Oct. 27, 1925. 1,559,147

P. A. AURNESS

STETHOSCOPE

Filed Sept. 18, 1922

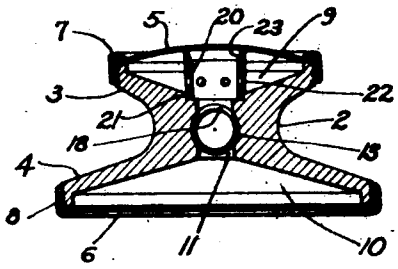


FIG. 1

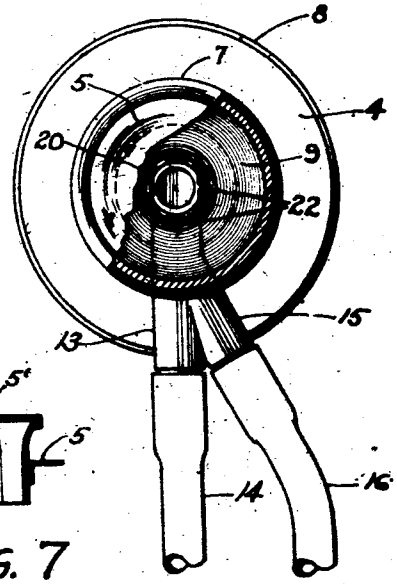


FIG. 2



FIG. 7

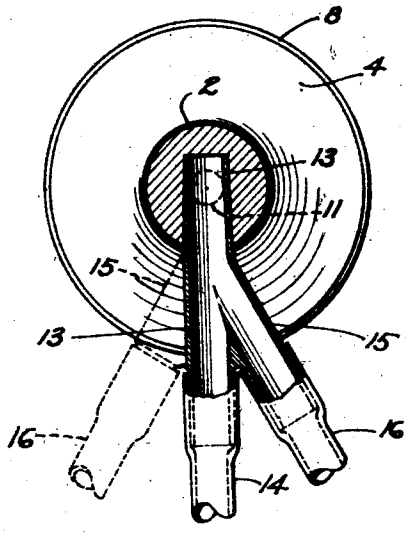


FIG. 3

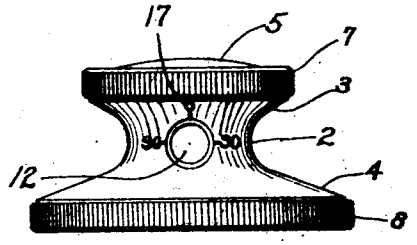


FIG. 4

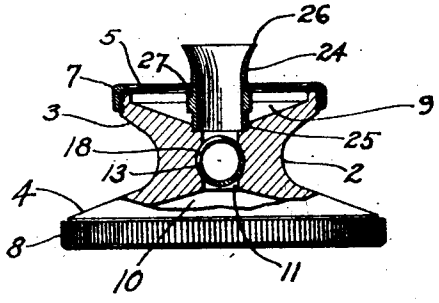


FIG. 6

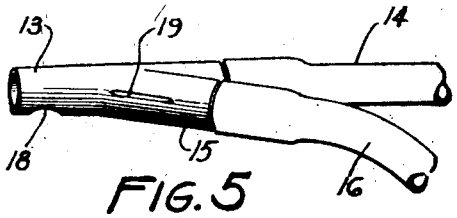


FIG. 5

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UNITED STATES PATENT OFFICE.

PETER A. AURNESS, OF MINNEAPOLIS, MINNESOTA.

STETHOSCOPE.

Application filed September 18, 1922. Serial No. 588,993.

To all whom it may concern:

Be it known that I, PETER A. AURNESS, a citizen of the United States, resident of Minneapolis, county of Hennepin, State of Minnesota, have invented certain new and useful Improvements in Stethoscopes, of which the following is a specification.

The object of my invention is to improve the stethoscope shown and described in Letters Patent of the United States issued to me February 5, 1907, Number 843,319.

The general object of my present invention is to provide means for more readily obtaining arterial sound through instrumental contact pressure in arterial regions.

A further object is to provide means for readily determining the position of the port or opening in the plug inserted into the stethoscope with respect to the openings leading to the diaphragm, thus enabling the operator by the simple rotation of the plug to increase or decrease the area of the sound passage.

Other objects of the invention will appear from the following detailed description.

The invention consists generally in various constructions and combinations all as hereinafter described and pointed out in the claims.

In the accompanying drawings forming part of this specification,

Figure 1 is a sectional view through a stethoscope embodying my invention.

Figure 2 is a plan view with a portion of one of the diaphragms broken away showing the sleeve beneath the diaphragm.

Figure 3 is a sectioinal view showing the manner of inserting the plug into the stethoscope.

Figure 4 is a side view of the stethoscope with the plug removed.

Figure 5 is a detail view of the plug showing the mark thereon for registering with the mark or index on the wall of the stethoscope.

Figure 6 is a sectional view illustrating a flaring tube or sleeve which passes through the diaphragm and is adapted for contact with surfaces of the body which can not be easily reached with the full area of the diaphragm.

