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(11) **EP 0 795 402 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
10.07.2002 Bulletin 2002/28

(51) Int Cl.7: **B41F 35/00**

(21) Application number: **97104146.2**

(22) Date of filing: **12.03.1997**

(54) **Cylinder cleaning device**

Walzenwaschvorrichtung

Dispositif de nettoyage d'un cylindre

(84) Designated Contracting States:
DE ES FR GB IT NL SE

(30) Priority: **14.03.1996 JP 8571196**
06.08.1996 JP 22444496
31.10.1996 JP 30732196
27.11.1996 JP 33022496

(43) Date of publication of application:
17.09.1997 Bulletin 1997/38

(60) Divisional application:
01123457.2 / 1 176 010

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Description

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

[0001] The present invention relates to a cylinder cleaning device for cleaning a circumferential surface of a cylinder by pressing a cleaning fabric passed between a cleaning fabric supplying element for said cleaning fabric against said circumferential surface of said cylinder, the cylinder cleaning device comprising a frame supporting said cleaning fabric take-up shaft assembly, wherein the circumferential configuration of the take-up shaft assembly can be changed such that a cleaning fabric roll wound onto said take-up shaft assembly will be loosened to be easily separated from said take-up shaft assembly.

2. RELATED ARTS

[0002] Generally, in a conventional cylinder cleaning device that uses a cleaning fabric to clean the surface of a blanket cylinder, etc., of an offset printer, the cleaning fabric is fed from a cleaning fabric supplying element that is formed into a roll, or that is reversibly folded, and is pressed against the outer circumference of the cylinder to clean it. After that, the used cleaning fabric is wound around a take-up shaft as the surface of the cylinder is cleaned. As is shown in Fig. 38 belt shaped cleaning fabric 3 that is wound around a core, or that is fan-folded, is used. To form a cleaning fabric roll, the cleaning fabric 3 is wound around a take-up shaft 6 that has on its surface multiple tiny pointed protrusions 6a. The take-up shaft assembly is proposed in, for example, Japanese Utility Model Laid-Open No. Hei 5-60843. A plurality of rows of raised and recessed portions are alternately formed around this type of take-up shaft.

[0003] When cleaning fabric, from a cleaning fabric supplying element that is attached to a cylinder cleaning device is to be wound around a take-up shaft in order to prepare for cleaning, this must be performed with a cylinder cleaning device that is installed near the cylinder of a printer. Especially because a current printer is compactly made, there is only a narrow space available in which to perform the above process. In addition, without shifting the cleaning fabric on the take-up shaft while it is being wound, it is difficult to wind a wide cleaning fabric (e.g., about 170 cm for newspapers) that passes through a small gap (about 3 cm) between a cylinder surface and a cylinder cleaning device so that no loose portion appears around the take-up shaft, and so that the widthwise side edge of the cleaning fabric is aligned. That is, it is not easy to wind the cleaning fabric around the take-up shaft while keeping the side edge of the cleaning fabric perpendicular to the shaft (to maintain a right angle); how well this procedure is performed depends on the skill of an operator.

[0004] When the take-up shaft around which a used cleaning fabric is wound is removed from the cylinder cleaning device, in order to dispose of the fabric roll, the cleaning fabric must be unrolled manually. Since the used cleaning fabric holds ink, a worker tends to become dirty while unrolling it, and as the unrolled used cleaning fabric is easily contaminated and bulky, it is difficult to handle.

[0005] From US-A-1 746 976 it is known to design a paper take-up roll in such a manner that the diameter can be decreased after winding up the paper so that the paper roll can easily be stripped off the take-up roll. For that purpose the take-up roll is divided lengthwise in a plane containing the axis, and the two halves are adapted to be moved longitudinally and spread apart in order to increase and decrease its diameter. The construction of this take-up roll is comparatively complex and expensive.

20 SUMMARY OF THE INVENTION

[0006] It is therefore one object of the present invention to provide a cylinder cleaning device that has a cleaning fabric take-up shaft assembly that permits a take-up shaft to be easily removed from a cleaning fabric roll.

[0007] It is another object of the present invention to provide cleaning fabric that can be accurately and easily attached to a cleaning fabric take-up shaft assembly.

[0008] It is an additional object of the present invention to provide a waste cleaning fabric processing method whereby waste cleaning fabric can be removed from a take-up shaft and can be disposed of as a roll of the waste cleaning fabric.

[0009] According to the present invention, a cylinder cleaning device for cleaning a circumferential surface of a cylinder by pressing a cleaning fabric passed between cleaning fabric supplying element for the cleaning fabric and cleaning fabric take-up shaft assembly for taking up the cleaning fabric against the circumferential surface of the cylinder, comprises:

a shaft member, at least one groove of a predetermined width being formed in the outer surface of said shaft member in the axial direction thereof, and at least one bar member which can be inserted in said groove so that said cleaning fabric contacts one part of an outer surface of the bar member during the winding of said cleaning fabric, and which has at least one end detachably attached to an end of said shaft member, wherein said bar member is capable of being taken out from said shaft member and thereafter said shaft member is removable from said wound cleaning fabric. A groove in the outer surface of said shaft member and bar members are very simple in a constructional point of view and therefor inexpensive.

[0010] Thus the invention provides a mechanical structure for changing a circumference of the cleaning fabric take-up shaft assembly.

[0011] Since provided for the take-up shaft assembly is an assembly for mechanically changing a condition at an area where the cleaning fabric take-up shaft assembly contacts the cleaning fabric that is wound around it, its overall diameter can be reduced after the cleaning fabric has been wound. As a result, the winding force with which the cleaning fabric is applied to the take-up shaft is extremely reduced. Therefore, the take-up shaft can be easily removed from the cleaning fabric roll.

[0012] Since the used cleaning fabric is disposed of as a roll, operating efficiency is improved, compared with a conventional case where the used fabric must be unrolled to be disposed of, and contamination of the periphery and of workers is reduced. In other words, the maintenance is improved.

[0013] When engagement means is provided for the cleaning fabric take-up shaft, the winding of the fabric around the take-up shaft is easy, and the winding process can be stably performed at a right angle.

[0014] For the structure for engaging cleaning fabric employing a bar member, a groove and a shaft member, a condition where a cleaning fabric roll contacts the outer periphery of the shaft member is changed by removing the bar member from the shaft member, so that the shaft member is easily removed from the cleaning fabric roll. Especially for a structure where bar members are extracted from a plurality of grooves, the condition where the fabric roll contacts the shaft member can be changed more drastically than can that where a bar member is removed from a single groove, and the removal of the shaft member becomes even easier. For a structure where a plurality of bar members are provided at predetermined intervals for a single groove, the bar members engaged at one side end are released from the shaft member, and are brought near each other by the winding force exerted by the cleaning fabric roll. As a result, the circumference of the shaft is reduced and the contact condition between the shaft member and the fabric roll is changed, so that the removal of the shaft member is easy.

[0015] When an oblong cross section bar member is employed, when the bar member is released from the shaft member it is rotated to reduce the circumference of the shaft, so that the shaft member can be easily removed. In addition, when a gap is defined around the bar member, the bar member is shifted to the gap when it is removed from the shaft end to reduce the circumference of the shaft, and thereafter the shaft member is easily removed.

[0016] When a long shaft is used, accordingly, the length of a bar member is increased and its removal from a cleaning fabric roll becomes more difficult. It is preferable that such a long shaft have a structure such that an engagement member is provided at the middle portion of a groove to engage the ends of the bar mem-

bers on one side, or a structure such that bar members are coupled together in the groove. With such an arrangement and such an engagement member, a short bar member can be employed. As a result, the removal of the bar member is facilitated and the operation can be easily implemented from either side of the shaft.

[0017] Furthermore a cylinder cleaning device, for cleaning a circumferential surface of a cylinder by pressing a cleaning fabric passed between cleaning fabric supplying element for the cleaning fabric and cleaning fabric take-up shaft assembly for taking up the cleaning fabric against the circumferential surface of the cylinder according to the present invention comprises

engagement means for engaging means of the cleaning fabric to be engaged at an outer periphery or at a shaft end of the take-up shaft supported by the frame.

[0018] With the thus described arrangement, an assembly that easily engages the take-up shaft, and which has a certain strength relative to the rotational direction of the take-up shaft, is provided at a predetermined end portion, or at a location at which the cleaning fabric can be engaged, so that engaging the cleaning fabric with the take-up shaft is easily accomplished, the positioning is accurate, the attachment of the fabric around the take-up shaft can be precisely performed.

[0019] When an engagement release mechanism is provided, a phenomenon such that used cleaning fabric sticks to the take-up shaft can be prevented, and the used cleaning fabric roll can be easily removed from the take-up shaft. Especially since the engagement/disengagement function can be implemented by only one mechanism, the device can be simplified.

[0020] Reinforcement, or coating or impregnation with low friction material, or with a curing agent, is performed for the portion where the means of the cleaning fabric to be engaged is provided to prevent deformation of that portion, and engagement/disengagement can be stably performed.

The portion that contacts the outer periphery of the take-up shaft on the cleaning fabric side and/or the outer periphery of the take-up shaft are smoothed, and the used cleaning fabric can be removed from the take-up shaft and can be disposed of as a roll. Thus, the handling of the used cleaning fabric is improved.

[0021] In the structure where the engagement means is provided for the member of the cleaning fabric to be engaged, which is at the outer periphery of the take-up shaft, the member to be engaged with which the used cleaning fabric is wound is removed from the take-up shaft, and from the outside is pushed toward the center to reduce the diameter of the take-up shaft, and make it possible to remove the member to be engaged.

[0022] Further, according to the present invention, cylinder cleaning fabric is wound into a roll or is fan-folded, and has means to be engaged, which engages engagement means on a take-up shaft that is installed in a cylinder cleaning device.

[0023] Preferably, a cleaning fabric, or a connection member contiguous with the cleaning fabric, has a smooth portion that contacts an outer surface of a take-up shaft, and a hole, a slit, a cut, or a cut-out strip is formed at or near the end of the fabric.

[0024] Additionally a cleaning fabric mounting element may be provided on the cleaning fabric side. The cleaning fabric mounting element is constituted by one or more bar members, or string members attached to a cleaning fabric, or to a member that is added to the cleaning fabric. Further, a cleaning fabric mounting element obtained by processing a cleaning element, or a member added to the cleaning fabric, is provided.

[0025] A cleaning fabric is easily wound around a take-up shaft by engaging the means to be engaged of the cleaning fabric with the above described engagement means, and a right angle can be stably maintained.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026]

Fig. 1 is a plan view of a cleaning fabric take-up shaft according to one embodiment of the present invention;

Fig. 2 is a perspective view of a bar member unit;

Fig. 3 is a perspective view of a shaft member;

Fig. 4 is a diagram viewed along line J-J in Fig. 1;

Fig. 5 is a diagram viewed along line K-K in Fig. 1;

Fig. 6 is an explanatory diagram for the positioning of cleaning fabric;

Fig. 7 is an explanatory diagram for the positioning of the cleaning fabric after it has been completed;

Fig. 8 is a diagram for explaining the use of the cleaning fabric take-up shaft in the embodiment shown in Fig. 1;

Fig. 9 is a cross-sectional view taken along line L-L in Fig. 8;

Fig. 10 is an explanatory diagram for the process for extracting a bar member unit;

Fig. 11 is an explanatory diagram for the movement of the bar member by the winding force exerted by a cleaning fabric roll;

Fig. 12 is a diagram for explaining a modification of the embodiment shown in Fig. 1;

Figs. 13A and 13B are explanatory diagrams for another modification;

Figs. 14A and 14B are explanatory diagrams for another modification;

Figs. 15A and 15B are explanatory diagrams for an additional modification;

Figs. 16A and 16B are side views of one part of a cleaning fabric take-up shaft according to another additional embodiment of the present invention, viewed from one end of the shaft;

Figs. 17A and 17B are side views of one part of a cleaning fabric take-up shaft having a bar member with a square cross section;

Figs. 18A and 18B are side views of one part of a cleaning fabric take-up shaft having a bar member with an oblong cross section;

Fig. 19 is a plan view of a cleaning fabric take-up shaft according to a still another embodiment of the present invention;

Fig. 20 is a diagram viewed along line M-M in Fig. 19;

Fig. 21 is a perspective view of a bar member unit that is to be attached to the cleaning fabric take-up shaft shown in Fig. 19;

Fig. 22 is a plan view of the cleaning fabric take-up shaft assembly to which the bar member unit is attached;

Fig. 23 is a plan view of a modification of the embodiment in Fig. 19;

Fig. 24 is a cross-sectional view taken along line N-N in Fig. 23;

Fig. 25 is a plan view of another modification of the embodiment in Fig. 19;

Fig. 26 is a perspective view of a bar member unit to be attached to the cleaning fabric take-up shaft in Fig. 25;

Fig. 27 is a side view of another example of the coupling structure of the bar member;

Fig. 28 is a cross-sectional view taken along line P-P in Fig. 27;

Figs. 29A and 29B are a top view and a side view of an additional example of the coupling structure of the bar member,

Fig. 30 is a cross-sectional view taken along line Q-Q in Fig. 29B;

Fig. 31 is a perspective view of a cleaning fabric take-up shaft according to yet another embodiment of the present invention;

Fig. 32 is a diagram for explaining cylinder cleaning fabric;

Fig. 33 is a diagram for explaining an example of a cleaning fabric mounting element;

Fig. 34 is a diagram for explaining another example of the cleaning fabric mounting element;

Figs. 35A through 35D are diagrams for explaining other examples of the cylinder cleaning fabric;

Fig. 36 is a perspective view of another example of the engagement/disengagement mechanism;

Fig. 37 is a left side view of the mechanism in Fig. 36;

Fig. 38 is an explanatory diagram showing a conventional cleaning fabric take-up shaft; and

Fig. 39 is a cross-sectional view of the schematic arrangement of a cylinder cleaning device.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0027] The preferred embodiments of the present invention will now be described while referring to the accompanying drawings. Fig. 39 is a cross-sectional view

of the basic structure of a cylinder cleaning device according to the present invention. The cylinder cleaning device serves as a cleaning unit 2 that is installed facing a cylinder 1 of a printer. The cleaning unit 2 comprises a cleaning fabric supplying element 4, for feeding cleaning fabric 3; a cleaning fabric take-up shaft section 5, for winding the cleaning fabric 3 from the cleaning fabric supplying element 4; and a cylinder pressing part, for pressing, against the surface of the cylinder 1, the cleaning fabric 3 that is held taut between the cleaning fabric supplying element 4 and the cleaning fabric take-up shaft section 5. These components are supported by side plates 9 that are parts of a frame constituting the cleaning unit 2.

