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**Ferrante**(10) **Pub. No.: US 2015/0033469 A1**(43) **Pub. Date: Feb. 5, 2015**(54) **ELECTRONIC TAP WITH OPERATING  
SYSTEM AT THE END OF THE SPOUT**(30) **Foreign Application Priority Data**

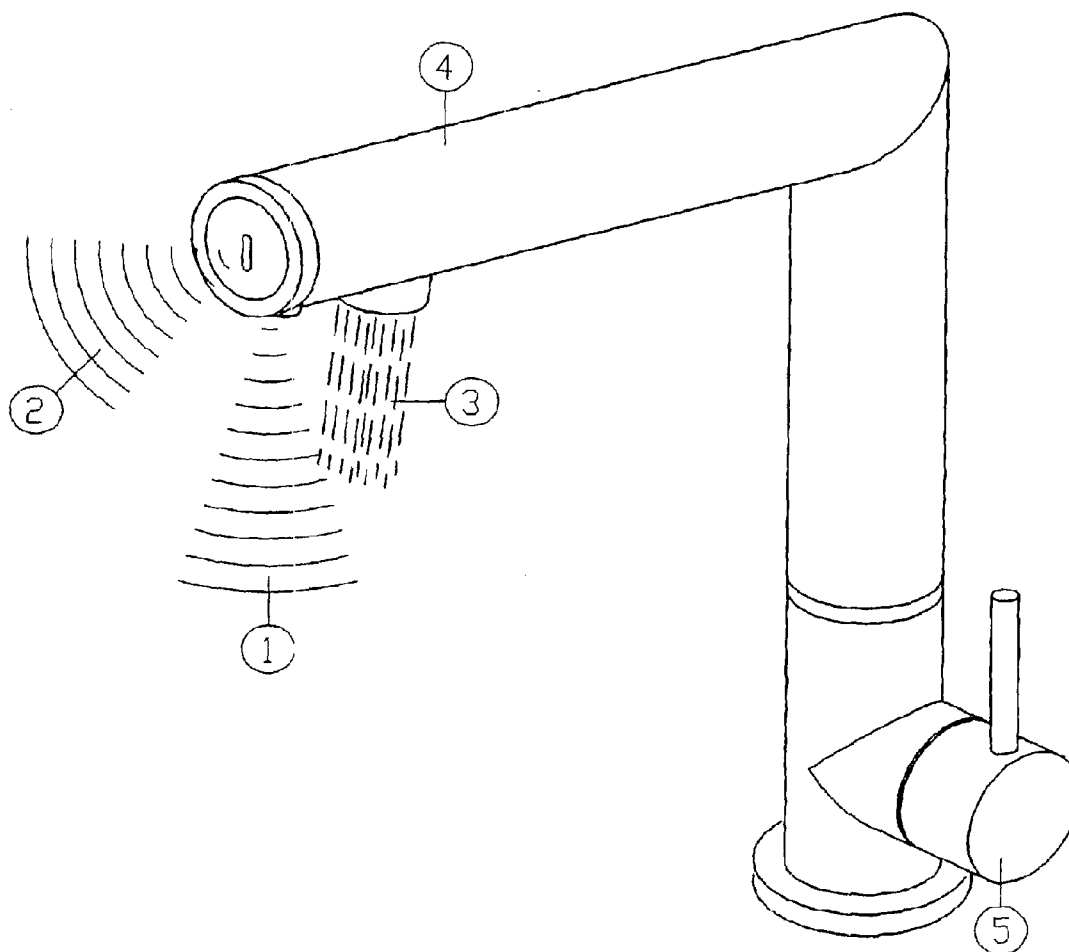
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USPC ..... **4/678**(21) Appl. No.: **14/387,078**(57) **ABSTRACT**(22) PCT Filed: **Mar. 19, 2013**(86) PCT No.: **PCT/IB2013/000428**

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The present invention relates to an electronic faucet with a head (15) that incorporates the operative system for controlling dispensing of the water. The head is mounted at the end of the spout (4). Furthermore, the tap is equipped with a by-pass system for manual operation in an emergency when the operative system has a malfunction.



