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(54) CONTROL APPARATUS FOR AVOIDING EQUIPMENT ABNORMALITY

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(57) ABSTRACT

When a job is executed in an image processing apparatus, a user is recognized by inputting a user ID from an operation unit. When an abnormality such as interferes with execution of the job occurs, data indicative of avoidance countermeasures for each user or each type of abnormality stored in a memory is referred to and the plural avoidance countermeasures are displayed sequentially from the one that is most frequently executed, and an optimum one is selected. After that, the frequency data for the selected avoidance countermeasure is renewed.

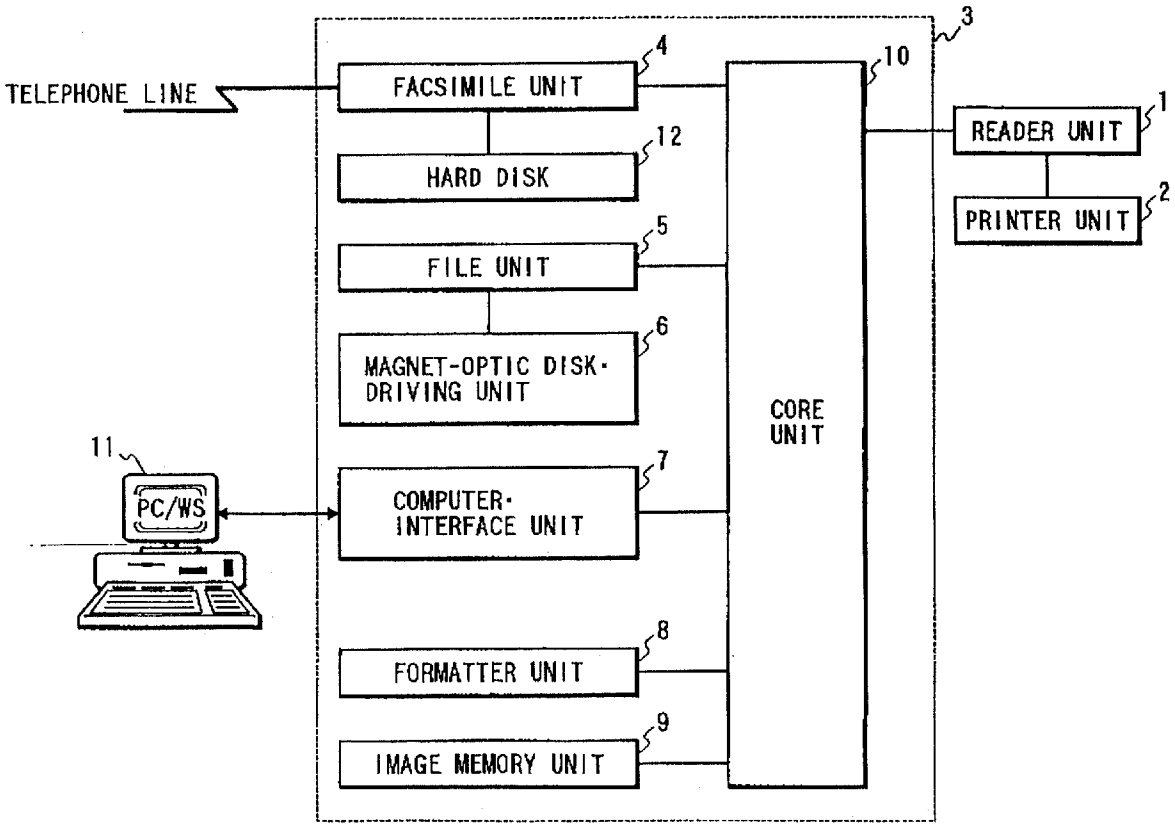


FIG. 1

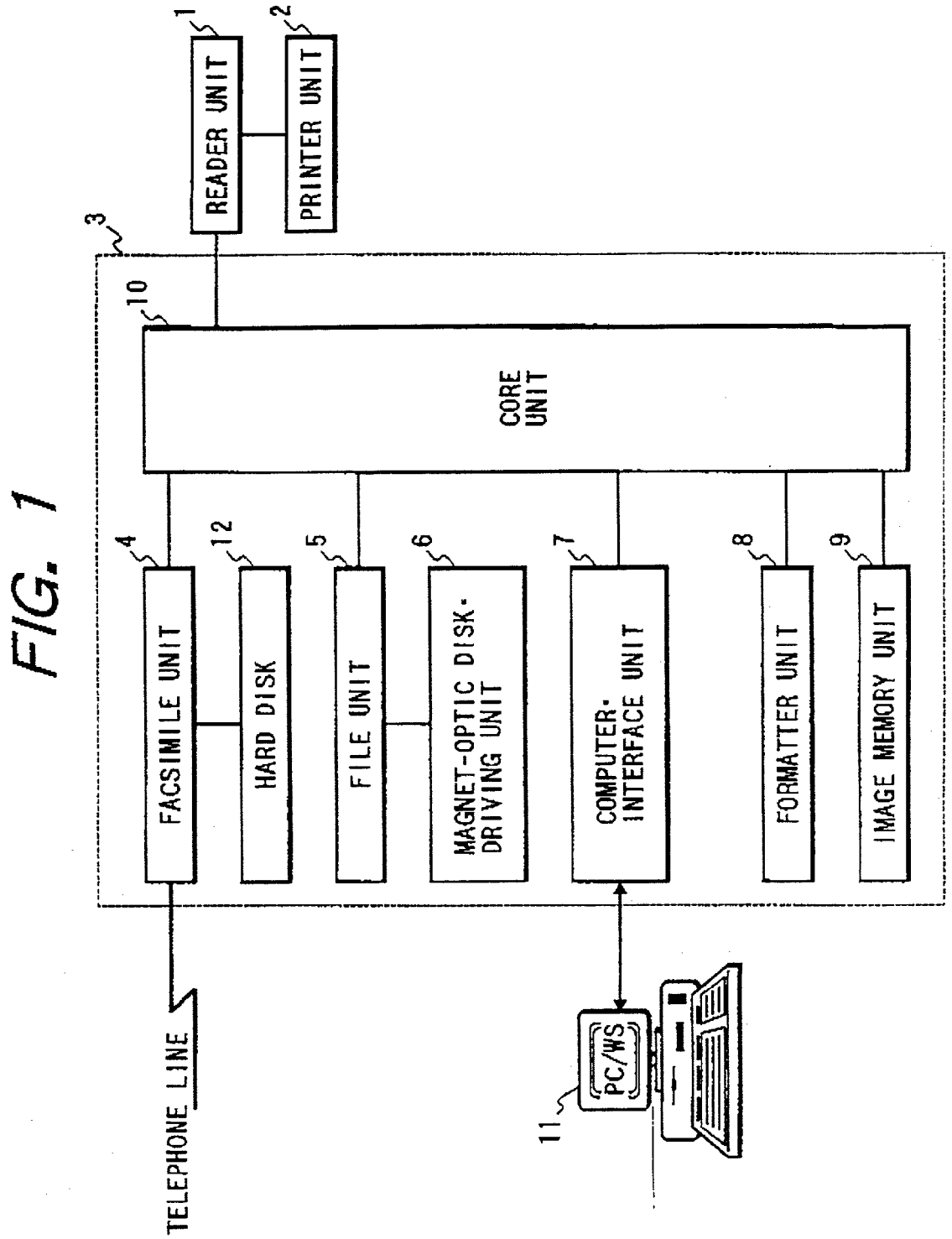

1
READER UNIT
2
PRINTER UNIT
3
10
CORE UNIT
4
FACSIMILE UNIT
12
HARD DISK
5
FILE UNIT
6
MAGNET-OPTIC DISK-DRIVING UNIT
7
COMPUTER-INTERFACE UNIT
8
FORMATTER UNIT
9
IMAGE MEMORY UNIT
TELEPHONE LINE
11
PC/WS

FIG. 2

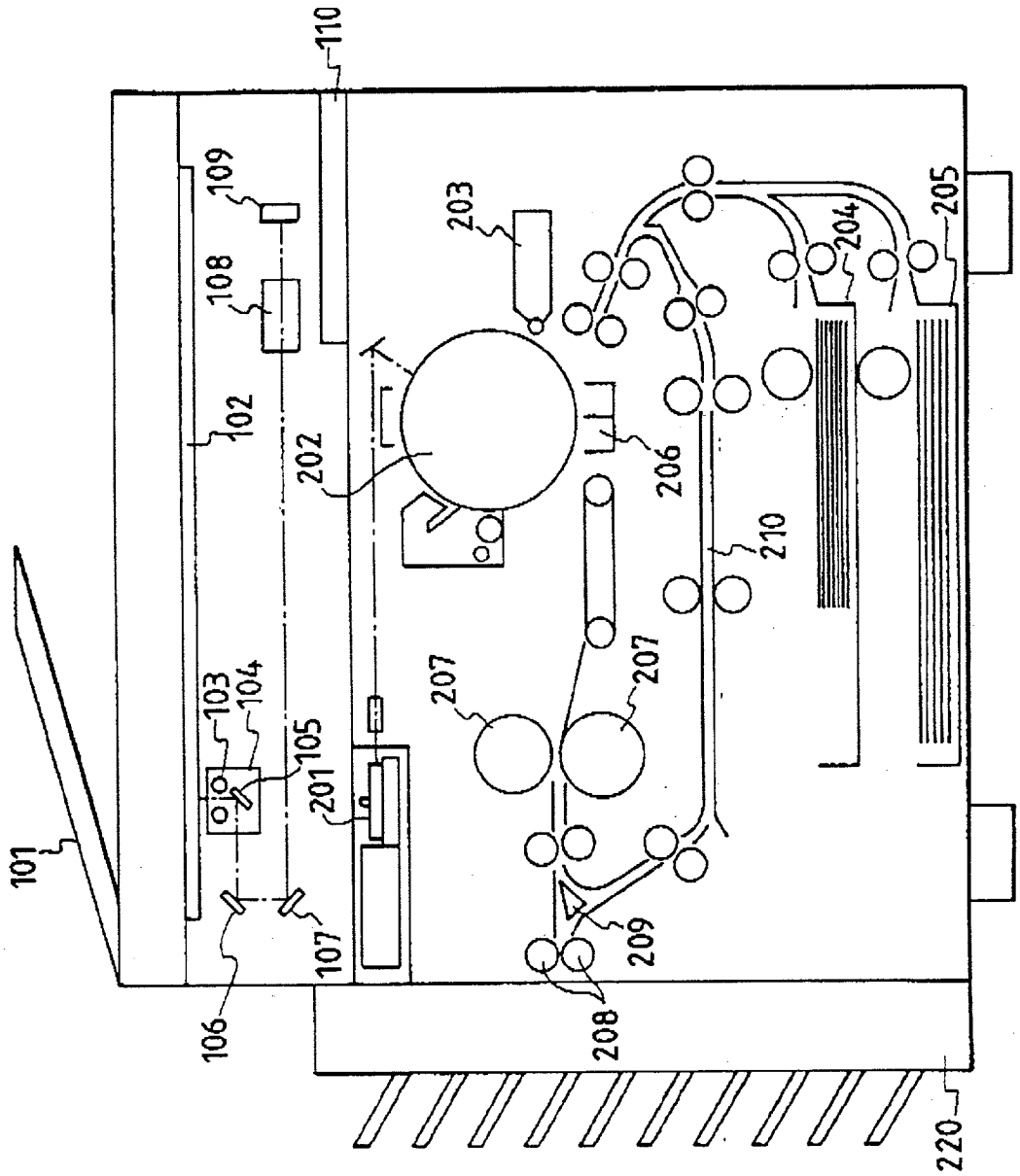

110
109
108
102
202
203
204
205
206
210
207
207
103
104
105
201
101
107
106
209
208
220

