No. 832,032. PATENTED OCT. 2, 1906.

C. R. C. BORDEN.

STETHOSCOPE.

APPLICATION FILED MAR. 19, 1906.

Fig. 1.

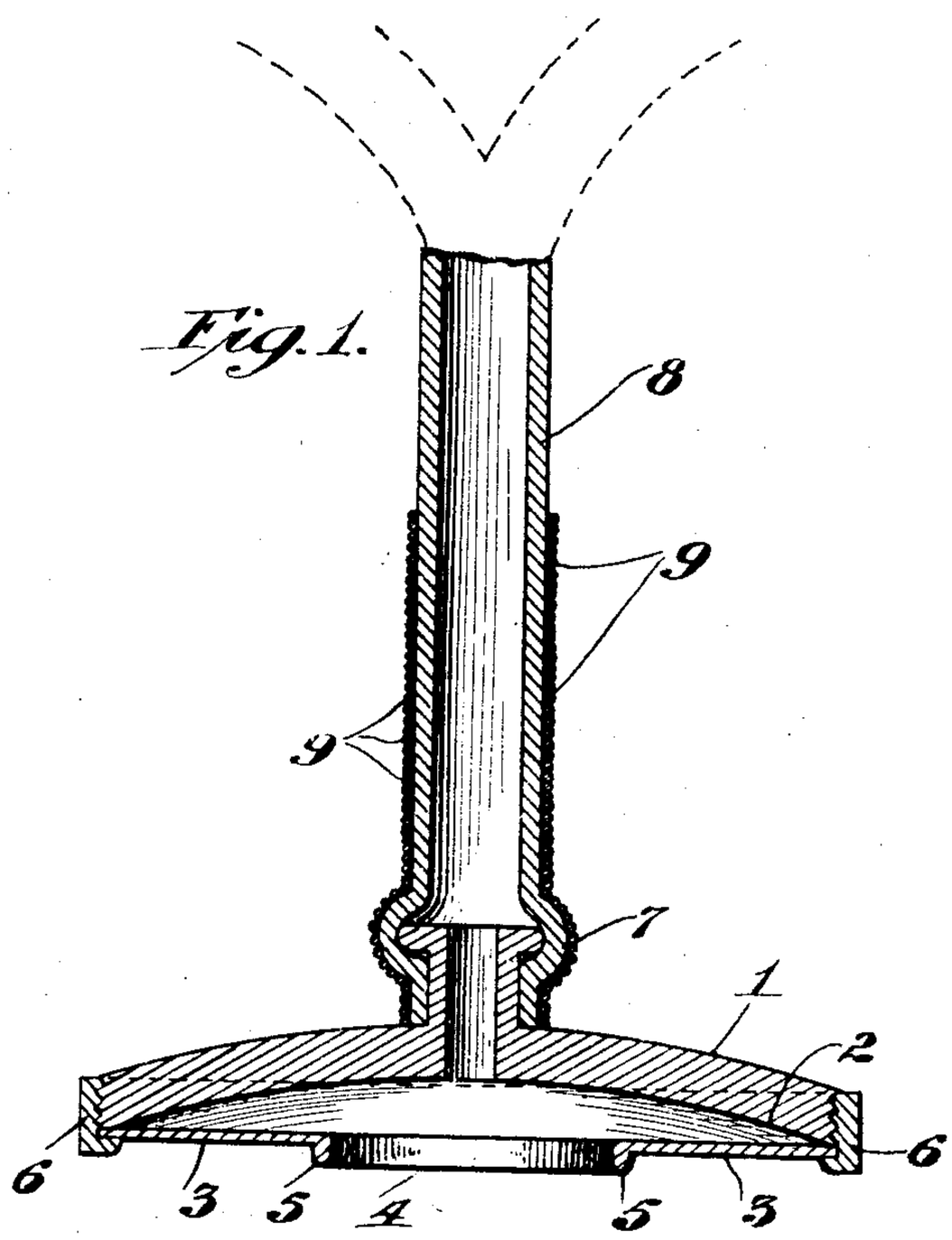
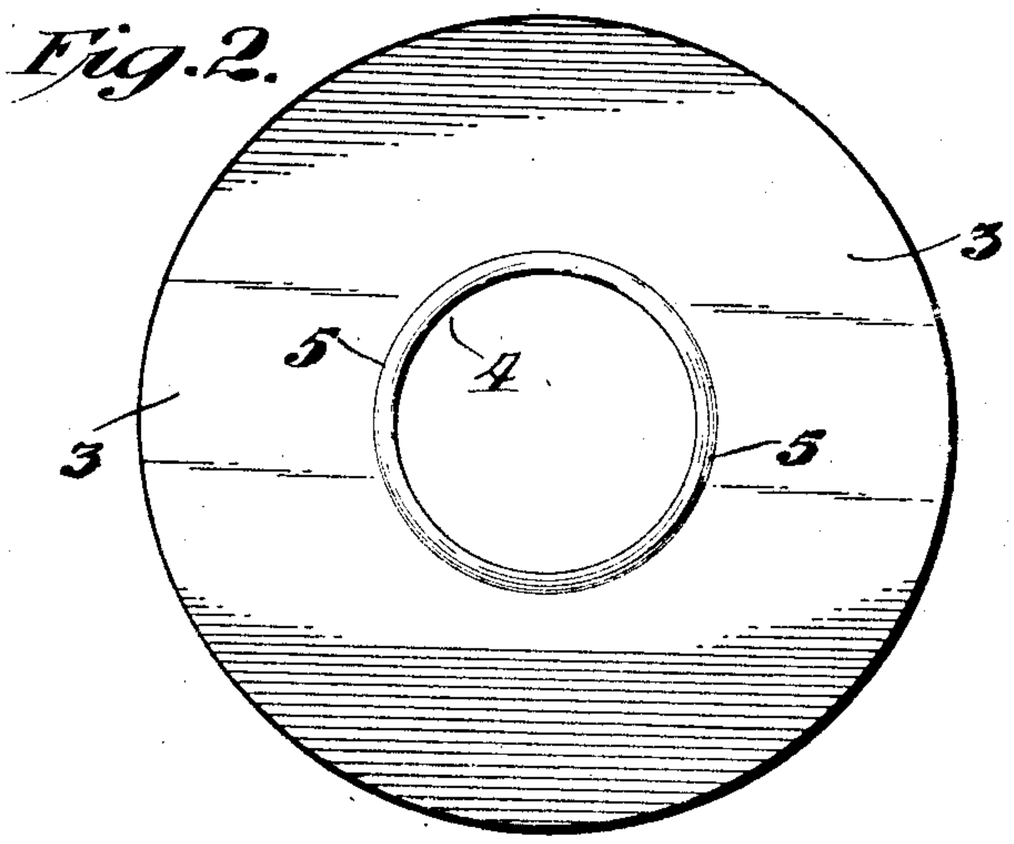


