(12) **Oversettelse av europeisk patentskrift**

(11) **NO/EP 2704822 B1**

(19) NO

NORGE

(51) Int Cl.

B01J 19/12 (2006.01)
C02F 1/48 (2006.01)

Patentstyret

(21)	Oversettelse publisert	2019.01.21
(80)	Dato for Den Europeiske Patentmyndighets publisering av det meddelte patentet	2018.08.15
(86)	Europeisk søknadsnr	12726015.6
(86)	Europeisk innleveringsdag	2012.05.03
(87)	Den europeiske søknadens Publiseringsdato	2014.03.12
(30)	Prioritet	2011.05.04, SK, 342011
(84)	Utpekte stater	AL ; AT ; BE ; BG ; CH ; CY ; CZ ; DE ; DK ; EE ; ES ; FI ; FR ; GB ; GR ; HR ; HU ; IE ; IS ; IT ; LI ; LT ; LU ; LV ; MC ; MK ; MT ; NL ; NO ; PL ; PT ; RO ; RS ; SE ; SI ; SK ; SM ; TR
	Utpekte samarbeidende stater	BA ME
(73)	Innehaver	OKEANOS CORPORATION, Suite 9, Ansuya Estate, Revolution Avenue, Victoria, Mahe, Seychellene
(72)	Oppfinner	GREGA, Samuel, Mukacevska 10, 08001 Presov, Slovakia

(54)	Benevnelse	**METHOD FOR PHYSICALLY TREATING AND/OR HEATING MEDIA, IN PARTICULAR LIQUIDS**
(56)	Anførte publikasjoner	WO-A1-2007/045487

Vedlagt foreligger en oversettelse av patentkravene til norsk. I hht patentloven § 66i gjelder patentvernet i Norge bare så langt som det er samsvar mellom oversettelsen og teksten på behandlingsspråket. I saker om gyldighet av patentet skal kun teksten på behandlingsspråket legges til grunn for avgjørelsen. Patentdokument utgitt av EPO er tilgjengelig via Espacenet (http://worldwide.espacenet.com), eller via søkemotoren på vår hjemmeside her: https://search.patentstyret.no/

[0001] The invention relates to a method for physical processing and/or heating of liquids as defined by the preamble to claim 1.

[0002] Pretreating liquid and gaseous media in technologies that work with water as well as other chemical compounds (methane, alcohol, ethanol, and others), elemental substances (pure hydrogen gas, gaseous helium, and others), homogeneous compositions (air, seawater, water solutions, such as salt solution, copper vitriol solution, and others), colloidal compositions (milk, blood, and others), heterogeneous compositions (suspension, emulsion, foam, aerosols), is known. These excitation devices are used in biochemistry, petrochemical technologies, chemical technologies, and the like, in which the media are of an organized, inorganic, polar, nonpolar, natural or synthetic type.

[0003] Current technologies that work with liquid or gaseous media (whether as material jointly to be processed or as auxiliary material that improves the technological conditions) are defined by the energy bonds in the molecule and between the molecules. The magnitude of their decisive properties, such as fluidity, electrical conductivity, surface tension, and so forth, depends on these bonds. On account of their broad application and their high number in the context of this invention these technologies are not described concretely enough. This involves fluids and gases to the full extent of their molecular composition, such as: water, soda, acid, organic and inorganic liquids, hydrocarbons, in particular fuels, petroleum, gasoline, kerosene, mineral oils, liquid fertilizers, and so forth.

[0004] The technologies that relate to the media listed, such as burning, combustion, heating, cooling, mixing of media, such as homogenization, creating solutions, colloids as well as segregation, such as distillation, refinement, evaporation, segmentation and the like, are expensive in terms of energy, time and material.

[0005] The current technologies that require a temperature change (heating, cooling) of the medium are implemented by means of solid, liquid and gaseous fuels, electrical energy, solar radiation, geothermal heating (geothermics), heat pumps, and the like.

[0006] The disadvantage of the present methods is the high expenditure of energy; in combustion, the fuels have negative effects on the environment. In the case of automobile, air and ship traffic, the effects are even multiple times greater and more harmful.

[0007] If water is used as a heating medium or in the production of steam, for instance for a turbine drive, this medium requires complex processing in order to reduce some or all of the elements. Even possible ventilation, particularly on account of the formation of crusts, has to be provided for. In this processing, damage occurs to the surface of the technological systems, the functional surfaces of furnaces and of the machines, such as heating elements, heat exchangers, heating devices, and heating equipment.

[0008] In the case of heating water according to PCT Application WO 2007/045487, the heating is slow and sometimes unwanted. The way of attaining the objective recited was the subject of further research, in particular on account of the unexpected interactions in the type of heating, which was directed to the changes in the medium being treated. The physical changes ascertained led to the use in a further implementation, such as distilled water, demineralized water, geothermal water, alcohol, oils, gases, petroleum, gasoline, kerosene, methane, biogas, and other media that are mentioned in this application.

[0009] In US 4,427,544, a magneto-electrochemical reactor for water processing is described, which is located on a nonmagnetic pipeline with an inlet and an outlet. On the outside of the pipeline, a DC source is mounted. In the interior, there is a rotating turbine, which is located on ferromagnetic rods that are supported in the pipeline. The rotating turbine generates electric current, which acts on the formation of scale in the pipeline and that forms a protective layer against the depositions of crust in energy devices and heat exchangers.

[0010] US 5,384,627 shows a method and a device for electrolytic treatment of materials in which the material to be treated is stored in an electrolyte onto which an electromagnetic field acts. On the surface of the material to be treated, this field engenders electromagnetic and electrokinetic forces, which are capable of generating chemical and physical changes in the material to be treated. This involves a reactor, supplemented with an electrolyte, that has treatment materials such as ions, acids, bases, and the like with an optimal pH value as well as a reducing electrode, or a mixing device and a reducer. The reactor has a number of possible embodiments; the reducing electrode is connected to a cathodic metal.

This method is employed for cementing surfaces of the material to be treated.

[0011] US 4,061,551 shows a method for extracting gallium from alkaline solutions. This is a method for obtaining gallium from solutions for their further use, for instance as components for semiconductor elements of thermometers and the like. This is a device which comprises a container with an anode and a liquid metal cathode; the electrolyte contains a gallium solution. An electromagnetic field accelerates the displacement of gallium out of the alkaline electrolyte onto the electrodes.

[0012] US Patent Application 2007/0029261 shows a method and a device for water processing by electromagnetic waves for the sake of removing scale. This involves a part of a pipeline having an electromagnetic induction coil, which is connected to the source of the electromagnetic signal. The electromagnetic field is generated in the interior of the pipeline.

[0013] DE 888537 shows a method for extracting solids from solutions in order to prevent the formation of deposits on the heating cooling bodies in cooperation with an anode and a cathode. The technology is employed using the effect of magnets, whose magnetic fields, whether with direct current or alternating current, are generated or formed by a permanent magnet. In an alternative version, the effect is supplemented with a high-frequency field.

[0014] GB 2 433 267 shows a device having an electrostatic, electromagnetic field and an induction field. This is an electrostatic reduction device having a combined electromagnetic generator that is connected to a coil. The coil is formed on the outside of the entire circumference of a container in which a reactant is located. The AC generator is connected in the container to the AC electrode. The AC generator is connected to the bottom of the container, and the reactant has both a liquid and a solid aggregate state.

[0015] Republic of Moldova patent 4055 shows a method and a device for softening natural mineral water. In the device, there is a separate chamber for acting on water by means of a hollow cathode with a water inlet. The cathode is located on a coil, which is connected to a converter, a source of high-frequency magnetic pulses. The water treated by means of the cathode can be let out through a valve. However, it can also flow in the opposite direction on its outer circumference and be let out via a second, continuous outflow. Between the anode and the cathode, there is a ceramic membrane; a separate anode chamber has its own inlet and outlet and is connected to the positive pole of a direct-current source. The negative pole of the direct-current source is connected to the cathode. The way of attaining the objective also describes the parameters for the electrochemical treatment of the mineral water in this device.