FIG. 3

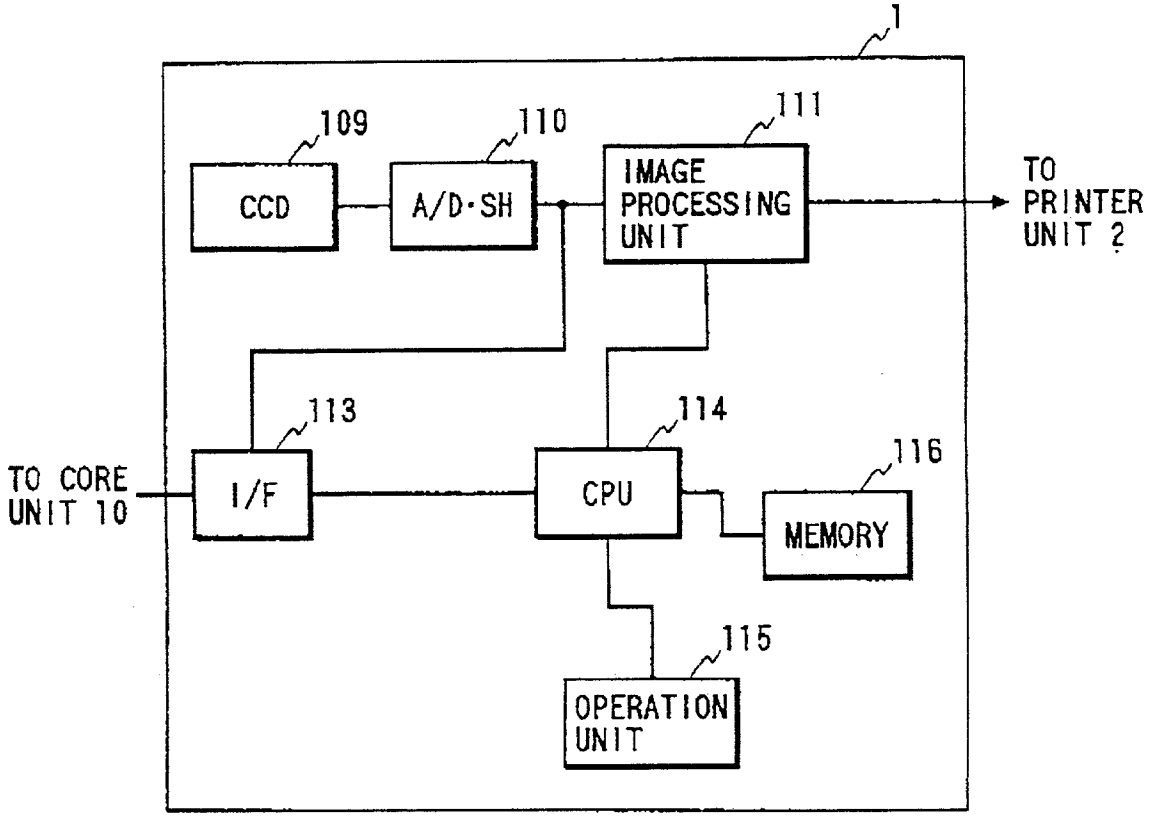

1
109
110
111
CCD
A/D·SH
IMAGE PROCESSING UNIT
TO PRINTER UNIT 2
113
114
116
TO CORE UNIT 10
I/F
CPU
MEMORY
115
OPERATION UNIT

FIG. 4

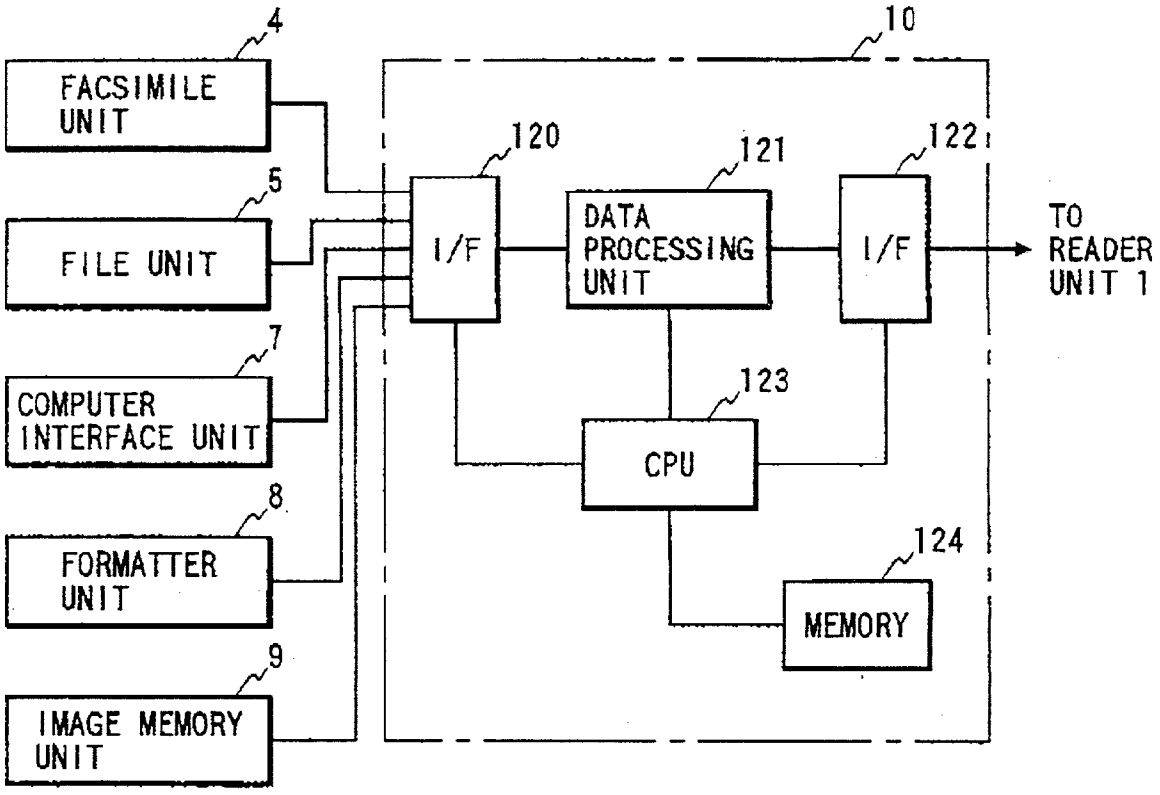

4
FACSIMILE UNIT
5
FILE UNIT
7
COMPUTER INTERFACE UNIT
8
FORMATTER UNIT
9
IMAGE MEMORY UNIT
10
120
I/F
121
DATA PROCESSING UNIT
122
I/F
TO READER UNIT 1
123
CPU
124
MEMORY

FIG. 5

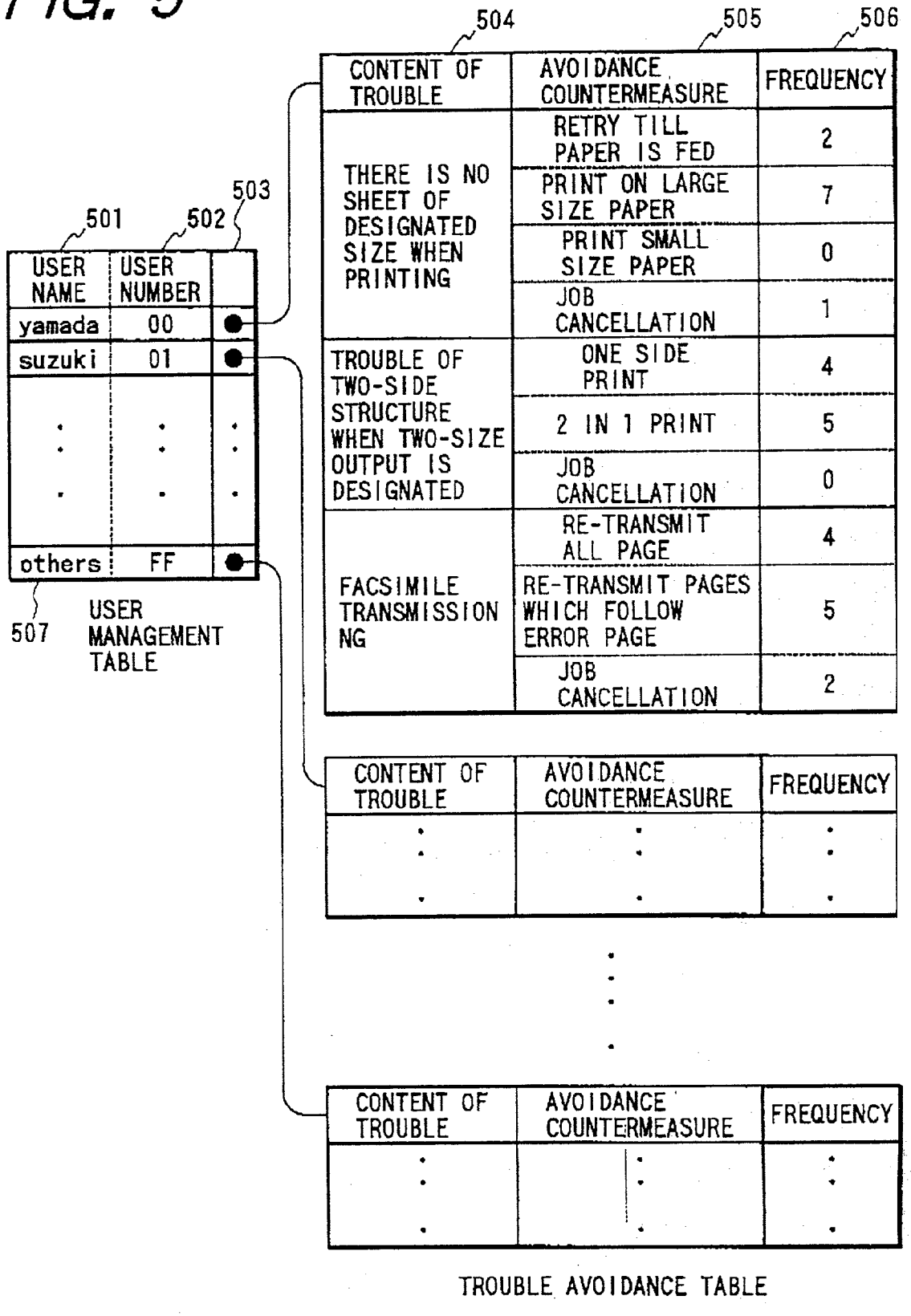

504
505
506
CONTENT OF TROUBLE
AVOIDANCE COUNTERMEASURE
FREQUENCY
THERE IS NO SHEET OF DESIGNATED SIZE WHEN PRINTING
RETRY TILL PAPER IS FED
2
PRINT ON LARGE SIZE PAPER
7
PRINT SMALL SIZE PAPER
0
JOB CANCELLATION
1
TROUBLE OF TWO-SIDE STRUCTURE WHEN TWO-SIZE OUTPUT IS DESIGNATED
ONE SIDE PRINT
4
2 IN 1 PRINT
5
JOB CANCELLATION
0
FACSIMILE TRANSMISSION NG
RE-TRANSMIT ALL PAGE
4
RE-TRANSMIT PAGES WHICH FOLLOW ERROR PAGE
5
JOB CANCELLATION
2
501
502
503
USER NAME
USER NUMBER
yamada
00
suzuki
01
others
FF
507
USER MANAGEMENT TABLE
TROUBLE AVOIDANCE TABLE

