June 1, 1943. E. C. GUEDON 2,320,427

ELECTRICAL SIGNAL-TRANSLATING APPARATUS

Filed Sept. 28, 1940

Fig. 1

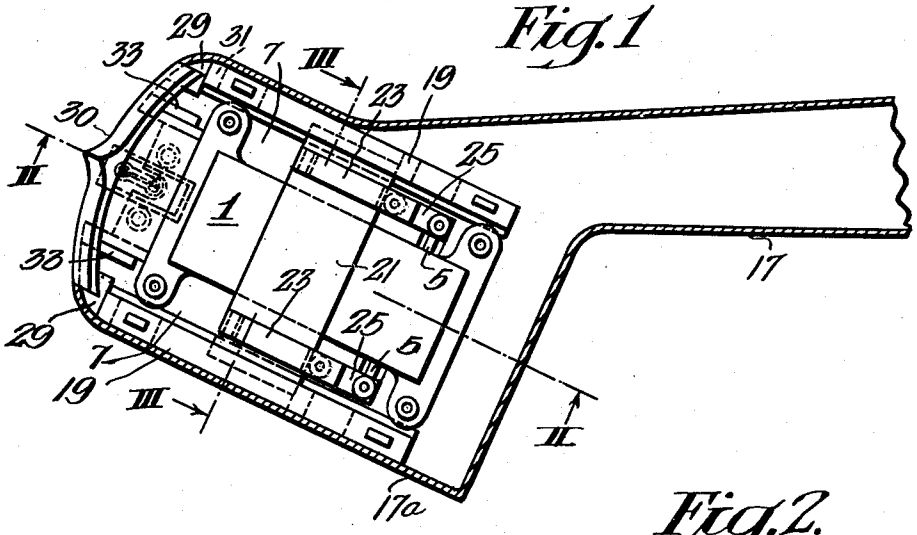


Fig. 2.

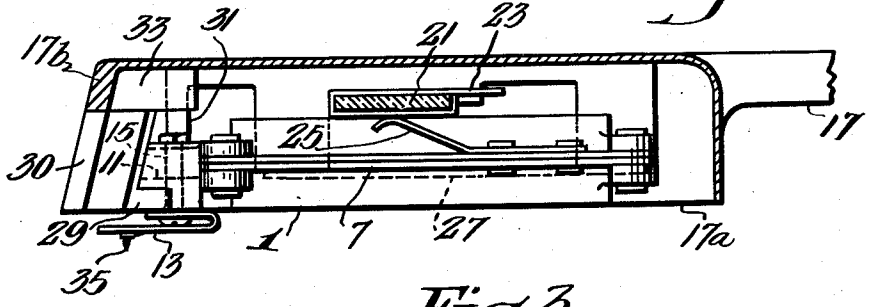


Fig. 3.

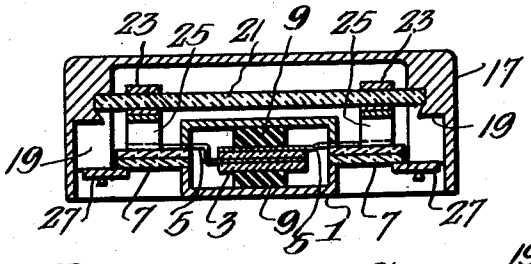
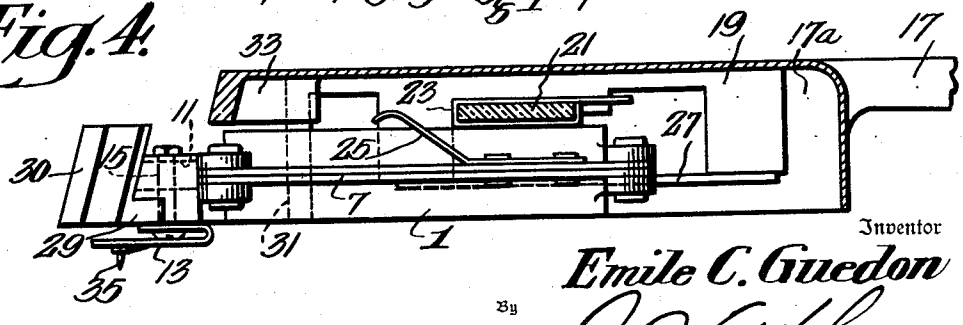


Fig. 4.



