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STETHOSCOPE

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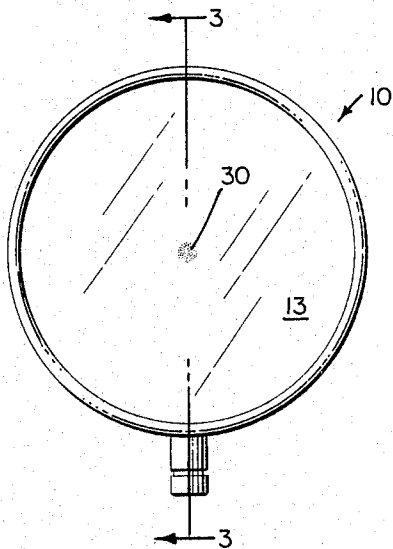


Fig. 1

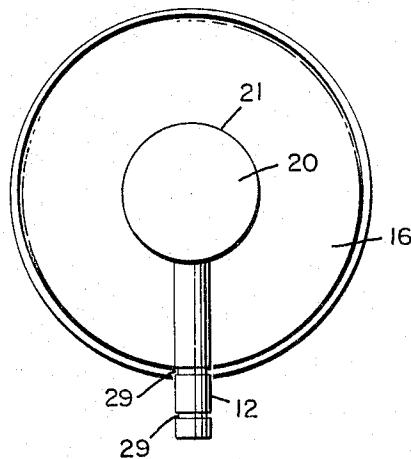


Fig. 2

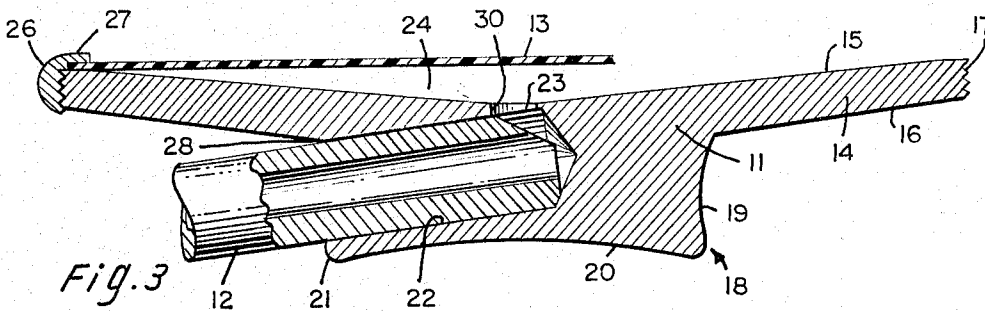


Fig. 3

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STETHOSCOPE

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The present invention relates to stethoscope chestpieces and more particularly to novel and improved stethoscope chestpieces which have excellent sound pickup properties and which are convenient and relatively easy to use and manufacture.

Many varied types of stethoscope chestpiece constructions are known. However, there has been a need for a lightweight, attractive stethoscope chestpiece which is relatively easily and inexpensively constructed, yet, provides ease of manufacture and use.

Accordingly it is an important object of this invention to provide a stethoscope chestpiece which has excellent sound receiving properties and which can be comfortably used and carried.

Another object of this invention is to provide a stethoscope chestpiece in accordance with the preceding object which is lightweight and highly compact.

Still another object of this invention is to provide a novel and improved method for the manufacture of stethoscope chestpieces in accordance with the preceding objects.

According to the invention, a lightweight stethoscope chestpiece has a body formed of a solid integral mass with a circular apron having two major opposite side walls. One side wall is concave in configuration and the other side wall has a rearwardly extending projection coaxially formed on the side wall. An annular edge connects the peripheries of the side walls. A planar circular diaphragm covers one side wall with its edge joined to the annular edge and the projection has an annular concave side wall continuous with the apron. A top is provided on the projection having a peripheral edge common with an edge of the annular concave side wall. An elongated stem has an opening extending longitudinally thereof and a first end extending into the projection at an acute angle with respect to the plane of the diaphragm and terminates in the body adjacent an axis passing through the center of the diaphragm and the center of the first mentioned side wall. Means defining a circular opening is provided in the body coincident with the axis of the diaphragm and interconnects the stem opening with a space formed between the diaphragm and the first mentioned side wall of the apron.

Preferably the top of the projection is concave and provides a thumb pressure surface for pressing the chestpiece against the body of a patient. The top has an outer edge lying in a plane substantially parallel to the plane of the diaphragm thereby providing for ease of thumb pressure actuation when listening through the sound tube of a stethoscope in which the chestpiece is used. In its preferred form, the chestpiece is uniformly covered with an anodized colored coating to enhance the appearance of the chestpiece.

In the method of this invention, a bore is formed in the projection at an acute angle to the diaphragm. A second bore is formed from the first mentioned side wall underlying the diaphragm axially thereof to meet with the projection bore. This method provides for ease of manufacture with a circular opening providing good sound receiving properties to the chestpiece and simplifying location of the opening to the stem in the first side wall.

Other objects, advantages and features of the invention will become readily apparent from the following detailed

description when read in connection with the accompanying drawings in which:

FIG. 1 is a plan view of the face of a preferred embodiment of the chestpiece of this invention;

FIG. 2 is a plan view of an opposite face thereof; and,

FIG. 3 is an enlarged cross sectional view taken through line 3—3 of FIG. 1.

With reference now to the drawings, a chestpiece 10 is illustrated having a body 11, a stem 12 and a diaphragm 13 attached thereto.

