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(54) **ULTRASOUND DIAGNOSIS APPARATUS HAVING PLURALITY OF DISPLAY UNITS**

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(57) **ABSTRACT**

An ultrasound diagnosis apparatus includes a main body supporting ultrasound equipment that generates ultrasound image signals. First and second display units are electrically coupled to the ultrasound equipment, and display ultrasound images corresponding to the ultrasound image signals. A first coupling unit couples the second display unit and the main body and enables movement of the second display unit relative to the main body. As the position of the second display unit is adjustable, a patient may easily view ultrasound images displayed on the second display unit.

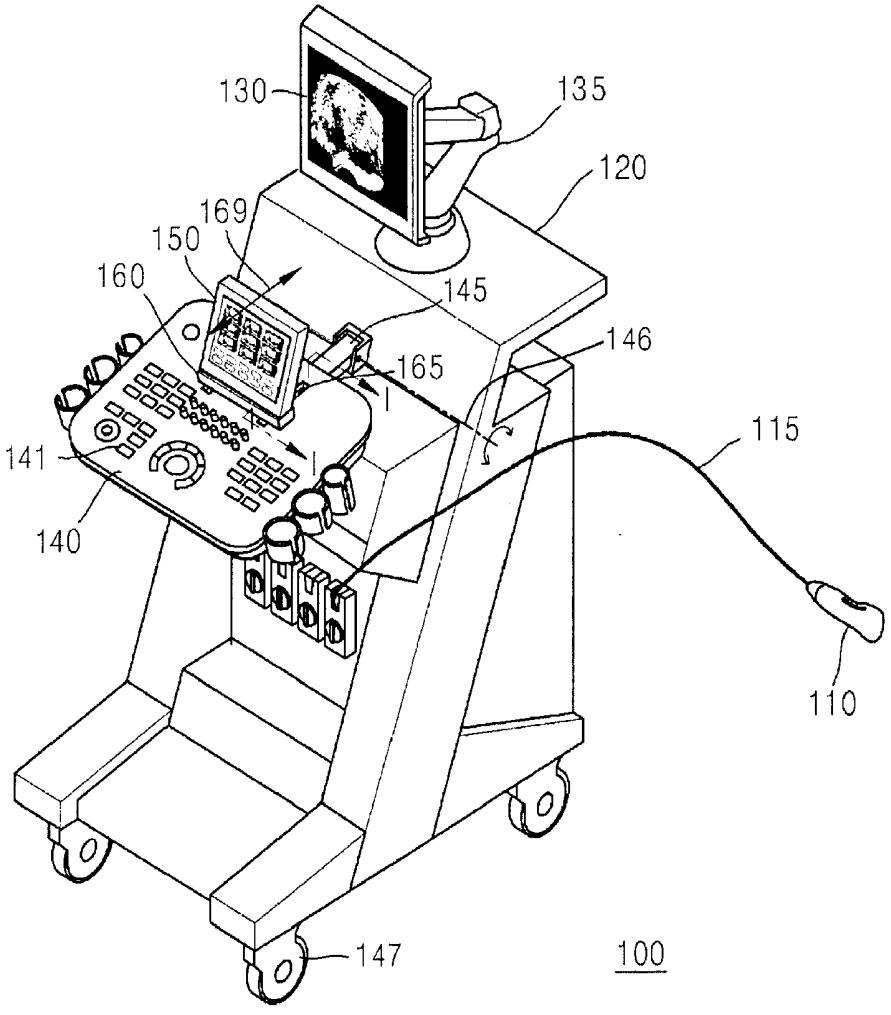


FIG. 1

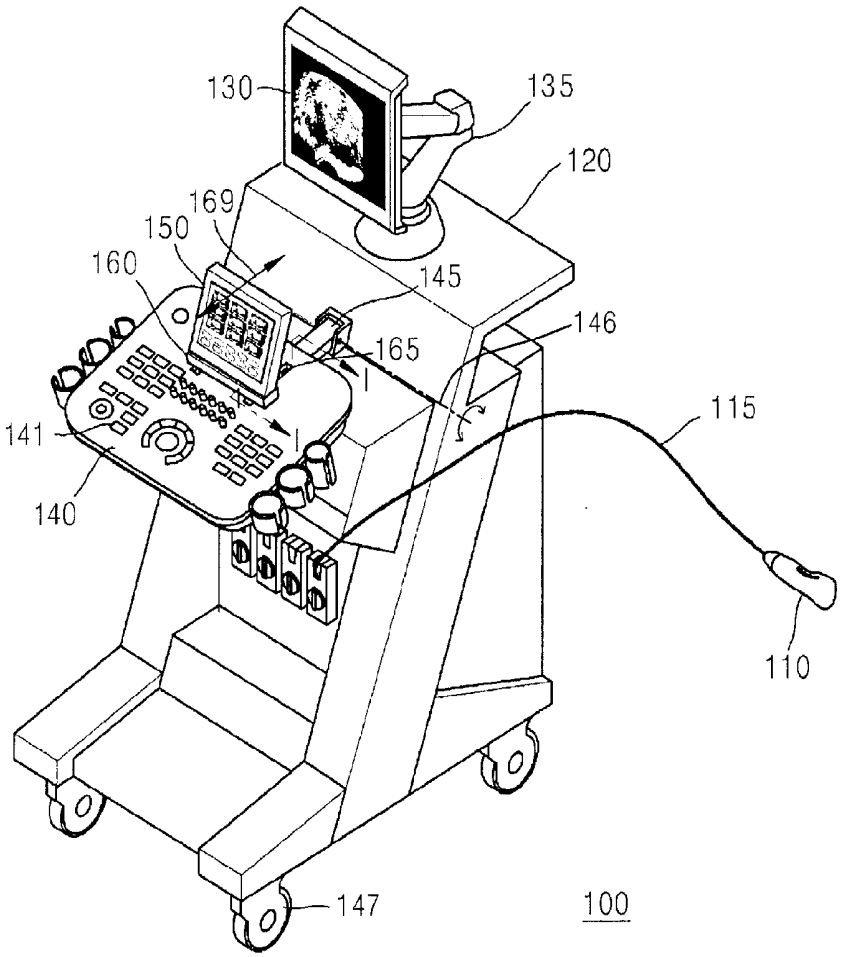

130
135
120
169
150
160
145
146
165
115
141
140
110
147
100

FIG. 2

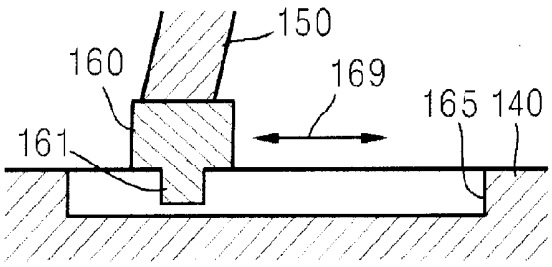

150
160
169
165 140
161

FIG. 3

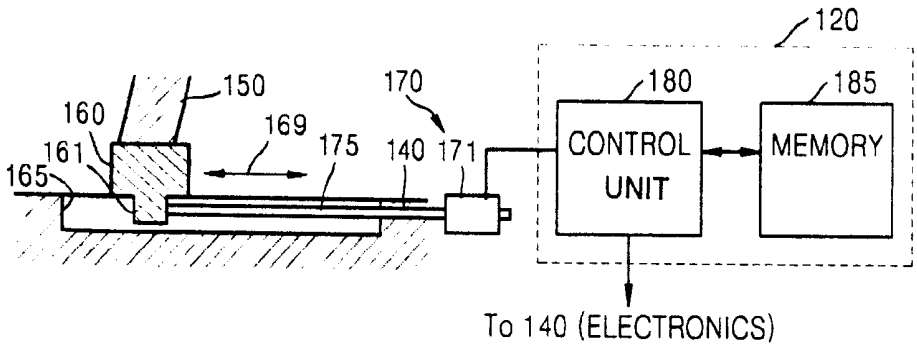

120
150
170
180
185
160
169
161
175
140
171
165
CONTROL UNIT
MEMORY
To 140 (ELECTRONICS)

