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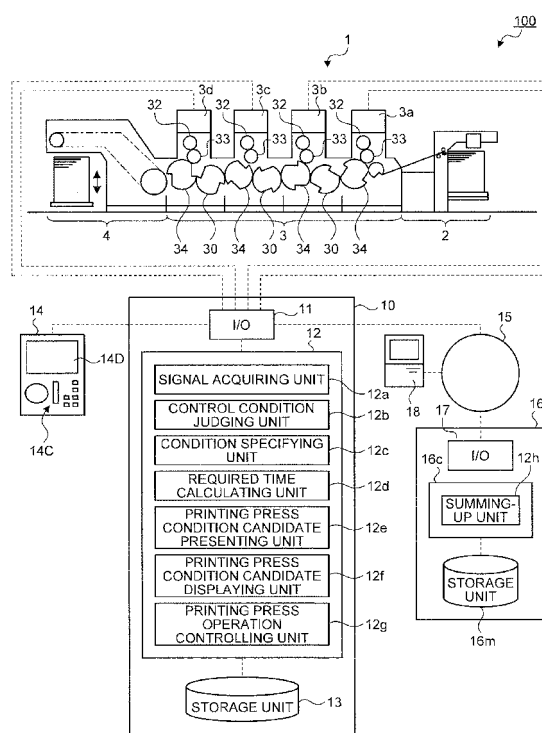
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(54) **PRINTING MACHINE CONDITION SPECIFYING DEVICE, PRINTING MACHINE CONDITION SPECIFYING METHOD AND COMPUTER PROGRAM**

(57) The present invention is intended to reduce unclear conditions upon collecting the conditions of a printing press. For this end, a processing unit 12 of a printing press control device 10 acquires an electric signal from a printing press 1 with a signal acquiring unit 12a. A control condition judging unit 12b judges whether the condition of the printing press 1 corresponding to the electric signal acquired by the signal acquiring unit 12a is determined uniquely. If the control condition judging unit 12b judges that the condition of the printing press 1 corresponding to the electric signal is not determined uniquely, a condition specifying unit 12c estimates the condition of the printing press 1 based on a combination of a plurality of such electric signals.

FIG.1



Description

TECHNICAL FIELD

[0001] The present invention relates to a condition specifying device for a printing press, a method for specifying a condition of a printing press, and a computer program for specifying a condition of a printing press that specify the type of job executed by a printing press and the condition of a printing press, such as whether the printing press is operating.

BACKGROUND ART

[0002] For the product management of printing presses, the operational status of a printing press must be known. For example, Patent Document 1 discloses a utility management device including a computer for printing presses. A watt-hour meter, a gas flowmeter, a water flowmeter, and various types of ink discharge valves each provided with a pulse signal generating mechanism per unit usage are included in each printing press and a rotation speed detection mechanism is also included in each printing press. The computer retrieves a pulse signal in conjunction with the rotation speed detection mechanisms, and converts the number of pulse signals to the total usage through a data collection device, and integrates and sums up the total usage.

[0003] [Patent Document 1] Japanese Patent Application Laid-open No. H6-47904 (0006 and 0007).

DISCLOSURE OF INVENTION

PROBLEM TO BE SOLVED BY THE INVENTION

[0004] To improve and enhance the efficiency of printing jobs, the type of job and time executed by a printing press are summed up to calculate the operation rate of the printing press, the operation time of each job, and the like. However, the condition of a printing press has been known from a record kept by an operator or a manual input by an operator. Accordingly, the condition of the printing press is often unclear, and the improvement has been desired. The present invention has been made in view of the foregoing, and an object of the present invention is to reduce unclear conditions upon collecting the conditions of the printing press.

MEANS FOR SOLVING PROBLEM

[0005] According to an aspect of the present invention, a condition specifying device for a printing press includes: a signal acquiring unit that acquires an electric signal related to a condition of the printing press; a control condition judging unit that judges whether the condition of the printing press corresponding to the electric signal acquired by the signal acquiring unit is determined uniquely; and a condition specifying unit that, if the control condition

judging unit judges that the condition of the printing press corresponding to the electric signal is not determined uniquely, estimates the condition of the printing press based on a combination of a plurality of such electric signals.

[0006] This condition specifying device for a printing press specifies the condition of the printing press at the point when the electric signal that indicates a certain condition of the printing press is acquired, by combining the electric signals. Accordingly, the condition of the printing press can be specified without a record kept by an operator or a manual input by an operator. As a result, unclear conditions can be reduced upon collecting the conditions of the printing press.

[0007] Advantageously, the condition specifying device for a printing press further includes a printing press condition candidate presenting unit that, if the condition of the printing press corresponding to the electric signal is not determined uniquely, displays a plurality of candidates of the condition of the printing press on a displaying unit. Accordingly, the operator can select the job executed by the operator from the displayed candidates and enter the operation into the condition specifying device for a printing press. Consequently, the condition of the printing press can be more accurately specified. Even if the condition of the printing press cannot be specified by combining the electric signals, because the operator selects the job executed by the operator and enters the operation into the condition specifying device for a printing press, unclear conditions can more certainly be reduced upon collecting the conditions of the printing press.

[0008] Advantageously, the condition specifying device for a printing press further includes a printing press condition candidate displaying unit that, to display the candidates on the displaying unit, displays the condition of the printing press estimated based on the combination of the electric signals in a mode different from that of other candidates. Accordingly, the operator can confirm the probable condition of the printing press estimated by the condition specifying device for a printing press, and enter the condition into the condition specifying device for the printing press. Consequently, the condition of the printing press can be specified more accurately.

[0009] Advantageously, in the condition specifying device for a printing press, if the condition of the printing press is selected from the candidates displayed on the displaying unit, the condition specifying unit defines the candidate being selected as the condition of the printing press. Accordingly, even if the condition of the printing press cannot be specified by combining the electric signals, because the operator selects the job executed by the operator and enters the operation into the condition specifying device for a printing press, unclear conditions can be more certainly reduced upon collecting the conditions of the printing press.

[0010] Advantageously, in the condition specifying device for a printing press, if the condition of the printing press is not selected from the candidates being present-

ed, the condition specifying unit defines the condition of the printing press estimated based on the combination of the electric signals as the condition of the printing press. Accordingly, even if the operator does not select the candidate of the condition of the printing press, the condition of the printing press can be specified. Consequently, unclear conditions can be reduced upon collecting the conditions of the printing press.

[0011] Advantageously, the condition specifying device for a printing press further includes a required time calculating unit that, after the condition of the printing press is defined, calculates time during which the condition of the printing press being defined has continued. Accordingly, time during which each condition of the printing press has continued can be known.

[0012] Advantageously, in the condition specifying device for a printing press, after the condition of the printing press is defined, the required time calculating unit sums up time required for the condition for each type of the condition of the printing press. Accordingly, the operational status of the printing press can be known for each condition of the printing press.

[0013] Advantageously, in the condition specifying device for a printing press, the condition specifying unit classifies the condition of the printing press based on the required time calculated by the required time calculating unit. Accordingly, if the condition of the printing press cannot be determined uniquely, the condition of the printing press can be more accurately estimated.

[0014] Advantageously, in the condition specifying device for a printing press, the condition specifying unit classifies the condition of the printing press by comparing the required time calculated by the required time calculating unit with a threshold for classifying the condition of the printing press set in advance. Accordingly, if the condition of the printing press cannot be determined uniquely, the condition of the printing press can be more accurately estimated.

[0015] Advantageously, in the condition specifying device for a printing press, the threshold is obtained by adding a predetermined allowance value to the required time calculated by the required time calculating unit. By adding the allowance value as described above, the skill level of the operator of the printing press and the design and the paper quality of an object to be printed can be taken into consideration. Accordingly, it is possible to prevent the estimation accuracy of the condition of the printing press from degrading.

[0016] Advantageously, in the condition specifying device for a printing press, if the condition of the printing press corresponding to the electric signal is not determined uniquely, the condition of the printing press is entered by using an electric signal for maintaining the condition of the printing press at present. Accordingly, an environment where the operator of the printing press can easily enter the condition of the printing press can be provided. Consequently, the operator can easily enter the condition of the printing press, and as a result, the

condition of the printing press can be specified more easily.

[0017] According to another aspect of the present invention, a method for specifying a condition of a printing press includes: a step of acquiring an electric signal related to the condition of the printing press; and a step of estimating the condition of the printing press based on a combination of a plurality of such electric signals if the condition of the printing press corresponding to the electric signal is not determined uniquely.

[0018] This method for specifying the condition of the printing press includes a step of acquiring an electric signal related to the condition of the printing press and storing the signal into a storage unit, a step of judging whether there is a plurality of conditions of the printing press corresponding to the electric signal, and a step of acquiring the condition of the printing press corresponding to a combination of the acquired electric signals and temporarily storing the condition into the storage unit, by referring to a condition-estimation data map in which a correspondence relationship between the combination of the electric signals and the condition of the printing press corresponding to the combination is written, the condition-estimation data map being stored in the storage unit if the result of the judgment indicates that there is a plurality of conditions of the printing press corresponding to the electric signal.

[0019] In this manner, in the method for specifying the condition of the printing press of the present invention, the condition of the printing press at the point when the electric signal indicating a certain condition of the printing press is acquired, by acquiring the electric signals from the printing press, and combining the electric signals. Accordingly, the condition of the printing press can be specified without a record kept by an operator or a manual input by an operator. As a result, unclear conditions can be reduced upon collecting the conditions of the printing press.

[0020] Advantageously, in the method for specifying a condition of a printing press, if the condition of the printing press corresponding to the electric signal is not determined uniquely, a candidate of the condition of the printing press is presented before defining the condition of the printing press. Accordingly, for example, because the operator can select the job executed by the operator from the candidate present on a displaying unit and enter the operation into the condition specifying device for a printing press, the condition of the printing press can be more accurately specified. Even if the condition of the printing press cannot be specified by combining the electric signals, because the operator selects the job executed by the operator and enters the operation into the condition specifying device for a printing press, unclear conditions can be more certainly reduced upon collecting the conditions of the printing press.

[0021] The candidate of the condition of the printing press has been presented. If the candidate is not selected as the condition of the printing press, it is preferable to

execute a procedure of estimating the condition of the printing press, based on the combination of the electric signals described above. Accordingly, if the candidate of the condition of the printing press is selected as the condition of the printing press, the procedure of estimating the condition of the printing press needs not be executed, based on the combination of the electric signals described above. Consequently, the procedure of estimating the condition of the printing press can be simplified. As a result, upon causing a computer to execute the method for specifying the condition of the printing press according to the present invention, the load on hardware resources can be reduced.

[0022] Advantageously, in the method for specifying a condition of a printing press, to display the candidate on a displaying unit, the condition of the printing press estimated based on the combination of the electric signals is presented in a mode different from that of other candidate. Accordingly, because the operator can confirm the probable condition of the printing press estimated by the condition specifying device for a printing press, and enter the condition into the condition specifying device for a printing press, the condition of the printing press can be specified further accurately.

[0023] Advantageously, in the method for specifying a condition of a printing press, if the condition of the printing press is selected from the candidate being presented, the candidate being selected is defined as the condition of the printing press. Accordingly, even if the condition of the printing press cannot be specified by combining the electric signals, because the operator selects the job executed by the operator and enters into the condition specifying device for a printing press, unclear conditions can be more certainly reduced upon collecting the conditions of the printing press.

[0024] Advantageously, in the method for specifying a condition of a printing press, if the condition of the printing press is not selected from the candidate being presented, the condition of the printing press estimated based on the combination of the electric signals is defined as the condition of the printing press. Accordingly, even if the candidate of the condition of the printing press is not selected by the operator, the condition of the printing press can be specified. Consequently, unclear conditions can be reduced upon collecting the condition of the printing press.

[0025] Advantageously, in the method for specifying a condition of a printing press, after the condition of the printing press is being defined, time during which the condition of the printing press being defined has continued is calculated. Accordingly, time during which each condition of the printing press has continued can be known.

[0026] Advantageously, in the method for specifying a condition of a printing press, after the condition of the printing press is being defined, time required for the condition is summed up for each type of the condition of the printing press. Accordingly, the operational status of the printing press can be known for each condition of the

printing press.

[0027] Advantageously, in the method for specifying a condition of a printing press, the condition of the printing press is classified based on the required time calculated by the required time calculating unit. Accordingly, if the condition of the printing press cannot be determined uniquely, the condition of the printing press can be more accurately estimated.

[0028] Advantageously, in the method for specifying a condition of a printing press, the condition of the printing press is classified by comparing the required time calculated by the required time calculating unit with a threshold for classifying the condition of the printing press set in advance. Accordingly, if the condition of the printing press cannot be determined uniquely, the condition of the printing press can be more accurately estimated.

[0029] Advantageously, in the method for specifying a condition of a printing press, the threshold is obtained by adding a predetermined allowance value to the required time calculated by the required time calculating unit. In this manner, by adding the allowance value, the skill level of the operator of the printing press and the design and the paper quality of an object to be printed can be taken into consideration. Accordingly, it is possible to prevent the estimation accuracy of the condition of the printing press from degrading.

[0030] Advantageously, in the method for specifying a condition of a printing press, if the condition of the printing press corresponding to the electric signal is not determined uniquely, the condition of the printing press is entered by using an electric signal for maintaining the condition of the printing press at present. Accordingly, an environment where the operator of the printing press can easily enter the condition of the printing press can be provided. Consequently, the operator can easily enter the condition of the printing press, and as a result, the condition of the printing press can be specified more easily.

[0031] According to still another aspect of the present invention, in a computer program for specifying a condition of a printing press, the computer program causes a computer to implement the method for specifying a condition of a printing press. Accordingly, the method for specifying the condition of the printing press can be implemented by using a computer.

EFFECT OF THE INVENTION

[0032] The present invention is capable of reducing unclear conditions upon collecting the conditions of a printing press.

BRIEF DESCRIPTION OF DRAWINGS

[0033]

[Fig. 1] Fig. 1 is a schematic of a printing system including a condition specifying device for a printing

press according to a first embodiment.

