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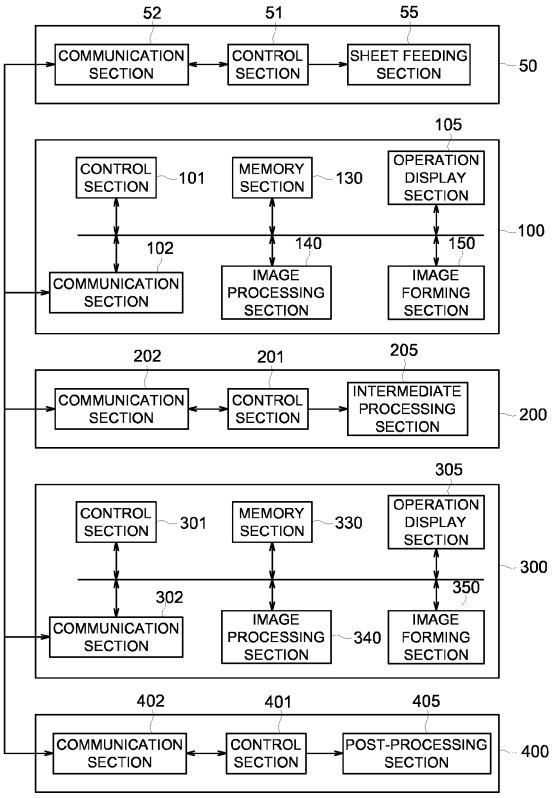
## (54) Image forming system and image forming apparatus

(57) Provided is an image forming system, having: a plurality of image forming apparatuses connected serially so as to share image forming by being assigned to any of areas on a recording sheet, wherein each image forming apparatus includes; a display section to display various items, and a control section to cause the display section to selectively display a monolithic image of specific information in each image forming apparatus or a mixed image in which mutual information of the image forming system and the specific information are combined.

FIG. 1

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## Description

### TECHNICAL FIELD

**[0001]** The present invention relates to an image forming system in which a plurality of image forming apparatuses are connected serially so that the image forming apparatuses share image forming by being assigned to an obverse or reverse side of a recording sheet or any of areas on the recording sheet, and the image forming apparatus used in the image forming system.

### BACKGROUND OF THE INVENTION

**[0002]** There is an image forming system having a plurality of image forming apparatuses connected serially, wherein a recording sheet on which an image is formed by a first image forming apparatus in an area is subsequently inputted to a second image forming apparatus and the second image forming apparatus forms an image in another area on the recording sheet

**[0003]** According to the above image forming system, there is a merit that by forming images on the obverse and reverse sides of the recording sheet respectively via two image forming apparatus, a high speed output is possible, also by forming images with different color of toners via two image forming apparatuses or by forming images to respectively suite a text area and a picture area via two image forming apparatuses, high quality image forming is possible.

**[0004]** In the above image forming system, it is preferred that a condition of each image forming apparatus and a condition of entire system are verified via a display section. Incidentally, the above image forming system is disclosed in the following Patent Documents.

**[0005]** Patent Document 1: Japanese Patent Publication Open to Public Inspection No. 2006-340259

**[0006]** Patent Document 2: Japanese Patent Publication Open to Public Inspection No. H11-313181

**[0007]** In case of the image forming system disclosed in the above Patent Document 1, a plurality of images which are contracted display screens of the image forming apparatuses are arranged within one display careen. In the above display screen, an amount of items of information increases thought there is a problem of visibility. Also duplicated portions remain as they are and useless images exist.

**[0008]** In the image forming system disclosed in the Patent Document 2, display is conducted by acquiring statuses from the image forming apparatus. However, information of entire image forming system was not considered.

**[0009]** Also, a conventional tandem type image forming system, operation of the entire system is conducted from the operation display section of a master image forming apparatus representing. In the above case, there are two problems that the operation become complicated since the operations for two apparatuses are necessary at the operation display section on the master side and the operation display section on a slave side is wasted since it is not used.

### SUMMARY

**[0010]** The present invention has one aspect to solve the above problems and an object of the present invention is to provide an image forming system, having a plurality of image forming apparatuses connected serially which enables to share image forming by being assigned to an obverse and a reverse side of a recording sheet or any of area on the recording sheet, wherein mutual information of the entire image forming system and specific information of each apparatus can be easily verified.

**[0011]** Also, the present invention has another aspect to solve the above problems and an object of the present invention is to provide an image forming apparatus capable of verifying the mutual information of the entire image forming system and the specific information of each image forming apparatus in a state that a plurality of the image forming apparatuses are connected serially so as to enable sharing of image forming by being assigned to the obverse and the reverse side of the recording sheet or to any of the areas on the recording sheet.

**[0012]** The structures to resolve the above problem are as follow.

Structure 1. An image forming system, having a plurality of image forming apparatuses connected serially so as to share image forming by being assigned to any of areas on a recording sheet, wherein each image forming apparatus includes; a display section to display various items, and a control section to cause the display section to selectively display a monolithic image of specific information in each image forming apparatus or a mixed image in which mutual information of the image forming system and the specific information are combined.

Structure 2. The image forming system of Structure 1, wherein the control section creates an own apparatus specific information image based on the specific information of an own image forming apparatus and acquires a mutual information image based on the mutual information from an other image forming apparatus so as to create the mixed image from the own apparatus specific information image and the mutual information image.

Structure 3. The image forming system of Structure 1, wherein the control section creates an own apparatus specific information image based on the specific information of an own image forming apparatus and a mutual information image based on the mutual information so as to create the mixed image from the own apparatus specific information image and the mutual information image.

Structure 4. The image forming system of Structure 1, wherein the control section acquires an other ap-

paratus specific information image based on the specific information of another image forming apparatus, creates an own apparatus specific information image based on the specific information of an own image forming apparatus and creates a mutual information image based on the mutual information so as to create the mixed image from the other apparatus specific information image and the own apparatus specific information image and the mutual information image.

Structure 5. The image forming system of Structure 3 or 4, wherein the control section transmits the mutual information image to the other image forming apparatuses

**[0013]** According the above structures the following effects can be achieved.

(1) In Structure 1, as to the specific information of each image forming apparatus and the mutual information on the image forming system, since the monolithic image of the specific information or the mixed image of the specific information and the mutual information can be selectively displayed on the display section, the mutual information of the entire image forming system and the specific information of each apparatus can be easily verified in a state that a plurality of the image forming apparatuses connected serially to share image forming by being, assigned to an obverse and a reverse side of a recording sheet or any of areas on the recording sheet.

(2) In Structure 2, since the own apparatus specific information image based on the specific information of the own image forming apparatus is created and the mutual information image based on the mutual information from another image forming apparatus is acquired so as to create the mixed image from the own apparatus specific information image and the mutual information image, the mutual information of the entire image forming system and the specific information of each apparatus can be easily verified in a slave side image forming apparatus

(3) In Structure 3, since the own apparatus specific information image based on the specific information of the own image forming apparatus and a mutual information image based on the mutual information are created so as to create the mixed image from the own apparatus specific information image and the mutual information image, the mutual information of the entire image forming system and the specific information of each apparatus can be easily verified in a master side image forming apparatus.

(4) In Structure 4, since another apparatus specific information image based on the specific information of another image forming apparatus is acquired, the own apparatus specific information image based on the specific information of the own image forming apparatus is created and the mutual information image based on the mutual information is created so as to create the mixed image from the other apparatus specific information image, the own apparatus specific information image and the mutual information image, the mutual information of the entire image forming system and the specific information of each apparatus can be easily verified in the master side image forming apparatus.

(5) In Structure 5, since the control section of image forming apparatus on the master side creates and transmits the mutual information image to the image forming apparatuses on the slave side. Therefore, the mutual information of the entire image forming system and the specific information of each apparatus can be easily verified in the image forming apparatuses on the master side and the slave side.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0014]**

Fig.1 1 is a block diagram showing a configuration of an image forming apparatus of an embodiment of the present invention.

Fig. 2 is a schematic diagram showing a structure of an image forming apparatus of an embodiment of the present invention.

Fig. 3 a and 3b are explanatory diagrams showing operation of an image forming apparatus of an embodiment of the present invention.

Fig. 4 is an explanatory diagram showing operation of an image forming apparatus of an embodiment of the present invention.

Fig. 5 is a flow chart showing operation of an image forming apparatus of an embodiment of the present invention.

Fig. 6 shows an exemplary display screen of an image forming apparatus of an embodiment of the present invention.

Fig. 7 shows an exemplary display screen of an image forming apparatus of an embodiment of the present invention.

Fig. 8 shows an exemplary display screen of an image forming apparatus of an embodiment of the present invention.

Fig. 9 shows an exemplary display screen of an image forming apparatus of an embodiment of the present invention.

Fig. 10a and 10b show exemplary display screens of an image forming apparatus of an embodiment of the present invention.

Fig. 11 a and 11b show exemplary display screens of an image forming apparatus of an embodiment of the present invention.

Fig.12 a and 12b show exemplary display screens of an image forming apparatus of an embodiment of the present invention.

Fig. 13 is a flow chart showing an operation of an

image forming apparatus of an embodiment of the present invention.

**DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS**)

**[0015]** Embodiments of the present invention will be specifically described with reference to the drawings as follow.

**[0016]** Here, an image forming system in which a plurality of image forming apparatuses are connected serially to enable sharing of image forming by being assigned to an obverse and a reverse side of the recording sheet or any areas on the recording sheet, and the image forming apparatuses used in said image forming system will be described.

<Configuration of Image Forming Apparatus and Image Forming System>

**[0017]** In Figs. 1 to 3, as an embodiment of the present invention, there is described an image forming system having an image forming apparatus 100 and a image forming apparatus 300 connected serially, wherein the apparatuses are assigned to an obverse side or a reverse side or any of areas on a recording sheet so as to enable sharing of image forming. Incidentally, there is disclosed a state where the tow image forming apparatuses 100 an 200 serially connected, however, three or more image apparatuses can be connected.

**[0018]** Here, a sheet feeding apparatus 50 to feed the recording sheet on which an image is to be formed, the image forming apparatus 100 to form an image by being assigned to the obverse or the reverse side or any of areas on one side of the recording sheet sent from the sheet feeding apparatus 50, an intermediate processing apparatus 200 which feeds the recoding sheet to the image forming apparatus 300 at a posterior stage after conducting intermediate processing such as turning over of the recording sheet on which the image has been formed by the image forming apparatus 100, an image forming apparatus 300 to form an image by being assigned to the obverse or the reverse side or to any of areas on one side of the recording sheet sent from the intermediate processing apparatus 200, and a post processing apparatus 400 to apply various kinds of processing (punching process, stapling process, and binding process) onto the recording sheet on which the image has been formed by the image forming apparatuses 100 and 300 are connected serially along a flow of the recording sheet.

**[0019]** Namely, the image forming system conducts image forming in a way that the image forming apparatuses 100 and 300 are connected serially along the flow of the recording sheet as Fig. 2 and 3 show and in the image forming apparatus 100 at the anterior stage, an image is formed in a portion of an area on the recording sheet then the recording sheet is inputted to the image forming apparatus 300 in the posterior stage and the image forming apparatus 300 in the posterior state forms an image in other portion of the area on the above recording sheet.

**[0020]** As above, according to the above image forming system, by turning over the recording sheet via the intermediate processing apparatus 200, there is a merit that the two image forming apparatuses 100 and 300 can form images on the obverse and the reverse sides of the recording sheets respectively, thus a high speed output is possible. In the above case, as Fig. 3 (a) shows, the image forming apparatus 100 at the anterior stage forms the image on the obverse side of the recording sheet in advance, then the sheet is turned over via the intermediate processing apparatus 200, thereafter the image forming apparatus 300 at the second stage forms another image on the reverse side of the recording sheet, thereby the recording sheet is outputted face-down where the image on the obverse side is on the downside. Also in the above system, as Fig. 3 (b) shows, the image forming apparatus 100 at the anterior stage forms the image on the reverse side of the recording sheet in advance, then the sheet is turned over via the intermediate processing apparatus 200, thereafter the image forming apparatus 300 at the posterior stage forms another image on the obverse side of the recording sheet, thereby the recording sheet is outputted face-up where the image on the obverse side is on the upside. Incidentally, in the above embodiment, on the recording sheet, the image on a first side which is an anterior image in a page sequence is called as an obverse image and the image on a second side which is a posterior image in the page sequence is called as a reverse image.

