

R. C. M. BOWLES.
STETHOSCOPE.

(Application filed Dec. 3, 1897.)

(No Model.)

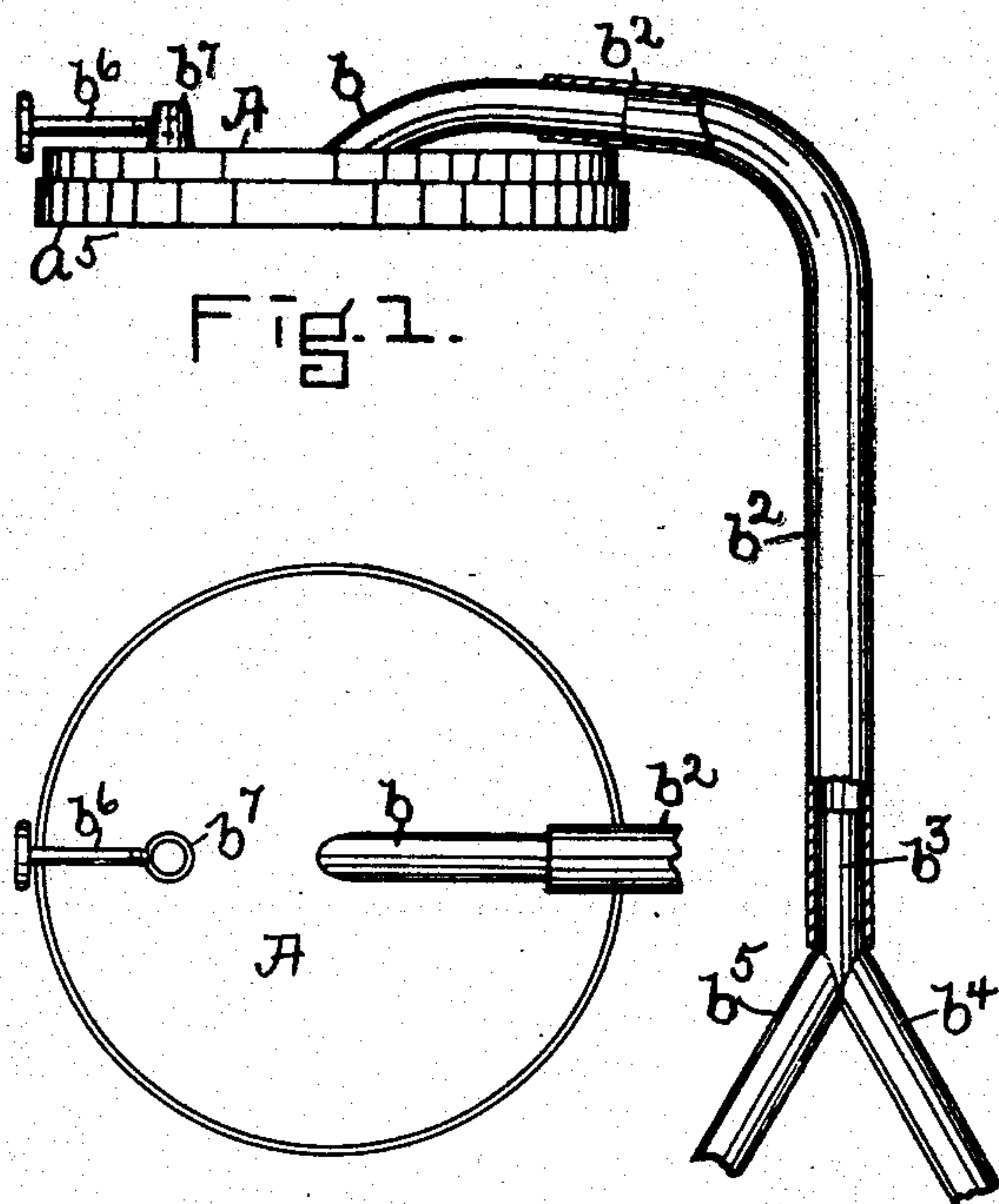


Fig. 1.