[0016] From WO 2007/045487, a method for physical processing and/or heating media, in particular liquids, is known in which the medium is subjected entirely, or only in part, to ionization and/or polarization and simultaneously to an electromagnetic interaction, or is exposed multiple times to such an effect.

[0017] The common goal of the references cited is prevention of crust formation on the pipelines by the effect of a magnetic or electromagnetic field on the water in cooperation with a static or moving component in the flow direction. A further group of documents relates to the changes in the takeup of negative and positive ions by electrodes or the material to be treated, with an enrichment of the surface around these elements, with the goal of achieving cementation or the formation of an antioxidation protective layer, or recovery of elements from the solutions (electrolytes).

[0018] The objective is the processing of the medium, whether in the liquid or gaseous state, in order to vary changes in force and energy in the molecule and between the molecule and the medium, which changes are the cause of physical and/or chemical properties of the medium.

[0019] The essence of the invention is that the hydrodynamically processed medium, in the liquid and gaseous state, is exposed to polar and/or ionic electrochemical potentials as well as electrochemical signals RC AC. It suffices if, prior to the physical, biological, chemical, biochemical and other technologies, for at least some the medium to be pretreated in this way.

[0020] Additionally, the processed medium is enriched by the laser effect as a further type of energy, which is located either directly in the body or outside the body.

[0021] In a further embodiment it is provided that prior to the physical, biological, chemical, biochemical and other technologies, the entire content of the medium is processed in an excitation device. The best method for the processing provides that the medium is passed intentionally more than once to multiple times through the body of the excitation device. The essence of the invention further consists in that in the body of the excitation device, at least one controlled electrode is connected to a frequency source. This frequency source is connected to an energy source. A polarization and/or ionization chamber formed of various electrochemical potentials follows in the direction of the forced flow of the treated medium or, without a forced flow, through the flow tripped by temperature changes. It is technically simplest if these electrochemical potentials are formed on a body that has normal dimensions on its inside circumference and/or on its axis. The advantage of this method for physical processing, for the excitation device, and for its connection resides in the increase in the physical changes and their control or acceleration of the heating and expansion of the implementation of the excitation device in technologies in which it produces unexpected effects if one employs the method for instance for heating as an interactive node. Then, the excitation device. in combination with the conventional technologies, accelerates the heating, increases the output of the heating devices (boilers), and reduces the burden of emissions, which has favorable effects on the environment. In combination with other technologies, it acts as a catalyst, in particular in the field of organic and inorganic chemistry, petrochemistry, natural gas, petroleum and fuel processing, in the production of paper, in water purification, in the energy field, and the like. The effect introduced is achieved in that the bonds in the molecule and between the molecule and medium are changed; in the case of liquids, they change their fluidity and surface tension, similarly to what also happens with gases. They become thinner as a result and have weaker bonds, which leads to changing their physical and chemical properties (heat content/enthalpy changes), such as evaporation, heating, cooling, drying, mixing, and the like, as well as to changes in the chemical, physical, biological and bioenergetic reactions.

[0022] The invention will be described in further detail in conjunction with the accompanying drawings. In the drawings:

Fig. 1 schematically shows an excitation device for liquids and gases;

Fig. 2 shows an excitation device built into the cleaning module of a pipe system;

Fig. 3 shows an excitation device with a heat exchanger and a conventional heating module;

Fig. 4 shows a variant connection of the excitation device to pipelines of large diameter;

Fig. 5 shows a variant connection of the excitation device to a chamber with a mixing device of a redistributor;

Fig. 6 shows a variant connection of the excitation device to a chamber with biological, chemical and other technological devices;

Fig. 7 shows a basic embodiment of the body in which the negative electrode is in contact with the medium;

Fig. 8 shows a variant in which the negative electrode is located on only a part of the body;

Fig. 9 shows a variant with a secondary negative electrode with various potentials;

Fig. 10 shows a variant with an insulating layer between the negative and secondary negative electrodes;

Fig. 11 shows a variant with a different negative electrode;

Fig. 12 shows a variant with the relationship of the negative electrode to the controlled electrode, which are separated from the positive electrode and the medium;

Figs. 13 and 13A show a large-volume heating device with a controlled electrode and a positive electrode in two variants;

Fig. 14 shows the concatenation of a plurality of excitation devices;

Fig. 15 is a block diagram of the excitation device in a vehicle, having a transporting device for the medium;

Fig. 16 shows a variant of the excitation device of Fig. 15; and

Fig. 17 shows a variant with a vertical orientation of the electrodes.

[0023] The invention will be described in further detail in terms of an exemplary embodiment of an excitation device shown in Fig. 1.

[0024] In a body 1, an excitation device 10 for liquids and gases has at least one controlled electrode 6, which is connected to a frequency source 62 connected to an energy source 63.

[0025] In the direction of the forced flow of a treated medium 9 or by means of a flow tripped by temperature changes without a forced flow, a polarization and/or ionization chamber follows, which is formed of various electrochemical potentials. It is technically the simplest if these electrochemical potentials are formed at the body 1 with normal dimensions on its inner circumference and on its axis. The excitation device 10 for liquids and gases according to the invention processes only some, or the entire volume, of the medium 9 in polar and/or nonpolar-ionic fashion, which determines the type of change in the medium 9, by physical means, such as electrochemical signals RC AC, and by different electrochemical potentials in the body, when there is a hydrodynamic flow of the medium in the body. If on its surface the electrochemical potential located in the body 1 has an insulating layer such as 3.0 or 2.1, for instance in the form of silicate, Teflon, PP and PPR film, or a layer applied for instance in a vacuum, then a polarizing effect is involved. If this insulating layer is only part of the electrochemical potential of the electrodes, and part of its surface is in contact with the treated medium 9, an ionizing effect is involved. The activation excitation device 10 for liquids and gases that is shown is next inserted into an existing, old pipe system. Upon a change in the flow, preferably directly in the arc 1.0, from or in the vicinity of its axis, a flange is subsequently secured; a body 1 of insulating material, such as polyethylene, polypropylene, glass, silicate ceramic, or material with an electrochemical potential equal to zero (platinum) is secured dismountably in the arc 1.0. A through opening of the body 1, preferably with a round shape, is closed by a closure plate 1.3 of insulating material. In place of the flow of the medium 9, the body 1 laterally has an inlet opening 4 and in its axis it has an outlet opening 5. On its inner surface, the body 1 in the concrete exemplary embodiment has a negative electrode 3 in the form of a coating layer and the like.

[0026] In an alternative embodiment, at least a portion of of it is covered with a peripheral insulating layer 3.0. In the vicinity of or directly in the axis of the body 1, a support 6.1 is secured in the closure plate 1.3 in water-tight (media-tight) fashion with the controlled electrode 6, in which a transmission device 64 in the form of a rod or spiral is located and in this way is inserted into a silicate, silicon and/or quartz glass tube. The transmission device 64 is connected by one end dismountably or fixedly to the frequency source 62, which is connected to the energy source 63. The energy source 63 can be designed for instance as a distributor network 230V/50Hz or also as a photovoltaic module, battery, or their equivalents. The integrated controlled electrode 6 (Fig. 12) has a positively polarized electrode 2, for instance, on its end, which electrode is located in the common silicate tube and is separated from the controlled electrode 6 by an air gap or an insulating material having a minimal thermal dilation and/or a nonpolar elastic material. The positively polarized electrode 2 is formed for instance of C, Ag, Au, and the like or also comprises mixtures thereof or compounds having other elements. Located on the silicate tube of the controlled electrode 6 and/or of the positive electrode 2, in an alternative embodiment, is a coating, a layer 2.1 with positive and/or negative electrochemical potential. In this way, the medium 9 comes into direct contact with the coating, the layer 2.1, and is ionized.

[0027] Further embodiments of the controlled electrode 6 and of the polarized electrode 2 as well as the negative electrode 3 are shown in Figs. 7-12.

