



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 010 797 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
21.06.2000 Bulletin 2000/25

(51) Int. Cl.⁷: **D06C 7/00, D06C 15/06**

(21) Application number: **98830768.2**

(22) Date of filing: **18.12.1998**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

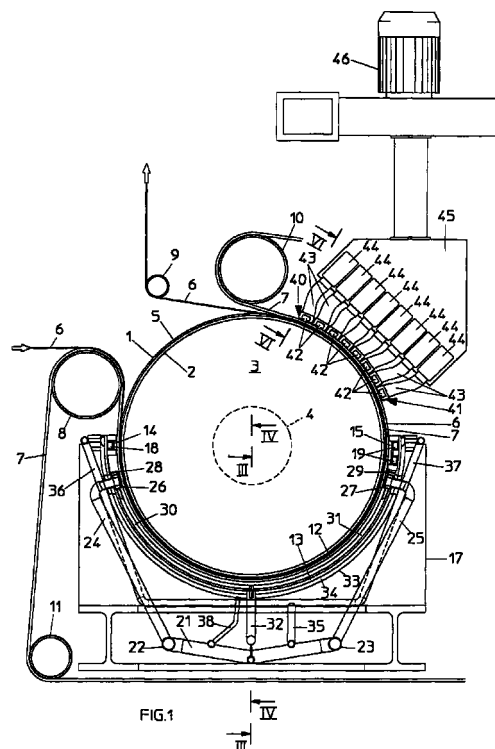
(71) Applicant: **SPEROTTO RIMAR S.p.A.**
I-20121 Milano (IT)

(72) Inventor: **Bertoldo, Franco**
36070 Brogliano (Vicenza) (IT)

(74) Representative:
Marchi, Massimo et al
c/o Marchi & Partners s.r.l.,
Via Pirelli, 19
20124 Milano (IT)

(54) **Machine and process for the continuous decatizing and stabilizing of a fabric**

(57) A machine for the continuous decatizing and stabilizing of a fabric (6) comprises a cylindrical drum (1) having a side wall (2) around which are wrapped a first blanket (5), the fabric (6) and a second blanket (7), rollers (8, 10) for moving the second blanket (7), a sealed chamber (12) that contains saturated steam at preselected pressure and temperature for impregnating the fabric (6) and is located in a first preselected peripheral region of the drum (1), on the outside of and close to the side wall (2), and a device (40; 140) capable of forming a stream of air for stabilizing the fabric (6); the device (40; 140) is located in a second preselected peripheral region of the drum (1), on the outside of and close to the side wall (2), and the stream of air formed by the device (40; 140) flows in a substantially tangential direction with respect to the side wall (2) of the drum (1).



EP 1 010 797 A1

Description

[0001] The present invention relates to a machine and a process for the continuous decatizing and stabilizing of a fabric.

[0002] It is known that the fabrics piece processing is completed by certain finishing treatments in which the fabrics are given desired technical and aesthetic characteristics, such as dimensional stability, smooth handle and pleasing appearance.

[0003] For wool or wool blended fabrics, one finishing treatment is that known as decatizing, in which the fabric piece is treated with saturated steam at preselected pressure and temperature and then stabilized by sudden cooling.

[0004] EP-B1-0 293 028 discloses a machine for the continuous decatizing of a fabric, comprising a cylindrical drum having a side wall covered with a textile sleeve which forms a first blanket. The fabric is partially wrapped around the sleeve and a second textile blanket is partially wrapped around the fabric. The machine also includes means capable of moving and tensioning the second blanket in order to compress the fabric against the sleeve and the side wall of the drum. In addition, the machine includes a sealed chamber containing saturated steam at preselected pressure and temperature for impregnating the fabric and so decatizing it. The chamber is located in a peripheral region, on the outside of and close to the drum.

[0005] The fabric which is unwrapped from the drum is subjected to sudden cooling, in order to stabilize it, in a cylinder located above the drum. The cylinder has a perforated side wall around which the fabric is partially wrapped and has an inner cavity connected to an aspirator. The aspirator draws in air from the outside and forms a radial centripetal stream of air that passes through the fabric and through the perforated wall of the cylinder. The fabric thus undergoes a sudden temperature drop which serves to stabilize it.

[0006] EP-B1-0 533 295 discloses a machine for the continuous decatizing and cooling of a fabric, comprising a rotating cylindrical drum and a fixed inner cylinder coaxial with the drum. The cylindrical drum has a perforated side wall covered with a sleeve of textile material which forms a first blanket. The fabric is partially wrapped around the sleeve and a second textile blanket is wrapped, again partially, around the fabric. The machine also includes means capable of moving and tensioning the second blanket in order to compress the fabric against the sleeve and the side wall of the drum. The fixed inner cylinder has a side wall which is radially spaced from the side wall of the drum and is provided with a perforated portion. Between the two side walls is an annular space that is subdivided into two sealed inner chambers. One inner chamber contains saturated steam at preselected pressure and temperature which, via the perforated wall of the drum, impregnates the fabric in order to decatize it. Another

inner chamber is located around the perforated portion of the wall of the inner cylinder and is connected to an aspirator. The aspirator draws in air from the outside and forms a radial centripetal stream of air that passes through the fabric and the perforated walls of the drum and of the inner cylinder. The fabric thus undergoes a sudden temperature drop which serves to stabilize it.

[0007] Both of the machines described are rather complicated and have high manufacturing, installing, maintenance and running costs.

[0008] The object of the present invention is to provide an improved machine and an improved method, compared with those known, for the continuous decatizing and stabilizing of a fabric.

[0009] In an initial aspect the invention relates to a machine for the continuous decatizing and stabilizing of a fabric, comprising

- a) a cylindrical drum having a side wall about which are wrapped a first blanket of textile material, said fabric and a second blanket of textile material,
- b) means capable of moving and tensioning the said second blanket in order to compress the said fabric against the said first blanket and the said side wall of the said drum,
- c) a sealed chamber associated to the said drum and containing saturated steam at preselected pressure and temperature for impregnating the said fabric, the said chamber being located in a first preselected peripheral region of the said drum, on the outside of and close to the said side wall, and
- d) a device capable of forming a stream of air for stabilizing the said fabric, characterized in that
- e) the said device capable of forming a stream of air is located in a second preselected peripheral region of the said drum, on the outside of and close to the said side wall, and
- f) the stream of air formed by the said device flows in a substantially tangential direction with respect to the said side wall of the said drum.