**[0021]** Incidentally, other than assignments to the obverse side and the reverse, assignments of the image forming apparatuses 100 and 300 to different areas such as upper or lower areas and right or left areas in the same side of the recording sheet are possible. Also the image forming apparatuses 100 and 300 can be assigned to forming of images having different colors such as ordinary color and special color in the same side of the recording sheet. Further, the image forming apparatuses 100 and 300 can be assigned to forming of images having different graduation such as a picture (graduation image) and a text (monochrome).

**[0022]** The detail configuration of each apparatus of the image forming system will be described.

**[0023]** The sheet feeding apparatus 50 is configured with a control section 51 to control each section of the sheet feeding apparatus 50, a communication section 52 to communicate with the image forming apparatus 100 representing a destination of sheet feeding, and a sheet feeding section 55 to feed the stored sheets at a predetermined timing requested by the image forming apparatus 100. Incidentally, the control section 51 can be omitted, in case the sheet feeding section 55 is directly operated by control from the image forming apparatus 100 to be described later.

**[0024]** Incidentally, here in the image forming system,

a case where the image forming apparatus 100 represent a master (master machine) having an initiative and the image forming apparatus 300 represents a slave (slave machine) to serve a subsidiary function will be described, however the above relation can be reversed. Also, to the image forming apparatuses 100 and 300, functions of the master and the slave are assigned, though the image forming system is configured by combining stand-alone apparatuses which are basically the same type.

**[0025]** The image forming apparatus 100 is configured with a control section 101 to control each section in the image forming apparatus 140 as well as to control an entire system representing the image forming system, a communication section 102 to communicate with other apparatuses in connection, an operation display section 105 to conduct input operation by a user and to display a status of the image forming apparatus 100, a memory section 130 to store image data when forming image and various items of data, an image processing section 140 to execute various image processes necessary for image forming and an image forming section 150 to execute image forming based on image forming commands and the image data.

**[0026]** Incidentally, as Fig. 4 shows, the control section 101 is configured with an image control section 1011 which controls so as to selectively display a monolithic image representing the specific information or a mixed image representing combination of the specific information and the mutual information, as for the specific information in each image forming apparatus and the mutual information, in the image forming system, a mutual information image creation section 1012 to create a mutual information image based on the mutual information ,
a specific information image created section 1013 to create own apparatus specific information image based on the specific information of the image forming apparatus 100 (own apparatus) and a specific

**[0027]** information image acquiring section 1015 to acquire anther apparatus specific information image based on the specific information of the image forming apparatus 300 (another apparatus).

**[0028]** Incidentally, information related to each apparatus represents the specific information and the same mutual information for entire the image forming system, for example, information with respect to a job represents the mutual information.

**[0029]** Here, the operation display section 105 configures a display section to selectively display a monolithic image having only the specific information or the mixed image having the specific information and the mutual information. Incidentally the operation display section 105 configures an operation section to notify the screen operation information to the control section 101 in case the operator conducts screen operation with respect to the image being displayed and to notify key codes to the control section 101 in case hardware keys (not illustrated) such as numerical keys and a copying button are operated.

**[0030]** The intermediate processing apparatus 200 is configured with a communication section 202 to make the control section 210 to control each section in the intermediate processing apparatus 200 communicate with the image forming apparatuses 100 and 300 representing counter parts of processes, and an intermediate processing section 205 to conduct intermediate processing such as inversion of the recording sheet on which an image has been formed via the image forming apparatus 100 in the anterior state, so as to enable a suitable state that another image is formed on the reverse side of the recording sheet via the image forming apparatus 300 at the posterior stage. Incidentally, in case the intermediate processing section 205 is operated directly via control of the image forming apparatus 100, the control section 201 can be omitted.

**[0031]** The image forming apparatus 300 is configured with a control section 301 to control each section in the image forming apparatus 300,
a communication section 302 to communicate with other apparatuses connected, an operation display section 305 to conduct input operation by the user and display a status of the image forming apparatus 300, a memory section 330 to store image data when forming an image and various kinds of data, an image forming section 340 to execute various kids of image processing necessary for image forming, and the image forming section 350 to execute image forming based on the image forming command and the image data.

**[0032]** Incidentally, as Fig. 4 shows, the control section 301 is configured with an image control section 3011 which controls to selectively display the monolithic image representing the specific information or the mixed image representing combination of the specific information and the mutual information, as for the specific information on individual image forming apparatuses and the mutual information on the image forming system, a mutual information image acquiring section 3012 to acquire the mutual information image based on the mutual information, a specific information image created section 3013 to create the own apparatus specific information image based on the specific information of the image forming apparatus 300 (own apparatus).

**[0033]** Here, the operation display section 305 configures a display section to selectively display a monolithic image having only the specific information or the mixed image having the specific information and the mutual information via display control of the image control section 3011. Incidentally the operation display section 305 configures a control section to notify the screen operation information to the control section 301 in case the operator conducts screen operation with respect to the image being displayed and to notify key codes to the control section 301 in case hardware keys (not illustrated) such as numerical keys and a copying button are operated.

**[0034]** The post-processing apparatus 400 is configured with a control section 401 to control each section in the post-processing apparatus 400, a communication

section 402 to communicate with each apparatus, and a post-processing section 405 to apply various kinds of processes (punching process, stapling process and binding process) onto the recording sheet on which the image is formed by the image forming apparatuses 100 and 300 in accordance with control of the control section 401. Incidentally in case the post-processing apparatus 405 is directly operated by control of the image forming apparatus 100 or 300, the control section 401 can be omitted.

<Operations (1) of The Image Forming Apparatus and Image forming System>

**[0035]** Operations of the first embodiment of the image forming system will be described with reference to Fig. 5. In Fig. 5, a control flow chart of the image forming apparatus 100 via the control section 101 and a flow chart of the image forming apparatus 300 via the control section 301 are shown side by side.

**[0036]** Here, the display screen G1 to be displayed on the operation display section 105 and the operation display section 305 is configured as shown in Fig. 6. On the upper part of the display screen G1 tabs such as "copy", "Scan", "store", job administration" and "machine condition" are allocated. When the tab is selected by the user, corresponding screen operation information is created from the control sections 105 and 305, and corresponding display screens are created and displayed by the image control sections 1011 and 3011 which have received the above screen operation information.

**[0037]** Incidentally, for example, when the "copy" tab is selected a copy screen appears where the mixed image of the mutual information image and the specific information image is displayed, when the "scan" tab is selected a scanning screen appears where the monolithic image of the mutual information image is displayed, when the "store" tab is selected, a storing screen appears where a monolithic image of the mutual information image is displayed, when the "job administration" tab is selected a job administration screen appears where the mixed image of the mutual information image and the specific information image is displayed, when the "machine condition" tab is selected a machine condition screen appears where the mixed image of the mutual information image and the specific information image is displayed and when the "setting menu" tab (unillustrated) is selected, a setting menu screen appears where the monolithic image of the specific information image is displayed.

**[0038]** Therefore, depending on which screen the operation display section 105 or 305 displays, the necessity of the specific information image and the necessity of the mutual information image are changed.

**[0039]** The control section 101 checks whether the specific information image is necessary in accordance with selection of the tab on the display screen in the operation display section 105 (Step S101 in Fig. 5) and if the specific information image is necessary (YES in step S 101 in Fig. 5), the specific information image creation section 1013 creates the own apparatus specific information image (hereinafter simply called specific information image as well) based on the specific information of the image forming apparatus 100 (own apparatus).

**[0040]** Then the mutual information image creation section 1012 creates the mutual information image based on the mutual information of entire image forming system. Incidentally, any one of Steps S101 to S102 and S103 can be carried out in advance or can be carried out parallel.

**[0041]** The control section 301 verifies whether the specific information image is necessary or not in conjunction with selection of the tab of the display screen in the operation display section 305 (Step 5201 in Fig. 5), and if the specific information image is necessary (YES in Step S201 in Fig. 5), the specific information image creation section 3013 creates the own apparatus specific information image based on the specific information of the image forming apparatus 300 (own apparatus)(Step S202 in Fig. 5).

**[0042]** Also, the control section 301 verifies whether the mutual information image is necessary or not in conjunction with the display screen in the operation display section 305 (Step S203 in Fig. 5), and if the mutual information image is necessary (YES in Step S203 in Fig. 5) the mutual information acquiring section 3012 requests the mutual information image to the mutual information image creation section 1012(Step S204 in Fig. 5).

**[0043]** Here, if there is a request for the mutual information image from the mutual information image acquiring section 3012 (YES in Step S 104 in Fig. 5), the mutual information image creation section 1012 converts the created mutual information image into an image format such as jpeg and sends it to the mutual information image acquiring section 3012 (Step S105 in Fig. 5).

**[0044]** Incidentally, on the image forming apparatus 100 side, the image control section 1011 draws the mutual information image created by the mutual information image creation section 1012 and the specific information image created by the specific information image creation section 1013 on a VRAM and displays on the operation display section 105 (Step S 106 in Fig. 5) in accordance with selection of the tab in the display screen. Incidentally, as the VRAM, the image memory of the image processing section 104 can be used, or the image control section 1011 can be provided with an exclusive memory (unillustrated).

**[0045]** Also, on the image forming apparatus 300 side, a necessary portion of the mutual information image acquired by the mutual information image acquiring section 3012 (Step S205 in Fig. 5) and the specific information image created by the specific information image creation section 3013 (Step S202 in Fig. 5) are combined by the image control section 3011 on the VRAM (Step S206 in Fig. 5) in accordance with selection of the tab in the display screen on the operation display section 305 and displayed on the operation display section 305 (Step

S207 in Fig. 5). Incidentally, the VRAM of the image control section 3011 is the same as the VRAM of the image control section 1011. Namely, the specific information image crated by the specific information image creation section 3013 and a necessary portion of the mutual information image acquired by the mutual information image acquiring section 3012 are combined and drawn by the image control section 3011.

**[0046]** Incidentally, in case the specific information image is not necessary in conjunction with selection of the tab in the display screen in the operation display section 305 (NO in Step 201 in Fig. 5, no existing portion of the specific information image in Step S206) and only the mutual information image is necessary, a necessary portion of the mutual information image acquired by the mutual information image acquiring section 3012 (Step S205 in Fig. 5) is drawn on the VRAM by the image control section 3011 and displayed on the display control section 305 (Step S207 in Fig. 5).

**[0047]** Also, in case the mutual information image is not necessary in conjunction with selection of the tab in the display screen on the operation display section 305 ( NO in Step S203 in Fig. 5, the no necessary portion of the mutual information image in Step S206) and only the specific information image is necessary, the specific information image created by the specific information image creation section 3013 (Step S202 in Fig. 5) is drawn by the image control section 3011 on the VRAM (Step S206 in Fig. 5) and displayed on the operation display section 305 (Step S207 in Fig. 5).

**[0048]** The mixed image and the monolithic image will be described with reference to tangible display screens displayed on the operation display sections 105 and the 305.

**[0049]** In a display screen G1 by selecting the "copy" tab a1 in Fig. 6, "periodical check" a2 in Fig. 6," image quality adjusting" a3 in Fig. 6, and "sheet setting" a4 in Fig. 6 are specific information images created from the specific information of each image forming apparatus, and other portions are mutual information images which are mutual for the image forming system. Thus the display screen G1 is a mixed image.

**[0050]** In the display screen G2 by selecting "machine condition" tab b 1 in Fig. 7 shown, "message column" b2 in Fig. 7, "periodical check" b3 in Fig. 7, "tray information" b4 in Fig. 7 and "toner finisher information. b5 in Fig. 7 are specific information images created from the specific information of each image forming apparatus and other portions are the mutual information images which is mutual for the image forming system. Thus the display screen G2 is the mixed image.

**[0051]** In the display screen G3 by selecting "scanner" tab in Fig. 8, all the images are the mutual information images created by the mutual information image creation section 1012 and the same display screen G3 is displayed on the operation display sections 105 and the 305, thus, in case the "scan" tab is selected in the operation display section 305, the control section 301 draws the mutual information image acquired from the control section 101 as it is and displays it on the operation display section 305.

