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(54) **Machine for the scouring and bleaching of webs of fabric and the like**

(57) Into a machine for the treatment of webs of fabric, preferably scouring and bleaching, there is introduced in combination a wringing unit (6) prior to entry into the treatment vat of the machine, for the application of a vacuum to the fabric (2) to be continuously treated, and an arrangement (11,12) for forced passage of the treatment liquid through the web of fabric (2), in a transverse direction to the web of fabric (2) being treated, from an entry face of the web of fabric (2) to the opposed face of the same, which is the liquid outlet face, during the displacement of the web of fabric (2) in the direction of its longitudinal axis, the passage of the liquid being produced by the action of forced suction by means of a liquid suction system.

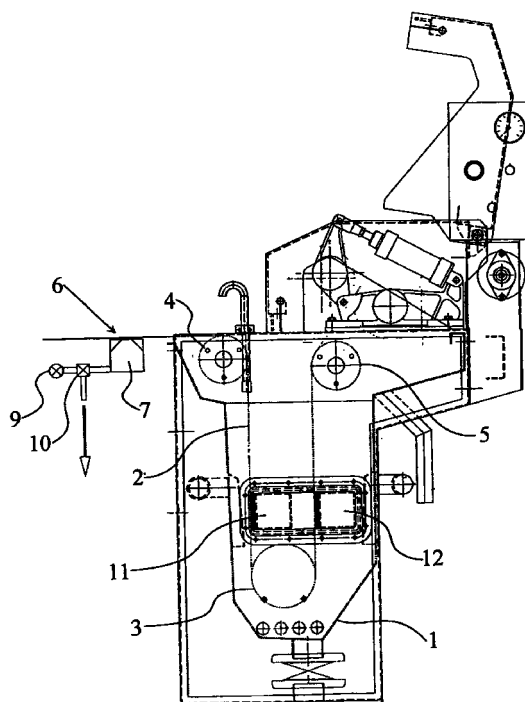


FIG. 1

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Description

[0001] The present invention is intended to disclose some improvements to textile machines for scouring, dyeing and washing webs of fabric and the like.

[0002] As is known, at present full width dyeing processes are carried out in which the machine operates by depletion, that is to say, the web of fabric passes through different rollers and is submerged in a vat which contains the treatment liquid, for example, a colouring agent. These are the machines known traditionally as hydraulic jiggers.

[0003] Because of the characteristics of the methods known at present, the machines used for carrying them out have a reduced productivity and likewise have drawbacks in the treatment of delicate webs of fabric such as rayon and acetates, owing to the actual form of working of the machine and the irregularities of tension produced in the web of fabric. In order to remedy the said drawbacks, the present invention provides means for obtaining a much more intense treatment by producing a vacuum effect inside the machine, which causes the penetration of the bath liquid into the web of fabric to be regulated electronically, constituting a very innovative technical solution, and likewise the machine has an electronic control for the drive cylinders for working with the web of fabric at a constant velocity and tension, further combining it with a mechanism for minimizing the turbulence which the return of the bath liquid can produce after having been drawn through the web of fabric by means of suction tubes arranged within the liquid.

[0004] Likewise, the improvements of the present invention are intended to obtain the result that the webs of fabric, on leaving the machine, have a much more reduced water content than is at present customary in this type of machine.

[0005] The improvements of the present invention are based on increasing to a very high degree both the prior wringing of the web of fabric before its entry into the treatment vat and also the effectiveness of the treatment within the machine. In this way it is possible to take the web of fabric out of the machine with a much reduced excess of water, for example with a water content of the order of 105% compared with the much higher values which are possible at present with the known machines, which vary around 130%.

[0006] The improvements of the present invention comprise combining a vacuum device prior to the entry into the machine, over which the web of fabric is caused to pass, making it possible to reduce the water content on entry to approximately 55%, in combination with an assembly for drawing the treatment liquid through the web of fabric by means of tubular forced suction elements of a system which comprises suction pumps and an intermediate tank for closing the circuit between the treatment vat, the web of fabric lying tangentially on grilles of the suction tubes, the actual suction tubes and the system of pump and intermediate tanks from which

the treatment liquid will return again to the vat.

