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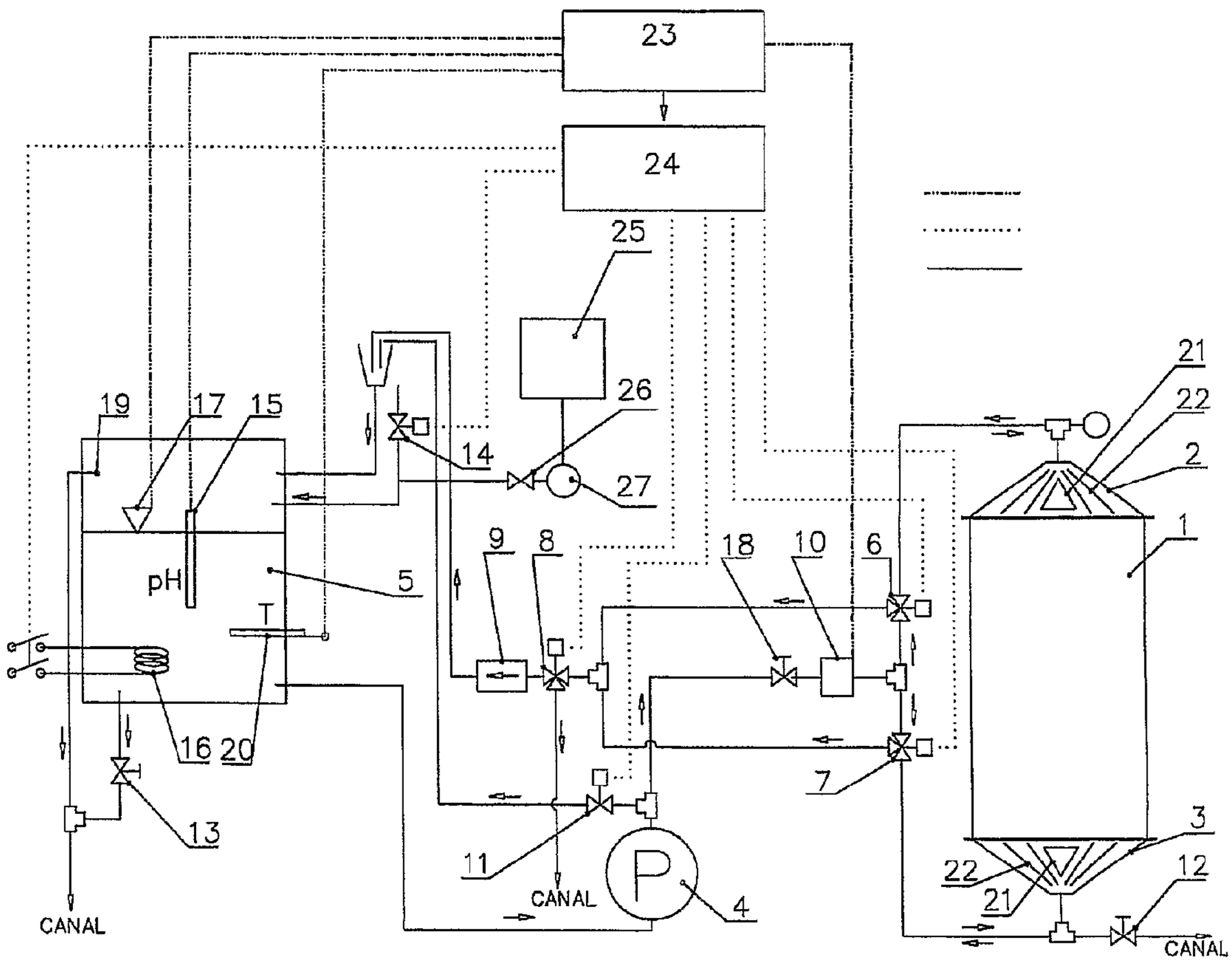
(54) Title: DEVICE FOR PROCESSING FIBROUS RAW MATERIALS AND THE METHOD OF FIBROUS PLANTS PROCESSING



(57) Abrégé/Abstract:
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others. The device enables controlled water flow and controlling pH value, temperature and the process time. The method enables using physico-chemical phenomena, especially osmosis, which run inside the stems in contact with water. The solution enables production of natural fibre of exceptionally good usable properties.

