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A. A. BARTELINK
 FERROMAGNET SYSTEM FOR CONVERTING ELECTRIC OSCILLATIONS
 INTO ACOUSTIC VIBRATIONS OR CONVERSELY
 Filed Sept. 11, 1930

1,943,884

Fig. 1

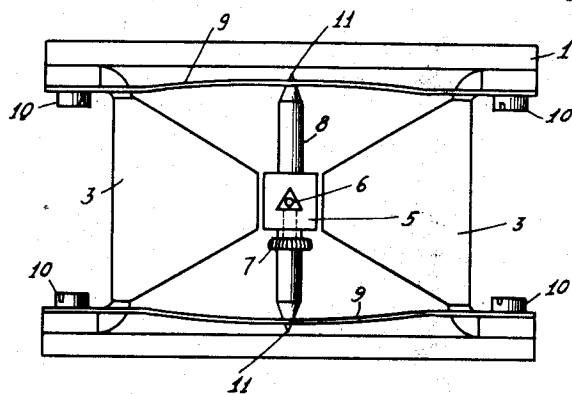


Fig. 2

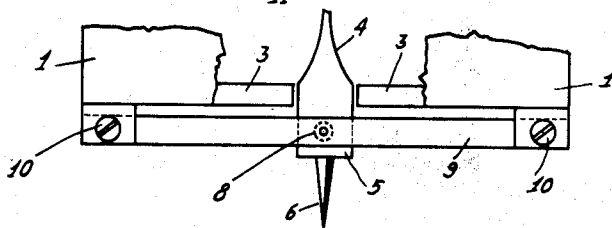


Fig. 3

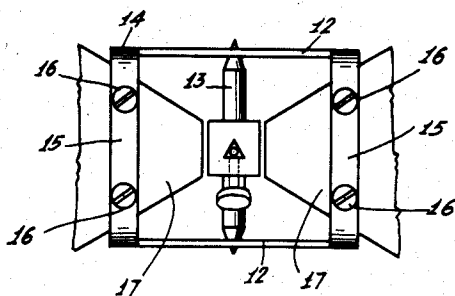
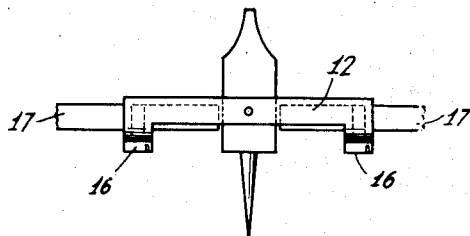


Fig. 4



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FERROMAGNET SYSTEM FOR CONVERTING
ELECTRIC OSCILLATIONS INTO ACOUSTIC
VIBRATIONS OR CONVERSELYAlbertus Antony Bartelink, Eindhoven, Nether-
lands, assignor to Radio Corporation of
America, a corporation of DelawareApplication September 11, 1930, Serial No.
481,128, and in the Netherlands September 19,
1929

11 Claims. (Cl. 175—339)

This invention has reference to a ferromagnet system of devices for converting electric oscillations into acoustic vibrations or conversely, such as gramophones, loud speakers, microphones and the like.

It has been proposed to damp the movement of the armature in the magnetic field of such systems by applying rubber to the ends of the spindle of the armature. It has, however, been found that eventually the composition of the rubber alters, in that for example it becomes hard so that the movement of the armature is interfered with and is no longer suitable.

A further limitation of the use of rubber in this case consists in that the air gap between the armature and the pole pieces of the magnet is consequently not equally large with all the devices made in the same manner. This is due to the fact that for the correct adjustment of the armature the ends of the spindle with the rubber are exposed to some pressure. This results in the rubber being compressed in one case to an extent different from that in another case so that like devices are all different as regards the size of the air gap. This is objectionable in wholesale manufacture.

The invention has for its object to obviate these and other disadvantages.

According to the invention, for this purpose the ends of the spindle of the armature are arranged so as to be resilient in the direction of the axis.

In one embodiment of the invention the spindle is mounted between two springs which may be laminated if desired. Preferably, use will be made of spindles having conical ends. In order to avoid any undue amount of latitude of the armature by wear of the ends of the spindle, the springs are provided with apertures in which the conical ends of the spindle are journaled. It is, of course, obvious that consequently the rubber on the ends of the spindle can be dispensed with and the place of the armature between the pole pieces is fixed so that the air gaps of all the devices made in the same manner are of equal size.

