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(54) **INFORMATION PROCESSING APPARATUS AND CONTROL METHOD**

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CPC ***H04L 63/20*** (2013.01)

(57) **ABSTRACT**

An image processing apparatus performs control in such a manner that first processing for storing at least a part of a setting value group receives as a target for import as an operation setting which is retained in a non-volatile random access memory (NVRAM) and second processing for, after the first processing, storing, by overwrite, setting values of a setting item in such a way as to satisfy a security policy, as a part of the operation setting which is retained in the NVRAM are performed as a series of processing operations in import processing.

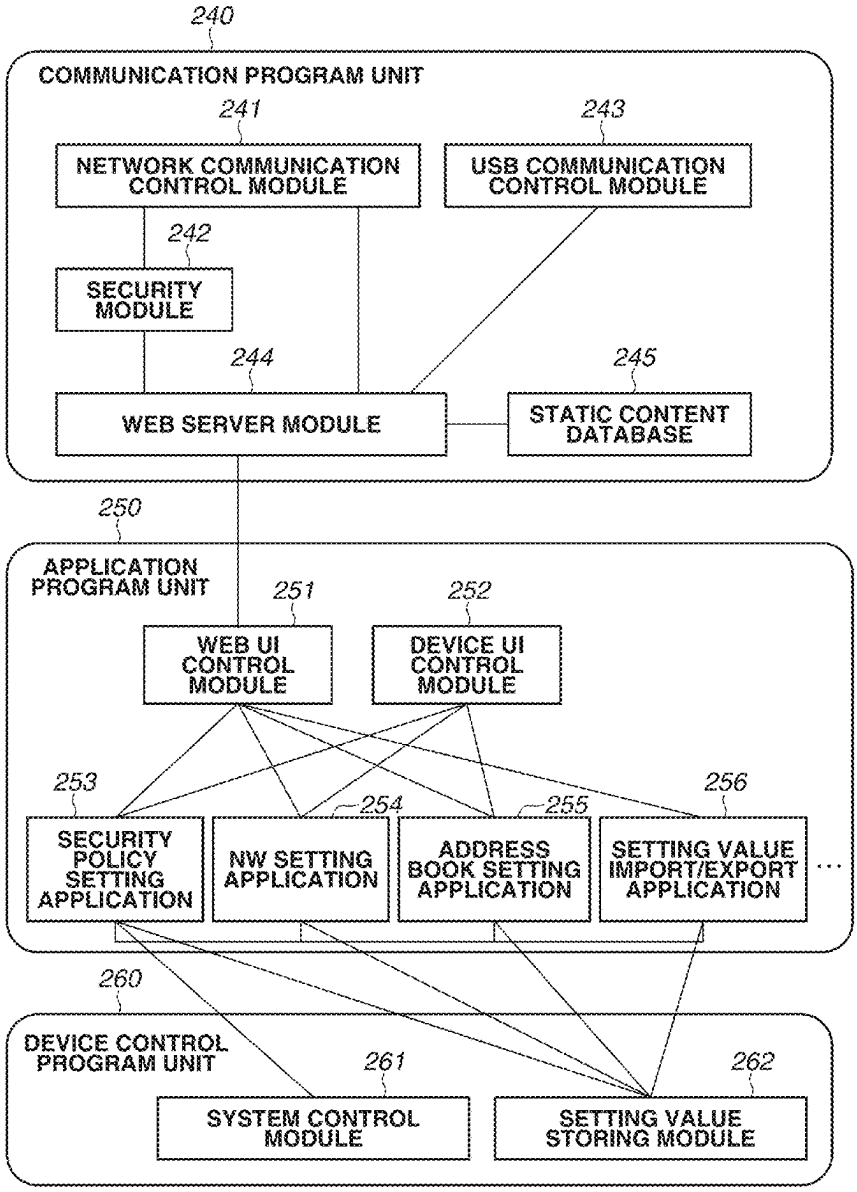


FIG.1

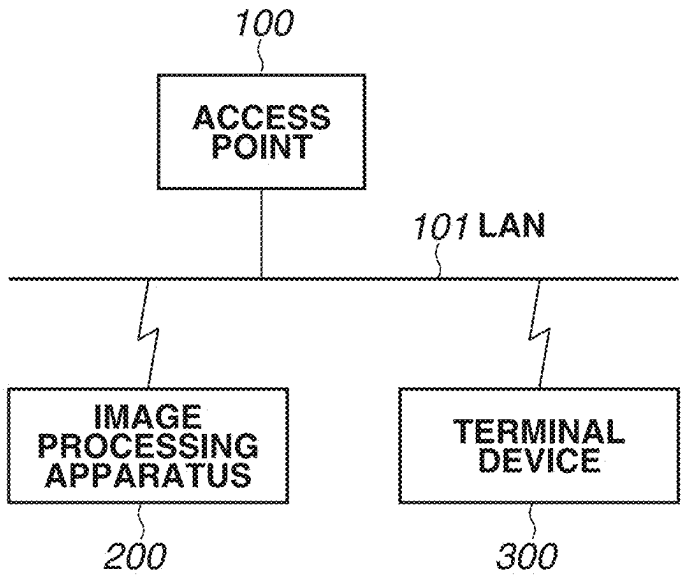

100
ACCESS POINT
101 LAN
IMAGE PROCESSING APPARATUS
TERMINAL DEVICE
200
300

FIG.2

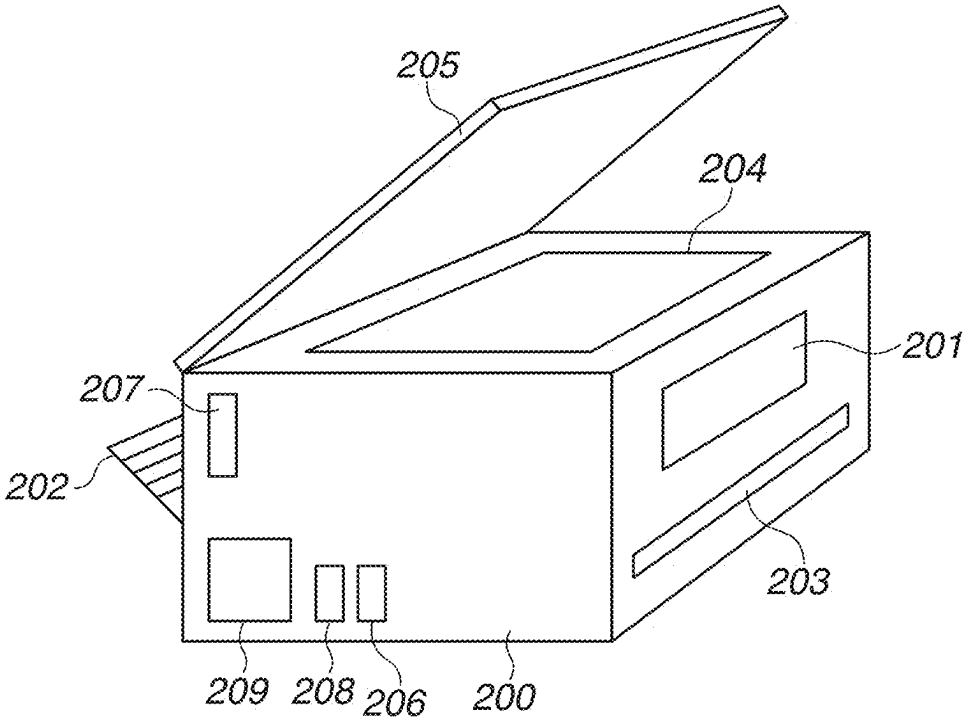


FIG.3

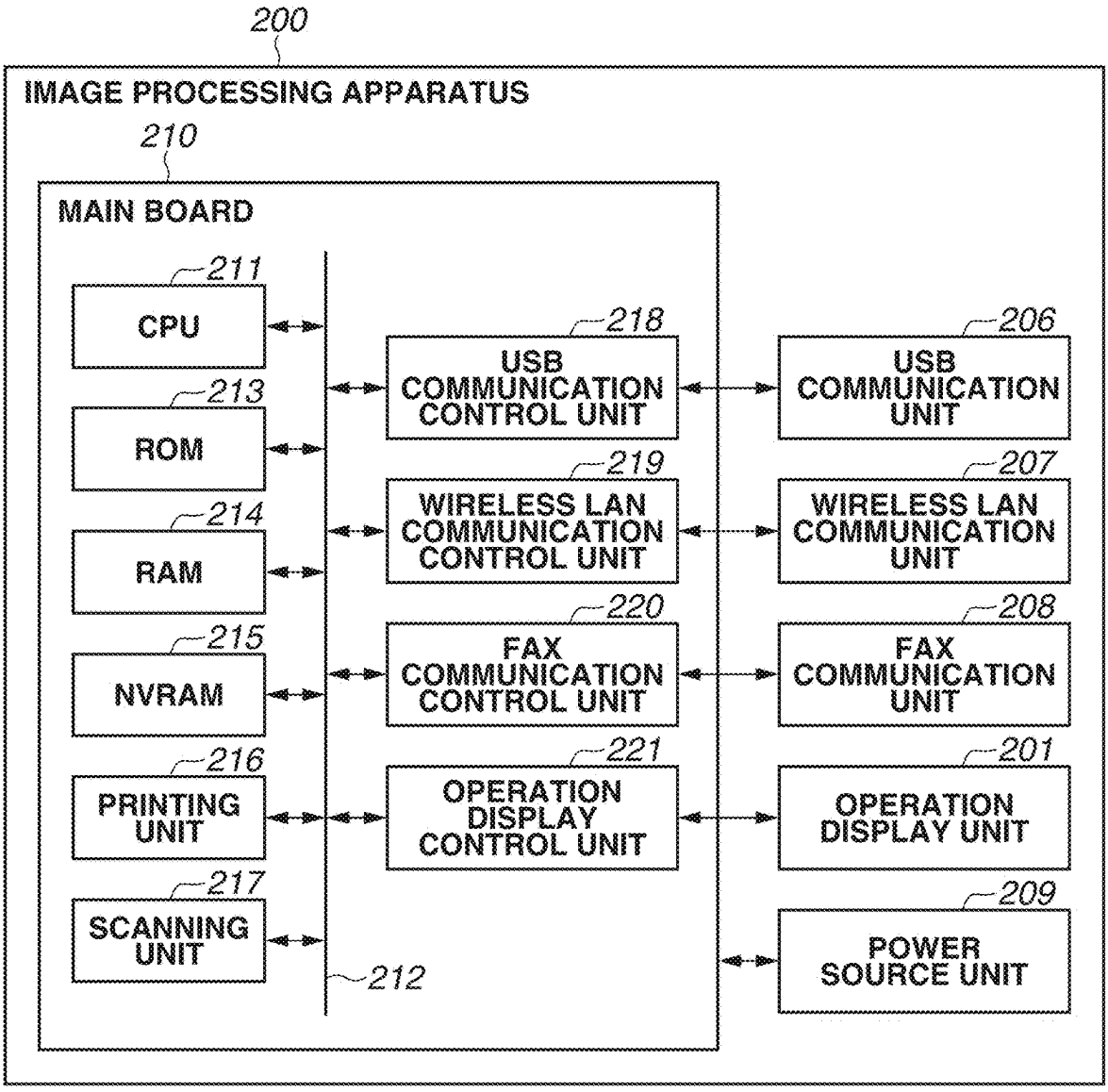

200
IMAGE PROCESSING APPARATUS
210
MAIN BOARD
211
CPU
213
ROM
214
RAM
215
NVRAM
216
PRINTING UNIT
217
SCANNING UNIT
212
218
USB COMMUNICATION CONTROL UNIT
219
WIRELESS LAN COMMUNICATION CONTROL UNIT
220
FAX COMMUNICATION CONTROL UNIT
221
OPERATION DISPLAY CONTROL UNIT
206
USB COMMUNICATION UNIT
207
WIRELESS LAN COMMUNICATION UNIT
208
FAX COMMUNICATION UNIT
201
OPERATION DISPLAY UNIT
209
POWER SOURCE UNIT

FIG.4

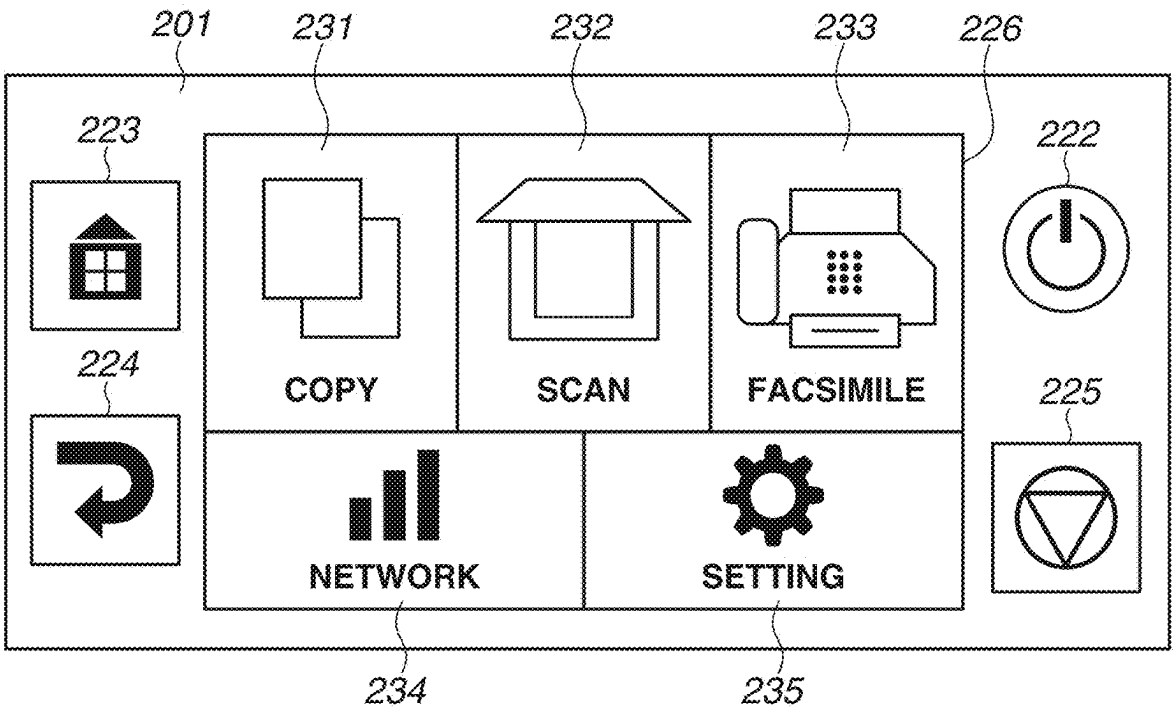

201
231
232
233
226
223
222
224
COPY
SCAN
FACSIMILE
225
NETWORK
SETTING
234
235

FIG.5

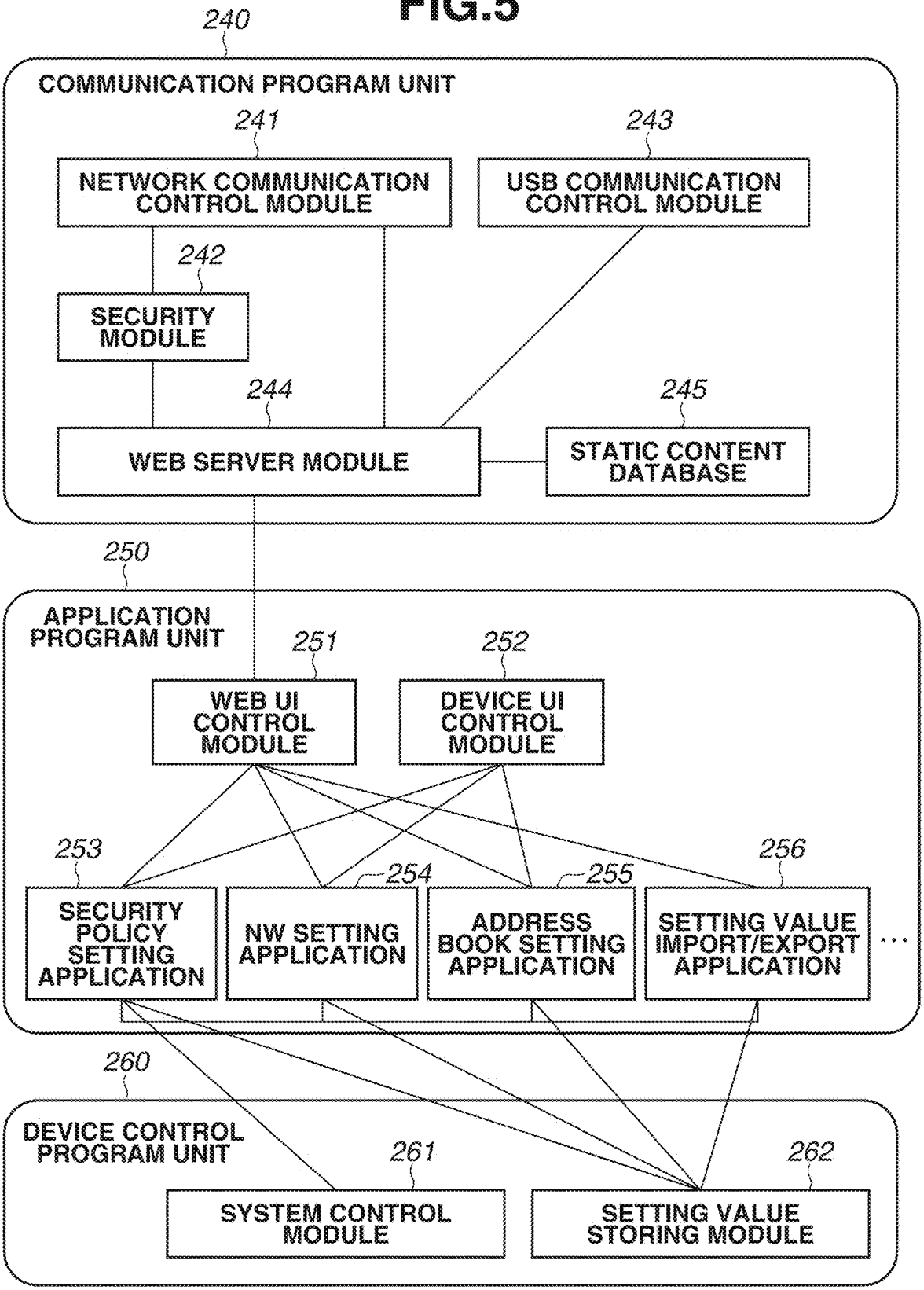

240
COMMUNICATION PROGRAM UNIT
241
NETWORK COMMUNICATION CONTROL MODULE
243
USB COMMUNICATION CONTROL MODULE
242
SECURITY MODULE
244
WEB SERVER MODULE
245
STATIC CONTENT DATABASE
250
APPLICATION PROGRAM UNIT
251
WEB UI CONTROL MODULE
252
DEVICE UI CONTROL MODULE
253
SECURITY POLICY SETTING APPLICATION
254
NW SETTING APPLICATION
255
ADDRESS BOOK SETTING APPLICATION
256
SETTING VALUE IMPORT/EXPORT APPLICATION
...
260
DEVICE CONTROL PROGRAM UNIT
261
SYSTEM CONTROL MODULE
262
SETTING VALUE STORING MODULE

FIG.6A

400

SETTING ITEM			SETTING VALUE
CATEGORY	ITEM ID	ITEM NAME	
NETWORK SETTING	00001	Direct connection setting	OFF
	00002	Automatic start of easy connection	OFF
	00003	Wired LAN connection setting	OFF
	00004	Wireless LAN connection setting	ON
	00005	DHCP setting	ON
	00006	IP address value	192.168.10.5
	00007	Proxy setting	OFF
	00008	LPD print setting	OFF
	00009	RAW print setting	OFF
	00010	WSD print setting	OFF
	00011	IPP print setting	ON
	...	...	...
PASSWORD SETTING	01001	Security administrator password setting	OFF
	01002	Security administrator password value	""
	01003	Administrator password setting	ON
	01004	Administrator password value	"!QAZ1qaz"
	01005	Rule: Minimum number of characters	8
	01006	Rule: Use one or more English lower-case letters.	ON
	01007	Rule: Use one or more English capital letters.	ON
	01008	Rule: Use one or more numerals.	ON
	01009	Rule: Use one or more symbols.	ON
	...	...	...
ADDRESS BOOK SETTING	02001	Permit addition of a new address.	ON
	02002	Address book ID001	Type: fax, Value: "0123456789"
	02003	Address book ID002	Type: fax, Value: "1111222333"
	02004	Address book ID003	Type: email, Value: "aaa@example.com"
	02005	Address book ID004	Type: email, Value: "bbb@example.com"
	02006	Address book ID005	Type: NotRegistered, Value: ""
	...	...	...
SECURITY POLICY SETTING	10001	Prohibit the use of direct connection.	ON
	10002	Prohibit the use of wireless LAN connection.	OFF
	10003	Restrict LPD port.	ON
	10004	Restrict RAW port.	ON
	10005	Restrict WSD port.	OFF
	10006	Restrict IPP port.	OFF
	10007	Minimum number of characters of password	8
	10008	Force the use of English lower-case letter for password.	ON
	10009	Force the use of English capital letter for password.	ON
	10010	Force the use of numeral for password.	OFF
	10011	Force the use of symbol for password.	OFF
	10012	Permit transmission only to a destination previously registered with an address book.	OFF
	...	...	...
	...	...	...

FIG.6B

403 404

INITIAL VALUE	ATTRIBUTE OF SETTING ITEM		
	SETTING VALUE TYPE	SETTING MINIMUM VALUE	SETTING MAXIMUM VALUE
ON	Boolean type	FALSE	TRUE
ON	Boolean type	FALSE	TRUE
OFF	Boolean type	FALSE	TRUE
ON	Boolean type	FALSE	TRUE
ON	Boolean type	FALSE	TRUE
0.0.0.0	Unsigned 1-byte array	0.0.0.0	255.255.255.255
OFF	Boolean type	FALSE	TRUE
ON	Boolean type	FALSE	TRUE
ON	Boolean type	FALSE	TRUE
ON	Boolean type	FALSE	TRUE
ON	Boolean type	FALSE	TRUE
...	...	...	...
OFF	Boolean type	FALSE	TRUE
""	Character string type	—	—
ON	Boolean type	FALSE	TRUE
"default"	Character string type	—	—
4	Unsigned 1-byte	1	32
OFF	Boolean type	FALSE	TRUE
OFF	Boolean type	FALSE	TRUE
OFF	Boolean type	FALSE	TRUE
OFF	Boolean type	FALSE	TRUE
...	...	...	...
ON	Boolean type	FALSE	TRUE
Type: NotRegistered, Value: ""	Address book type	—	—
Type: NotRegistered, Value: ""	Address book type	—	—
Type: NotRegistered, Value: ""	Address book type	—	—
Type: NotRegistered, Value: ""	Address book type	—	—
Type: NotRegistered, Value: ""	Address book type	—	—
...	...	...	...
OFF	Boolean type	FALSE	TRUE
OFF	Boolean type	FALSE	TRUE
OFF	Boolean type	FALSE	TRUE
OFF	Boolean type	FALSE	TRUE
OFF	Boolean type	FALSE	TRUE
OFF	Boolean type	FALSE	TRUE
0	Unsigned 1-byte	1	32
OFF	Boolean type	FALSE	TRUE
OFF	Boolean type	FALSE	TRUE
OFF	Boolean type	FALSE	TRUE
OFF	Boolean type	FALSE	TRUE
OFF	Boolean type	FALSE	TRUE
...	...	...	...
...	...	...	...