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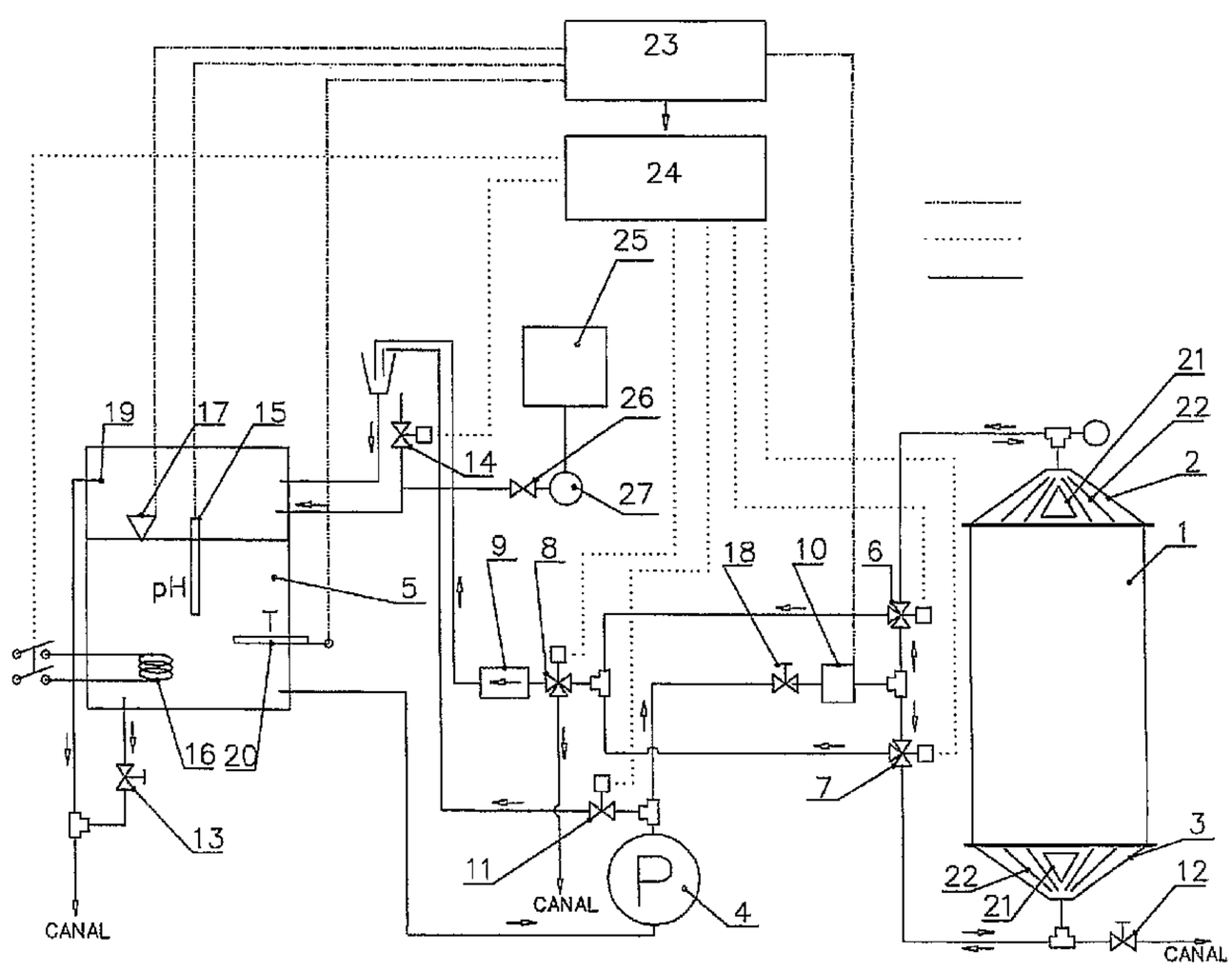
(54) Title: DEVICE FOR PROCESSING FIBROUS RAW MATERIALS AND THE METHOD OF FIBROUS PLANTS PROCESSING



(57) Abstract: The subjects of the invention are: a device for processing fibrous raw materials and the method of fibrous plant raw materials processing. The device is used for specific processing of fibrous plants raw materials such as flax, hemp, kenaf, jute, ramie and others. The device enables controlled water flow and controlling pH value, temperature and the process time. The method enables using physico-chemical phenomena, especially osmosis, which run inside the stems in contact with water. The solution enables production of natural fibre of exceptionally good usable properties.

WO 2008/063091 A1

Device for processing fibrous raw materials and the method of fibrous plants processing

The subjects of the invention are: a device for processing fibrous raw materials and the method of fibrous plant raw materials processing. The device is used for specific processing of fibrous plants raw materials such as flax, hemp, kenaf, jute, ramie and others. The device enables controlled water flow and controlling pH value, temperature and the process time. The method enables using physico-chemical phenomena, especially osmosis, which run inside the stems in contact with water. The solution enables production of natural fibre of exceptionally good usable properties.

In the patent description CN1542198 (published 2004-11-03) the textile ultrasonic treatment device was presented. The ultrasonic fabric treating apparatus is used mainly in water washing, desizing, bleaching, dyeing and other pre-treatment. It includes water tank, longitudinal cloth rollers in two rows inside the water tank for the cloth to turn to form cloth wave, and two or more double-sided ultrasonic units set over and below the cloth wave. The present invention is used in treating cloth and has greatly lowered water consumption and power consumption, reduced water tank number and small volume.

In the patent description CN1455040 (published 2003-11-12) the ramie wet spinning method and apparatus was presented. The present invention discloses a ramie wet spinning method and its equipment. It directly uses the ramie rove of conventional process to spin line yarn, and includes the processes of degumming ramie, combing, doubling and obtaining rove, making the rove pass through wet-spinning machine,

drying, winding and baling, in which the ramie wet-spinning machine is obtained by improving flax wet-spinning machine, i.e. original curved frame is changed into a special-made breast plate which can be mounted between front and rear rollers, their drafting interval distance can be changed into 180-260 mm from 160 mm, and the hairness and nep of obtained ramie yarn can be obviously reduced, its produce quality can be obviously raised, the yarn-forming hair is in 20/10m, and its breaking strength is identical to that of dry-spun yarn, and its retentivity is above 95%.

In the patent description CN1446952 (published 2003-10-08) equipments for processing flax and technical method were described. An apparatus for processing flax is composed of electric motor, stirring wheel, the stirrer of peregal and high-speed machine oil, hydraulic pump, tubes, liquid tank, baker, spraying box with nozzles, and pneumatic pump. Its technology includes washing in cold water, washing in acid, washing in hot water, washing in cold water, enzyme treating for degumming, washing in cold water, baking, treating with the mixture of peregal and high-speed machine oil, opening and carding.

In the patent description JP2001164458 (published 2001-06-19) the method for bleaching cotton fiber product using ozone and apparatus therefore. Carrying out bleaching of a fiber without using chlorinated chemicals and to suppress yellowing thereof with a lapse of time by bringing the fabric to be bleached into contact with a gas containing ozone and then washing the fabric with hot water was solved. This method for bleaching and the apparatus therefore is that the cotton fiber after subjected to desizing and degumming is moistened, then brought into contact with the gas containing the ozone and finally washed with the hot water.

