

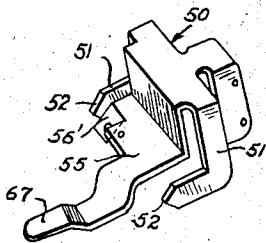
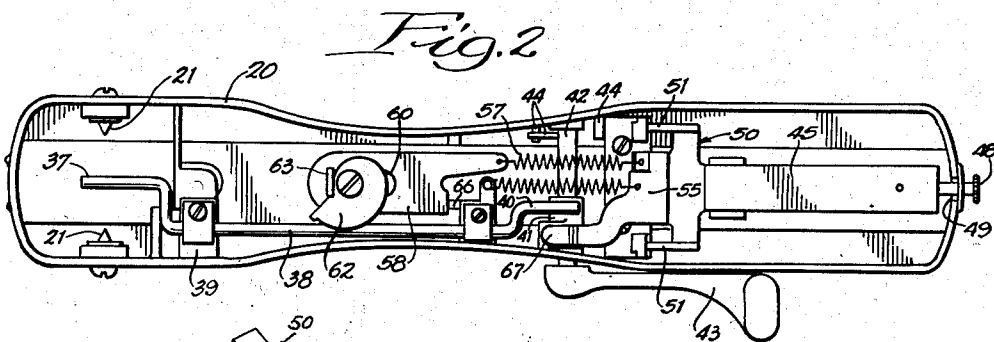
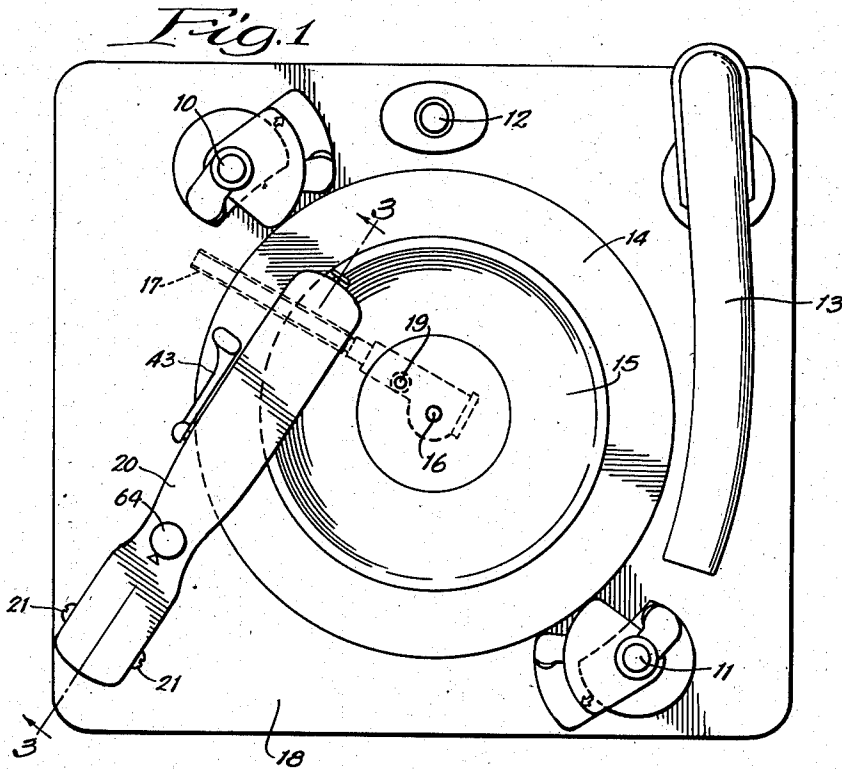
May 8, 1945.

