

(19)



(11)

EP 2 043 792 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

04.05.2016 Bulletin 2016/18

(51) Int Cl.:

B08B 3/02 (2006.01)

D21F 1/32 (2006.01)

(86) International application number:

PCT/IB2006/003892

(21) Application number: **06842330.0**

(22) Date of filing: **26.07.2006**

(87) International publication number:

WO 2008/012597 (31.01.2008 Gazette 2008/05)

(54) **SYSTEM FOR CONTINUOUS TREATMENT**

SYSTEM FÜR EINE KONTINUIERLICHE BEHANDLUNG

SYSTÈME POUR TRAITEMENT CONTINU

(84) Designated Contracting States:

**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI
SK TR**

(43) Date of publication of application:

08.04.2009 Bulletin 2009/15

(73) Proprietor: **Reis de Carvalho, Ricardo**

Sao Paulo 13272073 (BR)

(72) Inventor: **Reis de Carvalho, Ricardo**

Sao Paulo 13272073 (BR)

(74) Representative: **Hernández Hernández, Carlos**

SilexIP Consulting

Velázquez 109 2° D

28006 Madrid (ES)

(56) References cited:

WO-A-95/13422

US-A- 6 129 099

US-A1- 2003 178 048

US-B1- 6 227 460

EP 2 043 792 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] The present invention patent deals with a system destined for continuous treatment of felts and screens in paper and cellulose machines, in a differentiated manner, and also the cleaning of other parts of the same machines at regular intervals, such as structures, tanks, hoods, floors, etc, utilizing applications of heated and pressurized chemical solution or homogenized enzymes, which are applied in association or separately.

[0002] The same system can also be applied in machines in other segments such as those utilized in the food, textile, transportation, asbestos, paint, aviation or metal industry, etc, both continuously and intermittently, on the respective equipment and parts thereof.

[0003] The development in question utilizes the application of chemical products or enzymes for treating the machines or parts thereof, continuously or intermittently, providing the solution at predetermined levels for the appropriate concentration, thus forming a homogenized mixture that is heated and pressurized.

[0004] The system is composed of a set of parts, and prominent among these are one or more tanks for storing and feeding chemical products or enzymes, which may or may not be associated with thermodynamic equipment that combines water, steam and chemical products, to produce a potent homogenized solution that is heated and pressurized, which is directed towards the showers or ejector devices, which may or may not be used together, and which are strategically positioned on the machines to be treated, or the parts thereof.

[0005] The application of this system for the treatment of the felts and screens results in large numbers of benefits, among which there is the possibility of:

Continuous cleaning of the felts and screens, with greater efficiency and without interrupting the machine in its production of paper and cellulose;

Greater uniformity of the cross-sectional profile of the product, with regard to the moisture content, and better quality of the paper and cellulose sheet;

Better performance, because of the stability of the machine, with reduction in the number of breakages in the paper and cellulose sheet;

Possibility of individualized treatment for the different characteristics and requirements for fabrics in the same machine;

Increase in the productivity of the machine, because of greater capacity for removing water from the sheet, since the system supplies a chemical solution, which may or may not contain an enzyme and which is homogenized and heated, thereby keeping the felts conditioned and clean;

Increase in the useful life of the felts and reduction in the number of stoppages for replacing them;

Elimination of problems caused by the handling and use of substances that are harmful to the working environment;

Elimination of damage caused to the external environment and cost from effluent treatment.

[0006] For the other parts of the machines that are treated intermittently, the following possibilities can also be highlighted as advantageous:

More efficient cleaning of the treated parts
Reduction in the time lost during interruptions in production for treating the treated parts;

Elimination of the handling and use of substances that are harmful to the working environment and also to the external environment.

[0007] The state of the technique is represented by the previous patent, which was granted to the same inventor, filed under the number PI 9715083-5, which also refers to a continuous system for the treatment of felts and screens in paper and cellulose machines, which consists of the application of a chemical cleaning solution that is homogenized, heated and pressurized for application.

[0008] Other documents known are the documents US2003178048 WO9513422, US 6227460 B1. In US2003178048 is disclosed a cleaning equipment for cleaning a moving surface particularly in a paper machine includes a washing head with a chamber in it opening onto the surface to be cleaned and nozzle elements arranged inside the chamber. The cleaning equipment also includes vacuum means and removal means.

[0009] In WO9513422 is disclosed an oscillator for tubular spray which is intended in particular for washing the wires of paper machines with a cleansing liquid. The oscillator includes a drive means which generates a reciprocatory linear movement and which is connected with at least one washing-jet delivery inner tube of the tubular spray.

[0010] In US 6227460 B1, which is considered as the closest state of the art is disclosed a system in accordance with the preamble of claim 1.

[0011] However, the present development offers a series of advantages of an economic, technical and operational nature, and also makes it possible to have greater performance from the equipment for the proposed purpose.

[0012] The aforementioned problems are solved by a system in accordance with claim 1.

[0013] The matter will become perfectly understood in the following description:

FIGURE 1 - schematic view of the water feed system

of the system, and its circulation;

FIGURE 2 - schematic view of the water and steam feed lines, with the other intermediate devices;

FIGURE 3 - schematic view of the water and steam lines and their interconnection with the chemical product containers, connected to the dosage pump, to the thermal injector pump or heat exchanger with, high-pressure pump, and to the showers or injector devices for feeding the final solution into the system;

FIGURE 4 - schematic view of the water, steam and chemical product lines, going through the thermal injector pumps or heat exchangers with high-pressure pumps, with interconnection with the protection chambers for the structure, with an external command panel and external showers with internal telescopic fit guides, or other injector devices;

FIGURE 5 - schematic view of the internal layout of the showers with internal telescopic fit guides which allow unblocking of the injector nozzles with halting the operation of the system;

FIGURE 6 - schematic view of the combination, with detailing of the distribution network and lead lines for water, steam and chemical products or enzymes;

FIGURE 7 - schematic view of the system in accordance with the invention

FIGURE 8 - schematic view of an embodiment of the invention, with the provision (by way of example) of three showers and an injector and spraying device, showing all the equipment that it is composed of, which can be utilized in parts or with more branches, connected in parallel, according to the needs.