[0028] As is shown in Fig. 39, the cylinder pressing part supplies compressed air to an inflation member 7a that, when inflated, presses the cleaning fabric against the surface of the cylinder 1. Further, the cylinder pressing part releases air from the inflation member 7a to deflate it, as is indicated by a broken line 7b, and thus separate the cleaning fabric 3 from the surface of the cylinder 1.

[0029] The cleaning fabric supplying element 4 is used for a roll of the cleaning fabric 3, or for fan-folded cleaning fabric 3. Especially, a cleaning fabric roll having a tube core or a bar core, or one that has no core, can be used. The cleaning fabric 3 consists of woven or non-woven cloth, paper or film, or one of them for which some processing has been performed, or another similar material. The processed cleaning fabric can be material impregnated with a liquid, or material impregnated with a liquid and then packaged in a vacuum. The cleaning fabric 3 also includes material coated with a cleaning jelly or a cleaning paste.

[0030] The cleaning fabric take-up shaft section 5 is constituted by a cleaning fabric take-up shaft 6, and a constant distance winding mechanism (not shown) that applies, to the take-up shaft 6, the rotational force required to wind the cleaning fabric 3 a constant distance around the take-up shaft 6. A cleaning fabric feeding shaft 8 for supplying the cleaning fabric supplying element 4, the cleaning fabric take-up shaft 6 and the constant distance winding mechanism are assembled inside the side plates 9.

[0031] A cleaning fabric take-up shaft assembly according to the present invention comprises a plurality of mechanical components to provide an assembly for mechanically changing the condition at the location where the take-up shaft and the cleaning fabric contact each other. In the following explanation, the cleaning fabric take-up shaft assembly is referred to as a "cleaning fabric take-up shaft."

[0032] An explanation will be given for a structure for changing a circumferential configuration of the cleaning fabric take-up shaft, which serves as the assembly for mechanically changing the condition at the location where the take-up shaft contacts the cleaning fabric that is wound around it.

[0033] A cleaning fabric take-up shaft according to still another embodiment is shown in Fig. 1. Fig. 2 is a perspective view of a bar member unit, and Fig. 3 is a perspective view of a shaft member. Fig. 4 is a diagram viewed from line J-J in Fig. 1, and Fig. 5 is a diagram viewed from line K-K in Fig. 1. In this embodiment, as a mechanism for mechanically changing the condition where the cleaning fabric take-up shaft is in contact with the cleaning fabric that is wound around it, ends of both bar members are fitted into the end of a shaft member. A groove having a predetermined width is formed in the outer periphery of the shaft member in the axial direction. The bar members are fitted into the groove in the shaft member. To wind the cleaning fabric, a condition where the cleaning fabric contacts part of the outer periphery of the bar member is produced.

[0034] In Fig. 1, a cleaning fabric take-up shaft 6 comprises a shaft member 110 and bar members 111A and 111B that extend along the entire length, or almost the entire length, of the shaft member 110. A groove 112 is formed in the outer periphery of the shaft member 110 in the axial direction. The bar members 111A and 111B are located in the groove 112. Engagement holes 113 are formed in one end of the shaft member 110, and an end plate 114 is fixed to the other end at the position of the groove 112. Engagement holes 115 are formed in the end plate 114 at the position corresponding to the end of the groove 112, and ends 111a and 111b of the bar members 111A and 111B are inserted into the engagement holes 115. Therefore, the end plate 114 serves as a hook member for holding the ends 111a and 111b of the bar members 111A and 111B, while the engagement holes 115 serve as bar member engagement portions.

[0035] The bar members 111A and 111B are fixed by screws to a support plate 116. A bar member unit 111 is provided by integrally forming the bar members 111A and 111B and the support plate 116. When the support plate is fitted onto the shaft member 110, the bar members 111A and 111B are positioned with a predetermined interval between them and parallel to the bottom face of the shaft member 110. Engagement projections 111a and 111b are formed at the ends of the bar members 111A and 111B on one side, so that they can be fitted into the engagement holes 115 in the end plate 114. Engagement protrusions 117 are formed on a support plate 116 and are inserted into the engagement holes 113, which are formed in the end of the shaft member 110. The bar member unit 111 is attached to the shaft member 110 by inserting the engagement projections 111a and 111b of the bar members 111A and 111B into the engagement holes 115 in the end plate 114, and by inserting the engagement projections 117 on the support plate 116 into the engagement holes 113 on the end of the shaft member 110.

[0036] The use for the cleaning fabric take-up shaft 6 will now be explained. First, the bar member unit 111 is removed from the shaft member 110, and then, the lead-

ing edge (the leading portion of the fabric that is first wound around the cleaning fabric take-up shaft) of the cleaning fabric 3 is placed over the groove 112, as is shown in Fig. 6. Following this, as is shown in Fig. 7, the bar member unit 111 is attached to the shaft member 110, so that the cleaning fabric 3 is held between the bottom of the groove 112 and the bar members 111A and 111B. When the cleaning fabric take-up shaft 6 is rotated, the cleaning fabric 3 is taken up around the cleaning fabric take-up shaft 6, as is shown in Fig. 8. When the cleaning fabric 3 is taken up, the cleaning fabric 3 is in contact with parts of the bar members 111A and 111B, i.e., the parts opposite the bottom of the groove 112, as is shown in Fig. 9.

[0037] To remove the cleaning fabric take-up shaft from the wound cleaning fabric 3, the bar member unit 111 is pulled in the axial direction, as is shown in Fig. 10, and the ends of the bar members 111A and 111B are disengaged from the end plate 114. Then, a force indicated by arrows in Fig. 11 is applied by the cleaning fabric 3 to the bar members 111A and 111B. Since the bar members 111A and 111B are attached to the support plate 116 with an open sided structure, they are deflected at their free ends and approach each other, so that the distance between them is reduced. As the bar members are moved in this manner, the contact between the cleaning fabric 3 and the bar members 111A and 111B is relaxed, so that the bar members 111A and 111B can be easily pulled out. When the bar members 111A and 111B have been removed, the force of the contact between the shaft member 110 and the cleaning fabric 3 is reduced, and the shaft member 110 can be easily removed.

[0038] Modifications of the above embodiment will now be described. In a first modification, a plurality of grooves are formed in the outer periphery of a shaft member, and a bar member unit is provided for each groove. In the modification in Fig. 12, two grooves 112A and 112B are formed in a shaft member 110. As is shown in Fig. 12, since a mechanism, for mechanically changing the contact condition of a cleaning fabric take-up shaft and cleaning fabric that is taken up around the take-up shaft, is provided at a plurality of locations, the shaft member can more easily be removed from the cleaning fabric, and work efficiency can be improved.

[0039] In a second modification, in order to easily remove a shaft member from cleaning fabric, bar members are moved toward the bottom of a groove to reduce the force of contact with cleaning fabric, or to provide a no contact condition. A groove 112 is so deep that, as is shown in Fig. 13A, a gap can be formed between its bottom and bar members 111A and 111B while a bar member unit is attached to a shaft member. Cleaning fabric 3 is sandwiched and held between the bar members 111A and 111B and the side walls of the groove 112. When the bar member unit is pulled out in the axial direction, the bar member is disengaged from the shaft member, and as is shown in Fig. 13B, the bar members

111A and 111B are moved to the bottom of the groove 112 and are separated from the cleaning fabric 3. Thus, the bar members 111A and 111B can be easily extracted from the shaft member, and the shaft member can be removed from the cleaning fabric. The grooves 112A and 112B in the first modification can be formed as deep as in the second modification.

[0040] In a third modification, a groove has a shallow bottom portion and a deep bottom portion, and when bar members are disengaged from a shaft member, the bar members are moved from the shallow bottom portion to the deep bottom portion so they can be easily removed. In Fig. 14, a groove 112 in a shaft member has a shallow bottom portion 112a, in which a bar member 111A is fixed while cleaning fabric is taken up, and a deep bottom portion, which is adjacent to the shallow bottom portion 112a and which is used when the bar member 111A is to be pulled out. To pull out the bar members 111A, they are disengaged from the shaft member, and as is shown in Fig. 14B, they are moved to the deep bottom portion 112b. Since the bar members 111A are separated from the cleaning fabric, they can be easily removed.

[0041] A fourth modification has a structure wherein a groove from which a bar member is to be extracted is shallow at one end and the depth of the groove increases toward the other end. When one end of the bar member is disengaged from the end of the shaft member, the bar member is moved toward the bottom of the groove and enters a no contact state relative to the cleaning fabric. When the cleaning fabric has been taken up with bar member engaging the shaft member, after the bar member is disengaged from the shaft member, the bar member is moved toward the bottom of the groove, as is shown in Fig. 15B. Therefore, the bar member is separated from the cleaning fabric and easily be removed.

[0042] An explanation will now be given for a structure where a bar member having a polygonal shape or an oblong shape in cross section is disengaged from a shaft member and falls into a groove to enter a no contact condition with cleaning fabric. In the modification in Figs. 16A and 16B, a bar member having a rectangular shape in cross section is used. As is shown in Fig. 16A, while the faces of the bar member that correspond to the short sides of the rectangle are parallel with the bottom of a groove, the bar member is fitted in a shaft member to wind cleaning fabric. To remove the bar member, the bar member is disengaged from the shaft member. Then, as is shown in Fig. 16B, the bar member is rotated, and a face of the bar member that corresponds to a long side of the rectangle contacts the bottom of the groove to separate the bar member from the cleaning fabric, so that the bar member is easily removed.

[0043] Similarly, Fig. 17 is a diagram showing an example bar member having a square shape in cross section, and Fig. 18 is a diagram of an additional example bar member having an oblong in cross section. When either of these bar members is used, the same effect as in Fig. 16 can be obtained. Although, in these embodi-

ments, only one bar member has been used, a plurality of bar members may be employed.

[0044] When the width of a cylinder to be cleaned is large, the length of the cleaning fabric take-up shaft is increased accordingly. For a structure where a long bar member is provided over the entire axial length, or almost the entire axial length, at a cylinder, a bar member unit having a bar member attached to a support plate is difficult to handle, and the bar member tends to be bent and causes a reduction in the work efficiency. This is an especially important problem as a bar member that is bent may catch the cleaning fabric or a shaft member and be difficult to remove.

[0045] As a countermeasure for the above problem, a still further embodiment is provided where one or more hook members are available for hooking the ends of bar members at a middle portion of a groove in a shaft member, so that the bar members can be removed from both sides of the shaft member. In Fig. 19, a shaft member 110 has an hook member 118 that is fixed to the middle portion of a groove 112. As is shown in Fig. 20, holes 119 are formed in the hook member 118 so that the bar members can be hooked at both sides.

[0046] Bar members 111A and 111B have protrusions 111a and 111b at their distal ends, as is shown in Fig. 21. The protrusions 111a and 111b are inserted into the holes 119 of the hook member 118. The holes 119 serve as a bar member hooking portion for hooking one end of each bar member.

[0047] In this embodiment, in consonance with the axial length of a cleaning fabric take-up shaft, a shaft member is constituted by a plurality of bar member segments that are provided along the axial direction and toward the middle portion of the axis. Two bar members form one pair of bar member units. In Fig. 22, a bar member unit 111(1) is detachably attached to the left side of the shaft member by using a support plate 116A. Another bar member unit 111 (2) is attached to the right of the shaft member by using a support plate 116B. The bar member units 111(1) and 111(2) are to be pulled out at the ends from which the units are attached. In this embodiment, the protrusions 111a and 111b have been formed on the bar members, and the holes 119 into which the protrusions are inserted have been formed in the hook member 118. However, an opposite arrangement may be employed. In other words, holes may be formed in the distal ends of the bar members and protrusions may be formed on the hook members.