FIG. 6

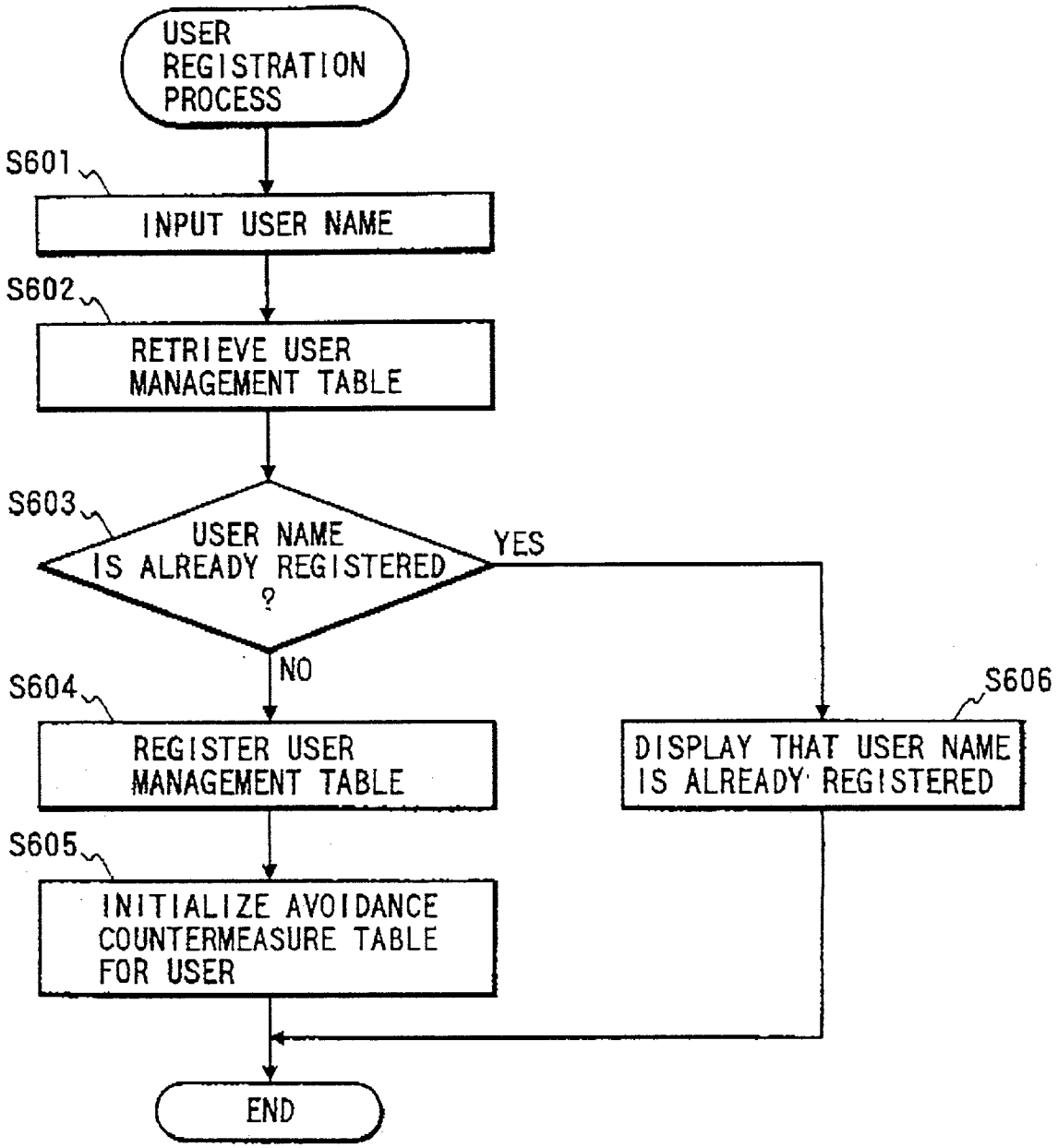

USER REGISTRATION PROCESS
S601
INPUT USER NAME
S602
RETRIEVE USER MANAGEMENT TABLE
S603
USER NAME IS ALREADY REGISTERED ?
YES
NO
S604
REGISTER USER MANAGEMENT TABLE
S605
INITIALIZE AVOIDANCE COUNTERMEASURE TABLE FOR USER
S606
DISPLAY THAT USER NAME IS ALREADY REGISTERED
END

FIG. 7

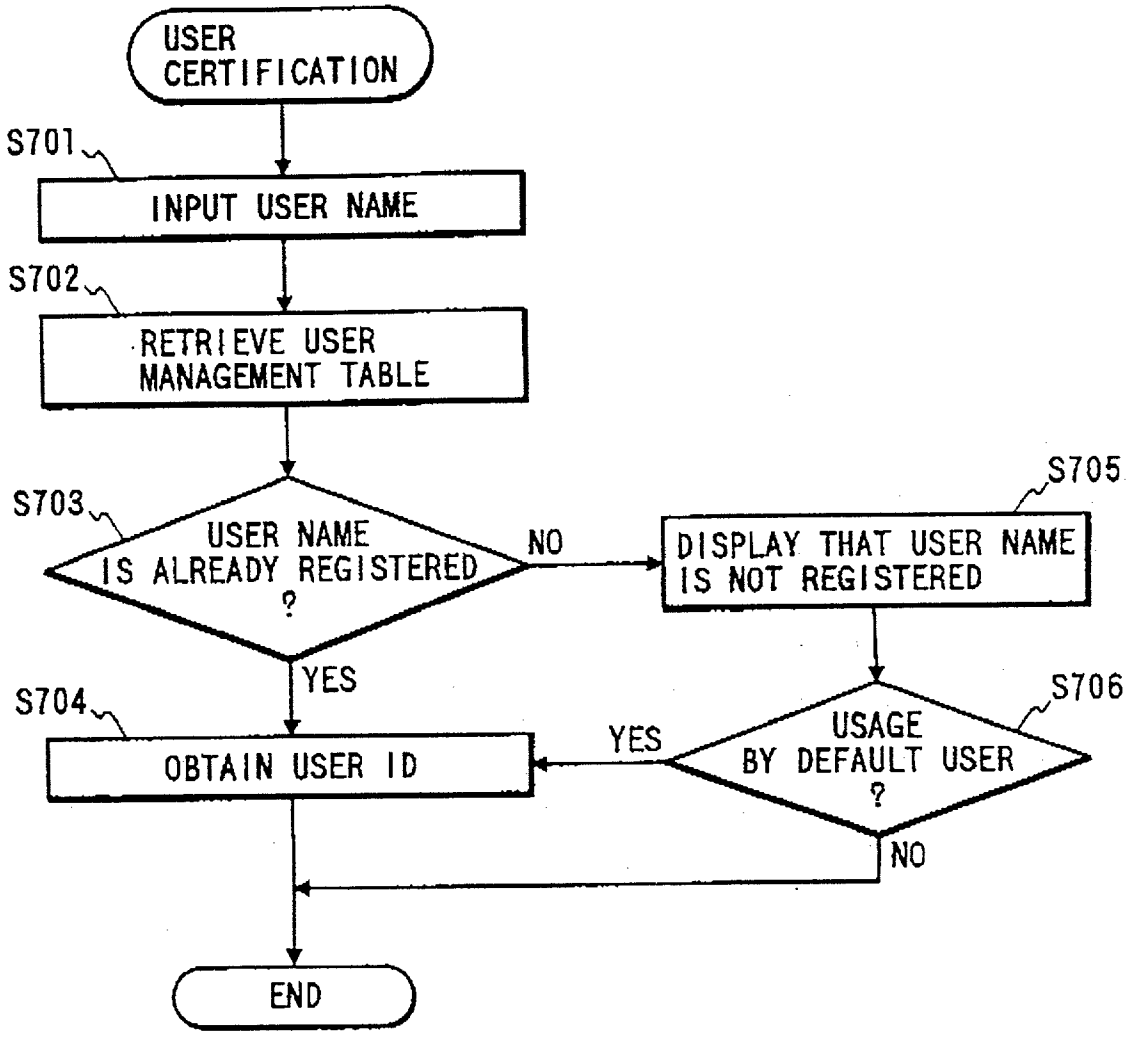

USER CERTIFICATION
S701
INPUT USER NAME
S702
RETRIEVE USER MANAGEMENT TABLE
S703
USER NAME IS ALREADY REGISTERED ?
NO
S705
DISPLAY THAT USER NAME IS NOT REGISTERED
YES
S704
OBTAIN USER ID
YES
S706
USAGE BY DEFAULT USER ?
NO
END

FIG. 8

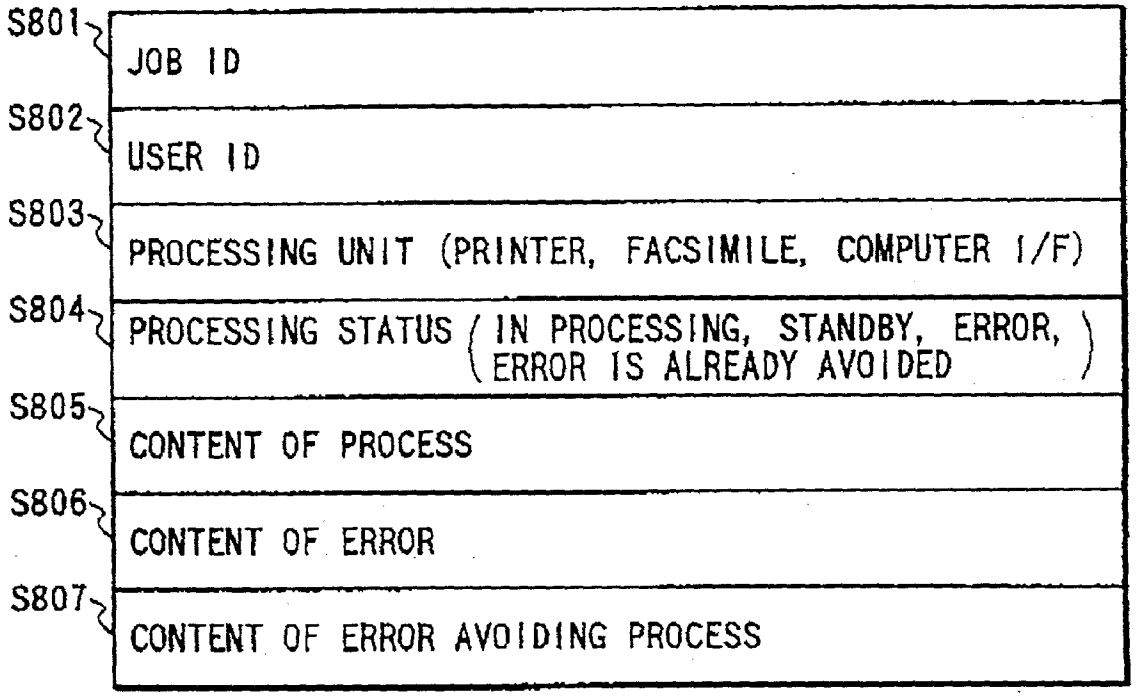

S801
JOB ID
S802
USER ID
S803
PROCESSING UNIT (PRINTER, FACSIMILE, COMPUTER I/F)
S804
PROCESSING STATUS (IN PROCESSING, STANDBY, ERROR, ERROR IS ALREADY AVOIDED)
S805
CONTENT OF PROCESS
S806
CONTENT OF ERROR
S807
CONTENT OF ERROR AVOIDING PROCESS

