part 11 is lifted by a command from the control drum and the fabric is cast off the needles 3.

There exist various modifications, which can be performed within the scope of the invention. The operation of parts 10 and 11 can proceed in opposite sequence. The upper part 11' (Fig. 8) is provided with a conical surface 110' and the lower part 10' with a screw-like conical surface 100'. In case of fit of the part 11' into the part 10' (Fig. 9), the fabric is tensioned and taken down by the part 10'. Another modification representing no change in the principle of the solution consists in that the rotary location is changed. The lower part 10 or 10' is arranged non-rotatably and the upper part 11, 11' is arranged as driven.

Further, the surfaces by which the parts fit into each other do not need to be conical, but they may be for example of a cylindrical shape, as evident on parts 11a, 10a in Figs. 4 and 5, or they may be formed in adjacent plane faces of parts 11b, 10b (Figs. 6 and 7).

Further, the take down device can be arranged for upper take down so that the part with the opening, for example the part 10, is arranged in the upper needle cylinder, and the full part, for example the part 11, in the lower cylinder. In this case it is possible that the full part in the lower needle cylinder is not axially shiftable and the part with the opening for fabric passage is axially shiftable.

The device according to the invention can be used even in single cylinder knitting machines and also in large diameter knitting machines.

Claims

1. Mechanical take down device in a circular knitting machine, particularly in a double cylinder knitting machine, being characterized in that

it comprises two coaxially arranged circular parts (10, 11, 10', 11', 10a, 11a, 10b, 11b) between which passes fabric (P), while one of them is provided on the surface coming in contact with fabric (P) with a screw-like surface (110, 100') and one of them rotates and the other is arranged non-rotatably.

2. Mechanical take down device according to claim 1,

being characterized in that the screw-like surface (110, 100') of one part has the same slope like circular surface (100, 110'), while both parts (10, 11, 10', 11', 10a, 11a) are formed so that they fit into each other, while one of them is full and the other is provided with a central opening for fabric passage.

3. Mechanical take down device according to claims 1 and 2

being characterized in that one of the parts (10, 11, 10', 11', 10a, 10b, 11a, 11b) is arranged axially shiftable.

4. Mechanical take down device according to claims 1, 2 and 3,

being characterized in that part (10, 10', 10a, 10b) with the opening is fixedly connected with the needle cylinder (1) for example with the lower one, and the other full part (11, 11', 11a, 11b) is non-rotatably shiftable located in the other needle cylinder (2).

5. Mechanical take down device according to claims 1 to 4,

being characterized in that the screw-like surface (110) is formed on full part (11).

6. Mechanical take down device according to claims 1 to 4,

being characterized in that the screw-like surface (100) is formed on part (10) with the central opening.

