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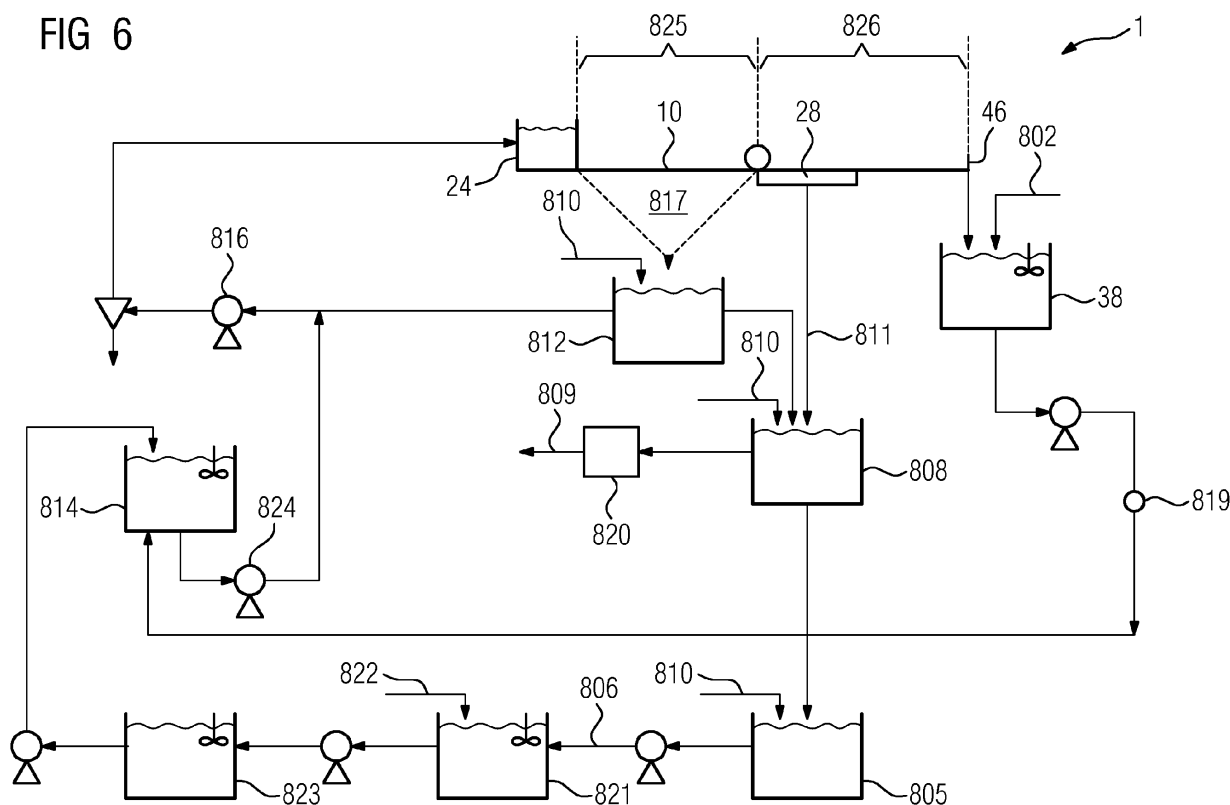
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(54) **Method of operating a paper machine**

(57) The invention relates to a method of operating a paper machine (1) and a paper machine (1). The paper machine (1) comprises a paper web forming fabric (10) for supporting a wet paper web during a paper web formation, a head box (24) for supplying a fibre slurry to the paper web forming fabric (10), at least one shower apparatus with a plurality of shower nozzles for cleaning the paper web forming fabric (10), and a couch pit (38)

disposed beneath the paper web forming fabric (10) for collecting fibres removed from the paper web forming fabric (10). The method comprises the steps of using filtered process water at the at least one shower apparatus instead of fresh water; and selectively activating shower nozzles for removing a paper trim (46) from the paper web forming fabric (10) according to an actual trim width.

FIG 6



Description

[0001] The invention relates to the field of paper making, in particular industrial paper making by means of paper machines.

[0002] Most industrial paper machines utilize fresh water at medium and high pressure cleaning showers at the wet-end to keep the paper machine wire clean while forming a wet web. The paper web forming fabric is a moving wire mesh belt, which is generally referred to in the art as the "wire". Usually the fresh water is sprayed from shower nozzles located above and adjacent to the paper web forming fabric in order to remove remaining fine, fillers, fibres and foreign material from the paper web forming fabric. Due to this water-based cleaning, significant amounts of fresh water are continuously added to the wet end of the paper machine. Excess fresh water at the paper machine wet end ultimately blends with process water, resulting in a dilution, to a fibre consistency less than 0.2%, in the couch pit where valuable paper trim is sent during the paper making process by utilizing knock off showers (trim showers).

[0003] In order to recover the valuable paper fibres back to the machine chest, excess water has to be removed, therefore a fibre recovery process is utilized by the industry to increase the consistency of the flow from the couch pit so that it can be pumped back to the machine chest where the consistency has to be around 4% to 5%. This fibre recovery may be achieved by a side hill screen, a disk filter, a dissolved air flotation (= DAF), or a device which is generally referred to in the art as "save-all".

[0004] The goal of the save-all is to remove excess water and increase the consistency of the flow from the couch pit by capturing the solids, in particular the fibres, available in the white water in order to recover valuable materials back to the process. A fractionating save-all provides paper-makers an option to retain fibres and to remove fines and ash from the system. However, the save-all process is not 100% efficient and causes quality and productivity issues as well as extra cost on material, energy, intake water, treatment plant and runnability.

[0005] Therefore, it is an object of the present invention to provide an improved paper making process to the paper industry.

[0006] The object of the present invention is achieved by a method of operating a paper machine comprising a paper web forming fabric for supporting a wet paper web during a paper web formation, a head box for supplying a fibre slurry to the paper web forming fabric, at least one shower apparatus with a plurality of shower nozzles for cleaning the paper web forming fabric, and a couch pit disposed beneath the paper web forming fabric for collecting fibres removed from the paper web forming fabric, the method comprising the steps of: using filtered process water at the at least one shower apparatus instead of fresh water; and selectively activating shower nozzles for removing a paper trim from the paper web forming

fabric according to an actual trim width. Further, the object of the present invention is achieved by a paper machine comprising a paper web forming fabric for supporting a wet paper web during paper web formation, a head box for supplying a fibre slurry to the paper web forming fabric, at least one shower apparatus with a plurality of shower nozzles for cleaning the paper web forming fabric, a couch pit disposed beneath the paper web forming fabric for collecting fibres removed from the paper web forming fabric, a liquid delivery device for supplying filtered process water instead of fresh water to the at least one shower apparatus, and a shower control unit operatively associated with said liquid delivery means and said at least one shower apparatus for selectively activating shower nozzles adapted to remove a paper trim from the paper web forming fabric according to an actual trim width.