[0010] Advantageously, the said second peripheral region is located immediately after the said first peripheral region with respect to the advancing direction of the said fabric.

[0011] Preferably, the said device comprises at least one opening for the air having an air port arranged on the outside of and at a preselected distance from the said side wall of the said drum.

[0012] In particular, the said air port is arranged on the outside of the said second blanket and is substantially tangent to and in contact with it.

[0013] In addition, the said air port is substantially rectangular and has preselected width and length, the said length being substantially equal to the length of the said drum.

[0014] Preferably, the said device comprises a plu-

rality of openings for the air arranged side by side, having air ports arranged on the outside of and at a preselected distance from the said side wall of the said drum.

[0015] Advantageously, the said air ports are arranged on the outside of the said second blanket and are substantially tangent to and in contact with it.

[0016] In one embodiment, the said openings for the air are connected to an air aspirator and are capable of sucking air in order to form the said stream.

[0017] In another embodiment, the said openings for the air are connected to an air blower and are capable of emitting jets of air in order to form the said stream.

[0018] In particular, the said openings are connected to the said aspirator or to the said blower by respective pipes and manifolds and a respective conveying means.

[0019] Advantageously, the said first blanket is a sleeve which covers the said drum.

[0020] Preferably, the said chamber is in the form of a half-cylindrical tank provided with longitudinal and semicircular seals, the said longitudinal seals being pressed by air tubes to prevent leaks between the said tank on the one hand, and the said second blanket, fabric, first blanket and side wall of the said drum on the other, while the said semicircular seals are pressed by air tubes to prevent leaks between the semicircular edges of the said tank on the one hand, and the said second blanket, fabric, first blanket and semicircular edges of the side wall of the said drum on the other.

[0021] In addition, a half-cylindrical shell surrounds the said tank and forms an interspace containing further steam which maintains the said tank at a temperature such as to prevent condensation of the steam present in the said chamber.

[0022] Preferably, the said chamber is located substantially in two quadrants of the said drum and extends around an arc of circumference that subtends an angle of approx. 180°.

[0023] Advantageously, the said openings for the air are distributed around a preselected arc of circumference substantially concentric with the said drum.

[0024] In particular, the said openings for the air extend around an arc of circumference that subtends an angle of approx. 45°.

[0025] Preferably, the said openings for the air are positioned in a quadrant immediately following the quadrants in which the said chamber is located.

[0026] In a second aspect the invention relates to a process for the continuous decatizing and stabilizing of a fabric comprising the following steps:

- i) wrapping the said fabric around the side wall of a cylindrical drum,
- ii) treating the said fabric with saturated steam at preselected pressure and temperature in a first peripheral region of the said drum, on the outside of and close to the said side wall, and then

iii) treating the said fabric with a stabilizing stream of air, characterized in that

iv) in step iii) the said stream of air is formed in a second peripheral region of the said drum which is on the outside of and close to the said side wall, and flows in a substantially tangential direction with respect to the said side wall.

[0027] The decatizing treatment carried out with the machine and by the process of the invention gives unexpected results.

[0028] Although the reasons for these results have not been yet fully understood, it is thought that

1. The side wall of the drum, which is heated from the interior, supplies to the whole of the second blanket, the fabric and the first blanket, the heat required to encourage evaporation of the moisture and to accelerate the drying of the fabric, which is an important factor in stabilization.

2. The stabilizing stream of air is heated by the heat radiated by the side wall of the drum, thus increasing the ability to carry away the residual moisture from the combination of the second blanket, the fabric and the first blanket.

3. Moreover, in the specific case in which the stream of air is produced by an aspirator, the suction of the air would create a vacuum inside the openings such as to generate a thrust on the openings against the whole of the second blanket, the fabric and the first blanket; the consequent pressure transmitted to the fabric would favourably increase the squeezing action which has an important function in stabilization.

[0029] The results obtained are surprising when it is considered that those skilled in the art were of the opinion that the phase of stabilization had to be carried out by directing a stream of air through the fabric piece in a direction substantially perpendicular to the said piece.

[0030] At the same time, the machine according to the invention has a simple and compact structure. This makes it possible to keep down the costs of construction, intallation and maintenance. It also means that the decatizing treatment can be carried out in short times, with a favourable impact on running costs.

[0031] Features and advantages of the invention will now be explained with reference to embodiments illustrated by way of non-limiting example in the accompanying figures, in which

Fig. 1 is a cross section through a machine, embodied in accordance with the invention, for the continuous decatizing and stabilizing of a fabric;

Fig. 2 is a partial view on an enlarged scale of a cylindrical drum and of a steam-containing chamber of the machine shown in Fig. 1;

Fig. 3 is a partial view in section taken along the plane III-III in Fig. 1;

Fig. 4 is a partial view in section taken along the plane IV-IV in Fig. 1;

Fig. 5 is a partial view on an enlarged scale of a device capable of forming a stream of air, which forms part of the machine shown in Fig. 1;

Fig. 6 is a view in section taken along the plane VI-VI in Fig. 1;

Fig. 7 is a partial view on an enlarged scale of an opening for the air shown in Fig. 5;

Fig. 8 shows a variant of the machine shown in Fig. 1.

[0032] Figs. 1-4 show a machine for the continuous decatizing and stabilizing of a fabric. It comprises a cylindrical steel drum 1. The drum 1 has a side wall 2 and bases 3 to each of which is fixed an axial hub 4. The drum 1 is supported rotatably in a frame 17 by means of the hubs 4. The wall 2 is made of solid steel sheet and is heated internally by steam. The wall 2 is covered with a sleeve 5 of textile material, which constitutes a lower blanket. A fabric 6 is fed by a motorized roller (not shown) and wrapped around the sleeve 5 of the drum 1 together with an upper blanket 7 of textile material. The fabric 6 and the blanket 7 are advanced towards the drum 1 by a motorized roller 8. A roller 9 guides the fabric 6, which unwraps from the cylinder 1, towards a conveyor belt (not shown) which advances the fabric 6 towards a plaiter (also not shown). The blanket 7 is unwrapped from the sleeve 5 of the drum 1 by a motorized roller 10 and is guided to run around a closed loop, shown only in part, by tension rollers, such as that shown with 11. The roller 10 has a greater angular velocity than roller 8 so that the blanket 7 is subjected to a preselected tension and compresses the fabric 6 against the sleeve 5 of the drum 1. The drum 1 is motorized and is rotated at the same peripheral speed as the roller 8.