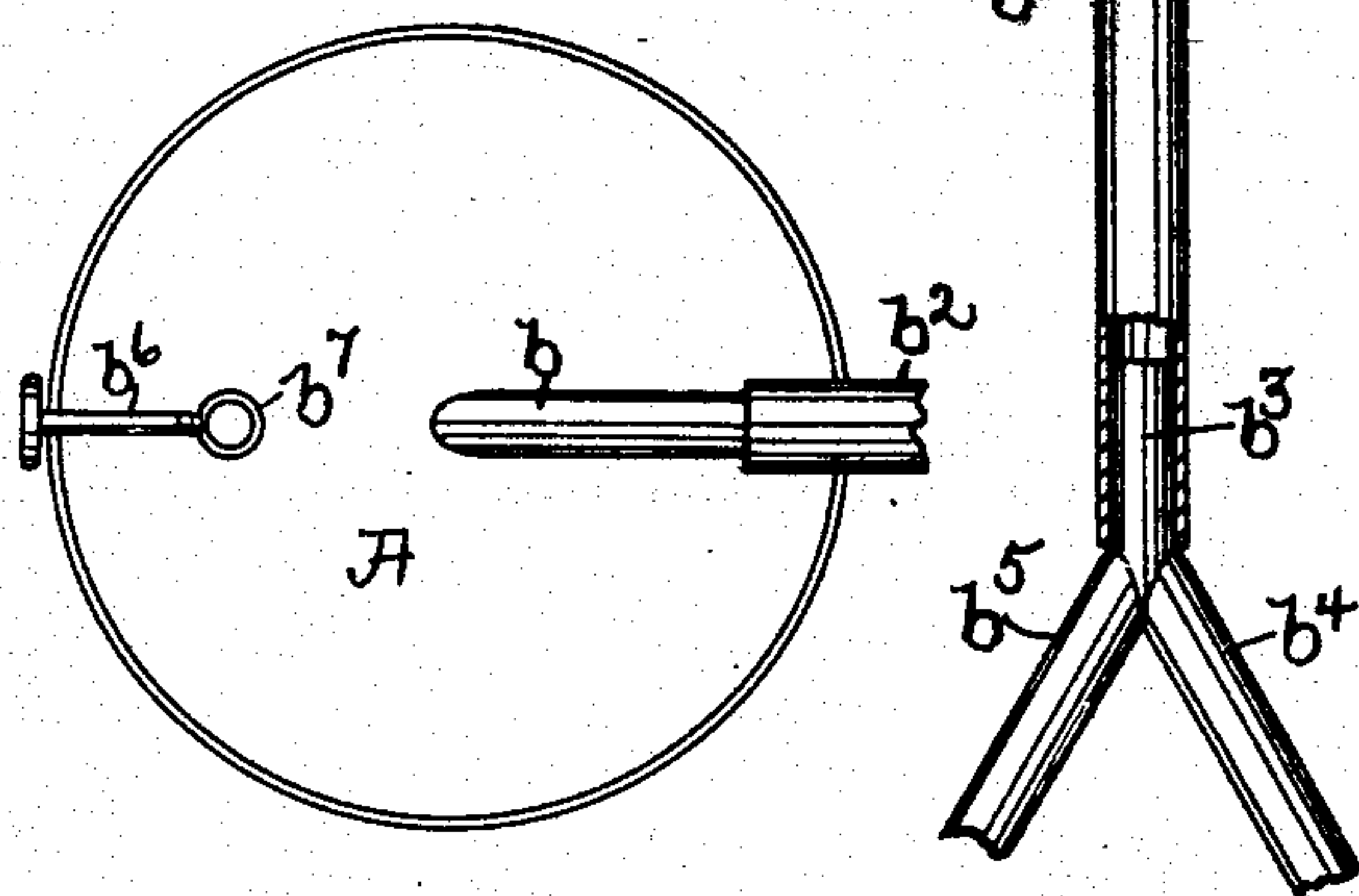


Fig. 2.