[0007] Since filtered process water is reused at the wet-end, the problem of overflowing process water to the couch pit is avoided. Likewise, the problem of overflow of process water of the white water tank to the sewer is eliminated. Thus, a significant loss of process water, fibres, fines, fillers, hot water, etc., is avoided. Once the overflow of the process water to the couch pit is stopped, then by utilizing an adjustable trim shower for removal of the trim, a desired couch pit consistency can be maintained.

[0008] The present invention utilizes a shower apparatus which effectively, efficiently, and relatively inexpensively adjusts the quantity and placement of knock-off liquid sprays employed to remove trim from a forming wire to adjust for different trim widths. With the shower of the present invention the amount of knock-off water entering a couch pit for subsequent recovery can be minimized, greatly simplifying the downstream steps employed in the recovery process.

[0009] The shower apparatus of the present invention relates to a structural combination including a paper web forming wire having spaced edges and a forming wire support surface between the spaced edges for supporting a wet paper web during paper web formation, the paper web forming wire movable along a path of movement.

[0010] The shower control unit is operatively associated with the liquid delivery means and the plurality of knock-off shower nozzles for selectively and independently controlling the flow of liquid through each knock-off shower nozzle of said plurality of knock-off shower nozzles from the liquid delivery means to vary the location of liquid knock-off sprays directed onto the marginal portion of the paper web forming wire and to vary the total quantity of liquid directed on to the marginal portion of the paper web forming wire by the knock-off shower nozzles.

[0011] In sum, these new features in a paper machine allow to operate the paper machine without using a save-all. The benefits of eliminating the need of a save-all and the improved fibre recovery process results in a conser-

vation of resources, reduced cost of environmental compliance, a reduction of material cost, a reduced chemical usage, a reduction of waste disposal cost, and improved productivity. Further, because of the much smoother operation which is possible without the over-dilution and overflow events, the product quality is improved.

[0012] In addition, running a paper machine without a save-all process can be easily implemented on existing paper mills. In a trial phase existing save-alls can be maintained as a fall-back option. The paper-makers can run the paper machine alternately with or without a save-all until they feel confident about the new wet-end.

[0013] Further advantages are achieved by embodiments of the invention indicated by the dependent claims.

[0014] According to an embodiment of the invention, using filtered process water comprises a step of cleaning process water by filtering fibres from the process water, a step of delivering the filtered process water to the at least one shower apparatus, and a step of cleaning the paper web forming fabric by spraying from shower nozzles the filtered process water onto the paper web forming fabric.

[0015] According to an embodiment of the invention, the process water comprises water drained off from the wet paper web supported by the paper web forming fabric during paper web formation.

[0016] According to an embodiment of the invention, the method further comprises the step of checking a fibre consistency of the process water collected in the couch pit and adapting the fibre consistency of the process water to a pre-defined range before delivering it back to the machine

[0017] According to an embodiment of the invention, the process water collected in the couch pit with a consistency close to the machine chest consistency is directly delivered to a machine chest. Then a fibre slurry called thick stock at the machine chest is mixed with the process water from a silo to form a diluted fibre slurry, and the diluted fibre slurry is directly delivered to the head box. The silo is a container where process water drained from a section of the paper web forming fabric limited by the head box and the vacuum suction area is collected and blended with make-up water. Make-up water is fresh water which is added to process water in order to compensate lost process water.

[0018] According to an embodiment of the invention, the paper machine is operated without a save-all.

[0019] According to an embodiment of the invention, the method also includes controlling the flow of knock-off liquid in a paper making machine including a paper web forming wire having spaced edges and a forming wire support surface between the spaced edges for supporting a wet paper web during web formation, the paper web forming wire movable along a path of movement, and paper slurry delivery means for delivering a paper slurry to the forming wire support surface of the paper web forming wire.

[0020] According to an embodiment of the invention,

the method also includes the steps of positioning a plurality of knock-off shower nozzles adjacent to the paper web forming wire with the knock-off shower nozzles being spaced from one another, arrayed laterally relative to the path of movement of the paper web forming wire, and located above a marginal portion of the paper web forming wire adjacent to and inwardly of a forming wire edge of the paper web forming wire.

[0021] According to an embodiment of the invention, the method also includes the step of selectively and independently controlling the flow of liquid, i.e. filtered process water, through each knock-off shower nozzle of said plurality of knock-off shower nozzles to vary the location of liquid knock-off sprays directed on to the marginal portion of the paper web forming wire from the knock-off shower nozzles and to vary the quantity of liquid directed on to the marginal portion of the paper web forming wire by the knock-off shower nozzles. Based on the trim width, a number of nozzles required to knock the trim off the paper web forming wire can be activated. The trim is removed by applying water under pressure. A desired consistency in the couch pit can be achieved by adjusting the water pressure at the knock-off shower.

[0022] Preferably, the shower apparatus is able to activate all shower nozzles, i.e. to spray pressurized water over the full deckle width, so that the paper web can be removed during a web break.

[0023] According to another embodiment of the invention, the paper machine comprises a filtration unit for cleaning the process water, particularly by filtering fibres from the process water.

[0024] According to another embodiment of the invention, the paper machine comprises a consistency control unit for checking a fibre consistency of the process water collected in the couch pit and adapting the fibre consistency of the process water to a pre-defined range before delivering the process water to the head box. The consistency controller fine tunes the stock consistency before sending the process water to a machine chest.

[0025] According to another embodiment of the invention, the paper machine does not comprise a save-all.

[0026] According to an embodiment of the invention, the shower apparatus comprises a plurality of knock-off shower nozzles which are located adjacent to the paper web forming wire, the knock-off shower nozzles being spaced from one another and arrayed laterally relative to the path of paper web movement for directing a plurality of liquid knock-off sprays onto the paper web forming wire adjacent to and inwardly of an edge of the paper web forming wire.

[0027] Other features, advantages, and objects of the present invention will become apparent with reference to the following description and accompanying drawings, of which:

Fig. 1 is a flow chart presentation of a paper machine according to prior art;

- Fig. 2 is a diagrammatic presentation of a paper web forming section of a paper machine according to an embodiment of the present invention;
- Fig. 3 is a diagrammatic, perspective view of a shower apparatus constructed in accordance with the present invention;
- Fig. 4 is a diagrammatic view of selected structural elements of the shower apparatus of Fig. 3;
- Fig. 5 is a perspective view showing details of the nozzle array and liquid delivery system of the shower apparatus of Fig. 3; and
- Fig. 6 is a flow chart presentation of a paper machine according to an embodiment of the present invention.

