United States Patent

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[72] Inventor **Thomas Albert Scanlon**
Barrington, Rhode Island

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[73] Assignee **Avid Corporation**
East Providence, Rhode Island
a corporation of Rhode Island

[54] **STETHOSCOPE**
4 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **181/24**
[51] **Int. Cl.** **A61b 7/02**
[50] **Field of Search** 181/24

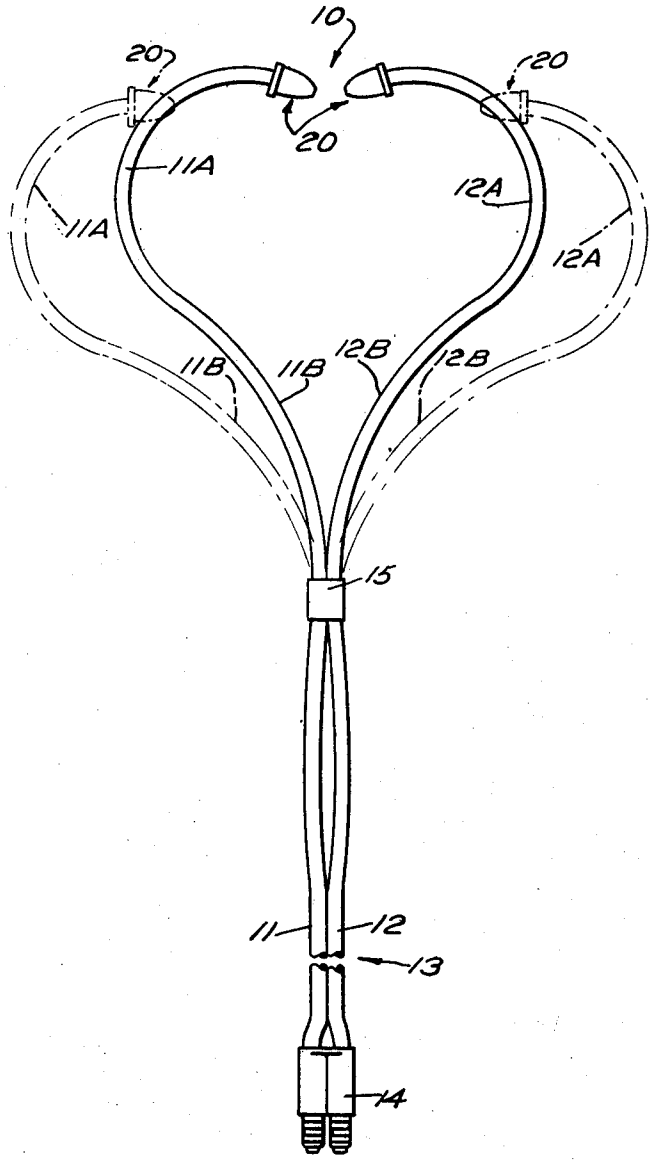
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Primary Examiner—Stephen J. Tomsky
Attorney—William Frederick Werner

ABSTRACT: Stethoscope for conducting sound waves comprising a pair of plastic tubes, heat set into a preselected form on one end thereof, and ear tips, one for each tube and fastened thereon, fabricated from pliable plastic and preshaped, so as to be self-supporting in an ear canal.