In the patent description GB2282609 (published 1995-04-12) the method for degumming silk fabrics and apparatus therefore was presented. A degumming solution is heated in a kier to 120 - 130 DEG C and the silk fabric is immersed in the heated solution for 30 - 60 minutes. The kier comprises a body containing a degumming chamber and a pair of heat exchanger chambers communicating at their top and bottom portions with the degumming chamber. A lid seals the kier and an intake/exhaust pipe filled with a valve is used to control the pressure. In the heat exchanger chambers are two pairs of heat exchanger pipes and steam discharge pipes having upwardly directed nozzles, each pair

being provided one above the other. Steam or cooling water can be supplied to the heat exchanger pipes to control the temperature. The top and bottom of the kier body are in communication through a circulation pipe which includes a pump and a heat exchanger.

In the patent description CN1058624 (published 1992-02-12) the method and apparatus for comprehensive treatment of waste from biological degumming of ramie were presented. This invention relates to a complete set technology of combined bacterio-chemical degumming process for ramie with equipment thereof. It features that the refined waste gas generated in biological degumming of ramie, waste water after flushing machine, oiled waste liquid, condensed water of baker, partial refined water liquid and fermentation tail-gas treatment are used for the immersion of bacterially degummed ramie, beating ramie, refining, oiling, and filtering the soot of boiler, so realizing comprehensive treatment of waste water. Its settling tank is a plane-rectangular diagonal flow type. This invention has such advantages as low investment, low running expense and good treatment effect. The quality of treated water conforms to class-one national standard.

In the patent description CN1102675 (published 1995-05-17) the method and device for degumming silk fabric were presented. A degumming device in which a silk fabric can be suspended easily and can be degummed uniformly. Radial arms are provided in a cylindrical degumming kier. A silk fabric is suspended spirally from the arms by attaching its top edge to hooks provided on the arms. In this state, a gap is present between the adjacent layers of the spirally suspended silk fabric. Since degumming solution can smoothly flow through the gap, the silk fabric can be degummed uniformly. While degumming, the arms are gradually swung upwards so that the distances between the adjacent arms narrow gradually. With this arrangement, the top edge of the silk fabric is allowed to shrink at the same rate as its bottom edge.

In the patent description CN1070021 (published1993-03-17) the bleaching and dyeing technology for silk and tow of tussah was presented. The bleaching and dyeing technology for tussah is comprised of degumming, bleaching, dyeing and silk scrooping agent treatment. The degumming includes following steps: pretreatment (0.5-2 g/l. sodium carbonate water solution, 80-90 deg. C), water washing, boiling with enzyme (1.5-2.5 g/l. neutral enzyme preparation, 45-50 deg. C), water washing, boiling with soup

(1.5-2.0 g/l. soapwater, 95 deg. C). After bleaching (5.5-7.2 g/l. H2O2, 60-85 deg. C., bath ratio 1:30) 3-4 hr., the active, neutral, and acidic dye stuffs are use for dyeing (30-95 deg. C) and controls the dyeing rate. And finally, the silk scrooping agent treatment is proceeded (concentration of water solution 4-5 g/l. 40-50 deg. C). The technology is reasonable, installation is simple, operation is easy, dyeing is uniform, fastness is high and color is lustrous.

In the patent description JP5247830 (published 1993-09-24) the apparatus and method for treatment of fiber product were presented. The purpose of the invention was to provide a safe apparatus for preventing danger, intended for the treatment, including bleaching, washing, dyeing, boiling, desizing, mercerizing, or the like, of textile materials. This apparatus has such a scheme that an applicator disposed substantially sideways in the direction of carrying a textile product is furnished, an aerosol jet emitted from the nozzle of the applicator is directed to a textile product to be treated, wherein the applicator is designed as a cylinder with its inlet and outlet provided on the edge face thereof, furthermore, there is furnished a chamber helically surrounded by a heating element, wherein both the chamber and the heating element are placed in a pipe.

In the patent description CN1056139 (published 1991-11-13) the technology and apparatus for textile bleaching or pre-treatment before dyeing were presented. This invention belongs to the treating method before bleaching or print-dyeing of fabrics. It aims at that it provides the technology and equipment of shortened process and reduced equipment to save heat energy, water resource, auxiliary agent, man power and lift the product quality and quantity. Its features are: the fabric after alkali soaking and rolling by mercerizing range, tentering, and flush-absorbing, is steamed in cook pot, then carry on the following processes: flat washing, bleaching with oxygen, piling up, tensioning flat washing, rebleaching with oxygen, drying, bluing and whitening and stentering.

In the patent description RU2133788 (published 1999-07-27) the fibrous material washing apparatus was describe. The washing apparatus has conveyor for feeding fibrous material preliminarily loosened on scutching machine to hopper, where fibrous material is wetted by spray beam delivered from nozzle. Fibrous column is compacted and fed to carding drum for discretization of yarns and removal of organic, mineral and plant contaminants. Preliminarily cleaned complexes are passed above pallet for removal of

contaminants. Apparatus is further provided with roll for removing fibrous material from drum and throwing it onto conveyor. Fibrous material is washed with washing solution spray beam in zone between conveyor carrier run and nozzle. Fibrous material layer saturated with washing agent is supplied into microwave field working zone between conveyor and wave guide. Microwave energy is emitted from wave guide to fibrous layer so as to penetrate through it and excite it at atomic and molecular level. Microwave field activates microparticles of aqueous-fibrous mixture to excited state, which is displayed by fast heating of mixture. Heat and related electric factors facilitate disintegration between fibers and organic contaminants, with viscosity of organic contaminants suddenly decreasing. Portion of fatty substance drips into tank. Final washing out of contaminants is accomplished by washing solution spray beams delivered by nozzles. Used solution drips into tank from which it is delivered into soaking nozzle. Cleaned fibers are fed to roll tips and discharged from apparatus. Used solutions are supplied from tank to settlers for further processing and recycling.

