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(54) Titre : APPAREIL ULTRASONORE DE STETHO-CARDIOGRAPHIE

(54) Title: STETHO-CARDIO-ULTRASOUND MACHINE

(57) **Abrégé/Abstract:**

The Stetho-Cardio-Ultra machine (Scum), consist of a miniature ultrasound like device, which is attached proximally to the bell of the Stethoscope. At the bell of the Stethoscope there is a direct attachment for the probe of the ultrasound machine. However, the probe can also connect directly to the ultrasound machine. The ultrasound like device will be able to analyze information from both the stethoscope and the probe separately and simultaneously when necessary. This device will have an in-built program which will allow one to compare abnormal and normal functions of the organ that is under examination. This will make it easier for doctors to make better and quicker diagnosis. Once a diagnosis has been made by the doctor, he will then input the information in the system, and a treatment plan will be suggested by the system. The device will basically be carrying a medical encyclopedia which will be use to analyze thousands of medical illnesses by the touch of a button.



Patent for Invention

Abstract:

The Stetho-Cardio-Ultra machine (Scum), consist of a miniature ultrasound like device, which is attached proximally to the bell of the Stethoscope. At the bell of the Stethoscope there is a direct attachment for the probe of the ultrasound machine. However, the probe can also connect directly to the ultrasound machine. The ultrasound like device will be able to analyze information from both the stethoscope and the probe separately and simultaneously when necessary. This device will have an in-built program which will allow one to compare abnormal and normal functions of the organ that is under examination. This will make it easier for doctors to make better and quicker diagnosis. Once a diagnosis has been made by the doctor, he will then input the information in the system, and a treatment plan will be suggested by the system. The device will basically be carrying a medical encyclopedia which will be use to analyze thousands of medical illnesses by the touch of a button.

Specification:

The invention relates to a medical instrument, which exams the heart and other vital organs of the body by use of the principle used by the stethoscope and the ultrasound machine.

It is common in other devices, in order to exam the heart, one must do it solely by the ultrasound, stethoscope or by a Tran esophageal echogram. In respect to the later procedure, it is invasive and very discomforting to patient. The procedure is known to cause temporary dementia and confusion, especially in elderly patients. Other dangerous side effects are also related to this invasive procedure. This would include the use of anesthetics to numb the throat as the transducer of the device must be swallowed and be positioned behind the heart. After the procedures the patient is not allowed to drive for 12hours, or eat after 2hrs as the throat is sore and still numb which may allow the aspiration of food in the lungs. In addition, these instruments are large and expensive and are own mainly by hospitals which has the ability to finance these machines.

I have found that these disadvantages may be overcome by providing a combination of the function of a stethoscope and a miniature ultrasound like device. This device will be non-invasive and still have the ability to detect proper function of the heart valves, measure the size of the valves, check for prolapsed valves, detect murmur and regurgitation, check liver enlargement and dysfunction, abdominal masses etc. In addition, this machine will be light weight and will become useful in both remote and inner city areas. This device is also less expensive and will be highly appreciated by doctors in impoverished countries and even in the medical arena of war. In general, all family doctors and heart specialist and other health professionals will find the device to be very important and useful in their practice.

Description:

The Stethoscope:

The stethoscope is generally used to listen to heart sound, bowel sounds and vascular flow, by skilled medical personnel. In this device a miniature-like-ultrasound machine will be physically attached just proximal to the bell of the stethoscope as seen in Fig: S (system).

There will be a circuit connection from the cords of the stethoscope, which will transmit information to the ultrasound machine. That sound will be dissected and will be transmitted to both the earpiece of the stethoscope and to the ultrasound machine at the same time. The sound that is transmitted to the ultrasound portion of the device will be analyzed. The quality of sounds will generally depict whether the organ under examination is healthy or unhealthy.

Fig: 4 shows the bell of the stethoscope where the cords a1 and a2 leaves to enter the ear-piece of the stethoscope. Structure a3 and a4 is the circuit which will transmit the sound to the ultrasound machine where it will analyzed.