[0028] Fig. 1 gives a flow chart presentation of a paper machine 1 according to prior art. A head box 24 contains paper slurry with a fibre consistency of approximately 0.5%. The head box 24 delivers the wet paper slurry to a support surface of a paper web forming fabric 10, in the art shortly referred to as "wire". Process water 817 dripping off the forming paper web in a first section 825 of the paper web forming fabric 10 limited by the head box 24 and the suction box 28 is collected in a silo 812. The term "process water" generally refers to a fibre suspension with a fibre consistency depending on the location within the paper machine and the progress of the paper-making process.

[0029] In a second section 826 of the paper web forming fabric 10, the forming paper web passes a suction box 28 where water is sucked off by means of a vacuum and reaches a fibre consistency of approximately less than 3.5%. The sucked off process water 811 is delivered to a seal tank 808 where it may be blended with make-up water 810. Process water of the seal tank 808 is recirculated 809 back to the paper-making process or delivered to a white water tank 805.

[0030] At the end of the second section 826, the marginal paper trim is knocked off the paper web forming fabric 10 by means of showers spraying pressurized fresh water to the full deckle of the wire 10. The paper web trim 46 and the fresh water 801 sprayed from the full deckle shower is collected in a couch pit 38. The process waters are kept agitated in these tanks and chests by propeller-like agitators 827 exemplarily shown in Fig. 1 in some tanks 38, 814.

[0031] The fresh water usage in the shower and the fixed deckle knock-off shower over-dilutes the couch pit 38 so that the fibre consistency is approximately only 0.2%. This highly diluted process water from the couch pit 38 is delivered to a save-all 90. The over-diluted process water from the couch pit 38 causes inefficiency at the save-all 90 due to sudden flow rate and consistency changes of the incoming flow from the couch pit 38. In

the save-all 90 the fibre suspension is divided into an accept fraction 804, i.e. a cleaner suspension, and into a reject fraction 803, i.e. an un-cleaned suspension with heavy and even light contaminate particles.

[0032] The accept 804, having a fibre consistency of approximately 2% to 5%, is delivered to a machine chest 814. Many paper mills build extra holding tanks to store the accept 804 from the save-all 90 and slowly pump it back to the machine chest 814. The reject 803 is delivered to the white water tank 805. The white water tank 805 also receives process water from the above mentioned seal tank 808 and make-up water 810. The process water of the white water tank 805 is delivered 806 to a pulper. Overflowing process water 807 of the white water tank 805 is conveyed to the sewer.

[0033] The process water 817 collected in the silo 812 may be blended with make-up water 810. Process water of the silo 812 is delivered via a fan pump 816 back to the head box 24. In case of an overflow of the silo 812, overflow process water is delivered 813 to the couch pit 38.

[0034] The machine chest 814 collects accept 804 of a consistency of approximately 2% to 5% from the save-all 90 and fresh stock 815, so that the fibre consistency in the machine chest optimally is at 4% to 5%. Process water of the machine chest 814 is delivered, driven by the fan pump 816, back to the head box 24.

[0035] The above mentioned sudden flow rate and consistency changes at the save-all 90, due to the incoming flow from the couch pit 38, also cause consistency upsets at the machine chest 814. Thus there are production losses at end of each run, over-dilutions of the machine chest 814 during breaks, colour and furnish variations and overflows at the save-all during breaks.

[0036] Referring now to Fig. 2, a looped paper web forming fabric 10, e.g. a Fourdrinier wire, having a forming wire support surface 12 is supported by rolls 14, 16, 18, 20 and 22. The wire 10 moves along a path of movement shown by the arrows above and below the wire 10.

[0037] A head box 24 delivers wet paper slurry to the support surface 12 of the wire 10. The deposited slurry travels over table rolls 26 and over suction boxes 28. An air knife 30 is disposed over the wire 10 and the wet paper web supported thereby and is utilized to cut trim from the web before the web engages a transfer fabric or felt 32 looped about a vacuum roll 34. A couch pit 38 is disposed under the forming wire 10.

[0038] The structure just described is conventional and need not be described in detail. The present invention is related to the knock-off or removal of the trim from the wire 10, it being understood that the trim follows the wire past vacuum roll 34 and stays on the wire 10. Dislodging of the trim from the wire 10 is accomplished by spraying, from a knock-off spray box 40, a quantity of pressurized water on the wire 10 along a marginal portion of the wire 10 carrying the trim and which is adjacent to and inwardly of an edge of the wire 10. With the present invention the amount and location of the sprayed water from the knock-

off spray box 40 can be varied in accordance with the particular width of the trim. In other words, only water that is actually needed to dislodge the trim need be sprayed onto the wire 10.

[0039] In addition, showers 400 are located along the wire 10 in the back-looping section of the wire 10 for spraying of water onto the paper web forming fabric 10 in order to clean the wire 10 before the fibre slurry is anew applied from the head box 24.

[0040] Now also referring to Figs. 3 to 5, the shower apparatus of the present invention includes a spray box 40 located above the lower run of the wire 10 as shown diagrammatically in Fig. 1. The spray box 40 is for the purpose of knocking off the trim 46 from the wire 10 into the couch pit 38.

[0041] It is known to provide knock-off showers for removing trim 46 from a Fourdrinier wire or other paper web forming fabrics 10 as well as for cleaning the fabric. The width w of the trim 46 being removed from the wet paper web 10 varies depending upon a number of factors. However, prior art knock-off showers utilized to remove trim 46 deliver the same amount of water and over the same wire area for such purpose regardless of the width w of the trim 46 being removed. This can cause a variety of problems downstream during the recovery process. In the recovery process, excess water from the couch pit 38 must be removed to raise consistency before the trim 46 can be re-circulated through the paper making machine 1. This problem is aggravated considerably when a relatively narrow strip of trim 46 is being knocked off the forming wire 10 since prior art systems emit water from all of the nozzles 42a-e, 44a-e thereof regardless of trim width w.

[0042] Figs. 3 to 5 illustrate a shower apparatus which addresses this problem. Fig. 5 shows the bottom wall of the spray box 40 and Fig. 3 depicts the complete spray box 40 which is supported by any suitable support means (not shown) above the forming wire 10. The spray box 40 extends across the full width of the forming wire 10 as shown in FIG. 3.