FIG. 9

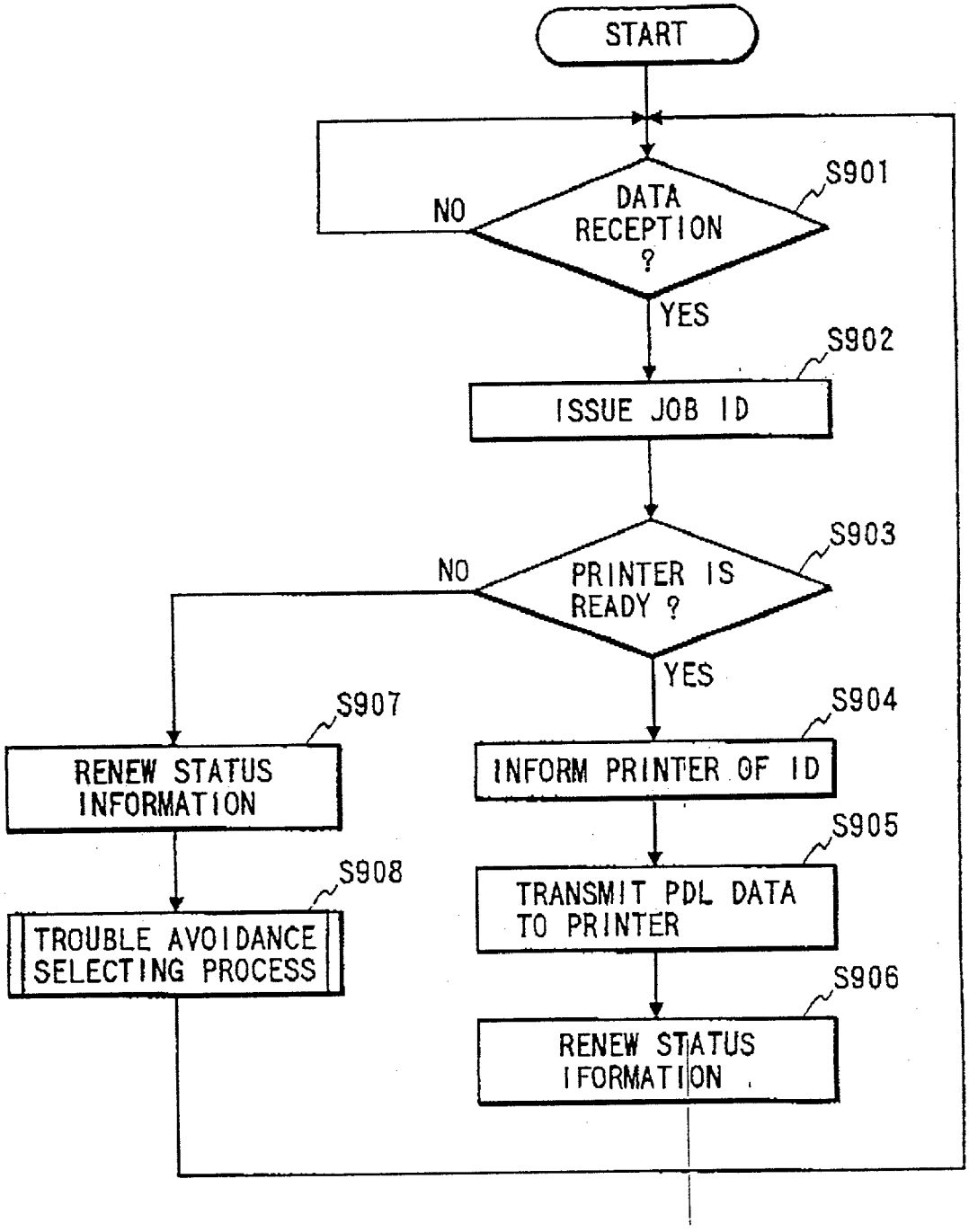

START
S901
DATA RECEPTION ?
NO
YES
S902
ISSUE JOB ID
S903
PRINTER IS READY ?
NO
YES
S907
RENEW STATUS INFORMATION
S908
TROUBLE AVOIDANCE SELECTING PROCESS
S904
INFORM PRINTER OF ID
S905
TRANSMIT PDL DATA TO PRINTER
S906
RENEW STATUS IFORMATION

FIG. 10

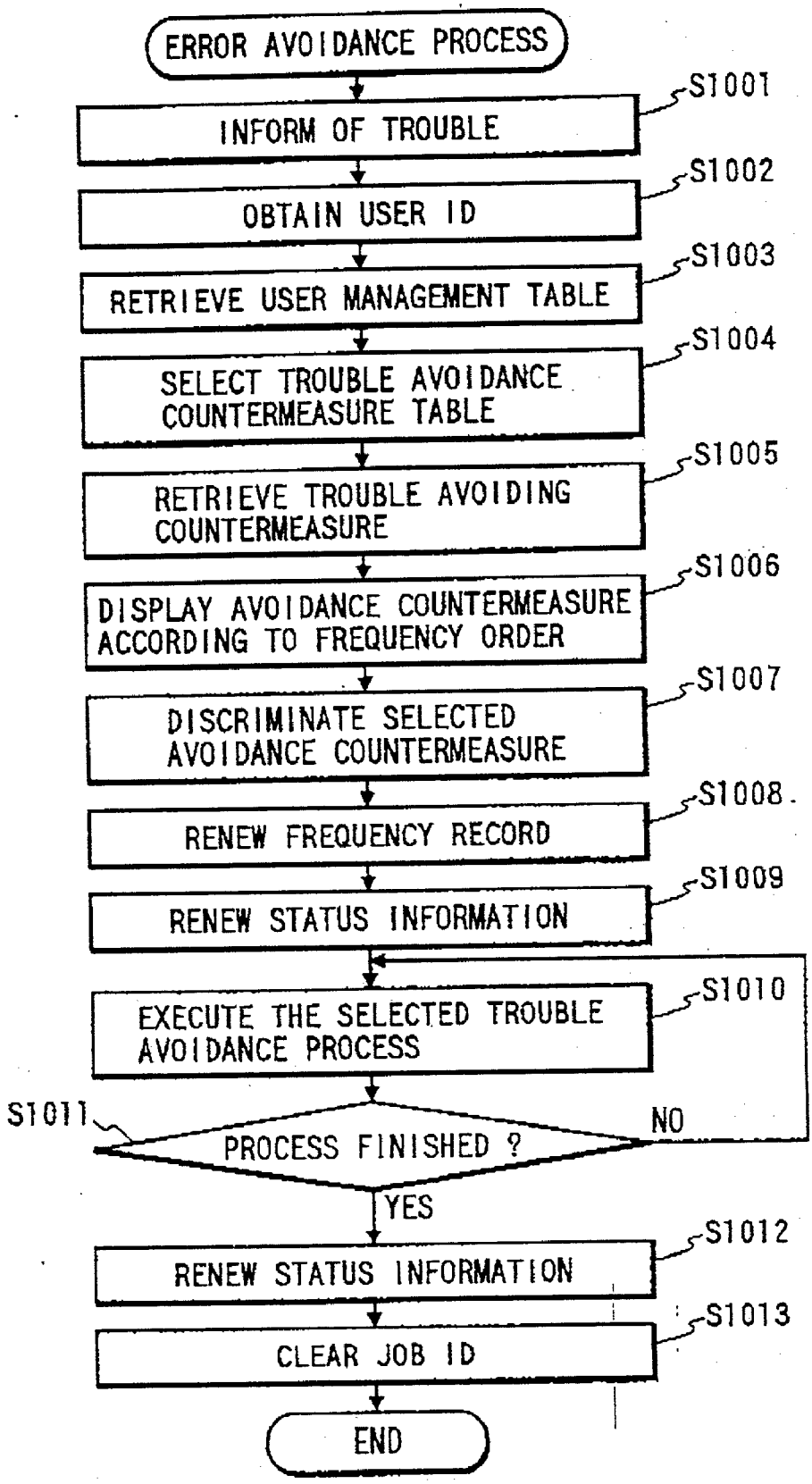

ERROR AVOIDANCE PROCESS
INFORM OF TROUBLE
S1001
OBTAIN USER ID
S1002
RETRIEVE USER MANAGEMENT TABLE
S1003
SELECT TROUBLE AVOIDANCE COUNTERMEASURE TABLE
S1004
RETRIEVE TROUBLE AVOIDING COUNTERMEASURE
S1005
DISPLAY AVOIDANCE COUNTERMEASURE ACCORDING TO FREQUENCY ORDER
S1006
DISCRIMINATE SELECTED AVOIDANCE COUNTERMEASURE
S1007
RENEW FREQUENCY RECORD
S1008
RENEW STATUS INFORMATION
S1009
EXECUTE THE SELECTED TROUBLE AVOIDANCE PROCESS
S1010
S1011
PROCESS FINISHED ?
NO
YES
RENEW STATUS INFORMATION
S1012
CLEAR JOB ID
S1013
END

FIG. 11

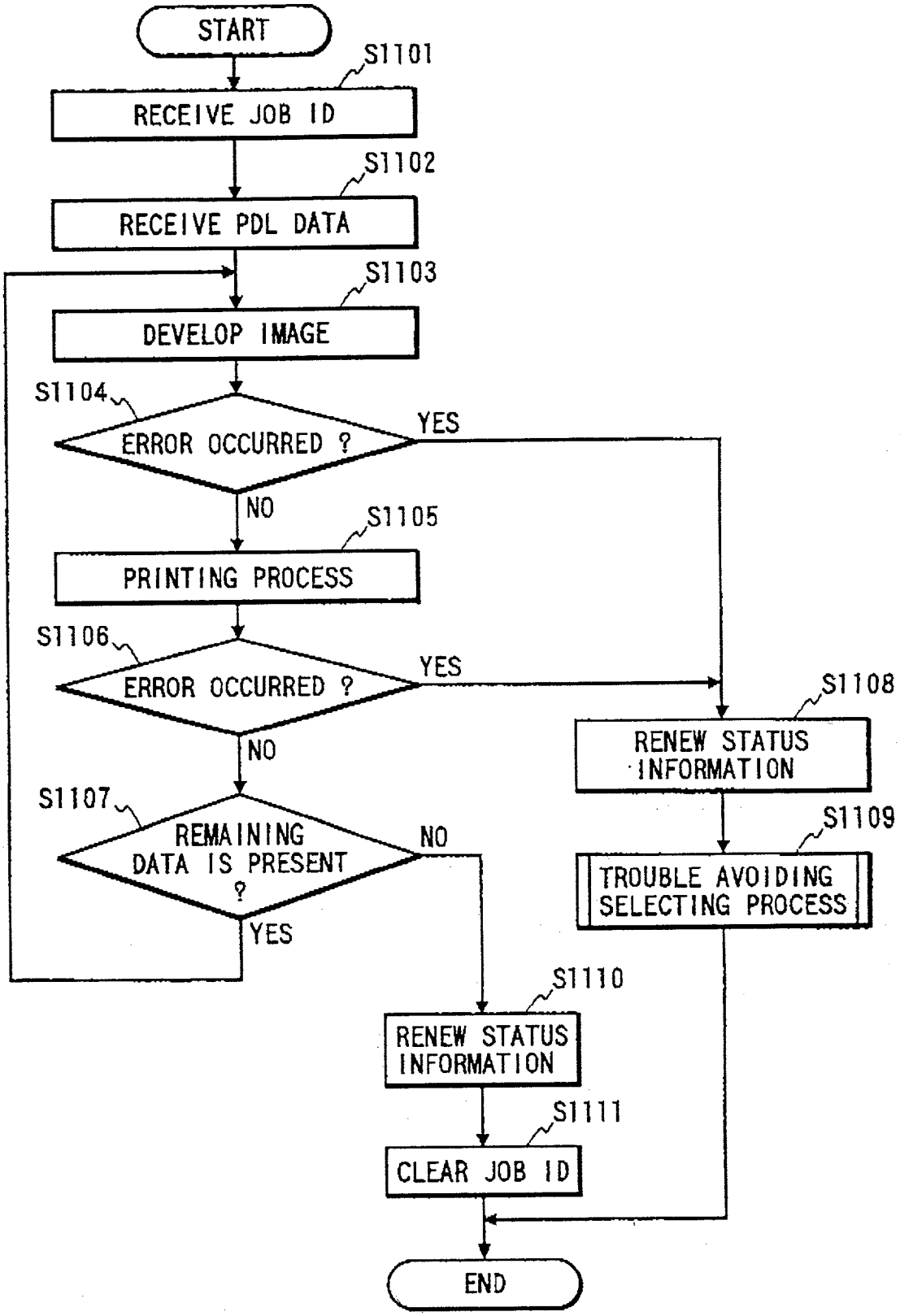

START
S1101
RECEIVE JOB ID
S1102
RECEIVE PDL DATA
S1103
DEVELOP IMAGE
S1104
ERROR OCCURRED ?
YES
NO
S1105
PRINTING PROCESS
S1106
ERROR OCCURRED ?
YES
NO
S1107
REMAINING DATA IS PRESENT ?
NO
YES
S1108
RENEW STATUS INFORMATION
S1109
TROUBLE AVOIDING SELECTING PROCESS
S1110
RENEW STATUS INFORMATION
S1111
CLEAR JOB ID
END

