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E03C 1/02 (2006.01)

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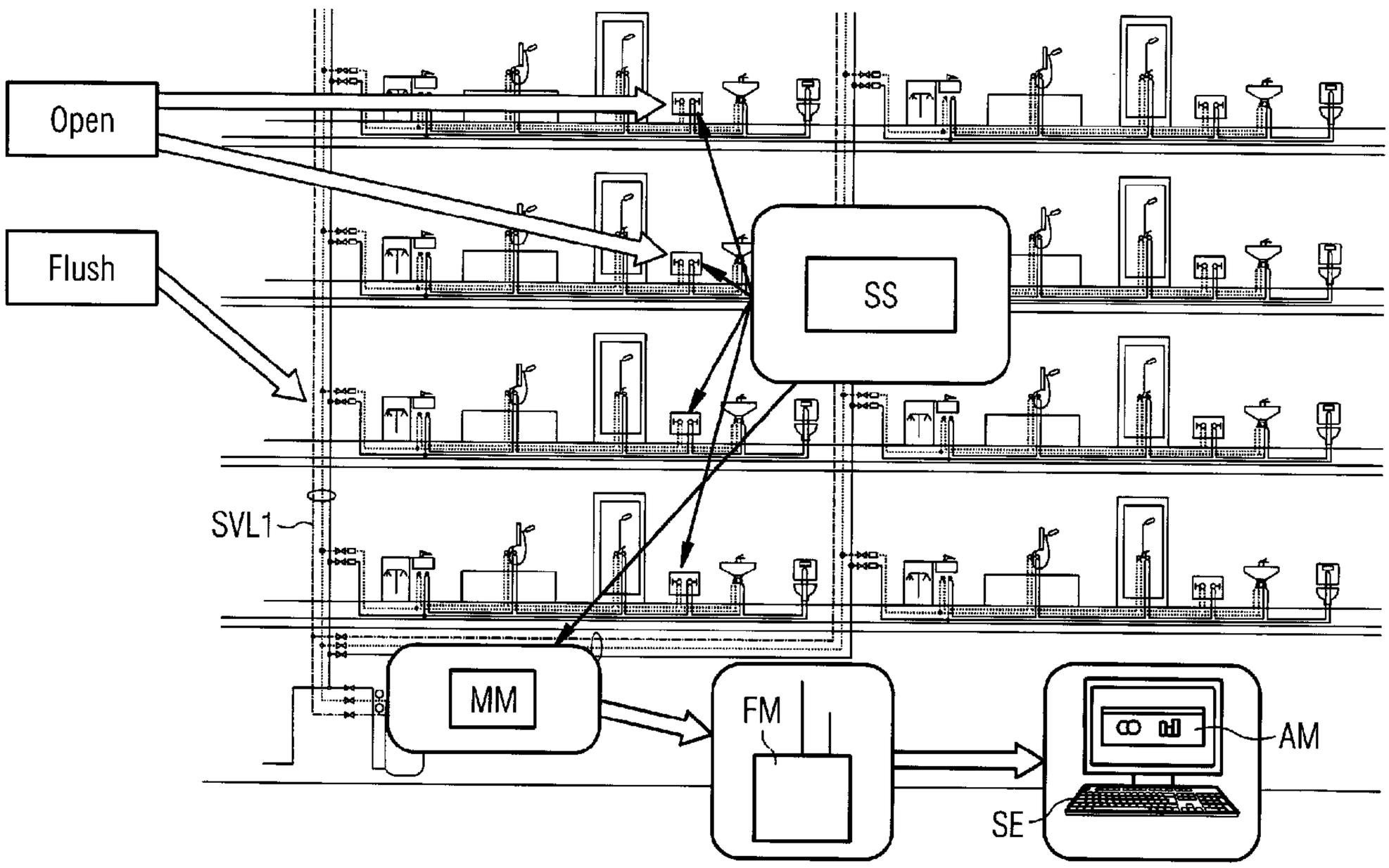
(54) **Titre : SYSTEME ET METHODE DE CHASSE D'UNE INSTALLATION D'EAU POTABLE**
(54) **Title: SYSTEM AND METHOD FOR FLUSHING A DRINKING WATER INSTALLATION**



(57) **Abrégé/Abstract:**
The invention relates to a system and method for flushing a drinking water installation, comprising - at least one riser or distribution pipe (SVL), - a plurality of branch pipes (ZL) connected to the riser or distribution pipe (SVL), - consumers (V) and flushing stations (SS) connected to the branch pipes (ZL), - wherein the flushing stations (SS) have measuring devices (MM) for the temperature change in the branch pipe (ZL) or the throughflow through the branch pipe (ZL), and/or measuring devices (MM) for the temperature change or the throughflow are provided, - a control unit (SE) which is connected to the measuring devices (MM) by means of data cables or by radio, - wherein the control unit (SE) has an evaluation module (AM) for the data transmitted by the measuring devices (MM), and - the evaluation module is set up to determine, on the basis of the transmitted data, which flushing stations (SS) need to be flushed simultaneously in order for the riser or distribution pipe (SVL) to be flushed.

Abstract

The invention relates to a system and method for flushing a drinking water installation, comprising

- at least one riser or distribution pipe (SVL),
- a plurality of branch pipes (ZL) connected to the riser or distribution pipe (SVL),
- consumers (V) and flushing stations (SS) connected to the branch pipes (ZL),
- wherein the flushing stations (SS) have measuring devices (MM) for the temperature change in the branch pipe (ZL) or the throughflow through the branch pipe (ZL), and/or measuring devices (MM) for the temperature change or the throughflow are provided,
- a control unit (SE) which is connected to the measuring devices (MM) by means of data cables or by radio,
- wherein the control unit (SE) has an evaluation module (AM) for the data transmitted by the measuring devices (MM), and
- the evaluation module is set up to determine, on the basis of the transmitted data, which flushing stations (SS) need to be flushed simultaneously in order for the riser or distribution pipe (SVL) to be flushed.

