

J. J. SINGER.
 RESONATING STETHOSCOPE OR INTENSIFIER.
 APPLICATION FILED JAN. 6, 1914.

1,143,791.

Patented June 22, 1915.

Fig. 1.

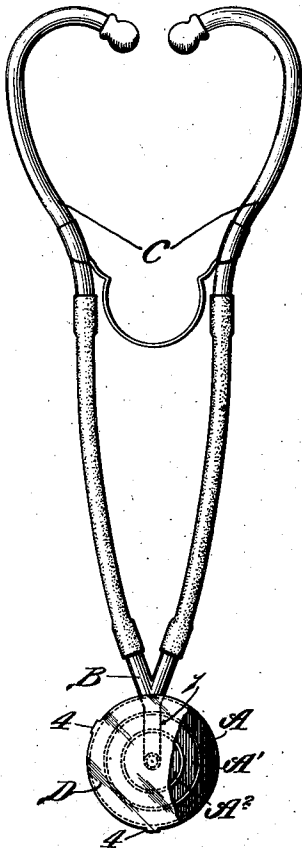


Fig. 2.

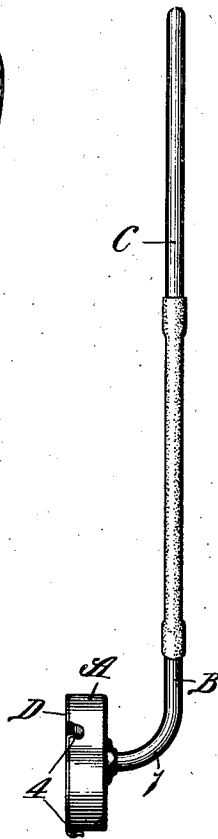


Fig. 3.

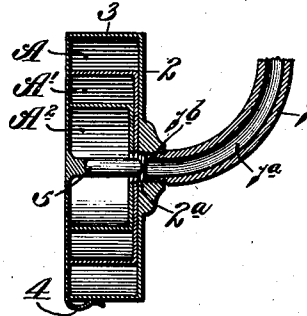


Fig. 4.

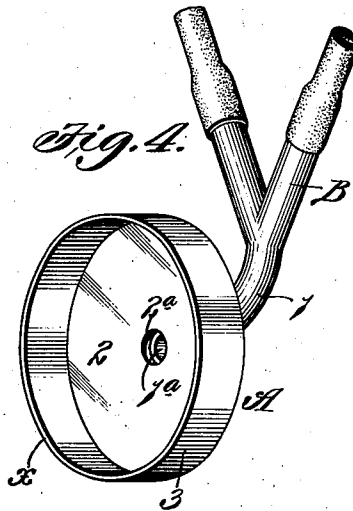


Fig. 5.

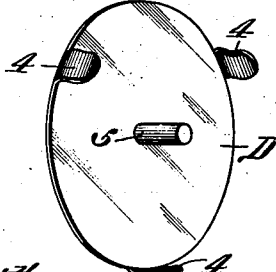


Fig. 6.

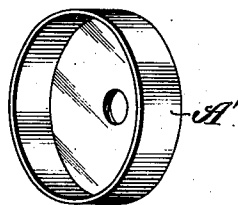
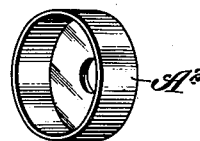


Fig. 7.



Witnesses:
 Geo. P. Radson
 C. M. Badger

Inventor:
 Jacob J. Singer
 By Bakewell & Chumley, attys.

UNITED STATES PATENT OFFICE.

JACOB J. SINGER, OF ST. LOUIS, MISSOURI.

RESONATING STETHOSCOPE OR INTENSIFIER.

1,143,791.

Specification of Letters Patent.

Patented June 22, 1915.

Application filed January 6, 1914. Serial No. 810,672.

To all whom it may concern:

Be it known that I, JACOB J. SINGER, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Resonating Stethoscopes or Intensifiers, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to devices for intensifying the audibility of sounds, and particularly to stethoscopes, although I do not wish it to be understood that my invention is limited to a device or instrument used in indirect auscultation.

The type of stethoscope that is now in general use is equipped with a hard rubber diaphragm for intensifying and transmitting the sound waves to the ear-pieces of the instrument. One objectionable feature of such instruments is that the diaphragms of same cannot be sterilized, and they are so fragile that they break easily. And another objectionable feature is that confusing friction sounds occur in same, due to the direct engagement of the diaphragm with the skin of the patient. Furthermore, such instruments are costly, and, on account of the peculiar construction of same, it is necessary for a physician to own several complete instruments of different sizes, each of which is usually stored in a separate case.

The main object of my invention is to provide a sound intensifier that is more efficient than those heretofore in use, that comprises no delicate or fragile parts, and which is so designed that it can be sterilized.

Another object is to provide a stethoscope which is so designed that peculiar friction sounds will not be produced in same on account of harshness of the patient's skin or hair on the skin.

Another object is to provide a device that will intensify sound without changing the character of the sound.

Another object is to provide an instrument for the purpose described, which is so constructed and designed that no parts of same tend to impede or dampen the sound waves emanating from a given source. And still another object is to provide a simple and inexpensive instrument of the character

mentioned which comprises a plurality of resonators of different sizes that are adapted to be detachably connected to a hollow device that serves as a handle and also as a connection for the ear-pieces, the resonators being so constructed that they can be nested together and combined with a member which coöperates with the resonator of greatest diameter to form a housing or protecting shell for the other resonators that are nested inside of same.

Other objects and desirable features of my invention will be hereinafter pointed out.

