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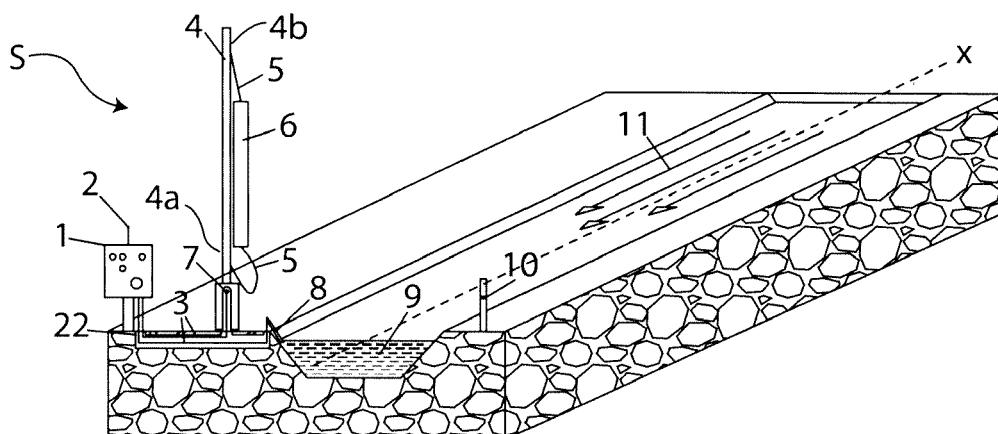
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(54) **Automatic system for detecting and blocking pollutants dissolved in environmental sites**

(57) The present invention concerns an automatic system (S) for detecting and blocking pollutants dissolved in environmental sites, comprising sensor means (8) that can be placed in contact with said environmental sites, for detecting the presence of said pollutants, said sensor means (8) being capable to transmit signals; blocking means (4, 6, 7, 10, 13, 14, 16, 17) for containing said pollutants, capable to assume a rest position and a work position, where said blocking means (4, 6, 7, 10, 13, 14, 16, 17) block the flow of said pollutants dissolved

in said environmental sites, and a control unit (1, 2, 3) connected to said sensor means (8) and to said blocking means (4, 6, 7, 10, 13, 14, 16, 17), wherein, when said sensor means (8) detect said pollutants dissolved in said environmental sites (9), said sensor means (8) transmit a corresponding signal to said control unit (1, 2, 3), and said control unit (1, 2, 3) operates said blocking means (4, 6, 7, 10, 13, 14, 16, 17), making them passing from said rest position to said work position.



**Fig. 1**

**EP 2 865 820 A1**

## Description

**[0001]** The present invention concerns an automatic system for detecting and blocking pollutants dissolved in environmental sites.

**[0002]** More specifically the invention concerns a system of the above kind, studied and realized especially to protect environmental sites by accidental spills of pollutants or toxic substances but that can be used for any environmental or anthropic matrix, such as surface water, groundwater, lotic waters, sewers or surface or underground channels, empty or filled, for which the protection function from accidental contamination of pollutants is necessary.

**[0003]** In the following, the description will be directed to the protection of a surface and an underground water course, but it is clear that the same should not be considered limited to this specific use.

**[0004]** As it is well known, at present there are systems for the protection and the safety of the environmental and anthropic matrices, such as mechanical barriers siphoned and not siphoned, inflatable and non-inflatable, that, as a result of malicious events, intentional or accidental, prejudicial and harmful to human health and the environment are activated to protect the environment and human health.

**[0005]** The activation of the security mechanism of said security systems is provided by a force generated by a man, for example winch or levers, or by the use by an operator of auxiliary machines in the event of potential or real danger.

**[0006]** In particular, for physical containment and absorbent equipment, such as confinement barriers, pneumatic or floating, must be handled by the man and placed on the site where the accidental spillage happened.

**[0007]** After the positioning of said equipment recovering the pollutant is necessary.

**[0008]** It appears obvious that these systems have considerable disadvantages, since the positioning and handling of equipment requires a considerable amount of time that causes the progressive diffusion of the pollutant.

**[0009]** A further disadvantage is represented by the reduction in effectiveness of the intervention if done by inexperienced people in the use of the equipment.

**[0010]** In light of the above, it is, therefore, object of the present invention to provide an automatic system which ensures immediate containment of the pollutants, thus allowing a drastic reduction of the confinement times of the pollutants.

**[0011]** It is therefore specific object of the present invention an automatic system for detecting and blocking pollutants dissolved in environmental sites, comprising sensor means that can be placed in contact with said environmental sites, for detecting the presence of said pollutants, said sensor means being capable to transmit signals; blocking means for containing said pollutants, capable to assume a rest position and a work position,

where said blocking means block the flow of said pollutants dissolved in said environmental sites, and a control unit connected to said sensor means and to said blocking means, wherein, when said sensor means detect said pollutants dissolved in said environmental sites, said sensor means transmit a corresponding signal to said control unit, and said control unit operates said blocking means, making them passing from said rest position to said work position.

**[0012]** Further according to the invention, said control unit could comprise an electric control board or a control unit, a warning device for transmitting an alarm, and electric cables for transmitting and receiving electric signals with said blocking means and said sensor means.

