

SAFETY CABINET SYSTEM, CLEAN BENCH SYSTEM, SAFETY CABINET AND CLEAN BENCH

BACKGROUND OF THE INVENTION

Field of the Invention

5 The present invention relates to a safety cabinet system, a clean bench system, a safety cabinet, and a clean bench, and more specifically to a safety cabinet system, a clean bench system, a safety cabinet, and a clean bench for improving an operation level in the safety cabinet and the clean bench and a management level of the operation details.

Description of the Related Art

10 Japanese Patent Application Laid-Open No. 6-241519 describes a safety cabinet provided with an alarming device for preventing a biohazard caused by microorganisms operated in a safety cabinet from being occurred. When an operation is performed in a workspace in the safety cabinet, an operator usually wears rubber gloves to perform necessary operations such as incubation or experiment in order to prevent infection with
15 the microorganism.

SUMMARY OF THE INVENTION

In a conventional safety cabinet, including that described in Japanese Patent Application Laid-Open No. 6-241519, an operator needs to wear rubber gloves for safety as the operator manually performs all the operations. Therefore, when the operator
20 performs an operation deviated from a standard operation procedure such as for cell processing performed in a workspace of the safety cabinet, or a standard protocol that specifies operation conditions/situations, the operator needs to record by hand writing with the rubber gloves on. The operator also needs to leave the safety cabinet for making contact with a quality administrator outside the lab and to stay in an environment
25 that is less clean than in the workspace in the safety cabinet for making outside contact. That caused a problem of cross-contamination and lowering of working efficiency.

The present invention has been made in view of the abovementioned problem and intends to provide a safety cabinet system and a safety cabinet for enabling an operator to

record the operation details or make outside contact without causing cross-contamination or lowering of the working efficiency.

In order to achieve the object, the safety cabinet system according to the present invention is a safety cabinet system including a safety cabinet for handling a subject to be
5 handled under a negative pressure and an information management device connected with the safety cabinet via a communication line and located at a place isolated from the safety cabinet, including a controlling device which controls a display of a standard working procedure or a standard protocol indicating standard operation details and a working procedure performed in the safety cabinet; a displaying device which displays the
10 standard working procedure or the standard protocol, controlled by the controlling device; an inputting device which accepts input of operation information from an operator who operates in the safety cabinet; and a communication device which performs two-way communication of the operation information between the information management device and the safety cabinet.

15 The safety cabinet may further include a barcode reader or a wireless tag reader for reading information on the subject to be handled from a two-dimensional barcode or a wireless tag, which is attached to a container containing the subject to be handled and on which the information on the subject to be handled, which is to be contained in the container, is recorded, and wherein the controlling device may cause the displaying device
20 to display the standard working procedure or the standard protocol based on the read out information on the subject to be handled.

The inputting device may include a microphone for inputting operation information by voice of the operator, a voice recognition device which recognizes the voice inputted from the microphone and converts the voice into character information, or a foot pedal for
25 the operator to input operation information by operating it by foot.

The inputting device may accept input of executed information indicating that the operation details displayed on the displaying device has been executed, and the controlling device may cause the displaying device to display the executed operation details by using a display appearance different from operation details that have not been
30 executed based on the executed information.

The information management device may have a deviated operation procedure or a deviated protocol indicating the operation details deviated from the standard operation procedure or the standard protocol, wherein the inputting device may accept input of

deviated operation information indicating the deviated operation details when the operator performs an operation deviated from the standard operation procedure or the standard protocol, the information management device may extract the deviated operation procedure or the deviated protocol corresponding to the deviated operation details based
5 on the deviated operation information and send the deviated operation procedure or the deviated protocol to the safety cabinet, and the displaying device may display the received deviated operation procedure or the deviated protocol.

A two-way communication device for the operator to perform two-way communication with someone at a place remote from the safety cabinet may be further
10 included.

The information management device may record and manage operation information from the safety cabinet received via the communication device.

The present invention is a clean bench system that uses a clean bench for handling a subject to be handled under a positive pressure instead of the safety cabinet described in
15 any one of a first aspect to a seventh aspect of the present invention.

The present invention is a safety cabinet for handling a subject to be handled under a negative pressure, including a displaying device which displays a standard operation procedure or a standard protocol indicating standard operation details and an executing order that are executed in the safety cabinet; an inputting device which accepts input of
20 operation information from an operator who performs an operation in the safety cabinet; and a cabinet communication device which sends the operation information to the information management device located at a place remote from the safety cabinet.