[0048] In Fig. 23 is shown a modification for a hook member, which has inclined faces 120 on both sides in the direction in which a groove 112 is formed. A hook member 118 is a trapezoid in cross section, as is shown in Fig. 24. Since the inclined faces are formed on both sides of the hook member 118, a defect can be removed where cleaning fabric catches at the hook member and can not be loosened, or is difficult to loosen, when the shaft member 110 is to be removed from the cleaning fabric. It should be noted that an adequate number of

hook members can be selected in consonance with the structure of a bar member unit. As for the number and the shape of bar members, those specified in the previously described embodiments can be employed, and can be combined as needed.

[0049] In Fig. 25 is shown another modification of the structure where bar members are coupled at the middle portion of a groove in a shaft member. Bar member units 111(1) and 111(2) are coupled at a coupling portion 121 at the distal ends of the bar members before being attached to a shaft member 110. In Fig. 26, protrusions 111a and 111b are formed on the ends of the bar members on one side, while holes 111c and 111d are formed in the ends of the other bar members. To attach the individual units to the shaft member 110, the bar members are moved in the longitudinal direction at the coupling portion 121, and protrusions are inserted into holes and secured.

[0050] In a structure for coupling bar members in Fig. 27, bar members 111 are coupled together in the direction perpendicular to the longitudinal direction of the bar members 111. The distal ends of the bar members to be coupled have faces that are parallel to each other in the longitudinal direction. Portions to be engaged are formed on the faces of bar members on one side, and engagement portions are formed on the faces of the other bar members opposite them. To attach the individual units to a shaft member, the engagement portions are employed to engage the portions to be engaged to couple bar member pair.

[0051] In Fig. 28, at the distal end of a bar member 111 by a cut portion is formed that is almost equivalent in size to half of the diameter. The internal face of the cut portion serves as a recessed portion 111e, which is a portion to be engaged, and a convex portion 111f is formed as an engagement portion on another bar member 111. The recessed portion 111e and the convex portion 111f engage to couple the bar members together. This coupled structure is not limited to that shown in the diagrams; but various other coupling techniques can be applied.

[0052] In a coupled structure for bar members in Figs. 29A and 29B, a coupling portion 121 is separately formed at the distal end of bar member for coupling them. A coupling member 130 having a portion to be engaged 130a is attached to the distal end of a bar member 111, as is shown in Fig. 30. A coupling member 131 having an engagement portion, for which hooks 131a are provided, is formed at the distal end of the other bar member 111. The hook portions 131a engage the portion to be engaged 130a to couple the bar members.

[0053] When one, or both, of the coupling member having the portion to be engaged and the coupling member having the engagement portion are formed of an elastic material, or when a click motion mechanism is adopted for the portion to be engaged or for the engagement portion, the engagement of the portions 131a and 130a is secured when the bar members are coupled to-

gether. Although in this modification, the portion to be engaged 130a is provided as a groove, it can be provided as a recessed portion or as a convex portion. In such a case, the hook of the engagement portion 131a should have a shape corresponding to either the recessed or the convex portion.

[0054] An explanation will now be given for a structure where a shaft member having a polygonal shape in cross section is employed, and a bar member is located at one corner at least. In Fig. 31 is shown a structure where a bar member is located at one corner of a shaft member that is a square in cross section. A portion 122 is formed by cutting off one corner portion of a shaft member along the entire length. In the cut portion 122, an end plate 114 and a support plate 116 are located opposite each other. The end plate 114 is secured to one axle end to hold one side of a bar member 111A in the longitudinal direction of the axle. A support plate 116 to which the bar member 111A is attached is detachably provided at the other end of the axle. While the bar member 111A is attached to the shaft member 110, a gap is formed between the cut face 122 of the shaft member and the bar member 111A.

[0055] To remove the bar member from cleaning fabric, when the support plate 116 is pulled to disengage one end of the bar member 111A from the end plate 114, the bar member 111A is moved toward the cut portion 122. Since the bar member 111A is thus separated from the cleaning fabric, the bar member 111A can be easily removed.

[0056] Although a solid-core shaft member has been employed for the cleaning fabric receiving shaft assemblies in the above embodiments, a hollow shaft member may also be employed. When a hollow shaft member, such as a pipe shaft, is employed for the assembly, the assembly is light and easy to handle. Specifically, in the cleaning fabric take-up shaft assembly in the embodiment shown in Fig. 1, when a shaft member having a groove in its outer periphery is employed, means can be provided for using a plate that covers the openings of the hollow shaft member to engage one end of a bar member. As a result, the number of required components can be reduced. shaft members, a shell member, or a member including an axle portion, all of which constitute a cleaning fabric take-up shaft.

[0057] In Fig. 32, a cleaning fabric mounting element 90 is fitted into an engagement groove 89 formed in the outer periphery of a cleaning fabric take-up shaft 6, and is rotated in the direction indicated by an arrow, so that cleaning fabric 3 is wound to form a roll. The cleaning fabric mounting element 90 forms a curled portion 102 in the vicinity of the tail end (Fig. 33) or at the tail end (Fig. 34) of the cleaning fabric 3. This curled portion 102 is formed by rolling up fabric only or by rolling the fabric around a core.

[0058] When an assembly for changing the periphery of a cleaning fabric take-up shaft is used as a mechanism for mechanically changing the condition at the

point where the cleaning fabric take-up shaft is in contact with cleaning fabric wound around the shaft, if a hook member is provided in the middle portion of the groove of the shaft member as is shown in Fig. 19 or Fig. 23, and the cleaning fabric is held and hooked between the bar member and the bottom of the groove of the shaft member, the hook member will obstruct the hooking of the bar member and the hooking of the cleaning fabric will not be ensured. In this example, an opening, a slit, etc., is formed at the position of the hooking member at the leading edge of the cleaning fabric or in its vicinity.

[0059] Various processes for hooking the cleaning fabric are shown in Figs. 35A through 35D: a hole 3a through which a hook member is passed is formed near the leading edge of cleaning fabric 3 (Fig. 35A); a notch slit 3b through which a hook member is passed is formed at the leading edge of cleaning fabric (Fig. 35B); a notch 3c is formed at the leading edge of cleaning fabric (Fig. 35C); and a portion, near the leading edge of cleaning fabric, where a hook member is located is formed as strips (Fig. 35D).

[0060] In this example, when a shaft member is to be removed from wound cleaning fabric, is probable that a cleaning fabric processed portion, such as a hole or a slit, may interfere with and be caught by a hook member, or that resistance by a hook member may prevent the shaft member from being smoothly pulled out. Thus, it is preferable that a hooking member have inclined faces on both sides, as is shown in Fig. 23.

[0061] An explanation will be given for a structure where only one mechanism is employed to engage cleaning fabric with a take-up shaft, and to disengage and remove the used cleaning fabric that is wound around the take-up shaft.

[0062] A structure for engagement/disengagement of cleaning fabric relative to a take-up shaft is shown in Fig. 36. In this embodiment, provided is a structure wherein the cleaning fabric is engaged by its end side portion being held against the take-up shaft side. Further, by detaching a holding member from the shaft, the shape of the take-up shaft is changed to perform disengagement.

[0063] A groove (taper groove) 190, for which the width is changed while traveling from one end to the other end, is formed in a take-up shaft 6 in the longitudinal direction. A holding member is provided, which includes a key member 191 having the same shape as the groove 190 that is to be inserted into the groove 190. The key member 191 is removed from the groove 190, and the end side portion of the cleaning fabric is inserted into the groove 190. Then, the key member 191 is inserted into the groove 190, and the cleaning fabric is securely held by the outer side of the key member 191 and the internal face of the groove 190. At this time, the surface of the key member 191 is at the same level as the surface of the take-up shaft 6, integrally forming a part of the surface of the take-up shaft 6. To remove the used

cleaning fabric from the take-up shaft, the key member 191 is detached to disengage the cleaning fabric from the take-up shaft. Since the shape of the take-up shaft is changed by the detachment of the key member 191, the take-up shaft 6 can be easily removed from the used cleaning fabric 3.

[0064] In this embodiment, the end side portion of the cleaning fabric 3 is held between the key member and the take-up shaft. However, the cleaning fabric engagement portion may be provided at another location, and the key member may be used only for a disengagement function for loosening the cleaning fabric 3.

[0065] In the above described embodiments, in order to facilitate the removal of the used cleaning fabric while it is retained in the shape that it acquired by being wound around the take-up shaft, the surface of the outer periphery of the take-up shaft is smoothed, or a teflon resin is coated on the surface of a take-up shaft, so that friction between the take-up shaft and the cleaning fabric is reduced. Further, smoothing the face of the end side portion of the cleaning fabric that contacts the take-up shaft is also effective, for example, the cleaning fabric 3 is coated with a teflon resin or wax, a low friction sheet such as a teflon resin sheet is used as a coupling member, or a film of low friction material is laminated with cleaning fabric during the manufacturing process.

[0066] In the procedure for removing the cleaning fabric, the cleaning fabric is separated from the take-up shaft by rotating only the take-up shaft in the direction opposite the direction for winding. Then, the take-up shaft is extracted, and the used cleaning fabric roll is disposed of. Especially with an assembly that has means for disengaging the cleaning fabric from the take-up shaft, the work will be safe, and it will be easy to disengage the cleaning fabric from the shaft and to extract the take-up shaft.

Claims

1. A cylinder cleaning device for cleaning a circumferential surface of a cylinder by pressing a cleaning fabric passed between a cleaning fabric supplying element for said cleaning fabric and a cleaning fabric take-up shaft assembly (110) for taking up said cleaning fabric against said circumferential surface of said cylinder, the cylinder cleaning device comprising a frame (9) supporting said cleaning fabric take-up shaft assembly (110), **characterized in that** the circumferential configuration of the take-up shaft assembly (110) can be changed such that a cleaning fabric (3) roll wound onto said take-up shaft assembly will be loosened to be easily separated from said take-up shaft assembly, wherein said take-up shaft assembly (110) comprises a shaft member (110), a groove (112, 122) of a predetermined width being formed in the outer surface of said shaft member (110) in the axial direction thereof, and a bar member (111) which can be inserted in said groove (112, 122) so that said cleaning fabric (3) contacts one part of an outer surface of the bar member during the winding of said cleaning fabric, and which has at least one end detachably attached to an end of said shaft member (110), wherein said bar member (111) is capable of being taken out from said shaft member and thereafter said shaft member is removable from said wound cleaning fabric (3, 100).
2. A cylinder cleaning device according to claim 1, wherein a plurality of said grooves (112) are formed in said outer surface of said shaft (110), and wherein said bar members (111) are detachably fitted in said grooves, respectively.
3. A cylinder cleaning device according to claim 1 or 2, wherein said cleaning fabric (3) is so engaged as to be inserted between said bar member (111) and said groove (112) of said shaft member (110).
4. A cylinder cleaning device according to anyone of claims 1 to 3, wherein said bar member includes a plurality of parallel bar member segments (111A, 111B), which are arranged at a predetermined interval, and wherein, when said bar members are removed from said end of said shaft member (110), said interval is reduced and said shaft member is removed from said cleaning fabric (3).
5. A cylinder cleaning device according to anyone of claims 1 to 4, wherein said bar members (111) have a circular, elliptic, or polygonal shape in cross section.
6. A cylinder cleaning device according to anyone of claims 1 to 5, wherein said bar members (111) have an elliptic or polygonal shape in cross section, and wherein, after said bar members have been removed from said end of said shaft member (110), and said cleaning fabric (3) has been wound by rotating said shaft member, a condition in contact with said cleaning fabric is changed and said shaft member is removed from said cleaning fabric in a roll shape (100).
7. A cylinder cleaning device according to anyone of claims 1 to 6, wherein a gap is formed between a part or all of said bar members (111), which are attached to said shaft member (110), and a bottom of said groove (112) in said shaft member, and wherein, when said bar members are detached from said end of said shaft member, said shaft member is moved toward said gap and removed from said cleaning fabric.
8. A cylinder cleaning device according to claim 7,

wherein the depth of said gap is greater from at, or in the vicinity of, the end of said shaft (110) where said bar members (111) are to be extracted from said shaft member, to the opposite end of said shaft.

9. A cylinder cleaning device according to anyone of claims 1 to 8, further comprising: a hook member (118) having a bar member hook portion in the middle of said groove (112) in said shaft member (110), wherein an end of said bar member detachably engages said bar member hook portion to thereby attach said bar member to said shaft member.

10. A cylinder cleaning device according to claim 9, wherein each of said bar members includes a plurality of bar member segments (111(1); 111(2)) in the axial direction of said shaft member (110) and toward the center of said shaft, and wherein ends of said bar members on one side are detachably engaged with said bar member hook portion of said hook member (118), so that said bar member is pulled out from both ends of said shaft member.