In the patent description CA2111458 (published 1992-12-23) the method of decorticating flax, and flax-processing machine designed to carry out the method were presented. The aim of the invention is to produce, after only a short dew-retting time or light chemical pretreatment, a degree of decortication sufficient to form the preliminary step of a constant-flow fiber-digestion process. The flax is picked up as a tangled mass and processed in a tangential flow breaker unit and a subsequent longitudinal-flow fiber scutching and cleaning unit. Incorporated in the first breaker is a system of parallel slots and in the second breaker a peripheral gap whose axis of curvature is at right angles to the slots in the first breaker. The fiber scutching and cleaning unit has several longitudinal sections fitted with fiber-conveying and loosening means which separate and clean the fibers. The decorticated fibers are then compressed, in a built-on baler unit, into bales.

In the patent description WO2006032181 (published 2006-03-30) the process for degumming the jute was presented. A process for degumming the jute, which includes the following steps: (1) unpacking and stricker-up of the raw jute (2); treating the raw jute with a compound enzyme, which comprises adding to the container the aqueous solution of the compound enzyme made from pectinase and laccase so that the jute is treated, taking the jute out the container and patching up in a predetermined duration, and finally

rinsing the raw jute with hot water (3); reduction bleaching, which comprises adding to the container a aqueous solution of reductive bleaching agent and bleaching the jute, and then adding a decolorizer thereto and treating the jute, finally taking the jute out the container after the treatments are carried out (4) beating the result jute, and then rinsing, oiling, dehydrating, drying sequentially, thereby the jute fiber decolorized and impurity free is obtained. The percentage of decoloring and the removal rate of lignin genera are up to 89 % and over 76 %, respectively. The shade of the jute fiber is white. This jute fiber can be blended or interweaved with other kinds of fibers, and the resultant cloth can meet the requirement in using as facing fabric in apparel industry.

Despite described above studies on obtaining new devices for processing fibrous plant raw materials, there is a need to build an effective and versatile device that could be used to conduct the technological process with the option of setting at least several parameters describing the process and functioning in the same time.

This invention aims at providing means that could be used to manufacture a device improving processing fibrous plants raw materials keeping the possibility of parallel setting of at least several parameters, including their correlation, without interrupting the processing.

Performing this goal and solving problems connected with developing a device enabling processing of fibrous plant raw materials described in the status of the technique, characterized also by option of processing with at least several parameters set have been achieved in this invention.

The subject of the present invention is a device for processing fibrous raw materials characterized in that the device is built of two tanks: a reservoir of working fluid 5 and working tank of the apparatus 1, of which integral parts are openable collector 2 and permanent collector 3 and guides 22 located in collectors 2 and 3, where working fluid from the working fluid reservoir 5 is supplied to working tank of the apparatus 1 by chemical pump 4, where the working fluid is being supplied from the regulating valve 18 to the openable collector 2 and/or permanent collector 3 of the working tank of the apparatus 1, while the excess of liquid supplied by chemical pump 4 from the two-way

regulating valve 11 is directed to the working fluid reservoir 5, whereas the range of the two-way regulating valve 11 regulation is set by a manual regulating valve 18, where there are heaters 16, temperature detector 20, pH detector 15 and fluid level detector 17, fresh water intake controlled by the water intake from the network valve 14, and overflow 19 and drain valve 13 in working fluid reservoir 5, while particular parameters in working fluid reservoir 5 are read by the flow-meter 10, pH detector 15, water level detector 17, temperature detector 20 and are compared by the regulator 23 with the set values, while the deviations generate impulse to the steering device 24 starting the two-way valve III 8, two-way regulating valve 11, the valve supply water form the network 14, turning on the heaters 16.

Preferentially, the speed of fluid flow in the working tank 1 of the apparatus is adjusted by the two-way regulating valve 11 from the regulator 23 by the steering device 24, and the working fluid is directed by the regulating valve 18, flow-meter 10 and a two-way valve I 6 or a two-way valve II 7 to the openable collector 2 and/or permanent collector 3 of the apparatus working tank 1.

Preferentially, the fluid flow goes in opened cycle, where the fluid having passed through the apparatus working tank 1 is directed to the sewage collector by the two-way valve III 8 or by manually controlled valve 12.

Preferentially, the fluid flow goes in closed cycle, where the fluid having passed through apparatus working tank 1 is guided to working fluid reservoir 5 by the two-way valve III 8 and a filter 9, where the filter 9 is a unit prepared for particular process.

Preferentially, pH is controlled constantly.

Preferentially, the device is equipped with ultrasound generators 21 in collectors 2 and 3.

Preferentially, the processing is conducted by liquid water solutions of chemicals and/or enzymatic processing and/or biological processing and/or physical processing.

Preferentially, the processing is conducted with the use of constant water flow by using physico-chemical phenomena, especially osmosis.

Preferentially, the device is used for degumming raw materials from fibrous plants by using physico-chemical phenomena, especially osmosis.

Preferentially, the device is used for degumming, washing, rinsing, bleaching, dying, impregnation and chemical treatment of raw materials made of fibrous plants.

Preferentially, the device is presented in Fig. 1.