[0014] As can be seen from the said illustrations, the system consists of a principal water feed pipe (1) from which a lead line (2) for fresh water goes out to the set, passing through filters (3) and stored in the tank (4), and is taken through the pressure-raising and pressure maintenance pump (5). There is also provision for a principal pipe (6) for steam feed, which is led through the line (T) to the system, passing through a device for extracting condensate (8) and then through the steam filter (9). From the containers for continuous chemical product or enzymes (10) and shock containers (11), the feed pipes (12) for these go out to the system. In this, the first line goes through the dosing pump (13) and flow measuring device (14), and the two pipes (12) are led to the protection chamber, with a support structure and external indicator panel (16). Inside this, the thermal injector pumps or heat exchangers with a high-pressure pump (15) are housed, with outputs in pipelines leading the pressurized chemical solution (17) to the showers with internal tele-

scopic fit guides (18), ejector devices (22) or spraying devices (23), for spraying out the cleaning product. There is provision for a mixing tank and lowering of pressure and temperature (19), and the tubular showers (18) are provided with sliding internal cylinders (20), in which the spraying nozzles are attached (21).

[0015] Thus, the system has provision for optional use of adaptations of ejector devices (22) or spraying devices (23), together with the showers (18), which are all destined for the outlet from the pipelines (17) that lead the pressurized chemical solution. These may be destined, respectively, for cleaning the felts and screens in paper and cellulose machines, other parts of these machines or, additionally, other equipment.

[0016] It can thus be observed, as listed in the following, that the modifications introduced enable the existence of a series of advantages and improvements in relation to the previous system, which can be identified through the following characteristics:

In the water feed part, the fresh water filters (3), the tank for storing the fresh water (4) and the pump for raising and maintaining the pressure of the fresh water (5) have been incorporated.

[0017] These devices have the purpose of reducing the quantity of water utilized in the system, improving the water quality and stabilizing the pressure of the water admitted into the thermal pumps or heat exchangers with high-pressure pumps.

[0018] The quantity of water utilized in the system can be reduced as the quality of the water is improved, since this provides a reduction in the quantity of contaminant and also reduces the size of these elements, and thus the ejector nozzles for the chemical solution in the showers can have smaller diameters and consequently this gives rise to lower consumption of the sprayed chemical solution, and therefore lower water consumption.

[0019] In the steam feed, a steam filter (9) and a device (8) for condensate extraction (for example, a purger or other manual device) have been coupled to the previously known equipment. Meanwhile, in the part for feeding chemical products and/ or enzymes, the following have been incorporated into the existing system:

The storage container for chemical products (11), which has become present in greater numbers, for each high-pressure thermal injector pump or heat exchanger with high-pressure pump, and a storage container is utilized for the continuous chemical product and/or enzymes (10) and another for the shock product (11).

[0020] The dosing pump (13), which has become utilized only for continuously dosing the solution. It can, in certain cases, be replaced by a device for measuring the chemical products, which are directly sucked in by the thermal pump. The device (14) provided for in the follow-

ing may be a measuring glass, rotameter or any type of flow measuring device (electromagnetic or other).

[0021] In the dosing of chemical product for shock, the utilization of the dosing pump can be done away with when the thermal injector pump is utilized, since this sucks in the chemical product directly. However, when a heat exchanger and high-pressure pump is utilized, the dosing pump (13) needs to be used for the chemical product.

[0022] In the part of the system responsible for raising the temperature, raising the pressure and preparing the chemical solution and/ or enzymes (15), the following devices have been incorporated:

Protection chamber (16) for the thermal injector pump(s), which have a safety purpose regarding thermal protection for the set, and also the incorporation of an external indicator panel for water, steam and chemical solution pressure and also for the temperature of the mixture.

[0023] Two or more thermal injector pumps (15) or heat exchangers, together with the high-pressure pumps, work in parallel, thereby allowing the fabrics of the paper or cellulose machines to be treated individually and in a personalized manner. "

[0024] With this latter innovation, the system can start to attend to several fabrics simultaneously, thus allowing the control conditions for temperature, pressure, outflow of the solution and dosing of chemical products and/ or enzymes to be done differently for each of them.

[0025] The original system did not allow different fabrics for the same application to have individualized treatment, since a single piece of equipment would attend to all of them simultaneously.

[0026] With the incorporation of these items, users of the system will have a large number of benefits in addition to those cited earlier, such as:

Reduction in the consumption of fresh water; Reduction in steam consumption;

- Reduction in the consumption of chemical products, since the fabrics are treated individually, with the utilization of only what is necessary for each one and not all together;
- Better performance from the paper and cellulose machines, since each fabric starts to have its own treatment, as a function of its characteristics and lifespan
- The chamber (16) offers a structure inside it for assembling the thermal injector pumps or heat exchangers, together with high-pressure pumps, which ensures protection of the equipment and. users.

- In the showers of telescopic type for the application of chemical solutions in the paper and cellulose machines.

[0027] When the paper or cellulose machines are working, it may happen that one or more shower nozzles become blocked. Such blockages can occur from inside to outside, or from outside to inside, according to the particular environmental conditions of each section if each paper and cellulose machine.

[0028] When blockages occur in any of the ejector nozzles, which may harm the quality of the product obtained, either the operation of the paper or cellulose machine is halted for cleaning the nozzles, or the operation is allowed to continue until it is possible to stop the machine for preventive or corrective maintenance.

