

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: **85300407.5**

(51) Int. Cl.⁴: **D 05 B 33/00, D 05 C 3/02**

(22) Date of filing: **22.01.85**

(30) Priority: **02.02.84 JP 18879/84**

(71) Applicant: **KABUSHIKIKAISHA BARUDAN, 20, aza-Tsukagoshi Ohaza-Jyosuiji, Ichinomiya-shi Aichi-ken (JP)**

(43) Date of publication of application: **07.08.85**
Bulletin 85/32

(72) Inventor: **Shibata, Yoshio, 1075 aza-Kitakadoda Ohaza-Kadoma Kisogawa-cho, Hagui-gun Aichi-ken (JP)**

(84) Designated Contracting States: **DE FR GB IT**

(74) Representative: **Evans, David Charles et al, F.J. CLEVELAND & COMPANY 40-43, Chancery Lane, London, WC2A 1JQ (GB)**

(54) **A curved cloth stretch frame construction for an embroidery sewing machine.**

(57) A curved cloth stretch frame construction for an embroidery sewing machine comprises a substantially cylindrical frame body with an embroidery window, a reciprocation transmitting means to transfer axially the frame body and a rotation transmitting means to rotate the frame body. A curved cloth work, such as an arm of a shirt, is tightly put on the frame body, which is driven axially and rotatably by the means, and a wide curved embroidery area on the cloth work can continuously be embroidered.

EP 0 150 971 A2

0150971

A Curved Cloth Stretch Frame Construction for an
Embroidery Sewing Machine

DESCRIPTION

1. Field of the Invention

The present invention relates to a curved cloth stretch frame construction which is used for embroidering sleeve-shaped curved cloth works such as caps, arms of undershirts or the like.

2. Description of the Prior Art

A planar cloth work is usually stretched on an annular tambour and a core of a slightly smaller diameter is laid on and pressed against the cloth work, which is thus held between the inner side surface of the tambour and the outer side surface of the core, and is kept tightly stretched. The tambour is longitudinally transferred and transversely shifted on a plane by a drive means linked with a connection means cooperating with the tambour, and the cloth work can thus be embroidered. The tambour, however, can not be used for embroidering a nonplanar work, a cap with a visor. Moreover, only such a tambour as of a very limited diameter can be inserted into a cylindrical

work, for example, an arm of an underwear, since a space for accomodating a shuttle must be reserved inside the work. It is therefore pointed out as a serious drawback in the prior art that only a very small area on the cloth work can be prepared for continuous embroidery.

Summary of the Invention

It is therefore an object of the present invention to provide a curved cloth stretch frame construction having a frame body which is constructed to have a substantially cylindrical outer surface and is suitable to be adapted inside a sleeve-shaped curved cloth work, thereby enabling the curved cloth work to be continuously embroidered on a very wide embroidery area.

It is another object of the present invention to provide a similar frame body which, however, consists of two separable frame sections, thereby making it efficient to put a cloth work on said frame body.

It is still another object of the present invention to provide a similar frame construction which can correctly transmit a delicate movement for embroidery to said frame body.

Other objects and advantages of the invention will become apparent during the following discussion of the accompanying drawings.

Brief Description of the Drawings

Fig. 1 is a perspective view showing wholly an embroidery sewing machine;

Fig. 2 is a perspective view showing a curved cloth stretch frame construction;

Fig. 3 is a section taken along a line III - III in Fig. 2;

Fig. 4 is a fragmentary view showing the frame construction in Fig. 2;

Fig. 5 is a perspective view showing the frame construction in Fig. 2 with a second frame section taken away;

Fig. 6 is a perspective view showing the second frame section and a cap put thereon;

Fig. 7 is a view as seen along an arrow VII in Fig. 5;

Fig. 8 is a section taken along a line VIII - VIII in Fig. 9;

Fig. 9 is a section taken along a line IX - IX in Fig. 8;

Fig. 10 is an enlarged view showing the essential part of the construction in Fig. 8;

Fig. 11 is a sectional view showing the operative process concerning Fig. 10;

Fig. 12 is a view for explaining a case where a stocking is embroidered;

Fig. 13 is a view for explaining a case where an arm of a shirt is embroidered;

Fig. 14 is a view for explaining a case where a breast pocket of a shirt is embroidered;

Fig. 15 is a perspective view showing a different embodiment of an embroidery window;

Fig. 16 is a perspective view showing a different embodiment of the curved cloth stretch frame construction;

Fig. 17 is a view as seen along an arrow XVII in Fig. 16;

Fig. 18 is a perspective view showing a drive means for the curved cloth stretch frame construction in Fig. 16;

Fig. 19 is a sectional view showing a still different embodiment of the curved cloth stretch frame and the machine bed of the embroidery sewing machine;

Fig. 20 is a perspective view showing a still different embodiment of the curved cloth stretch frame;

Fig. 21 is a front elevational view showing the relation between the curved cloth stretch frame in Fig. 20 and the machine bed;

Fig. 22 is a perspective view showing a still different embodiment of the curved cloth stretch frame construction;

Fig. 23 is a perspective view showing the construction in Fig. 22 with some parts thereof taken away or broken;

Fig. 24 is a section taken along a line XXIV - XXIV in Fig. 22 with some parts thereof omitted;

Fig. 25 is a section taken along a line XXV - XXV in Fig. 24; and

Fig. 26 is a section taken along a line XXVI - XXVI in Fig. 24.

Description of the Preferred Embodiments

Referring to the drawings, the preferred embodiments are now described. In Fig. 1 showing wholly an embroidery sewing machine, a pair of heads 2 are mounted, at the base portions thereof, on a setting 1. Although two heads are shown in the figure, only one will suffice or more than two may be provided. A stitch needle 3 is provided in the front end portion of the head 2 for vertical movement as is usually known. A bed 4 is disposed under the head 2 with the rear base portion thereof secured in the setting 1. The front end portion of the bed 4 is

provided with a needle plate 5 having a needle hole 5a opposite to the needle 3, as shown in Figs. 2 and 5. Inside the bed 4, is contained a well known shuttle. A movable frame 6 is placed on the setting 1 and is adapted to be transferred front and rear (in the direction shown by an arrow 7) and right and left (in the direction shown by an arrow 8) by a transfer mechanism (not shown) in accordance with a preprogramming. In the next place, a curved cloth stretch frame 9 is accommodated over the bed 4 and is constructed, as shown in Figs. 2 to 6, so as to be transferred front and rear in accordance with the front and rear transfer of said movable frame 6 and to be rotated around the axis thereof in response to the right and left shift of the movable frame 6. The curved cloth stretch frame 9 is shown, in Fig. 1, only for one of the beds 4 but the other bed is provided, of course, with another frame 9. When the curved cloth stretch frame 9 is not set on the embroidery sewing machine, a usual embroidery operation can be obtained with a conventional tambour attached on the movable frame 6. A frame body 10 of the curved cloth stretch frame is constructed in the form of a hollow cylinder and consists of a first frame section 11 at the rear base side and a second frame section 12 at the front end side, said two frame sections being made by dividing the frame 9 by a plane crossing rectangularly the axis of the frame 9.

A plurality of connection cuts 13 are formed at the front end of the first frame section 11. Connection projections 14 are formed at the rear end of the second frame section 12 and are adapted to be inserted in said connection cuts 13, with the axes of said sections coinciding each other, the relative rotation between said two sections around the axes being thus prevented. A couple hole 15 is formed in the first frame section 11, a threaded hole 16 is formed in the second frame section 12, and a resilient connection piece 17 is fixed on the outer surface of the second frame section 12 by a fastening screw 18 inserted in the threaded hole 16. The extreme end of the connection piece 17 is formed as a couple projection 19 extending towards the axis of the frame body 10 as shown in Fig. 3. The couple projection 19 is adapted to be inserted in said couple hole 15, the frame sections 11 and 12 being thereby prevented from parting axially each other. A plurality of connection pieces are used. The outer surface of the frame body 10 is formed as a curved cloth stretch surface 20, the upper half of which is of a semicylindrical form with an arcuate cross section around the axis of said frame body 10. This surface 20 is intended to put thereon the internal side surface of a cap 21 shown exemplarily as a cloth work to be embroidered (called a curved cloth as well). The surface 20 is shown, in the figure, as a circular

cylindrical surface but may be a polygonal cylindrical surface consisting of several planar areas. The front end of the frame body 10 is made a free end, onto which the cap 21 can easily be put from the free end side of said frame body 10. Inside the frame body 10 is reserved an accomodation space 22 in which said bed 4 is disposed as shown in Figs. 8 and 9. This accomodation space 22 is made sufficiently large so that the frame body 10 may rotate by a prescribed angle around the axis thereof with the bed 4 disposed therein. An opening 23 is bored through the curved cloth stretch surface 20 and is widely defined in the form of a window. This is hereafter called an embroidery window as well. This window 23 is adapted to pass therethrough the stitch needle 3 from over the frame body 10 towards the bed 4. A cloth fastener 24, with one end thereof secured on the outer surface of the second frame section 12, is made of a resilient material and is adapted to hold pressingly the cloth work, the cap 21. A plurality of cloth fastners 24 are attached on the second frame section 12. An engage toothed wheel 25, formed on the outer surface of the first frame section 11 is shown as an example of a driven member of a drive transmitting means and includes a number of teeth 25a projecting from the outer surface of the first frame section 11. This engage toothed wheel 25 serves both as a main part of a ratation transmitting means to rotate the