Structure a3 and a4 will communicate with "heart sound" switch from the interface of the instrument as seen in Structure C. This connection will be able to communicate with the circuit S1, S2, S3, and S4, which in fact has the information of the respective sounds of the heart, that is; S1, S2, S3, and S4.

Structure a3 and a4 will also carry information from the mitral valve, tricuspid valve, aortic valve and the pulmonary valve, using the sound waves. These sound waves will be transmitted to the screen of the ultrasound machine, where each valve will be represented by different colors. See below:

Mitral valve-----Green
 Tricuspid Valve-----yellow
 Aortic Valve-----orange
 Pulmonary-----blue

If there is damage to any of the mentioned valves, the color red will indicate the problem. This damaged valve can then be studied further, checking for calcification or valve prolapsed.

Ultrasound effect:

The Ultrasound machine is one which transmits sounds that has a higher pitch or frequency, than that of the human ear. Now because ultrasound is at that range, electronic equipment is used to detect it.

In my device the ultrasound probe, structure A, is detachable and is located at the bell, structure B, of the stethoscope. It can also be attached directly to the ultrasound machine as seen in the photograph. However, in either case, the probe will have a 10" to 16" cord in order to allow better movement of the instrument on the body surface of the patient.

The ultrasound machine 'C' transmits high frequency (1 to 5 MHz) sound pulses into the body using the probe (transducer). The sound waves will travel into body and hits a boundary between tissues of the body, e.g. the heart. The probe 'A' will then transmit this sound into the ultrasound machine 'C', which is attached to the anterior part of the stethoscope system 'S'. The CPU of the device will then calculate the distance from the probe 'A' to the tissue or organ (boundaries) using the speed of sound in tissue (5,005 ft/s or 1,540m/s), and the time of each echo's return (usually on the order of millionth of a second). The machine then display the distances and intensities of the echoes on the screen 'C' forming a two or three dimensioned image, like the one seen on the screen 'C'.

Doppler Effect:

The Doppler is a special part of the ultrasound that will check the velocity or speed of blood moving to or away from the receiver. This will determine the rate of blood flow in the heart. In contrast, the M-mode and 2-D evaluate the size, thickness and movement of the heart structure, i.e. heart chambers, valves, and muscles of the heart.

During the examination, the ultrasound beams will evaluate the flow of blood which makes it way in and out of the heart. This information will evaluate the flow of blood and present it visually on the monitor as color images or grayscale tracings. It will also present a series of audible swishing or pulsating sound (references; patent # 5798489, # 5960089, # 6126608.) Structure 'A' the probe will transmit sound waves to the CPU of the ultrasound machine, structure 'C', where all the information will be analyzed and be converted to a image on the screen.

As seen in figure 2, each organ or structure of the body has its own micro CPU. Thus once information of the heart is needed the button on the interface of the machine is pressed, which then communicates with the probe and the micro cpu-1, which then communicate with 1a, which has both normal and abnormal information of the body organ that the probe 'A' is examining.

1a then has further communication with Figure 3, where more information of the heart can be access.

Function 2; represent the kidney information, and will communicate with 2a.

Function 3; represent the Liver information, and will communicate with 3a.

Function 4; represent the Spleen information, and will communicate 4.

Function 5; represent the Lungs and communicate with 5a.

Function 6; represent the Jugular vein and communicates with 6a.

Function 7 represents the femoral vein and communicates with 7a.

Claims

1: A portable Stetho- Cardio Ultrasound machine to examine the heart and other vital organs of the body, comprising of a stethoscope, miniature ultrasound with a transducer attached to the bell of the stethoscope or to the miniature ultrasound.

2: The device as defined in claim 1, in which the miniature ultrasound is attached or securely clipped anteriorly and proximally to bell of the stethoscope.

3: The device as defined in claim 1 & 2 where the technical connections of the stethoscope with the ultrasound machine is via a3 and a4 as depicted in figure 4 and figure S.

4: The device as defined in claim 1, 2 and 3, in which the sound from the bell of the stethoscope is transmitted to the ear-piece of the stethoscope and to the ultrasound – like machine at the same time, thus having a manual detection of the sound by a trained physician or health personnel, and the detection and analyzing of the sound by the ultrasound machine.