**[0013]** Preferably according to the invention, said blocking means could comprise a first support, installed on the bank of an environmental site, a second support, installed on the opposite bank in respect with the one said first support is installed on, a bar provided with a first end which is hinged on said first support, and a second free end, such that in said rest position, said bar is vertical, while in said work position, said bar is horizontal, parallel to the surface of said environmental site, and said second end is in contact with said second support, and a barrier, fixed at said bar, which can contact said environmental site to block said pollutants, when said blocking means are in said work position.

**[0014]** Always according to the invention, said barrier is fixed at said bar by an anchor cable, which connects said first and said second end of said bar with the respective first and second end of said barrier.

**[0015]** Still according to the invention, said barrier could be integral with said bar, extends entirely or partially along said bar and is adapted to the passive transfer of said pollutants present in said environmental site, in addition said bar could be partially or completely hollow in correspondence of the contact area with said barrier for housing said pollutants coming from said barrier, further the system could comprise a sensor within said bar for sensing of the filling level of said bar, said sensor could be operatively connected with a pump, which is activated manually or automatically, on indication of said sensor, in order to drain said pollutants from inside of said bar to the outside.

**[0016]** Further according to the invention, said bar could be partially or completely hollow in correspondence of the contact area with said barrier for housing said pollutants coming from said barrier, in addition said barrier could be a tape integral with a rotating roller, partially inserted into said hollow bar and made of polymeric material, suitable to absorb pollutants, further said system could comprise a pressure element which presses on said tape in order to clean it of said trapped pollutants, in addition said system comprises a sensor within said bar for sensing the filling level of said bar, further said sensor is operatively connected with a pump, which is activated manually or automatically, on indication of said sensor, so as to drain said pollutants from inside of said

bar to the outside.

**[0017]** Further according to the invention, said blocking means comprise a first support, installed on the bank of a environmental site, a second support, installed on the bank opposite with respect to the one said first support is installed on, a first rotating element or drum, installed on said first support, a second rotating element or drum, installed on said second support, and an anchor cable provided with a barrier, wherein in said rest position, said anchor cable is wrapped around said second rotating element or drum and it is fixed with an end at said a first rotating element or drum, while in said work position, said anchor cable is at least partially wrapped around said first rotating element or drum, such that said barrier is stretched by said anchor cable and it is immersed in said environmental site.

**[0018]** Preferably according to the invention, said barrier could be a bulkhead or an absorbent and containing float, and said environmental site could be a watercourse, and said barrier can touch said watercourse only on the surface or wholly to the bed of said watercourse.

**[0019]** Still according to the invention, said blocking means could be installed within a duct or a closed pipe, said duct having a containment wall, said blocking means comprising a pneumatic spear valve provided with a first part and a second part, installed on a portion of said containment wall of said duct, said first part and second part (17b) being faced each other, a pneumatic pipeline, connected to said control unit, which can convey an expansion fluid to said first and second part of said pneumatic spear valve, such that, in said rest position, said first and second part of said pneumatic spear valve have a minimum size, while in said work position, said first and second part are filled by said expansion fluid, which inflates said first and second part, till they contact each other.

**[0020]** Always according to the invention, said pneumatic shutter could be made of absorbent and containing material, or could be represented by a selective membrane.

**[0021]** Further according to the invention, said blocking means are installed within a duct or a closed pipe, said duct having a containment wall, said blocking means (16, 17) comprising a bulkhead mounted on a portion of said containment wall of said duct, such that, in said rest position, said bulkhead is contained within said portion of said containment wall of said duct while, in said work position, said bulkhead falls down on the opposed wall of said duct in order to wholly close the lumen of said duct.

**[0022]** Preferably according to the invention, said sensor (8) is a physic sensor which can detect a pressure variation within said duct.

**[0023]** Still according to the invention, a fluid flows in said duct.

**[0024]** Always according to the invention, said warning device is an antenna or a visual or audible warning device, integrated with GPS, videocamera and telephonic voice synthesizer.

**[0025]** At last according to the invention, said sensor

means comprise a chemical sensor, which can detect the chemical components of said pollutants dissolved in said environmental sites.

**[0026]** Preferred embodiments are defined in the dependent claims.

**[0027]** The present invention will be now described, for illustrative but not limitative purposes, according to its preferred embodiments, with particular reference to the figures of the enclosed drawings, wherein:

figure 1 shows a perspective view of a first embodiment of the system according to the invention; figures 2a-2c show the system of figure 1 in a sequence of operating steps;

figure 2d shows a first variant of the first embodiment of the system according to the invention, shown in figure 1;

figure 2e shows a second variant of the first embodiment of the system according to the invention, shown in figure 1;

figures 3a-3c show a second embodiment of the system according to the invention in a sequence of operating steps; and

figures 4a-4c show a third embodiment of the system according to the invention in a sequence of operating steps.

**[0028]** In the various figures, similar parts will be indicated by the same reference numbers.

**[0029]** The system S mainly comprises a control unit of the electrical operation of the overall system S, sensor means surrounded by, or in contact with the, fluid to be monitored, for detecting the possible presence of pollutants, and blocking means for containing said pollutants dispersed in the fluids.

