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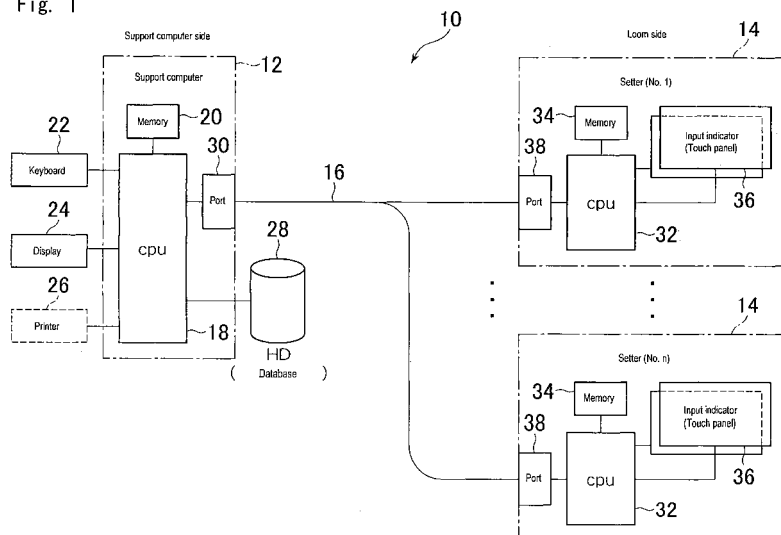
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(54) Information display for textile machinery

(57) The information display comprises a computer having a database recording plural pieces of necessary information needed by an operator, and a plurality of information terminals, each being provided in correspondence to one textile machine or a plurality of textile machines and having an indicator for displaying in letters said necessary information to be transmitted from said computer. The necessary information is translated in further plural languages and pre-recorded in the database,

and the information terminal transmits the input information inputted therein to the computer, while the computer reads out the necessary information in letters corresponding to the received input information from the database on the basis of the language selection information corresponding to the information terminal, and transmits to said information terminal to the information terminal, which displays the transmitted necessary information in the indicator.

Fig. 1



Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to an information display for textile machinery such as a yarn sizing machine, a winder, a loom and the like.

Description of Prior Art

[0002] As one of information displays for textile machinery, there is a maintenance information display for displaying maintenance information for loom parts.

[0003] This maintenance information display comprises: a recording portion where the maintenance information corresponding to an identification code given to each of plural parts that constitute a loom is recorded; a search portion for extracting from the above-mentioned recording portion the maintenance information corresponding to the identification code to be inputted; and an indicator for indicating in letters the maintenance information extracted in the search portion (Patent Document 1).

[0004] [Patent Document 1] Japanese Utility Model Appln. Public Disclosure No. 4-92585 Official Gazette

[0005] Since such a maintenance information display is used by a plurality of operators working in a textile factory such as a weaving factory, a single language favorite with many operators is used for the language of the letters to be displayed in the indicator of the information display.

[0006] In a conventional information display, however, an operator who is poor at the language set in the information display cannot read the letters displayed in that language and, therefore, cannot understand the meaning of the displayed information.

[0007] Of late, particularly, there are many cases that a plurality of operators poor at a language set in an information display work in the same factory. Outside Japan, there are countries where two or more languages are used as official languages, and where there may be included operators who are not always good at all the official languages (i.e., those who can understand only one official language) operate the information display.

[0008] In a conventional information display, however, regardless of existence of operators who are poor at the language set in the information display, a common single language which many of the operators can understand is set in an indicator. Therefore, there are cases that a few operators are not good at the common language.

[0009] Therefore, the foregoing maintenance information display has such a problem as remarkably spoil the workability of operators who are not good at the language set in such a manner. This problem is caused not only in a weaving factory but also in any textile factory where another textile machinery such as a warp preparatory machine is equipped.

SUMMARY OF THE INVENTION

[0010] It is an object of the present invention not to spoil workability relative to machines of any operators whose favorite languages are different.

[0011] The present invention assumes that: the information display comprises a computer having a database in which plural pieces of information required by operators are recorded, and a plurality of information terminals having an indicator displaying the necessary information to be transmitted from the computer in letters; that each information terminal is provided in correspondence to one textile machine or plural textile machines; that the information terminals transmit inputted information to the computer, which reads necessary information in letters corresponding to the received input information from the database and transmits it to the information terminals; and that the information terminals display the transmitted necessary information in the indicator.

[0012] The necessary information is further translated into a plurality of languages and pre-stored in the database, and the computer, upon receipt of the inputted items, reads the necessary information corresponding to the input information from the database on the basis of language selection information corresponding to the input information and transmits it as necessary information corresponding to the input information.

[0013] Each operator requests his favorite language information previously. The computer, when outputting the necessary information corresponding to the input information which the operator inputted, selects the necessary information corresponding to the requested language information from the database recording the necessary information translated into several languages and sends it to the information terminals. The information terminals display in the language the necessary information to be sent in such a manner. That is to say, the necessary information is displayed in the indicator by a language which can be easily understood by operators whose favorite languages are different, which helps any operators understand the necessary information. Consequently, any operators whose favorite languages are different can improve their workability and operability relative to the textile machines.

[0014] The language selection information of each operator to be pre-registered may be inputted either into the information terminals or set in the computer. To be more concrete, where one day's production is assumed to be made by a plurality of operation shifts, in the former case, each operator may previously input his language selection information into the information terminals of a machine which he is in charge of at the time of changing shifts, and the information terminals may be adapted to transmit the inputted language selection information to the computer. If the operator once sets his language selection in the setter of the machine he is in charge of before starting operation, any trouble or machine stop that may occur in the machine is automatically indicated

in the selected language without bothering the operator for switching indication of languages, so that thereafter he can easily understand information in expressed letters of the language.

[0015] Also, in the latter case, each language selection information relative to an operator in charge at each work shift for each textile machine is previously registered in the computer, the computer renews the language selection information of each machine at every work shift, and outputs necessary information with reference thereto. By this, since an operator in charge of the machine can omit a work to change setting of the language selection at each information terminal, a setter and an input device forming the setter are more long-lived by the decrease in operation of the setter. Further, since the setting of the language selection at each information terminal can be collectively changed by the computer, such a setting can be efficiently carried out.

[0016] As for the textile machinery, there can be enumerated more concretely, a loom, a weft or warp manufacturing equipment (spinning machine, yarn twister, doubler), warp sizer, warper, and the like.

[0017] Information terminals may be provided in one-to-one correspondence to textile machines, or in correspondence of one to plural textile machines.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018]

Fig. 1 is a block diagram of an electric circuit showing an embodiment of the information display according to the present invention.

Fig. 2 is a flow chart for explaining actions of the information display shown in Fig. 1.

Fig. 3 is a view showing the initial screen displayed in the input indicator of the information display in Fig. 1.

Fig. 4 is a view showing a language selection screen displayed in the input indicator of the information display in Fig. 1.

Fig. 5 is a view showing the initial screen displayed in English in the input indicator of the information display in Fig. 1.

Fig. 6 is a view showing a screen of the support menu displayed in English in the input indicator of the information display in Fig. 1.

Fig. 7 is a view showing a screen of an exchange adjustment support menu displayed in English in the input indicator of the information display in Fig. 1.

Fig. 8 is a view showing a parts number inputting screen displayed in English in the input indicator of the information display in Fig. 1.

Fig. 9 is a view showing a screen of support information displayed in English in the input indicator of the information display in Fig. 1.

Fig. 10 is a view showing an example of a screen displayed in Japanese of the screen of the support

menu in Fig. 6.

Fig. 11 is a view showing an example of a screen displayed in Japanese of the screen of the exchange adjustment support menu in Fig. 7.

Fig. 12 is a view showing an example of a screen displayed in Japanese of the parts number inputting screen in Fig. 8.

Fig. 13 is a view showing an example of a screen displayed in Japanese of the support information in Fig. 9.

PREFERRED EMBODIMENT OF THE INVENTION

[0019] Referring to Fig. 1, the information display 10 is constituted as a support system for displaying, in exchanging parts of a loom, working steps or working procedure for reparation, checking and the like and adjustment of renewal parts and the like, and to switch over to one of languages to be displayed by selecting an operator's language information. And it shows an example where a plurality of looms are arranged in a textile factory and where setters serving as the information terminals are provided in the loom in one-to-one correspondence.

[0020] The information display 10 comprises a support computer 12 installed in a control room, and as information terminals, a plurality of setters 14 as setters of machines, and a database 28. The support computer 12 and each setter 14 are connected with each other by a LAN 16.

[0021] The support computer 12 has a central processing unit (CPU) 18 for performing various processes and a memory 20 which stores processing programs necessary for the support computer to perform the support system of the above-mentioned loom, and various kinds of information.

[0022] The CPU 18 is connected to the memory 20, a keyboard 22, an indicator 24, a printer 26 and the database 28 as well as to a communication network 16 through an input/output port 30.

[0023] Each setter 14 has a CPU 32 for performing various processes, an input indicator 36 with touch panels serving as an input device as well as a screen indicator, and a memory 34 storing a process program necessary for the setter to perform a support system of the loom and various kinds of information.

[0024] The CPU 32 is connected to the memory 34 and the input indicator 36, and to the communication network 16 through an input/output port 38.

[0025] Setters 14 may be provided not only in one-to-one correspondence to looms, but also in one-to-plural correspondence to a group of looms (concretely, one setter 14 may be shared by a plurality of looms). According to the following explanation, however, each setter 14 is supposed to be provided to correspond to one loom.