The next subject of the invention is the method of processing of raw materials obtained from fibrous plants, characterized in that the raw material is being placed in working tank of the apparatus 1 and the water and/or other fluid is run through it, where the fluid is being run through the working tank of the apparatus 1, where the guides 22 mounted in the openable collector 2 and in the permanent collector 3 ensure the uniform flow of liquid in the whole cross-section of the apparatus working tank 1, the working fluid from the reservoir of the working fluid 5 is supplied to the apparatus working tank 1 by the chemical pump 4, where the fluid is given its target fluid flow rate in the working tank of the apparatus 1 using the two-way regulating valve 11 from the regulator 23 by the steering unit 24, where the working fluid is directed from the two-way regulating valve 11 through the flow-meter 10 and two-way valve I 6 or the two-way valve II 7 to the apparatus working tank collector 1, while the excess of the fluid supplied by the chemical pump 4 from the two-way regulating valve 11 is directed to the working fluid reservoir 5, where the working fluid is prepared and treated so it's properties meet the requirements of the process, than the values of particular parameter detected by the flow-meter 10, pH detector 15, fluid level detector 17, temperature detector 20 are compared with the set values by the regulator 23, while the deviations generate impulse to the steering unit 24, triggering the two-way valve III 8, the two-way regulating valve 11, the valve supply water form the network 14 and turning-off the heaters 16.

Preferentially, the processed raw material is placed in the apparatus working tank 1 and the water and/or other fluid is run through it, where the fluid is being run through the apparatus working tank alternate in two directions.

Preferentially, pH is controlled constantly.

Preferentially, the ultra sound generator 21 helps the process.

Preferentially, the liquid water solutions of chemicals are used and/or enzymatic processing and/or biological processing and/or physical processing is used.

Preferentially, the processing is conducted with the use of constant water flow by using physico-chemical phenomena, especially osmosis.

Preferentially, the processing is conducted in an opened flow of the working fluid and the fluid, having passed through the apparatus working tank 1 is directed to the sewage collector by the two-way valve III 8.

Preferentially, the processing is conducted in close cycle of working fluid, where the fluid, following passing through the apparatus working tank 1 is directed on the two-way valve III 8, through the filter 9 to the working fluid reservoir 5 where the filter 9 purifies the working fluid after it has passed through the apparatus working tank 1 eliminating substances released from processed raw materials during the process, where purification of the liquid enables recycling the fluid.

Preferentially, the processing of fibrous plants raw materials is periodical.

Preferentially, the processing is used for degumming raw materials from fibrous plants by using physico-chemical phenomena, especially osmosis.

Preferentially, the method is used for degumming, washing, rinsing, bleaching, dying, impregnation and chemical treatment of raw materials made of fibrous plants.

Attached figure helps the better explanation of the invention principle.

Figure 1 shows the scheme of device for processing fibrous plant raw materials, where:

1 – Apparatus working tank

2 – Openable collector

3 – Permanent collector

4 – Pump

5 – Working fluid reservoir

6 – Two-way valve I controlled electrically

7 – Two-way valve II controlled electrically

8 – Two-way valve III

9 – Filter

10 – Flow-meter

11 – Two-way regulating valve

12 – Apparatus working tank drain valve 1

13 – Working fluid reservoir drain valve 5

14 – Water supply from the network valve

15 – pH detector
16 – Heaters
17 – Fluid lever detector
18 – Manual regulating valve
19 – Overflow
20 – Temperature detector
21 – Ultrasound generator
22 – Guides
23 – Regulator
24 – Steering unit
25 – batching tank
26 – batching valve
27 – batching pomp

Presented below are examples of application of above define invention

Example 1. Degumming flax stems.

Having opened openable container 2, 15 kg of flax stems were placed in apparatus working container 1 so that the stems bulk distribution was as even as possible in whole container volume which was 1.1 m high, and 0.6 m in diameter. The parameters on the steering unit: regulator 23 and steering device 24, were set as follows: water pH – 6.5, temperature – 30°C, water flow rate through the raw material set by manual regulating valve 18 – 20 L/min and time of change of water flow direction through the apparatus working tank 1 from the bottom to the top or from the top to the bottom. Having turned on the device at the steering unit: regulator 23 and steering device 24, the working fluid reservoir 5 was automatically filled with water from the network through the water supply from the network valve 14, than the water was heated by heaters 16 till set temperature measured by the detector 20 was achieved, and having reached the set temperature, water was pumped over by the pump 4 from the working fluid reservoir to apparatus working tank 1 through the electrically controlled two-way valve II 7 and permanent collector 3. The level of water in working fluid reservoir 5 was controlled by

the fluid level detector 17. Having pumped water over, the working fluid reservoir 5 was filled up with tap water through water supply from the network valve 14, water was heated with heaters 16 and pumped over to the apparatus working tank 1 by the pump 4 through the two-way valve II 7 and permanent collector 3. Filling up the apparatus working tank 1 with water took place till the moment when the working fluid reservoir 5 and apparatus working tank 1 were completely filled. Degumming was conducted at constant water flow through the raw material which was directed to the openable collector alternate 2 from the bottom to the top of the apparatus working tank 1 by the electrically controlled two-way valve II 7 or the electrically controlled three-way I valve 6. A uniform flow of water through the whole bulk of raw material was secured by guides 22 in the openable collector 2 and in permanent collector 3. Having passed through the apparatus working tank 1 water run through the two-way valve III 8 and came back through the filter 9 to the working fluid reservoir 5. The working fluid reservoir 5 was equipped with overflow 19 protecting from water overflow over its edge. The set rate of water flow through the apparatus working tank 1 was measured by the flow-meter 10 and controlled by the signal from this flow-meter by electrically controlled regulating valve 11. Degumming was conducted at constant flow of water through the raw material for 72 hours. Having terminated the process the water working fluid from apparatus working tank 1 was dumped to the sewage system by the drain valve 12 and from working fluid reservoir 5 by the drain valve 13. Both valves, drain valve 12 and drain valve 13 were manually controlled. Having removed the water, the stems were taken out from the apparatus working tank 1, than it was squeezed, dried, broken and the fiber was separated.