The present invention is a clean bench for handling a subject to be handled under a positive pressure, including a displaying device which displays a standard operation
25 procedure or a standard protocol indicating standard operation details and an executing order that are executed in the clean bench; an inputting device which accepts input of operation information from an operator who performs an operation in the clean bench; and a cabinet communication device which sends the operation information to an information management device located at a place remote from the clean bench.

30 BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an entire configuration diagram of a cell management system of an embodiment according to the present invention;

Fig. 2 is an outlined configuration diagram of the safety cabinet 72;

Fig. 3 is a block diagram showing a configuration of the controlling unit 100 of the safety cabinet 72;

Fig. 4 is an outlined diagram describing an outline of an information system of the safety cabinet system of the first embodiment;

Fig. 5 is a flowchart showing a flow of processing of the safety cabinet system;

Fig. 6 is a schematic diagram showing an exemplified display screen that displays a standard working procedure (SOP) and a standard protocol;

Fig. 7 is a schematic diagram showing an exemplified display screen that displays a deviated operation procedure and a deviated operation protocol;

Fig. 8 is a schematic diagram showing an exemplified screen display that displays an external point of contact; and

Fig. 9 is an outlined diagram showing an outline of the information system of the safety cabinet system of the second embodiment.

15 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Preferred embodiments for implementing the present invention will be described with reference to the attached drawings.

<First Embodiment>

Fig. 1 is an entire configuration diagram of a regeneration medicine system using cells, to which a safety cabinet system according to the present invention is adopted.

A medical institution 28 (or a research institute) such as a hospital collects cells from human subjects. The collected cells are contained in a predetermined container 12 and carried to a cell-processing center 20.

The cell-processing center 20 (CPC: Cell Processing Center, hereinafter merely called as CPC) is an institute that accepts the cells collected from human subjects at the medical institute 28 in the predetermined container 12 and performs a series of processes such as examination of the cells, cell processing (segregation, differentiation-inducing, growing or the like), incubation, preservation, examination, shipment and the like.

The examination center 29 is an institution that performs a virus examination, a DNA examination and the other examinations. The examination center 29 is provided outside the medical institution 28 in Fig. 1, but it may be provided inside the medical institute 28 as a part of the institute 28.

In the medical institute 28, cells processed at the cell-processing center 20 are used to perform transplant surgery on a patient. The transplantation includes transplantation to the human subject from whom the cells are collected (so called auto-transplantation) and transplantation to a human subject different from the human subject from whom the
5 cells are collected (so called allogeneic transplantation).

The cell-processing center 20 has an acceptance inspection laboratory 21, a cell-processing laboratory 22, a cell incubation laboratory 23, a preservation room 24, an examination/packing room 25 and a central monitoring room 26. The acceptance inspection laboratory 21 accepts cells collected from a living body at the medical institute
10 28 and performs an acceptance inspection. The acceptance inspection laboratory 21 is provided with an inspection terminal 71 for inputting the result of the acceptance inspection. The cell-processing laboratory 22 is provided with a safety cabinet 72 for keeping sterility. Segregation of particular cells from the cells that have passed an acceptance inspection, differentiation-inducing to the cells (differentiated cells) of a
15 necessary organ from particular cells, growing and the other cell processing are performed in the safety cabinet 72. The cell incubation laboratory 23 is provided with an incubator 73 for incubating cells, in which cells are incubated. The preservation room 24 is provided with a preservation room 74 for freezing and preserving incubated cells. The examination/packing room 25 is a place for examining cells to be shipped and packing a
20 container 12 for shipment. The central monitoring room 26 is provided with a database 42, a server 44, and a computer terminal 51.

The cell-processing center 20 is provided with pass boxes 61, 62 and 63 for passing a container 12 containing cells between the acceptance inspection laboratory 21 and the cell-processing laboratory 22, between the cell-processing laboratory 22 and the cell
25 incubating room 23, and between the cell-incubating room 23 and the preservation room 24 and the examination/packing room 25.