**[0030]** In particular, referring to figures 1 and 2a-2c, it is shown a first embodiment of the automatic system S for detecting and blocking pollutants according to the present invention, installed on the bank of a surface watercourse 9, flowing in a direction X. In this case, system S allows the detection of pollutants that are accidentally poured in said watercourse 9, which have a density lower than the density of water, such as hydrocarbons.

**[0031]** In this case, the control unit comprises an electrical control panel or control case 1, which controls the operation of the overall electrical system S, a detector 2, such as an antenna for the transmission of an alarm, and electric cables 3, passing through a conduit 22, housed in the bank of the watercourse, which transmit electrical signals between the different parts of the system S, and in particular between the sensor means and the control unit 1 and between the control unit 1 and the blocking means.

**[0032]** Sensor means comprise at least one sensor 8, in particular, in this case, a chemical sensor, continuously immersed in the watercourse 9 to be monitored, capable of detecting the chemical components of possible pollutants present therein.

**[0033]** The blocking means comprise, in this case, a bar 4 provided with a first end 4a rotatably hinged to a first support 7, and an end 4b, which rests on a second support 10 in the working position, as will be better described below. Said second support 10 is placed on the opposite bank of the watercourse 9 with respect to the one on which is arranged said first support 7.

**[0034]** Said bar 4 is capable of moving from a rest position, in which it is positioned substantially vertically, to a working position, in which it is positioned substantially horizontally and wherein said second end 4b is leaning on said second support 10.

**[0035]** The bar 4 is provided with a bulkhead 6. Alternatively, said bulkhead 6 may be replaced by a barrier, or an element floating, or a barrier. Said bulkhead 6 is realized according to the physical characteristics, hydrogeological and hydrodynamic siphoned of the watercourse 9, such as the variation of the flow of the watercourse 9, which causes the change in the level of the free surface.

**[0036]** Said barrier 6 is connected to the bar 4, by means of an anchor cable 5, which connects the first 4a and the second 4b end of said bar 4 with the corresponding two ends of the barrier 6.

**[0037]** Alternatively, in reference to figure 2d, in a first variant of the first embodiment, said barrier 6 may be integral with said bar 4 and may extend entirely or partially along said bar 4.

**[0038]** Said barrier 6 can be represented by a selective membrane adapted to allow the passage of said pollutants present in said watercourse 9.

**[0039]** Said bar 4 may be hollow, at the region of contact with said barrier 6, in order to house polluting substances coming from said barrier 6.

**[0040]** Within said bar 4 a sensor 61 can be housed, of full tank type, for detecting the filling level of said hollow bar 4.

**[0041]** Said sensor 61 can be operatively connected to a pump 62, which is manually or automatically activated, on the basis of the indication of said sensor 61, in order to drain said pollutants from the inside to the outside of said hollow bar 4.

**[0042]** Alternatively, referring to figure 2e, in a second variant of the first embodiment, said barrier 6 can be represented by a tape 63 integral with a rotating roller 64, partially inserted in said hollow bar 4, which may extend along the entire length of said hollow bar 4 or only in part.

**[0043]** In particular, said strip 63 can be made of polymeric material suitable to absorb pollutants.

**[0044]** In this second variant, inside said hollow bar 4, there is a pressure element 65, which presses on said belt 63 in order to clean it of said trapped pollutants. Also in this second variant there are said sensor 61 and said pump 62.

**[0045]** In a third variant of the first embodiment, not shown in the figure, said belt 63 and said rotating roller 64 may surround externally said bar 4, wholly or partially. In this case, also said pressure element 65 is positioned

externally to said bar 4.

**[0046]** The operation of the system S described above is as follows.

**[0047]** Referring to figures 2a, 2b, 2c, 2d and 2e, when the watercourse 9 is accidentally polluted by a pollutant, the sensor 8 detects the chemical composition of the pollutant and transmits an alarm signal to the control unit 1 by means of electric cables 3.

**[0048]** The control unit 1 transmits the closing signal to the bar 4, which passes from the vertical resting position to the horizontal working position, in which the second end 4b leans on the second support 10.

**[0049]** In the working position of the bar 4, the barrier 9, suitably arranged to be in contact with the surface of the water, is partially immersed in the watercourse 9 to block the flow of the pollutant.

**[0050]** Together with the activation of the bar 4, the control unit 1 activates the detector 2, in this case an antenna, which sends an alarm signal to the radio stations in communication with the system S, so as to make the rescues intervene for the recovery of the pollutant.

**[0051]** In the case of the first variant, the pollutants in contact with said membrane 6, penetrate, through passive transport, in its structure up to reach the inside of said hollow bar 4.

**[0052]** If the polluting substances absorbed fill the interior space of said hollow bar 4, said sensor 61 sends a signal to said pump 62, which is activated to empty said hollow bar 4 and drain said pollutants to the outside of said hollow bar 4.

**[0053]** In the case of the second variant, these pollutants, in contact with said tape 63 set in rotation by said rotating roller 64, are absorbed by said rotating roller 64, until it reaches the interior of said hollow bar 4.