[0007] For greater understanding thereof, diagrammatic drawings of an embodiment of the improvements of the present patent are provided by way of an explanatory non-limiting example.

Figure 1 shows a simplified view in elevation and in section of a machine which incorporates the improvements of the present invention.

Figure 2 shows a diagrammatic plan view of the same machine as Figure 1.

Figure 3 shows a view in elevation, from one end, of the same machine as Figures 1 and 2.

Figure 4 is a view in front elevation of a second embodiment of the present improvements showing diagrammatically the arrangement of the principal elements.

Figure 5 is a detailed view showing one of the cylinders and its bearings.

Figure 6 shows a plan view illustrating the suction arrangement of the vat.

[0008] A machine which incorporates the present improvements comprises a vat 1 through which is passed a web of fabric 2 guided by rollers, among which have been indicated the bottom roller 3 and also the rollers of the upper part of the vat 4 and 5, the said vat being filled up to a predetermined level with the treatment liquid to which the web of fabric is subjected. The improvements comprise especially two groups of technical means: a) the arrangement of a vacuum wringing assembly 6 at the entry of the machine, which comprises diagrammatically a chamber 7 provided with an upper region 8 in the form of a flat grille or other type of grille and a vacuum source 9, for example a vacuum pump or other system, with a purging means 10, for the purpose of ensuring that the water content of the web of fabric at the entry of the machine is reduced to a value which is approximately between 40 and 70% and preferably approximately 55%, and: b) the passage of the web of fabric inside the treatment vat, where it passes in front of the tubular elements 11 and 12 which form part of a liquid passage circuit which can be seen in more detail in Figure 2, in which can be seen the pump 13, as well as the manifold pipe 14 intended to be connected to the tubular elements 11 and 12, causing the treatment liquid to return by means of the pipe 15 towards the pump which, by way of a heating means or intermediate tank 16, will cause it to pass by means of the pipe 17 back to the treatment vat 1 again.

[0009] The tubular pipes 11 and 12 may have any desired shape, for example square, having lateral faces equipped with grilles or grooves to permit the forced passage of the liquid through the web of fabric, thus increasing the effectiveness of the treatment.

[0010] The arrangement shown will make it possible to pass the liquid through the two faces of the web of fabric, as will be observed from the path of the web of

fabric 2, guided by the roller 3, by passing in front of the assembly of grilles or grooves of the tubular pipe 11, and then of the tubular pipe 12. However, if the treatment had to be carried out from only one face, the changes of position and guiding necessary for this could be introduced.

[0011] By means of the improvements of the present invention, the result obtained is that the web of fabric can emerge from the scouring and bleaching phase with a water content of the order of 100 to 110%, preferably of the order of 105%, which represents a considerable improvement with respect to the machines known at present, in which the excess of water is in the best cases around 130%.

[0012] In the embodiment in Figures 4, 5 and 6, the machine which incorporates the present invention comprises a treatment vat 19 through the inside of which circulates the web of fabric to be treated 20, guided by a lower roller 21 and other intermediate rollers 22 and 23, proceeding from the upper motor-driven rollers 24 and 25, on which the web of fabric is wound alternately, as in a conventional jigger. The assembly of the elements of the machine is comprised within a frame of stainless steel which constitutes the casing of the machine, in which can be seen the access covers 26 and 27 which have a transparent portion and allow a visual check to be carried out.

[0013] Smoothing assemblies 28 and 29 run on respective guides 30 and 31, allowing the smoothing of the workpiece to be carried out during its treatment.

[0014] The vat 19 receives the treatment bath liquid, having an overflow 32 for communication with a lower pipe 33, intended to conduct the liquid towards the outside.