[0029] In both cases, the operation is impaired, such that in the first case there is the consequence of lost production and in the second case the treatment of the fabrics in the machines is prejudiced, with consequent problems and alterations in the moisture profile and the vacuum in the suction boxes, thereby leading to greater energy consumption, etc, with obvious losses of quality in the paper or cellulose produced.

[0030] To resolve this type of problem, the shower devices with internal telescopic fit guides have been incorporated into the present development. These showers are constructed with a double body, i.e. an external one that is attached to the structure of the machine that will be treated and an independent internal one in which the spray nozzles and respective guides for removal and insertion are located.

[0031] When necessary, the internal part of the shower is removed for corrective maintenance (for example cleaning of the nozzles, joints, etc) by the personnel in charge of the paper or cellulose machines while in operation, so that their production is not interrupted, and such maintenance can be carried out by this personnel, without the need for specialized labor.

[0032] Devices have been, incorporated for reducing the temperature and pressure of the solution utilized and for simultaneous utilization of other chemical products and/or enzymes (with or without mixing), for application to certain parts of the paper and cellulose machines, which will be treated in different manners. These devices (kits) are placed in strategic intermediate positions in the system, and each of them is composed of parts shown in the diagram of the set, and the temperatures are reduced from the range of 75°to 90°Cto 40°to 60°C and the pressures from 7 to 25 bar to 1 to 6 bar.

[0033] The system based on the equipment now developed aims to eliminate a series of technical problems at present faced by paper manufacturers, with the objective of increasing the productivity of the machines and improving the quality of the final product, without any harm to the environment.

[0034] The integrated and optimized application of the three components (fresh water, chemical products and

pressure and heat) result in better performance for the system, for continuous treatment of the fabrics of paper and cellulose machines, thereby ensuring the operational benefits of: stability in the operation of the machine and a notable reduction in the number of breakages in the processed sheets; reduction in the time lost through interruptions in paper production for cleaning the fabrics, rollers, boxes, etc; better quality of the sheets obtained, with regard to their formation, uniformity and resistance.

Claims

1. SYSTEM FOR CONTINUOUS AND INDIVIDUALIZED TREATMENT FOR FABRICS FOR PAPER AND CELLULOSE MACHINES AND OTHERS, which includes equipment consisting of:

- a principal water feed pipe (1) connected to a lead line (2) for fresh water connected to a tank (4) for storing the fresh water,
- a container (10) for chemical products or enzymes and a container for shock products (11), from each container exits a respective feed pipe (12), wherein the two pipes (12) are connected to a protection chamber, with a support structure and external indicator panel (16), wherein inside this protection chamber, two or more thermal injector pumps (15) or heat exchangers with a high-pressure pumps (15) working in parallel are housed, with outputs in pipelines leading the pressurized chemical solution to showers characterized (18) in that
- the principal water feed pipe (1) is provided with filters (3) and comprises a pressure maintenance pump (5) at the exit of the tank (4),
- it comprises a line (7) connected to a principal pipe (6) for steam feed, wherein the line (7) is provided with a device for extracting condensate (8) followed by a steam filter (9) being further connected to the thermal injector or high pressure pumps (15),
- the first feed pipe (12) connected to the container (10) for chemical products or enzymes goes through a dosing pump (13) and a flow measuring device (14),
- a mixing tank for lowering of pressure and temperature (19) of the fluid exiting the protection chamber, and ,
- the said showers (18) are tubular, provided with internal telescopic fit guides and with sliding internal cylinders (20), in which the spraying nozzles are attached (21).

2. SYSTEM FOR CONTINUOUS AND INDIVIDUALIZED TREATMENT FOR FABRICS FOR PAPER AND CELLULOSE MACHINES AND OTHERS, in accordance with claim 1, **characterized by** the fact

that it includes the incorporation of ejector devices (22) or spraying devices (23), together with the showers (18)

Patentansprüche

1. System für eine kontinuierliche und individuelle Behandlung von Geweben für Papier-, Zellulose- und andere Maschinen, die Vorrichtungen umfassen, bestehend aus:

- einer Hauptwasserzufuhrleitung (1), die mit einer mit einem Tank (4) zur Speicherung von Süßwasser verbundenen Anschlussleitung (2) für Süßwasser verbunden ist;
- einem Behälter (10) für chemische Produkte oder Enzyme und einem Behälter für Schockprodukte (11), wobei aus jedem Behälter eine entsprechende Zufuhrleitung (12) austritt, wobei beide Leitungen (12) mit einer Schutzkammer mit einer Trägerstruktur und einem externen Anzeigenpanel (15) verbunden sind, wobei in dieser Schutzkammer zwei oder mehrere parallel arbeitende thermische Einspritzpumpen (15) oder Wärmetauscher mit Hochdruckpumpen (15) untergebracht sind, deren Ausstöße in Rohrleitungen die druckbeaufschlagte chemische Lösung zu Berieselungsvorrichtungen (18) führen, **dadurch gekennzeichnet, dass**
- die Hauptwasserzufuhrleitung (1) mit Filtern (3) ausgestattet ist und eine Druckhaltungspumpe (5) am Ausgang des Tanks (4) umfasst;
- sie eine Leitung (7) umfasst, die mit einer Hauptleitung (6) zur Dampfzufuhr verbunden ist, wobei die Leitung (7) mit einer Vorrichtung zur Extraktion von Kondensat (8) gefolgt von einem Dampffilter (9) ausgestattet ist, der ferner mit den thermischen Einspritz- oder Hochdruckpumpen (15) verbunden ist;
- die erste, mit dem Behälter (10) für chemische Produkte oder Enzyme verbundene Zufuhrleitung (12) durch eine Dosierpumpe (13) und eine Durchflussmessvorrichtung (14) verläuft;
- ein Mischtank zur Senkung des Drucks und der Temperatur (19) des aus der Schutzkammer tretenden Fluidums; und
- diese Berieselungsvorrichtungen (18) rohrförmig und mit internen, teleskopischen Anpassungsführungen und mit gleitenden, internen Zylindern (20) ausgestattet sind, in denen die Spritzdüsen (21) befestigt sind.