C. G. JOHNSON
PHONOGRAPH RECORDER

2,375,658

Filed Nov. 8, 1941

2 Sheets-Sheet 1



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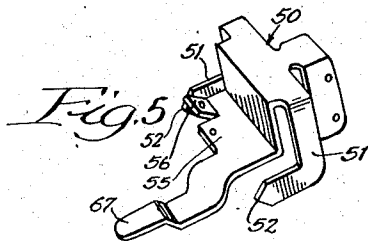
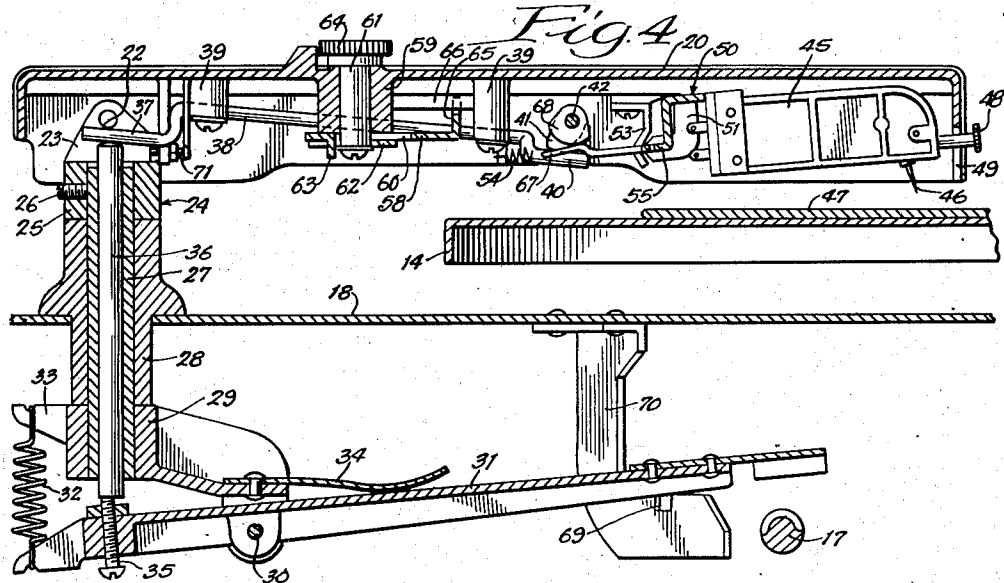
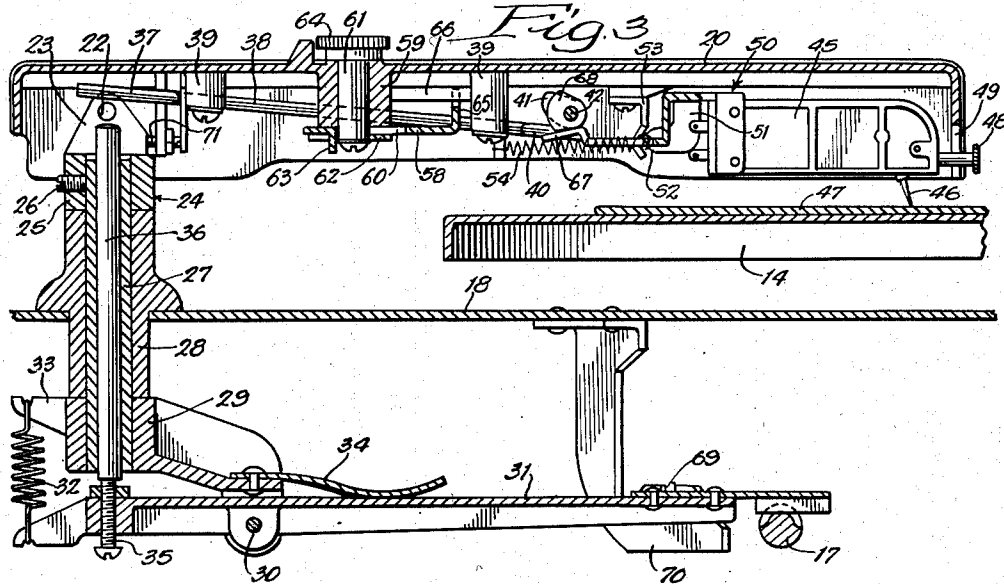
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2,375,658

PHONOGRAPH RECORDER

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,375,658

PHONOGRAPH RECORDER

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Application November 8, 1941, Serial No. 418,311

8 Claims. (Cl. 274—9)

This invention relates to phonograph recorders and has for its principal object to provide an improved phonograph recorder.

One of the principal objects is to provide an improved simple phonograph recorder which can readily be manipulated by the public generally for the purpose of making home recordings.

Another object of the invention is to provide an improved mounting for the cutting head, to provide an improved means for controlling the pressure of the cutting head upon the blank, and to provide improved means for elevating the cutting head from the recording blank.

A further object of the invention is to provide improved means for disengaging the recorder arm from the driving lead screw.

A further object of the invention is to provide a single mechanism adapted to be operated for the joint purpose of elevating the cutting head from the blank and disengaging the recorder arm from the lead screw.

A further object of the invention is to provide an improved mounting for the cutting head in the recorder arm whereby the head may readily be removed from and adjusted upon the recorder arm.