[0015] A basic feature of the machine of the present invention consists in the arrangement of tubular members such as the members 34 and 35 which are connected to a centrifugal pump 36 which draws in the bath liquid present in the vat 19 through front suction grilles 37 and 38, causing it then to pass through the pipes 39 back towards the bath, that is to say, operating in a closed circuit. The main feature of this arrangement consists in that the faces 37 and 38 receive the web of fabric 20 which passes by friction over the faces, so that because of the suction of the liquid by the action of the centrifugal pump 36, the liquid is forced through the web of fabric. In this way, high activation is obtained, controlled by acting on the variable parameters of the machine and of the process, it being possible to increase to a great extent the efficacy of the treatment.

[0016] As will be understood, the structure of the tubes, their arrangement and number will be variable in accordance with the complete design of the machine, the basic principle being that mentioned previously, so that the invention likewise extends to the method which consists essentially in carrying out, within a mass of treatment bath, the forced passage of the liquid which constitutes the bath in a transverse direction to the web

of fabric being treated, from a liquid entry face to the opposed face of the web of fabric, which is the liquid outlet face, during the displacement of the web of fabric in the direction of its longitudinal axis. Preferably, the forced passage of liquid takes place by creating a flow of treatment liquid in a transverse direction to the web of fabric in longitudinal displacement, being created by the suction of the liquid from the outlet face of the web of fabric, produced by the drawing of the liquid by means of a suction pump through a pipe over the entry of which the web of fabric to be treated is applied during its rectilinear displacement.

[0017] Although there has been shown in the figures the passage of the bath liquid first through one face of the web of fabric and then through the other, it may also be passed through only one face in certain desired cases, for example, in webs of fabric of the napped type, that is to say, velvet, corduroy etc.

[0018] The drive of the main rollers of the machine will be effected by means of two servo-motors operated by two servo-controllers with general control by means of a computer programmed by means of specific software.

[0019] The rollers will be driven at a variable speed in accordance with the control parameters which will be taken into account for said speed graduation.

[0020] The rollers, for example the main roller 25, which is shown in Figure 2, are mounted on bearings 40 and 41, of large size and specific design, being mounted on supports indicated diagrammatically by the numbers 42 and 43, which can allow their centring by means of a spindle for the alignment of the web of fabric.

Claims

1. Improvements to machines for the scouring and bleaching of webs of fabric and the like, characterized in that into a machine for web of the treatment of webs of fabric, preferably scouring and bleaching, there is introduced in combination a wringing unit prior to the entry into the treatment vat of the machine, for the application of a vacuum to the fabric to be continuously treated, and an arrangement for forced passage of treatment liquid through the web of fabric, in a transverse direction to the web of fabric being treated, from an entry face of the web of fabric to the opposed face of the same, which is the liquid outlet face, during the displacement of the web of fabric in the direction of its longitudinal axis, the passage of the liquid being produced by the action of forced suction by means of a liquid suction system which comprises an external pump which draws in by suction through the internal pipes of the machine and which by way of a heating means conveys the treatment liquid back to the treatment vat again.

2. Improvements to machines for the scouring and bleaching of webs of fabric and the like, according to claim 1, characterized in that the vacuum wringing device has a vacuum chamber with a face partially adapted to receive the web of fabric as it passes through, said chamber being connected to a vacuum source and incorporating a purging device for the removal of the extracted liquid. 5
3. Improvements to machines for the scouring and bleaching of webs of fabric and the like, according to claim 1, characterized by the arrangement of a system of internal tubes in the treatment vat provided with surfaces carrying grilles and/or grooves intended to receive the web of fabric passing through, which is traversed forcibly by the volume of liquid drawn in by suction by the external pump connected to said tubular elements. 10 15
4. Machine for carrying out the treatment of wet webs of fabric, of the type which has a one-piece casing provided at the top with two drive rollers, with reversible direction of rotation and driven by means of respective servo-motors controlled according to a control program, in order to vary their speed and direction of motion, intended to receive the rolls of fabric being treated and having an assembly of rollers for guiding the fabric towards a vat provided with the treatment liquid, with the inclusion of intermediate trains guided by means of individual guides, intended to effect the smoothing of the web of fabric which is moving in one direction or the other, characterized in that it has pipes immersed in the treatment bath, connected to a system for the drawing in of the liquid by suction by means of centrifugal pumps which re-supply the bath, said pipes having areas coinciding with the web of fabric in its rectilinear displacement at one of its faces, forcing the treatment liquid to pass through the web of fabric. 20 25 30 35 40
5. Machine according to claim 4, characterized in that the suction pipes arranged within the bath have flat areas provided with grooves, intended to receive the web of fabric in its longitudinal displacement and which permit the passage of the liquid, after passing through the web of fabric, towards the recirculating suction system equipped with centrifugal pumps. 45 50 55

