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(54) ULTRASONIC IMAGING SYSTEM WITH BODY MARKER ANNOTATIONS

ULTRASCHALLDARSTELLUNGSSYSTEM MIT KÖRPERMARKER-ANNOTATIONEN

SYSTEME D'IMAGERIE ULTRASONORE PERMETTANT L'ANNOTATION DE MARQUAGES
ANATOMIQUES

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(73) Proprietor: **Koninklijke Philips N.V.**
5656 AE Eindhoven (NL)

(72) Inventors:
• **JACKSON, Patty**
Bothell, Washington 98041-3003 (US)

• **CHENAL, Cedric**
Bothell, Washington 98041-3003 (US)

(74) Representative: **Roche, Denis et al**
Philips IP&S France
Société Civile SPID
33 rue de Verdun
BP 313
92156 Suresnes Cedex (FR)

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Description

[0001] This invention relates to ultrasonic diagnostic imaging systems and, in particular, to ultrasonic imaging systems in which the results of an ultrasonic diagnosis are recorded in a template corresponding to the body region being diagnosed.

[0002] Many ultrasound examinations require that the results of the exam be annotated in a way which records the location in the body of a lesion or suspicious finding. One way to do this is for the ultrasonographer to delineate the location of the abnormality on the ultrasound image graphically with labels, measurements, and icons of the pertinent anatomy. This technique is desirable when the ultrasound images are to be transferred to another clinician who is skilled in reading ultrasound images, such as a radiologist or surgeon, particularly in applications where the anatomic location is not obvious based on surrounding structures.

[0003] However, the results of an ultrasound exam frequently are forwarded to a referring physician who may not routinely read ultrasound images. In such case the diagnostic report benefits from a template which schematically represents the region of the body being diagnosed. The location of a lesion or other abnormality can be marked on the template, clearly showing the location of the abnormality to someone who is unfamiliar with the subtleties of ultrasound images. An example of a body marker graphic is given in US Pat. 6,500,118, for instance. The selection of a body marker and use of a lesion locator tool such as this is done at the time of the exam so that the operator can clearly convey lesion or transducer location at the time of the study. This is usually done by selecting the desired template from a file of templates, then keying the annotation information of the abnormality onto the template image. This traditional technique can be overly time-consuming as the user manipulates graphics over the template with a cursor or other graphic control, at a time when it is desirable to finish the examination and the report as efficiently as possible. Accordingly it is desirable to improve the speed and accuracy with which the annotation of the examination results is performed.

[0004] US 6,468,212 B1 discloses a virtual control user interface for an ultrasound processor including a software-driven display obtained from a memory unit in the ultrasound processor and displayed on a display monitor under control of a processing unit. The virtual control user interface may be used in conjunction with a touch sensitive user input screen and may include a touchscreen input command converter responsive to a user's touch on the touch sensitive display monitor to convert the tactile input into a software command corresponding to the image proximally displayed on the touch sensitive display monitor.

[0005] US 5,709,206 A discloses a method and an apparatus for processing a plurality of ultrasound images of ductolobular systems in a breast. This method and

apparatus enable an operator to scan each particular duct system in the breast and to save these axial scan segments. The imaging system, interactively with the operator, aligns the axial scan segments of the duct. This is accomplished by electronically noting the radial direction of the axial scan or by identifying two like image points on respective, sequential axial scan segments. A composite axial scan image is compiled by aligning multiple, sequential axial scan segments together.

[0006] US 2003/0212327 A1 discloses an adjunctive ultrasound mammography system and associated methods comprising an adjunctive ultrasound display configured for quick, intuitive, interactive viewing of data derived from volumetric ultrasound scans. The data are therein displayed near a conventional X-ray mammogram display.

[0007] In accordance with the principles of the present invention, an ultrasound system has an image display on which an ultrasound image being read is displayed, and a touchscreen display on which a body marker template is displayed. The clinician annotates the location of an abnormality by simply touching the corresponding point on the touchscreen display while observing the ultrasound image, making template annotation quick and simple. Unlike the conventional body marker user interface, the touchscreen template display can be operated by one hand. The clinician is thus not constrained to annotating only frozen images, but can enter annotations by touching the template screen with one hand while continuing to hold the ultrasound probe in contact with the patient for continuous acquisition of real time ultrasound images. In an illustrated embodiment the template annotation also enables the clinician to easily record the position of the ultrasound probe when the image of the abnormality was being acquired. Recording this information enables the abnormality to be quickly reacquired during a subsequent imaging session such as when the abnormality is being diagnosed again or treated. .

[0008] The invention provides an ultrasonic diagnostic imaging system according to claim 1. Preferred embodiments are defined in the dependent claims

[0009] In the drawings

FIGURE 1 illustrates in a perspective view an ultrasound system of the present invention.

FIGURE 2 illustrates in block diagram form an embodiment of an ultrasonic diagnostic imaging system constructed in accordance with the principles of the present invention.

FIGURE 3 illustrates a first embodiment of a touchscreen with a breast body marker template displayed.

FIGURE 4 illustrates the body marker template of FIGURE 3 after annotation.

FIGURES 5a-5c illustrates further embodiments of cardiac body marker templates.

[0010] Referring first to FIGURE 1 an ultrasound im-

aging system 10 constructed in accordance with one embodiment of the invention is shown. The system 10 includes a chassis 12 containing most of the electronic circuitry for the system 10. The chassis 12 is mounted on a cart 14, and an ultrasound image display 16 is mounted on the chassis 12. Different imaging probes may be plugged into three connectors 26 on the chassis. The chassis 12 includes a keyboard and controls, generally indicated by reference numeral 28, for allowing a sonographer to operate the ultrasound system 10 and enter information about the patient or the type of examination that is being conducted. At the back of the control panel 28 is a touchscreen display 18 on which body marker templates are displayed in accordance with the present invention. The sonographer enters information on the touchscreen display 18 simply by touching a point on the display screen.