Other objects, advantages and capabilities of the invention will appear from the following description of a preferred embodiment thereof taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a plan view of a phonograph embodying my improved recorder mechanism, the recorder arm being shown in operative position;

Fig. 2 is an inverted plan view of the recorder arm removed from its mounting on the machine;

Fig. 3 is a vertical section taken on the line 3—3 of Fig. 1 showing the recorder arm and associated elements in section;

Fig. 4 is a similar view showing the recording head elevated and the lead screw engaging element elevated away from the lead screw;

Fig. 5 is a perspective view of a carriage on which the cutting head is mounted, and

Fig. 6 is a similar view of a modified form of carriage.

It will be understood that my improved recorder mechanism may be applied to any phonograph having a turntable or to a recording machine having a turntable and not equipped with a reproducing player arm. For home use, however, it is preferable to mount my recording devices upon an automatic phonograph and in Fig. 1 I have shown my recorder applied to the automatic phonograph described and claimed in my

copending application Serial No. 325,111 filed March 21, 1940, now Patent No. 2,351,972, granted June 20, 1944.

It may be noted that when I employ this phonograph I set the supporting posts 10 and 11 in position to play twelve-inch records. Then when the turntable is put into operation by the switch 12, the player arm 13 moves into the twelve-inch initial playing position and remains out of contact with the turntable 14 and the record blank 15 upon which the recording is being made. It will be understood, however, that any suitable means may be provided to disconnect the posts 10 and 11 and the player arm 13 from the drive of the motor which drives the turntable so that the recording operation may be effected without any actuation of the record-changing devices or the player arm 13.

The turntable 14 is driven at uniform speed by a motor (not shown) in well-known manner. The turntable 14 is rigidly mounted on a spindle 16 which is operatively connected to a lead screw 17 by means of a worm and gear connection. The lead screw projects in a generally radial direction with respect to the turntable 14 below the motor board 18.

The motor drive of the turntable and the interconnection between the spindle 16 and the lead screw 17 are not illustrated in detail since these elements may take any desired form. They may, however, be precisely similar to those shown in my copending application Serial No. 329,591 filed April 15, 1940, now Patent No. 2,266,763 granted December 23, 1941. It is to be understood, however, that the lead screw 17 is driven at constant speed while the turntable 14 is driven at its own constant speed. As fully described in the last-mentioned copending application, the turntable 14 is preferably provided with a plunger 19 which is adapted to extend through an opening in the recording blank 15 so that the blank is caused positively to rotate with the turntable 14.

The recorder arm 20 may suitably be of general box formation, being open on its under side, as shown in Fig. 2. The recorder arm 20 is provided with two set screws 21 which are adapted to extend into openings 22 in vertical webs 23 of a supporting member 24. The supporting member 24 comprises a collar portion 25 from which the two vertical webs 23 extend upwardly, these vertical webs being located in parallelism. The collar 25 is adapted to be secured by means of a set screw 26 to a sleeve 27 which is located vertically and is adapted to be rotated on a verti-

cal axis in a standard 28 rigidly secured to the motor board 18.

Rigidly mounted on the lower end of the sleeve 27 and below the motor board 18 is a bracket 29 which is also rigidly secured to the sleeve 27. The collar portion 25 of the supporting member 24 and the boss of the bracket 29 hold the sleeve 27 against movement in the vertical direction. An extension of the bracket 29 provides a pivot 30 for a lead screw engaging lever 31 one end of which is adapted to engage the lead screw 17 as shown in Fig. 3.

The lead screw engaging lever 31 is biased towards lead screw engagement by means of a suitable spring. Thus, I have shown a tension spring 32 which connects one end of the member 31 to a lug 33 on the bracket 29. I have also shown a leaf spring 34 mounted on the bracket 29 and abutting against the member 31. It will, of course, be understood that either of these springs or any other suitable spring arrangement may be used for securing engagement between the member 31 and the lead screw 17.

The end of the lever or member 31 remote from the lead screw 17 carries an upwardly directed set screw 35 which is adapted to engage the lower end of a rod 36 slidably mounted in the sleeve 27. The upper end of the rod 36 is adapted to be engaged and depressed by a crank 37 formed at one end of a rod 38.

The rod 38 is pivotally mounted in posts 39 depending from the upper wall of the arm 20 as best seen in Figs. 3 and 4. The other end of the rod 38 is formed into a similar crank 40 which is adapted to be engaged by a cam 41 rigidly carried by a shaft 42 which extends across the arm 20 and is provided with suitable bearings in the side webs thereof.