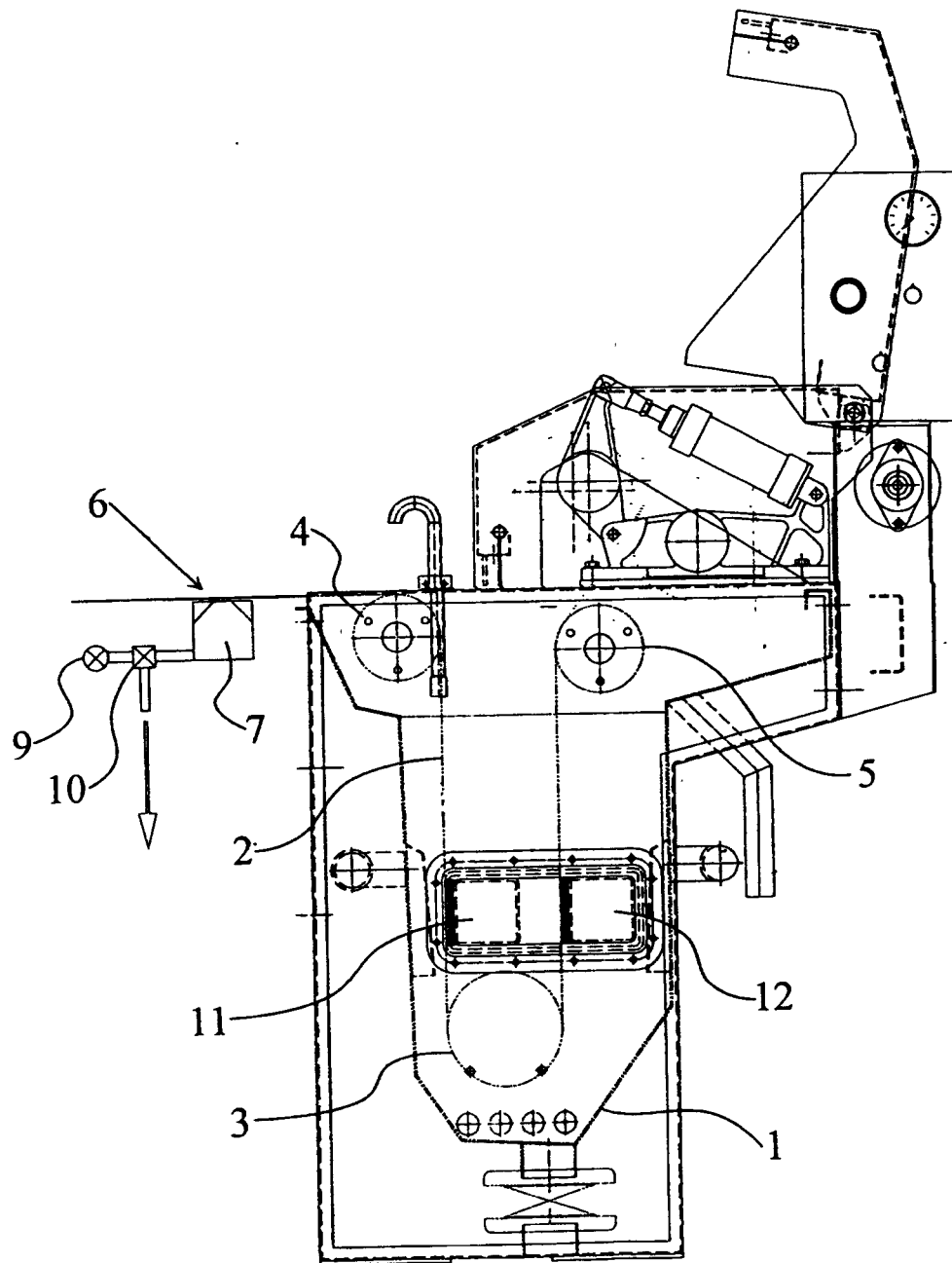


FIG. 1