[0028] A further embodiment (Fig. 2) for generally attaining the objective, referred to in PCT Application WO 2007/045487, provides that at least some of the medium 9 is physically processed in the body 1, for instance by means of an electrochemical signal RC AC and various electrical potentials in the hydrodynamic flow of the medium 9 in its polarizing and/or nonpolarizing effect in the body 1, which is inserted subsequently into a dirt filter 1.0 that is a component of the pipe system. Here, the technology is implemented in a linear flow of the medium 9. The excitation device 10 for liquids and gases comprises one chamber of the controlled electrode 6 of the body 1 and one chamber of the positively polarized electrode 2 of the body 1. The inlet opening 4 is located in the axis of the integrated body 1 of the chamber of the controlled electrode 6. The chamber of the positively polarized electrode 2 has a lateral outlet opening 5 as well as an auxiliary inlet opening 41. The chamber of the controlled electrode 6 and the chamber of the positively polarized electrode 2 are linked to one another in the body 1 via a communication opening 45. A positively polarized electrode 2 is located directly in the axis of the integrated body 1 of the chamber of the controlled electrode 6 or is located in a silicate tube, preferably of technical glass. The body 1 comprises a first body 1.1, which forms the separate chamber of the controlled electrode 6, and a second body 1.2, which forms the separate chamber of the positively polarized electrode 2. These chambers communicate with one another mutually through a closure plate 1.3. The transmission device 64 located in the silicate tube communicates fixedly and/or dismountably with the frequency source 62, which is connected to the energy source 63. Similarly to the controlled electrode 6, the positively polarized electrode 2 is also located via a support 21 on the body 1 in the closure plate 1.3, which is secured dismountably on the flange. The body 1 is provided with sludge openings 1.4 and an external closable outflow opening 1.5. A cylindrical filter 1.02 is located on the circumference of a thus-embodied body 1.

[0029] How the objective of processing the medium 9 with multiple passes through the excitation device 10 with hydraulic and electrical connection, through which heating is achieved, is attained is shown in detail in Fig. 3. The body 1 has at least one controlled electrode 6 and at least one positively polarized electrode 2. In this version, a negative electrode 3 is located on the inner surface of the body 1, in the event that the body is made from an insulating material. In an alternative polarized version, the body 1 has a peripheral insulating layer 3.0 on the inside circumference, or only on a portion (see the right and left portions of the body 1). At least one conventional heating module 14, or at least one heat exchanger 17, is located in watertight fashion In the interior of the body 1. The controlled electrode 6 communicates with the frequency source 62, which is connected to the energy source 63. The energy source 63 is connected electrically to a transportation-promoting device 15 of the medium 9 and a conventional heating module 14 and their equivalents (laser, induction heating, and the like). The transportation-promoting device 15 communicates by its outlet to the interior of the body 1 at places where at least one controlled electrode 6 is located. The inlet into the transportation-promoting device 15 out of the chamber of the body 1 is effected at locations at which there is at least one positively polarized electrode 2, which is located in the support 21. The interior of the body 1 has a heat exchanger 17 with an inlet opening 17.1 and an outlet opening 17.2. These openings can also be a kinematic reversal. They are inlet-outlet openings. In an alternative way of attaining the objective, ahead of and/or behind the transportation-promoting device 15, a secondary excitation device 16 can be connected. The body 1 has a closable air-gas guide 7 and a closable sludge outlet 8. If the body 1 is located horizontally, then these openings are located on the upper and lower walls of the body 1. The excitation device 10 cited, shown in Fig. 3 without a hydraulic connection or without a heat exchanger 17 and heating module 14, can be used for processing the medium 9, specifically with a one-time pass of the medium 9 prior to the implementation of physical, chemical, biochemical, biological and other technologies.

[0030] A further embodiment of the excitation device 10 is shown in Fig. 4. It shows an arrangement on a pipeline of large diameter for the transportation of relatively large quantities of the medium 9 with minimization of the execution time. The hydrodynamic chamber 55 forms a part of the pipeline 100, to which an inlet opening 102 and outlet opening 101 are adapted in watertight fashion. It is advantageous to install closure and opening devices 103 and 104 on these openings. The closure and opening device 103 for the medium 9 is located on the outlet opening 101. The transportation-promoting device 15 is connected to the inlet of the excitation device 10, the outlet pipe of which communicates with the inlet opening 102 via the closure and opening device 104. The electronic frequency source 62 communicates on the one hand with the controlled electrode 106 and the energy source 63 and on the other with the control module 64. The control module 64 is connected to the transportation-promoting device 15 as well as to a first electronic closer/opener 65, operating continuously or in stages, as well as to a second closure/opener 66. The frequency source 62 is connected to the energy source 63 for alternating or direct current. The control module 64 is connected for example to a first measuring device T (for instance for temperature), a second measuring device t (for instance for pressure), and a final measuring device z (for instance for conductivity, pH, and the like). The transportation-promoting device 15 is preferably a pump of any type and its equivalent, but in the case of gases it is also a suction pump, ventilator, compressor, and equivalents thereof. The variant of the connection shown, at a lower technical level, does not have any first and second closers/openers 65, 66 operating continuously or in stages.

[0031] A further connection layout of two excitation devices 10 in the heat generation system with a boiler 100 is shown in Fig. 5. The first excitation device 10 communicates via a pipeline with the hydrodynamic chamber 55, which in a concrete embodiment forms a mixing device or a pressure regulator, or their equivalent. In this way, the transportation-promoting device 15 of the medium 9 is connected to the communicating pipeline. Upstream of the boiler 100, an excitation device 10 can but need not be installed; it is installed only in the case when the hydrodynamic chamber 55 is located at a distance from the boiler 100. The boiler 100 has an inlet P for the arriving medium 9, an outlet of the heating medium OM, and usually a gas outlet p as well as a sludge outlet k and an outlet for impurities. The outlet from the boiler 100 communicates with the distributor chamber 56, the outlet of which communicates with a first technological block 57, such as a heating block. The second outlet communicates with a second technology block 58, such as a solvate block for a biological washing system with chemical cleaning. A third outlet from the distributor chamber 56 communicates with a third technological block 59, for example for pool water heating. The technological blocks 57, 58, 59, 60, and so on, are each equipped as needed on the whole, for instance for a hotel, office building, manufacturing facilities, and the like. The hydrodynamic chamber 55 and the distributor chamber 56 also have the outlets p and k. The final technological block 60 is the last outlet, which communicates with the distributor chamber 56, and its outlet communicates with the hydrodynamic chamber 55 via a mixing device or its equivalents.

[0032] Fig. 6 shows a general connection of the excitation device 10 to a hydrodynamic chamber 55, which communicates by an outlet with the boiler 100. The hydrodynamic chamber 55 communicates by its first outlet with the physical block 71, by its second outlet with the chemical block 72, and with final outlet with the biological block 73, for example. It is understood that there can be more technological blocks than these blocks 71, 72, 73 mentioned here. If the medium 9 is petroleum, the block 71 can be physical, the block 72 can be a refining block, and the block 73 can be an evaporation or distillation block or the like. The embodiment of the negative electrode 3 can be of any kind, depending on the type of medium 9 being processed (anionic or cationic), which can be liquid or gaseous.

[0033] The general way of attaining the objective forms a layer, a coating, along the entire circumference of the chamber of the body 1 (Fig. 7).

[0034] Fig. 8 shows a way of attaining the objective in which at least a part of the body 1 is covered by the electrode 3, or by the positive and/or negative electrochemical potential equal to zero.

[0035] The embodiment of the electrode 3, in which two layers with different electrochemical potentials are in surface contact with one another, is shown in Fig. 9.

[0036] The same embodiment as in Fig. 9 is shown in Fig. 10, except with the difference that there is a peripheral insulation layer 3.0 between the electrochemical potentials.

[0037] Fig. 11 shows a body 1 with an electrochemical potential equal to zero. The body 1 comprises one part, which has an electrochemical potential equal to zero or comprises an insulating material, and secondary parts, which have a negative or positive electrochemical potential and which at the same time replace the electrode 3.