Example 2. Degumming flax stems using ultrasounds.

The example concerns using the device and the method for degumming decorticated fibre of such fibrous plants as flax, hemp, kenaf, jute and others Having opened openable container 2, 15 kg of flax stems was placed in apparatus working container 1 so that the stems bulk distribution was as even as possible in whole container volume which was 1.1 m high, and 0.6 m in diameter. The parameters on the steering unit: regulator 23 and steering device, were set as follows: water pH – 6.5, temperature – 30°C, water flow rate

through the raw material set by manual regulating valve – 20 L/min and time of change of water flow direction through the apparatus working tank 1 from the bottom to the top or from the top to the bottom. Having turned on the device at the steering unit: regulator 23 and steering device 24, the working fluid reservoir 5 was automatically filled with water from the network through the water supply from the network valve 14, than the water was heated by heaters 16 till set temperature measured by the detector 20 was achieved, and having reached the set temperature, water was pumped over by the pump 4 from the working fluid reservoir to apparatus working tank 1 through the electrically controlled two-way valve II 7 and permanent collector 3. The level of water in working fluid reservoir 5 was controlled by the fluid level detector 17. Having pumped water over, the working fluid reservoir 5 was filled up with tap water through water supply from the network valve 14, water was heated with heaters 16 and pumped over to the apparatus working tank by the pump 4 through the two-way valve II 7 and permanent collector 3. Filling up the apparatus working tank 1 with water took place till the moment when the working fluid reservoir 5 and apparatus working tank 1 were completely filled.

Having filled up the apparatus working tank 1 the ultrasound generators 21 were turned on that are placed in the permanent collector 3 and in the openable collector 2. The working time of ultrasound generators depends on the temperature and requirements of the process.

Degumming was conducted at constant flow of water through the raw material, that was directed alternate from the bottom to the top of the apparatus working tank 1 by the electrically controlled two-way valve II 7 or by the electrically controlled three-way I valve 6 to the openable collector 2. Uniform flow of water through the whole bulk of raw material was secured by guides 22 in the openable collector 2 and in permanent collector 3. Having passed through the apparatus working tank 1 water run through the two-way valve III 8 and came back through the filter 9 to the working fluid reservoir 5. The working fluid reservoir 5 was equipped with overflow 19 protecting from water overflow over its edge. The set rate of water flow through the apparatus working tank 1 was measured by the flow-meter 10 and controlled by the signal from this flow-meter by electrically controlled regulating valve 11. Degumming was conducted at constant flow of water through the raw material for 48 hours. After set time, the chemical pump 4,

heaters 16 and ultrasound generator 21 were turned off and two-way valve III 8 opened, and working fluid from apparatus working tank 1 was dumped to the sewage system by the drain valve 12 and from working fluid reservoir 5 by drain valve 13. Both valves, the drain valve 12 and drain valve 13 were controlled manually. Having dumped the water, stems were taken out from the apparatus working tank 1, than squeezed, dried, broken and the fiber was separated.

Claims

1. A device for processing raw materials obtained from fibrous raw materials, characterized in that the device is built of two tanks: a reservoir of working fluid (5) and working tank of the apparatus (1), of which integral parts are openable collector (2) and permanent collector (3) and guides (22) located in collectors (2 and 3), where working fluid from the working fluid reservoir (5) is supplied to working tank of the apparatus (1) by chemical pump (4), where the working fluid is being supplied to regulating valve (18) to the openable collector (2) and/or permanent collector (3) to the working tank of the apparatus (1), while the excess of liquid supplied by chemical pump (4) from the two-way regulating valve (11) is directed to the working fluid reservoir (5), whereas the range of the two-way regulating valve (11) regulation is set by a manual regulating valve (18), where there are heaters (16), temperature detector (20), pH detector (15) and fluid level detector (17), fresh water intake controlled by the water intake from the network valve (14), and overflow (19) and drain valve (13) in working fluid reservoir (5), while particular parameters in working fluid reservoir (5) are read by the flow-meter (10), pH detector (15), water level detector (17), temperature detector (20) and are compared by the regulator (23) with the set values, while the deviations generate impulse to the steering device (24) starting the two-way valve III (8), two-way regulating valve (11), the valve supply water form the network (14), turning on the heaters (16).

2. A device according to claim 1, characterized in that the speed of fluid flow in the working tank (1) of the apparatus is adjusted by the two-way regulating valve (11) from the regulator (23) by the steering device (24), and the working fluid is directed by the regulating valve (18), flow-meter (10) and a two-way valve I (6) or a two-way valve II (7) to the openable collector (2) and/or permanent collector (3) of the apparatus working tank (1).

3. A device according to claim 1, characterized in that the fluid flow goes in opened cycle, where the fluid having passed through working tank of apparatus (1) is directed to the sewage collector by the two-way valve III (8) or manually controlled valve (12).

4. A device according to claim 1, characterized in that the fluid flow goes in closed cycle, where the fluid having passed through apparatus working tank (1) is guided to working fluid reservoir (5) by the two-way valve III (8) and a filter (9), where the filter (9) is a unit prepared for particular process.

5. A device according to claim 1, characterized in that pH is controlled constantly.

6. A device according to claim 1, characterized in that it is equipped with ultrasound generators (21) in collectors (2) and (3).

7. A device according to claim 1, characterized in that the processing is conducted by liquid water solutions of chemicals and/or enzymatic processing and/or biological processing and/or physical processing.