[Fig. 2-1] Fig. 2-1 is a schematic of a printing system including a condition specifying device according to a first modification of the first embodiment.

[Fig. 2-2] Fig. 2-2 is a schematic of a printing system including a condition specifying device according to a second modification of the first embodiment.

[Fig. 3] Fig. 3 is a flowchart of a procedure of a method for specifying a condition according to the first embodiment.

[Fig. 4] Fig. 4 is a chart of the condition of a printing press that can be determined uniquely and the condition of a printing press that cannot be determined uniquely, in the method for specifying a condition according to the first embodiment.

[Fig. 5] Fig. 5 is an example of a timing chart of the method for specifying the condition according to the first embodiment.

[Fig. 6] Fig. 6 is a schematic of the condition in which a candidate of the condition of the printing press is displayed on a display, in the method for specifying the condition according to the first embodiment.

[Fig. 7] Fig. 7 is a conceptual diagram of a data map in which the conditions of the printing press and the time during which each of the conditions has continued are described in an associated manner.

[Fig. 8] Fig. 8 is a conceptual diagram of a data map in which job classifications of the printing press and the time during which the job classifications have continued are summed up and described in an associated manner.

[Fig. 9] Fig. 9 is a flowchart of a procedure of a method for specifying a condition according to a second embodiment.

[Fig. 10] Fig. 10 is a flowchart of a method for setting a threshold of required time used to classify the condition of the printing press in the second embodiment.

[Fig. 11] Fig. 11 is a schematic of an operation panel of the printing press.

[Fig. 12] Fig. 12 is a conceptual diagram of a data map indicating a relationship between an electric signal used when an operator of the printing press is urged to enter the condition of the printing press, and the condition of the printing press.

[Fig. 13] Fig. 13 is a conceptual diagram of a data map used to narrow down the candidate of the condition of the printing press.

[Fig. 14] Fig. 14 is a conceptual diagram of a data map describing the specification of an operation performed by the printing press for each of the operators of the printing press.

2	paper feeder unit
3	printing unit
3a, 3b, 3c, 3d	printing unit
4	delivery unit
5	operation panel
10, 10A, 10B	printing press control device
11	input-output unit
12, 12A	processing unit
12a	signal acquiring unit
10 12b	control condition judging unit
12c	condition specifying unit
12d	required time calculating unit
12e	printing press condition candidate presenting unit
15 12f	printing press condition candidate displaying unit
12g	printing press operation controlling unit
12h	summing-up unit
20 13	storage unit
14	control panel
14C	input unit
14D	display
15	communication line
25 16, 16A	summing-up device
16c, 16Ac	processing unit
16m	storage unit
17	input-output unit
18	printing press management device
30 30	transfer cylinder
32	plate cylinder
33	blanket cylinder
34	impression cylinder
60	printing press condition map
35 61	printing press job classification map
62, 63, 64	data map
100, 100A, 100B	printing system

BEST MODE(S) FOR CARRYING OUT THE INVENTION

[0035] The present invention will now be described in detail with reference to the drawings. The present invention is not limited to the best modes (hereinafter, embodiments) for carrying out the invention. Constituent elements according to the embodiments below include elements that can be easily assumed by a person skilled in the art, and elements being substantially the same as those elements. The type of printing press to which the present invention can be applied is not limited.

(First Embodiment)

[0036] The present embodiment is unique in that an electric signal related to a condition of a printing press is acquired, and if the condition of the printing press corresponding to the acquired electric signal is not determined uniquely, the condition of the printing press is defined

EXPLANATIONS OF LETTERS OR NUMERALS

[0034]

1 printing press

based on a combination of a series of a plurality of electric signals acquired from the printing press, and if the condition of the printing press corresponding to the acquired electric signal is determined uniquely, the condition of the printing press corresponding to the electric signal is defined as the condition of the printing press.

[0037] Fig. 1 is a schematic of a printing system including a condition specifying device for a printing press according to a first embodiment. A printing system 100 includes a printing press 1, and a printing press controlling device 10 that controls the printing press 1. This printing press 1, for example, is a sheet-fed printing press of an offset printing press, and includes a paper feeder unit 2, a printing unit 3, and a delivery unit 4. The paper feeder unit 2 sends out paper (paper sheet) being set, and feeds the paper to the printing unit 3 formed of a plurality of printing units 3a, 3b, 3c, and 3d. Each of the printing units 3a, 3b, 3c, and 3d includes a plate cylinder 32, a blanket cylinder 33, and an impression cylinder 34, and performs offset printing on the supplied paper.

[0038] If the printing unit 3, for example, is in a color printing press, the printing unit 3 includes the four printing units 3a, 3b, 3c and 3d corresponding to colors black (K), cyan (C), magenta (M), and yellow (Y), respectively, and being connected to each other. The paper is delivered from the paper feeder unit 2 to the printing unit 3 and the delivery unit 4 in this order, by the impression cylinder 34, a transfer cylinder 30, a chain gripper, and the like.

[0039] A printing block is mounted on the outer periphery of the plate cylinder 32, and ink is supplied to the printing block from an ink supplying unit. A print image is formed on the printing block by the ink. The print image is transferred to the blanket cylinder 33, and is then transferred to the paper. The impression cylinder 34 presses the delivered paper against the blanket cylinder 33, thereby transferring the print image on the paper. The paper printed in all the printing units 3a, 3b, 3c, and 3d is sent to the delivery unit 4. The delivery unit 4 stacks the paper printed by the printing unit 3 in a pile.

[0040] The printing press control device 10 controls the operation performed by the printing press 1, and executes a method for specifying a condition of a printing press (hereinafter, referred to as method for specifying a condition) according to the present embodiment. In this manner, the printing press control device 10 acts as the condition specifying device for a printing press (hereinafter, referred to as condition specifying device) according to the present embodiment. The printing press control device 10 is a computer, and includes an input-output unit (I/O) 11, a processing unit 12, and a storage unit 13. The printing press control device 10 may be formed of a so-called personal computer, or may be formed by combining a central processing unit (CPU) and memory.

[0041] The processing unit 12 controls the operation performed by the printing press 1, by sending a control signal to an object to be controlled of the printing press 1, through the input-output unit 11. The processing unit 12 also receives information used for controlling the print-

ing press 1 and information related to the condition of the printing press 1, from sensors of the printing press 1. The information used to control the printing press 1 and the information related to the condition of the printing press 1 are sent to the processing unit 12 of the printing press control device 10 in a form of an electric signal. The processing unit 12 is composed of a CPU, and reads and interprets a sequence of instructions called a program (computer program) stored on the storage unit 13, and moves and processes data according thereto.

[0042] The processing unit 12 may be implemented as dedicated hardware. The processing procedure of the method for specifying the condition according to the present embodiment may be executed, by recording a computer program for implementing the function of the processing unit 12 into a computer-readable recording medium, and causing a computer system to read the computer program stored in the recording medium to execute. The "computer system" includes an operating system (OS) and hardware such as peripheral devices.

[0043] The "computer-readable recording medium" is a portable medium such as a flexible disk, a magneto optical disk, a read only memory (ROM), and a compact disk-read only memory (CD-ROM), or a recording device such as a hard disk built in the computer system. The "computer-readable recording medium" also includes those that store therein a computer program for a short period of time, such as a communication wire in a case where the computer program is transmitted through a communication line such as the Internet and a telephone line, and a volatile memory in a computer system serving as a server or a client in such a case. The computer program may implement a part of the functions described above, and may implement the functions described above in conjunction with a computer program already stored in the computer system.

[0044] The method for specifying the condition according to the present embodiment may be implemented by executing a computer program prepared in advance on a computer such as a personal computer and a work station. The computer program can be distributed through a communication line such as the Internet. The computer program may also be stored in a computer readable recording medium such as a hard disk, a flexible disk (FD), a compact disk-read only memory (CD-ROM), a magneto optical disk (MO), and a digital versatile disk (DVD), and executed by being read out from the recording medium by a computer.

[0045] The processing unit 12 includes a signal acquiring unit 12a, a control condition judging unit 12b, a condition specifying unit 12c, a required time calculating unit 12d, a printing press condition candidate presenting unit 12e, a printing press condition candidate displaying unit 12f, and a printing press operation controlling unit 12g. Among these, the condition specifying device according to the present embodiment includes the signal acquiring unit 12a, the control condition judging unit 12b, the condition specifying unit 12c, the required time calculating

unit 12d, the printing press condition candidate presenting unit 12e, and the printing press condition candidate displaying unit 12f. The functions of the condition specifying device according to the present embodiment are implemented at least by the signal acquiring unit 12a, the control condition judging unit 12b, and the condition specifying unit 12c.

[0046] The signal acquiring unit 12a acquires an electric signal related to the condition of the printing press 1 through the input-output unit 11. The control condition judging unit 12b judges whether the condition of the printing press 1 corresponding to the electric signal acquired by the signal acquiring unit 12a is determined uniquely. If the condition of the printing press 1 corresponding to the electric signal acquired by the signal acquiring unit 12a is not determined uniquely, the condition specifying unit 12c defines the condition of the printing press 1 based on a combination of a plurality of such electric signals. If the condition of the printing press 1 corresponding to the electric signal acquired by the signal acquiring unit 12a is determined uniquely, the condition specifying unit 12c estimates that the condition is the condition of the printing press 1.

[0047] The required time calculating unit 12d calculates the time during which the condition of the printing press 1 defined by the condition specifying unit 12c has continued, and stores the time into the storage unit 13 in a data format associated with the condition of the printing press. If the same condition occurs several times at certain intervals, the required time calculating unit 12d integrates the time of the condition. If the condition of the printing press 1 corresponding to the electric signal is not determined uniquely, the printing press condition candidate presenting unit 12e presents a single or a plurality of candidates of the condition of the printing press 1. The printing press condition candidate presenting unit 12e displays single or a plurality of candidates on a display 14D that is a displaying unit of a control panel 14 that is an input-output portion connected to the input-output unit 11.

[0048] The printing press condition candidate displaying unit 12f displays the condition of the printing press 1 estimated by the condition specifying unit 12c, in a mode different from that of the other candidates displayed on the display 14D. For example, the printing press condition candidate displaying unit 12f may flash the condition of the printing press 1 estimated by the condition specifying unit 12c, or may display in a color different from that of the other candidates. The printing press operation controlling unit 12g controls the operation performed by the printing press 1 such as an operation required for maintenance and an operation required for printing operation.

[0049] The control panel 14 includes an input unit 14C used to enter an instruction for controlling the operation performed by the printing press 1. In the present embodiment, the control panel 14 includes the display 14D of a touch panel type. Accordingly, in the present embodiment, an instruction can be entered into the control panel

14 by using the display 14D, in addition to the input unit 14C.

[0050] The storage unit 13 is a volatile memory such as a random access memory (RAM), a non-volatile memory such as a read-only-memory (ROM), a hard disk device, a magnetooptical disk device, a read-only storage medium such as a compact disk-read only memory (CD-ROM), or a combination of these. The storage unit 13 stores therein a computer program and data for implementing the method for specifying the condition according to the present embodiment, or a computer control program or control data for implementing the control of the printing press 1. By using the computer program and the data, the processing unit 12 implements the method for specifying the condition according to the present embodiment, or control the operation performed by the printing press 1. The storage unit 13 may also be provided in other devices (such as a data server) connected to a communication line 15 (same applies in the following examples). In this case, the printing press control device 10 accesses the storage unit 13 by communicating through the communication line 15.

[0051] The input-output unit 11 is connected to the communication line 15. In this manner, the processing unit 12 of the printing press control device 10 is connected to the communication line 15 through the input-output unit 11. The communication line 15 is the Internet or a local area network (LAN). A summing-up device 16 that sums up the operational status of the printing press 1, and a printing press management device 18 used for the production management of the printing press 1 are connected to the communication line 15.

[0052] The summing-up device 16 includes an input-output unit 17 connected to the communication line 15, a processing unit 16c composed of a CPU, and a storage unit 16m composed of a ROM and a RAM. The summing-up device 16 is formed of a so-called personal computer. The processing unit 16c includes a summing-up unit 12h. The summing-up unit 12h sums up the operational status of the printing press 1, from the relationship between the condition of the printing press and the time during which the condition has continued, acquired from the printing press control device 10 through the communication line 15. The printing press management device 18 acquires the operational status of the printing press 1 summed up by the summing-up device 16, and performs a production control and the like on the printing press 1.

[0053] Fig. 2-1 is a schematic of a printing system including a condition specifying device according to a first modification of the first embodiment. The condition specifying device and a printing system 100A including the same according to the present modification, are similar to the condition specifying device and the printing system 100 described above. The condition specifying device according to the present modification is different from the condition specifying device described above, in that it is implemented by a processing unit 16Ac of a summing-up device 16A connected to the communication line 15.

The other configurations are the same as those in the condition specifying device and the printing system 100 described above.

[0054] In the present modification, a printing press control device 10A is connected to the communication line 15 through the input-output unit 11. The printing press control device 10A includes a processing unit 12A composed of a CPU, and controls the operation performed by the printing press 1 by using the processing unit 12A. A computer program for executing the method for specifying the condition according to the present embodiment is not stored in the storage unit 13, and the processing unit 12A only controls the operation performed by the printing press 1. As will be described below, the summing-up device 16A connected to the communication line 15 executes the method for specifying the condition according to the present embodiment.

[0055] The summing-up device 16A sums up the operational status of the printing press 1, and executes the method for specifying the condition according to the present embodiment. In this manner, the summing-up device 16A acts as a condition specifying device according to the present embodiment. The summing-up device 16A includes the input-output unit 17 connected to the communication line 15, the processing unit 16Ac composed of a CPU, and the storage unit 16m composed of a ROM or a RAM. The summing-up device 16A is formed of a so-called personal computer. The functions of the processing unit 16Ac are the same as those of the processing unit 12 of the printing press control device 10 described above. The functions of the storage unit 16m is the same as the functions of the storage unit 13 of the printing press control device 10 described above.

