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(54) Handwash station

(57) A handwash station comprises a wall mounted cabinet (1) which contains soap and water despensing means (10,11), a proximity sensor (9) and processing circuitry. The processing circuitry controls the dispensing of soap and water in response to signals from the proximity sensor. A count of valid handwashes is incremented only if a user's hand is detected by the proximity sensor at certain key points. The key points comprise at least the start of a last soap dispensing step and a the start of a last rinsing water dispensing step.

Differential valid handwash count values are stored periodically by the processing circuitry and can be downloaded to a central station for analysis.

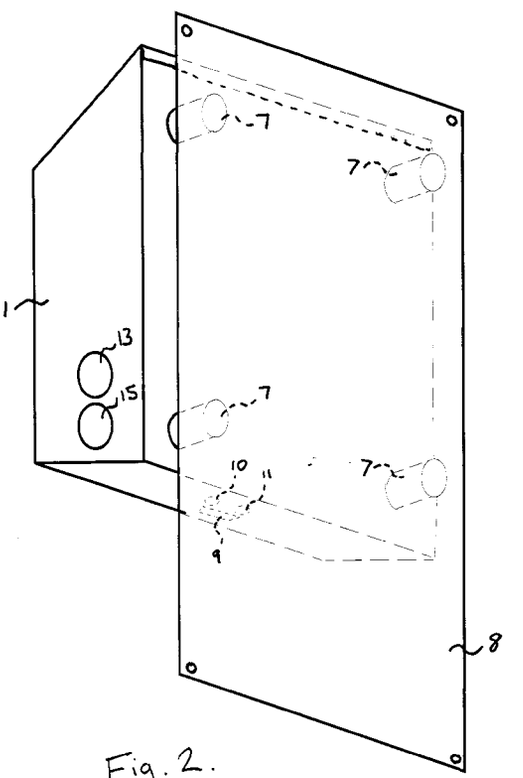


Fig. 2.

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Description

The present invention relates to an apparatus for handwashing and a method of monitoring handwashing activity.

In the catering and healthcare industries, it is essential that workers regularly wash their hands so as to reduce the risk of food poisoning to customers and cross-contamination from one worker to another. It is also desirable that management be able to monitor their staff's handwashing activity.

Various systems have been developed wherein it is intended that a counter be incremented each time a worker uses a handwash station. For example, United States Patent No. 5,199,118 discloses a handwash station wherein soap is first dispensed onto a user's hands, followed by rinsing water. A counter is incremented at a predetermined point in the wash cycle. The disclosed system suffers from the problem that there is no positive determination that the user has indeed washed his/her hands fully, using both soap and water.

Similarly, the apparatus disclosed in United States Patent No. 5,031,258 is based on the assumption that once a user has started a wash cycle she/he will complete it.

It is an aim of the present invention to overcome the disadvantages of the prior art and provide more reliable monitoring of handwashing.

According to a first aspect of the present invention, there is provided a handwash station comprising a controllable soap dispensing means, a controllable water dispensing means, a counter means for counting handwashes, sensor means for detecting a hand in using relation to the station and a control means operable to control the soap and water dispensing means according to a predetermined cycle, the cycle including at least a soap dispensing step and a rinsing water dispensing step, wherein the counter means is incremented following a last rinsing step of the cycle if the sensor means has detected a hand at the start of each of the soap and water dispensing steps.

Thus, according to the present invention in its first aspect, there is a positive determination of the presence of a user's hand in a position to receive soap before soap is dispensed. If no hand is present the wash cycle may be aborted but, in any event, the counter is not incremented. The station may maintain a separate count of hand rinse operations, i.e. those terminating before soap is dispensed, in addition to the count of full handwashes.

Recent developments in soap technology have produced liquid soaps with very low viscosity. When such soaps are used, there is a temptation for a busy worker merely to wipe off the soap on his/her clothing rather than rinsing properly. To counteract this temptation, the present invention provides for the positive determination the presence of a hand before rinsing water is dispensed. The counter is then only incremented if the rinsing water is dispensed onto a hand or hands.

Preferably, the cycle includes two soap dispensing steps. In a preferred embodiment, the cycle comprises a pre-rinse period, a first soap dispensing step, a first rinse step, a second soap dispensing step and a final rinse step.

Preferably, an audible or visible warning is given when a user is required to place his/her hands in a position to be sensed.

Preferably, the handwash station includes memory means, wherein the control means is operable to store periodically a count of handwashes completed in a predetermined period.

Also according to the first aspect of the present invention is a method of monitoring handwashing activity comprising the steps of: determining whether a hand is in position to receive soap at a soap dispensing step; thereafter, determining whether a hand is in a position to receive rinsing water at a rinsing step; and incrementing a handwashes counter if a hand is determined to be in position at both the soap dispensing and rinsing steps.

Preferably, the method includes the step of communicating said stored counts and optionally a handwash station ID code to a central station.

Preferrably, communicated data is encrypted before being dispatched.

It has been proposed, for instance in PCT Application No. 93/10311, to provide monitoring of an individual's use of a handwash station. However, this requires the user to identify himself to the station either by a code, which may be forgotten, or by a swipe card, which may be lost. Furthermore, both of these arrangements may be subverted and are not totally hands-free. The use of a keypad for entering a user code risk is the build up of dirt on the keypad. A swipe card would conveniently be worn around the neck on a chain. This is undesirable in a kitchen where it may be caught in machinery

In order to overcome these problems, a preferred embodiment of the present invention includes memory means wherein the control means is operable to store periodically a count of handwashes completed in a predetermined period.

According to a second aspect of the present invention, there is provided a handwash station comprising data collection means, wherein the data collection means is operable to store periodically a count of handwashes completed in a predetermined period.

Thus, the handwashing rate for a group of workers can be monitored and suitable management action taken in respect of the whole group if the rate falls below a threshold. Data transmission means may be provided and the control means be operable to cause the data transmission means to transmit said periodically stored counts, preferably with a station ID code, from the station. Advantageously, the transmitted data is encrypted.

According to a third aspect of the present invention, there is provided a handwash system comprising a handwash station having control means for controlling

the operation of the station and communication means, and a portable programming unit having user input means and communication means for communicating with the communication means of the station, wherein, when the communication means are in operative relation, the control means is responsive to operation of the user input means to establish a handwashing program for the station.

Preferably, programming unit can be plugged into the station and receives operating power from the station.

Preferably, the station displays menus or instructions so the handwashing program is established interactively. If the station is not provided with a suitable display, a display could be provided on the programming unit.

Preferably, the system includes a portable code storing unit wherein the communication means of the station is operable to read a code from the portable code storing unit. Such a unit is useful for logging service visits. Each service technician would have a unit programmed with a code identifying him. Another option is for the unit to store a code which triggers a self-test routine in the station.

Preferably, the system includes a data transmission means for conveying data from the station's communication means to a remote station, wherein the station includes data logging means for logging handwashes carried out using the station and said transmission means is operative to send logged data to the data transmission means.

Preferably, the data transmission means comprises a portable data carrier, for example a portable computer or "personal digital assistant", smart card or magnetic medium. However, the medium could comprise a data network. In a preferred embodiment, the data carrier comprises a memory mounted in a housing, provided with the male or female parts of an electrical connector. The cooperating part of the connector would be provided on the handwash station. It should be borne in mind that virtually any of the known methods of electronically or optically transferring data between two points may be employed.