[0011] In operation, a probe which is plugged into one of the connectors 26 is placed against the skin of a patient (not shown) and a particular anatomy of the patient such as the breast or heart is imaged on the image display 16. The images may be examined as they are acquired in real time, or selected images may be frozen and stored. A body marker template corresponding to the anatomy being examined is accessed and displayed on the touchscreen display 18, either at the start of the examination or when particular pathology is diagnosed in one of the images on the display. The ultrasonographer will then mark the location of the pathology on the template by simply touching the appropriate location on the template and/or making further refinements as discussed more fully below. The template can then be incorporated into the diagnostic report along with one or more of the images showing the abnormality as discussed below.

[0012] A block diagram of an ultrasound system constructed in accordance with the principles of the present invention is shown in FIGURE 2. A probe 30 has a multi-element array transducer 32 which transmits ultrasound waves into a subject and receives echo signals. The echo signals are converted into electrical signals by the transducer elements and coupled to a beamformer 34. Preferably the transducer signals are digitized and the processed digitally in the beamformer. The beamformer forms coherent echo signals when then undergo processing by a signal processor 36 such as quadrature detection, wall filtering (for Doppler signals), or other filtering for signal enhancement such as harmonic signal separation or spatial or frequency compounding. The processed signals are then coupled to a B mode processor 42 for B mode imaging which involves the envelope detection of signals from tissue structure, or are processed by a Doppler processor 44 to produce images of the motion of blood flow or moving tissue. The coordination of the beamformer 34, the signal processor 36, the B mode and Doppler processor 44, as well as the other processing steps in the ultrasound signal path prior to display such as scan conversion, is performed by a controller 50. The resultant 2D or 3D tissue, motion or spectral Doppler image signals

are arranged in the desired display format by a scan converter 60. The ultrasound images are then coupled to a Cineloop® memory 62 where an entire sequence of real time images may be captured and replayed for diagnosis. Individual images or a loop (sequence) of images may be stored in an image store (not shown) for later further diagnosis. The images in the Cineloop memory are applied to a video processor 64 which drives the image display 16 in the appropriate manner for display of the images.

[0013] The ultrasound system is operated by a user who manipulates the appropriate controls of a control panel 54. Signals from the control panel are received by the controller 50 which responds by controlled the ultrasound system as desired by the operator. In accordance with the present invention, the user can use the control panel to call up a body marker template for display on the touchscreen display 18. Alternately, the ultrasound system may call up a particular template in correspondence with selection by the user of a particular ultrasound exam. For instance, if the user indicates that a breast exam will be performed, the ultrasound system may call up the templates for a breast diagnosis. The graphical templates are applied to a graphics generator 56, which applies the graphics signals to a touchscreen controller 58, which drives the touchscreen display appropriately to display the selected template. Located below the touchscreen display as seen in FIGURE 1 is a row of control knobs 20 which are coupled to the controller so that signals from the control knobs can be received by the controller and the appropriate responses made as described below. A report generator 52 is also resident on the ultrasound system and assists in the assembly of a diagnostic report for the examination. The report generator 52 is also controlled by the controller 50. The report generator can access ultrasound images from the Cineloop memory 62 and body marker templates from the graphics generator 56 for assembly into a diagnostic report. The diagnostic report can be viewed on one of the display screens and/or printed on a printer 66.

[0014] FIGURE 3 shows a breast exam embodiment of the present invention as it appears on the touchscreen 18. A graphic 102 in the upper left corner of the touchscreen display indicates whether the displayed breast template is for the left or right breast. The user can change between left and right breast templates with a single control on the touch screen. In this example the template is for the left breast and the word "Left" is highlighted. If the template is to be used for diagnosis of the right breast, the word "Right" would be touched by the user, causing this graphic on the template to be highlighted. In the center of the touchscreen display is a side view template and on the right side of the screen is a front view template of the breast. These two templates enable the three dimensional location of an abnormality to be clearly marked. The side view template is segmented into A, B and C depth zones to mark the depth of an abnormality and the radial zones of the front view template indicate the an-

gular orientation and radial distance of an abnormality relative to the nipple in the center.

[0015] Located in a row 110 at the bottom of the touchscreen display 18 are five softkeys. These softkeys are operated by the control knobs 20 located below the respective softkeys. In this embodiment only the first three softkeys are used and are controlled by knobs 112a, 112b, and 112c.

[0016] When the user finds an abnormality in a breast image on the image display 16, the location of the abnormality in the breast is annotated on the breast template as shown in FIGURE 4. In this example the sonographer has found an abnormality in the deepest region C of the left breast and at the 11 o'clock position radially relative to the center nipple. The abnormality is in the second radial segment out from the nipple. The sonographer indicates this position by touching the appropriate location on either the side or front template, which causes the ultrasound system to respond by displaying a circle 120a, 120b on the touchscreen display. In the illustrated embodiment two markers 120a, and 120b are used. Each of the markers may be placed by manually touching the screen. Alternatively, when one of the templates 104, 106 is touched, a corresponding marker is automatically placed on the other template 106, 104. The position of the second marker is then precisely adjusted. This may be done by manually touching a marker and then dragging it with the finger into the proper location on the touchscreen. However in the illustrated embodiment the position of the marker 120b can be finely adjusted with the control knobs 112b and 112c. Turning the knob 112b will cause the marker 120b to rotate around the nipple position. In the illustrated embodiment the marker 120b has been adjusted to the 11 o'clock position and "11:00" appears in the softkey graphic above knob 112b. The marker 120b can be moved radially outward and inward from the nipple position in the front template 104 by turning the control knob 112c. As this adjustment is made the current position of the marker is indicated on the softkey graphic. In this example 8cm is shown on the softkey. As the marker 120b is moved on the front template 104 the marker 120a will move correspondingly on the side template 106. In this embodiment two dashed lines join the markers in the two templates to indicate their correspondence. It will be appreciated that another softkey and knob can be used to adjust the position of the marker 120a in the side template, enabling the user to precisely adjust the indicated depth of the abnormality in the side template 106.

[0017] This embodiment also enables the sonographer to indicate the position of the probe when the ultrasound image shown on the image display 16 was acquired. This information will enable the abnormality to be imaged in the same way in a subsequent exam or treatment procedure. The front template 104 is seen to have a rectangular graphic 120c positioned over the abnormality marker 120b. This rectangular graphic corresponds to the rectangular shape of the transducer array 32 of the probe.

