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(12) # EUROPEAN PATENT SPECIFICATION

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(54) **System to obtain a reciprocal differentiated pressure in the contact between two cylinders in looms.**

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Description

This invention concerns a system to improve the contact pressure between two rollers — particularly the cloth-pulling roller and the cloth-pressing bar of a loom — allowing to obtain a proper pressure of mutual contact along the whole length of said rollers.

It is known that the productiveness of modern weaving machines depends not only on the speed, but also on the width of the weaving: there is hence a trend to increase the length of weaving machines.

This obviously involves structural problems connected with the loads which the machines and their parts have to bear.

A particular problemn is that of warp yarn tension and of the fabric adhering onto the cloth-pulling roller, this being an essential condition to obtain the "right feel" in the fabric and prevent even serious weaving defects (mainly determined by a change in the number of wefts per centimeter).

In fact, to obtain an increased weaving width, a longer weaving loom is required, whereby the loom structure becomes more flexible. During working, this may reduce — even up to eliminating it — the grip of the fabric onto the cloth-pulling roller which, in the central part of the loom, tends to move apart from the cloth-pressing bar apt to guarantee said grip. Furthermore, the increased length of the cloth-pulling roller and of the cloth-pressing bar is apt to limit the action, in the central part of the loom, of any lateral pressure members: this means that, at the centre of the loom, the grip of the fabric onto the roller is merely obtained thanks to the weight of the cloth-pressing bar, which is often insufficient.

Some attempts to overcome these drawbacks have been made in the past, but with scarce success. In particular, according to the German Patent No. 2.335.638, it has been provided to interpose an endless belt between the cloth-pulling roller and the cloth-pressinig bar, in order to obtain a constant regular grip of the fabric onto the roller.

The present invention now proposes to fully solve this problem by providing a system which allows to obtain a proper pressure of mutual contact — between the cloth-pulling roller and the cloth-pressing bar — along the whole length of the loom, whereby the fabric perfectly adheres onto the roller around which it winds while being produced, even at the centre of the loom or in correspondence of any critical parts thereof.

For this purpose, the invention provides a system to improve the mutual contact between two rollers, characterized in that one of said rollers, particularly the cloth-pressing bar, is formed of a tube rotating about its own axis, and of an inner structure in said tube, which elastically presses against the inner surface thereof with a force directed to the line of contact between the rollers, the force exerted by said inner structure on the inner surface of the tube varying along the length of the roller.

The system according to the invention can be realized in a wide variety of embodiments, some of which are illustrated, by mere way of non-limiting example, in the accompanying drawings, in which:

Fig. 1 is a longitudinal view of a unit comprising a cloth-pulling roller and a cloth-pressing bar according to a first embodiment of the system of the present invention;

Figs. 2 and 3 are side views showing the assembly of the elements forming the cloth-pressing bar of the unit of fig. 1;

Fig. 4 shows a variant of the system according to the invention illustrated in figs. 1 to 3;

Fig. 5 is a longitudinal view of another embodiment of the system according to the invention, of which:

Fig. 6 shows a variant;

Fig. 7 is a longitudinal view of a still further embodiment of the system according to the invention;

Fig. 8 is a side view showing the assembly of the cloth-pressing bar of the embodiment of fig. 7;

Fig. 9 is a longitudinal view of a cloth-pulling roller and cloth-pressing bar unit, according to a fluid pressure operated embodiment of the system according to the invention; and

Figs. 10 and 11 are side views showing some details of the system of fig. 9, fig. 11 being on an enlarged scale.

With reference to figures 1 to 3, the system according to the invention comprises a cloth-pulling roller 1, of conventional characteristics, to which there is associated a cloth-pressing bar 2 formed: of an external tube 3, provided with a suitable covering and mounted rotatable on two end supports 4, of a metal bar 5, which is elastically deformed in respect of its originally bent configuration and is arranged inside the tube 3, fixedly mounted therein by means of two pressing end supports 6, and of a bush 7, interposed at the centre of the unit between the bar 5 and the tube 3, so as to impart a pressure on this latter, while allowing the rotation thereof.

