Oct. 13, 1931. E. H. HANSEN 1,827,519

APPARATUS FOR RADIO RECORDING AND REPRODUCTION

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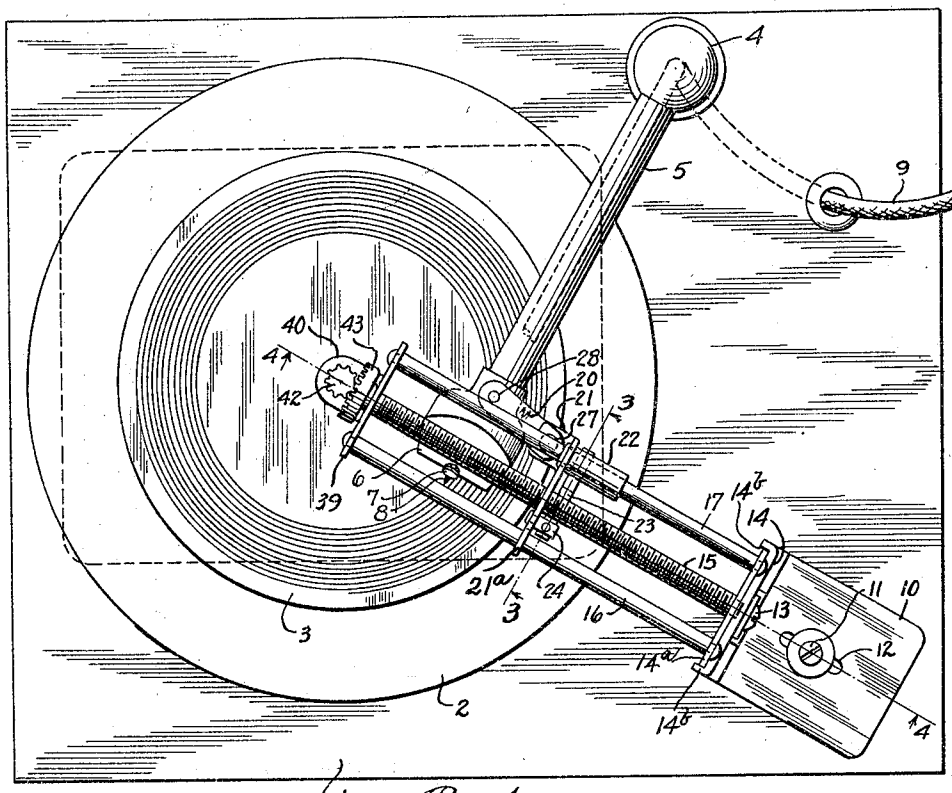


Fig. 1

Fig. 2

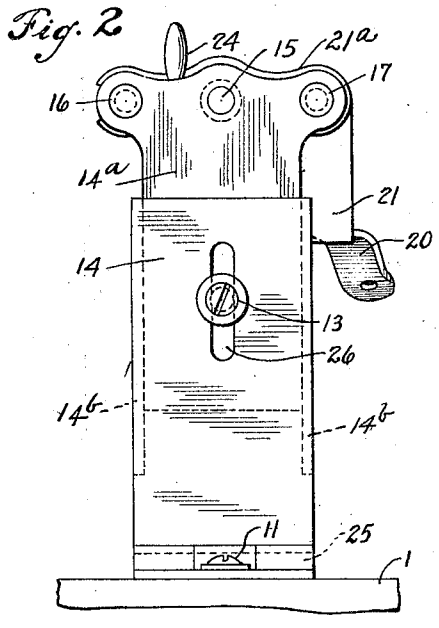
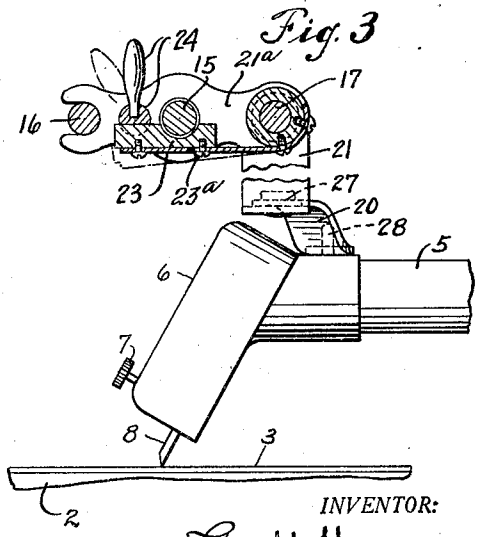