SYSTEM AND METHOD FOR FLUSHING A DRINKING WATER INSTALLATION

Description

The invention relates to a system and a method for flushing a drinking water installation which comprises at least one riser or distribution pipe, a plurality of branch pipes connected to the riser or distribution pipe and consumers and flushing stations connected to the branch pipes, wherein the flushing stations have measuring devices for the temperature change in the branch pipes or the throughflow through the branch pipe.

In a relatively large drinking water installation, as for example in a multi-storey hotel, there is always the risk of some rooms being unoccupied for a relatively long time and as a result the drinking water standing in these pipe sections for too long. If the water stands for a relatively long time, germs, bacteria or in the worst case even legionella may develop. If, after a relatively long time, a guest uses the shower or the wash basin again, they will use contaminated water, and this can cause health impairments. Therefore, it is conventional to provide in the sanitary installations flushing stations which contain measuring devices that ascertain whether the water has been standing for longer than, for example 72 hours. If this is the case, flushing is automatically initiated by the flushing station, with the result that the water in the branch pipe in the sanitary area in question is renewed again. The flushing stations ensure reliable flushing of the branch pipes.

Drinking water installations in relatively large buildings are very complex, however, and also comprise risers or distribution pipes, which have a larger diameter than the branch pipes. In these risers or distribution pipes, too, it is possible for standing water or water that moves only minimally to occur in the event of certain building sections not being used for a relatively long time, with the result that bacteria, germs or legionella may develop.

The object of the invention is to propose a solution ensuring reliable flushing of the entire drinking water installation, including the risers or distribution pipes.

According to the invention, the object is achieved by a system for flushing a drinking water installation, comprising
- at least one riser or distribution pipe,
- a plurality of branch pipes connected to the riser or distribution pipe,
- consumers and flushing stations connected to the branch pipes,
- wherein the flushing stations have measuring devices for the temperature change in the branch pipe or the throughflow through the branch pipe, and/or measuring devices for the temperature change or the throughflow are provided,
- a control unit,
- wherein the control unit is connected to the measuring devices by means of data cables or by radio,
- the control unit has an evaluation module for the data transmitted by the measuring devices, and
- the evaluation module is set up to determine, on the basis of the transmitted data, which flushing stations need to be

flushed simultaneously in order for the riser or distribution pipe to be flushed.

The invention makes use in particular of the measuring devices integrated into the flushing stations and connects them by means of data cables or wireless to a central control unit, which can in turn ascertain, via an evaluation module, which riser or distribution pipe needs to be flushed. Since the measuring devices in the individual flushing stations sense the water throughflow, the evaluation module can calculate in which risers or distribution pipes too little water movement has taken place and in which there is thus the risk of germs, bacteria or legionella developing. Alternatively or in addition, it is also possible to use measuring devices installed in the drinking water installation independently of the flushing stations. Furthermore, the invention makes use of the fact that, through the simultaneous flushing of several flushing stations, such a high water flow rate arises in the riser or distribution pipe that the flow in the riser or distribution pipe becomes turbulent and thus reliable flushing of the riser or distribution pipe is achieved.

On account of the fact that a plurality of risers or distribution pipes for hot water and cold water are provided in a drinking water installation, and the risers or distribution pipes have a larger diameter than the branch pipes in which the flushing stations are integrated, the flow in the riser or distribution pipe when only one flushing station is actuated is generally laminar, with the result that insufficient flushing is achieved in the riser or distribution pipe. It is only through the simultaneous flushing of a certain number of

flushing stations that the flow in the riser or distribution pipe becomes turbulent.

Advantageously, each flushing station is assigned an ID for example in the form of a serial number, on the basis of which the control unit can clearly identify to which branch pipe and where in the system the flushing station is connected.

According to a preferred embodiment, the evaluation module in the control unit is set up to output a notification as to which riser or distribution pipe needs to be flushed. This has the advantage that the facilities management is merely informed as to which riser or distribution pipe needs to be flushed and can carry out the flushing operation for the riser or distribution pipe at a time in which the users of the building are not disturbed. For example, as a result of the simultaneous flushing of a large number of flushing stations, the water pressure in the system can briefly drop, with the result that, in particular in the upper storeys, only a low water pressure, if any, is available, resulting in users for example in a hotel potentially being disturbed. Therefore, it is advantageous for the flushing to be initiated by the facilities management, who can select the time so that as few users of the building are disturbed as possible.

According to a further preferred embodiment, the control unit comprises a configuration module which proposes which flushing station is to be flushed depending on the riser or distribution pipe to be flushed and via which it is possible to set at least one of the following parameters: flushing time, flushing duration, flushing for the hot water pipe and/or cold water

pipe and whether flushing needs to take place once or in a recurring manner.

The configuration module thus allows the facilities management to implement the notification, output by the evaluation module, for flushing a riser or distribution pipe, wherein certain settings can be made on the basis of the abovementioned parameters.

According to an alternative embodiment, the evaluation module is set up to initiate flushing of the riser or distribution pipe automatically by simultaneous flushing of the ascertained flushing stations.

According to a further preferred embodiment, the consumers are connected in the branch pipes via a serial and/or loop pipe system and the connection of the consumers to the serial and/or loop pipe system is realized via what are known as loop fittings. This not only brings about reliable flushing of the branch pipes via the flushing stations but also, in the event of simultaneous flushing of a plurality of flushing stations, causes the turbulent flow in the riser or distribution pipe.

The invention also relates to a method for flushing a drinking water installation, comprising

- at least one riser or distribution pipe,
- a plurality of branch pipes connected to the riser or distribution pipe,
- consumers and flushing stations connected to the branch pipes,

- wherein the flushing stations have measuring devices for the temperature change in the branch pipe or the throughflow through the branch pipes, and/or measuring devices for the temperature change or the throughflow are provided,
- a control unit,
- wherein the control unit is connected to the measuring devices by means of data cables or by radio and receives the data about the throughflow through the branch pipes and/or risers or distribution pipes,
- the control unit has an evaluation module for the data transmitted from the flushing stations, and
- the evaluation module determines, on the basis of the transmitted data, which flushing stations need to be flushed simultaneously in order for the riser or distribution pipe to be flushed.