FIG. 4

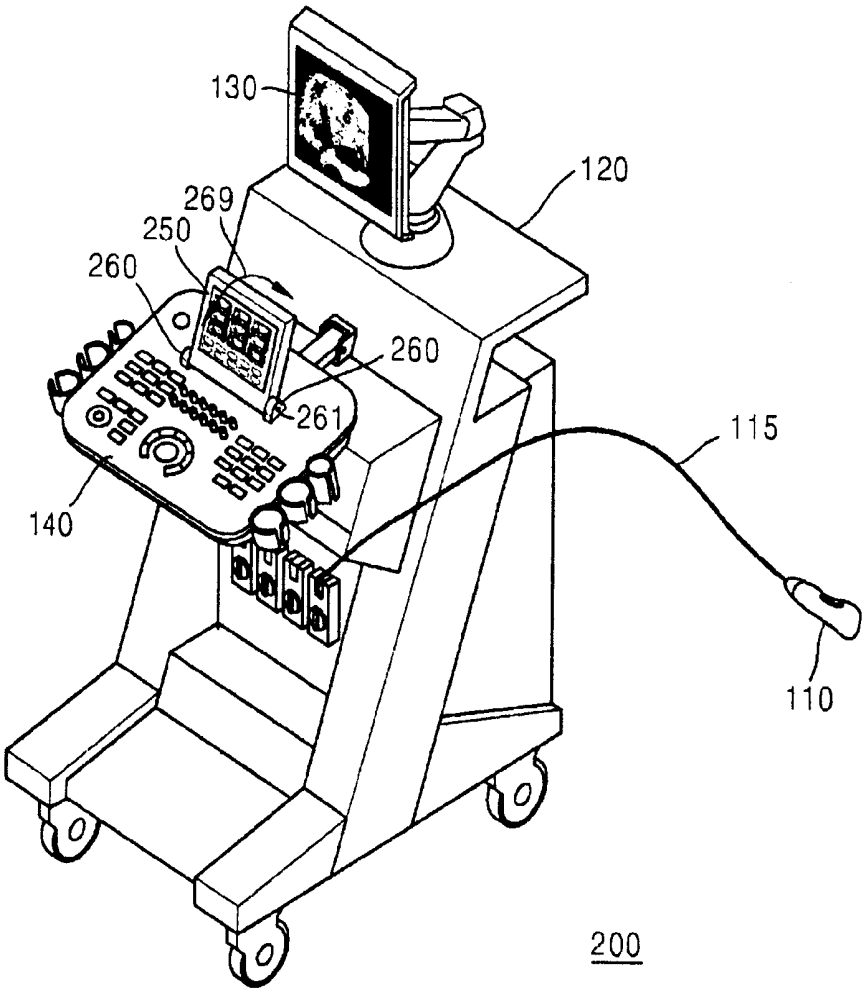

130
120
269
250
260
260
261
115
140
110
200

FIG. 5

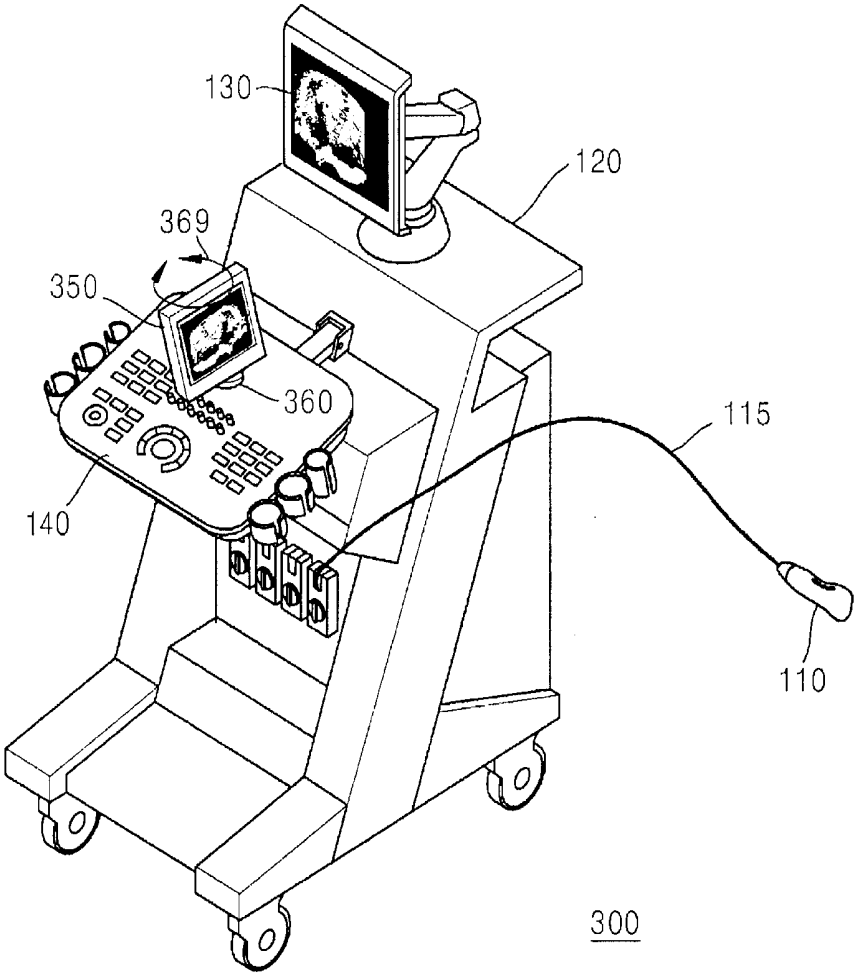


FIG. 6

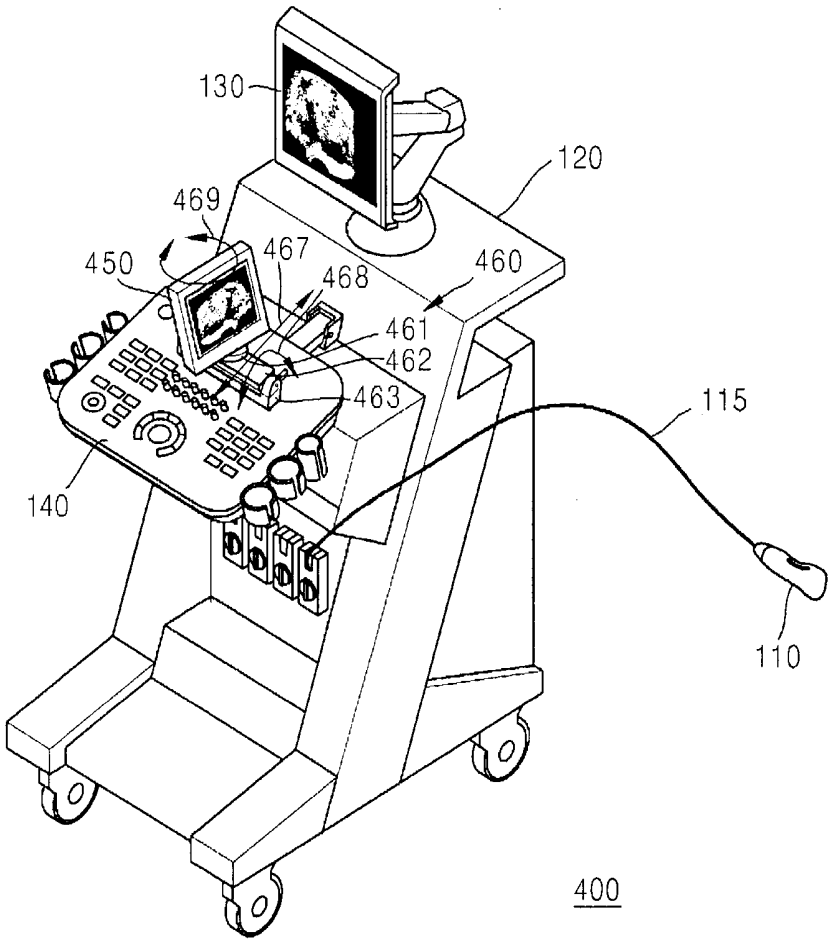


FIG. 7

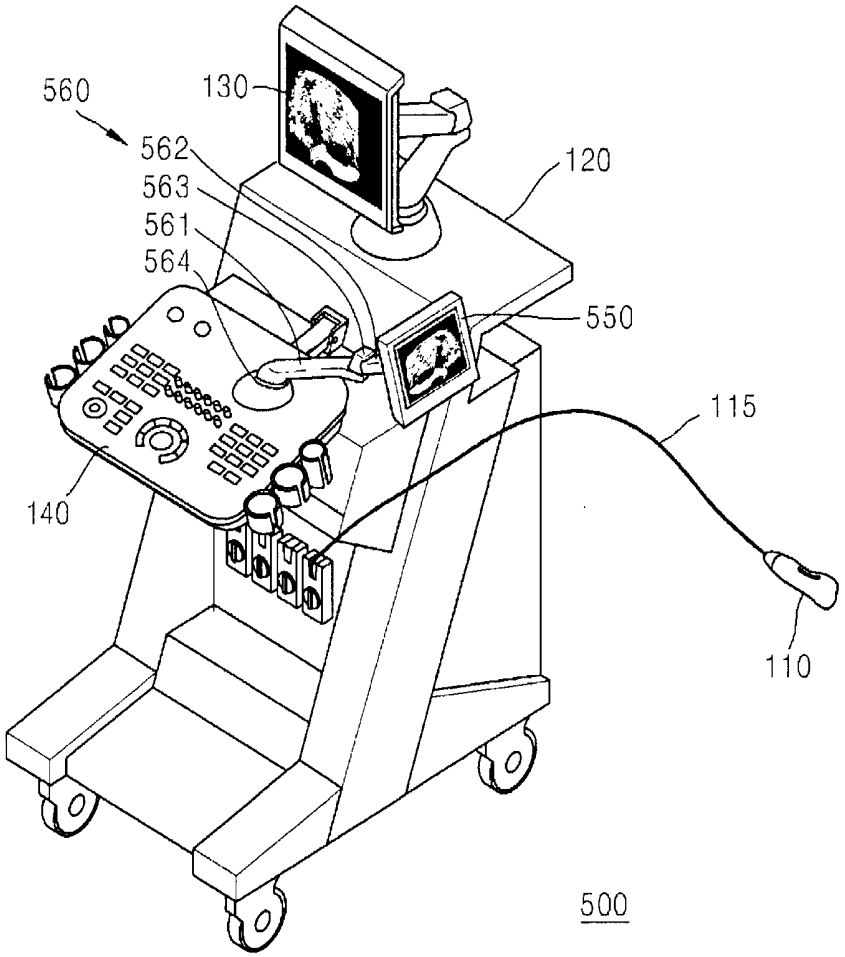
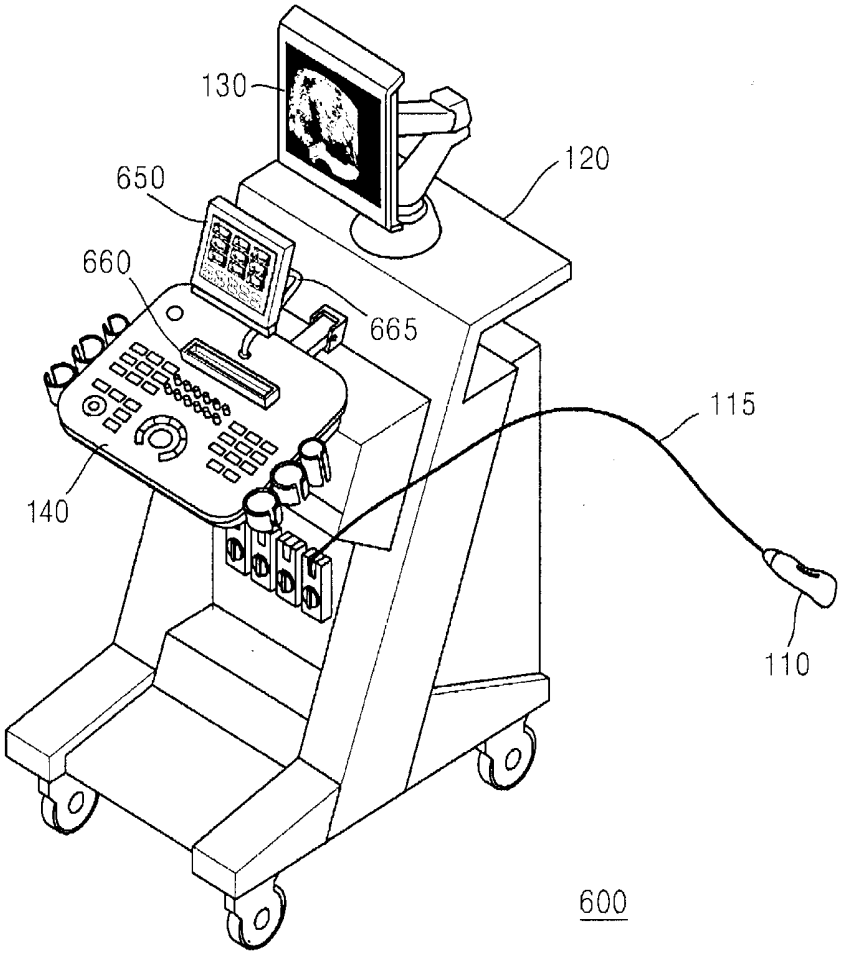


FIG. 8



ULTRASOUND DIAGNOSIS APPARATUS HAVING PLURALITY OF DISPLAY UNITS

CLAIM OF PRIORITY

[0001] This application is a Continuation of U.S. patent application Ser. No. 13/749,862 filed on Jan. 25, 2013 which claims the benefit of Korean Patent Application No. 10-2012-0008530, filed on Jan. 27, 2012, in the Korean Intellectual Property Office, the disclosure of which is incorporated herein in its entirety by reference.

BACKGROUND

[0002] 1. Technical Field

[0003] This disclosure relates to ultrasound diagnosis apparatus.

[0004] 2. Description of the Related Art

[0005] An ultrasound signal refers to a sound wave in a high-frequency band higher than an audio frequency (20 Hz through 20 kHz) discernible by humans. An ultrasound diagnosis apparatus delivers an ultrasound signal to tissue or organs in a human body, and obtains an image of the tissue or organs using information derived from the ultrasound signal reflected from the matter within the human body.