[0043] Positioned in the interior of the spray box 40 and for the purpose of spraying knock-off water onto the forming wire 10 are a plurality of knock-off shower nozzles 42a-42e and 44a-44e. These knock-off shower nozzles are located only at the ends of the spray box, as shown. The knock-off shower nozzles are spaced from one another and arrayed laterally relative to the path of movement of the forming wire 10 and trim 46.

[0044] The liquid knock-off nozzles are for the purpose of directing a plurality of liquid knock-off sprays onto the paper web forming wire 10 along marginal portions of the paper web forming wire 10 adjacent to and inwardly of the edges of the forming wire. In Fig. 3, knock-off shower nozzles 42a, 42b and 44a, 44b are shown directing overlapping water sprays adjacent to both edges of the forming wire 10 in the vicinity of trim strips 46, 48 which have been separated as described above from the main web by the air knife 30. The overlapping knock-off sprays will

first engage the wire 10 and then the trim strips to remove same from the wire 10.

[0045] As may perhaps best be seen with reference to Fig. 5, knock-off shower nozzles 42a and 44a are connected to a common supply line 48a. Likewise, nozzles 42b and 44b are connected to a supply line 48b. This same arrangement holds true with respect to the rest of the nozzles. That is to say, introduction of pressurized water into any of the supply lines will cause spray to be emitted from two knock-off shower nozzles operatively associated therewith, those two knock-off shower nozzles being equidistant from their respective associated wire edges.

[0046] Supply lines 48a-48e proceed from the spray box 40 to a header or manifold 50 which, in the present arrangement, is located within a control box 51. Of course, the control box 51 is preferably positioned where it can be readily accessed by the machine operator.

[0047] Each of the supply lines or liquid delivery lines has a solenoid operated valve associated therewith for controlling the flow of water through the line. Supply lines 48b, 48c, 48d and 48e are connected, respectively, to solenoid operated valves 52b, 52c, 52d, and 52e. These valves are located downstream from the interior of manifold or header 50 to either allow the flow of liquid from the manifold into lines 48b through 48e or terminate such flow.

[0048] A feed conduit 60 is connected to manifold 50 and delivers pressurized water thereto from a suitable supply source, preferably a seal tank. A solenoid valve 62 is utilized to selectively terminate or initiate such flow. Since supply line 48a has no solenoid valve operatively associated therewith downstream from manifold 50 in the disclosed arrangement, opening of valve 62 will serve to pressurize the manifold interior and also cause the flow of pressurized water through supply line 48a. Of course, if desired, a separate solenoid valve similar to solenoid valves 52b-52e could be employed downstream from the manifold 50 with respect to supply line 48a.

[0049] As perhaps can best be seen with reference to Fig. 4, valves 62, 52b, 52c, 52d, and 52e are controlled respectively by on/off switches 66 labelled 1 through 5 in Fig. 4. That is, actuation of the switch designated by numeral 1 will actuate valve 62. Switches 2, 3, 4 and 5 will actuate, respectively, valves 52b, 52c, 52d, and 52e.

[0050] It can thus readily be seen that the flow of water through each knock-off shower nozzle can be readily selectively and independently controlled to vary the location of liquid knock-off sprays directed on to the marginal portions of the paper web forming wire and to vary the total quantity of liquid directed on to the marginal portions of the paper web forming wire 10 by the knock-off shower nozzles. As shown in Fig. 3, signal light 70 is operatively associated with each of the switches 66 to display for the operator the identity of the open valves.

[0051] In the arrangement illustrated, the manifold 50 is also supplied by a second feed conduit 72 having a valve 74 associated therewith which may, for example,

be utilized to direct white water through the nozzles.

[0052] Fig. 6 is a flow chart presentation of a paper machine 1 according to an embodiment of the present invention. The process of applying a fibre slurry to a support surface of a paper web forming fabric 10 is the same as described above with reference to Fig. 1. Also, as described above, process water 817 dripping off the forming paper web in the first section 825 is collected in the silo 812, process water 811 sucked off by means of the suction box 28 is delivered to the seal tank 808.

[0053] Contrary to the prior art paper machine described with reference to Fig. 1, however, the showers spraying water to the paper web forming fabric 10 are supplied with filtered process water instead of fresh water. Furthermore, at the knock-off shower for removing the marginal trim of the wet paper web at the end of the second section 826 only those shower nozzles are activated to spray which are actually required to remove the trim, whose width may vary, in contrast to the removal of the trim by a full deckle knock-off shower known from the prior art. The adjustable trim shower reduces the trim consistency from 20% to 4.5%, i.e. around the machine chest consistency. However, the possibility to operate the knock-off shower in the full deckle mode should be kept for the case of a web break.

[0054] The paper web trim 46 and the recycled, particularly fibre-filtered, process water 802 sprayed from the width-adjustable trim shower 802 is collected in the couch pit 38. As according to the invention the use of fresh water at the trim shower is replaced by the use of filtered process water, the formerly known over-dilution of the couch pit 38 is avoided.

[0055] Also, since the showers at the paper web forming fabric 10 is supplied with filtered process water instead of fresh water, i.e. since process water is filtered and reused at the wet-end, the problem of overflowing process water to the couch pit 38 is avoided.

[0056] Because of the re-use of process water at the showers, the consistency of the couch pit 38 can be maintained at a level of about 4.5%. A desired consistency of the couch pit 38 can be achieved by adjusting water pressure at the knock-off shower. The relatively steady consistency at the couch pit 38 allows dispensing with a save-all. Therefore, the process water from the couch pit 38 is conveyed via a consistency control unit 819 directly to the machine chest 814 without passing a save-all. The consistency control unit 819 checks the consistency of the process water flowing out the couch pit 38 and, if necessary, triggers measures so that the consistency of the process water which is delivered to the machine chest 814 is fine tuned to approximately 4.2% before sending the stock to the machine chest 814.

[0057] Unlike in the prior art paper machine 1 of Fig. 1, the silo 812 according to an embodiment of the present invention has no overflow channel to the couch pit 38. Instead, any surplus process water in the silo 812 is delivered to the seal tank 808. Process water of the seal tank 808 is filtered in a filtration unit 820, and the filtered,

i.e. cleaned, process water is supplied 809 to the showers of the paper web forming fabric 10.

[0058] Any surplus process water in the seal tank 808 is delivered to the white water tank 805. The white water tank 805 also receives make-up water 810. The process water of the white water tank 805 is delivered 806 to a pulper 821. Since the showers at the paper web forming fabric 10 are supplied with filtered process water instead of fresh water, i.e. since filtered process water is reused at the wet-end, the problem of overflowing process water of the white water tank 805 to the sewer is eliminated. From the pulper 821, which may receive material input 822 for preparation of the fibre pulp, e.g. fibres, fillers, fresh water, etc., the fibre pulp is delivered to a dump chest 823, and from there to the machine chest 814.

