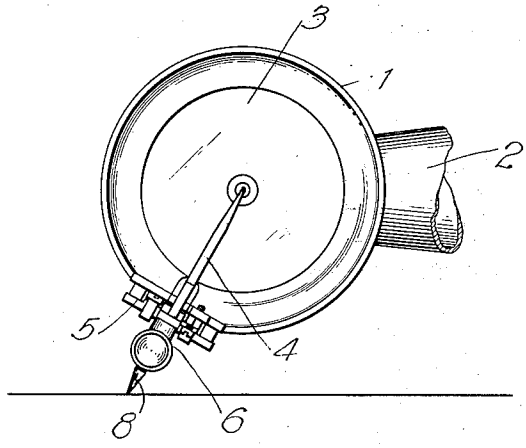
L. C. PETTITT.

PHONOGRAPIC REPRODUCER.

APPLICATION FILED JULY 10, 1919.

1,380,498. Patented June 7, 1921.



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UNITED STATES PATENT OFFICE.

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PHONOGRAPHIC REPRODUCER.

1,380,498. Specification of Letters Patent. Patented June 7, 1921.

Application filed July 10, 1919. Serial No. 309,892.

To all whom it may concern:

Be it known that I, LEWIS C. PETTITT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Phonographic Reproducers, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to phonographic reproducers, and particularly to the diaphragm and associated parts thereof.

The general object of the present invention resides in the provision of a phonographic reproducer having louder and clearer tone or sound-reproducing qualities, and which is practically non-breakable or damageable.

This and other objects of the present invention will be pointed out in detail in connection with the accompanying drawing showing one form of reproducer constructed in accordance with my invention. Although I have illustrated a reproducer adapted for use only on the lateral groove form of record, I wish it to be understood that my invention may be applied to the hill and dale groove record, in which case the diaphragm of the reproducer lies parallel to the face of the record.

Referring to the accompanying drawing, 1 designates a reproducer or sound-box casing attached to a tube 2 extending to the resonator or horn of the instrument. The reproducer casing 1 supports the diaphragm 3 which is connected at its geometrical center with the upper end of a stylus lever 4 pivoted to the casing as shown at 5. The lower or free end of the stylus lever 4 is provided with the usual stylus or needle socket 6 and stylus screw 7 for clamping the stylus 8 onto the lever. The diaphragm 3 is formed of aluminum alloyed with magnesium or some other metal which will increase the stiffness and resiliency of the aluminum. In the preferred form of my invention, I form this diaphragm of luminum alloyed with not to exceed five per cent. magnesium. This five per cent. is not a critical or limiting amount. I have found, however, that excellent results are secured in the use of an alloy in which the magnesium content is slightly less than five per cent. Such an alloy is quite springy, it has a close hard grain, its specific gravity is low, it does not readily tarnish or corrode, it does not split or cleave as does mica, it is relatively inexpensive and it is capable of withstanding comparatively rough handling.

I propose further to construct the lever 4 and stylus 8 of the same material as that of the diaphragm, with the result that the vibrations produced by the record are carried through the instrument by the same or homogeneous metal, and the tone or sound reproduced is clear and distinct.

I am not certain that I can give a correct, scientific explanation of the reasons for the excellent results secured in the use of a phonographic reproducer equipped with a diaphragm of an aluminum alloy as previously described. I do know from repeated experiment and test that when such aluminum alloy diaphragm is used, the tone quality is very much improved over that which I have been able to secure in the use of mica. There is greater fidelity in the reproduction of the human voice and in the reproduction of the tones of certain musical instruments, particularly, for example, the treble part of the scale of a piano. I attribute this increased fidelity of reproduction to a more complete and perfect reproduction of the vibrations of the sound waves. I believe that the extreme lightness of this aluminum alloy makes it very free to respond to the vibrations impressed upon it by the stylus. I believe that its very considerable stiffness and springiness causes the diaphragm to follow rapidly and exactly the slower and more rapid vibrations of the stylus, which correspond with the over-tones of the sound to be reproduced. This alloy has what may be described, perhaps, as a natural bell-like quality. Its superiority in this respect may be due to the hardness, closeness and more perfect homogeneity of the metal. While I am not certain therefore, I believe that the superiority of this aluminum alloy for the diaphragms of phonographic reproducers is due to its lightness, its stiffness, its springiness and its hard, close homogeneous grain. I do know that the results secured from the use of these diaphragms are excellent.

Although I have described my invention as applied to phonographic reproducers, it will be apparent that certain of the improved arrangements can be applied to phonographic recorders without departing from the spirit and scope of the present invention.

Having thus described my invention, what I claim is:—

1. A phonograph reproducer diaphragm formed of a malleable, fine grained, springy alloy of aluminum.

2. A phonograph reproducer diaphragm formed of a malleable, springy, and fine grained magnesium alloy of aluminum.

3. A phonograph reproducer diaphragm formed of a hard, malleable, springy, and fine grained magnesium alloy of aluminum in which the percentage of magnesium does not exceed five per cent.

In witness whereof, I hereunto subscribe my name this 7th day of July, 1919.

LEWIS C. PETTITT.

Witnesses:
MARY A. COOK,
ANDREW WINTERCORN.