[0056] The processing unit 16Ac includes the signal acquiring unit 12a, the control condition judging unit 12b, the condition specifying unit 12c, the required time calculating unit 12d, the printing press condition candidate presenting unit 12e, the printing press condition candidate displaying unit 12f, and the summing-up unit 12h. Among these, the signal acquiring unit 12a, the control condition judging unit 12b, the condition specifying unit 12c, the required time calculating unit 12d, the printing press condition candidate presenting unit 12e, and the printing press condition candidate displaying unit 12f are the same as those in the processing unit 12 of the printing press control device 10 described above. Accordingly, the descriptions thereof will be omitted. The processing unit 16Ac executes the method for specifying the condition according to the present embodiment, by acquiring an electric signal related to the condition of the printing press 1, through the printing press control device 10A and the communication line 15.

[0057] The required time calculating unit 12d calculates the time during which the condition of the printing press 1 defined by the condition specifying unit 12c has continued, and stores the time into the storage unit 16m in a data format associated with the condition of the printing press. The summing-up unit 12h acquires the rela-

tionship between the condition of the printing press and the time during which the condition has continued from the storage unit 16m, and sums up the operational status of the printing press 1.

[0058] Fig. 2-2 is a schematic of a printing system including a condition specifying device according to a second modification of the first embodiment. The condition specifying device according to the present modification and a printing system 100B including the condition specifying device, are similar to the condition specifying device and the printing system 100 described above. However, the condition specifying device according to the present modification is different from that described above, in that it is implemented by a printing press control device 10B including the summing-up unit 12h. The other configurations are the same as those in the condition specifying device and the printing system 100 described above.

[0059] In the printing press control device 10B, the summing-up unit 12h is included in the processing unit 12 of the printing press control device 100 illustrated in Fig. 1. The printing press control device 10B executes the method for specifying the condition according to the present embodiment, by acquiring an electric signal related to the condition of the printing press 1 through the input-output unit 11. The summing-up unit 12h then sums up the operational status of the printing press 1, by acquiring the relationship between the condition of the printing press and the time during which the condition has continued, from the storage unit 16m. In the condition specifying device according to the present modification, processes up to the summing up of the operational status of the printing press 1 can be performed in the printing press control device 10B.

[0060] A procedure of the method for specifying the condition according to the present embodiment will now be described. The method for specifying the condition according to the present embodiment is realized by the printing press control device 10 illustrated in Fig. 1, or by the summing-up device 16A illustrated in Fig. 2-1. In the following, in principle, an example of executing the method for specifying the condition according to the present embodiment with the printing press control device 10 illustrated in Fig. 1 as the condition specifying device is described. Examples of using the summing-up device 16A illustrated in Fig. 2-1 and the printing press control device 10B illustrated in Fig. 2-2 as the condition specifying device will also be described as needed (the same applies in the following embodiments).

[0061] Fig. 3 is a flowchart of a procedure of the method for specifying the condition according to the first embodiment. Fig. 4 is a chart of the conditions of a printing press that can be determined uniquely and the conditions of a printing press that cannot be determined uniquely, in the method for specifying the condition according to the first embodiment. Fig. 5 is an example of a timing chart of the method for specifying the condition according to the first embodiment. Fig. 6 is a schematic of a state in which

candidates of the condition of the printing press are displayed on a display, in the method for specifying the condition according to the first embodiment. Fig. 7 is a conceptual diagram of a data map in which the conditions of the printing press and the time during which each of the conditions has continued are described in an associated manner. Fig. 8 is a conceptual diagram of a data map in which job classifications of the printing press and the time during which the classified jobs have continued are summed up and described in an associated manner.

[0062] Upon executing the method for specifying the condition according to the present embodiment, at Step S101, the signal acquiring unit 12a of the processing unit 12 in the printing press control device 10 illustrated in Fig. 1, acquires an electric signal related to the condition of the printing press 1 (hereinafter, referred to as printing press condition electric signal), from sensors of the printing press 1, a control signal sent to an object to be controlled of the printing press 1, and the like. If the summing-up device 16A illustrated in Fig. 2-1 is used as the condition specifying device, the signal acquiring unit 12a of the processing unit 16Ac acquires a printing press condition electric signal, through the printing press control device 10A and the communication line 15 illustrated in Fig. 2-1. The printing press condition electric signal is a control signal sent to the printing press 1 generated by the printing press control device 10, a signal detected by the sensors (such as an opening-closing sensor of a door and a limit sensor for controlling the movement of a movable portion) of the printing press 1, and the like.

[0063] At Step S102, the control condition judging unit 12b of the processing unit 12 in the printing press control device 10 illustrated in Fig. 1, judges whether the condition of the printing press 1 corresponding to the printing press condition electric signal acquired at Step S101 is determined uniquely. To be determined uniquely means that the acquired printing press condition electric signal and the condition of the printing press 1 correspond one-to-one, and if the condition of the printing press 1 corresponding to the printing press condition electric signal is determined uniquely, in other words, singularly, all the other conditions are eliminated.

[0064] Accordingly, to be not determined uniquely means that the acquired printing press condition electric signal and the condition of the printing press 1 do not correspond one-to-one, in other words, there is a plurality of conditions of the printing press 1 corresponding to the acquired printing press condition electric signal. In this case, the condition of the printing press 1 corresponding to the printing press condition electric signal is not determined uniquely, in other words, singularly, and there is a plurality of candidates of the condition of the printing press 1 for one printing press condition electric signal.

[0065] As illustrated in Fig. 4, for example, if the job executed by the printing press 1 is a press run of good sheet, a printing plate change (semi-automatic printing plate change and full-automatic printing plate change), cleaning (automatic blanket cleaning and automatic ink

cleaning), or registration using a clamp, the condition of the printing press 1 corresponding to the printing press condition electric signal is specified to one of the jobs. For example, if the output of a good sheet counter included in the printing press 1 is turned ON, the job executed by the printing press 1 is uniquely specified as the printing on the good sheet. If a signal indicating that the printing plate is being changed is turned ON, the job executed by the printing press 1 is uniquely specified as the printing plate change. If a signal indicating that the blanket is being cleaned is turned ON, or if a signal indicating that the ink is being cleaned (ink passage is being cleaned) is turned ON, the job executed by the printing press 1 is uniquely specified as the blanket cleaning or the ink cleaning.

[0066] In the timing chart illustrated in Fig. 5, a start-up preparation J; registration, color matching, and printing E; printing on good sheet A; and registration using a clamp F are the conditions of the printing press 1 corresponding one-to-one with an ON signal of a printing press condition electric signal ES_a indicating that the power of the printing press 1 is turned ON, an ON signal of a printing press condition electric signal ES_e indicating that the printing is in process, an ON signal of a printing press condition electric signal ES_f indicating that the good sheet counter is turned ON, and an ON signal of a printing press condition electric signal ES_i indicating the registration using a clamp, respectively. For example, if the signal acquiring unit 12a acquires the ON signal of the printing press condition electric signal ES_f indicating that the good sheet counter is turned ON at Step S101, the control condition judging unit 12b specifies that the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101, is the printing on the good sheet A. If the signal acquiring unit 12a acquires the ON signal of the printing press condition electric signal ES_i indicating the registration using a clamp at Step S101, the control condition judging unit 12b specifies that the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101, is the registration using a clamp F.

[0067] If it is judged Yes at Step S102, in other words, if the control condition judging unit 12b judges that the condition of the printing press 1 corresponding to the printing press condition electric signal is determined uniquely, the procedure proceeds to Step S103. In other words, if the control condition judging unit 12b judges that only one type of condition of the printing press 1 corresponds to the acquired printing press condition electric signal, the procedure proceeds to Step S103. At Step S103, the condition specifying unit 12c included in the processing unit 12 of the printing press control device 10 illustrated in Fig. 1 specifies that the condition of the printing press 1 corresponding to the printing press condition electric signal acquired at Step S101 is the condition of the printing press 1 at the point when the printing press condition electric signal is acquired. For example, if the

printing press condition electric signal acquired at Step S101 is the ON signal of the good sheet counter, the condition specifying unit 12c uniquely specifies that the job executed by the printing press 1 (condition of printing press 1) at the point when the ON signal of the good sheet counter is acquired, is printing on the good sheet. The specified condition of the printing press 1 is stored in the storage unit 13 of the printing press control device 10 as needed (the same applies in the following).

[0068] At Step S104, the required time calculating unit 12d of the processing unit 12 in the printing press control device 10 illustrated in Fig. 1, calculates the time (required time) during which the condition of the printing press 1 specified at Step S103 has continued. At Step S105, the required time calculating unit 12d stores data in a format in which the condition of the specified printing press 1 is associated with the required time calculated at Step S104, into the storage unit 13 of the printing press control device 10. A case where it is judged No at Step S102 is now described.

[0069] If it is judged No at Step S102, in other words, if the control condition judging unit 12b judges that the condition of the printing press 1 corresponding to the printing press condition electric signal is not determined uniquely, the procedure proceeds to Step S106. In other words, if the control condition judging unit 12b judges that there is a plurality of conditions of the printing press 1 corresponding to the acquired printing press condition electric signal, the procedure proceeds to Step S106. At this point, the condition specifying unit 12c cannot uniquely determine the condition of the printing press 1. Accordingly, at Step S106, the condition specifying unit 12c classifies the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101, as the "others", and temporarily stores the condition into the storage unit 13.

[0070] At Step S107, the printing press condition candidate presenting unit 12e of the processing unit 12 in the printing press control device 10 presents candidates (hereinafter, referred to as condition candidates) of the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101, and displays the candidates on the display 14D of the control panel 14. In the present embodiment, all the condition candidates are displayed on the display 14D. A single condition candidate may be displayed on the display 14D instead.

[0071] In this case, as illustrated in Fig. 6, job items classified as preparation for printing are displayed as condition candidates SB1 to SB4 on a display region DA1 of the display 14D. Job items classified as maintenance of the printing press 1 are displayed as condition candidates SB5 to SB11 on a display region DA2. Job items that can be estimated by the condition specifying unit 12c by the method for specifying the condition according to the present embodiment, are displayed as condition candidates SB15 to SB28, on a display region DA3 of the display 14D. Job items that are not classified as any of

the preparation for printing, the maintenance, and the job items that can be estimated (in other words, condition candidates), are displayed as condition candidates SB12 to SB14 and SB0, on a display region DA4 of the display 14D. The condition candidate SB0 displayed on the display region DA4 is classified as "others", and is the condition of the printing press 1 that is not classified as any of the condition candidates SB1 to SB29.

[0072] After the condition candidates are displayed on the display 14D, at Step S108, the control condition judging unit 12b judges whether an operator has made an entry, in other words, whether the operator has selected one from the condition candidates displayed on the display 14D as the condition of the printing press 1. If it is judged Yes at Step S108, in other words, if the control condition judging unit 12b judges that the operator has made an entry, the procedure proceeds to Step S109.

[0073] At Step S109, the condition specifying unit 12c specifies the entered condition candidate as the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101. Step S104 and Step S105 described above are then executed, and data in a format in which the condition of the printing press 1 specified at Step S109 is associated with the required time calculated at Step S104, is stored in the storage unit 13 of the printing press control device 10. A case where it is judged No at Step S108 is now described.

[0074] If it is judged No at Step S108, in other words, if the control condition judging unit 12b judges that the operator has not made an entry, the procedure proceeds to Step S110. At Step S110, the signal acquiring unit 12a acquires a printing press condition electric signal from the sensors of the printing press 1 and a control signal to an object to be controlled of the printing press 1. The condition specifying unit 12c, based on the printing press condition electric signal acquired at Step S101 and Step S110, estimates the condition of the printing press 1, at the point when the printing press condition electric signal is acquired at Step S101. The estimation is performed, for example, as follows.

[0075] The correspondence relationship between the combination of a plurality of printing press condition electric signals and the condition of the printing press 1 corresponding to the combination is written in a condition-estimation data map and stored in the storage unit 13 in advance. The condition specifying unit 12c refers to the condition-estimation data map, and estimates the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101. In other words, the condition specifying unit 12c acquires the condition of the printing press 1 corresponding to the combination of the printing press condition electric signals at the point when the printing press condition electric signal is acquired at Step S101, from the condition-estimation data map, and specifies this as the estimated condition of the printing press 1.

[0076] If the condition specifying unit 12c can estimate the condition, the condition specifying unit 12c sets a

condition estimation enable flag F_g from 0 to 1, and temporarily stores the estimated condition of the printing press 1 into the storage unit 13. If the condition specifying unit 12c cannot estimate the condition, the condition specifying unit 12c sets the condition estimation enable flag F_g to 0, and specifies the condition of the printing press 1 to the "others".

[0077] For example, as depicted in the items that "cannot be determined uniquely" illustrated in Fig. 4, if a printing press condition electric signal indicating that the printing press is stopped and a printing press condition electric signal indicating the start of changing the printing plate are acquired in this order, the condition of the printing press 1 (printing press condition) is estimated to be standing-by for a printing plate. Similarly, if a printing press condition electric signal indicating that the printing is in process, a printing press condition electric signal indicating that the printing press is stopped, a printing press condition electric signal indicating that a certain printing unit is in a safe mode, a printing press condition electric signal indicating that the printing plate blanket cover is opened, a printing press condition electric signal indicating inching and reverse inching, a printing press condition electric signal indicating that the printing plate blanket cover is closed, and a printing press condition electric signal indicating the return to operation mode, are acquired in this order, the condition of the printing press 1 is estimated to be the treatment of the printing plate (removal of dust). The same can be applied for manual impression cylinder wash, recess, maintenance of dampening system, maintenance of blanket cleaning device, and refueling illustrated in Fig. 4.