[0059] The process water 817 collected in the silo 812 may be blended with make-up water 810. Process water of the silo 812 is delivered via a fan pump 816 back to the head box 24. Also process water of the machine chest 814 is delivered, driven by the fan pump 816, back to the head box 24. The fibre consistency in the machine chest 814 optimally is at 4.2.

[0060] The invention is not limited by the embodiments given.

Claims

1. A method of operating a paper machine (1) comprising a paper web forming fabric (10) for supporting a wet paper web during a paper web formation, a head box (24) for supplying a fibre slurry to the paper web forming fabric (10), at least one shower apparatus (40, 400) with a plurality of shower nozzles (42a-e, 44a-e) for cleaning the paper web forming fabric (10), and a couch pit (38) disposed beneath the paper web forming fabric (10) for collecting fibres removed from the paper web forming fabric (10), the method comprising the steps of:

using filtered process water at the at least one shower apparatus (40, 400) instead of fresh water; and
selectively activating shower nozzles (42a-e, 44a-e) for removing a paper trim (46) from the paper web forming fabric (10) according to an actual trim width (w).

2. The method of claim 1, the step of using filtered process water comprising:

cleaning process water by filtering fibres from the process water;
delivering the filtered process water to the at least one shower apparatus (40, 400); and
cleaning the paper web forming fabric by spraying from shower nozzles (42a-e, 44a-e) the filtered process water onto the paper web forming

fabric (10).

3. The method of claim 1 or 2, wherein the process water comprises water drained off from the wet paper web supported by the paper web forming fabric (10) during a paper web formation.

4. The method of one of claims 1 to 3, further comprising the step of checking a fibre consistency of the process water collected in the couch pit (38) and adapting the fibre consistency of the process water to a pre-defined range before delivering the process water to the head box (24).

5. The method of claim 4, wherein the process water collected in the couch pit (38) is directly delivered to a machine chest (814), depending on the fibre consistency of the process water delivered from the couch pit (38) further fibres are added to the process water in the machine chest (814), the process water from the machine chest (814) is blended with process water from a silo (812) to form said fibre slurry, and the fibre slurry is directly delivered to the head box (24).

6. The method of one of claims 1 to 5, wherein the paper machine (1) is operated without a save-all (90).

7. A paper machine (1) comprising

- a paper web forming fabric (10) for supporting a wet paper web during a paper web formation,
- a head box (24) for supplying a fibre slurry to the paper web forming fabric (10),
- at least one shower apparatus (40, 400) with a plurality of shower nozzles (42a-e, 44a-e) for cleaning the paper web forming fabric (10),
- a couch pit (38) disposed beneath the paper web forming fabric (10) for collecting fibres removed from the paper web forming fabric (10),
- a liquid delivery device (60, 72) for supplying filtered process water instead of fresh water to the at least one shower apparatus (40, 400), and
- a shower control unit (51) operatively associated with said liquid delivery means (60, 72) and said at least one shower apparatus (40, 400) for selectively activating shower nozzles (42a-e, 44a-e) adapted to remove a paper trim (46) from the paper web forming fabric (10) according to an actual trim width (w).

8. The paper machine (1) of claim 7, further comprising a filtration unit (820) for cleaning the process water, particularly by filtering fibres from the process water.

9. The paper machine (1) of claim 7 or 8, further comprising a consistency control unit (819) for checking a fibre consistency of the process water collected in

the couch pit (38) and adapting the fibre consistency of the process water to a pre-defined range before delivering the process water to the head box (24).