FIG.7

411 410 412

SECURITY POLICY SETTING			LIMITATION OF SETTING VALUE BY SECURITY POLICY		
Item ID	Item name	Setting value in causing a limitation to occur in another setting item	Item ID	Item name	Value or content into which forcing is performed
10001	Prohibit the use of direct connection.	ON	00001	Direct connection setting	OFF
			00002	Automatic start of easy connection	OFF
10002	Prohibit the use of wireless LAN connection.	ON	00004	Wireless LAN connection setting	OFF
10003	Restrict LPD port.	ON	00008	LPD print setting	OFF
10004	Restrict RAW port.	ON	00009	RAW print setting	OFF
10005	Restrict WSD port.	ON	00010	WSD print setting	OFF
10006	Restrict IPP port.	ON	00011	IPP print setting	OFF
10007	Minimum number of characters of password	1, 2, 3, ..., 32	01005	Rule: Minimum number of characters	Value which is set by the security policy setting
10008	Force the use of English lower-case letter for password.	ON	01006	Rule: Use one or more English lower-case letters.	ON
10009	Force the use of English capital letter for password.	ON	01007	Rule: Use one or more English capital letters.	ON
10010	Force the use of numeral for password.	ON	01008	Rule: Use one or more numerals.	ON
10011	Force the use of symbol for password.	ON	01009	Rule: Use one or more symbols.	ON
10012	Permit transmission only to a destination previously registered with an address book.	ON	02001	Permit addition of a new address.	OFF
			02002	Address book ID001	Changing prohibited
			02003	Address book ID002	Changing prohibited
			02004	Address book ID003	Changing prohibited
			02005	Address book ID004	Changing prohibited
			02006	Address book ID005	Changing prohibited
			...	...	...
...	...	...	...	...	...

FIG.8A

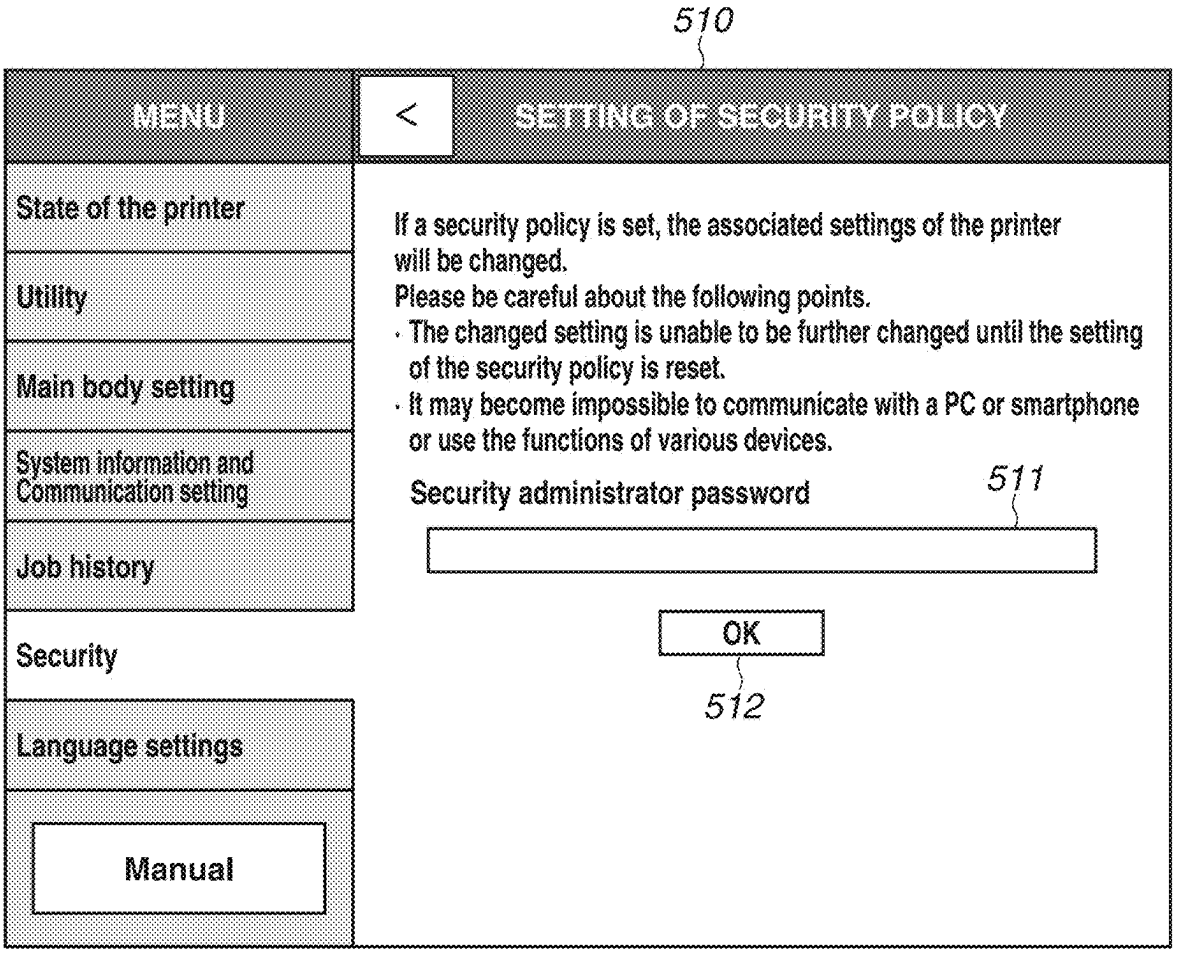

510
MENU
<
SETTING OF SECURITY POLICY
State of the printer
Utility
Main body setting
System information and Communication setting
Job history
Security
Language settings
Manual
If a security policy is set, the associated settings of the printer will be changed.
Please be careful about the following points.
· The changed setting is unable to be further changed until the setting of the security policy is reset.
· It may become impossible to communicate with a PC or smartphone or use the functions of various devices.
Security administrator password
511
OK
512

FIG.8B

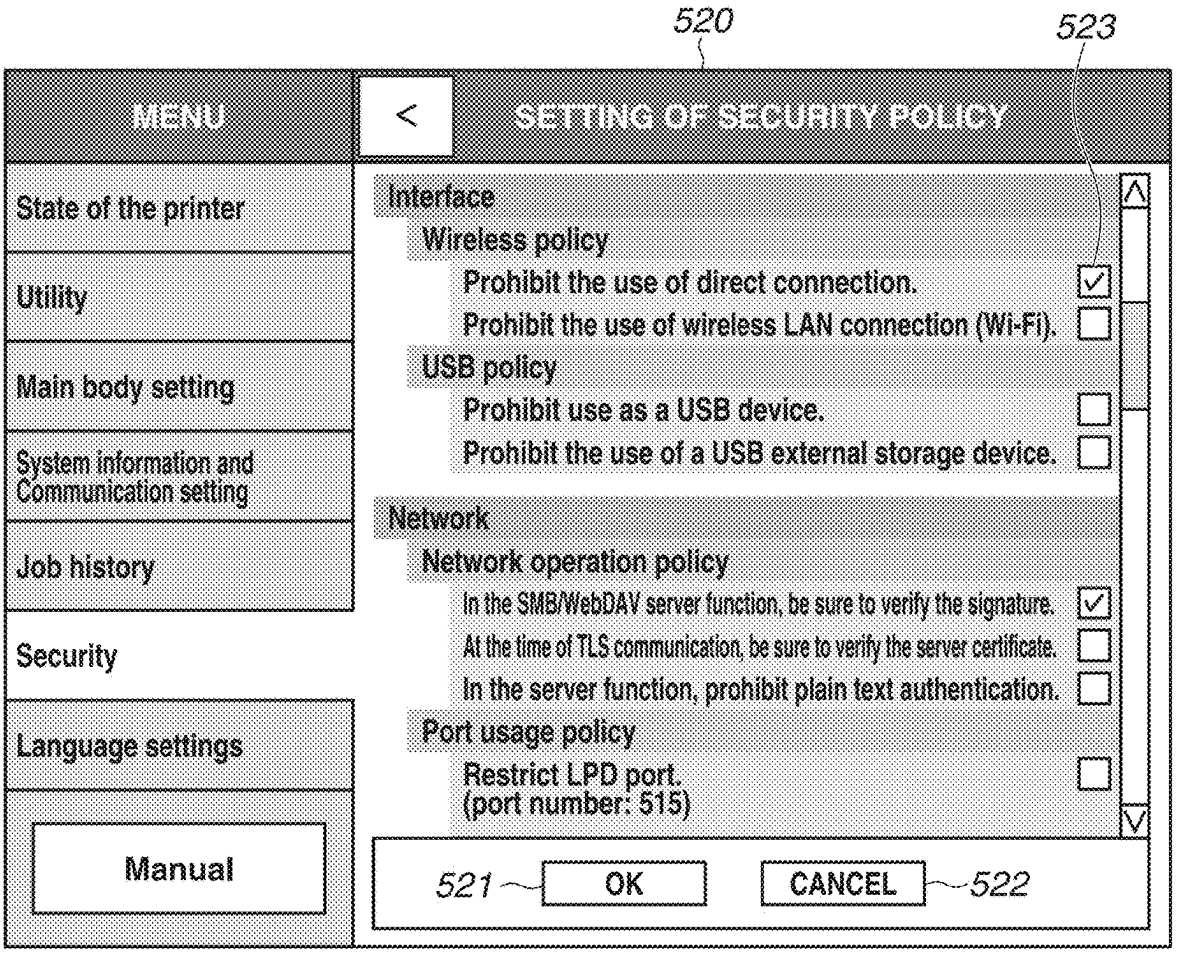

520
523
MENU
<
SETTING OF SECURITY POLICY
State of the printer
Utility
Main body setting
System information and Communication setting
Job history
Security
Language settings
Manual
Interface
Wireless policy
Prohibit the use of direct connection.
Prohibit the use of wireless LAN connection (Wi-Fi).
USB policy
Prohibit use as a USB device.
Prohibit the use of a USB external storage device.
Network
Network operation policy
In the SMB/WebDAV server function, be sure to verify the signature.
At the time of TLS communication, be sure to verify the server certificate.
In the server function, prohibit plain text authentication.
Port usage policy
Restrict LPD port. (port number: 515)
521
OK
CANCEL
522

FIG.8C

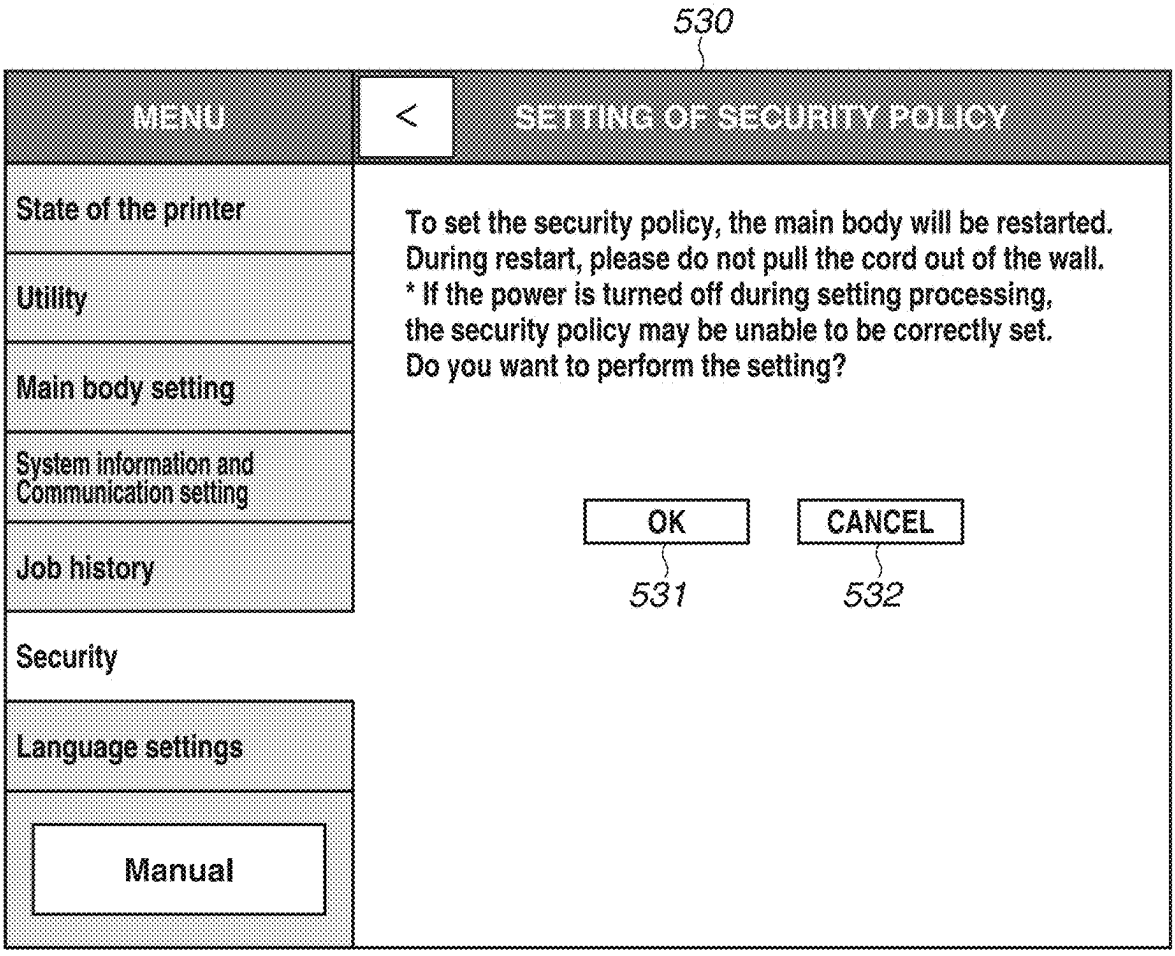

530
MENU
<
SETTING OF SECURITY POLICY
State of the printer
Utility
Main body setting
System information and Communication setting
Job history
Security
Language settings
Manual
To set the security policy, the main body will be restarted.
During restart, please do not pull the cord out of the wall.
* If the power is turned off during setting processing,
the security policy may be unable to be correctly set.
Do you want to perform the setting?
OK
CANCEL
531
532

FIG.8D

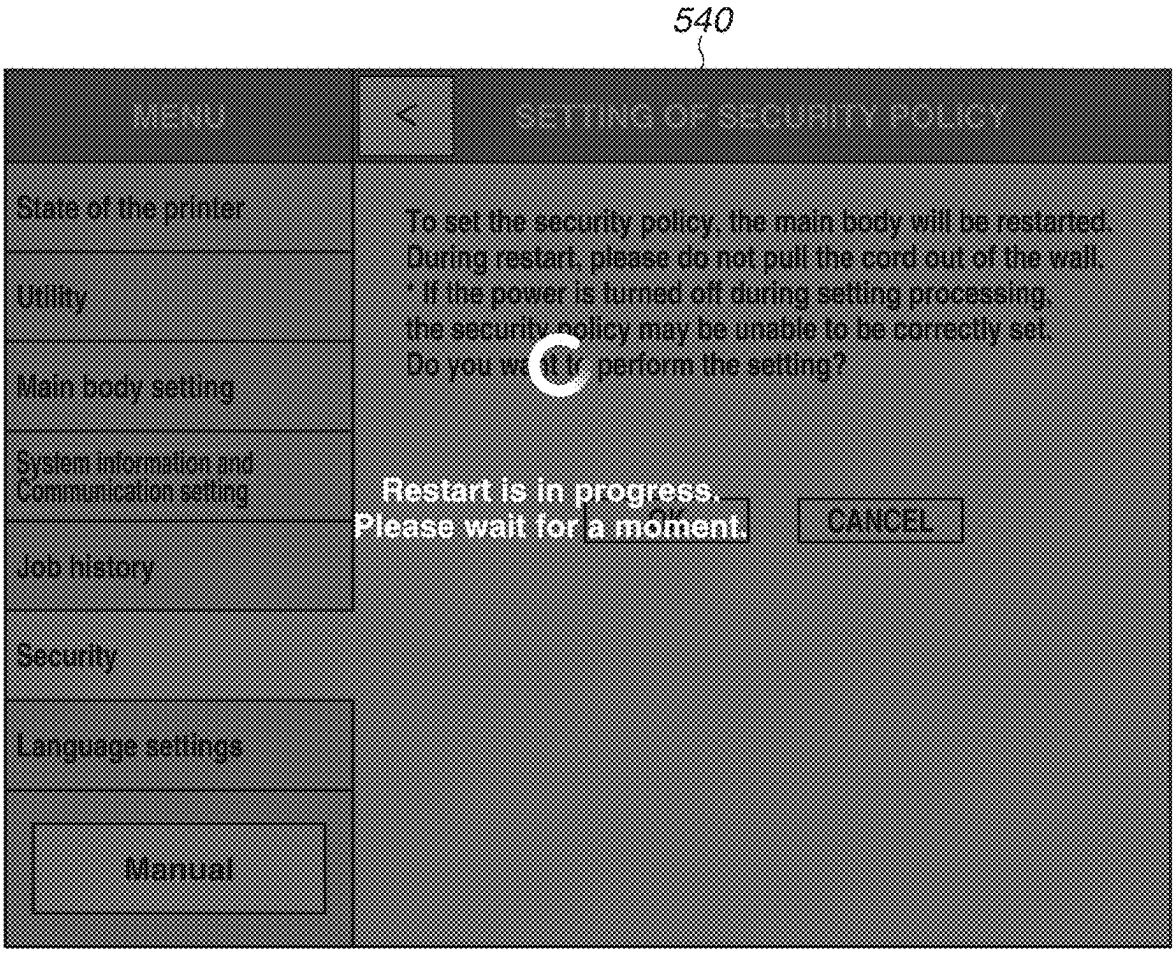

540
MENU
State of the printer
Utility
Main body setting
System information and Communication setting
Job history
Security
Language settings
Manual
<
Settings of security policy
To set the security policy, the main body will be restarted.
During restart, please do not pull the cord out of the wall.
* If the power is turned off during setting processing,
the security policy may be unable to be correctly set.
Do you wish to perform the setting?
Restart is in progress.
Please wait for a moment.
CANCEL

FIG.9

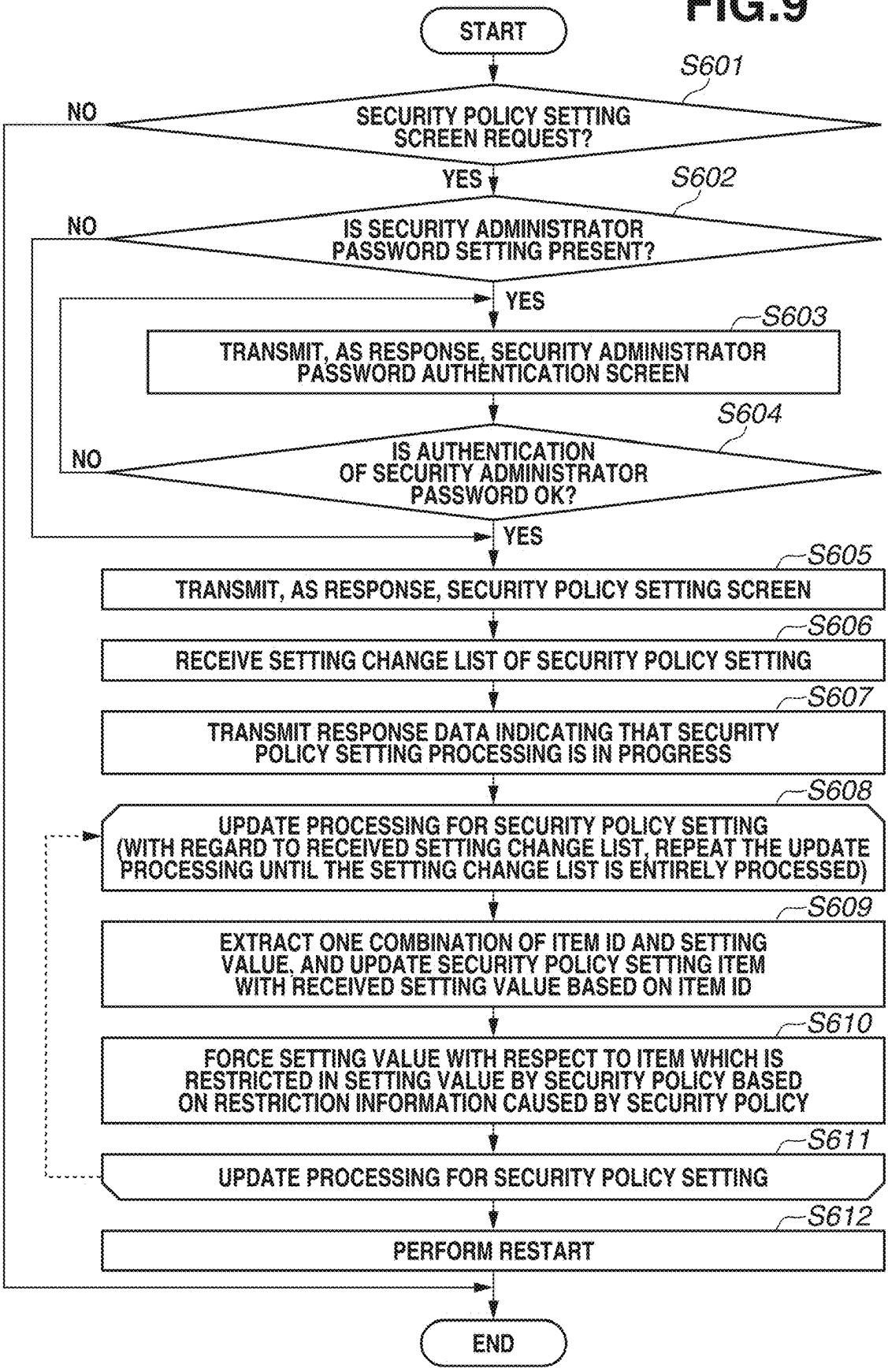

START
S601
SECURITY POLICY SETTING SCREEN REQUEST?
NO
YES
S602
IS SECURITY ADMINISTRATOR PASSWORD SETTING PRESENT?
NO
YES
S603
TRANSMIT, AS RESPONSE, SECURITY ADMINISTRATOR PASSWORD AUTHENTICATION SCREEN
S604
IS AUTHENTICATION OF SECURITY ADMINISTRATOR PASSWORD OK?
NO
YES
S605
TRANSMIT, AS RESPONSE, SECURITY POLICY SETTING SCREEN
S606
RECEIVE SETTING CHANGE LIST OF SECURITY POLICY SETTING
S607
TRANSMIT RESPONSE DATA INDICATING THAT SECURITY POLICY SETTING PROCESSING IS IN PROGRESS
S608
UPDATE PROCESSING FOR SECURITY POLICY SETTING (WITH REGARD TO RECEIVED SETTING CHANGE LIST, REPEAT THE UPDATE PROCESSING UNTIL THE SETTING CHANGE LIST IS ENTIRELY PROCESSED)
S609
EXTRACT ONE COMBINATION OF ITEM ID AND SETTING VALUE, AND UPDATE SECURITY POLICY SETTING ITEM WITH RECEIVED SETTING VALUE BASED ON ITEM ID
S610
FORCE SETTING VALUE WITH RESPECT TO ITEM WHICH IS RESTRICTED IN SETTING VALUE BY SECURITY POLICY BASED ON RESTRICTION INFORMATION CAUSED BY SECURITY POLICY
S611
UPDATE PROCESSING FOR SECURITY POLICY SETTING
S612
PERFORM RESTART
END