[0026] In the database 28, plural pieces of information required by an operator are translated into plural languages and pre-recorded for each of the languages. Each of these pieces of information is expressed in a

form of including a language and includes information that is electrically or magnetically recorded in the database 28 for reference purpose when displaying in the input indicator 36 (screen 80) of the setter 14.

[0027] Each setter 14 transmits information including the language selection information inputted by an operator by performing the process program in the memory 34 of the setter to the support computer 12, and displays visually the information transmitted from the support computer 12 on the screen 80 of the input indicator 36.

[0028] The support computer 12 reads out information for displaying in letters corresponding to the information inputted by the operator from the database 28 and transmits it to the setter 14, by executing the process program in the memory 20 of the support computer based on the information including the language selection information transmitted from the setter 14 and the input information including a support requirement requested by the operator. The necessary information corresponding to the input information transmitted from the support computer 12 to the setter 14 corresponds to the information translated into the operator's favorite language.

[0029] Next, referring to Figs. 2 to 9, a series of actions of the information display 10 between the support computer 12 and the setter 14 made to correspond to the loom of machine No. 1 is concretely explained. Fig. 2 concretely shows processes to be carried out by the support computer and the loom in carrying out the above-mentioned support system, and in Figs 3 through 9, screens to be displayed in the setter of the loom in carrying out the above-mentioned support system are shown in order.

[0030] Firstly, with the power supply of the loom No. 1 turned on, the screen 80 of the input indicator 36 is lighted, operation information 100 is displayed as shown, for example, in Fig. 3 in Japanese as the initial information, and a language selection key 102 for the operator to select a language is displayed.

[0031] The operation information 100 displayed on the screen 80 shows a ratio of the length of the woven cloth to a desired weaving length, a ratio of the warp length remaining in a warp beam to the initial length of the warp wound round a warp beam, time for weaving, initial length of the warp wound round the warp beam, operation rate (Efficiency), rational frequency of the loom, warp beam diameter presently selected, color of the weft, and weft density, and the like, which are information with high significance in weaving control. Other information, however, may be displayed as the initial information.

[0032] On the screen 80, not only the present date and time but also a language selection operating key 102 for the operator to select his desired language is displayed.

[0033] In the above-mentioned state, when the operator presses the language selection operating key 102 of the screen 80, the selection information as shown in Fig. 4 is displayed on the screen 80.

[0034] In the example shown in Fig. 4, instead of the operation data shown in Fig. 3, an icon 104 urging the

operator to select a desired language and a plurality of keys 106 through 122 for the operator to select a desired language are displayed on the screen 80.

[0035] The selection keys 104, 106, 108, 110, 112, 114, 116, 118 and 120 respectively correspond to Chinese, Korean, Japanese, English, French, Italian, Portuguese, Spanish and Turkish.

[0036] Then, when the operator selects any selection key, for example, English 112 (step 50), the setter 14 stores therein selection information to that effect, transmits the language selection information corresponding to the selected language to the support computer 12 together with the machine No., sets the language flag corresponding to the selected language, and thereafter, expresses in English the information indicated by letters on the screen 80, so that the operation information 100 is indicated by the selected language (English) (Step 52).

[0037] As a result, the setter 14 indicates in English to show in Fig. 4 the same information as the information displayed on the screen 80 shown in Fig. 3. Also, the support computer 12 sets the language flag corresponding to the selected language for each machine No. of the loom (Step 54). When input information is transmitted, following a request for support from the setter of the corresponding machine No., the language flag of the support computer, details of which are mentioned later, is used for language selection of necessary information for reply.

[0038] The operator in charge of the loom (for example, weaver, maintenance worker and the like), judging that a support by the support system is necessary, has a loom support menu displayed on the screen 80 by an operation (not shown) of the input indicator 36, and starts inputting the information to request a support (Step 56). In Fig. 6, an example of indicating such a loom support menu in a selected language (English) is shown.

[0039] The loom support menu in the illustrated example, includes: key 124 for "1. request for information on parts adjustment and replacement"; key 126 for "2. request for information on trouble shooting"; key 128 for "3. request for information on parts catalog"; key 130 for "4. request for information on advice on weaving"; key 132 for "5. request for information on instruction manual;" and key 134 for "6. request for information on operation report in the fabric."

[0040] Then, for example, by pressing key 124 for "1. request for information on parts adjustment and replacement," the operator proceeds to the step for narrowing down detailed contents to specify the support request information, and the setter 14 displays the parts adjustment and replacement menu on the screen 80 as shown in Fig. 7.

[0041] In Fig. 7, information to the effect that the support menu for "requesting information on parts exchange and adjustment" is selected is displayed in the upper part as illustrated, and keys 140, 142, 144, 146, 148, 150 and 152, respectively, for selecting "1. warp shedding device", "2. picking device", "3. beam let-off device", "4. cloth take-up device", "5. main driving device", "6. sel-

vedge device and catch cord device", and "7. filling device (warp & weft)" are arranged to be indicated on the screen 80.

[0042] In addition to the exchange and adjustment support menu shown in Fig. 7, key 136 for "returning to the initial screen" is displayed on the screen 80.

[0043] Then, when the operator presses key 152 corresponding to, for example, "7. filling device (warp & weft)" to request a support on "exchange and adjustment of weft feeler H1", the screen 80 displays a plurality of selection menus such as selection keys for selection of a kind of yarn sensor, for example, "dropper" meaning a warp sensor, "leno" meaning a selvage yarn sensor, "catch cord" meaning a catch code sensor, "weft feeler H1" belonging to the weft and for judging whether or not the weft is correctly inserted or not, "weft feeler H2" for judging long pick or blowing off (not shown). As shown in Fig. 8, the setter 14 displays a screen for promoting more detailed input relative to the exchange and adjustment support for the weft feeler H1.

[0044] In the input menu of detailed information relative to the exchange and adjustment support for the "weft feeler H1", an input column 168 for inputting parts No. of the weft feeler H1 as input information is displayed, and when the operator touches the input column 168, input keys for inputting parts No. such as ten keys 160 corresponding to respective numerals, delete key 162 for erasing one character of inputted numerals, an enter key 166 for fixing the inputted numerals, and a return key 164 for erasing the enumerated input numerals when inputting is finished are displayed. Also, command key 170 for commanding the support computer to search with the inputted parts No. as input information is included.

[0045] Next, when the operator inputs parts No. and presses the command key 170, the inputted parts No. is transmitted as the input information to the support computer 12, thereby terminating Step 58 for narrowing down the detailed information.

[0046] Upon receipt of such input information from the setter, the support computer 12 reads out the selected language flag, searches the data necessary for exchange and adjustment of the weft feeler H1 and corresponding to the selected language (Step 60), and transmits the necessary information corresponding to the selected language as searched and the input information to the setter 14 (Step 62). Thus, the necessary information is pre-stored in the database 28 so as to be extracted by parts No. which is the selected language and input information.

[0047] Then, the setter 14 displays the received data (necessary information) on the screen 80 of the input indicator 36 (Step 64). An example of data to be finally displayed on the screen 80 as necessary information corresponding to the input information is shown in Fig. 9.

[0048] The information finally displayed on the screen 80 includes information 172 showing that the currently displayed information corresponds to parts No. of the weft feeler H1 "626511AA" and information 174 to be expressed by letters necessary for exchange and adjust-

ment of that parts No. The screen 80 further shows key 136 for "returning to the initial screen," key 154 for "returning to the loom support menu" and keys 176 and 178, respectively, for returning to the previous page and advancing to the following page in case the above-mentioned necessary information is indicated over plural pages, for reasons of the area for display.

[0049] Regardless of whichever screen from Fig. 6 to Fig. 9 is displayed, when the operator presses any key, the information corresponding to the pressed key is displayed on the screen 80. Also, when the operator presses the key 136, the initial screen shown in Fig. 3 is displayed on the screen 80.

[0050] Just for reference, screens in Japanese of the same contents as those displayed in Figs. 6, 7, 8 and 9 are respectively shown in Figs. 10, 11, 12 and 13, suppose Japanese is selected.

[0051] According to the information display 10 constituting such a support system, the operator requests in advance language information of his favorite language. The computer, when outputting the necessary information corresponding to the input information inputted by the operator, sends the necessary information in the language corresponding to the selected language information requested by the operator, from the database recording the necessary information translated into plural languages to the information terminal. As a result, the information terminal displays the necessary information as sent in the language requested by each operator, so that the operator can easily understand the necessary information displayed in the input indicator 36. Therefore, even textile factories where operators having different favorite languages are working, any operators can improve their operability and workability relative to a loom.

[0052] There are considered variations of the foregoing embodiment, as follows. The foregoing embodiment exemplifies that, by the language selection setting carried out relative to the setter on the side of the loom, the language selection information is immediately transmitted to the computer, which accumulates the language selection information in preparation for any search for necessary information thereafter. However, instead of thus accumulating the language selection information in the computer, it is also possible to constitute for the information terminal to send the language selection information based on a language selection flag previously determined, together with the input information every time, and for the computer to search the corresponding necessary information according to the transmitted information.

[0053] In the foregoing embodiment, the database is exemplified as accumulating necessary information per language, but the database may be constituted to accumulate necessary information displayed in plural languages per input information, while the computer extracts the necessary information in a corresponding language among the necessary information in plural languages corresponding to the input information. Therefore, both

methods are examples that necessary information is stored in correspondence to the selected language information and are included in the present invention.

