Appeal Decision

Appeal No. 2019-3501

Appellant Fisher-Rosemount Systems, Inc.

Patent Attorney NAKAJIMA , Jun

The case of appeal against the examiner's decision of refusal of Japanese Patent Application No. 2016-503366 entitled "SYSTEM AND METHOD FOR GRAPHICALLY DISPLAYING PROCESS CONTROL SYSTEM INFORMATION" (the application is internationally published on September 18, 2014 with an Application Publication No. WO2014/145495, and published in Japan on July 14, 2016 with an Application Publication No. JP 2016-520893A) has resulted in the following appeal decision.

Conclusion

The appeal of the case was groundless.

Reason

I. History of the procedures

The present application is Japanese Patent Application No. 2016-503366, which was filed on March 17, 2014 (the priority claim accepted by the Foreign Agency on the basis of Paris Convention in the United States on March 15, 2013, and in the United States on April 9, 2013) as the international filing date, and the main history of the procedures are as follows:

September 10, 2015	: Submitted domestic document
March 15, 2017	: Submitted written amendment
March 14, 2018	: Notice of reasons for refusal
June 19, 2018	: Submitted written opinion
November 7, 2018	: Decision of refusal
March 13, 2019	: Submitted written request for appeal and written amendment
May 29, 2019	: Reconsideration report
October 31, 2019	: Notice of reasons for refusal
May 7, 2020	: Submitted written opinion and written amendment
September 24, 2020	: Notice of reasons for refusal

December 22, 2020 : Submitted written opinion

II. The Invention

The invention according to Claim 1 (hereinafter referred to as "the Invention") in the scope of claims amended according to the written amendment submitted on May 7, 2020 is as follows:

"[Claim 1]
A method, comprising:
monitoring a process variable of a process control system;
determining the current state of the monitored process variable;
determining a trend associated with the process variable;
generating a first graphic representative of information associated with the process variable, the information comprising the current state of the process variable and the trend of the process variable; and
rendering the first graphic via a display;
The current state of the process variable being represented by the shape of the outline of the first graphic."

III. Reasons for refusal

The outline of the reasons for refusal notified to the Invention by this examination on September 24, 2020 is as follows.

The Invention could have been easily made by a person skilled in the art to which the claimed invention pertains, on the basis of the invention described in JP H08-106321A (hereinafter referred to as "Cited Document 1"), which is distributed in Japan or other foreign countries or made available to the public through electric telecommunication lines prior to the filing of the application. Therefore, the Invention cannot be granted a patent under the provisions of Patent Act Article 29(2).

IV. Descriptions of cited documents and Cited Invention

Descriptions of Cited Document 1

(1) Cited Document 1 and the drawings together describe the following matters (the underlined part is added by the body ; the same applies hereinafter).

(i) "[Scope of claims]
[Claim 1] A plant monitoring apparatus, comprising: a detection means for detecting the

liquid level of a plant; a process input means for inputting a signal from the detection means; a change detection means for detecting the fluctuation amount of the signal from the process input means; and a display control means for displaying a bar graph having a size corresponding to a signal level and changing, according to the fluctuation amount detected by the change detection means, the shape of the bar graph to be displayed and outputted.

...

[Claim 3] The plant monitoring device according to Claim 1, wherein the change detection means detects whether or not the fluctuation amount is fluctuating; the display control means sets the shape of the tip of the bar graph to a straight line when the detection result of the change detection means is not fluctuating, and sets the shape of the tip of the bar graph to a waveform when the detection result of the change detection means is fluctuating.

(ii) "[0001] [Industrial applicability]

The present invention relates to a plant monitoring device for monitoring a liquid level."

(iii) "[0002] [Prior art]

Fig. 14 is a block diagram of a conventional plant monitoring device 10. Sensors 2 that are used as a means for detecting the liquid level (water level) of tanks 101 are respectively provided in the plurality of tanks 101 used as monitoring objects. The process input means 3 of the process computer 1 periodically inputs signals from the sensors 2. The display control means 5 displays, by changing a bar graph or the magnitude of a digital amount, according to the magnitude of the signal level inputted by the process input means 3, the bar graph or the magnitude of the digital amount displayed on a CRT 6, which is a display device.

