Title: METHOD AND SYSTEM FOR CENTRALISED SUPPLYING OF WATER TO ONE OR MORE INSTALLATIONS, WITH ELECTRONIC AND INDEPENDENT CONTROL OF THE TEMPERATURE AND OF THE SUPPLIED FLOW.

Abstract: The object of this invention is a method and corresponding system for the centralised supply of water to one or more installations with electronic and independent control of the temperature and of the flowrate supplied to plumbing plants; said systems are of the type comprising a distribution network with a single pipe that takes already mixed water to the installation to be served; mixing occurring upstream of distribution, in one or more electromechanical mixing devices of the type comprising one or more three-way solenoid valves connected respectively at the inlet to the cold and hot water conduits and at the outlet to the thus mixed water delivery conduit. The method consists of sending water, mixed by the solenoid valve and corresponding single-pipe conduit, to the plumbing plant to serve and command mixing of flows of hot and cold water according to a return electric signal from the installation. Said water supply at the required temperature being supplied both to the bathroom equipment and to the electrical household appliances.
DESCRIPTION

METHOD AND SYSTEM FOR CENTRALISED SUPPLYING OF WATER TO ONE OR MORE INSTALLATIONS, WITH ELECTRONIC AND INDEPENDENT CONTROL OF THE TEMPERATURE AND OF THE SUPPLIED FLOW.

The present invention relates to the field of systems and plumbing plants for domestic and/or industrial use. In particular, reference will be made to a method and system for centralised and remote supplying of water to one or more installations, with electronic and independent control of the temperature and of the supplied flow.

Background Art

The known art serves installations by a system or network of distinct pipes, one for cold water and the other one for hot water so as to convey the water to the fixtures and fittings of the plumbing accessories such as washbasins, showers, lavatories, bidets, etc., or also household appliances like dishwashers and washing machines. Each fixture and fitting, for example, has a mechanical system for dosing flows that, by a suitable checking member, regulates the inlet flows, mixing the fluids and consequently the outlet temperature. Substantially, it is in the dispenser that the flow is mixed and regulated.

The aforesaid mechanical type of technology has drawbacks, first of all the great installation and maintenance cost and the fact that the pipes of
the plant are always under pressure even when they are not used for dispensing.

Single-pipe plumbing plants are also known, i.e. plants comprising a sole pipe that conveys already mixed water as far as the plumbing.

In this case, mixing occurs upstream of the distribution in a mixing collector where the two hot water and cold water pipes arrive and from which a single delivery conduit leaves for each piece of plumbing as far as the installation to be served. The water, which has been suitably mixed to have the desired temperature, reaches the installation through the single conduit, avoiding the use of the two pipes, as shown previously. In this manner, use of two pipes is avoided, with considerable saving of time and material and installation costs.

In this case, mixing occurs upstream of the distribution of the corresponding installation, generally near the boiler and by the distribution collector, a three-way solenoid valve being connected respectively in the inlet to the cold and hot water conduits, in the outlet to the thus mixed delivery conduit.

Each conduit conveys the water, mixed by the solenoid valve, to the installation to be served: the user adjusts mixing by means of an adjusting knob near the installation and via electric cables connected to
the solenoid valve or to the corresponding control circuit, commands
operation of the mixing collector.

In this manner, by modify the position of the adjusting knob, the position
of the solenoid valve, i.e. mixing between hot and cold water and the
outlet flow, is adjusted.

**Disclosure and advantages of the invention**

The object of the present invention is to provide the prior art with a
method and system for centralising supplying of water to one or more
installations, with electronic and independent control of the temperature
and of the flowrate supplied to plumbing plants by a system of
electromechanical mixing and adjusting devices of the flows of hot and
cold water with electronic control of the temperature and of the flow and
reading and indicating systems of the parameters desired by the user.

Another object of the invention is to provide the prior art with a type of
plant in which the pipes that supply the installations are never under
pressure, apart from the minimal and negligible pressure generated
during dispensing by possible restrictions in the dispensing ports.

Another object of the invention is to be able to interrupt the dispensing
after a preset time, thus preventing overflows due to lack of attention or
problems of another type.
Another object of the invention is to be able to dispense, with the method and system in question, water at the operating temperature not only to traditional bathroom equipment but also to household appliances such as dishwashers and washing machines.

Another object of the invention is to provide energy saving by providing water at operating temperature to household appliances like washing machines and dishwashers. If the hot water is supplied by a boiler, a saving is obtained because heating by a boiler, solar panels or the like is more efficient than the electric coil found in the aforesaid household appliances.