[0078] In the timing chart illustrated in Fig. 5, if the signal acquiring unit 12a acquires an ON signal of a printing press condition electric signal ES_b indicating that the job is in process at Step S101, the condition of the printing press 1 cannot be determined uniquely. Accordingly, in this case, the condition specifying unit 12c stores the other M into the storage unit 13, as the condition of the printing press 1. If the signal acquiring unit 12a acquires an ON signal of a printing press condition electric signal ES_c indicating the printing plate change at Step S110, the condition specifying unit 12c estimates that the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101, is standing-by for a printing plate G ((A) in Fig. 5).

[0079] If the signal acquiring unit 12a acquires an OFF signal of the printing press condition electric signal ES_e indicating that the printing has finished at Step S101, the condition of the printing press 1 cannot be determined uniquely. In this case, the condition specifying unit 12c stores the other M into the storage unit 13, as the condition of the printing press 1. If the signal acquiring unit 12a acquires an ON signal of the printing press condition electric signal ES_e indicating that the printing is in process at Step S110, the condition specifying unit 12c estimates that the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at

Step S101, is registration and color matching job E ((B) in Fig. 5).

[0080] At Step S111, the control condition judging unit 12b judges whether the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101, can be estimated from the combination of the acquired printing press condition electric signals. For example, if the condition estimation enable flag F_g is 1, the control condition judging unit 12b judges that the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101, can be estimated, and if the condition estimation enable flag F_g is 0, the control condition judging unit 12b judges that the condition of the printing press 1 cannot be estimated.

[0081] If it is judged Yes at Step S111, in other words, if the control condition judging unit 12b judges that the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101, can be estimated from the combination of the acquired printing press condition electric signals, the procedure proceeds to Step S112. At Step S112, the printing press condition candidate presenting unit 12e displays the condition candidates at the point when the printing press condition electric signal is acquired at Step S101, on the display 14D of the control panel 14. In the present embodiment, all the condition candidates are displayed on the display 14D.

[0082] At this time, the printing press condition candidate displaying unit 12f displays the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101, estimated by the condition specifying unit 12c based on the combination of the printing press condition electric signals, on the display 14D in a mode different from that of the other candidates. At Step S112, the condition displayed in a mode different from that of the other candidates, for example, is the one that the condition specifying unit 12c has estimated based on the combination of the printing press condition electric signals, among standing-by for a printing plate, treatment of a printing plate, manual impression cylinder wash, recess, maintenance of dampening system, maintenance of a blanket cleaning device, and refuelling, among the printing press conditions that is "selected by operator" in Fig. 4.

[0083] Upon displaying the condition of the printing press estimated based on the combination of the printing press condition electric signals in a mode different from that of the other candidates, for example, if the condition candidate SB15 is estimated by the condition specifying unit 12c, the printing press condition candidate displaying unit 12f displays the condition candidate SB15 in a color different from that of the other condition candidates SB0 to SB14, and SB16 to SB28, or by flashing only the condition candidate SB15. In this manner, it is possible to guide the operator to select the condition candidate easily.

[0084] After the condition candidates are displayed on

the display 14D, at Step S113, the control condition judging unit 12b judges whether an operator has made an entry, in other words, whether the operator has selected one from the condition candidates displayed on the display 14D as the condition of the printing press 1. If it is judged Yes at Step S113, in other words, if the control condition judging unit 12b judges that the operator has made an entry, the procedure proceeds to Step S109. The processes after Step S109 are the same as those described above, and the descriptions thereof are omitted.

[0085] If it is judged No at Step S113, in other words, the control condition judging unit 12b judges that the operator has not made an entry, the procedure proceeds to Step S114. At Step S114, the condition specifying unit 12c specifies that the condition of the printing press 1 estimated at Step S110, is the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101. The condition of the printing press 1 estimated at Step S110 is certainly the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101. This is because it is reasonable to specify the condition of the printing press 1 estimated at Step S110, as the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101 if the operator has not made an entry.

[0086] After the condition of the printing press 1 is specified at Step S114, Step S104 and Step S105 described above are executed, and data in a format in which the condition of the printing press 1 specified at Step S114 is associated with the required time calculated at Step S104, is stored in the storage unit 13 of the printing press control device 10. A case where it is judged No at Step S111 is now described. If it is judged No at Step S111, in other words, if the control condition judging unit 12b judges that the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101, cannot be estimated from the combination of the acquired printing press condition electric signals, the procedure proceeds to Step S115.

[0087] At Step S115, the control condition judging unit 12b judges whether the current job of the printing press 1 has finished. If it is judged Yes at Step S115, in other words, if the control condition judging unit 12b judges that the current job of the printing press 1 has finished, the procedure proceeds to Step S116. For example, if the signal acquiring unit 12a acquires an OFF signal of the printing press condition electric signal ES_b indicating that the job has finished at Step S111, the control condition judging unit 12b judges that the current job of the printing press 1 has finished. In this case, the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101, cannot be determined uniquely. Accordingly, the procedure proceeds to Step S116, and the printing press condition candidate presenting unit 12e displays the condition candidates at the point when the printing press con-

dition electric signal is acquired at Step S101, on the display 14D of the control panel 14. Then the procedure proceeds to Step S117, and the control condition judging unit 12b judges whether an operator has made an entry, in other word, whether the operator has selected one from the condition candidates displayed on the display 14D, as the condition of the printing press 1.

[0088] If it is judged Yes at Step S117, in other words, if the control condition judging unit 12b judges that the operator has made an entry, the procedure proceeds to Step S118. At Step S118, the condition specifying unit 12c specifies the entered condition candidate as the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101.

[0089] In the timing chart illustrated in Fig. 5, if the signal acquiring unit 12a acquires an OFF signal of the printing press condition electric signal ES_b indicating that the job has finished, the condition specifying unit 12c stores the other M into the storage unit 13, as the condition of the printing press 1. If the signal acquiring unit 12a acquires an entry L from the operator at Step S118, the condition specifying unit 12c specifies the condition candidate selected by the operator from the condition candidates displayed on the display 14D and entered by the operator, as the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101 ((C) in Fig. 5). Step S104 and Step S105 described above are then executed, and data in a format in which the condition of the printing press 1 specified at Step S118 is associated with the required time calculated at Step S104, is stored in the storage unit 13 of the printing press control device 10.

[0090] If it is judged No at Step S117, in other words, if the control condition judging unit 12b judges that the operator has not made an entry, the procedure proceeds to Step S119. At Step S119, the condition specifying unit 12c specifies the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101, to the others, and stores the condition into the storage unit 13. This is because, if the condition of the printing press 1 at the point when the printing press condition electric signal is acquired at Step S101 cannot be estimated from the combination of the acquired printing press condition electric signals (No at Step S111), the condition of the printing press 1 cannot be selected from the condition candidates (No at Step S117), and the job has finished, the condition of the printing press 1 cannot be specified in this job.

[0091] If the condition of the printing press 1 is specified as the others at Step S119, Step S104 and Step S105 described above are executed, and data in a format in which the condition of the printing press 1 specified at Step S119 (in other words, the others) is associated with the required time calculated at Step S104, is stored in the storage unit 13 of the printing press control device 10. A case where it is judged No at Step S115 is now described. If it is judged No at Step S115, in other words, if the control condition judging unit 12b judges that the

current job of the printing press 1 has not yet finished, Steps S110 to 119 are repeated.

[0092] In the present embodiment, the condition of the printing press 1 is specified by the procedure described above. The specified condition of the printing press 1 (printing press condition) is associated with the time during which the condition has continued (required time), and is written on a printing press condition map 60 illustrated in Fig. 7 and stored in the storage unit 13 of the printing press control device 10. The required time in the printing press condition map 60, for example, is a value in which each of the printing press conditions in one job is accumulated.

[0093] In the conditions of the printing press 1 stored in the storage unit 13, those classified as the others may be denoted with an identification (ID) for identifying one from the other. For example, the condition of the printing press 1 classified as the others by the manual input of the operator may be specified, by reading out those classified into the others from the storage unit 13, after all the operations in a day has finished. In this manner, it is possible to further reduce unclear conditions of the printing press. The condition candidate selected by the operator from the condition candidates displayed on the display 14D may be stored in the storage unit 13, in a file different from that specified by the printing press control device 10 (in other words, condition specifying device according to the present embodiment). In this manner, for example, the condition candidate specified by the printing press control device 10 and the condition candidate selected by the operator may be compared during summing up, thereby selecting a more accurate condition.

[0094] The summing-up unit 12h of the summing-up device 16 connected to the communication line 15 illustrated in Fig. 1 acquires the printing press condition map 60, from the storage unit 13 of the printing press controlling unit 10 through the communication line 15. The summing-up unit 12h, for example, as illustrated in a printing press job classification map 61 in Fig. 8, sums up the printing press conditions written on the printing press condition map 60 and classifies the conditions as a job of the printing press 1. For example, in the printing press conditions written on the printing press condition map 60, a manual blanket cleaning, a manual ink cleaning, and the like are classified as cleaning among the jobs of the printing press 1. Accordingly, the accumulated time of the manual blanket cleaning, the manual ink cleaning, and the like are written in the cleaning of the job classification of the printing press in the printing press job classification map 61. Similarly, a manual printing plate change, a printing plate change at a fixed position of a plate cylinder, and the like are classified as the printing plate change among the jobs of the printing press 1. Accordingly, the accumulated time of the manual printing plate change, the printing plate change at the fixed position of the plate cylinder, and the like are written in the printing plate change of the job classification of the print-

ing press of the printing press job classification map 61.

[0095] The total time of the jobs of the printing press 1, the time during which the power is turned ON, and non-printing time are written on the printing press job classification map 61. The non-printing time is calculated by subtracting the total time of the jobs of the printing press 1 from the time during which the power of the printing press 1 is turned ON. By using the printing press job classification map 61 for each working day created in this manner, an operation report of the printing press 1 is created. The summing up of the conditions of the printing press 1 is not limited to the examples, and items of interest in the operations, operational status, and the like of the printing press 1, may be summed up. If the summing-up device 16A illustrated in Fig. 2-1 is used, the summing-up device 16A specifies the condition of the printing press 1 by acquiring a printing press condition electric signal through the printing press control device 10A and the communication line 15, and stores the condition into the storage unit 16m of the summing-up device 16A.

The specified condition of the printing press is then summed up, and for example, the printing press job classification map 61 is created.

[0096] In the present embodiment and the modifications, depending on the printing press condition electric signal and the operator, if the condition of the printing press is not determined uniquely, the condition of the printing press is estimated based on the combination of the printing press condition electric signals. In this manner, it is possible to reduce unclear conditions of the printing press. Accordingly, information obtained by summing up the conditions of the printing press is more accurate in detail. As a result, the operational status and the like of the printing press can be known more accurately. Because the condition of the printing press is automatically estimated by a computer, it is possible to reduce the process required for estimation.

(Second Embodiment)

[0097] Fig. 9 is a flowchart of a procedure of a method for specifying a condition according to a second embodiment. The second embodiment is substantially the same as the first embodiment, but is different from the first embodiment in that the condition of the printing press 1 is classified based on the time during which the specified condition of the printing press has continued, in other words, the required time. In the following, the conditions of the printing press 1 also include operations on the printing press 1 by an operator, such as changing of the printing plate and removing of dust from the roller of the printing press 1 by the operator, in addition to the conditions of the printing press.

[0098] The method for specifying the condition according to the second embodiment is executed after the required time of the specified condition of the printing press 1 is calculated in the method for specifying the condition according to the first embodiment. The method for spec-

ifying the condition according to the second embodiment may be executed after the required time of the specified condition of the printing press 1 is calculated, for example, after Step S104 or Step S105 in Fig. 3.

[0099] Step S201 of the method for specifying the condition according to the second embodiment is executed, after the required time of the specified condition of the printing press 1 is calculated (for example, after Step S105 in Fig. 3) in the method for specifying the condition according to the first embodiment. At Step S201, the control condition judging unit 12b illustrated in Fig. 1 judges whether required time T required for the condition of the printing press 1 specified in the method for specifying the condition according to the first embodiment, is equal to or less than a predetermined first threshold Ta.

[0100] If it is judged Yes at Step S201, in other words, if the control condition judging unit 12b judges that it is $T \leq Ta$, the procedure proceeds to Step S202. At Step S202, the condition specifying unit 12c illustrated in Fig. 1 classifies the condition of the printing press 1 as a condition A, and stores the condition into the storage unit 13 of the printing press control device 10. If it is judged No at Step S201, in other words, if the control condition judging unit 12b judges that it is $T > Ta$, the procedure proceeds to Step S203. At Step S203, the control condition judging unit 12b judges whether the required time T required for the condition of the printing press 1 specified in the method for specifying the condition according to the first embodiment is equal to or less than a predetermined second threshold Tb.

[0101] If it is judged Yes at Step S203, in other words, if the control condition judging unit 12b judges that it is $Ta < T \leq Tb$, the procedure proceeds to Step S204. At Step S204, the condition specifying unit 12c classifies the condition of the printing press 1 as a condition B, and stores the condition into the storage unit 13 of the printing press control device 10. If it is judged No at Step S203, in other words, if the control condition judging unit 12b judges that it is $T > Tb$, the procedure proceeds to Step S205. At Step S205, the condition specifying unit 12c classifies the condition of the printing press 1 as a condition C, and stores the condition into the storage unit 13 of the printing press control device 10.

[0102] The first threshold Ta and the second threshold Tb are thresholds for classifying the condition of the printing press 1, and are set and stored in the storage unit 13 in advance. For example, the first threshold Ta and the second threshold Tb are the time required for an operation performed on the printing press 1 by an operator such as the time required to remove dust from the roller, the time required to change the printing plate, and the time required to adjust the nip.

[0103] To execute Step S201 and Step S202, the control condition judging unit 12b reads out the first threshold Ta or the second threshold Tb from the storage unit 13 to be compared with the required time T. The first threshold Ta or the second threshold Tb, for example, may be an average value of the time during which the condition

A and the condition B have continued, or may be set individually, depending on the skill level of the operator of the printing press 1, and the design and the paper quality of printing. If the first threshold Ta and the second threshold Tb are to be set individually, the first threshold Ta and the second threshold Tb may be changed depending on the skill level of the operator, and the first threshold Ta and the second threshold Tb may be changed depending on the design and the paper quality of printing. In this manner, in the method for specifying the condition according to the second embodiment, the condition of the printing press 1 can be more accurately classified.