[0003] When the plant monitoring device 10 monitors the status of a plant, the plant system diagram 100 shown in Fig. 15 is displayed on the CRT 6 as a schematic diagram, and the operator monitors the plant system diagram to grasp the operating status of the plant. When the tanks 101 used as monitoring objects in the plant are displayed as the plant system diagram 100, the liquid level of the tanks is represented by the bar graph 102, the numerical value 103, or a combination of both. The operator monitors the liquid level of the tanks by visually observing this display.

[0004] By using such a device, the value of process data such as the liquid level can be confirmed by referring to the bar graph display or the numerical value display. In addition, the operator is alerted by issuing an alarm when the process data is greater than or less

than a certain value, or by changing the display color of the bar graph display or numerical value display to a color indicating an alarm state."

(iv) "[0005]
[Problems to be solved by the invention] When such a device is used, it is easy to monitor the alarm state as described above, but this is only possible to monitor the instantaneous value at a certain arbitrary time, and it is impossible to monitor the behavior of the process data, i.e., whether or not the process data is fluctuating. Therefore, when it is desired to show the behavior of the process data, a method of displaying and updating the bar graph display and numerical value display at high speed is adopted.
If a device cannot update the displays at high speed, the operator has to check carefully the displays to determine the process data behavior. In this case, the behavior of the process data cannot be effectively monitored until the displays are updated, which is inconvenient in case of emergency. In addition, when there is a plurality of monitoring objects, the behavior cannot be confirmed unless all the plurality of displays are checked, so that there is the problem that the burden on the operator increases, making sufficient monitoring impossible. Furthermore, a hard copy printout of the display is used as a means as a record, but this record also only records the status of the plant at an arbitrary time, and therefore it is impossible to record the behavior of the process data, and there is a problem that, in order to confirm the behavior, it is necessary to use a plurality of hard copies and compare the contents therein to confirm the behavior. The purpose of the invention is to create a plant monitoring device capable of allowing an operator to easily and quickly determine changes in the process volume of the liquid level."

(v) "[0006] [Means for solving the problems]
In order to achieve the above-mentioned purpose, the present invention provides a plant monitoring apparatus, comprising: a detection means for detecting the liquid level of a plant; a process input means for inputting signals from the detection means; a change detection means for detecting the fluctuation amount of the signals from the process input means; and a display control means for displaying a bar graph having a size corresponding to the signal level and changing, according to the fluctuation amount detected by the change detection means, the shape of the bar graph to be displayed and outputted."

(vi) "[0007] [Functions] In the device configured as described above, the liquid level of the plant is detected by the detection means, the signal of the process amount detected by the detection means is inputted by the process input means, and the fluctuation amount of

the signal inputted by the process input means is detected by the change detection means. The display control means creates a bar graph according to the magnitude of the signal inputted by the process input means, and changes the shape of the bar graph according to the fluctuation amount detected by the change detection means."

(vii) "[0008] [Embodiments]
Hereinafter, the embodiments of the present invention are described with reference to Figs. 1-13. Fig. 1 is a block diagram of the plant monitoring device 20 according to Embodiment 1 of the present invention. Sensors 22, which are used as means for detecting the liquid level (water level) of tanks 201, are respectively provided in the plurality of tanks 201 used as monitoring objects. The process input means 23 of the process computer 21 periodically inputs process amount signals from the plant comprising the sensors 22. Change determination unit 27, which is a component of change detection means 24, determines whether or not the inputted process amount is fluctuating. The display control means 25 creates, on the basis of the presence or absence of a change in the process amount determined by the change determination unit 27 and the process amount, data for displaying a bar graph. CRT 26, which is a display device, displays the bar graph data created by the display control means 25."

(viii) "[0019] In addition, it is natural for an operator to change the shape of the tip, but the side portion can also be represented by a waveform so that the outline of the entire bar graph fluctuates. Fig. 7 is a block diagram of the plant monitoring device 30 according to Embodiment 2 of the present invention. [0020] The process computer 31 in Embodiment 2 comprises process input means 33 having the same configuration function as the process input means 23 in Embodiment 1 shown in Fig. 1. In addition to the change determination unit 37 having the same function as the change determination unit 27 in Embodiment 1 shown in Fig. 1, the change detection means 34 further comprises the fluctuation amount determination unit 38 for determining the fluctuation amount of the process amount. The display control means 35 creates data, used for displaying a bar graph, comprising the process amount, the presence or absence of fluctuation in the process amount, and the fluctuation amount of the process amount."