**[0052]** In the display screen G4 by selecting "setting menu" tab shown by Fig. 9, all the entire images are the specific information images. Thus on the image forming apparatus 100 side, the specific information image created by the specific information image creation section 1013 is drawn by the image control section 1011 on the VRAM and displayed on the operation display section 105. Also, on the image forming apparatus 300 side, the specific information image created by the specific information image creation section 3013 is drawn by the image control section 3011 on the VRAM and displayed on the operation control section 305.

**[0053]** In case "job administration" tab shown by Fig. 10 is selected, the operation display section 105 on the image forming apparatus 100 side displays a display screen G5A in Fig. 10a and the control section 305 on the image forming apparatus 300 side displays a display screen G5B in Fig. 10b. Here, the mutual information image and the specific information image are combined and displayed by dividing one screen largely. A job status is the mutual information image and da1 in the Fig. 10a and da1 in Fig.10b are the same. Also, a tray status is the specific information image and da2 in Fig.10a is the specific information image of the image forming apparatus 100 created by the specific information image creation section 1013. The symbol db2 in Fig. 10b is the specific information image of the image forming apparatus 300 created by the specific information image creation section 3013.

**[0054]** Fig. 11 shows a display screen showing a state where jamming occurs on the image forming apparatus 300 side while a job is executed in case the "job administration" tab shown by Fig. 10 is selected.

**[0055]** In the job statuses in the display screen G6A in Fig.11 a and the display screen G6B in Fig. 11b, "Job A: Stop (jam occurred) "and the mutual information image are displayed.

**[0056]** On the other hand, in the display screen G6B in Fig.11b on the image forming apparatus 300 side, a popup image db3 in Fig. 11b indicating occurrence of jam is displayed as an additional specific information image in addition to the conventional mutual information image and the specific information image. The above additional specific information image is created by the specific information image creation section 1013. In the event having higher priority or urgency it is preferred that the additional specific information image appropriately appears.

**[0057]** As described in the forgoing, according to the aforesaid embodiment, as to the specific information in each image forming apparatus and the mutual information in the image forming system, since the single image of the specific information or the mixed image of the specific information and the mutual information can be selectively displayed on the display section, the mutual in-

formation of the image forming system and the specific information of each apparatus can be easily verified in a state where a plurality of image forming apparatuses are connected serially so as to enable image forming by assigning the image forming apparatuses to the obverse and the reverse side of the recording sheet or to any of areas on one side of the recording sheet.

<Operation (2) of Image Forming Apparatus and Image Forming System>

**[0058]** As to a display screen to show the status of the jam occurrence in a condition where "job administration" tab shown in Fig. 11 is selected, an example that only the operation display section 105 side displays is indicated in Fig. 12.

**[0059]** In Fig.12, selection tabs such as "anterior stage" and "posterior stage" are provided on an upper section in the screen to select either the image forming apparatus 100 or the image forming apparatus 300 to display the display screen.

**[0060]** Here, if "anterior stage" 1 in Fig. 12a is selected, a display screen for the image forming apparatus 100, which is equivalent to Fig.11 a is displayed on the operation display section 105 as Fig. 12a shows.

**[0061]** On the other hand if "posterior stage" 2 in Fig. 12b is selected, a display screen for the image forming apparatus 300 having a popup screen, which is equivalent to Fig. 11b, is displayed on the operation display section 105 as Fig. 12b shows.

**[0062]** A flow chart to conduct the display in Fig.12 is shown in Fig. 13. In the above case, the specific information image acquiring section 1015 in the control section 101 judges existence of the specific information image of the image forming apparatus 300 (other apparatus) (Step S111 in Fig.13), and if the specific information image of the image forming apparatus 300 (other apparatus) exists (YES in Step S111 in Fig.13), the control section 101 requests the specific information image of the image forming apparatus 300 to the specific information image creation section 3013 (Step S212 in Fig. 13).

**[0063]** Here, if the specific information image is requested by the specific information image, acquiring section 1015 (Step S112 in Fig. 13), the specific information image creation section 3013 converts the created specific information image (Step S211 in Fig. 13) into the image format such as jpeg and transmits to the specific information image acquiring section 1015 (Step S212 in Fig. 13).

**[0064]** Also, on the image forming apparatus 100 side, a necessary portion of the specific image of the other apparatus acquired by the specific information image acquiring section 1015 (Step S 113 in Fig. 13), the mutual information image created by the mutual information image creation section 1012 and the specific information image of own apparatus created by the specific information image creation section 1013 (Steps S114 and S 115 in Fig. 13) are combined to be displayed in one screen (Step S116 in Fig. 13).

**[0065]** Incidentally, as described in the forgoing, by selecting tabs such as "copy", "scan", "store", "job administration" and "machine condition", there are differences as the single image of only the specific information image, the single image of only the mutual information image, and the mixed image of the specific information image and the mutual information image. Thus in the flow chart in Fig. 13 also, necessary information within the mutual information image, the specific information image of own apparatus, and the specific information image of the other information image is acquired (Steps S111, S112 and S113 in Fig.13) or created (Steps S114,S115 and S 116 in Fig.13) and displayed (Step S 117 in Fig.13).

**[0066]** Incidentally, in Fig. 12, while the selection tabs such as "anterior stage" and "posterior stage" to select the display screen of either the image forming apparatus 100 or the image forming apparatus 300 to display are provided in case "job administration" tab is selected, in case other tab such as "copy", "scan", "store" or "machine condition" is selected, it is possible that only the image forming apparatus 100 side displays.

**[0067]** As above, in the above embodiment, in addition to the mutual information image and own apparatus specific information image, since the other apparatus specific image is acquired and displayed, in the image forming apparatus 100 on the master side, the mutual information of the entire image forming system and the specific information of each apparatus can be easily verified.

<Other Embodiment

**[0068]** In the above embodiment, while the display screen in the operation display section 105 and the operation display section 305 have been described, if each tab or each icon is selected by the operator in each display screen, an operation in accordance with the selection is possible.

**[0069]** Namely, if an operation for the mutual information image to be displayed on the display control section 305, the control section 301 detects the operation and notifies screen operation information on the mutual information to the control section 101.

**[0070]** Thus, as for the mutual information, an operation via the image forming apparatus 300 on the slave side is possible besides the operation via the image forming apparatus 100 on the master side. On the other hand, as for the mutual information being edited by the image forming apparatus 100 side, it is preferred to apply shading to give an attribute of read only (multi-access prohibited) so as to prohibit operation and display the mutual information image.

**[0071]** Also, in the operation display section 105 of the image forming apparatus 100, in case the specific information image of the image forming apparatus 100 is displayed, the specific information of the image forming apparatus 300 can be operated by the image forming apparatus 100 side in the same manner. Further, the spe-

cific information being edited by the image forming apparatus 300 side is preferred to be in an operation prohibited state by shading to give an attribute of read only (multi-access prohibited) and to be displayed on the operation display section 105.

## Claims

1. An image forming system, comprising:

   a plurality of image forming apparatuses connected serially so as to share image forming by being assigned to any of areas on a recording sheet,
   wherein each image forming apparatus includes;
   a display section to display various items, and
   a control section to cause the display section to selectively display a monolithic image of specific information in each image forming apparatus or a mixed image in which mutual information of the image forming system and the specific information are combined.

2. The image forming system of claim 1, wherein the control section creates an own apparatus specific information image based on the specific information of an own image forming apparatus and acquires a mutual information image based on the mutual information from an other image forming apparatus so as to create the mixed image from the own apparatus specific information image and the mutual information image.

3. The image forming system of claim 1, wherein the control section creates an own apparatus specific information image based on the specific information of an own image forming apparatus and a mutual information image based on the mutual information so as to create the mixed image from the own apparatus specific information image and the mutual information image.

4. The image forming system of claim I, wherein the control section acquires an other apparatus specific information image based on the specific information of another image forming apparatus, creates an own apparatus specific information image based on the specific information of an own image forming apparatus and creates a mutual information image based on the mutual information so as to create the mixed image from the other apparatus specific information image and the own apparatus specific information image and the mutual information image.

5. The image forming system of claim 3 or 4, wherein the control section transmits the mutual information image to the other image forming apparatuses

6. An image forming apparatus in an image forming system having a plurality of the image forming apparatuses connected serially to share image forming by being assigned to any of areas in a recording sheet so, the image forming apparatus, comprising:

   a display section to display various items, and
   a control section to cause the display section to selectively display a monolithic image of specific information in each image forming apparatus or a mixed image in which mutual information of the image forming system and the specific information are combined.

7. The image forming apparatus of claim 6, wherein the control section creates an own apparatus specific information image based on the specific information of an own image forming apparatus and acquires a mutual information image based on the mutual information from an other image forming apparatus so as to create the mixed image from the own apparatus specific information image and the mutual information image.

8. The image forming system of claim 6, wherein the control section creates an own apparatus specific information image based on the specific information of an own image forming apparatus and a mutual information image based on the mutual information so as to create the mixed image from the own apparatus specific information image and the mutual information image.

9. The image forming system of claim 6, wherein the control section acquires an other apparatus specific information image based on the specific information of another image forming apparatus, creates an own apparatus specific information image based on the specific information of an own image forming apparatus and creates a mutual information image based on the mutual information so as to create the mixed image from the other apparatus specific information image and the own apparatus specific information image and the mutual information image.

10. The image forming system of claim 8 or 9, wherein the control section transmits the mutual information image to the other image forming apparatuses

FIG. 1

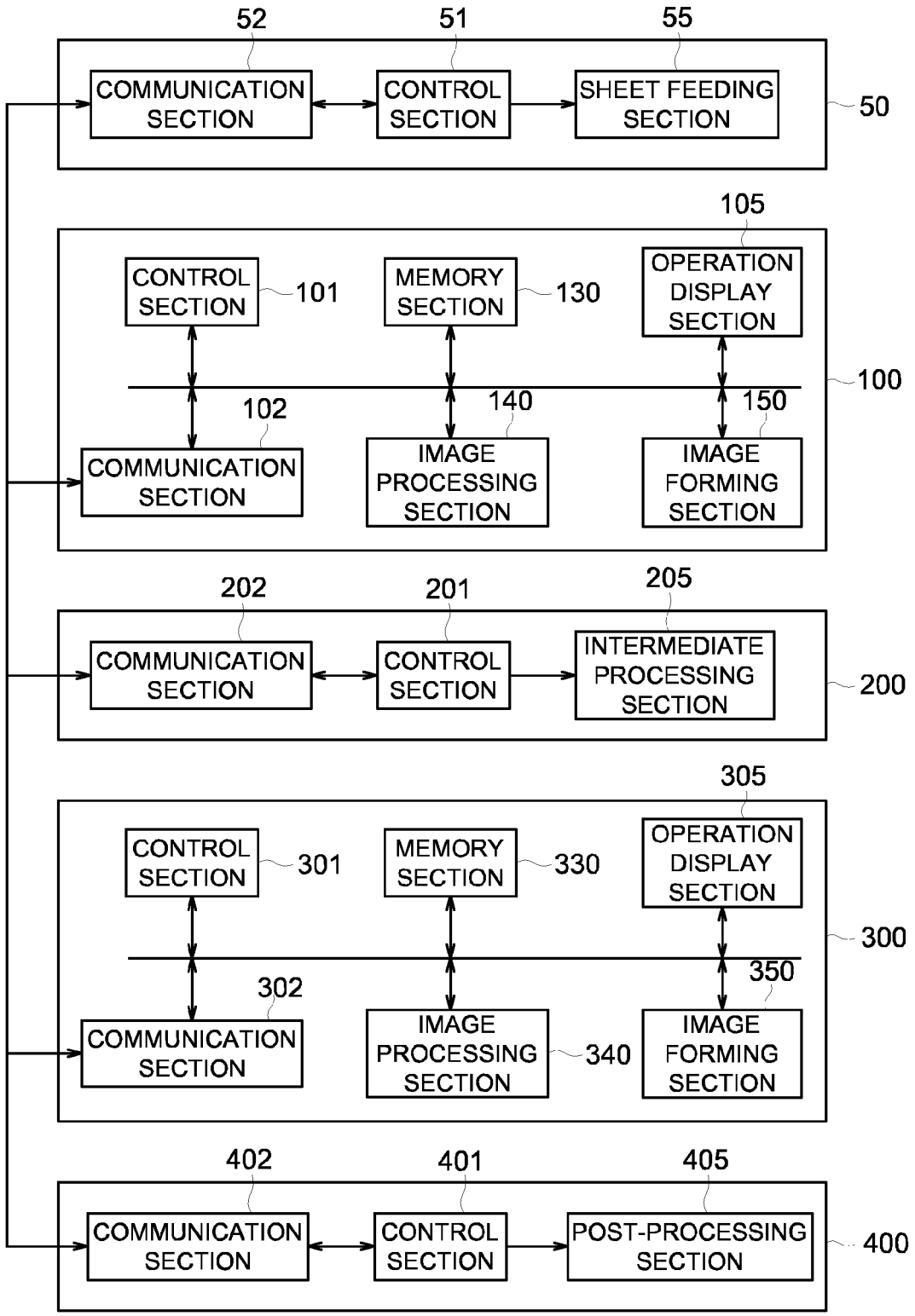
52
51
55
COMMUNICATION SECTION
CONTROL SECTION
SHEET FEEDING SECTION
50
105
CONTROL SECTION
101
MEMORY SECTION
130
OPERATION DISPLAY SECTION
100
102
140
150
COMMUNICATION SECTION
IMAGE PROCESSING SECTION
IMAGE FORMING SECTION
202
201
205
COMMUNICATION SECTION
CONTROL SECTION
INTERMEDIATE PROCESSING SECTION
200
305
CONTROL SECTION
301
MEMORY SECTION
330
OPERATION DISPLAY SECTION
300
302
350
COMMUNICATION SECTION
IMAGE PROCESSING SECTION
340
IMAGE FORMING SECTION
402
401
405
COMMUNICATION SECTION
CONTROL SECTION
POST-PROCESSING SECTION
400