[0104] If the relationship between the condition of the printing press 1 and the required time T required for the condition is accumulated, the first threshold Ta and the second threshold Tb may be reset, by using the statistics such as the average value and the standard deviation. For example, the condition specifying unit 12c illustrated in Fig. 1 calculates the statistics of the required time T required for a certain condition of the printing press 1, from the relationship between the condition of the printing press 1 and the required time T accumulated in the storage unit 13, and resets the first threshold Ta and the second threshold Tb based on the result. For example, if the average value of the required time T required for a certain condition of the printing press 1 is used as the statistics, the condition specifying unit 12c calculates the average value of the required time T required for the condition A, the condition B, and the like, and if the calculated average value is different from the latest first threshold Ta or the second threshold Tb, the condition specifying unit 12c resets the calculated average value to the first threshold Ta or the second threshold Tb, and stores the value into the storage unit 13. In this manner, in the method for specifying the condition according to the second embodiment, the condition of the printing press 1 can be more accurately classified.

[0105] The conditions A, B, and C classified in the method for specifying the condition according to the second embodiment, for example, may be obtained by further subdividing the printing press condition that cannot be determined uniquely, illustrated in Fig. 4, with the first threshold Ta or the second threshold Tb. For example, if the printing press condition is estimated from the combination of signals, or selected by an operator as the treatment of the printing plate, the treatment of the printing plate is further subdivided into removal of dust (condition A), maintenance of roller (condition B), and adjustment of nip (condition C), with the first threshold Ta or the second threshold Tb. In other words, if the required time T is equal to or less than the first threshold Ta, the printing press condition is classified as the removal of dust, if the required time T is larger than Ta and equal to or less than the second threshold Tb, the printing press condition is classified as the maintenance of roller, and if the required time T is larger than the second threshold Tb, the printing press condition is classified as the adjustment of nip. In

this manner, the printing press condition that cannot be determined uniquely can be further subdivided to be estimated and specified.

[0106] The conditions A, B, and C classified in the method for specifying the condition according to the second embodiment, for example, may be the printing press condition that cannot be determined uniquely, and may be classified with the first threshold Ta and the second threshold Tb, from the candidates estimated from the combination of signals. For example, in the method for specifying the condition according to the first embodiment, if there is a plurality of condition candidates of the printing press 1 estimated from the combination of signals, the condition candidates SB0, SB1, and the like are displayed on the display 14D in Fig. 1. Because these are only estimations derived from the combination of signals, the condition candidates may be different from the actual job performed by the operator of the printing press 1. Accordingly, the estimated condition candidates are classified with the first threshold Ta and the second threshold Tb. As described above, if the first threshold Ta and the second threshold Tb are individually set depending on the skill level of the operator of the printing press 1, and the design and the paper quality of printing, the actual job condition can be reflected on the classification of the estimated condition candidate. Accordingly, the printing press condition that cannot be determined uniquely can be more accurately estimated. In the present embodiment, the condition of the printing press 1 is classified into three types. However, the number of classifications of the condition of the printing press 1 is not limited thereto.

[0107] Fig. 10 is a flowchart of a method for setting a threshold of required time used to classify the condition of the printing press in the second embodiment. To classify the condition of the printing press 1 based on the time during which the specified condition of the printing press 1 has continued, in other words, the required time T, the first threshold Ta and the second threshold Tb (threshold of the required time T used to classify the condition of the printing press 1) need to be set. As described above, the first threshold Ta and the second threshold Tb may be stored in the storage unit 13 in advance. As will be described below, the first threshold Ta and the second threshold Tb may instead be set by using the required time T that is the time during which the condition of the printing press 1 has actually continued. In this manner, the actual operating condition can be reflected on the first threshold Ta and the second threshold Tb. Accordingly, the printing press condition can be more accurately estimated.

[0108] This method is executed after the required time T of the specified condition of the printing press 1 is calculated (for example, after Step S104 or after Step S105 in Fig. 3), and before the method for specifying the condition according to the second embodiment is executed. To set the threshold of the required time used to classify the condition of the printing press, at Step S301, the con-

trol condition judging unit 12b illustrated in Fig. 1 judges whether the operator of the printing press 1 has selected one from the condition candidates SB0, SB1, and the like presented by the printing press control device 1 as the condition of the printing press 1, in other words, whether the operator has made an entry. Whether the operator has made an entry is determined at Step S113 and Step S117 in the method for specifying the condition according to the first embodiment. Accordingly, if it is judged Yes at Step S113 and Step S117, the threshold of the required time is set by the present procedure.

[0109] If it is judged No at Step S301, in other words, if the control condition judging unit 12b judges that the operator has not made an entry, the present procedure is finished. If it is judged Yes at Step S301, in other words, if the control condition judging unit 12b judges that the operator has made an entry, the procedure proceeds to Step S302. At Step S302, it is determined whether the condition of the printing press entered by the operator is appropriate. To make the confirmation, the control condition judging unit 12b displays accordingly on the display 14D illustrated in Fig. 1 for the operator to make an entry. This is because, the input of the operator at Step S113 and Step S117 illustrated in Fig. 1 may be a mistake.

[0110] If it is judged No at Step S302, in other words, if the operator makes an entry indicating that the condition of the printing press entered by the operator is wrong, the present procedure is finished. In this case, the operator may re-enter the correct condition of the printing press, thereby making the procedure proceed to Step S303. If it is judged Yes at Step S302, in other words, if the operator makes an entry indicating that the condition of the printing press entered by the operator is correct, the procedure proceeds to Step S303. At Step S303, the required time T during which the condition of the printing press 1 has continued specified by the method for specifying the condition according to the first embodiment, calculated at Step S104 in Fig. 1, is displayed on the display 14D. For example, the required time calculating unit 12d in Fig. 1 displays the required time T. The required time T is calculated at Step S104 in Fig. 3, by the required time calculating unit illustrated in Fig. 1.

[0111] At Step S304, the required time calculating unit 12d allows the operator of the printing press 1 to judge whether the required time T should be set as a threshold used for classifying the condition of the printing press 1. Accordingly, the required time calculating unit 12d displays a screen to allow the operator to judge whether the required time T should be set as the threshold on the display 14D. If it is judged No at Step S304, in other words, if the operator of the printing press 1 makes an entry indicating that the required time T should not be set as a threshold used to classify the condition of the printing press 1 into the printing press control device 10, the present procedure is finished.

[0112] If it is judged Yes at Step S304, in other words, if the operator of the printing press 1 makes an entry indicating that the required time T should be set as a

threshold used to classify the condition of the printing press 1 into the printing press control device 10, the procedure proceeds to Step S305. At Step S305, the required time calculating unit 12d sets an allowance value of the threshold. Accordingly, the required time calculating unit 12d displays a screen for the operator to enter an allowance value ΔT on the display 14D. By setting the allowance value ΔT , the skill level of the operator of the printing press 1, and the degree of difficulty (design and paper quality) of printing can also be taken into consideration. Accordingly, it is possible to prevent the estimation accuracy of the condition of the printing press from degrading.

[0113] At Step S305, if the operator of the printing press 1 has entered the allowance value ΔT into the printing press control device 10, the procedure proceeds to Step S306. The required time calculating unit 12d sets a value $T+\Delta$ that is a value obtained by adding the allowance value ΔT to the required time T , as a threshold (such as first threshold T_a and second threshold T_b) used for classifying the condition of the printing press 1, and stores the value into the storage unit 13. To classify the condition of the printing press 1 after this, the threshold set at Step S305 is used.

(Third Embodiment)

[0114] Fig. 11 is a schematic of an operation panel of the printing press. Fig. 12 is a conceptual diagram of a data map indicating a relationship between an electric signal used to allow an operator of the printing press enter the condition of the printing press, and the condition of the printing press. A third embodiment is unique in that an electric signal for maintaining the condition of the printing press 1 at present is used upon allowing the operator of the printing press 1 to enter the condition of the printing press in the method for specifying the condition according to the first embodiment. In the present embodiment, for example, if the display 14D of the printing press control device 1 illustrated in Fig. 1 and the like, is far from the operator, the present condition of the printing press 1 is specified by the operator operating the combination of a plurality of input units (such as operation buttons) on an operation panel of the printing press 1.

[0115] In the first embodiment described above, the condition of the printing press 1 is estimated from the electric signal. Thus, if the printing press 1 is simply being stopped, or running idle, the condition of the printing press 1 cannot be further estimated. For example, the condition of standing-by for a printing plate in which a printing plate is waited for to be prepared, is the condition in which the printing press 1 is simply being stopped, or running idle, and the condition of the printing press 1 cannot be further estimated. Accordingly, in the present embodiment, the present condition of the printing press 1 is specified, for example, with the operator pressing buttons 5a to 5n on an operation panel 5 provided on the delivery unit 4 of the printing press 1 illustrated in Fig. 1,

or on a remote control desk of the printing press 1.

[0116] If the display 14D of the printing press controlling unit 1 is far from the operator, and the operation panel 5 is near the operator, the moving distance of the operator is reduced if the operator makes an entry from the operation panel 5. Accordingly, the workload on the operator is reduced. In this manner, the operator can easily enter the condition of the printing press 1, and the condition of the printing press 1 can be specified more easily. If the condition of the printing press 1 can be entered by using buttons on the operation panel provided not only on the delivery unit 4, but also on the paper feeder unit 2, and the printing units 3a, 3b, 3c, and 3d, the workload on the operator can be more reduced. In this manner, in the present embodiment, an environment where the operator can easily enter the condition of the printing press 1 can be provided. Accordingly, the operator can easily enter the condition of the printing press 1, and as a result, the condition of the printing press 1 can be specified more easily.

[0117] In the present embodiment, if the operator of the printing press 1 enters the condition of the printing press 1 by using the buttons 5a to 5n on the operation panel 5, the operator presses a button, or performs button operation, to generate an electric signal for maintaining the present condition of the printing press 1. In this manner, regardless of the entry by the operator, the condition of the printing press 1 can be specified, while maintaining the operational status of the printing press 1 at present. In this manner, it is possible to prevent the condition of the printing press 1 from being affected. Accordingly, it is possible to prevent the printing press 1 from starting, or an operating printing press from stopping, by the entry of the operator. The electric signal for maintaining the present condition of the printing press 1, for example, is a signal generated by pressing a preparation button 5b of the printing press 1, a signal generated by pressing a stopping button 5a while the printing press 1 is stopped, a signal generated by pressing a Smart Print End (SPE) button 51, and the like.

[0118] For example, as illustrated in a data map 62 of Fig. 12, if the operation performed by the operator is such that the preparation button 5b is pressed once while the stopping button 5a is kept being pressed, the present condition of the printing press 1 is classified as A (such as removal of dust from the printing plate). If the operation performed by the operator is such that the SPE button 51 is pressed once while the stopping button 5a is kept being pressed, the present condition of the printing press 1 is classified as B (such as maintaining roller). If the operation performed by the operator is such that the stopping button 5a is pressed twice, and the preparation button 5b is pressed twice, the present condition of the printing press 1 is classified as Z (for example, refueling).

(Fourth Embodiment)

[0119] Fig. 13 is a conceptual diagram of a data map

used to narrow down the candidate of the condition of the printing press. A fourth embodiment is approximately the same as the first embodiment, but different from the first embodiment in that the candidate of the condition (condition candidate) of the printing press 1, is narrowed down based on the time during which the specified printing press 1 has continued, in other words, the required time. The time (required time) during which the specified condition of the printing press 1 has continued, is calculated by the method for specifying the condition according to the first embodiment. If the required time is accumulated, the condition of the printing press 1 can be estimated from the accumulated required time. The accumulated required time of a certain condition of the printing press 1, such as the printing plate change, is statically processed, and if the required time obtained by performing a certain routine of a method for specifying the condition falls within a predetermined range relative to the average value of the accumulated required time T, the condition of the printing press 1 relative to the required time obtained by the certain routine of the method for specifying the condition is estimated as the printing plate change.

[0120] In this manner, by estimating the condition of the printing press 1 based on the accumulated required time, if the required time in a certain routine exceeds a predetermined range relative to the average value of the accumulated required time T, the condition of the printing press 1 relative to the required time within the predetermined range for the average value of the accumulated required time T can be excluded from the condition of the printing press 1 in the routine. In this manner, for example, upon displaying the candidates of the condition of the printing press 1 on the display 14D illustrated in Fig. 1 at Step S112 and Step S116 illustrated in Fig. 3, it is possible to narrow down the candidate. To narrow down the candidate, the excluded candidates may not be displayed on the display 14D, or, for example, may be discretely displayed on the display 14D.

[0121] The candidates of the condition of the printing press 1, in other words, the condition candidates SB0, SB1, SB2, ..., SBn, and average values of required time T0_m, T1_m, T2_m, ..., Tn_m relative to the condition candidates, are written in a data map 63 illustrated in Fig. 13. The average values of the required time T0_m, T1_m, T2_m, ..., Tn_m are updated as the required time is accumulated. A predetermined range may be given to the average values of required time T0_m, T1_m, T2_m, ..., Tn_m written in the data map 63. Such a data map 63 is stored in the storage unit 13 illustrated in Fig. 1, and the candidate of the condition (condition candidate) of the printing press 1 is narrowed down therewith. In this manner, the condition of the printing press can be estimated more accurately. In a case where the operator of the printing press 1 selects a condition candidate, the condition candidate can be selected speedily, by narrowing down the condition candidate.

