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INFLATABLE BLADDER WITH SELF-CONTAINED FLEXIBLE  
LISTENING DEVICE FOR THE SOLE PURPOSE  
OF MEASURING BLOOD PRESSURE  
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3,621,831

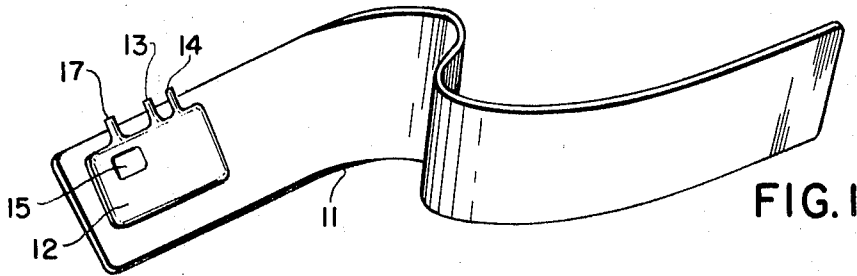


FIG. 1

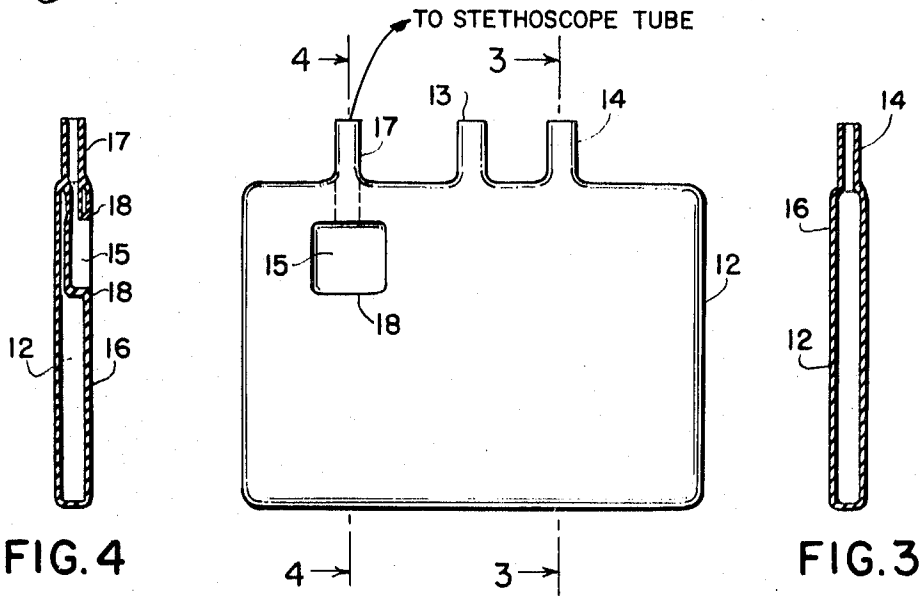


FIG. 4

FIG. 2

FIG. 3

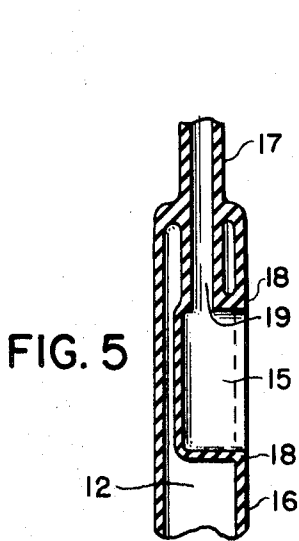


FIG. 5

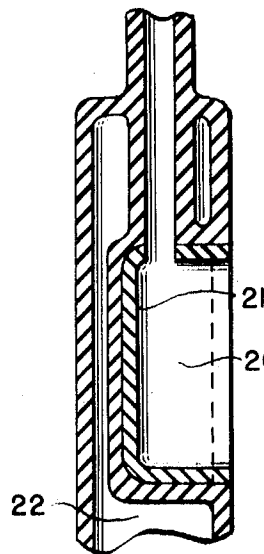


FIG. 6

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**INFLATABLE BLADDER WITH SELF-CONTAINED FLEXIBLE LISTENING DEVICE FOR THE SOLE PURPOSE OF MEASURING BLOOD PRESSURE**

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5 Claims

**ABSTRACT OF THE DISCLOSURE**

An inflatable bladder with one wall of the bladder having a recess therein defined by a flexible peripheral wall disposed within the confines of the bladder and including a tube for communication with a listening device such as a stethoscope for the sole purpose of measuring blood pressure when used with a conventional blood pressure cuff.