11. A cylinder cleaning device according to claim 9, wherein a plurality of said hook members are formed.

12. A cylinder cleaning device according to anyone of claims 1 to 11, wherein said bar member (111) consists of a plurality of bar member segments (111(1); 111(2)), one end of each of said bar member segments being detachably attached to a respective end of said shaft member (110) so that when said pair of bar member segments (111(1); 111(2)) are attached to said shaft member said pair of bar member segments are connected to each other.

13. A cylinder cleaning device according to claim 12, wherein, in said connection structure for said pair of bar member segments (111(1); 111(2)), a connection member (111a, b, c, d) is attached to an end of said bar member segment, or ends of both of said bar member segments, to be coupled with other bar member segment via said connection member.

14. A cylinder cleaning device according to claim 12, wherein, in said connection structure for said pair of bar member segments (111(1); 111(2)), a portion to be engaged (111c, d) is formed to one bar member segment and an engagement portion (111a, b) is provided to the other bar member segment, so that said engagement portion is connected to said portion to be engaged.

15. A cylinder cleaning device according to claim 14, wherein said portion to be engaged is a hole (111c, d) formed in a distal end of said bar member segment (111(2)), and said engagement portion is a

projection (111a, b), and wherein said projection is fitted into, and coupled with, said hole by moving said bar member segment in a longitudinal direction.

16. A cylinder cleaning device according to anyone of claims 9 to 11, wherein the hook member (118) has inclined faces (120).

17. A cylinder cleaning device according to anyone of claims 9 to 11 and 16, wherein a forward end of said cleaning fabric (3) first wound around said cleaning fabric take-up shaft assembly (110) is provided with a hole (3a) or a slit (3c) or is cut (3b) to accommodate the hook member (118) of said shaft assembly (110).

18. A cylinder cleaning device according to any one of claims 1, 2, 3, 5 and 6, wherein said cleaning fabric take-up shaft (6) has engagement means for engaging said cleaning fabric (3) to a take-up shaft member of said cleaning fabric take-up shaft assembly (6).

Patentansprüche

1. Walzenwaschvorrichtung zum Reinigen einer Umfangsfläche eines Zylinders durch Pressen eines Reinigungstuchs, das zwischen einem Reinigungstuchzufuhrelement für das Reinigungstuch und einem Reinigungstuch-Aufnahmewellenaufbau (110) durchgeleitet wird, um das Reinigungstuch aufzunehmen, gegen die Zylinderfläche des Zylinders, wobei die Walzenwaschvorrichtung einen Rahmen (9) umfasst, der den Reinigungstuch-Aufnahmewellenaufbau (110) trägt, **dadurch gekennzeichnet, dass** die Umfangskonfiguration des Aufnahmewellenaufbaus (110) derart geändert werden kann, dass ein Reinigungstuch (3), das auf dem Aufnahmewellenaufbau rollenartig gewickelt ist, gelockert wird, um von dem Aufnahmewellenaufbau problemlos abgetrennt werden zu können, wobei der Aufnahmewellenaufbau (110) ein Wellenelement (110), eine Nut (112, 122) mit einer vorbestimmten Breite, die in der Außenseite des Wellenelements (110) in seiner axialen Richtung gebildet ist und ein Stangenelement (111) aufweist, das in die Nut (112, 122) derart eingeführt werden kann, dass das Reinigungstuch (3) einen Teil der Außenseite des Stangenelements während des Aufwickelns des Reinigungstuchs kontaktiert, und von welchem Element zumindest ein Ende ablösbar an einem Ende des Wellenelements (110) angebracht ist, wobei das Stangenelement (111) aus dem Wellenelement entnommen werden kann, woraufhin das Wellenelement von dem aufgewickelten Reinigungstuch (3, 100) entferntbar ist.

2. Walzenwaschvorrichtung nach Anspruch 1, wobei mehrere der Nuten (112) in der Außenseite der Welle (110) gebildet sind, und wobei die Stangenelemente (111) in den Nuten jeweils lösbar angebracht sind. 5
3. Walzenwaschvorrichtung nach Anspruch 1 oder 2, wobei das Reinigungstuch (3) sich derart im Eingriff befindet, dass es zwischen dem Stangenelement (111) und der Nut (112) des Wellenelements (110) eingesetzt ist. 10
4. Walzenwaschvorrichtung nach einem der Ansprüche 1 bis 3, wobei das Stangenelement mehrere parallele Stangenelementsegmente (111A, 111B) aufweist, die mit einem vorbestimmten Zwischenraum angeordnet sind, und wobei dann, wenn die Stangenelemente von dem Ende des Wellenelements (110) entfernt sind, die Zwischenräume verringert sind und das Wellenelement von dem Reinigungstuch (3) entfernt ist. 15 20
5. Walzenwaschvorrichtung nach einem der Ansprüche 1 bis 4, wobei die Stangenelemente (111) eine kreisförmige, elliptische oder mehreckige Querschnittsform aufweisen. 25
6. Walzenwaschvorrichtung nach einem der Ansprüche 1 bis 5, wobei die Stangenelemente (111) eine elliptische oder mehreckige Querschnittsform aufweisen, und wobei, nachdem die Stangenelemente von dem Ende des Wellenelements (110) entfernt worden sind und das Reinigungstuch (3) durch Drehen des Wellenelements aufgewickelt worden ist, eine Kontaktbedingung mit dem Reinigungstuch geändert wird und das Wellenelement von dem Reinigungstuch in Rollenform (100) entfernt wird. 30 35
7. Walzenwaschvorrichtung nach einem der Ansprüche 1 bis 6, wobei zwischen einem Teil oder sämtlichen der Stangenelemente (111), die an dem Wellenelement (110) angebracht sind und einem Grund der Nut (112) in dem Wellenelement ein Spalt gebildet ist, und wobei dann, wenn die Stangenelemente von dem Ende des Wellenelements abgenommen sind, das Wellenelement in Richtung auf den Spalt bewegt und von dem Reinigungstuch entfernt wird. 40 45
8. Walzenwaschvorrichtung nach Anspruch 7, wobei die Tiefe des Spalts ausgehend von oder im Bereich des Endes der Welle (110) dort größer ist, wo die Stangenelemente (111) von dem Wellenelement abgenommen werden sollen zum gegenüberliegenden Ende der Welle. 50 55
9. Walzenwaschvorrichtung nach einem der Ansprüche 1 bis 8, außerdem aufweisend:

Ein Hakenelement (118) mit einem Stangenelementhakenabschnitt in der Mitte der Nut (112) in dem Wellenelement (110), wobei ein Ende des Stangenelements mit dem Stangenelementhakenabschnitt lösbar im Eingriff steht, um das Stangenelement am Wellenelement anzubringen.
10. Walzenwaschvorrichtung nach Anspruch 9, wobei jedes der Stangenelement mehrere Stangenelementsegmente (111(1); 111 (2)) in der axialen Richtung des Wellenelements (110) und in Richtung zum Zentrum der Welle aufweist, und wobei Enden der Stangenelemente auf einer Seite mit dem Stangenelementhakenabschnitt des Hakenelements (118) derart lösbar im Eingriff stehen, dass das Stangenelement von beiden Enden des Wellenelements herausgezogen wird bzw. herausziehbar ist.
11. Walzenwaschvorrichtung nach Anspruch 9, wobei mehrere der Hakenelemente vorgesehen sind.
12. Walzenwaschvorrichtung nach einem der Ansprüche 1 bis 11, wobei das Stangenelement (111) aus mehreren Stangenelementsegmenten (111 (1); 111 (2)) besteht, wobei ein Ende von jedem der Stangenelementsegmente an einem jeweiligen Ende des Wellenelements (110) lösbar angebracht ist, so dass dann, wenn das Paar von Stangenelementsegmenten (111 (1); 111(2)) an dem Wellenelement angebracht ist, das Paar von Stangenelementsegmenten miteinander verbunden ist.
13. Walzenwaschvorrichtung nach Anspruch 12, wobei in der Verbindungsstruktur für das Paar von Stangenelementsegmenten (111 (1); 111 (2)) ein Verbindungselement (111 a, b, c, d) an einem Ende des Stangenelementsegments oder an Enden von beiden Stangenelementsegmenten angebracht ist, um mit dem anderen Stangenelementsegment über das Verbindungselement verbunden zu sein.
14. Walzenwaschvorrichtung nach Anspruch 12, wobei in der Verbindungsstruktur für das Paar von Stangenelementsegmenten (111 (1); 111 (2)) ein in Eingriff zu nehmender Abschnitt (111 c, d) an einem Stangenelementsegment gebildet ist und ein Eingriffabschnitt (111a, b) an dem anderen Stangenelementsegment vorgesehen ist, so dass der Eingriffabschnitt mit dem in Eingriff zu nehmenden Abschnitt verbunden ist.
15. Walzenwaschvorrichtung nach Anspruch 14, wobei der in Eingriff zu nehmende Abschnitt ein Loch (111 c, d) ist, das in einem distalen Ende des Stangenelementsegments (111 (2)) gebildet ist, und wobei der Eingriffabschnitt ein Vorsprung (111 a, b) ist, und wobei der Vorsprung in das Loch eingesetzt

oder mit diesem verbunden wird durch Bewegen des Stangenelementsegments in Längsrichtung.

16. Walzenwaschvorrichtung nach einem der Ansprüche 9 bis 11, wobei das Hakenelement (118) 5 Schrägflächen (120) aufweist.
17. Walzenwaschvorrichtung nach einem der Ansprüche 9 bis 11 und 16, wobei ein Vorderende des Reinigungstuchs (3), das zunächst um den Reinigungstuch-Aufnahmewellenaufbau (110) gewickelt ist, mit einem Loch (3a) oder einem Schlitz (3c) oder einem Einschnitt (3b) versehen ist, um das Hakenelement (118) des Wellenaufbaus (110) aufzunehmen. 10
18. Walzenwaschvorrichtung nach einem der Ansprüche 1, 2, 3, 5 und 6, wobei die Reinigungstuchaufnahmewelle (6) Eingriffsmittel aufweist, um das Reinigungstuch (3) mit dem Aufnahmewellenelement des Reinigungstuch-Aufnahmewellenaufbaus (6) in Eingriff zu bringen. 20

Revendications

1. Dispositif de nettoyage de cylindre pour nettoyer une surface circonférentielle d'un cylindre en présentant un tissu de nettoyage passé entre un élément d'alimentation de tissu de nettoyage pour ledit tissu de nettoyage et un ensemble d'arbre de réception de tissu de nettoyage (110) pour recevoir ledit tissu de nettoyage contre ladite surface circonférentielle dudit cylindre, le dispositif de nettoyage de cylindre comprenant une structure (9) supportant ledit ensemble d'arbre de réception de tissu de nettoyage (110), **caractérisé en ce que** la configuration circonférentielle de l'ensemble d'arbre de réception (110) peut être modifiée de telle sorte qu'un rouleau de tissu de nettoyage (3) enroulé sur l'ensemble d'arbre de réception peut être libéré pour être facilement séparé dudit ensemble d'arbre de réception, dans lequel ledit ensemble d'arbre de réception (110) comprend un élément d'arbre (110), une rainure (112, 122) de largeur prédéterminée formée dans la surface externe dudit élément d'arbre (110) dans la direction axiale de celui-ci, et un élément de barre (111) qui peut être inséré dans ladite rainure (112, 122) de sorte que ledit tissu de nettoyage (3) vient en contact avec une partie d'une surface externe de l'élément de barre pendant l'enroulement dudit tissu de nettoyage, et qui a au moins une extrémité fixée de manière détachable à une extrémité dudit élément d'arbre (110), dans lequel ledit élément de barre (111) est capable d'être extrait dudit élément d'arbre et ensuite ledit élément d'arbre est retirable dudit tissu de nettoyage enroulé (3, 100). 30 35 40 45 50 55

2. Dispositif de nettoyage de cylindre selon la revendication 1, dans lequel une pluralité desdites rainures (112) sont formées dans ladite surface externe dudit arbre (110), et dans lequel lesdits éléments de barre (111) sont adaptés de manière détachable dans lesdites rainures respectivement.
3. Dispositif de nettoyage de cylindre selon la revendication 1 ou 2, dans lequel ledit tissu de nettoyage (3) est en prise de telle manière à être inséré entre ledit élément de barre (111) et ladite rainure (112) dudit élément d'arbre (110).
4. Dispositif de nettoyage de cylindre selon l'une quelconque des revendications 1 à 3, dans lequel ledit élément de barre comprend une pluralité de segments d'éléments de barre parallèles (111A, 111B) qui sont disposés à un intervalle prédéterminé, et dans lequel lorsque lesdits éléments de barre sont retirés de ladite extrémité dudit élément d'arbre (110), ledit intervalle est réduit et ledit élément d'arbre est retiré dudit tissu de nettoyage (3).
5. Dispositif de nettoyage de cylindre selon l'une quelconque des revendications 1 à 4, dans lequel lesdits éléments de barre (111) ont une section transversale de forme circulaire, elliptique ou polygonale. 25
6. Dispositif de nettoyage de cylindre selon l'une quelconque des revendications 1 à 5, dans lequel lesdits éléments de barre (111) ont une section transversale de forme elliptique ou polygonale, et dans lequel après que lesdits éléments de barre ont été retirés de ladite extrémité dudit élément d'arbre (110), et que ledit tissu de nettoyage (3) a été enroulé en faisant tourner ledit élément d'arbre, une condition de contact avec ledit tissu de nettoyage est modifiée et ledit élément d'arbre est retiré dudit tissu de nettoyage sous la forme d'un rouleau (100). 30 35 40 45 50 55
7. Dispositif de nettoyage de cylindre selon l'une quelconque des revendications 1 à 6, dans lequel un espace est formé entre une partie ou la totalité desdits éléments de barre (111), qui sont fixés auxdits éléments d'arbre (110), et un fond de ladite rainure (112) dans ledit élément d'arbre, et dans lequel, lorsque lesdits éléments de barre sont détachés de ladite extrémité dudit élément d'arbre, ledit élément d'arbre est déplacé vers ledit espace et retiré dudit tissu de nettoyage.
8. Dispositif de nettoyage de cylindre selon la revendication 7, dans lequel la profondeur dudit espace est supérieure à partir, de ou à proximité de l'extrémité dudit arbre (100) lorsque lesdits éléments de barre (111) doivent être extraits dudit élément d'arbre par rapport à l'extrémité opposée dudit arbre.