[0033] The fabric 6 and the blanket 7 are wrapped around the drum 1 through an angle of approx. 270° . The sleeve 5 and the blanket 7 are made of e.g. a needled felt of polyester and Nomex™ (an aramid fibre of the Kevlar™ family).

[0034] A sealed half-cylindrical chamber 12, containing saturated steam at preselected pressure and temperature, is located in a lower peripheral region of the drum 1, on the outside of and close to the side wall. The chamber 12 is formed by a half-cylindrical tank 13 having longitudinal 14 and 15 and semicircular 16 scraping seals. The longitudinal seals 14 and 15 are pressed by air tubes 18 and 19 to prevent leaks between the tank 13 on the one hand, and the whole of the blanket 7, fabric 6, sleeve 5 and side wall 2 of the drum 1 on the other. The semicircular seals 16 are pressed by air tubes 20 to prevent leaks between the semicircular edges of the tank 13 on the one hand, and the whole of the blanket 7, fabric 6, sleeve 5 and semi-

circular edges of the side wall 2 of the drum 1 on the other (Figs. 3 and 4). The half-cylindrical chamber 12 is located in the region of the two lower quadrants of the drum 1 and extends around an arc of circumference that subtends an angle of approx. 180° . The steam is fed into the chamber 12 via a manifold 21, two pipes 22 and 23 and sets of three pipes 24 and 25 each that feed into opposite sides of the chamber 12. The pipes 24 and 25 terminate in longitudinal channels 26 and 27. The channels 26 and 27 are provided with baffles 28 and 29 that cause separation of steam condensate and are connected to drainage pipes 30 and 31 which convey the condensate into a discharge pipe 32.

[0035] Saturated steam is sent into the chamber 12 at an adjustable pressure, variable from atmospheric pressure with a corresponding temperature of approx. 100°C , to a maximum relative pressure of between approx. 2.8-3.0 bar with a corresponding temperature of between approx. $142-144^\circ\text{C}$.

[0036] A half-cylindrical shell 33 surrounds the tank 13 and forms an interspace (pocket) 34 containing further steam which serves to maintain the steam present inside the chamber 12 at a temperature such as to prevent it from condensing.

[0037] The steam is fed into the interspace 34 through a pipe 35 and sets of pipes 36 and 37 which feed into opposite sides of the interspace. A discharge pipe 38 collects condensate which forms in the interspace 34.

[0038] The half-cylindrical tank 13 and the half-cylindrical shell 33 are mounted on the frame 17.

[0039] A suction device 40 capable of forming a stream of air for stabilizing the fabric 6, is located in an upper peripheral region of the drum 1, on the outside of and close to the side wall 2. The device 40 comprises suction openings 41 connected by pipes 43, manifolds 44 and a conveying duct 45, to an air aspirator 46. The aspirator 46 takes the form of a fan or an air pump.

[0040] The openings 41 have inlet ports 42 located close up to the side wall 2 of the drum 1 and practically contacting the blanket 7 (Figs. 5-7). Each inlet port 42 is substantially rectangular and has preselected width and length, the first being in the circumferential and the second in the longitudinal directions of the drum 1. The length of each inlet port 42 is substantially equal to the length of the drum 1.

[0041] The suction device 40 is located in a peripheral region which is after the peripheral region in which the chamber 12 is located, with respect to the advancing direction of the fabric 6. In particular, the suction openings 41 are positioned in a quadrant immediately following the quadrants in which the chamber 12 is located and extend around an arc of circumference which subtends an angle of approx. 45° .

[0042] When the machine is working, the fabric 6 wrapped around the drum 1 is impregnated by the steam coming from the chamber 12. The portion of fabric impregnated with steam is moved underneath the

suction device 40 where the openings 41, connected to the aspirator 46, suck air from the environment and form a stream of air which flows in a substantially tangential direction with respect to the side wall 2 of the drum 1. The stream of air permeates the fabric 6, carries away its residual moisture and causes a sudden lowering of its temperature which serves to stabilize it. In this way the fabric assumes the desired technical and aesthetic characteristics, such as dimensional stability, smooth handle and pleasing appearance.

[0043] Fig. 8 shows a variant of the decatizing and stabilizing machine of Fig. 1 in which identical parts are shown with the same numbers. In this case a blowing device 140 is associated to the drum 1. The blowing device 140 is capable of forming a stream of air with which to stabilize the fabric 6. The device 140 comprises a plurality of delivering openings 141 connected by pipes 143, manifolds 144 and a conveying duct 145, to an air blower 146. The blower 146 takes the form of a centripetal or reciprocating compressor.

[0044] The openings 141 have air outlet ports 142 located close up to the side wall 2 of the drum 1 and practically contacting the blanket 7 (Fig. 8).

[0045] The blowing device 140 performs a similar function to the suction device 40. The openings 141 are able to emit jets of air which form a stream flowing in a substantially tangential direction with respect to the side wall 2 of the drum 1. The stream of air permeates the fabric 6, carries away its residual moisture and causes a sudden lowering of its temperature which serves to stabilize it.

Claims

1. Machine for the continuous decatizing and stabilizing of a fabric (6), comprising

- a) a cylindrical drum (1) having a side wall (2) about which are wrapped a first blanket (5) of textile material, said fabric (6) and a second blanket (7) of textile material,
- b) means (8, 10) capable of moving and tensioning the said second blanket (7) in order to compress the said fabric (6) against the said first blanket (5) and the said side wall (2) of the said drum (1),
- c) a sealed chamber (12) associated to the said drum (1) and containing saturated steam at preselected pressure and temperature for impregnating the said fabric (6), the said chamber (12) being located in a first preselected peripheral region of the said drum (1), on the outside of and close to the said side wall (2), and
- d) a device (40; 140) capable of forming a stream of air for stabilizing the said fabric (6), characterized in that
- e) the said device (40; 140) capable of forming

a stream of air is located in a second preselected peripheral region of the said drum (1), on the outside of and close to the said side wall (2), and

f) the stream of air formed by the said device (40; 140) flows in a substantially tangential direction with respect to the said side wall (2) of the said drum (1).

2. Machine according to claim 1, characterized in that the said second peripheral region is located immediately after the said first peripheral region with respect to the advancing direction of the said fabric (6).

3. Machine according to claim 1, characterized in that the said device (40; 140) comprises at least one opening for the air (41; 141) having an air port (42; 142) arranged on the outside of and at a preselected distance from the said side wall (2) of the said drum (1).

4. Machine according to claim 3, characterized in that the said air port (42; 142) is arranged on the outside of the said second blanket (7) and is substantially tangent to and in contact with it.