first frame section 11 along the curved cloth stretch surface 20 and a main part of a reciprocation transmitting means to transfer axially the first frame section. The rotation transmitting means and the reciprocation transmitting means may be prepared as separate units. A frame support means 26 for the curved cloth stretch frame 9 bears up the same for rotation around and reciprocation along the axis of said frame 9. In this frame support means 26, a sustaining bracket 27 is secured against the setting 1 as shown in Fig. 2, a guide rail 28 is mounted fixedly on the sustaining bracket 27, and a guide groove 28a is formed by a bottom wall 28a and both side walls 28b. This guide groove 28c is formed along the direction of the front and rear movement of the aforementioned movable frame 6. On each inner side of said side walls 28b is provided a guide slot 29 extending horizontally in effect. A slide member 30 is fitted in said guide groove 28c for longitudinal movement with both side edges thereof received in said guide slots 29 as shown in Fig. 7. A mount plate 31 is secured on the slide member 30, support poles 32 and 33 are stood on the mount plate 31, a support arm 34 is fixed on the support pole 32, and support arms 35 and 36 are fixed on the support pole 33. A grooved gear wheel 37 is rotably mounted on said support arm 34 and consists of a gear 37a and of a pair of flanges 37b attached to both sides of said gear 37a. This gear 37a

is formed so as to be in mesh with said engage toothed wheel 25, and the width of a groove 37c defined by the flanges 37b is adjusted to be suitable for receiving said engage toothed wheel 25. Another grooved gear wheel 38 is carried by said support pole 32 for rotation and is similarly constructed. A roller 39 is rotatably supported by said support pole 33 and rollers 40 and 41 are rotatably mounted on said support arms 35 and 36 respectively. These rollers 39 to 41 are disposed so as to support rotatably the lower side surface of said second frame section 12 as shown in Fig. 8. The curved cloth stretch frame 9 is thus supported with said engage toothed wheel 25 in mesh with the grooved gear wheels 37 and 38 and with the bottom surface of said second frame section 12 rested on said rollers 39 to 41 as shown in Figs. 8 and 9. In this situation, the bed 4 is positioned at the upper region of said accomodation space 22 and the upper surface of the needle plate 5 is brought close to the curved cloth stretch surface 20 as shown in Figs. 10 and 11. A transmitting frame 42 is now fixed on said movable frame 6 by a mounting screw 43 and is adapted to rotate said curved cloth stretch frame 9 around the axis thereof and to transfer the same front and rear along said axis in accordance with the movement of said movable frame 6. The transmitting frame 42 includes a frame base 44 and a slide duct 45 which is formed

in the frame base 44 and is adapted to hang on said engage toothed wheel 25. A rack 46 is formed on the bottom surface of the slide duct 45 and is provided with rack teeth 46a engageable with said engage toothed wheel 25. Said engage toothed wheel 25 rested rotatably on said grooved gear wheels 37 and 38 is received in said slide duct 45 as shown in Figs. 2 and 9, and the rack 46 is in mesh with said engage toothed wheel 25.

When the side surface of the cap 21, an exemplary shown curved cloth work, is to be embroidered with the curved cloth stretch frame constructed as mentioned above, the connection piece 17 is first disconnected from the couple hole 15, the second frame section 12 of said curved cloth stretch frame 9 is then separated from said first frame section 11 as shown in Fig. 4, and the cap 21 is put on said separated second frame section 12. The cap 21 is set on the free end of said second frame section 12 as shown in Fig. 6, and an area on said cap 21 to be embroidered (an embroidery area) is brought to the central portion of said embroidery window 23 and is abutted on the curved cloth stretch surface 20. In this situation, the peripheral edge of the cap 21 is clipped by the cloth fastener 24 on the outer side surface of the second frame section 12 and the visor 21a is similarly clipped by the cloth fastener 24, the cap 21 being thus fixed. The connection

projection 14 of the second frame section 12 is fitted in the connection cut 13 of the first frame section 11 and the couple projection 19 of the connection piece 17 is fitted in the couple hole 15, the second frame section 12 being thus jointed with the first frame section 11 as shown in Fig. 2. With the second frame section 12 and the first frame section 11 jointed with each other, the embroidery area on the cap 21 stretched on the embroidery window 23 is placed directly over the needle plate 5 of the bed 4 and under the stitch needle 3. While the embroidery sewing machine is operated, the stitch needle 3 moving vertically proceeds to stitch an embroidery thread on the embroidery area on the cap 21 and the movable frame 6 is driven front and rear and right and left in accordance with a preprogrammed embroidery pattern. When the movable frame 6 is driven front and rear in this manner, the curved cloth stretch frame 9 is transferred front and rear with the slide member 30 travelling front and rear along the guide slots 29, since the engage toothed wheel 25 on the curved cloth stretch frame 9 is caught by the slide duct 45 of the transmitting frame 42 and, in addition, is fitted in the grooves 37c of the grooved gear wheels 37 and 38. When the movable frame 6 is driven right and left, the curved cloth stretch frame 9 is rotated around the axis thereof together with the engage toothed wheel 25 rotated by the rack 46, since the curved

cloth stretch frame 9 is rotatably beared up by the rollers 39 to 41 and the grooved gear wheels 37 and 38, and the engage toothed wheel 25, being further received in the grooved gear wheels 37 and 38, is in mesh with the rack gear 46a of the transmitting frame 42. The embroidery area on the cap 21 stretched on the embroidery window 23 is transferred front and rear by the front and rear movement of the movable frame 6 and is shifted right and left by the right and left movement of the movable frame 6 as shown in Figs. 10 and 11, a prescribed embroidery pattern being stitched on the embroidery area on the cap 21. If a number of second frame sections 12 are prepared, setting of the cap on the second frame section 12 can efficiently be carried out while another cap is being embroidered by the embroidery sewing machine. The cap 21 may alternatively be set on the second frame section 12 already jointed with the first frame section 11 as shown in Fig. 11.

Figure 12 shows now a case in which a stocking 21e, expandable and contractable due to the elasticity thereof, is embroidered. In this case, the stocking 21e can simply be attached pressingly on the free front end portion of the frame body 10e due to the self elasticity of the stocking 21e only by setting the stocking 21e on said front end portion. The elasticity of the stocking 21e is thus utilized as a function to clip the stocking 21e

against the curved cloth stretch frame 9e. Members which are considered functionally or constructionally equivalent to those shown in previous figures are given the numerals same as in those figures but with an alphabetical suffix e, repeated descriptions of such members being omitted.

(Numerals in the following figures are successively given alphabetical suffixes f, g, h, i, j, k and l according to the same idea if necessary, repeated descriptions being similarly omitted.)

Figure 13 shows now a case in which a long cylindrical cloth work, an arm 21f of a shirt, is embroidered. In this case, the arm 21f is fastened against said curved cloth stretch surface 20 at both sides of said embroidery frame 23f by passing a pair of rubber bands 47 and 48 after the arm 21f is adapted on the frame body 10f and the embroidery area is correctly positioned on the embroidery window 23f. The arm 21f can be kept tightly stretched and is correctly embroidered.

Figure 14 shows now a case in which a mark or the like is embroidered on a breast pocket 21g. In this case, the free end portion of the frame body 10g is made thinner so as to be inserted into the close pocket 21g. The cloth fastener 24g for clipping the cloth work, the pocket 21g, is provided on the frame body 10g. A fastening piece 49 of the cloth fastener 24g is pivoted for vertical turn and is

biased by a spring not shown so that the tip portion of the fastening piece 49 may be pressed down. Under the tip of this fastening piece 49 is attached a needle cloth 50 by which a cloth work is clipped. The fastening piece 49 may alternatively be a spring plate attached on the frame body 10g.

Figure 15 shows a different embodiment of the embroidery window. The embroidery window 23h is provided as a cut formed to extend to the free end of the frame body 10h.

Figures 16 to 18 show now an embodiment of the curved cloth stretch frame construction different in the stretch frame and the frame support means and including newly a drive means. The curved cloth stretch frame 9i in this embodiment consists of the frame body 10 i having the form of an incomplete circular cylinder with the lowest quarter of the side wall thereof cut away longitudinally. The frame 10i consists of a single member and the upper surface thereof serves as a semicylindrical curved cloth stretch surface 20i. In the frame support means 26i for said curved cloth stretch frame 9i, an elongated support bar 51 is beared up, for rotation and axial transfer, by a bearing means not shown. Support arms 52 and 53 are fixed on the support bar 51 at one ends thereof and on the internal surface of said frame body 10i at the other ends thereof, which serve both as a connection part for axial reciprocation

and that for rotation. Pairs of the support arms 52 and 53 are arranged at two axial points on the support bar 51 and the frame body 10i can be supported around the support bar 51 via these support arms 52 and 53. Said support bar 51 is positioned so as to pass the center of curvature of the external surface of the frame body 10i. A gear 54 is fixed to one end of the support bar 51 and is adapted to be rotated and to be axially transferred by a drive means 55. In this drive means 55, a guide rectangular rod of a rectangular cross section is rotatably supported in parallel with said support bar 51 by bearing means not shown, and is adapted to be rotated by an electric motor 57 in the regular and the reverse directions. A transfer member 58 is fitted on the guide rectangular rod 56 for axial slide movement and is provided with a gear 59 on the outer surface thereof. At both sides of the gear 59 are formed flanges 60, between which a groove 61 is defined. Said gear 54 is received in this groove 61 and is in mesh with said gear 59. An engage neck 62 is formed on the side of the transfer member 58 and one end of an operation rod 63 is received in the engage neck 62. An endless timing belt 66 is passed round a pair of pulleys 64 and 65. One transfer side 66a of this timing belt 66 is disposed in parallel with said guide rectangular rod 56 and the other end of said operation rod 63 is fixed on this transfer side 66a. One of said pulleys 64 is adapted

to be rotated by another electric motor 67 in regular and reverse directions. Said electric motors 57 and 67 are controlled to operate in response to the prescribed embroidery pattern.