Embodiments of the present invention will now be described with reference to the accompanying drawings in which

Figure 1 shows the front, left side and top of a handwash station according to the present invention;

Figure 2 shows the back, bottom and right side of the station of Figure 1;

Figure 3 is a side view of the station of Figure 1 mounted to a wall above a sink;

Figure 4 is a block diagram of the control circuit of the station of Figure 1;

Figure 5 is a timing diagram illustrating the operation of the station of Figure 1;

Figure 6 illustrates the transfer of data from the station according to the present invention within a central station;

Figure 7 shows a handheld unit for programming the operation of a station according to the present invention;

Figure 8 is a diagram illustrating a station set up routine;

Figure 9 shows a Person-In-Charge Key according to the present invention;

Figure 10 is a flow diagram illustrating a data capture routine according to the present invention; and

Figure 11 shows a personal computer and a Data Capture Key adapter unit according to the present invention.

Referring to Figures 1 and 2, a hand wash station comprises a stainless steel cabinet 1. A display 3 is provided on the front wall of the cabinet 1 and is used to display the current hand wash count and instruction and warning messages for users. A socket 5 is provided in the top face of the cabinet 1. Four standoffs 7 are arranged in a square on the back wall of the cabinet 1 and couple it to a backplate 8. The upper portion of the backplate 8 is substantially co-extensive with the cabinet 1 whereas the lower portion of the backplate 8 extends below the bottom of the cabinet 1. An active infrared proximity sensor 9 is provided on the bottom of the cabinet 1 together with a soap nozzle 10 and a water nozzle 11. An indicator light 12 is also mounted on the front face of the cabinet 1. Water is supplied to the station through a first aperture 13 in the lower right hand wall of the cabinet 1 and electrical power is supplied through a second aperture 15 in the lower right hand wall of the cabinet 1.

The cabinet contains a soap tank, a water valve for dispensing water, a soap pump for dispensing soap and control circuitry (Figure 4).

Referring to Figure 3, the cabinet 1 is mounted to a wall 15 by screws passing though the backplate 8. The backplate 8 is welded to the standoffs 7 which are themselves attached to the back wall of the cabinet 1. The rest of the cabinet 1, including the soap tank, water valve, soap pump and control circuity, is hooked onto the back wall of the cabinet 1. Thus, the station is installed by screwing the backplate 8 to the wall 15 and then hooking on the major part of the cabinet 1. A sink unit 17 is located beneath the cabinet 1. The standoffs 7 facilitate easy cleaning behind the cabinet 1.

Referring to Figure 4, the control circuitry of the station comprises a microprocessor 30 including a RAM, a ROM 31 for storing a control program and other permanent data, a EEPROM 32 for storing data, a display controller 34, a serial I/O circuit 35 and a bus 36 connecting the foregoing units. The display controller 34 controls the display 3 (Figure 1) in response to control signals from the microprocessor 30. The I/O circuit 35 is coupled to the socket 5 (Figure 1) and enables the microprocessor 30 to communicate with external devices. The microprocessor 30 has an output signal line 37 to the water

valve, an output signal line 38 to the soap pump and an input signal line 39 from the proximity sensor. The operating range of the infrared sensor 9, normally 4" to 5", can be varied by varying a threshold against which the sensor signal is compared. If the range is set to too great a distance, the sensor 9 will respond to the presence of the sink 17 below the station.

A power supply unit 40 is provided for transforming and rectifying input mains power to supply the circuits in the station. A backup battery 41, providing 12 hours of normal operation in the event of main failure. The power supply unit 40 also includes battery charging circuitry for recharging the battery 41.

A preferred handwash cycle will now be described with reference to Figure 5.

Referring additionally to Figure 5, the microprocessor 30 continually monitors the infrared sensor 9 to determine whether a user has placed his or her hands in a position to receive water. If hands are detected (TST1), the microprocessor 30 initially causes the display 3 to display the massage "hands detected" and thereafter opens the water supply valve to supply wetting water to the user's hands. While the wetting water is being supplied, the microprocessor 30 causes the display 3 to indicate a countdown to the end of this supply of water. Once the supply of water has ended, the display 3 is changed to instruct the user to place his hand under the sensor 9 in order to trigger the dispensing of soap and the indicator light 12 is flashed, typically for 10 seconds. If hands are then detected by the sensor 9 (TST2), the soap valve is opened and soap dispensed while the display 3 is changed to notify the user that soap is being dispensed. However, if no hands are detected at this point, the microprocessor 30 records a "hands rinsed" event and the station returns to its initial state.

Once the full dose of soap has been dispensed, the display 3 instructs the user to place his hands under the sensor 9 and provides a countdown to the supply of rinsing water, and the indicator light 12 is flashed. Towards the end of the period for the user to soap his hands, the display 3 changes to instruct the user to place his hands under the sensor 9 again in order to receive rinsing water while the indicator lamp is flashed. Once the users hands are detected (TST3), the water valve is opened and rinsing water is supplied to the users hands. The display 3 provides a countdown with the time remaining for the dispensing of rinsing water. If the users hands are not detected at this stage, the station returns to its initial state.

At the end of the rinsing period, the user is again instructed to place his hands under the sensor 9 and the indicator light 12 flashed, and once his hands are detected (TST4), a further dose of soap is supplied. The display 3 notifies the user that soap is being dispensed during this stage. If the users hands had not been detected, the station would return to its initial condition.

Once a complete dose of soap has been supplied, the display 3 instructs the user to soap his hands and indicates the time until the final dose of rinsing water is to be dispensed. Towards the end of the soaping up period, the user is instructed by the display 3 to place his hands under the sensor 9 again in order to trigger (TST5) the dispensing of the final rinsing water. At the same time, the indicator light 12 is flashed. If his hands are not detected the station returns to its initial condition.

During the dispensing of final rinsing water, the display 3 provides a countdown to the end of rinsing. At the end of the final rinsing operation, a count is incremented by the microprocessor 30.

The microprocessor 30 includes a timer function and at the end of time segments, of predetermined size (e.g. half an hour), it stores the number of washes and hands rinsed events during that segment in the EEPROM 32. The EEPROM 32 has the capacity to store approximately five weeks' data. If the EEPROM 32 becomes full, the oldest data therein is overwritten.

Any period of mains power failure is logged by the microprocessor 30 and the data transferred to the EEPROM 32 with the handwash data. In the event of impending total power failure, any data stored in the microprocessor's RAM is transferred to the EEPROM 32.

If the handwash station is not used for a predetermined period, the microprocessor 30 causes water to be dispensed for a short period so as to purge the system.

Referring to Figure 6, a supervisor is provided with a hand held computer 19. When it is desired to retrieve the hand washing frequency data for analysis, the supervisor connects the hand held computer 19 to the socket 5 on the handwash station via a cable 21. The hand held computer 19 is programmed so as to allow the supervisor to interrogate the handwash station and read the stored count values. Once all the count data has been transferred to the hand held computer 19, the supervisor can transfer it to a central station, for instance a personal computer 23. A data link 24 is formed between the hand held computer 19 and the personal computer 23 and the retrieved count data transferred from the hand held computer 19 to the personal computer 23. Once the count data has been transferred to the personal computer 23, it can be manipulated with conventional software, for instance spreadsheet programs.

The handheld computer 19 may be used to transfer hand wash count data from a plurality of hand wash stations to the personal computer 23. Also, data from handwash stations in different areas of the workplace may be transferred to the personal computer 23 using different handheld computers 19.

The microprocessor 30 is programmed to encrypt the transferred data before it is transferred.