[0006] Modern ultrasound diagnosis apparatus (hereafter, "ultrasound apparatus," interchangeably) is small, inexpensive, and capable of displaying an image in real-time. Ultrasound is considered harmless and is thus a preferred diagnosis method; it is also widely used in conjunction with other image diagnosis apparatuses such as an X-ray diagnosis apparatus, a computerized tomography (CT) scanner, a magnetic resonance imaging (MRI) apparatus, a nuclear medical diagnostic apparatus, or the like.

[0007] Typical ultrasound apparatus includes a main body which contains ultrasound electronics for generating ultrasound images by processing an ultrasound echo signal received via an ultrasound probe. A display unit for displaying the ultrasound images is mounted on the main body, and a control panel for control of the ultrasound diagnosis apparatus is arranged on a front surface of the main body.

SUMMARY

[0008] The present disclosure provides an ultrasound diagnosis apparatus which has a plurality of display units and facilitates improved manipulation convenience.

[0009] According to an exemplary embodiment, an ultrasound diagnosis apparatus includes a main body supporting ultrasound equipment that generates ultrasound image signals. First and second display units are electrically coupled to the ultrasound equipment, and display ultrasound images corresponding to the ultrasound image signals. A first coupling unit couples the second display unit and the main body and enables movement of the second display unit relative to the main body. As a position of the second display unit is adjustable, a patient may easily view ultrasound images displayed on the second display unit. The second display unit may be either a passive display panel or a touchscreen panel for displaying an image and receiving user commands via touch input.

[0010] The ultrasound diagnosis apparatus may further include a control panel that is located at a front side of the main body The first coupling unit may couple the second display unit and the control panel so as to allow the second display unit to be movable relative to the control panel. Examples of movement of the second display panel include slidable movement, tilt, and/or left-right rotation.

[0011] The first coupling unit may include at least one joint.

[0012] The first coupling unit may couple the second display unit to the control panel, whereby the second display unit may be detachable with respect to the control panel, and maintain a displayed image when detached.

[0013] The ultrasound diagnosis apparatus may further include a driving unit that supplies a driving force to enable movement of the second display unit.

