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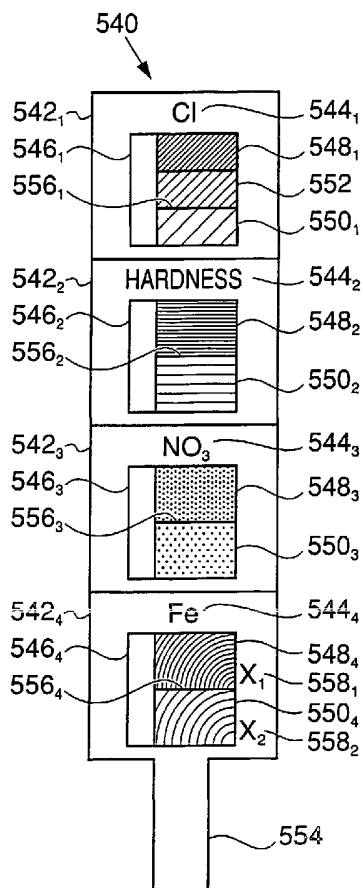
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(54) Title: FLUID TESTER



(57) Abstract: Fluid testing device for determining the value of each of a plurality of properties of a fluid, the fluid testing device including a planar base and a plurality of test sections, located on the planar base, each of the test sections including a test sub-section which exhibits a color according to the value, as a result of reaction of a reagent with the fluid and a reference section located adjacent to the test sub-section, the reference section including a plurality of different reference colors.

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FLUID TESTER

5 FIELD OF THE DISCLOSED TECHNIQUE

The disclosed technique relates to methods and systems for testing fluids in general, and to methods and systems for testing water, in particular.

BACKGROUND OF THE DISCLOSED TECHNIQUE

10 Systems and methods for testing water for chemicals and other properties are known in the art. A prevalent method consists of inserting into the tested water an absorbent material, such as paper, which is impregnated with a chemical reagent. The reagent chemical is designed to react with predetermined chemicals or predetermined fluid properties. As a result of this reaction, the color
15 of the reagent chemical changes, and this is visible on the absorbent material. Accordingly, a color change is achieved when the water under test, contains these predetermined chemicals or is characterized by the predetermined fluid properties. The hue of the resulting color can further quantitatively determine the level of the detected chemical or property, by comparing the hue with a standard
20 color scale.

US Patent No. 3,876,378 to Montagnon, entitled "Analytic Device Utilizing Reaction-Sensitive Chemical Product", is directed to an apparatus for chemical testing of liquids using a chemical reagent. The construction of this apparatus is intended to overcome some of the problems that may occur in such
25 tests. The apparatus includes a vessel with a flange at its bottom forming a groove, and a disc made of absorbent material, which comfortably fits inside the groove. The disc is impregnated with a chemical reagent, so that upon introduction of the tested liquid, the disc may undergo a color change, depending on the conditions of the liquid.

US Patent No. 4,904,605 entitled "Method and Apparatus for Residential Water Test Kit" issued to O'Brien et al., is directed to a system and method for testing water for a plurality of chemicals and other characteristics. The water test kit includes a container with a label on the exterior. The label includes a color comparison chart and optionally, operating instructions. The color comparison chart indicates the properties to be tested. Each row of the chart pertains to one chemical or property, and includes a scale of colors and their corresponding levels of the chemical concentration or the property. The kit further includes a dipstick or test strip. The dipstick or test strip is divided into a plurality of areas. Each area contains a reagent that reacts to a specific chemical or fluid property, producing a color change in that area. To test the water using this device, the user first fills the bottle with tap water. She then fully immerses the test strip in the sample bottle and waits for 30 seconds. Next, she removes the test strip from the water, and positions the test strip so that it is aligned with the color chart. Finally, she compares the color of each of the test strip areas to the corresponding section of the chart.

Numbers indicating problematic levels are underlined and may also be printed in a different color (e.g., red) from the rest of the numbers on the chart. A solution chart may also be provided, on which solutions to the problems are given, possibly by reference to different water filters and the like. The need for the strip to be matched with the color chart makes this system relatively complicated to operate, and may result in misreadings or other errors by the unskilled user. It is also necessary for all of the separate parts of the kit to be present in order for the testing to be possible. Another method for colorimetric testing of water known in the art consists of inserting a reagent into the water sample and allowing it to react inside the water, thus causing the water to change color, and then comparing the color of the water with a standard color scale.

US Patent No. 3,381,572 entitled "Colorimetric Testing Device" issued to Tuwiner, is directed to a device for quantitatively determining the concentration of a chemical or the levels of a property such as pH. The apparatus

includes an optical color index unit, adjacent to a container for the tested sample. The index unit color changes gradually from one end to another, in correspondence with the color change of the tested sample at different levels of the property being tested. The index unit also has numbers printed thereon to
5 indicate the corresponding levels. To perform the test, the user inserts the sample, together with a color-indicating reagent, into the container and compares the changed color of the sample with the index unit color scale.

US Patent No. 4,125,376 entitled "Method for Detecting Water Pollutants" issued to Razulis, is directed to a method for identifying chemicals in
10 water. The apparatus is a transparent container, with an urethane foam cube disposed therein, and a plug for sealing the tube. The urethane foam cube is impregnated with a specific spot detection chemical. The chemical produces a colorimetric indication when exposed to specific pollutants in the tested water sample. The method is carried out by adding the water to the container, sealing
15 the container with a plug and then shaking it. The color change is then compared to a color comparator chart of the specific pollutants.

US Patent No. 4,180,009 issued to Voss et al., and entitled "Ion Concentration Testing Apparatus", is directed to a device for determining different ion concentrations in swimming pool water. The device includes two
20 measurement containers, a reference container and an indicating screen. The measurement containers and the reference container are bounded on one side by a common wall. The indicating screen is located in front of the common wall and includes a plurality of indicating windows associated with the measurement containers and a plurality of indicating windows associated with the reference
25 container. The measurement containers and the reference container are arranged in a row and each has a square or a rectangular cross section. The indicating windows are distributed over the height of the measurement containers and the reference container. Each of the indicating windows associated with the reference container, has a reference or standard coloration corresponding to a
30 predetermined ion concentration. The indicating windows are transparent.

The indicating screen further includes a plurality of marks adjacent to the indicating windows associated with the measurement containers. The value of each of the marks is related with the respective indicating window associated with the reference container. The user fills the measurement containers with water and
5 inserts different color forming reagents, according to the particular ion concentration to be tested, in each measurement container. The color forming reagents dissolve and the water in each measurement container acquires a color which corresponds with the concentration of the ion. The user compares the color of the water seen through the indicating windows associated with a measurement
10 container, with the respective reference coloration of the indicating window associated with the reference container. The user determines the ion concentration by reading the value of the mark, which corresponds with the reference coloration which was identified as a result of this comparison.

Merck KGaA located in Darmstadt, Germany, discloses a first method
15 for determining the concentration of substances in water, landfills and soil. According to the first method, the user adds a liquid reagent to a liquid sample, thereby rendering a color to the liquid. The concentration of the substance is measured by a photometer, according to the color of the liquid. Merck KGaA discloses a second method for testing a solution. According to the second method,
20 the user dips a test strip in the solution. After a given reaction time has elapsed, the user compares the color of the reaction zone with a color scale on the package, thereby determining the concentration.

Merck KGaA discloses a system for determining the concentration of substances or a parameter in a liquid. The system includes an electronic
25 instrument, a plurality of test strips and a bar code. Each of the test strips are designated to test the concentration of a selected substance or a selected parameter in the liquid. The bar code includes information respective of the selected substance or the selected parameter. The user calibrates the electronic instrument, by passing the bar code through the electronic instrument. The user
30 then dips a test strip in the liquid, whereby the reaction renders a color to the test

strip. The user passes the test strip through the electronic instrument, the electronic instrument determines the value of the concentration or the parameter and displays this value on a display.

5 Hach Company located in Colorado, U.S.A., discloses a colorimetric method for determining the concentration of a parameter in a sample. The user adds a reagent to the sample, thereby rendering a color to the sample. The user determines the concentration by comparing the color of the sample with test strips, color cubes, color discs, a colorimeter or a spectrometer. Hach discloses an electrochemical method for determining the concentration of a parameter.

10 According to the electrochemical method, the presence or the absence of a parameter is determined, by measuring the electrical activity of a sample. Hach discloses a titration method for determining the concentration of a substance. According to the titration method, the user dispenses a reagent on the sample, until the color of the sample changes. The user determines the concentration by

15 measuring the volume of the reagent which is dispensed (e.g., by counting the drops of the reagent dispensed from an eye dropper, or according to the reading of a digital titrator).

SUMMARY OF THE DISCLOSED TECHNIQUE

20 It is an object of the disclosed technique to provide a novel method and system for determining the properties of a fluid.

In accordance with the disclosed technique, there is thus provided a fluid testing device for determining the value of each of a plurality of properties of a fluid. The fluid testing device includes a planar base and a plurality of test

25 sections, located on the planar base. Each of the test sections includes a test sub-section and a reference section located adjacent to the test sub-section. Each test sub-section exhibits a color according to the value, as a result of reaction of a reagent with the fluid. The reference section includes a plurality of different reference colors.

In accordance with another aspect of the disclosed technique, there is thus provided a fluid testing device for determining the value of each of a plurality of properties of a fluid. The fluid testing device includes a container, a plurality of test sections and a plurality of reference sections. Each container has
5 at least one transparent portion. Each of the test sections exhibits a color according to the value, as a result of reaction of a reagent with the fluid. Each of the reference sections is located adjacent to a respective one of the test sections and each of the reference sections includes a plurality of different reference colors.

10 In accordance with a further aspect of the disclosed technique, there is thus provided a fluid testing device for determining the value of each of a plurality of properties of a fluid. The fluid testing device includes a plurality of containers, a test section for each of the containers and a reference section for each of the test sections. Each container has at least one transparent portion. Each
15 test section exhibits a color according to the value, as a result of reaction of a reagent with the fluid. Each reference section is located adjacent to a respective test section, wherein the reference section includes a plurality of different reference colors.

In accordance with another aspect of the disclosed technique, there is
20 thus provided a method for determining the value of a plurality of properties of a fluid. The method includes the procedures of providing a plurality of test sections on a planar base and pre-associating a multiple color reference scheme with a property test substance of a respective one of the test sections. The method further includes the procedures of matching a test color of the property test substance,
25 with a selected one of different colors of the multiple color reference scheme and determining a respective one of the values according to the outcome of the procedure of matching.

In accordance with a further aspect of the disclosed technique, there is thus provided a method for determining the value of a plurality of properties of a
30 fluid. The method includes the procedures of providing a plurality of test sections,

each located on the inner wall of a respective one of a plurality of containers and pre-associating a multiple color reference scheme with a property test substance of a respective one of the test sections. The method further includes the procedures of matching a test color of the property test substance, with a selected
5 one of different colors of the multiple color reference scheme and determining a respective one of the values according to the outcome of the procedure of matching.

In yet another aspect of the present invention a fluid testing device for comparing the value of each of a plurality of properties of a fluid with a reference
10 value is disclosed, the device comprising, a planar base, a plurality of test sections, located on the planar base, the test sections including, a test sub-section which exhibits a color according to the value, as a result of reaction of a reagent with the fluid, a reference section located adjacent to the test sub-section, the reference section including at least one reference color corresponding to the
15 reference value. The reference value may be a maximum acceptable value or a minimum acceptable value. The reference value may be printed adjacent to the reference color. The test section may further comprise a label respective of a property of the fluid. The test sub-section may be impregnated with the reagent. The reference section may include at least two references colored sub sections.
20 The reference section may include a limit line.

In another aspect of the invention a method for comparing values of a plurality of properties of a fluid to a plurality of reference values is presented, the method comprising the procedures of, providing a plurality of test sections on a planar base, pre-associating a color from color reference scheme including at least
25 one reference color with a property test substance of a respective one of the test sections, immersing the planar base in the fluid to obtain a test color of said property test substance, and comparing the test color of the property test substance, with the at least one reference color. The method further comprises the color reference scheme including a maximum acceptable value or a minimum
30 acceptable value.