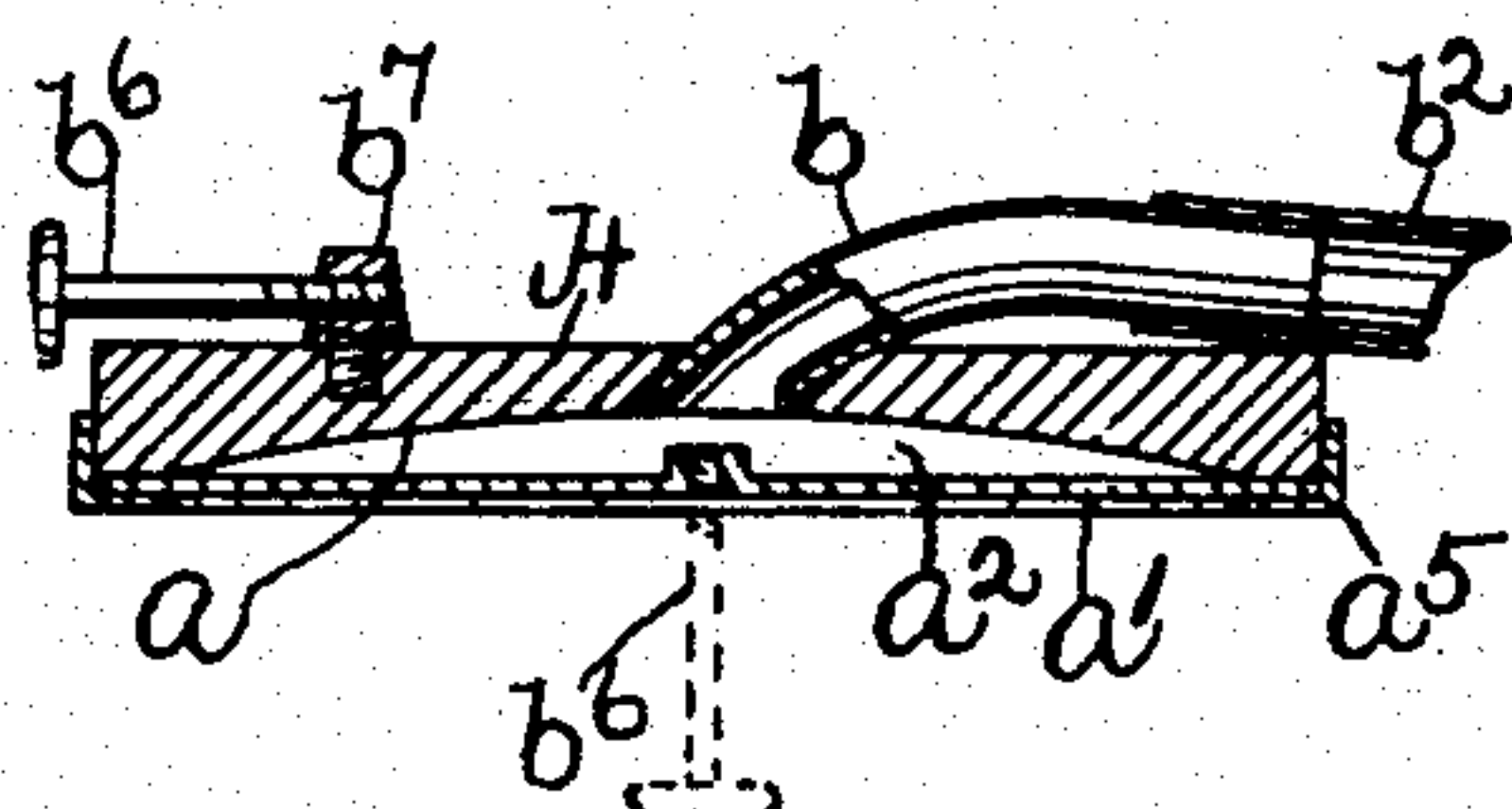


Fig. 3.