5: The device as defined in claim 1, 2, 3, and 4, by which the following areas of the heart can be exam; tricuspid valve, mitral valve, pulmonary valve, Right ventricle, Left ventricle, Left Atrium, Right atrium, Pulse pressure, S1, S2, S3, and S4 sounds.

6: The device as defined in claim 1, 2, 3, 4, and 5, also has a transducer or probe, which transmit sound waves to the ultrasound machine, where the sound is analyzed and processed and transformed into an image on the screen of the machine.

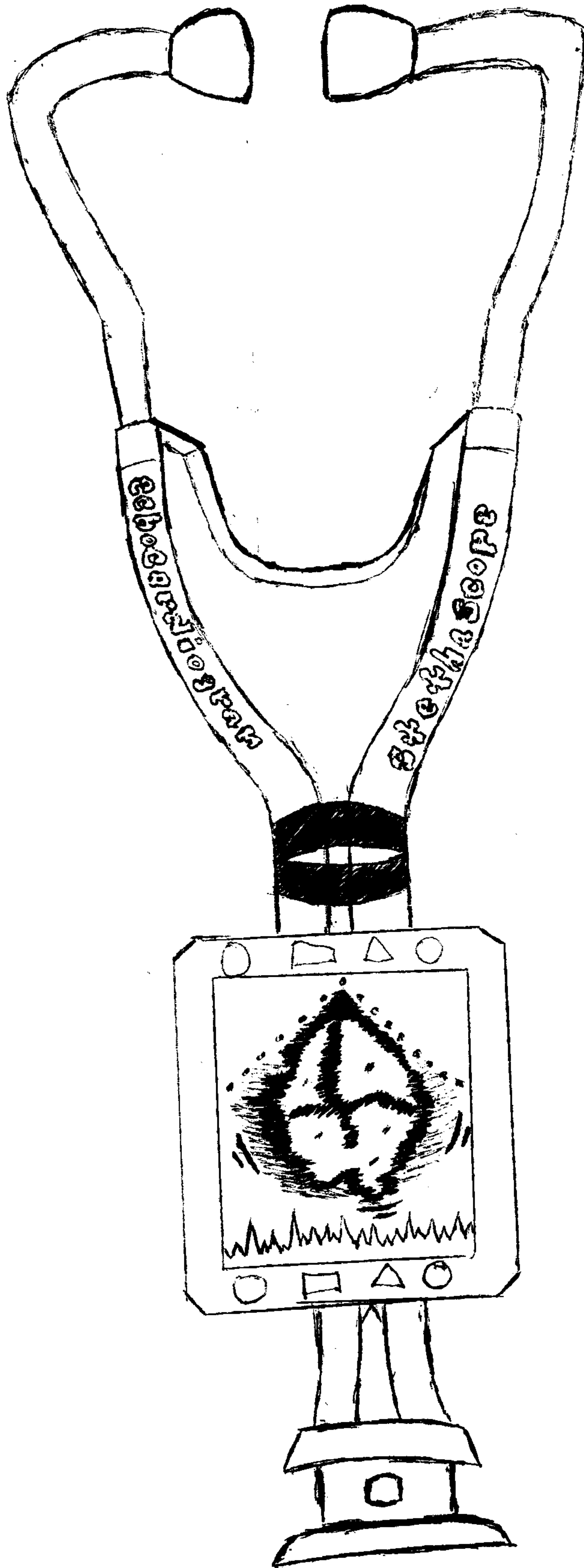
7: The device as defined in claim 1 through 6 will detect normal and abnormal sounds of the heart, and show pictures of the heart, kidney, liver spleen and the lung, and also detect functions of the femoral and jugular vasculature.

8: The device as defined in claim 1 through 7 will also have buttons on its interface corresponding to each organ as listed in Figure 2.

9: The device as defined in claim 1 through 8 will also have a connection between Figure 2 and Figure 3, in which the function of the heart can be checked in detail as function 1 connects to part 1a, which connects to the CPU of each parts which determine the function of S1, S2, S3, S4, L. Ventricle, R. Ventricle, Left and right atrium etc.