Advantageously, the evaluation module outputs only a notification as to which riser or distribution pipe needs to be flushed. Preferably, the control unit comprises a configuration module which proposes which flushing station is to be flushed depending on the riser or distribution pipe to be flushed and via which the flushing station to be flushed can be selected manually. According to an alternative embodiment, the flushing of the riser or distribution pipe is initiated automatically by simultaneous flushing of flushing stations by the evaluation module.

Further advantageous configurations of the invention are disclosed in the dependent claims and the following description of the figures.

The invention is explained in more detail by way of an exemplary embodiment illustrated in the drawings.

In the drawings:

Figure 1 schematically shows a drinking water installation having ten flushing stations,

Figure 2 schematically shows the networking of the flushing stations via a control unit,

Figure 3 shows a configuration module of the control unit, and

Figure 4 shows the output of the configuration module following definition of the parameters.

In the following text, elements with the same function are provided with the same reference signs throughout the figures and not explained separately per figure.

Figure 1 shows a system for a drinking water installation having ten different sanitary areas SB1 to SB10, as could be installed for example in a hotel. The sanitary areas SB1 and SB6 are arranged on the ground floor and the sanitary areas SB2 to SB5 and SB7 to SB10 are arranged on floors 1 to 4, respectively. In the basement, a boiler B for heating water is provided, wherein a hot water pipe WWL leads from the boiler B once to the sanitary areas SB1 to SB10 (feed flow) and back therefrom to the boiler B again (return flow). Furthermore, a cold water feed pipe KWL is provided in the basement, said cold water feed pipe KWL likewise leading to the sanitary areas SB1

to SB10. The water pipes WWL and KWL which lead to the sanitary areas SB1 to SB10 are denoted risers or distribution pipes SVL in the main line. The sanitary areas SB1 to SB5 are connected via the riser or distribution pipe SVL1. The sanitary areas SB6 to SB10 are connected via the riser or distribution pipe SVL2, which is initially laid horizontally in the basement and then leads vertically from the basement to the fourth floor. Branch pipes ZL lead from the risers or distribution pipes SVL1 and SVL2 into the respective sanitary areas SB1 to SB10. A plurality of consumers are connected to the branch pipes ZL per sanitary area SB. In the illustrated sanitary areas SB1 to SB10, these are a wash basin WB, a bathtub BW, a shower D, a further wash basin WB and, at the end, a toilet T. One flushing station SS1 to SS10 is integrated per sanitary area SB1 to SB10 between the shower D and the wash basin WB. In the sanitary areas SB2 to SB10, the consumers WB, BW, D and T are denoted V, since they are presented only by way of example. The consumers V are connected to the branch pipes ZL via a serial and/or loop pipe system, that is to say that both the hot water pipe and the cold water pipe are laid via what are known as loop fittings at each consumer V, such that no dead T pieces arise, but rather, when the toilet T is operated, for example in the entire serial and/or loop pipe system of the branch pipe ZL for the cold water, the latter is moved in the pipe past all the consumers V.

Figure 2 shows the drinking water installation according to Figure 1, wherein the flushing stations SS have been coupled to a control unit SE via a radio module FM, such that the data as to how much water has been moved in the branch pipes ZL and whether a flushing station SS had to be actuated can be

collected in the control unit SE. To this end, measuring devices MM are provided in the flushing stations SS, said measuring devices MM being able to determine the throughflow of drinking water through the hot water pipe and through the cold water pipe via temperature changes or a throughflow meter and to pass this information on to the control unit SE via the radio module. Alternatively or in addition, it is also possible to use measuring devices installed in the drinking water installation independently of the flushing stations, for example measuring devices MM in the risers and distribution pipes SVL1 and SVL2. It is likewise possible to connect all the flushing stations SS and measuring devices MM to the control unit SE via laid data cables.

Provided in the control unit is an evaluation module AM, which can determine, on the basis of the received data from the measuring devices MM in the flushing stations SS, whether a riser or distribution pipe SVL, for example the riser or distribution pipe SVL1 in Figure 1, has to be flushed. This is the case for example when the flushing stations SS1 to SS5 have been triggered frequently in the sanitary areas SB1 to SB5 because the water in the sanitary areas was standing too long. The individual actuation of a flushing station does not, however, result in turbulent flow in the riser or distribution pipe SVL1, resulting in the risk of germs or bacteria developing in the riser or distribution pipe SVL1, too. If this is ascertained by the evaluation module AE in the control unit SE, the control unit SE outputs a notification that a particular riser or distribution pipe, for example SVL1, has to be flushed. To this end, the control unit SE preferably has a configuration module KM, as illustrated in Figure 3. In the

configuration module, the building can be selected in the menu item "Site", the building section can be selected in the menu item "Section" and the corresponding riser or distribution pipe can be selected in the menu item "Riser". In the further menu item "Common Group Flush Time", it is possible to set when flushing should take place, and the menu item "Duration" makes it possible to set the flushing duration. In the menu items "Hot", "Cold" and "Hot & Cold", it is possible to set whether only the cold water pipe, only the hot water pipe or all the pipes should be flushed. The menu item "Frequency" makes it possible to set whether flushing should take place once or in a recurring manner. If the person responsible, usually the facilities management, receives the information, via the evaluation module AE, that a particular riser or distribution pipe SVL needs to be flushed, the configuration module KM allows them to select this riser or distribution pipe SVL, whereupon the configuration module KM proposes a certain number of flushing stations SS to them, as shown in Figure 4, there being three in the exemplary embodiment according to the figure, which should be flushed simultaneously in order to achieve reliable flushing of the riser or distribution pipe SVL1. The advantage of setting via the configuration module is that the facilities management can incorporate their own experience with the system and use the configuration module KM primarily to set the flushing time so that visitors to the sanitary areas are not disturbed. In particular in multi-storey buildings, when many flushing stations, for example SS1 to SS5, are actuated simultaneously, a pressure drop occurs, and so reduced water pressure or even no pressure would be available for a short time in the sanitary area SS5. Therefore, it is

appropriate to select the flushing time such that there is a low probability of the sanitary areas being used.

Alternatively, the evaluation module AE can also be set such that flushing is initiated automatically via the flushing stations SS.

