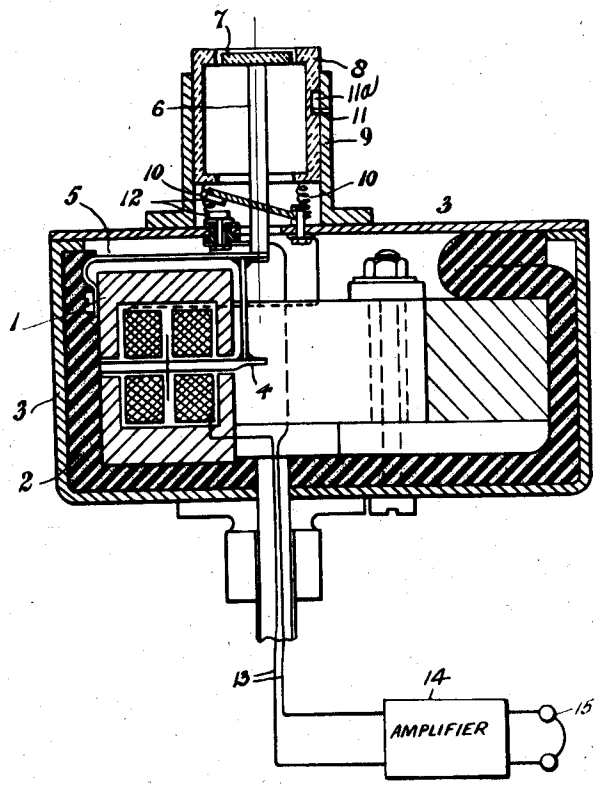
May 14, 1935. C. A. MASON 2,001,537

STETHOSCOPE

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STETHOSCOPE

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5 Claims. (Cl. 181—24)

This invention relates to stethoscopes and has for its object to provide an electrically operated stethoscope which will be much more sensitive than such instruments as are already in use.

This instrument consists in providing means for transmitting sounds from the interior of the human body, such as the beating of the heart or the passage of air through the lungs, to a microphone and in providing means for amplifying these sounds to any desired extent.

The accompanying drawing illustrates one method of carrying this invention into effect.

In this form I provide a microphone 1 which is preferably of the moving iron or reed type. This microphone is mounted in resilient material such as spongy rubber 2 in an iron box 3 for screening purposes. The reed 4 is connected either directly or through a resilient support 5 to a rod 6 which carries at its outer end a disc 7 of heat insulating material, which conveys the impulses from the body to the microphone by direct contact. This contact disc is protected by a heat insulating cylinder 8 which surrounds it and normally projects a slightly greater distance from the casing of the instrument than the disc. Heat insulating material is used in preference to metal in order to prevent cold metal coming in contact with the body. The insulating cylinder slides inside a metal cylinder 9 secured to the casing 3 of the instrument and is normally held in its outermost position by means of springs 10. The insulating cylinder may be held against rotation by means of one or more guide pins 11 operating in longitudinal grooves or slots 11a formed in the cylinder, and these pins may be utilized to limit the outward movement of the cylinder.

The microphone is connected through a switch including a pair of contacts 12 and through leads 13 to an amplifier represented by the rectangle 14, the output of which may be connected to a telephone or other suitable sound receiving device as indicated by the numeral 15.

In operation the insulating cylinder 8 is pressed against the body of the patient and slides into the metal cylinder 9 against the action of the springs 10 normally holding it in its outermost position. This movement of the cylinder first brings the contact disc 7 into contact with the patient's body and the further limited movement insures good contact which will always be substantially the same. The inward movement of the insulating cylinder also closes the pair of contacts 12 located in the filament circuit of the amplifier 14 and so enables the amplifier to be switched on automatically. The amplifier may be of any convenient or suitable type but I prefer to use a three stage resistance capacity coupled unit having battery operated valves with directly heated filaments. As shown in the drawing a pair of head-phones may be connected in the amplifier circuit, or, where the instrument is to be used for demonstration purposes in a lecture room or in an operating theatre, a loud-speaker may take the place of the head-phones.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. In a stethoscopic apparatus, a microphonic device including a movable member, a disc adapted to be pressed into contact with a body thereby to be vibrated by sounds to be transmitted from said body, means to transmit the vibrations of said disc to said movable member, and means to maintain substantially constant the pressure of said disc against said body.

2. In a stethoscopic apparatus, a microphonic device having a movable iron member, a disc adapted to be brought into contact with a body thereby to be vibrated by sounds to be transmitted from said body, means to transmit the vibrations of said disc to said movable iron member, a protecting sleeve surrounding said disc, and a circuit closing means, said sleeve being slidable to uncover said disc and to operate said circuit closing means.

3. In a stethoscopic apparatus, a microphonic device having a movable reed, a disc adapted to be pressed into contact with a body thereby to be vibrated by sounds to be transmitted from said body, means to transmit the vibrations of said disc to said reed, and a protecting sleeve surrounding said disc, said sleeve being slidable to uncover said disc, and means to limit the sliding movement of said sleeve whereby the pressure of said disc on said body is substantially uniform.

4. In a stethoscopic apparatus, a microphone having a movable member, a contact member adapted to be pressed against a body thereby to be vibrated by sounds to be transmitted from said body, means to connect said contact member to said movable member, and a protecting member surrounding said contact member and slidable a predetermined distance to uncover said contact member whereby the pressure of said contact member on said body is substantially uniform.

5. In a stethoscopic apparatus, a microphone having a movable member, a contact member

adapted to be pressed against a body thereby to be vibrated by sounds to be transmitted from said body, means to connect said contact member to said movable member, a casing surrounding said microphone, a protecting member surrounding said contact member and slidable with respect to said casing, means to bias said protecting member to a position at a predetermined distance outwardly from said casing, and means to limit the travel of said protecting member toward said casing whereby the pressure of said contact member against said body is maintained substantially uniform when said stethoscopic apparatus is applied to said body.

CYRIL ARTHUR MASON.