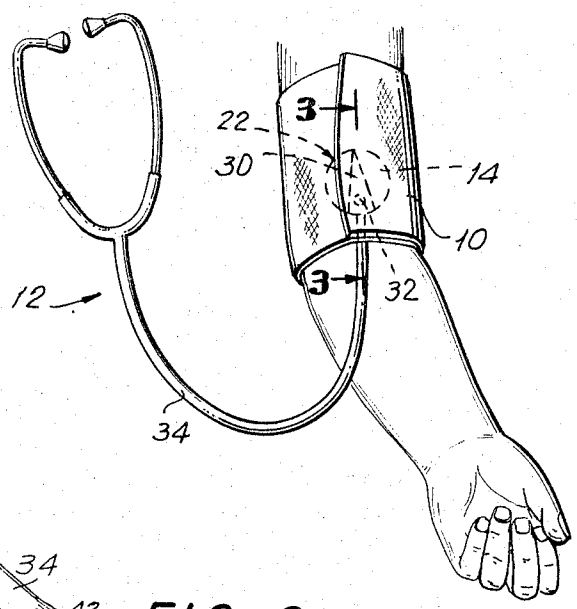
Sept. 5, 1967 I. A. SPEELMAN 3,339,667

STETHOSCOPE

Filed Aug. 2, 1966

FIG. 1



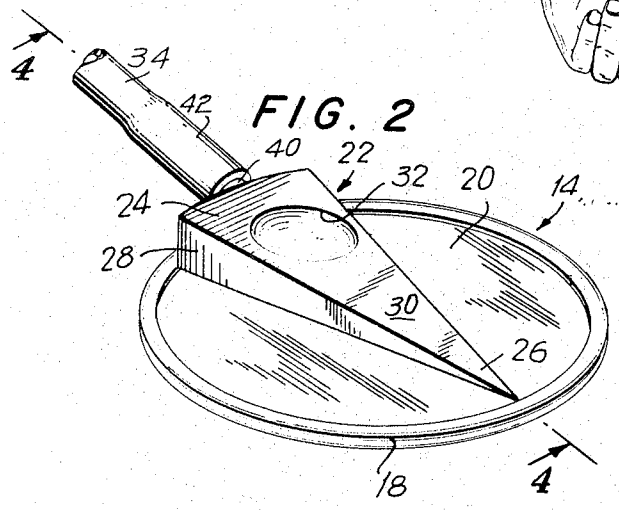


FIG. 2

FIG. 4

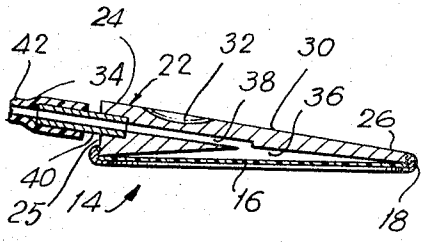
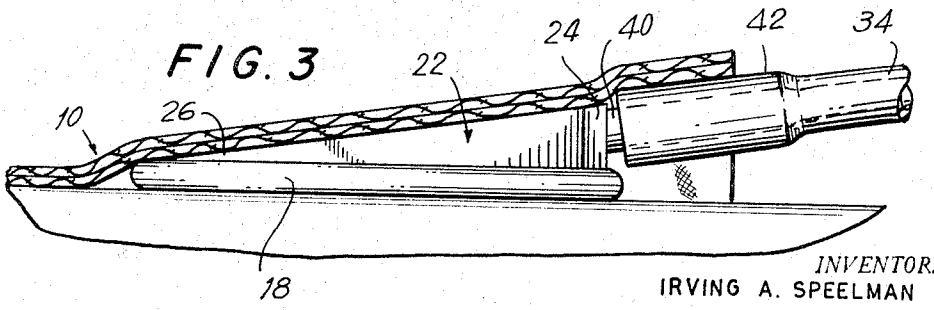


FIG. 3



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United States Patent Office 3,339,667
Patented Sept. 5, 1967

3,339,667

STETHOSCOPE

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Filed Aug. 2, 1966, Ser. No. 569,661
6 Claims. (Cl. 181—24)

ABSTRACT OF THE DISCLOSURE

A stethoscope particularly adapted to be received in a confined space such as the antecubital space beneath a sphygmomanometer cuff. The stethoscope includes a receiver having a front face for engaging the part of the body from which sound is to be received and a rear face opposed to the front face. A means is carried by the rear receiver face for facilitating, in combination with the rear face, insertion of the receiver into such a confined space and for retaining the receiver in the latter space until withdrawn therefrom. The front face of the receiver has at its periphery a rim into which a leading end of this means smoothly merges, this latter means becoming gradually thicker toward an opposed trailing end thereof so that it forms a wedge-shaped body. This latter body is solid and formed with a bore extending from its trailing end through the body into communication with an interior hollow space of the receiver at a central location where this space has a maximum depth, so that a central sound pick-up can be provided through this bore from that part of the interior receiver space which is of a maximum depth.