FIG. 12

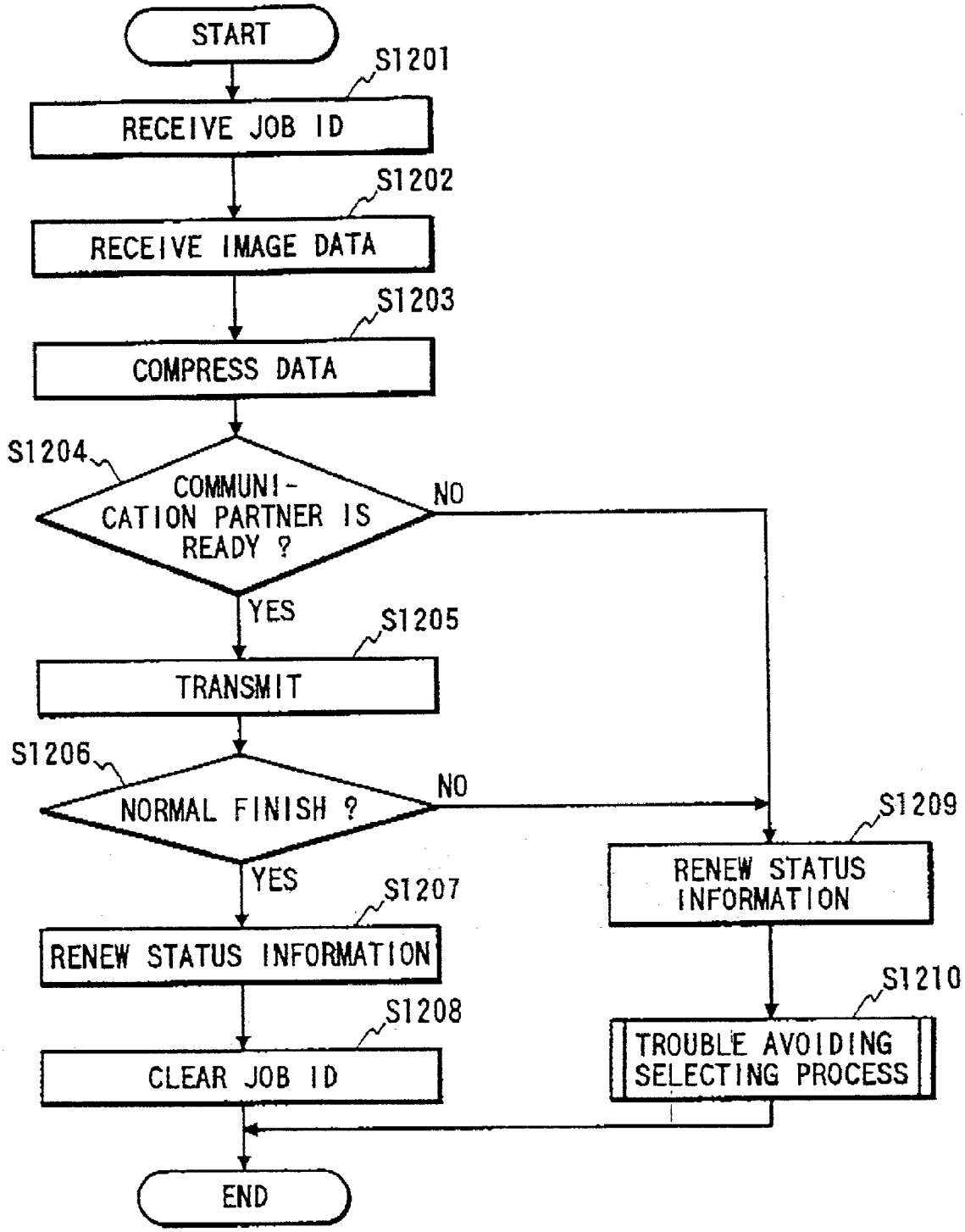

START
S1201
RECEIVE JOB ID
S1202
RECEIVE IMAGE DATA
S1203
COMPRESS DATA
S1204
COMMUNI-CATION PARTNER IS READY ?
NO
YES
S1205
TRANSMIT
S1206
NORMAL FINISH ?
NO
YES
S1207
RENEW STATUS INFORMATION
S1208
CLEAR JOB ID
S1209
RENEW STATUS INFORMATION
S1210
TROUBLE AVOIDING SELECTING PROCESS
END

FIG. 13

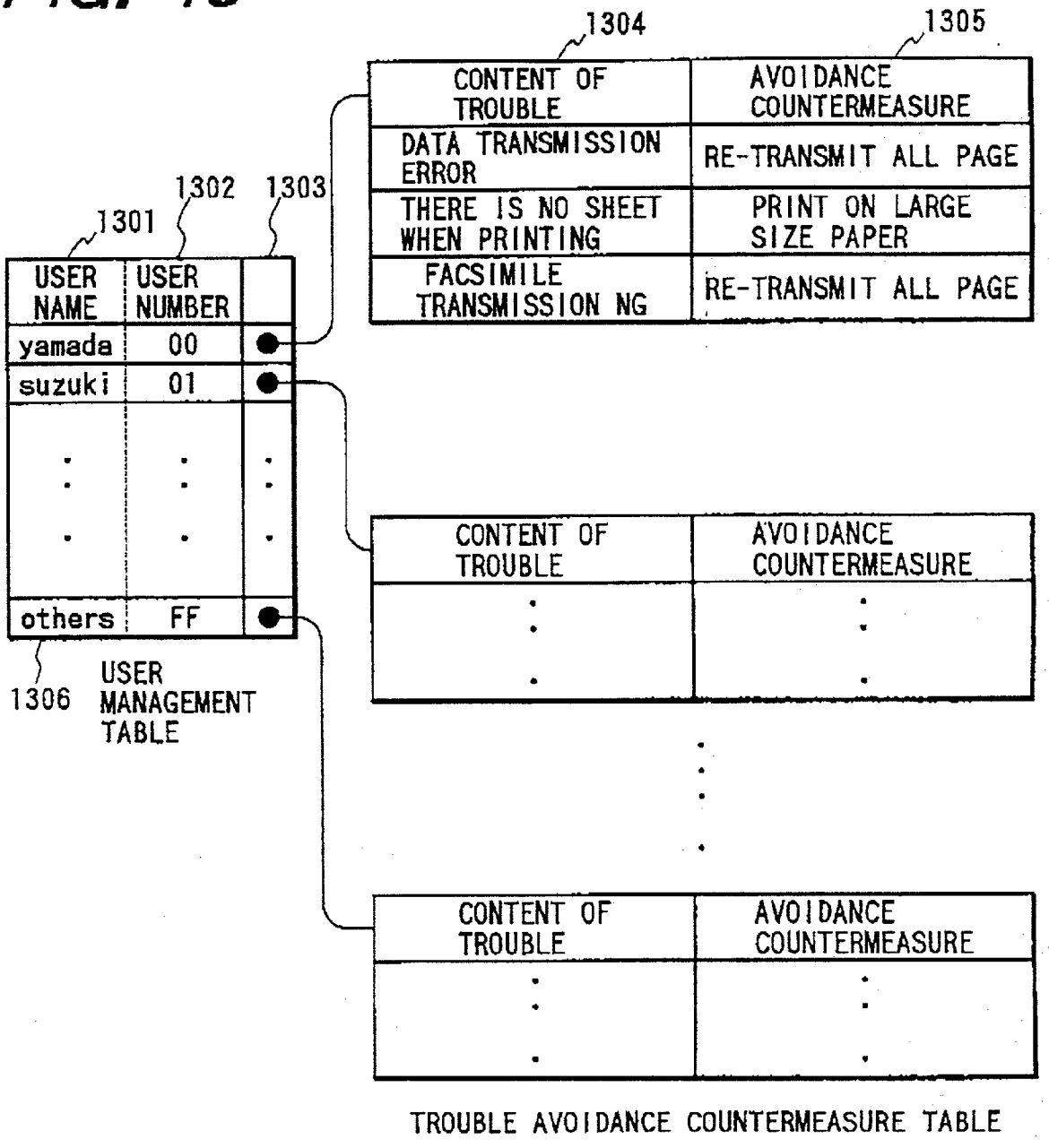

1304
1305
CONTENT OF TROUBLE
AVOIDANCE COUNTERMEASURE
DATA TRANSMISSION ERROR
RE-TRANSMIT ALL PAGE
THERE IS NO SHEET WHEN PRINTING
PRINT ON LARGE SIZE PAPER
FACSIMILE TRANSMISSION NG
RE-TRANSMIT ALL PAGE
1302
1303
1301
USER NAME
USER NUMBER
yamada
00
suzuki
01
others
FF
1306
USER MANAGEMENT TABLE
CONTENT OF TROUBLE
AVOIDANCE COUNTERMEASURE
CONTENT OF TROUBLE
AVOIDANCE COUNTERMEASURE
TROUBLE AVOIDANCE COUNTERMEASURE TABLE

FIG. 14

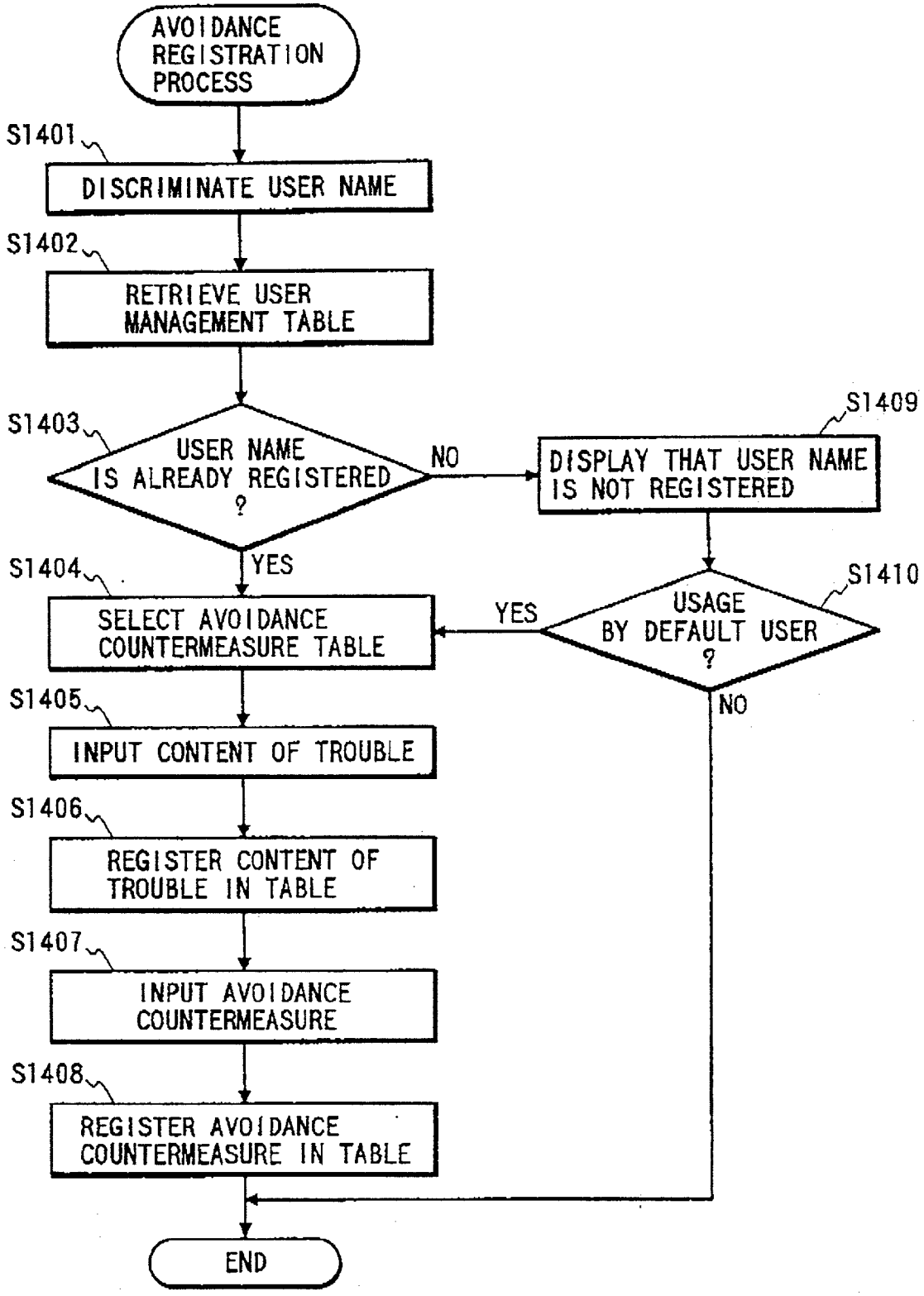
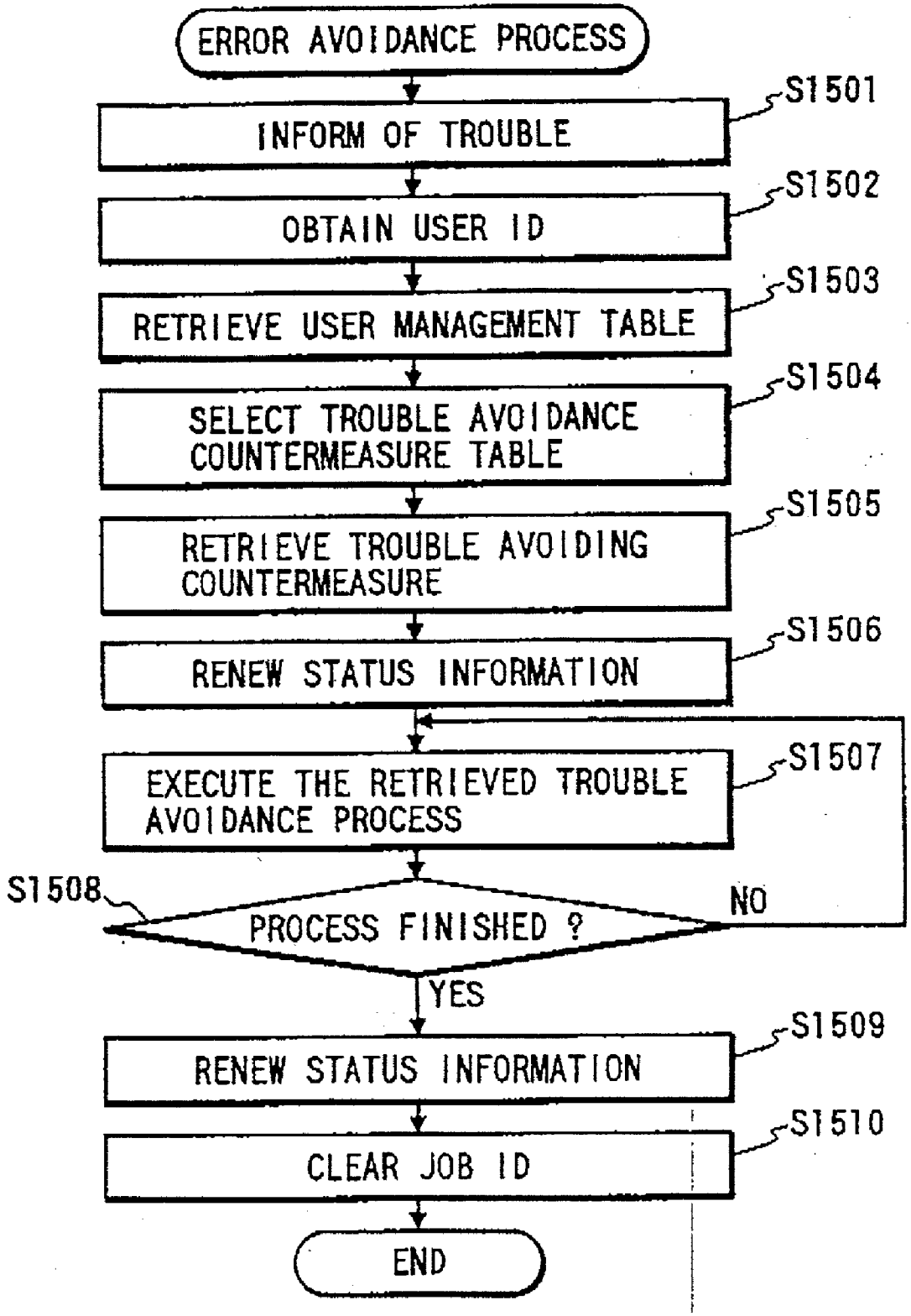

