July 11, 1933. R. C. BURT 1,917,633

NONVIBRATORY SUPPORT OF RECORD TABLE

Filed May 19, 1930

Fig. 1

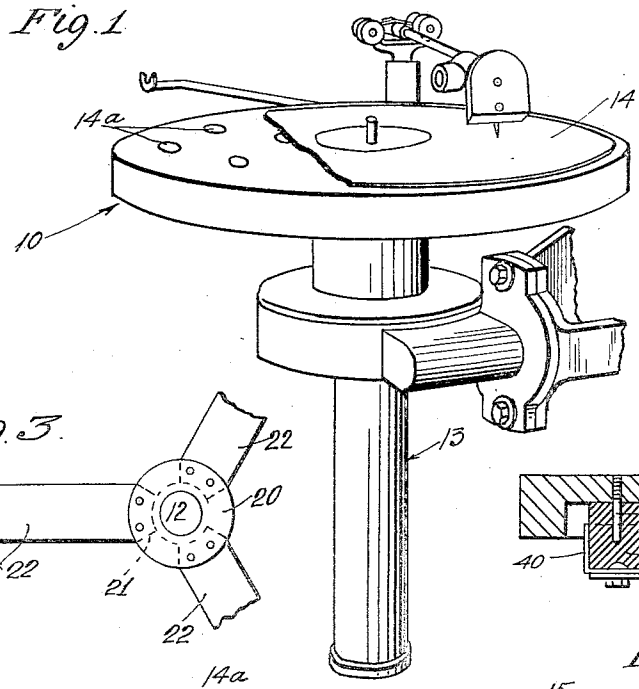


Fig. 3.

Fig. 5.

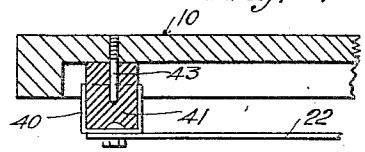


Fig. 2.

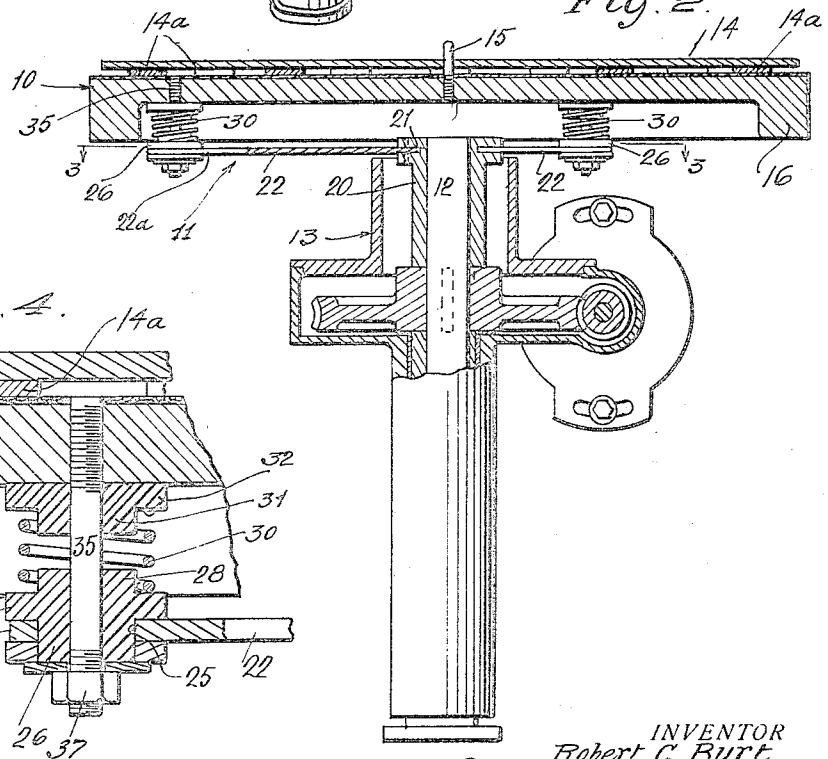


Fig. 4.

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NONVIBRATORY SUPPORT OF RECORD TABLE

Application filed May 19, 1930. Serial No. 453,574.

This invention relates generally to sound reproducing apparatus of the type utilizing mechanical disk records, and is more particularly concerned with a vibration absorbing mounting for the rotating record table of such apparatus.

Sound reproducing apparatus is designed with a particular view toward reducing mechanical vibrations to an absolute minimum, as such vibrations when transferred to the rotating record disk cause distortions and serious irregularities in sound reproduction. It has been found to be an extremely difficult problem, however, to so balance and cushion the apparatus that all such vibrations are effectively eliminated. To reduce the irregularities of sound reproduction introduced by such vibrations, it has been common to go to such lengths as mounting the record table separately from the balance of the apparatus; the table being driven in such cases, for instance, by means of a flexible drive member.

The primary object of my invention is to provide a mounting for the record table of sound reproducing apparatus which is of such a nature that all vibrations set up in the reproducing apparatus are effectively absorbed before reaching the record table.

My improved table mounting includes resilient means for absorbing all vibrations of the reproducing apparatus before transmission to the record table, and the table is made relatively quite heavy so that whatever feeble vibrational energy is actually transmitted through my resilient mounting is not sufficient to set-up the slightest perceptible vibration of the table.

The invention itself will be best understood from the following detailed description of a present preferred embodiment thereof, reference for this purpose being had to the accompanying drawing, in which:

Fig. 1 is a perspective view of a record table and part of the reproducing apparatus on which it is mounted;

Fig. 2 is a vertical section taken medially through the record table and my resilient table mounting;

Fig. 3 is a horizontal section taken on line 3—3 of Fig. 2;

Fig. 4 is an enlarged detail in section taken from Fig. 2, and

Fig. 5 shows a variational simplified mounting for the table.