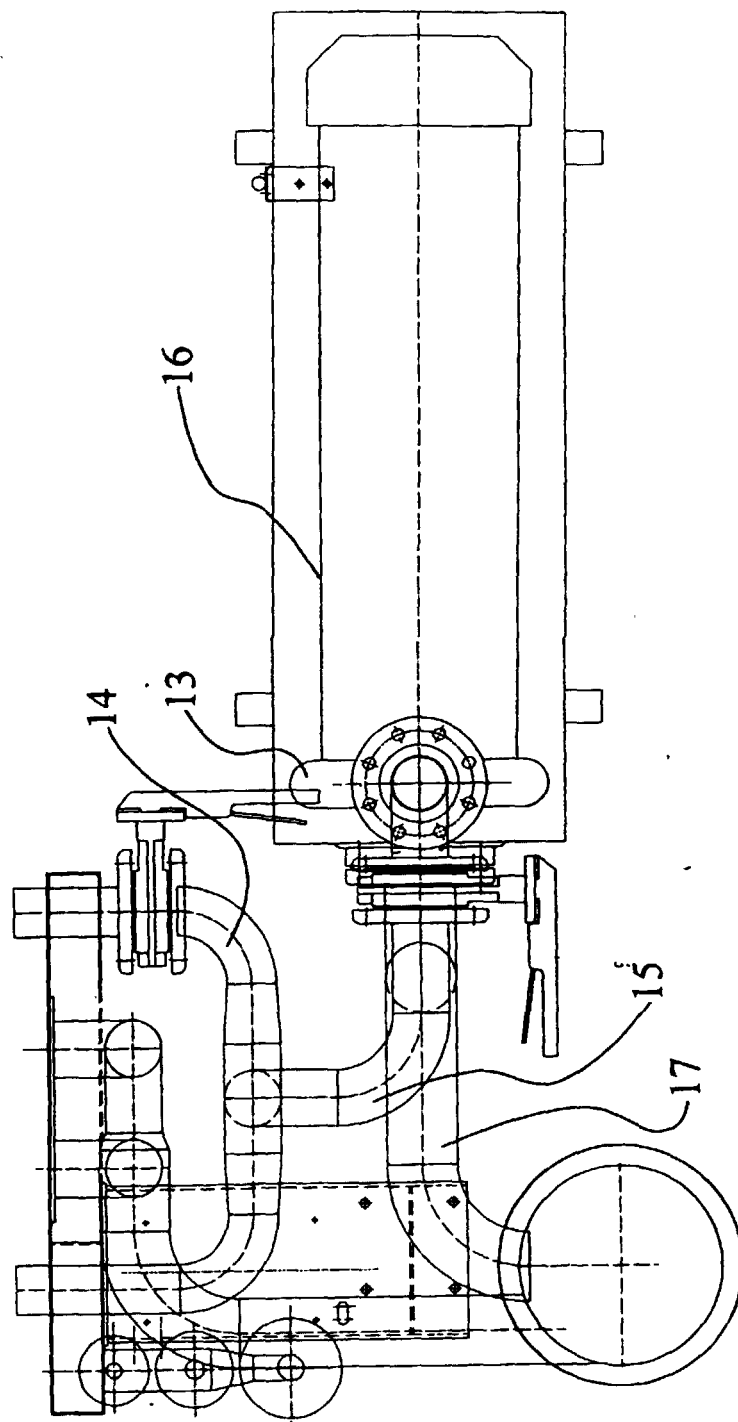


FIG. 2