2. System für eine kontinuierliche und individuelle Behandlung von Geweben für Papier-, Zellulose- und andere Maschinen nach Anspruch 1, **dadurch gekennzeichnet, dass** dieses die Einfügung von Ausstoßvorrichtungen (22) oder Spritzvorrichtungen

(23) zusammen mit den Berieselungsvorrichtungen (18) umfasst.

de dispositifs de pulvérisation (23), avec les douches (18).

Revendications

5

1. SYSTÈME POUR TRAITEMENT CONTINU ET INDIVIDUEL DE TISSUS POUR MACHINES À PAPIER ET CELLULOSE ET AUTRES, qui inclut l'équipements consistant en :

10

- une conduite principale d'alimentation en eau (1) reliée à une ligne de récupération (2) d'eau douce reliée à une cuve (4) de stockage de l'eau douce,
- un container (10) pour les produits chimiques ou enzymes et un container pour les produits de choc (11),

15

de chaque conduite sort un tuyau d'alimentation respectif (12), où les deux tuyaux (12) sont reliés à une chambre de protection, avec une structure de support et un panneau indicateur externe (16), dans lequel, à l'intérieur de cette chambre de protection, sont logés deux ou plusieurs pompes d'injection thermiques (15) ou échangeurs de chaleur dotés de pompes à haute pression (15) fonctionnant en parallèle, avec des sorties dans les conduites menant la solution chimique sous pression aux douches caractérisé (18) en ce que la conduite principale d'alimentation en eau (1) est munie d'un filtre (3) et comprend une pompe de maintien de pression (5) à la sortie de la cuve (4),

20

25

30

- il comprend une conduite (7) raccordée à une conduite principale (6) pour l'alimentation en vapeur, dans lequel la conduite (7) est munie d'un dispositif d'extraction de condensat (8) suivi d'un filtre de vapeur (9) relié en outre à l'injecteur thermique ou à la pompe haute pression (15),
- le premier tuyau d'alimentation (12) relié au container (10) de produits chimiques ou d'enzymes passe à travers une pompe de dosage (13) et un dispositif de mesure de débit (14),
- un réservoir de mélange pour diminuer la pression et la température (19) du fluide sortant de la chambre de protection, et,
- lesdites douches (18) sont tubulaires, pourvues de guides d'ajustement télescopiques internes et de cylindres de glissement internes (20), où sont fixées les buses de pulvérisation (21).

35

40

45

50

2. SYSTÈME POUR TRAITEMENT CONTINU ET INDIVIDUEL DE TISSUS POUR MACHINES À PAPIER ET CELLULOSE ET AUTRES, conformément à la revendication 1, **caractérisé en ce qu'il** comprend l'incorporation de dispositifs d'éjection (22) ou