10: The device as defined in claim 1 through 9 will have the ability to detect normal and abnormal function via the CPU of 1a, 2a, 3a, 4a, 5a, 6a, and 7a, where detailed information of each organ will be stored as shown in figure 2.

Fig S = The system



Dr. S.S. Phillip
[Signature]

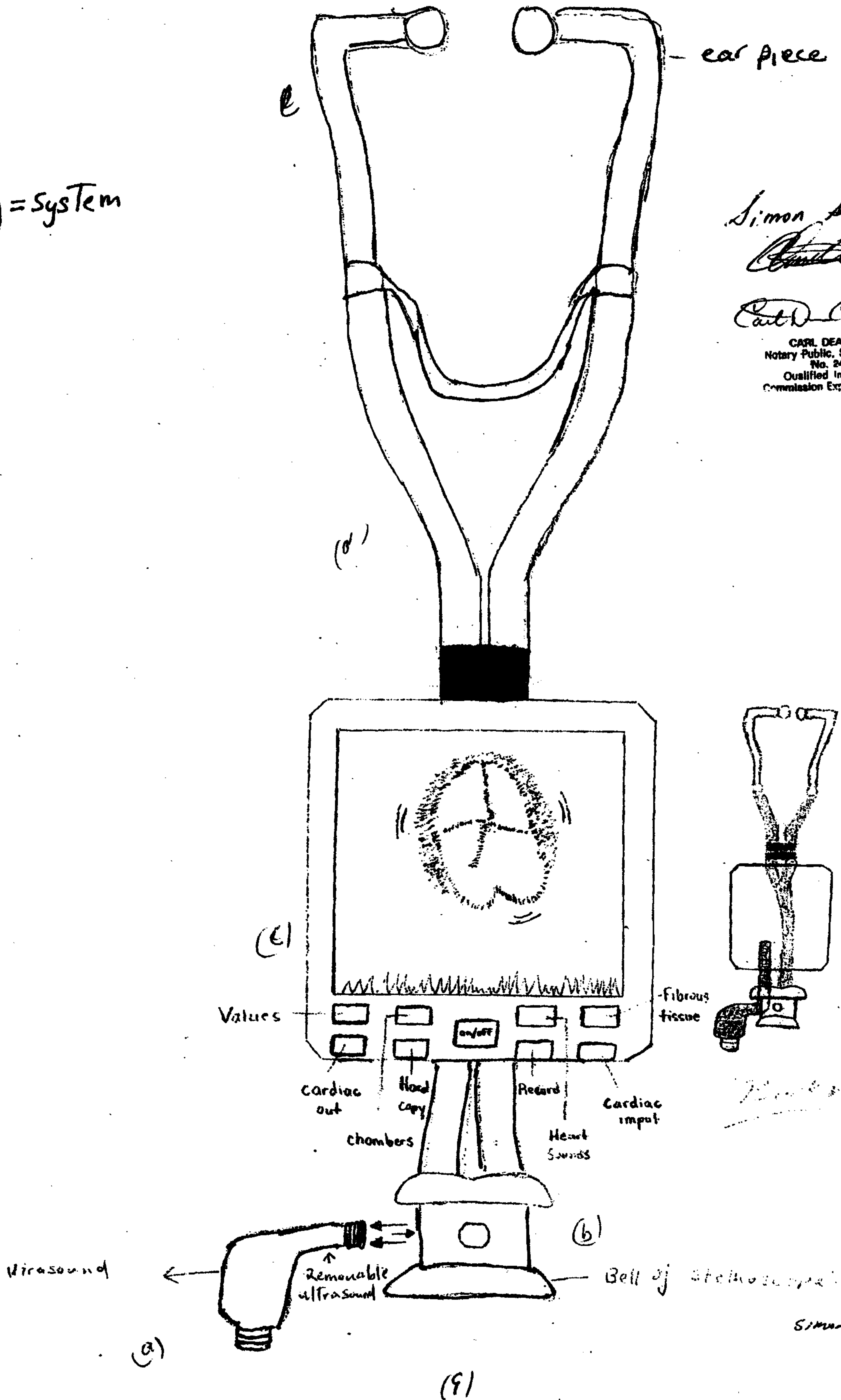
Witness by:

[Signature]

(8)

Stetho-echogram

Fig (S) = system



Simon Samuel Ph.D.