Fig. 3



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Fig. 4

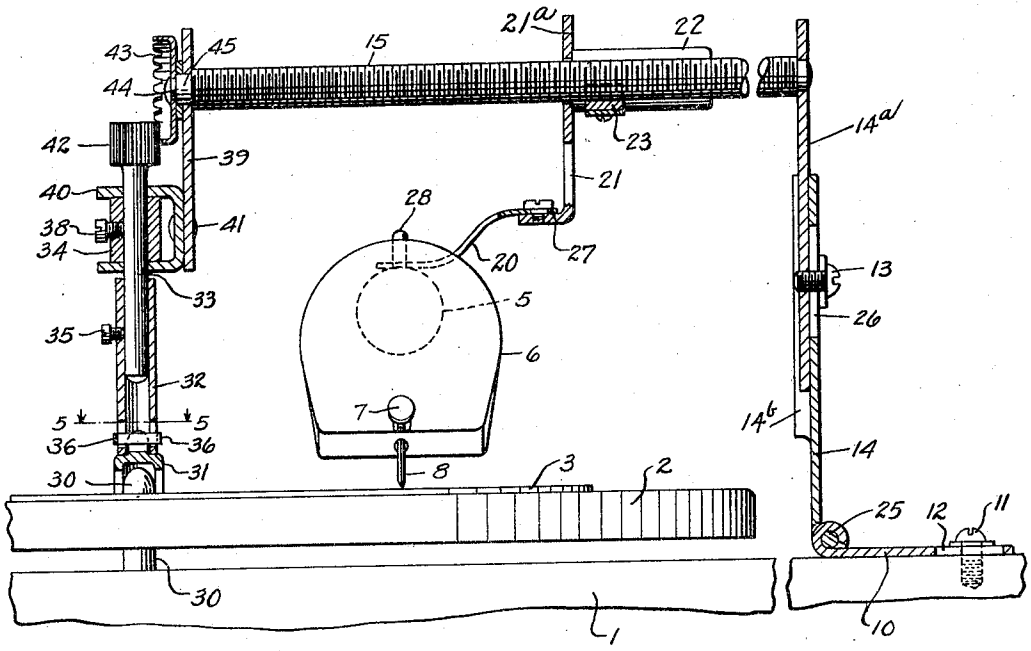


Fig. 7

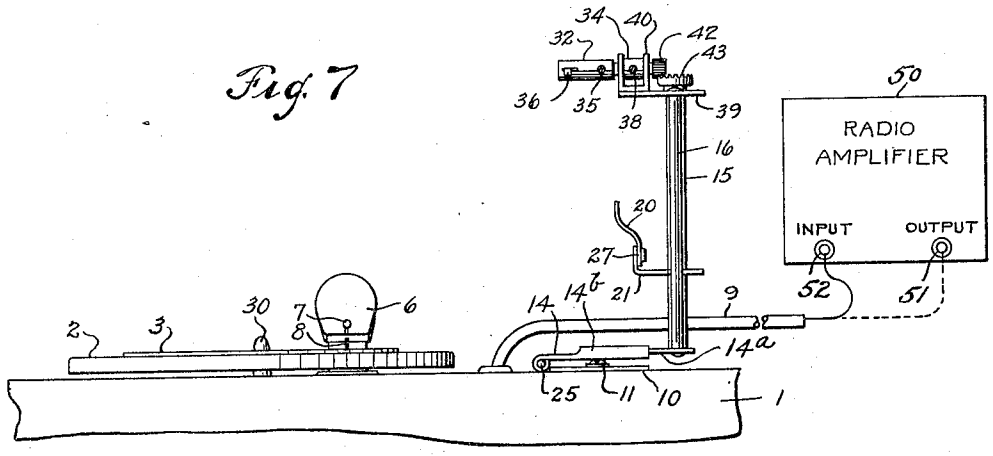


Fig. 5

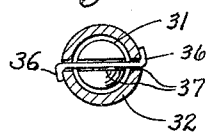
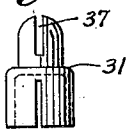


Fig. 6



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UNITED STATES PATENT OFFICE

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APPARATUS FOR RADIO RECORDING AND REPRODUCTION

Application filed June 14, 1928. Serial No. 285,458.

This invention has reference to the art of radio transmission and communication, and particularly relates to apparatus by means of which a radio receiver and phonographic instrument can be combined for electrically recording and subsequently reproducing any part of a radio program, including vocal and instrumental music, that may be desired.