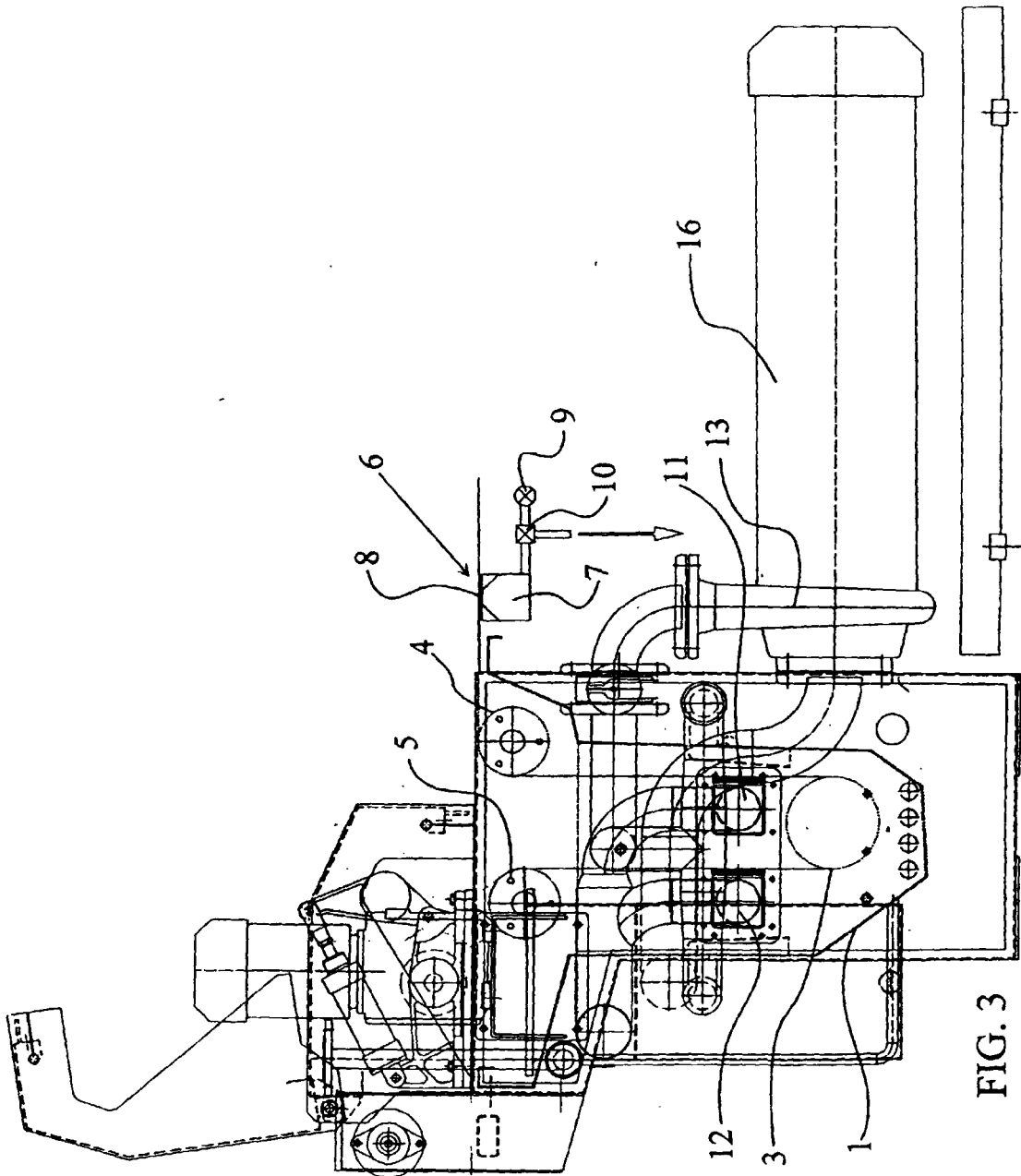


FIG. 3