The two supports 4 for the tube 3 each comprise a shell 8, having an end pivoted in 9 and housing into a suitable seat at its centre one end of the tube 3, the other end of said shell 8 being subject to the action of a locking setscrew 10, by way of a spring 11. The supports 6 each comprise a metal lever 12, having an end pivoted in 13 and housing at the centre one end of the bar 5, the rotation of which is prevented by suitable means 12A, the other end of said lever 12 being subject to the action of a locking setscrew 14.

Originally, the bar 5 has a deeply curved configuration, in respect of which it is elastically deformed by being bent until it can be inserted — substantially rectilinear — into the tube 3.

Herein it is kept bent thanks to the supports 6, thereby imparting a strong elastic action of pressure onto the tube 3, through the bush 7; this guarantees a highly efficient and continuous contact between the tube 3 and the cloth-pulling roller 1, in the central part of said roller and of the loom (this part usually being the critical area where the structure and geometrical confriguration of the cloth-pressing bar are likely to vary).

Since the critical area of contact between the two rollers 1 and 2 may obviously vary according to the structural characteristics of the loom, to its way of working, to the work being performed, and so on — thereby differing from the area subjected to the pressure of the bush 7 — it is understood that said bush 7 may have a varying length, or may even be replaced by two or more bushes, according to requirements.

The embodiment of the system according to the invention, shown in figure 4, illustrates the use of two bushes 15 and 16, suitably spaced and interposed between the bar 5 and the tube 3 of the cloth-pressing bar 2, in the central part of the loom.

In the embodiment of figure 5, the cloth-pressing bar 2 again comprises an external rotating tube 3 cooperating with the cloth-pulling roller 1; however, the unit comprising the bar 5 and the bush 7 (solution of figure 1) has been replaced by a barrel-shaped bar 17, elastically bent and kept so deformed by the supports 6, whereby its generatrix contacting the tube 3 results substantially rectilinear. The bar 17 produces the same effect as the aforespecified unit, thereby ensuring a proper and continuous contact between the cloth-pressing bar 2 and the cloth-pulling roller 1.

It can be easily understood that, in the embodiment of figure 5, the function of the supports 4 for the tube 3 is not essential, as the position of said tube can be guaranteed by the assembly of the bar 17. Figure 6 therefore illustrates a variant of the embodiment of figure 5, wherein said supports have actually been eliminated.

The embodiment shown in figures 7 and 8 is somewhat different from the previous embodiment of the system according to the invention. In this case, the cloth-pressing bar 2 is obtained by associating to a tube 3 — rotating on end supports, as in the case of figure 1 — a rectilinear bar 18 having, throughout its length, a projecting profile 19 which is suitably shaped in correspondence of the areas whereon a supplementary pressure is required. Said bar 18 is mounted with its ends 20, external to the tube 3, rotating on supports 21, and it is subjected to torsion by screws 22 acting on levers 23 which are keyed on said bar close to its ends (see figure 8); the screws 22 screw into proper seats fixed on the loom casing, as shown in 24.

The action of the projecting profile 19 of the bar 18 against the inner wall of the tube 3 guarantees a proper continuous contact between the cloth-pressing bar 2 and the cloth-pulling roller 1.

According to a still further embodiment of the system according to the invention — illustrated in figures 9 to 11 — the structure of the cloth-pressing bar 2 comprises a tube 29, rotating within fixed end supports 30, and a fixed tube 31 mounted inside said tube 29. Two pluralities of elements 32 radially project from the fixed tube 31 (figures 9 and 10), said elements being mounted as pistons (see enlarged detail of figure 11) along a generatrix of said tube 31 and being apt to press against the inner wall of the tube 29. The elements 32 are distributed according to a law determined by the contact pressure required between the rollers 1 and 2 along the different parts of the loom; as clearly shown in figure 9, said distribution is uneven, since a greater number of said elements is provided in correspondence of the central part of the loom. Fluid under pressure is sent into the properly sealed fixed tube 31, to drive the elements 32 partially out of their seats in the wall of said tube and push them against the rotating tube 29, as indicated by the arrow 33 in figure 11. Though not shown, this embodiment will evidently provide for sealing means, for the fluid under pressure, between the elements 32 and the seats in the wall of the fixed tube 31, wherein said elements are mounted slidable.