[0014] The ultrasound diagnosis apparatus may further include a memory for storing position information for each user of the second display unit; and a control unit for controlling a position of the second display unit according to the position information stored in the memory, whereby the second display unit may automatically move according to a control by the user.

[0015] The ultrasound diagnosis apparatus may further include a second coupling for coupling the control panel and the main body so as to allow the control panel to be movable relative to the main body. The second coupling unit may allow the control panel to tilt or to linearly move with respect to the main body.

[0016] The ultrasound diagnosis apparatus may further include a third coupling unit for coupling the first display unit and the main body so as to allow the first display unit to be movable relative to the main body. The third coupling unit may include at least one joint for coupling the first display unit and the main body.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The above and other features and advantages of the present invention will become more apparent by describing in detail exemplary embodiments thereof with reference to the attached drawings in which:

[0018] FIG. **1** is a perspective view of an ultrasound diagnosis apparatus according to an embodiment of the present invention;

[0019] FIG. **2** is a cross-sectional view of a first coupling unit in the ultrasound diagnosis apparatus of FIG. **1**;

[0020] FIG. **3** illustrates an example of a driving arrangement that may be employed within the ultrasound diagnosis apparatus of FIG. **1**;

[0021] FIG. **4** is a perspective view of an ultrasound diagnosis apparatus according to another embodiment of the present invention;

[0022] FIG. **5** is a perspective view of an ultrasound diagnosis apparatus according to yet another embodiment of the present invention;

[0023] FIG. **6** is a perspective view of an ultrasound diagnosis apparatus according to still another embodiment of the present invention;

[0024] FIG. **7** is a perspective view of an ultrasound diagnosis apparatus according to a further embodiment of the present invention; and

[0025] FIG. **8** is a perspective view of an ultrasound diagnosis apparatus according to yet another embodiment of the present invention.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0026] Hereinafter, exemplary embodiments of the present invention will be described in detail with reference to the

attached drawings. In the drawings, like reference numerals denote like elements, and the thicknesses of layers and regions may be exaggerated for clarity.

[0027] As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items. The word "may" is used to indicate at least an optional element, feature or function of the described embodiment.

[0028] FIG. **1** is a perspective view of an ultrasound diagnosis apparatus **100** according to an embodiment of the present invention. FIG. **2** is a cross-sectional view of a first coupling unit **160**, taken along a line I-I of FIG. **1**.

[0029] Referring to FIG. **1**, the ultrasound diagnosis apparatus **100** includes an ultrasound probe **110** for transceiving ultrasound, and a main body **120** supporting or housing ultrasound electronics for generating ultrasound image signals using echo data received from the ultrasound probe **110**. A first display unit **130** and a second display unit **150** each display ultrasound images corresponding to the ultrasound image signals. The first coupling unit **160** couples the second display unit **150** to the main body **120** and is designed to allow the second display unit **150** to be movable relative to the main body **120**. Examples of the movement of second display unit **150** relative to main body **120** include slidable (e.g. linear) movement, tilting and left-right (i.e., horizontal) rotation.

[0030] A control panel **140** may be further arranged on a front side of the main body **120**. Here, the front side of the main body **120** denotes the side generally facing the user (i.e., the equipment operator/examiner of the patient) during use of the ultrasound apparatus **100**. The second display unit **150** may be coupled to the control panel **140** by the first coupling unit **160** in a location at the front side of the main body **120**, and the control panel **140** may be coupled to the main body **120** by a second coupling unit **145**. If the control panel **140** is omitted (explained below), the second display unit **150** may be directly coupled to the main body **120** by the first coupling unit **160**.

[0031] In addition, the first display unit **130** and the main body **120** may be coupled by a third coupling unit **135**.

[0032] The ultrasound probe **11** is a device that converts a pulse signal into ultrasound, transmits the ultrasound to a target object, and receives an ultrasound echo signal reflected from the target object. A cable that is detachable with respect to the main body **120** may be arranged at an end of the ultrasound probe **110**. The ultrasound probe **110** includes a transducer that converts the pulse signal into the ultrasound and converts the reflected ultrasound echo signal into an electrical signal. A signal processing circuit may be included within the ultrasound probe **110**, thereby processing electrical signals that are input to or output from the transducer. The transducer may be formed of a plurality of piezoelectric devices that are one-dimensionally or two-dimensionally arrayed.

[0033] The ultrasound electronics (interchangeably referred to as "ultrasound equipment") supported or housed by the main body **120** may include a signal processing unit (not shown) that generates the ultrasound images by using the echo data received from the ultrasound probe **110**. (Note that the ultrasound probe **110**, cable **115** and control panel **140** are all considered part of the ultrasound equipment supported by the main body **120**.) The main body **120** may be embodied in the form of a movable cart mounted on wheels **147**.

[0034] The first display unit **130** may be arranged on a top portion of the main body **120**. The first display unit **130** may display in real-time the ultrasound images obtained from the ultrasound probe **110**.

[0035] The control panel **140** includes one or more keys or buttons **141** for allowing the user to control operations including selection of an ultrasound image mode, ultrasound strength, signal processing, or the like.

[0036] The second display unit **150** may be a display panel that displays a status related to the manipulation of the control panel **140** or signal processing in the ultrasound equipment and also displays the ultrasound images. The second display unit **150** may be embodied as a touchscreen panel configured to receive user commands via touch input. In this case, the user may directly touch and select the ultrasound images or various control menus that are displayed on the touchscreen. That is, when the second display unit **150** is the touchscreen panel, the ultrasound diagnosis apparatus **100** may be controlled by using only the second display unit **150**, and in this case, the control panel **140** may optionally be omitted.

[0037] The second display unit **150** may perform horizontal slidable movement **169** forward or backward from the front side of the main body **120**, by means of the first coupling unit **160**. The slidable movement is preferably linear, but curved slot or groove designs are also possible to allow nonlinear sliding.