As a result of the described solution, the bacterial load in drinking water installations is drastically reduced, without additional fixtures being required. As a result of the intelligent networking of the flushing stations SS and the simultaneous flushing of the flushing stations SS, a turbulent flow and necessary flushing in the risers or distribution pipes SVL is also achieved. This allows a drinking water installation pursuant to the regulations EN 806-5, VDI 6023 and the WHO guidelines.

List of reference signs

KWL	Cold water pipe
B	Boiler
WWL	Hot water pipe
SVL1, SVL2	Riser or distribution pipe
ZL	Branch pipe
V	Consumer
WB	Wash basin
BW	Bathtub
D	Shower
T	Toilet
SS1 to SS10	Flushing stations
SB1 to SB10	Sanitary areas
FM	Radio module
SE	Control unit
MM	Measuring device
AM	Evaluation module
KM	Configuration module

What is claimed is:

1. System for flushing a drinking water installation, comprising
- at least one riser or distribution pipe (SVL),
- a plurality of branch pipes (ZL) connected to the riser or distribution pipe (SVL),
- consumers (V) and flushing stations (SS) connected to the branch pipes (ZL),
- wherein the flushing stations (SS) have measuring devices (MM) for the temperature change in the branch pipe (ZL) or the throughflow through the branch pipe (ZL), and/or measuring devices (MM) for the temperature change or the throughflow are provided,
- a control unit (SE) which is connected to the measuring devices (MM) by means of data cables or by radio,
- wherein the control unit (SE) has an evaluation module (AM) for the data transmitted by the measuring devices (MM), and
- the evaluation module is set up to determine, on the basis of the transmitted data, which flushing stations (SS) need to be flushed simultaneously in order for the riser or distribution pipe (SVL) to be flushed.

2. System according to Claim 1,
characterized in that
a plurality of risers or distribution pipes (SVL1, SVL2) for the feed flow and return flow of a hot water pipe (WWL) and a cold water pipe (KWL) are provided and the risers or distribution pipes (SVL) have a larger diameter than the branch pipes (ZL).

3. System according to either of Claims 1 and 2, characterized in that each flushing station (SS) is assigned an ID (SS1 to SS10) and, on the basis of the ID (SS1 to SS10), the flushing station (SS) is locally assignable in the system.

4. System according to one of Claims 1 to 3, characterized in that the evaluation module (AM) is set up to output a notification as to which riser or distribution pipe (SVL) needs to be flushed.

5. System according to one of Claims 1 to 4, characterized in that the control unit comprises a configuration module (KM) which proposes which flushing station (SS1 to SS10) is to be flushed depending on the riser or distribution pipe (SVL1, SVL2) to be flushed and via which at least one of the following parameters: flushing time, flushing duration, flushing for the hot water pipe and/or cold water pipe and flushing once or in a periodically recurring manner is settable.

6. System according to one of Claims 1 to 4, characterized in that the evaluation module (AM) is set up to initiate flushing of the riser or distribution pipe (SVL) automatically by simultaneous flushing of the flushing stations (SS).

7. System according to one of Claims 1 to 6, characterized in that the consumers are connected in the branch pipes (ZL) via a serial and/or loop pipe system and the connection of the consumers (V) is realized via loop fittings.

8. Method for flushing a drinking water installation, comprising
- at least one riser or distribution pipe (SVL),
- a plurality of branch pipes (ZL) connected to the riser or distribution pipe (SVL),
- consumers (V) and flushing stations (SS) connected to the branch pipes,
- wherein the flushing stations (SS) have measuring devices (MM) for the temperature change in the branch pipe (ZL) or the throughflow through the branch pipes (ZL), and/or measuring devices (MM) for the temperature change or the throughflow are provided,
- a control unit (SE),
- wherein the control unit (SE) is connected to the measuring devices (MM) by means of data cables or by radio and receives the data about the throughflow through the branch pipes (ZL) and/or risers or distribution pipes (SVL),
- the control unit (SE) has an evaluation module (AM) for the data transmitted from the flushing station (SS), and
- the evaluation module (AM) determines, on the basis of the transmitted data, which flushing stations (SS) need to be flushed simultaneously in order for the riser or distribution pipe (SVL) to be flushed.

9. Method according to Claim 8,
characterized in that
the evaluation module (AM) outputs a notification as to which riser or distribution pipe (SVL) needs to be flushed.

10. Method according to either of Claims 8 and 9,
characterized in that
the control unit (SE) comprises a configuration module (KM) which proposes which flushing stations (SS) are to be flushed depending on the riser or distribution pipe (SVL1, SVL2) to be flushed and via which the flushing stations (SS) to be flushed can be selected manually.

11. Method according to Claim 10,
characterized in that,
via the communication module (KM), at least one of the following parameters: flushing time, flushing duration, flushing for the hot water pipe and/or cold water pipe and flushing once or in a periodically recurring manner is settable and flushing is initiated by a user of the control unit.

12. Method according to Claim 8,
characterized in that
the evaluation module initiates flushing of the riser or distribution pipe (SVL) automatically by simultaneous flushing of a plurality of flushing stations (SS).

