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2,651,380

STETHOSCOPE WITH MEANS FOR REGULATING THE TONE AND PITCH

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FIG. 1.

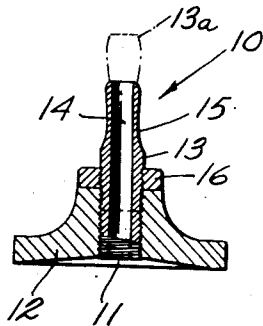


FIG. 2.

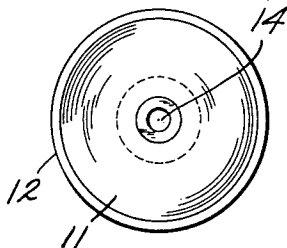


FIG. 3.

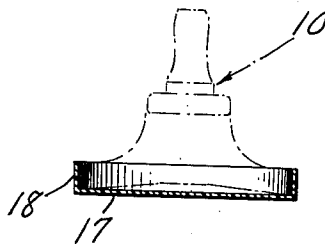


FIG. 4.

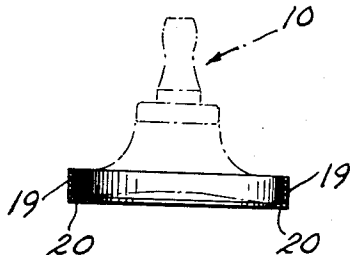


FIG. 5.

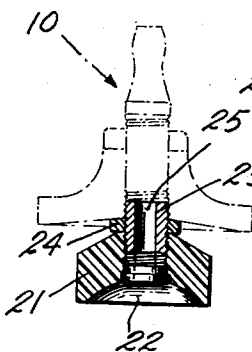


FIG. 6.

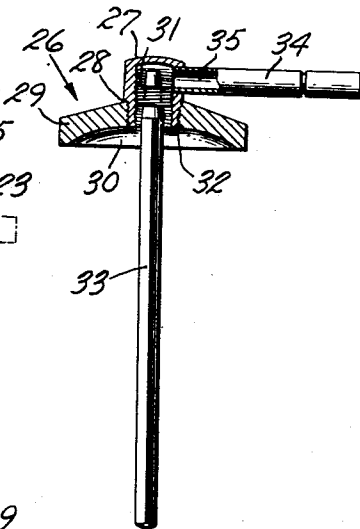


FIG. 7.

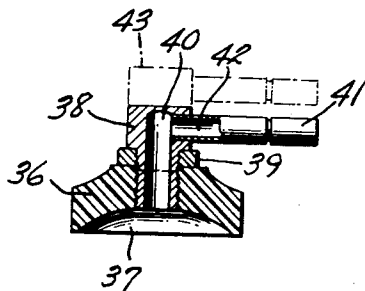
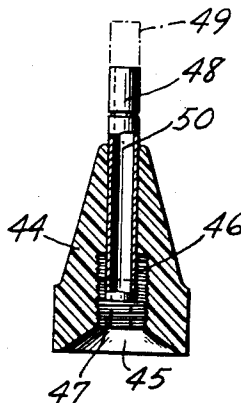


FIG. 8.



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STETHOSCOPE WITH MEANS FOR REGULATING THE TONE AND PITCH

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1 Claim. (Cl. 181—24)

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This invention relates to improvements in stethoscopes.

Broadly, it is an object of the invention to provide a stethoscope in which the tone of the instrument can be regulated and set at a desired tone or pitch.

More particularly, it is an object of the invention to provide a stethoscope that will give a stronger and clearer tone and which is more sensitive to sound.

A further object of the invention is to provide a simple means of regulating the tone and pitch of a stethoscope to that desired by the doctor using it. Such pitch or tone can be varied as desired when sounding different parts of the body, such as the heart, lungs, etc.

Still a further object is to provide a covering or disk for the portion of the stethoscope which would normally contact the skin and which is cheap enough so that such covering or disk can be discarded after each use to provide a hygienic and sanitary stethoscope. Furthermore, such a covering, if made of Celluloid or plastic will not be as cold to the body as metal and will help to increase the resonance of the instrument.

A further object of the invention is to provide a stethoscope with the above advantages which can be used upon a patient who is lying down and cannot sit up.

Another object is to provide a stethoscope which can be used in duplicate upon a double tube type of instrument so that each stethoscope can be regulated or adjusted to compensate for the difference in hearing ability of each ear and which can thus be used to compare sounds of different parts of the body simultaneously, such as the two lungs, or the two cardiac valves.

For a fuller understanding of the nature and objects of the invention, reference is had to the following detailed description in connection with the accompanying drawings, in which:

Fig. 1 is a vertical cross sectional view of the stethoscope with the lower portion of the central member partly broken away.

Fig. 2 is a bottom view showing the sound receiving chamber.

Fig. 3 is a vertical cross sectional view of a hygienic cover for the stethoscope.