[0038] FIG. **2** illustrates an example of the first coupling unit **160** by which the second display unit **150** is coupled to the control panel **140**. A groove **165** that extends in a linear direction is formed in the control panel **140**, and a projection part **161** that is inserted into the groove **165** is arranged in an end of the first coupling unit **160**. A plurality of the grooves **165** and the projection parts **161** may be formed. The groove **165** functions as a slidable motion guide with respect to the projection part **161**. A roller (not shown) or a ball bearing (not shown) may be arranged in the projection part **161** so as to reduce friction or noise that is incurred due to movement of the second display unit **150** therein, and by doing so, the second display unit **150** may move smoothly. The first coupling unit **160** of FIG. **2** is one example of a slidable motion guide; however, alternative designs are also possible to achieve slidable motion in other implementations. Thus, various well-known linear motion guides may be used as the first coupling unit **160**.

[0039] The first display unit **130** may be a main monitor that displays the ultrasound images obtained from the ultrasound probe **110** whereas the second display unit **150** may be an auxiliary monitor that displays the status related to the manipulation of the control panel **140** or the signal processing in the main body **120**.

[0040] The second coupling unit **145** coupling the main body **120** and the control panel **140** may have a structure which allows a position or orientation of the control panel **140** with respect to the main body **120** to be varied by the operator. As illustrated in FIG. **1**, an example hinge structure of the second coupling unit **145** of FIG. **1** is shown in which the control panel **140** rotates (i.e., the control panel **140** tilts up and down) with respect to a horizontal axis **146**. Any suitable hinge structure to enable tilting may alternatively be used. Further, while tilting capability is preferred, the control panel **140** could be provided fixed with respect to the main body **120** in a more simplistic design.

[0041] In the exemplary ultrasound diagnosis apparatus **100**, a height of the control panel **140** may be adjusted by

using the second coupling unit **145** according to a usage environment Distance between the second display unit **150** and the user may be adjusted by the first coupling unit **160**. Accordingly, positioning of the second display unit **150** can be optimized by the operator. When the user intends to control operations of the ultrasound diagnosis apparatus **100** using one hand while scanning a patient's body using the ultrasound probe **110** in the other hand, the ability to adjust the second display unit **150** position may significantly improve operational convenience.

[0042] The third coupling unit **135** coupling the first display unit **130** to the main body **120** is illustrated with a swivel structure by which a position or orientation the first display unit **130** may be adjusted with respect to the main body **120** so as to improve user convenience. Configurations other than the illustrated swivel may be employed in the alternative. In a simplistic design, the first display unit **130** may be fixed with respect to the main body **120** without provision for physical adjustment.

[0043] FIG. **3** illustrates an example of a driving arrangement that may be used within the ultrasound diagnosis apparatus **100** of FIG. **1** to cause slidable movement of the second display unit **150**. The ultrasound diagnosis apparatus **100** may include a driving unit **170** that supplies a driving force to the first coupling unit **160**. The driving unit **170** may include a linear motor **171** and a shaft **175**. The linear motor **171** drives the shaft **175** forward or backward in response to a user input command on control panel **140**. An end of the shaft **175** is coupled to the projection part **161** of the first coupling unit **160**. Movement of the shaft **175** causes the first coupling unit **160** and the second display unit **150** coupled to the first coupling unit **160** to move in a direction controlled by the operator. Other suitable driving arrangements can be employed as alternatives to the illustrated arrangement. If the driving unit **170** is arranged as described above, when a plurality of users use the ultrasound diagnosis apparatus **100** at different times, an optimal position of the second display unit **150** for each user may be stored in a memory **185** in the main body **120**. With this design, each user may select his or her own optimal position via suitable commands input on control panel **140**, so that a position of the second display unit **150** may be automatically adjusted via the control unit **180**. In a more simplistic design, a common adjustment position is stored for all users, which can be updated by a current user. It is noted here that control unit **180** and memory **185** may be either individual components mounted on a printed circuit board contained within main body **120**, or realized as portions of already existing control and memory electronics of the ultrasound equipment within main body **120**.

[0044] FIG. **4** is a perspective view of an ultrasound diagnosis apparatus **200** according to another embodiment of the present invention.

[0045] The ultrasound diagnosis apparatus **200** is substantially the same as the previous embodiment **100**, except that a first coupling unit **260** of the ultrasound diagnosis apparatus **200** has a coupling structure by which a tilt of a second display unit **250** may be adjusted. That is, the ultrasound diagnosis apparatus **200** includes ultrasound probe **110**, main body **120**, first display unit **130**, control panel **140**, and the second display unit **250**. The second display unit **250** may be a passive display panel or a touchscreen panel, as described above. The control panel **140** and the second display unit **250** may be coupled to each other by the first coupling unit **260**. The control panel **140** and the main body **120** may be coupled to each other by the second coupling unit **145**. The first display unit **130** and the main body **120** may be coupled to each other by the third coupling unit **135**. The first coupling unit **260** allows the second display unit **250** to be rotated as indicated by legend **269** with respect to a horizontal rotation axis **261**, so that a tilt of the second display unit **250** may be adjusted. The tilt adjustment may be done manually, or a suitable drive mechanism (not shown) may be included to enable an electronically controlled tilt via user command on control panel **140**. The first coupling unit **260** shown in FIG. **4** is but one example of a coupling structure by which the second display unit **250** can be tilted. Any suitable coupling structure that allows tilt adjustment may be used in the alternative.

[0046] In the ultrasound diagnosis apparatus **200** according to the present embodiment, a driving means is not separately arranged in the first coupling unit **260**; however, a well-known driving means such as a rotating motor may be used to allow the second display unit **250** to automatically rotate.

[0047] FIG. **5** is a perspective view of an ultrasound diagnosis apparatus **300** according to yet another embodiment of the present invention.

[0048] The ultrasound diagnosis apparatus **300** is substantially the same as the previous described embodiments, except that a first coupling unit **360** of the ultrasound diagnosis apparatus **300** has a coupling structure by which a second display unit **350** may rotate in right and left directions. The ultrasound diagnosis apparatus **300** may include ultrasound probe **110**, main body **120**, first display unit **130**, control panel **140**, and the second display unit **350**. The control panel **140** and the second display unit **350** may be coupled to each other by the first coupling unit **360**; the control panel **140** and the main body **120** may be coupled to each other by a second coupling unit **145**; and the first display unit **130** and the main body **120** may be coupled to each other by a third coupling unit **135**. The first coupling unit **360** may allow rotation **369** of the second display unit **350** in the right and left directions. That is, rotation is enabled in a horizontal plane when the display unit **350** is in a non-tilted state with top and bottom sides oriented horizontally. As described above, the second display unit **350** may be a passive display panel or a touchscreen panel. The first coupling unit **360** shown in FIG. **5** is but one example of a rotatable coupling structure that couples the second display unit **350** to the control panel **140** in such a manner that a display direction of the second display unit **350** may be rotated in a horizontal plane with respect to control panel **140** and main body **120** (e.g., switched between a front direction and a side direction of the control panel **140**). However, other rotatable coupling structures may be employed in the alternative.