Fig. 2.



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CHARLES R. C. BORDEN, OF BROOKLINE, MASSACHUSETTS.

STETHOSCOPE.

No. 832,032. Specification of Letters Patent. Patented Oct. 2, 1906.

Application filed March 19, 1906. Serial No. 306,880.

To all whom it may concern:

Be it known that I, CHARLES R. C. BORDEN, a citizen of the United States, residing at Brookline, in the county of Norfolk and State of Massachusetts, have invented a new and useful Stethoscope, of which the following is a specification.

My invention relates to improvements in stethoscopes, and particularly to such as are provided with a diaphragm to be placed against the patient's body.

In devices of this nature heretofore employed the body portion of the stethoscope consists of a thick disk having a dished or hollowed-out face over which is placed a substantially flat closed vibratory diaphragm of hard rubber or other suitable material, thus forming a broad shallow air-chamber in which the effect of the vibration is increased in intensity. In use the diaphragm is placed flat against the patient's body and takes up the vibration from the heart pulsation or the sounds of respiration and communicates them to the shallow body of air contained in the chamber, from which they are conveyed through an aperture in the thick disk or body portion to the auditor's ears by means of suitable ear-tubes. The closed diaphragm employed in this structure is found to be objectionable, however, for the reason that its flat surface affords no firm hold upon the skin, but permits the instrument to slip slightly with each vibration, thereby producing noises which interfere greatly with the clearness of the sounds which it is desired to detect. Furthermore, the closed diaphragm has a tendency to deaden the sounds communicated to the shallow air-chamber.