One end of the shaft 42 rigidly carries an actuating arm 43 which is located on the outside of the adjacent side web of the arm 20. Suitable stops 44 are provided on the shaft 42 and on the inside of the arm 20 so that the arm 43 may be swung from its normal position shown in Fig. 2 into a position removed therefrom by 180°.

The cutting head 45 is mounted in the end of the arm 20 remote from the sleeve 27 and is provided with a needle 46 adapted to engage the recording blank 47 located on the turntable 14. The needle 46 is held in the head by means of a set screw 48 and the outer end of the arm 20 is provided with a slot 49 to permit the set screw 48 to move up and down as may be required.

The head 45 is rigidly mounted on a carriage 50 which is best seen in Fig. 5. The carriage includes two bracket members 51 which terminate in knife-edge portions 52. These knife-edge portions 52 are normally located in suitable recesses in a pair of brackets 53 which depend from the upper wall of the arm 20.

The knife-edge portions 52 are normally held in these recesses by means of a spring 54 which is secured to a suitable abutment on the arm 20 and to web 55 of the carriage 50. This web 55 is preferably located in alignment with the knife-edge portions 52 so that the spring 54 merely retains the head in mounted position without affecting the pressure on the needle 46.

The carriage 50 also comprises a web 56 which is out of alignment with the web 55 and the knife-edge portions 52. To the web 56 is connected a spring 57, the other end of which is connected to a sliding member 58. The sliding member 58 is mounted on a boss 59 on the inside of the arm 20 and it is provided with a slot 60 through

which extends a shaft 61. The sliding member 58 is held to the boss 59 by a cam 62 rigidly mounted on the lower end of the shaft 61.

The cam member 62 is adapted to engage an abutment 63 formed on the sliding member 58. The upper end of the shaft 61 carries a knurled button 64 which is located on the upper side of the arm 20. By rotating the button 64, the shaft 61 and the cam 62 are likewise displaced. It will readily be understood, by referring to Fig. 2, that when the button 64 is rotated, the sliding member 58 moves so as to vary the tension on the spring 57. Since the tension on the spring 57 is applied to the head 45 out of alignment with is pivotal mounting, such adjustment varies the pressure of the head, or rather its needle 46 upon the recording blank 47.

The sliding member 58 is provided with an up-turned lug 65 which is provided with a recess to receive a rib 66 on the arm 20. The engagement of the rib 66 with the recess in the lug 65 prevents the sliding member 58 from moving in any direction except in the longitudinal direction of the arm 20.

The carriage 50 is provided with an extension 67 which projects from the carriage in a direction away from the knife edges and away from the head 45. This extension 67 is located below a cam 68 which is also carried by the shaft 42. The cam 68 is so located that the head 45 is in the lower cutting position when the arm 43 is in the relation shown in Fig. 2.

When the arm 43 is swung from this position upwardly, the cam 68 engages the extension 67 and the cutting head is elevated from cutting position into its position in Fig. 4. After the head has been raised, the cam 41 engages the crank 40 and the crank 37 is swung downwardly, depressing the rod 36 and elevating the member 31 away from the lead screw 17. This relation is shown in Fig. 4. It may be noted that the head 45 is elevated before the member 31 so that the arm 20 is held against translational movement until after the needle 46 is clear of the blank 47.

When the head 45 and the member 31 are both elevated, the recorder arm 20 may be swung to its inoperative position, clear of the turntable, and in this position the member 31 is located above a recess 69 in a bracket 70 mounted on the under side of the motor board 18. The arm 43 may then be swung forwardly, into its position in Fig. 2, with the result that the head 45 is again moved downwardly and the member 31 is caused to enter the recess 69, holding the arm 20 in inoperative position, clear of the turntable, until the member 31 is again elevated by actuation of the lever 43.

The arm 20 has a normal horizontal position which is defined by a set screw 71 mounted on the arm 20 and adapted to abut against one of the webs 23 as shown in Figs. 3 and 4. The arm 20 can, of course, be elevated manually about its pivot provided by the set screws 22.

The degree of pressure of the needle 46 upon the recording blank 47 can be adjusted by manipulation of the knurled button 64 which button, when moved from its position in Fig. 2, increases the tension of the spring 57. Increase of this spring tension being applied on the web 52 above the pivot of the head 45, decreases the effect of the weight of the head 45 upon the needle.