Figure 1 of the drawings is a front elevational view, partly broken away, of my complete instrument; Fig. 2 is a side elevational view of same; Fig. 3 is an enlarged sectional view taken on the line 3-3 of Fig. 1; Fig. 4 is a perspective view showing the large resonator mounted in operative position on the combined handle and connecting member; Fig. 5 is a perspective view of the cover member; and Figs. 6 and 7 are perspective views of the smaller resonators.

Referring to the drawings which illustrate the preferred form of my invention, A designates the large resonator of my improved instrument which I will term a resonating stethoscope or intensifier, and B designates a device or member that carries the resonator and to which the ear-pieces of the instrument are connected, said device B preferably consisting of a hollow Y-shaped member whose main shank 1 is detachably connected to the resonator. The resonator A is a substantially cup-shaped member that is formed from thin sheet metal or some other suitable material that has a certain degree of resonance so that it will vibrate or resonate with the sounds set up inside of said member. When the lower edge α of the member A is placed in contact with the patient's body, for example, the patient's chest, the air that is trapped inside of said member A is set in vibration by the vibration waves of the chest wall. These vibrations in the air are taken up in unison by the member A itself, which is formed from resonating material, and, consequently, the sound waves are intensified and transmitted through the hollow connecting device B and thence to the ear drums of the

user through the ear pieces C of the instrument. I prefer to provide the resonator with a substantially flat top wall 2 and with a substantially ring-shaped side wall 3, as shown in Fig. 4, so as to give a reflecting surface of great area, but it will, of course be understood that the resonator could be shaped in various other ways without departing from the spirit of my invention.

The shank 1 of the connecting device B is preferably curved, as shown in Fig. 3, so as to form a handle which the user can grasp without having to touch the patient's body, without liability of touching the resonator, and thus neither interrupting the vibrations set up in the resonator by the sound-waves inside of same, nor those of the patient's body, it being, of course, understood that the top wall 2 of the resonator is provided with an opening 2^a that communicates with the opening 1^a in the shank of the device B. I prefer to connect the resonator to the member B in such a manner that it can be disconnected from same easily, thereby enabling the same connecting member B to be used with different resonators. One convenient way of connecting these members together is to provide the shank 1 of the connecting member with a screw-threaded portion 1^b that is screwed into the opening 2^a in the top wall of the resonator.

The complete instrument comprises a plurality of resonators A, A¹ and A² of different sizes, and when the instrument is not in use the resonators A¹ and A² are nested inside of the resonator A, as shown in Fig. 3. A cap member D is provided for holding the resonators A¹ and A² in operative position in the resonator A and protecting them from dirt. The cap member D herein shown consists of a disk that is provided with a plurality of spring fingers 4 that lap over the flange or side wall 3 of the large resonator A, as shown in Fig. 3, and thus hold the cap member in position, said cap member cooperating with the resonator A to form a shell or casing for the small resonators A¹ and A² that are arranged inside of same. Said cap member is also preferably provided with a stud or guide 5 that projects through the center openings in the resonators A¹ and A² and thus acts to hold said resonators in position in the inclosing shell and prevent them from rattling or moving around.

When the instrument is to be used, the cap member D is removed, and the resonator of the proper size is then secured to the connecting member B to which the ear-pieces are attached, the operator grasping the shank of the member B and using it as a handle to place the resonator in proper position on the body of the patient.

An instrument of the construction above-described can be sterilized because it does not comprise any parts that are damaged by

water or excessive heat, such, for example, as the hard rubber diaphragms of the stethoscopes now in general use; and no peculiar friction sounds occur in same owing to the fact that only the lower edge of the side wall of the resonator comes in contact with the patient's body. It intensifies sound without changing the character of the sound, and no portions of the instrument tend to impede or dampen the sound waves arising from a given source. In other words, the instrument does not comprise a diaphragm which offers resistance to feeble vibrations, and the resonator of the instrument is not formed of rigid or unyielding material, such, for example, as cast metal or hard rubber, which would tend to dampen the vibration set up inside of the resonator. In my improved instrument the vibrations are conducted to the ear drums of the user without any resistance, except the air that is trapped inside of the resonator, the resonator itself being formed of thin resonating material and having an unobstructed interior and an open end so that when the lower edge portion of the side wall of the resonator is placed in contact with the patient's body nothing except the air inside of the resonator will be interposed between the patient's body and the top wall of the resonator. Consequently, sounds can be heard through my instrument much clearer than is possible with stethoscopes of the kind now in general use.

The instrument comprises a relatively great reflecting area, as the top wall 2 of the resonator is preferably made substantially flat so that it will act as a sounding board or resonating portion against which the sound waves strike, the side wall 3 of the resonator acting to confine a body of air under said sounding board and hold the sounding board out of direct contact with the object being examined. Furthermore, my improved instrument overcomes the necessity of a physician owning a number of complete stethoscopes of different sizes, owing to the fact that it comprises a plurality of resonators of different sizes that can be stored more compactly than one stethoscope of the kind now in general use; and the instrument can be manufactured and sold at a low cost on account of the simplicity of construction of same.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

A sound intensifier comprising a substantially cup-shaped member formed from resonating material and having a substantially flat wall from which a flange depends, the interior of said member being unobstructed so that when the lower edge of said flange is pressed against the object being examined the column of air that is trapped

inside of said member will be set in vibration by the vibration waves emanating from said object, said vibrations being taken up in unison by said cup-shaped member and thus causing the sound waves from said object to be greatly intensified.

signature in the presence of two witnesses,
this thirty-first day of December 1913.

JACOB J. SINGER.

Witnesses:

WELLS L. CHURCH,
GEORGE BAKEWELL.

In testimony whereof I hereunto affix my