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UNITED STATES PATENT OFFICE

2,320,427

ELECTRICAL SIGNAL-TRANSLATING APPARATUS

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Application September 28, 1940, Serial No. 358,757

5 Claims. (Cl. 179—100.41)

This invention relates to electrical signal-translating apparatus, and more particularly to apparatus for reproducing sound from a phonograph record.

In the copending application of Harold J. Hasbrouck, Jr., Serial No. 326,896, filed March 30, 1940, now Patent No. 2,280,763, granted April 21, 1942 and assigned to Radio Corporation of America, there is disclosed a pickup device employing a piezoelectric transducer provided with a particular kind of record-engaging needle designed for long life. Experience has shown that it is preferable to secure the needle to the translating device instead of making it readily removable therefrom since the average user of the phonograph will not possess the requisite technical skill for replacing and properly adjusting the needle when it has become worn. To require the user of a phonograph equipped with such a pick-up device to engage the services of a skilled technician imposes a rather unwarranted limitation on him, and the primary object of my present invention is to provide an improved pickup device of the type under consideration which will be free from this handicap.

More particularly, it is an object of my present invention to provide an improved signal translating device of the type set forth wherein the entire unit can be replaced, when necessary, even by one not skilled in the art.

A further object of my present invention is to provide an improved signal-translating device as aforesaid which is simple in construction and inexpensive in cost.

In accordance with my invention, I provide, as a unit, a sound transducer which may consist of a more or less conventional piezoelectric "cartridge," as it is usually known in the art, or any other suitable electromechanical signal-translating device to which the needle may be either permanently connected or connected in such a way that it should be removed from the cartridge or unit and replaced therein only by a skilled technician for proper adjustment and operation of the device. The transducer unit is preferably slidably and removably mounted on a suitable supporting arm in such a way that suitable contacts are made between the unit and a pair of terminal members on the supporting arm for external connection. Preferably, the cartridge or the like is provided with a pair of spring contact members for pressingly engaging the aforementioned terminals when the unit is in operative position on the supporting arm, the pressure between the spring-contact members and the terminal members on the supporting arm being sufficient to releasably retain the unit in operative position on the supporting arm.

The novel features that I consider characteristic of my invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation, as well as additional objects and advantages thereof, will best be understood from the following description of one embodiment thereof, when read in connection with the accompanying drawing, in which

Figure 1 is a top plan view of a translating device embodying my invention and employing a supporting arm in which the removable translating unit is mounted, the top of the supporting arm being removed to show the arm in section for the sake of clearness,

Figure 2 is a sectional view taken on the line II—II of Figure 1 but showing the cartridge in side elevation and in operative position on the supporting arm,

Figure 3 is a sectional view taken on a line III—III of Figure 1, and

Figure 4 is a view similar to Figure 2 but showing the cartridge partly removed from the supporting arm.

Referring more particularly to the drawing, wherein similar reference characters designate corresponding parts throughout, there is shown an electromechanical transducer comprising a casing 1 which encloses a pair of piezo-electric crystals 3 and with which are associated a pair of terminal foils or conductors 5 in well-known manner, the conductors 5 terminating on a non-conductive terminal board 7 carried by the casing 1. The crystals 3 are preferably spaced from the casing 1 by suitable blocks 9 of damping material and are clamped at their forward end in well-known manner by a torsion yoke 11 which is connected to a suitable needle 13 by means of a rigid rod 15 in the manner more particularly disclosed in the aforementioned patent granted to Harold J. Hasbrouck, Jr.

The transducer unit thus far described is slidably and removably carried by a suitable supporting arm 17 the forward end of which is provided with a housing 17a in which the unit is received and concealed in operative position, as clearly shown in Figs. 2 and 3. The housing 17a includes a pair of oppositely disposed, longitudinally extending side pieces 19 which carry a transversely extending, nonconductive terminal block 21 to which are fixed a pair of spaced terminal strips 23 through which external connection may be made to a suitable amplifier. On the terminal board 7 are mounted two contact springs 25 which are electrically connected to the foils 5 and which are spaced apart the same distance as the terminal strips 23, the resilient contact members 25 being arranged to engage the rigid terminal strips 23 when the unit or cartridge is in operative position within the housing 17a. Thus, electrical connection is provided between the crystals 3 and the terminal strips 23.