[0049] Because the second display unit **350** may rotate left and right, the second display unit **350** may be used not only as an auxiliary monitor for an examiner situated at the front control panel **140**, but also may be used as a monitor viewable by a target subject (i.e., a patient) situated at the side control panel **140**. That is, the user performs an ultrasound examination while he or she watches an ultrasound image displayed on the first display unit **130**, and at the same time, the user may allow the second display unit **350** to face the target subject by adjusting a position of the second display unit **350**, so that the target subject may watch his or her own ultrasound image. Here, the ultrasound image displayed on the second display unit **350** may be a still image that is selected by the examiner,

or may be an image that is displayed in real-time. The real-time image may be the same image displayed on the first display unit **130**.

[0050] In the ultrasound diagnosis apparatus **300** according to the illustrated embodiment, a driving means is not included in the first coupling unit **360**; however, in alternative implementations, a well-known driving means such as a rotating motor may be incorporated to allow the second display unit **350** to automatically rotate via user control.

[0051] FIG. **6** is a perspective view of an ultrasound diagnosis apparatus **400** according to still another embodiment of the present invention.

[0052] The ultrasound diagnosis apparatus **400** is substantially the same as the previous embodiments, except that a first coupling unit **460** of the ultrasound diagnosis apparatus **400** has a coupling structure that allows a second display unit **450** to perform all of slidable (e.g., linear) movement **467**, tilting (i.e., vertical plane rotation) **468**, and left-right (horizontal plane) rotation **469**. Ultrasound diagnosis apparatus **400** may include ultrasound probe **110**, main body **120**, first display unit **130**, control panel **140**, and the second display unit **450**. The control panel **140** and the second display unit **450** may be coupled to each other by the first coupling unit **460**; the control panel **140** and the main body **120** may be coupled to each other by a second coupling unit **145**; and the first display unit **130** and the main body **120** may be coupled to each other by a third coupling unit **135**. The first coupling unit **460** may be formed as a composite module having a first sub-coupling unit **461** for performing the left-right rotation **469**, a second sub-coupling unit **462** for performing the tilting **468**, and a third sub-coupling unit **463** for performing the slidable movement **467**. The first sub-coupling unit **461** may be positioned on the second sub-coupling unit **462** and perform the left-right rotation **469** with respect to the second sub-coupling unit **462**. The second sub-coupling unit **462** may be positioned on the third sub-coupling unit **463** and may tilt **468** with respect to the third sub-coupling unit **463**. The third sub-coupling unit **463** may be positioned on the control panel **140** and may perform the slidable movement **467** with respect to the control panel **140**, so that a distance from a user may be adjusted. Thus, the second display unit **450**, by means of the coupling unit **460**, may perform all of the slidable movement **467**, the tilting **468**, and the left-right rotation **469** with respect to the control panel **140**. The first, second, and third sub-coupling units **461**, **462**, and **463** may correspond to the coupling structures **160**, **260**, and **360** of the previously described embodiments of FIGS. **1**, **4**, and **5**, respectively.

[0053] As described above, the second display unit **450** may be a passive display panel or a touchscreen panel. The first coupling unit **460** shown in FIG. **6** is one example of a coupling structure that allows all of the slidable movement **467**, tilting **468**, and the left-right rotation **469**, but other configurations are possible. Thus, various well-known coupling structures, each of which is capable of composite movements, may be alternatively used as the first coupling unit **460**. Furthermore, in the first coupling unit **460**, each of the first, second, and third sub-coupling units **461**, **462**, and **463** has an independent coupling structure, thus, the first coupling unit **460** may have a structure in which any two of the first, second, and third sub-coupling units **461**, **462**, and **463** are combined.

[0054] Since the second display unit **450** may rotate in right and left directions due to the first sub-coupling unit **461**, the second display unit **450** may be used as an auxiliary monitor for a user, and by adjusting a position of the second display unit **450** so as to allow the second display unit **450** to face a target subject (i.e., a patient), the second display unit **450** may also be used as a monitor viewable by the patient.

[0055] FIG. **7** is a perspective view of an ultrasound diagnosis apparatus **500** according to a further embodiment of the present invention.

[0056] The ultrasound diagnosis apparatus **500** is substantially the same as the previous described embodiments, except that a first coupling unit **560** of the ultrasound diagnosis apparatus **500** has a coupling structure by which a second display unit **550** can be moved three dimensionally to a position desired by the operator. Such 3D movement is achievable in the embodiment by means of the first coupling unit **560** configured in the form of a flexible arm structure.

[0057] Ultrasound diagnosis apparatus **500** may include ultrasound probe **110**, main body **120**, first display unit **130**, control panel **140**, and the second display unit **550**. The control panel **140** and the second display unit **550** may be coupled to each other by the first coupling unit **560**; the control panel **140** and the main body **120** may be coupled to each other by a second coupling unit **145**; and the first display unit **130** and the main body **120** may be coupled to each other by a third coupling unit **135**. The first coupling unit **560** may have an arm structure having a first arm **561**, a second arm **562**, and a joint unit **563** for rotatably coupling the first arm **561** and the second arm **562**. Furthermore, the first arm **561** may be coupled to the control panel **140** by a sub-coupling unit **564** so as to be rotatable in right and left directions with respect to the control panel **140**. As described above, the second display unit **550** may be a display panel or a touchscreen panel. In the ultrasound diagnosis apparatus **500** of the present embodiment, the first coupling unit **560** has one joint unit **563**, but the first coupling unit **560** may have at least two joint units **563**.