(Fifth Embodiment)

[0122] Fig. 14 is a conceptual diagram of a data map describing the specification of an operation performed by the printing press for each of the operators of the printing press. In a fifth embodiment, the specification of the operation performed by the printing press 1, for example, condition candidates of the printing press 1 displayed on the display 14D, a threshold of the required time used to classify the condition of the printing press 1, and the like can be changed corresponding to an operator of the printing press 1. In this manner, the threshold can be changed according to an operator. For example, the condition of the printing press can be more accurately estimated, by providing high threshold for beginners, and providing low threshold for skilled operators. Because the display items on the display 14D can be changed and the button arrangement on a touch panel can be changed individually, so that an individual operator can operate easily, the work efficiency of the operator can be improved.

[0123] In a data map 64 illustrated in Fig. 14, IDs of the operators are associated with specifications of the operation performed by the printing press 1, such as the display information like the condition candidates SB0 and SB1 displayed on the display 14D, and thresholds used for classifying the condition of the printing press 1. The data map 64 is stored in the storage unit 13 illustrated in Fig. 1, and upon performing the printing job, the operator of the printing press 1 enters his/her ID from the control panel 14 of the printing press control device 10. The specification of the operation performed by the printing press 1 corresponding to the entered ID is read out from the data map 64, and set in the printing press control device 10. In this manner, the printing press 1 can be operated according to the specification of the operation performed by the printing press 1 corresponding to the entered ID.

[0124] For example, if an ID of an operator is abcde, the condition candidates SB5 and SB6 for maintenance are not displayed on the display 14D, and the first threshold Ta is set as Ta1 and the second threshold Tb is set as Tb1. If an ID of an operator is bafgk, the condition candidate SB11 of the maintenance is not displayed on the display 14D, and the first threshold Ta is set as Ta1 and the second threshold Tb is set as Tb2. If an ID of an operator is mlngz, the condition candidate SB1 for preparation and the condition candidate SB10 for maintenance are not displayed on the display 14D, and the first threshold Ta is set as Ta8, and the second threshold Tb is set as Tb5. In this manner, the specification of the operation performed by the printing press 1 can be changed according to the operator. Thus, the advantages such as the improved accuracy of estimation of the condition of the printing press 1, and the improved work efficiency of an operator can be obtained.

INDUSTRIAL APPLICABILITY

[0125] In this manner, the condition specifying device

for a printing press, the method for specifying a condition of a printing press, and the computer program for specifying a condition of a printing press according to the present invention are advantageous in collecting the conditions of the printing press. More specifically, the condition specifying device for a printing press, the method for specifying a condition of a printing press, and the computer program for specifying a condition of a printing press are suitable for reducing unclear conditions.

Claims

1. A condition specifying device for a printing press, the condition specifying device comprising:

a signal acquiring unit that acquires an electric signal related to a condition of the printing press; a control condition judging unit that judges whether the condition of the printing press corresponding to the electric signal acquired by the signal acquiring unit is determined uniquely; and a condition specifying unit that, if the control condition judging unit judges that the condition of the printing press corresponding to the electric signal is not determined uniquely, estimates the condition of the printing press based on a combination of a plurality of such electric signals.

2. The condition specifying device for a printing press according to claim 1, further comprising a printing press condition candidate presenting unit that, if the condition of the printing press corresponding to the electric signal is not determined uniquely, displays a plurality of candidates of the condition of the printing press on a displaying unit.

3. The condition specifying device for a printing press according to claim 2, further comprising a printing press condition candidate displaying unit that, to display the candidates on the displaying unit, displays the condition of the printing press estimated based on the combination of the electric signals in a mode different from that of other candidates.

4. The condition specifying device for a printing press according to claim 2 or 3, wherein if the condition of the printing press is selected from the candidates displayed on the displaying unit, the condition specifying unit defines the candidate being selected as the condition of the printing press.

5. The condition specifying device for a printing press according to claim 2 or 3, wherein if the condition of the printing press is not selected from the candidates being presented, the condition specifying unit defines the condition of the printing press estimated based on the combination of the electric signals as

the condition of the printing press.

6. The condition specifying device for a printing press according to any one of claims 2 to 5, further comprising a required time calculating unit that, after the condition of the printing press is defined, calculates time during which the condition of the printing press being defined has continued.

7. The condition specifying device for a printing press according to claim 6, wherein after the condition of the printing presses is defined, the required time calculating unit sums up time required for the condition for each type of the condition of the printing press.

8. The condition specifying device for a printing press according to claim 6, wherein the condition specifying unit classifies the condition of the printing press based on the required time calculated by the required time calculating unit.

9. The condition specifying device for a printing press according to claim 6, wherein the condition specifying unit classifies the condition of the printing press by comparing the required time calculated by the required time calculating unit with a threshold for classifying the condition of the printing press set in advance.

10. The condition specifying device for a printing press according to claim 9, wherein the threshold is obtained by adding a predetermined allowance value to the required time calculated by the required time calculating unit.

11. The condition specifying device for a printing press according to claim 1, wherein if the condition of the printing press corresponding to the electric signal is not determined uniquely, the condition of the printing press is entered by using an electric signal for maintaining the condition of the printing press at present.

12. A method for specifying a condition of a printing press, the method comprising:

a step of acquiring an electric signal related to the condition of the printing press; and a step of estimating the condition of the printing press based on a combination of a plurality of such electric signals if the condition of the printing press corresponding to the electric signal is not determined uniquely.

13. The method for specifying a condition of a printing press according to claim 12, wherein if the condition of the printing press corresponding to the electric signal is not determined uniquely, a candidate of the condition of the printing press is presented before

defining the condition of the printing press.

14. The method for specifying a condition of a printing press according to claim 13, wherein to display the candidate on a displaying unit, the condition of the printing press estimated based on the combination of the electric signals is presented in a mode different from that of other candidate. 5
15. The method for specifying a condition of a printing press according to claim 13 or 14, wherein if the condition of the printing press is selected from the candidate being presented, the candidate being selected is defined as the condition of the printing press. 10
16. The method for specifying a condition of a printing press according to claim 13 or 14, wherein if the condition of the printing press is not selected from the candidate being presented, the condition of the printing press estimated based on the combination of the electric signals is defined as the condition of the printing press. 15
17. The method for specifying a condition of a printing press according to any one of claims 13 to 16, wherein after the condition of the printing press is being defined, time during which the condition of the printing press being defined has continued is calculated. 20
18. The method for specifying a condition of a printing press according to claim 17, wherein after the condition of the printing press is being defined, time required for the condition is summed up for each type of the condition of the printing press. 25
19. The method for specifying a condition of a printing press according to claim 17, wherein the condition of the printing press is classified based on the required time calculated by the required time calculating unit. 30
20. The method for specifying a condition of a printing press according to claim 17, wherein the condition of the printing press is classified by comparing the required time calculated by the required time calculating unit with a threshold for classifying the condition of the printing press set in advance. 35
21. The method for specifying a condition of a printing press according to claim 20, wherein the threshold is obtained by adding a predetermined allowance value to the required time calculated by the required time calculating unit. 40
22. The method for specifying a condition of a printing press according to claim 12, wherein if the condition of the printing press corresponding to the electric signal is not determined uniquely, the condition of 45

the printing press is entered by using an electric signal for maintaining the condition of the printing press at present.

23. A computer program for specifying a condition of a printing press, wherein the computer program causes a computer to implement the method for specifying a condition of a printing press according to any one of claims 12 to 22. 50