(ix) "[0026] ... Fig. 10 is a block diagram of the plant monitoring device 40 according to Embodiment 3 of the present invention.
[0027] The process computer 41 in Embodiment 3 comprises the process input means 43 having the same configuration function as the process input means 23 in Embodiment 1

shown in Fig. 1. In addition to the change determination unit 47 having the same function as the change determination unit 27 in Embodiment 1 shown in Fig. 1, the change detection means 44 further comprises the change direction determination unit 49 for determining the change direction of an increase/decrease in the process amount. The display control means 45 creates data, used for displaying a bar graph, comprising the process amount, the presence or absence of fluctuation in the process amount, and the change direction of the process amount."

(x) "[0033] Fig. 12 is a block diagram of the plant monitoring device 50 according to Embodiment 4 of the present invention. The process computer 51 in Embodiment 2 (note of the appeal decision: it is a clerical error of "Embodiment 4") comprises the process input means 53 having the same configuration function as the process input means 23 in Embodiment 1 shown in Fig. 1. The change detection means 54 comprises the change determination unit 57 having the same function as the change determination unit 27 in Embodiment 1 shown in Fig. 1; the fluctuation amount determination unit 58 having the same function as the fluctuation amount determination unit 38 in Embodiment 2 shown in Fig. 7, and the change direction determination unit 59 having the same function as the change direction determination unit 49 in Embodiment 3 shown in Fig. 10. The display control means 55 creates data, used for displaying a bar graph, comprising the process amount, the presence or absence of fluctuation in the process amount, the fluctuation amount of the process amount, and the change direction of the process amount.

[0034] The plant monitoring device 50 inputs, by means of the process input means 53, signals of the process amount of the plant detected by sensors 22. The process amount is inputted at an arbitrary period, and the change determination unit 57 determines, by means of the function shown in Embodiment 1, whether or not there is a fluctuation in the process amount. When the change determination unit 57 determines that there is a fluctuation in the process amount, the fluctuation amount determination unit 58 determines the magnitude of the fluctuation amount by means of the function shown in Embodiment 2. In addition, the change direction determination unit 59 determines the change direction of the process amount by means of the function shown in Embodiment 3.

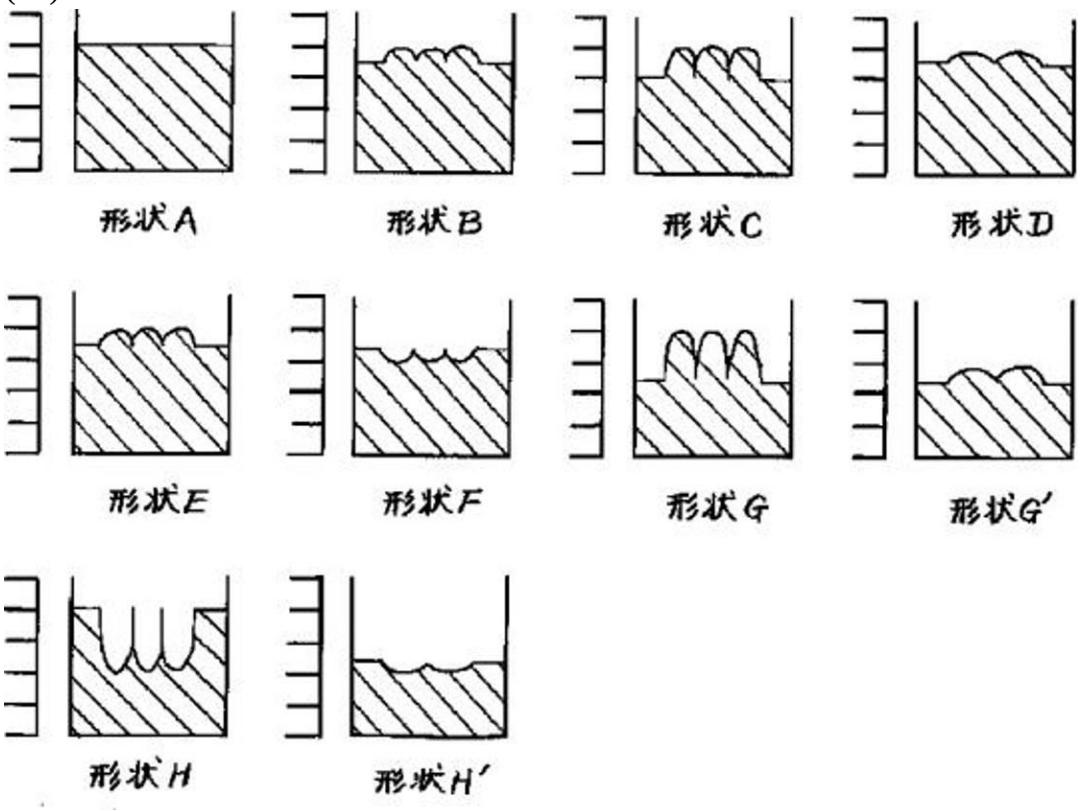
[0035] The display control means 55 creates bar graph data on the basis of the magnitude of the fluctuation amount of the process amount, the change direction, and the input value of the process amount this time, and displays the data on a CRT 26. The bar graph data created by the display control means 55 is of shape A in Fig. 2 when the process amount does not change, shape G when the fluctuation amount is large and the change direction

