Jan. 24, 1967 SEITARO FUJIHASHI 3,299,676

APPARATUS FOR CONTINUOUSLY LEADING TEXTILES INTO OR OUT OF A PRESSURE-TREATING CHAMBER

Filed Jan. 29, 1965 2 Sheets-Sheet 1

FIG. 1

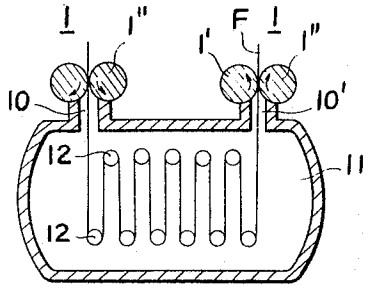

FIG. 2

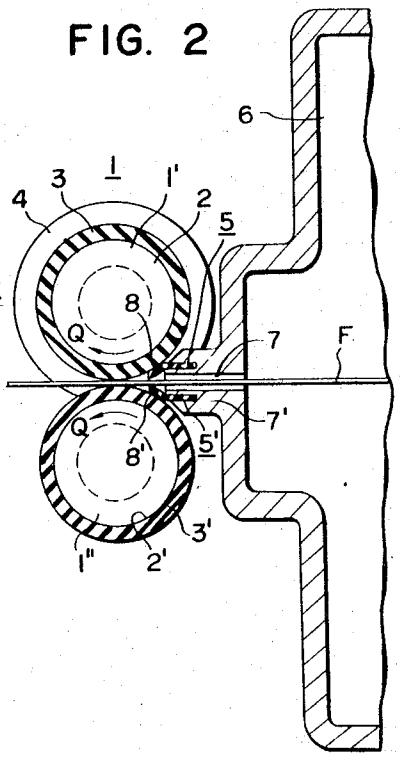

FIG. 3

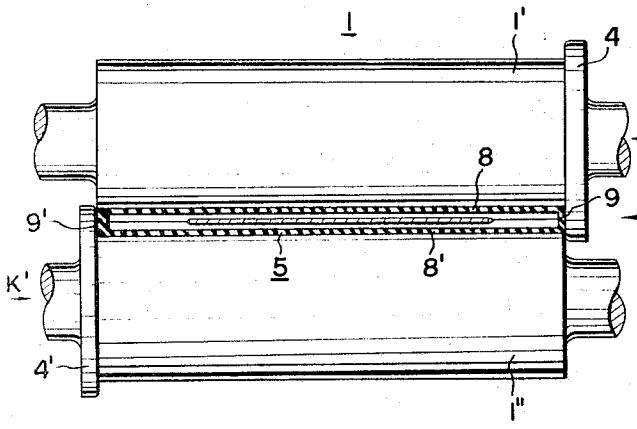

FIG. 4

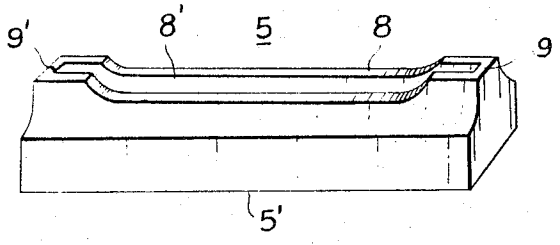

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FIG. 6

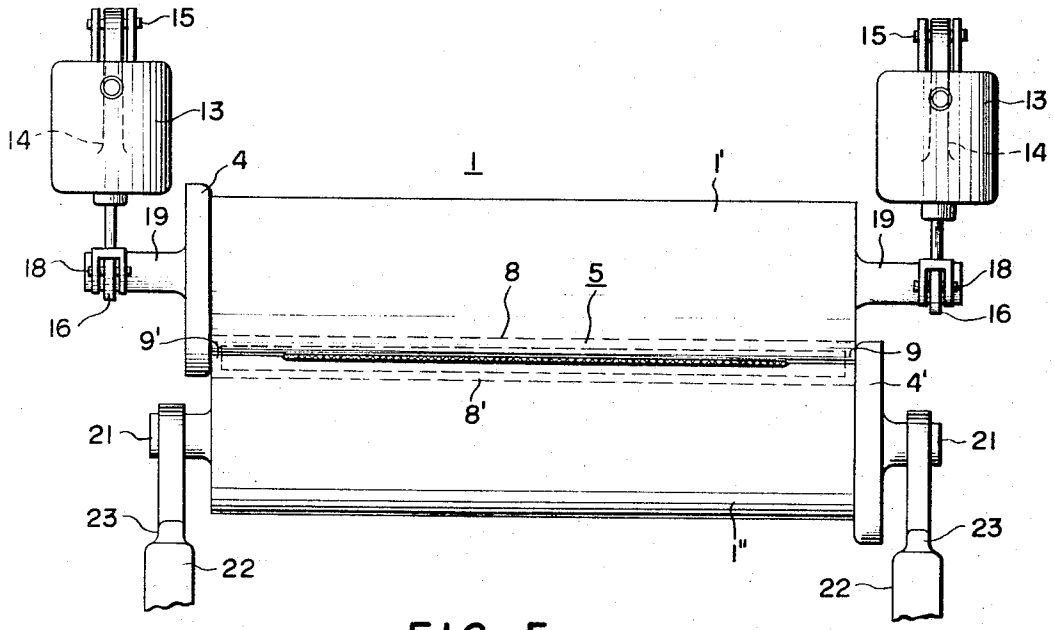
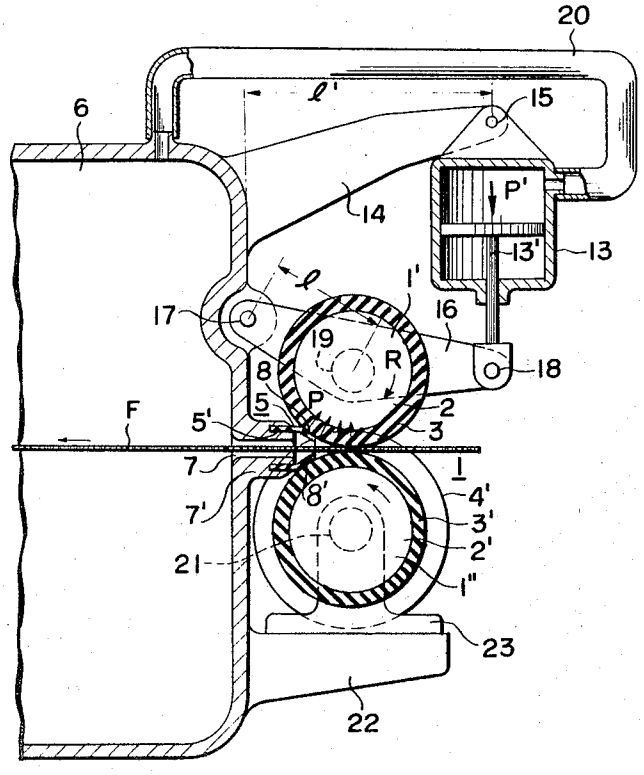


FIG. 5



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3,299,676

APPARATUS FOR CONTINUOUSLY LEADING TEXTILES INTO OR OUT OF A PRESSURE-TREATING CHAMBER

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2 Claims. (Cl. 68—5)

This invention relates to apparatus for continuously leading textile into or out of a pressure-treating chamber.

A principal object of the present invention is to provide a very simple apparatus for leading textiles in or out of a pressure-treating chamber wherein textiles can be continouusly led into or out of a pressure-treating chamber in a substantially perfectly air-tight or liquid-tight state.

Another object of the present invention is to provide an apparatus for leading textiles in or out wherein, when a textile is to be led into or out of a pressure-treating chamber by being held between two feeding rolls, irrespective of the fluctuation of the pressure in said pressure-treating chamber, a necessary tightening pressure can be always given between both feeding rolls and the pressure fluid in said pressure-treating chamber can be prevented from leaking through the part of the textile held between the two feeding rolls.