9. Dispositif de nettoyage de cylindre selon l'une quelconque des revendications 1 à 8, comprenant en outre : un élément de crochet (118) ayant une partie de crochet d'élément de barre au milieu de ladite rainure (112) dans ledit élément d'arbre (110), dans lequel une extrémité dudit élément de barre est en prise amovible avec ladite partie de crochet d'élément de barre pour ainsi fixer ledit élément de barre audit élément d'arbre.
10. Dispositif de nettoyage de cylindre selon la revendication 9, dans lequel chacun desdits éléments de barre comprend une pluralité de segments d'éléments de barre (111 (1) ; 111 (2)) dans la direction axiale dudit élément d'arbre (110) et en direction du centre dudit arbre, et dans lequel des extrémités desdits éléments de barre sur un côté sont en prise amovible avec ladite partie de crochet d'élément de barre dudit élément de crochet (118) de sorte que ledit élément de barre est retiré des deux extrémités dudit élément d'arbre.
11. Dispositif de nettoyage de cylindre selon la revendication 9, dans lequel une pluralité desdits éléments de crochet sont formés.
12. Dispositif de nettoyage de cylindre selon l'une quelconque des revendications 1 à 11, dans lequel ledit élément de barre (111) consiste en une pluralité de segments d'éléments de barre (111 (1) ; 111 (2)), une extrémité de chacun desdits segments d'éléments de barre étant fixée de manière détachable à une extrémité respective dudit élément d'arbre (110) de sorte, que lorsque ladite paire de segments d'éléments de barre (111 (1) ; 111 (2)) est fixée audit élément d'arbre, ladite paire de segments d'élément de barre est connectée l'une à l'autre.
13. Dispositif de nettoyage de cylindre selon la revendication 12, dans lequel dans ladite structure de connexion pour ladite paire de segments d'éléments de barre (111 (1) ; 111 (2)), un élément de connexion (111 a, b, c, d) est fixé à une extrémité dudit segment d'élément de barre, ou aux extrémités des deux segments d'éléments de barre, destinées à être couplées avec l'autre segment d'éléments de barre via ledit élément de connexion.
14. Dispositif de nettoyage de cylindre selon la revendication 12, dans lequel, dans ladite structure de connexion pour ladite paire de segments d'éléments de barre (111 (1) ; 111 (2)), une partie destinée à venir en prise (111 c, d) est formée sur un segment d'élément de barre et une partie de prise (111 a, b) est prévue sur l'autre segment d'élément de barre, de sorte que ladite partie de prise est connectée à ladite partie destinée à venir en prise.
15. Dispositif de nettoyage de cylindre selon la revendication 14, dans lequel ladite partie destinée à venir en prise est un trou (111 c, d) formé dans une extrémité distale dudit segment d'élément de barre (111 (2)), et ladite partie de prise est une projection (111 a, b), et dans lequel ladite projection est engagée dans, et couplée avec ledit trou en déplaçant ledit segment d'élément de barre dans une direction longitudinale.
16. Dispositif de nettoyage de cylindre selon l'une quelconque des revendications 9 à 11, dans lequel ledit élément de crochet (118) a des faces inclinées (120).
17. Dispositif de nettoyage de cylindre selon l'une quelconque des revendications 9 à 11 et 16, dans lequel une extrémité avant dudit tissu de nettoyage (3) d'abord enroulé autour de l'ensemble d'arbre de réception de tissu de nettoyage (110) est pourvu d'un trou (3a) ou d'une fente (3c) ou d'une découpe (3b) pour recevoir l'élément de crochet (118) dudit ensemble d'arbre (110).
18. Dispositif de nettoyage de cylindre selon l'une quelconque des revendications 1, 2, 3, 5 et 6, dans lequel ledit arbre de réception de tissu de nettoyage (6) comprend des moyens de prise pour mettre ledit tissu de nettoyage (3) en prise avec un élément d'arbre de réception dudit ensemble d'arbre de réception de tissu de nettoyage (6).

