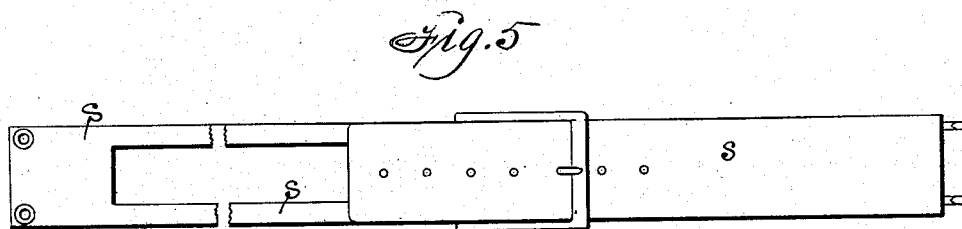
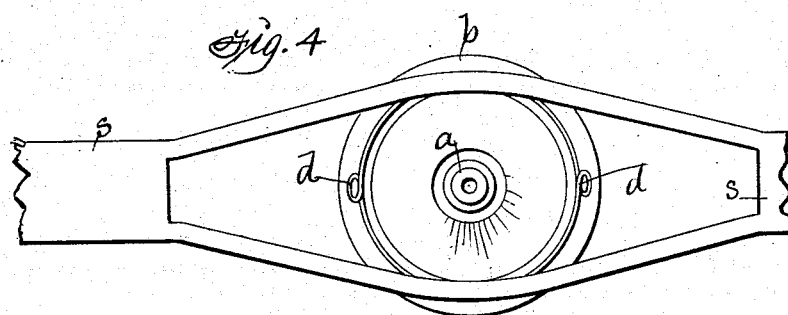
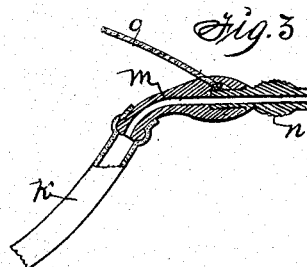
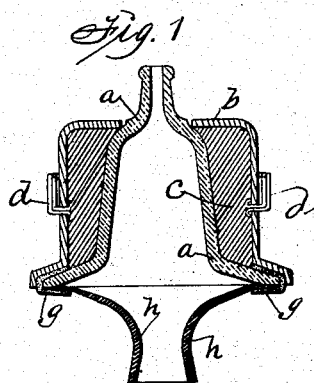


W. E. SCOTT.
STETHOSCOPE.

(Application filed June 30, 1899.)

(No Model.)



Witnesses:
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UNITED STATES PATENT OFFICE.

WALTER E. SCOTT, OF ADEL, IOWA.

STETHOSCOPE.

SPECIFICATION forming part of Letters Patent No. 676,999, dated June 25, 1901.

Application filed June 30, 1899. Serial No. 722,396. (No model.)

To all whom it may concern:

Be it known that I, WALTER E. SCOTT, a citizen of the United States, residing at Adel, in the county of Dallas and State of Iowa, have invented a new and useful Stethoscope, of which the following is a specification.

My object is to produce improved results in the use of stethoscopes. Such instruments are used chiefly for the purpose of conveying sounds produced within the human body to the ear of the observer by vibrations set up in a column of air within the instrument when applied to the surface to be examined and to the ear of the observer.

The objects of my instrument are, first, to provide a simple and unobstructed column of air within the instrument for the conduction of vibrations to the ear and yet permit the operator to face the patient and be at a distance of from one to two feet from the patient; second, to close one ear of the operator to external sounds to as great an extent as possible; third, to intensify the sounds produced in the body being examined as they are conveyed to the ear of the operator; fourth, to completely eliminate the sounds of muscular contraction produced by contact of the hand with the instrument; fifth, to allow the observer the use of either or both of his hands for percussion and other examinations while he is observing sounds within the body or those artificially produced by the operator.

My invention consists in the construction, arrangement, and combination of parts, as hereinafter set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a transverse sectional view showing a central bell-shaped glass, a metal cup surrounding the glass, a metal packing fixed inside of the cup and fitted to the glass, and an auxiliary rubber bell detachably connected with the bottom edge of the glass bell-shaped cup. Fig. 2 is a longitudinal sectional view of a rubber ear-plug. Fig. 3 is a sectional view showing a flexible rubber tube, a hard-rubber extension, a metal ear-plug, and a flexible cord combined. Fig. 4 is an enlarged top view of the stethoscope, showing a section of a belt applied as required for retaining the stethoscope on the body of a person.

Fig. 5 shows the form of a belt adapted for holding the stethoscope on a person.

The letter *a* designates the interior bell-shaped glass cup, *b* the exterior metal cup, and *c* a metal packing, preferably lead, fitted between the metal cup and the glass cup and fixed to the metal cup by pouring in molten lead or in any suitable way.

A frame *d*, made of spring-wires and adapted to serve as a finger-hold and also adapted to aid in detachably connecting the stethoscope with a belt, as shown in Fig. 4, is fixed on the exterior of the metal cup by extending the ends of the wires through holes in the metal cup and then bending them to be embedded in the packing, as shown in Fig. 1.