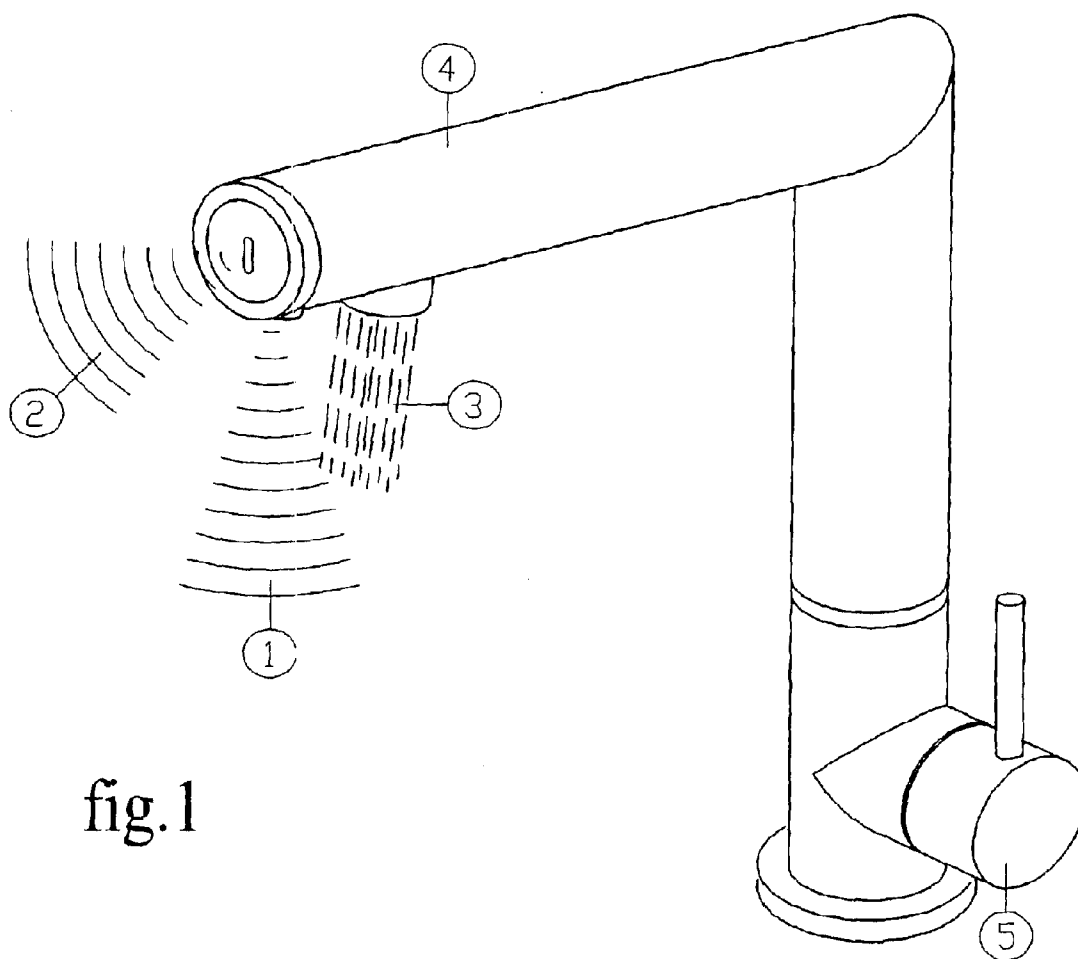


fig.1

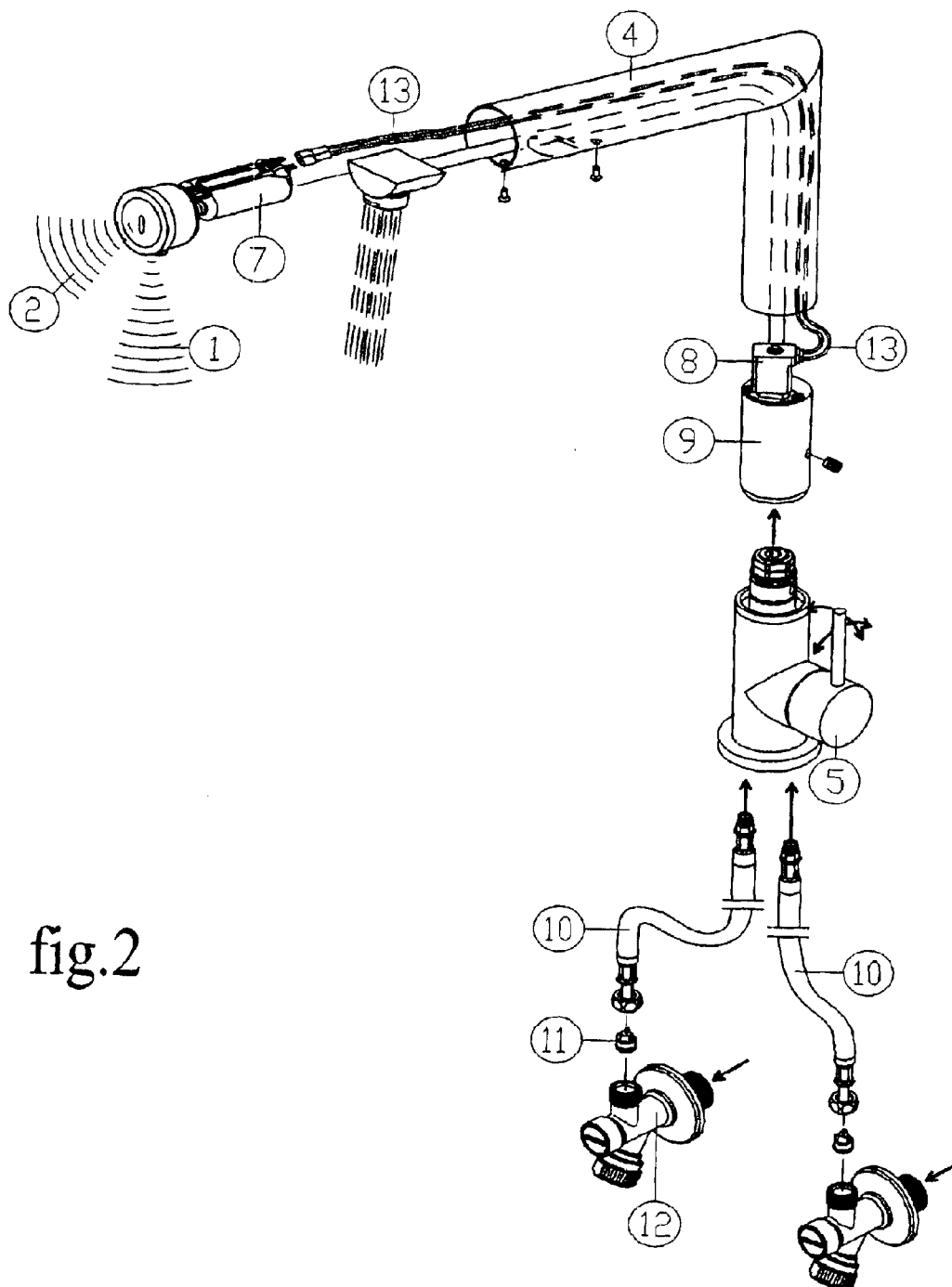