This produces an effect of elastic deformation along the area of the cloth-pressing bar 2 contacting the cloth-pulling roller 1, which allows to suitably adjust the pressure of mutual contact between said rollers, according to the object of the present invention.

Claims

1. System to improve the mutual contact between two rollers in a weaving loom, characterized in that one of said rollers, particularly the cloth-pressing bar (2), is formed of a tube (3, 29) rotating about its own axis, and of an inner structure (5, 17, 18, 31) in said tube (3, 29), which elastically presses against the inner surface thereof with a force directed to the line of contact between the rollers, the force exerted by said inner structure on the inner surface of the tube varying along the length of the roller.

2. System as in claim 1, wherein said inner structure comprises an elastically deformed metal bar (5) and at least one bush (7) mounted thereon and pressing against the inner wall of said tube (3).

3. System as in claim 1, wherein said inner structure comprises a barrel-shaped bar (17), having a geometrical configuration which varies along its axis.

4. System as in claim 1, wherein said inner structure comprises a rectilinear metal bar (18), rotating on end supports (21) and having, throughout its length, a suitably shaped projecting profile (19) apt to press against the inner wall of the tube (3), means (22, 23) being provided to adjust the angular position of the bar (18) in respect of said tube (3).

5. System as in claim 1, wherein said inner

structure comprises a tube (31) and at least one plurality of pressure elements (32) radially projecting therefrom and operated by fluid pressure means.

6. System as in claims 1 to 5, wherein said cloth-pressing bar (2) comprises: a tube (29) rotating on fixed end supports (30); a fixed tube (31) mounted inside said tube (29); at least one plurality of pressure elements (32), mounted as pistons along a generatrix of said fixed tube (31) and radially projecting therefrom, said elements (32) being apt to press against the inner wall of the rotating tube (29); and means sending fluid under pressure into said fixed inner tube (31), to cause said elements (32) to press against said tube (29).

7. System as in claim 7, comprising two pluralities of pressure elements (32), mounted along two generating lines of said fixed tube (31).

Patentansprüche

1. System zur Verbesserung des gegenseitigen Kontakts zwischen zwei Walzen einer Webmaschine, dadurch gekennzeichnet, daß die eine der Walzen, insbesondere der Warenbaum (2), in Form eines um seine eigene Achse rotierenden Rohres (3, 29) mit einem Innenaufbau (5, 17, 18, 31) ausgebildet ist, der elastisch gegen die Innenfläche des Rohres mit einer Kraft drückt, die auf die Kontaktlinie zwischen den Walzen gerichtet ist, wobei die von dem Innenaufbau auf die Innenfläche des Rohres ausgeübte Kraft entlang der Länge der Walze variiert.

2. System nach Anspruch 1, wobei der Innenaufbau eine elastisch deformierbare Metallstange (5) und wenigstens eine auf dieser montierten und gegen die Innenfläche des Rohres (3) drükkende Buchse (7) aufweist.

3. System nach Anspruch 1, wobei der Innenaufbau eine tonnenförmige Stange (17) aufweist, deren geometrische Ausbildung entlang der Achse variiert.

4. System nach Anspruch 1, wobei der Innenaufbau eine geradlinige Metallstange (18) aufweist, die in Endlagern (21) dreht und über ihre Länge ein geeignet geformtes vorstehendes Profil (19) aufweist, das zum Drücken gegen die Innenwand des Rohres (3) ausgebildet ist, und Mitteln (22, 23), die vorgesehen sind, um die Winkelposition der Stange (13) in bezug auf das Rohr (3) einzustellen.

5. System nach Anspruch 1, wobei der Innenaufbau ein Rohr (31) und wenigstens eine Mehrzahl von Druckelementen (32) aufweist, die sich radial von diesem weg erstrecken und durch Fluiddruckmittel betrieben werden.

6. System nach Anspruch 1 bis 6, wobei der Warenbaum aufweist: ein in festen Endlagern (30) rotierendes Rohr (29), ein festes Rohr (31), das auf der Innenseite des Rohres (29) montiert ist; wenigstens eine Mehrzahl von Druckelementen (32), die als Kolben entlang einer Erzeugenden des festen Rohres (31) sich von dieser radial weg erstreckend montiert sind, wobei die Elemente (32) zum Drücken gegen die Innenfläche des rotierenden Rohres (29) eingerichtet sind; und Mitteln zum Ausbringen eines Druckfluids in das feste innere Rohr (31), um ein Drücken der Elemente (32) gegen das Rohr (29) zu verursachen.