An endless flexible band *g* is stretched over the bottom edge of the glass cup and cemented fast thereto in such a manner that it can be used for detachably connecting a hard rubber cup *h* thereto in an inverted position, as shown in Fig. 1 and as required to adapt the stethoscope to contact with and cover a smaller area of surface than is covered by the contact of the circumference of the glass cup.

A flexible rubber tube *k*, adapted to be detachably connected with the small tubular end or stem of the glass cup *a*, has a hard-rubber curved extension *m* detachably connected with one end of the tube, as shown in Fig. 3. *n* is a metal ear-tube detachably connected with the free end of the rubber extension *m*. It is adapted in form to enter a person's ear and on account of its density and weight to retain vibrations in the same manner that the metal around the glass cup retains vibrations received from the person under examination.

An elastic cord *o* is fixed at one of its ends to the rubber extension *m* and at its other end to the rubber ear-plug *r* by boring holes through the rubber and fastening the ends of the cord therein or in any suitable way as required to retain the two ear-tubes connected to facilitate their use simultaneously in the ears of a person. The ear-plug thus combined with the ear-tube closes the one ear to extraneous sound, and by stretching the elastic cord from the ear-tube in one ear over the head of the examiner and inserting the plug

in the other ear the plug and cord aid in retaining the ear-tube securely in the cavity of the ear, as required in the practical operation of my invention. Winding the flexible tube on the plug by simply rotating the plug while in a person's ear regulates the length and tension of the elastic cord as required to aid in retaining the plug and tube securely in place in the operator's ears.

10 s is a flexible belt composed of two parts, made of leather or other suitable flexible material and adjustably connected by means of a buckle on the end of one of the parts and perforations in one of the ends of the other part and detachably connected at their other ends by means of eyelets in the end of one part and hooks fixed to the end of the other part, as shown in Fig. 5. One or more elongated openings are formed in the belt to produce two parallel flexible strips adapted to engage the stethoscope, as shown in Fig. 4, and as required for advantageously adjusting and holding the stethoscope upon a person. The swells on the ends of the ear-tube and ear-plug have grooves in their surfaces or are otherwise roughened and adapted to stick fast in the ears of a person when placed there for practical use.

It is obvious that when the open end of the stethoscope is in contact with a person and the metal ear-tube *n* in one of the operator's ears and the ear-plug *r* in the other ear sounds will be conveyed from the body of the person that is under examination through the glass cup, the flexible tube, and the rigid ear-tube direct to the tympanum of the operator, and extraneous sounds will be shut out from the other ear by the ear-plug. The weight of the metal tube aids in preventing it from becoming disconnected from the ear. It is also obvious that the metal packing between the outside surface of the glass cup and the inside surface of the metal cup will prevent any sound-vibration from the exterior of the glass cup from affecting the delicate sound-vibrations that pass from the interior of the person through the glass cup and will also retain the vibrations from the person under examination within the glass. It is also obvious that when the stethoscope is held to a person by hand-pressure the fingers of the operator will engage the exterior wire frame and not come in direct contact with the metal cup, and consequently no sound-vibrations will be conveyed from the operator's person into the stethoscope to mingle with and confuse sounds that come from the person under examination.

Having thus described the construction and function of each element, the practical operation and utility of my invention will be understood by persons familiar with the art to which it pertains, and what I claim as new, and desire to secure by Letters Patent, is—

1. In a stethoscope, an auxiliary heavy metal ear-tube adapted to enter and contact with the external auditory canal in a person's ear, in combination with a light hard-rubber tube adapted to be connected with a flexible tube, and a flexible tube for the purposes stated.

2. In a stethoscope, a cup-shaped glass having a tubular small end adapted for connecting a flexible tube therewith and a metal casing fitted and fixed around the outside of the glass cup for the purposes stated.

3. In a stethoscope, the combination of a metal packing fitted and fixed around a bell-shaped glass, and a metal cup fitted and fixed over the metal packing and a bell-shaped cup made of glass and having an opening through its small end, to operate in the manner set forth for the purposes stated.

4. In a stethoscope, a bell-shaped glass cup covered with metal on its outside and springs fixed to the metal to serve as finger-holds to operate in the manner set forth for the purposes stated.

5. In a stethoscope, a cup-shaped member having springs fixed to its outside adapted to engage two distinct parts of a belt in combination with a flexible belt divided longitudinally some space to admit the cup-shaped member as and for the purposes stated.

6. A stethoscope adapted to be detachably and adjustably connected with a person, comprising a bell-shaped glass cup having a tubular extension at its top, a metal cup adapted to cover the glass cup, a metal packing between the two cups, a wire frame fixed to the outside of the metal cup, a rubber band fixed to the bottom edge portion of the glass cup, an auxiliary cup adapted to be detachably connected with the bottom of the glass cup, an ear-tube connected with the end of the elastic tube, an ear-plug connected with the ear-tube and a belt having one or more oblong openings adapted to admit the metal cup, all arranged and combined to operate in the manner set forth, for the purposes stated.

WALTER E. SCOTT.

Witnesses:

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