The handheld computer 19 may also be used to program the wash cycle and reset the handwash count.

Another embodiment will now be described which avoids the use of a handheld computer.

The handwash station of this embodiment is structurally the same as that of the first embodiment de-

scribed above. Therefore, it will not be described again. Also the handwash cycle is the same.

Referring to Figure 7, custom handheld unit 60 is used to control the wash cycle and reset the count in conjunction with the program controlling the operation of the microprocessor 30. The handheld unit 60 comprises a body 61 containing four pushbutton switches 64,65,66,67 and processing circuitry, a plug 62 for insertion into the socket 3 on the handwash station, and a lead 63 coupling the body 61 to the plug 62. Typically a manager would keep and use the handheld unit 60 and it will hereafter be referred to as the Manager's Key. The plug 62 comprises four contacts 62a to 62d. The Managers Key 60 is powered from the station, contacts 62a and 62d being respectively for the positive and negative power supply lines. Contact 62b is for serial data communication to the station. Contact 62c is not used for the Manager's Key 60 but the equivalent contact on other keys (described below) is used for data transmissions from the station.

The microprocessor 30 repeatedly tests to establish whether the plug of a key is inserted into the socket 5. When the plug 62 is inserted into the socket 5 on the station and any of the pushbutton switches 64,65,66,67 operated, the microprocessor 30 of the station enters a set up routine. The set up routine causes menus to be displayed by the display 3. The user navigates around the menus using the pushbutton switches 65,66,67.

The set up routine will now be described with reference to Figure 8.

Initially, the display 3 is caused to show message D1. If no further action is taken a predetermined period, the set up routine is terminated. This means that staff are not prevented from using the station if a manager is called away during resetting and forgets to remove the Manager's Key. The set up routine is also terminated, if the THIS/OK pushbutton switch 66 is operated.

If the manager presses the NEXT/+ pushbutton switch 67, the display 3 changes to show message D2. Pressing the THIS/OK pushbutton switch 66 causes the station to enter a cycle time setting routine. The first message D3 of the cycle time setting routine indicates the period set for pre-soap water supply. This value can be incremented and decremented by pressing the NEXT/+ pushbutton switch 67 and the LAST/- pushbutton switch 65 respectively. Once the correct period is displayed, the THIS/OK pushbutton switch 66 is pressed to move on to the next period to be set. Messages D4 to D8 are displayed for setting the soap dispensing time, the soaping up time, the rinsing water supply time, the purge duration and the period between purges. Pressing the THIS/OK pushbutton switch 66 at display D8 brings up message D1 again. The soap dispensing time applies to both soap dispensing steps. Likewise, the soaping up and rinsing water supply times apply to both soaping up and rinsing steps in the handwash cycle.

If the NEXT/+ pushbutton switch 67 is pressed in response to message D2, message D9 is displayed. Pressing the THIS/OK pushbutton switch 66 at this point enters the station into a time and date setting routine during which messages D10 to D14 are displayed. The time and date are set in the same manner as the cycle periods.

Pressing the NEXT/+ pushbutton switch 67 in response to message D9 brings up message D14 which includes the units identifier "KITCHEN1". If the THIS/OK pushbutton switch 66 is pressed at this time, message D16 is displayed. The manager can set or alter the unit's identifier at this point. Initially, the first character of the identifier is displayed with an underscore and the manager can change the character by pressing the NEXT/+ and LAST/- pushbutton switches 67,65 to step through the alphabet and the numerals 0 to 9. When the THIS/OK pushbutton switch 66 is switched the next character is underscored and can be changed in the same manner as the first character. When the manager has stepped through each character of the identifier, the last operation of the THIS/OK pushbutton switch 66 causes the microprocessor 30 to store the identifier in the EEPROM 32 and message D1 is again displayed.

Finally, pressing the NEXT/+ pushbutton switch 67, when message D15 is being displayed, causes message D17, showing the "total hand washes" value, to be displayed. Message D1 is then brought up by pressing the NEXT/+ pushbutton switch 67.

If the displayed message D1, D2, D9, D15, D17 includes LAST, pressing the LAST/- pushbutton switch 65 returns the display to the previous message.

Once the set up routine has been completed, the microprocessor 30 stores the details of the new settings which are then transferred to the EEPROM 32 with the next batch of handwash data.

The pushbutton switch 64 causes a soap test message to be sent to the microprocessor 30. The microprocessor 30 responds to this message by causing the station to dispense one dose of soap.

Referring to Figure 9, another key 70, the Person-In-Charge Key, is provided to the person in charge at the site of the handwash station 1. The Person-In-Charge Key 70 comprises a body 71 and a plug 72 extending from the body 71. The plug 72 is substantially the same as that connected to the Manager's Key 60. The body 71 contains a memory and data communication circuitry.

The memory is programmed with an ID code for the Person-In-Charge Key 70 which includes a portion identifying the key as a Person-In-Charge Key.

When the Person-In-Charge Key 70 is inserted into the socket 5 on the station, the microprocessor 30 detects its presence and interrogates it to read out the ID code. From the ID code, the microprocessor 30 determines that a Person-In-Charge key 70 has been inserted and performs a self-test routine. The microprocessor 30 then logs the occurance of the self-test together with the key's ID code. This data is then transferred to the

EEPROM 32 with the next batch of handwash data.

A third key, having the same construction as the Person-In-Charge Key 70, is provided to service technicians. However, the ID code, stored in the key's memory, includes a portion identifying it as a service technicians key. When a service technician attends to the station, he inserts his key into the socket 5 on the station. The microprocessor 30 detects its presence and interrogates it to read out the ID code. The microprocessor 30 determines from the ID code that the key is a technician's key and logs a service visit together with the ID code. The service visit data is transferred to the EEPROM with the next batch of handwash data.

A further key, the Data Capture Key, is similar in construction to the Person-In-Charge key 70 and includes an EEPROM for storing data provided from a handwash station. The Data Capture Key is used to transfer data from the station to a remote computer for analysis. The capture of data from a station using the Data Capture Key will now be described with reference to Figure 10.

When the microprocessor 30 detects that a Data Capture Key has been inserted into the socket 5, it first reads the EEPROM in the key to establish whether it contains any data (steps s1 and s2). If the key's EEPROM contains data, the microprocessor 30 causes the message "CANNOT WRITE KEY FULL OR FAULTY" to be displayed by the display 3 of the station (step s3). Then the microprocessor 30 exits the data capture routine.

If, at step s2, it is determined that the key's EEPROM is empty, the microprocessor 30 looks fro the station's identifier in EEPROM 32 (step s4). If the microprocessor 30 cannot find a station identifier in the EEPROM 32, it causes the display 3 to display the message "CANNOT WRITE KEY NO STATION CODE" (step s5) and exits the data capture routine.

If the station's identifier is located at step s4, the microprocessor 30 causes the display 3 to display the message "WRITING DATA" and proceeds to write the station identifier to the EEPROM in the key (steps s6 and s7). Then the microprocessor 30 writes the handwash data, power failure data, service data and set up data, stored in the EEPROM 32 to the key's EEPROM (step s8).

Once step s8 has been completed, the microprocessor 30 causes the display to change to "CHECKING DATA" and reads back the data it has written to the key's EEPROM (step s9). The microprocessor 30 then compares the read back data with that stored in the EEPROM 32 (step s10). If the two sets of data do not match, the microprocessor 30 causes the message "DATA ERROR REMOVE AND RETRY" to be displayed by the display 3 (step s11) and then exits the data capture routine. On the other hand, if the stored and read back data match, the microprocessor 30 causes the display 3 to display the message "DATA CHECKED OK REMOVE KEY" (step s12) and exit the data capture routine.