increases, shape G' when the fluctuation amount is small and the change direction increases, shape H when the fluctuation amount is large and the change direction decreases, and shape H' when the fluctuation amount is small and the change direction decreases."

(xi) "[0039]

[Effects of the invention] According to the present invention, an operator can easily grasp the change state of the liquid level of the plant without checking the displayed process amount. In addition, even in a complicated system in which a plurality of monitoring targets exists, the monitoring targets can be easily selected, so that the burdens on the operator can be reduced. Furthermore, even if a hard copy is used, the status of the plant can also be grasped according to the shape of the bar graph, so that the hard copy can also be used as an effective record in plant operation history management."

(xii)



形状	Shape

(2) The following matters can be understood according to the descriptions in (1) above.

(i) According to item (x) in item (1) above, the process computer 51 of the plant monitoring device according to Embodiment 4 comprises the process input means 53 having the same configuration function as the process input means 23 in Embodiment 1, the change determination unit 57 having the same function as the change determination unit 27, the fluctuation amount determination unit 58 having the same function as the fluctuation amount determination unit 38 in Embodiment 2, the change direction determination unit 59 having the same function as the change direction determination unit 49 in Embodiment 3, and further comprises the display control means 55. The display control means 55 creates data, used for displaying a bar graph, comprising the process amount (liquid level), the presence or absence of fluctuation in the process amount (liquid level), the fluctuation amount of the process amount (liquid level), and the change direction of the process amount (liquid level).

(ii) According to item (x) and (xii) in item (1) above, the display control means 55 creates bar graph data for the shape of the tip of the bar graph on the basis of the magnitude of the fluctuation amount of the process amount (liquid level), the change direction, and the input value of the process amount (liquid level) this time, and displays the data on the CRT. For the bar graph data created by the display control means 55, (a) the tip of the bar graph is a straight line as shown in shape A in Fig. 2 when the process amount (liquid level) does not change; (b) the tip of the bar graph is a waveform pointing upwards as shown in shape G when the fluctuation amount is large and the change direction increases; the tip of the bar graph is a waveform pointing upwards and smaller than shape G as shown in shape G' when the fluctuation amount is small and the change direction increases; the tip of the bar graph is a waveform pointing downwards as shown in shape H when the fluctuation amount is large and the change direction decreases; and the tip of the bar graph is a waveform pointing downwards and smaller than shape H as shown in shape H' when the fluctuation amount is small and the change direction decreases, that is, the change (presence/absence) of the process amount (liquid level), the fluctuation amount, and the change direction (direction such as increase/decrease) are represented by the shape of the tip of the bar graph.

(iii) According to items (i)-(xii) in (1), Cited Document 1 also discloses a method for monitoring the plant while disclosing the plant monitoring device.

2 Cited Invention

In combination with (1) and (2) above, it can be known that Cited Document 1 describes the following invention (hereinafter simply referred to as "Cited Invention").