55

FIG. 1

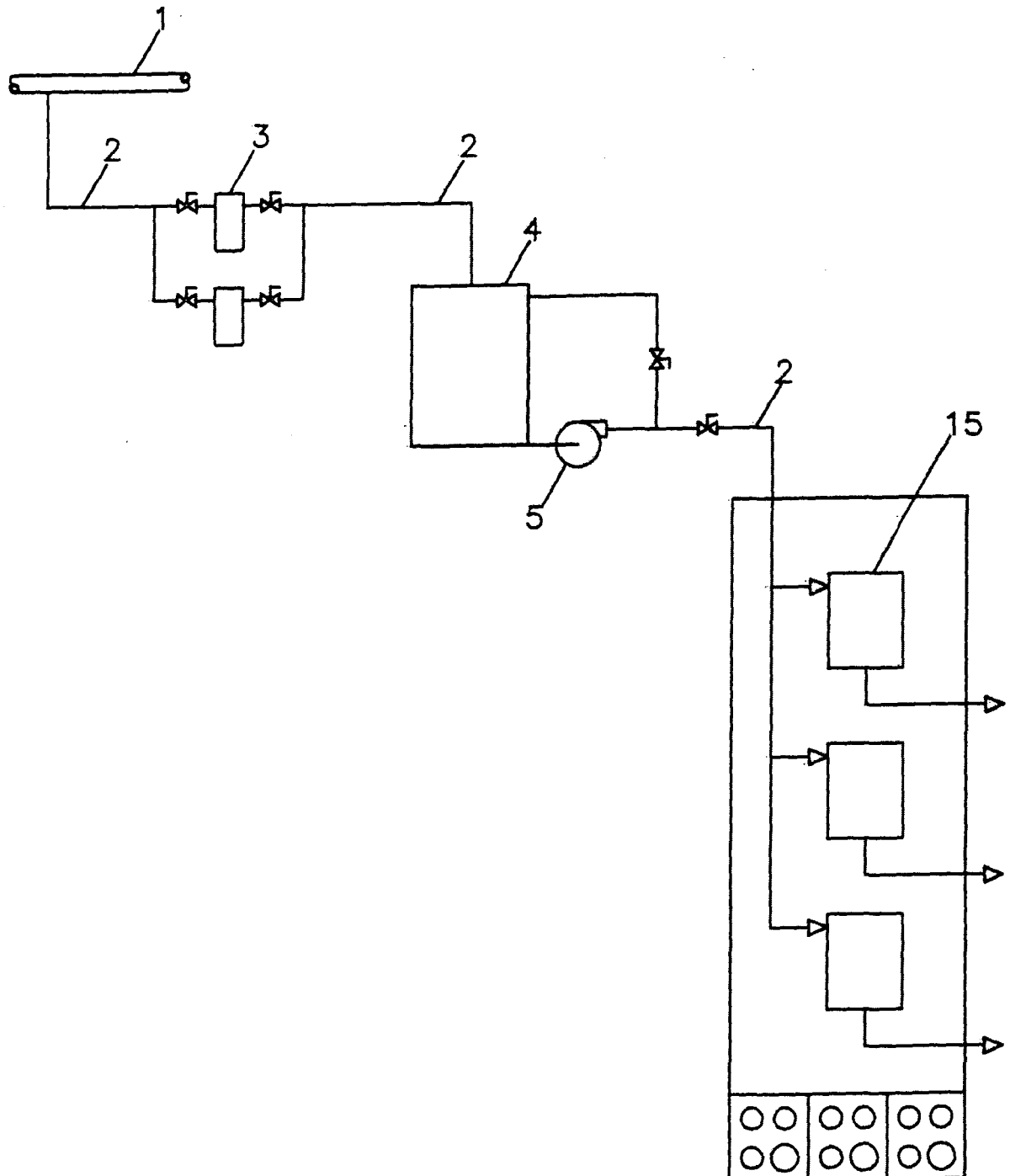


FIG. 2

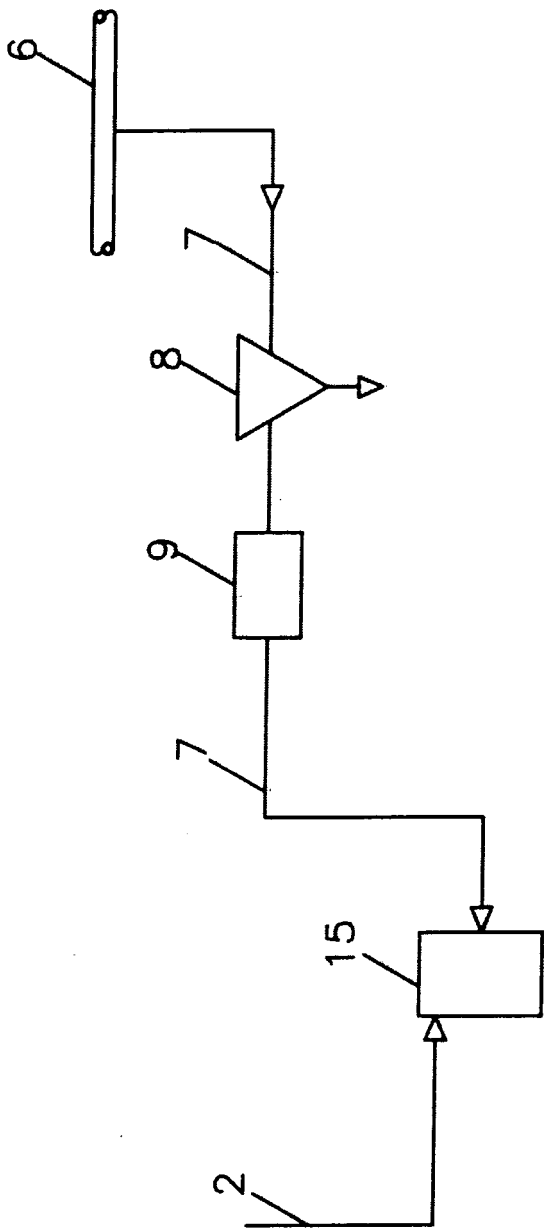


FIG. 3

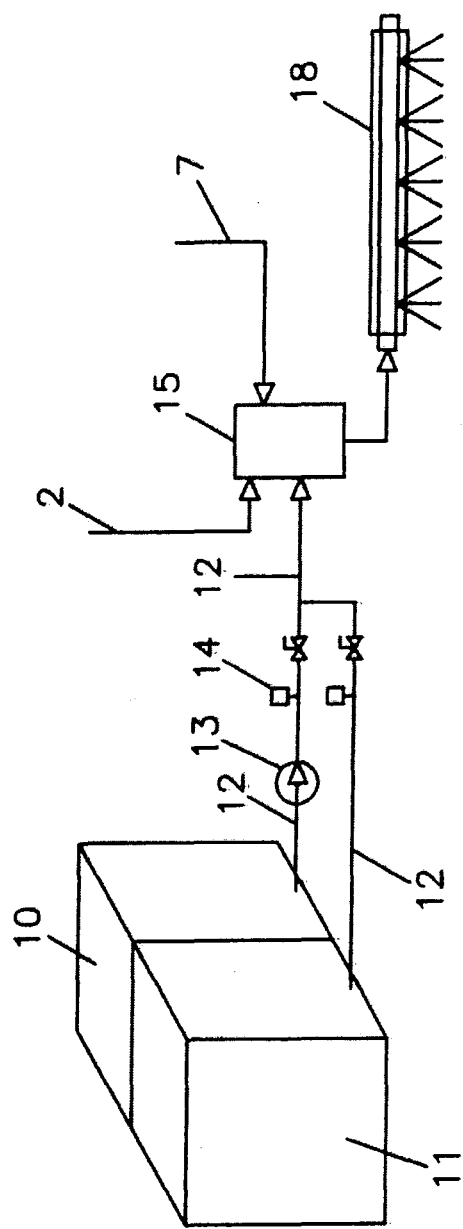