Carl Dean Carlton 6/22/01

CARL DEAN CARLTON
Notary Public, State of New York
No. 24-0570580
Qualified in Kings County
Commission Expires June 30, 2007

Simon Samuel Ph.D.
Witness by: Lar.
L. L. L. L.

Fig-2

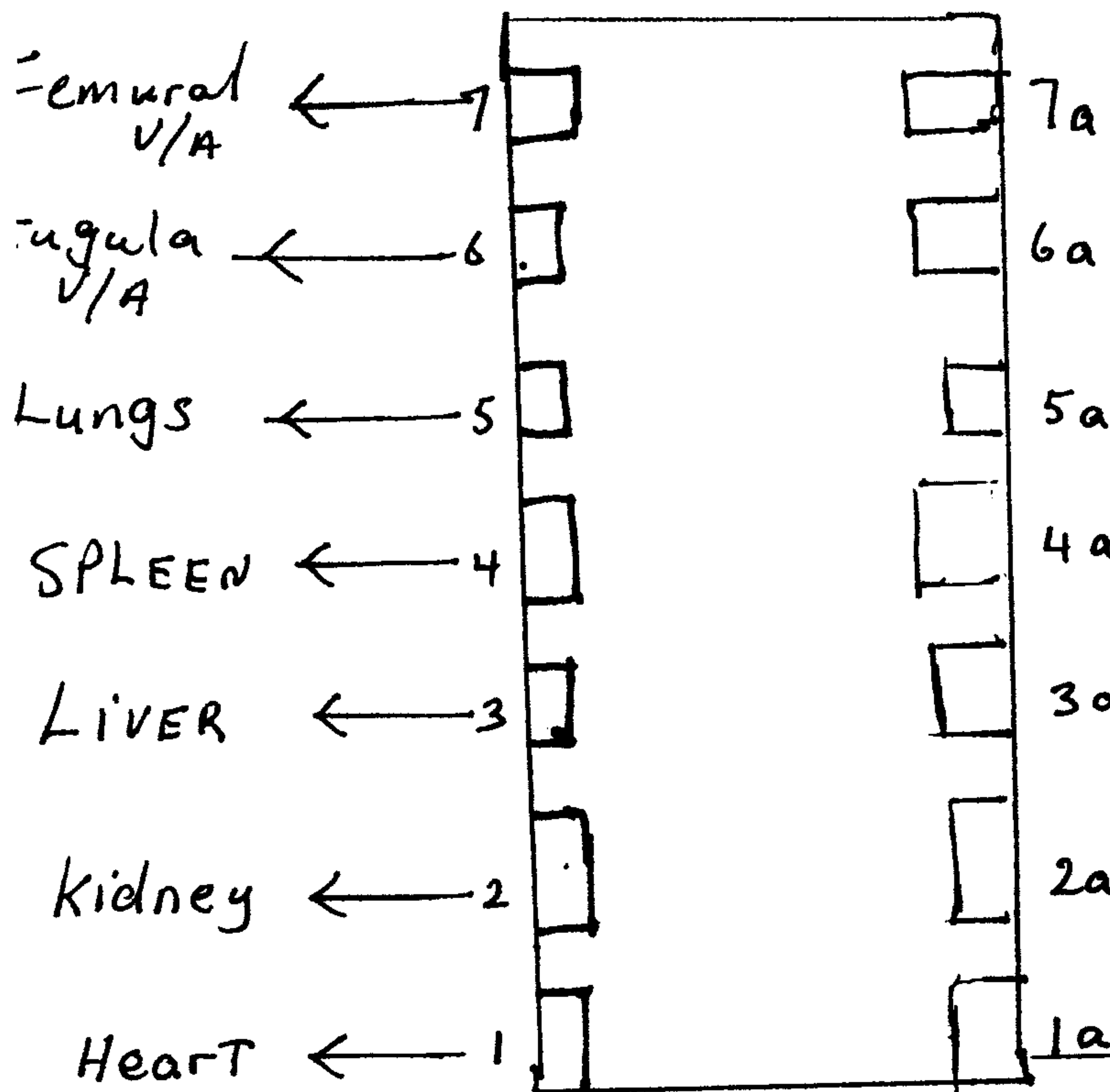