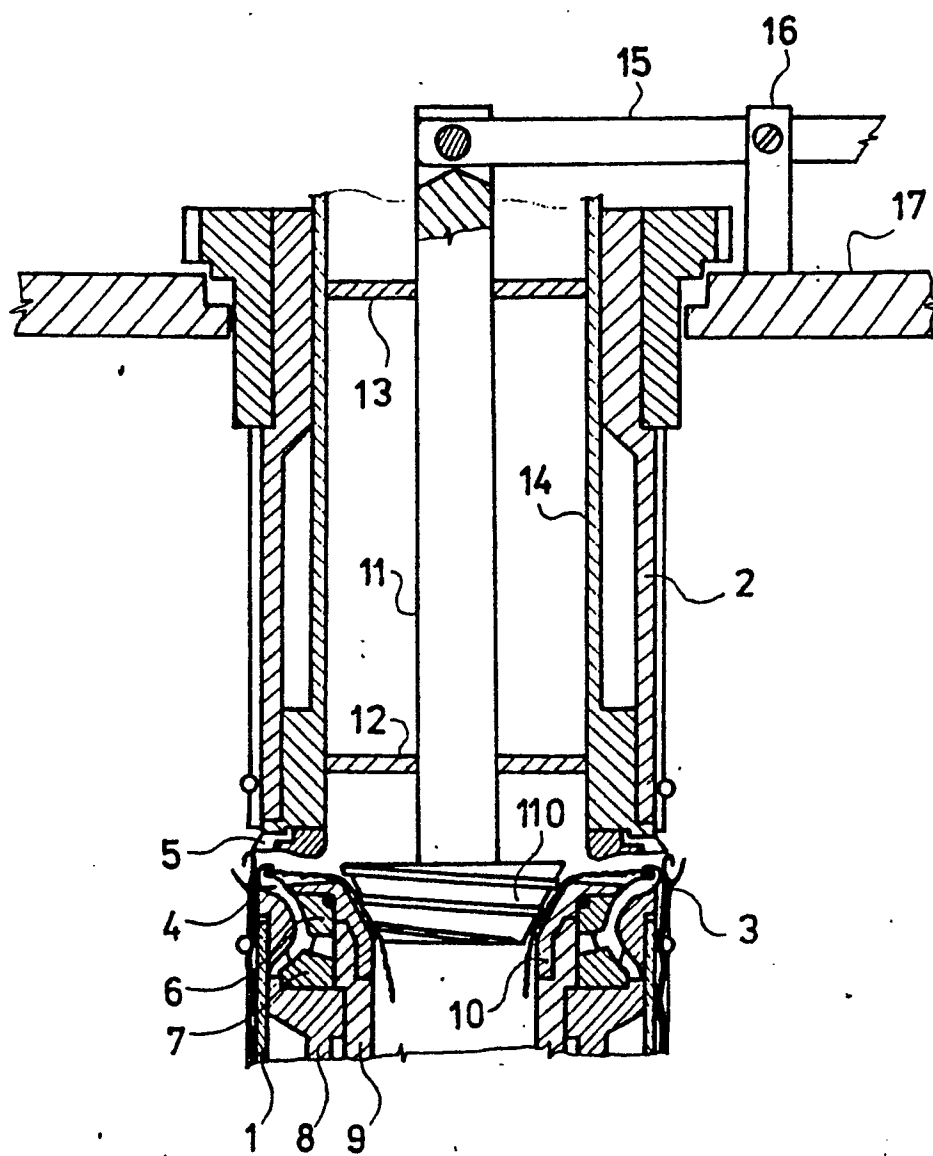
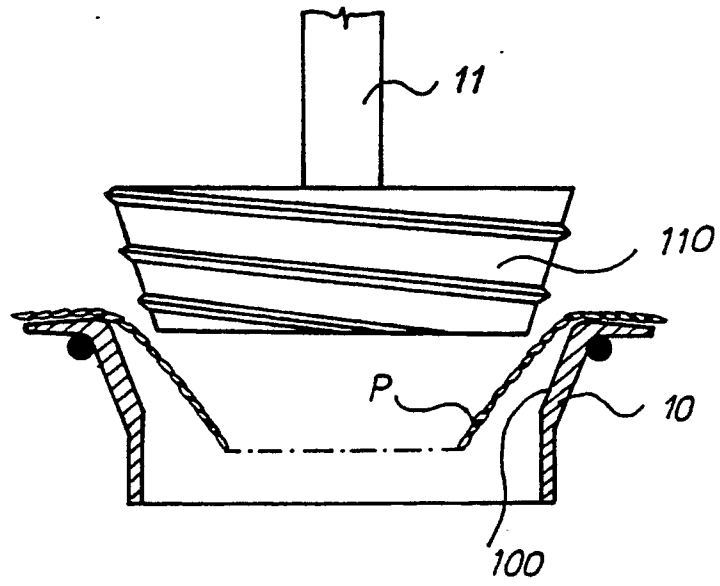
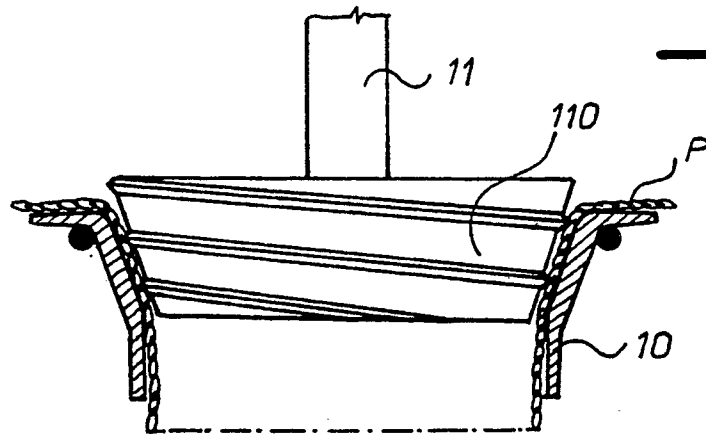


