Sept. 16, 1930. H. W. ROGERS 1,776,045

ELECTRICAL RECORDER REPRODUCER

Original Filed March 10, 1927

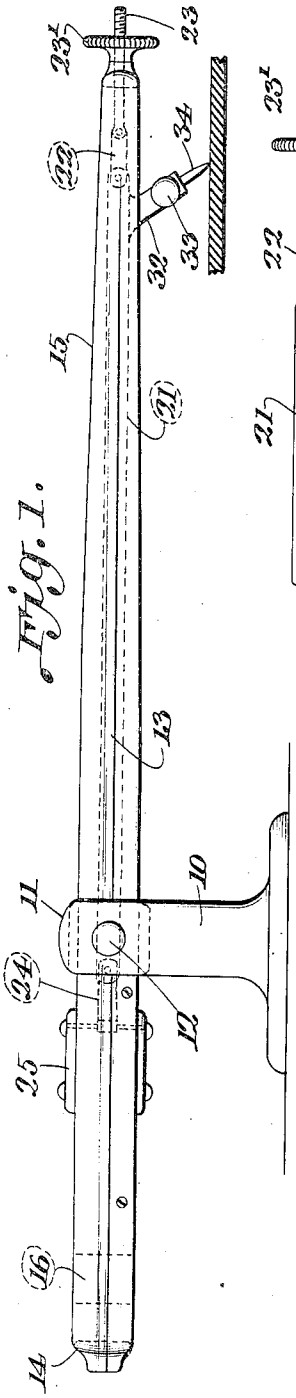


Fig. 1.

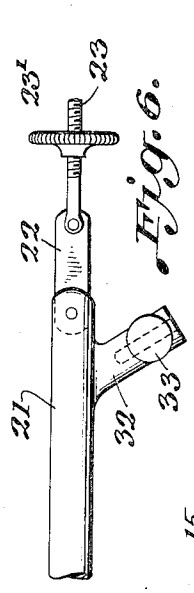


Fig. 6.

Fig. 2.

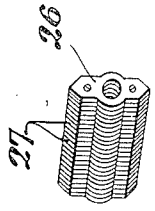


Fig. 5.

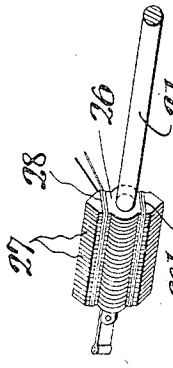


Fig. 4.

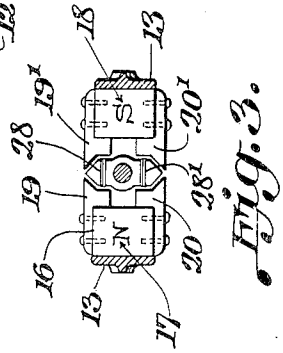


Fig. 3.

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UNITED STATES PATENT OFFICE

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ELECTRICAL RECORDER REPRODUCER

Application filed March 10, 1927, Serial No. 174,182. Renewed March 4, 1930.

This invention relates to improvements in electrical recorder-reproducers and more particularly to that type of magnetic recorder-reproducer used in conjunction with the power amplifying circuits in making and reproducing sound records, one object of the invention being the provision of device of this character which is simple, durable and practical in construction and thoroughly efficient in use.

A further object of this invention is the provision of an electric recorder-reproducer of the magnetic type in which the armature is so mounted as to oscillate or be oscillated by a stylus carrying member, which is normally held biased to a neutral position, thus preventing any undue vibrations or oscillations either set up at the initial movement from the sound groove while reproducing or from the magnetic effect when used as a recorder.

Still further object is the provision of an electric recorder-producer of the magnetic "pick-up" type, in which the whole device is nicely balanced in a frame or arm that is itself mounted to swing over the record as well as to and from the same so that the least possible weight is exerted downwardly through the stylus upon the record, yet sufficiently pressed down as to form the record groove in the master record when recording and ride in the sound groove when reproducing.

With the foregoing and other objects in view, the invention resides in the arrangement and combination of parts as hereafter set forth and more particularly claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a side elevation of the complete "pick-up".

Figure 2 is a top plan view thereof.

Figure 3 is a section or line 3—3 of Figure 2.

Figure 4 is a perspective view of the armature and an adjacent portion of the carrying rod with coils.

Figure 5 is an enlarged detail view of the armature per se.

Figure 6 is an enlarged detail view of the outer end of the stylus carrying rod and its spring support.

Referring to the drawings, the numeral 10 designates the base of the support 11, which is swivelled or pivoted for horizontal swinging movement, which adjustably supported by the adjusting pintles or screws 12 to the support 11, is the frame or arm 13 of the device.

