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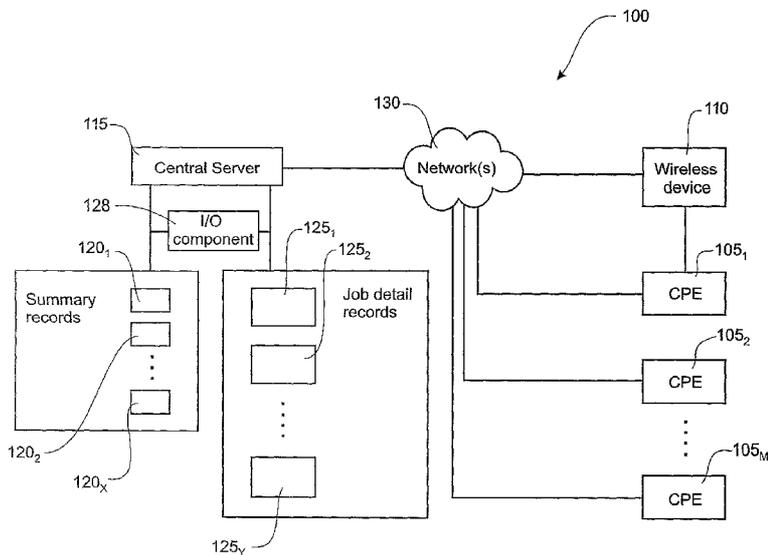
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(54) Title: UTILITY METER INSTALLATION SYSTEM AND METHOD



(57) Abstract: The invention provides a method of effecting a change to one or more utility meters at one or more customer premises. The method includes transmitting one or more job summary records from a central server to a wireless device operated by a utility meter installer; displaying at least part of the or at least one of the job summary records on the wireless device; accepting an installer selection of the or at least one of the displayed job summary records; transmitting one or more job detail records from the central server to the wireless device; effecting the change specified in the job detail record(s); modifying one or more of the job detail records; and transmitting one or more of the modified job detail records to the central server.

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## UTILITY METER INSTALLATION SYSTEM AND METHOD

## FIELD OF INVENTION

5 The present invention relates to a method and system for installing electrical equipment. More particularly but not exclusively the invention relates to a method and system for effecting a change to one or more utility meters at one or more customer premises.

## BACKGROUND OF INVENTION

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The installation, maintenance and repair of utility meters is a complex task. The task is required to be carried out by a skilled human installer. The installer requires a significant amount of data that is specific to an individual meter being removed, an individual meter being installed, and information about the customer for whom the operation has been performed and pricing information specific to that customer.

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The data required to be maintained is in most countries specified by regulatory requirements. Normal paper-based systems for capturing the required data are complicated, time-consuming and error prone.

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One method of providing such detailed information to an installer is by providing the installer with a handheld computing device that is in wireless communication with a central server. One problem with such an arrangement is that network coverage is not available in many of the customer premises in which an installer works. The information required by an installer to conduct a job at a customer premises is often not able to be transmitted in real time from the central server to the handheld device of the installer. A further problem is that the data recorded by the installer is not able to be transmitted to the central server resulting in a loss of accuracy and/or quality of data.

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A further disadvantage of simple techniques involving handheld computing devices is that such prior art techniques do not facilitate the required tests and capture of the necessary data. In some cases it is necessary to obtain test results that are specific to the type of installation, site certification number, seal number and so on. Prior art techniques do not address the need to obtain specific test results.

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It is an object of the present invention to provide an improved or alternative method for installing utility meters at a customer premises, or to at least provide the public with a useful choice.

## 5 SUMMARY OF THE INVENTION

The invention in one form provides a method of effecting a change to one or more utility meters at one or more customer premises, the method comprising transmitting one or more job summary records from a central server to a wireless device operated by a utility meter installer; displaying at least part of the or at least one of the job summary records on the wireless device; 10 accepting an installer selection of the or at least one of the displayed job summary records; transmitting one or more job detail records from the central server to the wireless device, the job detail records associated with respective selected job summary records; effecting the change specified in the job detail record(s); modifying one or more of the job detail records; and 15 transmitting one or more of the modified job detail records to the central server.