fig.2

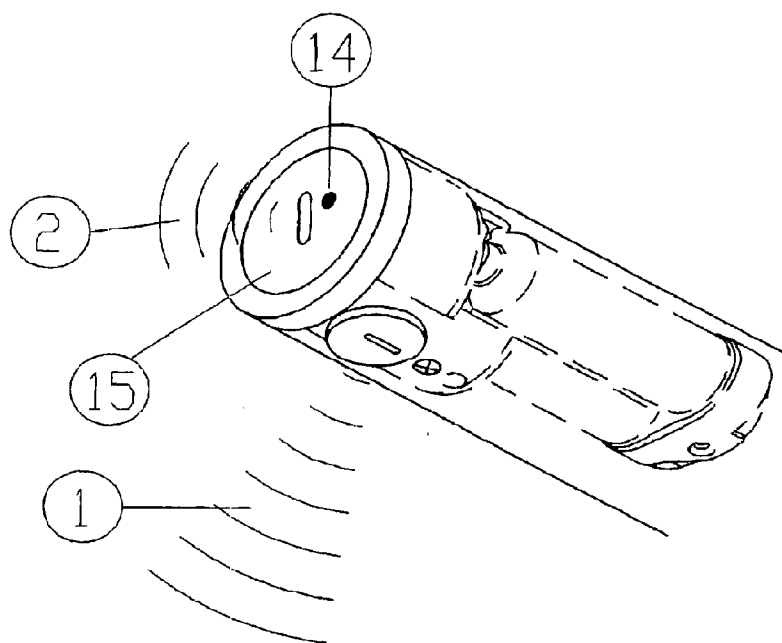


fig.3.1