The cartridge is guided in its sliding movement within the housing 17a by a pair of plates 27 which are secured to the side pieces 19 and on which the side edges of the terminal board 7 rest, the inward movement of the cartridge with respect to the housing 17a being limited by a pair of projections 29 which extend rearwardly from a front plate 30 on the transducer unit and which are adapted to engage with stops 31 on the side pieces 19. The pressure of the spring contact members 25 against the terminal strips 23 not only effects a frictional force between these members, but also forces the side edges of the terminal board 7 against the plates 27, and the friction thus created is effective to releasably retain the transducer unit in the housing 17a against too easy or accidental removal. However, the pressure between the contact members 25 and the terminal strips 23 is not so great as to inhibit ready removal of the cartridge from the casing 17a.

The front of the housing 17a has a downwardly extending portion 17b with which the front plate 30 is flush when the cartridge is in the fully inserted, operative position, as shown in Figure 2. As the cartridge is withdrawn from the housing 17a, the spring contact members 25 spring upwardly as soon as they clear the terminal strips 23 and their free ends assume a position such that they would strike the housing portion 17b. This, of course, would obstruct complete withdrawal of the cartridge from the pickup arm housing, and to avoid this, the housing is provided with a pair of tracks 33 which are engaged by the free ends of the contact members 25 during withdrawal of the cartridge and which depress the latter to enable them to clear the front housing portion 17b.

It will be obvious, from the foregoing description, that I have provided a novel and simple signal translating unit which can be removed easily from its supporting arm. Thus, when the record engaging tip 35 of the needle becomes worn after several thousand playings, all that the user of the phonograph need do is merely to withdraw the cartridge as a unit from the housing 17a and slide back into the housing 17a a new cartridge which he can obtain from a dealer. Since the dealer is in a position to supply the customer with cartridges which have been assembled, accurately adjusted and tested by skilled technicians, it is obvious that the customer will always be assured of a unit which is properly suited to the needs of his phonograph.

Although I have shown and described but one embodiment of my invention, it will be obvious to those skilled in the art that many other modifications, as well as changes in that described herein, are possible. For example, instead of providing the terminal strips 23 on the block 21 and the spring contact members 25 on the terminal board 7, these parts may be reversed and the resilient contact members mounted on the block 21 with the strips 23 on the board 7. It will also be apparent to those skilled in the art that the signal -translating unit need not necessarily be of the crystal type but may be an electromagnetic unit, an electrodynamic unit, or a unit of any other suitable type. I therefore desire that my invention shall not be limited except insofar as is made necessary by the prior art and by the spirit of the appended claims.

I claim as my invention:

1. In electrical signal-translating apparatus, the combination of a supporting arm constituting a first part, an electromechanical transducer unit slidably and removably carried by said arm and constituting a second part, means for guiding the relative sliding movement of said apparatus, and friction means separate from said guiding means cooperatively carried by said parts for releasably retaining said unit in operative position on said arm.

2. In electrical signal-translating apparatus, the combination of a supporting arm, a pair of spaced terminal members on said arm, an electromechanical transducer unit slidably and removably carried by said arm, guide means on said arm for guiding the sliding movement of said unit thereon, and a pair of correspondingly spaced, resilient terminal elements on said unit adapted to pressingly engage said terminal members when said unit is mounted in operative position on said arm, the pressure between said terminal elements and said terminal members serving to releasably retain said unit on said arm in said position.

3. The invention set forth in claim 2 characterized in that said terminal elements and said terminal members are so arranged relative to said guide means that the pressure between said elements and said members is effective to pressingly engage said unit against said guide means, the resulting friction between said unit and said guide means being effective to releasably retain said unit on said arm in said operative position.

4. In signal translating apparatus, the combination of a supporting arm, an electromechanical transducer unit slidably and removably received by said arm, guide means on said arm for guiding the sliding movement of said unit thereon, and means for pressing said unit against said guide means, the resulting friction between said unit and said guide means being effective to releasably retain said unit on said arm against accidental removal therefrom.

5. In phonographic sound reproducing apparatus, the combination of a supporting arm including a housing, a non-conductive terminal block in said housing, a pair of conductive terminal members mounted on said block in spaced relation to each other, and an electromechanical transducer unit comprising a casing, a piezoelectric element in said casing, a record engaging needle cooperatively associated with said element, a nonconductive terminal board carried by said casing, a pair of conductors connected to said piezoelectric element and terminating on said terminal board, and a pair of conductive, resilient strips on said terminal board connected to said conductors and spaced from each other in correspondence with said terminal members, said unit being slidably carried by said housing for movement into and out of operative position thereon and being concealed within said housing when in operative position thereon, and said resilient strips being adapted to make electrical contact with and pressingly engage said terminal members when said unit is in said operative position within said housing for releasably retaining said unit in said operative position and for providing external electrical connection to said unit.

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