In this embodiment the rectangular probe graphic 120c automatically appears over the abnormality marker 120b. The probe graphic must then be adjusted by the sonographer which is done by turning softkey knob 112a. This causes the rectangular graphic to rotate about its center until it is in the same position that the sonographer was holding the probe when the image being annotated was acquired. Similar to the other softkeys, the probe orientation softkey has a rectangular graphic which rotates in the same manner as the probe graphic 120c. With the probe graphic properly positioned the abnormality can be imaged in the same manner as shown in the currently display image at a later date.

[0018] FIGURES 5a-5c illustrate exemplary body marker templates for another embodiment of the present invention, a cardiac exam. When the myocardium is being examined for indicia of infarction by wall motion abnormalities, the location of a wall defect is conventionally marked on a template such as a bullseye scorecard 130 as shown in FIGURE 5a. The bullseye scorecard 130 represents areas of the myocardium distributed around the apex of the heart which is represented by the center of the scorecard. When the echocardiographer discerns an abnormality in wall motion the location where the abnormality was found is located on the scorecard. The scorecard 130 is displayed on the touchscreen display and the clinician simply touches the appropriate segment of the scorecard to mark the location of the abnormality. In one embodiment the segment touched by the clinician can simply darken or brighten on the display. If a color display is used the touch of the user can mark a color on the scorecard. For example, touching a segment once can cause the segment to turn yellow, indicating a heart wall location where the wall motion is suspect. Touching the segment twice in rapid succession can cause the segment to turn red, indicating a location where wall motion is definitively abnormal. Touching a colored segment again will eliminate the color, thereby enabling the clinician to correct an incorrectly marked segment.

[0019] FIGURES 5b and 5c illustrate cardiac templates for an exam where four-chamber and transverse views of the heart are acquired. As explained in US patent 6,447,453, these template have high anatomical accuracy as they are created from automatically drawn and segmented boundary tracings of the inside and outside of the myocardium, the endocardium and the epicardium. The four-chamber template 140 and the transverse template 142 thus closely correspond to the anatomy as seen in the image being diagnosed. As in the previous example, the appropriate segment or segments of the templates are touched by the user to indicate a suspicious region of the heart wall where abnormal wall motion was detected. Precise body marker templates are thus formed quickly and marked rapidly, improving the efficiency of the diagnostic exam. At the completion of the exam a report is produced which contains both the ultrasound image(s) being diagnosed and the corresponding templates, clearly indicating to the referring physician the

location of an abnormality.

[0020] While the templates may be indexed in a file system on the ultrasound system and called up by the user addressing the appropriate body marker template, it is sometimes desirable to have the templates called up and displayed automatically. This may be done when the user is carrying out a diagnostic protocol, a series of exam steps, which has been preprogrammed on the ultrasound system. In such case the selection of each step of the protocol by the user would automatically call up and display the appropriate body marker template for the imaging procedure of that step. This obviates the need to manually search for and call up the template for each imaging procedure of the protocol. Transition from one marker template to another (including left/right and annotations) is driven by the protocol, which are then modified by the user through the easy touchscreen interface.

Claims

1. An ultrasonic diagnostic imaging system (10) including a probe (30) for acquiring ultrasonic echo signals, an image processor (36, 42, 44) coupled to the probe (30), an image display (16) adapted to display an ultrasonic image produced from acquired ultrasonic echo signals, and a control panel (54) for manually controlling the ultrasonic diagnostic imaging system (10), comprising:

a storage medium (56) on which a body marker template (104, 106, 130, 140, 142) comprising a graphical representation of anatomy being scanned is stored;
a touchscreen display (18) coupled to the storage medium (56), and
a touchscreen controller (58), configured to drive the touchscreen display (18) to display the body marker template (104, 106, 130, 140, 142) in response to a call up of the body marker template (104, 106, 130, 140, 142) or of a corresponding ultrasound exam by an imaging system operator via the control panel (54),

characterized in that

the touchscreen display (18) is responsive to the manual touch of the imaging system operator on the touchscreen display (18) to indicate on the body marker template (104, 106, 130, 140, 142) the location of a region of the anatomy identified in the ultrasonic image as being or possibly being suspect, and in that the touchscreen controller (58) is configured to record the body marker template (104, 106, 130, 140, 142) with said indication of a suspect or possibly suspect region in response to the manual touch of the imaging system operator on the touchscreen display (18).

2. The ultrasonic diagnostic imaging system (10) of Claim 1, wherein the storage medium (56) comprises a storage medium on which a body marker template (104, 106) comprising a graphical representation of the breast is stored.
3. The ultrasonic diagnostic imaging system (10) of Claim 1, wherein the storage medium (56) comprises a storage medium on which a body marker template (130, 140, 142) comprising a graphical representation of the heart is stored.
4. The ultrasonic diagnostic imaging system (10) of Claim 1, wherein the touchscreen display (18) is further responsive to the manual touch of an imaging system operator to reposition an indication on the body marker template (104, 106, 130, 140, 142) of the region of the anatomy.
5. The ultrasonic diagnostic imaging system (10) of Claim 1, further comprising a body marker user control (50), wherein the touchscreen display (18) is responsive to the body marker user control (50) to adjust the position of an indication on the body marker template (104, 106, 130, 140, 142) of the region of the anatomy.
6. The ultrasonic diagnostic imaging system (10) of Claim 5, wherein the body marker template (104, 106) comprises a breast body marker template, wherein the touchscreen display (18) is responsive to the body marker user control (50) to adjust the indicated depth of the indication on the body marker template (104, 106) of the region of the anatomy.
7. The ultrasonic diagnostic imaging system (10) of Claim 5, wherein the body marker template (104, 106) comprises a breast body marker template, wherein the touchscreen display (18) is responsive to the body marker user control (50) to adjust the indicated radial position of the indication on the body marker template (104, 106) of the region of the anatomy.
8. The ultrasonic diagnostic imaging system of Claim 1, further comprising a body marker user control (50), wherein the touchscreen display (18) is responsive to the body marker user control (50) to adjust the position of an indication on the body marker template (104, 106, 130, 140, 142) of the position of the probe (30) when scanning the region of the anatomy.
9. The ultrasonic diagnostic imaging system (10) of Claim 1, further comprising a diagnostic report generator (52), responsive to the production of an ultrasonic image and a body marker template (104, 106, 130, 140, 142), which operates to generate a diag-

nostic report containing an ultrasonic image and related body marker template.