The term "comprising" as used in this specification and claims means "consisting at least in part of. That is to say, when interpreting statements in this specification and claims which include "comprising", the features prefaced by this term in each statement all need to be present but 20 other features can also be present. Related terms such as "comprise" and "comprised" are to be interpreted in a similar manner.

To those skilled in the art to which the invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the scope of the invention as defined in the appended claims. The disclosures 25 and the descriptions herein are purely illustrative and are not intended to be in any sense limiting.

## BRIEF DESCRIPTION OF THE FIGURES

The invention will now be described by way of example only and with reference to the drawings in which:

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Figure 1 shows a preferred form system in which the techniques described below can be implemented;

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Figure 2 shows a preferred form method for transmitting summary records and job detail records over the network of figure 1;

Figure 3 shows a preferred form method for recording details of utility meter installations; and

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Figure 4 shows a preferred form process for uploading job details to the central server.

## DETAILED DESCRIPTION

Figure 1 shows a preferred form system in which the techniques described below can be implemented. The system 100 includes a plurality of utility meters 105, ...<sub>M</sub>. Utility meters 105 are indicated generally as customer premises equipment or CPE. The utility meters monitor usage of a utility such as electricity, gas or water to a customer premises. Utility meters 105 are installed and maintained by a certified human installer. The installer is contracted or employed by a utility supplier to maintain the utility meters.

25 At least one of the human installers has control or at least access to wireless device 110. This wireless device 110 includes for example a personal digital assistant (PDA) capable of both wireless and wireline communication with other entities. The wireless device typically has a display screen, a processing module or CPU and a storage component.

30 System 100 further includes a central server or similar that is operated by a utility sendee provider. The central server 115 has stored on it or at least has access to data records representing utility meters 105 that are installed at customer premises. As will be described further below the central server transmits both summary records 120, ...<sub>x</sub> and job detail records 125, ...<sub>y</sub>. Central server 115 manages summary records 120 and job detail records 125 through  
35 I/O component 128.

The central server 115 and wireless device 110 are configured to transmit summary records 120 and job detail records 125 over network or networks 130. As shown in Figure 1, central server 115 and utility meters 105 are configured to transmit data between themselves also over network 130.

Figure 2 illustrates one preferred form method for transmitting both summary records and job detail records from the central server 115 to the wireless device 110.

10 The installer is optionally offered the capability of entering on the wireless device 110 one or more search criteria. It is envisaged that the search criteria will include street name, suburb, ICP number and/or job number. An ICP number identifies an electricity connection point and is a unique identifier across New Zealand for a particular utility meter installation. The installer enters 205 one or more search criteria into the wireless device.

15 The search criteria are matched at the central server against a series of job records. Of those job records that match the search criteria entered at the wireless device, summary records of those job records are transmitted 210 from the central server 115 to the wireless device 110.

20 The search results are displayed 215 on the display associated with the wireless device 110. It is envisaged that up to 20 individual jobs will be shown at any one time on the wireless device. It will be appreciated that the number of jobs able to be shown at a particular time is a configurable number and depends at least partly on the size of the display associated with the wireless device. It is envisaged that at least the address, ICP number and job number will be displayed on the 25 wireless device.

Also displayed could be the customer name, a job type, a controller type, and a user identifier. The job type specifies the nature of the job to be performed by the installer. This could include installing a utility meter, upgrading a utility meter, attending to a fault, removing a meter, 30 installing a prepay system and so on. The controller type specifies the manner in which the utility meter is configured to communicate with wireless device 110 and central server 115. This could include for example RF mesh or GSM. The user identifier specifies the first installer, if any, that has downloaded the job.

It is envisaged that at least some of the job records 120 and/ or 125 include a job completion status indicator. This status indicator specifies whether a job has not yet been started, is in progress or is completed. It is envisaged that some filtering of summary records is performed at the central server so that the summary records transmitted to the wireless device include only jobs that have been assigned to the organisation to which the installer belongs and those jobs which have a status of in progress.

From the list of summary records displayed on the wireless device 110, the installer selects one or more jobs to download. It is envisaged that a maximum number of jobs able to be downloaded at one time is set to 20 although it will be appreciated that this number is a configurable number and able to be changed.

Before job details records are transmitted to the wireless device, at least one pre download task is performed. One such pre download task is to transmit wireless device configuration information from the central server 115 to the wireless device 110. This configuration data includes display locations, utility meter locations and other information.

