

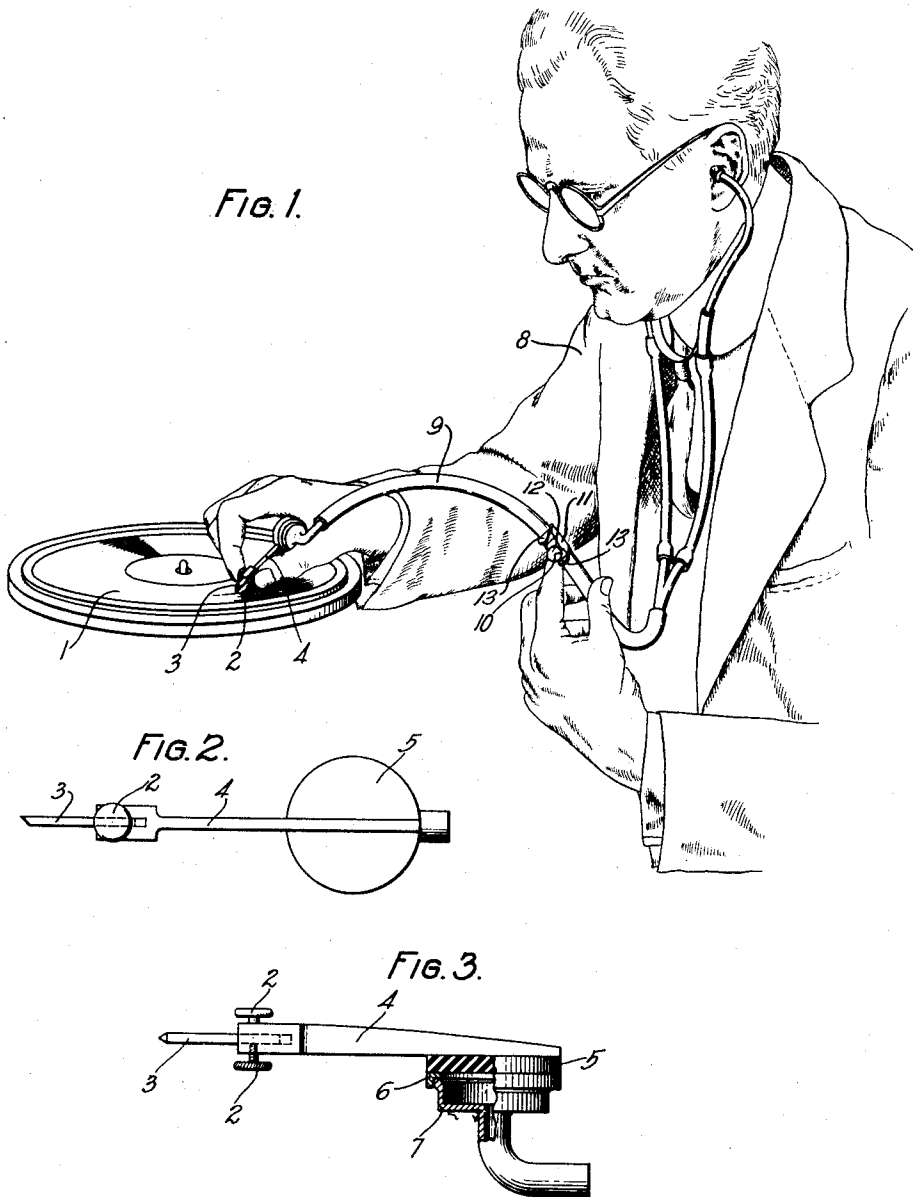
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D. G. BLATTNER

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SOUND REPRODUCTION

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INVENTOR
DAVID G. BLATTNER
BY *J. M. Campbell*
ATTORNEY

UNITED STATES PATENT OFFICE

DAVID G. BLATTNER, OF BOGOTA, NEW JERSEY, ASSIGNOR TO BELL TELEPHONE LABORATORIES, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

SOUND REPRODUCTION

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This invention relates to sound reproducing systems and more particularly to mechanical pick-up devices for reproducing low frequency vibrations such as recorded heart sounds. The general object of the invention is to provide such a device at very low cost.