To the container 12 containing cells, a wireless tag 11 with a wireless communication function and a storing function is attached. The wireless tag 11 stores identifying information that can uniquely identify cells contained in the container 12, and
30 conditions and status of the cell processing, and a standard working procedure (hereinafter referred to as "SOP") or a standard protocol which defines standard operation details and an executing order of the cell processing. Information on the standard protocol and the

SOP may be written in and read from a two-dimensional barcode or a mu-chip that are printed instead of the wireless tag 11.

The medical institute 28 and the examination center 29 have computer terminals 52 and 53. The tag information may be written in the wireless tag 11 at the medical
5 institute 28 and the examination center 29, the tag information to be written in the wireless tag 11 may be stored and managed in the computer terminals 52 and 53, and may be read at each department in the cell processing center 20, or the tag information may be written in the wireless tag 11 at the acceptance inspection laboratory 21 of the cell processing center 20.

10 The acceptance inspection laboratory 21, the safety cabinet 72 of the cell-processing laboratory 22, the incubator 73 in the cell incubation laboratory 23, the preservation room 24, the examination/packing room 25, and pass boxes 61, 62 and 63, are provided with wireless tag readers 31, 32, 33, 34, 35, 36, 37 and 38 for wirelessly communicating with the wireless tag 11 attached to the container 12, respectively. Thus,
15 the wireless tag readers 31 to 38 are arranged at each appliance provided with the container 12 containing cells, each appliance through which the container 12 passes, and the other places for handling the containers 12.

The wireless tag readers 31 to 38, a database 42 of the central monitoring room 26, the server 44, the computer terminal 51 and the examining terminal 71 in the acceptance
20 inspection laboratory 21 are connected to a LAN (Local Area Network) 90, adapted to be able to communicate with each other. To the LAN 90, an interphone-switching device 94 is connected. To the interphone-switching device 94, a PBX 95 is connected.

The computer terminal 51 in the central monitoring room 26 is adapted not to be able to access the server 44 until the USB (Universal Serial Bus) key 511 is inserted into a
25 USB port of the computer terminal 51, while a predetermined program is activated and predetermined authentication information is inputted. Thus, persons only who inserted a correct physical key (USB key) and correctly inputs authentication information can access the server 44. It is adapted to reject an access from the third party.

The database 42 is for managing a schedule or a progress of the processing on the
30 cells, the examination result, a history of read cell IDs from the wireless tag 11 of the container 12 by the wireless tag readers 31 to 38, and information on the other regenerating medicine. It also stores a deviated protocol that defines operation conditions and status different from the standard protocol and a deviated operation

procedure indicating an executing order of deviated operation details. The deviated protocol and the deviated operation procedure are stored in association with a keyword indicating a deviated operation or status.

The server 44 communicate with the examination terminal 71 of the acceptance
5 inspection laboratory 21, the examination terminal (not shown) of the cell-processing laboratory 22, the examination terminal (not shown) of the cell incubation laboratory 23, the examination terminal (not shown) of the examination/packing room 25, a computer terminal 51 of the central monitoring room 26, the wireless tag readers 31 to 38 and the other various devices, and collects a schedule and a progress of processing on the cells,
10 executed information received form the safety cabinet 72 or operation information that is inputted by an operator from a microphone or a foot pedal 131, examination result, a reading of a cell ID, and information on the other regenerating medicine and registers them to the database 42. The server 44 corresponds to the definition (for example, 21CFR PART11) on an electric record and an electric signature of an application form to
15 the FDA (Food and Drug Administration). The server 44 stores an FDA software program for recording and signing the processing result at the CPC, a voice recognition software program for recognizing voice information received from the safety cabinet 72 and outputting character recognition information, and a searching software program for searching the database 42 based on character recognition information outputted by the
20 voice recognition to search the deviated protocol and sending it to the safety cabinet 72, and executes the software programs.

When the server 44 receives an information request from the computer terminal 51, it performs authentication and then edits information managed at the database 42, provides the requested information for the computer terminal 51.

25 In the embodiment, the server 44 is adapted to control segregation, differentiation-inducing, incubation, preservation, shipment and the other processes performed on cells based on the result of the examination of cells.