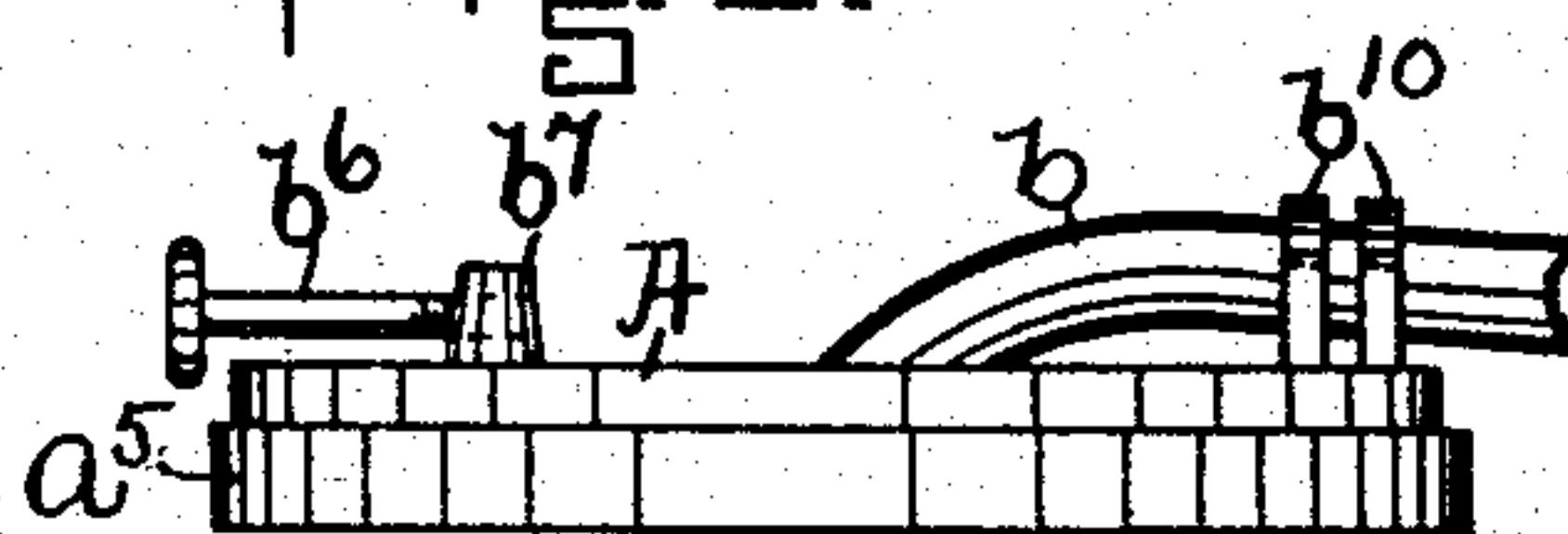


Fig. 4.

WITNESSES.

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ATT'Y.

UNITED STATES PATENT OFFICE.

ROBERT C. M. BOWLES, OF BROOKLINE, MASSACHUSETTS.

STETHOSCOPE.

SPECIFICATION forming part of Letters Patent No. 677,172, dated June 25, 1901.

Application filed December 3, 1897. Serial No. 660,575. (No model.)

To all whom it may concern:

Be it known that I, ROBERT C. M. BOWLES, residing in Brookline, in the county of Norfolk and State of Massachusetts, have invented an Improvement in Stethoscopes, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to stethoscopes of that class shown and described in United States Letters Patent No. 526,802, granted to me October 2, 1894, and is an improvement thereon.

In the practical application of a stethoscope it is of frequent urgency that neither should the patient be raised nor the bedclothing be removed and that all exposure of the person should be avoided as far as possible. These results cannot be satisfactorily accomplished with stethoscopes as now constructed and known to me; and my present invention has for its object to provide an instrument with which these desirabilities can be accomplished.

This invention further has for its object to construct the instrument in a manner, as will be described, whereby the above-mentioned desirabilities may be accomplished with an amplification and more distinct delivery of the sound-vibrations.

In accordance with this invention the back of the instrument is provided with a sound-delivering tube or pipe, preferably of metal, hard rubber, wood, or other material or combination of materials not easily compressible, extended substantially parallel with the plane of the diaphragm, so that the depth of the instrument is substantially small and preferably about one-half an inch. The sound-delivering tube or pipe is preferably curved and joined to the back of the instrument at its center, whereby the sound has an unobstructed and smooth passage through said tube which avoids diminution of the sound. The instrument proper is composed of the back referred to and a diaphragm secured or attached thereto and forming the front of the instrument. The back of the instrument is slightly concaved on its front face, so as to form with the diaphragm a shallow air-chamber, which is preferably only of sufficient

depth to permit of the free vibration of the diaphragm. The shallow air-chamber referred to coöperates with the construction of the delivery tube or pipe, so as to enable the completed instrument to be of minimum thickness or depth, and thereby enable it to be used without removing the bedclothing and without raising the patient, as it can be passed between the unremoved clothing and the body of the patient and can even be passed beneath the body of the patient. The sound-delivery tube is connected to the usual binaural tubes by a flexible tube of any desired length which serves to permit of the use of the instrument without removing the clothing. These and other features of this invention will be pointed out in the claims at the end of this specification.