7. System nach Anspruch 6, mit zwei Gruppen von Druckelementen (32), die entlang der beiden Erzeugenden des festen Rohres (31) montiert sind.

Revendications

1. Système pour améliorer le contact mutuel entre deux rouleaux dans un métier à tisser, caractérisé en ce que l'un des rouleaux, en particulier le barreau (2) servant à presser le vêtement, est formé d'un tube (3, 29), monté à rotation autour de son axe, et d'une structure interne (5, 17, 18, 31) logée dans le tube (3, 29), et qui sollicite élastiquement par pression la surface interne de ce tube, avec une force dirigée vers la ligne de contact entre les rouleaux, la force exercée par la structure interne sur la surface interne du tube variant sur la longueur du rouleau.

2. Système selon la revendication 1, dans lequel la structure interne comprend un barreau métallique déformé élastiquement (5) et au moins un manchon (7) monté sur celui-ci et qui sollicite par pression la paroi interne du tube (3).

3. Système selon la revendication 1, dans lequel la structure interne comprend un barreau (17) conformé en canon, qui possède une configuration géométrique qui varie le long de son axe.

4. Système selon la revendication 1, dans lequel la structure interne comprend un barreau métallique rectiligne (18) monté à rotation sur des supports d'extrémité (21) et possédant, sur sa longueur, un profil (19) en saillie conformé de façon appropriée pour solliciter par pression la paroi interne du tube (3), des moyens (22, 23) étant prévus pour ajuster la position angulaire du barreau (18) par rapport au tube (3).

5. Système selon la revendication 1, dans lequel la structure interne comprend un tube (31) et au moins une pluralité d'éléments presseurs (32) en saillie radialement à partir de celui-ci et actionné par des moyens à pression de fluide.

6. Système selon les revendications 1 à 5, dans lequel le barreau (2) exercant une pression sur le vêtement comprend: un tube (29) monté à rotation sur des supports d'extrémité fixes (30), un tube fixe (31) monté à l'intérieur du tube (29), au moins une pluralité d'éléments presseurs (32) montés à la façon de pistons le long d'une génératrice du tube fixe (31) et en saillie radialement à partir de celui-ci, les éléments (32) étant adaptés pour solliciter par pression la paroi interne du tube rotatif (29) et des moyens dirigeant un fluide sous pression à l'intérieur du tube interne fixe (31), pour conduire les éléments (32) à solliciter par pression le tube (29).

7. Système selon la revendication 6, comprenant deux séries d'éléments presseurs (32) montés le long de deux génératrices du tube fixe (31).

