April 5, 1949. R. W. NICHOLLS 2,466,469

MEANS FOR MOUNTING THE ARMATURE OF A MAGNETIC PHONOGRAPH RECORD REPRODUCER AND RECORDING HEAD

Filed Oct. 26, 1945

Fig. 1.

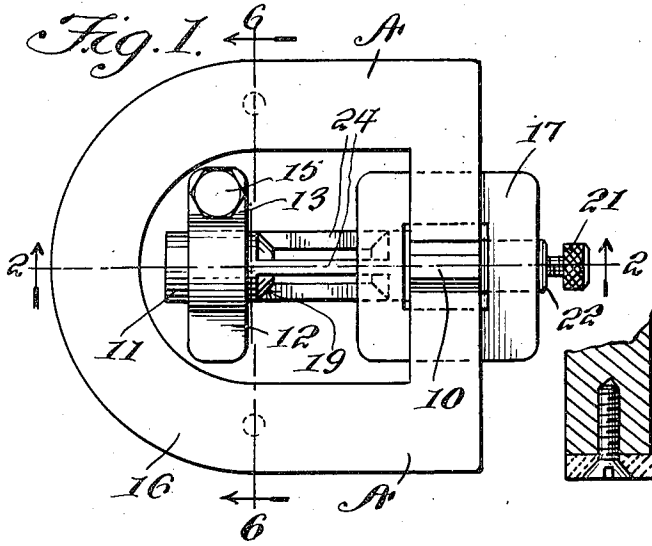


Fig. 6.

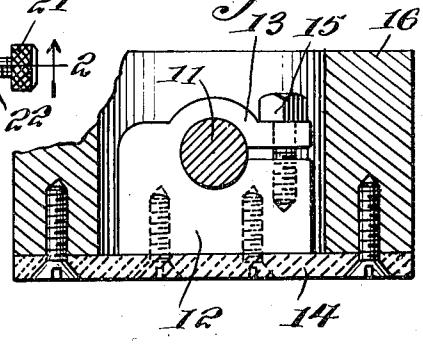


Fig. 2.

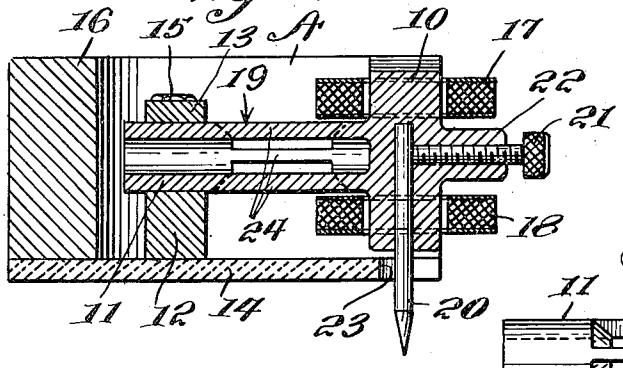


Fig. 4.

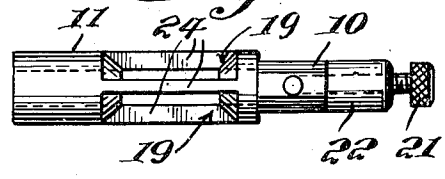


Fig. 3.

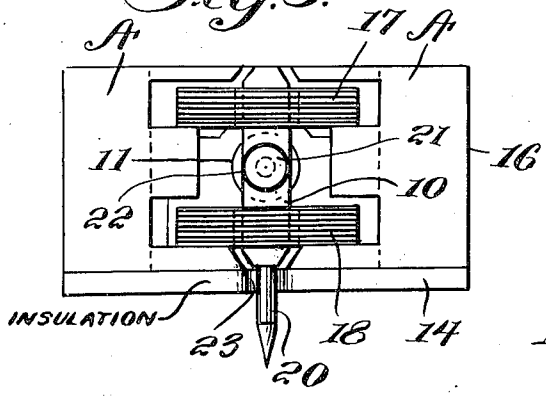
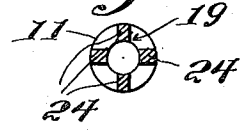


Fig. 5.



INVENTOR.

Ralph W. Nicholls,

BY Victor J. Evans & Co.

ATTORNEYS

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MEANS FOR MOUNTING THE ARMATURE OF A MAGNETIC PHONOGRAPH RECORD REPRODUCER AND RECORDING HEAD

Ralph William Nicholls, Miami Shores, Fla.

Application October 26, 1945, Serial No. 624,843

3 Claims. (Cl. 179—100.41)

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The invention relates to a device for recording and reproducing acoustic vibrations.

The primary object of the invention is the provision of a device of this character, wherein the mounting of an armature in a magnetic phonograph record reproducer or the recording head is had without the usual bearings, retaining springs or rubber damping mediums, the device being of novel construction and is unique in the arrangement of its parts, for the successful operation thereof.

With this thought in mind this invention contemplates a pickup needle carried by an armature having a horizontally disposed shaft integral therewith with an extending end of the shaft journaled in a bearing on a base plate end with the armature positioned between the pole pieces of a permanent magnet of the horse shoe type, and with coils around upwardly and downwardly extending arms of the armature and positioned in gaps in said pole pieces.

The incorporation of the shaft in the vibrating system of phonograph reproducers and recording cutter heads eliminates the use of rubber bearings and damping means, thus enabling the pick-up to be adjusted to a very low mechanical impedance, therefore, a very light pressure is required on the record grooves for it to track and operate successfully. This results in long usage from lacquer or commercial recordings due to the extremely low mechanical impedance and the slight pressure on the record.