In the above described construction, the electric motor 57 operates first to rotate said guide rectangular rod 56, the transfer member 58 and the gear 59 are then actuated to rotate the gear 54 and the support bar 51, and the curved cloth stretch frame 9i is thereby rotated to shift the curved cloth work right and left. The electric motor 67 operates to turn the timing belt 66, the operation rod 63 is then transferred front and rear to actuate slidably the transfer member 58 front and rear, and the support bar 51 and the curved cloth stretch frame 9i are thereby transferred front and rear to move the curved cloth work front and rear.

Figure 19 shows now a still different embodiment for the curved cloth stretch frame and the bed. The curved cloth stretch frame 9j consists of the frame body 10j having the form of an incomplete circular cylinder with the upper wall thereof cut away longitudinally and the bed 4j is constructed so as to have a circular cross section. In this embodiment, the curved cloth work 21j stretched on the frame body 10j is transferred keeping contact with the upper surface of the bed 4j in the embroidery window 23j.

Figures 20 and 21 show a still different embodiment for the curved cloth stretch frame which is suitable for embroidering a slender cylindrically curved cloth work (a slender arm or a close breast pocket of a shirt for ladies for example). The base portion of the curved cloth stretch frame 9k in this embodiment is constructed to have the same form as one shown in foregoing Fig. 6 has, and the front end thereof is closed thinner as shown. The cross section of said front end consists of some arcuate curves around the center of rotation 10a of the frame body as shown in Fig. 21, and the curved cloth stretch frame 9k, on rotating, does not collide with the bed 4k.

Figures 22 to 26 show lastly a still different embodiment of the curved cloth stretch frame construction. A support shaft 68 is secured at one end thereof on the setting 12. A pair of support plates 69 are fixedly attached on the internal surface of the frame body 102 and are provided with metals 70 aligned along the axis of the frame body 102. The support shaft 68 is beared by the metals 70 for rotation and axial movement. A pair of adapt flanges 71 are attached on the rear end portion of said frame body 102. On the bottom side of the transmitting frame 422 are formed two adapt grooves 72 in which said adapt flanges 71 are engageably fitted. A pair of string members 73 and 74 for transmitting drive torque are crosswise passed in opposite

directions round the frame body 102 from the transmitting frame 422 through a passage slot 75. One ends 73a and 74a of said string members 73 and 74 are fixed on said transmitting frame 422 by fixing screws 76 threadedly attached in said transmitting frame 422. The other ends of said string members 73 and 74 are passed on the outer surface of the first frame section 112 in opposite directions and are then connected towards a terminal screw 77 inserted threadedly in the first frame section 112 via straining springs 78 (tension springs). The string members 73 and 74, therefore, can tightly be stretched at all times. Said string members 73 and 74 are preferably less stretchy members, for example, wires. The sum of the lengths of the string members 73 and 74 laid on the outer surface of the first frame section 112 is adjusted to be equal to one round on said section 112. The sum, however, may be smaller (a length sufficient to realize a required angle of revolution) or larger (several rounds).

The operation proper to the above described embodiment is as follows. When the movable frame 62 is transferred front and rear, the curved cloth stretch frame 92 is similarly moved front and rear together with the frame 62, since the adapt flanges 71 of the curved cloth stretch frame 92 are engageably set in the adapt grooves 72 of the frame 422. When the movable frame is shifted right and left,

the transmitting frame 42 ℓ is driven transversely to the axis of the curved cloth stretch frame 6 ℓ , and the movement of said frame 42 ℓ is transmitted to the curved cloth stretch frame 9 ℓ through the string members 73 and 74, the frame 9 ℓ being thus rotated right and left with respect to the central support shaft 68. When the transmitting frame 42 ℓ is driven to the left in Fig.26, one end 73a of the string member 73 is pulled and moved to the left. The other end 73b of the string member 73 consequently pulls and turns the curved cloth stretch frame 9 ℓ in the direction shown by an arrow 79. When the movement of the frame 42 ℓ is now changed to the reverse direction, i.e., to the right, the string member 74 rotates instantly the curved cloth stretch frame 9 ℓ in the reverse direction shown by an arrow 80. In this case, the string members 73 and 74 do not loose to any extent and the frame 42 ℓ , therefore, can rotate the curved cloth stretch frame 9 ℓ in alternative directions correctly in response to the reciprocation of said frame 42 ℓ .

It is an advantage of the present invention that, in embroidering the cylindrical side surface 21b of the embroidery work 21, the free end of the frame body 10 can simply be inserted into the end opening 21c of said cylindrical work 21, the embroidery area thereof is tightly stretched on the curved cloth stretch surface 20, and the curved area, as it is, can be embroidered. This advantage

is very remarkable since said cylindrical work 21, with the curved state thereof maintained, can be embroidered broadly and neatly. It is another advantage of the present invention that, on reversing the direction of the longitudinal movement of the frame 42ℓ, the curved cloth stretch frame 9ℓ which has just been rotated in a certain direction by the string member 73, can instantly be returned in the reverse direction without any play or delay by the string member 74. That is, the delicate movement of the frame 42ℓ around the turning point thereof is faithfully transmitted to the curved cloth stretch frame 9ℓ and any fine embroidery pattern can correctly be realized.

Since many widely different embodiments of the present invention can be thought of without departing from the spirit and scope thereof, by those who are skilfull in the art, it should be understood that the invention is not limited to the specific embodiments thereof except as defined in the appended claims.

0150971

CLAIMS

1. A curved cloth stretch frame construction, for an embroidery sewing machine having a vertically reciprocating stitch needle and a movable frame adapted to move two-dimensionally on a substantially horizontal plane, comprising a substantially cylindrical frame body having free front end thereof and reserving therein an accomodation space large enough to contain a bed of said embroidery sewing machine, an embroidery window bored through said frame body, a reciprocation transmitting means cooperating with said frame body to transmit axial drive to said frame body, and a rotation transmitting means cooperating with said frame body to transmit rotational drive to said frame body, said reciprocation transmitting means and said rotation transmitting means being operably connected with said movable frame, and said frame body, together with a curved cloth work stretched on said embroidery window, being supported for rotation and axial transfer between said bed and said stitch needle.

2. A curved cloth stretch frame construction as set forth in claim 1, wherein said frame body consists of two substantially cylindrical frame sections adapted to be separated from and connected to each other, said embroidery window being bored through at least one of said sections.

3. A curved cloth stretch frame construction as set forth in claim 1, wherein said rotation transmitting means and said reciprocation transmitting means consist of a rack secured on said movable frame and an engage toothed wheel formed on said frame body, said engage toothed wheel being in mesh with said rack for rotation around the axis of said frame body and for axial movement together with said rack.

4. A curved cloth stretch frame construction as set forth in claim 1, wherein said rotation transmitting means and said reciprocation transmitting means consist of adapt grooves placed fixedly against said movable frame, adapt flanges formed on said frame body, and a pair of string members which are tightly passed round said frame body in opposite directions with one ends thereof fixed against said movable frame and with the other ends thereof fixed against said frame body, said adapt flanges being engageably fitted in said adapt grooves for rotation around the axis of said frame body and for axial movement together with said frame body.

5. A curved cloth stretch frame construction as set forth in claim 1, wherein a cloth fastener is provided on said frame body.

6. A curved cloth stretch frame construction as set forth in claim 1, wherein the free front end of said frame body is made thinner.

7. A curved cloth stretch frame construction as set forth in claim 1, wherein said embroidery window is formed so as to extend to said free front end of said frame body.

8. A curved cloth stretch frame construction for an embroidery sewing machine having a vertically reciprocating stitch needle, comprising a substantially cylindrical frame body having free front end thereof and reserving therein an accommodation space large enough to contain a bed of said embroidery sewing machine, an embroidery window bored through said frame body, a support bar disposed securely against said frame body along the axis of the same, and a drive means operably connected to said support bar and constructed so as to actuate the same for rotation and axial transfer, said support bar being movably disposed against a setting of said sewing machine and said frame body being disposed for rotation and axial reciprocation between said stitch needle and said bed.