FIG.10

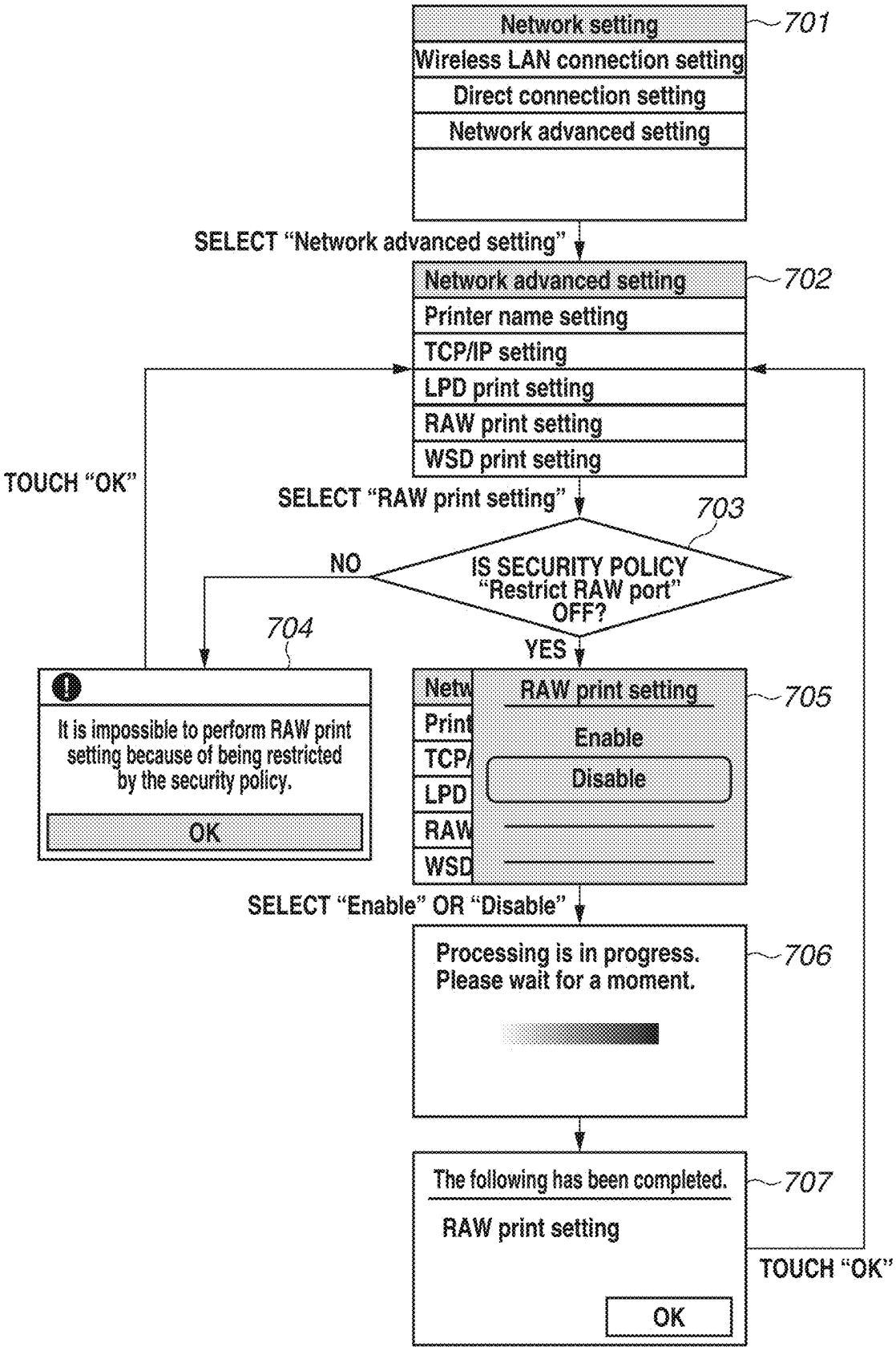

Network setting
Wireless LAN connection setting
Direct connection setting
Network advanced setting
701
SELECT "Network advanced setting"
Network advanced setting
Printer name setting
TCP/IP setting
LPD print setting
RAW print setting
WSD print setting
702
TOUCH "OK"
SELECT "RAW print setting"
703
IS SECURITY POLICY "Restrict RAW port" OFF?
NO
YES
704
It is impossible to perform RAW print setting because of being restricted by the security policy.
OK
Netw
Print
TCP/
LPD
RAW
WSD
RAW print setting
Enable
Disable
705
SELECT "Enable" OR "Disable"
Processing is in progress.
Please wait for a moment.
706
The following has been completed.
RAW print setting
OK
707
TOUCH "OK"

FIG.11A

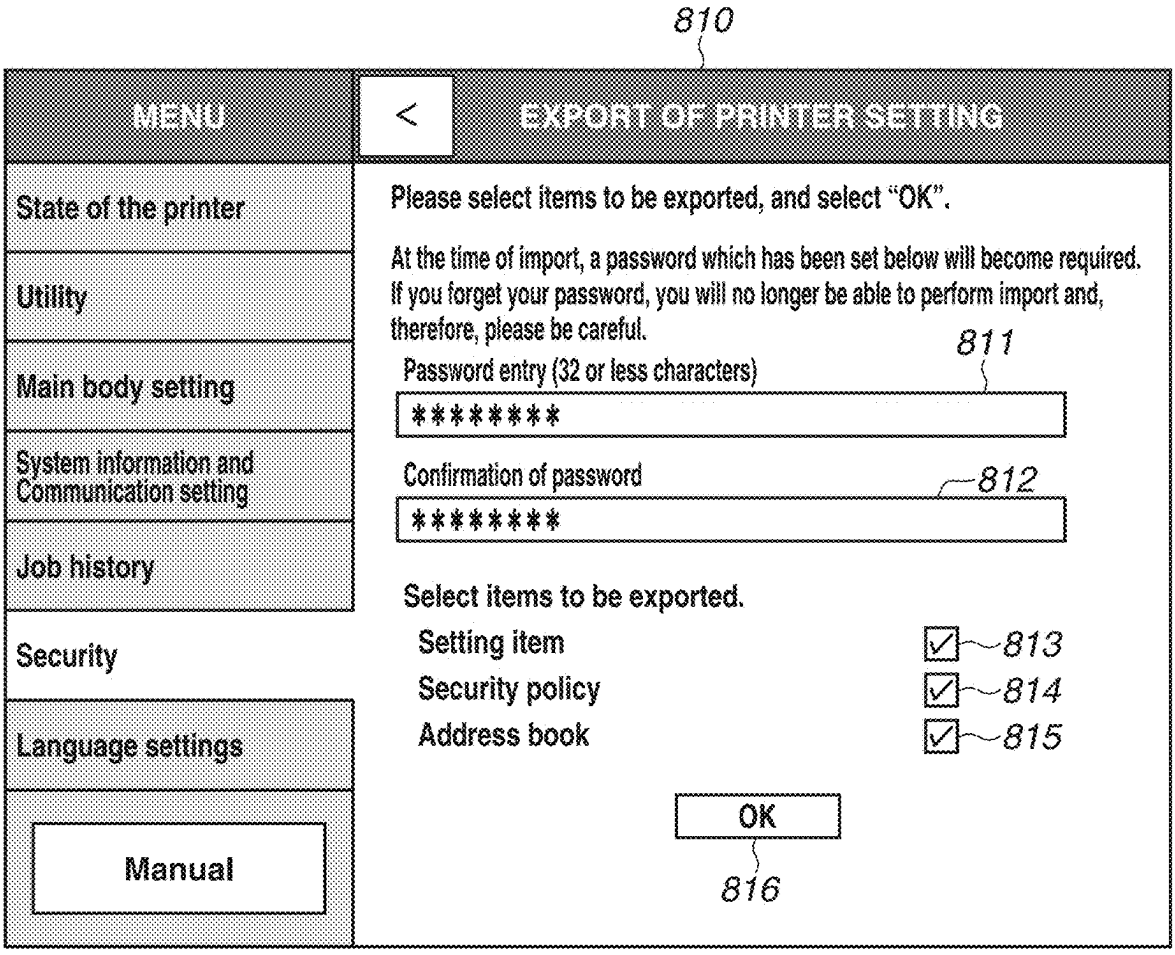

810
MENU
<
EXPORT OF PRINTER SETTING
State of the printer
Utility
Main body setting
System information and Communication setting
Job history
Security
Language settings
Manual
Please select items to be exported, and select "OK".
At the time of import, a password which has been set below will become required. If you forget your password, you will no longer be able to perform import and, therefore, please be careful.
811
Password entry (32 or less characters)
****
Confirmation of password
812
****
Select items to be exported.
Setting item
813
Security policy
814
Address book
815
OK
816

FIG.11B

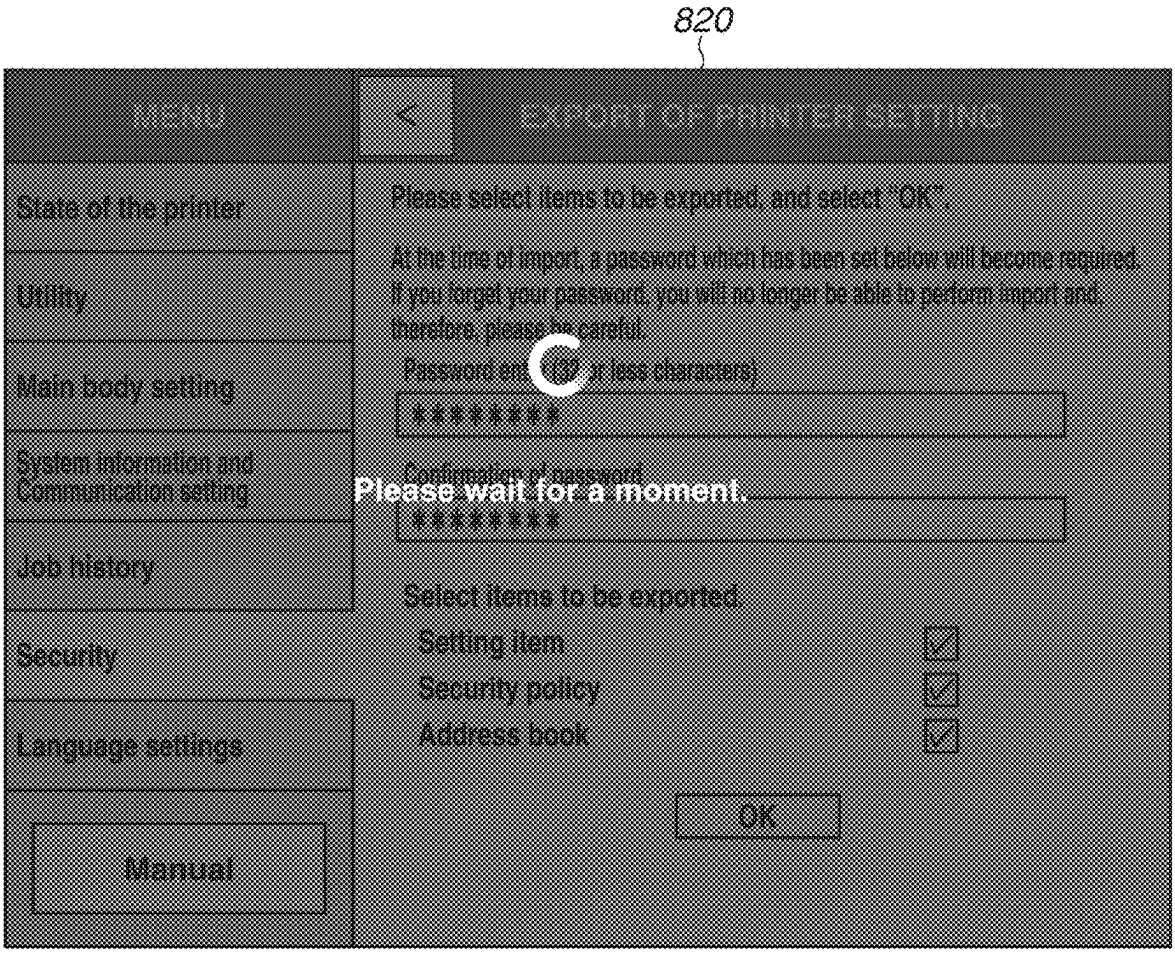

820
MENU
State of the printer
Utility
Main body setting
System information and Communication setting
Job history
Security
Language settings
Manual
<
Please select items to be exported, and select "OK".
At the time of import, a password which has been set below will become required. If you forget your password, you will no longer be able to perform import and, therefore, please be careful.
Password entry (32 or less characters)
****
Confirmation of password
****
Please wait for a moment.
Select items to be exported.
Setting item
Security policy
Address book
OK

FIG.11C

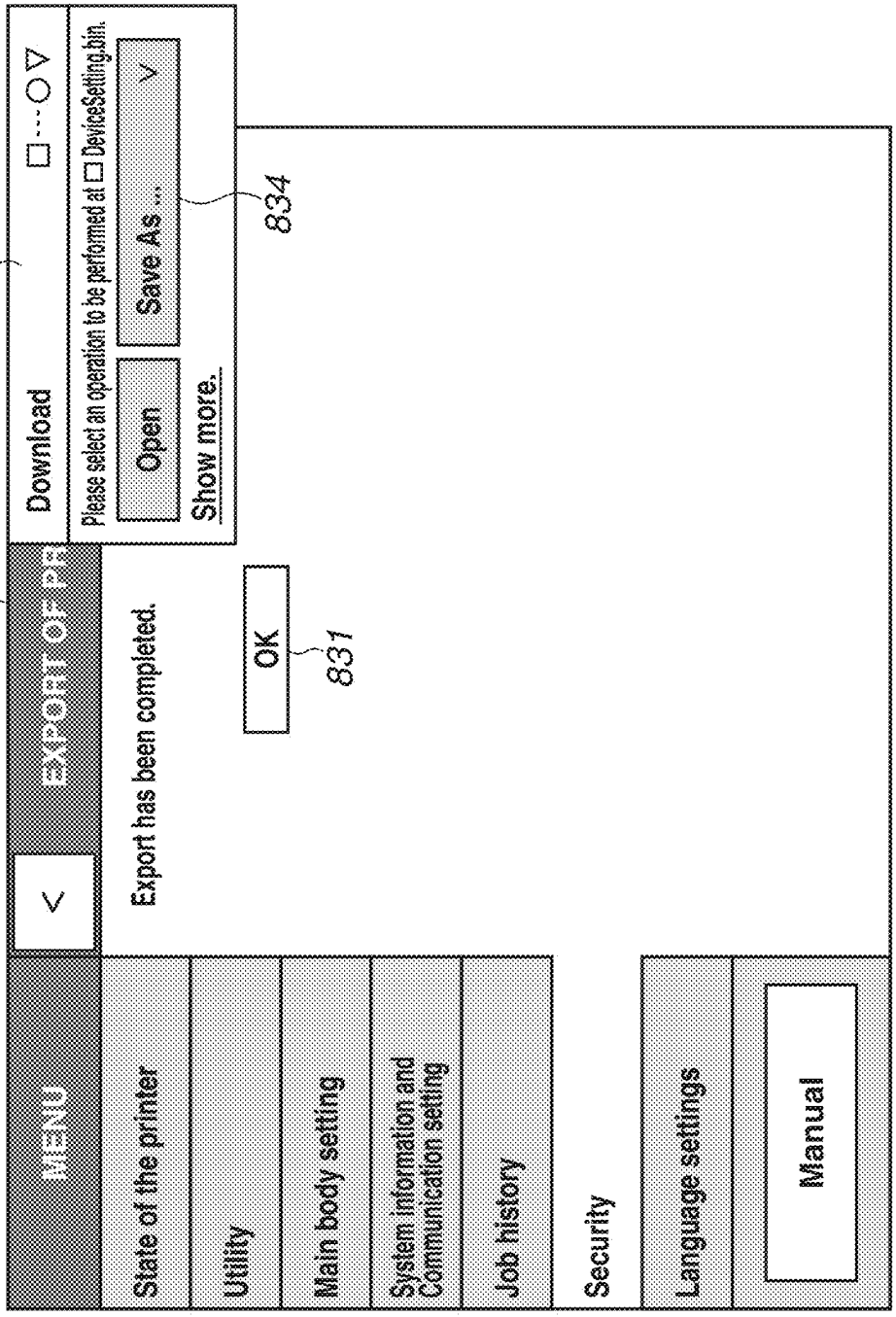

MENU
State of the printer
Utility
Main body setting
System information and Communication setting
Job history
Security
Language settings
Manual
Export has been completed.
OK
831
830
832
Download
Please select an operation to be performed at DeviceSetting.bin.
Open
Save As ...
Show more.
834

FIG.11D

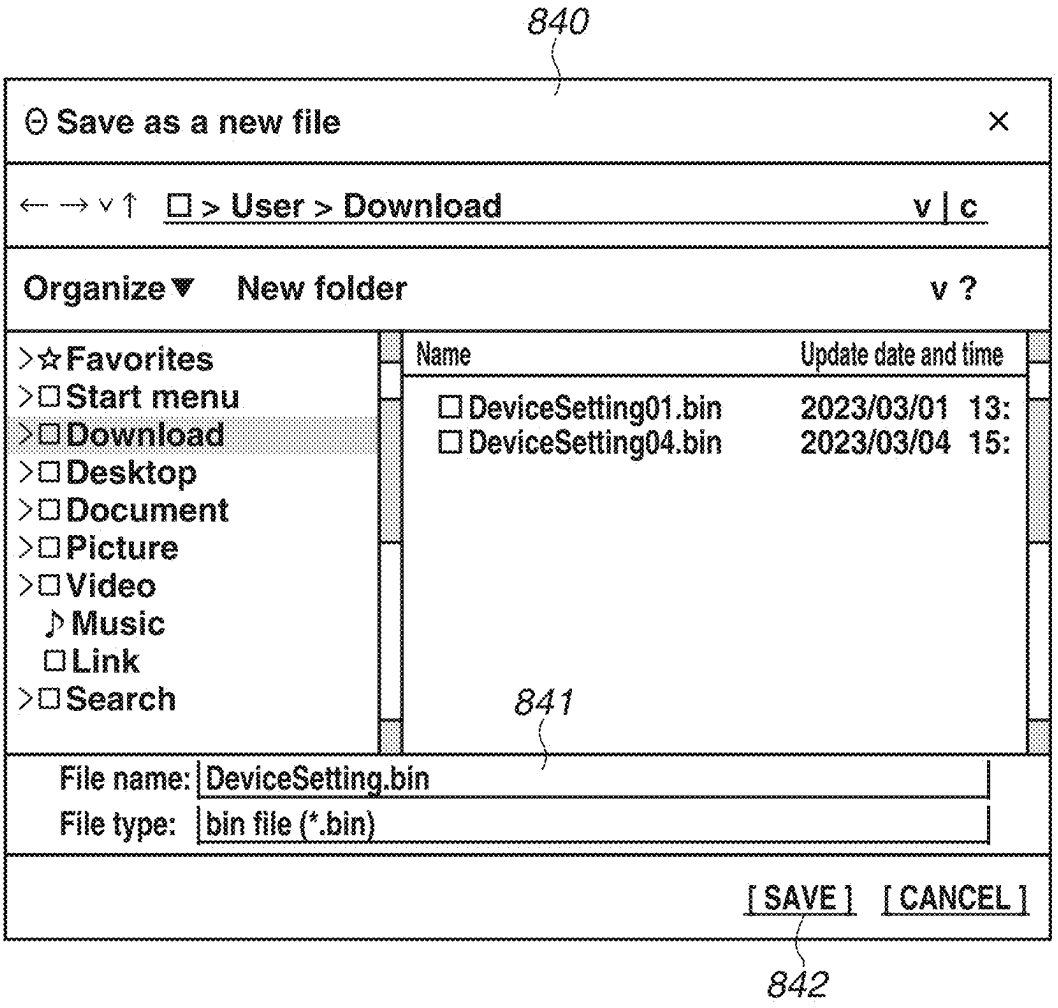

840
Save as a new file
×
← → v ↑ > User > Download
v | c
Organize
New folder
v ?
>☆Favorites
>Start menu
>Download
>Desktop
>Document
>Picture
>Video
♪Music
Link
>Search
Name
Update date and time
DeviceSetting01.bin
2023/03/01 13:
DeviceSetting04.bin
2023/03/04 15:
841
File name: DeviceSetting.bin
File type: bin file (*.bin)
[SAVE] [CANCEL]
842