AVOIDANCE REGISTRATION PROCESS
S1401
DISCRIMINATE USER NAME
S1402
RETRIEVE USER MANAGEMENT TABLE
S1403
USER NAME IS ALREADY REGISTERED ?
NO
S1409
DISPLAY THAT USER NAME IS NOT REGISTERED
YES
S1404
SELECT AVOIDANCE COUNTERMEASURE TABLE
S1410
USAGE BY DEFAULT USER ?
YES
NO
S1405
INPUT CONTENT OF TROUBLE
S1406
REGISTER CONTENT OF TROUBLE IN TABLE
S1407
INPUT AVOIDANCE COUNTERMEASURE
S1408
REGISTER AVOIDANCE COUNTERMEASURE IN TABLE
END

FIG. 15


ERROR AVOIDANCE PROCESS
S1501
INFORM OF TROUBLE
S1502
OBTAIN USER ID
S1503
RETRIEVE USER MANAGEMENT TABLE
S1504
SELECT TROUBLE AVOIDANCE COUNTERMEASURE TABLE
S1505
RETRIEVE TROUBLE AVOIDING COUNTERMEASURE
S1506
RENEW STATUS INFORMATION
S1507
EXECUTE THE RETRIEVED TROUBLE AVOIDANCE PROCESS
S1508
PROCESS FINISHED ?
NO
YES
S1509
RENEW STATUS INFORMATION
S1510
CLEAR JOB ID
END

CONTROL APPARATUS FOR AVOIDING EQUIPMENT ABNORMALITY

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] This invention relates to a control apparatus for avoiding equipment abnormalities.

[0003] 2. Related Background Art

[0004] A combined image processing apparatus having facsimile and printer capabilities as well as a copying function has been recently considered.

[0005] When using such an apparatus for printing out a document or drawing created by a computer, a printer driver on the computer converts it to data in a page description language (PDL), and on receipt of the converted data a printer formatter unit formats a layout or drawing procedure to form and print out a desired image.

[0006] In this case, the apparatus has a function for sending information of the printer formatter unit, such as online/offline switching, various error status indicative of no sheet and such and busy state indicative of other job being processed.

[0007] The use of the apparatus as the facsimile unit permits an operator to receive notice of image transmission information indicating that a communication partner is ready, or the image is transmitting or receiving, together with an abbreviated name of the communication partner. It can also store a history of communication results, the communication time and date, abbreviated names of communication partners and their telephone numbers, and inform the operator of the historical information.

[0008] When using a filing function, the apparatus permits the operator to receive such processing status as indicates that data is being recorded, a file is being retrieved or the disk is write-protected.

[0009] Combinations of these functions permit the apparatus to perform the following compound control operations.

[0010] (1) Print data is developed in the printer formatter unit and transferred to the facsimile unit so that the data transferred can be compressed in the facsimile unit for facsimile transmission via public lines.

[0011] (2) When filing a document created by the computer or the like, the document data is developed in the printer formatter unit in the same manner when printing it on a sheet, and transferred to a filing unit, so that the filing unit stores the transferred image data in a magneto-optical disk.

[0012] (3) When filing an image received by the facsimile, the image received and expanded is transferred to the filing unit in the same manner when printing it on a sheet, so that the filing unit stores the transferred image in a magneto-optical disk.

[0013] During the compound control operations, various processing status equivalent to those in respective single-control operations can be informed.

[0014] However, when a trouble occurs and the corresponding processing can not be continued, the operator is informed of insufficient information such as only the type of error. It is therefore necessary for the operator to ignore the error and instruct continuation of the processing or to terminate the current job once and initiate the job again. To know the progress status of the job, the operator has to judge and select units related to the processing from among the printer formatter unit, the facsimile unit and the filing unit, and to monitor respective information of the units regarded as related to the processing. For this reason, adequate sense and complex confirmation work are required for obtaining information indicative of whereabouts in all the processing one particular job is located.

SUMMARY OF THE INVENTION

[0015] An object of the present invention is to provide control apparatus and method for abnormality avoidance, which can overcome the above drawbacks.

[0016] Another object of the present invention is to provide control apparatus and method for abnormality avoidance, which can store a history of abnormality avoiding operations for each user so that when an error occurs, a sequence of operations selected in the past will be informed.

[0017] Still another object of the present invention is to provide control apparatus and method for changing a guidance of abnormality avoiding operations according to the frequency of abnormality avoiding operations selected by the user in the past.

[0018] Yet another object of the present invention is to provide control apparatus and method for abnormality avoidance, which can provide a proper guidance of abnormality avoiding operations even when no user is recognized.

[0019] The other objects of the present invention will be apparent from the following description and the appended claims when considered in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] In the drawings:

[0021] **FIG. 1** is a block diagram of an image processing apparatus according to an embodiment of the present invention;

[0022] **FIG. 2** is a sectional view of a reader unit and a printer unit;

[0023] **FIG. 3** is a block diagram of the reader unit;

[0024] **FIG. 4** is a block diagram of a core unit;

[0025] **FIG. 5** is a diagram showing a user management table;

[0026] **FIG. 6** is a flowchart of a user registering process;

[0027] **FIG. 7** is a flowchart of a user certifying process;

[0028] **FIG. 8** is a diagram showing a status information management table;

[0029] **FIG. 9** is a flowchart showing an operation executed by a computer interface unit **7**;

[0030] **FIG. 10** is a flowchart of a trouble avoidance countermeasure selecting process executed when a trouble occurs;

[0031] **FIG. 11** is a flowchart showing an operation executed by a formatter unit **8**;

[0032] **FIG. 12** is a flowchart showing an operation executed by a facsimile unit **4**;

[0033] **FIG. 13** is a diagram showing a user management table according to a second embodiment;

[0034] **FIG. 14** is a flowchart of a trouble avoidance countermeasure registering process; and

[0035] **FIG. 15** is a flowchart of a trouble avoidance countermeasure selecting process executed when a trouble occurs in the second embodiment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0036] Referring to the accompanying drawings, preferred embodiments of the present invention will be described below.

[0037] **FIG. 1** is a block diagram showing structure of an image processing apparatus according to an embodiment of the present invention. A reader unit **1** reads an image on a document and outputs image data corresponding to the original image to a printer unit **2** and an image input/output control unit **3**. The printer unit **2** records on a sheet the image corresponding to the image data from the reader unit **1** and the image input/output control unit **3**. The image input/output control unit **3** is connected to the reader unit **1**, which is constituted of a facsimile unit **4**, a file unit **5**, a computer interface unit **7**, a formatter unit **8**, an image memory unit **9** and a core unit **10**.

[0038] The facsimile unit **4** expands compressed image data received via a telephone line, and transfers the expanded image data to the core unit **10**. On the other hand, it compresses the image data from the core data **10** and transfers the compressed data via a telephone line.

[0039] A hard disk **12** is connected to the facsimile unit **4**, which receives and temporarily stores compressed data.

[0040] A magneto-optic disk drive unit **6** is connected to the file unit **5**. The file unit **5** compresses image data transferred from the core unit **10** and stores the compressed image data, together with a key word for retrieval of the image data, in a magneto-optic disk set in the magneto-optic disk drive unit **6**. The file unit **5** also retrieves, based on the key word, the compressed image data stored in the magneto-optic disk, reads and expands the compressed data retrieved, and transfers the expanded image data to the core unit **10**.

[0041] The computer interface unit **7** is an interface between the core unit **10** and a personal computer or workstation (PC/WS) **11**.

[0042] On receipt of an image from the PC/WS **11**, the formatter unit **8** develops code data indicative of the image so that the printer unit **2** can record the developed image data. The image memory unit **9** temporarily stores the image data transferred from the PC/WS **11**.

[0043] As will be described later, the core unit **10** controls the data flow between the reader **1** and the respective main units in the image input/output control unit **3**, namely, the facsimile unit **4**, file unit **5**, the computer interface **7**, the formatter unit **8**, the image main memory **9**.

[0044] **FIG. 2** is a sectional view of the reader unit **1** and the printer unit **2**. A document feeder **101** of the reader unit **1** feeds sheets of document onto a platen glass **102** one by one consecutively from the last page, and ejects the document on the platen glass **102** after completion of document reading operation. When a sheet of document is fed onto the platen glass **102**, a lamp **103** is turned on to start moving a scanner unit **104** so that the document can be exposed and scanned. The reflected light from the document is led to a CCD image sensor (hereinbelow, referred to as CCD) **109** through mirrors **105**, **106**, **107** and a lens **108**. An image on the document is thus read by the CCD **109**. The image data output from the CCD **109** is processed in a predetermined processing and transferred to the printer unit **2** and the core unit **10** in the image input/output control unit **3**.