FIG. 2

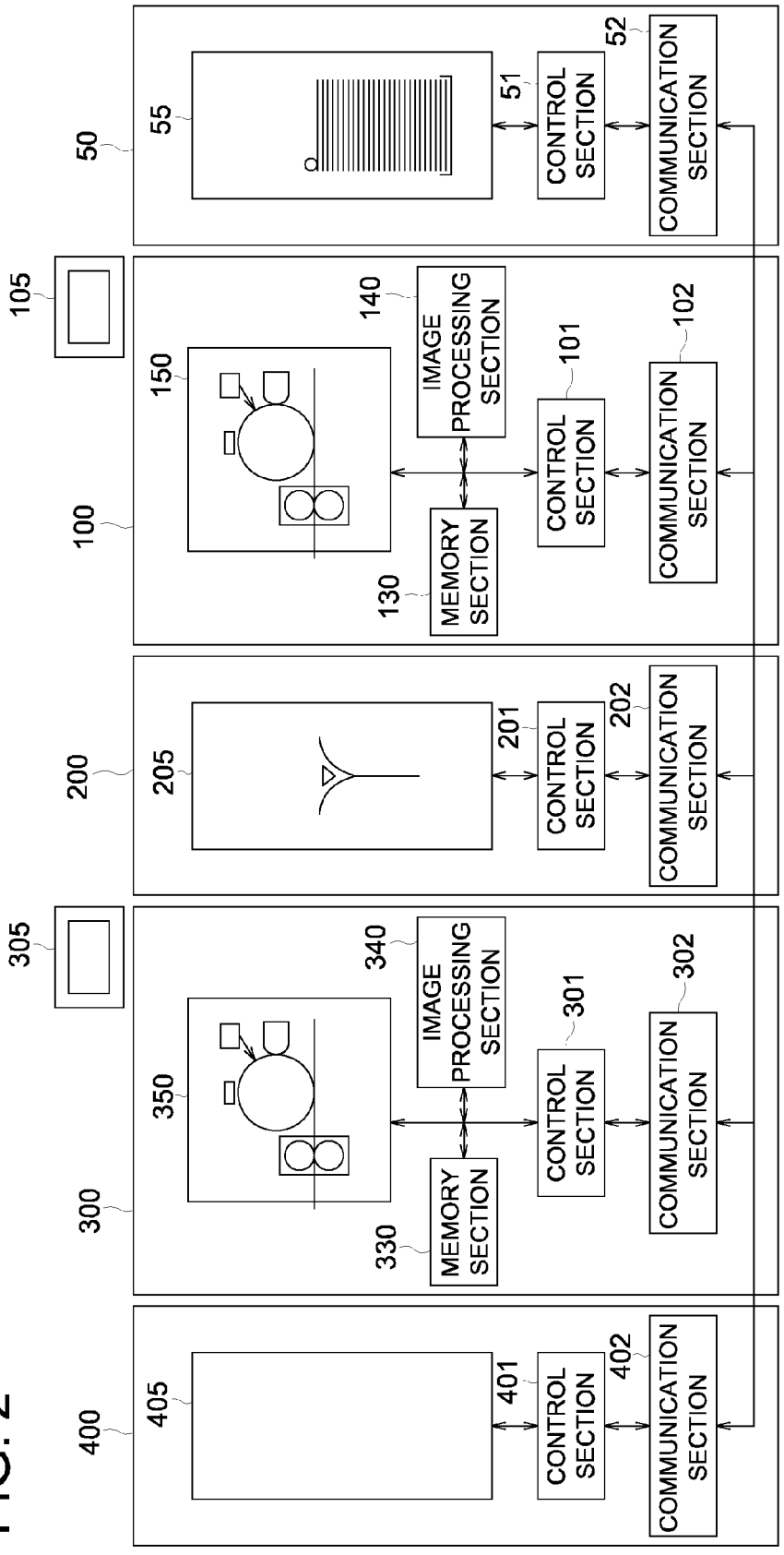
50
55
51
CONTROL SECTION
52
COMMUNICATION SECTION
105
100
150
140
IMAGE PROCESSING SECTION
101
CONTROL SECTION
102
COMMUNICATION SECTION
130
MEMORY SECTION
200
205
201
CONTROL SECTION
202
COMMUNICATION SECTION
305
300
350
340
IMAGE PROCESSING SECTION
301
CONTROL SECTION
302
COMMUNICATION SECTION
330
MEMORY SECTION
400
405
401
CONTROL SECTION
402
COMMUNICATION SECTION