According to another aspect of the present invention a fluid testing device for determining the value of at least one property of a fluid is disclosed, the device comprising, a planar base, and at least one test section, located on the planar base, each of the test sections including, a test sub-section which exhibits a color according to the value, as a result of reaction of a reagent with the fluid, and a reference section located adjacent to the test sub-section, the reference section including at least one reference color. The value may be determined by matching one of the at least one reference color with the color. The test section may further comprise a label respective of a property of said fluid. The test sub-section may be impregnated with the reagent. The at least one property may be a concentration of a substance in said fluid. The test section further comprises a value indicating section, the value indicating section may include at least one number, the one number is located adjacent to a respective to the at least one reference color, the at least one number may represent a selected value of a property of the fluid.

15

BRIEF DESCRIPTION OF THE DRAWINGS

The disclosed technique will be understood and appreciated more fully from the following detailed description taken in conjunction with the drawings in which:

20 Figure 1A is a schematic illustration of a fluid testing device, constructed and operative in accordance with an embodiment of the disclosed technique;

Figure 1B is a schematic illustration of the fluid testing device of Figure 1A being immersed in a fluid;

25 Figure 1C is a schematic illustration of the fluid testing device of Figure 1A, wherein the colors of the test sections have changed, after immersion of the fluid testing device in the fluid;

30 Figure 2A is a schematic illustration of a battery of containers, constructed and operative in accordance with another embodiment of the disclosed technique;

Figure 2B is a schematic illustration of the containers of Figure 2A, after reaction of a fluid with the test substance of the test sub-section of each container;

Figure 3 is a schematic illustration of a method for determining a
5 quantitative property of a fluid, operative in accordance with a further embodiment of the disclosed technique;

Figure 4 is a schematic illustration of a fluid testing device, constructed and operative in accordance with another embodiment of the disclosed technique;

10 Figure 5A is a schematic illustration of a container, constructed and operative in accordance with a further embodiment of the disclosed technique;

Figure 5B is a schematic illustration of the container of Figure 5A, after pouring a fluid in the container, wherein the fluid has reacted with different test substances;

15 Figure 6A is a schematic illustration of a test section, constructed and operative in accordance with another embodiment of the disclosed technique;

Figure 6B is a schematic illustration of the test section of Figure 6A, after a reaction of the test substance of the test sub-section with a fluid; and

20 Figure 7 is a schematic illustration of a fluid testing device, constructed and operative in accordance with a further embodiment of the disclosed technique.

Figure 8A is a schematic illustration of a fluid testing device, constructed and operative in accordance with another embodiment of the disclosed technique;

25 Figure 8B is a schematic illustration of a fluid testing device, constructed and operative in accordance with another embodiment of the disclosed technique;

DETAILED DESCRIPTION OF THE EMBODIMENTS

The disclosed technique overcomes the disadvantages of the prior art by providing a test medium in which the color of the fluid changes as a result of reaction with a plurality of test substances, and the user determines a respective
5 property of the fluid, by matching a respective resultant color with a respective color index. A battery of associated pairs of test sections and reference schemes can be placed side by side, such as on a card, whereby the user determines the concentration of different substances in the fluid, by immersing the card in the fluid and matching the color of the test section with the reference scheme. Each
10 test section is impregnated with a selected substance, whereby the reaction of the selected substance with the fluid enables the user to determine the concentration of another selected substance in the fluid.

Reference is now made to Figures 1A, 1B and 1C. Figure 1A is a schematic illustration of a fluid testing device, generally referenced 100,
15 constructed and operative in accordance with an embodiment of the disclosed technique. Figure 1B is a schematic illustration of the fluid testing device of Figure 1A being immersed in a fluid. Figure 1C is a schematic illustration of the fluid testing device of Figure 1A, wherein the colors of the test sections have changed, after immersion of the fluid testing device in the fluid.

20 With reference to Figure 1A, fluid testing device 100 includes a plurality of test sections 102₁, 102₂, 102₃, 102₄, 102₅ and 102_N. Test sections 102₁, 102₂, 102₃, 102₄, 102₅ and 102_N include label sections 104₁, 104₂, 104₃, 104₄, 104₅ and 104_N, reference schemes 106₁, 106₂, 106₃, 106₄, 106₅ and 106_N, and test sub-sections 108₁, 108₂, 108₃, 108₄, 108₅ and 108_N, respectively. Each reference
25 scheme further includes a plurality of reference colored sub-sections, each of which is in a different color. For example, reference scheme 106_N includes reference colored sub-sections 106_{N,1}, 106_{N,2}, 106_{N,3}, 106_{N,4} and 106_{N,N}, which are in different shades of blue. According to the example set forth in Figure 1A, reference schemes 106₁, 106₂, 106₃, 106₄ and 106₅ include reference colored sub-

sections in different shades of brown, yellow, green, turquoise and purple, respectively.

Generally, a color can be defined according to a hue (e.g., blue, green, red, yellow, and the like), a saturation level and a brightness level. The saturation level defines the concentration of a specific hue. The brightness level defines the level of brightness or darkness of the hue. For example, a yellow oil paint consists of a mixture of linseed oil and lead chromate. The linseed oil allows the paint to flow and the lead chromate renders a yellow color to the oil paint. The saturation level of the yellow oil paint is defined by the amount of lead chromate in a given volume of linseed oil. The brightness level of the yellow oil paint is defined by the amount of white lead (for whiteness) or charcoal (for darkness) in the given volume of linseed oil.

It is noted that some or all of the reference colored sub-sections in a given test section can be in different hues (e.g., blue, green, red, yellow, and the like). Alternatively, all the reference colored sub-sections in a given test section can be in the same hue, but each having a different saturation level, brightness level, or both (e.g., each of the reference colored sub-sections of a given test section being a different shade of red).

Each of the label sections 104₁, 104₂, 104₃, 104₄, 104₅ and 104_N indicates a property of the fluid or a substance in the fluid, whose concentration can be determined by matching the color of the respective test sub-section with the color of one of the reference colored sub-sections of the respective reference scheme. In the example set forth in Figure 1A, test section 102₁ is constructed to test the pH of water and test sections 102₂, 102₃, 102₄, 102₅ and 102_N are constructed to test the concentration of nitrate (NO₃), lead (Pb), zinc (Zn), *Escherichia Coli* (*E. Coli*) and sodium (Na), respectively, in water. It is noted that sedimentation, the presence of general or specific bacteria, and concentration of hydrogen sulfide and nitrite (NO₂) can be determined. It is further noted that other tests for other substances in other fluids can also be imprinted on a card according to the disclosed technique, such as air, liquid fuel, crude oil, and the like.

Fluid testing device 100 is made of a material which substantially remains stable after being immersed in the fluid. For this purpose, fluid testing device 100 can be made of a flexible polymer, rigid polymer, glass, paper, plastic coated paper, cardboard, timber, dry clay, ceramic, masonry, leather, textile, metal, fabricated materials, and the like. Fluid testing device 100 is a substantially thin sheet in the form of rectangle, square, triangle, rhombus, parallelogram, trapezoid, quadrilateral, circle, annulus, ellipse, sector of a circle, freeform closed curve, and the like. Geometrically, the thin sheet is a plane which can either be flat or warped (i.e., rolled, folded, twisted, convex, concave, and the like).

Each test sub-section is impregnated with a test substance whose reaction with the fluid causes the color of the test sub-section to change, whereby the new color of the test sub-section indicates the concentration of a selected substance in the fluid or the concentration of a selected property of the fluid under test.

With reference to Figure 1B, a container 110 contains a fluid 112 which is to be tested. User 114 immerses fluid testing device 100 in the fluid 112 and waits for the test substances in each of the test sub-sections 108_1 , 108_2 , 108_3 , 108_4 , 108_5 and 108_N to react with the fluid.

With reference to Figure 1C, reference colored sub-sections $106_{1,1}$, $106_{1,2}$, $106_{1,3}$, $106_{1,4}$ and $106_{1,N}$ designate pH levels of 9, 8, 7, 6 and 5, respectively. Reference colored sub-sections $106_{2,1}$, $106_{2,2}$, $106_{2,3}$, $106_{2,4}$ and $106_{2,N}$ designate nitrate concentrations of 14, 12, 10, 8 and 6 milligram per liter (mg/l), respectively. Reference colored sub-sections $106_{N,1}$, $106_{N,2}$, $106_{N,3}$, $106_{N,4}$ and $106_{N,N}$ designate sodium concentrations of 16, 15, 14, 13 and 12 mg/l, respectively.

In the following description, fluid 112 is water. When fluid 112 reacts with the test substance which is impregnated in test sub-section 108_1 , the color of test sub-section 108_1 changes to a hue which corresponds to the pH level of fluid 112. When fluid 112 reacts with the test substance which is impregnated in test sub-section 108_2 , the color of test sub-section 108_2 changes to a hue which

corresponds to the nitrate level of fluid 112. When fluid 112 reacts with the test substance which is impregnated in test sub-section 108_N, the color of test sub-section 108_N changes to a hue which corresponds to the sodium level of fluid 112. User 114 determines the concentration of a selected substance in water, by
5 matching the color of the test sub-section, with the color of one of the reference colored sub-sections of the respective reference scheme. It is noted the matching process is a straight forward operation and that the user does not have to align the test sub-sections with the reference colored sub-sections.

For example, user 114 compares the color of test sub-section 108₁ with
10 reference colored sub-sections 106_{1,1}, 106_{1,2}, 106_{1,3}, 106_{1,4} and 106_{1,N} and determines that the color of test sub-section 108₁ is substantially similar to the color of reference colored sub-section 106_{1,3}. Thus, user 114 determines that the pH of fluid 112 is 7. User 114 compares the color of test sub-section 108₂ with reference colored sub-sections 106_{2,1}, 106_{2,2}, 106_{2,3}, 106_{2,4} and 106_{2,N} and
15 determines that the color of test sub-section 108₂ is substantially similar to the color of reference colored sub-section 106_{2,4}. Thus, user 114 determines that the concentration of nitrate in fluid 112 is 8 mg/l. User 114 compares the color of test sub-section 108_N with reference colored sub-sections 106_{N,1}, 106_{N,2}, 106_{N,3}, 106_{N,4} and 106_{N,N} and determines that the color of test sub-section 108_N is substantially
20 similar to the color of reference colored sub-section 106_{N,1}. Thus, user 114 determines that the concentration of sodium in fluid 112 is 16 mg/l. It is noted that a substantially large number of test sections 102₁, 102₂ and 102_N can be constructed on fluid testing device 100, thus enabling the testing of a substantially large number of properties and substance concentrations in the fluid,
25 simultaneously. The invention is not limited the determining of a plurality of properties of a liquid. Accordingly, it is within the scope of the invention to provide also fluid testing device including only one test section that includes, a test sub-section exhibiting a color according to a value of property tested as a result of reaction of a reagent with liquid and adjacent to test sub-section is
30 located a reference scheme section that can include one or more colors. The fluid

testing device may further include a value indicating section, as shown in view of Figure 7 below, including one or more values of property adjacent to a reference section including one or more reference colors can be presented when one or more value of property is determined with a fluid testing device.