[0038] Fig. 12 shows an integrated controlled electrode 6 and a polarized electrode 2, which are located, separately from one another, in the same silicate tube; this tube on its outer surface has at least one outer coating, the layer 2.1 of positive and/or negative electrochemical potential. Fig. 12 shows additional possible exemplary embodiments of the electrode 3, the layers of which touch one another, are separate from one another, or cover one another.

[0039] The excitation device 10 for liquids and gases in the form of a large-volume heating device is provided on one side, in the vicinity of the inlet opening 4, with one or more controlled electrodes 6 and, in the vicinity of the outlet opening 5, with one or more polarized electrodes 2. It is advantageous if the interior of the body 1 has an insulating layer 10.2, preferably whenever the body 1 is formed of a load-bearing conductive material 10.1. It is advantageous if in this case the body 1 has on its outside at least one technological layer in the form of a heat insulation and/or a reflector for the electromagnetic radiation, for instance in the form of an aluminum foil and the like (Figs. 13, 13A).

[0040] The multiple passes of the medium through the excitation device 10 can be implemented with the aid of the transportation-promoting device 15. A further concrete embodiment can be achieved by lining up the excitation devices 10 with one another (Fig. 14). The medium 9 has enhanced technological effects if it is passed through two excitation devices.

[0041] The electrode 3 is anionic or cationic, depending on the type of material with which it ionizes. The physical liquid or the gas as the medium 9 is thus varied. In an alternative embodiment, the electrode 3, if it polarizes the medium 9, has an insulating layer 3.0 on the anionic or cationic material. This electrode 3 is the subject of further research. The polarized electrode 2 can have test tubes of anionic or cationic material in the interior of the silicate tube and is also a subject of further research with regard to its interactions with the chemical composition, the physical properties, and the like, of the medium 9.

[0042] The method according to the invention is the subject of further investigations. At present, one can conclude that if the electrode 3 comprises a material of negative electrode potential (negative electrochemical potential – cathode), such as Fe, Al, to lithium (-3.04V), and compounds and mixtures thereof, reduction processes are occurring in the medium 9. These versions were tested in the power supply industry. If the electrode 3 comprises a material of positive electrode potential (positive electrochemical potential – anode), such as Cu and from Ag to gold (1.55V) and compounds and mixtures thereof, then oxidation processes are occurring in the medium 9. These versions were tested in wastewater cleaning, biogas processing, and similar technologies. The polarized electrodes 2 are also a subject of further investigations, in particular regarding their interactions when there are changes in the medium 9. The polarized electrode 2 can have test tubes of anionic or cationic material in the interior of the silicate tube and is likewise a subject of research with regard to its interactions with the chemical composition and the physical changes in the medium 9.

[0043] Novel physical and chemical properties of the way of attaining the objective have been studied using the PO method, which is the subject of Slovakian patent 279429. The outcome of the study is as follows:

– The molecules in the medium, after the treatment according to the invention, are more weakly bound in the molecular and intermolecular structure; the medium has an increased fluidity and an altered surface tension; influences in the medium the occurrence of an electrical double layer; the electrical and chemical potential and the changes in the conditions for the electrical equilibrium affect the pH value and thus also the chemical compositions; the properties of the treated medium are dependent on the time of treatment, the heat content/enthalpy, and the absorption, which were measured under the conditions of changed properties by the Si that occurs in the medium.

By experimental measurements, differences in the evaporation speed and the heating speed as well as a drop in energy consumption for heating and cooling of the same medium were ascertained.

In view of the high measured absorption of water, which was prepared according to the invention, in comparison to water, which was not prepared, the inventor has found the following after the preparation over 30 seconds by means of a laser (laser pointer and laser battery, obtainable on the market):

After 110 hours, the inventor performed a comparison of:

- distilled water that was not prepared,
- distilled water that was not prepared according to the invention,
- distilled water that was prepared according to the invention and was affected by the laser.

This involves heating of a volume normal of 50°C to 60°C with the following outcome: distilled water that was not prepared with 4.5 MJ/kg, distilled water that was not prepared according to the invention with 4.1 MJ/kg, and distilled water that was prepared according to the invention and was affected by the laser with 3.7 MJ/kg.

What is listed above was confirmed by experiments in cooling, which have confirmed a substantially shorter time until the onset of germ formation for the water prepared according to the invention (performed by WSL – Institute for Snow and Avalanche Research SLF, Davos, Switzerland). As a result of the change in the bonds between the molecules and in the molecules, an optimized heat transfer and a change in the heat conductivity in the medium can be observed. The energy required for freezing can be transmitted more quickly or at a lower temperature gradient.

– Measurements for the use of distilled water, which was prepared according to the invention, for the electrolysis of water were performed; a faster reaction and a reduction in the costs for the power supply of 28% were measured.

– Tests with biogas processing were performed; after the processing according to the invention, an increase in the heating value of biogas by 17% occurred.

The tests were performed with an electromagnetic alternating signal and with an electromagnetic constantly sinusoidal signal, one continuous and one intermittent signal of 100-500 MHz; via a controlled electrode with a power of 0.1 to 100 W, a polarized electrode comprising technical glass and oxide ceramic with a filler of Cu, Ag, Al, C, Mg, and an ionized electrode of stainless steel, Zn, Sn, Fe, Cu, C, and coatings, W, Cr, Mo layers, whose carbides, nitrides, silicides, multilayer structures and communicating structures was worked.

[0044] By means of the method according to the invention, the methane gas that was bound in the well water was eliminated, which confirms a weakening of the bonds.

[0045] The possibilities for use occur because of the magnitude of the changes in the physical properties of the liquids and gases that flow through the device. The changes are proportional to the number of passes through the electrochemical potentials or with use of the controlled electrode. This involves the industry for preparing drinking water and water for industrial purposes, technical water and wastewater, in building construction, in the field of spas and healing sources, in cleaning and laundering, in the food industry, in the production of alcohol in brewing, in the health field, in dermatology, in ceramic production, and in heat generation, in heat economy, in wastewater treatment plants, energy economy, water sources, swimming pools, and the like. In processing in the petroleum industry and the automobile industry as well, the method for preparing liquids can be employed.

[0046] The method according to the invention both interacts and acts on solid materials which are present in the liquid or gaseous medium, either intentionally or in the form of impurities. The effect with the processing can be employed in the liquid state or the gaseous state. In the gas, among other things from dampness to a liquid can be present, and in the liquid in turn, free or bound gas may be present. In other words, this involves the effect on a composition of a solid, liquid or gaseous medium in which sometimes the liquid state and other times the gaseous state predominates. The method recited can be employed in ecology, in particular in the combustion of solid fuels.

Patentkrav

1. Fremgangsmåte for fysikalsk bearbeiding og/eller oppvarming av medier, spesielt av væsker, i et legeme (1) til en eksitasjonsinnretning, der mediet (9) i sin helhet eller en del derav utsettes for ionisering og/eller polarisering og samtidig for en elektromagnetisk vekselvirkning, eller utsettes for en slik virkning flere ganger, der kraftforbindelser i mediets (9) molekyl og mellom dets molekyler svekkes, forandrer seg eller bindes svakt i supermolekylærstrukturen, noe som fører til en endring av mediets (9) fysikalske og/eller kjemiske egenskaper og utvirker seg i fluiditeten, overflatespenningen, absorberingen, hastigheten for varmeopptak og -overføring, varmeinnholdet/entalpi avhengig av type medium (9),

karakterisert ved

at det bearbeidete mediet (9) tilføres virkningen av laser som en ytterligere energitype som er anordnet enten direkte i legemet (1) eller utenfor legemet (1).

2. Fremgangsmåte for fysikalsk bearbeiding og/eller oppvarming av medier, spesielt væsker, ifølge krav 1,

karakterisert ved

at mediet (9) anvendes som teknologisk forbehandling for en ytterligere bearbeiding i fysikalske, kjemiske, petrokjemiske, bioteknologiske teknologier.