In some cases where the head 45 is of insufficient weight, the spring 57 is arranged to ap-

ply extra downward pressure upon the needle 46. This may be effected by merely turning the lug 52' downwardly as shown in Fig. 6 instead of the upwardly directed lug 52 shown in Fig. 5. In this construction, actuation of the knurled button 64 and cam 62 from the position of Fig. 2 will effect increase of pressure upon the needle 46.

Although the invention has been described in connection with specific details of a preferred embodiment thereof, it must be understood that such details are not intended to be limitative of the invention except in so far as set forth in the accompanying claims.

Having thus described by invention, I declare that what I claim is:

1. In a recorder, in combination, a recorder arm arranged to swing over a disc on a turn table, a cutting head pivotally mounted within the arm, a tension spring connected to said head, a member mounted on said arm for slidable bodily displacement connected to said spring whereby the tension of said spring may be adjusted by the bodily displacement of said member thereby controlling the needle pressure of said cutting head, and cam means on the arm for controlling the displacement and position of said slidable member whereby the needle pressure can be adjusted to desired degree.

2. In a recorder, in combination, a recorder arm, a cutting head pivotally mounted within said recorder arm, resilient means normally holding said head in a normal operating position, manual means mounted upon said recorder arm adapted positively to engage said head to move the head positively against the action of said resilient means into inoperative position within said arm when said manual means is actuated.

3. In combination, a recorder arm, a cutting head, complementary knife-edge pivot means on said arm and said cutting head providing pivotal support for the cutting head on said arm, a spring extending between said cutting head and said arm in substantial alignment with the axis of said pivot means whereby the knife-edge pivot elements are held together, and a spring connected to said arm and to said head out of alignment with the pivotal axis for adjusting the needle weight of said head.

4. In combination, a recorder arm, a cutting head, complementary knife-edge pivot means on said arm and said cutting head providing pivotal support for the cutting head on said arm, a spring extending between said cutting head and said arm whereby the knife-edge pivot elements are held together, a spring connected to said arm and to said head out of alignment with the pivotal axis for adjusting the needle weight of said head, and manually actuated cam means on said arm for adjusting the tension of last said spring.

5. In combination, a recorder arm, a pivotally mounted vertical support on which said recorder arm is pivotally mounted, a lead screw following member pivotally mounted on said pivotally mounted support, spring means for biasing said lead screw following member into operative position, a rod slidably mounted within said pivotally mounted support and adapted to engage said

lead screw following member, and manually operable means on the recorder arm whereby said rod may be displaced to effect movement of the lead screw following member out of its operative position.

6. In combination, a recorder arm, a pivotally mounted vertical support on which said recorder arm is pivotally mounted, a lead screw following member pivotally mounted on said pivotally mounted support, spring means for biasing said lead screw following member into operative position, a rod slidably mounted within said pivotally mounted support and adapted to engage said lead screw following member, crank means mounted on said arm adapted to engage the upper end of said rod, and a manually actuated member adapted to cooperate with said crank means to effect longitudinal displacement of said rod and the removal of the lead screw following member out of operative position.

7. In combination, a recorder arm, a pivotally mounted vertical support on which said arm is pivotally mounted, a lead screw following member pivotally mounted on said pivotally mounted support, spring means for biasing said lead screw following member into operative position, a rod slidably mounted within said pivotally mounted support and adapted to engage said lead screw following member, crank means mounted on said arm adapted to engage the upper end of said rod, a cutting head pivotally mounted on said arm, means defining the operative position of said cutting head relative to said arm, and manual control means swinging said head into inoperative position and for actuating said crank means to effect longitudinal displacement of said rod and the removal of said lead screw following member out of operative position.

8. In a recorder for phonograph records, in combination, a recording arm, adjustable stop means for defining a generally horizontal recording position of said arm, said arm being maintained in said position by its weight, a pivotally mounted vertical support on which said arm is pivotally mounted, a recording head pivotally mounted on said arm in unbalanced relation whereby its weight tends to move its cutting needle downwardly towards the record blank, a tension member connected to said recording head on the side of its pivot remote from the needle, a cam mounted on said arm and arranged to control said tension member whereby the normal position of the head relative to said arm may be controlled by said cam, a lead screw following member pivotally mounted on said pivotally-mounted support, a rod extending through said pivotally-mounted support and adapted to engage said lead screw following member, crank means mounted on said arm adapted to engage the upper end of said rod, and manual control means on said arm for simultaneously actuating said crank means and said head, whereby the lead screw following member is moved into inoperative position and the recording head is elevated from its operative position determined by said tension member.

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