5 Figure 8A presents a planar base fluid testing device 520. According to the embodiment shown in Figure 8A, a fluid testing device 520 includes a plurality of test sections 528₁, 528₂, 528₃, 528₄ and 528₅. Test sections 528₁, 528₂, 528₃, 528₄, 528₅ include label sections 522₁, 522₂, 522₃, 522₄, 522₅, reference schemes 526₁, 526₂, 526₃, 526₄, 526₅, and test sub-sections 524₁, 524₂, 524₃, 524₄,
10 524₅. Fluid testing device 520 has a holding part 530 to be held by the user when immersing the device in tested liquid. Each of labels 522₁, 522₂, 522₃, 522₄, 522₅, indicates a reagent or substance to be tested. Thus, the fluid testing device 520 presents the properties of a tested liquid. According to the embodiment of Fig. 8A, fluid testing device 520 includes reference schemes 526₁, 526₂, 526₃, 526₄,
15 526₅ that have one color only for each of test sub-sections 528₁, 528₂, 528₃, 528₄ and 528₅. This color may correspond, for example, to the maximum acceptable value of the tested substance. Accordingly, fluid testing device 520 is able to determine properties and substance concentrations within a fluid concurrently. A user (not shown) using fluid testing device 520 can compare the color of
20 reference test sub-sections 524₁, 524₂, 524₃, 524₄, 524₅ to reference schemes 526₁, 526₂, 526₃, 526₄, 526₅, respectively. One skilled in the art can appreciate that different reagents and materials can be tested for their concentration and presence by the fluid testing device 520. Furthermore, the number of test sections is not limited to the number shown in Figure 8A and can be fewer or greater than the
25 number shown. According to one example of the present embodiment, a darker hue in test sub-section 524₅ than reference scheme 526₅ will indicate a concentration of Iron (Fe) higher than allowed. Similarly, according to another example lighter hue received in test-subsection 524₅ than reference scheme 526₅ or alternatively an identical color as within reference scheme 526₅ will indicate an
30 allowed concentration of Fe. The difference between test sub-sections 524₁, 524₂,

524₃, 524₄, 524₅ and reference schemes 526₁, 526₂, 526₃, 526₄, 526₅, respectively, according to the embodiment is obvious and can be indicated by a line drawn between test sub-sections and reference schemes. One skilled in the art can appreciate that when other concentrations of other material are tested for their concentration within a liquid with a fluid testing device a lighter hue can indicate an unacceptable concentration. Hence the hue of the reference scheme according to the present embodiment corresponds to a crucial concentration, e.g., max. permitted value and a comparison shows whether the concentration in tested fluid is above or below this value.

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Figure 8B is a schematic illustration of a fluid testing device 540 constructed and operative in accordance with yet another embodiment of the disclosed invention. Fluid testing device 540 has a holding part 554 that can be held by user when inserting or taking out of said device from tested liquid. Fluid testing device 540 includes a plurality of test sections 542₁, 542₂, 542₃ and 542₄. Test sections 542₁, 542₂, 542₃, 542₄ include label sections 544₁, 544₂, 544₃, 544₄ and test sub-sections 546₁, 546₂, 546₃, 546₄. According to the present embodiment, the reference scheme in each of the of test sections 542₁, 542₂, 542₃, 542₄ is having two or more reference colored sub section. Thus, test sub-section 542₁ includes reference colored sub sections 548₁, 552 and 550₁, test sub-section 542₂ includes reference colored sub sections 548₂ and 550₂, test sub-section 542₃ includes reference colored sub sections 548₃ and 550₃ and test sub-section 542₄ includes reference colored sub sections 548₄ and 550₄. Inserting of fluid testing device 540 into a tested liquid will indicate according to the present embodiment whether the concentration of Cl (Free Chlorine) is within the allowable limit and thus acceptable for use or not (e.g. if the tested liquid is water whether the water is acceptable for use). Similarly, fluid testing device 540 is able to indicate whether the hardness of the liquid (e.g. water), the concentration of NO₃ (Nitrates) and Fe (Iron) are acceptable for use. Lines 556₁, 556₂, 556₃ and 556₄ indicate a limit line within test sub-sections 542₁, 542₂, 542₃ and 542₄,

respectively. The limit line indicates the acceptable color limit differentiating between the acceptable and unacceptable values of concentration of reagents and substrates tested within a liquid. Thus, according to one example the hue of the reference test sub-sections 546₁, 546₂, 546₃ and 546₄, are compared to the

5 reference schemes within each test sections. According to one example the hue within reference colored sub section 548₄ positioned above limit line 556₄ indicates the unacceptable value of Iron within the tested liquid and reference colored sub section 550₄ positioned below limit line 556₄ indicates the acceptable value within the liquid. The color received in reference test sub-section 546₄ after

10 inserting fluid testing device 540 within a tested liquid is compared to reference colored sub sections 548₄ and 550₄. According to the example if color received within reference test sub-section 546₄ is the same as one of reference colored sub sections 548₄ and 550₄ the concentration of Iron and determination whether the concentration is performed by simple comparison to said sub sections and the use

15 of limit line 556₄. If the said color received within reference test sub-section 546₄ is different from reference colored sub sections 548₄ and 550₄ the hue of said reference test sub-section is compared to reference colored sub sections 548₄ and 550₄. Accordingly, if said color within reference test sub-section 546₄ is darker than reference scheme 548₄ the concentration of Iron is unacceptable within the

20 tested liquid. Similarly, if the color within reference test sub-section 546₄ is lighter than reference scheme 550₄ the concentration of Iron within the tested liquid is acceptable. According to the shown embodiment the concentrations of the Iron as represented by reference sub-sections 548₄ and 550₄ are indicated 558₁ and 558₂ adjacent to reference colored sub sections. Thus, if the color on

25 reference test sub-section 546₄ is identical to reference colored sub section 548₄ or 550₄ the user can determinate the concentration of Iron within tested liquid. According to the present embodiment the user is able to determine whether the concentration of Iron within tested liquid is acceptable as well as to determine the concentration of Iron within the liquid. According to other embodiments the

30 concentration of other reagents and substrates within in other test sections can be

indicated beside reference schemes. One skilled in the art can comprehend that according to other embodiments test sections for testing either the same concentration presents of reagents and substances can include one reference colored sub section as shown in Figure 8A or a plurality of reference schemes.

- 5 Thus, a fluid testing device can include test sections that can include one reference colored sub section, test sections that can include two, three or any other plurality of reference schemes for testing the concentration and presence of desired reagents and substrates within a tested liquid.

Reference is now made to Figures 2A and 2B. Figure 2A is a
10 schematic illustration of a battery of containers, generally referenced 150, constructed and operative in accordance with another embodiment of the disclosed technique. Figure 2B is a schematic illustration of the containers of Figure 2A, after reaction of a fluid with the test substance of the test sub-section of each container.

- 15 The battery of containers 150, includes a plurality of containers 152₁, 152₂, 152₃, 152₄, 152₅ and 152_N. Each of containers 152₁, 152₂, 152₃, 152₄, 152₅ and 152_N is constructed separately and are fastened together, by an adhesive, at least one fastener, welding, and the like. Alternatively, containers 152₁, 152₂, 152₃, 152₄, 152₅ and 152_N are constructed as separate cavities within a single
20 body.

- Containers 152₁, 152₂, 152₃, 152₄, 152₅ and 152_N include reference schemes 154₁, 154₂, 154₃, 154₄, 154₅ and 154_N and test sub-sections 156₁, 156₂, 156₃, 156₄, 156₅ and 156_N, respectively. Each reference scheme further includes a plurality of reference colored sub-sections, each of which is in a different color.
25 For example, reference scheme 154_N includes reference colored sub-sections 154_{N,1}, 154_{N,2}, 154_{N,3}, 154_{N,4} and 154_{N,N}, which are in different shades of blue. According to the example set forth in Figure 2A, reference schemes 154₁, 154₂, 154₃, 154₄ and 154₅ include reference colored sub-sections in different shades of brown, yellow, green, turquoise, purple and blue, respectively. Each of the test
30 sub-sections 156₁, 156₂, 156₃, 156₄, 156₅ and 156_N is impregnated with a test

substance, selected to determine the concentration of a selected substance in the fluid or the value of a selected property of the fluid.

One end of each of containers 152₁, 152₂, 152₃, 152₄, 152₅ and 152_N is entirely or partially open, in order to allow the user to let the fluid into the container. Each of containers 152₁, 152₂, 152₃, 152₄, 152₅ and 152_N can be closed by a matching stopper (not shown), in order to allow the user to shake the container and for the reaction between the test substance and the fluid to take place. Alternatively, the stoppers of containers 152₁, 152₂, 152₃, 152₄, 152₅ and 152_N are part of a single body.

Test sub-sections 156₁, 156₂, 156₃, 156₄, 156₅ and 156_N are transparent strips which are fastened to the inner wall of containers 152₁, 152₂, 152₃, 152₄, 152₅ and 152_N, respectively. Test sub-sections 156₁, 156₂, 156₃, 156₄, 156₅ and 156_N are located adjacent to reference schemes 154₁, 154₂, 154₃, 154₄, 154₅ and 154_N, respectively.

The cross section of each of containers 152₁, 152₂, 152₃, 152₄, 152₅ and 152_N, along either the longitudinal axis or the transverse axis thereof, can be either variable or constant. This cross section can be in the form of rectangle, square, triangle, rhombus, parallelogram, trapezoid, quadrilateral, circle, annulus, ellipse, sector of a circle, freeform closed curve, and the like.

Each of containers 152₁, 152₂, 152₃, 152₄, 152₅ and 152_N is made of a polymer, glass, timber, dry clay, ceramic, masonry, metal, and the like, having at least one transparent portion. If the container is opaque, then that portion of the container which covers a test sub-section, is enhanced by a transparent property or is made of a transparent material. Hence, the user can compare the color of a test sub-section with the colors of the respective reference colored sub-sections.

When the test substance of a test sub-section reacts with the fluid, the color of the test sub-section changes to a color substantially similar to the color of one of the reference colored sub-sections in the respective reference scheme. The user, then determines the value of the selected property of the fluid or the

concentration of the selected substance in the fluid, by matching the new color of the test sub-section, with the color of one of the reference colored sub-sections.

With reference to Figure 2B, containers 152₂, 152₃ and 152_N include reference schemes 154₂, 154₃ and 154_N, respectively. Reference scheme 154₂ includes reference colored sub-sections 154_{2,1}, 154_{2,2}, 154_{2,3}, 154_{2,4} and 154_{2,N}. Reference scheme 154₃ includes reference colored sub-sections 154_{3,1}, 154_{3,2}, 154_{3,3}, 154_{3,4} and 154_{3,N}. Reference scheme 154_N includes reference colored sub-sections 154_{N,1}, 154_{N,2}, 154_{N,3}, 154_{N,4} and 154_{N,N}.

The fluid which is to be tested, is poured in containers 152₂, 152₃ and 152_N. The test substances in test sub-sections 156₂, 156₃ and 156_N react with the fluid and the color of each of test sub-sections 156₂, 156₃ and 156_N in each container changes to the color of one of the reference colored sub-sections in the respective reference scheme. In the example set forth in Figure 2B, container 152₂ is designated to test the concentration of nitrate in the fluid. The user matches the color of test sub-section 156₂ with reference colored sub-section 154_{2,2} and determines that the concentration of nitrate in the fluid is 12 mg/l.

Container 152₃ is designated to test for example, the concentration of lead in the fluid. Reference colored sub-sections 154_{3,1}, 154_{3,2}, 154_{3,3}, 154_{3,4} and 154_{3,N} designate lead concentrations of 0.0122, 0.0124, 0.0126, 0.0128 and 0.0130 mg/l, respectively, in the fluid. The user matches the color of test sub-section 156₃ with reference colored sub-section 154_{3,4} and thus, determines that the concentration of lead in the fluid is 0.0128 mg/l.

Container 152_N is designated to test the concentration of sodium in the fluid. The user matches the color of test sub-section 156_N with reference colored sub-section 154_{N,1} and thus, determines that the concentration of sodium in the fluid is 16 mg/l.

Reference is now made to Figure 3, which is a schematic illustration of a method for determining a quantitative property of a fluid, operative in accordance with a further embodiment of the disclosed technique. In procedure 300, a plurality of test sections are provided on a planar base. With reference to

Figure 1A, test sections 102₁, 102₂, 102₃, 102₄, 102₅ and 102_N are provided to test card 100.