**BACKGROUND OF THE INVENTION**

The present invention generally relates to a flexible bladder having a listening chamber of flexible construction incorporated into one wall thereof and communicated with a listening device through a tube communicated with the chamber for use with a conventional blood pressure cuff for the sole purpose of measuring blood pressure.

Prior patents in this field of endeavor include inflatable cuffs or bladders for use in measuring blood pressure. Examples of such patents are Pats. Nos. 2,758,593, issued Aug. 14, 1956 and 2,981,251, issued Apr. 25, 1961 to Robert A. Berman. The latter mentioned patent includes a space Q communicated with a stethoscope through a tube assembly 57, 58 and 59 as illustrated in FIG. 5 thereof. Ryan Pat. No. 1,619,886 discloses an inflatable member adapted to be placed around the chest of a patient to measure expansion of the lungs.

**SUMMARY OF THE INVENTION**

Essentially, the invention relates specifically to the structure of an inflatable flexible bladder with a self-contained sound chamber or listening chamber formed by a recess in one wall of the bladder with the recess being defined by a peripheral wall which is flexible. The flexible and recessed sound chamber or stethoscope head is essential for accurate readings especially in measuring blood pressure in weak infants such as newborn babies. Rigid wall sound chambers which project beyond the wall of the inflatable bladder introduce, or have been found to introduce, inaccurate blood pressure readings unless the patient is completely cooperative and care is taken to place the stethoscope head so that its rim does not impinge on the underlying artery. Accordingly, the present invention overcomes this problem of inaccuracy by providing a stethoscope head or recessed sound chamber which is recessed into the wall of the bladder and does not project laterally therefrom and is defined by a flexible peripheral wall throughout its extent.

**BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a perspective view of a conventional blood pressure cuff illustrating the bladder of the present invention associated therewith.

FIG. 2 is a plan view of the inflatable bladder.

FIG. 3 is a vertical sectional view taken substantially upon a plane passing along section line 3—3 of FIG. 2 illustrating the structure of the bladder.

FIG. 4 is a vertical sectional view taken substantially

upon a plane passing along section line 4—4 of FIG. 2 illustrating the structural details of the bladder and the recessed sounding chamber.

FIG. 5 is a fragmental vertical sectional view of the bladder and sounding chamber, on an enlarged scale, illustrating the specific structure of the sound chamber and its relationship to the bladder.

FIG. 6 is a sectional view similar to FIG. 5 on a larger scale illustrating a modified structure.

**DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Referring now more particularly to the drawing illustrating preferred embodiments by which the invention may be realized, there is disclosed in FIG. 1 a conventional cuff 11 adapted to be wrapped around a limb, such as for example, the arm of an infant. An inflatable bladder 12 is disposed within cuff 11 at substantially an end thereof. Bladder 12 is made of any suitable flexible material, such as for example, rubber, synthetic rubber, plastic or the like. Basically, bladder 12 is a flat hollow member which has a passage 13 for attaching thereto a rubber tube leading to a conventional sphygmomanometer, and a second passage 14 for attaching thereto a rubber tube leading to a conventional inflating bulb. Tubes, sphygmomanometer and bulb are not shown in the drawing. It is understood that bladder 12 may have but one passage for inflation and internal pressure recording of the bladder. At substantially one end of bladder 12 a sound chamber 15 is made integral with the front wall 16 thereof by forming a recess in the wall 16 of bladder 12. A separate outlet 17 communicates between sound chamber 15 and the outside of bladder 12 (as seen at 19) so that a stethoscope listening tube may be attached thereto which leads to the ears of the observing physician. The periphery 18 of sounding chamber 15 is completely flexible so that it will conform to the surface of the arm under the influence of the air pressure applied. It is obvious that by this arrangement, the diagnosing physician can apply the sounding chamber 15 precisely to the area where he desires to listen through the stethoscope without being forced to hold a conventional stethoscope sounding chamber in place.