FIG. 3a FACE-DOWN

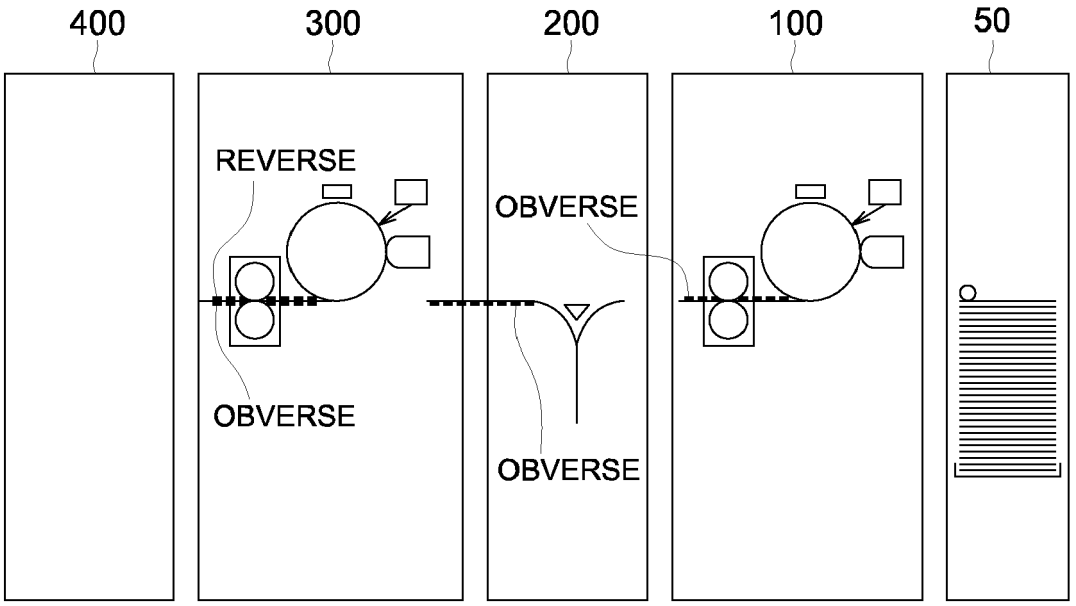


FIG. 3b FACE-UP

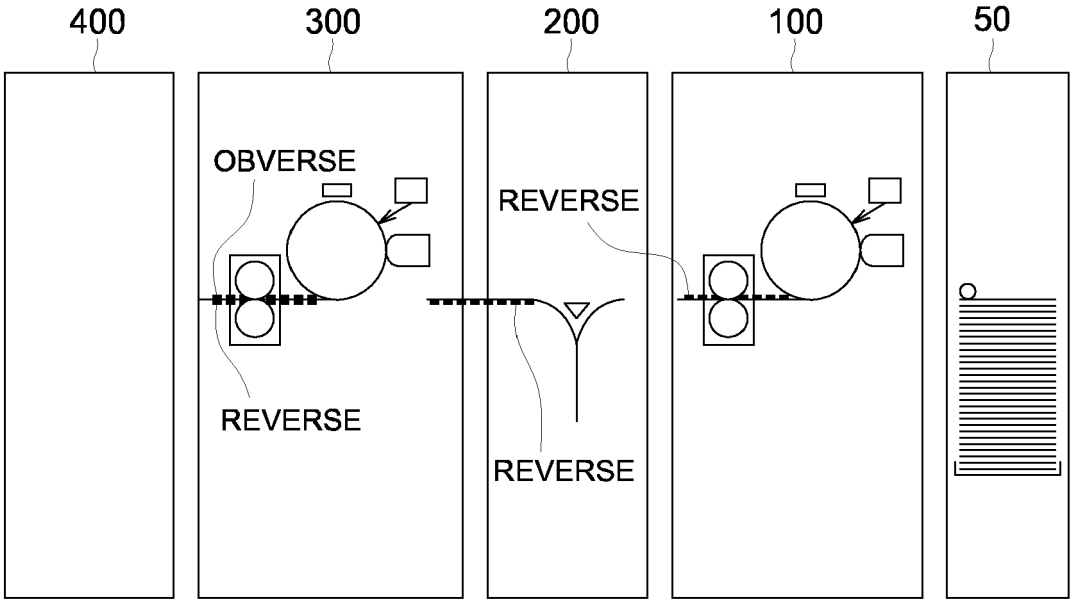

FIG. 4

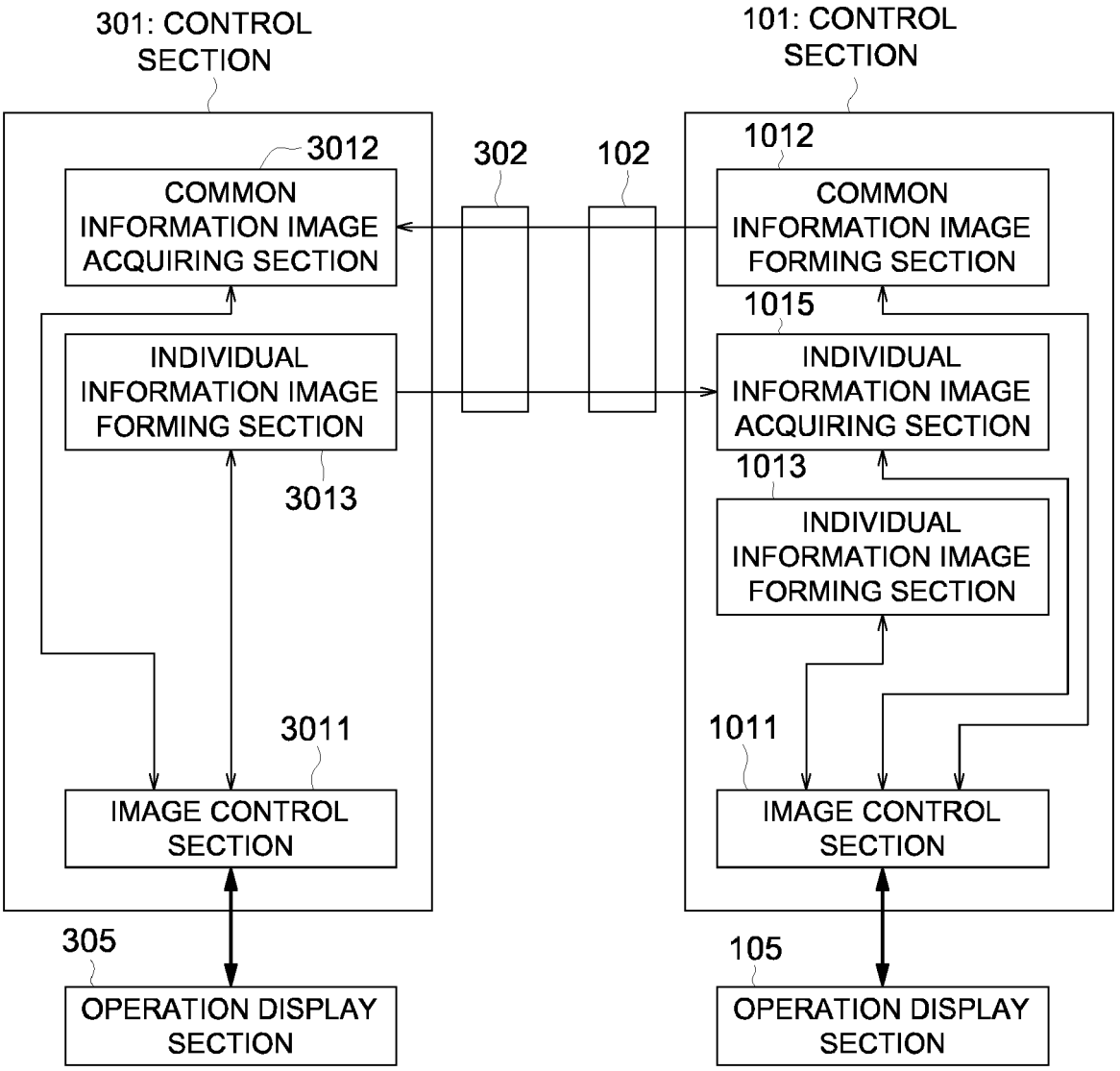
301: CONTROL SECTION
101: CONTROL SECTION
3012
COMMON INFORMATION IMAGE ACQUIRING SECTION
302
102
1012
COMMON INFORMATION IMAGE FORMING SECTION
1015
INDIVIDUAL INFORMATION IMAGE FORMING SECTION
INDIVIDUAL INFORMATION IMAGE ACQUIRING SECTION
3013
1013
INDIVIDUAL INFORMATION IMAGE FORMING SECTION
3011
1011
IMAGE CONTROL SECTION
IMAGE CONTROL SECTION
305
105
OPERATION DISPLAY SECTION
OPERATION DISPLAY SECTION

FIG. 5

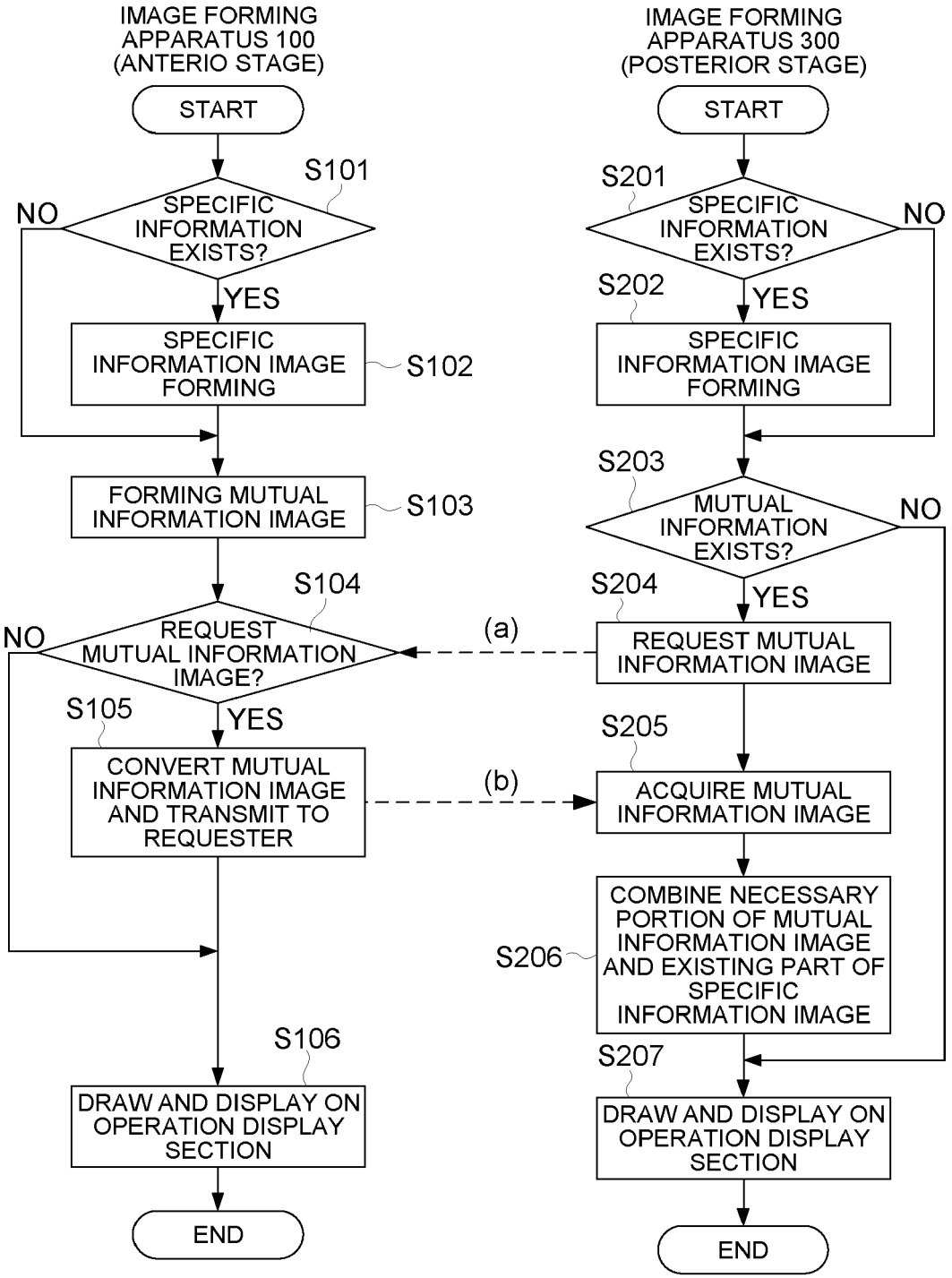
IMAGE FORMING APPARATUS 100 (ANTERIO STAGE)
START
S101
SPECIFIC INFORMATION EXISTS?
NO
YES
SPECIFIC INFORMATION IMAGE FORMING
S102
FORMING MUTUAL INFORMATION IMAGE
S103
S104
REQUEST MUTUAL INFORMATION IMAGE?
NO
YES
S105
CONVERT MUTUAL INFORMATION IMAGE AND TRANSMIT TO REQUESTER
S106
DRAW AND DISPLAY ON OPERATION DISPLAY SECTION
END
(a)
(b)
IMAGE FORMING APPARATUS 300 (POSTERIOR STAGE)
START
S201
SPECIFIC INFORMATION EXISTS?
NO
YES
S202
SPECIFIC INFORMATION IMAGE FORMING
S203
MUTUAL INFORMATION EXISTS?
NO
YES
S204
REQUEST MUTUAL INFORMATION IMAGE
S205
ACQUIRE MUTUAL INFORMATION IMAGE
S206
COMBINE NECESSARY PORTION OF MUTUAL INFORMATION IMAGE AND EXISTING PART OF SPECIFIC INFORMATION IMAGE
S207
DRAW AND DISPLAY ON OPERATION DISPLAY SECTION
END

FIG. 6

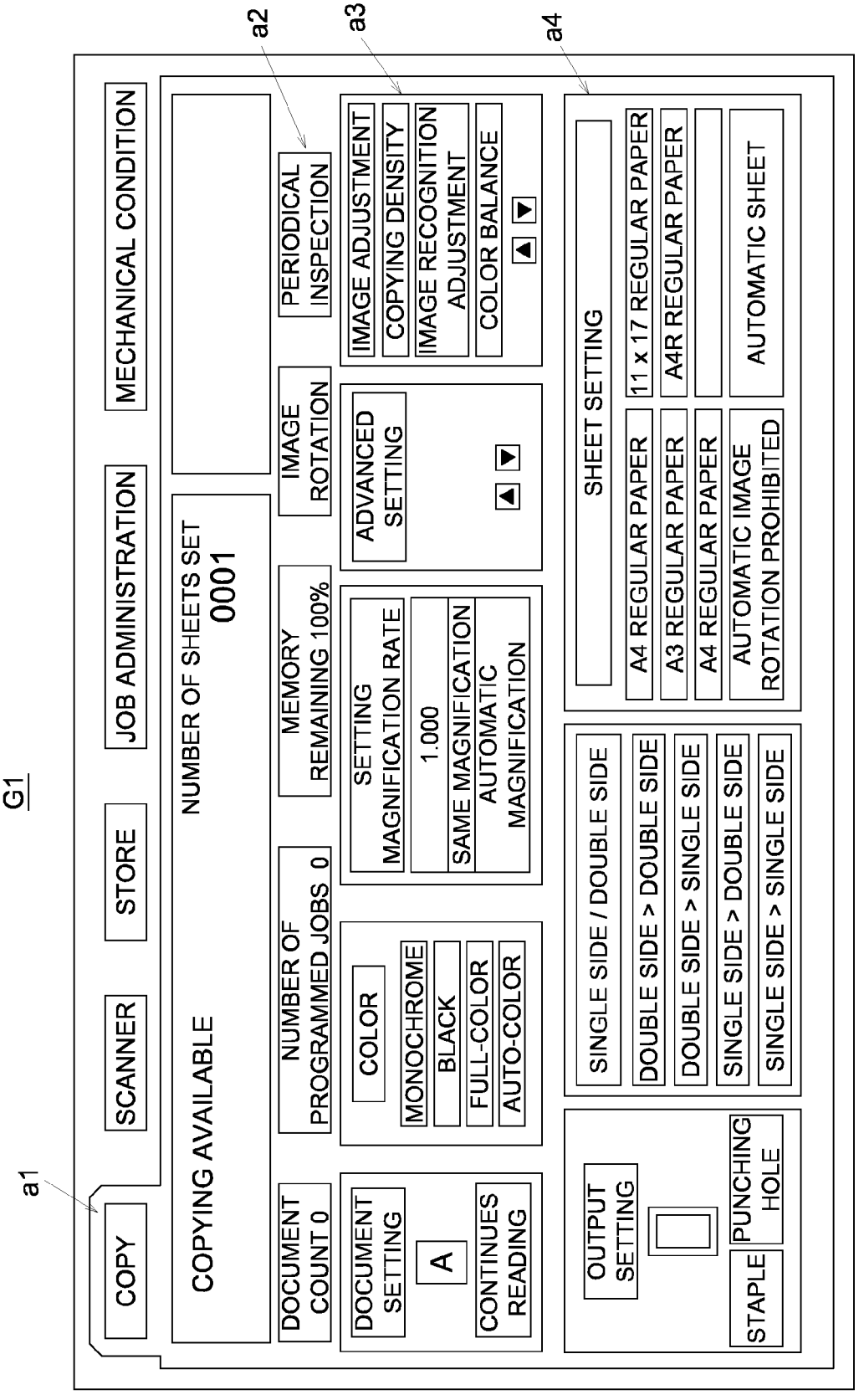
G1
a1
a2
a3
a4
COPY
SCANNER
STORE
JOB ADMINISTRATION
MECHANICAL CONDITION
COPYING AVAILABLE
NUMBER OF SHEETS SET
0001
DOCUMENT COUNT 0
NUMBER OF PROGRAMMED JOBS 0
MEMORY REMAINING 100%
IMAGE ROTATION
PERIODICAL INSPECTION
DOCUMENT SETTING
A
CONTINUES READING
COLOR
MONOCHROME
BLACK
FULL-COLOR
AUTO-COLOR
SETTING MAGNIFICATION RATE
1.000
SAME MAGNIFICATION
AUTOMATIC MAGNIFICATION
ADVANCED SETTING
IMAGE ADJUSTMENT
COPYING DENSITY
IMAGE RECOGNITION ADJUSTMENT
COLOR BALANCE
OUTPUT SETTING
STAPLE
PUNCHING HOLE
SINGLE SIDE / DOUBLE SIDE
DOUBLE SIDE > DOUBLE SIDE
DOUBLE SIDE > SINGLE SIDE
SINGLE SIDE > DOUBLE SIDE
SINGLE SIDE > SINGLE SIDE
SHEET SETTING
A4 REGULAR PAPER
A3 REGULAR PAPER
A4 REGULAR PAPER
AUTOMATIC IMAGE ROTATION PROHIBITED
11 x 17 REGULAR PAPER
A4R REGULAR PAPER
AUTOMATIC SHEET