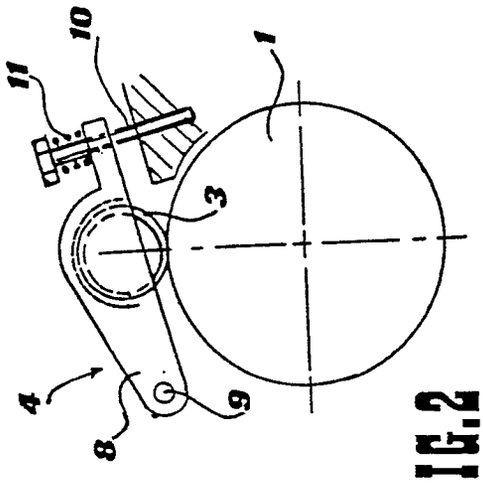

FIG.2

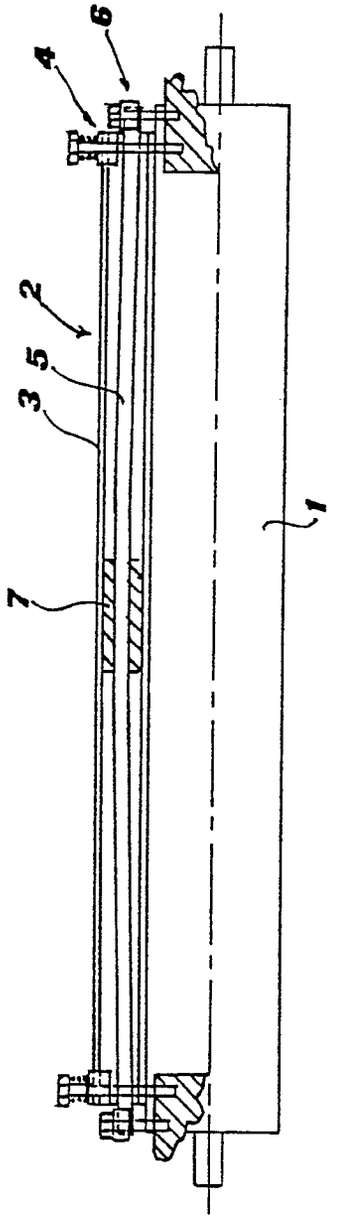

FIG.1

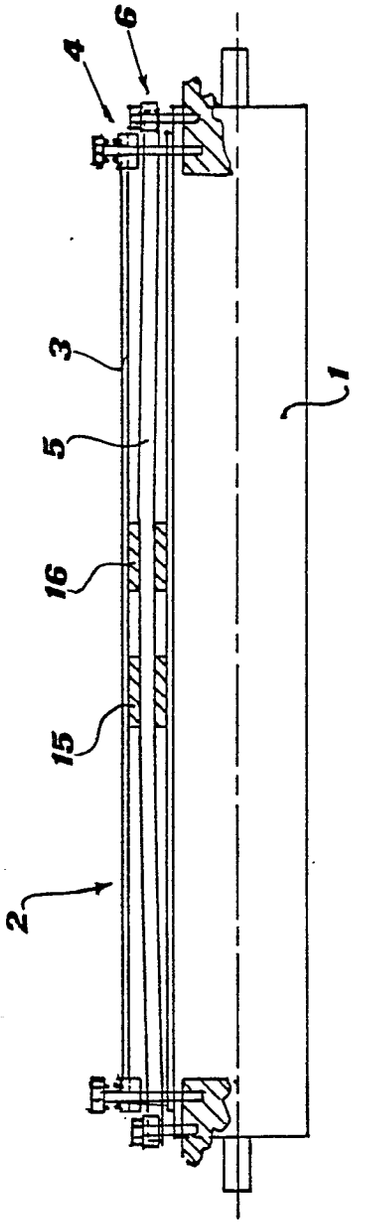

FIG.4