FIG 1

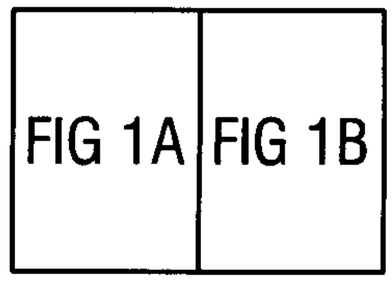


FIG 1A
FIG 1B

FIG 1A

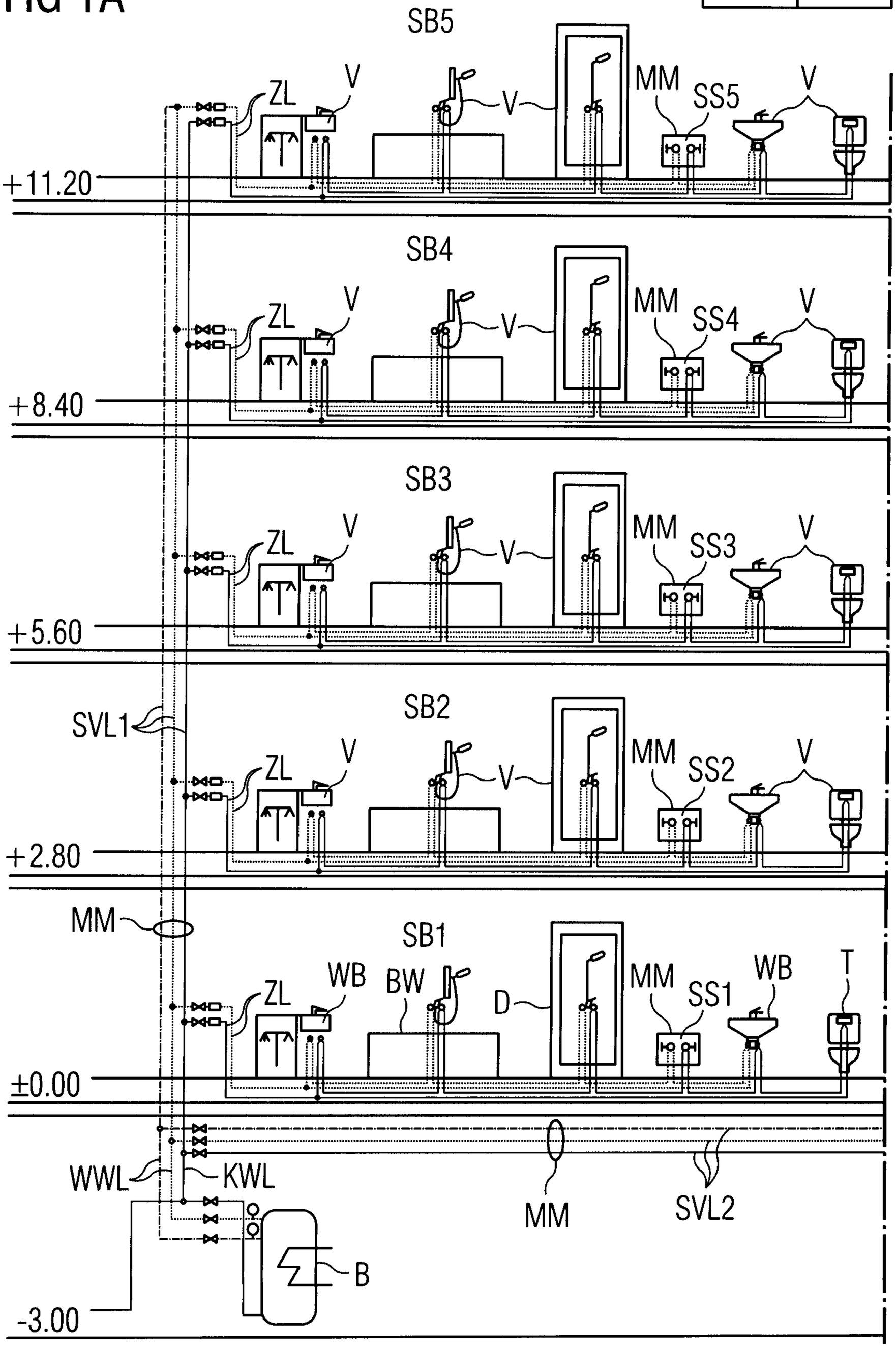
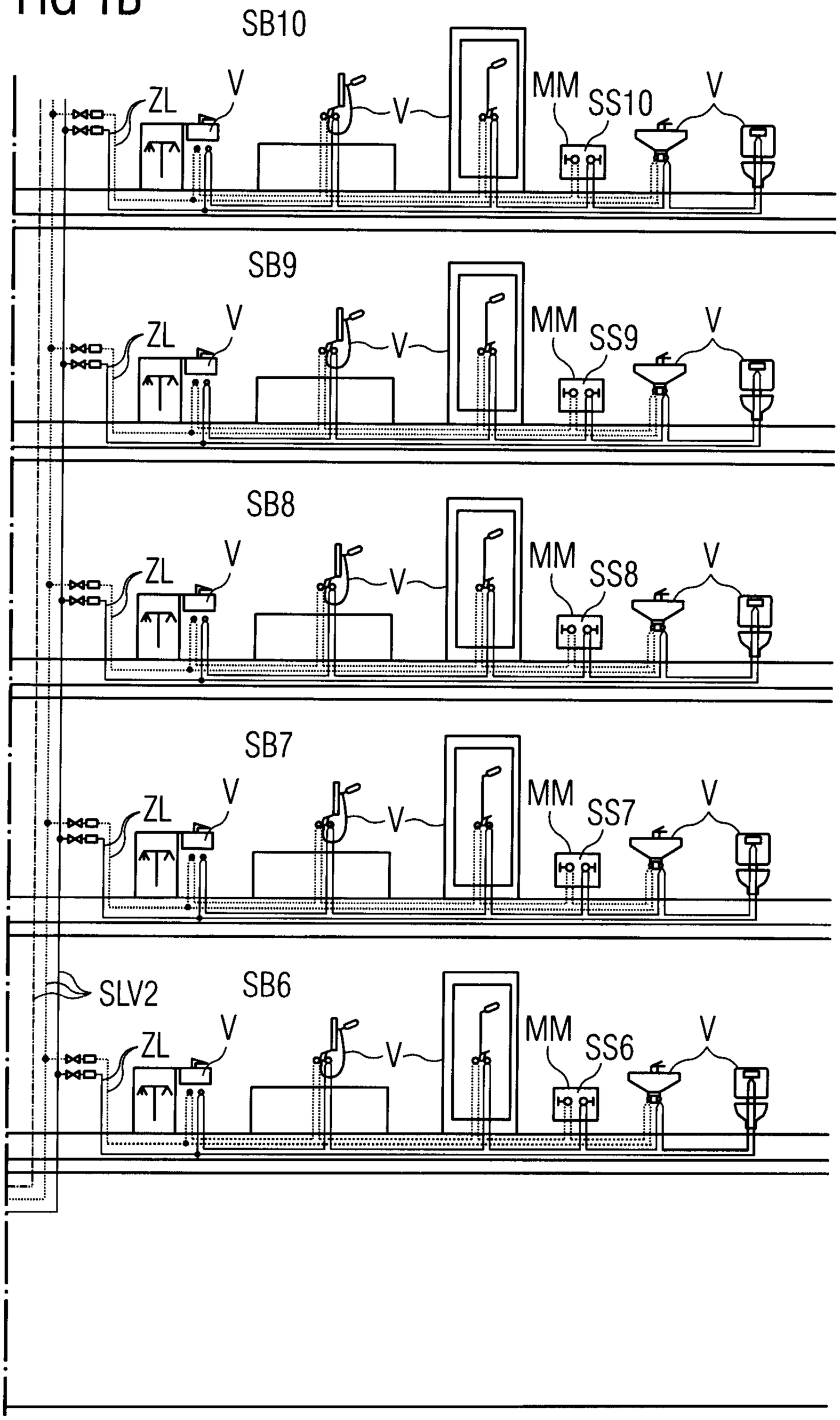