The body 11 is preferably made of a lightweight metal such as aluminum formed as a solid integral mass with a circular apron 14. The apron 14 has a first major side wall 15 and a second major side wall 16 opposing said first side wall. Side walls 15 and 16 are joined at their periphery by an annular threaded edge 17. An integral projection 18 extends from side wall 16 and has an annular concave side wall 19 continuous with the apron at one edge and a top concave surface 20 having an edge 21 common with the edge of the annular concave side wall as best seen in FIG. 3. The edge 21 is preferably located parallel to the plane of diaphragm 13 in order to maintain the chestpiece as flat as possible. This configuration is desirable for ease of manipulating the stethoscope under the shirt of a patient or in other locations. The concave top 20 provides a thumb pressure surface for pressing the chestpiece firmly against the chest of a patient with little exertion on the part of a user. The annular concave side wall 19 cooperates to allow the fingers to grip the stethoscope as it is pressed into use.

A bore 22 defines an opening passing from the annular concave side wall 19 to a point adjacent and beyond a central axis of the diaphragm 13 and side wall 15. The elongated stem 12 is snugly received within the circular bore 22 and has an angled opened end 23 by which its hollow passageway is interconnected with the space between the diaphragm 13 and the side wall 15. The stem can be secured in the bore by any conventional means and is preferably secured therein by a suitable adhesive. The opened end 23 can be easily aligned with a circular bore 30 passing axially of the diaphragm in the body to interconnect the stem opening with the space 24. Preferably bore 22 has an opening with an edge portion 28 adjacent apron side wall 16 and a second edge portion spaced from the top edge 21 of the projection. Thus this bore provides for the stem passing at an acute angle to the diaphragm thereby enhancing the compact flat configuration of the chestpiece. The angle of the center line of the stem with a plane parallel to the plane of diaphragm 12 is preferably no greater than 30 degrees and in the specific preferred embodiment is 7½ degrees.

Annular grooves or indentations 29 are preferably provided in the stem 12 for attachment of the stem to a conventional stethoscope resilient sound tube.

The circular planar diaphragm 13 may be any conventional plastic or other diaphragm known in the art. The diaphragm 13 has a peripheral edge extending near edge 17 as best shown in FIG. 3 and is joined to the apron by an annular member 26. Annular member 26 is internally threaded to mate with the threaded edge 17 and provide an annular end wall slightly larger than the width of the apron with an inwardly extending lip 27 overlying the diaphragm peripheral edge and securing the diaphragm to the body.

In a specific example of the preferred embodiment, edge 17 has a diameter of 1.7 inches, diaphragm 13 has a diameter of 1½ inches, bore 30 has a diameter of ⅜ inch, bore 22 has a diameter of ⅜ inch, top 20 has a diameter of ¾ inch and the overall thickness of the chestpiece from diaphragm 13 to edge 21 is approximately 1⅜ inches. The chestpiece is made of aluminum and is extremely lightweight.

The side wall 16 and projection 18 are preferably coated with an anodized layer which may comprise any of the anodized aluminum layers to give an esthetically pleasing colored effect to the stethoscope. The colored layer can also be formed on the outer surface of annular member 26.

Turning now to the method of this invention, the chestpiece is preferably formed in a conventional manner with a solid aluminum mass for body 11. Bore 22 is then drilled into body 11. It has been found that the annular concave wall 19 facilitates drilling of bore 22. It is preferred not to have bore 22 contact side wall 15 but rather be spaced therefrom as shown in FIG. 3. A second bore forming circular opening 30 on side wall 15 is then drilled to interconnect bore 22 and bore 21. The stem 12 is then inserted into the bore 22 and adhesively secured using conventional methods with its opened end 23 interconnecting space 24 with the stem of the chestpiece. This method of using two bores rather than a conventional method of drilling bore 22 until it meets side wall 15, is believed to be advantageous in providing for excellent sound receiving properties of the chestpiece. In addition, precision of manufacture is assured since opening 30 is always located coaxially of the side wall 15 and diaphragm 13.

It is also possible to drill bore 30 before drilling bore 22 or to position the stem within bore 22 and subsequently drill bore 30 into the stem opening.

While a preferred embodiment of this invention has been shown and described, it should be understood that many variations thereof are possible. The chestpiece of this invention can be used with conventional ear pieces and a sound tube of a conventional stethoscope. This invention is to be limited only by the spirit and scope of the appended claims.

What is claimed is:

1. A lightweight compact stethoscope chestpiece comprising:
 - a body formed of a solid integral mass having a circular apron with two opposite major side walls,
 - one side wall being concave in configuration and the other side wall having a rearwardly extending projection coaxially formed thereon, said projection defining a stem passageway,
 - an annular edge connecting the periphery of said side walls,
 - a planar circular diaphragm covering said one side wall with its edge joined to said annular edge,

said projection having an annular concave side wall continuous with said apron and a top having a peripheral edge common with an edge of said annular concave side wall, said stem passageway having an outer end on said concave wall,

said one side wall defining a substantially circular opening axially aligned with a central axis of said one side wall and said diaphragm with said circular opening interconnecting a space between said one side wall and said diaphragm with said stem passageway, an elongated stem secured in said stem passageway defining an opening extending longitudinally there-through with said stem having one end extending into said projection at an acute angle with respect to the plane of said diaphragm and terminating in said projection beyond said axis passing through the center of said diaphragm and said one side wall, said stem having a portion thereof removed for communication of said stem passageway with said space through said first-mentioned opening.

2. A lightweight stethoscope chestpiece in accordance with claim 1 wherein said top is concave and provides a thumb pressure surface having an outer edge lying in plane substantially parallel to the plane of said diaphragm.

3. A lightweight stethoscope chestpiece in accordance with claim 1 wherein said projection and said other apron side wall are uniformly covered with an anodized colored coating.

4. A lightweight stethoscope chestpiece in accordance with claim 1 wherein said stem is fixed in said body and extends out of said projection at said outer edge of said stem passageway which is spaced from said top and adjacent said other body side wall.

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