Patentansprüche

1. System zur diagnostischen Ultraschallbildgebung (10) umfassend eine Sonde (30) zum Erfassen von Ultraschallechosignalen, einen mit der Sonde (30) gekoppelten Bildprozessor (36, 42, 44), eine Bildanzeige (16), die dafür ausgelegt ist, ein anhand der erfassten Ultraschallechosignale erzeugtes Ultraschallbild anzuzeigen, und ein Bedienfeld (54) zum manuellen Steuern des Systems zur diagnostischen Ultraschallbildgebung (10), wobei das System zur diagnostischen Ultraschallbildgebung Folgendes umfasst:

ein Speichermedium (56), auf dem eine Körpermarkierungsvorlage (104, 106, 130, 140, 142) mit graphischen Darstellungen der abgetasteten Anatomie gespeichert ist;

eine Touchscreen-Anzeige (18), die mit dem Speichermedium (56) gekoppelt ist, und eine Touchscreen-Steuereinheit (58), die dafür eingerichtet ist, die Touchscreen-Anzeige (18) anzusteuern, damit sie die Körpermarkierungsvorlage (104, 106, 130, 140, 142) in Reaktion auf ein Aufrufen der Körpermarkierungsvorlage (104, 106, 130, 140, 142) oder einer entsprechenden Ultraschalluntersuchung durch einen Bediener des Bildgebungssystems über das Bedienfeld (54) anzeigt,

dadurch gekennzeichnet, dass

die Touchscreen-Anzeige (18) auf die manuelle Berührung der Touchscreen-Anzeige (18) durch den Bediener des Bildgebungssystems reagiert, um auf der Körpermarkierungsvorlage (104, 106, 130, 140, 142) den Ort einer in dem Ultraschallbild als verdächtig oder möglicherweise verdächtig identifizierten Region der Anatomie anzugeben, und dadurch, dass die Touchscreen-Steuereinheit (58) dafür eingerichtet ist, die Körpermarkierungsvorlage (104, 106, 130, 140, 142) mit der genannten Angabe einer verdächtigen oder möglicherweise verdächtigen Region in Reaktion auf die manuelle Berührung der Touchscreen-Anzeige (18) durch den Bediener des Bildgebungssystems aufzuzeichnen.

2. System zur diagnostischen Ultraschallbildgebung (10) nach Anspruch 1, wobei das Speichermedium (56) ein Speichermedium umfasst, auf dem eine Körpermarkierungsvorlage (104, 106) mit einer graphischen Darstellung der Brust gespeichert ist.
3. System zur diagnostischen Ultraschallbildgebung (10) nach Anspruch 1, wobei das Speichermedium

(56) ein Speichermedium umfasst, auf dem eine Körpermarkierungsvorlage (130, 140, 142) mit einer graphischen Darstellung des Herzens gespeichert ist.

4. System zur diagnostischen Ultraschallbildgebung (10) nach Anspruch 1, wobei die Touchscreen-Anzeige (18) weiterhin auf die manuelle Berührung durch einen Bediener des Bildgebungssystems reagiert, um eine Angabe der Region der Anatomie auf der Körpermarkierungsvorlage (104, 106, 130, 140, 142) neu zu positionieren.
5. System zur diagnostischen Ultraschallbildgebung (10) nach Anspruch 1, weiterhin umfassend eine Körpermarkierungs-Benutzersteuerung (50), wobei die Touchscreen-Anzeige (18) auf die Körpermarkierungs-Benutzersteuerung (50) reagiert, um die Position einer Angabe der Region der Anatomie auf der Körpermarkierungsvorlage (104, 106, 130, 140, 142) anzupassen.
6. System zur diagnostischen Ultraschallbildgebung (10) nach Anspruch 5, wobei die Körpermarkierungsvorlage (104, 106) eine Brust-Körpermarkierungsvorlage umfasst, wobei die Touchscreen-Anzeige (18) auf die Körpermarkierungs-Benutzersteuerung (50) reagiert, um die angegebene Tiefe der Angabe der Region der Anatomie auf der Körpermarkierungsvorlage (104, 106) anzupassen.
7. System zur diagnostischen Ultraschallbildgebung (10) nach Anspruch 5, wobei die Körpermarkierungsvorlage (104, 106) eine Brust-Körpermarkierungsvorlage umfasst, wobei die Touchscreen-Anzeige (18) auf die Körpermarkierungs-Benutzersteuerung (50) reagiert, um die angegebene radiale Position der Angabe der Region der Anatomie auf der Körpermarkierungsvorlage (104, 106) anzupassen.
8. System zur diagnostischen Ultraschallbildgebung nach Anspruch 1, das weiterhin eine Körpermarkierungs-Benutzersteuerung (50) umfasst, wobei die Touchscreen-Anzeige (18) auf die Körpermarkierungs-Benutzersteuerung (50) reagiert, um die Position einer Angabe der Position der Sonde (30) auf der Körpermarkierungsvorlage (104, 106, 130, 140, 142) während des Abtastens der Region der Anatomie anzupassen.
9. System zur diagnostischen Ultraschallbildgebung (10) nach Anspruch 1, das weiterhin einen Diagnoseberichtsgenerator (52) umfasst, der auf die Erzeugung eines Ultraschallbilds und eine Körpermarkierungsvorlage (104, 106, 130, 140, 142) reagiert und betriebsfähig ist, um einen Diagnosebericht zu er-

zeugen, der ein Ultraschallbild und die zugehörige Körpermarkierungsvorlage enthält.