3. Fremgangsmåte for fysikalsk bearbeiding og/eller oppvarming av medier, spesielt væsker, ifølge krav 1 og 2,

karakterisert ved

at en polarisert elektrode (2) dannes av et materiale med et positivt elektrokjemisk potensiale, som f. eks. Cu, C hhv. av et materiale med et negativt elektrokjemisk potensiale som rustfritt stål, Fe, Al samt av ytterligere faste, flytende eller gassformede virker som er lagret separat på innsiden av et silikat- eller kvartsskall, et rør eller reagensglass.

4. Fremgangsmåte for fysikalsk bearbeiding og/eller oppvarming av medier, spesielt væsker, ifølge krav 1 og 3,

karakterisert ved

at en ionisert elektrode (3) bringes i direkte kontakt med mediet (9) og dannes av et materiale med et positivt elektrokjemisk potensiale, som Cu, C hhv. av et materiale med et negativt elektrokjemisk potensiale som rustfritt stål, Fe, Al samt av flere faste virker.

5. Fremgangsmåte for fysikalsk bearbeiding og/eller oppvarming av medier, spesielt væsker, ifølge krav 1 til 4,

karakterisert ved

at mediet (9) bearbeidet ifølge krav 1 tilføres virkningen av varmeenergi som en ytterligere energitype som er anordnet enten direkte i legemet (1) eller utenfor legemet (1).

6. Fremgangsmåte for fysikalsk bearbeiding og/eller oppvarming av medier, spesielt væsker, ifølge krav 1 til 5,

karakterisert ved

at det hydrodynamisk bearbeidete mediet (9) påvirkes med en elektromagnetisk styrt elektrode (6) fra utsiden av legemet (1).

7. Fremgangsmåte ifølge krav 1 til 6,

karakterisert ved

at den hydrodynamisk bearbeidete væsken har minst formen av en strømningsløsning eller endringer i strømningsretningen, foretrukket med inngangs- og utgangsåpninger (4 og 5) anordnet tangentialt mot strømningsretningen i legemet (1), der den positive elektroden (2) og/eller de negative elektrodene (3) har en mekanisk endret overflateruhet.