Fig-3

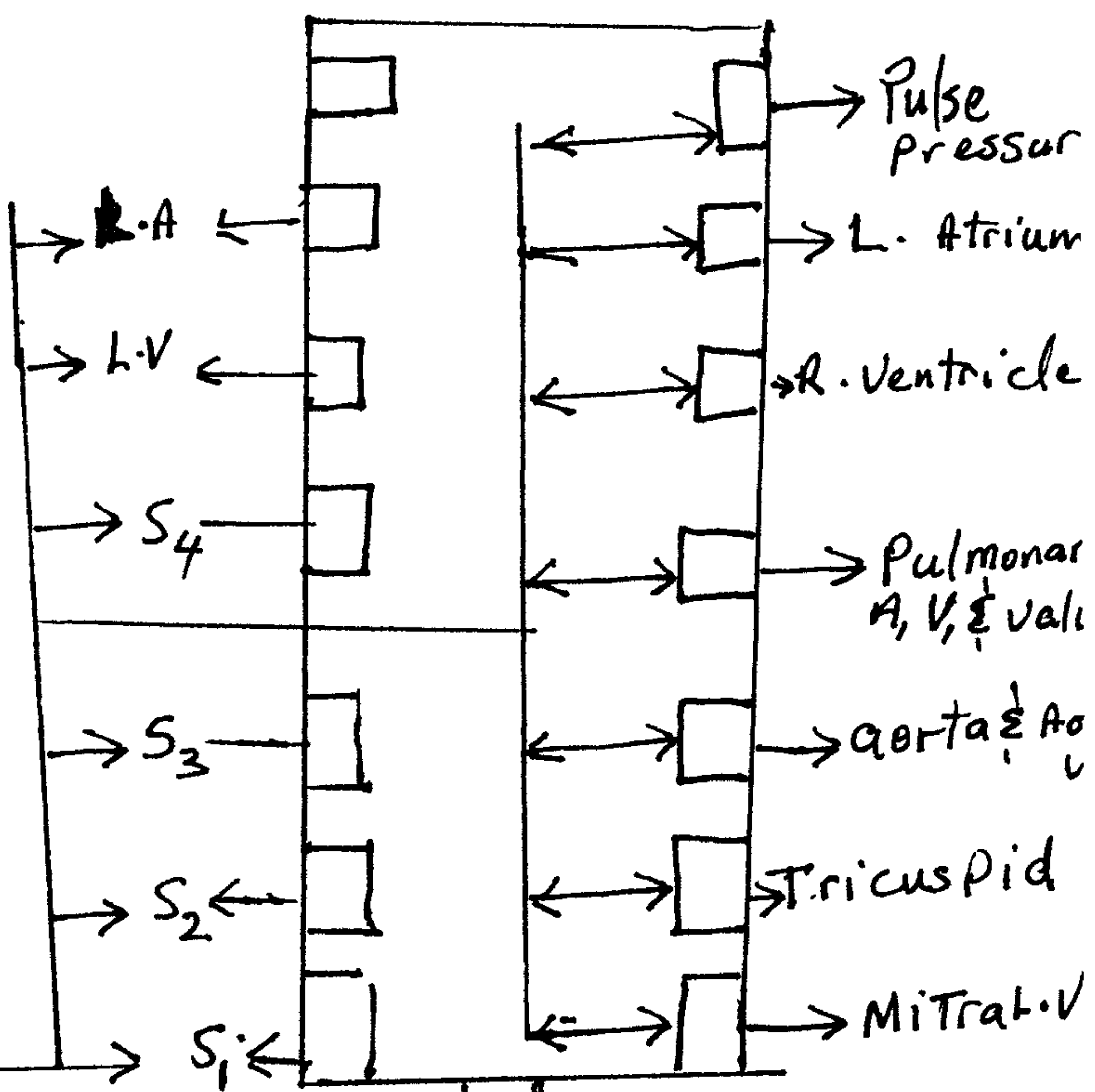


Fig-1

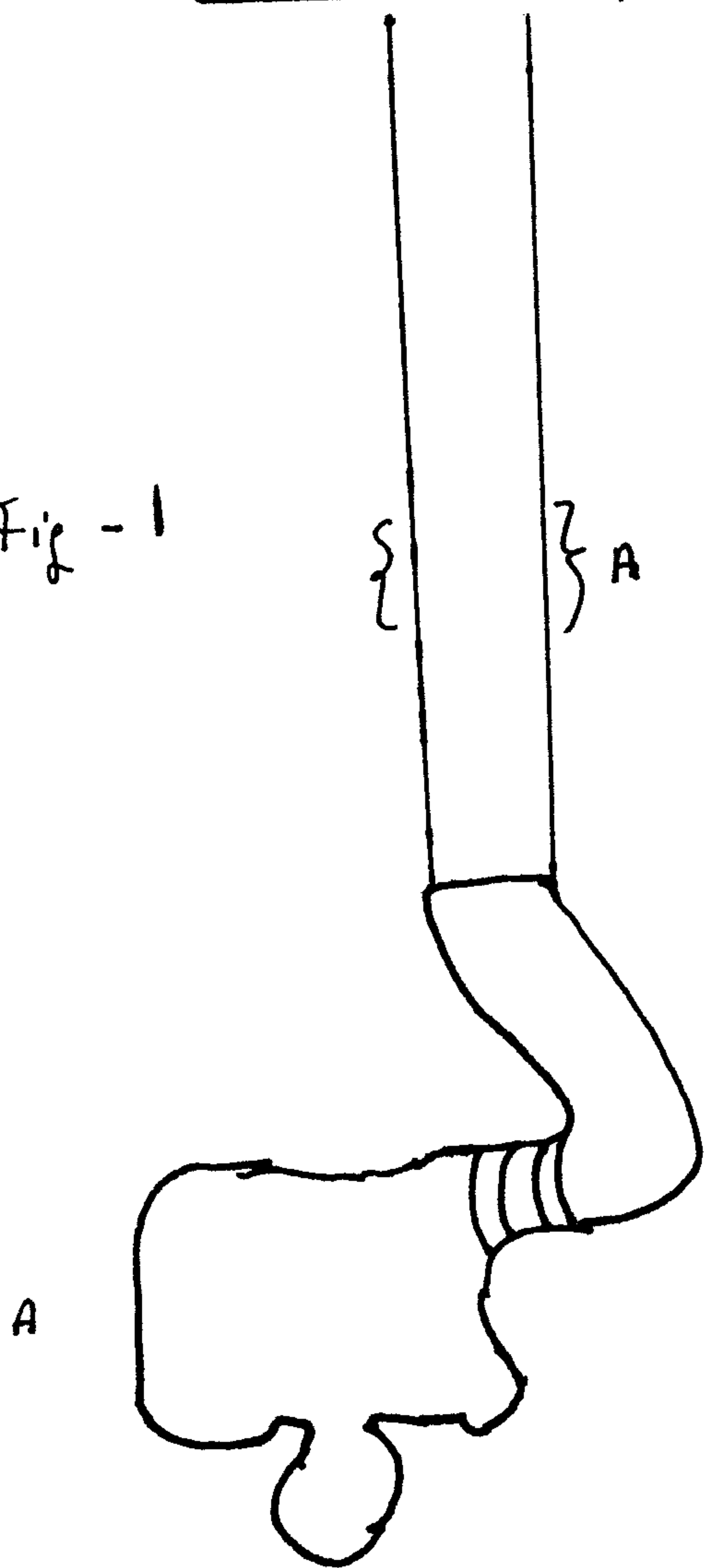


Fig-4