8. A device according to claim 1, characterized in that the processing in the device is conducted with the use of constant water flow by using physico-chemical phenomena.

9. A device according to claim 1 or 2 or 3 or 4 or 5 or 6, characterized in that it is used for degumming raw materials from fibrous plants by using physico-chemical phenomena.

10. A device according to claim 1 o r 2 or 3 or 4 or 5 or 6, characterized in that the device is used for degumming, washing, rinsing, bleaching, dying, impregnation and chemical treatment of raw materials made of fibrous plants.

11. A device as claimed in claim 8 or 9, in which the physico-chemical phenomena is “osmosis”.

12. A method of fibrous plants processing characterized in that the raw material is being placed in working tank of the apparatus (1) and the water and/or other fluid is run through it, where the fluid is being run through working tank of the apparatus (1), where the guides (22) mounted in the openable collector (2) and in the permanent collector (3) ensure the uniform flow of liquid in the whole

cross-section of the apparatus working tank (1), the working fluid from the reservoir of the working fluid (5) is supplied to the apparatus working tank (1) by the chemical pump (4), where the fluid is given its target fluid flow rate in the working tank of the apparatus (1) using the two-way regulating valve (11) from the regulator (23) by the steering unit (24), where the working fluid is directed from the two-way regulating valve (11) through the flow-meter (10) and two-way valve I (6) or the two-way valve II (7) to the apparatus working tank collector (1), while the excess of the fluid supplied by the chemical pump (4) from the two-way regulating valve (11) is directed to the working fluid reservoir (5), where the working fluid is prepared and treated so it's properties meet the requirements of the process, than the values of particular parameter detected by the flow-meter (10), pH detector (15), fluid level detector (17), temperature detector (20) are compared with the set values by the regulator (23), while the deviations generate impulse to the steering unit (24), triggering the two-way valve III (8), the two-way regulating valve (11), the valve supply water form the network (14) and turning-off the heaters (16).

13. The method according to claim 12, characterized in that the processed raw material is placed in the apparatus working tank (1) and the water and/or other fluid is run through it, where the fluid is being run through the apparatus working tank alternate in two directions.

14. The method according to claim 12, characterized in that pH is controlled constantly.

15. The method according to claim 12, characterized in that the ultra sound generator (21) helps the process.

16. The method according to claim 12, characterized in that the liquid water solutions of chemicals are used and/or enzymatic processing and/or biological processing and/or physical processing is used.

17. The method according to claim 12, characterized in that the processing is conducted with the use of constant water flow by using physico-chemical phenomena.

18. The method according to claim 12, characterized in that the processing is conducted in an opened flow of the working fluid and the fluid having passed through the apparatus working tank (1) is directed to the sewage collector by the two-way valve III (8).

19. The method according to claim 12, characterized in that the processing is conducted in closed cycle of working fluid, where the fluid, following passing through the apparatus working tank (1) is directed on the two-way valve III (8), through the filter (9) to the working fluid reservoir (5) where the filter (9) purifies the working fluid after it has passed through the apparatus working tank (1) eliminating substances released from processed raw materials during the process, where purification of the liquid enables recycling the fluid.

20. The method according to claim 12 or 15, characterized in that the processing of fibrous plants raw materials is periodical.

21. The method according to claim 12 or 13 or 15, characterized in that the processing is used for degumming raw materials from fibrous plants by using physico-chemical phenomena.

22. The method according to claim 12 or 16, characterized in that the processing is used for degumming, washing, rinsing, bleaching, dying, impregnation and chemical treatment of raw materials made of fibrous plants.