It is expected that the wireless device configuration information only changes occasionally. For this reason it is only necessary to transmit this data from the central server to the wireless device once per day. The installer will generally download the configuration data prior to jobs being downloaded for the first time on any given day.

A further possible pre download task is to delete old jobs. Wireless device 110 transmits a first set of one or more job numbers or job number identifiers. This first set of job number identifiers represents jobs that have not yet been started. As will be described below, as jobs are completed or partially completed, job detail records are changed to represent progress on individual jobs. Jobs that have not been started do not have modified job detail records.

The central server 115 transmits a second set of one or more job number identifiers from the central server 115 to the wireless device 110. This second set of job number identifiers represents a subset of the first set of job number identifiers. The job detail records associated with these job number identifiers have a job completion status of other than "in progress". This includes job detail records that have the status "completed" or "not started".

The job detail records represented by the second set of job number identifiers are then deleted from the wireless device.

Once the above pre download tasks have been performed, the job detail records for the job or jobs selected by the installer are then transmitted 235 from the central server to the wireless device. If this is the first time that a job has been transmitted to a wireless device, then the user identifier of the installer operating the wireless device is recorded in the job record stored in the central server. This means that that job is not sent to other installers on the same or subsequent days.

Figure 3 illustrates one preferred form method for recording details of utility meter installations. The installer has selected a job detail record and this job detail record is displayed 305 on the wireless device. Typical details displayed include job number, installation type, job type, address, customer name, phone number and so on.

The installer decides whether or not to accept the job 310. If the installer does not accept the selected job *the* installer selects 315 another job detail record.

If the installer accepts the job the installer removes the existing or old equipment at the customer premises. The installer records 320 details of this removed equipment, for example the owner and serial number of each meter, in the wireless device.

The wireless device then displays 325 metering configuration. One way of displaying this information is a drop down list of rate prices for a particular utility. The installer selects an appropriate rate from the drop down list. Once the installer has selected a rate price, the wireless device displays further metering configuration details, for example, the number of meters to install, the type of meters to install, the configuration of each meter and so on.

Details are then recorded 330 of the installed equipment in the wireless device. In one embodiment the serial number of each new meter is scanned. The serial number of each meter is compared with a list of serial numbers stored in the wireless device for validation. If the new serial number scanned matches a serial number in the list then validation fails. It is envisaged that the wireless device includes a purge function to purge all serial numbers scanned earlier than a predetermined time period where necessary to save space.

Using a wired or wireless connection to the utility meter, the wireless device initialises 335 a controller within the meter. The initialisation data is linked to the rate product selected by the installer.

- 5 The wireless device checks 340 the controller to ensure that it is functioning correctly. If the controller is not functioning correctly steps 325 to 340 are then repeated.

If the controller is functioning correctly the installer updates 345 the job detail record with the job type, any site hazards, access notes, test data and certification data.

10

If network coverage is available, the updated job detail record or records is/are transmitted 350 back to the central server. The transmission step is conducted at the customer premises site if network coverage is available. The benefit of doing the transmission at this point is that if there are any serial number validation issues at the central server side, then the installer will be alerted 15 to these issues while still at the customer site and is able to take corrective action at that time.

If the installer chooses not to upload the job details at the end of the installation, or if there is no network coverage, then the job detail records are uploaded once the wireless device is back within network coverage, or when specified by the installer.

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Figure 4 shows a preferred form process for uploading job details to the central server. An "upload job details to server" option is preferably made available to the installer on the wireless device. If selected by the installer, all jobs stored on the wireless device for which the meter has been installed but the data has not yet been uploaded is then transmitted 405 to the central 25 server. The information transmitted includes the number of meters installed at a customer site, serial numbers and other data.

As each job detail record is transmitted to the central server, validation is performed 410 against the serial numbers in the job detail records. If any of the serial numbers provided or transmitted 30 to the central server do not match the serial numbers stored in the central server, then validation will fail. If any of the serial numbers have been used for previous jobs then validation will also fail.

If validation fails 415, an exception report is generated 420. One example of an exception report 35 is a notification to the wireless device of the installer that the job has not been closed together

with a reason for the lack of closure. A further example of an exception report is a daily report created by the central server that contains a list of all jobs not closed. This report can be transmitted to interested parties for action.

- 5 If validation fails for a job detail record, that job is suspended 425. The job can be resumed at a later date.