My invention aims to avoid these objectionable features by providing a comparatively wide unobstructed opening in the diaphragm described over which the skin of the patient may be more or less tightly stretched, thus causing the skin to form a continuation of the diaphragm of the instrument, or in another aspect of the case the skin forms a secondary diaphragm.

My invention also contemplates means adjacent the aperture to stretch the patient's skin.

One embodiment of my invention which has herein been selected for illustration is shown in the accompanying drawings, in which—

Figure 1 is a transverse sectional view of a preferred form of my improved stethoscope. Fig. 2 is a face view of the diaphragm detached.

In the embodiment of my invention herein selected for illustration the stethoscope comprises a body portion 1, which may be made of metal, hard rubber, or other suitable material and is dished, as at 2, on its front face. Over this dished face of the body portion is placed a substantially flat vibratory diaphragm 3, which in my improved form of instrument is provided with a comparatively wide opening 4, the latter being preferably surrounded by a raised lip or ridge 5. The diaphragm may be secured in place as by an annular rim 6. The diaphragm forms with the dished face of the body portion an air-chamber 2′, which has the effect of greatly amplifying the sound-vibration.

When the instrument is placed against the patient's body, the skin will be more or less tightly stretched over the opening and will form a continuation of the fixed diaphragm or will form a secondary diaphragm much more sensitive to the transmission of sound than is the closed diaphragm of former structures. The raised lip or ridge surrounding the opening moreover serves to stretch the skin more tightly over the opening, rendering its diaphragm action still more sensitive, and at the same time affording the instrument a more secure hold, and thus preventing it from accidentally slipping. At the center of the body portion 1 is an aperture 7, and to the rear extends a nipple 7′, to which a flexible tube 8 may be attached to convey the sound-vibrations from the air-chamber 2′ to the ear of the auditor.

In ordinary practice it is frequently necessary to slip the instrument beneath a patient when lying upon a bed in order that he may not be disturbed. In such use the tube 8 may be bent to a position approximately parallel with the back of the body portion 1.

In order that the tube may not be collapsed when so bent, it may be wound or wrapped with a fine wire or silk thread 9.

While I have herein described a preferred form of my device, it is to be understood that various changes may be made in the details and arrangement of the parts without departing from the spirit and scope of the invention.

I claim—

1. A stethoscope having a shallow broad air-chamber and a substantially flat vibra-

tory diaphragm adapted to contact directly with the patient's body and provided with an unobstructed aperture communicating with said chamber over which the patient's skin forms a supplemental diaphragm when the instrument is in use.

2. A stethoscope having therein a shallow broad air-chamber and a substantially flat vibratory diaphragm adapted to contact directly with the patient's body and provided with a wide unobstructed aperture over which the patient's skin forms a supplemental diaphragm when the instrument is in use and means adjacent the edge of said aperture to stretch the skin.

3. A stethoscope comprising a shallow broad air-chamber and a substantially flat vibratory diaphragm adapted to contact with the patient's body and provided with a wide unobstructed aperture over which the patient's skin forms a supplemental diaphragm when the instrument is in use and a lip adjacent said aperture to stretch the skin.

4. A substantially flat vibratory stethoscope-diaphragm having a wide unobstructed sound-receiving aperture over which the patient's skin forms a secondary diaphragm when the instrument is in use and means adjacent the aperture to stretch the skin.

5. A substantially flat vibratory stethoscope-diaphragm having a wide unobstructed sound-receiving aperture over which the patient's skin forms a secondary diaphragm when the instrument is in use and a lip adjacent said aperture to stretch the skin.

In testimony whereof I affix my signature in the presence of two witnesses.

CHARLES R. C. BORDEN.

Witnesses:
F. H. THOMAS,
H. L. CROWLEY.