Fig. 2 is an outlined configuration diagram of the safety cabinet 72 set in the cell-processing laboratory 22. The safety cabinet 72 has a case 170 for handling a
30 subject to be handled under a negative pressure, a workspace 171 inside the case 170, an opening and closing part 172 which are located at the front of the case 170 and can open and close the workspace 171 by vertical movement, an opening part 173 through which the workspace 171 and the outside space of the safety cabinet 72 are communicating with

each other, and an HEPA filter (High Efficiency Particulate Air filter) 174 for purifying the air in the workspace 171. The safety cabinet 72 also has a display unit 120 for displaying a SOP or a standard protocol on a surface that forms the workspace 171 and faces an operator who operates by using the safety cabinet 72. The case 170 is provided
5 with a controlling unit 100 for controlling an operation of the safety cabinet 72. The operator wears a microphone 130 and an earphone 121 and operates the foot pedal 131.

Fig. 3 is a block diagram showing a configuration of the controlling unit 100 of the safety cabinet 72. The controlling unit 100 has a central processing unit (CPU) 101 for mainly controlling an operation of each component, a display unit interface (hereinafter
10 an interface will be described as "I/F") 104 for connecting a display unit 120 formed by a liquid crystal monitor for displaying an image, an earphone I/F 105 for connecting the earphone 121 and outputting an audio signal, a microphone I/F 106 for connecting a microphone 130 and accepting an input of a voice signal from the microphone 130, a pedal I/F 107 for accepting a signal inputted from the foot pedal 131, a communication I/F
15 109 for connecting with the LAN 90 in the CPC and a bus 110 for connecting the abovementioned components with each other. The microphone 130 and the foot pedal 131 are provided as an inputting device in the above description but the inputting device is not limited to them. An inputting device for a manual operation such as a keyboard or a trackball may be provided for the safety cabinet 72, an inputting device not for a manual
20 operation in inputting is preferable in that it does not interrupts the manual operation, for example, a sight tracer for inputting by detecting a sight position of the operator may be used.

Next, a flow of processing of the safety cabinet system will be described with reference to Fig. 4 to Fig. 8. Fig. 4 is an outlined diagram describing an outline of an
25 information system of the safety cabinet system according to the embodiment. Fig. 5 is a flowchart showing a flow of processing of the safety cabinet system. Fig. 6 is a schematic diagram showing an exemplified display screen that displays a SOP and a standard protocol. Fig. 7 is a schematic diagram showing an exemplified display screen that displays a deviated operation procedure and a deviated operation protocol. Fig. 8 is
30 an exemplified screen display that displays an external point of contact.

As shown in Fig. 4, the safety cabinet 72 set in the cell-processing laboratory 22 is connected with the server 44 and the computer terminal 51 set in the central monitoring room 26 via the LAN 90. Information inputted by an operator who operates the safety

cabinet 72 by using the microphone 130 or the foot pedal 131 is sent to the server 44 and the computer terminal 51 via the LAN 90. The voice signal inputted from the microphone 130 is converted into character information by the voice recognition software of the computer terminal 51 or the controlling unit 100 and an examination request and an examination result of the database 42 are received based on the character information. To the LAN 90, an interphone-switching device 94 is connected for enabling two-way communication between an operator wearing the microphone 130 and the earphone 121 and someone outside the central monitoring room 26 or outside the CPC. A flow of processing of the safety cabinet system will be described in the order of steps of Fig. 5.

10 At S1, the wireless tag reader 33 of the safety cabinet 72 reads tag information from the wireless tag 11 attached to the container 12 containing a specimen (S1). To the wireless tag 11, standard protocol information including conditions and status indicating operation details on the specimen previously contained in the container 12 and SOP information indicating an operation procedure are stored.

15 At S2, the server 44 accepts input of tag information from the wireless tag reader 33 and causes the display device 120 to display a standard protocol and a SOP (S2). As shown in Fig. 6, in a procedure display region 121 on the display unit 120, operation details of three operations such as an operation 1, an operation 2, and an operation 3 which an operator should perform in the workspace 171 of the safety cabinet 72 are displayed along the operation procedure. The operation 1 is displayed by using a display aspect different from the operation 2 or the operation 3 that has been or has not been executed (for example, with a different color for display) to indicate that it has been executed. In the protocol display region 122 on the display unit 120, a standard protocol such as operation conditions 1 and conditions 2 of the operation 2 that is currently executed by the operator is displayed. In the protocol display region 122, a description screen 123 for describing a status of the operation 2 may be displayed. Under the displaying unit 120, a result of voice recognition on the voice information inputted by an operator via the microphone 130 and conversion it into character information is also displayed. The voice recognition may send the audio information to the server 44 or the computer terminal 51, convert the character information by voice recognition software program installed in the server 44 or the computer terminal 51 into character information, and receive the character information. If the voice recognition software is installed in the controlling unit 100, the operation may be performed at the controlling unit 100.