Revendications

1. Système d'imagerie diagnostique à ultrasons (10), comportant une sonde (30) servant à acquérir des signaux ultrasonores d'écho, un processeur d'image (36, 42, 44) couplé à la sonde (30), un affichage d'image (16) conçu pour afficher une image ultrasonore produite à partir des signaux ultrasonores d'écho acquis, et un pupitre de commande (54) servant à commander manuellement le système d'imagerie diagnostique à ultrasons (10), comprenant :

un support de stockage (56) sur lequel une matrice de marqueur corporel (104, 106, 130, 140, 142) comprenant une représentation graphique de l'anatomie en cours d'analyse est stockée ; un affichage à écran tactile (18) couplé au support de stockage (56), et

un dispositif de commande à écran tactile (58), conçu pour commander l'affichage à écran tactile (18) pour afficher la matrice de marqueur corporel (104, 106, 130, 140, 142) en réponse à un appel de la matrice de marqueur corporel (104, 106, 130, 140, 142) ou d'un examen par ultrasons correspondant par un opérateur du système d'imagerie par l'intermédiaire du pupitre de commande (54), **caractérisé en ce que**

l'affichage à écran tactile (18) est sensible à un contact manuel de l'opérateur du système d'imagerie sur l'affichage à écran tactile (18) pour indiquer sur la matrice de marqueur corporel (104, 106, 130, 140, 142) l'emplacement d'une région de l'anatomie identifiée sur l'image ultrasonore qui est suspecte ou éventuellement suspecte, et **en ce que** le dispositif de commande à écran tactile (58) est conçu pour enregistrer la matrice de marqueur corporel (104, 106, 130, 140, 142) avec ladite indication d'une région suspecte ou éventuellement suspecte en réponse au contact manuel de l'opérateur du système d'imagerie sur l'affichage à écran tactile (18).

2. Système d'imagerie diagnostique à ultrasons (10) selon la revendication 1, dans lequel le support de stockage (56) comprend un support de stockage sur lequel une matrice de marqueur corporel (104, 106) comprenant une représentation graphique du sein est stockée.
3. Système d'imagerie diagnostique à ultrasons (10) selon la revendication 1, dans lequel le support de stockage (56) comprend un support de stockage sur lequel une matrice de marqueur corporel (130, 140, 142) comprenant une représentation graphique du

coeur est stockée.

4. Système d'imagerie diagnostique à ultrasons (10) selon la revendication 1, dans lequel l'affichage à écran tactile (18) est sensible en outre au contact manuel d'un opérateur du système d'imagerie pour repositionner une indication sur la matrice de marqueur corporel (104, 106, 130, 140, 142) de la région de l'anatomie.
5. Système d'imagerie diagnostique à ultrasons (10) selon la revendication 1, comprenant en outre un contrôle utilisateur de marqueur corporel (50), dans lequel l'affichage à écran tactile (18) est sensible au contrôle utilisateur de marqueur corporel (50) pour ajuster la position d'une indication sur la matrice de marqueur corporel (104, 106, 130, 140, 142) de la région de l'anatomie.
6. Système d'imagerie diagnostique à ultrasons (10) selon la revendication 5, dans lequel la matrice de marqueur corporel (104, 106) comprend une matrice de marqueur corporel de sein, dans lequel l'affichage à écran tactile (18) est sensible au contrôle utilisateur de marqueur corporel (50) pour ajuster la profondeur indiquée de l'indication sur la matrice de marqueur corporel (104, 106) de la région de l'anatomie.
7. Système d'imagerie diagnostique à ultrasons (10) selon la revendication 5, dans lequel la matrice de marqueur corporel (104, 106) comprend une matrice de marqueur corporel de sein, dans lequel l'affichage à écran tactile (18) est sensible au contrôle utilisateur de marqueur corporel (50) pour ajuster la position radiale indiquée de l'indication sur la matrice de marqueur corporel (104, 106) de la région de l'anatomie.
8. Système d'imagerie diagnostique à ultrasons selon la revendication 1, comprenant en outre un contrôle utilisateur de marqueur corporel (50), dans lequel l'affichage à écran tactile (18) est sensible au contrôle utilisateur de marqueur corporel (50) pour ajuster la position d'une indication sur la matrice de marqueur corporel (104, 106, 130, 140, 142) de la position de la sonde (30) lors du balayage de la région de l'anatomie.
9. Système d'imagerie diagnostique à ultrasons (10) selon la revendication 1, comprenant en outre un générateur de rapport de diagnostic (52), sensible à la production d'une image ultrasonore et d'une matrice de marqueur corporel (104, 106, 130, 140, 142), qui sert à générer un rapport de diagnostic contenant une image ultrasonore et une matrice de marqueur corporel associée.