**[0054]** Said pressure element 65 presses on said roller 63 in order to facilitate the discharge of said absorbed pollutants.

**[0055]** The operation of the sensor 61 and the pump 62 is similar to the operation described above.

**[0056]** After the end of the recovery operations, the bar 4 returns to its vertical resting position, by an automatic or manual mechanism.

**[0057]** Referring now to figures 3a-3c, a second embodiment of the system S is described, mounted on the bank of a river as described above, for the detection of polluting substances with lower density than the density of water.

**[0058]** This second embodiment differs from the first embodiment only in the conformation of the blocking means.

**[0059]** In this embodiment, the blocking means comprise a first rotating element or drum 13, which is installed on a first support 7 on a bank of the watercourse 9 and a second rotating element or drum 14 which is installed on a second support 10 on the opposite bank.

**[0060]** Said blocking means further comprise an anchor cable 5, wound on said second drum 14 and coupled at the free end to said first drum 13. the barrier 6 is mount-

ed on said anchor cable 5, as described above.

**[0061]** In the resting position of the system S, the barrier 6 is entirely rolled on said second drum 14; while, in the working position, the barrier 6 is partially immersed in the watercourse 9, tightened by the anchoring cable 5.

**[0062]** The barrier 6 can be made of absorbent material and can have a containment structure, so as to absorb and contain the pollutants.

**[0063]** The operation of the system S, in the case of the second embodiment, is as follow.

**[0064]** When the watercourse 9 is accidentally contaminated by a contaminant, the sensor 8 detects the chemical composition of the pollutant and transmits an alarm signal to the control unit 1 by means of the electric cables 3.

**[0065]** The control unit 1 transmits the alarm signal to the first drum 13, which starts to rotate clockwise and to tighten the anchor cable 5, which in its turn rotates clockwise also the second drum 14.

**[0066]** The rotation of said first 13 and second drum 14 may also be in the counterclockwise direction.

**[0067]** The barrier 6 then is tensioned by the cable 5 until it is fully opened and partially immersed in the watercourse 9, to block the flow of the pollutant.

**[0068]** Referring now to figures 4a-4c, a third embodiment of the system S is described, mounted in this case within a duct or closed channel 23, in which a watercourse 9 flows, or of a other fluid, according to a flowing direction X.

**[0069]** Also this third embodiment differs only in the conformation of the blocking means.

**[0070]** In particular, the blocking means comprise a pneumatic shutter 17, powered by a pneumatic pipe 16, connected to the control unit 1.

**[0071]** Said pneumatic shutter 17 has a first part 17a installed on a wall of the duct 23 and a second part 17b installed on the opposite wall of the duct 23.

**[0072]** In the rest position, said first 17a and second 17b part of the shutter 17 has a small footprint.

**[0073]** In the working position, said first 17a and second part 17b of the shutter 17 are filled by means of a fluid that causes their expansion up to the mutual contact.

**[0074]** In this case, it is necessary also to provide an inspection chamber 20 for controlling the operation of the underground system S.

**[0075]** In a variant of this third embodiment, said shutter 17 can be made of absorbent and containment material, or may be represented by a selective membrane, so as to absorb the pollutants and TO retain them in its interior up to the emptying time.

**[0076]** The operation of the system S, in this third embodiment, is as follow.

**[0077]** When the watercourse 9, or other fluid, is accidentally contaminated by a contaminant, the sensor 8, which in this case can also be physical, detects the composition of the pollutant or the pressure variation within the duct 23 and transmits an alarm signal to the control unit 1 by means of the electric cables 3.

**[0078]** The control unit 1 transmits the alarm signal to the pneumatic pipe 16 which begins to deliver the fluid expansion to said first 17a and second part 17b of the shutter 17, so as to block the flowing of the watercourse 9, or other fluid in the duct 23, while waiting for the recovery of the pollutant.

**[0079]** The shutter 17 may also have a guillotine structure, made by a bulkhead installed on a wall of the duct, which, in resting position, is arranged in the wall, while in the working position is released to completely close the lumen of the duct 23.

**[0080]** These three embodiments described above may be provided with a warning device 2, which can be also of light or sound type, integrated with GPS, camera phone and voice synthesizer.

**[0081]** The system S described above can also be used for the detection of pollutants with a density greater than or equal to that of water so that they do not float on the water surface but tend to reach the bed of the watercourse.

**[0082]** In this case, the blocking mechanical members, in particular the barrier 6 of the first and second embodiment, will be shaped to reach the bed of the watercourse 9, so as to ensure the total barrier.

**[0083]** The system S described above can operate similarly in case of absence of fluid both in the case of surface watercourse 9 and in the case of the duct 23.

**[0084]** In this case, the sensor 8 is in direct contact with the environment site to be monitored, in particular with the bed of the watercourse or with the walls of the duct 23, and activates the operating mechanism described above, when it detects the passage of a pollutant, even without a fluid flow.

**[0085]** It is clear how the above described automatic system S in its various embodiments allows for immediate intervention to stem the flow of a pollutant accidentally poured into a watercourse.