FIG.1

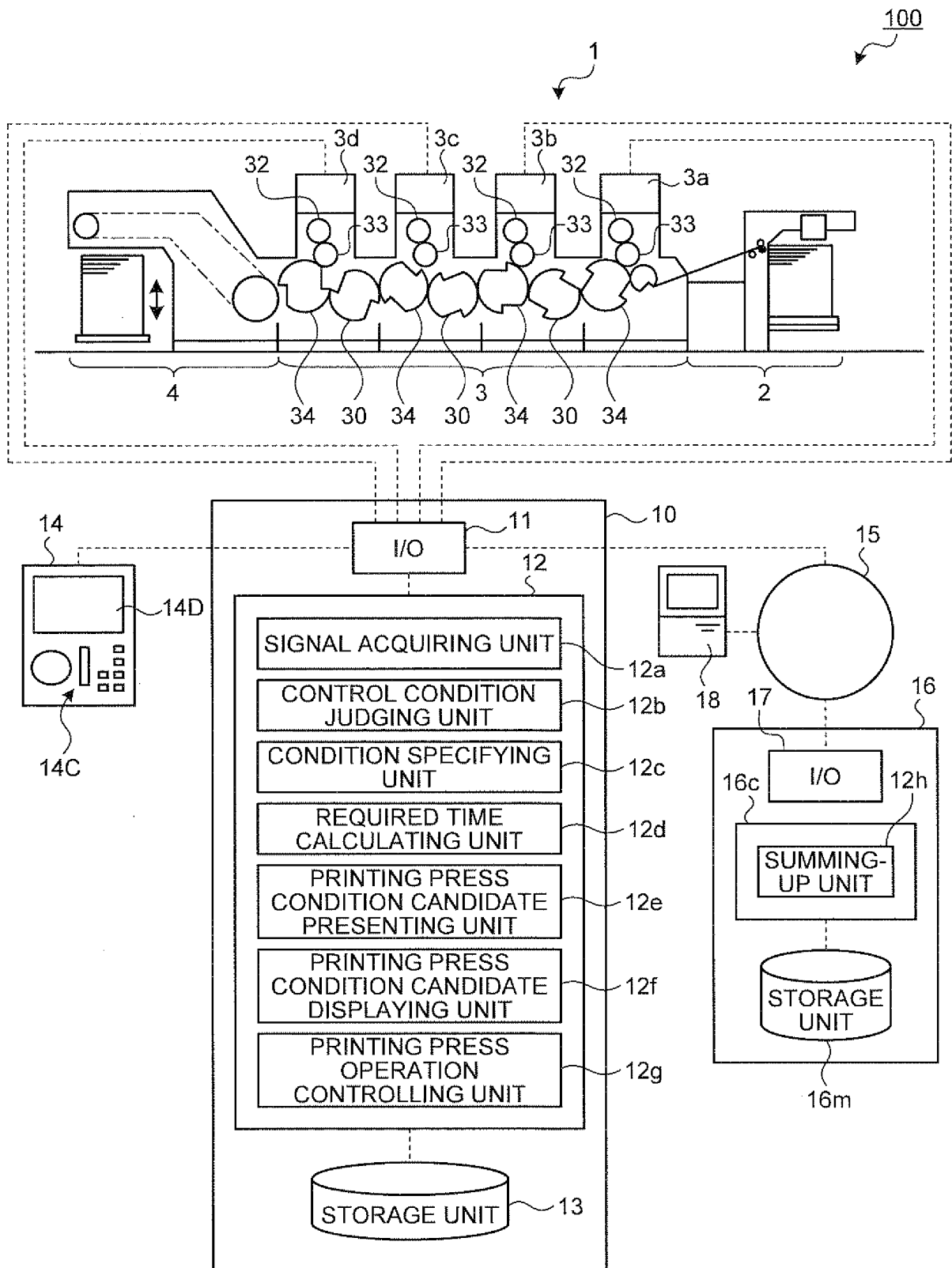


FIG.2-1
100A

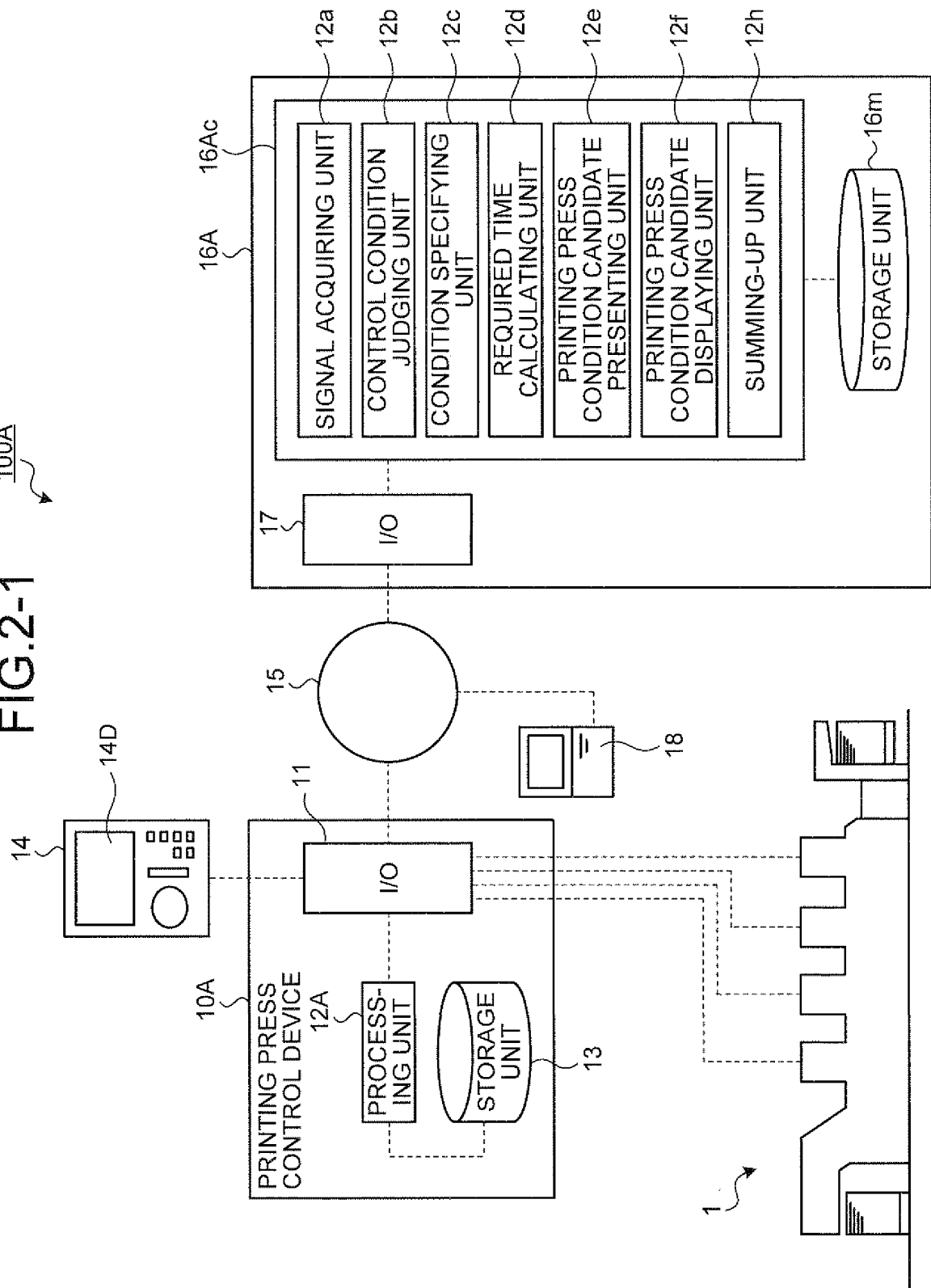


FIG.2-2

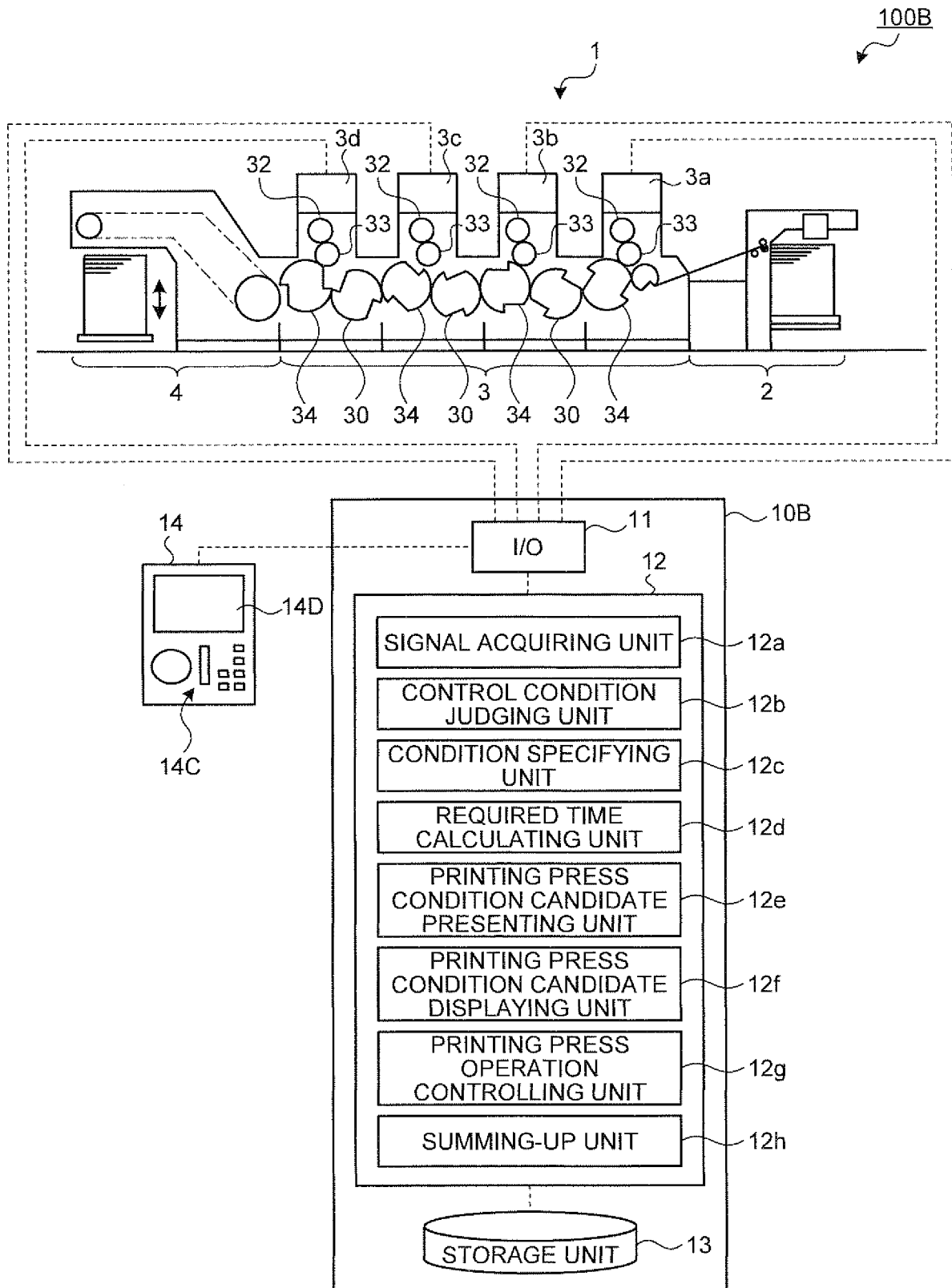


FIG.3

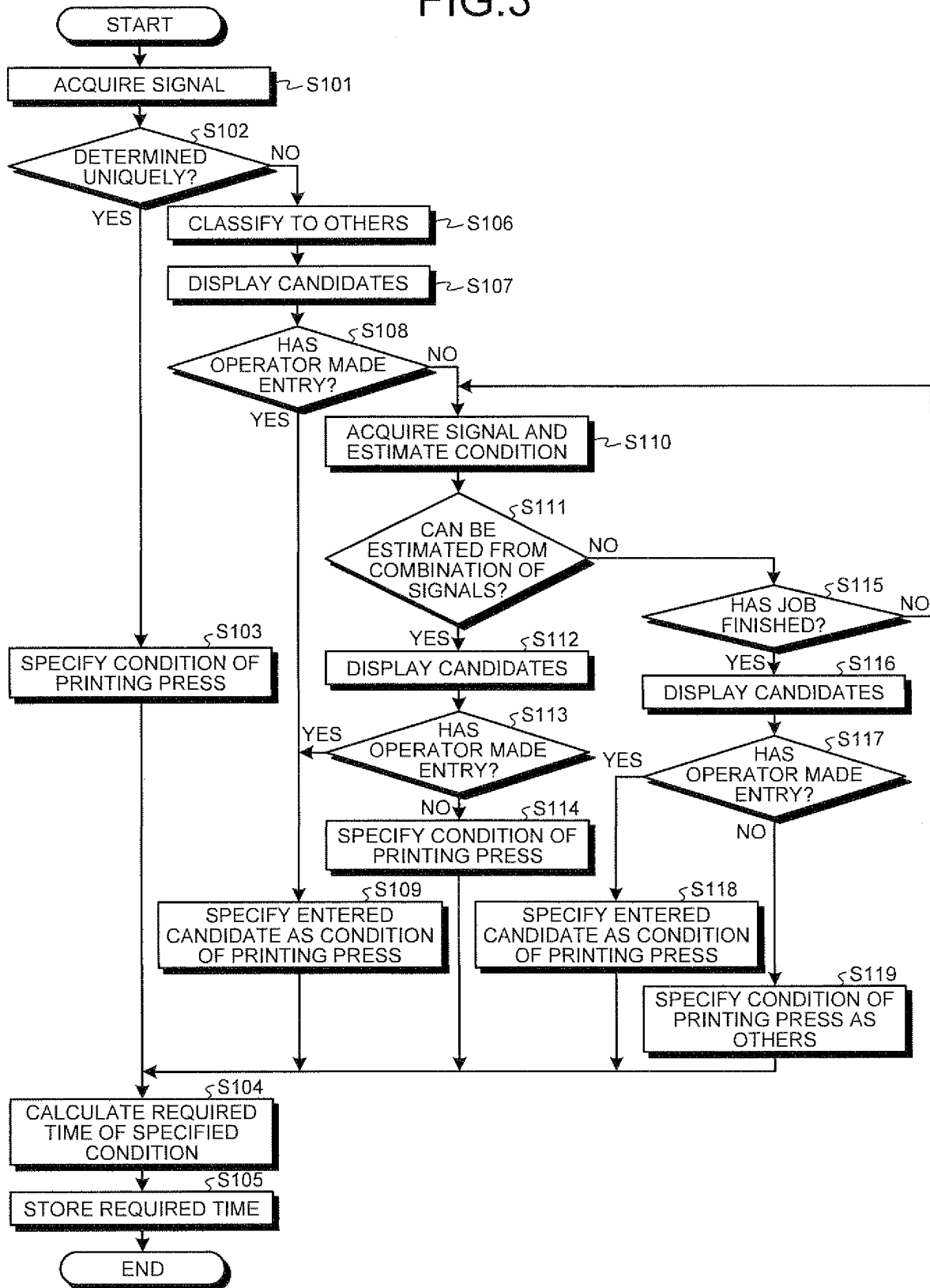


FIG.4-1

JOB CLASSIFICATION OF PRINTING PRESS	CONDITION OF PRINTING PRESS	CAN BE DETERMINED UNIQUELY	CANNOT BE DETERMINED UNIQUELY	SELECTED BY OPERATOR
PRINTING ON REGULAR PAPER	PRESS RUN	O	-	-
PRINTING PLATE CHANGE	SEMI-AUTOMATIC/ FULL-AUTOMATIC	O	-	-
CLEANING	AUTOMATIC BLANKET CLEANING	O	-	-
	AUTOMATIC INK CLEANING	O	-	-
PREPARATION FOR PRINTING	REGISTRATION USING VISE	O	-	-
	STANDING-BY FOR PRINTING PLATE	-	(1)PRINTING PRESS IS STOPPED (2)START CHANGING PRINTING PLATE PERIOD BETWEEN NON-PRINTING TIME AND START CHANGING PRINTING PLATE	SELECT CANDIDATE ON SCREEN
	TREATMENT OF PRINTING PLATE (REMOVAL OF DUST)	-	(1)PRINTING IS IN PROCESS (REGARDLESS OF ON OR OFF OF PAPER DISCHARGE COUNTER) (2)PRINTING PRESS IS STOPPED (3)CERTAIN PRINTING UNIT IS IN SAFE MODE (4)OPEN PRINTING PLATE BLANKET COVER (5)INCHING/REVERSE INCHING (6)CLOSE PRINTING PLATE BLANKET COVER (7)RETURN TO OPERATION MODE	SELECT CANDIDATE ON SCREEN
	MANUAL IMPRESSION CYLINDER WASH	-	(1)CERTAIN PRINTING UNIT IS IN SAFE MODE (2)OPEN SCAFFOLD COVER (3)INCHING (4)CLOSE SCAFFOLD COVER (5)RETURN TO OPERATION MODE	SELECT CANDIDATE ON SCREEN

FIG.4-2

JOB CLASSIFICATION OF PRINTING PRESS	CONDITION OF PRINTING PRESS	CAN BE DETERMINED UNIQUELY	CANNOT BE DETERMINED UNIQUELY	SELECTED BY OPERATOR
RECESS	RECESS	-	(1)ENTER ESTIMATION TIME IN ADVANCE (2)PERIOD OF NOT OPERATING PRINTING PRESS	SELECT CANDIDATE ON SCREEN
MAINTENANCE	MAINTENANCE OF DAMPENING SYSTEM	-	(1)CERTAIN PRINTING UNIT IS IN SAFE MODE (2)OPEN DAMPENING COVER (3)INCHING/REVERSE INCHING (4)CLOSE DAMPENING COVER (5)RETURN TO OPERATION MODE	SELECT CANDIDATE ON SCREEN
	MAINTENANCE OF BLANKET CLEANING DEVICE	-	(1)CERTAIN PRINTING UNIT IS IN SAFE MODE (2)OPEN BLANKET WASHER COVER (3)INCHING/REVERSE INCHING (4)CLOSE BLANKET WASHER COVER (5)RETURN TO OPERATION MODE	SELECT CANDIDATE ON SCREEN
	REFUELING	-	(1)CUE SIGNAL	SELECT CANDIDATE ON SCREEN
STANDING-BY	SHEET, PRINTING PLATE, INSTRUCTION, ETC.	-	-	SELECT CANDIDATE ON SCREEN