[0058] In the present embodiment, the arm structure of the second display unit **550** is capable of freely moving, so that the second display unit **550** may be used as an auxiliary monitor for a user. By adjusting a position of the second display unit **550** so as to allow the second display unit **550** to face a target subject (i.e., a patient), the second display unit **550** may also be used as a monitor viewable by the patient.

[0059] In the illustrated ultrasound diagnosis apparatus **500** according to the present embodiment, a driving means is not separately arranged in the first coupling unit **560**; however, in an alternative configuration, a well-known driving means such as a motor or a pressure device may be formed to allow the second display unit **550** to automatically move via user commands.

[0060] FIG. **8** is a diagram of an ultrasound diagnosis apparatus **600** according to still another embodiment of the present invention.

[0061] The ultrasound diagnosis apparatus **600** is substantially the same as the previous embodiments, except that a first coupling unit **660** of the ultrasound diagnosis apparatus **600** has a coupling structure that allows a second display unit **650** to be detachable. That is, referring to FIG. **8**, the ultrasound diagnosis apparatus **600** may include ultrasound probe **110**, main body **120**, first display unit **130**, control panel **140**, and the second display unit **650**. The control panel **140** and the second display unit **650** may be coupled to each other by the first coupling unit **660**; the control panel **140** and the main body **120** may be coupled to each other by a second coupling unit **145**; and the first display unit **130** and the main body **120** may be coupled to each other by a third coupling unit **135**. For

example, the first coupling unit **660** may have a groove into which the second display unit **650** is inserted. A cable **665** for electrically connecting the second display unit **650** and the main body **120** may be formed of a flexible material. Thus, the second display unit **650** in a detached state may be used by an examiner or may be used as a patient monitor to be shown to a patient. Second display unit **650** includes battery power to enable the image display to be maintained while detached. The second display unit **650** may also be compositely coupled with one of the coupling structures capable of performing sliding (e.g., linear) movement, tilting, and/or leftward-rightward rotation, as described above with reference to FIGS. **1** through **6**. As described above, the second display unit **650** may be a passive display panel or a touchscreen panel.

[0062] In any of the above-described embodiments, the second display unit may display the same image as the first display unit **130** in a first operating mode, and may display a different image than that displayed on the first display unit in a second operating mode. The operating modes are selectable by the user via commands input through either the control panel **140** or touch input with the second display unit embodied as a touch screen.

[0063] In an ultrasound diagnosis apparatus according to the related art, a display unit such as a lamp indicating a control status, a liquid crystal display (LCD), and the like are formed in a control panel, and in general, the display unit is fixed to the control panel. Recently, the display unit is being replaced with a touchscreen but its structure in terms of being fixed to the control panel is maintained. Thus, generally, when a user intends to manipulate the touchscreen of the control panel while he or she locates an ultrasound probe on a target part of a patient, the user has to move the entire control panel. On the other hand, in the ultrasound diagnosis apparatuses **100**, **200**, **300**, **400**, **500**, and **600** according to the embodiments of the present invention, the user moves only the second display units **150**, **250**, **350**, **450**, **550**, and **650** while the control panel **140** remains still and maintains a position or an angle, which is initially set by the user, so that user convenience is improved. In addition, if required during an ultrasound examination, the user may turn the second display units **150**, **250**, **350**, **450**, **550**, and **650** toward the patient, so that the first display unit **130** may be used as a main monitor that displays ultrasound images to the user in real-time, and the second display units **150**, **250**, **350**, **450**, **550**, and **650** may be used as an auxiliary monitor that displays selective information (e.g., a selected ultrasound image) to the patient according to selection by the user.

[0064] In the ultrasound diagnosis apparatus according to the one or more embodiments of the present invention, the second display unit may be movable relative to the control panel, so that, when an examiner examines a target subject by using a probe, the examiner may adjust a position of the second display unit to an optimal position, and thus manipulation convenience may be improved.

[0065] While the present invention has been particularly shown and described with reference to exemplary embodiments thereof, it will be understood by those of ordinary skill in the art that various changes in form and details may be made therein without departing from the spirit and scope of the present invention as defined by the following claims.

What is claimed is:

1. An ultrasound diagnosis apparatus, comprising:

a main body supported by wheels and including an ultrasound image processing unit that generates ultrasound image signals;

a first display unit electrically coupled to the ultrasound image processing unit and operable to display ultrasound images corresponding to the ultrasound image signals;

a second display unit electrically coupled to the ultrasound image processing unit, the second display unit displaying a control menu of the ultrasound image processing unit; and

a first coupling unit coupling the second display unit and the main body and enabling movement of the second display unit relative to the main body,

wherein the second display unit is a touchscreen panel configured to receive user commands via touch input, and

wherein the first coupling unit comprises a slidable motion guide configured to allow the second display unit to slide with respect to the main body.

2. The ultrasound diagnosis apparatus of claim **1**, wherein the slidable motion guide comprises a groove extended in a direction and a projection part inserted into the groove and sliding along the groove.

3. The ultrasound diagnosis apparatus of claim **1**, further comprising a second coupling unit for coupling the first coupling unit to the main body so as to allow the second display unit to tilt and/or to rotate left and right with respect to the main body.

4. The ultrasound diagnosis apparatus of claim **1**, further comprising:

a memory for storing position information for at least one user of the second display unit; and

a control unit for controlling a position of the second display unit according to the position information stored in the memory.

5. The ultrasound diagnosis apparatus of claim **1**, further comprising a third coupling unit for coupling the first display unit and the main body so as to allow the first display unit to be movable relative to the main body.

6. The ultrasound diagnosis apparatus of claim **5**, wherein the third coupling unit comprises at least one joint for coupling the first display unit and the main body.

7. The ultrasound diagnosis apparatus of claim **5**, wherein the first display unit is coupled to a top portion of the main body.

8. The ultrasound diagnosis apparatus of claim **1**, wherein the second display unit displays ultrasound images corresponding to the ultrasound image signals according to a user command.

9. The ultrasound diagnosis apparatus of claim **8**, wherein the second display unit displays the same image as the first display unit in a first operating mode, and displays a different image than that displayed on the first display unit in a second operating mode.

* * * * *

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当前申请(专利权)人(译)	SAMSUNG ELECTRONICS CO.，LTD.		
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摘要(译)

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