Fig. 1

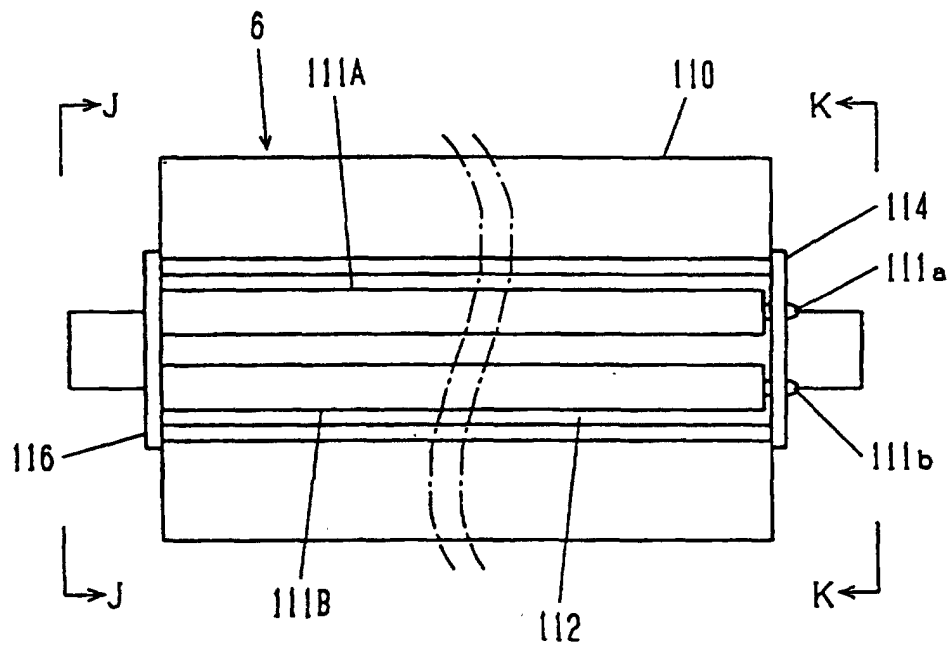


Fig. 2

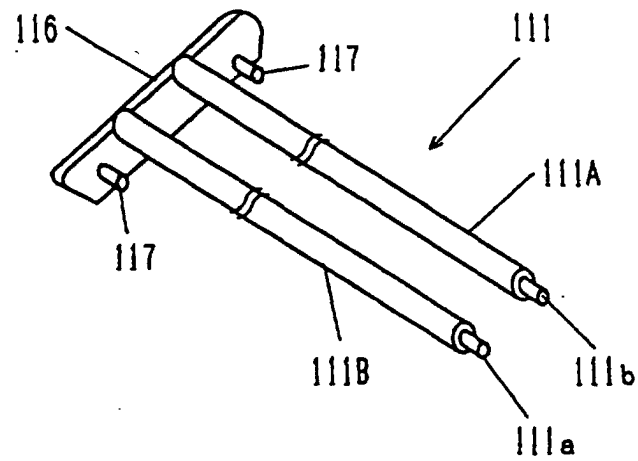


Fig. 3

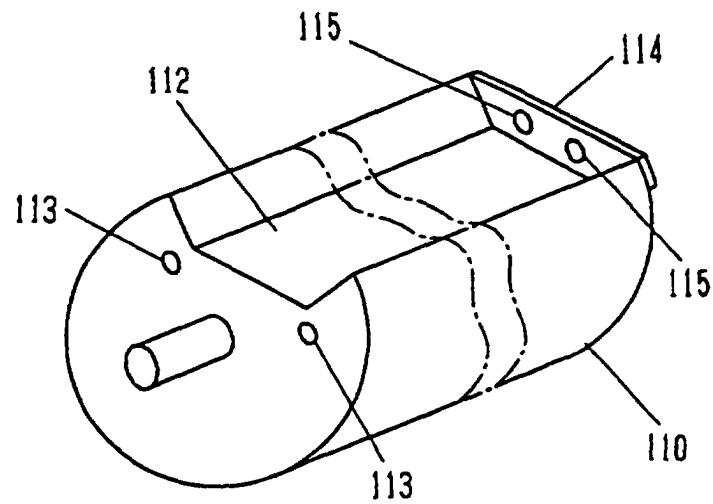


Fig. 4

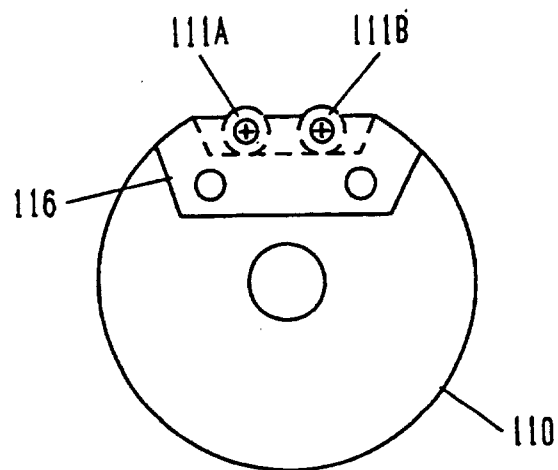


Fig. 5

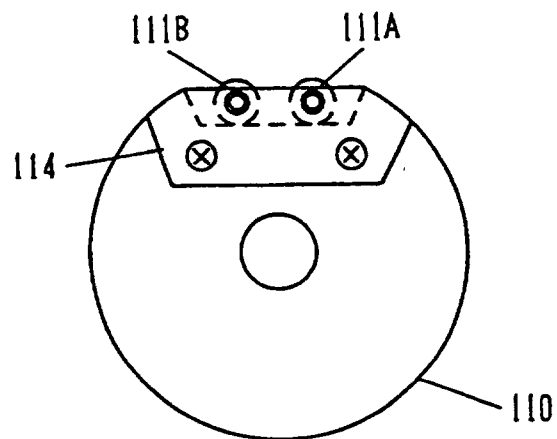


Fig. 6

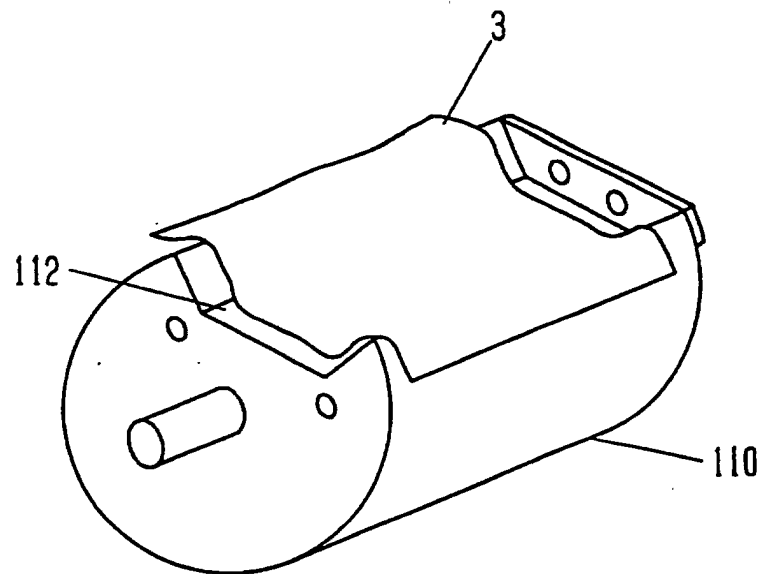


Fig. 7

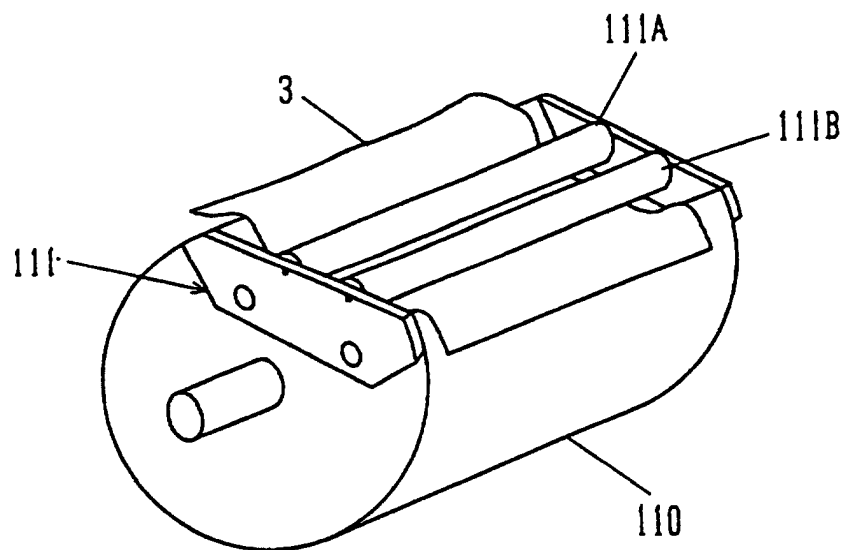


Fig. 8

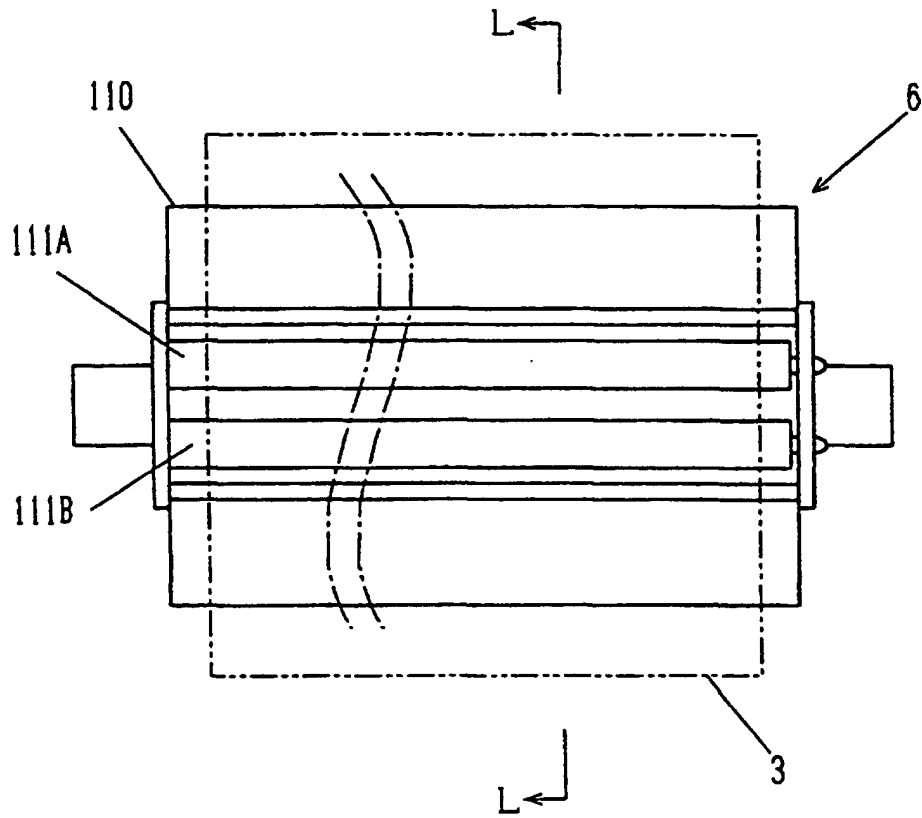


Fig. 9

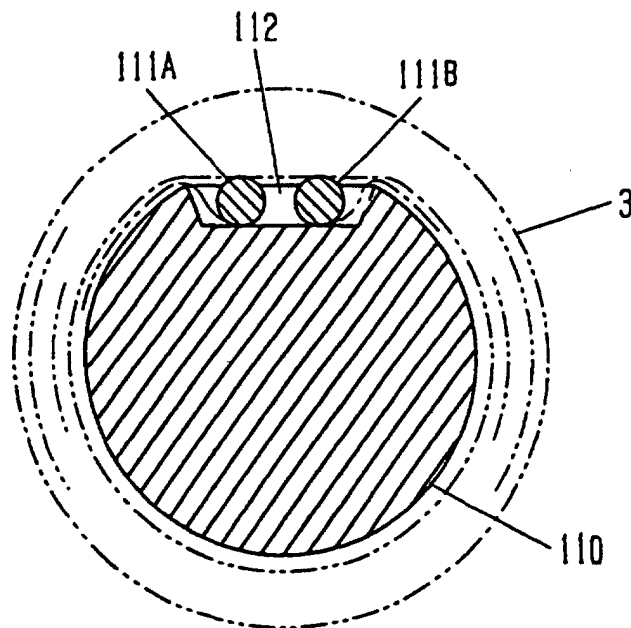


Fig. 10

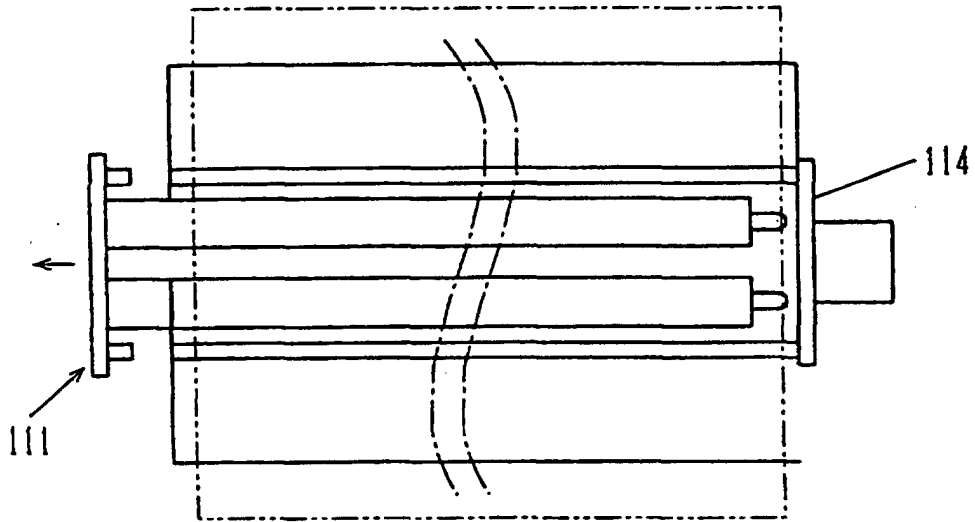


Fig. 11

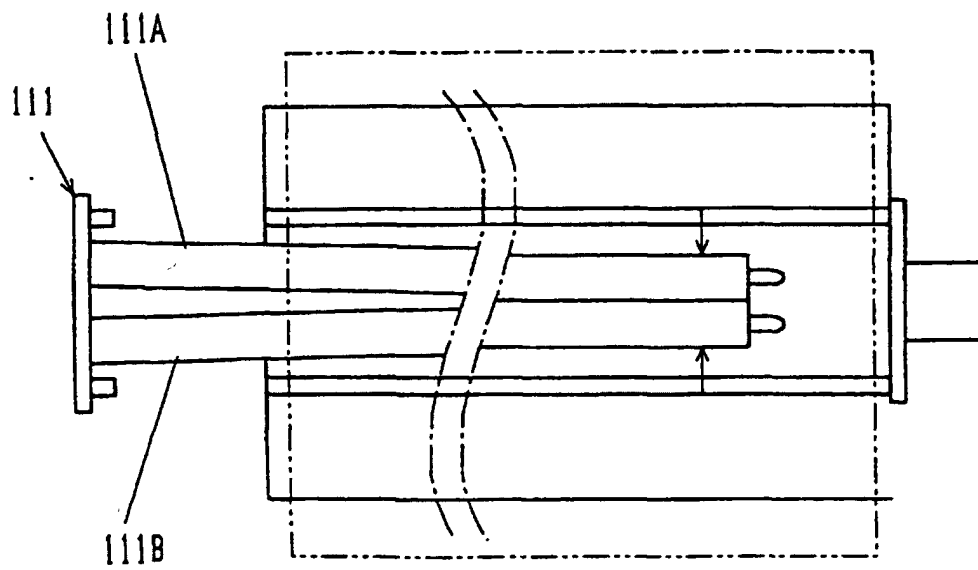


Fig. 12

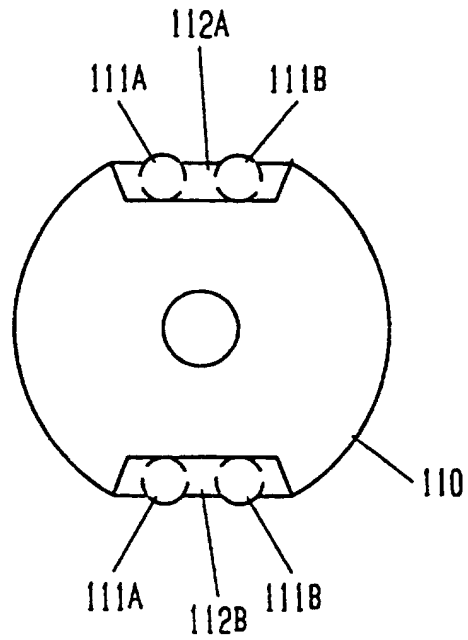
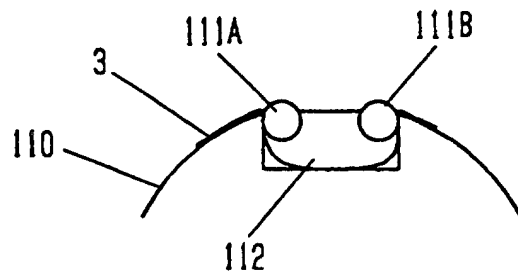


Fig. 13 (a)



(b)

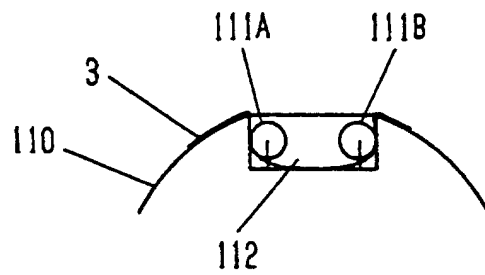


Fig. 14

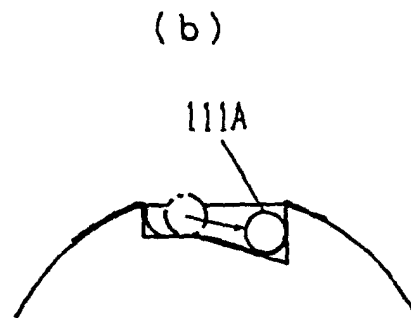
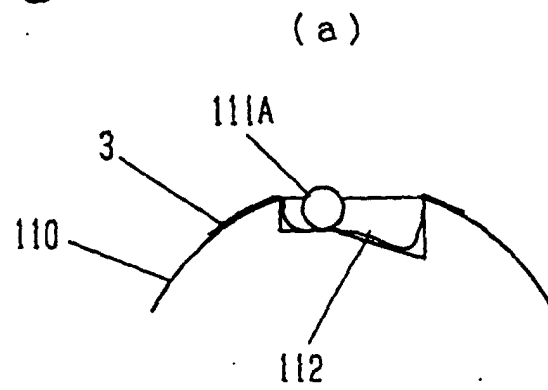


Fig. 15

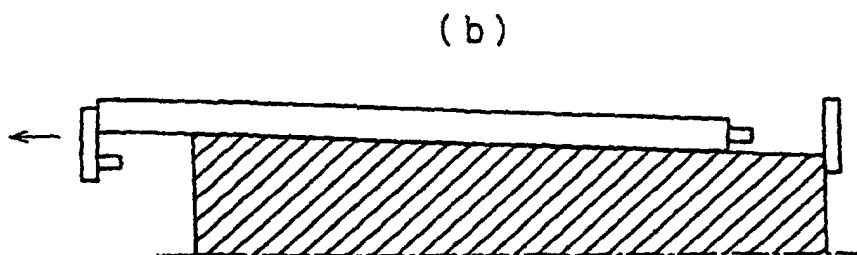
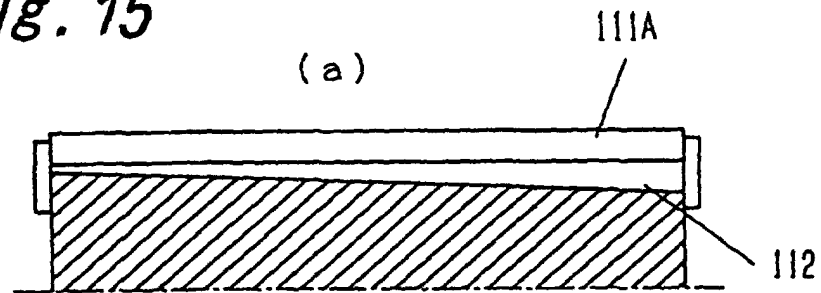
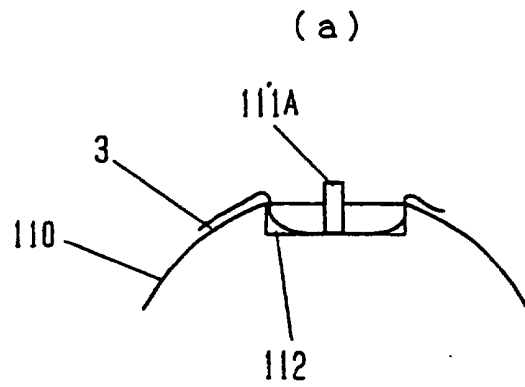