"A method, comprising:
monitoring the process volume (liquid level) of a plurality of tanks used as monitoring objects in a plant;
determining the change and fluctuation amount of the monitored process amount (liquid level) by means of a change determination unit and a fluctuation amount determination unit;
determining the change direction of the process amount (liquid level) by means of a change direction determination unit;
generating a bar graph representative of information comprising the change in the process amount (liquid level), the fluctuation amount, and the change direction; and
displaying and outputting the bar graph on a CRT;
the information comprising the change in the process amount (liquid level), the fluctuation amount, and the change direction being represented by the shape of the tip of the bar graph."

V. Comparison

The Invention is compared with Cited Invention.

The phrase "monitoring ... used as monitoring objects in a plant" in the feature "monitoring the process volume (liquid level) of a plurality of tanks used as monitoring objects in a plant" in Cited Invention can be considered to constitute part of a "process control system" of the plant, whereas the "process amount (liquid level)" in Cited Invention is a process-related parameter and therefore corresponds to the "process variable" of the Invention, and the feature "monitoring the process volume (liquid level) of a plurality of tanks used as monitoring objects in a plant" in Cited Invention corresponds to the feature "monitoring the process variable of the process control system" of the Invention.

The phrase "the change and fluctuation amount of the process amount (liquid level)" in the feature "determining the change and fluctuation amount of the monitored process amount (liquid level) by means of the change determination unit and fluctuation amount determination unit" in Cited Invention indicates whether or not the liquid level is fluctuating at that time and the amount of the liquid level, and therefore corresponds to the "current state of the process variable" of the Invention, and the feature "determining

the change and fluctuation amount of the monitored process amount (liquid level) by means of the change determination unit and fluctuation amount determination unit" in Cited Invention corresponds to the feature "determining the current state of the monitored process variable" of the Invention.

The phrase "the change direction of the process amount (liquid level)" in the feature "determining the change direction of the process amount (liquid level) by means of a change direction determination unit" in Cited Invention indicates the direction such as increase/decrease of the liquid level, and therefore corresponds to the "trend associated with the process variable" of the Invention, and the feature "determining the change direction of the process amount (liquid level) by means of a change direction determination unit" in Cited Invention corresponds to the feature "determining the trend associated with the process variable" of the Invention.

It can be said that: the phrase "bar graph" in the feature "generating a bar graph representative of information comprising the change in the process amount (liquid level), the fluctuation amount, and the change direction" in Cited Invention corresponds to the "first graphic" of the Invention, and the phrase "information comprising the change in the process amount (liquid level), the fluctuation amount, and the change direction" in Cited Invention corresponds to the "information associated with the process variable, i.e., information comprising the current state of the process variable and the trend of the process variable" of the Invention; therefore, the feature "generating a bar graph representative of information comprising the change in the process amount (liquid level), the fluctuation amount, and the change direction" in Cited Invention corresponds to the feature "generating a first graphic representative of information associated with the process variable, the information comprising the current state of the process variable and the trend of the process variable" of the Invention.

"CRT" in the feature "displaying and outputting the bar graph on a CRT" in Cited Invention is a "display"; therefore, the feature is common with the feature "rendering the first graphic via a display" of the Invention in the feature "displaying the first graphic via a display".

The feature "the information comprising the change in the process amount (liquid level), the fluctuation amount, and the change direction being represented by the shape of the tip of the bar graph" in Cited Invention is common with the feature "the current state of the process variable being represented by the shape of the outline of the first graphic" of the Invention in the feature "the current state of the process variable being represented by the shape of the first graphic."

Therefore, the Invention and Cited Invention are in correspondence in the following points:

"A method, comprising:

monitoring the process variable of the process control system;

determining the current state of the monitored process variable;

determining the trend associated with the process variable;

generating the first graphic representative of information associated with the process variable, the information comprising the current state of the process variable and the trend of the process variable; and

rendering the first graphic via the display; the current state of the process variable being represented by the shape of the first graphic,"

and differ in the following points.

Difference 1: regarding displaying the first graphic via the display, the Invention relates to rendering the first graphic via the display, whereas Cited Invention relates to displaying and outputting the bar graph on a CRT; therefore, it is unclear whether or not the bar graph corresponding to the first graphic is rendered via the CRT corresponding to the display.