In order that the invention may be clearly understood and readily carried into effect some embodiments thereof will be described with reference to the accompanying drawing, in which:

Figure 1 is a bottom view of a portion of a construction of an electric pick up with a ferromagnet system according to the invention;

Figure 2 is a side view of this portion;

Figure 3 is a bottom view of a portion of a different construction of an electric pick up with a

ferromagnet system according to the invention, and

Figure 4 is a side view of this portion.

Referring to Figures 1 and 2, the armature 4 is arranged between two magnets 1 and 2 of an electric pick up with pole pieces 3. The armature 4 has a portion 5 which serves as a holder for a needle 6 clamped therein by means of a screw 7. The spindle 8 to which the armature is secured and which is provided with conical ends is rotatably arranged between two springs 9 secured by screws 10 to the pole pieces 3. In order to avoid any amount of latitude of the armature the springs are provided with apertures 11 in which the spindle ends are journaled.

In the form of construction shown in Figures 3 and 4 the springs 12 between which the spindle 13 is rotatably arranged constitute two opposite sides of a frame 14 which has its two other sides 15 secured by screws 16 to the pole pieces 17 of the magnet system not shown.

For the purpose of illustrating the invention it has been deemed sufficient to show only a portion of the armature and the pole pieces, as the invention resides in the manner in which the spindle about which the armature vibrates, is mounted. It is to be understood that a suitable coil is positioned so as to be influenced either by the lines of force through the armature or the lines of force through one or both of the poles of the magnet system. Such arrangements of coils are well-known in the prior art and do not require further description or illustration.

In the appended claims the term "transducer" is used in accordance with its usual meaning to designate any device taking power from one electrical, acoustical or mechanical system and furnishing power to another system of the same or different type.

What I claim is:

1. A ferromagnetic system for a transducer comprising, an armature, a rigid spindle about which said armature is adapted to vibrate as a center, and means for resiliently supporting said spindle for movement in the direction of its axis only.

2. A ferromagnetic system for a transducer comprising an armature, a rigid spindle forming the center of vibration of said armature, and flexible means at the ends of said spindle for permitting movement thereof in the direction of its axis only.

3. A ferromagnetic system for a transducer comprising an armature, a rigid spindle rigidly

connected thereto, and means for supporting the ends of said spindle, said means permitting rotational and axial movement only of said spindle.

4. A ferromagnetic system for a transducer comprising, an armature, a spindle forming the center of vibration therefor and flexible leaf springs cooperating with the ends of said spindle for permitting movement thereof in the direction of its axis.
5. A transducer comprising a magnet system having pole pieces, an armature adapted to be vibrated between said pole pieces, a spindle on which said armature is mounted, and thin, flat springs supporting the ends of said spindle in such a manner that the spindle is resiliently mounted in the direction of its axis.
6. A transducer comprising a magnet system having pole pieces, an armature adapted to be vibrated between said pole piece, a spindle on which said armature is mounted, a pair of thin, flat, flexible spring members each of which is mounted at at least one end and provided with an aperture in which an end of the spindle is seated, said spring members mounting said spindle for flexible movement in the direction of its axis only.
7. A transducer comprising a magnet system having pole pieces, an armature adapted to vi-

brate between said pole pieces, a spindle on which said armature is mounted, a pair of thin, flat spring members resiliently supporting said spindle for movement in the direction of its axis, and means for supporting each end of both of said spring members, said means being supported from said pole pieces.

8. A ferromagnetic system for a transducer comprising an armature, a spindle on which said armature is mounted, and resilient means for supporting the ends of the spindle, said means being resilient only in the direction of the longitudinal axis of the spindle.

9. A ferromagnetic system as claimed in claim 8 in which the spindle ends are mounted between two flat, comparatively thin springs.

10. A ferromagnetic system as claimed in claim 8 in which the spindle ends are mounted between springs provided with apertures in which the spindle ends are journaled.

11. A ferromagnetic system as claimed in claim 8 wherein the spindle ends are journaled in springs which constitute two opposite sides of a rectangular frame which has its other two sides secured to the pole pieces of the magnet system.

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35	110
40	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150