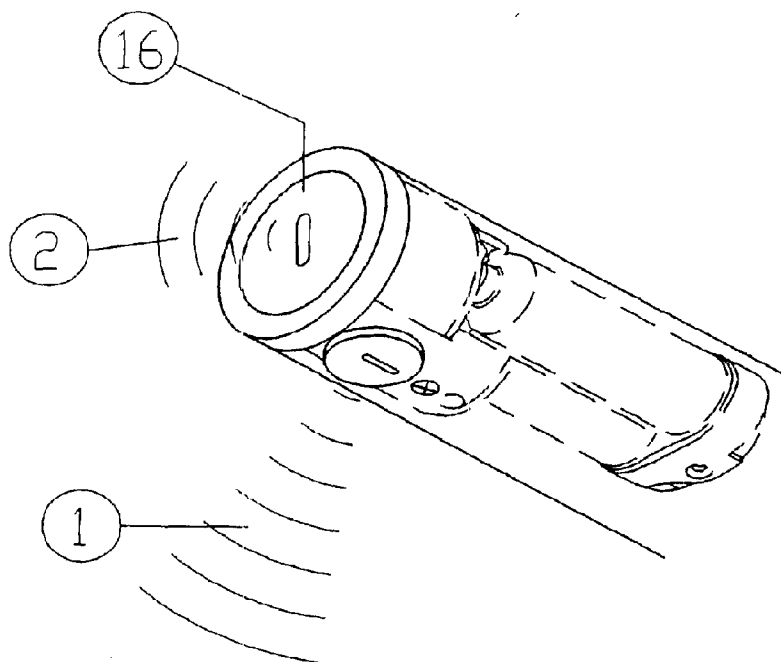
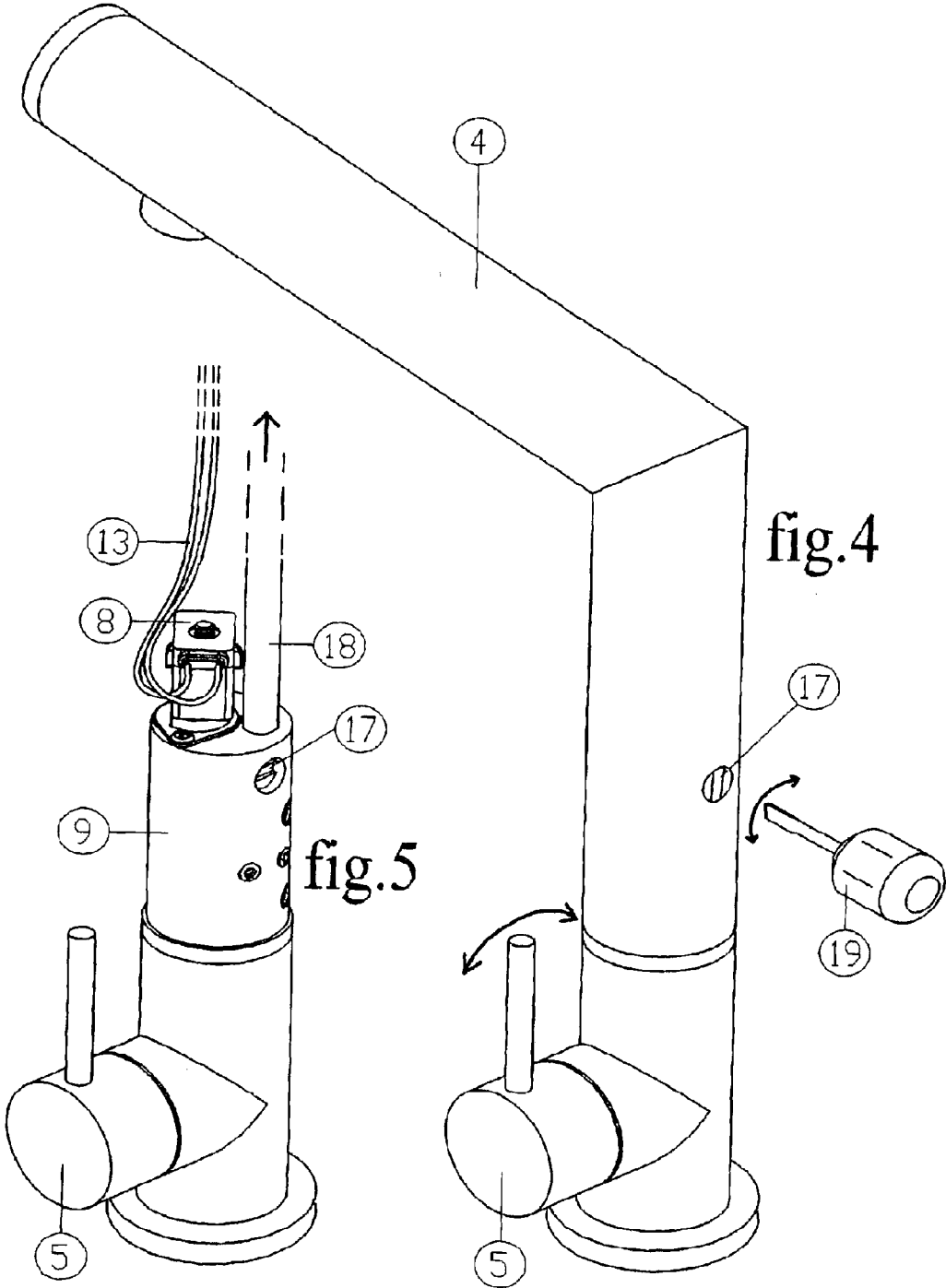