Another object of the invention, therefore, is the provision of a device of this character, wherein it is simplified for manufacturing assembling, eliminates rubber bearings, springs and reduces all friction, at the same time being rigid, but allows the armature fastened in place to twist on an axis, the twist being slight, and the pole pieces, magnet and clamp are assembled on a base plate or in a die casting or plastic or punch pressed phonograph arm, so that very slight pressure is necessary on records which increases the number of playings before surface of each is cut up by the needle, thereby increasing the length of usefulness.

A further object of the invention is the provision of a device of this character, which is simple in construction, thoroughly reliable and efficient in operation, strong, durable, neat in appearance, light in weight, and inexpensive to manufacture and install.

With these and other objects in view, the invention consists in the features of construction, combination and arrangement of parts as will

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hereinafter be more fully described, illustrated in the accompanying drawing, which shows the preferred embodiment of the invention, and is pointed out in the claims hereunto appended.

In the accompanying drawing—

Figure 1 is a top plan view of the device constructed in accordance with the invention;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1 looking in the direction of the arrows;

Figure 3 is an elevation of the device looking toward the needle holding end of the armature of the device;

Figure 4 is a detail plan view of one part of the device removed;

Figure 5 is a sectional view taken on the line 5—5 of Figure 4 looking in the direction of the arrows;

Figure 6 is a cross section through the device, being taken on line 6—6 of Figure 1.

Similar reference characters indicate corresponding parts throughout the several views in the drawing.

Referring to the drawing in detail, the device constituting the present invention, comprises an armature 10, made as a whole with a shaft 11 which will allow it to track in an oscillating motion. This shaft 11 at its inner end is removably held in a bearing 12 by a releasable clip 13 thereon, and such bearing is supported by a base plate 14, the clip being connected by a fastener 15.

The plate 14 supports and has insulated therefrom a U-shaped magnet 16, and disposed between the pole pieces at the ends of the two arms A—A thereof, and under the balanced influence of the magnetic fields produced by the permanent magnet is the armature 10. The pole pieces which are of ferromagnetic material, for instance, soft iron, are integral and in intimate contact with the permanent magnet 16.

Encircling the armature 10 above and below the shaft 11 are the two coils 17 and 18, of identical construction, which coils can be connected in series or in parallel at will and through which flows the impressed amplified current during recording and the induced current during reproduction. The formation of the shaft 11, as indicated at 19 enables the tracking thereof in an oscillating motion, as before stated, as it permits of a slight twist to such shaft, at this point 19, which should be obvious.

The armature 10 is a part of the shaft 11 and has formed in its lower end a clearance for a recording needle 20, adapted to be detachably

held in place by a set screw 21 threaded into a lateral boss 22 projected beyond the overlying relation of the coils 17 and 18, respectively. The base plate 14 is also provided with a recess 23 for the passage of the needle 20 through the same. The formation 19 of a thinned radial web construction, the webs being denoted at 24, respectively.

The device constructed in accordance with the invention is devoid of pivot bearings, springs or damping mediums, as will be apparent from Figures 1, 2 and 3 of the drawing. It is, of course, understood that in lieu of the needle 20 a permanent sapphire point may be substituted in its place.

What is claimed is:

1. Means for mounting the needle carrying armature of a magnetic phonograph reproducer or recorder comprising a bearing post fixed rigidly within the reproducer or recorder, a hollow shaft having the armature fixed rigidly to one end thereof and having the other end fixed rigidly to the bearing post, the shaft being provided between the bearing post and armature with longitudinal slots presenting a pair of vertical ribs and a pair of horizontal ribs adapted to hold the shaft and its armature against vertical and lateral movement but adapting the shaft to twist about its longitudinal axis as the armature is electrically or mechanically oscillated.

2. In an armature for an electro-magnetic pickup device, a vertically disposed armature head having a needle socket in the lower end and having a horizontally disposed tubular shaft extended from a point in the armature head midway of the height thereof and perpendicularly disposed in relation to said head, said shaft having longitudinally disposed slots therein with the slots centered in diagonally positioned planes at 45 degrees to the vertical and horizontal planes through the shaft providing comparatively thin aligned vertical and horizontal webs connecting the ends of the shaft whereby with the shaft supported by the end opposite to that on which the armature head is positioned the head is suspended with the webs preventing vertical and horizontal movement and providing oscillating or twisting vibrations therein.

3. In an armature for an electro-magnet pickup device having a U-shaped magnet with the armature suspended between the poles thereof, the combination which comprises, a vertically disposed armature head having a needle holding socket in the lower end and having a horizontally disposed tubular shaft extended from a point in the armature head midway of the height thereof and perpendicularly disposed in relation to said head, said shaft having longitudinally disposed slots therein with the slots centered on diagonally positioned planes at 45 degrees to axially extended vertical and horizontal planes of the shaft providing comparatively thin aligned vertical and horizontal webs connecting the ends of the shaft whereby with the shaft supported by the end opposite to that on which the armature is positioned the head is suspended with the webs preventing vertical and horizontal movement and providing oscillating or twisting vibration in the shaft, and a bearing post in which the end of the shaft opposite to that on which the armature head is positioned, for supporting the armature with the said shaft thereof positioned midway between the arms of the U-shaped magnet and in a plane extended through said arms and midway of the width thereof.

RALPH WILLIAM NICHOLLS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,833,070	Crouse	Nov. 24, 1931
1,995,177	Guedon	Mar. 19, 1935
2,027,169	Harrison	Jan. 7, 1936
2,092,884	Kendall	Sept. 14, 1937

FOREIGN PATENTS

Number	Country	Date
520,447	Great Britain	Apr. 24, 1940