

Sept. 9, 1941.

J. J. HOEHN

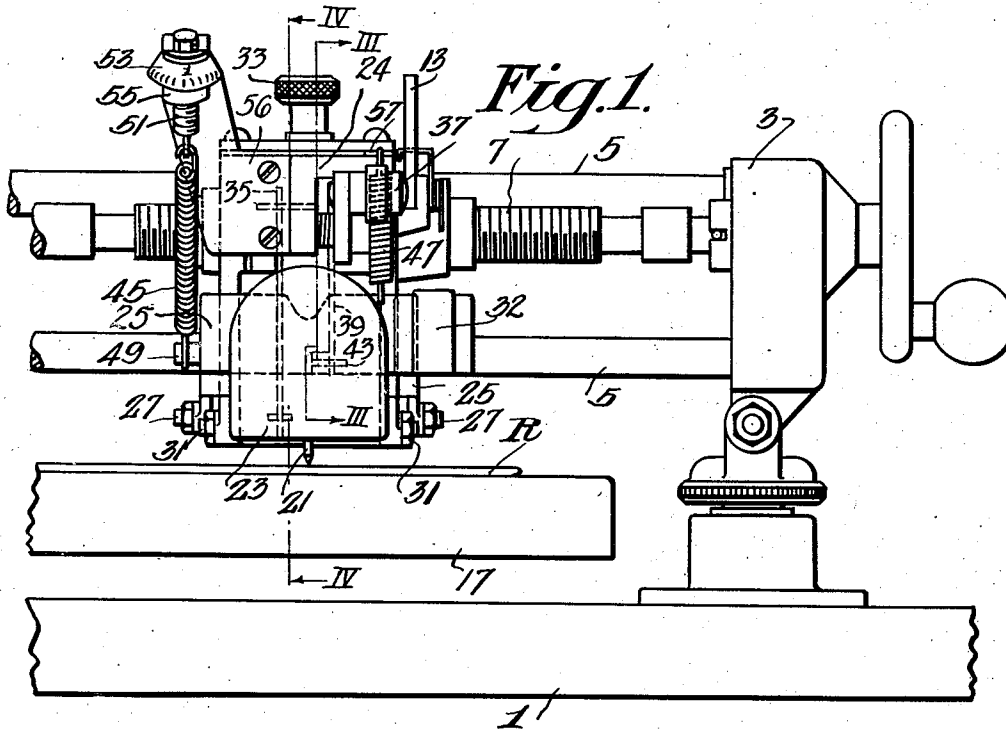
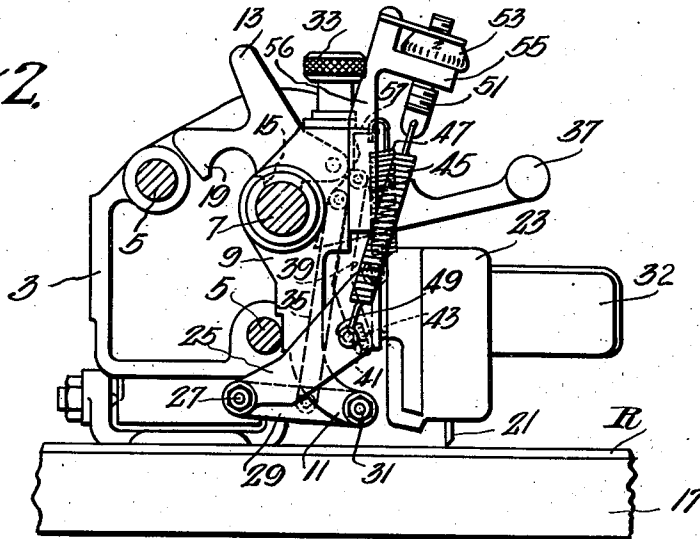
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PHONOGRAPHIC APPARATUS

Filed Nov. 30, 1939

2 Sheets-Sheet 1

Fig. 2.



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Sept. 9, 1941.