SB5
ZL
V
V
MM
SS5
V
+11.20
SB4
ZL
V
V
MM
SS4
V
+8.40
SB3
ZL
V
V
MM
SS3
V
+5.60
SVL1
SB2
ZL
V
V
MM
SS2
V
+2.80
MM
SB1
ZL
WB
BW
D
MM
SS1
WB
T
±0.00
WWL
KWL
B
-3.00
MM
SVL2

FIG 1B


SB10
ZL
V
V
MM
SS10
V
SB9
ZL
V
V
MM
SS9
V
SB8
ZL
V
V
MM
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SLV2
SB6
ZL
V
V
MM
SS6
V

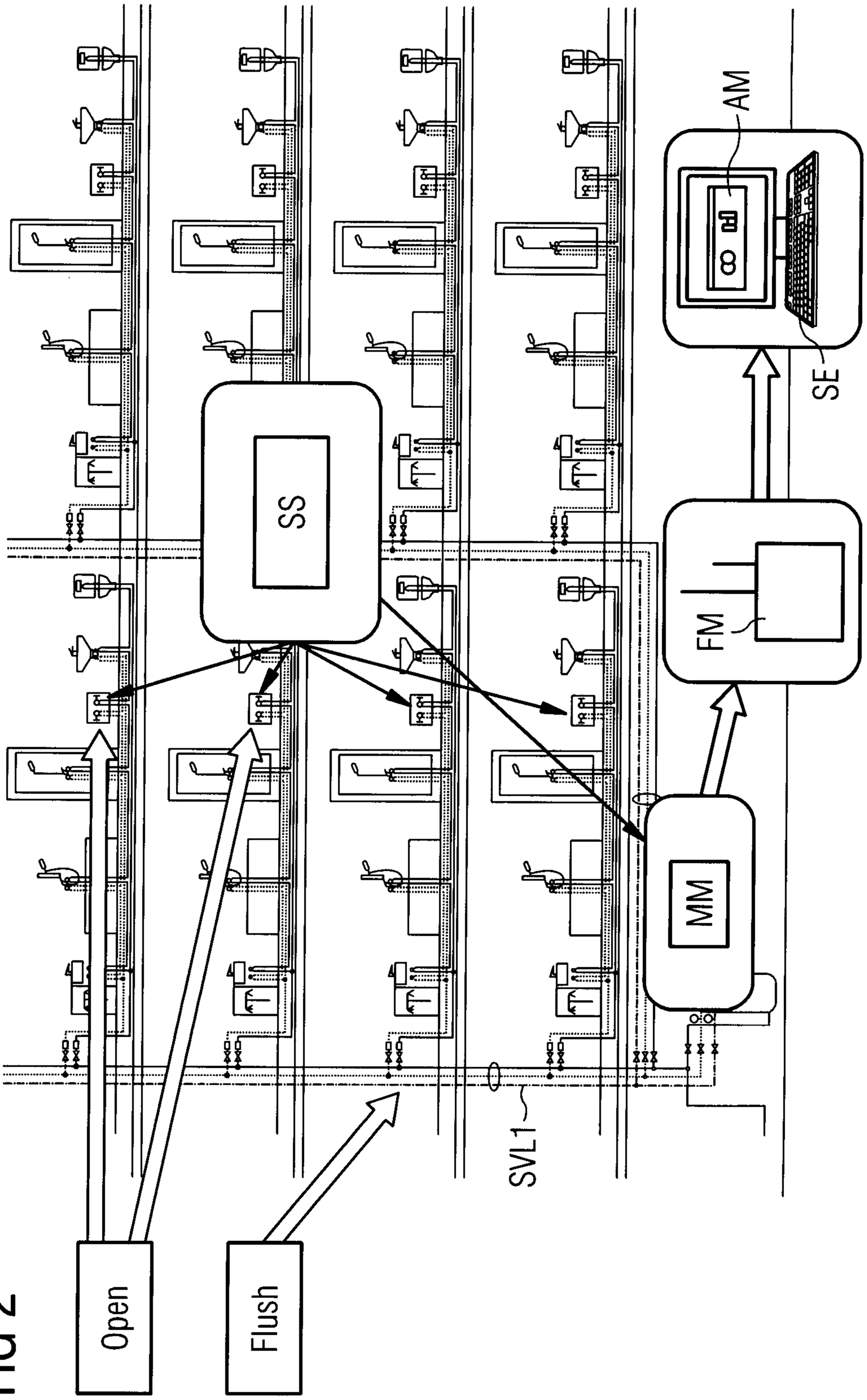


FIG 2

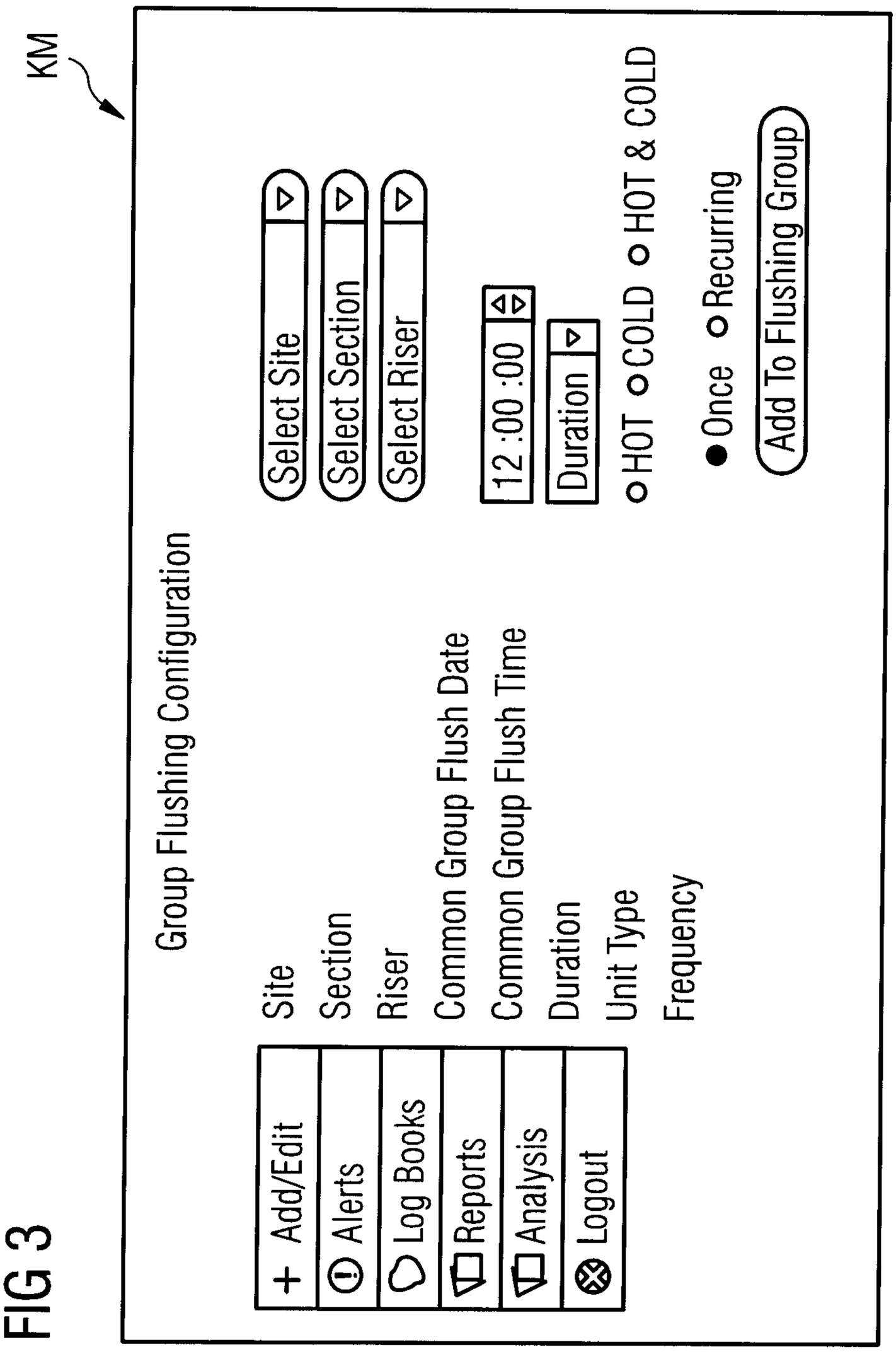
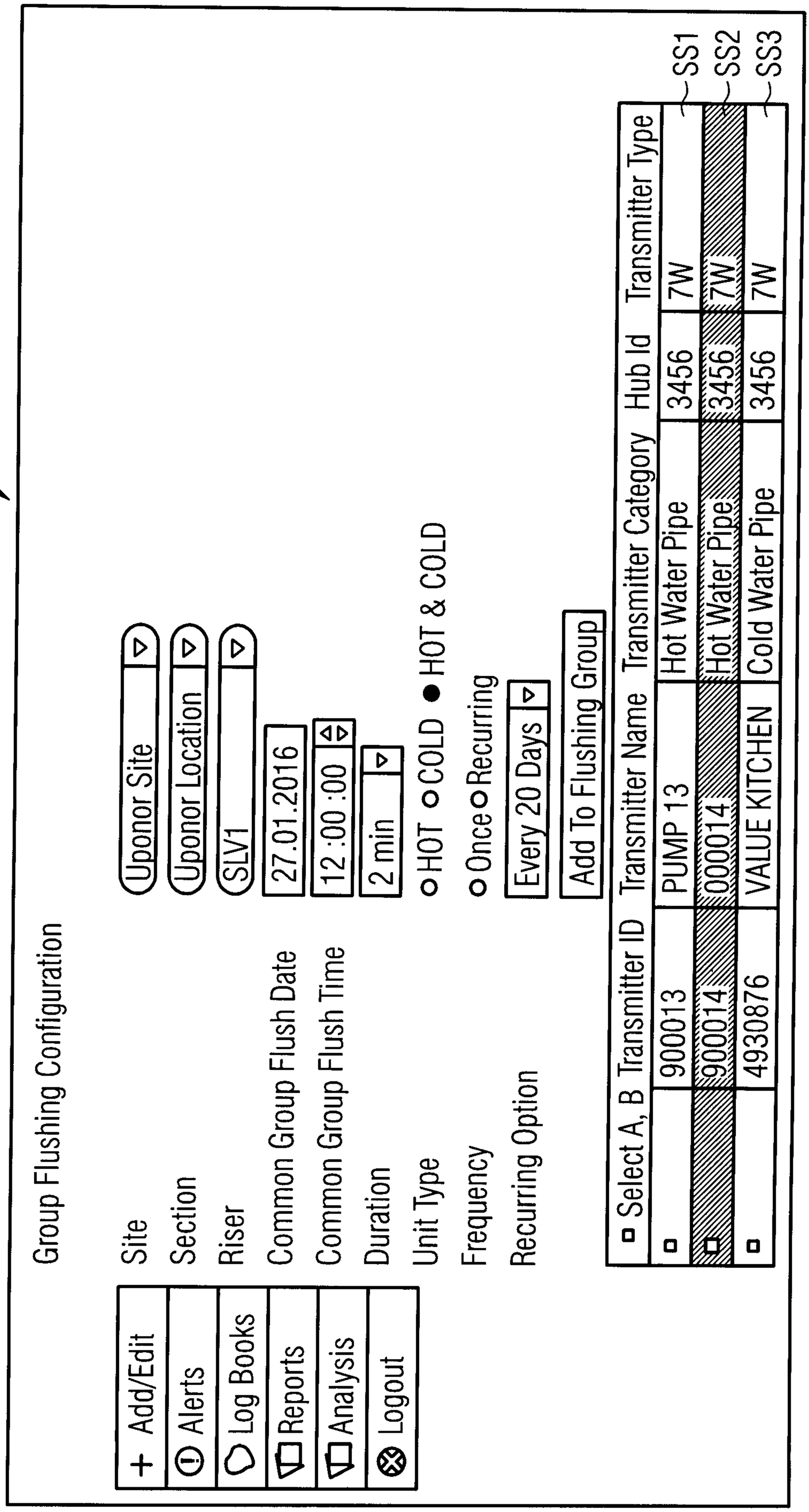