FIG. 4

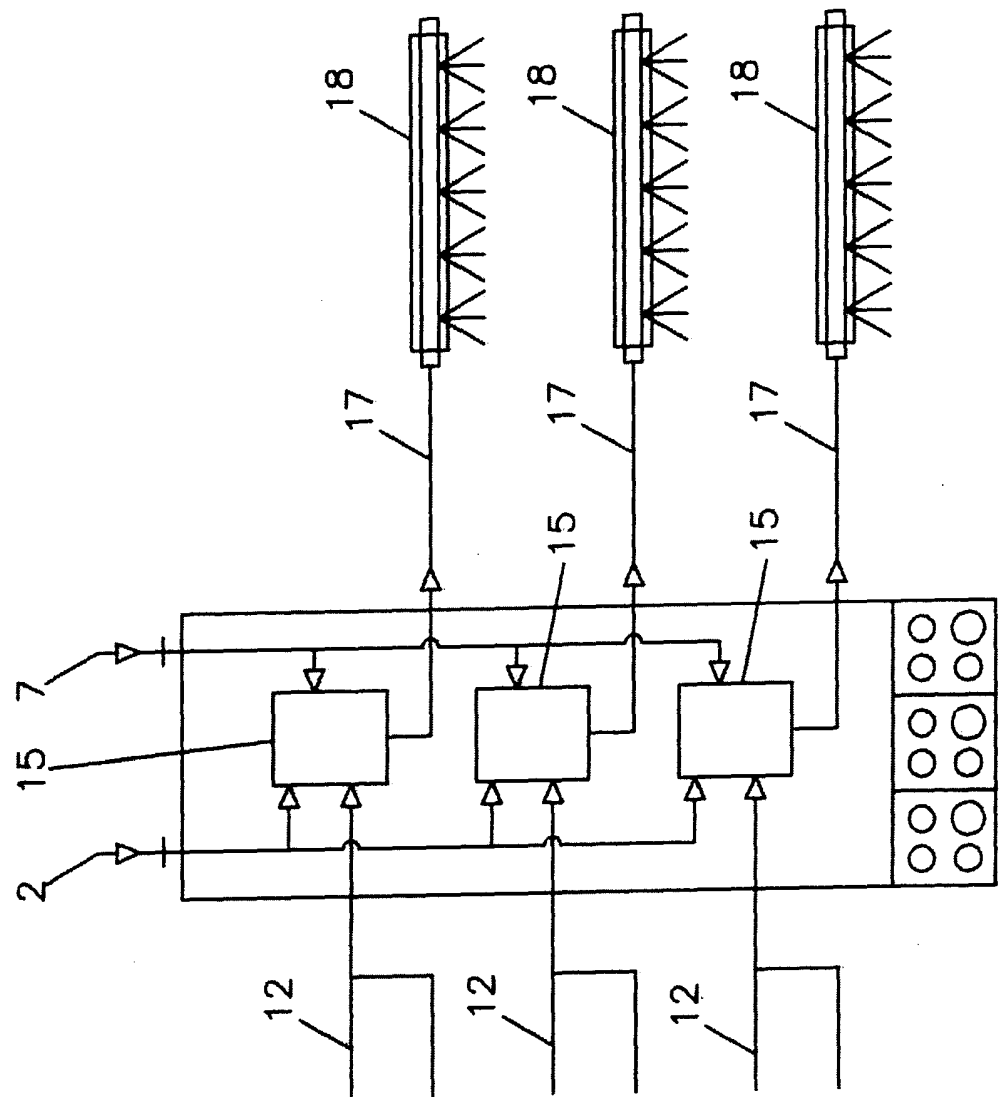


FIG. 5

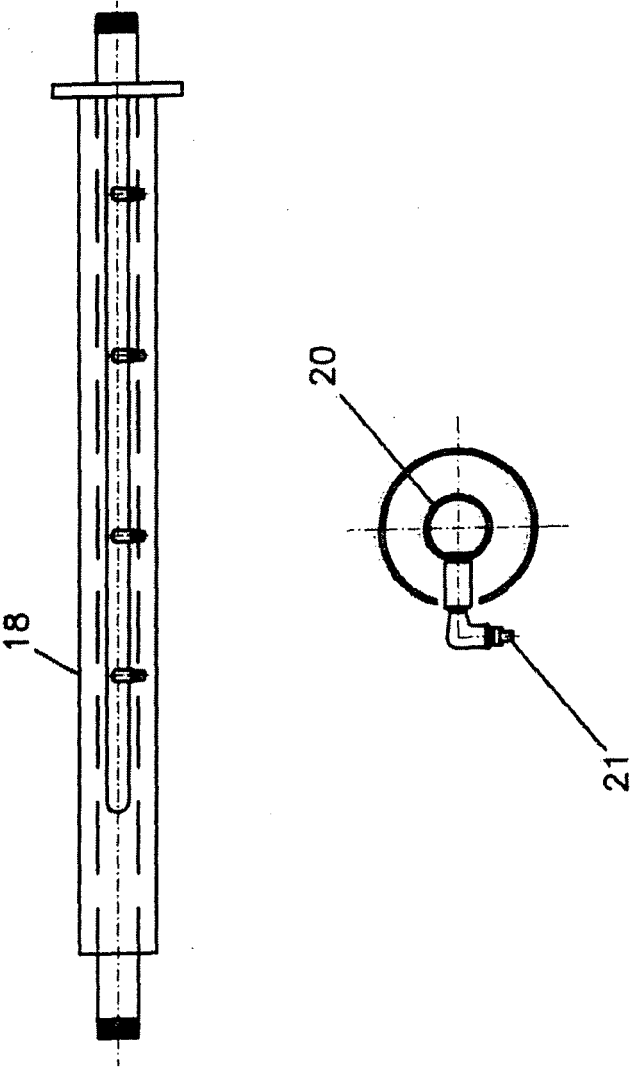


FIG. 6