10. The paper machine (1) of one of claims 7 to 9, wherein the paper machine (1) does not comprise a save-all (90).

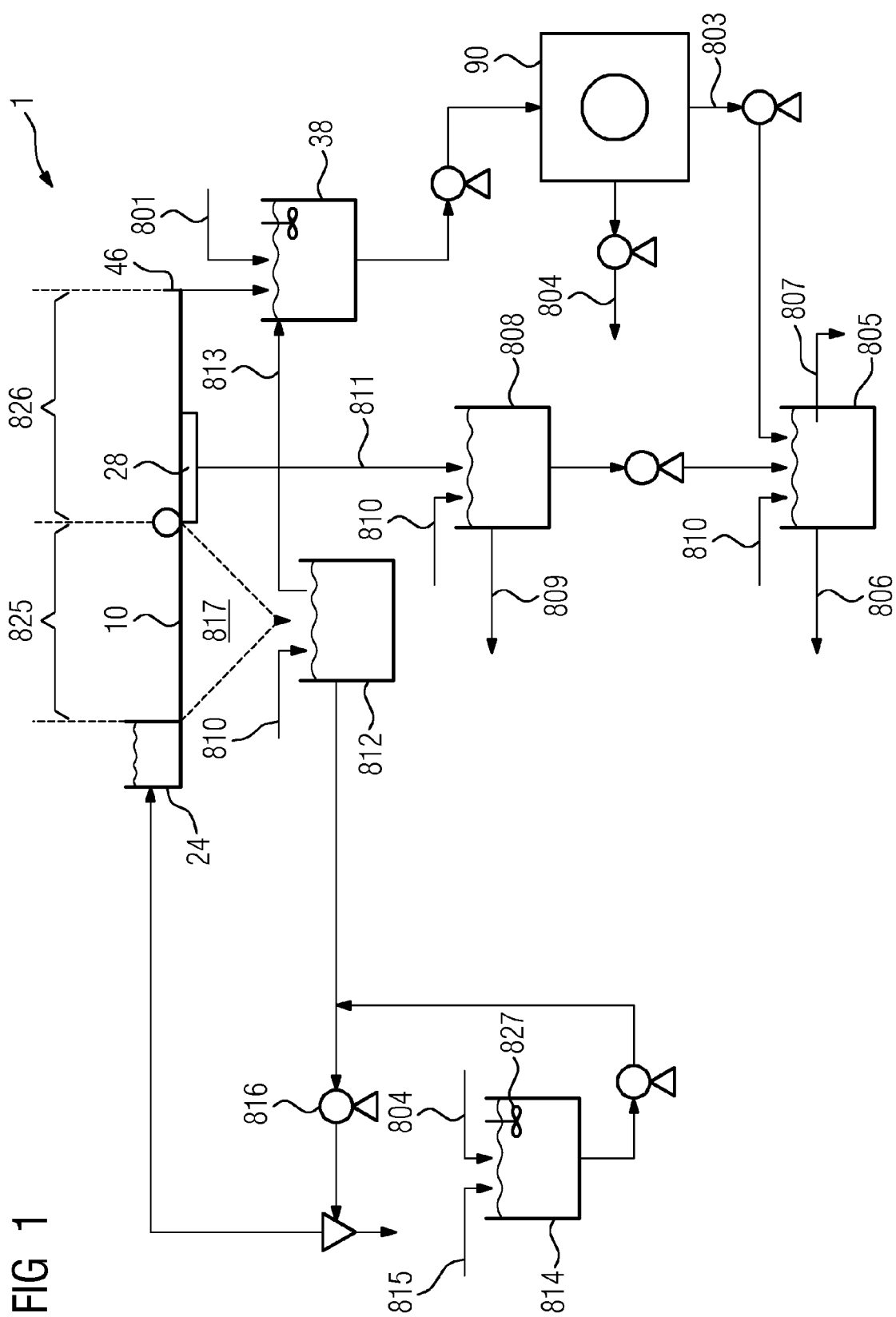