FIG.12A

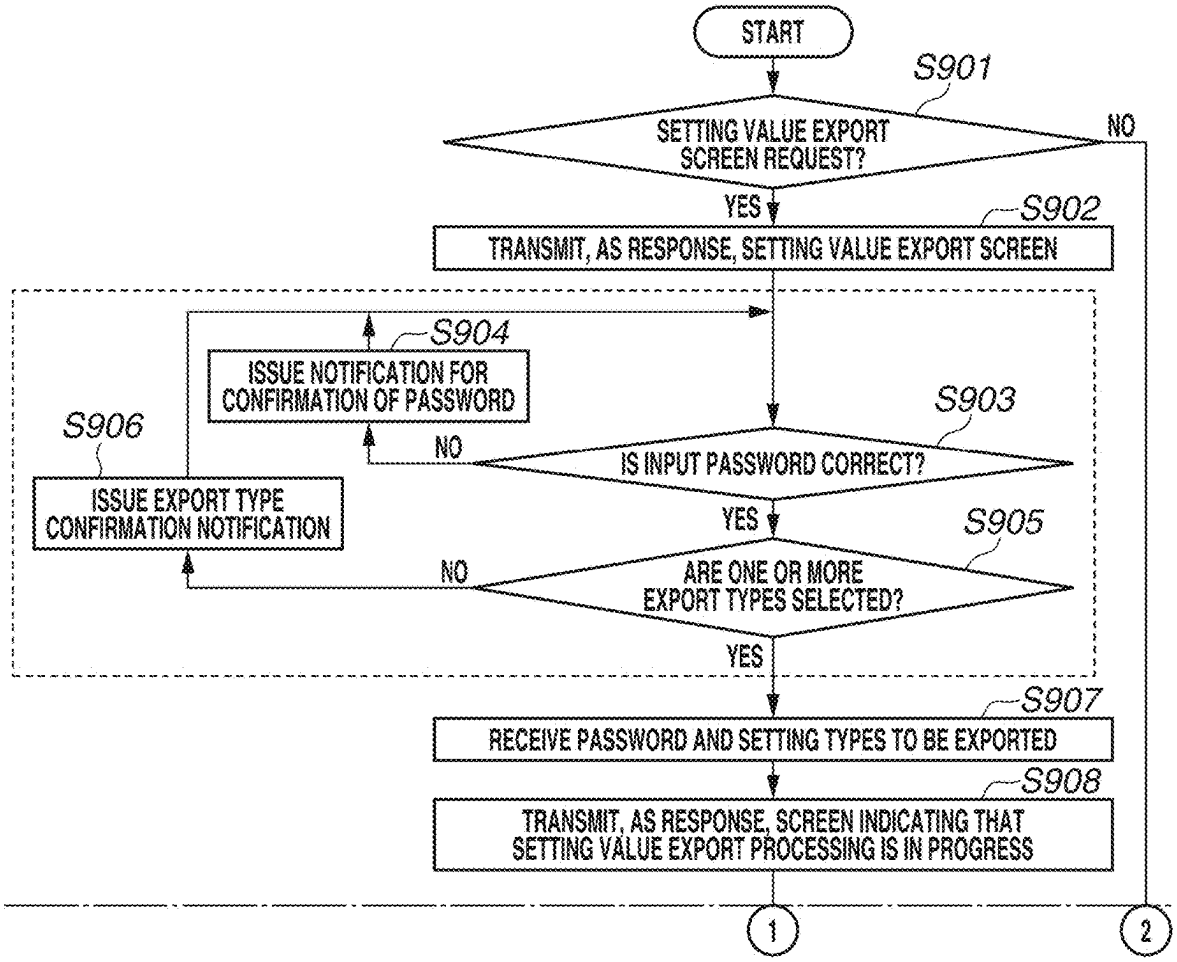

START
S901
SETTING VALUE EXPORT SCREEN REQUEST?
NO
YES
S902
TRANSMIT, AS RESPONSE, SETTING VALUE EXPORT SCREEN
S904
ISSUE NOTIFICATION FOR CONFIRMATION OF PASSWORD
S903
S906
NO
IS INPUT PASSWORD CORRECT?
ISSUE EXPORT TYPE CONFIRMATION NOTIFICATION
YES
S905
NO
ARE ONE OR MORE EXPORT TYPES SELECTED?
YES
S907
RECEIVE PASSWORD AND SETTING TYPES TO BE EXPORTED
S908
TRANSMIT, AS RESPONSE, SCREEN INDICATING THAT SETTING VALUE EXPORT PROCESSING IS IN PROGRESS
1
2

FIG.12B

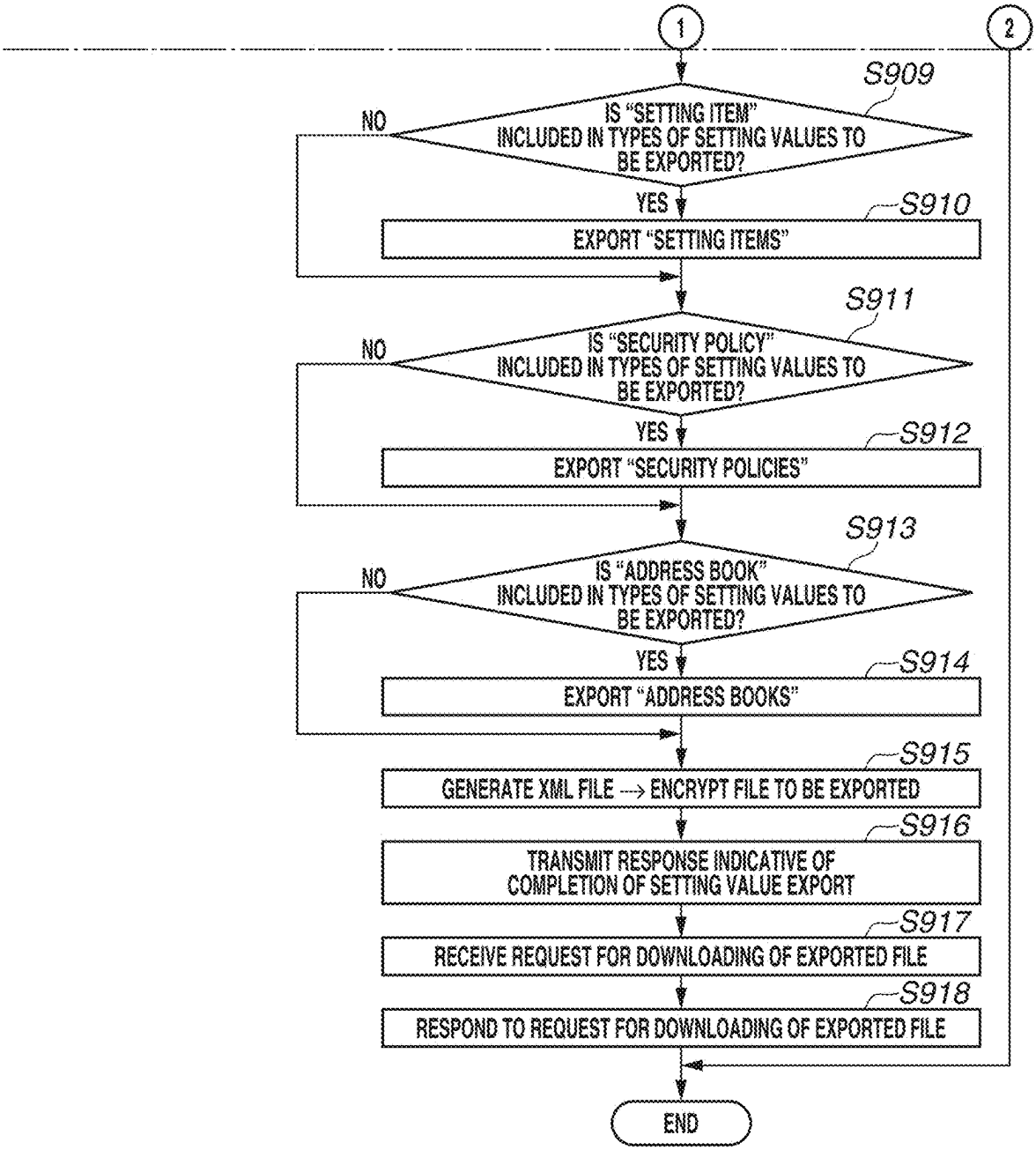

1
2
S909
IS "SETTING ITEM" INCLUDED IN TYPES OF SETTING VALUES TO BE EXPORTED?
NO
YES
S910
EXPORT "SETTING ITEMS"
S911
IS "SECURITY POLICY" INCLUDED IN TYPES OF SETTING VALUES TO BE EXPORTED?
NO
YES
S912
EXPORT "SECURITY POLICIES"
S913
IS "ADDRESS BOOK" INCLUDED IN TYPES OF SETTING VALUES TO BE EXPORTED?
NO
YES
S914
EXPORT "ADDRESS BOOKS"
S915
GENERATE XML FILE → ENCRYPT FILE TO BE EXPORTED
S916
TRANSMIT RESPONSE INDICATIVE OF COMPLETION OF SETTING VALUE EXPORT
S917
RECEIVE REQUEST FOR DOWNLOADING OF EXPORTED FILE
S918
RESPOND TO REQUEST FOR DOWNLOADING OF EXPORTED FILE
END

FIG.13A

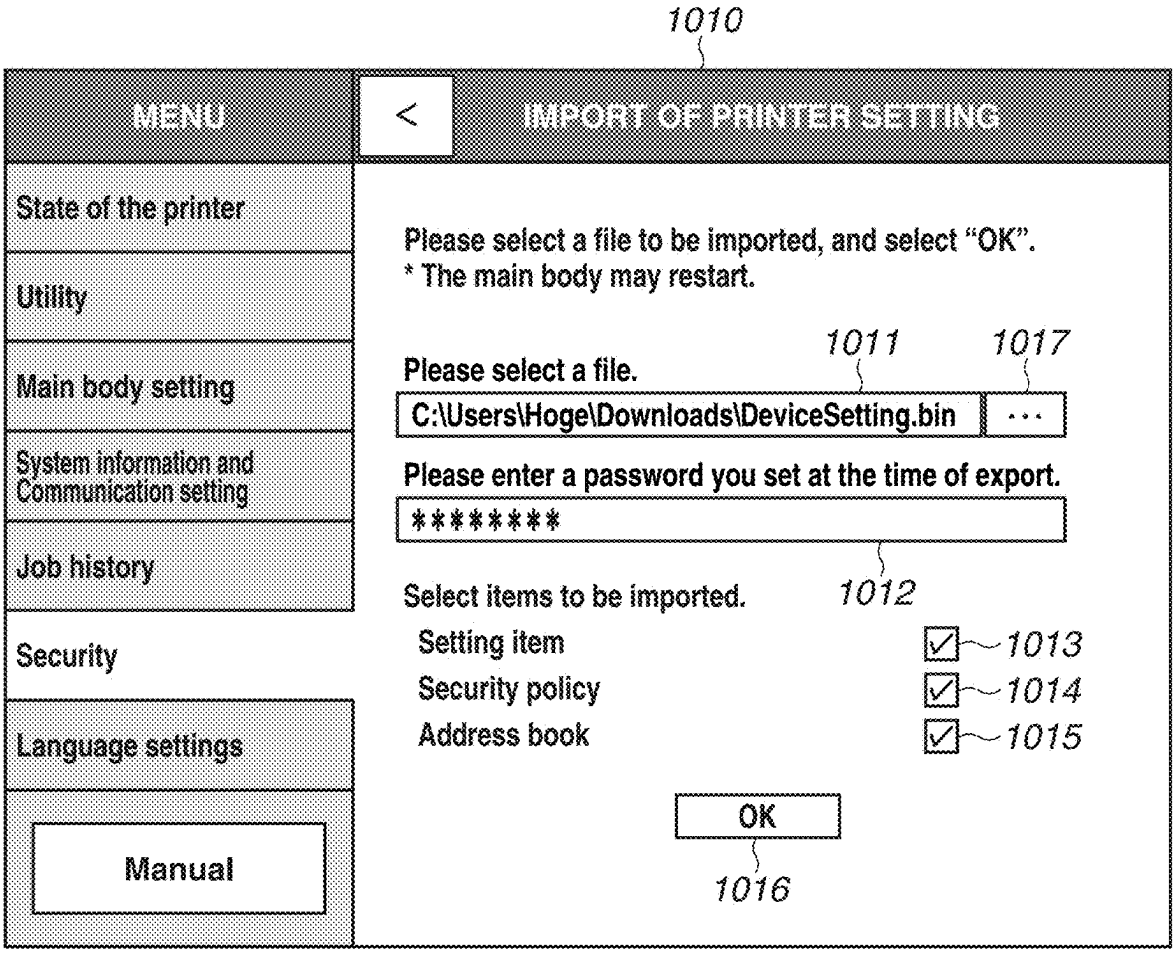

1010
MENU
<
IMPORT OF PRINTER SETTING
State of the printer
Utility
Main body setting
System information and Communication setting
Job history
Security
Language settings
Manual
Please select a file to be imported, and select "OK".
* The main body may restart.
1011
1017
Please select a file.
C:\Users\Hoge\Downloads\DeviceSetting.bin
...
Please enter a password you set at the time of export.
****
1012
Select items to be imported.
Setting item
1013
Security policy
1014
Address book
1015
OK
1016

FIG.13B

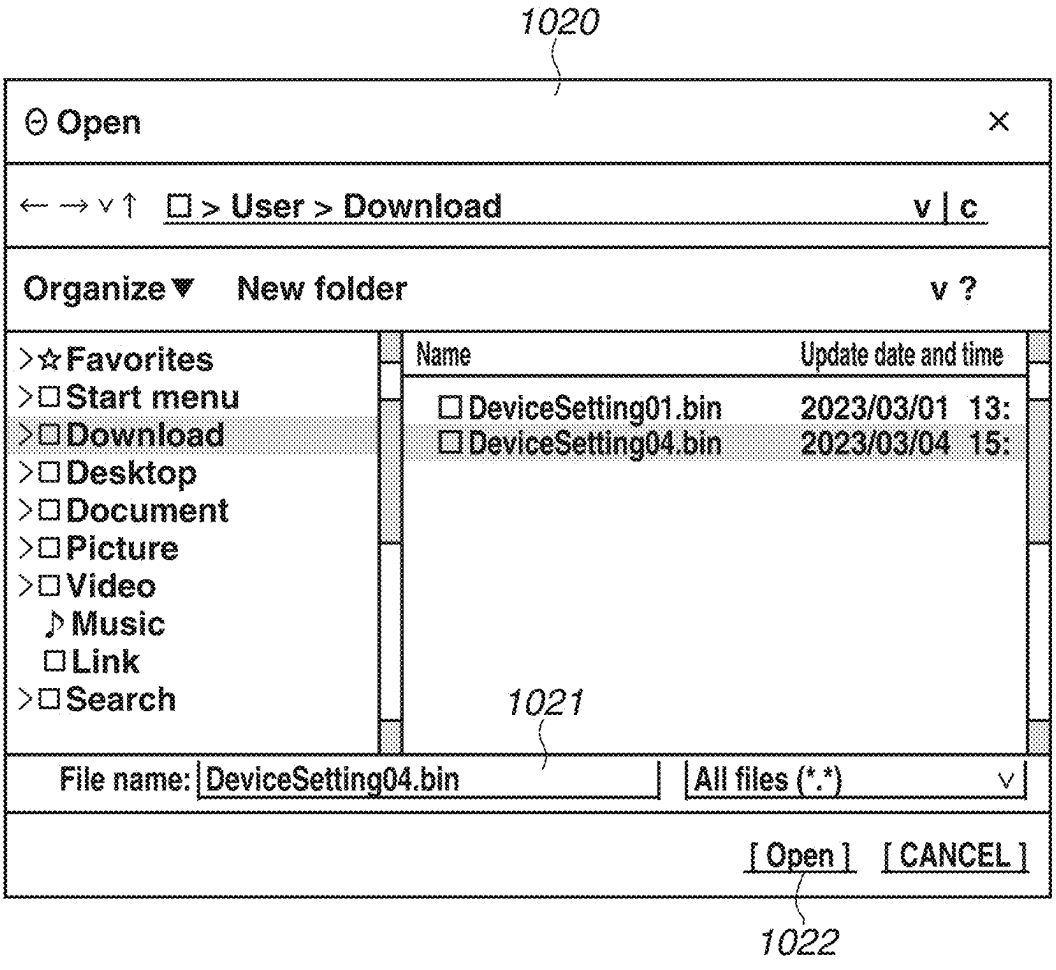

1020
Open
User > Download
Organize
New folder
Favorites
Start menu
Download
Desktop
Document
Picture
Video
Music
Link
Search
Name
Update date and time
DeviceSetting01.bin
2023/03/01 13:
DeviceSetting04.bin
2023/03/04 15:
1021
File name:
DeviceSetting04.bin
All files (*.*)
[Open]
[CANCEL]
1022

FIG.13C

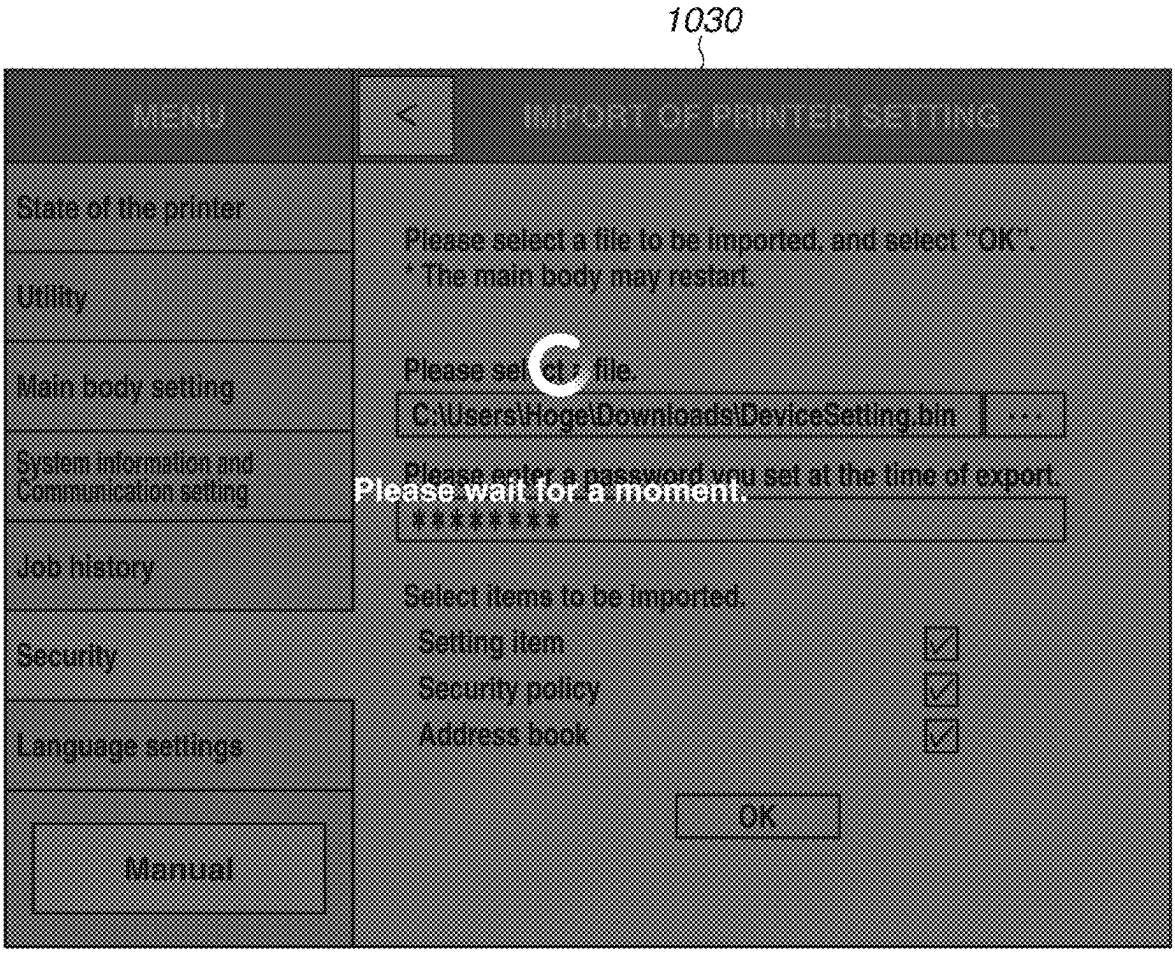

1030
MENU
State of the printer
Utility
Main body setting
System information and Communication setting
Job history
Security
Language settings
Manual
<
Please select a file to be imported, and select "OK".
* The main body may restart.
Please select file.
C:\Users\Hoge\Downloads\DeviceSetting.bin
Please enter a password you set at the time of export.
Please wait for a moment.
Select items to be imported.
Setting item
Security policy
Address book
OK

FIG.13D

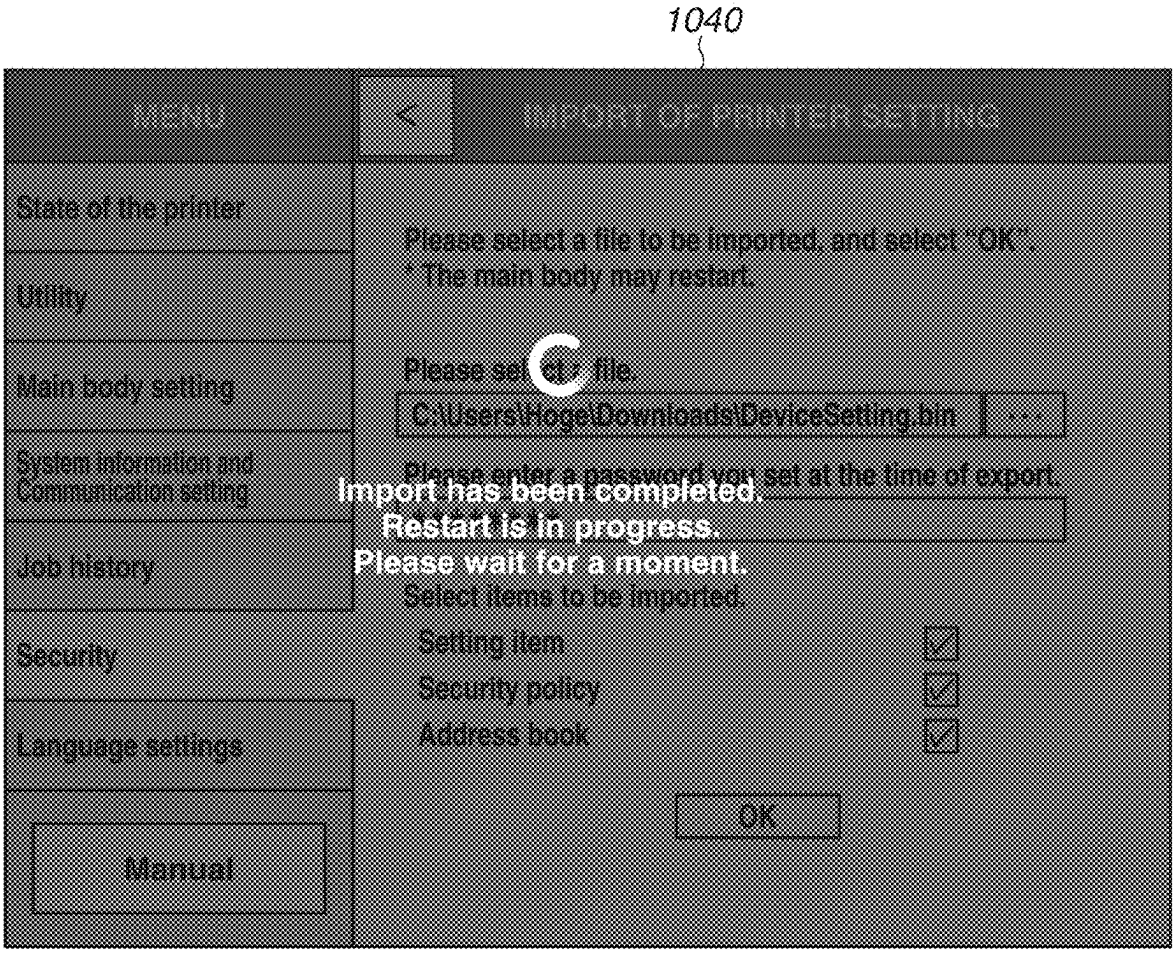

1040
MENU
State of the printer
Utility
Main body setting
System information and Communication setting
Job history
Security
Language settings
Manual
<
Please select a file to be imported, and select "OK".
* The main body may restart.
Please select file.
C:\Users\Hoge\Downloads\DeviceSetting.bin
Please enter a password you set at the time of export.
Import has been completed.
Restart is in progress.
Please wait for a moment.
Select items to be imported.
Setting item
Security policy
Address book
OK