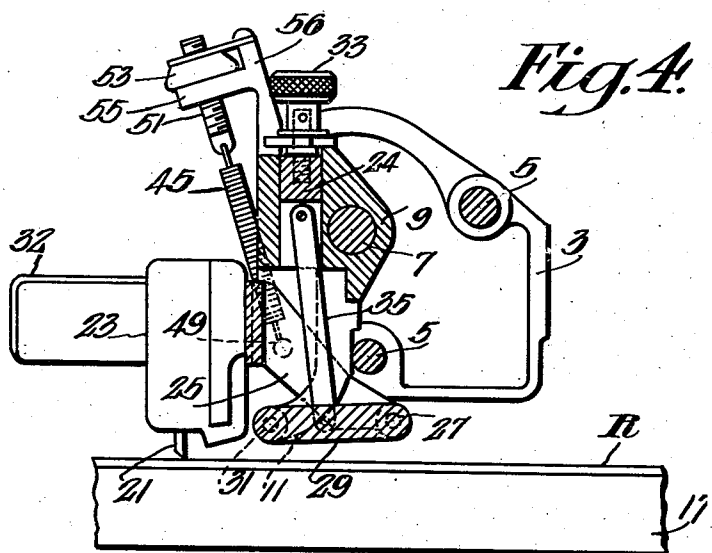
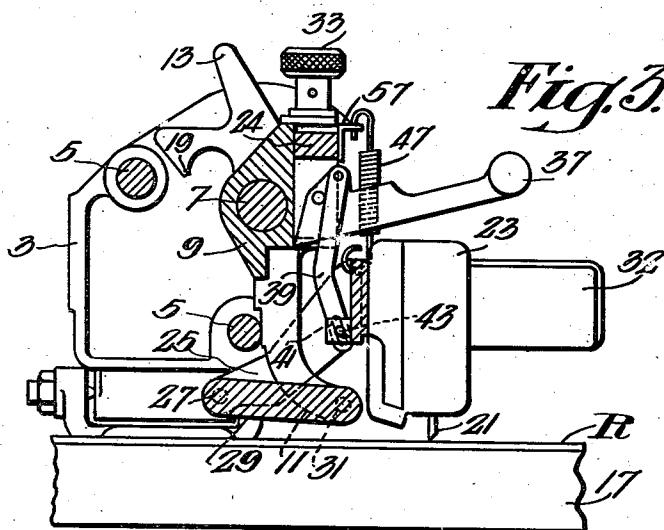
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UNITED STATES PATENT OFFICE

2,255,218

PHONOGRAPHIC APPARATUS

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Application November 30, 1939, Serial No. 306,833

7 Claims. (Cl. 274—9)

This invention relates to phonographic apparatus, and more particularly to recording apparatus used in recording upon blank discs or cylinders which may be played back immediately after recording, the present invention being in the nature of an improvement upon that disclosed in the copending application of Harold J. Hasbrouck, Jr., Serial No. 256,270, filed February 14, 1939, and assigned to Radio Corporation of America.

In the said copending application, there is disclosed a recording machine wherein the recording head is carried on a pivotally mounted cradle and is fed across the record by a feed screw which may be driven from the turntable spindle, for example, damping means being provided in conjunction with the aforesaid cradle to prevent substantial vibration or oscillation of the cutter head in a direction normal to the surface of the record with which the cutting stylus is in contact. An adjustable spring is provided for regulating the depth of cut of the cutting stylus.

While a construction of this sort affords very good results, the load of the cutter head on the supporting bearing therefor is relatively great and the cutter head does not oscillate as freely on its bearings as is sometimes desirable, particularly since there is an unequal load on the two pivot bearings, so that best results can not always be obtained with a construction of this sort.

The primary object of my present invention is to provide an improved cutter head suspension for recording machines wherein the aforementioned difficulty is obviated.

More particularly, it is an object of my present invention to provide, in phonographic apparatus as aforesaid, an improved cutter head suspension wherein the load on the cutter head mounting bearings will be balanced, or substantially equalized, thereby providing freedom for oscillatory movement of the cutter head.

Another object of my invention is to provide an improved cutter head suspension by means of which more delicate adjustment of the depth of the needle cut will be possible.

A further object of my present invention is to provide an improved cutter head suspension, as above described, which can be readily adapted to existing recording machines.

It is also an object of my present invention to provide an improved cutter head suspension, as aforesaid, which is very simple in construction and highly efficient in use.

In accordance with my present invention, I suspend the floating cutter head mounting bracket or cradle by means of two separated tension springs. The tension of one spring is preferably made adjustable by means of a suitable screw and thumb nut to control the depth of the cut groove, while the assisting spring is preferably of fixed tension, although it may also be made adjustable as to tension if desired.

In any case, the tension of the assisting spring is weaker than that of the spring which controls the cutting depth. It follows, therefore, that the two springs cannot have the same periods, and therefore the control of the vertical oscillation of the cutter and its carriage passes automatically from one spring to the other. At the same time, the use of two springs, one on each side of the cutter head, balances the load on the cutter head mounting bearings.

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 drawings in which

Figure 1 is a front elevation of a portion of a recording machine showing my improved cutter head suspension applied thereto,

Figure 2 is an end elevation as seen from the left in Fig. 1,

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

Figure 4 is a sectional view taken on the line IV—IV of Fig. 1.

Referring more particularly to the drawings, wherein similar reference characters designate corresponding parts throughout, there is shown a motor board 1 upon which is pivotally mounted for universal movement thereon a frame 3 carrying a pair of guide rods 5 and a rotatable feed screw 7 on which a carriage 9 is slidably and rotatably mounted, the carriage 9 being provided with a pair of downwardly and forwardly extending arms 11. The carriage 9 also pivotally carries a latch lever 13 which is formed with a half nut 15 adapted to cooperate with the feed screw 7 whereby the carriage 9 and the parts carried thereby may be fed radially across a record blank R supported on a suitable turntable 17. The latch lever 13 is also provided with a latching toe 19 which is adapted to engage the upper guide rod 5 when the carriage 9 and

the latch lever 13 are rotated on the feed screw 7 a sufficient distance in a counter-clockwise direction, as viewed in Fig. 2.