[0054] While the information to be displayed on the screen 80 of the input indicator 36 of the loom-side setter 14, particularly, the information shown in Figs. 3 through 5 is realized in the above-mentioned example by the process program of the setter 14, it is possible to realize by sending the information to be displayed by the process program of the support computer, or to display by transmitting the information from the support computer 12 to the setter 14.

[0055] It is possible to set the language selection information collectively to the support computer instead of setting the language selection information to each loom. For instance, it is possible to place such a support computer in a control room, to install the support computer in the control room store information on an operator and language selection information for every work shift relative to each loom as set data, and to search the necessary information in the language corresponding to the input information with reference to the set data by the support computer, instead of sending the language selection information from the setter to the support computer. Incidentally, in such a system, at a time of shift change, for example, the support computer transmits the language selection information to the setter of each machine, thereby changing the language selection set for the setter of each machine base simultaneously.

[0056] It is also possible to make each operator hold a recording medium with language selection information pre-stored instead of inputting the language selection information into the setter, whereby a reader provided in the loom can recognize the language selection information of the operator by reading out the language selection information from the recording medium held by the operator. Thus, a system for recognizing the language selection information without using a setting function in the information terminal is included in the present invention.

[0057] As another example concerning parts, the support information which the information display 10 of the loom provides may have a catalog of the parts of the loom transmitted and displayed in the loom-side setter. In this case, the request for displaying the parts catalog corresponds to the above-mentioned input information, and as the necessary information to be displayed in correspondence thereto, not only the shapes of the parts, Nos. of the illustrated parts, but also the names of the parts in the language may be displayed. This facilitates the control of the parts, and the system can be utilized for ordering parts from a manufacturer. Such a system is also included in the present invention.

[0058] Further, when any trouble occurs in the loom, the information display 10 narrows down the basic cause of the trouble by a dialog with the support computer, and transmits the basic cause and countermeasures against the cause displayed as the above-mentioned support information to the setter of the loom. This so-called expert

system displayed in the form of language can be included in the present invention. In this case, the contents of the trouble and the dialog information inputted for narrowing down the trouble contents correspond to the above-mentioned input information, and the basic cause displayed by the language as a result of narrowing down and countermeasures against the cause correspond to the above-mentioned necessary information.

[0059] The information display 10 may further transmit advice information relative to the loom to the setter thereof as the support information and have the setter display it. Thereby, in case setting and adjustment relative to the loom do not go well at the time of a change in weaving, the advice information displayed in the form of language can be utilized. Such a system is also included in the present information. In this case, reference information such as a cloth specification, a kind of the cloth and the like to be inputted for obtaining the advice information corresponds to the above-mentioned input information, and the advice information displayed in the language in correspondence thereto corresponds to the above-mentioned necessary information.

[0060] The information display 10 may further be constituted to transmit, as the support information, an instruction manual for the loom describing the maintenance information on the loom parts, steps for operating the loom in the form of language to the loom-side setter and display the same. In this case, the instruction manual on the loom may be stored in the memory of the support computer as a document file with different names for each language, and the loom-side setter may be made to open and display the document file to be received. Such a system is also included in the present invention. In this case, the request for reference to the instruction manual from an operator corresponds to the above-mentioned input information, and the display contents of the instruction manual displayed in the language in correspondence thereto correspond to the above-mentioned necessary information. Incidentally, as regards the request for reference to the instruction manual as the foregoing input information, more concretely, there are a location and the name of a document file where the instruction manual is stored, and based on the information, the support computer sends the information on the document file as a reply to the setter. There may be a case that a plurality of kinds of instruction manuals are prepared. In such a case, either the names of document files or locations for saving are made different according to the kinds.

[0061] The information display 10 may further be adapted to count such information as the rate of operation, the number of stoppages, the length of weaving and so on, for each loom in the support computer, and transmit the counted operation information to the setter of the loom to make to setter display the information according to a request from the setter of the loom. In this case, the operation information represented by numerals as well as item information represented by a language corresponds to the above-mentioned necessary information.

In this case, an operator's request for display of the operation information corresponds to the above input information, while the item information displayed in the form of language side by side with the numerical information corresponds to the above-mentioned necessary information.

[0062] The support computer may be installed either in a weaving factory or elsewhere. In case of installing the support computer in a remote place outside the compound of the weaving factory, transmission of information may be made through a public phone line or the Internet.

[0063] The setter as an information terminal provided in the loom is not necessarily be one attached to the loom itself but may be a portable device such as, for example, a portable computer or a mobile-phone.

Industrial Applicability

[0064] The present invention can be applied not only to a loom but also to an information display of other textile machinery such as a warp preparatory machine including a warp sizer, warping machine, a warp rewinder and the like.

[0065] The present invention is not limited to the foregoing embodiments but can be variously modified without departing from the purport of the present invention.

Claims

1. An information display for textile machinery, comprising a computer having a database recording plural pieces of necessary information needed by an operator, and a plurality of information terminals each of which is provided in correspondence to one textile machine or a plurality of textile machines, each of said plurality of information terminals having an indicator which displays the necessary information transmitted from the computer in letters; wherein each of said information terminal transmits the input information inputted into the information terminal to said computer, said computer, reading out the necessary information in letters corresponding to said received input information from said database, transmits to said information terminal to have said indicator display said transmitted necessary data; and wherein in said data base said necessary information further translated into a plurality of languages is pre-recorded; and wherein, upon receipt of said input information, said computer reads out the necessary information corresponding to said input information, based on the requested language selection information, from said database and transmits the same as the necessary information relative to said input information.
2. An information display for textile machinery accord-

ing to claim 1, wherein, when language selection information is inputted by an operator into each of said plural information terminals, each information terminal transmits said inputted language selection information respectively to said computer.

3. An information display for textile machinery according to claim 1 or 2, wherein the language selection information is set in said computer for each information terminal.