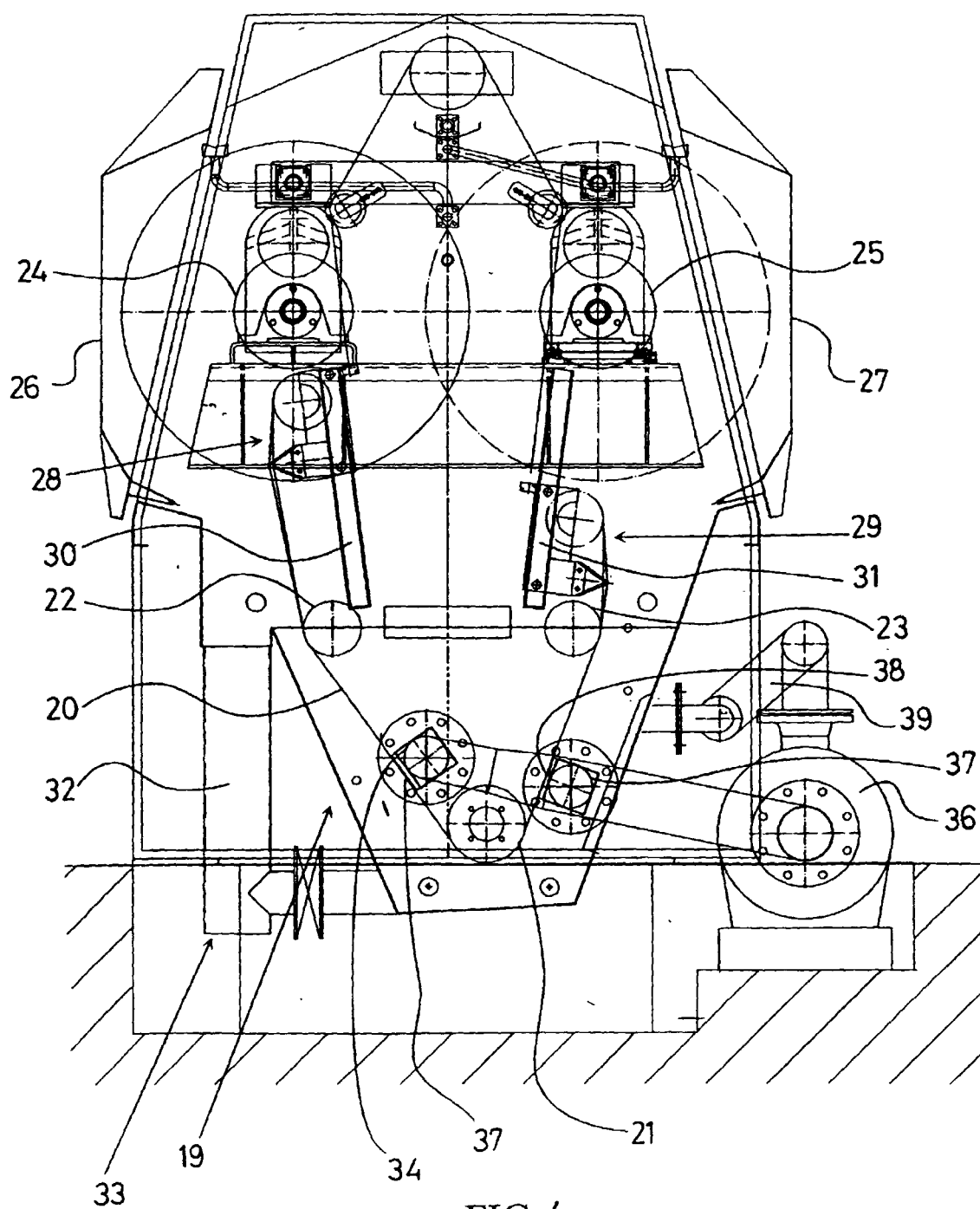


FIG. 4