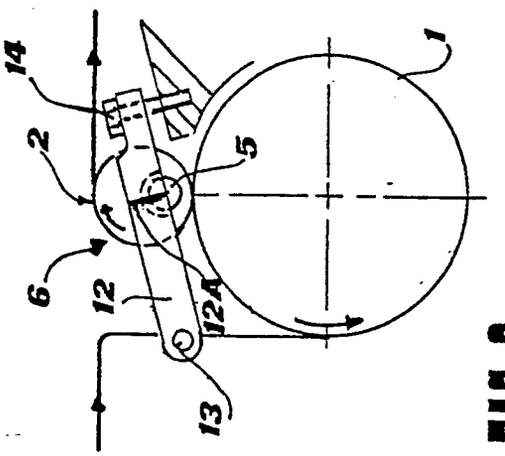

FIG.3

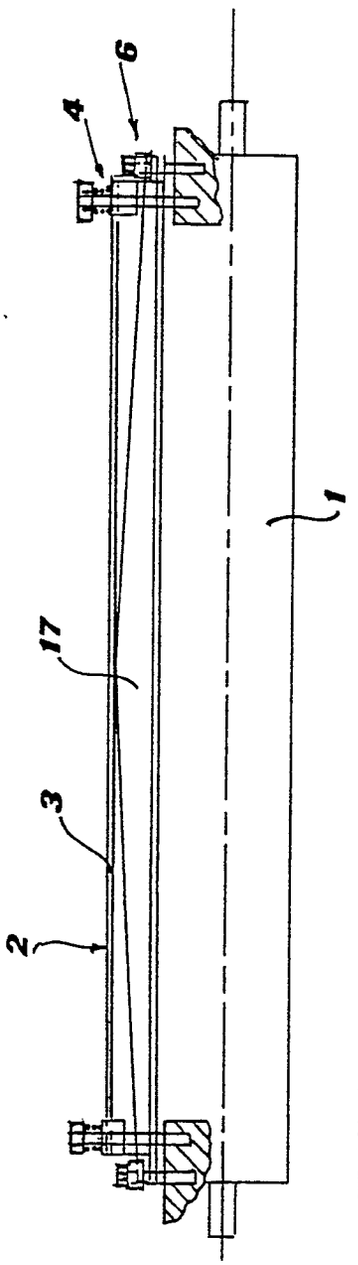

FIG.5

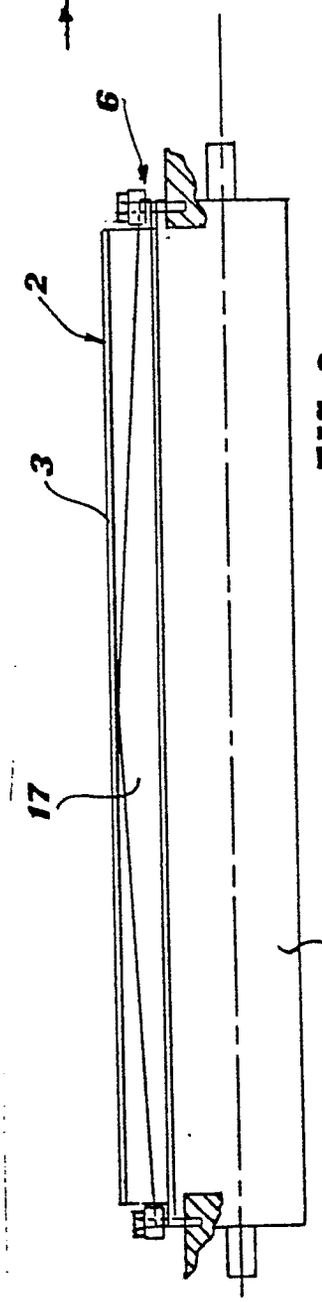

FIG.6

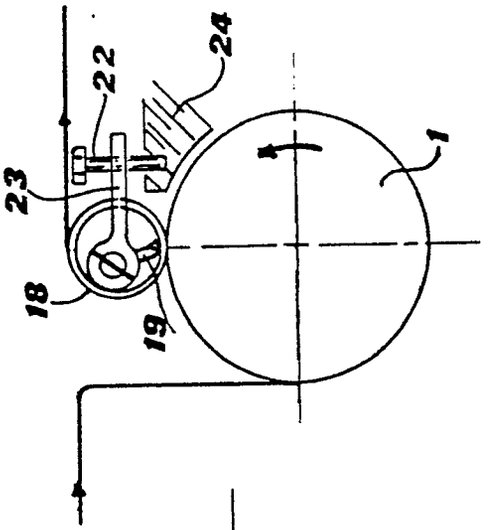