In procedure 302, a multiple color reference scheme is pre-associated with a property test substance in each of the test sections, wherein each of the different colors designates a different value of a tested property of a fluid under test. With reference to Figure 1A, reference schemes 106₁, 106₂, 106₃, 106₄, 106₅ and 106_N of fluid testing device 100, are placed adjacent to test sub-sections 108₁, 108₂, 108₃, 108₄, 108₅ and 108_N, respectively. Each of test sub-sections 108₁, 108₂, 108₃, 108₄, 108₅ and 108_N includes a selected test substance, to test the level of another substance in a fluid. For example, reference scheme 106_N is placed adjacent to test sub-section 108_N. Reference scheme 106_N is colored in different shades of blue, as illustrated by reference colored sub-sections 106_{N,1}, 106_{N,2}, 106_{N,3}, 106_{N,4} and 106_{N,N}. Reference scheme 106_N is employed to determine the concentration of sodium and each of the reference colored sub-sections 106_{N,1}, 106_{N,2}, 106_{N,3}, 106_{N,4} and 106_{N,N} designates a different sodium concentration in the fluid.

In procedure 304, the test sections bearing planar base is subjected to the fluid under test, whereby the color of the property test substance changes to a new test color, as a result of reaction of the fluid with the property test substance. With reference to Figures 1A and 1B, fluid testing device 100 is immersed in fluid 112, whereby fluid 112 reacts with the test substance included in test sub-section 108_N and the color of test sub-section 108_N (and the fluid which was absorbed by test sub-section 108_N), changes to a new color.

In procedure 306, the new test color is matched with a selected one of the different colors. With reference to Figure 1C, the user matches the color of test sub-section 108_N with reference colored sub-section 106_{N,1}.

In procedure 308, a selected one of the different values is determined, according to the matched color. With reference to Figure 1C, the user determines that the concentration of sodium (i.e., the property under test) in the fluid, is 16 mg/l.

Reference is now made to Figure 4, which is a schematic illustration of a fluid testing device, generally referenced 350, constructed and operative in accordance with another embodiment of the disclosed technique. Fluid testing device 350 includes a plurality of test sections 352₁, 352₂ and 352_N. Test section 5 352₁ includes a label section 354₁, a reference scheme 356₁ and a test sub-section 358₁. Reference scheme 356₁ includes a plurality of reference colored sub-sections 356_{1,1}, 356_{1,2}, 356_{1,3}, 356_{1,4} and 356_{1,N} and a limit line 360₁.

Test section 352₂ includes a label section 354₂, a reference scheme 356₂ and a test sub-section 358₂. Reference scheme 356₂ includes a plurality of 10 reference colored sub-sections 356_{2,1}, 356_{2,2}, 356_{2,3}, 356_{2,4} and 356_{2,N} and a limit line 360₂. Test section 352_N includes a label section 354_N, a reference scheme 356_N and a test sub-section 358_N. Reference scheme 356_N includes a plurality of reference colored sub-sections 356_{N,1}, 356_{N,2}, 356_{N,3}, 356_{N,4} and 356_{N,N} and a limit line 360_N.

15 Limit line 360₁ is located between reference colored sub-sections 356_{1,3} and 356_{1,4}. Limit line 360₂ is located between reference colored sub-sections 356_{2,2} and 356_{2,3}. Limit line 360_N is located between reference colored sub-sections 356_{N,3} and 356_{N,4}.

Each limit line indicates to the user, that if the color of a test sub- 20 section matches the color of one of the reference colored sub-sections which are located below the limit line, then the fluid under test, according to the tested property, is unacceptable for use. For example, if test section 352₁ is employed to test the pH level of the fluid, and the color of test sub-section 358₁ after immersion of fluid testing device 350 in the fluid, matches the color of reference 25 colored sub-section 356_{1,4} or 356_{1,N}, then the user determines that in both cases, the pH is below the allowable limit and thus the fluid is unacceptable for use.

Alternatively, the limit line indicates to the user, that if the color of a test sub-section matches the color of one of the reference colored sub-sections which are located above the limit line, then the fluid under test, according to the 30 tested property, is unacceptable for use. For example, if test section 352₂ is

employed to test the concentration of nitrate in the fluid, and the color of test sub-section 358₂ after immersion of fluid testing device 350 in the fluid, matches the color of reference colored sub-section 356_{2,1} or 356_{2,2}, then the user determines that in both cases, the nitrate concentration is above the allowable limit and thus
5 the fluid is unacceptable for use.

Reference is now made to Figures 5A and 5B. Figure 5A is a schematic illustration of a container, generally referenced 400, constructed and operative in accordance with a further embodiment of the disclosed technique. Figure 5B is a schematic illustration of the container of Figure 5A, after pouring a
10 fluid in the container, wherein the fluid has reacted with different test substances. Container 400 includes a plurality of label sections 404₁, 404₂ and 404_N, a plurality of reference schemes 406₁, 406₂ and 406_N, and a plurality of test sub-sections 408₁, 408₂ and 408_N.

Reference scheme 406₁ includes a plurality of reference colored sub-sections 406_{1,1}, 406_{1,2}, 406_{1,3}, 406_{1,4} and 406_{1,N}. Reference scheme 406₂ includes a
15 plurality of reference colored sub-sections 406_{2,1}, 406_{2,2}, 406_{2,3}, 406_{2,4} and 406_{2,N}. Reference scheme 406_N includes a plurality of reference colored sub-sections 406_{N,1}, 406_{N,2}, 406_{N,3}, 406_{N,4} and 406_{N,N}.

Each of the label sections 404₁, 404₂ and 404_N is printed on an inner
20 wall of container 400, on an outer wall thereof or within the wall of container 400. Alternatively, each of the label sections 404₁, 404₂ and 404_N is in form of a transparent or an opaque pressure sensitive tape, which is adhered either to the inner wall of container 400, or to the outer wall thereof.

Reference schemes 406₁, 406₂ and 406_N are located below label
25 sections 404₁, 404₂ and 404_N, respectively. Each of the reference schemes 406₁, 406₂ and 406_N is printed on an inner wall of container 400, on an outer wall thereof or within the wall of container 400. Alternatively, each of the label sections 406₁, 406₂ and 406_N is in form of a transparent or an opaque pressure sensitive tape, which is adhered either to the inner wall of container 400, or to the

outer wall thereof. Alternatively, reference schemes 406₁, 406₂ and 406_N are located above label sections 404₁, 404₂ and 404_N, respectively.

Each of test sub-sections 408₁, 408₂ and 408_N is a transparent strip which is impregnated with a test substance, wherein the transparent strip is fastened to the inner wall of container 400. Alternatively, each of test sub-sections 408₁, 408₂ and 408_N is a test substance in the form of a powder, which coats the inner wall of container 400. Test sub-sections 408₁, 408₂ and 408_N are located below reference schemes 406₁, 406₂ and 406_N, respectively. Test sub-sections 408₁, 408₂ and 408_N are located substantially adjacent to reference schemes 406₁, 406₂ and 406_N, respectively. Alternatively, test sub-sections 408₁, 408₂ and 408_N are located above reference schemes 406₁, 406₂ and 406_N, respectively.

With reference to Figure 5B, fluid 402 which is poured in container 400, fluid 402 reacts with test sub-sections 408₁, 408₂ and 408_N and as a result of the reaction, the color of fluid 402 in the vicinity of each of the test sub-sections 408₁, 408₂ and 408_N, changes. The user, then determines the value of each property of fluid 402, or the concentration of a substance in fluid 402, by matching the color of fluid 402 in the vicinity of test sub-sections 408₁, 408₂ and 408_N, with the color of one of the reference colored sub-sections of reference schemes 406₁, 406₂ and 406_N, respectively.

It is noted that after performing a fluid test, test sub-sections 408₁, 408₂ and 408_N can be removed from the inner wall of container 400 and a new set of test sections applied to the inner wall of container 400, thereby allowing the user to perform a new fluid test, by employing container 400 once again. Alternatively, the user can dispose of the container after performing a test and use another container for performing a new test. Each of the test sub-sections further includes a limit line, whereby the user can determine whether the fluid under test is acceptable for use according to a selected property, if the color of fluid after reaction, matches the color of one of the reference colored sub-sections, which is located either to the right or to the left of the limit line.

It is noted that different combinations of the relative locations of a label section, the respective reference scheme and the respective test sub-section, can be selected. Hence, the combinations described above are not exhaustive and other combinations are possible.

5 Reference is now made to Figures 6A and 6B. Figure 6A is a schematic illustration of a test section, generally referenced 420, constructed and operative in accordance with another embodiment of the disclosed technique. Figure 6B is a schematic illustration of the test section of Figure 6A, after a reaction of the test substance of the test sub-section with a fluid.

10 With reference to Figure 6A, test section 420 includes a label 422, a reference scheme 424 and a test sub-section 426. Reference scheme 424 includes a plurality of reference colored sub-sections 424₁, 424₂, 424₃, 424₄, 424₅ and 424₆. Test section 420 is in form of a circle. Label 422 is in form of a circle within test section 420. Reference scheme 424 is in form of an annulus around
15 label 422. Each of reference colored sub-sections 424₁, 424₂, 424₃, 424₄, 424₅ and 424₆ is a sector of the annulus of reference scheme 424.

 Test sub-section 426 is in form of an annulus surrounding reference scheme 424. Test sub-section 426 is impregnated with a selected test substance, in order to determine the concentration of a substance or the value of a property in
20 the fluid. According to the example set forth in Figure 6A, test sub-section 426 is impregnated with a test substance to determine the concentration of chlorine. The centers of label 422, reference scheme 424 and test sub-section 426, lie at substantially the same point.

 With reference to Figure 6B, test sub-section 426 exhibits a color
25 which matches the color of reference colored sub-section 424₂. Thus, the user determines that the concentration of chlorine in the fluid is for example, 0.5 mg/l. It is noted that any geometric shape can be used for a test section, including a rectangle, an ellipse, abstract shapes, known trade marks, and the like.

 Reference is now made to Figure 7, which is a schematic illustration of
30 a fluid testing device, generally referenced 500, constructed and operative in

accordance with a further embodiment of the disclosed technique. Fluid testing device 500 includes a plurality of test sections 502₁, 502₂, 502₃, 502₄, 502₅ and 502₆. Test sections 502₁, 502₂, 502₃, 502₄, 502₅ and 502₆ include label sections 504₁, 504₂, 504₃, 504₄, 504₅ and 504₆, reference schemes 506₁, 506₂, 506₃, 506₄, 506₅ and 506₆, test sub-sections 508₁, 508₂, 508₃, 508₄, 508₅ and 508₆, and value indicating sections 510₁, 510₂, 510₃, 510₄, 510₅ and 510₆, respectively.

Each reference scheme further includes a plurality of reference colored sub-sections, each of which is in a different hue. A number is printed adjacent to each reference colored sub-section in each value indicating section. The material and geometry of fluid testing device 500 is similar to those of fluid testing device 100, as described herein above in connection with Figure 1A.

Test sections 502₁, 502₂, 502₃, 502₄, 502₅ and 502₆ are designated for testing the concentration of iron (Fe), copper (Cu), nitrate (NO₃), chlorine (Cl), and the hardness and pH of water, respectively. The numbers in each value indicating section represent different concentrations of the respective substance or different values of the respective parameter in the water under test.

Thus, the user reads the concentration of the substance or the value of the parameter, after comparing the color of a test sub-section with the respective reference scheme and determining the reference colored sub-section which matches the color of the test sub-section. One of the numbers in each value indicating section is printed in a different style than the rest, thereby indicating the allowable concentration of a substance in water, or the allowable hardness or pH of water, according to a standard. For example, this number can be printed in bold, italics, be underlined, in a different color, in a different font, in a different size, and the like. It is noted that other properties of water can be determined, such as total alkalinity, and the like.

It will be appreciated by persons skilled in the art that the disclosed technique is not limited to what has been particularly shown and described here in above. Rather the scope of the disclosed technique is defined only by the claims which follow.