FIG.13E

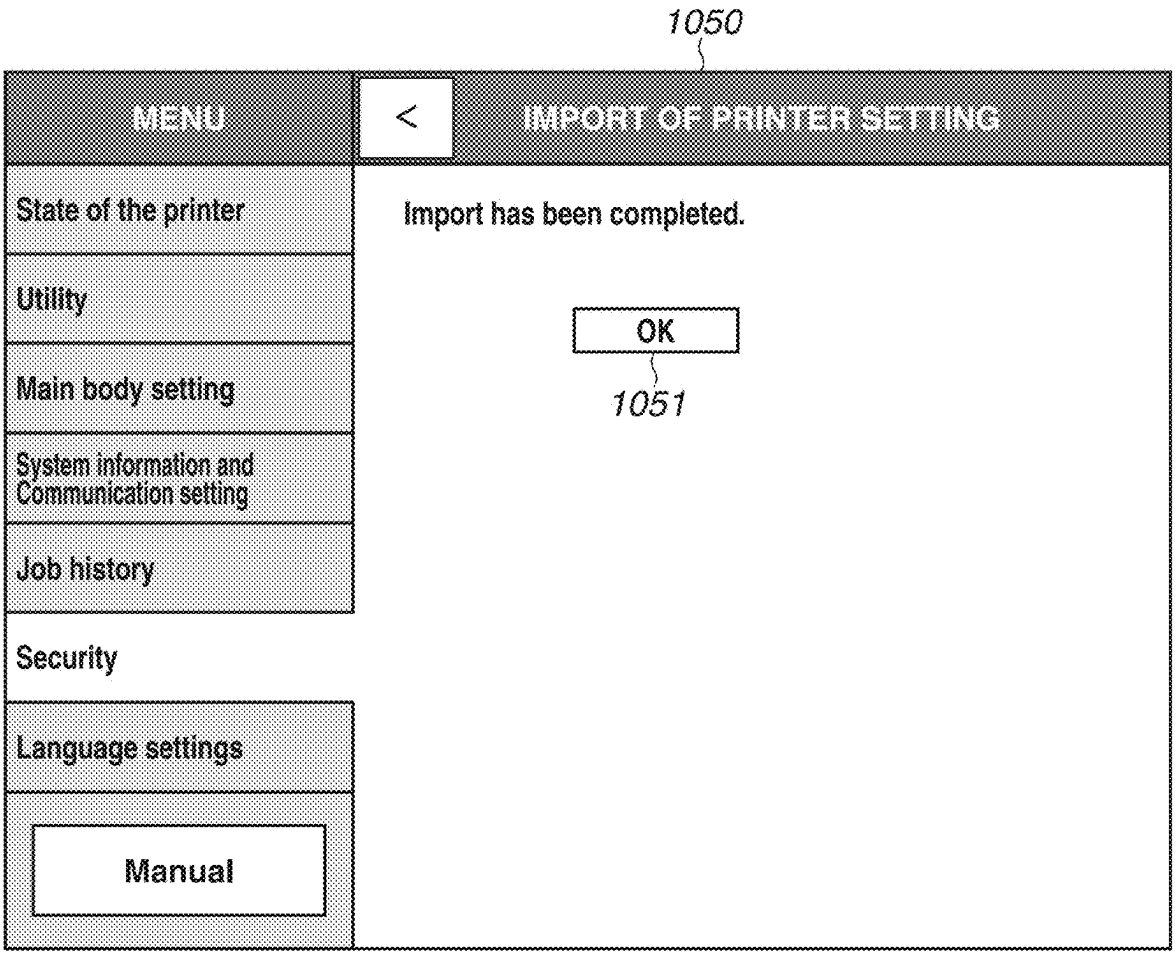

1050
MENU
<
IMPORT OF PRINTER SETTING
State of the printer
Utility
Main body setting
System information and Communication setting
Job history
Security
Language settings
Manual
Import has been completed.
OK
1051

FIG.14A

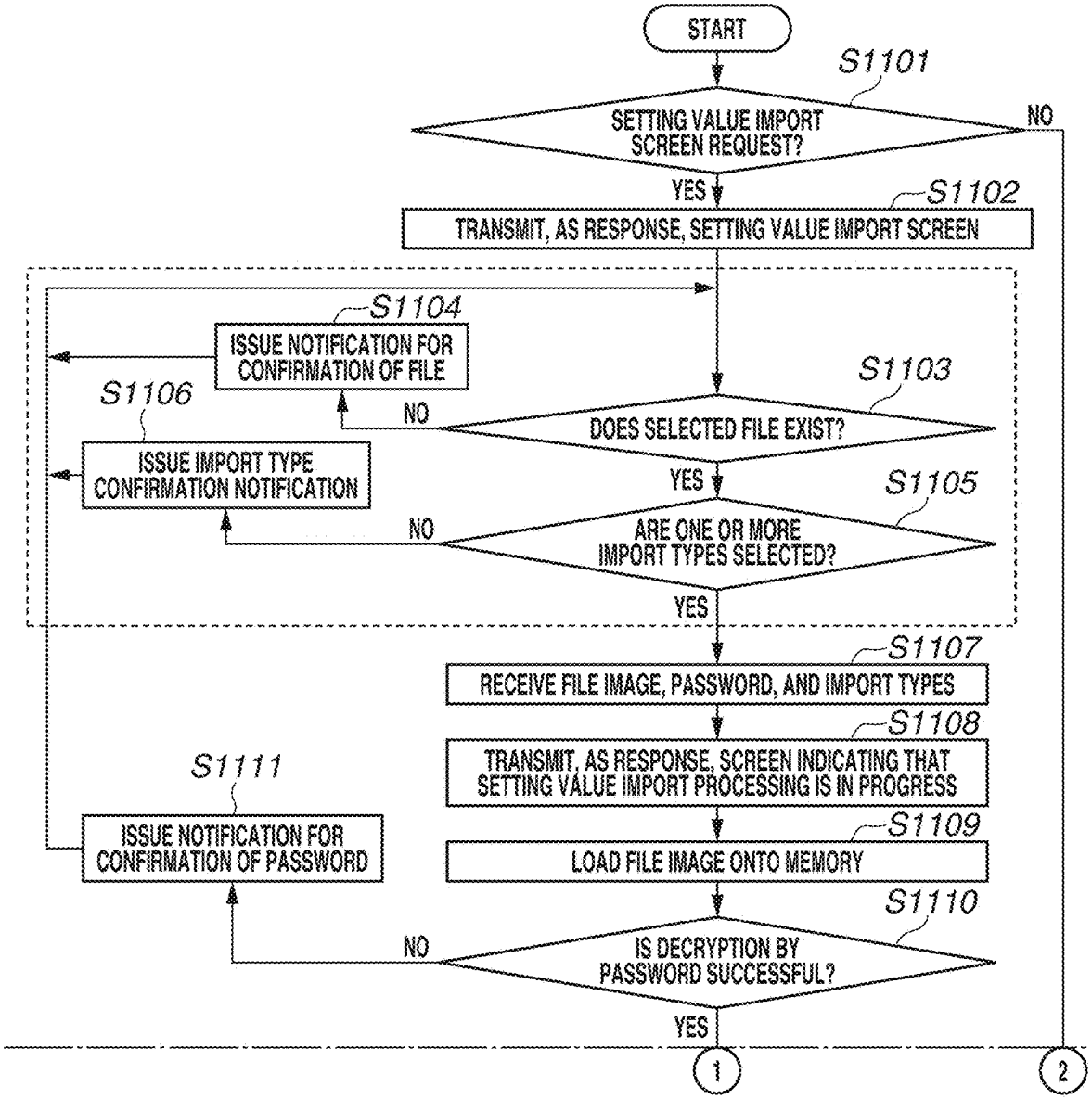
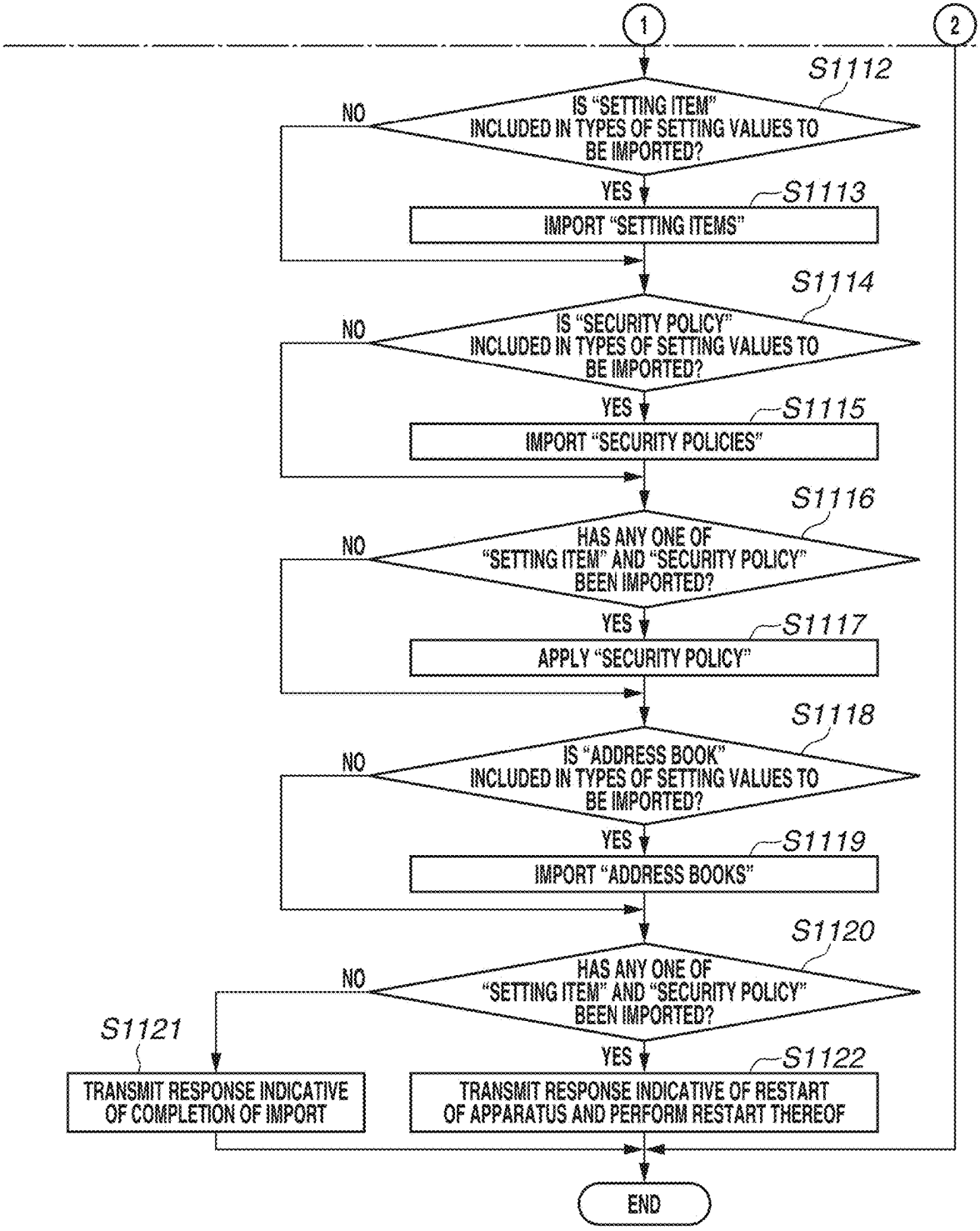

START
S1101
SETTING VALUE IMPORT SCREEN REQUEST?
NO
YES
S1102
TRANSMIT, AS RESPONSE, SETTING VALUE IMPORT SCREEN
S1104
ISSUE NOTIFICATION FOR CONFIRMATION OF FILE
S1103
S1106
NO
DOES SELECTED FILE EXIST?
ISSUE IMPORT TYPE CONFIRMATION NOTIFICATION
YES
S1105
NO
ARE ONE OR MORE IMPORT TYPES SELECTED?
YES
S1107
RECEIVE FILE IMAGE, PASSWORD, AND IMPORT TYPES
S1108
S1111
TRANSMIT, AS RESPONSE, SCREEN INDICATING THAT SETTING VALUE IMPORT PROCESSING IS IN PROGRESS
S1109
ISSUE NOTIFICATION FOR CONFIRMATION OF PASSWORD
LOAD FILE IMAGE ONTO MEMORY
S1110
NO
IS DECRYPTION BY PASSWORD SUCCESSFUL?
YES
1
2

FIG.14B


1
2
S1112
IS "SETTING ITEM" INCLUDED IN TYPES OF SETTING VALUES TO BE IMPORTED?
NO
YES
S1113
IMPORT "SETTING ITEMS"
S1114
IS "SECURITY POLICY" INCLUDED IN TYPES OF SETTING VALUES TO BE IMPORTED?
NO
YES
S1115
IMPORT "SECURITY POLICIES"
S1116
HAS ANY ONE OF "SETTING ITEM" AND "SECURITY POLICY" BEEN IMPORTED?
NO
YES
S1117
APPLY "SECURITY POLICY"
S1118
IS "ADDRESS BOOK" INCLUDED IN TYPES OF SETTING VALUES TO BE IMPORTED?
NO
YES
S1119
IMPORT "ADDRESS BOOKS"
S1120
HAS ANY ONE OF "SETTING ITEM" AND "SECURITY POLICY" BEEN IMPORTED?
NO
YES
S1121
TRANSMIT RESPONSE INDICATIVE OF COMPLETION OF IMPORT
S1122
TRANSMIT RESPONSE INDICATIVE OF RESTART OF APPARATUS AND PERFORM RESTART THEREOF
END

INFORMATION PROCESSING APPARATUS AND CONTROL METHOD

BACKGROUND

Field of the Disclosure

[0001] Aspects of the present disclosure generally relate to a technique for importing a setting value of an information processing apparatus.

Description of the Related Art

[0002] Personal computers (PCs) or server equipment which connects to networks located in, for example, offices are desirable to be operated according to security policies defined by the respective offices. The security policy is a fundamental policy concerning the information security of the whole enterprise, which is obtained by compiling policies for preventing the abuse of information, external intrusion, and information leak.

[0003] The equipment which connects to networks located in offices includes, in addition to PCs and server equipment, image processing apparatuses such as multifunction peripherals and printers. Each of recent image processing apparatuses not only simply prints or transmits images but also provides, to the user, a web user interface (UI) which enables the user to operate the image processing apparatus via a web browser present on a PC or provides, to the user, various cloud services cooperating with respective cloud servers. Thus, image processing apparatuses have come to play a role similar to that of another PC or server equipment present on a network. Accordingly, to maintain a safe and secure office environment, as with PCs and server equipment, even in image processing apparatuses, the user is required to follow a security policy.

[0004] Here, following a security policy means, for example, imposing a limitation on an operation regarding security on the image processing apparatus so as to prevent abuse or information leak, such as making user authentication mandatory or making encryption in a communication pathway mandatory.

[0005] In such an image processing apparatus, control for maintaining a state following a security policy is performed. Specifically, when a given security policy has been set, a setting item related to the set security policy becomes a fixed value, so that the setting item becomes unable to be changed by any user other than a security administrator.

[0006] Moreover, each of recent image processing apparatuses has various functions and thus has a large number of setting items to cause such various functions to appropriately operate. There is equipment which has the function of compiling such setting items, exporting the compiled setting items as a file format to outside the equipment, and, after that, importing the setting items at a certain opportunity (hereinafter referred to as a "setting value import function").

[0007] Furthermore, examples of the above-mentioned certain opportunity include, first, an opportunity at which, in an enterprise, due to the influence of an external environment accompanied by departmental arrangement or personnel relocating, setting items of, for example, a network, an address book, and a security policy are applied in a simplified procedure. Alternatively, examples of the above-mentioned certain opportunity also include a case where the backup of a setting value is performed immediately before initialization at the time of delivery to, for example, a manufacturer service for, for example, repair and the setting value is restored after the repair is complete. Then, at various opportunities or scenes such as situations of the installation including the relocation of a device in an enterprise or home in a subscription service, which has recently begun to gain popularity, or settings inheritance at the time of replacement or settings application in an intrinsic environment, the restoration of a setting group from an existing state or the measures of a convenience improvement by a setting group batch conversion matching an environment are being requested.

[0008] At this time, to maintain a state following a security policy, with regard to a specific setting value on which a limitation is imposed by the security policy, it is necessary to perform a setting value initialization function in such a way as not to deviate from the security policy.

[0009] Japanese Patent Application Laid-Open No. 2015-180990 discusses a technique which checks whether a security policy is individually satisfied with respect to each of a large number of setting items included in an image processing apparatus and imports only the setting items which satisfy the security policy.

[0010] In the case of a configuration which, as mentioned above, checks whether a security policy is individually satisfied with respect to each setting item to determine whether to import the setting item, a processing load for determination increases in proportion to the number of setting items and an increase of the number of security policy items. As a result, the processing time for the setting value import function increases, so that the user's waiting time may become longer. Particularly, with regard to an image processing apparatus of the low-end model with a relatively low central processing unit (CPU) capability, such an influence becomes conspicuous.

SUMMARY

[0011] According to an aspect of the present disclosure, an information processing apparatus includes a non-volatile memory, a first management unit configured to manage a security policy setting, a second management unit configured to manage setting values of a setting item group which affects at least one or more operations of the information processing apparatus, one or more memories storing instructions, and one or more processors capable of executing the instructions causing the information processing apparatus to retain, in the non-volatile memory, an operation setting of the information processing apparatus, receive a setting value group serving as a target for import, and perform control in such a manner that first processing for storing at least a part of the received setting value group as the operation setting which is retained in the non-volatile memory and second processing for, after the first processing, storing, by overwrite, setting values which the second management unit manages in such a way as to satisfy the security policy setting which the first management unit manages, as a part of the operation setting which is retained in the non-volatile memory are performed as a series of processing operations in import processing.

[0012] Further features of the present disclosure will become apparent from the following description of exemplary embodiments with reference to the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. **1** is a diagram illustrating an example of a network configuration in an exemplary embodiment of the present disclosure.

[0014] FIG. **2** is an appearance diagram of an image processing apparatus serving as an example of an information processing apparatus in the present exemplary embodiment.

[0015] FIG. **3** is a diagram illustrating an example of a hardware configuration of the image processing apparatus.

[0016] FIG. **4** is a diagram used to explain an operation display unit of the image processing apparatus.

[0017] FIG. **5** is a diagram used to explain a software configuration of the image processing apparatus.

[0018] FIGS. **6**A and **6**B are diagrams illustrating setting item management information for the image processing apparatus.

[0019] FIG. **7** is a diagram illustrating a dependency relationship between a security policy setting and other settings in the image processing apparatus.

[0020] FIGS. **8**A, **8**B, **8**C, and **8**D are diagrams illustrating display examples of screens each of which is displayed by a terminal device at the time of setting of a security policy.

[0021] FIG. **9** is a flowchart illustrating security policy setting processing.

[0022] FIG. **10** is a diagram illustrating examples of setting screens for setting items the setting change of which is limited by the security policy.

[0023] FIGS. **11**A, **11**B, **11**C, and **11**D are diagrams illustrating examples of setting screens each of which is displayed at the time of performing a setting value export function in the image processing apparatus.

[0024] FIGS. **12**A and **12**B are flowcharts illustrating setting value export processing in the image processing apparatus.

[0025] FIGS. **13**A, **13**B, **13**C, **13**D, and **13**E are diagrams illustrating examples of setting screens each of which is displayed at the time of performing a setting value import function in the image processing apparatus.

[0026] FIGS. **14**A and **14**B are flowcharts illustrating setting value import processing in the image processing apparatus.

DESCRIPTION OF THE EMBODIMENTS

[0027] Various exemplary embodiments, features, and aspects of the disclosure will be described in detail below with reference to the drawings. Moreover, with regard to the present disclosure, it should be understood that embodiments obtained by appropriately making alternations or improvements to the exemplary embodiments described below based on the ordinary knowledge of one skilled in the art within the range not departing from the gist of the present disclosure also fall within the scope of the present disclosure.

[0028] First, a network configuration in an exemplary embodiment of the present disclosure is described with reference to FIG. **1**. Furthermore, the network configuration described as follows is merely an example in the present exemplary embodiment, can be applied to various types of configurations capable of performing communications by wired or by wireless between an image processing apparatus and a terminal device, and is not intended to be restricted to the configuration illustrated in FIG. **1**. Moreover, in the present specification and the accompanying drawings, a "network" may be referred to as "NW" for abbreviation.

[0029] FIG. **1** is a diagram illustrating an example of a network configuration in an exemplary embodiment of the present disclosure.

[0030] In the example illustrated in FIG. **1**, the network configuration in the present exemplary embodiment includes an access point **100**, a local area network (LAN) **101**, which the access point **100** forms, and an image processing apparatus **200** and a terminal device **300**, which are connected to such a network (LAN **101**). Here, the connection form of the LAN **101** can be wired communication or wireless communication, and is assumed to be implemented by a connection using, for example, Wi-Fi® (Wireless Fidelity), which is a communication standard compliant with the IEEE 802.11 series.

[0031] In the LAN **101**, respective different Internet Protocol (IP) addresses are allocated to the image processing apparatus **200** and the terminal device **300** by the access point **100**. This enables designating IP addresses as destinations between devices included in the LAN **101** and causing the devices to perform communications with each other.

[0032] The image processing apparatus **200** is an example of an information processing apparatus according to aspects of the present disclosure. The image processing apparatus **200** is, for example, an inkjet printer and provides functions such as print, scan, and facsimile (FAX) to the user. Additionally, the image processing apparatus **200** has a web server function and is capable of performing request reception and response transmission using the HyperText Transfer Protocol (HTTP) function. Furthermore, the functions which are mounted in the image processing apparatus **200** do not need to be restricted to such functions, and some of the above-mentioned functions do not need to be mounted or a function other than the above-mentioned functions can be mounted. Moreover, the image processing apparatus **200** is not restricted to an inkjet printer, but can be another type of apparatus such as a laser beam printer or an office multifunction peripheral. Moreover, the present disclosure is not restricted to an image processing apparatus, but can be applied to various types of information processing apparatuses such as network home electrical appliance and other electronic equipment.