[0045] A laser driver **221** of the printer unit **2** drives a laser light emission unit **201** to emit laser light according to the image data output from the reader unit **1**. The laser light is radiated onto a photosensitive drum **202** to form a latent image on the photosensitive drum **202** according to the laser light. Developer is adhered to the latent image area on the photosensitive drum **202**. A sheet of recording paper is fed from either of cassettes **204** and **205** at timing of synchronization with start of laser light radiation, and conveyed to a transfer unit **206** in which the developer adhered on the photosensitive drum **203** is transferred to the recording paper. The recording paper with the developer thereon is then conveyed to a fixing unit **207** and the developer is fixed on the recording paper due to application of heat and pressure by the fixing unit **207**. The recording paper passed through the fixing unit **207** is ejected by an eject roller **208** and stored in a corresponding one of bins by a sorter **220**. When a sorting mode is not set, the sorter **220** stores the recording paper in the topmost bin. In a two-side recording mode, the sorter **220** inverses the rotating direction of the recording paper conveyed to the eject roller **208** and a flapper **209** leads it to a paper re-feed line. In a multi-recording mode, the flapper **209** leads the recording paper to the paper re-feed line before the recording paper is conveyed to the eject roller **208**. The recording paper led to the paper re-feed line is fed to the transfer unit **206** at the timing described above.

[0046] **FIG. 3** is a block diagram of the reader unit **1**. The image data output from the CCD **109** is subjected to analog/digital conversion and shading correction at an A/D SH unit **110**. The image data processed by the A/D SH unit **110** is transferred to the image input/output control unit **3**, i.e., through an image data processing unit **111** to the printer **2** and through an interface unit **113** to the core **10**, respectively. A CPU **114** controls the image processing unit **111** and the interface unit **113** according to the content set in an operation unit **115**. For example, when a copy mode for performing a copy operation after trimming processing is set in the operation unit **115**, the CPU **114** instructs the image processing unit **111** to process the image data in a trimming processing and to transfer it to the printer unit **2**. When a facsimile transmission mode is set in the operation unit **115**, it instructs the interface unit **113** to transfer to the core unit **10** the image data together with a control command corresponding to the set mode. Such a control program executed by the CPU **114** is stored in a memory **116** so that the CPU **114** can perform control while referring to the memory **116**. The memory **116** is also used as a work area for the CPU **114**.

[0047] **FIG. 4** is a block diagram of the core unit **10**. The image data from the reader unit **1** is transferred to a data processing unit **121**, while the control command from the reader unit **1** is transferred to a CPU **123**. The data processing unit **121** performs image processings such as image rotating processing and magnification changing processing. The image data transferred from the reader unit **1** to the data processing unit **121** is then transferred through the interface **120** to the facsimile unit **4**, the file unit **5** or the computer interface unit **7** according to the control command transferred from the reader unit **1**. On the other hand, the code data indicative of the image input through the computer interface unit **7** is transferred to the data processing unit **121**, then to the formatter unit **8**. The code data is developed into image data, and the image data developed is transferred to a desired unit such as the facsimile unit **4** or the reader unit **2** after transferred to the data processing unit **121**. The image data from the facsimile unit **4** is transferred to a desired unit such as the printer unit **2**, the file unit **5** or the computer interface unit **7** after transferred to the data processing unit **121**. The image data from the file unit **5** is similarly transferred to a desired unit such as the printer unit **2**, the facsimile unit **4** or the computer interface unit **7** after transferred to the data processing unit **121**. The CPU **123** performs control operations mentioned above in accordance with a control program stored in a memory **124** and the control command transferred from the reader unit **1**. The memory **124** is also used as a work area for the CPU **123**. The image processing apparatus is thus permitted to carry out combined functions such as reading of an image on a document, image printing, image transmission, storage of the image and input or output of data from a computer.

[0048] The above-mentioned main units, such as the reader unit **1**, the printer unit **2**, the facsimile unit **4**, the file unit **5**, the computer interface unit **7** and the formatter unit **8**, are provided with individual abnormality detecting circuits, respectively, which, when an abnormality occurs, transmit information indicative of an abnormality of each unit through the core unit **10** to the reader **1** so that the abnormality can be displayed by an indicator of the operation unit **115**. Status information of each unit is also displayed by the indicator of the operation unit **115** in the same manner.

[0049] In the embodiment, when an abnormality occurs, an optimum countermeasure can be selected by each user. Referring next to **FIGS. 5 and 6**, a procedure for user registration will be described.

[0050] **FIG. 5** shows a user management table for managing registered user information, in which a column **501** is for storing user names, a column **502** for storing user IDs and a column **503** for storing positions of trouble avoidance countermeasure tables for individual users. The trouble avoidance countermeasure table **503** is provided for each user, in which a column **504** is for storing the content of troubles, a column **505** for storing alternative trouble avoidance countermeasures and a column **506** for storing the frequency of specification in the past. The user management table is provided in a predetermined area of the memory **116**.

[0051] The following is description to a user registering process. At first, a user inputs his or her name through the operation unit **115** at S**601**. The CPU **114** retrieves the user name from the user management table at S**602** and determines at S**603** whether or not the user name has already been registered. If registered, the CPU **114** instructs the operation unit **115** to indicate that the user name has already been registered. If not registered, the user name is registered in the column **501** of the user management table at S**604**. Then, a new user ID is so assigned that the one-to-one correspondence can be shown between the user name and the user ID. The new user ID is registered in the column **502**. At S**605**, an area of a trouble avoidance countermeasure table for the newly registered user is secured and initialized.

[0052] When the user starts execution of a job in the image processing apparatus, the user inputs his or her name through the operation unit **115** prior to execution of the job. The user name is then certified and used when selecting the trouble avoidance countermeasure table for the user. The user ID input method is not limited by input through the operation unit **115**, and it may be performed by reading data of a user ID card in the apparatus.

[0053] Referring to **FIG. 7, a** procedure for user certification will be described below.

[0054] At first, the user name is input by the user through the operation unit **115** at S**701**. The CPU **114** retrieves the user name from the user management table at S**702** and determines at S**703** whether or not the user name has already been registered. If registered, the user ID is obtained from the column **502** at S**704**. If not registered, the CPU **114** instructs the operation unit **115** at S**705** to inform the user that the user name has not been registered yet, then at S**706**, to make the user select whether to use the apparatus without registration of the user name. When initiating the job without registration of the user name, a default user name "others" indicative of indefinite users is given as shown in a column **507**, and a default user ID is obtained at S**704**. The default user name and the default user ID are used to select and execute the trouble avoidance countermeasure table registered therefore.

[0055] Next, description will be made to an exemplary processing executed according to the type of job by the combined image processing apparatus of the present invention.

[0056] **FIG. 8** shows a management table indicative of status information of the job, which is provided in the memory **124**.

[0057] The status information management table is a management table for grasping processing progress status of the core unit **10**, in which the processing progress status is renewed sequentially in response to input of data from the core unit **10**, the printer formatter unit **8** and the facsimile unit **4**. The status information management table is composed of a column **801** for storing job IDs as management numbers, a column **802** for storing user IDs used for identifying the user who currently owns the job, a column **803** for indicating a processing unit currently executing the job, a column **804** for storing current processing progress status, a column **805** for storing the content of processings, a column **806** for storing the content of errors occurring during processings and a column **807** for storing the content of error avoiding processes.

[0058] Referring to **FIG. 9**, description will be made to operation of the entire apparatus when PDL data is received from the computer and transferred to the printer formatter unit **8**.

[0059] At S901, the CPU 123 of the core unit 10 determines whether or not PDL data is received from the computer through the interface unit 7. The core unit 10 is designed to receive data from the computer in each processing unit (hereinbelow, the processing unit is referred to as a job). When detecting data reception, the core unit 10 issues a job ID at S902 for use as a management number so as to show the one-to-one correspondence to the data received. After that, the job ID and the user ID indicative of the owner of the job are used to grasp and inquire the processing status.

[0060] Subsequently, the CPU 123 recognizes the state of the printer formatter unit 8 at S903. If the printer formatter unit 8 is in a state where the PDL data cannot be received for some reason, the column 804 of the status information management table is renewed at S907 to transmit the data of the status information management table to the CPU 114. Then, the operation shifts to the trouble avoidance selecting process of S908, and the CPU 114 displays alternative avoidance countermeasures corresponding to the content of each trouble in the order of the frequency of specification in the past so that the user can select an optimum countermeasure for continuation of the processing. Details will be described later with reference to FIG. 10. On the other hand, when the CPU 123 recognizes at S903 that the printer formatter unit 8 is ready for data reception, the job ID issued at S902 is informed to the printer formatter unit 8 at S904, and then the PDL data is transferred to the printer formatter unit 8 at S905. After that, the column 803 of the status information management table is renewed at S906 so as to indicate that the processing is transferred to the printer formatter unit 8, and the operation is returned to S901 for the next data reception from the computer.

[0061] Referring next to FIG. 10, description will be made to the trouble avoidance selecting process of S908.

[0062] The CPU 114 informs the user of occurrence of a trouble and its cause through the operation unit 115 at S1001. Subsequently at S1002, the CPU 114 obtains the user ID from the status information management table of the job trouble occurs, and at S1003, it retrieves the user management table in accordance with the user ID obtained. Then, at S1004 the CPU 114 selects the trouble avoidance countermeasure table for the user, and at S1005, it retrieves avoidance countermeasures in accordance with the content of the trouble. At S1006, the avoidance countermeasures are displayed on the operation unit 115, based on the history of the frequency of specification stored in the column 506, as alternatives sequentially from the avoidance countermeasure that is most frequently specified. When a user registered with a user name "Yamada" is taken by way of example, the frequency of specification of the avoidance countermeasures corresponding to each trouble is recorded as shown in FIG. 5. If the type of error is no sheet of designated size, alternative avoidance countermeasures "Print on Large Size Paper", "Retry till Paper is Fed", "Job Cancel" and "Print on Small Size Paper" are displayed in this order. When the two-side printing can not be performed due to a trouble of a two-side structure though two-side printing is designated by the user, the alternative avoidance countermeasures "2 in. Print", "One-Side Print" and "Job Cancel" are displayed in this order. At S1007, a trouble avoidance countermeasure selected by the user through the operation unit 115 is discriminated, and at S1008, the frequency data in the column 506 corresponding to the avoidance countermeasure selected is renewed. At S1009, the CPU 123 renews the content of error avoiding process in the column 807 of the status information management table from the previous one to the avoidance countermeasure selected by the user at S1007. The trouble avoiding process is then executed at S1010. After that, the CPU 123 determines at S1011 whether or not the process is finished. If finished, the CPU 123 renews the data in the column 804 of the status information management table at S1012 so as to indicate that the process is finished, and clears the job ID at S1013. The job is thus ended.

[0063] Referring next to FIG. 11, description will be made to operation of the entire apparatus in connection with the processing in the printer formatter unit 8.

[0064] The printer formatter unit 8 receives a job ID from the core unit 10 at S1101. The job ID is used for processing data to be received subsequently. The printer formatter unit 8 receives PDL data from the core unit 10 at S1102. At S1103, the printer formatter unit 8 analyzes the PDL data and develops an image in the image memory unit 9, and at S1104, it determines whether or not an error occurs during the image developing process. If occurrence of an error is determined, the operation advances to S1108. If the image developing process has been finished normally without any error, the operation shifts to a printing process of S1105. The CPU 123 of the core unit 10 determines at S1106 whether or not an error occurs during the printing process, and if occurrence of an error is determined, the operation advances to S1108. If the printing process has been finished normally without any error in the printer formatter unit 8 and the printer unit 2, the operation goes to S1107 in which it is determined as to whether remaining data to be developed is present or absent. If present, a sequence of processing steps from S1103 is repeated. If absent, the CPU 123 renews the data in the column 803 of the status information management table at S1110 so as to indicate that the processing in the printer formatter unit 8 is finished, and clears the job ID at S1111. The job is thus ended. The CPU 123 also renews the data in the column 804 of the status information management table at S1108 so as to indicate that an error occurs in the process, and transmits the data of the status information management table to the CPU 114. Then, the operation shifts to the trouble avoiding process of S1109 in which the CPU 114 displays alternative avoidance countermeasures corresponding to the content of the trouble in the order of the frequency of specification in the past, and instructs the user to select optimum one for continuation of the processing. The details are described above with respect to FIG. 10.

[0065] Referring next to FIG. 12, description will be made to operation of the entire apparatus in connection with the processing in the facsimile unit 4.