Referring to Figure 11, a special adapter unit 80 is provided for interfacing Data Capture Keys 81 to a personal computer 82. The adapter unit 80 is connected to a serial port of the computer 82 by a cable 83. A plurality of sockets 84 are provided on the adapter unit 80 for receiving Data Capture Keys 81. The computer 82 is programmed to access the EEPROMs of Data Capture Keys 81 plugged into the adapter unit 80 and read out the data stored therein.

The data read from the Data Capture Keys 81 is processed by the computer to produce management reports relating to the levels of use of various handwash stations and their configurations. The self-test data is used to determine whether persons-in-charge are checking the handwash stations for which they are responsible. The service data can be used to ensure that service calls are being attended to and to identify rogue handwash stations subject to persistent or repeated faults.

Claims

1. A handwash station comprising a controllable soap dispensing means, a controllable water dispensing means, a counter means for counting handwashes, sensor means for detecting a hand in using relation to the station and a control means operable to control the soap and water dispensing means according to a predetermined cycle, the cycle including at least a soap dispensing step and a rinsing water dispensing step, wherein the counter means is incremented following a last rinsing step of the cycle if the sensor means has detected a hand at the start of each of the soap and water dispensing steps.

2. A handwash station according to claim 1, wherein said cycle includes two soap dispensing steps.

3. A handwash station according to claim 1 or 2, including memory means wherein the control means is operable to store periodically a count of handwashes completed in a predetermined period.

4. A handwash station according to claim 1, 2 or 3, including a visible or audible warning means, wherein the control means operates the warning means when a user should place his hand or hands so as to be detected by the sensor means.

5. A handwash station comprising data collection means, wherein the data collection means is operable to store periodically a count of handwashes completed in a predetermined period.

6. A handwash system comprising a handwash station having control means for controlling the operation of the station and communication means, and a

portable programming unit having user input means and communication means for communicating with the communication means of the station, wherein, when the communication means are in operative relation, the control means is responsive to operation of the user input means to establish a handwashing program for the station.

7. A system according to claim 6, the communication means cooperate to provide an electrical connection between the station and the programming unit for the supply of power to the programming means from the station.

8. A system according to claim 6 or 7, wherein the station includes a display and the control means is responsive to the programming unit to cause the display to display instructional or informational matter in dependence on the operation of the user input means so as to provide for the interactive establishment of a handwashing program.

9. A system according to claim 6, 7 or 8, comprising a portable code storing unit wherein the communication means of the station is operable to read a code from the portable code storing unit.

10. A system according to claim 9, wherein the station is responsive to a predetermined code being read from the portable code storing unit to perform a self-test routine.

11. A system according to any one of claims 6 to 10, including a data transmission means for conveying data from the station's communication means to a remote station, wherein the station includes data logging means for logging handwashes carried out using the station and said transmission means is operative to send logged data to the data transmission means.

12. A system according to claim 11, including encryption means for encrypting logged data for transmission.

13. A system according to claim 11 or 12, wherein the data transmission means comprises a transmission line.

14. A system according to claim 11 or 12, wherein the data transmission means comprises a portable data carrier.

15. A system according to claim 14, wherein the portable data carrier comprises a portable computer.

16. A system according to claim 14, wherein the portable data carrier comprises a memory, configured to be written to by said communication means.

17. A system according to any one claims 6 to 16, wherein the handwash station is in accordance with any one of claims 1 to 5.

18. A method of monitoring handwashing activity comprising the steps of:

determining whether a hand is in position to receive soap at a soap dispensing step;
thereafter, determining whether a hand is in a position to receive rinsing water at a rinsing step; and
incrementing a handwashes counter if a hand is determined to be in position at both the soap dispensing and rinsing steps.

19. A method according to claim 18, comprising the additional, preliminary steps of:

determining whether a hand is in position to receive soap at a preliminary soap dispensing step;
thereafter, determining whether a hand is in a position to receive rinsing water at a preliminary rinsing step.

20. A method according to claim 18 or 19, including the step of periodically storing a differential handwash count.

21. A method according to claim 20, including the step of communicating said stored counts to a central station.

22. A method according to claim 21, wherein a handwash station ID code is communicated to the central station with said stored counts.

23. A method according to claim 21 or 22, wherein communicated data encrypted before being dispatched.

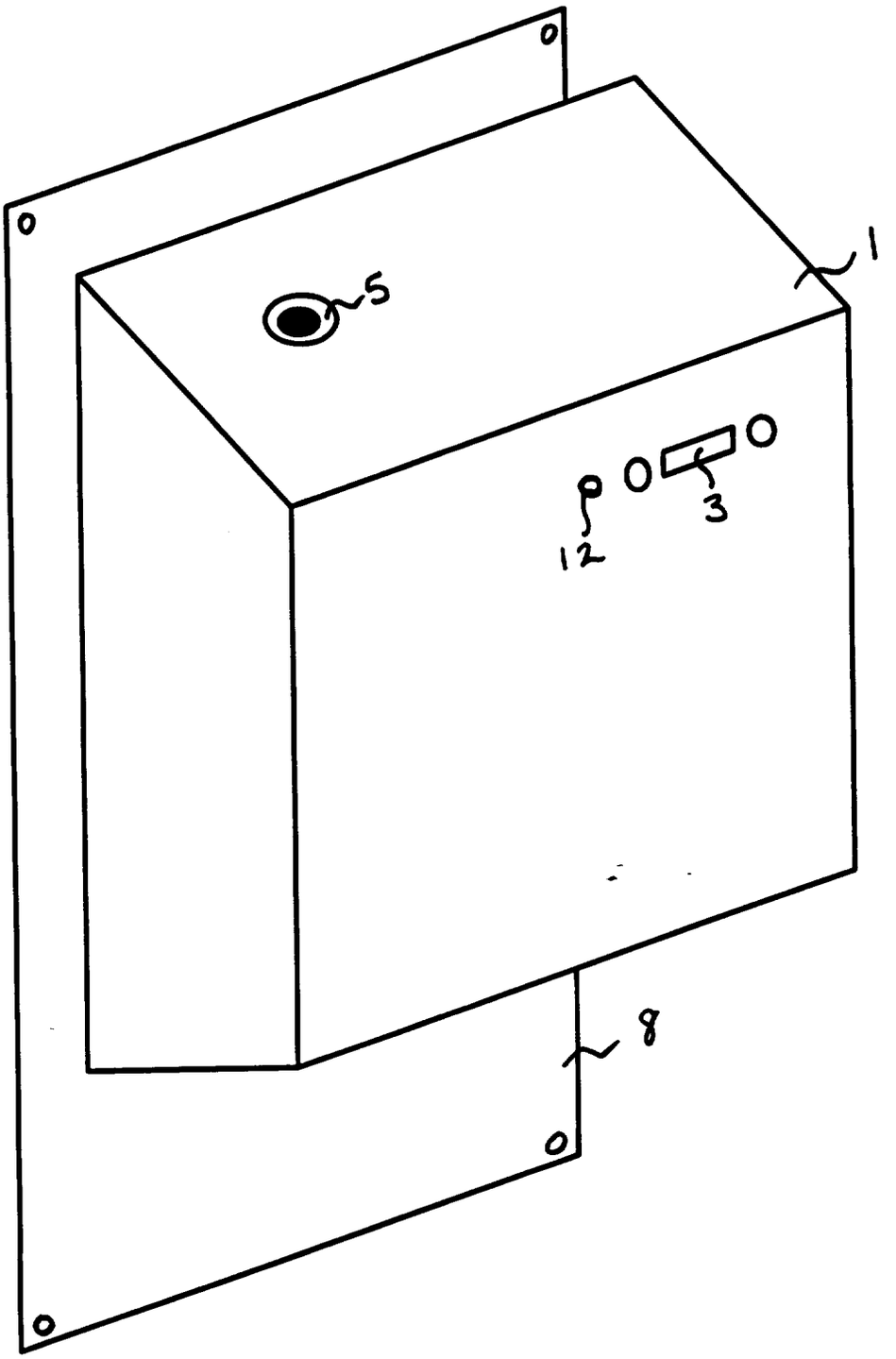


Fig. 1.