The present invention relates to stethoscopes.

In particular, the present invention relates to the structure of a stethoscope at the receiver thereof which is adapted to receive the sounds which are transmitted to the ears of the operator of the stethoscope.

As is well known, it is quite often required to situate the receiver of the stethoscope in a relatively confined space. For example, when measuring blood pressure it is conventional to situate the receiver of the stethoscope in a relatively confined space formed by the antecubital space situated beneath the sphygmomanometer cuff, so that in this way the operator can listen to the blood flow to determine when the blood flow stops and starts and the intervening Korotokoff sounds so as to properly correlate the operation of the sphygmomanometer with the meter readings derived therefrom and to aid the physician in his diagnosis of the patient. At this time, as when measuring blood pressure, it is necessary for the operator to carry out several operations, such as introducing air under pressure into the sphygmomanometer cuff so that it will stop the flow of blood through the artery, releasing this pressure at the proper time, and of course in addition holding the receiver of the stethoscope properly situated with respect to the artery in a confined space such as that referred to above. Thus, it becomes necessary for the operator to carry out a considerable number of operations, which renders the operations inconvenient and which leads to the requirement of a considerable amount of skill and experience in order to properly carry out all of these operations.

It is accordingly a primary object of the present invention to provide the receiver of a stethoscope with a construction which will enable it to conveniently be introduced into a confined space, while at the same time being capable of remaining in the confined space without any operations being required on the part of the operator, so that insofar as maintaining the receiver of the stethoscope at a predetermined confined space, the operations required of the operator can be eliminated with the structure of the present invention.

In addition, it is an object of the invention to provide for the receiver of a stethoscope a structure which will accomplish this object without undesirably increasing the size or weight of the stethoscope, particularly at the receiver thereof.

In addition, it is an object of the present invention to provide the receiver of a stethoscope with its construction while at the same time taking advantage of the presence of the structure of the invention to render more convenient other additional features of the stethoscope.

Thus, with the stethoscope of the invention the receiver conventionally has a front face which is adapted to be placed next to the part of the body from which sound is to be received and a rear face directed away from the front face. The receiver of the invention carries at its rear face a means for facilitating the introduction of the receiver into a confined space, such as the antecubital space beneath a sphygmomanometer cuff, and for retaining the receiver in this space, without requiring any manipulations on the part of the operator for this purpose.

The invention is illustrated by way of example in the accompanying drawings which form part of this application and in which:

FIG. 1 is a schematic illustration of the manner in which the structure of the invention can be used;

FIG. 2 is a perspective view of a receiver of a stethoscope, this receiver being shown as it appears from the rear and of course this receiver of FIG. 2 is provided with the structure of the present invention;

FIG. 3 is an elevational side view showing schematically a sphygmomanometer in section and showing how the structure of the invention is situated in a relatively confined space; and

FIG. 4 is a longitudinal sectional elevation taken along line 4—4 of FIG. 2 in the direction of the arrows.

Referring to FIG. 1, there is schematically illustrated therein a sphygmomanometer cuff **10** wrapped around the arm of the person whose blood pressure is being measured. A stethoscope **12** has its receiver **14** situated in the antecubital space beneath the sphygmomanometer cuff so that the blood pressure can be measured by operation of the sphygmomanometer in a well known manner.

The particular receiver **14** which is shown in FIGS. 2–4 is in the form of a microphone of the diaphragm type, and as may be seen from FIG. 4, at its front face the receiver **14** is provided with the diaphragm **16** which is held onto the receiver body by a threaded ring **18** in a well known manner. Ring **18** forms a rim for the front face of the receiver **14** at the periphery of the latter. This receiver **14** has a rear face **20** which is directed away from its front face, and it is at this rear face **20** that there is located the means **22** of the present invention for facilitating in combination with rear face **20** the introduction of the receiver **14** into a confined space and for retaining it in this confined space.

Thus, in accordance with the present invention the means **22** is in the form of a body of wedge-shaped elongated configuration tapering from a rear relatively large end **24** to a front, leading end **26** which is of a substantially pointed configuration. The rear or trailing end **24** terminates in a rear surface **25** which forms part of a cylinder, and means **22** has a pair of opposed side surfaces **28** which converge toward the front leading end **26** of the means **22** and which become of a gradually increasing width from the front end **26** to the rear end **24** of the means **22**. Thus, the surface **30** which forms the outer face of the means **22** is inclined from the rear end **24** to the front end **26**, so that in this way the means **22** has the substantially pointed configuration indicated in the drawings. The surface **30** is formed with a recess **32** adapted to receive a fingertip of the operator so that in this way

when the receiver **14** is not situated in a confined space it can conveniently be held by the operator at a desired location. The front substantially pointed tip end **26** of the means **22** merges smoothly into the rear surface **20**, as is particularly apparent from FIG. 4.