Fig. 1

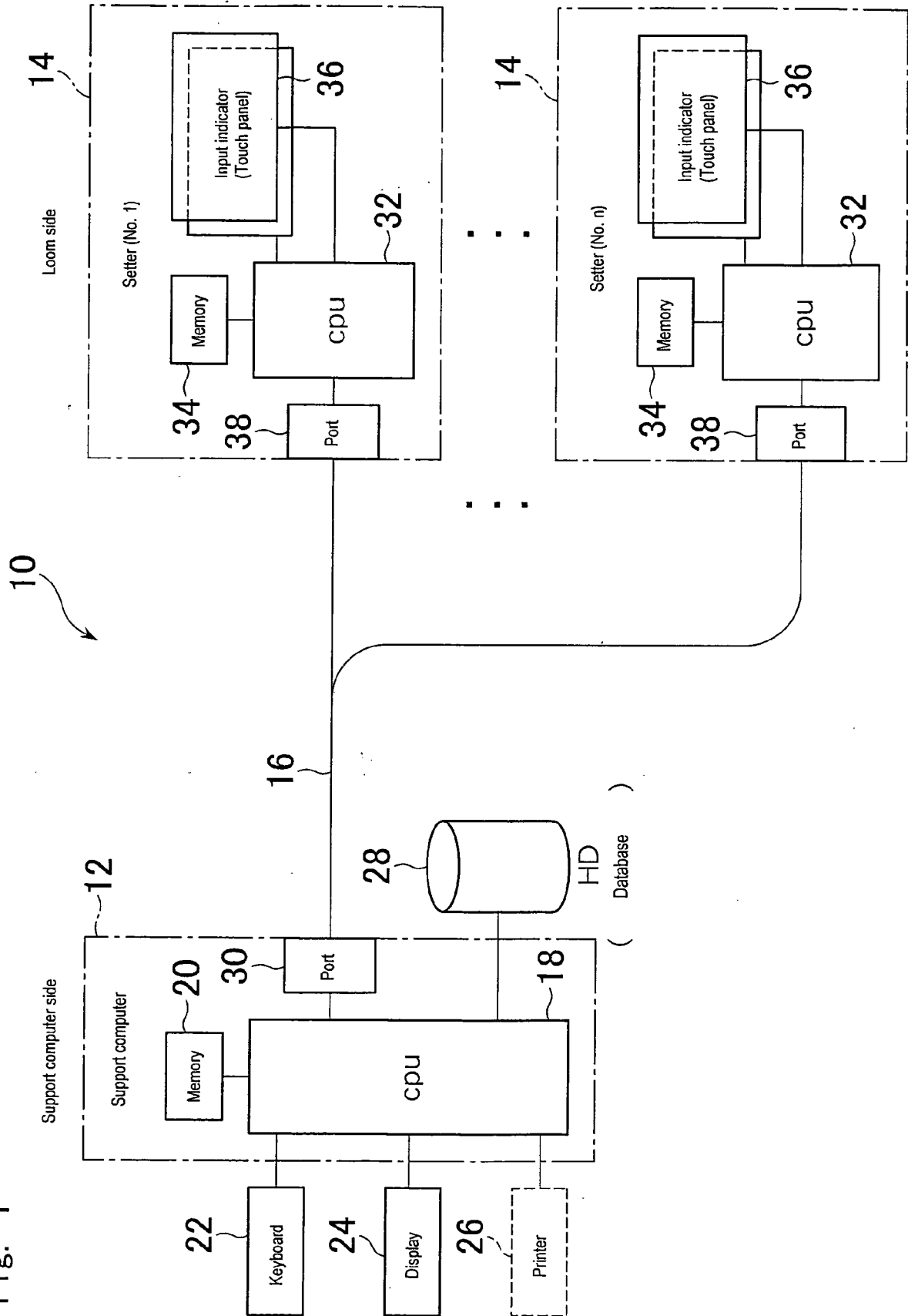


Fig. 2

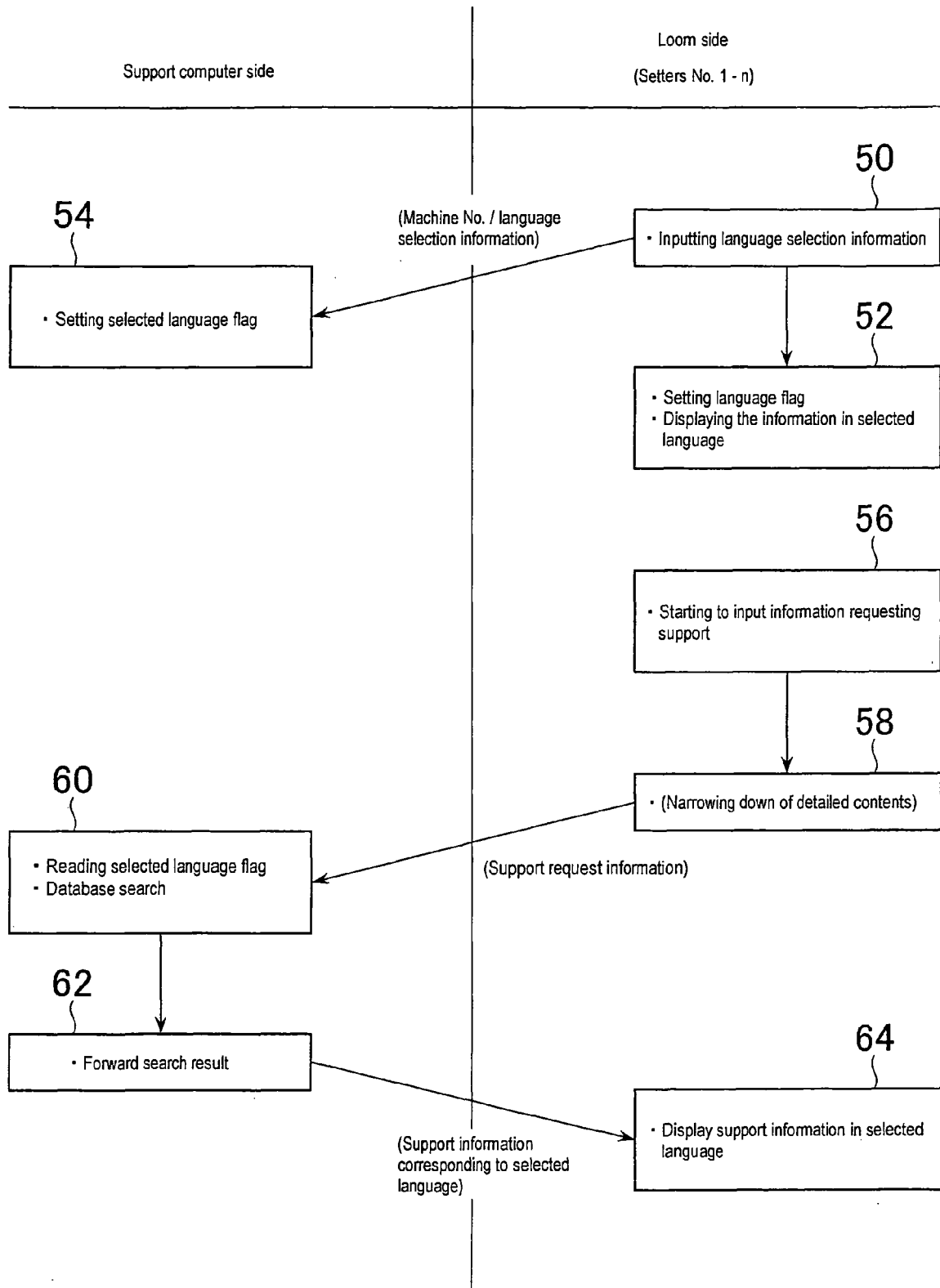


Fig. 3

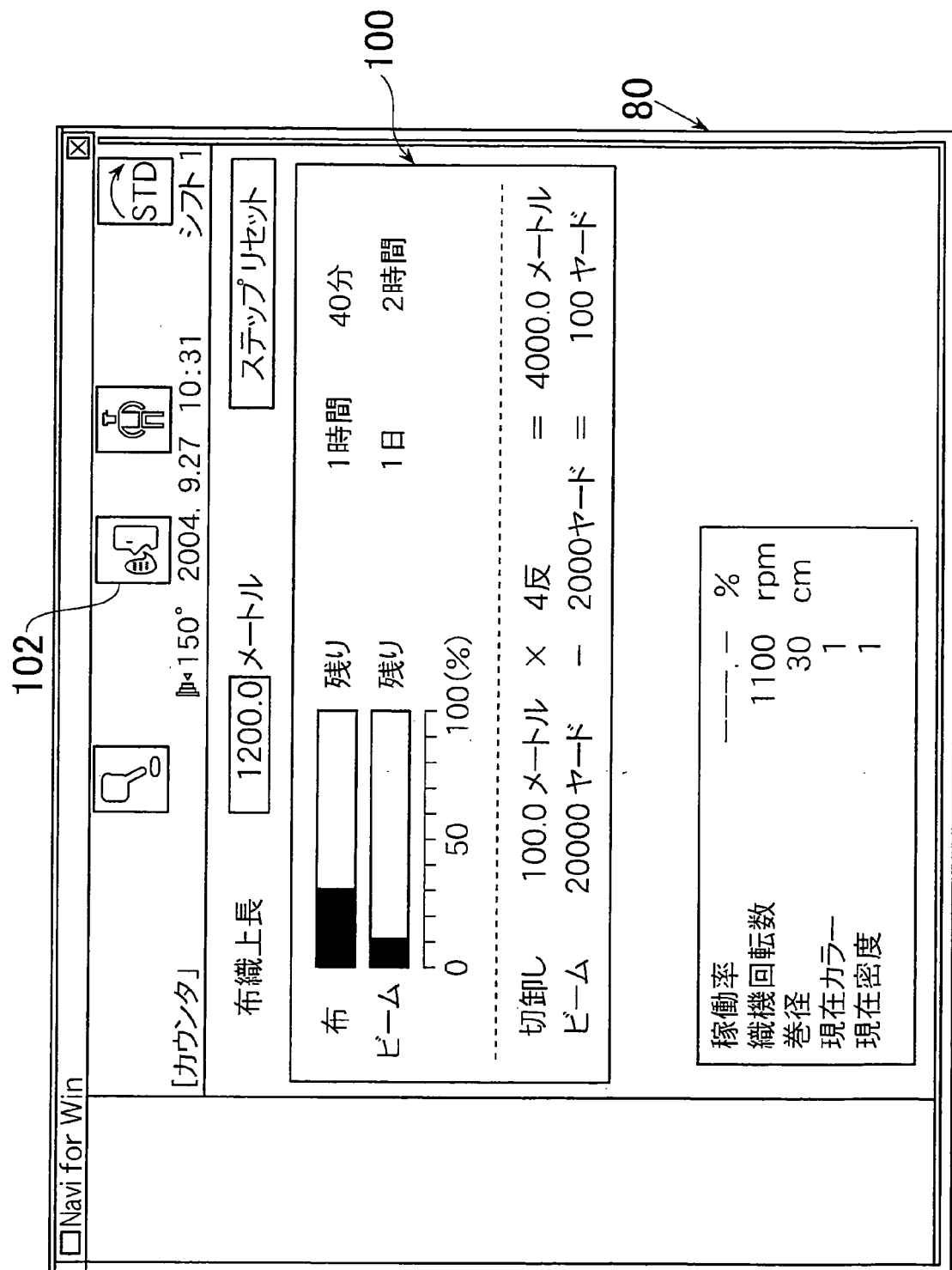