A further object of the present invention is to provide an apparatus wherein, when a textile is to be led into or out of a pressure-treating chamber, the textile is not likely to be impaired by the tightening pressure between said two feeding rolls.

The present invention shall now be explained with reference to the accompanying drawings.

FIGURE 1 is a vertically sectioned sketch of a pressure-treating chamber equipped with apparatus of the present invention.

FIGURE 2 is a vertically sectioned view of an embodiment of the apparatus of the present invention.

FIGURE 3 is a partly sectioned rear view of the same.

FIGURE 4 is a perspective view of an air-tight or liquid-tight tube used in the apparatus of the present invention.

FIGURE 5 is a vertically sectioned view of another embodiment of the present invention.

FIGURE 6 is an elevation of the same.

FIGURE 1 is a vertically sectioned sketch of a pressure-treating chamber equipped with apparatus of the present invention. In the drawing, **1** is a feeding roll device consisting of two rolls **1'** and **1''** pressed against each other. When a textile F to be treated is held between both rolls **1'** and **1''** and the rolls are rotated in the directions indicated by the respective arrows, the textile F will be led into the pressure-treating chamber **11** through a textile inlet **10**, will be guided by many guide rolls **12** so as to progress zigzag in the pressure-treating chamber, will be dyed, bleached, steamed or otherwise treated with a pressure fluid during its progress and will be led out of the chamber **11** through the textile outlet **10'** after the completion of the treatment.