Difference 2: regarding the feature that the current state of the process variable is represented by the shape of the first graphic, the Invention relates to that the current state of the process variable is represented by the shape of the outline of the first graphic, whereas Cited Invention relates to that the information comprising the change in the process amount (liquid level), the fluctuation amount, and the change direction is represented by the shape of the tip of the bar graph; therefore, it is unclear whether it is represented by the shape of the outline of the bar graph, which is a graphic.

VI. Judgement

The above-mentioned differences are discussed.

Regarding Difference 1, "rendering" indicates that certain processing or calculation is performed on the basis of a set of data to generate an image, a video, audio, etc., whereas Cited Invention aims to generate a bar graph display representative of information comprising the change in the process amount (liquid level), the fluctuation amount, and the change direction, and display and output the generated bar graph on the CRT, and therefore aims to generate, by performing processing and calculation on the basis of the

set of data (obtained in a time sequence) which is the process amount (liquid level), an image which is a bar graph.

Therefore, there is sufficient motivation for rendering in Cited Invention, and rendering is generally performed at the time of display. Therefore, in Cited Invention, a person skilled in the art could have easily conceived of using the matter specifying the invention of the Invention according to above-mentioned Difference 1 as a specific means for generating an image which is a bar graph.

Regarding Difference 2, the word "outline" means a line forming the outer shape of an object, whereas in Cited Invention, the tip of the bar graph forms the upper side edge which is part of the outer shape of the object which is a bar graph, and forms the outer shape.

Therefore, in Cited Invention, the state of the process amount (liquid level) is also represented by the shape of the tip of the bar graph forming the outline of the bar graph, this point is not a substantive difference.

Even if the shape of the tip does not correspond to the shape of the outline of the Invention, paragraph [0019] in IV (1) (viii) above also suggests that the outline of the entire bar graph is displayed in a fluctuating manner, such that the display of the bar graph in Cited Invention is represented by the display of the outline of the entire bar graph according to the suggestion; therefore, a person skilled in the art could have easily conceived of the matter specifying the Invention according to above-mentioned Difference 2.

Moreover, the Invention, as a whole, does not exert a remarkable effect beyond what is predicted in Cited Invention.

VII. Allegation of the appellant

Regarding the notice of reasons for refusal notified by this examination on September, 24, 2020, the appellant allegation is as follow in the written opinion submitted on December 22, 2020.

In the plant monitoring device 50 of Cited Document 1, as shown in Fig. 2, the magnitude of the fluctuation amount of the water level and the change direction of the water level are displayed as a change of the graphic shape inside the rectangular outline of the bar graph data. In addition, the current water level is displayed as a vertical position change of the graphic inside the rectangular outline.

Therefore, in the plant monitoring device 50 of Cited Document 1, the magnitude

of the fluctuation amount of the water level, the change direction of the water level, and the current water level are displayed as changes in the shape and position of the graphic inside the outline instead of changing the shape of the entire rectangular outline of the bar graph data.

With this regard, in the Invention, the change of the process variable and the current state are displayed as changes of the shape of the outline of the first graphic. Therefore, Cited Document 1 does not disclose the constituent requirement F (the current state of the process variable is displayed by using the shape of the outline of the first graphic) of the Invention.

Regarding the above-mentioned allegation, as discussed with respect to Difference 2 in VI above, in Cited Invention, the state of the liquid level is also represented by the shape of the tip of the bar graph forming the outline of the bar graph, and this point is not a substantive difference; on the assumption that the representation by the shape of the tip does not correspond to the representation by the shape of the outline of the Invention, representation should be performed by the outline of the entire bar graph according to the suggestion in paragraph [0019] in IV (1) (viii) above; therefore, a person skilled in the art could also have easily conceived of the matter specifying the invention of the Invention according to above-mentioned Difference 2; therefore, the assertions of the appellant cannot be accepted.

VIII. Conclusion

As described above, the Invention could have been easily made by a person skilled in the art on the basis of the invention described in Cited Document 1, which is distributed in Japan or other foreign countries or made available to the public through electric telecommunication lines prior to the filing of the application; therefore, the Invention cannot be granted a patent under the provisions of Patent Act Article 29(2).

Therefore, the appeal decision shall be made according to the conclusion.

July 21, 2021

Chief administrative judge: KARIMA, Hironobu
Administrative judge: KEMMOKU, Shoji
Administrative judge: TATAI, Shogo