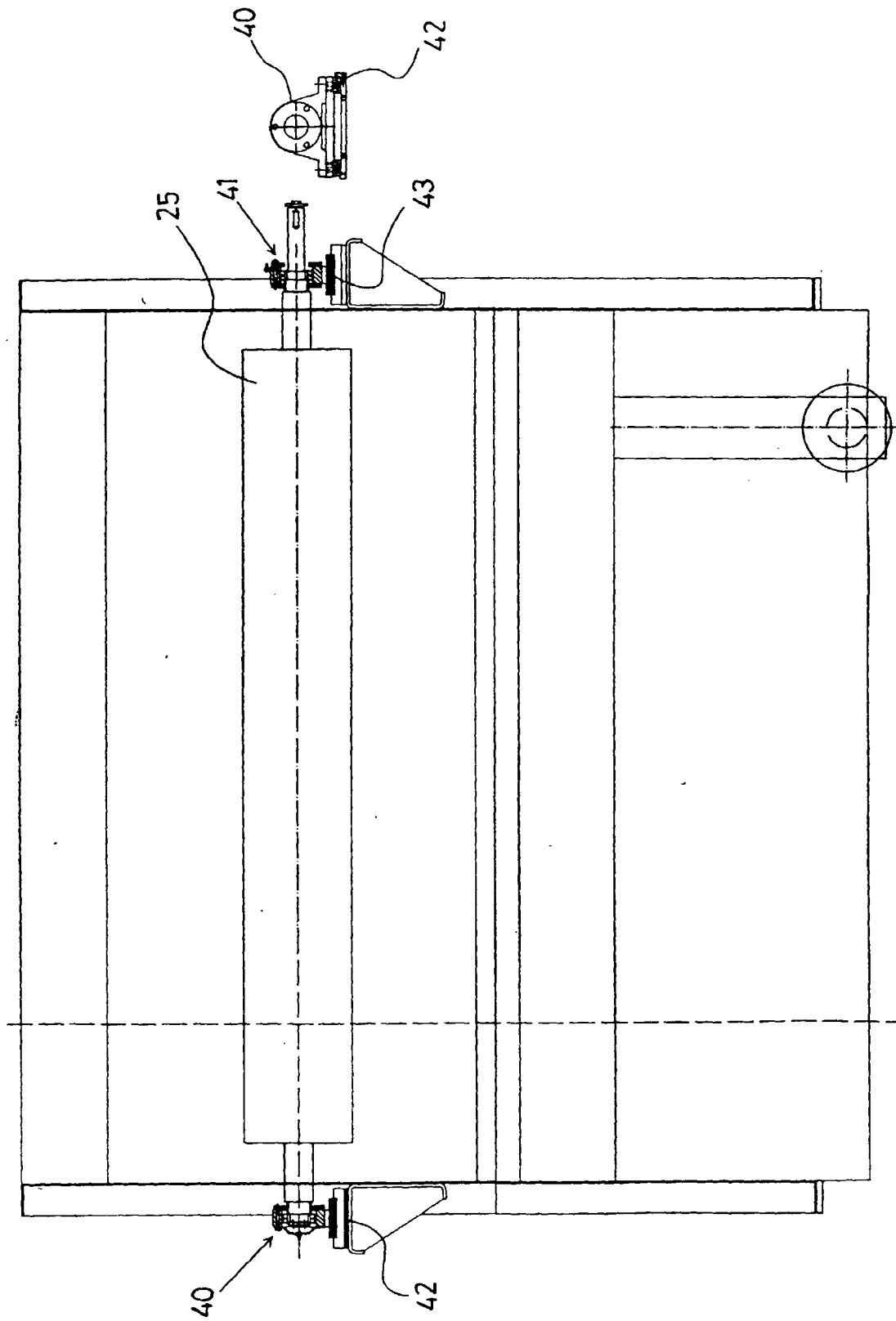


FIG. 5