5. Machine according to claim 3, characterized in that the said air port (42; 142) is substantially rectangular and has preselected width and length, the said length being substantially equal to the length of the said drum (1).

6. Machine according to claim 1, characterized in that the said device (40; 140) comprises a plurality of openings for the air (41; 141) arranged side by side, having air ports (42; 142) arranged on the outside of and at a preselected distance from the said side wall (2) of the said drum (1).

7. Machine according to claim 6, characterized in that the said air ports (42; 142) are arranged on the outside of the said second blanket (7) and are substantially tangent to and in contact with it.

8. Machine according to claim 6, characterized in that the said openings for the air (41) are connected to an air aspirator (46) and are capable of sucking air in order to form the said stream.

9. Machine according to claim 6, characterized in that the said openings for the air (141) are connected to an air blower (146) and are capable of emitting jets of air in order to form the said stream.

10. Process for the continuous decatizing and stabilizing of a fabric (6) comprising the following steps:

- i) wrapping the said fabric (6) around the side wall (2) of a cylindrical drum (1),
- ii) treating the said fabric (6) with saturated steam at preselected pressure and temperature in a first peripheral region of the said drum (1), on the outside of and close to the said side wall (2), and then
- iii) treating the said fabric (6) with a stabilizing stream of air, characterized in that
- iv) in step iii) the said stream of air is formed in a second peripheral region of the said drum (1) which is on the outside of and close to the said side wall (2), and flows in a substantially tangential direction with respect to the said side wall (2).

20

25

30

35

40

45

50

55

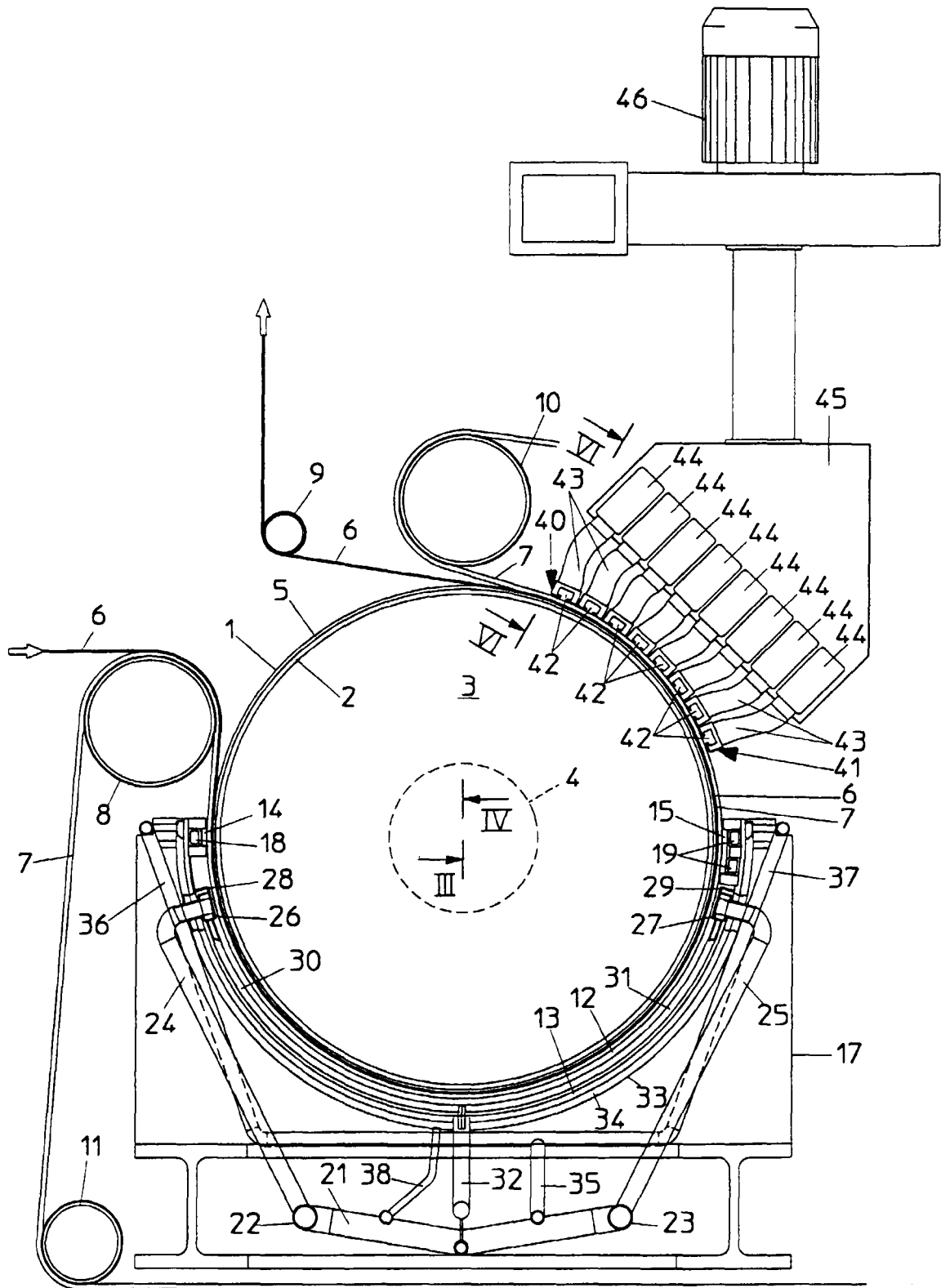
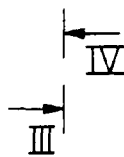
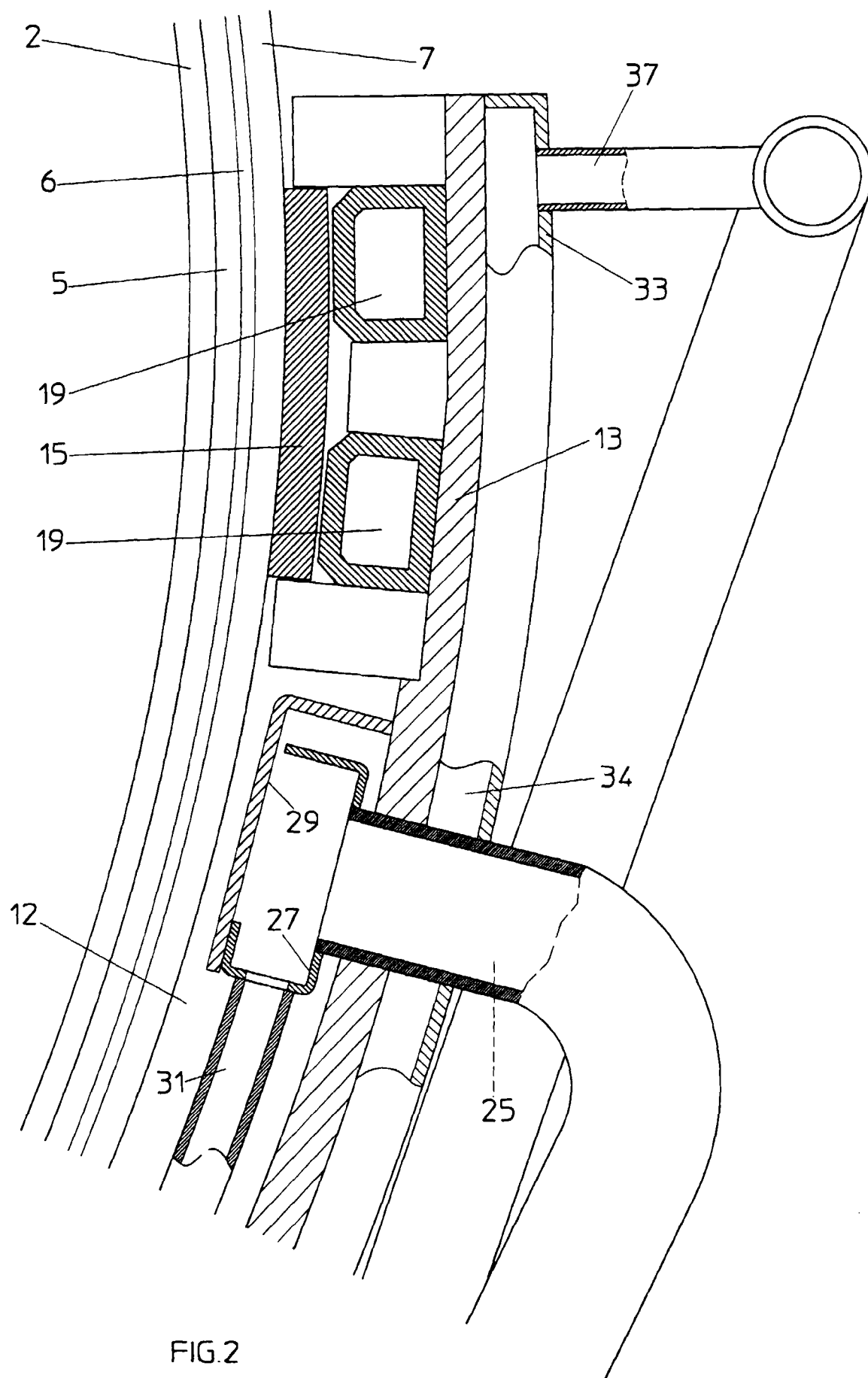