FIG.1

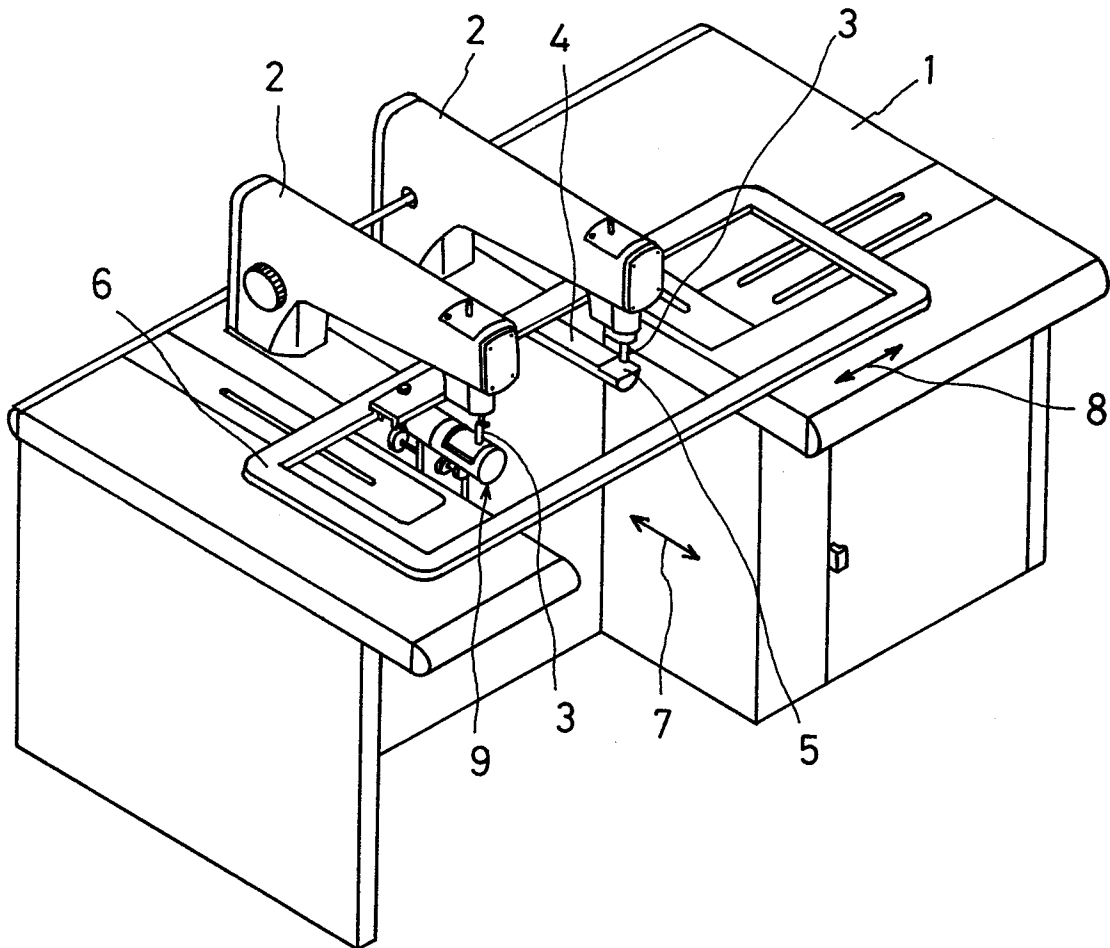


FIG.3

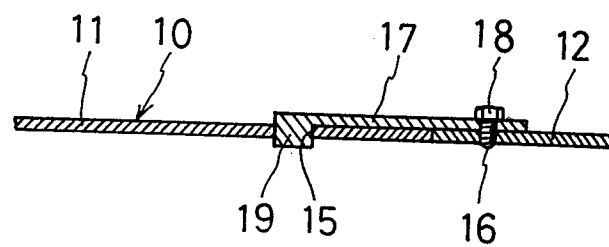


FIG. 2

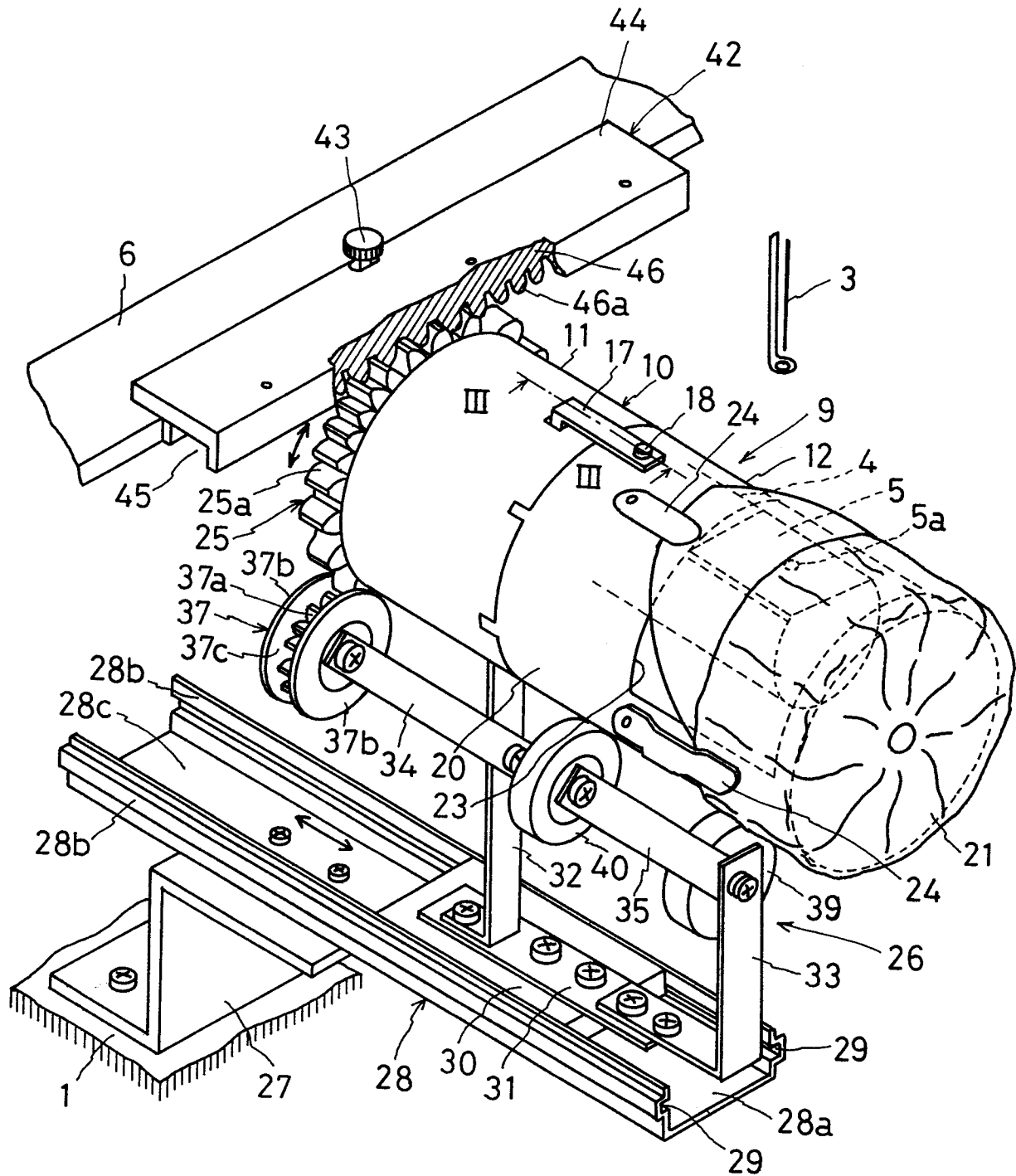


FIG. 4

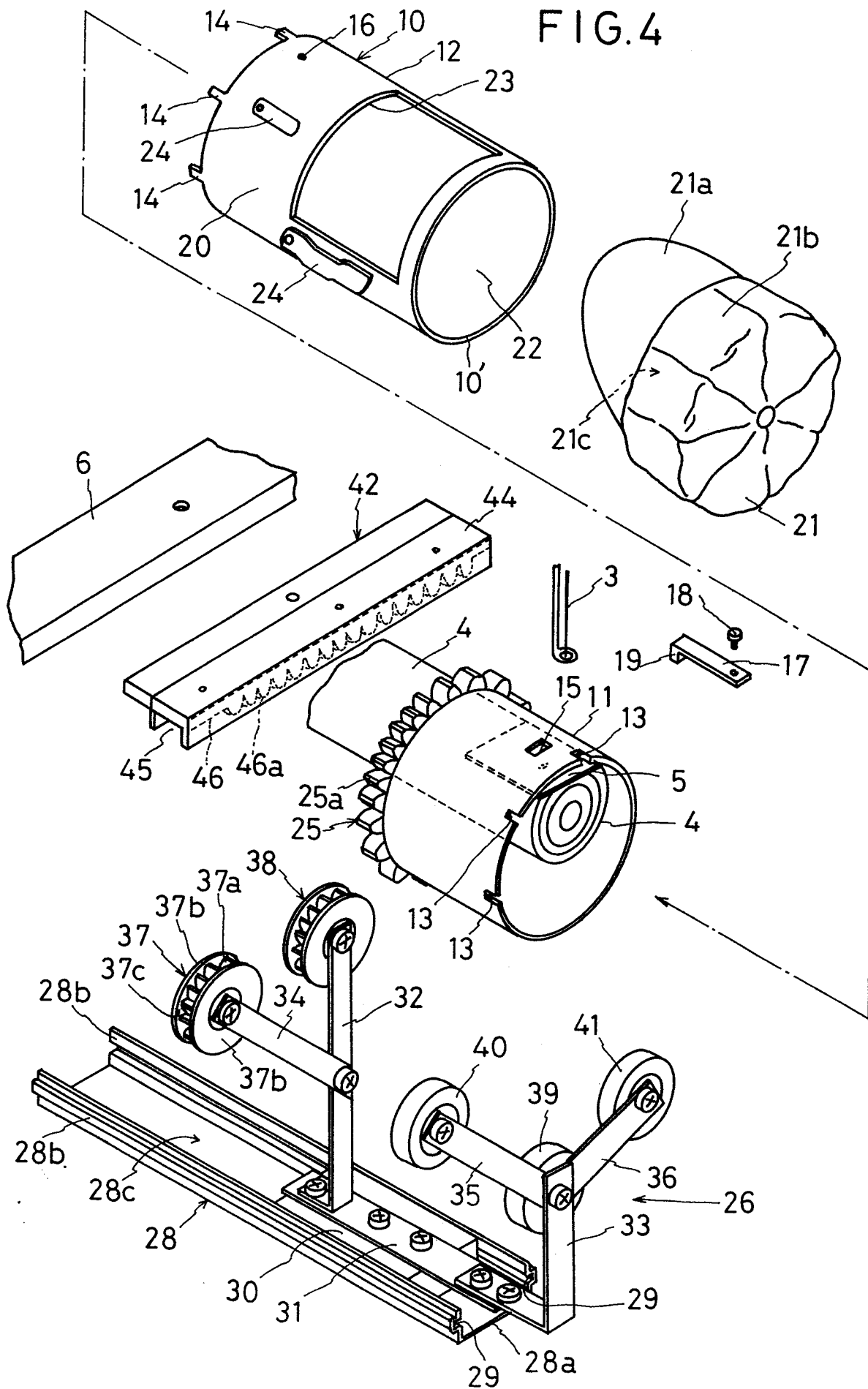


FIG. 5

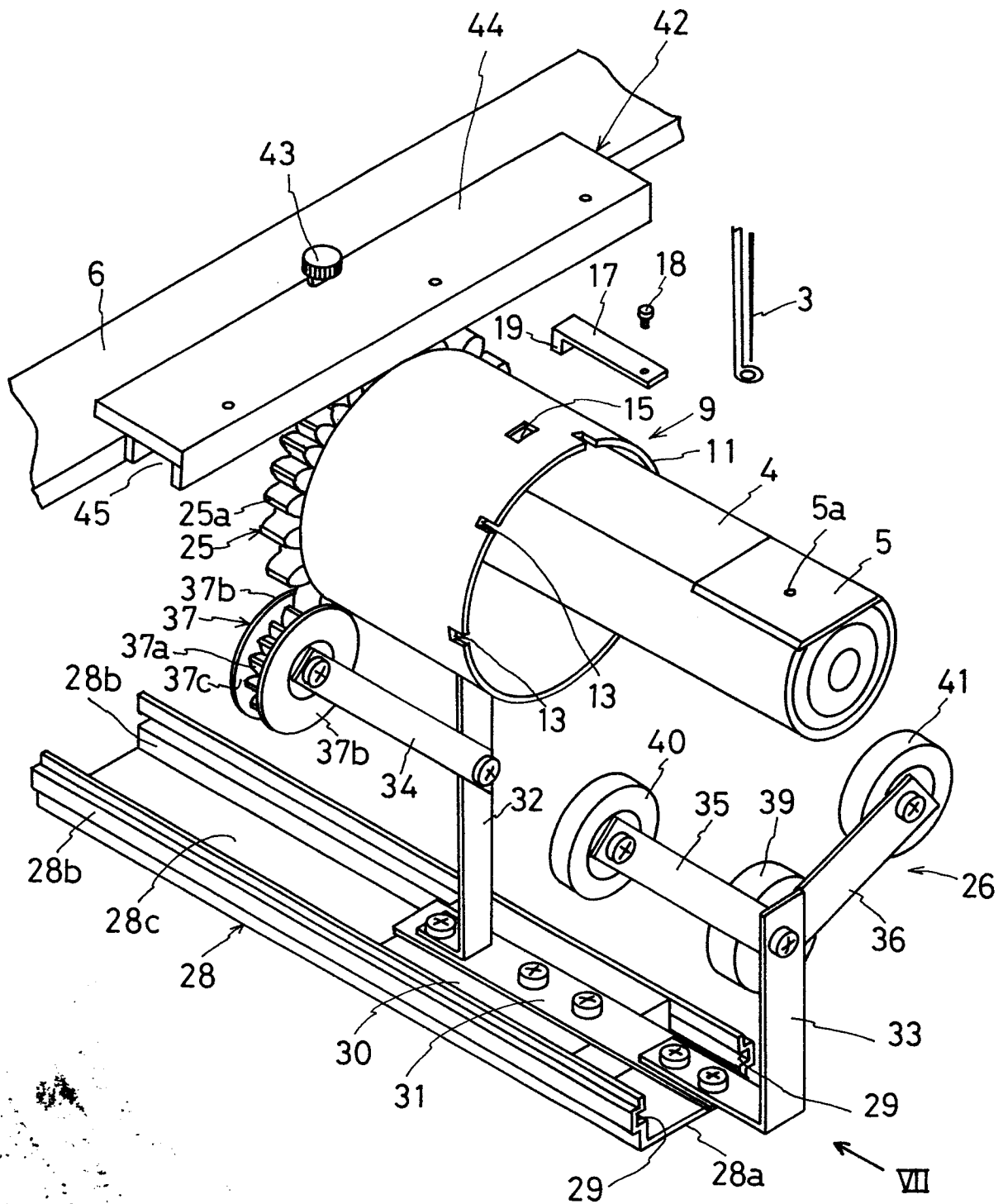