KM
Group Flushing Configuration
Site
Section
Riser
Common Group Flush Date
Common Group Flush Time
Duration
Unit Type
Frequency
+ Add/Edit
Alerts
Log Books
Reports
Analysis
Logout
Select Site
Select Section
Select Riser
12 :00 :00
Duration
HOT COLD HOT &
Once Recurring
Add To Flushing Grou

FIG 3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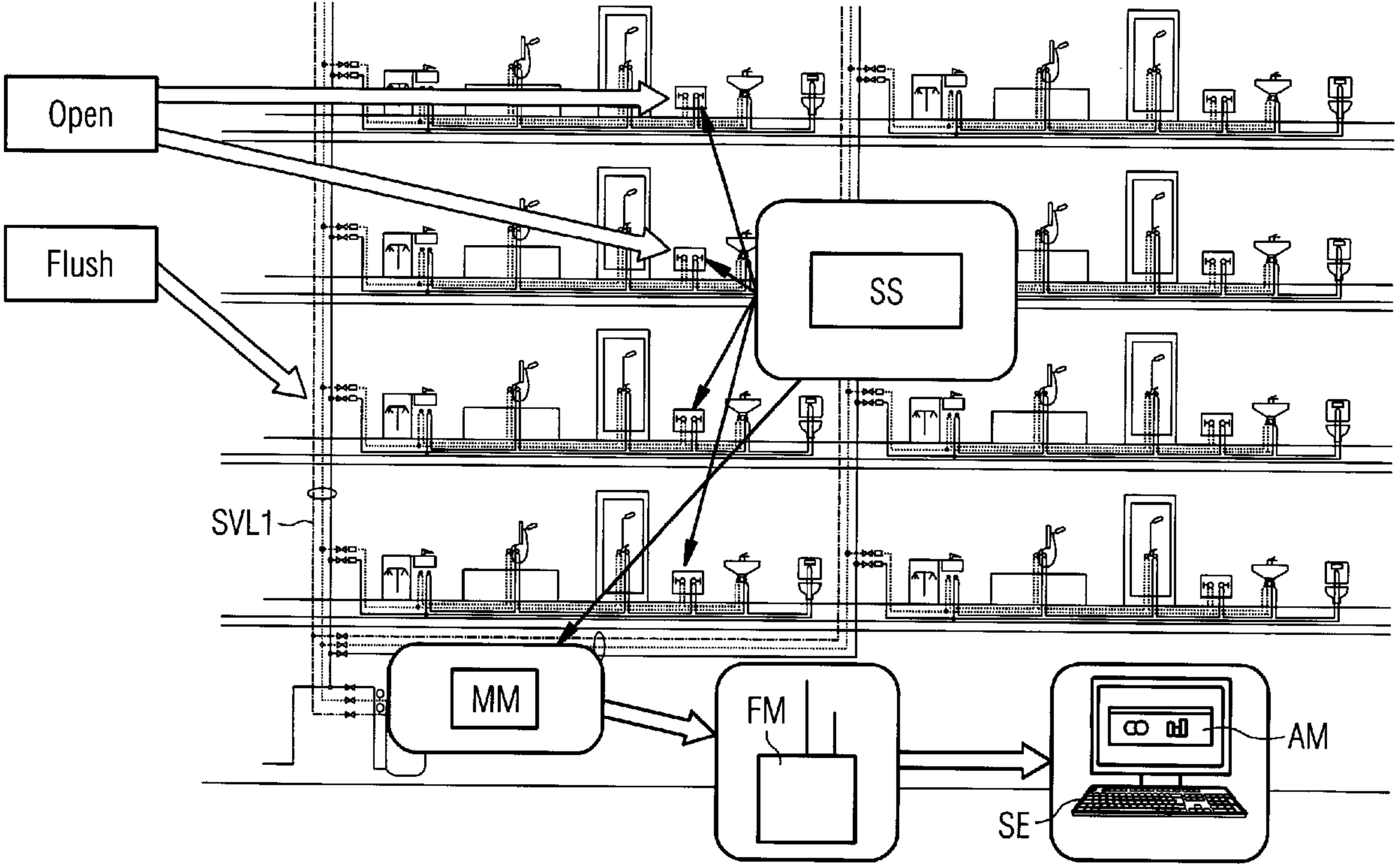
Group Flushing Configuration
Site
Uponor Site
Section
Uponor Location
Riser
SLV1
Common Group Flush Date
27.01.2016
Common Group Flush Time
12 :00 :00
Duration
2 min
Unit Type
HOT COLD HOT & COLD
Frequency
Once Recurring
Recurring Option
Every 20 Days
Add To Flushing Group
Select A, B Transmitter ID Transmitter Name Transmitter Category Hub Id Transmitter Type
900013 PUMP 13 Hot Water Pipe 3456 7W
900014 000014 Hot Water Pipe 3456 7W
4930876 VALUE KITCHEN Cold Water Pipe 3456 7W
SS1
SS2
SS3
+ Add/Edit
Alerts
Log Books
Reports
Analysis
Logout

FIG 4


Open
Flush
SS
SVL1
MM
FM
AM
SE