It is of course required that the tubular means **34** of the stethoscope communicate with the space **36** situated behind the diaphragm **16** (FIG. 4) and for this purpose the means **22** itself is formed with a bore **38** communicating with the space **36**. It will be noted that the space **36** is at its maximum depth at its central region behind the central portion of the diaphragm **16**, and by way of the bore **38** which passes through the solid body **22**, the pick-up of the sound waves takes place at this central portion of the space **36** where its depth is at a maximum. At the rear end **24** of the means **22** a tubular fitting **40** is provided, this fitting **40** either having a press fit or a threaded fit in the rear end of the means **22** of the present invention, and the flexible tube **42** is carried by the fitting **40** in the manner indicated in the drawings. Thus, the means **22** of the present invention serves in combination with rear face **20** not only to facilitate introduction of the receiver **14** into a confined space but also as a convenient structure for providing a bore communicating with the space behind the diaphragm so as to provide communication between this space **36** and the tubular means **42**.

Referring to FIG. 3, it will be seen that because of the structure of the means **22** of the present invention it can very easily be introduced into a confined space such as that indicated in FIG. 3. It will be noted that the front, leading end **26** of the means **22** has at the region of the rim **18** of the front face of the receiver **14** a thickness which is substantially the same as that of the rim **18** so that the front, leading end of the means **22** merges smoothly into the rim **18** maintaining the entire thickness of the receiver **14** at the region of the leading end **26** no greater than the rim **18**, so that the receiver **14** can be very easily slipped into the confined space. The particular space illustrated is the antecubital space below the sphygmomanometer cuff **10**. It is furthermore to be noted that the further the receiver **14** is introduced into the confined space the more surface area of the surface **30** is engaged by the sphygmomanometer cuff and furthermore the greater the extent to which the cuff is deflected away from the arm of the person whose blood pressure is being measured, so that in this way the frictional force retaining the receiver **14** in position by way of the means **22** of the present invention becomes greater as the receiver **14** is introduced to an increasing extent into the confined space. This frictional retaining of the receiver **14** in the confined space does not require any manipulations on the part of the operator who can simply allow the structure to remain in the condition indicated in FIGS. 1 and 3 without any manipulations whatsoever. It is to be noted in this connection that the sphygmomanometer cuff will have a certain pressure also with the rear corners of the wedge-shaped means **22** so as to enhance the force of friction which retains the structure in the required location.

At the same time, whenever it is desired to remove the receiver **14** the operator need only pull it out of the confined space, and the sliding provided between the sphygmomanometer cuff **10** and the surface **30** will make it possible to remove the receiver **14** very readily.

It is therefore apparent that with the structure of the invention the relatively small wedge-shaped means **22** hardly increases the size and weight of the stethoscope to any appreciable extent while at the same time making it possible to operate the stethoscope in a manner which is far more convenient than has heretofore been possible.

What is claimed is:

1. In a stethoscope, a receiver having a front face adapted to be placed against that part of the body from which sound is received and a rear face opposed to said front face, and wedge-shaped means carried by said receiver at said rear face thereof for facilitating in combination with said rear face insertion of said receiver into a confined space such as the antecubital space beneath a sphygmomanometer cuff and for retaining said receiver in said confined space until said receiver is withdrawn from the space, said receiver having an outer rim at the periphery of said front face thereof and said means having a leading end of substantially the same thickness as and merging smoothly into said rim, said means having distant from said leading end thereof at a part of said rim which is opposed to that part where said leading end of said means is situated a trailing end substantially thicker than said leading end and said means being of a gradually increasing thickness from said leading toward said trailing end thereof so that said means at its leading end together with said rear face of said receiver form a relatively thin structure capable of being easily inserted into a confined space, said receiver having between said front and rear faces thereof a hollow interior which has a maximum depth at a central region of said front face behind the latter and said means being solid and formed with a bore extending from said trailing end thereof through said means in communication with said hollow interior space of said receiver at the region where its depth is at a maximum for providing a central pick-up of sound at the central region of the receiver where its hollow interior is of a maximum depth.

2. The combination of claim **1** and wherein said stethoscope includes a tubular means communicating with said bore at said trailing end of said means for facilitating introduction of said receiver into a confined space.

3. The combination of claim **2** and wherein said wedge-shaped means has a substantially pointed configuration at its leading end, said wedge-shaped means having a pair of opposed side surfaces which converge toward each other as they approach said leading end and the thickness of said wedge-shaped means becoming gradually smaller from said trailing towards said leading end thereof so that said side surfaces have a width which gradually increases from said leading to said trailing end of said wedge-shaped means.

4. The combination of claim **3** and wherein said leading end of said wedge-shaped means merges smoothly into said rear face of said receiver.

5. The combination of claim **4** and wherein said wedge-shaped means is provided at its trailing end with a convexly curved surface forming part of a cylinder and extending between said side surfaces of said wedge-shaped means.

6. The combination of claim **5** and wherein said wedge-shaped means has an outer surface formed with a recess adapted to receive a fingertip of the operator for facilitating positioning of said receiver when the latter is not situated in a confined space.

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