FIG. 7

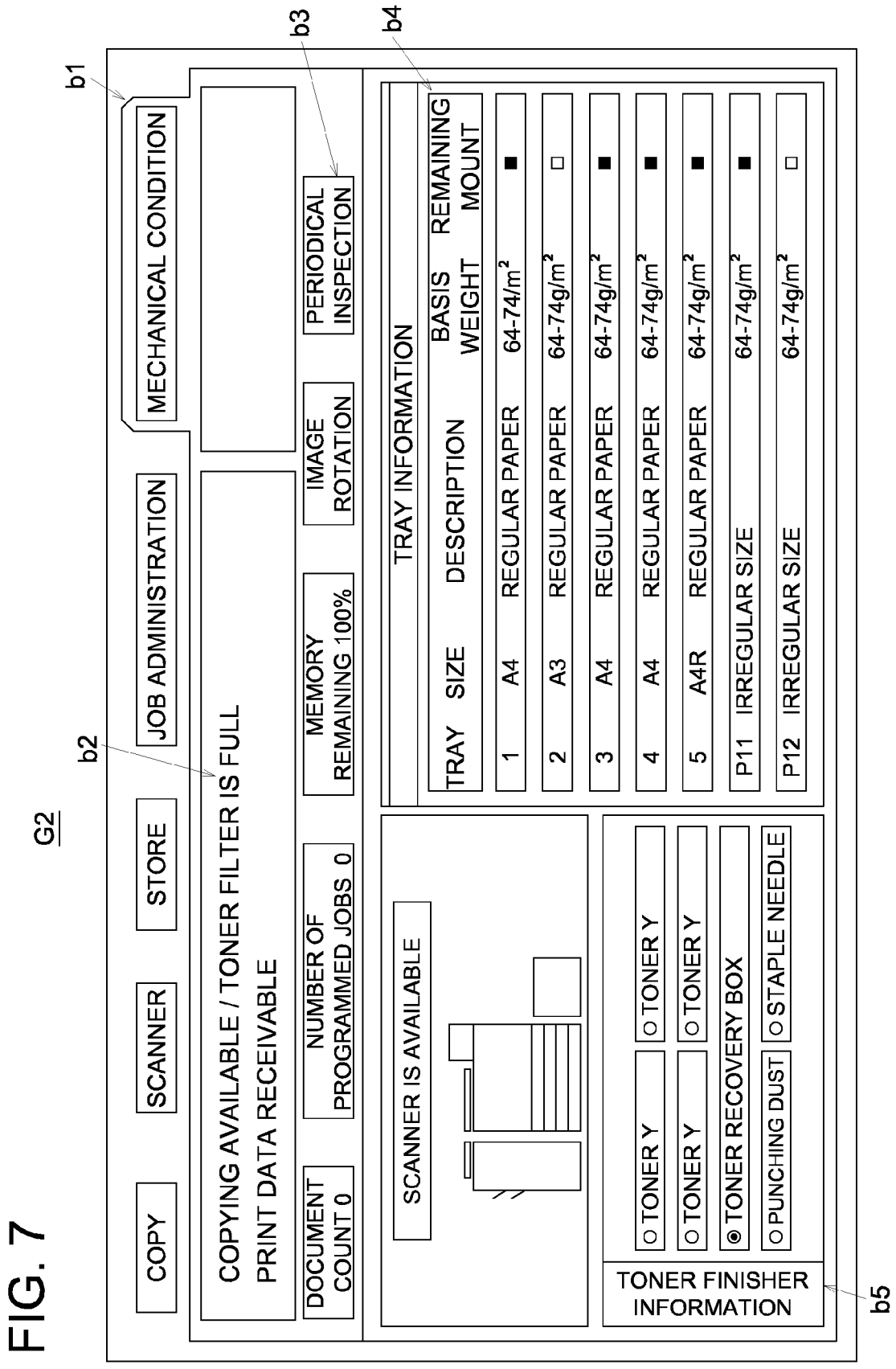
G2
b1
b2
b3
b4
b5
COPY
SCANNER
STORE
JOB ADMINISTRATION
MECHANICAL CONDITION
COPYING AVAILABLE / TONER FILTER IS FULL
PRINT DATA RECEIVABLE
DOCUMENT COUNT 0
NUMBER OF PROGRAMMED JOBS 0
MEMORY REMAINING 100%
IMAGE ROTATION
PERIODICAL INSPECTION
SCANNER IS AVAILABLE
TRAY INFORMATION
TRAY SIZE DESCRIPTION BASIS WEIGHT REMAINING MOUNT
1 A4 REGULAR PAPER 64-74/m² ■
2 A3 REGULAR PAPER 64-74g/m² □
3 A4 REGULAR PAPER 64-74g/m² ■
4 A4 REGULAR PAPER 64-74g/m² ■
5 A4R REGULAR PAPER 64-74g/m² ■
P11 IRREGULAR SIZE 64-74g/m² ■
P12 IRREGULAR SIZE 64-74g/m² □
○ TONER Y
○ TONER Y
○ TONER Y
○ TONER Y
◉ TONER RECOVERY BOX
○ PUNCHING DUST
○ STAPLE NEEDLE
TONER FINISHER INFORMATION

FIG. 8

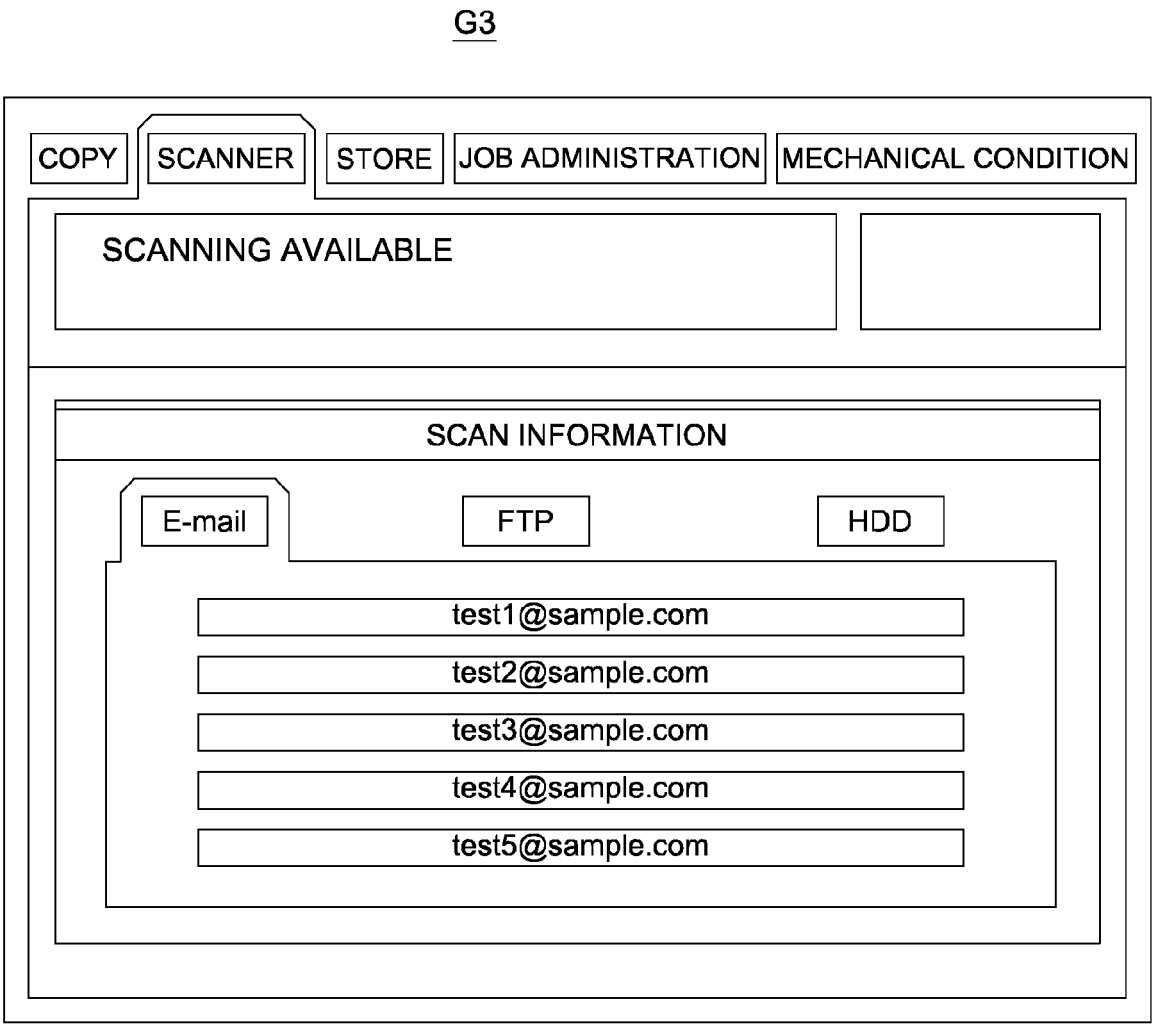
G3
COPY
SCANNER
STORE
JOB ADMINISTRATION
MECHANICAL CONDITION
SCANNING AVAILABLE
SCAN INFORMATION
E-mail
FTP
HDD
test1@sample.com
test2@sample.com
test3@sample.com
test4@sample.com
test5@sample.com