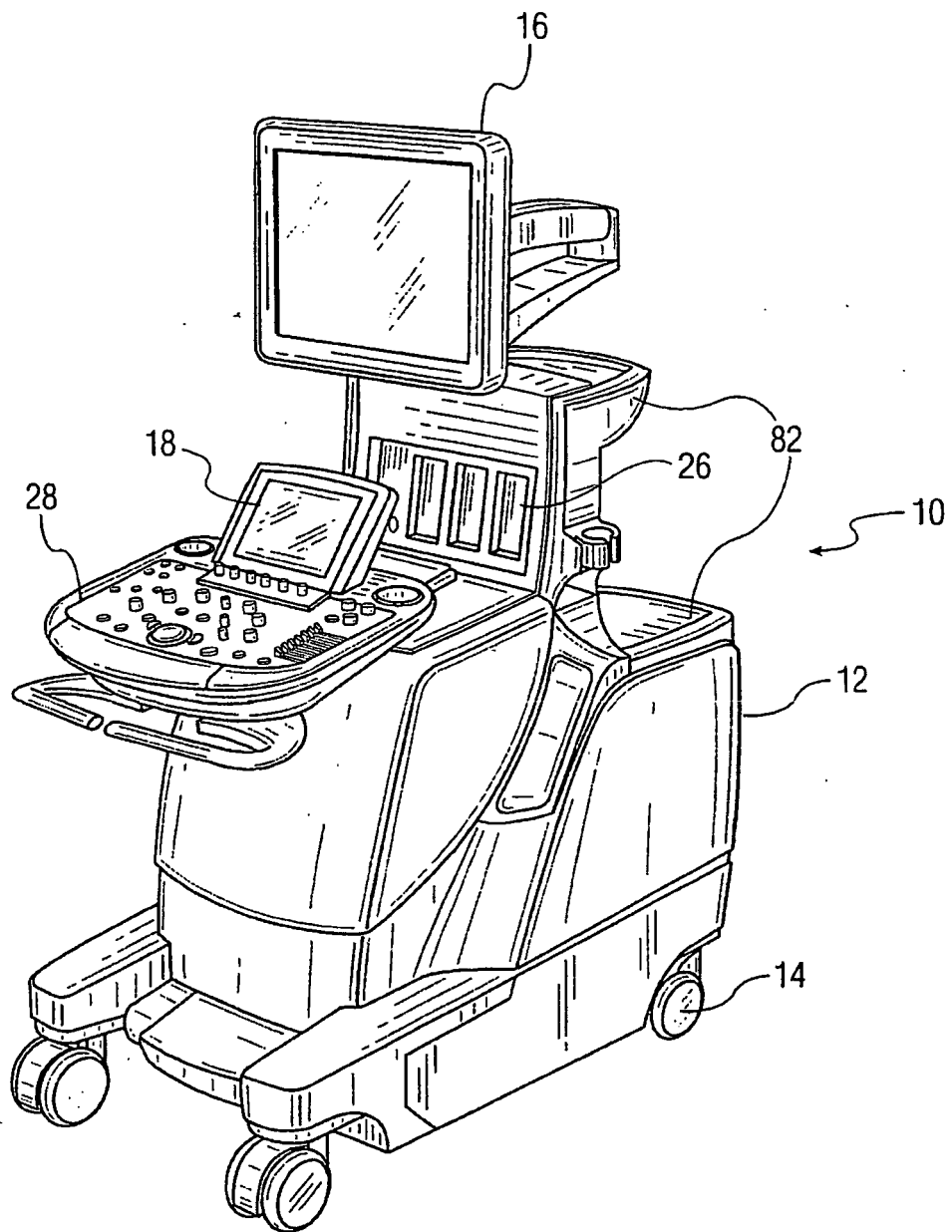


FIG. 1

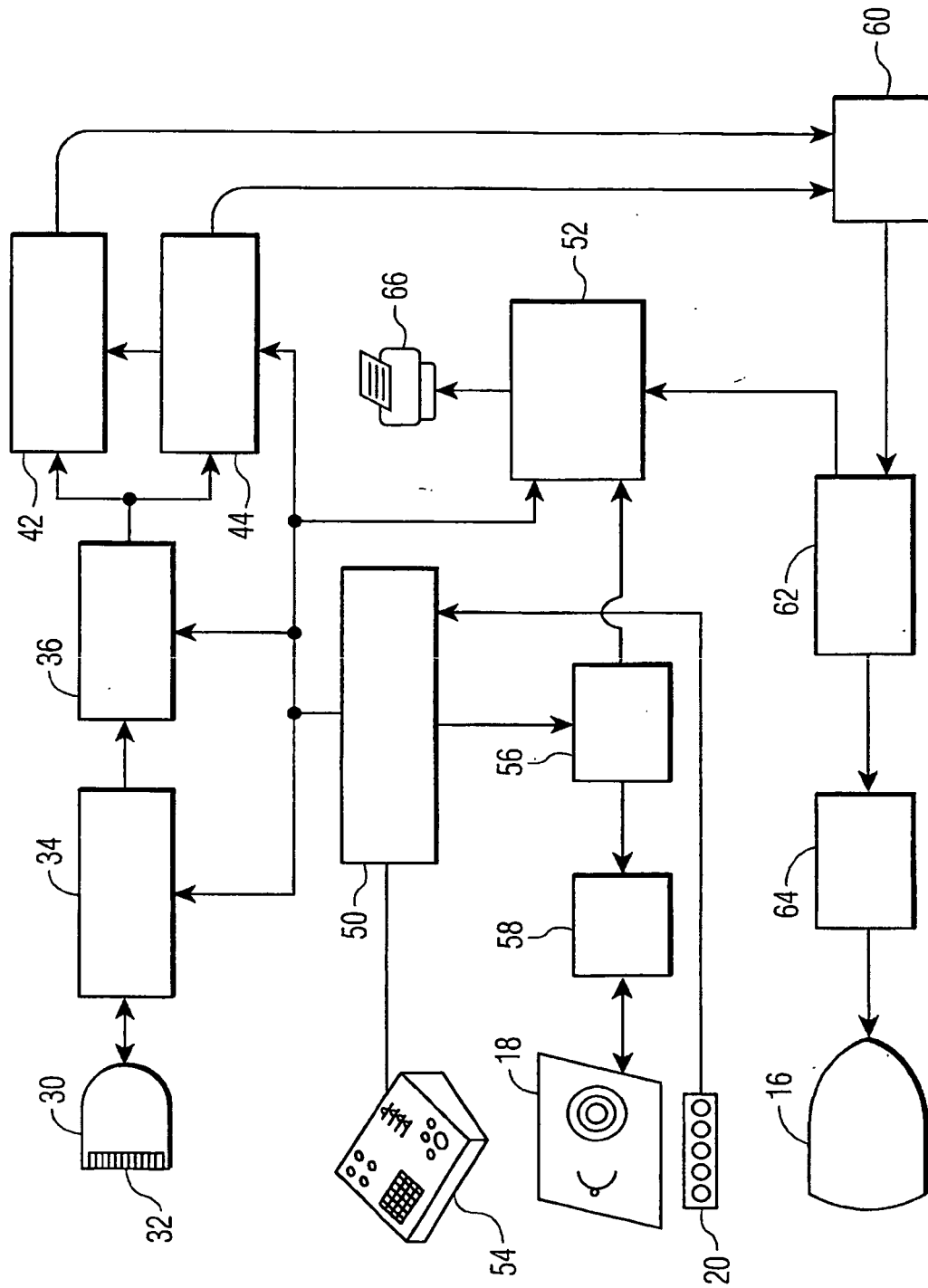