Fig. 1

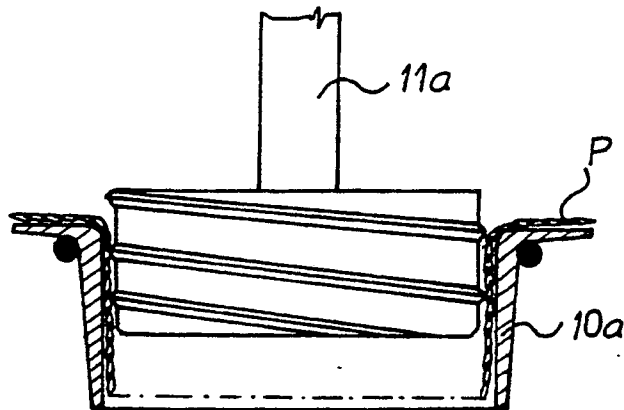
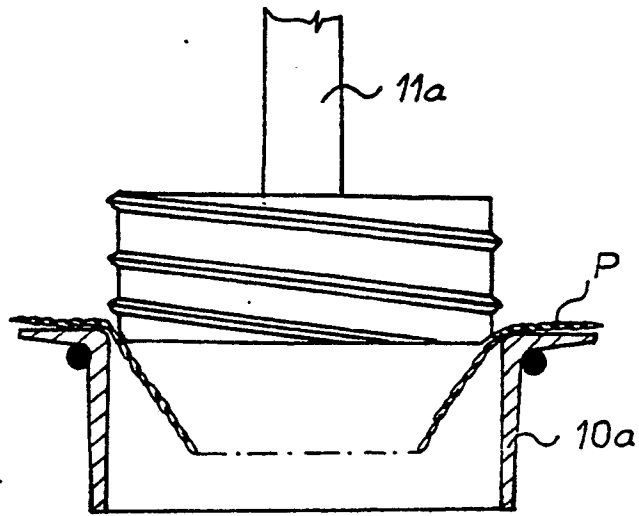
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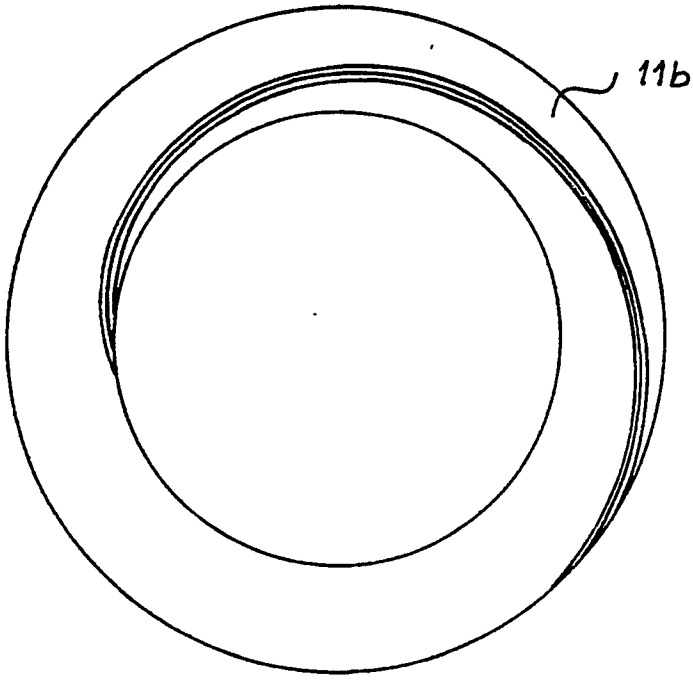
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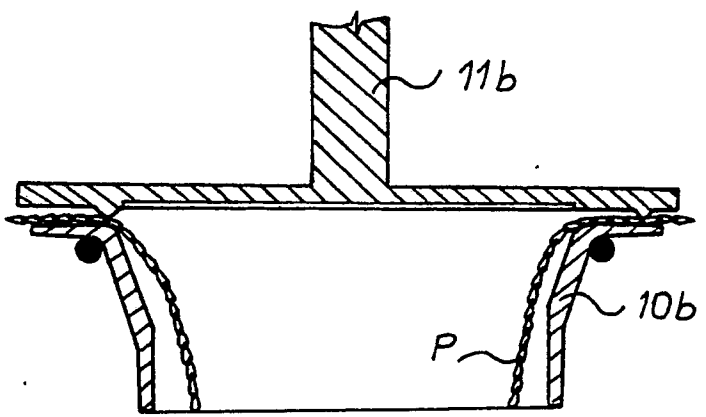
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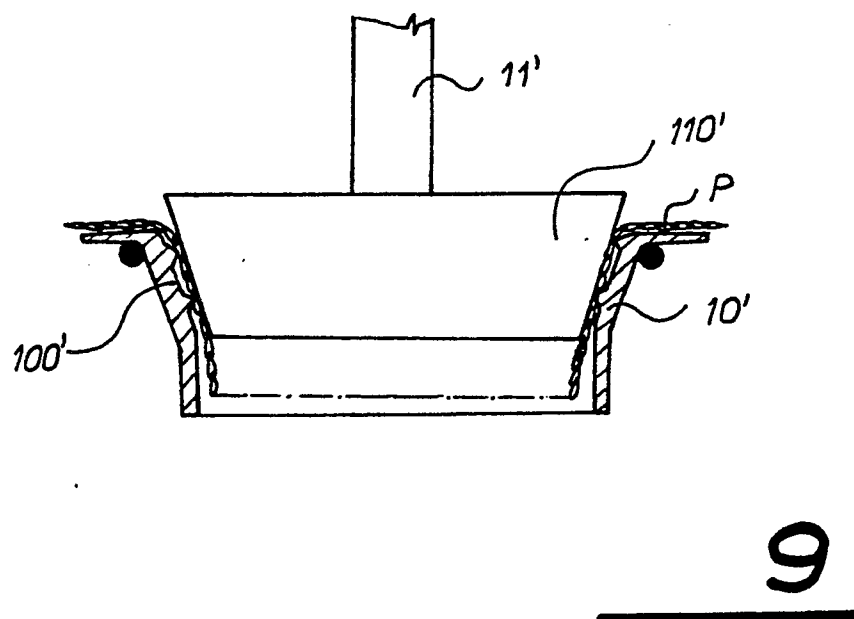
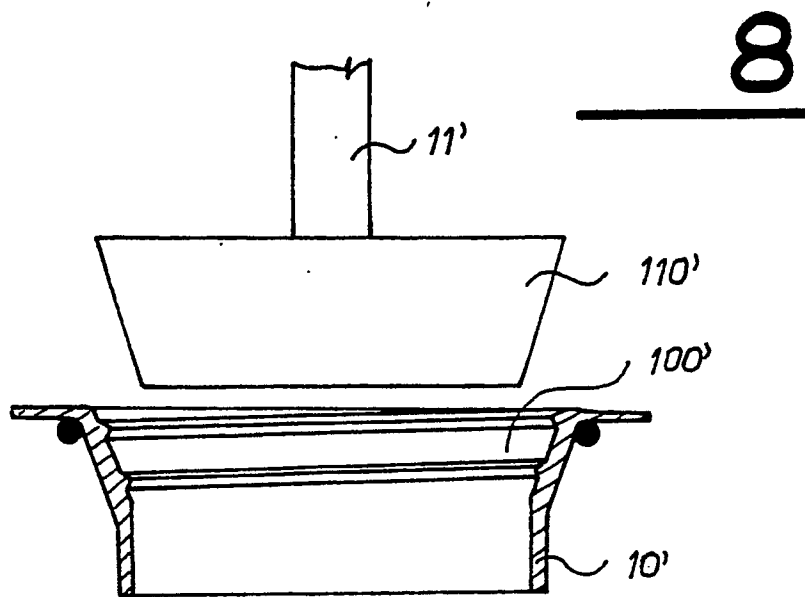
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DOCUMENTS CONSIDERED TO BE RELEVANT			EP 90102477.8
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.)
X	<u>GB - A - 432 233</u> (SPIERS) * Figures 2,3; page 7, lines 34-36; page 6, lines 68-70 * --	1-6	D 04 B 15/88
A	<u>GB - A - 1 444 930</u> (CARABELLI) --		
A	<u>GB - A - 659 999</u> (BATA) --		
A	<u>GB - A - 1 175 131</u> (SOLIS) -----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.) D 04 B 15/00
Place of search		Date of completion of the search	Examiner
VIENNA		30-04-1990	BAUMANN
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			