Among the objects of my invention may be noted the following: To provide means by which a radio receiving set can be made to record itself, in permanent form; to provide means by which a radio receiving set can be utilized for the purpose of producing a permanent record of its emanations, which record can be reproduced indefinitely; to provide means by which a radio receiving set can be made to produce a permanent record of its output, in whole or in part, and then reproduce the same indefinitely; to provide means for electrically reproducing any of the standard makes of disk records, utilizing for the purpose the audio amplifier of a radio set and its loud speaker; to provide a mechanism, for the purposes stated in the foregoing, which is adapted to be quickly applied to any type of phonograph by simple means; to provide a mechanism, for the purposes stated, the design and structure of which compensate for any unevenness of the phonographic turntable, and enable the mechanism, through the medium of adjustments, to be applied to practically any type of phonograph; to provide an apparatus, capable of bringing about the functions and uses noted in the foregoing, which can be adapted to any type of audio frequency amplifier used in radio sets, and which can be connected either in the plate circuit of the last tube or across the terminals of the output transformer, if one is employed; to provide a simple, economical and durable mechanism, in the form of an attachment, which can be easily and quickly applied to a radio amplifier, either on the output or input side thereof, and to a phonographic reproducing apparatus, for the purposes of making a permanent record, in whole or in part, of the output of a radio-receiving set, and of reproducing such record, or parts thereof, at will and indefinitely; and to provide a record-receiving plate of aluminum which is strong and durable and which will indefinitely retain its record and which record can be reproduced by the use of standard fiber needles.

In order that my invention may be clearly understood, I have provided drawings wherein:

Figure 1 is a top plan view of a phonographic turntable having my attachment applied thereto and showing a record-making or cutting mechanism capable of being inserted in the output circuit of a radio amplifier;

Figure 2 is a view of the supporting and attaching parts of my invention, looking at the same from the right-hand of Figure 1;

Figure 3 is a view showing in side elevation the recording and reproducing head and in section the feed controlling device of my mechanism, the view being taken substantially on the line 3—3 of Figure 1;

Figure 4 is a vertical sectional view taken on the line 4—4 of Figure 1;

Figure 5 is a detail sectional view taken on the line 5—5 of Figure 4;

Figure 6 is a view in side elevation of the socket applied to the spindle of the turntable for driving the feeding device of my mechanism; and

Figure 7 is a view in side elevation showing my recording means thrown back out of operation, and the record disk being utilized for reproduction purposes, the cutting head now being utilized as a reproducer and for the purpose inserted in the input circuit of the radio amplifier.

Referring to the drawings, the numeral 1 indicates the casing or support of a usual type of phonograph, and 2 is the turntable thereof, on which is placed one of my disks, indicated at 3, in which a record is being cut in Figures 1 and 4, and which record is being reproduced through the radio amplifier in Figure 7. The numeral 4 indicates the swivel support for the arm 5 of the microphonic head or sound-box 6, in which either a reproducing needle or a cutting point 8 may be held, as by the usual bindiig screw 7. The arm 5 of the sound-box may be in circuit, through the conductor 9, with

any form of radio amplifier 50, and can be connected to either the output side 51, or the input side 52, thereof according to whether a record is to be made, or a record is to be reproduced.

The record-making attachment of my invention is composed of a few simple parts shown in Figures 1, 2, 3 and 4, particularly, and therein it will be seen that my feeding device, for actuating the record cutter, is composed of the attaching plate 10 secured to support 1 by a screw 11 passing through a longitudinal centrally disposed slot 12, a washer being utilized, if desired, for obtaining a better grip upon the attaching plate. The elongated slot permits the plate to be adjusted variously to compensate for any size or form of phonograph. A plate 14 is hinged at 25 to the plate 10 and has an elongated slot 26 therein through which is passed a binding screw 13, utilized with a washer, if desired, for connecting adjustably thereto a plate 14^a guided in ways 14^b on the plate 14 for the purpose of maintaining the proper relation of the two plates. The plate 14^a has a screw-threaded feed-rod 15 mounted at one end to turn therein, the opposite end of which rod is journaled at 45 in a supporting plate 39, held by a rivet 41 to a U-shaped bracket 40, in which is mounted a sleeve 34, through which passes a shaft 33 fixed to the sleeve 34 by the screw 38, and to a tubular extension or coupling 32 by a screw 35, so that the rotation of the extension 32 will rotate the shaft 33 and cause its pinion 42, at the upper end thereof, to mesh with the crown gear 43, to rotate the rod 15, to which rod the crown gear is connected by headed screw 44. The lower end of the coupling 32 is provided with opposite parallel slots, through which extends a locking pin, the opposite ends of which are bent at 36 to overlap the circumference of the coupling, leaving the locking pin capable of being shifted within the slots of said coupling without being displaced or lost. Details of this structure are shown in Figure 5; and Figure 6 shows a resilient split socket adapted to fit tightly frictionally upon the pin 30 of the turntable which centers the records or disks. The socket is reduced at its outer end to provide the shoulder 31 on which the extreme end of the coupling 32 is adapted to rest. The reduced outer end of the socket is provided with an elongated slot 37, into which the locking pin is entered, thus locking the socket and coupling 32 together, so that the rotation of the pin 30 of the turntable will be imparted to the threaded feed rod 15, as previously noted. By use of the screws 35 and 38, the shaft 33 can be shifted to compensate for varying elevations of turntables, etc., to which my mechanism is applied. In fact, the adjustment just described coupled with the adjustment of plate 14^a, compensate for variations in the height or size of turntable or phonograph.