CLAIMS

1. Fluid testing device for determining the value of each of a plurality of properties of a fluid, the fluid testing device comprising:
 - 5 a planar base; and
 - a plurality of test sections, located on said planar base, each of said test sections including:
 - a test sub-section which exhibits a color according to said value, as a result of reaction of a reagent with said fluid; and
 - 10 a reference section located adjacent to said test sub-section, said reference section including a plurality of different reference colors.
2. The fluid testing device according to claim 1, wherein said value is determined by matching one of said different reference colors with said
15 color.
3. The fluid testing device according to claim 1, wherein said test section further comprises a label respective of a property of said fluid.
- 20 4. The fluid testing device according to claim 1, wherein said test sub-section is impregnated with said reagent.
5. The fluid testing device according to claim 1, wherein each of said properties is a concentration of a different substance in said fluid.
25
6. The fluid testing device according to claim 5, wherein said different substance is selected from the list consisting of:
 - nitrate;
 - nitrite;
 - 30 lead;

zinc;
Escherichia Coli;
sodium;
iron;
5 copper;
chlorine;
bacteria;
sedimentation; and
hydrogen sulfide.

10

7. The fluid testing device according to claim 1, wherein a selected one of said properties is the hardness of water.

15

8. The fluid testing device according to claim 1, wherein a selected one of said properties is the pH of said fluid.

9. The fluid testing device according to claim 1, wherein a selected one of said properties is the total alkalinity of said fluid.

20

10. The fluid testing device according to claim 1, wherein said fluid is selected from the list consisting of:

water;
air;
liquid fuel; and
25 crude oil.

25

11. The fluid testing device according to claim 1, wherein said planar base is made of a material selected from the list consisting of:

flexible polymer;
30 rigid polymer;

30

- 5 fabricated materials;
glass;
paper;
plastic coated paper;
cardboard;
timber;
dry clay;
ceramic;
masonry;
10 leather;
textile; and
metal.
12. The fluid testing device according to claim 1, wherein said planar base is in
15 form of a sheet.
13. The fluid testing device according to claim 12, wherein the geometry of said
sheet is selected from the list consisting of:
- 20 rectangle;
square;
triangle;
rhombus;
parallelogram;
trapezoid;
25 quadrilateral;
circle;
annulus;
ellipse;
sector of a circle; and
30 freeform closed curve.

14. The fluid testing device according to claim 12, wherein the form of said sheet is selected from the list consisting of:
- 5 flat;
 rolled;
 folded;
 twisted;
 convex; and
 concave.
- 10
15. The fluid testing device according to claim 1, wherein said different reference colors are of the same hue, and wherein each of said reference colors are of different saturation levels and different brightness levels.
- 15 16. The fluid testing device according to claim 1, wherein at least one of said different reference colors designating an acceptable value of a property of said fluid, is separated by a limit line, from at least another one of said different reference colors designating an unacceptable value of said property.
- 20
17. The fluid testing device according to claim 1, wherein said test section further comprises a value indicating section, said value indicating section includes a plurality of numbers, each of said numbers is located adjacent to a respective reference color, each of said numbers represents a selected
- 25 value of a property of said fluid.
18. The fluid testing device according to claim 17, wherein a selected one of said numbers is represented in a different style, thereby separating at least one number which designates an acceptable value of said property, from at

least another number which designates an unacceptable value of said property.

19. The fluid testing device according to claim 18, wherein said different style is
5 selected from the list consisting of:
- bold;
 - italics;
 - underlined;
 - color;
 - 10 font; and
 - size.
20. Fluid testing device for determining the value of each of a plurality of
properties of a fluid, the fluid testing device comprising:
- 15 a container, having at least a transparent portion;
- a plurality of test sections, each of said test sections exhibiting a color
according to said value, as a result of reaction of a reagent with said fluid;
and
- 20 a plurality of reference sections, each of said reference sections being
located adjacent to a respective one of said test sections, each of said
reference sections including a plurality of different reference colors.
21. The fluid testing device according to claim 20, wherein said value is
determined by matching one of said different reference colors with said
25 color.
22. The fluid testing device according to claim 20, further comprising a stopper
for closing an at least partially open end of said container.

23. The fluid testing device according to claim 20, wherein said container is made of a material selected from the list consisting of:

polymer;
glass;
5 timber;
dry clay;
ceramic;
masonry; and
metal.

10

24. The fluid testing device according to claim 20, wherein the cross section of said container is selected from the list consisting of:

rectangle;
square;
15 triangle;
rhombus;
parallelogram;
trapezoid;
quadrilateral;
20 circle;
annulus;
ellipse;
sector of a circle; and
freeform closed curve.

25

25. The fluid testing device according to claim 20, wherein said container comprises a plurality of different labels respective of different ones of said properties, each of said different labels being located adjacent to a respective one of said test sections.

30

26. The fluid testing device according to claim 20, wherein each one of said test sections is attached to the inner wall of said container, said test section is impregnated with said reagent.
- 5 27. The fluid testing device according to claim 26, wherein said test section is replaced by an unused test section of the same kind, after testing said fluid.
- 10 28. The fluid testing device according to claim 20, wherein a reference section respective of a property of said fluid is in form of a circle, said different reference colors respective of said reference section are in form of sectors of said circle and a test section respective of said property, is in form of an annulus surrounding said circle.
- 15 29. The fluid testing device according to claim 20, wherein a reference section respective of a property of said fluid and a test section respective of said property, each is in form of a strip.
- 20 30. The fluid testing device according to claim 20, wherein each of said test sections comprises said reagent, said reagent coating the inner wall of said container.
31. The fluid testing device according to claim 20, wherein each of said properties is a concentration of a different substance in said fluid.
- 25 32. The fluid testing device according to claim 31, wherein said different substance is selected from the list consisting of:
- nitrate;
 - nitrite;
 - lead;
 - 30 zinc;

Escherichia Coli;
sodium;
iron;
copper;
5 chlorine;
bacteria;
sedimentation; and
hydrogen sulfide.

10 33. The fluid testing device according to claim 20, wherein a selected one of said properties is the hardness of water.

34. The fluid testing device according to claim 20, wherein a selected one of said properties is the pH of said fluid.

15

35. The fluid testing device according to claim 20, wherein a selected one of said properties is the total alkalinity of said fluid.

20

36. The fluid testing device according to claim 20, wherein at least one of said different reference colors designating an acceptable value of a property of said fluid, is separated by a limit line, from at least another one of said different reference colors designating an unacceptable value of said property.

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37. The fluid testing device according to claim 20, wherein each of said test sections comprises a value indicating section, said value indicating section includes a plurality of numbers, each of said numbers is located adjacent to a respective one of said different reference colors, each of said numbers represents a selected value of a property of said fluid.

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38. The fluid testing device according to claim 37, wherein a selected one of said numbers is represented in a different style, thereby separating at least one number which designates an acceptable value of said property, from at least another number which designates an unacceptable value of said property.
39. Fluid testing device for determining the value of each of a plurality of properties of a fluid, the fluid testing device comprising:
- a plurality of containers, each having at least a transparent portion;
 - a test section for each of said containers, said test section exhibiting a color according to said value, as a result of reaction of a reagent with said fluid; and
 - a reference section for each of said test sections, said reference section being located adjacent to a respective test section, said reference section including a plurality of different reference colors.
40. The fluid testing device according to claim 39, wherein said value is determined by matching one of said different reference colors of said reference section respective of a selected container, with said color of said test section respective of said selected container.
41. The fluid testing device according to claim 39, wherein said containers are part of a solid body.
42. The fluid testing device according to claim 39, wherein each of said containers is a separate body, and wherein said containers are attached together.
43. The fluid testing device according to claim 39, further comprising a stopper for closing an at least partially open end of each of said containers.

44. The fluid testing device according to claim 43, wherein said stoppers are part of a body.
- 5 45. The fluid testing device according to claim 39, wherein said test section is attached to the inner wall of each of said containers, said test section is impregnated with said reagent.
- 10 46. The fluid testing device according to claim 45, wherein said test section is replaced by an unused test section of the same kind, after testing said fluid.
- 15 47. The fluid testing device according to claim 39, wherein said reference section is in form of a circle, said different reference colors respective of said reference section are in form of sectors of said circle and said test section respective of said reference section, is in form of an annulus surrounding said circle.
- 20 48. The fluid testing device according to claim 39, wherein said reference section and said test section respective of said reference section, each is in form of a strip.
- 25 49. The fluid testing device according to claim 39, wherein said test section comprises said reagent, said reagent coating the inner wall of each of said containers.
- 30 50. The fluid testing device according to claim 39, wherein each of said properties is a concentration of a different substance in said fluid.
51. The fluid testing device according to claim 50, wherein said different substance is selected from the list consisting of:

nitrate;
nitrite;
lead;
zinc;
5 Escherichia Coli;
sodium;
iron;
copper;
chlorine;
10 bacteria;
sedimentation; and
hydrogen sulfide.

52. The fluid testing device according to claim 39, wherein a selected one of
15 said properties is the hardness of water.

53. The fluid testing device according to claim 39, wherein a selected one of
said properties is the pH of said fluid.

20 54. The fluid testing device according to claim 39, wherein a selected one of
said properties is the total alkalinity of said fluid.

55. The fluid testing device according to claim 39, wherein at least one of said
different reference colors designating an acceptable value of a property of
25 said fluid, is separated by a limit line, from at least another one of said
different reference colors designating an unacceptable value of said
property.

56. The fluid testing device according to claim 39, wherein said test section
30 comprises a value indicating section, said value indicating section includes a

plurality of numbers, each of said numbers is located adjacent to a respective one of said different reference colors, each of said numbers represents a selected value of a property of said fluid.

- 5 57. Method for determining the value of a plurality of properties of a fluid, the method comprising the procedures of:

providing a plurality of test sections on a planar base;

pre-associating a multiple color reference scheme with a property test substance of a respective one of said test sections;

- 10 matching a test color of said property test substance, with a selected one of different colors of said multiple color reference scheme; and

determining a respective one of said values according to the outcome of said procedure of matching.

- 15 58. The method according to claim 57, further comprising a procedure of subjecting said test sections to said fluid, after said procedure of pre-associating, whereby said property test substance exhibits said test color, as a result of a reaction of said fluid with said property test substance.

- 20 59. The method according to claim 57, further comprising a preliminary procedure of impregnating each of said test sections with a respective property test substance.

- 25 60. The method according to claim 57, wherein said determining procedure further comprises a sub-procedure of reading a selected one of a plurality of numbers, said selected number designates said value, and

wherein each of said numbers is located adjacent to a respective one of said different colors.

61. Method for determining the value of a plurality of properties of a fluid, the method comprising the procedures of:
- providing a plurality of test sections, each located on the inner wall of a respective one of a plurality of containers;
 - 5 pre-associating a multiple color reference scheme with a property test substance of a respective one of said test sections;
 - matching a test color of said property test substance, with a selected one of different colors of said multiple color reference scheme; and
 - 10 determining a respective one of said values according to the outcome of said procedure of matching.
62. The method according to claim 61, further comprising a procedure of subjecting said test sections to said fluid by letting said fluid in said containers, after said procedure of pre-associating, whereby said property
- 15 test substance exhibits said test color, as a result of a reaction of said fluid with said property test substance.
63. The method according to claim 61, further comprising a preliminary procedure of impregnating each of said test sections with a respective
- 20 property test substance.
64. Fluid testing device for comparing the value of each of a plurality of properties of a fluid with a reference value, the fluid testing device comprising:
- 25 a planar base; and
 - a plurality of test sections, located on said planar base, said test sections including:
 - a test sub-section which exhibits a color according to said value, as a result of reaction of a reagent with said fluid; and

a reference section located adjacent to said test sub-section, said reference section including at least one reference color corresponding to said reference value.

5 65. The fluid testing device according to claim 63 wherein said reference value is a maximum acceptable value.

66. The fluid testing device according to claim 63 wherein said reference value is a minimum acceptable value.

10

67. The fluid testing device according to claim 64, wherein said reference value is printed adjacent to said reference color.

15

68. The fluid testing device according to claim 64, wherein said test section further comprises a label respective of a property of said fluid.

69. The fluid testing device according to claim 65, wherein said test sub-section is impregnated with said reagent.

20

70. The fluid testing device according to claim 65, wherein said reference section includes at least two references colored sub sections.