Fig. 16



(b)

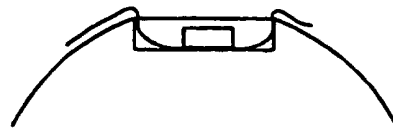
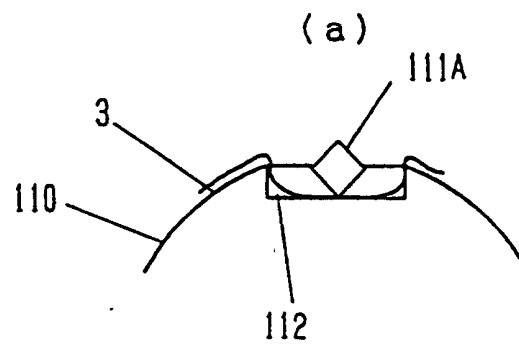


Fig. 17



(b)

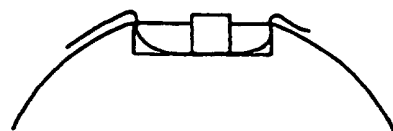


Fig. 18

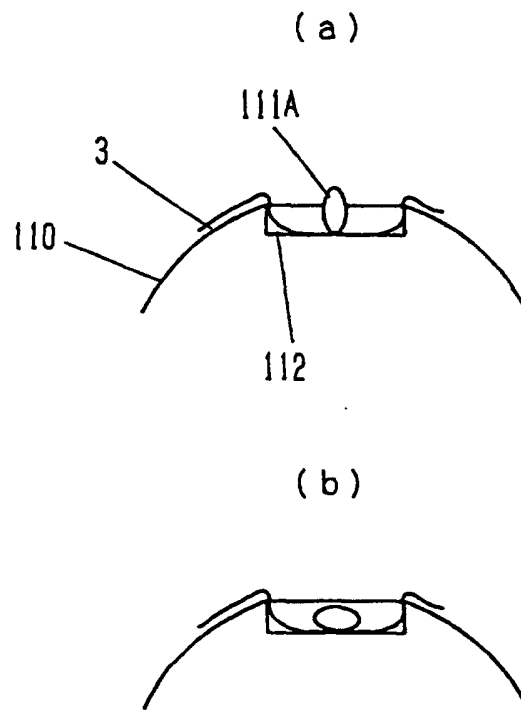


Fig. 19

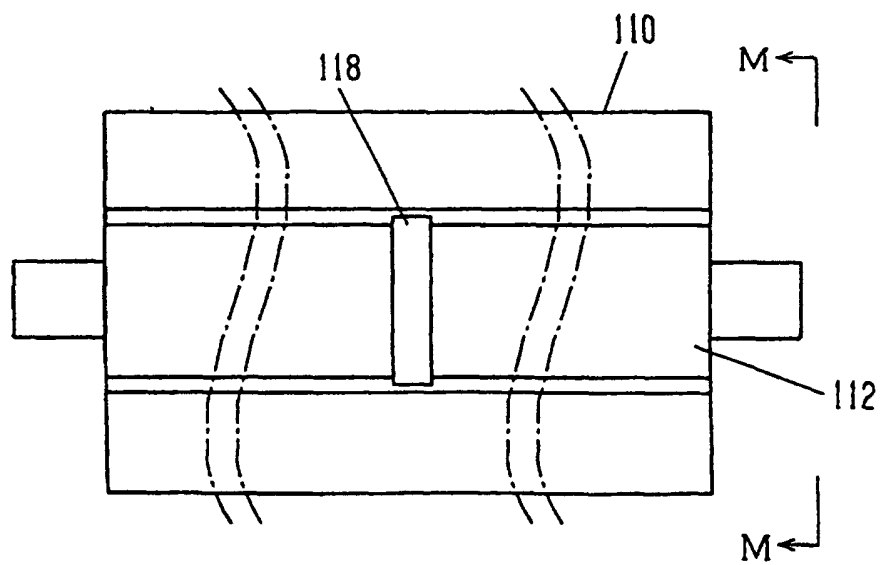


Fig. 20

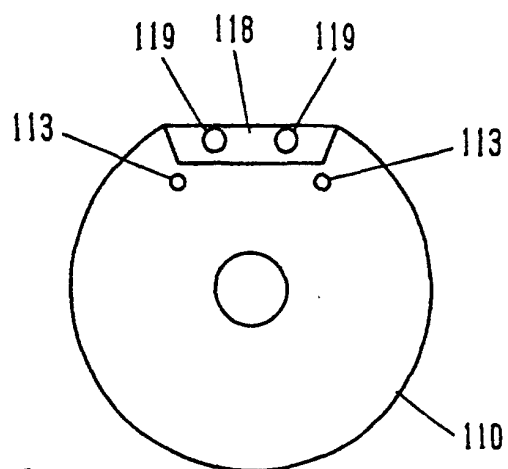


Fig. 21

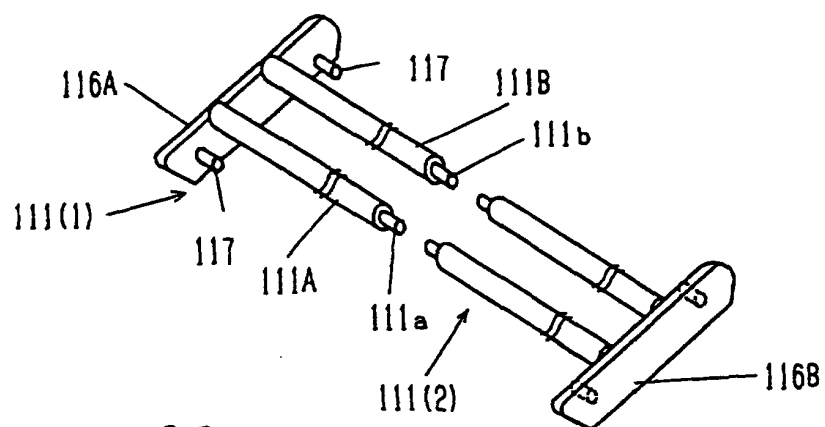


Fig. 22

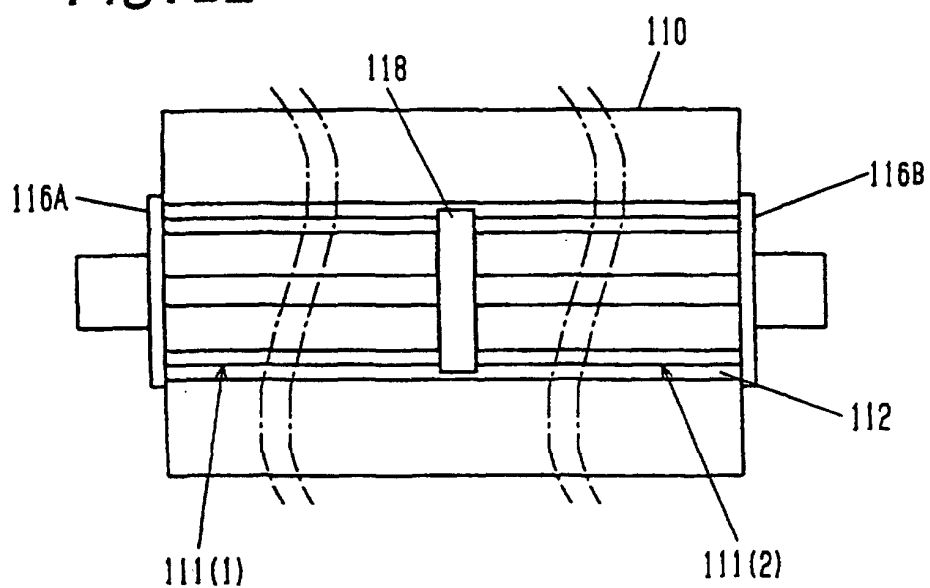


Fig. 23

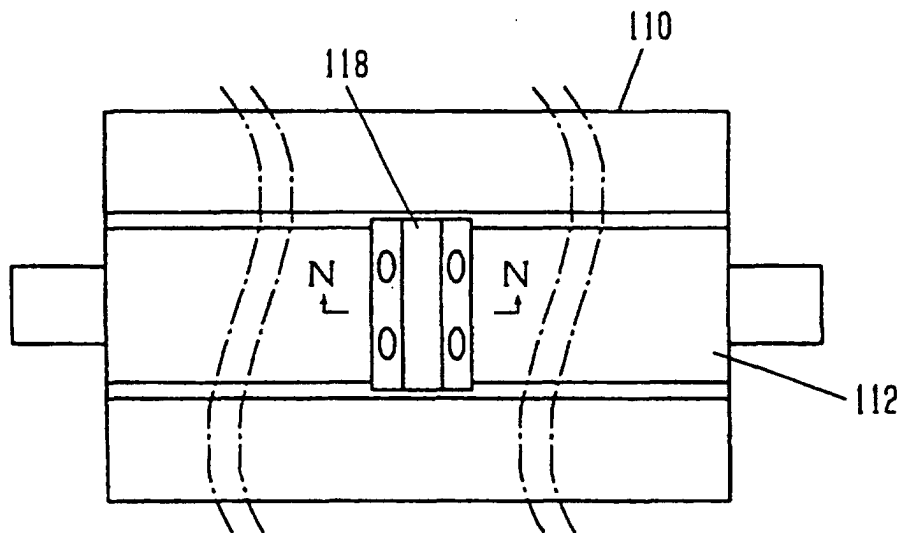


Fig. 24

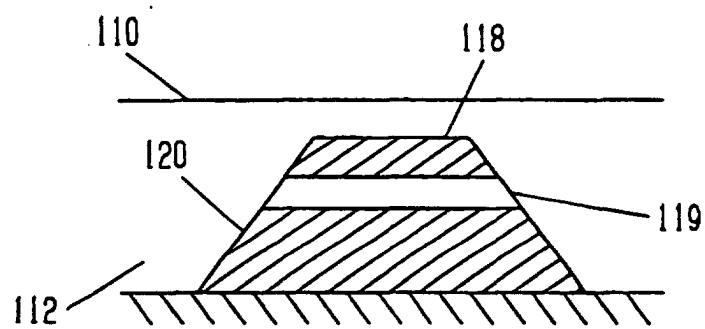


Fig. 25

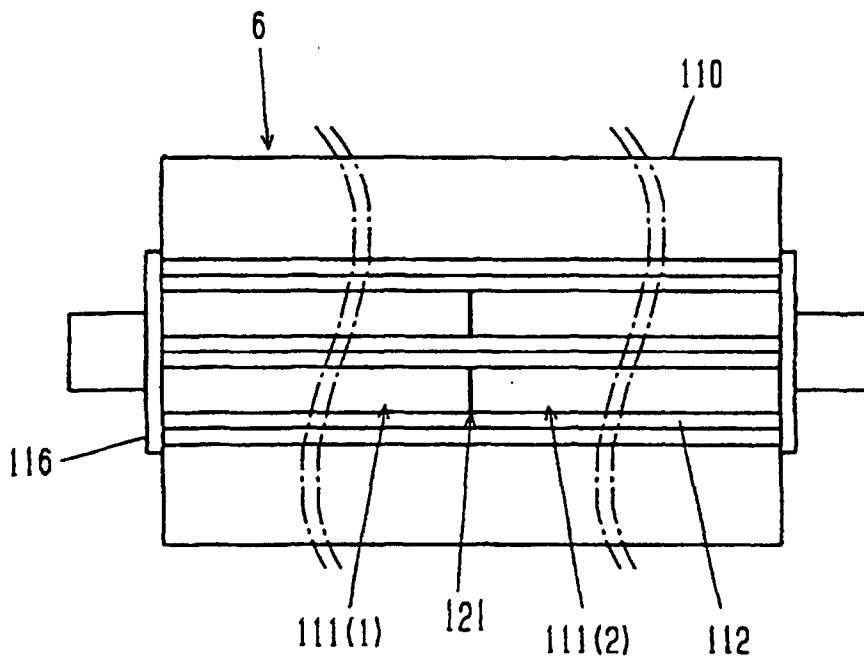


Fig. 26

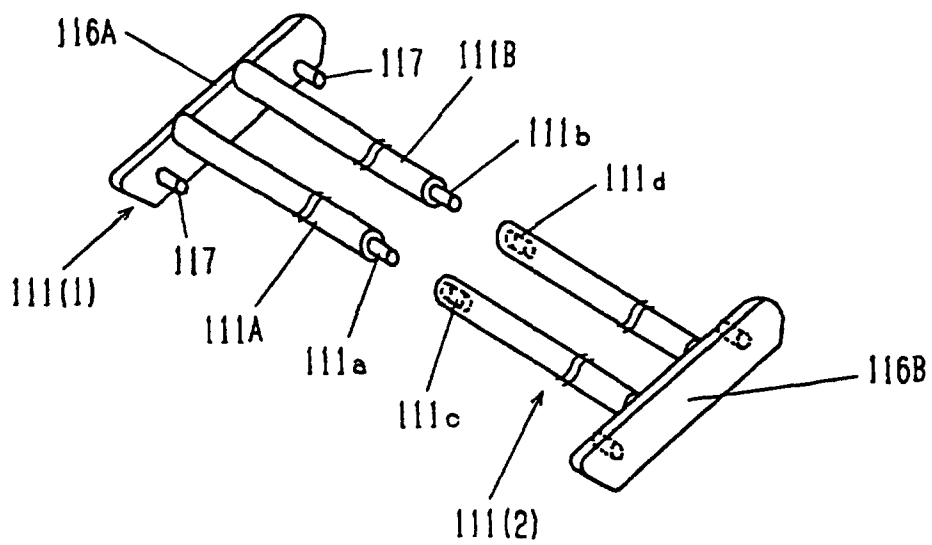


Fig. 27

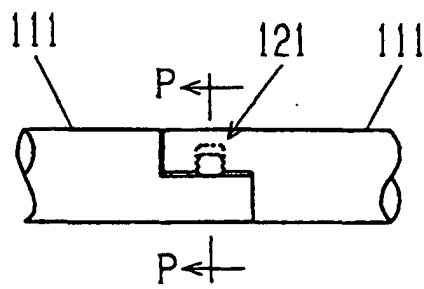


Fig. 28