To strengthen the structure just described and hold the same rigidly while in operation, I provide two connecting brace rods 16 and 17, one at each side of the supporting plates 14^a and 39, which are riveted to said plates and prevent them from twisting and the feed-rod from wabbling. Mounted on the brace-rod 17 is a sleeve 22 carrying at one end an angular member having a depending leg 21, which at its foot-end supports a resilient, curved connector 20 swivelly secured in place by means of a screw 27, and having at its free end an aperture adapted to receive the pin 28 carried by the head of the sound-box 6. The horizontal arm 21^a of the angular member has a groove in its bottom, through which the feed-rod 15 freely works; has a groove in its outer end embracing the brace rod 16; and between the said rods has a cam 24 with a handle for manipulating it. The sleeve 22 has adjustably secured to it a spring 23^a, which extends under the rod 15 parallel with the arm 21^a, said spring, at its outer end, carrying a track-block 23 having a threaded groove extending transversely thereof for the reception of the feed-rod 15. The spring 23^a maintains the track-block 23 in engagement with the feed-rod 15, while the cam 24 may disconnect the parts, when desired, by acting upon and depressing the block, thus checking the feed movement of the sleeve. With the connector 20 engaged with pin 28, the cutting point 8 is caused to move radially relatively to the disk 3 mounted on the turntable, while the said disk is being rotated by said turntable. Thus, the record cut in the disk 3 will have lateral undulations and will be in spiral form as usual; and it will be seen, viewing Figure 7, that the record-making part of my apparatus may be thrown entirely out of action, or the cutting action of the cutter 8 can be controlled so that during the reception, through a radio apparatus, of a given program, selected portions only thereof may be recorded; or, so that selected parts of various programs can be successively recorded, as desired.

From the foregoing it will be seen that by plugging into the output circuit of the radio amplifier and utilizing the cutting point on the sound-box of a phonograph, and throwing my feeding mechanism into cooperative and driving relation with the turntable of the phonograph, I can record in disk 3, through connection 20—21, any radio program or portions thereof desired. After making a record, the latter can be reproduced by merely throwing back my feeding mechanism on its hinge 25, as shown in Figure 7, which will release the sound-box from the connecting member 20, and then substituting

a reproducing needle for the cutting point and plugging into the input side of the radio amplifier.

For the purposes of my invention, I provide aluminum disks, which can be cheaply and readily made in various sizes, with a hard surface finish but a comparatively soft body, and have found that they adapt themselves very nicely to the cutting of a record and that the latter can be "reproduced" therefrom with approximately original clearness and accuracy. The hard surface makes a durable track and adds to the life of the record. Thus, I am able to utilize both a radio apparatus and a phonographic apparatus for the additional purposes of cutting or making a record from the radio apparatus on the phonographic apparatus, and utilizing the latter and the radio apparatus for reproducing such record. These functions have never, to my knowledge, been accomplished before, and upon them I desire to lay great stress.

An important feature of my invention is that it is an attachment and is adapted to any form of phonograph and any form of radio receiving set. A pin 28 should be added to the sound-box or a sound-box with a pin provided. A special cutter, for record-making purposes, is substituted for the reproducing needle. My feeding mechanism is adjusted so as to create the requisite amount of pressure upon the sound-box; vertical play between the sound-box and the connector 20 must be avoided. The feed of the sound-box is positive, so that both the spiral track and its lateral undulations are accurately made. The axis 4 about which the sound-box swings is eccentric to the axis of the turntable and of the disk 3, requiring the swivel connection 27 for the connector 20. The split-socket of Figure 6 has the additional function of a clamp for the disk 3, to prevent it from slipping during the action of cutting the record.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In combination with a radio receiving set and a phonograph, means between the two for cutting a record of the radio output and for reproducing the record through the radio set, said means including a supporting bracket, a feed screw mounted therein, a removable coupling to the record-receiving pin of the phonographic turntable, a flexible connection from the feed screw to the phonographic sound box, and means connecting the latter with the radio amplifier.

2. An attachment, for the purposes stated, comprising supporting brackets, a feed shaft journaled in said brackets, coupling means to engage the record receiving pin of a phonograph including means for driving said shaft, a flexible coupling for engagement with the sound-box of a phonograph including a sliding sleeve and detachable feed-block for engagement with the feed shaft, substantially as described.

3. In combination with a radio receiving set and a phonograph, means between the two for cutting a record of the radio output and for reproducing the record through the radio set, said means including a carriage, a feed screw journaled in the carriage, a resilient socket engaging the record-receiving pin of the phonographic turntable, a universal connection between the feed screw and the phonographic sound box, and means connecting the latter with the radio amplifier.

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