FIG.6

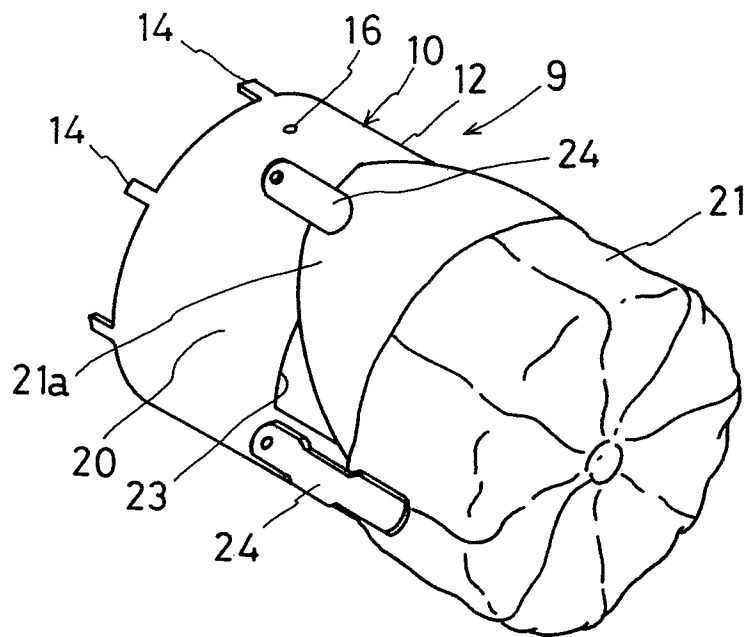


FIG.7

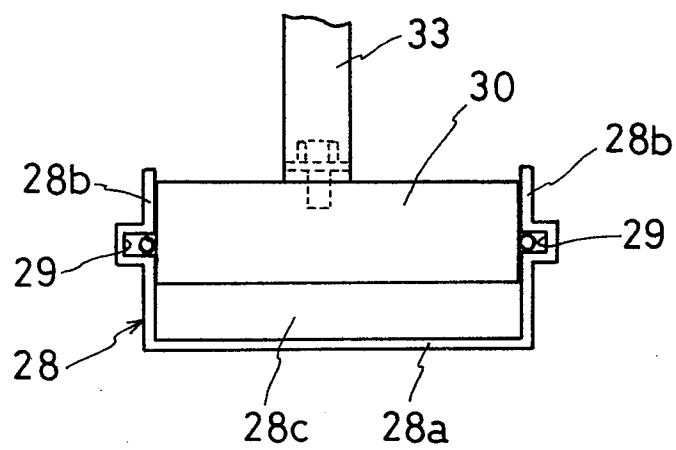


FIG. 8

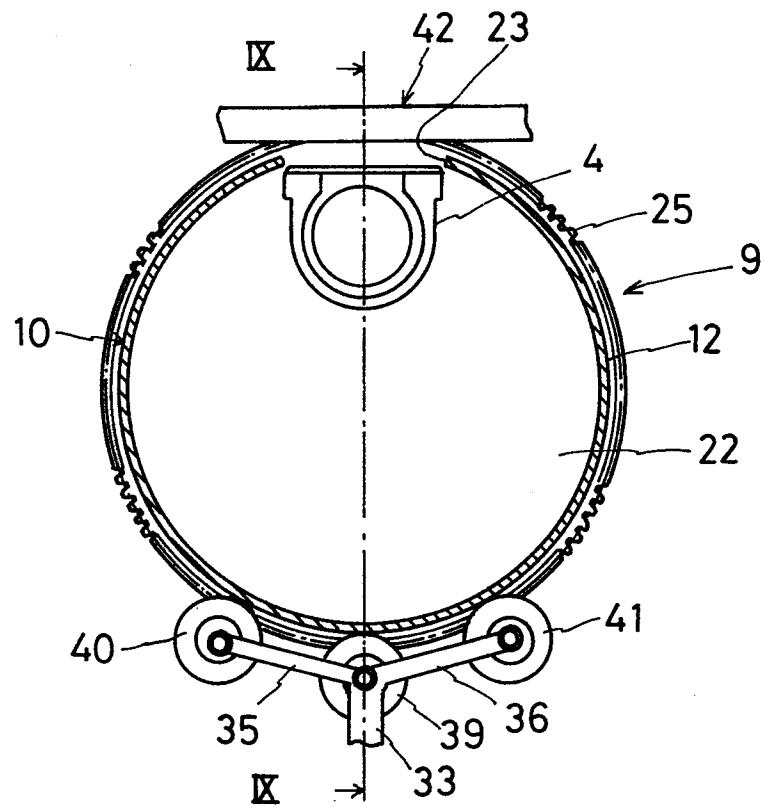


FIG. 9

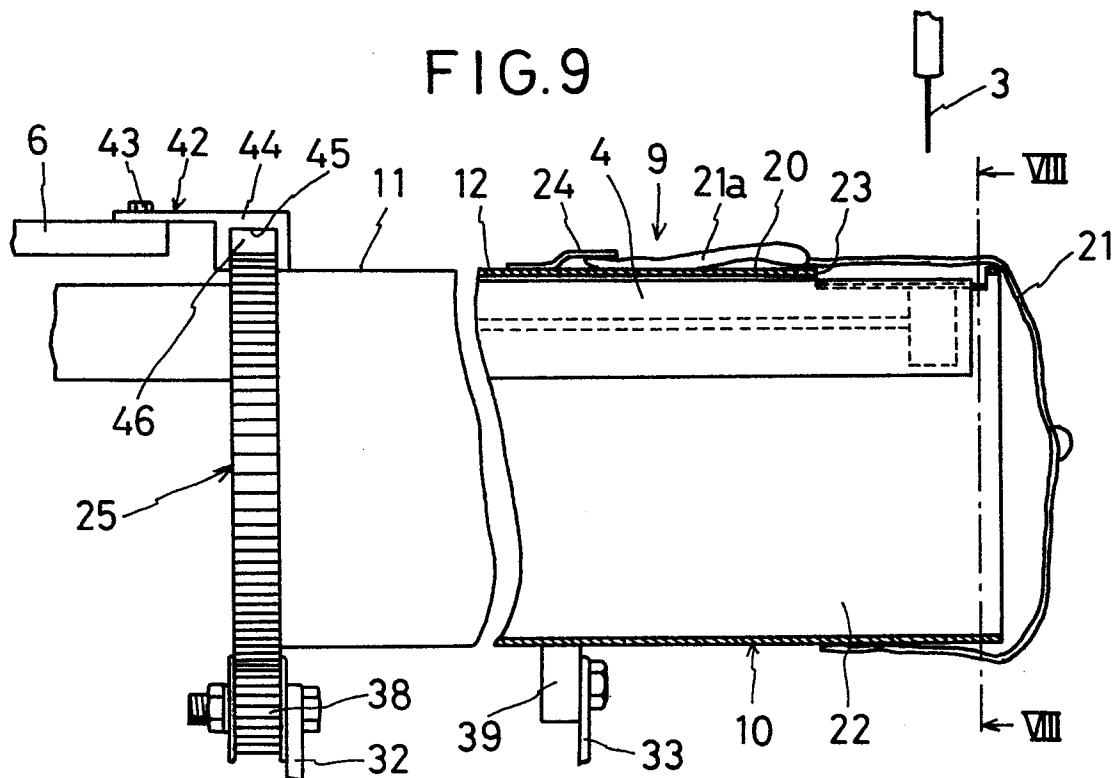


FIG.10

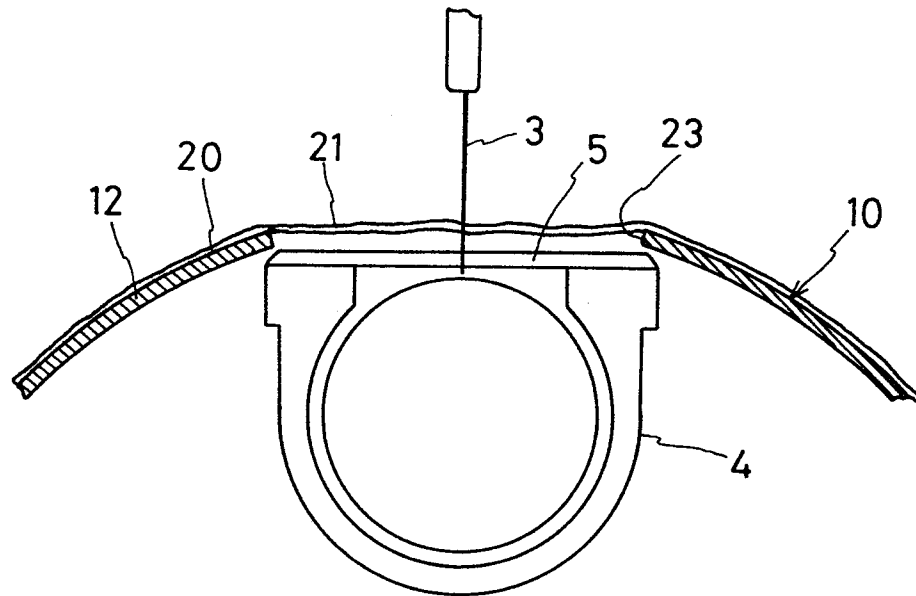