Figure 7 is a detail sectional view showing a diaphragm on the sleeve illustrated in Figure 6.

In the drawing, 2 represents the body or shell of the stethoscope having the flaring end portions 3 and 4 on which diaphragms 5 and 6 of different sizes are mounted by suitable means such as rings 7 and 8. These diaphragms cover chambers 9 and 10, encircled by the end portions 3 and 4. Between these chambers through the body 2, is a port or passage 11, and the side wall of this port or passage has a socket 12 that is adapted to receive a hollow plug 13 which communicates at one end with a tube 14, and has a branch 15 connected with a similar tube 16. These tubes lead to suitable ear pieces as usual in instruments of this type.

The wall of the body 2 has a mark 17 thereon, indicated preferably by *o*, and 90° from this point on each side, marks are provided indicated by figures 90. A port 18 is provided in the plug 13 adapted to register with the passage 11 and a mark 19 is preferably formed on the wall of the plug which when adjusted opposite the marks on the body 2, will enable the user of the device to determine the position of the port 18 with respect to the passage 11 and by rotating the plug in the socket he can increase or decrease the area of this passage as occasion may require. The *o* mark will preferably indicate the minimum point for the passage of sound, while the maximum opening for the sound passage will be indicated by the numerals 90. With these two positions definitely determined, simple rotation of the plug will determine the increase or decrease of the sound passage from the diaphragm chamber to the plug, and enable the user of the instrument to quickly and accurately adjust it for the desired work.

For the purpose of quickly and accurately providing stethoscope transmission of arterial sounds, or pulsation, I provide a sleeve 20 fitting within a socket 21 in the body 2, and having ports 22 in walls and a flaring outer end 23 that is adapted to bear on the inner surface of the diaphragm 5 and form a rigid support for said diaphragm. allowing the user to press the diaphragm against the surface of the body adjacent the artery, and then by the vibrations of the outer portion of the diaphragm, obtain an accurate transmission of arterial sounds or pulsation waves.

As shown in Figure 1, I prefer to make the sleeve 20 of sufficient length so that the diaphragm will be arched or convexed with

its middle portion raised above the edge thereof for convenience in applying the instrument to the body.

In some cases, it is desirable to place the instrument on the body at some point or angle where the comparatively broad surface of the stethoscope cannot be readily applied, and in such cases, I provide a sleeve 24, seated in a socket 25 in the body of the stethoscope and projecting through the diaphragm, having a bell-shaped outer end 26 which can be readily placed on the surface of the body, as for instance, in the angle of the elbow and held firmly on the skin at a point where it would be difficult if not impossible to apply the full area of the end of the stethoscope. The sleeve has a shoulder 27 on which the diaphragm is seated and when its outer end is applied to the body surface, arterial sounds will be transmitted through the bell-shaped receiver, and the vibrating diaphragm to the ear tubes in substantially the same manner as when the diaphragm is applied directly to the body.

In Figure 7, I have shown a small auxiliary diaphragm 5′ applied to the outer end of the sleeve 24 to enable the user of the instrument to more easily detect arterial sounds. In other respects this sleeve 24 will be substantially the same as shown with reference to Figure 6.

In various ways the details of construction herein shown and described may be modified and still be within the scope of my invention.

I claim as my invention:

1. A stethoscope comprising a shell having a large diaphragm thereon and a portion having a socket therein to receive an ear tube, a small sleeve mounted on the socket portion in said shell and forming a support between the middle portion of the large diaphragm and said socket portion.

2. A stethoscope comprising a shell having a large diaphragm thereon and a portion having a socket therein to receive an ear tube, a sleeve mounted on the socket portion in said shell between the middle portion of the diaphragm and said socket portion and projecting through said diaphragm and having an outer end for contact with the surface of the body.

3. A stethoscope comprising a shell having a central partition and a large diaphragm mounted thereon, a socket in the partition adapted to receive an ear tube and a small sleeve mounted on the partition in said shell between the diaphragm and socket and supporting the middle of the diaphragm.

4. A stethoscope of that type comprising a double cone-shaped shell with open ends and diaphragms of different areas closing the ends thus forming chambers in each end, a partition between the chambers having a sound passageway between them with a socket in the partition leading to the passageway, an ear tube plug fitting the socket and a sleeve mounted in said shell on the partition and around the passageway and contacting with a diaphragm.

5. In a stethoscope of that type comprising a double cone-shaped shell having open ends and diaphragms of different areas closing the ends, a partition between the chambers having a sound passageway between the chambers with a socket in the partition leading to the sound passageway, a tube over the passageway and supporting a diaphragm, an ear tube plug fitting the socket leading to said passageway and having a port in its side wall for communicating with said passageway, said plug being mounted for rotation in said passageway and having indicating means on its surface, the wall of said shell also having indicating means cooperating with the mark on said plug to indicate the maximum or minimum area of the sound passage between said plug and said chambers.

In witness whereof, I have hereunto set my hand this 14th day of September, 1922.

PETER A. AURNESS.