Fig. 4 is a vertical cross sectional view of a hygienic flanged disk for the stethoscope.

Fig. 5 is a vertical cross sectional view of an auxiliary stethoscope unit with the lower portion of the central member partly broken away and showing the main transmitter head in dotted lines.

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Fig. 6 is a vertical cross sectional view of a modified right angle stethoscope for patients that cannot sit up showing the right angle horizontal member partly broken away and showing the key to turn the externally threaded member which varies the size of the sound receiving chamber.

Fig. 7 is a vertical cross sectional view of a modified right angle stethoscope with an external set screw for fixing the position of the central member.

Fig. 8 is a vertical cross sectional view of another modified stethoscope of the bell shape type.

Referring to the drawings, numeral 10 represents a stethoscope transmitter head has a central internally threaded opening 11. The circular base 12 is solid and slopes inwardly toward the opening 11 providing a sound receiving chamber. The solid base will not distort the tone as would a hollow one. A central member 13 externally threaded at one end is adapted to coact with the internal threads of opening 11 so that the central member 13 can be adjusted higher or lower as shown by the dot-dash line 13^a so that the size of the sound receiving chamber, which comprises the hollow of the inwardly sloping base 12 and the lower portion of threaded central opening 11 can be varied which in turn effects the tone or pitch of the stethoscope. The central member 13 has a longitudinal opening or bore 14 therethrough to permit the sound to travel from the sound receiving chamber through the bore 14 and thence through the rubber tubing (not shown) which is well known in the field of stethoscopes. The upper end of the central member 13 is curved inwardly, as shown at 15, to receive the end of the rubber tubing (not shown). A nut 16, internally threaded, is adapted to coact with the external threads of the central member 13 to fix the position of the central member 13 at the desired point. The base 12 can be made of metal or plastic, such as Catalin, Bakelite or similar plastics.

Since the ears of different persons vary in sensitivity, the doctor can adjust the sound receiving chamber by regulating and setting the central member 13 so that a strong pure tone is obtained, excluding partial tones or overtones. If the central member 13 is retracted so that the sound receiving chamber is larger, the tone becomes louder and the pitch is somewhat softened. As the doctor gets older his hearing varies and he can then adjust the size of the sound receiving chamber from time to time to obtain a stronger and purer tone as desired by the individual doctor. Sometimes a doctor may desire

to vary the pitch or tone in order to better hear the beat of a heart or lung. In some instances two stethoscopes can be used simultaneously by the use of two rubber tubes, such as when listening to two lungs or two cardiac valves to obtain an instantaneous comparison. The different stethoscopes can also be easily regulated or adjusted to compensate for the difference in hearing of each ear of a person.

The sloping walls of the base 12 may be straight or curved, as desired.

Since a stethoscope is generally used on sick persons it is important to have a sanitary or hygienic device so that germs or microbes are not carried from one person to another. I have, therefore, provided a thin cover 17, preferably made of Celluloid, vinyl or other similar material to fit upon the end of the base 12 by frictional engagement, that is, the circular flange 18 is adapted to be seated upon the end of base 12 and to cover the sound receiving chamber, as shown in Fig. 3. When the cover 17 is used with the stethoscope it acts as a resonance plate and will give a slightly louder tone or pitch to the sound being received. In Fig. 4 I have shown a modification of the cover shown in Fig. 3, which comprises a circular upright flange 19 and a short flange 20 at right angles to flange 19 leaving the central portion entirely open. The flanged disk shown in Fig. 4 is adapted to be seated upon the base 12 by frictional engagement. Both the thin cover shown in Fig. 3 and the flanged disk shown in Fig. 4 are very inexpensive so that such disk or cover would be discarded after each use. An additional advantage is that such a disk or cover will be more sympathetic and not as cold to the body as metal or some types of plastics.

In Fig. 5, I have shown an auxiliary stethoscope unit which is adapted to be used with a larger unit, such as shown in Figs. 1, 6 and 7. Very often a doctor wants to sound portions of the body, such as between the ribs. The larger stethoscope will not make as good contact as the smaller unit. The doctor can readily attach the auxiliary unit to the larger stethoscope as shown in Fig. 5. The auxiliary unit comprises a transmitter head 21, which may be made of solid metal or plastic and which is circular in form. The auxiliary unit has a sound receiving chamber 22 in its base, the walls of which are arcuate. However, such walls may be sloped inwardly toward a central internally threaded opening within which there is a central externally threaded member 23 which is threaded throughout its entire length. An internally threaded nut 24 is adapted to be seated upon the central member 23 in order to fix the position of the central member 23 with relation to the transmitter head 21. By turning the central member upward or downward with relation to the head 21, the volume of the sound receiving chamber 22 is varied thus changing the pitch of any sound that may travel into the sound receiving chamber. The central member 23 has a central longitudinal bore 25 there-through so that sound from the chamber 22 will pass through the bore 25. The thread of member 23 coacts with the internally threaded opening 11 of the stethoscope shown in Fig. 1 and in dotted lines on Fig. 5.