If validation performs successfully, the job is marked as closed 430 in the central server. The job detail records have already been transmitted to the central server. Closing the job involves the  
10 central server setting a flag indicating that the job is now closed.

The foregoing describes the invention including preferred forms thereof. Modifications and improvements as would be obvious to those skilled in the art are intended to be incorporated in the scope hereof, as defined by the accompanying claims.

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## WHAT WE CLAIM IS:

1. A method of effecting a change to one or more utility meters at one or more customer premises, the method comprising:  
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transmitting one or more job summary records from a central server to a wireless device operated by a utility meter installer;  
10  
displaying at least part of the or at least one of the job summary records on the wireless device;  
accepting an installer selection of the or at least one of the displayed job summary records;  
15  
transmitting one or more job detail records from the central server to the wireless device, the job detail records associated with respective selected job summary records;  
effecting the change specified in the job detail record(s);  
20  
modifying one or more of the job detail records; and  
transmitting one or more of the modified job detail records to the central server.
2. The method of claim 1 where the job summary records and the job detail records include a job number identifier, and where job detail records that are associated with job summary records include the same job number identifier.
3. The method of claim 2 where the job detail records include a job completion status indicator.  
30
4. The method of claim 3 where the list of possible values for the indicator include "not started", "in progress" and "completed".
5. The method of claim 4 wherein the transmitted job summary records each have an associated job detail record having a job completion status of "in progress".  
35

6. The method of claim 5 further comprising:

5 transmitting a first set of one or more job number identifiers from the wireless device to the central server, the first set of job number identifiers representing job detail records for which changes have not been effected;

10 transmitting a second set of one or more job number identifiers from the central server to the wireless device, the second set of job number identifiers representing a subset of the first set of job number identifiers having an associated job detail record having a job completion status other than "in progress"; and

15 deleting the job detail records represented by the second set of job number identifiers from the wireless device.

7. The method of any one of the preceding claims where the job detail records include an installer identifier, the method further comprising the step of modifying the installer identifier of the job detail records on the central server for each job detail record transmitted to the wireless device.

8. The method of any one of the preceding claims where transmitting the job summary record(s) is performed following a query by the installer.

9. A system for effecting a change to one or more utility meters at one or more customer premises, the system comprising:

25 one or more job summary records maintained in computer memory;

30 one or more job detail records maintained in computer memory, the job detail records associated with respective selected job summary records;

a server configured to retrieve one or more job summary records from computer memory;

a wireless device configured to receive the or at least one of the retrieved job summary records over a network and to display at least part of the or at least one of the retrieved job summary records; and

5 a user input component configured to receive an installer selection of the or at least one of the displayed job summary records;

the server configured to receive the installer selection and to retrieve at least one job detail record from computer memory that corresponds to the installer selection; and

10 the wireless device configured to receive the or at least one of the retrieved job detail records, to receive modifications to the job detail record(s) from the user input component and to transmit the modifications to the server.