FIGURES 2 and 3 illustrate an embodiment of the apparatus of the present invention. In the drawings, **1** is a feeding roll device consisting of two rolls **1'** and **1''** pressed against each other. Both rolls **1'** and **1''** are made by applying coatings **3** and **3'** made of such soft elastic substance as elastic rubber respectively to the peripheral surfaces of roll bodies **2** and **2'** made, for example, of a metal and forming respectively flanges **4** and **4'** at one end of one roll and at the other end of the other roll. **5** is an air-tight or liquid-tight tube made of such

soft elastic substance as, for example, elastic rubber. (See FIGURE 4.) This tube **5** is of a truncated-tapered shape in section and the peripheral wall **5'** of its base end is embedded in the peripheral wall **7'** of an orifice **7** of the pressure-treating chamber **6**. Both side walls **8** and **8'** of the free end of the air-tight or liquid-tight tube **5** are to be pressed against the opposed peripheral surfaces of both rolls **1'** and **1''** by the fluid pressure in said pressure-treating chamber **6** and both end walls **9** and **9'** of the free end of the air-tight or liquid-tight tube **5** are to be pressed against the inside surface of the flanges **4** and **4'** of the above mentioned two rolls **1'** and **1''**, respectively, by the same fluid pressure.

Further, pressures in the directions indicated by the arrows K and K' in FIGURE 3 or in the axial directions are given to both rolls **1'** and **1''** of the feeding roll device **1**, respectively. By these pressures, too, both end walls **9** and **9'** of the free end of the air-tight or liquid-tight tube **5** will be pressed against the inside surfaces of the flanges **4** and **4'** of both rolls, respectively, so that the tightness between them may be preferably higher.

In the apparatus illustrated in FIGURES 2 and 3, when the treated textile F is to be led out of the pressure-treating chamber **6**, the textile F is held between both rolls **1'** and **1''** of the feeding roll device through the orifice **7** and the air-tight or liquid-tight tube **5** and both rolls **1'** and **1''** are rotated in the directions indicated by the arrows Q in FIGURE 2. Then, the fluid pressure in the pressure-treating chamber **6** will strongly press both side walls **8** and **8'** of the free end of the air-tight or liquid-tight tube **5** against the opposed peripheral surfaces of both rolls **1'** and **1''** of the feeding roll device and press both end walls **9** and **9'** of the free end of said tube **5** against the inside surfaces of the flanges **4** and **4'**, respectively. Thereby, the pressure fluid in the pressure-treating chamber **6** can be prevented from leaking out through the orifice **7** and meanwhile the treated textile F can be continuously led out of the pressure-treating chamber **6** in a substantially perfectly air-tight or liquid-tight state. In case the textile F to be treated is to be led into the pressure-treating chamber **6**, both rolls **1'** and **1''** of the feeding roll device **1** may be rotated in directions reverse to those indicated by the arrows Q in FIGURE 2.

In the apparatus illustrated in FIGURES 2 and 3, as described above, the truncated-tapered air-tight or liquid-tight tube made of a soft elastic substance is connected at the base end with the orifice, the feeding roll device consisting of two rolls having flanges formed respectively at one end of one roll and at the other end of the other roll is set in front of the orifice and the free end of said air-tight or liquid-tight tube is inserted between the opposed peripheral surfaces of both rolls of the feeding roll device and between both flanges made at the opposed ends of the respective rolls so that the peripheral wall of said air-tight or liquid-tight tube may be pressed against the opposed peripheral surfaces of both rolls of the feeding roll device and against the inside surfaces of both flanges. Therefore, the textile to be treated can be led into or out of the pressure-treating chamber through said air-tight or liquid-tight tube in a substantially perfectly air-tight or liquid-tight state.

FIGURES 5 and 6 illustrate another embodiment of the present invention. According to this embodiment, irrespective of the fluctuation of the fluid pressure in the pressure-treating chamber, the pressure fluid can be perfectly prevented from leaking out through the textile tightening part between both rolls **1'** and **1''** of the feeding roll device. In the drawings, **1**, **1'**, **1''**, **2**, **2'**, **3**, **3'**, **4**, **4'**, **5**, **5'**, **6**, **7**, **7'**, **8**, **8'**, **9** and **9'** represent the same respective parts of the same corresponding numerals as in FIGURES 2 and 3. **13** is a cylinder and **13'** is a piston. Said cylinder **13** is pivotally jointed at the upper end through a pin

15 to the free end of an arm 14 fixed to the upper part of the side wall of said pressure-treating chamber 6. 16 is a bearing lever pivotally jointed at the base end to the side wall of said pressure-treating chamber 6 through a pin 17 and at the free end to the lower end of said piston 13' through a pin 18. The shaft 19 of the roll 1' is borne at each end by the central part of the lever 16. 20 is a flexible pipe connected at one end to said pressure-treating chamber 6 and at the other end to the upper chamber of said cylinder 13. Said cylinder 13, piston 13', lever 14, pin 15, bearing lever 16, pins 17 and 18 and pipe 20 are provided at each end of the roll 1'. The shaft 21 of the roll 1'' is borne by two bearings 23 fixed respectively to the upper surfaces of two supporting bases 22 fixed to the lower part of the side wall of the pressure-treating chamber 6.