FIG 2

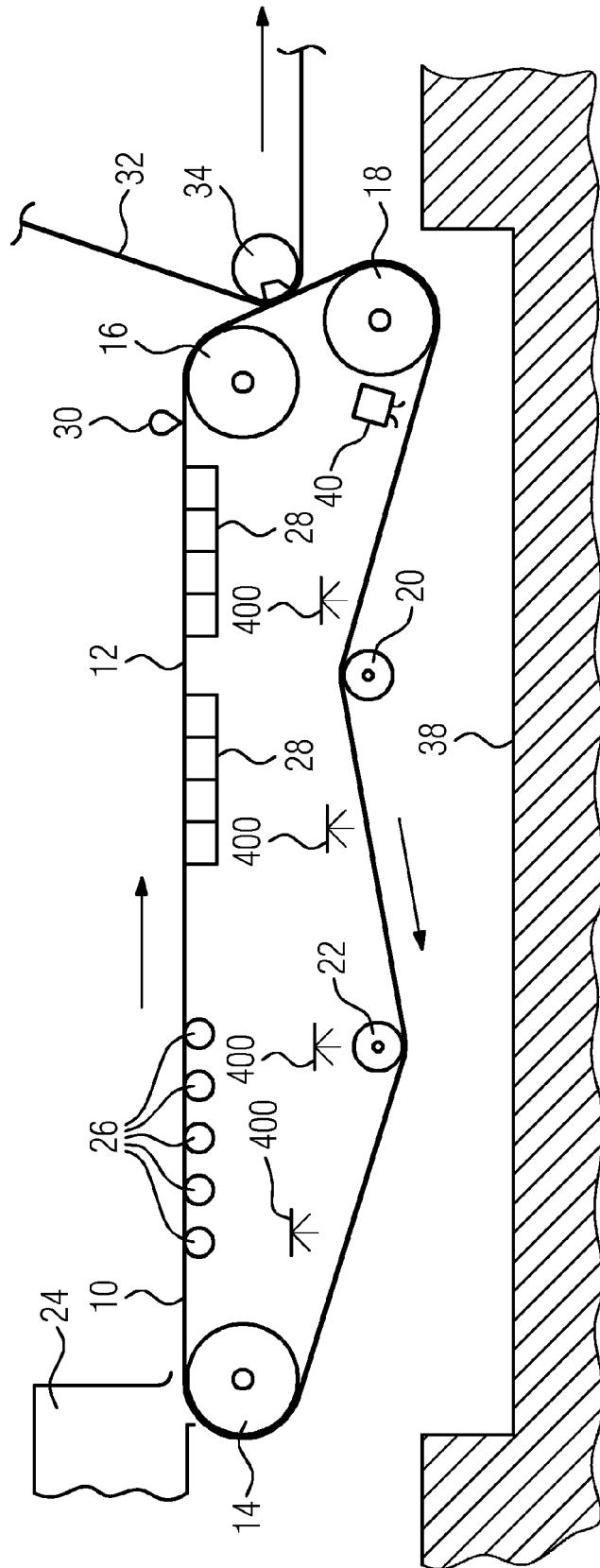


FIG 3

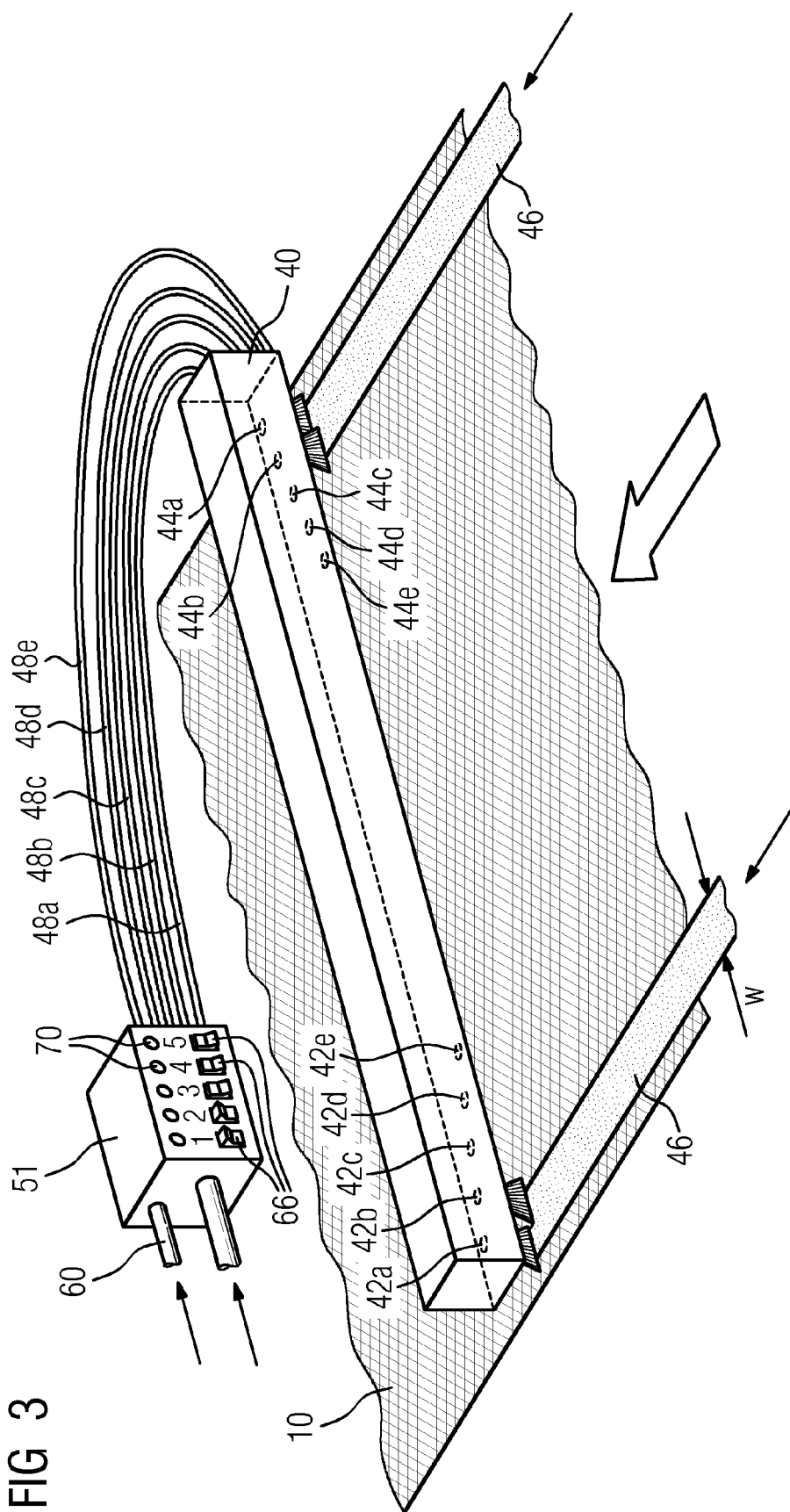
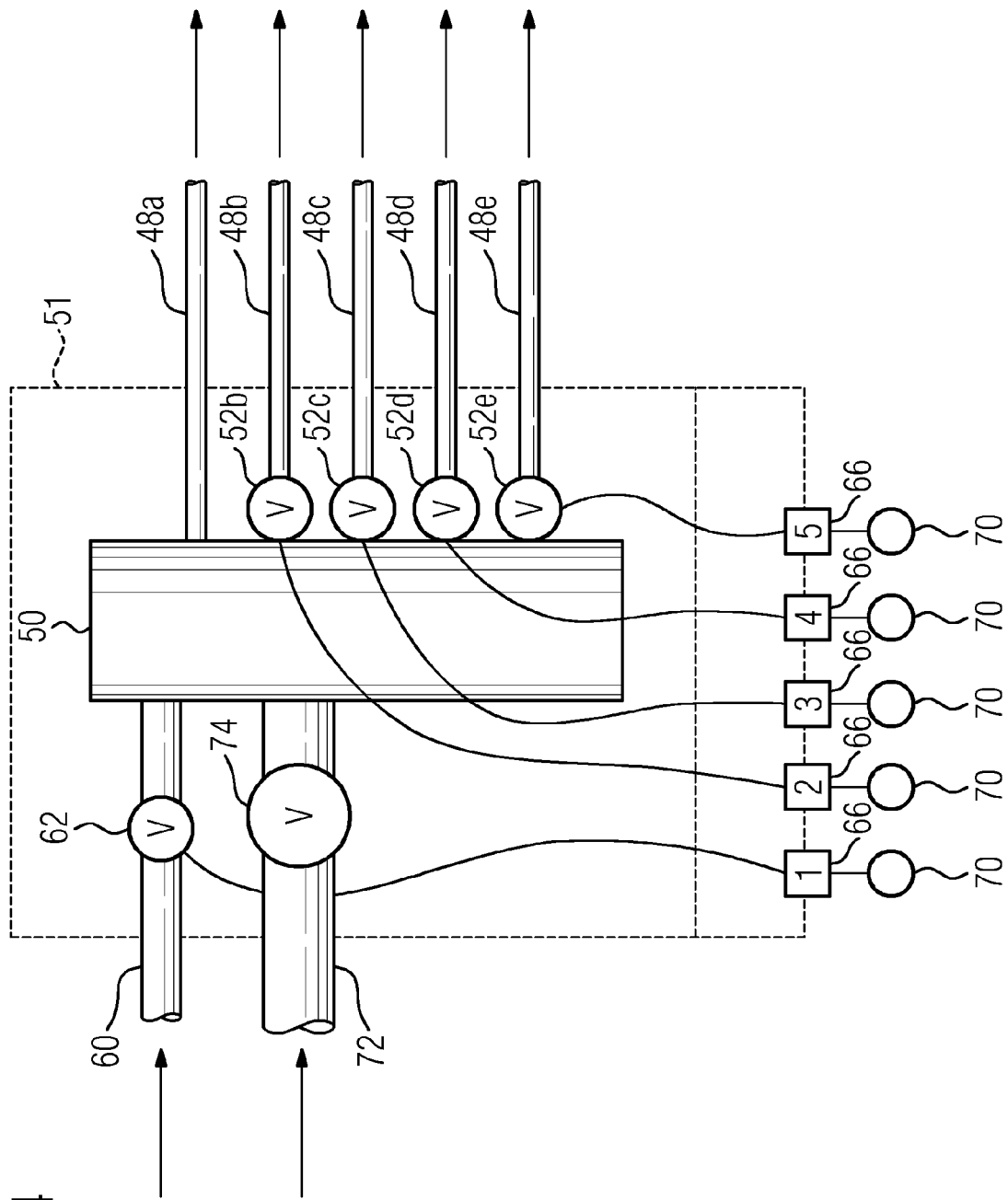