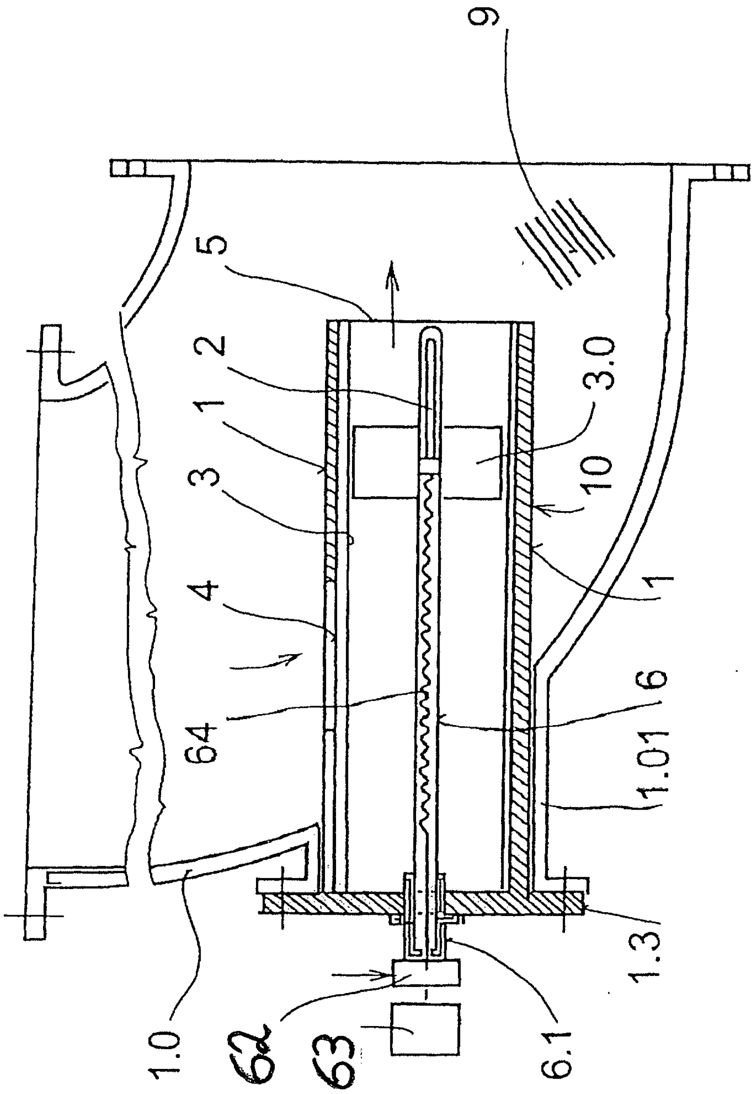

Fig. 1

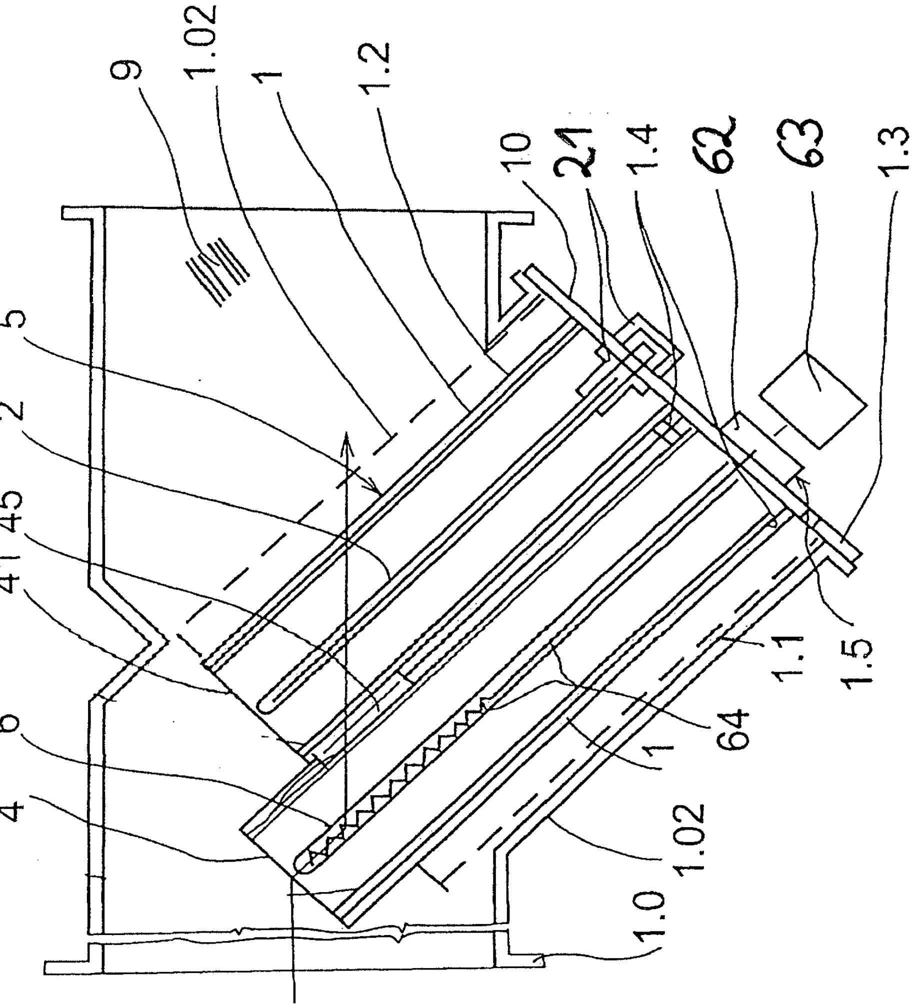

Fig. 2

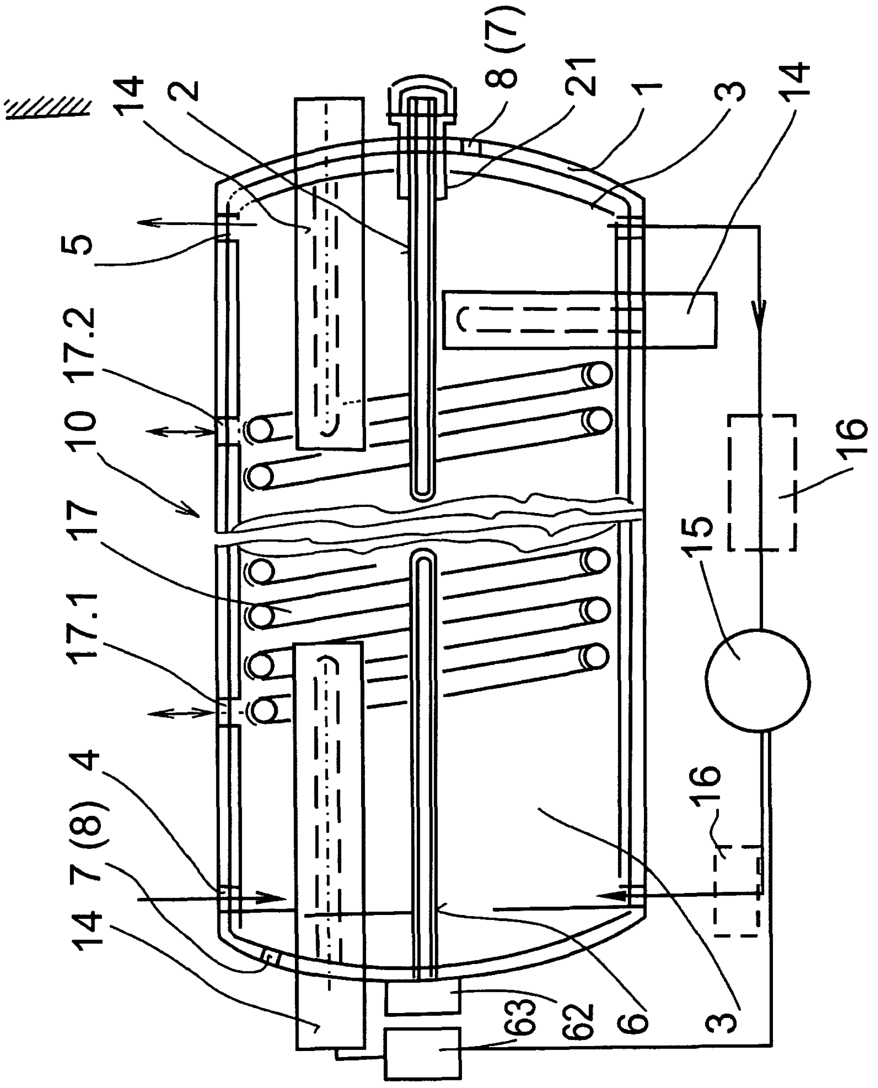

Fig. 3

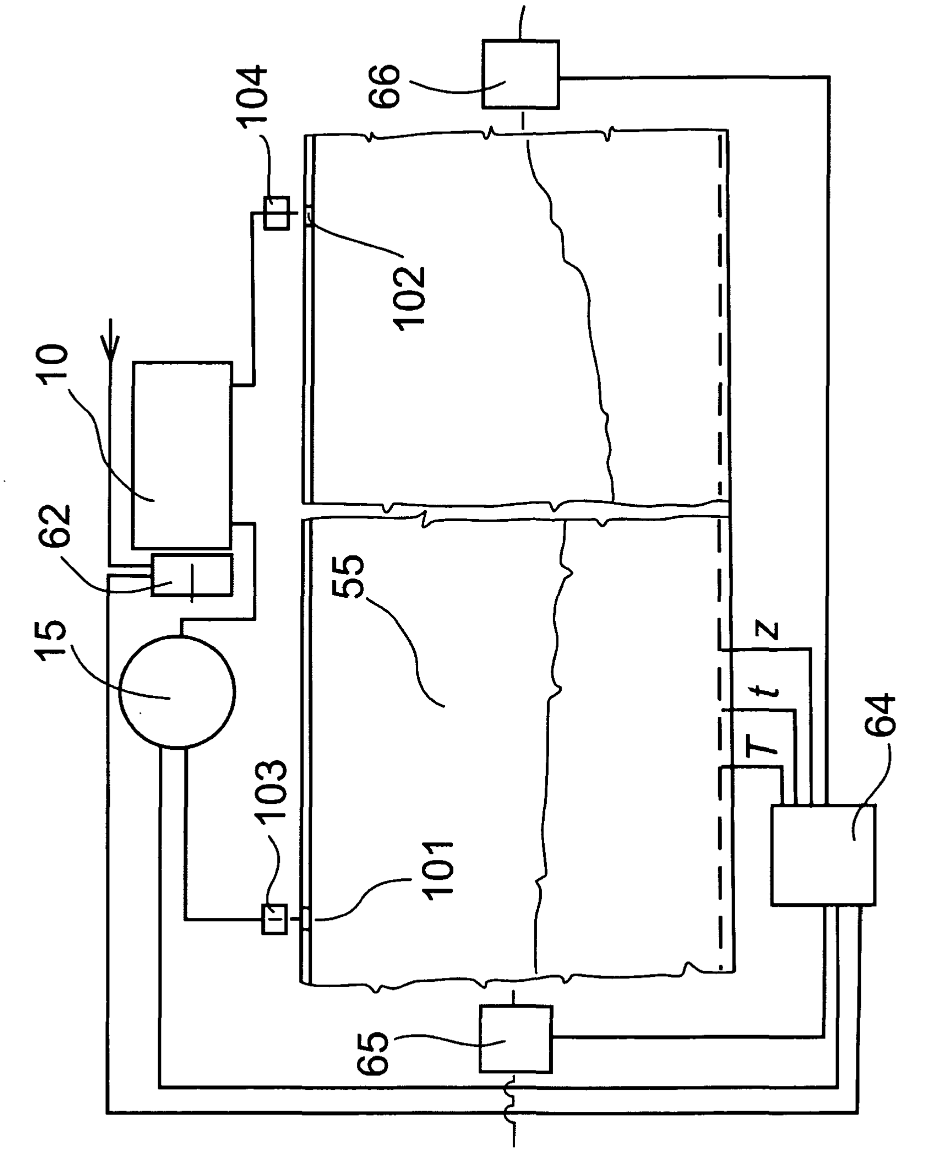

Fig. 4

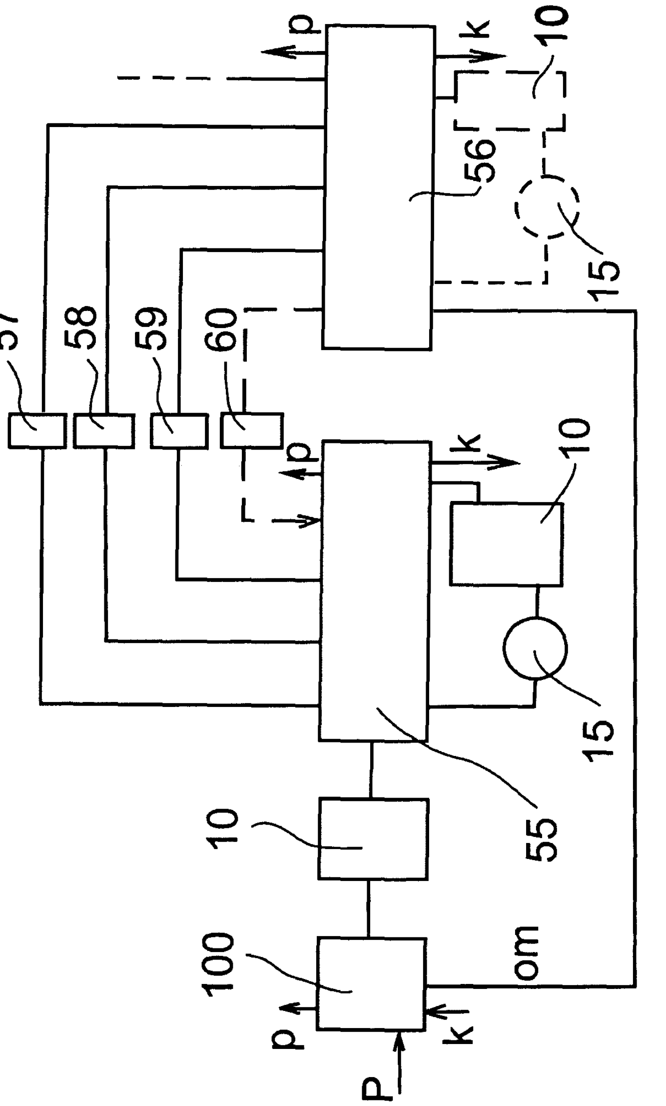

Fig. 5

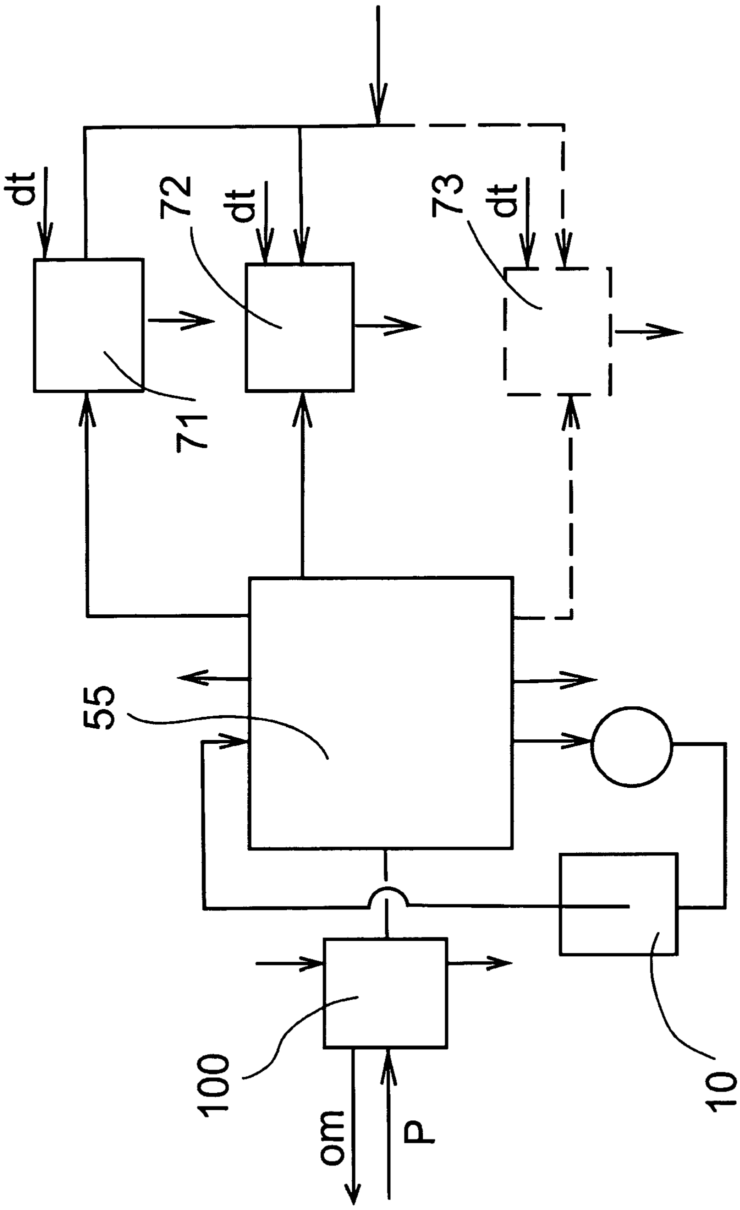

Fig. 6