Fig. 4

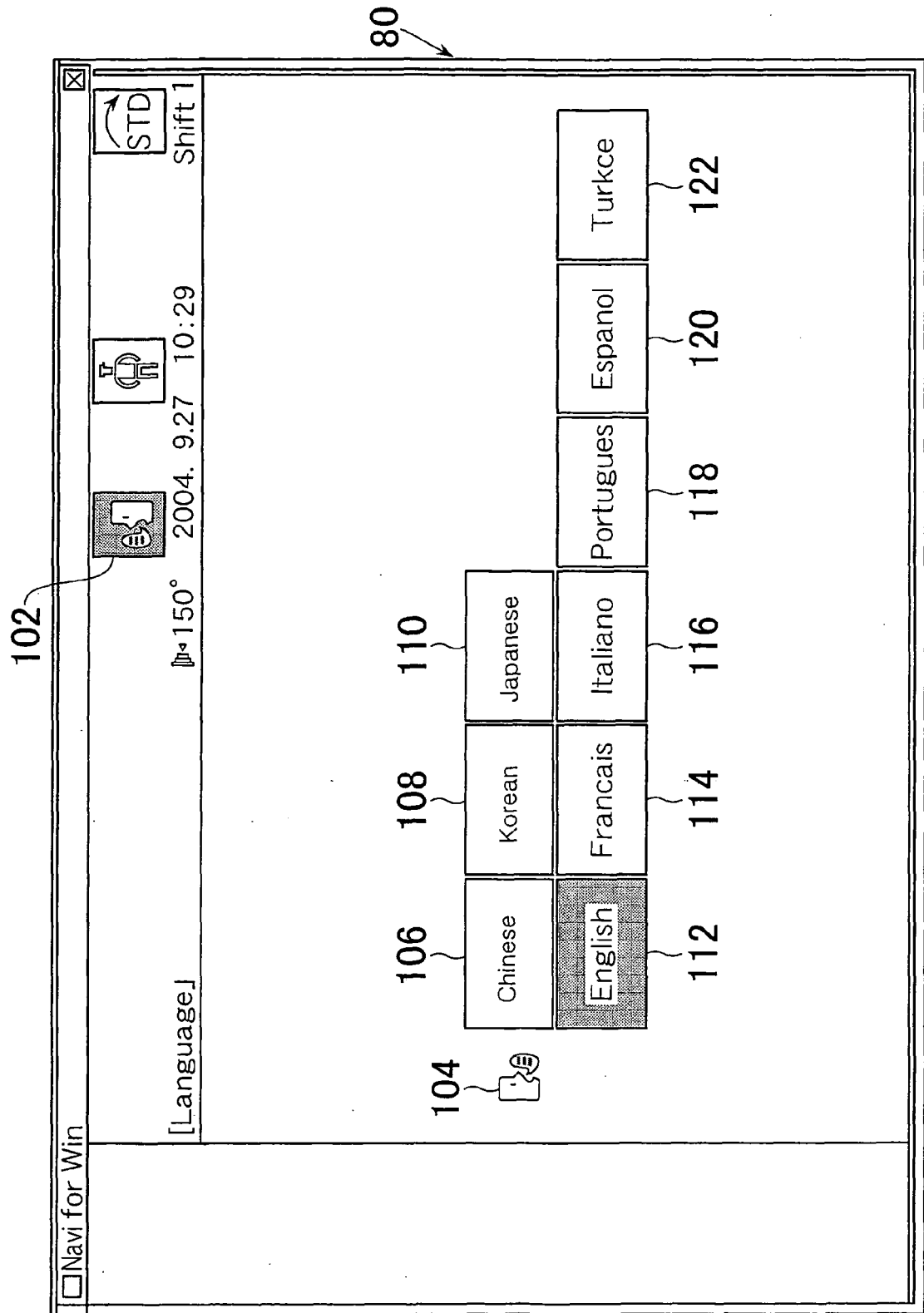


Fig. 5

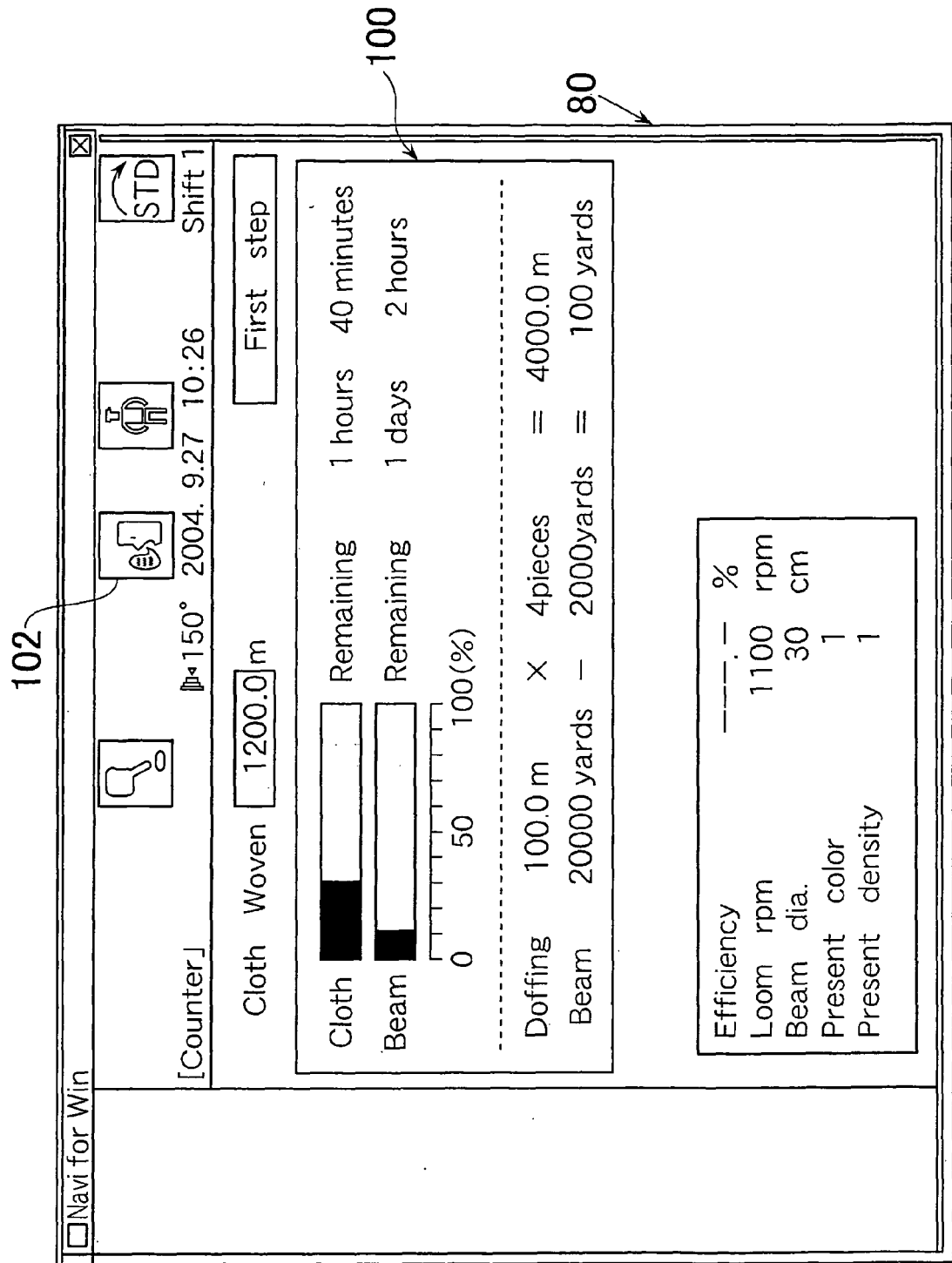


Fig. 6

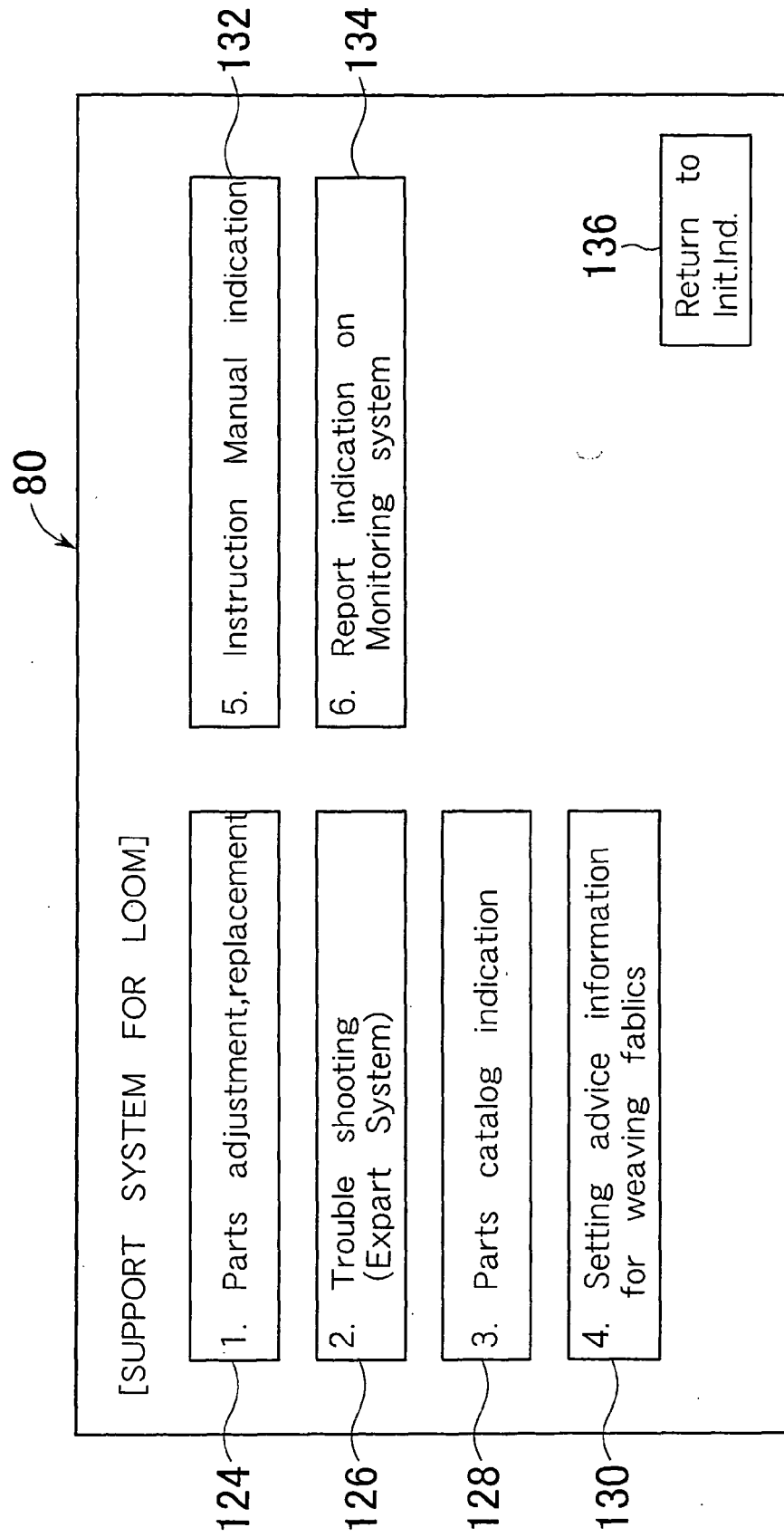