FIG 4



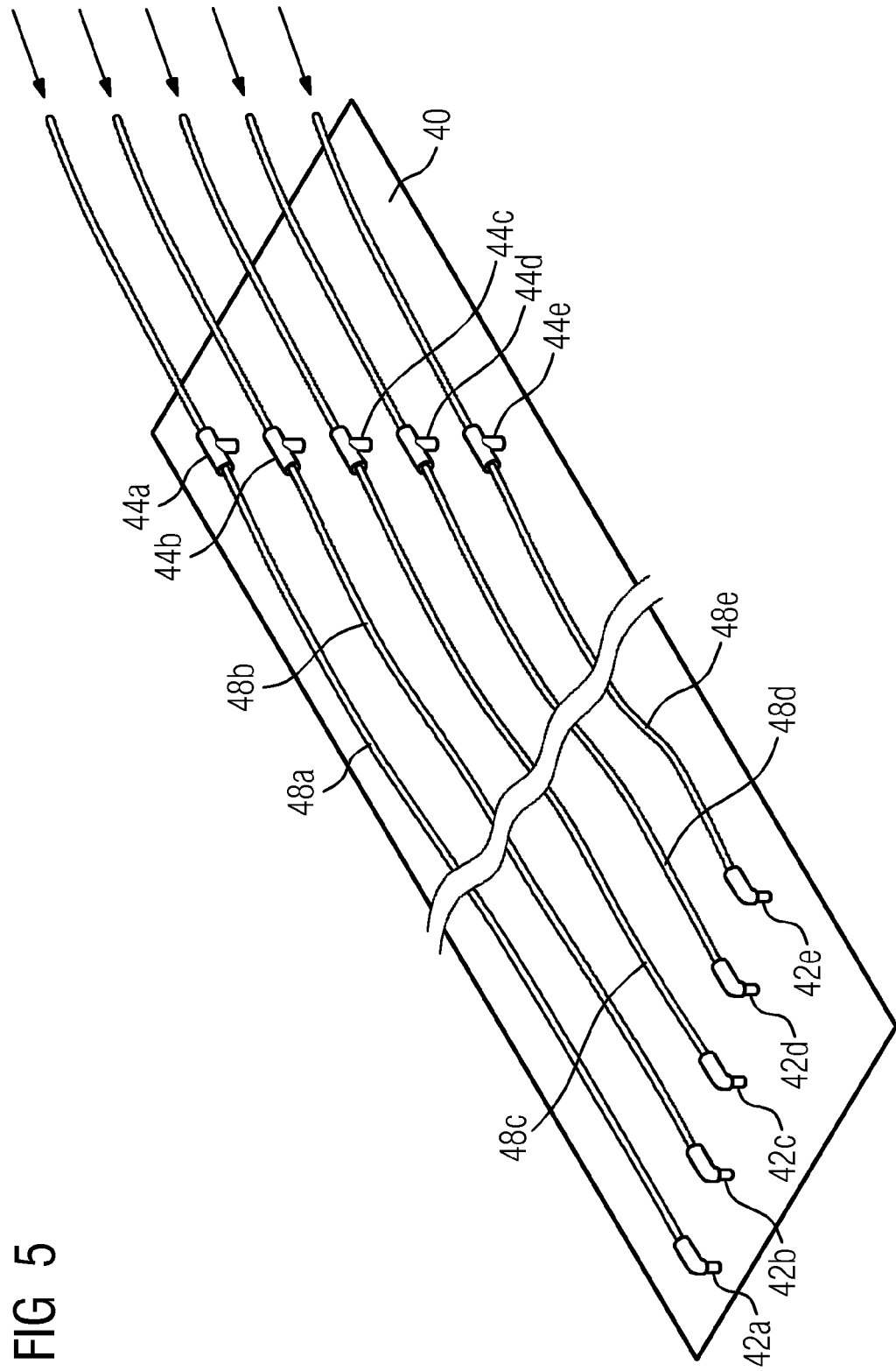


FIG 5

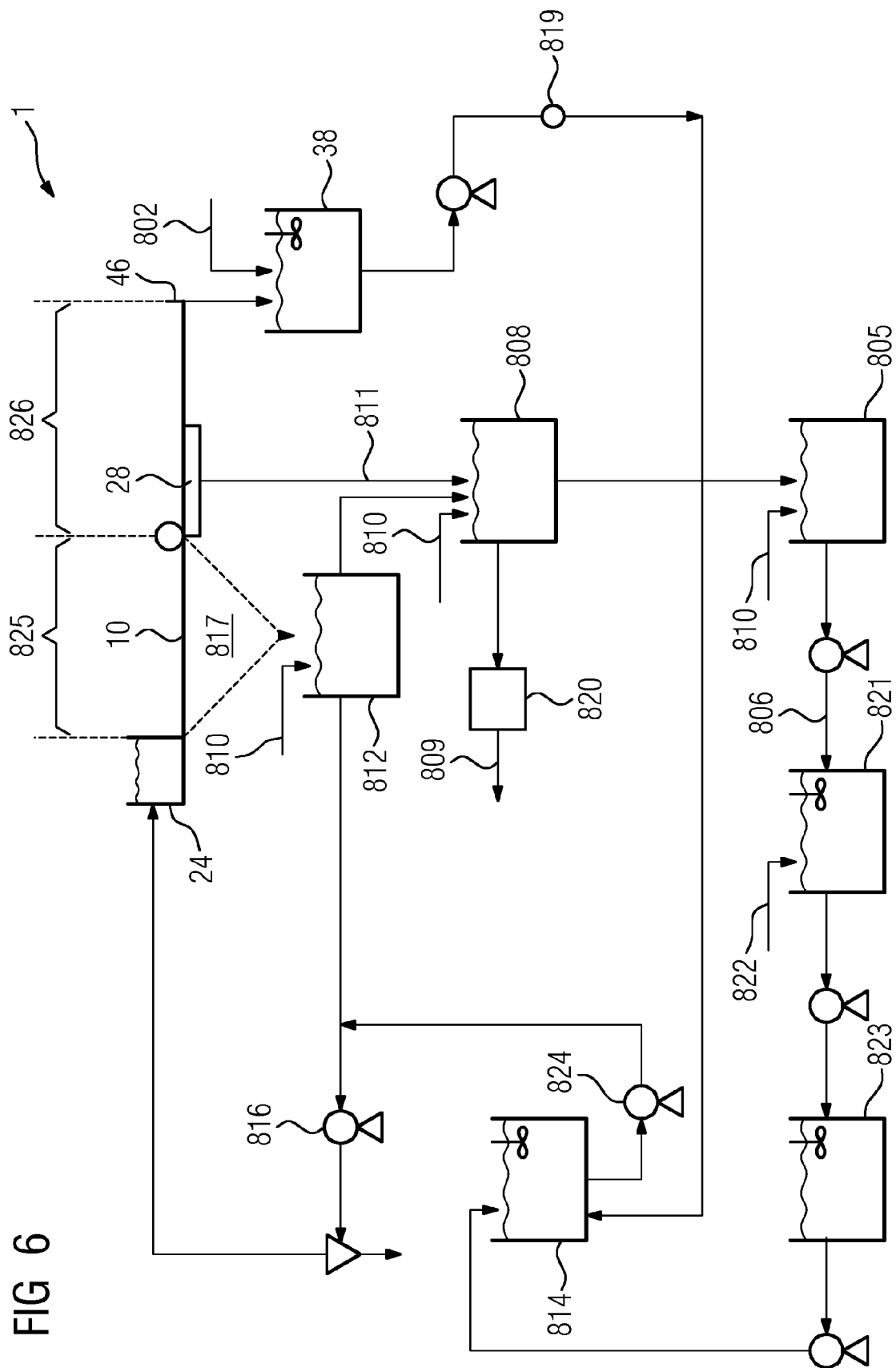


FIG 6



EUROPEAN SEARCH REPORT

Application Number
EP 12 19 3802

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Place of search		Date of completion of the search	Examiner
Munich		14 February 2013	Sabatucci, Arianna
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