fig.3.2



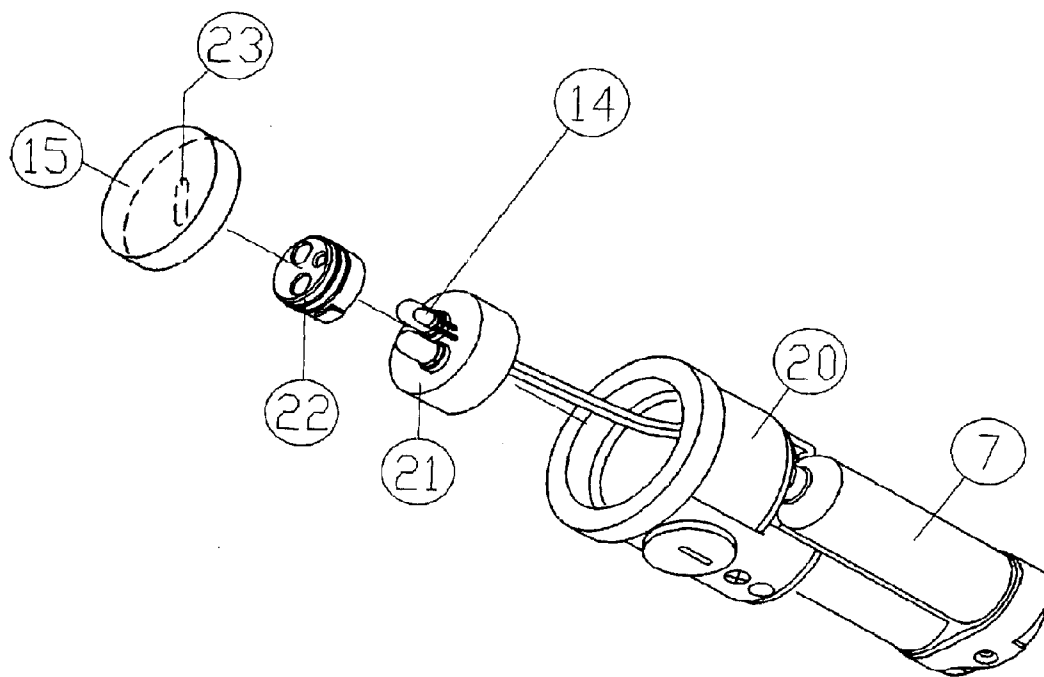


fig.6

# **ELECTRONIC TAP WITH OPERATING SYSTEM AT THE END OF THE SPOUT**

**[0001]** The present invention relates to an electronic faucet with head that incorporates the operative system for the water outlet and the relative emergency system.