23. The method as claimed in claim 17 or 21, in which the physic-chemical phenomena is “osmosis”.

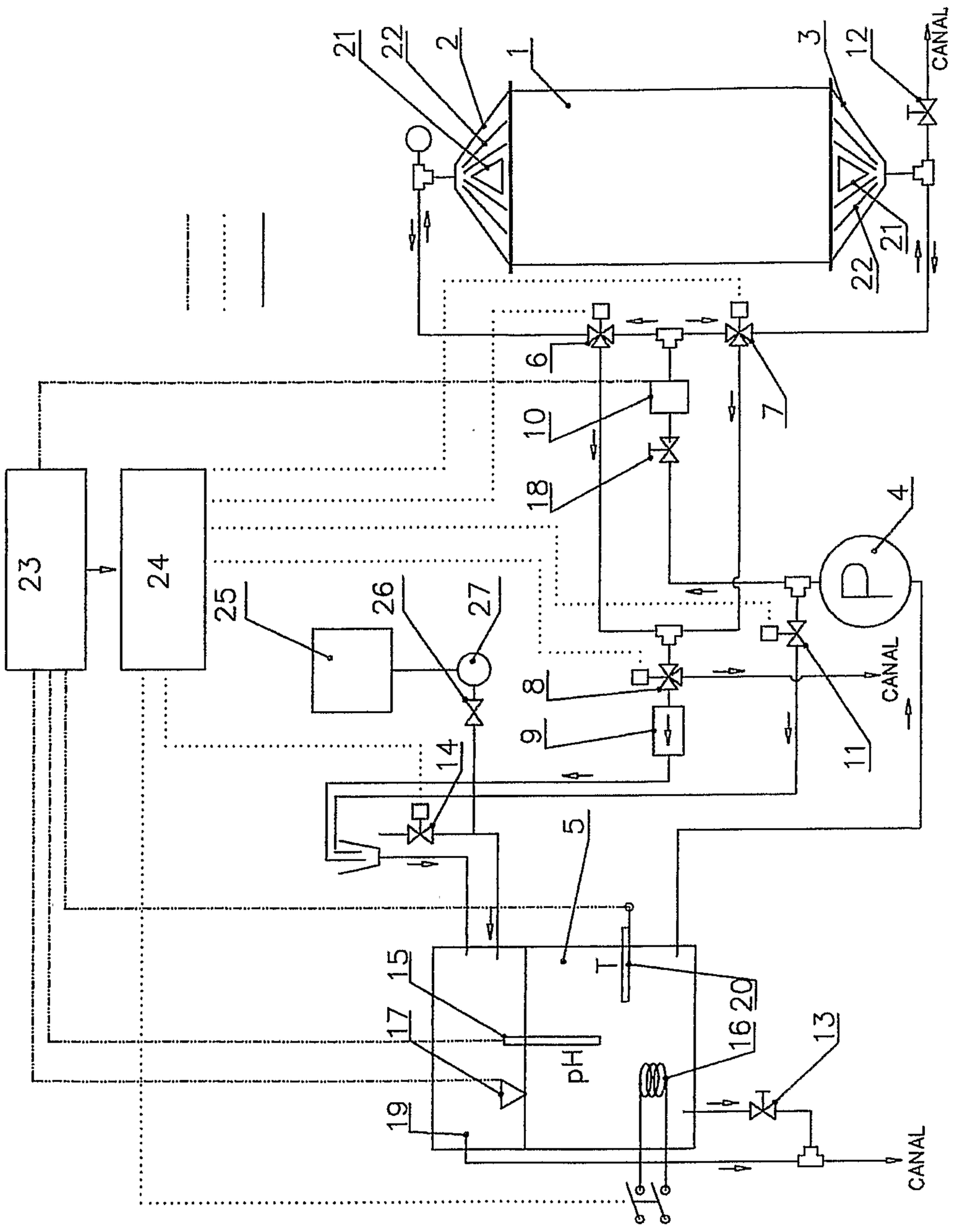

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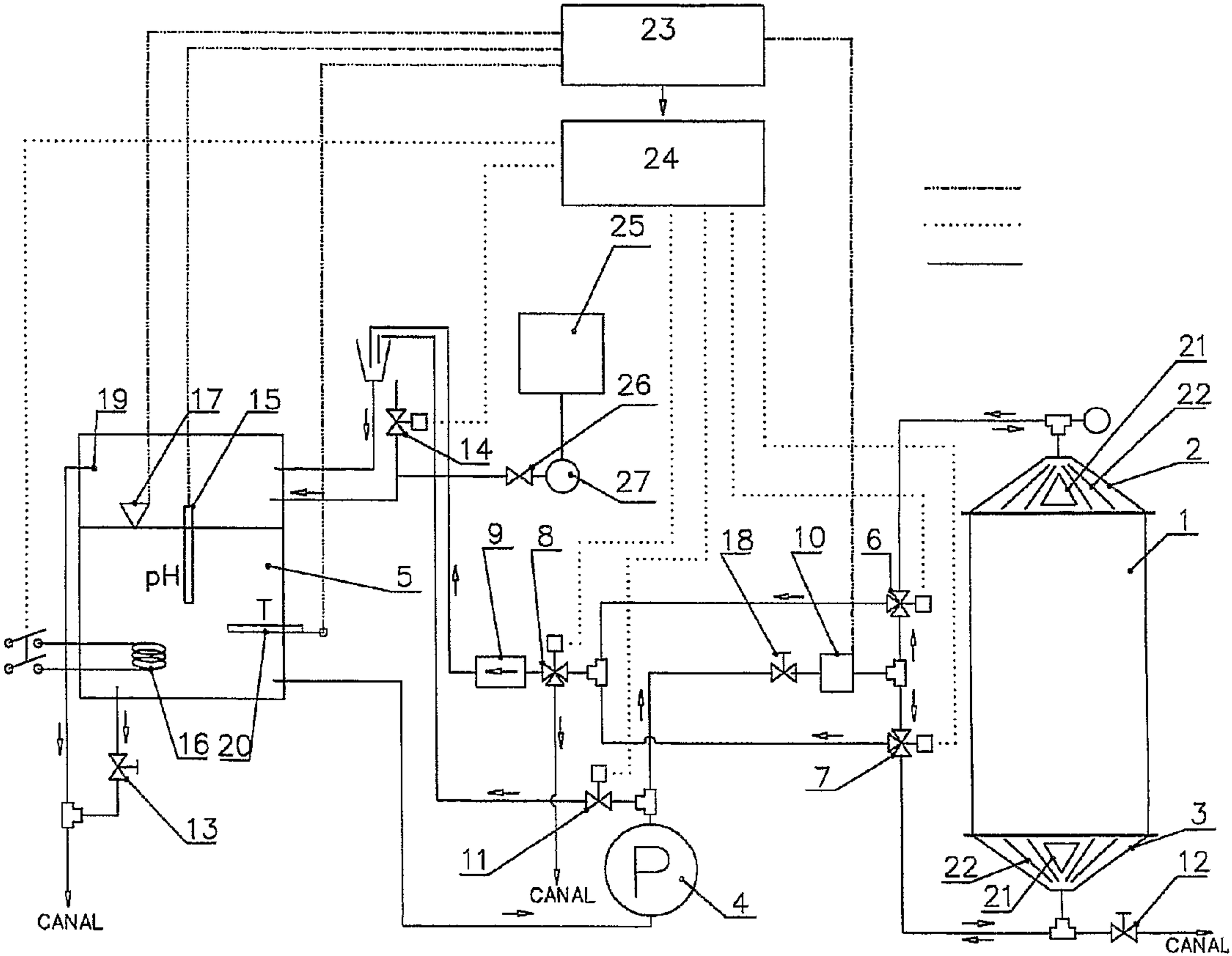
Fig.1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