FIG.8

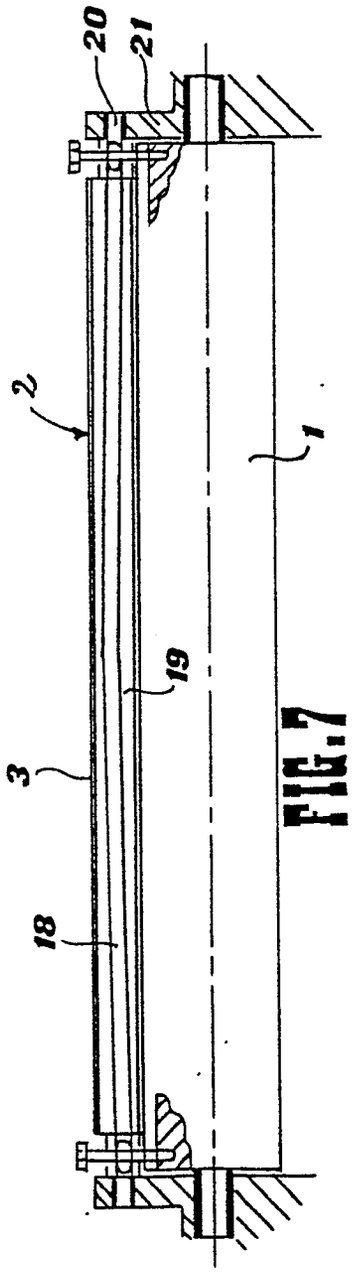

FIG.7

FIG.9

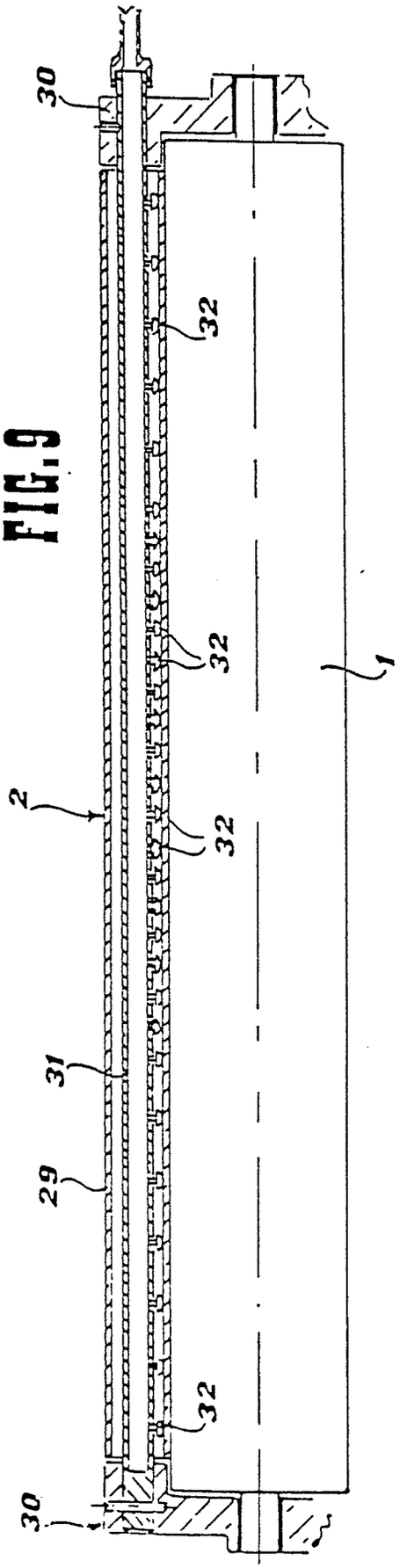

FIG.11

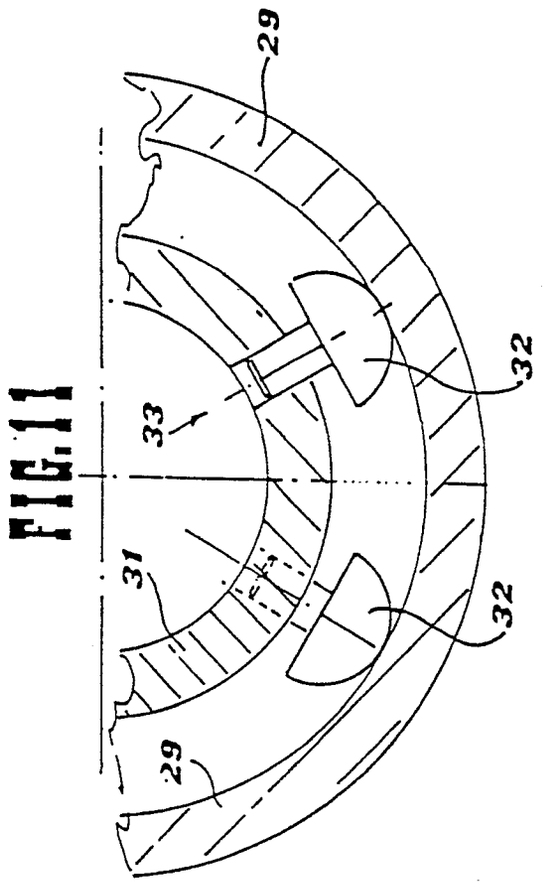

FIG.10