FIG. 2

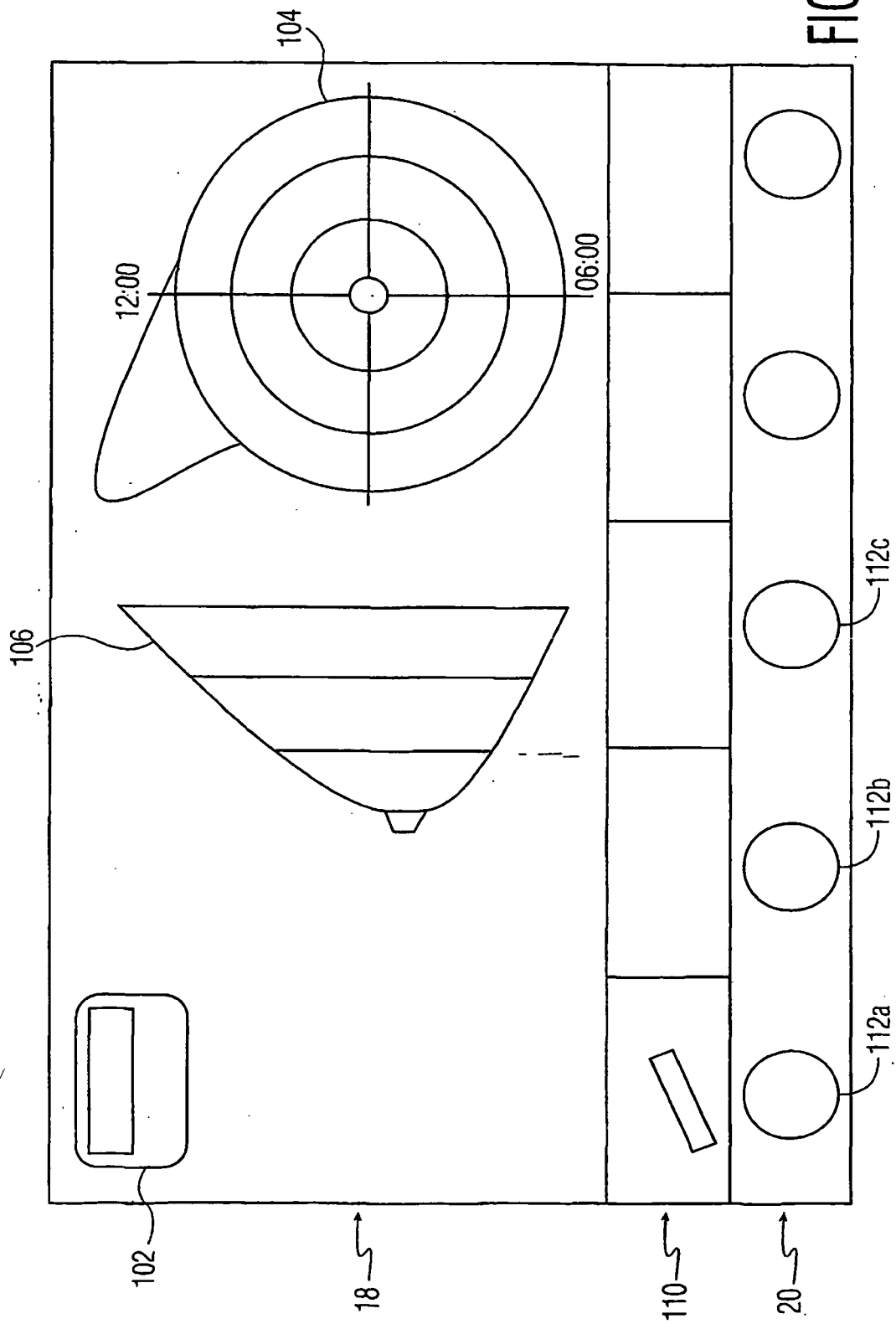
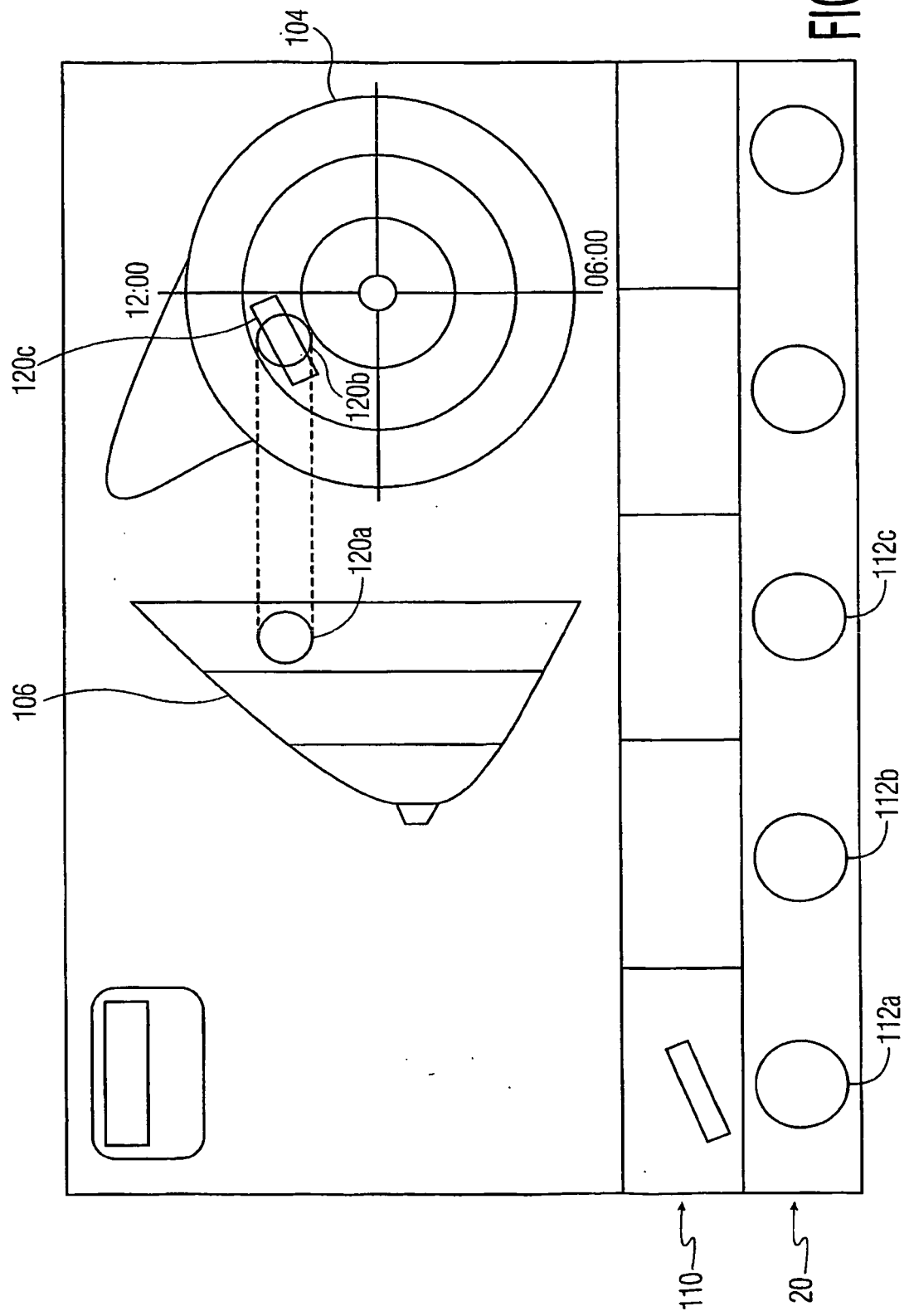