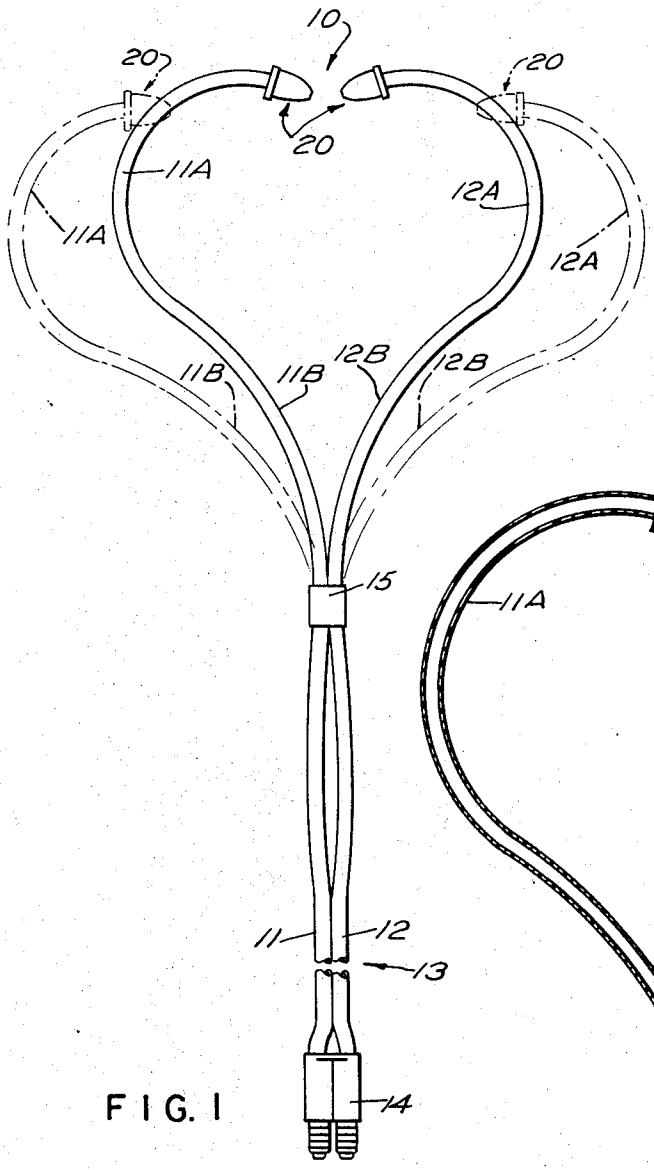


FIG. 1

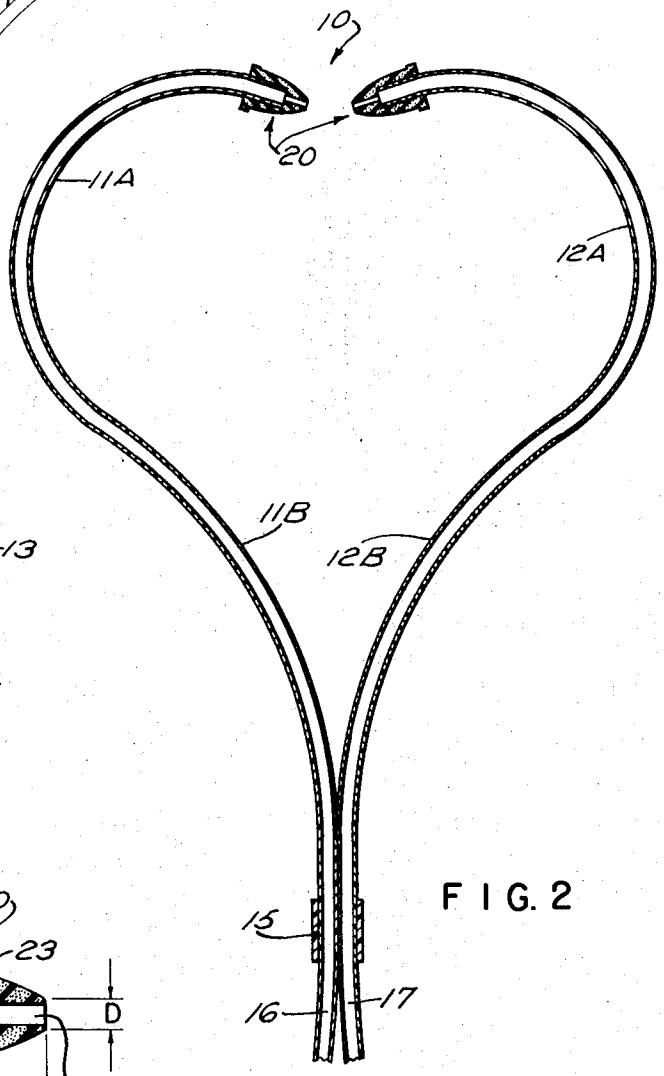


FIG. 2

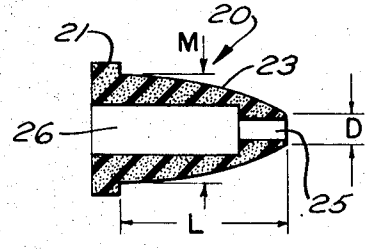


FIG. 3

INVENTOR
THOMAS ALBERT SCANLON
BY
William Frederick Kenner
ATTORNEY

STETHOSCOPE

This invention relates to stethoscopes and more particularly to a new construction which is self-supporting in ear canals and is provided with adjustable means for varying the pressure on the ear canals.

An object of the present invention is to preform the end portions of a pair of plastic tubes into an open loop so as to render them resilient in a diametrically opposite plane and to provide means for varying the resilient pressure exerted in the diametrically opposite plane.

Another object of the present invention is to provide ear tips of a preselected material and configuration so that the ear tips will support the respective, loop ends of the plastic tubes in, respective, ear canals.

Still another object of the present invention is to provide a stethoscope of inexpensive construction and extremely light in weight and comfortable to the wearer when supported in the orifices of the ears.

Other objects of the present invention will become apparent in part and be pointed out in part in the following specification and claims.