Fig. 7

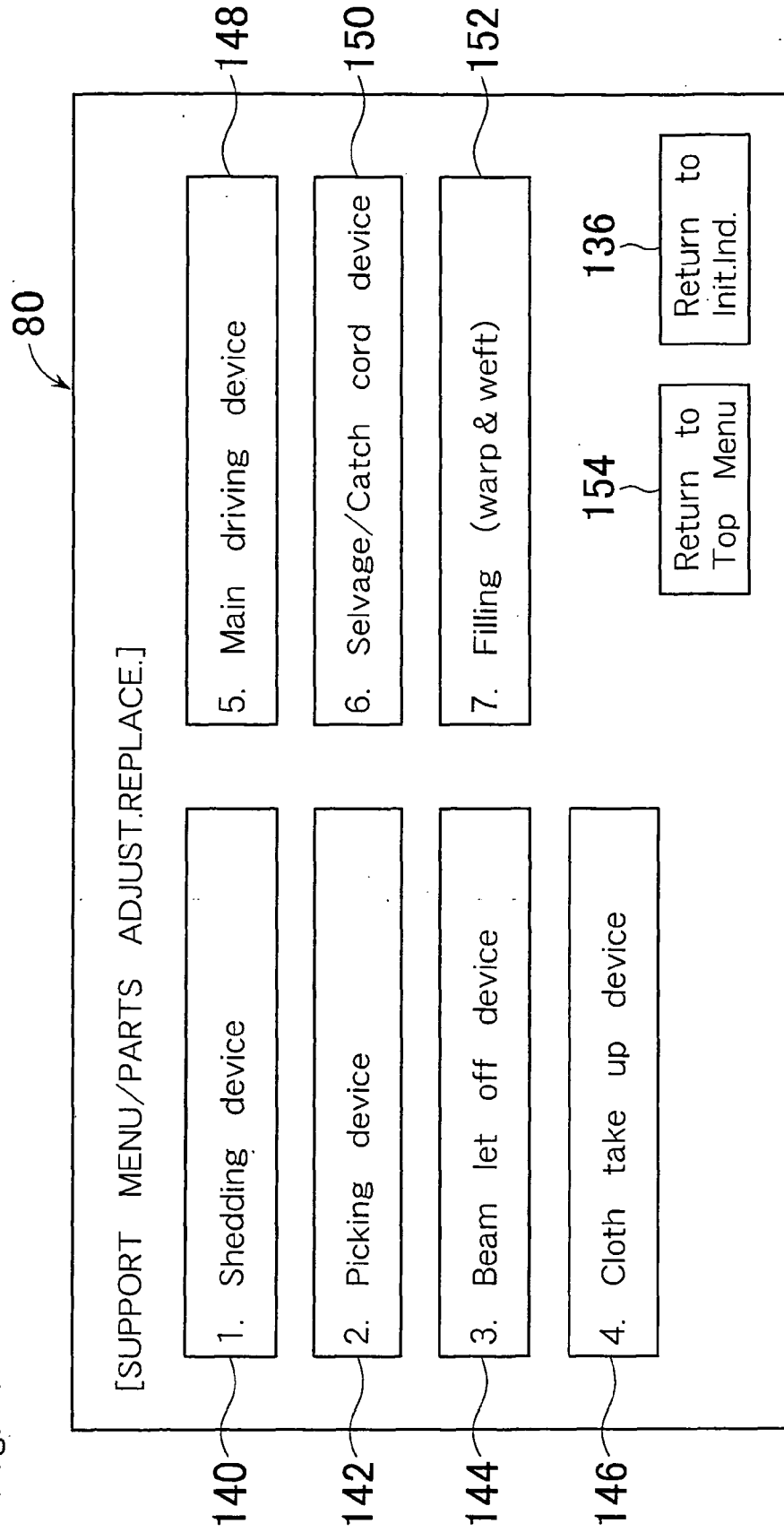


Fig. 8

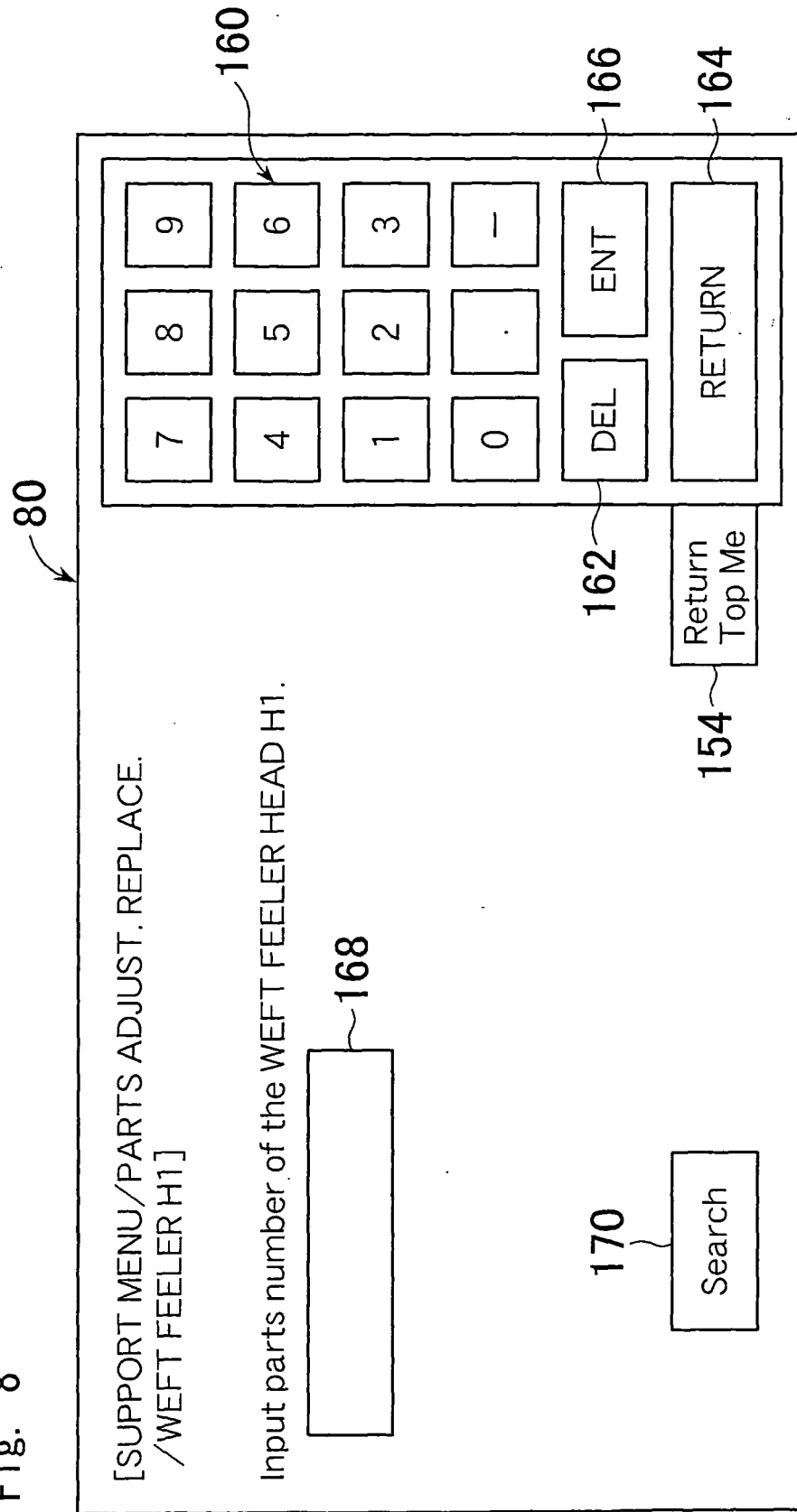


Fig. 9

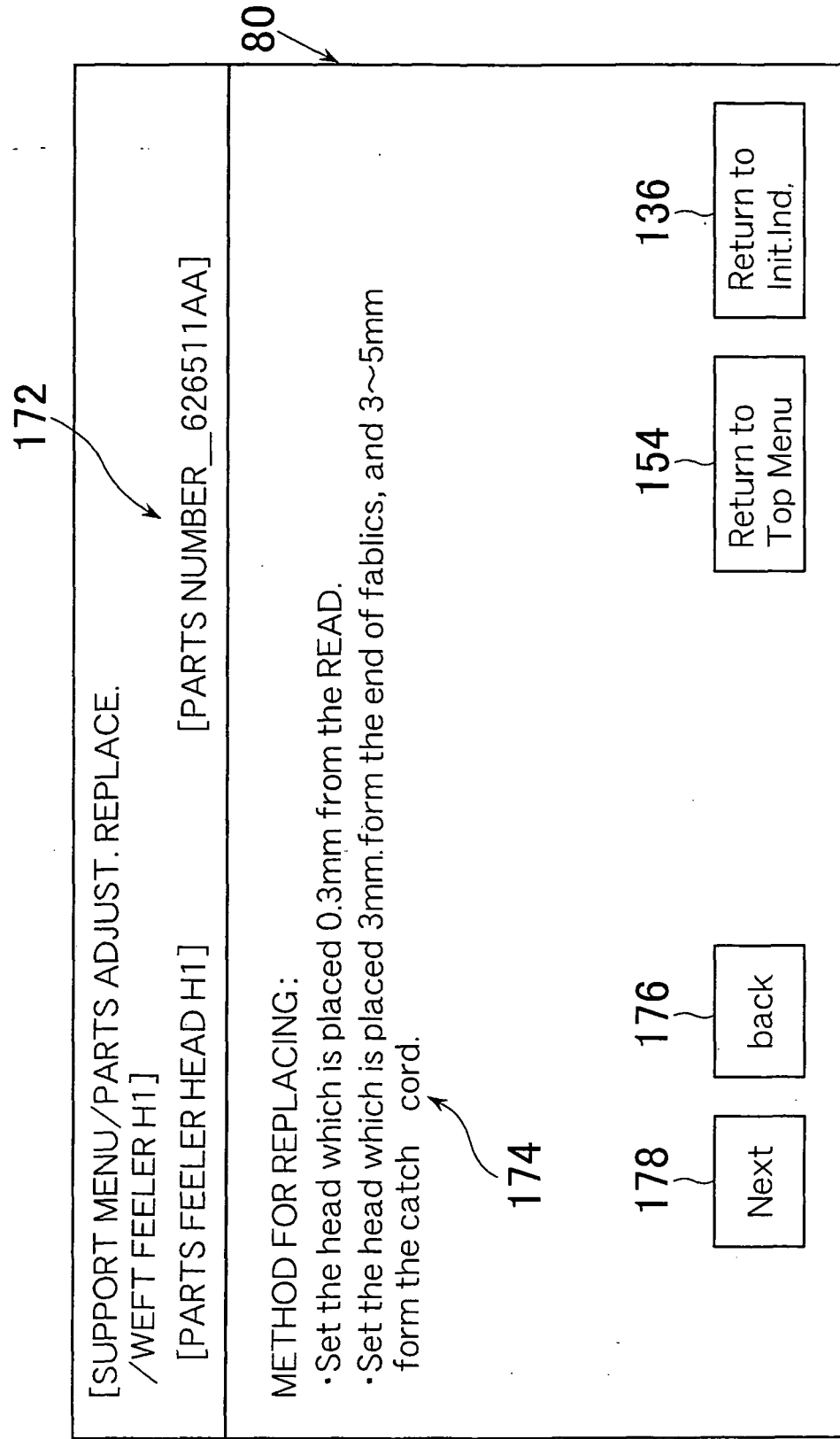