Referring now to the drawing, the numeral 10 designates the record table, driven through my improved resilient mounting, generally indicated at numeral 11, by means of a concentric vertical drive shaft 12 journaled in the frame 13 of the sound reproducing apparatus, shaft 12 being understood to be driven by any usual or convenient drive means, not shown. The driving means for shaft 12 and the mounting for frame 13 on the reproducing apparatus is preferably embodied, however, as disclosed in my companion application entitled "Sound reproduction talking motion picture," filed March 15, 1930, Ser. No. 436,141.

The sound record 14 is rested on a plurality of circularly arranged resilient disks or cushions 14*a*, of sponge rubber or like material, applied to the upper surface of table 10, and is centered thereon by means of a usual centering pin 15.

Table 10 is made quite heavy, being formed of a cast iron plate of substantial thickness, and having a depending marginal flange 16 for added weight. The table is made of considerable weight so that whatever feeble vibratory energy may actually be transmitted through the resilient mounting will not set up vibrations of the table.

Applied to the upper end of drive shaft 12 is a tubular member 20, the head of which is formed with an outwardly facing annular slot 21 into which is taken and secured the inner ends of radial, table-supporting arms 22. Radial arms 22 rather than a full disk are here preferably utilized, for the added resiliency gained in such a structure.

The record table is resiliently supported by the outer ends of arms 22, as shown best in Figure 4. Extending downwardly through a hole 25 in each of the outer ends 22*a* of arms 22 is the lower end of a rubber cushion 26, cushion 26 being provided with a medial flange 27 which rests at its lower side on the

upper surface of arm 22. Encircling the upper end 28 of each of the cushions 26 and bearing downwardly on the upper side of cushion-flange 27 is a coil spring 30, which spring also encircles at its upper end the lower end of a rubber cushion 31 mounted coaxially with cushions 26, and having a head flange 32 against which spring 30 upwardly bears. The under side of table 10 rests on cushions 31.

Studs 35 set into table 10 and extending downwardly therefrom concentrically through cushions 31 and 26, which have a relatively tight fit therewith, serve, in cooperation with nuts 37 provided on the lower ends thereof, to clamp the assembly together with proper compression for the desired resilient action of the springs 30; and also, due to capability of transverse bending, provide lateral resiliency in the mounting. Lateral resiliency is also gained in the medium of cushions 26 and 31.

Cushions 31, springs 30, cushions 26 and the resilient radial arms 22, constitute the resilient means for absorbing vertical vibration, or vibrations longitudinally of shaft 12.

The table is thus seen to be both laterally and longitudinally insulated from vibrational energy in its driving shaft; and its weight being sufficient, the table is found in practice to rotate steadily without the slightest perceptible vibration, even though there may be vibrations of considerable amplitude and of several distinctly perceptible frequencies in the drive shaft or frame parts of the apparatus.

Fig. 5 shows a simplified form of cushion mounting for the table on the radial arms 22, which I may utilize in certain situations. In this case the outer ends of the arms 22 support cups 40 within which are carried resilient cushions 41 of sponge rubber or the like, and on the upper ends of which rest the table 10, studs 43 extending from the table down into the cushions for the purpose of centering the table with reference to shaft 12.

It will be understood the drawing and description are to be considered merely as illustrative of and not restrictive on the broader claims appended hereto, for various changes in design, structure and arrangement may be made without departing from the spirit and scope of said claims.

I claim:—

1. In sound reproducing apparatus, the combination of a record table, a driving shaft therefor, and a vibration absorbing mounting for the table on the drive shaft; said mounting comprising a plurality of resilient elements applied to the under side of the record table at points offset from the table axis, said elements yielding both transversely of and in the plane of rotation of the record table, and resilient means supporting said resilient elements from the driving shaft.

2. In sound reproducing apparatus, the combination of a record table, a driving shaft therefor, and a vibration absorbing mounting for the table on the drive shaft; said mounting including a plurality of arms extending radially outward from the driving shaft and resiliently supporting the record table at their outer ends.

3. In sound reproducing apparatus, the combination of a record table, a driving shaft therefor, and a vibration absorbing mounting for the table on the drive shaft; said mounting including a plurality of arms extending radially outward from the driving shaft, and resilient elements applied to the outer ends of said arms and resiliently supporting the record table.

4. In sound reproducing apparatus, the combination of a rotatable record table, a vertical driving shaft concentric therewith, and a vibration absorbing mounting for the table on the drive shaft; said mounting comprising a resilient supporting structure extending horizontally from said drive shaft and resiliently supporting the record table at points offset from its axis of rotation.

5. In sound reproducing apparatus, the combination of a rotatable record table, a vertical driving shaft concentric therewith, and a vibration absorbing mounting for the table on the drive shaft; said mounting comprising a resilient supporting structure extending horizontally from said drive shaft, and resilient elements applied to said supporting structure and resiliently supporting the record table at points offset from its axis of rotation.

6. In a sound record carrying mechanism, a driving shaft, a record carrying table concentric with and adapted to be supported and driven from said shaft, and a flexible connective element interposed between the shaft and table and capable of flexing both in the direction of the plane of the table and in a direction transverse of said plane, said record carrying table having sufficient inertia to cause vibrations of the driving shaft to be absorbed in said flexible connective element with substantially no vibratory motion of the record carrying table.

In witness that I claim the foregoing I have hereunto subscribed my name this 24 day of April, 1930.

ROBERT C. BURT.