**[0086]** The present invention has been described for illustrative but not limitative purposes, according to its preferred embodiments, but it is to be understood that modifications and/or changes can be introduced by those skilled in the art without departing from the relevant scope as defined in the enclosed claims.

## Claims

1. Automatic system (S) for detecting and blocking pollutants dissolved in environmental sites, comprising sensor means (8) that can be placed in contact with said environmental sites, for detecting the presence of said pollutants, said sensor means (8) being capable to transmit signals; blocking means (4, 6, 7, 10, 13, 14, 16, 17) for containing said pollutants, capable to assume a rest position and a work position, where said blocking means (4, 6, 7, 10, 13, 14, 16, 17) block the flow of said pollutants dissolved in said environmental sites,

and

a control unit (1, 2, 3) connected to said sensor means (8) and to said blocking means (4, 6, 7, 10, 13, 14, 16, 17),

wherein, when said sensor means (8) detect said pollutants dissolved in said environmental sites (9), said sensor means (8) transmit a corresponding signal to said control unit (1, 2, 3), and said control unit (1, 2, 3) operates said blocking means (4, 6, 7, 10, 13, 14, 16, 17), making them passing from said rest position to said work position.

2. System (S) according to claim 1, **characterized in that** said control unit (1, 2, 3) comprises an electric control board or a control unit (1), a warning device (2) for transmitting an alarm, and electric cables (3) for transmitting and receiving electric signals with said blocking means (4, 6, 7, 10, 13, 14, 16, 17) and said sensor means (8).

3. System (S) according to anyone of previous claim, **characterized in that** said blocking means (4, 6, 7, 10) comprise
  - a first support (7), installed on the bank of an environmental site (9),
  - a second support (10), installed on the opposite bank in respect with the one said first support (7) is installed on,
  - a bar (4) provided with a first end (4a) which is hinged on said first support (7), and a second free end (4b), such that in said rest position, said bar (4) is vertical, while in said work position, said bar (4) is horizontal, parallel to the surface of said environmental site, and said second end (4b) is in contact with said second support (10), and
  - a barrier (6), fixed at said bar (4), which can contact said environmental site to block said pollutants, when said blocking means (4, 6, 7, 10) are in said work position.

4. System (S) according to the previous claim, **characterized in that** said barrier (6) is fixed at said bar (4) by an anchor cable (5), which connects said first (4a) and said second end (4b) of said bar (4) with the respective first and second end of said barrier (6).

5. A system (S) according to claim 3, **characterized in that** said barrier (6) is integral with said bar (4), extends entirely or partially along said bar (4) and is adapted to the passive transfer of said pollutants present in said environmental site (9);
  - in that** said bar (4) is partially or completely hollow in correspondence of the contact area with said barrier (6) for housing said pollutants coming from said barrier (6);
  - in that** it comprises a sensor (61) within said bar (4) for sensing of the filling level of said bar (4);
  - in that** said sensor (61) is operatively connected with

a pump (62), which is activated manually or automatically, on indication of said sensor (61), in order to drain said pollutants from inside of said bar (4) to the outside.

6. A system (S) according to claim 3, **characterized in that** said bar (4) is partially or completely hollow in correspondence of the contact area with said barrier (6) for housing said pollutants coming from said barrier (6);
  - in that** said barrier (6) is a tape (63) integral with a rotating roller (64), partially inserted into said hollow bar (4) and made of polymeric material, suitable to absorb pollutants;
  - in that** it comprises a pressure element (65) which presses on said tape (63) in order to clean it of said trapped pollutants;
  - in that** it comprises a sensor (61) within said bar (4) for sensing the filling level of said bar (4); and
  - in that** said sensor (61) is operatively connected with a pump (62), which is activated manually or automatically, on indication of said sensor (61), so as to drain said pollutants from inside of said bar (4) to the outside.
7. System (S) according to anyone of previous claim 1 or 2, **characterized in that** said blocking means (7, 10, 13, 14) comprise
  - a first support (7), installed on the bank of an environmental site (9),
  - a second support (10), installed on the bank opposite with respect to the one said first support (7) is installed on,
  - a first rotating element or drum (13), installed on said first support (7),
  - a second rotating element or drum (14), installed on said second support (10), and
  - an anchor cable (5) provided with a barrier (6), wherein in said rest position, said anchor cable (5) is wrapped around said second rotating element or drum (14) and it is fixed with an end at said a first rotating element or drum (13), while in said work position, said anchor cable (5) is at least partially wrapped around said first rotating element or drum (13),
  - such that said barrier (6) is stretched by said anchor cable (5) and it is immersed in said environmental site.
8. System (S) according to anyone of previous claim 3-4, **characterized in that** said barrier (6) is a bulkhead or an absorbent and containing float,
  - in that** said environmental site is a watercourse (9), and
  - in that** said barrier (6) can touch said watercourse (9) only on the surface or wholly to the bed of said watercourse (9).