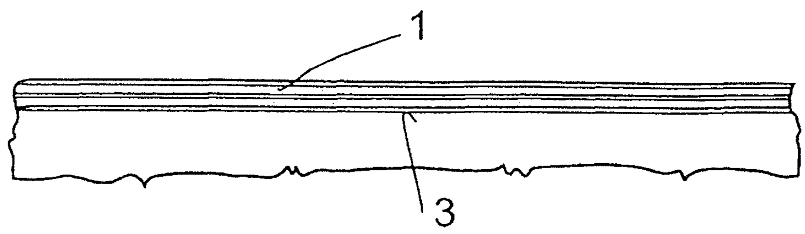

Fig. 7

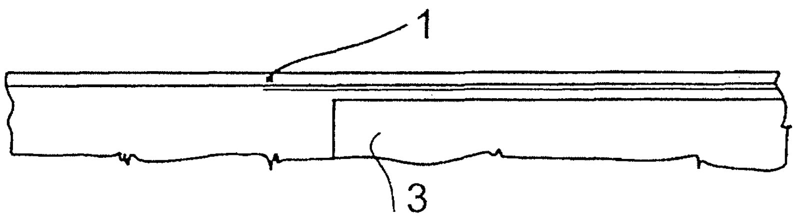

Fig. 8

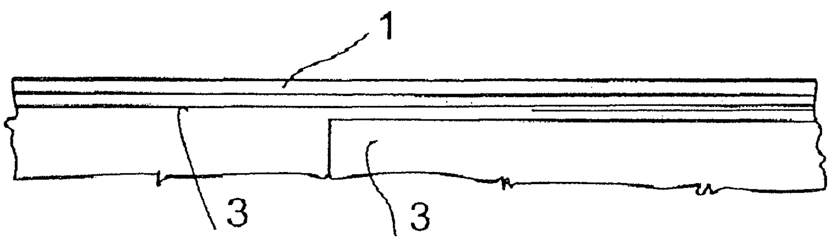

Fig. 9

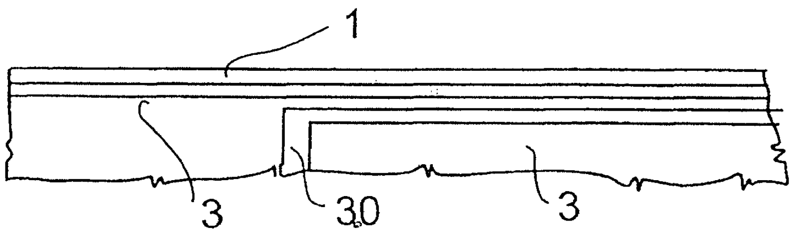

Fig. 10

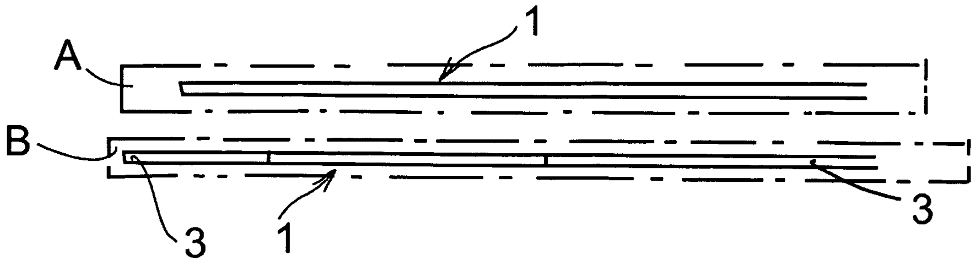

Fig. 11

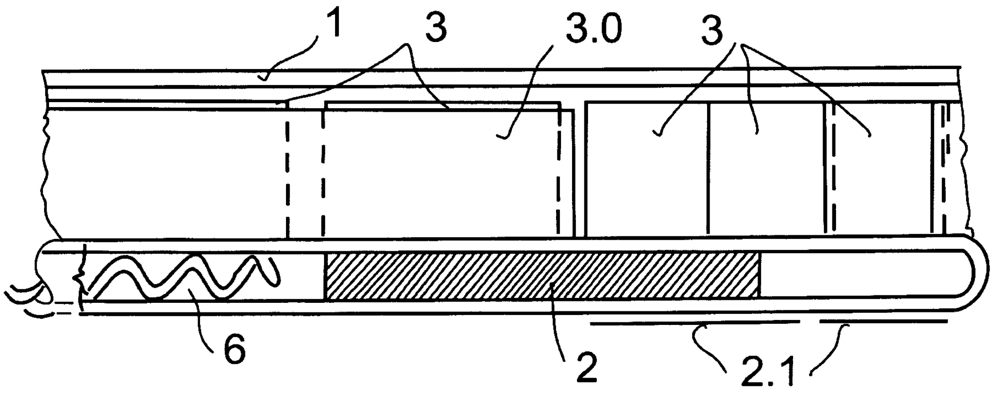

Fig. 12