71. The fluid testing device according to claim 70, wherein said reference section includes a limit line.

25

72. Method for comparing values of a plurality of properties of a fluid to a plurality of reference values, the method comprising the procedures of: providing a plurality of test sections on a planar base;

pre-associating a color from color reference scheme including at least one reference color with a property test substance of a respective one of said test sections;

immersing said planar base in said fluid to obtain a test color of said property test substance; and

comparing the test color of said property test substance, with said at least one reference color.

73. The method for comparing values of a plurality of properties of claim 72 wherein said color reference scheme includes a maximum acceptable value.

74. The method for comparing values of a plurality of properties of claim 72 wherein said color reference scheme includes a minimum acceptable value.

75. Fluid testing device for determining the value of at least one property of a fluid, the fluid testing device comprising:
a planar base; and
at least one test section, located on said planar base, each of said test sections including:
a test sub-section which exhibits a color according to said value, as a result of reaction of a reagent with said fluid; and
a reference section located adjacent to said test sub-section, said reference section including at least one reference color.

76. The fluid testing device according to claim 75, wherein said value is determined by matching one of said at least one reference color with said color.

77. The fluid testing device according to claim 75, wherein said test section further comprises a label respective of a property of said fluid.
- 5 78. The fluid testing device according to claim 75, wherein said test sub-section is impregnated with said reagent.
79. The fluid testing device according to claim 75, wherein said at least one property is a concentration of a substance in said fluid.
- 10 80. The fluid testing device according to claim 75, wherein said test section further comprises a value indicating section, said value indicating section includes at least one number, said at least one number is located adjacent to a respective said at least one reference color, said at least one number represents a selected value of a property of said fluid.