FIG.1





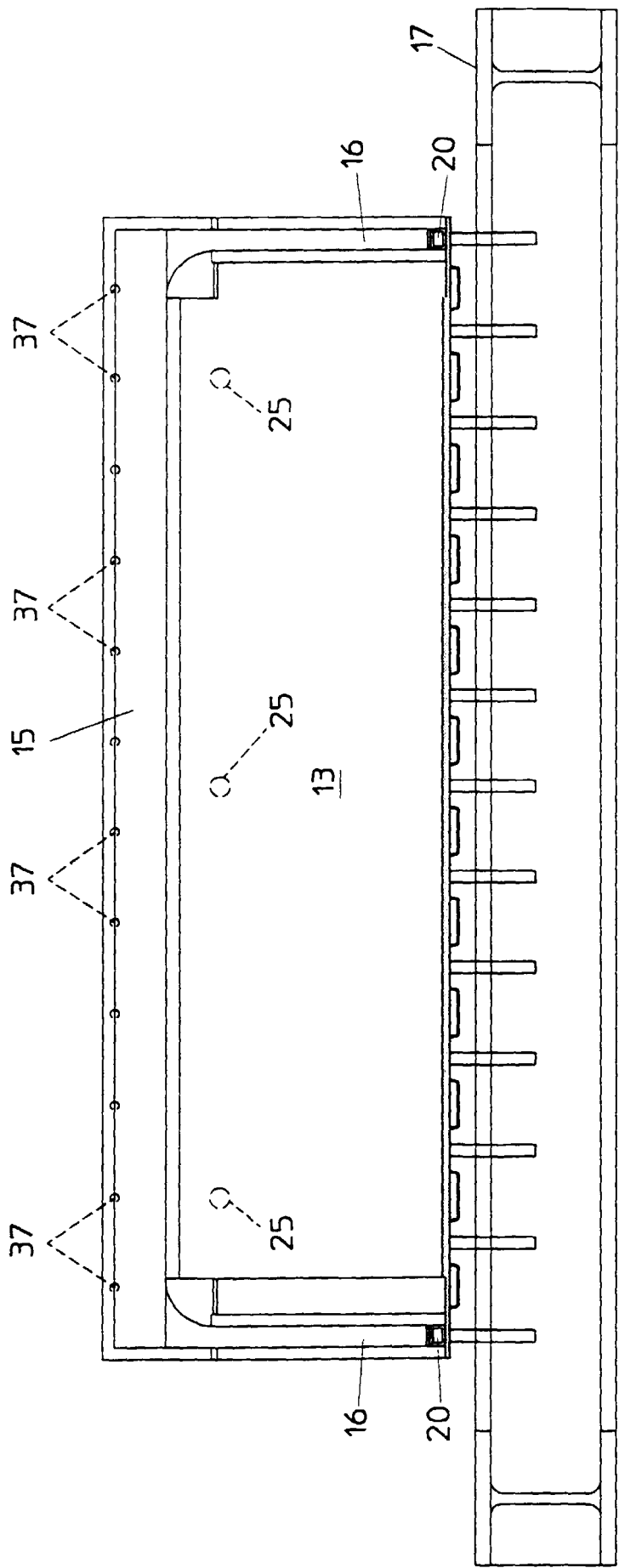


FIG.3

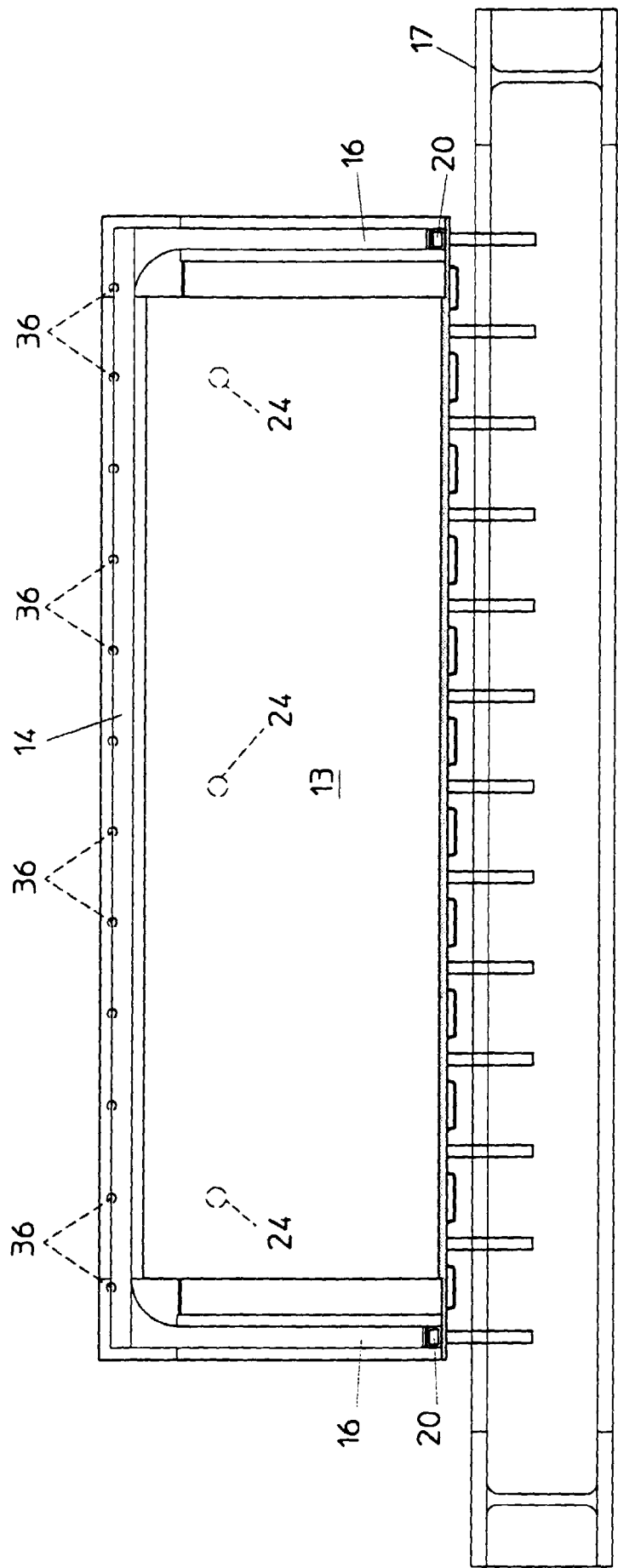


FIG. 4

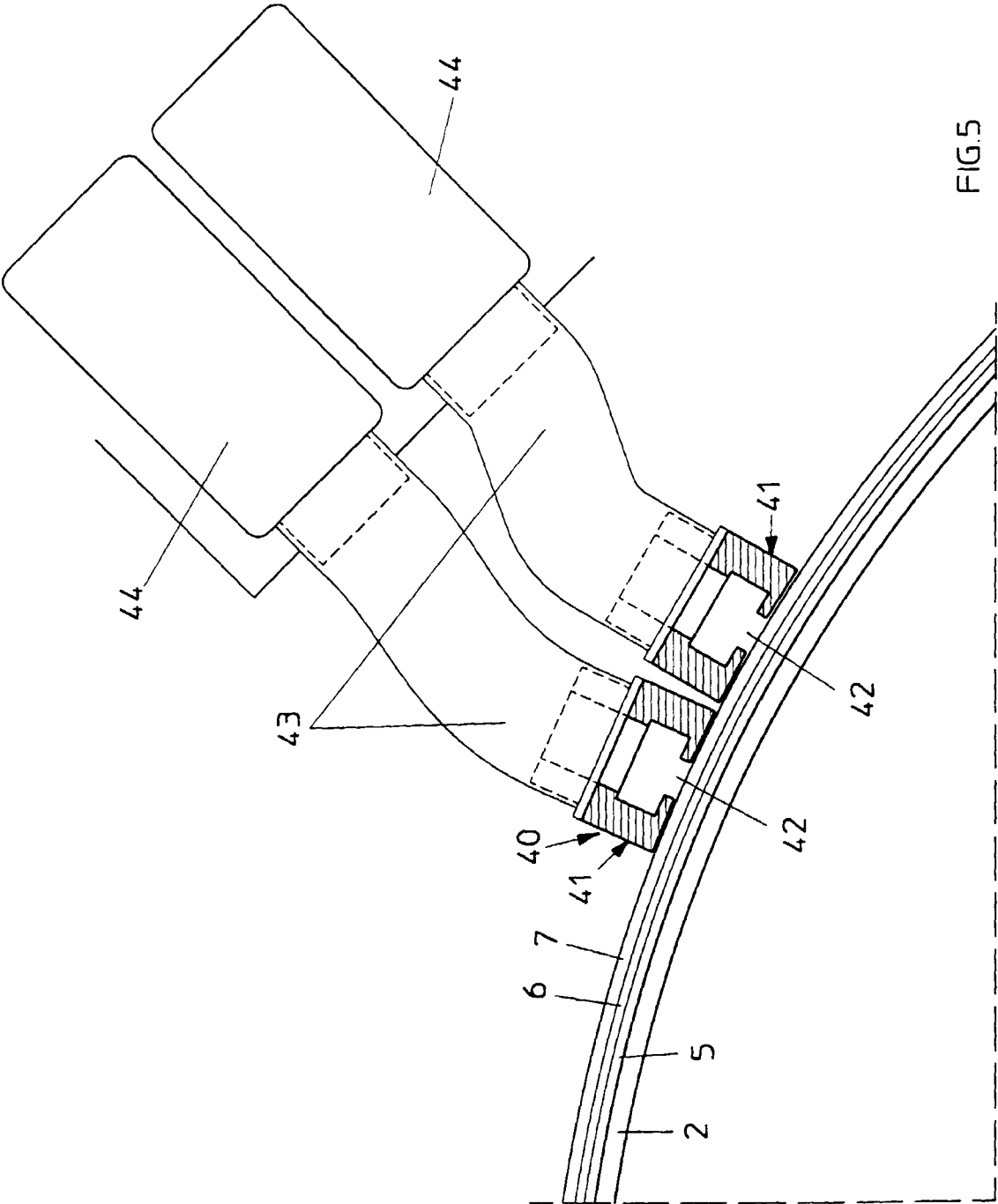


FIG. 5

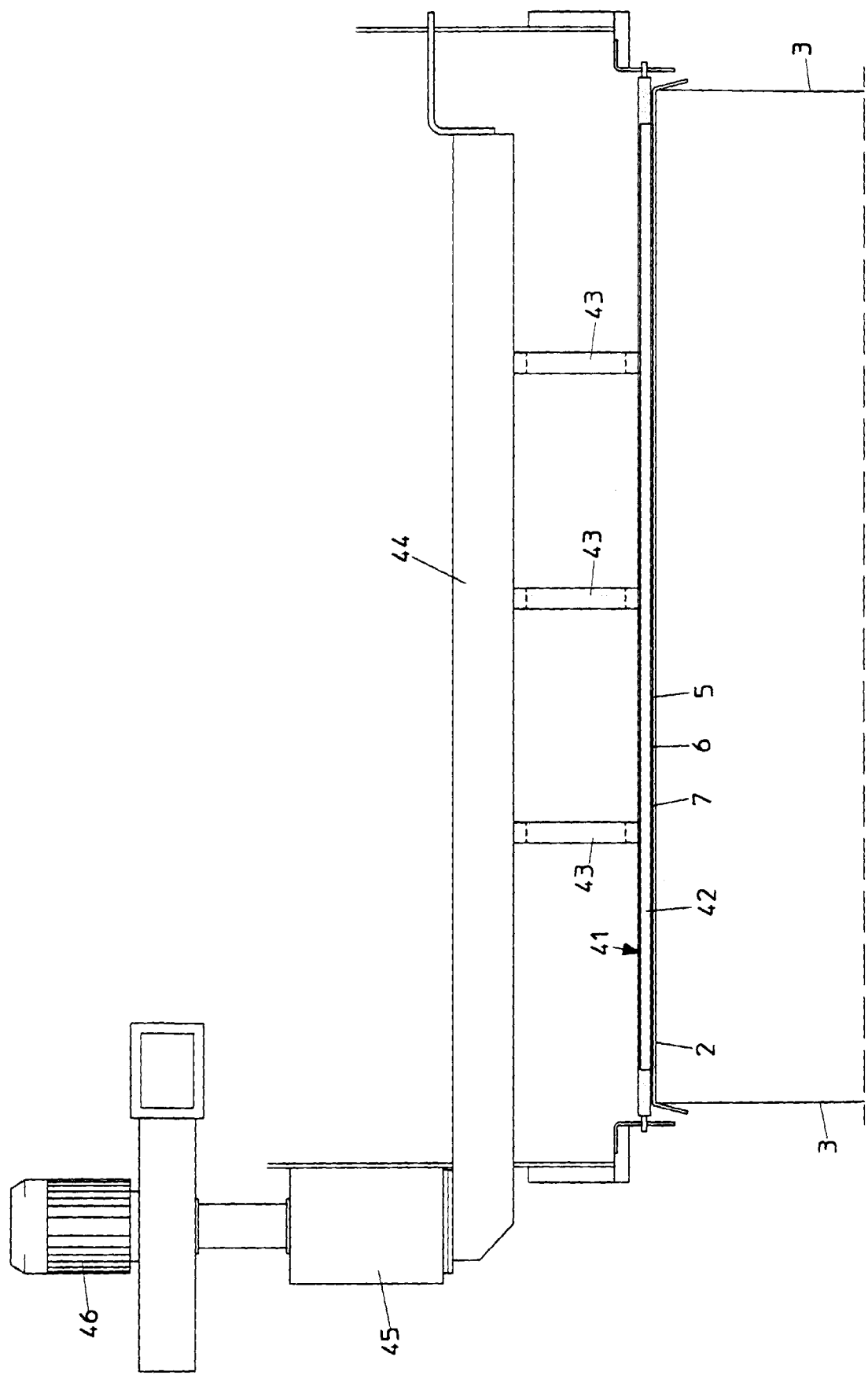


FIG. 6

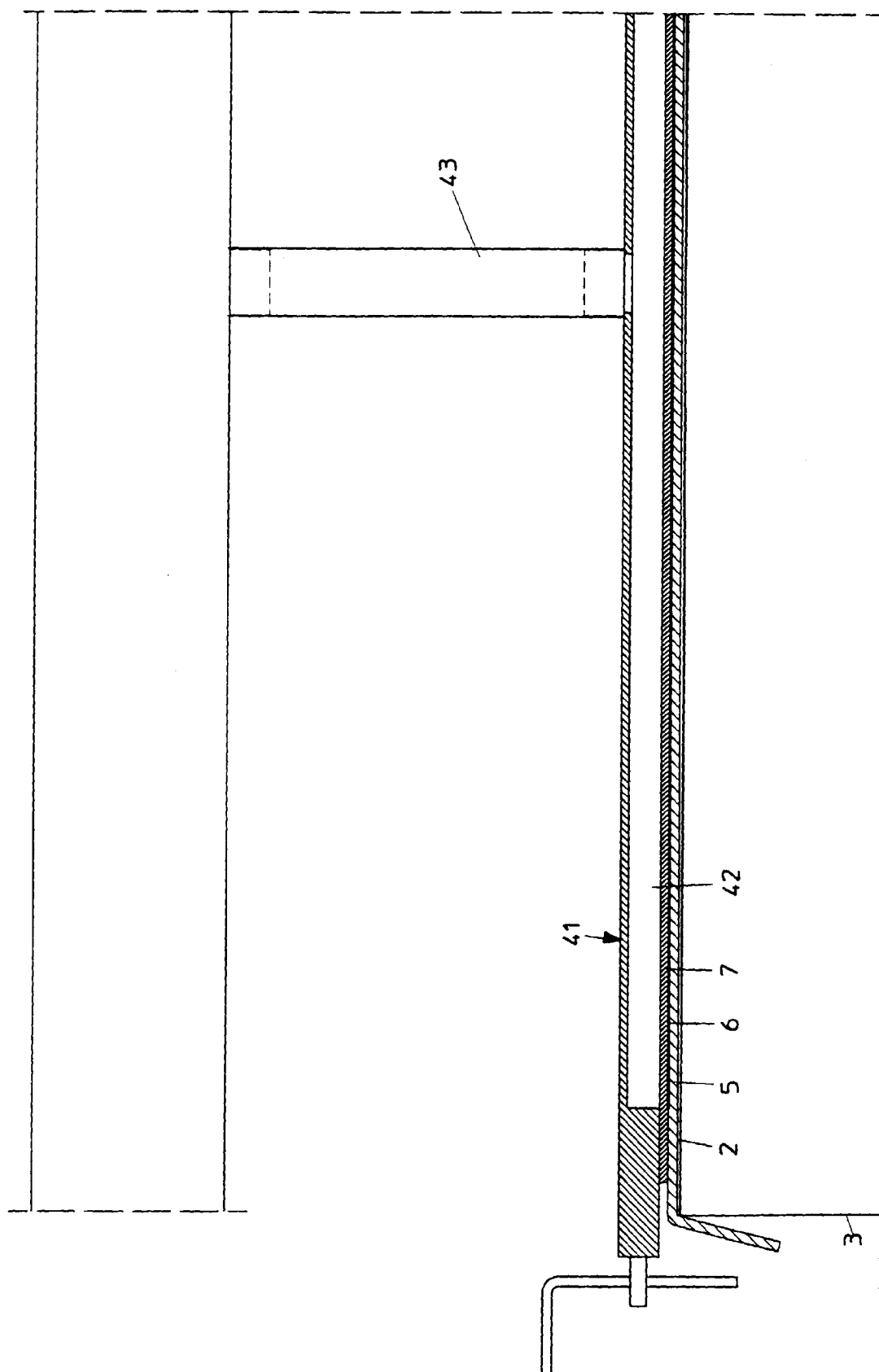


FIG. 7

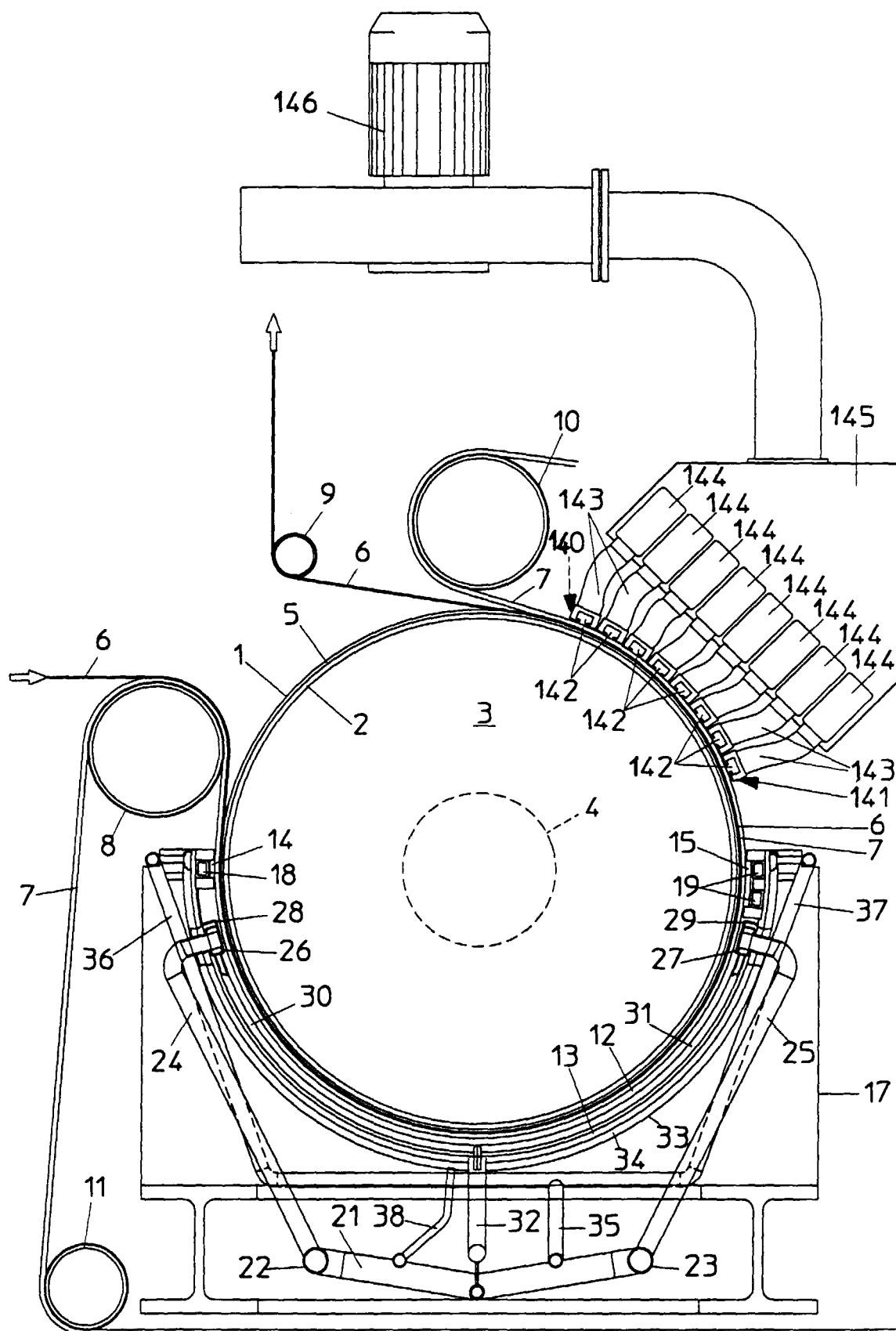


FIG. 8



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 83 0768

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
D,A	EP 0 533 295 A (SPEROTTO RIMAR S.P.A.) 24 March 1993 * claims 1,12,13; figures 1,3 * ---	1,2,10	D06C7/00 D06C15/06
D,A	EP 0 293 028 A (SPEROTTO RIMAR S.P.A.) 30 November 1988 * column 3, line 10 - line 51 * -----	1,10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			D06C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 27 April 1999	Examiner Goodall, C
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04/C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 83 0768

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

27-04-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0533295 A	24-03-1993	IT 1251330 B	08-05-1995
		DE 69205788 D	07-12-1995
		DE 69205788 T	05-06-1996
		ES 2081558 T	01-03-1996
		JP 5195416 A	03-08-1993
		US 5301521 A	12-04-1994
EP 0293028 A	30-11-1988	DD 284711 A	21-11-1990
		DE 3874963 A	05-11-1992
		JP 2788031 B	20-08-1998
		JP 63312000 A	20-12-1988
		US 4858448 A	22-08-1989