At S3, whether the operation details and the status to be performed by the operator are defined in the SOP and the standard protocol displayed on the display unit 120 or not is determined (S3). If it is "YES", the operation proceeds to S4. If it is "NO", the operation proceeds to S6.

5 At S4, the operator executes an operation along the SOP and the standard protocol, and inputs executed information by stamping on the foot pedal 131. Alternatively, the operator may utter to input that the operation has been executed via the microphone 130. At S5, when the controlling unit 100 accepts input of executed information, a display aspect of the operation executed at the displaying unit 120, for example, the operation 1 is
10 updated. The executed information and the operation information are sent to and recorded at the database 42 from the safety cabinet 72.

At S6, the operator performs a searching request of the deviated protocol and the deviated operation procedure (S6). The operator utters a word to be a keyword for describing a deviated status and inputs the word from the microphone 130. The inputted
15 voice information is converted into character information by voice recognition software in any of the controlling unit 100, the server 44 or the computer terminal 51. The server 44 searches the database 42 based on the converted character information and extracts the deviated operation procedure and the deviated protocol to match the character information. Then, it sends them to the controlling unit 100 of the safety cabinet 72. The character
20 information is displayed in the voice input information display region 124 for an operator to see.

At S7, the controlling unit 100 causes the display unit 120 to display the received deviated operation procedure and deviated operation protocol. Fig. 7 shows an exemplified screen display displayed at the step. In the display unit 120, the deviated
25 operations A1, A2 and A3 are displayed along the operation procedure. The protocol of the deviated operation A1 is also displayed.

At S8, whether the problem is solved by the deviated operation procedure and the deviated protocol displayed at S7 or not is determined. If it is "YES", the operation proceeds to S10. If it is "NO", the operation proceeds to S9.

30 At S9, the operator selects a desired point of contact and makes outside contact of the cell-processing laboratory 22 (S9). Fig. 8 is an exemplified screen display for selecting a phone counterpart. When an operator successively stamps on the foot pedal 131 twice or utters a request for displaying the point of contact via the microphone 130

for inputting it, the screen on the display unit 120 transfers from Fig. 7 to Fig. 8. In Fig. 8, a counterpart with whom the operator is assumed to make contact is displayed. The operator keeps stamping on the foot pedal 131 to move a selection cursor 125 to a desired counterpart position. When the operator moves off his/her foot from the foot pedal 131, the counterpart is selected. When the operator stamps on the foot pedal 131 again, a request of communication is given to the counterpart. The interphone-switching device 94 is connected to a PBX if it is in the CPC, or connected to a general communication line if it is outside the CPC.

At S10, whether all the operations in the safety cabinet 72 has been processed or not is determined. If it is "YES", the operation ends. If it is "NO", the operation returns to S3 and continues with the next operation.

According to the embodiment, the SOP and the standard protocol are displayed on the display unit 120 provided on the safety cabinet 72 for enabling the operator to perform the operation by viewing them. That can prevent an operation error. The operator can simply and correctly perform recording of the executed operation by further inputting executed information indicating that it has been executed with a simple operation such as uttering or stamping on the foot pedal 131 and storing the inputted result in the database 42. If a status deviated from the SOP and the standard protocol occurs, the operator can perform searching and extracting of the operation procedure and the protocol of the deviated operation or making outside contact without leaving the safety cabinet 72 so as to solve inefficiency due to cross-contamination or interruption of the work.

<The other Embodiment>

The SOP and the standard protocol are stored in the wireless tag 11 in the first embodiment, but identification information on the specimen is stored in the wireless tag 11 and the standard protocol corresponding to the identification information may be stored in the database 42, tag information may be sent from the communication I/F 109 of the safety cabinet 72 to the server 44 to search the standard protocol.