FIG. 3



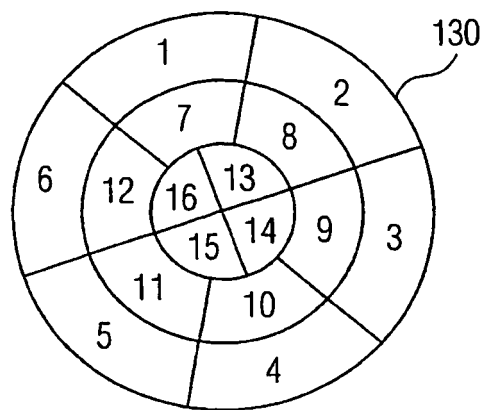


FIG. 5A

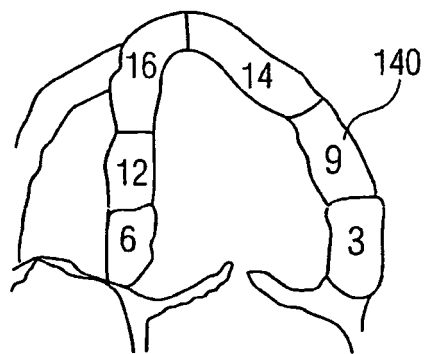


FIG. 5B

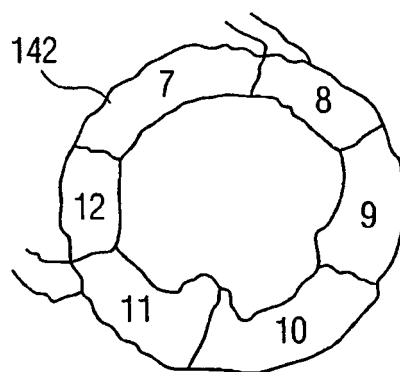


FIG. 5C

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 6500118 B [0003]
- US 6468212 B1 [0004]
- US 5709206 A [0005]
- US 20030212327 A1 [0006]
- US 6447453 B [0019]

专利名称(译)	具有身体标记注释的超声成像系统		
公开(公告)号	EP1799110B1	公开(公告)日	2015-12-23
申请号	EP2005787197	申请日	2005-10-03
[标]申请(专利权)人(译)	皇家飞利浦电子股份有限公司		
申请(专利权)人(译)	皇家飞利浦电子N.V.		
当前申请(专利权)人(译)	皇家飞利浦N.V.		
[标]发明人	JACKSON PATTY CHENAL CEDRIC		
发明人	JACKSON, PATTY CHENAL, CEDRIC		
IPC分类号	A61B8/00 A61B8/08		
CPC分类号	A61B8/465 A61B8/0825 A61B8/4405		
代理机构(译)	ROCHE , DENIS		
优先权	60/617493 2004-10-08 US		
其他公开文献	EP1799110A1		
外部链接	Espacenet		

摘要(译)

操作超声诊断成像系统以获取包含可疑解剖结构的身体区域的超声图像，例如疑似病变。身体区域的身体标记模板（104,106）显示在成像系统的触摸屏显示器上。操作者通过触摸触摸屏显示器上显示的身体标记模板上的对应点来记录可疑解剖结构的位置。模板上的标记（120a，120b）可以通过成像系统控制面板上的一个或多个控件进行精细调整。身体标记模板还可以记录指示（120c）当对可疑解剖结构进行成像时超声探头相对于身体的取向的图形。报告生成器生成报告，该报告包含可疑解剖结构的超声图像和具有可疑解剖结构的指示位置的身体标记模板。

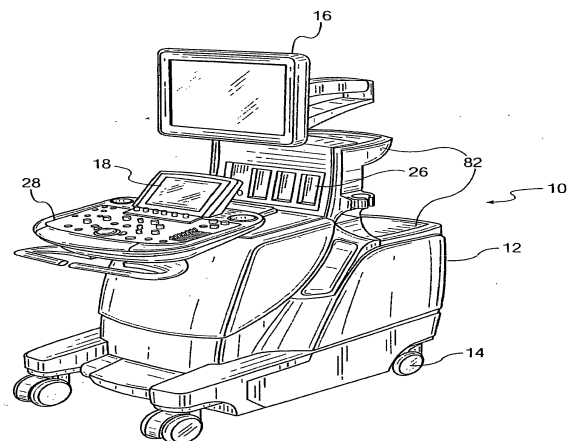


FIG. 1