US 20030115964A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2003/0115964 A1

Shinohara (43) Pub. Date: Jun. 26, 2003

(54) SYSTEM FOR ULTRASONIC TOMOGRAPHY

(76) Inventor: **Katsuhiko Shinohara**, Kakogawa-shi (JP)

Correspondence Address:
Katsuhiko Shinohara
669-20, Kimura
Kakogawa-choo
Kakogawa-shi
Hyogo 675-0038 (JP)

(21) Appl. No.: **10/230,419**

(22) Filed: **Aug. 30, 2002**

(30) **Foreign Application Priority Data**

Dec. 25, 2001 (JP) 2001-403291

Publication Classification

(51) **Int. Cl.**[7] **G01N 29/00**

(52) **U.S. Cl.** **73/606**

(57) **ABSTRACT**

An ultrasonic tomographic image is obtained by using the difference between intensities of two echoes from the same analyte by two ultrasonic beams emitted through a vibrator element group of a probe A and through some vibrator elements within this group, respectively.

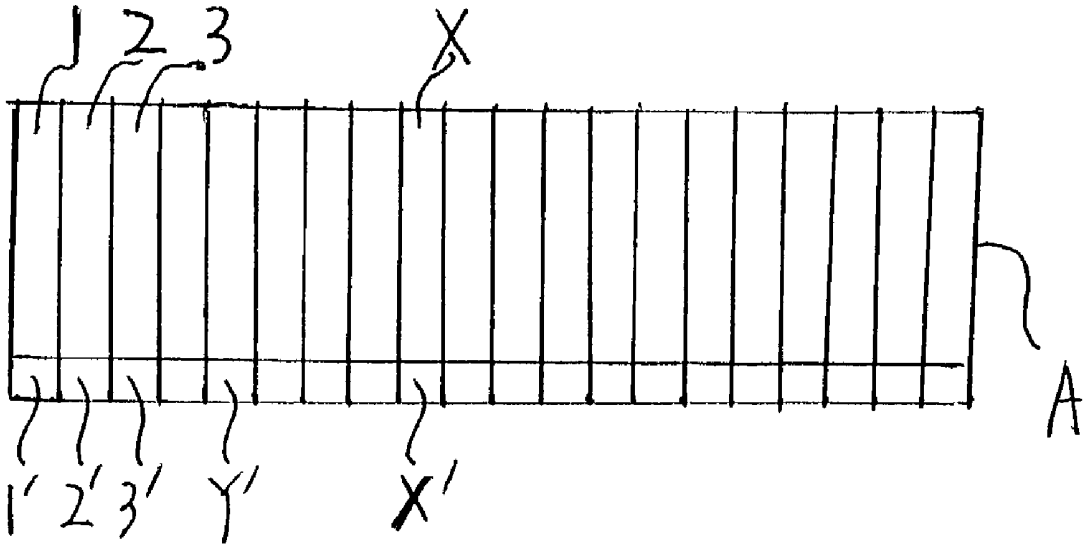


Fig.1

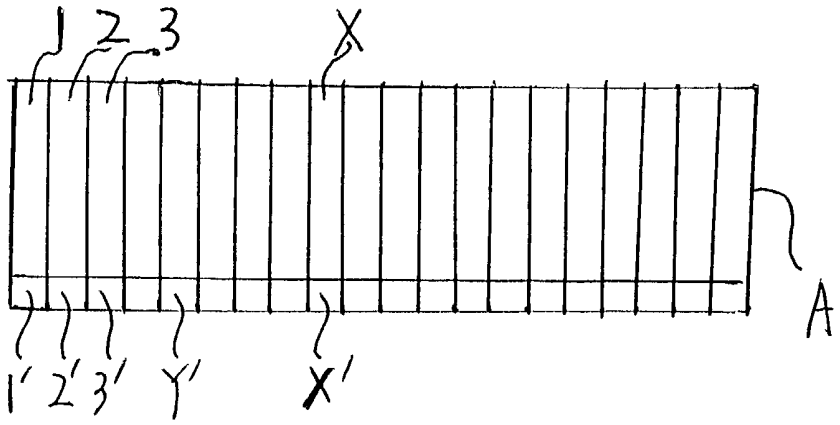


Fig.2

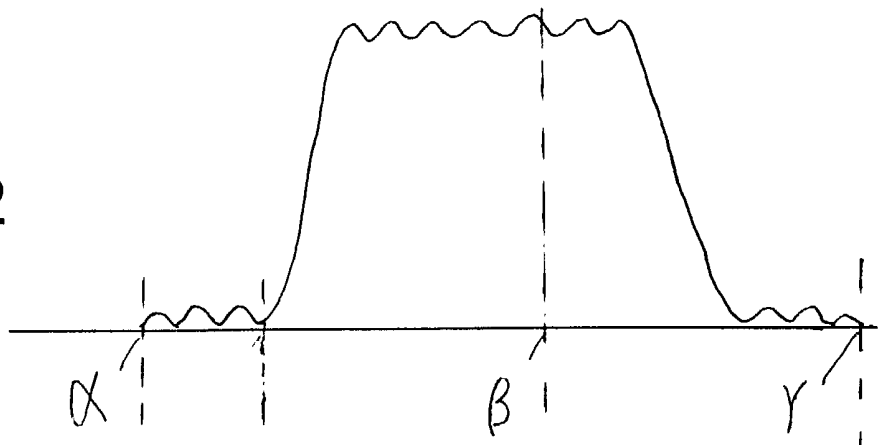
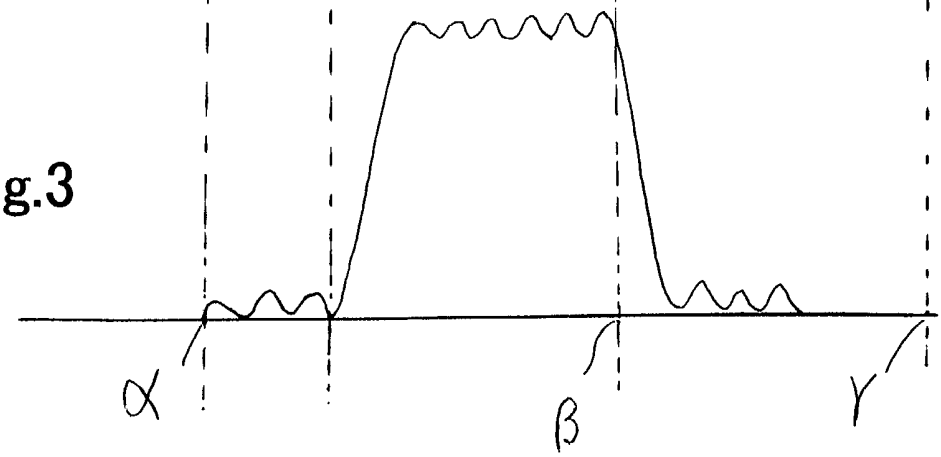


Fig.3



SYSTEM FOR ULTRASONIC TOMOGRAPHY

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a system for ultrasonic tomography.

[0002] The system for conventional ultrasonic tomography improves the lateral resolution with both an acoustic lens and electronic focuses.

[0003] This has the problem that it cannot cope with diagnosing the analyte near the probe due to bad lateral resolution in this area.

[0004] Thus, two or three kinds of probes are required for diagnosing the human body with ultrasound.

SUMMARY OF THE INVENTION

[0005] The object of the present invention is to provide a low-cost system for ultrasonic tomography that can diagnose the analytes at all depth of the human body with one probe.

[0006] In order to achieve these objectives, said present invention gets an ultrasonic tomographic image of the human body by using the difference between intensites of two echoes from the same analyte in a human body by means of two ultrasonic beams emitted through a vibrator element group of a probe and through some vibrator elements within this group, respectively.

BRIEF DESCRIPTION OF THE DRAWING

[0007] **FIG. 1** shows the ultrasonic wave transmission/receiving component of the probe of an embodiment.

[0008] **FIG. 2** shows the ultrasonic intensity distribution graph transmitted through a vibrator element group (1, 2, 3, . . . , X, 1', 2', 3', . . . , X') at a location near the probe of an embodiment in the direction of the short axis of the probe.