G. S. F.

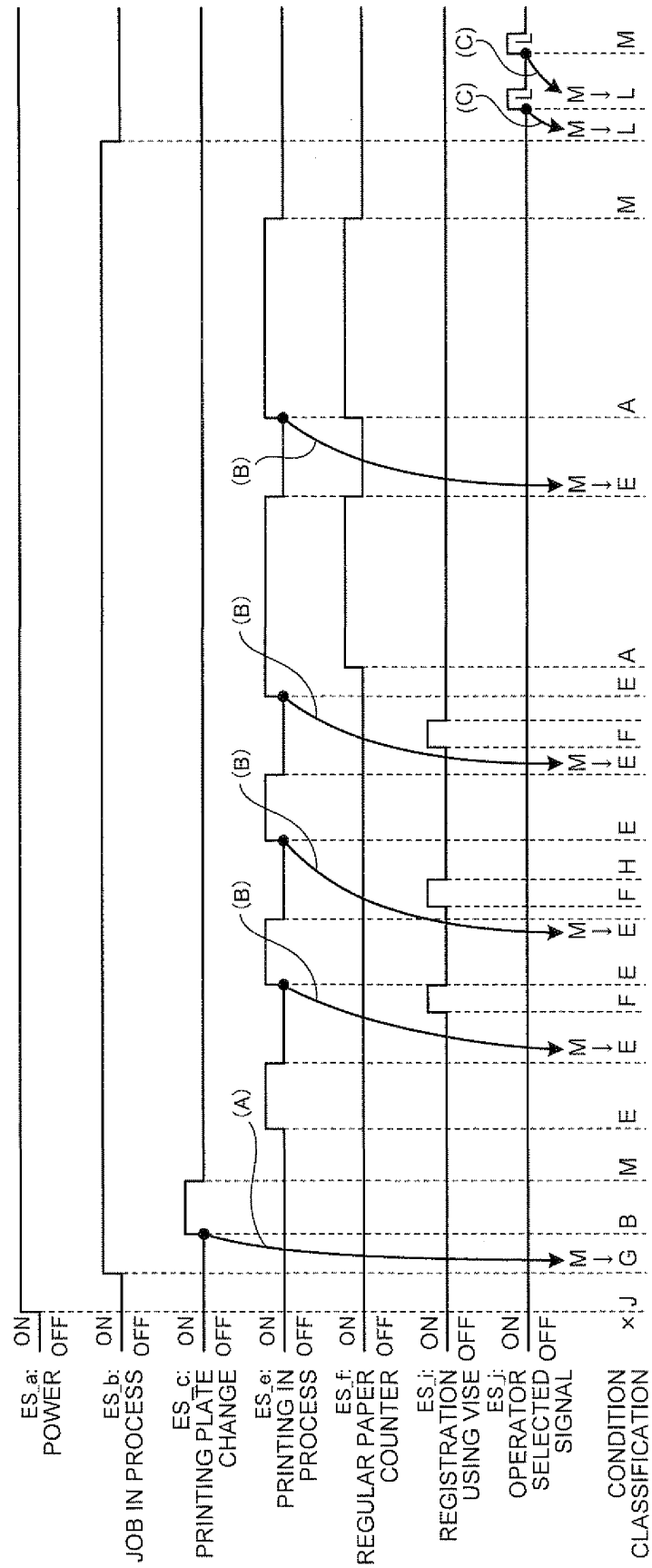


FIG.6

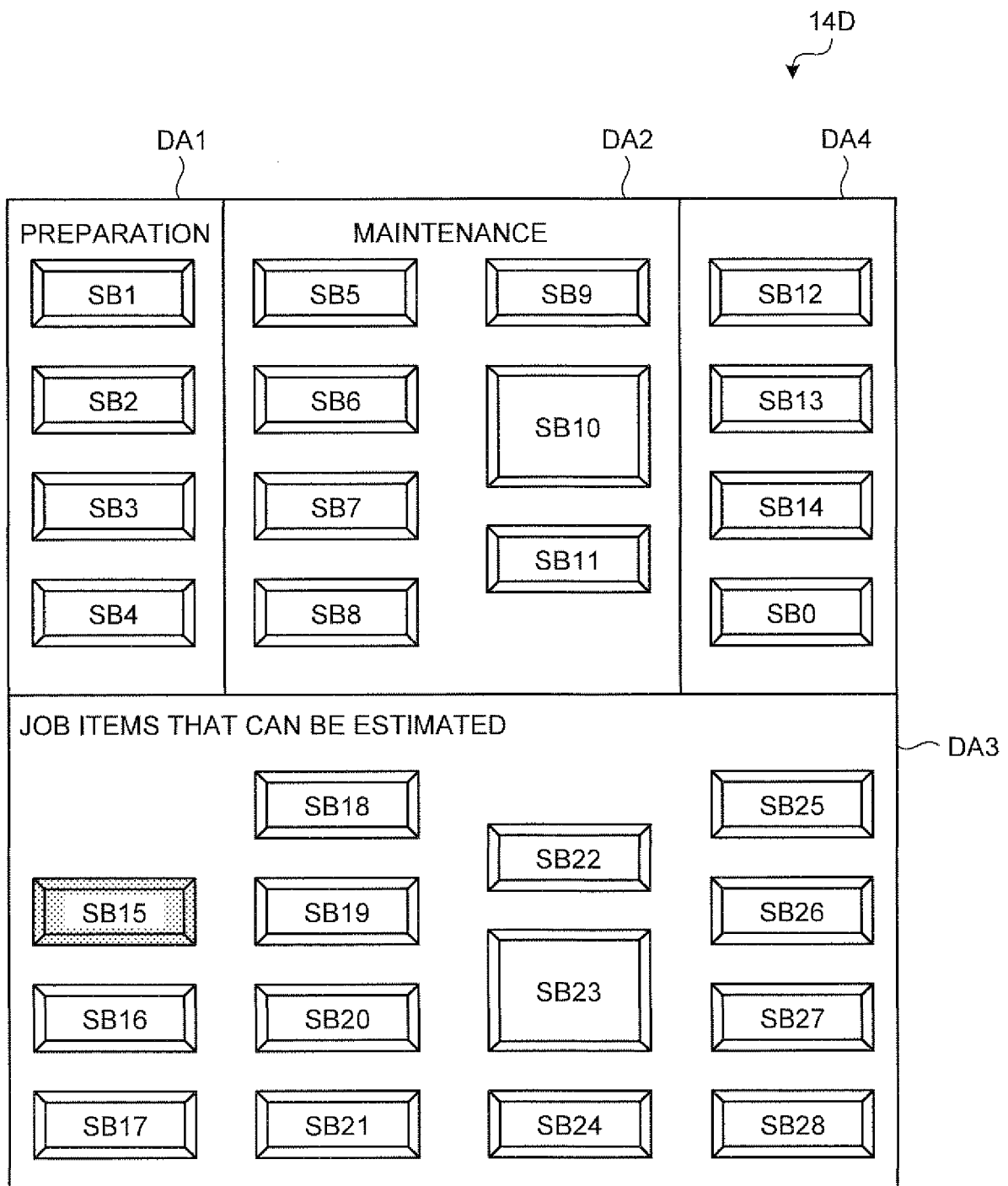


FIG.7

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CONDITION OF PRINTING PRESS	REQUIRED TIME (ACCUMULATED: MIN)
MANUAL BLANKET CLEANING	10
MANUAL INK CLEANING	25
⋮	⋮
MANUAL PRINTING PLATE CHANGE	8
PRINTING PLATE CHANGE AT FIXED POSITION OF PLATE CYLINDER	5
⋮	⋮
BLANKET CHANGE	10
RECESS	45
OTHERS	32

FIG.8

61
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JOB CLASSIFICATION OF PRINTING PRESS	TIME (ACCUMULATED: MIN)
START WORKING/ FINISH WORKING	30
PREPARATION FOR PRINTING	40
PRINTING	480
CLEANING	40
PRINTING PLATE CHANGE	60
MAINTENANCE	30
RECESS	80
OTHERS	14
TOTAL (MIN)	774
POWER-ON TIME (MIN)	1094
NON-PRINTING TIME (MIN)	320

FIG.9

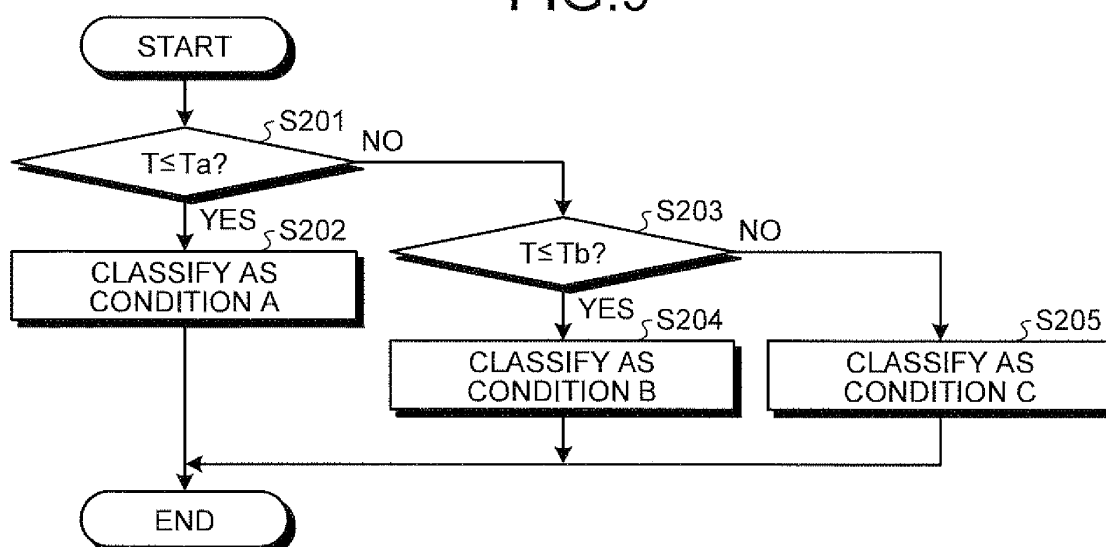


FIG.10

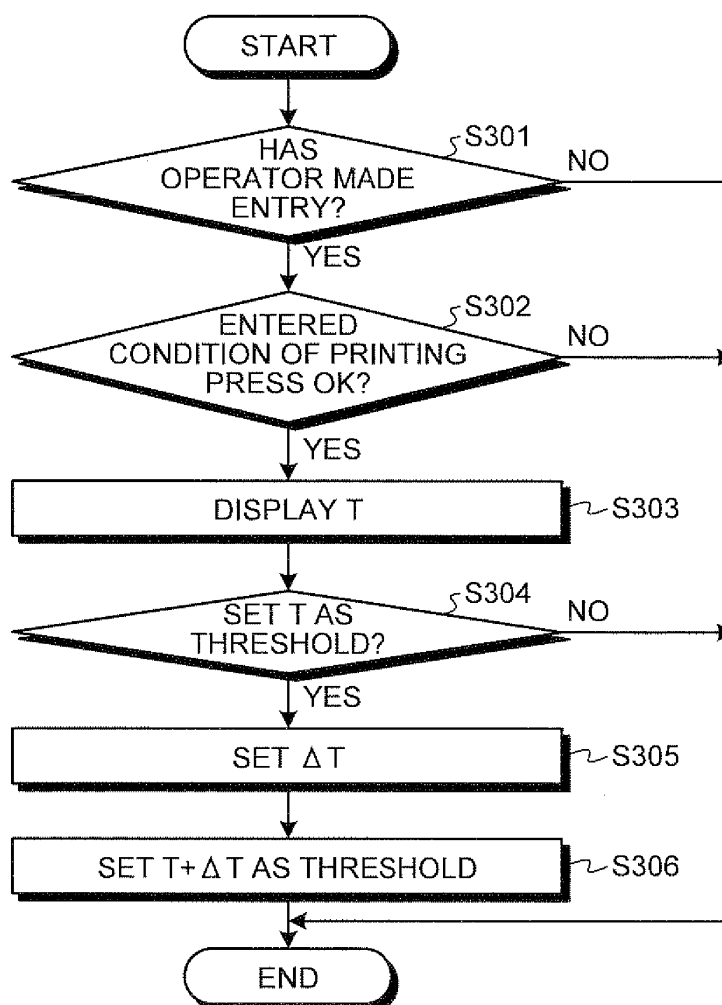


FIG.11

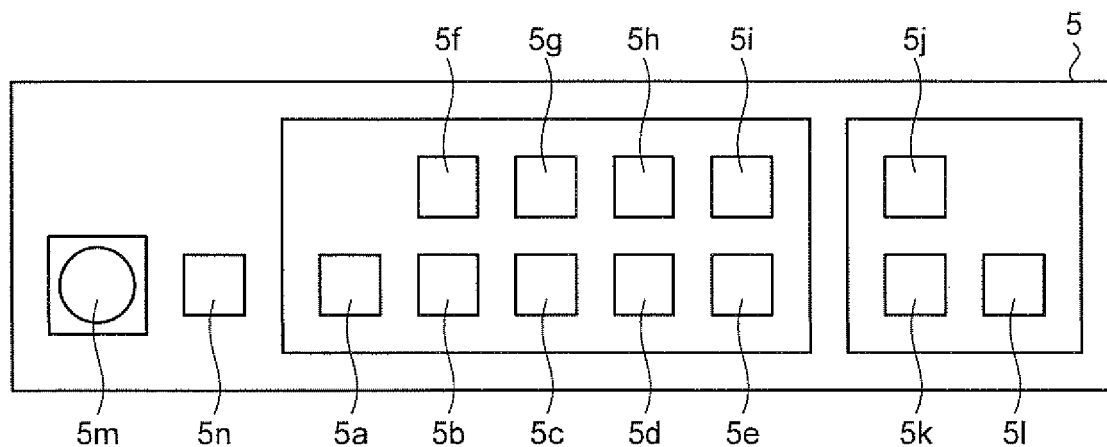


FIG.12

62

CLASSIFICATION OF PRINTING PRESS CONDITION	OPERATION
A	KEEP PRESSING "STOP" & PRESS "PREPARATION" ONCE
B	KEEP PRESSING "STOP" & PRESS "SPE" ONCE
⋮	⋮
Z	PRESS "STOP" TWICE & PRESS "PREPARATION" TWICE

FIG.13

63

CONDITION CANDIDATE	AVERAGE TIME
SB0	T0_m
SB1	T1_m
SB2	T2_m
⋮	⋮
SBn	Tn_m

FIG.14

64

OPERATOR ID	DISPLAY INFORMATION	FIRST THRESHOLD Ta	SECOND THRESHOLD Tb	...
abcde	MAINTENANCE SB5 AND SB6 NOT DISPLAYED	Ta1	Tb1	...
bafgk	MAINTENANCE SB11 NOT DISPLAYED	Ta1	Tb2	...
⋮	⋮	⋮	⋮	⋮
mlnqz	PREPARATION SB1 AND MAINTENANCE SB10 NOT DISPLAYED	Ta8	Tb5	...

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2008/071446

A. CLASSIFICATION OF SUBJECT MATTER

B41F33/00(2006.01)i, B41F33/02(2006.01)i, G06F17/00(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B41F33/00, B41F33/02, G06F17/00

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

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2008

Kokai Jitsuyo Shinan Koho 1971-2008 Toroku Jitsuyo Shinan Koho 1994-2008

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2004-188789 A (Tohoku Ricoh Co., Ltd.), 08 July, 2004 (08.07.04), Full text; all drawings (Family: none)	1-23
A	JP 2-157990 A (Dainippon Printing Co., Ltd.), 18 June, 1990 (18.06.90), Full text; all drawings (Family: none)	1-23
A	JP 6-47904 A (Kyodo Printing Co., Ltd.), 22 February, 1994 (22.02.94), Full text; all drawings (Family: none)	1-23

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"&" document member of the same patent family

Date of the actual completion of the international search
22 December, 2008 (22.12.08)Date of mailing of the international search report
13 January, 2009 (13.01.09)Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP H647904 B [0003]