Another object of the present invention is to interrupt the dispensing of water to household appliances like washing machines and dishwashers after a maximum (optional) operating time. In this manner, it is possible to prevent floods due to breakages of or leaks from the pipes that supply the aforesaid household appliances.

Another object of the present invention is to be modular, i.e. it is composable according to the number of installations to be served, and is expandable, if it is necessary to connect to further components.

Another object of the present invention is to devise a plant that is not under pressure and thus exploit pipes costing significantly less than traditional pipes and in the same way save on materials.
Another object is to provide, in the case of the joining of several devices, as disclosed above, the common serving by a single inlet conduit of the cold water and an inlet conduit of the hot water.

Said objects and advantages are all achieved by the modular and composable mixing device, with electronic control of the temperature and of the outlet flowrate that is the object of the present invention, which is characterised by what is set out in the claims below.

**Brief Description of Drawings**

This and other features will be clearer from the following description of certain embodiments illustrated merely by way of non-limiting example in the attached drawings.

- Figure 1: is a schematic illustration of the centralised management and distribution system that is the object of the present invention, with supply of premixed water upstream of the installation to be served, and in which said installations are bathroom equipment plumbing devices and water delivery inlets for household appliances such as dishwashers, washing machines etc.

- Figure 2: illustrates the control panel, which is touch-sensitive or also only keys, for remote control of the temperature and of the dispensed flowrate; as written below, the panel can be replaced by traditional fixtures and fittings and be provided with transducer means of the
position that send a corresponding electric signal to the associated dispensing device.

**Description of the Invention**

With particular reference to the drawings indicated above, a method is illustrated for the centralised supply of water to one or more installations, with electronic and independent control of the temperature and of the flowrate supplied.

The method is particularly used in plumbing parts such as bathroom equipment, and which comprise a distribution network with a single pipe that conveys already mixed water as far as the installation to be served. Nevertheless, the invention is applicable and is used for the direct supply of water that is premixed and is at the correct temperature, also to household appliances such as dishwashers and washing machines, thus enabling water-heating coils to be eliminated that are still today widely used for said apparatuses.

As can be seen from the drawing, the mixing of the single installation occurs upstream of the final distribution, i.e. in one or several series of distribution collectors consisting of several mixing devices.

Precisely, with the term electromechanical devices mechanical components are indicated comprising one or more solenoid valves with several paths, preferably three, connected respectively at the inlet to the
hot and cold water conduits and at the outlet to the delivery conduit or the water that is to be delivered mixed.

Each solenoid valve has an associated electromechanical system for moving fluid intercepting members and adjusting in this manner the flowrate and percentage flow at the inlet; said members are also adjusted according to the input, i.e. return signal, from the installation that, by the cabling illustrated in the drawing, enables the user to set in loco the switch-on and/or the flowrate and/or the temperature of the water for the installation or household appliance to be served.

The water is mixed by the solenoid valve and sent by a respective single-pipe conduit.

In the example, two mixing devices are illustrated that serve installations, but it is obvious that without falling outside the required area of protection, there will also be more and each one will serve at least one installation, such as, for example, those illustrated, i.e. washing machine, dishwasher, shower, washbasin, etc.

Also, the method commands remote mixing by control indicators or panels connected to corresponding centralised mixing devices; following the indication sent, by electric signal, of the degree of opening of the solenoid valve, the degree of opening of the associated mixing device is commanded.
To summarise, the method:

a. sends water - mixed by the solenoid valve and corresponding single-pipe conduit - to the plumbing installation to be served;

b. commands mixing of the flows of hot and cold water according to an electric return signal from the installation and maintaining the temperature constantly the same as that requested by the user, in fact reacting to possible variations in flowrate or temperature due to external causes;

c. intervening after a chosen lapse of time to interrupt dispensing so as to prevent flooding due to forgetfulness or problems of another nature.

The aforesaid supply of water at the temperature requested can be supplied both to the bathroom equipment and to the household appliances.

The system maintains the pipes not in pressure, thus enabling pipes to be used with a much lower cost and at the same savings in the materials used.

Alternatively, the method controls remote mixing by corresponding fixtures and fittings of known and traditional type, associated with the bathroom equipment; in this case, the fixtures and fittings are provided with at least one position transducer that is suitable for
detecting the arrangement thereof with respect to a settable mechanical zero point and converting into a corresponding electric signal the information to the associated mixing device.