**[0002]** Electronic faucets equipped with photocells, proximity sensors, etc. are well-known in the art and allow the water jet to be dispensed only when the presence of a user or means (for example, a glass) is detected.

**[0003]** The advantage of these faucets is that they facilitate the water outlet when, for example, hands are dirty, providing not only hygiene and cleanliness but water savings.

**[0004]** Traditional electronic faucets as known in the art (Patent No. US20090094740, Patent No. FR2761446) comprise systems dispensing the water jet by employing automatic vertical and/or frontal sensors, powered by batteries and with manual emergency function. Nevertheless, these faucets have highly complex components that make installation, battery replacement and spout rotation difficult. In fact, many components are located below the sink deck making installation and maintenance very complex and can only be performed by a skilled technician.

**[0005]** Given the above, it is evident there is a need for a solution that allows "electronic" faucets to comprise suitable equipment for dispensing the water jet in an optimum manner that overcomes the disadvantages of the known art.

**[0006]** The solution provided for with this invention falls within this context, as it can be adapted to various types of sinks.

**[0007]** Therefore, the scope of the present invention is the construction of an electronic faucet with a head that incorporates the operative system for the water outlet, allowing the limits of known technology to be overcome and obtaining an improvement in the technical results described previously.

**[0008]** In addition, a further scope of the present invention is the construction of a system requiring shorter times and lower costs of installation as well as limited management costs.

**[0009]** Yet another aim of the invention is the construction of an electronic faucet that is substantially simple, safe and reliable.

**[0010]** The present invention will now be described with preferred, but not-limiting, embodiments, with specific reference to the figures in the attached drawings, in which:

**[0011]** FIG. 1 shows a prospective view, chosen as for purely illustrative purposes, with no limitation to the scope of the invention for this shape of faucet, in which the faucet has a vertical sensor (1) and a front sensor (2);

**[0012]** FIG. 2 shows a cross-section of the construction of the faucet with all its components and their relative optimum placement;

**[0013]** FIGS. 3.1 and 3.2 illustrate two perspective views of the upper part of the head where the batteries are located, two sensors (frontal (2) and vertical (1)), and the LED (14) that signals operation and low battery power;

**[0014]** FIGS. 4 and 5 respectively show a perspective view of the insides of the faucet and a cross-section of the spout showing the by-pass (17) constructed as per this invention;

**[0015]** FIG. 6 shows a perspective view of the head support body (20) for inserting the front sensor and/or vertical sensor, constructed according to this invention.

**[0016]** This is a preferable but not exhaustive example of construction; it can be seen that the head consists of a glass disc with natural or colored background (15), where a cut (23)

is made using a laser or grinder, that therefore becomes transparent in the cut area. This disk can be the same color as the spout.

**[0017]** A LED holder (22), for the sensors, is applied to the head (15). The sensor (21) with the electronic control circuit is then in turn inserted in the LED holder (22). This entire unit is then fixed in place and kept together by the head support body (20), which also holds the batteries (7), facilitating replacement. The infrared sensors (21) can therefore function perfectly through the cut (23) obtaining the "on-off" function for the faucet. This results in a head with an invisible optical sensor that, above all, is not subject to problems due to scratches and consequent malfunction as the glass is highly resistant compared to the other traditional sensors available on the market.

**[0018]** A very important point about the head is that it has a very pleasant appearance, as the colored glass (15) can be made in the exact same color tone as the water delivery spout.

**[0019]** In FIG. 3.1 the LED (14), for example red, can be seen which serves to signal the detection of the hand or object and the dispensing of the water, or to indicate that the batteries (7) are low in power.

**[0020]** This LED can also be replaced with a back-lit system (see FIGS. 3.1 and 3.2, and Reference 16) which makes the head with the front sensor even more pleasing and attractive. In this case, the LED holder (22) in FIG. 6 houses multiple LEDs (14) which, turning on, together, create a soft, graphic, very modern effect.

**[0021]** The head can function with 1.5 volt alkaline batteries, which are the most economic and common around the world. They are incorporated inside the spout, located in the area next to the sensors, therefore in an easy, accessible position for replacement.