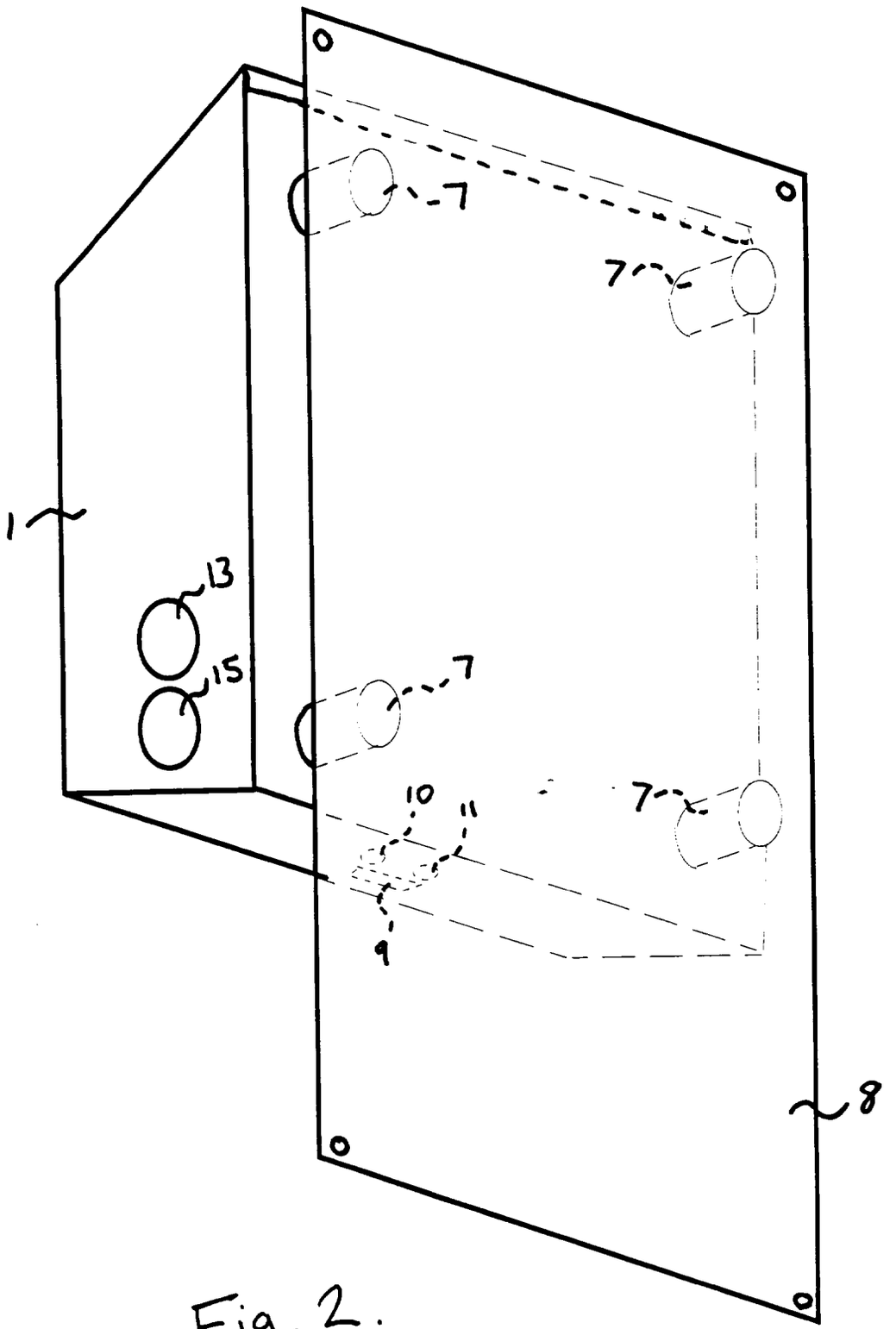


Fig. 2.

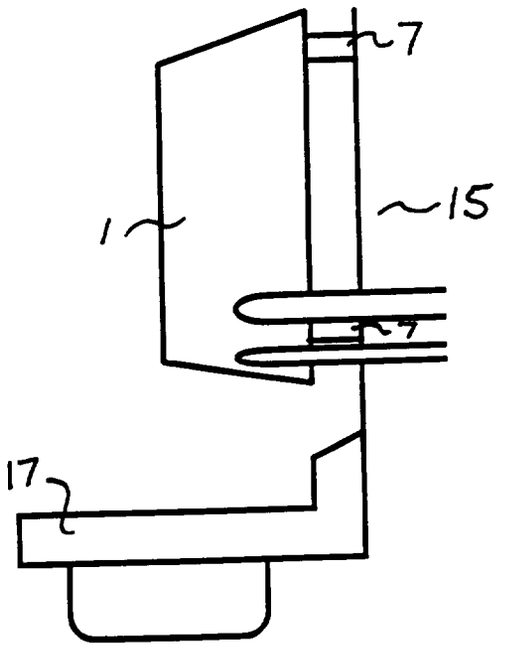


Fig. 3.