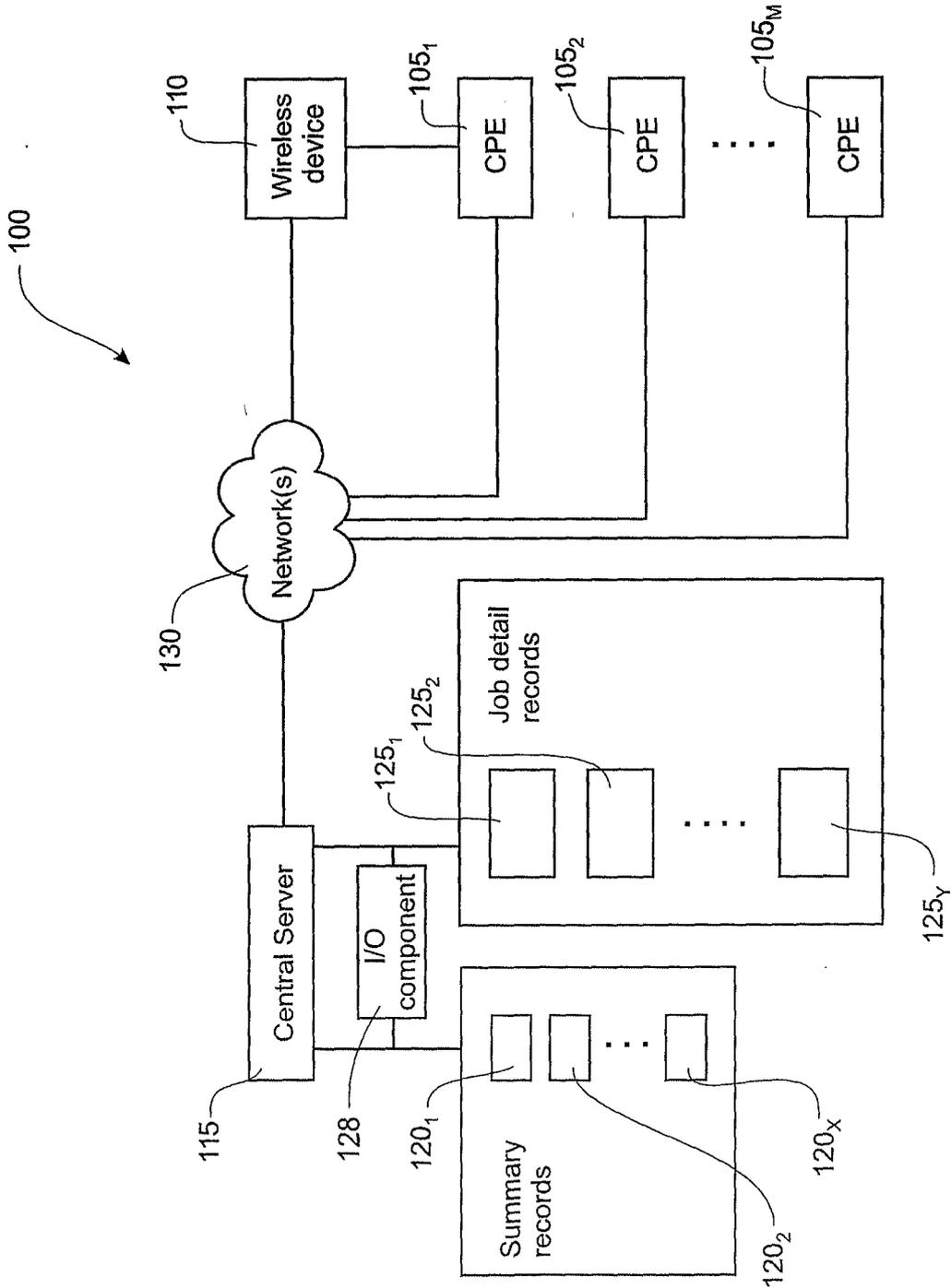
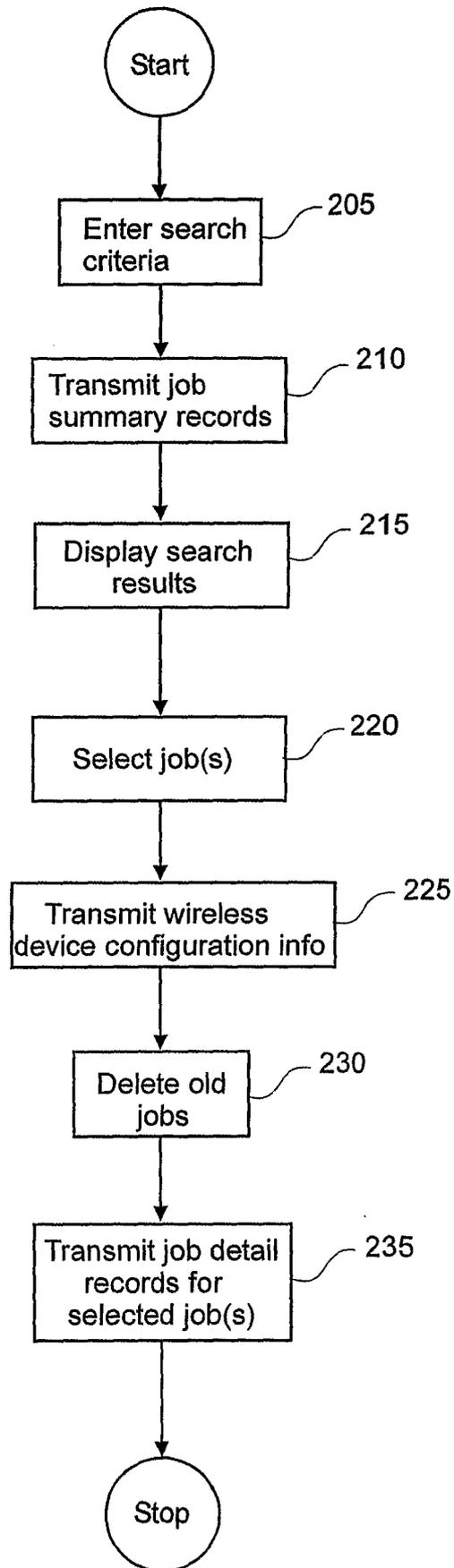