[0009] **FIG. 3** shows the ultrasonic intensity distribution graph transmitted through a vibrator element group (1, 2, 3, . . . , X) at a location near the probe of an embodiment in the direction of the short axis of the probe.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0010] An embodiment of the present invention is explained hereiafter referring to Figures.

[0011] In **FIG. 1**, the ultrasonic beam is emitted through a vibrator element group (1, 2, 3, . . . , X, 1', 2', 3', X') of the probe A, and the echoes from the analytes of the human body near said probe A, are received.

[0012] Then, another ultrasonic beam is emitted through a vibrator element group (1, 2, 3, . . . , X) of said probe A, and the echoes from the analytes of the human body near said probe A are also received.

[0013] The ultrasonic tomohraphic image near said probe A of the present invention is obtained by using the difference between intensities of the two above-mentioned echoes from the same analyte in a human body near said probe A.

[0014] In **FIGS. 1 and 2**, the two shapes of the ultrasonic intensity distribution graphs are almost the same in the range from α to β.

[0015] Therefore, the above-mentioned difference between intensities of said two echoes gives almost the same intensity of the echo from the each analyte near the said probe A in the range from β to γ.

[0016] Thus, the lateral resolution of the system for ultrasonic tomography of the present invention is superior to that of the system for conventional ultrasonic tomography in the direction of the short axis of their respective probes at a location near their respective probes.

[0017] In another embodiment of the present invention, the ultrasonic tomographic image is obtained by using the difference between intensities of the two echoes from the same analyte near said probe A in a human body by means of two ultrasonic beams emitted through a vibrator element group (1, 2, 3, . . . , X, 1', 2', 3', . . . , X') and through a vibrator element group (1, 2, 3, . . . , X, 1' . . . , Y'), respectively.(with the value of X' being much larger than that of Y'.)

[0018] In this embodiment, the lateral resolution of the system for ultrasonic tomohraphy of the present invention is superior to that of the system for conventional ultrasonic tomography in the direction of both short and long axies of their said respective probes at a location near their respective probes.

[0019] The thyroid gland, mammae, supurficial lymph-nodes, muscles, tendons, etc., can be examined with only one probe in the present invention for the examination of liver and pancreas.

[0020] The lateral resolution in the system for ultrasonic tomography of the present invention improves inversely, in proportion to the distance between said probe A and the analytes in a human body.

[0021] While a few embodiments of the invention have been illustrated and described in detail, it is particularly understood that the invention is not limited thereto or thereby.

What is claimed is:

1. A system for ultrasonic tomography comprising; an ultrasonic tomographic image by means of a differentiating between intensites of two echoes from the same analyte by means of two ultrasonic beams emitted through a vibrator element group of a probe and through some vibrator elements within this group, respectively.

2. Said system for ultrasonic tomography of claim 1, wherein said two echoes are obtained from two ultrasonic beams emitted through a vibrator element group (1, 2, 3, . . . , X, 1', 2', 3', . . . , X') and through a vibrator element group (1, 2, 3, . . . , X), respectively.

3. Said system for ultrasonic tomography of claim 1, wherein said two echoes are obtained from two ultrasonic beams emitted through a vibrator element group (1, 2, 3, . . . , 1', 2', 3', . . . , X') and through a vibrator element group (1, 2, 3, . . . , X, 1', . . . , Y'), respectively.

* * * * *

专利名称(译)	超声波断层扫描系统		
公开(公告)号	US20030115964A1	公开(公告)日	2003-06-26
申请号	US10/230419	申请日	2002-08-30
[标]申请(专利权)人(译)	筱原克彦		
申请(专利权)人(译)	筱原克彦		
当前申请(专利权)人(译)	筱原克彦		
[标]发明人	SHINOHARA KATSUHIKO		
发明人	SHINOHARA, KATSUHIKO		
IPC分类号	A61B8/00 G01S15/87 G01S15/89 G01N29/00		
CPC分类号	G01S15/87 G01S15/8927 G01S15/8918 G01S15/8925		
优先权	2001403291 2001-12-25 JP		
外部链接	Espacenet USPTO		

摘要(译)

通过使用通过探针A的振动器元件组和该组内的一些振动器元件发射的两个超声波束，来自相同分析物的两个回波的强度之间的差异来获得超声波断层图像。