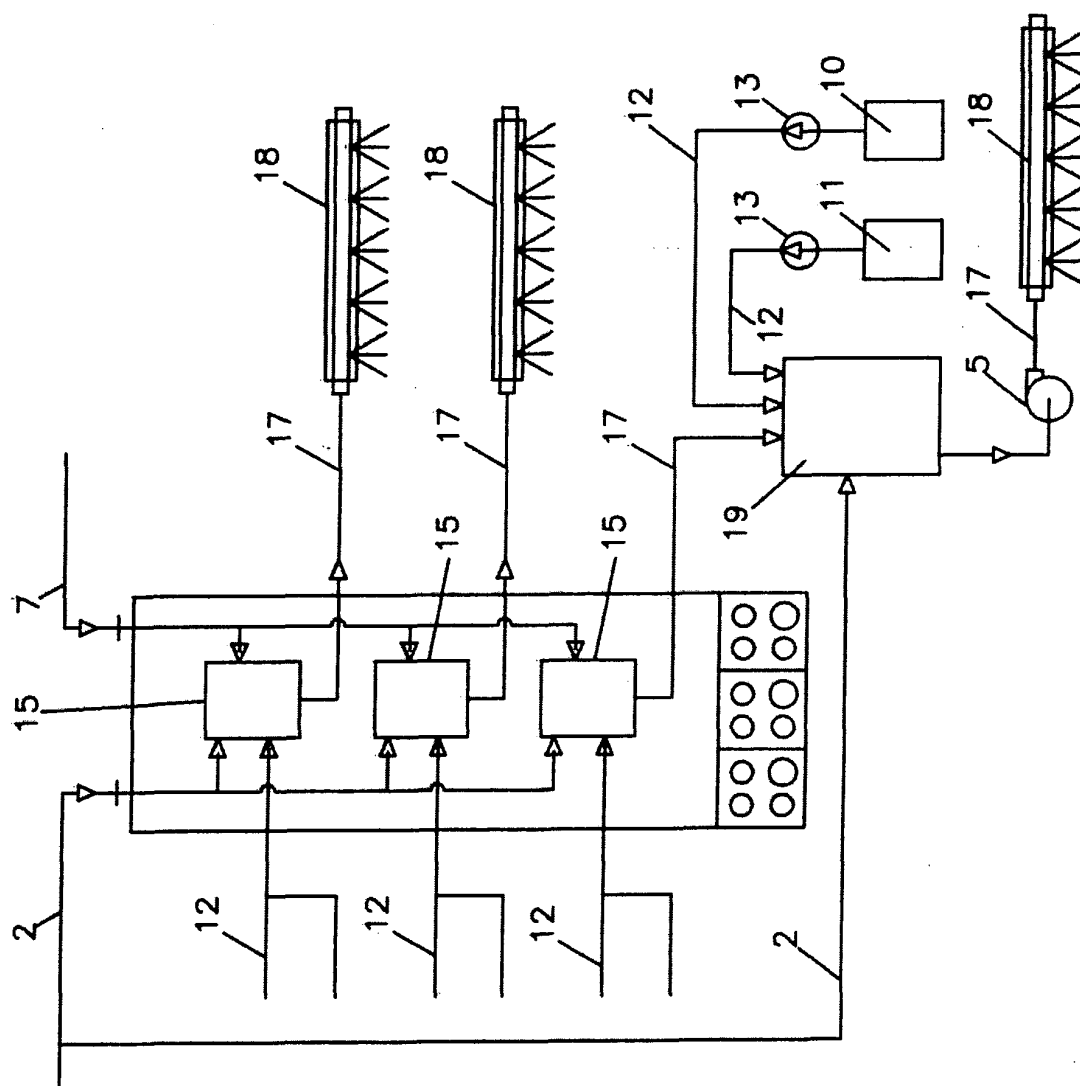


FIG. 7

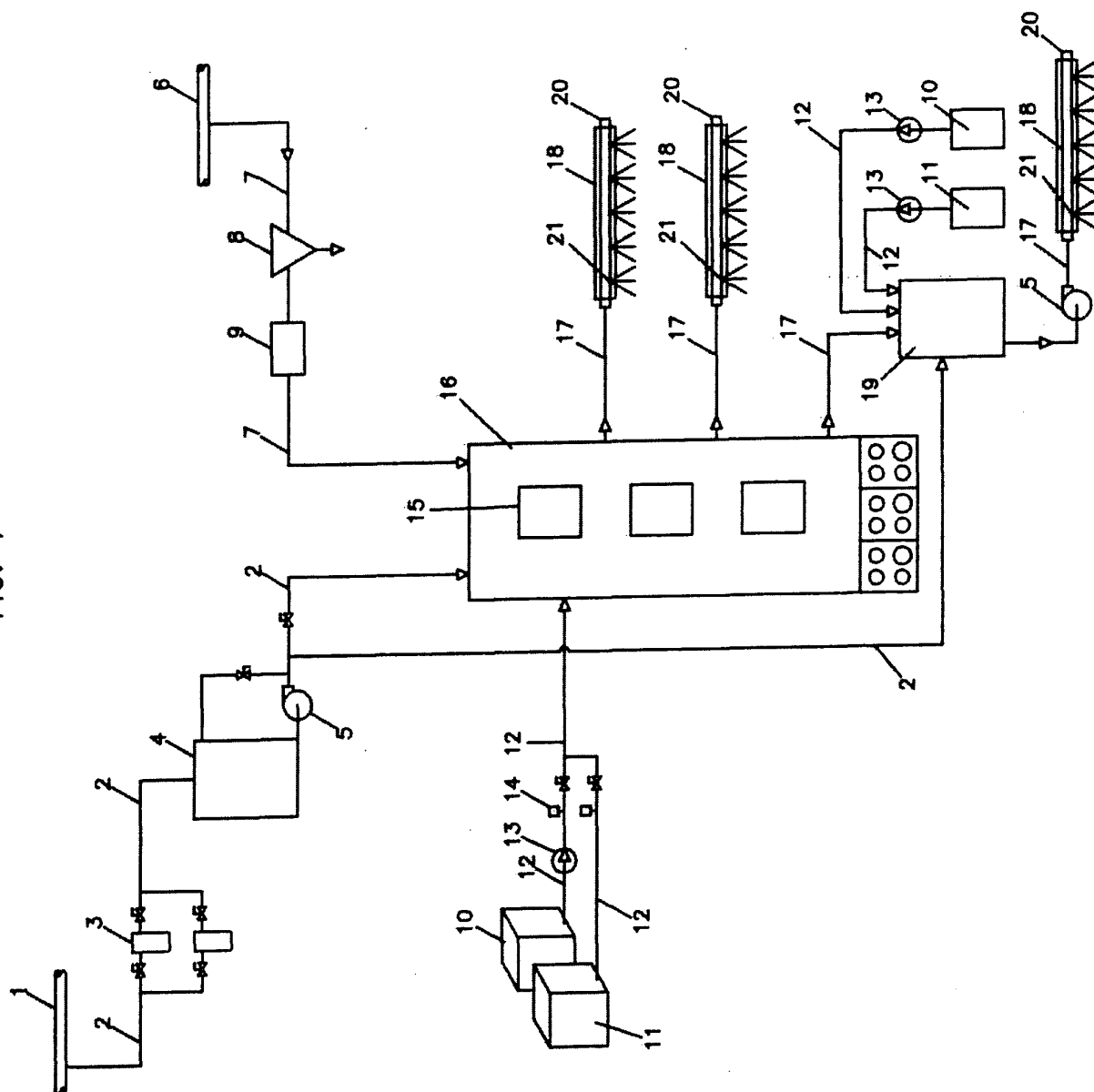
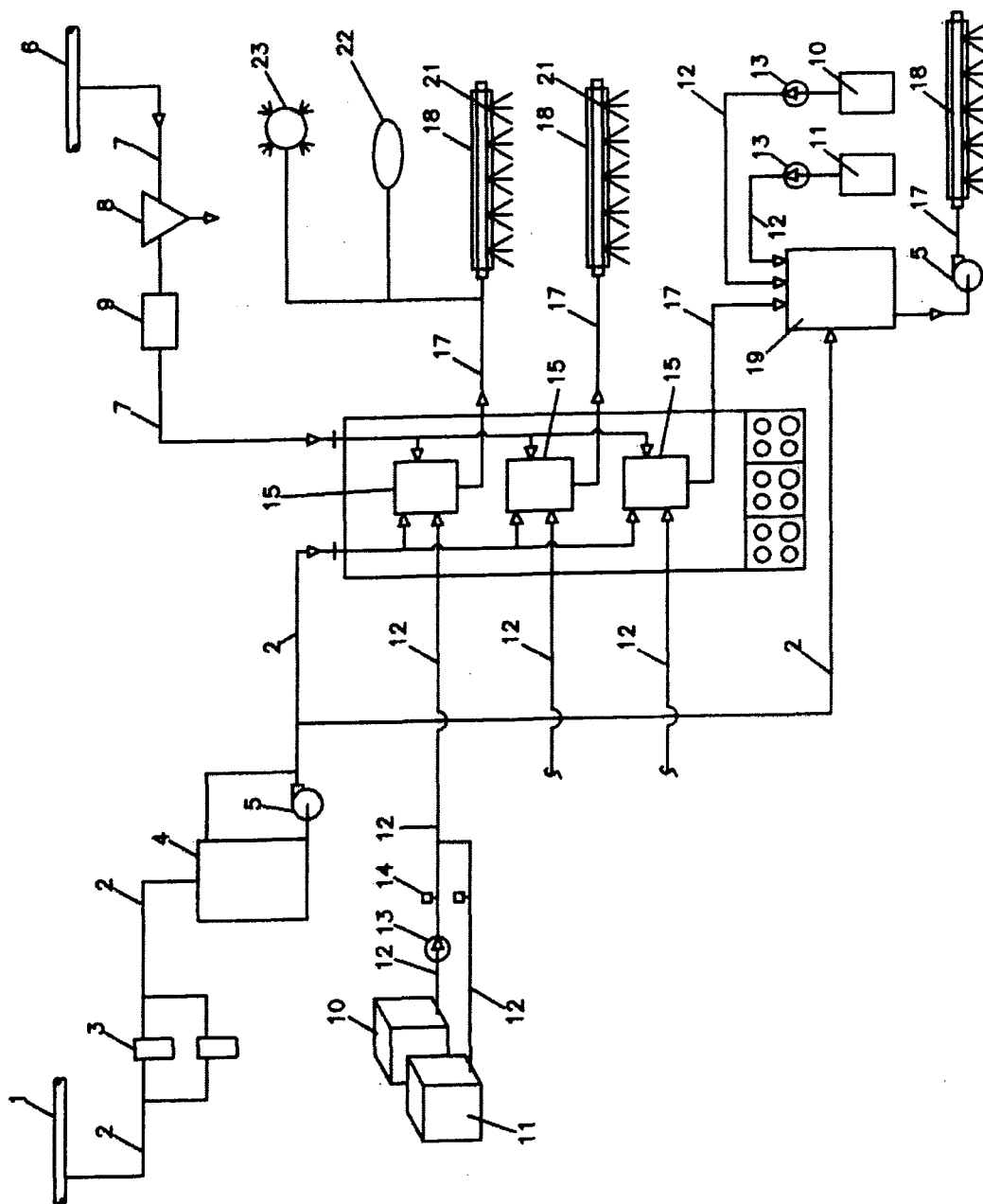


FIG. 8



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 97150835 A [0007]
- US 2003178048 A [0008]
- WO 9513422 A [0008] [0009]
- US 6227460 B1 [0008] [0010]