Fig. 10

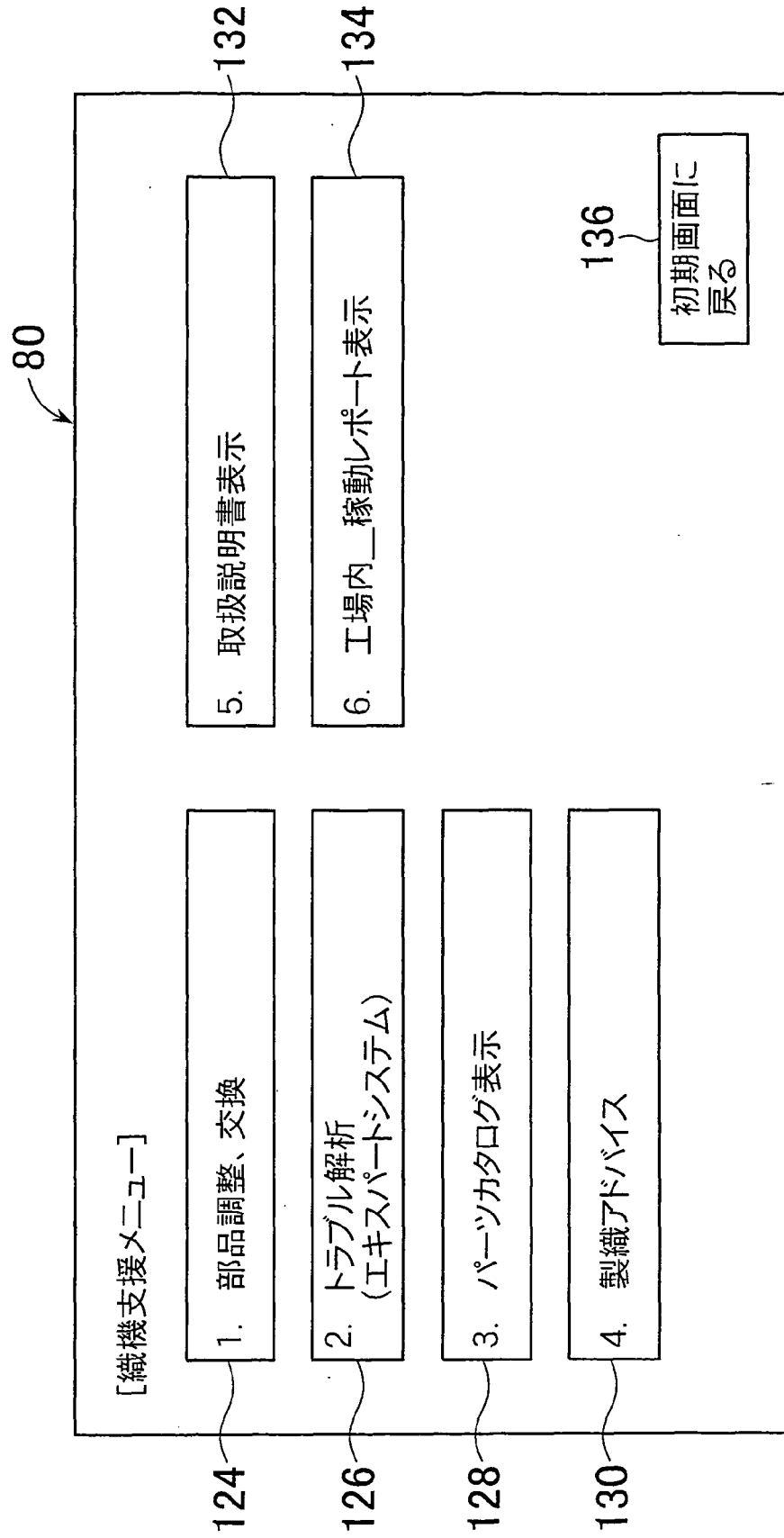


Fig. 11

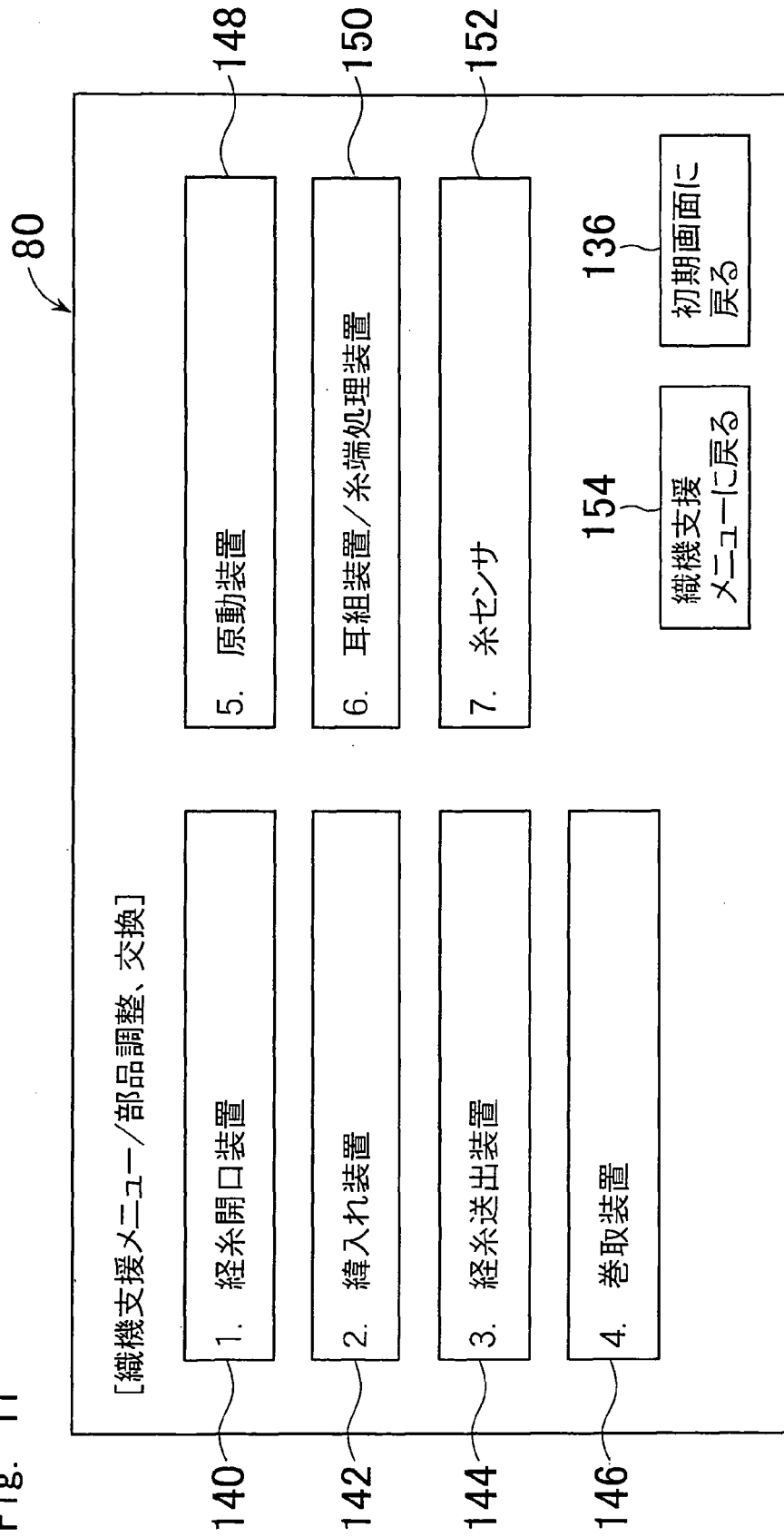


Fig. 12