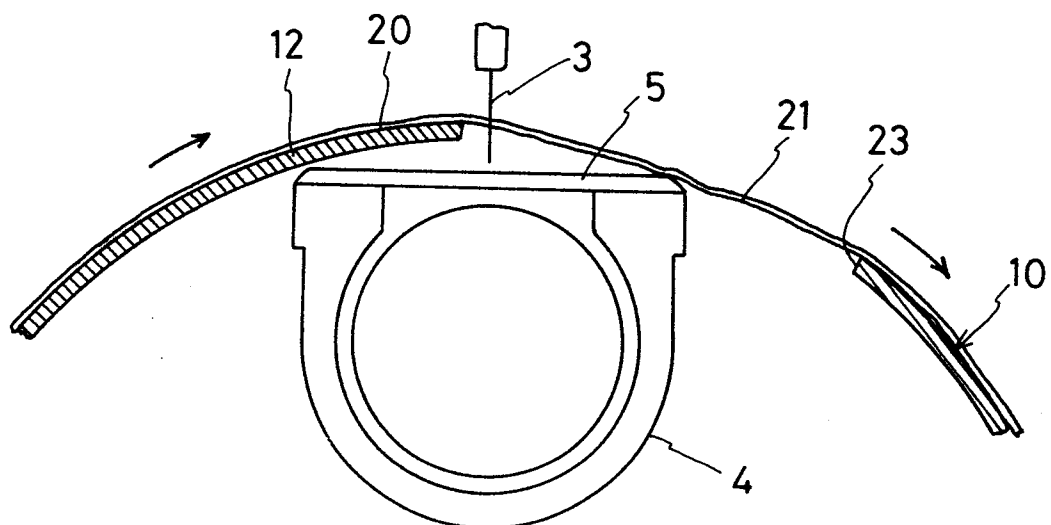
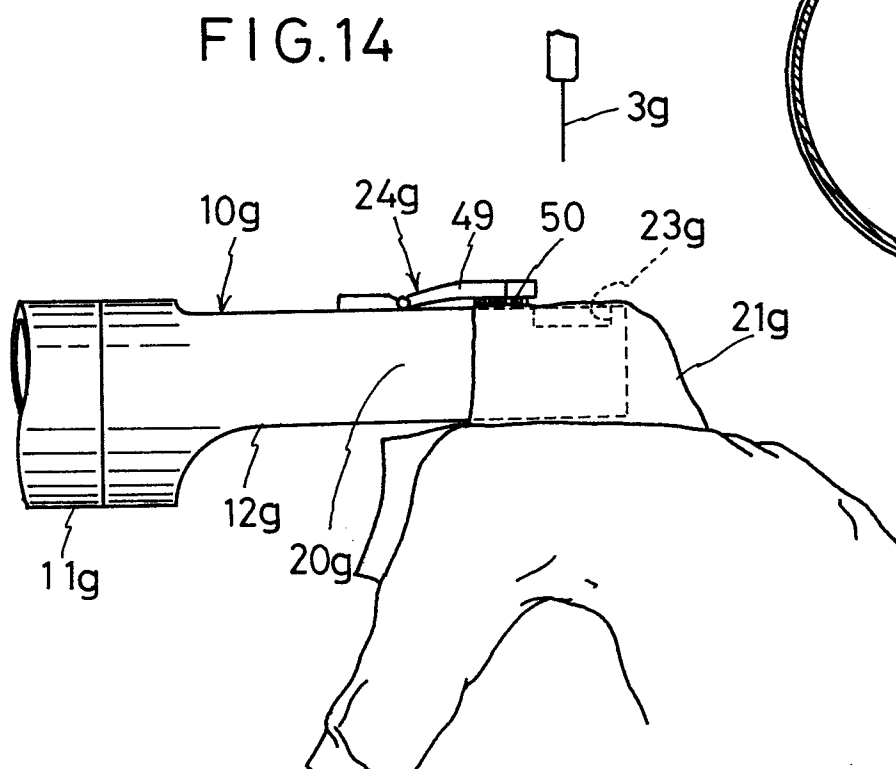
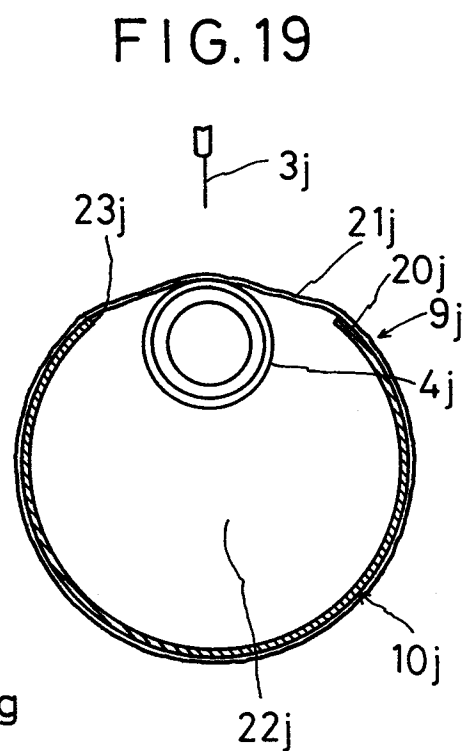
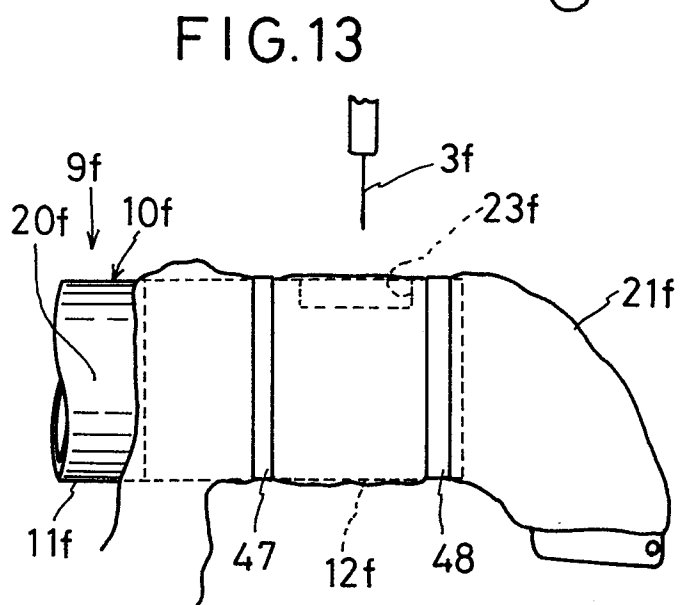
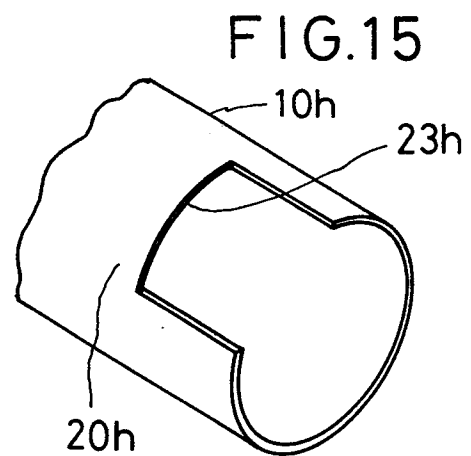
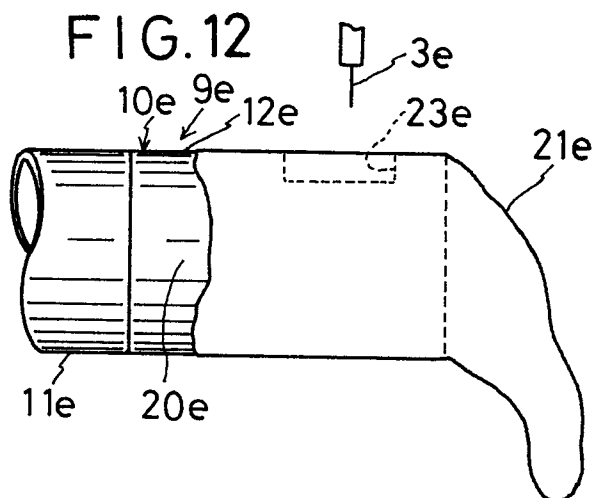