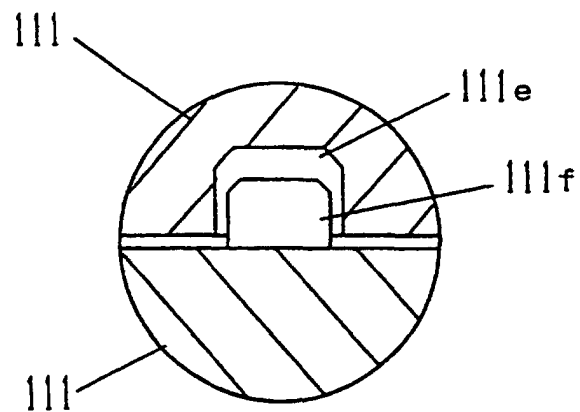


Fig. 29

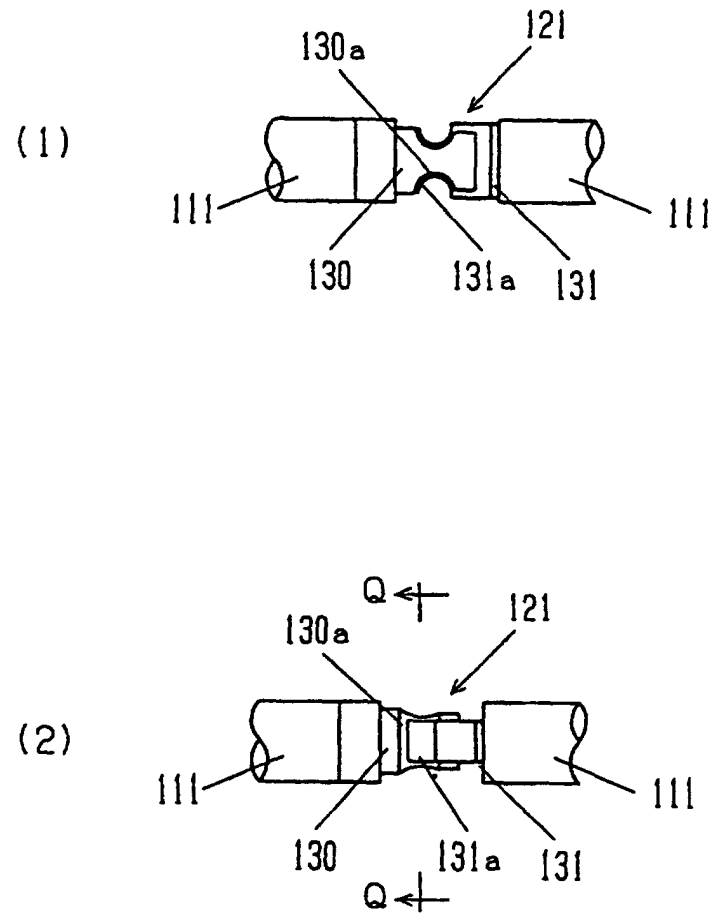


Fig. 30

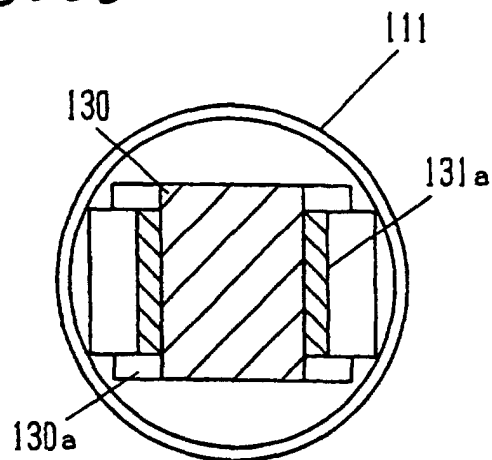


Fig. 31

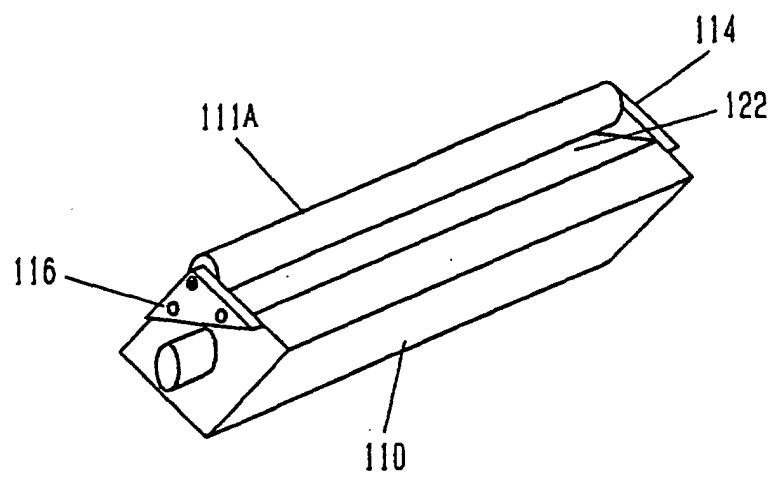


Fig. 32

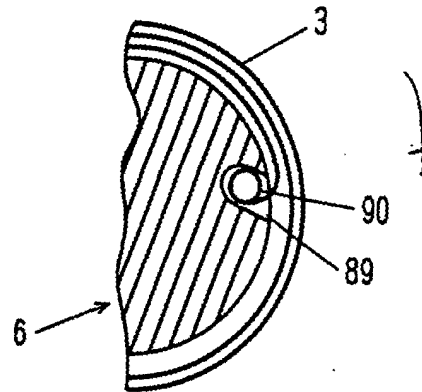


Fig. 33

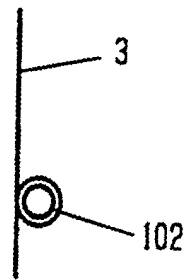


Fig. 34

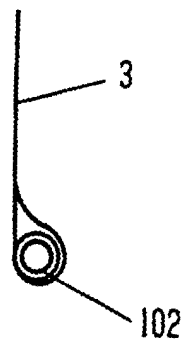
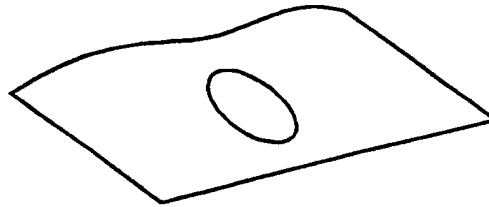
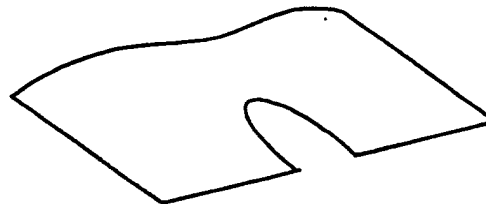


Fig. 35

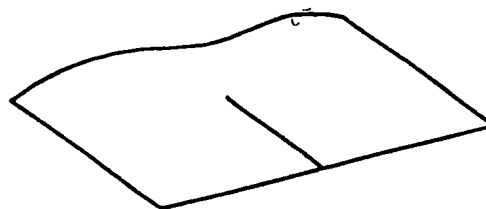
(a)



(b)



(c)



(d)

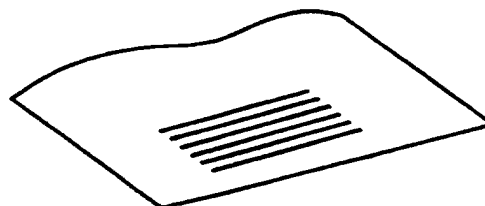


Fig. 36

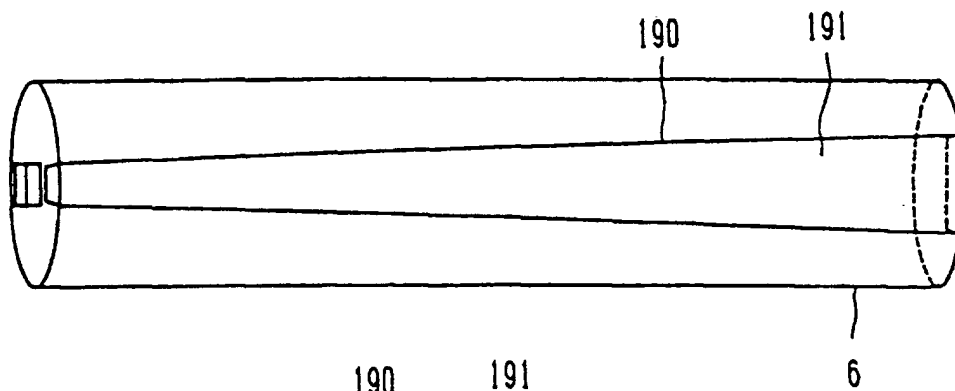


Fig. 37

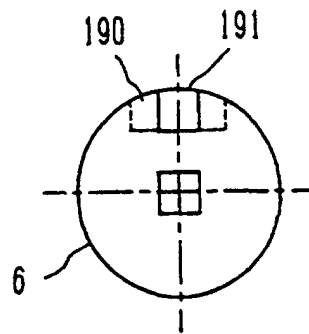


Fig. 38

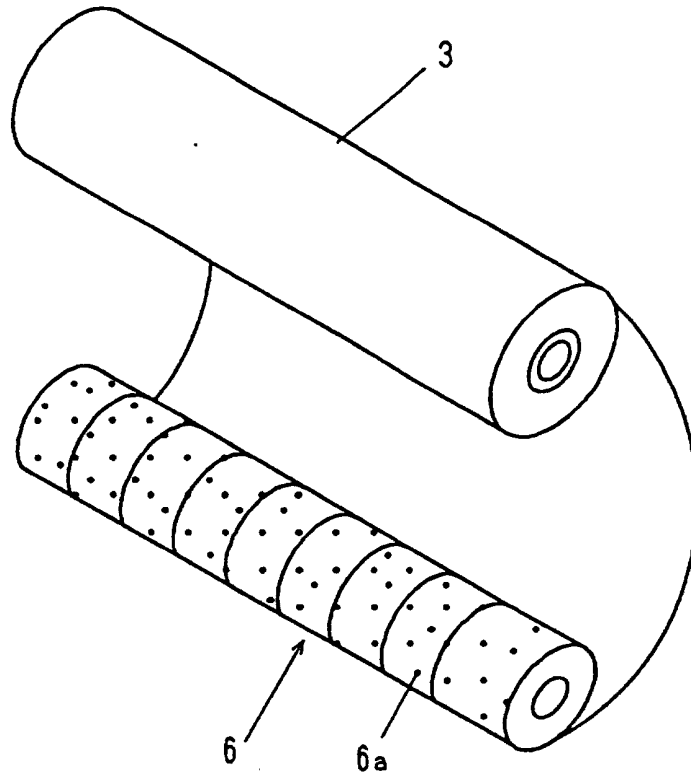


Fig. 39