15

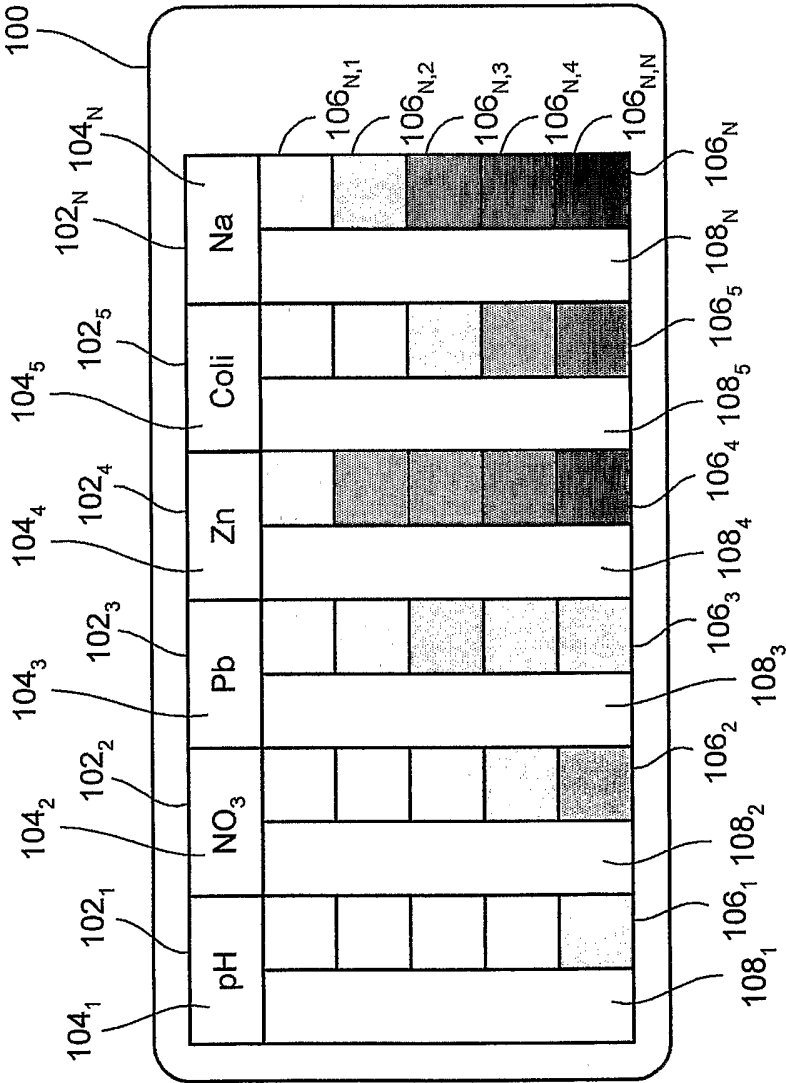


FIG. 1A

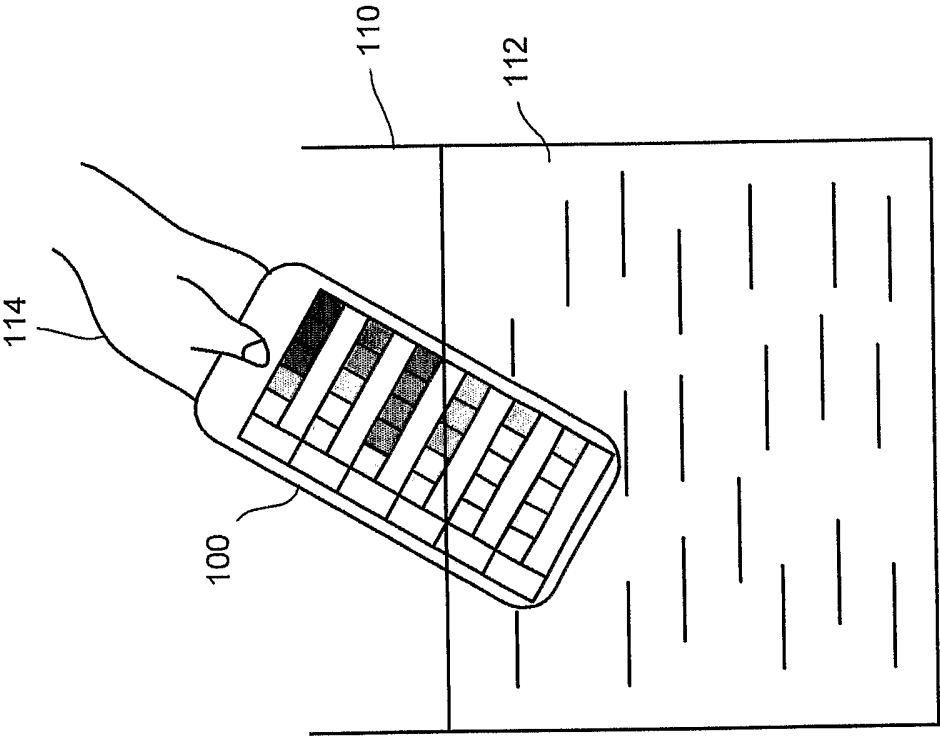


FIG. 1B

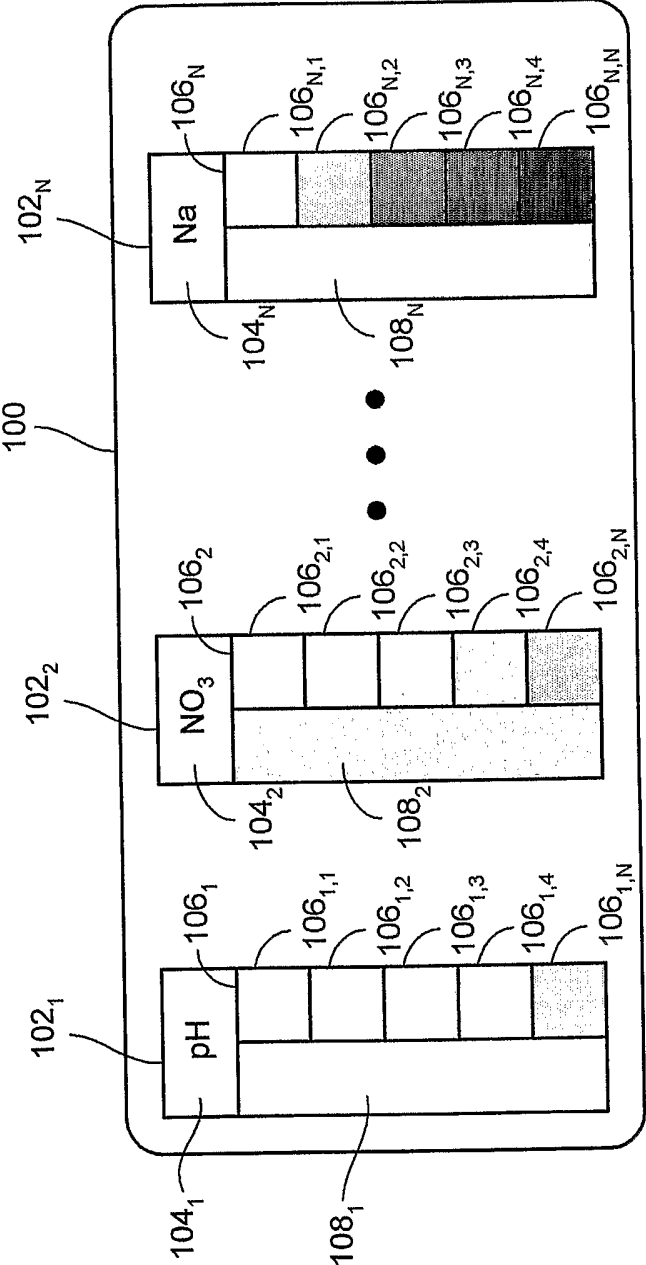


FIG. 1C

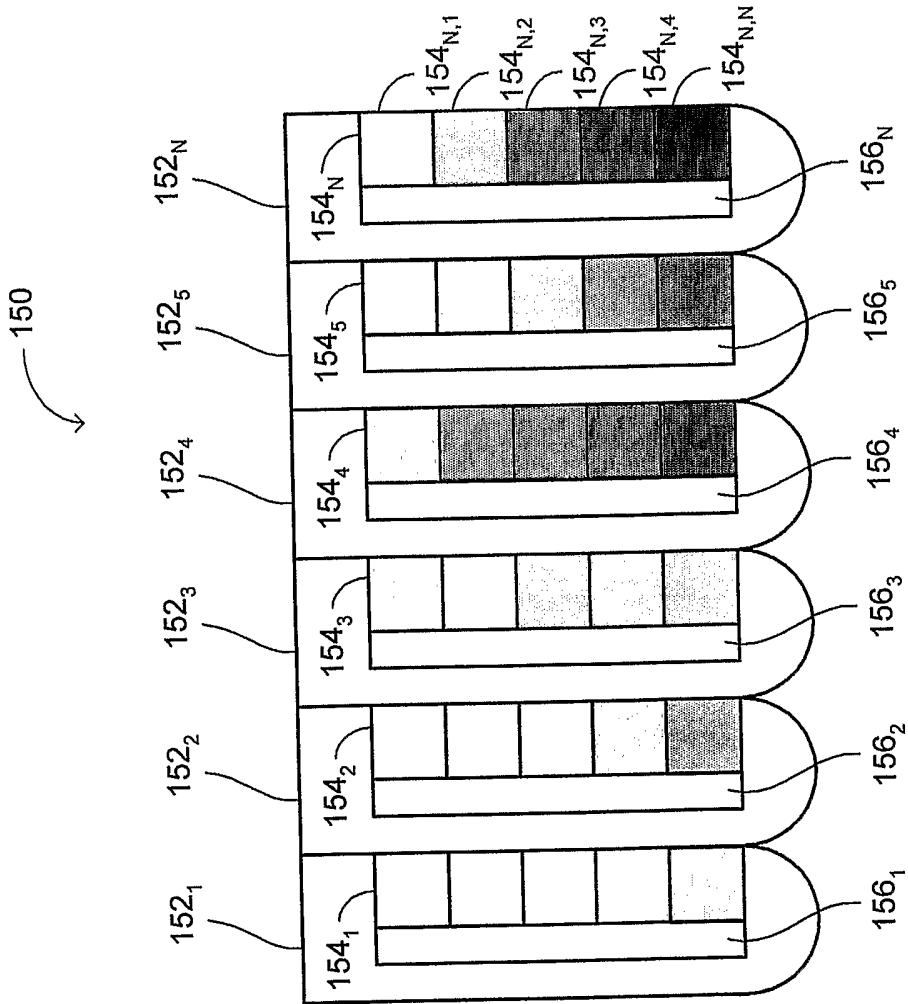


FIG. 2A

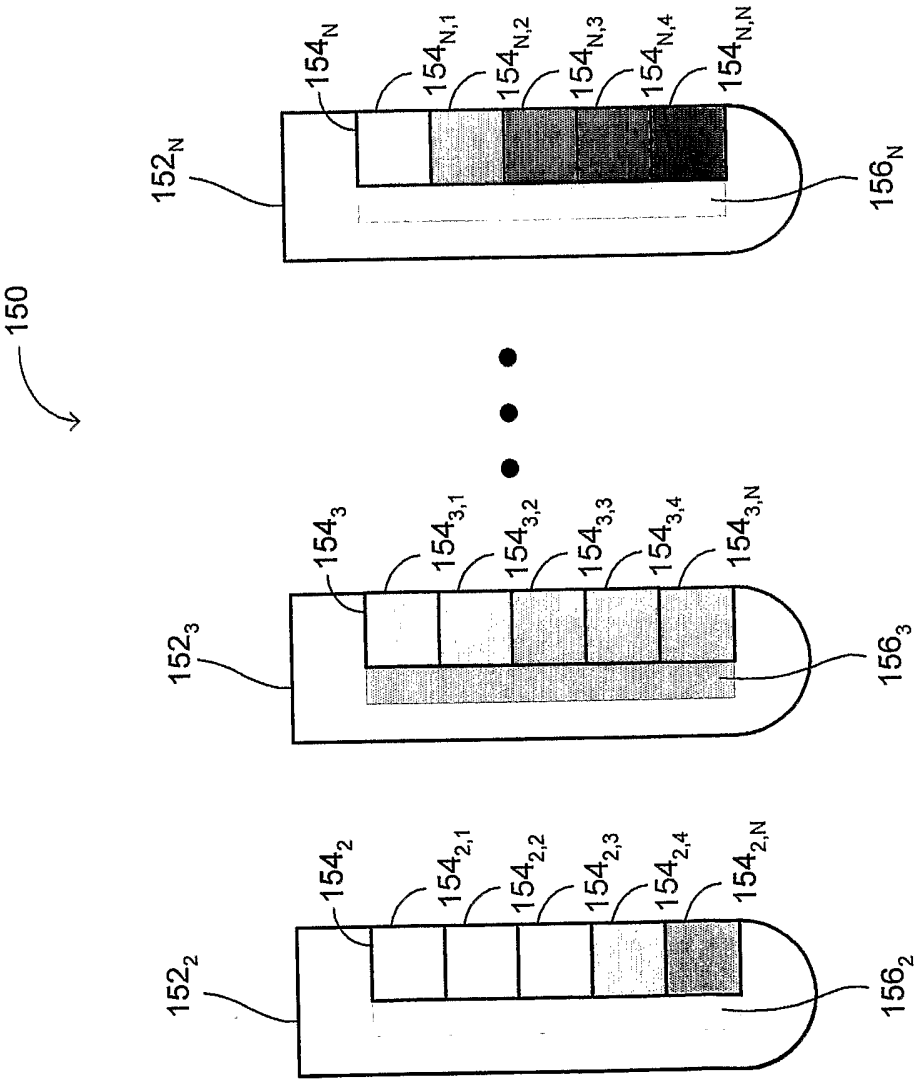


FIG. 2B

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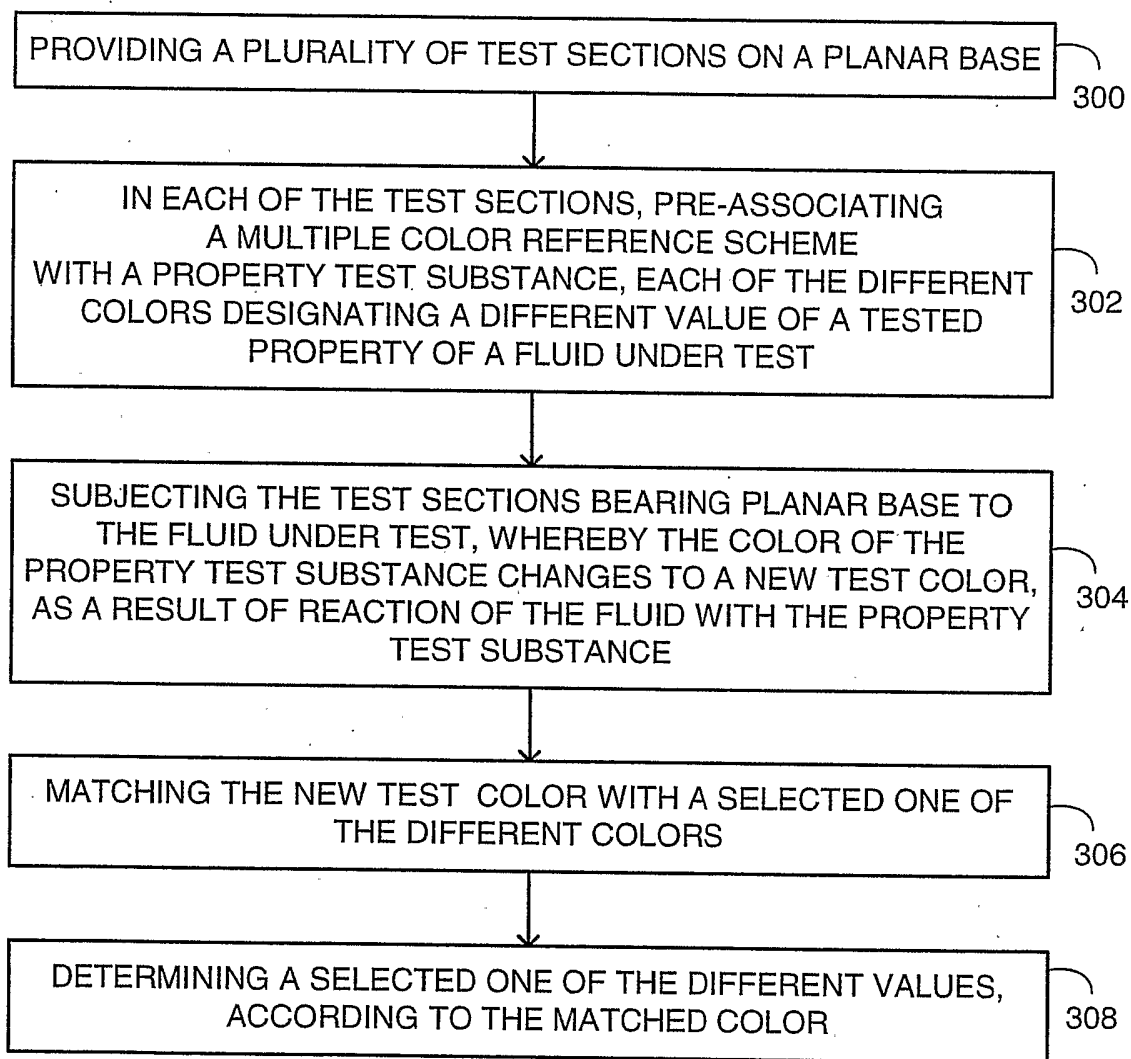