**[0022]** By placing all of the electronics inside the head and the head inside the spout (4), the spout (4) can freely rotate 360° around itself, compared to known faucets to the current state of the art. Therefore, inserting the head that incorporates the operative system for the water flow completely within the faucet spout represents a true innovation, making installation, maintenance, and battery replacement not only quick and problem-free but extremely simple.

**[0023]** Therefore, inside the faucet there are no wires that can twist and break, as occurs in certain existing faucets that function with a classic power transformer.

**[0024]** The ease and simplicity of installation can be understood from FIG. 2 and is complete with the details of the hoses (10), check valves (11) and stopcocks (12) with filters that can be inspected for impurities in the water.

**[0025]** The usefulness of this solution is immediately evident. Further innovation in this invention is the possibility, when the head cannot operate because the batteries are exhausted, to discharge the water manually and for temporary emergencies using a by-pass system. FIGS. 4 and 5 show the screw (17) that turns a half-turn with a screw driver (19) or a coin and acts as a by-pass for the water, functioning in parallel with the solenoid valve (9). In fact, it is sufficient to turn the spout (4) and turn the screw (17) located behind the spout and not under the sink deck, as known in the art, making the operation very simple and accessible for everyone.

**[0026]** The screw (17) acts as a by-pass in place of the magnetic coil (8) that cannot function due to the lack of energy when the batteries are exhausted. The membrane inside the solenoid valve (9) is lifted and at this point the water flows out continuously.

[0027] FIG. 2 illustrates an example, with no limitation of scope, of the invention, in which all the components are shown in their proper positions which allow for the construction of the electronic faucet described thus far.

[0028] This invention has been described for illustrative purposes with no limitation of scope in the preferred shape of construction; the present invention includes any alterations and further modifications of the illustrated devices and described methods and further applications of the principles of the invention which would normally occur to one skilled in the art to which the invention relates, as described in the attached claims.

1-8. (canceled)

9. A faucet, comprising:

a spout having a head end through which water is dispensed;

a valve system connected to the spout for controlling flow of water through the spout;

an electronic mechanism positioned at the head end of the spout for electronically controlling operation of the valve system to dispense water; and

a bypass system connected to the valve system enabling manual control of the valve system to dispense water when desired.

10. The faucet of claim 9, wherein the electronic mechanism comprises an electronic control circuit including one or more sensors for detecting presence of a user or an object near the faucet to activate the valve system to dispense water and one or more batteries for powering the electronic control circuit.

11. The faucet of claim 10, wherein the electronic control circuit and the one or more batteries are mounted as a unit in a holder in the head end of the spout to facilitate replacement of the unit or the one or more batteries.

12. The faucet of claim 9, wherein the one or more sensors comprise a vertical sensor.

13. The faucet of claim 9, wherein the one or more sensors comprise a front sensor.

14. The faucet of claim 9, wherein the one or more sensors comprise a vertical sensor and a front sensor.

15. The faucet of claim 9, wherein the one or more sensors comprise one or more optical sensors.

16. The faucet of claim 9, wherein the electronic mechanism further comprises a light emitting diode or a back-light system to signal detection of a user or an object near the faucet.

17. The faucet of claim 9, wherein the electronic mechanism further comprises a light emitting diode or a back-light system to signal low battery power.

18. The faucet of claim 9, further comprising a protective glass piece for the electronic mechanism positioned at the head end of the spout, said glass piece having a colored portion and a transparent portion, wherein one or more sensors in the electronic mechanism operate through the transparent portion of the glass piece to detect presence of a user or an object near the faucet.

19. The faucet of claim 9, wherein the colored portion of the glass piece has a color matching a color of the spout.

20. The faucet of claim 19, wherein the glass piece comprises a glass disk, and wherein the transparent portion of the glass piece resembles a slit in the glass disk.

21. The faucet of claim 9, further comprising a back-light system behind the glass piece.

22. The faucet of claim 21, wherein the back-light system comprises a plurality of light emitting diodes.

23. The faucet of claim 9, wherein positioning of the electronic mechanism in the head end of the spout enables free rotation of the spout relative to a surface on which the faucet is mounted.

24. The faucet of claim 9, wherein the valve system includes a solenoid valve controlled by the electronic mechanism, and wherein the bypass system can be activated to cause continuous flow of water through the solenoid valve.

25. The faucet of claim 24, wherein the bypass system can be activated by turning a screw in the bypass system.

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