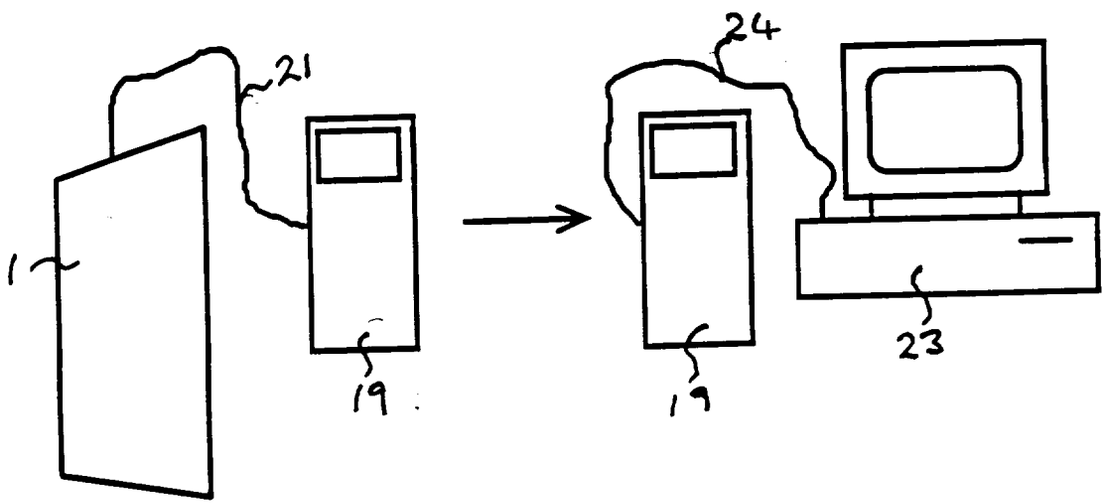


Fig. 6

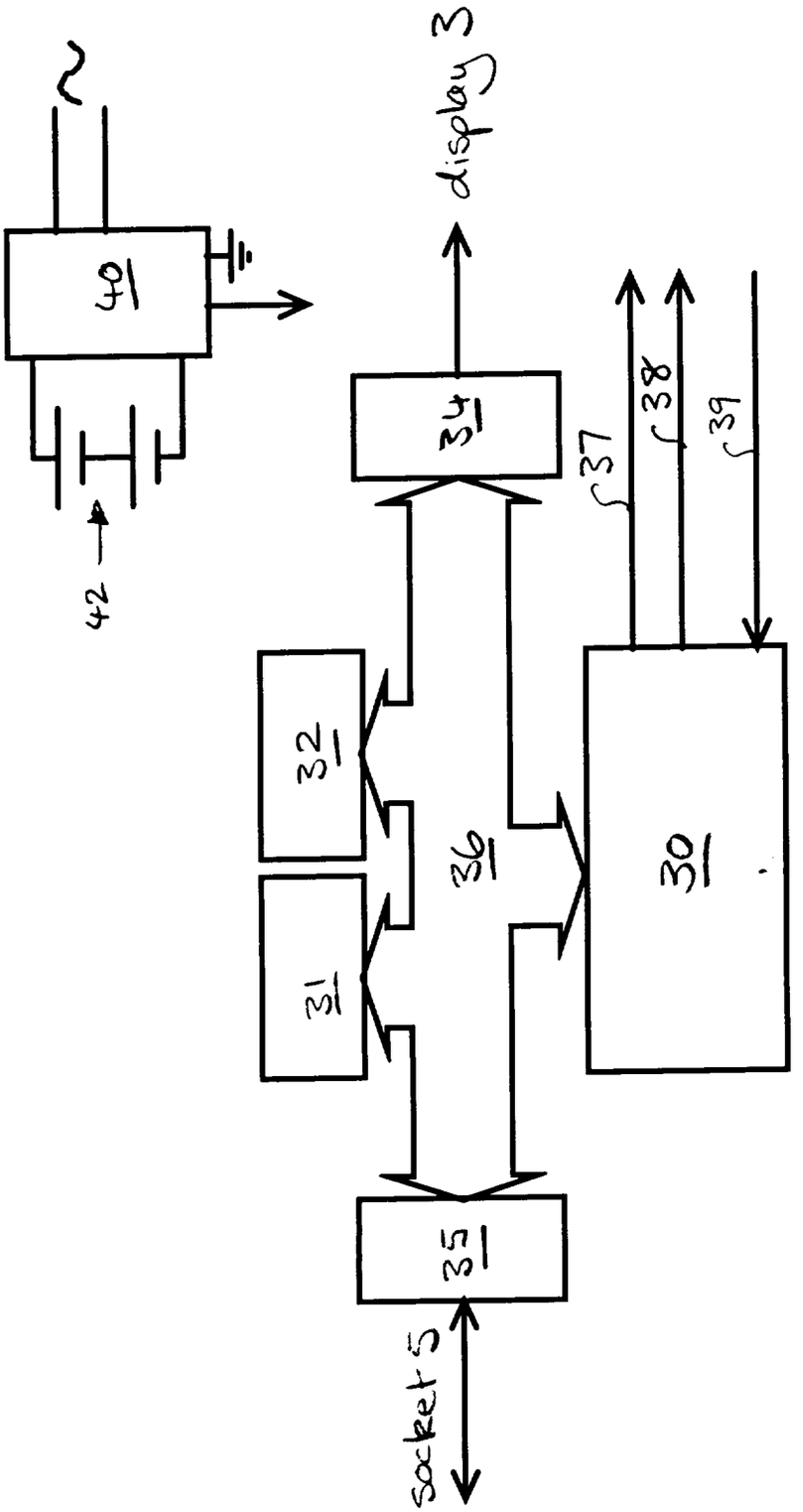


Fig. 4

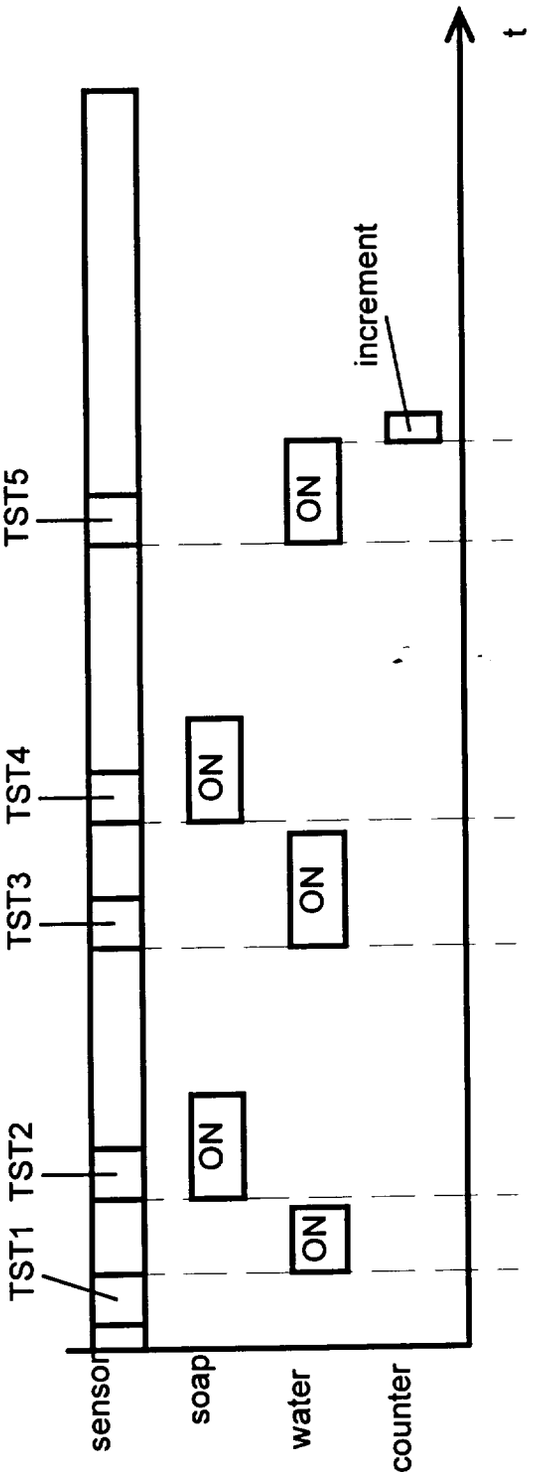

t
increment
TST5
TST4
TST3
TST2
TST1
ON
ON
ON
ON
ON
sensor
soap
water
counter

Fig 5

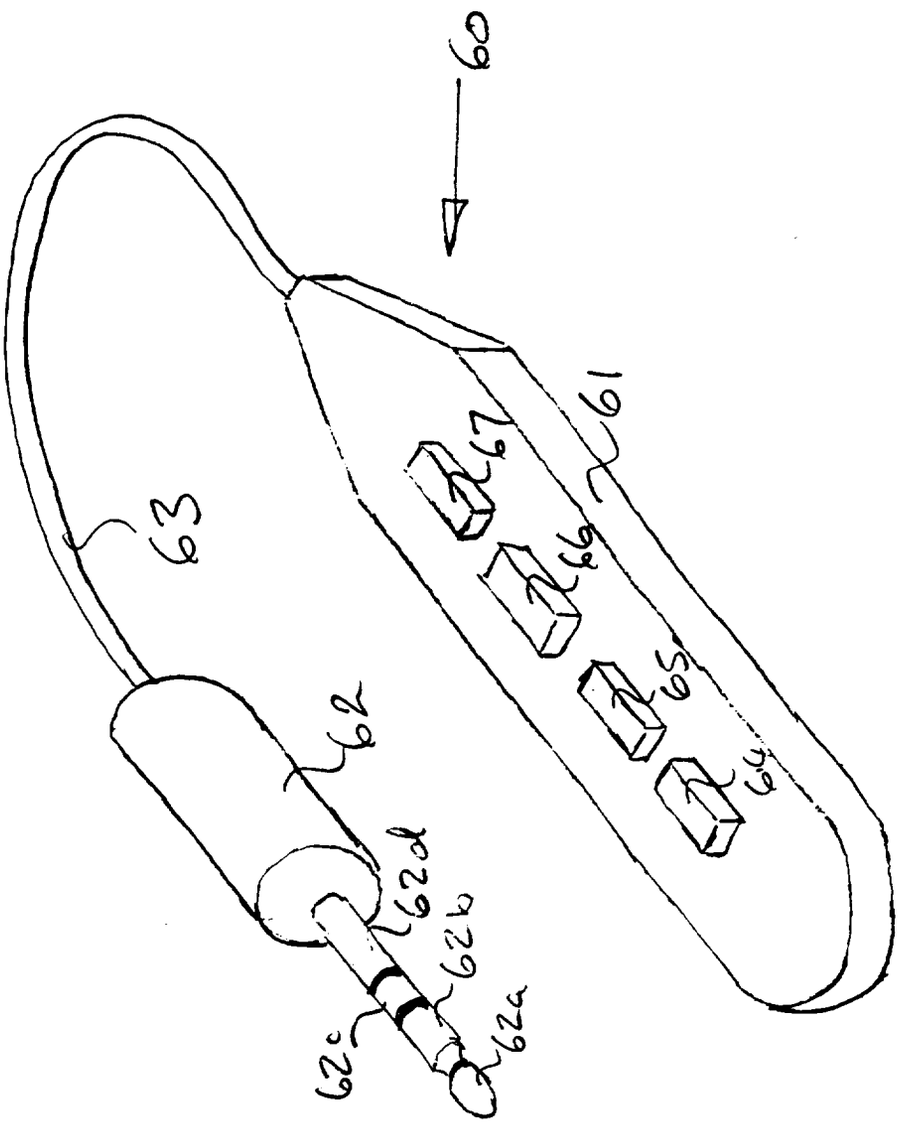


Fig. 7.

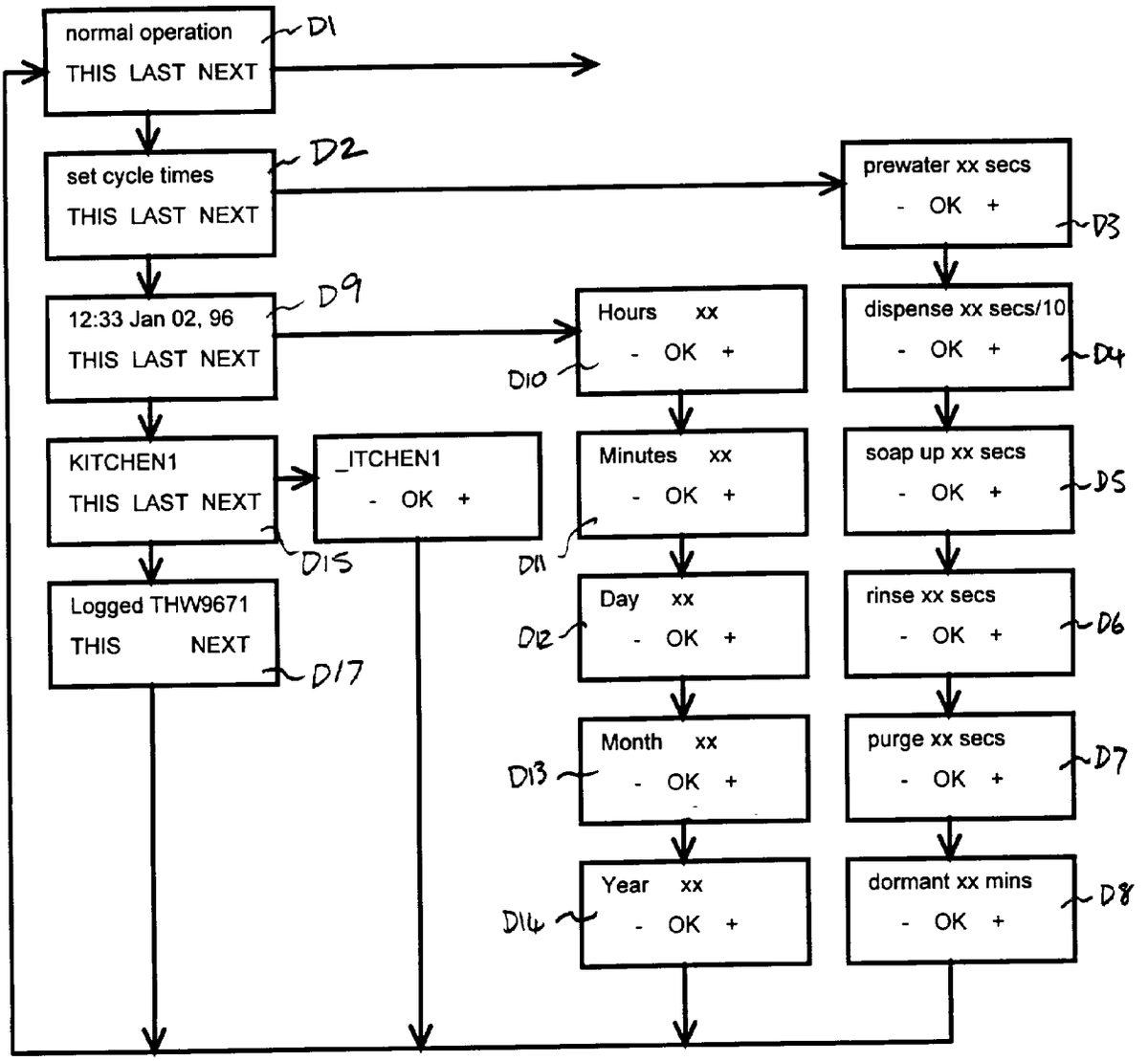

normal operation
THIS LAST NEXT
D1
set cycle times
THIS LAST NEXT
D2
prewater xx secs
- OK +
D3
12:33 Jan 02, 96
THIS LAST NEXT
D9
Hours xx
- OK +
D10
dispense xx secs/10
- OK +
D4
KITCHEN1
THIS LAST NEXT
D15
_ITCHEN1
- OK +
Minutes xx
- OK +
D11
soap up xx secs
- OK +
D5
Logged THW9671
THIS NEXT
D17
Day xx
- OK +
D12
rinse xx secs
- OK +
D6
Month xx
- OK +
D13
purge xx secs
- OK +
D7
Year xx
- OK +
D14
dormant xx mins
- OK +
D8

Fig. 8.