FIG.11





9/12

0150971

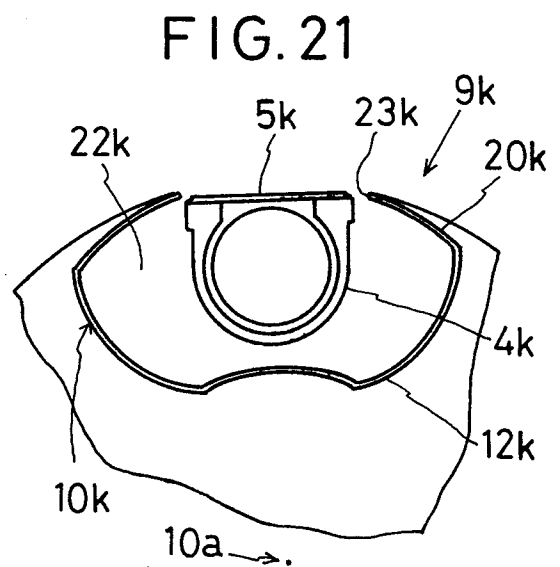
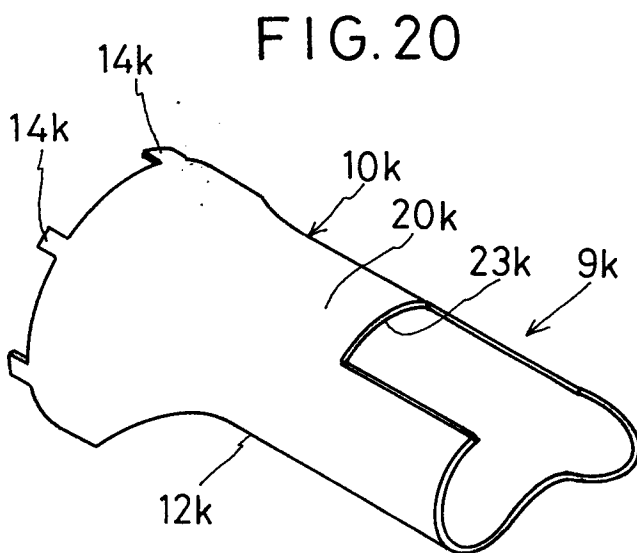
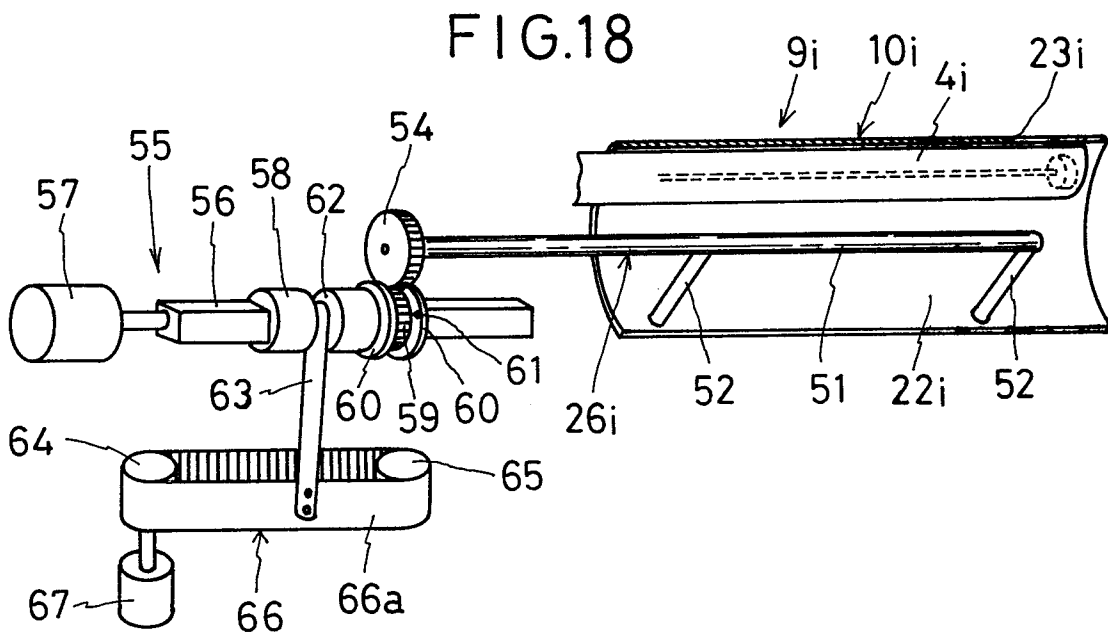
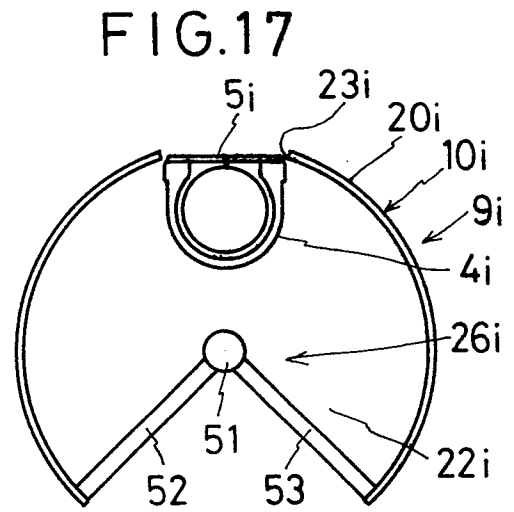
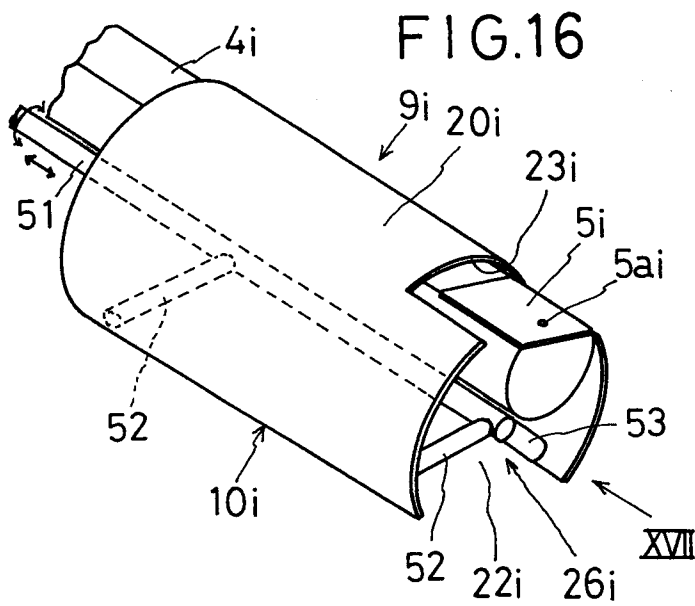