Figure 1 is a side elevation, on an enlarged scale, of an instrument embodying this invention, a part of the binaural tubes being shown; Fig. 2, a top or plan view of the instrument shown in Fig. 1; Fig. 3, a section on the line 3 3, Fig. 2; and Fig. 4, a modification to be referred to.

Referring to Fig. 3, A represents the back or base, preferably made in circular form and provided with a concave front face *a*, which is made on a substantially large radius to form with the diaphragm *a'* a shallow air-chamber *a²*, the diaphragm *a'* being detachably secured to the back A, as herein shown, by means of a ring or cap *a⁵*, which is attached to the back A in any suitable manner. The air-chamber *a²* is provided with an outlet pipe or tube *b*, which in accordance with this invention extends from substantially the center of the back A toward the outer edge of the same and substantially parallel therewith and to the plane in which the diaphragm is held, so that the said tube lies in close proximity to the said back. The tube or pipe *b* is preferably curved where it joins the back A in order to avoid angles which would tend to diminish the sound. The tube *b* is joined by a flexible section of tubing *b²* with the usual tube *b³*, having the branches *b⁴* *b⁵*, which lead to the ears of the user.

By an inspection of the drawings it will be seen that the instrument possesses the advantages and functions above set forth. The instrument may be provided with a center-

ing or localizing point b^6 , which may be screwed into a hub or projection b^7 on the back A when not in use and which may be screwed into a suitable opening in the diaphragm, as represented by dotted lines, Fig. 3.

I prefer to make the outlet tube or pipe b of metal, hard rubber, or other material or combination of materials not easily compressible; but I do not desire to limit my invention in this respect, as the said outlet tube or pipe may be made of substantially flexible material and when in use held substantially parallel to the back of the instrument by means of hooks b^{10} or like devices attached to the back of the instrument after the manner shown in Fig. 4. So, also, I prefer to make the sound-delivery pipe curved where it joins the back A, as I have found by practical tests that a much louder and more distinct sound can be thereby obtained over an instrument in which the sound-delivery tube extends perpendicularly from the back of the instrument, as in my patent referred to.

I claim—

1. As an improved article of manufacture, a stethoscopic instrument provided with a diaphragm and with a back having a concaved front face with which said diaphragm coöperates to form an air-chamber, and a substantially small curved, non-compressible outlet or sound delivery tube or pipe attached to said back to communicate with said air-chamber near its center and permanently extended toward the outer edge of said back substantially parallel to the plane in which the diaphragm is held, as and for the purpose specified.

2. As an improved article of manufacture, a stethoscopic instrument provided with an exposed diaphragm adapted to make contact with the body of a person, and with a back having a concaved front face with which said diaphragm coöperates to form an air-chamber, and a substantially small curved sound delivery tube or pipe of substantially non-compressible material attached to said back near its center and extended toward the outer

edge of said back to afford a smooth and unobstructed outlet for the sound-vibrations from said chamber, substantially as described.

3. As an improved article of manufacture, a stethoscopic instrument provided with a back A having its front face a made in the arc of a circle of substantially large radius and a diaphragm a' attached to said back to form a shallow air-chamber a^2 of a depth only sufficient to permit of the free vibration of said diaphragm, and a curved outlet-pipe b attached to said back near its center and extended toward the outer edge of said back substantially parallel to the plane in which the diaphragm is held, substantially as described.

4. As an improved article of manufacture, a stethoscopic instrument provided with a diaphragm and with a back or base having a concaved front face with which said diaphragm coöperates to form an air-chamber, and an outlet or sound delivery tube or pipe attached to said back near its center to communicate with said air-chamber and permanently extended toward the outer edge of said back substantially parallel to the plane in which the diaphragm is held, for the purpose specified.

5. As an improved article of manufacture, a stethoscopic instrument provided with a back or base having coöperating with its front face a diaphragm to form an air-chamber, and provided with a substantially small sound-delivery passage communicating with the said air-chamber substantially near its center and extended toward the outer edge or rim of said back or base substantially parallel to the plane of the diaphragm, for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT C. M. BOWLES.

Witnesses:

JAS. H. CHURCHILL,
J. MURPHY.