FIG. 9

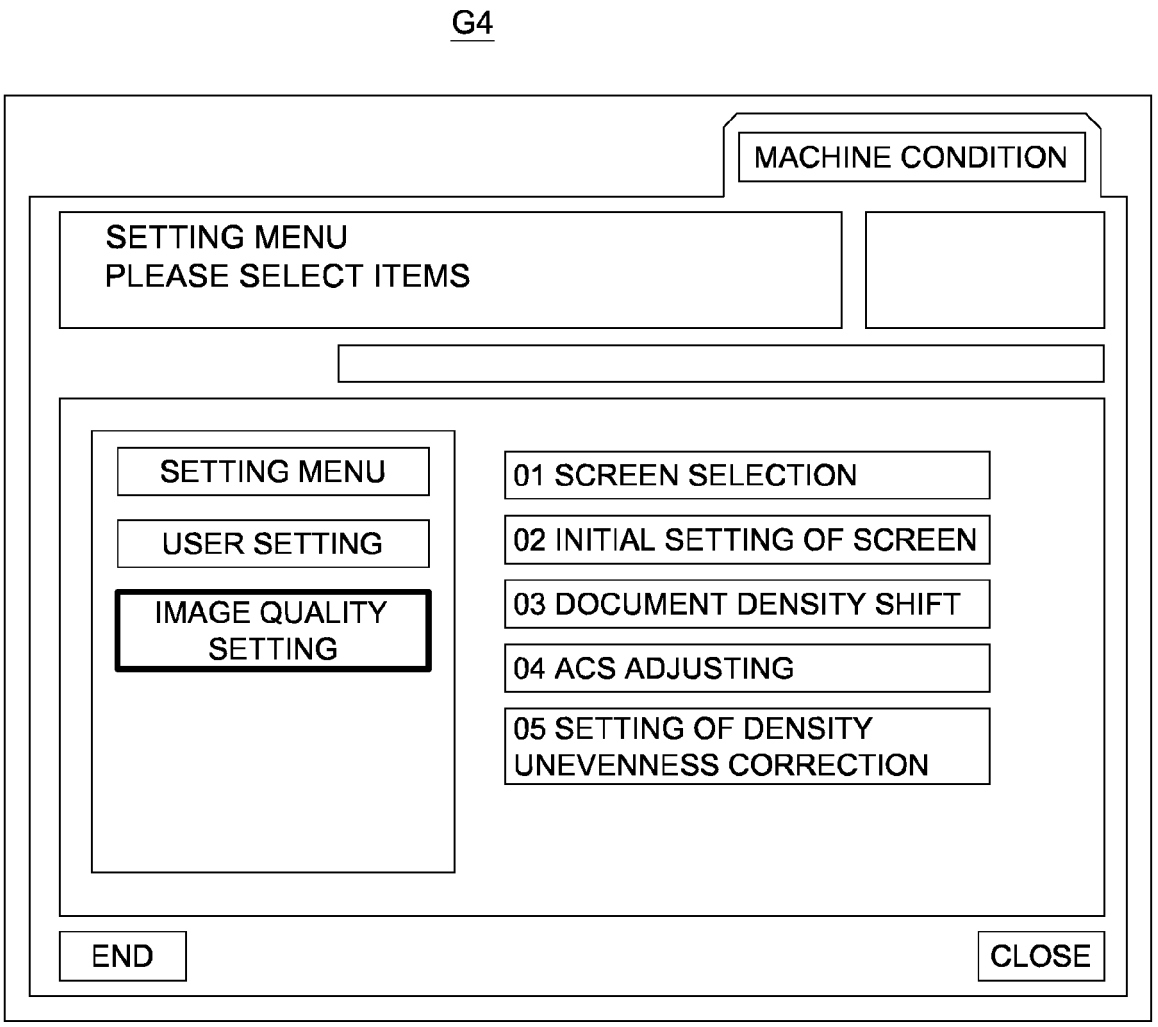
G4
MACHINE CONDITION
SETTING MENU
PLEASE SELECT ITEMS
SETTING MENU
USER SETTING
IMAGE QUALITY SETTING
01 SCREEN SELECTION
02 INITIAL SETTING OF SCREEN
03 DOCUMENT DENSITY SHIFT
04 ACS ADJUSTING
05 SETTING OF DENSITY UNEVENNESS CORRECTION
END
CLOSE