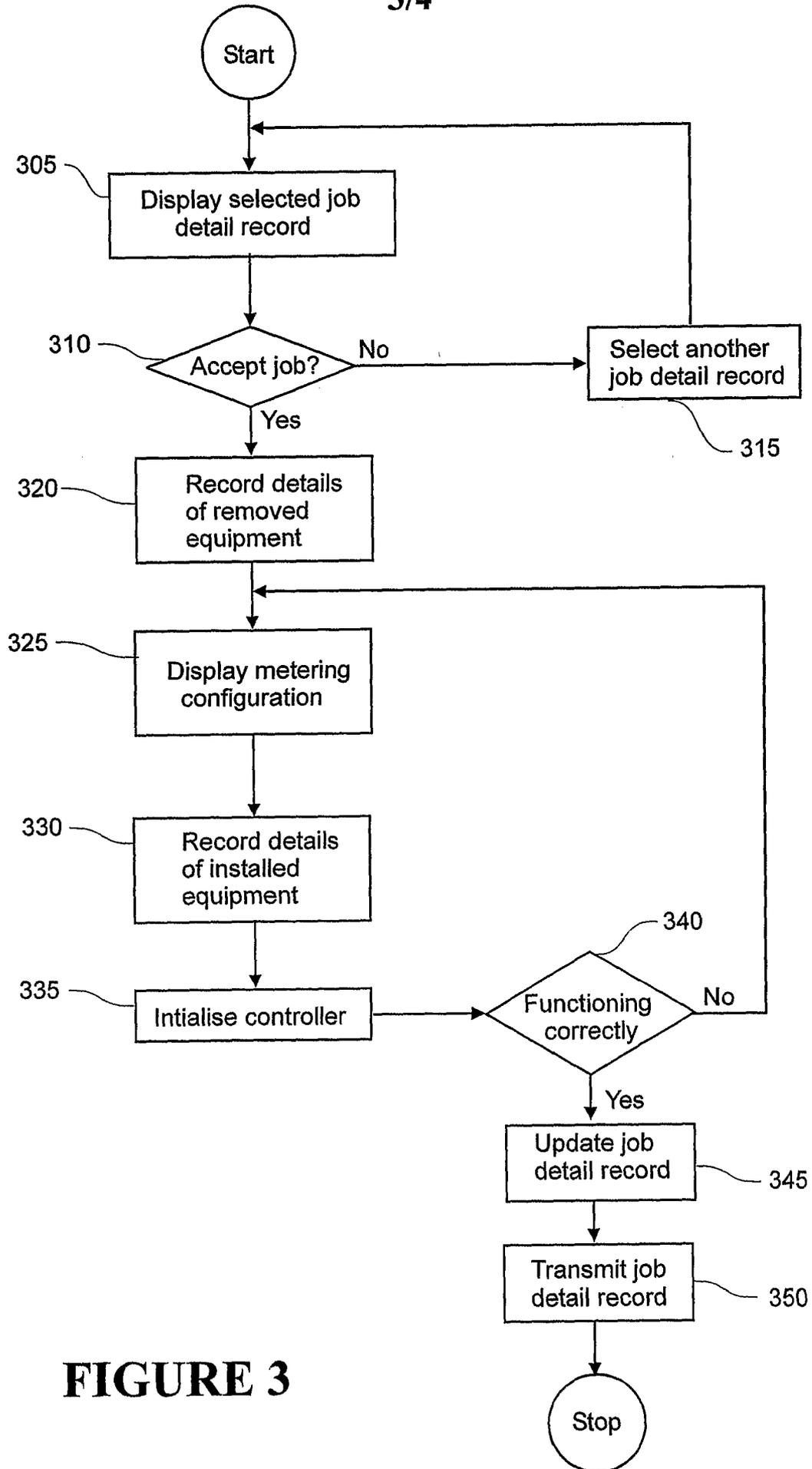
FIGURE 1

2/4



**FIGURE 2**

3/4