In the modification of the stethoscope shown in Fig. 6 a modification is shown for use upon patients who cannot readily sit up and it is more convenient for the doctor to use a right angle stethoscope such as is shown in this figure. This stethoscope comprises a transmitter head 26

which has a central internally threaded opening within which there is seated a hollow member 27 having a shoulder 28 which acts as a stop against the top of the base 29. The bottom of the base 29 has a hollow chamber 30 which leads into the hollow opening of the chamber 27. This hollow opening 31 is internally threaded along its entire length. Within opening 31 an externally threaded small circular member 32 having a central opening is adapted to be seated and which may be moved upwards or downwards within the opening 31 by a key 33, as shown in Fig. 6. A hollow tube 34 is attached at right angles to the hollow member 27 with its central opening 35 communicating with the opening 31 and since there is a central opening in the small member 32 it thus communicates with the sound receiving chamber 30. By turning the small member 32 with the key 33 the volume of the sound receiving chamber 30 is somewhat changed consequently varying the pitch of any sound which may pass through the sound receiving chamber. A rubber tubing (not shown) is attached over the end of the hollow tube 34, as is well known in the art, which leads to the ear pieces of the well known form of stethoscope.

In Fig. 7 I have shown a modification of the right angle stethoscope shown in Fig. 6. This stethoscope comprises a base 36 which has a sound receiving chamber 37. The base 36 has a central internally threaded opening within which a central member 38 is adapted to be seated. The end of the central member 38 which passes into the central opening of the base 36 is threaded and an internally threaded nut 39 is adapted to be seated upon the threaded upper portion of the member 38. A central channel 40 runs through the center of the member 38 and is closed at the upper end. A right angle hollow tubing 41 is joined at the upper portion of the central member 38 and its central opening 42 communicates with the channel 40 which leads into the sound receiving chamber 37. By turning the threaded member 38 and resetting the nut 39 the volume of the sound receiving chamber can be varied thus changing the pitch of the sound which passes into the sound receiving chamber 37. The dot and dash lines 43 show a higher position of the central member 38. The usual tubing of stethoscopes is attached over the end of the tubing 41, which in turn leads to the ear pieces.

The thin cover shown in Fig. 3 and the flanged disks shown in Fig. 4, can be used at the base of the right angle stethoscope shown in Figs. 6 and 7. The same coverings can also be adapted to fit over the base 21 shown in Fig. 5 to provide sanitary and hygienic means for these types of stethoscopes.

In Fig. 8 I have shown the bell type of stethoscopes which also have its sound receiving chamber varied to alter the pitch of the device. This stethoscope comprises a base 44 which is bell shaped and has a sound receiving chamber 45 at its lower end which leads into a central threaded opening 46. Within the opening 46 there is a hollow threaded member 47 which is attached to a hollow pipe 48. By turning the pipe 48 the member 47 can be raised or lowered thus varying the size of the sound receiving chamber 45, as is shown by the dot and dash line 49. The end of pipe 49 may be attached to a rubber tubing which leads to the ear pieces of the stethoscope which is well known in the art. The hollow opening 50 of the pipe 48 com-

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municates through the central opening of the threaded member 47 and thence into the sound receiving chamber 45 so that the sound may travel into the rubber tubing (not shown).

Of course the cover and the disk shown in Figs. 3 and 4 respectively, may be adapted to fit over the lower end of the base 44 and which may be discarded after each use for sanitary and hygienic purposes.

The base members shown in Figs. 1, 6, 7 and 8 and the auxiliary member shown in Fig. 5 may be made of either solid metal or different forms of plastic.

It is obvious that various changes and modifications may be made in the details of construction and arrangement of parts without departing from the general spirit of the invention.

I claim:

A stethoscope comprising a transmitter head consisting of a solid block having a circular concaved bottom surface and being formed with a threaded opening extending entirely through the block, the lower end of the threaded opening communicating with the concaved bottom surface centrally thereof, a tubular member of substantially thickness being externally threaded throughout its length and open at its respective ends, said tubular member being threaded into the threaded opening in said block with its upper end portion extending beyond the upper face of the block to provide a stethoscope tube

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receiving nipple, said threaded tubular member being adapted for longitudinal adjustment in the threaded opening in the block for causing the lower end of the tubular member to be disposed in predetermined spaced relation with respect to the lower end of the opening in the block to provide a sound pocket of desired depth below the tubular member, the length of the sound pocket being defined by the distance between the lower end of the threaded opening in the block and the corresponding lower end of the tubular member, and a nut threaded on the upper end of the tubular member engaging the upper face of the block to retain the tubular threaded member in its adjusted position.

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