This frame or arm is open throughout its central portion to provide the rear closed end 14, and the tapered forward end 15. Fitted within the end 14 and also acting as a counterbalance for the long free end of the frame, is the bi-polar permanent magnet 16, whose respective north terminal 17 and south terminal 18, project toward the pivotal point of the frame, there being attached to the terminal 17 the two pole pieces 19 and 20, projecting toward and spaced from the two pole pieces 19′ and 20′ carried by the terminal 18 of the magnet. A steel rod 21, preferably a drill rod is mounted centrally and longitudinally of the frame, and is supported at its rear end by a flat torsion spring 24, in turn supported by the plate 25, while its forward end is supported by the flat torsion spring 22, through the medium of the adjusting device composed of the screw 23 and its nut 23′. By this means the rod 21 is held in a neutral or central position, but permitted a limited oscillatory movement relative to its longitudinal axis, the purpose of which will presently appear.

The armature 26 is fast upon the rod 21 and is composed of a series of laminations 27 of .150 silicon steel plates, formed in contour to fit within the space between the inner ends of the respective pole pieces 19—19′ and 20—20′, with a limited movement therebetween. Two coils 28 and 28′, are carried by the armature, and these coils are connected to the terminals 30 and 31, for insertion in a circuit either for recording or reproducing.

Carried by the rod 21 at its forward end and depending therefrom is the stylus carrying arm 32, having the lock screw 33 to hold the stylus 34 in place.

From the foregoing description, the opera-

tion and use of the present invention is readily understood, but briefly stated it is as follows.

As a recording device the coils 28—28′ are connected in an amplifying circuit under the influence of the microphone or other electrical transmitting device, and as the flow of current to and through the coils is influenced, the effect of magnet is to cause the armature to oscillate, thus moving the stylus to provide or form sound indentations upon the wax record, which is revolved in the usual manner, the two torsion springs 22 and 24, permitting this action but also preventing any undue movement in the rod, so that no false movements are imparted to the stylus.

As a reproducing device or "pick-up", the coils are connected in an amplifying circuit, which in turn is provided with a loud speaker and its various means for staging various stages of amplification. The stylus is then placed in the sound groove of a sound record which in turn is revolved, this action causing the lateral indentations or sound reproducing parts in the groove to impart lateral oscillatory movements to the rod 21 and the armature, which in turn influences the pole pieces of the magnet and thus transmits variations in the current flow in the circuit so that the sound is reproduced in the loud speaker. The torsion springs in this instance tend to and do prevent any too sudden or great movement in the rod 21, and thus the sound is reproduced as it should be from the very initial starting of the record.

The two springs as hereto stated act to hold the rod in a neutral or unbiased position, the magnet acts as a counterbalance in the frame or arm, and by means of the nut and screw adjustment the tension of the spring support may be varied as required to produce the best results.

It is evident that with a recorder-reproducer constructed as here set forth, that a very simple device of this type is provided, one that is not likely to get out of order, and which will record or reproduce in a most efficient manner without extraneous sounds due to mechanical oscillations of the stylus carrying member at the initial starting of the operations of recording and reproducing.

What I claim as new is:—

1. An electric recorder-reproducer, including a swinging support, a magnet carried thereby, a rod, a stylus carried thereby, spring supports for the rod and for connecting the rod to the frame and permitting the rod limited oscillatory movement, and an armature provided with coils carried by the rod, said armature being disposed between the poles of the magnet.

2. An electric recorder-reproducer, including a frame pivotally and swingingly mounted, a magnet mounted in the frame at one end and acting as a counterbalance for the other end, a spring supported oscillatory armature mounted for limited movement in the frame, said magnet being upon both sides of the pivotal axis of the armature, coils mounted on the armature to be connected in a circuit for co-operation with the magnet and armature to effect the movement of the armature, and a stylus carrying member in the end of the frame remote from the magnet and operably connected to the armature.

3. An electric recorder-reproducer, including a swinging support, a magnet carried by the support, an oscillatory armature disposed to be influenced by the poles of the magnet, coils carried by the armature, a stylus carrying member connected to move simultaneously with the armature, and a torsion spring connected to the stylus carrying member to normally hold the said member and the armature in a neutral position.

4. An electric recorder-reproducer, including a swinging support, a magnet carried by the support, an oscillatory armature disposed to be influenced by the poles of the magnet, coils carried by the armature, a stylus carrying member connected to move simultaneously with the armature, and two torsion springs connected to the stylus carrying member to normally hold the stylus carrying member and armature in a neutral position.

In testimony whereof I affix my signature.

HARRISON W. ROGERS.