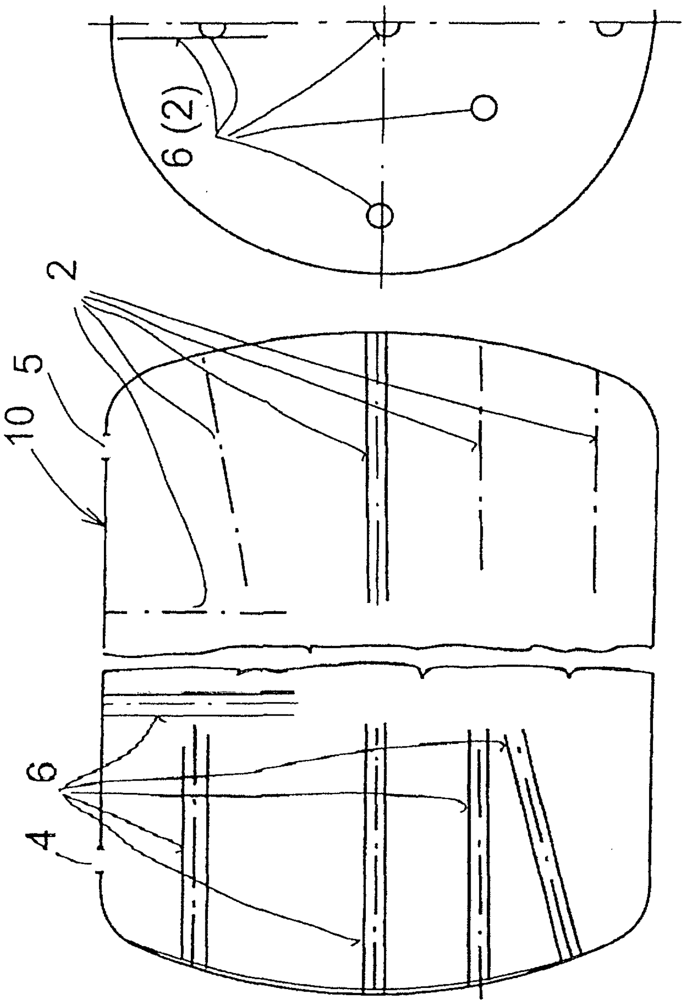

Fig. 13

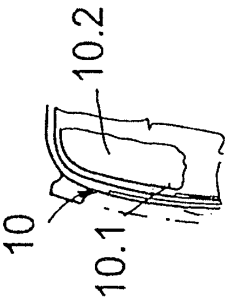

Fig. 13A

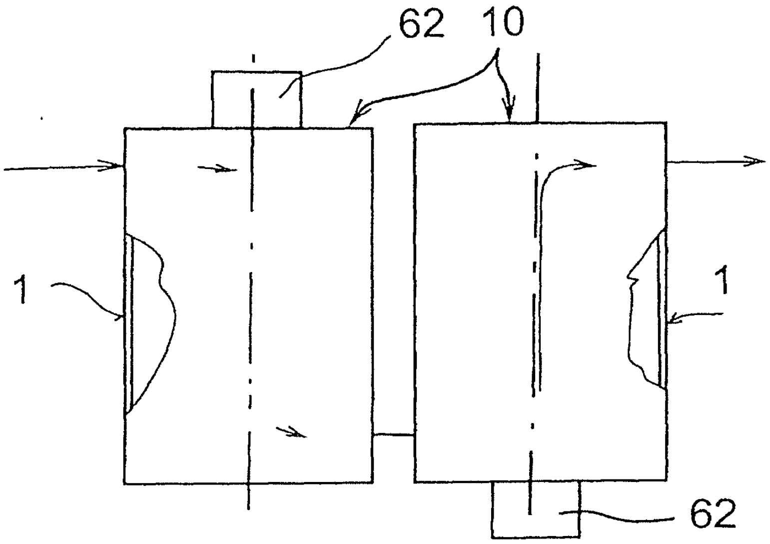

Fig. 14

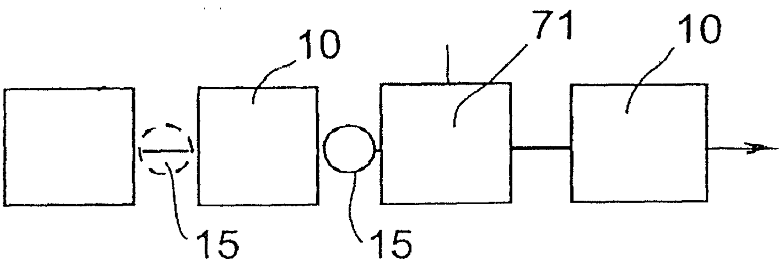

Fig. 15

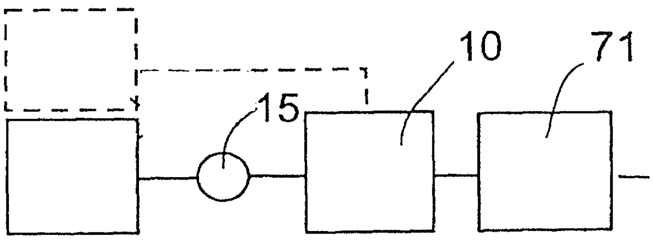

Fig. 16

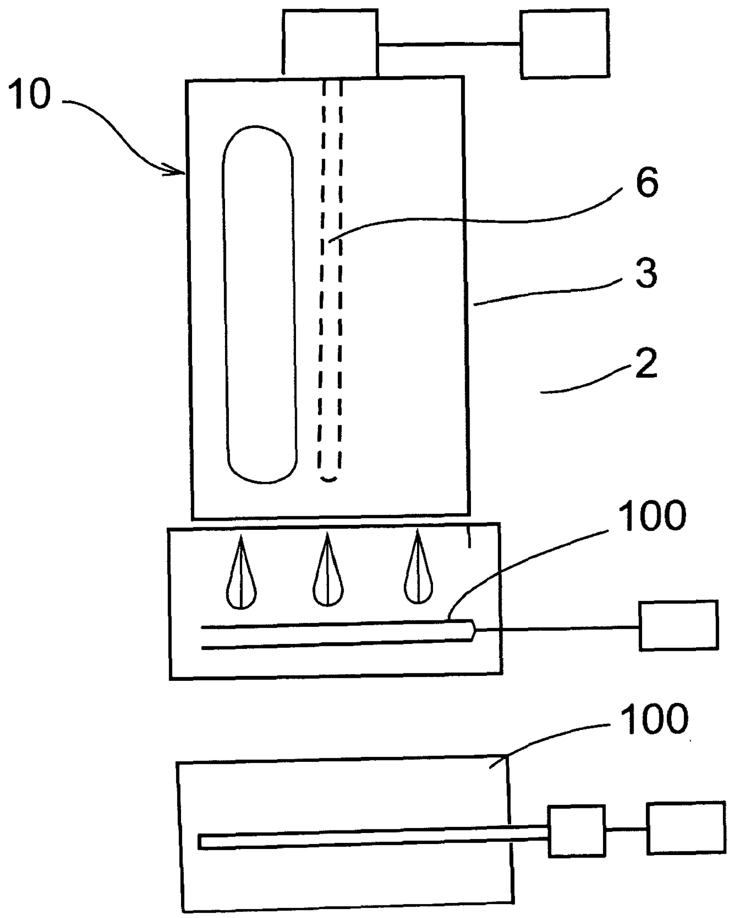

Fig. 17