In accordance with the general features of the invention the pick-up device is held in the hand so that the fingers serve as the pivot of the stylus arm and supply the proper damping action for the vibrating system; the needle arm is attached to a diaphragm of flexible material along its diameter and the sound is heard by means of an ordinary stethoscope attached to the sound box associated with the diaphragm.

In the drawings Fig. 1 is a general view showing the method of using this invention. Figs. 2 and 3 show in detail the construction of the pick-up device.

The record 1 to be reproduced is placed upon any available phonograph turntable and the pick-up device is held with set screws 2, which holds the stylus 3 in place, between the thumb and finger as shown. When the stylus 3 is in contact with the moving record, the recorded sounds cause the stylus arm 4 to vibrate about the pivot point provided by the fingers. This arm is attached to a flexible rubber diaphragm 5 along a diameter and the diaphragm in turn is secured to a metal ring 6 which is threaded to receive the sound box 7 as shown in Fig. 3. The movements of the stylus arm alternately compress and release the diaphragm 5 in the usual way so that air vibrations corresponding to the sounds of interest are produced in the sound box and reach the ears of the operator 8 through the acoustic stethoscope 9. Minor adjustments of the volume level for obtaining a more natural tone may be made by means of the adjustable clamp 10 of any well known type which will be effective to vary the size of the air passage at the clamping point. In the device shown a tubular member 11 surrounds the tube 9 and is threaded to receive the thumb screw 12. A metal strip 13 is bent at its ends to keep it within the member 11 and under the action

of screw 12 deforms the rubber tubing 9 to decrease the size of the air passage as desired.

The rather unusual construction of this device is due to the fact that it is designed to reproduce frequencies below the range of an ordinary phonograph pick-up. In this case the recorded sounds are largely transients of very low frequency, which previous to this invention, could be satisfactorily reproduced only with expensive apparatus. It was necessary, therefore, that this device should faithfully reproduce the sounds at natural volume, relatively free from surface noise and yet be of such a simple construction as to be very inexpensive.

The inertia type construction already described was found to fulfill all of these requirements. The use of a high dissipation material in the diaphragm results in low efficiency particularly at high frequencies. This means that the device discriminates against objectionable noise and reproduces the desired sounds at only their natural intensity. The flexibility of the diaphragm makes it capable of responding to the low frequency transients and the high degree of damping introduced by holding the device in the hand and driving the diaphragm in the manner shown assures faithfulness of reproduction.

What is claimed is:

1. The combination with a phonograph pick up device adapted to be held in the hand of an operator, of acoustic stethoscopic means for conducting the sound waves set up in the device to the ears of the operator.

2. In a sound box the combination of a casing with a diaphragm of flexible, high dissipation material and a stylus arm secured to said diaphragm along a diameter of said diaphragm.

3. In a sound box the combination with a casing and a thick diaphragm of high dissipation material secured at its periphery to said casing, of a stylus arm adapted to be held in the hand and attached to said diaphragm along a diameter.

4. In a sound reproducing device, a stylus, a stylus arm for holding said stylus adapted

to be held in the hand of an operator, a sound box with a diaphragm of high dissipation material driven along a diameter by said stylus arm, stethoscope means for conveying sound vibrations from said sound box to the ears of said operator, and means for varying the volume of said sound vibrations.

5 5. The combination with a sound pick up device having a diaphragm of high dissipation material and a stylus supporting member
10 attached to the diaphragm for driving it along a diameter, the device being adapted to be held in the hand of an operator, of acoustic stethoscopic means for conducting the
15 sound waves set up in the device to the ears of the operator.

6. In a phonograph reproducer the combination of a diaphragm and a stylus arm attached to the diaphragm along a diameter
20 of the diaphragm and adapted to be supported solely between the fingers of the operator and to pivot about the point of support.

7. The combination with a diaphragm and
25 a stylus arm attached to the diaphragm along a diameter of the diaphragm and adapted to be supported solely between the fingers of the operator and to pivot about the point of support, of means responsive to vibrations of
30 the diaphragm for directing sound waves to the ears of the operator.

In witness whereof, I hereunto subscribe my name this 21st day of February, 1928.

DAVID G. BLATTNER.

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