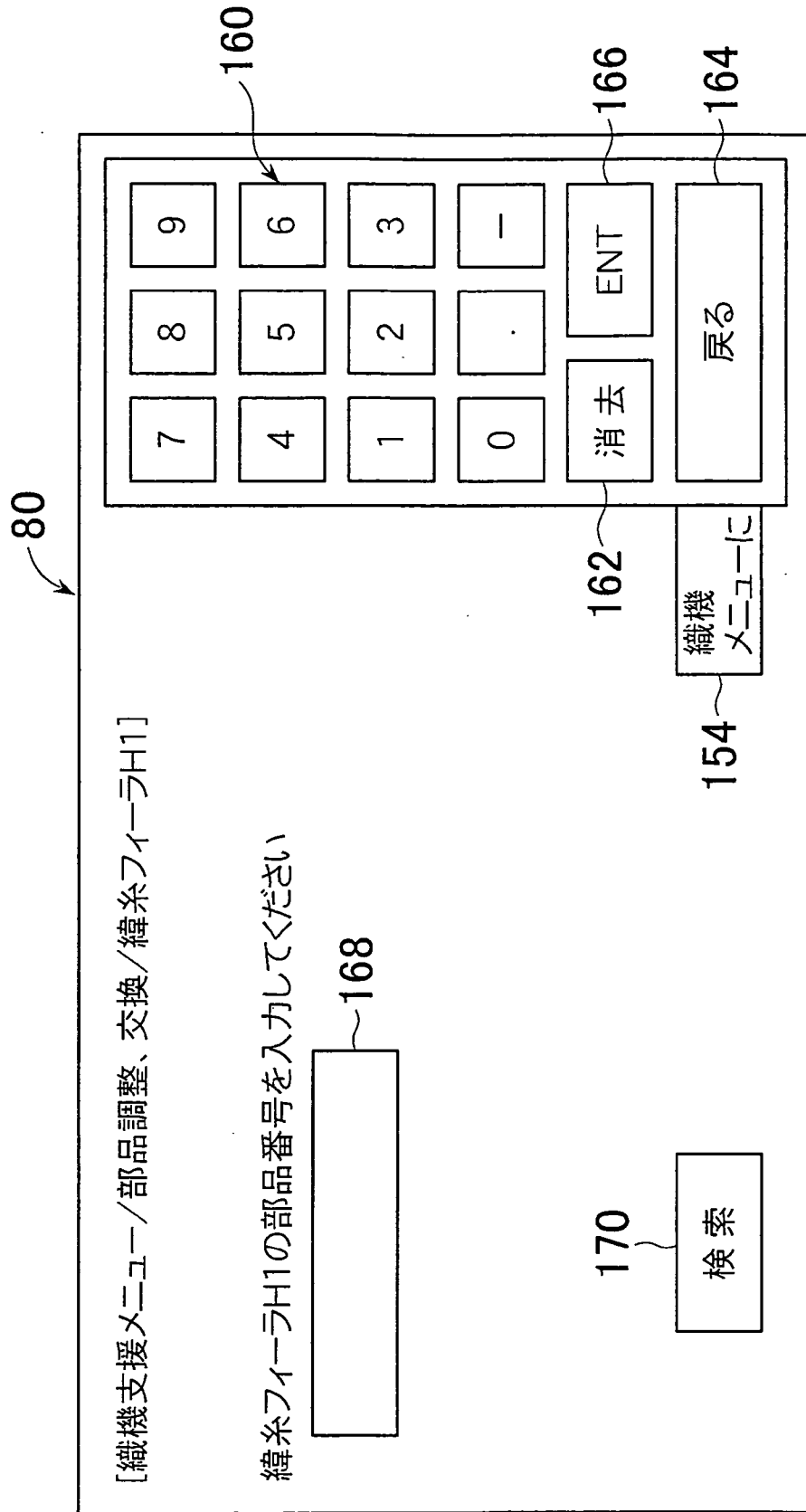
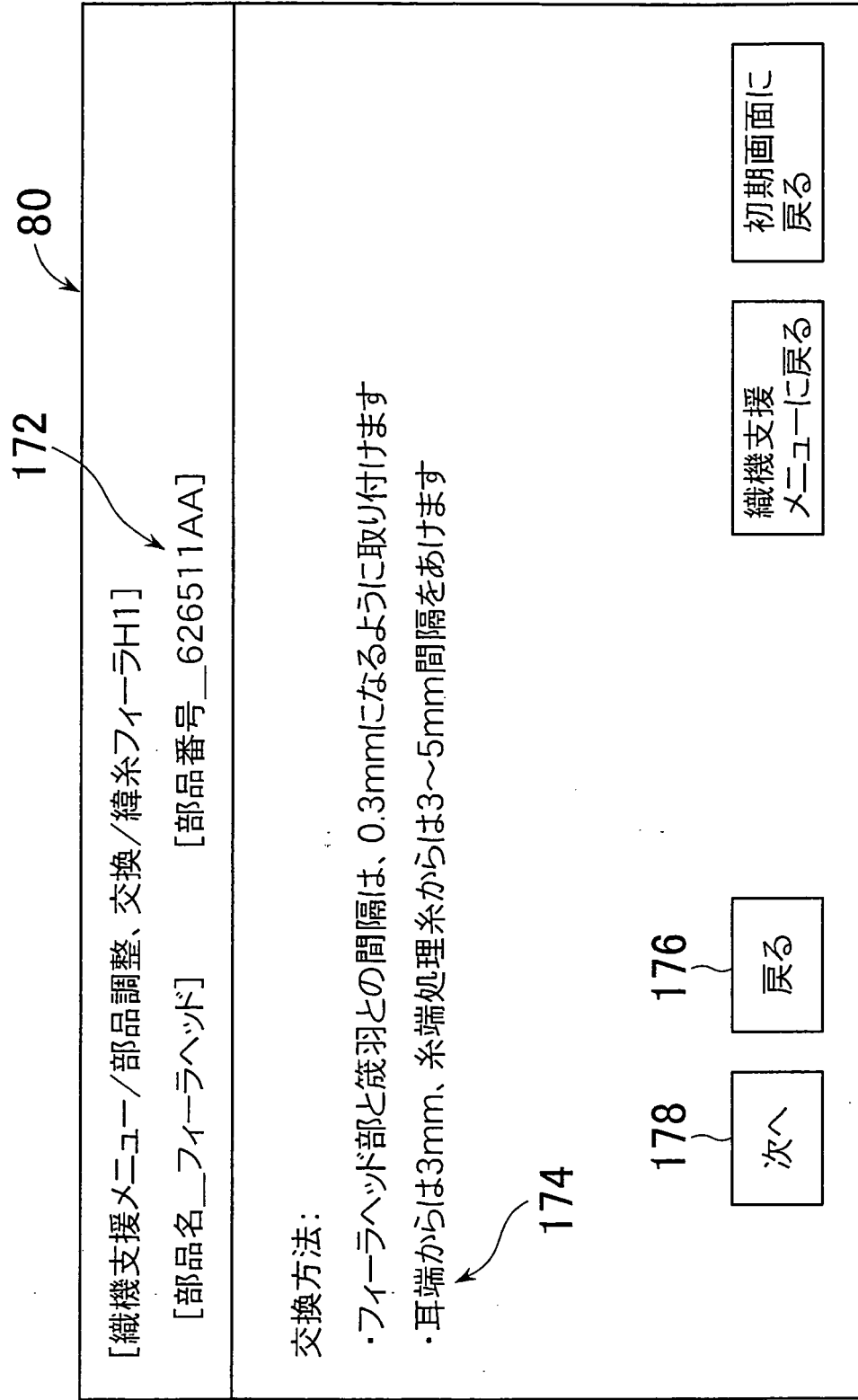


Fig. 13



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 4092585 U [0004]