FIG. 10a

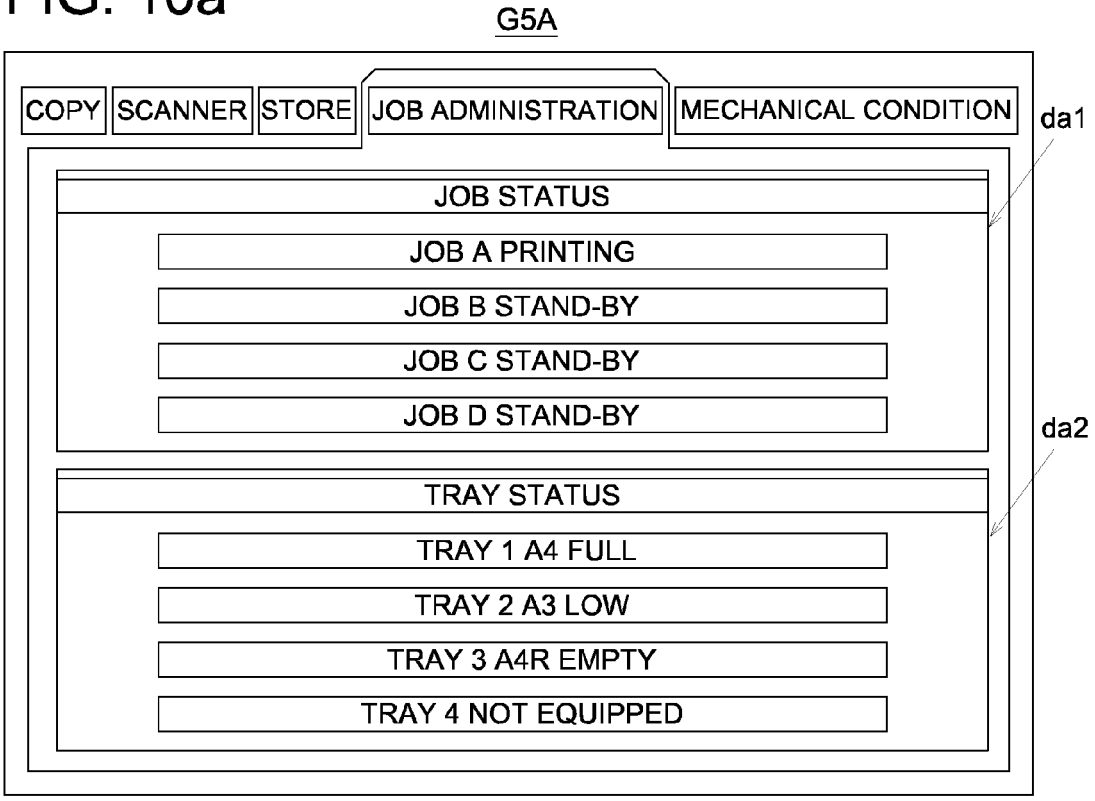


FIG. 10b

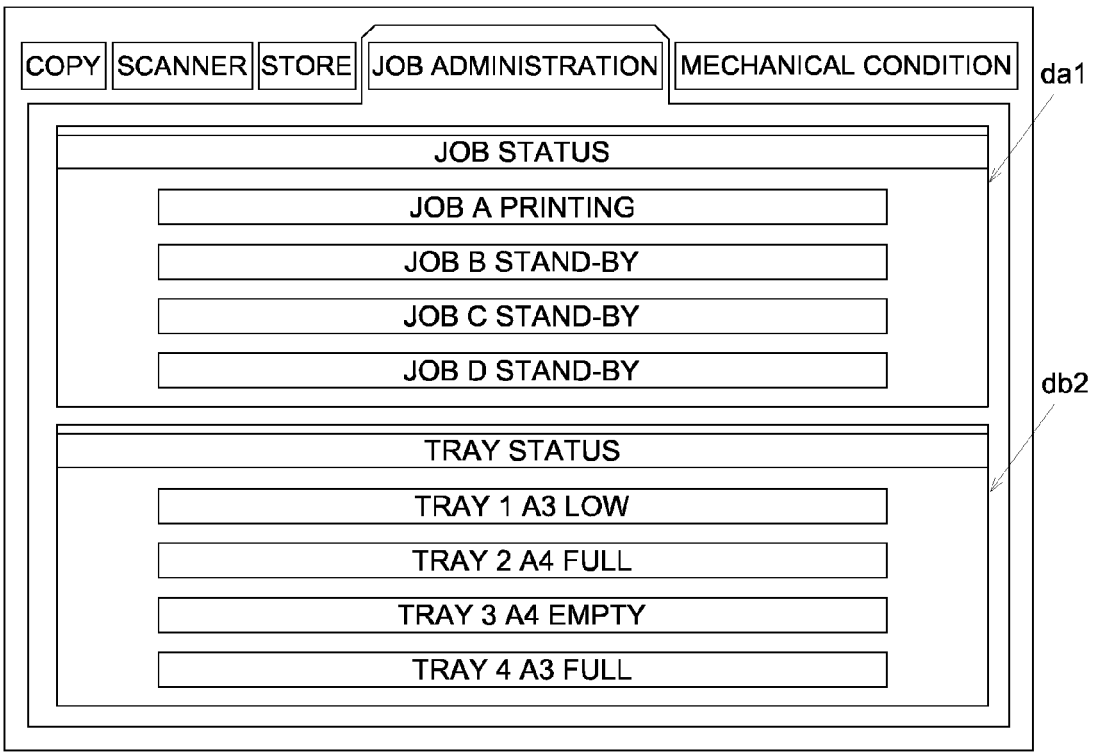

FIG. 11a

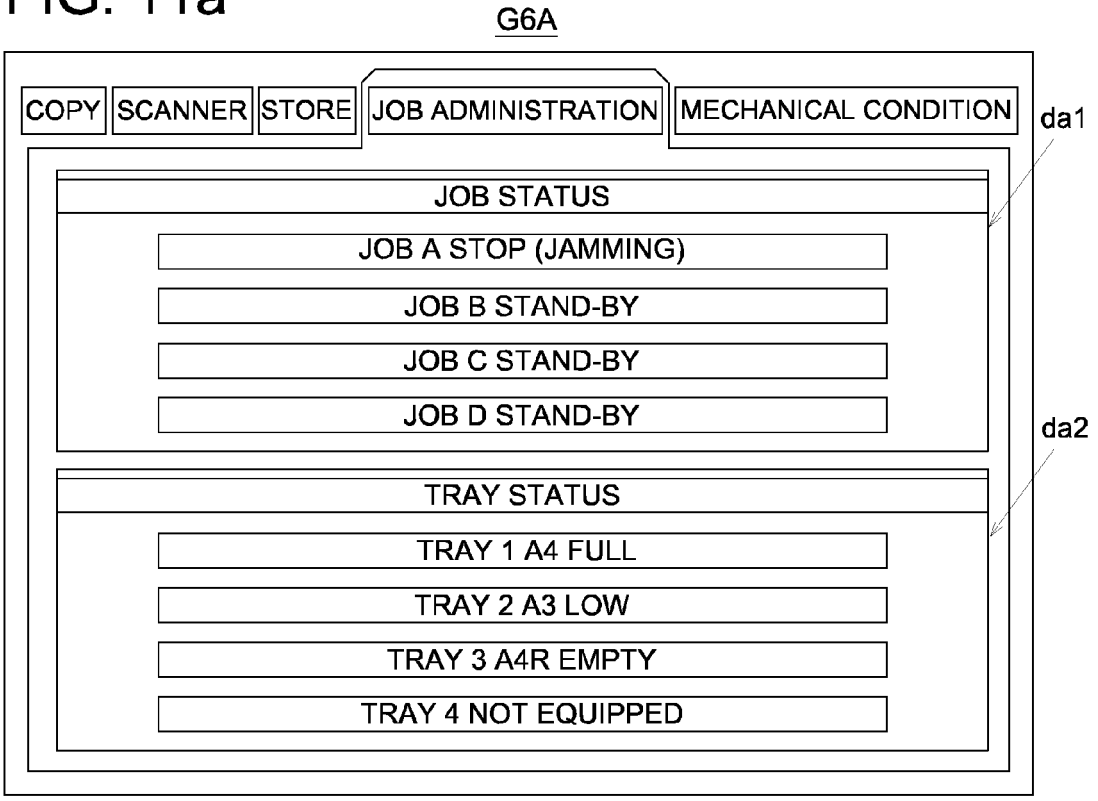


FIG. 11b

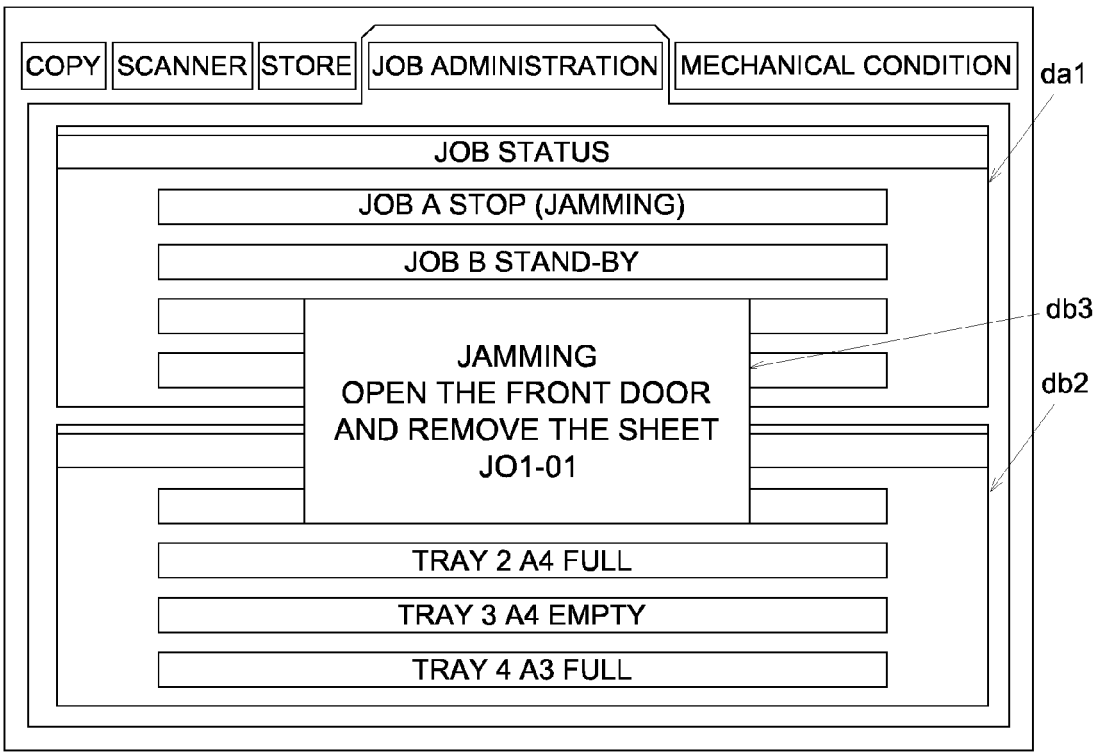

FIG. 12a

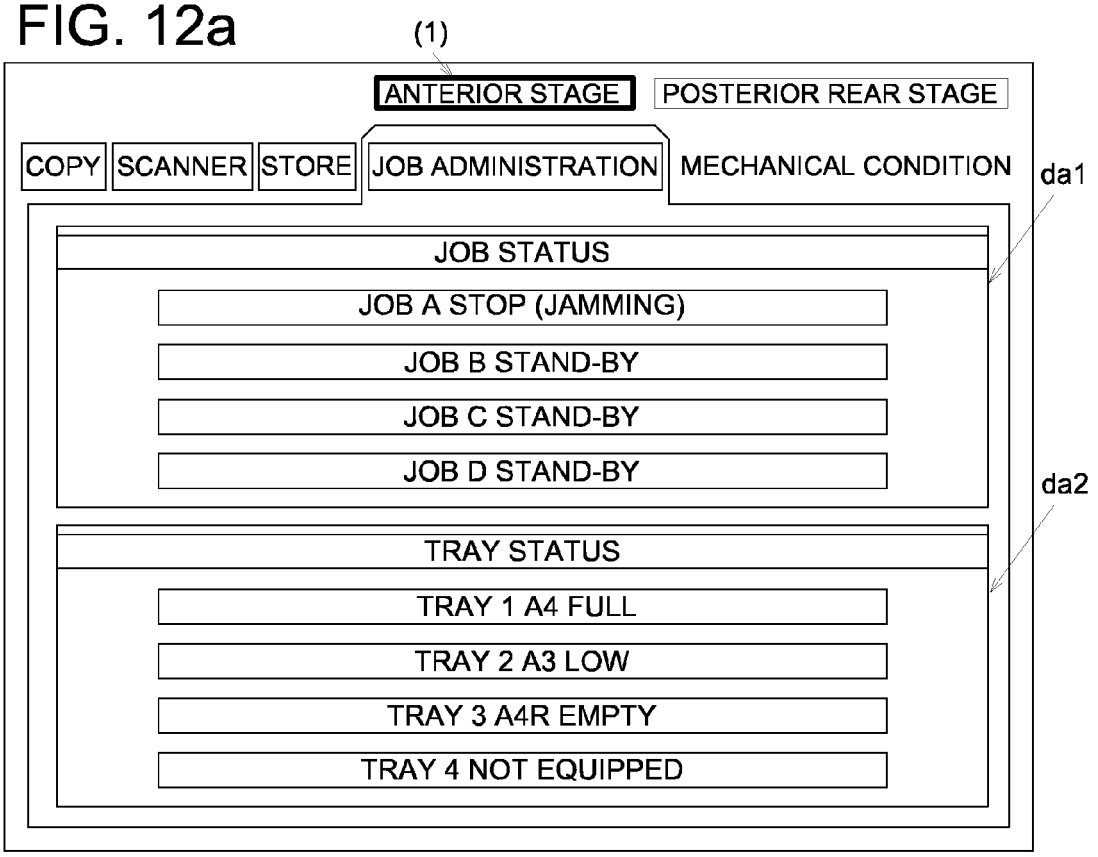


FIG. 12b

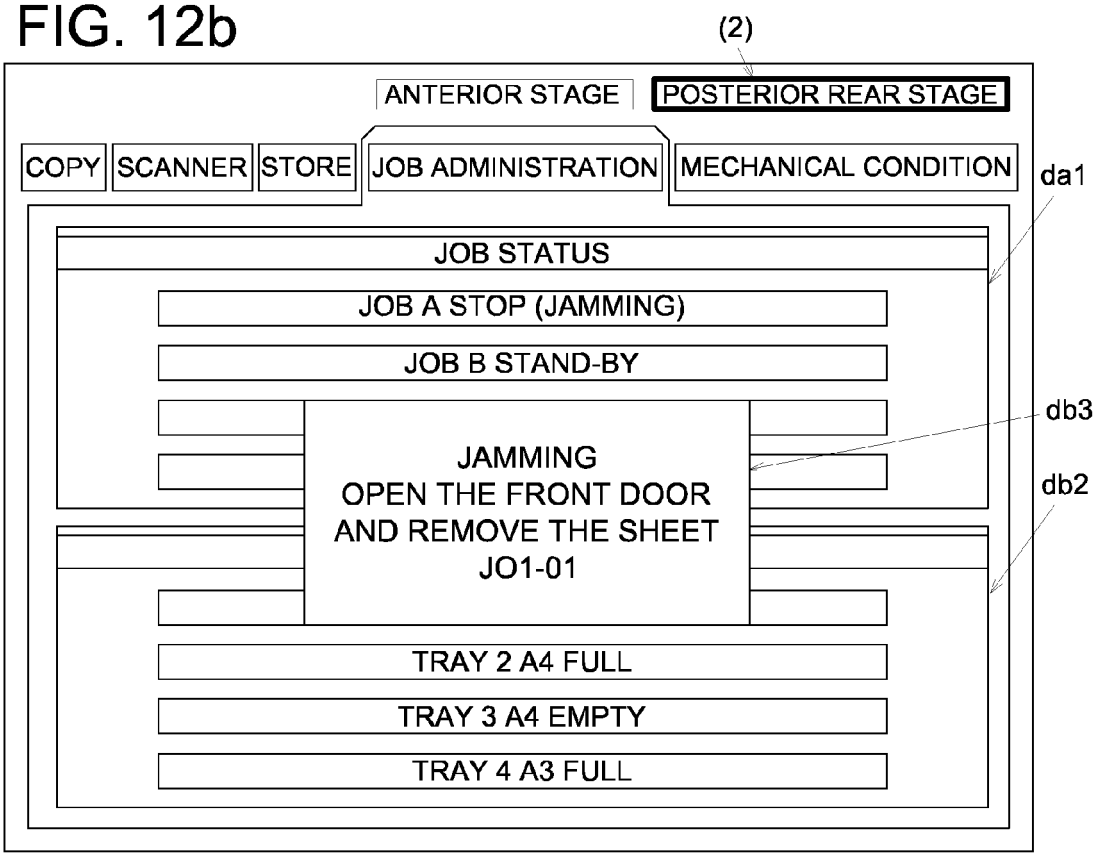

FIG. 13

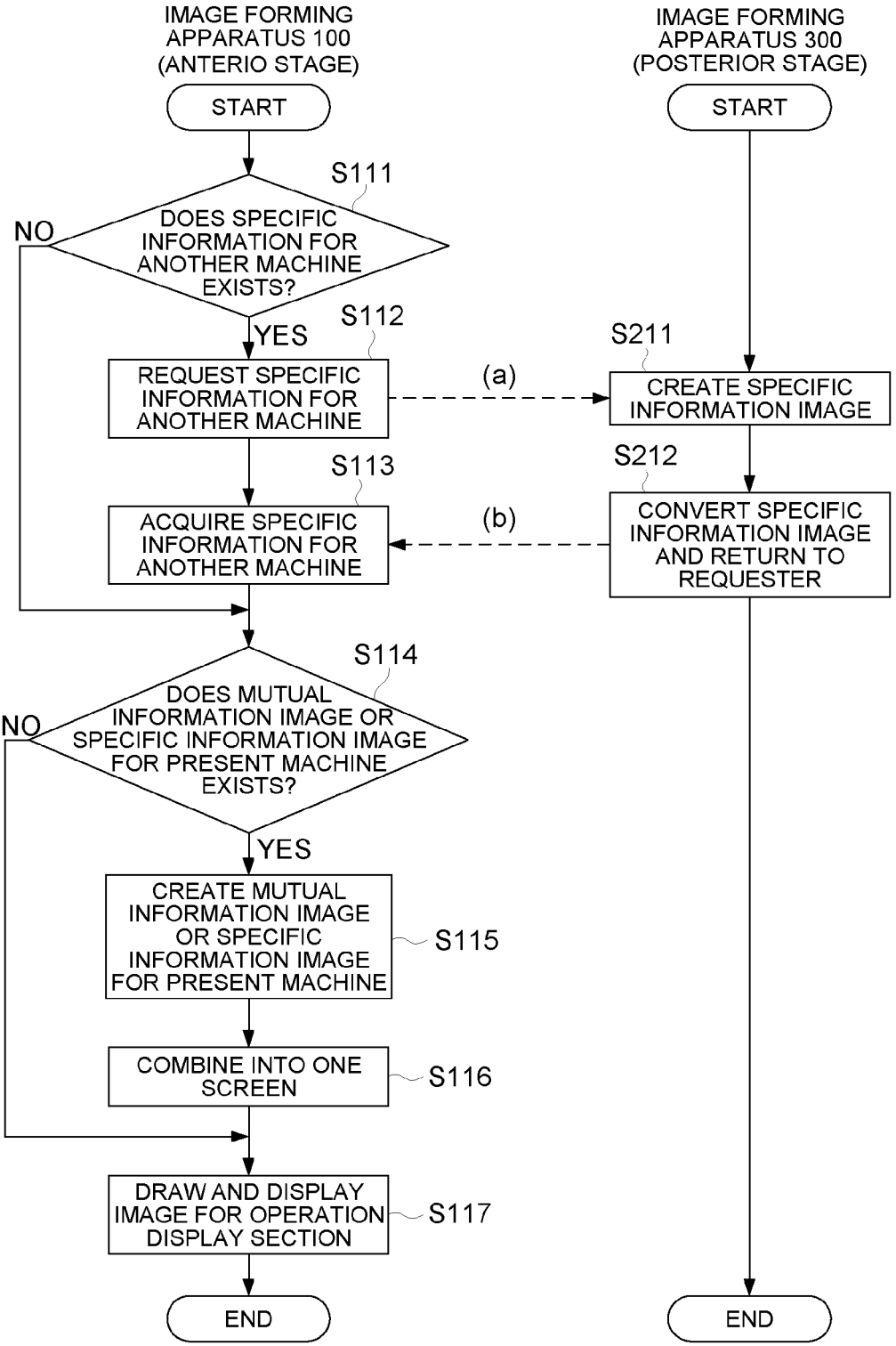
IMAGE FORMING APPARATUS 100 (ANTERIO STAGE)
START
S111
DOES SPECIFIC INFORMATION FOR ANOTHER MACHINE EXISTS?
NO
YES
S112
REQUEST SPECIFIC INFORMATION FOR ANOTHER MACHINE
(a)
S113
ACQUIRE SPECIFIC INFORMATION FOR ANOTHER MACHINE
(b)
S114
DOES MUTUAL INFORMATION IMAGE OR SPECIFIC INFORMATION IMAGE FOR PRESENT MACHINE EXISTS?
NO
YES
CREATE MUTUAL INFORMATION IMAGE OR SPECIFIC INFORMATION IMAGE FOR PRESENT MACHINE
S115
COMBINE INTO ONE SCREEN
S116
DRAW AND DISPLAY IMAGE FOR OPERATION DISPLAY SECTION
S117
END
IMAGE FORMING APPARATUS 300 (POSTERIOR STAGE)
START
S211
CREATE SPECIFIC INFORMATION IMAGE
S212
CONVERT SPECIFIC INFORMATION IMAGE AND RETURN TO REQUESTER
END

## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


- JP 2006340259 A **[0005]**
- JP H11313181 B **[0006]**