Arranged to cooperate with the record blank R is the cutting stylus 21 of a cutter head 23 to which is fixed a rearwardly extending cradle 25 pivotally mounted on a pair of spaced pivot bearings 27. The pivot bearings 27 extend in opposite directions, as clearly shown in Fig. 1, and are carried by a pair of parallel links 29 which, in turn, are pivotally mounted on a pair of spaced, cooperating pivot bearings 31 carried by the arms 11 of the carriage 9, the carriage 9 thus constituting a supporting member for the cutter head 23, its cradle 25, the bearings 27, the links 29 and the bearings 31. A damping member 32 of any suitable construction is preferably provided for the cutter head 23 by securing it to the cradle 25, for example.

Slidably mounted within the carriage 9 for vertical movement thereon is a suitable block 24 which may be adjusted in a vertical direction by means of a thumb screw 33, a link 35 connecting the aforesaid block with the links 29 to permit adjustment of the assembly in a direction normal to the surface of the record R. In addition, there is pivotally mounted on the aforesaid block an operating handle 37 which pivotally carries a connecting link 39. The link 39 has a slot 41 formed on its lower end to receive a pin 43 on the cradle 25. To raise the cutting stylus 21 from record blank R, it is merely necessary to raise the handle 37 whereupon the play in the slot 41 is first taken up, after which the end of the slot engages the pin 43 to raise the cradle 25 and the cutter head 23. Lowering of the handle 37 will, of course, bring the cutter head 23 back into engagement with the record blank R.

To balance the load of the cutter head 23 on the pivot bearings 27 and 31, I have provided a pair of tension springs 45 and 47. The spring 45 has one end fixed to a pin 49 on the cradle 25 and its other end secured to a screw 51 which is adjustable by means of a thumb nut 53 on an extension 55 of a bracket 56 fixed to the block 24. Adjustment of the thumb nut 53 varies the tension in the spring 45 and thereby more or less counterbalances the cutter head 23 to regulate the depth of cut of the cutting stylus 21. The spring 47 is preferably of a fixed, predetermined tension and has its lower end also secured to the cradle 25 and its upper end secured to a tab or extension 57 on the carriage 9. The springs 45 and 47 balance the load on the bearings 27 and 31 and insure a substantially equal load on the pivot bearings. By providing the spring 47, it is possible to make the spring 45 weaker than is customary and therefore a finer adjustment of the cutting depth of stylus 21 is possible. Moreover, by making the tension of the fixed spring 47 weaker than the tension of the spring 45, it is obvious that the two springs will not have the same periods, and the control of the vertical oscillations of the cutter carriage will

automatically pass from the spring 45 to the spring 47.

Although I have shown and described but one embodiment of my invention, I am fully aware that other modifications are possible, and 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.

1. In phonographic apparatus, the combination of a supporting member, a pivotal mounting thereon including spaced bearing parts, a sound translating device pivotally carried by said mounting, and means comprising a plurality of resilient members substantially equalizing the load of said pick-up on said bearing parts.

2. In phonographic apparatus, the combination of a supporting member, a pivotal mounting thereon including spaced bearing parts, a sound translating device pivotally carried by said mounting, and a pair of springs substantially equalizing the load of said pick-up on said bearing parts.

3. In phonographic apparatus, the combination of a supporting member, a pivotal mounting thereon including spaced bearing parts, a sound translating device pivotally carried by said mounting, and a pair of tension springs substantially equalizing the load of said pick-up on said bearing parts, said springs each having a different tension.

4. In phonographic apparatus, the combination of a supporting member, a pivotal mounting thereon including spaced bearing parts, a sound translating device pivotally carried by said mounting, a pair of tension springs substantially equalizing the load of said device on said bearing parts, and means for adjusting the tension of at least one of said springs.

5. In phonographic apparatus, the combination of a supporting member, a pivotal mounting thereon including spaced bearing parts, a sound translating device pivotally carried by said mounting, a pair of tension springs substantially equalizing the load of said device on said bearing parts, one of said springs having a fixed tension, and means for adjusting the tension of the other of said springs at will.

6. The invention set forth in claim 5 characterized in that the spring having a fixed tension is weaker than the adjustable spring.

7. In phonograph apparatus, the combination of a supporting member, a plurality of pivot bearings carried by said member in spaced relation to each other, a cradle pivotally carried by said bearings, a sound translating device carried by said cradle, and a pair of tension springs connecting said cradle to said supporting member, one of said springs being located adjacent one of said bearings and the other of said springs being located adjacent another of said bearings, the tensions of said springs being of such a magnitude as to substantially equalize the load on each of said bearings.

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