FIG. 22

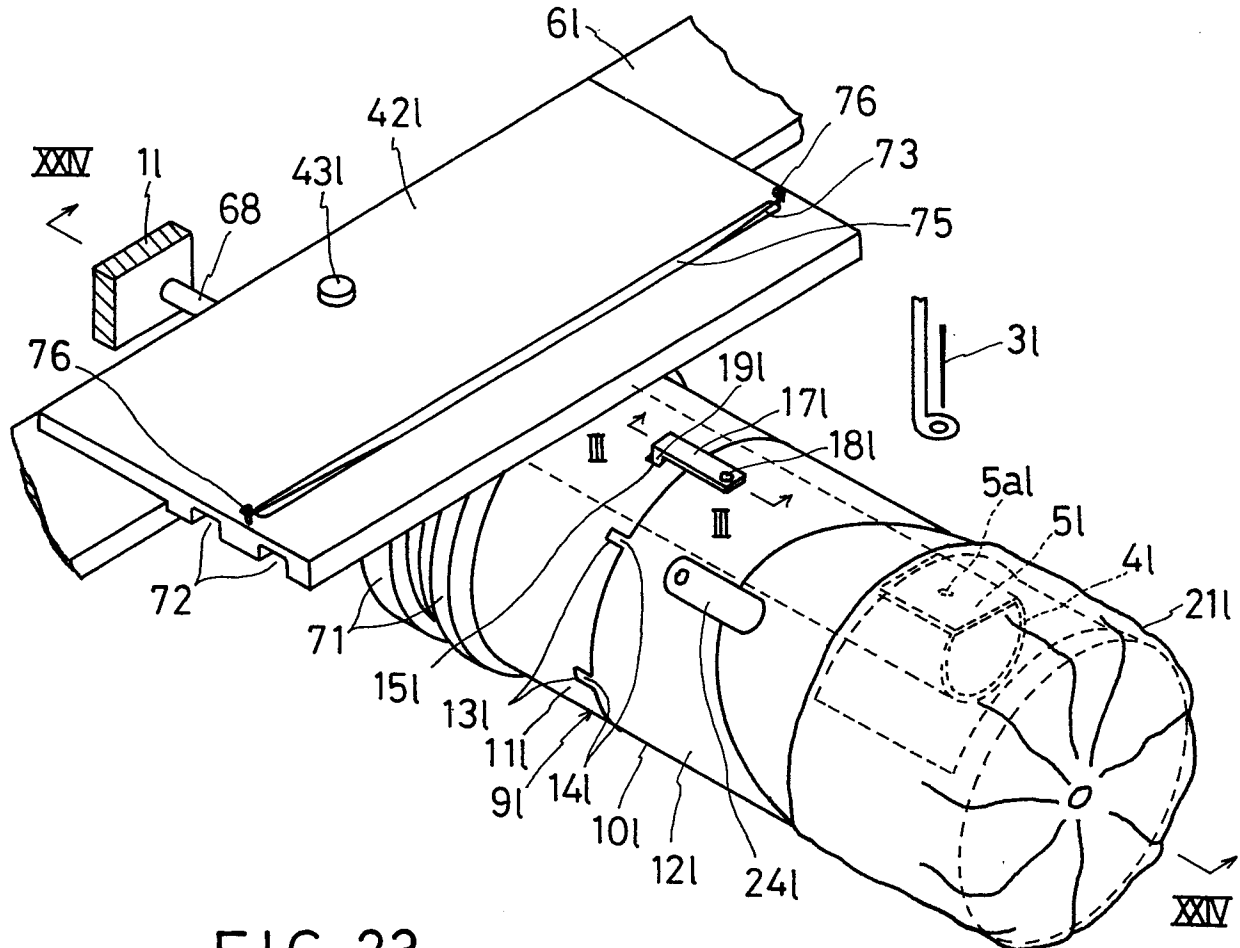


FIG. 23

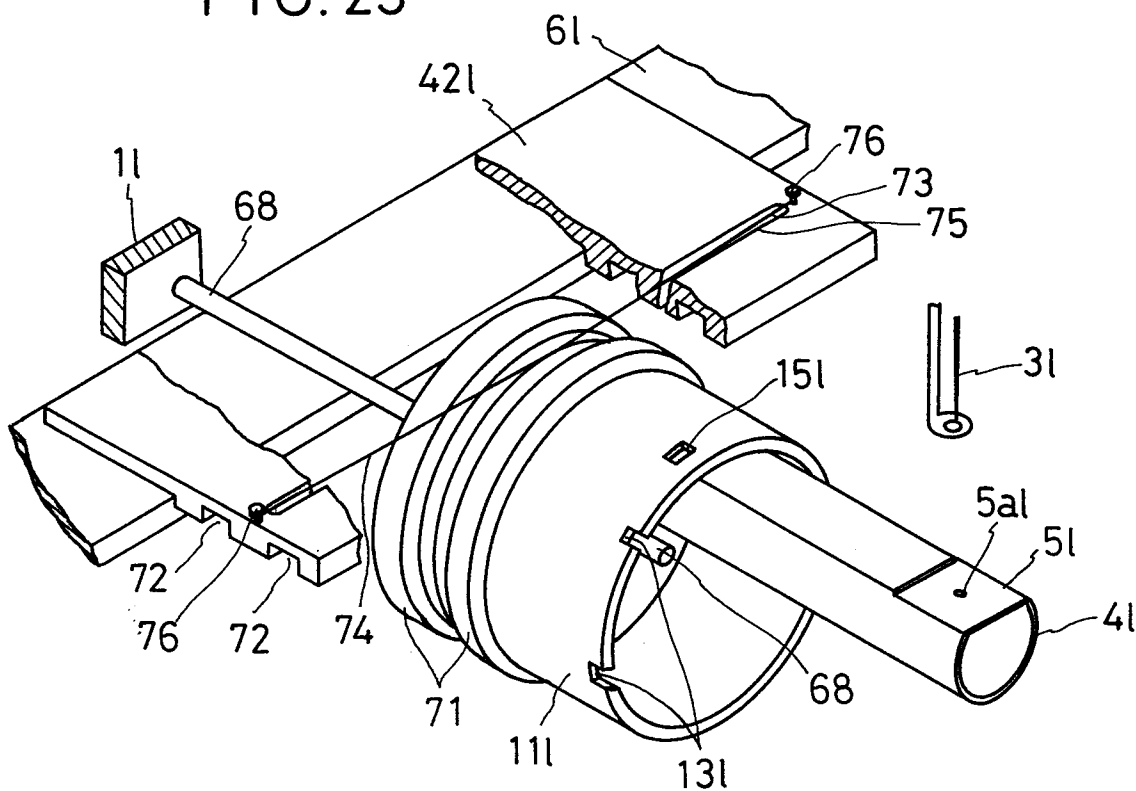


FIG. 26