As shown in FIG. 6, modified sounding chamber 20 may be cup-shaped and may also be reinforced by a thickening of wall 21, or by adding suitable material to prevent excessive distortion of wall 21 by the pressure of the air in bladder 22 while maintaining flexibility of the sounding chamber.

From the foregoing, it can be readily seen that the blood pressure measuring device includes a flexible bladder disposed within a conventional cuff adjacent to an inner wall of said cuff at substantially one end thereof. The bladder has passage means for inflation and internal pressure recording and a sounding chamber integral with a wall of the bladder. The space within the bladder and the space within the sounding chamber are non-communicative and the sounding chamber has an outlet communicating with and connectible with a stethoscope tube.

It has been found that by employing the flexible walled sounding chamber that is completely recessed within the bladder, enables auscultation of Korotkoff's sounds by a physician under conditions which have heretofore been impractical, such as for example, in the arms and legs of newborn or small infants. Further, this invention reduces inaccuracies caused by excessive pressure exerted by the non-flexible rim of conventional stethoscope heads when attempting to measure blood pressure in uncooperative subjects. (All awake newborn infants are uncooperative subjects.) This problem has been effectively solved by use of a sounding chamber of flexible resilient material and recessing of the sounding chamber within the bladder

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so that the bladder is inflated, there is no single area or point of impingement on the skin or the blood vessel underlying the skin.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention, namely, the construction of a flexible recessed listening device.

What is claimed as new is as follows:

1. An inflatable bladder for use in measuring blood pressure comprising an inflatable flexible bladder provided with at least one passage communicating with the space within said bladder for inflation of said bladder, a flexible sounding chamber, said chamber being defined by a recess extending inwardly from a wall of said bladder, said space within said bladder and the space within said chamber being non-communicative, said chamber having outlet means for attachment of said chamber to a stethoscope tube, the junction formed between said recess and said wall being flush with the wall, peripherally continuous and flexible whereby said sounding chamber does not project beyond the plane of said wall, thereby eliminating any pressure points which would otherwise be produced when said bladder is inflated, which pressure points could interfere with the accurate determination of the blood pressure when the device is in use.

2. A pneumatic blood pressure cup for use in measuring the blood pressure of a patient and comprising an elongate strip of flexible material configured and adapted for encircling an appendage of the patient, an inflatable bladder disposed within the strip and extending partially therealong, said bladder including means for coupling a controllable air pressure and air pressure monitor to the bladder, a unitary flexible cup-shaped member in one wall of the bladder and defining a cavity therein communicating with the surface of the wall of the bladder with the area of the cavity enabling transmission of sound from the surface of the bladder into the cavity, said bladder including means defining a passage therethrough from the cavity to an exterior surface of the bladder other than the wall through which the cavity opens for coupling to a listening device.

3. The structure as defined in claim 2 wherein said

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cavity is defined by a peripheral wall and a bottom wall disposed adjacent to the opposite wall of the bladder whereby the depth of the cavity is only slightly less than the depth of the bladder between the opposite walls thereof.

4. The structure as defined in claim 3 wherein said peripheral wall and bottom of the cavity isolate the cavity from the interior of the bladder thus leaving the cavity unpressured.

5. The structure as defined in claim 1 wherein said bladder is of substantially rectangular configuration and provided with substantially parallel opposed wall surfaces disposed in closely spaced relation for positioning between a blood pressure cuff and the surface of the skin of a patient, said sounding chamber including a continuous peripheral wall and a bottom with the bottom being closely spaced to the wall of the bladder engaged by the cuff and the peripheral wall being integral with the wall of the bladder engaging the patient, said outlet means for the chamber including a tubular passage integral with the peripheral wall of the sound chamber and extending outwardly of the periphery of the bladder.

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128—2.05 S; 181—24