[0033] The terminal device **300** is, for example, a smartphone, and provides a web browser function within the device itself to the user. In the web browser function, the terminal device **300** performs request transmission and response reception using the HTTP communication, and performs screen displaying associated with these communications. Furthermore, the functions which are mounted in the terminal device **300** do not need to be restricted to these, and a function other than the above-mentioned functions can be mounted therein.

[0034] Moreover, the terminal device **300** is not restricted to a smartphone, but can be another type of device such as a personal computer (PC) or a tablet terminal.

[0035] FIG. **2** is a diagram illustrating an example of an appearance of the image processing apparatus **200**.

[0036] In the present exemplary embodiment, an inkjet printer is illustrated as an example of an image processing apparatus, and this is a multifunction printer (MFP) having print, scan, facsimile (FAX), and other functions in combination.

[0037] An operation display unit **201** includes a display and buttons which are used to operate the image processing apparatus **200**. The details of the operation display unit **201** are described below with reference to FIG. **4**.

[0038] A printing paper insertion port **202** is an insertion port to which to set sheets of paper with various sizes. The sheets of paper set to the printing paper insertion port **202** are conveyed one by one to a printing unit, are subjected to desired printing, and are discharged from a printing paper discharge port **203**.

[0039] A document positioning plate **204** is a glasslike transparent plate, on which to put a document and which is used to read the document by a scanner. A document positioning plate pressing plate **205** is a cover which, at the time of reading being performed by the scanner, presses a document against the document positioning plate **204** in such a way as to cause the document not to float and prevents external light from entering a scanning portion.

[0040] A Universal Serial Bus (USB) communication unit **206** includes a circuit and a USB connector which are used for the image processing apparatus **200** to perform communications using USB connection with, for example, an external terminal device **300**.

[0041] A wireless LAN communication unit **207** includes, built therein, circuits such as an antenna, which are used to perform wireless communication using the above-mentioned wireless connection or a direct connection, in which the image processing apparatus **200** itself serves as an access point and forms a wireless LAN.

[0042] A facsimile (FAX) communication unit **208** includes circuits which are used to perform FAX transmission and reception and a connector for a telephone cable.

[0043] A power source unit **209** includes a power source circuit and a power source jack which are used to supply electric power to the image processing apparatus **200**.

[0044] FIG. **3** is a block diagram illustrating an example of a hardware configuration of the image processing apparatus **200**.

[0045] The image processing apparatus **200** includes a main board **210**, which performs control of the entire image processing apparatus **200**, the operation display unit **201**, the USB communication unit **206**, the wireless LAN communication unit **207**, the FAX communication unit **208**, and the power source unit **209**.

[0046] A central processing unit (CPU) **211**, which is in the form of a microprocessor arranged in the main board **210**, operates according to a control program stored in a read-only memory (ROM) **213**, to which the CPU **211** is connected via an internal bus **212**, and data stored in a random access memory (RAM) **214**, to which the CPU **211** is also connected via the internal bus **212**. Moreover, various types of operation settings of the image processing apparatus **200** are retained in a non-volatile random access memory (NVRAM) **215**, which is a non-volatile memory, and are read and written according to the control program.

[0047] The CPU **211** can control a scanning unit **217** to read an image of a document and stores the read image in an image memory, which is a part of the RAM **214**. Moreover, the CPU **211** can control a printing unit **216** to print an image retained in the image memory, which is a part of the RAM **214**, on a recording medium.

[0048] The CPU **211** controls the USB communication unit **206** via a USB communication control unit **218** to perform USB communication using USB connection with an external device. Moreover, the CPU **211** controls the wireless LAN communication unit **207** via a wireless LAN communication control unit **219** to perform wireless LAN communication using infrastructure connection or direct connection with an external device. Additionally, the CPU **211** controls the FAX communication unit **208** via a FAX communication control unit **220** to perform FAX communication using a telephone line with an external device.

[0049] The CPU **211** controls an operation display control unit **221** to receive operation information output from the operation display unit **201**. Moreover, the CPU **211** can control the operation display control unit **221** to perform displaying of the state of the image processing apparatus **200** or displaying of a function selection menu on the operation display unit **201**.

[0050] FIG. **4** is a diagram schematically illustrating an example of a configuration of the operation display unit **201** of the image processing apparatus **200**. The operation display unit **201** is configured with, for example, a plurality of buttons, a display, and light-emitting diodes (LEDs).

[0051] In the example illustrated in FIG. **4**, a case where a touch panel liquid crystal display (hereinafter referred to as a "touch display") is employed as the display of the operation display unit **201** is illustrated. In a state in which electric power is being supplied from the power source unit **209**, in response to a power button **222** being pressed by the user, the image processing apparatus **200** starts. In response to the image processing apparatus **200** starting, a home screen (a home screen such as that illustrated in FIG. **4**), which is the uppermost layer of a menu which the user is able to operate, is displayed on the touch display **226**.

[0052] The home screen includes a copy region **231** for receiving an execution instruction for a copy function, a scan region **232** for receiving an execution instruction for a scan function, and a FAX region **233** for receiving an execution instruction for a FAX function. Moreover, the home screen also includes a network region **234** for transitioning to a menu for performing a network setting change or condition confirmation of infrastructure connection or direct connection of the image processing apparatus **200**. Additionally, the home screen also includes a setting region **235** for transitioning to a menu for performing, for example, other various setting changes, update of firmware, and a maintenance function such as cleaning.

[0053] In a case where inputting of a character string from the user is required for password authentication, a software keyboard can be displayed on the touch display **226** to receive such inputting.

[0054] In response to a home button **223** being pressed in a state in which a screen in another menu layer other than the home screen is being displayed, the displayed screen can return to the home screen. Moreover, in response to a back button **224** being pressed in a state in which a screen in another menu layer other than the home screen is being displayed, the displayed screen can return to a screen in a menu layer upper by one layer.

[0055] At any timing when each of the various functions such as the copy function and the scan function is being performed and processing is able to be stopped, in response to a stop button **225** being pressed, processing which is being performed can be stopped.

[0056] FIG. **5** is a block diagram conceptually illustrating an example of a software configuration for implementing a setting change and a setting value import function out of

pieces of software which run in the image processing apparatus **200**. Furthermore, processing which is performed for the setting value import function is referred to as "setting import processing" or is referred to simply as "import processing". Moreover, elements or components of the software illustrated in FIG. **5** are merely examples, and are not intended to restrict the elements or components to those illustrated in FIG. **5**.

[0057] A software group schematically illustrated in FIG. **5** implements various functions in the image processing apparatus **200** by the CPU **211** executing a control program stored in the ROM **213** with use of a part of data associated with the control program and stored in the RAM **214**. The software group includes a communication program unit **240**, which mainly performs communication control, an application program unit **250**, which mainly controls an application function, and a device control program unit **260**, which mainly controls lower layers in the image processing apparatus **200**.

[0058] The communication program unit **240** includes a network communication control module **241**, a security module **242**, a USB communication control module **243**, a web server module **244**, and a static content database **245**.

[0059] The network communication control module **241** is a module which controls the wireless LAN communication control unit **219** and takes charge of up to the transport layer of communication protocol stack, and implements Transmission Control Protocol/Internet Protocol (TCP/IP) communication for the image processing apparatus **200**.

[0060] The security module **242** is a module which takes charge of processing for, for example, encryption and decryption of communication and authentication and hash accompanied by such processing, and implements Transport Layer Security/Secure Sockets Layer (TLS/SSL) communication for the image processing apparatus **200**.

[0061] The USB communication control module **243** is a module which controls the USB communication control unit **218** and takes charge of an operation for the image processing apparatus **200** behaving as a USB device, and implements USB communication for the image processing apparatus **200**.

[0062] The web server module **244** is a module which takes charge of an operation for the image processing apparatus **200** behaving as a web server, and implements HyperText Transfer Protocol (HTTP) communication with the external terminal device **300** in which a web browser operates. Specifically, the web server module **244** analyzes an HTTP request received from the external terminal device **300**, causes a web UI control module **251** or the static content database **245** to operate according to a result of the analysis, and forms and transmits the generated data as an HTTP response. The web server module **244** performs request reception and response transmission with use of TCP/IP communication, TLS/SSL communication, or USB communication.

[0063] The static content database **245** is a module which operates as a file system, and performs reading-out of data, such as Joint Photographic Experts Group (JPEG) data or HyperText Markup Language (HTML) data, stored in the ROM **213** or the RAM **214**.

[0064] The application program unit **250** includes the web UI control module **251**, a device UI control module **252**, and application modules **253** to **256** taken as examples.

[0065] The web UI control module **251** performs data generation for displaying a web UI of the image processing apparatus **200** on the web browser of the external terminal device **300** according to a request from the web server module **244**. The web UI control module **251** is able to cause the operational state or setting state of the image processing apparatus **200** to be displayed on the web UI by acquiring the operational state or setting state of the image processing apparatus **200** from the respective application modules and transmitting the shaped data as a response. Moreover, the web UI displayed by the web browser of the terminal device **300** is configured to be able to issue an instruction to perform, for example, a setting change or password authentication for the image processing apparatus **200**. When the web browser is operated by the user and an instruction for performing, for example, a setting change or password authentication for the image processing apparatus **200** is issued from the web UI, an HTTP request with the content of the instruction stored therein is received by the image processing apparatus **200**. The web UI control module **251** receives such an instruction via the web server module **244** and causes the application module associated with the content of the instruction to perform processing for, for example, the setting change or password authentication. Upon completion of the processing, the web UI control module **251** stores a processing result indicative of success or failure in an HTTP response and transmits the HTTP response via the web server module **244**.

[0066] The device UI control module **252** implements a UI in the main body of the image processing apparatus **200** by controlling the operation display control unit **221**. The device UI control module **252** stores menu layer information and causes, for example, an operation menu corresponding to the current menu layer to be displayed on the touch display **226**. Moreover, the device UI control module **252** is also able to acquire the operational state or setting state of the image processing apparatus **200** from the respective application modules, shape the acquired data, and causes the shaped data to be displayed on the touch display **226**. Additionally, the device UI control module **252** receives an operation for, for example, a setting change or password authentication from the operation display unit **201** and causes the application module associated with the operation to perform processing therefor. Upon completion of the processing, the device UI control module **252** causes a processing result indicative of success or failure to be displayed on the touch display **226**.

[0067] The security policy setting application **253** receives an instruction issued from the web UI control module **251** or the device UI control module **252** and performs acquisition of a security policy setting state or changing of a security policy setting.

[0068] The NW setting application **254** receives an instruction issued from the web UI control module **251** or the device UI control module **252** and performs acquisition of an NW setting state or changing of an NW setting.

[0069] The address book setting application **255** receives an instruction issued from the web UI control module **251** or the device UI control module **252** and performs acquisition of address book information (address setting data constituting an address book) including, for example, FAX destination information and, for example, addition or deletion of new destination information to or from the address book information.

[0070] The setting value import/export application **256** receives an instruction issued from the web UI control module **251** and performs import and export processing for setting values of the image processing apparatus **200**, a security policy, and an address book. In the present exemplary embodiment, the setting value import/export application **256** is described as respective different names such as a setting value import application **256***a* and a setting value export application **256***b*. Furthermore, in the present exemplary embodiment, an operation for performing import and export of setting values is assumed to be performed only via a web UI. This is because export processing which is processing for outputting setting values as an electronic file to an external unit and import processing which is processing for receiving the electronic file as an input are required to be respectively performed as download and upload by a web browser.

[0071] The device control program unit **260** includes a system control module **261** and a setting value storing module **262**.

[0072] The system control module **261** takes charge of such an operation as to comprehensively control the entire software system, such as starting and stopping of the image processing apparatus **200**. In the present exemplary embodiment, the system control module **261** receives a restart request from the security policy setting application **253** and thus performs restart processing for the image processing apparatus **200**.

[0073] The setting value storing module **262** operates in such a way as to comprehensively control, for example, storing of setting values of the image processing apparatus **200**, receives an instruction for storing of setting values from another module such as each application module, and performs writing of the setting values to the NVRAM **215**. Moreover, the setting value storing module **262** receives an instruction for referring to setting values from another module such as each application module, and performs reading-out of setting values from the NVRAM **215**.

[0074] FIGS. **6**A and **6**B are diagrams schematically illustrating an example of setting item management information for an image processing apparatus in the present exemplary embodiment.

[0075] FIGS. **6**A and **6**B schematically illustrate a part of setting item management information **400** obtained by compiling setting values of the respective setting items and management information therefor retained in the NVRAM **215** via the setting value storing module **262**.

[0076] As shown in column **401**, all of the setting items are able to be uniquely identified by the respective item identifiers (IDs), so that designating an item ID enables performing writing or reading-out of a setting value corresponding to the designated item ID.

[0077] Column **402** shows current setting values of the respective setting items.

[0078] Column **403** shows factory-configured setting values of the respective setting items. When a setting reset function included in the main the main body setting items is performed, the respective setting items targeted for the setting reset function are set to initial values, which are factory-configured values, shown in column **403**.

[0079] Column **404** shows attributes of the respective setting items. Each of attributes of the respective setting items is composed of the following three elements, i.e., a setting value type (data type) for retaining each setting value, a minimum value of each setting value (a setting minimum value), and a maximum value of each setting value (a setting maximum value). In the attributes of the respective setting items, the setting value type is not only referred to at the time of internal memory acquisition in exporting a setting value but also used as information constituting a data type in tags to be output. Moreover, the setting minimum value and the setting maximum value in the attributes of the respective setting items are values which are referred to for determining the consistency of a setting value in importing the setting value.

[0080] While, in the example illustrated in FIGS. **6**A and **6**B, the setting item management information **400** is shown in tabular form, the form for use in retaining such information in the image processing apparatus **200** is not limited to this. For example, the setting item management information **400** can be retained in specific database form, or can be retained in another form such as JavaScript Object Notation (JSON) form. Additionally, only the setting values shown in column **402** can be retained in the RAM **214** or the NVRAM **215**, and the other pieces of information can be expressed as a program which has been stored in the ROM **213** or table data which has been statically defined.

[0081] FIG. **7** is a diagram schematically illustrating a dependency relationship between a security policy setting and other settings in the image processing apparatus in the present exemplary embodiment.

[0082] FIG. **7** schematically illustrates a part of a dependency relationship **410** between a security policy setting and other settings, which is managed and controlled by the security policy setting application **253**. The dependency relationship mentioned here means that the content of a setting value of the dependency source affects the content of a setting value of the dependency destination.

[0083] Column **411** shows setting items of the security policy setting which serve as the dependency source, and conditions in which the dependence occurs.

[0084] Column **412** shows setting items which serve as the dependency destination, and shows how each setting value is forced when the dependence has occurred.

[0085] For example, with regard to the setting item "Prohibit the use of direct connection" of the security policy setting indicated by the item ID "10001", the case where the setting value of the corresponding setting item is "ON", i.e., is enabled, affects the setting value of the dependency destination. In that case, the setting value of the setting item "Direct connection setting" indicated by the item ID "00001" is forced into "OFF" and the setting value of the setting item "Automatic start of easy connection" indicated by the item ID "00002" is also forced into "OFF", i.e., into disabled.

[0086] Moreover, for example, with regard to the setting item "Minimum number of characters of password" of the security policy setting indicated by the item ID "10007", the case where the setting value of the corresponding setting item is a value of one of integers "1" to "32" affects the setting value of the dependency destination. In that case, the setting value of the setting item "Rule: Minimum number of characters" indicated by the item ID "01005" is forced into the same value as a value which is set in the setting item "Minimum number of characters of password" of the security policy setting.

[0087] Moreover, for example, with regard to the setting item "Permit transmission only to a destination previously

registered with an address book" of the security policy setting indicated by the item ID "10012", the case where the setting value of the corresponding setting item is "ON", i.e., is enabled, affects the setting value of the dependency destination. In that case, the setting value of the setting item "Permit addition of a new address" indicated by the item ID "02001" is forced into "OFF", i.e., is disabled, and, additionally, with regard to all of the pieces of address information written in rows of the item ID "02002" and subsequent item IDs, changing of the setting value thereof is prohibited.

[0088] While FIG. **7** illustrates the dependency relationship **410** between a security policy setting and other settings in tabular form, the form for use in retaining such information in the image processing apparatus **200** is not limited to this. For example, the dependency relationship **410** can be retained in specific database form, can be retained in another form such as JSON form, or can be expressed as a program stored in the ROM **213**.

[0089] Next, processing which is performed in the case of performing security policy setting via a web UI is described with reference to FIGS. **8**A, **8**B, **8**C, and **8**D and FIG. **9**.

[0090] FIGS. **8**A, **8**B, **8**C, and **8**D are diagrams illustrating examples of screens which the web browser of the terminal device **300** displays at the time of setting of a security policy in the present exemplary embodiment.

[0091] FIG. **9** is a flowchart illustrating an example of security policy setting processing which is performed by the image processing apparatus **200** in the present exemplary embodiment. Processing operations in steps illustrated in FIG. **9** are performed by the CPU **211** executing a program stored in the ROM **213**. Processing illustrated in the flowchart of FIG. **9** is started in response to the web server module **244** of the image processing apparatus **200** receiving an HTTP request described below output from the web browser of the terminal device **300**.

[0092] In step S**601** illustrated in FIG. **9**, the web server module **244** checks whether the received HTTP request is a security policy setting screen request. Whether the received HTTP request is a security policy setting screen request is determined based on a requested Uniform Resource Locator (URL) or a request parameter. If it is determined that the received HTTP request is not a security policy setting screen request (NO in step S**601**), the web server module **244** ends the processing in the present flowchart. Furthermore, while, since the actual image processing apparatus is also able to receive a request other than the security policy setting screen request, the web server module **244** performs processing for continuing to check whether the received HTTP request is another receivable request, this processing deviates from the gist of the present description and is, therefore, omitted from description.

[0093] On the other hand, if it is determined that the received HTTP request is a security policy setting screen request (YES in step S**601**), the web server module **244** requests the web UI control module **251** to generate a security policy setting screen. In response to this request, the web UI control module **251** performs a processing operation in step S**602**.

[0094] In step S**602**, the web UI control module **251** determines whether security administrator password setting is present. Specifically, the web UI control module **251** acquires the setting value of security administrator password setting from the NVRAM **215** via the security policy setting application **253** and the setting value storing module **262**. If the acquired setting value is "ON", the web UI control module **251** determines that security administrator password setting is present, and, if the acquired setting value is "OFF", the web UI control module **251** determines that security administrator password setting is not present.

[0095] Here, if it is determined that security administrator password setting is present (YES in step S**602**), the web UI control module **251** advances the processing to step S**603**.

[0096] On the other hand, if it is determined that security administrator password setting is not present (NO in step S**602**), the web UI control module **251** advances the processing to step S**605**.

[0097] In step S**603**, the web UI control module **251** generates a security administrator password authentication screen, and transmits, as a response, the security administrator password authentication screen to the terminal device **300** via the web server module **244**.

[0098] FIG. **8**A illustrates an example of a screen **510** which the web browser of the terminal device **300** displays upon receiving the security administrator password authentication screen which the image processing apparatus **200** has transmitted as a response.

[0099] An entry field **511** is an entry field for a security administrator password, and an OK button **512** is a button operable for performing authentication using the security administrator password. When a security administrator password has been entered into the entry field **511** by the user and the OK button **512** has been pressed by the user, information about the entered security administrator password is transmitted to the image processing apparatus **200** by the web browser of the terminal device **300**.

[0100] Then, the description refers back to the flowchart of FIG. **9**.

[0101] In step S**604**, the web UI control module **251** receives, via the web server module **244**, an HTTP request including the information about a security administrator password which the terminal device **300** has transmitted, and performs authentication of the security administrator password. Specifically, the web UI control module **251** compares the received information about a security administrator password and a "security administrator password value" stored in the NVRAM **215** with each other, and determines the success or failure of the authentication based on whether the received information and the "security administrator password value" coincide with each other.

[0102] Here, in a case where the received password and the stored password do not coincide with each other, the web UI control module **251** determines that the security administrator password authentication is failed (NO in step S**604**), the web UI control module **251** returns the processing to step S**603**, and then transmits, as a response, a security administrator password authentication screen again to the web browser of the terminal device **300** and performs control to prompt the user to re-enter a password.

[0103] On the other hand, in a case where the received password and the stored password coincide with each other, the web UI control module **251** determines that the security administrator password authentication is successful (YES in step S**604**), and then, the web UI control module **251** advances the processing to step S**605**.

[0104] In step S**605**, the web UI control module **251** generates a security policy setting screen, and transmits, as a response, the security policy setting screen to the terminal device **300** via the web server module **244**.

[0105] FIG. **8**B illustrates an example of a screen **520** which the web browser of the terminal device **300** displays upon receiving the security policy setting screen which the image processing apparatus **200** has transmitted as a response.

[0106] In a region **523**, various setting items concerning the security policy are displayed together with, for example, checkboxes or text boxes for enabling the respective settings. The user, who operates the web browser of the terminal device **300**, is able to change the security policy setting of the image processing apparatus **200** by operating, for example, the above-mentioned checkboxes or text boxes.

[0107] A cancel button **522** is a button operable for stopping the security policy setting. When the cancel button **522** is pressed by the user, an HTTP request for requesting a menu screen higher by one rank than the security policy setting menu is transmitted from the web browser. Then, the image processing apparatus **200** generates and transmits, as a response, data about the requested screen, and the processing in the flowchart of FIG. **9** ends.

[0108] An OK button **521** is a button operable for fixing changing of the security policy setting. When the OK button **521** is pressed by the user, a setting change list for the security policy setting operated via the screen **520** (hereinafter referred to as a "setting change list") is temporarily stored in the web browser, and then, the screen **520** transitions to a screen illustrated in FIG. **8**C.

[0109] FIG. **8**C illustrates an example of a security policy setting execution confirmation screen **530**.

[0110] A cancel button **532** is a button operable for cancelling transmission of the setting change list.

[0111] When the cancel button **532** is pressed by the user, the web browser displays the screen **520** again. At this time, the web browser reads out the temporarily stored setting change list, and performs displaying in a state in which the settings in the setting change list are applied to, for example, applicable checkboxes or text boxes in the region **523**.

[0112] An OK button **531** is a button operable for transmitting the setting change list. In response to the OK button **531** being pressed by the user, an HTTP request including the setting change list temporarily stored in the web browser is transmitted to the image processing apparatus **200**. Here, the setting change list is, for example, information obtained by combining, in list form, values of the item IDs and changed setting values of the applicable setting items with regard to rows included in the category "Security policy setting" in the column **401** illustrated in FIGS. **6**A and **6**B.

[0113] Then, the description refers back to the flowchart of FIG. **9**.

[0114] In step S**606**, the web UI control module **251** receives, via the web server module **244**, an HTTP request including the setting change list which the terminal device **300** has transmitted, and starts change processing of the security policy setting. Here, the web UI control module **251** generates response data indicating that the security policy setting processing is in progress.

[0115] Next, in step S**607**, the web UI control module **251** transmits, as a response, an HTTP response including the response data indicating that the security policy setting processing is in progress to the terminal device **300** via the web server module **244**. Additionally, the web UI control module **251** passes the above-mentioned received setting change list to the security policy setting application **253**.