The centralised supply system comprises:

- a distribution network with a single pipe that conveys already mixed water to the installation to be served,
- a series of parallel-connected solenoid valves receiving -at the inlet- the conduits of cold and hot water and sending -at the outlet- water mixed in a corresponding distribution conduit, the said distribution pipes being connected to the respective installations to be served
- a supply system connected to the electric network
- cabling system for connecting with remote devices.

The water at the required temperature is supplied both to bathroom equipment and to household appliances.
Fig. 1
power supply unit
dispensing outlets
MIXED OUTLET

Fig. 2
(11) connection with remote devices
(12) supply connector
(13) connection with mixing device
(14) temperature reduction key
(15) display
(16) temperature increase key
(17) disconnect thermostat and activate only cold water
(18) flow rate control 0-100%
(19) ON/OFF control display
CLAIMS

1. Method for the centralised supply of water to one or more installations with electronic and independent control for installation of the temperature and flow supplied to plumbing plants; said systems comprising a distribution network with a single pipe that conveys already mixed water to the installation to be served; mixing occurring upstream of distribution, in one or more electromechanical mixing devices of the type comprising one or more three-way solenoid valves connected respectively at the inlet to cold and hot water conduits and at the outlet to the delivery conduit of the thus mixed water; characterised in that

a. it sends the water mixed by the solenoid valve and the corresponding single-pipe conduit to the plumbing installation to be served;

b. commanding mixing of the flows of hot and cold water according to an electric signal of return from the installation and maintaining the temperature constantly the same as the temperature required by the user, in fact reacting to possible flowrate or temperature variations due to external causes;
c. Intervening after a selected lapse of time to interrupt dispensing so as to prevent flooding due to forgetfulness or problems of another type;

said supply of water at the requested temperature being supplied both to the bathroom equipment and to the electrical household appliances.

2. Method according to claim 1, characterised in that it commands remote mixing by control indicators or panels connected to corresponding centralised mixing devices; depending on the instruction sent, by an electric signal, concerning the degree of opening of the solenoid valve, the degree of opening of the associated mixing device in commanded.

3. Method according to claim 1, characterised in that it commands remote mixing by means of the corresponding fittings and fixtures associated with the bathroom equipment; a position transducer detects the arrangement of said fixtures and fittings in relation to a settable mechanical zero point and converts the information to the associated mixing device into an electric signal.

4. Method according to claim 1, characterised in that the signal is sent by a cabled connection.
5. Method according to claim 1, characterised in that it maintains the pipes non-pressurised, thus enabling the use of pipes with a significantly lower cost and at the same time a saving in the materials used.

6. System of centralised supplying of water to one or more installations, with electronic and independent control of the temperature and of the flowrate supplied to plumbing plants; said systems of the type comprising a distribution network with a single pipe that conveys already mixed water and at the flowrate and temperature required to the user to be served, water already mixed upstream in one or more electromechanical mixing devices or the three-way solenoid valves that characterise the system, in turn characterised by the fact that it comprises:

a. a series of solenoid valves connected parallel and receiving -at the inlet- the cold and hot-water conduits and sending -at the outlet- water mixed in a corresponding distribution conduit, the said distribution pipes being connected to the respective installations to be served

b. a supply system connected to the electric network
c. cabling system for connecting with remote devices
d. commanding mixing hot and cold-water flows according to an electric or mechanical signal from the installation;
said supply of water at the required temperature being supplied both to the bathroom equipment and to the household appliances.

7. System according to claim 6, characterised in that said remote devices are a series of respective indicating panels of the temperature and required flowrate, in addition to interfaces for adjusting and setting the latter.

8. System according to claim 6, characterised in that said remote devices are a series of one or more fixtures and fittings associated with the bathroom equipment that, by a respective position transducer, detects and supplies the configuration thereof with respect to a settable mechanical zero point, converting into a suitable electric signal the information to the associated mixing device.
**INTERNATIONAL SEARCH REPORT**

**International application No**

PCT/EP2014/001061

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#### A. CLASSIFICATION OF SUBJECT MATTER

**INV.** E03B1/04  E03B7/04  E03B7/O7  E03C1/01  E03C1/02  E03C1/O5

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#### ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

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#### B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

E03B  E03C

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

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#### C. DOCUMENTS CONSIDERED TO BE RELEVANT

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* Special categories of cited documents :

- "X" earlier application or patent but published on or after the international filing date
- "L" later application or patent filed on or after the international filing date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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I sai lovski, Marko

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