The controlling unit 100 is provided for the safety cabinet 72 in the first embodiment, but input processing from the display control of the display unit 120, the microphone 130 or the foot pedal 131 may be controlled by the computer terminal 51 in the central monitoring room 26 without providing the controlling unit 100 for the safety cabinet 72. Fig. 9 shows an information system outlined diagram in the embodiment. The wireless tag reader 33 connects to the LAN 90 and sends the read tag information to

the computer terminal 51. Then, the computer terminal 51 decides the SOP and the standard protocol to be displayed based on the tag information. Next, the computer terminal 51 sends the display data to the display unit 120 via the LAN 90. The computer terminal 51 changes a display appearance of the executed operation details, as well as
5 searches and displays processing of the deviated operation procedure or the deviated protocol based on information inputted from the microphone 130 or the foot pedal 131.

In the abovementioned embodiment, a safety cabinet for incubating cells collected from a living body is exemplified, a safety cabinet for segregating and handling the specimen consisting of microorganisms such as viruses or germs or a safety cabinet for
10 handling a chemical agent may be applied.

In the abovementioned embodiment, a safety cabinet 72 for handling a subject to be handled under a negative pressure is described, but a clean bench for handling a subject to be handled under a positive pressure may be used instead of a safety cabinet 72.

WHAT IS CLAIMED IS:

1. A safety cabinet system including a safety cabinet for handling a subject to be handled under a negative pressure and an information management device connected with the safety cabinet via a communication line and located at a place isolated from the safety
5 cabinet, comprising:

a controlling device which controls a display of a standard operation procedure or a standard protocol indicating standard operation details and a working procedure performed in the safety cabinet;

- a displaying device which displays the standard working procedure or the standard
10 protocol, controlled by the controlling device;

an inputting device which accepts input of an operation information from an operator who operates in the safety cabinet; and

a communication device which performs two-way communication of the operation information between the information management device and the safety cabinet.

- 15 2. The safety cabinet system according to claim 1, further comprises a barcode reader or a wireless tag reader for reading information on the subject to be handled from a two-dimensional barcode or a wireless tag, which is attached to a container containing the subject to be handled and on which the information on the subject to be handled, which is to be contained in the container, is recorded

- 20 and wherein the controlling device causes the displaying device to display the standard working procedure or the standard protocol based on the read out information on the subject to be handled.

3. The safety cabinet system according to claim 1, wherein
the inputting device comprises: a microphone for inputting an operation
25 information by voice of the operator; and a voice recognition device which recognizes the voice inputted from the microphone and converts the voice into character information; or a foot pedal for the operator to input an operation information by operating the foot pedal by foot.

4. The safety cabinet system according to claim 1, wherein

the inputting device accepts input of executed information indicating that the operation details displayed on the displaying device has been executed, and

the controlling device causes the displaying device to display the executed operation details by using a display appearance different from operation details that have
5 not been executed based on the executed information.

5. The safety cabinet according to claim 1, wherein

the information management device has a deviated operation procedure or a deviated protocol indicating the operation details deviated from the standard operation
10 procedure or the standard protocol,

the inputting device accepts input of the deviated operation information indicating the deviated operation details when the operator performs an operation deviated from the standard operation procedure or the standard protocol,

the information management device extracts the deviated operation procedure or
15 the deviated protocol corresponding to the deviated operation details based on the deviated operation information and sends the deviated operation procedure or the deviated protocol to the safety cabinet, and

the displaying device displays the received deviated operation procedure or the deviated protocol.

20 6. The safety cabinet system according to claim 1, further comprising

a two-way communication device for the operator to perform two-way communication with someone at a place remote from the safety cabinet.

7. The safety cabinet system according to claim 1, wherein

the information management device records and manages an operation information
25 from the safety cabinet received via the communication device.

8. A clean bench system that uses a clean bench for handling a subject to be handled under a positive pressure instead of the safety cabinet described in claim 1.

9. A safety cabinet for handling a subject to be handled under a negative pressure, comprising:

a displaying device which displays a standard operation procedure or a standard protocol indicating standard operation details and an executing order that are executed in the safety cabinet;

an inputting device which accepts input of an operation information from an operator who performs an operation in the safety cabinet; and

a cabinet communication device which sends the operation information to the information management device located at a place remote from the safety cabinet.

10. A clean bench for handling a subject to be handled under a positive pressure, comprising:

10 a displaying device which displays a standard operation procedure or a standard protocol indicating standard operation details and an executing order that are executed in the clean bench;

an inputting device which accepts input of an operation information from an operator who performs an operation in the clean bench; and

15 a cabinet communication device which sends the operation information to an information management device located at a place remote from the clean bench.