[0116] Here, FIG. **8**D illustrates an example of a screen **540** which the web browser of the terminal device **300** displays upon receiving the response data indicating that the security policy setting processing is in progress which the image processing apparatus **200** has transmitted as a response.

[0117] In the screen **540**, the web browser operates in such a way as not to receive an operation performed by the user. Then, the web browser periodically inquires whether the security policy setting processing has been completed, in the background processing for the web browser, and, in a case where the security policy setting processing has been completed, operates in such a way as to display a top screen for the web UI of the image processing apparatus **200** (not illustrated).

[0118] Then, the description refers back to the flowchart of FIG. **9**.

[0119] The security policy setting application **253**, to which the setting change list has been passed from the web UI control module **251**, performs repetitive processing illustrated in step S**608** to step S**611**. The repetitive processing is repeated with regard to the received setting change list until the setting change list is entirely processed.

[0120] In the repetitive processing, first, in step S**609**, the security policy setting application **253** acquires one combination of an item ID and a setting value unprocessed in the repetitive processing from the setting change list. Then, the security policy setting application **253** stores the setting change of the acquired one combination in the NVRAM **215** via the setting value storing module **262**. Here, since the setting value is stored based on the item ID, it is possible to update a designated item in the security policy setting.

[0121] Next, in step S**610**, the security policy setting application **253** performs limitation processing of a setting value based on the dependency relationship **410** between the security policy setting and other settings such as that illustrated in FIG. **7**. As specifically described with reference to FIG. **7**, the security policy setting application **253** checks a row which coincides with the item ID of the security policy setting stored at this time with regard to the column **411**, and checks whether the stored setting value coincides with a "Setting value in causing a limitation to occur in another setting item". If the stored setting value coincides with a "Setting value in causing a limitation to occur in another setting item", the security policy setting application **253** forces a setting value with respect to a setting item at the dependency destination as illustrated in the column **412**. For example, if the setting change of the acquired one combination is "item ID 10001, ON", the security policy setting application **253** stores "OFF" as the setting value of the item ID 00001 and "OFF" as the setting value of the item ID 00002 in the NVRAM **215** via the setting value storing module **262**.

[0122] Next, in step S**611**, if an unprocessed combination remains in the setting change list, the security policy setting application **253** returns the processing to step S**608**, and, if the processing is complete with respect to all of the combinations in the setting change list, the security policy setting application **253** advances the processing to step S**612**.

[0123] In step S**612**, the security policy setting application **253** requests the system control module **261** to restart the image processing apparatus **200**. In response to such a

request, the system control module **261** performs restart processing, and then, the processing in the present flowchart ends.

[0124] FIG. **10** is a diagram illustrating examples of setting screens for setting items the setting change of which is limited by the security policy in the present exemplary embodiment.

[0125] FIG. **10** illustrates a screen flow occurring in the case of trying to operate and display a RAW print setting as an example of how a UI operation of the image processing apparatus **200** is limited by the security policy setting. Furthermore, the screen flow illustrated in FIG. **10** is processed by the CPU **211** executing a program stored in the ROM **213**, and, mainly, the device UI control module **252** takes charge of control of the screen flow.

[0126] A screen **701** is a network setting menu screen which is displayed in a case where the region **234** (FIG. **4**) has been touched in a state in which the home screen (FIG. **4**) is being displayed on the touch display **226** of the image processing apparatus **200**. In response to "Network advanced setting" in the screen **701** being touched, the screen **701** transitions to a screen **702**.

[0127] Next, in response to "RAW print setting" in the screen **702** being touched, the screen flow proceeds to determination **703**.

[0128] In determination **703**, the device UI control module **252** acquires, via the security policy setting application **253**, a setting value indicating whether the security policy setting item ID 10004 "Restrict RAW port" is "OFF", i.e., is disabled. In a case where the acquired value indicates that the security policy setting item ID 10004 "Restrict RAW port" is "ON", i.e., is enabled (NO in determination **703**), the screen **702** transitions to a screen **704**.

[0129] The screen **704** notifies the user that the setting change of RAW print setting is currently limited by the security policy setting, and, in response to an OK button in the screen **704** being pressed, the screen **704** returns to the screen **702**.

[0130] On the other hand, in a case where the acquired value indicates that the security policy setting item ID 10004 "Restrict RAW port" is "OFF", i.e., is disabled (YES in determination **703**), the screen **702** transitions to a screen **705**.

[0131] In the screen **705**, options of RAW print setting are displayed, and, in the case of the screen **705**, in response to any one of "Enable" or "Disable" being touched, the screen **705** transitions to a screen **706**.

[0132] In the screen **706**, a screen for notifying the user that the setting change processing is in progress is displayed, so that the setting change of the image processing apparatus **200** is performed.

[0133] For example, in a case where "Enable" has been touched in the screen **705**, the device UI control module **252** changes the setting value of the item ID 00009 "RAW print setting" to "ON" via the NW setting application **254** or the setting value storing module **262**.

[0134] On the other hand, in a case where "Disable" has been touched in the screen **705**, the device UI control module **252** changes the setting value of the item ID 00009 "RAW print setting" to "OFF" in a similar way.

[0135] Upon completion of the processing for the setting change of the image processing apparatus **200**, the screen **706** transitions to a screen **707**, thus notifying the user of the completion of the setting change. In response to an OK button in the screen **707** being pressed, the screen **707** returns to the screen **702**.

[0136] Furthermore, while FIG. **10** illustrates a case where the setting change is performed by a UI operation on the main body of the image processing apparatus **200**, the method for the setting change is not limited to this. For example, the setting change can be implemented by a web UI, and, in that case, a setting change procedure or a limitation of setting change similar to that in the screen flow illustrated in FIG. **10** can also be performed.

[0137] Next, processing which is performed in the case of performing export of setting values via a web UI is described with reference to FIGS. **11**A, **11**B, **11**C, and **11**D and FIGS. **12**A and **12**B.

[0138] In the present exemplary embodiment, a use case where a file exported from the image processing apparatus **200** is imported to the same image processing apparatus **200** is described on the assumption that, for example, all of the device settings are backed up due to manufacturer repair and, after repair, all of the device settings are restored. The back-up mentioned here means exporting setting values, and the restore mentioned here means importing the exported setting values and restoring to original state.

[0139] FIGS. **11**A, **11**B, **11**C, and **11**D are diagrams illustrating examples of screens which the web browser of the terminal device **300** displays at the time of export of setting values in the present exemplary embodiment.

[0140] FIGS. **12**A and **12**B are flowcharts illustrating an example of setting value export processing which is performed by the image processing apparatus **200** in the present exemplary embodiment. In FIG. **12**A, a portion surrounded by a dashed line represents processing which is performed by the terminal device **300**. Processing operations in steps of the image processing apparatus **200** illustrated in FIGS. **12**A and **12**B are performed by the CPU **211** executing a program stored in the ROM **213**. Moreover, processing operations in steps of the terminal device **300** are performed by a CPU executing a program stored in a storage device such as a solid state drive (SSD) (not illustrated) of the terminal device **300**.

[0141] Processing illustrated in the flowcharts of FIGS. **12**A and **12**B is started in response to the web server module **244** of the image processing apparatus **200** receiving an HTTP request described below output from the web browser of the terminal device **300**.

[0142] In step S**901**, the web server module **244** determines where the received HTTP request is a setting value export screen request, and, if it is determined that the received HTTP request is not a setting value export screen request (NO in step S**901**), the web server module **244** ends the processing in the present flowchart. Furthermore, while, since the actual image processing apparatus is also able to receive a request other than the setting value export screen request, the web server module **244** performs processing for continuing to check whether the received HTTP request is another receivable request, this processing deviates from the gist of the present description and is, therefore, omitted from description.

[0143] On the other hand, if it is determined that the received HTTP request is a setting value export screen request (YES in step S**901**), the web server module **244** requests the web UI control module **251** to generate a setting

value export screen. In response to this request, the web UI control module **251** performs a processing operation in step S**902**.

[0144] In step S**902**, the web UI control module **251** generates a setting value export screen, and transmits, as a response, the setting value export screen to the terminal device **300** via the web server module **244**.

[0145] FIG. **11**A illustrates an example of a screen **810** which the web browser of the terminal device **300** displays upon receiving the setting value export screen which the image processing apparatus **200** has transmitted as a response.

[0146] An OK button **816** is a button operable for issuing an instruction for execution of setting value export. In response to the OK button **816** being pressed by the user, the terminal device **300** temporarily stores, in the web browser thereof, a password character string described below which has been set in the screen **810** and a setting type which is to be exported, and, before causing the screen **810** to transition to a screen illustrated in FIG. **11**B, performs subsequent processing operations for determining whether the entered contents are correct (step S**903** to step S**906** illustrated in FIG. **12**A).

[0147] Entry fields **811** and **812** are used to enter a password character string which is provided for encrypting file contents at the time of exporting setting values and is required to, at the time of import, decrypt the file contents with the password entered at the time of export. The password to be entered by the user is required to be entered two times for confirmation. Processing for determining whether the contents entered into the entry fields **811** and **812** are correct is as follows. If a character string for password confirmation entered into the entry field **812** does not coincide with a character string entered into the entry field **811**, the terminal device **300** generates a screen (not illustrated) for confirming a password and notifies the user of the generated screen. This portion is determination processing indicated in step S**903** illustrated in FIG. **12**A, and the screen of which the user is notified (the screen (not illustrated) for confirming a password) is displayed in step S**904**.

[0148] Next, checkboxes **813** to **815** are controls which allow the user to select types of setting values to be exported. The checkbox **813** is a control for selecting setting values of a setting item group which affects at least one or more actions of the image processing apparatus **200** as a type of setting values to be exported. The checkbox **814** is a control for selecting setting values of the security policy setting as a type of setting values to be exported. The checkbox **815** is a control for selecting setting values of an address book not included in the setting item for the checkbox **813** as a type of setting values to be exported. At least one or more of these checkboxes are required to be selected. Processing for determining whether the contents input at the checkboxes **813** to **815** are correct is as follows. In a case where there is no selection, the terminal device **300** generates a screen (not illustrated) for prompting the user to perform selection and notifies the user of the generated screen. This portion is determination processing indicated in step S**905** illustrated in FIG. **12**A, and processing for displaying a screen of which the user is notified if the result of the determination is NO (the screen (not illustrated) for prompting the user to perform selection) is assumed to be performed in step S**906**.

[0149] The terminal device **300** temporarily stores, in the web browser thereof, the password entered by the user and the checked types of setting values, and, in response to the OK button **816** being pressed, determines whether the input contents are correct (step S**903** to step S**905**). Then, if the input contents are correct (YES in step S**903** and YES in step S**905**), the terminal device **300** sends the input contents (the password and the types of setting values to be exported) together with an HTTP request to the image processing apparatus **200**.

[0150] Then, the description refers back to the flowcharts of FIGS. **12**A and **12**B.

[0151] In step S**907**, the web UI control module **251** receives (accepts), via the web server module **244**, an HTTP request (including the password and the types of setting values to be exported) transmitted from the terminal device **300**.

[0152] Next, in step S**908**, the web UI control module **251** starts setting value export processing using the password and the types of setting values to be exported received in step S**907** mentioned above and, at the same time, generates a screen **820** indicating that setting value export processing is in progress and transmits the generated screen **820** as a response. Furthermore, the web UI control module **251** passes, to the setting value export application **256***b*, the password and the types of setting values to be exported included in the HTTP request received from the terminal device **300** in step S**907** mentioned above and causes the setting value export application **256***b* to perform setting value export processing.

[0153] FIG. **11**B illustrates an example of a screen **820** which the web browser of the terminal device **300** displays upon receiving the screen indicating that setting value export processing is in progress which the image processing apparatus **200** has transmitted as a response.

[0154] In the screen **820** transmitted as a response in step S**908** illustrated in FIG. **12**A, the web browser operates in such a way as not to receive an operation performed by the user, and then, periodically inquires whether the setting value export processing has been completed, in the background processing for the web browser. When the setting value export processing has been completed, the web UI control module **251** generates response data indicating that the setting value export processing has been completed and then transmits the generated response data as a response via the web server module **244** (step S**916** described below). Upon receiving the response data, the web browser causes the screen **820** to transition to a screen **830** illustrated in FIG. **11**C.

[0155] FIG. **11**C illustrates an example of the screen **830**, which the web browser of the terminal device **300** displays upon receiving the response data indicating that the setting value export processing has been completed which the image processing apparatus **200** has transmitted as a response.

[0156] Here, the web browser of the terminal device **300** transmits, to the image processing apparatus **200**, a download request for a file obtained by exporting the setting values generated by the setting value export application **256***b* of the image processing apparatus **200**. The image processing apparatus **200** returns an HTTP response responsive to the download request via the web server module **244**. At this time, in the case of downloading of the exported file, as with an ordinary file download by the web browser, a

download selection dialog box **832** for allowing the user to select handling of the downloaded file is displayed, thus bring about a state for awaiting the user input.

[0157] In this state, in the present exemplary embodiment, when a Save As button **834** is pressed by the user, the terminal device **300** stores, in a storage device (not illustrated) of the terminal device **300**, the downloaded file with a desired file name designated in a file selection screen such as that illustrated in FIG. **11**D.

[0158] FIG. **11**D illustrates an example of a general-purpose selection screen **840** which is displayed to "save as a new file" a file to be downloaded. In the general-purpose selection screen **840**, after designation of a location for storing a file and selection of a file name or entry of a file name into an entry field **841**, the file is stored in response to a save button **842** being pressed.

[0159] Then, the description refers back to the flowcharts of FIGS. **12**A and **12**B.

[0160] In step S**909**, the setting value export application **256***b* refers to types of setting values to be exported passed from the web UI control module **251**, and determines whether a setting item is included in the types of setting values to be exported.

[0161] Here, if it is determined that a setting item is included in the types of setting values to be exported (YES in step S**909**), the setting value export application **256***b* advances the processing to step S**910**.

[0162] On the other hand, if it is determined that no setting item is included in the types of setting values to be exported (NO in step S**909**), the setting value export application **256***b* advances the processing to step S**911**, which is determination of a next export type.

[0163] In step S**910**, the setting value export application **256***b* performs export processing for setting items. In the export processing for setting items, the setting value export application **256***b* loads and generates, on the RAM **214**, a list of setting values targeted for export included in the currently set setting values retained in the NVRAM **215**, via the setting value storing module **262**. Next, the setting value export application **256***b* converts the list of setting values generated on the RAM **214** into the extended markup language (XML) format and outputs the converted list to a temporary buffer for file output similarly loaded on the RAM **214**. In a case where the type for export is a setting item, a configuration in which the type for export is able to be discriminated from another export type with an XML tag by, for example, setting <DeviceSettings> as an example of a tag which is a middle item of XML is employed.

[0164] Furthermore, while, in the present exemplary embodiment, the format of data to be exported is the XML format, the present exemplary embodiment is not limited to this, and another data format can be employed. For example, the comma separated value (CSV) format, the JSON format, or a unique binary format for directly mapping a structured data structure on a memory can also be employed. Moreover, the setting value export application **256***b* is retaining information retained in the NVRAM **215** described above with regard to the setting item management information **400**, and appends information about, for example, an attribute associated with a setting value to data to be exported together with the setting value. These pieces of information are composed of a data type which represents, for example, the size or type of value data about each setting item or, in the case of arrays, the number of arrays, and the maximum value and minimum value of data, and may include, for example, a level value which defines how far to allow a device revision at the time of import. Furthermore, the setting value export application **256***b* sets information to be exported in common between devices at the beginning of export processing. These pieces of information are, for example, values including, for example, a serial number for identifying a type of device or an individual and version information about firmware running in the device. Arranging these pieces of information at an upper-level portion of XML causes them to be analyzed in the early stage at the time of import and enables controlling import processing of each setting value. Here, a configuration in which the type of device is able to be discriminated from another type by, for example, setting <DeviceInformation> as an example of an identification tag in the XML format of information to be exported in common between devices is employed.

[0165] Next, when export of setting items is complete and data in the XML format is once complete, the setting value export application **256***b* advances the processing to step S**911**, which is determination of a next export type.

[0166] In step S**911**, the setting value export application **256***b* refers to types of setting values to be exported passed from the web UI control module **251**, and determines whether a security policy is included in the types of setting values to be exported.

[0167] Here, if it is determined that a security policy is included in the types of setting values to be exported (YES in step S**911**), the setting value export application **256***b* advances the processing to step S**912**.

[0168] On the other hand, if it is determined that no security policy is included in the types of setting values to be exported (NO in step S**911**), the setting value export application **256***b* advances the processing to step S**913**, which is determination of a next export type.

[0169] In step S**912**, the setting value export application **256***b* performs export processing for security policies. In the export processing for security policies, the setting value export application **256***b* loads and generates, on the RAM **214**, a list of enabled security policies out of the security policies retained in the NVRAM **215**, via the setting value storing module **262**. Each security policy is managed in such a manner that the updated content thereof is controlled by the security policy setting application **253** and the up-to-data state thereof is always retained in the setting value storing module **262**. In a case where, in step S**910**, which is an immediately preceding step, export of setting items has been performed, output data is present with the XML format in a temporary buffer for file output loaded on the RAM **214**, but, in a case where export of setting items is not performed, output data becomes XML data in which only an identification tag in common between devices is present. In any case, even in export processing for security policies, as with setting items, the setting value export application **256***b* generates XML data while composing tags to be exported based on respective pieces of information included in the setting item management information **400**, and then concatenates the XML data with character string data retained in the temporary buffer. Here, in a case where the type for export is a security policy, a configuration in which the type for export is able to be discriminated from another export type with an XML tag by, for example, setting <SecurityPolicySettings> as an example of a tag which is a middle item of XML is employed.

[0170] Next, when export of security policies is complete and data in the XML format is once complete, the setting value export application **256***b* advances the processing to step S**913**, which is determination of a next export type.

[0171] In step S**913**, the setting value export application **256***b* refers to types of setting values to be exported passed from the web UI control module **251**, and determines whether an address book is included in the types of setting values to be exported.

[0172] Here, if it is determined that an address book is included in the types of setting values to be exported (YES in step S**913**), the setting value export application **256***b* advances the processing to step S**914**.

[0173] On the other hand, if it is determined that no address book is included in the types of setting values to be exported (NO in step S**913**), the setting value export application **256***b* advances the processing to step S**915**.

[0174] In step S**914**, the setting value export application **256***b* performs export processing for address books. In the export processing for address books, the setting value export application **256***b* loads and generates, on the RAM **214**, a list of address books retained in the NVRAM **215**, via the setting value storing module **262**. Each address book is managed in such a manner that the updated content thereof is controlled by the address book setting application **255** and the up-to-data state thereof is always retained in the setting value storing module **262**. Since constituent information stored in each address book includes, as character strings, pieces of stylized information such as the full name of a registrant, the name of an organization, and a telephone number or e-mail address, the setting value export application **256***b* generates address book data by invoking a module which acquires such pieces of information from the address book setting application **255**, which comprehensively manages such pieces of information. Specifically, the setting value export application **256***b* acquires individual IDs retained in an address book from the setting value storing module **262**, and generates XML format data by using a module which acquires detailed information which the address book setting application **255** provides according to the acquired IDs. The setting value export application **256***b* sequentially concatenates the generated XML format address data for one address with existing XML character string data retained in the temporary buffer, and thus finally composes all of the addresses. Furthermore, in a case where the type for export is an address book, a configuration in which the type for export is able to be discriminated from another export type with an XML tag by, for example, setting <AddressBook> as an example of a tag which is a middle item of XML is employed.

[0175] When, out of the above-mentioned three export types, all of the export processing operations selected as the types of setting values to be exported have been completed, the setting value export application **256***b* advances the processing to step S**915**.

[0176] In step S**915**, the setting value export application **256***b* concatenates a closing tag so as to complete XML data retained in the temporary buffer for file output loaded on the RAM **214**, and also performs encryption thereon using a password. Furthermore, while, in the present exemplary embodiment, an XML format data file is exported as a compressed file with a ZIP format password, the present exemplary embodiment is not limited to this method. For example, instead of the ZIP format, an encryption library which a third vendor provides can be used, and, instead of archiving the entire file by a password, the Advanced Encryption Standard (AES) encryption using OpenSSL can be performed on a portion serving as a value included in XML format data.

[0177] When the above-mentioned processing operation in step S**915** is complete, the setting value export application **256***b* notifies the web UI control module **251** that the export processing has been completed. In response to this notification, the web UI control module **251** performs a processing operation in step S**916**.

[0178] In step S**916**, to transmit a response to a periodic request about the processing completion from the terminal device **300**, the web UI control module **251** issues an event indicative of export completion to the web server module **244**. The web server module **244** forms data indicative of export completion as an HTTP response and transmits the HTTP response to the terminal device **300**. The terminal device **300** receives HTTP data indicative of export completion, and performs displaying of, for example, a screen **830** illustrated in FIG. **11**C on the web browser thereof.

[0179] Next, in step S**917**, the web UI control module **251** receives, via the web server module **244**, a download request for an exported file associated with the setting value export processing completion from the terminal device **300**. Here, the name of a file to be downloaded is fixedly determined, and, in the present exemplary embodiment, is assumed to be, for example, "DeviceSetting.bin".

[0180] Next, in step S**918**, the web UI control module **251** transmits, via the web server module **244**, the exported file (for example, "DeviceSetting.bin"), as a response to the above-mentioned download request for an exported file received in step S**917**, to the web browser of the terminal device **300**. This causes the download selection dialog box **832** to be displayed on the web browser of the terminal device **300**. Here, when the Save As button **834** is pressed by the user and, in the file selection screen **840** illustrated in FIG. **11**D, a file name is designated and the save button **842** is pressed, the exported file is then stored with a desired file name in a storage device (not illustrated) of the terminal device **300**.

[0181] As described above, it is possible to perform export of setting values.

[0182] Next, processing which is performed in the case of performing import of setting values via a web UI is described with reference to FIGS. **13**A, **13**B, **13**C, **13**D, and **13**E and FIGS. **14**A and **14**B.

[0183] FIGS. **13**A, **13**B, **13**C, **13**D, and **13**E are diagrams illustrating examples of screens which the web browser of the terminal device **300** displays at the time of import of setting values in the present exemplary embodiment.

[0184] FIGS. **14**A and **14**B are flowcharts illustrating an example of setting value import processing which is performed by the image processing apparatus **200** in the present exemplary embodiment. In FIG. **14**A, a portion surrounded by a dashed line represents processing which is performed by the terminal device **300**. Processing operations in steps of the image processing apparatus **200** illustrated in FIGS. **14**A and **14**B are performed by the CPU **211** executing a program stored in the ROM **213**. Moreover, processing operations in steps of the terminal device **300** are performed by a CPU executing a program stored in a storage device such as a solid state drive (SSD) (not illustrated) of the terminal device **300**.