9. System (S) according to anyone of previous claim 1 or 2, **characterized in that** said blocking means (16, 17) are installed within a duct or a closed pipe (23), said duct having a containment wall, said blocking means (16, 17) comprising  
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a pneumatic spear valve (17) provided with a first part (17a) and a second part (17b), installed on a portion of said containment wall of said duct (23), said first part (17a) and second part (17b) being  
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faced each other,  
a pneumatic pipeline (16), connected to said control unit (1, 2, 3) which can convey an expansion fluid to said first (17a) and second (17b) part of said pneumatic spear valve (17),  
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such that, in said rest position, said first (17a) and second (17b) part of said pneumatic spear valve (17) have a minimum size, while in said work position, said first (17a) and second (17b) part are filled by said expansion fluid, which inflates said first (17a) and second (17b) part, till they contact each other. 20
10. System (S) according to the preceding claim **characterized in that** said pneumatic shutter (17) is made of absorbent and containing material, or is represented by a selective membrane. 25
11. System (S) according to anyone of previous claim 1 or 2, **characterized in that** said blocking means (16, 17) are installed within a duct or a closed pipe (23), said duct having a containment wall, said blocking means (16, 17) comprising  
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a bulkhead (17) mounted on a portion of said containment wall of said duct (23),  
such that, in said rest position, said bulkhead (17) is contained within said portion of said containment wall of said duct (23) while, in said work position, said bulkhead (17) falls down on the opposed wall of said duct (23) in order to wholly close the lumen of said duct (23). 35  
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12. System (S) according to anyone of previous claim 9 or 11, **characterized in that** said sensor (8) is a physic sensor which can detect a pressure variation within said duct (23). 45
13. System (S) according to anyone of previous claim 9-12, **characterized in that** a fluid (9) flows in said duct (23).
14. System (S) according to anyone of previous claim, **characterized in that** said warning device (2) is an antenna or a visual or audible warning device, integrated with GPS, videocamera and telephonic voice synthesizer. 50  
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15. System (S) according to anyone of previous claim, **characterized in that** said sensor means (8) comprise a chemical sensor which can detect the chem-
- ical components of said pollutants dissolved in said environmental sites.