In this apparatus, in case the textile F to be treated is to be led into the pressure-treating chamber 6, the textile F is held between both rolls 1' and 1'' of the feeding roll device 1 and is passed through the air-tight or liquid-tight tube 5 and the textile inlet 7 and then both rolls 1' and 1'' are rotated in the directions indicated by the arrows R in FIGURE 5. Then, the fluid pressure in the pressure-treating chamber 6 will press the peripheral walls 8 and 8' of the free end of the air-tight or liquid-tight tube 5 against the opposed peripheral surfaces of both rolls 1' and 1'' and will press both end walls 9 and 9' of the free end of said tube against the inside surfaces of the flanges 4 and 4' of the rolls 1' and 1'' respectively. In such case, the pressure fluid in the pressure-treating chamber 6 will enter the upper chamber of each cylinder 13 through the pipe 20 and will rotate each bearing lever 16 clockwise around the pin 17 as a center through the piston 13' so that the peripheral surface of the roll 1' may be pressed against the peripheral surface of the roll 1'' through the textile F. Now, if P is the pressure applied to the peripheral surface of the roll 1' from the pressure fluid in the pressure-treating chamber 6, a is the area of the peripheral surface subjected to said pressure, l is the length between the pin 17 and the shaft 19 of the roll 1' and M is the moment to push the roll 1' upward around the pin 17 as a center, $M=P\times a\times l$. Further, if P' is the pressure applied to the piston 13' from the pressure fluid in the pressure-treating chamber 6 through the pipe 20 and the upper chamber of the cylinder 13, a' is the area of the piston 13, l' is the length between the pin 15 and the side wall of the pressure treating chamber 6 and M' is the moment to push the roll 1' downward around the pin 17 as a center, as the piston 13' is provided at each end of the roll 1' as described above, $M'=2\times P'\times a'\times l$. In order to prevent the pressure fluid in the pressure-treating chamber 6 from leaking out through the part holding the textile F between the rolls 1' and 1'', $P=P'$ and therefore it is necessary that $M=M'$ or $M<M'$. In this apparatus, by making $M=M'$ or $M<M'$ the pressure fluid in the pressure-treating chamber 6 can be prevented from leaking out through the part holding the textile F between both rolls 1' and 1'' of the feeding roll device 1 and the textile tightening force between the rolls 1' and 1'' can be so selected as not to impair the textile. In such case, as $P=P'$, even if the fluid pressure in the pressure-treating chamber 6 fluctuates, the textile tightening force between the rolls 1' and 1'' or the moment M' by P' and the moment M of the fluid leakage in the textile tightening part by the fluid pressure in the pressure-treating chamber 6 will normally fluctuate in direct proportion. Therefore, the leakage of the pressure fluid through the textile tightening part between both rolls 1' and 1'' of the feeding roll device can be perfectly prevented irrespective of the fluctuation of the fluid pressure in the pressure-treating chamber.

What is claimed is:

1. An apparatus for continuously leading textiles into or out of a pressure-treating chamber comprising a feeding roll device set in front of an orifice of the pressure-treating chamber and comprising two rolls provided with flanges respectively at one end of one roll and at the other end of the other roll and pressed against each other and a truncated tapered fluid tight tube made of a soft elastic substance, connected at the base end to said orifice and having the peripheral wall at the free end pressed against the opposed peripheral surfaces of both rolls of said feeding roll device and against the inside surfaces of both flanges of said rolls by the fluid pressure in said pressure-treating chamber so that the textile may be led into or out of said pressure-treating chamber by moving as held between both rolls of said feeding roll device through the orifice of said pressure-treating chamber and through said fluid-tight tube.

2. An apparatus for continuously leading textiles into or out of a pressure-treating chamber comprising a feeding roll device set in front of an orifice of the pressure-treating chamber and comprising two rolls provided with flanges respectively at one end of one roll and at the other end of the other roll and pressed against each other, a truncated tapered fluid-tight tube made of a soft elastic substance, connected at the base end to said orifice and having the peripheral wall at the free end pressed against the opposed peripheral surfaces of both rolls of said feeding roll device and against the inside surfaces of both flanges of said rolls by the fluid pressure in said pressure-treating chamber and a device for pressing the peripheral surface of one roll of said feeding roll device against the peripheral surface of the other roll with the fluid pressure in said pressure-treating chamber so that the textile may be led into or out of said pressure-treating chamber by moving as held between both rolls of said feeding roll device through the orifice of said pressure-treating chamber and through said fluid-tight tube.

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IRVING BUNEVICH, *Primary Examiner.*