Like reference numerals refer to like parts in the following drawings in which:

FIG. 1 is a side elevational view of the new and improved stethoscope;

FIG. 2 is a vertical medial view through FIG. 1;

FIG. 3 is an enlarged vertical cross-sectional view through an ear tip.

Referring to the drawings with more particularity, a sound tube head set or stethoscope, indicated generally by reference numeral **10**, includes two flexible tubes **11**, **12** of the type produced by the extrusion method for plastics and which may be fabricated from polyvinylchloride. Tubes **11** and **12** have separate acoustical or sound wave passageways **16**, **17**.

The two flexible tubes **11** and **12** may be fastened together as by heat sealing for part of their length, as shown at **13**. One end of tubes **11** and **12** may be fastened in a jack **14** which can be plugged into a sound collector, transducer or sound receiver (not shown).

A sleeve **15** is frictionally mounted upon tubes **11** and **12** for sliding movement along said tubes in the length away from where the tubes **11**, **12** are fastened together.

The respective ends **11A** and **12A** of tubes **11** and **12** are placed in a form and heat set into a reverse curve which forms a bowlike shape in each end; with the respective ends diametrically facing each other to form a resilient open loop.

Sleeve **15**, slidable upon tube ends **11A** and **12A**, dictates the size of the loop and the tension exerted by the loop ends **11A** and **12A** toward each other, through the movement of sections **11B** and **12B** of the reverse curve toward and away from each other.

Reference is made to FIG. 3 wherein an ear tip, generally indicated by reference numeral **20**, is illustrated.

Ear tips **20** are fabricated from natural or synthetic rubber and are preferable molded from sponge rubber so as to be soft and pliable and easily deformable into the shape of an ear canal.

It has been found through empirical effort that an ear tip having a length "L" of seventeen thirty-seconds of an inch, an entering end diameter "D" of three-sixteenths of an inch, a major body diameter "M" of three-eighths of an inch, and a flange **21**, will comfortably stay inserted in most ear canals even though a head is moved in routine daily movement.

A tapered or curved surface **23** connects dimension "D" with dimension "M" to form the desired contour for the ear tip.

Ear tip **20** is axially provided with a sound passageway **25** and an axial bore **26**.

The outer ends of tubes **11A**, **12A** are inserted, respectively, in axial bores **26** so as to connect sound wave or acoustical passageways **16** and **17** in communication with sound passageways **25**.

The ear tips **20** are fastened respectively, FIG. **2**, to the outer ends of tubes **11A**, **12A** by means of the inherent resilience of the material, or by heat sealing, cement or a drive fit in axial bores **26**. Flange **21** is a stop to limit the extent that the ear tip **20** may be inserted into an ear canal.

Having shown and described a preferred embodiment of the present invention, by way of example, it should be realized that structural changes could be made and other examples given without departing from either the spirit or scope of this invention.

I claim:

1. A stethoscope for conducting sound waves comprising a pair of flexible tubes, a sleeve frictionally mounted for sliding movement upon said tubes, each tube having a reverse curve section adjacent one end to provide tube ends diametrically opposite each other to form a resilient open loop, and two ear tips, fastened respectively, to the outer ends of said pair of tubes, said sleeve increasing or decreasing the resiliency of said open loop.

2. A structure as claimed in claim **1** being further characterized by: said pair of ear tips being fabricated from soft pliable material having a tapered outer surface wherein one end of the taper approximates three-sixteenths of an inch, the opposite end of the taper approximates three-eighths of an inch and the length of the taper approximates seventeen thirty-seconds of an inch.

3. In the manufacture of a stethoscope for conducting sound waves, the method comprising the steps of:

a. extruding a plastic tube of a required cross section;
b. cutting said tube into appropriate lengths;
c. laying two lengths of tube side by side to provide a pair of tubes;
d. fastening said tubes together a selected portion of the appropriate lengths;
e. sliding a sleeve over said pair of tubes at the unfastened portion of the appropriate lengths;
f. providing a reverse curve section adjacent one end of each of said pair of tubes to provide tube ends diametrically opposite to each other; and
g. heat setting the reverse curve sections to form a resilient open loop.

4. In the manufacture of a stethoscope for conducting sound waves, the method comprising the steps of:

a. extruding two plastic tubes, each of required cross section;
b. bonding the two tubes together at the mouth of the extruder to form a web between the two tubes;
c. cutting said tubes into appropriate lengths;
d. severing the web to separate the two tubes a selected portion of the appropriate length;
e. sliding a sleeve over said pair of tubes at the severed portion of the appropriate lengths;
f. providing a reverse curve section adjacent one end of each of said pair of tubes to provide tube ends diametrically opposite to each other; and
g. heat setting the reverse curve sections to form a resilient open loop.