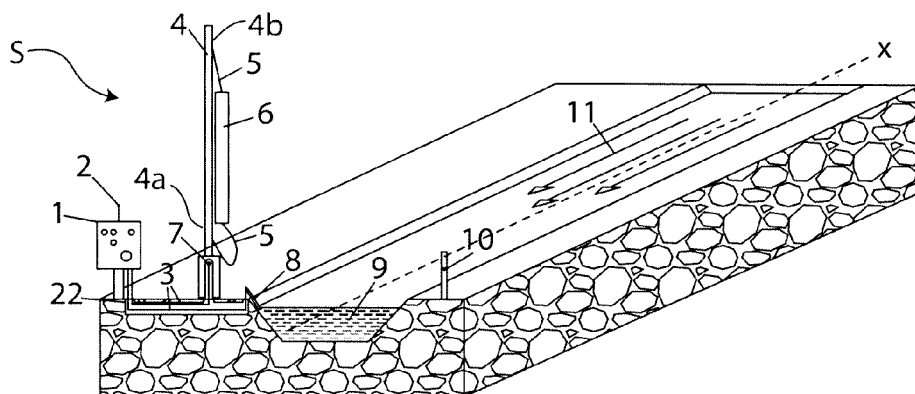


Fig. 1

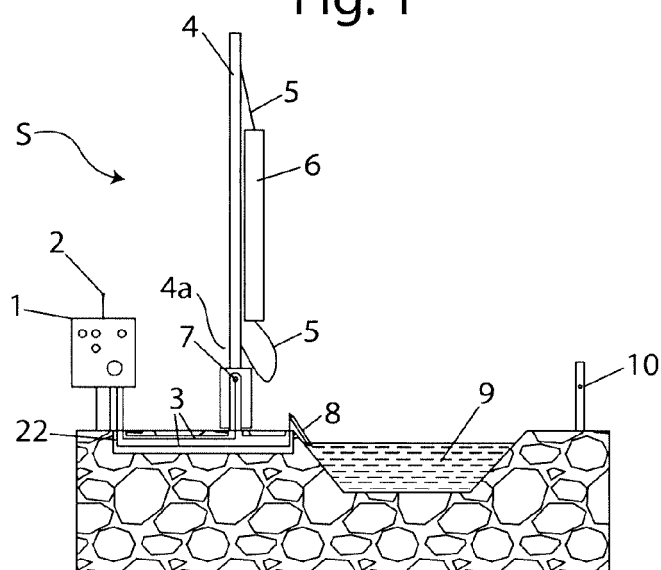


Fig. 2a

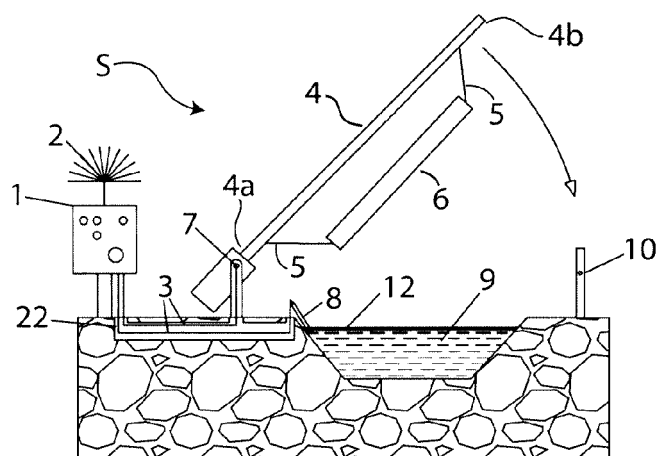


Fig. 2b

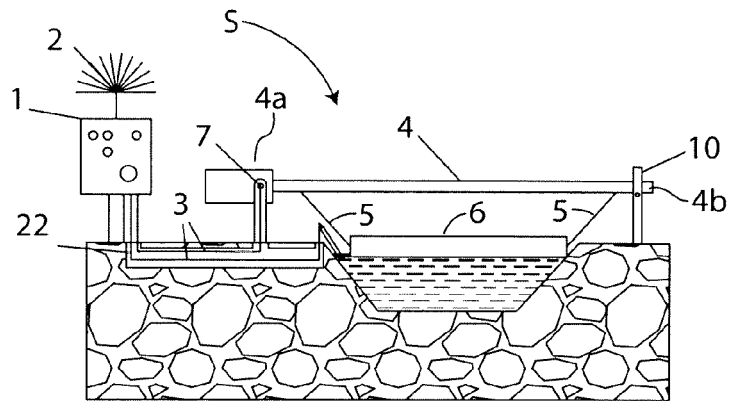


Fig. 2c

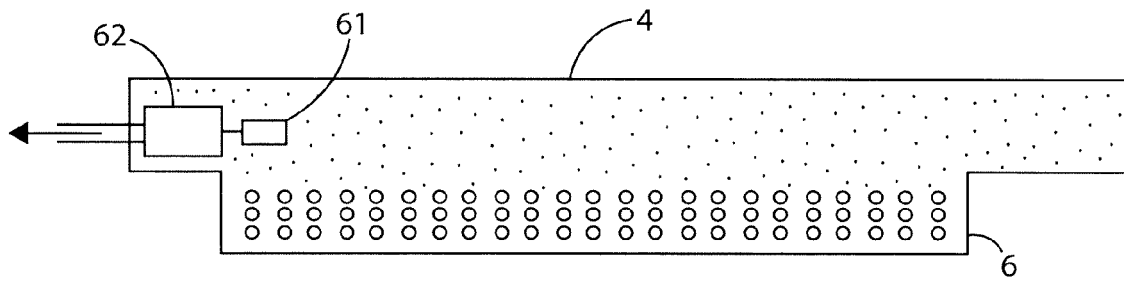


Fig. 2d

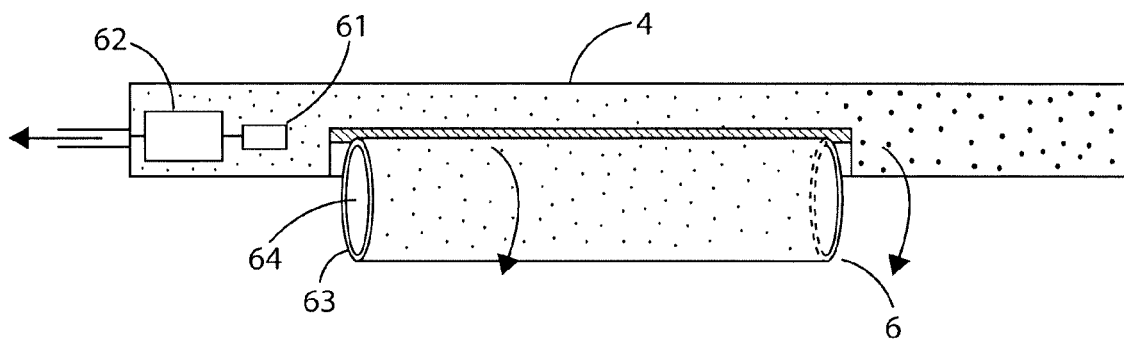


Fig. 2e

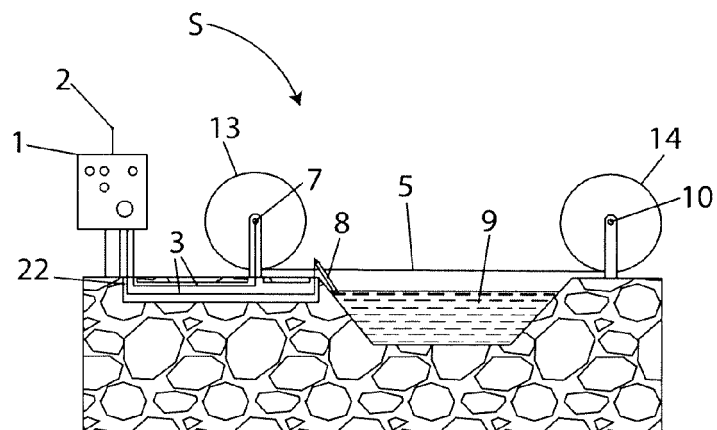