FIG. 3

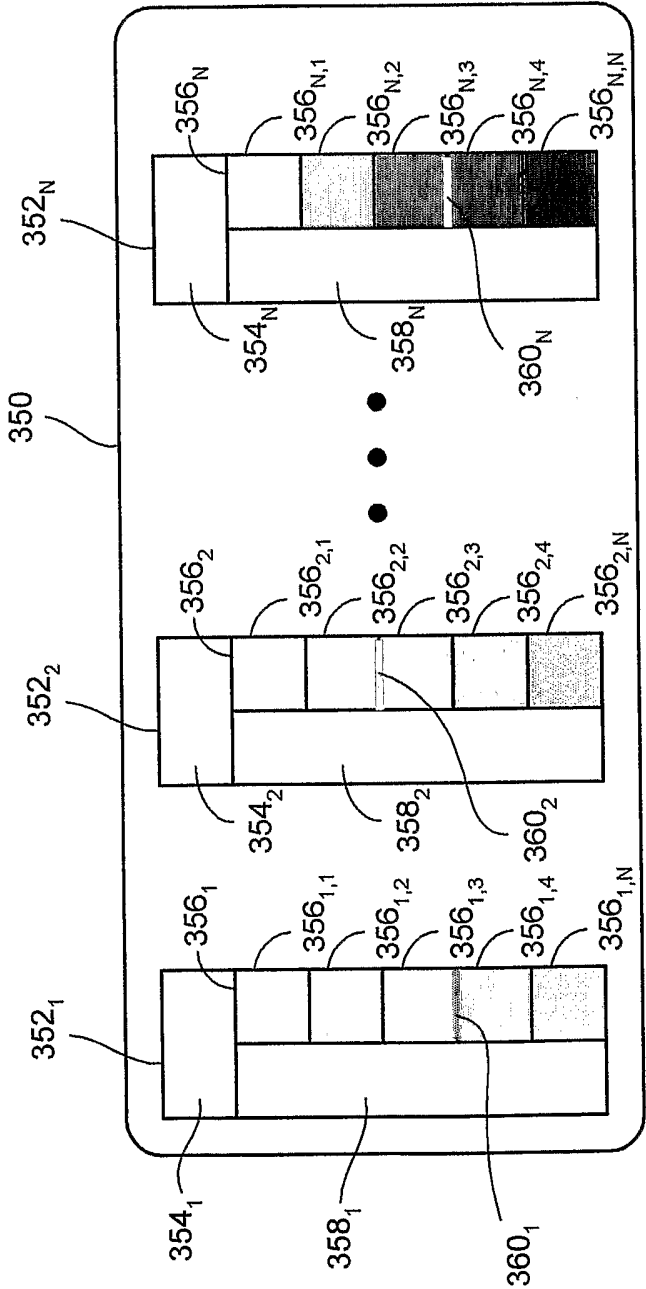


FIG. 4

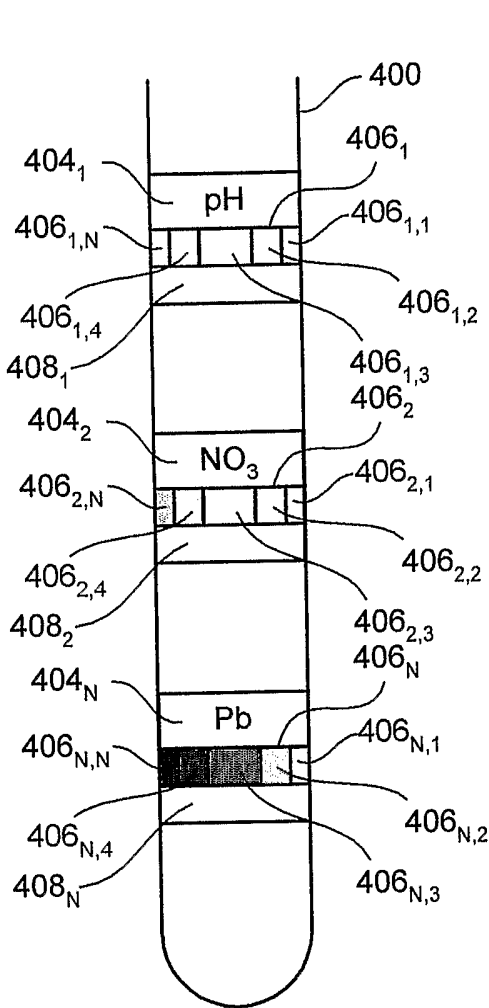


FIG. 5A

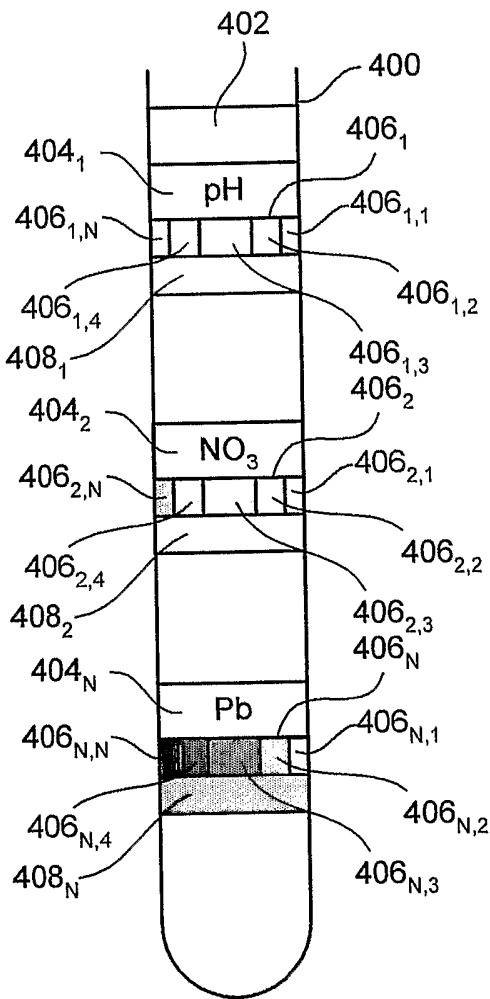


FIG. 5B

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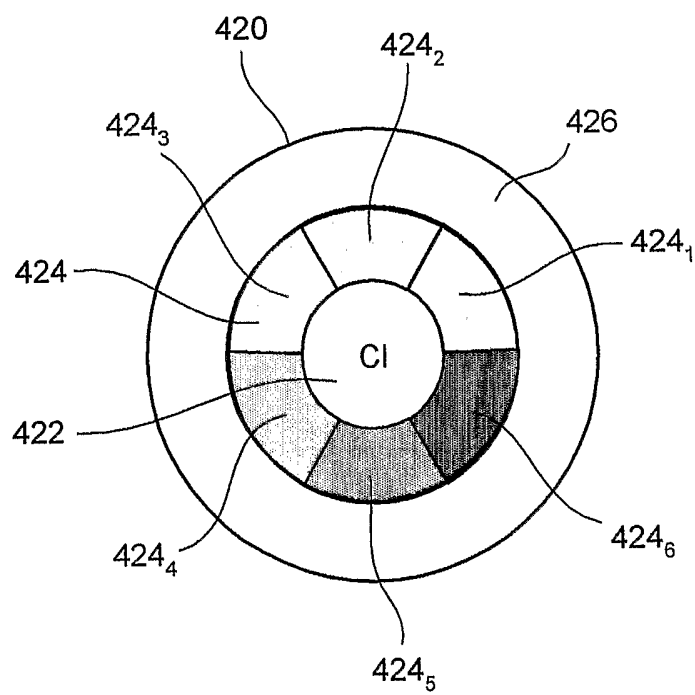


FIG. 6A

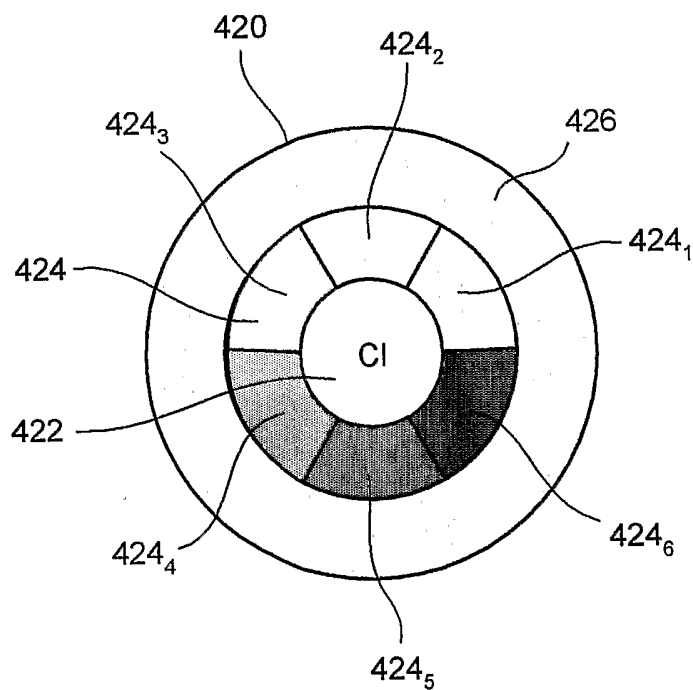


FIG. 6B

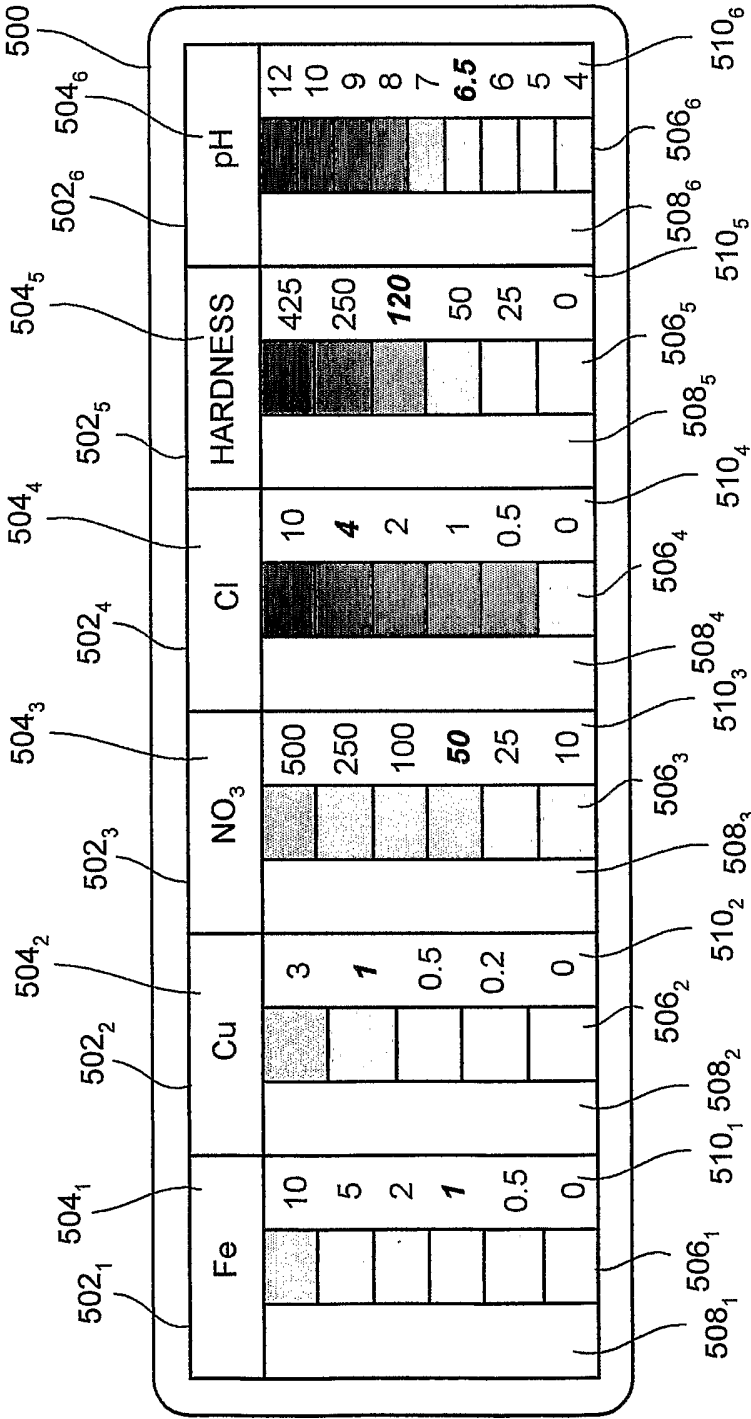


FIG. 7

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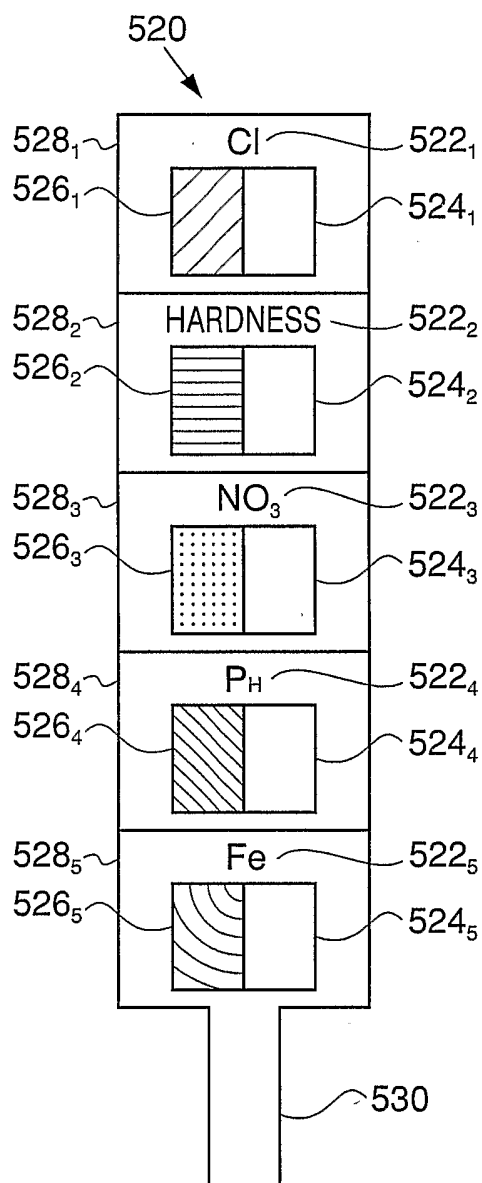


FIG. 8A

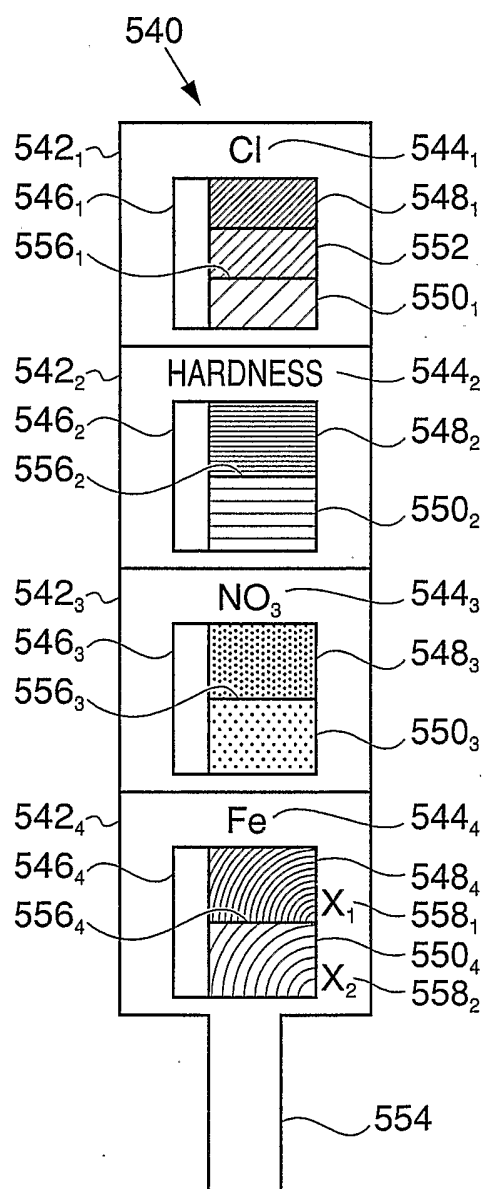


FIG. 8B