[0185] Processing illustrated in the flowcharts of FIGS. **14**A and **14**B is started in response to the web server module **244** of the image processing apparatus **200** receiving an HTTP request described below output from the web browser of the terminal device **300**.

[0186] In step S**1101**, the web server module **244** determines where the received HTTP request is a setting value import screen request, and, if it is determined that the received HTTP request is not a setting value import screen request (NO in step S**1101**), the web server module **244** ends the processing in the present flowchart. Furthermore, while, since the actual image processing apparatus is also able to receive a request other than the setting value import screen request, the web server module **244** performs processing for continuing to check whether the received HTTP request is another receivable request, this processing deviates from the gist of the present description and is, therefore, omitted from description.

[0187] On the other hand, if it is determined that the received HTTP request is a setting value import screen request (YES in step S**1101**), the web server module **244** requests the web UI control module **251** to generate a setting value import screen. In response to this request, the web UI control module **251** performs a processing operation in step S**1102**.

[0188] In step S**1102**, the web UI control module **251** generates a setting value import screen, and transmits, as a response, the setting value import screen to the terminal device **300** via the web server module **244**.

[0189] FIG. **13**A illustrates an example of a screen **1010** which the web browser of the terminal device **300** displays upon receiving the setting value import screen which the image processing apparatus **200** has transmitted as a response.

[0190] An OK button **1016** is a button operable for issuing an instruction for execution of setting value import. In response to the OK button **1016** being pressed by the user, the terminal device **300** temporarily stores, in the web browser thereof, a file path for import described below set in the screen **1010**, a password, and a setting type which is to be imported, and, before causing the screen **1010** to transition to a screen illustrated in FIG. **13**C, performs subsequent processing operations for determining whether the entered contents are correct (step S**1103** to step S**1106** illustrated in FIG. **14**A).

[0191] An entry field **1011** is used to designate a file to be imported and enter a file path including a file name, and a file name including the designated file path is entered into the entry field **1011** with use of a general-purpose selection screen **1020** for opening a file illustrated in FIG. **13**B. In the present exemplary embodiment, in response to a " . . . " button **1017** located above or on the right side of the entry field **1011** being pressed, the selection screen **1020** illustrated in FIG. **13**B is displayed, in which the user performs file selection by designating a file name at an entry field **1021** and then pressing an "open" button **1022**. Furthermore, in a case where the file selected at the time of the OK button **1016** having been pressed by the user is not able to be opened, the result of a determination performed in step S**1103** illustrated in FIG. **14**A is NO (NO in step S**1103**), and then in step S**1104**, the terminal device **300** generates a screen (not illustrated) for prompting the user to check a file and notifies the user of the generated screen. Furthermore, a file to be imported which is designated here is, for example, a file exported by export processing illustrated in FIGS. **12**A and **12**B, and includes a setting value group targeted for import processing.

[0192] An entry field **1012** is used to enter a password character string which is required to, at the time of importing setting values, decrypt the encrypted file.

[0193] Checkboxes **1013** to **1015** are controls which allow the user to select types of setting values to be imported. At least one or more of these checkboxes are required to be selected, and, in a case where there is no selection, the terminal device **300** generates a screen (not illustrated) for prompting the user to perform selection and notifies the user of the generated screen. This portion is determination processing indicated in step S**1105** illustrated in FIG. **14**A, and processing for displaying a screen of which the user is notified if the result of the determination is NO (the screen (not illustrated) for prompting the user to perform selection) is assumed to be performed in step S**1106**.

[0194] The terminal device **300** temporarily stores, in the web browser thereof, the password entered by the user and the checked types of setting values, and, in response to the OK button **1016** being pressed, sends the input contents (the password and the types of setting values to be imported) together with an HTTP request to the image processing apparatus **200**. Moreover, the terminal device **300** reads a designated file to be imported into a temporarily allocated memory region and also transmits the designated file as binary format data to the image processing apparatus **200**.

[0195] Then, the description refers back to the flowcharts of FIGS. **14**A and **14**B.

[0196] In step S**1107**, the web UI control module **251** receives (accepts), via the web server module **244**, an HTTP request (including the file data, the password, and the types of setting values to be imported) transmitted from the terminal device **300**.

[0197] Next, in step S**1108**, the web UI control module **251** starts setting value import processing using the file data, the password, and the import types received in step S**1107** mentioned above and, at the same time, generates a screen **1030** indicating that setting value import processing is in progress and transmits the generated screen **1030** as a response. Furthermore, the web UI control module **251** passes, to the setting value import application **256***a*, the file data, the password, and the import types included in the HTTP request received from the terminal device **300** in step S**1107** mentioned above and causes the setting value import application **256***a* to perform setting value import processing.

[0198] FIG. **13**C illustrates an example of a screen **1030** which the web browser of the terminal device **300** displays upon receiving the screen indicating that setting value import processing is in progress which the image processing apparatus **200** has transmitted as a response.

[0199] In the screen **1030** transmitted as a response in step S**1108** illustrated in FIG. **14**A, the web browser operates in such a way as not to receive an operation performed by the user, and then, periodically inquires whether the setting value import processing has been completed, in the background processing for the web browser. When the setting value import processing has been completed, the web UI control module **251** generates response data indicating that the setting value import processing has been completed and then transmits the generated response data as a response (step S**1121** described below). Upon receiving the response data, the web browser causes the screen **1030** to transition to

a screen **1040** illustrated in FIG. **13**D. However, in a case where import processing has been completed with respect to only address books, since the image processing apparatus **200** does not need to be restarted, the web browser causes the screen **1030** to return to a screen which has been displayed one screen before the screen illustrated in FIG. **13**A.

[0200] FIG. **13**D illustrates an example of a screen **1040** which the web browser of the terminal device **300** displays upon receiving the response data indicating that the setting value import processing has been completed which the image processing apparatus **200** has transmitted as a response. In the screen **1040**, the web browser of the terminal device **300** notifies the user that setting value import processing has been completed and the image processing apparatus **200** is then being restarted.

[0201] Then, the description refers back to the flowcharts of FIGS. **14**A and **14**B.

[0202] In step S**1109**, the setting value import application **256***a* loads (for example, loads in ZIP format), onto the RAM **214**, a file image received together with the HTTP request from the terminal device **300** in step S**1107** mentioned above, and decrypts the file image by an application programming interface (API) module with use of the password which has been received likewise.

[0203] Next, in step S**1110**, if the setting value import application **256***a* has failed to decrypt the data on the RAM **214** loaded in ZIP format with use of the password (NO in step S**1110**), the setting value import application **256***a* advances the processing to step S**1111**.

[0204] In step S**1111**, the setting value import application **256***a* requests the web UI control module **251** to generate a screen (not illustrated) for notifying the user of confirmation of the password and notify the user of the generated screen, and returns the screen to the screen **1010** illustrated in FIG. **13**A, to perform control to prompt the user to re-enter a password.

[0205] On the other hand, if the setting value import application **256***a* has succeeded in decrypting the data with use of the password (YES in step S**1110**), the setting value import application **256***a* advances the processing to step S**1112**.

[0206] In step S**1112**, the setting value import application **256***a* refers to types of setting values to be imported passed from the web UI control module **251**, and determines whether a setting item is included in the types of setting values to be imported.

[0207] Here, if it is determined that a setting item is included in the types of setting values to be imported (YES in step S**1112**), the setting value import application **256***a* advances the processing to step S**1113**.

[0208] On the other hand, if it is determined that no setting item is included in the types of setting values to be imported (NO in step S**1112**), the setting value import application **256***a* advances the processing to step S**1114**, which is determination of a next import type.

[0209] In step S**1113**, the setting value import application **256***a* performs import processing for setting items. In the import processing for setting items, first, the setting value import application **256***a* analyzes information in common between devices composed at the time of export from the decrypted file of the XML format, and sets the analyzed information to an array memory allocated for information in common between devices on the RAM **214**. This processing is assumed to be performed only once before types to be imported are processed. For example, in a case where a setting item is not a target for import and a security policy is a target for import, the above-mentioned processing is performed before import processing for the security policy. Next, in the case of import of setting items, the setting value import application **256***a* identifies <DeviceSettings>, which is a tag in a middle item of the decrypted XML, by XML analytical processing, and sets the setting items one by one to arrays allocated as retention regions for setting items on the RAM **214**. At this time, the setting value import application **256***a* refers to information in common between devices, and sets the setting values to the arrays while checking the acceptable level in performing import or checking whether the adequacy of a setting value is correct by referring to the above-mentioned setting value data table. Next, the setting value import application **256***a* passes the arrays retained in the RAM **214** to which all of the setting items have been set to an application programming interface (API) which the setting value storing module **262** provides, and causes the arrays to be retained in the NVRAM **215**.

[0210] Next, in step S**1114**, the setting value import application **256***a* refers to types of setting values to be imported passed from the web UI control module **251**, and determines whether a security policy is included in the types of setting values to be imported.

[0211] Here, if it is determined that a security policy is included in the types of setting values to be imported (YES in step S**1114**), the setting value import application **256***a* advances the processing to step S**1115**.

[0212] On the other hand, if it is determined that no security policy is included in the types of setting values to be imported (NO in step S**1114**), the setting value import application **256***a* advances the processing to step S**1116**.

[0213] In step S**1115**, the setting value import application **256***a* performs import processing for security policies. In the import processing for security policies, the setting value import application **256***a* analyzes <SecurityPolicySettings>, which is a middle item tag of the decrypted XML, by XML analytical processing, and sets the analyzed setting values one by one to arrays allocated as retention regions for security policies on the RAM **214**. At this time, the setting value import application **256***a* refers to information in common between devices, and sets the setting values to the arrays while checking the acceptable level in performing import or checking whether the adequacy of a setting value is correct by referring to the above-mentioned setting value data table. Next, the setting value import application **256***a* invokes a check module for security policy setting items of the security policy setting application **253** while designating arrays on the RAM **214**, and thus checks whether the imported item is undeviating as a setting value of each security policy. Here, in a case where there is a deviating setting value in security policy items to be imported, the security policy setting application **253** overwrites a target item on the RAM **214** with an undeviating closest value.

[0214] With the processing operations performed up to this point, items of security policies to be imported become values which are able to be retained in the image processing apparatus **200**, and the values are passed from the security policy setting application **253** to the setting value storing module **262** and are thus stored in the NVRAM **215**. However, at this point, the imported security policies may not yet be reflected in the setting items of the image

processing apparatus **200**, which are thus in an incomplete and inconsistent state. Next, to perform processing for correcting this state, the setting value import application **256***a* advances the processing to step S**1116**.

[0215] In step S**1116**, the setting value import application **256***a* refers to setting types to be imported passed from the web UI control module **251**, and thus determines whether any one of a setting item and a security policy is included in the setting types to be imported. If it is determined that none of them is included (NO in step S**1116**), i.e., in a case where import of only address books is performed, the setting value import application **256***a* advances the processing to step S**1118**, which is determination of import of address books.

[0216] On the other hand, if it is determined that any one of them is included (YES in step S**1116**), the setting value import application **256***a* advances the processing to step S**1117**.

[0217] In step S**1117**, the setting value import application **256***a* performs processing for applying a security policy. In the processing for applying a security policy, the setting value import application **256***a* invokes a module which reflects a security policy which the security policy setting application **253** provides in a setting item. Then, the module performs storing of a value of the currently enabled security policy item, which the security policy setting application **253** is managing, in the NVRAM **215** via the setting value storing module **262**. Thus, the value of a setting item which depends on the currently enabled security policy in the imported values is then overwritten with the thus-stored value.

[0218] Furthermore, a setting item which depends on a predetermined security policy item has been described above with reference to FIG. **7**.

[0219] Furthermore, the processing operation in step S**1117** is processing which has to be necessarily performed in a case where any one of import processing in step S**1113** and import processing in step S**1115** has been performed. The processing operation in step S**1117** performs forced overwriting without performing, for example, comparative determination or conditional determination between the value of a setting item and the value compatible with a security policy, thus enabling preventing or reducing an increase in processing load in the image processing apparatus **200** and applying a security policy in a short time.

[0220] Next, in step S**1118**, the setting value import application **256***a* refers to types of setting values to be imported passed from the web UI control module **251**, and determines whether an address book is included in the types of setting values to be imported.

[0221] Here, if it is determined that an address book is included in the types of setting values to be imported (YES in step S**1118**), the setting value import application **256***a* advances the processing to step S**1119**.

[0222] On the other hand, if it is determined that no address book is included in the types of setting values to be imported (NO in step S**1118**), the setting value import application **256***a* advances the processing to step S**1120**.

[0223] In step S**1119**, the setting value import application **256***a* performs import processing for address books. In the import processing for address books, the setting value import application **256***a* confirms a security policy for which application processing has been performed immediately before step S**1119** and determines whether to perform import. Specifically, in a case where the setting value of the security policy setting "Permit transmission only to a destination previously registered with an address book" indicated by the item ID 10012 illustrated in FIG. **7** is "ON", i.e., is enabled, the following setting values are affected. Since, first, the item ID 02001 "Permit addition of a new address" is restricted to "OFF" and, secondly, changing of pieces of address book information written in rows of the item ID 02002 and subsequent item IDs is prohibited, import of address books is substantially restricted. In a case where import of address books has been restricted by a security policy, the setting value import application **256***a* ends import processing for address books without importing address books. On the other hand, in a case where import of address books is not restricted by a security policy, the setting value import application **256***a* performs import of address books. In the import of address books, the setting value import application **256***a* identifies <AddressBook>, which is a tag in a middle item of the decrypted XML, by XML analytical processing, and sets the setting values one by one to arrays allocated as retention regions for address books on the RAM **214**. In each address book, a number of data blocks each having a structure for storing, unlike other setting values, not accompanying information but pieces of stylized constituent information such as the full name of a registrant, the name of an organization, and a telephone number or e-mail address are allocated and interconnected, thus being loaded on a memory. The constructed address book data blocks are passed to a module for import which the address book setting application **255** provides, so that a new address book imported after initialization of the existing address book is then stored in the NVRAM **215** via the setting value storing module **262**.

[0224] After the import processing for address books is complete, the setting value import application **256***a* advances the processing to step S**1120**. In step S**1120**, the setting value import application **256***a* determines whether to perform restart of the image processing apparatus **200**. This determination is performed, as with determination in step S**1116**, to determine whether any one of a setting item and a security policy is included in the setting types to be imported. If it is determined that none of them is included (NO in step S**1120**), i.e., in a case where import of only address books is performed, the setting value import application **256***a* advances the processing to step S**1121** without restarting the image processing apparatus **200**.

[0225] In step S**1121**, the setting value import application **256***a* notifies the web UI control module **251** that the import processing has been completed. In response to this notification, the web UI control module **251** generates an import completion screen **1050**, and transmits, as a response, the import completion screen **1050** to the terminal device **300** via the web server module **244**.

[0226] FIG. **13**E illustrates an example of the import completion screen **1050**, which the image processing apparatus **200** has transmitted as a response. In response to an OK button **1051** being pressed, the import processing ends, so that the processing illustrated in the flowcharts of FIGS. **14**A and **14**B ends.

[0227] On the other hand, if it is determined that any one of a setting item and a security policy is included (YES in step S**1120**), the setting value import application **256***a* advances the processing to step S**1122**.

[0228] In step S**1122**, the setting value import application **256***a* issues an event for requesting restart to the system control module **261**, thus restarting the image processing apparatus **200**.

[0229] FIG. **13**D illustrates an example of the screen **1040**, which the web browser of the terminal device **300** displays upon receiving response data indicating that the image processing apparatus **200** is being restarted in response to the completion of import, which the image processing apparatus **200** has transmitted as a response. In the screen **1040**, the web browser operates in such a way as not to receive an operation performed by the user. Then, the web browser periodically inquires whether restart of the image processing apparatus **200** has been completed, in the background processing for the web browser, and, in a case where the restart has been completed, displays a top screen for the web UI of the image processing apparatus **200**, so that the import processing is complete.

[0230] Furthermore, while, in the above description, the setting types to be exported or imported are a setting item, a security policy, and an address book, user account data can also be included in the setting types to be exported or imported. Import processing for user account data is similar to the import processing for address books. Specifically, the setting value import application **256***a* refers to the types of setting values to be imported passed from the web UI control module **251**, and determines whether user account data is included in the types of setting values to be imported. Here, if it is determined that user account data is included, the setting value import application **256***a* performs import processing for user account data. In the import processing for user account data, the setting value import application **256***a* checks a security policy for which application processing has been performed immediately before that time and thus determines whether to perform import. Specifically, in a case where a specific security policy setting (a security policy setting for restricting setting of user accounts) is included in the security policy settings, the setting value import application **256***a* does not import user account data and ends the import processing for user account data. On the other hand, in a case where the specific security policy setting is not included in the security policy settings, the setting value import application **256***a* performs control to import user account data.

[0231] As described above, after processing for overwriting a setting item (or setting values of a security policy) with the imported values is performed, the setting item is further overwritten with the setting values of the security policy. Furthermore, with regard to an address book, in a case where, when a security policy is checked, import of address books is restricted by the security policy, import of address books is not performed. This enables maintaining restriction of setting values by the security policy setting in the setting value import processing. Additionally, compared with a conventional configuration in which, with regard to all of the setting items included in an apparatus, it is checked whether each setting item is restricted by the security policy setting, the number of times for which comparison and checking are performed is smaller, so that it is possible to prevent or reduce an increase in processing load due to the number of setting items and also to shorten the user's waiting time. Thus, as compared with the conventional configuration, it is possible to, while preventing or reducing an increase in processing load due to the number of setting items, import setting values in a short time in such a manner that the restriction by a security policy is maintained and to dramatically improve usability. For example, even in a case where all of the device settings are exported for, for example, repair and, after the completion of repair, all of the device settings are imported, as compared with the conventional configuration, processing is complete in a short time, so that, as compared with the conventional configuration, it is possible to greatly reduce a burden on an administrator who takes charge of, for example, maintenance management of the apparatus.

[0232] Furthermore, the configurations of various pieces of data and contents thereof described above are not limited to those, and, naturally, various configurations and contents thereof can be employed according to use applications and purposes.

[0233] While aspects of the present exemplary embodiment have been described, the present disclosure can be embodied as, for example, a system, an apparatus, a method, and a program or storage medium. Specifically, the present disclosure can be applied to a system composed of a plurality of pieces of equipment, or can be applied to an apparatus composed of one piece of equipment.

[0234] Moreover, a configurations obtained by combining some or all of the above-described aspects of the present exemplary embodiment is also included in the present disclosure.

OTHER EMBODIMENTS

[0235] Embodiment(s) of the present disclosure can also be realized by a computer of a system or apparatus that reads out and executes computer executable instructions (e.g., one or more programs) recorded on a storage medium (which may also be referred to more fully as a 'non-transitory computer-readable storage medium') to perform the functions of one or more of the above-described embodiment(s) and/or that includes one or more circuits (e.g., application specific integrated circuit (ASIC)) for performing the functions of one or more of the above-described embodiment(s), and by a method performed by the computer of the system or apparatus by, for example, reading out and executing the computer executable instructions from the storage medium to perform the functions of one or more of the above-described embodiment(s) and/or controlling the one or more circuits to perform the functions of one or more of the above-described embodiment(s). The computer may comprise one or more processors (e.g., central processing unit (CPU), micro processing unit (MPU)) and may include a network of separate computers or separate processors to read out and execute the computer executable instructions. The computer executable instructions may be provided to the computer, for example, from a network or the storage medium. The storage medium may include, for example, one or more of a hard disk, a random access memory (RAM), a read-only memory (ROM), a storage of distributed computing systems, an optical disk (such as a compact disc (CD), digital versatile disc (DVD), or Blu-ray Disc (BD)™), a flash memory device, a memory card, and the like.

[0236] While the present disclosure has been described with reference to exemplary embodiments, it is to be understood that the disclosure is not limited to the disclosed exemplary embodiments. The scope of the following claims

is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures and functions.

[0237] This application claims the benefit of Japanese Patent Application No. 2024-023236 filed Feb. 19, 2024, which is hereby incorporated by reference herein in its entirety.

What is claimed is:

1. An information processing apparatus comprising:

a non-volatile memory;

a first management unit configured to manage a security policy setting;

a second management unit configured to manage setting values of a setting item group which affects at least one or more operations of the information processing apparatus;

one or more memories storing instructions; and

one or more processors capable of executing the instructions causing the information processing apparatus to:

retain, in the non-volatile memory, an operation setting of the information processing apparatus;

receive a setting value group serving as a target for import; and

perform control in such a manner that first processing for storing at least a part of the received setting value group as the operation setting which is retained in the non-volatile memory and second processing for, after the first processing, storing, by overwrite, setting values which the second management unit manages in such a way as to satisfy the security policy setting which the first management unit manages, as a part of the operation setting which is retained in the non-volatile memory are performed as a series of processing operations in import processing.

2. The information processing apparatus according to claim **1**, wherein, in a case where the security policy setting is included in the received setting value group, in the first processing, the received security policy setting is stored as the operation setting in the non-volatile memory.

3. The information processing apparatus according to claim **2**, further comprising a third management unit configured to manage address setting data constituting an address book, which is not included in setting items which the second management unit manages,

wherein, in a case where the address setting data is included in the received setting value group, after the first processing in the series of processing operations in import processing, according to a specific security policy being set to the security policy setting which the first management unit manages, the second processing is performed without the received address setting data being stored as the operation setting in the non-volatile memory.

4. The information processing apparatus according to claim **3**, wherein, in a case where the address setting data is included in the received setting value group, after the first processing in the series of processing operations in import processing, according to the specific security policy being not set to the security policy setting which the first management unit manages, the second processing is performed with the received address setting data having been stored as the operation setting in the non-volatile memory.

5. The information processing apparatus according to claim **2**, further comprising a fourth management unit configured to manage user account data, which is not included in setting items which the second management unit manages,

wherein, in a case where the user account data is included in the received setting value group, after the first processing in the series of processing operations in import processing, according to a specific security policy being set to the security policy setting which the first management unit manages, the second processing is performed without the received user account data being stored as the operation setting in the non-volatile memory.

6. The information processing apparatus according to claim **5**, wherein, in a case where the user account data is included in the received setting value group, after the first processing in the series of processing operations in import processing, according to the specific security policy being not set to the security policy setting which the first management unit manages, the second processing is performed with the received user account data having been stored as the operation setting in the non-volatile memory.

7. A control method for an information processing apparatus including a non-volatile memory, a first management unit configured to manage a security policy setting, and a second management unit configured to manage setting values of a setting item group which affects at least one or more operations of the information processing apparatus, the control method comprising:

retaining, in the non-volatile memory, an operation setting of the information processing apparatus;

receiving a setting value group serving as a target for import; and

performing control in such a manner that first processing for storing at least a part of the received setting value group as the operation setting which is retained in the non-volatile memory and second processing for, after the first processing, storing, by overwrite, setting values which the second management unit manages in such a way as to satisfy the security policy setting which the first management unit manages, as a part of the operation setting which is retained in the non-volatile memory are performed as a series of processing operations in import processing.

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