[0066] The facsimile unit 4 receives a job ID from the core unit 10 at S1201. The job ID is used for processing data to be received subsequently. The facsimile unit 4 receives image data from the reader unit 1 at S1202. At S1203, the facsimile unit 4 compresses (encodes) the received image data for facsimile transmission, and at S1204, it calls a communication partner according to the communication standard and determines whether or not the communication partner is ready for communication. If the communication is possible, the data is transmitted at S1205. If not possible, the CPU 123 renews the data in the column 804 of the status

information management table at S1209 so as to indicate that an error occurs. Then the facsimile unit **4** determines at S1206 whether or not the facsimile transmitting process has been finished normally. If a normal finish is determined, the CPU **123** renews the data in the column **803** of the status information management table at S1207 so as to indicate that the facsimile transmitting process is finished normally, and clears the job ID at S1208. The job is thus ended. If the facsimile unit **4** determines an abnormal finish at S1206, the CPU **123** renews the data in the column **804** of the status information management table at S1209 so as to indicate that an error occurs in the process. Then, the operation shift to the trouble avoidance selecting process of S1210 in which the CPU **114** displays alternative avoidance countermeasures corresponding to the content of the trouble currently occurring in the order of the frequency of specification in the past, and instructs the user to select optimum one for continuation of the processing. The details are described above with respect to **FIG. 10**.

[0067] During facsimile transmitting process, if an error occurs due to unexpected cut-off of the line currently connected, alternative avoidance countermeasures "Re-Transmit Pages Which Follow Error Page", "Re-Transmit All Pages" and "Job Cancel" are displayed in this order according to the table of **FIG. 5**.

[0068] Although in the above embodiment the avoidance countermeasures are displayed based on the history of selection in the past, the following second embodiment shows a case where the avoidance countermeasures are pre-registered for each user. In the second embodiment, almost all the portions are the same as those in the first embodiment except the structure of the user management table, the avoidance countermeasure registering process and the avoidance countermeasure selecting process.

[0069] Hereinbelow, the second embodiment will be described.

[0070] **FIG. 13** shows a user management table for managing user information registered, in which a column **1301** is for storing user names, a column **1302** for storing user IDs corresponding to individual user names and a column **1303** for storing corresponding positions of trouble avoidance countermeasure tables for individual users. The trouble avoidance countermeasure table **1303** is provided for each user, in which a column **1304** is for storing the content of troubles and a column **1305** for storing trouble avoidance countermeasures. The user management table is provided in a predetermined area of the memory **116**.

[0071] Referring next to **FIG. 14**, description will be made to a procedure for registering trouble avoidance countermeasures for each user.

[0072] At S1401, the CPU **114** discriminates a user name input from the operation unit **115** to identify the user whose avoidance countermeasures are to be registered. Subsequently, the CPU **114** retrieves the column **1301** of the user management table at S1402 and determines at S1403 whether or not the discriminated user name has already been registered. If registered, a corresponding avoidance countermeasure table is selected at S1404 by designating it in the user management table. If not registered, the CPU **114** instructs the operation unit **115** at S1409 to indicate that the discriminated user name has not been registered yet, and at S1410, to make the user select whether to use the default user. If the default user is used, an avoidance countermeasure table for default user is selected in the column **1306** of the user management table at S1404. At S1405, the user inputs, through the operation unit **115**, the content of troubles corresponding to avoidance countermeasures to be registered, and at S1406, the CPU **114** registers the content of troubles in the column **1304** of an avoidance countermeasure table for the user. Subsequently at S1407, the user inputs, through the operation unit **115**, avoidance countermeasures corresponding to the content of troubles, and at S1408, the CPU **114** registers the input avoidance countermeasures in the column **1305** of the avoidance countermeasure table for the user.

[0073] Instead of user input of the content of troubles at S1405 and S1406, the CPU **114** can instruct the operation unit **115** to display the content of troubles serially so that the user can input corresponding avoidance countermeasures one by one in accordance with the content of troubles displayed.

[0074] Although the processing for receiving PDL data from the computer and transmitting the PDL data to the printer formatter unit **8**, the processing in the printer formatter unit **8** and the processing in the facsimile unit **4** are the same as those in the first embodiment and therefore the description is omitted, respective trouble avoiding processes are different. In the second embodiment, a trouble avoiding process corresponding to the content of the trouble is automatically selected from the trouble avoidance countermeasure table for continuation of the processing.

[0075] Referring to **FIG. 15**, the trouble avoiding process will be described.

[0076] At S1501, the CPU **114** informs the user of occurrence of a trouble and its cause through the operation unit **115**. At S1502, the CPU **123** obtains the user ID from the status information management table for the job the trouble occurs, and transmits it to the CPU **114**. The CPU **114** retrieves the user management table at S1503 in accordance with the user ID obtained. Then, at S1504 a trouble avoidance countermeasure table for the user is selected, and at S1505, an avoidance countermeasure is retrieved in accordance with the content of the trouble. At S1506, the CPU **123** renews the content of the error avoiding process in the column **807** of the status information management table from the previous one to the avoidance countermeasure selected by the user at S1505. The trouble avoiding process selected is executed at S1507.

[0077] As shown in **FIG. 13**, in the case where the trouble avoidance countermeasures corresponding to the content of troubles have been pre-registered by the user having the user name "Yamada", when the cause of occurrence of the trouble is a data transmission error, the data transmission is required again. When the cause is no sheet in the printer formatter unit **8**, printing is performed using large-sized paper. When the cause is facsimile transmission NG, retransmission of all pages is required.

[0078] At S1508, the CPU **123** determines whether or not the process has been finished. If finished, the column **804** of the status information management table is renewed at S1509 so as to indicate that the process has been finished, and the job ID is cleared at S1510. The job is thus ended.

[0079] As described above, when an error occurs, alternative avoidance countermeasures are displayed, in the order of the frequency of specification in the past, as reference information that assists the user in judging and selecting an optimum trouble avoidance countermeasure, so that the user can use his or her own results in the past as a standard of judgment. It is therefore possible to lighten the work load of the user in recognizing and confirming the progress status of the processing of each job.

[0080] Further, when an error occurs, an individual trouble avoidance registration table is provided for each user and the processing is automatically continued according to the avoidance countermeasure previously specified by the user, so that the user does not need to recognize the progress status of the processing of each job. It is therefore possible to release the user from complex confirmation work and to execute an optimum trouble avoiding process required by the user even when an error occurs. The optimum trouble avoiding process can thus be provided for each user automatically.

[0081] The present invention is not limited by the above embodiments, and various modifications are possible within the scope of the appended claims.

What is claimed is:

1. A control apparatus for avoiding equipment abnormality comprising:

user recognition means for recognizing a user who has specified execution of a job;

abnormality detection means for detecting an abnormality that interferes with execution of the job;

storage means for storing the frequency of avoidance countermeasures, executed by the user for avoiding the abnormalities detected by said abnormality detection means, according to the type or for each user; and

display means for displaying executable avoidance countermeasures, based on the user recognized by said user recognition means and the execution frequency of each avoidance countermeasure stored in said storage means, when an abnormality is detected by said abnormality detection means.

2. An apparatus according to claim 1, wherein said display means displays a plurality of executable avoidance countermeasures in the order of the frequency.

3. An apparatus according to claim 1, wherein said user recognition means has input means for inputting identification information for identifying the user.

4. An apparatus according to claim 1, wherein said storage means stores the execution frequency of avoidance countermeasures according to the type of each abnormality.

5. An apparatus according to claim 1, wherein when the user can not be recognized by said user recognition means, said storage means stores the execution frequency of an avoidance countermeasure executed for an indefinite user.

6. An apparatus according to claim 5, wherein when the user can not be recognized by said user recognition means, said display means displays avoidance countermeasures executable for the indefinite user.

7. An apparatus according to claim 1, further comprising user registration means for registering a user to be recognized by said user recognition means.

8. A control apparatus for avoiding equipment abnormality comprising:

user recognition means for recognizing a user who has specified execution of a job;

abnormality detection means for detecting an abnormality that interferes with execution of the job;

input means which enables the user to previously register avoidance countermeasures made correspondent to respective abnormalities that are likely detected by said abnormality detection means;

storage means for storing the avoidance countermeasures input by said input means; and

control means for automatically selecting and executing an avoidance countermeasure, based on the user recognized by said user recognition means and the avoidance countermeasures stored in said storage means, when an abnormality is detected by said abnormality detection means.

9. An apparatus according to claim 8, wherein said storage means stores an avoidance countermeasure for each type of abnormality.

10. An apparatus according to claim 9, wherein said user recognition means has input means for inputting identification information for identifying the user.

11. An apparatus according to claim 9, further comprising user registration means for registering a user to be recognized by said user recognition means.

12. A control method for avoiding equipment abnormality comprising the steps of:

(a) recognizing a user who has specified execution of a job;

(b) executing the job;

(c) detecting an abnormality that interferes with execution of the job;

(d) storing in a memory the execution frequency of avoidance countermeasures, executed by the user for avoiding the abnormalities detected, according to the type or for each user; and

(e) displaying executable avoidance countermeasures, based on the user recognized at step (a) and the execution frequency of each avoidance countermeasure stored in the memory, when an abnormality is detected.

13. A method according to claim 12, wherein at step (e) a plurality of executable avoidance countermeasures are displayed in the order of the frequency.

14. A method according to claim 12, wherein at step (a) identification information for identifying the user is input.

15. A Method according to claim 12, wherein at step (d) the execution frequency of avoidance countermeasures is stored according to the type of each abnormality.

16. A method according to claim 12, wherein when the user can not be recognized at step (a), the execution frequency of an avoidance countermeasure executed for an indefinite user is stored at step (d).

17. A method according to claim 16, wherein when the user can not be recognized at step (a), avoidance countermeasures executable for the indefinite user are displayed at step (e).

18. A method according to claim 12, further comprising a registration step of registering a user to be recognized at step (a).

19. A control method for avoiding equipment abnormality comprising the steps of:

(a) previously registering in a memory avoidance countermeasures made correspondent to respective abnormalities that likely interfere with execution of a job;

(b) recognizing a user who has specified execution of the job;

(c) executing the job;

(d) detecting an abnormality that interferes with execution of the job; and

(e) automatically selecting and executing an avoidance countermeasure, based on the user recognized at step (b) and the avoidance countermeasures stored in the memory, when an abnormality is detected.

20. A method according to claim 19, wherein at step (a) an avoidance countermeasures is registered for each type of abnormality.

21. A method according to claim 19, wherein identification information for identifying the user is input at step (b).

22. A method according to claim 19, further comprising the step of registering a user to be recognized at step (b).

23. A computer program product comprising a computer readable medium having computer program code, said product including:

user recognizing process procedure codes for executing recognition of a user who has specified execution of a job;

abnormality detecting process procedure codes for executing detection of an abnormality that interferes with execution of the job;

storing process procedure codes for executing storage of the execution frequency of avoidance countermeasures, executed by the user for avoiding the abnormalities detected in said abnormality detecting process, according to the type or for each user; and

displaying process procedure codes for executing display of executable avoidance countermeasures, based on the user recognized in said user recognizing process and the execution frequency of each avoidance countermeasure stored in said storing process, when an abnormality is detected in said abnormality detecting process.

24. A product according to claim 23, wherein said displaying process procedure codes includes a code for executing display of a plurality of executable avoidance countermeasures in the order of the frequency.

25. A product according to claim 23, wherein said storing process procedure codes includes a code for executing storage of the execution frequency of avoidance countermeasures according to the type of each abnormality.

26. A product according to claim 23, wherein said storing process procedure codes includes a code for executing storage of an avoidance countermeasure executed for an indefinite user when the user can not be recognized in said user recognizing process.

27. A product according to claim 26, wherein said displaying process procedure codes includes a code for executing display of avoidance countermeasures executable for the indefinite user when the user can not be recognized in said user recognizing process.

28. A product according to claim 23, further including user registering process procedure codes for registering a user to be recognized in said user recognizing process.

29. A computer program product comprising a computer readable medium having computer program code, said product including:

registering process procedure codes for previously registering in a memory avoidance countermeasures made correspondent to respective abnormalities that likely interfere with execution of a job;

user recognizing process procedure codes for recognizing a user who has specified execution of the job;

abnormality detecting process procedure codes for detecting an abnormality that interferes with execution of the job; and

executing process procedure codes for automatically selecting and executing an avoidance countermeasure, based on the user recognized in said user recognizing process and the avoidance countermeasures stored in the memory, when an abnormality is detected.

30. A product according to claim 29, wherein said registering process procedure codes includes a code for registering the execution frequency of the avoidance countermeasure for each type of abnormality.

31. A product according to claim 29, further including user registering process procedure codes for registering a user to be recognized in said user recognizing process.

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