Fig. 3a

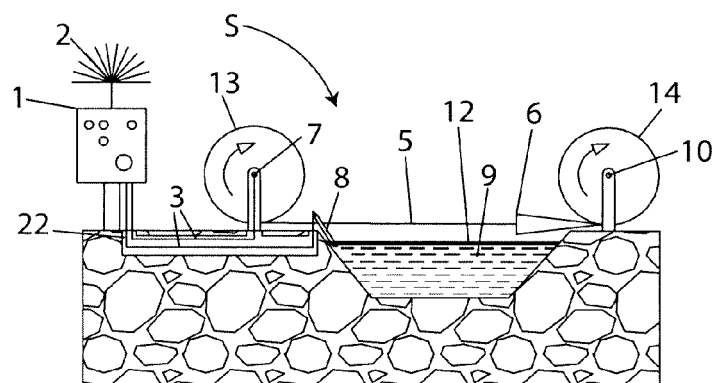


Fig. 3b

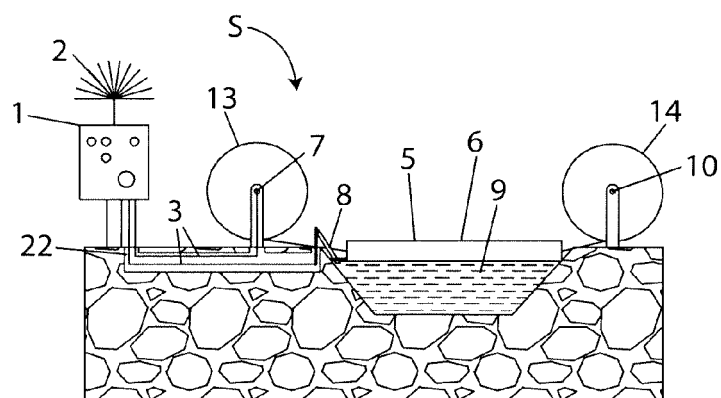


Fig. 3c

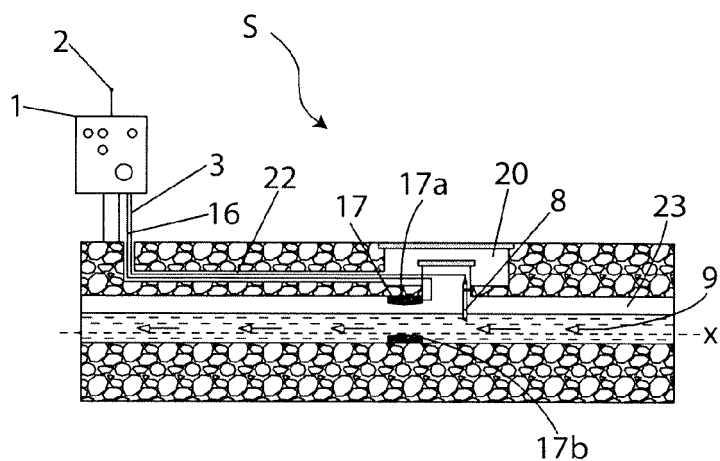


Fig. 4a

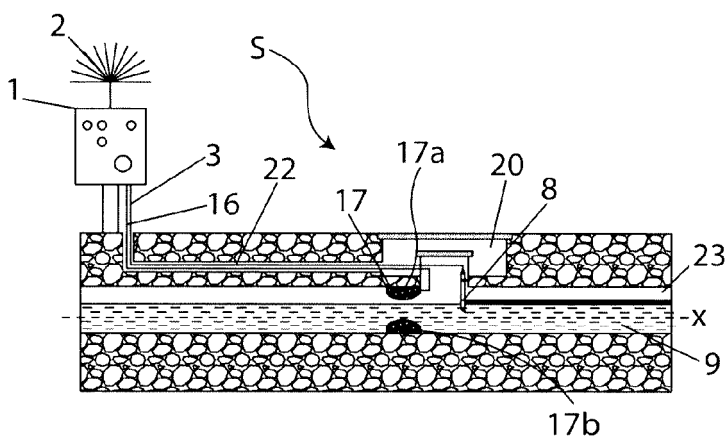


Fig. 4b

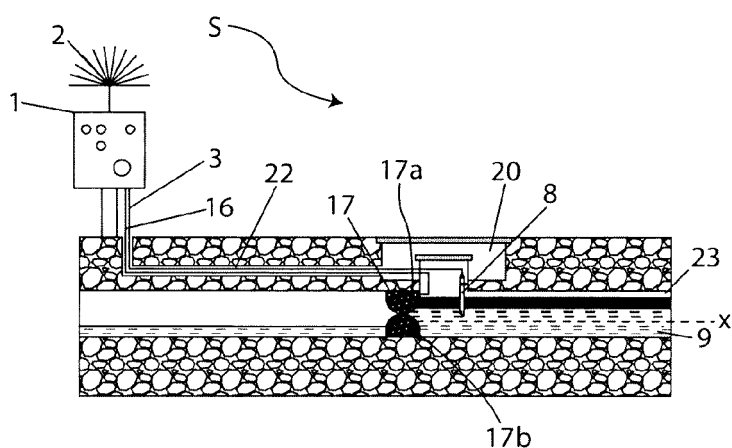


Fig. 4c



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