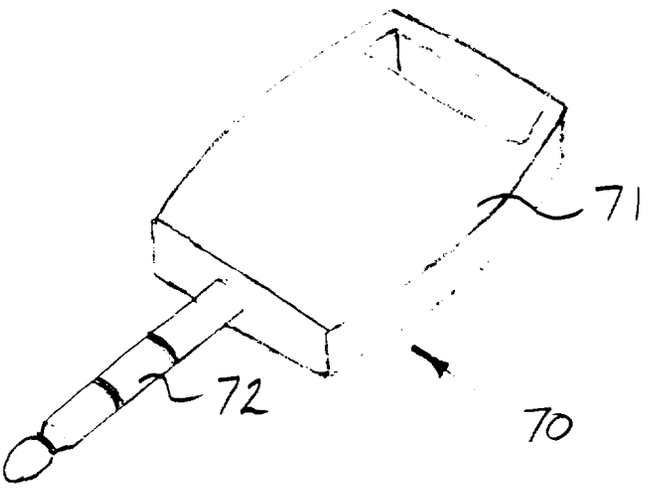


Fig. 9.

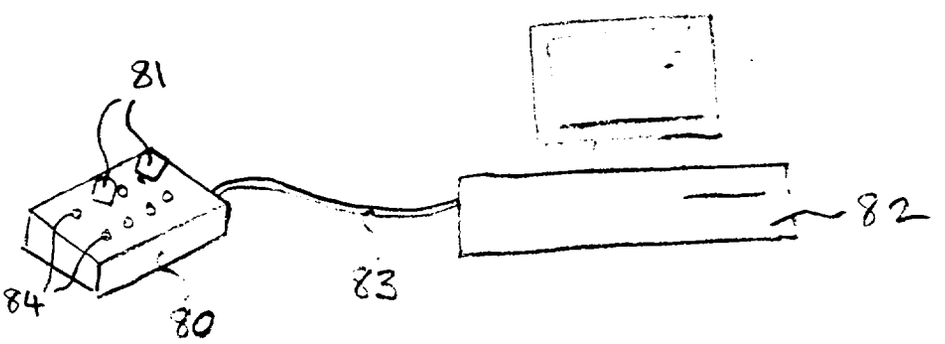


Fig. 11

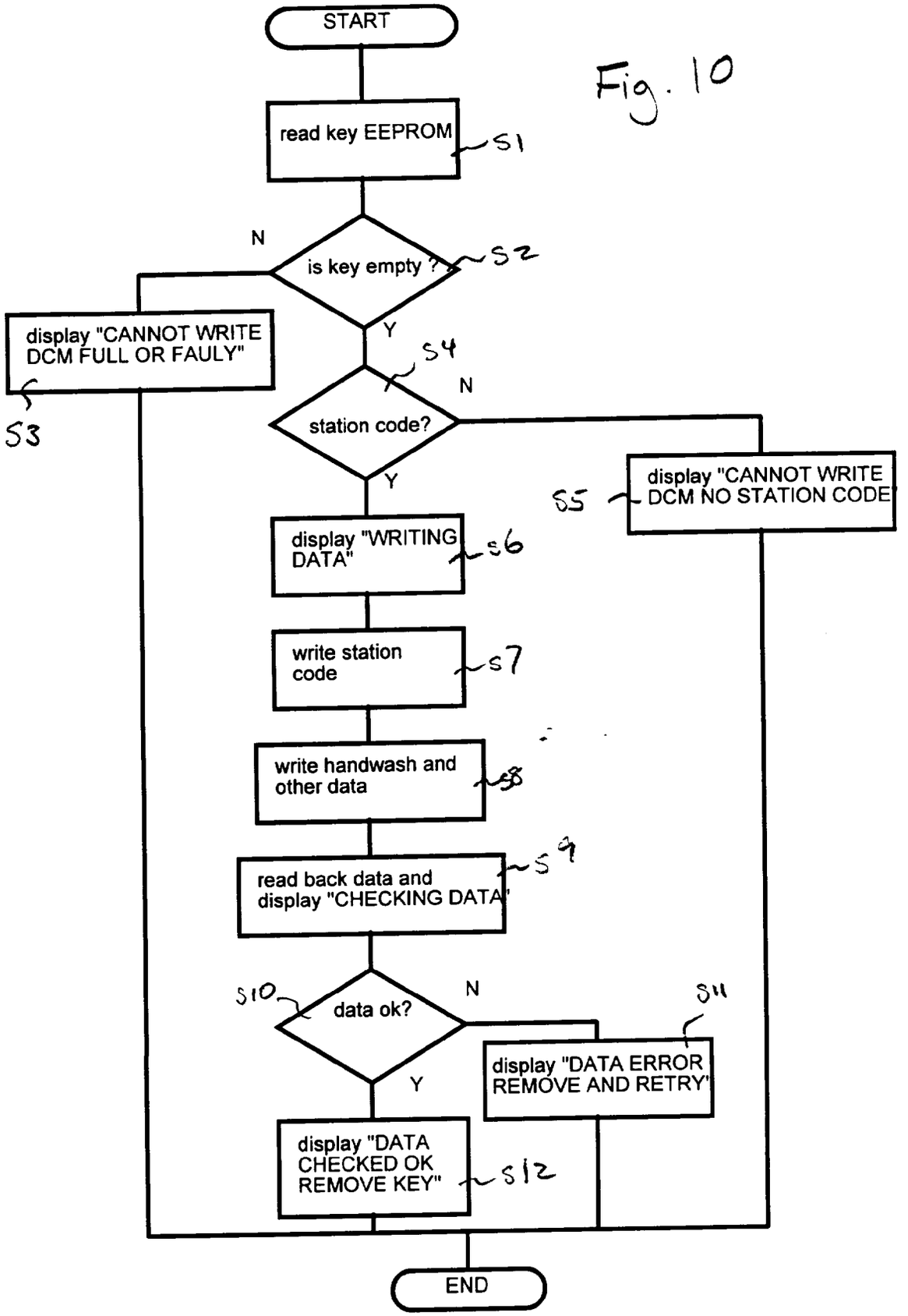

START
read key EEPROM
S1
is key empty ?
S2
N
Y
display "CANNOT WRITE DCM FULL OR FAULY"
S3
S4
station code?
N
Y
display "CANNOT WRITE DCM NO STATION CODE"
S5
display "WRITING DATA"
S6
write station code
S7
write handwash and other data
S8
read back data and display "CHECKING DATA"
S9
S10
data ok?
N
Y
S11
display "DATA ERROR REMOVE AND RETRY"
display "DATA CHECKED OK REMOVE KEY"
S12
END

Fig. 10

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 30 5780

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
D,X	WO-A-93 10311 (WASH N RINSE LTD) 27 May 1993	1,3,5	E03C1/05
A	* the whole document *	4,6-23	
A	US-A-5 217 035 (VAN MARCKE KAREL C) 8 June 1993 * the whole document *	1,18,19	
A	US-A-5 318 070 (SURABIAN EDWARD C) 7 June 1994 * the whole document *	1,18,19	
D,A	US-A-5 031 258 (SHAW DANIEL C) 16 July 1991 * the whole document *	1,18,19	
D,A	US-A-5 199 118 (COLE CHARLES K ET AL) 6 April 1993 * the whole document *	1,18,19	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

E03C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	21 November 1996	Verelst, P

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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