**FIGURE 3**

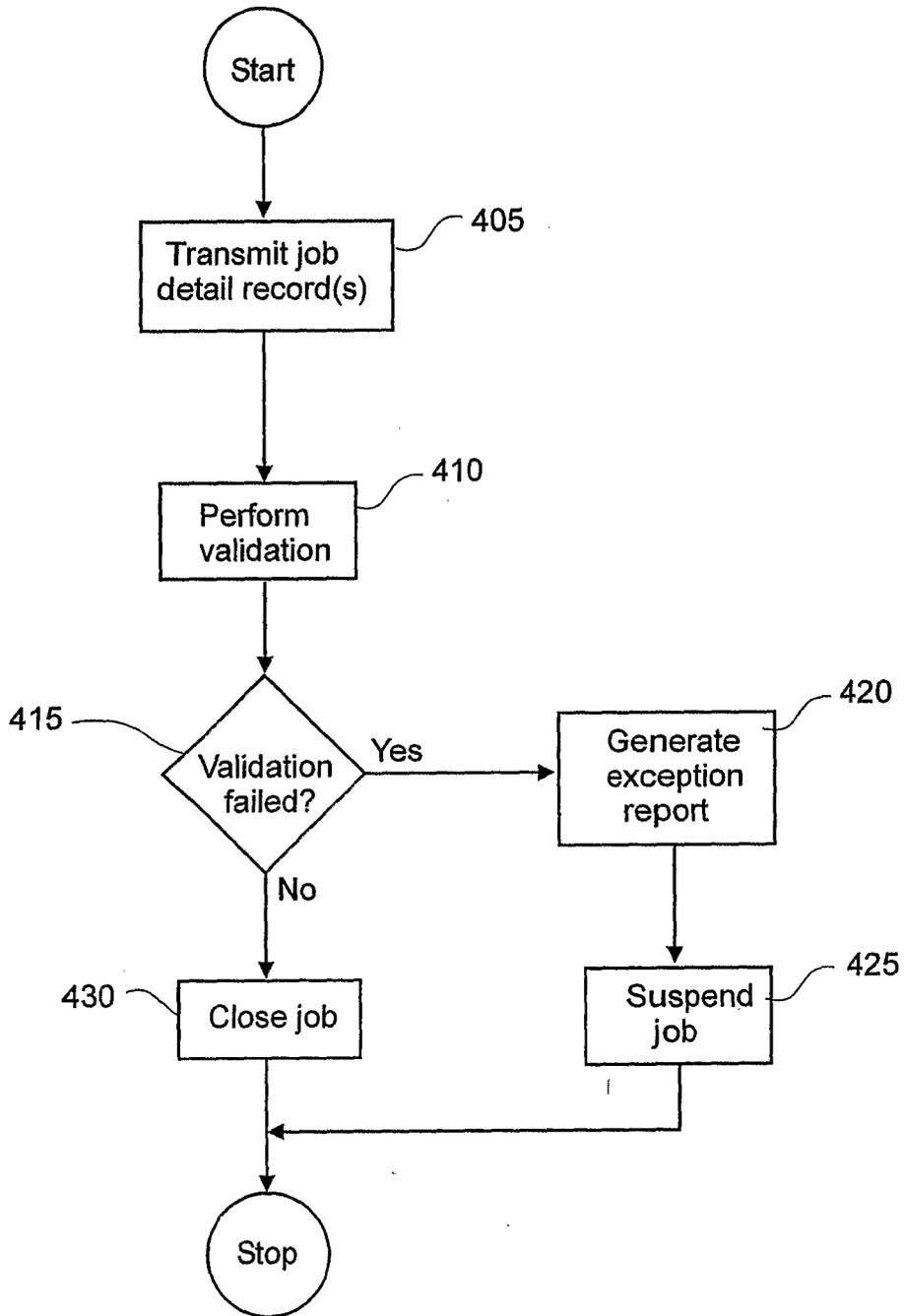


FIGURE 4